Devil's Gate Reservoir Sediment Removal and Management Project Final Environmental Impact Report (FEIR)

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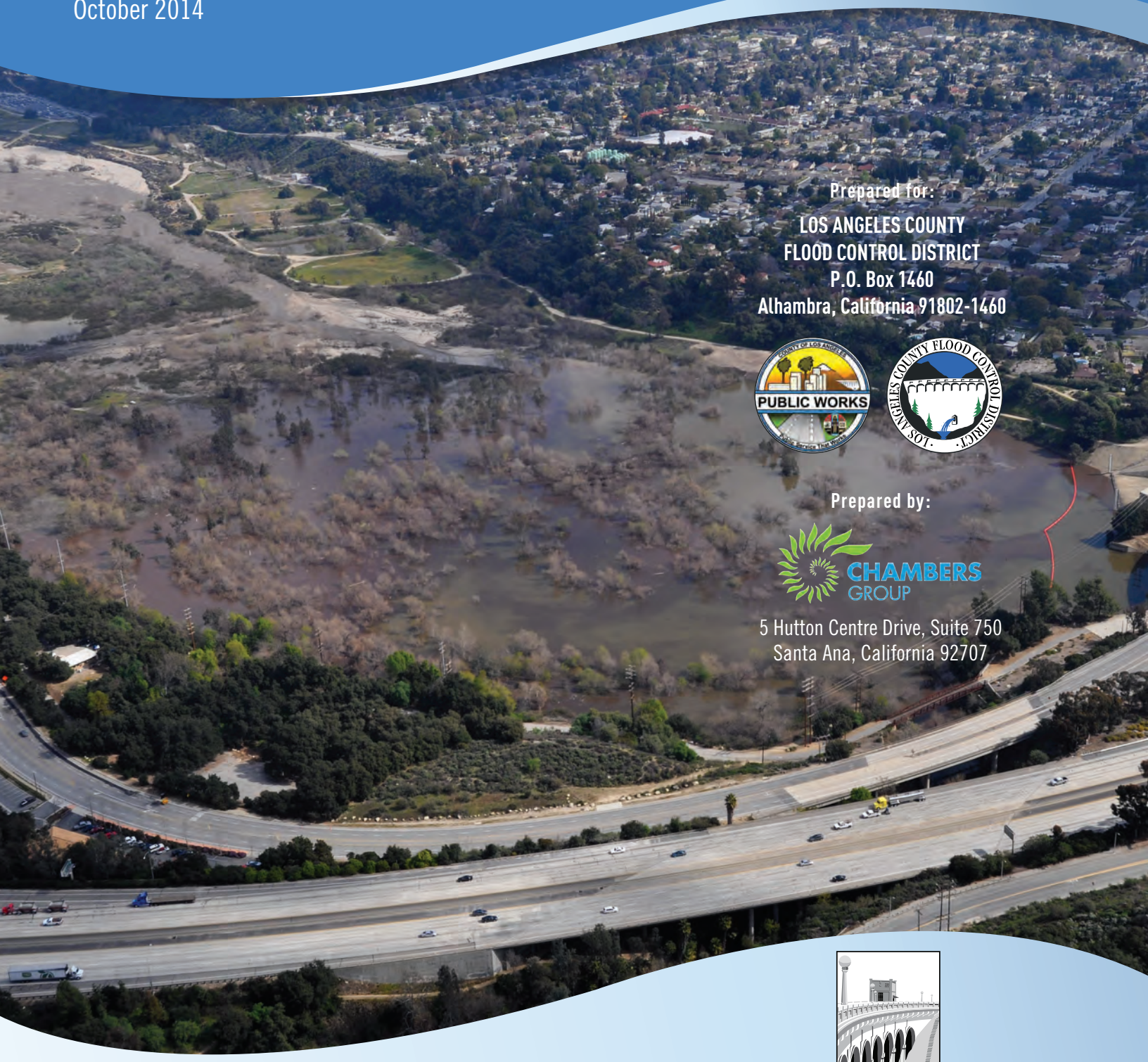

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FINAL ENVIRONMENTAL IMPACT REPORT

DEVIL'S GATE RESERVOIR SEDIMENT REMOVAL AND MANAGEMENT PROJECT PASADENA, CA (LOS ANGELES COUNTY)

Prepared for:

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ACRONYMS AND ABBREVIATIONS

ac-ft	acre-feet
amsl	above mean sea level
ANF	Angeles National Forest
AP Zone	Alquist-Priolo Earthquake Fault Zone
APP	Accumulated Precipitation Procedure
AQMP	Air Quality Management Plan
ASTs	aboveground storage tanks
ASTM	American Society of Testing and Materials
AWD	Altadena West Drain
BDG	Below Devil's Gate
BFW	Below Flint Wash
bgs	below ground surface
Board	County of Los Angeles Board of Supervisors
BMPs	Best Management Practices
BP	before present
Caltrans	California Department of Transportation
Cal/EPA	California Environmental Protection Agency
CAL/OSHA	California Occupational Safety and Health Administration
CARB	California Air Resources Board
CCR	California Code of Regulations
CDFW	California Department of Fish and Wildlife
CDMG	California Department of Conservation, Division of Mines and Geology
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Responsibility, Compensation, and Liability Act
CESA	California Endangered Species Act
cfs	cubic feet per second
CHBI	California Historic Bridge Inventory

CHL	California Historical Landmarks
CHHSL	California Human Health Screening Level
CHRIS	California Historic Resources Information System
CNDDB	California Natural Diversity Database
CNEL	Community Noise Equivalent Level
CO	carbon monoxide
COC	chemicals of concern
COPCs	chemicals of potential concern
CRHR	California Register of Historical Resources
CUPA	Certified Unified Program Agencies
CWA	Clean Water Act
cy	cubic yards
DDE	design debris event
DO	dissolved oxygen
DSOD	California Department of Water Resources Division of Safety of Dams
DTSC	Department of Toxic Substances Control
DWR	Department of Water Resources
EDR	Environmental Data Resources, Inc
EMI	Emissions Inventory Data
EPA	U.S. Environmental Protection Agency
ETI	Equestrian Trails, Inc.
EIR	Environmental Impact Report
FAST	Flow-Assisted Sediment Transport
FEMA	Federal Emergency Management Agency
FID	Facility Inventory Database
FUDS	Formerly Used Defense Sites
GHG	greenhouse gas
GPS	global positioning system

HHMD	Health Hazardous Materials Division
HWP	Hahamongna Watershed Park
HPDF	Historic Property Data File
HWPMP	Hahamongna Watershed Park Master Plan
IMP	Interim Measures Project
IS	Initial Study
JPL	Jet Propulsion Laboratory
LACDPW	Los Angeles County Department of Public Works
LACFCD	Los Angeles County Flood Control District
LAFD	Los Angeles Fire Department
LARWQCB	Los Angeles Regional Water Quality Control Board
LOS	Level of Service
LQG	Large Quantity Generator
LUST	Leaking Underground Storage Tank
MBMU	Multi-Benefit/Multi-Use
MCE	Maximum Credible Earthquake
MCL	maximum contaminant level
mg/L	milligrams per liter
MMRP	Mitigation Monitoring and Reporting Program
MOA	Memorandum of Agreement
MRZ	Mineral Resource Zone
NAHC	Native American Heritage Commission
NASA	National Aeronautics & Space Administration
NEPA	National Environmental Policy Act
NFL	National Football League
NO_2	nitrogen dioxide
NOD	Notice of Determination
NOI	Notice of Intent

NOP	Notice of Preparation
NO_X	nitrous oxide
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NRHP	National Register of Historic Places
O_3	ozone
OHP	Office of Historic Preservation
OS	Open Space
OSHA	Occupational Safety and Health Administration
PA	National Historic Preservation Act
PA	Participating Agency
PCBs	polychlorinated biphenyls
PCE	tetrachloroethene
pga	peak horizontal ground acceleration
PHI	California Points of Historical Interest
PM_{10}	particulate matter
Porter-Cologne	Porter-Cologne Water Quality Control Act
PWP	Pasadena Department of Water and Power
RCRA	Resource Conservation and Recovery Act
RSL	Regional Screening Level
RWQCB	Regional Water Quality Control Board
SAA	Streambed Alteration Agreement
SCAB	South Coast Air Basin
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
SCCIC	South Central Coastal Information Center
SCE	Southern California Edison
SEA	Significant Ecological Area

SLIC	Spills, Leaks, Investigation, and Cleanup
SO_2	sulfur dioxide
SPS	Sediment Placement Site
SUSMP	Standard Urban Storm Water Mitigation Plan
SVOCs	semi-volatile organic compounds
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TCE	trichloroethene
TDS	total dissolved solids
TMDL	total maximum daily loads
TPH	total petroleum hydrocarbon
TRTP	Tehachapi Renewable Transmission Project
TWLTL	two-way left turn lane
UCLA	University of California, Los Angeles
UDG	Upper Devil's Gate
U.S.	United States
USACE	U.S. Army Corps of Engineers
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UST	underground storage tank
VOCs	volatile organic compounds
WIP	Well Investigation Program
WDS	Waste Discharge System
WQO	water quality objectives
WWECP	Wet Weather Erosion Control Plan

EXECUTIVE SUMMARY

E.S.1 INTRODUCTION

This Final Environmental Impact Report (EIR) has been prepared to evaluate and inform the general public about the potential environmental effects that may result from the proposed Devil's Gate Reservoir Sediment Removal and Management Project (Proposed Project). The goal of the Proposed Project is to restore and maintain flood capacity at Devil's Gate Reservoir to meet its intended level of flood protection for the communities downstream. The Proposed Project involves a comprehensive sediment removal plan which will restore flood capacity and establish a reservoir management system to maintain the flood control capacity of the reservoir. The Proposed Project is the project described in the IS/NOP and presented at the Scoping Meetings held on October 5 and October 15, 2011. In response to comments received during the public review period and in conformance with CEQA Guidelines, several alternatives were developed that meet most of the basic objectives of the project and lessen potentially significant effects of the project. Alternative 3, Configuration D is the Environmentally Superior Alternative. Alternative 3, Configuration D is discussed in Section E.S.6 of this Executive Summary and is described and analyzed in Section 4.6. This document has been prepared in accordance with the California Environmental Quality Act (CEQA) by the Los Angeles County Flood Control District (LACFCD) as the Lead Agency.

E.S.2 PROJECT SUMMARY

E.S.2.1 Proposed Project Location and Setting

The Proposed Project is located in the City of Pasadena, in Los Angeles County, (see Figure ES-1: Proposed Project Location and Vicinity Map). The City of La Cañada Flintridge lies west of the Proposed Project site, and the unincorporated community of Altadena lies east of the Proposed Project site. The Proposed Project site is located within Hahamongna Watershed Park. Hahamongna Watershed Park is owned and operated by the City of Pasadena and includes the Oak Grove area of Hahamongna Watershed Park. Southern California Edison, Southern California Gas Company, Pasadena Water and Power, and the LACFCD hold easements within Hahamongna Watershed Park. Other land uses directly adjacent to the project site include the California Institute of Technology (Caltech)/National Aeronautics and Space Administration (NASA) – Jet Propulsion Laboratory (JPL) to the northwest and east; La Cañada High School and Hillside School and Learning Center to the west; single-family residential uses to the north, east, and south; and the Interstate 210 Foothill Freeway (I-210) to the south.

E.S.2.2 Project Background

Devil's Gate Dam was built in 1920, the oldest dam constructed by the LACFCD, to provide flood protection to the Cities of Pasadena, South Pasadena, and Los Angeles and to promote water conservation efforts. Devil's Gate Dam and Reservoir had an original storage capacity of approximately 7.42 million cubic yards (cy).

The reservoir is designed to attenuate stormwater flows to prevent high flow rates from overtopping the downstream flood control channel. During this process sediment and debris are also trapped behind the dam in the reservoir. Excessive sediment accumulation in the reservoir affects the ability of the outlet works (valves, gates, and spillway) to function correctly and can reduce available reservoir capacity below

Proposed Project Boundary

SCALE=1 inch equals 1 mile

0 0.5 1

Miles

Figure ES-1
Devil's Gate Reservoir Sediment Removal and Management Project
Project Location and Vicinity Map

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20346 - \\Cgi-gisdata01\gis_data\Projects\20000s\20201 - 20400\20346 Devil's Gate EIR\20346 Figure ES-1 Proposed Project Location and Vicinity Map.mxd

that which is necessary for flood control storage or to safely contain future sediment inflow, including the Design Debris Event (DDE). The DDE is the estimated amount of sediment that could flow into the reservoir after the undeveloped portion of the tributary watershed is completely burned and a 50-year design storm event occurs after four years of watershed recovery. The 50-year design storm and the DDE are defined by the Los Angeles County Department of Public Works Hydrology and Sedimentation Manuals, respectively.

The Los Angeles County Flood Control Act (Act) was adopted by the State Legislature in 1915 after a disastrous regional flood took a heavy toll on lives and property. The Act established the LACFCD and empowered it to provide flood protection and water conservation within its boundaries.

A reservoir storage design capacity of two DDEs below the dam's lowest spillway was determined to be the standard acceptable level of risk at Devil's Gate Dam and Reservoir. The DDE volume of capacity is determined using the January 2006 County of Los Angeles Department of Public Works Hydrology Manual and the March 2006 County of Los Angeles Department of Public Works Sedimentation Manual.

LACFCD established the required design capacity at two DDEs to ensure that the reservoir always has sufficient capacity to maintain the level of downstream flood protection. By establishing the design capacity at two DDEs, the reservoir is likely to have sufficient capacity to experience a design level storm, or several smaller but significant debris events, and still maintain capacity of at least one DDE during the lengthy environmental and construction processes to remove the debris. Further, it should be noted that additional criteria in special circumstances related to dam safety may also dictate the need to remove sediment from a reservoir:

- Depending on the structural stability of the dam, the height of sediment against the dam may need to be limited (sediment weighs more than water and increases the forces on the dam during an earthquake).

- The volume of sediment accumulation may also be limited to prevent sediment from blocking valves/operations (if the debris blocks the outlet valves, they cannot be used to regulate storm flows or to empty the dam during an emergency).

Therefore, to minimize flood risk for Devil's Gate Dam and Reservoir, the required reservoir capacity is based on debris control and is 4.0 million cy (two DDEs) below the spillway elevation of 1,040.50 feet.

For more information on the DDE calculations, please review the Hydrology and Sedimentation Manuals at the following locations:

The Hydrology Manual (January 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_Hydrology_Manual/2006%20Hydrology%20Manual-Divided.pdf

The Sedimentation Manual (March 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_sedimentation_manual/Sedimentation%20Manual-Second%20Edition.pdf

The DDE for Devil's Gate Reservoir is approximately 2 million cubic yards (cy). Sediment removal is required to maintain flood control capacity behind the dam. Sediment accumulation has increased dramatically over the past several years as a result of the 2009 Station Fire, the largest fire in recorded

history of the Angeles National Forest (est. 1892) and the 12th largest fire in California since 1933. The Station Fire burned over 160,000 acres, leaving vast areas of the San Gabriel Mountains denuded and susceptible to sediment flows. The fire impacted five of the LACFCD's dams and reservoirs, one of which is Devil's Gate Dam and Reservoir. Approximately 68 percent of the watershed tributary to Devil's Gate Reservoir (approximately 100 percent of the undeveloped portion) was burned, making sediment deposition inevitable during subsequent storm seasons. The storms that occurred in the two wet seasons after the fire increased sediment accumulation in the reservoir by approximately 1,300,000 cy, reducing the available flood control capacity to less than one DDE. In October 2010, the California Division of Safety of Dams (DSOD) recommended removal of sediment buildup behind the dam as well as removal of associated vegetation and tree growth to restore flood control capacity.

LACFCD initiated project planning for a large-scale sediment removal project to remove sediment from the reservoir in 2010. In March 2011, in recognition of stakeholder and environmental concerns, the Los Angeles County Board of Supervisors directed LACFCD to complete an EIR to assess the impacts associated with removing sediment from the project site. Since the EIR would take considerable additional time to complete, LACFCD was also directed to implement interim measures to reduce downstream flood risk until the EIR is completed and a sediment removal project is implemented.

The Interim Measures Project (IMP) is currently underway to reduce downstream flood risk. The IMP includes minor dam modifications to help keep debris from plugging the outlet works and allow for removal of up to 25,000 cy of sediment per year from the dam face until the project associated with the EIR is started. In 2011, 13,000 cy was removed from the dam face and placed at Johnson Field, a nearby unused sports field. In 2012, approximately 1,525 cy of sediment and 419 cy of green waste were removed from the dam face and hauled to Johnson Field and Scholl Canyon Landfill, respectively. In 2013, 1,200 cy of sediment and 12 to 14 loads of green waste were removed from the dam face and hauled to Johnson Field and Scholl Canyon Landfill, respectively.

E.S.2.3 Project Goals and Objectives

The Proposed Project will remove sediment from Devil's Gate Reservoir to restore the design capacity (volume for two DDEs below the spillway elevation of 1,040.5 feet) and establish a reservoir management system to maintain the flood control capacity of the reservoir.

Primary project objectives that were developed during the Initial Study/Notice of Preparation (IS/NOP) phase of CEQA include:

1. Reducing flood risk to the communities downstream of the reservoir adjacent to the Arroyo Seco by restoring reservoir capacity for flood control and future sediment inflow events;

2. Supporting sustainability by establishing a reservoir configuration more suitable for routine maintenance activities including reservoir management;

3. Removing sediment in front of the dam to facilitate an operational reservoir pool to reduce the possibility of plugging the outlet works with sediment or debris during subsequent storm events;

4. Removing sediment placed at Johnson Field during the Devil's Gate Reservoir IMP;

5. Supporting dam safety by removing sediment accumulated in the reservoir in a timely manner to ensure the ability to empty the reservoir in the event of a dam safety concern; and

6. Delivering the sediment to placement or reuse facilities that are already prepared and designated to accept such material without native vegetation and habitat removal.

E.S.2.4 Proposed Project Description, Configuration A

Sediment Removal Phase

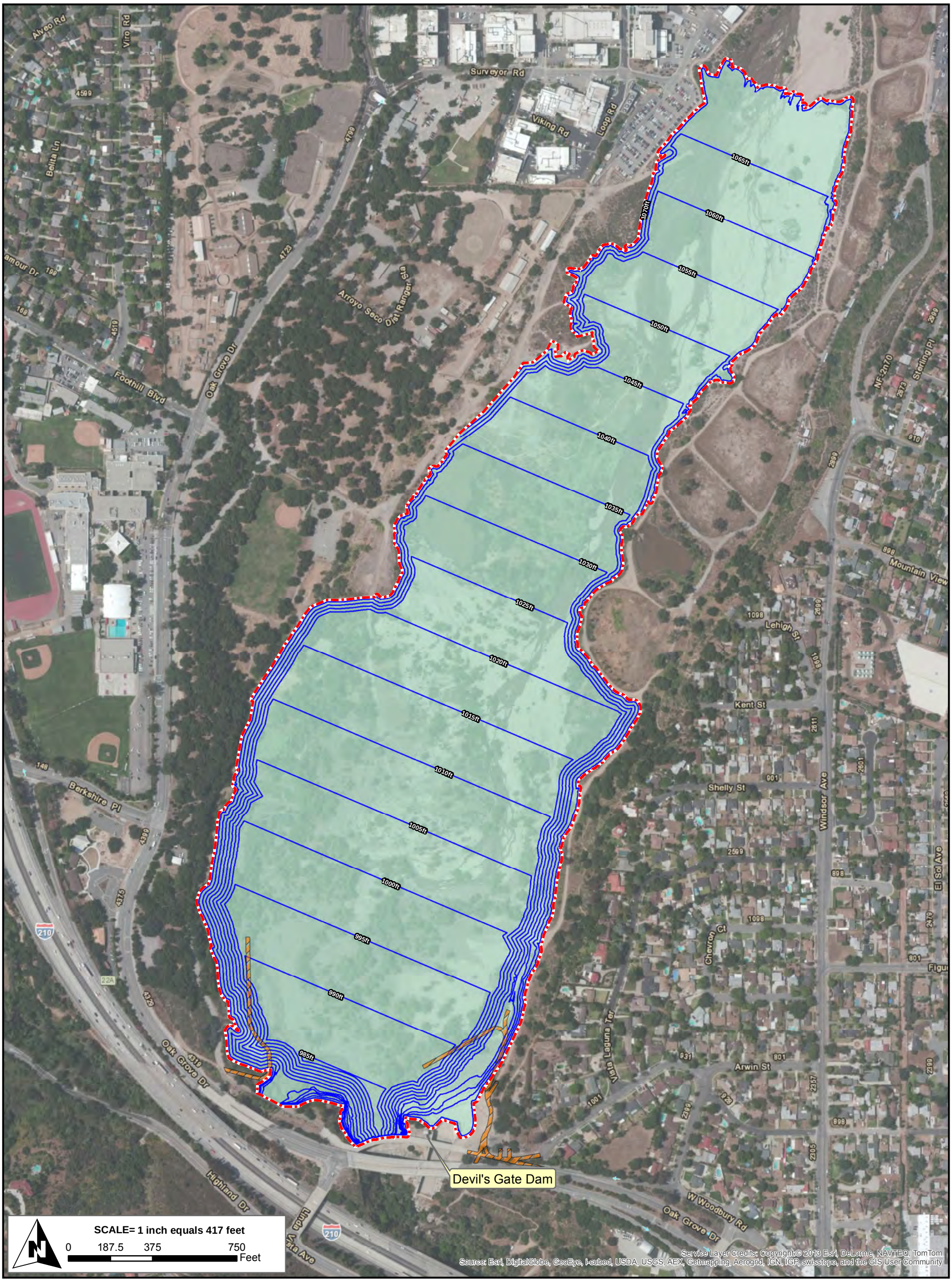
Proposed Project excavation activities will take place within the Proposed Project's excavation limit boundaries (see Figure ES-2, Proposed Project Excavation and Entire Configuration A Management Area, Option 1). The proposed excavation will remove approximately 2.9 million cy of the existing excess sediment in the reservoir in addition to any additional sediment that accumulates from storm flows throughout the duration of the project.

At the time the NOP was released, an area of 178 acres was considered for the Proposed Project; this has been refined to an area of approximately 120 acres. In addition to the sediment excavated as part of the Proposed Project, sediment stockpiled at Johnson Field from the IMP will also be removed. Excavation areas will not include the Oak Grove area of Hahamongna Watershed Park, the area of the reservoir above the northern end of excavation limits, or the City of Pasadena's spreading grounds on the east side of the reservoir.

Sediment Disposal

Excavated sediment will be trucked offsite to existing disposal site locations which are currently available to accept the sediment. Trucks will travel and place sediment at one of the primary disposal site locations, the Waste Management Facility in Azusa, the Vulcan Materials Reliance Facility in Irwindale, or the Manning Pit Sediment Placement Site (SPS) in Irwindale. Secondary disposal sites are the facilities in Sun Valley (Sheldon Pit, Sun Valley Fill Site, Bradley Landfill, and Boulevard Pit). Over the life of the Proposed Project sediment removal phase, it is estimated that the eastern disposal sites will be used from 80 to 100 percent of the time. Use of the Sun Valley sites is estimated to occur from 0 to 20 percent of the time throughout the Proposed Project sediment removal phase. Removed vegetation and organic debris will be hauled to Scholl Canyon Landfill located in the City of Glendale.

The trucks expected to be used for sediment transport are double dump trucks which have an estimated capacity of 16 to 20 cy of sediment. The trucks are anticipated to haul an estimated 7,650cy per day. Removal of the sediment, vegetation, trees, and organic debris is expected to require an average of 50 truck round trips per hour, with an estimated maximum of 425 truck round trips per day during excavation activities.



Proposed Project Boundary

Access Road

Reservoir Management Area

Sediment Removal Excavation Limit

Figure ES-2

Excavation Area and Configuration A Management Area, Option 1

Proposed Project - Configuration A

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\\Cgi-gisdata01\gis_data\Projects\20000s\20201 - 20400\20346 Devil's Gate EIR\20346 Figure ES-2 Proposed Project, Configuration A Excavation Area and Configuration A Management Area, Option 1.mxd

Proposed Project Site and Access

Trucks will enter the reservoir via the upgraded reservoir access road at the east side of the reservoir. Trucks will exit the reservoir on the west side via an existing access road. Rehabilitation and minor improvements need to be completed to the existing west side reservoir access road prior to its use. As part of the Proposed Project, the existing western access road and the upgraded eastern access road will be improved with new ramps to allow for truck traffic in and out of the reservoir. The eastern access road will allow for one-way truck traffic, and the western access road will also allow for one-way truck traffic. The eastern access road will be upgraded to allow for traffic to enter the reservoir directly from Oak Grove Drive as opposed to using La Cañada Verdugo Road. The existing western access road is currently unpaved, and the portion of this access road from below the bike path to the reservoir will remain unpaved. The portion of this access road from Oak Grove Drive to the West Rim Trail bike path will need to be widened and paved. Empty trucks will be staged within the Proposed Project site. Trucks will access the Proposed Project site from I-210 by exiting at Windsor Avenue/Arroyo Boulevard, turning north at Windsor Avenue, turning left onto northbound Oak Grove Drive, then entering the reservoir utilizing an upgraded ramp on the east side of the reservoir.

Loaded trucks will exit the reservoir on the upgraded existing west side access road, turn right onto northbound Oak Grove Drive, then left onto westbound Berkshire Place, and then to I-210 eastbound to disposal sites in Azusa and Irwindale or to I-210 westbound to disposal sites in Sun Valley. For vegetation, tree, and organic material disposal at Scholl Canyon Landfill, the trucks will follow I-210 east to State Highway 134 (SR-134), and exiting on Scholl Canyon Road (see Figures 2.5-2 through 2.5-4).

Project Schedule

Construction for the Proposed Project is expected to occur over the course of approximately 5 years beginning Summer 2015. Excavation and associated activities within the reservoir area are expected to take place during drier months, from April to December, Monday through Saturday (except on holidays), as weather permits. During dry years, work could potentially start earlier and/or continue later. Onsite excavation activities will take place Monday through Friday between the hours of 7:00 a.m. and 6:00 p.m. Standard Time and between 7:00 a.m. and 7:00 p.m. Daylight Savings Time and on Saturday between 8:00 a.m. and 5:00 p.m. Removal of sediment and organic materials offsite is also expected to take place during these hours.

Reservoir Management Phase

Reservoir Management Phase is expected to start after the completion of the main Sediment Removal phase. The purpose of the proposed annual management activities, described below, is to reduce buildup of sediment in the reservoir management area and eliminate or substantially reduce the occurrence of another large-scale sediment removal project in the future. Reservoir management will take place under one of two management options. Both options involve the same management activities and methods described below but with different management areas.

Option 1 – Entire Configuration A Management Area

Management Area

The management area for Option 1 is shown in Figure ES-2 and involves the entire Proposed Project site, which includes an area of approximately 120 acres.

Management Activities

The reservoir will be managed through a combination of: FASTing, vegetation maintenance, and sediment excavation/trucking offsite.

Flow-Assisted Sediment Transport (FAST): During rain events (during the winter), with the dam gate open, natural flows will pass finer grain size sediment through the reservoir and downstream of the dam. This is referred to as a FAST operation. FAST operations have been routinely used at Devil's Gate Reservoir and result in relatively small amounts of finer grained sediment passing through the reservoir. A FAST operation uses storm runoffs throughout the storm season to flush the sediment out of the reservoir. It is anticipated that the majority of these FAST operations will be similar to historic FAST operations and that similar volumes of sediment will pass through the reservoir and into the Arroyo Seco.

Vegetation Maintenance: Vegetation within the reservoir configuration will be mowed or removed and grubbed annually. These activities will occur Monday through Friday over an estimated three-week period in the late summer or early fall.

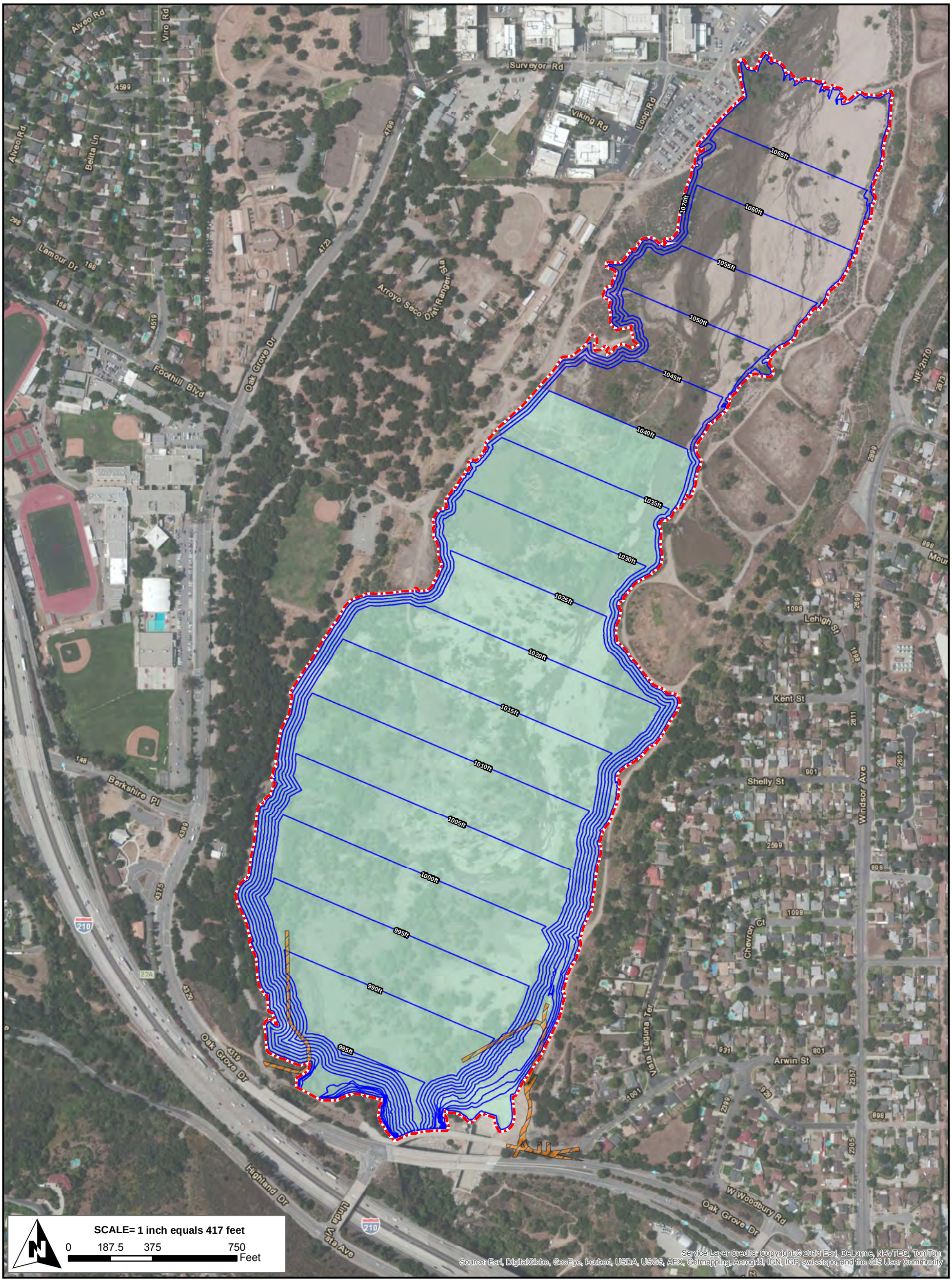
Sediment Excavation/Trucking Offsite: Depending on the efficiency of the FAST operations, some mechanical excavation and trucking offsite may be required for removal of accumulated sediment. Sediment excavation/trucking offsite will use the same methods and trucking routes as under the sediment removal phase. It is estimated, based on past storm events, that sediment excavation/trucking offsite will be required to typically remove 13,000 cy of sediment annually. Based on an estimated removal of 4,800 cy per day, it is expected this will occur over an estimated two-week period, Monday through Friday. This removal activity will take place during the late summer/early fall following vegetation maintenance.

Moderately large sediment deposits have the potential to occur during a storm season, but it is anticipated that even with this type of event the newly deposited sediment could be removed in one season. A moderately large sediment removal event, anticipated to involve around 170,000 cy, could take place over an estimated 12-week period during the late summer/early fall following the vegetation maintenance.

Option 2 – Reduced Management Area

Management Area

The management area for Option 2 is shown in Figure ES-3, Proposed Project, Configuration A Excavation Area and Reduced Management Area, Option 2. This management option will involve a total reservoir management area of approximately 91 acres.



Proposed Project Boundary

Access Road

Reservoir Management Area

Sediment Removal Excavation Limit

Figure ES-3

Excavation Area and Reduced Management Area, Option 2

Proposed Project - Configuration A

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\\Cgi-gisdata01\gis_data\Projects\20000s\20201 - 20400\20346 Devil's Gate EIR\20346 Figure ES-3 Proposed Project, Configuration A Excavation Area and Reduced Management Area, Option 2.mxd

Management Activities

Under Option 2, the reservoir will involve the same management activities using the same methods described above for Option 1.

Proposed Project Management Duration

The proposed annual management routine to remove all sediment within the reservoir management footprint will help reduce sediment buildup in the reservoir management area. A large-scale sediment removal project will be required if a significant amount of sediment accumulates in the reservoir despite the reservoir management activities. This is not anticipated for a period of over two decades unless significant major fires and storms occur within the watershed. If future reservoir conditions threaten dam operations, LACFCD will initiate the planning process for a new large-scale sediment removal project. Part of this planning will involve utilizing the CEQA process to evaluate and determine the appropriate level of environmental document required for the future project.

E.S.3 AREAS OF CONTROVERSY/ISSUES TO BE RESOLVED

Section 15123 (b)(2) of the *CEQA Guidelines* requires that an EIR Executive Summary identify areas of controversy known to the lead agency, including issues raised by other agencies and the public.

Community input was gathered from project stakeholders, and comment was invited on the scope and content of the EIR. Issues and concerns raised included haul routes, water conservation, protection of habitat, compatibility with Hahamongna Watershed Park Master Plan elements, the creation of soccer fields, minimizing traffic impacts, allowing regular and sustainable removal of sediment, sensitivity to La Cañada High School and adjacent land uses, coordination with agencies and organizations, and potential job opportunities.

A Notice of Preparation (NOP) and Initial Study (IS) was released on September 28, 2011 (Appendix A); and two Public Scoping meetings were held on October 5 and October 15, 2011. Comments received during a 45-day comment period were considered and incorporated into this document. The scoping meetings introduced the Proposed Project, outlined the environmental review process for the EIR, and invited the public to submit comments on the scope and content of the EIR. Approximately 50 members of the public attended each meeting. Issues and concerns raised at the public scoping meetings included disruption to neighbors, destruction of biodiversity and habitat, restoring natural processes in the reservoir, sluicing sediment as an alternative, sensitivity to surrounding land uses including the high school, and coordination with agencies and affected users. The key issues and areas of controversy are detailed in Section 1.0 – Introduction, subsection 1.4. In addition to the comments provided at the interviews and scoping meetings, several comments were received in response to the Notice of Preparation (NOP)/Initial Study (IS) for this EIR. The primary areas of controversy identified by the public and agencies include impacts to traffic, air quality, noise in the surrounding areas, land use issues, and impacts to recreation.

E.S.4 POTENTIAL IMPACTS FOUND NOT TO BE SIGNIFICANT

In the analysis undertaken for the IS, the public scoping, and the NOP, the LACFCD determined several issue areas pursuant to CEQA that are not expected to have significant impacts resulting from implementation of the Proposed Project: Agricultural and Forest Resources, Population and Housing, and Public Services (fire protection, police protection, schools, and other public facilities).

The analysis undertaken for the Draft EIR has determined that impacts to Geology and Soils, Greenhouse Gas Emissions, Hazards and Hazardous Materials, Hydrology and Water Quality, Public Services, Recreation, and Utilities and Service Systems were less than significant.

E.S.5 SUMMARY OF POTENTIAL IMPACTS AND MITIGATION MEASURES

The analysis undertaken for this Final EIR has determined that impacts to Air Quality, Biological Resources, Cultural Resources, Land Use and Planning, and Noise could be mitigated to a level of less than significant. Unmitigable significant impacts include significant impacts to Aesthetics and temporary significant impacts to Traffic/Transportation.

Table ES-1 summarizes the potential significant impacts for the Proposed Project. Impacts found to be potentially significant are listed along with the proposed mitigation measures. The residual impact after application of mitigation is also indicated for each significant impact. Potentially significant cumulative impacts, if any, are also identified.

Table ES-0-1: Summary of Potential Significant Impacts and Mitigation Measures

Potential Impacts	Mitigation Measures	Level of significance after mitigation
Aesthetics		
Aesthetics-1: Potentially significant impact to scenic vistas will occur from sediment removal activities during the sediment removal phase.	No feasible mitigation available. The less than significant impacts during reservoir management will be further reduced through the implementation of Mitigation Measures MM BIO-6, MM BIO-7, and MM BIO-8.	Impact remains significant and unavoidable.
Aesthetics-3: Potentially significant impact to visual characteristics will occur from sediment removal activities during the sediment removal phase.	No feasible mitigation available. The less than significant impacts during reservoir management will be further reduced through the implementation of Mitigation Measures MM BIO-6, MM BIO-7, and MM BIO-8	Impact remains significant and unavoidable.
Air Quality		
Air Quality-1: Conflict with the implementation of SCAQMD air quality management plan due to sediment removal emissions of NO_X exceeding the Daily Regional Threshold will result in a significant impact.	**MM AQ-1**: LACFCD shall require all construction contractors during the sediment removal phase of the Proposed Project to use only sediment removal dump trucks that meet the EPA's emission standards for Model Year 2007 or later. **MM AQ-2**: LACFCD shall require all construction contractors during the sediment removal phase of the Proposed Project to use off-road equipment that meets, at a minimum, EPA's emission standards for Tier 3 equipment.	Less than Significant
Air Quality-2 and Air Quality-3: Sediment removal emissions of NO_X will exceed the SCAQMD Daily Regional Threshold, resulting in a significant impact to an air quality standard.	See MM AQ-1 and MM AQ-2.	Less than Significant
Air Quality 6: Sediment removal emissions of NO_X will exceed the SCAQMD Daily Regional Threshold, resulting in a cumulatively significant impact.	See MM AQ-1 and MM AQ-2.	Less than Significant
Biological Resources		
Biology-1: Removal of habitat during sediment removal will result in a potentially significant impact to five special status wildlife species (least Bell's vireo, yellow warbler, southwestern pond turtle, coast range newt, and two-striped garter	**MM BIO – 1**: A qualified biological monitor shall be present during initial ground- or vegetation-disturbing project-related activities to provide measures and monitor for wildlife in harm's way. This includes initial ground- or vegetation-disturbing project-related activities at the annual start of each year of sediment removal or maintenance activities. Following initial project-related activities, a qualified monitoring biologist shall be present as necessary to	Less than significant

Potential Impacts	Mitigation Measures	Level of significance after mitigation
snake) and nesting native birds and roosting bats.	maintain the implemented protection measures and monitor for additional species in harm's way. These protection measures shall include, as appropriate: redirecting wildlife, identifying areas that may require exclusionary devices (e.g., fencing), or capturing and relocating wildlife outside the work area. Any captured species shall be relocated to adjacent appropriate habitat that is contiguous to adjacent habitat and not impacted by project-related disturbance activities. **MM BIO – 2:** Within 90 days prior to ground-disturbing activities, a sensitive species educational briefing shall be conducted by a qualified biologist for construction personnel. The biologist will identify all sensitive resources that may be encountered onsite, and construction personnel will be instructed to avoid and report any sightings of sensitive species to LACFCD or the monitoring biologist. Educational briefings shall be repeated annually for the duration of the sediment removal. **MM BIO – 3**: Within 90 days prior to ground-disturbing activities, a preconstruction survey shall be conducted by a qualified biologist for the presence of any sensitive species in harm's way, including coast range newt, the southwestern pond turtle, and the two-striped garter snake. If sensitive species are observed in harm's way, the qualified biologist will develop and implement appropriate protection measures for that species. These protection measures shall include, as appropriate: redirecting the species, constructing exclusionary devices (e.g., fencing), or capturing and relocating wildlife outside the work area. Preconstruction surveys shall be repeated annually for the duration of the sediment removal. Observations of special status species made during these surveys shall be recorded onto a CNDDB field data sheet and submitted to CDFW for inclusion into the CNDDB. **MM BIO – 4**: LACFCD, in consultation with a qualified biologist, will employ bird exclusionary measures (e.g., mylar flagging) prior to the start of bird breeding season to prevent birds nesting within established boundaries of the project. Prior to commencement of sediment removal activities within bird breeding season (March 1-August 31), a preconstruction bird nesting survey shall be conducted by a qualified biologist for the presence of any nesting bird within 300 feet of the construction work area. The surveys shall be conducted 30 days prior to the disturbance of suitable nesting habitat by a qualified biologist with experience in conducting nesting bird surveys. The surveys shall continue on a weekly basis with the last survey being conducted no more than 3 days prior to	

Potential Impacts	Mitigation Measures	Level of significance after mitigation
	the initiation of clearance/construction work. Preconstruction surveys shall be repeated annually for the duration of the sediment removal. If an active nest is found, the qualified biologist will develop and implement appropriate protection measures for that nest. These protection measures shall include, as appropriate, construction of exclusionary devices (e.g., netting) or avoidance buffers. The biologist shall have the discretion to adjust the buffer area as appropriate based on the proposed construction activity, the bird species involved, and the status of the nest and nesting activity; but shall be no less than 30 feet. Work in the buffer area can resume once the nest is determined to be inactive by the monitoring biologist. **MM BIO – 5**: Within 30 days prior to commencement of vegetation or structure removal activities, a preconstruction bat survey shall be conducted by a qualified biologist for the presence of any roosting bats. Acoustic recognition technology shall be used if feasible and appropriate. If either a bat maternity roost or hibernacula (structures used by bats for hibernation) are present, a qualified biologist will develop and implement appropriate protection measures for that maternity roost or hibernacula. These protection measures shall include, as appropriate: safely evicting non-breeding bat hibernacula, establishment of avoidance buffers, or replacement of roosts at a suitable location. These measures shall also include as appropriate: ▪ To the extent feasible, trees that have been identified as roosting sites shall be removed or relocated between October 1 and February 28. ▪ When trees must be removed during the maternity roost season (March 1 to September 30), a qualified bat specialist shall conduct a preconstruction survey to identify those trees proposed for disturbance that could provide hibernacula or nursery colony roosting habitat for bats. ▪ Trees identified as potentially supporting an active nursery roost shall be inspected by a qualified biologist no greater than 7 days prior to tree disturbance to determine presence or absence of roosting bats. ▪ Trees determined to support active maternity roosts will be left in place until the end of the maternity season (September 30). ▪ If bats are not detected in a tree, but the qualified biologist determined that roosting bats may still be present, trees shall be removed as follows: o Pushing the tree down with heavy machinery instead of	

Potential Impacts	Mitigation Measures	Level of significance after mitigation
	felling the tree with a chainsaw o First pushing the tree lightly 2 to 3 times with a pause of 30 seconds in between each nudge to allow bats to become active, then pushing the tree to the ground slowly o Allowing the tree to remain in place for 24 to 48 hours until inspected by the qualified biologist for presence or absence of roosting bats ▪ The qualified biologist shall document all bat survey, monitoring, and protection measure activities and prepare a summary report for LACFCD.	
Biology-2: A significant impact will occur to riparian habitats and sensitive habitats.	**MM BIO – 6**: Riversidean Alluvial Fan Sage Scrub habitat shall be restored and/or enhanced at a 1:1 ratio by acreage. Areas shall be mapped using aerial photographs. **MM BIO – 7**: Within 90 days prior to ground-disturbing activities, a qualified biologist shall conduct a tree survey within the project footprint, to identify trees that will be removed or potentially affected by the Proposed Project and trees that can be avoided. LACFCD will replace trees that cannot be avoided. The replacement is expected to be up to 1:1 by acreage. The biological monitor shall implement measures to protect the root zone of oak trees that may be impacted immediately adjacent to the project site and along access roads. **MM BIO – 8**: A combination of onsite and offsite habitat restoration, enhancement, and exotic removal shall be implemented by LACFCD at a 1:1 ratio for impacted sensitive habitat and jurisdictional waters. Habitat restoration/enhancement shall include use of willow cuttings and exotic species removal. Non-native, weedy habitats within the basin shall be utilized whenever possible as mitigation sites. This mitigation measure shall be monitored for success for five years following implementation. A report of the monitoring results shall be submitted annually, during the five years following implementation, to resource agencies as required by the Section 401 Certification, Section 404 permit, and a Streambed Alteration Agreement.	Less than significant
Biology-3: A significant impact will occur to wetlands.	See MM BIO-8, above.	Less than significant

Potential Impacts	Mitigation Measures	Level of significance after mitigation
Biology-4: A significant impact will occur to wildlife nursery sites.	See MM BIO-1 through MM BIO-8, above.	Less than significant
Biology-5: A significant impact will occur due to removal of native trees from the Proposed Project site.	See MM BIO-7, above.	Less than significant
Cultural Resources		
Cultural-2: A significant impact will occur if sediment removal or reservoir management activities uncover unknown archaeological resources.	**MM CUL-1**: If sediment removal or reservoir management activities exceed the depth of the historic flood deposits and encounter native sediments, these activities will be monitored by a qualified archaeologist. In the event this occurs and historic or archaeological materials are observed, the excavation in the proximity of the discovery should be diverted until a qualified archaeologist and/or paleontologist evaluates the discovery.	Less than significant
Cultural-3: A significant impact will occur if sediment removal or reservoir management activities uncover unknown paleontological resources.	**MM CUL-2:** If sediment removal or reservoir management activities exceed the depth of the historic flood deposits and encounter native sediments, these activities will be monitored by a qualified paleontologist. In the event that this occurs and paleontological materials are observed, the excavation in the proximity of the discovery should be diverted until a qualified paleontologist evaluates the discovery.	Less than significant
Cultural-4: A significant impact will occur if sediment removal or reservoir management activities uncover human remains.	**MM CUL-3**: In the event human remains are discovered, all work in the area must be halted until the County Coroner identifies the remains and makes recommendations regarding their appropriate treatment pursuant to PRC Section 5097.98.	Less than significant
Land Use and Planning		
Land Use-1: A significant impact will be associated with recreational activities coexisting with flood management and water conservation, as implementation of sediment removal and reservoir management under both management options will result in temporarily restricted access to portions of designated trails and indirect impacts to existing recreation uses associated with construction activities.	**MM LAN-1**: Temporary impacts to designated recreational facilities and trails shall be minimized through advance communication and redirection to the nearest facility in the vicinity of the Proposed Project. Prior to completion of final plans and specifications, the LACFCD shall review the plans and specifications to ensure that they contain proper language requiring that signs be posted at the nearby parking lots and trailheads at least one month in advance of sediment removal activities.	Less than significant

Potential Impacts	Mitigation Measures	Level of significance after mitigation
Noise/Vibration		
Noise-2: Onsite construction equipment vibration impacts to nearby sensitive receptors will be significant.	**MM N-1:** The LACFCD shall restrict the operation of any off-road construction equipment that is powered by a greater than 200-horsepower engine from operating within 180 feet of any offsite residential structure. Equipment that is not performing any earth-moving activities and is solely operating for entering or leaving the site via the access roads to the reservoir is exempted from this requirement.	Less than significant
Noise-4: Cumulative onsite construction equipment vibration impacts to nearby sensitive receptors could be significant.	See MM N-1.	Less than significant
Transportation and Traffic		
Transportation-1: Temporary significant impacts to haul route intersections could cause a substantial increase in traffic which would affect the efficiency of the circulation system.	**MM TRA-1**: Proposed Project haul trucks will not deliver to the Vulcan Material Reliance Facility during the PM peak period. **MM TRA-2**: Proposed Project haul trucks will not deliver to the Boulevard Pit during the PM peak period.	Implementation of the mitigation measures would reduce impacts but not to a level of less than significant. Other potential impact reduction measures could reduce impacts to less than significant; however, these measures cannot be legally imposed by the LACFCD, since the locations are under the jurisdiction of other agencies. Every reasonable effort will be made to coordinate with and receive approval from the jurisdictional agencies to implement the impact reduction measures but LACFCD cannot guarantee that the measures will be implemented. Therefore, this temporary impact could remain potentially significant.

Potential Impacts	Mitigation Measures	Level of significance after mitigation
Transportation-2: Proposed Project traffic associated with sediment removal could adversely affect traffic level of service at the following intersections, resulting in a temporary significant impact: Berkshire Place and I-210 Eastbound Ramps intersection during the AM peak period; Figueroa St/Scholl Canyon Road and SR-134 Westbound Ramps during the AM and PM peak periods; Irwindale Avenue/Foothill Boulevard intersection during the PM peak hour; Glenoaks Boulevard and Osborne Street intersection during the AM and PM peak periods; Sheldon Street and San Fernando Road intersection during the PM peak period; and Branford Street and San Fernando Road intersection during the PM peak period.	See MM TRA-1 and MM TRA-2.	Implementation of the mitigation measures would reduce impacts but not to a level of less than significant. Other potential impact reduction measures could reduce impacts to less than significant; however, these measures cannot be legally imposed by the LACFCD, since the locations are under the jurisdiction of other agencies. Every reasonable effort will be made to coordinate with and receive approval from the jurisdictional agencies to implement the impact reduction measures but LACFCD cannot guarantee that the measures will be implemented. Therefore, this temporary impact could remain potentially significant.
Transportation-5: Reduction of LOS at intersections could affect buses using the existing roadway network, resulting in a temporary significant impact.	See MM TRA-1 and MM TRA-2.	Implementation of the mitigation measures would reduce impacts but not to a level of less than significant. Other potential impact reduction measures could reduce impacts to less than significant; however, these measures cannot be legally imposed by the LACFCD, since the locations are under the jurisdiction of other agencies. Every reasonable effort will be

Potential Impacts	Mitigation Measures	Level of significance after mitigation
		made to coordinate with and receive approval from the jurisdictional agencies to implement the impact reduction measures but LACFCD cannot guarantee that the measures will be implemented. Therefore, this temporary impact could remain potentially significant.
Transportation-6: During sediment removal the Proposed Project will result in significant delays at the following intersections, resulting in significant cumulative impacts. These intersections include: Berkshire Place and I-210 Eastbound Ramps intersection during the AM peak period; Irwindale Avenue/Foothill Boulevard intersection during the PM peak hour; Figueroa St/Scholl Canyon Road and SR-134 Westbound Ramps during the AM and PM peak periods; Glenoaks Boulevard and Osborne Street intersection during the AM and PM peak periods; Sheldon Street and San Fernando Road intersection during the PM peak period; and Branford Street and San Fernando Road intersection during the PM peak period.	See MM TRA-1 and MM TRA-2.	Implementation of the mitigation measures would reduce impacts but not to a level of less than significant. Other potential impact reduction measures could reduce impacts to less than significant; however, these measures cannot be legally imposed by the LACFCD, since the locations are under the jurisdiction of other agencies. Every reasonable effort will be made to coordinate with and receive approval from the jurisdictional agencies to implement the impact reduction measures but LACFCD cannot guarantee that the measures will be implemented. Therefore, this temporary impact could remain potentially significant.

E.S.6 PROJECT ALTERNATIVES

Section 15126.6 of the *CEQA Guidelines* requires consideration and discussion of alternatives to the Proposed Project which would feasibly attain most of the basic objectives of the project and would avoid or substantially lessen any of the significant effects of the project. Four alternatives — the Conveyor Belt Alternative, the Slurry Pipeline Alternative, the Dam Removal Alternative, and the Upstream Sediment Management Alternative— were considered but rejected from consideration in this EIR as infeasible (see further discussion in Section 4.10). Five feasible alternatives plus the CEQA required No Project Alternative are reviewed in Chapter 4.0 of this document and briefly summarized in Table ES-2, below, and shown in Figure ES-4: Alternative Configurations, Alternatives 1 through 3 and Figure ES-5: Alternative Configurations, Alternatives 4 through 6.

Alternative 3, Configuration D, which was found to be the Environmentally Superior Alternative in the Draft EIR, was based on the City of Pasadena's Hahamongna Watershed Park Master Plan (HWPMP). Alternative 3, Configuration D, Option 2 drastically reduces the project's footprint of 120 acres down to 71 acres. Additionally, the limited maintenance area for Alternative 3 further reduces the permanent habitat impacts down to approximately 51 acres by allowing for site replanting and mitigation to take place within the reservoir footprint. This reduction in project acreages will greatly lessen environmental impacts of the Proposed Project.

As shown in the Draft EIR, Section 4.6, Alternative 3 receives an in-depth analysis which presents the potential impacts of each of the alternative and compares the impacts of the alternative to the Proposed Project and each of the other alternatives; providing ample information as to why this alternative was found to be the Environmentally Superior Alternative. Section 4.11 is a summary of these findings. The Draft EIR does not determine and has not designated any of the alternatives, including the Proposed Project, as the "Recommended Alternative." With the completion of the Final EIR, an alternative will be chosen and be presented to the Board of Supervisors as the Recommended Alternative. Any of the alternatives analyzed in the Draft EIR can be chosen as the Recommended Alternative.

Of the alternatives, Alternative 3, Configuration D is considered to be the Environmentally Superior Alternative. Alternative 3, Configuration D substantially attains all of the project objectives and would lessen significant effects associated with the Proposed Project. When compared to the other alternatives, Alternative 3, Configuration D would result in the fewest environmental impacts. A summary comparison of the alternatives is provided in Table ES-3.

Table ES-2: Proposed Project Alternatives and the Proposed Project

Item		Proposed Project Configuration A		Alternative 1 Configuration B	Alternative 2 Configuration C	Alternative 3 Configuration D (Environmentally Superior Alternative)		Alternative 4 Sluicing	Alternative 5 Haul Route	Alternative 6 No Project
Alternative Description		Closest to the original reservoir configuration		Retains the original capacity while reducing footprint and allowing for restoration of trails	Back basin provides management area that can only be maintained through mechanical excavation.	Limits excavation to two deeply excavated channels to provide more natural sediment movement and impact a smaller footprint		Requires mechanical agitation of the sediment in the reservoir to move sediment downstream.	Alternative Haul Routes for Several of the Haul Route Segments	No large-scale excavation would be completed. Sediment would continue to accumulate in reservoir.
Sediment Removal	Flood Control Volume	4,153,000 cy		3,963,000 cy	3,615,000 cy	3,588,000 cy		4,153,000 cy	4,153,000 cy	1,245,000 cy
	Flood Protection	2 DDEs		2 DDEs	Approximately 2 DDEs	Approximately 2 DDEs		Up to 2 DDEs	2 DDEs	<1 DDE
	Total Removal Volume*	2,946,000 cy		2,784,000 cy	4,000,000 cy	2,425,000 cy		2,946,000 cy	2,946,000 cy	0 cy
	Reservoir Footprint	120.42 ac		83.08 ac	83.96 ac	Option 1: 75.99 ac	Option 2: 70.81 ac	120.42 ac	120.42 ac	Existing
	Project Duration	5 years		5 years	5 years	5 years	5 years	Indeterminate	5 years	N/A
Reservoir Management	Acreage (in green)	Option 1: 120.42 ac	Option 2: 91.28ac	54.56 ac	47.10 ac	50.78 ac	52.57 ac	120.42 ac	120.42 ac	N/A
	Max Elevation	1070'	1040'	1020'	1010'	1040'	1040’	1040'	1040'	N/A
	Vegetation and Trees	Vegetation maintenance of whole site	Allow to regrow above 1040'	Allow to regrow above 1020' and plant on side slopes above 1020'	Allow to regrow above 1010' and plant on side slopes above 1020'	Allow to regrow above 1040' and in the west leg. Keep invert of the east leg clear	Allow to regrow above 1040'. Replant above 1020’ on the side slopes but keep invert clear	Vegetation maintenance of whole site	Vegetation maintenance of whole site	Allow all vegetation and tree growth
	Frequency	FAST during rain events. Vegetation maintenance for three weeks, sediment excavation for two weeks, annually during dry weather.		FAST during rain events. Vegetation maintenance for three weeks, sediment excavation for two weeks, annually during dry weather.	FAST during rain events. Vegetation maintenance for three weeks, sediment excavation for two weeks, annually during dry weather.	FAST during rain events. Vegetation maintenance for three weeks, sediment excavation for two weeks, annually during dry weather.		Sluicing and mechanical agitation year round.	FAST during rain events. Vegetation maintenance for three weeks, sediment excavation for two weeks, annually during dry weather.	N/A
Project Objectives**	1	Met		Met	Met	Met		Met	Met	No
	2	Met		Met	Met	Met		Met	Met	No
	3	Met		Met	Met	Met		Met	Met	No
	4	Met		Met	Met	Met		Not Fully	Met	No
	5	Met		Met	Met	Met		Not Fully	Met	No
	6	Met		Met	Met	Met		No	Met	N/A

* Plus any additional sediment received during the project sediment removal phase
** Project Goal is to restore the design capacity (volume for two DDEs below the spillway elevation of 1,040.5 feet) and establish a reservoir management system to maintain the flood control capacity of the reservoir.

Table ES-3: Summary Comparison of Potentially Significant Impacts of Proposed Project and Alternatives

Impact Area	Proposed Project Configuration A	Alternative 1 Configuration B	Alternative 2 Configuration C	Alternative 3 Configuration D*	Alternative 4 Sluicing	Alternative 5 Haul Route Alternative	Alternative 6 No Project
Aesthetics	Significant and Unavoidable	Reduced	Reduced	Reduced	Increased	Similar	Potentially Increased
Air Quality	Less than Significant with Mitigation	Reduced	Increased	Reduced	Potentially Increased	Similar	Reduced
Biological Resources	Less than Significant with Mitigation	Reduced	Reduced	Reduced	Potentially Increased	Similar	Potentially Increased
Cultural Resources	Less than Significant with Mitigation	Reduced	Similar	Reduced	Similar	Similar	Reduced
Land Use and Planning	Less than Significant with Mitigation	Reduced	Reduced	Reduced	Increased	Similar	Potentially Increased
Noise/Vibration	Less than Significant with Mitigation	Reduced	Increased	Reduced	Potentially Increased	Similar	Reduced
Transportation and Traffic	Temporary, Significant and Unavoidable	Reduced	Increased	Reduced	Potentially Increased	Reduced	Reduced

Reduced= reduced impact compared to the Proposed Project
Similar = similar impact compared to the Proposed Project
Increased = increased impact compared to the Proposed Project
*Alternative 3, Configuration D is the Environmentally Superior Alternative

Alternative 1 (Configuration B)

Alternative 2 (Configuration C)

Alternative 3 (Configuration D) Option 1

Alternative 3 (Configuration D) Option 2

Legend

- Proposed Project Boundary
- Sediment Removal Excavation Limit
- Reservoir Management Area

N

0 500 1,000 2,000

Feet

Scale = 1:10,000

Figure ES-4
Alternative Configurations
Alternatives 1 through 3

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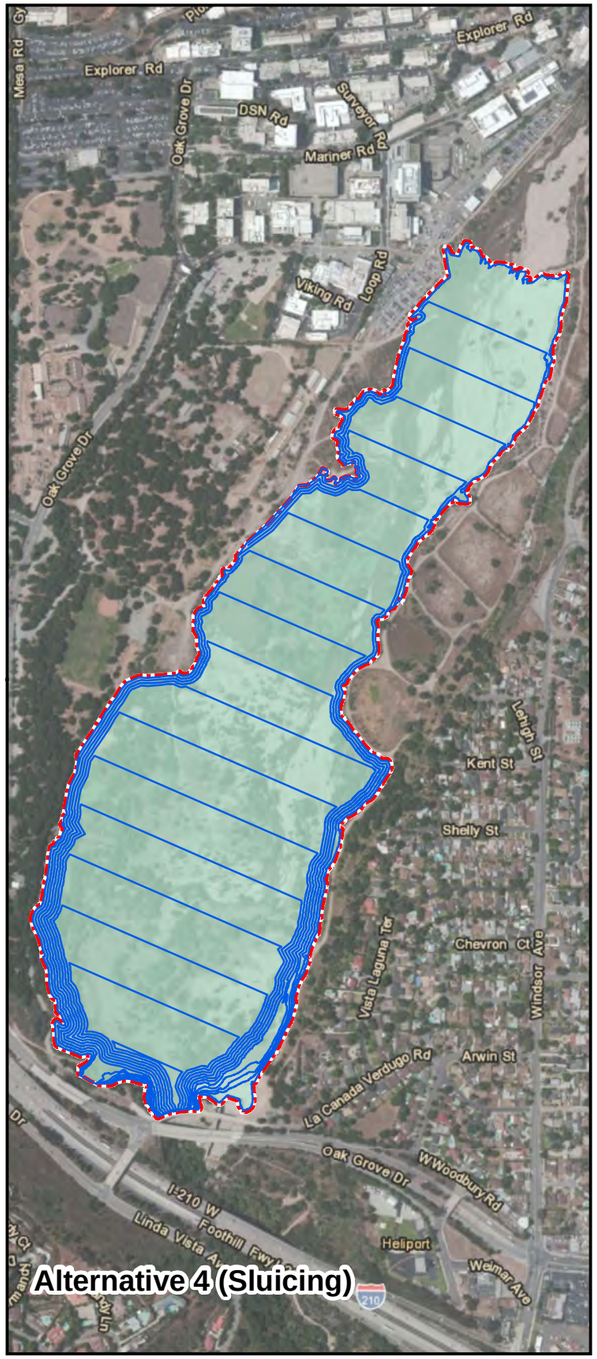
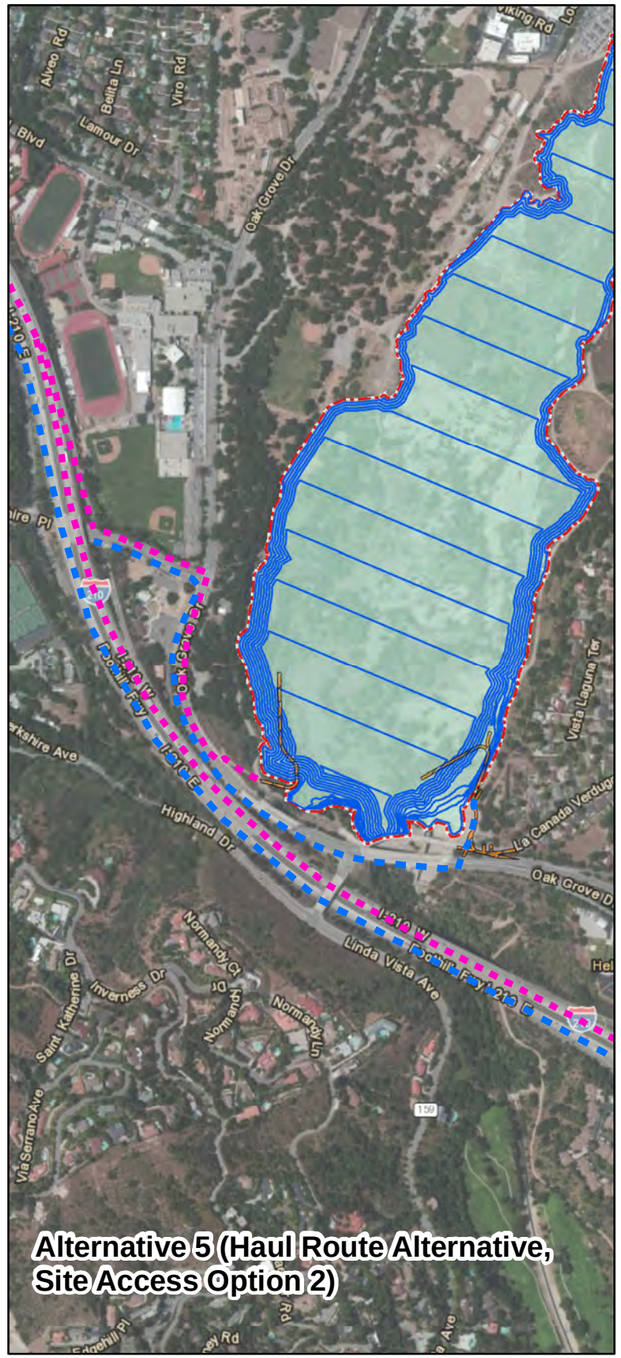
\\cgr-gisdata01\GIS_DATA\Projects\20000s\20201 - 20400\20346 Devil's Gate EIR\20346 Figure ES-4 Alternative Configurations, Alternatives 1 through 3ms.mxd



Alternative 4 (Sluicing)

Alternative 5 (Haul Route Alternative, Site Access Option 1)



Alternative 5 (Haul Route Alternative, Site Access Option 2)

Alternative 6 (No Project)

Legend

- Proposed Project Boundary
- Reservoir Management Area
- Access Road
- Sediment Removal Excavation Limit

Haul Routes

- Inbound Haul Route
- Outbound Haul Route

N

0 500 1,000 2,000

Feet

Scale = 1:10,000

Figure ES-5
Alternative Configurations
Alternatives 4 through 6

Version Date: 10/13/2014

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\\cgi-gisdata01\GIS_DATA\Projects\20000s\20201 - 20400\20346 Devil's Gate EIR\20346 Figure ES-5 Alternative Configurations, Alternatives 4 through 6_options.mxd

SECTION 1.0 – INTRODUCTION

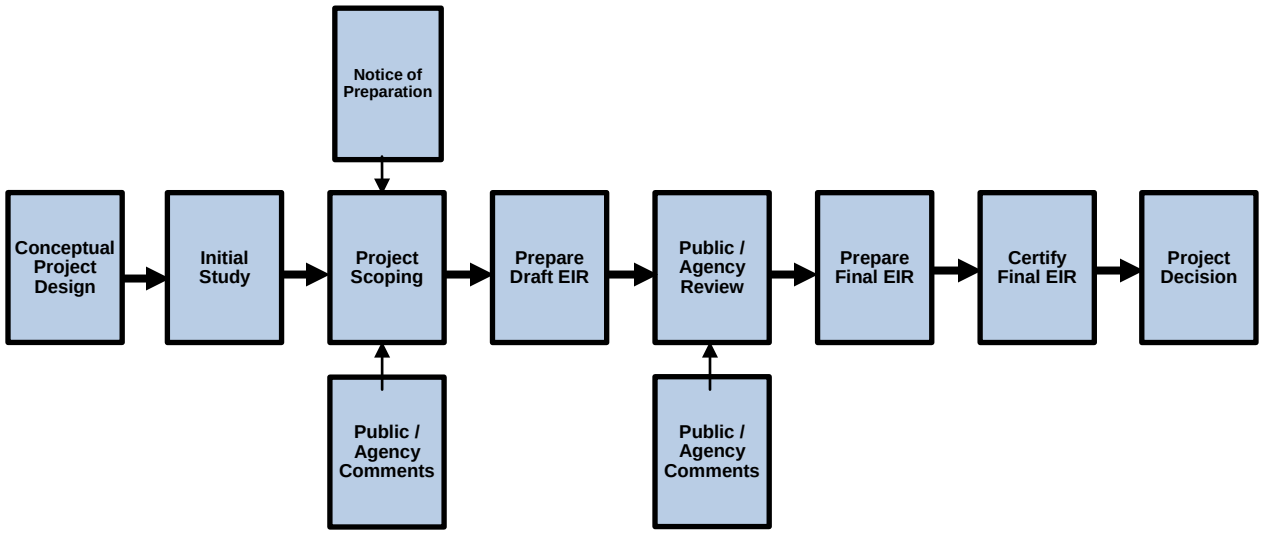
1.1 PURPOSE OF THE ENVIRONMENTAL IMPACT REPORT

All "projects" within the State of California are required to undergo environmental review to determine the environmental impacts associated with implementation of the project in accordance with the California Environmental Quality Act (CEQA).

CEQA was enacted in 1970 by the California Legislature to disclose to decision makers and to the public the significant environmental effects of a proposed project and identify possible ways to avoid or minimize significant environmental effects of a project by requiring implementation of mitigation measures or recommending feasible alternatives. CEQA applies to all California governmental agencies at all levels, including local, regional, and state, as well as boards, commissions, and special districts. As such, the Los Angeles County Flood Control District (LACFCD) is required to conduct an environmental review to analyze the potential environmental effects associated with the Proposed Project. The LACFCD is the lead agency for the preparation of this Draft Environmental Impact Report (Draft EIR) in accordance with CEQA.

This Draft EIR is circulated to the public and affected agencies for review and comment. One of the primary objectives of CEQA is to enhance public participation in the planning process; public involvement is an essential feature of CEQA. Community members are encouraged to participate in the environmental review process, request to be notified, monitor newspapers for formal announcements, and submit substantive comments at every possible opportunity afforded by the agency. The environmental review process provides ample opportunity for the public to participate through scoping, public notice, and public review of CEQA documents. A diagram illustrating the CEQA process is shown in Figure 1.1-1 below. Additionally, lead agencies are required to consider comments from the scoping process in the preparation of the Draft EIR and respond to public comments on the Draft EIR in the Final EIR.

Figure 1.1-1: The Environmental Review Process



1.2 SCOPE OF THE EIR

This section provides a summary of the issues addressed in the EIR. This Draft EIR was prepared following input from the public, responsible agencies, and affected agencies through the EIR scoping process, which included the following:

- In accordance with the State CEQA Guidelines, a Notice of Preparation (NOP) and Initial Study (IS) were prepared and distributed to responsible agencies, affected agencies, and other interested parties.
- The NOP was posted on September 28, 2011, in the County Clerk's office for 45 days. The NOP was submitted to the State Clearinghouse to officially solicit participation in determining the scope of the EIR.
- Scoping meetings were conducted on Wednesday, October 5, 2011, at 6:30 p.m. at the Rose Bowl Locker Room, 1001 Rose Bowl Drive, Pasadena, 91103 and Saturday, October 15, 2011, at 9:00 a.m. at the La Cañada High School cafeteria, 4463 Oak Grove Drive, La Cañada Flintridge, 91011.
- Requests for additional information and input provided from public comments during the 45-day scoping public review period and the scoping meetings regarding the contents of the NOP/IS and the scope of the EIR were incorporated in this Draft EIR.

The content of the Draft EIR was established based on the findings of the IS and public and agency input. Under the CEQA Guidelines, the analysis in the Draft EIR is focused on issues determined in the IS to be potentially significant, whereas issues found in the IS to have less than significant impacts or no impact, do not require further evaluation. Therefore, based on the analysis contained in the IS, the following issue areas were determined to have less than significant impacts or no impacts with respect to implementation of the Proposed Project and will not require further evaluation in the Draft EIR:

- Agriculture and Forest Resources
- Population and Housing
- Public Services (fire protection, police protection, schools, and other public facilities)

This Draft EIR analyzes the following environmental issues:

- Aesthetics
- Air Quality
- Biological Resources
- Cultural Resources
- Geology/Soils
- Greenhouse Gas Emissions
- Hazards and Hazardous Materials
- Hydrology and Water Quality
- Land Use and Planning
- Mineral Resources
- Noise/Vibration
- Public Services (included under Recreation)
- Recreation
- Transportation and Traffic
- Utilities and Service Systems

Mitigation measures to reduce impacts to a less-than-significant level were proposed where feasible. In addition to the environmental issues identified above, this Draft EIR also includes all of the sections required by the CEQA Guidelines.

1.3 FINAL EIR ORGANIZATION

The Final EIR is organized into the following chapters so the reader can easily obtain information about the Proposed Project and related environmental issues:

- Executive Summary – Presents a summary of the Proposed Project and alternatives, areas of controversy and issues to be resolved, potential impacts and mitigation measures, and impact conclusions regarding growth inducement and cumulative impacts.

- Chapter 1: Introduction – Describes the purpose and use of the Draft EIR, provides a scope of the Draft EIR, and outlines the organization of the Draft EIR.

- Chapter 2: Project Description– Describes the project location, project details, and the LACFCD's overall objectives for the Proposed Project.

- Chapter 3: Environmental Analysis – Describes the existing conditions, or setting, before project implementation; methods and assumptions used in impact analysis; thresholds of significance; impacts, including cumulative, that would result from the Proposed Project; and applicable mitigation measures that would eliminate or reduce significant impacts identified for each environmental issue. This assessment of impacts considers the regulatory framework, environmental baseline conditions, thresholds for significance recommended by CEQA and other relevant statutes and regulations, and the potential to reduce or avoid significant impacts.

The environmental baseline condition for the sediment removal phase is considered at the time of publication of the NOP; however, due to the extremely dynamic drainage and vegetation conditions on the Proposed Project site; aesthetic and biological resources conditions change on a regular basis due to seasonal conditions, water flow/views, water storage, and sediment conditions. In 2011, these resources were severely impacted by sediment deposition. Under these resource issues, 2013 conditions were also taken into account. The environmental baseline condition for reservoir management will be conditions after sediment removal, approximately in the year 2020.

- Chapter 4: Alternatives Analysis – Evaluates the environmental effects of project alternatives, including the No Project Alternative, and provides an Environmentally Superior Project Alternative.

- Chapter 5: Other Mandatory CEQA Considerations – Includes a discussion of issues required by CEQA that are not covered in other chapters. This includes unavoidable adverse impacts, impacts found not to be significant, irreversible environmental changes, and growth inducing impacts.

- Chapter 6: References – Identifies the documents and individuals consulted in preparing the Draft EIR.

- Chapter 7: Report Preparation – Lists the individuals involved in preparing the Draft EIR.

- Chapter 8: Clarifications and Modifications – Identifies clarifications and revisions intended to update the Draft EIR in response to the comments received during the public review period.

- Chapter 9: Response to Comments – Provides the comments received during the public review period and the responses to those comments.

- Chapter 10: Mitigation Monitoring and Reporting Program

- Appendices – Present data supporting the analysis or contents of this Draft EIR. The Appendices include the following:

    - APPENDIX A Notice of Preparation and Initial Study, and Scoping Comments
    - APPENDIX B Air Quality Report
    - APPENDIX C Health Risk Assessment
    - APPENDIX D Biological Resources Reports
    - APPENDIX E Cultural Resources Report
    - APPENDIX F Geochemical and Geotechnical Exploration Report
    - APPENDIX G Greenhouse Gas Report
    - APPENDIX H EDR Hazardous Database Search

- APPENDIX I Noise Impact Analysis
- APPENDIX J Traffic Report
- APPENDIX K Sediment Transport Capacity Analysis

1.4 AREAS OF CONTROVERSY/ISSUES TO BE RESOLVED

Section 15123 (b)(2) of the *CEQA Guidelines* requires that an EIR Executive Summary identify areas of controversy known to the lead agency, including issues raised by other agencies and the public.

A Notice of Preparation (NOP) and Initial Study (IS) was released on September 28, 2011 (Appendix A) and two Public Scoping meetings were held on October 5 and October 15, 2011. Comments received during a 45-day comment period were considered and incorporated into this document. The scoping meeting introduced the Proposed Project, outlined the environmental review process for the EIR, and invited public comment on the scope and content of the EIR. Approximately 50 members of the public attended each meeting. Through this process, several key issues and areas of controversy were identified, including:

- What will be the potential of disruption to neighbors?
- Will there be potential destruction of biodiversity and habitat?
- Is there a possibility of water conservation or water replenishment?
- Is there a possibility of allowing natural processes within the reservoir?
- Could the Proposed Project include a landscaped seasonal water feature?
- Will the Proposed Project be compatible with the Hahamongna Watershed Park Master Plan elements?
- Will the spreading grounds be used for soccer fields?
- The Proposed Project should minimize traffic impacts on Windsor, include traffic control on Berkshire, and improve surface road conditions after sediment removal.
- Will the Proposed Project create a permanent access road to Oak Grove Drive?
- How will the Proposed Project provide conditions for sustainable regular removal of sediment instead of large-scale removals?
- Consider removing sediment through sluicing; allow the stream to move sediment naturally.
- The Proposed Project should consider a larger scope and long-term sustainability.
- Ensure sensitivity to La Cañada High School especially regarding hours of construction; maximize sediment removal when school is not in session.

- Communicate and coordinate with adjacent land uses (La Cañada United Methodist and Children's School, Child Education Center, Flintridge Riding Club, JPL).
- Coordinate with the following agencies: California Department of Fish and Wildlife (CDFW), U.S. Forest Service (USFS), City of Pasadena, City of Pasadena Public Works, and the California Department of Transportation (Caltrans).
- Coordinate with Audubon Society and other experts.
- Will there be potential job opportunities for local residents?

LACFCD refined the Proposed Project and developed project alternatives based on the public comments and concerns.

Another issue to be resolved involves the availability of dump trucks that meet EPA's emission standards for Model Year 2007 and later and the availability of off-road equipment that meets EPA's emission standards for Tier 3 equipment. This equipment would be required to conform to the mitigation measures proposed in Section 3.5 Air Quality; however, the availability of this equipment is unknown at this time.

1.5 AVAILABILITY OF THE DRAFT EIR

The Draft EIR for the Devil's Gate Reservoir Sediment Removal and Management Project was distributed directly to responsible and reviewing agencies and a Notice of Availability (NOA) was distributed to organizations and interested groups and persons informing them of where the document can be viewed and how to comment. The Draft EIR was also available for review at the following locations:

- Linda Vista Library, 1281 Bryant Street, Pasadena
- San Rafael Branch Library, 1240 Nithsdale Road, Pasadena
- Pasadena Central Library, 285 East Walnut Street, Pasadena
- Altadena Library District, 600 East Mariposa Street, Altadena
- Bob Lucas Memorial Library, 2659 Lincoln Avenue, Altadena
- La Cañada Flintridge Library, 4545 North Oakwood Avenue, La Cañada Flintridge
- Irwindale Public Library, 5050 Irwindale Avenue, Irwindale
- County of Los Angeles Department of Public Works, 900 South Fremont Avenue, Alhambra, available at the 2nd floor public counter
- Sun Valley Library, 7935 Vineland Avenue, Sun Valley

In addition, the Draft EIR is also available online at the following website:

http://www.LASedimentManagement.com/DevilsGate.

SECTION 2.0 – PROJECT DESCRIPTION

This chapter provides a description of the Proposed Project. Included are the Proposed Project location, background, objectives Proposed Project description, alternatives, and a summary of Project approvals that would be required.

2.1 PROJECT LOCATION

2.1.1 Location

The Devil's Gate Reservoir Sediment Removal and Management Project (Proposed Project) is located in Devil's Gate Reservoir, the City of Pasadena (City), in Los Angeles County (County) approximately 14 miles north of downtown Los Angeles (see Figure 2.1-1: Proposed Project Location and Vicinity Map). The City of La Cañada Flintridge and the unincorporated community of Altadena are located near the Proposed Project site to the west and east, respectively.

Lying south of the San Gabriel Mountains, the Proposed Project site is located in the upper portion of the Arroyo Seco watershed. The Arroyo Seco watershed extends approximately 16 miles in length along the centerline of the watershed and 24 miles along the Arroyo Seco from its origin in the Angeles National Forest to the Arroyo Seco's confluence with the Los Angeles River. Approximately 20,416 acres (31.9 square miles) of both residential and undeveloped land drain into Devil's Gate Reservoir.

The Proposed Project includes transportation and placement of sediment at facilities already prepared and designated to accept such sediment (see Figure 2.1-2: Sediment and Vegetation Disposal Sites Map). The facilities that will be used for the majority of the Proposed Project sediment placement will include the Waste Management Facility in Azusa, the Vulcan Materials Reliance Facility in Irwindale, and the Manning Pit Sediment Placement Site (SPS) in Irwindale for the placement of sediment, and Scholl Canyon Landfill for the placement of vegetation and organic debris. Sediment may also be placed at the following disposal facilities in the Sunland area of Los Angeles: Sheldon Pit, Sun Valley Fill Site, Bradley Landfill, and Boulevard Pit.

2.1.2 Project Site

The Proposed Project site covers approximately 120 acres. The topography in the vicinity of the Proposed Project site is generally flat, with a slight incline to the north. The San Gabriel Mountains are located to the north of the Proposed Project site and are characterized by both the foothills and steep slopes associated with mountainous terrain. The Proposed Project site can currently be accessed via a park entrance at Oak Grove Drive and Foothill Boulevard on the west, Windsor Avenue via La Cañada Verdugo Road on the southeast, and Explorer Road on the northeast.

2.1.3 General Plan Designation/Zoning

The Proposed Project site has a General Plan Land Use designation of Open Space and is zoned as Open Space under the City of Pasadena General Plan (City of Pasadena 2004).

Figure 2.1-1
Devil's Gate Reservoir Sediment Removal and Management Project
Project Location and Vicinity Map

Version Date: 10/5/2013

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20346 - \\Cgi-gisdata01\gis_data\Projects\20000s\20201 - 20400\20346 Devil's Gate EIR\20346 Figure 2.1-1 Proposed Project Location and Vicinity Map.mxd

Figure 2.1-2
Devil's Gate Reservoir Sediment Removal and Management Project

Sediment and Vegetation Disposal Sites Map

Version Date: 10/4/2013

Boulevard Pit

Sheldon Pit

Sun Valley Fill Site

Bradley Landfill

Devil's Gate Reservoir

Scholl Canyon Landfill

Vulcan Materials

Waste Management Facility

Manning Pit

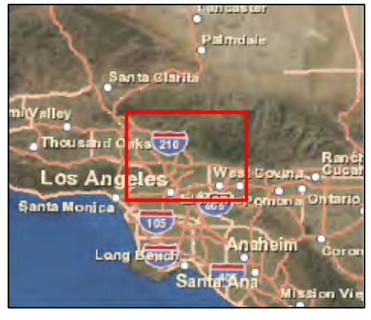
Devil's Gate Resevoir

Sediment Placement Sites

SCALE= 1 inch equals 2 miles

0 1 2 4

Miles



Service Layer Credits: Copyright:© 2013 Esri, DeLorme, NAVTEQ, TomTom
Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User

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\\Cgr-gisdata01\gis_data\Projects\20000s\20201 - 20400\20346 Devils Gate EIR\20346 Figure 2.1-2 Sediment and Vegetation Disposal Sites.mxd

2.1.4 LACFCD Devil's Gate Dam and Reservoir Easement

Through easements granted in May of 1919 and March of 1965, the City of Pasadena granted the LACFCD, under a perpetual easement, the right to construct, reconstruct, inspect, maintain, repair, and operate Devil's Gate Dam, its spillway, reservoir, bypasses, tunnels, and other support facilities as may be necessary for the construction and maintenance of a reservoir capable of impounding the waters of the Arroyo Seco for purposes of storage and control, and to control such waters as may be necessary in the prevention of damage by flood (City of Pasadena 1919/1965).

2.1.5 Hahamongna Watershed Park Master Plan

In 1993, the City of Pasadena established Hahamongna Watershed Park, which includes Devil's Gate Reservoir. Hahamongna Watershed Park is owned and operated by the City of Pasadena and includes the Oak Grove area of Hahamongna Watershed Park. Recreational uses in the park include hiking, bicycling, horseback riding, picnicking, soccer, baseball, softball, and disc golf. Between 2003 and 2005, the City of Pasadena developed and adopted three separate master plans that govern Pasadena parks along the Arroyo Seco: the Lower Arroyo Master Plan, the Central Arroyo Master Plan, and the Hahamongna Watershed Park Master Plan (HWPMP). The HWPMP is a land use plan for approximately 300 acres of Hahamongna Watershed Park, which in total encompasses approximately 1,300 acres of open space that extends northward from Devil's Gate Dam into the Arroyo Seco Canyon. Devil's Gate Dam and Reservoir is within the HWPMP area. The HWPMP establishes a visionary framework for recreation, water resources, flood management, habitat restoration, and cultural resources in Hahamongna Watershed Park (HWPMP 2003).

2.1.6 Surrounding Land Uses

Hahamongna Watershed Park is approximately 300 acres of parkland and open space located at the base of Arroyo Seco Canyon, in the floodplain behind Devil's Gate Dam and includes the Oak Grove area of Hahamongna Watershed Park. The Oak Grove area of Hahamongna Watershed Park, located west of the Proposed Project site, contains picnic facilities, restrooms, a play field, an equestrian staging area, trails, and a disc golf course. The current leaseholders within Hahamongna Watershed Park include the Los Angeles County Fire Department (Fire Camp 2) and the Rose Bowl Riders, who sublet to the Tom Sawyer Camp and MACH 1 (Move a Child Higher). In addition to the LACFCD, Southern California Edison, Southern California Gas Company, and Pasadena Water and Power hold easements within Hahamongna Watershed Park. Other land uses directly adjacent to the Proposed Project area include the California Institute of Technology – Jet Propulsion Laboratory (JPL) to the northwest and east; La Cañada High School and Hillside School and Learning Center to the west; single-family residential uses to the south, north, and east; and the 210 Foothill Freeway (I-210) to the south.

2.2 PROJECT BACKGROUND

2.2.1 LACFCD History

Devil's Gate Dam was built in 1920, following the floods of 1914 and 1916, for the purposes of water conservation and flood control. Devil's Gate Dam is the oldest dam constructed by the LACFCD. Devil's Gate Dam and Reservoir had an original storage capacity of approximately 7,423,000 cubic yards (cy). Between 1934 and 1947, most of the Arroyo Seco downstream of the dam (approximately 450 feet south of the dam) was channelized.

Following the 1971 Sylmar Earthquake, heightened safety concerns and better understanding of seismic behavior prompted new investigations and analysis of LACFCD dams, including Devil's Gate Dam. In response to findings from these studies, in 1978 the State Department of Water Resources Division of Safety of Dams (DSOD) officially imposed an operational restriction preventing the holding of water at Devil's Gate Dam due to concerns with the dam's ability to withstand a major earthquake. In 1998, the LACFCD completed a construction project that seismically rehabilitated Devil's Gate Dam. The rehabilitation project also enlarged the spillway to safely pass the tributary watershed's updated Probable Maximum Flood, the required level of flood protection, without overtopping the dam. After project completion, the DSOD restriction was removed, restoring use of the dam and reservoir to its full operational capacity, thus providing its potential for water conservation. The project improvements resulted in Devil's Gate Dam meeting current maximum credible earthquake design standards and probable maximum flood design standards.

The Devil's Gate Reservoir captures stormwater, sediment, and debris during storm events and retains stormwater to prevent high flow rates from overwhelming the downstream flood control channel. The outflow from the reservoir is controlled by three outlet corridors: a low level gate, the outlet valve, and the outlet tunnel gates. These allow the dam to make controlled releases up to 5,500 cubic feet per second (cfs). Controlled releases are made through the outlet valve and tunnel gates after the reservoir has impounded stormwater. During major storm events that exceed the capacity of the valves and gates, the dam is designed such that the reservoir level rises until flow discharges uncontrolled through the spillway ports (openings in the spillway structure) and then over the spillway.

As noted above, sediment and debris is captured in the reservoir during storm events. Sediment removal efforts have previously taken place at the reservoir in order to ensure correct functioning of the outlet works and/or to maintain reservoir capacity. These activities are granted under the LACFCD Devil's Gate Dam and Reservoir Easement and performed in accordance with CEQA. The last major Devil's Gate Reservoir sediment removal project occurred in 1994, when 190,000 cy of sediment were removed. Sediment was trucked off site via a maintenance road just west of the dam which exits on to Oak Grove Drive. Two smaller sediment removal operations also took place with 14,000 cy removed in 2006 and 3,800 cy removed in 2009.

Sediment accumulation has increased dramatically over the past several years as a result of the 2009 Station Fire, the largest fire in recorded history of the Angeles National Forest (est. 1892) and the 12thlargest fire in California since 1933 (CalFire 2013). It burned over 160,000 acres leaving vast areas of the San Gabriel Mountains denuded and susceptible to sediment flows. The fire impacted five of the LACFCD's dams and reservoirs, one of which is the Devil's Gate Dam and Reservoir. Approximately 68 percent of the watershed tributary to Devil's Gate Reservoir (approximately 100 percent of the undeveloped portion) was burned, making sediment deposition inevitable during subsequent storm events. The storms that occurred in the two wet seasons after the fire increased sediment accumulation in the reservoir by approximately 1,300,000 cy, reducing the available capacity to less than one DDE. In October 2010, the California DSOD recommended the removal of sediment buildup behind the dam as well as the removal of vegetation growth.

In 2010, LACFCD initiated project planning to remove 1,670,000 cy from the reservoir. In March 2011, in recognition of stakeholder and environmental concerns, the Los Angeles County Board of Supervisors directed LACFCD to complete an EIR to assess the impacts associated with removing sediment from the Proposed Project site. Since the EIR would take considerable time to complete, LACFCD was also directed to implement interim measures to reduce downstream flood risk until the EIR is completed and a sediment removal project is implemented.

The Interim Measures Project (IMP) is currently underway to reduce downstream flood risk. The IMP includes dam modifications to reduce the risk of debris plugging the outlet works and allow for the removal of up to 25,000 cy of sediment per year from the dam face until the Proposed Project is started. In 2011, approximately 13,000 cy were removed from the dam face and placed at Johnson Field. In 2012, approximately 1,525 cy of sediment and 419 cy of green waste were removed from the dam face and hauled to Johnson Field and Scholl Canyon Landfill, respectively. In 2013, 1,200 cubic yards of sediment and 12 to 14 loads of green waste were removed from the dam face and hauled to Johnson Field and Scholl Canyon Landfill, respectively.

2.3 PROJECT NEED

The LACFCD must remove sediment that has accumulated behind the dam to restore the capacity of Devil's Gate Reservoir to minimize the level of flood risk to downstream communities along the Arroyo Seco. In its current condition, the reservoir no longer has the capacity to safely contain another major debris event; and the outlet works have a risk of becoming clogged and inoperable. Too much sediment accumulation in the reservoir can affect the ability of the outlet works to function correctly and can potentially reduce available reservoir capacity to below that which is necessary for flood control storage or to safety contain future sediment inflow including the Design Debris Event (DDE). The DDE is the predicted amount of sediment that can flow into the reservoir after the undeveloped portion of the tributary watershed is completely burned and a 50-year design storm event occurs after four years of watershed recovery. The 50-year design storm and the DDE are defined by the Los Angeles County Department of Public Works Hydrology and Sedimentation Manuals respectively.

The Los Angeles County Flood Control Act (Act) was adopted by the State Legislature in 1915 after a disastrous regional flood took a heavy toll on lives and property. The Act established the LACFCD and empowered it to provide flood protection and water conservation within its boundaries.

A reservoir storage design capacity of two DDEs below the dam's lowest spillway was determined to be the standard acceptable level of risk at Devil's Gate Dam and Reservoir. The DDE volume of capacity is determined using the January 2006 County of Los Angeles Department of Public Works Hydrology Manual and the March 2006 County of Los Angeles Department of Public Works Sedimentation Manual.

LACFCD established the required design capacity at two DDEs to ensure that the reservoir always has sufficient capacity to maintain the level of downstream flood protection. By establishing the design capacity at two DDEs, the reservoir is likely to have sufficient capacity to experience a design level storm, or several smaller but significant debris events, and still maintain capacity of at least one DDE during the lengthy environmental and construction processes to remove the debris. Further, it should be noted that additional criteria in special circumstances related to dam safety may also dictate the need to remove sediment from a reservoir:

- Depending on the structural stability of the dam, the height of sediment against the dam may need to be limited (sediment weighs more than water and increases the forces on the dam during an earthquake).

- The volume of sediment accumulation may also be limited to prevent sediment from blocking valves/operations (if the debris blocks the outlet valves, they cannot be used to regulate storm flows or to empty the dam during an emergency).

Therefore, to minimize flood risk for Devil's Gate Dam and Reservoir, the required reservoir capacity is based on debris control and is 4.0 million cy (two DDEs) below the spillway elevation of 1,040.50 feet.

For more information on the DDE calculations, please review the Hydrology and Sedimentation Manuals at the following locations:

The Hydrology Manual (January 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_Hydrology_Manual/2006%20Hydrology%20Manual-Divided.pdf

The Sedimentation Manual (March 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_sedimentation_manual/Sedimentation%20Manual-Second%20Edition.pdf

The DDE for the Devil's Gate Reservoir is approximately 2 million cy. Due to the sediment deposited in the reservoir from winter storms after the 2009 Station Fire, the current available capacity for Devil's Gate Reservoir is less than one DDE. Sediment removal is required to maintain flood control capacity behind the dam.

2.4 PROJECT GOALS AND OBJECTIVES

The Proposed Project will remove sediment from Devil's Gate Reservoir to restore the design capacity (volume for two DDEs below the spillway elevation of 1,040.5 feet) and establish a reservoir management system to maintain the flood control capacity of the reservoir. This will include removal of approximately 2.9 million cy of current excess sediment in the reservoir in addition to any additional sediment received during the project sediment removal phase.

Primary project objectives include:

1. Reducing flood risk to the communities downstream of the reservoir adjacent to the Arroyo Seco by restoring reservoir capacity for flood control and future sediment inflow events;

2. Supporting sustainability by establishing a reservoir configuration more suitable for routine maintenance activities including reservoir management;

3. Removing sediment in front of the dam to facilitate an operational reservoir pool to reduce the possibility of plugging the outlet works with sediment or debris during subsequent storm events;

4. Removing sediment placed at Johnson Field during the Devil's Gate Reservoir Interim Measures Project;

5. Supporting dam safety by removing sediment accumulated in the reservoir in a timely manner to ensure the ability to empty the reservoir in the event of a dam safety concern; and

6. Delivering the sediment to placement or reuse facilities that are already prepared and designated to accept such material without native vegetation and habitat removal.

2.5 PROPOSED PROJECT DESCRIPTION, CONFIGURATION A

2.5.1 Sediment Removal Phase

The sediment removal phase constitutes the construction phase of the Proposed Project. Approximately 2.9 million cy of sediment is the current excess amount of sediment in the reservoir; however, additional sediment accumulation is anticipated during the upcoming storm seasons due to the denuded surfaces of the watershed created by the 2009 Station Fire. Proposed Project excavation activities will take place within the project's excavation limit boundaries (see Figure 2.1-1: Proposed Project Location and Vicinity Map). The proposed excavation will remove approximately 2.9 million cy of current excess sediment in the reservoir in addition to any additional sediment received from storm flows during the Proposed Project sediment removal phase.

Excavation/Reservoir Configuration

At the time the NOP was released, an area of 178 acres was considered for the Proposed Project; this was refined to an area of 120.42 acres for the EIR. Specific excavation limits and reservoir configuration for the Proposed Project are shown in Figure 2.5-1: Proposed Project, Configuration A Excavation Area and Configuration A Management Area, Option 1. As shown in Figure 2.5-1, the basin will be excavated to a 985-foot elevation at the face of the dam, sloping up to a 1,070-foot elevation at approximately 4,977 feet north of the dam. In addition to the sediment excavated as part of the Proposed Project, sediment stockpiled at Johnson Field as part of the IMP will also be removed. Proposed Project excavation will not involve the Oak Grove area of Hahamongna Watershed Park, the area of the reservoir above the northern end of excavation limits, or the City of Pasadena's spreading grounds on the east side of the basin.

Removal Method

Historically, as storm events have deposited sediment in the reservoir, native and non-native vegetation have become established in the sediment. During subsequent storm events some of the vegetation and trees have been washed out by storm flows or submerged when the reservoir level rises, or buried under sedimentation. Despite the dynamic changes to water elevation and flows in the reservoir, mature black willow trees, Riversidean Alluvial Fan Sage Scrub, Mule Fat Thickets, and riparian vegetation have thrived in the reservoir. During storm events following the 2009 Station Fire, a large portion of the reservoir vegetation was buried in sediment; however, significant amounts of vegetation, including numerous mature willow trees, remain intact.

In order to remove the sediment from the reservoir, trees and vegetation growing within the excavation areas will need to be removed. The accumulated sediment will be excavated with construction equipment including but not limited to approximately four front loaders with 4-cubic-yard buckets, two bulldozers, one excavator, one grader, one water truck, and two tender trucks (for fuel and maintenance). Vegetation and organic debris will be separated from the sediment. Coarse material may need to be processed through sorters and crushers to be hauled offsite. Depending on the moisture content of the sediment removed, the sediment may need to be stockpiled to allow the sediment to dry. Stockpiling of the sediment will occur onsite within Devil's Gate Reservoir.

Sediment Disposal

Excavated sediment will be trucked offsite to existing disposal site locations which are currently available to accept the sediment. Trucks will travel and place sediment at one of the primary disposal site locations, the Waste Management Facility in Azusa, the Vulcan Materials Reliance Facility in Irwindale, or the Manning Pit Sediment Placement Site (SPS) in Irwindale. Secondary disposal sites are the facilities in Sun Valley (Sheldon Pit, Sun Valley Fill Site, Bradley Landfill, and Boulevard Pit). It is estimated that over the life of the sediment disposal phase of the Proposed Project the eastern disposal sites will be used from 80 to 100 percent of the time. Use of the Sun Valley sites is estimated to occur from 0 to 20 percent of the time over the duration of the sediment disposal phase. Removed vegetation and organic debris will be hauled to Scholl Canyon Landfill located in the City of Glendale. It is estimated that for approximately three weeks during the first year of sediment removal, approximately 50 percent of the total trucking will be vegetation and organic debris hauled to Scholl Canyon Landfill; and the remaining 50 percent will be sediment distributed to the other sites. In the subsequent years of sediment removal, it is estimated that during the first week 25 percent of the total trucking will be vegetation and organic debris hauled to Scholl Canyon Landfill; and the remaining 75 percent will be sediment distributed to the other sites.

The trucks expected to be used for sediment transport are double dump trucks, which have an estimated capacity of 16 to 20 cy of sediment. The trucks are anticipated to haul an estimated 7,650 cy per day. Removal of the sediment, vegetation, trees, and organic debris is expected to require an average of 50 truck round trips per hour, with an estimated maximum of 425 truck round trips per day during excavation activities.

Waste Management Facility is located at the corner of Irwindale Avenue and Gladstone Street in the City of Azusa. Hours of operation are 6:00 a.m. to 8:00 p.m., Monday to Saturday. The facility is permitted to accept 6,500 tons per day and has a remaining capacity of approximately 34 million cy (CalRecycle 2013).

Vulcan Materials Reliance Facility is owned by Vulcan Materials Company. The facility is located north of East Foothill Boulevard, off Irwindale Avenue. The facility is a sand and gravel facility that processes asphalt and aggregate materials. Days and hours of operation are 7:00 a.m. to 4:00 p.m., Monday through Friday. The facility is permitted to accept 6,000 tons per day and has a maximum permitted capacity of 2,187,000 tons per year (CalRecycle 2013).

Manning Pit SPS is located at the corner of Vincent Avenue and Arrow Highway in the City of Irwindale. The Manning Pit SPS is a LACFCD-designated sediment placement site. As of 2011, the facility has an estimated remaining capacity of approximately 2 million cy.

Sheldon Pit is an active operating gravel pit owned by Vulcan Materials Company. Hours of operation are 6:00 a.m. to 8:00 p.m., Monday to Saturday. It has no route or load restrictions (Hall & Foreman, Inc. 2013b. Located at the north end of the Sun Valley Watershed, the pit is bounded by Wentworth Street to the east, Glenoaks Boulevard to the southwest, Tujunga Wash to the northwest, and Hansen Dam Golf Course to the north.

Sun Valley Fill Site (also known as Cal-Mat and Glenoaks Landfill) occupies a 90-acre site bounded by Glenoaks Boulevard on the southwest, Wentworth Street on the northwest, Peoria Street on the southeast, and Dronfield Avenue on the northeast. Hours of operation are 6:00 a.m. to 8:00 p.m.,

Monday to Saturday. It has a load restriction of 300 trucks per day (Hall & Foreman, Inc. 2013b). Cal Mat Pit was an active gravel pit until the late 1980s. Since then it has been used as a landfill for inert construction debris including concrete, asphalt, rock, dirt, and brick. Vulcan Materials Company owns and operates Cal Mat Pit under a City of Los Angeles Environmental Affairs Department solid waste facilities permit (Number 19-AR-1160). A reclamation plan for Cal Mat Pit has been approved by and is on file at the City of Los Angeles Department of City Planning (LADWP 2012).

Boulevard Pit, an active gravel pit is owned by Vulcan Materials Company. The pit is bounded by Branford Street to the north, San Fernando Road to the east, Sheldon Street to the south, and Laurel Canyon Boulevard to the west. Hours of operation are 6:00 a.m. to 8:00 p.m., Monday to Saturday. It has no route or load restrictions (Hall & Foreman, Inc. 2013b).

Owned and operated by Waste Management, Inc., the Bradley Landfill and Recycling Center (Sun Valley Recycling Park) is focused on recycling green waste and other materials, converting gas to energy (providing electric power for more than 6,000 homes), waste hauling, and post closure activities related to the Bradley Landfill such as monitoring of air and groundwater (the landfill closed April 14, 2007). The facility does not currently accept soil for disposal; however, the location was considered since the Recycling Park may require soil for onsite construction projects in the future within the multi-year construction period for the project (LADWP 2012).

Scholl Canyon Landfill is located in the City of Glendale, just north of State Highway 134 (SR-134). The site accepts clean dirt, clean asphalt, and green waste. The site has a remaining capacity of 9.9 million cy and can accept green waste loads to use as alternative daily cover and mulch (LACSD 2013). Hours of operation are 8:00 a.m. to 5:00 p.m., Monday to Friday, and 8:00 a.m. to 3:30 p.m., Saturday. The landfill is permitted to accept 3,400 tons per day (CalRecycle 2013).

Sediment Disposal Truck Routes

The sediment disposal truck routes are described below and shown in Figure 2.5-2: Haul Routes to Irwindale/Azusa Disposal Sites, Figure 2.5-3: Haul Routes to Sun Valley Disposal Sites, and Figure 2.5-4: Haul Route to Scholl Canyon Landfill.

Project Site Access/Staging

Trucks will enter the reservoir via the upgraded reservoir access road located on the east side of the reservoir. After rehabilitation and minor improvements to the existing west side reservoir access road, trucks will exit the reservoir via this road. As part of the Proposed Project, the existing western access road and the upgraded eastern access road will be improved with new ramps to allow for truck traffic in and out of the reservoir. The eastern access road will allow for one-way truck traffic, and the western access road will allow for one-way truck traffic. The eastern access road will now allow for traffic to enter the reservoir directly from Oak Grove Drive as opposed to using La Cañada Verdugo Road. The existing western access road is currently unpaved, and the portion of this access road from below the bike path to the reservoir will be widened but remain unpaved. The portion of this access road from Oak Grove Drive to the West Rim Trail bike path will need to be widened and paved. The sediment removal equipment will be staged within the Proposed Project site overnight, during sediment removal operations. No staging of sediment removal equipment will take place on city streets. Specifics of the staging area(s) will be dictated by the contractor but will follow all applicable RWQCB requirements.

Sediment hauling trucks will be queued within the Proposed Project site during removal activities and will be stored offsite nightly by their respective operators.

Project Site and Freeway Access

As shown in Figures 2.5-2 through 2.5-6, trucks will access the Proposed Project site from I-210 by exiting at Windsor Avenue/Arroyo Boulevard, turning north at Windsor Avenue, turning left onto northbound Oak Grove Drive, and then entering the eastern reservoir access road.

Loaded trucks will exit the reservoir on the existing access road, turning right onto northbound Oak Grove Drive, then left onto westbound Berkshire Place, and then to I-210 eastbound to disposal sites in Azusa and Irwindale or to I-210 westbound to disposal sites in Sun Valley.

Waste Management Facility/Vulcan Materials Reliance Facility/Manning Pit SPS Route

As shown in Figure 2.5-2, trucks carrying sediment to the Waste Management Facility or the Manning Pit SPS will follow I-210 east, exiting at Irwindale Avenue, turning right onto Irwindale Avenue southbound, turning left onto eastbound Gladstone Street, then turning left into the Waste Management Facility or turning right onto southbound Vincent Avenue, and turning right into Manning Pit SPS. Trucks returning to I-210 will take Vincent Avenue north and/or turn left onto westbound Gladstone Street and then turn right onto northbound Irwindale Avenue to I-210 west. Trucks carrying sediment to the Vulcan Materials Reliance Facility will follow I-210 east, exiting at Irwindale Avenue, turning left onto Irwindale Avenue northbound, and entering the facility immediately north of Foothill Boulevard. Trucks returning to I-210 will take Irwindale Avenue southbound and merge right onto I-210 west.

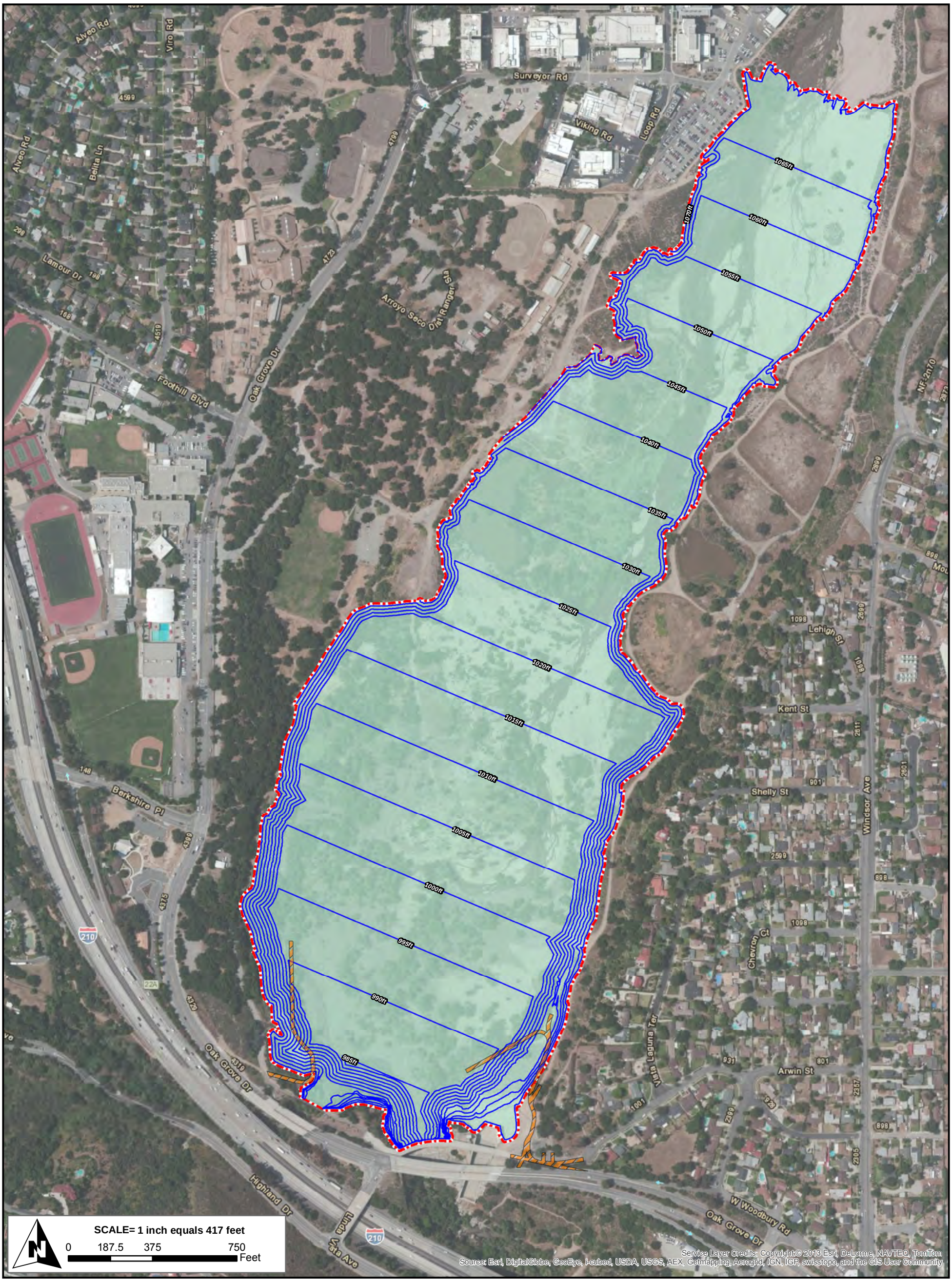
Sun Valley Disposal Sites Route

As shown in Figure 2.5-3, trucks carrying sediment to Sheldon Pit, Sun Valley Fill Site, and Bradley Landfill will follow I-210 west until exiting at the Osborne Street/Foothill Boulevard interchange; turning left onto Foothill Boulevard westbound, then left onto Osborne Street westbound, then left onto Glenoaks Boulevard southbound, and then left onto Sheldon Street eastbound. Trucks accessing Bradley Landfill will turn left onto Glenoaks Boulevard, then right onto Peoria Street. Trucks will then follow this route in reverse to return to I-210.

Trucks accessing Boulevard Pit will follow I-210 west until exiting at the Wheatland Avenue interchange; turning right onto Wheatland Avenue northbound, right onto Foothill Boulevard eastbound, then right onto Wentworth Street westbound, the left onto Glenoaks Boulevard, right onto Tuxford Street, then right onto San Fernando Road, then left onto Branford Street. Trucks will then follow this route in reverse to return to I-210.

Scholl Canyon Landfill Route

As shown in Figure 2.5-4, for vegetation and organic material disposal, the trucks will follow I-210 east to SR-134 west, exit Figueroa Street northbound, and then turn right on northbound Scholl Canyon Road to the Scholl Canyon Landfill. Exiting southbound on Scholl Canyon Road, returning trucks will turn right onto Figueroa Street to access SR-134 eastbound and continue to I-210 west.



Proposed Project Boundary

Access Road

Reservoir Management Area

Sediment Removal Excavation Limit

Figure 2.5-1

Excavation Area and Configuration A Management Area, Option 1

Proposed Project - Configuration A

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\\Cgi-gisdata01\gis_data\Projects\20000s\20201 - 20400\20346 Devil's Gate EIR\20346 Figure 2.5-1 Proposed Project, Configuration A Excavation Area and Configuration A Management Area, Option 1.mxd

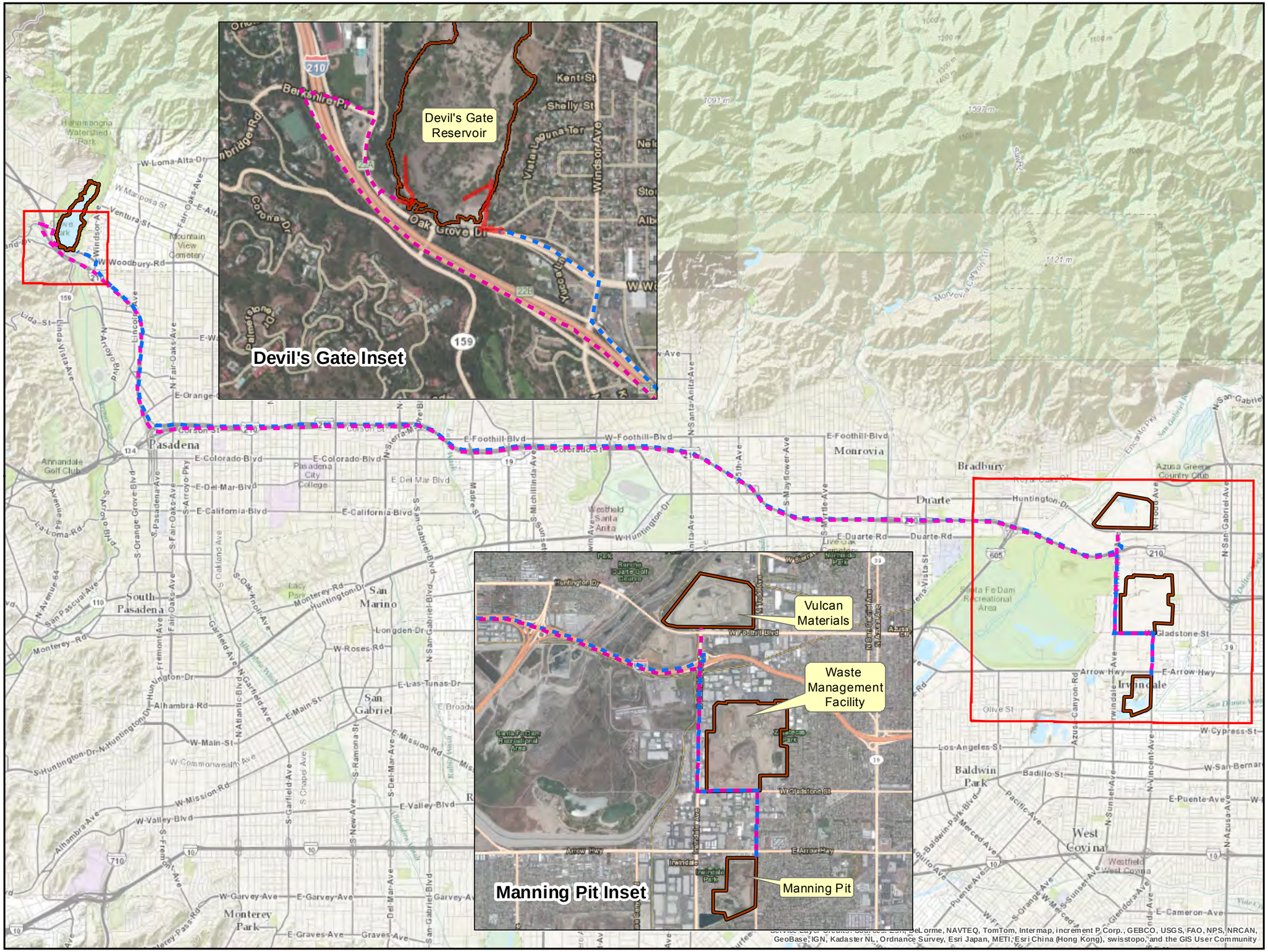


Figure 2.5-2
Proposed Haul Routes Map
Devil's Gate to the Irwindale/Azusa Disposal Sites

Version Date: 10/5/2013

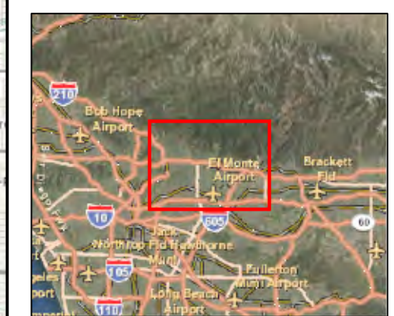
Approximate Limts of Work
Access Road

Haul Routes

Inbound Haul Route
Outbound Haul Route

SCALE= 1 in = 1 mile

0 0.5 1 2
Miles



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\\Cgi-gisdata01\gis_data\Projects\20000s\20201 - 20400\20346 Devil's Gate EIR\20346 Figure 2.5-2 Haul Route to Irwindale_Azusa Sites.mxd

Figure 2.5-3
Proposed Haul Routes Map
Devil's Gate to the
Sun Valley Sites

Version Date: 10/22/2013

Approximate Limts of Work

Access Road

Haul Routes

Inbound Haul Route

Outbound Haul Route

SCALE=1 inch equals 1 mile

0 0.5 1 2

Miles

Sun Valley Sites Inset

Sheldon Pit

Sun Valley Fill Site

Boulevard Pit

Bradley Landfill

Devil's Gate Inset

Devil's Gate Reservoir

Service Layer Credits: Sources: Esri, DeLorme, NAVTEQ, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, and the GIS User Community

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\\Cgi-gisdata01\gis_data\Projects\20000s\20201 - 20400\20346 Devil's Gate EIR\20346 Figure 2.5-3 Haul Route to Sun Valley Sites.mxd

Figure 2.5-4
Proposed Haul Routes Map
Devil's Gate to the
Scholl Canyon Landfill

Version Date: 10/18/2013

Approximate Limts of Work

Access Road

Haul Routes

Inbound Haul Route

Outbound Haul Route

SCALE=1 inch equals 1 mile

0 0.5 1 2

Miles

Devil's Gate Inset

Scholl Canyon Landfill Inset

Service Layer Credits: Sources: Esri, DeLorme, NAVTEQ, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, and the GIS User Community

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\\Cgi-gisdata01\gis_data\Projects\20000s\20201 - 20400\20346 Devil's Gate EIR\20346 Figure 2.5-4 Haul Route to Scholl Canyon Landfill.mxd

Project Schedule

Construction for the Proposed Project is expected to occur between Summer 2015 and Summer 2020. Excavation and associated activities within the reservoir area are expected to take place during drier months, from April to December, Monday through Saturday (except on holidays), as weather permits. During dry years, work could potentially start earlier and/or continue later in the year. Onsite excavation activities will take place between the hours of 7:00 a.m. and 6:00 p.m. Standard Time and between 7:00 a.m. and 7:00 p.m. Daylight Savings Time and on Saturday between 8:00 a.m. and 5:00 p.m. Removal of sediment and organic materials offsite is expected to take place during these hours.

2.5.2 Reservoir Management Phase

The reservoir management phase of the Proposed Project is expected to start in 2020 after the completion of the sediment removal phase. The Proposed Project is expected to result in a reservoir configuration and access to facilitate future routine annual management and sediment removal. After the initial proposed sediment removal activities, the reservoir will be managed through vegetation maintenance, sediment excavation/trucking offsite, and Flow-Assisted Sediment Transport (FAST). These activities will take place under one of the options described below. The purpose of the proposed annual management activities, described below, is to reduce buildup of sediment in the reservoir management area and eliminate or substantially reduce the need for large-scale sediment removal. It is estimated that typically 13,000 cy of sediment will potentially be deposited in the reservoir annually after completion of the Proposed Project. The access roads will be maintained to provide proper road width for access.

Moderately large sediment deposits have the potential to occur during a storm season, but it is anticipated that even with this type of event the newly deposited sediment could be removed in one season. A moderately large sediment removal event, anticipated to involve around 170,000 cy, could take place over an estimated 12-week period during the late summer/early fall following the vegetation maintenance.

Option 1 – Entire Configuration A Management Area

Under Option 1, the reservoir configuration shown in Figure 2.5-1 will be maintained with the approximate cut and elevation levels described previously in the Excavation/Reservoir Configuration discussion through the following activities.

Vegetation Maintenance

Vegetation within the reservoir configuration will be mowed or removed and grubbed annually. These activities will occur Monday through Friday over an estimated three-week period in the late summer or early fall.

Flow-Assisted Sediment Transport (FAST)

During some rain events (during the winter), with the dam gate open, natural flows will pass finer grain size sediment through the reservoir and downstream of the dam. This is referred to as a FAST operation. FAST operations have been routinely used at Devil's Gate Reservoir and result in relatively small amounts of finer grained sediment passing through the reservoir. A FAST operation uses the storm

runoffs throughout the storm season to flush the sediment out of the reservoir. This is a passive method that does not use any mechanical agitation or assistance. This method works effectively when sediment deposition behind the dam is minimal. A FAST operation, if performed regularly, can be used to reduce sediment accumulation in the reservoir and thus help maintain capacity. The amount of sediment that will be removed through FAST operations is limited by the amount of storm runoff received into the reservoir.

It is anticipated that the majority of these FAST operations will be similar to historic FAST operations and that fine sediment discharged during FAST operations will be transported to the Pacific Ocean via Arroyo Seco Channel and the Los Angeles River, either via discharge flow or subsequent storm flows.

Sediment Excavation/Trucking Offsite

Depending on the efficiency of the FAST operations, some mechanical excavation and trucking offsite may be required for removal of accumulated sediment. Sediment excavation/trucking offsite will use the same methods and trucking routes as the initial sediment removal activities. The need for future sediment removal will depend on future storm activity and associated sediment accumulation.

It is estimated, based on past storm events, that sediment excavation/trucking offsite will be required to typically remove 13,000 cy of sediment annually. Based on an estimated removal of a maximum of 4,800 cy per day, it is expected this will occur over an estimated two-week period, Monday through Friday. This removal activity will take place during the late summer/early fall following the vegetation maintenance. Removal of the sediment, vegetation, trees, and organic debris is expected to require an average of 50 truck round trips per hour, with an estimated 200 to a maximum of 300 truck round trips per day during excavation activities.

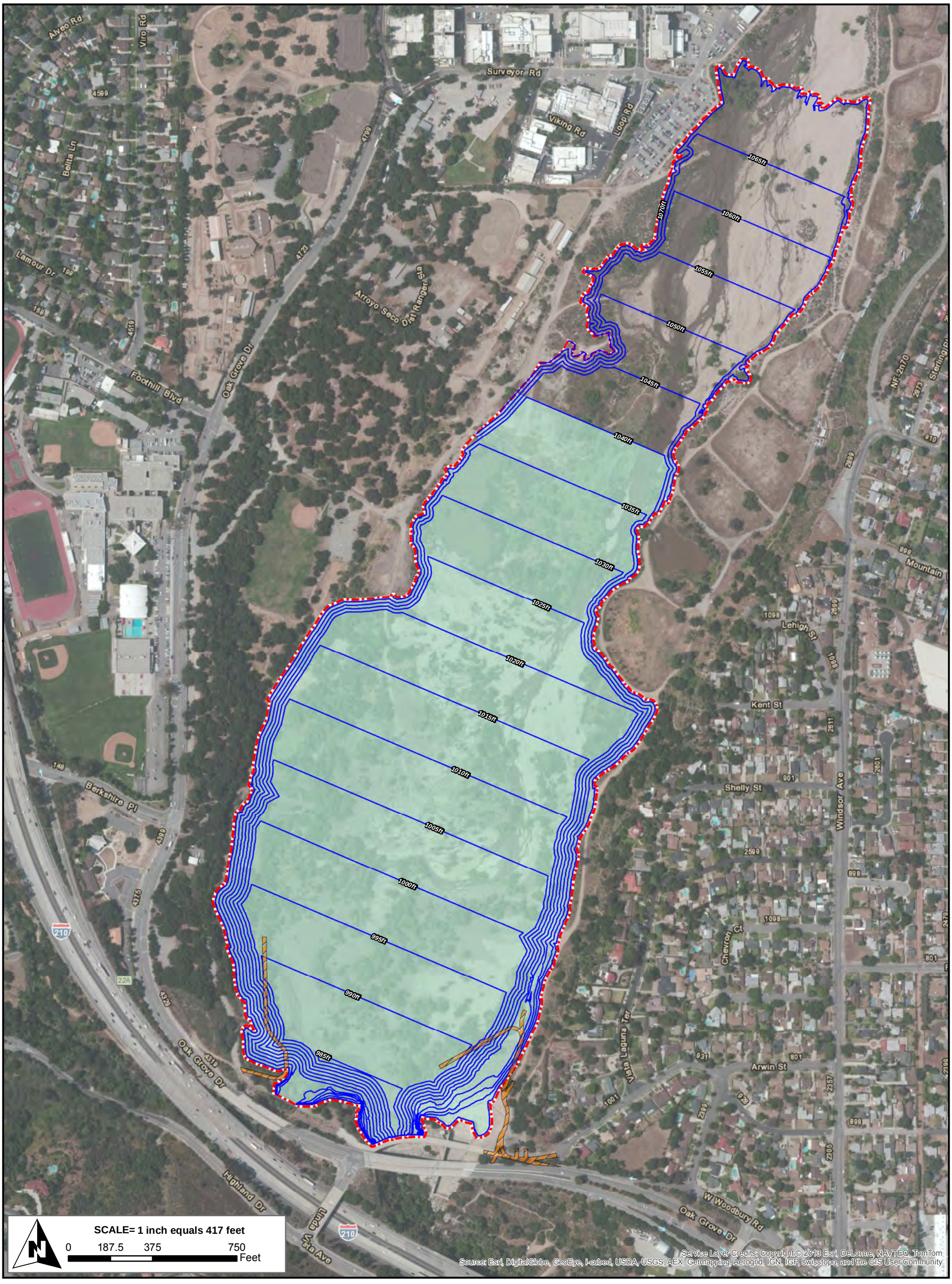
Moderately large sediment deposits have the potential to occur during a storm season, but it is anticipated that even with this type of event the newly deposited sediment could be removed in one season. A moderately large sediment removal event, anticipated to involve around 170,000 cy, could take place over an estimated 12-week period during the late summer/early fall following the vegetation maintenance.

Option 2 – Reduced Management Area

Under Option 2, the reservoir will be maintained with the approximate cut and elevation levels shown in Figure 2.5-5: Proposed Project, Configuration A Excavation Area and Reduced Management Area, Option 2 through the following activities. This will involve the area from the dam to elevation 1,040 feet, approximately 3,283 feet north of the dam, every year for a total management area of approximately 91 acres.

Vegetation Maintenance

Vegetation within the reservoir management footprint will be mowed or removed and grubbed annually. These activities will occur Monday through Friday over an estimated three-week period in the late summer or early fall. All vegetation and sediment outside the reservoir management footprint will be allowed to naturally re-establish and/or remain in place.



Proposed Project Boundary

Access Road

Reservoir Management Area

Sediment Removal Excavation Limit

Figure 2.5-5
Excavation Area and Reduced Management Area, Option 2
Proposed Project - Configuration A

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\\Cgi-gisdata01\gis_data\Projects\20000s\20201 - 20400\20346 Devil's Gate EIR\20346 Figure 2.5-5 Proposed Project, Configuration A Excavation Area and Reduced Management Area, Option 2.mxd

Figure 2.5-6
Devil's Gate Reservoir Sediment Removal and Management Project
Access Roads Map

Version Date: 10/18/2013

Proposed Project Boundary
Access Road

SCALE= 1 inch = 125 feet

0 50 100 200

Feet

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\\Cgh-gisdata01\gis_data\Projects\20000s\20201 - 20400\20346 Devil's Gate EIR\20346 Figure 2.5-6 Access Roads Map.mxd

Flow-Assisted Sediment Transport (FAST)

Maintenance FAST operations will take place as described for Option 1.

Sediment Excavation/Trucking Offsite

Maintenance mechanical excavation and trucking offsite will take place as described for Option 1 within the reservoir management footprint. Sediment deposits and natural vegetation growth above the reservoir management footprint will be allowed to remain in place.

Reservoir Management Phase Duration

Regardless of the option chosen, the proposed annual management routine to remove all sediment and vegetation within the reservoir management footprint will help reduce buildup of sediment in the reservoir management area. A large-scale sediment removal project will be required if a significant amount of sediment accumulates in the reservoir despite the management activities. This is not anticipated for a period of over two decades unless significant major fires and/or storms occur within the watershed. If future reservoir conditions threaten dam operations, LACFCD will initiate the planning process for a new large-scale sediment removal project. Part of this planning will involve utilizing the CEQA process to evaluate and determine the appropriate level of environmental document required for the future project.

2.6 ENVIRONMENTAL COMMITMENTS

The Proposed Project lies within the boundaries of the County of Los Angeles and shall conform to the following requirements:

- Waste Discharge Requirements for Municipal Storm Water and Urban Runoff Discharges within the County of Los Angeles, and the Incorporated Cities Therein, except the City of Long Beach (Order No. 01-182, NPDES No. CAS004001).

- Other applicable federal, State, and local requirements.

2.7 BEST MANAGEMENT PRACTICES

To reduce potential impacts to erosion and water quality, the Proposed Project would be conducted in accordance with applicable standards and BMPs. The Proposed Project will also conform to the requirements in the latest edition of the LACDPW "Construction Site Best Management Practices Manual" (BMP Manual). The following environmental safeguards will be implemented as part of the Proposed Project:

- No project equipment-related materials (i.e., waste, spills, or residue) shall be discharged from the project site to streets, drainage facilities, receiving waters, or adjacent property by wind or runoff.

- Non-storm water runoff from equipment, vehicle washing, or any other activity shall be contained within the project site using appropriate BMPs.

- Erosion from exposed topsoil slopes and channels shall be prevented.

- Grading will be minimized during the wet season. All erosion susceptible slopes along the borders of excavation or reservoir management areas shall be covered, planted, or protected in any way that prevents erosion of susceptible slopes.

- If the project may be active during rain events, the Contractor shall prepare an accumulated precipitation procedure (APP) for review and approval by the LACFCD Engineer before any discharge from the project. The APP shall describe the location of proposed discharges, the BMPs to prevent pollution, and the actual equipment to be used. The APP shall be prepared and submitted in accordance with BMP NS-2 and the LACDPW Construction Site BMPs Manual (BMP Manual) Section 7.

2.8 REQUIRED PERMITS AND APPROVALS

This section provides, to the extent the information is known to the LACFCD, the CEQA Lead Agency, a list of the agencies that are expected to use this EIR in their decision making and a list of permits and other approvals required to implement the project.

2.8.1 Lead Agency Approval

The Final EIR must be certified by the County of Los Angeles Board of Supervisors (Board) as to its adequacy in complying with the requirements of CEQA before taking any action on the Proposed Project. The Board will consider the information contained in the EIR in making a decision to approve or deny the Devil's Gate Reservoir Sediment Removal and Management Project (Proposed Project). The analysis in the EIR is intended to provide a full disclosure of the Proposed Project's potential environmental impacts in accordance with CEQA requirements.

2.8.2 Other Required Permits and Approvals

A Responsible Agency is a public agency, other than the lead agency, that has discretionary approval authority over a project. The Responsible Agencies, and their corresponding approvals, for this project include the following:

- California Department of Fish and Wildlife (CDFW) – Section 1600 Streambed Alteration Agreement

- California Regional Water Quality Control Board (RWQCB)– Section 401 Water Quality Certification

- United States Army Corps of Engineers (USACE) – Section 404 Permit

2.8.3 Reviewing Agencies

Reviewing Agencies include those agencies that do not have discretionary powers but that may review the EIR for adequacy and accuracy. Potential Reviewing Agencies include the following:

State of California

- Office of Historic Preservation
- Department of Transportation (Caltrans)
- Department of Conservation, Division of Oil, Gas and Geothermal Resources
- Native American Heritage Commission (NAHC)
- California Highway Patrol

Regional Agencies

- Southern California Association of Governments (SCAG)
- South Coast Air Quality Management District (SCAQMD)

Local Agencies

- City of Pasadena
- City of La Cañada Flintridge
- City of Azusa
- City of Irwindale
- City of Los Angeles

2.9 CUMULATIVE SCENARIO

Cumulative impacts refer to the combined effect of Proposed Project impacts with the impacts of other past, present, and reasonably foreseeable future projects. Both CEQA and the CEQA Guidelines require that cumulative impacts be analyzed in an EIR. As set forth in the CEQA Guidelines, the discussion of cumulative impacts must reflect the severity of the impacts, as well as the likelihood of their occurrence; however, the discussion need not be as detailed as the discussion of environmental impacts attributable to the project alone. As stated in CEQA, "a project may have a significant effect on the environment if the possible effects of a project are individually limited but cumulatively considerable."

It should be noted that:

> "The mere existence of significant cumulative impacts caused by other projects alone shall not constitute substantial evidence that the proposed project's incremental effects are cumulatively considerable."

Cumulative impact discussions for each issue area are provided in the technical analyses contained within Chapter 3 (Environmental Analysis).

As previously stated, and as set forth in the CEQA Guidelines, related projects consist of, "closely related, past, present, and reasonable foreseeable probable future projects that would likely result in similar impacts and are located in the same geographic area." The "list" approach was used for the cumulative impacts discussion in this EIR.

While the cumulative project's list establishes approved, proposed, or reasonably foreseeable projects to consider in combination with the Proposed Project, the cumulative setting varies for each

environmental factor. The cumulative setting is established specific to each environmental factor based on the nature and extent of the resource or issue. Some environmental factors such as hazards and hazardous materials will be highly localized. In contrast, environmental factors such as air quality and greenhouse gases emissions may be regional in nature. In most cases, a geographic scope (in distance from the Proposed Project site) is identified.

The majority of the lands adjacent to the study area are already highly urbanized. The ability to develop new projects within or adjacent to the study area is limited. Based on input from the Cities of Pasadena, La Cañada Flintridge, Los Angeles, Azusa, Irwindale, and the community of Altadena, the following area projects were identified, as shown in Table 2.9-1: Cumulative Projects.

Figure 2.9-1: Cumulative Projects Map shows the approximate location of these projects.

- Hahamongna Watershed Park Multi-Benefit/Multi-Use (MBMU) Project
- Caltech/NASA - Jet Propulsion Laboratory (JPL) On-Site Parking Structure
- Temporary Use of the Rose Bowl Stadium by the National Football League (NFL)
- Azusa Material Recovery Facility and Waste Transfer Station Project
- Metro Gold Line Foothill Extension
- Arroyo Seco Canyon Project
- Devil's Gate Water Conservation Project

Table 2.9-1: Cumulative Projects

No.	Project Name	Lead Agency	Project Location	Distance from Proposed Project Site	Summary Project Description	Status
1	HWP Multi Benefit/Multi-Use Project	City of Pasadena	Hahamongna Watershed Park Master Plan Area Oak Grove Drive and Foothill Boulevard, Pasadena, CA	Adjacent	The project includes improvements outlined in the Arroyo Seco Master Plan including: Westside Perimeter Trail, restoration of Berkshire Creek, Oak Grove Field restroom, Foothill Drain Improvements, and expanded parking area.	Project Description is under review, and environmental review process will restart once scope of work is fully known.
2	NASA JPL On-Site Parking Structure	NASA	NASA JPL 4800 Oak Grove Drive, Pasadena, CA	Adjacent	This project involves construction of an onsite parking structure in the NASA JPL facility to accommodate approximately 1,093 parking spaces.	In construction phase

Table 2.9-1: Cumulative Projects

No.	Project Name	Lead Agency	Project Location	Distance from Proposed Project Site	Summary Project Description	Status
3	Temporary Use of the Rose Bowl Stadium by the NFL	City of Pasadena	Rose Bowl Stadium 1001 Rose Bowl Dr, Pasadena, CA	2 miles	The project would amend the Arroyo Seco Public Lands Ordinance to allow an additional 13 displacement events to occur annually at the Rose Bowl for a total of 25 displacement events. No construction is involved. The amendment would allow the additional use no sooner than the 2013-2014 NFL season for a period of five years.	Project approved
4	Azusa Material Recovery Facility and Waste Transfer Station Project	City of Azusa	1211 West Gladstone Street, Azusa, CA	16 miles	The project involves the construction of an 110,000-square-foot LEED-certified facility. The project involves both a materials recovery facility to process recyclable materials and a waste transfer station to manage municipal solid waste.	In construction phase, expected to continue until 2014.
5	Metro Gold Line Foothill Extension	Metro	Azusa Citrus Station will be located at: 1101 N Citrus Avenue, Azusa	18 miles	The project includes the expansion of the Metro Gold Line from Azusa to Montclair, and will include 12.6 miles of new alignment and six new stations.	Under construction, expected to be completed in 2015.
6	Arroyo Seco Canyon Project	City of Pasadena Water and Power	Hahamongna Watershed Park At the spreading grounds and East Arroyo Parking Lot on the eastern edge of the reservoir.	Adjacent	Project elements include rehabilitation of intake structure, installation of a public restroom, removal of unused water facilities, habitat restoration, and improving passive recreational opportunities.	In conceptual design phase

Table 2.9-1: Cumulative Projects

No.	Project Name	Lead Agency	Project Location	Distance from Proposed Project Site	Summary Project Description	Status
7	Devil's Gate Water Conservation Project	LACFCD	Devil's Gate Dam and adjacent	Adjacent	The project includes installing a pump and intake on the upstream face of Devil's Gate Dam. A 5-mile pipeline will be constructed from the pump easterly to transfer water to Eaton Wash.	In conceptual design phase

Figure 2.9.1
Devil's Gate Reservoir
Cumulative Projects Map

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Proposed Project Boundary

Cumulative Project Locations

NASA JPL On-Site Parking Structure

Arroyo Seco Canyon Project

Hahamongna Watershed Park MBMU Project

Devil's Gate Water Conservation Project

Temporary Use of the Rose Bowl Stadium by the NFL

Azusa Material Recovery Facility & WasteTransfer Station Project

Metro Gold Line Foothill Extension

SCALE= 1 inch equals 2 miles

0 1.5 3 6

Miles

Service Layer Credits: Copyright © 2013 Esri, DeLorme, NAVTEQ, TomTom
Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User

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\\Cgi-gisdata01\gis_data\Projects\2000s\20201 - 20400\20346 Devil's Gate EIR\20346 Figure 2.9.1 Cumulative Projects Map.mxd

SECTION 3.0 – ENVIRONMENTAL ANALYSIS

3.1 ENVIRONMENTAL ISSUES ADDRESSED

An Initial Study (IS) was prepared for the Proposed Project in December 2010 (see Appendix A). Based on the findings documented in the IS, the LACFCD determined which issue areas required further analysis in the EIR. Environmental issue areas are listed by the level of significance of their impacts in Table 3.1-1 below, as determined by the IS process. Only those issue areas identified as having potentially significant impacts in the IS are further analyzed in this EIR.

Table 3.1-1: Summary of Environmental Impacts Identified in the Initial Study

No Impact	Less Than Significant Impact	Potentially Significant Impact
	Aesthetics (light, glare)	Aesthetics (scenic vistas, scenic resources within a state scenic highway, visual character)
Agriculture and Forest Resources		
		Air Quality
Biological Resources (habitat conservation plan)		Biological Resources (sensitive species, riparian habitat, wetlands, wildlife movement, local policies/ordinances)
		Cultural Resources
Geology and Soils (Alquist-Priolo Earthquake Fault Zoning, seismic ground shaking, liquefaction, landslides, unstable soil, expansive soil, septic tanks)		Geology and Soils (soil erosion)
		Greenhouse Gas Emissions
Hazards and Hazardous Materials (safety hazard at airport or private airstrip)	Hazards and Hazardous Materials (wildland fires)	Hazards and Hazardous Materials (transport/disposal, public, school, hazardous materials site, emergency response plan)
Hydrology and Water Quality (deplete groundwater, increase surface runoff, result in flooding, place housing or structures within a flood hazard area, expose people or structures to risk of flooding)	Hydrology and Water Quality (inundation)	Hydrology and Water Quality (water quality, drainage)
Land Use and Planning (habitat conservation plan)	Land Use and Planning (community)	Land Use and Planning (land use plan)
		Mineral Resources
Noise (permanent ambient noise levels, airport, private airstrip)		Noise (noise levels, vibration, temporary ambient noise levels)
Population and Housing		
Public Services (fire protection, police protection, schools, other public facilities)		Public Services (parks, covered under Recreation)
		Recreation

Table 3.1-1: Summary of Environmental Impacts Identified in the Initial Study

No Impact	Less Than Significant Impact	Potentially Significant Impact
Transportation and Traffic (air traffic)		Transportation and Traffic (circulation, level of service, design hazards, emergency access, alternative transportation)
Utilities and Service Systems (wastewater requirements, wastewater treatment facilities)	Utilities and Service Systems (water supply, wastewater treatment, landfill, regulations)	Utilities and Service Systems (stormwater drainage)

The LACFCD used the IS, as well as agency and public input received during the public comment period (September 28, 2011, to November 11, 2011), to determine the final scope for this EIR. The issue areas and their corresponding subchapter numbers discussed in the EIR include:

- 3.4 – Aesthetics
- 3.5 – Air Quality
- 3.6 – Biological Resources
- 3.7 – Cultural Resources
- 3.8 – Geology and Soils
- 3.9 – Greenhouse Gas Emissions
- 3.10 – Hazards and Hazardous Materials
- 3.11 – Hydrology and Water Quality
- 3.12 – Land Use and Planning
- 3.13 – Mineral Resources
- 3.14 – Noise and Vibration
- 3.15 – Recreation/Public Services
- 3.16 – Transportation and Traffic
- 3.17 – Utilities and Service Systems

Chapters 3.4 through 3.17 provide a detailed discussion of the environmental setting, impacts associated with the Proposed Project, cumulative impacts, and mitigation measures designed to reduce significant impacts.

3.2 ORGANIZATION OF ENVIRONMENTAL ANALYSIS

To assist the reader in comparing information about the various environmental issues, each chapter contains the following information.

- Introduction
- Existing Environmental Setting
- Applicable Regulations
- Significance Criteria
- Methodology
- Impacts and Mitigation
    - Project Impacts
        - Mitigation Measures

        - Residual Impacts
    - Cumulative Impacts
        - Mitigation Measures
        - Residual Impacts

3.3 TERMINOLOGY USED IN THIS ANALYSIS

For each question listed in the IS checklist, a determination of the level of significance of the impact is provided. Impacts are categorized in the following categories:

- No Impact. A designation of no impact is given when no adverse changes in the environment are expected.

- Less Than Significant. A less than significant impact would cause no substantial adverse change in the environment.

- Less Than Significant with Mitigation. A potentially significant (but mitigable) impact would have a substantial adverse impact on the environment but could be reduced to a less-than-significant level with incorporation of mitigation measure(s).

- Potentially Significant. A significant and unavoidable impact would cause a substantial adverse effect on the environment, and no feasible mitigation measures would be available to reduce the impact to a less-than-significant level.

3.4 AESTHETICS

3.4.1 Introduction

This section describes the Proposed Project's potential to affect visual resources (aesthetics) in the Proposed Project area. The visual resources to be analyzed include both natural and human-made features that make up the physical characteristics of the landscape. In general, natural resources include the landform, water, soil, and vegetation, while human-made features include physical structures, roads, etc. The analysis describes the potential aesthetic impacts of the Proposed Project on the existing landscape and discusses the compatibility of the Proposed Project with existing conditions and the effect on visual resources.

As noted in the Initial Study (Appendix A), impacts associated with light or glare were found to have a less than significant impact and are not discussed within the EIR.

The environmental baseline condition for the sediment removal phase is considered at the time of publication of the NOP. The environmental baseline conditions for reservoir management will be conditions post sediment removal, approximately in the year 2020.

3.4.2 Existing Environmental Setting

The Proposed Project site is located within Devil's Gate Reservoir and within Hahamongna Watershed Park. Hahamongna Watershed Park is approximately 300 acres of parkland and open space located at the base of Arroyo Seco Canyon, in the floodplain behind Devil's Gate Dam.

The Proposed Project site is primarily a flood control facility, with flood control features including a dam and reservoir that provide flood control for the Arroyo Seco and downstream areas. The Proposed Project site consists of a broad sediment basin with maintenance roads and currently contains areas of riparian, upland, and non-native vegetation communities and disturbed/non-vegetated areas. The distribution of the vegetated and disturbed/non-vegetated areas changes depending on seasonal conditions, water flow, and sediment deposition. The Proposed Project site is surrounded by recreational uses and urban development.

Views from the Proposed Project vicinity include views of Hahamongna Watershed Park, the JPL facility to the north, residential development to the east and south, portions of the Arroyo Seco Channel to the south, the San Gabriel Mountains to the north, and the Verdugo Mountains to the south. Devil's Gate Dam and Reservoir is generally flat, with a slight incline to the north. The various vegetation communities often dominate views in the foreground during dry weather, and seasonal rains can result in the retention of water behind the dam and scouring or washing out the vegetation and trees. As shown in aerial photographs of Devil's Gate Reservoir, from 2003, 2010, and 2011, the vegetation communities vary from year to year in composition and density (see Figure 3.4-1 Devil's Gate Reservoir View, May 2003, Figure 3.4-2: Devil's Gate Reservoir View, February 2010, and Figure 3.4-3: Devil's Gate Reservoir View, February 2011). Overall, the conditions for the vegetation had become degraded due to the sediment that has been deposited in the reservoir by the Station Fire.

The environmental baseline condition for the sediment removal phase is considered at the time of publication of the NOP; however, due to the extremely dynamic drainage and vegetation conditions on the Proposed Project site; aesthetic conditions change on a regular basis due to seasonal conditions, water flow/views, water storage, and sediment conditions. As discussed above, in 2011 these resources were

Figure 3.4-1
Devil's Gate Reservoir Sediment Removal
and Management Project
Reservoir View, May 2003

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20346 - \\cgi-gisdata01\GIS_DATA\Projects\20000s\20201 - 20400\20346 Devil's Gate EIR\20346 Figure 3.4-1 Devil's Gate Reservoir View, May 2003.mxd

Figure 3.4-2
Devil's Gate Reservoir Sediment Removal
and Management Project
Reservoir View, February 2010

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Figure 3.4-3
Devil's Gate Reservoir Sediment Removal
and Management Project
Reservoir View, February 2011

Version Date: 9/9/2013

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severely impacted by sediment deposition. Most of the vegetation and trees on the Proposed Project site were dead, washed out, or buried under sediment, reducing the visual quality and views of the Proposed Project site. Since the publication of the NOP, some of the vegetation and trees have re-established, improving visual quality and views of the Proposed Project site. In order to achieve a more conservative analysis of the potential impacts to aesthetics from the Proposed Project, 2013 conditions were also taken into account. Figures of existing conditions and visual simulations of sediment removal and reservoir management conditions are based on 2013 conditions. The environmental baseline conditions for reservoir management will be conditions post sediment removal, approximately in the year 2020.

Scenic Highways

The Proposed Project site is located approximately 1.6 miles from State Highway 2 – Angeles Crest Highway (SR-2), an Officially Designated State Scenic Highway, and is located in close proximity to I-210, an Eligible State Scenic Highway (Caltrans 2011) (see Figure 2.1-1: Proposed Project Location and Vicinity Map). Views of the Proposed Project site are not available from SR-2. Views of the Proposed Project site are available from I-210; but because of the traveling speed on the freeway and the limited viewpoint these views are of a very brief duration.

Scenic Vistas

A scenic vista is generally defined as a viewpoint that provides expansive views of a highly valued landscape for the benefit of the public. Hahamongna Watershed Park Master Plan area, including the Proposed Project site, does not contain any designated scenic vistas (City of Pasadena 2002). Views of expansive vistas are available from locations around the Proposed Project site. These vistas can include views of the Devil's Gate Dam and Reservoir, Hahamongna Watershed Park recreational facilities, JPL facilities, residential areas, the San Gabriel Mountains, and the Verdugo Mountains. While the Proposed Project site is not designated as a scenic resource, it is considered to be an important scenic area and does receive a high degree of use (City of Pasadena 2002).

Representative Viewpoints

Views of the Proposed Project site are available from residences located on the eastern edge of the reservoir in the community of Altadena and residences south of I-210 in the City of La Cañada Flintridge. Public view areas include the designated trails that surround the reservoir including the Flint Wash Trail and the Arroyo Seco Trail (part of the Santa Monica Mountains Conservancy's Rim of the Valley trail network), the Gabrielino Trail, a U.S. National Recreation trail (designated by USFS), the Altadena Crest Trail, and the Hahamongna Watershed Park West Rim Trail. These trails include both paved and unpaved portions that are popular trails for hikers, mountain bikers, and equestrians. In addition, a bench along the Flint Wash Trail provides a location to stop and view the reservoir. Beyond the designated trails noted above, multiple maintenance roads are used by the LACFCD, Southern California Edison (SCE), and the City of Pasadena, among others, for operations and maintenance of Devil's Gate Reservoir and other facilities in the area and also serve as unofficial trails when reservoir water levels and conditions allow.

A number of representative viewpoints were established to assess existing visual resources conditions. These viewpoints were selected to be representative of the locations from which the Proposed Project site could be seen and would be easily accessible by the public. The viewpoints were located based on

their usefulness in evaluating existing landscapes and potential impacts on visual resources. Locations of the representative viewpoints are shown on Figure 3.4-4 and are described below.

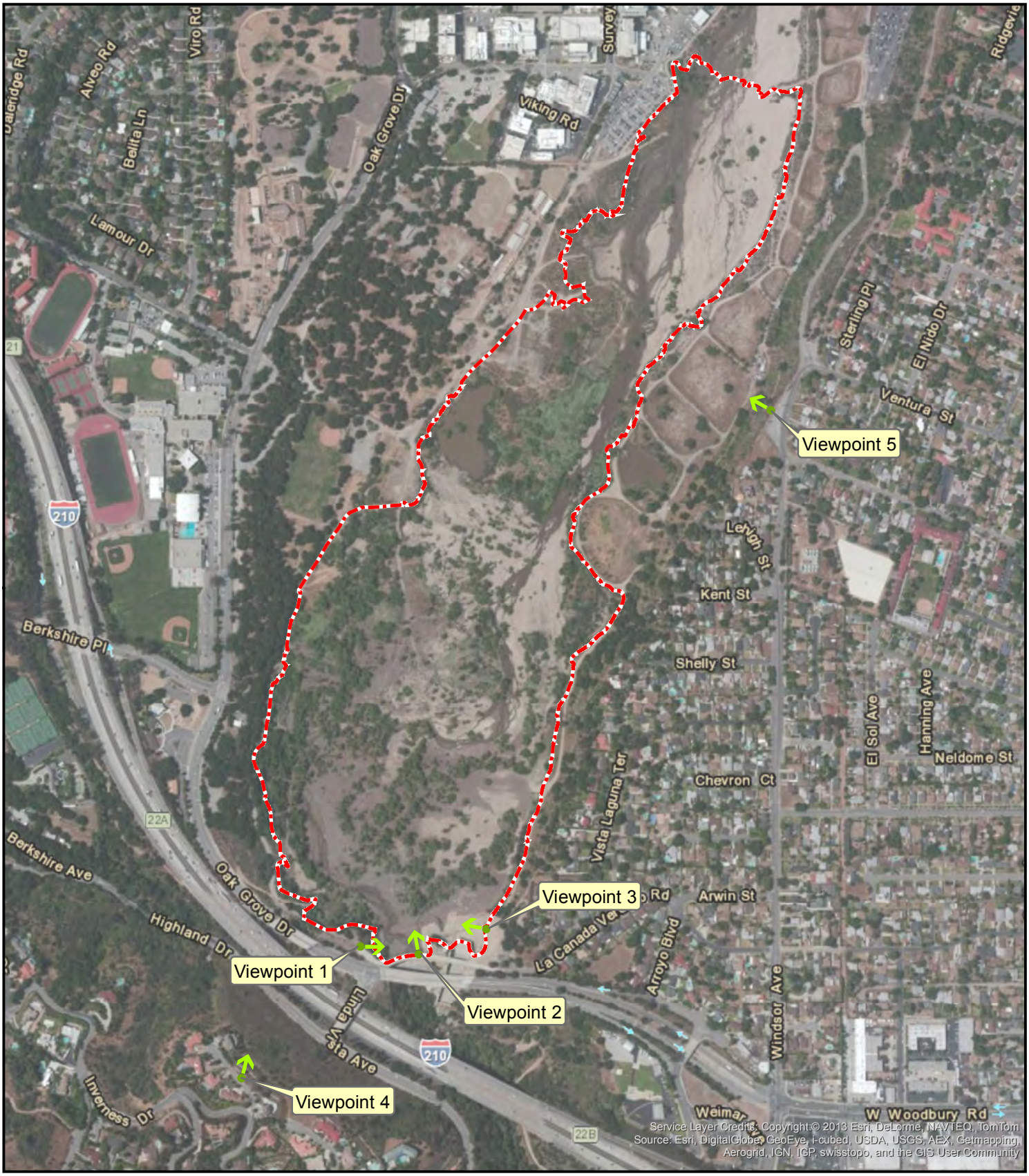
View 1 is located immediately to the west of the Devil's Gate Dam, from a bench that provides a view of the reservoir from the Flint Wash Trail (see Figure 3.4-5: Viewpoint 1 Existing Conditions). The view faces a northeasterly direction and provides a view of the dam face, the reservoir, the San Gabriel Mountains, Oak Grove Drive, JPL facilities, and the residential area to the east of the dam. The view also includes other man-made features such as maintenance roads, electrical lines, and the debris boom line. From this location viewers would be in close proximity to and would have an open, unobstructed view of the Proposed Project site. This view is easily accessed by the public, and the bench provides the opportunity to enjoy the view for a longer period of time.

View 2 is located above the Devil's Gate Dam face on a walkway/access road that follows the top of the dam (see Figure 3.4-6: Viewpoint 2 Existing Conditions). The view faces a northerly direction and provides a view of the reservoir, the San Gabriel Mountains, JPL facilities, and the western edge of Hahamongna Watershed Park. The view also includes other man-made features such as maintenance roads, electrical lines, and the debris boom line. From this location viewers would be in close proximity to and would have an open, unobstructed view of the Proposed Project site. This view is easily accessed by the public.

View 3 is located immediately east of the dam face, on the Arroyo Seco Trail. The view faces a westerly direction and provides views of the dam face, the reservoir, Oak Grove Drive, JPL facilities, I-210, the western edge of Hahamongna Watershed Park, and La Cañada High School (see Figure 3.4-7: Viewpoint 3 Existing Conditions). The view also includes other man-made features such as maintenance roads, electrical lines, residences, and the debris boom line. From this location viewers would be in close proximity to and would have an open, unobstructed view of the Proposed Project site. This view is easily accessed by the public.

View 4 is located on Normandy Court in La Cañada Flintridge. The view faces in a northerly direction, and includes views of I-210, Oak Grove Drive, and Devil's Gate Dam in the foreground with the reservoir, JPL facilities, and residences visible against the backdrop of the San Gabriel Mountains (see Figure 3.4-8: Viewpoint 4 Existing Conditions). From this location the Proposed Project site would be a distant feature and range from unobstructed to obstructed views of the Proposed Project site. Access of this view would be largely limited to local residences.

View 5 is located at the western edge of a parking lot at the corner of Windsor Avenue and Ventura Street, also the location of the Gabrielino Trailhead. This area is located at the northeastern end of the reservoir (see Figure 3.4-9: Viewpoint 5 Existing Conditions). The view faces a southwesterly direction, and provides a view of the JPL facilities, the City of Pasadena's spreading grounds, electrical lines, the reservoir, the Verdugo Mountains, the San Gabriel Mountains, and a distant view of the dam face, I-210, Oak Grove Drive, and the western edge of Hahamongna Watershed Park.



Proposed Project Boundary

Proposed Project Viewpoint

SCALE= 1 inch = 708 feet

0 354 708 1,416

Feet

Figure 3.4-4
Devil's Gate Reservoir Sediment Removal and Management Project
Proposed Project Viewpoints

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20346 - \\Cgi-gisdata01\gis_data\Projects\20000s\20201 - 20400\20346 Devil's Gate EIR\20346 Figure 3.4-4 Proposed Project Viewpoints.mxd

Legend

Proposed Project Boundary

Proposed Project Viewpoint

Figure 3.4-5
Devil's Gate Reservoir Sediment Removal and Management Project
Viewpoint 1 Existing Conditions

Version Date: 10/21/2013

CHAMBERS GROUP

Legend

- Proposed Project Boundary
- Proposed Project Viewpoint

Figure 3.4-6
Devil's Gate Reservoir Sediment Removal and Management Project
Viewpoint 2 Existing Conditions

Version Date: 10/21/2013

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Legend

- Proposed Project Boundary
- Proposed Project Viewpoint

Figure 3.4-7
Devil's Gate Reservoir Sediment Removal and Management Project
Viewpoint 3 Existing Conditions

Version Date: 10/21/2013

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Legend

Proposed Project Boundary

Proposed Project Viewpoint

Figure 3.4-8
Devil's Gate Reservoir Sediment Removal and Management Project
Viewpoint 4 Existing Conditions

Version Date: 10/21/2013

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Legend

Proposed Project Boundary

Proposed Project Viewpoint

Figure 3.4-9
Devil's Gate Reservoir Sediment Removal and Management Project
Viewpoint 5 Existing Conditions

Version Date: 10/21/2013

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Visual Sensitivity

A visual analysis was conducted to determine the existing visual sensitivity at the Proposed Project site. The visual quality, viewer sensitivity, and overall viewer exposure (visibility, distance zone, number of viewers, duration of view) was described for each representative viewpoint and is summarized below in Table 3.4-1: Existing Visual Conditions.

As discussed above, while the Proposed Project site is not designated as a scenic resource, it is considered to be an important scenic area and does receive a high degree of use (City of Pasadena 2002). Viewer sensitivity would range from high to moderate-high.

From Viewpoint 1, the Proposed Project site is highly visible, and view duration would be moderate. Combined with visual quality, number of viewers, and viewer sensitivity, this viewpoint would have an overall visual sensitivity of moderate-high.

From Viewpoints 2 and 3, the Proposed Project site is highly visible, and view duration would be low-moderate. Combined with visual quality, number of viewers, and viewer sensitivity, this viewpoint would have an overall visual sensitivity of moderate-high.

From Viewpoint 4, when not obscured by trees or residences, the Proposed Project site is visible but less dominant due to distance and other more dominant visual elements (I-210, Devil's Gate Dam, San Gabriel Mountains). View duration from residences would be high. Combined with visual quality, number of viewers, and viewer sensitivity, this viewpoint would have an overall visual sensitivity of moderate-high.

From Viewpoint 5, the Proposed Project site is visible but less dominant due to distance and other more dominant visual elements (spreading grounds, JPL facilities). View duration would be low-moderate. Combined with visual quality, number of viewers, and viewer sensitivity, this viewpoint would have an overall visual sensitivity of moderate-high.

3.4.3 Applicable Regulations

LACFCD

Through easements granted in May of 1919 and March of 1965, the City of Pasadena granted the LACFCD, under a perpetual easement, the right to construct, reconstruct, inspect, maintain, repair, and operate Devil's Gate Dam, its spillway, bypasses, tunnels, and other support facilities as may be necessary for the construction and maintenance of a reservoir capable of impounding the waters of the Arroyo Seco for purposes of storage and control and to control such waters as may be necessary in the prevention of damage by flood (City of Pasadena 1919/1965).

City of Pasadena General Plan

The City of Pasadena General Plan Land Use Element Objectives and Policies pertaining to the Proposed Project are outlined below.

> OBJECTIVE 9 – Open Space Preservation and Acquisition: Preserve and acquire open space in Pasadena in order to enhance the quality of Pasadena life.

Table 3.4-1: Existing Visual Conditions

Viewpoint No. (Location, pole, etc.)	Viewpoint			Visual Quality	Viewer Sensitivity	Viewer Exposure				Overall Visual Sensitivity
	Location	Direction Facing	Figure No.			Visibility	Distance Zone	Number of Viewers	Duration of View	
View 1	Bench near the west side of the dam	East	3.4-5	Moderate to High: The view includes a reservoir with scenic qualities including vegetation and open space against the backdrop of the San Gabriel Mountains. Many built features are visible including the dam, JPL facilities, residences, electrical lines, a nearby road, the debris boom, etc.	High: A place where recreation takes place, with a bench present	High	Reservoir: 0-0.8 mile; Road: 0.05 mile; JPL: 1-3 miles; Mountains: ~4+ miles	Moderate-High: Recreation areas have over 10,000 users per year[1], nearby freeway and roadways very highly traveled	Moderate	Moderate-High
View 2	Top of dam	North	3.4-6	Moderate to High: Displays the same scenic qualities as View 1, as well as many of the same built features including JPL facilities, residences, electrical lines, and the debris boom	High: A natural place to stop and look at the view	High	Reservoir: 0-1.1 mile; JPL: 0.8-1.3 miles; Mountains: ~4+ miles	Moderate-High: Recreation areas have over 10,000 users per year,[1] nearby freeway and roadways very highly traveled	Low-moderate	Moderate-High
View 3	East of dam near trail	West	3.4-7	Moderate to High: Displays the same scenic qualities as View 1, with built features including the dam, electrical lines, boom, residential, etc. More dam infrastructure is apparent in the foreground, as well as a school and a freeway.	High: Located on a designated trail	High	Dam: 0-0.05 mile; Freeway: 0.4 mile; School: 0.5 mile	Moderate-High: Recreation areas have over 10,000 users per year,[1] nearby freeway and roadways very highly traveled	Low-moderate	Moderate-High
View 4	Normandy Court	North	3.4-8	Moderate to High: The view includes freeway and dam infrastructure in the foreground with reservoir, JPL facilities, and residences visible against the backdrop of the San Gabriel Mountains.	High: Views available from residences and from roadway.	Moderate-High	Freeway: 0.1 mile; Dam: 0.18 mile; Reservoir: 0.19-1.3 miles; JPL: 1.9-1.4 miles; Mountains: ~4+ miles	Low: Limited to residential uses and roadways with limited use	High	Moderate-High
View 5	Windsor Parking Lot	Southwest	3.4-9	Moderate to High: The view includes the reservoir; however, the characteristics are less natural, with spreading basins, stables, a disk golf course, and a freeway.	Moderate-High: a parking lot that is heavily used, trailhead, etc.	Moderate-High	Reservoir: 0-0.3 mile; JPL: 0.3-0.7 mile; Park: 0.4 mile; Freeway: 0.7 mile	Moderate-High: Recreation areas have over 10,000 users per year,[1] nearby freeway and roadways very highly traveled	Low-moderate	Moderate-High

[1] Personal communication, City of Pasadena Human Services & Recreation Department, April 2012.

Policy 9.5 – Stewardship of the Natural Environment: Encourage and promote the stewardship of Pasadena's natural environment, including water conservation, clean air, natural open space protection, and recycling. Encourage the use of native, water conserving, and regionally appropriate landscaping.

The Green Space, Recreation and Parks Element (City of Pasadena 2007)

Policy 1.2 – Protect Open Spaces: Protect natural open areas, watersheds, and environmentally sensitive areas such as Hahamongna, Eaton Canyon, riparian areas, and other open spaces.

OBJECTIVE 2 – Preservation And Protection Of The Arroyo Seco And Adjacent Open Space Areas: Recognize the importance to Pasadena of the history, cultural resources, and unique character of the Arroyo Seco, and conserve and enhance these assets.
Policy 2.1 – Arroyo Seco Planning: Fully implement all master plans and design guidelines for the Arroyo. This includes the Lower Arroyo Master Plan, the Hahamongna Watershed Park Master Plan, and the Central Arroyo Master Plan. (LUE Policy 9.2)

Policy 2.3 – Balance Recreation with Environmental Protection: Implement the Arroyo Seco Master Plans by balancing recreational opportunities with protection and restoration of the ecosystem, while recognizing the important existing water resources and flood management functions of the area.

Policy 2.4 – Promote multi-faceted use of the Arroyo: Through implementation of the Arroyo Seco Master Plans, continue to maintain and enhance the area as a prime resource for quality of life of Pasadena residents.

The General Plan Update Open Space and Conservation Element (City of Pasadena 2012c), provides a blueprint for natural open space and conservation. Implementation Measures found in this Element pertaining to the Proposed Project are outlined below.

Protect Existing Open Space: Continue to preserve and restore the Arroyo Seco and Eaton Canyon.

Zoning Changes: Protect the existing natural open space within the Hahamongna Watershed Park Master Plan area.

City of Pasadena Hahamongna Watershed Park Master Plan

Applicable Goals and Objectives of the Hahamongna Watershed Park Master Plan include the following:

Goal 2: The Devil's Gate flood control basin will be managed to provide protection to the developed and natural downstream areas.

Objectives:

- Facilitate the dam and reservoir maintenance operations in a manner that is compatible with the proposed features of the Master Plan and will result in minimal impacts to the surrounding area.

- Develop a sediment removal plan that minimizes the impact to the basin and to the surrounding neighborhoods.

- Develop a grading plan that allows habitat restoration and recreational activities to coexist with flood management and water conservation.

Goal 5: Enrich and promote the unique history and culture of Hahamongna Watershed Park.

Objectives:

- Develop design guidelines to ensure aesthetic compatibility and quality construction for any improvements made within Hahamongna Watershed Park.

Scenic Highways

The California Scenic Highway Program is administered by Caltrans. In general, a highway may be designated by Caltrans as scenic depending upon how much of the natural landscape can be seen by travelers, the scenic quality of the landscape, and the extent to which development intrudes upon the traveler's enjoyment of the view. When a city or county nominates an eligible local highway for official scenic highway designation, it must identify and define the scenic corridor of the highway. The agency must also adopt ordinances to preserve the scenic quality of the corridor or document such regulations that already exist in various portions of local codes. The ordinances make up the scenic corridor protection program. In general, a designated scenic corridor is the land generally adjacent to and visible from the highway. A designated scenic corridor is generally identified using a motorist's line of vision. A reasonable boundary is selected when the view extends to the distant horizon (Caltrans 2013).

3.4.4 Significance Criteria

- *AESTHETICS-1: Would the project have a substantial adverse effect on a scenic vista?*
- *AESTHETICS-2: Would the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?*
- *AESTHETICS-3: Would the project substantially degrade the existing visual character or quality of the site and its surroundings?*
- *AESTHETICS-4:Cumulative Impacts*

3.4.5 Methodology

Chambers Group, Inc. (Chambers Group) has conducted a visual analysis of the Proposed Project site including the five LACFCD-chosen viewpoints. The implementation of the Proposed Project was analyzed using a visual analysis system which, in general, examines visual sensitivity and visual change. The purpose of this analysis was to identify any significant impacts to visual resources as a result of the Proposed Project.

Existing Visual Sensitivity Factors

An analysis of the existing visual sensitivity of the Proposed Project site was made through an examination of the existing views and visual characteristics of the site. This was accomplished through a determination of public viewpoints, taking photographs from those viewpoints, and recording

information including the visual quality of the site, potential viewer sensitivity, site visibility, and duration of views, among other information. These factors were qualified as follows:

Project Visual Sensitivity Factors

Viewpoints

Key viewpoints were selected to be representative of significant locations from which the project would be seen. Viewpoints were chosen based on their usefulness in evaluating existing landscapes and potential impacts on visual resources. Each viewpoint was photographed and its location and cardinal direction was recorded.

Visual Quality

Visual Quality is a measure of the overall impression or appeal of an area as determined by the landscape characteristics. This can include natural features such as landscapes, waterways, or natural open space or can include built features that are aesthetically pleasing such as a park or skyline or that have an associated public value. The five levels of visual quality can generally be defined as follows:

- *Low:* Landscape elements have low to no appeal, and the landscape is dominated by discordant built features. The landscape character is heavily altered.
- *Low-to-Moderate:* The landscape elements have low to moderate appeal due to some prominent, though not dominantly discordant, built features.
- *Moderate:* The landscape elements are moderately appealing; the landscape attributes have common or ordinary values. The landscape may contain discordant built features, but they are subordinate.
- *Moderate-to-High:* Landscape attributes have a mix of moderate and high values, containing built features that neither complement nor detract from overall visual quality.
- *High:* High visual appeal due to landscape elements including landforms, vegetative patterns, water characteristics, and cultural features. The viewpoint has distinctive landscape that attracts people to the view.

Viewer Sensitivity

Viewer Sensitivity is a factor used to represent the value of the visual landscape to the viewing public, including the extent to which the landscape is viewed. For example, a landscape may have high scenic qualities but be remotely located and, therefore, is seldom viewed. Sensitivity considers such factors as visual access (including duration and frequency of view), type and amount of use, public interest, adjacent land uses, and whether the landscape is part of a special or designated area. The three levels of viewer sensitivity can generally be defined as follows:

- *Low Sensitivity:* Areas that are remote from populated areas, major roadways, and protected areas or are severely degraded visually.

- *Medium Sensitivity:* Areas lacking specific, or designated, scenic resources protection but receive a high degree of use and/or are located in sufficiently close proximity to be within the viewshed of the protected area. Includes areas that are visible from well-traveled roads and highways.

- *High Sensitivity*: Areas that are either designated for scenic resources protection or receive a high degree of use.

Visibility

Visibility is how easily the view can be seen or accessed by the public. Visibility is determined during the site visit, based on viewing proximity, visible detail, lighting, and any screening or obscuring features; and is ranked low to high.

Distance Zones of Project Components

From the viewpoint chosen, the distance zones were identified to note the nearest elements and furthest elements in view, including the project site.

Type/Number of Viewers

This category identifies the type of area in which the viewer is located and the number of this type of viewer that could be expected. The types of areas would include: roadways, trails, parks, residential uses, etc. The number of viewers is qualified based on the type of viewer and ranked low to high.

Duration of View

This category identifies how long the view of the project site will be seen. If it is a designated lookout then the viewer can stand there as long as he or she wants; however, if the view is from a highway, the view would be relatively brief. The four levels of duration of view can generally be defined as follows:

- *Low:* Brief, less than one minute

- *Low to Moderate:* Less than 10 minutes

- *Moderate:* Less than one hour

- *High:* Over an hour (potentially indefinite)

Overall Visual Sensitivity

Under this category, the overall visual sensitivity of a site is derived from the combination of the above defined contributing and equally weighted factors of visual quality, viewer sensitivity, and overall viewer exposure (visibility, distance zone, number of viewers, duration of view) and is

ranked from low to high. The summation of these factors is intuitive when all contributing factors receive the same ranking: if all factors are ranked high the summation will also be high; if all factors are ranked low the summation will also be low. When the contributing factors receive mixed rankings, a determination of summation is based on analyst judgment.

Project Visual Impact Factors

The visual impact a project may have on a site is qualified through the following factors:

Type of Visual Change

A description of what the visual change will entail; can include project and engineering details.

Visual Contrast

Describes the degree to which a project's visual characteristics or elements differ from the same visual elements established in the existing landscape. The degree of contrast can range from low to high. The elements in the landscape similar to those of a Proposed Project indicate a landscape more capable of accepting those project characteristics than a landscape where those elements are absent. This ability to accept alteration is often referred to as visual absorption capability and typically is inversely proportional to visual contrast; and is ranked from low to high.

Project Dominance

This section is a measure of a feature's apparent size relative to other visible landscape features and the total field of view. A feature's dominance is affected by its relative location in the field of view and the distance between the viewer and the feature. The level of dominance can range from low (subordinate) to moderate (codominant) to high (dominant).

View Blockage

Describes the extent to which any previously visible landscape features are blocked from view as a result of the project's scale and/or position. Absence of view blockage is ranked as none. When view blockage does occur, the degree of view blockage is ranked from low to high.

Overall Visual Change

This category offers a concluding assessment as to the degree of visual change that would be caused by a project. Overall visual change is derived by combining the three equally weighted factors of visual contrast, project dominance, and view blockage. Overall visual change can range from low to high. The summation of these factors is intuitive when all contributing factors receive the same ranking: if all factors are ranked high the summation will also be high; if all factors are ranked low the summation will also be low. When the contributing factors receive mixed rankings, a determination of summation is based on analyst judgment.

Impact Significance

The determination of the level of impact a project may have on a project site is based on the relationship of the overall visual sensitivity to the expected overall visual change, as demonstrated in Table 3.4-2 below. Visual changes to a site with a high visual degree of sensitivity could be low without a potentially significant impact occurring. At the other end of the spectrum, visual changes to a site with a low degree of visual sensitivity could be high without a potentially significant impact occurring. The determinations are ranked as follows:

- **Not Significant –** visual changes are considered minor
- **Adverse but Less Than Significant –** visual changes may be viewed as negative but do not exceed environmental thresholds
- **Adverse and Potentially Significant -**visual changes are perceived as negative and may exceed environmental thresholds depending on project and site-specific circumstances
- **Significant-** visual changes are perceived as negative and do exceed environmental thresholds

Table 3.4-2: Visual Impact Significance

Overall Visual Sensitivity	Overall Visual Change				
	Low	Low to Moderate	Moderate	Moderate to High	High
Low	Less than Significant	Less than Significant	Less than Significant	Less than Significant	Less than Significant
Low to Moderate	Less than Significant	Less than Significant	Less than Significant	Less than Significant	Potentially Significant
Moderate	Less than Significant	Less than Significant	Less than Significant	Potentially Significant	Potentially Significant
Moderate to High	Less than Significant	Less than Significant	Potentially Significant	Potentially Significant	Significant
High	Less than Significant	Potentially Significant	Potentially Significant	Significant	Significant

3.4.6 Impacts and Mitigation

AESTHETICS-1 *Have a substantially adverse effect on a scenic vista.*

Sediment Removal

Potential impacts to views are described below in Table 3.4-3: Sediment Removal Visual Change.

Table 3.4-3:Sediment Removal Visual Change

Viewpoint No. (Location, pole, etc.)	Viewpoint		Visual Change				
	Location	Direction Facing	Type of Visual Change	Visual Contrast	Project Dominance	View Blockage	Overall Visual Change
View 1	Bench near the west side of the dam (near La Cañada Verdugo Road)	East	Area of vegetation and soil removal reduced in comparison to the Proposed Project. Large swaths of existing vegetation and topography will remain in the center and on the east and west sides of the Proposed Project site. Removal activities will occur seasonally over a five-year timeframe.	High	Moderate	None	Moderate-High
View 2	Top of dam	North	Area of vegetation and soil removal reduced in comparison to the Proposed Project. Large swaths of existing vegetation and topography will remain in the center and on the east and west sides of the Proposed Project site. Removal activities will occur seasonally over a five-year timeframe.	High	High	None	Moderate-High
View 3	East of dam near trail	West	Area of vegetation and soil removal reduced in comparison to the Proposed Project. Large swaths of existing vegetation and topography will remain in the center and on the east and	High	Moderate	None	Moderate-High

Table 3.4-3:Sediment Removal Visual Change

Viewpoint No. (Location, pole, etc.)	Viewpoint		Visual Change				
	Location	Direction Facing	Type of Visual Change	Visual Contrast	Project Dominance	View Blockage	Overall Visual Change
			west sides of the Proposed Project site. Removal activities will occur seasonally over a five-year timeframe.				
View 4	Normandy Court	North	Area of vegetation and soil removal reduced in comparison to the Proposed Project. Large swaths of existing vegetation and topography will remain in the center and on the east and west sides of the Proposed Project site. Removal activities will occur seasonally over a five-year timeframe.	Moderate-High	Moderate	None	Moderate
View 5	Windsor Parking Lot	Southwest	Area of vegetation and soil removal reduced in comparison to the Proposed Project. Large swaths of existing vegetation and topography will remain in the center and on the east and west sides of the Proposed Project site. Removal activities will occur seasonally over a five-year timeframe.	Moderate-High	Moderate	None	Moderate

Table 3.4-4: Sediment Removal Visual Impact Significance summarizes the overall visual sensitivity and visual change associated with each of the viewpoints during sediment removal, and how these correspond to the impact significance.

Table 3.4-4: Sediment Removal Visual Impact Significance

Viewpoint	Overall Visual Sensitivity	Overall Visual Change	Impact Significance
View 1	Moderate-High	Moderate-High	Potentially Significant
View 2	Moderate-High	Moderate-High	Potentially Significant
View 3	Moderate-High	Moderate-High	Potentially Significant
View 4	Moderate-High	Moderate	Potentially Significant
View 5	Moderate-High	Moderate	Potentially Significant

The proposed sediment removal activities would change the visual characteristics of the Proposed Project site through the removal of sediment and associated vegetation and trees in the reservoir. Sediment removal activities would not result in obstruction or blockage of views due to the difference in elevation between viewpoints and the Proposed Project site. Construction equipment would also be visible in the basin. Views of construction equipment would be expected elements in the viewshed due to the ongoing IMP measures currently underway to keep debris from plugging the outlet works; however, the amount of equipment and duration will be greater for the Proposed Project than for the IMP measures.

With sediment removal, the topography of the reservoir would be lower, especially toward the downstream portion of the reservoir near the dam; and vegetation within the Proposed Project site would be removed. These elements would result in a high degree of contrast from existing visual characteristics and would result in a significant impact to scenic vistas. These highly contrasting elements would be highly visible from Viewpoints 1 through 3.

For Viewpoints 1 and 3, however, the codominant features of Devil's Gate Dam, the maintenance roads, electrical lines, and the debris boom line and other less dominant features of the San Gabriel Mountains, Oak Grove Drive, JPL facilities, and residential areas will remain unchanged. Sediment removal activities would also be visible from Viewpoint 4 and Viewpoint 5 but would be less dominant due to distance and other more dominant visual elements. The dominant features for Viewpoint 4 (I-210, Devil's Gate Dam, San Gabriel Mountains) and Viewpoint 5 (spreading grounds, JPL facilities) will remain unchanged.

Excavation and associated activities within the reservoir area are expected to take place during drier months, from April to December, as weather permits. During the wetter months, temporary changes to the visual characteristics of the Proposed Project site will be slightly less apparent with water storage in the basin. Some regrowth of riparian vegetation is likely to occur during this time. Both these factors will reduce the change in the visual characteristics associated with sediment removal. In addition, as discussed above, sediment removal activities would not introduce view-obstructing features.

Due to the multi-year duration of the sediment removal phase, the large-scale alteration, visibility of the site, and the level of viewer sensitivity, sediment removal activities will be a significant impact to scenic vistas (see Table 3.4-4).

Reservoir Management

Reservoir management would not result in obstruction or blockage of views. Construction equipment would also be visible in the basin for short periods of time.

Under Management Option 1, after sediment removal, approximately 120 acres of vegetation will be maintained annually. Vegetation conditions on the Proposed Project site will change annually from disturbed to low and dense. Due to the rapid growth of wetland herbaceous plants, it is expected that during the majority of the year the Proposed Project site will be appear vegetated. Therefore, Management Option 1 will result in a lower degree of contrast than seen during sediment removal and will result in a less than significant impact to scenic vistas.

Visual simulations were created for Viewpoints 1 through 4 to portray the expected conditions under reservoir management Option 2 at each of the chosen locations (see Figure 3.4-10 Viewpoint 1 Reservoir Management Conditions, Figure 3.4-11: Viewpoint 2 Reservoir Management Conditions, Figure 3.4-12: Viewpoint 3 Reservoir Management Conditions, and Figure 3.4-13: Viewpoint 4 Reservoir Management Conditions). These views were selected based upon location, accessibility, topography, and potential visibility. Visual simulations were not created for Viewpoint 5 due to dominance of other visual elements (spreading grounds, JPL facilities). Potential impacts to views are described below and summarized in Table 3.4-5: Reservoir Management Visual Change. Table 3.4-6: Reservoir Management Visual Impact Significance summarizes the overall visual sensitivity and visual change associated with each of the viewpoints during reservoir management and how these correspond to the impact significance.

Under Management Option 2, approximately 91.28 acres on the southern half of the reservoir will be maintained annually. After completion of the proposed sediment removal activities, the disturbed areas outside the reservoir management area are expected to experience natural regrowth by native vegetation, primarily Riparian Herbaceous vegetation. Riparian Herbaceous vegetation is an early successional stage of willow scrub and riparian forest communities. Composed of pioneer wetland herbaceous plants that rapidly colonize disturbed areas (Gray and Bramlet 1992), this vegetation community is expected to continue to populate and/or re-establish the Proposed Project site after the annual mowing or removal/grubbing activities. As with existing conditions, vegetation conditions on the Proposed Project site, including height and density, would change on a regular basis due to seasonal conditions, water flow/views, water storage, and sediment conditions. Under Option 2, at the end of the sediment removal phase, implementation of Mitigation Measures MM BIO-6, MM BIO-7, and MM BIO-8 would involve habitat restoration and enhancement and tree replacement in the remaining approximately 28.72 acres on the northern half of the reservoir. As with existing conditions, vegetation conditions on the Proposed Project site, including height and density, would change on a regular basis due to seasonal conditions, water flow/views, water storage, and sediment conditions. The vegetation and trees on the northern half of the reservoir are expected to appear as more dominant features than the vegetation in the southern portion. Therefore, Management Option 2 will result in a lower degree of contrast than seen during sediment removal or under Management Option 1 and will result in a less than significant impact to scenic vistas.

Table 3.4-5: Reservoir Management Visual Change

Viewpoint No. (Location, pole, etc.)	Viewpoint			Visual Change				
	Location	Direction Facing	Figure No.	Type of Visual Change	Visual Contrast	Project Dominance	View Blockage	Overall Visual Change
View 1	Bench near the west side of the dam (near La Cañada Verdugo Road)	East	3.4-10	Views of natural regrowth of native vegetation in the majority of the reservoir. Trees on border of reservoir management area expected to be dominant features.	Low	Low	None	Low
View 2	Top of dam	North	3.4-11	Views of natural regrowth of native vegetation in the majority of the reservoir. Trees on border of reservoir management area expected to be dominant features.	Low	Low-Moderate	None	Low
View 3	East of dam near trail	West	3.4-12	Views of natural regrowth of native vegetation in the majority of the reservoir. Trees on border of reservoir management area expected to be dominant features.	Low	Low	None	Low
View 4	Normandy Court	North	3.4-13	Views of natural regrowth of native vegetation in the majority of the reservoir. Trees on border of reservoir management area expected to be dominant features.	Low	Low	None	Low
View 5	Windsor Parking Lot	Southwest	NA	Views of natural regrowth of native vegetation in the majority of the reservoir. Trees on border of reservoir management area expected to be dominant features.	Low	Low	None	Low

Table 3.4-6: Reservoir Management Visual Impact Significance

Viewpoint	Overall Visual Sensitivity	Overall Visual Change	Impact Significance
View 1	Low-Moderate	Moderate	Less than Significant
View 2	Low-Moderate	Moderate	Less than Significant
View 3	Low-Moderate	Moderate	Less than Significant
View 4	Low-Moderate	Moderate	Less than Significant
View 5	Low-Moderate	Moderate	Less than Significant

Mitigation Measure

Achieving the sediment removal described for the Proposed Project would necessitate excavation activities throughout the entire Proposed Project site for an extended duration. These factors eliminate any feasible mitigation measure to reduce this impact.

Reservoir management under either option will not result in any significant impacts and, therefore, will not require mitigation. For reservoir management under Option 2, however, the less than significant impacts will be further reduced through the implementation of Mitigation Measures MM BIO-6, MM BIO-7, and MM BIO-8.

Residual Impacts After Mitigation

Due to the multi-year duration of the sediment removal phase, the large-scale alteration, visibility of the site, the level of viewer sensitivity, and the lack of feasible mitigation measures; impacts to scenic vistas from sediment removal activities will remain significant.

Reservoir management impacts to scenic vistas under both options will result in a lower degree of contrast than seen during sediment removal and will result in a less than significant impact to scenic vistas.

AESTHETICS-2 *Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway.*

Sediment Removal/Reservoir Management

The Proposed Project would not involve damage to rock outcroppings or historic buildings and would not involve the obstruction of views. Activities under sediment removal and both reservoir management options would involve the removal of vegetation, including native and non-native trees, from the site.

As described previously, the Proposed Project is not visible from the only designated state scenic highway in the vicinity of the Proposed Project, State Highway 2 (SR-2). Therefore, implementation of the Proposed Project would not damage scenic resources within the viewshed of a designated state scenic highway.

I-210, located to the south of the Proposed Project site, is identified as "Eligible" in the State Scenic Highway Program. The Proposed Project would impact the existing visual character of a portion of the

viewshed through the removal of vegetation including native and non-native trees from the site. Views of the Proposed Project site from I-210, however, are very brief in nature (are visible for approximately 0.3 miles) and are dominated by views of the JPL facilities and San Gabriel Mountains. Implementation of the Proposed Project would not obstruct views of these features. Impacts to scenic resources within a state scenic highway would be less than significant.

Mitigation Measure

No mitigation is necessary.

Residual Impacts After Mitigation

The Proposed Project site is not visible from any designated state scenic highway and is only briefly visible from an eligible state scenic highway; therefore, impacts related to state scenic highways from sediment removal and reservoir management under both options are less than significant.

AESTHETICS-3 *Potentially degrade the existing visual character or quality of the site and its surroundings.*

The visual character of the Proposed Project site consists of a flood control facility, with flood control features including a dam and reservoir that provide flood control for the Arroyo Seco and downstream areas, surrounded by passive and active recreational uses, residential uses, the San Gabriel Mountains, and the JPL facilities. While the Proposed Project site does contain man-made features such as maintenance roads, electrical lines, and a debris boom line, the dominant visual characteristics are that of an open area composed of sediment and native and non-native vegetation along with the San Gabriel Mountains. The distribution of the vegetated and disturbed/non-vegetated areas changes depending on seasonal conditions, water flow, and sediment deposition. The Proposed Project site has an overall moderate-to-high visual quality due to this mix of openness, sediment/vegetative patterns, and built features.

Sediment Removal

The proposed sediment removal activities would change the visual characteristics of the existing Proposed Project site through the removal of sediment and associated vegetation in the reservoir. The potential impacts to visual characteristics are described above in Table 3.4-3: Sediment Removal Visual Change.

Disturbed landscape areas, both man-made and natural, are currently found throughout the basin. The amount and distribution of these areas change on a regular basis and are expected visual elements in the Proposed Project site landscape. Construction equipment will also be visible in the basin. Views of construction equipment will be expected elements in the viewshed, due to the ongoing IMP measures currently underway to keep debris from plugging the outlet works; however, the amount of equipment and duration onsite will be greater for the Proposed Project than for the IMP measures.

Sediment and debris management are considered existing operational components of Devil's Gate Reservoir and are not considered significant impacts to the visual characteristics of the site (City of Pasadena 2002). During the sediment removal phase, the disturbed areas will replace the vegetated areas, resulting in a high degree of contrast between existing and sediment removal conditions. While

the open character of the site will remain, the overall visual quality of the Proposed Project site will be lower due to the large-scale alteration and decrease of desirable elements.

Excavation and associated activities within the reservoir area are expected to take place during drier months, from April to December, as weather permits. During the wetter months, temporary changes to the visual characteristics of the Proposed Project site will be slightly less apparent with water storage in the basin. Some regrowth of riparian vegetation is also likely to occur during this time. Both these factors will reduce the temporary change in the visual characteristics associated with sediment removal. Nevertheless, due to the multi-year duration of the sediment removal phase, the large-scale alteration, visibility of the site, and the level of viewer sensitivity, sediment removal activities will be a significant impact to the visual character of the Proposed Project site.

Reservoir Management

Under both management options, construction equipment would also be visible in the basin but only for short periods of time.

As described previously, under Management Option 1, vegetation conditions on the Proposed Project site will change annually from disturbed to low and dense. Due to the rapid growth of wetland herbaceous plants, it is expected that during the majority of the year the Proposed Project site will appear vegetated. Therefore, Management Option 1 will result in a lower degree of contrast than seen during sediment removal and will result in a less than significant impact to visual characteristics.

Figures 3.4-10 through 3.4-13 show the expected visual conditions under Reservoir Management Option 2. Potential impacts to visual characteristics are described above in Table 3.4-4 Reservoir Management Visual Change and Table 3.4-5 Reservoir Management Visual Impact Significance. Under Management Option 2, approximately 91.28 acres on the southern half of the reservoir will exhibit the annual changes from disturbed to low, dense Riparian Herbaceous vegetation; and habitat restoration and enhancement and tree replacement will take place in the remaining approximately 28.72 acres on the northern half of the reservoir. As with existing conditions, vegetation conditions on the Proposed Project site, including height and density, would change on a regular basis due to seasonal conditions, water flow/views, water storage, and sediment conditions. Therefore, Management Option 2 will result in a lower degree of contrast than seen during sediment removal or under Management Option 1 and will result in a less than significant impact to visual characteristics.

Mitigation Measure

No feasible mitigation measures were identified for sediment removal.

For reservoir management under Option 2, at the end of the sediment removal phase, implementation of Mitigation Measures MM BIO-6, MM BIO-7, and MM BIO-8 would involve habitat restoration and enhancement and tree replacement in the remaining approximately 28.72 acres on the northern half of the reservoir.

Residual Impacts After Mitigation

Due to the multi-year duration of the sediment removal phase, the large-scale alteration, visibility of the site, the level of viewer sensitivity, and the lack of feasible mitigation; impacts to visual character from sediment removal activities will remain significant.

Reservoir management impacts to visual character under both options will result in a lower degree of contrast than seen during sediment removal and will result in a less than significant impact to visual character.

AESTHETICS-4 *Cumulative Impacts*

Only four of the cumulative projects are within the immediate vicinity of the Proposed Project site and would have the potential to combine with the Proposed Project to create a cumulative aesthetic impact.

The NASA Jet Propulsion Laboratory (JPL) On-Site Parking Structure project is expected to blend in with and have a lower skyline than the existing JPL buildings (AEGISS, Inc. 2012).

The Hahamongna Watershed Park MBMU Project will also not introduce view-obstructing structures into the landscape (City of Pasadena 2002). Construction activities from the Hahamongna Watershed Park MBMU Project may take place during the same time as the Proposed Project's sediment removal phase and could increase the temporary change in the views of and the visual characteristics of Hahamongna Watershed Park. In addition, mature existing vegetation would for the most part screen views of one project from the other, reducing the potential for cumulative impacts to less than significant.

The Arroyo Seco Canyon Project will also not introduce view-obstructing structures into the landscape (Arroyo Seco Foundation 2013). Construction activities from the Arroyo Seco Canyon Project may take place during the same time as the Proposed Project's sediment removal phase and could increase the temporary change in views of the visual characteristics of Hahamongna Watershed Park. Most of the changes would be beneficial, as the Arroyo Seco Canyon Project includes the reduction in size of the East Arroyo Parking lot, expanding the existing spreading grounds, restoring riparian habitat, and improving passive recreational opportunities.

The Devil's Gate Water Conservation Project will also not introduce view-obstructing structures into the landscape. Construction activities for the Devil's Gate Water Conservation Project may take place during the same time as the Proposed Project sediment removal phase and could increase the temporary change in views of the visual characteristics of Hahamongna Watershed Park; however, impacts would be confined to the eastern edge of the reservoir and would be less than significant.

Mitigation Measure

None required.

Residual Impacts After Mitigation

Cumulative impacts related to aesthetics are less than significant.

Legend

- Proposed Project Boundary
- Proposed Project Viewpoint

Figure 3.4-10
Devil's Gate Reservoir Sediment Removal and Management Project
Viewpoint 1 Reservoir Management Conditions

Version Date: 10/21/2013

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Legend

- Proposed Project Boundary
- Proposed Project Viewpoint

Figure 3.4-11
Devil's Gate Reservoir Sediment Removal and Management Project
Viewpoint 2 Reservoir Management Conditions

Version Date: 10/21/2013

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Legend

- Proposed Project Boundary
- Proposed Project Viewpoint

Figure 3.4-12
Devil's Gate Reservoir Sediment Removal and Management Project
Viewpoint 3 Reservoir Management Conditions

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Legend

Proposed Project Boundary

Proposed Project Viewpoint

Figure 3.4-13
Devil's Gate Reservoir Sediment Removal and Management Project
Viewpoint 4 Reservoir Management Conditions

Version Date: 10/21/2013

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3.5 AIR QUALITY

3.5.1 Introduction

This section describes the existing air quality environmental conditions, and discusses the consequences to air quality related to Proposed Project implementation.

An Air Quality Report (Appendix B) was conducted to analyze the potential air quality impacts that could occur with the sediment removal and management at the Proposed Project. The Air Quality Report was conducted within the context of the California Environmental Quality Act (CEQA, California Public Resources Code Sections 21000 et seq.). The methodology follows the CEQA Air Quality Handbook prepared by the South Coast Air Quality Management District (SCAQMD) for quantification of emissions (SCAQMD 1993).

The environmental baseline condition for the sediment removal phase is considered at the time of publication of the NOP. The environmental baseline conditions for reservoir management will be conditions post sediment removal, approximately in the year 2020.

3.5.2 Existing Environmental Setting

Atmospheric Setting

The Proposed Project site will be located wholly within the South Coast Air Basin (SCAB), which includes all of Orange County, as well as the non-desert portions of Los Angeles, Riverside, and San Bernardino counties. The distinctive climate of the SCAB is determined by its terrain and geographical location. The SCAB is located in a coastal plain with connecting broad valleys and low hills, bounded by the Pacific Ocean in the southwest quadrant, with high mountains forming the remainder of the perimeter. The general region lies in the semi-permanent high-pressure zone of the eastern Pacific. As a result, the climate is mild, tempered by cool sea breezes. This usually mild climatological pattern is interrupted infrequently by periods of extremely hot weather, winter storms, or Santa Ana winds.

Temperature and Precipitation

The annual average temperature varies little throughout the 6,600-square-mile SCAB, ranging from the low 60s to the high 80s. The inland portion, having a less pronounced oceanic influence, shows greater variability in the annual minimum and maximum temperatures. The mean annual high and low temperatures in the project area — as determined from the nearest weather station in Altadena, which has a period of record from 1922 to 2010— are 74.1 degrees Fahrenheit (°F) and 50.0 °F, respectively. The overall climate is a mild Mediterranean, with average monthly maximum temperatures reaching to over 86°F in the summer and dipping to 42°F in the winter (Western Regional Climate Center 2013).

In contrast to a fairly steady pattern of temperature, rainfall is seasonally and annually highly variable. The total average annual precipitation is 22.01 inches, with 83 percent of precipitation occurring between November and March.

Humidity

Although the SCAB has a semi-arid climate, the air near the surface is typically moist because of the presence of a shallow marine layer. Except for infrequent periods when dry, continental air is brought into the SCAB by offshore winds, the ocean effect is dominant. Periods of heavy fog, especially along the coastline, are frequent; and low stratus clouds, often referred to as "high fog" are a characteristic climatic feature. Annual average humidity ranges from a high of about 72 percent at the coast to about 58 percent in the eastern portion of the SCAB.

Wind

Wind patterns across the south coastal region are characterized by westerly and southwesterly onshore winds during the day and easterly or northeasterly breezes at night. Wind speed is somewhat greater during the dry summer months than during the rainy winter season. Typical summer winds in the project area range from 4 to 7 miles per hour (mph) during the day and 2 to 6 mph during the night.

Between the periods of dominant airflow, periods of air stagnation may occur, both in the morning and evening hours. Whether such a period of stagnation occurs is one of the critical determinants of air quality conditions on any given day. During periods of low inversions and low wind speeds, air pollutants generated in urbanized areas are transported predominantly onshore into Riverside and San Bernardino counties. In the winter, the greatest pollution problems are carbon monoxide (CO) and nitrogen oxides (NO_X) because of extremely low inversions and air stagnation during the night and early morning hours. In the summer, the longer daylight hours and the brighter sunshine combine to cause a reaction between hydrocarbons and NO_X to form photochemical smog.

During the winter and fall months, surface high-pressure systems over the SCAB, combined with other meteorological conditions, can result in very strong, downslope Santa Ana winds. These winds normally have a duration of a few days before predominant meteorological conditions are re-established. Within the project area, Santa Ana winds have a decidedly distinct pattern. Santa Ana winds from a northerly direction flow through the Cajon Pass and then follow the Santa Ana River in a southwestward direction to the coast. The highest wind speeds typically occur during the afternoon due to daytime thermal convection caused by surface heating. This convection brings about a downward transfer of momentum from stronger winds aloft. While the maximum wind speed during Santa Ana conditions is undefined, sustained winds of 60 mph with higher gusts are not uncommon in the project vicinity.

Inversions

In conjunction with the two characteristic wind patterns that affect the rate and orientation of horizontal pollutant transport, two similarly distinct types of temperature inversions control the vertical depth through which pollutants are mixed. These inversions are the marine/subsidence inversion and the radiation inversion. The height of the base of the inversion at any given time is known as the "mixing height." This mixing height can change under conditions when the top of the inversion does not change. The combination of winds and inversions is a critical determinant in leading to the highly degraded air quality in summer and the generally good air quality in the winter in the project area.

Air Quality Environment

Criteria Air Pollutants

As required by the Federal Clean Air Act (FCAA), the Environmental Protection Agency (EPA) has identified criteria pollutants and established National Ambient Air Quality Standards (NAAQS) to protect public health and welfare. NAAQS have been established for ozone, CO, nitrogen dioxide (NO_2), sulfur dioxide (SO_2), suspended particulate matter (PM), and lead. Suspended PM has standards for both PM with an aerodynamic diameter of 10 microns or less (respirable PM, or PM_{10}) and PM with an aerodynamic diameter of 2.5 microns or less (fine PM, or $PM_{2.5}$). The California Air Resources Board (CARB) has established separate standards for the State, i.e., the California Ambient Air Quality Standards (CAAQS). The CARB established CAAQS for all the federal pollutants and sulfates, hydrogen sulfide, and visibility-reducing particles.

For some of the pollutants, the identified air quality standards are expressed in more than one averaging time in order to address the typical exposures found in the environment. For example, CO is expressed as a one-hour averaging time and an eight-hour averaging time. Regulations have set NAAQS and CAAQS limits in parts per million (ppm) or micrograms per cubic meter ($\mu g/m^3$). Table 3.5-1 summarizes the State and federal ambient air quality standards for all criteria pollutants.

Table 3.5-1: National and State Ambient Air Quality Standards

Air Pollutant	Averaging Time	California Standard	National Standard
Ozone (O_3)	1 hour	0.09 ppm	—
	8 hour	0.070 ppm	0.075 ppm
Respirable particulate matter (PM_{10})	24 hour	50 $\mu g/m^3$	150 $\mu g/m^3$
	Mean*	20 $\mu g/m^3$	—
Fine particulate matter ($PM_{2.5}$)	24 hour	—	35 $\mu g/m^3$
	Mean	12 $\mu g/m^3$	15 $\mu g/m^3$
Carbon monoxide (CO)	1 hour	20 ppm	35 ppm
	8 hour	9.0 ppm	9 ppm
Nitrogen dioxide (NO_2)	1 hour	0.18 ppm	0.100 ppm ***
	Mean	0.030 ppm	0.053 ppm***
Sulfur dioxide (SO_2)	1 hour	0.25 ppm	0.075 ppm ***
	24 hour	0.04 ppm	—
Lead**	30-day	1.5 $\mu g/m^3$	—
	Rolling 3-month	—	0.15 $\mu g/m^3$
	Quarter	—	1.5 $\mu g/m^3$

Table 3.5-1: National and State Ambient Air Quality Standards

Air Pollutant	Averaging Time	California Standard	National Standard
Sulfates	24 hour	25 µg/m^3	**No Federal Standard**
Hydrogen sulfide	1 hour	0.03 ppm	
Vinyl chloride**	24 hour	0.01 ppm	
Visibility-reducing particles	8 hour	Extinction coefficient of 0.23 per kilometer, visibility of ten miles or more due to particles when relative humidity is less than 70%.	

Abbreviations:
ppm = parts per million
µg/m^3 = micrograms per cubic meter
30-day = 30-day average
Quarter = Calendar quarter
* Mean = Annual Arithmetic Mean
** The CARB has identified lead and vinyl chloride as "toxic air contaminants" with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.
*** The new 1-hour and annual mean NO_2 standards and 1-hour SO_2 standard are parts per billion (ppb) but in order to compare national and California standards directly, it has been converted to ppm.
Reference: Ambient Air Quality Standards. California Air Resources Board. June 7, 2012.

Pollutants of Concern

As discussed below, the area surrounding the project is nonattainment or maintenance for ozone, PM, NO_2, and CO. Since reactive hydrocarbons and nitrogen oxides are precursors to ozone, that is, are photochemically combined to create ozone, these are considered pollutants of concern. Following is a brief description of these pollutants of concern, including health effects and the relative level of contributed emissions.

- **Carbon monoxide** (CO) is a colorless, odorless gas produced by incomplete combustion of carbon-containing fuels (e.g., gasoline, diesel fuel, and biomass). CO levels tend to be highest during the winter months and low wind speed when the meteorological conditions favor the accumulation of the pollutants. This occurs when relatively low inversion levels trap pollutants near the ground and concentrate the CO. CO is essentially inert to plants and materials but can have significant effects on human health. CO gas enters the body through the lungs, dissolves in the blood, and creates a solid bond to hemoglobin, not allowing it to form a loose bond with carbon dioxide (CO_2), which is essential to the CO_2/oxygen exchange to occur. This firm binding therefore reduces available oxygen in the blood and oxygen delivery to the body's organs and tissues.

  A review of CARB's 2010 Emission Inventory shows that the primary source of CO is from on-road motor vehicles, which contribute almost60 percent of the total CO in the SCAB portion of Los Angeles County. Other off-road engines and vehicles (such as construction equipment and recreational boats) contribute another 32 percent. Higher levels of CO generally occur in areas with heavy traffic congestion (CARB 2011).

- **Volatile organic compounds** (VOC) are defined as any compound of carbon, excluding CO, CO_2, carbonic acid, metallic carbides or carbonates, and ammonium carbonate, which participates in atmospheric photochemical reactions. It should be noted that no state or national ambient air quality standard for VOC exists because they are not classified as criteria pollutants. They are regulated, however, because a reduction in VOC emissions reduces certain chemical reactions that contribute to the formulation of ozone. VOC are also transformed into organic aerosols in the atmosphere, which contribute to higher PM_{10} and lower visibility.

  VOC emissions result primarily from incomplete fuel combustion and the evaporation of chemical solvents and fuels. On-road mobile sources are the largest single contributor to VOC emissions in the SCAB portion of Los Angeles County with almost 30 percent of the total VOC emissions, with most of that coming from light-duty vehicles. Another 21 percent is contributed by off-road sources like construction equipment and recreational boats. Solvent evaporation VOC sources in the area contribute another 21 percent and are primarily from the use of consumer products.

- **Nitrogen oxides** (NO_X) serve as integral participants in the process of photochemical smog production. The two major forms of NO_X are nitric oxide (NO) and NO_2. NO is a colorless, odorless gas formed from atmospheric nitrogen and oxygen when combustion takes place under high temperature and/or high pressure. NO_2 is a reddish-brown, irritating gas formed by the combination of NO and oxygen. The SCAB is designated a maintenance area for NO_2, but the primary concern is from the combined NO_X and its relationship to ozone. NO_X is an ozone precursor. A precursor is a directly emitted air contaminant that, when released into the atmosphere, forms, causes to be formed, or contributes to the formation of a secondary air contaminant for which an ambient air standard has been adopted, or whose presence in the atmosphere will contribute to the violation of one or more standards. When NO_X and VOC are released in the atmosphere, they can chemically react with one another in the presence of sunlight to form ozone.

  A review of the 2010 Emission Inventory shows that 86 percent of the total NO_X emissions in the SCAB portion of Los Angeles County come from on- and off-road vehicles (50 percent from on-road and 39 percent from off-road). The largest portion of on-road NO_X emissions come from heavy-duty diesel trucks (36 percent of the total for on-road) and light-duty cars and trucks (28 percent). The largest contributors from off-road sources are construction and demolition equipment (55 percent of total off-road NO_X).

- **Particulate matter** (PM). Particle pollution is a mixture of microscopic solids and liquid droplets suspended in air. This pollution, also known as particulate matter, is made up of a number of components, including acids (such as nitrates and sulfates), organic chemicals, metals, soil or dust particles, and allergens (such as fragments of pollen or mold spores). The size of particles is directly linked to their potential for causing health problems. Small particles less than 10 micrometers in diameter pose the greatest problems because they can get deep into lungs and the bloodstream. Being even smaller, $PM_{2.5}$ will travel further into the lungs. Exposure to such particles can affect both lungs and heart.

  A review of the 2010 Emission Inventory shows that almost 69 percent of the total PM_{10} emissions in the SCAB portion of Los Angeles County come from the category labeled Miscellaneous Processes. The largest portion of the PM_{10} emissions from miscellaneous

processes come from paved road dust (66 percent of the total for miscellaneous processes) and construction and demolition (13 percent). Whereas a significant portion of PM_{10} emissions come from dislocation processes, $PM_{2.5}$ is smaller and is more often a result of particulates coming from combustion sources. Subsequently, Miscellaneous Processes only represent 42 percent of the total $PM_{2.5}$, with paved road dust (39 percent of Miscellaneous Processes $PM_{2.5}$), cooking (32 percent), and residential fuel combustion (14 percent)being the main contributors.

Other Criteria Pollutants

The standards for other criteria pollutants are either being met, maintained, or are unclassified in the SCAB; and the latest pollutant trends suggest that these standards will not be exceeded in the foreseeable future.

Toxic Air Contaminants

In addition to the above-listed criteria pollutants, toxic air contaminants (TACs) are another group of pollutants of concern. According to the California's latest Almanac, the Health and Safety Code defines a TAC as an air pollutant which may cause or contribute to an increase in mortality or serious illness or which may pose a present or potential hazard to human health. Almost 200 compounds have been designated as TACs in California. The 10 TACs posing the greatest known health risk in California, based primarily on ambient air quality data, are acetaldehyde, benzene, 1,3-butadiene, carbon tetrachloride, hexavalent chromium, formaldehyde, methylene chloride, para-dichlorobenzene, perchloroethylene, and diesel particulate matter (DPM). As with the criteria pollutants, TACs are emitted from stationary sources, area-wide sources, and mobile sources (CARB 2013).

The Almanac relates that an analysis of 2007 State-wide health risks demonstrated that 79 percent of entire State's risks from TACs are attributed to DPM. CARB identified the PM emissions from diesel-fueled engines as a TAC in August 1998 under California's TAC program. In California, diesel engine exhaust has been identified as a carcinogen. DPM is emitted from both mobile and stationary sources; but in California, on-road diesel-fueled vehicles contribute approximately 38 percent of the statewide total, with an additional 60 percent attributed to other mobile sources such as construction and mining equipment, agricultural equipment, and transport refrigeration units. Stationary sources, contributing about 1 percent of emissions, include shipyards, warehouses, heavy equipment repair yards, and oil and gas production operations.

The primary existing source of TAC emissions in the Proposed Project area is I-210.

Sensitive Receptors

Some members of the population are especially sensitive to air pollutant emissions and should be given special consideration when air quality impacts from projects are evaluated. These people include children, the elderly, persons with preexisting respiratory or cardiovascular illness, and athletes and others who engage in frequent exercise. Structures that house these persons or places where they gather are defined as sensitive receptors by SCAQMD.

Residential areas are considered sensitive to air pollution because residents (including children and the elderly) tend to be at home for extended periods of time, resulting in sustained exposure to any pollutants present. Recreational land uses are considered moderately sensitive to air pollution. Exercise

places a high demand on respiratory functions, which can be impaired by air pollution even though exposure periods during exercise are generally short. In addition, noticeable air pollution can detract from the enjoyment of recreation. Industrial and commercial areas are considered the least sensitive to air pollution. Exposure periods are relatively short and intermittent, as the majority of the workers tend to stay indoors most of the time. In addition, the working population is generally the healthiest segment of the public.

The Proposed Project is located adjacent to residential areas, and 10 schools are located within one-half mile: i.e., Crestview Preparatory, Franklin Elementary, Hillside School and Learning Center, Jackson Elementary, La Cañada High School (includes La Cañada Junior High School), Child Education Center, Nanny's Nursery, Odyssey Charter, and Woodbury Preschool Village.

Historical Ambient Conditions

Local Ambient Air Quality

Existing levels of ambient air quality and historical trends and projections in the Proposed Project area are best documented by ambient measurements made by the SCAQMD. The SCAQMD has an extensive air-monitoring network that measures levels of several air pollutants throughout the SCAB. The SCAQMD has subdivided the SCAB into 38 Source-Receptor Areas (SRA), each containing one or more monitoring stations. These SRAs provide a general representation of the local meteorological and air quality conditions within the particular area.

The Proposed Project is located within the western portion of the San Gabriel Valley Area. The project site is in SRA 8 and has a monitoring station located only 5 miles southeast of the project site; however, this site (the Pasadena, S. Wilson Avenue Site) measures only ozone, CO, NO_2, and $PM_{2.5}$. The nearest site that measures PM_{10} is located in Burbank on West Palm (8 miles west).

Table 3.5-2: Ambient Air Quality Monitoring Summary summarizes 2006 through 2011 published monitoring data from the CARB's Aerometric Data Analysis and Management System (ADAM) for the Pasadena and Burbank Stations (CARB 2013).

The monitoring data shows that no violations of CO or NO_2 were recorded in the most recent six years; however, the Pasadena Station demonstrates the general air quality problems of the SCAB in that it exceeded both federal and State 8-hour ozone standards and the State 1-hour ozone standard in all the last six years, with the last two years being the cleanest. The State PM_{10} in Burbank and the federal $PM_{2.5}$ standards in Pasadena were exceeded in five of the six years, with the 2010 season not exceeding either. The federal PM_{10} standard was not exceeded in Burbank in any of the years.

Table 3.5-2: Ambient Air Quality Monitoring Summary

Air Pollutant	2006	2007	2008	2009	2010	2011
Ozone (O_3) – Pasadena						
Max 1 Hour (ppm)	**0.151**	**0.149**	**0.122**	**0.176**	**0.101**	**0.107**
Days > CAAQS (0.09 ppm)	26	13	16	12	1	5
Max 8 Hour (ppm)	**0.117**	**0.101**	**0.100**	**0.114**	**0.081**	**0.084**
Days > NAAQS (0.08 ppm)	23	11	16	12	3	5
Days > CAAQS (0.070 ppm)	35	21	26	19	6	13
Carbon Monoxide (CO) – Pasadena						
Max 8 Hour (ppm)	2.80	2.28	2.21	2.13	1.94	2.15
Days > NAAQS (9 ppm)	0	0	0	0	0	0
Days > CAAQS (9.0 ppm)	0	0	0	0	0	0
Nitrogen Dioxide (NO_2) – Pasadena						
Max 1 Hour (ppm)	0.120	0.092	0.105	0.080	0.071	0.102
Days > CAAQS (0.18 ppm)	0	0	0	0	0	0
Particulate Matter (PM_{10}) – Burbank						
Max Daily California Measurement	**69**	**107**	**61**	**76**	50	**60**
Days > NAAQS (150 µg/m^3)	0	0	0	0	0	0
Days > CAAQS (50 µg/m^3)	10	5	5	10	0	2
Particulate Matter ($PM_{2.5}$) – Pasadena						
Max Daily National Measurement	**45.8**	**68.8**	**66.0**	**51.9**	35.2	**43.8**
Days > NAAQS (35 µg/m^3)	1	3	2	3	0	1

Abbreviations:

> = exceed ppm = parts per million □g/m3 = micrograms per cubic meter
CAAQS = California Ambient Air Quality Standard NAAQS = National Ambient Air Quality Standard
Mean = Annual Arithmetic Mean **Bold** = exceedance
* No Data/Insufficient Data

Reference: ADAM Air Quality Data Statistics. California Air Resources Board. http://www.arb.ca.gov/adam/welcome.html. Accessed March 2013.

3.5.3 Applicable Regulations

Air pollutants are regulated at the national, State, and air basin levels; and each agency has a different degree of control. EPA regulates at the national level, CARB regulates at the State level, and SCAQMD regulates at the air basin level in the project area.

Regulatory Agencies

Environmental Protection Agency (EPA)

EPA is the federal agency responsible for overseeing state air programs as they relate to the FCAA, approving State Implementation Plans (SIP), establishing NAAQS, and setting emission standards for mobile sources under federal jurisdiction. EPA has delegated the authority to implement many of the

federal programs to the states while retaining an oversight role to ensure that the programs continue to be implemented.

California Air Resources Board (CARB)

CARB is the State agency responsible for establishing CAAQS, adopting and enforcing emission standards for various sources including mobile sources (except where federal law preempts their authority), fuels, consumer products, and toxic air contaminants. CARB is also responsible for providing technical support to California's 35 local air districts, which are organized at the county or regional level, overseeing local air district compliance with State and federal law, approving local air plans, and submitting the SIP to the EPA. CARB also regulates mobile emission sources in California, such as construction equipment, trucks, and automobiles.

For the purposes of managing air quality in California, the California Health and Safety Codes Section 39606(a)(2) gave CARB the responsibility "based upon similar meteorological and geographic conditions and consideration for political boundary lines whenever practicable" to divide the State into air basins. Los Angeles County is located within three different air basins: the Mojave Desert Air Basin; Salton Sea Air Basin, and the SCAB. The Proposed Project area is in the SCAB portion of Los Angeles County.

South Coast Air Quality Management District (SCAQMD)

The air pollution control agency designated the authority for regulating air quality for the SCAB is SCAQMD. SCAQMD is responsible for controlling emissions primarily from stationary sources and maintains air quality monitoring stations throughout the SCAB to document ambient conditions. The SCAB contains an area of 10,743 square miles that is home to over 16.7 million people — about half the population of the whole state of California. It is the second most populated urban area in the United States and one of the smoggiest.

Attainment Status

Federal

EPA has identified nonattainment and attainment areas for each criteria air pollutant. Under amendments to the FCAA, EPA has classified air basins, or portions thereof, as "attainment," "nonattainment," or "unclassifiable," based on whether or not the national standards have been achieved. EPA uses two categories to designate areas with respect to $PM_{2.5}$ and NO_2, which include (1) does not meet the standard (nonattainment) and (2) cannot be classified or better than national standards (unclassifiable/attainment). EPA uses four categories to designate for SO_2, but the only two that are applicable in California are nonattainment or unclassifiable. EPA uses three categories to designate for PM_{10}: attainment, nonattainment, and unclassifiable.

The FCAA uses the classification system to design cleanup requirements appropriate for the severity of the pollution and set realistic deadlines for reaching cleanup goals. If an air basin is not in federal attainment (that is, it does not meet federal standards) for a particular pollutant, the basin is classified as a marginal, moderate, serious, severe, or extreme nonattainment area, based on the estimated time it would take to reach attainment. Nonattainment areas must take steps towards attainment by a specific timeline. Table 3.5-3: Designations/Classifications for the SCAB shows the federal attainment designations and classifications for the SCAB.

State

The current State Area Designations were adopted by CARB December 28, 2012, and became effective April 1, 2013. The area designations are made on a pollutant-by-pollutant basis, for all pollutants listed above. The State designation criteria specify four categories: nonattainment, nonattainment-transitional, attainment, and unclassified. A nonattainment designation indicates one or more violations of the State standard have occurred. A nonattainment-transitional designation is a subcategory of nonattainment that indicates improving air quality, with only occasional violations or exceedances of the State standard. In contrast, an attainment designation indicates no violations of the State standard. Finally, an unclassified designation indicates either a lack of air quality data or an incomplete set of air quality data (CARB 2012). State attainment designations in the affected area are listed in Table 3.5-3.

Table 3.5-3: Designations/Classifications for the SCAB

Pollutant	State Designation	Federal Designation (Classification)
Ozone	Nonattainment	Nonattainment (Extreme)
Suspended Particulate Matter (PM_{10})	Nonattainment	Nonattainment (Serious)
Fine Particulate Matter ($PM_{2.5}$)	Nonattainment	Nonattainment
Carbon Monoxide (CO)	Attainment	Attainment
Nitrogen Dioxide (NO_2)	Nonattainment	Attainment
Sulfur Dioxide (SO_2)	Unclassifiable	Attainment
Lead	Attainment	Unclassifiable
Sulfates	Attainment	**No federal standards**
Hydrogen Sulfide (H_2S)	Unclassified	
Visibility Reducing Particles	Unclassified	

Federal Clean Air Act Requirements

The FCAA requires plans to provide for the implementation of all reasonably available control measures including the adoption of reasonably available control technology for reducing emissions from existing sources. The FCAA encourages market-based approaches to emission control innovations. Other federal requirements addressed include mechanisms to track plan implementation and milestone compliance for ozone and CO.

2007 Air Quality Management Plan (AQMP)

To ensure continued progress toward clean air and comply with State and federal requirements, the SCAQMD, in conjunction with CARB and Southern California Association of Governments (SCAG), prepared the 2012 revision to its AQMP. The AQMP incorporated the latest scientific and technological information and planning assumptions, including the 2012 Regional Transportation Plan/Sustainable Communities Strategy and updated emission inventory methodologies for various source categories (SCAQDM 2012).

The AQMP was designed to address the federal 24-hour $PM_{2.5}$ air quality standards in the SCAB, to satisfy the planning requirements of the FCAA, and to provide an update on the strategy to meet the 8-hour ozone standard. The AQMP established basin-wide and episodic short-term $PM_{2.5}$ measures; 8-hour ozone implementation measures; and transportation control measures.

In the AQMP, $PM_{2.5}$ measures focused primarily on directly emitted $PM_{2.5}$ and NO_X reductions which could be feasibly achieved by the attainment date of 2014. Direct $PM_{2.5}$ emissions could be substantially reduced by episodically curtailing residential wood burning and open burning from agricultural or prescribed (e.g., brush clearing) sources. NO_X is a precursor to both $PM_{2.5}$ and ozone, and thus NO_X reductions are preferred since they are also needed for ozone.

The 8-hour ozone strategy is more complex since the deadline for attainment is 2023. SCAQMD has another scheduled AQMP for 2015. The AQMP pursues actions that need to be implemented over the next two to three years to work towards meeting the 8-hour ozone standards. Proposed measures to reduce ozone include emission reductions from coatings, consumer products, and RECLAIM facilities as well as early transitions to cleaner technologies.

SCAQMD Rules and Regulations

All projects are subject to SCAQMD rules and regulations in effect at the time of construction. Specific rules applicable to the construction of the Proposed Project may include, but are not limited to, the following:

- Rule 401 – Visible Emissions. A person shall not discharge into the atmosphere from any single source of emission whatsoever any air contaminant for a period or periods aggregating more than three minutes in any one hour which is as dark as or darker in shade than that designated No. 1 on the Ringelmann Chart, as published by the United States Bureau of Mines.

- Rule 402 – Nuisance. This Rule prohibits discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public; or which endanger the comfort, repose, health, or safety of any such persons or the public; or which cause, or have a natural tendency to cause injury or damage to business or property. The provisions of this rule do not apply to odors emanating from agricultural operations necessary for the growing crops or raising fowl or animals.

- Rule 403 – Fugitive Dust. This rule is intended to reduce the amount of particulate matter entrained in the ambient air as a result of anthropogenic (man-made) fugitive dust sources by requiring actions to prevent, reduce, or mitigate fugitive dust emissions. Rule 403 applies to any activity or man-made condition capable of generating fugitive dust.

- Rule 431.1 and 431.2 – Sulfur Content of Gaseous Fuels and Sulfur Content of Liquid Fuels. This Rule requires the use of low-sulfur fuel for stationary construction equipment.

- Rule 1108 – Emulsified Asphalt**.** This Rule sets limitations on VOC content in asphalt.

Toxic Air Contaminants

Air quality regulations also focus on TACs. In general, for those TACs that may cause cancer, there is no concentration that does not present some risk. In other words, no threshold level exists below which adverse health impacts may not be expected to occur. This contrasts with the criteria air pollutants for which acceptable levels of exposure can be determined and for which the ambient standards have been established. Instead, EPA and CARB regulate hazardous air pollutants (HAPs) and TACs, respectively,

through statutes and regulations that generally require the use of the maximum or best available control technology (MACT or BACT) for toxics to limit emissions at the source. These, in conjunction with additional rules set forth by SCAQMD, establish the regulatory framework for TACs.

Federal Hazardous Air Pollutant Programs

EPA has programs for identifying and regulating HAPs. Title III of the FCAA directed EPA to promulgate National Emissions Standards for HAPs (NESHAP). The NESHAP may be different for major sources than for area sources of HAPs. Major sources are defined as stationary sources with potential to emit more than 10 tons per year (tpy) of any HAP or more than 25 tpy of any combination of HAPs; all other sources are considered area sources. The FCAA called on EPA to promulgate emissions standards in two phases. In the first phase (1992 through 2000), EPA developed technology-based emission standards designed to produce the maximum emission reduction achievable. These standards are generally referred to as requiring MACT. For area sources, the standards may be different, based on generally available control technology. In the second phase (2001 through 2008), EPA is required to promulgate health risk-based emissions standards, where deemed necessary, to address risks remaining after implementation of the technology-based NESHAP standards.

The FCAA also required EPA to promulgate vehicle or fuel standards containing reasonable requirements that control toxic emissions, at a minimum for benzene and formaldehyde. Performance criteria were established to limit mobile-source emissions of toxics, including benzene, formaldehyde, and 1,3-butadiene. In addition, Section 219 of the FCAA required the use of reformulated gasoline in selected areas with the most severe ozone nonattainment conditions to further reduce mobile-source emissions.

State and Local Toxic Air Contaminant Programs

TACs in California are primarily regulated through the Tanner Air Toxics Act (Assembly Bill [AB] 1807) and the Air Toxics Hot Spots Information and Assessment Act of 1987 (Hot Spots Act) (AB 2588). AB 1807 sets forth a formal procedure for CARB to designate substances as TACs. Research, public participation, and scientific peer review must occur before CARB can designate a substance as a TAC. To date, CARB has identified more than 21 TACs and adopted EPA's list of HAPs as TACs. DPM was added to the CARB list of TACs in 1998.

Once a TAC is identified, CARB adopts an airborne toxics control measure (ATCM) for sources that emit that particular TAC. If a substance has a safe threshold at which no toxic effect occurs, the control measure must reduce exposure below that threshold. If there is no safe threshold, the measure must incorporate BACT to minimize emissions (e.g., an ATCM limits truck idling to 5 minutes).

CARB published an Air Quality and Land Use Handbook, which provides guidance concerning land use compatibility with TAC sources. While not a law or adopted policy, the Handbook offers advisory recommendations for the siting of sensitive receptors near uses associated with TACs, such as freeways and high-traffic roads, commercial distribution centers, rail yards, ports, refineries, dry cleaners, gasoline stations, and industrial facilities, to help protect children and other sensitive populations (CARB 2005).

At the local level, air pollution control or management districts may adopt and enforce CARB control measures. Under SCAQMD Regulation XIV (Toxics and Other Non-Criteria Pollutants), and in particular Rule 1401 (New Source Review), all sources that possess the potential to emit TACs are required to obtain permits from the district. Permits may be granted to these operations if they are constructed and

operated in accordance with applicable regulations, including new source review standards and air toxics control measures. SCAQMD limits emissions and public exposure to TACs through a number of programs. SCAQMD prioritizes TAC-emitting stationary sources based on the quantity and toxicity of the TAC emissions and the proximity of the facilities to sensitive receptors.

3.5.4 Significance Criteria

- *AIR QUALITY-1: Would the project conflict with or obstruct implementation of the applicable air quality plan?*
- *AIR QUALITY-2: Would the project violate any air quality standard or contribute substantially to an existing or projected air quality violation?*
- *AIR QUALITY-3: Would the project result in a cumulatively considerable net increase of any criteria pollutants for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?*
- *AIR QUALITY-4: Would the project expose sensitive receptors to substantial pollutant concentrations?*
- *AIR QUALITY-5: Would the project create objectionable odors affecting a substantial number of people?*
- *AIR QUALITY-6: Cumulative Impacts*

3.5.5 Methodology

Short-term activities related to the sediment removal and emissions from ongoing reservoir management activities of criteria air pollutants were assessed in accordance with methodologies recommended by CARB and SCAQMD. Emissions were calculated using methodologies and formulas from various agencies including CARB, EPA, and the SCAQMD. Modeled emissions were compared with applicable SCAQMD thresholds to determine significance. Calculations were based, in part, on information about vehicle trip generation from the Proposed Project's Traffic Impact Analysis (Appendix J) prepared for this project. Information on off-road equipment and project scheduling and logistics was supplied by the LACFCD (Hall and Foreman 2013).

Regional Thresholds of Significance

The following regional significance thresholds (Table 3.5-4: Regional Thresholds of Significance) for air quality have been established by the SCAQMD on a daily basis for construction and operations emissions. During construction or operation, if any of the identified daily air pollutant thresholds are exceeded by the Proposed Project, then the project's air quality impacts may be considered significant. The SCAQMD indicates in Chapter 6 of its CEQA Handbook that it considers a project to be mitigated to a level of insignificance if its primary effects are mitigated below the thresholds provided in Table 3.5-4.

Table 3.5-4: Regional Thresholds of Significance

Pollutant	Emissions in lbs/day	
	Construction	Operations
ROG	75	55
NO_X	100	55
CO	550	550
PM_{10}	150	150
$PM_{2.5}$	55	55
SO_X	150	150

Reference: Air Quality Significance Thresholds. South Coast Air Quality Management District. Revised October 2006.

Localized Significance Thresholds (LSTS)

The SCAQMD Governing Board adopted a methodology for calculating localized air quality impacts through Localized Significance Thresholds (LSTs), which is consistent with SCAQMD's Environmental Justice Enhancement Initiative I-4 (SCAQMD 2008). LSTs represent the maximum emissions from a project that will not cause or contribute to an exceedance of the most stringent applicable State or national ambient air quality standard. The LSTs are developed based on the ambient concentrations of that pollutant for each source receptor area and are applicable to NO_X, CO, PM_{10}, and $PM_{2.5}$. The LST guidelines states that, for LST purposes, emissions include only onsite activities and that the $PM_{2.5}$ and PM_{10} emissions include both fugitive dust and exhaust from the stationary/mobile equipment onsite.

The Proposed Project is located in SRA 8. It is assumed that construction will disturb no more than 5 acres per day in areas where sensitive receptors are within 25 meters (~82 feet). Using the 2006-2008 look-up tables provided in the LST Guidelines for a conservative 5 acres per day disturbed at a receptor distance of 25 meters, Table 3.5-5 shows the appropriate LSTs for construction activity. Since ongoing reservoir management activity will essentially be a reduced-intensity version of the Proposed Project, construction LSTs will be used for reservoir management.

Table 3.5-5: SCAQMD Localized Thresholds for Construction

Pollutant	Localized Significance Threshold (lbs/day)
Nitrogen Dioxide (NO_2)	148
Carbon Monoxide (CO)	1,540
Inhalable Particulate Matter (PM_{10})	12
Fine Particulate Matter ($PM_{2.5}$)	7

Reference: Final Localized Significance Threshold Methodology. South Coast Air Quality Management District. Revised July 2008.

On-Road Truck Emissions

To generate expected exhaust emissions, this AQR used CARB's EMFAC2011 Web-Based Data Access with emission rate data for Los Angeles County for the years 2015 and 2020. This AQR used EMFAC2011's aggregate model years, which is an average age of vehicles specific to Los Angeles County for the specific years modeled. Since the average fleet emissions in the State are getting cleaner each year, the more conservative first year of operation, year 2015, was used. This AQR used "T7 single

construction" as the most representative EMFAC2011 vehicle category for the sediment disposal trucks and generated an aggregate average emission factor for vehicle speeds 5 miles per hour (mph) to 45 mph for surface street mileage and 50 mph to 70 mph for highway mileage.

Off-Road Equipment Emissions

Off-road equipment brake horsepower and emission factors were obtained from the CalEEMod Users Guide. Since CalEEMod uses 2007OFFROAD default load factors and CARB has released an updated load factor list which demonstrates that, for most equipment types, the 2007OFFROAD model will result in a fairly significant overestimation of emissions; this AQR uses equipment load factors from the Carl Moyer Program Guidelines (CARB 2013).

Employee Vehicle Emissions

To generate expected exhaust emissions, this AQR used CARB's EMFAC2011 Web-Based Data Access as mentioned in the on-road trucks section. In order to more accurately represent the type of vehicles used by the potential employee work pool, a weighted average emission factor was generated using 69 percent of the pool using light-duty automobiles and the rest using light-duty trucks. The percentages were derived from the distributions of VMT from EMFAC2011.

Fugitive Dust Emissions

Emissions of PM_{10} and $PM_{2.5}$ from fugitive sources were calculated using various methods. Fugitive dust from excavation activities, grading, and material loading were calculated using EPA's AP-42 methods (USEPA 1995).

Localized Significance Thresholds

The SCAQMD's LST methodology was developed to be used as a tool to assist lead agencies to analyze localized impacts associated with project-specific level proposed projects. The LST methodology and associated mass rates are not designed to evaluate localized impacts from mobile sources traveling over the roadways. The emissions used for the purpose of LST analysis include only onsite activities.

3.5.6 Impacts and Mitigation

AIR QUALITY-1 *Conflict with or obstruct implementation of the applicable air quality plan.*

Typically, assessments for air quality plan consistency use four criteria for determining project consistency with the current AQMP. The first and second criteria are from the SCAQMD. According to the SCAQMD, two key indicators of AQMP consistency are: (1) whether the project will not result in an increase in the frequency or severity of existing air quality violations or cause or contribute to new violations, or delay timely attainment of air quality standards or the interim emission reductions specified in the AQMP; and (2) whether the project will exceed the assumptions in the AQMP based on the year of project buildout and phase (SCAQMD 2006). The third criterion is compliance with the control measures in the AQMP. The fourth criterion is compliance with the SCAQMD regional thresholds.

Sediment Removal/Reservoir Management

Contribution to Air Quality Violations

As shown below in the impact discussions in AIR QUALITY-2 and AIR QUALITY-4, sediment removal activities have the potential to violate an air quality standard or contribute substantially to an existing or projected air quality violation. This is due to emissions of NO_X exceeding the Daily Regional Thresholds during sediment removal, resulting in a potentially significant impact. Use of sediment removal dump trucks that meet EPA's emission standards for Model Year 2007 and use of off-road equipment that meets, at a minimum, EPA's emission standards for Tier 3 equipment, would result in a reduction of NO_X emissions to less than the SCAQMD Regional Threshold for NO_X. Implementation of Mitigation Measures MM AQ-1 and MM AQ-2 will result in a reduction of NO_X emissions to less than the SCAQMD Regional Threshold for NO_X. Therefore, impacts during sediment removal will be less than significant.

As shown below in the impact discussions in AIR QUALITY-2 and AIR QUALITY-4, reservoir management activities under both options will not violate any air quality standards or contribute substantially to any existing or projected air quality violations; therefore, the Proposed Project during reservoir management will be consistent with the first indicator. No significant impact would occur under either reservoir management options.

AQMP Assumptions

One way to assess project compliance with the AQMP assumptions is to ensure that the population density and land use are consistent with the growth assumptions used in the air plans for the air basin. According to CARB transportation performance standards, the rate of growth in vehicle miles traveled (VMT) and trips should be held to the rate of population growth (SCAQMD 2006). Compliance with this performance standard is one way suggested by CARB of showing compliance with the growth assumptions used in the AQMP. If the total VMT generated by the Proposed Project at buildout is at or below that predicted by the AQMP, then the Proposed Project's mobile emissions are consistent with the AQMP. It is assumed that the existing and future pollutant emissions computed in the AQMP were based on land uses from area general plans.

The Proposed Project under sediment removal and both reservoir management options does not create any overall population growth and therefore has no effect on growth assumptions used in the latest SCAQMD AQMP (SCAQMD 2012). Total long-term VMT generated by the Proposed Project is related to management activities and is considered minimal and will not affect consistency with the AQMP.

Mitigation Measures

MM AQ-1: LACFCD shall require all construction contractors during the sediment removal phase of the Proposed Project to use only sediment removal dump trucks that meet EPA's emission standards for Model Year 2007 or later.

MM AQ-2: LACFCD shall require all construction contractors during the sediment removal phase of the Proposed Project to use off-road equipment that meets, at a minimum, EPA's emission standards for Tier 3 equipment.

Residual Impacts After Mitigation

Implementation of these mitigations would reduce the Proposed Project's combined NO_X emissions during the sediment removal phase to a level of less than significant.

Reservoir management activities under both options will not violate an air quality standard or contribute substantially to an existing or projected air quality violation; therefore, the Proposed Project during reservoir management will be consistent with the first indicator. No significant impact would occur under either reservoir management option.

AIR QUALITY-2 *Violate an air quality standard or contribute substantially to an existing or project air quality violation.*

Sediment Removal

Emissions will be related to the off-road equipment used to remove the sediment, including four front loaders with 4-cubic-yard buckets, two bulldozers, an excavator, a grader, water truck, and sorters/crushers. In addition, disposal trucks with 16 to 20 cubic yards of capacity are proposed to haul approximately 7,650cubic yards of sediment per day. Removal of the sediment, vegetation, trees, and organic debris is expected to require an average of 50 truck trips per hour, with an estimated maximum of 425 truck round trips per day during excavation activities. The sediment disposal trucks will dispose of material either to the east and placed at the primary disposal site locations (the Waste Management Facility in Azusa, the Vulcan Materials Reliance Facility in Irwindale or the Manning Pit SPS in Irwindale) or to the west and placed in one of the facilities in Sun Valley. Removed vegetation and organic debris will be hauled to Scholl Canyon Landfill, located in the City of Glendale. It is estimated that for approximately three weeks during the first year of the Proposed Project, approximately 50 percent of the total trucking will be green waste debris trucked to the green waste facility at Scholl Canyon; and the remaining 50 percent of trucking will be sediment that will be distributed to the other sites. After the first year, during the first week approximately 25 percent of the total trucking will be green waste debris trucked to the Scholl Canyon Landfill; and the remaining 75 percent of trucking will be sediment distributed to the other sites. For the five years of sediment removal, it is estimated that for the total trips, approximately 3 percent will go to the Scholl Canyon Landfill, 78 percent will go to the Irwindale sites, and 19 percent will go to the Sun Valley sites.

Construction activities emissions, including dust emissions from soil disturbance and combustion pollutants from onsite construction equipment, from offsite trucks hauling sediment material, and from employees working on the Proposed Project would create a temporary addition of pollutants to the local airshed. These emissions were estimated using the following assumptions and methods.

Table 3.5-6: Unmitigated Sediment Removal Emissions provides a summary of the unmitigated emission estimates for sediment removal activity. Details of the air quality calculations are included in Appendix B.

Table 3.5-6: Unmitigated Sediment Removal Emissions

Category	Maximum Daily Emissions (lbs/d)				
	ROG	CO	NO_X	PM_{10}	$PM_{2.5}$
Off-Road	7.54	33.99	55.18	2.87	2.87
On-Road Trucks	7.15	34.87	314.93	5.33	4.91
Onsite Idling	0.44	1.89	7.88	0.05	0.05
Employees	0.07	2.44	0.24	0.00	0.00
Fugitive	0.00	0.00	0.00	27.30	4.44
Project Maximum Daily	15.2	73.2	378.2	13.70	8.70
SCAQMD Daily Threshold	75.00	550.00	100.00	150.00	55.00
Exceeds Threshold?	No	No	**Yes**	No	No

As shown in the above table, during the sediment removal portion project emissions of NO_X would exceed the Daily Regional Threshold, resulting in a potentially significant impact during sediment removal phase.

The two categories that combine to contribute most to the potentially significant impact are the emissions from on-road trucks and the off-road equipment.

On-Road

Reduction of impacts from on-road trucks during the sediment removal can be accomplished by requiring the contractor that receives the work to ensure that all disposal trucks used meet EPA's emission standards for Model Year 2007 and later. On December 21, 2000, EPA signed emission standards for Model Year 2007 and later, heavy-duty highway engines that require them to achieve a NO_X standard of 0.02 gram per brake-horsepower-hour (g/bhp-hr). This NO_X Standard was phased in for diesel engines between 2007 and 2010.

The EMFAC emission factor used to estimate emissions from the disposal trucks is based on a fleet average number that incorporates vehicles from various age brackets. The EMFAC2011 emission factor for these dump trucks in the year 2015 is 9.7926 grams per mile (g/m). In order to ascertain the effectiveness of requiring all dump trucks to meet EPA NO_X Standards, conversion of the g/m factor to the g/bhp-h factor is required. EPA published a conversion guideline based on brake-specific fuel consumption (BSFC). Applying the conversion factor for heavy-duty trucks would yield a fleet-wide average NO_X emission factor of 3.2308. Therefore the EPA's Standard for NO_X is 94 percent more stringent than the factor used in calculating the emission estimates (USEPA 1998). This would reduce the estimated emissions from on-road disposal trucks.

Off-Road

Reduction of impacts from off-road equipment usage during the sediment removal can be accomplished by requiring the Proposed Project Contractor to use only EPA Tier 3 equipment. Tier 3 emissions standards are addressed in 40 Code of Federal Regulations (CFR), Part 1039 which addresses new compression-ignition non-road (i.e., CARB off-road equivalent) engines. Standards were phased in for various power categories with the latest being effective in 2011.

The emission factor used to estimate off-road equipment in this AQR was obtained from tables presented in CalEEMod's User Guidelines and represents the statewide average of equipment for each category. The factors for Fleet Year 2015 most closely compare to an average fleet of Tier 2 equivalent equipment. Applying the percentage reductions from Tier 2 to Tier 3 to the unmitigated emissions represented above reduces the NO_X emissions from the off-road component for the sediment removal phase of the Proposed Project (SCAQMD 2013).

Employee Vehicle Emissions

To generate expected exhaust emissions, this AQR used CARB's EMFAC2011 Web Based Data Access as mentioned in the on-road trucks section. In order to more accurately represent the type of vehicles used by the potential employee work pool, a weighted average emission factor was generated using 69 percent of the pool using light-duty automobiles and the rest using light-duty trucks. The percentages were derived from the distributions of VMT from EMFAC2011.

Fugitive Dust Emissions

Emissions of PM_{10} and $PM_{2.5}$ from fugitive sources were calculated using various methods. Fugitive dust from excavation activities, grading, and material loading were calculated using EPA's AP-42 methods (USEPA 1995). Emissions estimates were reduced to reflect the Proposed Project's full compliance with the SCAQMD's Rule 403, including, but not limited to:

- Implementation of one of the measures in subparagraphs (d)(5)(A) through (d)(5)(E) at each vehicle egress from the site to a paved public road to reduce impacts from track-out;
- Submission of a Large Operation Notification (SCAQMD Form 403 N) to the SCAQMD Executive Officer within 7 days of qualifying as a large operation;
- Apply water or stabilizing agent during clearing and grubbing, crushing, or earth-moving activities in sufficient quantity to prevent the generation of dust plumes. Soil should be maintained in a damp condition so that visible emissions do not exceed 100 feet in any direction;
- During exporting of materials, use tarps or other suitable enclosures on all haul trucks. Haul loads should have at least six inches of freeboard space;
- Stabilize all off-road traffic on haul routes and in parking areas and stabilize all staging areas and stockpiled materials. Limit speeds of vehicles on haul routes, staging areas, and parking lots;
- Limit vehicular activity to established unpaved roads (haul routes) and unpaved parking lots;

- For all earth-moving activity within 100 feet of property lines, maintain soil moisture content at a minimum of 12 percent, as determined by American Society for Testing and Materials (ASTM) method D-2216 or other equivalent approved method.

As shown in Table 3.5-7 below, use of sediment removal dump trucks that meet EPA's emission standards for Model Year 2007 and use of off-road equipment that meets, at a minimum, EPA's emission standards for Tier 3 equipment would result in a reduction of the Proposed Project's combined NO_X emissions during the sediment removal to less than the SCAQMD Regional Threshold for NO_X. Implementation of Mitigation Measures MM AQ-1 and MM AQ-2 will result in a reduction of NO_X emissions and will reduce the NO_X emissions to a level of less than significant for the sediment removal phase.

Table 3.5-7: Sediment Removal Emissions with Model 2007 Sediment Removal Trucks and Tier 3 Off-road Equipment

Category	Maximum Daily Emissions (lbs/d)				
	ROG	CO	NO_X	PM_{10}	$PM_{2.5}$
Off-Road	4.7	33.99	22.05	22.60	2.15
On-Road Trucks	7.15	34.87	18.90	11.07	0.98
Onsite Idling	0.44	1.89	2.48	00.01	0.01
Employees	0.07	2.44	0.24	00.00	0.00
Fugitive	0.00	0.00	0.00	55.46	0.89
Project Maximum Daily	12.4	73.2	81.7	110.5	5.2
SCAQMD Daily Threshold	75.00	550.00	100.00	150.00	55.00
Exceeds Threshold?	No	No	No	No	No

Reservoir Management

Emissions will be related to the off-road equipment used for reservoir management under both options, including four front loaders with 2-cubic-yard buckets, one bulldozer, an excavator, a grader, water truck, and sorters/crushers. Removal of the sediment, vegetation, trees, and organic debris is expected to require an estimated 200 to a maximum of 300 truck trips per day. It is estimated that during the first week approximately 25 percent of the debris will be green waste trucked to the Scholl Canyon Landfill, and the remaining 75 percent of trucking will be sediment distributed to the other sites. During reservoir management it is estimated that for the total trips, 2 percent will go to Scholl Canyon Landfill, 75 percent will go to the Irwindale sites, and 23 percent will go to the Sun Valley sites. Reservoir management activities will use only disposal trucks that meet EPA's emission standards for Model Year 2007 or later and Tier 3 or higher equipment.

Reservoir management activities emissions, including dust emissions from soil disturbance and combustion pollutants from onsite construction equipment, from offsite trucks hauling sediment material, and from employees working on the Proposed Project will create a temporary addition of

pollutants to the local airshed. The duration of reservoir management under Option 2 will likely be reduced in comparison to Option 1 due to the reduction in management area; however, the daily activities will be the same and therefore the daily emission levels will be the same. The calculations below represent both reservoir management options.

Employee Vehicle Emissions

To generate expected exhaust emissions, this AQR used CARB's EMFAC2011 Web-Based Data Access as mentioned in the on-road trucks section. In order to more accurately represent the type of vehicles used by the potential employee work pool, a weighted average emission factor was generated using 69 percent of the pool using light-duty automobiles and the rest using light-duty trucks. The percentages were derived from the distributions of VMT from EMFAC2011.

Fugitive Dust Emissions

Emissions of PM_{10} and $PM_{2.5}$ from fugitive sources were calculated using various methods. Fugitive dust from excavation activities, grading, and material loading were calculated using EPA's AP-42 methods (USEPA 1995). Emissions estimates were reduced to reflect the Proposed Project's full compliance with the SCAQMD's Rule 403, including, but not limited to:

- Implementation of one of the measures in subparagraphs (d)(5)(A) through (d)(5)(E) at each vehicle egress from the site to a paved public road to reduce impacts from track-out;
- Submission of a Large Operation Notification (SCAQMD Form 403 N) to the SCAQMD Executive Officer within 7 days of qualifying as a large operation;
- Apply water or stabilizing agent during clearing and grubbing, crushing, or earth-moving activities in sufficient quantity to prevent the generation of dust plumes. Soil should be maintained in a damp condition so that visible emissions do not exceed 100 feet in any direction;
- During exporting of materials, use tarps or other suitable enclosures on all haul trucks. Haul loads should have at least 6 inches of freeboard space;
- Stabilize all off-road traffic on haul routes and in parking areas and stabilize all staging areas and stockpiled materials. Limit speeds of vehicles on haul routes, staging areas, and parking lots;
- Limit vehicular activity to established unpaved roads (haul routes) and unpaved parking lots;
- For all earth-moving activity within 100 feet of property lines, maintain soil moisture content at a minimum of 12 percent, as determined by American Society for Testing and Materials (ASTM) method D-2216 or other equivalent approved method.

Table 3.5-8: Unmitigated Reservoir Management Activity shows estimated emissions from reservoir management activities. Details of the air quality calculations are included in Appendix B.

Table 3.5-8: Unmitigated Reservoir Management Activity

Category	Maximum Daily Emissions (lbs/d)*				
	ROG	CO	NO_X	PM_{10}	$PM_{2.5}$
Off-Road	2.86	17.29	19.26	0.98	0.98
On-Road Trucks	2.82	17.47	40.56	1.70	1.56
Onsite Idling	0.20	0.89	1.17	0.00	0.00
Employees	0.02	0.76	0.07	0.00	0.00
Fugitive	0.00	0.00	0.00	3.30	0.75
Project Maximum Daily	5.9	36.4	61.1	10.5	3.3
SCAQMD Daily Threshold	75.00	550.00	100.00	150.00	55.00
Exceeds Threshold?	No	No	No	No	No

* Reservoir management activities will use only disposal trucks that meet EPA's emission standards for Model Year 2007 or later and Tier 3 or higher equipment.

As shown in the above table, reservoir management under either option will not exceed any standard and will result in less than significant impacts.

Mitigation Measures

See Mitigation Measures MM AQ-1 and MM AQ-2.

Residual Impacts After Mitigation

Implementation of Mitigation Measures MM AQ-1 and MM AQ-2 would reduce the Proposed Project's combined NO_X emissions during the sediment removal phase to a level of less than significant.

Reservoir management under either option will not exceed any standard SCAQMD Regional Threshold; therefore, this impact will be less than significant.

AIR QUALITY-3 *Result in a cumulatively considerable net increase of any criteria pollutants for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors).*

Sediment Removal/Reservoir Management

In accordance with *CEQA Guidelines* 15130(b), this analysis of cumulative impacts incorporates a summary of projections. The following three-tiered approach is to assess cumulative air quality impacts.

- Consistency with the SCAQMD project-specific thresholds for construction and operation;
- Project consistency with existing air quality plans;

- Assessment of the cumulative health effects of the pollutants.

Project Specific Thresholds

Emissions of VOC, PM_{10}, and $PM_{2.5}$ are not expected to exceed the SCAQMD regional significance thresholds during sediment removal or on-going reservoir management activities; however, NO_X emissions are expected to exceed the SCAQMD regional significance thresholds during sediment removal, though only during the main sediment removal phase and not during reservoir management.

Air Quality Plans

The SCAB, the air quality basin in which the Proposed Project is located, is in nonattainment for ozone, PM_{10}, and $PM_{2.5}$. As such, the SCAQMD is required to prepare and maintain an AQMP and a SIP to document the strategies and measures to be undertaken to reach attainment of air quality standards. While the SCAQMD does not have direct authority over land use decisions, it was recognized that changes in land use and circulation planning were necessary to maintain clean air. As discussed above in AIR QUALITY-1, the Proposed Project will not affect consistency with the AQMP under sediment removal or either reservoir management options.

Cumulative Health Impacts

The SCAB is in nonattainment for ozone, PM_{10}, and $PM_{2.5}$, which means that the background levels of those pollutants are at times higher than the air quality standards. The air quality standards were set to protect the health of sensitive individuals (i.e., elderly, children, and the sick). Therefore, when the concentration of those pollutants exceeds the standard, it is likely that some of the sensitive individuals of the population experience adverse health effects.

The analysis in Air Quality-2 demonstrated that during sediment removal, the significance threshold would not be exceeded for emissions of particulate matter and CO; and no significance threshold would be exceeded during reservoir management under either option. Implementation of Mitigation Measures MM AQ-1 and MM AQ-2 will result in a reduction of NO_X emissions and will reduce the NO_X emissions to a level of less than significant for the sediment removal phase.

Mitigation Measures

See Mitigation Measures MM AQ-1 and MM AQ-2.

Residual Impacts After Mitigation

Implementation of Mitigation Measures MM AQ-1 and MMAQ-2 would reduce the Proposed Project's combined NO_X emissions during the sediment removal phase to a level of less than significant.

Reservoir management under either option will not exceed any localized significance threshold; therefore, this impact will be less than significant.

AIR QUALITY-4 *Expose sensitive receptors to substantial pollutant concentrations.*

Localized Significance Thresholds

Sediment Removal

The onsite emissions for sediment removal activities are presented in Table 3.5-9: Onsite Sediment Removal Emissions and show that no LST thresholds are exceeded.

Table 3.5-9: Onsite Sediment Removal Emissions

Category	Maximum Daily Emissions (lbs/d)			
	CO	NO_X	PM_{10}	$PM_{2.5}$
Off-Road	33.99	55.18	2.87	2.87
Fugitive	0.00	0.00	5.46	0.89
Unmitigated Max Daily	**34.00**	**55.20**	**8.30**	**3.87**
LST Threshold	1,540.00	148.00	12.00	7.00
Exceeds Threshold?	No	No	No	No

Reservoir Management

The onsite emissions for reservoir management activities under either option are presented in Table 3.5-10: Onsite Reservoir Management Emissions and show that no LST thresholds are exceeded.

Table 3.5-10: Onsite Reservoir Management Emissions

Category	Maximum Daily Emissions (lbs/d)			
	CO	NO_X	PM_{10}	$PM_{2.5}$
Off-Road	3.14	16.57	0.98	0.98
Fugitive	0.00	0.00	3.30	0.75
Unmitigated Max Daily	**3.10**	**16.60**	**4.30**	**1.74**
LST Threshold	1,540.00	148.00	12.00	7.00
Exceeds Threshold?	No	No	No	No

Carbon Monoxide Hotspot

Sediment Removal/Reservoir Management

Because CO is produced in greatest quantities from vehicle combustion and does not readily disperse into the atmosphere, adherence to the AAQSs is typically demonstrated through an analysis of localized

CO concentrations. Areas of vehicle congestion have the potential to create "pockets" of CO called "hot spots." Hot spots are usually created in locations where vehicles are subject to congestion, reduced speeds, and queuing. These are most typically at intersections, but can also be along congested major arterials and freeways. Typically, for vehicles to produce a hot spot, the roadway/intersection level of service (LOS) must be degraded to "D" or worse.

The Traffic Impact Analysis prepared for this project shows that five intersections are modeled to be at LOS F or worse in 2014 with the Proposed Project (Hall and Foreman 2013). A CO hot-spot analysis was prepared in accordance with the Transportation Project-Level Carbon Monoxide Protocol (CO Protocol). According to the CO Protocol, intersections with an LOS E or F could require detailed analysis (Garza et al. 1997).

The hot-spot analysis was performed on the five intersections. CALINE4 was used to predict the potential CO concentrations at these intersections. CALINE4 is a dispersion model produced by Caltrans that predicts CO impacts near roadways. CO modeling results are available in Appendix B.

Several inputs are made to the CALINE4 model. One input is the traffic volumes, which was provided in the Traffic Impact Analysis, and another input is roadway widths. Table 3.5-11: CO Concentrations Summary shows estimated CO concentrations at the worst-case receptor location for these intersections. The CALINE4 output is added to the 1-hour and 8-hour backgrounds to produce the concentrations. Backgrounds were obtained from 2011 air quality data of 8-hour CO monitoring data and dividing the 8-hour by a persistence factor of 0.7 to generate the 1-hour background. Significance impact shows the comparison of the 1-hour concentration to the State standard of 20 ppm and the 8-hour concentration to the State/national standard of 9 ppm (SCAQMD 2013).

Table 3.5-11: CO Concentrations Summary

Intersection Number and Description		CO Concentration (ppm)	
		1-hour	8-hour
#11	Irwindale Avenue @ Gladstone St	3.54	2.48
#13	Vincent Avenue @ Arrow Highway	3.74	2.62
#21	Figueroa St/Scholl Canyon @ SR-134 WB Ramps	3.34	2.34
#22	Figueroa Street@ Eagle Vista Dr	3.34	2.34
#23	Figueroa Street@ SR-134 EB Ramps	3.44	2.41
	Significance Thresholds	20.00	9.00
	Exceeds Threshold?	No	No

The CO Hotspot analysis shows no exceedance of the State or federal CO standard and no significant impact is expected during sediment removal or either reservoir management option.

Carcinogenic Or Toxic Contaminants Sediment Removal/Reservoir Management

In order to ascertain the potential for the Proposed Project to emit carcinogenic or toxic contaminants that exceed the maximum individual cancer risk of 10 in one million, a Health Risk Assessment (HRA) was performed and attached in Appendix C (Vista Environmental 2013). The Proposed Project would

generate TAC emissions from diesel truck emissions and onsite diesel equipment used during both the sediment removal activities and the annual reservoir management activities. According to SCAQMD methodology, health effects from carcinogenic air toxics are usually described in terms of individual cancer risk. "Individual Cancer Risk" is the likelihood that a person exposed to concentrations of TACs over a 70-year lifetime will contract cancer, based on the use of standard risk-assessment methodology.

Since the diesel truck emissions would operate in the closest proximity to sensitive receptors while on surface streets, the diesel truck travel modeling has been limited to the portion of the trips that would occur on surface streets. Results of ISC-AERMOD modeling presented in the HRA show that the maximum offsite diesel concentration was found to be 1.9 in a million; thus significantly below the 10 in a million cancer risk threshold. In addition, all routes modeled resulted in less than significant non-cancer risk from diesel emissions created by the Proposed Project.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

Impacts will be less than significant.

AIR QUALITY-5 *Create objectionable odors affecting a substantial number of people.*

Sediment Removal/Reservoir Management

The CEQA guidelines indicate that a significant impact would occur if the Proposed Project would create objectionable odors affecting a substantial number of people.

Diesel exhaust will be emitted from equipment during sediment removal process, which is objectionable to some; however, concentrations will disperse rapidly from the project site (OB-1 2013); therefore impacts will be less than significant.

Mitigation Measures

No mitigation measures are necessary.

Residual Impacts After Mitigation

The Proposed Project is not expected to produce objectionable odors beyond the Proposed Project site under sediment removal or either reservoir management option; therefore, this impact will be less than significant.

AIR QUALITY-6 *Cumulative Impacts*

The Proposed Project would generate air pollutant emissions from construction over a five-year period. Cumulative projects that could contribute to cumulative air quality impacts would be the cumulative projects that could be under construction during the same time period (Hahamongna Watershed Park MBMU Project, Metro Gold Line Foothill Extension, Arroyo Seco Canyon Project, and Devil's Gate Water Conservation Project). Each of the cumulative projects would have construction emissions contributing

to existing air quality violations. All projects would be required to comply with the SCAQMD's air pollution control measures and rules. Implementation of these measures would reduce air emissions.

Mitigation Measures

See Mitigation Measures MM AQ-1 and MM AQ-2.

Residual Impacts After Mitigation

Implementation of these mitigations would reduce the Proposed Project's combined NO_X emissions during the sediment removal phase to a level of less than significant.

3.6 BIOLOGICAL RESOURCES

3.6.1 Introduction

This section describes the existing biological resources environmental conditions and discusses the consequences to biological resources related to Proposed Project implementation. The environmental baseline condition for the sediment removal phase is considered at the time of publication of the NOP; however, due to the extremely dynamic drainage and vegetation conditions on the Proposed Project site; biological resources conditions change on a regular basis due to seasonal conditions, water flow/views, water storage, and sediment conditions. As discussed above, in 2011 these resources were severely impacted by sediment deposition. Most of the vegetation and trees on the Proposed Project site were dead, washed out, or buried under sediment, reducing the amount and quality of vegetation communities and wildlife habitat. Since publication of the NOP, some of the vegetation and trees have re-established, improving the amount and quality of vegetation communities and wildlife habitat of the Proposed Project site. In order to achieve a more conservative analysis of the potential impacts to biological resources from the Proposed Project, 2013 conditions were also taken into account. The environmental baseline conditions for reservoir management will be conditions post sediment removal, approximately in the year 2020.

Information in this section was gathered through literature review, examination of available databases, and through field reconnaissance. General surveys and field surveys for vegetation communities, trees, sensitive plants and wildlife, and jurisdictional waters were conducted from 2010 through 2013. Additional detail about the biological resources within and surrounding the project site is provided in biological reports prepared for the Proposed Project that are included as Appendix D.

As noted in the Initial Study (Appendix A), impacts associated with provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or State habitat conservation plans were found to have a less than significant impact and are not discussed within the EIR.

3.6.2 Existing Environmental Setting

Vegetation

At the time of the 2010 survey (Chambers Group 2010a), the Proposed Project site was primarily composed of riparian and upland communities (see Figure 3.6-1: Devil's Gate Vegetation Communities (2010)). The Proposed Project site was resurveyed in 2013 (Chambers Group 2013) and is shown to be primarily composed of riparian and non-native, weedy communities plus large scoured areas created as a consequence of the 2009 Station Fire (see Figure 3.6-2: Devil's Gate Vegetation Communities (2013)). Further descriptions of the Proposed Project site are listed below.

In 2009, the Station Fire burned through more than 160,000 acres in the Angeles National Forest in Los Angeles County. Approximately 68 percent of the 31.9-square-mile Arroyo Seco Channel watershed tributary to Devil's Gate Dam and Reservoir was burned during this event. Due to the denuding of this large natural tributary area, large sediment loads (in excess of 1 million cubic yards) were deposited within the reservoir area during the subsequent storm seasons. This deposition has raised ground elevations and buried vegetation in excess of 18 feet in some locations. The accumulated sediment is unstable and highly susceptible to scouring during storms.

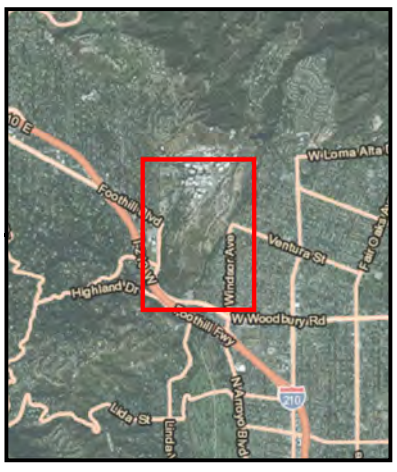
Vegetation Communities

- 1. Riversidean Alluvial Fan Sage Scrub
- 2. California Sagebrush – California Buckwheat Scrub
- 3. Scoured
- 4. Escaped Cultivars
- 5. Riparian Woodland
- 6. Mustard and Annual Brome Semi-Natural Herbaceous Stand
- 7. Mule Fat Thickets
- 8. Disturbed (Barren/Trails)
- 10. Coast Live Oak Woodland - Disturbed

SCALE= 1 inch equals 467 feet

0 233.5 467 934 Feet

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors



Survey Area

Figure 3.6-1
Devil's Gate
Vegetation Communities Map (2010)

Version Date: 10/16/2014

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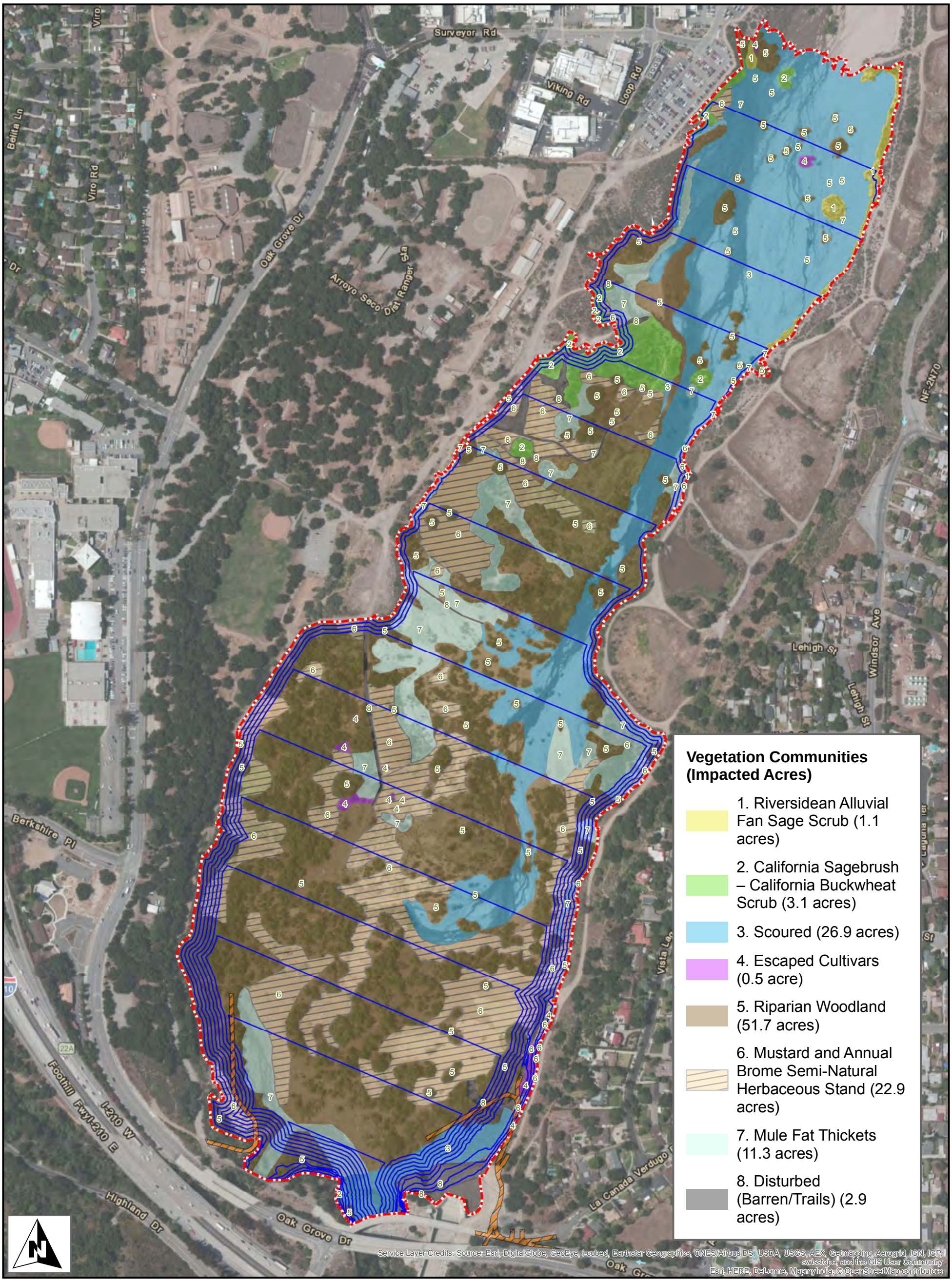
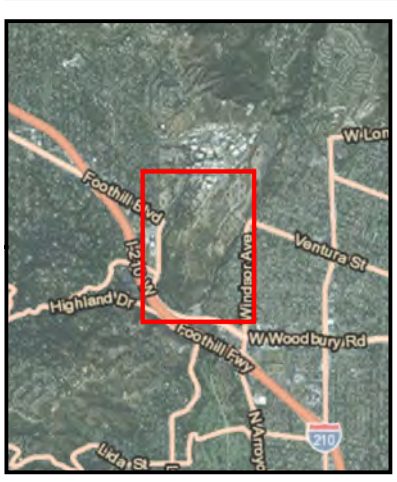
\\cgi-gisdata01\GIS_DATA\Projects\20000s\20201 - 20400\20346 Devil's Gate EIR\20346 Figure 3.6-1 Devil's Gate Vegetation Communities (2010).mxd





Proposed Project Boundary

Access Road

Sediment Removal Excavation Limit

Figure 3.6-2
Devil's Gate
Vegetation Communities Map (2013)
Proposed Project - Configuration A

Version Date: 10/16/2014

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\\cgi-gisdata01\GIS_DATA\Projects\20000s\20201 - 20400\20346 Devil's Gate EIR\20346 Figure 3.6-2 Devil's Gate Vegetation Communities (2013).mxd

Additionally, sediments deposited during storm events are unstable so when future storm events occur, these sediments along the banks of flow paths fall into the storm flow. Therefore any habitat that establishes on these banks of accumulated sediment cannot mature, since it is also washed away frequently.

Representative site photographs were taken to document site conditions during the surveys (Appendix D). Table 3.6-1 Devil's Gate Reservoir 2013 Vegetation Communities shows the 2013 acreage of the various vegetation communities found on the Proposed Project site.

Table 3.6-1: Devil's Gate Reservoir 2013 Vegetation Communities

Vegetation Community	2013 Survey Acreage
RIPARIAN	
Mule Fat Thickets	11.1
Riparian Woodland (Black Willow Series)	51.4
UPLAND	
California Sagebrush – California Buckwheat Scrub	3.1
Riversidean Alluvial Fan Sage Scrub	1.1
OTHER	
Mustard and Annual Brome Semi-Natural Herbaceous Stand	22.8
Escaped Cultivars	0.4
Disturbed (Barren/Trails)	1.9
Scoured	26.5

Riparian Communities

Riparian Woodland/Black Willow Series

Black Willow Series, as described by Sawyer et al. (2009), exists when black willow (*Salix gooddingii*) is the sole dominant shrub or tree in the canopy. This community occurs in habitats seasonally flooded and saturated with freshwater. This community occurs in floodplains along rivers and streams and on the edges of meadows. Species that usually occur with black willow include California sycamore (*Platanus racemosa*), coyote brush (*Baccharis pilularis*), Fremont cottonwood (*Populus fremontii*), blue elderberry (*Sambucus nigra* subsp. *caerulea*), mule fat (*Baccharis salicifolia subsp. salicifolia*), white alder (*Alnus rhombifolia*), and other willows (*Salix* sp.).

In 2010, the southern half of the Proposed Project site was primarily composed of the Black Willow Series. In 2013, this series is present in large and small patches throughout the Proposed Project site. Black willow is dominant in this community. Other native species include mule fat (*Baccharis salicifolia*), Fremont cottonwood, black cottonwood (*Populus trichocarpa*), white alder, red willow (*Salix laevigata*), and California dodder (*Cuscuta californica*). Non-native species in this community include gum tree (*Eucalyptus* sp.) and tree tobacco (*Nicotiana glauca*). Portions of this community are lacking secondary structure due to unstable sediment accumulation and subsequent scouring during storm events. The secondary structure is typically made up of understory shrubs or herbaceous plants which can provide refuge for wildlife. The canopy and understory contribute to the overall function of a habitat; more height and age diversity of vegetation result in an overall increase in habitat value. The lack of secondary

structure reduces the quality of the habitat considerably. Furthermore, any secondary habitat that would start to establish would be lost during storm events when the unstable banks of sediment erode and wash into the flow paths.

In 2010, Coast Live Oak was present in the Riparian Woodland mostly at the southern end of the Proposed Project site (Chambers Group 2010a). In 2013, only four small patches were identified in the Project site, including one located east of the dam face (Chambers Group 2013b).

Mule Fat Thickets

Mule Fat Thickets, as described by Sawyer et al. (2009), exists when mule fat is the sole or co-dominant shrub in the canopy. Shrubs are less than 16 feet (5 meters) in height and the canopy is continuous with two tiers. One tier can reach up to 6 feet in height. The second tier can reach up to 16 feet in height. The herbaceous layer is sparse. This community typically occupies canyon bottoms, floodplains, irrigation ditches, lake margins, and stream channels. Soils are mixed alluvium. Other species associated with this community may include California sagebrush (Artemisia californica), coyote brush, laurel sumac (Malosma laurina), blue elderberry, and other willow species.

Mule Fat Thickets were present in the Proposed Project site during both surveys. The native plant species found included mule fat and black willow. Non-native species found within this community in the Proposed Project site include Italian thistle (*Carduus pycnocephalus*), poison hemlock (*Conium maculatum*), and short-pod mustard (*Hirschfeldia incana*).

Portions of the habitat mapped as Mule Fat Thickets are represented by an early successional stage of the thicket. In 2010, sparse riparian vegetation was present in the northern half of the Proposed Project site, while in 2013, this type of vegetation was concentrated only near the face of the dam. Native plant species found in this early seral stage include young seedlings and saplings of mule fat, black willow, and red willow. Non-native plant species associated with the early successional stage of this community include curly dock (*Rumex crispus*), wild radish (*Raphanus sativus*), and short-pod mustard.

Upland Communities

Riversidean Alluvial Fan Sage Scrub

Riversidean Alluvial Fan Sage Scrub occurs in alluvial fans as well as in washes and is a subtype of Riversidean Coastal Scrub (Holland 1986) or referenced as Scalebroom Scrub by Sawyer et al. (2009). Three stages of alluvial fan scrub succession are described by Smith (1980), with density and species diversity varying in direct relationship to the frequency of water scouring each stage receives. Older stages of alluvial scrub are located on high benches and have not been subjected to a recent major flood event. This mature stage can be identified by the presence of larger shrubs, an increase in species diversity, and a groundcover of organic material and annual grasses. Many large shrubs over 10 feet in height are found in the mature community, including laurel (*Malosma laurina*). The intermediate and early stages are located on lower benches closer to the active flood plain and have been subjected to relatively recent flooding events. Intermediate and early stages are progressively more open and less diverse. Medium-sized shrubs up to 4 feet in height can be found in intermediate stage areas, while early stage shrubs are rarely greater than 2 feet in height. Organic material and annual grasses are much less common in intermediate areas and are almost absent in early stages. Scale-broom (*Lepidospartum*

squamatum), considered to be an indicator species of alluvial scrub communities, is present in most alluvial scrub communities.

In 2010, Riversidean Alluvial Fan Sage Scrub was present on the northeast portion of the Proposed Project site. Much smaller patches of this community remain in 2013. The reduction in habitat is due to post-fire sediment accumulation. As discussed previously, the significant sediment loading occurring as a result of the 2009 Station Fire has greatly reduced the size of this community and has inhibited its ability for succession.

Plant species found in the Proposed Project site include scale-broom, California sagebrush (*Artemisia californica*), California buckwheat (*Eriogonum fasciculatum*), deerweed (*Acmispon glaber* [*Lotus scoparius*]), our Lord's candle (*Yucca whipplei*), and coastal prickly pear (*Opuntia littoralis*).

California Sagebrush – California Buckwheat Scrub

Coastal Sagebrush – California Buckwheat Scrub, as described by Sawyer et al. (2009), exists when both California sagebrush and California buckwheat are codominant in the shrub canopy. Most shrubs are less than 6 feet in height, and some are less than 16 feet in height. The canopy is two-tiered and intermittent to continuous. The herbaceous layer is seasonally present. This community occurs on steep, south-facing slopes with colluvial soils. Other species that may occur within this community include coyote brush, laurel sumac, and black sage (*Salvia mellifera*).

In 2010, large patches of California Sagebrush – California Buckwheat Scrub surrounded the riparian habitat in the northern portion of the Proposed Project site. These patches have been largely replaced with scoured areas. As with the Riversidean Alluvial Fan Sage Scrub, only much smaller patches of California Sagebrush – California Buckwheat Scrub remain in 2013. As discussed previously, the recent significant sediment loading experienced in the Reservoir has greatly reduced the size of this community and has inhibited its ability for succession.

<u>Other Communities</u>

Ephemeral Stream

An ephemeral stream has flowing water for a short duration after precipitation events in a representative year. The main source of water flow in an ephemeral stream is runoff from rainfall. Ephemeral stream beds are located above the water table year-round.

An ephemeral stream is located within the project site. The ephemeral stream did not change significantly from 2010 to 2013. It still generally runs in a north/south direction, but its overall path has meandered due to the increase in sedimentation and erosion occurring as a consequence of the 2009 Station Fire.

Ephemeral Pond

An ephemeral pond holds water for a short duration after precipitation events in a representative year. The source of water flow in an ephemeral pond is from rainfall.

In 2010, two areas with ephemeral ponds were identified, most likely formed by sediment; but during the 2013 survey, only flowing water (runoff) from two storm drains was observed.

Disturbed (Barren)

Disturbed areas are those areas that are either devoid of vegetation (cleared or graded), such as dirt roads, or those areas that have a high percentage of non-native weedy species (i.e., greater than 25 percent of the species cover). Disturbed areas are present along the boundaries of the project area and within the watershed. Disturbed areas consisting of maintenance roads exist on the east and west sides of the reservoir and pedestrian/horseback riding trails exist on the west side and within the reservoir. Conditions did not change from 2010 to 2013.

Scoured

Scoured areas are those where high velocity water flow has caused the removal of sediment such as sand or rock and are often devoid of vegetation.

In 2010, approximately 11.41 acres of areas were considered to be scoured (Chambers Group 2010b); but in 2013, that number increased to 26.5 acres (Chambers Group 2013b) due to the increase in unstable sedimentation and subsequent higher erosion rates.

Escaped Cultivars

Escaped cultivars include areas where the vegetation is dominated by non-native horticultural plants (Gray and Bramlet 1992) that have been purposely planted for aesthetic reasons. Often, these horticultural/cultivated plants escape the garden environment and can become established in the natural setting. Typically, the species composition consists of introduced trees, shrubs, flowers, and turf grass. Several areas within the Proposed Project site have escaped cultivars as the dominant vegetation type present.

Several small patches of escaped cultivars persist in 2013 (compared to the 2010 survey), but the overall acreage has decreased from 1.44 acres to 0.4 acre dispersed throughout the project site.

Mustard and Annual Brome Semi-Natural Herbaceous Stand

This herbaceous stand is dominated by a composition of non-native short-pod mustard (*Hirschfeldia incana*) and non-native annual brome grasses (*Bromus* spp.). Other non-native annual species within this community include red-stemmed filaree (*Erodium cicutarium*) and bristly ox-tongue (Helminthotheca echioides). Herbs are less than 6 feet in height and the canopy is continuous. This community responds positively to frequent disturbance and competes with native vegetation (Sawyer et al. 2009). Each of these species has a California Invasive Plant Inventory (Cal-IPC) ranking indicating they have the potential to threaten California wildlands and ecologically impact the physical processes, plant and animal communities, and vegetation structure (Cal-IPC 2006). The presence of non-native plant species in a given area can ultimately lead to a reduction in the diversity of wildlife that use the area for foraging and refuge.

Classified as Ruderal in 2010, this community has been updated to reflect a preference by the Resource Agencies to use Alliance code per Sawyer et al. (2009). The amount of non-native weedy vegetation

onsite has increased from 7.64 acres in 2010 to approximately 22.8 acres in 2013 due to frequent disturbance from sedimentation and erosion during storm events.

Poison Hemlock Patches (Semi-Natural Stands)

Poison Hemlock Patches are a vegetation community dominated by the herbaceous, weedy species poison hemlock. This biennial plant typically grows up to 10 feet in height and occurs in moist, especially disturbed places at elevations generally less than 3,280 feet (Baldwin et al. 2009).

In 2010, Poison Hemlock Patches were present within the watershed near the center of the Proposed Project site. This series was not identified during the 2013 survey and is likely buried by sediment.

Perennial Pepper Weed Patches (Semi-Natural Stands)

Perennial Pepper Weed Patches are a vegetation community dominated by the herbaceous, weedy species peppergrass (*Lepidium latifolium*).

In 2010, Perennial Pepper Weed Patches were present within the watershed near the center of the Proposed Project site. This series was not identified during the 2013 survey and is likely buried by sediment.

Special Status Plant Species

The literature review resulted in a list of 14 sensitive plant species that have been known to occur in the vicinity of the Proposed Project site. Six of these plant species are considered absent from the Proposed Project site due to a lack of suitable habitat present or because the species occurs outside the elevation range found on the Proposed Project site. Suitable habitat was present onsite for eight sensitive species; however, after the focused plant surveys in which none of these species were observed within the Proposed Project site, these species were considered absent from the site. These special status plant species and their status are listed in Table 3.6-2: Special Status Plant Species Known to Occur in Proposed Project Vicinity. No special status plant species were found during the field surveys.

Wildlife

Wildlife species observed or detected during the site surveys were characteristic of the existing site conditions. A full list of the wildlife species detected within the Proposed Project site is included in Appendix D.

Amphibians and Reptiles

Fourteen amphibian and reptile species were observed or detected in the Proposed Project area during the surveys. Species included the California toad (*Anaxyrus boreas halophilus*), American bullfrog (*Lithobates catesbeianus*), Baja California treefrog (*Pseudacris hypochondriaca hypochondriaca*), California treefrog (*Pseudacris cadaverina*), San Diego alligator lizard (*Elgaria multicarinata webii*), western side-blotched lizard (*Uta stansburiana elegans*), Great Basin fence lizard (*Sceloporus occidentalis longipes*), coastal whiptail (*Aspidoscelis tigris stejnegeri*), two-striped garter snake (*Thamnophis hammondii*), California kingsnake (*Lampropeltis getula californiae*), and San Diego gopher snake (*Pituophis catenifer annectens*).

Table 3.6-2: Special Status Plant Species Known to Occur in Proposed Project Vicinity

Species	Status	Habitat	Potential for Occurrence
round-leaved filaree (*California macrophylla*)	CNPS Rare Plant Rank: 1B.1	Cismontane woodland, open scrub, and valley and foothill grasslands.	Not observed during survey. Considered absent due to lack of suitable habitat.
southern tarplant (*Centromadia parryi* ssp. *australis*)	CNPS Rare Plant Rank: 1B.1	Moist saline soils of marshes and swamps, vernal pools, and valley and foothill grasslands.	Not observed during survey. Considered absent due to lack of suitable habitat.
Los Angeles sunflower (*Helianthus nuttallii* ssp. *parishii*)	CNPS Rare Plant Rank: 1A	Damp to wet soils of marshes and swamps and coastal salt and freshwater marshes.	Not observed during survey. Considered absent due to lack of suitable habitat.
Coulter's goldfields (*Lasthenia glabrata* ssp. *coulteri*)	CNPS Rare Plant Rank: 1B.1	Coastal salt marshes and swamps, playas, and vernal pools.	Not observed during survey. Considered absent due to lack of suitable habitat.
San Gabriel linanthus (*Linanthus concinnus*)	CNPS Rare Plant Rank: 1B.2	Dry, rocky slopes of fir and pine forests.	Not observed during survey. Considered absent due to lack of suitable habitat.
Orcutt's linanthus (*Linanthus orcuttii*)	CNPS Rare Plant Rank: 1B.3	Openings within pine forest, chaparral, and desert scrub.	Not observed during survey. Considered absent due to lack of suitable habitat.
Nevin's barberry (*Berberis nevinii*)	Federal: FE State: SE CNPS Rare Plant Rank: 1B.1	Chaparral, coastal scrub, cismontane woodlands, and riparian scrub in sandy/gravelly soils.	Not observed during survey. Potential habitat exists but not observed during survey. Considered absent from site.
Plummer's mariposa lily (*Calochortus plummerae*)	CNPS Rare Plant Rank: 4.2	Chaparral, cismontane woodland, coastal scrub, lower montane coniferous forest, and valley and foothill grasslands.	Not observed during survey. Potential habitat exists but not observed during survey. Considered absent from site.
Parry's spineflower (*Chorizanthe parryi* var. *parryi*)	CNPS Rare Plant Rank: 1B.1	Chaparral, cismontane woodland, coastal scrub, and valley and foothill grasslands.	Not observed during survey. Potential habitat exists but not observed during survey. Considered absent from site.

Table 3.6-2: Special Status Plant Species Known to Occur in Proposed Project Vicinity

Species	Status	Habitat	Potential for Occurrence
slender-horned spineflower (*Dodecahema leptoceras*)	Federal: FE State: SE CNPS Rare Plant Rank: 1B.1	Chaparral, cismontane woodlands, and coastal scrub habitats.	Not observed during survey. Potential habitat exists but not observed during survey. Considered absent from site.
mesa horkelia (*Horkelia cuneata* ssp. *puberula*)	CNPS Rare Plant Rank: 1B.1	Chaparral, cismontane woodland, and coastal scrub communities.	Not observed during survey. Potential habitat exists but not observed during survey. Considered absent from site.
white rabbit-tobacco (*Pseudognaphalium leucocephalum*)	CNPS Rare Plant Rank: 2.2	Chaparral, cismontane woodland, coastal scrub, and Riparian Woodland habitats.	Not observed during survey. Potential habitat exists but not observed during survey. Considered absent from site.
Parish's gooseberry (*Ribes divaricatum* var. *parishii*)	CNPS Rare Plant Rank: 1A	Riparian Woodland.	Not observed during survey. Potential habitat exists but not observed during survey. Considered absent from site.
Greata's aster (*Symphyotrichum greatae*)	CNPS Rare Plant Rank: 1B.3	Broad-leafed upland forest, chaparral, cismontane woodland, lower montane coniferous forest, and Riparian Woodland.	Not observed during survey. Potential habitat exists but not observed during survey. Considered absent from site.

Source: CNDDB 2013

Sensitivity Status Codes used in this table:

Federal:
FE = Federally listed; Endangered

State:
SE = State listed; Endangered
Rare Plant Rank (RPR)/CNPS:
Rare Plant Rank 1B: Rare, Threatened or Endangered in California and elsewhere
Rare Plant Rank 2: Rare, Threatened or Endangered in California, more common elsewhere
Threat extension: 1- Seriously endangered in California
2- Fairly endangered in California
3- Not very endangered in California

Birds

Fifty bird species were observed or detected in the Proposed Project area during the reconnaissance level surveys. Some of the species included California quail (*Callipepla californica*), mourning dove (*Zenaida macroura*), Allen's hummingbird (*Selasphorus sasin*), acorn woodpecker (*Melanerpes formicivorus*), northern rough-winged swallow (*Stelgidopteryx serripennis*), common raven (*Corvus*

corax), European starling (*Sturnus vulgaris*), common yellowthroat (*Geothlypis trichas*), black-headed grosbeak (*Pheucticus melanocephalus*), and housefinch (*Carpodacus mexicanus*), as well as the other bird species included on the comprehensive list in Appendix D.

Mammals

Twelve mammal species were observed or detected in the Proposed Project area during the surveys. Species included the Virginia opossum (*Didelphis virginiana*), desert cottontail (*Sylvilagus audubonii*), western gray squirrel (*Sciurus griseus*), California ground squirrel (*Otospermophilus beecheyi*), domestic dog (*Canis familiaris*), coyote (*Canis latrans*), grey fox, (*Urocyon cinereoargenteus*), raccoon (*Porocyon lotor*), striped skunk (*Mephitis mephitis*), bobcat (*Lynx rufus*), mule deer (*Odocoileus hemionus*), *and* horse (*Equus caballus*).

Special Status Animal Species

After a literature review and an assessment of the various habitat types in the vicinity of the Proposed Project site, it was determined that 15 sensitive wildlife species have the potential to occur within the Proposed Project site or were present in the Proposed Project site during the survey. Factors used to determine potential for occurrence include quality of habitat, impact of surrounding residential development, and the date and location of prior California Natural Diversity Database (CNDDB) records of occurrence. These special status animal species and their status are listed in Table 3.6-3: Special Status Animal Species Occurring in Proposed Project Vicinity.

Table 3.6-3: Special Status Animal Species Occurring in Proposed Project Vicinity

Species	Status	Potential for Occurrence
AMPHIBIANS		
Sierra Madre yellow-legged frog (*Rana muscosa*)	SSC	Low potential to occur due to lack of known historical occurrences within 5 miles of Proposed Project site but not observed during survey.
coast range newt (*Taricha torosa torosa*)	SSC	High potential for occurrence, due to the presence of suitable habitat and occurrences within 5 miles of the Proposed Project site but not observed during survey.
REPTILES		
coast horned lizard (*Phrynosoma blainvillii*)	SSC	Low potential to occur due to lack of known historical occurrences within 5 miles of Proposed Project site but not observed during survey.
coast patch-nosed snake	SSC, FSC	Present within the Proposed Project site.
southwestern pond turtle (*Actinemys marmorata*)	SSC	Moderate potential for occurrence, due to the presence of suitable habitat but not observed during survey.
two-striped garter snake (*Thamnophis hammondii*)	SSC	Present within Proposed Project site.

Table 3.6-3: Special Status Animal Species Occurring in Proposed Project Vicinity

Species	Status	Potential for Occurrence
BIRDS		
burrowing owl (*Athene cunicularia*)	SSC	Low potential to occur due to lack of known historical occurrences within 5 miles of Proposed Project site but not observed during survey.
southwestern willow flycatcher (*Empidonax traillii extimus*)	FE, SE	Low potential to occur due to lack of known historical occurrences within 5 miles of Proposed Project site but not observed during survey.
least Bell's vireo (*Vireo bellii pusillus*)	FE, SE	Present but not nesting within Proposed Project site.
yellow warbler (*Dendroica petechia brewsteri*	SSC (nesting)	Present within Proposed Project site.
MAMMALS		
pallid bat (*Antrozous pallidus*)	SSC	Low potential to occur due to lack of known historical occurrences within 5 miles of Proposed Project site but not observed during general surveys.
western mastiff bat (*Eumops perotis californicus*)	SSC	Low potential to occur due to lack of known historical occurrences within 5 miles of Proposed Project site but not observed during general surveys.
western yellow bat (*Lasiurus xanthinus*)	SSC	Low potential to occur due to lack of known historical occurrences within 5 miles of Proposed Project site but not observed during general surveys.
southern grasshopper mouse (*Onchomys torridus ramona*)	SSC	Low potential to occur due to lack of known historical occurrences within 5 miles of Proposed Project site but not observed during general surveys.
American badger (*Taxidea taxus*)	SSC	Low potential to occur due to lack of known historical occurrences within 5 miles of Proposed Project site but not observed during general surveys.

Source: CNDDB 2013
Sensitivity Status Codes used in this table:

Federal:
FE = Federally listed; Endangered
FSC = Federal Species of Concern

State:
SE = State listed; Endangered
SSC = State Species of Special Concern

Six sensitive wildlife species have a moderate to high potential to occur in the Proposed Project site. One species, least Bell's vireo, is a federally and state listed as endangered species and was present on the site during protocol surveys. Two species, western pond turtle and coast range newt, are California State Species of Special Concern (SSC) and have a moderate or high potential to occur on the site. One

species, yellow warbler, is a SSC when nesting and was present on the site during the reconnaissance survey. A two-striped garter snake was observed on the dirt road leading to the spillway. The coast patch-nosed snake, a SSC and Federal Species of Concern (FSC), was present during one of the vireo surveys.

Least Bell's Vireo - FE, SE

The least Bell's vireo (nesting) is a federally and state listed as endangered subspecies of the Bell's vireo. The breeding range of the species extends from North Dakota to Indiana, south through Arkansas and Texas, and west to southern New Mexico, Arizona, California, and northern Mexico; however, the least Bell's vireo subspecies is restricted to coastal California and Baja California, Mexico, and a few inland populations. Its winter range extends along the Pacific coast from northern Mexico south to northern Nicaragua. It is a small, gray songbird with two faint wing bars and a faint eye ring and is whiter below. This species prefers to nest in low, dense, scrubby vegetation in early successional areas and is particularly dependent on corridors of habitat along rivers and streams. Habitats may include willow woodlands and dense mule fat, scrub oak, coastal chaparral, and mesquite patches with dense early successional understories. It builds a suspended cup nest about 0.5 to 2.0 meters above the ground and, on average, lays four eggs. It may produce two broods per season. On the breeding grounds, the least Bell's vireo feeds primarily on insects and small spiders that it gleans from twigs and leaves. The two major factors in the decline of least Bell's vireo populations are loss of habitat and nest parasitism by the brown headed-cowbird (*Molothrus ater*). Habitat loss and degradation, especially along streams and rivers due to development, agriculture, logging operations, and intensive cattle grazing practices, are the greatest threats to the continued existence of the least Bell's vireo. Overgrazing has been estimated to have reduced nesting sites by 50 percent in some areas, and it has contributed to an increase in non-native invasive plant species that do not typically support the breeding of this species.

Cowbird parasitism is also an important factor in population declines. The cowbird lays its egg in the nest of an unsuspecting vireo, and the vireo may then raise the cowbird chick as its own. The cowbird egg hatches earlier than the vireo eggs, and the chick then grows much larger in less time, eventually outcompeting the vireo chicks and causing nest failure. Fragmentation of habitat also increases cowbird parasitism by artificially creating favored habitats of cowbirds; and it isolates small, fringe vireo populations. In turn, these populations are more susceptible to localized extirpations which contribute to large-scale range reductions. Domestic and feral cats are also a significant predatory force in some areas. Despite historic population losses, recent trends indicate that populations are on the rise and that the least Bell's vireo is returning to parts of its former range as well as colonizing some new areas.

Approximately 62.5 acres of suitable habitat (Riparian Woodland and Mule Fat Thickets) for least Bell's vireo are present within the Project site. Historic records do not exist within the *Pasadena*, California USGS 7.5-minute topographic quadrangle; however, known occurrences do exist for this species in the San Gabriel Mountains in Los Angeles County. Because habitat for this species occurs in the Survey Area and occurrences are known in other areas of the San Gabriel Mountains, focused protocol-level least Bell's vireo surveys were conducted from May through August 2010 and from April through July 2013 following modified USFWS *Least Bell's Vireo Survey Guidelines* (Jan. 19, 2001)**.** No least Bell's vireos were observed during the 2010 surveys. In July 2012, an adult and a juvenile least Bell's vireo were observed in the Proposed Project site (CDFW 2013). Because least Bell's vireo have high site fidelity, and are likely to return to the same site to breed every year, focused surveys for least Bell's vireo were conducted in 2013 to determine if they are breeding within the Project site. A single male least Bell's vireo was observed during the first four of six 2013 surveys (April 29, May 23, June 5, and June 17, 2013). The least

Bell's vireo male was extremely vocal, continuously singing throughout the mornings, and appeared to be very territorial. It did not appear to be paired, however, and no nesting behavior was observed. Shortly before the June 17, 2013, survey, recreational activities within the Proposed Project site increased dramatically due to the initiation of children's summer camps within Hahamongna Watershed Park and the flood control reservoir. Camp activities included clearing vegetation for children's play areas within the Riparian Woodland, cutting new trails through the occupied least Bell's vireo habitat, and increasing sound disturbance within the occupied least Bell's vireo habitat. The least Bell's vireo was no longer observed during the June 27 or July 9, 2013, surveys; however, due to Bell's vireo having high site fidelity, this species is considered present within the Proposed Project site.

Coast Range Newt- SSC

The coast range newt is a California Species of Special Concern found in terrestrial habitats such as grasslands, woodlands, and forests. Within these habitat types, this species uses pools, ponds, reservoirs, and slow-moving streams as breeding sites. Its range includes most of coastal California, and it may be found up to 7,800 feet in elevation. It has a light brown dorsum, reddish-orange or yellow venter, large eyes, and smooth to rough skin. It may exceed 7 inches in total length. Breeding males have flattened tails, dark skin on the undersides of the feet, and smooth skin. Its diet includes invertebrates such as earthworms, slugs, sowbugs, snails, and larval insects. This species is threatened by habitat loss and alteration of hydrological systems during their breeding season.

Habitat for the coast range newt occurs seasonally within the Proposed Project site. The Arroyo Seco watershed is a slow-moving seasonal stream. During the 2010 surveys, spreading basins, one holding water at the time of the survey (most likely from rain), were present on the east side of the stream; and a seasonal pond, also filled with rain water at the time, was located on the west side of the stream. The amount of ponding within the reservoir is dependent upon where sediment accumulates and the amount of flows, rainfall, and runoff. During the 2013 survey, two storm drains that divert runoff from neighborhoods and businesses into the watershed had flowing water (Chambers Group 2013b). Water was entering the reservoir from Flint Wash on the southwest side of the site, and a culvert on the southeast contained a pond with a little water flow as well. Water from the Arroyo Seco and storm drains continues to flow to the southernmost point in the reservoir and leaves the reservoir from the outlet structures of the dam. The stream, basins, and pond are all potential breeding habitat for this species. A historic occurrence (2003) exists for this species in the Arroyo Seco watershed less than 0.5 mile upstream of the Proposed Project site. Therefore, this species has a high potential to occur within the Proposed Project site; however, this species was not observed during the surveys.

Coast Patch-nosed Snake – SSC, FSC

This species is a California Species of Special Concern and Federal Species of Concern. This species occurs in California from San Luis Obispo County, along the coast west of the deserts, and into northern coastal Baja California (California Reptiles and Amphibians 2009). This species is a generalist in diet and habitat. It inhabits coastal chaparral in canyons, rocky hillsides, sandy flats, and plains. This species is diurnal and can be found throughout the day in milder temperatures, with greatest activity occurring in May and June, and basking in early morning or late day in hotter temperatures in the summer. This species can move quickly and may climb shrubs in pursuit of prey (California Reptiles and Amphibians 2009). This species has acute vision and can escape quickly if threatened and will also burrow into loose soil.

This species is considered uncommon in the area. Little is known about its natural history. Habitat destruction including development and grazing is the primary threat to this species.

Southwestern Pond Turtle- SSC

This species is a California Species of Special Concern. This species occurs along the west coast of North America from Baja California up to San Francisco Bay and from sea level to 5,900 feet in elevation (California Reptiles and Amphibians 2009). It inhabits permanent or nearly permanent bodies of water in many habitat types including ponds, marshes, rivers, and streams that typically have a rocky or muddy bottom and extensive aquatic vegetation along water body margins (California Reptiles and Amphibians 2009). The southwestern pond turtle requires basking sites such as partially submerged logs, vegetation mats, or open mud banks. This species occurs in a variety of habitat types including woodland, grassland, and open forest (California Reptiles and Amphibians 2009). Although this species is considered aquatic, some spend a lot of time on land (Bury and Germano 2008). The top of the shell is dark brown or yellow-olive and may have dark streaks (Bury and Germano 2008). Pond turtles are diurnal, but will quickly slide into water when they feel threatened. Most activity takes place from February to November. They hibernate under water in mud and will estivate during dry summers in soft mud, leaf litter, or wood rat nests (California Reptiles and Amphibians 2009). If water temperatures are right, this species may be active year-long (Bury and Germano 2008). Pond turtles mate in April and May and nest between April and August (California Reptiles and Amphibians 2009). Hatchlings emerge in early fall. Pond turtles feed on aquatic plants, invertebrates, worms, frog and salamander eggs and larvae, crayfish, carrion, and occasionally frogs and fish (California Reptiles and Amphibians 2009).

Habitat destruction is the primary threat to this species. Pond turtles are found to occur near dams, although the habitat quality is low. Dams cause cooler water temperatures, fast flows below the dams, and human disturbance due to fishing in reservoirs behind the dams. Reservoirs also tend to have decreased vegetation cover, which decreases invertebrates (Bury and Germano 2008).

Habitat for the southwestern pond turtle occurs seasonally within the Proposed Project site. The Arroyo Seco watershed is a slow-moving seasonal stream. As discussed previously, ponding was observed during the 2010 survey and flowing water (runoff) from two storm drains during the 2013 surveys. The stream, basins, and ponded areas are all potential breeding habitat for this species. A historic occurrence (1971) exists for this species in the Arroyo Seco watershed less than 5 miles upstream of the Proposed Project site. Therefore, this species has a moderate potential to occur within the Proposed Project site; however, this species was not observed during the surveys.

*Yellow Warbler (*Dendroica petechia brewsteri*) - SSC*

The yellow warbler (nesting) is a California Species of Special Concern. Its breeding range includes most of North America from northern Alaska and northern Canada to the southern U.S. and Mexico. Wintering birds occur from Mexico to Peru. Breeding habitats include wet areas, such as Riparian Woodlands, orchards, gardens, swamp edges, and willow thickets. Most breeding habitats generally contain medium to high-density tree and shrub species with ample early successional understories. In migration, yellow warblers may occur in other habitats, including early seral riparian habitats. Its plumage is more extensively yellow than other North American wood-warblers, and it is also unique in having yellow on the inner webs of its tail feathers (except middle pair). Males show rusty streaking on the breast. Yellow warblers are almost entirely insectivorous, but they also eat a few berries.

Populations are in decline in California due to habitat loss, grazing of riparian understories, and brood parasitism by the brown-headed cowbird.

The yellow warbler was observed in the Proposed Project site during the biological reconnaissance survey in riparian habitat within the reservoir. This species is considered present within the Proposed Project site.

Two-Striped Garter Snake

The two-striped garter snake is a California Species of Special Concern. It is found in Salinas in Monterey County, south along the coast, into the Traverse Ranges in southern California, into Victorville, south to the Peninsular Ranges, and south to Baja California (California Reptiles and Amphibians 2009). The two-striped garter snake is found in or near permanent and intermittent freshwater habitats, including streams, rivers, ponds, and small lakes from sea level to around 8,000 feet. Oak woodlands, brushlands, sparse coniferous forests, and riparian forests may surround its freshwater habitat. It is recognized by its lack of a mid-dorsal stripe, and its coloration is usually olive or brownish above and dull yellow to orange-red or salmon below. Intergrading color morphs are common. This highly aquatic snake is most active at dusk or at night, but it may also forage by day (California Reptiles and Amphibians 2009). Its diet includes tadpoles, toads, frogs, small fish, earthworms, California newt (*Taricha torosa torosa*) larvae, and aquatic eggs. The two-striped garter snake is a live-bearing species that gives birth to up to 36 young at a time. Loss of wetland habitats has contributed to a reduction in the range of this snake.

A two-striped garter snake was observed during the biological reconnaissance survey. The deceased snake was observed on the dirt road leading down to the spillway of the reservoir. This species is considered present within the Proposed Project site.

Downstream Survey

A downstream biological resources survey was conducted within the Arroyo Seco Channel to determine habitat and species types present downstream of the Proposed Project site in relation to a specific project alternative. These surveys would be standard operating procedure only for projects that may include sluicing. Appendix D contains the results of this survey. The majority of the Arroyo Seco Channel consists of a concrete-lined channel. The sections of the concrete-lined channel total 9 miles in length. Two sections of the Arroyo Seco Channel, approximately 0.5 mile in total length, were identified to have natural sediment bottoms. The Los Angeles River from where the Arroyo Seco Channel enters the Los Angeles River to the Pacific Ocean also mainly consists of a concrete-lined river. The concrete-lined sections of this portion of the Los Angeles River total 21 miles in length. Sections of the Los Angeles River, approximately 4 miles in total length, were identified as having concreted riprap sides and bottoms. The majority of the concreted riprap sections were located in Long Beach from West Willow Street south to the Pacific Ocean. This section was approximately 90 percent of the total concreted riprap length. An area known as Golden Shore Marine Biological Reserve is located adjacent to the Los Angeles River immediately to the east of the main channel. This area is an intertidal and subtidal wetland area exposed to tidal influences.

Little to no vegetation was present within the channel or riverbed in concrete-lined areas of the Arroyo Seco Channel and Los Angeles River. These areas had little to no potential for sensitive plant species or for wildlife to forage and find shelter. Several bridges crossing over the Arroyo Seco Channel and Los Angeles River were identified during the survey; however, the majority of these bridges were

constructed of solid concrete or had exposed steel beams and do not provide suitable bat hibernacula. Despite these river characteristics, six areas that have potential for plant and animal life are described below.

Area 1

Area 1 is located in the Arroyo Seco Channel just downstream of Devil's Gate Dam in the City of Pasadena. This area starts at the downstream area below Devil's Gate Dam south to the drop spillway structure located approximately 560 feet downstream of the I-210 overpass near the northern portion of the Brookside Golf Course. This section of the channel consists of freshwater emergent habitat with cattails and leads to a mature Riparian Woodland habitat with willows, alders, and western sycamore trees in downstream sections of this area. No sensitive wildlife or plant species were observed during surveys in Area 1; however, the riparian habitat present is suitable foraging habitat for avian species. Suitable roosting habitat for bats was present within the large native trees surrounding the channel. No fish were observed in this section of the Arroyo Seco Channel.

Area 2

Area 2 is located in the Arroyo Seco Channel just downstream of West Holly Street in the City of Pasadena. This soft-bottom channel area starts at the end of the concrete-lined Arroyo Seco Channel approximately 750 feet north of the SR-134 freeway overpass and continues downstream to a drop spillway structure located approximately 300 feet south of the SR-134 freeway overpass. The northern section of Area 2 consists of riparian habitat with red willows and California white alder trees. Sandy and rocky substrates were present within the streambed, and undercuts were present along the banks that could provide cover/shelter for aquatic species. Large ponds approximately 5 to 6 feet deep and 50 feet wide were found in the downstream section of this area. The ponds had a sandy bottom with little vegetation on the banks. No sensitive wildlife or plant species were observed during surveys. Riparian habitat surrounding the channel is suitable foraging and nesting habitat for avian species. Suitable roosting habitat for bats was also present in the trees surrounding the channel. During fish surveys, approximately 60 mosquito fish were identified in this section of the Arroyo Seco Channel. These fish were found near the banks where vegetative cover was present along the bank. Mosquito fish are not native fish species and are known to be used as vector control species.

Area 3

Area 3 consists of two restoration areas that flow north to south parallel to the Arroyo Seco Channel and are located to the west and east of the Arroyo Seco Channel (concrete-lined). This area begins at the drop spillway structure located at the southern end of Area 2 just north of the Colorado Boulevard overpass bridge and continues south for approximately 0.33 mile near the Pasadena Roving Archers archery range. Water enters the sites through a small gate located on both sides of the channel. The water present at these sites flows back into the concrete-lined Arroyo Seco Channel. The restoration area sections of the channel are comprised of slow-moving, pooled habitat, cobble and rock substrates, with heavy silt sedimentation present. Trees line the banks of both restoration sites, with an open canopy along the middle of the channel. The mature canopy includes willow, California white alders, aspens, and sycamore trees. Emergent cattails were present in areas with pooled water. No sensitive wildlife or plant species were observed during surveys. Suitable foraging and nesting habitat for avian species was present in the surrounding riparian habitat in both restoration sites. This habitat also provides roosting habitat for bats. Although suitable fish habitat exists within the restoration areas,

either the spillway structure at the north end or the restoration areas may act as barriers that prevent or limit fish populations from occurring here.

Area 4

Area 4 is located in the City of Los Angeles. The desktop analysis identified three small areas under several street bridges traversing over the Los Angeles River as potentially having sediment or rocky substrates within the streambed. These overpass bridges were located at East 7th Street, at East Olympic Boulevard, and under a railway bridge just south of East Washington Boulevard. The Los Angeles River within Area 4 consists of a concrete-lined river with rocky and sandy substrates present under the bridges previously mentioned. The majority of the rocky sediment was observed around the support columns of the bridges. Little to no vegetative cover was present at these locations. The scattered emergent vegetation was located on the rocky sediment around the bridge support columns, and algae covered the concrete-lined river and rocky sediment. Due to the small amount of vegetation and sediments, these areas could provide low quality foraging opportunities for common species. No sensitive wildlife or plant species were observed during surveys. No surrounding habitat with the potential to support sensitive wildlife species was observed. The bridges have either no potential or a low potential to support bat species. No fish species were observed at any of the three locations within Area 4. These locations do not have appropriate riverbed composition, vegetative cover, or food sources to support native fish populations.

Area 5

Area 5 is located within the Los Angeles River in the Long Beach Area just north of the West Willow Street overpass bridge to the West Anaheim Street overpass bridge. The area downstream of West Willow Street is comprised of a large, deep pool leading into a riffle and run river system. The water within this area was turbid, and visibility was less than 1 foot. This area appeared to have an earthen basin with concreted riprap consisting of large boulders along the banks. Vegetation was present along the lower sections of the banks and included willows, cattails, and sedges; however, the vegetation lining the outer banks of the river appeared to have recently been removed. No sensitive wildlife or plant species were observed during surveys. Vegetation found in this area did not appear suitable for cover; therefore, the potential for sensitive riparian wildlife species to occur in this area is unlikely. The West Willow Street Bridge consisted of solid concrete and does not provide suitable roosting habitat for bats. No fish were observed in the water during the survey; however, non-native fish are considered to be present in this area. This area likely hosts only exotic fish species such as mosquito fish, goldfish, and sunfish species that have been introduced by local anglers. The water downstream of West Anaheim Street appears to have a brackish water influence and may support species adapted to higher saline conditions.

Area 6

Area 6 is located within the Los Angeles River in the City of Long Beach from the West Anaheim Street overpass to the Pacific Ocean. This area was completely turbid, and visibility was less than 1 foot. Sandy sediment may be present on the river bottom, and the banks consisted of concreted riprap. This section of the Los Angeles River appeared to have ocean confluent water with high salinity levels. Plants that are adapted to high saline conditions, such as pickleweed and California cord grass, were observed along the banks closer to the ocean. Several extensive patches of non-native castorbean and arundo also exist along the banks. The vegetation lining the outer banks of the river at this area also appeared to have

been recently removed. The bridges crossing over the river did not provide suitable roosting habitat for bats. Many avian shoreline species were observed in this area near the mouth of the river entering the Pacific Ocean, including a white-tailed kite (CDFW fully protected species) flying through the area. Due to turbid conditions, no fish were observed during visual surveys from outer banks; however, fish are considered present in this area. This area may support larger fish or species adapted to confluent freshwater and ocean water environments.

The Golden Shore Marine Biological Reserve is located adjacent to the Los Angeles River on the eastern bank of the channel. This area was originally part of Palm Beach Park, an area created in the 1950s for a launch ramp and parking lot. This area was exposed to continual silt buildup and was eventually closed in the early 1990s. In the late 1990s, 6.4 acres of intertidal and subtidal wetland habitat was mitigation for the impact on the saltwater lagoon that was converted to Rainbow Harbor, a recreational boating area. Many avian species typical of coastal areas were observed including: great blue heron, black-crowned night heron, great egret, willet, marbled godwit, pied-billed grebe, eared grebe, western grebe, black-necked stilt, killdeer, and western gulls. This area is also known for fish spawning typical of intertidal and subtidal wetland areas. The Golden Shore Marine Biological Reserve is likely to support fish spawning areas and foraging opportunities for fish species typical of coastal wetlands.

The Dominguez Gap Wetlands are also located adjacent to the channel. The Dominguez Gap Wetlands Project is part of the Los Angeles River Master Plan (LACDPW 1996). The purpose of the project is to restore ecological functions, improve water quality, and recharge the aquifer (LACDPW 2008). The gates to the wetlands are operational and allow for flows from the channel to be controlled.

Jurisdictional Waters/Wetland Habitats

The Proposed Project site was surveyed for jurisdictional features and potential wetland habitats in November 2010 and May 2013. Results of these surveys are found in Appendix D. USACE and RWQCB potential wetland areas were evaluated based upon the presence of three parameters: hydrophytic vegetation, hydric soils, and wetland hydrology, in accordance with USACE guidelines (USACE 2008). Vegetation communities were identified to be of CDFW interest if at least one of the three wetland parameters were present.

Soils

Soil characteristics were assessed in the field by digging pits, checking for soil indicators, and verifying or determining actual soil types present. Problematic soils were found to occur within Devil's Gate Reservoir. Problematic soils include soil profiles that have angular gravel or fill (Wetland Delineation Manual, Arid West Region), such as the sediment load entering a reservoir after heavy rain events. The Devil's Gate Dam serves as a man-made structure altering natural hydrology in the area. Most man-induced wetlands do not contain hydric soils because of the relatively recent changes in soil and hydrology. Hydric soils may take several years to hundreds of years to mature. Fire and rainfall patterns cause debris and sediment to wash down and get trapped in the reservoir; and as a result, the reservoir is continually loaded with debris and sediment buildup, such as the case with Devil's Gate Reservoir. Since 2009, as a result of the Station Fire, Devil's Gate Reservoir received depths between 3 to 18.5 feet (depending on the area of the reservoir) of recent debris and sediment buildup. Typically, sediment and debris is deposited at a much lower rate. With new soils continuously moving into the reservoir, the upper layers of soil do not have the chance to mature. Although this system is not considered natural,

the man-made changes have been left unchanged for a number of years and are considered normal circumstances.

Vegetation

As described above, vegetation in the Proposed Project site has mature riparian trees, pockets of Mule Fat Thickets, and freshwater marshes growing along scoured areas present due to unstable sediment accumulation and subsequent scouring during storm events occurring since the 2009 Station Fire. Upland vegetation communities and developed areas also exist within the Proposed Project site.

Drainage Features and Connectivity

The Devil's Gate Reservoir is fed by the Arroyo Seco Watershed, which begins in the San Gabriel Mountains north of Pasadena. Water flows from the watershed into the reservoir at the base of the mountains. According to the Hahamongna Watershed Park Master Plan (HWPMP), adopted in 2003, in addition to the Arroyo Seco, 23 storm drains also enter the reservoir. Water from the Arroyo Seco and storm drains continues to flow to the southernmost point in the reservoir and leaves the reservoir from the outlet structures of the dam. Water flows south of the dam for approximately 8.5 river miles to the Los Angeles River in the City of Los Angeles near State Route (SR) 110 and Interstate 5 (I-5) freeway interchange. The Los Angeles River continues to flow south for approximately 23.5 river miles when it reaches the Pacific Ocean at San Pedro Bay near Long Beach.

The total distance to the nearest traditional navigable waters (TNW) from Devil's Gate is the Los Angeles River at a distance of approximately 8.5 river miles. The Arroyo Seco Watershed is seasonal, flowing during the wet season after rain events. The headwaters are located at in the San Gabriel Mountains, and waters terminate at Los Angeles River.

Hydrology

Several indicators of wetland hydrology were present at the time of the field delineation. Characteristics included evidence of inundation, saturation, surface water, watermarks, drift lines, sediment deposits, water-stained leaves, destruction of vegetation and the presence or oxidation/reduction features in the soil, among several others. The braided channels were highly variable within the reservoir area, in many instances flowing subsurface through the highly permeable soils and appear to lose visible connectivity. Much of the soils are sandy to sandy loam soils that do not exhibit a relatively permanent bed and bank. Instead, the flow is highly variable and many tributaries formed from single rain events were observed.

The wet season in southern California typically runs from October 15th to April 15th. Outside the wet season, Devil's Gate Reservoir does not impound water; however, if enough water is available during the wet season, Devil's Gate Reservoir will impound water up to elevation 1020. When water within the reservoir reaches the 1020 contour, the dam's gates are opened to maintain the water level at elevation 1020. Based on this information, the Ordinary High Water Mark (OHWM) for the reservoir is therefore located at the 1020 contour. Due to the presence of problematic soils that inhibited determination of the three parameter wetland, the OHWM was therefore used to delineate the boundaries of the wetland area on the Proposed Project site.

The quality of habitat within the reservoir is low for most wildlife species. Water is not present all year, and therefore the presence of aquatic species would occur only seasonally rather than year-long. Due to

the nearby presence of a park, hiking paths, horseback riding trails and training rings, and domestic dogs, the site is considered disturbed. Because the site is frequently visited by the public and pets of the public, wildlife diversity will decrease. Some wildlife species prefer undisturbed, quiet areas and will find those areas north of the reservoir where the public has less of a presence. Off-leash dogs and outdoor cats in adjacent residential homes likely predate on native wildlife species, also causing a decrease in variability. The site is also highly disturbed due to frequent deposition of sediment as a consequence of the 2009 Station Fire and subsequent erosion of areas with unstable sediment buildup during storm events. Disturbed communities also allow exotic plant species to establish and spread.

United States Army Corps of Engineers (USACE) Jurisdiction

The waters within the reservoir ultimately connect to the Los Angeles River and terminate in the Pacific Ocean and are therefore considered USACE jurisdictional. A significant nexus analysis was performed to determine potential USACE jurisdiction. A significant nexus was determined to exist for the Proposed Project based on the following facts:

- It is a wetland directly abutting an ephemeral and intermittent non-Relatively Permanent Water (RPW) and is hydrologically connected approximately 8.5 river miles from the nearest Traditional Navigable Water (TNW) as the crow flies (Los Angeles River);
- It has the capacity to carry pollutants, nutrients, and organic carbon to the nearest TNW;
- The nutrients and organic carbon in turn support downstream foodwebs (i.e., aquatic plant and wildlife in the Los Angeles River). The nutrients and organic carbon also have the capacity to contribute to the ecology of all impoundments between the project site and the Pacific Ocean.

For this reservoir, the water level is highly variable within the seasons and throughout the year; however, water is released at the 1020 contour (OHWM); therefore, the USACE identified Wetland boundary is located up to the OHWM at the 1020 contour. The total USACE jurisdiction is defined by the riparian habitat within the HWM that is indicative of the total water capacity within the proposed project. USACE jurisdictional areas are shown in Figure 3.6-3: USACE/RWQCB Jurisdictional Areas Map.

Regional Water Quality Control Board (RWQCB) Jurisdiction

For this reservoir, the water level is highly variable within the seasons and throughout the year; however, water is released at the 1020 contour (OHWM); therefore, the RWQCB identified Wetland boundary is located up to the OHWM at the 1020 contour. The total RWQCB jurisdiction is defined by the HWM that is indicative of the total water capacity within the proposed project. The reservoir has the capacity to affect surface and subsurface water quality within California and, therefore, the RWQCB has jurisdiction over riparian habitat within the reservoir up to HWM line. USACE jurisdictional areas are shown in Figure 3.6-3.

California Department of Fish and Wildlife (CDFW) Jurisdiction

Though much of the reservoir is of low quality habitat, it does have the potential to support common riparian-dependent birds, mammals, and aquatic species. Mature riparian vegetation (i.e., willows and mule fat) was found present within the Proposed Project site, and characteristics of naturalized stream channels were present. CDFW jurisdiction applies to the top of the banks, or in this case the HWM, or

the edge of the riparian vegetation dripline, whichever is larger. Wetland conditions were identified to be of CDFW interest since at least one of the three wetland parameters was present. Additionally, CDFW will have jurisdiction over riparian vegetation from the OHWM up to the HWM elevation line. CDFW jurisdictional areas are shown in Figure 3.6-4: CDFW Jurisdictional Areas Map.

3.6.3 Applicable Regulations

This section provides brief descriptions of federal, State, and local regulations relevant to biological resources.

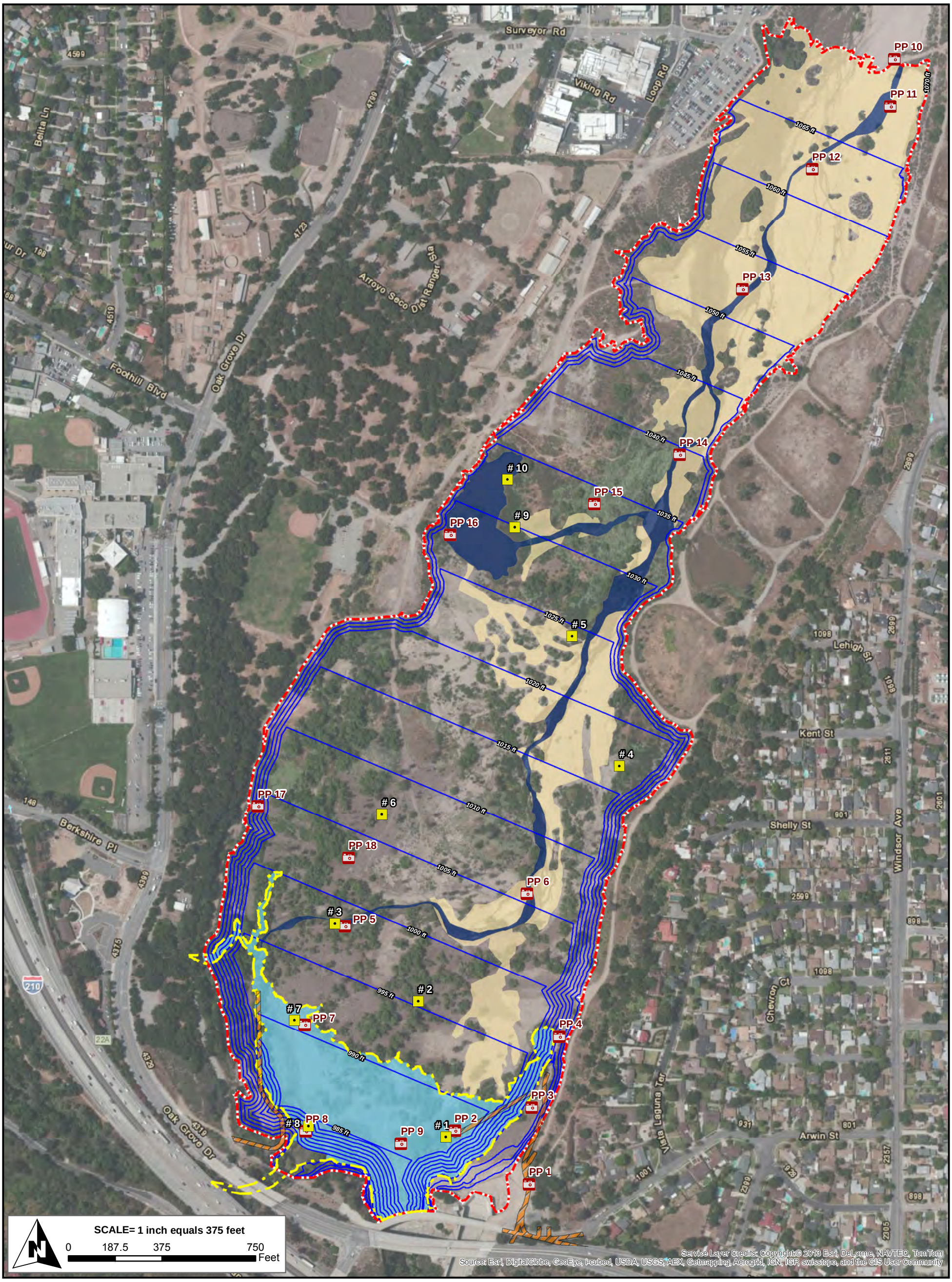
Federal

Endangered Species Act

The Endangered Species Act of 1973 (16 United States Code [USC] 1531–1544), as amended (ESA), provides for the protection of federally listed threatened and endangered species and their habitats. It prohibits unlawful "take" of federally listed species. The ESA defines "take" as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." "Harm" as defined in 50 Code of Federal Regulations (CFR) Part 222.102 "may include significant habitat modification or degradation which actually kills or injures fish or wildlife by significantly impairing essential behavioral patterns, including, breeding, spawning, rearing, migrating, feeding, or sheltering." United States Fish and Wildlife Service (USFWS) administers the ESA for terrestrial and freshwater organisms.

Migratory Bird Treaty Act

The Migratory Bird Treaty Act of 1918, as amended (MBTA) (16 USC 703 et. seq.), provides for the protection of migratory birds and prohibits their unlawful take, possession, or transport. It was originally enacted to implement a treaty between the United States and Great Britain (on behalf of Canada) and has since been amended to implement treaties between the United States and several other countries for the protection of migratory birds. A migratory bird is any bird listed in 50 CFR 10.13 and includes any mutations and hybrids of any such species, including any part, nest, or egg of any such bird, or any product consisting of such (50 CFR 10.12). Migratory birds may not be federally listed under the ESA. The MBTA, which is enforced by USFWS, makes it unlawful "by any means or in any manner, to pursue, hunt, take, capture, [or] kill" any migratory bird, or attempt such actions, except as permitted by regulation. The applicable regulations prohibit the take, possession, import, export, transport, sale, purchase, barter, or offering of these activities, except under a valid permit or as permitted in the implementing regulations (50 CFR 21.11).



Proposed Project Boundary

Access Road

Sediment Removal Excavation Limit

Inundation Line

Soil Test Pit

Photo Points

Waters

Wetland Area (11.2 acres)

Drainage (6.7 acres)

Braided Channel (28.9 acres)

Figure 3.6-3

Devil's Gate Reservoir Sediment Removal and Management Project

USACE/RWQCB Jurisdictional Areas Map

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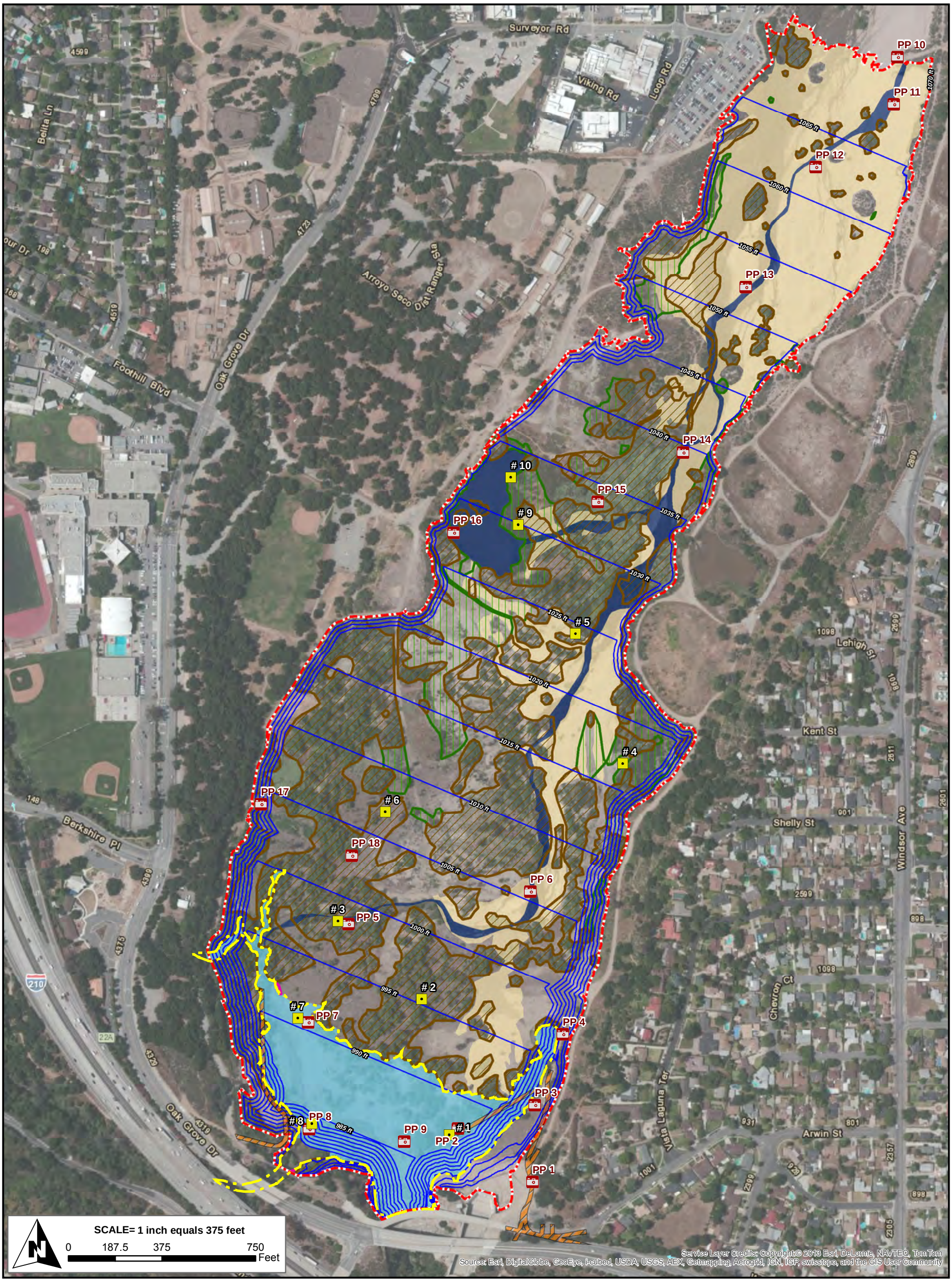

Proposed Project Boundary
Access Road
Sediment Removal Excavation Limit
Inundation Line
Soil Test Pit
Photo Points

Riparian Vegetation
Riparian Woodland (45 acres)
Mule Fat Scrub (9.3 acres)
Riparian Herbaceous (0.03 acre)

Waters
Wetland Area (11.2 acres)
Drainage (6.7 acres)
Braided Channel (28.9 acres)

Figure 3.6-4
Devil's Gate Reservoir Sediment Removal and Management Project
CDFW Jurisdictional Areas Map

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\\Cgi-gisdata01\gis_data\Projects\20000s\20201 - 20400\20346 Devil's Gate EIR\20346 Figure 3.6-4 CDFW Jurisdictional Areas Map.mxd

Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act (16 USC 668-668c), enacted in 1940 and as amended, prohibits anyone, without a permit issued by USFWS, from "taking" bald and golden eagles, including their parts, nests, or eggs. The Act defines "take" as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb." For purposes of these guidelines, "disturb" means: "to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, (1) injury to an eagle, (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior."

Federal Water Pollution Control Act (Clean Water Act)

The Clean Water Act (CWA), as amended, (33 USC 1251 et seq.) establishes the basic structure for water quality standards for surface waters and regulating discharges into the waters of the United States. The CWA gives the Environmental Protection Agency (EPA) the authority to implement pollution control programs such as the National Pollutant Discharge Elimination System (NPDES), which sets limits on the amounts of specific pollutants that are discharged to surface waters in order to restore and maintain the chemical, physical, and biological integrity of the water as established by ambient water quality standards.

These include setting wastewater standards for industry and water quality standards for contaminants in surface waters. The discharge of any pollutant from a point source into navigable waters is illegal unless a permit under its provisions is acquired. In California, the State Water Resources Control Board (SWRCB) and the nine RWQCBs are responsible for implementing the CWA. Section 404 of the CWA regulates the discharge of dredged, excavated, or fill material in wetlands, streams, rivers, and other waters of the United States. USACE is the federal agency authorized to issue Section 404 Permits for certain activities conducted in wetlands or other waters of the United States. Section 401 of the CWA grants each state the right to ensure that the state's interests are protected on any federally permitted activity occurring in or adjacent to waters of the State. In California, RWQCBs are the agencies mandated to ensure protection of the State's waters. For a Proposed project that requires a USACE CWA Section 404 permit and has the potential to impact waters of the State, RWQCB will regulate the project and associated activities through a Water Quality Certification determination (Section 401). Specifically, the Los Angeles Regional Water Quality Control Board (LARWQCB) will regulate the Proposed Project and associated activities through a Section 401.

State

California Endangered Species

The California Endangered Species Act of 1984 (CESA) provides a framework for the listing and protection of wildlife species determined to be threatened or endangered in California.

California Fish and Game Code 3503.5

Raptors (birds of prey) and active raptor nests are protected by the California Fish and Game Code (CFGC) 3503.5, which states that it is "unlawful to take, possess, or destroy any birds of prey or to take, possess, or destroy the nest or eggs of any such bird" unless authorized.

California Fish and Game Code 3503

Bird nests and eggs are protected by the CFGC 3503, which states "it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by this code or any regulation made pursuant thereto."

California Fish and Game Code 3513

The CFGC protects California's migratory birds by making it unlawful to take or possess any migratory nongame bird as designated in the Migratory Bird Treaty Act (MBTA) or any part of such migratory nongame birds.

State of California Fully Protected Species

The classification of Fully Protected was the state's initial effort in the 1960s to identify and provide additional protection to those animals that were rare or faced possible extinction. Lists were created for fish, mammals, amphibians and reptiles, birds, and mammals. Most Fully Protected species have also been listed as threatened or endangered species under ESA and/or CESA. Fully Protected species may not be taken or possessed at any time, and no licenses or permits may be issued for their take except for collecting these species for necessary scientific research and relocation of the bird species for the protection of livestock.

California Fish and Game Code, Section 1600, as amended

Under Section 1602 of the CFGC, CDFW regulates activities that would divert or obstruct the natural flow or substantially change the bed, channel, or bank of any river, stream, or lake that supports fish or wildlife. CDFW has jurisdiction over riparian habitats (e.g., southern willow scrub) associated with watercourses. Jurisdictional waters are delineated by the outer edge of riparian vegetation or at the top of the bank of streams or lakes, whichever is wider. CDFW jurisdiction does not include tidal areas or isolated resources. Section 1602 of the CFGC requires any person who proposes a project that will substantially divert or obstruct the natural flow or substantially change the bed, channel, or bank of any river, stream, or lake or use materials from a streambed to notify CDFW before beginning the project. If CDFW determines that the project may adversely affect existing fish and wildlife resources within CDFW-jurisdictional water, a Lake or Streambed Alteration Agreement is required.

Jurisdictional authority of the CDFW over wetland areas is established under Section 1600 of the Fish and Game Code, which pertains to activities that would disrupt the natural flow or alter the channel, bed, or bank of any lake, river, or stream. The Fish and Game Code stipulates that it is unlawful to substantially divert or obstruct the natural flow or substantially change the bed, channel, or bank of any river, stream, or lake without notifying the CDFW, incorporating necessary mitigation, and obtaining a Streambed Alteration Agreement. The Proposed Project will need to adhere to the CDFW's Section 1600 Streambed Alteration Agreement (SAA) since project activities will alter the flow, bed, channel, or bank of the streams in the project area. Coordination with CDFW will take place during project development regarding protected species or other natural resources and habitat that could be impacted by the sediment removal activities.

Native Plant Protection Act

The Native Plant Protection Act (NPPA)(CFGC Section. 1900-1913) prohibits the taking, possessing, or sale within the State of any plant listed by CDFW as rare, threatened, or endangered. An exception to this prohibition in the Act allows landowners, under specified circumstances, to take listed plant species, provided that the owners first notify CDFW at least 10 days prior to the initiation of activities that would destroy them. The NPPA exempts from "take" prohibition "the removal of endangered or rare native plants from a canal, lateral ditch, building site, or road, or other right of way."

Porter-Cologne Water Quality Control Act, as amended

The Porter-Cologne Act grants the State Water Resource Control Board (SWRCB) and the RWQCBs power to protect water quality and is the primary vehicle for implementation of California's responsibilities under the federal CWA. Waters of the State are defined by Porter-Cologne as "any surface water or groundwater, including saline waters, within the boundaries of the state" (Water Code Section 13050(e)). Waters of the State broadly includes all waters within the State's boundaries (public or private), including waters in both natural and artificial channels.

Local

Through easements granted in May of 1919 and March of 1965, the City of Pasadena granted the LACFCD under a perpetual easement, the right to construct, reconstruct, inspect, maintain, repair, and operate Devil's Gate Dam, its spillway, bypasses, tunnels, and other support facilities as may be necessary for the construction and maintenance of a reservoir capable of impounding the waters of the Arroyo Seco for purposes of storage and control, and to control such waters as may be necessary in the prevention of damage by flood (City of Pasadena 1919/1965).

The City of Pasadena adopted the City Trees and Trees Protection Ordinance in May 2002, amended its standards to include a total of 158 species in June 2003, and also amended in January 25, 2010. The ordinance seeks to protect public trees, landmark trees, native trees, and specimen trees in certain parts of the City and requires protection measures for new projects to avoid negative impacts that may occur during construction. A permit is required to remove or injure any tree protected under this ordinance, and one of the following findings must be made:

- There is a public benefit or public health safety or welfare benefit to the injury or removal that outweighs the protection of the tree; or
- The present condition of the tree is such that it is not reasonably likely to survive; or
- There is an objective feature of the tree that makes the tree not suitable for the protection of this chapter; or
- There would be a substantial hardship to a private property owner in the enjoyment and use of real property if the injury or removal is not permitted; or
- To not permit injury to, or removal of a tree, would constitute a taking of the underlying real property; or

- The project includes a landscape design plan that emphasizes a tree canopy that is sustainable over the long term by adhering to the replacement matrix adopted by resolution of the city council and included in the associated administrative guidelines.

The Los Angeles County Flood Control District was created by State legislation to implement the State-designated objectives of flood control and water conservation within the boundaries of the District. When implementing these State-designated objectives, the District is not subject to local ordinances like the City's Trees and Tree Protection Ordinance. The purpose of the Proposed Project is to restore and maintain flood capacity at the Devil's Gate Reservoir, which would directly further the District's regional flood control objective. Accordingly, the Proposed Project would not be subject to the provisions of the Pasadena City Trees and Tree Protection Ordinance.

3.6.4 Significance Criteria

- *BIOLOGY-1: Would the project have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or the U.S. Fish and Wildlife Service?*

- *BIOLOGY-2: Would the project have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?*

- *BIOLOGY-3: Would the project have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?*

- *BIOLOGY-4: Would the project interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?*

- *BIOLOGY-5: Would the project conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?*

- *BIOLOGY-6:Cumulative Impacts*

3.6.5 Methodology

Literature Review

Prior to performing the field surveys, existing documentation relevant to the Proposed Project site was reviewed. The most recent records of the California Natural Diversity Database managed by the California Department of Fish and Wildlife (CDFW 2013) and the California Native Plant Society's Electronic Inventory of Rare and Endangered Vascular Plants of California (CNPS 2013) were reviewed for the quadrangle containing and surrounding the Proposed Project site (i.e., *Pasadena*, California USGS 7.5 minute quadrangle). These databases contain records of reported occurrences of federal or state listed as endangered or threatened species, proposed endangered or threatened species, former

Federal Species of Concern (FSC), California Species of Special Concern (CSC), or otherwise sensitive species or habitat that may occur within or in the immediate vicinity of the Proposed Project site.

Biological Reconnaissance-Level Survey

A field survey was conducted in the Proposed Project site in order to identify any potential for occurrence of sensitive species, vegetation communities, or habitats to support sensitive wildlife species. The survey was conducted on foot throughout the Proposed Project site on May 27, 2010. Photographs of the Proposed Project site were recorded to document existing conditions. Field surveys were also conducted in May2013 to confirm and/or update the vegetation communities.

Vegetation

All plant species and soil types observed onsite were noted. Plant communities in the Proposed Project site were identified, qualitatively described, and mapped onto an aerial photograph. Plant communities were determined in accordance with the categories set forth in Holland (1986) or Sawyer and Keeler-Wolf (1995). Plant nomenclature follows that of *The Jepson Manual: Higher Plants of California* (Hickman 1993). A comprehensive list of the plant species observed during the survey is presented in the Biological Technical Review (BTR) (Appendix D).

Wildlife

All wildlife and wildlife sign observed and detected, including tracks, scat, carcasses, burrows, excavations, and vocalizations, were recorded. Additional survey time was spent in those habitats most likely to be utilized by wildlife (undisturbed native habitat, wildlife trails, etc.) or in habitats with the potential to support state- and/or federal-listed or proposed listed species. Notes were made on the general habitat types, species observed, and the conditions of the site. A list of the wildlife species observed during the site visit is included in the BTR (Appendix D).

USACE, RWQCB, and CDFW Preliminary Jurisdictional Assessment

Prior to beginning the field preliminary delineation, a 50-foot-to-the-inch scaled topographic map, scaled aerial photograph, and the *Pasadena* 7.5-minute USGS topographic quadrangle map were examined to determine the locations of potential areas of U.S. Army Corps of Engineers (USACE), Regional Water Quality Control Board (RWQCB) and/or California Department of Fish and Wildlife (CDFW) jurisdiction. Chambers Group biologists examined the Proposed Project site to identify potential USACE jurisdiction pursuant to Section 404 and 401 of the Clean Water Act and CDFW jurisdiction pursuant to Section 1602 of the State of California Fish and Game Code. Suspected jurisdictional areas were field checked for the presence of riparian vegetation, definable channels, and Ordinary High Water Marks (OHWMs). The lateral extent of a jurisdictional drainage can be measured in several ways, depending on the particular situation. The outer edge of riparian vegetation is used as the line of demarcation between riparian and upland habitats and is, therefore, an identifiable boundary of the lateral extent of a jurisdictional drainage. On smaller streams or dry washes with little or no riparian habitat, the uppermost bank extents may be used to mark the jurisdictional drainage.

Sensitive Species Focused Surveys

Focused Plant Surveys

Chambers Group conducted the reconnaissance-level survey in the Proposed Project site on May 27, 2010. Based on the literature search and reconnaissance survey, two of the sensitive plants are federal and state listed as endangered species and were determined to have potential for occurrence onsite. An additional six otherwise sensitive (CNPS listed) species were also determined to have potential for occurrence. A sensitive species is considered to potentially occur in a project area if its known geographic range includes part of the project area or an adjacent USGS 7.5-minute quadrangle and/or if the general habitat or environmental conditions (e.g., soil type, etc.) required for the species are present.

Because potential for sensitive plant species to occur onsite existed, focused surveys were recommended and conducted within the Proposed Project site. Because the sensitive plant species with potential to occur have two different flowering periods, two separate focused plant surveys were conducted.

Focused Least Bell's Vireo Surveys

Surveys for least Bell's vireo were performed according to modified USFWS guidelines (USFWS 2001). All surveys were conducted during favorable weather conditions.

3.6.6 Impacts and Mitigation

BIOLOGY-1 *Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or the U.S. Fish and Wildlife Service.*

Sediment Removal

Sensitive Plants

Of the 14 sensitive plant species identified in the literature review, 8 species – Nevin's barberry, Plummer's mariposa lily, Parry's spineflower, slender-horned spineflower, mesa horkelia, white rabbit-tobacco, Parish's gooseberry, and Greata's aster – have suitable habitat present onsite. Two of the sensitive plants, Nevin's barberry and slender-horned spineflower, are federal and state listed as endangered species. Agencies require focused surveys for any federal and/or state listed species with any kind of potential to occur onsite when the species is in bloom to ensure it is both evident and identifiable at the time of the survey. Seven of the sensitive species have an overlapping blooming period in June. Parish's gooseberry blooms from February to April but is a shrub that can be detected outside its blooming period. One species, white rabbit-tobacco, blooms from August to November, with uncommon flowering months in July and December.

Two focused plant surveys were conducted at the Proposed Project site to capture the blooming periods for all sensitive plant species with a potential to occur. The first focused plant survey was conducted from June 28 through June 30, 2010. The second focused survey was conducted on August 24, 2010. No

listed or otherwise sensitive plant species were detected during either of the focused surveys. Therefore, the eight plant species with a potential to occur are considered absent from the Survey Area at this time. Therefore, the Proposed Project is not expected to have a substantial adverse effect on any plant species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations or by CDFW or USFWS.

Sensitive Wildlife

Figure 3.6-2 and Table 3.6-1, above, show the amount of wildlife habitat that will be reduced with sediment removal activities. Of the 14 sensitive wildlife species identified in the literature review, 5 sensitive wildlife species were either observed on the Proposed Project site or have a moderate or high potential to occur in the Proposed Project area due to habitat onsite and/or nearby historic occurrences.

The least Bell's vireo is a federal and state listed endangered species. This species has been observed on the Proposed Project site and is considered present. Sediment removal activities will result in the removal of least Bell's vireo habitat within the Riparian Woodland and Mule Fat Thickets.

The yellow warbler, an SSC, was observed in the Proposed Project site in riparian habitat during the reconnaissance survey and during subsequent least Bell's vireo surveys. Sediment removal activities will result in the removal of yellow warbler habitat within Riparian Woodland and Riparian Herbaceous communities.

The southwestern pond turtle, coast range newt, and two-striped garter snake are all SSC. The two-striped garter snake was observed within the Proposed Project site during the biological reconnaissance survey. The southwestern pond turtle and coast range newt were not observed within the Proposed Project site. Habitat for the southwestern pond turtle, the coast range newt, and the two-striped garter snake occurs within streams and seasonal ponds found on the Proposed Project site. The amount of this habitat that will be available will depend upon where sediment accumulates and the amount of flows, rainfall, and runoff. This habitat will be disturbed during sediment removal activities but will be available during rainy season when sediment removal activities are not under way.

The Proposed Project site contains habitat and/or potential habitat for five special status species. Direct harm or take of these species during sediment removal activities would result in a significant impact. To ensure no harm or take of these special status species, Mitigation Measures MM BIO-1, MM BIO-2, and MM BIO-3 have been provided. With implementation of these mitigation measures, direct impacts to special status species would be less than significant.

During sediment removal, tree and vegetation removal would significantly affect nesting birds and roosting bats, if present. Disturbance of active nests would violate the Migratory Bird Treaty Act and result in a significant impact. With implementation of Mitigation Measure MM BIO-4 and MM BIO-5, impacts to nesting birds and roosting bats would be less than significant.

<u>Reservoir Management</u>

The reservoir management areas for both management options are expected to be composed of Riparian Herbaceous and Mustard and Annual Brome Semi-Natural Herbaceous Stand communities (see Figure 3.6-5: Vegetation Communities Conditions during Reservoir Management Option 2). As described

in Section 2.5, Reservoir Management Option 1 will involve the whole Proposed Project site and Reservoir Management Option 2 will involve approximately 91 acres.

Streams and seasonal ponds will be available depending upon where sediment accumulates and the amount of flows, rainfall, and runoff. The reservoir management area has potential to be used by the special status species after sediment removal or the yearly reservoir management disturbances.

Direct harm or take of these species during reservoir management activities will result in a significant impact. To ensure no harm or take of these special status species occurs, MM BIO-1, MM BIO-2, and MM BIO-3 have been provided. With implementation of these mitigation measures, direct impacts to special status species will be less than significant.

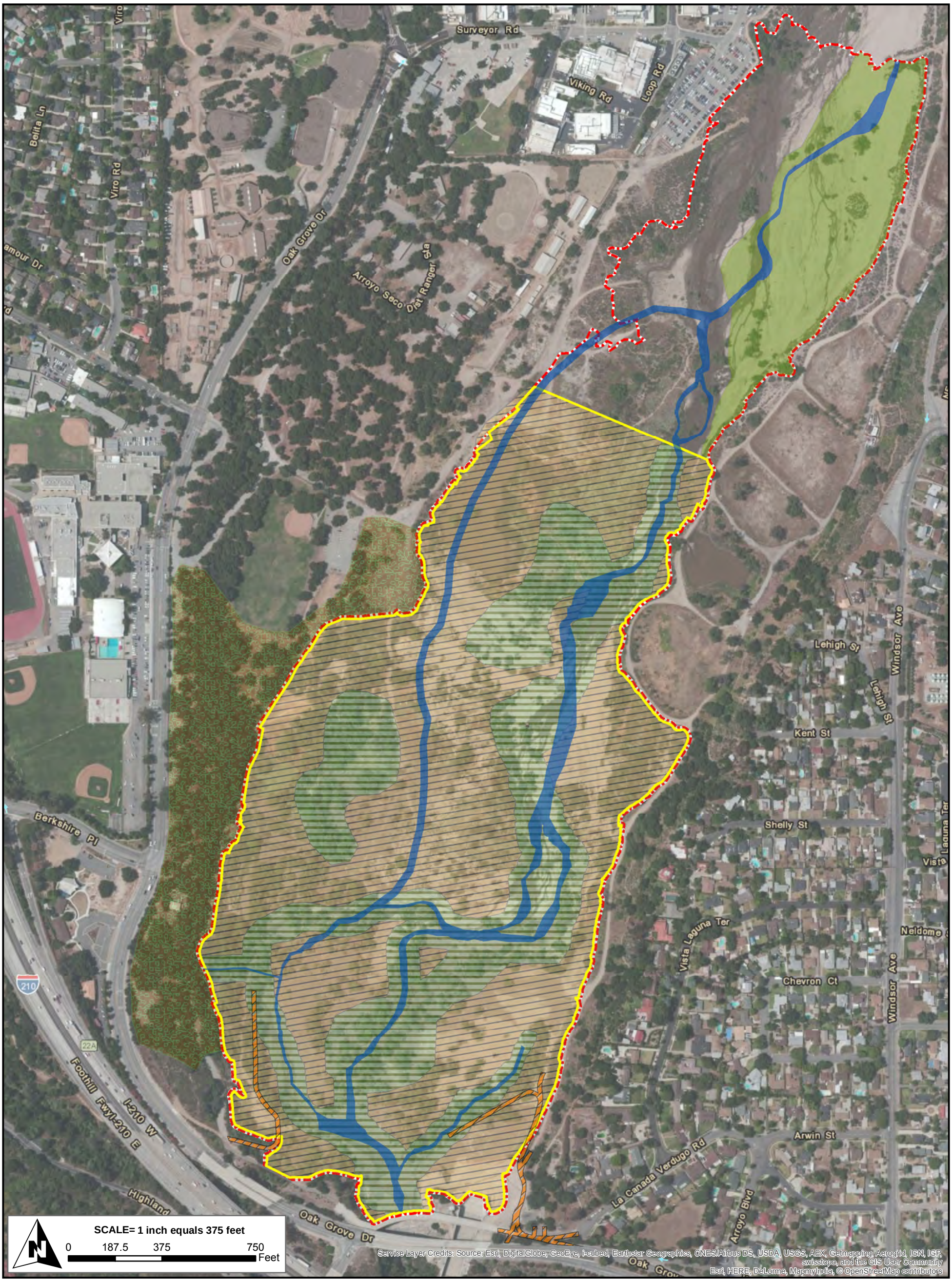
During reservoir management, tree and vegetation removal will significantly affect nesting birds and roosting bats, if present. Disturbance of active nests will violate the Migratory Bird Treaty Act and result in a significant impact. With implementation of Mitigation Measures MM BIO-4 and MM BIO 5, impacts to nesting birds and roosting bats will be less than significant.

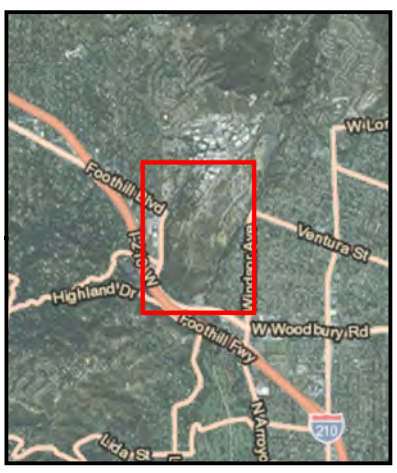
Mitigation Measures

MM BIO – 1: A qualified biological monitor shall be present during initial ground- or vegetation-disturbing project-related activities to provide protection measures and monitor for wildlife in harm's way. This includes initial ground- or vegetation-disturbing project-related activities at the annual start of each year of sediment removal or maintenance activities. Following initial project-related activities, a qualified monitoring biologist shall be present as necessary to maintain the implemented protection measures and monitor for additional species in harm's way. These protection measures shall include, as appropriate: redirecting the wildlife, identifying areas that may require exclusionary devices (e.g., fencing), or capturing and relocating wildlife outside the work area. Any captured species shall be relocated to adjacent appropriate habitat that is contiguous to adjacent habitat and not impacted by project-related disturbance activities.

MM BIO– 2: Within 90 days prior to ground-disturbing activities, a sensitive species educational briefing shall be conducted by a qualified biologist for construction personnel. The biologist will identify all sensitive resources that may be encountered onsite, and construction personnel will be instructed to avoid and report any sightings of sensitive species to LACFCD or the monitoring biologist. Educational briefings shall be repeated annually for the duration of the sediment removal.

MM BIO – 3: Within 90 days prior to ground-disturbing activities, a preconstruction survey shall be conducted by a qualified biologist for the presence of any sensitive species in harm's way, including coast range newt, the southwestern pond turtle, and the two-striped garter snake. If sensitive species are observed in harm's way, the qualified biologist will develop and implement appropriate protection measures for that species. These protection measures shall include, as appropriate, redirecting the species, constructing exclusionary devices (e.g., fencing), or capturing and relocating wildlife outside the work area. Preconstruction surveys shall be repeated annually for the duration of the sediment removal. Observations of special status species made during these surveys shall be recorded onto a CNDDB field data sheet and submitted to CDFW for inclusion into the CNDDB.





Proposed Project Boundary

Reservoir Management Area

Access Roads

Drainage

Vegetation Type

Mustard and Annual Brome Semi-Natural Herbaceous Stand

Alluvial Fan Sage Scrub

Coast Live Oak Woodland

Mule Fat Thickets

Figure 3.6-5
Vegetation Communities Conditions During Reservoir Management Option 2
Proposed Project - Configuration A

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CHAMBERS GROUP

\\cgi-gisdata01\GIS_DATA\Projects\20000s\20201 - 20400\20346 Devil's Gate EIR\20346 Figure 3.6-5 Vegetation Communities Conditions During Reservoir Management Option 2.mxd

MM BIO – 4: LACFCD, in consultation with a qualified biologist, will employ bird exclusionary measures (e.g., mylar flagging) prior to the start of bird breeding season to prevent birds nesting within established boundaries of the project.

Prior to commencement of sediment removal activities within bird breeding season (March 1 through August 31), a preconstruction bird nesting survey shall be conducted by a qualified biologist for the presence of any nesting bird within 300 feet of the construction work area. The surveys shall be conducted 30 days prior to the disturbance of suitable nesting habitat by a qualified biologist with experience in conducting nesting bird surveys. The surveys shall continue on a weekly basis, with the last survey being conducted no more than 3 days prior to the initiation of clearance/construction work. Preconstruction surveys shall be repeated annually for the duration of the sediment removal.

If an active nest is found, the qualified biologist will develop and implement appropriate protection measures for that nest. These protection measures shall include, as appropriate, construction of exclusionary devices (e.g., netting) or avoidance buffers. The biologist shall have the discretion to adjust the buffer area as appropriate based on the proposed construction activity, the bird species involved, and the status of the nest and nesting activity; but it shall be no less than 30 feet. Work in the buffer area can resume once the nest is determined to be inactive by the monitoring biologist.

MM BIO – 5: Within 30 days prior to commencement of vegetation or structure removal activities, a preconstruction bat survey shall be conducted by a qualified biologist for the presence of any roosting bats. Acoustic recognition technology shall be used if feasible and appropriate. If either a bat maternity roost or hibernacula (structures used by bats for hibernation) are present, a qualified biologist will develop and implement appropriate protection measures for that maternity roost or hibernacula. These protection measures shall include, as appropriate, safely evicting non-breeding bat hibernacula, establishment of avoidance buffers, or replacement of roosts at a suitable location. These measures shall also include as appropriate:

- To the extent feasible, trees that have been identified as roosting sites shall be removed or relocated between October 1 and February 28.
- When trees must be removed during the maternity season (March 1 to September 30), a qualified bat specialist shall conduct a preconstruction survey to identify those trees proposed for disturbance that could provide hibernacula or nursery colony roosting habitat for bats.
- Trees identified as potentially supporting an active nursery roost shall be inspected by a qualified biologist no greater than 7 days prior to tree disturbance to determine presence or absence of roosting bats.
- Trees determined to support active maternity roosts will be left in place until the end of the maternity season (September 30).
- If bats are not detected in a tree, but the qualified biologist determines that roosting bats may still be present, trees shall be removed as follows:

- Pushing a tree down with heavy machinery instead of felling the tree with a chainsaw
- First pushing the tree lightly 2 to 3 times with a pause of 30 seconds between each nudge to allow bats to become active, then pushing the tree to the ground slowly
- Allowing the tree to remain in place for 24 to 48 hours until inspected by the qualified biologist for presence or absence of roosting bats

- The qualified biologist shall document all bat survey, monitoring, and protection measure activities and prepare a summary report for LACFCD.

Residual Impacts after Mitigation

With implementation of these mitigation measures, the Proposed Project under sediment removal and both management options would result in a less than significant impact on candidate, sensitive, or special status species.

BIOLOGY-2 *Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service.*

Sediment Removal/Reservoir Management

The Proposed Project would impact approximately 1.1 acres of Riversidean Alluvial Fan Sage Scrub within the Proposed Project site. Riversidean Alluvial Fan Sage Scrub is considered to be of high priority for inventory by CDFW because of its significance and rarity. Impacts to Riversidean Alluvial Fan Sage Scrub would result in a significant impact requiring mitigation. To minimize impacts due to loss of Riversidean Alluvial Fan Sage Scrub, Mitigation Measure MM BIO-6 has been provided. Removing the sediment will also benefit the alluvial fan sage scrub since the habitat is currently buried under sediment and therefore considered poor quality. With implementation of this mitigation measure, impacts to Riversidean Alluvial Fan Sage Scrub would be reduced to a level below significance.

The Proposed Project would impact approximately 51.4 acres of Riparian Woodland and 11.1 acres of Mule Fat Thickets within the Proposed Project site. Riparian Woodland and Mule Fat Thickets are rare plant communities and provide nesting habitat for riparian species; impacts to these habitats would result in a significant impact. To minimize impacts due to the loss of Riparian Woodland and Mule Fat Thickets, Mitigation Measures MM BIO-7 and MM BIO-8 have been provided.

At Devil's Gate Reservoir, the OHWM of the reservoir exists up to the 1020 contour line. Wetland, as defined by USACE, exists within the OHWM area of Devil's Gate Reservoir. All three agencies have jurisdiction over this wetland within the Proposed Project site where there will be permanent impacts. USACE, CDFW and RWQCB have jurisdiction of the riparian habitat within the proposed project boundary, up to the HWM. Jurisdictional acreages were calculated within the Proposed Project site.

Figure 3.6-4: CDFW Jurisdictional Areas Map shows the jurisdictional acreages for the USACE, RWQCB, and the CDFW for waters and for vegetation impacts. Impacts to jurisdictional waters found within these

water features would result in a significant impact requiring mitigation. To minimize impacts due to loss of jurisdictional waters, Mitigation Measure MM BIO-8 has been provided.

Table 3.6-4: Jurisdictional Acreage Matrix

Authority	Jurisdictional Area		Total Jurisdiction (acres)
USACE	Riparian Area outside Wetland Area	54.33	101.13
	Wetland Area	11.2	
	Drainage Impacts *Main channel* *Braided channel*	35.6 *6.7* *28.9*	
RWQCB	Riparian Area Outside Wetland Area *Mule Fat Thickets* *Riparian Woodland*	2,366,614.8 (sq. ft.) 406,414.8 (sq. ft.) 1,960,200 (sq. ft.)	4,405,222.8 (sq. ft.)
	Wetland Area	487,872 (sq. ft.)	
	Drainage Impacts *Main channel* *Braided channel*	1,550,736 (sq. ft.) 291,852 (sq. ft.) 1,258,884 (sq. ft.)	
CDFW	Riparian Area Outside Wetland Area *Mule Fat Thickets* *Riparian Woodland*	54.43 *9.33* *45.0*	101.13
	Wetland Area	11.2	
	Drainage Impacts *Main channel* *Braided channel*	35.6 *6.7* *28.9*	

Mitigation Measures

MM BIO – 6: Riversidean Alluvial Fan Sage Scrub habitat shall be restored and/or enhanced at a 1:1 ratio by acreage. Areas shall be mapped using aerial photographs.

MM BIO – 7: Within 90 days prior to ground-disturbing activities, a qualified biologist shall conduct a tree survey within the project footprint to identify trees that will be removed or potentially affected by the Proposed Project and trees that can be avoided. LACFCD will replace trees that cannot be avoided. The replacement is expected to be up to 1:1 by acreage. The biological monitor shall implement measures to protect the root zone of oak trees that may be impacted immediately adjacent to the project site and along access roads.

MM BIO – 8: A combination of onsite and offsite habitat restoration, enhancement, and exotic removal shall be implemented by LACFCD at a 1:1 ratio for impacted sensitive habitat and jurisdictional waters. Habitat restoration/enhancement shall include use of willow cuttings and exotic species removal. Non-native, weedy habitats within the basin shall be utilized whenever

possible as mitigation sites. This mitigation measure shall be monitored for success for five years following implementation. A report of the monitoring results shall be submitted annually, during the five years following implementation, to resource agencies as required by the Section 401 Certification, Section 404 permit, and a Streambed Alteration Agreement.

Residual Impacts After Mitigation

With implementation of Mitigation Measures MM BIO-7 through MM BIO-8, the Proposed Project under sediment removal and both management options will result in a less than significant impact to sensitive habitats.

BIOLOGY-3 *Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means.*

Sediment Removal/Reservoir Management

Impacts to jurisdictional waters were calculated within the Proposed Project site. Table 3.6-4, above, includes the jurisdictional acreages for USACE, RWQCB, and CDFW for waters and for vegetation impacts. Impacts to jurisdictional waters found within these water features would result in a significant impact requiring mitigation. To minimize impacts due to loss of jurisdictional waters, Mitigation Measure MM BIO-8 has been provided.

Mitigation Measures

See Mitigation Measure MM BIO-8.

Residual Impacts After Mitigation

As noted in Mitigation Measure MM BIO-8, wetlands and drainages under the jurisdiction of CDFW, USACE, and RWQCB will be restored and/or enhanced on the Proposed Project site. With implementation of these mitigation measures, impacts to riparian habitats will be reduced to a level below significance.

BIOLOGY-4 *Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.*

Sediment Removal/Reservoir Management

The Proposed Project area is predominantly open for wildlife movement and habitat connectivity. Sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays). In addition, sediment removal activities would not completely block the Proposed Project site from surrounding habitat, would occur only during the day, and would not interfere with nighttime wildlife activity. Although some wildlife may be temporarily displaced during construction, wildlife would not be physically prevented from moving around and into the basin area. Sediment removal and reservoir management activities would interfere temporarily with the movement of native resident or migratory wildlife species, resulting in a significant impact. Reduction in

sensitive habitat would interfere with use of the habitat for wildlife nursery sites, resulting in a significant impact. To minimize impacts to less than significant, Mitigation Measures MM BIO-1 through MM BIO-8 has been provided.

Mitigation Measures

See Mitigation Measures MM BIO-1 through MM BIO-8.

Residual Impacts After Mitigation

With implementation of Mitigation Measures MM BIO-1 through MM BIO-8, impacts to use of the habitat for wildlife nursery sites will be reduced to a level below significance.

BIOLOGY-5 *Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.*

Sediment Removal/Reservoir Management

The Proposed Project would remove trees from the Proposed Project site. Implementation of Mitigation Measure MM BIO-7 will identify trees that will be removed or potentially affected, the appropriate level of tree replacement, and protection of the root zone of oak trees. Implementation of this mitigation measure will reduce impacts to city-protected trees to a level below significance.

Mitigation Measures

See Mitigation Measure MM BIO-7.

Residual Impacts After Mitigation

With implementation of Mitigation Measure MM BIO-7, the Proposed Project would result in a less than significant impact to city-protected trees.

BIOLOGY-6 *Cumulative Impacts*

No significant impacts to biological resources are expected with construction of the NASA JPL On-Site Parking Structure. Impacts to biological resources associated with the Hahamongna Watershed Park MBMU Project are in the process of being evaluated, and potential impacts are not known at this time. Impacts to biological resources associated with the Arroyo Seco Canyon Project and the Devil's Gate Water Conservation Project are also not known at this time. It is possible that either of these projects could result in impacts to special status species, riparian habitat and other sensitive natural communities, the movement of native resident or migratory wildlife species, and city-protected trees, resulting in significant cumulative impacts.

Mitigation Measure

See Mitigation Measures MM BIO-1 through MM BIO-8.

Residual Impacts After Mitigation

Implementation of Mitigation Measures MM BIO-1 through MM BIO-8 will reduce the Proposed Project's contribution to cumulative impacts to a level below significance.

3.7 CULTURAL RESOURCES

3.7.1 Introduction

This section describes the existing cultural resources environmental conditions and discusses the consequences to cultural resources related to Proposed Project implementation. Where impacts are identified, mitigation measures are proposed to reduce those impacts to less than significant levels.

Cultural resources are defined as buildings, sites, structures, or objects, each of which may have historical, architectural, archaeological, cultural, or scientific importance. The term "cultural resources" also encompasses the National Historic Preservation Act (NHPA) term "historic property" as well as CEQA terms "historic resource" and "unique archaeological resource." Under the NHPA, historic property refers to a property that is listed on, or determined eligible for listing on, the National Register of Historic Places (NRHP). Under CEQA, historic resource means a property that is listed on or determined eligible for listing on the California Register of Historical Resources (CRHR). Unique archaeological resources are archaeological artifacts, objects, or sites that contain information to answer important scientific questions, possess a particular quality such as the oldest of its type, or are directly associated with a recognized important prehistoric or historic event or person.

Chambers Group conducted an archaeological survey of Devil's Gate Reservoir for the LACFCD. The survey was conducted pursuant to Section 15064.5 of the *CEQA Guidelines*, with respect to the identification and preservation of historic resources, and also in accordance with Section 106 of the National Historic Preservation Act of 1966, as amended (16 U.S.C. 470f and 470h-2), and its implementing regulations (36 CFR 800.4), as well as the 2004 Programmatic Agreement among the Federal Highway Administration, the Advisory Council on Historic Preservation, and the California State Historic Preservation Officer (SHPO), regarding compliance with Section 106 of the PA.

The environmental baseline condition for the sediment removal phase is considered at the time of publication of the NOP. The environmental baseline conditions for reservoir management will be conditions post sediment removal, approximately in the year 2020.

3.7.2 Existing Environmental Setting

Prehistory

It is generally believed that human occupation of coastal southern California dates back to at least 10,000 years before present (BP). Four cultural periods of precontact occupation of California during the Holocene Epoch (10,000 years BP to present) are discussed below: the Early Holocene Period, the Early Horizon Period, the Middle Horizon Period, and the Late Horizon Period. During the Early Holocene Period (10,000 to 8,000 years BP), hunters/gatherers utilized lacustrine and marshland settings for the varied and abundant resources found there. Milling-related artifacts are lacking during this period, but the *atlatl* (spear-thrower) and dart are common. Hunting of large and small game occurred, as well as fishing. A few scattered permanent settlements were established near large water sources, but a nomadic lifestyle was more common (Moratto 1984).

Milling-related artifacts first appear in sites dating to the Early Horizon Period (8,000 to 4,000 years BP). Hunting and gathering continue during this period but with greater reliance on vegetal foods. Mussels and oysters were a staple. This gave way to greater consumption of shellfish in the Middle Horizon

Period (4,000 to 2,000 years BP). Use of bone artifacts appears to have increased during this period, and baked-earth steaming ovens were developed. Occupation of permanent or semi-permanent villages occurred in this period, as did reoccupation of seasonal sites. During the Late Horizon Period (2,000 years BP to the time of European Contact [i.e., AD 1769]), population densities were high, and settlement in permanent villages increased (Erlandson 1994; Moratto 1984). Regional subcultures also developed, each with its own geographical territory and language or dialect. These groups, bound by shared cultural traits, maintained a high degree of interaction, including trading extensively with one another.

Ethnography

Tongva (Gabrielino)

The area in proximity to the East Fork San Gabriel Bridge was inhabited prehistorically and well into European contact times by an indigenous group known as the Gabrielino.

The term "Gabrielino" came from the group's association with Mission San Gabriel Archangel, established in 1771; however, today the group prefers to be known by their ancestral name, Tongva. The Tongva were thought to be the "wealthiest, most populous, and powerful ethnic nationality in aboriginal Southern California" (Bean and Smith 1978:538), second only to their northwestern neighbors the Chumash. The Tongva occupied a large territory that included the Pacific coast from Malibu to Aliso Creek; parts of the Santa Monica and Santa Ana mountains; the Los Angeles, San Gabriel, and Santa Ana river drainages; plus the islands of Santa Barbara, Santa Catalina, and San Clemente. It is possible that the area was used by a number of groups during the sixteenth through the nineteenth centuries, although the Tongva may have been the controlling group.

The Tongva were a hunter-gatherer population exploiting local resources. They occupied numerous villages with populations ranging from 50 to 200 inhabitants. Residential structures within the villages were domed, circular, and made from thatched tule or other available wood. Tongva society was organized by kinship groups, with each group composed of several related families, who together owned hunting and gathering territories. Settlement patterns varied according to the availability of floral and faunal resources (Bean and Smith 1978; McCawley 1996, Miller 1991).

Vegetal staples consisted of acorns, chia seeds, piñon nuts, sage, cacti, roots, and bulbs. Animals hunted included deer, antelope, coyote, rabbits, squirrels, rodents, birds, and snakes. The Tongva also fished (Bean and Smith 1978; McCawley 1996; Miller 1991).

By the late eighteenth century, Tongva population had significantly dwindled due to introduced diseases and dietary deficiencies. Tongva communities near the missions disintegrated as individuals succumbed to Spanish control, fled the region, or died. Later, many of the Tongva fell into indentured servitude to Anglo-Americans. By the early 1900s few Tongva people had survived, and much of their culture had been lost (Bean and Smith 1978; McCawley 1996; Miller 1991). In the 1970s, a revival of the Tongva culture began which continues today with growing interest and support.

The prehistoric lands of what is currently Pasadena were inhabited by the Tongva. Tongva means "people of the earth" in the Uto-Aztecan language which they spoke (McCawley 1996). They are more widely referred to as the Gabrielino, which derives from the incorporation of their people into the Mission San Gabriel de Archangel during the eighteenth century (McCawley 1996).

The archaeology of Tongva Gabrielino sites is marked by bedrock mortars used for acorn processing. Manos and metates for seed grinding are also present. Also present are lithic scatters, midden, and possibly cemeteries (McKenna 2007). Temporary campsites, utilized for hunting, gathering, and collecting, are marked by fire-affected rock (Mason and Peterson 1994).

History

The three major periods of history for southern California are defined by key events documented by participants, witnesses, historians, and cartographers:

- Mission Period (A.D. 1769 to 1822, or 232 to 179 years ago);
- Rancho Period (A.D. 1822 to 1848, or 179 to 153 years ago); and
- American Period (A.D. 1848 to Present, or since 153 years ago).

The first significant European settlement of California began during the Mission Period (1769 to 1822), with the founding of the first mission in San Diego, and lasted until 1833/34 when the Mexican secularization laws effectively opened the area to social and economic growth. The establishment of San Gabriel and San Juan Capistrano missions in 1771 and 1776, respectively, had a number of impacts on the region. The Tongva were removed from their villages and resettled around the missions. This resulted in the abandonment of some areas and the agricultural and ranching development of other portions. The mission system was dismantled after Mexican governors introduced new secularization acts between 1822 and 1833, thus freeing the Indians from mission control.

After secularization, the dominance of the large land grant ranchos became established. In 1810, the Spanish government granted the first rancho to Jose Antonio Yorba and his nephew Juan Pablo Peralta. The Mexican government granted ranchos throughout California to Spanish and Hispanic soldiers and settlers (Castillo 1978). During this period, the entire area was almost constantly involved in political and military revolts. The tense situation ended when in 1847 California gained independence from Mexico during the "Bear Flag" revolt. One year later, the United States gained control of area as a result of the Mexican-American War.

Although under the control of the United States since 1847, the American Period did not really begin in the Proposed Project area until 1851, when the Land Act required rancho dons to confirm the ownership of their lands. Many rancho dons lacked funds and legal documents to confirm land ownership. Along with legal problems related to the Land Act and new taxes imposed by the United States, many second-generation dons experienced a disastrous two-year drought (McWilliams 1973:62). The combination of these hardships resulted in many rancho families losing their lands. Railroads brought a steady influx of Euro-Americans to the area. The Euro-Americans expanded commercial and land development primarily in farming and dairying. In the twentieth century, independent businesses began to dominate the economic strategy, much as they do today.

The founding of California Mission in 1769 marks the beginning of the historic period in California (McKenna 2007). The establishment of Mission San Diego de Alcalá on July 16, 1769, occurred during the Spanish period (1769-1822) of Alta California.

Locally, Mission San Gabriel Archangel was established by the Spanish in 1771 in what is now currently Montebello. Referred to as the Mission Vieja (old mission), it served the Tongva Gabrielino in the San Gabriel Valley. The same year that it was established, it was relocated to its current location in the city of San Gabriel.

In 1822, Alta California entered into the Mexican period (1822 to 1848). Under the Mexican government, the missions were secularized but continued to practice granting land, reminiscent of the Spanish government. It was during this time, the project area became Rancho San Pascual. The signing of the Treaty of Guadalupe Hidalgo on February 2, 1848, marked the beginning of the American period. The treaty dictating the concession of Alta California was signed after the defeat of Mexico during the Mexican-American War. California became a state in 1850 and was divided into 27 counties, including Los Angeles County. Rancho life continued to be the primary economy of southern California until a year of catastrophic floods in 1861-1862, followed by severe drought the following year in 1863-1864 (Cleland 1941). The land was thus further subdivided. During the 1880s, the Arroyo Seco and surrounding area became a place of leisure and recreation. By 1855, Pasadena was considered a recreational mecca. The resulting overuse of the area took its toll, and by the turn of the century the arroyo was in decline. During 1905, Charles Lummis founded the Arroyo Seco Foundation in an effort to protect and preserve the area from further deterioration. The foundation is still in existence today.

3.7.3 Applicable Regulations

A number of laws and regulations require Federal, state, and local agencies to protect cultural resources from potential adverse effects of project actions. For the purposes of CEQA, cultural resources are defined to include historic resources, prehistoric resources, archaeological resources, and paleontological resources. At the federal level, the Office of Historic Preservation (OHP) carries out reviews of historic resources under Section 106 of the NHPA of 1966, as amended. The laws and regulations presented below are pertinent to the Proposed Project.

National Historic Preservation Act – Section 106

Section 106 of the NHPA, as amended, provides the framework through which cultural resources are identified and assessed for listing on the NRHP and through which appropriate management through mitigation, alternative, or avoidance measures is applied. A cultural resource (herein historic property) is defined as "any prehistoric or historic district, site, building, structure or object included in or eligible for inclusion in the NRHP maintained by the Secretary of Interior. This term includes artifacts, records, and remains that are related to and located within such properties (and includes) properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization that meet the NRHP criteria" [36 CFR Section 800.16(1)].

National Register of Historic Places

Identified historic properties eligible for NRHP listing are assessed for significance by meeting at least one of four certain criteria, and/or be 50 years old (unless of exceptional significance) and retain integrity that provides the historic property with its ability to convey its significance and includes integrity of location, design, setting, materials, workmanship, feeling, and association.

Established criteria to be met are:

A. Associated with events that have made a significant contribution to the broad patterns of our history;

B. Associated with the lives of persons significant in our past;

C. Embodies the distinctive characteristics of type, period, or method of construction that represent the work of a master or that possesses high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

D. Have yielded or likely to yield, important information in prehistory or history.

National Environmental Policy Act

The National Environmental Policy Act of 1969, as amended, requires analysis of potential environmental impacts to important historic, cultural, and natural aspects of our national heritage (United State Code, section 4321, *et seq*.; 40 Code of Federal Regulations, section 1502.25).

California Environmental Quality Act

The California Environmental Quality Act (CEQA) provides protections and guidelines for effects on the environment under which historical resources are considered part of the environment. A project that may cause a substantial adverse effect on the significance of a historical resource is a project that may have a significant effect on the environment. The definition of "historical resources" is contained in Section 15064.5 of the CEQA Guidelines and includes, but is not limited to, "any object, building, site, area, place, record, or manuscript which is historically or archaeologically significant, or is significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California". More specifically, CEQA guidelines state that the term "historical resources" applies to any such resources listed in or determined to be eligible for listing in the California Register of Historic Resources, included in a local register of historical resources, or determined to be historically significant by the Lead Agency (Title 14 CCR§15064.5(a)(1)-(3)). Determinations of CEQA significance are made in the IS Checklist (Appendix A).

California Public Resources Code - Section 5020-5029.5: Article 2. Historical Resources provides a vehicle for and establishes the California Register of Historic Resources and the procedures and requirements for historical resources to be eligible for or on the list. A historical resource is a resource (historic or prehistoric) that meets the criteria for listing on the California Register of Historical Resources (Pub. Res. Code SS5024.1, Title 14 CCR, Section 4852).

The listing criteria for the California Register of Historic Resources requires that the resource:

1) Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;

2) Is associated with the lives of persons important in our past;

3) Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or

4) Has yielded, or may be likely to yield, information important in prehistory or history.

In addition Public Code Section 21083.2 provides that a unique archaeological resource is an archaeological artifact, object, or site which can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria:

1. Contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information.

2. Has a special and particular quality such as being the oldest of its type or the best available example of its type.

3. Is directly associated with a scientifically recognized important prehistoric or historic event or person.

Under CEQA, the historical or archaeological resource must meet requirements for significance or uniqueness to determine whether a project has a significant effect on the environment.

City of Pasadena Comprehensive General Plan

The City of Pasadena's Comprehensive General Plan includes two relevant policies to preserve Pasadena's historic character and environment:

- To preserve Pasadena's character and scale, including its traditional urban design form and historic character, shall be given highest priority in the consideration of future development; and

- To promote preservation of historically and architecturally significant buildings and revitalization of traditional neighborhoods and commercial areas.

The "Historic and Cultural Resources Element" of the City of Pasadena Comprehensive General Plan seeks to identify and protect areas, sites, and structures having architectural, historical, or cultural significance and to reaffirm their continuing value as a resource contributing to the vitality and diversity of the present.

Preservation of cultural resources and the City's historic character is a consistent theme throughout the Land Use Element of the City of Pasadena Comprehensive General Plan. The values of the community are laid out in the General Plan's Seven Guiding Principles. Principle No. 2 emphasizes the community's fundamental commitment to preservation of its historic character:

> *Change will be harmonized to preserve Pasadena's historic character and environment. City-wide design principles will be established so that new development blends with old; historically and architecturally significant buildings will be preserved; new public spaces will be acquired; and we will act as stewards of our natural environment.*

The following policies of the Land Use Element are related to the preservation of cultural resources:

> Policy 6.1 - Historic Inventory: Identify, document, and evaluate the significance of individual historic and cultural resources and districts by conducting a citywide historic resource survey

and continuing the City's long-range program of conducting intensive surveys of the City's historic neighborhoods.

Policy 6.2 - Protection of Historic and Cultural Resources: Adopt new legislation to protect historic and cultural resources according to levels of significance and include provisions to deter the demolition of historically, architecturally, and culturally significant structures.

Policy 6.3 - Adaptive Reuse: Encourage and promote the adaptive reuse of Pasadena's historic resources.

3.7.4 Significance Criteria

- *CULTURAL-1: Would the project cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?*
- *CULTURAL-2: Would the project cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?*
- *CULTURAL-3: Would the project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?*
- *CULTURAL-4: Would the project disturb any human remains, including those interred outside of formal cemeteries?*
- *CULTURAL-5:Cumulative Impacts*

3.7.5 Methodology

Records Search

A cultural resources literature review and records search was conducted by Marina Adame at the South Central Coastal Information Center (SCCIC) located at California State University in Fullerton in June 2011. The SCCIC is a branch of the California Historic Resources Information System (CHRIS) established by the Office of Historic Preservation (OHP) to manage information concerning cultural resources and associated studies in California. The records search provides information on archaeological sites, historic resources, and cultural resources investigations recorded within a 1-mile radius surrounding the Area of Potential Effect (APE) of the Proposed Project. The APE is defined as the area that is surveyed to determine presence of historic properties within the Proposed Project site. During the records search, the OHP's Historic Property Data File (HPDF), as well as a variety of publications and manuscripts, was consulted. The HPDF includes the following types of properties:

- National Register of Historic Places (NRHP)
- California Historical Landmarks (CHL)
- California Points of Historical Interest (PHI)
- California Register of Historical Resources (CRHR)

- California Historic Bridge Inventory (CHBI)

The first step of the records search was to review the USGS *Pasadena* quadrangle topographic map to find the locations of previously recorded archaeological and historical sites (Table 3.7-1 below).

Table 3.7-1: Technical Studies Conducted Within a 1-Mile Radius

Author	Report (#LA-)	Description	Date
Crabtree	2513	Highway Construction Survey, Foothill Freeway. UCAS-082-D	1965
Blodgett	1903	Preliminary Assessment of the Prehistoric Cultural Resources of the Devil's Gate Reservoir	1987
Smith	5449	Negative Archaeological Survey Report: Route 210	2000
Sylvia	5640	Negative Archaeological Survey Report	2003
Feldman	7430	Caltrans' Historic Bridges Inventory Update: Concrete Box Girder Bridges	2003
Strauss	7455	Historic Property Survey Report for the Oak Grove Drive Bridges 53C-1829 and 53C-1851 Seismic Retrofit Project	2005
McKenna	8927	A Phase I (CEQA) and Class III (NEPA) Cultural Resources Investigation for the Sunset Overlook Trailhead Area of the Hahamongna Watershed Park in the City of Pasadena	2007

Results show that Devil's Gate Reservoir was previously surveyed as part of the 1987 Cotton/ Beland Associates study for the City of Pasadena's Department of Water and Power (Blodgett 1987). The survey yielded no prehistoric archaeological sites within the reservoir boundaries; however, the report notes the potential for buried resources (Blodgett 1987:2). As a result of those cultural resources studies, three historic structures, not including the dam, have been recorded within a 1-mile radius of the reservoir (Table 3.7-2 below).

Table 3.7-2: Historic Sites Recorded Within A 1-Mile Radius

Author(s)	Primary #	Description	Date
National Park Service	85002814 NHLS/85002812 NHLS	JPL Space Flight Operations facility and 25-foot Space Simulator	1985
Feldman/ Greenwood	19-187571	Oak Grove Drive Bridge	2003
Strauss/ Dolan/ Gregory	19-186859	Arroyo Seco Flood Control Channel	2003
Delu/ Ewers	19-188404	Devil's Gate Dam	2009

Devil's Gate Dam was recorded by LSA Associates in April of 2009. In addition to the dam, a gauging station, concrete retaining walls flanking the dam to the north, and an associated flood control/ spillway feature east of the gauging station were recorded.

Native American Coordination

The Native American Heritage Commission (NAHC) maintains the Sacred Lands Inventory identifying lands sacred to Native Americans in California and other states. Chambers Group contacted the NAHC in June 2011 and requested a search of the Sacred Lands Inventory for any information regarding Sacred Lands or other cultural resources in the vicinity of Devil's Gate Reservoir (Appendix E). The results of the search were negative. The NAHC provided Chambers Group with a list of tribes affiliated with the Devil's Gate Reservoir area and recommended they be consulted regarding the Proposed Project. Chambers Group notified those tribes in August 2011 and invited comments regarding cultural resources in the area (Appendix E – Cultural Resources Report). A response has been received from the Gabrieleño Band of Mission Indians, stating that the site is considered culturally sensitive by their Elder Committee and Tribal historians. This response is included in Appendix E - Cultural Resources Report.

Survey

An archaeological survey was performed to identify archaeological or cultural resources. Chambers Group archaeologist Tim Murphy conducted a pedestrian survey of the interior of Devil's Gate Reservoir in June 2011. The survey was conducted at 15-meter intervals where possible until a particular area had been covered. It is estimated that 30 to 40 percent of the reservoir was covered by thick undergrowth or water and could not be surveyed at the 15-meter interval (see Appendix E). Those areas were inspected by following equestrian, bike, or foot paths as appropriate. No unrecorded historic or prehistoric sites were observed during the pedestrian survey of Devil's Gate Reservoir.

3.7.6 Impacts and Mitigation

The inventory of the Devil's Gate Reservoir interior basin did not result in the discovery of any new cultural resources. The survey surface area consisted of accumulated sediments and debris originating farther upstream in Arroyo Seco. Geotechnical borings related to this project have indicated that most of the Proposed Project area is filled with recently deposited sediment washed from the upstream watershed.

CULTURAL-1 *Cause a substantial adverse change in the significance of a historical resource.*

Sediment Removal/Reservoir Management

Three historic-era sites within a 1-mile radius were identified during the review of previous historic architectural surveys. No alterations or modifications to any of the buildings or structures will be made. Because the buildings and structures identified will not be modified as part of the either sediment removal or reservoir management, no impacts to historical resources are anticipated.

Mitigation Measures

No mitigation measures are necessary.

Residual Impacts After Mitigation

No historic resources are within the proposed Project site; therefore, the Proposed Project will not result in impacts to historic resources.

CULTURAL-2 *Cause a substantial adverse change in the significance of an archaeological resource.*

Sediment Removal/Reservoir Management

No archaeological resources were encountered during the course of the archaeological survey. The Proposed Project involves ground-disturbing activities under sediment removal and reservoir management; however, as noted previously, most of the soil in the Proposed Project area consists of recently accumulated sediment. In areas filled with recently accumulated sediment, archeological sites are not anticipated to exist however; it is always possible that unidentified archaeological sites exist in native soils below the accumulated sediment. If sediment removal or reservoir management activities exceed the depth of the historic flood deposits and encounter native soils, unidentified archaeological sites have potential to be significantly impacted. Implementation of Mitigation Measure MM CUL-1 will reduce potential impacts to less than significant.

Mitigation Measures

> **MM CUL-1**: If sediment removal or reservoir management activities exceed the depth of the historic flood deposits and encounter native sediments, these activities will be monitored by a qualified archaeologist. In the event that this occurs and archaeological materials are observed, the excavation in the proximity of the discovery should be diverted until a qualified archaeologist evaluates the discovery.

Residual Impacts After Mitigation

While it is always possible that unidentified archaeological sites exist in native soils below the accumulated sediment, with implementation of Mitigation Measure MM CUL-1, no significant adverse impacts are expected.

CULTURAL-3 *Cause a substantial adverse change in the significance of a paleontological resource.*

Sediment Removal/Reservoir Management

No paleontological resources were encountered during the course of the survey and are not expected in the accumulated sediment. It is always possible that unidentified paleontological materials exist in native soils below the accumulated sediment. If sediment removal or reservoir management activities exceed the depth of the historic flood deposits and encounter native soils, unidentified paleontological materials have potential to be significantly impacted. Implementation of Mitigation Measure MM CUL-2 will reduce impacts to less than significant.

Mitigation Measures

> **MM CUL-2:** If sediment removal or reservoir management activities exceed the depth of the historic flood deposits and encounter native sediments, these activities will be monitored by a qualified paleontologist. In the event that this occurs and paleontological materials are observed, the excavation in the proximity of the discovery should be diverted until a qualified paleontologist evaluates the discovery.

Residual Impacts After Mitigation

While it is always possible that unidentified paleontological materials exist in native soils below the accumulated sediment, with implementation of Mitigation Measure MM CUL-1, no significant adverse impacts are expected.

CULTURAL-4 *Potentially impact unknown human remains within the proposed project site.*

Sediment Removal/Reservoir Management

The Proposed Project area does not contain any formal cemeteries. Archival research and the archaeological survey in connection with the Proposed Project did not indicate the presence of any known human remains in the project area. In the event human remains are discovered, implementation of Mitigation Measure MM CUL-2 will reduce impacts to less than significant.

Mitigation Measures

> **MM CUL-3**: In the event human remains are discovered, all work in the area must be halted until the County Coroner identifies the remains and makes recommendations regarding their appropriate treatment pursuant to PRC Section 5097.98.

Residual Impacts After Mitigation

While it is possible that human remains could be discovered in native soils below the accumulated sediment, with implementation of Mitigation Measure MM CUL-2, no significant adverse impacts are expected.

CULTURAL-5 *Cumulative Impacts*

The geographic scope for cumulative impacts to cultural resources includes a 1-mile radius from the Proposed Project site. This geographic scope of analysis is appropriate because the archaeological, historical, and paleontological resources within this radius are expected to be similar to those in the Proposed Project site because of their proximity. No significant impacts to cultural resources are expected with construction of the NASA JPL On-Site Parking Structure. Impacts to cultural resources associated with the Hahamongna Watershed Park MBMU Project are expected to be reduced to less than significant through implementation of Hahamongna Watershed Park Master Plan EIR mitigation measures. Impacts to cultural resources associated with the Arroyo Seco Canyon Project and the Devil's Gate Water Conservation Project are not known at this time. As discussed above, with implementation of mitigation measures, no significant impact to cultural resources are expected with implementation of the Proposed Project. Therefore, the potential for cumulative impacts when combined with existing and foreseeable projects within a 1-mile radius are not significant.

Mitigation Measure

See Mitigation Measures MM CUL-1, MM CUL-2, and MM CUL-3.

Residual Impacts After Mitigation Measure

While it is possible that cultural resources could be discovered in native soils, with implementation of Mitigation Measures MM CUL-1, MM CUL-2, and MM CUL-3, the Proposed Project's contribution to any cumulative impact will be less than significant.

3.8 GEOLOGY AND SOILS

3.8.1 Introduction

This section describes the regional and local geologic and soil characteristics of the Proposed Project area. A *Feasibility Level Geotechnical and Geochemical Exploration Report* (Leighton Consulting, Inc. 2013) was used for purposes of the analysis contained in this section (see Appendix F). The geologic information contained in the evaluation reflects the existing conditions of the Proposed Project area.

As noted in the Initial Study (Appendix A), impacts associated with Alquist-Priolo Earthquake Fault Zoning, seismic ground shaking, liquefaction, landslides, unstable soil, expansive soil, and alternative wastewater disposal systems were found to have no impact and are not discussed within the EIR.

The environmental baseline condition for the sediment removal phase is considered at the time of publication of the NOP. The environmental baseline conditions for reservoir management will be conditions post sediment removal, approximately in the year 2020.

3.8.2 Existing Environmental Setting

The Proposed Project site lies near the southern margin of the Transverse Ranges Geomorphic Province. The Transverse Ranges Geomorphic Province is approximately 50 miles wide, extending from Point Arguello east-southeastward for approximately 275 miles towards and south of the Mojave Desert and characterized by east-west trending mountain ranges and valleys. The backbone of this geomorphic province in its central and eastern parts is formed by the San Gabriel and San Bernardino mountains, with major peaks extending to elevations of greater than 10,000 feet above sea level.

The Proposed Project site lies within an alluvial wash bounded to the north by foothills adjoining the San Gabriel Mountains, to the south by the San Rafael Hills, and to the west and east sides by the La Cañada Valley. The site is topographically lower than the surrounding alluvial valley on the west and east sides, and is underlain by Quaternary age alluvium derived from the San Gabriel Mountains. The alluvium consists of silts, sands, and gravel deposited by the Arroyo Seco. In addition to the existing soils, a majority of the sediment was deposited into the reservoir as a result of heavy rains occurring since the 2009 Station Fire. These recent sediment loads were deposited into the reservoir due to the denuding of a large amount of the upstream natural watershed tributary area.

3.8.3 Applicable Regulations

City of Pasadena General Plan

The City of Pasadena General Plan Seismic and Safety Element contains goals, objectives, implementation strategies, and policies that are intended to ensure, among other things, the safety of residents and visitors to Pasadena in the event of a geologic or seismic event.

> Policy G-1: Whenever possible, mitigation of geologic hazards will be conducted without violating the property owners' rights to modify or improve their investment, along with preserving the aesthetic or natural conditions of the area through minimal grading. When these goals are in conflict, protection of life and property will take precedence.

3.8.4 Significance Criteria

- *GEOLOGY-1: Would the project result in substantial erosion or the loss of topsoil?*
- *GEOLOGY-2: Cumulative Impacts*

3.8.5 Methodology

Potential impacts related to soils were evaluated on the basis of site-specific information prepared for the Proposed Project and developed through review of existing published reports and mapping.

3.8.6 Impacts and Mitigation

GEOLOGY-1 *Potentially result in soil erosion or loss of topsoil during sediment removal activities.*

Sediment Removal/Reservoir Management

The Proposed Project will involve the excavation sediment and deposition of the sediment at facilities already prepared and designated to accept such sediment during sediment removal and reservoir management. Sediment stockpiled at Johnson Field as part of the IMP will also be removed. Depending on the moisture content of the sediment removed, the sediment may need to be stockpiled to allow the sediment to dry. If drying is required, stockpiling of the sediment will occur onsite within Devil's Gate Reservoir. Disturbed sediments are more susceptible to erosion; however, as discussed above in Air Quality, these impacts will be reduced to less than significant through implementation of SCAQMD Rule 403 and BMPs. In addition, excavation, grading, and sediment placement activities will be in accordance with established guidelines, permits, and regulations established for the disposal. As such, sediment removal and management impacts to erosion will be less than significant.

Mitigation Measures

No mitigation will be required.

Residual Impacts After Mitigation

With implementation of SCAQMD Rule 403 and BMPs and the resulting reduction in potential for erosion, no significant impacts to geology and soils would occur as a result of the Proposed Project.

GEOLOGY-2 *Cumulative Impacts*

The geographic scope for cumulative impacts associated with soil erosion includes a 1-mile radius from the Proposed Project site. It is expected that the NASA JPL On-Site Parking Structure, the Hahamongna Watershed Park MBMU Project, and the Arroyo Seco Canyon Project will comply with SCAQMD Rule 403 and BMPs and will not result in any significant impacts associated with soil erosion. As discussed above, with implementation of SCAQMD Rule 403 and BMPs, no significant impacts associated with soil erosion are expected with implementation of the Proposed Project. Therefore, the potential for cumulative impacts when combined with existing and foreseeable projects within a 1-mile radius are not significant.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

With implementation of SCAQMD Rule 403 and BMPs and the resulting reduction in potential for erosion, no significant cumulative impacts to geology and soils would occur as a result of the Proposed Project under sediment removal and both management options.

3.9 GREENHOUSE GAS EMISSIONS

3.9.1 Introduction

This section describes the regional and local characteristics of the Proposed Project area related to climate change and greenhouse gas emissions. A *Greenhouse Gas Report* was conducted for the Proposed Project (see Appendix G). The purpose of the Greenhouse Gas Report is an analysis of potential climate change/greenhouse gas (GHG) impacts that could occur with the sediment removal and management at the Proposed Project.

The environmental baseline condition for the sediment removal phase is considered at the time of publication of the NOP. Typically baseline conditions are designed to provide a representative snapshot of current conditions in the project area. Related to GHG emissions, this usually is presented by documenting the general level of emissions in the area. Since there is no project-specific baseline data, the nearest and latest GHG inventory (City of Pasadena's 2009 Greenhouse Gas Emissions Inventory and Reduction Plan) is supplied for informational purposes. It is relevant only to provide the insight as to just how much GHG is generated in a defined area nearby, for comparison purposes. The environmental baseline conditions for reservoir management will be conditions post sediment removal, approximately in the year 2020.

3.9.2 Existing Environmental Setting

Constituent gases that trap heat in the Earth's atmosphere are called "greenhouse gases" (GHGs), analogous to the way a greenhouse retains heat. GHGs play a critical role in the Earth's radiation budget by trapping infrared radiation emitted from the Earth's surface which would otherwise have escaped into space. Prominent GHGs contributing to this process include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and chlorofluorocarbons (CFCs). Without the natural heat-trapping effect of GHGs, the earth's surface would be about 34 °F cooler. This natural phenomenon, known as the "Greenhouse Effect," is responsible for maintaining a habitable climate. Anthropogenic emissions of these GHGs in excess of natural ambient concentrations are responsible for the enhancement of the "Greenhouse Effect" and have led to a trend of unnatural warming of the Earth's natural climate known as global warming or climate change, or, more accurately, Global Climate Disruption. Emissions of these gases that induce global climate disruption are attributable to human activities associated with industrial/manufacturing, utility, transportation, residential, and agricultural sectors (CalEPA 2006).

Global warming potential (GWP) is the potential of a gas or aerosol to trap heat in the atmosphere. Individual GHG compounds have varying GWP and atmospheric lifetimes. The reference gas for the GWP is CO_2, and it has a GWP of one. The calculation of the CO_2 equivalent (CO_2e) is a consistent methodology for comparing GHG emissions since it normalizes various GHG emissions to a consistent metric. Methane's warming potential of 21 indicates that methane has a 21 times greater warming affect than CO_2 on a molecule per molecule basis. A CO_2e is the mass emissions of an individual GHG multiplied by its GWP. GHGs are often presented in units called tonnes (t) (i.e., metric tons) of CO_2e (tCO_2e).

In 2004, total worldwide GHG emissions were estimated to be 20,135 million (M) t of CO_2e ($MtCO_2e$), excluding emissions/removals from land use, land use change, and forestry. In 2004, GHG emissions in the U.S. were 7,074 $MtCO_2e$.

In 2009, total California greenhouse gas emissions were 457 $MtCO_2e$; and the net emissions were 453 $MtCO_2e$, reflecting the influence of sinks (net CO_2 flux from forestry). The transportation sector accounted for approximately 38 percent of the total emissions, while the industrial sector accounted for approximately 20 percent. Emissions from electricity generation were about 23 percent.

Local GHG Inventory

In October 2009, the City of Pasadena conducted a Greenhouse Gas Emissions Inventory and Reduction Plan that determined that in 2007 the total GHG emissions being produced by City residents, businesses, and municipal operations, according to the best available data, was approximately 7.8 $MtCO_2e$ (City of Pasadena 2009).

Table 3.9-1: City of Pasadena 2007 Net Total Emissions shows the breakdown of those emissions separated into United Nations Urban Environmental Accords (UEA) categories.

Table 3.9-1: City of Pasadena 2007 Net Total Emissions

UEA Category	GHG Emissions (tCO_2e)
Energy	1,075,811
Solid Waste	1,105,498
Urban Nature	2,175
Transportation	5,610,910
TOTAL	**7,794,394**

Reference: Greenhouse Gas Emissions Inventory and Reduction Plan. City of Pasadena. October 2009.

Transportation sources account for approximately 72 percent of the total. These emissions do not include pass-through traffic on the freeways within the City of Pasadena and account only for vehicle trips related to Pasadena land uses as starting points and destinations.

3.9.3 Applicable Regulations

GHGs, similar to criteria air pollutants, are regulated at the national, State, and air basin level by various agencies, and each agency has a different degree of control. The U.S. Environmental Protection Agency (EPA) regulates at the national level, the California Air Resources Board (CARB) regulates at the State level, and the South Coast Air Quality Management District (SCAQMD) regulates at the air basin level in the Proposed Project area.

Federal Climate Change Legislation

The federal government is taking a number of common-sense steps to address the challenge of climate change. EPA collects various types of GHG emissions data. This data helps policy makers, businesses, and EPA track GHG emissions trends and identify opportunities for reducing emissions and increasing efficiency. EPA has been collecting a national inventory of GHG emissions since 1990 and in 2009 established mandatory reporting of GHG emissions from large GHG emissions sources.

EPA is also getting GHG reductions through partnerships and initiatives by evaluating policy options, costs, and benefits; advancing the science; partnering with states, localities, tribes, and internationally; and helping communities adapt to climate change impacts.

State Climate Change Legislation

Executive Order S 3-05

On June 1, 2005, the Governor issued Executive Order S 3-05 which set the following GHG emission reduction targets:

- By 2010, reduce GHG emissions to 2000 levels;
- By 2020, reduce GHG emissions to 1990 levels;
- By 2050, reduce GHG emissions to 80 percent below 1990 levels.

To meet these targets, the Climate Action Team prepared a report to the Governor in 2006 that contains recommendations and strategies to help ensure the targets in Executive Order S-3-05 are met.

Assembly Bill 32 (AB 32)

In 2006, the California State Legislature enacted the California Global Warming Solutions Act of 2006, also known as AB 32. AB 32 focuses on reducing GHG emissions in California. GHGs, as defined under AB 32, include CO_2, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. AB 32 requires that GHGs emitted in California be reduced to 1990 levels by the year 2020. The CARB is the State agency charged with monitoring and regulating sources of emissions of GHGs that cause global warming in order to reduce emissions of GHGs. AB 32 also required that by January 1, 2008, the CARB had to determine what the statewide GHG emissions level was in 1990, and it had to approve a statewide GHG emissions limit to be applied to the 2020 benchmark. The CARB approved a 1990 GHG emissions level of 427 $MtCO_2e$ on December 6, 2007, in its Staff Report. Therefore, in 2020, emissions in California are required to be at or below 427 $MtCO_2e$.

Under the current business-as-usual (BAU) scenario, statewide emissions are increasing at a rate of approximately 1 percent per year as noted below. Also shown are the average reductions needed from all statewide sources (including all existing sources) to reduce GHG emissions back to 1990 levels.

- 1990: 427 $MtCO_2e$
- 2004: 480 $MtCO_2e$ (an average 11-percent reduction needed)
- 2020: 596 $MtCO_2eBAU$ (an average 28-percent reduction needed)

To achieve these goals, AB 32 mandates that CARB establish a quantified emissions cap, institute a schedule to meet the cap, implement regulations to reduce statewide GHG emissions from stationary sources, and develop tracking, reporting, and enforcement mechanisms to ensure that reductions are achieved. The following schedule outlines CARB actions mandated by AB 32:

- By January 1, 2008, CARB adopts regulations for mandatory GHG emissions reporting, defines 1990 emissions baseline for California (including emissions from imported power), and adopts it as the 2020 statewide cap.
- By January 1, 2009, CARB adopts plan to effect GHG reductions from significant sources of GHGs via regulations, market mechanisms, and other actions.
- During 2009, CARB drafts rule language to implement its plan and holds a series of public workshops on each measure (including market mechanisms).
- By January 1, 2010, early action measures take effect.
- During 2010, CARB, after workshops and public hearings, conducts series of rulemakings to adopt GHG regulations, including rules governing market mechanisms.
- By January 1, 2011, CARB completes major rulemakings for reducing GHGs, including market mechanisms. CARB may revise and adopt new rules after January 1, 2011, to achieve the 2020 goal.
- By January 1, 2012, GHG rules and market mechanisms adopted by CARB take effect and become legally enforceable.
- December 31, 2020, is the deadline for achieving the 2020 GHG emissions cap.

Cap-and-Trade

The AB 32 Scoping Plan identified a cap-and-trade program as one of the strategies California will employ to reduce the GHG emissions that cause climate change. CARB designed a California cap-and-trade program that is enforceable and meets the requirements of AB 32. The development of this program included a multi-year stakeholder process and consideration of potential impacts on disproportionately impacted communities. The program started on January 1, 2012, with an enforceable compliance obligation beginning with the 2013 GHG emissions. The Program includes market monitoring activities such as a Compliance Instrument Tracking System Service, quarterly allowance auctions, a Compliance Offset Program designed to give offset credits to GHG reductions or sequestered carbon that meet regulatory criteria, an Adaptive Management Plan focusing on localized air quality impacts from the regulation and forest impacts from the U.S. Forest Protocol, and a Voluntary Renewable Electricity Program.

Local Climate Change Policy

The City of Pasadena (City) created a Green City Action Plan (Action Plan) in 2006 that launched a comprehensive environmental action plan that guides the City towards sustainability and accelerates the City's environmental commitment (City of Pasadena 2006). The framework for the Action Plan is based on the 21 specific UEA goals to be accomplished by World Environment Day 2012. As of 2010, the Green City Indicator Report documents that 8 goals have been achieved, 10 goals are likely, and 3 of the 21 goals are listed as undetermined. The Proposed Project does not fit into any of the existing long-term GHG Reduction strategies presented in the City's Plan (City of Pasadena 2010).

3.9.4 Significance Criteria

- *GHG Emissions-1: Would the project generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?*
- *GHG Emissions-2: Would the project conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?*
- *GHG EMISSIONS-3:Cumulative Impacts*

Greenhouse Gas Emissions Thresholds

The California Air Quality Act (CEQA) requires lead agencies to evaluate potential environmental effects based to the fullest extent possible on scientific and factual data. Significance conclusions must be based on substantial evidence, which includes facts, reasonable assumptions predicated upon facts, and expert opinion supported by facts.

To provide guidance to local lead agencies on determining significance for GHG emissions in their CEQA documents, SCAQMD Board adopted an Interim CEQA GHG Significance Threshold for Stationary Sources, Rules, and Plans (SCAQMD Interim Guidance) (SCAQMD 2008). The Interim Guidance uses a tiered approach to determining significance. This Interim Guidance was developed primarily to apply to stationary source/industrial projects where the SCAQMD is the lead agency under CEQA, in absence of more directly applicable policy, the SCAQMD's Interim Guidance is often used as general guidance by local agencies to address the long-term adverse impacts associated with global climate change.

Even though this Proposed Project does not fit the typical "land-use" project, the Greenhouse Gas Report (see Appendix G) proposes the use of the "Tier 3" quantitative thresholds for residential and commercial projects as a reasonable metric. The SCAQMD proposes that if a project generates GHG emissions below 3,000 tCO_2e annually, it could be concluded that the Proposed Project's GHG contribution is not "cumulatively considerable" and is therefore less than significant under CEQA. If the Proposed Project generates GHG emissions above the threshold, the analysis must identify mitigation measures to reduce GHG emissions.

In addition, Appendix G of the CEQA Guidelines states that a project would have potentially significant GHG emission impacts if it would:

- Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment
- Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs

3.9.5 Methodology

Consistent with CEQA, indirect and direct impacts of the Proposed Project are required to be analyzed for a Proposed Project. The analysis of direct GHG impacts is relatively straightforward as onsite GHG sources or directly related offsite GHG sources, such as worker commute trips, are generally readily identifiable. Indirect GHG emission sources are less obvious, but the California Climate Action Registry

(CCAR) includes indirect emissions from grid-delivered electricity use and indirect emissions from imported steam, district heating or cooling, and electricity from a co-generation plant. This Proposed Project does not include any indirect source.

Short-term sediment removal and long-term reservoir management GHG emissions were assessed in accordance with methodologies and formulas recommended by CCAR, EPA, CARB, and SCAQMD. Modeled emissions were compared with SCAQMD's Interim Guidance thresholds to determine potential significance (SCAQMD 2008). Calculations were based, in part, on information about vehicle trip generation from the Traffic Impact Analysis (TIA) prepared for this project (Hall and Foreman 2013). Information on off-road equipment and project scheduling and logistics were supplied by the LACFCD.

For the purposes of determining whether or not GHG emissions from affected projects are significant, project emissions will include direct, indirect, and, to the extent information is available, life cycle emissions during construction (sediment removal) and operation (reservoir management). The SCAQMD Interim Guidance suggests that construction emissions should be amortized over the life of the project, defined as 30 years, added to the operational emissions, and compared to the applicable interim GHG significance threshold tier.

3.9.6 Impacts and Mitigation

GHG EMISSIONS-1 *Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment.*

Sediment Removal/Reservoir Management

GHG emissions are generated from the exhaust of off-road equipment used to remove the sediment, including four front loaders with 4-cubic-yard buckets, two bulldozers, an excavator, a grader, water truck, and sorters/crushers. In addition, GHG is emitted from the exhaust of the dump trucks proposed to haul approximately 7,650 cubic yards per day, which is expected to require an average of 50 truck trips in and out per hour, with an estimated maximum of 425 truck trips in and out per day during sediment removal activities. The disposal trucks will dispose of material either to the east and placed at the primary disposal site locations (the Waste Management Facility in Azusa, the Vulcan Materials Reliance Facility in Irwindale, or the Manning Pit SPS in Irwindale) or to the west and placed in one of the facilities in Sun Valley. Removed vegetation and organic debris will be hauled to Scholl Canyon Landfill, located in the City of Glendale. It is estimated that for approximately three weeks during the first year of the Proposed Project, approximately 50 percent of trucking will be green waste that will be trucked to Scholl Canyon Landfill; and the remaining 50 percent of the trucking will be sediment distributed to the other sites. After the first year, and for reservoir management activities, during the first week each year approximately 25 percent of the debris will be green waste trucked to the Scholl Canyon site; and the remaining trucking will be sediment distributed to the other sites.

For reservoir management, removal of the sediment, vegetation, trees, and organic debris is expected to require an estimated 200 to a maximum of 300 truck trips per day and off-road equipment including four front loaders with 2-cubic-yard buckets, one bulldozer, an excavator, a grader, water truck, and sorters/crushers. During reservoir management it is estimated that for the total trips, 2 percent will go to Scholl Canyon Landfill, 75 percent will go to the Irwindale sites, and 23 percent will go to the Sun Valley sites. Proposed Project emissions were estimated using the following assumptions and methods:

- On-Road Truck Emissions: To estimate emissions from on-road sediment dump trucks, mileages between the Proposed Project site and each of the disposal sites using haul routes assumed in the TIA were measured. For the five-year life of the Proposed Project it is estimated that approximately 3 percent of the trips will travel to the Scholl Canyon site, 78 percent will travel to the Irwindale sites, and 19 percent will go to the Sun Valley sites. During reservoir management activities, only 2 percent of the trips are assigned to Scholl Canyon, 75 percent will be delivered to the Irwindale sites, and 23 percent will go to the Sun Valley sites.

To calculate expected CO_2 emissions from exhaust, the Greenhouse Gas Report (Appendix G) used CARB's EMFAC2011 Web Based Data Access with emission rate data for Los Angeles County for the years 2015, 2017, and 2020. "T7 single construction" was used as the most representative EMFAC2011 vehicle category for the sediment dump trucks. To generate expected CH_4 and N_2O emissions, factors from the Local Governments Operations Protocol were applied (CARB 2010).

- Off-Road Equipment Emissions: Off-road equipment CO_2 and CH_4 emission factors were obtained from the CalEEMod Users Guide.

- Employee Vehicle Emissions: CARB's EMFAC2011 Web Based Data Access was used to generate expected CO_2 emissions from employee vehicle exhaust, as mentioned above in the section on on-road trucks. In order to more accurately represent the types of vehicles used by the potential employee work pool, a weighted average emission factor was generated using 69 percent of the pool using light-duty automobiles and the rest using light-duty trucks. The appropriate percentages were derived from the distribution of VMT from EMFAC2011.

Table 3.9-2: Sediment Removal GHG Emissions provides a summary of the GHG emission estimates for sediment removal. Reservoir management emissions, beginning in 2020, were calculated using the same methodology as before.

Table 3.9-2: Sediment Removal GHG Emissions

Emission Source	GHG Emissions (tonnes/year)			
	CO_2	CH_4	N_2O	CO_2e
Off-Road	745.8	0.071	N/A	747.3
On-Road Trucks	4,422.6	1.681	1.546	4,937.3
Employees	46.4	0.005	0.005	48.2
Totals	**5,215.0**	**1.760**	**1.550**	**5,773.0**

Table 3.9-3: Reservoir Management Activity GHG Emissions shows estimated emissions from reservoir management. Details of the air quality calculations are included in Appendix A.

Table 3.9-3: Reservoir Management Activity GHG Emissions

Emission Source	GHG Emissions (tonnes/year)			
	CO_2	CH_4	N_2O	CO_2e
Off-Road	96.8	0.007	N/A	96.9
On-Road Trucks	546.1	0.208	0.191	609.7
Employees	6.5	0.001	0.001	6.7
Totals	**649.0**	**0.220**	**0.190**	**713.0**

Typical development projects have short-term construction and long-term operational GHG emissions, where the operational activities generate the majority of the GHG emissions. In order to assess the overall lifetime project GHG emissions, the SCAQMD developed an Interim Guidance that recommends that construction emissions should be amortized over the life of the project, defined in the Guidance as 30 years, which is then added to the reservoir management emissions, and compared to the applicable interim GHG significance threshold tier. Using the above annual emission rates, the sediment removal phase is expected to produce 5,733 tCO_2e per year for 5 years, for a 5-year total of 28,664 tCO_2e. Amortized over 30 years the sediment removal would produce 951 tCO_2e per year. Adding that amount to the 713 tCO_2e per year expected during reservoir management would yield a Proposed Project total annual emissions of 1,669 tCO_2e, which is less than the Tier 3 threshold of 3,000 tCO_2e; therefore the Proposed Project is not "cumulatively considerable" and is therefore less than significant under CEQA. Use of sediment removal dump trucks that meet EPA's emission standards for Model Year 2007 or later and use of off-road equipment that meets, at a minimum, EPA's emission standards for Tier 3 equipment, would result in a reduction of GHG emissions.

In addition, the Proposed Project may prove a positive effect on climate change. High ambient temperatures coupled with important demand for oxygen due to the degradation of substantial organic matter amounts favor the production of CO_2, the establishment of anoxic conditions, and thus the production of CH_4. If the reservoir is left as it is, the large quantity of biomass currently existing may exacerbate the condition. With the removal and disposal of most of the organic mass in the Scholl Canyon Landfill, which uses the green waste primarily as "alternative daily cover" (ADC), the overall benefit to the carbon ecosystem will be positive since prior to using green waste for ADC, larger amounts of cover soil had to be imported into the landfill from offsite sources (Kong, et al. 2008). Therefore, use of the green waste ADC reduced fossil fuel use for cover soil importation and also reduces GHG emissions.

Mitigation Measures

No mitigation measures are necessary.

Residual Impacts After Mitigation

No significant impacts associated with the generation of greenhouse gas emissions will occur as a result of the Proposed Project.

GHG EMISSIONS-2 *Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases.*

Sediment Removal/Reservoir Management

AB 32 identified a 2020 target level for GHG emissions in California of 427 MMT of CO_2e, which is approximately 28.5 percent less than the year 2020 BAU emissions estimate of 596 MMT CO_2e. To achieve these GHG reductions, widespread reductions of GHG emissions will have to occur throughout California. Some of those reductions will need to come in the form of changes in vehicle emissions and mileage standards, changes in the sources of electricity, and increases in energy efficiency by existing facilities. The remainder will need to come from requiring new facility development to have lower carbon intensity than BAU conditions. Therefore, this analysis uses a threshold of significance that is in conformance with the State's goals.

On December 12, 2008, CARB adopted the AB 32 Scoping Plan, which details specific GHG emission reduction measures that target specific GHG emissions sources. Project-related GHG emissions would be reduced as a result of several AB 32 Scoping Plan measures. The Scoping Plan considers a range of actions that include direct regulations, alternative compliance mechanisms, monetary and non-monetary incentives, voluntary actions, and market-based mechanisms (e.g., cap-and-trade system).

Some examples include the following:

- Mobile-source GHG emissions reduction measures
    a. Pavley emissions standards (19.8 percent reduction)
    b. Low carbon fuel standard (7.2 percent reduction)
    c. Vehicle efficiency measures (2.8 percent reduction)

- Energy production related GHG emissions reduction measures
    d. Natural gas transmission and distribution efficiency measures (7.4 percent reduction)
    e. Natural gas extraction efficiency measures (1.6 percent reduction)
    f. Renewables (electricity) portfolio standard (33.0 percent reduction)

These reductions in mobile-source and energy production GHG emissions would occur with or without development of the Proposed Project. Overall, the Proposed Project would be consistent with the AB 32 goal of reducing statewide GHG emissions to 1990 levels by year 2020. Currently, no other GHG reduction plan (i.e., SCAG, SCAQMD, or County) applies to the Proposed Project. The Proposed Project would not conflict with any applicable plan, policy, or regulation of an agency adopted for the purpose of reducing the emissions of GHGs; therefore, impacts would be less than significant.

Mitigation Measures

No mitigation measures are necessary.

Residual Impacts After Mitigation

No significant impacts associated with any applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases will occur as a result of the Proposed Project.

GHG EMISSIONS-3 Cumulative Impacts

As discussed above, the Proposed Project would have amortized total annual emissions of 1,781 tCO_2e, which is less than the Tier 3 threshold of 3,000 tCO_2e; therefore, the Proposed Project is not "cumulatively considerable" and is therefore less than significant under CEQA. In addition, the Proposed Project would not conflict with any applicable plan, policy, or regulation of an agency adopted for the purpose of reducing the emissions of GHGs; therefore, impacts would be less than significant.

Mitigation Measures

No mitigation measures are necessary.

Residual Impacts After Mitigation

No significant cumulative adverse impacts were identified, and no mitigation measures are necessary.

3.10 HAZARDS AND HAZARDOUS MATERIALS

3.10.1 Introduction

The hazards and hazardous materials portion of the EIR discusses the potential sediment removal activities and how they may cause an exposure or release of hazards and hazardous materials to people and/or the environment. The environmental setting and regulatory agencies that have jurisdiction over the project are further detailed below, followed by an analysis of potentially significant impacts and identified mitigation measures.

As noted in the Initial Study (Appendix A), impacts associated with airport land use plans, private airstrips, and wildland fires were found to have less than significant impacts and are not discussed within the EIR.

The environmental baseline condition for the sediment removal phase is considered at the time of publication of the NOP. The environmental baseline conditions for reservoir management will be conditions post sediment removal, approximately in the year 2020.

3.10.2 Existing Environmental Setting

The Proposed Project site is located in the northwestern section of the City of Pasadena within the Arroyo Seco watershed and has an area of approximately 120 acres (Figure 2.1-1: Proposed Project Location and Vicinity Map). The site is bordered by the NASA - Jet Propulsion Laboratory (JPL) to the north and northwest, La Cañada High School to the west, a single-family residential development to the east, and I-210 to the south.

The Arroyo Seco watershed acts as a seasonal flood basin that is a part of the Arroyo Seco River system. The watershed is primarily used for informal recreational use and contains several spreading basins along the eastern border. By 2011, the flood basin had filled with approximately 2.6 million cubic yards of sediment, mainly as a result of the 2009 Station Fire and the storm events that followed. Those events deposited excess sediment within the reservoir. The excess sediment has threatened the flood protection capabilities of Devil's Gate Dam and its associated reservoir and is the primary reason for the proposed sediment removal activities. Due to the Proposed Project site's long time use as a reservoir for Devil's Gate Dam, few sources of hazards and hazardous materials have been identified within the Proposed Project site that could lead to potential human health or ecological health risks or other environmental concerns during the sediment removal activities.

Hazardous Database Search

Section 65962.5 of the California Government Code requires the California Environmental Protection Agency (Cal/EPA) to maintain an updated list of known hazardous materials sites, also known as the "Cortese List." The Cortese List identifies public drinking water wells with detectable levels of contamination, hazardous substance sites selected for remedial action, sites with known toxic material identified through the abandoned site assessment program, reported leaking underground storage tanks (LUSTs), and solid waste disposal facilities from which hazardous substance migration is known. The Cortese List, along with additional databases maintained by various State and federal regulatory agencies, was reviewed for the project site and properties within the immediate vicinity of the site. The primary purpose of this review was to identify any sources of chemicals of concern (COCs) that may have

potentially impacted the site. In accordance with the CEQA statute (Section 21092.6 of the Public Resources Code), this review of agency database information was compiled by Environmental Data Resources, Inc., (EDR) of Southport, Connecticut, an information search firm that utilizes computer search techniques to query governmental agency database information for a specified geocoded area. The results of the database search are included in Table 3.10-1: Results of EDR Database Search. Search radii comply with or exceed those specified in American Society of Testing and Materials (ASTM) Standard E 1527-05. The database search is included in Appendix H.

Table 3.10-1: Results of EDR Database Search

Name and Address	Distance to Site	Databases Listed	Reason for Listing
Flintridge Riding Club 4625 Oak Grove Drive	1/8 – 1/4 mi WNW	HIST CORTESE, HIST Underground Storage Tank (UST), EDR HISTORICAL CLEANERS, LUST	Previous dry cleaning operations and reported LUST. Case closed.
Jet Propulsion Laboratory (JPL) 4800 Oak Grove Drive	<1/8 – 1/4mi NNW	HIST CORTESE, Formerly Used Defense Sites (FUDS), Spills, Leaks, Investigation and Cleanup (SLIC), Leaking Underground Storage Tank (LUST), Waste Discharge System (WDS), Los Angeles County HMS Street Number List, CA FID Facility Inventory Database (FID) UST, ENVIROSTOR, Emissions Inventory Data (EMI), Facility and Manifest Data (HAZNET), Well Investigation Program (WIP)	Designated as a Superfund Site related to spills and releases related to military defense operations.
Oak Grove Ranger Station 4600 Oak Grove Drive	1/8 – 1/4 mi WNW	HIST CORTESE, LUST	Reported leaking UST impacting soil.
USDA Forest Service Oak Grove Drive	1/4 – 1/2 WNW	HIST CORTESE, LUST	Reported leaking UST impacting soil. Case closed.
Exxon Mobil Corporation 2172 Yucca Lane	1/8 – 1/4 mi ESE	Resource Conservation and Recovery Act (RCRA) - Large Quantity Generator (LQG)	Large quantity generator of hazardous waste. No violations recorded.
California Highway Patrol 2130 Windsor Avenue	1/4-1/2 mi ESE	LUST	Reported leaking UST impacting soil. Case closed.
Caltrans Maintenance Station 2122 North Windsor Avenue	1/4-1/2 mi ESE	LUST	Reported leaking UST impacting soil. Case closed.

Flintridge Riding Club, located west-northwest of the Proposed Project, is listed on the EDR HISTORICAL CLEANERS, SWEEPS underground storage tanks (UST), CA FID UST, HIST UST, HIST CORTESE, and LUST databases. According to the databases, a 500-gallon UST containing regular gasoline leaked its contents and impacted the surrounding soil. The property received a "case closed" status as of December, 1990. Due to the limited impacts and the leaking incident receiving a case closure status approximately 20 years ago, this property does not appear to be a significant environmental concern to the project.

JPL is located adjacent to and north-northwest of the Proposed Project. JPL was included on the National Priorities List (NPL) in 1992, which is a list of properties that have been designated as a Superfund Site under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). JPL operated as a Defense site throughout its history; and during the 1940s through the 1950s, liquids and solid wastes, including solvents, solid and liquid rocket propellants, and laboratory wastes were disposed of via seepage pits. The pits collected wastes from drains and sinks within many of the buildings, which then allowed the wastes to seep into the surrounding soils. Over time these wastes containing hazardous substances migrated into the underlying aquifer, known to occur at approximately 200 feet below ground surface (bgs). Site assessments that included soil and groundwater sampling in the 1990s, identified the presence of volatile organic compounds (VOCs), including carbon tetrachloride, trichloroethene (TCE), tetrachloroethene (PCE), total chromium, hexavalent chromium, and perchlorates, detected above regulatory limits. Since the discovery of soil and groundwater impacts, JPL has worked with the EPA to remediate the soil and groundwater impacts and to prevent further spills and releases. Due to the extent of VOC and perchlorate groundwater impacts originating from the JPL property impacting the groundwater beneath the Proposed Project site, the aquifer underlying the Arroyo Seco Watershed was included within the JPL Superfund site. As a result of the known environmental impacts at the JPL property, the impacted groundwater beneath the project, and the nature of chemicals and processes currently used in JPL's operations, the adjacent JPL property presents an elevated environmental concern.

Oak Grove Ranger Station, located west-northwest of the Proposed Project site, was listed on the CORTESE and LUST databases. According to the databases, the ranger station was the location of a gasoline UST that leaked its contents into the surrounding soil. The property received a case closure and no further action letter in December 1990. Due to the limited impacts and the leaking incident receiving a case closure status approximately 20 years ago, this property is considered to present little environmental concern to the Proposed Project.

The USDA Forest service, located west-northwest of the Proposed Project site, is listed on the HIST CORTESE and LUST databases. According to the LUST database, a leaking gasoline tank was recorded on December 4, 1990. The leaking tank was closed after a remediation plan was submitted on May 20, 1991, to mitigate the release. The database was last updated on June 3, 1992, with its current case status listed as closed.

At the time of the report, the remaining listed properties in the EDR report do not appear to pose an environmental concern to the Proposed Project based on their respective hydraulically down gradient locations, nature of the releases, and/or distal proximity to the Proposed Project.

3.10.3 Applicable Regulations

Federal

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)

CERCLA, otherwise known as the Superfund law, was enacted in 1980 by Congress, creating a federal authority responsible for responding to releases or threatened releases of hazardous materials that can become a threat to public health or the environment. CERCLA also provides the legal framework for dealing directly with abandoned properties containing hazardous waste and liability of potential

responsible parties for the release of hazardous waste. It established a fund for cleanup costs when no responsible party is identified.

Resource Conservation and Recovery Act (RCRA)

RCRA is a federal law that provides authority over the disposal of solid and hazardous waste including "cradle to grave" requirements. RCRA's cradle to grave authority includes managing every step of a particular waste stream including the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA also provides the legal framework for the management of nonhazardous waste.

State

Within the California Environmental Protection Agency (Cal/EPA), the Department of Toxic Substance Control (DTSC) is the responsible governing agency that regulates the permitting for the generation, handling, treatment, and disposal of hazardous waste in the State of California. The DTSC and the State Water Resources Control Board (SWRCB; per the Porter-Cologne Water Quality Control Act of 1969) regulates the cleanup activities of hazardous waste sites in California that have caused contamination in soil and groundwater.

Title 22 of the California Code of Regulations (CCR)

Title 22, Division 4.5 contains the State of California hazardous waste regulations that are enforced by the DTSC.

California Occupational Safety and Health Administration (CAL/OSHA)

Federal and State occupational safety and health laws contain requirements regarding the handling of hazardous waste concerning worker safety, training, and right-to-know. Authority to enforce federal Occupational Safety and Health Administration (OSHA) requirements has been delegated to California OSHA (CAL/OSHA), which has developed provisions that are at least as stringent as those enforced at the federal level. CAL/OSHA regulates and enforces occupational and public safety laws protecting the public and workers from any safety hazards.

Local

The local authority for the Hahamongna Watershed Park is the City of Pasadena. Local officials, including the Pasadena Fire Department, may be involved in the implementation of federal and State regulations concerning hazards and hazardous materials. Another local agency that may claim jurisdiction is the Los Angeles County Health Department.

3.10.4 Significance Criteria

The criteria used to perform the analysis in determining the project's potential for significant impacts was provided in the Initial Study (IS), dated September 2011 and included in Appendix A. The IS evaluated the Proposed Project activities against the hazards and hazardous materials checklist.

- *HAZARDS-1: Would the project create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?*

- *HAZARDS-2: Would the project create a significant hazard to the public or the environment through reasonable foreseeable upset and accident conditions involving the release of hazardous materials into the environment?*

- *HAZARDS-3: Would the project emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?*

- *HAZARDS-4: Would the project be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?*

- *HAZARDS-5: Would the project impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?*

- *HAZARDS-6: Cumulative Impacts*

3.10.5 Methodology

For proper disposal procedures, the conditions of the sediment were characterized through the performance of a sediment and surface water sampling program. The sampling program included a limited subsurface investigation and surface water sampling to assess the sediment and water quality and identify any potential hazards associated to the public or the environment during the excavation, transportation, and disposal of the sediment. This study was also performed to assess whether the removal of the sediment would impact the water and/or water quality. The analytical approach for the collected sediment and water samples was developed by researching the known historical environmental impacts from the surrounding properties summarized in the hazardous database search above. The identified primary chemicals of concern from the database search included VOCs, metals, petroleum hydrocarbons, perchlorate, polychlorinated biphenyls (PCBs) and semi-volatile organic compounds (SVOCs).

A subsurface investigation was conducted to assess the geotechnical and environmental conditions of soil encountered at Devils Gate Reservoir (Appendix F). The soil samples were analyzed to evaluate whether the identified potential contaminants of concern are present in the post-fire sediments contained in Devil's Gate Reservoir. The soil boring locations are depicted in Figure 3.10-1: Soil Boring Locations.

The results of laboratory analyses performed on soil samples collected from the borings at Devil's Gate Reservoir were compared the results of applicable health screening levels issued by State and federal agencies that include the Bureau of Land Management (BLM) Human Risk Management Criteria (HRMCs), California Environmental Protection Agency (Cal/EPA) California Human Health Screening Levels (CHHSLs), and U.S. Environmental Protection Agency (EPA) Regional Screening Levels (RSLs). The concentrations of analytes were also compared to State and federal hazardous waste screening thresholds that include the Title 22 Chapter 11 of California Code of Regulations (CCR) and Part 1910 of the Code of Federal Regulations (CFR).

Proposed Project Boundary

Soil Boring Location*

*Soil boring locations obtained from Gannett Fleming

SCALE= 1 inch equals 833 feet

0 416.5 833

Feet

Figure 3.10-1
Devil's Gate Reservoir Sediment Removal and Management Project
Soil Boring Locations

Version Date: 10/18/2013

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20346 - \\Cgi-gisdata01\gis_data\Projects\20000s\20201 - 20400\20346 Devil's Gate EIR\20346 Figure 3.10-1 Soil Boring Locations.mxd

3.10.6 Impacts and Mitigation

HAZARDS-1 *Create a hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials.*

Sediment Removal/Reservoir Management

Results of the soil sample analyses indicate detectable concentrations of VOCs, petroleum hydrocarbons, organochlorine pesticides, SVOCs, and heavy metals. The concentrations of VOCs, organochlorine pesticides, petroleum hydrocarbons (diesel and hydraulic/motor oil range and aromatics), and SVOCs detected in samples that were collected from Devil's Gate Reservoir are below regulatory thresholds. No perchlorates, the substance of concern from JPL, were found in the soil sample analysis.

Arsenic concentrations detected in soil samples collected from the project area are below the California DTSC accepted southern California background range of 6 mg/kg to 12.0 mg/kg (DTSC 2005). The arsenic concentrations detected in the soil samples collected from the site are also consistent with mean background arsenic concentration of 3.5 mg/kg in California soils (Kearney Foundation 1996).

Since the arsenic concentrations detected are expected to be naturally occurring and consistent with background concentrations in California, and the site will not be occupied, the appropriate screening level is considered to be the BLM HRMC for workers of 12 mg/kg. In addition, implementation of SCAQMD Rule 403 and BMPs will ensure adequate dust control during grading operations or other work requiring disturbance of soil. No significant impacts associated with hazardous soils are expected.

Results from the surface water sampling program did not identify potential sources of contaminants from surface water; therefore, the surface water appears not to be a hazards or hazardous materials source. The water sampling program, along with the water quality analysis, is discussed further in Section 3.11, Hydrology and Water Quality, of this report.

Proposed Project activities that include the use of hazardous materials are associated with the construction equipment needed to perform the removal activities. Examples of the hazardous materials include gasoline and diesel fuels, lubricating fluids, and solvents. Proposed Project activities involving construction equipment will involve the limited transport, use, disposal, and storage of hazardous materials, which are regulated by various agencies. Adequate BMPs will be utilized; and adherence to the regulations set forth by the County, State, and federal agencies will reduce the potential for hazardous materials impacts to a less than significant level and would not pose a safety hazard to sensitive receptors.

Mitigation Measures

No mitigation measures are necessary.

Residual Impacts After Mitigation

Implementation of BMPs and adherence to the applicable regulations will reduce the potential for impacts associated with hazardous materials to a less than significant level.

HAZARDS-2 *Create a significant hazard to the public or environment through accident conditions involving the release of hazardous materials into the environment.*

As noted in Hazards-1, above, the concentrations of organochlorine pesticides, petroleum hydrocarbons (diesel and hydraulic/motor oil range and aromatics), and SVOCs detected in samples that were collected from Devil's Gate Reservoir are below regulatory thresholds. In addition, project activities that include the use of hazardous materials are associated with the construction equipment needed to perform the removal activities. Adequate BMPs will be utilized; and adherence to the regulations set forth by County, State, and federal agencies will reduce the potential for hazardous materials impacts to a less than significant level and would not create a significant hazard to the public or environment.

Mitigation Measures

No mitigation measures are necessary.

Residual Impacts After Mitigation

Implementation of BMPs and adherence to the applicable regulations will reduce the potential for impacts associated with hazardous materials to a less than significant level.

HAZARDS-3 *Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school.*

Sediment Removal/Reservoir Management

The Proposed Project will include the use of hazardous materials associated with the construction equipment needed to perform the removal activities. The proposed construction routes pass La Cañada High School and Hillside School and Learning Center. Adherence to the County, State, and federal agency regulations governing the use of these materials reduces the potential for impacts to a less than significant level and would not pose a safety hazard to sensitive receptors. No mitigation measures are required.

Mitigation Measures

No mitigation measures are necessary.

Residual Impacts After Mitigation

Implementation of BMPs and adherence to the applicable regulations will reduce the potential for impacts associated with hazardous materials within one-quarter mile of an existing school to a less than significant level.

HAZARDS-4 *Located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would create a significant hazard to the public or the environment.*

Sediment Removal/Reservoir Management

The EPA included Hahamongna Watershed Park area on the NPL Superfund List due to the presence of detected VOCs and perchlorate in groundwater originating from the JPL property. The impacted groundwater is at 200 feet bgs and, as with the Proposed Project, the concentrations of VOCs, organochlorine pesticides, petroleum hydrocarbons (diesel and hydraulic/motor oil range and aromatics), and SVOCs detected in samples that were collected from Devil's Gate Reservoir are below regulatory thresholds; and no perchlorates, the substance of concern from JPL, were found in the soil sample analysis. Therefore, the listing of the watershed on the Superfund List does not present a significant hazard to the public or the environment; and no significant impacts associated with the Proposed Project are expected.

Mitigation Measures

No mitigation measures are necessary.

Residual Impacts After Mitigation

No significant adverse impacts were identified.

HAZARDS-5 *Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.*

Sediment Removal/Reservoir Management

The City of Pasadena maintains a citywide emergency response plan, which takes effect at the onset of a major disaster, such as a major earthquake or fire. The Pasadena Fire Department maintains and implements the disaster plan, and the Pasadena Police Department devises evacuation routes based on the specific circumstance of the emergency. The City has preplanned evacuation routes for dam inundation areas associated with Devil's Gate Dam, Eaton Wash, and Jones Reservoir.

The proposed sediment removal activities will occur onsite and will not interfere with the current emergency response plan or emergency evacuation plan for local, State, or federal agencies. Additionally, access to the surrounding roads will be maintained during sediment removal activities and will not interfere with the response facilities located adjacent to the Proposed Project site, including the County of Los Angeles Fire Department Camp 2 and the City of Pasadena Police Department facility located at 2175 Yucca Lane. The Proposed Project will also increase flood control protection downstream of the Devil's Gate Dam. No mitigation measures are required.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

No significant adverse impacts were identified.

HAZARDS-6 Cumulative Impacts

Existing onsite conditions related to hazardous materials are localized and site-specific. Potential impacts are not expected to combine with similar impacts of past, present, or reasonably foreseeable projects. As described above, no significant impacts associated with hazardous materials are expected with the Proposed Project. Only four of the cumulative projects within the immediate vicinity of the Proposed Project site (NASA Jet Propulsion Laboratory (JPL) On-Site Parking Structure project, Hahamongna Watershed Park MBMU Project, Arroyo Seco Canyon Project, Devil's Gate Water Conservation Project) would have the potential to combine with the Proposed Project to create a cumulative hazardous materials impact. In addition, no significant impacts associated with hazardous materials are expected with construction of the NASA JPL On-Site Parking Structure, the Hahamongna Watershed Park MBMU Project, the Arroyo Seco Canyon Project, or the Devil's Gate Water Conservation Project, with implementation of appropriate project BMPs and/or mitigation measures. Therefore, no significant cumulative hazardous materials impacts are expected.

Mitigation Measures

No mitigation measures are necessary.

Residual Impacts After Mitigation

No significant cumulative adverse impacts were identified.

3.11 HYDROLOGY AND WATER QUALITY

3.11.1 Introduction

This section describes the surface water and groundwater hydrology along with the water quality characteristics within the project area, located within the Hahamongna Watershed Park area of the City of Pasadena. The United States Army Corps of Engineers (USACE) report titled *Los Angeles County's Arroyo Seco Watershed Ecosystem Restoration Study* (USACE 2010), *Los Angeles Region Water Quality Control Plan* (LARWQCB 1994), and *California's Groundwater Bulletin 118* (DWR 2003) for the Raymond Groundwater Basin, and observations from the project-specific water quality study were reviewed in order to prepare the hydrology analysis contained in this section. The information obtained from these documents adequately reflects the current conditions that were present at the time the notice of preparation was published for this project (September 2011).

As noted in the Initial Study (Appendix A), impacts associated with the existing drainage pattern, creating runoff water, flood hazard areas, flooding, or inundation by seiche, tsunami, or mudflow were found to have less than significant impacts and are not discussed within the EIR.

The environmental baseline condition for the sediment removal phase is considered at the time of publication of the NOP. The environmental baseline conditions for reservoir management will be conditions post sediment removal, approximately in the year 2020.

3.11.2 Existing Environmental Setting

Regional Setting

The Proposed Project site is located within Hahamongna Watershed Park, which is a part of the larger 22-mile-long Arroyo Seco Watershed; and the Arroyo Seco Watershed is a subwatershed of the Los Angeles River Watershed. An area of approximately 47 square miles drains into the Arroyo Seco Watershed, extending from the Angeles National Forest (ANF) until its confluence with the Los Angeles River near Elysian Park. In the past, the waters of the Arroyo Seco traveled in a deep, incised canyon through the San Gabriel Mountains and emptied into open areas of alluvium and incised channels until its confluence with the Los Angeles River. The Arroyo Seco Watershed has undergone major development, becoming increasingly urbanized over time. Two dams have been constructed along the Arroyo Seco: Brown Mountain Debris Dam, located 7 miles downstream of Arroyo Seco's headwaters, and Devil's Gate Dam, at the southern boundary of the Proposed Project site (5 miles downstream below Brown Mountain Debris Dam). The other significant alteration is the channelization of the lower Arroyo Seco, with the stream bottom and sides made of impervious material. The Cities of Pasadena, South Pasadena, Los Angeles, and La Cañada Flintridge are located within the Arroyo Seco Watershed, along with the community of Altadena, NASA JPL, SR-110, SR-134, and I-210 (USACE 2010). It is important to note that in August 2009, the Station Fire, the largest fire in the ANF history, burned almost the entire undeveloped watershed of Devil's Gate Dam.

The Arroyo Seco Watershed is a subwatershed of the Los Angeles River Watershed and is considered a major tributary to the Los Angeles River Watershed. The Los Angeles River Watershed covers about 834 square miles of land and is one of the largest in the South Coast Region. It extends from the eastern portions of the Santa Monica Mountains to the San Gabriel Mountains in the west, surrounding the path of the Los Angeles River. The Los Angeles River's headwaters originate at the confluence of Bell Creek and Calabasas Creek in the San Fernando Valley, and the river culminates where it finally discharges into San Pedro Bay near Long

Beach. In the past, under natural conditions, the Los Angeles River flowed freely over the coastal plain. For flood control measures, from the 1930s to the 1960s, the USACE channelized the river by lining a large portion of it with concrete.

Surface Drainage Characteristics of the Project Site

Due to urbanization surrounding the Arroyo Seco Watershed, large areas of impervious surfaces now occur within the watershed. The impervious surfaces and the steep, mountainous stream channels cause rainwater to flow quickly to the storm drains and the Arroyo Seco. Approximately 31.9 square miles of stormwater runoff, originating from the La Cañada Flintridge, Altadena, and Pasadena communities, drain along the Arroyo Seco Watershed toward Devil's Gate Reservoir through Flint Wash, Altadena West Drain, and other drains. Stormwater also flows into the watershed from the northern portion of the Arroyo Seco. The stormwater in Devil's Gate Reservoir feeds through Devil's Gate Dam, then through the channelized lower section of the Arroyo Seco and further downstream to the Los Angeles River.

With the exception of Devil's Gate Dam, the majority of the project site is pervious, undeveloped land. The Proposed Project will add minimal impermeable surface area to the project site through the paving (asphalt and/or concrete) of dirt roads along the access to the reservoir; and, at the completion of the Proposed Project, surface runoff will continue to drain Devil's Gate Reservoir toward Devil's Gate Dam.

Water Quality

This section discusses the existing water quality of the section of the Arroyo Seco that flows through the project site. The source of water collected in Devil's Gate Reservoir is a combination of upgradient tributaries from the San Gabriel Mountains and water runoff coming into the watershed from adjacent neighboring communities. The term *runoff* is used to describe any source of water that drains or flows onto the project site that can result from a rain event or nuisance flows from various other sources. Nuisance flows can originate from activities such as irrigation, use of residential hoses, pipe leaks, and waste water from cleaning.

As part of the project site's water quality analysis, prior to sediment removal operations, a baseline water quality assessment characterizing the current water surface conditions was performed in September 2011. The four sampling locations selected to assess the current water quality conditions of the project site were Upper Devil's Gate (UDG), Altadena West Drain (AWD), Below Flint Wash (BFW), and Below Devil's Gate (BDG). The sampling locations, UDG, AWD, BFW, and BDG, are depicted in Figure 3.11-1: Water Quality Sampling Locations. UDG was sampled to assess the source of water originating from upgradient tributaries flowing into the project area. Sampling stations AWD and BFW represent nuisance flows coming into the watershed that originate from neighboring communities to the east and west of the project site, respectively. It is important to note that the BFW sampling station is south of the confluence of the runoff originating from the Flint Canyon Residential Community and the main stream flowing through Devil's Gate Reservoir. The final sampling station, BDG, is located just south of Devil's Gate Dam and represents the overall condition of the water flowing from Devil's Gate Reservoir, continuing south along the Arroyo Seco.

At each surface water station, water samples were collected in containers provided by TestAmerica Analytical Laboratories, Inc. per United States Environmental Protection Agency (USEPA) sample methods. The samples were analyzed by TestAmerica for the parameters listed in Table 3.11-1: Analytical Results for Surface Water Survey and Table 3.11-2: General Water Quality Parameters for Surface Water Survey.

Proposed Project Boundary

Water Quality Station Location

*Water quality station locations obtained from Gannett Fleming

SCALE= 1 inch equals 833 feet

0 416.5 833

Feet

Figure 3.11-1
Devil's Gate Reservoir Sediment Removal and Management Project
Water Quality Sampling Locations

Version Date: 10/18/2013

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Table 3.11-1: Analytical Results for Surface Water Survey

Station ID	Station Code	Date Sampled	Detected Title 22 Metals using USEPA Method 6020/7470A Filt.(µg/L)							Detected VOCs using USEPA Method 8260B (µg/L)	Detected TPH using USEPA Method 8015B(M) / 3510C (mg/L)			Detected SVOCs using USEPA Method by 8270C / 3520C (µg/L)	Detected Perchlorate using USEPA Method by 314.0 (µg/L)
			Arsenic	Barium	Cobalt	Copper	Lead	Molybdenum	Vanadium	All Analytes	TPH-GRO (C4C12)	TPH-DRO (C10C22)	TPH-ORO (C23C40)	All Analytes	Perchlorate
Upper Devil's Gate	UDG	9/19/2011	*2.5*	*35*	<1.0	<2.0	<1.0	12.0	<2.0	ND	<50	<0.50	<0.50	ND	<4.0
Altadena West Drain	AWD	9/19/2011	*4.3*	*91*	*1.0*	*4.6*	*1.8*	*5.4*	*5.2*	ND	<50	<0.49	<0.49	ND	<4.0
Below Flint Wash	BFW	9/19/2011	*1.4*	*140*	*1.5*	<2.0	<1.0	<2.0	<2.0	ND	<50	<0.53	<0.53	ND	<4.0
Below Devil's Gate	BDG	9/20/2011	<1.0	*130*	<1.0	<2.0	<1.0	<2.0	<2.0	ND	<50	<0.50	<0.50	ND	<4.0
			USEPA MCL												
			10	2,000	NG	1,300	15	NG	NG	varies	NG	NG	NG	varies	NG
			CAL MCL												
			10	1,000	NG	1,300	15	NG	NG	varies	NG	NG	NG	varies	6

Notes:
USEPA United States Environmental Protection Agency.
CAL California MCL provided by the Department of Public Health,
VOC Volatile Organic Compound.
TPH Total Petroleum Hydrocarbon.
SVOCs Semi-Volatile Organic Compounds
Filt. Sample was field filtered for metals
GRO Gasoline range organics
DRO Diesel range organics
ORO Oil range organics
mg/L Milligrams per liter.
µg/L Micrograms per liter.
MCL Maximum Contaminant Level (US Environmental Protection Agency, 2009).
* MCL provided by California Department of Public Health, 2010
NG No MCL Guideline Available.
ND No values detected above associated laboratory reporting limit
<0.00100 & ND Denotes value is less than the laboratory reporting limit(s)
Italics Denotes detected concentrations above the laboratory reporting limits indicated
Bold Indicates concentration exceeds the MCL

Source: Gannet Fleming, 2012.

Table 3.11-2: General Water Quality Parameters for Surface Water Survey

Station ID	Station Code	Date Sampled	Temperature °F	Dissolved Oxygen mg/L	pH std units	Residual Chlorine mg/L	Ammonia-Nitrogen mg/L	Total Kjeldahl Nitrogen mg/L	Nitrite-Nitrogen mg/L	Nitrate-Nitrogen mg/L	Orthophosphate-P mg/L	Phosphorus mg/L	Turbidity NTU	Turbidity visual	Color visual	Conductivity mS/cm	Total Dissolved Solids mg/L	Total Suspended Solids mg/L
Upper Devil's Gate	UDG	9/19/2011	66.5	12.35	7.92	<0.10	<0.50	<0.50	<0.15	**0.11**	<0.16	<0.050	0	Clear	Clear	0.45	**280**	<10
Altadena West Drain	AWD	9/19/2011	67.2	3.24	7.34	<0.10	**3.80**	**5.6**	<1.5	**0.58**	**0.64**	**0.90**	2.6	Clear	Clear	1.24	**760**	<10
Below Flint Wash	BFW	9/19/2011	72.5	6.03	7.14	<0.10	**0.72**	**1.5**	<0.15	**1.10**	<0.16	**0.33**	39.8	Clear	Clear	1.56	**1,000**	**21**
Below Devil's Gate	BDG	9/20/2011	64.4	7.81	7.10	<0.10	**0.64**	**1.2**	<0.15	**0.32**	<0.16	**0.43**	41.7	Clear	Faint Yellow	1.14	**720**	**15**
LARWQCB Water Quality Objectives																		
			32-86	>5.0	6.5-8.5	<0.10	6.8-23[1]	NG	1	10	NG	NG	0-50[2]	NG	NG	NG	300[3]	NG

Notes:
NTU= Nephelometric Turbidity Units
LARWQCB= Los Angeles Regional Water Quality Control Board
NG= Not Given
°F= degrees Fahrenheit
Mg/L= Milligrams per Liter
mS/cm= Milliseimens per centimeter
std= standard

Bold= denotes detected concentrations above the laboratory reporting limits indicated

Indicates concentration exceeds the LARWQCB Water Quality Objective

[1] One-hour average concentration for total Ammonia for waters designated as Warm at 68 °F with a pH range 7-8

[2] Increases shall not exceed 20% where natural turbidity is between 0 and 50 NTU

[3] Arroyo Seco above spreading ground Los Angeles River Watershed water quality objective

Source: Gannet Fleming, 2012.

In addition, water temperature, dissolved oxygen, pH, turbidity, conductivity, and sampling time were recorded in the field using a portable meter. The collected samples were placed in ice-filled chests (<4 degrees Celsius) and delivered to the laboratory under proper chain-of-custody protocols. Position coordinates (i.e., latitude and longitude) of the sampling stations were obtained using a hand-held global positioning system (GPS).

It is important to note that due to installation of IMP measures to reduce flood risk downstream and interim sediment removal activities, stream flow was not naturally flowing through Devil's Gate Dam. The water was being stored north of the dam and then pumped approximately every 10 minutes through the dam and into the lower Arroyo Seco. These activities may have affected the water quality and water sampling results for the BDG station. Volatile organic compounds (VOCs), total petroleum hydrocarbon (TPH), perchlorate, and semi-volatile organic compounds (SVOCs) were not detected in any of the samples collected during this event (Table 3.11-1). Metals that were detected above the laboratory reporting limits did not exceed their respective EPA maximum contaminant level (MCLs) and California Department of Public Health MCLs. The analytical results from the surface water survey did not identify any chemicals of potential concern (COPCs) at concentrations that exceeded regulatory thresholds in the surface water.

The water quality measurements that did not meet the Los Angeles Regional Water Quality Control Board (LARWQCB) water quality objectives include dissolved oxygen (DO) level at AWD and total dissolved solids (TDS) measured at AWD, BFW, and BDG (Table 3.11-2). The lower DO concentrations at AWD are likely the result of high biochemical oxygen demand (BOD) waste, including sediments, nutrients, and organic matter, contained in the stormwater runoff and nuisance flow from surrounding neighborhood streets. Additionally, a higher amount of atmospheric oxygen becomes mixed in areas with turbulent and/or shallow flow, resulting in increased DO levels. Therefore, since the water at AWD is deeper and slower moving compared with the other stations, DO levels may also be lower due to the decreased surface interaction between water and air at the station. Furthermore, although the DO measured in the flow coming into the watershed at AWD was below the LARWQCB objective of 5.0 milligrams per liter (mg/L), the DO levels measured at station BDG are considered a better representation of the water quality for the project area, since it represents the combined flow of all source water flowing out of the watershed and meets the LARWQCB DO objectives for the watershed. The elevated TDS levels measured at the nuisance flows of BFW (760 mg/L) and AWD (1,000 mg/L) likely contributed to the elevated TDS measurement at BDG (720 mg/L). The preexisting elevated TDS levels detected in the surface water likely result from anthropogenic activities from the surrounding neighborhoods, such as car washing and hosing down driveways and sidewalks, denuded vegetation areas, erosion, etc. The elevated TDS will be taken into consideration in determining the impact of the sediment removal operations to water quality.

A summary of the potential sources of pollutants that could be discharged into the surface water of Devil's Gate Reservoir during sediment removal operations is provided in Table 3.11-3: Potential Sources of Pollution.

Table 3.11-3: Potential Sources of Pollution

Activity/Source	Pollutants of Concern
Chemical spills	Engine fuel, diesel, vehicle fluids, hydrocarbons, oil, and grease
Erosion	Sediment, organic matter
Stormwater/nuisance runoff	Particulate matter, associated pollutants, sediment, green waste, organic matter, fuel, oil
Litter and debris	Litter and debris
Loading/unloading areas	Oil and grease, hydrocarbons, litter, heavy metals
Construction activities and storage	Fuel, lubricants, and solvents
Adjacent properties with known hazardous releases	PCBs, VOCs, petroleum hydrocarbons, perchlorate, SVOCs, heavy metals, organochlorine pesticide
Parking lot runoff	Oil and grease, hydrocarbons, litter, heavy metals
Pet feces	Coliform bacteria
Utility line maintenance and repairs	Chloramines, chlorine, sediment, adhesive cements, primers

Groundwater

The project area overlies the Raymond Groundwater Basin (Raymond Basin), which is located within the Los Angeles-San Gabriel Hydrologic Unit, which covers most of Los Angeles County (LARWQCB 1994; DWR 2003). Raymond Basin is a 40.9-square mile basin located in the northwest part of the San Gabriel Valley extending from La Cañada Flintridge and the San Rafael Hills on the southwest to Santa Anita Canyon on the east. The basin underlies the majority of the Arroyo Seco Watershed and is bound to the north by the San Gabriel Mountains and to the south by the Raymond Fault (DWR 2003). The lithology of the Raymond Basin is comprised primarily of the water-bearing, unconsolidated, Quaternary alluvial gravel, sand, and silt material that was carried by the streams coming from the San Gabriel Mountains (DWR 2003).

Raymond Basin's average annual precipitation is approximately 21 inches (DWR 2003); and groundwater recharge is possible through the penetration of rain falling on alluvial surfaces, returns from irrigation water, and infiltration of stream flow, primarily from the San Gabriel Mountains, that is collected in Hahamongna, and also diverted to spreading grounds within the basin. The spreading grounds within the Raymond Basin, including the Hahamongna Watershed Park above Devil's Gate Dam, have an estimated maximum annual capacity of approximately 41,000 acre-feet (ac-ft), capturing an average of about 6,000 ac-ft per year over the past 45 years. The spreading grounds permit water to infiltrate and recharge Raymond Basin. Groundwater quality in Raymond Basin is generally good to fair, with average total dissolved solids content ranging from 138 to 780 mg/L. Beneficial uses of the water in Raymond Basin include industrial, domestic drinking water, and other municipal uses.

Groundwater in the vicinity of the project site is impacted with VOCs and perchlorate associated with the JPL superfund site. The VOC and perchlorate impacts to groundwater are discussed further in the Hazards Section of this report. According to available investigation and monitoring data from the adjacent JPL site, including boring logs and groundwater monitoring reports, the depth to groundwater encountered at the time monitoring wells MW-3 through MW-5 were installed (January-March 1990)

(located inside or adjacent to the northern portion of the project area), ranged from 100 feet to 130 feet bgs. This is equivalent to a depth of approximately 970 amsl at well MW-3, which is located just north of the project area. Recent piezometric water level elevations measured at MW-3 (a multi-nested well with five discrete intervals), ranged from 1,023.46 feet to 1,002.08 feet amsl.

These groundwater elevations are comparable to the water level elevations observed in three of the four soil borings advanced during this investigation (approximately 1,016.75 feet [B-3], 1,013 feet [B-4], and 1,012 feet amsl [B-9]; Figure 3.11-1: Water Quality Sampling Locations) and reported in the Geology and Soils section (Section 3.8). The difference between the first encountered water elevation in the MW-3 borehole (970 feet amsl) and the elevations measured recently from MW-3 suggest the aquifer where MW-3 is screened is likely under confined or semi-confined conditions. That is, the water elevations measured in MW-3 represent the elevation to which water will rise under its full static head. In contrast, the water encountered during the recent investigation in borings B-3, B-4, and B-9, likely represents the water table of a perched aquifer in a braided-stream deposit scenario and may not be connected with the deeper aquifer where MW-3 is installed. Although it is uncertain whether the perched water exists in all areas of the project area (without confirming with additional borings), it would be a fair assumption that the groundwater may be encountered at an interval consistent with the recent investigation (i.e., 22 feet to 25.25 feet bgs) across the project area.

Flooding

Since 1860, the Arroyo Seco has experienced damaging flood events due to unpredictable storm flows from the San Gabriel Mountains. Overflow channel flooding caused fatalities and severe structure and infrastructure damage. This led to the creation of the LACFCD. The LACDPW, on behalf of the LACFCD, implements flood control activities. Previous activities included the channelization of the Los Angeles River, the development of the Arroyo Seco stormwater drainage systems, and the construction of the Devil's Gate Dam to provide flood risk management and water recharge to the Raymond Basin aquifer.

According to the Federal Emergency Management Agency Flood Insurance Rate Map, the project site is primarily located in Flood Zone X, which is an area designated to be outside the 0.2 percent annual chance floodplain and both the 100- and 500-year flood zones (EDR 2011). A small area, located along the northern section of the site, is in Flood Zone D, an area in which flood hazards are undetermined but possible (FEMA Map Item # 06037C1375F).

3.11.3 Applicable Regulations

Federal

In 1972, the Clean Water Act (CWA) was established, providing regulations for discharging pollutants into the waters of the United States. EPA, through the CWA, has implemented pollution control programs for industry and set water quality standards for surface waters.

The National Pollutant Discharge Elimination System (NPDES) stormwater permit program, authorized by the CWA in Section 402(p), controls water pollution by regulating point sources that discharge pollutants into surface waters. NPDES permits must be obtained by industrial, municipal, and other facilities that discharge directly to surface waters. This permitting program is administered by the Regional Water Quality Control Board (RWQCB), on behalf of EPA under Order No. 01-182, NPDES No. CAS004001.

It is assumed for this project that a NPDES General Construction Permit will not be required because the Proposed Project is limited to sediment removal as it pertains to the confines of the reservoir's original design. Therefore, the Proposed Project is considered to be a construction activity, which is not covered under the General Construction Permit. The Proposed Project is considered to be "routine maintenance to maintain the original hydraulic capacity and purpose" (SWRCB 2012).

United States Army Corps of Engineers (USACE)

USACE is a federal agency responsible for planning civil engineering projects associated with dams, canals, and flood protection in the United States and is responsible for overseeing issues affecting waters of the United States. As the proposed sediment removal project is considered to be part of the routine maintenance reservoir, a Nationwide Permit (NWP) 31 for Maintenance of Existing Flood Control Facilities will be required Under Section 404 of the CWA. The need for this permit and other NWPs (e.g., NWP 3 – Maintenance) can be determined during a pre-application meeting between LACFCD and the USACE Los Angeles District office regulatory branch. The federal mandate associated with the 401 certification of the CWA is addressed and enforced by RWQCB.

State

The Porter-Cologne Water Quality Control Act (Porter-Cologne) of 1969 entitles the SWRCB and the nine associated RWQCBs ultimate authority for water quality policies and rights and enforcing water quality regulations in the state of California.

Under Section 401 of the CWA and EPA 404(b)(1) guidelines a 401 certification from RWQCB is required because the proposed scope of work can cause discharge into navigable waters. The RWQCB 401 certification will show that the possible discharge due to the project will comply with State water quality standards. In order to be in compliance with the 401 certification, the project must address watershed hydrograph modification and proposed creek- or river-related modifications.

The local regulating RWQCB that oversees the issuing of permits and enforcement for the project site is the LARWQCB. Under Section 303(d) of the CWA, the LARWQCB developed a Water Quality Control Plan (Basin Plan) to protect the quality of surface and ground waters of the region from both point and nonpoint sources of pollution. The plan establishes water quality standards and objectives that protect the beneficial uses of various waters. In order to protect these uses, the State developed Total Maximum Daily Loads (TMDLs), a calculation of the maximum amount of a pollutant that a waterbody can receive and still meet Water Quality Objectives (WQOs) established in the Basin Plan.

The CWA requires states, territories, and authorized tribes to:

- Develop water quality standards for all surface waters
- Monitor these waters
- Identify and list those waters not meeting water quality standards, called the 303(d) List of Water Quality Limited Segments

This list contains no waters of concern for this project site and portion of the Arroyo Seco; however, south of Devil's Gate Dam, two segments of the Arroyo Seco above convergence with the Los Angeles

River are on the list. The Proposed Project is not expected to affect the TMDL impairments listed (Table 3.11-4, below).

Table 3.11-4: TMDL Impairments

303(d) Listed Segments	TMDL Impairments
Arroyo Seco Reach 1 (LA River to West Holly Avenue)	Benthic-Macro Invertebrate Bio assessments, Coliform Bacteria, Trash
Arroyo Seco Reach 2 (West Holly Avenue to Devil's Gate Dam)	Coliform Bacteria, Trash

Source: SWRCB 2010

CDFW

This department maintains and protects native fish, wildlife and plant species, and natural communities for their intrinsic ecological value and their benefits to people. The Proposed Project will need to adhere to the CDFW's Section 1600 Streambed Alteration Agreement (SAA) since Proposed Project activities will alter the flow, bed, channel, or bank of the streams in the project area. Coordination with CDFW will take place during Proposed Project development regarding protected species or other natural resources and habitat that could be impacted by the sediment removal activities.

Local

LACFCD

Any restoration project that may be proposed in the future would need to be consistent with the goals and objectives of the LACFCD. In general, the LACFCD holds a 25-foot easement on both sides of the channel downstream of the dam. The LACFCD maintains the right to construct and maintain Devil's Gate Dam and its spillway, bypasses, tunnels, and other support facilities as may be necessary for the construction and maintenance of a reservoir capable of impounding the waters of the Arroyo Seco for purposes of storage and control and to control such waters as may be necessary for flood protection.

Los Angeles County

As the project site is located within Los Angeles County, it must adhere to the Los Angeles County Municipal Separate Storm Sewer System (MS4) National Pollutant Discharge Elimination System (NPDES) permit requirement for permittees to develop and incorporate programs for stormwater management. The NPDES permit is administered under the LARWQCB and is enforced by the Los Angeles County Stormwater Program, which is a part of the LACDPW Watershed Management Division. Model programs are available and can be used to provide guidance for permittees.

City Of Pasadena

The City of Pasadena's Stormwater Management and Discharge Control Code (Section 8.70 of the municipal code) provides regulations on non-stormwater discharges to the stormwater system including spillage control, disposal of materials, and pollutant reduction in urban runoff and stormwater systems.

3.11.4 Significance Criteria

- *HYDROLOGY-1: Would the project violate any water quality standards or waste discharge requirements?*
- *HYDROLOGY-2: Would the project substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?*
- *HYDROLOGY-3: Would the project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or offsite?*
- *HYDROLOGY-4: Would the project otherwise substantially degrade water quality?*
- *HYDROLOGY-5: Cumulative Impacts*

3.11.5 Methodology

The following hydrology and water quality analysis is based on review of the available technical reports, including Los Angeles County's Arroyo Seco Watershed Ecosystem Restoration Study prepared by USACE (2010), and knowledge of the proposed type, intensity, and duration of project sediment removal activities on the Proposed Project site. In addition, surface water samples were collected to investigate the current water conditions from the storm drains and the northern tributary flowing into Devil's Gate Reservoir.

3.11.6 Impacts and Mitigation

HYDROLOGY-1 *Violate any water quality standards or waste discharge requirements.*

Sediment Removal/Reservoir Management

FAST operations have routinely occurred at Devil's Gate Reservoir and result in relatively small amounts of finer grained sediment passing through the reservoir. During both sediment removal and reservoir management phases, FAST operations will occur during winter rain events, using natural flows to allow the finer grained sediment to pass through the reservoir and downstream of the dam. It is anticipated that these FAST operations will be similar to historic FAST operations and that fine sediment discharged during FAST operations will be transported to the Pacific Ocean via Arroyo Seco and the Los Angeles River, either via the discharge flow or subsequent storm flows. No significant impacts to water quality standards are expected due to FAST operations.

Sediment removal and reservoir management activities will include the use of heavy construction equipment necessary to perform the grading, excavation, transport, and disposal of the sediment. These activities could potentially have a negative impact on the water quality or waste discharge requirements, as contaminants could be released into the watershed and adversely affect water quality.

A NPDES General Construction Permit will not be required as this project will be limited to sediment removal as it pertains to the confines of the reservoir's original design; however, to avoid sediment removal activities violating water quality standards, all removal activities will be conducted in general accordance with the LARWQCB regulations and LACDPW regulations. Specific requirements that could be instituted include BMPs for sediment and erosion control and site management, including the following:

- Erosion prevention measures will be implemented to protect erosion susceptible slopes along the borders of excavation or reservoir management areas. These areas shall be covered, planted, or protected in any way that prevents erosion of susceptible soils and/or slopes.
- Production of non-stormwater runoff from project activities will be minimized during sediment removal operations.
- Production of project-related materials including waste, spills, or debris will not be released into receiving waters or drainage structures or to the streets via wind or runoff.

Project activities will occur during the dry season to the extent feasible to avoid erosion of susceptible slopes along the borders of excavation and/or reservoir management areas. The baseline water quality test performed in September of 2011 provided data on the existing water quality conditions. The baseline test results indicate that water quality within the project area is generally within accepted thresholds. Adhering to the regulatory requirements listed above would assist to prevent sediment-laden runoff from entering into the active stream channel and maintain water quality standards. Accordingly, impacts related to violations of water quality standards are less than significant.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

Adequate BMPs will be utilized; and adherence to the regulations set forth by the county, State, and federal agencies will reduce the potential for impacts to water quality to a less than significant level.

HYDROLOGY-2 *Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level.*

Sediment Removal/Reservoir Management

The Proposed Project will remove accumulated sediment deposits within the reservoir. This means the percolation characteristics of the reservoir will stay the same if not improve, and the reservoir will still permit penetration of rainfall and percolation of local runoff to replenish the groundwater basin. Additionally, sediment removal will restore Devil's Gate Reservoir to its current design standard of the ability to contain two DDEs. As such, the reservoir will have the ability to contain more of the local runoff, which in turn could result in more runoff penetrating into the ground in the project area and subsequently recharging the groundwater basin. In addition, by keeping the reservoir clear of future sediment deposits, the Proposed Project will reduce the potential for accumulated sediments to impact

the percolation rate. No significant impacts to groundwater supplies are expected from the actions of the Proposed Project.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

Proposed Project will result in less than significant impacts on groundwater recharge.

HYDROLOGY-3 *Substantially alter the existing drainage pattern of the site, which would potentially result in substantial erosion or siltation.*

Sediment Removal/Reservoir Management

Drainage patterns within the reservoir change on a regular basis depending on seasonal conditions, water flow, and sediment depositions. Sediment removal and reservoir management would result in alterations of surface drainage characteristics at the project site due to clearing, grading, and excavation activities. Although the drainage characteristics for the site will be altered, the project overall will result in a positive impact to drainage of the Devil's Gate Reservoir because it will enhance the flood control abilities of Devil's Gate Dam by increasing available flood control storage in the reservoir. Excavation, grading, and sediment placement activities will occur under LACDPW regulations, which establish protocols for proper design of slopes and temporary sediment-collecting structures. Additionally, while the Proposed Project will result in a small increase of impervious surface area, this small amount is not expected to significantly change drainage patterns; and no significant increase in the amount of surface runoff would occur. As such, impacts related to offsite erosion would be less than significant.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

Proposed Project will result in a less than significant impact on drainage patterns.

HYDROLOGY-4 *Otherwise substantially degrade water quality.*

Sediment Removal/Reservoir Management

The proposed sediment removal project will cause physical disturbance to the site. The physical disturbance to the site may cause temporary water quality impacts during the excavation process due to the likely generation of loose sediments, increased turbidity, and suspended sediments at and downstream of the work areas. It is possible that the excavated sediments could reduce dissolved oxygen concentrations and cause a temporary increase in concentrations of constituents, such as heavy metals, petroleum, and/or VOCs. These water quality impacts are expected to be minimized by implementing the NPDES permit requirements and BMPs, LARWQCB regulations, and LACDPW regulations.

Heavy equipment needed for sediment removal has the potential to cause accidental spills of fuel, and lubricating oil and contaminants could be released into the watershed and adversely affect water quality. The Proposed Project activities involving construction equipment, however, will be temporary and involve the limited transport, use, disposal, and storage of fuel and lubricating oil, which are regulated by various agencies. Adequate BMPs will be utilized; and adherence to the regulations set forth by the County, State, and federal agencies will reduce the potential for impacts to water quality to a less than significant level.

With adherence to regulations and permit requirements and implementation of project-specific BMPs, impacts related to otherwise substantially degrading water quality would be less than significant.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

Adequate BMPs will be utilized; and adherence to the regulations set forth by the county, State, and federal agencies will reduce the potential for impacts to water quality to a less than significant level.

HYDROLOGY-5 Cumulative Impacts

Only four of the cumulative projects within the immediate vicinity of the Proposed Project site (NASA Jet Propulsion Laboratory [JPL] On-Site Parking Structure project, Hahamongna Watershed Park MBMU Project, Arroyo Seco Canyon Project, and Devil's Gate Water Conservation Project) would have the potential to combine with the Proposed Project to create a cumulative hydrology impact.

With the NASA Jet Propulsion Laboratory (JPL) On-Site Parking Structure Project, short-term minor impacts to surface water would be minimized through implementation of SWPPP measures and BMPs to less than significant. No significant long-term impacts to drainage or groundwater are expected as no increase would occur in impervious surface (AEGISS, Inc. 2012).

The Hahamongna Watershed Park MBMU Project would reduce impacts to water quality due to construction to less than significant through implementation of SWPPP measures and BMPs and would increase park usage. No long-term impacts to groundwater are expected. The project will also involve improvements to the spreading grounds (City of Pasadena 2002).

The Arroyo Seco Canyon Project and the Devil's Gate Water Conservation Project are both in the conceptual design phase. It is likely that both these projects would reduce any short-term impacts to water quality due to construction to less than significant through implementation of SWPPP measures and BMPs. These projects would likely involve less than significant long-term impacts to drainage or groundwater as a result of minimal increases in impervious surface. These projects will also involve improvements to the spreading grounds and/or groundwater recharge.

No substantial changes in absorption rates, surface and groundwater quality, groundwater flow, and the quantity of groundwater are anticipated to occur as a result of implementation of the Proposed Project and other cumulative projects. The Proposed Project would improve flood control conditions in the project area, thereby improving the existing hydrologic conditions. In addition, by keeping the reservoir clear of future sediment deposits, the Proposed Project will reduce the potential for accumulated sediments to impact the

percolation rate. Related projects would be required to comply with water quality and waste discharge requirements to ensure that no impacts to groundwater or surface water quality would occur. No cumulative hydrology impacts would occur.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

No significant adverse cumulative impacts would occur.

3.12 LAND USE AND PLANNING

3.12.1 Introduction

This section addresses the land use and management activities on the land within and immediately surrounding the Proposed Project site and describes the planning laws and regulations that govern land use and development in the study area. While the City of Pasadena is the landowner of the project site, LACFCD holds an inundation easement granting the LACFCD the right to construct, reconstruct, inspect, maintain, repair, and operate the dam, spillway, reservoir, and other support structures for the purposes of flood protection. Land use within the Proposed Project site includes LACFCD operations and maintenance activities and recreation. This chapter discusses General Plan and other land use plans in effect for the project site and discusses potential conflicts with those conditions. Recreation is discussed separately in Section 3.15.

As noted in the Initial Study (Appendix A), no impacts are associated with either physically dividing an established community or conflicting with any applicable habitat conservation plan or natural community conservation plan; and therefore, they are not discussed within the EIR.

The environmental baseline condition for the sediment removal phase is considered at the time of publication of the NOP. The environmental baseline conditions for reservoir management will be conditions post sediment removal, approximately in the year 2020.

3.12.2 Existing Environmental Setting

Devil's Gate Dam and Reservoir is located in the City of Pasadena in Los Angeles County, approximately 14 miles north of downtown Los Angeles. The City of La Cañada Flintridge and the community of Altadena are located near the Proposed Project site, to the west and east, respectively.

The Proposed Project site is located within the Hahamongna Watershed Park. Hahamongna Watershed Park is approximately 300 acres of parkland and open space located at the base of Arroyo Seco Canyon, in the floodplain behind Devil's Gate Dam. Hahamongna Watershed Park also includes the Oak Grove area of Hahamongna Watershed Park, which contains picnic facilities, restrooms, an equestrian staging area, trails, a disc golf course, and a field used for various recreation activities. The current leaseholders within Hahamongna Watershed Park include the Los Angeles County Fire Department (Fire Camp 2) and the Rose Bowl Riders, who also sublet to the Tom Sawyer Camp and MACH 1. In addition, LACFCD, Southern California Edison, Southern California Gas Company, and Pasadena Water and Power hold easements within the Hahamongna Watershed Park. Other land uses adjacent to the project area include the NASA – Jet Propulsion Laboratory (JPL) to the north, La Cañada High School and Hillside School and Learning Center to the west, single-family residential uses to the south and east, and I-210 to the south.

3.12.3 Applicable Regulations

LACFCD

Through easements granted in May of 1919 and March of 1965, the City of Pasadena granted the LACFCD under a perpetual easement, the right to construct, reconstruct, inspect, maintain, repair, and operate Devil's Gate Dam, its spillway, bypasses, tunnels, and other support facilities as may be

necessary for the construction and maintenance of a reservoir capable of impounding the waters of the Arroyo Seco for purposes of storage and control, and to control such waters as may be necessary in the prevention of damage by flood (City of Pasadena 1919/1965).

City of Pasadena General Plan

The City of Pasadena is the landowner of the project site. The Proposed Project site has a General Plan Land Use designation of Open Space and is zoned as Open Space (OS). "Open Space" is defined as follows, "This category is for a variety of active and passive public recreational facilities and for City-owned open space facilities. This includes natural open spaces and areas which have been designated as environmentally and ecologically significant. This category also applies to land which is publicly owned, though in some instances public access may be restricted. Most importantly, this designation only applies to lands owned by the City."

The City of Pasadena General Plan Objectives and Policies pertaining to the Proposed Project are outlined below.

- OBJECTIVE 9 – Open Space Preservation and Acquisition: Preserve and acquire open space in Pasadena in order to enhance the quality of Pasadena life.

- Policy 9.1 – Open Space Corridors: Development of open space corridors, easement and acquisition programs, and trails shall be established where feasible.

- Policy 9.2 – Arroyo Seco: Continue and complete comprehensive planning for, and implementation of, plans for the Arroyo, including restoration of the natural area of the Lower Arroyo and the development of the Hahamongna Watershed Park Plan.

- Policy 9.4 – Adequate Open Space: Provide an adequate total quantity and equitable distribution of public or publicly accessible open spaces throughout the City.

- Policy 9.5 – Stewardship of the Natural Environment: Encourage and promote the stewardship of Pasadena's natural environment, including water conservation, clean air, natural open space protection, and recycling. Encourage the use of native, water conserving, and regionally appropriate landscaping.

The General Plan Update Open Space and Conservation Element (City of Pasadena 2012c), provides a blueprint for natural open space and conservation. Implementation Measures found in this Element pertaining to the Proposed Project are outlined below.

- Protect Existing Open Space: Continue to preserve and restore the Arroyo Seco and Eaton Canyon.

- Zoning Changes: Protect the existing natural open space within the Hahamongna Watershed Park Master Plan area.

City of Pasadena Zoning Code

The Proposed Project site is zoned as Open Space (OS). As described in Section 17.26.020(A) of the City's Zoning Code, "The OS district is applied to sites with open space, parks, and recreational facilities of a

landscaped, open character having a minimum contiguous site area of two acres. The OS zoning district is consistent with and implements the Open Space land use designation of the General Plan." Section 17.26.030 of the Code specifies that public safety facilities uses meet the intent of the OS zone and are conditionally allowed uses in the OS zone.

Hahamongna Watershed Park Master Plan

The Proposed Project site is also within the Hahamongna Watershed Park Master Plan area (HWPMP 2003). The Hahamongna Watershed Park Master Plan (HWPMP) was adopted by the City of Pasadena in 2003 and establishes a visionary framework for recreation, water resources, flood management, habitat restoration, and cultural resources in this area. Applicable Goals and Objectives of the Hahamongna Watershed Park Master Plan include the following:

Goal 2: The Devil's Gate flood control basin will be managed to provide protection to the developed and natural downstream areas.

Objectives:

- Facilitate the dam and reservoir maintenance operations in a manner that is compatible with the proposed features of the Master Plan and will result in minimal impacts to the surrounding area.
- Maintain or improve the flood capacity behind Devil's Gate Dam.
- Develop a sediment removal plan that minimizes the impact to the basin and to the surrounding neighborhoods.
- Develop a grading plan that allows habitat restoration and recreational activities to coexist with flood management and water conservation.
- Develop a multi-agency task force to review maintenance, sediment removal, dam operation, permit, and liability issues on a continual basis after this plan is adopted.

Goal 6: Provide a safe and secure park.

Objectives:

- Develop guidelines and delegate agency responsibilities for recreation, flood management, and water conservation liabilities.

3.12.4 Significance Criteria

- *LAND USE-1: Would the project conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?*
- *LAND USE-2: Cumulative Impacts*

3.12.5 Methodology

The LACFCD easement, the City of Pasadena General Plan and Zoning Ordinance, and the Hahamongna Watershed Park Master Plan were utilized to aid in the development of this analysis. Additionally, site visits were conducted; and aerial and topographic maps were examined to determine existing land uses.

3.12.6 Impacts and Mitigation

LAND USE-1 *Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect.*

Sediment Removal/Reservoir Management

As discussed earlier, the Proposed Project site is designated "Open Space" by the City of Pasadena's General Plan and zoned as open space (OS). Section 17.26.030 of the Code specifies that public safety facilities uses meet the intent of the OS zone and are conditionally allowed uses in the OS zone. The Proposed Project would not change the land use designation and zoning of Open Space and would be consistent with the LACFCD easement. Therefore, the Proposed Project would not conflict with the City's General Plan designation or zoning for the Proposed Project site.

The Open Space Element of the City of Pasadena General Plan emphasizes the enhancement of open spaces, maximization of existing open space resources, and use of privately owned open spaces to reduce demand on public resources. The Proposed Project will not change the land use designation or zoning of Open Space and would be consistent with the LACFCD easement.

As discussed in Subsection 3.12.3, Applicable Regulations, the HWPMP emphasizes protection of recreational and natural resources as well as the management of flood control for the downstream watershed. Key to determining the consistency of the project with the HWPMP is the conformance with the plans Goals and Objectives. As identified in the Applicable Regulations portion of the Existing Conditions, Goal 2 and Goal 6 are the most crucial in determining conformance. These Goals focus on the basin being "managed to provide protection to the developed and natural downstream areas and providing a safe and secure park." The Proposed Project will manage the flood control basin for protection of the downstream areas by improving and maintaining the flood capacity behind Devil's Gate Dam.

Implementation of sediment removal and reservoir management under both management options will result in only temporarily restricted access to portions of designated trails and indirect impacts to existing recreation uses associated with construction activities (see further discussion in Section 3.15 Recreation). With implementation of Mitigation Measure MM LAN-1, impacts associated with recreational activities coexisting with flood management and water conservation would be reduced to less than significant. Overall the Proposed Project will not have any significant impacts or conflict with the applicable land use plans, policies, or regulations of adopted plans.

Mitigation Measure

MM LAN-1: Temporary impacts to designated recreational facilities and trails shall be minimized through advance communication and redirection to the nearest facility in the vicinity of the Proposed Project. Prior to completion of final plans and specifications, the LACFCD shall review the plans and specifications to ensure that they contain proper language requiring that signs be posted at the nearby parking lots and trailheads at least one month in advance of sediment removal activities.

Residual Impacts After Mitigation

With the implementation of MM LAN-1, impacts associated with applicable land use plans and policies would be reduced to less than significant for sediment removal and management options.

LAND USE-2 Cumulative Impacts

For other applicable land use plans and policies, the Proposed Project, in combination with approved, proposed, and reasonably foreseeable projects, would not cumulatively contribute to cumulative impacts with the LACFCD easement, the City of Pasadena General Plan and Zoning Ordinance, and the Hahamongna Watershed Park Master Plan. No significant cumulative impacts are expected.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

No significant adverse cumulative impacts would occur.

3.13 MINERAL RESOURCES

3.13.1 Introduction

This section describes the Proposed Project's potential to affect mineral resources within the Proposed Project area. Mineral resources are commercially viable mineral or aggregate deposits, such as sand, gravel, and other construction aggregate. The California Department of Conservation, California Geological Survey (1994, 2010), the City of Pasadena General Plan, and the Arroyo Seco Master Plan EIR (2002) were reviewed for purposes of the analysis contained in this section.

The environmental baseline condition for the sediment removal phase is considered at the time of publication of the NOP. The environmental baseline conditions for reservoir management will be conditions post sediment removal, approximately in the year 2020.

3.13.2 Existing Environmental Setting

Currently no mining operations are active within the City of Pasadena (City of Pasadena 2012b). Two areas previously mined in the City of Pasadena were: Eaton Wash, mined for sand and gravel; and Devil's Gate Reservoir, mined for cement concrete aggregate. Aggregate material for Portland Cement Concrete has been historically mined from Devil's Gate Reservoir. Arroyo stone has potential to be found in Devil's Gate Reservoir (Arroyo Seco Master Plan EIR 2002); however, this EIR was prepared prior to the 2009 Station Fire. Due to the sediment accumulation occurring since the Station Fire, the likelihood of excavating arroyo stone is significantly reduced.

Currently, the majority of the material in the southern half of the reservoir consists of sediment with unfavorable characteristics such as fine gradation soil and high organic content levels. Usable aggregate material and arroyo stone suitable for sale or reuse may be found in areas of the northern half of the reservoir.

3.13.3 Applicable Regulations

Surface Mining and Reclamation Act

The California Surface Mining and Reclamation Act of 1975 (SMARA) was developed to encourage production and conservation of mineral resources, prevent or minimize adverse effects to the environment, and protect public health and safety (California Geological Survey Mineral Resources 2007). The California Division of Mines and Geology (CDMG) provides objective geologic expertise and information about California's diverse nonfuel mineral resources. Maps, reports, and other data products developed by CDMG assist government agencies, mining companies, consultants, and the public in recognizing, developing, and protecting important mineral resources. SMARA has resulted in preparation of mineral land classification maps delineating Mineral Resource Zones (MRZs). The Proposed Project site contains areas delineated within zone designated MRZ-2, which means that the area contains adequate information to indicate that significant mineral deposits are present or are judged to have a high likelihood for their presence (CDMG 1994).

The California Department of Conservation protects mineral resources to ensure adequate supplies for future production. According to the California Geological Survey, the State had approximately 700 active mines in 2010. Construction sand and gravel was California's leading industry mineral; however, this

industry has been hit hard by the downturn in the economy and construction industry (CDMG 2010). CDMG listed the Devil's Gate Reservoir Pit D & S Earth Movers as Mines and Mineral Producers Active in California between 1988 and 1989 for sand and gravel (City of Pasadena 2002). Currently, no mining operations are active within the City of Pasadena (City of Pasadena 2012b).

City of Pasadena General Plan

According to the City of Pasadena General Plan Open Space and Conservation Element (2012), one of the goals of the Conservation Element is to protect and conserve natural resources.

Arroyo Seco Master Plan EIR (2002)

The Arroyo Seco Master Plan EIR (2002) states that Portland Cement Concrete historically mined aggregate material from Devil's Gate Reservoir. In addition, it states that grading below reservoir template is likely to turn up large quantities of arroyo stone in the reservoir, and this resource would be in demand by landscaping companies. The EIR included designation of a stockpiling area in Hahamongna Watershed Park to stock and store arroyo stone and boulders to be used for future City projects. This storage area is located on the west side of the basin next to Tom Sawyer Camp and the Disc Golf Course.

3.13.4 Significance Criteria

- *MINERALS-1: Would the project result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?*
- *MINERALS-2: Would the project result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?*
- *MINERALS-3: Cumulative Impacts*

3.13.5 Methodology

The approach to the analysis of potential impacts on mineral resources was to determine the presence of known valuable mineral resources. For the purposes of the evaluation, mineral resources are considered valuable if they are identified as MRZ-2 or MRZ-3 or are otherwise protected by local regulations. New construction built directly on a valuable resource was considered a "loss of availability." Localized resources not meeting guidelines as being suitable for aggregate, but being suitable for use as road base or other fill, are not considered a loss of available mineral resources.

3.13.6 Impacts and Mitigation

MINERALS-1 *Result in the loss of availability of a known mineral resource that would be of value to the region and residents of the state.*

Sediment Removal

The Proposed Project involves the excavation and removal of large amounts of sediment throughout the Devil's Gate Reservoir. Sediment removal in the southern half of the Proposed Project site is not expected to involve usable aggregate material or arroyo stone due to unfavorable characteristics such as fine gradation soil and high organic content levels. Sediment removal in the northern half of the

Proposed Project site has the potential to expose mineral resources such as sand or gravel, as well as some arroyo stone. The majority of the sediment removal will occur in the southern half of the Proposed Project site, closest to the dam, and would excavate sediment from the dam face north to an elevation of 1,070 feet, about 4,977 feet upstream of the dam. The vast majority of this material will be removed to a sediment disposal site. The limited remainder of the sediment will be transported through the FASTing operations to the Pacific Ocean via the Arroyo Seco Channel and the Los Angeles River.

The Proposed Project site would not be available for mining operations during sediment removal activities; however, as stated above, sediment removal is not expected to involve usable aggregate material or arroyo stone due to unfavorable characteristics such as fine gradation soil and high organic content levels. Impacts involving the loss of availability of a known mineral resource that would be of value to the region and the residents of the state, or a locally important mineral resource recovery site, will be less than significant.

Reservoir Management

Sediment deposited after the sediment removal phase will be removed on an annual basis. The amount of sediment is expected to be small, typically 13,000 cy per year. The sediment excavated during reservoir management activities is not expected to involve usable aggregate material or arroyo stone due to unfavorable characteristics such as fine gradation soil and high organic content levels. Impacts involving the loss of availability of a known mineral resource that would be of value to the region and the residents of the state, or a locally important mineral resource recovery site, will be less than significant.

Mitigation Measure

No mitigation measures are necessary.

Residual Impacts After Mitigation

The Proposed Project will not result in any significant impacts to mineral resources that will be of value to the region and residents of the state.

MINERALS-2 *Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan.*

Sediment Removal/Reservoir Management

While the Arroyo Seco Master Plan EIR (2002) states that the reservoir may contain large quantities of arroyo stone, the Proposed Project site is not delineated as a locally important mineral resource recovery site on a local general plan, specific plan, or other local land use plan. The Proposed Project site will not be available for mining operations during sediment removal and reservoir management activities; however, sediment excavation is not expected to involve usable aggregate material or arroyo stone due to unfavorable characteristics such as fine gradation soil and high organic content levels. Impacts will be less than significant.

Mitigation Measure

No mitigation measures are necessary.

Residual Impacts After Mitigation

The Proposed Project will not result in any significant impacts to availability of a locally important mineral resource recovery site.

MINERALS-3 Cumulative Impacts

Impact Analysis

Most of the cumulative projects are located in areas that do not contain MRZs or Active Mines and Mineral Producers and, therefore, are not expected to impact mineral and mining resources. Other projects involve areas that have been urbanized and, therefore, would not be available for mining activities. As with the Proposed Project, the Hahamongna Watershed Park is within a designated MRZ-2 zone. Hahamongna Watershed Park Multi-Benefit/Multi-Use (MBMU) Project is not expected to involve substantial excavation activities or the export of earth materials. In addition, this project would not preclude the future extraction of mineral resources from Devil's Gate Reservoir. Therefore, cumulative impacts to mineral resources are expected to be less than significant.

Mitigation Measure

No mitigation measures are necessary.

Residual Impacts After Mitigation

Cumulative impacts related to mineral and mining resources are less than significant.

3.14 NOISE AND VIBRATION

3.14.1 Introduction

This section describes the Proposed Project's potential to have noise and vibration impacts on the area around the Proposed Project site. A Noise Impact Analysis was prepared to determine the offsite and onsite noise impacts associated with the Proposed Project (Appendix I).

As noted in the Initial Study (Appendix A), impacts associated with a permanent increase in ambient noise levels, airport land use plans, and private airstrips were found to have less than significant impacts and are not discussed within the EIR.

The environmental baseline condition for the sediment removal phase is considered at the time of publication of the NOP. The environmental baseline conditions for reservoir management will be conditions post sediment removal, approximately in the year 2020.

3.14.2 Existing Environmental Setting

Terminology

Noise is defined as unwanted sound. Sound becomes unwanted when it interferes with normal activities, when it causes actual physical harm, or when it has adverse effects on health. Sound is produced by the vibration of sound pressure waves in the air. Sound pressure levels are used to measure the intensity of sound and are described in terms of decibels. The decibel (dB) is a logarithmic unit which expresses the ratio of the sound pressure level being measured to a standard reference level. A-weighted decibels (dBA) approximate the subjective response of the human ear to a broad frequency noise source by discriminating against very low and very high frequencies of the audible spectrum. They are adjusted to reflect only those frequencies which are audible to the human ear.

Noise Equivalent sound levels are not measured directly but are calculated from sound pressure levels typically measured in dBA. The equivalent sound level (Leq) represents a steady state sound level containing the same total energy as a time-varying signal over a given sample period. The peak traffic hour Leq is the noise metric used by California Department of Transportation (Caltrans) for all traffic noise impact analyses.

The Day-Night Average Level (Ldn) is the weighted average of the intensity of a sound, with corrections for time of day, and averaged over 24 hours. The time of day corrections require the addition of 10 decibels to sound levels at night between 10:00 p.m. and 7:00 a.m. The Community Noise Equivalent Level (CNEL) is similar to the Ldn except that it has another addition of 4.77 decibels to sound levels during the evening hours between 7:00 p.m. and 10:00 p.m. These additions are made to the sound levels at these time periods because during the evening and nighttime hours, when compared to daytime hours, ambient noise levels are decreased, which creates an increased sensitivity to sounds. For this reason the sound appears louder in the evening and nighttime hours and is weighted accordingly. The City of Pasadena and County of Los Angeles rely on the CNEL noise standard to assess transportation-related impacts on noise sensitive land uses.

Ground-borne vibrations consist of rapidly fluctuating motions within the ground that have an average motion of zero. The effects of ground-borne vibrations typically only cause a nuisance to people, but at

extreme vibration levels damage to buildings may occur. Although ground-borne vibration can be felt outdoors, it is typically only an annoyance to people indoors where the associated effects of the shaking of a building can be notable. Ground-borne noise is an effect of ground-borne vibration and exists only indoors, since it is produced from noise radiated from the motion of the walls and floors of a room and may also consist of the rattling of windows or dishes on shelves.

Existing Noise Conditions

To determine the existing noise level environment, noise measurements have been taken in the vicinity of the Proposed Project site. The field survey noted that noise within the Proposed Project area is generally characterized by vehicular traffic on the nearby roadways.

The results of the short-term peak hour noise level measurements are presented in Table 3.14-1: Existing (Ambient) Noise Level Measurements. The existing noise level measurements ranged from 50.4 to 66.7 dBA Leq, with the highest noise measurement occurring at the La Cañada Flintridge United Methodist Church.

Table 3.14-1: Existing (Ambient) Noise Level Measurements

Site No.	Description	Time of Measurement	Primary Noise Source	Noise Level (dBA Leq/Lmax)
1	Located at La Cañada United Methodist Church at 104 Berkshire Place, in church parking lot and 25 feet from edge of Oak Grove Drive.	2:22 p.m. to 2:37 p.m.	Traffic on Oak Grove Drive and cars in parking lot.	66.7/81.0
2	Located near a park bench across the street from La Cañada High School at 4463 Oak Grove Drive and approximately 100 feet north of the pool.	2:48 p.m. to 3:03 p.m.	Traffic on Oak Grove Drive, kids talking, and cars in parking lot.	57.9/68.8
3	Located at the front yard of the home at 2301 Vista Laguna Terrace, Pasadena, and approximately 150 feet north of La Cañada Verdugo Road.	3:54 p.m. to 4:09 p.m.	Dogs barking, traffic on residential streets.	57.6/68.5
4	Located on the edge of the road in front of the home at 1021 W. Shelly Street, Altadena.	4:22 p.m. to 4:37 p.m.	Kids playing, dogs barking, delivery truck and cars.	58.4/79.7
5	Located at the Rose Bowl Riders at 4750 Oak Grove Drive, Pasadena, at the back of youth camp and adjacent to equestrian property on a dirt road.	4:53 p.m. to 5:08 p.m.	Equestrians talking and horses.	50.4/57.2
6	Located at the western end of the southern parking lot for John Muir High School at 1905 Lincoln Avenue, Pasadena.	5:21 p.m. to 5:36 p.m.	Traffic on I-210 and Lincoln Avenue.	59.9/65.3
7	Located at the middle of the western parking lot for Irwindale Public Library at 5050 Irwindale Avenue, Irwindale.	12:08 p.m. to 12:23 p.m.	Cars and people in parking lot.	52.2/63.7

Source: Chambers Group, Inc., noise measurements taken on June 3, 2011.

The noise contours of the nearby existing roadway have been calculated in order to provide the existing traffic noise levels. The distances to the 55, 60, 65, and 70 dBA CNEL noise contours were calculated, plus the noise level at the nearest sensitive receptor to the roadway. Table 3.14-2: Existing Roadway Noise Contours shows the existing traffic noise contours. As shown below, several roadway segments currently exceed the County's 60 dBA CNEL residential exterior noise standard.

Table 3.14-2: Existing Roadway Noise Contours

Roadway	Segment	CNEL at Nearest Receptor (dBA)[1]	Distance to Contour (feet)			
			70 dBA CNEL	65 dBA CNEL	60 dBA CNEL	55 dBA CNEL
Devil's Gate Dam and Reservoir						
Berkshire Place	East of I-210northbound ramps	60	RW	RW	60	130
Oak Grove Drive	South of Berkshire Place	58	RW	RW	59	128
Oak Grove Drive	East of Foothill Freeway Overpass	60	RW	RW	79	170
Windsor Avenue	North of I-210northbound ramps	65	RW	70	150	323
Manning Pit						
Vincent Avenue	South of Gladstone Street	65	RW	55	119	257
Vincent Avenue	South of Arrow Highway	67	RW	65	140	301
Arrow Highway	East of Vincent Avenue	69	54	115	249	535
Arrow Highway	East of Lark Ellen Avenue	69	54	117	251	542
Arrow Highway	East of Enid Avenue	69	55	119	256	552
Azusa Avenue	North of Arrow Highway	69	RW	107	230	497
Azusa Avenue	North of Gladstone Street	66	RW	73	157	338
Scholl Canyon Landfill						
Scholl Canyon Road	North of SR-134 Westbound Ramps	54	RW	RW	RW	38
Figueroa Street	South of Eagle Vista Drive	63	RW	RW	92	198
Sheldon Pit, Sun Valley Fill Site, Bradley Pit, and Boulevard Pit						
Foothill Boulevard	South of I-210 Westbound Ramps	62	RW	71	154	332
Osborne Street	West of Foothill Boulevard	65	RW	64	137	295
Glenoaks Boulevard	South of Osborne Street	69	51	111	239	515
Glenoaks Boulevard	South of Penrose Street	68	RW	83	178	385
Glenoaks Boulevard	South of Sunland Boulevard	68	42	91	196	421
Foothill Boulevard	East of Wheatland Avenue	64	RW	55	118	254
Wentworth Street	South of Foothill Boulevard	65	RW	61	131	283
Osborne Street	East of I-5 northbound ramps	65	RW	81	174	375
Laurel Canyon Boulevard	South of Osborne Street	65	RW	60	129	277
Branford Street	East of Laurel Canyon Boulevard	64	RW	RW	94	202

Table 3.14-2: Existing Roadway Noise Contours

Roadway	Segment	CNEL at Nearest Receptor (dBA)[1]	Distance to Contour (feet)			
			70 dBA CNEL	65 dBA CNEL	60 dBA CNEL	55 dBA CNEL
Branford Street	West of Laurel Canyon Boulevard	63	RW	RW	97	208
San Fernando Road	South of Branford Street	56	RW	51	109	235

Notes:
[1]Distances to nearest sensitive receptor shown in Appendix I Table E. The noise contours do not take into account existing noise barriers.
The haul routes to Waste Management Facility and Vulcan Materials Reliance Facility will not travel by any sensitive receptors.
RW = Noise contour is located within right-of-way of roadway.
Source: FHWA Traffic Noise Prediction Model- FHWA-RD-77-108.

3.14.3 Applicable Regulations

Federal Regulations

The adverse impact of noise was officially recognized by the federal government in the Noise Control Act of 1972, which serves three purposes:

- Promulgating noise emission standards for interstate commerce
- Assisting state and local abatement efforts
- Promoting noise education and research

The Federal Office of Noise Abatement and Control (ONAC) was initially tasked with implementing the Noise Control Act; however, ONAC has since been eliminated, leaving the development of federal noise policies and programs to other federal agencies and interagency committees. For example, the Occupational Safety and Health Administration (OSHA) agency prohibits exposure of workers to excessive sound levels. The Department of Transportation (DOT) assumed a significant role in noise control through its various operating agencies. The Federal Aviation Administration (FAA) regulates noise of aircraft and airports. Surface transportation system noise is regulated by a host of agencies, including the Federal Transit Administration (FTA). Transit noise is regulated by the federal Urban Mass Transit Administration (UMTA), while freeways that are part of the interstate highway system are regulated by the Federal Highway Administration (FHWA). Finally, the federal government actively advocates that local jurisdictions use their land use regulatory authority to arrange new development in such a way that "noise sensitive" uses are either prohibited from being sited adjacent to a highway or, alternately, that the developments are planned and constructed in such a manner that potential noise impacts are minimized.

Although the proposed project is not under the jurisdiction of FTA, FTA is the only agency that has defined what constitutes a significant noise impact from implementing a project. FTA standards are based on extensive studies by FTA and other governmental agencies on the human effects and reaction to noise. A summary of the FTA findings is provided below in Table 3.14-3: FTA Project Effects on Cumulative Noise Exposure.

Since the federal government has preempted the setting of standards for noise levels that can be emitted by the transportation sources, local jurisdictions are restricted to regulating the noise generated by the transportation system through nuisance abatement ordinances and land use planning.

Table 3.14-3: FTA Project Effects on Cumulative Noise Exposure

Existing Noise Exposure (dBA Leq or Ldn)	Allowable Noise Impact Exposure dBA Leq or Ldn		
	Project Only	Combined	Noise Exposure Increase
45	51	52	+7
50	53	55	+5
55	55	58	+3
60	57	62	+2
65	60	66	+1
70	64	71	+1
75	65	75	0

Source: Federal Transit Administration, 2006.

State Regulations

Noise Standards

California Department of Health Services Office of Noise Control

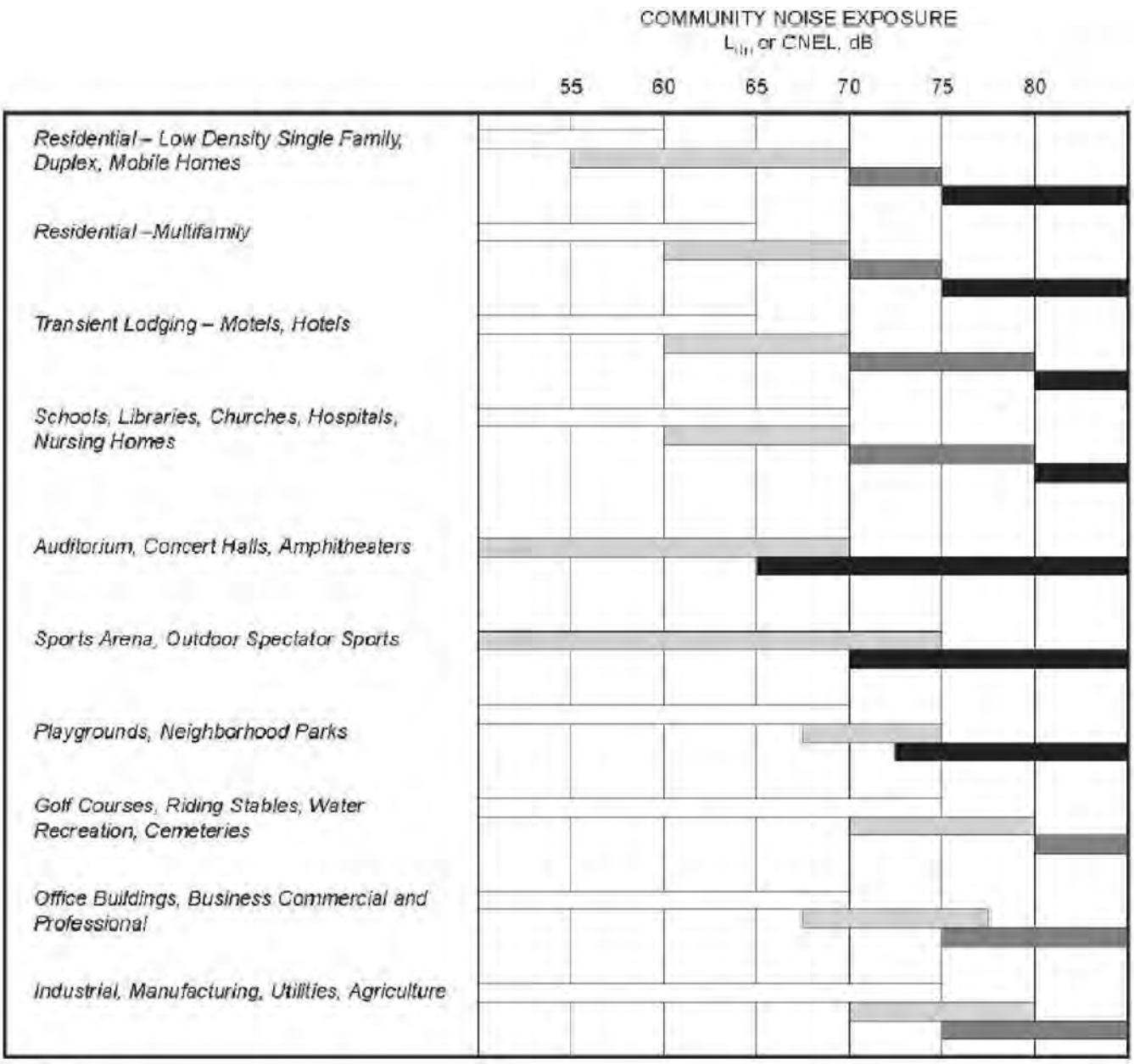
Established in 1973, the California Department of Health Services Office of Noise Control (ONC) was instrumental in developing regularity tools to control and abate noise for use by local agencies. One significant model is the "Land Use Compatibility for Community Noise Environments Matrix," which allows the local jurisdiction to clearly delineate compatibility of sensitive uses with various incremental levels of noise and which is shown in Figure 3.14-1: Land Use Compatibility Matrix.

California Noise Insulation Standards

Title 24, Chapter 1, Article 4 of the California Administrative Code (California Noise Insulation Standards) requires noise insulation in new hotels, motels, apartment houses, and dwellings (other than single-family detached housing) that provides an annual average noise level of no more than 45 dBA CNEL. When such structures are located within a 60-dBA CNEL (or greater) noise contour, an acoustical analysis is required to ensure that interior levels do not exceed the 45-dBA CNEL annual threshold. In addition, Title 21, Chapter 6, Article 1 of the California Administrative Code requires that all habitable rooms, hospitals, convalescent homes, and places of worship shall have an interior CNEL of 45 dB or less due to aircraft noise.

Government Code Section 65302

Government Code Section 65302 mandates that the legislative body of each county and city in California adopt a noise element as part of its comprehensive general plan. The local noise element must recognize the land use compatibility guidelines published by the State Department of Health Services. The guidelines rank noise land use compatibility in terms of normally acceptable, conditionally acceptable, normally unacceptable, and clearly unacceptable.



LEGEND:

NORMALLY ACCEPTABLE
Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction without any special noise insulation requirements.

CONDITIONALLY ACCEPTABLE
New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made. Conventional construction, but with closed windows and fresh air supply systems or air conditioning, will normally suffice.

NORMALLY UNACCEPTABLE
New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and neede noise insulation features included in the design.

CLEARLY UNACCEPTABLE
New construction or development should generally not be undertaken.

Source: California Department of Health. *Guidelines for the Preparation and Content of Noise Elements of the General Plan*. November, 1990

Figure 3.14-1
Devil's Gate Reservoir Sediment Removal and Management Project
Land Use Compatibility Matrix

Version Date: 9/9/2013

CHAMBERS GROUP

Local Regulations

The Proposed Project site is under a LACFCD easement and is located in the City of Pasadena. The community of Altadena, which is an unincorporated area of Los Angeles County, is located adjacent to the east side of the project site, and the City of La Cañada Flintridge is located on the west side of the project site. The applicable policies related to noise and vibration from the above jurisdictions' General Plans and Municipal Codes are provided below.

County of Los Angeles General Plan Noise and Vibration Policies

N 1.1 Employ effective noise abatement to achieve acceptable levels of noise as defined by the Los Angeles County Exterior Noise Standards.

N1.2 Ensure the compatibility of land uses throughout the County to minimize excessive noise levels.

N 2.3 Mitigate exterior and interior noises to the levels listed in Table 3.14-4: Los Angeles County Exterior Noise Standards, below, to the extent feasible, for stationary sources:

Table 3.14-4: Los Angeles County Exterior Noise Standards

Noise Zone Level	Designated Noise Zone Land Use (Receptor Property)	Time Interval	Exterior Noise (dB)
I	Noise-sensitive area, designated to ensure exceptional quiet	Anytime	45
II	Residential properties, zoned as such in the County Code Title 22	10:00 p.m. to 7:00 a.m. (nighttime) 7:00 a.m. to 10:00 p.m. (daytime)	45 50
III	Commercial properties, zoned as such in the County Code Title 22	10:00 p.m. to 7:00 a.m. (nighttime) 7:00 a.m. to 10:00 p.m. (daytime)	55 60
IV	Industrial properties, zoned as such in the County Code Title 22	Anytime	70

Source: Los Angeles County General Plan, 2007.

County of Los Angeles Municipal Code

The County of Los Angeles Municipal Code establishes the following applicable standards related to noise.

12.08.570 Activities Exempt From Noise Restrictions

H. Public Health and Safety Activities. All transportation, flood control, and utility company maintenance and construction operations at any time on public right-of-way, and those situations which may occur on private real property deemed necessary to serve the best interest of the public and to protect the public's health and well-being, including but not limited to street sweeping, debris and limb removal, removal of downed wires, restoring electrical service, repairing traffic signals, unplugging sewers, snow removal, house moving, vacuuming catch

basins, removal of damaged poles and vehicles, repair of water hydrants and mains, gas lines, oil lines, sewers, etc.

City of La Cañada Flintridge General Plan Noise and Vibration Policies

NE 1.1.5 Require developers to implement noise abatement that meets Caltrans' acoustical criteria or other standards established by the City if new developments cause increases in traffic volumes that result in roadway noise levels greater than 65 dB CNEL at sensitive receptors.

NE 2.2.2 Require new development to minimize noise impacts on adjacent uses through site and building design, setbacks, berms, landscaping, and/or other noise abatement techniques.

City of La Cañada Flintridge Municipal Code

The City of La Cañada Flintridge Municipal Code establishes the following applicable standards related to noise.

5.36.010 Construction noise prohibited when.

Except as otherwise provided in this chapter, a person may perform any construction or repair work of any kind upon any building or structure, or perform any earth excavating, filling or moving, where any of the foregoing entails the use of any air compressors; jack-hammers; power-driven drill, riveting machine; excavator, diesel-powered truck, tractor or other earth moving equipment; hand hammers on steel or iron; or any other machine, tool, device or equipment which makes loud noises exceeding a decibel level of sixty-five (65) dBA as measured from any adjacent residential property line during the following hours:

	During Standard Time:	**During Daylight Savings Time:**
Monday – Friday	7:00 a.m. to 6:00 p.m.	7:00 a.m. to 7:00 p.m.
Saturday	9:00 a.m. to 5:00 p.m.	9:00 a.m. to 5:00 p.m.
Sunday	None	None
Holiday	None	None

City of Pasadena General Plan Noise and Vibration Policies

7b The City will encourage limitations on construction activities adjacent to sensitive noise receptors as defined in Figure 3.14-1 (of General Plan).

7c The City will encourage construction and landscaping activities that employ techniques to minimize noise.

7d The City will enforce noise level restrictions contained in the City of Pasadena Noise Regulations (Chapter 9.36 of the Municipal Code), except during federal, State, or local emergencies (such as power generators required for emergencies).

City of Pasadena Municipal Code

The City of Pasadena Municipal Code establishes the following applicable standards related to noise.

9.36.070 Construction projects

A. No person shall operate any pile driver, power shovel, pneumatic hammer, derrick power hoist, forklift, cement mixer, or any other similar construction equipment within a residential district or within a radius of 500 feet there from at any time other than as listed below:

1. From 7:00 a.m. to 7:00 p.m. Monday through Friday;
2. From 8:00 a.m. to 5:00 p.m. on Saturday;
3. Operation of any of the listed construction is prohibited on Sundays and holidays.

B. No person shall perform any construction or repair work on buildings, structures, or projects within a residential district or within a radius of 500 feet there from in such a manner that a reasonable person of normal sensitiveness residing in the area is caused discomfort or annoyance at any time other than as listed below:

1. From 7:00 a.m. to 7:00 p.m. Monday through Friday;
2. From 8:00 a.m. to 5:00 p.m. on Saturday;
3. Performance of construction or repair work is prohibited on Sundays and holidays.

9.36.080 Construction equipment

It is unlawful for any person to operate any powered construction equipment if the operation of such equipment emits noise at a level in excess of 85 dBA when measured within a radius of 100 feet from such equipment.

9.36.170 Exemptions

A. This chapter is not intended to regulate construction or maintenance and repair activities conducted by public agencies or their contractors necessitated by emergency conditions or deemed necessary by the city to serve the best interests of the public and to protect the public health, safety and welfare. These operations may include, but are not limited to, street sweeping, debris and limb removal, removal of downed wires, restoring electrical service, repairing traffic lights, unplugging sewers, vacuuming catch basins, repairing water hydrants and mains, gas lines, oil lines, storm drains, roads, sidewalks, etc.

3.14.4 Significance Criteria

- *NOISE-1: Would the project result in exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?*

- *NOISE-2: Would the project result in exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?*

- *NOISE-3: Would the project result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?*
- *NOISE-4: Cumulative Impacts*

3.14.5 Methodology

Existing Noise Conditions

To determine the existing noise level environment, noise measurements have been taken in the vicinity of the Proposed Project site. The field survey noted that noise within the Proposed Project area is generally characterized by vehicular traffic on the nearby roadways. The measurement procedures, measurement locations, noise measurement results, and the modeling of the existing noise environment are described in detail in Appendix I.

Modeled Existing Noise Levels

The noise contours of the nearby existing roadway have been calculated in order to provide the existing traffic noise levels. The distances to the 55, 60, 65, and 70 dBA CNEL noise contours were calculated, plus the noise level at the nearest sensitive receptor to the roadway, which was determined from aerial photos of the study area. FHWA Model printouts are provided in Appendix I.

Onsite Construction Equipment Noise

The noise impacts from construction of the Proposed Project have been analyzed through use of the FHWA's Roadway Construction Noise Model (RCNM). The FHWA compiled noise measurement data regarding the noise generating characteristics of several different types of construction equipment. From this acquired data the FHWA developed the RCNM, which may be used for the prediction of construction noise.

Construction noise impacts to the nearby sensitive receptors have been calculated according to the FHWA-compiled equipment noise levels and usage factors and through use of the RCNM and the Proposed Project equipment list. For the analysis, equipment usage was placed at the nearest locations to the nearby sensitive receptors, and pieces of equipment were placed 100 feet apart.

Offsite Vehicular Noise

The Proposed Project would require export of material from the Proposed Project site through the use of trucks as well as vehicle trips from workers to the Proposed Project site. In order to quantify the potential noise impacts created and received by the Proposed Project and compare them to the existing noise levels, the existing roadway noise environment was modeled using the FHWA Traffic Noise Prediction Model - FHWA-RD-77-108 (FHWA Model). The FHWA Model arrives at a predicted noise level through a series of adjustments to the Reference Energy Mean Emission Level (REMEL). Adjustments are then made to the reference energy mean emission level to account for the roadway active width (i.e., the distance between the center of the outermost travel lanes on each side of the roadway); the total average daily traffic (ADT) and the percentage of ADT which flows during the day, evening, and night; the travel speed; the vehicle mix on the roadway, which is a percentage of the volume of automobiles, medium trucks, and heavy trucks; the roadway grade; the angle of view of the observer exposed to the

roadway; and site conditions ("hard" or "soft" relates to the absorption of the ground, pavement, or landscaping). The following section provides a discussion of the software and modeling input parameters used in this analysis and a discussion of the resultant existing noise model. The roadway parameters and ADT volumes used for this study are presented in Appendix I. Only the roadway segments that had sensitive land uses (i.e., residential, school, parks, libraries, and hospitals) and to which the Proposed Project may generate additional vehicular trips were analyzed.

Vibration

Construction activity can result in varying degrees of ground vibration, depending on the equipment used on the site. Operation of construction equipment causes ground vibrations that spread through the ground and diminish in strength with distance. Buildings in the vicinity of a construction site respond to these vibrations with varying results ranging from no perceptible effects at the low levels to slight damage at the highest levels. The approximate vibration levels for particular construction activities found in Appendix I have been used to calculate the potential vibration impacts for the Proposed Project.

3.14.6 Impacts and Mitigation

NOISE-1 *Result in exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.*

Sediment Removal/Reservoir Management

Onsite Construction Equipment Noise

Construction equipment onsite during removal of sediment activities would require the simultaneous operation of four front-end loaders, two bulldozers, one excavator, one water truck, one sorter/crusher, and two tender trucks (for fuel and maintenance). The sediment maintenance activities would require the simultaneous operation of two front-end loaders, one bulldozer, one excavator, one water truck, one sorter/crusher, and two tender trucks (for fuel and maintenance). Since the removal of sediment activities would require a greater amount of equipment, these noise calculations for onsite construction equipment have been based on the equipment list for sediment removal activities.

Noise impacts from onsite construction equipment activities associated with the Proposed Project would be a function of the noise generated by construction equipment, equipment location, sensitivity of nearby land uses, and the timing and duration of the construction activities. Construction noise impacts to the nearby sensitive receptors are shown below in Table 3.14-5: Noise Levels of Onsite Construction Equipment at Nearby Sensitive Receptors.

Table 3.14-5: Noise Levels of Onsite Construction Equipment at Nearby Sensitive Receptors

Receptor Description	Receptor Jurisdiction	Distance to Receptor (feet)	Construction Noise Levels[1]	
			dBA Leq	dBA L_{max}
Single-Family Home	Pasadena	140	71	73
Single-Family Home	Los Angeles County	180	69	71
JPL Office	La Cañada Flintridge	200	68	70
Hahamongna Watershed Park	Pasadena	20	86	90
La Cañada High School	La Cañada Flintridge	430	63	63
La Cañada Methodist Church	La Cañada Flintridge	500	62	62

Notes:
[1] Lmax is based on the maximum noise from the loudest piece of equipment and the Leq is the average noise from all equipment.
Source: RCNM, Federal Highway Administration, 2006

Table 3.14-5, above, shows that construction noise impacts would range from 62 dBA Leq to 86 dBA Leq at the nearby receptors, with the highest noise levels occurring at the portion of Hahamongna Watershed Park adjacent to the west side of the reservoir.

The City of Pasadena and County of Los Angeles exempt public agencies from the Municipal Code noise requirements. The City of La Cañada Flintridge does not provide maximum noise thresholds of construction noise that occurs during the allowed times between Monday through Friday, 7:00 a.m. to 6:00 p.m. Standard Time, and 7:00 a.m. to 7:00 p.m. Daylight Savings Time and on Saturday between 7:00 a.m. and 5:00 p.m. Therefore, the Proposed Project will comply with all local ordinances that apply to sediment removal and reservoir management activities taking place during the allowed hours.

Offsite Vehicular Noise

The sediment removal and reservoir management activities for the Proposed Project would generate up to 425 daily round trips and 200 daily round trips, respectively, from haul trucks. Since activities for removal of sediment would involve a greater number of trips, these offsite vehicular noise calculations have been based on the sediment removal activities.

The haul trucks would export the material from the project site to one of the following sites: Manning Pit, Waste Management Facility, Vulcan Materials Reliance Facility, Scholl Canyon Landfill, Bradley Landfill, Boulevard Pit, Sun Valley Fill Site, or Sheldon Pit.

The California Department of Health has developed the noise compatibility matrix, shown above in Figure 3.14-1: Land Use Compatibility Matrix, that has been adopted by most of the jurisdictions that may be impacted by the Proposed Project's vehicular noise and details normally acceptable noise levels for different land uses that include 60 dB CNEL for single-family homes and 70 dB CNEL for schools, libraries, churches, and parks. Neither the California Department of Health nor any of the local jurisdictions provide any direction for sensitive receptors that already exceed the normally acceptable noise levels for the Without Project condition; however, the Federal Transit Administration (2006), which assesses noise and vibration impacts from transit projects, found that when the ambient noise is between 60 and 64, a noise exposure increase of 2 dB is allowed before a significant impact would occur; when the ambient noise is between 65 and 74 dB Ldn, a noise exposure increase of 1 dB is

allowed before a significant impact would occur; and when the ambient noise exceeds 74 dB Ldn, any increase in noise exposure would create a significant impact.

The potential offsite traffic noise impacts created by the offsite vehicle trips generated from the Proposed Project have been analyzed through utilization of the FHWA Model and parameters described above. The FHWA model calculation printouts are provided in Appendix I. A comparison of the existing conditions to the estimated with-project conditions is provided in Table 3.14-6: Project Traffic Noise Contributions Near Devil's Gate Dam for access to and from the Proposed Project site from I-210.

Table 3.14-6: Project Traffic Noise Contributions Near Devil's Gate Dam

Roadway	Segment	dBA CNEL at Nearest Receptor[1]			Threshold
		Existing	Existing Plus Route 1A	Project Contribution	
I-210 to Devil's Gate Ingress					
Berkshire Place	East of I-210northbound ramps[2]	59	60	1	70 dB
Oak Grove Drive	South of Berkshire Place[3]	59	59	1	70 dB
Oak Grove Drive	East of Foothill FreewayOverpass[4]	60	60	0	60 dB
Windsor Avenue	North of I-210northbound ramps[4]	66	66	0	> +1 dB
Devil's Gate Egress to I-210					
Berkshire Place	East of I-210 northbound ramps[2]	59	60	1	70 dB
Oak Grove Drive	South of Berkshire Place[3]	59	59	0	70 dB
Oak Grove Drive	East of Foothill FreewayOverpass[4]	60	60	0	60 dB
Windsor Avenue	North of I-210northbound ramps[4]	66	66	0	> +1 dB

Notes:
[1] Distance to nearest receptor, does not take into account existing noise barriers.
[2] Nearest sensitive receptor is La Cañada High School.
[3] Nearest sensitive receptor is La Cañada United Methodist Church.
[4] Nearest sensitive receptor is residential.
Source: FHWA Traffic Noise Prediction Model- FHWA-RD-77-108.

Table 3.14-6 shows that at most, the project's contributions to traffic noise for access to and from the Proposed Project site from I-210 would increase the roadway noise by up to 1 dB. The Proposed Project would not cause the noise level at any nearby land use to exceed the normally compatible noise standard that is not already exceeded under existing conditions. For the roadway segment of Windsor Avenue north of I-210 northbound ramps that already exceeds the normally compatible residential noise standard, the noise level increase from the Proposed Project will be less than a 1-dB increase. In order to be considered significant, the noise level increase would need to be greater than a 1-dB increase. Therefore, roadway noise impacts would be less than significant for access to and from the Proposed Project site from I-210.

A comparison of the existing conditions to the estimated with-project conditions is provided in Table 3.14-7: Project Traffic Noise Contributions to/from Manning Pit SPS for access to and from Manning Pit SPS.

Table 3.14-7: Project Traffic Noise Contributions to/from Manning Pit SPS

Roadway	Segment	dBA CNEL at Nearest Receptor[1]			Threshold
		Existing	Existing Plus Route 2A	Project Contribution	
I-210 Manning Pit SPS					
Vincent Avenue	South of Gladstone Street[3]	65	66	1	> +1 dB
Vincent Avenue	South of Arrow Highway[3]	67	67	0	> +1 dB
Arrow Highway	East of Vincent Avenue[3]	69	70	1	> +1 dB
Arrow Highway	East of Lark Ellen Avenue[3]	69	70	1	> +1 dB
Arrow Highway	East of Enid Avenue[2]	70	70	0	70 dB
Azusa Avenue	North of Arrow Highway[3]	69	69	0	> +1 dB
Azusa Avenue	North of Gladstone Street[3]	66	66	0	> +1 dB

Notes:
[1] Distance to nearest residential or school use, does not take into account existing noise barriers.
[2] Nearest sensitive receptor is Gladstone High School.
[3] Nearest sensitive receptor is residential.
The haul routes to Waste Management Facility and Vulcan Materials Reliance Facility will not travel by any sensitive receptors and therefore have not been analyzed.
Source: FHWA Traffic Noise Prediction Model- FHWA-RD-77-108.

Table 3.14-7 shows that at most, the project's contributions to traffic noise associated with travel to and from Manning Pit SPS would increase the roadway noise by up to 1 dB. The Proposed Project would not cause the noise level at any nearby land use to exceed the normally compatible noise standard that did not already exceed the standards for existing conditions. The roadway segments of Vincent Avenue south of Gladstone Street, Vincent Avenue south of Arrow Highway, Arrow Highway east of Vincent Avenue, Arrow Highway east of Lark Ellen Avenue, Azusa Avenue north of Arrow Highway, and Azusa Avenue north of Gladstone Street all currently exceed the normally compatible residential noise standard with noise levels that range between 65 and 69 dB CNEL. The noise level increase from the Proposed Project is within the greater than plus 1 dB noise exposure increase allowed before it is considered significant for these roadway segments. Roadway noise impacts would be less than significant for travel to and from Manning Pit SPS. Travel from I-210 to the Waste Management Facility via Irwindale Avenue and Gladstone Street and Vulcan Materials Reliance Facility via Irwindale Avenue would not pass by any noise sensitive land use and noise impacts will be less than significant.

A comparison of the existing conditions to the estimated with-project conditions is provided in Table 3.14-8, below, for access to and from the Scholl Canyon Landfill.

Table 3.14-8: Project Traffic Noise Contributions to/from Scholl Canyon Landfill

Roadway	Segment	dBA CNEL at Nearest Receptor[1]			Threshold
		Existing	Existing Plus Route 4A	Project Contribution	
Scholl Canyon Road	North of SR-134 Westbound Ramps[2]	54	60	6	60 dB
Figueroa Street	South of Eagle Vista Drive[3]	63	64	1	70 dB

Notes:
[1] Distance to nearest receptor, does not take into account existing noise barriers.
[2] Nearest sensitive receptor is residential.
[3] Nearest sensitive receptor is Eagle Rock Recreation Center.
Source: FHWA Traffic Noise Prediction Model- FHWA-RD-77-108.

Table 3.14-8 shows that at most, the project traffic noise contributions to and from Scholl Canyon Landfill would increase the roadway noise by up to 6 dB. The Proposed Project would not cause the noise level at any nearby land use to exceed the normally compatible noise standard for the with-project condition that did not already exceed the standards for the without-project condition. Roadway noise impacts would be less than significant for access to and from Scholl Canyon Landfill.

A comparison of the existing conditions to the estimated with-project conditions is provided in Table 3.14-9, below, for access to and from Sheldon Pit, Sun Valley Fill Site, and Bradley Landfill.

Table 3.14-9: Project Traffic Noise Contributions to/from Sheldon Pit, Sun Valley Fill Site, and Bradley Landfill

Roadway	Segment	dBA CNEL at Nearest Receptor[1]			Threshold
		Existing	Existing Plus Route 5A	Project Contribution	
Foothill Boulevard	South of I-210 Westbound Ramps[2]	62	63	1	> +2 dB
Osborne Street	West of Foothill Boulevard[3]	65	66	1	70 dB
Glenoaks Boulevard	South of Osborne Street[2]	69	69	0	> +1 dB

Notes:
[1] Distance to nearest receptor, does not take into account existing noise barriers.
[2] Nearest sensitive receptor is residential.
[3] Nearest sensitive receptor is Pacoima Youth Athletic Foundation (park use).
Source: FHWA Traffic Noise Prediction Model- FHWA-RD-77-108.

Table 3.14-9 shows that at most, the project's contributions to traffic noise from travel to and from Sheldon Pit, Sun Valley Fill Site, and Bradley Landfill would increase the roadway noise by up to 1 dB. The Proposed Project would not cause the noise level at any nearby land use to exceed the normally compatible noise standard that did not already exceed the standards for existing conditions. The roadway segment of Foothill Boulevard south of the I-210 westbound ramps currently exceeds the normally compatible residential noise standard with an existing noise level of 62 dBA CNEL, which allows for a project increase of greater than 2 dB before it is considered significant. The roadway segment of Glenoaks Boulevard south of Osborne Street currently exceeds the normally compatible residential noise standard with an existing noise level of 69 dBA CNEL, which allows for a project increase of greater

than 1 dB before it is considered significant. Roadway noise impacts would be less than significant for travel to and from Sheldon Pit, Sun Valley Fill Site, and Bradley Landfill.

A comparison of the existing conditions to the estimated with-project conditions is provided in Table 3.14-10, below, for access to and from Boulevard Pit SPS.

Table 3.14-10: Project Traffic Noise Contributions to/from Boulevard Pit SPS

Roadway	Segment	dBA CNEL at Nearest Receptor[1]			Threshold
		Existing	Existing Plus Route 8A	Project Contribution	
Branford Street	East of Laurel Canyon Boulevard[3]	64	65	1	> +1 dB
Branford Street	West of Laurel Canyon Boulevard[3]	63	63	0	> +2 dB

Notes:
[1] Distance to nearest receptor, does not take into account existing noise barriers.
[2] Nearest sensitive receptor is residential.
Source: FHWA Traffic Noise Prediction Model- FHWA-RD-77-108.

Table 3.14-10 shows that at most, the project's contributions to traffic noise from travel to and from Boulevard Pit SPS would increase the roadway noise by up to 1 dB. The Proposed Project would not cause the noise level at any nearby land use to exceed the normally compatible noise standard that did not already exceed the standards for existing conditions. Both analyzed roadway segments currently exceed the normally compatible residential noise standard with existing noise levels that range between 63 and 64 dBA CNEL, which allows for a project increase of greater than 2 dB before it is considered significant. Roadway noise impacts would be less than significant for travel to and from Boulevard Pit SPS.

Mitigation Measures

No mitigation measures are necessary.

Residual Impacts After Mitigation

The Proposed Project will comply with all local noise ordinances, and roadway noise impacts will be less than significant.

NOISE-2 *Result in exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels.*

Sediment Removal/Reservoir Management

Onsite Construction Equipment Vibration Impacts

Vibration impacts primarily occur in structures where people are sitting or lying down and are more sensitive to vibration in these positions. The primary source of vibration during construction would be from the onsite operation of a bulldozer. Impacts from onsite equipment vibration to nearby sensitive receptors have been calculated through use of typical vibration propagation rates, and the vibration levels for a bulldozer are shown below in Table 3.14-11.

Table 3.14-11: Vibration Impacts of Onsite Construction Equipment at Nearby Sensitive Receptors

Receptor Description	Receptor Jurisdiction	Distance to Receptor (feet)	Maximum Vibration Level Peak Particle Velocity inch/second
Single-Family Home	Pasadena	140	0.013
Single-Family Home	Los Angeles County	180	0.010
JPL Office	La Cañada Flintridge	200	0.009
La Cañada High School	La Cañada Flintridge	430	0.004
La Cañada Methodist Church	La Cañada Flintridge	500	0.003
County of Los Angeles Vibration Standard			0.01

Notes: Based on vibration levels for a large bulldozer and vibration propagation rates detailed in Caltrans, 2004.

Table 3.14-11, above, shows that vibration impacts from onsite construction equipment would range from 0.003 to 0.013-inch-per-second peak particle velocity. Since the Cities of Pasadena and La Cañada Flintridge do not provide vibration standards, the County of Los Angeles vibration standards have been used to analyze the vibration impacts to all nearby sensitive receptors. Table 3.14-11 shows that only the nearby single-family homes in the City of Pasadena would experience vibration levels that would exceed the 0.01-inch-per-second vibration standard. This would be considered a significant impact.

Mitigation Measure MM N-1 is provided that would restrict the use of large bulldozers and other large equipment (greater than 200 horsepower) from operating within 180 feet of any offsite residential structure. Equipment that is not performing any earth-moving activities and is solely operating for entering or leaving the site via the access roads to the reservoir is exempted from this requirement. Through implementation of Mitigation Measure MM N-1, the onsite construction equipment vibration impacts to nearby sensitive receptors would be reduced to less than significant.

Offsite Truck Operations Vibration Impacts

Although considerable data is available on the vibration levels created by construction equipment and trucks operating on dirt roads at construction sites, relatively little quantitative data exists on vibration impacts from trucks operating on paved roads, which produce much lower vibration levels than dirt roads due to their smoother surfaces and compacted road bases. The City of Concord, California, did a comprehensive survey of the vibration impacts from the city's major roadways and freeways and found that the roadways create vibration levels up to 64 vibration velocity (VdB) at 20 feet or 0.003-inch-per-second peak particle velocity. The nearest sensitive receptors to the roadways would be single-family homes as close as 50 feet to the roadways travelled by Proposed Project trucks. Based on typical vibration propagation rates, the vibration level at the nearest homes would be 0.001-inch-per-second peak particle velocity, which is within the County of Los Angeles 0.01-inch-per-second vibration standard. Impacts would be less than significant.

Mitigation Measures

MM N-1: The LACFCD shall restrict the operation of any off-road construction equipment that is powered by a greater than 200-horsepower engine from operating within 180 feet of any offsite residential structure. Equipment that is not performing any earth-moving activities and is solely

operating for entering or leaving the site via the access roads to the reservoir is exempted from this requirement.

Residual Impacts After Mitigation

Through implementation of Mitigation Measure MM N-1, the onsite construction equipment vibration impacts to nearby sensitive receptors would be reduced to less than significant.

NOISE-3 *Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.*

Sediment Removal/Reservoir Management

The Proposed Project would not create a substantial temporary or periodic increase in ambient noise levels in the project vicinity above noise levels existing without the Proposed Project. For this analysis, both the sediment removal activities and reservoir management activities have been considered as temporary activities, since they would occur only for limited durations of time. The construction activities associated with the removal of the sediment may create temporary onsite noise impacts from the operation of construction equipment as well offsite noise impacts from the use of haul trucks to export material offsite.

Onsite Construction Equipment Noise

The analysis above found that the onsite equipment that would be operated during the removal of sediment would not exceed any construction noise standards at the nearby sensitive receptors. Therefore, any temporary noise level increase from onsite construction noise would be less than significant.

Offsite Vehicular Noise

The sediment removal activities for the Proposed Project would generate up to 425 daily round trips from haul trucks and up to 17 daily round trips from workers commuting to the project site. The analysis above found that the offsite vehicular trips would not create an exceedance of the normally acceptable noise standards for nearby sensitive land uses for locations that do not already exceed the standards for existing conditions. The analysis also found that for the locations that currently exceed the normally acceptable noise standard, the Proposed Project noise contribution to these roadway segments would be within the Federal Transit Administration's allowable noise exposure increase levels. Therefore, the temporary noise level increase created from offsite vehicular noise impacts would result in a less than significant impact.

Mitigation Measures

No mitigation measures are necessary.

Residual Impacts After Mitigation

Temporary noise level increase from onsite construction noise and offsite vehicular noise would be less than significant.

NOISE-4 Cumulative Impacts

Onsite Construction Equipment Noise

Cumulatively, the Proposed Project would not be expected to incrementally add to the noise levels during construction of most of the cumulative projects, as they are either not going to coincide with the Proposed Project with respect to construction phasing or worst-case construction noise levels would be separated by enough distance not to cumulatively add to one another. If the construction phasing of the Hahamongna Watershed Park MBMU Project and the Arroyo Seco Canyon Project occur at the same time as the Proposed Project, a cumulative increase in vibration impacts could occur to nearby sensitive receptors. Through implementation of Mitigation Measure MM N-1, the Proposed Project's contribution to temporary cumulative noise vibration level increase from onsite construction equipment would be reduced to less than significant.

Offsite Vehicular Noise

The offsite vehicular noise analysis is based on the traffic impact analysis, which took future projects into account during traffic modeling and, therefore, is cumulative in nature. The Project Year 2014 Model included the following projects:

- Hahamongna Watershed Park Multi-Benefit/Multi-Use (MBMU) Project
- National Aeronautics and Space Administration (NASA) Jet Propulsion Laboratory (JPL) On-Site Parking Structure
- Temporary Use of the Rose Bowl Stadium by the National Football League (NFL)
- Azusa Material Recovery Facility and Waste Transfer Station Project
- Metro Gold Line Foothill Extension
- Arroyo Seco Canyon Project

The Project Year 2014 Model also included an annual increase factor of 4.5 percent, totaling 9 percent for 2 years. This is a conservative estimated growth factor to account for any construction improvements and cumulative projects expected to occur in the surrounding area up to 2014. As shown above, no significant impacts are expected with offsite noise impacts.

Mitigation Measures

See Mitigation Measure MM N-1.

Residual Impacts After Mitigation

With implementation of Mitigation Measure MM N-1, the Proposed Project's contribution to cumulative vibration impacts to nearby sensitive receptors would be less than significant.

3.15 RECREATION/PUBLIC SERVICES

3.15.1 Introduction

This section provides an overview of the recreational resources, including recreational resources associated with public services, in the vicinity of Devil's Gate Reservoir and evaluates potential impacts that could result from Proposed Project implementation. Recreational resources include facilities developed for recreation, such as designated parks, trails, and picnic areas, as well as land where dispersed recreational activities such as hiking, biking, horseback riding, and bird-watching/nature walks, etc. may take place. This section focuses on temporary and indirect impacts, as well as long-term impacts to recreational resources as a result of the implementation of the Proposed Project.

As noted in the Initial Study (Appendix A), impacts associated with fire protection, police protection, schools, and other public facilities were found to have less than significant impacts and are not discussed within the EIR.

The environmental baseline condition for the sediment removal phase is considered at the time of publication of the NOP. The environmental baseline conditions for reservoir management will be conditions post sediment removal, approximately in the year 2020.

3.15.2 Existing Environmental Setting

Project Site and Immediate Surroundings

Numerous recreational facilities are found in the vicinity of the Proposed Project site (See Figure 3.15-1: Area Recreational Facilities). The Proposed Project site is located within the Hahamongna Watershed Park. Due to the recreational opportunities in the surrounding area, the Proposed Project site is also used as an unofficial recreation area. Common recreational activities that occur within the reservoir include hiking, biking, horseback riding, bird-watching, and nature walks. These activities also involve the trails adjacent to but not within the reservoir. Outside of its main purpose of flood control, the use of the reservoir as an unofficial recreation area is dependent on safety, weather, and seasonal conditions as the reservoir receives natural storm inflows and holds water for flood control purposes.

Hahamongna Watershed Park

Hahamongna Watershed Park is approximately 300 acres of parkland and open space located at the base of Arroyo Seco Canyon, in the floodplain behind Devil's Gate Dam. The park includes areas within and adjacent to the project site.

The Oak Grove Area of Hahamongna Watershed Park

Hahamongna Watershed Park includes the Oak Grove area of Hahamongna Watershed Park, which contains picnic facilities, restrooms, an equestrian staging area, a disc golf course, and a sports field used for informal recreation activities. Access to the Oak Grove area of Hahamongna Watershed Park is provided at the main park entrance at the intersection of Foothill Boulevard and Oak Grove Drive (City of Pasadena 2012b).

Oak Grove Disc Golf Course

The Oak Grove Disc Golf Course is located in Hahamongna Watershed Park west of the Proposed Project site. The course was established in 1975 and hosts 18+ holes. The Oak Grove Disc Golf Course was the first permanent disc golf course established in the world and is recognized by the Professional Disc Golf Association.

Park Trails

Approximately six trails for pedestrian, bicycle, and equestrian use are adjacent to the Proposed Project site (see Figure 3.15-2: Devil's Gate Area Trails) (City of Pasadena 2013). These include:

Altadena Crest Trail

The Altadena Crest Trail is located in the northern part of Hahamongna Watershed Park and provides access to the park from the community of Altadena. This trail is currently restricted to equestrian and hiking use only.

Arroyo Seco (Rim of the Valley) Trail

The Arroyo Seco Trail, a portion of the Rim of the Valley Trail, links all three sections of the Arroyo Seco together. This trail travels in a parallel fashion along both sides of the arroyo. The trail is currently restricted to equestrian and hiking use only.

Flint Wash (Rim of the Valley) Trail

The Flint Wash Trail, a portion of the Rim of the Valley Trail, begins at the southwest corner of Hahamongna Watershed Park at the confluence of Flint Wash and Devil's Gate Reservoir.

Gabrielino Trail

The Gabrielino Trail is a regional trail that begins at the intersection of Windsor Avenue and Ventura Street. The trail lies along the east boundary of Hahamongna Watershed Park north of Ventura Street. USFS has designated this trail as a multi-use trail for equestrians, hikers, and bicycles.

Gould Canyon Trail

The Gould Canyon trailhead is located just west of Hahamongna Watershed Park and connects to the La Cañada Flintridge trail system.

West Rim Trail

Internal to the park, the West Rim Trail leads north from the Flint Wash trailhead connection to the Equestrian Staging Area and the upper terrace picnic area.

Maintenance Roads

Maintenance roads within the basin are used by the LACFCD, Southern California Edison (SCE), and the City of Pasadena, among others, for operations and maintenance of Devil's Gate Reservoir and other

facilities in the area. These roads are used as unofficial trails when reservoir water levels and conditions permit.

Recreation Uses

Hahamongna Watershed Park Use

Hahamongna Watershed Park is used by individuals and organized groups. Organized groups known to frequent the area include:

Disc Golfers

Approximately 750 disc golfers use the Oak Grove Disk Golf Course each week, with a majority of the use being on the weekends. The course is used the most during the fall and spring months, with fewer users in the summer due to the dry and hot conditions. Disc golfers bring their own equipment to the course, as rental equipment is not available at this time. In addition, the Oak Grove Disc Golf Club offers both monthly and weekly tournaments, with the monthly tournament held the third Sunday of each month and weekly tournaments occurring each Tuesday and Wednesday. Other disc golf courses in the area include Verdugo Hills Disc Golf Course approximately 6.1 miles northwest, DeBell Disc Golf Course approximately 7.2 miles west, and Chavez Ridge Disc Golf Course approximately 8.5 miles southwest of the Oak Grove Disc Golf Course (Oak Grove Disc Golf Club 2012).

Tom Sawyer Camp

The Tom Sawyer Camp utilizes the Hahamongna Watershed Park as a summer day camp for youth ages 3 to 14 years old. It offers year-round horseback riding lessons, typically on the weekends, provided by the Rose Bowl Riders organization, also based within the park. The camp's main use is primarily during a 10-week period from June to August, Monday through Friday, from 7:30 a.m. to 6:00 p.m. of each year. During the summer, Tom Sawyer Camp offers its facility to approximately 1,200 campers. The camp has a staff of approximately 200 and has 45 vans to transport members. Weekly riding lessons, on average, include approximately 30 children and adults. The camp is based out of Hahamongna Watershed Park, and 90 percent of all activities take place within the park (Tom Sawyer Camp 2012).

Rose Bowl Riders

Rose Bowl Riders is a non-profit/all-volunteer organization that is based out of Hahamongna Watershed Park. The organization provides horseback riding, riding lessons, boarding, horseshows, a horsemanship clinic (open to the public), and additional membership activities. The organization has over 200 members of all ages, including a small special-needs population. Rose Bowl Riders utilizes Hahamongna Watershed Park recreational area year-round on a daily basis, primarily on weekday mornings and afternoons, and throughout the day on the weekends. Rose Bowl Riders is located in the northwest section of Hahamongna Watershed Park on approximately 12 acres of land. While Rose Bowl Riders' activities revolve around the Hahamongna Watershed Park area, currently two alternative sites where members can ride, train, board horses, and park trailers are located within a 15-mile radius. The San Pascual Stables are located approximately 6.5 miles south, and Griffith Park is approximately 14 miles southwest of Hahamongna Watershed Park (Rose Bowl Riders 2012).

MACH 1

MACH 1 (Move a Child Higher) is a professional therapeutic horsemanship wellness program for people with disabilities. This program also includes MACH 2 (Military and Companion Horses), which offers therapeutic horsemanship activities for military veterans and active duty military personnel. The program is a Professional Association of Therapeutic Horsemanship (PATH) International Premier Accredited Center and has been operated in cooperation with the City of Pasadena for 17 years. MACH 1 is based at the Pasadena Equestrian Center in the Hahamongna Watershed Park. MACH 1 is currently a subtenant of the Rose Bowl Riders. With the support of the City of Pasadena, MACH 1 is developing a new therapeutic riding facility, also located in the Hahamongna Watershed Park's Pasadena Equestrian Center. This facility is expected to be in operation in 2014.

Pasadena Audubon Society

The Pasadena Audubon Society is a Southern California Chapter of the National Audubon Society. Their mission is to bring an interest in birds to the community through birding, education, and the conservation of bird habitats. The organization provides several bird walks a month, programs, and birding classes to its members, which number approximately 1,400. Roughly 20 members visit Hahamongna Watershed Park on a weekly basis. Birds use the Hahamongna area as a migration, resting, and feeding place year-round (Pasadena Audubon Society 2012). An additional 30 members use the area a few times a month, while approximately 100 members attend the beginners' walk provided once a month. The Audubon Society holds official walks from September through June, but individuals bird-watch year-round. The monthly bird walks are held the first Saturday of each month in the morning.

Many additional bird-watching areas are located around Pasadena and surrounding areas with easy access to a variety of habitats (Pasadena Audubon Society website 2013). These include the following:

- Upper Arroyo Seco - Shaded canyon with live oaks, white alders, and a permanent stream.
- Lower Arroyo Park - Narrow canyon (corridor) with oaks, sycamores, and chaparral shrubs and a permanent stream. Good for sparrows in fall and winter. Swifts and swallows nest under the bridge.
- Eaton Canyon Natural Area - Birding around the Nature Center, large oak terrace, some water in the stream.
- Las Flores Canyon And The Cobb Estate - The shade of the oaks in the canyon and the thickets and trees of the Cobb Estate.
- Huntington Library And Botanical Gardens - Extensive garden plantings attract many species of birds.
- Almansor Park - Wood ducks year round, a variety of waders when the water level is not too high, and grazing waterfowl and gulls in winter.
- Switzer Picnic Area – Variety of birds in one location with mountain birds, riparian birds, chaparral birds, and oak woodland birds.

- Santa Anita Canyon – Riparian and chaparral birds found in habitat consisting of a stream with alders and oaks. Black swift and American dipper are found here.

- Santa Fe Dam Recreational Area – Alluvial coastal scrub habitat with paved walkways around the lake and raptors present in the winter months.

City of Pasadena, Recreation Department

The City of Pasadena's Recreation Department maintains a large portion of Hahamongna Watershed Park. In calendar year 2010, approximately 10,200 visitors came to Hahamongna Watershed Park to utilize the sports and recreational facilities available by permit through the City. These included sporting events and tournaments, City special events, picnics, and equine-related clinics and shows. Certain sporting activities, such as disc golf, softball, youth soccer, hiking, horseback riding, and bicycling, are conducted on a daily basis at Hahamongna Watershed Park. Various camping and picnicking areas are also utilized throughout the year on a daily basis. Other events, such as use of the Amphitheater and the Environmental Education Center, generally occur once a year or as needed (City of Pasadena 2012d).

Area Recreational Facilities

Other recreational facilities in the surrounding area include Brookside Golf Course, Brookside Park, Charles White Park, and Loma Alta Park, among others (see Table 3.15-1, below) (City of Pasadena Dept. of Public Works website 2012; Google Earth 2012).

Table 3.15-1: Area Recreational Facilities

Recreational Facilities	Onsite Activities	Approximate Driving Distance from Proposed Project Site
Angeles National Forest	Multiple hiking and camping opportunities	5.8 miles
Annandale Golf Course	A private golf course	4.9 miles
Brenner Park	Basketball court, picnic shelter, ball field, playground equipment, restroom facilities, tennis court, athletic field with lighting, and an open field	3.3 miles
Brookside Fitness Trail	14-station exercise trail	4.2 miles
Brookside Golf Course	Two golf courses with a combined 36 holes	2.7 miles
Brookside Park	Baseball diamond, softball fields, tennis courts, two playgrounds, picnic areas, fitness trail, and bleacher seating	4.2 miles
Central Park	Horseshoe pits, lawn bowling, open area, playground equipment, walkway lighting, and restroom facilities	4.8 miles
Charles White Park	Multipurpose field, walking path, fitness zone, picnic area, children's play area, and a recreation office	3.1 miles
Chevy Chase Country Club	A private country club with golf, swimming, and banquet facilities	3.3 miles
Eagle Rock Hillside Park	Park with playground area	9.1 miles

Table 3.15-1: Area Recreational Facilities

Recreational Facilities	Onsite Activities	Approximate Driving Distance from Proposed Project Site
Eagle Rock Recreation Center	Auditorium, barbecue pits, baseball diamond (lighted/unlighted), basketball courts (lighted/indoor, unlighted/outdoor), children's play area, football field (unlighted), indoor gym (without weights), picnic tables, tennis courts (unlighted).	5.9 miles
Emerald Isle Park	Basketball court, children's play area, two tennis courts, and picnic area	2.8 miles
Jackie Robinson Park	Basketball courts, open field, softball diamond, roller skating rink, picnic area, swimming pool, gymnasium, recreational room, lounge, game area, meeting room, and a kitchen	3.7 miles
Kidspace Children's Museum	Museum comprised of exhibits and programs for children 12 and under	3.7 miles
La Cañada Flintridge Country Club	A members-only country club that provides recreational opportunities including golf, tennis, swimming, and fitness rooms, among other recreational facilities.	4.2 miles
La Pintoresca Park	Basketball court, skate area, picnic tables, playground area, and a water park	3.2 miles
Loma Alta Park	Basketball and tennis courts, lighted baseball fields, gymnasium, swimming pool, picnic areas, multipurpose facility, community garden, play areas, equestrian ring, computer lab, and an indoor kitchen	3.6 miles
Lower Arroyo Park	Natural park, fly-casting pond and clubhouse, archery range and clubhouse, a system of rubble walls that retain the slopes and help define paths, multi-use trails, the La Casita del Arroyo community center, the Aids Memorial Grove, and several promontory outlook points such as the Bird Sanctuary	4.3 miles
Memorial Park	Large open lawn space, separate playgrounds for toddlers (covered) and older children, picnic tables, hillside walkway, gazebo with bandstand, restrooms; and memorials to the city's military veterans, placed on the base of the gazebo	2.5 miles
Olberz Park	Large, open lawn space	2.4 miles
Pasadena Memorial Park	Various memorials, amphitheater, play equipment, open area, and restroom facilities	4.5 miles
Rose Bowl Aquatics Center	Two Olympic size pools, warm water pool, diving platforms, hydro spa, exercise room, two conference rooms, clubhouse, lockers, showers, and a pro shop	4.2 miles

Table 3.15-1: Area Recreational Facilities

Recreational Facilities	Onsite Activities	Approximate Driving Distance from Proposed Project Site
Rose Bowl Stadium	Facility used to accommodate football games, concerts, religious services, celebrations, and a flea market	3.0 miles
San Rafael Park	Play park equipment, open area	6.1 miles
Scholl Canyon Golf Course	Golf course, tennis, club, banquet facilities, and clubhouse	10.1 miles
Scholl Canyon Park	Children's play area, picnic areas, special facilities	8.9 miles
Villa Parke	Large auditorium with stage and storage area, social/recreation room, weight room, boxing room, teen facility meeting rooms, senior room, several small meeting rooms, two kitchens, lounge, and a gymnasium with showers and dressing rooms. Recreation activities include a complete aerobics program, self-defense (Jujitsu), arts and crafts, seasonal sports leagues, a unique Summer Enrichment Day Camp, and the City's largest youth soccer program	4.5 miles

Brookside Fitness Trail

The Brookside Fitness Trail is located in Brookside Park, south of the Proposed Project site. The trail provides a 2/3-mile loop with 14 fitness stations targeting stretching, balancing, coordination, and strength-building exercises (City of Pasadena Department of Public Works website 2012).

Brookside Golf Course

The Brookside Golf Course is located in the central portion of the Arroyo Seco, south of the Proposed Project site in the City of Pasadena. The course opened in 1928 shortly after the construction of the Rose Bowl and is presently a public course that contains two courses with a total of 36 holes. The Arroyo Seco Channel runs through the golf course, and the course is immediately to the north of the Rose Bowl Stadium. The course is open only during daytime hours, and golfers must reserve a tee time prior to arriving at the course. The Brookside Golf Course has hosted major golf championships including the Los Angeles Open, among others (American Golf website 2012). In addition, a pathway around the golf course and other nearby facilities provides a pathway for runners and bicyclists to use.

Brookside Park

Brookside Park is located in the central portion of the Arroyo Seco, south of the Proposed Project site in the City of Pasadena. The park consists of approximately 62 acres with amenities including historic Jackie Robinson Baseball Stadium, softball fields, tennis courts, two playgrounds, picnic facilities, a fitness trail, bleacher seating, and restrooms. The Rose Bowl Aquatics Center and Kidspace Children's Museum are also located within the park (City of Pasadena Department of Public Works website 2012).

Charles White Park

Charles White Park is located east of the Proposed Project site in the community of Altadena. The park is located on 5 acres of land with facilities including a multipurpose field, a walking path, a fitness zone, picnic and barbeque areas, two children's play areas, restrooms, and a recreation office (Los Angeles County Parks and Recreation website 2012).

Jackie Robinson Park

Jackie Robinson Park is located southeast of the Proposed Project site in the City of Pasadena. The park is located on 7 acres of land with facilities includes four basketballs courts, an open field, two softball diamonds, a roller skating rink, a picnic area, restrooms, and drinking fountains. Robinson Park Center is also located on the site with facilities including a swimming pool, gymnasium, social recreational room, lounge, game area, meeting room, kitchen, music room, restrooms, and drinking fountains (City of Pasadena Department of Public Works website 2012).

Kidspace Children's Museum

The Kidspace Children's Museum is located in Brookside Park, south of the Proposed Project site. The museum is housed in the former Fanny Morrison Horticultural Center and offers exhibits and programs developed especially for children under the age of 12 (Kidspace Museum website 2012).

La Pintoresca Park

La Pintoresca Park is located southeast of the Proposed Project site in the City of Pasadena. The park is located on 2.9 acres of land with facilities including a basketball court, skate area, picnic tables, playground area, a water park, restrooms, and drinking fountains (City of Pasadena Department of Public Works website 2012).

Loma Alta Park

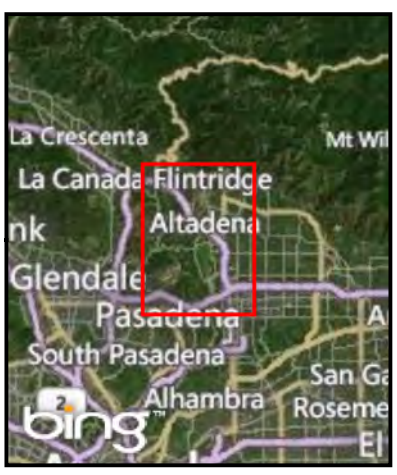
Loma Alta Park is located northeast of the Proposed Project site in the community of Altadena. The park is located on 7.33 acres of land with facilities including two outdoor basketball courts, tennis courts, a lighted baseball diamond, a gymnasium, a swimming pool, picnic areas, a community building with multi-purpose rooms, a community garden, two play areas, an equestrian ring, a computer lab, and an indoor kitchen (Los Angeles County Parks and Recreation website 2012).

Rose Bowl Aquatics Center

The Rose Bowl Aquatics Center is located in Brookside Park, south of the Proposed Project site. The center hosts two Olympic-size pools, one 55,000-gallon warm-water pool, diving platforms, two hydro spas, a weight and exercise room, two large conference rooms, and a clubhouse building with locker rooms, showers, pro shop, and administrative offices (Rose Bowl Aquatics website 2012).

La Canada Flintridge Country Club
Hahamongna Watershed Park
Angeles National Forest
Memorial Park
Olberz Park
Loma Alta County Park
Oak Grove Disc Golf Course
Hahamonga Watershed Park
Oak Grove Area
Charles White Park
Emerald Isle Park
Chevy Chase Country Club
La Pintoresca Park
Brookside Golf Club
Jackie Robinson Park
Rose Bowl Stadium
Brenner Park
Scholl Canyon Golf Course
Brookside Fitness Trail
Kidspace Children's Museum
Villa Parke
Brookside Park
Rose Bowl
Scholl Canyon Park
Rose Bowl Aquatics Center
Pasadena Memorial Park
Eagle Rock Hilside Park
Annandale Golf Course
Lower Arroyo Park
Eagle Rock Recreation Center
Central Park

SCALE= 1 inch equals 2,083 feet
0 1,041.5 2,083 4,166 Feet



Recreational Facilities

Proposed Project Boundary

Figure 3.15-1
Devil's Gate Area
Recreational Facilities

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\\Cgi-gisdata01\gis_data\Projects\20000s\20201 - 20400\20346 Devil's Gate EIR\20346 Figure 3.15-1 Area Recreational Facilities.mxd

Devil's Gate Excavation Limit

Existing Trails

- Altadena Crest Trail
- Arroyo Seco Trail
- Flint Wash Trail
- Gabrielino Trail
- Gould Canyon Trail
- West Rim Trail

Figure 3.15-2
Devil's Gate Area Designated Trails

Version Date: 10/5/2013

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\\Cgi-gisdata01\gis_data\Projects\20000s\20201 - 20400\20346 Devil's Gate EIR\20346 Figure 3.15-2 Devil's Gate Area Designated Trails.mxd

Rose Bowl Stadium

The Rose Bowl Stadium is a National Historic Landmark located south of the Proposed Project site located in the central portion of the Arroyo Seco in the City of Pasadena. The stadium was built in 1922 to accommodate patrons who wished to see football games. Today the stadium has an official seating capacity of 92,542 and is known for the New Year's Day college football game held after the Rose Parade. The Rose Bowl hosts all the University of California, Los Angeles (UCLA) home college football games, in addition to hosting NFL Super Bowl Games, Olympic and World Cup Soccer matches, concerts, religious services, Fourth of July Celebrations, and the world's largest flea market (Rose Bowl Stadium 2012).

3.15.3 Applicable Regulations

LACFCD

Through easements granted in May of 1919 and March of 1965, the City of Pasadena granted the LACFCD, under a perpetual easement, the right to construct, reconstruct, inspect, maintain, repair, and operate Devil's Gate Dam, its spillway, bypasses, tunnels, and other support facilities as may be necessary for the construction and maintenance of a reservoir capable of impounding the waters of the Arroyo Seco for purposes of storage and control and to control such waters as may be necessary in the prevention of damage by flood (City of Pasadena 1919/1965).

City of Pasadena General Plan

The City of Pasadena is the landowner of the project site. The Proposed Project site has a General Plan Land Use designation of Open Space and is zoned as Open Space (OS). "Open Space" is defined as follows: "This category is for a variety of active and passive public recreational facilities and for City-owned open space facilities. This includes natural open spaces and areas which have been designated as environmentally and ecologically significant. This category also applies to land which is publicly owned, though in some instances public access may be restricted. Most importantly, this designation only applies to lands owned by the City."

The City of Pasadena General Plan Objectives and Policies pertaining to the Proposed Project are outlined below.

- OBJECTIVE 9 – Open Space Preservation And Acquisition: Preserve and acquire open space in Pasadena in order to enhance the quality of Pasadena life.
- Policy 9.1 – Open Space Corridors: Development of open space corridors, easement and acquisition programs, and trails shall be established where feasible.
- Policy 9.2 – Arroyo Seco: Continue and complete comprehensive planning for, and implementation of, plans for the Arroyo, including restoration of the natural area of the Lower Arroyo and the development of the Hahamongna Watershed Park Plan.
- Policy 9.4 – Adequate Open Space: Provide an adequate total quantity and equitable distribution of public or publicly accessible open spaces throughout the City.

- Policy 9.5 – Stewardship of the Natural Environment: Encourage and promote the stewardship of Pasadena's natural environment, including water conservation, clean air, natural open space protection, and recycling. Encourage the use of native, water conserving, and regionally appropriate landscaping.

The General Plan Update Open Space and Conservation Element (City of Pasadena 2012c), provides a blueprint for natural open space and conservation. Implementation Measures found in this Element pertaining to the Proposed Project are outlined below.

- Protect Existing Open Space: Continue to preserve and restore the Arroyo Seco and Eaton Canyon.

- Zoning Changes: Protect the existing natural open space within the Hahamongna Watershed Park Master Plan area.

City of Pasadena Zoning Code

The Proposed Project site is zoned as Open Space (OS). As described in Section 17.26.020(A) of the City's Zoning Code, "The OS district is applied to sites with open space, parks, and recreational facilities of a landscaped, open character having a minimum contiguous site area of two acres. The OS zoning district is consistent with and implements the Open Space land use designation of the General Plan." Section 17.26.030 of the Code specifies that public safety facilities uses meet the intent of the OS zone and are conditionally allowed uses in the OS zone.

Hahamongna Watershed Park Master Plan

The Proposed Project site is also within the Hahamongna Watershed Park Master Plan (HWPMP 2003) area. Applicable Goals and Objectives of the HWPMP include the following:

Goal 1: Preserve, restore, and enhance the native habitats.

Goal 2: The Devil's Gate flood control basin will be managed to provide protection to the developed and natural downstream areas.

Objectives:

- *Facilitate the dam and reservoir maintenance operations in a manner that is compatible with the proposed features of the Master Plan and will result in minimal impacts to the surrounding area.*

- *Maintain or improve the flood capacity behind Devil's Gate Dam.*

- *Develop a sediment removal plan that minimizes the impact to the basin and to the surrounding neighborhoods.*

- *Develop a grading plan that allows habitat restoration and recreational activities to coexist with flood management and water conservation.*

- *Develop a multi-agency task force to review maintenance, sediment removal, dam operation, permit, and liability issues on a continual basis after this plan is adopted.*

Goal 5: Enrich and promote the unique history and culture of Hahamongna Watershed Park.

Objectives:

- *Develop design guidelines to ensure aesthetic compatibility and quality construction for any improvements made within Hahamongna Watershed Park.*

Goal 6: Provide a safe and secure park.

Objectives:

- *Develop guidelines and delegate agency responsibilities for recreation, flood management, and water conservation liabilities.*

3.15.4 Significance Criteria

- *RECREATION-1: Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?*
- *RECREATION-2: Would the project include recreational facilities or require the construction or expansion of existing recreational facilities which might have an adverse physical effect on the environment?*
- *PUBLIC SERVICES-1: Would the project result in substantial adverse impacts associated with the provision of or need for new or physically altered recreational facilities, the construction of which could cause significant environmental impacts?*
- *RECREATION-3: Cumulative Impacts*

3.15.5 Methodology

The City of Pasadena General Plan and the Hahamongna Watershed Park Master Plan were utilized to aid in the development of this analysis. Interviews with several individuals associated with various recreational activities that take place in and around the Proposed Project site also provided information for this analysis. Additionally, site visits were conducted, and aerial and topographic maps were examined to determine existing recreational uses.

3.15.6 Impacts and Mitigation

RECREATION-1 *Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated.*

The Proposed Project will not result in the construction of new residences or facilitate the development of residences, or result in an increase in area population. Therefore, implementation of the Proposed Project will not result in increased use or the physical deterioration associated with increased use for neighborhood or regional parks or other recreational facilities due to any increases in area population.

Sediment Removal Impacts

Proposed Project sediment removal will occur over the course of five years. It involves clearing plants and vegetation in the configuration footprint followed by the large-scale removal of accumulated sediment and trucking the sediment offsite. During project sediment removal, most of the Proposed Project site will be closed to public use from the dam face to the edge of the Proposed Project's excavation limit boundaries (see Figure 2.1-1: Proposed Project Location and Vicinity Map). Maintenance roads within the basin are used by the LACFCD, Southern California Edison (SCE), and the City of Pasadena, among others, for operations and maintenance of Devil's Gate Reservoir and other facilities in the area. The majority of the maintenance roads will be closed during sediment removal; however these roads are not officially designated for recreational uses and are often not available for unofficial recreation use due to reservoir water levels or maintenance activities.

Designated Recreational Uses

As detailed below, implementation of sediment removal will result in temporarily restricted access to portions of designated trails and indirect impacts to existing recreation uses associated with construction activities. These impacts may increase the use of other area parks and recreational facilities such as those listed in Table 3.15-1, Area Recreational Facilities.

The Oak Grove area of Hahamongna Watershed Park and the associated facilities including Oak Grove Disk Golf Course will remain open during sediment removal and will continue to provide active recreational facilities to the area. Sediment removal activities will not limit the use of the Oak Grove area of Hahamongna Watershed Park by individuals or by organizations such as the Oak Grove Disc Golf Club, the Rose Bowl Riders, MACH 1, or Tom Sawyer Camp.

Activities such as hiking, biking, horseback riding, bird-watching, and nature walks will be limited to trails located outside the excavation boundary or to trails opened in absence of removal activities. Of the six designated trails in and adjacent to the Proposed Project site, three of these trails, Flint Wash Trail, Gabrielino Trail, and Gould Canyon Trail, will remain open during sediment removal and will continue to provide active recreational facilities to the area. Portions of the Altadena Crest Trail, Arroyo Seco Trail, and West Rim Trail will either be closed when sediment removal activities are under way and/or are near the trail. A small portion of the Altadena Crest Trail (an estimated 0.2 mile) will be closed during the whole sediment removal phase. Figure 3.15-3: Devil's Gate Area Impacts shows the location of the different access conditions during sediment removal.

Sediment removal activities will not limit use of the Oak Grove Area of Hahamongna Watershed Park or much of the designated trails; however, use of these facilities may be less desirable due to construction-related emissions, noise, dust, visual, and traffic impacts associated with sediment removal. These impacts are described in detail in Sections 3.4, 3.5, 3.14, and 3.16.

Recreational users may choose to visit other area parks, recreational facilities, or trails due to the temporary access restrictions or the indirect effects of construction-related activities. Due to the number of other recreational facilities and trails in the vicinity, it is anticipated that these visitors will be dispersed throughout the area and that no single park or facility will experience a substantial increase in use. Therefore, the Proposed Project will not increase use of other existing parks or recreation facilities

Devil's Gate Excavation Limit

Trail & Maintenance Road Closures

- Closed during the full duration of sediment removal
- To remain open during sediment removal
- Closed during sediment removal with possible opening on a seasonal basis
- Temporarily closed while sediment removal is occuring in the area

Figure 3.15-3
Devil's Gate Area Impacts to Designated Trails

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CHAMBERS GROUP

\\Cgi-gisdata01\gis_data\Projects\20000s\20201 - 20400\20346 Devil's Gate EIR\20346 Figure 3.15-3 Devil's Gate Area Impacts to Designated Trails.mxd

such that substantial physical deterioration of these facilities will occur or be accelerated. Impacts to other existing parks and recreation facilities during sediment removal will be temporary and less than significant.

Reservoir Management Impacts

After the annual proposed sediment removal project management, access to Devil's Gate Reservoir will be similar to existing conditions for most of the year. The Oak Grove area of Hahamongna Watershed Park and the trails found in and around the reservoir would be beneficially affected in the long-term through the reduction of potential disruption by flooding or being buried under sediment.

Under reservoir management Option 1, the reservoir will be temporarily closed to public access every year for vegetation and sediment maintenance. This will occur during the late summer/early fall over an estimated five-week period, Monday through Friday. The length of time will vary depending on the amount of sediment deposited in the reservoir over the course of the year.

The Oak Grove area of Hahamongna Watershed Park and most of the designated trails will remain open during reservoir management activities and will continue to provide active recreational facilities to the area. The proposed reservoir management activities will typically occur only during the weekdays; therefore, visitors of Hahamongna Watershed Park on the weekends would not be affected by the proposed reservoir management activities. Under reservoir management Option 2, a smaller portion of the reservoir will be closed for reservoir management activities (see Figure 2.5-5: Proposed Project, Configuration A Excavation Area and Reduced Management Area, Option 2).

Recreational users may choose to visit other area parks, recreational facilities, or trails due to the temporary access restrictions or the indirect construction-related activities during reservoir management activities; however, reservoir management activities will occur over a relatively short time period. In addition, with the number of other recreational facilities and trails in the vicinity, it is anticipated that these visitors will be dispersed throughout the area and that no single park or facility will experience a substantial increase in use. Therefore, the Proposed Project will not increase use of other existing parks or recreation facilities such that substantial physical deterioration of these facilities will occur or be accelerated. Impacts to other existing parks and recreation facilities during reservoir management will be temporary and less than significant.

Mitigation Measures

No mitigation measures are required.

Residual Impacts after Mitigation

The Proposed Project will not result in any significant impacts associated with increased use of other existing parks or recreational facilities.

RECREATION-2 *Include recreational facilities or require the construction or expansion of existing recreational facilities which might have an adverse physical effect on the environment.*

As discussed in detail above under RECREATION-1, recreational users may choose to visit other area parks, recreational facilities, or trails due to the temporary access restrictions or the indirect effects of

construction-related activities during reservoir management activities. It is anticipated that these visitors will be dispersed throughout the area and that no single park or facility will experience a substantial increase in use. Therefore, the Proposed Project will not require the construction or expansion of existing recreational facilities which might have an adverse physical effect on the environment.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

The Proposed Project will not result in any significant impacts associated with construction or expansion of existing recreational facilities.

PUBLIC SERVICES-1 *Result in substantial adverse impacts associated with the provision of or need for new or physically altered recreational facilities, the construction of which could cause significant environmental impacts.*

As discussed in detail above under RECREATION-2, the Proposed Project will not result in a substantial increase in use of any one park or facility. Therefore, the Proposed Project will not require the provision of or need for new or physically altered recreational facilities, the construction of which could cause significant environmental impacts.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

The Proposed Project will not result in any significant impacts associated with the construction or expansion of recreational facilities.

RECREATION-3-Cumulative Impacts

Most of the cumulative projects will not result in the construction of new residences or facilitate the development of residences and, therefore, will not result in increased population or the associated increased demand for neighborhood or regional parks or other recreational facilities. Only four of the cumulative projects within the immediate vicinity of the Proposed Project site (Rose Bowl NFL Stadium designation project, Hahamongna Watershed Park MBMU Project, Arroyo Seco Canyon Project, and Devil's Gate Water Conservation Project) would have the potential to combine with the Proposed Project to create a cumulative recreation impact.

The Rose Bowl NFL Stadium designation project could result in an increase in visitor population to onsite and proximate parks and recreational facilities (Impact Sciences, Inc. 2012). The nearest active and passive recreational facilities, Brookside Park, Rose Bowl Aquatics Center, and Rose Bowl Park to the south as well as Brookside Golf Course to the north could experience additional usage from the Rose Bowl NFL Stadium designation. Additionally, the Rose Bowl NFL Stadium designation could result in the

potential unavailability of these facilities or substantial disruption of activities during major stadium events for 25 days per year.

In the long term, the Hahamongna Watershed Park MBMU Project and the Arroyo Seco Canyon Project will involve improvements and expansion of the existing park facilities, resulting in greater recreational opportunities for Pasadena residents and surrounding communities. In the short term, construction of these two projects, as well as the Devil's Gate Water Conservation Project, could also temporarily limit access or result in construction-related emissions, noise, dust, visual, and traffic impacts. Recreational users may choose to visit other area parks, recreational facilities, or trails due to the temporary access restrictions or the indirect effects of construction-related activities during reservoir management activities. It is anticipated that these visitors will be dispersed throughout the area and that there will not be a substantial increase in use of any one park or facility. Therefore, cumulative impacts to recreation uses are expected to be less than significant.

Mitigation Measure

No mitigation measures are required.

Residual Impacts after Mitigation

Cumulative impacts to recreation are less than significant.

3.16 TRANSPORTATION AND TRAFFIC

3.16.1 Introduction

As noted in the Initial Study (Appendix A), impacts associated with air traffic patterns were found to have less than significant impacts and are not discussed within the EIR.

The environmental baseline condition for the sediment removal phase is considered at the time of publication of the NOP. The environmental baseline conditions for reservoir management will be conditions post sediment removal, approximately in the year 2020.

3.16.2 Existing Environmental Setting

Potential impacts to traffic and circulation associated with hauling excavated sediment to offsite disposal sites were analyzed in the traffic impact analysis report prepared for the Proposed Project (Appendix J). As described in Chapter 2.0 – Project Description, hauling excavated sediment offsite would require haul routes to each of the eight potential disposal facilities. The traffic report contains analysis of multiple variations for the project haul routes. This included a route for the Sun Valley disposal sites that used SR-134 to I-5, but this route was determined to have more impacts than the proposed routes.

LACFCD selected the following haul routes to the disposal sites since they were identified by the local jurisdictions and/or disposal site operators as designated and/or preferred haul routes to the sites.

Proposed Project Site and Freeway Access

Trucks will access the Proposed Project site from I-210 by exiting at Windsor Avenue/Arroyo Boulevard, turning north at Windsor Avenue, turning left onto northbound Oak Grove Drive, and then entering the eastern reservoir access road.

Loaded trucks will exit the reservoir on the existing access road, turn right onto northbound Oak Grove Drive, then left onto westbound Berkshire Place, and then to I-210 eastbound to disposal sites in Azusa and Irwindale and/or to I-210 westbound to disposal sites in Sun Valley.

Waste Management Facility/Vulcan Materials Reliance Facility/Manning Pit SPS Routes

As shown in Figure 2.5-2, trucks carrying sediment to the Waste Management Facility or the Manning Pit SPS will follow I-210 east, exiting at Irwindale Avenue, turning right onto Irwindale Avenue southbound, turning left onto eastbound Gladstone Street, then turning left into the Waste Management Facility or turning right onto southbound Vincent Avenue and turning right into Manning Pit SPS. Trucks returning to I-210 will take Vincent Avenue north and/or turn left onto westbound Gladstone Street and then turn right onto northbound Irwindale Avenue to I-210 west. Trucks carrying sediment to the Vulcan Materials Reliance Facility will follow I-210 east, exiting at Irwindale Avenue, turning left onto Irwindale Avenue northbound, and entering the facility immediately north of Foothill Boulevard. Trucks returning to I-210 will take Irwindale Avenue south and merge right onto I-210 west.

Sun Valley Disposal Sites Routes

As shown in Figure 2.5-3, trucks carrying sediment to Sheldon Pit, Sun Valley Fill Site, and Bradley Landfill will follow I-210 west until exiting at the Osborne Street/Foothill Boulevard interchange; turning left onto Foothill Boulevard westbound, then left onto Osborne Street westbound, then left onto Glenoaks Boulevard southbound, and then left onto Sheldon Street eastbound. Trucks accessing Bradley Landfill will turn left onto Glenoaks Boulevard, then right onto Peoria Street. Trucks will then follow this route in reverse to return to I-210.

Trucks accessing Boulevard Pit will follow I-210 west until exiting at the Wheatland Avenue interchange; turning right onto Wheatland Avenue northbound, right onto Foothill Boulevard eastbound, then right onto Wentworth Street westbound, the left onto Glenoaks Boulevard, right onto Tuxford Street, then right onto San Fernando Road, then left onto Branford Street. Trucks will then follow this route in reverse to return to I-210.

Scholl Canyon Landfill Route

As shown in Figure 2.5-4, for vegetation and organic material disposal, the trucks will follow I-210 east to SR-134 west, exit Figueroa Street northbound, and then turn right on northbound Scholl Canyon Road to the Scholl Canyon Landfill. Exiting southbound on Scholl Canyon Road, returning trucks will turn right onto Figueroa Street to access eastbound SR-134 and continue to I-210 west.

Table 3.16-1 presents the streets to be used for these haul routes.

Table 3.16-1: Project Haul Route Streets

Proposed Haul Routes	Streets To Be Used
To/From Devil's Gate Reservoir to eastern disposal sites	▪ Exit WB I-210 at Windsor Avenue/Arroyo Boulevard ▪ Turn right onto EB Windsor Avenue and then left onto NB Oak Grove Drive ▪ Enter and exit the project site on Oak Grove Drive ▪ Turn right onto NB Oak Grove Drive and then left onto WB Berkshire Place ▪ Enter EB I-210 at Berkshire Place
To/From Devil's Gate Reservoir Area to western disposal sites	▪ Exit EB I-210 at Windsor Avenue/Arroyo Boulevard ▪ Turn left onto EB Windsor Avenue and then left onto NB Oak Grove Drive ▪ Enter and exit the project site on Oak Grove Drive ▪ Turn right onto NB Oak Grove Drive and then left onto WB Berkshire Place ▪ Enter WB I-210 at Berkshire Place
To/From Manning Pit	▪ Exit EB I-210 at Irwindale Avenue ▪ Turn right onto SB Irwindale Avenue ▪ Turn left onto EB Gladstone Street and then right onto SB Vincent Avenue ▪ Enter and exit the disposal site on Vincent Avenue ▪ Turn left onto NB Vincent Avenue and then left onto WB Gladstone Street ▪ Turn right onto NB Irwindale Avenue ▪ Enter WB I-210 at Irwindale Avenue

Table 3.16-1: Project Haul Route Streets

Proposed Haul Routes	Streets To Be Used
To/From Vulcan Materials Reliance Facility	▪ Exit EB I-210 at Irwindale Avenue ▪ Turn left onto NB Irwindale Avenue ▪ Enter and exit the disposal site at the intersection of Irwindale Avenue and on Foothill Boulevard ▪ Head south on Irwindale Avenue ▪ Enter WB I-210 at Irwindale Avenue
To/From Waste Management Facility	▪ Exit EB I-210 at Irwindale Avenue ▪ Turn right onto SB Irwindale Avenue ▪ Turn left onto EB Gladstone Street ▪ Enter and exit the disposal site on Gladstone Street ▪ Turn right onto WB Gladstone Street ▪ Turn right onto NB Irwindale Avenue ▪ Enter WB I-210 at Irwindale Avenue
To/From Scholl Canyon Landfill	▪ Exit WB SR-134 at Figueroa Street ▪ Turn right onto NB Scholl Canyon Road ▪ Enter and exit the disposal site on Scholl Canyon Road ▪ Turn right onto SB Scholl Canyon Road ▪ Enter EB SR-134 at Figueroa Street
To/From Sheldon Pit	▪ Exit WB I-210 at the Osborne Street/Foothill Boulevard interchange ▪ Turn left onto WB Foothill Boulevard ▪ Turn left onto WB Osborne Street ▪ Turn left onto SB Glenoaks Boulevard ▪ Turn left onto EB Sheldon Street ▪ Enter and exit the disposal site on Sheldon Street ▪ Turn right onto WB Sheldon Street ▪ Turn right onto NB Glenoaks Boulevard ▪ Turn right onto EB Osborne Street ▪ Turn right onto EB Foothill Boulevard ▪ Enter EB I-210 at the Osborne Street/Foothill Boulevard interchange
To/From Sun Valley Fill Site	▪ Exit WB I-210 at the Osborne Street/Foothill Boulevard interchange ▪ Turn left onto WB Foothill Boulevard ▪ Turn left onto WB Osborne Street ▪ Turn left onto SB Glenoaks Boulevard ▪ Turn left onto EB Sheldon Street ▪ Enter the disposal site on Sheldon Street ▪ Exit the disposal site on Glenoaks Boulevard ▪ Turn right onto NB Glenoaks Boulevard ▪ Turn right onto EB Osborne Street ▪ Turn right onto EB Foothill Boulevard ▪ Enter EB I-210 at the Osborne Street/Foothill Boulevard interchange

Table 3.16-1: Project Haul Route Streets

Proposed Haul Routes	Streets To Be Used
To/From Bradley Landfill	▪ Exit WB I-210 at the Osborne Street/Foothill Boulevard interchange ▪ Turn left onto WB Foothill Boulevard ▪ Turn left onto WB Osborne Street ▪ Turn left onto SB Glenoaks Boulevard ▪ Turn right onto WB Peoria Street ▪ Enter and exit the disposal site on Peoria Street ▪ Turn left onto EB Peoria Street ▪ Turn left onto NB Glenoaks Boulevard ▪ Turn right onto EB Osborne Street Turn right onto EB Foothill Boulevard ▪ Enter EB I-210 at the Osborne Street/Foothill Boulevard
To/From Boulevard Pit	▪ Exit WB I-210 at the Wheatland Avenue interchange ▪ Turn right onto NB Wheatland Avenue then right onto EB Foothill Boulevard ▪ Turn right onto Wentworth Street ▪ Turn left onto Glenoaks Boulevard ▪ Turn right onto Tuxford Street then right onto San Fernando Road ▪ Turn left onto Branford Street ▪ Enter and exit the disposal site on Branford Street ▪ Turn right onto EB Branford Street ▪ Turn right onto San Fernando Road then left on to Tuxford Street ▪ Turn left onto NB Glenoaks Boulevard ▪ Turn right onto EB Sheldon Street ▪ Turn left onto WB Foothill Boulevard then left onto SB Wheatland Avenue ▪ Enter EB I-210 at the Wheatland Avenue interchange

The proposed haul routes would consist of the roadways described below.

Devil's Gate Reservoir to/from I-210

Oak Grove Drive is a north-south, four-lane arterial road with a striped median to the north of the Foothill Freeway Overpass and a raised median to the south. The roadway provides two travel lanes in each direction and a bike lane in each direction. Oak Grove Drive provides direct access to the project site and freeway access from the project site through the intersections of Berkshire Place and Windsor Avenue. On-street parking is not permitted along Oak Grove Drive. Pavement conditions range from fair to poor conditions.

Berkshire Place is a west-east, four-lane collector road with two travel lanes in each direction, a bike lane in each direction, and a striped two-way left turn lane median. The road provides access to I-210from the residential neighborhoods to the north and west of the project site. On-street parking is not permitted along Berkshire Place. Pavement conditions range from good to fair conditions.

Windsor Avenue is a north-south, four lane arterial road with two travel lanes in each direction, one bike lane on the southbound side, and a striped two-way left turn lane median. Windsor Avenue provides regional access within the City of Pasadena and access to I-210. On-street parking is not

permitted along the west side, and some street parking is allowed on the east side of the roadway. Pavement conditions range from good to fair conditions.

Waste Management Facility, Vulcan Materials Reliance Facility, and Manning Pit Area to/from I-210

Irwindale Avenue is a north-south, four-lane arterial road with two travel lanes in each direction that has a raised median to the north of First Street and a striped two-way left turn lane median between First Street and Gladstone Street. Irwindale Avenue provides regional access within the Cities of Azusa and Irwindale and local access to I-210 and Interstate 10. On-street parking is generally permitted on both sides of the roadway between First Street and Gladstone Street. Pavement conditions range from good to fair conditions.

Foothill Boulevard is an east-west, four-lane arterial road with two travel lanes in each direction and a striped or raised median. Foothill Boulevard (Route 66) generally follows the alignment of the I-210 freeway. Pavement conditions range from good to fair.

Gladstone Street is a west-east, four-lane collector street with two travel lanes in each direction and a striped two-way left turn lane median. Gladstone Street provides regional access within the City of Azusa and access to I-210. On-street parking is permitted along some segments of the roadway, but these areas are not adjacent. Pavement conditions range from good to fair conditions.

Vincent Avenue is a north-south, four-lane collector road with two travel lanes in each direction and a striped two-way left turn lane median along certain sections of the roadway. Vincent Avenue provides regional access within the City of Azusa and Irwindale. On-street parking is generally permitted along the west side of the roadway and prohibited on the east side. Pavement conditions range from fair to poor conditions.

Arrow Highway is a west-east, four-lane arterial highway with two travel lanes in each direction and a striped two-way left turn lane median. Arrow Highway serves as an alternative to I-210 by providing access from the San Bernardino, Rancho Cucamonga, and San Dimas areas to Azusa, Covina, and Irwindale. It also provides regional access within Azusa, Covina, and Irwindale as well as access to Interstate 605 and SR-57. On-street parking is generally permitted along both sides of the roadway. Pavement conditions range from good to fair conditions.

Azusa Avenue (SR-39) is a north-south, divided four-lane arterial highway with two travel lanes in each direction and a raised median. Azusa Avenue (SR-39) provides access from the Cities of Azusa and Covina to Orange County. It also provides regional access to I-210 and Interstate 10. On-street parking is generally permitted along some segments of the roadway. Pavement conditions range from good to fair conditions.

First Street is a west-east, four-lane collector road with two travel lanes in each direction with a striped median. It provides regional access within the City of Azusa and access to westbound I-210. On-street parking is generally prohibited along both sides of the roadway. Pavement conditions range from good to fair conditions.

Scholl Canyon Landfill Area to/from SR-134

Figueroa Street is a north-south, four-lane arterial road with two travel lanes in each direction and a striped median. It provides access from the City of Los Angeles to the Eagle Rock area. It also provides regional access to SR-134. On-street parking is generally permitted along the west side of the roadway and prohibited on the east side. Pavement conditions range from fair to poor conditions. Scholl Canyon Road is a west-east, two-lane collector road with one travel lane in each direction and a striped median. Scholl Canyon Road provides access to the Scholl Canyon Landfill. On-street parking is generally permitted along both sides of the roadway. Pavement conditions are poor.

Boulevard, Bradley, Sun Valley Fill Site, and Sheldon Pits/Landfill to/from Freeways

Foothill Boulevard is a north-south, four-lane arterial road with two travel lanes in each direction, a striped bike lane in each direction, and a striped two-way left turn lane median. It provides access from the La Cañada Flintridge area to the San Fernando Valley area. It also provides regional access to I-210. On-street parking is generally prohibited along both sides of the roadway. Pavement conditions range from good to fair.

Osborne Street is a west-east, four-lane collector road with two travel lanes in each direction and a striped two-way left turn lane median. Osborne Street provides local access to I-210 and I-5. On-street parking is generally permitted along both sides of the roadway. Pavement conditions range from good to fair.

Branford Street is a west-east collector road with four lanes in some sections and three lanes in other sections and a striped, two-way left turn lane median. Branford Street provides access to I-5. Pavement conditions range from good to fair.

Glenoaks Boulevard is a north-south, four-lane arterial road with two travel lanes in each direction, a striped bike lane in each direction, and a striped two-way left turn lane median. It provides access from the City of San Fernando to the Cities of Los Angeles and Burbank. It also provides regional access to SR-118 and I-5. On-street parking is generally permitted along both sides of the roadway. Pavement conditions range from fair to poor.

Sheldon Street is west-east, four-lane arterial road with two travel lanes in each direction, a striped bike lane in each direction, and a two-way left turn lane. Sheldon Street provides local access to I-5and the Sun Valley Fill Site and Sheldon pit. On-street parking is generally prohibited along both sides of the roadway. Pavement conditions range from good to fair.

Laurel Canyon Boulevard is a north-south, four-lane arterial road with two travel lanes in each direction and a striped two-way left turn lane median. It provides access from the City of San Fernando to the City of Los Angeles. It also provides regional access to SR-118 and I-5. On-street parking is generally permitted along both sides of the roadway. Pavement conditions range from good to fair.

San Fernando Road is a north-south, four-lane arterial road with two travel lanes in each direction and a striped two-way left turn lane median. It provides access from the City of San Fernando to the Cities of Los Angeles and Burbank. It also provides regional access to SR-118 and I-5. On-street parking is generally permitted along the west side of the roadway and prohibited on the east side of the roadway. Pavement conditions range from good to fair.

Wheatland Avenue is a north-south, two-lane collector road with one travel lane in each direction and a striped median. Wheatland Avenue provides the Sunland community access to I-210. On-street parking is generally allowed along both sides of the roadway. Pavement conditions range from fair to poor.

Wentworth Street is a west-east, four-lane arterial road with two travel lanes in each direction, a striped bike lane in each direction, and a two-way left turn lane. Wentworth Street provides local access to the Sunland area. On-street parking is generally prohibited along both sides of the roadway. Pavement conditions range from good to fair.

Tuxford Street is a west-east, four-lane collector road with two travel lanes in each direction and a two-way left turn lane. Tuxford Street provides local access to I-5. On-street parking is generally allowed along both sides of the roadway. Pavement conditions range from good to fair.

Peoria Street is a west-east, two-lane local road with one travel lane in each direction. Peoria Street provides access to Bradley Landfill. On-street parking is generally allowed along the both sides of the roadway. Pavement conditions range from fair to poor.

Intersections

Potential impacts from traffic associated with the Proposed Project were analyzed for the following 52 intersections:

1. Berkshire Place and I-210 eastbound ramps (La Cañada Flintridge/Caltrans)
2. Berkshire Place and I-210 westbound ramps (La Cañada Flintridge/Caltrans)
3. Oak Grove Drive and Berkshire Place (Pasadena)
4. Oak Grove Drive and Foothill Freeway Overpass (La Cañada Flintridge)
5. Windsor Avenue and Oak Grove Drive/Woodbury Road (Altadena/Los Angeles County)
6. Windsor Avenue/Arroyo Boulevard and I-210 westbound ramps (Los Angeles County/Caltrans)
7. Windsor Avenue/Arroyo Boulevard and I-210 eastbound ramps (Pasadena/Caltrans)
8. Irwindale Avenue and I-210 westbound ramps (Caltrans, Irwindale)
9. Irwindale Avenue and I-210 eastbound ramps (Caltrans, Irwindale)
10. Irwindale Avenue and First Street (Irwindale/Azusa)
11. Irwindale Avenue and Gladstone Street (Irwindale/Azusa)
12. Vincent Avenue and Gladstone Street (Azusa)
13. Vincent Avenue and Arrow Highway(Irwindale/Azusa)
14. Arrow Highway and Lark Ellen Avenue (County of Los Angeles)
15. Arrow Highway and Enid Avenue (County of Los Angeles)
16. Azusa Avenue and Arrow Highway(Azusa/Covina)
17. Azusa Avenue and Gladstone Street (Azusa)
18. Azusa Avenue and I-210eastboundramps (Caltrans/ Azusa)
19. Azusa Avenue and First Street (Azusa)
20. First Street and Alameda Street/I-210 westbound ramps (Caltrans, Azusa)
21. Figueroa Street/Scholl Canyon Road and SR-134 westbound ramps (City of Los Angeles, Caltrans)
22. Figueroa Street and Eagle Vista Drive (City of Los Angeles)
23. Figueroa Street and SR-134 eastbound ramps (City of Los Angeles, Caltrans)
24. Foothill Boulevard and I-210 westbound ramps (City of Los Angeles, Caltrans)
25. Foothill Boulevard and I-210 eastbound ramps (City of Los Angeles, Caltrans)

26. Foothill Boulevard and Osborne Street (City of Los Angeles)
27. Glenoaks Boulevard and Osborne Street (City of Los Angeles)
28. Glenoaks Boulevard and Montague Street (City of Los Angeles)
29. Glenoaks Boulevard and Branford Street (City of Los Angeles)
30. Glenoaks Boulevard and Sheldon Street (City of Los Angeles)
31. Glenoaks Boulevard and Peoria Street (City of Los Angeles)
32. Glenoaks Boulevard and Tuxford Street (City of Los Angeles)
33. Glenoaks Boulevard and Penroe Street (City of Los Angeles)
34. Glenoaks Boulevard and Sunland Boulevard (City of Los Angeles)
35. Glenoaks Boulevard and Roscoe Boulevard (City of Los Angeles)
36. Roscoe Boulevard and I-5 northbound ramps (City of Los Angeles/Caltrans)
37. Roscoe Boulevard and I-5 southbound ramps (City of Los Angeles/Caltrans)
38. Branford Street and I-5 southbound ramps (City of Los Angeles/Caltrans)
39. Branford Street and I-5 northbound ramps (City of Los Angeles/Caltrans)
40. Branford Street and Laurel Canyon Boulevard (City of Los Angeles)
41. Osborne Street and I-5 southbound ramps (City of Los Angeles/Caltrans)
42. Osborne Street and I-5 northbound ramps (City of Los Angeles/Caltrans)
43. Osborne Street and Laurel Canyon Boulevard (City of Los Angeles)
44. Wheatland Avenue and I-210 eastbound ramps (City of Los Angeles/Caltrans)
45. Wheatland Avenue and I-210 westbound ramps (City of Los Angeles/Caltrans)
46. Wheatland Avenue and Foothill Boulevard (City of Los Angeles)
47. Wentworth Street and Foothill Boulevard (City of Los Angeles)
48. Tuxford Street and San Fernando Road (City of Los Angeles)
49. Lankershim Boulevard and San Fernando Road (City of Los Angeles)
50. Sheldon Street and San Fernando Road (City of Los Angeles)
51. Branford Street and San Fernando Road (City of Los Angeles)
52. Irwindale Avenue and Foothill Boulevard (City of Irwindale)

Freeway Facilities

The proposed haul routes have the potential to impact the following freeway facilities:

Interstate 210 Freeway (I-210) provides regional access within the study area and runs west to east to the east of the SR-134 interchange and runs north to south to the north of the SR-134 interchange. To the east of the SR-134 interchange, I-210 is an eight-lane freeway with four lanes in each direction and one carpool lane in each direction. To the north of the SR-134 interchange, I-210 becomes an eight-lane freeway with four lanes in each direction. This freeway is an interstate facility that provides travel between the San Bernardino, Rancho Cucamonga, and San Dimas areas to the Pasadena and San Fernando areas.

Interstate 5 Freeway (I-5) provides regional access within the study area and runs north to south, connecting southern California to northern California. I-5 is an eight-lane freeway with four lanes in each direction. This freeway is an interstate facility that provides travel between Los Angeles to Orange and San Diego counties and between Los Angeles to Bakersfield, Sacramento, and San Francisco.

State Route 134 Freeway (SR-134) provides regional access within the study area and runs west to east from the I-210 interchange to the US-101 and SR-170 interchange in Hollywood. SR-134 is an eight-lane

freeway with four lanes in each direction and one carpool lane in each direction. This freeway is a state facility that provides travel between the Ventura, Hollywood, and Burbank areas to the Pasadena, San Dimas, and San Bernardino areas.

State Route 2 Freeway (SR-2) provides regional access within the study area and runs north to south from south of the I-5 interchange in Los Angeles to the I-210 interchange in La Cañada Flintridge. SR-2 is an eight-lane freeway with four lanes in each direction. This freeway is a state facility that provides travel between the La Cañada Flintridge and Glendale areas to the Los Angeles and Hollywood areas.

An increase in truck traffic along the freeway and ramps can impact the level of service (LOS) of the freeway and ramps adversely. In order to ensure adequate freeway and ramp operations, this study has identified 28 freeway segments and 54 on- and off-ramps for analysis. The 28 freeway segments identified for analysis consist of the following:

1. I-210 between Windsor Avenue/Arroyo Boulevard and Berkshire Place
2. I-210 between Lincoln Avenue and Windsor Avenue/Arroyo Boulevard
3. I-210 between SR-134 and Mountain Street
4. SR-134 between San Rafael Avenue and Figueroa Street.
5. SR-134 between I-210 and San Rafael Avenue
6. I-210 between SR-134 and Lake Avenue
7. I-210 between I-605 and Irwindale Avenue
8. I-210 between Irwindale Avenue and Azusa Avenue
9. I-210 between Berkshire Place and Foothill Boulevard
10. I-210 between Angeles Crest Highway and SR-2 (Glendale Freeway)
11. SR-2 between I-210 and Mountain Street
12. SR-2 between Mountain Street and SR-134
13. SR-134 between SR-2 and Figueroa Street
14. SR-134 between SR-2 and Glendale Avenue
15. SR-134 between Pacific Avenue and Concord Street
16. SR-134 between Concord Street and I-5
17. I-5 between SR-134 and Western Avenue
18. I-5 between North Hollywood Way and Roscoe Boulevard/Glenoaks Boulevard
19. I-5 between Sheldon Street/Laurel Canyon Boulevard and SR-170
20. I-5 between SR-170 and Branford Street
21. I-210 between SR-2 and Montrose Avenue
22. I-210 between Sunland Boulevard and Wheatland Avenue
23. I-210 between Wheatland Avenue and Foothill Boulevard/Osborne Street
24. I-210 between Foothill Boulevard/Osborne Street and SR-118
25. SR-118 between I-210 and Glenoaks Boulevard
26. SR-118 between San Fernando Road and I-5
27. I-5 between SR-118 and Van Nuys Boulevard
28. I-5 between Tierra Bella Street and Osborne Street

The 54 on-ramps and off-ramps identified for analysis consist of the following:

1. Berkshire Place and the eastboundI-210 off-ramp (Diverge Point)
2. Berkshire Place and the westboundI-210 on-ramp (Merge Point)
3. Berkshire Place and the eastboundI-210 on-ramp (Merge Point)

4. Berkshire Place and the westboundI-210 off-ramp (Diverge Point)
5. Windsor Avenue/Arroyo Boulevard and the eastbound I-210 off-ramp (Diverge Point)
6. Windsor Avenue/Arroyo Boulevard and the westbound I-210 on-ramp (Merge Point)
7. Windsor Avenue/Arroyo Boulevard and the eastbound I-210 on-ramp (Merge Point)
8. Windsor Avenue/Arroyo Boulevard and the westbound I-210 off-ramp (Diverge Point)
9. Southbound I-210 Transition ramp to westbound SR-134mainline and eastbound I-210 mainline (Diverge Point)
10. Westbound I-210 and eastbound SR-134 transition ramp to the westbound I-210 mainline (Merge Point)
11. Eastbound I-210 transition ramp to westbound SR-134 mainline (Merge Point)
12. Eastbound SR-134 transition ramp to westbound I-210 mainline (Diverge Point)
13. Figueroa St/Scholl Canyon Road and westbound SR-134 off-ramp (Diverge Point)
14. Figueroa Street and eastbound SR-134 eastbound on-ramp (Merge Point)
15. Eastbound I-210 transition ramp to eastbound I-210 mainline(Merge Point)
16. Westbound I-210 transition ramp to westbound I-210 mainline (Diverge Point)
17. Irwindale Avenue and eastbound I-210 off-ramp (Diverge Point)
18. Irwindale Avenue and westbound I-210 on-ramp (Merge Point)
19. First Street/Alameda Street and westbound I-210 on-ramp (Merge Point)
20. Westbound I-210 transition ramp to southbound SR-2 mainline (Diverge Point)
21. Northbound SR-2 transition ramp to eastboundI-210 mainline (Merge Point)
22. Westbound I-210 transition ramp to southbound SR-2 mainline. (Merge Point)
23. Northbound SR-2 transition ramp to eastboundI-210 mainline (Diverge Point)
24. Southbound SR-2 transition ramp to eastbound SR-134 mainline (Diverge Point)
25. Westbound and eastbound SR-134 Transition ramp to northbound SR-2 mainline (Merge Point)
26. Southbound SR-2 transition ramp to eastbound SR-134 mainline (Merge Point)
27. Westbound SR-134 transition ramp to northbound SR-2 mainline (Diverge Point)
28. Figueroa Street and eastbound SR-134 off-ramp (Diverge Point)
29. Figueroa Street and westbound SR-134 on-ramp (Merge Point)
30. Southbound SR-2 transition ramp to westbound SR-134 mainline (Merge Point)
31. Eastbound SR-134 transition ramp to northbound SR-2 mainline (Diverge Point)
32. Westbound SR-134 transition ramp to northbound I-5 mainline (Diverge Point)
33. Southbound I-5 transition ramp to eastbound SR-134 mainline (Merge Point)
34. Westbound SR-134 transition ramp to northbound I-5 mainline (Merge Point)
35. Southbound I-5 transition ramp to eastbound SR-134 mainline (Diverge Point)
36. Roscoe Boulevard/Glenoaks Boulevard and northbound I-5 mainline off-ramp (Diverge Point)
37. Roscoe Boulevard/Glenoaks Boulevard and southbound I-5 mainline on-ramp (Merge Point)
38. Branford Street and southbound I-5 mainline on-ramp (Merge Point)
39. Branford Street and northbound I-5 mainline off-ramp (Diverge Point)
40. Wheatland Avenue and westbound I-210 mainline off-ramp (Diverge Point)
41. Wheatland Avenue and eastbound I-210 mainline on-ramp (Merge Point)
42. Foothill Boulevard/Osborne Street and westbound I-210 mainline off-ramp (Diverge Point)
43. Foothill Boulevard/Osborne Street and eastbound I-210 mainline on-ramp (Merge Point)
44. Westbound I-210 transition ramp to westbound SR-118 mainline (Diverge Point)
45. Eastbound SR-118 transition ramp to eastboundI-210 mainline (Merge Point)
46. Westbound I-210 transition ramp to westbound SR-118 mainline (Merge Point)
47. Eastbound SR-118 transition ramp to eastbound I-210 mainline (Diverge Point)
48. Westbound SR-118 transition ramp to southbound I-5 mainline (Diverge Point)

49. Northbound I-5 transition ramp to eastbound SR-118 mainline (Merge Point)
50. Westbound SR-118 transition ramp to southbound I-5 mainline (Merge Point)
51. Northbound I-5 transition ramp to eastbound SR-118 mainline (Diverge Point)
52. Osborne Street and southbound I-5 mainline off-ramp (Diverge Point)
53. Osborne Street and northbound I-5 mainline on-ramp (Merge Point)
54. Irwindale Avenue and westbound I-210 on-ramp. (Merge Point)

3.16.3 Applicable Regulations

City of Pasadena General Plan Mobility Element

The Mobility Element of the City of Pasadena General Plan provides a framework of objectives and policies to guide transportation development. The Mobility Element has been developed to serve two purposes for the City of Pasadena:

- The Mobility Element contains objectives and policies that will guide the future development towards the City's Guiding Principle related to mobility – Pasadena will be a city where people can circulate without cars.

- The Mobility Element addresses the requirements of California state law designed to evaluate the transportation needs of the community within the context of the region and to present a comprehensive plan to meet those needs.

The Mobility element seeks to meet its first purpose through development of an integrated and multimodal transportation system that integrates public transit services, parking strategies, bicycle facilities, car-sharing programs, and pedestrian components into the larger regional transportation system. The Mobility Element has identified the following four objectives in pursuit of this goal:

- Promote a livable community

- Encourage non-auto travel

- Protect neighborhoods by discouraging traffic from intruding into community neighborhoods

- Manage multimodal corridors to promote and improve citywide transportation services

Each of these objectives is supported by numerous policies to guide future transportation development in the City. Relevant policies from the "Protect neighborhoods by discouraging traffic from intruding into community neighborhoods" section of the Mobility Element include:

- Policy 3.1 Make the most efficient use of major corridors and discourage auto and truck traffic from using local streets to bypass congested intersections. Review new development along multimodal corridors to eliminate or minimize the intrusion of traffic from these projects.

- Policy 3.5 Promote safe travel in neighborhoods and enforce traffic regulations with particular attention given to sensitive uses such as schools, senior centers, hospitals, community services, and parks.

Relevant policies from the "Manage multimodal corridors to promote and improve citywide transportation services" section of the Mobility Element include:

- Policy 4.1 Develop and implement appropriate traffic management measures and improved directional signage to keep traffic on designated major multimodal corridors and to accommodate the needs of users along the corridor and the needs of multimodal and peak-hour travelers.

- Policy 4.5 Ensure safe and efficient travel and traffic management throughout the City, while providing adequate access for all users.

City of Los Angeles General Plan Transportation Element

The purpose of the Transportation Element of the City of Los Angeles general Plan is to provide a guide for the further development of a citywide transportation system. The Transportation Element places its primary emphasis on maximizing the efficiency of existing and proposed transportation infrastructure through:

- advanced transportation technology,
- reduction of vehicle trips, and
- focusing growth in proximity to public transit.

In order to establish a citywide strategy to achieve long-term mobility and accessibility within the City of Los Angeles, the Transportation Element has established goals, objectives, and policies. The Transportation Element has identified the following three goals:

- Adequate accessibility to work opportunities and essential services, and acceptable levels of mobility for all those who live, work, travel, or move goods in Los Angeles.

- A street system maintained in a good to excellent condition adequate to facilitate the movement of those reliant on the system.

- An integrated system of pedestrian priority street segments, bikeways, and scenic highways which strengthens the City's image while also providing access to employment opportunities, essential services, and open space.

Each of these goals is supported by numerous objectives and policies to guide future transportation development in the City of Los Angeles. Relevant policies under the Transportation Element's Objective 4, to preserve the existing character of lower density residential areas and maintain pedestrian-oriented environments where appropriate, include:

- Policy 4.1 – Seek to eliminate or minimize the intrusion of traffic generated by new regional or local development into residential neighborhoods while preserving an adequate collector street system.

- Policy 4.2 – Incorporate traffic management measures to control traffic speeds and volumes on local and collector streets within low density residential neighborhoods to assure safe and

orderly traffic flow. Traffic management measures for such local streets may include partial closures and/or traffic diverters.

City of Irwindale General Plan Infrastructure Element

The Infrastructure Element of the City of Irwindale General Plan provides a guide for the ongoing development of the City of Irwindale's roadway system. The purpose of the Infrastructure Element is to promote the maintenance of a safe and efficient circulation system for the City of Irwindale. The policies included in the Infrastructure Element focus on the City of Irwindale's commitment to maintaining highest standards of service with respect to circulation and infrastructure and to improve safe and efficient circulating in the City of Irwindale. Additionally, the City of Irwindale implements a number of programs within the Infrastructure Element. A relevant program is:

- Truck Route Planning. The City will work with other cities, public agencies, and stakeholders to establish a system of truck route plans for the sub-region.

City of Azusa General Plan Mobility Element

The City of Azusa seeks to become a pedestrian-friendly, transit-oriented community. The Mobility Element of the City of Azusa provides a guided approach to local transportation choices for the City of Azusa as an integral part of the regional circulation pattern. The Mobility Element includes ideas to facilitate change for the City of Azusa, such as:

- Promote the construction of two Gold Line Light Rail Stations – Downtown and Monrovia Nursery.
- Increase roadway capacity at the western and southern edges of the City thus relieving through traffic on Azusa Avenue.
- Create a "river parkway" that links to I-210 interchange and Sierra Madre Avenue.
- Create new north-south routes south of the freeway to improve southwestern circulation.
- Add bike and pedestrian links to schools, commercial centers, and public centers.
- Study the conversion of Azusa and San Gabriel Avenues to two-way traffic.
- Replace Vernon Avenue interchange with a new interchange at Zachary Padilla to reclaim the surrounding neighborhood.

Relevant policies under the Mobility Element goal to balance the roadway with the planning lands use in the City include:

- Policy 1.2 – Maintain Level of Service D on roadway segments and at signalized intersections throughout the City, except in the downtown area, the University District, and in the vicinity of freeway interchanges where Level of Service E shall be maintained in these areas.
- Policy 1.4 – Work with adjacent jurisdictions and agencies to ensure that development projects and infrastructure projects outside the City of Azusa do not adversely impact the City.

A relevant policy under the Mobility Element goal to focus truck traffic onto appropriate arterial corridors within the City, and keep truck traffic out of residential neighborhoods, is:

- Policy 7.1 Modify the truck route network in accordance with the Truck Route Plan.

City of La Cañada Flintridge Circulation Element

The Circulation Element of La Cañada Flintridge's General Plan is intended to guide the development of the City of La Cañada Flintridge's circulation system. The Circulation element includes goals, objectives, and policies to establish a foundation to guide future circulation- and transportation-related decisions within the City.

A relevant policy under the Circulation Element's goal to maintain a safe, multi-modal, efficient, economical, and aesthetically pleasing circulation system providing for the circulation of people, goods, and services to serve the existing and future needs of the City of La Cañada Flintridge, is:

- Policy 1.1.4 – Participate in transportation planning efforts that involve other governmental agencies, mandated programs, and regulations in order to minimize potential environmental impacts related to transportation in and around the City.

Metropolitan Transit Authority

Los Angeles County Metropolitan Transportation Authority (LACMTA) is the Congestion Management Agency for Los Angeles County. LACMTA is responsible for transportation planning, design, construction, and operation of transportation systems.

California Department of Transportation

The California Department of Transportation (Caltrans) manages more than 50,000 miles of California's highway and freeway lanes, provides intercity rail services, permits more than 400public-use airports and special-use hospital heliports, and works with local agencies. Caltrans carries out its mission of improving mobility across California with six primary programs: Aeronautics, Highway Transportation, Mass Transportation, Transportation Planning Administration, and the Equipment Service Center. State routes in the vicinity of the Proposed Project site are the Golden State Freeway (I-5) and the Hollywood Freeway (SR-170).

3.16.4 Significance Criteria

- *TRANSPORTATION-1: Would the project conflict with an applicable plan, ordinance or policy establishing measure of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?*

- *TRANSPORTATION-2: Would the project conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?*

- *TRANSPORTATION-3: Would the project substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?*
- *TRANSPORTATION-4: Would the project result in inadequate emergency access?*
- *TRANSPORTATION-5: Would the project conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities supporting alternative transportation (e.g., bus turnouts, bicycle racks)?*
- *TRANSPORTATION-6: Cumulative Impacts*

3.16.5 Methodology

The traffic impact report (Appendix J) analyzed whether implementation of the Proposed Project would impact LOS standards at each intersection, freeway segment, and freeway on- and off-ramp used by the Proposed Project haul routes and associated impacts to congestion management plans.

Level of Service Analysis for Local Intersections

In order to verify the intersection capacity analysis impacts, present LOS was analyzed for the signalized and unsignalized study intersections. Based on the existing intersection geometrics and traffic volumes during the AM, Mid-day, and PM peak hours, the intersection capacity analyses for the signalized and unsignalized intersections were conducted using Trafficware Ltd Synchroversion 8, which implements the methods of the 2010 Highway Capacity Manual (HCM) and2003 Intersection Capacity Utilization (ICU) methods. Table 3.16-2: Critical Movement Analysis (CMA) –LOS and V/C Thresholds presents the LOS standards utilized in the critical movement analysis for LOS and volume capacity (V/C) ratios. Further details on the methodology used in the traffic impact analysis are presented in Appendix J.

It is important to note that each city/jurisdiction has different criteria and thresholds to identify the lowest acceptable service levels. Each jurisdiction along the truck haul routes follows either the ICU, CMA, or HCM methodologies for signalized intersections. Synchro analysis was used to conduct the intersection capacity analyses for the signalized and unsignalized intersections since Synchro can provide the LOS per the HCM and ICU methodologies. To further understand the concepts and differences between the methodologies used by the local jurisdictions, each methodology is described below.

Critical Movement Analysis (CMA)

The Critical Movement Analysis methodology is a method developed by the Transportation Research Board (TRB) Circular 212. Under the CMA methodology the LOS is determined by dividing the volume of vehicles that pass through the facility over the capacity of that facility. This ratio is known as the volume-to-capacity (V/C) ratio. A V/C ratio value of 1.00 or greater indicates that an intersection is at or exceeding capacity. The V/C ratio value is based upon volumes by lane, signal phasing, and approach lane configurations. The LOS values range from LOS A to LOS F, where a LOS A indicates excellent operating conditions and a LOS F represents congested conditions with excessive vehicle delay. Table 3.16-2 presents the threshold table for signalized intersections per the CMA methodology.

Table 3.16-2: Critical Movement Analysis (CMA) –LOS and V/C Thresholds

Level of Service (LOS)	Volume/Capacity Ratio (V/C)	Definition
A	0.000 – 0.600	EXCELLENT. No vehicle waits longer than one red light, and no approach phase is fully used.
B	0.601 – 0.700	VERY GOOD. An occasional approach phase is fully utilized; many drivers begin to feel somewhat restricted within groups of vehicles.
C	0.701 – 0.800	GOOD. Occasionally, drivers may have to wait through more than one red light; backups may develop behind turning vehicles.
D	0.801 – 0.900	FAIR. Delays may be substantial during portions of the rush hours, but enough lower-volume periods occur to permit clearing of developing lines, preventing excessive backups.
E	0.901 – 1.000	POOR. Represents the most vehicles that intersection approaches can accommodate; long lines of vehicles may wait through several signal cycles.
F	Greater than 1.000	FAILURE. Backups from nearby intersections or on cross streets may restrict or prevent movement of vehicles out of the intersection approaches. Tremendous delays occur with continuously increasing queue lengths.

ICU

The ICU traffic analysis methodology is similar to the CMA methodology. Like the CMA method the ICU method uses V/C ratios to determine a LOS for an intersection; however, the ICU method compares the V/C ratios of conflicting turn movements at an intersection, sums these critical conflicting V/C ratios for each intersection approach, and determines the overall ICU. The resulting ICU is expressed in terms of LOS, where LOS A represents free-flow activity and LOS F represents overcapacity operation. The ICU thresholds are similar to the thresholds of the CMA methodology but can vary by local jurisdictions.

HCM Methodology

The HCM traffic analysis methodology was developed by the Transportation Research Board (TRB). Under the HCM methodology the LOS of an intersection is determined based on the delay of vehicles at the intersections. For signalized intersections the HCM measures the LOS based on control delay. Control delay is a portion of the total delay attributed to a signalized intersection and consists of initial acceleration delay, queue move-up time, stopped delay, and final acceleration delay. The HCM bases its delay on an adjusted flow using a mean control delay for the highest 15-minute period within the hour. The LOS for signalized intersections ranges from LOS A, which indicates excellent operating conditions and LOS F, which represents congested conditions with excessive vehicle delay.

Level of Service Analysis Criteria for Freeways and Ramps:

The proposed haul routes for the Devil's Gate Reservoir Sediment Removal and Management Project will require the expected truck trips to travel through the I-210, I-5, SR-2, and SR-134 freeways from which 28 freeway segments and 54 ramps were identified for analysis. The LOS analysis done on the

freeways and ramps was conducted per Caltrans requirements, which consists of the use of the HCM 2010 methodologies. To determine the LOS per the HCM 2010 methodology, Highway Capacity 2010 software, (HCS) which is developed by McTrans, was used for the freeway mainline analysis, ramp analysis, and weaving analysis.

Freeway Mainline HCM Analysis:

The freeway mainline LOS analysis was conducted using existing mainline volumes provided by Caltrans for each segment identified for analysis. The HCM methodology for determining the LOS of a basic freeway segment consists of inputting the existing geometric data, free-flow speed (FFS), base free-flow speed (BFFS), and mainline volumes into specific formulas described in Chapter 23 of the HCM. The procedure consists of adjusting the BFFS and mainline volume based on the existing conditions of the freeway. After the adjustments are made, a speed-flow curve is used to determine the average passenger car speed in order to compute the density of the freeway segment to determine the LOS of that segment.

To determine the mainline LOS, the mainline volumes and required criteria are inputted into the HCS 2010 software, which calculates the freeway segment density value using the HCM methodology. Caltrans District 7 has established that the densities in a freeway mainline should not exceed 35 number of cars per mile per lane(pc/mi/ln), which corresponds to a LOS D. Caltrans has determined that freeway segments that operate below LOS D should be identified and improved to an acceptable LOS.

Ramp HCM Analysis

The HCM methodology for determining the LOS of a freeway ramp consists of inputting the existing geometric data, ramp free-flow speed, and the existing ramp volumes into specific formulas described in Chapter 25 of the HCM. The volume (demand) is adjusted, and then a demand flow rate is computed for a merging (entering) maneuver in an on-ramp or a diverging (exiting) maneuver in an off-ramp. Capacity is then computed and compared to the adjusted flow. After this, the density for the ramp can be computed and the LOS of the ramp can be determined.

To determine the freeway ramp LOS, a ramp merge and diverge analysis was carried out through the use of the freeway-to-arterial interchanges analysis in the HCS software. According to Chapter 13 of the HCM, the merge and diverge ramp areas focus on an influential area of 1,500 feet, which includes the acceleration or deceleration lane and adjacent freeway lanes. The HCM methodology has three major steps that need to be followed.

The first step is the determination of traffic entering the freeway lanes immediately upstream of the merge area for a merging maneuver or at the beginning of a deceleration lane of the diverge area for a diverging maneuver. The second step is to determine the capacity for the corresponding segment. The final step is the determination of the density of flow within the influence area and the LOS based on that density value.

The HCS software computes a density value for a freeway ramp using the same HCM procedure. Caltrans District 7 has established that the densities in a freeway ramp should not exceed 35.0 pc/mi/ln, which corresponds to a LOS D. Caltrans has determined that freeway ramps that operate below LOS D should be identified and improved to an acceptable LOS.

Capacity analyses were conducted for 52 intersections, 28 freeway segments, and 54 freeway on- and off-ramps based on the following three traffic models:

- Existing Conditions
- Existing Conditions with Project
- Project Year 2014

The work day is divided into three peak hour periods. The AM peak period consists of the hours 7:00 a.m. to 10:00 a.m. The MID-DAY peak period consists of the hours 10 a.m. to 4 p.m. The PM peak period consists of the hours from 4:00 p.m. to 6:00 p.m.

3.16.6 Impacts and Mitigation

TRANSPORTATION-1 *Conflict with an applicable plan, ordinance or policy establishing measure of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit.*

Sediment Removal

The Proposed Project would adhere to traffic regulations regarding truck traffic; however, during sediment removal, Proposed Project truck traffic is expected to impact traffic LOS on the existing roadway network. Potential impacts regarding existing LOS are discussed under TRANSPORTATION-2 below. This increase in traffic would result in temporary significant impacts to the efficiency of the circulation system. Implementation of Mitigation Measures MM TRA-1 and TRA-2 would reduce this impact but not to a level of less than significant.

Other potential impact reduction measures discussed under TRANSPORTATION-2, below, could reduce impacts to less than significant. These measures cannot be legally imposed by the LACFCD, however, since the locations are under the jurisdiction of other agencies. Every reasonable effort will be made to coordinate with and receive approval from the jurisdictional agencies to implement the impact reduction measures but LACFCD cannot guarantee that the measures will be implemented. Therefore, this temporary impact could remain potentially significant.

Reservoir Management

Truck traffic associated with reservoir management is not expected to adversely affect traffic LOS on the existing roadway network. Therefore, impacts to the efficiency of the circulation system would be less than significant.

Mitigation Measures

MM TRA-1: Proposed Project haul trucks will not deliver to the Vulcan Material Reliance Facility during the PM peak period.

MM TRA-2: Proposed Project haul trucks will not deliver to the Boulevard Pit during the PM peak period.

Residual Impacts After Mitigation

Potentially significant traffic impacts associated with the sediment removal phase would be temporary, expected to occur during the drier months (from April to December, except on holidays), and would cease at the end of the sediment removal phase. Implementation of the mitigation measures described above would reduce impacts to traffic and circulation but not to a level of less than significant. Other potential impact reduction measures discussed under TRANSPORTATION-2, below, could reduce impacts to less than significant. These measures cannot be legally imposed by the LACFCD, however, since the locations are under the jurisdiction of other agencies. Every reasonable effort will be made to coordinate with and receive approval from the jurisdictional agencies to implement the impact reduction measures but LACFCD cannot guarantee that the measures will be implemented. Therefore, this temporary impact could remain potentially significant. No significant traffic impacts would occur under reservoir management.

TRANSPORTATION-2 *Conflict with an applicable congestion management program, including but not limited to level of service standards and travel demand measures or other standards established by the county congestion management agency for designated roads or highways.*

Sediment Removal

The Proposed Project would utilize the project haul routes listed in Table 3.16-1, shown above. Impacts to intersections, freeway segments, and freeway on- and off-ramps based on the selected Proposed Project haul routes are presented below.

Intersections

Devil's Gate Reservoir to/from I-210 (eastern disposal sites)

Table 3.16-3: LOS for Devil's Gate Reservoir to/from I-210 (eastern disposal sites), Year 2014 with Project Traffic AM Peak Period LOS for Devil's Gate Reservoir to/from I-210 (eastern disposal sites), Year 2014 with Project Traffic AM Peak Period shows the LOS for Proposed Project traffic at year 2014 for the intersections between the reservoir and I-210. All the intersections are anticipated to continue to operate at an LOS D or better for all utilized intersections during the MID-DAY and PM peak periods. Therefore, no significant impacts will occur at these intersections during the MID-DAY and PM peak periods. The Berkshire Place and I-210 eastbound ramps intersection is anticipated to operate at an unacceptable LOS during the AM peak hour, resulting in a temporary significant impact. Table 3.16-4 shows the contribution of Proposed Project traffic to existing conditions and year 2014 conditions for the AM peak period.

In order to reduce the impacts to the Berkshire Place and I-210 eastbound ramps intersection during the AM peak period, sediment removal trucks would have to use an alternative route during this period. This alternative route would involve as follows: Loaded trucks will exit the reservoir on the improved, existing westerly access road, turning left onto southbound Oak Grove Drive, then right onto westbound

Windsor Avenue, and then east onto I-210 east, to disposal sites in Azusa and Irwindale or I-210 west to the Sun Valley disposal sites.

As shown in Table 3.16-5: Alternative Haul Route to I-210 to Eastern Disposal Sites AM Peak Hour, under this route all the intersections are anticipated to continue to operate at an LOS C or better for all utilized intersections for the AM Peak Period; however, use of this alternative route would require implementation of the following potential impact reduction measure:

- Proposed Project haul trucks would avoid using the Berkshire Place and I-210 eastbound ramps intersection during the AM peak period by instead using the Windsor/Arroyo and I-210 ramps. This would require the median on Oak Grove Drive to be restriped to a Two Way Left Turn Lane (TWLTL). Trucks exiting the Devil's Gate Reservoir driveway will cross the two lanes of oncoming westbound traffic on Oak Grove Drive and utilize the TWLTL if necessary to merge into the eastbound traffic. The changes to Oak Grove Drive would require the approval of the City of Pasadena.

The impact reduction measure discussed above cannot be legally imposed by the LACFCD since the location is under the jurisdiction of the City of Pasadena. Every reasonable effort will be made to coordinate with and receive approval to implement this impact reduction measure; however, LACFCD cannot guarantee that this impact reduction measure will be implemented. Therefore this temporary impact would remain potentially significant.

Table 3.16-3: LOS for Devil's Gate Reservoir to/from I-210 (eastern disposal sites), Year 2014 with Project Traffic

Intersection		AM				MID-DAY (12-2 PM)				MID-DAY (2-4 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
1	Berkshire Place and I-210 eastbound ramps	F	51.4	-	-	B	10.8	-	-	C	23.7	-	-	D	31.6	-	-
2	Berkshire Place and I-210 westbound ramps	A	9.5	-	-	A	4.9	-	-	A	7.2	-	-	A	3.8	-	-
3	Oak Grove Drive and Berkshire Place	B	19.2	0.93	B	A	5.6	0.29	A	A	8.4	0.57	B	A	8	0.57	B
4	Oak Grove Drive and Foothill Freeway Overpass	C	19.2	-	-	A	9.6	-	-	A	9.5	-	-	B	11.3	-	-
5	Windsor Avenue and Oak Grove Drive/Woodbury Road	C	34.7	0.94	D	B	14.3	0.54	A	B	17.1	0.58	A	C	24.9	0.76	C
6	Windsor Avenue/Arroyo Boulevard and I-210 westbound ramps	B	10.4	0.66	B	A	6	0.31	A	A	7.3	0.41	A	A	8.2	0.45	B

Table 3.16-4: Devil's Gate Reservoir to/from I-210 (eastern disposal sites) AM Peak Period

Intersection AM Peak Hour		Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project		Year 2014 with Project Mitigation		
Intersection # / Name		HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact
1	Berkshire Place and I-210 eastbound ramps	-	D	-	E	YES	-	F	N/A*	N/A*	YES
2	Berkshire Place and I-210 westbound ramps	-	A	-	A	NO	-	A	NMR**	NMR**	NO
3	Oak Grove Drive and Berkshire Place	0.50	A	0.67	A	NO	0.93	B	NMR**	NMR**	NO
4	Oak Grove Drive and Foothill Freeway Overpass	-	B	-	C	NO	-	C	NMR**	NMR**	NO
5	Windsor Avenue and Oak Grove Drive/Woodbury Road	0.87	C	0.86	C	NO	0.94	C	NMR**	NMR**	NO
6	Windsor Avenue/Arroyo Boulevard and I-210 westbound ramps	0.53	A	0.57	A	NO	0.66	B	NMR**	NMR**	NO

*No mitigation available.
**No mitigation required.

Table 3.16-5: Alternative Haul Route to I-210 to Eastern Disposal Sites AM Peak Hour

AM Peak Hour		Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project and Impact Reduction Measure*		Year 2014 with Project and Mitigation		
Intersection # / Name		HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact
4	Oak Grove Drive and Foothill Freeway Overpass	-	B	-	C	NO	-	C	NMR**	NMR**	NO
5	Windsor Avenue and Oak Grove Drive/Woodbury Road	0.87	C	0.86	C	NO	0.94	C	NMR**	NMR**	NO
6	Windsor Avenue/Arroyo Boulevard and I-210 westbound ramps	0.53	A	0.60	A	NO	0.68	B	NMR**	NMR**	NO
7	Windsor Avenue/Arroyo Boulevard and I-210 eastbound ramps	0.49	C	0.53	C	NO	0.39	C	NMR**	NMR**	NO

* Use of this alternative route would require implementation of the impact reduction measure discussed above. LACFCD cannot guarantee implementation of this measure. Measure would require approval from the City of Pasadena.
**No mitigation required.

Devil's Gate Reservoir to/from I-210 (western disposal sites)

Table 3.16-6 shows the LOS for Proposed Project traffic at year 2014 for the intersections between the reservoir and I-210. Table 3.16-7 shows the contribution of Proposed Project traffic to existing conditions and year 2014 conditions for the AM peak period. All the intersections are anticipated to continue to operate at an LOS C or better for all utilized intersections throughout the day. Therefore, no significant impacts will occur at these intersections.

Table 3.16-6: LOS for Devil's Gate Reservoir to/from I-210 (western disposal sites), Year 2014 with Project Traffic

Intersection		AM				MID-DAY (12-2 PM)				MID-DAY (2-4 PM)				PM			
Intersection #/Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
2	Berkshire Place and I-210 westbound ramps (3)	B	10.4	-	-	A	4.6	-	-	A	6.6	-	-	A	3.5	-	-
3	Oak Grove Drive and Berkshire Place	B	19.2	0.93	B	A	5.6	0.29	A	A	8.4	0.57	B	A	8	0.57	B
4	Oak Grove Drive and Foothill Freeway Overpass (3)	C	19.2	-	-	A	9.6	-	-	A	9.5	-	-	B	11.3	-	-

Table 3.16-6: LOS for Devil's Gate Reservoir to/from I-210 (western disposal sites), Year 2014 with Project Traffic

Intersection		AM				MID-DAY (12-2 PM)				MID-DAY (2-4 PM)				PM			
Intersection #/Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
5	Windsor Avenue and Oak Grove Drive/Woodbury Road	C	34.7	0.94	D	B	14.3	0.54	A	B	17.1	0.58	A	C	24.9	0.76	C
6	Windsor Avenue/Arroyo Boulevard and I-210 westbound ramps	A	9.7	0.61	B	A	5.7	0.37	A	A	6.4	0.37	A	A	7.8	0.44	B
7	Windsor Avenue/Arroyo Boulevard and I-210 eastbound ramps	C	28.6	0.57	A	B	16.1	0.39	A	B	17.4	0.42	A	C	26.8	0.63	A

Table 3.16-7: Devil's Gate Reservoir to/from I-210 (western disposal sites) AM Peak Period

Intersection AM Peak Hour		Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project		Year 2014 with Project and Mitigation		
Intersection #/Name		HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact
2	Berkshire Place and I-210 westbound ramps	-	A	-	A	NO-	-	B	NMR*	NMR*	NO
3	Oak Grove Drive and Berkshire Place	0.50	A	0.67	A	NO	0.93	B	NMR*	NMR*	NO
4	Oak Grove Drive and Foothill Freeway Overpass	-	B	-	C	NO	-	C	NMR*	NMR*	NO
5	Windsor Avenue and Oak Grove Drive/Woodbury Road	0.87	C	0.86	C	NO	0.94	C	NMR*	NMR*	NO
6	Windsor Avenue/Arroyo Boulevard and I-210 westbound ramps	0.53	A	0.55	A	NO	0.61	A	NMR*	NMR*	NO
7	Windsor Avenue/Arroyo Boulevard and I-210 eastbound ramps	0.49	C	0.53	C	NO	0.57	C	NMR*	NMR*	NO

*No mitigation required.

Manning Pit Area to/from I-210

Table 3.16-8 shows the LOS for Proposed Project traffic at year 2014 for the intersections between Manning Pit and I-210. Table 3.16-9 shows the contribution of Proposed Project traffic to existing conditions and year 2014 conditions for the AM peak period. All the intersections are anticipated to continue to operate at an LOS C or better for all utilized intersections throughout the day. Therefore, no significant impacts will occur at these intersections.

Table 3.16-8: LOS for Manning Pit Area to/from I-210 Intersections, Year 2014 with Project Traffic

Intersection		AM				MID-DAY				PM			
Intersection #/Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
8	Irwindale Avenue and I-210 westbound ramps	A	7.1	0.56	A	A	7.4	0.53	A	A	7.3	0.56	A
9	Irwindale Avenue and I-210 eastbound ramps	C	27.9	0.93	C	C	22.0	0.79	C	C	26.9	0.91	D
10	Irwindale Avenue and First Street	B	10.6	0.63	B	B	14.2	0.65	B	C	23.2	0.86	C
11	Irwindale Avenue and Gladstone Street	C	29.9	0.92	D	B	16.0	0.72	B	C	30.2	0.95	D
12	Vincent Avenue and Gladstone Street	B	14.3	0.80	C	A	8.9	0.45	A	B	14.4	0.72	C
13	Vincent Avenue and Arrow Highway	B	17.6	0.90	D	A	9.8	0.45	A	B	15.4	0.93	D

Table 3.16-9: Manning Pit Area to/from I-210, AM Peak Period

Intersection AM Peak Hour		Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project		Year 2014 with Project and Mitigation		
Intersection #/Name		HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact
8	Irwindale Avenue and I-210 westbound ramps	0.48	A	0.5	A	NO	0.56	A	NMR*	NMR*	NO
9	Irwindale Avenue and I-210 Eastbound Ramps	0.84	C	0.85	C	NO	0.93	C	NMR*	NMR*	NO
10	Irwindale Avenue and First Street	0.6	B	0.64	B	NO	0.63	B	NMR*	NMR*	NO
11	Irwindale Avenue and Gladstone Street	0.81	C	0.87	C	NO	0.92	C	NMR*	NMR*	NO

Table 3.16-9: Manning Pit Area to/from I-210, AM Peak Period

Intersection AM Peak Hour		Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project		Year 2014 with Project and Mitigation		
Intersection #/Name		HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact
12	Vincent Avenue and Gladstone Street	0.61	B	0.72	B	NO	0.8	B	NMR*	NMR*	NO
13	Vincent Avenue and Arrow Highway	0.77	B	0.8	B	NO	0.9	B	NMR*	NMR*	NO

*No mitigation required.

Waste Management to/from I-210

Table 3.16-10 shows the LOS for Proposed Project traffic at year 2014 for the intersections between Waste Management and I-210. Table 3.16-11 shows the contribution of Proposed Project traffic to existing conditions and year 2014 conditions for the AM peak period. All the intersections are anticipated to continue to operate at an LOS C or better for all utilized intersections throughout the day. Therefore, no significant impacts will occur at these intersections.

Table 3.16-10: LOS for Waste Management Facility to/from I-210 Intersections, Year 2014 with Project Traffic

Intersection		AM				MID-DAY				PM			
Intersection #/Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
8	Irwindale Avenue and I-210 westbound ramps	A	7.1	0.56	A	A	7.4	0.53	A	A	7.3	0.56	A
9	Irwindale Avenue and I-210 eastbound ramps	C	27.9	0.93	C	C	22.0	0.79	C	C	26.9	0.91	D
10	Irwindale Avenue and First Street	B	10.6	0.63	B	B	14.2	0.65	B	C	23.2	0.86	C
11	Irwindale Avenue and Gladstone Street	C	29.9	0.92	D	B	16.0	0.72	B	C	30.2	0.95	D
12	Vincent Avenue and Gladstone Street	B	11.7	0.68	B	A	8.7	0.31	A	B	11.0	0.57	B

Table 3.16-11: Waste Management to/from I-210, AM Peak Period

Intersection AM Peak Hour		Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project		Year 2014 with Project and Mitigation		
Intersection #/Name		HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact
8	Irwindale Avenue and I-210 westbound ramps	0.48	A	0.5	A	NO	0.56	A	NMR*	NMR*	NO
9	Irwindale Avenue and I-210 eastbound ramps	0.84	C	0.85	C	NO	0.93	C	NMR*	NMR*	NO
10	Irwindale Avenue and First Street	0.6	B	0.64	B	NO	0.63	B	NMR*	NMR*	NO
11	Irwindale Avenue and Gladstone Street	0.81	C	0.87	C	NO	0.92	C	NMR*	NMR*	NO
12	Vincent Avenue and Gladstone Street	0.61	B	0.65	B	NO	0.68	B	NMR*	NMR*	NO

*No mitigation required.

Vulcan Material Reliance Facility to/from I-210

Table 3.16-12 shows the LOS for Proposed Project traffic at year 2014 for the intersections between Vulcan Material Reliance Facility and I-210. All the intersections are anticipated to continue to operate at an LOS D or better for all utilized intersections during the AM and MID-Day peak periods. Therefore, no significant impacts will occur at these intersections during these time periods. The Irwindale Avenue/Foothill Boulevard intersection is anticipated to operate at an unacceptable LOS during the PM peak hour, resulting in a temporary significant impact. Table 3.16-13 shows the contribution of Proposed Project traffic to existing conditions and year 2014 conditions for the PM peak period. Implementation of Mitigation Measure MM TRA-1 would reduce the impact to the Irwindale Avenue/Foothill Boulevard intersection to less than significant.

Table 3.16-12: LOS for Vulcan Material Reliance Facility to/from I-210 Intersections, Year 2014 with Project Traffic

Intersection		AM				MID-DAY				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
8	Irwindale Avenue and I-210 westbound ramps	A	7.2	0.57	A	A	7.5	0.54	A	A	7.5	0.58	A
9	Irwindale Avenue and I-210 eastbound ramps	C	27.9	0.90	C	C	22.5	0.80	C	C	26.6	0.88	D
53	Irwindale Avenue and Foothill Boulevard	C	30.0	0.87	C	D	46.8	1.01	D	E	77.1	1.09	F

Table 3.16-13: Vulcan Material Reliance Facility to/from I-210, PM Peak Period

Intersection PM Peak Hour		Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project		Year 2014 with Project and Mitigation		
Intersection # / Name		HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact
8	Irwindale Avenue and I-210 westbound ramps	0.50	A	0.52	A	NO	0.58	A	NPPT*	NPPT*	NO
9	Irwindale Avenue and I-210 eastbound ramps	0.83	C	0.84	C	NO	0.88	C	NPPT*	NPPT*	NO
53	Irwindale Avenue and Foothill Boulevard	0.94	D	1.05	D	NO	1.09	E	NPPT*	NPPT*	NO

*No Proposed Project traffic during PM peak hour with implementation of Mitigation Measure MM TRA-1.

Scholl Canyon Landfill to/from SR-134

Table 3.16-14 shows the LOS for Proposed Project traffic at Year 2014 for the intersections between Scholl Canyon Landfill and SR-134. All the intersections are anticipated to continue to operate at an LOS B or better for all utilized intersections during the MID-DAY peak period. Therefore, no significant impacts will occur at these intersections during the MID-DAY peak period.

The Figueroa St/Scholl Canyon Road and SR-134 westbound ramps intersection is anticipated to operate at an unacceptable LOS during the AM and PM peak hours, resulting in a temporary significant impact. Reducing this impact to less than significant would require implementation of the following potential impact reduction measure:

- Figueroa Street/Scholl Canyon Road and SR-134 westbound ramps: Restripe the westbound right turn lane to a shared left-right turn lane and the northbound through lane to a shared through-right turn lane. The northbound direction will include a shared through-right turn lane and a right turn lane. The southbound direction will include a shared through-left turn lane and a through turn lane. The westbound direction will include a left turn lane and a shared left-right turn lane. This impact reduction measure will require the approval of the City of Los Angeles and Caltrans.

Table 3.16-15 and Table 3.16-16 show the contribution of Proposed Project traffic to existing conditions and year 2014 conditions for the AM and PM peak periods, respectively. As shown in these tables, implementation of the impact reduction measure discussed above would reduce the impact to the Figueroa St/Scholl Canyon Road and SR-134 westbound ramps intersection to less than significant.

This impact reduction measure cannot be legally imposed by the LACFCD. Every reasonable effort will be made to coordinate with and receive approval to implement the impact reduction measure; however, LACFCD cannot guarantee that the measure will be implemented therefore this temporary impact could remain significant.

Table 3.16-14: LOS for Scholl Canyon Landfill to/from SR-134 Intersections, Year 2014 with Project Traffic

Intersection		AM				MID-DAY (12-2 PM)				PM			
Intersection #/Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
21	Figueroa St/Scholl Canyon Road and SR-134 westbound ramps	E	41.2	-	-	B	14.4	-	-	E	49.9	-	-
	With Lane Modification	C	15.3	-	-	B	11.0	-	-	C	15.7	-	-
22	Figueroa Street and Eagle Vista Drive	B	14.2	-	-	B	12.8	-	-	C	22.9	-	-
23	Figueroa Street and SR-134 eastbound ramps	A	9.2	0.66	B	A	6.4	0.44	A	A	8.6	0.63	B

Table 3.16-15: Scholl Canyon Landfill to/from SR-134, AM Peak Hours

Intersection AM Peak Hour		Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project		Year 2014 with Project and Potential Impact Reduction Measure*		
Intersection #/Name		HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact
21	Figueroa St/Scholl Canyon Road and SR-134 Westbound Ramps	-	D	-	E	YES	-	E	-	C	NO
22	Figueroa Street and Eagle Vista Drive	-	B	-	B	NO	-	B	NMR**	NMR**	NO
23	Figueroa Street and SR-134 Eastbound Ramps	0.5	A	0.57	A	NO	0.66	A	NMR**	NMR**	NO

* Use of this alternative route would require implementation of the impact reduction measure discussed above. LACFCD cannot guarantee implementation of this measure. Measure would require approval from the City of Los Angeles and Caltrans.
**No mitigation required.

Table 3.16-16: Scholl Canyon Landfill to/from SR-134, PM Peak Hours

Intersection PM Peak Hour		Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project		Year 2014 with Project and Potential Impact Reduction Measure		
Intersection #/Name		HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact
21	Figueroa St/Scholl Canyon Road and SR-134 westbound ramps	-	D	-	D	YES	-	E	-	C	NO
22	Figueroa Street and Eagle Vista Drive	-	C	-	C	NO	-	C	NMR*	NMR*	NO
23	Figueroa Street and SR-134 eastbound ramps	0.46	A	0.55	A	NO	0.63	A	NMR*	NMR*	NO

*No mitigation required.

Sheldon Pit to/from I-210

The preferred route identified for Sheldon Pit is the route that has been designated by the site operator for site access. Table 3.16-17 shows the LOS for Proposed Project traffic at year 2014 for the intersections between the Sheldon Pit and I-210. All the intersections are anticipated to continue to operate at an LOS D or better for all utilized intersections during the MID-DAY peak period. Therefore, no significant impacts will occur at these intersections during the MID-DAY peak period.

Table 3.16-18 and Table 3.16-19 show the contribution of Proposed Project traffic to existing conditions and Year 2014 conditions for the AM and PM peak periods, respectively. The Glenoaks Boulevard and Osborne Street intersection is anticipated to operate at an unacceptable LOS during the AM and PM peak hours, resulting in a temporary significant impact.

Table 3.16-17: LOS for Sheldon Pit to/from I-210 Intersections, Year 2014 with Project Traffic

Intersection		AM				MID-DAY (12-2 PM)				PM			
Intersection #/Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
24	Foothill Boulevard and I-210 westbound ramps	A	5.8	0.30	A	A	5.9	0.31	A	A	8.5	0.56	A
25	Foothill Boulevard and I-210 eastbound ramps	A	6.4	0.32	A	A	6.7	0.33	A	A	7.9	0.44	A
26	Foothill Boulevard and Osborne Street	C	20.7	0.78	D	B	10.8	0.56	A	C	21.1	0.88	D
27	Glenoaks Boulevard and Osborne Street	F	105.7	1.15	F	D	35.4	0.88	C	E	55.4	0.95	E
28	Glenoaks Boulevard and Montague Street	B	10.5	0.79	B	A	9.5	0.41	A	A	10.0	0.62	C
29	Glenoaks Boulevard and Branford Street	B	17.9	0.80	C	B	16.5	0.65	B	C	21.9	0.91	D
30	Glenoaks Boulevard and Sheldon Street	B	14.2	0.86	E	A	8.1	0.56	B	C	21.8	1.10	D

Table 3.16-18: Sheldon Pit to/from I-210, AM Peak Hours

Intersection AM Peak Hour		Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project		Year 2014 with Project and Potential Impact Reduction Measure		
Intersection #/Name		HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact
24	Foothill Boulevard and I-210 westbound ramps	0.51	A	0.57	A	NO	0.30	A	NMR*	NMR*	NO
25	Foothill Boulevard and I-210 eastbound ramps	0.60	A	0.63	A	NO	0.32	A	NMR*	NMR*	NO
26	Foothill Boulevard and Osborne Street	0.89	B	1.16	D	NO	0.78	C	NMR*	NMR*	NO
27	Glenoaks Boulevard and Osborne Street	0.99	E	1.13	F	YES	1.15	F	N/A**	N/A**	YES

Table 3.16-18: Sheldon Pit to/from I-210, AM Peak Hours

Intersection AM Peak Hour		Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project		Year 2014 with Project and Potential Impact Reduction Measure		
Intersection #/Name		HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact
28	Glenoaks Boulevard and Montague Street	0.69	A	0.72	A	NO	0.79	B	NMR*	NMR*	NO
29	Glenoaks Boulevard and Branford Street	0.77	B	0.81	B	NO	0.80	B	NMR*	NMR*	NO
30	Glenoaks Boulevard and Sheldon Street	0.75	B	0.78	B	NO	0.86	B	NMR*	NMR*	NO

*No mitigation required.
**No mitigation available.

Table 3.16-19: Sheldon Pit to/from I-210, PM Peak Hours

Intersection PM Peak Hour		Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project		Year 2014 with Project and Potential Impact Reduction Measure		
Intersection # / Name		HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact
24	Foothill Boulevard and I-210 westbound ramps	0.46	A	0.50	A	NO	0.56	A	NMR*	NMR*	NO
25	Foothill Boulevard and I-210 eastbound ramps	0.39	A	0.41	A	NO	0.44	A	NMR*	NMR*	NO
26	Foothill Boulevard and Osborne Street	0.73	B	0.91	B	NO	0.88	C	NMR*	NMR*	NO
27	Glenoaks Boulevard and Osborne Street	0.90	D	0.90	D	NO	0.95	E	N/A**	N/A**	YES
28	Glenoaks Boulevard and Montague Street	0.55	A	0.58	A	NO	0.62	A	NMR*	NMR*	NO
29	Glenoaks Boulevard and Branford Street	0.76	C	0.80	C	NO	0.91	C	NMR*	NMR*	NO
30	Glenoaks Boulevard and Sheldon Street	0.75	B	0.95	B	NO	1.10	C	NMR*	NMR*	NO

*No mitigation required.
**No mitigation available.

Sun Valley Fill Site to/from I-210

The preferred route identified for the Sun Valley Fill Site is the route that has been designated by the site operator for site access. Table 3.16-20 shows the LOS for Sun Valley Fill Site to/from I-210 Intersections, Year 2014 with Project Traffic for the intersections between the Sheldon Pit and I-210. All the intersections are anticipated to continue to operate at an LOS D or better for all utilized intersections during the MID-DAY peak period. Therefore, no significant impacts will occur at these intersections during the MID-DAY peak period.

Table 3.16-21 and Table 3.16-23 show the contribution of Proposed Project traffic to existing conditions and Year 2014 conditions for the AM and PM peak periods, respectively. The Glenoaks Boulevard and Osborne Street intersection is anticipated to operate at an unacceptable LOS during the AM and PM peak hours, resulting in a temporary significant impact.

Table 3.16-20: LOS for Sun Valley Fill Site to/from I-210 Intersections, Year 2014 with Project Traffic

Intersection		AM				MID-DAY (12-2 PM)				PM			
Intersection #/Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
24	Foothill Boulevard and I-210 westbound ramps	A	5.8	0.30	A	A	5.9	0.31	A	A	8.5	0.56	A
25	Foothill Boulevard and I-210 eastbound ramps	A	6.4	0.32	A	A	6.7	0.33	A	A	7.9	0.44	A
26	Foothill Boulevard and Osborne Street	C	20.7	0.78	D	B	10.8	0.56	A	C	21.1	0.88	D
27	Glenoaks Boulevard and Osborne Street	F	105.7	1.15	F	D	35.4	0.88	C	E	55.4	0.95	E
28	Glenoaks Boulevard and Montague Street	B	10.5	0.79	B	A	9.5	0.41	A	A	10.0	0.62	C
29	Glenoaks Boulevard and Branford Street	B	17.9	0.80	C	B	16.5	0.65	B	C	21.9	0.91	D
30	Glenoaks Boulevard and Sheldon Street	B	14.2	0.86	E	A	8.1	0.56	B	C	21.8	1.10	D

Table 3.16-21: Sun Valley Fill Site to/from I-210, AM Peak Hours

Intersection AM Peak Hour		Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project		Year 2014 with Project and Potential Impact Reduction Measure		
Intersection #/Name		HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact
24	Foothill Boulevard and I-210 westbound ramps	0.51	A	0.57	A	NO	0.30	A	NMR*	NMR*	NO
25	Foothill Boulevard and I-210 eastbound ramps	0.60	A	0.63	A	NO	0.32	A	NMR*	NMR*	NO
26	Foothill Boulevard and Osborne Street	0.89	B	1.16	D	NO	0.78	C	NMR*	NMR*	NO
27	Glenoaks Boulevard and Osborne Street	0.99	E	1.13	F	YES	1.15	F	N/A**	N/A**	YES
28	Glenoaks Boulevard and Montague Street	0.69	A	0.72	A	NO	0.79	B	NMR*	NMR*	NO
29	Glenoaks Boulevard and Branford Street	0.77	B	0.81	B	NO	0.80	B	NMR*	NMR*	NO
30	Glenoaks Boulevard and Sheldon Street	0.75	B	0.78	B	NO	0.86	B	NMR*	NMR*	NO

*No mitigation required.
**No mitigation available.

Table 3.16-22: Sun Valley Fill Site to/from I-210, PM Peak Hours

Intersection PM Peak Hour		Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project		Year 2014 with Project and Potential Impact Reduction Measure		
Intersection # / Name		HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact
24	Foothill Boulevard and I-210 westbound ramps	0.46	A	0.50	A	NO	0.56	A	NMR*	NMR*	NO
25	Foothill Boulevard and I-210 eastbound ramps	0.39	A	0.41	A	NO	0.44	A	NMR*	NMR*	NO
26	Foothill Boulevard and Osborne Street	0.73	B	0.91	B	NO	0.88	C	NMR*	NMR*	NO
27	Glenoaks Boulevard and Osborne Street	0.90	D	0.90	D	NO	0.95	E	N/A**	N/A**	YES
28	Glenoaks Boulevard and Montague Street	0.55	A	0.58	A	NO	0.62	A	NMR*	NMR*	NO
29	Glenoaks Boulevard and Branford Street	0.76	C	0.80	C	NO	0.91	C	NMR*	NMR*	NO
30	Glenoaks Boulevard and Sheldon Street	0.75	B	0.95	B	NO	1.10	C	NMR*	NMR*	NO

*No mitigation required.
**No mitigation available.

Bradley Landfill to/from I-210

The preferred route identified for Bradley Landfill is the route that has been designated by the site operator for site access. Table 3.16-23, below, shows the LOS for Proposed Project traffic at Year 2014 for the intersections between the Bradley Landfill and I-210. All the intersections are anticipated to continue to operate at an LOS D or better for all utilized intersections during the MID-DAY peak period. Therefore, no significant impacts will occur at these intersections during the MID-DAY peak period.

Table 3.16-23 and Table 3.16-24 show the contribution of Proposed Project traffic to existing conditions and Year 2014 conditions for the AM and PM Peak Periods, respectively. The Glenoaks Boulevard and Osborne Street intersection is anticipated to operate at an unacceptable LOS during the AM and PM peak hours, resulting in a temporary significant impact.

Table 3.16-23: LOS for Bradley Landfill to/from I-210 Intersections, Year 2014 with Project Traffic

Intersection		AM				MID-DAY (12-2 PM)				PM			
Intersection #/Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
24	Foothill Boulevard and I-210 westbound ramps	A	5.8	0.30	A	A	5.9	0.31	A	A	8.5	0.56	A
25	Foothill Boulevard and I-210 eastbound ramps	A	6.4	0.32	A	A	6.7	0.33	A	A	7.9	0.44	A
26	Foothill Boulevard and Osborne Street	C	20.7	0.78	D	B	10.8	0.56	A	C	21.1	0.88	D
27	Glenoaks Boulevard and Osborne Street	F	105.7	1.15	F	D	35.4	0.88	C	E	55.4	0.95	E
28	Glenoaks Boulevard and Montague Street	B	10.5	0.79	B	A	9.5	0.41	A	A	10.0	0.62	C
29	Glenoaks Boulevard and Branford Street	B	17.9	0.80	C	B	16.5	0.65	B	C	21.9	0.91	D
30	Glenoaks Boulevard and Sheldon Street	B	14.2	0.86	E	A	8.1	0.56	B	C	21.8	1.10	D
31	Glenoaks Boulevard and Peoria Street	A	6.2	0.64	A	A	5.4	0.42	A	A	6.4	0.56	A

Table 3.16-24: Bradley Landfill to/from I-210, AM Peak Hours

Intersection AM Peak Hour		Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project		Year 2014 with Project and Impact Reduction Measure		
Intersection #/Name		HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact
24	Foothill Boulevard and I-210 westbound ramps	0.51	A	0.57	A	NO	0.30	A	NMR*	NMR*	NO
25	Foothill Boulevard and I-210 eastbound ramps	0.60	A	0.63	A	NO	0.32	A	NMR*	NMR*	NO
26	Foothill Boulevard and Osborne Street	0.89	B	1.16	D	NO	0.78	C	NMR*	NMR*	NO
27	Glenoaks Boulevard and Osborne Street	0.99	E	1.13	F	YES	1.15	F	N/A**	N/A**	YES
28	Glenoaks Boulevard and Montague Street	0.69	A	0.72	A	NO-	0.79	B	NMR*	NMR*	NO
29	Glenoaks Boulevard and Branford Street	0.77	B	0.81	B	NO	0.80	B	NMR*	NMR*	NO
30	Glenoaks Boulevard and Sheldon Street	0.75	B	0.78	B	NO	0.86	B	NMR*	NMR*	NO
31	Glenoaks Boulevard and Peoria Street	0.54	B	0.61	A	NO	0.64	A	NMR*	NMR*	NO

*No mitigation required.
**No mitigation available.

Table 3.16-25: Bradley Landfill to/from I-210, PM Peak Hours

Intersection PM Peak Hour		Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project		Year 2014 with Project and Impact Reduction Measure		
Intersection # / Name		HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact
24	Foothill Boulevard and I-210 westbound ramps	0.46	A	0.50	A	NO	0.56	A	NMR*	NMR*	NO
25	Foothill Boulevard and I-210 eastbound ramps	0.39	A	0.41	A	NO	0.44	A	NMR*	NMR*	NO
26	Foothill Boulevard and Osborne Street	0.73	B	0.91	B	NO	0.88	C	NMR*	NMR*	NO
27	Glenoaks Boulevard and Osborne Street	0.90	D	0.90	D	NO	0.95	E	N/A**	N/A**	YES
28	Glenoaks Boulevard and Montague Street	0.55	A	0.58	A	NO	0.62	A	NMR*	NMR*	NO
29	Glenoaks Boulevard and Branford Street	0.76	C	0.80	C	NO	0.91	C	NMR*	NMR*	NO
30	Glenoaks Boulevard and Sheldon Street	0.75	B	0.78	B	NO	0.86	B	NMR*	NMR*	NO
31	Glenoaks Boulevard and Peoria Street	0.52	B	0.55	A	NO	0.56	A	NMR*	NMR*	NO

*No mitigation required.
**No mitigation available.

Boulevard Pit to/from I-210

The preferred route identified for Boulevard Pit is the route that has been designated by the site operator for site access. Table 3.16-26 shows the LOS for Proposed Project traffic at Year 2014 for the intersections between Boulevard Pit and I-210. All the intersections are anticipated to continue to operate at an LOS D or better for all utilized intersections during the AM and MID-DAY peak periods. Therefore, no significant impacts will occur at these intersections during the AM and MID-DAY peak periods.

The Sheldon Street and San Fernando Road intersection and the Branford Street and San Fernando Road intersection are anticipated to operate at an unacceptable LOS during the PM peak hour, resulting in temporary significant impacts.

Table 3.16-27 shows the contribution of Proposed Project traffic to existing conditions and Year 2014 conditions for the PM peak period. Mitigation Measure MM TRA-2 would reduce the impacts to less than significant.

Table 3.16-26: LOS for Boulevard Pit to/from I-210, Year 2014 with Project Traffic

Intersection		AM				MID-DAY				PM			
Intersection #/Name		HCM LOS	HCM Delay	HCM V/C	HCM LOS	HCM Delay	HCM V/C	HCM LOS	HCM Delay	HCM V/C	HCM LOS	HCM Delay	HCM V/C
30	Glenoaks Boulevard and Sheldon Street	B	14.7	0.87	D	A	7.6	0.50	A	B	13.7	0.86	D
31	Glenoaks Boulevard and Peoria Street	A	6.6	0.59	A	A	9.0	0.39	A	B	16.9	0.53	A
32	Glenoaks Boulevard and Tuxford Street	D	40.1	1.10	E	A	8.9	0.63	B	B	11.1	0.81	C
44	Wheatland Avenue and I-210 eastbound ramp	A	0	-	-	A	0	-	-	A	0	-	-
45	Wheatland Avenue and I-210 westbound ramp	B	11.1	-	-	A	8.8	-	-	B	10.2	-	-
46	Wheatland Avenue and Foothill Boulevard	B	11.3	0.46	A	B	10.6	0.39	A	B	10	0.47	A
47	Wentworth Street and Foothill Boulevard	C	28.4	0.88	A	B	10.4	0.45	A	A	9.7	0.48	A
48	Tuxford Street and San Fernando Road	D	40.1	0.80	C	C	34.7	0.80	B	C	34.8	0.75	C
49	Lankershim Boulevard and San Fernando Road	A	8.6	0.57	A	A	7.8	0.47	A	A	9.6	0.55	A
50	Sheldon Street and San Fernando Road	C	34.8	0.80	C	C	24.3	0.54	A	E	58.1	1.03	E
51	Branford Street and San Fernando Road	D	38.0	0.89	B	C	30.7	0.51	A	F	84.0	0.99	D

Table 3.16-27: Boulevard Pit to/from I-210, PM Peak Hours

Intersection PM Peak Hour		Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project		Year 2014 with Project and Mitigation		
Intersection #/Name		HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact
30	Glenoaks Boulevard and Sheldon Street	0.75	B	0.75	B	NO	0.86	B	NPPT*	NPPT*	NO
31	Glenoaks Boulevard and Peoria Street	0.52	B	0.54	B	NO	0.53	B	NPPT*	NPPT*	NO
32	Glenoaks Boulevard and Tuxford Street	0.54	A	0.65	A	NO	0.81	B	NPPT*	NPPT*	NO
44	Wheatland Avenue and I-210 eastbound ramp	-	A	-	A	NO	-	A	NPPT*	NPPT*	NO
45	Wheatland Avenue and I-210 westbound ramp	-	A	-	A	NO	-	B	NPPT*	NPPT*	NO
46	Wheatland Avenue and Foothill Boulevard	0.27	A	0.43	B	NO	0.47	B	NPPT*	NPPT*	NO
47	Wentworth Street and Foothill Boulevard	0.42	A	0.43	A	NO	0.48	A	NPPT*	NPPT*	NO
48	Tuxford Street and San Fernando Road	0.73	C	0.71	D	NO	0.75	C	NPPT*	NPPT*	NO
49	Lankershim Boulevard and San Fernando Road	0.46	A	0.51	A	NO	0.55	A	NPPT*	NPPT*	NO
50	Sheldon Street and San Fernando Road	0.94	D	0.94	D	NO	1.03	E	NPPT*	NPPT*	NO
51	Branford Street and San Fernando Road	0.92	E	0.95	E	NO	0.99	F	NPPT*	NPPT*	NO

*No Proposed Project traffic during PM peak hour with implementation of Mitigation Measure MM TRA-2.

Freeway Segments

The traffic study analyzed 28 freeway segments to determine the mainline Level-of-Service (LOS). From the traffic analysis it was determined that the increase in Proposed Project truck trips does not cause any major traffic impacts at the identified freeway segments.

Freeway On- and Off-Ramps

This traffic study analyzed 54on and off-ramps to determine the Level-of-Service (LOS) of the utilized ramps with the study area. From the traffic analysis it was determined that the increase in Proposed Project truck trips do not cause any major traffic impacts at the identified freeway on- and off-ramps.

Reservoir Management

The reservoir management associated with the Proposed Project would require periodic management activities at the Devil's Gate Reservoir. Depending on storm events, sediment excavation/trucking offsite may be required over a period of a few weeks annually. Daily truck traffic is expected to be half the amount that will occur during sediment removal. Due to the limited time period and the reduced truck traffic, reservoir management activities are not expected to adversely affect traffic level of service on the existing roadway network. Therefore, impacts would be less than significant.

Mitigation Measures

See Mitigation Measures MM TRA-1 and MM TRA-2.

Residual Impacts After Mitigation

Potentially significant traffic impacts associated with the sediment removal phase would be temporary, expected to occur during the drier months (from April to December, except on holidays), and would cease at the end of the sediment removal phase. Implementation of the mitigation measures described above would reduce some but not all of the impacts to traffic and circulation to a level less than significant. Other potential impact reduction measures discussed above could reduce impacts to less than significant. These measures cannot be legally imposed by the LACFCD, however, since the locations are under the jurisdiction of other agencies. Every reasonable effort will be made to coordinate with and receive approval from the jurisdictional agencies to implement the impact reduction measures but LACFCD cannot guarantee that the measures will be implemented. Therefore, these temporary impacts could remain potentially significant. No significant traffic impacts would occur under reservoir management.

TRANSPORTATION-3 *Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).*

Sediment Removal

Implementation of the Proposed Project may include impact reduction measures described above that would require modifications to the existing roadway network. These modifications would consist of roadway restriping to reduce potential traffic impacts to a level less than significant. These changes would not alter existing roadway use and would be implemented consistently with all applicable traffic safety standards. The Proposed Project is limited to excavation and transportation of sediment that has accumulated in Devil's Gate Reservoir and would not introduce any new uses that would be incompatible or substantially increase hazards with the existing roadway system. Therefore, impacts related to traffic hazards would be less than significant.

Reservoir Management

The reservoir management associated with the Proposed Project would not require any modifications to the existing roadway network and would not introduce any new uses that would be incompatible with the existing roadway system. Therefore, no impact would occur.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

The Proposed Project would result in a less than significant impact.

TRANSPORTATION-4 *Result in inadequate emergency access.*

Sediment Removal/Reservoir Management

The Proposed Project would not sever, or otherwise block access to, any existing roadways. No equipment staging will occur on public roadways during construction of the Proposed Project. The impact to emergency access would be a less than significant impact.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

The Proposed Project would result in a less than significant impact.

TRANSPORTATION-5 *Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities supporting alternative transportation (e.g., bus turnouts, bicycle racks).*

Sediment Removal

The Proposed Project would be confined to the roadway network described in Section 3.16.2 and would not adversely affect alternative modes of public transportation such as light rail. Implementation of the Proposed Project would not require closure of any bus stops or disrupt any existing bus routes. The degrading of LOS at intersections, freeway segments, and freeway on- and off-ramps described above under TRANSPORTATION-2 could affect buses using the existing roadway network. This would be a temporary significant impact.

Reservoir Management

The reservoir management associated with the Proposed Project would require periodic management activities at Devil's Gate Reservoir that would not adversely affect traffic level of service on the existing roadway network that could delay bus services. Therefore, reservoir management impacts would be less than significant.

Mitigation Measures

See Mitigation Measures MM TRA-1 and MM TRA-2.

Residual Impacts After Mitigation

Potentially significant traffic impacts associated with the sediment removal phase would be temporary, expected to occur during the drier months (from April to December, except on holidays), and would cease at the end of the sediment removal phase. Implementation of the mitigation measures described above would reduce some but not all of the impacts to traffic and circulation to a level less than significant. Other potential impact reduction measures discussed above could reduce impacts to less than significant. These measures cannot be legally imposed by the LACFCD, however, since the locations

are under the jurisdiction of other agencies. Every reasonable effort will be made to coordinate with and receive approval from the jurisdictional agencies to implement the impact reduction measures but LACFCD cannot guarantee that the measures will be implemented. Therefore, these temporary impacts could remain potentially significant. No significant traffic impacts would occur under reservoir management.

TRANSPORTATION-6 *Cumulative Impacts*

The traffic impact report took future projects into account during traffic modeling and, therefore, is cumulative in nature. The Project Year 2014 Model included the following projects:

- Hahamongna Watershed Park Multi-Benefit/Multi-Use (MBMU) Project
- National Aeronautics and Space Administration (NASA) Jet Propulsion Laboratory (JPL) On-Site Parking Structure
- Temporary Use of the Rose Bowl Stadium by the National Football League (NFL)
- Azusa Material Recovery Facility and Waste Transfer Station Project
- Metro Gold Line Foothill Extension
- Arroyo Seco Canyon Project
- Devil's Gate Water Conservation Project

The Project Year 2014 Model also included an annual increase factor of 4.5 percent totaling 9 percent for 2 years. This is a conservative estimated growth factor to account for any construction improvements and cumulative projects expected to occur in the surrounding area up to 2014.

As described above under TRANSPORTATION-2, during sediment removal the Proposed Project will result in significant delays at five intersections, resulting in significant cumulative impacts. Implementation of Mitigation Measures MM TRA-1 and MM TRA-2 would reduce the Proposed Project's contribution to these temporary impacts but would not reduce the Proposed Project's contribution to a level that is to less than significant.

Mitigation Measures

See Mitigation Measures MM TRA-1 and MM TRA-2.

Residual Impacts After Mitigation

Potentially significant traffic impacts associated with the sediment removal phase would be temporary, expected to occur during the drier months (from April to December, except on holidays), and would cease at the end of the sediment removal phase. Implementation of the mitigation measures described above would reduce some but not all of the impacts to traffic and circulation to a level less than significant. Other potential impact reduction measures discussed above could reduce impacts to less than significant. These measures cannot be legally imposed by the LACFCD, however, since the locations are under the jurisdiction of other agencies. Every reasonable effort will be made to coordinate with and receive approval from the jurisdictional agencies to implement the impact reduction measures but

LACFCD cannot guarantee that the measures will be implemented. Therefore, these temporary impacts could remain potentially significant. No significant traffic impacts would occur under reservoir management.

3.17 UTILITIES AND SERVICE SYSTEMS

3.17.1 Introduction

This section addresses the effect of the Proposed Project on stormwater services. Included in this section are a description of the existing conditions of the Proposed Project area and thresholds for determining the significance of any anticipated impacts on utilities and service systems.

As noted in the Initial Study (Appendix A), impacts associated with: exceeding wastewater treatment requirements of the applicable Regional Water Quality Control Board; requiring or resulting in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects; having sufficient water supplies available to serve the project from existing entitlements and resources, and would not require new or expanded entitlements; resulting in a determination by the wastewater treatment provider that serves or may serve the project that it has inadequate capacity to serve the project's projected demand in addition to the provider's existing commitments; being served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs; and violating federal, State, or local statues and regulations related to solid waste, were found to have no impact and are not discussed within the EIR.

The environmental baseline condition for the sediment removal phase is considered at the time of publication of the NOP. The environmental baseline conditions for reservoir management will be conditions post sediment removal, approximately in the year 2020.

3.17.2 Existing Environmental Setting

The Proposed Project site is entirely within the Arroyo Seco Watershed, which is directly tributary to the Los Angeles River Watershed. The Proposed Project is located in the reservoir of Devil's Gate Dam, which separates the upper and lower watersheds of the Arroyo Seco. Due to urbanization, large areas of impervious surfaces now occur within the watershed. The impervious surfaces and the steep, mountainous stream channels cause rainwater to flow quickly via storm drains or natural drainages to the Arroyo Seco. Approximately 31.9 square miles of stormwater runoff, originating from the Angeles National Forest, in addition to the communities of La Cañada Flintridge, Altadena, and Pasadena, drains along the Arroyo Seco Watershed toward Devil's Gate Reservoir through Flint Wash, Altadena West Drain, and other drains.

Twenty-three storm drains enter Devil's Gate Reservoir. Most of these storm drains divert runoff from residential neighborhoods of Pasadena, Altadena, and La Cañada Flintridge and from the JPL grounds (USACE 2010). Water also enters the reservoir from Flint Wash on the southwest side of the Proposed Project site (Chambers Group 2011). The stormwater entering Devil's Gate Reservoir flows through Devil's Gate Dam to the channelized lower section of the Arroyo Seco. The Arroyo Seco Channel drains to the Los Angeles River, which eventually outlets to the Pacific Ocean. The Arroyo Seco Channel is a natural creek for several hundred feet downstream of Devil's Gate Dam but soon converts to an engineered, concrete-lined flood control channel with a second natural section approximately 1,500 feet in length near the SR- 134 overpass. The confluence with the Los Angeles River is approximately 9 miles downstream of Devil's Gate Dam (Sediment Transport Capability Analysis 2012). Additional details regarding the watershed and drainage basin are located in Section 3.11, Hydrology and Water Quality.

LACFCD, Southern California Edison (SCE), Southern California Gas Company, and Pasadena Water and Power (PWP) hold easements within the Proposed Project site. Overhead power lines within the Proposed Project site include SCE and the PWP power lines. Some of these power poles are also utilized by Verizon and local cable companies. In addition, communication lines are also installed underground starting at Devil's Gate Dam and traveling along the east side of Oak Grove Drive to the JPL campus. A 12-inch high-pressure natural gas line owned by the Southern California Gas Company is buried from 3 to 8 feet deep and traverses the basin underground from Kent Street to Foothill Boulevard (USACE2010).

JPL has set up a series of monitoring test wells throughout Devil's Gate Reservoir, on the JPL campus, and in the western residential areas of Altadena to track contaminants in the groundwater. Three water lines, 12-inch, 16-inch, and 30-inch lines, owned by the City of Pasadena run along the east side of the reservoir (USACE2010). The Oak Grove Drive sewer main runs near the Proposed Project site and serves the small local sewer line connections to the Oak Grove area of Hahamongna Watershed Park facilities (City of Pasadena 2012b).

3.17.3 Applicable Regulations

LACFCD

Through easements granted in May of 1919 and March of 1965, the City of Pasadena granted the LACFCD, under a perpetual easement, the right to construct, reconstruct, inspect, maintain, repair, and operate Devil's Gate Dam, its spillway, bypasses, tunnels, and other support facilities as may be necessary for the construction and maintenance of a reservoir capable of impounding the waters of the Arroyo Seco for purposes of storage and control and to control such waters as may be necessary in the prevention of damage by flood (City of Pasadena 1919/1965).

City of Pasadena Municipal Code

The Pasadena Municipal Code (Chapter 8.70) sets forth the minimum standards, provisions, and requirements for:

- Regulating non-stormwater discharges to the municipal stormwater system;
- Providing for the control of spillage, dumping, or disposal of materials into the municipal storm-water system;
- Reducing pollutants in stormwater and urban runoff to the maximum extent practicable.

The intent of this chapter is to protect and enhance water quality of our watercourses, water bodies, and wetlands in a manner pursuant to and consistent with the Federal Clean Water Act, and pursuant to National Pollutant Discharge Elimination System Permit No. CA0061654, as amended, and any successor legislation and permits.

Hahamongna Watershed Park Master Plan

The Proposed Project site is within the Hahamongna Watershed Park Master Plan (HWPMP 2003) area. Applicable Goals and Objectives of the HWPMP include the following:

Goal 2: The Devil's Gate flood control basin will be managed to provide protection to the developed and natural downstream areas.

Objectives:

- *Facilitate the dam and reservoir maintenance operations in a manner that is compatible with the proposed features of the Master Plan and will result in minimal impacts to the surrounding area.*
- *Maintain or improve the flood capacity behind Devil's Gate Dam.*
- *Develop a sediment removal plan that minimizes the impact to the basin and to the surrounding neighborhoods.*

3.17.4 Significance Criteria

- *UTILITIES-1: Would the project require or result in construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?*
- *UTILITIES-2: Cumulative Impacts*

3.17.5 Methodology

Potential impacts related to utilities were evaluated on the basis of site-specific information prepared for the Proposed Project and developed through review of existing published reports and mapping.

3.17.6 Impacts and Mitigation

UTILITIES-1 *Require or result in construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects.*

Sediment Removal

During sediment removal, the Proposed Project would not result in or require the construction of new or expansion of existing stormwater drainage systems.

Drainage patterns within the reservoir change on a regular basis depending on seasonal conditions, water flow, and sediment deposition. Sediment and vegetation removal operations would result in alterations of surface drainage characteristics at the project site due to clearing, grading, and excavation activities. Excavation, grading, and sediment placement activities will adhere to LACDPW specifications, which establish protocols for proper design of slopes and temporary sediment-collecting structures. Although the drainage characteristics for the site will be altered, the Proposed Project overall will result in a positive impact to drainage of Devil's Gate Reservoir because it will help restore the flood control capacity of Devil's Gate Dam and Reservoir.

The Proposed Project will add minimal impermeable surface area to the project site through paving the portion of the project access roads from Oak Grove Drive. This minimal increase in impervious surface area would not result in any significant increase in stormwater runoff that would require new stormwater drainage facilities.

In addition, these activities will not directly involve the existing storm drain outfalls, power lines, gas line, communication lines, water lines, sewer lines, or water wells. Impacts to these utility facilities will be avoided through compliance with City regulations regarding utility facilities, coordination with utility providers, and implementation of LACDPW BMPs.

Reservoir Management

During reservoir management, the Proposed Project would not result in or require the construction of new or expansion of existing stormwater drainage systems. Sediment that accumulates after the proposed removal will be removed through FAST operations or through mechanical excavation and trucking. The FAST operations are expected to be similar to historic FAST operations, and fine sediment discharged through FAST operations will be transported during storm flows to the Pacific Ocean via Arroyo Seco and the Los Angeles River. No impacts to stormwater facilities are expected during FAST operations. Any necessary mechanical removal during reservoir management is expected to be small (typically 13,000 cubic yards per year). Impacts to stormwater facilities during mechanical removal will be avoided through compliance with City regulations regarding stormwater facilities and implementation of LACDPW BMPs.

Mitigation Measure

No mitigation measures related to utility facilities are required.

Residual Impacts after Mitigation

No significant unavoidable impacts would occur to utility facilities as a result of the Proposed Project.

UTILITIES-2 *Cumulative Impacts*

Impact Analysis

Overall, the Proposed Project will result in increased flood control abilities of Devil's Gate Dam. Related projects would be required to comply with City regulations to ensure that no impacts to stormwater facilities would occur. During reservoir management, the Proposed Project would not result in or require the construction of new or expansion of existing stormwater drainage systems. No cumulative impacts to stormwater facilities would occur.

Mitigation Measure

No mitigation measures are necessary.

Residual Impacts After Mitigation

Cumulative impacts related to stormwater facilities are less than significant.

SECTION 4.0 – ALTERNATIVES ANALYSIS

4.1 INTRODUCTION AND OVERVIEW

CEQA requires that an EIR describe a reasonable range of alternatives to the project, or to the location of the project, which could feasibly avoid or lessen any significant environmental impacts while substantially attaining the basic project objectives. An EIR should also evaluate the environmental effects of the alternatives for a comparative analysis. This chapter describes potential alternatives to the Proposed Project that were considered, identifies alternatives that were eliminated from further consideration and reasons for dismissal, and analyzes available alternatives in comparison to the potential environmental impacts associated with the Proposed Project.

Key provisions of the CEQA Guidelines pertaining to the alternatives analysis are summarized below:

- The discussion of alternatives shall focus on alternatives to the Proposed Project or its location that are capable of avoiding or substantially lessening any significant effects of the Proposed Project, even if these alternatives would impede to some degree the attainment of the Proposed Project objectives or would be more costly.

- The No Project Alternative shall be evaluated along with its impact. The No Project analysis shall discuss the existing conditions at the time the Notice of Preparation is published. Additionally, the analysis shall discuss what would be reasonably expected to occur in the foreseeable future if the Proposed Project were not approved, based on current plans and consistent with available infrastructure and community services.

- The range of alternatives required in an EIR is governed by a "rule of reason;" therefore, the EIR must evaluate only those alternatives necessary to permit a reasoned choice. Alternatives shall be limited to ones that would avoid or substantially lessen any of the significant effects of the Proposed Project.

- For alternative locations, only locations that would avoid or substantially lessen any of the significant effects of the Proposed Project need to be considered for inclusion in the EIR.

- An EIR need not consider an alternative whose effects cannot be reasonably ascertained and whose implementation is remote and speculative.

The range of feasible alternatives is selected and discussed in a manner to foster meaningful public participation and informed decision-making. Among the factors that may be taken into account when addressing the feasibility of alternatives are environmental impacts, site suitability, economic viability, availability of infrastructure, general plan contingency, regulatory limitation, jurisdictional boundaries, and whether the proponent could reasonably acquire, control, or otherwise have access to the alternative site. An EIR need not consider an alternative whose effects cannot be reasonably identified, whose implementation is remote or speculative, and that would not achieve the basic project objectives.

4.2 PROJECT OBJECTIVES

The LACFCD must remove sediment that has accumulated behind the dam to minimize the level of flood risk to downstream communities along the Arroyo Seco. In its current condition, the reservoir no longer has the capacity to safely contain another major debris event; and the outlet works have a risk of becoming clogged and inoperable. The Proposed Project would remove sediment from Devil's Gate Reservoir and establish a reservoir management system to maintain the flood control capacity of the reservoir. This will include removal of approximately 2.9 million cubic yards of current excess sediment in the reservoir in addition to any additional sediment received during the project sediment removal phase.

Primary project objectives include:

1. Reducing flood risk to the communities downstream of the reservoir adjacent to the Arroyo Seco by restoring reservoir capacity for flood control and future sediment inflow events

2. Supporting sustainability by establishing a reservoir configuration more suitable for routine maintenance activities including reservoir management

3. Removing sediment in front of the dam to facilitate an operational reservoir pool to reduce the possibility of plugging the outlet works with sediment or debris during subsequent storm events

4. Removing sediment placed at Johnson Field during the Devil's Gate Reservoir Interim Measures Project

5. Supporting dam safety by removing sediment accumulated in the reservoir in a timely manner to ensure the ability to empty the reservoir in the event of a dam safety concern

6. Delivering the sediment to placement or reuse facilities that are already prepared and designated to accept such material without native vegetation and habitat removal

4.3 ALTERNATIVES TO THE PROPOSED PROJECT

The alternatives identified below, with the exception of the mandatory No Project Alternative, were selected due to their potential to attain the basic project objectives discussed above and to lessen or avoid significant environmental effects resulting from implementation of the Proposed Project. Alternatives considered in this EIR include:

- Alternative 1: Configuration B – will remove approximately 2.8 million cubic yards of current excess sediment in the reservoir.

- Alternative 2: Configuration C– will remove approximately 4 million cubic yards of current excess sediment in the reservoir.

- Alternative 3: Configuration D– will remove approximately 2.4 million cubic yards of current excess sediment in the reservoir.

- Alternative 4: Sluicing Method – will remove the approximately 2.9 million cubic yards of current excess sediment in the reservoir.

- Alternative 5: Configuration A Haul Route Alternative – will remove approximately 2.9 million cubic yards of current excess sediment in the reservoir.

- No Project Alternative - assumes that improvements described for the Proposed Project would not be implemented.

In summary, the purpose of this section is to discuss feasible alternatives and to evaluate the ability of each alternative to reduce or avoid significant adverse environmental impacts while achieving the basic project objectives. The reader is referred to the individual sections of the EIR and to the Executive Summary for a detailed discussion of environmental impacts, by each issue area, that would result from implementation of the Proposed Project.

Of the alternatives, Alternative 3, Configuration D is environmentally superior and satisfactorily meets the project objectives. While Alternative 3, Configuration D does not have the least impacts across all issue areas, it does have substantially reduced impacts in comparison to the Proposed Project and most of the other alternatives. A comparison of each of the alternatives to the Proposed Project is provided in Table 4.3-1.

Table 4.3-1: Comparison of Alternatives

Environmental Issue Area	Proposed Project	Alternative 1. Configuration B	Alternative 2. Configuration C	Alternative 3. Configuration D (Environmentally Superior)	Alternative 4. Sluicing Method	Alternative 5. Haul Route Alternative	Alternative 6 No Project Alternative
AESTHETICS - Would the project:							
Have a substantial adverse effect on a scenic vista?	Potentially Significant	Reduced (remains Potentially Significant)	Reduced (remains Potentially Significant)	Reduced (remains Potentially Significant)	Increased (remains Potentially Significant)	Similar (remains Potentially Significant)	Potentially Increased (remains Potentially Significant)
Damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	Less than Significant	Reduced (Less than Significant)	Reduced (Less than Significant)	Reduced (Less than Significant)	Increased (Less than Significant)	Similar (Less than Significant)	Potentially Increased (Less than Significant)
Substantially degrade the existing visual character or quality of the site and its surroundings?	Potentially Significant	Reduced (remains Potentially Significant)	Reduced (remains Potentially Significant)	Reduced (remains Potentially Significant)	Increased (remains Potentially Significant)	Similar (remains Potentially Significant)	Potentially Increased (remains Potentially Significant)
AIR QUALITY - Where available, the significance criteria established by the applicable air quality management or pollution control district may be relied upon to make the following determinations. Would the project:							
Conflict with or obstruct implementation of the applicable air quality plan?	Less than Significant with Mitigation	Reduced (Less than Significant with Mitigation)	Increased (Less than Significant with Mitigation)	Reduced (Less than Significant with Mitigation)	Potentially Increased (Less than Significant with Mitigation)	Similar (Less than Significant with Mitigation)	Reduced (Less than Significant)
Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	Less than Significant with Mitigation	Reduced (Less than Significant with Mitigation)	Increased (Less than Significant with Mitigation)	Reduced (Less than Significant with Mitigation)	Potentially Increased (Less than Significant with Mitigation)	Similar (Less than Significant with Mitigation)	Reduced (Less than Significant)

Table 4.3-1: Comparison of Alternatives

Environmental Issue Area	Proposed Project	Alternative 1. Configuration B	Alternative 2. Configuration C	Alternative 3. Configuration D (Environmentally Superior)	Alternative 4. Sluicing Method	Alternative 5. Haul Route Alternative	Alternative 6 No Project Alternative
Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emission, which exceed quantitative thresholds for ozone precursors)?	Less than Significant with Mitigation	Reduced (Less than Significant with Mitigation)	Increased (Less than Significant with Mitigation)	Reduced (Less than Significant with Mitigation)	Potentially Increased (Less than Significant with Mitigation)	Similar (Less than Significant with Mitigation)	Reduced (Less than Significant)
Expose sensitive receptors to substantial pollutant concentrations?	Less Than Significant	Reduced (Less than Significant)	Increased (Less than Significant)	Reduced (Less than Significant)	Potentially Increased (Less than Significant)	Similar (Less than Significant)	Reduced (Less than Significant)
Create objectionable odors affecting a substantial number of people?	Less Than Significant	Similar (Less than Significant)	Similar (Less than Significant)	Similar (Less than Significant)	Similar (Less than Significant)	Similar (Less than Significant)	Reduced (Less than Significant)
BIOLOGICAL RESOURCES – Would the project:							
Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or US Fish and Wildlife Service?	Less Than Significant with Mitigation	Reduced (Less than Significant with Mitigation)	Reduced (Less than Significant with Mitigation)	Reduced (Less than Significant with Mitigation)	Potentially Increased (Potentially Significant)	Similar (Less than Significant with Mitigation)	Potentially Increased (Potentially Significant)
Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans policies, and regulations or by the California Department of Fish and Game or US Fish and Wildlife Service?	Less Than Significant with Mitigation	Reduced (Less than Significant with Mitigation)	Reduced (Less than Significant with Mitigation)	Reduced (Less than Significant with Mitigation)	Potentially Increased (Potentially Significant)	Similar (Less than Significant with Mitigation)	Potentially Increased (Potentially Significant)

Table 4.3-1: Comparison of Alternatives

Environmental Issue Area	Proposed Project	Alternative 1. Configuration B	Alternative 2. Configuration C	Alternative 3. Configuration D (Environmentally Superior)	Alternative 4. Sluicing Method	Alternative 5. Haul Route Alternative	Alternative 6 No Project Alternative
Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	Less Than Significant with Mitigation	Reduced (Less than Significant with Mitigation)	Reduced (Less than Significant with Mitigation)	Reduced (Less than Significant with Mitigation)	Potentially Increased Potentially Increased (Potentially Significant)	Similar (Less than Significant with Mitigation)	Potentially Increased Potentially Increased (Potentially Significant)
Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impeded the use of native wildlife nursery sites?	Less Than Significant with Mitigation	Reduced (Less than Significant with Mitigation)	Reduced (Less than Significant with Mitigation)	Reduced (Less than Significant with Mitigation)	Potentially Increased (Potentially Significant)	Similar (Less than Significant with Mitigation)	Potentially Increased (Potentially Significant)
Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	Less Than Significant with Mitigation	Reduced (Less than Significant with Mitigation)	Reduced (Less than Significant with Mitigation)	Reduced (Less than Significant with Mitigation)	Potentially Increased (Less than Significant with Mitigation)	Similar (Less than Significant with Mitigation)	Potentially Increased (Potentially Significant)
CULTURAL RESOURCES – Would the project:							
Cause a substantial adverse change in the significance of a historical resource?	Less Than Significant	Similar (Less than Significant)	Similar (Less than Significant)	Similar (Less than Significant)	Similar (Less than Significant)	Similar (Less than Significant)	Similar (Less than Significant)
Cause a substantial adverse change in the significance of an archaeological resource?	Less Than Significant with Mitigation	Reduced (Less than Significant with Mitigation)	Similar (Less than Significant with Mitigation)	Reduced (Less than Significant with Mitigation)	Similar (Less than Significant with Mitigation)	Similar (Less than Significant with Mitigation)	Reduced (Less than Significant)

Table 4.3-1: Comparison of Alternatives

Environmental Issue Area	Proposed Project	Alternative 1. Configuration B	Alternative 2. Configuration C	Alternative 3. Configuration D (Environmentally Superior)	Alternative 4. Sluicing Method	Alternative 5. Haul Route Alternative	Alternative 6 No Project Alternative
Cause a substantial adverse change in the significance of a paleontological resource.	Less Than Significant with Mitigation	Reduced (Less than Significant with Mitigation)	Similar (Less than Significant with Mitigation)	Reduced (Less than Significant with Mitigation)	Similar (Less than Significant with Mitigation)	Similar (Less than Significant with Mitigation)	Reduced (Less than Significant)
Potentially impact unknown human remains within the proposed project site.	Less Than Significant with Mitigation	Reduced (Less than Significant with Mitigation)	Similar (Less than Significant with Mitigation)	Reduced (Less than Significant with Mitigation)	Similar (Less than Significant with Mitigation)	Similar (Less than Significant with Mitigation)	Reduced (Less than Significant)
GEOLOGY AND SOILS – Would the project:							
Potentially result in soil erosion or loss of topsoil during sediment removal activities.	Less Than Significant	Reduced (Less than Significant)	Reduced (Less than Significant	Reduced (Less than Significant)	Increase (Less than Significant)	Similar (Less than Significant)	Reduced (Less than Significant
GREENHOUSE GAS EMISSIONS – Would the project:							
Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment.	Less Than Significant	Reduced (Less than Significant)	Increased (Less than Significant)	Reduced (Less than Significant)	Potentially Increased (Less than Significant)	Similar (Less than Significant)	Reduced (Less than Significant)
Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases.	Less Than Significant	Similar (Less than Significant)	Similar (Less than Significant)	Similar (Less than Significant)	Similar (Less than Significant)	Similar (Less than Significant)	Similar (Less than Significant)
HAZARDS AND HAZARDOUS MATERIALS- Would the project:							
Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	Less Than Significant	Similar (Less than Significant)	Similar (Less than Significant)	Similar (Less than Significant)	Similar (Less than Significant)	Similar (Less than Significant)	Reduced (Less than Significant)

Table 4.3-1: Comparison of Alternatives

Environmental Issue Area	Proposed Project	Alternative 1. Configuration B	Alternative 2. Configuration C	Alternative 3. Configuration D (Environmentally Superior)	Alternative 4. Sluicing Method	Alternative 5. Haul Route Alternative	Alternative 6 No Project Alternative
Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	Less Than Significant	Similar (Less than Significant)	Similar (Less than Significant)	Similar (Less than Significant)	Similar (Less than Significant)	Similar (Less than Significant)	Reduced (Less than Significant)
Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	Less than Significant	Similar (Less than Significant)	Similar (Less than Significant)	Reduced (Less than Significant)	Similar (Less than Significant)	Reduced (Less than Significant)	Reduced (Less than Significant)
Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	Less Than Significant	Similar (Less than Significant)	Similar (Less than Significant)	Similar (Less than Significant)	Similar (Less than Significant)	Similar (Less than Significant)	Similar (Less than Significant)
Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	Less than Significant	Similar (Less than Significant)	Similar (Less than Significant)	Similar (Less than Significant)	Similar (Less than Significant)	Similar(Less than Significant)	Increased (Less than Significant)
HYDROLOGY AND WATER QUALITY– Would the project:							
Violate any water quality standards or waste discharge requirements?	Less Than Significant	Similar (Less than Significant)	Similar (Less than Significant)	Similar (Less than Significant)	Increased (Less than Significant)	Similar (Less than Significant)	Reduced (Less than Significant)

Table 4.3-1: Comparison of Alternatives

Environmental Issue Area	Proposed Project	Alternative 1. Configuration B	Alternative 2. Configuration C	Alternative 3. Configuration D (Environmentally Superior)	Alternative 4. Sluicing Method	Alternative 5. Haul Route Alternative	Alternative 6 No Project Alternative
Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (i.e., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted).	Less Than Significant	Increased (Less than Significant)	Reduced (Less than Significant)	Increased (Less than Significant)	Similar (Less than Significant)	Similar (Less than Significant)	Increased (Less than Significant)
Substantially alter the existing drainage pattern of the site, which would potentially result in substantial erosion or siltation	Less Than Significant	Similar (Less than Significant)	Similar (Less than Significant)	Similar (Less than Significant)	Increased (Less than Significant)	Similar (Less than Significant)	Similar (Less than Significant)
Otherwise substantially degrade water quality?	Less Than Significant	Similar (Less than Significant)	Similar (Less than Significant)	Similar (Less than Significant)	Similar (Less than Significant)	Similar (Less than Significant)	Reduced (Less than Significant)

Table 4.3-1: Comparison of Alternatives

Environmental Issue Area	Proposed Project	Alternative 1. Configuration B	Alternative 2. Configuration C	Alternative 3. Configuration D (Environmentally Superior)	Alternative 4. Sluicing Method	Alternative 5. Haul Route Alternative	Alternative 6 No Project Alternative
LAND USE AND PLANNING– Would the project:							
Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	Less Than Significant with Mitigation	Reduced (Less than Significant with Mitigation)	Reduced (Less than Significant with Mitigation)	Reduced (Less than Significant with Mitigation)	Increased (Less than Significant with Mitigation)	Similar (Less than Significant with Mitigation)	Potentially Increased (remains Significant)
MINERAL RESOURCES – Would the project							
Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	Less than Significant	Similar (Less than Significant)	Similar (Less than Significant)	Similar (Less than Significant)	Similar (Less than Significant)	Similar (Less than Significant)	Similar (Less than Significant)
Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?	Less than Significant	Similar (Less than Significant)	Similar (Less than Significant)	Similar (Less than Significant)	Similar (Less than Significant)	Similar (Less than Significant)	Similar (Less than Significant)

Table 4.3-1: Comparison of Alternatives

Environmental Issue Area	Proposed Project	Alternative 1. Configuration B	Alternative 2. Configuration C	Alternative 3. Configuration D (Environmentally Superior)	Alternative 4. Sluicing Method	Alternative 5. Haul Route Alternative	Alternative 6 No Project Alternative
NOISE& VIBRATION– Would the project result in:							
Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies, or a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	Less Than Significant	Reduced (Less than Significant)	Increased (Less than Significant)	Reduced (Less than Significant)	Potentially Increased (Less than Significant)	Similar (Less than Significant)	Reduced (Less than Significant)
Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	Less Than Significant with Mitigation	Reduced (Less than Significant with Mitigation)	Increased (Less than Significant with Mitigation)	Reduced (Less than Significant with Mitigation)	Potentially Increased (Less than Significant with Mitigation)	Similar (Less than Significant with Mitigation)	Reduced (Less than Significant)
A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	Less Than Significant	Reduced (Less than Significant)	Increased (Less than Significant)	Reduced (Less than Significant)	Potentially Increased (Less than Significant)	Similar (Less than Significant)	Reduced (Less than Significant)

Table 4.3-1: Comparison of Alternatives

Environmental Issue Area	Proposed Project	Alternative 1. Configuration B	Alternative 2. Configuration C	Alternative 3. Configuration D (Environmentally Superior)	Alternative 4. Sluicing Method	Alternative 5. Haul Route Alternative	Alternative 6 No Project Alternative
PUBLIC SERVICES							
Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:							
Parks	Less than Significant	Reduced (Less than Significant)	Reduced (Less than Significant)	Reduced (Less than Significant)	Increased (Less than Significant)	Similar (Less than Significant)	Potentially Increased (Less than Significant)
RECREATION– Would the project:							
Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	Less than Significant	Reduced (Less than Significant)	Reduced (Less than Significant)	Reduced (Less than Significant)	Increased (Less than Significant)	Similar (Less than Significant)	Potentially Increased (Less than Significant)
Does the project include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment?	Less than Significant	Reduced (Less than Significant)	Reduced (Less than Significant)	Reduced (Less than Significant)	Increased (Less than Significant)	Similar (Less than Significant)	Potentially Increased (Less than Significant)

Table 4.3-1: Comparison of Alternatives

Environmental Issue Area	Proposed Project	Alternative 1. Configuration B	Alternative 2. Configuration C	Alternative 3. Configuration D (Environmentally Superior)	Alternative 4. Sluicing Method	Alternative 5. Haul Route Alternative	Alternative 6 No Project Alternative
TRANSPORTATION/TRAFFIC– Would the project:							
Cause an increase in traffic, which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections)?	Potentially Significant	Reduced (remains Potentially Significant)	Increased (remains Potentially Significant)	Reduced (remains Potentially Significant)	Potentially Increased (remains Potentially Significant)	Reduced (remains Potentially Significant)	Reduced (Less than Significant)
Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways.	Potentially Significant	Reduced (remains Potentially Significant)	Increased (remains Potentially Significant)	Reduced (remains Potentially Significant)	Potentially Increased (remains Potentially Significant)	Reduced (remains Potentially Significant)	Reduced (Less than Significant)
Would the project substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	Less than Significant	Similar (Less than Significant)	Similar (Less than Significant)	Similar (Less than Significant)	Similar (Less than Significant)	Similar (Less than Significant)	Reduced (Less than Significant)
Result in inadequate emergency access?	Less Than Significant	Similar (Less than Significant)	Similar (Less than Significant)	Similar (Less than Significant)	Similar (Less than Significant)	Similar (Less than Significant)	Increased (remains Potentially Significant)
Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?	Potentially Significant	Reduced (remains Potentially Significant)	Increased (remains Potentially Significant)	Reduced (remains Potentially Significant)	Potentially Increased (remains Potentially Significant)	Reduced (remains Potentially Significant)	Reduced (Less than Significant)

Table 4.3-1: Comparison of Alternatives

Environmental Issue Area	Proposed Project	Alternative 1. Configuration B	Alternative 2. Configuration C	Alternative 3. Configuration D (Environmentally Superior)	Alternative 4. Sluicing Method	Alternative 5. Haul Route Alternative	Alternative 6 No Project Alternative
UTILITIES AND SERVICE SYSTEMS– Would the project:							
Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	Less than Significant Impact	Similar (Less than Significant)	Similar (Less than Significant)	Similar (Less than Significant)	Similar (Less than Significant)	Similar (Less than Significant)	Similar (Less than Significant)

4.4 ALTERNATIVE 1, CONFIGURATION B

4.4.1 Alternative Description

Sediment Removal

Alternative 1, Configuration B excavation activities will remove approximately 2.8 million cubic yards (cy) of current excess sediment in the reservoir in addition to any additional sediment received during the project.

Excavation/Reservoir Configuration

Specific excavation limits and reservoir configuration for the Configuration B Alternative are shown in Figure 4.4-1: Alternative 1, Configuration B Sediment Removal and Management Areas. As shown in Figure 4.4-1, the basin will be excavated from the face of the dam to approximately the middle of the reservoir. The basin will be excavated to a 985-foot elevation at the face of the dam, sloping up to a 1,055-foot elevation at approximately 4,977 feet north of the dam. This configuration will involve approximately 83 acres of the reservoir. As part of this Alternative, sediment stockpiled at Johnson Field as part of the IMP will also be removed. Excavation will not involve the Oak Grove area of Hahamongna Park, the area of the reservoir outside the western and northern excavation limits, or the City of Pasadena's spreading grounds on the east side of the basin.

Removal Method

In order to excavate sediment from the reservoir, trees and vegetation growing within the excavation areas or where haul roads are located will need to be removed. In the areas where excavation will not take place, including the western edge of the reservoir, vegetation will not be removed.

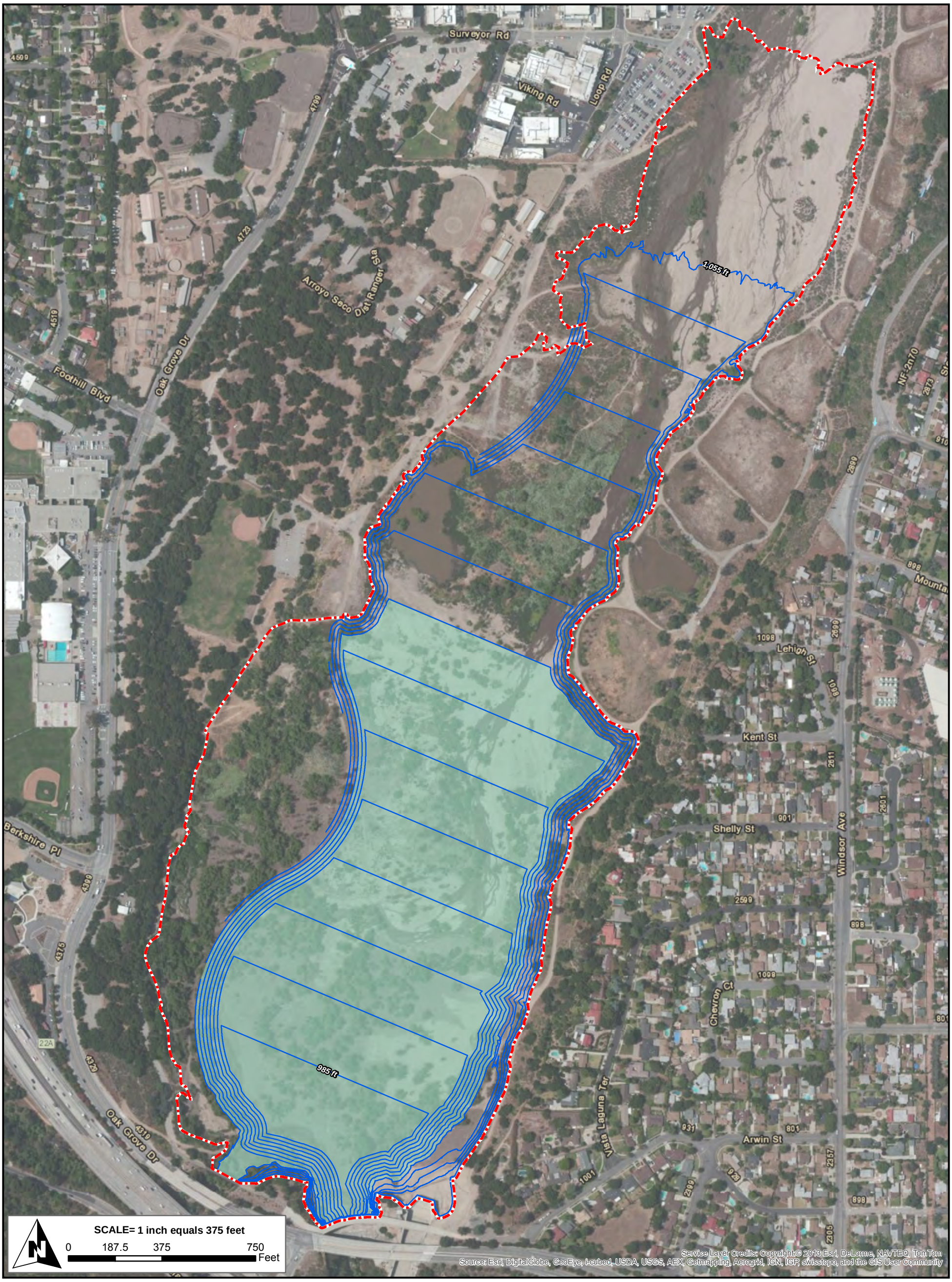
The accumulated sediment will be excavated within the limits shown in Figure 4.4-1. The excavation will be accomplished using the same removal method as the Proposed Project. Construction equipment will include but not be limited to approximately four front loaders with 4-yard buckets, two bulldozers, one excavator, one grader, one water truck, and two tender trucks. Vegetation and organic debris will be separated from the sediment. Coarse material may need to be processed through sorters and crushers to be hauled offsite. Depending on the moisture content of the sediment removed, the sediment may need to be stockpiled to allow it to dry. If drying is required, stockpiling of the sediment will occur onsite within the excavation limits in Devil's Gate Reservoir.

Sediment Disposal

As shown in Sediment Disposal Truck Routes, below, this Alternative will use the same disposal sites as the Proposed Project.

Sediment Disposal Truck Routes

Under this Alternative, excavated sediment will be trucked offsite to the same disposal sites as the Proposed Project. These sites will include: the primary disposal site locations (the Waste Management Facility in Azusa, the Vulcan Materials Reliance Facility in Irwindale, and/or the Manning Pit Sediment



Proposed Project Boundary

Reservoir Management Area

Sediment Removal Excavation Contours

Figure 4.4-1
Sediment Removal and Management Areas Map
Alternative 1 - Configuration B

Version Date: 10/18/2013

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\\Cgi-gisdata01\gis_data\Projects\20000s\20201 - 20400\20346 Devil's Gate EIR\20346 Figure 4.4-1 Alternative 1, Configuration B Sediment Removal and Management Areas.mxd

Placement Site located in Irwindale east of the Proposed Project site) or a secondary facility located in Sun Valley west of the Proposed Project site (Sheldon Pit, Sun Valley Fill Site, Bradley Landfill, and/or Boulevard Pit). As with the Proposed Project, it is estimated that the eastern disposal sites will be used from 80 to 100 percent of the time. Use of the Sun Valley sites is estimated to occur from 0 to 20 percent of the time. Removed vegetation and organic debris will be hauled to Scholl Canyon Landfill located in the City of Glendale.

Sediment Disposal Truck Routes

This Alternative will use the same sediment disposal truck routes as the Proposed Project and as shown in Figures 2.5-2, 2.5-3, 2.5-4, Proposed Project Haul Routes.

Project Schedule

As with the Proposed Project, sediment removal under this Alternative will occur between Summer 2015 and Summer 2020; however, sediment removal under this Alternative could potentially have a slightly shorter duration than the Proposed Project due to the reduced amount of sediment to be removed. Excavation and associated activities within the reservoir area are expected to take place during drier months, from April to December, Monday through Saturday (except on holidays), as weather permits. During dry years, work could potentially start earlier and/or continue later. Alternative 1, Configuration B sediment removal activities will take place Monday through Friday between 7:00 a.m. and 6:00 p.m. Standard Time and between 7:00 a.m. and 7:00 p.m. Daylight Savings Time and on Saturday between 8:00 a.m. and 5:00 p.m. Reservoir management activities will take place under the same hours Monday through Friday, with no activities on Saturday.

Reservoir Management

Alternative 1, Configuration B will employ reservoir management to manage sediment in a method similar to the Proposed Project to reduce buildup of sediment in the reservoir management area and eliminate or substantially reduce the occurrence of another large-scale sediment removal project in the future.

The reservoir will be maintained with the approximate reservoir management cut and elevation levels shown as the green shaded area in Figure 4.4-1. This will include a total reservoir management acreage of approximately 54.56 acres. The access roads will be maintained to provide proper road width for access.

Vegetation Maintenance

Vegetation within the reservoir management area of the reservoir will be mowed or removed and grubbed annually. These activities will occur Monday through Friday over an estimated three-week period in the late summer or early fall. All vegetation and sediment outside the reservoir management footprint will be allowed to reestablish and/or remain in place. This will include the western edge of the reservoir outside the reservoir management footprint.

FAST Operations

During FAST operations, reservoir inflows from rain events will naturally pass fine grain size sediment through the reservoir and downstream of the dam. These FAST operations will occur during the winter

storm season and will not require mechanical agitation or assistance. FAST operations will reduce sediment accumulation in the reservoir and help maintain flood control capacity. The amount of sediment that will be transported through FAST operations is limited by the smaller sediment grain size that can be moved by storm runoff received into the reservoir and the subsequent quantities of storm runoff received.

It is anticipated that the majority of these FAST operations will be similar to historic FAST operations and that similar volumes of sediment will pass through the reservoir and into the Arroyo Seco.

Sediment Excavation/Trucking Offsite

Depending on the efficiency of the FAST operations, some mechanical excavation and trucking offsite may be required to remove accumulated sediment. Sediment excavation/trucking offsite during reservoir management will use the same methods and trucking routes as the sediment removal activities. The accumulated sediment will be excavated with construction equipment, including but not limited to, approximately two front loaders with 4-yard buckets, one bulldozer, one excavator, one grader, one water truck, and two tender trucks (for fuel and maintenance). Vegetation and organic debris will be separated from the sediment. The need for future sediment removal will depend on future storm activity and associated sediment accumulation.

As with the Proposed Project, it is estimated, based on past storm events, that sediment excavation/trucking offsite will be required to remove typically 13,000 cy of sediment annually. Based on an estimated removal of 4,800 cy per day, it is expected this will occur over an estimated two-week period, working Monday through Friday. This sediment excavation activity will take place during the late summer/early fall following the vegetation maintenance.

Moderately large sediment deposits have the potential to occur during a storm season with very intense rainfall or following a significant wildfire within the watershed. Such events are expected to occur very infrequently. It is anticipated that even with this type of event the newly deposited sediment could be removed in one season. A moderately large sediment removal event, anticipated to involve approximately 170,000 cy, could take place over an estimated 12-week period during the late summer and early fall following the vegetation maintenance.

4.4.2 Alternative Duration

A large-scale sediment removal project will be required if a significant amount of sediment accumulates in the reservoir or outside the maintenance footprint despite the reservoir management activities. This is not anticipated for a period of over two decades unless major fires and subsequent intense storms occur within the watershed. Sediment outside the maintenance footprint will be monitored to determine if the sediment buildup is exceeding projected volumes. If future reservoir conditions threaten dam operations, LACFCD will initiate the planning process for a new large-scale sediment removal project. Part of this planning will involve utilizing the CEQA process to evaluate and determine the appropriate level of environmental document required for the future project.

4.4.3 Impact Analyses and Comparison to Proposed Project

AESTHETICS

AESTHETICS-1 *Have a substantially adverse effect on a scenic vista.*

Sediment Removal

Sediment removal activities associated with Alternative 1, Configuration B will change the visual characteristics of the reservoir through the removal of sediment and associated vegetation in the reservoir. These changes will be similar to the Proposed Project at the south end of the reservoir; however, these changes will be reduced in magnitude in comparison to the Proposed Project, as Alternative 1, Configuration B will leave a greater area along the west side of the reservoir untouched.

As with the Proposed Project, sediment removal activities associated with Alternative 1, Configuration B will not result in obstruction or blockage of views, due to the large difference in elevation between viewpoints and the Proposed Project site.

Construction equipment will be visible in the basin. Views of construction equipment will be expected elements in the viewshed due to the ongoing IMP measures currently underway to keep debris from plugging the outlet works; however, the amount of equipment and duration onsite will be greater for the Alternative than for the interim measures.

With sediment removal under Alternative 1, Configuration B, the topography of the reservoir will be lower, especially at the south end of the reservoir; and vegetation within the excavation limits will be removed. These elements will result in a high degree of contrast from existing visual characteristics and will result in a significant impact to scenic vistas. These contrasting elements will be highly visible for Viewpoints 1 through 3. For Viewpoints 1 and 3, however, the co-dominant features of Devil's Gate Dam, the reservoir maintenance roads, electrical lines, and the debris boom line, and other less dominant features of the San Gabriel Mountains, Oak Grove Drive, JPL facilities, and residential areas will remain unchanged. In addition, the existing vegetation along the west side of the reservoir will not be removed and will share dominance with the dam and the excavation area.

Sediment removal activities will also be visible from Viewpoint 4 and Viewpoint 5 but less dominant due to distance and other more dominant visual elements. The dominant features for Viewpoint 4 (I-210, Devil's Gate Dam, San Gabriel Mountains, and the west side of the reservoir) and Viewpoint 5 (spreading grounds, JPL facilities) will remain unchanged.

As with the Proposed Project, excavation and associated activities within the reservoir area are expected to take place during drier months, from April to December, as weather permits. During the wetter months, changes to the visual characteristics associated with sediment removal will be slightly less apparent when water is stored in the basin. Some regrowth of riparian vegetation will likely occur during this time. Both these factors will reduce the change in the visual characteristics associated with sediment removal. In addition, as discussed above, sediment removal activities will not introduce view-obstructing features.

Nevertheless, due to the multi-year duration of the sediment removal phase under Alternative 1, Configuration B, the large-scale alteration, visibility of the site, and level of viewer sensitivity, sediment removal activities will be a significant impact to scenic vistas. While the sediment removal associated with Alternative 1, Configuration B will result in a significant impact to scenic vistas, the degree of contrast will be reduced in comparison to the Proposed Project due to the reduction in excavation area and associated sediment removal activities.

Reservoir Management

As with the Proposed Project, reservoir management will not result in obstruction or blockage of views. Construction equipment will also be visible in the basin but only for short periods of time.

After completion of the proposed sediment removal activities associated with Alternative 1, Configuration B, the disturbed areas outside the reservoir management area are expected to experience natural regrowth with native vegetation, primarily Riparian Herbaceous vegetation. The area available for regrowth will be greater for this alternative than for either reservoir management option under the Proposed Project. Under Alternative 1, Configuration B, approximately 28.52 acres of previously disturbed area will have natural vegetation regrowth and 54.56 acres of vegetation will be maintained annually. In addition, 37.34 acres that were not disturbed during sediment removal will remain undisturbed. In contrast, under the Proposed Project's reservoir management Option 1, approximately 120.42 acres of vegetation will be maintained annually; while under reservoir management Option 2, 33.97 acres of previously disturbed area will have natural vegetation regrowth and 91.28 acres of vegetation will be maintained annually.

As described above, the majority of the reservoir will be allowed to naturally grow and/or remain in place; and the trees on the border of the reservoir management area are expected to become dominant features within the reservoir. Therefore, reservoir management under Alternative 1, Configuration B will result in a lower degree of contrast than seen during sediment removal and will result in a less than significant impact to scenic vistas. In addition, any contrast associated with this Alternative will be reduced in comparison to either reservoir management option under the Proposed Project due to the reduction in reservoir management area and associated reservoir management activities.

Mitigation Measures

No feasible mitigation measures were identified for sediment removal. No mitigation is necessary for reservoir management. For reservoir management, the less than significant impacts will be further reduced through the implementation of Mitigation Measures MM BIO-6, MM BIO-7, and MM BIO-8.

Residual Impacts After Mitigation

Due to the multi-year duration of the sediment removal phase, the large-scale alteration, visibility of the site, the level of viewer sensitivity, and the lack of feasible mitigation measures, impacts to scenic vistas from sediment removal activities will remain potentially significant.

Reservoir management impacts to scenic vistas will result in a lower degree of contrast than seen during sediment removal and will result in a less than significant impact to scenic vistas.

Comparison to Proposed Project and Other Alternatives

Alternative 1, Configuration B is considered environmentally superior for aesthetics to the Proposed Project with respect to impacts on scenic vistas due to the reduction in sediment removal and reservoir management areas and associated activities.

Due to the reduced area of sediment removal and reservoir management areas and associated activities, Alternative 1, Configuration B will be environmentally superior for aesthetics to Alternative 4, Sluicing and Alternative 5, Haul Route Alternative.

Due to the greater area of sediment removal and reservoir management areas and associated activities, Alternative 1, Configuration B will be environmentally inferior for aesthetics to Alternative 2, Configuration C and Alternative 3, Configuration D.

Alternative 1, Configuration B will be environmentally superior for aesthetics to Alternative 6, No Project, as views of the reservoir will likely degrade under Alternative 6, No Project due to continuous sediment deposition.

AESTHETICS-2 *Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway.*

Sediment Removal/Reservoir Management

As with the Proposed Project, Alternative 1, Configuration B will not involve damage to rock outcroppings or historic buildings but will involve removal of vegetation, including native and non-native trees from the site, though to a lesser degree than the Proposed Project. The Proposed Project site is not visible from the only designated state scenic highway in the vicinity of the Proposed Project site, SR-2. Therefore, implementation of this alternative will not damage scenic resources within the viewshed of a designated state scenic highway.

I-210, located to the south of the Proposed Project site, is identified as "Eligible" in the State Scenic Highway Program. Alternative 1, Configuration B will impact the existing visual character of a portion of the viewshed through the removal of vegetation including native and non-native trees from the site. This impact to visual character of a portion of the viewshed will be reduced in comparison to the Proposed Project due to the reduction in sediment removal and reservoir management areas and associated activities. In addition, views of the Proposed Project site from I-210 are very brief in nature (visibility for approximately 0.3 mile) and are dominated by views of the JPL facilities and San Gabriel Mountains. Implementation of Alternative 1, Configuration B will not obstruct views of these features. Therefore, impacts to scenic resources within this eligible but not designated state scenic highway will be less than significant.

Mitigation Measures

No mitigation is necessary.

Residual Impacts After Mitigation Measure

The Proposed Project site is not visible from any designated state scenic highway and is only briefly visible from an eligible state scenic highway; therefore, impacts related to state scenic highways from sediment removal and reservoir management are less than significant.

Comparison to Proposed Project and Other Alternatives

Alternative 1, Configuration B is considered environmentally superior for aesthetics to the Proposed Project with respect to impacts related to state scenic highways from sediment removal and reservoir management, due to the reduction in sediment removal and reservoir management areas and associated activities.

Due to the reduction in sediment removal and reservoir management areas and associated activities, Alternative 1, Configuration B will also be environmentally superior for aesthetics to Alternative 4, Sluicing and Alternative 5, Haul Route Alternative.

Alternative 1, Configuration B will be environmentally inferior for aesthetics to Alternative 2, Configuration C and Alternative 3, Configuration D due to the greater area of sediment removal and reservoir management activities.

Alternative 1, Configuration B will be environmentally superior for aesthetics to Alternative 6, No Project, as views of the reservoir will likely degrade under Alternative 6, No Project due to continuous sediment deposition.

AESTHETICS-3 *Substantially degrade the existing visual character or quality of the site and its surroundings.*

Sediment Removal

As described above under AESTHETICS-1, the proposed sediment removal activities associated with Alternative 1, Configuration B will change the visual characteristics of the existing Proposed Project site through the removal of sediment and associated vegetation in the reservoir.

Disturbed landscape areas, both man-made and natural, are currently found throughout the basin. The amount and distribution of these areas change on a regular basis and are expected visual elements in the Proposed Project site landscape. Construction equipment will also be visible in the basin. Views of construction equipment will be expected elements in the viewshed, due to the ongoing IMP measures currently underway to keep debris from plugging the outlet works; however, the amount of equipment and duration onsite will be greater for the Alternative than for the IMP measures.

Sediment and debris management are considered existing operational components of Devil's Gate Reservoir and are not considered significant impacts to the visual characteristics of the site (City of Pasadena 2002). During the sediment removal phase of Alternative 1, Configuration B the disturbed areas will largely replace the vegetated areas, resulting in a high degree of contrast between existing and sediment removal conditions. While the open character of the site will remain, the overall visual quality of the Proposed Project site will be lower due to the large-scale alteration and decrease of desirable elements.

Excavation and associated activities within the reservoir area are expected to take place during drier months, from April to December, as weather permits. During the wetter months, temporary changes to the visual characteristics of the Proposed Project site will be slightly less apparent with water storage in the basin. Some regrowth of riparian vegetation would likely occur during this time. Both these factors will reduce the temporary change in the visual characteristics associated with sediment removal. Due to the multi-year duration of the sediment removal phase, the large-scale alteration, visibility of the site, and level of viewer sensitivity, sediment removal activities will be a significant impact to the visual character of the Proposed Project site.

Although the sediment removal associated with this alternative will result in a significant impact to the visual character of the Proposed Project site, the degree of contrast will be reduced in comparison to the Proposed Project due to the reduction in excavation area and associated sediment removal activities. In addition, approximately 37.34 acres of the approximately 120.42 acres of the Proposed

Project site will be left undisturbed. This will include swaths along the west side of the site. With areas of undisturbed vegetation left throughout, the site will more closely resemble the mix of disturbed and vegetated areas found under existing conditions than the Proposed Project.

Reservoir Management

As with the Proposed Project, construction equipment will also be visible in the basin but only for short periods of time. After completion of the proposed sediment removal activities associated with Alternative 1, Configuration B, the disturbed areas outside the reservoir management area are expected to experience natural regrowth with native vegetation, primarily Riparian Herbaceous vegetation. Reservoir management under this alternative will result in a lower degree of contrast than seen during sediment removal and will result in a less than significant impact to visual character. The majority of the reservoir will be allowed to naturally grow and/or remain in place, and the trees on the border of the reservoir management area are expected to become dominant features within the reservoir. As described previously, the area requiring vegetation maintenance will be smaller than for either reservoir management option under the Proposed Project. In addition, any contrast associated with this Alternative will be reduced in comparison to either reservoir management option under the Proposed Project, due to the reduction in reservoir management area and associated reservoir management activities.

Mitigation Measures

No feasible mitigation measures were identified for sediment removal. No mitigation is necessary for reservoir management. For reservoir management, the less than significant impacts will be further reduced through the implementation of Mitigation Measures MM BIO-6, MM BIO-7, and MM BIO-8.

Residual Impacts After Mitigation

Due to the multi-year duration of the sediment removal phase, the large-scale alteration, visibility of the site, the level of viewer sensitivity, and the lack of feasible mitigation; impacts to visual character from sediment removal activities will remain potentially significant.

Reservoir management impacts to visual character will result in a lower degree of contrast than seen during sediment removal and will result in a less than significant impact to visual character.

Comparison to Proposed Project and Other Alternatives

Alternative 1, Configuration B is considered environmentally superior for aesthetics to the Proposed Project with respect to impacts to visual character due to the reduction in sediment removal and reservoir management areas and associated activities.

Due to the reduction in sediment removal and reservoir management areas and associated activities, Alternative 1, Configuration B will also be environmentally superior for aesthetics to Alternative 4, Sluicing and Alternative 5, Haul Route Alternative.

Alternative 1, Configuration B will be environmentally inferior for aesthetics to Alternative 2, Configuration C and Alternative 3, Configuration D due to the greater areas of sediment removal and reservoir management activities.

Alternative 1, Configuration B will be environmentally superior for aesthetics to Alternative 6, No Project, as views of the reservoir will likely degrade under Alternative 6, No Project due to continuous sediment deposition.

AIR QUALITY

AIR QUALITY- 1 Conflict with or obstruct implementation of the applicable air quality plan.

Sediment Removal/Reservoir Management

Typically, assessments for air quality plan consistency use four criteria for determining project conformance with the current air quality management plan (AQMP). The first and second criteria are from the South Coast Air Quality Management District (SCAQMD). According to the SCAQMD, AQMP consistency is determined by two key indicators: (1) whether the project will not result in an increase in the frequency or severity of existing air quality violations or cause or contribute to new violations, or delay timely attainment of air quality standards or the interim emission reductions specified in the AQMP; and (2) whether the project will exceed the assumptions in the AQMP based on the year of project build-out and phase (SCAQMD 2006). The third criterion is compliance with the control measures in the AQMP. The fourth criterion is compliance with the SCAQMD regional thresholds.

As with the Proposed Project (see Section 3.5.6), Alternative 1, Configuration B will be consistent with the second through fourth criteria but will not be consistent with the first criterion. This is due to emissions of NO_X exceeding the Daily Regional Threshold during sediment removal, resulting in a potentially significant impact. Implementation of Mitigation Measures MM AQ-1 and MM AQ-2 will result in a reduction of Alternative 1, Configuration B's combined NO_X emissions during sediment removal to a level of less than significant. Therefore, impacts during sediment removal will be less than significant. This impact will be reduced in comparison to the Proposed Project due to the reduction in excavation area and associated sediment removal activities.

As with the Proposed Project, reservoir management for Alternative 1, Configuration B will not exceed any standard and will result in less than significant impacts.

Mitigation Measures

MM AQ-1: LACFCD shall require all construction contractors during the sediment removal phase of the Proposed Project to use only sediment removal dump trucks that meet the EPA's emission standards for Model Year 2007 or later.

MM AQ-2: LACFCD shall require all construction contractors during the sediment removal phase of the Proposed Project to use off-road equipment that meets, at a minimum, EPA's emission standards for Tier 3 equipment.

Residual Impacts After Mitigation

Implementation of these mitigations would reduce the Alternative 1, Configuration B's combined NO_X emissions during the sediment removal phase to a level of less than significant.

Reservoir management activities will not violate an air quality standard or contribute substantially to an existing or projected air quality violation; therefore, the Alternative 1, Configuration B during reservoir management will be consistent with the first indicator. No significant impact would occur.

Comparison to Proposed Project and Other Alternatives

Alternative 1, Configuration B is considered environmentally superior to the Proposed Project with respect to impacts to air quality plans due to the reduction in sediment removal and reservoir management areas and associated activities.

Due to the reduction in sediment removal and reservoir management areas and associated activities, Alternative 1, Configuration B will also be environmentally superior to: Alternative 2, Configuration C and Alternative 5, Haul Route Alternative.

Alternative 1, Configuration B will be initially environmentally inferior to Alternative 4, Sluicing due to hauling sediment and vegetation from the reservoir. This Alternative will potentially be environmentally superior to Alternative 4, Sluicing if proper sediment transport does not occur under Alternative 4, Sluicing, causing sediment deposits from sluicing operations to develop along the route to the ocean. This would result in need for sediment removal from the Arroyo Seco Channel, the Los Angeles River, or the Port of Long Beach and air quality impacts associated with removal.

Alternative 1, Configuration B will be environmentally inferior to Alternative 3, Configuration D and Alternative 6, No Project due to sediment removal and reservoir management activities.

AIR QUALITY-2 *Violate an air quality standard or contribute substantially to an existing or project air quality violation.*

As with the Proposed Project, under Alternative 1, Configuration B emissions of NO_X exceed the Daily Regional Threshold during sediment removal, resulting in a potentially significant impact. Implementation of Mitigation Measures MM AQ-1 and MM AQ-2 will result in a reduction of Alternative 1, Configuration B's combined NO_X emissions during sediment removal to a level of less than significant. This impact will be reduced in comparison to the Proposed Project due to the reduction in excavation area and associated sediment removal activities.

As with the Proposed Project, reservoir management for Alternative 1, Configuration B will not exceed any standard and will result in less than significant impacts.

Mitigation Measures

See Mitigation Measures MM AQ-1 and MM AQ-2.

Residual Impacts After Mitigation

Implementation of these mitigations would reduce Alternative 1, Configuration B's combined NO_X emissions during the sediment removal phase to a level of less than significant.

Reservoir management will not exceed any standard SCAQMD Regional Threshold; therefore, this impact will be less than significant.

Comparison to Proposed Project and Other Alternatives

Alternative 1, Configuration B is considered environmentally superior to the Proposed Project with respect to impacts to air quality standards due to the reduction in sediment removal and reservoir management areas and associated activities.

Due to the reduction in sediment removal and reservoir management areas and associated activities, Alternative 1, Configuration B will also be environmentally superior to Alternative 2, Configuration C and Alternative 5, Haul Route Alternative.

Alternative 1, Configuration B will be initially environmentally inferior to Alternative 4, Sluicing due to hauling sediment and vegetation from the reservoir. This Alternative will potentially be environmentally superior to Alternative 4, Sluicing if proper sediment transport does not occur under Alternative 4, Sluicing, causing sediment deposits to develop along the route to the ocean. This would result in need for sediment removal from the Arroyo Seco Channel, the Los Angeles River, or the Port of Long Beach and air quality impacts associated with removal.

Alternative 1, Configuration B will be environmentally inferior to Alternative 3, Configuration D and Alternative 6, No Project, due to sediment removal and reservoir management activities.

AIR QUALITY-3 *Result in a cumulatively considerable net increase of any criteria pollutants for which the project region is nonattainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors).*

Sediment Removal/Reservoir Management

Air Quality Plans

As discussed previously, Alternative 1, Configuration B emissions of NO_X are expected to exceed the SCAQMD regional significance thresholds during sediment removal. This exceedance will not be consistent with air quality management plans and therefore will result in a significant cumulative impact. This impact will be reduced in comparison to the Proposed Project due to the reduction in excavation area and associated sediment removal activities.

Emissions of VOC, NO_X, PM_{10}, and $PM_{2.5}$ are not expected to exceed the SCAQMD regional significance thresholds during reservoir management. The SCAQMD considers construction-related emissions that do not exceed the project-specific thresholds will not result in a cumulative impact.

Cumulative Health Impacts

As with the Proposed Project, for Alternative 1, Configuration B, during sediment removal, significance threshold would not be exceeded for emissions of particulate matter and CO; no significance threshold would be exceeded during reservoir management under either option. Implementation of Mitigation Measures MM AQ-1 and MM AQ-2 will result in a reduction of NO_X emissions and will reduce the NO_X emissions to a level of less than significant for the sediment removal phase.

Mitigation Measure

See Mitigation Measures MM AQ-1 and MM AQ-2.

Residual Impacts After Mitigation

Sediment removal will not exceed any localized significance threshold except for combined NO_X emissions. Implementation of these mitigations would reduce Alternative 1, Configuration B's combined NO_X emissions during the sediment removal phase to a level of less than significant.

Reservoir management will not exceed any localized significance threshold; therefore, this impact will be less than significant.

Comparison to Proposed Project and Other Alternatives

Alternative 1, Configuration B is considered environmentally superior to the Proposed Project with respect to impacts to cumulative health due to the reduction in sediment removal and reservoir management areas and associated activities.

Due to the reduction in sediment removal and reservoir management areas and associated activities, Alternative 1, Configuration B will also be environmentally superior to Alternative 2, Configuration C and Alternative 5, Haul Route Alternative.

Alternative 1, Configuration B will be initially environmentally inferior to Alternative 4, Sluicing due to hauling sediment and vegetation from the reservoir. This Alternative will potentially be environmentally superior to Alternative 4, Sluicing if proper sediment transport does not occur under Alternative 4, Sluicing, causing sediment deposits to develop along the route to the ocean. This would result in need for sediment removal from the Arroyo Seco Channel, the Los Angeles River, or the Port of Long Beach and air quality impacts associated with removal.

Alternative 1, Configuration B will be environmentally inferior to Alternative 3, Configuration D and Alternative 6, No Project due to sediment removal and reservoir management activities.

AIR QUALITY-4 *Expose sensitive receptors to substantial pollutant concentrations.*

Sediment Removal/Reservoir Management

<u>Localized Significance Thresholds</u>

As with the Proposed Project, the onsite emissions for Alternative 1, Configuration B for sediment removal and reservoir management activities will exceed LST thresholds.

<u>Carbon Monoxide Hotspot</u>

As with the Proposed Project, the CO Hotspot analysis for Alternative 1, Configuration B shows no exceedance of the State or federal CO standard; and no significant impact is expected during sediment removal or management.

Carcinogenic Or Toxic Contaminants

As with the Proposed Project, all routes modeled for Alternative 1, Configuration B resulted in less than significant non-cancer risk from diesel emissions created by Alternative 1, Configuration B.

Mitigation Measure

No mitigation measures are required.

Residual Impacts After Mitigation

Impacts will be less than significant.

Comparison to Proposed Project and Other Alternatives

Alternative 1, Configuration B is considered environmentally superior to the Proposed Project with respect to impacts to sensitive receptors to substantial pollutant concentrations due to the reduction in sediment removal and reservoir management areas and associated activities.

Due to the reduction in sediment removal and reservoir management areas and associated activities, Alternative 1, Configuration B will also be environmentally superior to Alternative 2, Configuration C and Alternative 5, Haul Route Alternative.

Alternative 1, Configuration B will be initially environmentally inferior to Alternative 4, Sluicing due to hauling sediment and vegetation from the reservoir. This Alternative will potentially be environmentally superior to Alternative 4, Sluicing if proper sediment transport does not occur under Alternative 4, Sluicing, causing sediment deposits to develop along the route to the ocean. This would result in need for sediment removal from the Arroyo Seco Channel, the Los Angeles River, or the Port of Long Beach and air quality impacts associated with removal.

Alternative 1, Configuration B will be environmentally inferior to Alternative 3, Configuration D and Alternative 6, No Project due to sediment removal and reservoir management activities.

AIR QUALITY-5 *Create objectionable odors affecting a substantial number of people.*

Sediment Removal/Reservoir Management

The CEQA Guidelines indicate that a significant impact would occur if the Proposed Project would create objectionable odors affecting a substantial number of people.

As with the Proposed Project, diesel exhaust for Alternative 1, Configuration B will be emitted from equipment during the sediment removal process. Diesel exhaust is an objectionable odor to some; however, concentrations will disperse rapidly from the Project site (OB-1 2013); therefore, impacts will be less than significant.

Mitigation Measures

No mitigation measures are necessary.

Residual Impacts After Mitigation

Alternative 1, Configuration B is not expected to produce objectionable odors beyond the Proposed Project site under sediment removal or reservoir management; therefore, this impact will be less than significant.

Comparison to Proposed Project and Other Alternatives

Alternative 1, Configuration B is considered neither environmentally superior nor inferior to the Proposed Project with respect to impacts caused by objectionable odors.

Alternative 1, Configuration B will also be neither environmentally superior nor inferior to all of the other alternatives except Alternative 6, No Project Alternative.

Alternative 1, Configuration B will be environmentally inferior to Alternative 6, No Project Alternative due to sediment removal and reservoir management activities.

BIOLOGICAL RESOURCES

BIOLOGY-1 *Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or the U.S. Fish and Wildlife Service.*

Sediment Removal

As shown in Figure 4.4-2: Alternative 1, Configuration B Sediment Removal Vegetation Communities and Table 4.4-1, potential impacts to vegetation communities will be reduced in comparison to the Proposed Project due to the reduction in area disturbed during excavation and associated sediment removal activities.

Table 4.4-1: Alternative 1, Configuration B, Sediment Removal Impacts to Vegetation Communities

Vegetation Communities	Estimated Acres of Vegetation Removed During Sediment Removal	
	Proposed Project	Alternative 1 Configuration B
Riversidean Alluvial Fan Sage Scrub	1.1	0.1
California Sagebrush – California Buckwheat Scrub	3.1	1.9
Scoured	26.5	13.0
Escaped Cultivars	0.4	0.2
Riparian Woodland	51.4	37.2
Mustard and Annual Brome Semi-Natural Herbaceous Stand	22.8	17.4
Mule Fat Thickets	11.1	10.4
Disturbed	1.9	0.9

Sensitive Plants

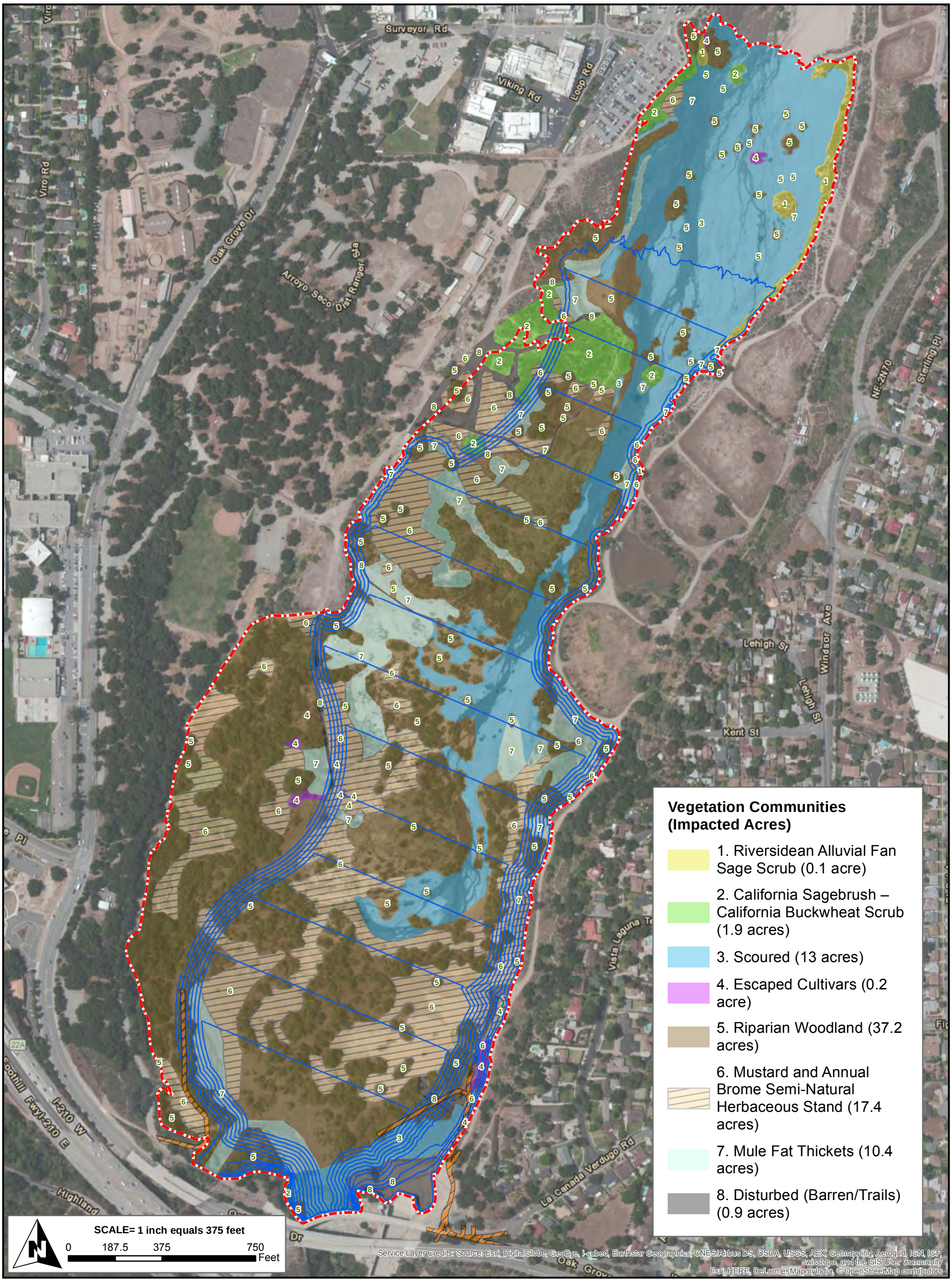
No listed or otherwise sensitive plant species were observed on the Proposed Project site. Therefore, as with the Proposed Project, Alternative 1, Configuration B is not expected to have a substantial adverse effect on any plant species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations or by CDFW or USFWS.

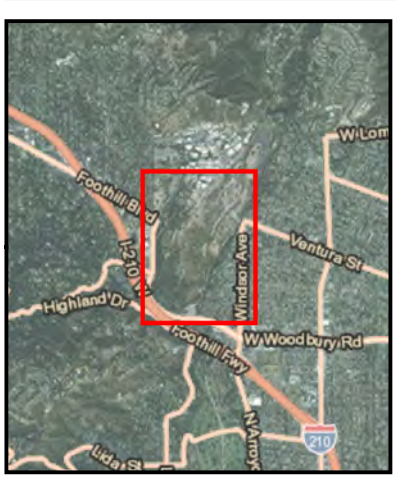
Sensitive Wildlife

The Proposed Project site contains habitat and/or potential habitat for five special status species: least Bell's vireo, yellow warbler, southwestern pond turtle, coast range newt, and two-striped garter snake. Least Bell's vireo, yellow warbler, coast range newt, and two-striped garter snake have all been observed on the Proposed Project site. The southwestern pond turtle has not been observed on the Proposed Project site. If it did occur, habitat for this species would be largely limited to ponded areas.

Of the approximately 120.42 acres that will be disturbed under the Proposed Project, approximately 37.34 acres, or 31 percent, will be left undisturbed under Alternative 1, Configuration B. These undisturbed areas will include swaths along the west side of the site. These undisturbed areas include potential habitat for the five special status species.

As shown in Figure 4.4-2: Alternative 1, Configuration B Sediment Removal Vegetation Communities Impacts and Table 4.4-1, potential impacts to sensitive wildlife will be reduced in comparison to the Proposed Project due to the reduction in habitat disturbed during sediment removal activities. Disturbance of habitat for the least Bell's vireo within Riparian Woodland and Mule Fat Thickets will be reduced by approximately 14.2 acres (28 percent) and 0.7 acre (7 percent), respectively, as compared to the Proposed Project.





Proposed Project Boundary

Access Road

Sediment Removal Excavation Limit

Figure 4.4-2
Sediment Removal Vegetation Communities Impacts Map
Alternative 1 - Configuration B

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\\cgi-gisdata01\GIS_DATA\Projects\20000s\20201 - 20400\20346 Devil's Gate EIR\20346 Figure 4.4-2 Alternative 1, Configuration B Sediment Removal Vegetation Communities Impacts.mxd

Disturbance of habitat for the yellow warbler within the Riparian Woodland community will be reduced by approximately 14.2 acres (28 percent), as compared to the Proposed Project.

Habitat for the coast range newt, the southwestern pond turtle, and the two-striped garter snake occurs within streams and seasonal ponds found on the Proposed Project site. The amount of this habitat that will be available will depend upon where sediment accumulates and the amount of flows, rainfall, and runoff. Under Alternative 1, Configuration B, disturbance of habitat for the coast range newt, the southwestern pond turtle, and the two-striped garter snake is expected to be reduced in comparison to the Proposed Project due to the reduction in habitat disturbed during sediment removal activities.

Direct harm or take of these species during sediment removal activities would result in a significant impact. The chance of this occurring during sediment removal activities under this alternative is expected to be reduced in comparison to the Proposed Project due to the reduction in excavation area and associated sediment removal activities. To ensure no harm or take of these special status species, Mitigation Measures MM BIO-1, MM BIO-2, and MM BIO-3, listed below, have been provided. With implementation of these mitigation measures, direct impacts to special status species will be less than significant.

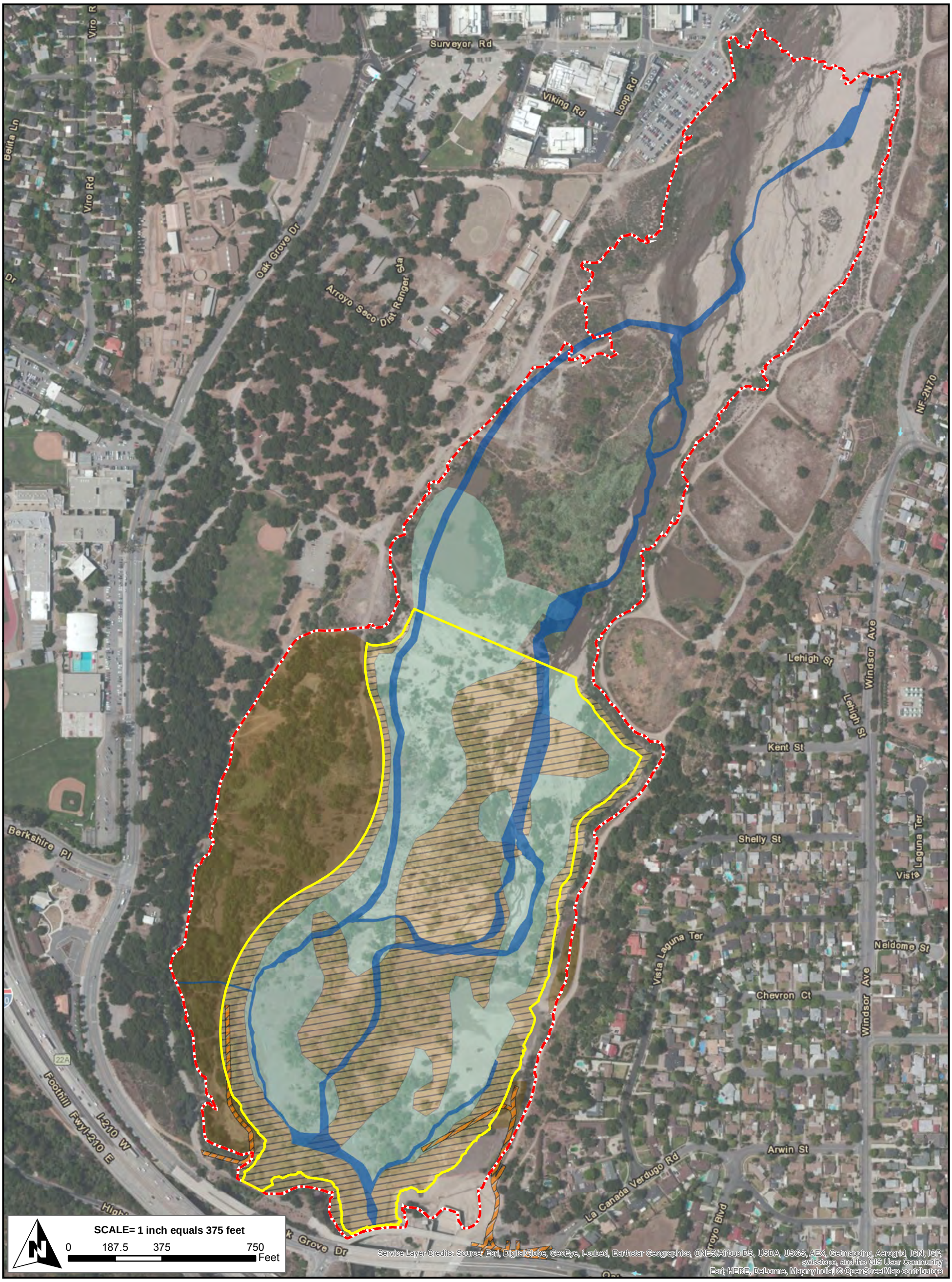
During sediment removal, tree and vegetation removal has the potential to significantly affect nesting birds and roosting bats if active nests or roosting bats are present. Disturbance of active nests will violate the Migratory Bird Treaty Act and result in a significant impact. This impact will be reduced under Alternative 1, Configuration B, as fewer acres of habitat will be removed in comparison to the Proposed Project (see Table 4.4-1). With implementation of Mitigation Measures MM BIO-4 and MM BIO-5, listed below, impacts to nesting birds and roosting bats will be less than significant.

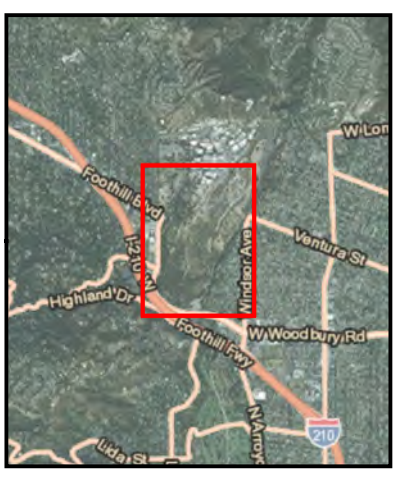
Reservoir Management

Figure 4.4-3: Alternative 1, Configuration B Expected Vegetation Communities Under Reservoir Management Figure 4.4-3: Alternative 1, Configuration B Expected Vegetation Communities Under Reservoir Management shows expected conditions of the vegetation communities under reservoir management for Alternative 1, Configuration B in comparison to the Proposed Project. As shown below, Alternative 1, Configuration B will result in a greater diversity of vegetation communities, including a greater amount of Riparian Woodland and Mule Fat Thickets. Under Alternative 1, Configuration B, a greater area of the Proposed Project site will be left undisturbed during reservoir management, approximately 37.34 acres. In contrast, under the Proposed Project's reservoir management Option 1, the whole Proposed Project site, approximately 120.42 acres, will be disturbed annually. Under the Proposed Project's reservoir management Option 2, 33.97 acres will be left undisturbed during reservoir management.

The reservoir management area for Alternative 1, Configuration B is expected to be composed of Mule Fat Thickets and Mustard and Annual Brome Semi-Natural Herbaceous Stand communities. The availability of streams and seasonal ponds will depend upon where sediment accumulates and the amount of flows, rainfall, and runoff.

Direct harm or take of these species during reservoir management activities will result in a significant impact. The chance of this occurring during reservoir management activities under this alternative is expected to be reduced in comparison to either of the Proposed Project's reservoir management options due to the reduction in the reservoir management area. To ensure no harm or take of these special status species occurs, MM BIO-1, MM BIO-2, and MM BIO-3 have been provided. With implementation of these mitigation measures, direct impacts to special status species will be less than significant.





Proposed Project Boundary

Reservoir Management Area

Access Road

Drainage

Vegetation Type

Mule Fat Thickets

Riparian Woodland

Mustard and Annual Brome Semi-Natural Herbaceous Stand

Figure 4.4-3
Expected Vegetation Communities Under Reservoir Management
Alternative 1 - Configuration B

Version Date: 10/16/2014

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\\cgi-gisdata01\GIS_DATA\Projects\20000s\20201 - 20400\20346 Devil's Gate EIR\20346 Figure 4.4-3 Alternative 1, Configuration B Expected Vegetation Communities Under Reservoir Management.mxd

During reservoir management, tree and vegetation removal will significantly affect nesting birds and roosting bats, if present. Disturbance of active nests will violate the Migratory Bird Treaty Act and result in a significant impact. This impact will be reduced under Alternative 1, Configuration B, as less vegetation will be removed in comparison to the Proposed Project. With implementation of Mitigation Measures MM BIO-4 and MM BIO 5, impacts to nesting birds and roosting bats will be less than significant.

Mitigation Measures

MM BIO – 1: A qualified biological monitor shall be present during initial ground- or vegetation-disturbing project-related activities to provide protection measures and monitor for wildlife in harm's way. This includes initial ground- or vegetation-disturbing activities at the annual start of each year of sediment removal or maintenance activities. Following initial project-related activities, a qualified monitoring biologist shall be present as necessary to maintain the implemented protection measures and monitor for additional species in harm's way. These protection measures shall include, as appropriate: redirecting the wildlife, identifying areas that may require exclusionary devices (e.g., fencing), or capturing and relocating wildlife outside the work area. Any captured species shall be relocated to adjacent appropriate habitat that is contiguous to adjacent habitat and not impacted by project-related disturbance activities.

MM BIO – 2: Within 90 days prior to ground-disturbing activities, a sensitive species educational briefing shall be conducted by a qualified biologist for construction personnel. The biologist will identify all sensitive resources that may be encountered onsite, and construction personnel will be instructed to avoid and report any sightings of sensitive species to LACFCD or the monitoring biologist. Educational briefings shall be repeated annually for the duration of the sediment removal.

MM BIO – 3: Within 90 days prior to ground-disturbing activities, a preconstruction survey shall be conducted by a qualified biologist for the presence of any sensitive species in harm's way, including coast range newt, the southwestern pond turtle, and the two-striped garter snake. If sensitive species are observed in harm's way, the qualified biologist will develop and implement appropriate protection measures for that species. These protection measures shall include, as appropriate, redirecting the species, constructing exclusionary devices (e.g., fencing), or capturing and relocating wildlife outside the work area. Preconstruction surveys shall be repeated annually for the duration of the sediment removal. Observations of special status species made during these surveys shall be recorded onto a CNDDB field data sheet and submitted to CDFW for inclusion into the CNDDB.

MM BIO – 4: LACFCD, in consultation with a qualified biologist, will employ bird exclusionary measures (e.g., mylar flagging) prior to the start of bird breeding season to prevent birds nesting within established boundaries of the project. Prior to commencement of sediment removal activities within bird breeding season (March 1 through August 31), a preconstruction bird nesting survey shall be conducted by a qualified biologist for the presence of any nesting bird within 300 feet of the construction work area. The surveys shall be conducted 30 days prior to the disturbance of suitable nesting habitat by a qualified biologist with experience in conducting nesting bird surveys. The surveys shall continue on a weekly basis, with the last survey being conducted no more than 3 days prior to the initiation of clearance/construction work. Preconstruction surveys shall be repeated annually for the duration of the sediment removal.

If an active nest is found, the qualified biologist will develop and implement appropriate protection measures for that nest. These protection measures shall include, as appropriate, construction of

exclusionary devices (e.g., netting) or avoidance buffers. The biologist shall have the discretion to adjust the buffer area as appropriate based on the proposed construction activity, the bird species involved, and the status of the nest and nesting activity; but it shall be no less than 30 feet. Work in the buffer area can resume once the nest is determined to be inactive by the monitoring biologist.

MM BIO – 5: Within 30 days prior to commencement of vegetation or structure removal activities, a preconstruction bat survey shall be conducted by a qualified biologist for the presence of any roosting bats. Acoustic recognition technology shall be used if feasible and appropriate. If either a bat maternity roost or hibernacula (structures used by bats for hibernation) are present, a qualified biologist will develop and implement appropriate protection measures for that maternity roost or hibernacula. These protection measures shall include, as appropriate, safely evicting non-breeding bat hibernacula, establishment of avoidance buffers, or replacement of roosts at a suitable location. These measures shall also include as appropriate:

- To the extent feasible, trees that have been identified as roosting sites shall be removed or relocated between October 1 and February 28.
- When trees must be removed during the maternity season (March 1 to September 30), a qualified bat specialist shall conduct a preconstruction survey to identify those trees proposed for disturbance that could provide hibernacula or nursery colony roosting habitat for bats.
- Trees identified as potentially supporting an active nursery roost shall be inspected by a qualified biologist no greater than 7 days prior to tree disturbance to determine presence or absence of roosting bats.
- Trees determined to support active maternity roosts will be left in place until the end of the maternity season (September 30).
- If bats are not detected in a tree, but the qualified biologist determines that roosting bats may still be present, trees shall be removed as follows:
    - Pushing a tree down with heavy machinery instead of felling the tree with a chainsaw
    - First pushing the tree lightly 2 to 3 times with a pause of 30 seconds between each nudge to allow bats to become active, then pushing the tree to the ground slowly
    - Allowing the tree to remain in place for 24 to 48 hours until inspected by the qualified biologist for presence or absence of roosting bats
- The qualified biologist shall document all bat survey, monitoring, and protection measure activities and prepare a summary report for LACFCD.

Residual Impacts after Mitigation

Alternative 1, Configuration B will result in a less than significant impact on candidate, sensitive, or special status species.

Comparison to Proposed Project and Other Alternatives

Alternative 1, Configuration B is considered environmentally superior to the Proposed Project with respect to impacts to candidate, sensitive, or special status species due to the reduction in sediment removal and reservoir management areas and associated activities.

Due to the reduction in sediment removal and reservoir management areas and associated activities, Alternative 1, Configuration B will also be environmentally superior to Alternative 2, Configuration C and Alternative 5, Haul Route Alternative. Alternative 1, Configuration B will also potentially be environmentally superior to Alternative 4, Sluicing if proper sediment transport does not occur under Alternative 4, Sluicing, causing sediment deposits to develop along the route to the ocean. This would result in need for sediment removal and impacts to downstream habitats associated with removal activities.

Alternative 1, Configuration B will be environmentally inferior to Alternative 3, Configuration D due to sediment removal and reservoir management activities.

Alternative 1, Configuration B will be environmentally superior to Alternative 6, No Project Alternative as habitat in the reservoir will likely degrade under Alternative 6, No Project due to continuous sediment deposition and degradation that will continue to increase over time.

BIOLOGY-2 *Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service.*

Sediment Removal/Reservoir Management

Alternative 1, Configuration B will impact approximately 0.1 acre of Riversidean Alluvial Fan Sage Scrub within the Proposed Project site. Impacts to Riversidean Alluvial Fan Sage Scrub will result in a significant impact requiring mitigation; however, disturbance of this community will be reduced by approximately 1 acre (9 percent) as compared to the Proposed Project. To minimize impacts due to loss of Riversidean Alluvial Fan Sage Scrub, Mitigation Measure MM BIO-6 has been provided. Removing the sediment will benefit the alluvial fan sage scrub since the habitat is currently buried under sediment and therefore considered poor quality. With implementation of this mitigation measure, impacts to Riversidean Alluvial Fan Sage Scrub will be reduced to a level below significance.

This alternative will impact approximately 37.2 acres of Riparian Woodland and 10.4 acres of Mule Fat Thickets within the Proposed Project site. Riparian Woodland and Mule Fat Thickets are rare plant communities that provide nesting habitat for riparian species. Impacts to these habitats will result in a significant impact; however, disturbance of Riparian Woodland and Mule Fat Thickets will be reduced by approximately 14.2 acres (28 percent) and 0.7 acre (7 percent), respectively, as compared to the Proposed Project. To minimize impacts due to the loss of Riparian Woodland and Mule Fat Thickets, Mitigation Measures MM BIO-7 and MM BIO-8 have been provided. With implementation of these mitigation measures, impacts to Riparian Woodland and Mule Fat Thickets will be reduced to a level below significance.

Figure 4.4-4: Alternative 1, Configuration B Impacted Water Features Figure 4.4-4: Alternative 1, Configuration B Impacted Water Features shows the water features that will be impacted. Compared to the Proposed Project, Alternative 1, Configuration B will reduce impacts to these water features by approximately 30 percent. To minimize impacts to jurisdictional waters found within these water

features, Mitigation Measure MM BIO-8 has been provided. With implementation of this mitigation measure, impacts will be reduced to a level below significance.

Mitigation Measures

MM BIO – 6: Riversidean Alluvial Fan Sage Scrub habitat shall be restored and/or enhanced at a 1:1 ratio by acreage. Areas shall be mapped using aerial photographs.

MM BIO – 7: Within 90 days prior to ground-disturbing activities, a qualified biologist shall conduct a tree survey within the project footprint, to identify trees that will be removed or potentially affected by the Proposed Project and trees that can be avoided. LACFCD will replace trees that cannot be avoided. The replacement is expected to be up to 1:1 by acreage. The biological monitor shall implement measures to protect the root zone of oak trees that may be impacted immediately adjacent to the project site and along access roads.

MM BIO – 8: A combination of onsite and offsite habitat restoration, enhancement, and exotic removal shall be implemented by LACFCD at a 1:1 ratio for impacted sensitive habitat and jurisdictional waters. Habitat restoration/enhancement shall include use of willow cuttings and exotic species removal. Non-native, weedy habitats within the basin shall be utilized whenever possible as mitigation sites. This mitigation measure shall be monitored for success for five years following implementation. A report of the monitoring results shall be submitted annually, during the five years following implementation, to resource agencies as required by the Section 401 Certification, Section 404 permit, and a Streambed Alteration Agreement.

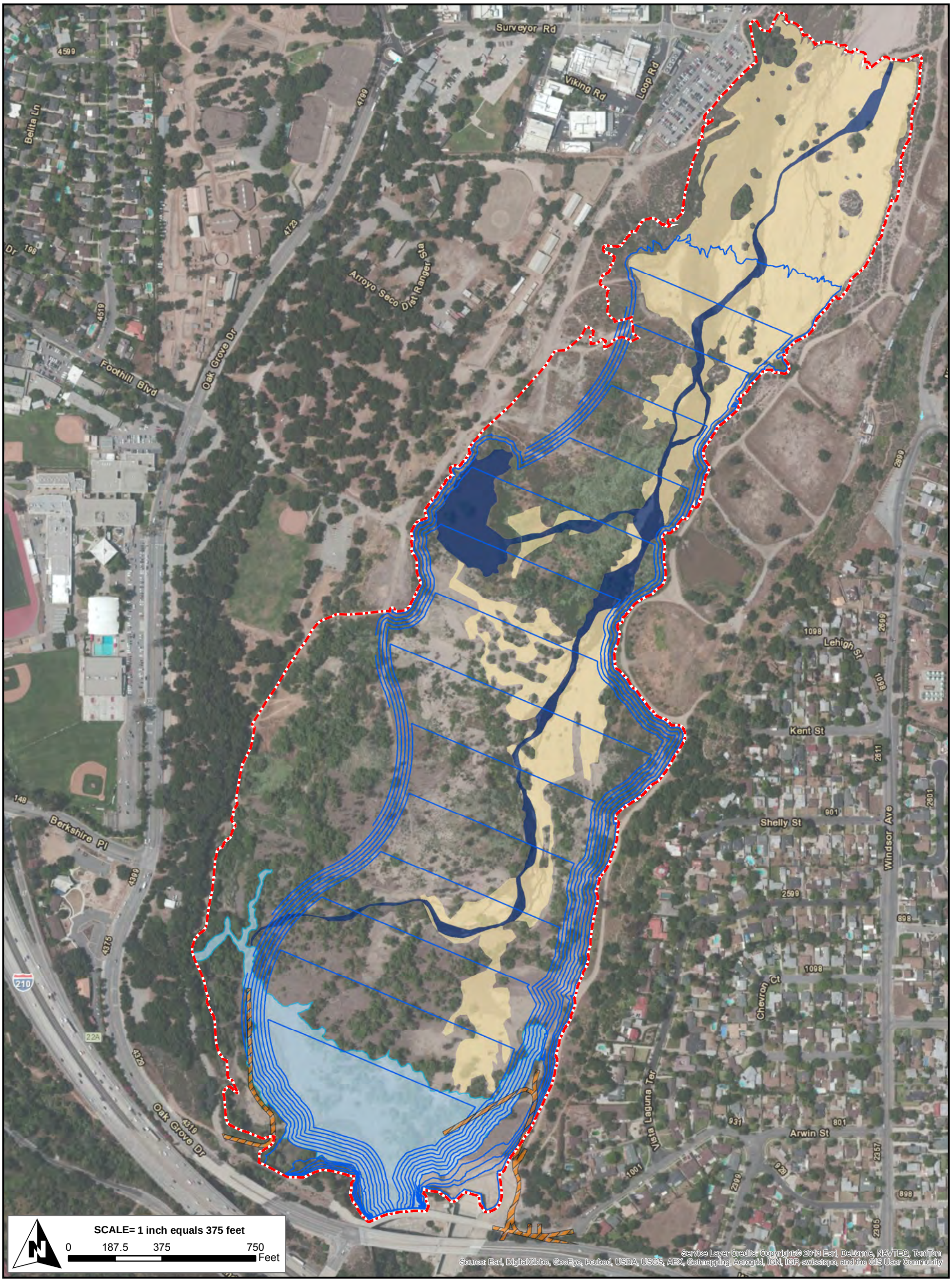
Residual Impacts after Mitigation

With implementation of Mitigation Measures MM BIO-6 through MM BIO-8, Alternative 1, Configuration B under sediment removal and reservoir maintenance will result in a less than significant impact on riparian habitat and other sensitive natural communities.

Comparison to Proposed Project and Other Alternatives

Alternative 1, Configuration B is considered environmentally superior to the Proposed Project with respect to impacts to riparian habitat and other sensitive natural communities due to the reduction in sediment removal and reservoir management areas and associated activities and increased opportunities for restoration and/or enhancement.

Due to the reduction in sediment removal and reservoir management areas and associated activities and increased opportunities for restoration and/or enhancement, Alternative 1, Configuration B will also be environmentally superior to Alternative 2, Configuration C and Alternative 5, Haul Route Alternative. Alternative 1, Configuration B will also potentially be environmentally superior to Alternative 4, Sluicing if proper sediment transport does not occur under Alternative 4, Sluicing, causing sediment deposits to develop along the route to the ocean. This would result in need for sediment removal and impacts to downstream habitats associated with removal activities.



Proposed Project Boundary

Access Road

Sediment Removal Excavation Limit

Waters (Impacted Acres)

Braided Channel (15.9 acres)

Drainage (5.8 acres)

Wetland (10.7 acres)

Figure 4.4-4
Impacted Water Features Map
Alternative 1 - Configuration B

Version Date: 10/18/2013

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Alternative 1, Configuration B will be environmentally inferior to Alternative 3, Configuration D due to sediment removal and reservoir management activities.

Alternative 1, Configuration B will be environmentally superior to Alternative 6, No Project Alternative as habitat in the reservoir will likely degrade under Alternative 6, No Project due to continuous sediment deposition and degradation that will continue to increase over time.

BIOLOGY-3 *Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means.*

Sediment Removal/Reservoir Management

Figure 4.4-4, above, shows the water features that will be impacted by this alternative. Compared to the Proposed Project, Alternative 1, Configuration B will reduce impacts to these water features by approximately 30 percent. To minimize impacts to jurisdictional waters found within these water features, Mitigation Measure MM BIO-8 has been provided. With implementation of this mitigation measure, impacts will be reduced to a level below significance.

Mitigation Measures

See Mitigation Measure MM BIO-8above.

Residual Impacts After Mitigation

As noted in MM BIO-8, wetlands and drainages under the jurisdiction of CDFW, USACE, and RWQCB will be restored and/or enhanced on the Proposed Project site. With implementation of these mitigation measures, impacts to wetlands will be reduced to a level below significance.

Comparison to Proposed Project and Other Alternatives

Alternative 1, Configuration B is considered environmentally superior to the Proposed Project with respect to impacts on federally protected wetlands due to the reduction in sediment removal and reservoir management areas and associated activities and increased opportunities for restoration and/or enhancement.

Due to the reduction in sediment removal and reservoir management areas and associated activities and increased opportunities for restoration and/or enhancement, Alternative 1, Configuration B will also be environmentally superior to Alternative 2, Configuration C and Alternative 5, Haul Route Alternative. Alternative 1, Configuration B will also potentially be environmentally superior to Alternative 4, Sluicing if proper sediment transport does not occur under Alternative 4, Sluicing, causing sediment deposits to develop along the route to the ocean. This would result in need for sediment removal and impacts to downstream wetlands and other sensitive habitats associated with removal activities.

Alternative 1, Configuration B will be environmentally inferior to Alternative 3, Configuration D due to sediment removal and reservoir management activities.

Alternative 1, Configuration B will be environmentally superior to Alternative 6, No Project Alternative as the wetlands in the reservoir will likely degrade under Alternative 6, No Project due to continuous sediment deposition and degradation that will continue to increase over time.

BIOLOGY-4 *Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.*

Sediment Removal/Reservoir Management

The Proposed Project area is predominantly open for wildlife movement and habitat connectivity. Sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays). In addition, sediment removal activities would not completely block the Proposed Project site from surrounding habitat, would occur only during the day, and would not interfere with nighttime wildlife activity. Although some wildlife may be temporarily displaced during construction, wildlife would not be physically prevented from moving around and into the basin area. Sediment removal and reservoir management activities associated with Alternative 1, Configuration B will interfere temporarily with the movement of native resident or migratory wildlife species, resulting in a significant impact. Reduction in sensitive habitat would interfere with use of the habitat for wildlife nursery sites, resulting in a significant impact. To minimize impacts to less than significant, Mitigation Measures MM BIO-1 through MM BIO-8 has been provided. This impact will be reduced in comparison to the Proposed Project due to the reduction in area disturbed during sediment removal and either reservoir management option.

Mitigation Measures

See Mitigation Measures MM BIO-1 through MM BIO-8.

Residual Impacts After Mitigation

As noted in MM BIO-8, restoration and/or enhancement of sensitive habitats will take place on the Proposed Project site. With implementation of these mitigation measures, impacts to use of the habitat for wildlife nursery sites will be reduced to a level below significance.

Comparison to Proposed Project and Other Alternatives

Alternative 1, Configuration B is considered environmentally superior to the Proposed Project with respect to impacts to wildlife movement and habitat connectivity due to the reduction in sediment removal and reservoir management areas and associated activities and increased opportunities for restoration and/or enhancement.

Due to the reduction in sediment removal and reservoir management areas and associated activities and increased opportunities for restoration and/or enhancement, Alternative 1, Configuration B will also be environmentally superior to Alternative 2, Configuration C and Alternative 5, Haul Route Alternative. Alternative 1, Configuration B will also potentially be environmentally superior to Alternative 4, Sluicing if proper sediment transport does not occur under Alternative 4, Sluicing, causing sediment deposits to develop along the route to the ocean. This would result in need for sediment removal and impacts to downstream wetlands and other sensitive habitats associated with removal activities.

Alternative 1, Configuration B will be environmentally inferior to Alternative 3, Configuration D due to sediment removal and reservoir management activities.

Alternative 1, Configuration B will be environmentally superior to Alternative 6, No Project Alternative as the wetlands in the reservoir will likely degrade under Alternative 6, No Project due to continuous sediment deposition and degradation that will continue to increase over time.

BIOLOGY-5 *Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.*

Sediment Removal/Reservoir Management

Implementation of Alternative 1, Configuration B will result in the removal of native trees from the Proposed Project site. This impact will be reduced under Alternative 1, Configuration B, as less vegetation and fewer trees will be removed in comparison to the Proposed Project. Implementation of Mitigation Measure MM BIO-7 will reduce impacts to city-protected trees to a level below significance.

Mitigation Measures

See Mitigation Measure MM BIO-7.

Residual Impacts After Mitigation

Alternative 1, Configuration B will result in a less than significant impact to city-protected trees.

Comparison to Proposed Project and Other Alternatives

Alternative 1, Configuration B is considered environmentally superior to the Proposed Project with respect to impacts to loss of native trees due to the reduction in potentially impacted trees.

Alternative 1, Configuration B will also be environmentally superior to Alternative 2, Configuration C; Alternative 4, Sluicing; and Alternative 5, Haul Route Alternative.

Alternative 1, Configuration B will be environmentally inferior to Alternative 3, Configuration D due to larger sediment removal and management impacts.

Alternative 1, Configuration B will be environmentally superior to Alternative 6, No Project Alternative, as trees in the reservoir will likely be lost under Alternative 6, No Project due to continuous sediment deposition.

CULTURAL RESOURCES

CULTURAL-1 *Cause a substantial adverse change in the significance of a historical resource.*

Sediment Removal/Reservoir Management

As with the Proposed Project, no alterations or modifications will be made to any historic resource; and therefore, no significant impact to historical resources is anticipated with this alternative.

Mitigation Measures

No mitigation measures are necessary.

Residual Impacts After Mitigation

No historic resources are within the proposed Project site; therefore Alternative 1, Configuration B will not result in impacts to historic resources.

Comparison to Proposed Project and Other Alternatives

As no historic resources are within the proposed Project site, Alternative 1, Configuration B is considered neither environmentally superior nor inferior to the Proposed Project with respect to historic resources.

Alternative 1, Configuration B will also be neither environmentally superior nor inferior to any of the other alternatives.

CULTURAL-2 Cause *a substantial adverse change in the significance of an archaeological resource.*

Sediment Removal/Reservoir Management

Alternative 1, Configuration B will involve ground-disturbing activities under sediment removal and reservoir management; however, as noted in Section 3.5, most of the soil in the Proposed Project area consists of recently accumulated sediment. In areas filled with recently accumulated sediment, archeological sites are not anticipated to exist, although it is always possible that unidentified archaeological sites exist in native soils below the accumulated sediment. If sediment removal or reservoir management activities exceed the depth of the historic flood deposits and encounter native soils, unidentified archaeological sites have a potential to be significantly impacted. Implementation of Mitigation Measure MM CUL-1 will reduce potential impacts to less than significant. This impact will also be reduced in comparison to the Proposed Project due to the reduction in area disturbed during sediment removal and reservoir management.

Mitigation Measures

> **MM CUL-1**: If sediment removal or reservoir management activities exceed the depth of the historic flood deposits and encounter native sediments, these activities will be monitored by a qualified archaeologist. In the event this occurs and archaeological materials are observed, the excavation in the proximity of the discovery will be diverted until a qualified archaeologist evaluates the discovery.

Residual Impacts After Mitigation

While it is always possible that unidentified archaeological sites exist in native soils below the accumulated sediment, with implementation of Mitigation Measure MM CUL-1, no significant adverse impacts are expected.

Comparison to Proposed Project and Other Alternatives

Alternative 1, Configuration B is considered environmentally superior to the Proposed Project with respect to archaeological resources due to the reduction in sediment removal and reservoir management areas.

Due to the reduction in sediment removal and reservoir management areas, Alternative 1, Configuration B will also be environmentally superior to Alternative 2, Configuration C; Alternative 4, Sluicing; and Alternative 5, Haul Route Alternative.

Alternative 1, Configuration B will be environmentally inferior to Alternative 3, Configuration D and Alternative 6, No Project due to sediment removal and reservoir management activities.

CULTURAL-3 *Cause a substantial adverse change in the significance of a paleontological resource.*

Sediment Removal/Reservoir Management

No paleontological resources were encountered during the course of the survey and are not expected in the accumulated sediment. It is always possible that unidentified paleontological materials exist in native soil below the accumulated sediment. If sediment removal or reservoir management activities exceed the depth of the historic flood deposits and encounter native soils, unidentified paleontological materials have the potential to be significantly impacted. Implementation of Mitigation Measure MM CUL-2 will reduce impacts to less than significant. This impact will also be reduced in comparison to the Proposed Project due to the reduction in area disturbed during sediment removal and reservoir management.

Mitigation Measures

> **MM CUL-2:** If sediment removal or reservoir management activities exceed the depth of the historic flood deposits and encounter native sediments, these activities will be monitored by a qualified paleontologist. In the event that this occurs and paleontological materials are observed, the excavation in the proximity of the discovery should be diverted until a qualified paleontologist evaluates the discovery.

Residual Impacts After Mitigation

While it is always possible that unidentified paleontological materials exist in native soils below the accumulated sediment, with implementation of Mitigation Measure MM CUL-2, no significant adverse impacts are expected.

Comparison to Proposed Project and Other Alternatives

Alternative 1, Configuration B is considered environmentally superior to the Proposed Project with respect to paleontological resources due to the reduction in sediment removal and reservoir management areas.

Due to the reduction in sediment removal and reservoir management areas, Alternative 1, Configuration B will also be environmentally superior to Alternative 2, Configuration C; Alternative 4, Sluicing; and Alternative 5, Haul Route Alternative.

Alternative 1, Configuration B will be environmentally inferior to Alternative 3, Configuration D and Alternative 6, No Project due to sediment removal and reservoir management activities.

CULTURAL-4 *Potentially impact unknown human remains within the proposed project site.*

Sediment Removal/Reservoir Management

As with the Proposed Project, archival research and the archaeological survey in connection with the Proposed Project did not indicate the presence of any known human remains in the project area. In the event human remains are discovered, implementation of Mitigation Measure MM CUL-3 will reduce impacts to less than significant.

Mitigation Measures

> **MM CUL-3**: In the event human remains are discovered, all work in the area must be halted until the County Coroner identifies the remains and makes recommendations regarding their appropriate treatment pursuant to PRC Section 5097.98.

Residual Impacts After Mitigation

While it is possible that human remains could be discovered in native soils below the accumulated sediment, with implementation of Mitigation Measure MM CUL-3, no significant adverse impacts are expected.

Comparison to Proposed Project and Other Alternatives

Alternative 1, Configuration B is considered environmentally superior to the Proposed Project with respect to accidental discovery of human remains due to the reduction in sediment removal and reservoir management areas.

Due to the reduction in sediment removal and reservoir management areas, Alternative 1, Configuration B will also be environmentally superior to Alternative 2, Configuration C; Alternative 4, Sluicing; and Alternative 5, Haul Route Alternative.

Alternative 1, Configuration B will be environmentally inferior to Alternative 3, Configuration D and Alternative 6, No Project due to sediment removal and reservoir management activities.

GEOLOGY & SOILS

GEOLOGY-1 *Potentially result in soil erosion or loss of topsoil during sediment removal activities.*

Sediment Removal/Reservoir Management

Alternative 1, Configuration B will involve the excavation and deposition of the sediment at facilities already prepared and designated to accept such sediment during sediment removal and reservoir management. Sediment stockpiled at Johnson Field as part of the IMP will also be removed. Depending on the moisture content of the sediment removed, the sediment may need to be stockpiled to allow it to dry. If drying is required, stockpiling of the sediment will occur onsite within Devil's Gate Reservoir. Disturbed sediments are more susceptible to erosion; however, as discussed above in Air Quality, these

impacts will be reduced to less than significant through implementation of SCAQMD Rule 403 and BMPs. In addition, excavation, grading, and sediment placement activities will be in accordance with established guidelines, permits, and regulations established for each disposal site. As such, sediment removal and reservoir management impacts to erosion will be less than significant. This impact will also be reduced in comparison to the Proposed Project due to the reduction in area disturbed during sediment removal and reservoir management.

Mitigation Measures

No mitigation measures will be required.

Residual Impacts After Mitigation

With implementation of SCAQMD Rule 403 and BMPs and the resulting reduction in potential for erosion, no significant impacts to geology and soils would occur as a result of Alternative 1, Configuration B.

Comparison to Proposed Project and Other Alternatives

Alternative 1, Configuration B is considered environmentally superior to the Proposed Project with respect to soil erosion due to the reduction in sediment removal and reservoir management areas and associated soil disturbance.

Due to the reduction in sediment removal and reservoir management areas and associated soil disturbance, Alternative 1, Configuration B will also be environmentally superior to Alternative 2, Configuration C; Alternative 4, Sluicing; and Alternative 5, Haul Route Alternative.

Alternative 1, Configuration B will be environmentally inferior to Alternative 3, Configuration D and Alternative 6, No Project due to sediment removal and reservoir management activities.

GREENHOUSE GAS EMISSIONS

GHG EMISSIONS-1 *Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment.*

Sediment Removal/Reservoir Management

Alternative 1, Configuration B will use the same amount and type of construction equipment as the Proposed Project and involve the same number of truck trips on a daily basis for sediment removal and reservoir management; however, sediment removal under this Alternative is expected to have a shorter duration than the Proposed Project due to the reduced amount of sediment to be removed. Use of sediment removal dump trucks that meet EPA's emission standards for Model Year 2007 or later and use of off-road equipment that meets, at a minimum, EPA's emission standards for Tier 3 equipment, would result in a reduction of GHG emissions. As noted in Section 3.6, generation of greenhouse gas emissions under the Proposed Project is not "cumulatively considerable" and is therefore less than significant under CEQA. Alternative 1, Configuration B will have the same amount of daily equipment usage/truck traffic and reduced overall sediment removal duration; therefore, this alternative will generate less greenhouse gas emissions than the Proposed Project. This impact will not be "cumulatively considerable" and is therefore less than significant under CEQA.

As with the Proposed Project, Alternative 1, Configuration B may prove a positive effect on climate change. High ambient temperatures coupled with important demand for oxygen due to the degradation of substantial amounts of organic matter favor the production of CO_2, the establishment of anoxic conditions, and thus the production of CH_4. If the reservoir is left as it is, the large quantity of biomass currently existing may exacerbate the condition. With the removal and disposal of most of the organic mass in the Scholl Canyon Landfill, which uses the green waste primarily as "alternative daily cover" (ADC), the overall benefit to the carbon ecosystem will be positive, since prior to using green waste for ADC, larger amounts of cover soil had to be imported into the landfill from offsite sources (Kong et al. 2008). Use of the green waste as ADC reduces fossil fuel use for cover soil importation and also reduces GHG emissions. This potential benefit will not be as great under Alternative 1, Configuration B due to the reduction in excavation area and associated vegetation removal.

Mitigation Measures

No mitigation measures are necessary.

Residual Impacts After Mitigation

No significant impacts associated with the generation of greenhouse gas emissions will occur as a result of Alternative 1, Configuration B.

Comparison to Proposed Project and Other Alternatives

Alternative 1, Configuration B will generate fewer overall greenhouse gas emissions than the Proposed Project; however, it will not produce as much green waste to be used as ADC. Use of ADC reduces fossil fuel use for cover soil importation and also reduces GHG emissions; nevertheless, Alternative 1, Configuration B is considered environmentally superior to the Proposed Project due to overall production of greenhouse gas emissions.

Due to overall production of greenhouse gas emissions, Alternative 1, Configuration B will also be environmentally superior to Alternative 2, Configuration C and Alternative 5, Haul Route Alternative.

Alternative 1, Configuration B will be initially environmentally inferior to Alternative 4, Sluicing due to hauling sediment and vegetation from the reservoir. This Alternative will potentially be environmentally superior to Alternative 4, Sluicing if proper sediment transport does not occur under Alternative 4, Sluicing, causing sediment deposits to develop along the route to the ocean. This would result in need for sediment removal from the Arroyo Seco Channel, the Los Angeles River, or the Port of Long Beach and impacts from associated overall production of greenhouse gas emissions.

Alternative 1, Configuration B will be environmentally inferior to Alternative 3, Configuration D and Alternative 6, No Project due to sediment removal and reservoir management activities and associated production of greenhouse gas emissions.

GHG EMISSIONS-2 *Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases.*

Sediment Removal/Reservoir Management

AB 32 identified a 2020 target level for GHG emissions in California of 427 MMT of CO_2e, which is approximately 28.5 percent less than the year 2020 BAU emissions estimate of 596 MMT CO_2e. To achieve these GHG reductions, widespread reductions of GHG emissions will have to occur across California. Some of those reductions will need to come in the form of changes in vehicle emissions and mileage standards, changes in the sources of electricity, and increases in energy efficiency by existing facilities. These reductions in mobile-sources and energy production of GHG emissions would occur with or without development of Alternative 1, Configuration B. Overall, Alternative 1, Configuration B will be consistent with the AB 32 goal of reducing statewide GHG emissions to 1990 levels by year 2020. Currently, no other GHG reduction plan (i.e., SCAG, SCAQMD, or County) applies to Alternative 1, Configuration B. As with the Proposed Project, Alternative 1, Configuration B will not conflict with any applicable plan, policy, or regulation of an agency adopted for the purpose of reducing the emissions of GHGs; therefore, impacts will be less than significant.

Mitigation Measures

No mitigation measures are necessary.

Residual Impacts After Mitigation

No significant impacts associated with any applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases will occur as a result of Alternative 1, Configuration B.

Comparison to Proposed Project and Other Alternatives

Alternative 1, Configuration B is considered neither environmentally superior nor inferior to the Proposed Project with respect to applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases.

Alternative 1, Configuration B will also be neither environmentally superior nor inferior to any of the other alternatives.

HAZARDS AND HAZARDOUS MATERIALS

HAZARDS-1 *Create a hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials.*

Sediment Removal/Reservoir Management

As with the Proposed Project, no significant impacts associated with hazardous soils are expected. Alternative 1, Configuration B will include the use of hazardous materials associated with the construction equipment needed to perform the removal activities. Adequate BMPs will be utilized; and adherence to the regulations set forth by County, State, and federal agencies will reduce the potential for hazardous materials impacts to a less than significant level and will not pose a safety hazard to sensitive receptors.

Mitigation Measures

No mitigation measures are necessary.

Residual Impacts After Mitigation

Implementation of BMPs and adherence to the applicable regulations will reduce the potential for impacts associated with hazardous materials to a less than significant level.

Comparison to Proposed Project and Other Alternatives

Alternative 1, Configuration B is considered neither environmentally superior nor inferior to the Proposed Project.

Alternative 1, Configuration B will also be neither environmentally superior nor inferior to any of the other alternatives except Alternative 6, No Project. Alternative 1, Configuration B will be environmentally inferior to Alternative 6, No Project due to sediment removal and reservoir management activities.

HAZARDS-2 *Create a significant hazard to the public or environment through accident conditions involving the release of hazardous materials into the environment.*

As with the Proposed Project, no significant impacts associated with hazardous soils are expected. Alternative 1, Configuration B will include the use of hazardous materials associated with the construction equipment needed to perform the removal activities. Adequate BMPs will be utilized; and adherence to the regulations set forth by County, State, and federal agencies will reduce the potential for hazardous materials impacts to a less than significant level and will not pose a safety hazard to sensitive receptors.

Mitigation Measures

No mitigation measures are necessary.

Residual Impacts After Mitigation

Implementation of BMPs and adherence to the applicable regulations will reduce the potential for impacts associated with hazardous materials impacts to a less than significant level.

Comparison to Proposed Project and Other Alternatives

Alternative 1, Configuration B is considered neither environmentally superior nor inferior to the Proposed Project.

Alternative 1, Configuration B will also be neither environmentally superior nor inferior to any of the other alternatives except Alternative 6, No Project. Alternative 1, Configuration B will be environmentally inferior to Alternative 6, No Project due to sediment removal and reservoir management activities.

HAZARDS-3 *Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school.*

Sediment Removal/Reservoir Management

As with the Proposed Project, Alternative 1, Configuration B will include the use of hazardous materials associated with the construction equipment needed to perform the removal activities. The proposed construction routes pass La Cañada High School and Hillside School and Learning Center. Adherence to County, State, and federal agency regulations governing the use of these materials reduces the potential for impacts to a less than significant level and will not pose a safety hazard to sensitive receptors. No mitigation measures are required.

Mitigation Measures

No mitigation measures are necessary.

Residual Impacts After Mitigation

Implementation of BMPs and adherence to the applicable regulations will reduce the potential for impacts associated with hazardous materials impacts within one-quarter mile of an existing school to a less than significant level.

Comparison to Proposed Project and Other Alternatives

Alternative 1, Configuration B is considered neither environmentally superior nor inferior to the Proposed Project.

Alternative 1, Configuration B will also be neither environmentally superior nor inferior to any of the other alternatives except Alternative 5, Haul Route Alternative and Alternative 6, No Project.

Alternative 1, Configuration B will be environmentally inferior to Alternative 5, Haul Route Alternative, as the Alternative 1, Configuration B construction routes pass La Cañada High School and Hillside School and Learning Center.

Alternative 1, Configuration B will be environmentally inferior to Alternative 6, No Project due to sediment removal and reservoir management activities.

HAZARDS-4 *Located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would create a significant hazard to the public or the environment.*

Sediment Removal/Reservoir Management

The EPA included Hahamongna Watershed Park area on the NPL Superfund List due to the presence of detected VOCs and perchlorate in groundwater originating from the JPL property. The impacted groundwater is at 200 feet bgs; and, as with the Proposed Project, the concentrations of organochlorine pesticides, petroleum hydrocarbons (diesel and hydraulic/motor oil range and aromatics), and SVOCs detected in samples collected from Devil's Gate Reservoir are below regulatory thresholds. Therefore,

the listing of the watershed on the Superfund List does not present a significant hazard to the public or the environment, and no significant impacts associated with Alternative 1, Configuration B are expected.

Mitigation Measures

No mitigation measures are necessary.

Residual Impacts After Mitigation

No significant adverse impacts were identified.

Comparison to Proposed Project and Other Alternatives

Alternative 1, Configuration B is considered neither environmentally superior nor inferior to the Proposed Project.

Alternative 1, Configuration B will also be neither environmentally superior nor inferior to any of the other alternatives.

HAZARDS-5 *Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.*

Sediment Removal/Reservoir Management

Alternative 1, Configuration B sediment removal and reservoir management activities will occur onsite and will not interfere with the current emergency response plan or emergency evacuation plan for local, State, or federal agencies. Additionally, access to the surrounding roads will be maintained during sediment removal and reservoir management activities and will not interfere with the response facilities located adjacent to the Proposed Project site, including the County of Los Angeles Fire Department Camp 2 and the City of Pasadena Police Department located at 2175 Yucca Lane. Alternative 1, Configuration B will also increase flood control protection downstream of Devil's Gate Dam. No mitigation measures are required.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

No significant adverse impacts were identified.

Comparison to Proposed Project and Other Alternatives

Alternative 1, Configuration B is considered neither environmentally superior nor inferior to the Proposed Project.

Alternative 1, Configuration B will also be neither environmentally superior nor inferior to any of the other alternatives except Alternative 6, No Project.

Alternative 1, Configuration B will be environmentally superior to Alternative 6, No Project, as Alternative 6, No Project will severely restrict flood control, potentially increasing flooding downstream of Devil's Gate Dam. This flooding could also potentially interfere with access to roadways.

HYDROLOGY & WATER QUALITY

HYDROLOGY-1 *Violate any water quality standards or waste discharge requirements.*

Sediment Removal/Reservoir Management

FAST operations have been routinely used at Devil's Gate Reservoir and result in relatively small amounts of finer grained sediment passing through the reservoir. During both sediment removal and reservoir management phases, FAST operations will take place during winter rain events, using natural flows to allow the finer grained sediment to pass through the reservoir and downstream of the dam. It is anticipated that these FAST operations will be similar to historic FAST operations and that sediment fines discharged during FAST operations will be transported to the Pacific Ocean via Arroyo Seco and the Los Angeles River, either via the discharge flow or subsequent storm flows. As with the Proposed Project, no significant impacts to water quality standards are expected due to FAST operations.

As with the Proposed Project, heavy equipment needed for sediment removal has the potential to cause accidental spills of fuel and lubricating oil. Contaminants could be released into the watershed and adversely affect water quality. Alternative 1, Configuration B activities involving construction equipment will be temporary and involve the limited transport, use, disposal, and storage of fuel and lubricating oil, which are regulated by various agencies. Adequate BMPs will be utilized; and adherence to the regulations set forth by County, State, and federal agencies will reduce the potential for impacts to water quality to a less than significant level.

With adherence to regulations and permit requirements and implementation of project-specific BMPs, impacts related to otherwise substantially degrading water quality will be less than significant.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

Adequate BMPs will be utilized; and adherence to the regulations set forth by County, State, and federal agencies will reduce the potential for impacts to water quality to a less than significant level.

Comparison to Proposed Project and Other Alternatives

Alternative 1, Configuration B is considered neither environmentally superior nor inferior to the Proposed Project.

Alternative 1, Configuration B will also be neither environmentally superior nor inferior to any of the other alternatives except Alternative 6, No Project. Alternative 1, Configuration B will be environmentally inferior to Alternative 6, No Project, due to sediment removal and reservoir management activities.

HYDROLOGY-2 *Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level.*

Sediment Removal/Reservoir Management

As with the Proposed Project, with implementation of Alternative 1, Configuration B the reservoir will have the ability to contain more of the local runoff, which in turn will result in more stormwater penetrating surface sediment in the project area and subsequently recharging the groundwater basin. No significant impacts to groundwater supplies are expected.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

No significant unavoidable adverse impacts would occur as a result of Alternative 1, Configuration B.

Comparison to Proposed Project and Other Alternatives

Alternative 1, Configuration B is considered environmentally inferior to the Proposed Project due to the reduction in area to contain local runoff and reduction in percolation due to less removal of accumulated sediment.

Alternative 1, Configuration B will also be environmentally inferior to all of the other alternatives except Alternative 3, Configuration D and Alternative 6, No Project. Alternative 1, Configuration B will be environmentally superior to Alternative 3, Configuration D and Alternative 6, No Project due to greater area to contain local runoff and increased percolation due to removal of accumulated sediment.

HYDROLOGY-3 *Substantially alter the existing drainage pattern of the site, which would potentially result in substantial erosion or siltation.*

Sediment Removal/Reservoir Management

Drainage patterns within the reservoir change on a regular basis depending on seasonal conditions, water flow, and sediment deposition. Sediment removal and reservoir management will also result in alterations of surface drainage characteristics at the project site due to clearing, grading, and excavation activities. Excavation, grading, and sediment placement activities will occur under LACDPW regulations, which establish protocols for proper design of slopes and temporary sediment-collecting structures.

Although the drainage characteristics for the site will be altered, Alternative 1, Configuration B will result in a positive impact to drainage of Devil's Gate Reservoir because it will enhance the flood control abilities of Devil's Gate Dam. While Alternative 1, Configuration B will result in a small increase of impervious surface area, this small amount is not expected to significantly change drainage patterns and no significant increase in the amount of surface runoff will occur. As such, impacts related to offsite erosion will be less than significant.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

Alternative 1, Configuration B will result in a less than significant impact on drainage patterns.

Comparison to Proposed Project and Other Alternatives

Alternative 1, Configuration B is considered neither environmentally superior nor inferior to the Proposed Project.

Alternative 1, Configuration B will also be neither environmentally superior nor inferior to any of the other alternatives except for Alternative 4, Sluicing. Alternative 1, Configuration B will be environmentally superior to Alternative 4, Sluicing due to the potential for erosion associated with the sluicing alternative.

HYDROLOGY-4 *Otherwise substantially degrade water quality.*

Sediment Removal/Reservoir Management

As with the Proposed Project, heavy equipment needed for sediment removal has the potential to cause accidental spills of fuel and lubricating oil. Contaminants could be released into the watershed and adversely affect water quality. Alternative 1, Configuration B activities involving construction equipment will be temporary and involve the limited transport, use, disposal, and storage of fuel and lubricating oil, which are regulated by various agencies. Adequate BMPs will be utilized; and adherence to the regulations set forth by County, State, and federal agencies will reduce the potential for impacts to water quality to a less than significant level.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

Adequate BMPs will be utilized; and adherence to the regulations set forth by County, State, and federal agencies will reduce the potential for impacts to water quality to a less than significant level.

Comparison to Proposed Project and Other Alternatives

Alternative 1, Configuration B is considered neither environmentally superior nor inferior to the Proposed Project.

Alternative 1, Configuration B will also be neither environmentally superior nor inferior to any of the other alternatives except Alternative 6, No Project. Alternative 1, Configuration B will be environmentally inferior to Alternative 6, No Project due to sediment removal and reservoir management activities.

LAND USE & PLANNING

LAND USE-1 *Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect.*

Sediment Removal

As with the Proposed Project, Alternative 1, Configuration B will not conflict with the City's General Plan or zoning designation of Open Space for the Proposed Project site and is consistent with the LACFCD easement.

As discussed in Subsection 3.8.3, Applicable Regulations, the HWPMP emphasizes protection of recreational and natural resources as well as the management of flood control for the downstream watershed. Alternative 1, Configuration B is consistent with HWPMP Goal 2 of managing the flood control basin for protection of the downstream areas by improving and maintaining the flood capacity behind Devil's Gate Dam.

Implementation of sediment removal and reservoir management will result in temporarily restricted access to portions of designated trails and indirect impacts to existing recreation uses associated with construction activities (see further discussion below in Recreation). With implementation of Mitigation Measure MM LAN-1, impacts associated with recreational activities coexisting with flood management and water conservation will be reduced to less than significant.

Mitigation Measure

MM LAN-1: Temporary impacts to designated recreational facilities and trails shall be minimized through advance communication and redirection to the nearest facility in the vicinity of the Proposed Project. Prior to completion of final plans and specifications, the LACFCD shall review the plans and specifications to ensure that they contain proper language requiring that signs be posted at the nearby parking lots and trailheads at least one month in advance of sediment removal activities.

Residual Impacts After Mitigation

Impacts associated with recreational activities coexisting with flood management and water conservation would be reduced to less than significant for sediment removal and reservoir management.

Comparison to Proposed Project and Other Alternatives

Alternative 1, Configuration B is considered environmentally superior to the Proposed Project with respect to impacts to land use associated with compatibility to recreation due to the reduction in sediment removal and reservoir management areas and associated activities.

Due to the increase in sediment removal and reservoir management areas and associated activities, Alternative 1, Configuration B will be environmentally inferior to all of the other alternatives except for Alternative 4, Sluicing and Alternative 5, Haul Route Alternative.

Due to the comparative reduction in sediment removal and reservoir management areas, associated activities, Alternative 1, Configuration B will be environmentally superior to Alternative 4, Sluicing and Alternative 5, Haul Route Alternative.

Alternative 1, Configuration B will be environmentally inferior to Alternative 6, No Project; however, recreational activities will likely be impacted under Alternative 6, No Project due to continuous sediment deposition.

MINERAL RESOURCES

MINERALS-1 *Result in the loss of availability of a known mineral resource that would be of value to the region and residents of the state.*

Sediment Removal/Reservoir Management

The Proposed Project site contains areas delineated within SMARA zone designated MRZ-2, which indicates that the area contains adequate information to indicate that significant mineral deposits are present or are judged to have a high likelihood for their presence (CDMG 1994). As with the Proposed Project, under Alternative 1, Configuration B, the Proposed Project site will not be available for mining operations during sediment removal and reservoir management activities; however, sediment removal is not expected to involve usable aggregate material or arroyo stone due to unfavorable characteristics such as fine gradation soil and high organic content levels. Impacts will be less than significant.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

Alternative 1, Configuration B will not result in any significant impacts to mineral resources that will be of value to the region and residents of the state.

Comparison to Proposed Project and Other Alternatives

Alternative 1, Configuration B is considered neither environmentally superior nor inferior to the Proposed Project.

Alternative 1, Configuration B will also be neither environmentally superior nor inferior to any of the other alternatives.

MINERALS-2 *Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan.*

While the Arroyo Seco Master Plan EIR (2002) states that the reservoir may contain large quantities of arroyo stone, the Proposed Project site is not delineated as a locally important mineral resource recovery site on a local general plan, specific plan, or other local land use plan. As with the Proposed Project, under Alternative 1, Configuration B, the Proposed Project site will not be available for mining operations during sediment removal and reservoir management activities; however, sediment excavation is not expected to involve usable aggregate material or arroyo stone due to unfavorable

characteristics such as fine gradation soil and high organic content levels. Impacts will be less than significant.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

Alternative 1, Configuration B will not result in any significant impacts to availability of a locally important mineral resource recovery site.

Comparison to Proposed Project and Other Alternatives

Alternative 1, Configuration B is considered neither environmentally superior nor inferior to the Proposed Project.

Alternative 1, Configuration B is considered neither environmentally superior nor inferior to any other alternative.

NOISE & VIBRATION

NOISE-1 *Result in exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.*

Sediment Removal/Reservoir Management

Onsite Construction Equipment Noise

Alternative 1, Configuration B sediment removal activities will take place Monday through Friday to between 7:00 a.m. and 6:00 p.m. Standard Time and between 7:00 a.m. and 7:00 p.m. Daylight Savings Time and on Saturday between 8:00 a.m. and 5:00 p.m. Reservoir management activities will take place under the same hours Monday through Friday, with no activities on Saturday. This alternative will use the same amount and type of construction equipment as the Proposed Project. Since the removal of sediment activities will require a greater amount of equipment than the reservoir management activities, calculations for onsite construction equipment noise have been based on the sediment removal activities equipment list.

Noise impacts from onsite construction equipment activities associated with Alternative 1, Configuration B will be a function of the noise generated by construction equipment, equipment location, sensitivity of nearby land uses, and the timing and duration of the construction activities. Construction noise impacts will be the same as those associated with the Proposed Project to the nearby sensitive receptors and are shown below in Table 4.4-2.

Table 4.4-2: Alternative 1 Onsite Construction Equipment Noise Levels at Nearby Sensitive Receptors

Receptor Description	Receptor Jurisdiction	Distance to Receptor (feet)	Construction Noise Levels[1]	
			dBA Leq	dBA L_{max}
Single-Family Home	Pasadena	140	71	73
Single-Family Home	Los Angeles County	180	69	71
JPL Office	La Cañada Flintridge	200	68	70
Hahamongna Watershed Park	Pasadena	20	86	90
La Cañada High School	La Cañada Flintridge	430	63	63
La Cañada Methodist Church	La Cañada Flintridge	500	62	62

Notes:
[1] Lmax is based on the maximum noise from the loudest piece of equipment and the Leq is the average noise from all equipment.
Source: RCNM, Federal Highway Administration, 2006

Table 4.4-2, above, shows that construction noise impacts will range from 62 dBA Leq to 86 dBA Leq at the nearby receptors, with the highest noise levels occurring at the portion of Hahamongna Watershed Park that is adjacent to the west side of the reservoir.

The City of Pasadena exempts public agencies from the Municipal Code noise requirements. The County of Los Angeles exempts flood control maintenance and construction operations from noise restrictions. The City of La Cañada Flintridge does not provide maximum noise thresholds of construction noise that occurs during the allowed times between Monday through Friday of 7:00 a.m. to 6:00 p.m. Standard Time and 7:00 a.m. to 7:00 p.m. Daylight Savings Time and on Saturday between 7:00 a.m. and 5:00 p.m. Therefore, Alternative 1, Configuration B will comply with all local ordinances that apply to sediment removal and reservoir management activities taking place during the allowed hours.

Offsite Vehicular Noise

Alternative 1, Configuration B sediment removal and reservoir management activities will generate the same number of daily haul truck trips as the Proposed Project: up to 425 daily round trips and 200 daily round trips, respectively. Therefore, potential impacts from offsite traffic noise created by the offsite vehicle trips for Alternative 1, Configuration B will be the same as those generated from the Proposed Project; however, due to the shorter time frame for removing the material, the impact from the Alternative will be lessened. Overall, as with the Proposed Project, roadway noise impacts will be less than significant.

Mitigation Measures

No mitigation measures are necessary.

Residual Impacts After Mitigation

Alternative 1, Configuration B will comply with all local noise ordinances, and roadway noise impacts will be less than significant.

Comparison to Proposed Project and Other Alternatives

Alternative 1, Configuration B is considered environmentally superior to the Proposed Project with respect to impacts associated with noise levels due to the shorter time frame for removing the material.

Due to the shorter time frame for removing the material, Alternative 1, Configuration B will also be environmentally superior to Alternative 2, Configuration C and Alternative 5, Haul Route Alternative.

Alternative 1, Configuration B will initially be environmentally inferior to Alternative 4, Sluicing due to hauling activities. Alternative 1, Configuration B could potentially be environmentally superior to Alternative 4, Sluicing if proper sediment transport does not occur under Alternative 4, Sluicing, causing sediment deposits to develop along the route to the ocean. This would result in need for sediment removal and impacts downstream associated with removal activities.

Alternative 1, Configuration B will be environmentally inferior to Alternative 3, Configuration D and Alternative 6, No Project Alternative due to sediment removal and reservoir management activities.

NOISE-2 *Result in exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels.*

Sediment Removal/Reservoir Management

As with the Proposed Project, only the nearby single-family homes in the City of Pasadena would experience vibration levels that would exceed the 0.01-inch-per-second vibration standard. This potentially significant impact will be reduced to less than significant through implementation of Mitigation Measure MM N-1. In addition, this impact will be reduced in comparison to the Proposed Project, as sediment removal under this alternative is expected to have a shorter duration.

Mitigation Measures

> **MM N-1**: LACFCD shall restrict the operation of any off-road construction equipment that is powered by a greater than 200-horsepower engine from operating within 180 feet of any offsite residential structure. Equipment that is not performing any earth-moving activities and is solely operating for entering or leaving the site via the access roads to the reservoir is exempted from this requirement.

Residual Impacts After Mitigation

Through implementation of Mitigation Measure MM N-1, the onsite construction equipment vibration impacts to nearby sensitive receptors would be reduced to less than significant.

Comparison to Proposed Project and Other Alternatives

Alternative 1, Configuration B is considered environmentally superior to the Proposed Project with respect to impacts associated with vibration levels due to the shorter time frame for removing the material.

Due to the shorter time frame for removing the material, Alternative 1, Configuration B will also be environmentally superior to all other alternatives except Alternative 3, Configuration D and Alternative 6, No Project.

Alternative 1, Configuration B will initially be environmentally inferior to Alternative 4, Sluicing due to hauling activities. Alternative 1, Configuration B could potentially be environmentally superior to Alternative 4, Sluicing if proper sediment transport does not occur under Alternative 4, Sluicing, causing sediment deposits to develop along the route to the ocean. This would result in need for sediment removal and impacts downstream associated with removal activities.

Alternative 1, Configuration B will be environmentally inferior to Alternative 3, Configuration D and Alternative 6, No Project Alternative due to sediment removal and reservoir management activities.

NOISE-3: *Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.*

Sediment Removal/Reservoir Management

Alternative 1, Configuration B will not create a substantial temporary or periodic increase in ambient noise levels in the project vicinity above existing noise levels. For this analysis, both the sediment removal activities and reservoir management activities have been considered as temporary activities, since they would occur only for limited durations of time. The construction activities associated with the removal of the sediment may create temporary onsite noise impacts from the operation of construction equipment as well offsite noise impacts from the use of haul trucks to export material offsite.

Onsite Construction Equipment Noise

As with the Proposed Project, the onsite equipment that will be operated under Alternative 1, Configuration B will not conflict with any construction noise standards. Any temporary noise level increase from onsite construction noise will be less than significant. Therefore, potential noise levels by onsite construction from Alternative 1, Configuration B will be the same as those generated from the Proposed Project; however, due to the shorter time frame for removing the material the impact will be lessened.

Offsite Vehicular Noise

As with the Proposed Project, the offsite vehicular trips associated with Alternative 1, Configuration B utilize locations that do not already exceed the standards for existing conditions. The analysis also found that for the locations that currently exceed the normally acceptable noise standard, Alternative 1, Configuration B's noise contribution to these roadway segments will be within the Federal Transit Administration's allowable noise exposure increase levels. The temporary increase in noise level created from offsite vehicular noise impacts will result in a less than significant impact. Therefore, potential for offsite vehicular noise from Alternative 1, Configuration B will be the same as those generated from the Proposed Project; however, due to the shorter time frame for removing the material the impact will be lessened.

Mitigation Measures

No mitigation measures are necessary.

Residual Impacts After Mitigation

Temporary noise level increase from onsite construction noise and offsite vehicular noise would be less than significant.

Comparison to Proposed Project and Other Alternatives

Alternative 1, Configuration B is considered environmentally superior to the Proposed Project with respect to impacts associated with noise levels due to the shorter time frame for removing the material.

Due to the shorter time frame for removing the material, Alternative 1, Configuration B will also be environmentally superior to: Alternative 2, Configuration C and Alternative 5, Haul Route Alternative.

Alternative 1, Configuration B will initially be environmentally inferior to Alternative 4, Sluicing due to hauling activities. Alternative 1, Configuration B could potentially be environmentally superior to Alternative 4, Sluicing if proper sediment transport does not occur under Alternative 4, Sluicing, causing sediment deposits to develop along the route to the ocean. This would result in need for sediment removal and impacts downstream associated with removal activities.

Alternative 1, Configuration B will be environmentally inferior to Alternative 3, Configuration D and Alternative 6, No Project Alternative due to sediment removal and reservoir management activities.

RECREATION/PUBLIC SERVICES

RECREATION-1 *Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated.*

Alternative 1, Configuration B will not result in the construction of new residences or facilitate the development of residences or result in an increase in area population. Therefore, implementation of the Alternative 1, Configuration B will not result in increased use or the physical deterioration associated with increased use for neighborhood or regional parks or other recreational facilities due to any increases in area population.

Sediment Removal Impacts

As with the Proposed Project, under Alternative 1, Configuration B sediment removal will occur over the course of five years; and during this, most of the Proposed Project site will be closed to public use from the dam face to the edge of this Alternative's excavation limit boundaries (see Figure 4.4-5: Alternative 1, Configuration B Impacts to Designated Trails). Alternative 1, Configuration B will have a potential impact on recreational opportunities through temporarily restricted access to trails and long-term alteration of the landscape. Maintenance roads within the basin are used by the LACFCD, Southern California Edison (SCE), and the City of Pasadena, among others, for operations and maintenance of Devil's Gate Reservoir and other facilities in the area. The majority of the maintenance roads will be closed during sediment removal; however, these roads are not officially designated for recreational uses and are often not available for unofficial recreation use due to reservoir water levels or maintenance activities.

Designated Recreational Uses

As detailed below, implementation of sediment removal will result in temporarily restricted access to portions of designated trails and indirect impacts to existing recreation uses associated with construction activities. These impacts may increase the use of other area parks and recreational facilities such as those described in Table 3.15-1: Area Recreational Facilities.

The Oak Grove area of Hahamongna Watershed Park and the associated facilities including Oak Grove Disk Golf Course will remain open during sediment removal and will continue to provide active recreational facilities to the area. Sediment removal activities will not limit the use of the Oak Grove area of Hahamongna Watershed Park by individuals or by organizations such as the Oak Grove Disc Golf Club, the Rose Bowl Riders, MACH 1, or the Tom Sawyer Camp.

Activities such as hiking, biking, horseback riding, bird watching, and nature walks will be limited to trails located outside the excavation boundary or to trails opened in absence of removal activities. Of the six designated trails in and adjacent to the Proposed Project site, three of these trails, Flint Wash Trail, Gabrielino Trail, and Gould Canyon Trail, will remain open during sediment removal and will continue to provide active recreational facilities to the area. Small portions of the Altadena Crest Trail, Arroyo Seco Trail, and West Rim Trail will either be closed when sediment removal activities are under way and/or are near the trail. A very small portion of the Altadena Crest Trail will be closed during the whole sediment removal phase. Figure 4.4-5 shows the location of the different access conditions during sediment removal.

Sediment removal activities associated with this Alternative will not limit or block access to the Oak Grove area and many of the designated trails and will not result in direct potentially significant impacts to these facilities; however, use of these facilities may be less desirable due to construction-related emissions and noise, dust, visual, and traffic impacts associated with sediment removal. These temporary, indirect impacts will reduce the quality of the recreational experience.

Indirect impacts to recreation associated with sediment removal under Alternative 1, Configuration B will be reduced in comparison to the Proposed Project due to the reduction in excavation area and associated sediment removal activities. In addition, approximately 37.34 acres of the approximately 120.42 acres of the Proposed Project site will be left undisturbed. This will include swaths along the west side of the site. These areas of undisturbed vegetation left throughout will serve to screen some of the ongoing recreation uses from the sediment removal activities and associated construction-related emissions and noise, dust, and visual impacts.

Recreational users may choose to visit other area parks, recreational facilities, or trails due to the temporary access restrictions or the indirect effects of construction-related activities. Due to the number of other recreational facilities and trails in the vicinity, it is anticipated that these visitors will be dispersed throughout the area and that no single park or facility would experience a substantial increase in use. Therefore, Alternative 1, Configuration B will not increase use of other existing parks or recreation facilities such that substantial physical deterioration of these facilities will occur or be accelerated. Impacts to other existing parks and recreation facilities will be temporary and less than significant. Sediment removal under this Alternative could potentially have a shorter duration than the Proposed Project due to the reduced amount of sediment to be removed. This shorter duration could further reduce the temporary and less than significant impact to other existing parks and recreation facilities.

Access Road

Sediment Removal Excavation Limit

Trail & Maintenance Road Closures

Closed during the full duration of sediment removal

To remain open during sediment removal

Closed during sediment removal with possible opening on a seasonal basis

Temporarily closed while sediment removal is occuring in the area

Figure 4.4-5
Impacts To Designated Trails Map
Alternative 1 - Configuration B

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CHAMBERS GROUP

\\Cgi-gisdata01\gis_data\Projects\20000s\20201 - 20400\20346 Devil's Gate EIR\20346 Figure 4.4-5 Alternative 1, Configuration B Impacts To Designated Trails.mxd

Reservoir Management Impacts

After the annual proposed reservoir management, access to Devil's Gate Reservoir will be similar to existing conditions. Every year the reservoir will be temporarily closed to public access for reservoir management. This will occur during the late summer/early fall over an estimated five-week period, Monday through Friday. The length of time will vary depending on the amount of sediment deposited in the reservoir over the course of the year. The Oak Grove area of Hahamongna Park and most of the designated trails will remain open during reservoir management activities and will continue to provide active recreational facilities to the area. The proposed reservoir management activities will typically occur only during the weekdays; therefore, weekend visitors of the Hahamongna Watershed Park will not be affected by the proposed reservoir management activities. Trails will be beneficially affected in the long-term through the reduction of potential disruption by flooding and/or being buried under sediment. Impacts to existing parks and recreation facilities associated with Alternative 1, Configuration B reservoir management activities will be less than significant. In addition, the reservoir management area under Alternative 1, Configuration B will be much smaller than under either Proposed Project reservoir management options.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

Alternative 1, Configuration B will not result in any potentially significant impacts associated with increased use of other existing parks or recreation facilities.

Comparison to Proposed Project and Other Alternatives

Alternative 1, Configuration B is considered environmentally superior to the Proposed Project with respect to recreation uses due to the reduction in sediment removal and reservoir management areas and associated activities.

Due to the reduction in sediment removal and reservoir management areas and associated activities, Alternative 1, Configuration B will also be environmentally superior to Alternative 2, Configuration C; Alternative 4, Sluicing; and Alternative 5, Haul Route Alternative.

Alternative 1, Configuration B will be environmentally inferior to Alternative 3, Configuration D due to sediment removal and reservoir management activities.

Alternative 1, Configuration B will be environmentally superior to Alternative 6, No Project Alternative, as recreational activities will likely be impacted under Alternative 6, No Project due to continuous sediment deposition.

RECREATION-2 *Require the construction or expansion of existing recreational facilities which might have an adverse physical effect on the environment.*

As discussed in detail above under RECREATION-1, recreational users may choose to visit other area parks, recreational facilities, or trails due to the temporary access restrictions or the indirect effects of construction-related activities during reservoir management activities. It is anticipated that these

visitors will be dispersed throughout the area and that no single park or facility will experience a substantial increase in use. Therefore, Alternative 1, Configuration B will not require the construction or expansion of existing recreational facilities which might have an adverse physical effect on the environment, resulting in a less than significant impact. Sediment removal under this Alternative could potentially have a shorter duration than the Proposed Project, due to the reduced amount of sediment to be removed. This shorter duration could further reduce the temporary and less than significant impact to other existing parks and recreation facilities.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

Alternative 1, Configuration B will not result in any potentially significant impacts associated with the construction or expansion of existing recreational facilities.

Comparison to Proposed Project and Other Alternatives

Alternative 1, Configuration B is considered environmentally superior to the Proposed Project due to the reduction in sediment removal and reservoir management areas and associated activities.

Due to the reduction in sediment removal and reservoir management areas and associated activities, Alternative 1, Configuration B will also be environmentally superior to Alternative 2, Configuration C; Alternative 4, Sluicing; and Alternative 5, Haul Route Alternative.

Alternative 1, Configuration B will be environmentally inferior to Alternative 3, Configuration D due to sediment removal and reservoir management activities.

Alternative 1, Configuration B will be environmentally superior to Alternative 6, No Project Alternative, as recreational activities will likely be impacted under Alternative 6, No Project due to continuous sediment deposition.

PUBLIC SERVICES-1 *Result in substantial adverse impacts associated with the provision of or need for new or physically altered recreational facilities, the construction of which could cause significant environmental impacts.*

As discussed in detail above under RECREATION-2, Alternative 1, Configuration B will not result in a substantial increase in use of any one park or facility. Therefore, Alternative 1, Configuration B will not require the provision of or need for new or physically altered recreational facilities, the construction of which could cause significant environmental impacts.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

Alternative 1, Configuration B will not result in any potentially significant impacts associated with the construction or expansion of existing recreational facilities.

Comparison to Proposed Project and Other Alternatives

Alternative 1, Configuration B is considered environmentally superior to the Proposed Project due to the reduction in sediment removal and reservoir management areas and associated activities.

Due to the reduction in sediment removal and reservoir management areas and associated activities, Alternative 1, Configuration B will also be environmentally superior to Alternative 2, Configuration C; Alternative 4, Sluicing; and Alternative 5, Haul Route Alternative.

Alternative 1, Configuration B will be environmentally inferior to Alternative 3, Configuration D due to sediment removal and reservoir management activities.

Alternative 1, Configuration B will be environmentally superior to Alternative 6, No Project Alternative, as recreational activities will likely be impacted under Alternative 6, No Project due to continuous sediment deposition.

TRANSPORTATION & TRAFFIC

TRANSPORTATION-1 *Conflict with an applicable plan, ordinance, or policy establishing measure of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized- travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit.*

Sediment Removal

Truck traffic associated with Alternative 1, Configuration B is expected to adhere to traffic regulations; however, during sediment removal, Alternative 1, Configuration B truck traffic is expected to impact traffic LOS on the existing roadway network. Potential impacts regarding existing LOS are discussed under TRANSPORTATION-2 below. This increase in traffic would result in temporary significant impacts to the efficiency of the circulation system. Implementation of Mitigation Measures MM TRA-1 and TRA-2 would reduce this temporary impact but not to a level of less than significant.

Sediment removal and associated transportation under this Alternative could potentially have a shorter duration than the Proposed Project due to the reduced amount of sediment to be removed. Other potential impact reduction measures discussed under TRANSPORTATION-2, below, could reduce impacts to less than significant. These measures cannot be legally imposed by the LACFCD, however, since the locations are under the jurisdiction of other agencies. Every reasonable effort will be made to coordinate with and receive approval from the jurisdictional agencies to implement the impact reduction measures but LACFCD cannot guarantee that the measures will be implemented. Therefore, this temporary impact could remain potentially significant.

Reservoir Management

Truck traffic associated with reservoir management is not expected to adversely affect traffic LOS on the existing roadway network. Therefore, impacts to the efficiency of the circulation system would be less than significant.

Mitigation Measures

MM TRA-1: Proposed Project haul trucks will not deliver to the Vulcan Material Reliance Facility during the PM peak period.

MM TRA-2: Proposed Project haul trucks will not deliver to the Boulevard Pit during the PM peak period.

Residual Impacts after Mitigation

Potentially significant traffic impacts associated with the sediment removal phase would be temporary, expected to occur during the drier months (from April to December, except on holidays), and would cease at the end of the sediment removal phase. Implementation of the mitigation measures described above would reduce temporary impacts to traffic and circulation but not to a level of less than significant. Other potential impact reduction measures discussed under TRANSPORTATION-2, below, could reduce impacts to less than significant. These measures cannot be legally imposed by the LACFCD, however, since the locations are under the jurisdiction of other agencies. Every reasonable effort will be made to coordinate with and receive approval from the jurisdictional agencies to implement the impact reduction measures but LACFCD cannot guarantee that the measures will be implemented. Therefore, this temporary impact could remain potentially significant. No significant traffic impacts would occur under reservoir management.

Comparison to Proposed Project and Other Alternatives

Alternative 1, Configuration B is considered environmentally superior to the Proposed Project due to the reduction in sediment removal and reservoir management areas.

Due to the reduced amount of trucking during reservoir management, Alternative 1, Configuration B will also be environmentally superior to Alternative 2, Configuration C.

Due to the larger sediment removal and reservoir management areas, Alternative 1, Configuration B will be environmentally inferior to Alternative 3, Configuration D.

Alternative 1, Configuration B will also be environmentally inferior to Alternative 5, Haul Route Alternative as the Alternative 5, Haul Route Alternative will result in reduced traffic impacts.

Alternative 1, Configuration B will be initially environmentally inferior to Alternative 4, Sluicing, due to hauling sediment and vegetation from the reservoir. This Alternative will potentially be environmentally superior to Alternative 4, Sluicing if proper sediment transport does not occur under Alternative 4, Sluicing, causing sediment deposits to develop along the route to the ocean. This would result in need for sediment removal from the Arroyo Seco Channel, the Los Angeles River, or the Port of Long Beach and impacts associated with removal.

Alternative 1, Configuration B will be environmentally inferior to Alternative 6, No Project due to sediment removal and reservoir management activities.

TRANSPORTATION-2 *Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways.*

Sediment Removal

As with the Proposed Project, Alternative 1, Configuration B will not significantly impact freeway segments and freeway on- and off-ramps but will significantly impact the following intersections:

- Berkshire Place and I-210 eastbound ramps during the AM peak period;
- Irwindale Avenue/Foothill Boulevard intersection during the PM peak hour;
- Figueroa St/Scholl Canyon Road and SR-134 westbound ramps during the AM and PM peak hours;
- Glenoaks Boulevard/Osborne Street intersection during the AM and PM peak hours;
- Sheldon Street and San Fernando Road intersection during the PM peak hour; and
- Branford Street and San Fernando Road intersection during the PM peak hour.

In order to reduce the impacts to the Berkshire Place and I-210 eastbound ramps intersection during the AM peak period, sediment removal trucks would have to use an alternative route during this period. This alternative route would involve as follows: Loaded trucks will exit the reservoir on the improved, existing westerly access road, turning left onto southbound Oak Grove Drive, then right onto westbound Windsor Avenue, and then east onto I-210 east, to disposal sites in Azusa and Irwindale or I-210 west to the Sun Valley disposal sites.

Under this route all the intersections are anticipated to continue to operate at an LOS C or better for all utilized intersections for the AM Peak Period; however, use of this alternative route would require implementation of the following potential impact reduction measure:

- Proposed Project haul trucks would avoid using the Berkshire Place and I-210 eastbound ramps intersection during the AM peak period by instead using the Windsor/Arroyo and I-210 ramps. This would require the median on Oak Grove Drive to be restriped to a Two Way Left Turn Lane (TWLTL). The changes to Oak Grove Drive would require the approval of the City of Pasadena.

The impact reduction measure discussed above cannot be legally imposed by the LACFCD since the location is under the jurisdiction of the City of Pasadena. Every reasonable effort will be made to coordinate with and receive approval to implement this impact reduction measure; however, LACFCD cannot guarantee that this impact reduction measure will be implemented. Therefore this temporary impact would remain potentially significant.

The Irwindale Avenue/Foothill Boulevard intersection is anticipated to operate at an unacceptable LOS during the PM peak hour, resulting in a temporary significant impact. Mitigation Measure MM TRA-1 would reduce the impact to the Irwindale Avenue/Foothill Boulevard intersection to less than significant.

The Figueroa St/Scholl Canyon Road and SR-134 westbound ramps intersection is anticipated to operate at an unacceptable LOS during the AM and PM peak hours, resulting in a temporary significant impact. Reducing this impact to less than significant would require implementation of the following potential impact reduction measure:

- Figueroa Street/Scholl Canyon Road and SR-134 westbound ramps: Restripe the westbound right turn lane to a shared left-right turn lane and the northbound through lane to a shared through-right turn lane. The northbound direction will include a shared through-right turn lane and a right turn lane. The southbound direction will include a shared through-left turn lane and a through turn lane. The westbound direction will include a left turn lane and a shared left-right turn lane. This impact reduction measure will require the approval of the City of Los Angeles and Caltrans.

Implementation of the impact reduction measure discussed above would reduce the impact to the Figueroa St/Scholl Canyon Road and SR-134 westbound ramps intersection to less than significant. This impact reduction measure cannot be legally imposed by the LACFCD. Every reasonable effort will be made to coordinate with and receive approval to implement the impact reduction measure; however, LACFCD cannot guarantee that the measure will be implemented therefore this temporary impact could remain significant.

The Glenoaks Boulevard and Osborne Street intersection is anticipated to operate at an unacceptable LOS during the AM and PM peak hours, resulting in a temporary significant impact.

The Sheldon Street and San Fernando Road intersection and the Branford Street and San Fernando Road intersection are anticipated to operate at an unacceptable LOS during the PM peak hour, resulting in temporary significant impacts. Mitigation Measure MM TRA-2 would reduce the impacts to less than significant.

Reservoir Management

The reservoir management associated with Alternative 1, Configuration B would require periodic management activities at the Devil's Gate Reservoir. Depending on storm events, sediment excavation/trucking offsite may be required over a period of a few weeks annually. Daily truck traffic is expected to be half the amount that will occur during sediment removal. Due to the limited time period and the reduced truck traffic, reservoir management activities are not expected to adversely affect traffic level of service on the existing roadway network. Therefore, impacts would be less than significant.

Mitigation Measures

See Mitigation Measures MM TRA-1 and MM TRA-2.

Residual Impacts After Mitigation

Potentially significant traffic impacts associated with the sediment removal phase would be temporary, expected to occur during the drier months (from April to December, except on holidays), and would cease at the end of the sediment removal phase. Implementation of the mitigation measures described above would reduce some but not all of the impacts to traffic and circulation to a level less than significant. Other potential impact reduction measures discussed above could reduce impacts to less than significant. These measures cannot be legally imposed by the LACFCD, however, since the locations are under the jurisdiction of other agencies. Every reasonable effort will be made to coordinate with and receive approval from the jurisdictional agencies to implement the impact reduction measures but LACFCD cannot guarantee that the measures will be implemented. Therefore, these temporary impacts could remain potentially significant. No significant traffic impacts would occur under reservoir management.

Comparison to Proposed Project and Other Alternatives

Alternative 1, Configuration B is considered environmentally superior to the Proposed Project due to the reduction in sediment removal and reservoir management areas.

Due to the reduced amount of trucking during reservoir management, Alternative 1, Configuration B will also be environmentally superior to Alternative 2, Configuration C.

Due to the larger sediment removal and reservoir management areas, Alternative 1, Configuration B will be environmentally inferior to Alternative 3, Configuration D.

Alternative 1, Configuration B will also be environmentally inferior to Alternative 5, Haul Route Alternative as the Alternative 5, Haul Route Alternative will result in reduced traffic impacts.

Alternative 1, Configuration B will be initially environmentally inferior to Alternative 4, Sluicing, due to hauling sediment and vegetation from the reservoir. This Alternative will potentially be environmentally superior to Alternative 4, Sluicing if proper sediment transport does not occur under Alternative 4, Sluicing, causing sediment deposits to develop along the route to the ocean. This would result in need for sediment removal from the Arroyo Seco Channel, the Los Angeles River, or the Port of Long Beach and impacts associated with removal.

Alternative 1, Configuration B will be environmentally inferior to Alternative 6, No Project, due to sediment removal and reservoir management activities.

TRANSPORTATION-3 *Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).*

Sediment Removal

Implementation of the Alternative 1, Configuration B may include impact reduction measures described above that would require modifications to the existing roadway network. These modifications would consist of roadway restriping to reduce potential traffic impacts to a level less than significant. These changes would not alter existing roadway use and would be implemented consistently with all applicable traffic safety standards. Alternative 1, Configuration B is limited to excavation and transportation of sediment that has accumulated in Devil's Gate Reservoir and would not introduce any

new uses that would be incompatible or substantially increase hazards with the existing roadway system. Therefore, impacts related to traffic hazards would be less than significant.

Reservoir Management

The reservoir management associated with Alternative 1, Configuration B would not require any modifications to the existing roadway network and would not introduce any new uses that would be incompatible with the existing roadway system. Therefore, no impact would occur.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

Impacts will be less than significant.

Comparison to Proposed Project and Other Alternatives

Alternative 1, Configuration B is considered neither environmentally superior nor inferior to the Proposed Project or any of the other alternatives as it would not introduce any new uses that would be incompatible with the existing roadway system.

TRANSPORTATION-4 *Result in inadequate emergency access.*

Sediment Removal/Reservoir Management

Alternative 1, Configuration B would not sever, or otherwise block access to, any existing roadways. No equipment staging will occur on public roadways during construction of the Proposed Project. The impact to emergency access would be a less than significant impact.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

Impacts will be less than significant.

Comparison to Proposed Project and Other Alternatives

Alternative 1, Configuration B is considered neither environmentally superior nor inferior to the Proposed Project or any other alternative except for Alternative 6, No Project Alternative.

Alternative 1, Configuration B will be environmentally superior to Alternative 6, No Project Alternative, as the No Project Alternative will severely restrict flood control, potentially increasing flooding downstream of Devil's Gate Dam.

TRANSPORTATION-5 *Conflict with adopted policies, plans, or programs regarding public transit or bicycle or pedestrian facilities or otherwise decrease the performance or safety of such facilities supporting alternative transportation (e.g., bus turnouts, bicycle racks).*

Sediment Removal

Alternative 1, Configuration B would be confined to the roadway network described in Section 3.16.2 and would not adversely affect alternative modes of public transportation such as light rail. Implementation of Alternative 1, Configuration B would not require closure of any bus stops or disrupt any existing bus routes. The degrading of LOS at intersections, freeway segments, and freeway on- and off-ramps described above under TRANSPORTATION-2 could affect buses using the existing roadway network. This would be a temporary potentially significant impact.

Reservoir Management

The reservoir management associated with Alternative 1, Configuration B would require periodic management activities at Devil's Gate Reservoir that would not adversely affect traffic level of service on the existing roadway network that could delay bus services. Therefore, reservoir management impacts would be less than significant.

Mitigation Measures

See Mitigation Measures MM TRA-1 and MM TRA-2.

Residual Impacts After Mitigation

Potentially significant traffic impacts associated with the sediment removal phase would be temporary, expected to occur during the drier months (from April to December, except on holidays), and would cease at the end of the sediment removal phase. Implementation of the mitigation measures described above would reduce some but not all of the impacts to traffic and circulation to a level less than significant. Other potential impact reduction measures discussed above could reduce impacts to less than significant. These measures cannot be legally imposed by the LACFCD, however, since the locations are under the jurisdiction of other agencies. Every reasonable effort will be made to coordinate with and receive approval from the jurisdictional agencies to implement the impact reduction measures but LACFCD cannot guarantee that the measures will be implemented. Therefore, these temporary impacts could remain potentially significant. No significant traffic impacts would occur under reservoir management.

Comparison to Proposed Project and Other Alternatives

Alternative 1, Configuration B is considered environmentally superior to the Proposed Project due to the reduction in sediment removal and reservoir management areas.

Due to the reduction in sediment removal and reservoir management areas, Alternative 1, Configuration B will also be environmentally superior to Alternative 2, Configuration C.

Due to larger sediment removal and management area, Alternative 1, Configuration B will be environmentally inferior to Alternative 3, Configuration D.

Alternative 1, Configuration B will be environmentally inferior to Alternative 5, Haul Route Alternative as the Alternative 5, Haul Route Alternative will result in reduced traffic impacts.

Alternative 1, Configuration B will be initially environmentally inferior to Alternative 4, Sluicing due to hauling sediment and vegetation from the reservoir. This Alternative will potentially be environmentally superior to Alternative 4, Sluicing if proper sediment transport does not occur under Alternative 4, Sluicing, causing sediment deposits to develop along the route to the ocean. This would result in need for sediment removal from the Arroyo Seco Channel, the Los Angeles River, or the Port of Long Beach and impacts associated with removal.

Alternative 1, Configuration B will be environmentally inferior to Alternative 6, No Project Alternative due to sediment removal and reservoir management activities.

UTILITIES & SERVICE SYSTEMS

UTILITIES-1 *Require or result in construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects.*

Sediment Removal

As with the Proposed Project, during sediment removal Alternative 1, Configuration B will not result in or require the construction of new or expansion of existing stormwater drainage systems. Sediment and vegetation removal operations will result in alterations of surface drainage characteristics at the project site due to clearing, grading, and excavation activities. Although the drainage characteristics for the site will be altered, the project overall will result in a positive impact to drainage of Devil's Gate Reservoir because it will help restore the flood control capacity of Devil's Gate Dam and Reservoir. As with the Proposed Project, Alternative 1, Configuration B will add minimal impermeable surface area to the Proposed Project site through paving a portion of the access roads from Oak Grove Drive. This minimal increase in impervious surface area will not result in any significant increase in stormwater runoff that will require new stormwater drainage facilities.

In addition, these activities will not directly involve the existing storm drain outfalls, power lines, gas line, communication lines, water lines, sewer lines, or water wells. Impacts to these utility facilities will be avoided through compliance with City regulations regarding utility facilities, coordination with utility providers, and implementation of LACDPW BMPs.

Reservoir Management

During reservoir management, Alternative 1, Configuration B will not result in or require the construction of new or expansion of existing stormwater drainage systems. Sediment that accumulates after the proposed removal will be removed through FAST operations or through mechanical excavation and trucking. The FAST operations are expected to be similar to historic FAST operations, and sediment fines discharged through FAST operations will be transported during storm flows to the Pacific Ocean via Arroyo Seco and the Los Angeles River. No impacts to stormwater facilities are expected during FAST operations. Any necessary mechanical removal during reservoir management is expected to be small (typically 13,000 cy per year). Impacts to stormwater facilities during mechanical removal will be avoided through compliance with City regulations regarding stormwater facilities and implementation of LACDPW BMPs.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

Alternative 1, Configuration B will not result in any potentially significant impacts to utility facilities.

Comparison to Proposed Project and Other Alternatives

Alternative 1, Configuration B is considered neither environmentally superior nor inferior to the Proposed Project or to any of the other alternatives.

4.4.4 Conclusion and Relationship to Project Objectives

Alternative 1, Configuration B will meet the Proposed Project's objectives of satisfactorily reducing flooding risk, creating a configuration suitable for routine operations and maintenance, reducing the possibility of plugging at the dam face, removing sediment from Johnson Field, removing sediment in a timely manner, and delivering sediment to facilities already prepared to accept sediment.

Alternative 1, Configuration B Alternative is considered environmentally superior to the Proposed Project due to reduced impacts associated with sediment removal and reservoir management.

Due to the reduction in sediment removal and reservoir management areas, Alternative 1, Configuration B will also be environmentally superior to Alternative 2, Configuration C except for impacts associated with Aesthetics and Land Use and Planning.

Due to the larger sediment removal and reservoir management areas, Alternative 1, Configuration B will be environmentally inferior to Alternative 3, Configuration D.

Alternative 1, Configuration B is considered environmentally superior to Alternative 5, Haul Route Alternative due to reduced impacts associated with sediment removal and reservoir management; however, Alternative 1, Configuration B will be environmentally inferior to Alternative 5, Haul Route Alternative with impacts associated with traffic and hazardous materials.

Alternative 1, Configuration B will be initially environmentally inferior to Alternative 4, Sluicing, due to hauling sediment and vegetation from the reservoir. This Alternative will potentially be environmentally superior to Alternative 4, Sluicing if proper sediment transport does not occur under Alternative 4, Sluicing, causing sediment deposits to develop along the route to the ocean. This would result in need for sediment removal from the Arroyo Seco Channel, the Los Angeles River, or the Port of Long Beach and impacts associated with removal.

Alternative 1, Configuration B will be environmentally inferior to Alternative 6, No Project Alternative, due to sediment removal and reservoir management activities; however, aesthetics, biological resources, and recreation resources of the reservoir will likely degrade under Alternative 6, No Project Alternative due to continuous sediment deposition.

4.5 ALTERNATIVE 2, CONFIGURATION C

4.5.1 Alternative Description

Sediment Removal

Alternative 2, Configuration C Alternative excavation activities will remove approximately 4 million cy of current excess sediment in the reservoir in addition to any additional sediment received during the project.

Excavation/Reservoir Configuration

Specific excavation limits and reservoir configuration for Alternative 2, Configuration C are shown in Figure 4.5-1: Alternative 2, Configuration C Sediment Removal and Reservoir Management Areas and will involve two excavation areas. As shown in Figure 4.5-1, the lower excavation area will be excavated to a 985-foot elevation at the face of the dam, sloping up to a 1,045-foot elevation at approximately 2,901 feet north of the dam. The upper excavation area will be excavated to a 1,050-foot elevation at approximately 3,580 feet north of the dam, sloping up to a 1,065-foot elevation at approximately 4,727 feet north of the dam. This configuration in total will involve approximately 84 acres of the reservoir. As part of this Alternative, sediment stockpiled at Johnson Field as part of the IMP will also be removed. Excavation will not involve the Oak Grove area of Hahamongna Watershed Park, the area of the reservoir outside the excavation limits of the two excavation areas, or the City of Pasadena's spreading grounds on the east side of the basin.

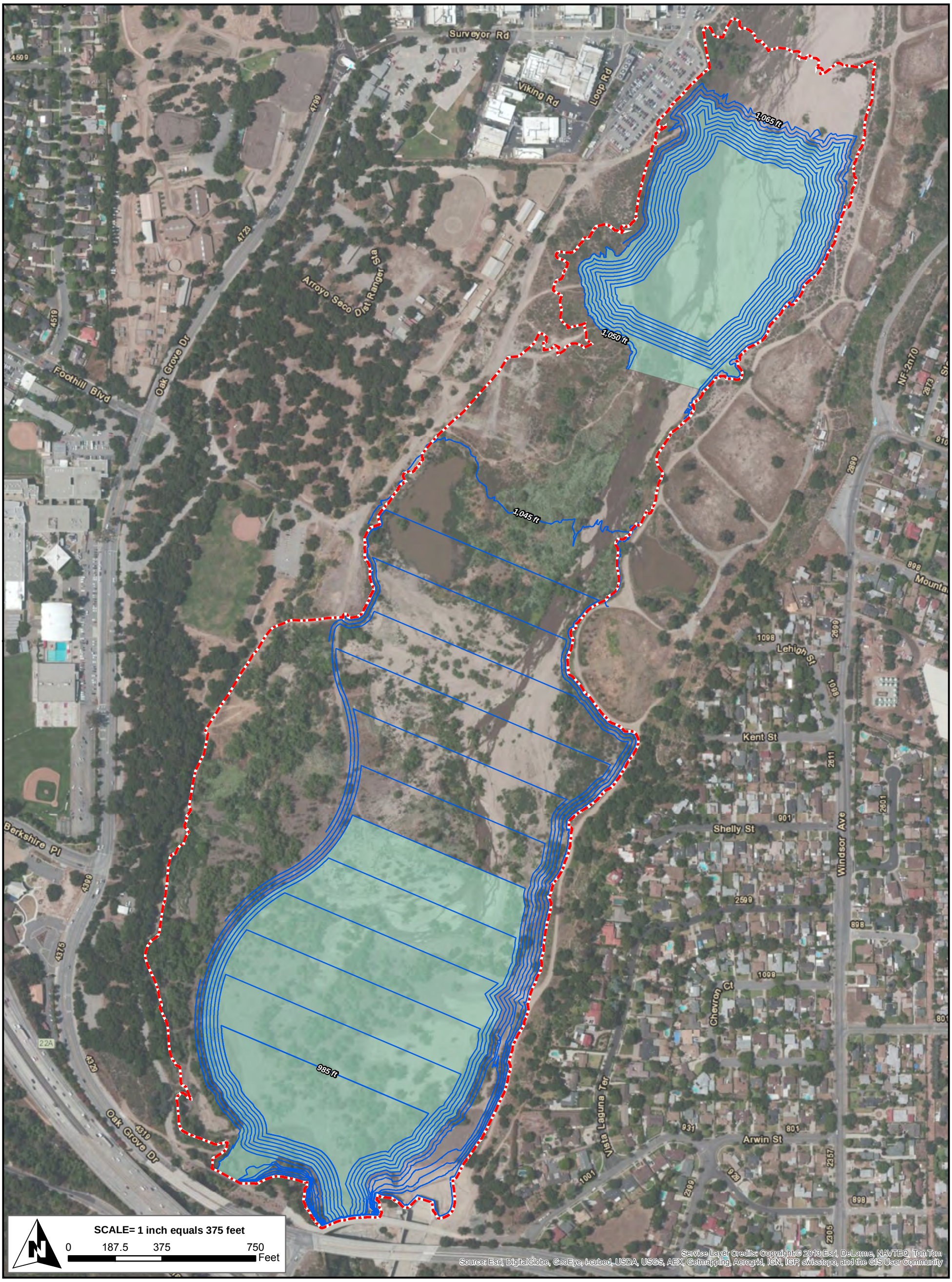
Removal Method

In order to excavate sediment from the reservoir, trees and vegetation growing within the excavation areas or where haul roads are located will need to be removed. In the areas where excavation will not take place, vegetation will not be removed.

The accumulated sediment will be excavated within the limits shown in Figure 4.5-1. The excavation will be accomplished using the same removal method as the Proposed Project. Construction equipment will include but not be limited to approximately four front loaders with 4-yard buckets, two bulldozers, one excavator, one grader, one water truck, and two tender trucks. Vegetation and organic debris will be separated from the sediment. Coarse material may need to be processed through sorters and crushers to be hauled offsite. Depending on the moisture content of the sediment removed, the sediment may need to be stockpiled to allow it to dry. If drying is required, stockpiling of the sediment will occur onsite within the excavation limits in Devil's Gate Reservoir.

Sediment Disposal

Under this Alternative, excavated sediment will be trucked offsite to the same disposal sites as the Proposed Project. These sites will include the primary disposal site locations: the Waste Management Facility in Azusa, the Vulcan Materials Reliance Facility in Irwindale, and/or the Manning Pit Sediment Placement Site (SPS) located in Irwindale east of the Proposed Project site, or a secondary facility located in Sun Valley west of the Proposed Project site (Sheldon Pit, Sun Valley Fill Site, Bradley Landfill, and/or Boulevard Pit). As with the Proposed Project, it is estimated that the eastern disposal sites will be used from 80 to 100 percent of the time. Use of the Sun Valley sites is estimated to occur from 0 to 20 percent of the time. Removed vegetation and organic debris will be hauled to Scholl Canyon Landfill, located in the City of Glendale.



Proposed Project Boundary

Reservoir Management Area

Sediment Removal Excavation Contours

Figure 4.5-1
Sediment Removal and Management Areas Map
Alternative 2 - Configuration C

Version Date: 10/21/2013

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Sediment Disposal Truck Routes

Alternative 2, Configuration C will use the same sediment disposal truck routes as the Proposed Project and as shown in Figures 2.5-2, 2.5-3, 2.5-4, Proposed Project Haul Routes.

Project Schedule

As with the Proposed Project, sediment removal under Alternative 2, Configuration C will occur between Summer 2015 and Summer 2020; however, sediment removal under this Alternative could potentially have a longer duration than the Proposed Project due to the larger amount of sediment to be removed. Excavation and associated activities within the reservoir area are expected to take place during dryer months, from April to December, Monday through Saturday (except on holidays), as weather permits. During dry years, work could potentially start earlier and/or continue later. Sediment removal activities for Alternative 2, Configuration C will take place Monday through Friday between 7:00 a.m. and 6:00 p.m. Standard Time and between 7:00 a.m. and 7:00 p.m. Daylight Savings Time and on Saturday between 8:00 a.m. and 5:00 p.m. Reservoir management activities will take place under the same hours Monday through Friday, with no activities on Saturday.

Reservoir Management

Alternative 2, Configuration C will have two maintenance areas, involving a total maintenance acreage of approximately 47 acres, with the approximate cut and elevation levels shown in the shaded areas of Figure 4.5-1. The access roads will be maintained to provide proper road width for access.

Vegetation Maintenance

Vegetation within the reservoir management area of the reservoir will be mowed or removed and grubbed annually. These activities will occur Monday through Friday over an estimated three-week period in the late summer or early fall. All vegetation and sediment outside the reservoir management footprint will be allowed to re-establish and/or remain in place.

FAST Operations

The lower excavation area will be maintained from the face of the dam to approximately 1,504 feet north of the dam using FAST operations. During FAST operations, reservoir inflows from rain events will naturally pass sediment through the reservoir and downstream of the dam. These FAST operations will occur during the winter storm season and will not require mechanical agitation or assistance. FAST operations will reduce sediment accumulation in the reservoir and help maintain flood control capacity. The amount of sediment that will be transported through FAST operations is limited by the smaller sediment grain size that can be moved by the storm runoff received into the reservoir and the subsequent quantities of storm runoff received.

It is anticipated that the majority of these FAST operations will be similar to historic FAST operations and that similar volumes of sediment will pass through the reservoir and into the Arroyo Seco.

Sediment Excavation/Trucking Offsite

The upper excavation area will be maintained through mechanical excavation and offsite trucking activities. These maintenance activities will help keep the upper excavation area available for sediment capture the

following year and improve the ability of the upper excavation area for groundwater recharge. The accumulated sediment will be excavated with construction equipment including but not limited to approximately two front loaders with 4-yard buckets, one bulldozer, one excavator, one grader, one water truck, and two tender trucks (for fuel and maintenance). Vegetation and organic debris will be separated from the sediment. The need for future sediment removal will depend on future storm activity and associated sediment accumulation.

The southern end of the upper excavation area will need to be armored and maintained to prevent erosion through one of two methods:

- Constructing a reinforced concrete structure, or;
- Utilizing large boulders from within the basin to make a grouted river rock protection. Stones of various sizes would be permanently grouted into place to provide erosion protection.

Additionally, directional discharge of flows from the upper excavation area will be possible via adjustable weirs to aid in FASTing efforts. The water leaving the upper excavation area will be "hungry," since sediment will have settled out in the basin, which will result in those flows helping to FAST from the middle and front areas of the reservoir.

All vegetation and sediment outside the maintenance footprints will be allowed to re-establish and/or remain in place.

As with the Proposed Project, it is estimated, based on past storm events, that sediment excavation/trucking offsite will be required to remove typically 13,000 cy of sediment annually. Based on an estimated removal of 4,800 cy per day, it is expected this will occur over an estimated two-week period, working Monday through Friday. This sediment excavation activity will take place during the late summer/early fall following the vegetation maintenance.

Moderately large sediment deposits have the potential to occur during a storm season with very intense rainfall or following a significant wildfire within the watershed. Such events are expected to occur very infrequently. It is anticipated that even with this type of event the newly deposited sediment could be removed in one season. A moderately large sediment removal event, anticipated to involve approximately 170,000 cy, could take place over an estimated12-week period during the late summer and early fall following the vegetation maintenance.

4.5.2 Alternative Duration

A large-scale sediment removal project will be required if a significant amount of sediment accumulates in the reservoir or outside the maintenance footprint despite the reservoir management activities. This is not anticipated for a period of over two decades unless major fires and subsequent intense storms occur within the watershed. Sediment outside the maintenance footprint will be monitored to determine if the sediment buildup is exceeding projected volumes. If future reservoir conditions threaten dam operations, LACFCD will initiate the planning process for a new large-scale sediment removal project. Part of this planning will involve utilizing the CEQA process to evaluate and determine the appropriate level of environmental document required for the future project.

4.5.3 Impact Analyses and Comparison to Proposed Project

AESTHETICS

AESTHETICS-1 *Have a substantially adverse effect on a scenic vista.*

Sediment Removal

Sediment removal activities associated with Alternative 2, Configuration C will change the visual characteristics of the reservoir through the removal of sediment and associated vegetation in the reservoir. These changes will be similar to the Proposed Project at the south end of the reservoir; however, these changes will be reduced in magnitude in comparison to the Proposed Project, as Alternative 2, Configuration C will leave a greater area undisturbed along the west side of the reservoir.

As with the Proposed Project, sediment removal activities associated with Alternative 2, Configuration C will not result in obstruction or blockage of views, due to the large difference in elevation between viewpoints and the Proposed Project site.

Construction equipment will be visible in the basin. Views of construction equipment will be expected elements in the viewshed, due to the ongoing IMP measures currently underway to keep debris from plugging the outlet works; however, the amount of equipment and duration onsite will be greater for the Alternative than for the IMP measures.

With sediment removal under Alternative 2, Configuration C, the topography of the reservoir will be lower, especially at the south end of the reservoir; and vegetation within the excavation limits will be removed. These elements will result in a high degree of contrast from existing visual characteristics and will result in a potentially significant impact to scenic vistas. These contrasting elements will be highly visible for Viewpoints 1 through 3. For Viewpoints 1 and 3, however, the co-dominant features of Devil's Gate Dam, the reservoir maintenance roads, electrical lines, the debris boom line, and other less dominant features of the San Gabriel Mountains, Oak Grove Drive, JPL facilities, and residential areas will remain unchanged. In addition, the existing vegetation along the west side of the reservoir will not be removed and will share dominance with the dam and the excavation area.

Sediment removal activities will also be visible from Viewpoint 4 and Viewpoint 5 but will be less dominant due to distance and other more dominant visual elements. The dominant features for Viewpoint 4 (I-210, Devil's Gate Dam, San Gabriel Mountains, and the west side of the reservoir) and Viewpoint 5 (spreading grounds, JPL facilities), will remain unchanged.

As with the Proposed Project, excavation and associated activities within the reservoir area are expected to take place during dryer months, from April to December, as weather permits. During the wetter months, changes to the visual characteristics associated with sediment removal will be slightly less apparent when water is stored in the basin. Some regrowth of riparian vegetation will likely occur during this time. Both these factors will reduce the change in the visual characteristics associated with sediment removal. In addition, as discussed above, sediment removal activities will not introduce view-obstructing features.

Nevertheless, due to the multi-year duration of the sediment removal phase under Alternative 2, Configuration C, the large-scale alteration, visibility of the site, and level of viewer sensitivity, sediment removal activities will be a potentially significant impact to scenic vistas. While the sediment removal

associated with Alternative 2, Configuration C will result in a potentially significant impact to scenic vistas, the degree of contrast will be reduced in comparison to the Proposed Project due to the reduction in excavation area and associated sediment removal activities.

Reservoir Management

As with the Proposed Project, reservoir management will not result in obstruction or blockage of views. Construction equipment will also be visible in the basin but only for short periods of time.

After completion of the proposed sediment removal activities associated with Alternative 2, Configuration C, the disturbed areas outside the reservoir management area are expected to experience natural regrowth with native vegetation, primarily Riparian Herbaceous vegetation. The area available for regrowth will be greater for this alternative than for either reservoir management option under the Proposed Project. Under Alternative 2, Configuration C, approximately 36.86 acres of previously disturbed area will have natural vegetation regrowth; and 47.1 acres of vegetation will be maintained annually. In addition, 36.46 acres that were not disturbed during sediment removal will remain undisturbed. In contrast, under the Proposed Project's reservoir management Option 1, approximately 120.42 acres of vegetation will be maintained annually. Under the Proposed Project's reservoir management Option 2, 33.97 acres of previously disturbed area will have natural vegetation regrowth; and 91.28 acres of vegetation will be maintained annually.

As described above, the majority of the reservoir will be allowed to naturally grow and/or remain in place; and the trees on the border of the reservoir management area are expected to become dominant features within the reservoir. Therefore, reservoir management under Alternative 2, Configuration C will result in a lower degree of contrast than seen during sediment removal and will result in a less than significant impact to scenic vistas. In addition, any contrast associated with this Alternative will be reduced in comparison to either reservoir management option under the Proposed Project, due to the reduction in reservoir management area and associated reservoir management activities.

Mitigation Measures

No feasible mitigation measures were identified for sediment removal. No mitigation is necessary for reservoir management. For reservoir management, the less than significant impacts will be further reduced through the implementation of Mitigation Measures MM BIO-6, MM BIO-7, and MM BIO-8.

Residual Impacts After Mitigation

Due to the multi-year duration of the sediment removal phase, the large-scale alteration, visibility of the site, the level of viewer sensitivity, and the lack of feasible mitigation measures, impacts to scenic vistas from sediment removal activities will remain significant.

Reservoir management impacts to scenic vistas will result in a lower degree of contrast than seen during sediment removal and will result in a less than significant impact to scenic vistas.

Comparison to Proposed Project and Other Alternatives

Alternative 2, Configuration C is considered environmentally superior to the Proposed Project with respect to impacts on scenic vistas due to the reduction in sediment removal and reservoir management areas and associated activities.

Due to the reduced area of sediment removal and reservoir management areas and associated activities, Alternative 2, Configuration C will be environmentally superior to Alternative 1, Configuration B; Alternative 4, Sluicing; and Alternative 5, Haul Route Alternative.

Due to the greater area of sediment removal and reservoir management areas and associated activities, Alternative 2, Configuration C will be environmentally inferior to Alternative 3, Configuration D.

Alternative 2, Configuration C will be environmentally superior to Alternative 6, No Project Alternative, as views of the reservoir will likely degrade under Alternative 6, No Project Alternative due to continuous sediment deposition.

AESTHETICS-2: *Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway.*

Sediment Removal/Reservoir Management

As with the Proposed Project, Alternative 2, Configuration C will not involve damage to rock outcroppings or historic buildings but will involve removal of vegetation, including native and non-native trees from the site, though to a lesser degree than the Proposed Project. The Proposed Project site is not visible from the only designated state scenic highway in the vicinity of the Proposed Project site, SR-2. Therefore, implementation of this alternative will not damage scenic resources within the viewshed of a designated state scenic highway.

I-210, located to the south of the Proposed Project site, is identified as "Eligible" in the State Scenic Highway Program. Alternative 2, Configuration C will impact the existing visual character of a portion of the viewshed through the removal of vegetation, including native and non-native trees from the site. This impact to visual character of a portion of the viewshed will be reduced in comparison to the Proposed Project due to the reduction in sediment removal and reservoir management areas and associated activities. In addition, views of the Proposed Project site from I-210 are very brief in nature (visibility for approximately 0.3 mile) and are dominated by views of the JPL facilities and San Gabriel Mountains. Implementation of Alternative 2, Configuration C will not obstruct views of these features. Therefore, impacts to scenic resources within this eligible but not designated state scenic highway will be less than significant.

Mitigation Measures

No mitigation is necessary.

Residual Impacts After Mitigation Measure

The Proposed Project site is not visible from any designated state scenic highway and is only briefly visible from an eligible state scenic highway; therefore, impacts related to state scenic highways from sediment removal and reservoir management are less than significant.

Comparison to Proposed Project and Other Alternatives

Alternative 2, Configuration C is considered environmentally superior to the Proposed Project with respect to impacts related to state scenic highways from sediment removal and reservoir management, due to the reduction in sediment removal and reservoir management areas and associated activities.

Due to the reduction in sediment removal and reservoir management areas and associated activities, Alternative 2, Configuration C will also be environmentally superior to Alternative 1, Configuration B; Alternative 4, Sluicing; and Alternative 5, Haul Route Alternative.

Alternative 2, Configuration C will be environmentally inferior to Alternative 3, Configuration D due to sediment removal and reservoir management activities.

Alternative 2, Configuration C will be environmentally superior to Alternative 6, No Project, as views of the reservoir will likely degrade under Alternative 6, No Project due to continuous sediment deposition.

AESTHETICS-3 *Substantially degrade the existing visual character or quality of the site and its surroundings.*

Sediment Removal

As described above under AESTHETICS-1, the proposed sediment removal activities associated with Alternative 2, Configuration C will change the visual characteristics of the existing Proposed Project site through the removal of sediment and associated vegetation in the reservoir.

Disturbed landscape areas, both man-made and natural, are currently found throughout the basin. The amount and distribution of these areas change on a regular basis and are expected visual elements in the Proposed Project site landscape. Construction equipment will also be visible in the basin. Views of construction equipment will be expected elements in the viewshed due to the ongoing IMP measures currently underway to keep debris from plugging the outlet works; however, the amount of equipment and duration onsite will be greater for the Alternative than for the IMP measures.

Sediment and debris management are considered existing operational components of Devil's Gate Reservoir and are not considered potentially significant impacts to the visual characteristics of the site (City of Pasadena 2002). During the sediment removal phase of Alternative 2, Configuration C the disturbed areas will, in large, replace the vegetated areas, resulting in a high degree of contrast between existing and sediment removal conditions. While the open character of the site will remain, the overall visual quality of the Proposed Project site will be lower due to the large-scale alteration and decrease of desirable elements.

Excavation and associated activities within the reservoir area are expected to take place during dryer months, from April to December, as weather permits. During the wetter months, temporary changes to the visual characteristics of the Proposed Project site will be slightly less apparent with water storage in the basin. Some regrowth of riparian vegetation is also likely to occur during this time. Both these factors will reduce the temporary change in the visual characteristics associated with sediment removal. Due to the multi-year duration of the sediment removal phase, the large-scale alteration, visibility of the site, and level of viewer sensitivity, sediment removal activities will be a potentially significant impact to the visual character of the Proposed Project site.

Although the sediment removal associated with this Alternative will result in a potentially significant impact to the visual character of the Proposed Project site, the degree of contrast will be reduced in comparison to the Proposed Project due to the reduction in excavation area and associated sediment removal activities. In addition, approximately 36.46 acres of the approximately 120.42 acres of the Proposed Project site will be left undisturbed. This will include swaths along the west side of the site.

With areas of undisturbed vegetation left throughout, the site will more closely resemble the mix of disturbed and vegetated areas found under existing conditions than with the Proposed Project.

Reservoir Management

As with the Proposed Project, construction equipment will also be visible in the basin but only for short periods of time. After completion of the proposed sediment removal activities associated with Alternative 2, Configuration C, the disturbed areas outside the reservoir management area are expected to experience natural regrowth with native vegetation, primarily Riparian Herbaceous vegetation. Reservoir management under this alternative will result in a lower degree of contrast than seen during sediment removal and will result in a less than significant impact to visual character. The majority of the reservoir will be allowed to naturally grow and/or remain in place, and the trees on the border of the reservoir management area are expected to become dominant features within the reservoir. As described previously, the area requiring vegetation maintenance will be smaller than for either reservoir management option under the Proposed Project. In addition, any contrast associated with this Alternative will be reduced in comparison to either reservoir management option under the Proposed Project, due to the reduction in reservoir management area and associated reservoir management activities.

Mitigation Measure

No feasible mitigation measures were identified for sediment removal. No mitigation is necessary for reservoir management. For reservoir management, the less than significant impacts will be further reduced through the implementation of Mitigation Measures MM BIO-6, MM BIO-7, and MM BIO-8.

Residual Impacts After Mitigation

Due to the multi-year duration of the sediment removal phase, the large-scale alteration, visibility of the site, the level of viewer sensitivity, and the lack of feasible mitigation; impacts to visual character from sediment removal activities will remain significant.

Reservoir management impacts to visual character will result in a lower degree of contrast than seen during sediment removal and will result in a less than significant impact to visual character.

Comparison to Proposed Project and Other Alternatives

Alternative 2, Configuration C is considered environmentally superior to the Proposed Project with respect to impacts to visual character due to the reduction in sediment removal and reservoir management areas and associated activities.

Due to the reduction in sediment removal and reservoir management areas and associated activities, Alternative 2, Configuration C will also be environmentally superior to Alternative 1, Configuration B; Alternative 4, Sluicing; and Alternative 5, Haul Route Alternative.

Alternative 2, Configuration C will be environmentally inferior to Alternative 3, Configuration D due to sediment removal and reservoir management activities.

Alternative 2, Configuration C will be environmentally superior to Alternative 6, No Project Alternative, as views of the reservoir will likely degrade under Alternative 6, No Project Alternative due to continuous sediment deposition.

AIR QUALITY

AIR QUALITY-1 *Conflict with or obstruct implementation of the applicable air quality plan.*

Sediment Removal/Reservoir Management

Typically, assessments for air quality plan consistency use four criteria for determining project consistency with the current AQMP. The first and second criteria are from the SCAQMD. According to the SCAQMD, two key criterion of AQMP consistency are: (1) whether the project will not result in an increase in the frequency or severity of existing air quality violations or cause or contribute to new violations, or delay timely attainment of air quality standards or the interim emission reductions specified in the AQMP; and (2) whether the project will exceed the assumptions in the AQMP based on the year of project build-out and phase (SCAQMD 2006). The third criterion is compliance with the control measures in the AQMP. The fourth criterion is compliance with the SCAQMD regional thresholds.

As with the Proposed Project (see Section 3.5.6), Alternative 2, Configuration C will be consistent with the second through fourth criteria, but will not be consistent with the first criterion. This is due to emissions of NO_X exceeding the Daily Regional Threshold during sediment removal, resulting in a potentially significant impact. Use of sediment removal dump trucks that meet EPA's emission standards for Model Year 2007, and use of off-road equipment that meets, at a minimum, EPA's emission standards for Tier 3 equipment, would result in a reduction of NO_X emissions to less than the SCAQMD Regional Threshold for NO_X. Implementation of Mitigation Measures MM AQ-1 and MM AQ-2 will result in a reduction of NO_X emissions to less than the SCAQMD Regional Threshold for NO_X. Therefore, impacts during sediment removal will be less than significant. This impact will be greater in comparison to the Proposed Project due to the increase in excavation volume and associated sediment removal activities.

As with the Proposed Project, reservoir management for Alternative 2, Configuration C will not exceed any standard and will result in less than significant impacts.

Mitigation Measures

MM AQ-1: LACFCD shall require all construction contractors during the sediment removal phase of the Proposed Project to use only sediment removal dump trucks that meet EPA's emission standards for Model Year 2007 or later.

MM AQ-2: LACFCD shall require all construction contractors during the sediment removal phase of the Proposed Project to use off-road equipment that meets, at a minimum, EPA's emission standards for Tier 3 equipment.

Residual Impacts After Mitigation

Implementation of these mitigations would reduce Alternative 2, Configuration C's combined NO_X emissions during the sediment removal Phase to a level of less than significant.

Reservoir management activities will not violate an air quality standard or contribute substantially to an existing or projected air quality violation; therefore, the Alternative 2, Configuration C during reservoir management will be consistent with the first indicator. No significant impact would occur.

Comparison to Proposed Project and Other Alternatives

Alternative 2, Configuration C is considered environmentally inferior to the Proposed Project with respect to impacts to air quality plans due to the increase in sediment removal and reservoir management volumes and associated activities.

Due to the increase in sediment removal and reservoir management volumes and associated activities, Alternative 2, Configuration C will also be environmentally inferior to all of the other alternatives.

Alternative 2, Configuration C will be initially environmentally inferior to Alternative 4, Sluicing, due to hauling sediment and vegetation from the reservoir. This Alternative will potentially be environmentally superior to Alternative 4, Sluicing if proper sediment transport does not occur under Alternative 4, Sluicing, causing sediment deposits to develop along the route to the ocean. This would result in need for sediment removal from the Arroyo Seco Channel, the Los Angeles River, or the Port of Long Beach and air quality impacts associated with removal.

Alternative 2, Configuration C will be environmentally inferior to Alternative 6, No Project Alternative, due to sediment removal and reservoir management activities.

AIR QUALITY-2 *Violate an air quality standard or contribute substantially to an existing or project air quality violation.*

As with the Proposed Project, emissions of NO_X under Alternative 2, Configuration C exceed the Daily Regional Threshold during sediment removal, resulting in a potentially significant impact. Implementation of Mitigation Measures MM AQ-1 and MM AQ-2 will result in a reduction of Alternative 2, Configuration C's combined NO_X emissions during sediment removal to a level of less than significant. This impact will be increased in comparison to the Proposed Project due to the increase in excavation volume and associated sediment removal activities.

As with the Proposed Project, reservoir management for Alternative 2, Configuration C will not exceed any standard and will result in less than significant impacts.

Mitigation Measures

See Mitigation Measures MM AQ-1 and MM AQ-2.

Residual Impacts After Mitigation

Sediment removal will not exceed any standard SCAQMD Regional Threshold except for combined NO_X emissions. Implementation of these mitigations would reduce Alternative 2, Configuration C's combined NO_X emissions during the sediment removal phase to a level of less than significant.

Reservoir management will not exceed any standard SCAQMD Regional Threshold; therefore, this impact will be less than significant.

Comparison to Proposed Project and Other Alternatives

Alternative 2, Configuration C is considered environmentally inferior to the Proposed Project with respect to impacts to air quality standards due to the increase in sediment removal and reservoir management volumes and associated activities.

Due to the increase in sediment removal and reservoir management volumes and associated activities, Alternative 2, Configuration C will also be environmentally inferior to all of the other alternatives.

Alternative 2, Configuration C will be initially environmentally inferior to Alternative 4, Sluicing, due to hauling sediment and vegetation from the reservoir. This Alternative will potentially be environmentally superior to Alternative 4, Sluicing if proper sediment transport does not occur under Alternative 4, Sluicing, causing sediment deposits to develop along the route to the ocean. This would result in need for sediment removal from the Arroyo Seco Channel, the Los Angeles River, or the Port of Long Beach and air quality impacts associated with removal.

Alternative 2, Configuration C will be environmentally inferior to Alternative 6, No Project Alternative, due to sediment removal and reservoir management activities.

AIR QUALITY-3 *Result in a cumulatively considerable net increase of any criteria pollutants for which the project region is nonattainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors).*

Sediment Removal/Reservoir Management

Air Quality Plans

As discussed previously, Alternative 2, Configuration C emissions of NO_X are expected to exceed the SCAQMD regional significance thresholds during sediment removal. This exceedance will not be consistent with air quality management plans and therefore will result in a significant cumulative impact. This impact will be greater in comparison to the Proposed Project due to the increase in excavation volume and associated sediment removal activities.

Emissions of VOC, NO_X, PM_{10}, and $PM_{2.5}$ are not expected to exceed the SCAQMD regional significance thresholds during reservoir management. The SCAQMD considers construction-related emissions that do not exceed the project-specific thresholds will not result in a cumulative impact.

Cumulative Health Impacts

As with the Proposed Project, for Alternative 2, Configuration C with Mitigation Measures MM AQ-1 and MM AQ-2, a significance threshold would not be exceeded for emissions of particulate matter and CO; and no significance threshold would be exceeded during reservoir management under either option. Implementation of Mitigation Measures MM AQ-1 and MM AQ-2 will result in a reduction of NO_X emissions and will reduce the NO_X emissions to a level of less than significant for the sediment removal phase.

Mitigation Measure

See Mitigation Measures MM AQ-1 and MM AQ-2.

Residual Impacts After Mitigation

Sediment removal will not exceed any localized significance threshold except for combined NO_X emissions. Implementation of these mitigations would reduce Alternative 2, Configuration C's combined NO_X emissions during the sediment removal phase to a level of less than significant.

Reservoir management will not exceed any localized significance threshold; therefore, this impact will be less than significant.

Comparison to Proposed Project and Other Alternatives

Alternative 2, Configuration C is considered environmentally inferior to the Proposed Project with respect to impacts to cumulative health due to the increase in sediment removal and reservoir management volumes and associated activities.

Due to the reduction in sediment removal and reservoir management areas and associated activities, Alternative 2, Configuration C will also be environmentally inferior to all of the other alternatives.

Alternative 2, Configuration C will be initially environmentally inferior to Alternative 4, Sluicing, due to hauling sediment and vegetation from the reservoir. This Alternative will potentially be environmentally superior to Alternative 4, Sluicing if proper sediment transport does not occur under Alternative 4, Sluicing, causing sediment deposits to develop along the route to the ocean. This would result in need for sediment removal from the Arroyo Seco Channel, the Los Angeles River, or the Port of Long Beach and air quality impacts associated with removal.

Alternative 2, Configuration C will be environmentally inferior to Alternative 6, No Project Alternative, due to sediment removal and reservoir management activities.

AIR QUALITY-4 *Expose sensitive receptors to substantial pollutant concentrations.*

Sediment Removal/Reservoir Management

<u>Localized Significance Thresholds</u>

As with the Proposed Project, the onsite emissions for Alternative 2, Configuration C for sediment removal reservoir management activities will not exceed LST thresholds.

<u>Carbon Monoxide Hotspot</u>

As with the Proposed Project, the CO Hotspot analysis for Alternative 2, Configuration C shows no exceedance of the State or federal CO standard; and no significant impact is expected during sediment removal or management.

Carcinogenic Or Toxic Contaminants

As with the Proposed Project, all routes modeled for Alternative 2, Configuration C resulted in less than significant non-cancer- risk from diesel emissions created by Alternative 2, Configuration C.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

Impacts will be less than significant.

Comparison to Proposed Project and Other Alternatives

Alternative 2, Configuration C is considered environmentally inferior to the Proposed Project with respect to impacts to sensitive receptors to substantial pollutant concentrations due to the increase in sediment removal and reservoir management volumes and associated activities.

Due to the increase in sediment removal and reservoir management volumes and associated activities, Alternative 2, Configuration C will also be environmentally inferior to all of the other alternatives.

Alternative 2, Configuration C will be initially environmentally inferior to Alternative 4, Sluicing, due to hauling sediment and vegetation from the reservoir. This Alternative will potentially be environmentally superior to Alternative 4, Sluicing if proper sediment transport does not occur under Alternative 4, Sluicing, causing sediment deposits to develop along the route to the ocean. This would result in need for sediment removal from the Arroyo Seco Channel, the Los Angeles River, or the Port of Long Beach and air quality impacts associated with removal.

Alternative 2, Configuration C will be environmentally inferior to Alternative 6, No Project Alternative, due to sediment removal and reservoir management activities.

AIR QUALITY-5 *Create objectionable odors affecting a substantial number of people.*

Sediment Removal/Reservoir Management

The CEQA Guidelines indicate that a potentially significant impact would occur if the Proposed Project would create objectionable odors affecting a substantial number of people.

As with the Proposed Project, diesel exhaust for Alternative 2, Configuration C will be emitted from equipment during the sediment removal process. Diesel exhaust is an objectionable odor to some; however, concentrations will disperse rapidly from the Project site (OB-1 2013); therefore impacts will be less than significant.

Mitigation Measures

No mitigation measures are necessary.

Residual Impacts After Mitigation

Alternative 2, Configuration C is not expected to produce objectionable odors beyond the Proposed Project site under sediment removal or either reservoir management option; therefore this impact will be less than significant.

Comparison to Proposed Project and Other Alternatives

Alternative 2, Configuration C is considered neither environmentally superior nor inferior to the Proposed Project with respect to impacts to objectionable odors.

Alternative 2, Configuration C will also be neither environmentally superior nor inferior to all of the other alternatives except Alternative 6, No Project Alternative.

Alternative 2, Configuration C will be environmentally inferior to Alternative 6, No Project Alternative, due to sediment removal and reservoir management activities.

BIOLOGICAL RESOURCES

BIOLOGY-1 *Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or the U.S. Fish and Wildlife Service.*

Sediment Removal

As shown in Figure 4.5-2: Alternative 2, Configuration C Sediment Removal Vegetation Communities Impacts and Table 4.5-1, potential impacts to vegetation communities will be reduced in comparison to the Proposed Project due to the reduction in area disturbed during excavation and associated sediment removal activities.

Table 4.5-1: Alternative 2, Configuration C Sediment Removal Impacts to Vegetation Communities

Vegetation Communities	Estimated Acres of Vegetation Removed During Sediment Removal	
	Proposed Project	Alternative 2 Configuration C
Riversidean Alluvial Fan Sage Scrub	1.1	0.2
California Sagebrush – California Buckwheat Scrub	3.1	0.2
Scoured	26.5	20.0
Escaped Cultivars	0.4	0.3
Riparian Woodland	51.4	34.1
Mustard and Annual Brome Semi-Natural Herbaceous Stand	22.8	16.2
Mule Fat Thickets	11.1	9.8
Disturbed	1.9	0.8

Sensitive Plants

No listed or otherwise sensitive plant species were observed on the Proposed Project site. Therefore, as with the Proposed Project, Alternative 2, Configuration C is not expected to have a substantial adverse effect on any plant species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations or by CDFW or USFWS.

Sensitive Wildlife

The Proposed Project site contains habitat and/or potential habitat for five special status species: least Bell's vireo, yellow warbler, southwestern pond turtle, coast range newt, and two-striped garter snake. Least Bell's vireo, yellow warbler, coast range newt, and two-striped garter snake have all been observed on the Proposed Project site. The southwestern pond turtle has not been observed on the Proposed Project site. If it did occur, habitat for this species would be largely limited to ponded areas.

Of the approximately 120.42 acres that will be disturbed under the Proposed Project, approximately 36.44 acres, or 30 percent, will be left undisturbed under Alternative 2, Configuration C. These undisturbed areas will include swaths along the west side of the site that include potential habitat for the five special status species.

As shown in Figure 4.5-2: Alternative 2, Configuration C Sediment Removal Vegetation Communities Impacts and Table 4.5-1, potential impacts to sensitive wildlife will be reduced in comparison to the Proposed Project due to the reduction in habitat disturbed during sediment removal activities. Disturbance of habitat for the least Bell's vireo within Riparian Woodland and Mule Fat Thickets communities will be reduced by approximately 17.3 acres (33 percent) and 1.3 acres (14 percent), respectively, as compared to the Proposed Project.

Disturbance of habitat for the yellow warbler within the Riparian Woodland community will be reduced by approximately 17.3 acres (33 percent), as compared to the Proposed Project.

Habitat for the coast range newt, the southwestern pond turtle, and the two-striped garter snake occurs within streams and seasonal ponds found on the Proposed Project site. The amount of this habitat that will be available will depend upon where sediment accumulates and the amount of flows, rainfall, and runoff. Under Alternative 2, Configuration C, disturbance of habitat for the coast range newt, the southwestern pond turtle, and the two-striped garter snake is expected to be reduced in comparison to the Proposed Project due to the reduction in habitat disturbed during sediment removal activities.

Direct harm or take of these species during sediment removal activities would result in a potentially significant impact. The chance of this occurring during sediment removal activities under this alternative is expected to be reduced in comparison to the Proposed Project due to the reduction in excavation area and associated sediment removal activities. To ensure no harm or take of these special status species, Mitigation Measures MM BIO-1, MM BIO-2, and MM BIO-3, listed below, have been provided. With implementation of these mitigation measures, direct impacts to special status species will be less than significant.

Vegetation Communities (Impacted Acres)

- 1. Riversidean Alluvial Fan Sage Scrub (0.2 acre)
- 2. California Sagebrush – California Buckwheat Scrub (0.2 acres)
- 3. Scoured (20 acres)
- 4. Escaped Cultivars (0.3 acre)
- 5. Riparian Woodland (34.1 acres)
- 6. Mustard and Annual Brome Semi-Natural Herbaceous Stand (16.2 acres)
- 7. Mule Fat Thickets (9.8 acres)
- 8. Disturbed (Barren/Trails) (0.8 acre)

SCALE= 1 inch equals 375 feet

0 187.5 375 750 Feet

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
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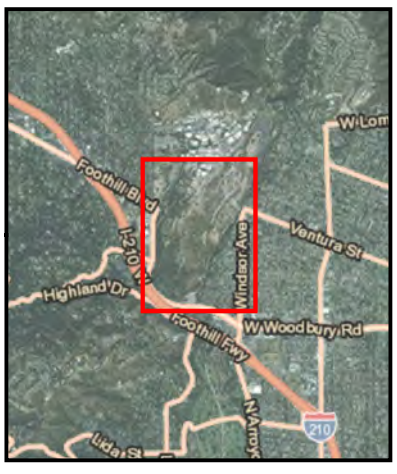

Proposed Project Boundary

Access Road

Sediment Removal Excavation Limit

Figure 4.5-2
Sediment Removal Vegetation Communities Impacts Map
Alternative 2 - Configuration C

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\\cgi-gisdata01\GIS_DATA\Projects\20000s\20201 - 20400\20346 Devil's Gate EIR\20346 Figure 4.5-2 Alternative 2, Configuration C Sediment Removal Vegetation Communities Impacts.mxd

During sediment removal, tree and vegetation removal has the potential to significantly affect nesting birds and roosting bats if active nests or roosting bats are present. Disturbance of active nests will violate the Migratory Bird Treaty Act and result in a potentially significant impact. This impact will be reduced under Alternative 2, Configuration C, as fewer acres of habitats will be removed in comparison to the Proposed Project (see Table 4.5-1). With implementation of Mitigation Measures MM BIO-4 and MM BIO-5, listed below, impacts to nesting birds and roosting bats will be less than significant.

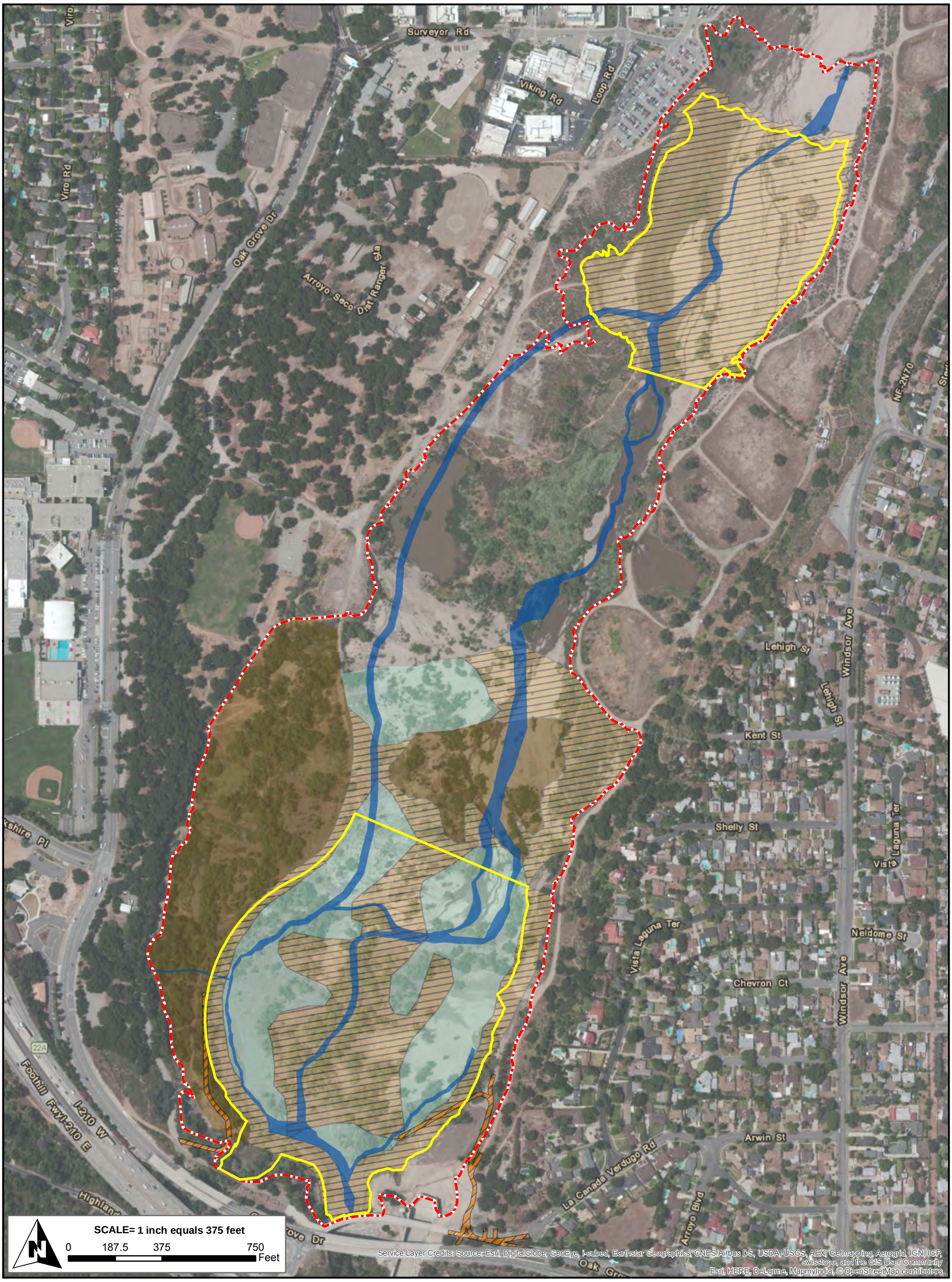
Reservoir Management

Figure 4.5-3: Alternative 2, Configuration C Expected Vegetation Communities Under Reservoir Management shows expected conditions of the vegetation communities under reservoir management for Alternative 2, Configuration C in comparison to the Proposed Project. As shown below, Alternative 2, Configuration C will result in a greater diversity of vegetation communities, including a greater amount of Riparian Woodland and Mule Fat Thickets. Under Alternative 2, Configuration C, a greater area of the Proposed Project site will be left undisturbed during reservoir management, approximately 36.46 acres. In contrast, under the Proposed Project's reservoir management Option 1, the whole Proposed Project site, approximately 120.42 acres, will be disturbed annually. Under the Proposed Project's reservoir management Option 2, 33.97 acres will be left undisturbed during reservoir management.

The reservoir management area for Alternative 2, Configuration C is expected to be composed of Riparian Herbaceous and Mustard and Annual Brome Semi-Natural Herbaceous Stand communities. Streams and seasonal ponds will be available depending upon where sediment accumulates and the amount of flows, rainfall, and runoff. Special status species have the potential to use the reservoir management area.

Direct harm or take of these species during reservoir management activities will result in a potentially significant impact. The chance of this occurring during reservoir management activities under this alternative is expected to be reduced in comparison to either of the Proposed Project's reservoir management options due to the reduction in the reservoir management area. To ensure no harm or take of these special status species occurs, MM BIO-1, MM BIO-2, MM BIO-3, and MM BIO-4 have been provided. With implementation of these mitigation measures, direct impacts to special status species will be less than significant.

During reservoir management, tree and vegetation removal will significantly affect nesting birds and roosting bats, if present. Disturbance of active nests will violate the Migratory Bird Treaty Act and result in a potentially significant impact. This impact will be reduced under Alternative 2, Configuration C, as less vegetation will be removed in comparison to the Proposed Project. With implementation of Mitigation Measure MM BIO-6, impacts to nesting birds and roosting bats will be less than significant.



Proposed Project Boundary

Reservoir Management Area

Access Road

Drainage

Vegetation Type

Mule Fat Thickets

Riparian Woodland

Mustard and Annual Brome Semi-Natural Herbaceous Stand

Figure 4.5-3
Expected Vegetation Communities Under Reservoir Management
Alternative 2 - Configuration C

Version Date: 10/16/2014

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\\cgi-gisdata01\GIS_DATA\Projects\20000s\20201 - 20400\20346 Devil's Gate EIR\20346 Figure 4.5-3 Alternative 2, Configuration C Expected Vegetation Communities Under Reservoir Management.mxd

Mitigation Measures

MM BIO – 1: A qualified biological monitor shall be present during initial ground- or vegetation-disturbing project-related activities to provide protection measures and monitor for wildlife in harm's way. This includes initial ground- or vegetation-disturbing project-related activities at the annual start of each year of sediment removal or maintenance activities. Following initial project-related activities, a qualified monitoring biologist shall be present as necessary to maintain the implemented protection measures and monitor for additional species in harm's way. These protection measures shall include, as appropriate: redirecting wildlife, identifying area that may require exclusionary devices (e.g., fencing), or capturing and relocating wildlife outside the work area. Any captured species shall be relocated to adjacent appropriate habitat that is contiguous to adjacent habitat and not impacted by project-related disturbance activities.

MM BIO – 2: Within 90 days prior to ground-disturbing activities, a sensitive species educational briefing shall be conducted by a qualified biologist for construction personnel. The biologist will identify all sensitive resources that may be encountered onsite, and construction personnel will be instructed to avoid and report any sightings of sensitive species to LACFCD or the monitoring biologist. Educational briefings shall be repeated annually for the duration of the sediment removal.

MM BIO – 3: Within 90 days prior to ground-disturbing activities, a preconstruction survey shall be conducted by a qualified biologist for the presence of any sensitive species in harm's way, including coast range newt, the southwestern pond turtle, and the two-striped garter snake. If sensitive species are observed in harm's way, the qualified biologist will develop and implement appropriate protection measures for that species. These protection measures shall include, as appropriate, redirecting the species, constructing exclusionary devices (e.g., fencing), or capturing and relocating wildlife outside the work area. Preconstruction surveys shall be repeated annually for the duration of the sediment removal. Observations of special status species made during these surveys shall be recorded onto a CNDDB field data sheet and submitted to CDFW for inclusion into the CNDDB.

MM BIO – 4: LACFCD, in consultation with a qualified biologist, will employ bird exclusionary measures (e.g., mylar flagging) prior to the start of bird breeding season to prevent birds nesting within established boundaries of the project. Prior to commencement of sediment removal activities within bird breeding season (March 1 through August 31), a preconstruction bird nesting survey shall be conducted by a qualified biologist for the presence of any nesting bird within 300 feet of the construction work area. The surveys shall be conducted 30 days prior to the disturbance of suitable nesting habitat by a qualified biologist with experience in conducting nesting bird surveys. The surveys shall continue on a weekly basis, with the last survey being conducted no more than 3 days prior to the initiation of clearance/construction work. Preconstruction surveys shall be repeated annually for the duration of the sediment removal.

If an active nest is found, the qualified biologist will develop and implement appropriate protection measures for that nest. These protection measures shall include, as appropriate, construction of exclusionary devices (e.g., netting) or avoidance buffers. The biologist shall have the discretion to adjust the buffer area as appropriate based on the proposed construction activity, the bird species involved, and the status of the nest and nesting activity; but it shall be no less than 30 feet. Work in the buffer area can resume once the nest is determined to be inactive by the monitoring biologist.

MM BIO – 5: Within 30 days prior to commencement of vegetation or structure removal activities, a preconstruction bat survey shall be conducted by a qualified biologist for the presence of any roosting bats. Acoustic recognition technology shall be used if feasible and appropriate. If either a bat maternity roost or hibernacula (structures used by bats for hibernation) are present, a qualified biologist will develop and implement appropriate protection measures for that maternity roost or hibernacula. These protection measures shall include, as appropriate, safely evicting non-breeding bat hibernacula, establishment of avoidance buffers, or replacement of roosts at a suitable location. These measures shall also include as appropriate:

- To the extent feasible, trees that have been identified as roosting sites shall be removed or relocated between October 1 and February 28.
- When trees must be removed during the maternity season (March 1 to September 30), a qualified bat specialist shall conduct a preconstruction survey to identify those trees proposed for disturbance that could provide hibernacula or nursery colony roosting habitat for bats.
- Trees identified as potentially supporting an active nursery roost shall be inspected by a qualified biologist no greater than 7 days prior to tree disturbance to determine presence or absence of roosting bats.
- Trees determined to support active maternity roosts will be left in place until the end of the maternity season (September 30).
- If bats are not detected in a tree, but the qualified biologist determined that roosting bats may still be present, trees shall be removed as follows:
    - Pushing the tree down with heavy machinery instead of felling the tree with a chainsaw
    - First pushing the tree lightly 2 to 3 times with a pause of 30 seconds between each nudge to allow bats to become active, then pushing the tree to the ground slowly
    - Allowing the tree to remain in place for 24 to 48 hours until inspected by the qualified biologist for presence or absence of roosting bats
- The qualified biologist shall document all bat survey, monitoring, and protection measure activities and prepare a summary report for LACFCD.

Residual Impacts after Mitigation

Alternative 2, Configuration C will result in a less than significant impact on candidate, sensitive, or special status species.

Comparison to Proposed Project and Other Alternatives

Alternative 2, Configuration C is considered environmentally superior to the Proposed Project with respect to impacts to candidate, sensitive, or special status species due to the reduction in sediment removal and reservoir management areas and associated activities.

Due to the reduction in sediment removal and reservoir management areas and associated activities, Alternative 2, Configuration C will also be environmentally superior to Alternative 5, Haul Route Alternative. Alternative 2, Configuration C will also potentially be environmentally superior to Alternative 4, Sluicing if proper sediment transport does not occur under Alternative 4, Sluicing, causing sediment deposits to develop along the route to the ocean. This would result in need for sediment removal and impacts to downstream habitats associated with removal activities.

Alternative 2, Configuration C will be environmentally inferior to Alternative 1, Configuration B and Alternative 3, Configuration D due to sediment removal and reservoir management activities.

Alternative 2, Configuration C will be environmentally superior to Alternative 6, No Project Alternative, as habitat in the reservoir will likely degrade under Alternative 6, No Project Alternative due to continuous sediment deposition and degradation that will increase over time.

BIOLOGY-2 *Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service.*

Sediment Removal/Reservoir Management

Alternative 2, Configuration C will impact approximately 0.6 acre of Riversidean Alluvial Fan Sage Scrub within the Proposed Project site. Impacts to Riversidean Alluvial Fan Sage Scrub will result in a potentially significant impact requiring mitigation; however, disturbance of this community will be reduced by approximately 1.4 acres (93 percent) as compared to the Proposed Project. To minimize impacts due to loss of Riversidean Alluvial Fan Sage Scrub, Mitigation Measure MM BIO-6 has been provided. Removing the sediment will benefit the alluvial fan sage scrub since the habitat is currently buried under sediment and therefore considered poor quality. With implementation of this mitigation measure, impacts to Riversidean Alluvial Fan Sage Scrub will be reduced to a level below significance.

This alternative will impact approximately 34.1 acres of Riparian Woodland and 9.8 acres of Mule Fat Thickets within the Proposed Project site. Riparian Woodland and Mule Fat Thickets are rare plant communities that provide nesting habitat for riparian species. Impacts to these habitats will result in a potentially significant impact; however, disturbance of Riparian Woodland and Mule Fat Thickets will be reduced by approximately 17.3 acres (33 percent) and 1.3 acre (14 percent), respectively, as compared to the Proposed Project. To minimize impacts due to the loss of Riparian Woodland and Mule Fat Thickets, Mitigation Measures MM BIO-7 and MM BIO-8 have been provided. With implementation of these mitigation measures, impacts to Riparian Woodland and Mule Fat Thickets will be reduced to a level below significance.

Figure 4.5-4: Alternative 2, Configuration C Impacted Water Features shows the water features that will be impacted. Compared to the Proposed Project, Alternative 2, Configuration C will reduce impacts to these water features by approximately 19 percent. To minimize impacts to jurisdictional waters found within these water features, Mitigation Measure MM BIO-8has been provided. With implementation of this mitigation measure, impacts will be reduced to a level below significance.

Mitigation Measures

MM BIO – 6: Riversidean Alluvial Fan Sage Scrub habitat shall be restored and/or enhanced at a 1:1 ratio by acreage. Areas shall be mapped using aerial photographs.

MM BIO – 7: Within 90 days prior to ground-disturbing activities, a qualified biologist shall conduct a tree survey within the project footprint, to identify trees that will be removed or potentially affected by the Proposed Project and trees that can be avoided. LACFCD will replace trees that cannot be avoided. The replacement is expected to be up to 1:1 by acreage. The biological monitor shall implement measures to protect the root zone of oak trees that may be impacted immediately adjacent to the project site and along access roads.

MM BIO – 8: A combination of onsite and offsite habitat restoration, enhancement, and exotic removal shall be implemented by LACFCD at a 1:1 ratio for impacted sensitive habitat and jurisdictional waters. Habitat restoration/enhancement shall include use of willow cuttings and exotic species removal. Non-native, weedy habitats within the basin shall be utilized whenever possible as mitigation sites. This mitigation measure shall be monitored for success for five years following implementation. A report of the monitoring results shall be submitted annually, during the five years following implementation, to resource agencies as required by the Section 401 Certification, Section 404 permit, and a Streambed Alteration Agreement.

Residual Impacts after Mitigation

Alternative 2, Configuration C, with implementation of Mitigation Measures MM BIO-6 through MM BIO-8, under sediment removal and reservoir maintenance, will result in a less than significant impact on riparian habitat and other sensitive natural communities.

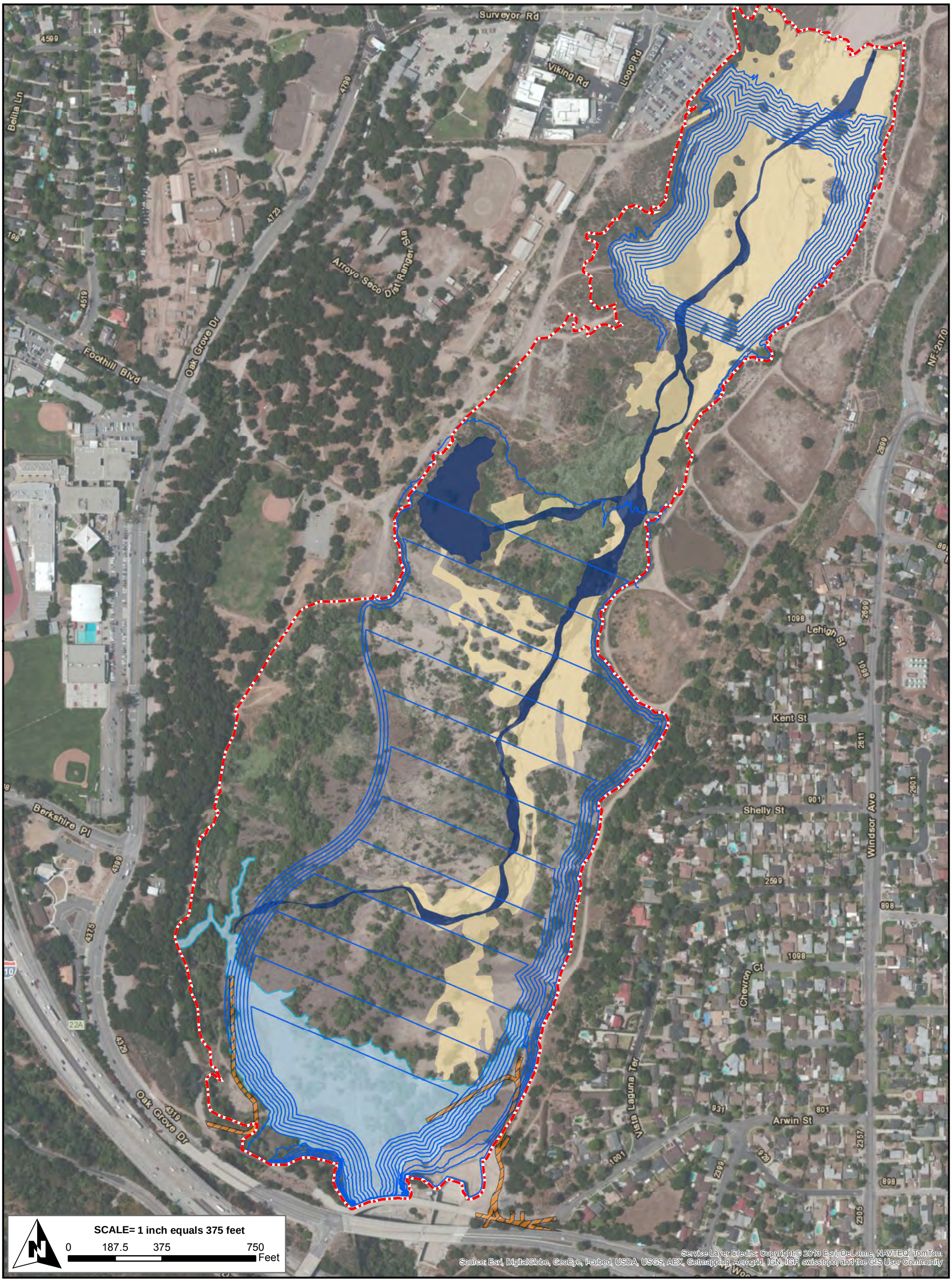
Comparison to Proposed Project and Other Alternatives

Alternative 2, Configuration C is considered environmentally superior to the Proposed Project with respect to impacts to riparian habitat and other sensitive natural communities due to the reduction in sediment removal and reservoir management areas and associated activities and increased opportunities for restoration and/or enhancement.

Due to the reduction in sediment removal and reservoir management areas and associated activities and increased opportunities for restoration and/or enhancement, Alternative 2, Configuration C will also be environmentally superior to Alternative 5, Haul Route Alternative. Alternative 2, Configuration C will also potentially be environmentally superior to Alternative 4, Sluicing if proper sediment transport does not occur under Alternative 4, Sluicing, causing sediment deposits to develop along the route to the ocean. This would result in need for sediment removal and impacts to downstream habitats associated with removal activities.

Alternative 2, Configuration C will be environmentally inferior to Alternative 1, Configuration B and Alternative 3, Configuration D due to sediment removal and reservoir management activities.

Alternative 2, Configuration C will be environmentally superior to Alternative 6, No Project Alternative, as habitat in the reservoir will likely degrade under Alternative 6, No Project Alternative due to continuous sediment deposition and degradation that will increase over time.



Proposed Project Boundary

Access Road

Sediment Removal Excavation Limit

Waters (Impacted Acres)

Braided Channel (21.8 acres)

Drainage (5.4 acres)

Wetland Area (10.7 acres)

Figure 4.5-4
Impacted Water Features Map
Alternative 2 - Configuration C

Version Date: 10/18/2013

CHAMBERS GROUP

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BIOLOGY-3: *Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means.*

Sediment Removal/Reservoir Management

Figure 4.5-4, above, shows the water features that will be impacted by this alternative. Compared to the Proposed Project, Alternative 2, Configuration C will reduce impacts to these water features by approximately 19 percent. To minimize impacts to jurisdictional waters found within these water features, Mitigation Measure MM BIO-8 has been provided. With implementation of this mitigation measure, impacts will be reduced to a level below significance.

Mitigation Measures

See Mitigation Measure MM BIO-8above.

Residual Impacts After Mitigation

As noted in MM BIO-8, wetlands and drainages under the jurisdiction of CDFW, USACE, and RWQCB will be restored and/or enhanced on the Proposed Project site. With implementation of these mitigation measures, impacts to wetlands will be reduced to a level below significance.

Comparison to Proposed Project and Other Alternatives

Alternative 2, Configuration C is considered environmentally superior to the Proposed Project with respect to impacts on federally protected wetlands due to the reduction in sediment removal and reservoir management areas and associated activities and increased opportunities for restoration and/or enhancement.

Due to the reduction in sediment removal and reservoir management areas and associated activities and increased opportunities for restoration and/or enhancement, Alternative 2, Configuration C will also be environmentally superior to Alternative 5, Haul Route Alternative. Alternative 2, Configuration C will also potentially be environmentally superior to Alternative 4, Sluicing if proper sediment transport does not occur under Alternative 4, Sluicing, causing sediment deposits to develop along the route to the ocean. This would result in need for sediment removal and impacts to downstream wetlands and other sensitive habitats associated with removal activities.

Alternative 2, Configuration C will be environmentally inferior to Alternative 1, Configuration B and Alternative 3, Configuration D due to sediment removal and reservoir management activities.

Alternative 2, Configuration C will be environmentally superior to Alternative 6, No Project Alternative, as habitat in the reservoir will likely degrade under Alternative 6, No Project Alternative due to continuous sediment deposition and degradation that will increase over time.

BIOLOGY-4 *Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.*

Sediment Removal/Reservoir Management

The Proposed Project area is predominantly open for wildlife movement and habitat connectivity. Sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays). In addition, sediment removal activities would not completely block the Proposed Project site from surrounding habitat, would occur only during the day, and would not interfere with nighttime wildlife activity. Although some wildlife may be temporarily displaced during construction, wildlife would not be physically prevented from moving around and into the basin area. Sediment removal and reservoir management activities associated with Alternative 2, Configuration C will interfere temporarily with the movement of native resident or migratory wildlife species, resulting in a potentially significant impact. Reduction in sensitive habitat would interfere with use of the habitat for wildlife nursery sites, resulting in a potentially significant impact. To minimize impacts to less than significant, Mitigation Measures MM BIO-1 through MM BIO-8 has been provided. This impact will be reduced in comparison to the Proposed Project due to the reduction in area disturbed during sediment removal and both reservoir management options.

Mitigation Measures

See Mitigation Measures MM BIO-1 through MM BIO-8.

Residual Impacts After Mitigation

As noted in MM BIO-8, restoration and/or enhancement of sensitive habitats will take place on the Proposed Project site. With implementation of these mitigation measures, impacts to use of the habitat for wildlife nursery sites will be reduced to a level below significance.

Comparison to Proposed Project and Other Alternatives

Alternative 2, Configuration C is considered environmentally superior to the Proposed Project with respect to impacts to wildlife movement and habitat connectivity due to the reduction in sediment removal and reservoir management areas and associated activities and increased opportunities for restoration and/or enhancement.

Due to the reduction in sediment removal and reservoir management areas and associated activities and increased opportunities for restoration and/or enhancement, Alternative 2, Configuration C will also be environmentally superior to Alternative 5, Haul Route Alternative. Alternative 2, Configuration C will also potentially be environmentally superior to Alternative 4, Sluicing if proper sediment transport does not occur under Alternative 4, Sluicing, causing sediment deposits to develop along the route to the ocean. This would result in need for sediment removal and impacts to downstream wetlands and other sensitive habitats associated with removal activities.

Alternative 2, Configuration C will be environmentally inferior to Alternative 1, Configuration B and Alternative 3, Configuration D due to sediment removal and reservoir management activities.

Alternative 2, Configuration C will be environmentally superior to Alternative 6, No Project Alternative, as the wetlands in the reservoir will likely degrade under Alternative 6, No Project Alternative due to continuous sediment deposition and degradation that will increase over time.

BIOLOGY-5 *Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.*

Sediment Removal/Reservoir Management

Implementation of Alternative 2, Configuration C will result in the removal of native trees from the Proposed Project site. This impact will be reduced under Alternative 2, Configuration C, as less vegetation and fewer trees will be removed in comparison to the Proposed Project. Implementation of Mitigation Measure MM BIO-7 will reduce impacts to city-protected trees to a level below significance.

Mitigation Measures

See Mitigation Measure MM BIO-7.

Residual Impacts After Mitigation

Alternative 2, Configuration C will result in a less than significant impact to city-protected trees.

Comparison to Proposed Project and Other Alternatives

Alternative 2, Configuration C is considered environmentally superior to the Proposed Project with respect to impacts to loss of native trees due to the reduction in potentially impacted trees.

Alternative 2, Configuration C will also be environmentally superior to: Alternative 4, Sluicing and Alternative 5, Haul Route Alternative.

Alternative 2, Configuration C will be environmentally inferior to Alternative 1, Configuration B and Alternative 3, Configuration D.

Alternative 2, Configuration C will be environmentally superior to Alternative 6, No Project Alternative, as trees in the reservoir will likely be lost under Alternative 6, No Project Alternative due to continuous sediment deposition.

CULTURAL RESOURCES

CULTURAL-1 *Cause a substantial adverse change in the significance of a historical resource.*

Sediment Removal/Reservoir Management

As with the Proposed Project, no alterations or modifications will be made to any historic resource; and therefore, no significant impact to historical resources is anticipated with this alternative.

Mitigation Measures

No mitigation measures are necessary.

Residual Impacts After Mitigation

No historic resources are within the proposed Project site; therefore Alternative 2, Configuration C will not result in impacts to historic resources.

Comparison to Proposed Project and Other Alternatives

As no historic resources are within the proposed Project site, Alternative 2, Configuration C is considered neither environmentally superior nor inferior to the Proposed Project with respect to historic resources.

Alternative 2, Configuration C will also be neither environmentally superior nor inferior to any of the other alternatives.

CULTURAL-2 *Cause a substantial adverse change in the significance of an archaeological resource.*

Sediment Removal/Reservoir Management

Alternative 2, Configuration C will involve ground-disturbing activities under sediment removal and reservoir management; however, as noted in Section 3.5, most of the soil in the Proposed Project area consists of recently accumulated sediment. In areas filled with recently accumulated sediment, archeological sites are not anticipated to exist, although it is always possible that unidentified archaeological sites exist in native soils below the accumulated sediment. If sediment removal or reservoir management activities exceed the depth of the historic flood deposits and encounter native soils, unidentified archaeological sites have a potential to be significantly impacted. Implementation of Mitigation Measure MM CUL-1 will reduce potential impacts to less than significant. This impact will also be reduced in comparison to the Proposed Project due to the reduction in area disturbed during sediment removal and reservoir management.

Mitigation Measures

> **MM CUL-1**: If sediment removal or reservoir management activities exceed the depth of the historic flood deposits and encounter native sediments, these activities will be monitored by a qualified archaeologist. In the event this occurs and archaeological materials are observed, the excavation in the proximity of the discovery will be diverted until a qualified archaeologist evaluates the discovery.

Residual Impacts After Mitigation

While it is always possible that unidentified archaeological sites exist in native soils below the accumulated sediment, with implementation of Mitigation Measure MM CUL-1, no significant adverse impacts are expected.

Comparison to Proposed Project and Other Alternatives

Alternative 2, Configuration C is considered neither environmentally superior nor inferior to the Proposed Project with respect to archaeological resources. While the acreage of Alternative 2, Configuration C is smaller, the excavation area in the back basin will be deeper; therefore, impacts will be similar in nature.

Due to the reduction in sediment removal and reservoir management areas, Alternative 2, Configuration C will be environmentally superior to: Alternative 4, Sluicing and Alternative 5, Haul Route Alternative.

Alternative 2, Configuration C will be environmentally inferior to Alternative 1, Configuration B; Alternative 3, Configuration D; and Alternative 6, No Project Alternative due to sediment removal and reservoir management activities.

CULTURAL-3 *Cause a substantial adverse change in the significance of a paleontological resource.*

Sediment Removal/Reservoir Management

No paleontological resources were encountered during the course of the survey and are not expected in the accumulated sediment. It is always possible that unidentified paleontological materials exist in native soil below the accumulated sediment. If sediment removal or reservoir management activities exceed the depth of the historic flood deposits and encounter native soils, unidentified paleontological materials have the potential to be significantly impacted. Implementation of Mitigation Measure MM CUL-2 will reduce impacts to less than significant. This impact will also be reduced in comparison to the Proposed Project due to the reduction in area disturbed during sediment removal and reservoir management.

Mitigation Measures

> **MM CUL-2:** If sediment removal or reservoir management activities exceed the depth of the historic flood deposits and encounter native sediments, these activities will be monitored by a qualified paleontologist. In the event that this occurs and paleontological materials are observed, the excavation in the proximity of the discovery should be diverted until a qualified paleontologist evaluates the discovery.

Residual Impacts After Mitigation

While it is always possible that unidentified paleontological materials exist in native soils below the accumulated sediment, with implementation of Mitigation Measure MM CUL-2, no significant adverse impacts are expected.

Comparison to Proposed Project and Other Alternatives

Alternative 2, Configuration C is considered neither environmentally superior nor inferior to the Proposed Project with respect to paleontological resources. While the acreage of Alternative 2, Configuration C is smaller, the excavation area in the back basin will be deeper; therefore, impacts will be similar in nature.

Due to the reduction in sediment removal and reservoir management areas, Alternative 2, Configuration C will be environmentally superior to: Alternative 4, Sluicing and Alternative 5, Haul Route Alternative.

Alternative 2, Configuration C will be environmentally inferior to Alternative 1, Configuration B; Alternative 3, Configuration D; and Alternative 6, No Project Alternative due to sediment removal and reservoir management activities.

CULTURAL-4 *Potentially impact unknown human remains within the proposed project site.*

Sediment Removal/Reservoir Management

As with the Proposed Project, archival research and the archaeological survey in connection with the Proposed Project did not indicate the presence of any known human remains in the project area. In the event human remains are discovered, implementation of Mitigation Measure MM CUL-3 will reduce impacts to less than significant.

Mitigation Measures

> **MM CUL-3**: In the event human remains are discovered, all work in the area must be halted until the County Coroner identifies the remains and makes recommendations regarding their appropriate treatment pursuant to PRC Section 5097.98.

Residual Impacts After Mitigation

While it is possible that human remains could be discovered in native soils below the accumulated sediment, with implementation of Mitigation Measure MM CUL-3, no significant adverse impacts are expected.

Comparison to Proposed Project and Other Alternatives

Alternative 2, Configuration C is considered neither environmentally superior nor inferior to the Proposed Project with respect to accidental discovery of human remains. While the acreage of Alternative 2, Configuration C is smaller, the excavation area in the back basin will be deeper; therefore, impacts will be similar in nature.

Due to the reduction in sediment removal and reservoir management areas, Alternative 2, Configuration C will be environmentally superior to: Alternative 4, Sluicing and Alternative 5, Haul Route Alternative.

Alternative 2, Configuration C will be environmentally inferior to Alternative 1, Configuration B; Alternative 3, Configuration D; and Alternative 6, No Project Alternative due to sediment removal and reservoir management activities.

GEOLOGY & SOILS

GEOLOGY-1 *Potentially result in soil erosion or loss of topsoil during sediment removal activities.*

Sediment Removal/Reservoir Management

Alternative 2, Configuration C will involve the excavation and deposition of sediment at facilities already prepared and designated to accept such sediment during sediment removal and reservoir management. Sediment stockpiled at Johnson Field as part of the IMP will also be removed. Depending on the moisture content of the sediment removed, the sediment may need to be stockpiled to allow it to dry. If drying is required, stockpiling of the sediment will occur onsite within Devil's Gate Reservoir. Disturbed sediments are more susceptible to erosion; however, as discussed above in Air Quality, these impacts will be reduced to less than significant through implementation of SCAQMD Rule 403 and BMPs. In addition, excavation, grading, and sediment placement activities will be in accordance with established

guidelines, permits, and regulations established for each disposal site. As such, sediment removal and reservoir management impacts to erosion will be less than significant. This impact will also be reduced in comparison to the Proposed Project due to the reduction in area disturbed during sediment removal and reservoir management.

Mitigation Measures

No mitigation measures s will be required.

Residual Impacts After Mitigation

With implementation of SCAQMD Rule 403 and BMPs and the resulting reduction in potential for erosion, no significant impacts to geology and soils would occur as a result of Alternative 2, Configuration C.

Comparison to Proposed Project and Other Alternatives

Alternative 2, Configuration C is considered environmentally superior to the Proposed Project with respect to soil erosion due to the reduction in sediment removal and reservoir management areas and associated soil disturbance.

Due to the reduction in sediment removal and reservoir management areas and associated soil disturbance, Alternative 2, Configuration C will also be environmentally superior to Alternative 4, Sluicing and Alternative 5, Haul Route Alternative.

Alternative 2, Configuration C will be environmentally inferior to Alternative 1, Configuration B; Alternative 3, Configuration D; and Alternative 6, No Project Alternative due to sediment removal and reservoir management activities.

GREENHOUSE GAS EMISSIONS

GHG EMISSIONS-1 *Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment.*

Sediment Removal/Reservoir Management

Alternative 2, Configuration C will use the same amount and type of construction equipment as the Proposed Project and involve the same number of truck trips on a daily basis for sediment removal and reservoir management; however, sediment removal under this Alternative is expected to have a longer duration than the Proposed Project due to the increased amount of sediment to be removed. Use of sediment removal dump trucks that meet EPA's emission standards for Model Year 2007 or later and use of off-road equipment that meets, at a minimum, EPA's emission standards for Tier 3 equipment, would result in a reduction of GHG emissions. As noted in Section 3.6, generation of greenhouse gas emissions under the Proposed Project is not "cumulatively considerable" and is therefore less than significant under CEQA. Alternative 2, Configuration C will have the same amount of daily equipment usage/truck traffic and increased overall sediment removal duration; therefore, this alternative will generate greater greenhouse gas emissions than the Proposed Project, but will be not "cumulatively considerable," and is therefore less than significant under CEQA.

As with the Proposed Project, Alternative 2, Configuration C may prove a positive effect on climate change. High ambient temperatures coupled with important demand for oxygen due to the degradation of substantial amounts of organic matter favor the production of CO_2, the establishment of anoxic conditions, and thus the production of CH_4. If the reservoir is left as it is, the large quantity of biomass currently existing may exacerbate the condition. With the removal and disposal of most of the organic mass in the Scholl Canyon Landfill, which uses the green waste primarily as "alternative daily cover" (ADC), the overall benefit to the carbon ecosystem will be positive, since prior to using green waste for ADC, larger amounts of cover soil had to be imported into the landfill from offsite sources (Kong et al. 2008). Therefore, use of the green waste as ADC reduces fossil fuel use for cover soil importation and also reduces GHG emissions. This potential benefit will not be as great under Alternative 2, Configuration C due to the reduction in excavation area and associated vegetation removal.

Mitigation Measures

No mitigation measures are necessary.

Residual Impacts After Mitigation

No significant impacts associated with the generation of greenhouse gas emissions will occur as a result of Alternative 2, Configuration C.

Comparison to Proposed Project and Other Alternatives

Alternative 2, Configuration C will generate greater overall greenhouse gas emissions than the Proposed Project; however, it will not produce as much green waste to be used as ADC. Use of ADC reduces fossil fuel use for cover soil importation and also reduces GHG emissions. Alternative 2, Configuration C is considered environmentally inferior to the Proposed Project due to overall production of greenhouse gas emissions.

Due to overall production of greenhouse gas emissions, Alternative 2, Configuration C will also be environmentally inferior to: Alternative 1, Configuration B; Alternative 3, Configuration D; and Alternative 5, Haul Route Alternative.

Alternative 2, Configuration C will be initially environmentally inferior to Alternative 4, Sluicing due to hauling sediment and vegetation from the reservoir. This Alternative will potentially be environmentally superior to Alternative 4, Sluicing if proper sediment transport does not occur under Alternative 4, Sluicing, causing sediment deposits to develop along the route to the ocean. This would result in need for sediment removal from the Arroyo Seco Channel, the Los Angeles River, or the Port of Long Beach and associated impacts from overall production of greenhouse gas emissions.

Alternative 2, Configuration C will be environmentally inferior to Alternative 6, No Project Alternative, due to sediment removal and reservoir management activities and associated production of greenhouse gas emissions.

GHG EMISSIONS-2 *Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases.*

Sediment Removal/Reservoir Management

AB 32 identified a 2020 target level for GHG emissions in California of 427 MMT of CO_2e, which is approximately 28.5 percent less than the year 2020 BAU emissions estimate of 596 MMT CO_2e. To achieve these GHG reductions, widespread reductions of GHG emissions will have to occur across California. Some of those reductions will need to come in the form of changes in vehicle emissions and mileage standards, changes in the sources of electricity, and increases in energy efficiency by existing facilities. These reductions in mobile-sources and energy production of GHG emissions would occur with or without development of Alternative 2, Configuration C. Overall, Alternative 2, Configuration C will be consistent with the AB 32 goal of reducing statewide GHG emissions to 1990 levels by year 2020. Currently, no other GHG reduction plan (i.e., SCAG, SCAQMD, or County) applies to Alternative 2, Configuration C. As with the Proposed Project, Alternative 2, Configuration C will not conflict with any applicable plan, policy, or regulation of an agency adopted for the purpose of reducing the emissions of GHGs; therefore, impacts will be less than significant.

Mitigation Measures

No mitigation measures are necessary.

Residual Impacts After Mitigation

No significant impacts associated with any applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases will occur as a result of Alternative 2, Configuration C.

Comparison to Proposed Project and Other Alternatives

Alternative 2, Configuration C is considered neither environmentally superior nor inferior to the Proposed Project with respect to applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases.

Alternative 2, Configuration C will also be neither environmentally superior nor inferior to any of the other alternatives.

HAZARDS AND HAZARDOUS MATERIALS

HAZARDS-1 *Create a hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials.*

Sediment Removal/Reservoir Management

As with the Proposed Project, no significant impacts associated with hazardous soils are expected. Alternative 2, Configuration C will include the use of hazardous materials associated with the construction equipment needed to perform the removal activities. Adequate BMPs will be utilized; and adherence to the regulations set forth by County, State, and federal agencies will reduce the potential for hazardous materials impacts to a less than significant level and will not pose a safety hazard to sensitive receptors.

Mitigation Measures

No mitigation measures are necessary.

Residual Impacts After Mitigation

Implementation of BMPs and adherence to the applicable regulations will reduce the potential for impacts associated with hazardous materials to a less than significant level.

Comparison to Proposed Project and Other Alternatives

Alternative 2, Configuration C is considered neither environmentally superior nor inferior to the Proposed Project.

Alternative 2, Configuration C will also be neither environmentally superior nor inferior to any of the other alternatives except Alternative 6, No Project Alternative. Alternative 2, Configuration C will be environmentally inferior to Alternative 6, No Project Alternative, due to sediment removal and reservoir management activities.

HAZARDS-2 *Create a significant hazard to the public or environment through accident conditions involving the release of hazardous materials into the environment.*

As with the Proposed Project, no significant impacts associated with hazardous soils are expected. Alternative 2, Configuration C will include the use of hazardous materials associated with the construction equipment needed to perform the removal activities. Adequate BMPs will be utilized; and adherence to the regulations set forth by County, State, and federal agencies will reduce the potential for hazardous materials impacts to a less than significant level and will not pose a safety hazard to sensitive receptors.

Mitigation Measures

No mitigation measures are necessary.

Residual Impacts After Mitigation

Implementation of BMPs and adherence to the applicable regulations will reduce the potential for impacts associated with hazardous materials to a less than significant level.

Comparison to Proposed Project and Other Alternatives

Alternative 2, Configuration C is considered neither environmentally superior nor inferior to the Proposed Project.

Alternative 2, Configuration C will also be neither environmentally superior nor inferior to any of the other alternatives except Alternative 6, No Project Alternative. Alternative 2, Configuration C will be environmentally inferior to Alternative 6, No Project Alternative due to sediment removal and reservoir management activities.

HAZARDS-3 *Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school.*

Sediment Removal/Reservoir Management

As with the Proposed Project, Alternative 2, Configuration C will include the use of hazardous materials associated with the construction equipment needed to perform the removal activities. The proposed construction routes pass La Cañada High School and Hillside School and Learning Center. Adherence to County, State, and federal agency regulations governing the use of these materials reduces the potential for impacts to a less than significant level and will not pose a safety hazard to sensitive receptors. No mitigation measures are required.

Mitigation Measures

No mitigation measures are necessary.

Residual Impacts After Mitigation

Implementation of BMPs and adherence to the applicable regulations will reduce the potential for impacts associated with hazardous materials within one-quarter mile of an existing school to a less than significant level.

Comparison to Proposed Project and Other Alternatives

Alternative 2, Configuration C is considered neither environmentally superior nor inferior to the Proposed Project.

Alternative 2, Configuration C will also be neither environmentally superior nor inferior to any of the other alternatives except Alternative 5, Haul Route Alternative and Alternative 6, No Project Alternative.

Alternative 2, Configuration C will be environmentally inferior to Alternative 5, Haul Route Alternative, as the Alternative 2, Configuration C construction routes pass La Cañada High School and Hillside School and Learning Center.

Alternative 2, Configuration C will be environmentally inferior to Alternative 6, No Project Alternative due to sediment removal and reservoir management activities.

HAZARDS-4 *Located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would create a significant hazard to the public or the environment.*

Sediment Removal/Reservoir Management

The EPA included Hahamongna Watershed Park area on the NPL Superfund List due to the presence of detected VOCs and perchlorate in groundwater originating from the JPL property. The impacted groundwater is at 200 feet bgs; and, as with the Proposed Project, the concentrations of organochlorine pesticides, petroleum hydrocarbons (diesel and hydraulic/motor oil range and aromatics), and SVOCs detected in samples collected from Devil's Gate Reservoir are below regulatory thresholds. Therefore, the listing of the watershed on the Superfund List does not present a significant hazard to the public or

the environment, and no significant impacts associated with the Alternative 2, Configuration C are expected.

Mitigation Measures

No mitigation measures are necessary.

Residual Impacts After Mitigation

No significant adverse impacts were identified.

Comparison to Proposed Project and Other Alternatives

Alternative 2, Configuration C is considered neither environmentally superior nor inferior to the Proposed Project.

Alternative 2, Configuration C will also be neither environmentally superior nor inferior to any of the other alternatives.

HAZARDS-5 *Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.*

Sediment Removal/Reservoir Management

Alternative 2, Configuration C sediment removal and reservoir management activities will occur onsite and will not interfere with the current emergency response plan or emergency evacuation plan for local, State, or federal agencies. Additionally, access to the surrounding roads will be maintained during sediment removal and reservoir management activities and will not interfere with the response facilities located adjacent to the Proposed Project site, including the County of Los Angeles Fire Department Camp 2 and the City of Pasadena Police Department located at 2175 Yucca Lane. Alternative 2, Configuration C will also increase flood control protection downstream of Devil's Gate Dam. No mitigation measures are required.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

No significant adverse impacts were identified.

Comparison to Proposed Project and Other Alternatives

Alternative 2, Configuration C is considered neither environmentally superior nor inferior to the Proposed Project.

Alternative 2, Configuration C will also be neither environmentally superior nor inferior to any of the other alternatives except Alternative 6, No Project Alternative.

Alternative 2, Configuration C will be environmentally superior to Alternative 6, No Project Alternative, as Alternative 6, No Project Alternative will severely restrict flood control, potentially increasing flooding downstream of Devil's Gate Dam. This flooding could also potentially interfere with access to roadways.

HYDROLOGY & WATER QUALITY

HYDROLOGY-1 *Violate any water quality standards or waste discharge requirements.*

Sediment Removal/Reservoir Management

FAST operations have been routinely used at Devil's Gate Reservoir and result in relatively small amounts of finer grained sediment passing through the reservoir. During both sediment removal and reservoir management phases, FAST operations will take place during winter rain events, using natural flows to allow the finer grained sediment to pass through the reservoir and downstream of the dam. It is anticipated that these FAST operations will be similar to historic FAST operations and that sediment fines discharged during FAST operations will be transported to the Pacific Ocean via Arroyo Seco and the Los Angeles River, either via the discharge flow or subsequent storm flows. As with the Proposed Project, no significant impacts to water quality standards are expected due to FAST operations.

As with the Proposed Project, heavy equipment needed for sediment removal has the potential to cause accidental spills of fuel and lubricating oil. Contaminants could be released into the watershed and adversely affect water quality. Alternative 2, Configuration C activities involving construction equipment will be temporary and involve the limited transport, use, disposal, and storage of fuel and lubricating oil, which are regulated by various agencies. Adequate BMPs will be utilized; and adherence to the regulations set forth by County, State, and federal agencies will reduce the potential for impacts to water quality to a less than significant level.

With adherence to regulations and permit requirements and implementation of project-specific BMPs, impacts related to otherwise substantially degrading water quality will be less than significant.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

Adequate BMPs will be utilized; and adherence to the regulations set forth by County, State, and federal agencies will reduce the potential for impacts to water quality to a less than significant level.

Comparison to Proposed Project and Other Alternatives

Alternative 2, Configuration C is considered neither environmentally superior nor inferior to the Proposed Project.

Alternative 2, Configuration C will also be neither environmentally superior nor inferior to any of the other alternatives except Alternative 6, No Project Alternative. Alternative 2, Configuration C will be environmentally inferior to Alternative 6, No Project Alternative due to sediment removal and reservoir management activities.

HYDROLOGY-2 *Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level.*

Sediment Removal/Reservoir Management

As with the Proposed Project, with implementation of Alternative 2, Configuration C the reservoir will have the ability to contain more of the local runoff, which in turn will result in more stormwater penetrating surface sediment in the project area and subsequently recharging the groundwater basin. No significant impacts to groundwater supplies are expected.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

No significant unavoidable adverse impacts would occur as a result of Alternative 2, Configuration C.

Comparison to Proposed Project and Other Alternatives

Alternative 2, Configuration C is considered environmentally superior to the Proposed Project due to the increase in area to contain local runoff and increase in percolation due to increased removal of accumulated sediment.

Alternative 2, Configuration C will also be environmentally superior to all of the other alternatives. Alternative 2, Configuration C will be environmentally superior to Alternative 6, No Project Alternative, due to greater area to contain local runoff and increased percolation due to removal of accumulated sediment.

HYDROLOGY-3 *Substantially alter the existing drainage pattern of the site, which would potentially result in substantial erosion or siltation.*

Sediment Removal/Reservoir Management

Drainage patterns within the reservoir change on a regular basis depending on seasonal conditions, water flow, and sediment deposition. Sediment removal and reservoir management will also result in alterations of surface drainage characteristics at the project site due to clearing, grading, and excavation activities. Excavation, grading, and sediment placement activities will occur under LACDPW regulations, which establish protocols for proper design of slopes and temporary sediment-collecting structures.

Although the drainage characteristics for the site will be altered, Alternative 2, Configuration C will result in a positive impact to drainage of Devil's Gate Reservoir because it will enhance the flood control abilities of Devil's Gate Dam. While Alternative 2, Configuration C will result in a small increase of impervious surface area, this small amount is not expected to significantly change drainage patterns and will not cause a significant increase in the amount of surface runoff. As such, impacts related to offsite erosion will be less than significant.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

Alternative 2, Configuration C will result in a less than significant impact on drainage patterns.

Comparison to Proposed Project and Other Alternatives

Alternative 2, Configuration C is considered neither environmentally superior nor inferior to the Proposed Project.

Alternative 2, Configuration C will also be neither environmentally superior nor inferior to any of the other alternatives except for Alternative 4, Sluicing. Alternative 2, Configuration C will be environmentally superior to Alternative 4, Sluicing due to the potential for erosion associated with the sluicing alternative.

HYDROLOGY-4 *Otherwise substantially degrade water quality.*

Sediment Removal/Reservoir Management

As with the Proposed Project, heavy equipment needed for sediment removal has the potential to cause accidental spills of fuel and lubricating oil. Contaminants could be released into the watershed and adversely affect water quality. Alternative 2, Configuration C activities involving construction equipment will be temporary and involve the limited transport, use, disposal, and storage of fuel and lubricating oil, which are regulated by various agencies. Adequate BMPs will be utilized; and adherence to the regulations set forth by County, State, and federal agencies will reduce the potential for impacts to water quality to a less than significant level.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

Adequate BMPs will be utilized; and adherence to the regulations set forth by County, State, and federal agencies will reduce the potential for impacts to water quality to a less than significant level.

Comparison to Proposed Project and Other Alternatives

Alternative 2, Configuration C is considered neither environmentally superior nor inferior to the Proposed Project.

Alternative 2, Configuration C will also be neither environmentally superior nor inferior to any of the other alternatives except Alternative 6, No Project Alternative. Alternative 2, Configuration C will be environmentally inferior to Alternative 6, No Project Alternative due to sediment removal and reservoir management activities.

LAND USE & PLANNING

LAND USE-1 *Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect.*

Sediment Removal

As with the Proposed Project, Alternative 2, Configuration C will not conflict with the City's General Plan or zoning designation of Open Space for the Proposed Project site and is consistent with the LACFCD easement.

As discussed in Subsection 3.8.3, Applicable Regulations, the HWPMP emphasizes protection of recreational and natural resources as well as the management of flood control for the downstream watershed. Alternative 2, Configuration C is consistent with HWPMP Goal 2 of managing the flood control basin for protection of the downstream areas by improving and maintaining the flood capacity behind Devil's Gate Dam.

Implementation of sediment removal and reservoir management will result in temporarily restricted access to portions of designated trails and indirect impacts to existing recreation uses associated with construction activities (see further discussion below in Recreation). With implementation of Mitigation Measure MM LAN-1, impacts associated with recreational activities coexisting with flood management and water conservation will be reduced to less than significant.

Mitigation Measures

> **MM LAN-1**: Temporary impacts to designated recreational facilities and trails shall be minimized through advance communication and redirection to the nearest facility in the vicinity of the Proposed Project. Prior to completion of final plans and specifications, the LACFCD shall review the plans and specifications to ensure that they contain proper language requiring that signs be posted at the nearby parking lots and trailheads at least one month in advance of sediment removal activities.

Residual Impacts After Mitigation

Impacts associated with recreational activities coexisting with flood management and water conservation would be reduced to less than significant for sediment removal and reservoir management.

Comparison to Proposed Project and Other Alternatives

Alternative 2, Configuration C is considered environmentally superior to the Proposed Project with respect to impacts to land use associated with compatibility to recreation due to the reduction in sediment removal and reservoir management areas and associated activities.

Due to the reduction in sediment removal and reservoir management areas and associated activities, Alternative 2, Configuration C will also be environmentally superior to Alternative 4, Sluicing and Alternative 5, Haul Route Alternative.

Alternative 2, Configuration C will be environmentally inferior to Alternative 1, Configuration B; Alternative 3, Configuration D; and Alternative 6, No Project Alternative; however, recreational activities will likely be impacted under Alternative 6, No Project Alternative due to continuous sediment deposition.

MINERAL RESOURCES

MINERALS-1 *Result in the loss of availability of a known mineral resource that would be of value to the region and residents of the state.*

Sediment Removal/Reservoir Management

The Proposed Project site contains areas delineated within SMARA zone designated MRZ-2, which indicates that the area contains adequate information to indicate that significant mineral deposits are present or are judged to have a high likelihood for their presence (City of Pasadena 2002). As with the Proposed Project, under Alternative 2, Configuration C, the Proposed Project site will not be available for mining operations during sediment removal and reservoir management activities; however, sediment removal is not expected to involve usable aggregate material or arroyo stone due to unfavorable characteristics such as fine gradation soil and high organic content levels. Impacts will be less than significant.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

Alternative 2, Configuration C will not result in any potentially significant impacts to mineral resources that will be of value to the region and residents of the State.

Comparison to Proposed Project and Other Alternatives

Alternative 2, Configuration C is considered neither environmentally superior nor inferior to the Proposed Project.

Alternative 2, Configuration C will also be neither environmentally superior nor inferior to any of the other alternatives.

MINERALS-2 *Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan.*

While the Arroyo Seco Master Plan EIR (2002) states that the reservoir may contain large quantities of arroyo stone, the Proposed Project site is not delineated as a locally important mineral resource recovery site on a local general plan, specific plan, or other local land use plan. As with the Proposed Project, under Alternative 2, Configuration C, the Proposed Project site will not be available for mining operations during sediment removal and reservoir management activities; however, sediment excavation is not expected to involve usable aggregate material or arroyo stone due to unfavorable characteristics such as fine gradation soil and high organic content levels. Impacts will be less than significant.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

Alternative 2, Configuration C will not result in any potentially significant impacts to availability of a locally important mineral resource recovery site.

Comparison to Proposed Project and Other Alternatives

Alternative 2, Configuration C is considered neither environmentally superior nor inferior to the Proposed Project.

Alternative 2, Configuration C is considered neither environmentally superior nor inferior to any other alternative.

NOISE & VIBRATION

NOISE-1 *Result in exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.*

Sediment Removal/Reservoir Management

Onsite Construction Equipment Noise

Alternative 2, Configuration C sediment removal activities will take place Monday through Friday between 7:00 a.m. and 6:00 p.m. Standard Time and between 7:00 a.m. and 7:00 p.m. Daylight Savings Time and on Saturday between 8:00 a.m. and 5:00 p.m. Reservoir management activities will take place under the same hours Monday through Friday, with no activities on Saturday. This alternative will use the same amount and type of construction equipment as the Proposed Project. Since the removal of sediment activities will require a greater amount of equipment than the reservoir management activities, calculations for onsite construction equipment noise have been based on the sediment removal activities equipment list.

Noise impacts from onsite construction equipment activities associated with Alternative 2, Configuration C will be a function of the noise generated by construction equipment, equipment location, sensitivity of nearby land uses, and the timing and duration of the construction activities. Construction noise impacts will be the same as those associated with the Proposed Project to the nearby sensitive receptors and are shown below in Table 4.5-2.

Table 4.5-2: Alternative 2 Onsite Construction Equipment Noise Levels at Nearby Sensitive Receptors

Receptor Description	Receptor Jurisdiction	Distance to Receptor (feet)	Construction Noise Levels[1]	
			dBA Leq	dBA L_{max}
Single-Family Home	Pasadena	140	71	73
Single-Family Home	Los Angeles County	180	69	71
JPL Office	La Cañada Flintridge	200	68	70
Hahamongna Watershed Park	Pasadena	20	86	90
La Cañada High School	La Cañada Flintridge	430	63	63
La Cañada Methodist Church	La Cañada Flintridge	500	62	62

Notes:
[1] Lmax is based on the maximum noise from the loudest piece of equipment and the Leq is the average noise from all equipment.
Source: RCNM, Federal Highway Administration, 2006

Table 4.5-2, above, shows that construction noise impacts will range from 62 dBA Leq to 86 dBA Leq at the nearby receptors, with the highest noise levels occurring at the portion of Hahamongna Watershed Park that is adjacent to the west side of the reservoir.

The City of Pasadena exempts public agencies from the Municipal Code noise requirements. The County of Los Angeles exempts flood control maintenance and construction operations from noise restrictions. The City of La Cañada Flintridge does not provide maximum noise thresholds of construction noise that occurs during the allowed times between Monday through Friday of 7:00 a.m. to 6:00 p.m. Standard Time and 7:00 a.m. to 7:00 p.m. Daylight Savings Time and on Saturday between 7:00 a.m. and 5:00 p.m. Therefore, Alternative 2, Configuration C will comply with all local ordinances that apply to sediment removal and reservoir management activities taking place during the allowed hours.

Offsite Vehicular Noise

Alternative 2, Configuration C sediment removal and reservoir management activities will generate the same number of daily haul truck trips as the Proposed Project: up to 425 daily round trips and 200 daily round trips, respectively. Therefore, Alternative 2, Configuration C potential offsite traffic noise impacts created by the offsite vehicle trips will be the same as those generated from the Proposed Project; however, due to the longer time frame for removing the material the impact will be increased. Overall, as with the Proposed Project, roadway noise impacts will be less than significant.

Mitigation Measures

No mitigation measures are necessary.

Residual Impacts After Mitigation

Alternative 2, Configuration C will comply with all local noise ordinances and roadway noise impacts will be less than significant.

Comparison to Proposed Project and Other Alternatives

Alternative 2, Configuration C is considered environmentally inferior to the Proposed Project with respect to impacts associated with noise levels due to the longer time frame for removing the material.

Due to the longer time frame for removing the material, Alternative 2, Configuration C will also be environmentally inferior to: Alternative 1, Configuration B; Alternative 3, Configuration D; and Alternative 5, Haul Route Alternative.

Alternative 2, Configuration C will be environmentally inferior to Alternative 4, Sluicing due to hauling activities. Alternative 2, Configuration C could potentially be environmentally superior to Alternative 4, Sluicing if proper sediment transport does not occur under Alternative 4, Sluicing, causing sediment deposits to develop along the route to the ocean. This would result in need for sediment removal and impacts downstream associated with removal activities.

Alternative 2, Configuration C will be environmentally inferior to Alternative 6, No Project Alternative due to sediment removal and reservoir management activities.

NOISE-2 *Result in exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels.*

Sediment Removal/Reservoir Management

As with the Proposed Project, only the nearby single-family homes in the City of Pasadena would experience vibration levels that would exceed the 0.01-inch-per-second vibration standard. This potentially significant impact will be reduced to less than significant through implementation of Mitigation Measure MM N-1; however, this impact will be increased in comparison to the Proposed Project, as sediment removal under this alternative is expected to have a longer duration.

Mitigation Measures

> **MM N-1**: LACFCD shall restrict the operation of any off-road construction equipment that is powered by a greater than 200-horsepower engine from operating within 180 feet of any offsite residential structure. Equipment that is not performing any earth-moving activities and is solely operating for entering or leaving the site via the access roads to the reservoir is exempted from this requirement.

Residual Impacts After Mitigation

Through implementation of Mitigation Measure MM N-1, the onsite construction equipment vibration impacts to nearby sensitive receptors would be reduced to less than significant.

Comparison to Proposed Project and Other Alternatives

Alternative 2, Configuration C is considered environmentally inferior to the Proposed Project with respect to impacts associated with vibration levels due to the longer time frame for removing the material.

Due to the longer time frame for removing the material, Alternative 2, Configuration C will also be environmentally inferior to all other alternatives, including Alternative 6, No Project Alternative.

NOISE-3: *Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.*

Sediment Removal/Reservoir Management

Alternative 2, Configuration C will not create a substantial temporary or periodic increase in ambient noise levels in the project vicinity above existing noise levels. For this analysis, both the sediment removal activities and reservoir management activities have been considered as temporary activities, since they would occur only for limited durations of time. The construction activities associated with the removal of the sediment may create temporary onsite noise impacts from the operation of construction equipment as well offsite noise impacts from the use of haul trucks to export material offsite.

Onsite Construction Equipment Noise

As with the Proposed Project, the onsite equipment that will be operated under Alternative 2, Configuration C will not conflict with any construction noise standards. Any temporary noise level increase from onsite construction noise will be less than significant. Therefore, Alternative 2, Configuration C's potential noise levels from onsite construction will be the same as those generated from the Proposed Project; however, due to the longer time frame for removing the material the impact will be increased.

Offsite Vehicular Noise

As with the Proposed Project, the offsite vehicular trips associated with Alternative 2, Configuration C will not create an exceedance of the normally acceptable noise standards for nearby sensitive land uses for locations that do not already exceed the standards for existing conditions. The analysis also found that for the locations that currently exceed the normally acceptable noise standard, Alternative 2, Configuration C's noise contribution to these roadway segments will be within the Federal Transit Administration's allowable noise exposure increase levels. Therefore, the temporary noise level increase created from offsite vehicular noise will result in a less than significant impact. Therefore, Alternative 2, Configuration C's potential impact from offsite vehicular noise will be the same as those generated from the Proposed Project; however, due to the longer time frame for removing the material the impact will be increased.

Mitigation Measures

No mitigation measures are necessary.

Residual Impacts After Mitigation

Temporary noise level increase from onsite construction noise and offsite vehicular noise would be less than significant.

Comparison to Proposed Project and Other Alternatives

Alternative 2, Configuration C is considered environmentally inferior to the Proposed Project with respect to impacts associated with noise levels due to the longer time frame for removing the material.

Due to the longer time frame for removing the material, Alternative 2, Configuration C will also be environmentally inferior to Alternative 1, Configuration B; Alternative 3, Configuration D and Alternative 5, Haul Route Alternative.

Alternative 2, Configuration C will be environmentally inferior to Alternative 4, Sluicing due to hauling activities. Alternative 3, Configuration D could potentially be environmentally superior to Alternative 4, Sluicing if proper sediment transport does not occur under Alternative 4, Sluicing, causing sediment deposits to develop along the route to the ocean. This would result in need for sediment removal and impacts downstream associated with removal activities.

Alternative 2, Configuration C, will be environmentally inferior to Alternative 6, No Project Alternative due to sediment removal and reservoir management activities.

RECREATION/PUBLIC SERVICES

RECREATION-1 *Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated.*

Alternative 2, Configuration C will not result in the construction of new residences, or facilitate the development of residences, or result in an increase in area population. Therefore, implementation of the Alternative 2, Configuration C will not result in increased use or the physical deterioration associated with increased use for neighborhood or regional parks or other recreational facilities due to any increases in area population.

Sediment Removal Impacts

As with the Proposed Project, under Alternative 2, Configuration C sediment removal will occur over the course of five years. During this, most of the Proposed Project site will be closed to public use from the dam face to the edge of this Alternative's excavation limit boundaries (see Figure 4.5-1). Alternative 2, Configuration C will have a potential impact on recreational opportunities through temporarily restricted access to trails and long-term alteration of the landscape. Maintenance roads within the basin are used by the LACFCD, Southern California Edison (SCE), and the City of Pasadena, among others, for operations and maintenance of Devil's Gate Reservoir and other facilities in the area. The majority of the maintenance roads will be closed during sediment removal; however, these roads are not officially designated for recreational uses and are often not available for unofficial recreation use due to reservoir water levels or maintenance activities.

Designated Recreational Uses

As detailed below, implementation of sediment removal will result in temporarily restricted access to portions of designated trails and indirect impacts to existing recreation uses associated with construction activities. These impacts may increase the use of other area parks and recreational facilities such as those described in Table 3.15-1.

The Oak Grove area of Hahamongna Watershed Park and the associated facilities including Oak Grove Disk Golf Course will remain open during sediment removal and will continue to provide active recreational facilities to the area. Sediment removal activities will not limit the use of the Oak Grove

area of Hahamongna Watershed Park by individuals or by organizations such as the Oak Grove Disc Golf Club, the Rose Bowl Riders, MACH 1, or the Tom Sawyer Camp.

Activities such as hiking, biking, horseback riding, bird watching, and nature walks will be limited to trails located outside the excavation boundary or to trails opened in absence of removal activities. Of the six designated trails in and adjacent to the Proposed Project site, three of these trails, Flint Wash Trail, Gabrielino Trail, and Gould Canyon Trail, will remain open during sediment removal and will continue to provide active recreational facilities to the area. Small portions of the Altadena Crest Trail, Arroyo Seco Trail, and West Rim Trail will either be closed when sediment removal activities are under way and/or are near the trail. A very small portion of the Altadena Crest Trail will be closed during the whole sediment removal phase.

Figure 4.5-5: Alternative 2, Configuration C Impacts to Designated Trails shows the location of the different access conditions during sediment removal. Sediment removal activities associated with this alternative will not limit or block access to the Oak Grove area and many of the designated trails and will not result in direct significant impacts to these facilities; however, use of these facilities may be less desirable due to construction-related emissions, noise, and dust, visual, and traffic impacts associated with sediment removal. These temporary, indirect impacts will reduce the quality of the recreational experience.

Indirect impacts to recreation associated with sediment removal under Alternative 2, Configuration C will be reduced in comparison to the Proposed Project due to the reduction in excavation area and associated sediment removal activities. In addition, approximately 36.44 acres of the approximately 120.42 acres of the Proposed Project site will be left undisturbed. This will include swaths along the west side of the site. These areas of undisturbed vegetation left throughout will serve to screen some of the ongoing recreation uses from the sediment removal activities and associated construction-related emissions, noise, dust, and visual impacts. Recreational users may choose to visit other area parks, recreational facilities, or trails due to the temporary access restrictions or the indirect effects of construction-related activities. Due to the number of other recreational facilities and trails in the vicinity, it is anticipated that these visitors will be dispersed throughout the area and that no single park or facility will experience a substantial increase in use. Therefore, Alternative 2, Configuration C will not increase use of other existing parks or recreation facilities such that substantial physical deterioration of these facilities will occur or be accelerated. Impacts to other existing parks and recreation facilities will be temporary and less than significant. Sediment removal under this Alternative could potentially have a longer duration than the Proposed Project due to the increased amount of sediment to be removed. This longer duration could potentially increase the temporary and less than significant impacts to other existing parks and recreation facilities.

Access Road

Sediment Removal Excavation Limit

Trail & Maintenance Road Closures

- Closed during the full duration of sediment removal
- To remain open during sediment removal
- Closed during sediment removal with possible opening on a seasonal basis
- Temporarily closed while sediment removal is occuring in the area

Figure 4.5-5
Impacts To Designated Trails Map
Alternative 2 - Configuration C

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CHAMBERS GROUP

\\Cgi-gisdata01\gis_data\Projects\20000s\20201 - 20400\20346 Devil's Gate EIR\20346 Figure 4.5-5 Alternative 2, Configuration C Impacts To Designated Trails.mxd

Reservoir Management Impacts

After the annual proposed reservoir management, access to Devil's Gate Reservoir will be similar to existing conditions. Every year the reservoir will be temporarily closed to public access for reservoir management. This will occur during the late summer/early fall over an estimated five-week period, Monday through Friday. The length of time will vary depending on the amount of sediment deposited in the reservoir over the course of the year. The Oak Grove area of Hahamongna Park and most of the designated trails will remain open during reservoir management activities and will continue to provide active recreational facilities to the area. The proposed reservoir management activities will typically occur only during the weekdays; therefore, weekend visitors of the Hahamongna Watershed Park will not be affected by the proposed reservoir management activities. Trails will be beneficially affected in the long-term through the reduction of potential disruption by flooding and/or being buried under sediment. Impacts to existing parks and recreation facilities associated with Alternative 2, Configuration C reservoir management activities will be less than significant. In addition, the reservoir management area under Alternative 2, Configuration C will be much smaller than under either Proposed Project reservoir management option. Since trucking is the only reservoir management method that can be used to clean out the back basin, Alternative 2, Configuration C may contribute more direct impacts to existing parks and recreational facilities during sediment management.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

Alternative 2, Configuration C will not result in any potentially significant impacts associated with increased use of other existing parks or recreation facilities.

Comparison to Proposed Project and Other Alternatives

Alternative 2, Configuration C is considered environmentally superior to the Proposed Project with respect to recreation uses due to the reduction in reservoir management areas and associated activities.

Due to the reduction in reservoir management areas and associated activities, Alternative 2, Configuration C will also be environmentally superior to Alternative 4, Sluicing and Alternative 5, Haul Route Alternative.

Alternative 2, Configuration C will be environmentally inferior to Alternative 1, Configuration B and Alternative 3, Configuration D due to increased sediment removal and reservoir management activities.

Alternative 2, Configuration C will be environmentally superior to Alternative 6, No Project Alternative, as recreational activities will likely be impacted under Alternative 6, No Project Alternative due to continuous sediment deposition.

RECREATION-2 *Require the construction or expansion of existing recreational facilities which might have an adverse physical effect on the environment.*

As discussed in detail above under RECREATION-1, recreational users may choose to visit other area parks, recreational facilities, or trails due to the temporary access restrictions or the indirect effects of

construction-related activities during reservoir management activities. It is anticipated that these visitors will be dispersed throughout the area and that no single park or facility will experience a substantial increase in use. Therefore, Alternative 2, Configuration C will not require the construction or expansion of existing recreational facilities which might have an adverse physical effect on the environment, resulting in a less than significant impact. Sediment removal under this Alternative could potentially have a longer duration than the Proposed Project due to the increased amount of sediment to be removed. This increased duration could potentially increase the temporary and less than significant impact to other existing parks and recreation facilities.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

Alternative 2, Configuration C will not result in any potentially significant impacts associated with the construction or expansion of existing recreational facilities.

Comparison to Proposed Project and Other Alternatives

Alternative 2, Configuration C is considered environmentally superior to the Proposed Project due to the reduction in reservoir management areas and associated activities.

Due to the reduction in sediment removal and reservoir management areas and associated activities, Alternative 2, Configuration C will also be environmentally superior to Alternative 4, Sluicing and Alternative 5, Haul Route Alternative.

Alternative 2, Configuration C will be environmentally inferior to Alternative 1, Configuration B and Alternative 3, Configuration D, due to sediment removal and reservoir management activities.

Alternative 2, Configuration C will be environmentally superior to Alternative 6, No Project Alternative, as recreational activities will likely be impacted under Alternative 6, No Project Alternative due to continuous sediment deposition.

PUBLIC SERVICES-1 *Result in substantial adverse impacts associated with the provision of or need for new or physically altered recreational facilities, the construction of which could cause significant environmental impacts.*

As discussed in detail above under RECREATION-2, Alternative 2, Configuration C will not result in a substantial increase in use of any one park or facility. Therefore, Alternative 2, Configuration C will not require the provision of or need for new or physically altered recreational facilities, the construction of which could cause significant environmental impacts.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

Alternative 2, Configuration C will not result in any potentially significant impacts associated with the construction or expansion of existing recreational facilities.

Comparison to Proposed Project and Other Alternatives

Alternative 2, Configuration C is considered environmentally superior to the Proposed Project due to the reduction in reservoir management areas and associated activities.

Due to the reduction in reservoir management areas and associated activities, Alternative 2, Configuration C will also be environmentally superior to Alternative 4, Sluicing and Alternative 5, Haul Route Alternative.

Alternative 2, Configuration C will be environmentally inferior to Alternative 1, Configuration B and Alternative 3, Configuration D due to sediment removal and reservoir management activities.

Alternative 2, Configuration C will be environmentally superior to Alternative 6, No Project Alternative, as recreational activities will likely be impacted under Alternative 6, No Project Alternative due to continuous sediment deposition.

TRANSPORTATION & TRAFFIC

TRANSPORTATION-1 *Conflict with an applicable plan, ordinance, or policy establishing measure of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit.*

Sediment Removal

Truck traffic associated with the Alternative 2, Configuration C is expected to adhere to traffic regulations; however, during sediment removal, Alternative 2, Configuration C truck traffic is expected to impact traffic LOS on the existing roadway network. Potential impacts regarding existing LOS are discussed under TRANSPORTATION-2 below. This increase in traffic would result in temporary significant impacts to the efficiency of the circulation system. Implementation of Mitigation Measures MM TRA-1 and TRA-2 would reduce this temporary impact but not to a level of less than significant.

Sediment removal and associated transportation under this Alternative could potentially have a longer duration than the Proposed Project due to the greater amount of sediment to be removed. Other potential impact reduction measures discussed under TRANSPORTATION-2, below, could reduce impacts to less than significant. These measures cannot be legally imposed by the LACFCD, however, since the locations are under the jurisdiction of other agencies. Every reasonable effort will be made to coordinate with and receive approval from the jurisdictional agencies to implement the impact reduction measures but LACFCD cannot guarantee that the measures will be implemented. Therefore, this temporary impact could remain potentially significant.

Reservoir Management

Truck traffic associated with reservoir management is not expected to adversely affect traffic LOS on the existing roadway network. Therefore, impacts to the efficiency of the circulation system would be less than significant.

Mitigation Measures

MM TRA-1: Proposed Project haul trucks will not deliver to the Vulcan Material Reliance Facility during the PM peak period.

MM TRA-2: Proposed Project haul trucks will not deliver to the Boulevard Pit during the PM peak period.

Residual Impacts after Mitigation

Potentially significant traffic impacts associated with the sediment removal phase would be temporary, expected to occur during the drier months (from April to December, except on holidays), and would cease at the end of the sediment removal phase. Implementation of the mitigation measures described above would reduce impacts to traffic and circulation but not to a level of less than significant. Other potential impact reduction measures discussed under TRANSPORTATION-2, below, could reduce impacts to less than significant. These measures cannot be legally imposed by the LACFCD, however, since the locations are under the jurisdiction of other agencies. Every reasonable effort will be made to coordinate with and receive approval from the jurisdictional agencies to implement the impact reduction measures but LACFCD cannot guarantee that the measures will be implemented. Therefore, this temporary impact could remain potentially significant. No significant traffic impacts would occur under reservoir management.

Comparison to Proposed Project and Other Alternatives

Alternative 2, Configuration C is considered environmentally inferior to the Proposed Project due to the greater amount of sediment removal and the trucking necessary for reservoir management.

Due to the increase in reservoir management volumes, Alternative 2, Configuration C will be environmentally inferior to Alternative 1, Configuration B; Alternative 3, Configuration D and Alternative 5, Haul Route Alternative.

Alternative 2, Configuration C will be environmentally inferior to Alternative 5, Haul Route Alternative as the Alternative 5, Haul Route Alternative will result in reduced traffic impacts.

Alternative 2, Configuration C will be initially environmentally inferior to Alternative 4, Sluicing due to hauling sediment and vegetation from the reservoir. This Alternative will potentially be environmentally superior to Alternative 4, Sluicing if proper sediment transport does not occur under Alternative 4, Sluicing, causing sediment deposits to develop along the route to the ocean. This would result in need for sediment removal from the Arroyo Seco Channel, the Los Angeles River, or the Port of Long Beach and impacts to transportation associated with removal activities.

Alternative 2, Configuration C will be environmentally inferior to Alternative 6, No Project Alternative, due to sediment removal and reservoir management activities.

TRANSPORTATION-2 *Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways.*

Sediment Removal

As with the Proposed Project, Alternative 2, Configuration C will not significantly impact freeway segments and freeway on- and off-ramps but will significantly impact the following intersections:

- Berkshire Place and I-210 eastbound ramps during the AM peak period;
- Irwindale Avenue/Foothill Boulevard intersection during the PM peak hour;
- Figueroa St/Scholl Canyon Road and SR-134 westbound ramps during the AM and PM peak hours;
- Glenoaks Boulevard/Osborne Street intersection during the AM and PM peak hours;
- Sheldon Street and San Fernando Road intersection during the PM peak hour; and
- Branford Street and San Fernando Road intersection during the PM peak hour.

In order to reduce the impacts to the Berkshire Place and I-210 eastbound ramps intersection during the AM peak period, sediment removal trucks would have to use an alternative route during this period. This alternative route would involve as follows: Loaded trucks will exit the reservoir on the improved, existing westerly access road, turning left onto southbound Oak Grove Drive, then right onto westbound Windsor Avenue, and then east onto I-210 east, to disposal sites in Azusa and Irwindale or I-210 west to the Sun Valley disposal sites.

Under this route all the intersections are anticipated to continue to operate at an LOS C or better for all utilized intersections for the AM Peak Period; however, use of this alternative route would require implementation of the following potential impact reduction measure:

- Proposed Project haul trucks would avoid using the Berkshire Place and I-210 eastbound ramps intersection during the AM peak period by instead using the Windsor/Arroyo and I-210 ramps. This would require the median on Oak Grove Drive to be restriped to a Two Way Left Turn Lane (TWLTL). The changes to Oak Grove Drive would require the approval of the City of Pasadena.

The impact reduction measure discussed above cannot be legally imposed by the LACFCD since the location is under the jurisdiction of the City of Pasadena. Every reasonable effort will be made to coordinate with and receive approval to implement this impact reduction measure; however, LACFCD cannot guarantee that this impact reduction measure will be implemented. Therefore this temporary impact would remain potentially significant.

The Irwindale Avenue/Foothill Boulevard intersection is anticipated to operate at an unacceptable LOS during the PM peak hour, resulting in a temporary significant impact. Mitigation Measure MM TRA-1 would reduce the impact to the Irwindale Avenue/Foothill Boulevard intersection to less than significant.

The Figueroa St/Scholl Canyon Road and SR-134 westbound ramps intersection is anticipated to operate at an unacceptable LOS during the AM and PM peak hours, resulting in a temporary significant impact. Reducing this impact to less than significant would require implementation of the following potential impact reduction measure:

- Figueroa Street/Scholl Canyon Road and SR-134 westbound ramps: Restripe the westbound right turn lane to a shared left-right turn lane and the northbound through lane to a shared through-right turn lane. The northbound direction will include a shared through-right turn lane and a right turn lane. The southbound direction will include a shared through-left turn lane and a through turn lane. The westbound direction will include a left turn lane and a shared left-right turn lane. This impact reduction measure will require the approval of the City of Los Angeles and Caltrans.

Implementation of the impact reduction measure discussed above would reduce the impact to the Figueroa St/Scholl Canyon Road and SR-134 westbound ramps intersection to less than significant. This impact reduction measure cannot be legally imposed by the LACFCD. Every reasonable effort will be made to coordinate with and receive approval to implement the impact reduction measure; however, LACFCD cannot guarantee that the measure will be implemented therefore this temporary impact could remain significant.

The Glenoaks Boulevard and Osborne Street intersection is anticipated to operate at an unacceptable LOS during the AM and PM peak hours, resulting in a temporary significant impact.

The Sheldon Street and San Fernando Road intersection and the Branford Street and San Fernando Road intersection are anticipated to operate at an unacceptable LOS during the PM peak hour, resulting in temporary significant impacts. Mitigation Measure MM TRA-2 would reduce the impacts to less than significant.

Reservoir Management

The reservoir management associated with Alternative 2, Configuration C would require periodic management activities at the Devil's Gate Reservoir. Depending on storm events, sediment excavation/trucking offsite may be required over a period of a few weeks annually. Daily truck traffic is expected to be half the amount that will occur during sediment removal. Due to the limited time period and the reduced truck traffic, reservoir management activities are not expected to adversely affect traffic level of service on the existing roadway network. Therefore, impacts would be less than significant.

Mitigation Measures

See Mitigation Measures MM TRA-1 and MM TRA-2.

Residual Impacts After Mitigation

Potentially significant traffic impacts associated with the sediment removal phase would be temporary, expected to occur during the drier months (from April to December, except on holidays), and would cease at the end of the sediment removal phase. Implementation of the mitigation measures described above would reduce some but not all of the impacts to traffic and circulation to a level less than significant. Other potential impact reduction measures discussed above could reduce impacts to less

than significant. These measures cannot be legally imposed by the LACFCD, however, since the locations are under the jurisdiction of other agencies. Every reasonable effort will be made to coordinate with and receive approval from the jurisdictional agencies to implement the impact reduction measures but LACFCD cannot guarantee that the measures will be implemented. Therefore, these temporary impacts could remain potentially significant. No significant traffic impacts would occur under reservoir management.

Comparison to Proposed Project and Other Alternatives

Alternative 2, Configuration C is considered environmentally inferior to the Proposed Project due to the increase in sediment removal and reservoir management volumes.

Due to the increase in sediment removal and reservoir management volumes, Alternative 2, Configuration C will also be environmentally inferior to Alternative 1, Configuration B and Alternative 3, Configuration D.

Alternative 2, Configuration C will be environmentally inferior to Alternative 5, Haul Route Alternative as the Alternative 5, Haul Route Alternative will result in reduced traffic impacts.

Alternative 2, Configuration C will be initially environmentally inferior to Alternative 4, Sluicing due to hauling sediment and vegetation from the reservoir. This Alternative will potentially be environmentally superior to Alternative 4, Sluicing if proper sediment transport does not occur under Alternative 4, Sluicing, causing sediment deposits to develop along the route to the ocean. This would result in need for sediment removal from the Arroyo Seco Channel, the Los Angeles River, or the Port of Long Beach and impacts to transportation associated with removal activities.

Alternative 2, Configuration C will be environmentally inferior to Alternative 6, No Project Alternative, due to sediment removal and reservoir management activities.

TRANSPORTATION-3 *Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).*

Sediment Removal

Implementation of Alternative 2, Configuration C may include impact reduction measures described above that would require modifications to the existing roadway network. These modifications would consist of roadway restriping to reduce potential traffic impacts to a level less than significant. These changes would not alter existing roadway use and would be implemented consistently with all applicable traffic safety standards. Alternative 2, Configuration C is limited to excavation and transportation of sediment that has accumulated in Devil's Gate Reservoir and would not introduce any new uses that would be incompatible or substantially increase hazards with the existing roadway system. Therefore, impacts related to traffic hazards would be less than significant.

Reservoir Management

The reservoir management associated with Alternative 2, Configuration C would not require any modifications to the existing roadway network and would not introduce any new uses that would be incompatible with the existing roadway system. Therefore, no impact would occur.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

Impacts will be less than significant.

Comparison to Proposed Project and Other Alternatives

Alternative 2, Configuration C is considered neither environmentally superior nor inferior to the Proposed Project or any of the other alternatives as it would not introduce any new uses that would be incompatible with the existing roadway system.

TRANSPORTATION-4 *Result in inadequate emergency access.*

Sediment Removal/Reservoir Management

Alternative 2, Configuration C would not sever or otherwise block access to any existing roadways. No equipment staging will occur on public roadways during construction of the Proposed Project. The impact to emergency access would be a less than significant impact.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

Impacts will be less than significant.

Comparison to Proposed Project and Other Alternatives

Alternative 2, Configuration C is considered neither environmentally superior nor inferior to the Proposed Project or any other alternative except for Alternative 6, No Project Alternative.

Alternative 2, Configuration C will be environmentally superior to Alternative 6, No Project Alternative as the No Project Alternative will severely restrict flood control, potentially increasing flooding downstream of Devil's Gate Dam.

TRANSPORTATION-5 *Conflict with adopted policies, plans, or programs regarding public transit or bicycle or pedestrian facilities or otherwise decrease the performance or safety of such facilities supporting alternative transportation (e.g., bus turnouts, bicycle racks).*

Sediment Removal

Alternative 2, Configuration C would be confined to the roadway network described in Section 3.16.2 and would not adversely affect alternative modes of public transportation such as light rail. Implementation of Alternative 2, Configuration C would not require closure of any bus stops or disrupt any existing bus routes. The degrading of LOS at intersections, freeway segments, and freeway on- and

off-ramps described above under TRANSPORTATION-2 could affect buses using the existing roadway network. This would be a temporary potentially significant impact.

Reservoir Management

The reservoir management associated with Alternative 2, Configuration C would require periodic management activities at Devil's Gate Reservoir that would not adversely affect traffic level of service on the existing roadway network that could delay bus services. Therefore, reservoir management impacts would be less than significant.

Mitigation Measures

See Mitigation Measures MM TRA-1 and MM TRA-2.

Residual Impacts After Mitigation

Potentially significant traffic impacts associated with the sediment removal phase would be temporary, expected to occur during the drier months (from April to December, except on holidays), and would cease at the end of the sediment removal phase. Implementation of the mitigation measures described above would reduce some but not all of the impacts to traffic and circulation to a level less than significant. Other potential impact reduction measures discussed above could reduce impacts to less than significant. These measures cannot be legally imposed by the LACFCD, however, since the locations are under the jurisdiction of other agencies. Every reasonable effort will be made to coordinate with and receive approval from the jurisdictional agencies to implement the impact reduction measures but LACFCD cannot guarantee that the measures will be implemented. Therefore, these temporary impacts could remain potentially significant. No significant traffic impacts would occur under reservoir management.

Comparison to Proposed Project and Other Alternatives

Alternative 2, Configuration C is considered environmentally inferior to the Proposed Project due to the increase in sediment removal and reservoir management volumes.

Due to the increase in sediment removal and reservoir management volumes, Alternative 2, Configuration C will also be environmentally inferior to Alternative 1, Configuration B and Alternative 3, Configuration D.

Alternative 2, Configuration C will be environmentally inferior to Alternative 5, Haul Route Alternative as the Alternative 5, Haul Route Alternative will result in reduced traffic impacts.

Alternative 2, Configuration C will be initially environmentally inferior to Alternative 4, Sluicing due to hauling sediment and vegetation from the reservoir. This Alternative will potentially be environmentally superior to Alternative 4, Sluicing if proper sediment transport does not occur under Alternative 4, Sluicing, causing sediment deposits to develop along the route to the ocean. This would result in need for sediment removal from the Arroyo Seco Channel, the Los Angeles River, or the Port of Long Beach and impacts to transportation associated with removal activities.

Alternative 2, Configuration C will be environmentally inferior to Alternative 6, No Project Alternative due to sediment removal and reservoir management activities.

UTILITIES & SERVICE SYSTEMS

UTILITIES-1 *Require or result in construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects.*

Sediment Removal

As with the Proposed Project, Alternative 2, Configuration C will not result in or require the construction of new or expansion of existing stormwater drainage systems during sediment removal. Sediment and vegetation removal operations will result in alterations of surface drainage characteristics at the project site due to clearing, grading, and excavation activities. Although the drainage characteristics for the site will be altered, the project overall will result in a positive impact to drainage of Devil's Gate Reservoir because it will help restore the flood control capacity of Devil's Gate Dam and Reservoir. As with the Proposed Project, Alternative 2, Configuration C will add minimal impermeable surface area to the Proposed Project site through paving a portion of the access roads from Oak Grove Drive. This minimal increase in impervious surface area will not result in any significant increase in stormwater runoff that will require new stormwater drainage facilities.

In addition, these activities will not directly involve the existing storm drain outfalls, power lines, gas line, communication lines, water lines, sewer lines, or water wells. Impacts to these utility facilities will be avoided through compliance with City regulations regarding utility facilities, coordination with utility providers, and implementation of LACDPW BMPs.

Reservoir Management

During reservoir management, Alternative 2, Configuration C will not result in or require the construction of new or expansion of existing stormwater drainage systems. Sediment that accumulates at the front of the reservoir after the proposed removal will be removed through FAST operations or through mechanical excavation, and sediment accumulated at the back basin will be removed through trucking. The FAST operations are expected to be similar to historic FAST operations, and sediment fines discharged through FAST operations will be transported during storm flows to the Pacific Ocean via Arroyo Seco and the Los Angeles River. No impacts to stormwater facilities are expected during FAST operations. Any necessary mechanical removal during reservoir management is expected to be small (typically 13,000 cy per year). Impacts to stormwater facilities during mechanical removal will be avoided through compliance with City regulations regarding stormwater facilities and implementation of LACDPW BMPs.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

Alternative 2, Configuration C will not result in any potentially significant impacts to utility facilities.

Comparison to Proposed Project and Other Alternatives

Alternative 2, Configuration C is considered neither environmentally superior nor inferior to the Proposed Project or to any of the other alternatives.

4.5.4 Conclusion and Relationship to Project Objectives

Alternative 2, Configuration C will meet the Proposed Project's objectives of satisfactorily reducing flooding risk, creating a configuration suitable for routine operations and maintenance, reducing the possibility of plugging at the dam face, removing sediment from Johnson Field, removing sediment in a timely manner, and delivering sediment to facilities already prepared to accept sediment.

Alternative 2, Configuration C is considered environmentally inferior to the Proposed Project due to increased impacts associated with sediment removal and reservoir management due to a larger volume of sediment removal. Alternative 2, Configuration C is considered environmentally superior to the Proposed Project with impacts associated with Aesthetics, Biology, and Land Use and Planning.

Due to the increase in sediment removal and reservoir management areas, Alternative 2, Configuration C will also be environmentally inferior to Alternative 1, Configuration B and Alternative 3, Configuration D.

Alternative 2, Configuration C is considered environmentally superior to Alternative 5, Haul Route Alternative due to reduced impacts associated with sediment removal and reservoir management. Alternative2, Configuration C will be environmentally inferior to Alternative 5, Haul Route Alternative with impacts associated with traffic.

Alternative 2, Configuration C will be initially environmentally inferior to Alternative 4, Sluicing due to hauling sediment and vegetation from the reservoir. This Alternative will potentially be environmentally superior to Alternative 4, Sluicing if proper sediment transport does not occur under Alternative 4, Sluicing, causing sediment deposits to develop along the route to the ocean. This would result in need for sediment removal from the Arroyo Seco Channel, the Los Angeles River, or the Port of Long Beach and impacts associated with removal activities.

Alternative 2, Configuration C will be environmentally inferior to Alternative 6, No Project, due to sediment removal and reservoir management activities; but aesthetics, biological resources, and recreation resources of the reservoir will likely degrade under Alternative 6, No Project Alternative due to continuous sediment deposition.

4.6 ALTERNATIVE 3, CONFIGURATION D

4.6.1 Alternative Description

Alternative 3, Configuration D, Option 1

Sediment Removal

Alternative 3, Configuration D, Option 1 excavation activities will remove approximately 2.4 million cy of current excess sediment in the reservoir in addition to any additional sediment received during the project.

Excavation/Reservoir Configuration

Specific excavation limits and reservoir configuration for Alternative 3, Configuration D, Option 1 are shown in Figure 4.6-1: Alternative 3, Configuration D, Option 1 Sediment Removal and Reservoir

Management Areas. As shown in Figure 4.6-1, the basin will be excavated to an elevation of approximately 985 feet at the face of the dam, sloping up to a 995-foot elevation where the basin splits and narrows into two excavation branches. Both branches slope up to a 1,040-foot elevation, at which point the western branch ends and the eastern branch widens and continues to slope up to a 1,060-foot elevation at approximately 4,700 feet north of the dam. The final configuration will involve approximately 76 acres of the reservoir. Additionally, this alternative will include removal of sediment stockpiled as part of the IMP at Johnson Field. Excavation will not involve the Oak Grove area of Hahamongna Park, the area of the reservoir outside the excavation limits shown in Figure 4.6-1, or the City of Pasadena's spreading grounds on the east side of the basin.

Alternative 3, Configuration D, Option 2

Sediment Removal

Alternative 3, Configuration D, Option 2 excavation activities will remove approximately 2.4 million cy of current excess sediment in the reservoir in addition to any additional sediment received during the project.

Excavation/Reservoir Configuration

Specific excavation limits and reservoir configuration for Alternative 3, Configuration D, Option2 are shown in Figure 4.6-2: Alternative 3, Configuration D, Option 2 Sediment Removal and Reservoir Management Areas. As shown in Figure 4.6-2, the basin will be excavated to an elevation of approximately 985 feet at the face of the dam, sloping up to a 995-foot elevation where the basin narrows into one excavation branch. The branch, which is in the eastern portion of the reservoir, slopes up to a 1,060-foot elevation at approximately 4,700 feet north of the dam. The final configuration will involve approximately 70 acres of the reservoir. Additionally, this alternative will include removal of sediment stockpiled at Johnson Field as part of the IMP. Excavation will not involve the Oak Grove area of Hahamongna Park, the area of the reservoir outside the excavation limits shown in Figure 4.6-2, or the City of Pasadena's spreading grounds on the east side of the basin.

Removal Method

In order to excavate sediment from the reservoir, trees and vegetation growing within the excavation areas or where haul roads are located will need to be removed. In the areas where excavation will not take place, including between the two excavation branches, vegetation will not be removed. To facilitate storm flows, a slightly steeper gradient than used with the Proposed Project will be used on the excavation branches.

The accumulated sediment will be excavated within the limits shown in Figure 4.6-1 for Alternative 3, Configuration D, Option1 and shown in Figure 4.6-2 for Alternative 3, Configuration D, Option 2. The excavation will be accomplished using the same removal method as the Proposed Project. Construction equipment will include but not be limited to approximately four front loaders with 4-yard buckets, two bulldozers, one excavator, one grader, one water truck, and two tender trucks. Vegetation and organic debris will be separated from the sediment. Coarse material may need to be processed through sorters and crushers to be hauled offsite. Depending on the moisture content of the sediment removed, the sediment may need to be stockpiled to allow it to dry. If drying is required, stockpiling of the sediment will occur onsite within the excavation limits in Devil's Gate Reservoir.

Sediment Disposal

Under Alternative 3, Configuration D, excavated sediment will be trucked offsite to the same disposal sites as the Proposed Project. These sites will include the primary disposal site locations, the Waste Management Facility in Azusa, the Vulcan Materials Reliance Facility in Irwindale, and/or the Manning SPS located in Irwindale east of the Proposed Project site; or a secondary facility located in Sun Valley west of the Proposed Project site (Sheldon Pit, Sun Valley Fill Site, Bradley Landfill, and/or Boulevard Pit). As with the Proposed Project, it is estimated that the eastern disposal sites will be used from 80 to 100 percent of the time. Use of the Sun Valley sites is estimated to occur from 0 to 20 percent of the time. Removed vegetation and organic debris will be hauled to Scholl Canyon Landfill, located in the City of Glendale.

Sediment Disposal Truck Routes

Alternative 3, Configuration D will use the same sediment disposal truck routes as the Proposed Project and as shown in Figures 2.5-2, 2.5-3, 2.5-4, Proposed Project Haul Routes.

Project Schedule

As with the Proposed Project, sediment removal under Alternative 3, Configuration D will occur between Summer 2015 and Summer 2020; however, sediment removal under this Alternative could potentially have a shorter duration than the Proposed Project due to the reduced amount of sediment to be removed. Excavation and associated activities within the reservoir area are expected to take place during drier months, from April to December, Monday through Saturday (except on holidays), as weather permits. During dry years, work could potentially start earlier and/or continue later. Alternative 3, Configuration D sediment removal activities will take place Monday through Friday between 7:00 a.m. and 6:00 p.m. Standard Time and between 7:00 a.m. and 7:00 p.m. Daylight Savings Time and on Saturday between 8:00 a.m. and 5:00 p.m. Reservoir management activities will take place under the same hours Monday through Friday, with no activities on Saturday.

Reservoir Management

Alternative 3, Configuration D will manage sediment in a method similar to the Proposed Project to reduce buildup of sediment in the reservoir management area and eliminate or substantially reduce the occurrence of another large-scale sediment removal project in the future.

The reservoir will be maintained with the approximate reservoir management cut and elevation levels shown as the green shaded area in Figure 4.6-1 for Option 1 and Figure 4.6-2 for Option 2. This will include the eastern branch and a portion of the upstream and downstream ends of the western branch every year for total reservoir management acreage of approximately 50.78 acres for Option 1 and 52.57 acres for Option 2. The access roads will be maintained to provide proper road width for access.

Vegetation Maintenance

Vegetation within the reservoir management area of the reservoir will be mowed or removed and grubbed annually. These activities will occur Monday through Friday over an estimated three-week period in the late summer or early fall. All vegetation and sediment outside the reservoir management footprint will be allowed to re-establish and/or remain in place. This will include the majority of the western branch and the undisturbed area between the two branches.

FAST Operations

During FAST operations, reservoir inflows from rain events will naturally pass sediment through the reservoir and downstream of the dam. These FAST operations will occur during the winter storm season and will not require mechanical agitation or assistance. FAST operations will reduce sediment accumulation in the reservoir and help maintain flood control capacity. The amount of sediment that will be transported through FAST operations is limited by the smaller sediment grain size that can be moved by the storm runoff received into the reservoir and the subsequent quantities of storm runoff received.

It is anticipated that the majority of these FAST operations will be similar to historic FAST operations and that similar volumes of sediment will pass through the reservoir and into the Arroyo Seco.

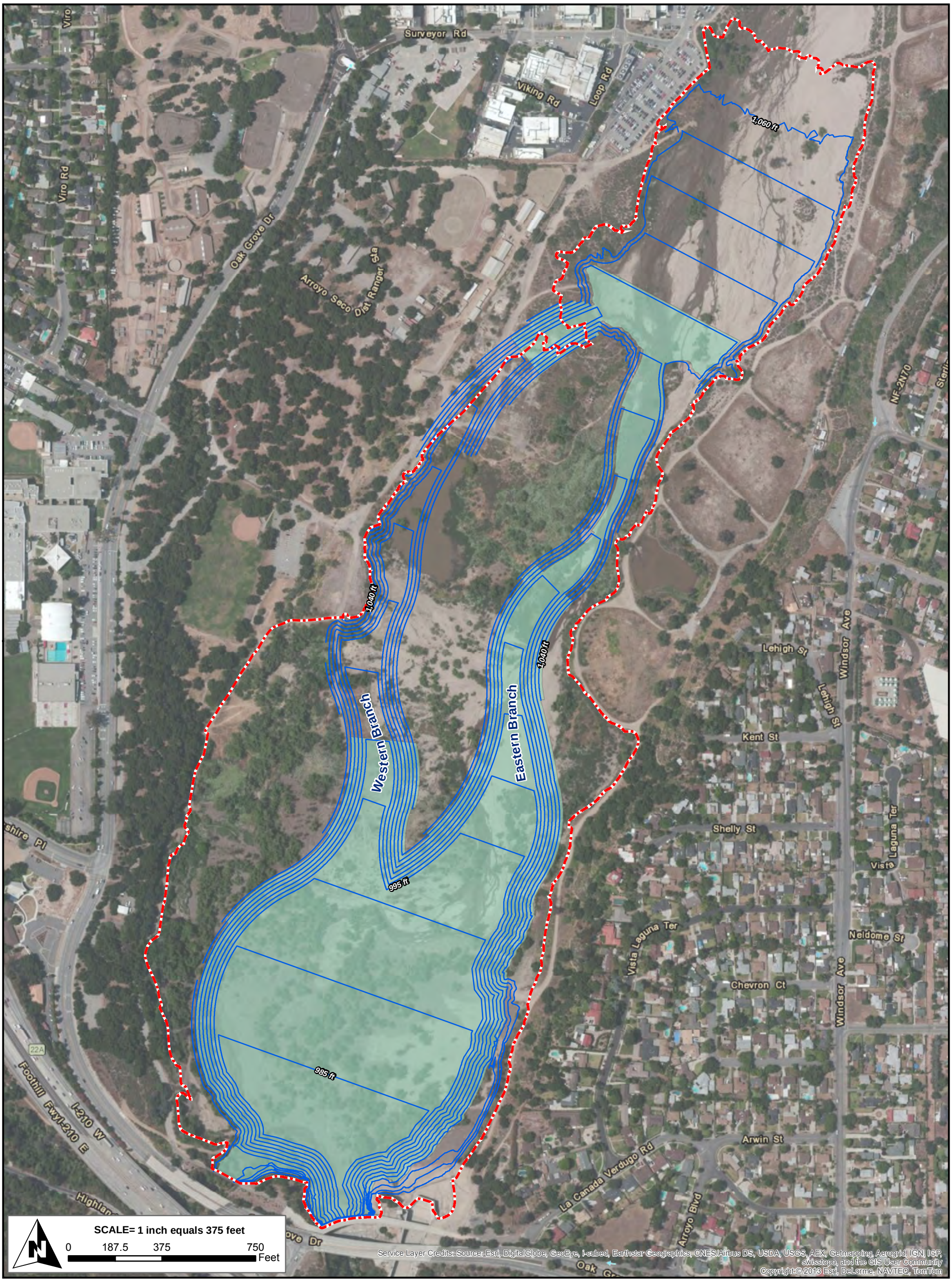
Sediment Excavation/Trucking Offsite

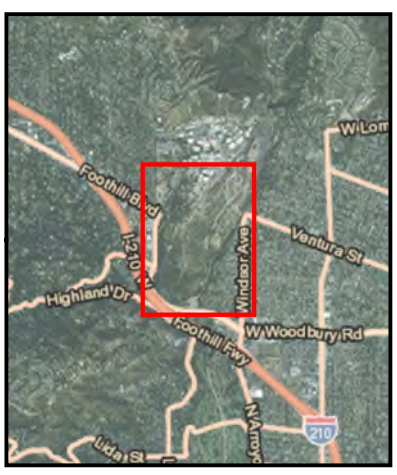
Minor grading at the upstream end of the branches will be performed annually to direct flows into and through the branches to keep sediment moving towards and through the dam. As with sediment removal, a slightly steeper gradient than that used for the Proposed Project will be used on the branches to facilitate this movement. This grading will serve an additional benefit by allowing the direction of recession flows to go towards the stream of the west branch.

Depending on the efficiency of the FAST operations, some mechanical excavation and trucking offsite may be required to remove accumulated sediment. Sediment excavation/trucking offsite during reservoir management will use the same methods and trucking routes as the sediment removal activities. The accumulated sediment will be excavated with construction equipment, including but not limited to approximately two front loaders with 4-yard buckets, one bulldozer, one excavator, one grader, one water truck, and two tender trucks (for fuel and maintenance). Vegetation and organic debris will be separated from the sediment. The need for future sediment removal will depend on future storm activity and associated sediment accumulation.

As with the Proposed Project, it is estimated, based on past storm events, that sediment excavation/trucking offsite will be required to remove typically 13,000 cy of sediment annually. Based on an estimated removal of 4,800 cy per day, it is expected this will occur over an estimated two-week period, working Monday through Friday. This sediment excavation activity will take place during the late summer/early fall following the vegetation maintenance.

Moderately large sediment deposits have the potential to occur during a storm season with very intense rainfall or following a significant wildfire within the watershed. Such events are expected to occur very infrequently. It is anticipated that even with this type of event the newly deposited sediment could be removed in one season. A moderately large sediment removal event, anticipated to involve approximately 170,000 cy, could take place over an estimated 12-week period during the late summer and early fall following the vegetation maintenance.





Proposed Project Boundary

Reservoir Management Area

Sediment Removal Excavation Contours

Figure 4.6-1
Sediment Removal & Reservoir Management Areas Map

Alternative 3 - Configuration D, Option 1

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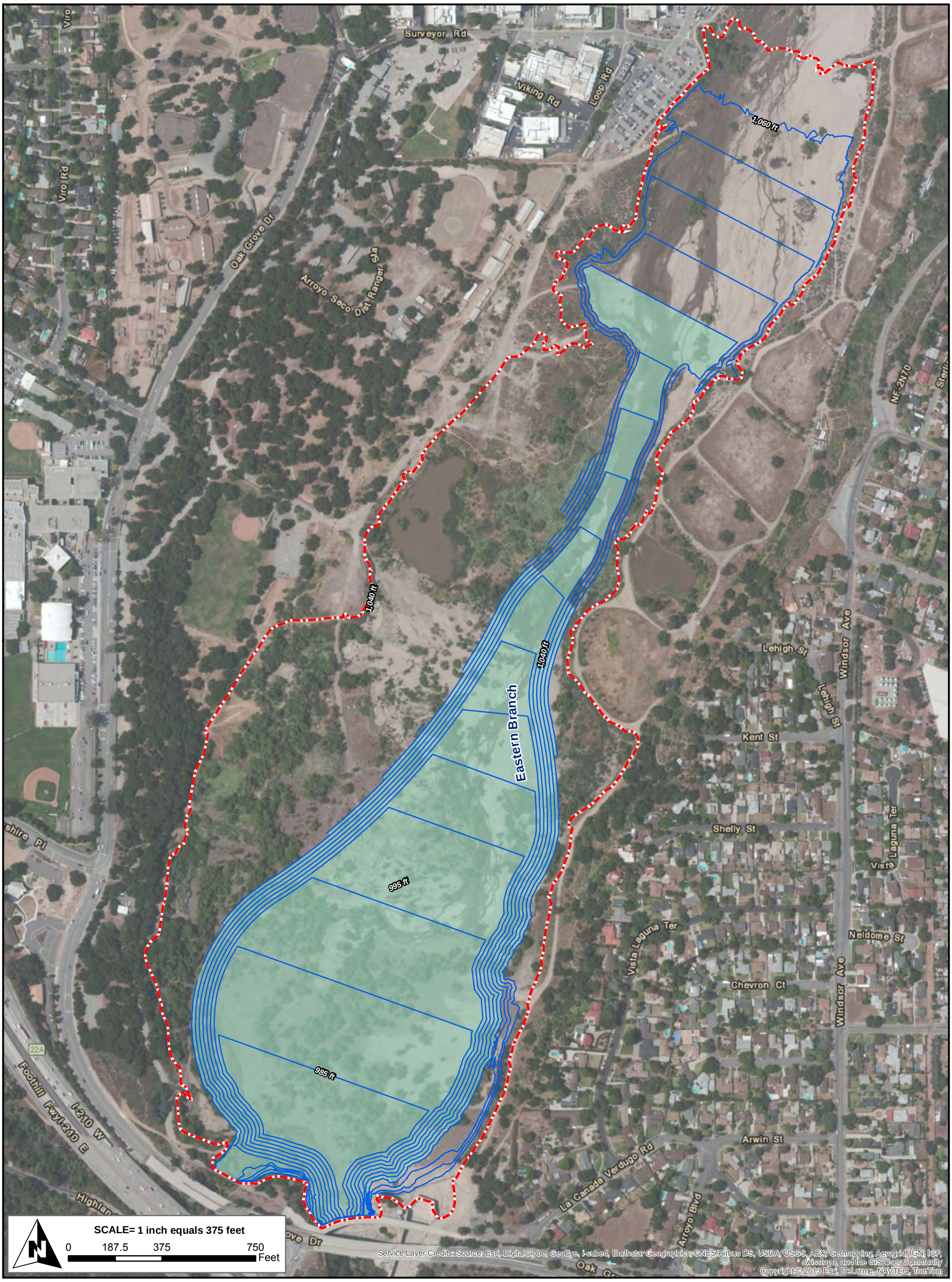
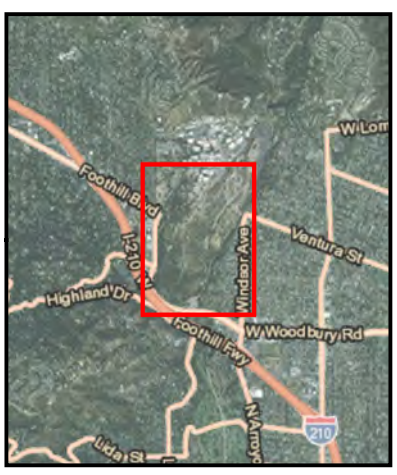
\\cgi-gisdata01\GIS_DATA\Projects\20000s\20201 - 20400\20346 Devil's Gate EIR\20346 Figure 4.6-1 Alternative 3, Configuration D1 Sediment Removal and Management Areas.mxd





Proposed Project Boundary

Sediment Removal Excavation Contours

Reservoir Management Area

Figure 4.6-2
Sediment Removal & Reservoir Management Areas Map

Alternative 3 - Configuration D, Option 2

Version Date: 8/20/2014

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\\cgi-gisdata01\GIS_DATA\Projects\20000s\20201 - 20400\20346 Devil's Gate EIR\20346 Figure 4.6-2 Alternative 3, Configuration D2 Sediment Removal and Management Areas.mxd

4.6.2 Alternative Duration

A large-scale sediment removal project will be required if a significant amount of sediment accumulates in the reservoir or outside the maintenance footprint despite the reservoir management activities. This is not anticipated for a period of over two decades unless major fires and subsequent intense storms occur within the watershed. Sediment outside the maintenance footprint will be monitored to determine if the sediment buildup is exceeding projected volumes. If future reservoir conditions threaten dam operations, LACFCD will initiate the planning process for a new large-scale sediment removal project. Part of this planning will involve utilizing the CEQA process to evaluate and determine the appropriate level of environmental document required for the future project.

4.6.3 Impacts Analysis and Comparison to Proposed Project

AESTHETICS

AESTHETICS-1 *Have a substantially adverse effect on a scenic vista.*

Sediment Removal

Summaries of the potential visual changes to representative viewpoints, shown on Figure 3.4-4: Devil's Gate Proposed Viewpoints, are described below and also in Table 4.6-1: Visual Analysis – Sediment Removal Visual Change. The potential impacts to representative viewpoints are summarized in Table 4.6-2: Sediment Removal Visual Impact Significance.

Sediment removal activities associated with Alternative 3, Configuration D will change the visual characteristics of the reservoir through the removal of sediment and associated vegetation in the reservoir. These changes will be similar to the Proposed Project at the south end of the reservoir; however, these changes will be reduced in magnitude in comparison to the Proposed Project, as Alternative 3, Configuration D, Option 1 will leave a greater area along the west and east sides of the reservoir and the area between the two branches undisturbed. Alternative 3, Configuration D, Option 2 changes will be reduced in magnitude in comparison to the Proposed Project, as Alternative 3, Configuration D, Option 2 will leave a greater area along the east side and a large, contiguous area on the west side of the reservoir undisturbed.

As with the Proposed Project, sediment removal activities associated with Alternative 3, Configuration D, Option 1 and Alternative 3 Configuration D, Option 2 will not result in obstruction or blockage of views due to the large difference in elevation between viewpoints and the Proposed Project site.

Construction equipment will be visible in the basin. Views of construction equipment will be expected elements in the viewshed due to the ongoing IMP measures currently underway to keep debris from plugging the outlet works; however, the amount of equipment and duration onsite will be greater for the Alternative than for the IMP measures.

Table 4.6-1: Visual Analysis – Sediment Removal Visual Change

Viewpoint No. (Location, pole, etc.)	Viewpoint		Visual Change				
	Location	Direction Facing	Type of Visual Change	Visual Contrast	Project Dominance	View Blockage	Overall Visual Change
View 1	Bench near the west side of the dam (near La Cañada Verdugo Road)	East	Area of vegetation and soil removal reduced in comparison to the Proposed Project. Under Option 1, large swaths of existing vegetation and topography will remain in the center and on the east and west sides of the Proposed Project site. Under Option 2, large swaths of existing vegetation and topography will remain on the east and west sides of the Proposed Project site. Removal activities will occur seasonally over a five-year timeframe.	Moderate-High	Moderate	Low	Moderate
View 2	Top of dam	North	Area of vegetation and soil removal reduced in comparison to the Proposed Project. Under Option 1, large swaths of existing vegetation and topography will remain in the center and on the east and west sides of the Proposed Project site. Under Option 2, large swaths of existing vegetation and topography will remain on the east and west sides of the Proposed Project site. Removal activities will occur seasonally over a five-year timeframe.	Moderate-High	High	Low	Moderate-High
View 3	East of dam near trail	West	Area of vegetation and soil removal reduced in comparison to the Proposed Project. Under Option 1, large swaths of existing vegetation and topography will remain in the center and on the east and west sides of the Proposed Project site. Under Option 2, large swaths of existing vegetation and topography will remain on the east and west sides of the Proposed Project site. Removal activities will occur seasonally over a five-year timeframe.	Moderate-High	Moderate	Low	Moderate
View 4	Normandy Court	North	Area of vegetation and soil removal reduced in comparison to the Proposed Project. Under Option 1, large swaths of existing vegetation and topography will remain in the center and on the east and west sides of the Proposed Project site. Under Option 2, large swaths of existing vegetation and topography will remain on the east and west sides of the Proposed Project site. Removal activities will occur seasonally over a five-year timeframe.	Moderate-High	Moderate	Low	Moderate
View 5	Windsor Parking Lot	Southwest	Area of vegetation and soil removal reduced in comparison to the Proposed Project. Under Option 1, large swaths of existing vegetation and topography will remain in the center and on the east and west sides of the Proposed Project site. Under Option 2, large swaths of existing vegetation and topography will remain on the east and west sides of the Proposed Project site. Removal activities will occur seasonally over a five-year timeframe.	Moderate	Moderate	Low	Moderate

With sediment removal under Alternative 3, Configuration D, Option 1, the topography of the reservoir will be lower, especially at the south end of the reservoir and within the two branches. Vegetation within the excavation limits will be removed. With sediment removal under Alternative 3, Configuration D, Option 2, the topography of the reservoir will be lower, especially at the south end of the reservoir and within the branch located in the eastern portion of the reservoir. These elements will result in a high degree of contrast from existing visual characteristics and will result in a potentially significant impact to scenic vistas. These contrasting elements will be highly visible for Viewpoints 1 through 3. For Viewpoints 1 and 3, however, the co-dominant features of Devil's Gate Dam, the reservoir maintenance roads, electrical lines, the debris boom line, and other less dominant features of the San Gabriel Mountains, Oak Grove Drive, JPL facilities, and residential areas will remain unchanged. In addition, for Alternative 3, Configuration D, Option 1, the existing vegetation along the west and east sides of the reservoir and the area between the two branches will not be removed and will share dominance with the dam and the excavation area. For Alternative 3, Configuration D, Option 2, the existing vegetation along the east side of the reservoir and a large, contiguous area in the western portion of the reservoir adjacent to the east branch will not be removed and will share dominance with the dam and the excavation area.

Sediment removal activities will also be visible from Viewpoint 4and Viewpoint 5 but will be less dominant due to distance and other more dominant visual elements. The dominant features for Viewpoint 4 (I-210, Devil's Gate Dam, San Gabriel Mountains, the west and east sides of the reservoir, the area between the two branches) and Viewpoint 5 (spreading grounds, JPL facilities), will remain unchanged.

As with the Proposed Project, excavation and associated activities within the reservoir area are expected to take place during drier months, from April to December, as weather permits. During the wetter months, changes to the visual characteristics associated with sediment removal will be slightly less apparent when water is stored in the basin. Some regrowth of riparian vegetation will likely occur during this time. Both of these factors will reduce the change in the visual characteristics associated with sediment removal. In addition, as discussed above, sediment removal activities will not introduce view-obstructing features.

Table 4.6-2: Sediment Removal Visual Impact Significance

Viewpoint	Overall Visual Sensitivity	Overall Visual Change	Impact Significance
View 1	Moderate-High	Moderate	Potentially Significant
View 2	Moderate-High	Moderate-High	Potentially Significant
View 3	Moderate-High	Moderate	Potentially Significant
View 4	Moderate-High	Moderate	Potentially Significant
View 5	Moderate-High	Moderate	Potentially Significant

Nevertheless, due to the multi-year duration of the sediment removal phase under Alternative 3, Configuration D, the large-scale alteration, visibility of the site, and level of viewer sensitivity, sediment removal activities will be a potentially significant impact to scenic vistas. While the sediment removal associated with Alternative 3, Configuration D will result in a potentially significant impact to scenic vistas, the degree of contrast will be reduced in comparison to the Proposed Project due to the reduction in excavation area and associated sediment removal activities.

Reservoir Management

Summaries of the potential visual changes to representative viewpoints are described below and also in Table 4.6-3: Visual Analysis – Reservoir Management Visual Change. The potential impacts to representative viewpoints are summarized in Table 4.6-4: Reservoir Management Visual Impact Significance.

Visual simulations were created for Viewpoints 1 through 4 to portray the expected conditions under reservoir management for this Alternative (see Figure 4.6-3, Figure 4.6-4, Figure 4.6-5, Figure 4.6-6, and Figure 4.6-7). Visual simulations were not created for Viewpoint 5 due to dominance of other visual elements (spreading grounds, JPL facilities). As with the Proposed Project, reservoir management will not result in obstruction or blockage of views. Construction equipment will also be visible in the basin but only for short periods of time.

After completion of the proposed sediment removal activities associated with Alternative 3, Configuration D, the disturbed areas outside the reservoir management area are expected to experience natural regrowth with native vegetation, primarily Riparian Herbaceous vegetation. The area available for regrowth will be greater for this alternative than for either reservoir management option under the Proposed Project. Under Alternative 3, Configuration D**,** Option 1, approximately 25.21 acres of previously disturbed area will have natural vegetation regrowth; and 50.78 acres of vegetation will be maintained annually. In addition, 44.43 acres that were not disturbed during sediment removal will remain undisturbed. Under Alternative 3, Configuration D, Option 2, approximately 18.43 acres of previously disturbed area will have natural vegetation regrowth; and 52.57 acres of vegetation will be maintained annually. In addition, 49.42 acres that were not disturbed during sediment removal will remain undisturbed. In contrast, under the Proposed Project's reservoir management Option 1, approximately 120.42 acres of vegetation will be maintained annually. Under the Proposed Project's reservoir management Option 2, 33.97 acres of previously disturbed area will have natural vegetation regrowth and 91.28 acres of vegetation will be maintained annually.

Table 4.6-3: Visual Analysis – Reservoir Management Visual Change

Viewpoint No. (Location, pole, etc.)	Viewpoint			Visual Change				
	Location	Direction Facing	Figure No.	Type of Visual Change	Visual Contrast	Project Dominance	View Blockage	Overall Visual Change
View 1	Bench near the west side of the dam (near La Cañada Verdugo Road)	East	4.6-2	Views of natural regrowth of native vegetation in the majority of the reservoir. Trees on border of maintenance area expected to be dominant features.	Low	Low	Low	Low
View 2	Top of dam	North	4.6-3	Views of natural regrowth of native vegetation in the majority of the reservoir. Trees on border of maintenance area expected to be dominant features.	Low	Low – Moderate	Low	Low
View 3	East of dam near trail	West	4.6-4	Views of natural regrowth of native vegetation in the majority of the reservoir. Trees on border of maintenance area expected to be dominant features.	Low	Low	Low	Low

Table 4.6-3: Visual Analysis – Reservoir Management Visual Change

Viewpoint No. (Location, pole, etc.)	Viewpoint			Visual Change				
	Location	Direction Facing	Figure No.	Type of Visual Change	Visual Contrast	Project Dominance	View Blockage	Overall Visual Change
View 4	Normandy Court	North	4.6-5	Views of natural regrowth of native vegetation in the majority of the reservoir. Trees on border of maintenance area expected to be dominant features.	Low	Low	Low	Low
View 5	Windsor Parking Lot	Southwest	NA	Views of natural regrowth of native vegetation in the majority of the reservoir. Trees on border of maintenance area expected to be dominant features.	Low	Low	Low	Low

Legend

- Proposed Project Boundary
- Proposed Project Viewpoint

Figure 4.6-3
Devil's Gate Reservoir Sediment Removal and Management Project
Alternative 3, Configuration D, Option 1 Viewpoint 1 Reservoir Management Conditions

Version Date: 8/20/2014

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Legend

- Proposed Project Boundary
- Proposed Project Viewpoint

Figure 4.6-4
Devil's Gate Reservoir Sediment Removal and Management Project
Alternative 3, Configuration D, Option 1 Viewpoint 2 Reservoir Management Conditions

Version Date: 8/20/2014

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Legend

- Proposed Project Boundary
- Proposed Project Viewpoint

Figure 4.6-5
Devil's Gate Reservoir Sediment Removal and Management Project
Alternative 3, Configuration D, Option 1 Viewpoint 3 Reservoir Management Conditions

Version Date: 8/20/2014

CHAMBERS GROUP

Legend

- Proposed Project Boundary
- Proposed Project Viewpoint

Figure 4.6-6
Devil's Gate Reservoir Sediment Removal and Management Project
Alternative 3, Configuration D, Option 1 Viewpoint 4 Reservoir Management Conditions

Version Date: 8/20/2014

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Legend

- Proposed Project Boundary
- Proposed Project Viewpoint

Figure 4.6-7
Devil's Gate Reservoir Sediment Removal and Management Project
Alternative 3, Configuration D, Option 2 Viewpoint 4 Reservoir Management Conditions

Version Date: 8/20/2014

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Table 4.6-4: Reservoir Management Visual Impact Significance

Viewpoint	Overall Visual Sensitivity	Overall Visual Change	Impact Significance
View 1	Low	Low	Less than Significant
View 2	Low	Low	Less than Significant
View 3	Low	Low	Less than Significant
View 4	Low	Low	Less than Significant
View 5	Low	Low	Less than Significant

As described above, the majority of the reservoir will be allowed to naturally grow and/or remain in place; and the trees on the border of the reservoir management area are expected to become dominant features within the reservoir (see Figures 4.6-3 through 4.6-7). Therefore, reservoir management under Alternative 3, Configuration D will result in a lower degree of contrast than seen during sediment removal and will result in a less than significant impact to scenic vistas. In addition, any contrast associated with this Alternative will be reduced in comparison to either reservoir management option under the Proposed Project due to the reduction in reservoir management area and associated reservoir management activities.

Mitigation Measures

No feasible mitigation measures were identified for sediment removal. No mitigation is necessary for reservoir management. For reservoir management, the less than significant impacts will be further reduced through the implementation of Mitigation Measures MM BIO-6, MM BIO-7, and MM BIO-8.

Residual Impacts After Mitigation

Due to the multi-year duration of the sediment removal phase, the large-scale alteration, visibility of the site, the level of viewer sensitivity, and the lack of feasible mitigation measures, impacts to scenic vistas from sediment removal activities will remain potentially significant.

Reservoir management impacts to scenic vistas will result in a lower degree of contrast than seen during sediment removal and will result in a less than significant impact to scenic vistas.

Comparison to Proposed Project and Other Alternatives

Alternative 3, Configuration D is considered environmentally superior to the Proposed Project with respect to impacts on scenic vistas due to the reduction in sediment removal and reservoir management areas and associated activities.

Due to the reduction in sediment removal and reservoir management areas and associated activities, Alternative 3, Configuration D will also be environmentally superior to Alternative 1, Configuration B; Alternative 2, Configuration C; Alternative 4, Sluicing; and Alternative 5, Haul Route Alternative.

Alternative 3, Configuration D will be environmentally superior to Alternative 6, No Project Alternative, as views of the reservoir will likely degrade under Alternative 6, No Project Alternative due to continuous sediment deposition.

AESTHETICS-2 *Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway.*

Sediment Removal/Reservoir Management

As with the Proposed Project, Alternative 3, Configuration D will not involve damage to rock outcroppings or historic buildings but will involve removal of vegetation, including native and non-native trees from the site, though to a lesser degree than the Proposed Project. The Proposed Project site is not visible from the only designated state scenic highway in the vicinity of the Proposed Project site, SR-2. Therefore, implementation of this alternative will not damage scenic resources within the viewshed of a designated state scenic highway.

I-210, located to the south of the Proposed Project site, is identified as "Eligible" in the State Scenic Highway Program. Alternative 3, Configuration D will impact the existing visual character of a portion of the viewshed through the removal of vegetation, including native and non-native trees from the site. This impact to visual character of a portion of the viewshed will be reduced in comparison to the Proposed Project due to the reduction in sediment removal and reservoir management areas and associated activities. In addition, views of the Proposed Project site from I-210 are very brief in nature (visibility for approximately 0.3 mile) and are dominated by views of the JPL facilities and San Gabriel Mountains. Implementation of Alternative 3, Configuration D will not obstruct views of these features. Therefore, impacts to scenic resources within this eligible but not designated state scenic highway will be less than significant.

Mitigation Measures

No mitigation is necessary.

Residual Impacts After Mitigation Measure

The Proposed Project site is not visible from any designated state scenic highway and is only briefly visible from an eligible state scenic highway; therefore, impacts related to state scenic highways from sediment removal and reservoir management are less than significant.

Comparison to Proposed Project and Other Alternatives

Alternative 3, Configuration D is considered environmentally superior to the Proposed Project with respect to impacts related to state scenic highways from sediment removal and reservoir management, due to the reduction in sediment removal and reservoir management areas and associated activities.

Due to the reduction in sediment removal and reservoir management areas and associated activities, Alternative 3, Configuration D will also be environmentally superior to Alternative 1, Configuration B; Alternative 2, Configuration C; Alternative 4, Sluicing; and Alternative 5, Haul Route Alternative.

Alternative 3, Configuration D will be environmentally superior to Alternative 6, No Project Alternative, as views of the reservoir will likely degrade under Alternative 6, No Project Alternative due to continuous sediment deposition.

AESTHETICS-3 *Substantially degrade the existing visual character or quality of the site and its surroundings.*

Sediment Removal

As described above under AESTHETICS-1, the proposed sediment removal activities associated with Alternative 3, Configuration D will change the visual characteristics of the existing Proposed Project site through the removal of sediment and associated vegetation in the reservoir.

Disturbed landscape areas, both man-made and natural, are currently found throughout the basin. The amount and distribution of these areas change on a regular basis and are expected visual elements in the Proposed Project site landscape. Construction equipment will also be visible in the basin. Views of construction equipment will be expected elements in the viewshed, due to the ongoing IMP measures currently underway to keep debris from plugging the outlet works; however, the amount of equipment and duration onsite will be greater for the Alternative than for the IMP measures.

Sediment and debris management are considered existing operational components of Devil's Gate Reservoir and are not considered potentially significant impacts to the visual characteristics of the site (City of Pasadena 2002). During the sediment removal phase of Alternative 3, Configuration D the disturbed areas will, in large, replace the vegetated areas, resulting in a high degree of contrast between existing and sediment removal conditions. While the open character of the site will remain, the overall visual quality of the Proposed Project site will be lower due to the large-scale alteration and decrease of desirable elements.

Excavation and associated activities within the reservoir area are expected to take place during drier months, from April to December, as weather permits. During the wetter months, temporary changes to the visual characteristics of the Proposed Project site will be slightly less apparent with water storage in the basin. Some regrowth of riparian vegetation is also likely to occur during this time. Both of these factors will reduce the temporary change in the visual characteristics associated with sediment removal. Due to the multi-year duration of the sediment removal phase, the large-scale alteration, visibility of the site, and level of viewer sensitivity, sediment removal activities will be a potentially significant impact to the visual character of the Proposed Project site.

Although the sediment removal associated with this alternative will result in a potentially significant impact to the visual character of the Proposed Project site, the degree of contrast will be reduced in comparison to the Proposed Project due to the reduction in excavation area and associated sediment removal activities. In addition for Alternative 3, Configuration D, Option1, approximately 44.43 acres of the approximately 120.42 acres of the Proposed Project site will be left undisturbed. This will include swaths along the west and east sides of the site and in the center of the site between the two branches. For Alternative 3, Configuration D, Option2, approximately 49.42 acres of the approximately 120.42 acres of the Proposed Project site will be left undisturbed. This will include a large swath along the east side of the reservoir and a large, contiguous area in the western portion of the reservoir adjacent to the east branch. With areas of undisturbed vegetation left throughout, the site will more closely resemble the mix of disturbed and vegetated areas found under existing conditions than with the Proposed Project.

Reservoir Management

As with the Proposed Project, construction equipment will also be visible in the basin but only for short periods of time. After completion of the proposed sediment removal activities associated with Alternative 3, Configuration D, the disturbed areas outside the reservoir management area are expected to experience natural regrowth with native vegetation, primarily Riparian Herbaceous vegetation. Reservoir management under this alternative will result in a lower degree of contrast than seen during sediment removal and will result in a less than significant impact to visual character. The majority of the reservoir will be allowed to naturally grow and/or remain in place, and the trees on the border of the reservoir management area are expected to become dominant features within the reservoir. As described previously, the area requiring vegetation maintenance will be smaller than for either reservoir management option under the Proposed Project. In addition, any contrast associated with this Alternative will be reduced in comparison to either reservoir management option under the Proposed Project due to the reduction in reservoir management area and associated reservoir management activities.

Mitigation Measures

No feasible mitigation measures were identified for sediment removal. No mitigation is necessary for reservoir management. For reservoir management, the less than significant impacts will be further reduced through the implementation of Mitigation Measures MM BIO-6, MM BIO-7, and MM BIO-8.

Residual Impacts After Mitigation

Due to the multi-year duration of the sediment removal phase, the large-scale alteration, visibility of the site, the level of viewer sensitivity, and the lack of feasible mitigation, impacts to visual character from sediment removal activities will remain potentially significant.

Reservoir management impacts to visual character will result in a lower degree of contrast than seen during sediment removal and will result in a less than significant impact to visual character.

Comparison to Proposed Project and Other Alternatives

Alternative 3, Configuration D is considered environmentally superior to the Proposed Project with respect to impacts to visual character due to the reduction in sediment removal and reservoir management areas and associated activities.

Due to the reduction in sediment removal and reservoir management areas and associated activities, Alternative 3, Configuration D will also be environmentally superior to Alternative 1, Configuration B; Alternative 2, Configuration C; Alternative 4, Sluicing; and Alternative 5, Haul Route Alternative.

Alternative 3, Configuration D will be environmentally superior to Alternative 6, No Project Alternative, as views of the reservoir will likely degrade under Alternative 6, No Project Alternative due to continuous sediment deposition.

AIR QUALITY

AIR QUALITY- 1 *Conflict with or obstruct implementation of the applicable air quality plan.*

Sediment Removal/Reservoir Management

Typically, assessments for air quality plan consistency use four criteria for determining project consistency with the current AQMP. The first and second criteria are from the SCAQMD. According to the SCAQMD, two key criterion of AQMP consistency are: (1) whether the project will not result in an increase in the frequency or severity of existing air quality violations or cause or contribute to new violations, or delay timely attainment of air quality standards or the interim emission reductions specified in the AQMP; and (2) whether the project will exceed the assumptions in the AQMP based on the year of project build-out and phase (SCAQMD 2006). The third criterion is compliance with the control measures in the AQMP. The fourth criterion is compliance with the SCAQMD regional thresholds.

As with the Proposed Project (see Section 3.5.6), Alternative 3, Configuration D will be consistent with the second through fourth criteria but will not be consistent with the first criterion. This is due to emissions of NO_X exceeding the Daily Regional Threshold during sediment removal, resulting in a potentially significant impact. Implementation of Mitigation Measures MM AQ-1 and MM AQ-2 will result in a reduction of Alternative 3, Configuration D's combined NO_X emissions during sediment removal. Therefore, impacts during sediment removal will be less than significant. This impact will be reduced in comparison to the Proposed Project due to the reduction in excavation area and associated sediment removal activities.

As with the Proposed Project, reservoir management for Alternative 3, Configuration D will not exceed any standard and will result in less than significant impacts.

Mitigation Measures

> **MM AQ-1**: LACFCD shall require all construction contractors during the sediment removal phase of the Proposed Project to use only sediment removal dump trucks that meet EPA's emission standards for Model Year 2007 or later.
>
> **MM AQ-2**: LACFCD shall require all construction contractors during the sediment removal phase of the Proposed Project to use off-road equipment that meets, at a minimum, EPA's emission standards for Tier 3 equipment.

Residual Impacts After Mitigation

Implementation of these mitigations would reduce the combined NO_X emissions of Alternative 3, Configuration D during the sediment removal phase to a level of less than significant.

Reservoir management activities will not violate an air quality standard or contribute substantially to an existing or projected air quality violation; therefore, during reservoir management Alternative 3, Configuration D will be consistent with the first indicator. No significant impact would occur.

Comparison to Proposed Project and Other Alternatives

Alternative 3, Configuration D is considered environmentally superior to the Proposed Project with respect to impacts to air quality plans due to the reduction in sediment removal and reservoir management areas and associated activities.

Due to the reduction in sediment removal and reservoir management areas and associated activities, Alternative 3, Configuration D will also be environmentally superior to Alternative 1, Configuration B; Alternative 2, Configuration C; and Alternative 5, Haul Route Alternative.

Alternative 3, Configuration D will be initially environmentally inferior to Alternative 4, Sluicing due to hauling sediment and vegetation from the reservoir. This Alternative will potentially be environmentally superior to Alternative 4, Sluicing if proper sediment transport does not occur under Alternative 4, Sluicing, causing sediment deposits to develop along the route to the ocean. This would result in need for sediment removal from the Arroyo Seco Channel, the Los Angeles River, or the Port of Long Beach and air quality impacts associated with removal activities.

Alternative 3, Configuration D will be environmentally inferior to Alternative 6, No Project Alternative, due to sediment removal and reservoir management activities.

AIR QUALITY-2 *Violate an air quality standard or contribute substantially to an existing or project air quality violation.*

As with the Proposed Project, under Alternative 3, Configuration D emissions of NO_X exceed the Daily Regional Threshold during sediment removal, resulting in a potentially significant impact. Implementation of Mitigation Measures MM AQ-1 and MM AQ-2 will result in a reduction of the combined NO_X emissions of Alternative 3, Configuration D during sediment removal. Implementation of these mitigations would reduce the Proposed Project's combined NO_X emissions during the sediment removal phase to a level of less than significant. This impact will be reduced in comparison to the Proposed Project due to the reduction in excavation area and associated sediment removal activities.

As with the Proposed Project, reservoir management for Alternative 3, Configuration D will not exceed any standard and will result in less than significant impacts.

Mitigation Measures

See Mitigation Measures MM AQ-1 and MM AQ-2.

Residual Impacts After Mitigation

Sediment removal will not exceed any standard SCAQMD Regional Threshold except for combined NO_X emissions. Implementation of these mitigations would reduce the combined NO_X emissions of Alternative 3, Configuration D during the sediment removal phase to a level of less than significant.

Reservoir management will not exceed any standard SCAQMD Regional Threshold; therefore, this impact will be less than significant.

Comparison to Proposed Project and Other Alternatives

Alternative 3, Configuration D is considered environmentally superior to the Proposed Project with respect to impacts to air quality standards due to the reduction in sediment removal and reservoir management areas and associated activities.

Due to the reduction in sediment removal and reservoir management areas and associated activities, Alternative 3, Configuration D will also be environmentally superior to: Alternative 1, Configuration B; Alternative 2, Configuration C; and Alternative 5, Haul Route Alternative.

Alternative 3, Configuration D will be initially environmentally inferior to Alternative 4, Sluicing due to hauling sediment and vegetation from the reservoir. This Alternative will potentially be environmentally superior to Alternative 4, Sluicing if proper sediment transport does not occur under Alternative 4, Sluicing, causing sediment deposits to develop along the route to the ocean. This would result in need for sediment removal from the Arroyo Seco Channel, the Los Angeles River, or the Port of Long Beach and air quality impacts associated with removal activities.

Alternative 3, Configuration D will be environmentally inferior to Alternative 6, No Project Alternative, due to sediment removal and reservoir management activities.

AIR QUALITY-3 *Result in a cumulatively considerable net increase of any criteria pollutants for which the project region is nonattainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors).*

Sediment Removal/Reservoir Management

Air Quality Plans

As discussed previously, emissions of NO_X from Alternative 3, Configuration D are expected to exceed the SCAQMD regional significance thresholds during sediment removal. This exceedance will not be consistent with air quality management plans and therefore will result in a significant cumulative impact. This impact will be reduced in comparison to the Proposed Project due to the reduction in excavation area and associated sediment removal activities.

Emissions of VOC, NO_X, PM_{10}, and $PM_{2.5}$ are not expected to exceed the SCAQMD regional significance thresholds during reservoir management. The SCAQMD considers construction-related emissions that do not exceed the project-specific thresholds will not result in a cumulative impact.

Cumulative Health Impacts

As with the Proposed Project, Alternative 3, Configuration D with Mitigation Measures MM AQ-1 and MM AQ-2, significance threshold would not be exceeded for emissions of particulate matter and CO; and no significance threshold would be exceeded during reservoir management under either option. Implementation of Mitigation Measures MM AQ-1 and MM AQ-2 will result in a reduction of NO_X emissions and will reduce the NO_X emissions to a level of less than significant for the sediment removal phase.

Mitigation Measures

See Mitigation Measures MM AQ-1 and MM AQ-2.

Residual Impacts After Mitigation

Sediment removal will not exceed any localized significance threshold except for combined NO_X emissions. Implementation of these mitigations would reduce the combined NO_X emissions of Alternative 3, Configuration D during the sediment removal phase to a level of less than significant.

Reservoir management will not exceed any localized significance threshold; therefore, this impact will be less than significant.

Comparison to Proposed Project and Other Alternatives

Alternative 3, Configuration D is considered environmentally superior to the Proposed Project with respect to impacts to cumulative health due to the reduction in sediment removal and reservoir management areas and associated activities.

Due to the reduction in sediment removal and reservoir management areas and associated activities, Alternative 3, Configuration D will also be environmentally superior to: Alternative 1, Configuration B; Alternative 2, Configuration C; and Alternative 5, Haul Route Alternative.

Alternative 3, Configuration D will be initially environmentally inferior to Alternative 4, Sluicing due to hauling sediment and vegetation from the reservoir. This Alternative will potentially be environmentally superior to Alternative 4, Sluicing if proper sediment transport does not occur under Alternative 4, Sluicing, causing sediment deposits to develop along the route to the ocean. This would result in need for sediment removal from the Arroyo Seco Channel, the Los Angeles River, or the Port of Long Beach and air quality impacts associated with removal activities.

Alternative 3, Configuration D will be environmentally inferior to Alternative 6, No Project Alternative, due to sediment removal and reservoir management activities.

AIR QUALITY-4 *Expose sensitive receptors to substantial pollutant concentrations.*

Sediment Removal/Reservoir Management

<u>Localized Significance Thresholds</u>

As with the Proposed Project, the onsite emissions for Alternative 3, Configuration D for sediment removal and reservoir management activities will not exceed LST thresholds.

<u>Carbon Monoxide Hotspot</u>

As with the Proposed Project, the CO Hotspot analysis for Alternative 3, Configuration D shows no exceedance of the State or federal CO standard; and no significant impact is expected during sediment removal or management.

Carcinogenic Or Toxic Contaminants

As with the Proposed Project, all routes modeled for Alternative 3, Configuration D resulted in less than significant non-cancer risk from diesel emissions created by the Alternative.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

Impacts will be less than significant.

Comparison to Proposed Project and Other Alternatives

Alternative 3, Configuration D is considered environmentally superior to the Proposed Project with respect to impacts to sensitive receptors to substantial pollutant concentrations due to the reduction in sediment removal and reservoir management areas and associated activities.

Due to the reduction in sediment removal and reservoir management areas and associated activities, Alternative 3, Configuration D will also be environmentally superior to Alternative 1, Configuration B; Alternative 2, Configuration C; and Alternative 5, Haul Route Alternative.

Alternative 3, Configuration D will be initially environmentally inferior to Alternative 4, Sluicing due to hauling sediment and vegetation from the reservoir. This Alternative will potentially be environmentally superior to Alternative 4, Sluicing if proper sediment transport does not occur under Alternative 4, Sluicing, causing sediment deposits to develop along the route to the ocean. This would result in need for sediment removal from the Arroyo Seco Channel, the Los Angeles River, or the Port of Long Beach and air quality impacts associated with removal activities.

Alternative 3, Configuration D will be environmentally inferior to Alternative 6, No Project Alternative, due to sediment removal and reservoir management activities.

AIR QUALITY-5 *Create objectionable odors affecting a substantial number of people.*

Sediment Removal/Reservoir Management

The CEQA Guidelines indicate that a potentially significant impact would occur if the Proposed Project would create objectionable odors affecting a substantial number of people.

As with the Proposed Project, diesel exhaust will be emitted from equipment during the sediment removal process for Alternative 3, Configuration D, which is an objectionable odor to some; however, concentrations will disperse rapidly from the Project site (OB-1 2013); therefore impacts will be less than significant.

Mitigation Measures

No mitigation measures are necessary.

Residual Impacts After Mitigation

Alternative 3, Configuration D is not expected to produce objectionable odors beyond the Proposed Project site under sediment removal or either reservoir management option; therefore this impact will be less than significant.

Comparison to Proposed Project and Other Alternatives

Alternative 3, Configuration D is considered neither environmentally superior nor inferior to the Proposed Project with respect to impacts to objectionable odors.

Alternative 3, Configuration D will also be neither environmentally superior nor inferior to Alternative 1, Configuration B; Alternative 2, Configuration C; Alternative 4, Sluicing; and Alternative 5, Haul Route Alternative.

Alternative 3, Configuration D will be environmentally inferior to Alternative 6, No Project Alternative, due to sediment removal and reservoir management activities.

BIOLOGICAL RESOURCES

BIOLOGY-1 *Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or the U.S. Fish and Wildlife Service.*

Sediment Removal

As shown in Figure 4.6-8: Alternative 3, Configuration D, Option 1 Sediment Removal Vegetation Communities Impacts and Figure 4.6-9: Alternative 3, Configuration D, Option 2 Sediment Removal Vegetation Communities Impacts, and Table 4.6-5: Alternative 3, Configuration D, Sediment Removal Impacts to Vegetation Communities, potential impacts to vegetation communities will be reduced in comparison to the Proposed Project due to the reduction in area disturbed during excavation and associated sediment removal activities.

Sensitive Plants

No listed or otherwise sensitive plant species were observed on the Proposed Project site. Therefore, as with the Proposed Project, Alternative 3, Configuration D is not expected to have a substantial adverse effect on any plant species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations or by CDFW or USFWS.

Table 4.6-5: Alternative 3, Configuration D, Sediment Removal Impacts to Vegetation Communities

Vegetation Communities	Estimated Acres of Vegetation Removed During Sediment Removal		
	Proposed Project	Alternative 3 Configuration D, Option 1	Alternative 3 Configuration D, Option 2
Riversidean Alluvial Fan Sage Scrub	1.1	0.4	0.4
California Sagebrush – California Buckwheat Scrub	3.1	2.1	0.9
Scoured	26.5	21.0	22.6
Escaped Cultivars	0.4	0.2	0.2
Riparian Woodland	51.4	28.9	29.8
Mustard and Annual Brome Semi-Natural Herbaceous Stand	22.8	14.8	12.1
Mule Fat Thickets	11.1	6.1	3.7
Disturbed	1.9	2.0	1.1

Sensitive Wildlife

The Proposed Project site contains habitat and/or potential habitat for five special status species: least Bell's vireo, yellow warbler, southwestern pond turtle, coast range newt, and two-striped garter snake. Least Bell's vireo, yellow warbler, coast range newt, and two-striped garter snake have all been observed on the Proposed Project site. The southwestern pond turtle has not been observed on the Proposed Project site. If it did occur, habitat for this species would be largely limited to ponded areas.

Of the approximately 120.42 acres that will be disturbed under the Proposed Project, approximately 44.43 acres, or 36 percent, will be left undisturbed under Alternative 3, Configuration D, Option 1. These undisturbed areas will include swaths along the west and east sides of the site and in the center of the site between the two branches. These undisturbed areas include potential habitat for the five special status species.

As shown in Figure 4.6-8 and Table 4.6-3, potential impacts to sensitive wildlife will be reduced in comparison to the Proposed Project due to the reduction in habitat disturbed during sediment removal activities. Disturbance of habitat for the least Bell's vireo within Riparian Woodland and Mule Fat Thickets communities will be reduced by approximately 22.5 acres (44 percent) and 5.0 acres (54 percent), respectively, as compared to the Proposed Project.

Disturbance of habitat for the yellow warbler within the Riparian Woodland community will be reduced by approximately 22.54 acres (44 percent), as compared to the Proposed Project.

Of the approximately 120.42 acres that will be disturbed under the Proposed Project, approximately 50.42 acres, or 42 percent, will be left undisturbed under Alternative 3, Configuration D, Option 2. These undisturbed areas will include a swath along the east side of the site and a large, contiguous area in the

western portion of the reservoir west of the proposed excavation. These undisturbed areas include potential habitat for the six special status species.

As shown in Figure 4.6-8 and Table 4.6-3, potential impacts to sensitive wildlife will be reduced in comparison to the Proposed Project due to the reduction in habitat disturbed during sediment removal activities. Disturbance of habitat for the least Bell's vireo within Riparian Woodland and Mule Fat Thickets communities will be reduced by approximately 21.6 acres (42 percent) and 7.6 acres (82 percent), respectively, as compared to the Proposed Project.

Disturbance of habitat for the yellow warbler within the Riparian Woodland community will be reduced by approximately 21.6 acres (42 percent), as compared to the Proposed Project.

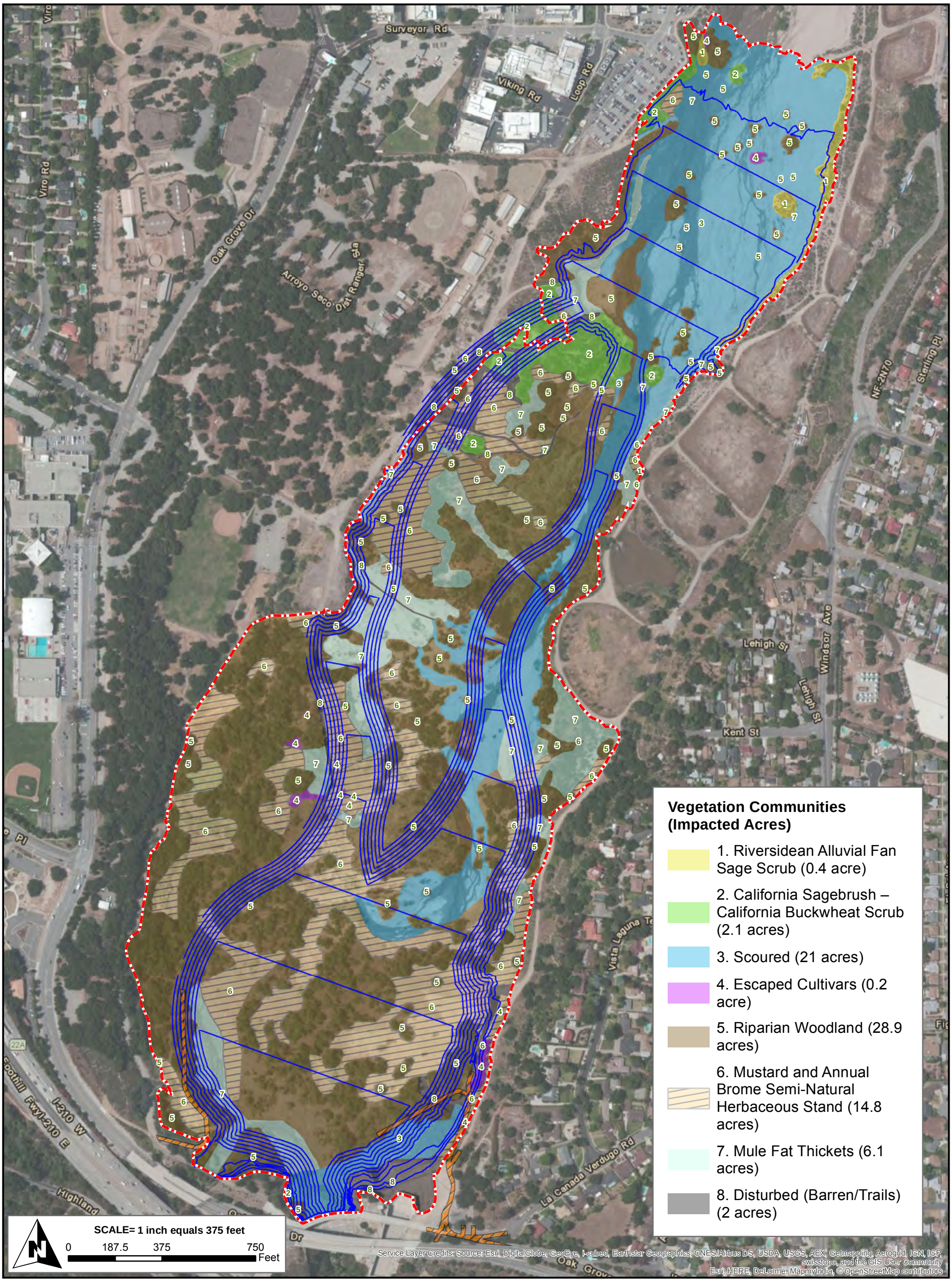
Habitat for the coast range newt, the southwestern pond turtle, and the two-striped garter snake occurs within streams and seasonal ponds found on the Proposed Project site. The amount of this habitat that will be available will depend upon where sediment accumulates and the amount of flows, rainfall, and runoff. Under Alternative 3, Configuration D, disturbance of habitat for the coast range newt, the southwestern pond turtle, and the two-striped garter snake is expected to be reduced in comparison to the Proposed Project due to the reduction in habitat disturbed during sediment removal activities.

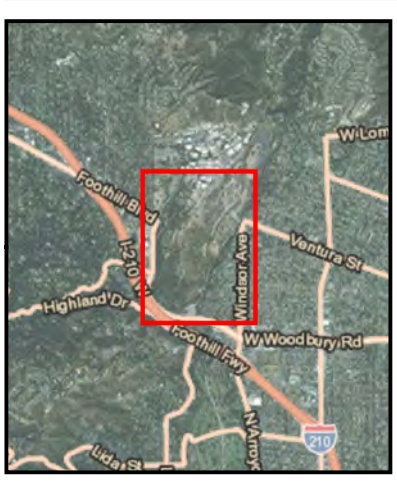
Direct harm or take of these species during sediment removal activities would result in a potentially significant impact. The chance of this occurring during sediment removal activities under this alternative is expected to be reduced in comparison to the Proposed Project due to the reduction in excavation area and associated sediment removal activities. To ensure no harm or take of these special status species, Mitigation Measures MM BIO-1, MM BIO-2, and MM BIO-3, listed below, have been provided. With implementation of these mitigation measures, direct impacts to special status species will be less than significant.

During sediment removal, tree and vegetation removal has the potential to significantly affect nesting birds and roosting bats if active nests or roosting bats are present. Disturbance of active nests will violate the Migratory Bird Treaty Act and result in a potentially significant impact. This impact will be reduced under Alternative 3, Configuration D, as less acreage of habitats will be removed in comparison to the Proposed Project (see Table 4.6-3). With implementation of Mitigation Measures MM BIO-4 and MM BIO-5, listed below, impacts to nesting birds and roosting bats will be less than significant.

Reservoir Management

Figure 4.6-8: Alternative 3, Configuration D, Option 1 Sediment Removal Vegetation Communities Impacts and Figure 4.6-9: Alternative 3, Configuration D, Option 2 Sediment Removal Vegetation Communities Impacts show expected conditions of the vegetation communities under reservoir management for Alternative 3, Configuration D, Option 1 and Alternative 3, Configuration D, Option 2, respectively, in comparison to the Proposed Project. As shown below, Alternative 3, Configuration D will result in a greater diversity of vegetation communities, including a greater amount of Riparian Woodland and Mule Fat Thickets. Under Alternative 3, Configuration D, a greater area of the Proposed Project site will be left undisturbed during reservoir management, approximately 69.64 acres under Option 1 and 67.85 acres under Option 2. In contrast, under the Proposed Project's reservoir management Option 1, the whole Proposed Project site, approximately 120.42 acres, will be disturbed annually. Under the Proposed Project's reservoir management Option 2, 33.97 acres will be left undisturbed during reservoir management.





Proposed Project Boundary

Access Road

Sediment Removal Excavation Limit

Figure 4.6-8
Sediment Removal Vegetation Communities Impacts Map

Alternative 3 - Configuration D, Option 1

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\\cgi-gisdata01\GIS_DATA\Projects\20000s\20201 - 20400\20346 Devil's Gate EIR\20346 Figure 4.6-8 Alternative 3, Configuration D1 Sediment Removal Vegetation Communities Impacts.mxd

Vegetation Communities (Impacted Acres)

- 1. Riversidean Alluvial Fan Sage Scrub (0.4 acre)
- 2. California Sagebrush – California Buckwheat Scrub (0.9 acres)
- 3. Scoured (22.6 acres)
- 4. Escaped Cultivars (0.2 acre)
- 5. Riparian Woodland (29.8 acres)
- 6. Mustard and Annual Brome Semi-Natural Herbaceous Stand (12.1 acres)
- 7. Mule Fat Thickets (3.7 acres)
- 8. Disturbed (Barren/Trails) (1.1 acres)

SCALE= 1 inch equals 375 feet

0 187.5 375 750 Feet

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors

Proposed Project Boundary

Access Road

Sediment Removal Excavation Contours

Figure 4.6-9
Sediment Removal Vegetation Communities Impacts Map

Alternative 3 - Configuration D, Option 2

Version Date: 10/16/2014

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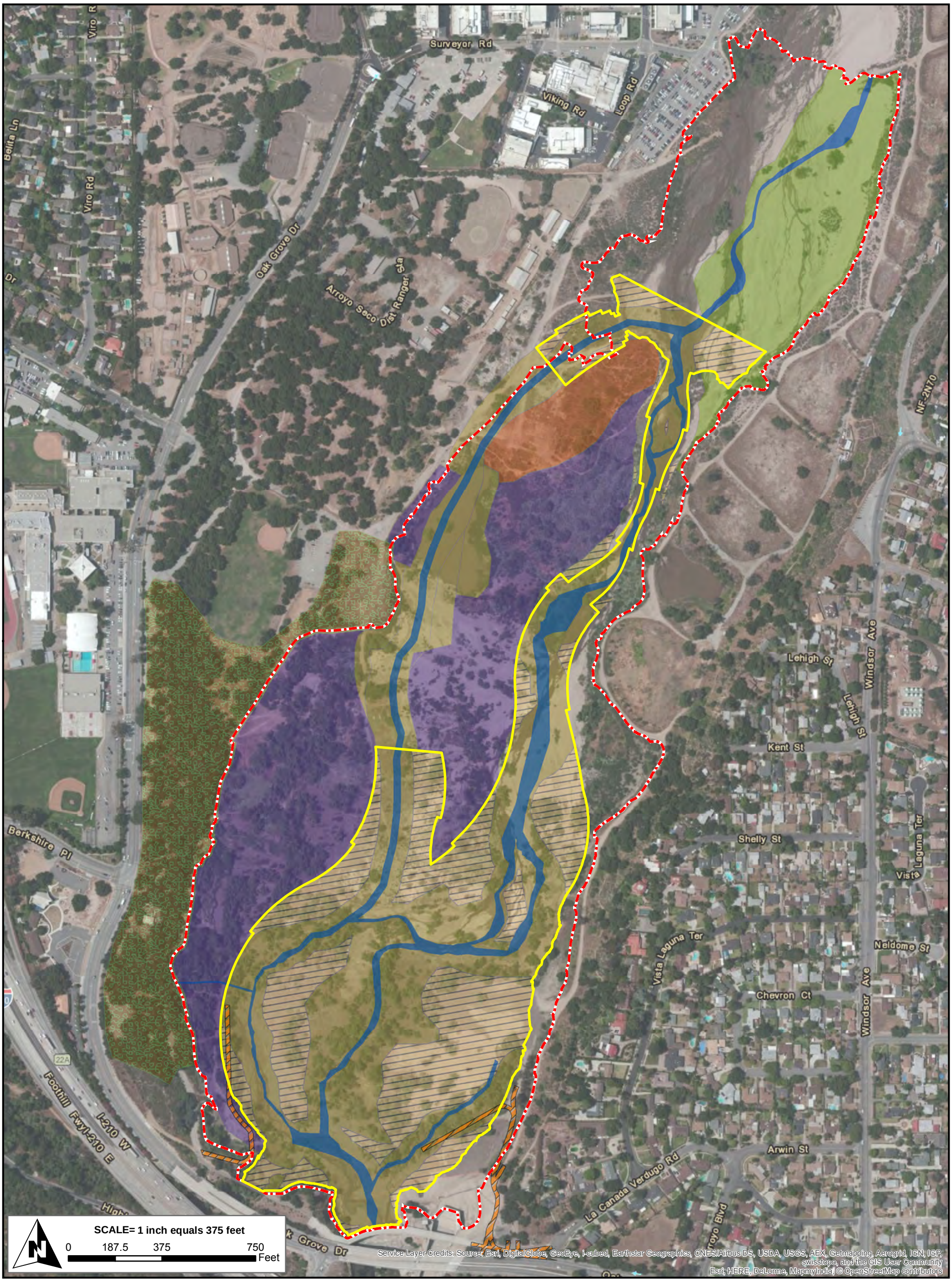
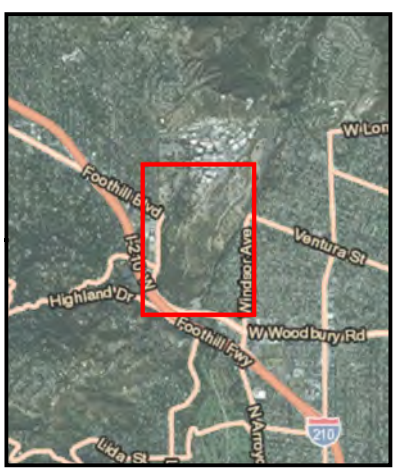
\\cgi-gisdata01\GIS_DATA\Projects\20000s\20201 - 20400\20346 Devil's Gate EIR\20346 Figure 4.6-9 Alternative 3, Configuration D2 Sediment Removal Vegetation Communities Impacts.mxd





Proposed Project Boundary

Reservoir Management Area

Access Road

Drainage

Maintained Vegetation

Alluvial Fan Sage Scrub

Coast Live Oak Woodland

California Sagebrush – California Buckwheat Scrub

Mule Fat Thickets

Riparian Woodland

Mustard and Annual Brome Semi-Natural Herbaceous Stand

Figure 4.6-10

Expected Vegetation Communities Under Reservoir Management

Alternative 3 - Configuration D, Option 1

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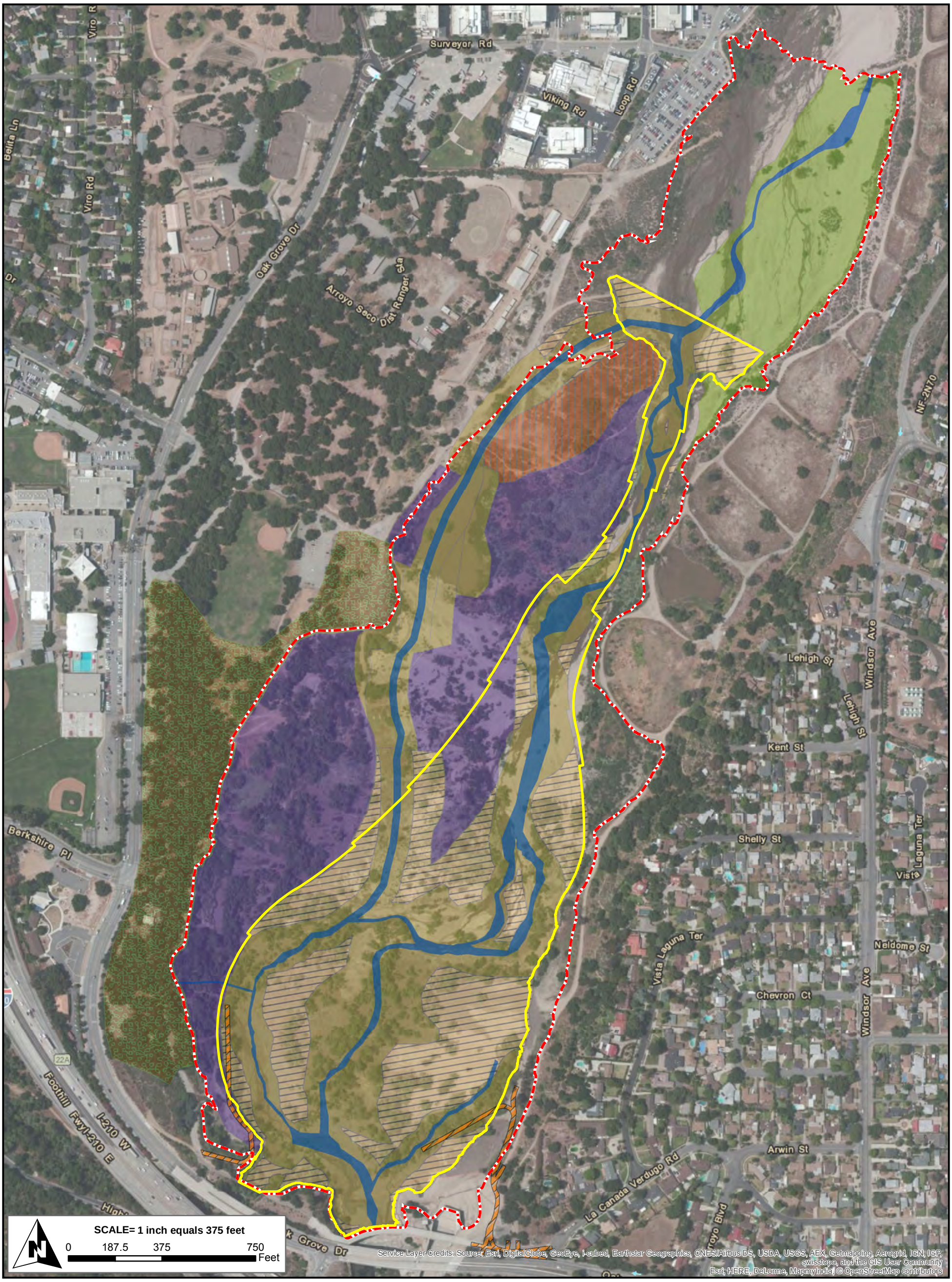
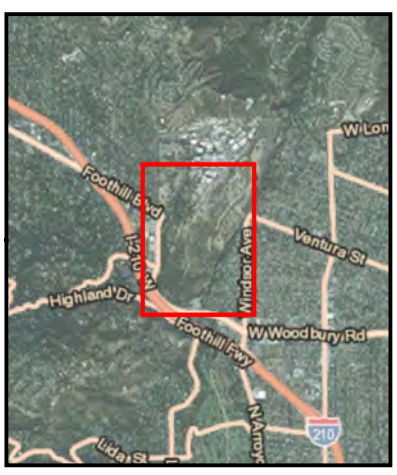
\\cgi-gisdata01\GIS_DATA\Projects\20000s\20201 - 20400\20346 Devil's Gate EIR\20346 Figure 4.6-10 Alternative 3, Configuration D1 Expected Vegetation Communities Under Reservoir Management.mxd





Reservoir Management Area

Proposed Project Boundary

Access Road

Drainage

Maintained Vegetation

Alluvial Fan Sage Scrub

Coast Live Oak Woodland

California Sagebrush – California Buckwheat Scrub

Mule Fat Thickets

Riparian Woodland

Mustard and Annual Brome Semi-Natural Herbaceous Stand

Figure 4.6-11

Expected Vegetation Communities Under Reservoir Management

Alternative 3 - Configuration D, Option 2

Version Date: 10/17/2014

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\\cgi-gisdata01\GIS_DATA\Projects\20000s\20201 - 20400\20346 Devil's Gate EIR\20346 Figure 4.6-11 Alternative 3, Configuration D2 Expected Vegetation Communities Under Reservoir Management.mxd

The reservoir management area for Alternative 3, Configuration D is expected to be composed of Riparian Herbaceous and Mustard and Annual Brome Semi-Natural Herbaceous Stand communities. Streams and seasonal ponds will be available depending upon where sediment accumulates and the amount of flows, rainfall, and runoff. Special status species have the potential to use the reservoir management area.

Direct harm or take of these species during reservoir management activities will result in a potentially significant impact. The chance of this occurring during reservoir management activities under this alternative is expected to be reduced in comparison to either of the Proposed Project's reservoir management options due to the reduction in the reservoir management area. To ensure no harm or take of these special status species occurs, MM BIO-1, MM BIO-2, and MM BIO-3 have been provided. With implementation of these mitigation measures, direct impacts to special status species will be less than significant.

During reservoir management, tree and vegetation removal has the potential to significantly affect nesting birds and roosting bats if active nests or roosting bats are present. Disturbance of active nests will violate the Migratory Bird Treaty Act and result in a potentially significant impact. This impact will be reduced under Alternative 3, Configuration D, as less vegetation will be removed in comparison to the Proposed Project. With implementation of Mitigation Measures MM BIO 4 and MM BIO-5, impacts to nesting birds and roosting bats will be less than significant.

Mitigation Measures

MM BIO – 1: A qualified biological monitor shall be present during initial ground- or vegetation-disturbing project-related activities to provide protection measures and monitor for wildlife in harm's way. This includes initial ground- or vegetation-disturbing project-related activities at the annual start of each year of sediment removal or maintenance activities. Following initial project-related activities, a qualified monitoring biologist shall be present as necessary to maintain the implemented protection measures and monitor for additional species in harm's way. These protection measures shall include, as appropriate: redirecting the wildlife, identifying areas that may require exclusionary devices (e.g., fencing), or capturing and relocating wildlife outside the work area. Any captured species shall be relocated to adjacent appropriate habitat that is contiguous to adjacent habitat and not impacted by project-related disturbance activities.

MM BIO – 2: Within 90 days prior to ground-disturbing activities, a sensitive species educational briefing shall be conducted by a qualified biologist for construction personnel. The biologist will identify all sensitive resources that may be encountered onsite, and construction personnel will be instructed to avoid and report any sightings of sensitive species to LACFCD or the monitoring biologist. Educational briefings shall be repeated annually for the duration of the sediment removal.

MM BIO – 3: Within 90 days prior to ground-disturbing activities, a preconstruction survey shall be conducted by a qualified biologist for the presence of any sensitive species in harm's way, including coast range newt, the southwestern pond turtle, and the two-striped garter snake. If sensitive species are observed in harm's way, the qualified biologist will develop and implement appropriate protection measures for that species. These protection measures shall include, as appropriate, redirecting the species, constructing exclusionary devices (e.g., fencing), or capturing and relocating wildlife outside the work area. Preconstruction surveys shall be repeated annually for the duration of the sediment removal. Observations of special status species made during these surveys shall be recorded onto a CNDDB field data sheet and submitted to CDFW for inclusion into the CNDDB.

MM BIO – 4: LACFCD, in consultation with a qualified biologist, will employ bird exclusionary measures (e.g., mylar flagging) prior to the start of bird breeding season to prevent birds nesting within established boundaries of the project. Prior to commencement of sediment removal activities within bird breeding season (March 1 through August 31), a preconstruction bird nesting survey shall be conducted by a qualified biologist for the presence of any nesting bird within 300 feet of the construction work area. The surveys shall be conducted 30 days prior to the disturbance of suitable nesting habitat by a qualified biologist with experience in conducting nesting bird surveys. The surveys shall continue on a weekly basis, with the last survey being conducted no more than 3 days prior to the initiation of clearance/construction work. Preconstruction surveys shall be repeated annually for the duration of the sediment removal.

If an active nest is found, the qualified biologist will develop and implement appropriate protection measures for that nest. These protection measures shall include, as appropriate, construction of exclusionary devices (e.g., netting) or avoidance buffers. The biologist shall have the discretion to adjust the buffer area as appropriate based on the proposed construction activity, the bird species involved, and the status of the nest and nesting activity; but it shall be no less than 30 feet. Work in the buffer area can resume once the nest is determined to be inactive by the monitoring biologist.

MM BIO – 5: Within 30 days prior to commencement of vegetation or structure removal activities, a preconstruction bat survey shall be conducted by a qualified biologist for the presence of any roosting bats. Acoustic recognition technology shall be used if feasible and appropriate. If either a bat maternity roost or hibernacula (structures used by bats for hibernation) are present, a qualified biologist will develop and implement appropriate protection measures for that maternity roost or hibernacula. These protection measures shall include, as appropriate, safely evicting non-breeding bat hibernacula, establishment of avoidance buffers, or replacement of roosts at a suitable location. These measures shall also include as appropriate:

- To the extent feasible, trees that have been identified as roosting sites shall be removed or relocated between October 1 and February 28.
- When trees must be removed during the maternity season (March 1 to September 30), a qualified bat specialist shall conduct a preconstruction survey to identify those trees proposed for disturbance that could provide hibernacula or nursery colony roosting habitat for bats.
- Trees identified as potentially supporting an active nursery roost shall be inspected by a qualified biologist no greater than 7 days prior to tree disturbance to determine presence of absence of roosting bats.
- Trees determined to support active maternity roosts will be left in place until the end of the maternity season (September 30).
- If bats are detected in a tree but the qualified biologist determined that roosting bats may still be present, trees shall be removed as follows:
    - Pushing the tree down with heavy machinery instead of felling the tree with a chainsaw
    - First pushing the tree lightly 2 or 3 times with a pause of 30 seconds between each nudge to allow bats to become active, then pushing the tree to the ground slowly

- Allowing the tree to remain in place to 24 to 48 hours until inspected by the qualified biologist for presence or absence of roosting bats

- The qualified biologist shall document all bat survey, monitoring, and protection measure activities and prepare a summary report for LACFCD.

Residual Impacts after Mitigation

Alternative 3, Configuration D will result in a less than significant impact on candidate, sensitive, or special status species.

Comparison to Proposed Project and Other Alternatives

Alternative 3, Configuration D is considered environmentally superior to the Proposed Project with respect to impacts to candidate, sensitive, or special status species due to the reduction in sediment removal and reservoir management areas and associated activities.

Due to the reduction in sediment removal and reservoir management areas and associated activities, Alternative 3, Configuration D will also be environmentally superior to Alternative 1, Configuration B; Alternative 2, Configuration C; and Alternative 5, Haul Route Alternative. Alternative 3, Configuration D will also potentially be environmentally superior to Alternative 4, Sluicing if proper sediment transport does not occur under Alternative 4, Sluicing, causing sediment deposits to develop along the route to the ocean. This would result in need for sediment removal and impacts to downstream habitats associated with removal activities.

Alternative 3, Configuration D will be environmentally superior to Alternative 6, No Project Alternative, as habitat in the reservoir will likely degrade under Alternative 6, No Project Alternative due to continuous sediment deposition and degradation that will increase over time.

BIOLOGY-2 *Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service.*

Sediment Removal/Reservoir Management

Alternative 3, Configuration D, Option 1 and Alternative 3 Configuration D, Option 2 will impact approximately 0.4 acre of Riversidean Alluvial Fan Sage Scrub within the Proposed Project site. Impacts to Riversidean Alluvial Fan Sage Scrub will result in a potentially significant impact requiring mitigation; however, disturbance of this community will be reduced by approximately 0.7 acres (64 percent) as compared to the Proposed Project. To minimize impacts due to loss of Riversidean Alluvial Fan Sage Scrub, Mitigation Measure MM BIO-6 has been provided. Removing the sediment will benefit the alluvial fan sage scrub since the habitat is currently buried under sediment and therefore considered poor quality. With implementation of this mitigation measure, impacts to Riversidean Alluvial Fan Sage Scrub will be reduced to a level below significance.

Alternative 3, Configuration D, Option 1 will impact approximately 28.9 acres of Riparian Woodland and 6.1 acres of Mule Fat Thickets within the Proposed Project site, while Alternative 3, Configuration D, Option 2 will impact approximately 28.9 acres of Riparian Woodland and 3.7 acres of Mule Fat Thickets. Riparian Woodland and Mule Fat Thickets are rare plant communities that provide nesting habitat for riparian species. Impacts to these habitats will result in a potentially significant impact; however, disturbance of Riparian Woodland and

Mule Fat Thickets under Option 1 will be reduced by approximately 22.5 acres (44 percent) and 5.0 acres (54 percent), respectively, as compared to the Proposed Project. In comparison, disturbance of Riparian Woodland and Mule Fat Thickets under Alternative 3, Configuration D, Option 2 will be reduced by approximately 22.5 acres (44 percent) and 7.4 acres (67 percent), respectively as compared to the Proposed Project. To minimize impacts due to the loss of Riparian Woodland and Mule Fat Thickets, Mitigation Measures MM BIO-7 and MM BIO-8 have been provided. With implementation of this mitigation measure, impacts to Riparian Woodland and Mule Fat Thickets will be reduced to a level below significance.

Figure 4.6-12: Alternative 3, Configuration D, Option 1 Impacted Water Features and Figure 4.6-13: Alternative 3, Configuration D, Option 2 show the water features that will be impacted. Compared to the Proposed Project, Alternative 3, Configuration D, Option 1 and Alternative 3, Configuration D, Option 2 will reduce impacts to these water features by approximately 19 percent. To minimize impacts to jurisdictional waters found within these water features, Mitigation Measure MM BIO-8 has been provided. With implementation of this mitigation measure, impacts will be reduced to a level below significance

Mitigation Measures

MM BIO – 6: Riversidean Alluvial Fan Sage Scrub habitat shall be restored and/or enhanced at a 1:1 ratio by acreage. Areas shall be mapped using aerial photographs.

MM BIO – 7: Within 90 days prior to ground-disturbing activities, a qualified biologist shall conduct a tree survey within the project footprint, to identify trees that will be removed or potentially affected by the Proposed Project and trees that can be avoided. LACFCD will replace trees that cannot be avoided. The replacement is expected to be up to 1:1 by acreage. The biological monitor shall implement measures to protect the root zone of oak trees that may be impacted immediately adjacent to the project site and along access roads.

MM BIO – 8: A combination of onsite and offsite restoration, enhancement, and exotic removal shall be implemented by LACFCD at a 1:1 ratio for impacted sensitive habitat and jurisdictional waters. Habitat restoration/enhancement shall include use of willow cuttings and exotic species removal. Non-native, weedy habitats within the basin shall be utilized whenever possible as mitigation sites. This mitigation measure shall be monitored for success for five years following implementation. A report of the monitoring results shall be submitted annually, during the five years following implementation, to resource agencies as required by the Section 401 Certification, Section 404 permit, and a Streambed Alteration Agreement.

Residual Impacts after Mitigation

Under sediment removal and reservoir maintenance, Alternative 3, Configuration D with implementation of Mitigation Measures MM BIO-6 through MM BIO-8 will result in a less than significant impact on riparian habitat and other sensitive natural communities.

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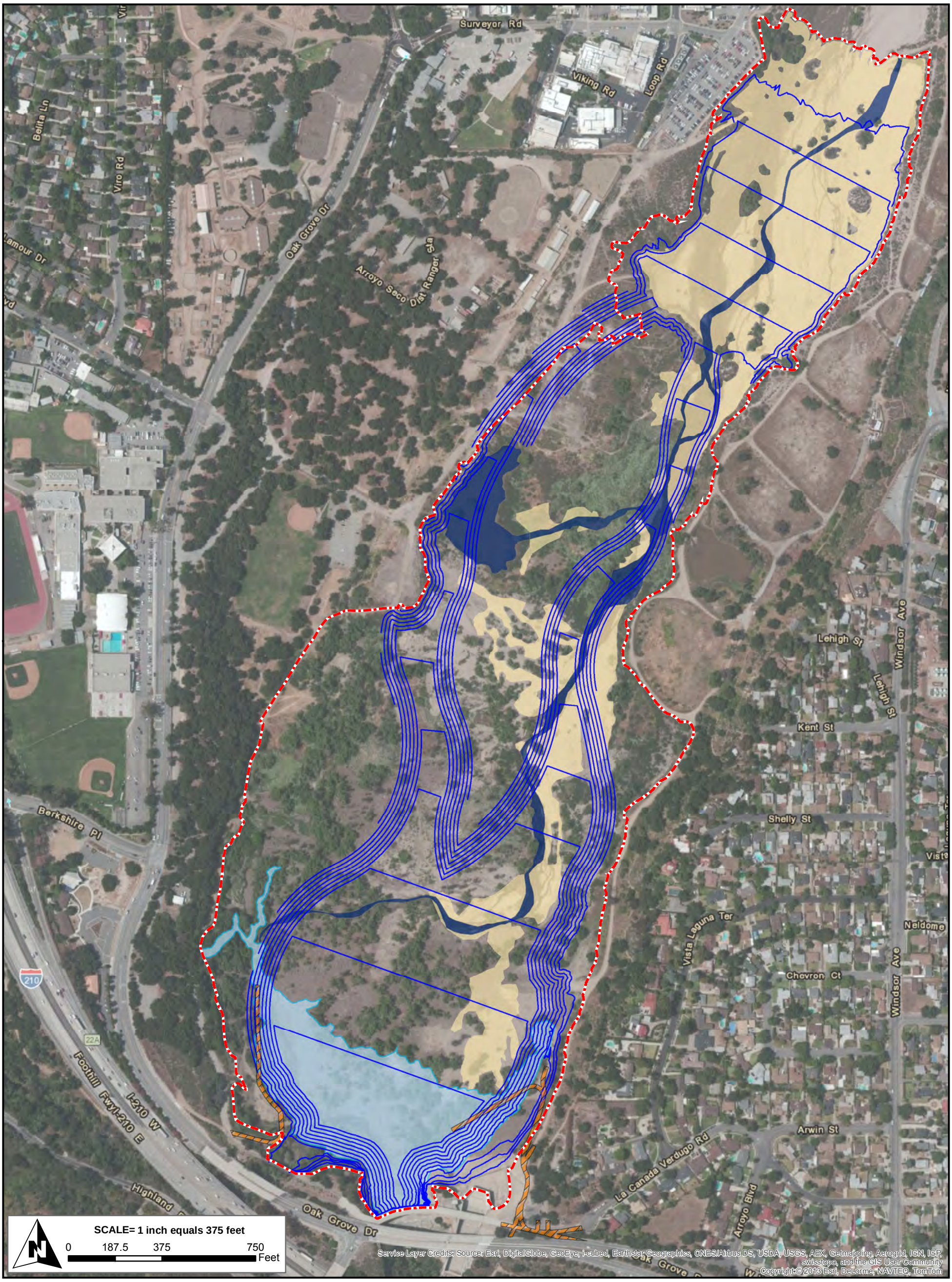

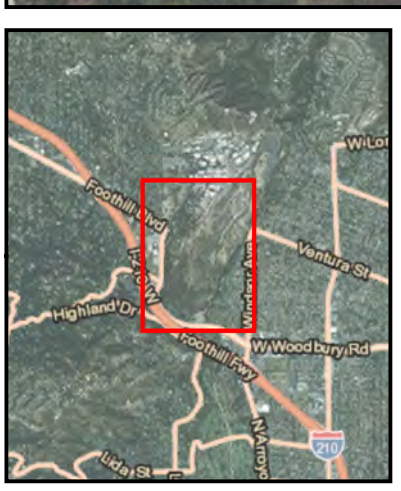

Proposed Project Boundary

Access Road

Sediment Removal Excavation Limit

Waters (Impacted Acres)

Braided Channel (22.2 acres)

Drainage (4.8 acres)

Wetland Area (10.8 acres)

Figure 4.6-12
Impacted Water Features Map

Alternative 3 - Configuration D, Option 1

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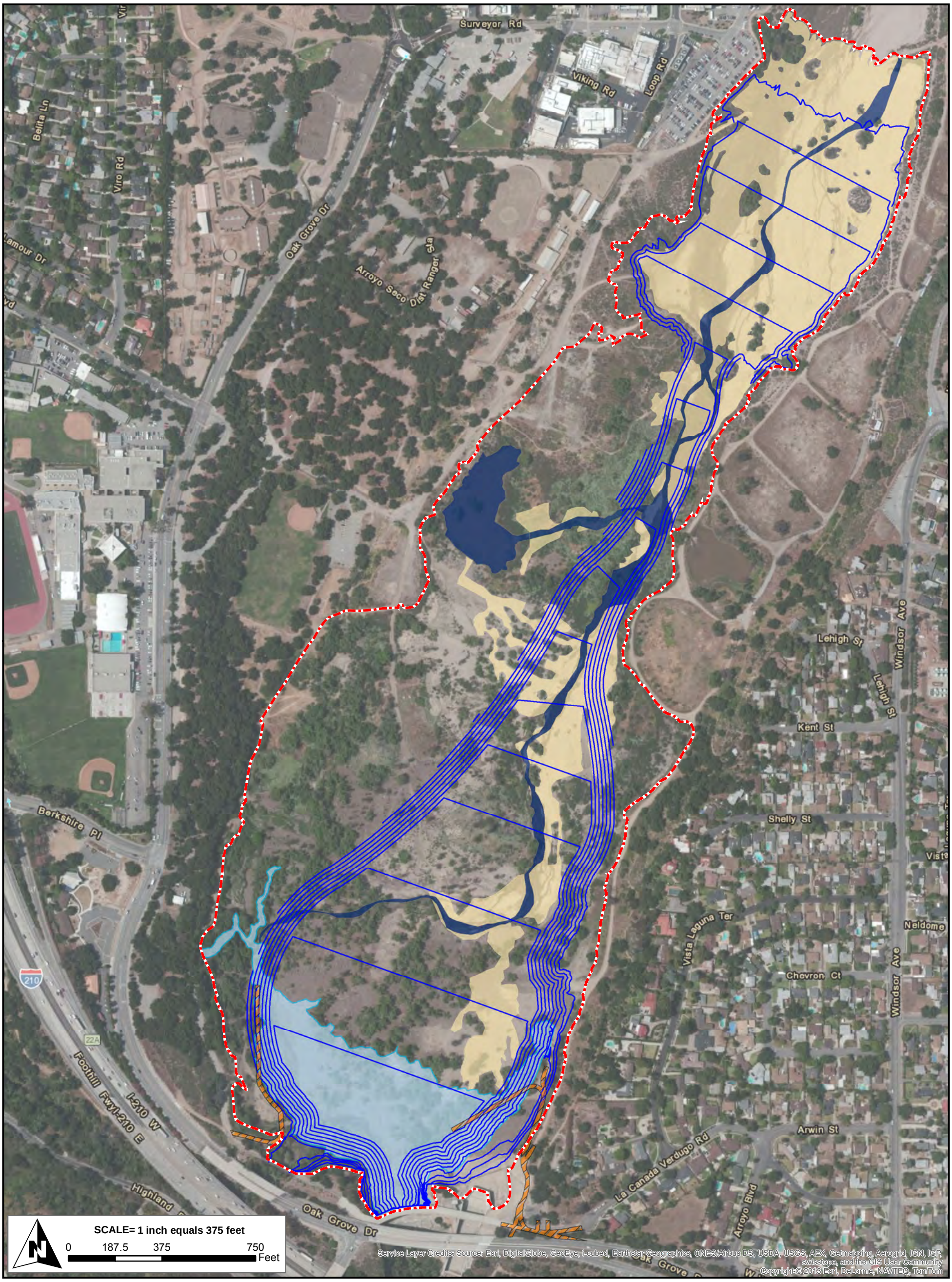
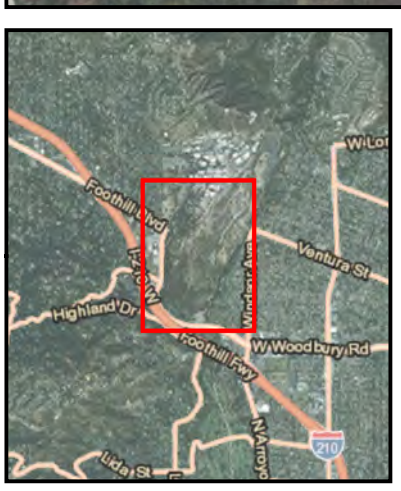
\\cgi-gisdata01\GIS_DATA\Projects\20000s\20201 - 20400\20346 Devil's Gate EIR\20346 Figure 4.6-12 Alternative 3, Configuration D1 Impacted Water Features.mxd





Proposed Project Boundary

Access Road

Sediment Removal Excavation Limit

Waters (Impacted Acres)

Braided Channel (23.2 acres)

Drainage (3.8 acres)

Wetland Area (10.8 acres)

Figure 4.6-13
Impacted Water Features Map

Alternative 3 - Configuration D, Option 2

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\\cgi-gisdata01\GIS_DATA\Projects\20000s\20201 - 20400\20346 Devil's Gate EIR\20346 Figure 4.6-13 Alternative 3, Configuration D2 Impacted Water Features.mxd

Comparison to Proposed Project and Other Alternatives

Alternative 3, Configuration D is considered environmentally superior to the Proposed Project with respect to impacts to riparian habitat and other sensitive natural communities due to the reduction in sediment removal and reservoir management areas and associated activities and increased opportunities for restoration and/or enhancement.

Due to the reduction in sediment removal and reservoir management areas and associated activities and increased opportunities for restoration and/or enhancement, Alternative 3, Configuration D will also be environmentally superior to Alternative 1, Configuration B; Alternative 2, Configuration C; and Alternative 5, Haul Route Alternative. Alternative 3, Configuration D will also potentially be environmentally superior to Alternative 4, Sluicing if proper sediment transport does not occur under Alternative 4, Sluicing, causing sediment deposits to develop along the route to the ocean. This would result in need for sediment removal and impacts to downstream habitats associated with removal activities.

Alternative 3, Configuration D will be environmentally superior to Alternative 6, No Project Alternative, as habitat in the reservoir will likely degrade under Alternative 6, No Project Alternative due to continuous sediment deposition and degradation that will increase over time.

BIOLOGY-3 *Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means.*

Sediment Removal/Reservoir Management

Figures 4.6-12 and 4.6-13, above, show the water features that will be impacted by this alternative. Compared to the Proposed Project, Alternative 3, Configuration D will reduce impacts to these water features by approximately 19 percent. To minimize impacts to jurisdictional waters found within these water features, Mitigation Measure MM BIO-8 has been provided. With implementation of this mitigation measure, impacts will be reduced to a level below significance.

Mitigation Measures

See Mitigation Measure MM BIO-8 above.

Residual Impacts After Mitigation

As noted in MM BIO-8, wetlands and drainages under the jurisdiction of CDFW, USACE, and RWQCB will be restored and/or enhanced on the Proposed Project site. With implementation of these mitigation measures, impacts to wetlands will be reduced to a level below significance.

Comparison to Proposed Project and Other Alternatives

Alternative 3, Configuration D is considered environmentally superior to the Proposed Project with respect to impacts on federally protected wetlands due to the reduction in sediment removal and reservoir management areas and associated activities and increased opportunities for restoration and/or enhancement.

Due to the reduction in sediment removal and reservoir management areas and associated activities and increased opportunities for restoration and/or enhancement, Alternative 3, Configuration D will also be environmentally superior to Alternative 1, Configuration B; Alternative 2, Configuration C; and Alternative 5, Haul Route Alternative. Alternative 3, Configuration D will also potentially be environmentally superior to Alternative 4, Sluicing if proper sediment transport does not occur under Alternative 4, Sluicing, causing sediment deposits to develop along the route to the ocean. This would result in need for sediment removal and impacts to downstream wetlands and other sensitive habitats associated with removal activities.

Alternative 3, Configuration D will be environmentally superior to Alternative 6, No Project Alternative, as the wetlands in the reservoir will likely degrade under Alternative 6, No Project Alternative due to continuous sediment deposition.

BIOLOGY-4 *Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.*

Sediment Removal/Reservoir Management

The Proposed Project area is predominantly open for wildlife movement and habitat connectivity. Sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays). In addition, sediment removal activities would not completely block the Proposed Project site from surrounding habitat, would occur only during the day, and would not interfere with nighttime wildlife activity. Although some wildlife may be temporarily displaced during construction, wildlife would not be physically prevented from moving around and into the basin area. Sediment removal and reservoir management activities associated with Alternative 3, Configuration D will interfere temporarily with the movement of native resident or migratory wildlife species, resulting in a potentially significant impact. Reduction in sensitive habitat would interfere with use of the habitat for wildlife nursery sites, resulting in a potentially significant impact. To minimize impacts to less than significant, Mitigation Measures MM BIO-1 through MM BIO-8 has been provided. This impact will be reduced in comparison to the Proposed Project due to the reduction in area disturbed during sediment removal and both reservoir management options.

Mitigation Measures

See Mitigation Measures MM BIO-1 through MM BIO-8.

Residual Impacts After Mitigation

As noted in MM BIO-8, restoration and/or enhancement of sensitive habitats will take place on the Proposed Project site. With implementation of these mitigation measures, impacts to use of the habitat for wildlife nursery sites will be reduced to a level below significance.

Comparison to Proposed Project and Other Alternatives

Alternative 3, Configuration D is considered environmentally superior to the Proposed Project with respect to impacts to wildlife movement and habitat connectivity due to the reduction in sediment

removal and reservoir management areas and associated activities and increased opportunities for restoration and/or enhancement.

Due to the reduction in sediment removal and reservoir management areas and associated activities and increased opportunities for restoration and/or enhancement, Alternative 3, Configuration D will also be environmentally superior to Alternative 1, Configuration B; Alternative 2, Configuration C; and Alternative 5, Haul Route Alternative. Alternative 3, Configuration D will also potentially be environmentally superior to Alternative 4, Sluicing if proper sediment transport does not occur under Alternative 4, Sluicing, causing sediment deposits to develop along the route to the ocean. Sediment deposition and associated removal activities would impact downstream wetlands and other sensitive habitats, would result in interference with the movement of native resident or migratory wildlife species, and would interfere with use of the habitat for wildlife nursery sites due to potential reduction in sensitive habitat.

Alternative 3, Configuration D will be environmentally superior to Alternative 6, No Project Alternative, as the wetlands in the reservoir will likely degrade under Alternative 6, No Project Alternative due to continuous sediment deposition.

BIOLOGY-5 *Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.*

Sediment Removal/Reservoir Management

Implementation of Alternative 3, Configuration D will result in the removal of native trees from the Proposed Project site. This impact will be reduced under Alternative 3, Configuration D, as less vegetation and fewer trees will be removed in comparison to the Proposed Project. Implementation of Mitigation Measure MM BIO-7 will reduce impacts to city-protected trees to a level below significance.

Mitigation Measures

See Mitigation Measure MM BIO-7.

Residual Impacts After Mitigation

Alternative 3, Configuration D will result in a less than significant impact to city-protected trees.

Comparison to Proposed Project and Other Alternatives

Alternative 3, Configuration D is considered environmentally superior to the Proposed Project with respect to impacts to loss of native trees due to the reduction in potentially impacted trees.

Alternative 3, Configuration D will also be environmentally superior to Alternative 1, Configuration B; Alternative 2, Configuration C; Alternative 4, Sluicing; and Alternative 5, Haul Route Alternative.

Alternative 3, Configuration D will be environmentally superior to Alternative 6, No Project Alternative as trees in the reservoir will likely be lost under Alternative 6, No Project Alternative due to continuous sediment deposition.

CULTURAL RESOURCES

CULTURAL-1 *Cause a substantial adverse change in the significance of a historical resource*

Sediment Removal/Reservoir Management

As with the Proposed Project, no alterations or modifications will be made to any historic resource; and therefore, no significant impact to historical resources is anticipated with this alternative.

Mitigation Measures

No mitigation measures are necessary.

Residual Impacts After Mitigation

No historic resources are within the Proposed Project site; therefore Alternative 3, Configuration D will not result in impacts to historic resources.

Comparison to Proposed Project and Other Alternatives

As no historic resources are within the Proposed Project site, Alternative 3, Configuration D is considered neither environmentally superior nor inferior to the Proposed Project with respect to historic resources.

Alternative 3, Configuration D will also be neither environmentally superior nor inferior to any of the other alternatives.

CULTURAL-2 *Cause a substantial adverse change in the significance of an archaeological resource*

Sediment Removal/Reservoir Management

Alternative 3, Configuration D will involve ground-disturbing activities under sediment removal and reservoir management; however, as noted in Section 3.5, most of the soil in the Proposed Project area consists of recently accumulated sediment. In areas filled with recently accumulated sediment, archeological sites are not anticipated to exist, although it is always possible that unidentified archaeological sites exist in native soils below the accumulated sediment. If sediment removal or reservoir management activities exceed the depth of the historic flood deposits and encounter native soils, unidentified archaeological sites have a potential to be significantly impacted. Implementation of Mitigation Measure MM CUL-1 will reduce potential impacts to less than significant. This impact will also be reduced in comparison to the Proposed Project due to the reduction in area disturbed during sediment removal and reservoir management.

Mitigation Measures

> **MM CUL-1**: If sediment removal or reservoir management activities exceed the depth of the historic flood deposits and encounter native sediments, these activities will be monitored by a qualified archaeologist. In the event this occurs and archaeological materials are observed, the excavation in the proximity of the discovery will be diverted until a qualified archaeologist evaluates the discovery.

Residual Impacts After Mitigation

While it is always possible that unidentified archaeological sites exist in native soils below the accumulated sediment, with implementation of Mitigation Measure MM CUL-1, no significant adverse impacts are expected.

Comparison to Proposed Project and Other Alternatives

Alternative 3, Configuration D is considered environmentally superior to the Proposed Project with respect to archaeological resources due to the reduction in sediment removal and reservoir management areas.

Due to the reduction in sediment removal and reservoir management areas, Alternative 3, Configuration D will also be environmentally superior to Alternative 1, Configuration B; Alternative 2, Configuration C; Alternative 4, Sluicing; and Alternative 5, Haul Route Alternative.

Alternative 3, Configuration D will be environmentally inferior to Alternative 6, No Project Alternative, due to sediment removal and reservoir management activities.

CULTURAL-3 *Cause a substantial adverse change in the significance of a paleontological resource.*

Sediment Removal/Reservoir Management

No paleontological resources were encountered during the course of the survey and are not expected in the accumulated sediment. It is always possible that unidentified paleontological materials exist in native soil below the accumulated sediment. If sediment removal or reservoir management activities exceed the depth of the historic flood deposits and encounter native soils, unidentified paleontological materials have the potential to be significantly impacted. Implementation of Mitigation Measure MM CUL-2 will reduce impacts to less than significant. This impact will also be reduced in comparison to the Proposed Project due to the reduction in area disturbed during sediment removal and reservoir management.

Mitigation Measures

> **MM CUL-2:** If sediment removal or reservoir management activities exceed the depth of the historic flood deposits and encounter native sediments, these activities will be monitored by a qualified paleontologist. In the event that this occurs and paleontological materials are observed, the excavation in the proximity of the discovery should be diverted until a qualified paleontologist evaluates the discovery.

Residual Impacts After Mitigation

While it is always possible that unidentified paleontological materials exist in native soils below the accumulated sediment, with implementation of Mitigation Measure MM CUL-2, no significant adverse impacts are expected.

Comparison to Proposed Project and Other Alternatives

Alternative 3, Configuration D is considered environmentally superior to the Proposed Project with respect to paleontological resources due to the reduction in sediment removal and reservoir management areas.

Due to the reduction in sediment removal and reservoir management areas, Alternative 3, Configuration D will also be environmentally superior to Alternative 1, Configuration B; Alternative 2, Configuration C; Alternative 4, Sluicing; and Alternative 5, Haul Route Alternative.

Alternative 3, Configuration D will be environmentally inferior to Alternative 6, No Project Alternative, due to sediment removal and reservoir management activities.

CULTURAL-4 *Potentially impact unknown human remains within the proposed project site.*

Sediment Removal/Reservoir Management

As with the Proposed Project, archival research and the archaeological survey in connection with the present project did not indicate the presence of any known human remains in the project area. In the event human remains are discovered, implementation of Mitigation Measure MM CUL-3 will reduce impacts to less than significant.

Mitigation Measures

> **MM CUL-3**: In the event human remains are discovered, all work in the area must be halted until the County Coroner identifies the remains and makes recommendations regarding their appropriate treatment pursuant to PRC Section 5097.98.

Residual Impacts After Mitigation

While it is possible that human remains could be discovered in native soils below the accumulated sediment, with implementation of Mitigation Measure MM CUL-3, no significant adverse impacts are expected.

Comparison to Proposed Project and Other Alternatives

Alternative 3, Configuration D is considered environmentally superior to the Proposed Project with respect to accidental discovery of human remains due to the reduction in sediment removal and reservoir management areas.

Due to the reduction in sediment removal and reservoir management areas, Alternative 3, Configuration D will also be environmentally superior to: Alternative 1, Configuration B; Alternative 2, Configuration C; Alternative 4, Sluicing; and Alternative 5, Haul Route Alternative.

Alternative 3, Configuration D will be environmentally inferior to Alternative 6, No Project Alternative, due to sediment removal and reservoir management activities.

GEOLOGY & SOILS

GEOLOGY-1 *Potentially result in soil erosion or loss of topsoil during sediment removal activities.*

Sediment Removal/Reservoir Management

Alternative 3, Configuration D will involve the excavation of sediment and deposition of the sediment at facilities already prepared and designated to accept such sediment during sediment removal and reservoir management. Sediment stockpiled at Johnson Field as part of the IMP will also be removed. Depending on the moisture content of the sediment removed, the sediment may need to be stockpiled to allow it to dry. If drying is required, stockpiling of the sediment will occur onsite within Devil's Gate Reservoir. Disturbed sediments are more susceptible to erosion; however, as discussed above in Air Quality, these impacts will be reduced to less than significant through implementation of SCAQMD Rule 403 and BMPs. In addition, excavation, grading, and sediment placement activities will be in accordance with established guidelines, permits, and regulations established for each disposal site. As such, sediment removal and reservoir management impacts to erosion will be less than significant. This impact will also be reduced in comparison to the Proposed Project due to the reduction in area disturbed during sediment removal and reservoir management.

Mitigation Measures

No mitigation measures will be required.

Residual Impacts After Mitigation

With implementation of SCAQMD Rule 403 and BMPs and the resulting reduction in potential for erosion, no significant impacts to geology and soils would occur as a result of Alternative 3, Configuration D.

Comparison to Proposed Project and Other Alternatives

Alternative 3, Configuration D is considered environmentally superior to the Proposed Project with respect to soil erosion due to the reduction in sediment removal and reservoir management areas and associated soil disturbance.

Due to the reduction in sediment removal and reservoir management areas and associated soil disturbance, Alternative 3, Configuration D will also be environmentally superior to Alternative 1, Configuration B; Alternative 2, Configuration C; Alternative 4, Sluicing; and Alternative 5, Haul Route Alternative.

Alternative 3, Configuration D will be environmentally inferior to Alternative 6, No Project Alternative, due to sediment removal and reservoir management activities.

GREENHOUSE GAS EMISSIONS

GHG EMISSIONS-1 *Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment.*

Sediment Removal/Reservoir Management

Alternative 3, Configuration D will use the same amount and type of construction equipment as the Proposed Project and involve the same number of truck trips on a daily basis for sediment removal and reservoir management; however, sediment removal under this Alternative is expected to have a shorter duration than the Proposed Project due to the reduced amount of sediment to be removed. Use of sediment removal dump trucks that meet EPA's emission standards for Model Year 2007 or later and use of off-road equipment that meets, at a minimum, EPA's emission standards for Tier 3 equipment, would result in a reduction of GHG emissions. As noted in Section 3.6, generation of greenhouse gas emissions under the Proposed Project is not "cumulatively considerable" and is therefore less than significant under CEQA. Alternative 3, Configuration D will have the same amount of daily equipment usage/truck traffic and reduced overall sediment removal duration; therefore, this alternative will generate less greenhouse gas emissions than the Proposed Project, which will not be "cumulatively considerable," and is therefore less than significant under CEQA.

As with the Proposed Project, Alternative 3, Configuration D may prove a positive effect on climate change. High ambient temperatures coupled with important demand for oxygen due to the degradation of substantial amounts of organic matter favor the production of CO_2, the establishment of anoxic conditions, and thus the production of CH_4. If the reservoir is left as it is, the large quantity of biomass currently existing may exacerbate the condition. With the removal and disposal of most of the organic mass in the Scholl Canyon Landfill, which uses the green waste primarily as "alternative daily cover" (ADC), the overall benefit to the carbon ecosystem will be positive, since prior to using green waste for ADC, larger amounts of cover soil had to be imported into the landfill from offsite sources (Kong et al. 2008). Therefore, use of the green waste as ADC reduces fossil fuel use for cover soil importation and also reduces GHG emissions. This potential benefit will not be as great under Alternative 3, Configuration D due to the reduction in excavation area and associated vegetation removal.

Mitigation Measures

No mitigation measures are necessary.

Residual Impacts After Mitigation

No significant impacts associated with the generation of greenhouse gas emissions will occur as a result of Alternative 3, Configuration D.

Comparison to Proposed Project and Other Alternatives

Alternative 3, Configuration D will generate less overall greenhouse gas emissions than the Proposed Project; however, it will not produce as much green waste to be used as ADC. Use of ADC reduces fossil fuel use for cover soil importation and also reduces GHG emissions. Alternative 3, Configuration D is considered environmentally superior to the Proposed Project due to overall production of greenhouse gas emissions.

Due to overall production of greenhouse gas emissions, Alternative 3, Configuration D will also be environmentally superior to Alternative 1, Configuration B; Alternative 2, Configuration C; and Alternative 5, Haul Route Alternative.

Alternative 3, Configuration D will be initially environmentally inferior to Alternative 4, Sluicing due to hauling sediment and vegetation from the reservoir. This Alternative will potentially be environmentally superior to Alternative 4, Sluicing if proper sediment transport does not occur under Alternative 4, Sluicing, causing sediment deposits to develop along the route to the ocean. This would result in need for sediment removal from the Arroyo Seco Channel, the Los Angeles River, or the Port of Long Beach and impacts associated with production of greenhouse gas emissions from removal activities.

Alternative 3, Configuration D will be environmentally inferior to Alternative 6, No Project Alternative, due to sediment removal and reservoir management activities and associated production of greenhouse gas emissions.

GHG EMISSIONS-2 *Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases.*

Sediment Removal/Reservoir Management

AB 32 identified a 2020 target level for GHG emissions in California of 427 MMT of CO_2e, which is approximately 28.5 percent less than the year 2020 BAU emissions estimate of 596 MMT CO_2e. To achieve these GHG reductions, widespread reductions of GHG emissions will have to occur across California. Some of those reductions will need to come in the form of changes in vehicle emissions and mileage standards, changes in the sources of electricity, and increases in energy efficiency by existing facilities. These reductions in mobile-sources and energy production of GHG emissions would occur with or without development of Alternative 3, Configuration D. Overall, Alternative 3, Configuration D will be consistent with the AB 32 goal of reducing statewide GHG emissions to 1990 levels by year 2020. Currently, no other GHG reduction plan (i.e., SCAG, SCAQMD, or County) applies to Alternative 3, Configuration D. As with the Proposed Project, Alternative 3, Configuration D will not conflict with any applicable plan, policy, or regulation of an agency adopted for the purpose of reducing the emissions of GHGs; therefore, impacts will be less than significant.

Mitigation Measures

No mitigation measures are necessary.

Residual Impacts After Mitigation

No significant impacts associated with any applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases will occur as a result of Alternative 3, Configuration D.

Comparison to Proposed Project and Other Alternatives

Alternative 3, Configuration D is considered neither environmentally superior nor inferior to the Proposed Project with respect to applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases.

Alternative 3, Configuration D will also be neither environmentally superior nor inferior to any of the other alternatives.

HAZARDS AND HAZARDOUS MATERIALS

HAZARDS-1 *Create a hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials.*

Sediment Removal/Reservoir Management

As with the Proposed Project, no significant impacts associated with hazardous soils are expected. Alternative 3, Configuration D will include the use of hazardous materials associated with the construction equipment needed to perform the removal activities. Adequate BMPs will be utilized; and adherence to the regulations set forth by County, State, and federal agencies will reduce the potential for hazardous materials impacts to a less than significant level and will not pose a safety hazard to sensitive receptors.

Mitigation Measures

No mitigation measures are necessary.

Residual Impacts After Mitigation

Implementation of BMPs and adherence to the applicable regulations will reduce the potential for impacts associated with hazardous materials to a less than significant level.

Comparison to Proposed Project and Other Alternatives

Alternative 3, Configuration D is considered neither environmentally superior nor inferior to the Proposed Project.

Alternative 3, Configuration D will also be neither environmentally superior nor inferior to any of the other alternatives except Alternative 6, No Project Alternative. Alternative 3, Configuration D will be environmentally inferior to Alternative 6, No Project Alternative due to sediment removal and reservoir management activities.

HAZARDS-2 *Create a significant hazard to the public or environment through accident conditions involving the release of hazardous materials into the environment.*

As with the Proposed Project, no significant impacts associated with hazardous soils are expected. Alternative 3, Configuration D will include the use of hazardous materials associated with the construction equipment needed to perform the removal activities. Adequate BMPs will be utilized; and adherence to the regulations set forth by County, State, and federal agencies will reduce the potential for hazardous materials impacts to a less than significant level and will not pose a safety hazard to sensitive receptors.

Mitigation Measures

No mitigation measures are necessary.

Residual Impacts After Mitigation

Implementation of BMPs and adherence to the applicable regulations will reduce the potential for impacts associated with hazardous materials to a less than significant level.

Comparison to Proposed Project and Other Alternatives

Alternative 3, Configuration D is considered neither environmentally superior nor inferior to the Proposed Project.

Alternative 3, Configuration D will also be neither environmentally superior nor inferior to any of the other alternatives except Alternative 6, No Project Alternative. Alternative 3, Configuration D will be environmentally inferior to Alternative 6, No Project Alternative due to sediment removal and reservoir management activities.

HAZARDS-3 *Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school.*

Sediment Removal/Reservoir Management

As with the Proposed Project, Alternative 3, Configuration D will include the use of hazardous materials associated with the construction equipment needed to perform the removal activities. The proposed construction routes pass La Cañada High School and Hillside School and Learning Center. Adherence to County, State, and federal agency regulations governing the use of these materials reduces the potential for impacts to a less than significant level and will not pose a safety hazard to sensitive receptors. No mitigation measures are required.

Mitigation Measures

No mitigation measures are necessary.

Residual Impacts After Mitigation

Implementation of BMPs and adherence to the applicable regulations will reduce the potential for impacts associated with hazardous materials within one-quarter mile of an existing school to a less than significant level.

Comparison to Proposed Project and Other Alternatives

Alternative 3, Configuration D is considered neither environmentally superior nor inferior to the Proposed Project.

Alternative 3, Configuration D will also be neither environmentally superior nor inferior to any of the other alternatives except Alternative 5, Haul Route Alternative and Alternative 6, No Project Alternative.

Alternative 3, Configuration D will be environmentally inferior to Alternative 5, Haul Route Alternative, as the Alternative 3, Configuration D construction routes pass La Cañada High School and Hillside School and Learning Center.

Alternative 3, Configuration D will be environmentally inferior to Alternative 6, No Project Alternative due to sediment removal and reservoir management activities.

HAZARDS-4 *Located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would create a significant hazard to the public or the environment.*

Sediment Removal/Reservoir Management

EPA included Hahamongna Watershed Park area on the NPL Superfund List due to the presence of detected VOCs and perchlorate in groundwater originating from the JPL property. The impacted groundwater is at 200 feet bgs; and, as with the Proposed Project, the concentrations of organochlorine pesticides, petroleum hydrocarbons (diesel and hydraulic/motor oil range and aromatics), and SVOCs detected in samples collected from Devil's Gate Reservoir are below regulatory thresholds. Therefore, the listing of the watershed on the Superfund List does not present a significant hazard to the public or the environment, and no significant impacts associated with the Alternative 3, Configuration D are expected.

Mitigation Measures

No mitigation measures are necessary.

Residual Impacts After Mitigation

No significant adverse impacts were identified.

Comparison to Proposed Project and Other Alternatives

Alternative 3, Configuration D is considered neither environmentally superior nor inferior to the Proposed Project.

Alternative 3, Configuration D will also be neither environmentally superior nor inferior to any of the other alternatives.

HAZARDS-5 *Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.*

Sediment Removal/Reservoir Management

Alternative 3, Configuration D sediment removal and reservoir management activities will occur onsite and will not interfere with the current emergency response plan or emergency evacuation plan for local, State, or federal agencies. Additionally, access to the surrounding roads will be maintained during sediment removal and reservoir management activities and will not interfere with the response facilities located adjacent to the Proposed Project site, including the County of Los Angeles Fire Department Camp 2 and the City of Pasadena Police Department located at 2175 Yucca Lane. Alternative 3, Configuration D will also increase flood control protection downstream of Devil's Gate Dam. No mitigation measures are required.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

No significant adverse impacts were identified.

Comparison to Proposed Project and Other Alternatives

Alternative 3, Configuration D is considered neither environmentally superior nor inferior to the Proposed Project.

Alternative 3, Configuration D will also be neither environmentally superior nor inferior to any of the other alternatives except Alternative 6, No Project Alternative.

Alternative 3, Configuration D will be environmentally superior to Alternative 6, No Project Alternative, as Alternative 6, No Project Alternative will severely restrict flood control, potentially increasing flooding downstream of Devil's Gate Dam. This flooding could also potentially interfere with access to roadways.

HYDROLOGY & WATER QUALITY

HYDROLOGY-1 *Violate any water quality standards or waste discharge requirements.*

Sediment Removal/Reservoir Management

FAST operations have been routinely used at Devil's Gate Reservoir and result in relatively small amounts of finer grained sediment passing through the reservoir. During both sediment removal and reservoir management phases, FAST operations will take place during winter rain events, using natural flows to allow the finer grained sediment to pass through the reservoir and downstream of the dam. It is anticipated that these FAST operations will be similar to historic FAST operations and that sediment fines discharged during FAST operations will be transported to the Pacific Ocean via Arroyo Seco and the Los Angeles River, either via the discharge flow or subsequent storm flows. As with the Proposed Project, no significant impacts to water quality standards are expected due to FAST operations.

As with the Proposed Project, heavy equipment needed for sediment removal has the potential to cause accidental spills of fuel and lubricating oil. Contaminants could be released into the watershed and adversely affect water quality. Alternative 3, Configuration D activities involving construction equipment will be temporary and involve the limited transport, use, disposal, and storage of fuel and lubricating oil, which are regulated by various agencies. Adequate BMPs will be utilized; and adherence to the regulations set forth by County, State, and federal agencies will reduce the potential for impacts to water quality to a less than significant level.

With adherence to regulations and permit requirements and implementation of project-specific BMPs, impacts related to otherwise substantially degrading water quality will be less than significant.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

Adequate BMPs will be utilized; and adherence to the regulations set forth by County, State, and federal agencies will reduce the potential for impacts to water quality to a less than significant level.

Comparison to Proposed Project and Other Alternatives

Alternative 3, Configuration D is considered neither environmentally superior nor inferior to the Proposed Project.

Alternative 3, Configuration D will also be neither environmentally superior nor inferior to any of the other alternatives except Alternative 6, No Project Alternative. Alternative 3, Configuration D will be environmentally inferior to Alternative 6, No Project Alternative due to sediment removal and reservoir management activities.

HYDROLOGY-2 *Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level.*

Sediment Removal/Reservoir Management

As with the Proposed Project, with implementation of Alternative 3, Configuration D the reservoir will have the ability to contain more of the local runoff, which in turn will result in more stormwater penetrating surface sediment in the project area and subsequently recharging the groundwater basin. No significant impacts to groundwater supplies are expected.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

No significant unavoidable adverse impacts would occur as a result of Alternative 3, Configuration D.

Comparison to Proposed Project and Other Alternatives

Alternative 3, Configuration D is considered environmentally inferior to the Proposed Project, due to the reduction in area to contain local runoff and reduction in percolation due to less removal of accumulated sediment.

Alternative 3, Configuration D will also be environmentally inferior to any of the other alternatives except Alternative 6, No Project Alternative. Alternative 3, Configuration D will be environmentally superior to Alternative 6, No Project Alternative, due to greater area to contain local runoff and increased percolation due to removal of accumulated sediment.

HYDROLOGY-3 *Substantially alter the existing drainage pattern of the site, which would potentially result in substantial erosion or siltation.*

Sediment Removal/Reservoir Management

Drainage patterns within the reservoir change on a regular basis depending on seasonal conditions, water flow, and sediment deposition. Sediment removal and reservoir management will also result in alterations of surface drainage characteristics at the project site due to clearing, grading, and excavation activities. Excavation, grading, and sediment placement activities will occur under LACDPW regulations, which establish protocols for proper design of slopes and temporary sediment-collecting structures.

Although the drainage characteristics for the site will be altered, Alternative 3, Configuration D will result in a positive impact to drainage of Devil's Gate Reservoir because it will enhance the flood control abilities of Devil's Gate Dam. While Alternative 3, Configuration D will result in a small increase of impervious surface area, this small amount is not expected to significantly change drainage patterns and will not cause a significant increase in the amount of surface runoff. As such, impacts related to offsite erosion will be less than significant.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

Alternative 3, Configuration D will result in a less than significant impact on drainage patterns.

Comparison to Proposed Project and Other Alternatives

Alternative 3, Configuration D is considered neither environmentally superior nor inferior to the Proposed Project.

Alternative 3, Configuration D will also be neither environmentally superior nor inferior to any of the other alternatives, except for Alternative 4, Sluicing. Alternative 3, Configuration D will be environmentally superior to Alternative 4, Sluicing due to the potential for erosion associated with the sluicing alternative.

HYDROLOGY-4 *Otherwise substantially degrade water quality.*

Sediment Removal/Reservoir Management

As with the Proposed Project, heavy equipment needed for sediment removal has the potential to cause accidental spills of fuel and lubricating oil. Contaminants could be released into the watershed and adversely affect water quality. Alternative 3, Configuration D activities involving construction equipment will be temporary and involve the limited transport, use, disposal, and storage of fuel and lubricating oil, which are regulated by various agencies. Adequate BMPs will be utilized; and adherence to the regulations set forth by County, State, and federal agencies will reduce the potential for impacts to water quality to a less than significant level.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

Adequate BMPs will be utilized; and adherence to the regulations set forth by County, State, and federal agencies will reduce the potential for impacts to water quality to a less than significant level.

Comparison to Proposed Project and Other Alternatives

Alternative 3, Configuration D is considered neither environmentally superior nor inferior to the Proposed Project.

Alternative 3, Configuration D will also be neither environmentally superior nor inferior to any of the other alternatives except Alternative 6, No Project Alternative. Alternative 3, Configuration D will be environmentally inferior to Alternative 6, No Project Alternative due to sediment removal and reservoir management activities.

LAND USE & PLANNING

LAND USE-1 *Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect.*

Sediment Removal

As with the Proposed Project, Alternative 3, Configuration D will not conflict with the City's General Plan or zoning designation of Open Space for the Proposed Project site and is consistent with the LACFCD easement.

As discussed in Subsection 3.8.3, Applicable Regulations, the HWPMP emphasizes protection of recreational and natural resources as well as the management of flood control for the downstream watershed. Alternative 3, Configuration D is consistent with HWPMP Goal 2 of managing the flood control basin for protection of the downstream areas by improving and maintaining the flood capacity behind Devil's Gate Dam.

Implementation of sediment removal and reservoir management will result in temporarily restricted access to portions of designated trails and indirect impacts to existing recreation uses associated with construction activities (see further discussion below in Recreation). With implementation of Mitigation Measure MM LAN-1, impacts associated with recreational activities coexisting with flood management and water conservation will be reduced to less than significant.

Mitigation Measure

> **MM LAN-1**: Temporary impacts to designated recreational facilities and trails shall be minimized through advance communication and redirection to the nearest facility in the vicinity of the Proposed Project. Prior to completion of final plans and specifications, the LACFCD shall review

the plans and specifications to ensure that they contain proper language requiring that signs be posted at the nearby parking lots and trailheads at least one month in advance of sediment removal activities.

Residual Impacts After Mitigation

Impacts associated with recreational activities coexisting with flood management and water conservation would be reduced to less than significant for sediment removal and reservoir management.

Comparison to Proposed Project and Other Alternatives

Alternative 3, Configuration D is considered environmentally superior to the Proposed Project with respect to impacts to land use associated with compatibility to recreation due to the reduction in sediment removal and reservoir management areas and associated activities.

Due to the reduction in sediment removal and reservoir management areas and associated activities, Alternative 3, Configuration D will also be environmentally superior to Alternative 1, Configuration B; Alternative 2, Configuration C; Alternative 4, Sluicing; and Alternative 5, Haul Route Alternative.

Alternative 3, Configuration D will be environmentally inferior to Alternative 6, No Project Alternative, although recreational activities will likely be impacted under Alternative 6, No Project Alternative due to continuous sediment deposition.

MINERAL RESOURCES

MINERALS-1 *Result in the loss of availability of a known mineral resource that would be of value to the region and residents of the state.*

Sediment Removal/Reservoir Management

The Proposed Project site contains areas delineated within SMARA zone designated MRZ-2, which indicates that the area contains adequate information to indicate that significant mineral deposits are present or are judged to have a high likelihood for their presence (City of Pasadena 2002). As with the Proposed Project, under Alternative 3, Configuration D, the Proposed Project site will not be available for mining operations during sediment removal and reservoir management activities; however, sediment removal is not expected to involve usable aggregate material or arroyo stone due to unfavorable characteristics such as fine gradation soil and high organic content levels. Impacts will be less than significant.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

Alternative 3, Configuration D will not result in any potentially significant impacts to mineral resources that will be of value to the region and residents of the state.

Comparison to Proposed Project and Other Alternatives

Alternative 3, Configuration D is considered neither environmentally superior nor inferior to the Proposed Project.

Alternative 3, Configuration D will also be neither environmentally superior nor inferior to any of the other alternatives.

MINERALS-2 *Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan.*

While the Arroyo Seco Master Plan EIR (2002) states that the reservoir may contain large quantities of arroyo stone, the Proposed Project site is not delineated as a locally important mineral resource recovery site on a local general plan, specific plan, or other local land use plan. As with the Proposed Project, under Alternative 3, Configuration D, the Proposed Project site will not be available for mining operations during sediment removal and reservoir management activities; however, sediment excavation is not expected to involve usable aggregate material or arroyo stone due to unfavorable characteristics such as fine gradation soil and high organic content levels. Impacts will be less than significant.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

Alternative 3, Configuration D will not result in any potentially significant impacts to availability of a locally important mineral resource recovery site.

Comparison to Proposed Project and Other Alternatives

Alternative 3, Configuration D is considered neither environmentally superior nor inferior to the Proposed Project.

Alternative 3, Configuration D is considered neither environmentally superior nor inferior to any other alternative.

NOISE & VIBRATION

NOISE-1 *Result in exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.*

Sediment Removal/Reservoir Management

Onsite Construction Equipment Noise

Alternative 3, Configuration D sediment removal activities will take place Monday through Friday between 7:00 a.m. and 6:00 p.m. Standard Time and between 7:00 a.m. and 7:00 p.m. Daylight Savings

Time and on Saturday between 8:00 a.m. and 5:00 p.m. Reservoir management activities will take place under the same hours Monday through Friday, with no activities on Saturday. This alternative will use the same amount and type of construction equipment as the Proposed Project. Since the removal of sediment activities will require a greater amount of equipment than the reservoir management activities, calculations for onsite construction equipment noise have been based on the sediment removal activities equipment list.

Noise impacts from onsite construction equipment activities associated with Alternative 3, Configuration D will be a function of the noise generated by construction equipment, equipment location, sensitivity of nearby land uses, and the timing and duration of the construction activities. Construction noise impacts will be the same as those associated with the Proposed Project to the nearby sensitive receptors and are shown below in Table 4.6-6.

Table 4.6-6: Alternative 3 Onsite Construction Equipment Noise Levels at Nearby Sensitive Receptors

Receptor Description	Receptor Jurisdiction	Distance to Receptor (feet)	Construction Noise Levels[1]	
			dBA Leq	dBA L_{max}
Single-Family Home	Pasadena	140	71	73
Single-Family Home	Los Angeles County	180	69	71
JPL Office	La Cañada Flintridge	200	68	70
Hahamongna Watershed Park	Pasadena	20	86	90
La Cañada High School	La Cañada Flintridge	430	63	63
La Cañada Methodist Church	La Cañada Flintridge	500	62	62

Notes:
[1] Lmax is based on the maximum noise from the loudest piece of equipment and the Leq is the average noise from all equipment.
Source: RCNM, Federal Highway Administration, 2006

Table 4.6-6, above, shows that construction noise impacts will range from 62 dBA Leq to 86 dBA Leq at the nearby receptors, with the highest noise levels occurring at the portion of Hahamongna Watershed Park that is adjacent to the west side of the reservoir.

The City of Pasadena exempts public agencies from the Municipal Code noise requirements. The County of Los Angeles exempts flood control maintenance and construction operations from noise restrictions. The City of La Cañada Flintridge does not provide maximum noise thresholds of construction noise that occurs during the allowed times between Monday through Friday of 7:00 a.m. to 6:00 p.m. Standard Time and 7:00 a.m. to 7:00 p.m. Daylight Savings Time and on Saturday between 7:00 a.m. and 5:00 p.m. Therefore, Alternative 3, Configuration D will comply with all local ordinances due to sediment removal and reservoir management activities taking place during the allowed hours.

Offsite Vehicular Noise

Alternative 3, Configuration D sediment removal and reservoir management activities will generate the same number of daily haul truck trips as the Proposed Project: up to 425 daily round trips and 200 daily round trips, respectively. Therefore, potential noise impacts created by the offsite vehicle trips from Alternative 3, Configuration D will be the same as those generated from the Proposed Project; however, due to the shorter time frame for removing the material the impact will be lessened. Overall, as with the Proposed Project, roadway noise impacts will be less than significant.

Mitigation Measures

No mitigation measures are necessary.

Residual Impacts After Mitigation

Alternative 3, Configuration D will comply with all local noise ordinances, and roadway noise impacts will be less than significant.

Comparison to Proposed Project and Other Alternatives

Alternative 3, Configuration D is considered environmentally superior to the Proposed Project with respect to impacts associated with noise levels due to the shorter time frame for removing the material.

Due to the shorter time frame for removing the material, Alternative 3, Configuration D will also be environmentally superior to Alternative 1, Configuration B; Alternative 2, Configuration C; and Alternative 5, Haul Route Alternative.

Alternative 3, Configuration D will be environmentally inferior to Alternative 4, Sluicing due to hauling activities. Alternative 3, Configuration D could potentially be environmentally superior to Alternative 4, Sluicing if proper sediment transport does not occur under Alternative 4, Sluicing, causing sediment deposits to develop along the route to the ocean. This would result in need for sediment removal and impacts downstream associated with removal activities.

Alternative 3, Configuration D will be environmentally inferior to Alternative 6, No Project Alternative due to sediment removal and reservoir management activities.

NOISE-2 *Result in exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels.*

Sediment Removal/Reservoir Management

As with the Proposed Project, only the nearby single-family homes in the City of Pasadena would experience vibration levels that would exceed the 0.01-inch-per-second vibration standard. This potentially significant impact will be reduced to less than significant through implementation of Mitigation Measure MM N-1. In addition, this impact will be reduced in comparison to the Proposed Project, as sediment removal under this alternative is expected to have a shorter duration.

Mitigation Measures

> **MM N-1**: LACFCD shall restrict the operation of any off-road construction equipment that is powered by a greater than 200-horsepower engine from operating within 180 feet of any offsite residential structure. Equipment that is not performing any earth-moving activities and is solely operating for entering or leaving the site via the access roads to the reservoir is exempted from this requirement.

Residual Impacts After Mitigation

Through implementation of Mitigation Measure MM N-1, the onsite construction equipment vibration impacts to nearby sensitive receptors would be reduced to less than significant.

Comparison to Proposed Project and Other Alternatives

Alternative 3, Configuration D is considered environmentally superior to the Proposed Project with respect to impacts associated with vibration levels due to the shorter time frame for removing the material.

Due to the shorter time frame for removing the material, Alternative 3, Configuration D will also be environmentally superior to all other alternatives except Alternative 4, Sluicing and Alternative 6, No Project Alternative. Alternative 3, Configuration D will be environmentally inferior to Alternative 4, Sluicing due to hauling activities. Alternative 3, Configuration D could potentially be environmentally superior to Alternative 4, Sluicing if proper sediment transport does not occur under Alternative 4, Sluicing, causing sediment deposits to develop along the route to the ocean. This would result in need for sediment removal and impacts downstream associated with removal activities.

Alternative 3, Configuration D will be environmentally inferior to Alternative 6, No Project Alternative due to sediment removal and reservoir management activities.

NOISE-3: *Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.*

Sediment Removal/Reservoir Management

Alternative 3, Configuration D will not create a substantial temporary or periodic increase in ambient noise levels in the project vicinity above existing noise levels. For this analysis, both the sediment removal activities and reservoir management activities have been considered as temporary activities, since they would occur only for limited durations of time. The construction activities associated with the removal of the sediment may create temporary onsite noise impacts from the operation of construction equipment as well offsite noise impacts from the use of haul trucks to export material offsite.

<u>Onsite Construction Equipment Noise</u>

As with the Proposed Project, the onsite equipment that will be operated under Alternative 3, Configuration D will not conflict with any construction noise standards. Any temporary increase in noise level from onsite construction noise will be less than significant. Therefore, potential noise impacts due to onsite construction from Alternative 3, Configuration D will be the same as those generated from the Proposed Project; however, due to the shorter time frame for removing the material the impact will be lessened.

<u>Offsite Vehicular Noise</u>

As with the Proposed Project, the offsite vehicular trips associated with Alternative 3, Configuration D will not create an exceedance of the normally acceptable noise standards for nearby sensitive land uses for locations that do not already exceed the standards for existing conditions. The analysis also found

that for the locations that currently exceed the normally acceptable noise standard, noise contribution from Alternative 3, Configuration D to these roadway segments will be within the Federal Transit Administration's allowable noise exposure increase levels. Therefore, the temporary noise level increase created from offsite vehicular noise impacts will result in a less than significant impact. Therefore, potential noise impacts from offsite vehicular trips from Alternative 3, Configuration D will be the same as those generated from the Proposed Project, however, due to the shorter time frame for removing the material the impact will be lessened.

Mitigation Measures

No mitigation measures are necessary.

Residual Impacts After Mitigation

Temporary noise level increase from onsite construction noise and offsite vehicular noise would be less than significant.

Comparison to Proposed Project and Other Alternatives

Alternative 3, Configuration D is considered environmentally superior to the Proposed Project with respect to impacts associated with noise levels due to the shorter time frame for removing the material.

Due to the shorter time frame for removing the material, Alternative 3, Configuration D will also be environmentally superior to: Alternative 1, Configuration B; Alternative 2, Configuration C; and Alternative 5, Haul Route Alternative.

Alternative 3, Configuration D will be environmentally inferior to Alternative 4, Sluicing due to hauling activities. Alternative 3, Configuration D could potentially be environmentally superior to Alternative 4, Sluicing if proper sediment transport does not occur under Alternative 4, Sluicing, causing sediment deposits to develop along the route to the ocean. This would result in need for sediment removal and impacts downstream associated with removal activities.

Alternative 3, Configuration D will be environmentally inferior to Alternative 6, No Project Alternative due to sediment removal and reservoir management activities.

RECREATION/PUBLIC SERVICES

RECREATION-1 *Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated.*

Alternative 3, Configuration D will not result in the construction of new residences, or facilitate the development of residences, or result in an increase in area population. Therefore, implementation of Alternative 3, Configuration D will not result in increased use or the physical deterioration associated with increased use for neighborhood or regional parks or other recreational facilities due to any increases in area population.

Sediment Removal Impacts

As with the Proposed Project, under Alternative 3, Configuration D sediment removal will occur over the course of five years. During this, most of the Proposed Project site will be closed to public use from the dam face to the edge of this Alternative's excavation limit boundaries (see Figure 4.6-1 and Figure 4.6-2). Alternative 3, Configuration D will have a potential impact on recreational opportunities through temporarily restricted access to trails and long-term alteration of the landscape. Maintenance roads within the basin are used by the LACFCD, Southern California Edison (SCE), and the City of Pasadena, among others, for operations and maintenance of Devil's Gate Reservoir and other facilities in the area. The majority of the maintenance roads will be closed during sediment removal; however, these roads are not officially designated for recreational uses and are often not available for unofficial recreation use due to reservoir water levels or maintenance activities.

Designated Recreational Uses

As detailed below, implementation of sediment removal will result in temporarily restricted access to portions of designated trails and indirect impacts to existing recreation uses associated with construction activities. These impacts may increase the use of other area parks and recreational facilities such as those described in Table 3.15-1: Area Recreational Facilities. The Oak Grove area of Hahamongna Watershed Park and the associated facilities including Oak Grove Disk Golf Course will remain open during sediment removal and will continue to provide active recreational facilities to the area. Sediment removal activities will not limit the use of the Oak Grove area of Hahamongna Watershed Park by individuals or by organizations such as the Oak Grove Disc Golf Club, the Rose Bowl Riders, MACH 1, or the Tom Sawyer Camp.

Activities such as hiking, biking, horseback riding, bird watching, and nature walks will be limited to trails located outside the excavation boundary or to trails opened in absence of removal activities. Of the six designated trails in and adjacent to the Proposed Project site, three of these trails, Flint Wash Trail, Gabrielino Trail, and Gould Canyon Trail, will remain open during sediment removal and will continue to provide active recreational facilities to the area. Small portions of the Altadena Crest Trail, Arroyo Seco Trail, and West Rim Trail will either be closed when sediment removal activities are under way and/or are near the trail. A very small portion of the Altadena Crest Trail will be closed during the whole sediment removal phase.

Figure 4.6-14: Alternative 3, Configuration D, Option 1 Impacts to designated Trails shows the location of the different access conditions during sediment removal for Alternative 3, Configuration D, Option 1. Figure 4.6-15: Alternative 3, Configuration D, Option 2 Impacts to Designated Trails shows the location of the different access conditions during sediment removal for Alternative 3, Configuration D, Option 2.

Sediment removal activities associated with this alternative will not limit or block access to the Oak Grove area and many of the designated trails and will not result in direct potentially significant impacts to these facilities; however, use of these facilities may be less desirable due to construction-related emissions, noise, dust, visual, and traffic impacts associated with sediment removal. These temporary, indirect impacts will reduce the quality of the recreational experience.

Project Boundary

Access Road

Sediment Removal Excavation Limit

Trail & Maintenance Road Closures

Closed during the full duration of sediment removal

To remain open during sediment removal

Closed during sediment removal with possible opening on a seasonal basis

Temporarily closed while sediment removal is occuring in the area

Figure 4.6-14
Impacts To Designated Trails Map

Alternative 3 - Configuration D, Option 1

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\\cgi-gisdata01\GIS_DATA\Projects\20000s\20201 - 20400\20346 Devil's Gate EIR\20346 Figure 4.6-14 Alternative 3, Configuration D1 Impacts To Designated Trails.mxd

Project Boundary

Access Road

Sediment Removal Excavation Limit

Trail & Maintenance Road Closures

Closed during the full duration of sediment removal

To remain open during sediment removal

Closed during sediment removal with possible opening on a seasonal basis

Temporarily closed while sediment removal is occuring in the area

Figure 4.6-15
Impacts To Designated Trails Map

Alternative 3 - Configuration D, Option 2

Version Date: 8/20/2014

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\\cgi-gisdata01\GIS_DATA\Projects\20000s\20201 - 20400\20346 Devil's Gate EIR\20346 Figure 4.6-15 Alternative 3, Configuration D2 Impacts To Designated Trails.mxd

Indirect impacts to recreation associated with sediment removal under Alternative 3, Configuration D will be reduced in comparison to the Proposed Project due to the reduction in excavation area and associated sediment removal activities. In addition, for Alternative 3, Configuration D, Option 1 approximately 44.43 acres of the approximately 120.42 acres of the Proposed Project site will be left undisturbed. This will include swaths along the west and east sides of the site and in the center of the site between the two excavated branches. For Alternative 3, Configuration D, Option 2 approximately 50.42 acres of the approximately 120.42 acres of the Proposed Project site will be left undisturbed. This will include a swath along the east side of the site as well as a large, contiguous area on the west side of the reservoir. These areas of undisturbed vegetation left throughout will serve to screen some of the ongoing recreation uses from the sediment removal activities and associated construction-related emissions, noise, dust, and visual impacts.

Recreational users may choose to visit other area parks, recreational facilities, or trails due to the temporary access restrictions or the indirect effects of construction-related activities. Due to the number of other recreational facilities and trails in the vicinity, it is anticipated that these visitors will be dispersed throughout the area and that no single park or facility will experience a substantial increase in use. Therefore, Alternative 3, Configuration D will not increase use of other existing parks or recreation facilities such that substantial physical deterioration of these facilities will occur or be accelerated. Impacts to other existing parks and recreation facilities will be temporary and less than significant. Sediment removal under this Alternative could potentially have a shorter duration than the Proposed Project due to the reduced amount of sediment to be removed. This shorter duration could further reduce the temporary and less than significant impacts to other existing parks and recreation facilities.

Reservoir Management Impacts

After the annual proposed reservoir management, access to Devil's Gate Reservoir will be similar to existing conditions. Every year the reservoir will be temporarily closed to public access for reservoir management. This will occur during the late summer/early fall over an estimated five-week period, Monday through Friday. The length of time will vary depending on the amount of sediment deposited in the reservoir over the course of the year. The Oak Grove area of Hahamongna Park and most of the designated trails will remain open during reservoir management activities and will continue to provide active recreational facilities to the area. The proposed reservoir management activities will typically occur only during the weekdays; therefore, weekend visitors of the Hahamongna Watershed Park will not be affected by the proposed reservoir management activities. Trails will be beneficially affected in the long-term through the reduction of potential disruption by flooding and/or being buried under sediment. Impacts to existing parks and recreation facilities associated with Alternative 3, Configuration D reservoir management activities will be less than significant. In addition, the reservoir management area under Alternative 3, Configuration D will be much smaller than under either Proposed Project reservoir management options.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

Alternative 3, Configuration D will not result in any potentially significant impacts associated with increased use of other existing parks or recreation facilities.

Comparison to Proposed Project and Other Alternatives

Alternative 3, Configuration D is considered environmentally superior to the Proposed Project with respect to recreation uses due to the reduction in sediment removal and reservoir management areas and associated activities.

Due to the reduction in sediment removal and reservoir management areas and associated activities, Alternative 3, Configuration D will also be environmentally superior to: Alternative 1, Configuration B; Alternative 2, Configuration C; Alternative 4, Sluicing; and Alternative 5, Haul Route Alternative.

Alternative 3, Configuration D will be environmentally superior to Alternative 6, No Project Alternative, as recreational activities will likely be impacted under Alternative 6, No Project Alternative due to continuous sediment deposition.

RECREATION-2 *Require the construction or expansion of existing recreational facilities which might have an adverse physical effect on the environment.*

As discussed in detail above under RECREATION-1, recreational users may choose to visit other area parks, recreational facilities, or trails due to the temporary access restrictions or the indirect effects of construction-related activities during reservoir management activities. It is anticipated that these visitors will be dispersed throughout the area and that no single park or facility will experience a substantial increase in use. Therefore, Alternative 3, Configuration D will not require the construction or expansion of existing recreational facilities which might have an adverse physical effect on the environment, resulting in a less than significant impact. Sediment removal under this Alternative could potentially have a shorter duration than the Proposed Project, due to the reduced amount of sediment to be removed. This shorter duration could further reduce the temporary and less than significant impacts to other existing parks and recreation facilities.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

Alternative 3, Configuration D will not result in any potentially significant impacts associated with the construction or expansion of existing recreational facilities.

Comparison to Proposed Project and Other Alternatives

Alternative 3, Configuration D is considered environmentally superior to the Proposed Project due to the reduction in sediment removal and reservoir management areas and associated activities.

Due to the reduction in sediment removal and reservoir management areas and associated activities, Alternative 3, Configuration D will also be environmentally superior to Alternative 1, Configuration B; Alternative 2, Configuration C; Alternative 4, Sluicing; and Alternative 5, Haul Route Alternative.

Alternative 3, Configuration D will be environmentally superior to Alternative 6, No Project Alternative, as recreational activities will likely be impacted under Alternative 6, No Project Alternative due to continuous sediment deposition.

PUBLIC SERVICES-1 *Result in substantial adverse impacts associated with the provision of or need for new or physically altered recreational facilities, the construction of which could cause significant environmental impacts.*

As discussed in detail above under RECREATION-2, Alternative 3, Configuration D will not result in a substantial increase in use of any one park or facility. Therefore, Alternative 3, Configuration D will not require the provision of or need for new or physically altered recreational facilities, the construction of which could cause significant environmental impacts.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

Alternative 3, Configuration D will not result in any potentially significant impacts associated with the construction or expansion of existing recreational facilities.

Comparison to Proposed Project and Other Alternatives

Alternative 3, Configuration D is considered environmentally superior to the Proposed Project due to the reduction in sediment removal and reservoir management areas and associated activities.

Due to the reduction in sediment removal and reservoir management areas and associated activities, Alternative 3, Configuration D will also be environmentally superior to Alternative 1, Configuration B; Alternative 2, Configuration C; Alternative 4, Sluicing; and Alternative 5, Haul Route Alternative.

Alternative 3, Configuration D will be environmentally superior to Alternative 6, No Project Alternative, as recreational activities will likely be impacted under Alternative 6, No Project Alternative due to continuous sediment deposition.

TRANSPORTATION & TRAFFIC

TRANSPORTATION-1 *Conflict with an applicable plan, ordinance, or policy establishing measure of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit.*

Sediment Removal

Truck traffic associated with Alternative 3, Configuration D is expected to adhere to traffic regulations; however, during sediment removal, Alternative 3, Configuration D truck traffic is expected to impact traffic LOS on the existing roadway network. Potential impacts regarding existing LOS are discussed under TRANSPORTATION-2 below. This increase in traffic would result in temporary significant impacts to the efficiency of the circulation system. Implementation of Mitigation Measures MM TRA-1 and TRA-2 would reduce this impact but not to a level of less than significant.

Sediment removal and associated transportation under this Alternative could potentially have a shorter duration than the Proposed Project, due to the reduced amount of sediment to be removed. Other potential impact reduction measures discussed under TRANSPORTATION-2, below, could reduce impacts to less than significant. These measures cannot be legally imposed by the LACFCD, however, since the locations are under the jurisdiction of other agencies. Every reasonable effort will be made to coordinate with and receive approval from the jurisdictional agencies to implement the impact reduction measures but LACFCD cannot guarantee that the measures will be implemented. Therefore, this temporary impact could remain potentially significant.

Reservoir Management

Truck traffic associated with reservoir management is not expected to adversely affect traffic LOS on the existing roadway network. Therefore, impacts to the efficiency of the circulation system would be less than significant.

Mitigation Measures

MM TRA-1: Proposed Project haul trucks will not deliver to the Vulcan Material Reliance Facility during the PM peak period.

MM TRA-2: Proposed Project haul trucks will not deliver to the Boulevard Pit during the PM peak period.

Residual Impacts after Mitigation

Potentially significant traffic impacts associated with the sediment removal phase would be temporary, expected to occur during the drier months (from April to December, except on holidays), and would cease at the end of the sediment removal phase. Implementation of the mitigation measures described above would reduce impacts to traffic and circulation but not to a level of less than significant. Other potential impact reduction measures discussed under TRANSPORTATION-2, below, could reduce impacts to less than significant. These measures cannot be legally imposed by the LACFCD, however, since the locations are under the jurisdiction of other agencies. Every reasonable effort will be made to coordinate with and receive approval from the jurisdictional agencies to implement the impact reduction measures but LACFCD cannot guarantee that the measures will be implemented. Therefore, this temporary impact could remain potentially significant. No significant traffic impacts would occur under reservoir management.

Comparison to Proposed Project and Other Alternatives

Alternative 3, Configuration D is considered environmentally superior to the Proposed Project due to the reduction in sediment removal and reservoir management areas.

Due to the reduction in sediment removal and reservoir management areas, Alternative 3, Configuration D will also be environmentally superior to Alternative 1, Configuration B and Alternative 2, Configuration C.

Alternative 3, Configuration D will be environmentally inferior to Alternative 5, Haul Route Alternative as the Alternative 5, Haul Route Alternative will result in reduced traffic impacts.

Alternative 3, Configuration D will be initially environmentally inferior to Alternative 4, Sluicing due to hauling sediment and vegetation from the reservoir. This Alternative will potentially be environmentally superior to Alternative 4, Sluicing if proper sediment transport does not occur under Alternative 4, Sluicing, causing sediment deposits to develop along the route to the ocean. This would result in need for sediment removal from the Arroyo Seco Channel, the Los Angeles River, or the Port of Long Beach and impacts to transportation associated with removal activities.

Alternative 3, Configuration D will be environmentally inferior to Alternative 6, No Project Alternative due to sediment removal and reservoir management activities.

TRANSPORTATION-2 *Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways.*

Sediment Removal

As with the Proposed Project, Alternative 3, Configuration D will not significantly impact freeway segments and freeway on- and off-ramps but will significantly impact the following intersections:

- Berkshire Place and I-210 eastbound ramps during the AM peak period;
- Irwindale Avenue/Foothill Boulevard intersection during the PM peak hour;
- Figueroa St/Scholl Canyon Road and SR-134 westbound ramps during the AM and PM peak hours;
- Glenoaks Boulevard/Osborne Street intersection during the AM and PM peak hours;
- Sheldon Street and San Fernando Road intersection during the PM peak hour; and
- Branford Street and San Fernando Road intersection during the PM peak hour.

In order to reduce the impacts to the Berkshire Place and I-210 eastbound ramps intersection during the AM peak period, sediment removal trucks would have to use an alternative route during this period. This alternative route would involve as follows: Loaded trucks will exit the reservoir on the improved, existing westerly access road, turning left onto southbound Oak Grove Drive, then right onto westbound

Windsor Avenue, and then east onto I-210 east, to disposal sites in Azusa and Irwindale or I-210 west to the Sun Valley disposal sites.

Under this route all the intersections are anticipated to continue to operate at an LOS C or better for all utilized intersections for the AM Peak Period; however, use of this alternative route would require implementation of the following potential impact reduction measure:

- Proposed Project haul trucks would avoid using the Berkshire Place and I-210 eastbound ramps intersection during the AM peak period by instead using the Windsor/Arroyo and I-210 ramps. This would require the median on Oak Grove Drive to be restriped to a Two Way Left Turn Lane (TWLTL). The changes to Oak Grove Drive would require the approval of the City of Pasadena.

The impact reduction measure discussed above cannot be legally imposed by the LACFCD since the location is under the jurisdiction of the City of Pasadena. Every reasonable effort will be made to coordinate with and receive approval to implement this impact reduction measure; however, LACFCD cannot guarantee that this impact reduction measure will be implemented. Therefore this temporary impact would remain potentially significant.

The Irwindale Avenue/Foothill Boulevard intersection is anticipated to operate at an unacceptable LOS during the PM peak hour, resulting in a temporary significant impact. Mitigation Measure MM TRA-1 would reduce the impact to the Irwindale Avenue/Foothill Boulevard intersection to less than significant.

The Figueroa St/Scholl Canyon Road and SR-134 westbound ramps intersection is anticipated to operate at an unacceptable LOS during the AM and PM peak hours, resulting in a temporary significant impact. Reducing this impact to less than significant would require implementation of the following potential impact reduction measure:

- Figueroa Street/Scholl Canyon Road and SR-134 westbound ramps: Restripe the westbound right turn lane to a shared left-right turn lane and the northbound through lane to a shared through-right turn lane. The northbound direction will include a shared through-right turn lane and a right turn lane. The southbound direction will include a shared through-left turn lane and a through turn lane. The westbound direction will include a left turn lane and a shared left-right turn lane. This impact reduction measure will require the approval of the City of Los Angeles and Caltrans.

Implementation of the impact reduction measure discussed above would reduce the impact to the Figueroa St/Scholl Canyon Road and SR-134 westbound ramps intersection to less than significant. This impact reduction measure cannot be legally imposed by the LACFCD. Every reasonable effort will be made to coordinate with and receive approval to implement the impact reduction measure; however, LACFCD cannot guarantee that the measure will be implemented therefore this temporary impact could remain significant.

The Glenoaks Boulevard and Osborne Street intersection is anticipated to operate at an unacceptable LOS during the AM and PM peak hours, resulting in a temporary significant impact.

The Sheldon Street and San Fernando Road intersection and the Branford Street and San Fernando Road intersection are anticipated to operate at an unacceptable LOS during the PM peak hour, resulting in

temporary significant impacts. Mitigation Measure MM TRA-2 would reduce the impacts to less than significant.

Reservoir Management

The reservoir management associated with Alternative 3, Configuration D would require periodic management activities at the Devil's Gate Reservoir. Depending on storm events, sediment excavation/trucking offsite may be required over a period of a few weeks annually. Daily truck traffic is expected to be half the amount that will occur during sediment removal. Due to the limited time period and the reduced truck traffic, reservoir management activities are not expected to adversely affect traffic level of service on the existing roadway network. Therefore, impacts would be less than significant.

Mitigation Measure

See Mitigation Measures MM TRA-1 and MM TRA-2.

Residual Impacts After Mitigation

Potentially significant traffic impacts associated with the sediment removal phase would be temporary, expected to occur during the drier months (from April to December, except on holidays), and would cease at the end of the sediment removal phase. Implementation of the mitigation measures described above would reduce some but not all of the impacts to traffic and circulation to a level less than significant. Other potential impact reduction measures discussed above could reduce impacts to less than significant. These measures cannot be legally imposed by the LACFCD, however, since the locations are under the jurisdiction of other agencies. Every reasonable effort will be made to coordinate with and receive approval from the jurisdictional agencies to implement the impact reduction measures but LACFCD cannot guarantee that the measures will be implemented. Therefore, these temporary impacts could remain potentially significant. No significant traffic impacts would occur under reservoir management.

Comparison to Proposed Project and Other Alternatives

Alternative 3, Configuration D is considered environmentally superior to the Proposed Project due to the reduction in sediment removal and reservoir management areas.

Due to the reduction in sediment removal and reservoir management areas, Alternative 3, Configuration D will also be environmentally superior to Alternative 1, Configuration B and Alternative 2, Configuration C.

Alternative 3, Configuration D will be environmentally inferior to Alternative 5, Haul Route Alternative as the Alternative 5, Haul Route Alternative will result in reduced traffic impacts.

Alternative 3, Configuration D will be initially environmentally inferior to Alternative 4, Sluicing due to hauling sediment and vegetation from the reservoir. This Alternative will potentially be environmentally superior to Alternative 4, Sluicing if proper sediment transport does not occur under Alternative 4, Sluicing, causing sediment deposits to develop along the route to the ocean. This would result in need

for sediment removal from the Arroyo Seco Channel, the Los Angeles River, or the Port of Long Beach and impacts to transportation associated with removal activities.

Alternative 3, Configuration D will be environmentally inferior to Alternative 6, No Project Alternative due to sediment removal and reservoir management activities.

TRANSPORTATION-3 *Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).*

Sediment Removal

Implementation of Alternative 3, Configuration D may include impact reduction measures described above that would require modifications to the existing roadway network. These modifications would consist of roadway restriping to reduce potential traffic impacts to a level less than significant. These changes would not alter existing roadway use and would be implemented consistently with all applicable traffic safety standards. Alternative 3, Configuration D is limited to excavation and transportation of sediment that has accumulated in Devil's Gate Reservoir and would not introduce any new uses that would be incompatible or substantially increase hazards with the existing roadway system. Therefore, impacts related to traffic hazards would be less than significant.

Reservoir Management

The reservoir management associated with Alternative 3, Configuration D would not require any modifications to the existing roadway network and would not introduce any new uses that would be incompatible with the existing roadway system. Therefore, no impact would occur.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

Impacts will be less than significant.

Comparison to Proposed Project and Other Alternatives

Alternative 3, Configuration D is considered neither environmentally superior nor inferior to the Proposed Project or to any of the other alternatives as it would not introduce any new uses that would be incompatible with the existing roadway system.

TRANSPORTATION-4 *Result in inadequate emergency access.*

Sediment Removal/Reservoir Management

Alternative 3, Configuration D would not sever or otherwise block access to any existing roadways. No equipment staging will occur on public roadways during construction of the Proposed Project. The impact to emergency access would be a less than significant impact.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

Impacts will be less than significant.

Comparison to Proposed Project and Other Alternatives

Alternative 3, Configuration D is considered neither environmentally superior nor inferior to the Proposed Project or any other alternative except for Alternative 6, No Project Alternative.

Alternative 3, Configuration D will be environmentally superior to Alternative 6, No Project Alternative as the No Project Alternative will severely restrict flood control, potentially increasing flooding downstream of Devil's Gate Dam.

TRANSPORTATION-5 *Conflict with adopted policies, plans, or programs regarding public transit or bicycle or pedestrian facilities or otherwise decrease the performance or safety of such facilities supporting alternative transportation (e.g., bus turnouts, bicycle racks).*

Sediment Removal

Alternative 3, Configuration D would be confined to the roadway network described in Section 3.16.2 and would not adversely affect alternative modes of public transportation such as light rail. Implementation of Alternative 3, Configuration D would not require closure of any bus stops or disrupt any existing bus routes. The degrading of LOS at intersections, freeway segments, and freeway on- and off-ramps, described above under TRANSPORTATION-2, could affect buses using the existing roadway network. This would be a potentially temporary significant impact.

Reservoir Management

The reservoir management associated with Alternative 3, Configuration D would require periodic management activities at Devil's Gate Reservoir that would not adversely affect traffic LOS on the existing roadway network that could delay bus services. Therefore, reservoir management impacts would be less than significant.

Mitigation Measure

See Mitigation Measures MM TRA-1 and MM TRA-2.

Residual Impacts After Mitigation

Potentially significant traffic impacts associated with the sediment removal phase would be temporary, expected to occur during the drier months (from April to December, except on holidays), and would cease at the end of the sediment removal phase. Implementation of the mitigation measures described above would reduce some but not all of the impacts to traffic and circulation to a level less than significant. Other potential impact reduction measures discussed above could reduce impacts to less

than significant. These measures cannot be legally imposed by the LACFCD, however, since the locations are under the jurisdiction of other agencies. Every reasonable effort will be made to coordinate with and receive approval from the jurisdictional agencies to implement the impact reduction measures but LACFCD cannot guarantee that the measures will be implemented. Therefore, these temporary impacts could remain potentially significant. No significant traffic impacts would occur under reservoir management.

Comparison to Proposed Project and Other Alternatives

Alternative 3, Configuration D is considered environmentally superior to the Proposed Project due to the reduction in sediment removal and reservoir management areas.

Due to the reduction in sediment removal and reservoir management areas, Alternative 3, Configuration D will also be environmentally superior to Alternative 1, Configuration B and Alternative 2, Configuration C.

Alternative 3, Configuration D will be environmentally inferior to Alternative 5, Haul Route Alternative as the Alternative 5, Haul Route Alternative will result in reduced traffic impacts.

Alternative 3, Configuration D will be initially environmentally inferior to Alternative 4, Sluicing due to hauling sediment and vegetation from the reservoir. This Alternative will potentially be environmentally superior to Alternative 4, Sluicing if proper sediment transport does not occur under Alternative 4, Sluicing, causing sediment deposits to develop along the route to the ocean. This would result in need for sediment removal from the Arroyo Seco Channel, the Los Angeles River, or the Port of Long Beach and impacts to transportation associated with removal activities.

Alternative 3, Configuration D will be environmentally inferior to Alternative 6, No Project Alternative due to sediment removal and reservoir management activities.

UTILITIES & SERVICE SYSTEMS

UTILITIES-1 *Require or result in construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects.*

Sediment Removal

As with the Proposed Project, during sediment removal Alternative 3, Configuration D will not result in or require the construction of new or expansion of existing stormwater drainage systems. Sediment and vegetation removal operations will result in alterations of surface drainage characteristics at the project site due to clearing, grading, and excavation activities. Although the drainage characteristics for the site will be altered, the project overall will result in a positive impact to drainage of Devil's Gate Reservoir because it will help restore the flood control capacity of Devil's Gate Dam and Reservoir. As with the Proposed Project, Alternative 3, Configuration D will add minimal impermeable surface area to the Proposed Project site through paving a portion of the access roads from Oak Grove Drive. This minimal increase in impervious surface area will not result in any significant increase in stormwater runoff that will require new stormwater drainage facilities.

In addition, these activities will not directly involve the existing storm drain outfalls, power lines, gas line, communication lines, water lines, sewer lines, or water wells. Impacts to these utility facilities will be avoided through compliance with City regulations regarding utility facilities, coordination with utility providers, and implementation of LACDPW BMPs.

Reservoir Management

During reservoir management, Alternative 3, Configuration D will not result in or require the construction of new or expansion of existing stormwater drainage systems. Sediment that accumulates after the proposed removal will be removed through FAST operations or through mechanical excavation and trucking. The FAST operations are expected to be similar to historic FAST operations, and sediment fines discharged through FAST operations will be transported during storm flows to the Pacific Ocean via Arroyo Seco and the Los Angeles River. No impacts to stormwater facilities are expected during FAST operations. Any necessary mechanical removal during reservoir management is expected to be small (typically 13,000 cy per year). Impacts to stormwater facilities during mechanical removal will be avoided through compliance with City regulations regarding stormwater facilities and implementation of LACDPW BMPs.

Mitigation Measure

No mitigation measures are required.

Residual Impacts After Mitigation

Alternative 3, Configuration D will not result in any potentially significant impacts to utility facilities.

Comparison to Proposed Project and Other Alternatives

Alternative 3, Configuration D is considered neither environmentally superior nor inferior to the Proposed Project nor to any of the other alternatives.

4.6.4 Conclusion and Relationship to Project Objectives

Alternative 3, Configuration D will meet the Proposed Project's objectives of satisfactorily increasing flood protection, creating a configuration suitable for routine operations and maintenance, reducing the possibility of plugging at the dam face, removing sediment from Johnson Field, removing sediment in a timely manner, and delivering sediment to facilities already prepared to accept sediment.

Alternative 3, Configuration D Alternative is considered environmentally superior to the Proposed Project due to reduced impacts associated with sediment removal and reservoir management.

Due to the reduction in sediment removal and reservoir management areas, Alternative 3, Configuration D will also be environmentally superior to Alternative 1, Configuration B and Alternative 2, Configuration C.

Alternative 3, Configuration D is considered environmentally superior to Alternative 5, Haul Route Alternative due to reduced impacts associated with sediment removal and reservoir management. Alternative 3, Configuration D will be environmentally inferior to Alternative 5, Haul Route Alternative, however, with impacts associated with traffic.

Alternative 3, Configuration D will be initially environmentally inferior to Alternative 4, Sluicing due to hauling sediment and vegetation from the reservoir. This Alternative will potentially be environmentally superior to Alternative 4, Sluicing if proper sediment transport does not occur under Alternative 4, Sluicing, causing sediment deposits to develop along the route to the ocean. This would result in need for sediment removal from the Arroyo Seco Channel, the Los Angeles River, or the Port of Long Beach and impacts associated with removal activities.

Alternative 3, Configuration D will be environmentally inferior to Alternative 6, No Project Alternative, due to sediment removal and reservoir management activities; although aesthetics, biological resources, and recreation resources of the reservoir will likely degrade under Alternative 6, No Project Alternative due to continuous sediment deposition.

4.7 ALTERNATIVE 4, SLUICING METHOD

4.7.1 Alternative Description

Sediment Removal

The Sluicing Alternative will remove the approximately 2.9 million cy of current excess sediment in the reservoir in addition to any additional sediment received during the project. Alternative 4, Sluicing will involve the removal of sediment from the reservoir through sluicing. Sediment stockpiled at Johnson Field as part of the IMP will also be sluiced. Through sluicing, sediment will be moved downstream to the Arroyo Seco. Sluicing will initially transport heavier and greater amounts of sediments downstream; however, as described in the sediment transport study (Appendix K), the sediment transport during historically typical flows and standard dam operations was found to be incapable of flushing excess sediment down the length of the Arroyo Seco Channel. After approximately 9.5 months of sluicing under historically typical flows, followed by an additional6 months of historically typical sediment flushing flows, approximately 20,000 cy of sediment will be conveyed to the Los Angeles River, leaving approximately 243,000 cy of sediment in the Arroyo Seco Channel, with deposits primarily occurring in and around the natural reaches. As demonstrated, it is likely that sediment loads will fall out rapidly after leaving Devil's Gate Reservoir. This sediment would eventually need to be removed from the Arroyo Seco Channel.

Reservoir Configuration

Any mechanical activity (as described below) will take place within the same area as the Proposed Project's excavation limit boundaries (see Figure 4.7-1: Alternative 4, Sluicing Sediment Removal and Reservoir Management Areas). Sediment removal will occur throughout the reservoir, depending on the amount and direction of water flow entering the reservoir. In addition, prior to sediment removal, vegetation removal will be required throughout the reservoir. As part of this Alternative, sediment stockpiled at Johnson Field as part of the IMP may also be removed.

Removal Method

Before sluicing is initiated, all vegetation and trees will be removed from within the excavation limit boundaries (see Figure 4.7-1) or where haul roads are located. The removed vegetation will be transported to the Scholl Canyon Landfill for use as alternate daily cover (ADT). After the initial

vegetation and tree removal, vegetation within the excavation footprint will be mowed or removed and grubbed annually during the sediment removal phase of the alternative.

Sluicing differs from FAST operations in the amount and weight of sediment transported. FAST operations have been routinely used at Devil's Gate Reservoir and result in relatively small amounts of finer grained sediment passing through the reservoir. FAST operations will take place using natural flows to allow the finer grained sediment to pass through the reservoir and downstream of the dam. The sediment fines discharged during historic FAST operations are transported to the Pacific Ocean via Arroyo Seco and the Los Angeles River, either via the discharge flow or subsequent storm flows.

Sluicing utilizes flowing water to transport sediment. In order to remove large amounts of accumulated sediment, the sluicing operation also involves mechanically agitating sediment to increase the sediment suspended in the water flowing through the reservoir and then opening the sluice gates to allow the sediment-laden water to be discharged downstream. Mechanical agitation is achieved by using bulldozers and other heavy equipment to actively push sediment into the flow path of the water. Two methods for sluicing will be utilized for this removal method:

- Prior to storm flows entering the reservoir, loose sediment will be pushed into an empty, defined channel to be picked up when future stormwater flows pass through the reservoir; or
- Sediment will be pushed into a channel that is already flowing with storm or recession water.

When flow rates entering the reservoir are below 150 cfs, rates of mechanical agitation will be adjusted to achieve an optimal sediment to water ratio to produce an efficient sluicing operation. When flows are over 150 cfs, mechanical agitation will cease and heavy equipment will be moved out of the flood plain.

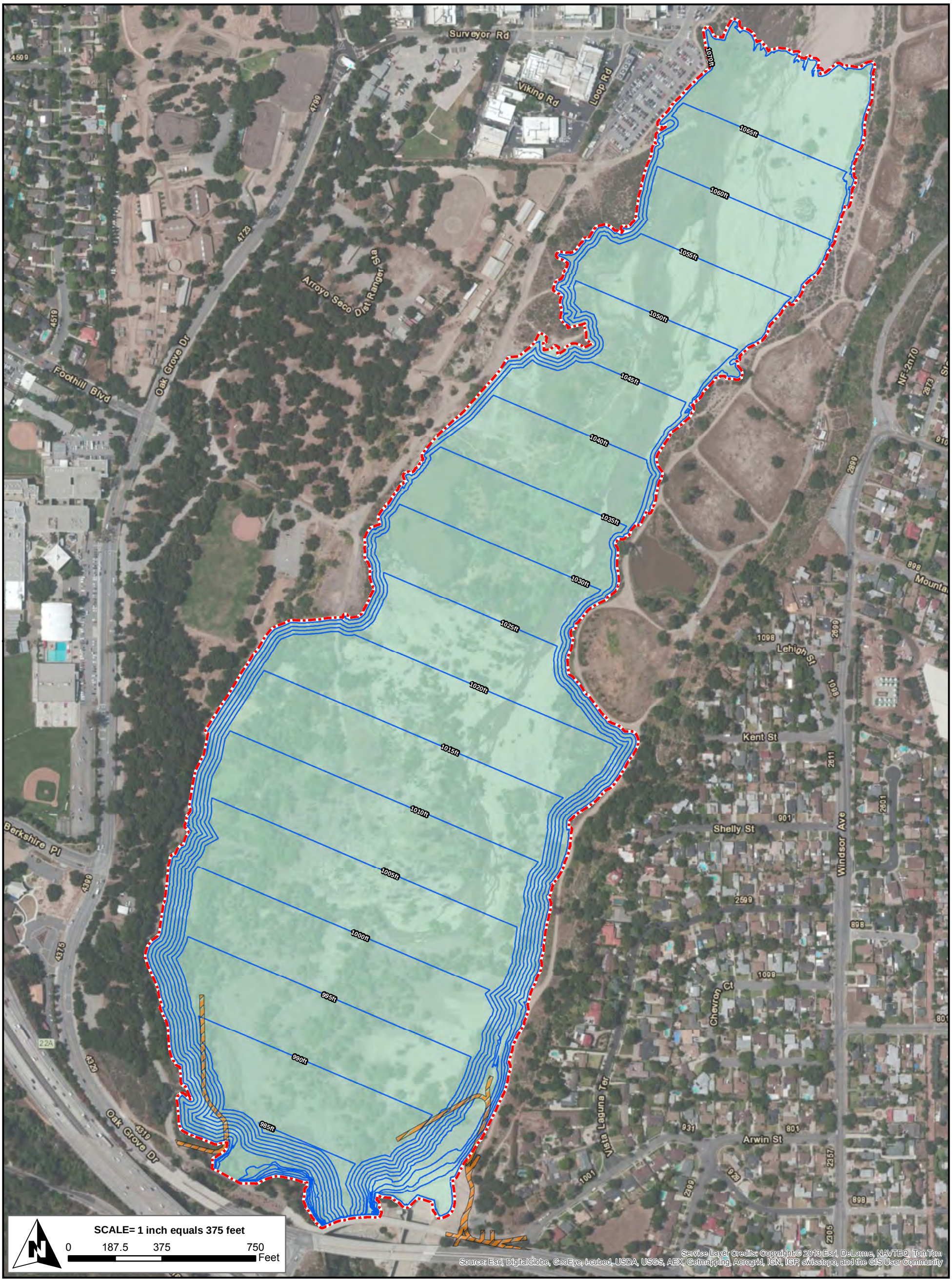
The amount of sediment that will be removed through sluicing operations is limited by the amount of storm runoff received into the reservoir.

Sediment Disposal

Sediment transported during the sluicing operations will be discharged to the Pacific Ocean via Arroyo Seco and the Los Angeles River either via the discharge flow or subsequent storm flows. If proper sediment transport does not occur and sediment deposits develop along the route to the ocean, sediment removal from the Arroyo Seco Channel, the Los Angeles River, or the Port of Long Beach may be required.

Project Schedule

Sluicing activities within the reservoir area will take place during the storm season. Any activities involving heavy equipment will take place between the hours of 7:00 a.m. and 6:00 p.m. Standard Time and between 7:00 a.m. and 7:00 p.m. Daylight Savings Time and on Saturday between 8:00 a.m. and 5:00 p.m.



Proposed Project Boundary

Access Road

Reservoir Management Area

Sediment Removal Excavation Limit

Figure 4.7-1
Sluicing Sediment Removal and Reservoir Management Areas
Alternative 4

Version Date: 10/18/2013

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\\Cgi-gisdata01\gis_data\Projects\20000s\20201 - 20400\20346 Devil's Gate EIR\20346 Figure 4.7-1 Alternative 4, Sluicing Sediment Removal and Reservoir Management Areas.mxd

Total project duration of this alternative will depend on future yearly storm flows and is therefore difficult to estimate. Sediment transport studies (see Appendix K) indicate, if successful, removal of the 2.9 million cy of sediment could take several decades. The estimated removal time for 1 million cy of sediment is 52 years; thus, removal of 2.9 million cy would take approximately 150 years to complete under the Sluicing Alternative (Bureau Veritas 2013).

Reservoir Management

Since the main sluicing portion of the project is projected to occur over a period of multiple decades, reservoir management will begin after the large-scale sediment removal is completed. Under reservoir management, sluicing will occur as needed due to sediment accumulation in the reservoir. The access roads will be maintained to provide proper road width for access.

Vegetation Maintenance

Vegetation within the maintenance footprint will be mowed or removed and grubbed annually, involving a total maintenance acreage of approximately 120.42 acres. These activities will occur Monday through Friday over an estimated three-week period in the late summer or early fall. Vegetation outside the maintenance footprint will be allowed to naturally re-establish and/or remain in place.

4.7.2 Alternative Duration

A large-scale sediment removal project will be required if a significant amount of sediment accumulates in the reservoir or outside the maintenance footprint despite the reservoir management activities. Sediment inside and outside the maintenance footprint will be monitored to determine if the sediment buildup is exceeding projected volumes. The need for a larger cleanout depends on the success of the sluicing as well as the total amount of future sediment inflow. If sluicing activities prove to be successful, sediment outside the maintenance footprint will be monitored. If future reservoir conditions threaten dam operations, LACFCD will initiate the planning process for a new large-scale sediment removal project. Part of this planning will involve utilizing the CEQA process to evaluate and determine the appropriate level of environmental document required for the future project.

4.7.3 Impact Analyses and Comparison to Proposed Project

AESTHETICS

AESTHETICS-1 *Have a substantially adverse effect on a scenic vista.*

Sediment Removal

Sediment removal activities associated with Alternative 4, Sluicing will change the visual characteristics of the reservoir through the removal of sediment and associated vegetation in the reservoir. As with the Proposed Project, sediment removal activities associated with Alternative 4, Sluicing will not result in obstruction or blockage of views, due to the large difference in elevation between viewpoints and the Proposed Project site.

Construction equipment will be visible in the basin. Views of construction equipment will be expected elements in the viewshed, due to the ongoing IMP measures currently underway to keep debris from

plugging the outlet works; however, the amount of equipment and duration onsite will be greater for the Alternative than for the IMP measures or for the Proposed Project.

With sediment removal under Alternative 4, Sluicing, the topography of the reservoir will be lower, especially at the south end of the reservoir; and all vegetation within the excavation limits will be removed. These elements will result in a high degree of contrast from existing visual characteristics and will result in a potentially significant impact to scenic vistas. These contrasting elements will be highly visible for Viewpoints 1 through 3. For Viewpoints 1 and 3, however, the co-dominant features of Devil's Gate Dam, the reservoir maintenance roads, electrical lines, the debris boom line, and other less dominant features of the San Gabriel Mountains, Oak Grove Drive, JPL facilities, and residential areas will remain unchanged. In addition, the existing vegetation along the west side of the reservoir will not be removed and will share dominance with the dam and the excavation area.

Sediment removal activities will also be visible from Viewpoint 4 and Viewpoint 5 but will be less dominant due to distance and other more dominant visual elements. The dominant features for Viewpoint 4 (I-210, Devil's Gate Dam, San Gabriel Mountains, and the west side of the reservoir) and Viewpoint 5 (spreading grounds, JPL facilities) will remain unchanged.

As with the Proposed Project, excavation and associated activities within the reservoir area are expected to take place during dryer months, from April to December, as weather permits. During the wetter months, changes to the visual characteristics associated with sediment removal will be slightly less apparent when water is stored in the basin. Some regrowth of riparian vegetation will likely occur during this time. Both these factors will reduce the change in the visual characteristics associated with sediment removal. In addition, as discussed above, sediment removal activities will not introduce view-obstructing features.

Nevertheless, due to the multi-year duration of the sediment removal phase under Alternative 4, Sluicing, the large-scale alteration, visibility of the site, and level of viewer sensitivity, sediment removal activities will be a potentially significant impact to scenic vistas. Not only will the sediment removal associated with Alternative 4, Sluicing result in a potentially significant impact to scenic vistas, the duration of sediment removal activities will be longer than the Proposed Project due to the alternate removal method.

Reservoir Management

As with the Proposed Project, reservoir management will not result in obstruction or blockage of views. Construction equipment will also be visible in the basin but only for short periods of time.

After completion of the proposed sediment removal activities associated with Alternative 4, Sluicing, the disturbed areas outside the reservoir management area are expected to experience natural regrowth with native vegetation, primarily Riparian Herbaceous vegetation. The area available for regrowth will be the same as reservoir management Option 1 under the Proposed Project.

The majority of the reservoir will not be allowed to naturally grow and/or remain in place, as the reservoir management area is the entire Configuration A excavation area. Therefore, reservoir management under Alternative 4, Sluicing will result in a similar degree of contrast as seen during sediment removal and will result in a potentially significant impact to scenic vistas. Any contrast

associated with this Alternative will be the same as reservoir management Option 1 under the Proposed Project.

Mitigation Measure

No feasible mitigation measures were identified for sediment removal. No mitigation is necessary for reservoir management. For reservoir management, the less than significant impacts will be further reduced through the implementation of Mitigation Measures MM BIO-6, MM BIO-7, and MM BIO-8.

Residual Impacts After Mitigation

Due to the multi-year duration of the sediment removal phase, the large-scale alteration, visibility of the site, the level of viewer sensitivity, and the lack of feasible mitigation measures, impacts to scenic vistas from sediment removal activities will remain potentially significant.

Reservoir management impacts to scenic vistas will result in a lower degree of contrast than seen during sediment removal and will result in a less than significant impact to scenic vistas.

Comparison to Proposed Project and Other Alternatives

Alternative 4, Sluicing is considered environmentally inferior to the Proposed Project with respect to impacts on scenic vistas due to the extended time frame for sediment removal through sluicing.

Due to the extended time frame for sediment removal through sluicing, Alternative 4, Sluicing will be environmentally inferior to Alternative 1, Configuration B; Alternative 2, Configuration C; Alternative 3, Configuration D; and Alternative 5, Haul Route Alternative.

Alternative 4, Sluicing will also be environmentally inferior to Alternative 6, No Project Alternative due to sediment removal and reservoir management activities; although views of the reservoir will likely degrade under Alternative 6, No Project due to continuous sediment deposition.

AESTHETICS-2 *Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway.*

Sediment Removal/Reservoir Management

As with the Proposed Project, Alternative 4, Sluicing will not involve damage to rock outcroppings or historic buildings but will involve removal of vegetation, including native and non-native trees from the site to a similar degree as the Proposed Project. The Proposed Project site is not visible from the only designated state scenic highway in the vicinity of the Proposed Project site, SR-2. Therefore, implementation of this alternative will not damage scenic resources within the viewshed of a designated state scenic highway.

I-210, located to the south of the Proposed Project site, is identified as "Eligible" in the State Scenic Highway Program. Alternative 4, Sluicing will impact the existing visual character of a portion of the viewshed through the removal of vegetation including native and non-native trees from the site. This impact to visual character of a portion of the viewshed will be reduced in comparison to the Proposed Project due to the reduction in sediment removal and reservoir management areas and associated activities. In addition, views of the Proposed Project site from I-210 are very brief in nature (visibility for

approximately 0.3 mile) and are dominated by views of the JPL facilities and San Gabriel Mountains. Implementation of Alternative 4, Sluicing will not obstruct views of these features. Therefore, impacts to scenic resources within this eligible but not designated state scenic highway will be less than significant.

Mitigation Measure

No mitigation is necessary.

Residual Impacts After Mitigation Measure

The Proposed Project site is not visible from any designated state scenic highway and is only briefly visible from an eligible state scenic highway; therefore, impacts related to state scenic highways from sediment removal and reservoir management are less than significant.

Comparison to Proposed Project and Other Alternatives

Alternative 4, Sluicing is considered environmentally inferior to the Proposed Project with respect to impacts related to state scenic highways from sediment removal and reservoir management due to the extended time frame for sediment removal through sluicing.

Alternative 4, Sluicing will be environmentally inferior to all the other alternatives due to the duration of sediment removal and reservoir management activities.

AESTHETICS-3: *Substantially degrade the existing visual character or quality of the site and its surroundings.*

Sediment Removal

As described above under AESTHETICS-1, the proposed sediment removal activities associated with Alternative 4, Sluicing will change the visual characteristics of the existing Proposed Project site through the removal of sediment and associated vegetation in the reservoir.

Disturbed landscape areas, both man-made and natural, are currently found throughout the basin. The amount and distribution of these areas change on a regular basis and are expected visual elements in the Proposed Project site landscape. Construction equipment will also be visible in the basin. Views of construction equipment will be expected elements in the viewshed due to the ongoing IMP measures currently underway to keep debris from plugging the outlet works; however, the amount of equipment and duration onsite will be greater for the Alternative than for the IMP measures or for the Proposed Project.

Sediment and debris management are considered existing operational components of Devil's Gate Reservoir and are not considered potentially significant impacts to the visual characteristics of the site (City of Pasadena 2002). During the sediment removal phase of Alternative 4, Sluicing the disturbed areas will, in large, replace the vegetated areas, resulting in a high degree of contrast between existing and sediment removal conditions. While the open character of the site will remain, the overall visual quality of the Proposed Project site will be lower due to the large-scale alteration and decrease of desirable elements.

Excavation and associated activities within the reservoir area are expected to take place during dryer months, from April to December, as weather permits. During the wetter months, temporary changes to the visual characteristics of the Proposed Project site will be slightly less apparent with water storage in the basin. Some regrowth of riparian vegetation will also likely occur during this time. Both these factors will reduce the temporary change in the visual characteristics associated with sediment removal. Due to the multi-year duration of the sediment removal phase, the large-scale alteration, visibility of the site, and level of viewer sensitivity, sediment removal activities will be a potentially significant impact to the visual character of the Proposed Project site.

Although the sediment removal associated with this alternative will result in a potentially significant impact to the visual character of the Proposed Project site, the degree of contrast will be greater in comparison to the Proposed Project due to the extended time frame for sediment removal through sluicing.

Reservoir Management

As with the Proposed Project, construction equipment will also be visible in the basin but only for short periods of time. After completion of the proposed sediment removal activities associated with Alternative 4, Sluicing, the disturbed areas outside the reservoir management area are expected to experience natural regrowth with native vegetation, primarily Riparian Herbaceous vegetation. Reservoir management under this alternative will result in a similar degree of contrast as seen during sediment removal and will result in a potentially significant impact to visual character. The majority of the reservoir will not be allowed to naturally grow and/or remain in place, as the reservoir management area is the entire Configuration A excavation area. As described previously, the area requiring vegetation maintenance will be similar to the reservoir management Option 1 under the Proposed Project. In addition, any contrast associated with this Alternative will be similar in comparison to reservoir management Option 1 under the Proposed Project, due to the similarities in reservoir management area and associated reservoir management activities.

Mitigation Measure

No feasible mitigation measures were identified for sediment removal. No mitigation is necessary for reservoir management. For reservoir management, the less than significant impacts will be further reduced through the implementation of Mitigation Measures MM BIO-6, MM BIO-7, and MM BIO-8.

Residual Impacts After Mitigation

Due to the multi-year duration of the sediment removal phase, the large-scale alteration, visibility of the site, the level of viewer sensitivity, and the lack of feasible mitigation, impacts to visual character from sediment removal activities will remain potentially significant.

Reservoir management impacts to visual character will result in a lower degree of contrast than seen during sediment removal and will result in a less than significant impact to visual character.

Comparison to Proposed Project and Other Alternatives

Alternative 4, Sluicing is considered environmentally inferior to the Proposed Project with respect to impacts on scenic vistas due to the extended time frame for sediment removal through sluicing.

Due to the extended time frame for sediment removal through sluicing, Alternative 4, Sluicing will be environmentally inferior to Alternative 1, Configuration B; Alternative 2, Configuration C; Alternative 3, Configuration D; and Alternative 5, Haul Route Alternative.

Alternative 4, Sluicing will also be environmentally inferior to Alternative 6, No Project Alternative, due to sediment removal and reservoir management activities; although views of the reservoir will likely degrade under Alternative 6, No Project Alternative due to continuous sediment deposition.

AIR QUALITY

AIR QUALITY-1 *Conflict with or obstruct implementation of the applicable air quality plan.*

Sediment Removal/Reservoir Management

Typically, assessments for air quality plan consistency use four criteria for determining project consistency with the current AQMP. The first and second criteria are from the SCAQMD. According to the SCAQMD, two key criterion of AQMP consistency are: (1) whether the project will not result in an increase in the frequency or severity of existing air quality violations or cause or contribute to new violations, or delay timely attainment of air quality standards or the interim emission reductions specified in the AQMP; and (2) whether the project will exceed the assumptions in the AQMP based on the year of project build-out and phase (SCAQMD 2006). The third criterion is compliance with the control measures in the AQMP. The fourth criterion is compliance with the SCAQMD regional thresholds.

As with the Proposed Project (see Section 3.5.6), Alternative 4, Sluicing will be consistent with the second through fourth criteria but would potentially not be consistent with the first criterion, as emissions of NO_X could exceed the Daily Regional Threshold during sediment removal from the Arroyo Seco Channel, the Los Angeles River, or the Port of Long Beach. Implementation of Mitigation Measures MM AQ-1 and MM AQ-2 will result in a reduction of NO_X emissions to less than the SCAQMD Regional Threshold for NO_X. Therefore, impacts during sediment removal will be less than significant. This impact will be increased in comparison to the Proposed Project due to the potentially longer distance of trucking during sediment removal activities from downstream portions of the channel.

As with the Proposed Project, reservoir management for Alternative 4, Sluicing will not exceed any standard and will result in less than significant impacts.

Mitigation Measures

MM AQ-1: LACFCD shall require all construction contractors during the sediment removal phase of the Proposed Project to use only sediment removal dump trucks that meet EPA's emission standards for Model Year 2007 or later.

MM AQ-2: LACFCD shall require all construction contractors during the sediment removal phase of the Proposed Project to use off-road equipment that meets, at a minimum, EPA's emission standards for Tier 3 equipment.

Residual Impacts After Mitigation

Implementation of these mitigations would reduce combined NO_X emissions from Alternative 4, Sluicing during the sediment removal phase to a level of less than significant.

Reservoir management activities will not violate an air quality standard or contribute substantially to an existing or projected air quality violation; therefore, during reservoir management Alternative 4, Sluicing will be consistent with the first indicator. No significant impact would occur.

Comparison to Proposed Project and Other Alternatives

Alternative 4, Sluicing is considered environmentally inferior to the Proposed Project with respect to impacts to air quality plans due to the likely need for sediment trucking from locations further downstream. Since the sediment will be deposited over a larger area, the sediment removal could potentially require trucks to travel further distances, which will have associated air quality impacts.

Due to the alternate sediment removal method and the need for trucking of sediment from further offsite, Alternative 4, Sluicing will also be environmentally inferior to Alternative 1, Configuration B; Alternative 2, Configuration C; and Alternative 5, Haul Route Alternative. If proper sediment transport does not occur under Alternative 4, Sluicing, sediment deposits will develop along the route to the ocean. This would result in need for sediment removal from the Arroyo Seco Channel, the Los Angeles River, or the Port of Long Beach, which will have associated air quality impacts.

Alternative 4, Sluicing will be environmentally inferior to Alternative 6, No Project Alternative due to sediment removal and reservoir management activities.

AIR QUALITY-2 *Violate an air quality standard or contribute substantially to an existing or project air quality violation.*

As with the Proposed Project, emissions of NO_X under Alternative 4, Sluicing could exceed the Daily Regional Threshold during the removal of sediment from further downstream, resulting in a potentially significant impact. Implementation of Mitigation Measures MM AQ-1 and MM AQ-2 will result in a reduction of combined NO_X emissions from Alternative 4, Sluicing during sediment removal. Therefore, this impact will be reduced to less than significant. This impact will be increased in comparison to the Proposed Project due to the longer distances required for the trucking sediment offsite.

As with the Proposed Project, reservoir management for Alternative 4, Sluicing will not exceed any standard and will result in less than significant impacts.

Mitigation Measure

See Mitigation Measures MM AQ-1 and MM AQ-2.

Residual Impacts After Mitigation

Sediment removal will not exceed any standard SCAQMD Regional Threshold except for combined NO_X emissions. Implementation of these mitigations would reduce combined NO_X emissions from Alternative 4, Sluicing during the sediment removal phase to a level of less than significant.

Reservoir management will not exceed any standard SCAQMD Regional Threshold; therefore, this impact will be less than significant.

Comparison to Proposed Project and Other Alternatives

Alternative 4, Sluicing is considered environmentally inferior to the Proposed Project with respect to impacts to air quality standards due to the likely need for sediment trucking from locations further downstream. Since the sediment will be deposited over a larger area, the sediment removal could potentially require trucks to travel further distances, which will have associated air quality impacts.

Due to the alternate sediment removal method and the need for trucking of sediment from further offsite, Alternative 4, Sluicing will also be environmentally inferior to Alternative 1, Configuration B; Alternative 2, Configuration C; and Alternative 5, Haul Route Alternative. If proper sediment transport does not occur under Alternative 4, Sluicing, sediment deposits will develop along the route to the ocean. This would result in need for sediment removal from the Arroyo Seco Channel, the Los Angeles River, or the Port of Long Beach, which will have associated air quality impacts.

Alternative 4, Sluicing will be environmentally inferior to Alternative 6, No Project Alternative due to sediment removal and reservoir management activities.

AIR QUALITY-3 *Result in a cumulatively considerable net increase of any criteria pollutants for which the project region is nonattainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors).*

Sediment Removal/Reservoir Management

Air Quality Plans

As discussed previously, emissions of NO_X from Alternative 4, Sluicing could exceed the SCAQMD regional significance thresholds during removal of sediment from further downstream. This exceedance will not be consistent with air quality management plans and therefore will result in a significant cumulative impact. This impact will be greater in comparison to the Proposed Project due to the longer distance required to truck sediment to the disposal sites.

Emissions of VOC, NO_X, PM_{10}, and $PM_{2.5}$ are not expected to exceed the SCAQMD regional significance thresholds during reservoir management. The SCAQMD considers construction-related emissions that do not exceed the project-specific thresholds will not result in a cumulative impact.

Cumulative Health Impacts

As with the Proposed Project, for Alternative 4, Sluicing with Mitigation Measures MM AQ-1 and MM AQ-2, a significance threshold would not be exceeded for emissions of particulate matter and CO; and no significance threshold would be exceeded during reservoir management under either option. Implementation of Mitigation Measures MM AQ-1 and MM AQ-2 will result in a reduction of NO_X emissions and will reduce the NO_X emissions to a level of less than significant for the sediment removal phase.

Mitigation Measures

See Mitigation Measures MM AQ-1 and MM AQ-2.

Residual Impacts After Mitigation

Sediment removal will not exceed any localized significance threshold except for combined NO_X emissions. Implementation of these mitigations would reduce combined NO_X emissions from Alternative 4, Sluicing during the sediment removal phase to a level of less than significant.

Reservoir management will not exceed any localized significance threshold; therefore, this impact will be less than significant.

Comparison to Proposed Project and Other Alternatives

Alternative 4, Sluicing is considered environmentally inferior to the Proposed Project with respect to impacts to cumulative health due to the longer distances for trucking the sediment to the disposal sites.

Due to the longer trucking distances, Alternative 4, Sluicing will also be environmentally inferior to Alternative 1, Configuration B; Alternative 2, Configuration C; Alternative 3, Configuration D; and Alternative 5, Haul Route Alternative. If proper sediment transport does not occur under Alternative 4, Sluicing, sediment deposits will develop along the route to the ocean. This would result in need for sediment removal from the Arroyo Seco Channel, the Los Angeles River, or the Port of Long Beach, which will have associated air quality impacts.

Alternative 4, Sluicing will be environmentally inferior to Alternative 6, No Project Alternative due to sediment removal and reservoir management activities.

AIR QUALITY-4 *Expose sensitive receptors to substantial pollutant concentrations.*

Sediment Removal/Reservoir Management

Localized Significance Thresholds

As with the Proposed Project, the onsite emissions for Alternative 4, Sluicing for sediment removal and reservoir management activities will not exceed LST thresholds.

Carbon Monoxide Hotspot

As with the Proposed Project, the CO Hotspot analysis for Alternative 4, Sluicing shows no exceedance of the State or federal CO standard, and no significant impact is expected during sediment removal or management.

Carcinogenic Or Toxic Contaminants

As with the Proposed Project, all routes modeled for Alternative 4, Sluicing resulted in less than significant non-cancer risk from diesel emissions created by this Alternative.

Mitigation Measure

No mitigation measures are required.

Residual Impacts After Mitigation

Impacts will be less than significant.

Comparison to Proposed Project and Other Alternatives

Alternative 4, Sluicing is considered environmentally inferior to the Proposed Project with respect to impacts to sensitive receptors due to the likely need for sediment trucking from locations further downstream. Since the sediment will be deposited over a larger area, the sediment removal could potentially require trucks to travel further distances, which will have associated air quality impacts and impacts to sensitive receptors in the area of the trucking.

Due to the alternate sediment removal method and the need for trucking of sediment from further offsite, Alternative 4, Sluicing will also be environmentally inferior to Alternative 1, Configuration B; Alternative 2, Configuration C; and Alternative 5, Haul Route Alternative. If proper sediment transport does not occur under Alternative 4, Sluicing, sediment deposits will develop along the route to the ocean. This would result in need for sediment removal from the Arroyo Seco Channel, the Los Angeles River, or the Port of Long Beach, which will have associated air quality impacts.

Alternative 4, Sluicing will be environmentally inferior to Alternative 6, No Project Alternative due to sediment removal and reservoir management activities.

AIR QUALITY-5 *Create objectionable odors affecting a substantial number of people.*

Sediment Removal/Reservoir Management

The CEQA Guidelines indicate that a potentially significant impact would occur if the Proposed Project would create objectionable odors affecting a substantial number of people.

As with the Proposed Project, diesel exhaust by Alternative 4, Sluicing will be emitted from equipment during the sediment removal process. Diesel exhaust is an objectionable odor to some; however, concentrations will disperse rapidly from the Project site (OB-1 2013).

Mitigation Measures

No mitigation measures are necessary.

Residual Impacts After Mitigation

Alternative 4, Sluicing may produce objectionable odors beyond the Proposed Project site under sediment removal or reservoir management; however, this impact will be less than significant.

Comparison to Proposed Project and Other Alternatives

Alternative 4, Sluicing is considered neither environmentally superior nor inferior to the Proposed Project with respect to impacts from objectionable odors.

Alternative 4, Sluicing will also be neither environmentally superior nor inferior to all the other alternatives except for Alternative 6, No Project Alternative due to sediment removal and reservoir management activities.

BIOLOGICAL RESOURCES

BIOLOGY-1 *Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or the U.S. Fish and Wildlife Service.*

Sediment Removal

Potential impacts to vegetation communities will be identical to the Proposed Project due to the identical sediment removal and reservoir management areas, as shown in Figure 4.7-1.

Sensitive Plants

No listed or otherwise sensitive plant species were observed on the Proposed Project site. Therefore, as with the Proposed Project, Alternative 4, Sluicing is not expected to have a substantial adverse effect on any plant species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations or by CDFW or USFWS.

Sensitive Wildlife

The Proposed Project site contains habitat and/or potential habitat for five special status species: least Bell's vireo, yellow warbler, southwestern pond turtle, coast range newt, and two-striped garter snake. Least Bell's vireo, yellow warbler, coast range newt, and two-striped garter snake have all been observed on the Proposed Project site. The southwestern pond turtle has not been observed on the Proposed Project site. If it did occur, habitat for this species would be largely limited to ponded areas.

Alternative 4, Sluicing will disturb the same amount of acreage within the Proposed Project site as will be disturbed under the Proposed Project. Potential impacts to sensitive wildlife will be the same as the Proposed Project due to the same amount of habitat disturbed during sediment removal activities.

Habitat for the coast range newt, the southwestern pond turtle, and the two-striped garter snake occurs within streams and seasonal ponds found on the Proposed Project site. The amount of this habitat that will be available will depend upon where sediment accumulates and the amount of flows, rainfall, and runoff. Under Alternative 4, Sluicing, disturbance of habitat for the coast range newt, the southwestern pond turtle, and the two-striped garter snake is expected to be the same as the Proposed Project due to the same reservoir configuration and expected habitat disturbance during sediment removal activities.

Direct harm or take of these species during sediment removal activities would result in a potentially significant impact. The chance of this occurring during sediment removal activities under this alternative

is expected to be the same as the Proposed Project due to the identical excavation area. To ensure no harm or take of these special status species, Mitigation Measures MM BIO-1, MM BIO-2, and MM BIO-3, listed below, have been provided. With implementation of these mitigation measures, direct impacts to special status species will be less than significant.

During sediment removal, tree and vegetation removal has the potential to significantly affect nesting birds and roosting bats if active nests or roosting bats are present. Disturbance of active nests will violate the Migratory Bird Treaty Act and result in a potentially significant impact. With implementation of Mitigation Measure MM BIO-4 and MM BIO-5, listed below, impacts to nesting birds and roosting bats will be less than significant.

If proper sediment transport does not occur under Alternative 4, Sluicing, sediment deposits will develop along the route to the ocean. This would result in need for sediment removal from the Arroyo Seco Channel, the Los Angeles River, or the Port of Long Beach, which will have associated impacts to biological resources.

Reservoir Management

As shown in Figure 4.7-1, Alternative 4, Sluicing will result in a similar diversity of vegetation communities as the Proposed Project, since the reservoir management area is identical to the Proposed Project.

The availability of streams and seasonal ponds will depend upon where sediment accumulates and the amount of flows, rainfall, and runoff. Special status species have the potential to use the reservoir management area.

Direct harm or take of these species during reservoir management activities will result in a potentially significant impact. The chance of this occurring during reservoir management activities under this alternative is expected to be the same as the Proposed Project's reservoir management Option 1. To ensure no harm or take of these special status species occurs, MM BIO-1, MM BIO-2, and MM BIO-3 have been provided. With implementation of these mitigation measures, direct impacts to special status species will be less than significant.

During reservoir management, tree and vegetation removal will significantly affect nesting birds and roosting bats, if present. Disturbance of active nests will violate the Migratory Bird Treaty Act and result in a potentially significant impact. This impact will be similar under Alternative 4, Sluicing, as similar amounts of vegetation will be removed in comparison to the Proposed Project. With implementation of Mitigation MeasureMMBIO-4 and MM BIO-5, impacts to nesting birds and roosting bats will be less than significant.

Mitigation Measures

> **MM BIO – 1:** A qualified biological monitor shall be present during initial ground- or vegetation-disturbing project-related activities to provide protection measures and monitor for wildlife in harm's way. This includes initial ground- or vegetation-disturbing project-related activities at the annual start of each year of sediment removal or maintenance activities. Following initial project-related activities, a qualified monitoring biologist shall be present as necessary to maintain the implemented protection measures and monitor for additional species in harm's way. These

protection measures shall include, as appropriate: redirecting the wildlife, identifying areas that may require exclusionary devices (e.g., fencing), or capturing and relocating wildlife outside the work area. Any captured species shall be relocated to adjacent appropriate habitat that is contiguous to adjacent habitat and not impacted by project-related disturbance activities.

MM BIO – 2: Within 90 days prior to ground-disturbing activities, a sensitive species educational briefing shall be conducted by a qualified biologist for construction personnel. The biologist will identify all sensitive resources that may be encountered onsite, and construction personnel will be instructed to avoid and report any sightings of sensitive species to LACFCD or the monitoring biologist. Educational briefings shall be repeated annually for the duration of the sediment removal.

MM BIO – 3: Within 90 days prior to ground-disturbing activities, a preconstruction survey shall be conducted by a qualified biologist for the presence of any sensitive species in harm's way, including coast range newt, the southwestern pond turtle, and the two-striped garter snake. If sensitive species are observed in harm's way, the qualified biologist will develop and implement appropriate protection measures for that species. These protection measures shall include, as appropriate, redirecting the species, constructing exclusionary devices (e.g., fencing), or capturing and relocating wildlife outside the work area. Preconstruction surveys shall be repeated annually for the duration of the sediment removal. Observations of special status species made during these surveys shall be recorded onto a CNDDB field data sheet and submitted to CDFW for inclusion into the CNDDB.

MM BIO – 4: LACFCD, in consultation with a qualified biologist, will employ bird exclusionary measures (e.g., mylar flagging) prior to the start of bird breeding season to prevent birds nesting within established boundaries of the project. Prior to commencement of sediment removal activities within bird breeding season (March 1 through August 31), a preconstruction bird nesting survey shall be conducted by a qualified biologist for the presence of any nesting bird within 300 feet of the construction work area. The surveys shall be conducted 30 days prior to the disturbance of suitable nesting habitat by a qualified biologist with experience in conducting nesting bird surveys. The surveys shall continue on a weekly basis, with the last survey being conducted no more than 3 days prior to the initiation of clearance/construction work. Preconstruction surveys shall be repeated annually for the duration of the sediment removal.

If an active nest is found, the qualified biologist will develop and implement appropriate protection measures for that nest. These protection measures shall include, as appropriate, construction of exclusionary devices (e.g., sound barriers) or avoidance buffers. The biologist shall have the discretion to adjust the buffer area as appropriate based on the proposed construction activity, the bird species involved, and the status of the nest and nesting activity; but it shall be no less than 30 feet. Work in the buffer area can resume once the nest is determined to be inactive by the monitoring biologist.

MM BIO – 5: Within 30 days prior to commencement of vegetation or structure removal activities, a preconstruction bat survey shall be conducted by a qualified biologist for the presence of any roosting bats. Acoustic recognition technology shall be used if feasible and appropriate. If either a bat maternity roost or hibernacula (structures used by bats for hibernation) are present, a qualified biologist will develop and implement appropriate protection measures for that maternity roost or hibernacula. These protection measures shall include, as appropriate, safely evicting non-breeding bat hibernacula, establishment of avoidance buffers, or replacement of roosts at a suitable location. These measures shall also include as appropriate:

- To the extent feasible, trees that have been identified as roosting sites shall be removed or relocated between October 1 and February 28.

- When trees must be removed during the maternity season (March 1 to September 30), a qualified bat specialist shall conduct a preconstruction survey to identify those trees proposed for disturbance that could provide hibernacula or nursery colony roosting habitat for bats.

- Trees identified as potentially supporting an active nursery roost shall be inspected by a qualified biologist no greater than 7 days prior to tree disturbance to determine presence or absence of roosting bats.

- Trees determined to support active maternity roosts will be left in place until the end of the maternity season (September 30).

- If bats are not detected in a tree, but the qualified biologist determined that roosting bats may still be present, trees shall be removed as follows:

    - Pushing the tree down with heavy machinery instead of felling the tree with a chainsaw

    - First pushing the tree lightly 2 to 3 times with a pause of 30 seconds between each nudge to allow bats to become active, then pushing the tree to the ground slowly

    - Allowing the tree to remain in place for 24 to 48 hours until inspected by the qualified biologist for presence or absence of roosting bats

- The qualified biologist shall document all bat survey, monitoring, and protection measure activities and prepare a summary report for LACFCD.

Residual Impacts after Mitigation

Alternative 4, Sluicing will result in a less than significant impact on the biological resources on the Proposed Project site; however, potentially significant impacts to downstream resources may remain significant.

Comparison to Proposed Project and Other Alternatives

Alternative 4, Sluicing is considered environmentally inferior to the Proposed Project with respect to impacts to candidate, sensitive, or special status species due to the potential downstream impacts associated with sluicing.

Alternative 4, Sluicing will also be environmentally inferior to Alternative 5, Haul Route Alternative.

Due to the larger sediment removal and reservoir management areas, Alternative 4, Sluicing will be environmentally inferior to Alternative 1, Configuration B; Alternative 2, Configuration C; and Alternative 3, Configuration D.

If proper sediment transport does not occur under Alternative 4, Sluicing, sediment deposits will develop along the route to the ocean. This would result in need for sediment removal from the Arroyo Seco Channel, the Los Angeles River, or the Port of Long Beach, which will have associated impacts to biological resources.

Alternative 4, Sluicing will be environmentally inferior to Alternative 6, No Project Alternative, due to sediment removal and reservoir management activities; although habitat in the reservoir will likely degrade under Alternative 6, No Project Alternative due to continuous sediment deposition and degradation that will increase over time.

BIOLOGY-2 *Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service.*

Sediment Removal/Reservoir Management

Alternative 4, Sluicing will impact the same acreage of Riversidean Alluvial Fan Sage Scrub as the Proposed Project. Impacts to Riversidean Alluvial Fan Sage Scrub will result in a potentially significant impact requiring mitigation. To minimize impacts due to loss of Riversidean Alluvial Fan Sage Scrub, Mitigation Measure MM BIO-6 has been provided. With implementation of this mitigation measure, impacts to Riversidean Alluvial Fan Sage Scrub will be reduced to a level below significance.

This alternative will impact the same amount of Riparian Woodland and Mule Fat Thickets as the Proposed Project. Riparian Woodland and Mule Fat Thickets are rare plant communities that provide nesting habitat for riparian species. Impacts to these habitats will result in a potentially significant impact. To minimize impacts due to the loss of Riparian Woodland and Mule Fat Thickets, Mitigation Measures MM BIO-7 and MM BIO-8have been provided. With implementation of these mitigation measures, impacts to Riparian Woodland and Mule Fat Thickets will be reduced to a level below significance.

Alternative 4, Sluicing will impact the same acreage of water features as the Proposed Project. To minimize impacts, Mitigation Measure MM BIO-8 has been provided. With implementation of this mitigation measure, impacts will be reduced to a level below significance.

If proper sediment transport does not occur under Alternative 4, Sluicing, sediment deposits will develop along the route to the ocean. This would result in need for sediment removal from the Arroyo Seco Channel, the Los Angeles River, or the Port of Long Beach, which will have associated impacts to biological resources. The sediment deposits could also impact riparian habitat and other sensitive natural communities downstream of the Proposed Project site. Impacts could be potentially significant.

Mitigation Measures

MM BIO – 6: Riversidean Alluvial Fan Sage Scrub habitat shall be restored and/or enhanced at a 1:1 ratio by acreage. Areas shall be mapped using aerial photographs.

MM BIO – 7: Within 90 days prior to ground-disturbing activities, a qualified biologist shall conduct a tree survey within the project footprint, to identify trees that will be removed or potentially affected by the Proposed Project and trees that can be avoided. LACFCD will replace trees that cannot be

avoided. The replacement is expected to be up to 1:1 by acreage. The biological monitor shall implement measures to protect the root zone of oak trees that may be impacted immediately adjacent to the project site and along access roads.

MM BIO – 8: A combination of onsite and offsite habitat restoration, enhancement, and exotic removal shall be implemented by LACFCD at a 1:1 ratio for impacted sensitive habitat and jurisdictional waters. Habitat restoration/enhancement shall include use of willow cuttings and exotic species removal. Non-native, weedy habitats within the basin shall be utilized whenever possible as mitigation sites. This mitigation measure shall be monitored for success for five years following implementation. A report of the monitoring results shall be submitted annually, during the five years following implementation, to resource agencies as required by the Section 401 Certification, Section 404 permit, and a Streambed Alteration Agreement.

Residual Impacts after Mitigation

Alternative 4, Sluicing will result in a less than significant impact on the biological resources on the Proposed Project site; however, potentially significant impacts to downstream resources may remain significant.

Comparison to Proposed Project and Other Alternatives

Alternative 4, Sluicing is considered environmentally inferior to the Proposed Project with respect to impacts to riparian habitat and other sensitive natural communities due to the potential downstream impacts associated with sluicing.

Alternative 4, Sluicing is also considered environmentally inferior to Alternative 5, Haul Route Alternative with respect to impacts to riparian habitat and other sensitive natural communities due to potential downstream impacts associated with sluicing.

Due to the larger size of sediment removal and reservoir management areas and decreased opportunities for restoration and/or enhancement, Alternative 4, Sluicing will be environmentally inferior to Alternative 1, Configuration B; Alternative 2, Configuration C; and Alternative 3, Configuration D.

If proper sediment transport does not occur under Alternative 4, Sluicing, sediment deposits will develop along the route to the ocean. This would result in need for sediment removal from the Arroyo Seco Channel, the Los Angeles River, or the Port of Long Beach, which will have associated impacts to biological resources.

Alternative 4, Sluicing will be environmentally inferior to Alternative 6, No Project Alternative due to sediment removal and reservoir management activities; although habitat in the reservoir will likely degrade under Alternative 6, No Project Alternative due to continuous sediment deposition and degradation that will increase over time.

BIOLOGY-3 *Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means.*

Sediment Removal/Reservoir Management

Alternative 4, Sluicing will impact the same acreage of water features impacts as the Proposed Project. To minimize impacts, Mitigation Measure MM BIO-8has been provided.

If proper sediment transport does not occur under Alternative 4, Sluicing, sediment deposits will develop along the route to the ocean. This would result in need for sediment removal from the Arroyo Seco Channel, the Los Angeles River, or the Port of Long Beach, which will have associated impacts to biological resources. The sediment deposits could also impact wetlands downstream of the Proposed Project site. Impacts could be potentially significant.

Mitigation Measures

See Mitigation Measure MM BIO-8above.

Residual Impacts After Mitigation

Alternative 4, Sluicing will result in a less than significant impact on the biological resources on the Proposed Project site; however, potentially significant impacts to downstream resources may remain significant.

Comparison to Proposed Project and Other Alternatives

Alternative 4, Sluicing is considered environmentally inferior to the Proposed Project with respect to impacts on federally protected wetlands due to the potential for downstream impacts associated with sluicing. The Proposed Project will also potentially be environmentally superior to Alternative 4, Sluicing if proper sediment transport does not occur under Alternative 4, Sluicing, causing sediment deposits to develop along the route to the ocean. This would result in need for sediment removal and impacts in downstream wetlands and other sensitive habitats associated with removal activities.

Alternative 4, Sluicing is also considered environmentally inferior to Alternative 5, Haul Route Alternative with respect to impacts on federally protected wetlands due to potential downstream impacts associated with sluicing.

Due to the larger size of the areas of sediment removal and reservoir management and decreased opportunities for restoration and/or enhancement, Alternative 4, Sluicing will be environmentally inferior to Alternative 1, Configuration B; Alternative 2, Configuration C; and Alternative3, Configuration D.

If proper sediment transport does not occur under Alternative 4, Sluicing, sediment deposits will develop along the route to the ocean. This would result in need for sediment removal from the Arroyo Seco Channel, the Los Angeles River, or the Port of Long Beach, which will have impacts to biological resources associated with removal activities.

Alternative 4, Sluicing will be environmentally inferior to Alternative 6, No Project Alternative, due to sediment removal and reservoir management activities; although the wetlands in the reservoir will likely degrade under Alternative 6, No Project Alternative due to continuous sediment deposition.

BIOLOGY-4 *Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.*

Sediment Removal/Reservoir Management

The Proposed Project area is predominantly open for wildlife movement and habitat connectivity. Sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays). In addition, sediment removal activities would not completely block the Proposed Project site from surrounding habitat, would occur only during the day, and would not interfere with nighttime wildlife activity. Although some wildlife may be temporarily displaced during construction, wildlife would not be physically prevented from moving around and into the basin area. Sediment removal and reservoir management activities associated with Alternative 4, Sluicing will interfere temporarily with the movement of native resident or migratory wildlife species, resulting in a potentially significant impact. Reduction in sensitive habitat would interfere with use of the habitat for wildlife nursery sites, resulting in a potentially significant impact. To minimize impacts to less than significant, Mitigation Measures MM BIO-1 through MM BIO-8 has been provided. This impact will be similar in comparison to the Proposed Project due to the similarities in area disturbed during sediment removal and reservoir management Option 1.

Additionally, if proper sediment transport does not occur under Alternative 4, Sluicing, sediment deposits will develop along the route to the ocean. This would result in need for sediment removal from the Arroyo Seco Channel, the Los Angeles River, or the Port of Long Beach, which will have associated impacts to biological resources. The sediment deposits could also impact wildlife movement downstream of the Proposed Project site. Impacts could be potentially significant.

Mitigation Measures

See Mitigation Measures MM BIO-1 through MM BIO-8.

Residual Impacts After Mitigation

Alternative 4, Sluicing will result in a less than significant impact on the biological resources on the Proposed Project site; however, potentially significant impacts to downstream resources may remain significant.

Comparison to Proposed Project and Other Alternatives

Alternative 4, Sluicing is considered environmentally inferior to the Proposed Project with respect to impacts to wildlife movement and habitat connectivity due to the potential downstream impacts associated with sluicing.

Alternative 4, Sluicing is also considered environmentally inferior to Alternative 5, Haul Route Alternative with respect to impacts to wildlife movement and habitat connectivity due to the potential downstream impacts associated with sluicing.

Due to the larger size of the areas of sediment removal and reservoir management and lack of opportunities for restoration and/or enhancement, Alternative 4, Sluicing will be environmentally inferior to Alternative 1, Configuration B; Alternative 2, Configuration C; and Alternative 3, Configuration D.

If proper sediment transport does not occur under Alternative 4, Sluicing, sediment deposits will develop along the route to the ocean. This would result in need for sediment removal from the Arroyo Seco Channel, the Los Angeles River, or the Port of Long Beach, which will have impacts to biological resources associated with removal activities.

Alternative 4, Sluicing will be environmentally inferior to Alternative 6, No Project Alternative, due to sediment removal and reservoir management activities; although the wetlands in the reservoir will likely degrade under Alternative 6, No Project Alternative due to continuous sediment deposition.

BIOLOGY-5 *Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.*

Sediment Removal/Reservoir Management

Implementation of Alternative 4, Sluicing will result in the removal of native trees from the Proposed Project site. This impact will be the same as for the Proposed Project, as the same amount of vegetation and trees will be removed. Implementation of Mitigation Measure MM BIO-7 will reduce impacts to city-protected trees to a level below significance.

If proper sediment transport does not occur under Alternative 4, Sluicing, however, sediment deposits will develop along the route to the ocean. This would result in need for sediment removal from the Arroyo Seco Channel, the Los Angeles River, or the Port of Long Beach, which will have associated impacts to biological resources. The sediment deposits could also impact trees downstream of the Proposed Project site. Impacts could be potentially significant.

Mitigation Measures

See Mitigation Measure MM BIO-7.

Residual Impacts After Mitigation

Alternative 4, Sluicing will result in a less than significant impact to city-protected trees.

Comparison to Proposed Project and Other Alternatives

Alternative 4, Sluicing is considered environmentally inferior to the Proposed Project with respect to impacts to loss of native trees due to the potential downstream impacts associated with sluicing.

Alternative 4, Sluicing is also considered environmentally inferior to Alternative 5, Haul Route Alternative with respect to impacts to loss of native trees due to the potential downstream impacts associated with sluicing.

Alternative 4, Sluicing will be environmentally inferior to Alternative 1, Configuration B; Alternative 2, Configuration C; and Alternative 3, Configuration D due to the potential downstream impacts associated with sluicing.

Alternative 4, Sluicing will be environmentally inferior to Alternative 6, No Project Alternative; although trees in the reservoir will likely be lost under Alternative 6, No Project Alternative due to continuous sediment deposition.

CULTURAL RESOURCES

CULTURAL-1 *Cause a substantial adverse change in the significance of a historical resource.*

Sediment Removal/Reservoir Management

As with the Proposed Project, no alterations or modifications will be made to any historic resource; and therefore, no significant impact to historical resources is anticipated with this alternative.

Mitigation Measures

No mitigation measures are necessary.

Residual Impacts After Mitigation

No historic resources are within the Proposed Project site; therefore Alternative 4, Sluicing will not result in impacts to historic resources.

Comparison to Proposed Project and Other Alternatives

As no historic resources are within the Proposed Project site, Alternative 4, Sluicing is considered neither environmentally superior nor inferior to the Proposed Project with respect to historic resources.

Alternative 4, Sluicing will also be neither environmentally superior nor inferior to any of the other alternatives.

CULTURAL-2 *Cause a substantial adverse change in the significance of an archaeological resource.*

Sediment Removal/Reservoir Management

Alternative 4, Sluicing will involve ground-disturbing activities under sediment removal and reservoir management; however, as noted in Section 3.5, most of the soil in the Proposed Project area consists of recently accumulated sediment. In areas filled with recently accumulated sediment, archeological sites are not anticipated to exist, although it is always possible that unidentified archaeological sites exist in native soils below the accumulated sediment. If sediment removal or reservoir management activities exceed the depth of the historic flood deposits and encounter native soils, unidentified archaeological sites have potential to be significantly impacted. Implementation of Mitigation Measure MM CUL-1 will

reduce potential impacts to less than significant. This impact will also be similar in comparison to the Proposed Project due to the similarities in area disturbed during sediment removal and reservoir management.

Mitigation Measures

> **MM CUL-1**: If sediment removal or reservoir management activities exceed the depth of the historic flood deposits and encounter native sediments, these activities will be monitored by a qualified archaeologist. In the event this occurs and archaeological materials are observed, the excavation in the proximity of the discovery will be diverted until a qualified archaeologist evaluates the discovery.

Residual Impacts After Mitigation

While it is always possible that unidentified archaeological sites exist in native soils below the accumulated sediment, with implementation of Mitigation Measure MM CUL-1, no significant adverse impacts are expected.

Comparison to Proposed Project and Other Alternatives

Alternative 4, Sluicing is considered neither environmentally superior nor inferior to the Proposed Project with respect to archaeological resources due to the similarities in sediment removal and reservoir management areas.

Alternative 4, Sluicing is also considered neither environmentally superior nor inferior to Alternative 2, Configuration C and Alternative 5, Haul Route Alternative with respect to archaeological resources.

Due to the larger sediment removal and reservoir management areas, Alternative 4, Sluicing will be environmentally inferior to Alternative 1, Configuration B and Alternative 3, Configuration D.

Alternative 4, Sluicing will be environmentally inferior to Alternative 6, No Project Alternative due to sediment removal and reservoir management activities.

CULTURAL-3 *Cause a substantial adverse change in the significance of a paleontological resource.*

Sediment Removal/Reservoir Management

No paleontological resources were encountered during the course of the survey and are not expected in the accumulated sediment. It is always possible that unidentified paleontological materials exist in native soil below the accumulated sediment. If sediment removal or reservoir management activities exceed the depth of the historic flood deposits and encounter native soils, unidentified paleontological materials have the potential to be significantly impacted. Implementation of Mitigation Measure MM CUL-2 will reduce impacts to less than significant. This impact will also be similar in comparison to the Proposed Project due to the similarities in area disturbed during sediment removal and reservoir management.

Mitigation Measures

MM CUL-2: If sediment removal or reservoir management activities exceed the depth of the historic flood deposits and encounter native sediments, these activities will be monitored by a qualified paleontologist. In the event that this occurs and paleontological materials are observed, the excavation in the proximity of the discovery should be diverted until a qualified paleontologist evaluates the discovery.

Residual Impacts After Mitigation

While it is always possible that unidentified paleontological materials exist in native soils below the accumulated sediment, with implementation of Mitigation Measure MM CUL-2, no significant adverse impacts are expected.

Comparison to Proposed Project and Other Alternatives

Alternative 4, Sluicing is considered neither environmentally superior nor inferior to the Proposed Project with respect to paleontological resources due to the similarities in sediment removal and reservoir management areas.

Alternative 4, Sluicing is considered neither environmentally superior nor inferior to Alternative 2, Configuration C and Alternative 5, Haul Route Alternative with respect to paleontological resources.

Due to the larger sediment removal and reservoir management areas, Alternative 4, Sluicing will be environmentally inferior to Alternative 1, Configuration B and Alternative 3, Configuration D.

Alternative 4, Sluicing will be environmentally inferior to Alternative 6, No Project Alternative, due to sediment removal and reservoir management activities.

CULTURAL-4 *Potentially impact unknown human remains within the proposed project site.*

Sediment Removal/Reservoir Management

As with the Proposed Project, archival research and the archaeological survey in connection with the present project did not indicate the presence of any known human remains in the project area. In the event human remains are discovered, implementation of Mitigation Measure MM CUL-3 will reduce impacts to less than significant.

Mitigation Measures

MM CUL-3: In the event human remains are discovered, all work in the area must be halted until the County Coroner identifies the remains and makes recommendations regarding their appropriate treatment pursuant to PRC Section 5097.98.

Residual Impacts After Mitigation

While it is possible that human remains could be discovered in native soils below the accumulated sediment, with implementation of Mitigation Measure MM CUL-3, no significant adverse impacts are expected.

Comparison to Proposed Project and Other Alternatives

Alternative 4, Sluicing is considered neither environmentally superior nor inferior to the Proposed Project with respect to accidental discovery of human remains due to the similarities in sediment removal and reservoir management areas.

Alternative 4, Sluicing is also considered neither environmentally superior nor inferior to Alternative 2, Configuration C and Alternative 5, Haul Route Alternative with respect to accidental discovery of human remains.

Due to the larger sediment removal and reservoir management areas, Alternative 4, Sluicing will be environmentally inferior to Alternative 1, Configuration B and Alternative 3, Configuration D.

Alternative 4, Sluicing will be environmentally inferior to Alternative 6, No Project Alternative, due to sediment removal and reservoir management activities.

GEOLOGY & SOILS

GEOLOGY-1 *Potentially result in soil erosion or loss of topsoil during sediment removal activities.*

Sediment Removal/Reservoir Management

Alternative 4, Sluicing will involve the removal of sediment from the reservoir through sluicing. Sediment stockpiled at Johnson Field as part of the IMP will also be sluiced. If drying is required, stockpiling of the sediment will occur onsite within Devil's Gate Reservoir. Through sluicing, sediment will be moved downstream to the Arroyo Seco. Sluicing will initially transport heavier and greater amounts of sediments downstream; however, as described in the sediment transport study (Appendix K), the sediment transport during historically typical flows and standard dam operations was found to be incapable of flushing excess sediment down the length of the Arroyo Seco Channel. After approximately 9.5 months of sluicing under historically typical flows, followed by an additional6 months of historically typical sediment flushing flows, approximately 20,000 cy of sediment will be conveyed to the Los Angeles River, leaving approximately 243,000 cy of sediment in the Arroyo Seco Channel, with deposits primarily occurring in and around the natural reaches. As demonstrated, it is likely that sediment loads will fall out rapidly after leaving Devil's Gate Reservoir. This sediment would eventually need to be removed from the Arroyo Seco. Any effort undertaken to remove this sediment would reduce impacts associated with erosion to less than significant through implementation of SCAQMD Rule 403 and BMPs; however, disturbed sediments are more susceptible to erosion. Depending on where fallout occurs and the time frame for developing a downstream sediment removal plan, these sediment deposits may be vulnerable to wind erosion. This impact will be greater in comparison to the Proposed Project due to movement of sediment downstream and the potential erosion impacts to the areas downstream of the Proposed Project site.

Mitigation Measures

No mitigation measures will be required.

Residual Impacts After Mitigation

With implementation of SCAQMD Rule 403 and BMPs and the resulting reduction in potential for erosion, no significant impacts to geology and soils would occur as a result of Alternative 4, Sluicing.

Comparison to Proposed Project and Other Alternatives

Alternative 4, Sluicing is considered environmentally inferior to the Proposed Project with respect to soil erosion due to the potential impacts on erosion downstream.

Due to the potential downstream impacts associated with sluicing, Alternative 4, Sluicing will also be environmentally inferior to Alternative 1, Configuration B; Alternative 2, Configuration C; Alternative 3, Configuration D; and Alternative 5, Haul Route Alternative.

Alternative 4, Sluicing will be environmentally inferior to Alternative 6, No Project Alternative due to sediment removal and reservoir management activities.

GREENHOUSE GAS EMISSIONS

GHG EMISSIONS-1 *Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment.*

Sediment Removal/Reservoir Management

Alternative 4, Sluicing will use the same amount and type of construction equipment as the Proposed Project; however, sediment removal under this Alternative will not involve trucking of sediment offsite. The only material to be trucked offsite includes vegetation, which will be transported to Scholl Canyon Landfill. Use of sediment removal dump trucks that meet EPA's emission standards for Model Year 2007 or later and use of off-road equipment that meets, at a minimum, EPA's emission standards for Tier 3 equipment, would result in a reduction of GHG emissions. As noted in Section 3.6, generation of greenhouse gas emissions under the Proposed Project is not "cumulatively considerable" and is therefore less than significant under CEQA. Alternative 4, Sluicing will have the same amount of daily equipment usage but less truck traffic; therefore, this alternative will generate less greenhouse gas emissions than the Proposed Project, which will not be "cumulatively considerable," and is therefore less than significant under CEQA.

As with the Proposed Project, Alternative 4, Sluicing may prove a positive effect on climate change. High ambient temperatures coupled with important demand for oxygen due to the degradation of substantial amounts of organic matter favor the production of CO_2, the establishment of anoxic conditions, and thus the production of CH_4. If the reservoir is left as it is, the large quantity of biomass currently existing may exacerbate the condition. With the removal and disposal of most of the organic mass in the Scholl Canyon Landfill, which uses the green waste primarily as "alternative daily cover" (ADC), the overall benefit to the carbon ecosystem will be positive, since prior to using green waste for ADC, larger amounts of cover soil had to be imported into the landfill from offsite sources (Kong et al. 2008). Therefore, use of the green waste as ADC reduces fossil fuel use for cover soil importation and also reduces GHG emissions. This potential benefit will be the same as the Proposed Project due to the same area of vegetation removal.

If proper sediment transport does not occur under Alternative 4, Sluicing, however, sediment deposits will develop along the route to the ocean. This would result in need for sediment removal from the Arroyo Seco Channel, the Los Angeles River, or the Port of Long Beach, which will have associated impacts to greenhouse gas emissions. Although additional downstream sediment removal could occur, as with the Proposed Project, impacts from generation of greenhouse gas emissions would likely not be "cumulatively considerable" and would therefore likely be less than significant under CEQA.

Mitigation Measures

No mitigation measures are necessary.

Residual Impacts After Mitigation

No significant impacts associated with the generation of greenhouse gas emissions will occur as a result of Alternative 4, Sluicing.

Comparison to Proposed Project and Other Alternatives

Alternative 4, Sluicing will potentially generate more overall greenhouse gas emissions than the Proposed Project and therefore is considered environmentally inferior to the Proposed Project due to overall production of greenhouse gas emissions.

Due to overall production of greenhouse gas emissions, Alternative 4, Sluicing will also be environmentally superior to Alternative 1, Configuration B; Alternative 2, Configuration C; Alternative 3, Configuration D; and Alternative 5, Haul Route Alternative. If proper sediment transport does not occur under Alternative 4, Sluicing, causing sediment deposits to develop along the route to the ocean, this would result in need for sediment removal from the Arroyo Seco Channel, the Los Angeles River, or the Port of Long Beach and impacts associated with overall production of greenhouse gas emissions.

Alternative 4, Sluicing will be environmentally inferior to Alternative 6, No Project Alternative due to sediment removal and reservoir management activities and associated production of greenhouse gas emissions.

GHG EMISSIONS-2 *Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases.*

Sediment Removal/Reservoir Management

AB 32 identified a 2020 target level for GHG emissions in California of 427 MMT of CO_2e, which is approximately 28.5 percent less than the year 2020 BAU emissions estimate of 596 MMT CO_2e. To achieve these GHG reductions, widespread reductions of GHG emissions will have to occur across California. Some of those reductions will need to come in the form of changes in vehicle emissions and mileage standards, changes in the sources of electricity, and increases in energy efficiency by existing facilities. These reductions in mobile-sources and energy production of GHG emissions would occur with or without development of Alternative 4, Sluicing. Overall, Alternative 4, Sluicing will be consistent with the AB 32 goal of reducing statewide GHG emissions to 1990 levels by year 2020. Currently, no other GHG reduction plan (i.e., SCAG, SCAQMD, or County) applies to Alternative 4, Sluicing. As with the Proposed Project, Alternative 4, Sluicing will not conflict with any applicable plan, policy, or regulation of

an agency adopted for the purpose of reducing the emissions of GHGs; therefore, impacts will be less than significant.

Mitigation Measures

No mitigation measures are necessary.

Residual Impacts After Mitigation

No significant impacts associated with any applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases will occur as a result of Alternative 4, Sluicing.

Comparison to Proposed Project and Other Alternatives

Alternative 4, Sluicing is considered neither environmentally superior nor inferior to the Proposed Project with respect to applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases.

Alternative 4, Sluicing will also be neither environmentally superior nor inferior to any of the other alternatives.

HAZARDS AND HAZARDOUS MATERIALS

HAZARDS-1 *Create a hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials.*

Sediment Removal/Reservoir Management

As with the Proposed Project, no significant impacts associated with hazardous soils are expected. Alternative 4, Sluicing will include the use of hazardous materials associated with the construction equipment needed to perform the removal activities. Adequate BMPs will be utilized; and adherence to the regulations set forth by County, State, and federal agencies will reduce the potential for hazardous materials impacts to a less than significant level and will not pose a safety hazard to sensitive receptors.

Mitigation Measures

No mitigation measures are necessary.

Residual Impacts After Mitigation

Implementation of BMPs and adherence to the applicable regulations will reduce the potential for impacts associated with hazardous materials to a less than significant level.

Comparison to Proposed Project and Other Alternatives

Alternative 4, Sluicing is considered neither environmentally superior nor inferior to the Proposed Project.

Alternative 4, Sluicing will also be neither environmentally superior nor inferior to any of the other alternatives except Alternative 6, No Project Alternative. Alternative 4, Sluicing will be environmentally inferior to Alternative 6, No Project Alternative, due to sediment removal and reservoir management activities.

HAZARDS-2 *Create a significant hazard to the public or environment through accident conditions involving the release of hazardous materials into the environment.*

As with the Proposed Project, no significant impacts associated with hazardous soils are expected. Alternative 4, Sluicing will include the use of hazardous materials associated with the construction equipment needed to perform the removal activities. Adequate BMPs will be utilized; and adherence to the regulations set forth by County, State, and federal agencies will reduce the potential for hazardous materials impacts to a less than significant level and will not pose a safety hazard to sensitive receptors.

Mitigation Measures

No mitigation measures are necessary.

Residual Impacts After Mitigation

Implementation of BMPs and adherence to the applicable regulations will reduce the potential for impacts associated with hazardous materials to a less than significant level.

Comparison to Proposed Project and Other Alternatives

Alternative 4, Sluicing is considered neither environmentally superior nor inferior to the Proposed Project.

Alternative 4, Sluicing will also be neither environmentally superior nor inferior to any of the other alternatives except Alternative 6, No Project Alternative. Alternative 4, Sluicing will be environmentally inferior to Alternative 6, No Project Alternative due to sediment removal and reservoir management activities.

HAZARDS-3 *Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school.*

Sediment Removal/Reservoir Management

As with the Proposed Project, Alternative 4, Sluicing will include the use of hazardous materials associated with the construction equipment needed to perform the removal activities. The proposed construction routes pass La Cañada High School and Hillside School and Learning Center. Adherence to County, State, and federal agency regulations governing the use of these materials reduces the potential for impacts to a less than significant level and will not pose a safety hazard to sensitive receptors. No mitigation measures are required.

Mitigation Measures

No mitigation measures are necessary.

Residual Impacts After Mitigation

Implementation of BMPs and adherence to the applicable regulations will reduce the potential for impacts associated with hazardous materials within one-quarter mile of an existing school to a less than significant level.

Comparison to Proposed Project and Other Alternatives

Alternative 4, Sluicing is considered environmentally superior to the Proposed Project due to the reduction in truck traffic.

Due to the reduction in truck traffic, Alternative 4, Sluicing will also be environmentally superior to all the other alternatives except Alternative 5, Haul Route Alternative and Alternative 6, No Project Alternative.

Alternative 4, Sluicing will be environmentally inferior to Alternative 5, Haul Route Alternative, as the Alternative 4, Sluicing haul truck routes pass La Cañada High School and Hillside School and Learning Center during vegetation removal to Scholl Canyon Landfill.

Alternative 4, Sluicing will be environmentally inferior to Alternative 6, No Project Alternative, due to sediment removal and reservoir management activities.

HAZARDS-4 *Located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would create a significant hazard to the public or the environment.*

Sediment Removal/Reservoir Management

EPA included Hahamongna Watershed Park area on the NPL Superfund List due to the presence of detected VOCs and perchlorate in groundwater originating from the JPL property. The impacted groundwater is at 200 feet bgs; and, as with the Proposed Project, the concentrations of organochlorine pesticides, petroleum hydrocarbons (diesel and hydraulic/motor oil range and aromatics), and SVOCs detected in samples collected from Devil's Gate Reservoir are below regulatory thresholds. Therefore, the listing of the watershed on the Superfund List does not present a significant hazard to the public or the environment, and no significant impacts associated with the Alternative 4, Sluicing are expected.

Mitigation Measures

No mitigation measures are necessary.

Residual Impacts After Mitigation

No significant adverse impacts were identified.

Comparison to Proposed Project and Other Alternatives

Alternative 4, Sluicing is considered neither environmentally superior nor inferior to the Proposed Project.

Alternative 4, Sluicing will also be neither environmentally superior nor inferior to any of the other alternatives.

HAZARDS-5 *Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.*

Sediment Removal/Reservoir Management

Alternative 4, Sluicing sediment removal and reservoir management activities will occur onsite and will not interfere with the current emergency response plan or emergency evacuation plan for local, State, or federal agencies. Additionally, access to the surrounding roads will be maintained during sediment removal and reservoir management activities and will not interfere with the response facilities located adjacent to the Proposed Project site, including the County of Los Angeles Fire Department Camp 2 and the City of Pasadena Police Department located at 2175 Yucca Lane. Alternative 4, Sluicing will also increase flood control protection downstream of Devil's Gate Dam. No mitigation measures are required.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

No significant adverse impacts were identified.

Comparison to Proposed Project and Other Alternatives

Alternative 4, Sluicing is considered neither environmentally superior nor inferior to the Proposed Project.

Alternative 4, Sluicing will also be neither environmentally superior nor inferior to any of the other alternatives except Alternative 6, No Project Alternative.

Alternative 4, Sluicing will be environmentally superior to Alternative 6, No Project Alternative, as Alternative 6, No Project Alternative will severely restrict flood control, potentially increasing flooding downstream of Devil's Gate Dam. This flooding could also potentially interfere with access to roadways.

HYDROLOGY & WATER QUALITY

HYDROLOGY-1 *Violate any water quality standards or waste discharge requirements.*

Sediment Removal/Reservoir Management

This Alternative uses sluicing to transport sediment downstream. Sluicing differs from FAST operations in the amount and weight of sediment transported. FAST operations have been routinely used at Devil's Gate Reservoir and result in relatively small amounts of finer grained sediment passing through the reservoir. FAST operations will take place using natural flows to allow the finer grained sediment to pass through the reservoir and downstream of the dam. The sediment fines discharged during historic FAST

operations are transported to the Pacific Ocean via Arroyo Seco and the Los Angeles River, either via the discharge flow or subsequent storm flows.

Sluicing will initially transport heavier and greater amounts of sediments downstream. Potentially significant impacts to water quality could occur from the increase in sediment load into the active stream channel.

As described in the sediment transport study (Appendix K), the sediment transport during historically typical flows and standard dam operations was found to be incapable of flushing excess sediment down the length of the Arroyo Seco Channel. After approximately 9.5 months of sluicing under historically typical flows, followed by an additional6 months of historically typical sediment flushing flows, approximately 20,000 cy of sediment will be conveyed to the Los Angeles River, leaving approximately 243,000 cy of sediment in the Arroyo Seco Channel, with deposits primarily occurring in and around the natural reaches. As demonstrated, it is likely that sediment loads will fall out rapidly after leaving Devil's Gate Reservoir, limiting the area impacted by heavy sediment-loaded storm flows. This sediment would eventually need to be removed from the Arroyo Seco.

Heavy equipment needed for sediment agitation has the potential to cause accidental spills of fuel and lubricating oil. Contaminants could be released into the watershed and adversely affect water quality. Alternative 4, Sluicing activities involving construction equipment will involve the limited transport, use, disposal, and storage of fuel and lubricating oil, which are regulated by various agencies. Adequate BMPs will be utilized; and adherence to the regulations set forth by County, State, and federal agencies will reduce the potential for impacts to water quality to a less than significant level. With adherence to regulations and permit requirements and implementation of project-specific BMPs, impacts related to otherwise substantially degrading water quality will be less than significant.

If proper sediment transport does not occur under Alternative 4, Sluicing, however, sediment deposits will develop along the route to the ocean. This would result in need for sediment removal from the Arroyo Seco Channel, the Los Angeles River, or the Port of Long Beach, which will have associated impacts to water quality. Adequate BMPs will be utilized during downstream removal; and adherence to the regulations set forth by County, State, and federal agencies will reduce the potential for impacts to water quality to a less than significant level. With adherence to regulations and permit requirements and implementation of project-specific BMPs, impacts related to otherwise substantially degrading water quality will be less than significant.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

Adequate BMPs will be utilized; and adherence to the regulations set forth by County, State, and federal agencies will reduce the potential for impacts to water quality associated with construction equipment to a less than significant level.

Proper sediment transport is not likely to occur under Alternative 4, Sluicing; and sediment deposits are expected to develop along the route to the ocean, requiring sediment removal from the Arroyo Seco Channel.

Comparison to Proposed Project and Other Alternatives

Due to increases in sediment load, Alternative 4, Sluicing is considered environmentally inferior to the Proposed Project.

Alternative 4, Sluicing will also be environmentally inferior to all the other alternatives.

HYDROLOGY-2 *Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level.*

Sediment Removal/Reservoir Management

As with the Proposed Project, with implementation of Alternative 4, Sluicing the reservoir will have the ability to contain more of the local runoff, which in turn will result in more stormwater penetrating surface sediment in the project area and subsequently recharging the groundwater basin. No significant impacts to groundwater supplies are expected. Alternative 4, Sluicing, however, would require an extended time frame to achieve this capacity. In addition, water stored in the reservoir would be used for the sluicing activities, reducing the available amount for future recharge efforts.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

No significant unavoidable adverse impacts would occur as a result of Alternative 4, Sluicing.

Comparison to Proposed Project and Other Alternatives

Alternative 4, Sluicing is considered neither environmentally superior nor inferior to the Proposed Project due to the same amount of area to contain local runoff.

Alternative 4, Sluicing will be environmentally superior to all of the other alternatives except Alternative 2, Configuration C and Alternative 5, Haul Route Alternative. Alternative 4, Sluicing will be environmentally inferior to Alternative 2, Configuration C due to a larger area to contain local runoff. Alternative 4, Sluicing will be neither environmentally superior nor inferior to Alternative 5, Haul Route Alternative, due to same amount of area to contain local runoff.

HYDROLOGY-3 *Substantially alter the existing drainage pattern of the site, which would potentially result in substantial erosion or siltation.*

Sediment Removal/Reservoir Management

Drainage patterns within the reservoir change on a regular basis depending on seasonal conditions, water flow, and sediment deposition. Sediment removal and reservoir management will also result in alterations of surface drainage characteristics at the project site due to clearing, grading, and excavation activities. Excavation, grading, and sediment placement activities will occur under LACDPW regulations, which establish protocols for proper design of slopes and temporary sediment-collecting structures.

Sluicing will initially transport great amounts of sediments downstream. This would temporarily increase the turbidity of the water, however. As described in the sediment transport study (Appendix K), the sediment transport during historically typical flows and standard dam operations was found to be incapable of flushing excess sediment down the length of the Arroyo Seco Channel. After approximately 9.5 months of sluicing under historically typical flows, followed by an additional6 months of historically typical sediment flushing flows, approximately 20,000 cy of sediment will be conveyed to the Los Angeles River, leaving approximately 243,000 cy of sediment in the Arroyo Seco Channel, with deposits primarily occurring in and around the natural reaches. Due to the rapid fallout, any impacts to water quality due to turbidity are expected to be adverse but less than significant; however, the deposition downstream may require the removal of sediment from the Arroyo Seco.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

Proper sediment transport is not likely to occur under Alternative 4, Sluicing; and sediment deposits are expected to develop along the route to the ocean, requiring sediment removal from the Arroyo Seco Channel.

Comparison to Proposed Project and Other Alternatives

Due to increases in turbidity and sediment deposition, Alternative 4, Sluicing is considered environmentally inferior to the Proposed Project.

Alternative 4, Sluicing will also be environmentally inferior to the other alternatives.

HYDROLOGY-4 *Otherwise substantially degrade water quality.*

Sediment Removal/Reservoir Management

As with the Proposed Project, heavy equipment needed for sediment removal has the potential to cause accidental spills of fuel and lubricating oil. Contaminants could be released into the watershed and adversely affect water quality. Alternative 4, Sluicing activities involving construction equipment will be temporary and involve the limited transport, use, disposal, and storage of fuel and lubricating oil, which are regulated by various agencies. Adequate BMPs will be utilized; and adherence to the regulations set forth by County, State, and federal agencies will reduce the potential for impacts to water quality to a less than significant level.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

Adequate BMPs will be utilized; and adherence to the regulations set forth by County, State, and federal agencies will reduce the potential for impacts to water quality to a less than significant level.

Comparison to Proposed Project and Other Alternatives

Alternative 4, Sluicing is considered neither environmentally superior nor inferior to the Proposed Project.

Alternative 4, Sluicing will also be neither environmentally superior nor inferior to any of the other alternatives except Alternative 6, No Project Alternative. Alternative 4, Sluicing will be environmentally inferior to Alternative 6, No Project Alternative due to sediment removal and reservoir management activities.

LAND USE & PLANNING

LAND USE-1 *Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect.*

Sediment Removal

As with the Proposed Project, Alternative 4, Sluicing will not conflict with the City's General Plan or zoning designation of Open Space for the Proposed Project site and is consistent with the LACFCD easement.

As discussed in Subsection 3.8.3, Applicable Regulations, the HWPMP emphasizes protection of recreational and natural resources as well as the management of flood control for the downstream watershed. Alternative 4, Sluicing is consistent with HWPMP Goal 2 of managing the flood control basin for protection of the downstream areas by improving and maintaining the flood capacity behind Devil's Gate Dam.

Implementation of sediment removal and reservoir management will result in temporarily restricted access to portions of designated trails and indirect impacts to existing recreation uses associated with construction activities (see further discussion below in Recreation). With implementation of Mitigation Measure MM LAN-1, impacts associated with recreational activities coexisting with flood management and water conservation will be reduced to less than significant.

Mitigation Measure

> **MM LAN-1**: Temporary impacts to designated recreational facilities and trails shall be minimized through advance communication and redirection to the nearest facility in the vicinity of the Proposed Project. Prior to completion of final plans and specifications, the LACFCD shall review the plans and specifications to ensure that they contain proper language requiring that signs be posted at the nearby parking lots and trailheads at least one month in advance of sediment removal activities.

Residual Impacts After Mitigation

Impacts associated with recreational activities coexisting with flood management and water conservation would be reduced to less than significant for sediment removal and reservoir management.

Comparison to Proposed Project and Other Alternatives

Alternative 4, Sluicing is considered environmentally inferior to the Proposed Project with respect to impacts to land use associated with compatibility to recreation due to the extended time frame for sediment removal through sluicing.

Due to the greater amount of sediment removal and reservoir management areas, Alternative 4, Sluicing will be environmentally inferior to Alternative 1, Configuration B; Alternative 2, Configuration C; Alternative 3, Configuration D; and Alternative 5, Haul Route Alternative.

Alternative 4, Sluicing will be environmentally inferior to Alternative 6, No Project Alternative, although recreational activities will likely be impacted under Alternative 6, No Project Alternative due to continuous sediment deposition.

MINERAL RESOURCES

MINERALS-1 *Result in the loss of availability of a known mineral resource that would be of value to the region and residents of the state.*

Sediment Removal/Reservoir Management

The Proposed Project site contains areas delineated within SMARA zone designated MRZ-2, which indicates that the area contains adequate information to indicate that significant mineral deposits are present or are judged to have a high likelihood for their presence (City of Pasadena 2002). As with the Proposed Project, under Alternative 4, Sluicing the Proposed Project site will not be available for mining operations during sediment removal and reservoir management activities; however, sediment removal is not expected to involve usable aggregate material or arroyo stone due to unfavorable characteristics such as fine gradation soil and high organic content levels. Impacts will be less than significant.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

Alternative 4, Sluicing will not result in any potentially significant impacts to mineral resources that will be of value to the region and residents of the state.

Comparison to Proposed Project and Other Alternatives

Alternative 4, Sluicing is considered neither environmentally superior nor inferior to the Proposed Project.

Alternative 4, Sluicing will also be neither environmentally superior nor inferior to any of the other alternatives.

MINERALS-2 *Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan.*

While the Arroyo Seco Master Plan EIR (2002) states that the reservoir may contain large quantities of arroyo stone, the Proposed Project site is not delineated as a locally important mineral resource recovery site on a local general plan, specific plan, or other local land use plan. As with the Proposed Project, under Alternative 4, Sluicing, the Proposed Project site will not be available for mining operations during sediment removal and reservoir management activities; however, sediment excavation is not expected to involve usable aggregate material or arroyo stone due to unfavorable characteristics such as fine gradation soil and high organic content levels. Impacts will be less than significant.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

Alternative 4, Sluicing will not result in any potentially significant impacts to availability of a locally important mineral resource recovery site.

Comparison to Proposed Project and Other Alternatives

Alternative 4, Sluicing is considered neither environmentally superior nor inferior to the Proposed Project.

Alternative 4, Sluicing is considered neither environmentally superior nor inferior to any other alternative.

NOISE & VIBRATION

NOISE-1 *Result in exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.*

Sediment Removal/Reservoir Management

Onsite Construction Equipment Noise

Alternative 4, Sluicing sediment removal activities will take place Monday through Friday to between 7:00 a.m. and 6:00 p.m. Standard Time and between 7:00 a.m. and 7:00 p.m. Daylight Savings Time and on Saturday between 8:00 a.m. and 5:00 p.m. Reservoir management activities will take place under the same hours Monday through Friday, with no activities on Saturday. This alternative will use the same amount and type of construction equipment as the Proposed Project. Since the removal of sediment activities will require a greater amount of equipment than the reservoir management activities,

calculations for onsite construction equipment noise have been based on the sediment removal activities equipment list.

Noise impacts from onsite construction equipment activities associated with Alternative 4, Sluicing will be a function of the noise generated by construction equipment, equipment location, sensitivity of nearby land uses, and the timing and duration of the construction activities. Construction noise impacts will be the same as those associated with the Proposed Project to the nearby sensitive receptors and are shown below in Table 4.7-1.

Table 4.7-1: Alternative 4 Onsite Construction Equipment Noise Levels at Nearby Sensitive Receptors

Receptor Description	Receptor Jurisdiction	Distance to Receptor (feet)	Construction Noise Levels[1]	
			dBA Leq	dBA L_{max}
Single-Family Home	Pasadena	140	71	73
Single-Family Home	Los Angeles County	180	69	71
JPL Office	La Cañada Flintridge	200	68	70
Hahamongna Watershed Park	Pasadena	20	86	90
La Cañada High School	La Cañada Flintridge	430	63	63
La Cañada Methodist Church	La Cañada Flintridge	500	62	62

Notes:
[1] Lmax is based on the maximum noise from the loudest piece of equipment and the Leq is the average noise from all equipment.
Source: RCNM, Federal Highway Administration, 2006

Table 4.7-1, above, shows that construction noise impacts will range from 62 dBA Leq to 86 dBA Leq at the nearby receptors, with the highest noise levels occurring at the portion of Hahamongna Watershed Park that is adjacent to the west side of the reservoir.

The City of Pasadena exempts public agencies from the Municipal Code noise requirements. The County of Los Angeles exempts flood control maintenance and construction operations from noise restrictions. The City of La Cañada Flintridge does not provide maximum noise thresholds of construction noise that occurs during the allowed times between Monday through Friday of 7:00 a.m. to 6:00 p.m. Standard Time and 7:00 a.m. to 7:00 p.m. Daylight Savings Time and on Saturday between 7:00 a.m. and 5:00 p.m. Therefore, Alternative 4, Sluicing will comply with all local ordinances due to sediment removal and reservoir management activities taking place during the allowed hours.

Offsite Vehicular Noise

Alternative 4, Sluicing sediment removal and reservoir management activities will generate fewer daily haul truck trips than the Proposed Project, as only vegetation will be trucked offsite. Therefore, potential impacts to offsite traffic noise created by the offsite vehicle trips under Alternative 4, Sluicing will be less than those generated from the Proposed Project.

If proper sediment transport does not occur under Alternative 4, Sluicing, however, sediment deposits will develop along the route to the ocean. This would result in need for sediment removal from the Arroyo Seco Channel, the Los Angeles River, or the Port of Long Beach, which will have associated impacts to offsite vehicular noise. This temporary noise level increase created from offsite vehicular noise impacts will result in a less than significant impact.

Mitigation Measures

No mitigation measures are necessary.

Residual Impacts After Mitigation

Alternative 4, Sluicing will comply with all local noise ordinances, and roadway noise impacts will be less than significant.

Comparison to Proposed Project and Other Alternatives

Alternative 4, Sluicing is considered environmentally inferior to the Proposed Project with respect to impacts associated with noise levels. If proper sediment transport does not occur under Alternative 4, Sluicing, sediment deposits will develop along the route to the ocean. This would result in sediment deposition and impacts downstream associated with removal activities.

Alternative 4, Sluicing will also be environmentally inferior to Alternative 1, Configuration B; Alternative 2, Configuration C; Alternative 3, Configuration D; and Alternative 5, Haul Route Alternative. If proper sediment transport does not occur under Alternative 4, Sluicing, sediment deposits will develop along the route to the ocean. This would result in sediment deposition and impacts downstream associated with removal activities.

Alternative 4, Sluicing will be environmentally inferior to Alternative 6, No Project Alternative due to sediment removal and reservoir management activities.

NOISE-2 *Result in exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels.*

Sediment Removal/Reservoir Management

As with the Proposed Project, only the nearby single-family homes in the City of Pasadena would experience vibration levels that would exceed the 0.01-inch-per-second vibration standard. This potentially significant impact will be reduced to less than significant through implementation of Mitigation Measure MM N-1. In addition, this impact will be greater in comparison to the Proposed Project, as sediment removal under this alternative is expected to have a longer duration.

Mitigation Measures

> **MM N-1:** LACFCD shall restrict the operation of any off-road construction equipment that is powered by a greater than 200-horsepower engine from operating within 180 feet of any offsite residential structure. Equipment that is not performing any earth-moving activities and is solely operating for entering or leaving the site via the access roads to the reservoir is exempted from this requirement.

Residual Impacts After Mitigation

Through implementation of Mitigation Measure MM N-1, the onsite construction equipment vibration impacts to nearby sensitive receptors would be reduced to less than significant.

Comparison to Proposed Project and Other Alternatives

Alternative 4, Sluicing is considered environmentally inferior to the Proposed Project with respect to impacts associated with vibration levels due to the extended time frame for sediment removal through sluicing.

Due to the impacts associated with sediment removal downstream, Alternative 4, Sluicing will also be environmentally inferior to all other alternatives including Alternative 6, No Project Alternative.

NOISE-3 *Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.*

Sediment Removal/Reservoir Management

Alternative 4, Sluicing, will not create a substantial temporary or periodic increase in ambient noise levels in the project vicinity above existing noise levels. For this analysis, both the sediment removal activities and reservoir management activities have been considered as temporary activities, since they would occur only for limited durations of time. The construction activities associated with the removal of the sediment may create temporary onsite noise impacts from the operation of construction equipment as well offsite noise impacts from the use of haul trucks to export vegetation offsite.

Onsite Construction Equipment Noise

As with the Proposed Project, the onsite equipment that will be operated under Alternative 4, Sluicing will not conflict with any construction noise standards. Any temporary noise level increase from onsite construction noise will be less than significant. Therefore, potential impacts to noise levels caused by onsite construction from Alternative 4, Sluicing will be the same as those generated from the Proposed Project; however, due to the longer time frame for removing the material the impact will be greater.

Offsite Vehicular Noise

As with the Proposed Project, roadway noise impacts from offsite vehicular trips associated with Alternative 4, Sluicing for locations that do not already exceed the standards for existing conditions would be less than significant. The analysis also found that for the locations that currently exceed the normally acceptable noise standard, noise contribution by Alternative 4, Sluicing to these roadway segments will be within the Federal Transit Administration's allowable noise exposure increase levels. Therefore, the impacts from temporary noise level increase created from offsite vehicular noise will result in a less than significant impact. Potential offsite vehicular noise from Alternative 4, Sluicing will be less than that generated from the Proposed Project due to the lesser number of trucks moving material offsite.

If proper sediment transport does not occur under Alternative 4, Sluicing, however, sediment deposits will develop along the route to the ocean. This would result in need for sediment removal from the Arroyo Seco Channel, the Los Angeles River, or the Port of Long Beach, which will have associated impacts to offsite vehicular noise. This temporary noise level increase created from offsite vehicular noise impacts will result in a less than significant impact.

Mitigation Measures

No mitigation measures are necessary.

Residual Impacts After Mitigation

Temporary noise level increase from onsite construction noise and offsite vehicular noise would be less than significant.

Comparison to Proposed Project and Other Alternatives

Alternative 4, Sluicing is considered environmentally inferior to the Proposed Project with respect to impacts associated with noise levels. If proper sediment transport does not occur under Alternative 4, Sluicing and sediment deposits will develop along the route to the ocean. This would result in sediment deposition and associated removal activities impacts downstream. Although less trucking would occur onsite, other sensitive receptors would potentially be impacted by the associated trucking of sediment.

Due to the impacts associated with sediment removal downstream, Alternative 4, Sluicing will also be environmentally inferior to Alternative 1, Configuration B; Alternative 2, Configuration C; Alternative 3, Configuration D; and Alternative 5, Haul Route Alternative. If proper sediment transport does not occur under Alternative 4, Sluicing and sediment deposits develop along the route to the ocean, this would result in need for sediment removal and impacts downstream associated with removal activities.

Alternative 4, Sluicing will be environmentally inferior to Alternative 6, No Project Alternative due to sediment removal and reservoir management activities.

RECREATION/PUBLIC SERVICES

RECREATION-1 *Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated.*

Alternative 4, Sluicing will not result in the construction of new residences, or facilitate the development of residences, or result in an increase in area population. Therefore, implementation of Alternative 4, Sluicing will not result in increased use or the physical deterioration associated with increased use for neighborhood or regional parks or other recreational facilities due to any increases in area population.

Sediment Removal Impacts

Unlike the Proposed Project, sediment removal under Alternative 4, Sluicing will occur over the course of multiple decades. During this time, most of the Proposed Project site will be closed to public use from the dam face to the edge of this Alternative's excavation limit boundaries (see Figure 4.7-1). Alternative 4, Sluicing will have a potential impact on recreational opportunities through temporarily restricted access to trails and long-term alteration of the landscape. Maintenance roads within the basin are used by the LACFCD, Southern California Edison (SCE), and the City of Pasadena, among others, for operations and maintenance of Devil's Gate Reservoir and other facilities in the area. The majority of the maintenance roads will be closed during sediment removal; however, these roads are not officially

designated for recreational uses and are often not available for unofficial recreation use due to reservoir water levels or maintenance activities.

Designated Recreational Uses

Implementation of sediment removal will result in temporarily restricted access to portions of designated trails and indirect impacts to existing recreation uses associated with construction activities. These impacts may increase the use of other area parks and recreational facilities such as those described in Table 3.15-1: Area Recreational Facilities.

The Oak Grove area of Hahamongna Watershed Park and the associated facilities, including Oak Grove Disk Golf Course, will remain open during sediment removal and will continue to provide active recreational facilities to the area. Sediment removal activities will not limit the use of the Oak Grove area of Hahamongna Watershed Park by individuals or by organizations such as the Oak Grove Disc Golf Club, the Rose Bowl Riders, MACH 1, or the Tom Sawyer Camp.

Activities such as hiking, biking, horseback riding, bird watching, and nature walks will be limited to trails located outside the excavation boundary or to trails opened in absence of removal activities. Of the six designated trails in and adjacent to the Proposed Project site, three of these trails, Flint Wash Trail, Gabrielino Trail, and Gould Canyon Trail, will remain open during sediment removal and will continue to provide active recreational facilities to the area. Small portions of the Altadena Crest Trail, Arroyo Seco Trail, and West Rim Trail will either be closed when sediment removal activities are under way and/or are near the trail.

Sediment removal activities associated with this alternative will not limit or block access to the Oak Grove area and many of the designated trails and will not result in direct potentially significant impacts to these facilities; however, use of these facilities may be less desirable due to construction-related emissions, noise, dust, visual, and traffic impacts associated with sediment removal. These temporary, indirect impacts will reduce the quality of the recreational experience.

Indirect impacts to recreation associated with sediment removal under Alternative 4, Sluicing will be greater in comparison to the Proposed Project due to longer time frame for sediment removal activities.

Recreational users may choose to visit other area parks, recreational facilities, or trails due to the temporary access restrictions or the indirect effects of construction-related activities. Due to the number of other recreational facilities and trails in the vicinity, it is anticipated that these visitors will be dispersed throughout the area and that no single park or facility will experience a substantial increase in use. Therefore, Alternative 4, Sluicing will not increase use of other existing parks or recreation facilities such that substantial physical deterioration of these facilities will occur or be accelerated. Impacts to other existing parks and recreation facilities will be temporary and less than significant. Sediment removal under this Alternative could potentially have a longer duration than the Proposed Project due to the alternate sediment removal method. This longer duration could further increase the temporary and less than significant impacts to other existing parks and recreation facilities.

Reservoir Management Impacts

After the annual proposed reservoir management, access to Devil's Gate Reservoir will be similar to existing conditions. Every year the reservoir will be temporarily closed to public access for reservoir

management. This will occur during the late summer/early fall over an estimated five-week period, Monday through Friday. The length of time will vary depending on the amount of sediment deposited in the reservoir over the course of the year. The Oak Grove area of Hahamongna Park and most of the designated trails will remain open during reservoir management activities and will continue to provide active recreational facilities to the area. The proposed reservoir management activities will typically occur only during the weekdays; therefore, weekend visitors of the Hahamongna Watershed Park will not be affected by the proposed reservoir management activities. Trails will be beneficially affected in the long-term through the reduction of potential disruption by flooding and/or being buried under sediment. Impacts to existing parks and recreation facilities associated with Alternative 4, Sluicing reservoir management activities will be less than significant.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

Alternative 4, Sluicing will not result in any potentially significant impacts associated with increased use of other existing parks or recreation facilities.

Comparison to Proposed Project and Other Alternatives

Alternative 4, Sluicing is considered environmentally inferior to the Proposed Project with respect to recreation uses due to the longer timeframe for sediment removal activities.

Due to the longer duration of sediment removal activities, Alternative 4, Sluicing will also be environmentally inferior to Alternative 1, Configuration B; Alternative 2, Configuration C; Alternative 3, Configuration D; and Alternative 5, Haul Route Alternative.

Alternative 4, Sluicing will be environmentally inferior to Alternative 6, No Project Alternative, due to sediment removal and reservoir management activities, although recreational activities will likely be impacted under Alternative 6, No Project Alternative due to continuous sediment deposition.

RECREATION-2 *Require the construction or expansion of existing recreational facilities which might have an adverse physical effect on the environment.*

As discussed in detail above under RECREATION-1, recreational users may choose to visit other area parks, recreational facilities, or trails due to the temporary access restrictions or the indirect effects of construction-related activities during reservoir management activities. It is anticipated that these visitors will be dispersed throughout the area and that no single park or facility will experience a substantial increase in use. Therefore, Alternative 4, Sluicing will not require the construction or expansion of existing recreational facilities which might have an adverse physical effect on the environment, resulting in a less than significant impact. Sediment removal under this Alternative could potentially have a longer duration than the Proposed Project, due to the alternate sediment removal method. This longer duration could increase the temporary and less than significant impacts to other existing parks and recreation facilities.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

Alternative 4, Sluicing will not result in any potentially significant impacts associated with the construction or expansion of existing recreational facilities.

Comparison to Proposed Project and Other Alternatives

Alternative 4, Sluicing is considered environmentally inferior to the Proposed Project due to the longer timeframe for sediment removal activities.

Due to the longer timeframe for sediment removal activities, Alternative 4, Sluicing will also be environmentally inferior to Alternative 1, Configuration B; Alternative 2, Configuration C; Alternative 3, Configuration D; and Alternative 5, Haul Route Alternative.

Alternative 4, Sluicing will be environmentally inferior to Alternative 6, No Project Alternative, due to sediment removal and reservoir management activities, although recreational activities will likely be impacted under Alternative 6, No Project Alternative due to continuous sediment deposition.

PUBLIC SERVICES-1 *Result in substantial adverse impacts associated with the provision of or need for new or physically altered recreational facilities, the construction of which could cause significant environmental impacts.*

As discussed in detail above under RECREATION-2, Alternative 4, Sluicing will not result in a substantial increase in use of any one park or facility. Therefore, Alternative 4, Sluicing will not require the provision of or need for new or physically altered recreational facilities, the construction of which could cause significant environmental impacts.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

Alternative 4, Sluicing will not result in any potentially significant impacts associated with the construction or expansion of existing recreational facilities.

Comparison to Proposed Project and Other Alternatives

Alternative 4, Sluicing is considered environmentally inferior to the Proposed Project due to the longer timeframe for sediment removal activities.

Due to the longer timeframe for sediment removal activities, Alternative 4, Sluicing will also be environmentally inferior to Alternative 1, Configuration B; Alternative 2, Configuration C; Alternative 3, Configuration D; and Alternative 5, Haul Route Alternative.

Alternative 4, Sluicing will be environmentally inferior to Alternative 6, No Project Alternative, due to sediment removal and reservoir management activities, although recreational activities will likely be impacted under Alternative 6, No Project Alternative due to continuous sediment deposition.

TRANSPORTATION & TRAFFIC

TRANSPORTATION-1 *Conflict with an applicable plan, ordinance, or policy establishing measure of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit.*

Sediment Removal

Truck traffic associated with the Alternative 4, Sluicing is expected to adhere to traffic regulations. Potential impacts regarding existing LOS are discussed under TRANSPORTATION-2 below. This increase in traffic would result in temporary significant impacts to the efficiency of the circulation system. Implementation of Mitigation Measures MM TRA-1 and TRA-2 would reduce this impact but not to a level of less than significant.

Other potential impact reduction measures discussed under TRANSPORTATION-2, below, could reduce impacts to less than significant. These measures cannot be legally imposed by the LACFCD, however, since the locations are under the jurisdiction of other agencies. Every reasonable effort will be made to coordinate with and receive approval from the jurisdictional agencies to implement the impact reduction measures but LACFCD cannot guarantee that the measures will be implemented. Therefore, this temporary impact could remain potentially significant.

Reservoir Management

Truck traffic associated with reservoir management is not expected to adversely affect traffic LOS on the existing roadway network. Therefore, impacts to the efficiency of the circulation system would be less than significant.

Mitigation Measures

MM TRA-1: Proposed Project haul trucks will not deliver to the Vulcan Material Reliance Facility during the PM peak period.

MM TRA-2: Proposed Project haul trucks will not deliver to the Boulevard Pit during the PM peak period.

Residual Impacts after Mitigation

Potentially significant traffic impacts associated with the sediment removal phase would be temporary, expected to occur during the drier months (from April to December, except on holidays), and would cease at the end of the sediment removal phase. Implementation of the mitigation measures described above would reduce impacts to traffic and circulation but not to a level of less than significant. Other

potential impact reduction measures discussed under TRANSPORTATION-2, below, could reduce impacts to less than significant. These measures cannot be legally imposed by the LACFCD, however, since the locations are under the jurisdiction of other agencies. Every reasonable effort will be made to coordinate with and receive approval from the jurisdictional agencies to implement the impact reduction measures but LACFCD cannot guarantee that the measures will be implemented. Therefore, this temporary impact could remain potentially significant. No significant traffic impacts would occur under reservoir management.

Comparison to Proposed Project and Other Alternatives

Alternative 4, Sluicing is considered environmentally inferior to the Proposed Project. If proper sediment transport does not occur under Alternative 4, Sluicing, sediment deposits will develop along the route to the ocean. This would result in need for sediment removal from the Arroyo Seco Channel, the Los Angeles River, or the Port of Long Beach and impacts to transportation associated with removal activities.

Due to the impacts associated with downstream sediment removal, Alternative 4, Sluicing will be environmentally superior to Alternative 1, Configuration B; Alternative 2, Configuration C; and Alternative 3, Configuration D. If proper sediment transport does not occur under Alternative 4, Sluicing, sediment deposits will develop along the route to the ocean. This would result in need for sediment removal from the Arroyo Seco Channel, the Los Angeles River, or the Port of Long Beach and impacts to transportation from associated with removal activities.

Alternative 4, Sluicing will be environmentally inferior to Alternative 5, Haul Route Alternative as Alternative 4, Sluicing will result in greater significant intersection impacts due to the associated impacts of downstream sediment removal.

Alternative 4, Sluicing will be environmentally inferior to Alternative 6, No Project Alternative due to sediment removal and reservoir management activities.

TRANSPORTATION-2 *Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways.*

Initially truck traffic under this Alternative would have a shorter duration than the Proposed Project, as only vegetation would be trucked offsite and transported to Scholl Canyon Landfill; however, if proper sediment transport does not occur under Alternative 4, Sluicing, sediment deposits will develop along the route to the ocean. This would result in need for sediment removal from the Arroyo Seco Channel, the Los Angeles River, or the Port of Long Beach, which will have impacts associated with transportation and traffic. It is likely that sediment loads will fall out rapidly after leaving Devil's Gate Reservoir, limiting the area impacted by heavy sediment loaded storm flows. As this would result in a similar amount of sediment removal, Alternative 4, Sluicing will not significantly impact freeway segments or freeway on- and off-ramps but will significantly impact the following intersections:

- Irwindale Avenue/Foothill Boulevard intersection during the PM peak hour;

- Figueroa St/Scholl Canyon Road and SR-134 westbound ramps during the AM and PM peak hours;
- Glenoaks Boulevard/Osborne Street intersection during the AM and PM peak hours;
- Sheldon Street and San Fernando Road intersection during the PM peak hour;
- and Branford Street and San Fernando Road intersection during the PM peak hour.

The Irwindale Avenue/Foothill Boulevard intersection is anticipated to operate at an unacceptable LOS during the PM peak hour, resulting in a temporary significant impact. Mitigation Measure MM TRA-1 would reduce the impact to the Irwindale Avenue/Foothill Boulevard intersection to less than significant.

The Figueroa St/Scholl Canyon Road and SR-134 westbound ramps intersection is anticipated to operate at an unacceptable LOS during the AM and PM peak hours, resulting in a temporary significant impact. Reducing this impact to less than significant would require implementation of the following potential impact reduction measure:

- Figueroa Street/Scholl Canyon Road and SR-134 westbound ramps: Restripe the westbound right turn lane to a shared left-right turn lane and the northbound through lane to a shared through-right turn lane. The northbound direction will include a shared through-right turn lane and a right turn lane. The southbound direction will include a shared through-left turn lane and a through turn lane. The westbound direction will include a left turn lane and a shared left-right turn lane. This impact reduction measure will require the approval of the City of Los Angeles and Caltrans.

Implementation of the impact reduction measure discussed above would reduce the impact to the Figueroa St/Scholl Canyon Road and SR-134 westbound ramps intersection to less than significant. This impact reduction measure cannot be legally imposed by the LACFCD. Every reasonable effort will be made to coordinate with and receive approval to implement the impact reduction measure; however, LACFCD cannot guarantee that the measure will be implemented therefore this temporary impact could remain significant.

The Glenoaks Boulevard and Osborne Street intersection is anticipated to operate at an unacceptable LOS during the AM and PM peak hours, resulting in a temporary significant impact.

The Sheldon Street and San Fernando Road intersection and the Branford Street and San Fernando Road intersection are anticipated to operate at an unacceptable LOS during the PM peak hour, resulting in temporary significant impacts. Mitigation Measure MM TRA-2 would reduce the impacts to less than significant.

Mitigation Measures

See Mitigation Measures MM TRA-1, and MM TRA-2.

Residual Impacts After Mitigation

Potentially significant traffic impacts associated with the sediment removal phase would be temporary, expected to occur during the drier months (from April to December, except on holidays), and would cease at the end of the sediment removal phase. Implementation of the mitigation measures described above would reduce some but not all of the impacts to traffic and circulation to a level less than significant. Other potential impact reduction measures discussed above could reduce impacts to less than significant. These measures cannot be legally imposed by the LACFCD, however, since the locations are under the jurisdiction of other agencies. Every reasonable effort will be made to coordinate with and receive approval from the jurisdictional agencies to implement the impact reduction measures but LACFCD cannot guarantee that the measures will be implemented. Therefore, these temporary impacts could remain potentially significant. No significant traffic impacts would occur under reservoir management.

Comparison to Proposed Project and Other Alternatives

Alternative 4, Sluicing is considered environmentally inferior to the Proposed Project. If proper sediment transport does not occur under Alternative 4, Sluicing, sediment deposits will develop along the route to the ocean. This would result in need for sediment removal from the Arroyo Seco Channel, the Los Angeles River, or the Port of Long Beach and impacts to traffic management from associated removal activities.

Due to impacts associated with downstream sediment removal, Alternative 4, Sluicing will also be environmentally inferior to Alternative 1, Configuration B; Alternative 2, Configuration C; and Alternative 3, Configuration D. If proper sediment transport does not occur under Alternative 4, Sluicing, sediment deposits will develop along the route to the ocean. This would result in need for sediment removal from the Arroyo Seco Channel, the Los Angeles River, or the Port of Long Beach and impacts to traffic management from associated removal activities.

Alternative 4, Sluicing will be environmentally inferior to Alternative 5, Haul Route Alternative as Alternative 5, Haul Route Alternative will result in reduced traffic impacts.

Alternative 4, Sluicing will be environmentally inferior to Alternative 6, No Project Alternative, due to sediment removal and reservoir management activities.

TRANSPORTATION-3 *Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).*

<u>Sediment Removal</u>

Implementation of the Alternative 4, Sluicing may include impact reduction measures that would require modifications to the existing roadway network. Alternative 4, Sluicing is limited to excavation and transportation of vegetation that has accumulated in Devil's Gate Reservoir and would not introduce any new uses that would be incompatible or substantially increase hazards with the existing roadway system. Therefore, impacts related to traffic hazards would be less than significant.

If proper sediment transport does not occur under Alternative 4, Sluicing, sediment deposits will develop along the route to the ocean. This would result in need for sediment removal from the Arroyo

Seco Channel, the Los Angeles River, or the Port of Long Beach, which will have impacts associated with transportation and traffic. Even if trucking of sediment further downstream is required, it would not introduce any uses that would be incompatible or substantially increase hazards with the existing roadway system; and it would have less than significant impacts.

Reservoir Management

The reservoir management associated with Alternative 4, Sluicing would not require any modifications to the existing roadway network and would not introduce any new uses that would be incompatible with the existing roadway system; therefore, no impact would occur.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

Impacts will be less than significant.

Comparison to Proposed Project and Other Alternatives

Alternative 4, Sluicing is considered neither environmentally superior nor inferior to the Proposed Project, or any of the other alternatives as it would not introduce any new uses that would be incompatible with the existing roadway system.

TRANSPORTATION-4 *Result in inadequate emergency access.*

Sediment Removal/Reservoir Management

Alternative 4, Sluicing would not sever or otherwise block access to any existing roadways. No equipment staging will occur on public roadways during construction of the Proposed Project. The impact to emergency access would be a less than significant impact.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

Impacts will be less than significant.

Comparison to Proposed Project and Other Alternatives

Alternative 4, Sluicing is considered neither environmentally superior nor inferior to the Proposed Project or any other alternative except for Alternative 6, No Project Alternative.

Alternative 4, Sluicing will be environmentally superior to Alternative 6, No Project Alternative as the No Project Alternative will severely restrict flood control, potentially increasing flooding downstream of Devil's Gate Dam.

TRANSPORTATION-5 *Conflict with adopted policies, plans, or programs regarding public transit or bicycle or pedestrian facilities or otherwise decrease the performance or safety of such facilities supporting alternative transportation (e.g., bus turnouts, bicycle racks).*

Sediment Removal

Alternative 4, Sluicing would be confined to the roadway network described in Section 3.16.2 and would not adversely affect alternative modes of public transportation such as light rail. Implementation of Alternative 4, Sluicing would not require closure of any bus stops or disrupt any existing bus routes. The degrading of LOS at intersections, freeway segments, and freeway on- and off-ramps described above under TRANSPORTATION-2 could affect buses using the existing roadway network. This would be a temporary potentially significant impact.

Reservoir Management

The reservoir management associated with Alternative 4, Sluicing would require periodic management activities at Devil's Gate Reservoir that would not adversely affect traffic level of service on the existing roadway network that could delay bus services. Therefore, reservoir management impacts would be less than significant.

Mitigation Measures

See Mitigation Measures MM TRA-1 and MM TRA-2.

Residual Impacts After Mitigation

Potentially significant traffic impacts associated with the sediment removal phase would be temporary, expected to occur during the drier months (from April to December, except on holidays), and would cease at the end of the sediment removal phase. Implementation of the mitigation measures described above would reduce some but not all of the impacts to traffic and circulation to a level less than significant. Other potential impact reduction measures discussed above could reduce impacts to less than significant. These measures cannot be legally imposed by the LACFCD, however, since the locations are under the jurisdiction of other agencies. Every reasonable effort will be made to coordinate with and receive approval from the jurisdictional agencies to implement the impact reduction measures but LACFCD cannot guarantee that the measures will be implemented. Therefore, these temporary impacts could remain potentially significant. No significant traffic impacts would occur under reservoir management.

Comparison to Proposed Project and Other Alternatives

Alternative 4, Sluicing is considered environmentally inferior to the Proposed Project. If proper sediment transport does not occur under Alternative 4, Sluicing, sediment deposits will develop along the route to the ocean. This would result in need for sediment removal from the Arroyo Seco Channel, the Los Angeles River, or the Port of Long Beach and impacts to transportation from associated removal activities.

Due to the lack of trucking sediment offsite during sediment removal and reservoir management, Alternative 4, Sluicing will also be environmentally superior to Alternative 1, Configuration B; Alternative 2, Configuration C; and Alternative 3, Configuration D.

Alternative 4, Sluicing will be environmentally inferior to Alternative 5, Haul Route Alternative as Alternative 5, Haul Route Alternative will result in reduced traffic impacts.

Alternative 4, Sluicing will be environmentally inferior to Alternative 6, No Project Alternative due to sediment removal and reservoir management activities.

UTILITIES & SERVICE SYSTEMS

UTILITIES-1 *Require or result in construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects.*

Sediment Removal

As with the Proposed Project, during sediment removal Alternative 4, Sluicing will not result in or require the construction of new or expansion of existing stormwater drainage systems. Sediment and vegetation removal operations will result in alterations of surface drainage characteristics at the project site due to clearing, grading, and excavation activities. Although the drainage characteristics for the site will be altered, the project overall will result in a positive impact to drainage of Devil's Gate Reservoir because it will help restore the flood control capacity of Devil's Gate Dam and Reservoir. As with the Proposed Project, Alternative 4, Sluicing will add minimal impermeable surface area to the Proposed Project site through paving a portion of the access roads from Oak Grove Drive. This minimal increase in impervious surface area will not result in any significant increase in stormwater runoff that will require new stormwater drainage facilities.

In addition, these activities will not directly involve the existing storm drain outfalls, power lines, gas line, communication lines, water lines, sewer lines, or water wells. Impacts to these utility facilities will be avoided through compliance with City regulations regarding utility facilities, coordination with utility providers, and implementation of LACDPW BMPs.

Reservoir Management

During reservoir management, Alternative 4, Sluicing will not result in or require the construction of new or expansion of existing stormwater drainage systems. Sediment that accumulates after the proposed removal will be removed through sluicing. No impacts to stormwater facilities are expected during sluicing operations. Impacts to stormwater facilities during mechanical removal will be avoided through compliance with City regulations regarding stormwater facilities and implementation of LACDPW BMPs.

Mitigation Measure

No mitigation measures are required.

Residual Impacts After Mitigation

Alternative 3, Configuration D will not result in any potentially significant impacts to utility facilities.

Comparison to Proposed Project and Other Alternatives

Alternative 4, Sluicing is considered neither environmentally superior nor inferior to the Proposed Project nor to any of the other alternatives.

4.7.4 Conclusion and Relationship to Project Objectives

Alternative 4, Sluicing will meet the Proposed Project's objectives of satisfactorily reducing flooding risk, creating a configuration suitable for routine operations and maintenance, reducing the possibility of plugging at the dam face, and removing sediment from Johnson Field. The alternative will not meet the Proposed Project objectives of removing sediment in a timely manner, as sediment removal would occur over multiple decades under this alternative. In addition, sediment will not be transported to facilities already designated to accept such material; instead the sediment will be transported downstream, where, if proper sediment transport does not occur under Alternative 4, Sluicing sediment deposits will develop along the route to the ocean. This would result in need for sediment removal from the Arroyo Seco Channel, the Los Angeles River, or the Port of Long Beach.

Alternative 4, Sluicing is considered environmentally inferior to the Proposed Project due to a longer duration in construction activities and potential downstream impacts. Alternative 4, Sluicing would initially be environmentally superior to the Proposed Project in terms of air quality, greenhouse gas, noise, and traffic impacts, as sediment will not be trucked offsite. If proper sediment transport does not occur under Alternative 4, Sluicing, sediment deposits will develop along the route to the ocean. This would result in need for sediment removal from the Arroyo Seco Channel, the Los Angeles River, or the Port of Long Beach. This removal effort may require roadway modifications.

Due to the increase in sediment removal and reservoir management areas, Alternative 4, Sluicing will also be environmentally inferior to Alternative 1, Configuration B; Alternative 2, Configuration C; and Alternative 3, Configuration D.

Alternative 4, Sluicing is considered environmentally inferior to Alternative 5, Haul Route Alternative due to a longer duration in construction activities and potential downstream impacts.

Alternative 4, Sluicing will be environmentally inferior to Alternative 6, No Project Alternative due to sediment removal and reservoir management activities, although aesthetics, biological resources, and recreation resources of the reservoir will likely degrade under Alternative 6, No Project Alternative due to continuous sediment deposition.

4.8 ALTERNATIVE 5, CONFIGURATION A, HAUL ROUTE ALTERNATIVE

4.8.1 Alternative Description

Sediment Removal

Alternative 5, Haul Route Alternative excavation activities will remove approximately 2.9 million cy of current excess sediment in the reservoir in addition to any additional sediment received from storm flows during the project. This is the same excavation volume as the Proposed Project.

Excavation/Reservoir Configuration

Specific excavation limits and reservoir configuration for Alternative 5 will be the same as the Proposed Project, as shown in Figure 2.5-1.

Removal Method

In order to excavate sediment from the reservoir, trees and vegetation growing within the excavation areas or where haul roads are located will need to be removed. In the areas where excavation will not take place, vegetation will not be removed.

The accumulated sediment will be excavated within the limits shown in Figure 2.5-1.

The excavation will be accomplished using the same removal method as the Proposed Project. Construction equipment will include but not be limited to approximately four front loaders with 4-yard buckets, two bulldozers, one excavator, one grader, one water truck, and two tender trucks. Vegetation and organic debris will be separated from the sediment. Coarse material may need to be processed through sorters and crushers to be hauled offsite. Depending on the moisture content of the sediment removed, the sediment may need to be stockpiled to allow it to dry. If drying is required, stockpiling of the sediment will occur onsite within the excavation limits in Devil's Gate Reservoir.

Sediment Disposal

This Alternative will use the same disposal sites as the Proposed Project.

Sediment Disposal Truck Routes

This Alternative analyzes the use of alternative routes for some of the segments of the sediment disposal truck routes.

Project Site and Freeway Access

The sediment disposal truck alternative routes to and from the Proposed Project Site and I-210 are shown in Figure 4.8-1: Haul Route To and From Proposed Site and I-210 Alternative, Option 1 and Figure 4.8-2: Haul Route To and From Proposed Site and I-210 Alternative, Option 2. Option 1 haul route will avoid La Cañada High School and Hillside School and Learning Center and also avoid the Berkshire Place and I-210 eastbound ramps intersection. Under the Proposed Project, this intersection was anticipated to operate at an unacceptable LOS during the AM peak hour, resulting in a significant impact. Option 2 haul route will avoid the use of Windsor Avenue.

For Option 1, as shown in Figure 4.8-1, trucks will access the Proposed Project site from I-210 by exiting Windsor Avenue/Arroyo Boulevard, turning right on eastbound Windsor Avenue, turning left onto northbound Oak Grove Drive, and then entering the east reservoir access road.

Loaded trucks will exit the reservoir on the improved, existing westerly access road, turning left onto southbound Oak Grove Drive, then right onto westbound Windsor Avenue, and then east onto I-210 east, to disposal sites in Azusa and Irwindale or I-210 west to the Sun Valley disposal sites.

Alternatively, for Option 2, as shown in Figure 4.8-2, trucks will access the Proposed Project site from I-210 by exiting at Berkshire Place, turning east onto Berkshire Place, turning right onto southbound Oak Grove Drive, then entering the reservoir by making a left onto the ramp on the east side of the reservoir.

Loaded trucks will exit the reservoir on the upgraded existing west side access road, turn right onto northbound Oak Grove Drive, then left onto westbound Berkshire Place, and then to I-210 eastbound to disposal sites in Azusa and Irwindale or to I-210 westbound to disposal sites in Sun Valley.

Manning Pit SPS Route

As shown in Figure 4.8-3, trucks carrying sediment to the Manning Pit SPS will follow I-210 east, exiting at Irwindale Avenue, turning right onto Irwindale Avenue southbound, turning left onto eastbound Gladstone Street, then turning right onto southbound Vincent Avenue, and turning right into Manning Pit SPS. Trucks returning to I-210 will take Vincent Avenue north, turning right onto Arrow Highway eastbound, turning left onto Azusa Avenue northbound, then turning right onto First Street eastbound to I-210 west.

Waste Management Facility/Vulcan Materials Reliance Facility

This Alternative would use the same routes to either Waste Management Facility or Vulcan Materials Reliance Facility as the Proposed Project.

Sun Valley Disposal Sites Routes

As shown in Figure 4.8-4: Haul Route Alternatives To and From Sun Valley Sites, trucks carrying sediment to Sheldon Pit, Sun Valley Fill Site, and Bradley Landfill will follow I-210 west until exiting at the Wheatland Avenue interchange; turning right onto Wheatland Avenue northbound, right onto Foothill Boulevard eastbound, and then right onto Wentworth Street westbound. If accessing Sheldon Pit or Sun Valley Fill Site, trucks will turn right onto Sheldon Street. Trucks accessing Bradley Landfill will turn left onto Glen Oaks Boulevard, then right onto Peoria Street.

Trucks accessing Boulevard Pit will follow I-210 west to SR-118 west to I-5 south until exiting at the Osborne Street; turning left onto Osborne Street eastbound, right onto Laurel Canyon Boulevard southbound, then left onto Branford Street eastbound, entering and exiting on Branford Street. Trucks will then follow this route in reverse to return to I-210.

Scholl Canyon Landfill Route

As shown in Figure 4.8-5: Haul Route Alternative To Scholl Canyon Landfill, for vegetation and organic material disposal, the trucks will follow I-210 west to SR-2 south toSR-134east, exit Figueroa Street northbound, and then turn right on northbound Scholl Canyon Road to the Scholl Canyon Landfill. Exiting southbound on Scholl Canyon Road, returning trucks will turn right onto Figueroa Street to access SR-134westbound to SR-2 north and continue to I-210 east.

Project Schedule

As with the Proposed Project, sediment removal under this Alternative will occur between Summer 2015 and Summer 2020. Excavation and associated activities within the reservoir area are expected to take

place during drier months, from April to December, Monday through Saturday (except on holidays), as weather permits. During dry years, work could potentially start earlier and/or continue later. Alternative 5, Haul Route Alternative sediment removal activities will take place Monday through Friday to between 7:00 a.m. and 6:00 p.m. Standard Time and between 7:00 a.m. and 7:00 p.m. Daylight Savings Time and on Saturday between 8:00 a.m. and 5:00 p.m. Reservoir management activities will take place under the same hours Monday through Friday, with no activities on Saturday.

Reservoir Management

Alternative 5, Haul Route Alternative will employ reservoir management to manage sediment in a method similar to the Proposed Project's reservoir management Option 1 to reduce buildup of sediment in the reservoir management area and eliminate or substantially reduce the occurrence of another large-scale sediment removal project in the future.

The reservoir will be maintained with the approximate reservoir management cut and elevation levels shown as the green shaded area in Figure 2.5-1. This will include the entire Configuration A excavation area for total reservoir management acreage of approximately 120.42 acres. The access roads will be maintained to provide proper road width for access.

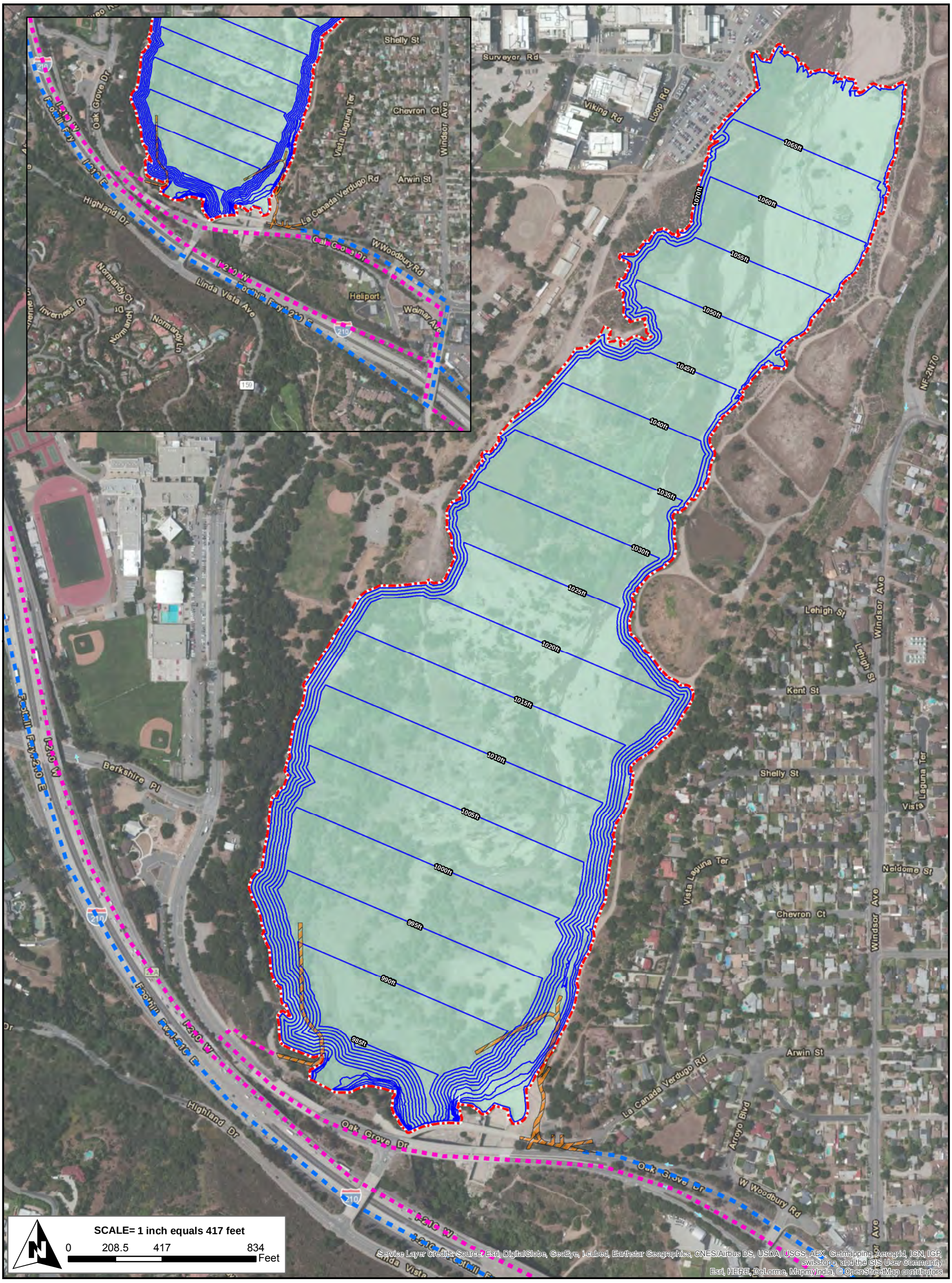
Vegetation Maintenance

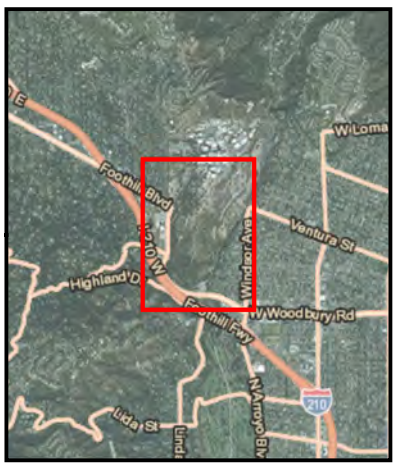
Vegetation within the reservoir management area of the reservoir will be mowed or removed and grubbed annually. These activities will occur Monday through Friday over an estimated three-week period in the late summer or early fall. All vegetation and sediment outside the reservoir management footprint will be allowed to re-establish and/or remain in place.

FAST Operations

During FAST operations, reservoir inflows from rain events will naturally pass sediment through the reservoir and downstream of the dam. These FAST operations will occur during the winter storm season and will not require mechanical agitation or assistance. FAST operations will reduce sediment accumulation in the reservoir and help maintain flood control capacity. The amount of sediment that will be transported through FAST operations is limited by the smaller sediment grain size that can be moved by the storm runoff received into the reservoir and the subsequent quantities of storm runoff received.

It is anticipated that the majority of these FAST operations will be similar to historic FAST operations and that similar volumes of sediment will pass through the reservoir and into the Arroyo Seco.





Proposed Project Boundary

Access Road

Haul Routes

Inbound Haul Route

Outbound Haul Route

Figure 4.8-1
Haul Route To and From Proposed Project Site and I-210 Freeway Alternative, Option 1

Alternative 5

Version Date: 10/13/2014

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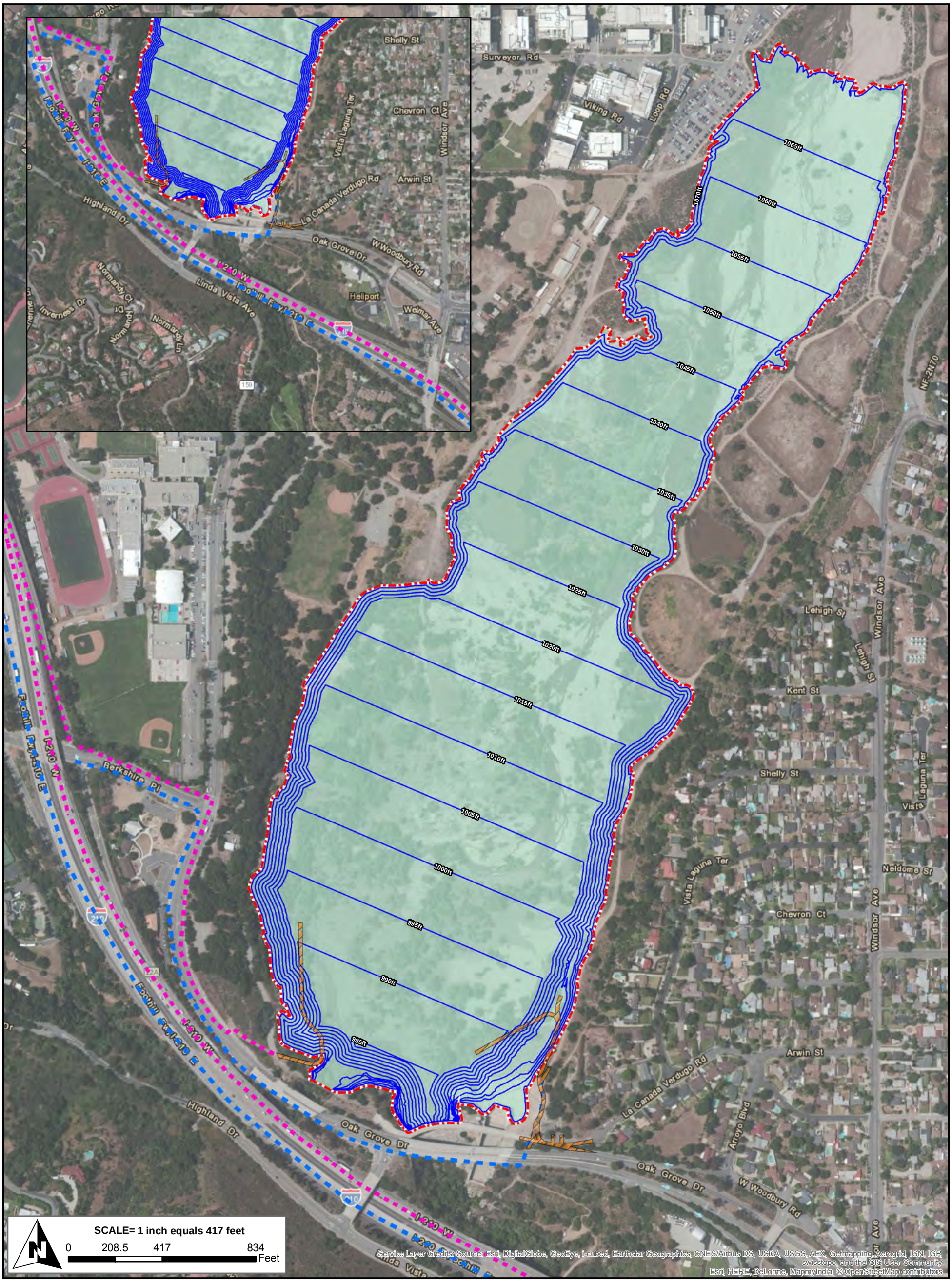
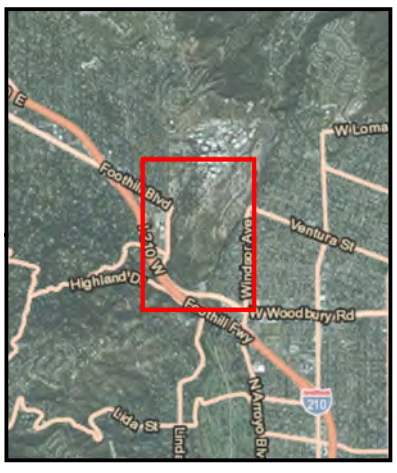
\\cgi-gisdata01\GIS_DATA\Projects\20000s\20201 - 20400\20346 Devil's Gate EIR\20346 Figure 4.8-1 Alternative 5, Haul Route Alternative, Option1.mxd





Proposed Project Boundary

Access Road

Haul Routes

Inbound Haul Route

Outbound Haul Route

Figure 4.8-2
Haul Route To and From Proposed Project Site and I-210 Freeway Alternative, Option 2

Alternative 5

Version Date: 10/13/2014

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\\cgi-gisdata01\GIS_DATA\Projects\20000s\20201 - 20400\20346 Devil's Gate EIR\20346 Figure 4.8-2 Alternative 5, Haul Route Alternative, Option2.mxd

Figure 4.8-3
Haul Route Alternative
To and From Manning Pit
and I-210 Freeway

Version Date: 10/1/2014

Approximate Limts of Work

Access Road

Haul Routes

Inbound Haul Route

Outbound Haul Route

Vulcan Materials

Waste Management Facility

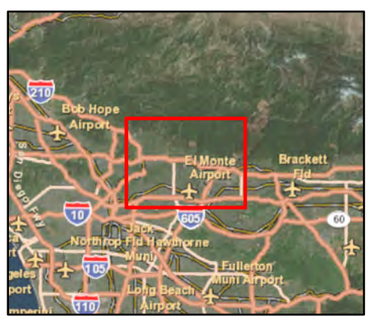
Manning Pit

Manning Pit Inset

SCALE= 1 in = 1 mile

0 0.5 1 2

Miles



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\\cgi-gisdata01\GIS_DATA\Projects\20000s\20201 - 20400\20346 Devil's Gate EIR\20346 Figure 4.8-3 Haul Route Alternative To and From Manning Pit and I-210 Freeway.mxd

Figure 4.8-4
Haul Route Alternatives
To Sun Valley Sites

Version Date: 10/1/2014

Approximate Limts of Work

Access Road

Haul Routes

Inbound Haul Route

Outbound Haul Route

SCALE=1 inch equals 1 mile

0 0.5 1 2

Miles

Sheldon Pit

Sun Valley Fill Site

Boulevard Pit

Bradley Landfill

Sun Valley Sites Inset

Service Layer Credits: Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

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\\cgi-gisdata01\GIS_DATA\Projects\20000s\20201 - 20400\20346 Devil's Gate EIR\20346 Figure 4.8-4 Haul Route Alternative To Sun Valley Sites.mxd

Figure 4.8-5
Haul Route Alternative
To Scholl Canyon Landfill

Version Date: 10/1/2014

Approximate Limts of Work

Access Road

Haul Routes

Inbound Haul Route

Outbound Haul Route

SCALE=1 inch equals 1 mile

0 0.25 0.5 1

Miles

Scholl Canyon Landfill Inset

Service Layer Credits: Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, ©

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\\cgr-gisdata01\GIS_DATA\Projects\20000s\20201 - 20400\20346 Devil's Gate EIR\20346 Figure 4.8-5 Haul Route Alternative To Scholl Canyon Landfill.mxd

Sediment Excavation/Trucking Offsite

Depending on the efficiency of the FAST operations, some mechanical excavation and trucking offsite may be required to remove accumulated sediment. Sediment excavation/trucking offsite during reservoir management will use the same methods and trucking routes as the sediment removal activities. The accumulated sediment will be excavated with construction equipment, including but not limited to approximately two front loaders with 4-yard buckets, one bulldozer, one excavator, one grader, one water truck, and two tender trucks (for fuel and maintenance). Vegetation and organic debris will be separated from the sediment. The need for future sediment removal will depend on future storm activity and associated sediment accumulation.

As with the Proposed Project, it is estimated, based on past storm events, that sediment excavation/trucking offsite will be required to remove typically 13,000 cy of sediment annually. Based on an estimated removal of 4,800cy per day, it is expected this will occur over an estimated two-week period, working Monday through Friday. This sediment excavation activity will take place during the late summer/early fall following the vegetation maintenance.

Moderately large sediment deposits have the potential to occur during a storm season with very intense rainfall or following a significant wildfire within the watershed. Such events are expected to occur very infrequently. It is anticipated that even with this type of event the newly deposited sediment could be removed in one season. A moderately large sediment removal event, anticipated to involve approximately 170,000 cy, could take place over an estimated 12-week period during the late summer and early fall following the vegetation maintenance.

4.8.2 Alternative Duration

A large-scale sediment removal project will be required if a significant amount of sediment accumulates in the reservoir or outside the maintenance footprint despite the reservoir management activities. This is not anticipated for a period of over two decades unless major fires and subsequent intense storms occur within the watershed. Sediment outside the maintenance footprint will be monitored to determine if the sediment buildup is exceeding projected volumes. If future reservoir conditions threaten dam operations, LACFCD will initiate the planning process for a new large-scale sediment removal project. Part of this planning will involve utilizing the CEQA process to evaluate and determine the appropriate level of environmental document required for the future project.

4.8.3 Impact Analyses and Comparison to Proposed Project

AESTHETICS

AESTHETICS-1 *Have a substantially adverse effect on a scenic vista.*

Sediment Removal

Sediment removal activities associated with Alternative 5, Haul Route Alternative will change the visual characteristics of the reservoir through the removal of sediment and associated vegetation in the reservoir. These changes will be the same as the Proposed Project, as the sediment removal area and activities would be the same as the Proposed Project.

As with the Proposed Project, sediment removal activities associated with Alternative 5, Haul Route Alternative will not result in obstruction or blockage of views, due to the large difference in elevation between viewpoints and the Proposed Project site.

Construction equipment will be visible in the basin. Views of construction equipment will be expected elements in the viewshed due to the ongoing IMP measures currently underway to keep debris from plugging the outlet works; however, the amount of equipment and duration onsite will be greater for the Alternative than for the IMP measures.

With sediment removal under Alternative 5, Haul Route Alternative, the topography of the reservoir will be the same as the Proposed Project. These elements will result in a high degree of contrast from existing visual characteristics and will result in a potentially significant impact to scenic vistas. These contrasting elements will be highly visible for Viewpoints 1 through 3. For Viewpoints 1 and 3, however, the co-dominant features of Devil's Gate Dam, the reservoir maintenance roads, electrical lines, the debris boom line, and other less dominant features of the San Gabriel Mountains, Oak Grove Drive, JPL facilities, and residential areas will remain unchanged. In addition, the existing vegetation along the west side of the reservoir will not be removed and will share dominance with the dam and the excavation area.

Sediment removal activities will also be visible from Viewpoint 4 and Viewpoint 5 but will be less dominant due to distance and other more dominant visual elements. The dominant features for Viewpoint 4 (I-210, Devil's Gate Dam, San Gabriel Mountains, and the west side of the reservoir) and Viewpoint 5 (spreading grounds, JPL facilities) will remain unchanged.

As with the Proposed Project, excavation and associated activities within the reservoir area are expected to take place during drier months, from April to December, as weather permits. During the wetter months, changes to the visual characteristics associated with sediment removal will be slightly less apparent when water is stored in the basin. Some regrowth of riparian vegetation will likely occur during this time. Both these factors will reduce the change in the visual characteristics associated with sediment removal. In addition, as discussed above, sediment removal activities will not introduce view-obstructing features.

Nevertheless, due to the multi-year duration of the sediment removal phase under Alternative 5, Haul Route Alternative, the large-scale alteration, visibility of the site, and level of viewer sensitivity, sediment removal activities will be a potentially significant impact to scenic vistas.

Reservoir Management

As with the Proposed Project, reservoir management will not result in obstruction or blockage of views. Construction equipment will also be visible in the basin but only for short periods of time.

After completion of the proposed sediment removal activities associated with Alternative 5, Haul Route Alternative, the disturbed areas outside the reservoir management area are expected to experience natural regrowth with native vegetation, primarily Riparian Herbaceous vegetation. The area available for regrowth will be the same for this alternative as for reservoir management Option 1 under the Proposed Project. Therefore, as with the Proposed Project, Alternative 5, Haul Route Alternative will result in a lower degree of contrast than seen during sediment removal and will result in a less than significant impact to scenic vistas.

Mitigation Measure

No feasible mitigation measures were identified for sediment removal. For reservoir management, the less than significant impacts will be further reduced through the implementation of Mitigation Measures MM BIO-6, MM BIO-7, and MM BIO-8.

Residual Impacts After Mitigation

Due to the multi-year duration of the sediment removal phase, the large-scale alteration, visibility of the site, the level of viewer sensitivity, and the lack of feasible mitigation measures, impacts to scenic vistas from sediment removal activities will remain significant.

Reservoir management impacts to scenic vistas will result in a lower degree of contrast than seen during sediment removal and will result in a less than significant impact to scenic vistas.

Comparison to Proposed Project and Other Alternatives

Alternative 5, Haul Route Alternative is considered neither environmentally superior nor inferior to the Proposed Project with respect to impacts on scenic vistas due to the similarities in sediment removal and reservoir management areas and associated activities.

Due to the larger area of sediment removal and reservoir management areas and associated activities, Alternative 5, Haul Route Alternative will be environmentally inferior to all the other alternatives except for Alternative 4, Sluicing.

Due to the extended time frame for sluicing activities, Alternative 5, Haul Route Alternative will be environmentally superior to Alternative 4, Sluicing.

Alternative 5, Haul Route Alternative will be environmentally to Alternative 6, No Project Alternative as views of the reservoir will degrade under Alternative 6, No Project Alternative due to continuous sediment deposition.

AESTHETICS-2 *Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway.*

Sediment Removal/Reservoir Management

As with the Proposed Project, Alternative 5, Haul Route Alternative will not involve damage to rock outcroppings or historic buildings but will involve removal of vegetation, including native and non-native trees from the site. The Proposed Project site is not visible from the only designated state scenic highway in the vicinity of the Proposed Project site, SR-2. Therefore, implementation of this alternative will not damage scenic resources within the viewshed of a designated state scenic highway.

I-210, located to the south of the Proposed Project site, is identified as "Eligible" in the State Scenic Highway Program. Alternative 5, Haul Route Alternative will impact the existing visual character of a portion of the viewshed through the removal of vegetation including native and non-native trees from the site. This impact to visual character of a portion of the viewshed will be similar in comparison to the Proposed Project due to the similar sediment removal and reservoir management areas and associated activities. In addition, views of the Proposed Project site from I-210 are very brief in nature (visibility for

approximately 0.3 mile) and are dominated by views of the JPL facilities and San Gabriel Mountains. Implementation of Alternative 5, Haul Route Alternative will not obstruct views of these features. Therefore, impacts to scenic resources within this eligible but not designated state scenic highway will be less than significant.

Mitigation Measures

No mitigation is necessary.

Residual Impacts After Mitigation Measure

The Proposed Project site is not visible from any designated state scenic highway and is only briefly visible from an eligible state scenic highway; therefore, impacts related to state scenic highways from Alternative 5, Haul Route Alternative sediment removal and reservoir management are less than significant.

Comparison to Proposed Project and Other Alternatives

Alternative 5, Haul Route Alternative is considered neither environmentally superior nor inferior to the Proposed Project with respect to impacts related to state scenic highways from sediment removal and reservoir management, due to the similarities in sediment removal and reservoir management areas and associated activities.

Due to the extended time frame for sluicing activities, Alternative 5, Haul Route Alternative will also be neither environmentally superior nor inferior to Alternative 4, Sluicing.

Alternative 5, Haul Route Alternative will be environmentally inferior to all of the other alternatives due to sediment removal and reservoir management volumes and activities except for Alternative 6, No Project Alternative.

Alternative 5, Haul Route Alternative will be environmentally superior to Alternative 6, No Project Alternative, as views of the reservoir will likely degrade under Alternative 6, No Project Alternative due to continuous sediment deposition.

AESTHETICS-3 *Substantially degrade the existing visual character or quality of the site and its surroundings.*

Sediment Removal

As described above under AESTHETICS-1, the proposed sediment removal activities associated with Alternative 5, Haul Route Alternative will change the visual characteristics of the existing Proposed Project site through the removal of sediment and associated vegetation in the reservoir.

Disturbed landscape areas, both man-made and natural, are currently found throughout the basin. The amount and distribution of these areas change on a regular basis and are expected visual elements in the Proposed Project site landscape. Construction equipment will also be visible in the basin. Views of construction equipment will be expected elements in the viewshed, due to the ongoing IMP measures currently underway to keep debris from plugging the outlet works; however, the amount of equipment and duration onsite will be greater for the Alternative than for the IMP measures.

Sediment and debris management are considered existing operational components of Devil's Gate Reservoir and are not considered potentially significant impacts to the visual characteristics of the site (City of Pasadena 2002). During the sediment removal phase of Alternative 5, Haul Route Alternative the disturbed areas will, in large, replace the vegetated areas, resulting in a high degree of contrast between existing and sediment removal conditions. While the open character of the site will remain, the overall visual quality of the Proposed Project site will be lower due to the large-scale alteration and decrease of desirable elements.

Excavation and associated activities within the reservoir area are expected to take place during drier months, from April to December, as weather permits. During the wetter months, temporary changes to the visual characteristics of the Proposed Project site will be slightly less apparent with water storage in the basin. Some regrowth of riparian vegetation will also likely occur during this time. Both these factors will reduce the temporary change in the visual characteristics associated with sediment removal. Due to the multi-year duration of the sediment removal phase, the large-scale alteration, visibility of the site, and level of viewer sensitivity, sediment removal activities will be a potentially significant impact to the visual character of the Proposed Project site.

Although the sediment removal associated with this alternative will result in a potentially significant impact to the visual character of the Proposed Project site, the degree of contrast will be similar in comparison to the Proposed Project due to the similarities in excavation area and associated sediment removal activities.

Reservoir Management

As with the Proposed Project, construction equipment will also be visible in the basin but only for short periods of time. As described previously, vegetation conditions on the Proposed Project site will change annually from disturbed to low and dense. Due to the rapid growth of wetland herbaceous plants, it is expected that during the majority of the year the Proposed Project site will be appear vegetated. Therefore, Alternative 5, Haul Route Alternative will result in a similar degree of contrast as seen during sediment removal and will result in a less than significant impact to visual characteristics.

Impacts to visual character of the Proposed Project site with this Alternative will be similar in comparison to reservoir management Option 1 under the Proposed Project due to the similarities in reservoir management area and associated reservoir management activities.

Mitigation Measures

No feasible mitigation measures were identified for sediment removal. For reservoir management, the less than significant impacts will be further reduced through the implementation of Mitigation Measures MM BIO-6, MM BIO-7, and MM BIO-8.

Residual Impacts After Mitigation

Due to the multi-year duration of the sediment removal phase, the large-scale alteration, visibility of the site, the level of viewer sensitivity, and the lack of feasible mitigation, impacts to visual character from sediment removal activities will remain significant.

Reservoir management impacts to visual character will result in a lower degree of contrast than seen during sediment removal and will result in a less than significant impact to visual character.

Comparison to Proposed Project and Other Alternatives

Alternative 5, Haul Route Alternative is considered neither environmentally superior nor inferior to the Proposed Project with respect to impacts to visual character due to the reduction in sediment removal area and reservoir management Option 1 area and associated activities.

Due to the extended time frame for sluicing, Alternative 5, Haul Route Alternative will be environmentally superior to Alternative 4, Sluicing.

Alternative 5, Haul Route Alternative will be environmentally inferior to all of the other alternatives to sediment removal and reservoir management volumes and activities except Alternative 6, No Project Alternative, as views of the reservoir will likely degrade under Alternative 6, No Project Alternative due to continuous sediment deposition.

AIR QUALITY

AIR QUALITY-1 *Conflict with or obstruct implementation of the applicable air quality plan.*

Sediment Removal/Reservoir Management

Typically, assessments for air quality plan consistency use four criteria for determining project consistency with the current AQMP. The first and second criteria are from the SCAQMD. According to the SCAQMD, two key criterion of AQMP consistency are: (1) whether the project will not result in an increase in the frequency or severity of existing air quality violations or cause or contribute to new violations, or delay timely attainment of air quality standards or the interim emission reductions specified in the AQMP; and (2) whether the project will exceed the assumptions in the AQMP based on the year of project build-out and phase (SCAQMD 2006). The third criterion is compliance with the control measures in the AQMP. The fourth criterion is compliance with the SCAQMD regional thresholds.

As with the Proposed Project (see Section 3.5.6), Alternative 5, Haul Route Alternative will be consistent with the second through fourth criteria but will not be consistent with the first criterion. This is due to emissions of NO_X exceeding the Daily Regional Threshold during sediment removal, resulting in a potentially significant impact. Implementation of Mitigation Measures MM AQ-1 and MM AQ-2 will result in a reduction of Alternative 5, Haul Route Alternative's combined NO_X emissions during sediment removal to a level of less than significant. Therefore, impacts during sediment removal will be less than significant. This impact will be similar in comparison to the Proposed Project due to the identical excavation area and associated sediment removal activities.

As with the Proposed Project, reservoir management for Alternative 5, Haul Route Alternative will not exceed any standard and will result in less than significant impacts.

Mitigation Measures

MM AQ-1: LACFCD shall require all construction contractors during the sediment removal phase of the Proposed Project to use only sediment removal dump trucks that meet EPA's emission standards for Model Year 2007 or later.

MM AQ-2: LACFCD shall require all construction contractors during the sediment removal phase of the Proposed Project to use off-road equipment that meets, at a minimum, EPA's emission standards for Tier 3 equipment.

Residual Impacts After Mitigation

Implementation of these mitigations would reduce the Alternative 5, Haul Route Alternative's combined NO_X emissions during the sediment removal phase to a level of less than significant.

Reservoir management activities will not violate an air quality standard or contribute substantially to an existing or projected air quality violation; therefore, the Alternative 5, Haul Route Alternative during reservoir management will be consistent with the first indicator. No significant impact would occur.

Comparison to Proposed Project and Other Alternatives

Alternative 5, Haul Route Alternative is considered neither environmentally superior nor inferior to the Proposed Project with respect to impacts to air quality plans due to the similarities in sediment removal area and reservoir management Option 1 area and associated activities.

Alternative 5, Haul Route Alternative will potentially be environmentally superior to Alternative 4, Sluicing if proper sediment transport does not occur under Alternative 4, Sluicing, causing sediment deposits to develop along the route to the ocean. This would result in need for sediment removal from the Arroyo Seco Channel, the Los Angeles River, or the Port of Long Beach and impacts to air quality associated with removal activities.

Alternative 5, Haul Route Alternative will be environmentally inferior to all of the other alternatives due to a greater amount of sediment removal and reservoir management activities.

AIR QUALITY-2 *Violate an air quality standard or contribute substantially to an existing or project air quality violation.*

As with the Proposed Project, under Alternative 5, Haul Route Alternative emissions of NO_X exceed the Daily Regional Threshold during sediment removal, resulting in a potentially significant impact. Implementation of Mitigation Measures MM AQ-1 and MM AQ-2 will result in a reduction of Alternative 5, Haul Route Alternative's combined NO_X emissions during sediment removal to a level of less than significant. This impact will be similar in comparison to the Proposed Project due to the identical excavation area and associated sediment removal activities.

As with the Proposed Project, reservoir management for Alternative 5, Haul Route Alternative will not exceed any standard and will result in less than significant impacts.

Mitigation Measures

See Mitigation Measures MM AQ-1 and MM AQ-2.

Residual Impacts After Mitigation

Sediment removal will not exceed any standard SCAQMD Regional Threshold except for combined NO_X emissions. Implementation of these mitigations would reduce combined NO_X emissions for Alternative 5, Haul Route Alternative during the sediment removal phase to a level of less than significant.

Reservoir management will not exceed any standard SCAQMD Regional Threshold; therefore, this impact will be less than significant.

Comparison to Proposed Project and Other Alternatives

Alternative 5, Haul Route Alternative is considered neither environmentally superior nor inferior to the Proposed Project with respect to impacts to air quality standards due to the similarities in sediment removal and reservoir management areas and associated activities.

Alternative 5, Haul Route Alternative will potentially be environmentally superior to Alternative 4, Sluicing if proper sediment transport does not occur under Alternative 4, Sluicing, causing sediment deposits to develop along the route to the ocean. This would result in need for sediment removal from the Arroyo Seco Channel, the Los Angeles River, or the Port of Long Beach and impacts to air quality associated with removal activities.

Alternative 5, Haul Route Alternative will be environmentally inferior to all of the other alternatives due to greater amounts of sediment removal and reservoir management activities.

AIR QUALITY-3 *Result in a cumulatively considerable net increase of any criteria pollutants for which the project region is nonattainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors).*

Sediment Removal/Reservoir Management

Air Quality Plans

As discussed previously, Alternative 5, Haul Route Alternative emissions of NO_X are expected to exceed the SCAQMD regional significance thresholds during sediment removal. This exceedance will not be consistent with air quality management plans and therefore will result in a significant cumulative impact. This impact will be similar in comparison to the Proposed Project due to the similarities in excavation area and associated sediment removal activities.

Emissions of VOC, NO_X, PM_{10}, and $PM_{2.5}$ are not expected to exceed the SCAQMD regional significance thresholds during reservoir management. The SCAQMD considers construction-related emissions that do not exceed the project-specific thresholds will not result in a cumulative impact.

Cumulative Health Impacts

As with the Proposed Project, Alternative 5, Haul Route Alternative with Mitigation Measures MM AQ-1 and MM AQ-2, a significance threshold would not be exceeded for emissions of particulate matter and CO; and no significance threshold would be exceeded during reservoir management under either option. Implementation of Mitigation Measures MM AQ-1 and MM AQ-2 will result in a reduction of NO_X emissions and will reduce the NO_X emissions to a level of less than significant for the sediment removal phase.

Mitigation Measures

See Mitigation Measures MM AQ-1 and MM AQ-2.

Residual Impacts After Mitigation

Sediment removal under Alternative 5, Haul Route Alternative will not exceed any localized significance threshold except for combined NO_X emissions. Implementation of these mitigations would reduce combined NO_X emissions of Alternative 5, Haul Route Alternative during the sediment removal phase to a level of less than significant.

Reservoir management will not exceed any localized significance threshold; therefore, this impact will be less than significant.

Comparison to Proposed Project and Other Alternatives

Alternative 5, Haul Route Alternative is considered neither environmentally superior nor inferior to the Proposed Project with respect to impacts to cumulative health due to the similarities in sediment removal area and reservoir management Option 1 area and associated activities.

Alternative 5, Haul Route Alternative will potentially be environmentally superior to Alternative 4, Sluicing if proper sediment transport does not occur under Alternative 4, Sluicing, causing sediment deposits to develop along the route to the ocean. This would result in need for sediment removal from the Arroyo Seco Channel, the Los Angeles River, or the Port of Long Beach and impacts to air quality associated with removal activities.

Alternative 5, Haul Route Alternative will be environmentally inferior to all of the other alternatives due to greater amounts of sediment removal and reservoir management activities.

AIR QUALITY-4 *Expose sensitive receptors to substantial pollutant concentrations.*

Sediment Removal/Reservoir Management

Localized Significance Thresholds

As with the Proposed Project, the onsite emissions for Alternative 5, Haul Route Alternative for sediment removal and reservoir management activities will not exceed LST thresholds.

Carbon Monoxide Hotspot

As with the Proposed Project, the CO Hotspot analysis for Alternative 5, Haul Route Alternative shows no exceedance of the State or federal CO standard; and no significant impact is expected during sediment removal or management.

Carcinogenic Or Toxic Contaminants

As with the Proposed Project, all routes modeled for Alternative 5, Haul Route Alternative resulted in less than significant non-cancer risk from diesel emissions created by Alternative 5, Haul Route Alternative.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

Impacts will be less than significant.

Comparison to Proposed Project and Other Alternatives

Alternative 5, Haul Route Alternative is considered neither environmentally superior nor inferior to the Proposed Project with respect to impacts to sensitive receptors from substantial pollutant concentrations due to the similarities in sediment removal area and reservoir management Option 1 area and associated activities.

Alternative 5, Haul Route Alternative will potentially be environmentally superior to Alternative 4, Sluicing if proper sediment transport does not occur under Alternative 4, Sluicing, causing sediment deposits to develop along the route to the ocean. This would result in need for sediment removal from the Arroyo Seco Channel, the Los Angeles River, or the Port of Long Beach and impacts to air quality associated with removal activities.

Alternative 5, Haul Route Alternative will be environmentally inferior to all the other alternatives due to greater amounts of sediment removal and reservoir management activities.

AIR QUALITY-5 *Create objectionable odors affecting a substantial number of people.*

Sediment Removal/Reservoir Management

The CEQA Guidelines indicate that a potentially significant impact would occur if the Proposed Project would create objectionable odors affecting a substantial number of people.

As with the Proposed Project, diesel exhaust for Alternative 5, Haul Route Alternative will be emitted from equipment during the sediment removal process. Diesel exhaust is an objectionable odor to some; however, concentrations will disperse rapidly from the Project site (OB-1 2013). Therefore impacts will be less than significant.

Mitigation Measures

No mitigation measures are necessary.

Residual Impacts After Mitigation

Alternative 5, Haul Route Alternative is not expected to produce objectionable odors beyond the Proposed Project site under sediment removal or reservoir management; therefore this impact will be less than significant.

Comparison to Proposed Project and Other Alternatives

Alternative 5, Haul Route Alternative is considered neither environmentally superior nor inferior to the Proposed Project with respect to impacts to objectionable odors.

Alternative 5, Haul Route Alternative will also be neither environmentally superior nor inferior to all the other alternatives except for Alternative 6, No Project Alternative.

Alternative 5, Haul Route Alternative will be environmentally inferior to Alternative 6, No Project Alternative, due to sediment removal and reservoir management activities.

BIOLOGICAL RESOURCES

BIOLOGY-1 *Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or the U.S. Fish and Wildlife Service.*

Sediment Removal

Potential impacts to vegetation communities will be identical to the Proposed Project due to the identical sediment removal and reservoir management areas.

Sensitive Plants

No listed or otherwise sensitive plant species were observed on the Proposed Project site. Therefore, as with the Proposed Project, Alternative 5, Haul Route Alternative is not expected to have a substantial adverse effect on any plant species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations or by CDFW or USFWS.

Sensitive Wildlife

The Proposed Project site contains habitat and/or potential habitat for five special status species: least Bell's vireo, yellow warbler, southwestern pond turtle, coast range newt, and two-striped garter snake. Least Bell's vireo, yellow warbler, coast range newt, and two-striped garter snake have all been observed on the Proposed Project site. The southwestern pond turtle has not been observed on the Proposed Project site. If it did occur, habitat for this species would be largely limited to ponded areas.

Alternative 5, Haul Route Alternative will disturb the same amount of acreage that will be disturbed under the Proposed Project. Potential impacts to sensitive wildlife will be the same as the Proposed Project due to the same amount of habitat disturbed during sediment removal activities.

Habitat for the coast range newt, the southwestern pond turtle, and the two-striped garter snake occurs within streams and seasonal ponds found on the Proposed Project site. The amount of this habitat that will be available will depend upon where sediment accumulates and the amount of flows, rainfall, and runoff. Under Alternative 5, Haul Route Alternative, disturbance of habitat for the coast range newt, the southwestern pond turtle, and the two-striped garter snake is expected to be the same as the Proposed Project due to the same reservoir configuration and expected habitat disturbance during sediment removal activities.

Direct harm or take of these species during sediment removal activities would result in a potentially significant impact. The chance of this occurring during sediment removal activities under this alternative is expected to be the same as the Proposed Project due to the identical excavation area. To ensure no harm or take of these special status species, Mitigation Measures MM BIO-1, MM BIO-2, and MM BIO-3, listed below, have been provided. With implementation of these mitigation measures, direct impacts to special status species will be less than significant.

During sediment removal, tree and vegetation removal has the potential to significantly affect nesting birds and roosting bats if active nests or roosting bats are present. Disturbance of active nests will violate the Migratory Bird Treaty Act and result in a potentially significant impact. With implementation of Mitigation Measures MM BIO-4 and MM BIO-5, listed below, impacts to nesting birds and roosting bats will be less than significant.

Reservoir Management

Alternative 5, Haul Route Alternative will result in a similar diversity of vegetation communities as the Proposed Project, since the reservoir management area Option 1 is identical to the Proposed Project.

The availability of streams and seasonal ponds will depend upon where sediment accumulates and the amount of flows, rainfall, and runoff. Special status species have the potential to use the reservoir management area.

Direct harm or take of these species during reservoir management activities will result in a potentially significant impact. The chance of this occurring during reservoir management activities under this alternative is expected to be the same as the Proposed Project's reservoir management Option 1. To ensure no harm or take of these special status species occurs, MM BIO-1, MM BIO-2, and MM BIO-3 have been provided. With implementation of these mitigation measures, direct impacts to special status species will be less than significant.

During reservoir management, tree and vegetation removal will significantly affect nesting birds and roosting bats, if present. Disturbance of active nests will violate the Migratory Bird Treaty Act and result in a potentially significant impact. This impact will be similar under Alternative 5, Haul Route Alternative, as similar amounts of vegetation will be removed in comparison to the Proposed Project. With implementation of Mitigation Measures MM BIO-4 and MM BIO-5, impacts to nesting birds and roosting bats will be less than significant.

Mitigation Measures

MM BIO – 1: A qualified biological monitor shall be present during initial ground- or vegetation-disturbing project-related activities to provide protection measures and monitor for wildlife in harm's way. This includes initial ground- or vegetation-disturbing project-related activities at the annual start of each year of the sediment removal or maintenance activities. Following initial project-related activities, a qualified monitoring biologist shall be present as necessary to maintain the implemented protection measures and monitor for additional species in harm's way. These protection measures shall include, as appropriate: redirecting the wildlife, identifying areas that may require exclusionary devices (e.g., fencing), or capturing and relocating wildlife outside the work area. Any captured species shall be relocated to adjacent appropriate habitat that is contiguous to adjacent habitat and not impacted by project-related disturbance activities.

MM BIO – 2: Within 90 days prior to ground-disturbing activities, a sensitive species educational briefing shall be conducted by a qualified biologist for construction personnel. The biologist will identify all sensitive resources that may be encountered onsite, and construction personnel will be instructed to avoid and report any sightings of sensitive species to LACFCD or the monitoring biologist. Educational briefings shall be repeated annually for the duration of the sediment removal.

MM BIO – 3: Within 90 days prior to ground-disturbing activities, a preconstruction survey shall be conducted by a qualified biologist for the presence of any sensitive species in harm's way, including coast range newt, the southwestern pond turtle, and the two-striped garter snake. If sensitive species are observed in harm's way, the qualified biologist will develop and implement appropriate protection measures for that species. These protection measures shall include, as appropriate, redirecting the species, constructing exclusionary devices (e.g., fencing), or capturing and relocating wildlife outside the work area. Preconstruction surveys shall be repeated annually for the duration of the sediment removal. Observations of special status species made during these surveys shall be recorded onto a CNDDB field data sheet and submitted to CDFW for inclusion into the CNDDB.

MM BIO – 4: LACFCD, in consultation with a qualified biologist, will employ bird exclusionary measures (e.g., mylar flagging) prior to the start of bird breeding season to prevent birds nesting within established boundaries of the project. Prior to commencement of sediment removal activities within bird breeding season (March 1 through August 31), a preconstruction bird nesting survey shall be conducted by a qualified biologist for the presence of any nesting bird within 300 feet of the construction work area. The surveys shall be conducted 30 days prior to the disturbance of suitable nesting habitat by a qualified biologist with experience in conducting nesting bird surveys. The surveys shall continue on a weekly basis, with the last survey being conducted no more than 3 days prior to the initiation of clearance/construction work. Preconstruction surveys shall be repeated annually for the duration of the sediment removal.

If an active nest is found, the qualified biologist will develop and implement appropriate protection measures for that nest. These protection measures shall include, as appropriate, construction of exclusionary devices (e.g., netting) or avoidance buffers. The biologist shall have the discretion to adjust the buffer area as appropriate based on the proposed construction activity, the bird species involved, and the status of the nest and nesting activity; but it shall be no less than 30 feet. Work in the buffer area can resume once the nest is determined to be inactive by the monitoring biologist.

MM BIO – 5: Within 30 days prior to commencement of vegetation or structure removal activities, a preconstruction bat survey shall be conducted by a qualified biologist for the presence of any roosting bats. Acoustic recognition technology shall be used if feasible and appropriate. If either a bat maternity roost or hibernacula (structures used by bats for hibernation) are present, a qualified biologist will develop and implement appropriate protection measures for that maternity roost or hibernacula. These protection measures shall include, as appropriate, safely evicting non-breeding bat hibernacula, establishment of avoidance buffers, or replacement of roosts at a suitable location. These measures shall also include as appropriate:

- To the extent feasible, trees that have been identified as roosting sites shall be removed or relocated between October 1 and February 28.
- When trees must be removed during the maternity season (March 1 to September 30), a qualified bat specialist shall conduct a preconstruction survey to identify those trees proposed for disturbance that could provide hibernacula or nursery colony roosting habitat for bats.
- Trees identified as potentially supporting an active nursery shall be inspected by a qualified biologist no greater than 7 days prior to tree disturbance to determine presence or absence of roosting bats.
- Trees determined to support active maternity roosts will be left in place until the end of the maternity season (September 30).
- If bats are not detected in a tree, but the qualified biologist determined that roosting bats may be present, trees shall be removed as follows:
    - Pushing the tree down with heavy machinery instead of felling the tree with a chainsaw
    - First pushing the tree lightly 2 to 3 times with a pause of 30 seconds between each nudge to allow bats to become active, then pushing the tree to the ground slowly
    - Allowing the tree to remain in place for 24 to 48 hours until inspected by the qualified biologist for presence or absence of roosting bats
- The qualified biologist shall document all bat survey, monitoring, and protection measure activities and prepare a summary report for LACFCD.

Residual Impacts after Mitigation

Alternative 5, Haul Route Alternative will result in a less than significant impact on candidate, sensitive, or special status species.

Comparison to Proposed Project and Other Alternatives

Alternative 5, Haul Route Alternative is considered neither environmentally superior nor inferior to the Proposed Project with respect to impacts to candidate, sensitive, or special status species due to the similarities in sediment removal area and reservoir management Option 1 area.

Alternative 5, Haul Route Alternative will potentially be environmentally superior to Alternative 4, Sluicing if proper sediment transport does not occur under Alternative 4, Sluicing, causing sediment deposits to develop along the route to the ocean. This would result in need for sediment removal from the Arroyo Seco Channel, the Los Angeles River, or the Port of Long Beach and impacts to biological resources associated with removal activities.

Alternative 5, Haul Route Alternative will be environmentally inferior to all the other alternatives.

Alternative 5, Haul Route Alternative will be environmentally inferior to Alternative 6, No Project Alternative as habitat in the reservoir will likely degrade under Alternative 6, No Project Alternative due to continuous sediment deposition and degradation that will increase over time.

BIOLOGY-2 *Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service.*

Sediment Removal/Reservoir Management

Alternative 5, Haul Route Alternative will impact the same acreage of Riversidean Alluvial Fan Sage Scrub as the Proposed Project. Impacts to Riversidean Alluvial Fan Sage Scrub will result in a potentially significant impact requiring mitigation. To minimize impacts due to loss of Riversidean Alluvial Fan Sage Scrub, Mitigation Measure MM BIO-6 has been provided. With implementation of this mitigation measure, impacts to Riversidean Alluvial Fan Sage Scrub will be reduced to a level below significance.

This Alternative will impact the same amount of Riparian Woodland and Mule Fat Thickets as the Proposed Project. Riparian Woodland and Mule Fat Thickets are rare plant communities that provide nesting habitat for riparian species. Impacts to these habitats will result in a potentially significant impact. To minimize impacts due to the loss of Riparian Woodland and Mule Fat Thickets, Mitigation Measures MM BIO-7 and MM BIO-8 have been provided. With implementation of these mitigation measures, impacts to Riparian Woodland and Mule Fat Thickets will be reduced to a level below significance.

Alternative 5, Haul Route Alternative will impact the same acreage of riparian or sensitive habitat as the Proposed Project. To minimize impacts, Mitigation Measure MM BIO-8 has been provided. With implementation of this mitigation measure, impacts will be reduced to a level below significance.

Mitigation Measures

MM BIO – 6: Riversidean Alluvial Fan Sage Scrub habitat shall be restored and/or enhanced at a 1:1 ratio by acreage. Areas shall be mapped using aerial photographs.

MM BIO – 7: Within 90 days prior to ground-disturbing activities, a qualified biologist shall conduct a tree survey within the project footprint, to identify trees that will be removed or potentially affected by the Proposed Project and trees that can be avoided. LACFCD will replace trees that cannot be avoided. The replacement is expected to be up to 1:1 by acreage. The biological monitor shall implement measures to protect the root zone of oak trees that may be impacted immediately adjacent to the project site and along access roads.

MM BIO – 8: A combination of onsite and offsite habitat restoration, enhancement, and exotic removal shall be implemented by LACFCD at a 1:1 ratio for impacted sensitive habitat and jurisdictional waters. Habitat restoration/enhancement shall include use of willow cuttings and exotic species removal. Non-native, weedy habitats within the basin shall be utilized whenever possible as mitigation sites. This mitigation measure shall be monitored for success for five years following implementation. A report of the monitoring results shall be submitted annually, during the five years following implementation, to resource agencies as required by the Section 401 Certification, Section 404 permit, and a Streambed Alteration Agreement.

Residual Impacts after Mitigation

With implementation of Mitigation Measures MM BIO-6 through MM BIO-8, Alternative 4, Sluicing under sediment removal and reservoir maintenance will result in a less than significant impact on riparian habitat and other sensitive natural communities.

Comparison to Proposed Project and Other Alternatives

Alternative 5, Haul Route Alternative is considered neither environmentally superior nor inferior to the Proposed Project with respect to impacts to riparian habitat and other sensitive natural communities due to the similarities in sediment removal area and reservoir management Option 1 area.

Alternative 5, Haul Route Alternative will potentially be environmentally superior to Alternative 4, Sluicing if proper sediment transport does not occur under Alternative 4, Sluicing, causing sediment deposits to develop along the route to the ocean. This would result in need for sediment removal from the Arroyo Seco Channel, the Los Angeles River, or the Port of Long Beach and impacts to biological resources associated with removal activities.

Alternative 5, Haul Route Alternative will be environmentally inferior to Alternative 1, Configuration B; Alternative 2, Configuration C; and Alternative 3, Configuration D.

Alternative 5, Haul Route Alternative will be environmentally superior to Alternative 6, No Project Alternative as habitat in the reservoir will likely degrade under Alternative 6, No Project Alternative due to continuous sediment deposition and degradation that will increase over time.

BIOLOGY-3 *Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means.*

Sediment Removal/Reservoir Management

Alternative 5, Haul Route Alternative will impact the same acreage of water features as the Proposed Project. To minimize impacts, Mitigation Measure MM BIO-8has been provided.

Mitigation Measures

See Mitigation Measure MM BIO-8above.

Residual Impacts After Mitigation

As noted in MM BIO-8, wetlands and drainages under the jurisdiction of CDFW, USACE, and RWQCB, will be restored and/or enhanced on the Proposed Project site. With implementation of these mitigation measures, impacts to wetlands will be reduced to a level below significance.

Comparison to Proposed Project and Other Alternatives

Alternative 5, Haul Route Alternative is considered neither environmentally superior nor inferior to the Proposed Project with respect to impacts on federally protected wetlands due to the similar sediment removal area and reservoir management Option 1 area.

Alternative 5, Haul Route Alternative will potentially be environmentally superior to Alternative 4, Sluicing if proper sediment transport does not occur under Alternative 4, Sluicing, causing sediment deposits to develop along the route to the ocean. This would result in need for sediment removal from the Arroyo Seco Channel, the Los Angeles River, or the Port of Long Beach and impacts to biological resources associated with removal activities.

Due to the larger sediment removal and reservoir management areas, Alternative 5, Haul Route Alternative will be environmentally inferior to Alternative 1, Configuration B; Alternative 2, Configuration C; and Alternative3, Configuration D.

Alternative 5, Haul Route Alternative will be environmentally superior to Alternative 6, No Project Alternative, as the wetlands in the reservoir will likely degrade under Alternative 6, No Project Alternative due to continuous sediment deposition.

BIOLOGY-4 *Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.*

Sediment Removal/Reservoir Management

The Proposed Project area is predominantly open for wildlife movement and habitat connectivity. Sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays). In addition, sediment removal activities would not completely block the Proposed Project site from surrounding habitat, would occur only during the day, and would not interfere with nighttime wildlife activity. Although some wildlife may be temporarily displaced during construction, wildlife would not be physically prevented from moving around and into the basin area. Sediment removal and reservoir management activities associated with Alternative 5, Haul Route Alternative will interfere temporarily with the movement of native resident or migratory wildlife species, resulting in a potentially significant impact. Reduction in sensitive habitat would interfere with use of the habitat for wildlife nursery sites, resulting in a potentially significant impact. To minimize impacts to less than significant, Mitigation Measures MM BIO-1 through MM BIO-8 has been provided. This impact will be similar in comparison to the Proposed Project due to the similarities in area disturbed during sediment removal and reservoir management Option 1.

Mitigation Measures

See Mitigation Measures MM BIO-1 through MM BIO-8.

Residual Impacts After Mitigation

As noted in MM BIO-8, restoration and/or enhancement of sensitive habitats will take place on the Proposed Project site. With implementation of these mitigation measures, impacts to use of the habitat for wildlife nursery sites will be reduced to a level below significance.

Comparison to Proposed Project and Other Alternatives

Alternative 5, Haul Route Alternative is considered neither environmentally superior nor inferior to the Proposed Project with respect to impacts to wildlife movement and habitat connectivity due to the similarities in sediment removal area and reservoir management Option 1 area.

Alternative 5, Haul Route Alternative will be environmentally superior to Alternative 4, Sluicing if proper sediment transport does not occur under Alternative 4, Sluicing, causing sediment deposits to develop along the route to the ocean. This would result in need for sediment removal from the Arroyo Seco Channel, the Los Angeles River, or the Port of Long Beach and impacts to biological resources associated with removal activities.

Due to the larger sediment removal and reservoir management areas, Alternative 5, Haul Route Alternative will be environmentally inferior to all the other alternatives.

Alternative 5, Haul Route Alternative will be environmentally superior to Alternative 6, No Project Alternative as the wetlands in the reservoir will likely degrade under Alternative 6, No Project Alternative due to continuous sediment deposition.

BIOLOGY-5 *Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.*

Sediment Removal/Reservoir Management

Implementation of Alternative 5, Haul Route Alternative will result in the removal of native trees from the Proposed Project site. This impact will be the same as with the Proposed Project, as the same amount of vegetation and trees will be removed. Implementation of mitigation measure MM BIO-7 will reduce impacts to city-protected trees to a level below significance.

Mitigation Measures

See Mitigation Measure MM BIO-7.

Residual Impacts After Mitigation

Alternative 5, Haul Route Alternative will result in a less than significant impact to city-protected trees.

Comparison to Proposed Project and Other Alternatives

Alternative 5, Haul Route Alternative is considered neither environmentally superior nor inferior to the Proposed Project with respect to impacts to loss of native trees due to the similarities in number of potentially impacted trees.

Alternative 5, Haul Route Alternative is considered environmentally superior to Alternative 4, Sluicing with respect to impacts to loss of native trees, as downstream sediment deposition could negatively impact trees.

Alternative 5, Haul Route Alternative will be environmentally inferior to all the other alternatives except Alternative 6, No Project Alternative.

Alternative 5, Haul Route Alternative will be environmentally superior to Alternative 6, No Project Alternative, as trees in the reservoir will likely be lost under Alternative 6, No Project Alternative due to continuous sediment deposition.

CULTURAL RESOURCES

CULTURAL-1 *Cause a substantial adverse change in the significance of a historical resource.*

Sediment Removal/Reservoir Management

As with the Proposed Project, no alterations or modifications will be made to any historic resource; and therefore, no significant impact to historical resources is anticipated with this alternative.

Mitigation Measures

No mitigation measures are necessary.

Residual Impacts After Mitigation

No historic resources are within the proposed Project site; therefore Alternative 5, Haul Route Alternative will not result in impacts to historic resources.

Comparison to Proposed Project and Other Alternatives

As no historic resources are within the proposed Project site, Alternative 5, Haul Route Alternative is considered neither environmentally superior nor inferior to the Proposed Project with respect to historic resources.

Alternative 5, Haul Route Alternative will also be neither environmentally superior nor inferior to any of the other alternatives.

CULTURAL-2 *Cause a substantial adverse change in the significance of an archaeological resource.*

Sediment Removal/Reservoir Management

Alternative 5, Haul Route Alternative will involve ground-disturbing activities under sediment removal and reservoir management; however, as noted in Section 3.5, most of the soil in the Proposed Project area consists of recently accumulated sediment. In areas filled with recently accumulated sediment, archeological sites are not anticipated to exist, although it is always possible that unidentified archaeological sites exist in native soils below the accumulated sediment. If sediment removal or reservoir management activities exceed the depth of the historic flood deposits and encounter native soils, unidentified archaeological sites have a potential to be significantly impacted. Implementation of Mitigation Measure MM CUL-1 will reduce potential impacts to less than significant.

Mitigation Measures

> **MM CUL-1**: If sediment removal or reservoir management activities exceed the depth of the historic flood deposits and encounter native sediments, these activities will be monitored by a qualified archaeologist. In the event this occurs and archaeological materials are observed, the excavation in the proximity of the discovery will be diverted until a qualified archaeologist evaluates the discovery.

Residual Impacts After Mitigation

While it is always possible that unidentified archaeological sites exist in native soils below the accumulated sediment, with implementation of Mitigation Measure MM CUL-1, no significant adverse impacts are expected.

Comparison to Proposed Project and Other Alternatives

Alternative 5, Haul Route Alternative is considered neither environmentally superior nor inferior to the Proposed Project with respect to archaeological resources due to the similarities in sediment removal area and reservoir management Option 1 area. Alternative 5, Haul Route Alternative is also considered neither environmentally superior nor inferior to Alternative 2, Configuration C.

Alternative 5, Haul Route Alternative is also considered neither environmentally superior nor inferior to Alternative 4, Sluicing with respect to archaeological resources.

Due to the larger sediment removal and reservoir management areas, Alternative 5, Haul Route Alternative will be environmentally inferior to all the other alternatives.

Alternative 5, Haul Route Alternative will be environmentally inferior to Alternative 6, No Project Alternative due to sediment removal and reservoir management activities.

CULTURAL-3 *Cause a substantial adverse change in the significance of a paleontological resource.*

Sediment Removal/Reservoir Management

No paleontological resources were encountered during the course of the survey and are not expected in the accumulated sediment. It is always possible that unidentified paleontological materials exist in

native soil below the accumulated sediment. If sediment removal or reservoir management activities exceed the depth of the historic flood deposits and encounter native soils, unidentified paleontological materials have the potential to be significantly impacted. Implementation of Mitigation Measure MM CUL-2 will reduce impacts to less than significant. This impact will also be similar in comparison to the Proposed Project due to the similarities in area disturbed during sediment removal and reservoir management.

Mitigation Measures

> **MM CUL-2:** If sediment removal or reservoir management activities exceed the depth of the historic flood deposits and encounter native sediments, these activities will be monitored by a qualified paleontologist. In the event that this occurs and paleontological materials are observed, the excavation in the proximity of the discovery should be diverted until a qualified paleontologist evaluates the discovery.

Residual Impacts After Mitigation

While it is always possible that unidentified paleontological materials exist in native soils below the accumulated sediment, with implementation of Mitigation Measure MM CUL-2, no significant adverse impacts are expected.

Comparison to Proposed Project and Other Alternatives

Alternative 5, Haul Route Alternative is considered neither environmentally superior nor inferior to the Proposed Project with respect to paleontological resources due to the similarities in sediment removal area and reservoir management Option 1 area.

Alternative 5, Haul Route Alternative is considered neither environmentally superior nor inferior to Alternative 2, Configuration C and Alternative 4, Sluicing with respect to paleontological resources.

Due to the larger sediment removal and reservoir management areas, Alternative 5, Haul Route Alternative will be environmentally inferior to all the other alternatives due to greater sediment removal and reservoir management activities.

CULTURAL-4 *Potentially impact unknown human remains within the proposed project site.*

Sediment Removal/Reservoir Management

As with the Proposed Project, archival research and the archaeological survey in connection with the present project did not indicate the presence of any known human remains in the project area. In the event human remains are discovered, implementation of Mitigation Measure MM CUL-3 will reduce impacts to less than significant.

Mitigation Measures

> **MM CUL-3**: In the event human remains are discovered, all work in the area must be halted until the County Coroner identifies the remains and makes recommendations regarding their appropriate treatment pursuant to PRC Section 5097.98.

Residual Impacts After Mitigation

While it is possible that human remains could be discovered in native soils below the accumulated sediment, with implementation of Mitigation Measure MM CUL-3, no significant adverse impacts are expected.

Comparison to Proposed Project and Other Alternatives

Alternative 5, Haul Route Alternative is considered neither environmentally superior nor inferior to the Proposed Project with respect to accidental discovery of human remains due to the similarities in sediment removal area and reservoir management Option 1 area.

Alternative 5, Haul Route Alternative is also considered neither environmentally superior nor inferior to Alternative 2, Configuration C and Alternative 4, Sluicing with respect to accidental discovery of human remains.

Due to the larger sediment removal and reservoir management areas, Alternative 5, Haul Route Alternative will be environmentally inferior to all of the other alternatives.

GEOLOGY & SOILS

GEOLOGY-1 *Potentially result in soil erosion or loss of topsoil during sediment removal activities.*

Sediment Removal/Reservoir Management

Alternative 5, Haul Route Alternative will involve the excavation sediment and deposition of the sediment at facilities already prepared and designated to accept such sediment during sediment removal and reservoir management. Sediment stockpiled at Johnson Field as part of the IMP will also be removed. Depending on the moisture content of the sediment removed, the sediment may need to be stockpiled to allow the sediment to dry. If drying is required, stockpiling of the sediment will occur onsite within Devil's Gate Reservoir. Disturbed sediments are more susceptible to erosion; however, as discussed above in Air Quality, these impacts will be reduced to less than significant through implementation of SCAQMD Rule 403 and BMPs. In addition, excavation, grading, and sediment placement activities will be in accordance with established guidelines, permits, and regulations established for each disposal site. As such, sediment removal and reservoir management impacts to erosion will be less than significant. This impact will also be reduced in comparison to the Proposed Project due to the reduction in area disturbed during sediment removal and reservoir management.

Mitigation Measures

No mitigation measures will be required.

Residual Impacts After Mitigation

With implementation of SCAQMD Rule 403 and BMPs and the resulting reduction in potential for erosion, no significant impacts to geology and soils would occur as a result of Alternative 5, Haul Route Alternative.

Comparison to Proposed Project and Other Alternatives

Alternative 5, Haul Route Alternative is considered neither environmentally superior nor inferior to the Proposed Project with respect to soil erosion due to the same sediment removal area and volume.

Due to the greater sediment removal and reservoir management area, Alternative 5, Haul Route Alternative will be environmentally inferior to Alternative 1, Configuration B; Alternative 2, Configuration C; and Alternative 3, Configuration D.

Alternative 5, Haul Route Alternative will potentially be environmentally superior to Alternative 4, Sluicing if proper sediment transport does not occur under Alternative 4, Sluicing, causing sediment deposits to develop along the route to the ocean. This would result in need for sediment removal from the Arroyo Seco Channel, the Los Angeles River, or the Port of Long Beach and potential downstream impacts associated with the sluicing process.

Alternative 5, Haul Route Alternative will be environmentally inferior to Alternative 6, No Project Alternative due to sediment removal and reservoir management activities.

GREENHOUSE GAS EMISSIONS

GHG EMISSIONS-1 *Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment.*

Sediment Removal/Reservoir Management

Alternative 5, Haul Route Alternative will use the same amount and type of construction equipment as the Proposed Project. Use of sediment removal dump trucks that meet EPA's emission standards for Model Year 2007 or later and use of off-road equipment that meets, at a minimum, EPA's emission standards for Tier 3 equipment, would result in a reduction of GHG emissions. As noted in Section 3.6, generation of greenhouse gas emissions under the Proposed Project is not "cumulatively considerable" and is therefore less than significant under CEQA. Alternative 5, Haul Route Alternative will have the same amount of daily equipment usage and truck traffic; therefore, this alternative will generate the same greenhouse gas emissions as the Proposed Project, which will not be "cumulatively considerable," and is therefore less than significant under CEQA.

As with the Proposed Project, Alternative 5, Haul Route Alternative may prove a positive effect on climate change. High ambient temperatures coupled with important demand for oxygen due to the degradation of substantial amounts of organic matter favor the production of CO_2, the establishment of anoxic conditions, and thus the production of CH_4. If the reservoir is left as it is, the large quantity of biomass currently existing may exacerbate the condition. With the removal and disposal of most of the organic mass in the Scholl Canyon Landfill, which uses the green waste primarily as "alternative daily cover" (ADC), the overall benefit to the carbon ecosystem will be positive, since prior to using green waste for ADC, larger amounts of cover soil had to be imported into the landfill from offsite sources (Kong et al. 2008). Therefore, use of the green waste as ADC reduces fossil fuel use for cover soil importation and also reduces GHG emissions. This potential benefit will be the same as for the Proposed Project due to the same area of vegetation removal.

Mitigation Measures

No mitigation measures are necessary.

Residual Impacts After Mitigation

No significant impacts associated with the generation of greenhouse gas emissions will occur as a result of Alternative 5, Haul Route Alternative.

Comparison to Proposed Project and Other Alternatives

Alternative 5, Haul Route Alternative will generate the same greenhouse gas emissions as the Proposed Project, therefore this Alternative is considered neither environmentally superior nor inferior to the Proposed Project due to overall production of greenhouse gas emissions.

Due to overall production of greenhouse gas emissions, Alternative 5, Haul Route Alternative will be environmentally inferior to all of the other alternatives except Alternative 4, Sluicing and Alternative 6, No Project Alternative.

Alternative 5, Haul Route Alternative will potentially be environmentally superior to Alternative 4, Sluicing if proper sediment transport does not occur under Alternative 4, Sluicing, causing sediment deposits to develop along the route to the ocean. This would result in need for sediment removal from the Arroyo Seco Channel, the Los Angeles River, or the Port of Long Beach and impacts associated with greenhouse gas emissions from removal activities.

Alternative 5, Haul Route Alternative will be environmentally inferior to Alternative 6, No Project Alternative due to sediment removal and reservoir management activities and associated production of greenhouse gas emissions.

GHG EMISSIONS-2 *Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases.*

Sediment Removal/Reservoir Management

AB 32 identified a 2020 target level for GHG emissions in California of 427 MMT of CO_2e, which is approximately 28.5 percent less than the year 2020 BAU emissions estimate of 596 MMT CO_2e. To achieve these GHG reductions, widespread reductions of GHG emissions will have to occur across California. Some of those reductions will need to come in the form of changes in vehicle emissions and mileage standards, changes in the sources of electricity, and increases in energy efficiency by existing facilities. These reductions in mobile-sources and energy production of GHG emissions would occur with or without development of Alternative 5, Haul Route Alternative. Overall, Alternative 5, Haul Route Alternative will be consistent with the AB 32 goal of reducing statewide GHG emissions to 1990 levels by year 2020. Currently, no other GHG reduction plan (i.e., SCAG, SCAQMD, or County) applies to Alternative 5, Haul Route Alternative. As with the Proposed Project, Alternative 5, Haul Route Alternative will not conflict with any applicable plan, policy, or regulation of an agency adopted for the purpose of reducing the emissions of GHGs; therefore, impacts will be less than significant.

Mitigation Measures

No mitigation measures are necessary.

Residual Impacts After Mitigation

No significant impacts associated with any applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases will occur as a result of Alternative 5, Haul Route Alternative.

Comparison to Proposed Project and Other Alternatives

Alternative 5, Haul Route Alternative is considered neither environmentally superior nor inferior to the Proposed Project with respect to applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases.

Alternative 5, Haul Route Alternative will also be neither environmentally superior nor inferior to any of the other alternatives.

HAZARDS AND HAZARDOUS MATERIALS

HAZARDS-1 *Create a hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials.*

Sediment Removal/Reservoir Management

As with the Proposed Project, no significant impacts associated with hazardous soils are expected. Alternative 5, Haul Route Alternative will include the use of hazardous materials associated with the construction equipment needed to perform the removal activities. Adequate BMPs will be utilized; and adherence to the regulations set forth by County, State, and federal agencies will reduce the potential for hazardous materials impacts to a less than significant level and will not pose a safety hazard to sensitive receptors.

Mitigation Measures

No mitigation measures are necessary.

Residual Impacts After Mitigation

Implementation of BMPs and adherence to the applicable regulations will reduce the potential for impacts associated with hazardous materials to a less than significant level.

Comparison to Proposed Project and Other Alternatives

Alternative 5, Haul Route Alternative is considered neither environmentally superior nor inferior to the Proposed Project.

Alternative 5, Haul Route Alternative will also be neither environmentally superior nor inferior to any of the other alternatives except Alternative 6, No Project Alternative. Alternative 5, Haul Route Alternative

will be environmentally inferior to Alternative 6, No Project Alternative due to sediment removal and reservoir management activities.

HAZARDS-2 *Create a significant hazard to the public or environment through accident conditions involving the release of hazardous materials into the environment.*

As with the Proposed Project, no significant impacts associated with hazardous soils are expected. Alternative 5, Haul Route Alternative will include the use of hazardous materials associated with the construction equipment needed to perform the removal activities. Adequate BMPs will be utilized; and adherence to the regulations set forth by County, State, and federal agencies will reduce the potential for hazardous materials impacts to a less than significant level and will not pose a safety hazard to sensitive receptors.

Mitigation Measures

No mitigation measures are necessary.

Residual Impacts After Mitigation

Implementation of BMPs and adherence to the applicable regulations will reduce the potential for impacts associated with hazardous materials to a less than significant level.

Comparison to Proposed Project and Other Alternatives

Alternative 5, Haul Route Alternative is considered neither environmentally superior nor inferior to the Proposed Project.

Alternative 5, Haul Route Alternative will also be neither environmentally superior nor inferior to any of the other alternatives except Alternative 6, No Project Alternative. Alternative 5, Haul Route Alternative will be environmentally inferior to Alternative 6, No Project Alternative due to sediment removal and reservoir management activities.

HAZARDS-3 *Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school.*

Sediment Removal/Reservoir Management

As with the Proposed Project, Alternative 5, Haul Route Alternative will include the use of hazardous materials associated with the construction equipment needed to perform the removal activities; however, the proposed construction routes associated with this alternative avoid La Cañada High School and Hillside School and Learning Center. Adherence to County, State, and federal agency regulations governing the use of these materials reduces the potential for impacts to a less than significant level and will not pose a safety hazard to sensitive receptors. No mitigation measures are required.

Mitigation Measures

No mitigation measures are necessary.

Residual Impacts After Mitigation

Implementation of BMPs and adherence to the applicable regulations will reduce the potential for impacts associated with hazardous materials within one-quarter mile of an existing school to a less than significant level.

Comparison to Proposed Project and Other Alternatives

Alternative 5, Haul Route Alternative is considered environmentally superior to the Proposed Project, as the construction routes will avoid La Cañada High School and Hillside School and Learning Center.

Alternative 5, Haul Route Alternative will be environmentally superior to all of the other alternatives except Alternative 6, No Project Alternative.

Alternative 5, Haul Route Alternative will be environmentally inferior to Alternative 6, No Project Alternative due to sediment removal and reservoir management activities.

HAZARDS-4 *Located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would create a significant hazard to the public or the environment.*

Sediment Removal/Reservoir Management

EPA included Hahamongna Watershed Park area on the NPL Superfund List due to the presence of detected VOCs and perchlorate in groundwater originating from the JPL property. The impacted groundwater is at 200 feet bgs; and, as with the Proposed Project, the concentrations of organochlorine pesticides, petroleum hydrocarbons (diesel and hydraulic/motor oil range and aromatics), and SVOCs detected in samples collected from Devil's Gate Reservoir are below regulatory thresholds. Therefore, the listing of the watershed on the Superfund List does not present a significant hazard to the public or the environment, and no significant impacts associated with the Alternative 5, Haul Route Alternative are expected.

Mitigation Measures

No mitigation measures are necessary.

Residual Impacts After Mitigation

No significant adverse impacts were identified.

Comparison to Proposed Project and Other Alternatives

Alternative 5, Haul Route Alternative is considered neither environmentally superior nor inferior to the Proposed Project.

Alternative 5, Haul Route Alternative will also be neither environmentally superior nor inferior to any of the other alternatives.

HAZARDS-5 *Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.*

Sediment Removal/Reservoir Management

Alternative 5, Haul Route Alternative sediment removal and reservoir management activities will occur onsite and will not interfere with the current emergency response plan or emergency evacuation plan for local, State, or federal agencies. Additionally, access to the surrounding roads will be maintained during sediment removal and reservoir management activities and will not interfere with the response facilities located adjacent to the Proposed Project site, including the County of Los Angeles Fire Department Camp 2 and the City of Pasadena Police Department located at 2175 Yucca Lane. Alternative 5, Haul Route Alternative will also increase flood control protection downstream of Devil's Gate Dam. No mitigation measures are required.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

No significant adverse impacts were identified.

Comparison to Proposed Project and Other Alternatives

Alternative 5, Haul Route Alternative is considered neither environmentally superior nor inferior to the Proposed Project.

Alternative 5, Haul Route Alternative will also be neither environmentally superior nor inferior to any of the other alternatives except Alternative 4, Sluicing and Alternative 6, No Project Alternative.

Alternative 5, Haul Route Alternative will be environmentally superior to Alternative 4, Sluicing and Alternative 6, No Project Alternative, as these alternatives will severely restrict flood control, potentially increasing flooding downstream of Devil's Gate Dam. This flooding could also potentially interfere with access to roadways.

HYDROLOGY & WATER QUALITY

HYDROLOGY-1 *Violate any water quality standards or waste discharge requirements.*

Sediment Removal/Reservoir Management

FAST operations have been routinely used at Devil's Gate Reservoir and result in relatively small amounts of finer grained sediment passing through the reservoir. During both sediment removal and reservoir management phases, FAST operations will take place during winter rain events, using natural flows to allow the finer grained sediment to pass through the reservoir and downstream of the dam. It is anticipated that these FAST operations will be similar to historic FAST operations and that sediment fines discharged during FAST operations will be transported to the Pacific Ocean via Arroyo Seco and the Los Angeles River, either via the discharge flow or subsequent storm flows. As with the Proposed Project, no significant impacts to water quality standards are expected due to FAST operations.

As with the Proposed Project, heavy equipment needed for sediment removal has the potential to cause accidental spills of fuel and lubricating oil. Contaminants could be released into the watershed and adversely affect water quality. Alternative 5, Haul Route Alternative activities involving construction equipment will be temporary and involve the limited transport, use, disposal, and storage of fuel and lubricating oil, which are regulated by various agencies. Adequate BMPs will be utilized; and adherence to the regulations set forth by County, State, and federal agencies will reduce the potential for impacts to water quality to a less than significant level.

With adherence to regulations and permit requirements and implementation of project-specific BMPs, impacts related to otherwise substantially degrading water quality will be less than significant.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

Adequate BMPs will be utilized; and adherence to the regulations set forth by County, State, and federal agencies will reduce the potential for impacts to water quality to a less than significant level.

Comparison to Proposed Project and Other Alternatives

Alternative 5, Haul Route Alternative is considered neither environmentally superior nor inferior to the Proposed Project.

Alternative 5, Haul Route Alternative will also be neither environmentally superior nor inferior to any of the other alternatives except Alternative 6, No Project Alternative. Alternative 5, Haul Route Alternative will be environmentally inferior to Alternative 6, No Project Alternative due to sediment removal and reservoir management activities.

HYDROLOGY-2 *Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level.*

Sediment Removal/Reservoir Management

As with the Proposed Project, with implementation of Alternative 5, Haul Route Alternative the reservoir will have the ability to contain more of the local runoff, which in turn will result in more stormwater penetrating surface sediment in the project area and subsequently recharging the groundwater basin. No significant impacts to groundwater supplies are expected.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

No significant unavoidable adverse impacts would occur as a result of Alternative 5, Haul Route Alternative.

Comparison to Proposed Project and Other Alternatives

Alternative 5, Haul Route Alternative is considered neither environmentally superior nor inferior to the Proposed Project, due to the same amount of area to contain local runoff.

Alternative 5, Haul Route Alternative will also be neither environmentally superior nor inferior to any of the other alternatives except Alternative 6, No Project Alternative. Alternative 5, Haul Route Alternative will be environmentally superior to Alternative 6, No Project Alternative due to greater area to contain local runoff and increased percolation due to removal of accumulated sediment.

HYDROLOGY-3 *Substantially alter the existing drainage pattern of the site, which would potentially result in substantial erosion or siltation.*

Sediment Removal/Reservoir Management

Drainage patterns within the reservoir change on a regular basis depending on seasonal conditions, water flow, and sediment deposition. Sediment removal and reservoir management will also result in alterations of surface drainage characteristics at the project site due to clearing, grading, and excavation activities. Excavation, grading, and sediment placement activities will occur under LACDPW regulations, which establish protocols for proper design of slopes and temporary sediment-collecting structures.

Although the drainage characteristics for the site will be altered, Alternative 5, Haul Route Alternative will result in a positive impact to drainage of Devil's Gate Reservoir because it will enhance the flood control abilities of Devil's Gate Dam. While Alternative 5, Haul Route Alternative will result in a small increase of impervious surface area, this small amount is not expected to significantly change drainage patterns nor cause a significant increase in the amount of surface runoff. As such, impacts related to offsite erosion will be less than significant.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

Alternative 5, Haul Route Alternative will result in a less than significant impact on drainage patterns.

Comparison to Proposed Project and Other Alternatives

Alternative 5, Haul Route Alternative is considered neither environmentally superior nor inferior to the Proposed Project.

Alternative 5, Haul Route Alternative will also be neither environmentally superior nor inferior to any of the other alternatives, except for Alternative 4, Sluicing. Alternative 5, Haul Route Alternative will be environmentally superior to Alternative 4, Sluicing due to the potential for erosion associated with the sluicing alternative.

HYDROLOGY-4 *Otherwise substantially degrade water quality.*

Sediment Removal/Reservoir Management

As with the Proposed Project, heavy equipment needed for sediment removal has the potential to cause accidental spills of fuel and lubricating oil. Contaminants could be released into the watershed and adversely affect water quality. Alternative 5, Haul Route Alternative activities involving construction equipment will be temporary and involve the limited transport, use, disposal, and storage of fuel and lubricating oil, which are regulated by various agencies. Adequate BMPs will be utilized; and adherence to the regulations set forth by County, State, and federal agencies will reduce the potential for impacts to water quality to a less than significant level.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

Adequate BMPs will be utilized; and adherence to the regulations set forth by County, State, and federal agencies will reduce the potential for impacts to water quality to a less than significant level.

Comparison to Proposed Project and Other Alternatives

Alternative 5, Haul Route Alternative is considered neither environmentally superior nor inferior to the Proposed Project.

Alternative 5, Haul Route Alternative will also be neither environmentally superior nor inferior to any of the other alternatives except Alternative 6, No Project Alternative. Alternative 5, Haul Route Alternative will be environmentally inferior to Alternative 6, No Project Alternative due to sediment removal and reservoir management activities.

LAND USE & PLANNING

LAND USE-1 *Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect.*

Sediment Removal

As with the Proposed Project, Alternative 5, Haul Route Alternative will not conflict with the City's General Plan or zoning designation of Open Space for the Proposed Project site and is consistent with the LACFCD easement.

As discussed in Subsection 3.8.3, Applicable Regulations, the HWPMP emphasizes protection of recreational and natural resources as well as the management of flood control for the downstream watershed. Alternative 5, Haul Route Alternative is consistent with HWPMP Goal 2 of managing the flood control basin for protection of the downstream areas by improving and maintaining the flood capacity behind Devil's Gate Dam.

Implementation of sediment removal and reservoir management will result in temporarily restricted access to portions of designated trails and indirect impacts to existing recreation uses associated with construction activities (see further discussion below in Recreation). With implementation of Mitigation Measure MM LAN-1, impacts associated with recreational activities coexisting with flood management and water conservation will be reduced to less than significant.

Mitigation Measure

> **MM LAN-1**: Temporary impacts to designated recreational facilities and trails shall be minimized through advance communication and redirection to the nearest facility in the vicinity of the Proposed Project. Prior to completion of final plans and specifications, the LACFCD shall review the plans and specifications to ensure that they contain proper language requiring that signs be posted at the nearby parking lots and trailheads at least one month in advance of sediment removal activities.

Residual Impacts After Mitigation

Impacts associated with recreational activities coexisting with flood management and water conservation would be reduced to less than significant for sediment removal and reservoir management.

Comparison to Proposed Project and Other Alternatives

Alternative 5, Haul Route Alternative is considered neither environmentally superior nor inferior to the Proposed Project with respect to impacts to land use associated with compatibility to habitat restoration and recreation due to the similarities in sediment removal area and reservoir management Option 1 area.

Alternative 5, Haul Route Alternative is considered environmentally superior to Alternative 4, Sluicing with respect to impacts to land use associated with compatibility to habitat restoration and recreation due to the longer time frame for sediment removal activities associated with sluicing.

Due to the greater sediment removal and reservoir management areas, Alternative 5, Haul Route Alternative will be environmentally inferior to all of the other alternatives except Alternative 6, No Project Alternative.

Alternative 5, Haul Route Alternative will be environmentally superior to Alternative 6, No Project Alternative, as habitat in the reservoir will likely degrade under Alternative 6, No Project Alternative due to continuous sediment deposition and degradation that will increase over time.

MINERAL RESOURCES

MINERALS-1 *Result in the loss of availability of a known mineral resource that would be of value to the region and residents of the state.*

Sediment Removal/Reservoir Management

The Proposed Project site contains areas delineated within SMARA zone designated MRZ-2, which indicates that the area contains adequate information to indicate that significant mineral deposits are present or are

judged to have a high likelihood for their presence (City of Pasadena 2002). As with the Proposed Project, under Alternative 5, Haul Route Alternative the Proposed Project site will not be available for mining operations during sediment removal and reservoir management activities; however, sediment removal is not expected to involve usable aggregate material or arroyo stone due to unfavorable characteristics such as fine gradation soil and high organic content levels. Impacts will be less than significant.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

Alternative 5, Haul Route Alternative will not result in any potentially significant impacts to mineral resources that will be of value to the region and residents of the state.

Comparison to Proposed Project and Other Alternatives

Alternative 5, Haul Route Alternative is considered neither environmentally superior nor inferior to the Proposed Project.

Alternative 5, Haul Route Alternative will also be neither environmentally superior nor inferior to any of the other alternatives.

MINERALS-2 *Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan.*

While the Arroyo Seco Master Plan EIR (2002) states that the reservoir may contain large quantities of arroyo stone, the Proposed Project site is not delineated as a locally important mineral resource recovery site on a local general plan, specific plan, or other local land use plan. As with the Proposed Project, under Alternative 5, Haul Route Alternative, the Proposed Project site will not be available for mining operations during sediment removal and reservoir management activities; however, sediment excavation is not expected to involve usable aggregate material or arroyo stone due to unfavorable characteristics such as fine gradation soil and high organic content levels. Impacts will be less than significant.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

Alternative 5, Haul Route Alternative will not result in any potentially significant impacts to availability of a locally important mineral resource recovery site.

Comparison to Proposed Project and Other Alternatives

Alternative 5, Haul Route Alternative is considered neither environmentally superior nor inferior to the Proposed Project.

Alternative 5, Haul Route Alternative is considered neither environmentally superior nor inferior to any other alternative.

NOISE & VIBRATION

NOISE-1 *Result in exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.*

Sediment Removal/Reservoir Management

Onsite Construction Equipment Noise

Alternative 5, Haul Route Alternative sediment removal activities will take place Monday through Friday between 7:00 a.m. and 6:00 p.m. Standard Time and between 7:00 a.m. and 7:00 p.m. Daylight Savings Time and on Saturday between 8:00 a.m. and 5:00 p.m. Reservoir management activities will take place under the same hours Monday through Friday, with no activities on Saturday. This alternative will use the same amount and type of construction equipment as the Proposed Project. Since the removal of sediment activities will require a greater amount of equipment than the reservoir management activities, calculations for onsite construction equipment noise have been based on the sediment removal activities equipment list.

Noise impacts from onsite construction equipment activities associated with Alternative 5, Haul Route Alternative will be a function of the noise generated by construction equipment, equipment location, and sensitivity of nearby land uses, and the timing and duration of the construction activities. Construction noise impacts will be the same as those associated with the Proposed Project to the nearby sensitive receptors and are shown below in Table 4.8-1.

Table 4.8-1: Alternative 5 Onsite Construction Equipment Noise Levels at Nearby Sensitive Receptors

Receptor Description	Receptor Jurisdiction	Distance to Receptor (feet)	Construction Noise Levels[1]	
			dBA Leq	dBA L_{max}
Single-Family Home	Pasadena	140	71	73
Single-Family Home	Los Angeles County	180	69	71
JPL Office	La Cañada Flintridge	200	68	70
Hahamongna Watershed Park	Pasadena	20	86	90
La Cañada High School	La Cañada Flintridge	430	63	63
La Cañada Methodist Church	La Cañada Flintridge	500	62	62

Notes:
[1] Lmax is based on the maximum noise from the loudest piece of equipment and the Leq is the average noise from all equipment.
Source: RCNM, Federal Highway Administration, 2006

Table 4.8-1, above, shows that construction noise impacts will range from 62 dBA Leq to 86 dBA Leq at the nearby receptors, with the highest noise levels occurring at the portion of Hahamongna Watershed Park that is adjacent to the west side of the reservoir.

The City of Pasadena exempts public agencies from the Municipal Code noise requirements. The County of Los Angeles exempts flood control maintenance and construction operations from noise restrictions.

The City of La Cañada Flintridge does not provide maximum noise thresholds of construction noise that occurs during the allowed times between Monday through Friday of 7:00 a.m. to 6:00 p.m. Standard Time and 7:00 a.m. to 7:00 p.m. Daylight Savings Time and on Saturday between 7:00 a.m. and 5:00 p.m. Therefore, Alternative 5, Haul Route Alternative will comply with all local ordinances due to sediment removal and reservoir management activities taking place during the allowed hours.

Offsite Vehicular Noise

Alternative 5, Haul Route Alternative sediment removal and reservoir management activities will generate the same daily haul truck trips as the Proposed Project. Therefore, potential impacts from offsite traffic noise created by the offsite vehicle trips for Alternative 5, Haul Route Alternative will be the same as those generated from the Proposed Project. Overall, as with the Proposed Project, roadway noise impacts will be less than significant.

Mitigation Measures

No mitigation measures are necessary.

Residual Impacts After Mitigation

Alternative 5, Haul Route Alternative will comply with all local noise ordinances, and roadway noise impacts will be less than significant.

Comparison to Proposed Project and Other Alternatives

Alternative 5, Haul Route Alternative is considered neither environmentally superior nor inferior to the Proposed Project with respect to impacts associated with noise levels due to similar timeframe for sediment removal.

Due to the longer timeframe for sediment removal, Alternative 5, Haul Route Alternative will be environmentally inferior to Alternative 1, Configuration B; Alternative 2, Configuration C; and Alternative 3, Configuration D.

Due to having a shorter time frame than Alternative 4, Sluicing, Alternative 5, Haul Route Alternative will be environmentally superior to Alternative 4, Sluicing.

Alternative 5, Haul Route Alternative will be environmentally inferior to Alternative 6, No Project Alternative due to sediment removal and reservoir management activities.

NOISE-2 *Result in exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels.*

Sediment Removal/Reservoir Management

As with the Proposed Project, only the nearby single-family homes in the City of Pasadena would experience vibration levels that would exceed the 0.01-inch-per-second vibration standard. This potentially significant impact will be reduced to less than significant through implementation of Mitigation Measure MM N-1.

Mitigation Measures

MM N-1: LACFCD shall restrict the operation of any off-road construction equipment that is powered by a greater than 200-horsepower engine from operating within 180 feet of any offsite residential structure. Equipment that is not performing any earth-moving activities and is solely operating for entering or leaving the site via the access roads to the reservoir is exempted from this requirement.

Residual Impacts After Mitigation

Through implementation of Mitigation Measure MM N-1, the onsite construction equipment vibration impacts to nearby sensitive receptors would be reduced to less than significant.

Comparison to Proposed Project and Other Alternatives

Alternative 5, Haul Route Alternative is considered neither environmentally superior nor inferior to the Proposed Project with respect to impacts associated with noise levels due to similar timeframe for sediment removal.

Due to the longer timeframe for sediment removal, Alternative 5, Haul Route Alternative will be environmentally inferior to Alternative 1, Configuration B; Alternative 2, Configuration C; and Alternative 3, Configuration D.

Due to having a shorter time frame than Alternative 4, Sluicing, Alternative 5, Haul Route Alternative will be environmentally superior to Alternative 4, Sluicing.

Alternative 5, Haul Route Alternative will be environmentally inferior to Alternative 6, No Project Alternative due to sediment removal and reservoir management activities.

NOISE-3 *Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.*

Sediment Removal/Reservoir Management

Alternative 5, Haul Route Alternative will not create a substantial temporary or periodic increase in ambient noise levels in the project vicinity above existing noise levels. For this analysis, both the sediment removal activities and reservoir management activities have been considered as temporary activities, since they would occur only for limited durations of time. The construction activities associated with the removal of the sediment may create temporary onsite noise impacts from the operation of construction equipment as well offsite noise impacts from the use of haul trucks to export material offsite.

<u>Onsite Construction Equipment Noise</u>

As with the Proposed Project, the onsite equipment that will be operated under Alternative 5, Haul Route Alternative will not conflict with any construction noise standards. Any temporary noise level increase from onsite construction noise will be less than significant. Therefore, Alternative 5, Haul Route Alternative potential onsite construction noise levels will be the same as those generated from the Proposed Project.

Offsite Vehicular Noise

As with the Proposed Project, the offsite vehicular trips associated with Alternative 5, Haul Route Alternative include locations that do not already exceed the standards for existing conditions. The analysis also found that for the locations that currently exceed the normally acceptable noise standard, Alternative 5, Haul Route Alternative noise contribution to these roadway segments will be within the Federal Transit Administration's allowable noise exposure increase levels. Therefore, the temporary noise level increase created from offsite vehicular noise impacts will result in a less than significant impact. Potential impacts from offsite vehicular noise from Alternative 5, Haul Route Alternative will be the same as those generated from the Proposed Project.

Mitigation Measures

No mitigation measures are necessary.

Residual Impacts After Mitigation

Temporary noise level increase from onsite construction noise and offsite vehicular noise would be less than significant.

Comparison to Proposed Project and Other Alternatives

Alternative 5, Haul Route Alternative is considered neither environmentally superior nor inferior to the Proposed Project with respect to impacts associated with noise levels due to the same amount of equipment used for onsite and offsite trucking.

Due to a longer timeframe for removing the material, Alternative 5, Haul Route Alternative will be environmentally inferior to all the other alternatives. Alternative 5, Haul Route Alternative will potentially be environmentally superior to Alternative 4, Sluicing if proper sediment transport does not occur under Alternative 4, Sluicing, causing sediment deposits to develop along the route to the ocean. This would result in need for sediment removal and impacts downstream associated with removal activities.

Alternative 5, Haul Route Alternative will be environmentally inferior to Alternative 6, No Project Alternative due to sediment removal and reservoir management activities.

RECREATION/PUBLIC SERVICES

RECREATION-1 *Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated.*

Alternative 5, Haul Route Alternative will not result in the construction of new residences, or facilitate the development of residences, or result in an increase in area population. Therefore, implementation of the Alternative 5, Haul Route Alternative will not result in increased use or the physical deterioration associated with increased use for neighborhood or regional parks or other recreational facilities due to any increases in area population.

Sediment Removal Impacts

As with the Proposed Project, under Alternative 5, Haul Route Alternative sediment removal will occur over the course of five years. During this, most of the Proposed Project site will be closed to public use from the dam face to the edge of this Alternative's excavation limit boundaries (see Figure 2.5-1). Alternative 5, Haul Route Alternative will have a potential impact on recreational opportunities through temporarily restricted access to trails and long-term alteration of the landscape. Maintenance roads within the basin are used by the LACFCD, Southern California Edison (SCE), and the City of Pasadena, among others, for operations and maintenance of Devil's Gate Reservoir and other facilities in the area. The majority of the maintenance roads will be closed during sediment removal; however, these roads are not officially designated for recreational uses and are often not available for unofficial recreation use due to reservoir water levels or maintenance activities.

Designated Recreational Uses

Implementation of sediment removal will result in temporarily restricted access to portions of designated trails and indirect impacts to existing recreation uses associated with construction activities. These impacts may increase the use of other area parks and recreational facilities such as those described in Table 3.15-1, Area Recreational Facilities.

The Oak Grove area of Hahamongna Watershed Park and the associated facilities, including Oak Grove Disk Golf Course, will remain open during sediment removal and will continue to provide active recreational facilities to the area. Sediment removal activities will not limit the use of the Oak Grove area of Hahamongna Watershed Park by individuals or by organizations such as the Oak Grove Disc Golf Club, the Rose Bowl Riders, MACH 1, or the Tom Sawyer Camp.

Activities such as hiking, biking, horseback riding, bird watching, and nature walks will be limited to trails located outside the excavation boundary or to trails opened in absence of removal activities. Of the six designated trails in and adjacent to the Proposed Project site, three of these trails, Flint Wash Trail, Gabrielino Trail, and Gould Canyon Trail, will remain open during sediment removal and will continue to provide active recreational facilities to the area. Small portions of the Altadena Crest Trail, Arroyo Seco Trail, and West Rim Trail will either be closed when sediment removal activities are under way and/or are near the trail.

Sediment removal activities associated with this alternative will not limit or block access to the Oak Grove area and many of the designated trails and will not result in direct potentially significant impacts to these facilities; however, use of these facilities may be less desirable due to construction-related emissions, noise, dust, visual, and traffic impacts associated with sediment removal. These temporary, indirect impacts will reduce the quality of the recreational experience.

Indirect impacts to recreation associated with sediment removal under Alternative 5, Haul Route Alternative will be the same as for the Proposed Project.

Recreational users may choose to visit other area parks, recreational facilities, or trails due to the temporary access restrictions or the indirect effects of construction-related activities. Due to the number of other recreational facilities and trails in the vicinity, it is anticipated that these visitors will be dispersed throughout the area and that no single park or facility will experience a substantial increase in use. Therefore, Alternative 5, Haul Route Alternative will not increase use of other existing parks or

recreation facilities such that substantial physical deterioration of these facilities will occur or be accelerated. Impacts to other existing parks and recreation facilities will be temporary and less than significant. Sediment removal under this Alternative would have the same duration as the Proposed Project and would, therefore, have less than significant impacts to other existing parks and recreation facilities.

Reservoir Management Impacts

After the annual proposed reservoir management, access to Devil's Gate Reservoir will be similar to existing conditions. Every year the reservoir will be temporarily closed to public access for reservoir management. This will occur during the late summer/early fall over an estimated five-week period, Monday through Friday. The length of time will vary depending on the amount of sediment deposited in the reservoir over the course of the year. The Oak Grove area of Hahamongna Park and most of the designated trails will remain open during reservoir management activities and will continue to provide active recreational facilities to the area. The proposed reservoir management activities will typically occur only during the weekdays; therefore, weekend visitors of the Hahamongna Watershed Park will not be affected by the proposed reservoir management activities. Trails will be beneficially affected in the long-term through the reduction of potential disruption by flooding and/or being buried under sediment. Impacts to existing parks and recreation facilities associated with reservoir management activities under Alternative 5, Haul Route Alternative will be less than significant.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

Alternative 5, Haul Route Alternative will not result in any potentially significant impacts associated with increased use of other existing parks or recreation facilities.

Comparison to Proposed Project and Other Alternatives

Alternative 5, Haul Route Alternative is considered neither environmentally superior nor inferior to the Proposed Project with respect to recreation uses.

Due to the larger acreage of sediment removal activities, Alternative 5, Haul Route Alternative will be environmentally inferior to Alternative 1, Configuration B; Alternative 2, Configuration C; and Alternative 3, Configuration D.

Due to Alternative 5, Haul Route Alternative having a shorter duration in sediment removal activities, Alternative 5, Haul Route Alternative will be environmentally superior to Alternative 4, Sluicing.

Alternative 5, Haul Route Alternative will be environmentally superior to Alternative 6, No Project Alternative, as recreational activities will likely be impacted under Alternative 6, No Project Alternative due to continuous sediment deposition.

RECREATION-2 *Require the construction or expansion of existing recreational facilities which might have an adverse physical effect on the environment.*

As discussed in detail above under RECREATION-1, recreational users may choose to visit other area parks, recreational facilities, or trails due to the temporary access restrictions or the indirect effects of construction-related activities during reservoir management activities. It is anticipated that these visitors will be dispersed throughout the area and that no single park or facility will experience a substantial increase in use. Therefore, Alternative 5, Haul Route Alternative will not require the construction or expansion of existing recreational facilities which might have an adverse physical effect on the environment, resulting in a less than significant impact. Sediment removal under this Alternative would have the same duration as the Proposed Project and, therefore, would result in less than significant impacts to other existing parks and recreation facilities.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

Alternative 5, Haul Route Alternative will not result in any potentially significant impacts associated with the construction or expansion of existing recreational facilities.

Comparison to Proposed Project and Other Alternatives

Alternative 5, Haul Route Alternative is considered neither environmentally superior nor inferior to the Proposed Project.

Due to the larger acreage of sediment removal activities, Alternative 5, Haul Route Alternative will be environmentally inferior to Alternative 1, Configuration B; Alternative 2, Configuration C; and Alternative 3, Configuration D.

Due to the shorter timeframe, Alternative 5, Haul Route Alternative will be environmentally superior to Alternative 4, Sluicing.

Alternative 5, Haul Route Alternative will be environmentally superior to Alternative 6, No Project Alternative, as recreational activities will likely be impacted under Alternative 6, No Project Alternative due to continuous sediment deposition.

PUBLIC SERVICES-1 *Result in substantial adverse impacts associated with the provision of or need for new or physically altered recreational facilities, the construction of which could cause significant environmental impacts.*

As discussed in detail above under RECREATION-2, Alternative 5, Haul Route Alternative will not result in a substantial increase in use of any one park or facility. Therefore, the Proposed Project will not require the provision of or need for new or physically altered recreational facilities, the construction of which could cause significant environmental impacts.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

Alternative 5, Haul Route Alternative will not result in any potentially significant impacts associated with the construction or expansion of existing recreational facilities.

Comparison to Proposed Project and Other Alternatives

Alternative 5, Haul Route Alternative is considered neither environmentally superior nor inferior to the Proposed Project.

Due to the larger acreage of sediment removal activities, Alternative 5, Haul Route Alternative will be environmentally inferior to Alternative 1, Configuration B; Alternative 2, Configuration C; and Alternative 3, Configuration D.

Due to the shorter timeframe of sediment removal activities, Alternative 5, Haul Route Alternative will be environmentally superior to Alternative 4, Sluicing.

Alternative 5, Haul Route Alternative will be environmentally superior to Alternative 6, No Project Alternative, as recreational activities will likely be impacted under Alternative 6, No Project Alternative due to continuous sediment deposition.

TRANSPORTATION & TRAFFIC

TRANSPORTATION-1 *Conflict with an applicable plan, ordinance, or policy establishing measure of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit.*

Sediment Removal/Reservoir Management

Truck traffic associated with the Alternative 5, Haul Route Alternative is expected to adhere to traffic regulations; however, during sediment removal, truck traffic is expected to impact traffic LOS on the existing roadway network. Potential impacts regarding existing LOS are discussed under TRANSPORTATION-2 below. This increase in traffic would result in temporary significant impacts to the efficiency of the circulation system. Implementation of Mitigation Measures MM TRA-1 and TRA-2 would reduce this impact but not to a level of less than significant.

Sediment removal and associated transportation under this Alternative could potentially have the same duration as the Proposed Project. Other potential impact reduction measures discussed under TRANSPORTATION-2, below, could reduce impacts to less than significant. These measures cannot be legally imposed by the LACFCD, however, since the locations are under the jurisdiction of other agencies. Every reasonable effort will be made to coordinate with and receive approval from the jurisdictional agencies to implement the impact reduction measures but LACFCD cannot guarantee that

the measures will be implemented. Therefore, this temporary impact could remain potentially significant.

Reservoir Management

Truck traffic associated with reservoir management is not expected to adversely affect traffic LOS on the existing roadway network. Therefore, impacts to the efficiency of the circulation system would be less than significant.

Mitigation Measures

MM TRA-1: Proposed Project haul trucks will not deliver to the Vulcan Material Reliance Facility during the PM peak period.

MM TRA-2: Proposed Project haul trucks will not deliver to the Boulevard Pit during the PM peak period.

Residual Impacts after Mitigation

Potentially significant traffic impacts associated with the sediment removal phase would be temporary, expected to occur during the drier months (from April to December, except on holidays), and would cease at the end of the sediment removal phase. Implementation of the mitigation measures described above would reduce impacts to traffic and circulation but not to a level of less than significant. Other potential impact reduction measures discussed under TRANSPORTATION-2, below, could reduce impacts to less than significant. These measures cannot be legally imposed by the LACFCD, however, since the locations are under the jurisdiction of other agencies. Every reasonable effort will be made to coordinate with and receive approval from the jurisdictional agencies to implement the impact reduction measures but LACFCD cannot guarantee that the measures will be implemented. Therefore, this temporary impact could remain potentially significant. No significant traffic impacts would occur under reservoir management.

Comparison to Proposed Project and Other Alternatives

Alternative 5, Haul Route Alternative is considered environmentally superior to the Proposed Project because the Alternative will result in less than significant intersection impacts.

Due to the alternate haul route, Alternative 5, Haul Route Alternative will also be environmentally superior to all the other alternatives except Alternative 6, No Project Alternative.

Alternative 5, Haul Route Alternative will potentially be environmentally superior to Alternative 4, Sluicing if proper sediment transport does not occur under Alternative 4, Sluicing, causing sediment deposits to develop along the route to the ocean. This would result in need for sediment removal from the Arroyo Seco Channel, the Los Angeles River, or the Port of Long Beach and traffic impacts associated with removal activities.

Alternative 5, Haul Route Alternative will be environmentally inferior to Alternative 6, No Project Alternative due to sediment removal and reservoir management activities.

TRANSPORTATION-2 *Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways.*

This Alternative analyzes the use of alternative routes for some of the segments of the sediment disposal truck routes. Table 4.8-2 presents the streets to be used for these haul routes.

Table 4.8-2: Alternative Haul Route Streets

Alternative Haul Routes	Streets To Be Used
To/From Devil's Gate Reservoir to eastern disposal sites, Option 1	▪ Exit WB I-210 at Windsor Avenue/Arroyo Boulevard ▪ Turn right onto EB Windsor Avenue and then left onto NB Oak Grove Drive ▪ Enter and exit the project site on Oak Grove Drive ▪ Turn left onto SB Oak Grove Drive and then right onto WB Windsor Avenue ▪ Enter EB I-210 at Windsor Avenue/Arroyo Boulevard
To/From Devil's Gate Reservoir to eastern disposal sites, Option 2	▪ Exit WB I-210 at Berkshire Place ▪ Turn right onto EB Berkshire Place and then right onto SB Oak Grove Drive ▪ Enter and exit the project site on Oak Grove Drive ▪ Turn right onto NB Oak Grove Drive and then left onto WB Berkshire Place ▪ Enter EB I-210 at Berkshire Place
To/From Devil's Gate Reservoir Area to western disposal sites, Option 1	▪ Exit EB I-210 at Windsor Avenue/Arroyo Boulevard ▪ Turn right onto EB Windsor Avenue and then left onto NB Oak Grove Drive ▪ Enter and exit the project site on Oak Grove Drive ▪ Turn left onto SB Oak Grove Drive and then right onto WB Windsor Avenue ▪ Enter WB I-210 at Windsor Avenue/Arroyo Boulevard
To/From Devil's Gate Reservoir Area to western disposal sites, Option 2	▪ Exit EB I-210 at Berkshire Place ▪ Turn left onto EB Berkshire Place and then right onto SB Oak Grove Drive ▪ Enter and exit the project site on Oak Grove Drive ▪ Turn right onto NB Oak Grove Drive and then left onto WB Berkshire Place ▪ Enter WB I-210 at Berkshire Place
To/From Manning Pit	▪ Exit EB I-210 at Irwindale Avenue ▪ Turn right onto SB Irwindale Avenue ▪ Turn left onto EB Gladstone Street and then right onto SB Vincent Avenue ▪ Enter and exit the disposal site on Vincent Avenue ▪ Turn left onto NB Vincent Avenue and then left onto NB Azusa Avenue ▪ Turn right onto EB First Street ▪ Enter WB I-210 at First Street
To/From Scholl Canyon Landfill	▪ Exit EB SR-134 at Figueroa Street ▪ Turn right onto NB Figueroa Street ▪ Enter and exit the disposal site on Scholl Canyon Road ▪ Turn right onto SB Scholl Canyon Road ▪ Enter WB SR-134 at Figueroa Street

Table 4.8-2: Alternative Haul Route Streets

Alternative Haul Routes	Streets To Be Used
To/From Sheldon Pit	▪ Exit WB I-210 at the Wheatland Avenue interchange ▪ Turn right onto NB Wheatland Avenue ▪ Turn right onto EB Foothill Boulevard ▪ Turn right onto WB Wentworth Street ▪ Enter and exit the disposal site on Sheldon Street ▪ Turn left onto EB Sheldon Street ▪ Turn left onto WB Foothill Boulevard ▪ Turn left onto SB Wheatland Avenue ▪ Enter EB I-210 at the left onto SB Wheatland Avenue interchange
To/From Sun Valley Fill Site	▪ Exit WB I-210 at the Wheatland Avenue interchange ▪ Turn right onto NB Wheatland Avenue ▪ Turn right onto EB Foothill Boulevard ▪ Turn right onto WB Wentworth Street ▪ Enter the disposal site on Sheldon Street ▪ Exit the disposal site on Glenoaks Boulevard ▪ Turn right onto NB Glenoaks Boulevard ▪ Turn right onto EB Sheldon Street ▪ Turn left onto WB Foothill Boulevard ▪ Turn left onto SB Wheatland Avenue ▪ Enter EB I-210 at the left onto SB Wheatland Avenue interchange
To/From Bradley Landfill	▪ Exit WB I-210 at the Wheatland Avenue interchange ▪ Turn right onto NB Wheatland Avenue ▪ Turn right onto EB Foothill Boulevard ▪ Turn right onto WB Wentworth Street ▪ Turn left onto SB Glenoaks Boulevard ▪ Turn right onto WB Peoria Street ▪ Enter and exit the disposal site on Peoria Street ▪ Turn left onto EB Peoria Street ▪ Turn left onto NB Glenoaks Boulevard ▪ Turn right onto EB Sheldon Street ▪ Turn left onto WB Foothill Boulevard ▪ Turn left onto SB Wheatland Avenue ▪ Enter EB I-210 at the left onto SB Wheatland Avenue interchange
To/From Boulevard Pit	▪ Exit the SB I-5 at Osborne Street ▪ Turn left onto EB Osborne Street ▪ Turn right onto SB Laurel Canyon Boulevard ▪ Turn left onto EB Branford Street ▪ Enter and exit the disposal site on Branford Street ▪ Turn left onto WB Branford Street ▪ Turn right onto NB Laurel Canyon Boulevard ▪ Turn left onto WB Osborne Street ▪ Enter the NB I-5 at Osborne Street

Devil's Gate Reservoir to/from I-210 (eastern disposal sites)

Option 1 Haul Route

Table 4.8-3 shows the LOS for Proposed Project traffic at year 2014 for the intersections between the reservoir and I-210, for Option 1 haul route toward the eastern disposal sites. Table 4.8-4: Alternative Haul Route to I-210 to Eastern Disposal Sites, Option 1 AM Peak Hour shows the contribution of Proposed Project traffic to existing conditions and year 2014 conditions for the AM peak period. All the intersections between the reservoir and I-210 toward the eastern disposal sites using the Option 1 haul route are anticipated to continue to operate at LOS C or better for all utilized intersections throughout the day.

Use of this alternative route would require implementation of the following potential impact reduction measure:

- The median on Oak Grove Drive would be restriped to a Two Way Left Turn Lane (TWLTL). Trucks exiting the Devil's Gate Reservoir driveway will cross the two lanes of oncoming westbound traffic on Oak Grove Drive and utilize the TWLTL if necessary to merge into the eastbound traffic. The changes to Oak Grove Drive would require the approval of the City of Pasadena.

The addition of the TWLTL for the impact reduction measure discussed above cannot be legally imposed by the LACFCD since the location is under the jurisdiction of the City of Pasadena. Every reasonable effort will be made to coordinate with and receive approval to implement this impact reduction measure; however, LACFCD cannot guarantee that this impact reduction measure will be implemented and cannot guarantee that these alternative haul routes can be used.

Table 4.8-3: Alternative Haul Route to I-210 to Eastern Disposal Sites, Option 1

Intersection #/Name		AM				MID-DAY (12-2 PM)				MID-DAY (2-4 PM)				PM			
		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
4	Oak Grove Drive and Foothill Freeway Overpass (3)	C	21.0	-	-	A	9.9	-	-	A	9.8	-	-	B	12.0	-	-
5	Windsor Avenue and Oak Grove Drive/Woodbury Road	C	34.6	0.94	D	B	14.4	0.59	A	B	17.1	0.58	A	C	24.7	0.76	C
6	Windsor Avenue/Arroyo Boulevard and I-210 westbound ramps	B	10.8	0.68	B	A	6.8	0.37	A	A	6.9	0.37	A	A	8.3	0.48	B
7	Windsor Avenue/Arroyo Boulevard and I-210 eastbound ramps	C	23.7	0.39	A	C	30.9	0.42	A	C	28.4	0.42	A	C	28.5	0.62	A

Table 4.8-4: Alternative Haul Route to I-210 to Eastern Disposal Sites AM Peak Hour, Option 1

AM Peak Hour		Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project and Impact Reduction Measure*		Year 2014 with Project and Mitigation		
Intersection #/Name		HCM V/C	HCM LOS	HCM V/C	HCM LOS	Potentially Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Potentially Significant Impact
4	Oak Grove Drive and Foothill Freeway Overpass (3)	-	B	-	C	NO	-	C	NMR**	NMR**	NO
5	Windsor Avenue and Oak Grove Drive/Woodbury Road	0.87	C	0.86	C	NO	0.94	C	NMR**	NMR**	NO
6	Windsor Avenue/Arroyo Boulevard and I-210 westbound ramps	0.53	A	0.60	A	NO	0.68	B	NMR**	NMR**	NO
7	Windsor Avenue/Arroyo Boulevard and I-210 eastbound ramps	0.49	C	0.53	C	NO	0.39	C	NMR**	NMR**	NO

* Use of this alternative route would require implementation of the impact reduction measure discussed above.

Table 4.8-4: Alternative Haul Route to I-210 to Eastern Disposal Sites AM Peak Hour, Option 1

AM Peak Hour	Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project and Impact Reduction Measure*		Year 2014 with Project and Mitigation		
Intersection #/Name	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Potentially Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Potentially Significant Impact

**No mitigation required.

Option 2 Haul Route

Table 4.8-5 shows the LOS for Proposed Project traffic at year 2014 for the intersections between the reservoir and I-210, for Option 2 haul route toward the eastern disposal sites.

Table 4.8-6: Alternative Haul Route to I-210 to Eastern Disposal Sites, Option 2 AM Peak Hour shows the contribution of Proposed Project traffic to existing conditions and year 2014 conditions for the AM peak period.

All the intersections between the reservoir and I-210 toward the eastern disposal sites using Berkshire Place are anticipated to continue to operate at an LOS C or better for all utilized intersections during the MID-DAY and PM peak periods. Therefore, no significant impacts will occur at these intersections during the MID-DAY and PM peak periods. The Berkshire Place and I-210 eastbound ramps intersection is anticipated to operate at an unacceptable LOS during the AM peak hour, resulting in a temporary significant impact.

Use of this alternative route would require implementation of the following potential impact reduction measure:

- The median on Oak Grove Drive would be restriped to a Two Way Left Turn Lane (TWLTL). Trucks traveling eastbound on Oak Grove Drive and entering the Devil's Gate Reservoir east side driveway will utilize the TWLTL if necessary to turn left. The changes to Oak Grove Drive would require the approval of the City of Pasadena.

The addition of the TWLTL for the impact reduction measure discussed above cannot be legally imposed by the LACFCD since the location is under the jurisdiction of the City of Pasadena. Every reasonable effort will be made to coordinate with and receive approval to implement this impact reduction measure; however, LACFCD cannot guarantee that this impact reduction measure will be implemented and cannot guarantee that these alternative haul routes can be used.

Table 4.8-5: Alternative Haul Route to I-210 to Eastern Disposal Sites, Option 2

Intersection #/Name		AM				MID-DAY (12-2 PM)				*MID-DAY (2-4 PM)*				PM			
		HCM LOS	HCM Delay	HCM V/C	ICU LOS	*HCM LOS*	*HCM Delay*	HCM V/C	ICU LOS	*HCM LOS*	*HCM Delay*	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
1	Berkshire Place and I-210 eastbound ramps	F	51.4	-	-	B	10.8	-	-	C	23.7	-	-	D	31.6	-	-
2	Berkshire Place and I-210 westbound ramps	B	13.1	-	-	A	7.0	-	-	A	9.3	-	-	A	5.6	-	-
3	Oak Grove Drive and Berkshire Place	C	26.6	0.97	B	A	6.2	0.30	A	A	7.1	0.49	A	A	8.4	0.57	B

Table 4.8-6: Alternative Haul Route to I-210 to Eastern Disposal Sites AM Peak Hour, Option 2

AM Peak Hour		Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project		Year 2014 with Project and Mitigation		
Intersection #/Name		HCM V/C	HCM LOS	HCM V/C	HCM LOS	Potentially Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Potentially Significant Impact
1	Berkshire Place and I-210 eastbound ramps	-	D	-	E	YES	-	F	N/A*	N/A*	YES
2	Berkshire Place and I-210 westbound ramps	-	A	-	A	NO	-	B	NMR**	NMR**	NO
3	Oak Grove Drive and Berkshire Place	0.50	A	0.67	A	NO	0.97	C	NMR**	NMR**	NO

* No mitigation available.
**No mitigation required.

Devil's Gate Reservoir to/from I-210 (western disposal sites)

Option 1 Haul Route

Table 4.8-7 shows the LOS for Proposed Project traffic at year 2014 for the intersections between the reservoir and I-210, for Option 1 haul route toward the western disposal sites.

Table 4.8-8 shows the contribution of Proposed Project traffic to existing conditions and year 2014 conditions for the AM peak period. All the intersections between the reservoir and I-210 toward the eastern disposal sites using the Option 1 haul route are anticipated to continue to operate at LOS D or better for all utilized intersections throughout the day. Therefore, no significant impacts will occur at these intersections.

Table 4.8-7: Alternative Haul Route to I-210 to Western Disposal Sites, Option 1

Intersection #/Name		AM				MID-DAY (12-2 PM)				MID-DAY (2-4 PM)				PM			
		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
4	Oak Grove Drive and Foothill Freeway Overpass (3)	C	21	-	-	A	9.9	-	-	A	9.8	-	-	B	12	-	-
5	Windsor Avenue and Oak Grove Drive/Woodbury Road	C	34.6	0.94	D	B	14.4	0.59	A	B	17.1	0.58	A	C	24.7	0.76	C
6	Windsor Avenue/Arroyo Boulevard and I-210 westbound ramps	A	9.9	0.62	B	A	5.5	0.31	A	A	5.6	0.27	A	A	7.9	0.47	B
7	Windsor Avenue/Arroyo Boulevard and I-210 eastbound ramps	C	28.6	0.57	A	B	16.1	0.39	A	B	17.4	0.42	A	C	26.8	0.63	A

Table 4.8-8: Alternative Haul Route to I-210 to Western Disposal Sites AM Peak Hour, Option 1

AM Peak Hour		Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project and Impact Reduction Measure*		Year 2014 with Project and Mitigation		
	Intersection #/Name	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Potentially Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Potentially Significant Impact
4	Oak Grove Drive and Foothill Freeway Overpass (3)	-	B	-	C	NO	-	C	NMR**	NMR**	NO
5	Windsor Avenue and Oak Grove Drive/Woodbury Road	0.87	C	0.86	C	NO	0.94	C	NMR**	NMR**	NO
6	Windsor Avenue/Arroyo Boulevard and I-210 westbound ramps	0.53	A	0.56	A	NO	0.62	A	NMR**	NMR**	NO
7	Windsor Avenue/Arroyo Boulevard and I-210 eastbound ramps	0.49	C	0.53	C	NO	0.57	C	NMR**	NMR**	NO

* Use of this alternative route would require implementation of the impact reduction measure discussed above.
**No mitigation required.

Option 2 Haul Route

Table 4.8-9 shows the LOS for Proposed Project traffic at year 2014 for the intersections between the reservoir and I-210 Option 2 haul route toward the western disposal sites.

Table 4.8-10: Alternative Haul Route to I-210 to Western Disposal Sites, Option 2 AM Peak Hour shows the contribution of Proposed Project traffic to existing conditions and year 2014 conditions for the AM peak period.

All the intersections between the reservoir and I-210 toward the western disposal sites using Berkshire Place are anticipated to continue to operate at an LOS C or better for all utilized intersections during the MID-DAY and PM peak periods. Therefore, no significant impacts will occur at these intersections during the MID-DAY and PM peak periods. The Berkshire Place and I-210 eastbound ramps intersection is anticipated to operate at an unacceptable LOS during the AM peak hour, resulting in a temporary significant impact.

Use of this alternative route would require implementation of the following potential impact reduction measure:

- The median on Oak Grove Drive would be restriped to a Two Way Left Turn Lane (TWLTL). Trucks traveling eastbound on Oak Grove Drive and entering the Devil's Gate Reservoir east side driveway will utilize the TWLTL if necessary to turn left. The changes to Oak Grove Drive would require the approval of the City of Pasadena.

The addition of the TWLTL for the impact reduction measure discussed above cannot be legally imposed by the LACFCD since the location is under the jurisdiction of the City of Pasadena. Every reasonable effort will be made to coordinate with and receive approval to implement this impact reduction measure; however, LACFCD cannot guarantee that this impact reduction measure will be implemented and cannot guarantee that these alternative haul routes can be used.

Table 4.8-9: Alternative Haul Route to I-210 to Western Disposal Sites, Option 2

Intersection #/Name		AM				MID-DAY (12-2 PM)				MID-DAY (2-4 PM)				PM			
		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
2	Berkshire Place and I-210 westbound ramps	B	11.0	-	-	A	4.7	-	-	A	6.9	-	-	A	3.7	-	-
1	Berkshire Place and I-210 eastbound ramps	E	48.2	-	-	B	10.6	-	-	C	18.9	-	-	C	21.8	-	-
3	Oak Grove Drive and Berkshire Place	C	26.6	0.97	B	A	6.2	0.30	A	A	7.1	0.49	A	A	8.4	0.57	B

Table 4.8-10: Alternative Haul Route to I-210 to Western Disposal Sites AM Peak Hour, Option 2

AM Peak Hour		Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project		Year 2014 with Project and Mitigation		
Intersection #/Name		HCM V/C	HCM LOS	HCM V/C	HCM LOS	Potentially Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Potentially Significant Impact
2	Berkshire Place and I-210 westbound ramps	-	A	-	A	NO-	-	B	NMR**	NMR**	NO
1	Berkshire Place and I-210 eastbound ramps	-	A	-	E	YES	-	E	NMR*	NMR*	YES
3	Oak Grove Drive and Berkshire Place	0.50	A	0.67	A	NO	0.97	c	NMR**	NMR**	NO

* No mitigation available.
**No mitigation required.

Manning Pit Area to/from I-210

Table 4.8-11 shows the LOS for Proposed Project traffic at year 2014 for the intersections between Manning Pit and I-210. Table 4.8-12, Table 4.8-13, and Table 4.8-14 show the contribution of Proposed Project traffic to existing conditions and year 2014 conditions for the AM, Mid-Day, and PM peak periods respectively. The Arrow Highway/Lark Ellen Avenue intersection is anticipated to operate at an unacceptable LOS during the AM, Mid-Day, and PM peak periods, resulting in a temporary significant impact. The Arrow Highway/Enid Avenue intersection, Azusa Avenue/Arrow Highway, Azusa Avenue/Gladstone Street, and First Street and Alameda Street/I-210 Westbound Ramps are anticipated to operate at an unacceptable LOS during the AM peak hour, resulting in a temporary significant impact. The Arrow Highway/Enid Avenue intersection is anticipated to operate at an unacceptable LOS during the Mid-Day peak hour, resulting in a temporary significant impact. The Arrow Highway/Enid Avenue intersection and Azusa Avenue/Arrow Highway are anticipated to operate at an unacceptable LOS during the PM peak hour, resulting in a temporary significant impact.

Table 4.8-11: Alternative Haul Route to Manning Pit Area

Intersection		AM				MID-DAY				PM			
Intersection #/Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
9	Irwindale Avenue and I-210 eastbound ramps	C	27.9	0.93	C	C	22.2	0.79	C	C	26.9	0.91	D
10	Irwindale Avenue and First Street	B	13.8	0.65	B	B	18.5	0.65	B	D	50.3	0.93	C
11	Irwindale Avenue and Gladstone Street	C	31.9	0.91	D	B	15.2	0.67	B	C	27.6	0.95	D
12	Vincent Avenue and Gladstone Street	B	12.6	0.74	B	A	8.7	0.38	A	B	14.2	0.72	C
13	Vincent Avenue and Arrow Highway	B	17.5	0.90	D	A	9.8	0.45	A	B	15.4	0.93	D
14	Arrow Highway and Lark Ellen Avenue	E	61.5	0.97	D	D	40.3	0.72	B	E	55.4	0.94	E
15	Arrow Highway and Enid Avenue	D	55.0	1.35	E	B	12.8	0.50	A	B	14.4	0.70	C
16	Azusa Avenue and Arrow Highway	E	63.8	1.15	D	E	55.4	0.96	D	E	58.4	1.04	E
17	Azusa Avenue and Gladstone Street	E	61.5	1.01	D	D	38.3	0.91	C	D	38.0	0.87	D
18	Azusa Avenue and I-210 Eastbound Ramps	B	12.1	0.71	A	B	11.7	0.75	A	B	10.3	0.65	A
19	Azusa Avenue and First Street	D	46.2	0.87	D	B	16.3	0.57	A	B	18.9	0.69	B
20	First Street and Alameda Street/I-210 Westbound Ramps	E	69.2	1.40	E	B	11.6	0.63	B	B	17.1	0.87	C

(*) F*- ICU LOS Exceeds LOS F

Table 4.8-12: Alternative Haul Route to Manning Pit Area to/from I-210, AM Peak Period

Intersection AM Peak Hour		Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project		Year 2014 with Project and Mitigation		
Intersection #/Name		HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact
9	Irwindale Avenue and I-210 Eastbound Ramps	0.84	C	0.85	C	NO	0.93	C	NMR*	NMR*	NO
10	Irwindale Avenue and First Street	0.60	B	0.64	B	NO	0.65	B	NMR*	NMR*	NO
11	Irwindale Avenue and Gladstone Street	0.81	C	0.88	C	NO	0.91	C	NMR*	NMR*	NO
12	Vincent Avenue and Gladstone Street	0.61	B	0.63	B	NO	0.74	B	NMR*	NMR*	NO

Table 4.8-12: Alternative Haul Route to Manning Pit Area to/from I-210, AM Peak Period

Intersection AM Peak Hour		Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project		Year 2014 with Project and Mitigation		
Intersection #/Name		HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact
13	Vincent Avenue and Arrow Highway	0.77	B	0.80	B	NO	0.90	B	NMR*	NMR*	NO
14	Arrow Highway and Lark Ellen Avenue	0.88	D	0.88	D	NO	0.97	E	N/A**	N/A**	YES
15	Arrow Highway and Enid Avenue	1.00	C	1.08	C	NO	1.35	D	NMR*	NMR*	NO
16	Azusa Avenue and Arrow Highway	0.95	D	1.04	D	NO	1.15	E	N/A**	N/A**	YES
17	Azusa Avenue and Gladstone Street	0.89	D	0.93	D	NO	1.01	E	N/A**	N/A**	YES
18	Azusa Avenue and I-210 Eastbound Ramps	0.63	A	0.64	B	NO	0.71	B	NMR*	NMR*	NO
19	Azusa Avenue and First Street	0.82	C	0.84	D	NO	0.87	D	NMR*	NMR*	NO
20	First Street and Alameda Street/I-210 Westbound Ramps	1.13	D	1.19	D	NO	1.40	E	N/A**	N/A**	YES

*No mitigation required.
** No mitigation available.

Table 4.8-13: Alternative Haul Route to Manning Pit Area to/from I-210, Mid-Day Peak Period

Intersection Mid-Day Peak Hour		Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project		Year 2014 with Project and Mitigation		
Intersection #/Name		HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact
9	Irwindale Avenue and I-210 Eastbound Ramps	0.71	B	0.72	B	NO	0.79	C	NMR*	NMR*	NO
10	Irwindale Avenue and First Street	0.60	B	0.60	B	NO	0.65	B	NMR*	NMR*	NO
11	Irwindale Avenue and Gladstone Street	0.51	B	0.57	B	NO	0.67	B	NMR*	NMR*	NO
12	Vincent Avenue and Gladstone Street	0.30	A	0.31	A	NO	0.38	A	NMR*	NMR*	NO
13	Vincent Avenue and Arrow Highway	0.36	A	0.40	A	NO	0.45	A	NMR*	NMR*	NO
14	Arrow Highway and Lark Ellen Avenue	0.62	C	0.67	C	NO	0.72	D	NMR*	NMR*	NO
15	Arrow Highway and Enid Avenue	0.43	B	0.48	B	NO	0.50	B	NMR*	NMR*	NO
16	Azusa Avenue and Arrow Highway	0.91	D	0.95	D	NO	0.96	E	N/A**	N/A**	YES
17	Azusa Avenue and Gladstone Street	0.75	C	0.79	C	NO	0.91	D	NMR*	NMR*	NO
18	Azusa Avenue and I-210 Eastbound Ramps	0.63	A	0.67	A	NO	0.75	B	NMR*	NMR*	NO
19	Azusa Avenue and First Street	0.53	B	0.53	B	NO	0.57	B	NMR*	NMR*	NO
20	First Street and Alameda Street/I-210 Westbound Ramps	0.54	B	0.56	B	NO	0.63	B	NMR*	NMR*	NO

*No mitigation required.
** No mitigation available.

Table 4.8-14: Alternative Haul Route to Manning Pit Area to/from I-210, PM Peak Period

Intersection PM Peak Hour		Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project		Year 2014 with Project and Mitigation		
Intersection #/Name		HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact
9	Irwindale Avenue and I-210 Eastbound Ramps	0.83	C	0.84	C	NO	0.91	C	NMR*	NMR*	NO
10	Irwindale Avenue and First Street	0.69	B	0.69	C	NO	0.93	D	NMR*	NMR*	NO
11	Irwindale Avenue and Gladstone Street	0.84	B	0.88	C	NO	0.95	C	NMR*	NMR*	NO
12	Vincent Avenue and Gladstone Street	0.57	B	0.60	B	NO	0.72	B	NMR*	NMR*	NO
13	Vincent Avenue and Arrow Highway	0.73	B	0.77	B	NO	0.93	B	NMR*	NMR*	NO
14	Arrow Highway and Lark Ellen Avenue	0.79	D	0.82	D	NO	0.94	E	N/A**	N/A**	YES
15	Arrow Highway and Enid Avenue	0.64	B	0.68	B	NO	0.70	B	NMR*	NMR*	NO
16	Azusa Avenue and Arrow Highway	0.94	D	0.96	D	NO	1.04	E	N/A**	N/A**	YES
17	Azusa Avenue and Gladstone Street	0.77	C	0.85	C	NO	0.87	D	NMR*	NMR*	NO
18	Azusa Avenue and I-210 Eastbound Ramps	0.58	A	0.59	A	NO	0.65	B	NMR*	NMR*	NO
19	Azusa Avenue and First Street	0.64	B	0.64	B	NO	0.69	B	NMR*	NMR*	NO
20	First Street and Alameda Street/I-210 Westbound Ramps	0.78	B	0.82	B	NO	0.87	B	NMR*	NMR*	NO

*No mitigation required.
** No mitigation available.

Waste Management to/from I-210

The route to the Waste Management Facility would be the same as for the Proposed Project. All the intersections are anticipated to continue to operate at an LOS C or better for all utilized intersections throughout the day. Therefore, no significant impacts will occur at these intersections.

Vulcan Material Reliance Facility to/from I-210

The route to the Vulcan Material Reliance Facility would be the same as for the Proposed Project. All the intersections are anticipated to continue to operate at an LOS D or better for all utilized intersections during the AM and MID-Day peak periods. Therefore, no significant impacts will occur at these intersections during these time periods. The Irwindale Avenue/Foothill Boulevard intersection is anticipated to operate at an unacceptable LOS during the PM peak hour, resulting in a temporary significant impact. Implementation of Mitigation Measure MM TRA-1 would reduce the impact to the Irwindale Avenue/Foothill Boulevard intersection to less than significant.

Scholl Canyon Landfill to/from SR-134

Table 4.8-15 shows the LOS for Proposed Project traffic at Year 2014 for the intersections between Scholl Canyon Landfill and SR-134. All the intersections are anticipated to continue to operate at an LOS B or better for all utilized intersections during the MID-DAY peak period. Therefore, no significant impacts will occur at these intersections during the MID-DAY peak period.

The Figueroa St/Scholl Canyon Road and SR-134 westbound ramps intersection is anticipated to operate at an unacceptable LOS during the AM and PM peak hours, resulting in a temporary significant impact. Reducing this impact to less than significant would require implementation of the following potential impact reduction measure:

- Figueroa Street/Scholl Canyon Road and SR-134 westbound ramps: Restripe the westbound right turn lane to a shared left-right turn lane and the northbound through lane to a shared through-right turn lane. The northbound direction will include a shared through-right turn lane and a right turn lane. The southbound direction will include a shared through-left turn lane and a through turn lane. The westbound direction will include a left turn lane and a shared left-right turn lane. This impact reduction measure will require the approval of the City of Los Angeles and Caltrans.

Table 4.8-16 and Table 4.8-17 show the contribution of Proposed Project traffic to existing conditions and year 2014 conditions for the AM and PM peak periods, respectively. As shown in these tables, implementation of the impact reduction measure discussed above would reduce the impact to the Figueroa St/Scholl Canyon Road and SR-134 westbound ramps intersection to less than significant.

This impact reduction measure cannot be legally imposed by the LACFCD. Every reasonable effort will be made to coordinate with and receive approval to implement the impact reduction measure; however, LACFCD cannot guarantee that the measure will be implemented therefore this temporary impact could remain significant.

Table 4.8-15: Alternative Haul Route to Scholl Canyon Landfill

Intersection		AM				MID-DAY (12-2 PM)				PM			
Intersection #/Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
21	Figueroa St/Scholl Canyon Road and SR-134 westbound ramps	E	41.3	-	-	B	14.3	-	-	F	53.8	-	-
	With Lane Modification	C	17.6	-	-	B	12.9	-	-	D	28.3	-	-
22	Figueroa Street and Eagle Vista Drive	B	14.2	-	-	B	12.8	-	-	C	22.9	-	-
23	Figueroa Street and SR-134 eastbound ramps	A	8.1	0.54	B	A	7.1	0.37	A	A	8	0.55	B

(*) F*- ICU LOS Exceeds LOS F

Table 4.8-16: Alternative Haul Route to Scholl Canyon Landfill to/from SR-134, AM Peak Hours

Intersection AM Peak Hour		Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project		Year 2014 with Project and Potential Impact Reduction Measure		
Intersection #/Name		HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact
21	Figueroa St/Scholl Canyon Road and SR-134 Westbound Ramps	-	D	-	D	NO	-	E	-	C	NO
22	Figueroa Street and Eagle Vista Drive	-	B	-	B	NO	-	B	NMR*	NMR*	NO
23	Figueroa Street and SR-134 Eastbound Ramps	0.50	A	0.52	A	NO	0.54	A	NMR*	NMR*	NO

*No mitigation required.

Table 4.8-17: Alternative Haul Route to Scholl Canyon Landfill to/from SR-134, PM Peak Hours

Intersection PM Peak Hour		Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project		Year 2014 with Project and Potential Impact Reduction Measure		
Intersection #/Name		HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact
21	Figueroa St/Scholl Canyon Road and SR-134 westbound ramps	-	D	-	E	YES	-	F	-	D	NO
22	Figueroa Street and Eagle Vista Drive	-	C	-	C	NO	-	C	NMR*	NMR*	NO
23	Figueroa Street and SR-134 eastbound ramps	0.46	A	0.48	A	NO	0.55	A	NMR*	NMR*	NO

*No mitigation required.

Sheldon Pit to/from I-210

Table 4.8-18 shows the LOS for Proposed Project traffic at year 2014 for the intersections between the Sheldon Pit and I-210. Table 4.8-19 shows the contribution of Proposed Project traffic to existing conditions and year 2014 conditions for the AM peak period. All the intersections are anticipated to continue to operate at an LOS C or better for all utilized intersections throughout the day. Therefore, no significant impacts will occur at these intersections.

Table 4.8-18: Alternative Haul Route to Sheldon Pit, Year 2014 with Project Traffic

Intersection		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
44	Wheatland Avenue and I-210 Eastbound Ramps	A	0.0	-	-	A	0.0	-	-	A	0.0	-	-
45	Wheatland Avenue and I-210 Westbound Ramps	B	11.1	-	-	A	8.8	-	-	B	10.2	-	-
46	Wheatland Avenue and Foothill Boulevard	B	11.3	0.46	A	B	10.6	0.39	A	B	10.0	0.47	A
47	Wentworth Street and Foothill Boulevard	C	28.4	0.88	A	B	10.4	0.45	A	A	9.7	0.48	A

Table 4.8-19: Alternative Haul Route to Sheldon Pit, AM Peak Hours

Intersection AM Peak Hour		Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project		Year 2014 with Project and Mitigation		
Intersection # / Name		HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact
44	Wheatland Avenue and I-210 Eastbound Ramp	-	A	-	A	NO	-	A	NMR*	NMR*	NO
45	Wheatland Avenue and I-210 Westbound Ramp	-	A	-	B	NO	-	B	NMR*	NMR*	NO
46	Wheatland Avenue and Foothill Boulevard	0.25	A	0.42	B	NO	0.46	B	NMR*	NMR*	NO
47	Wentworth Street and Foothill Boulevard	0.69	B	0.78	B	NO	0.88	C	NMR*	NMR*	NO

*No mitigation required.

Sun Valley Fill Site to/from I-210

Table 4.8-20 shows the LOS for Proposed Project traffic at year 2014 for the intersections between the Sun Valley Fill Site and I-210. Table 4.8-21 shows the contribution of Proposed Project traffic to existing conditions and year 2014 conditions for the AM PM peak period. All the intersections are anticipated to continue to operate at an LOS C or better for all utilized intersections throughout the day. Therefore, no significant impacts will occur at these intersections.

Table 4.8-20: Alternative Haul Route to Sun Valley Fill Site, Year 2014 with Project Traffic

Intersection		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
30	Glenoaks Boulevard and Sheldon Street	B	17.4	0.92	E	A	8.0	0.54	A	B	15.9	0.89	D
44	Wheatland Avenue and I-210 Eastbound Ramps	A	0	-	-	A	0	-	-	A	0	-	-
45	Wheatland Avenue and I-210 Westbound Ramps	B	11.1	-	-	A	8.8	-	-	B	10.2	-	-
46	Wheatland Avenue and Foothill Boulevard	B	11.3	0.46	A	B	10.6	0.39	A	B	10	0.47	A
47	Wentworth Street and Foothill Boulevard	C	28.4	0.88	A	B	10.4	0.45	A	A	9.7	0.48	A

Table 4.8-21: Alternative Haul Route to Sun Valley Fill Site, AM Peak Hours

Intersection AM Peak Hour		Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project		Year 2014 with Project and Mitigation		
Intersection # / Name		HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact
30	Glenoaks Boulevard and Sheldon Street	0.75	B	0.75	B	NO	0.92	B	NMR*	NMR*	NO
44	Wheatland Avenue and I-210 Eastbound Ramp	-	A	-	A	NO	-	A	NMR*	NMR*	NO
45	Wheatland Avenue and I-210 Westbound Ramp	-	A	-	B	NO	-	B	NMR*	NMR*	NO
46	Wheatland Avenue and Foothill Boulevard	0.25	A	0.42	B	NO	0.46	B	NMR*	NMR*	NO
47	Wentworth Street and Foothill Boulevard	0.69	B	0.78	B	NO	0.88	C	NMR*	NMR*	NO

*No mitigation required.

Bradley Landfill to/from I-210

Table 4.8-22 shows the LOS for Proposed Project traffic at year 2014 for the intersections between the Bradley Landfill and I-210. Table 4.8-23 shows the contribution of Proposed Project traffic to existing conditions and year 2014 conditions for the AM PM peak period. All the intersections are anticipated to continue to operate at an LOS C or better for all utilized intersections throughout the day. Therefore, no significant impacts will occur at these intersections.

Table 4.8-22: Alternative Haul Route to Bradley Landfill, Year 2014 with Project Traffic

Intersection		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
30	Glenoaks Boulevard and Sheldon Street	B	14.7	0.87	D	A	7.6	0.50	A	B	13.7	0.86	D
31	Glenoaks Boulevard and Peoria Street	A	6.2	0.64	A	A	5.4	0.42	A	A	6.4	0.56	A
44	Wheatland Avenue and I-210 Eastbound Ramps	A	0	-	-	A	0	-	-	A	0	-	-
45	Wheatland Avenue and I-210 Westbound Ramps	B	11.1	-	-	A	8.8	-	-	B	10.2	-	-
46	Wheatland Avenue and Foothill Boulevard	B	11.3	0.46	A	B	10.6	0.39	A	B	10	0.47	A
47	Wentworth Street and Foothill Boulevard	C	28.4	0.88	A	B	10.4	0.45	A	A	9.7	0.48	A

Table 4.8-23: Alternative Haul Route to Bradley Landfill, AM Peak Hours

Intersection AM Peak Hour		Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project		Year 2014 with Project and Mitigation		
Intersection # / Name		HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact
30	Glen Oaks Boulevard and Sheldon Street	0.75	B	0.78	B	NO	0.87	B	NMR*	NMR*	NO
31	Glen Oaks Boulevard and Peoria Street	0.54	B	0.61	A	NO	0.64	A	NMR*	NMR*	NO
44	Wheatland Avenue and I-210 Eastbound Ramp	-	A	-	A	NO	-	A	NMR*	NMR*	NO
45	Wheatland Avenue and I-210 Westbound Ramp	-	A	-	B	NO	-	B	NMR*	NMR*	NO
46	Wheatland Avenue and Foothill Boulevard	0.25	A	0.42	B	NO	0.46	B	NMR*	NMR*	NO
47	Wentworth Street and Foothill Boulevard	0.69	B	0.78	B	NO	0.88	C	NMR*	NMR*	NO

*No mitigation required.

Boulevard Pit Area to/from I-5

Table 4.8-24 shows the LOS for Proposed Project traffic at year 2014 for the intersections between Boulevard Pit and I-5. All the intersections are anticipated to continue to operate at an LOS D or better for all utilized intersections during the AM and MID-DAY peak periods. Therefore, no significant impacts will occur at these intersections during the AM and MID-DAY peak periods.

Table 4.8-25 shows the contribution of Proposed Project traffic to existing conditions and year 2014 conditions for the PM peak period respectively. The Osborne Street /Laurel Canyon Boulevard is anticipated to operate at an unacceptable LOS during the PM peak hour, resulting in a temporary significant impact. Mitigation Measure MM TRA-2 would reduce the impacts to less than significant.

Table 4.8-24: LOS for Boulevard Pit (Haul Route 8B), Year 2014 with Project Traffic

Intersection		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
40	Branford Street and Laurel Canyon Boulevard	C	21.9	1.00	D	B	11.0	0.54	C	D	37.2	1.21	F*
41	Osborne Street and I-5 Southbound Ramps	B	13.7	0.83	D	C	20.9	0.93	B	D	37.0	1.00	E
42	Osborne Street and I-5 Northbound Ramps	B	14.7	0.75	B	B	12.1	0.70	B	B	19.3	0.89	D
43	Osborne Street and Laurel Canyon Boulevard	D	42.3	0.98	E	C	25.2	0.80	D	E	66.3	1.03	F

Table 4.8-25: Boulevard Pit (Haul Route 8B), PM Peak Hours

Intersection PM Peak Hour		Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project		Year 2014 with Project and Mitigation		
Intersection # / Name		HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact
40	Branford Street and Laurel Canyon Boulevard	0.76	B	1.06	C	NO	1.21	D	NPPT*	NPPT*	NO
41	Osborne Street and I-5 Southbound Ramps	0.91	C	0.91	C	NO	1.00	D	NPPT*	NPPT*	NO
42	Osborne Street and I-5 Northbound Ramps	0.83	C	0.83	B	NO	0.89	B	NPPT*	NPPT*	NO
43	Osborne Street and Laurel Canyon Boulevard	1.01	D	0.98	D	NO	1.03	E	NPPT*	NPPT*	NO

*No Proposed Project traffic during PM peak hour with implementation of Mitigation Measure MM TRA-2.

Mitigation Measures

See Mitigation Measures MM TRA-1 and MM TRA-2.

Residual Impacts After Mitigation

As with the Proposed Project, Alternative 5, Haul Route Alternative will not significantly impact freeway segments and freeway on- and off-ramps.

With implementation of mitigation measures, as with the Proposed Project, Alternative 5, Haul Route Alternative will not significantly impact the following intersections:

- Irwindale Avenue/Foothill Boulevard intersection during the PM peak hour;
- Sheldon Street and San Fernando Road intersection during the PM peak hour; and

- Branford Street and San Fernando Road intersection during the PM peak hour.

As with the Proposed Project, Alternative 5, Haul Route Alternative will temporarily significantly impact the following intersections:

- Berkshire Place and I-210 eastbound ramps during the AM peak hour (Option 2); and
- Figueroa Street/Scholl Canyon Road and SR-134 westbound ramps during the AM and PM peak hours

In contrast to the Proposed Project, Alternative 5, Haul Route Alternative will impact the following intersection but with mitigation will lower the impact to less than significant:

- Osborne Street /Laurel Canyon Boulevard during the PM peak hour.

In contrast to the Proposed Project, Alternative 5, Haul Route Alternative will temporarily significantly impact the following intersections:

- Arrow Highway/Lark Ellen Avenue during the AM, Mid-Day, and PM peak periods;
- Arrow Highway/Enid Avenue intersection during the AM, Mid-Day, and PM peak hours;
- Azusa Avenue/Arrow Highway during the AM and PM peak hours; and
- First Street and Alameda Street/I-210 Westbound Ramps during the AM peak hour.

In contrast to the Proposed Project, Alternative 5, Haul Route Alternative will not significantly impact:

- Berkshire Place and I-210 eastbound ramps during the AM peak hour (with exception of Option 2); and
- Glenoaks Boulevard/Osborne Street intersection during the AM and PM peak hours.

Potentially significant traffic impacts associated with the sediment removal phase would be temporary, expected to occur during the drier months (from April to December, except on holidays), and would cease at the end of the sediment removal phase. Implementation of the mitigation measures described above would reduce some but not all of the impacts to traffic and circulation to a level less than significant. Other potential impact reduction measures discussed above could reduce impacts to less than significant. These measures cannot be legally imposed by the LACFCD, however, since the locations are under the jurisdiction of other agencies. Every reasonable effort will be made to coordinate with and receive approval from the jurisdictional agencies to implement the impact reduction measures but LACFCD cannot guarantee that the measures will be implemented. Therefore, these temporary impacts could remain potentially significant. No significant traffic impacts would occur under reservoir management.

Comparison to Proposed Project and Other Alternatives

Overall, Alternative 5, Haul Route Alternative is considered environmentally superior to the Proposed Project due to alternate haul route and reduction in traffic impacts associated with the route. Alternative 5, Haul Route Alternative is considered environmentally superior to the Proposed Project for the following segments: Devil's Gate Reservoir to I-210 (with exception of Option 2); To/From Sheldon Pit; To/From Sun Valley Fill Site; and To/From Bradley Landfill. Alternative 5, Haul Route Alternative is

considered neither environmentally superior nor inferior to the Proposed Project for the following segments: Devil's Gate Reservoir to I-210 (Option 2 only); To/From Waste Management Facility, To/From Vulcan Materials Reliance Facility, To/From Boulevard Pit, and To/From Scholl Canyon. Alternative 5, Haul Route Alternative is considered environmentally inferior to the Proposed Project for the following segment: To/From Manning Pit.

Due to the reduction in traffic impacts associated with the alternate haul route, Alternative 5, Haul Route Alternative will also be environmentally superior to all the other alternatives except Alternative 4, Sluicing and Alternative 6, No Project Alternative.

Alternative 5, Haul Route Alternative will potentially be environmentally superior to Alternative 4, Sluicing if proper sediment transport does not occur under Alternative 4, Sluicing, causing sediment deposits to develop along the route to the ocean. This would result in need for sediment removal from the Arroyo Seco Channel, the Los Angeles River, or the Port of Long Beach and traffic impacts associated with removal activities.

Alternative 5, Haul Route Alternative will be environmentally inferior to Alternative 6, No Project Alternative due to sediment removal and reservoir management activities.

TRANSPORTATION-3 *Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).*

Sediment Removal

Implementation of the Alternative 5, Haul Route Alternative may include impact reduction measures that would require modifications to the existing roadway network. Alternative 5, Haul Route Alternative would not introduce any new uses that would be incompatible or substantially increase hazards with the existing roadway system. Therefore, impacts related to traffic hazards would be less than significant.

Reservoir Management

The reservoir management associated with Alternative 5, Haul Route Alternative would not require any modifications to the existing roadway network and would not introduce any new uses that would be incompatible or substantially increase hazards with the existing roadway system. Therefore, no impact would occur.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

Impacts will be less than significant.

Comparison to Proposed Project and Other Alternatives

Alternative 5, Haul Route Alternative is considered neither environmentally superior nor inferior to the Proposed Project or any of the other alternatives as it would not introduce any new uses that would be incompatible with the existing roadway system.

TRANSPORTATION-4 *Result in inadequate emergency access.*

Sediment Removal/Reservoir Management

Alternative 5, Haul Route Alternative would not sever or otherwise block access to any existing roadways. No equipment staging will occur on public roadways during construction of the Proposed Project. This would be a less than significant impact.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

Impacts will be less than significant.

Comparison to Proposed Project and Other Alternatives

Alternative 5, Haul Route Alternative is considered neither environmentally superior nor inferior to the Proposed Project or any other alternative except for Alternative 6, No Project Alternative.

Alternative 5, Haul Route Alternative will be environmentally superior to Alternative 6, No Project Alternative as the No Project Alternative will severely restrict flood control, potentially increasing flooding downstream of Devil's Gate Dam.

TRANSPORTATION-5 *Conflict with adopted policies, plans, or programs regarding public transit or bicycle or pedestrian facilities or otherwise decrease the performance or safety of such facilities supporting alternative transportation (e.g., bus turnouts, bicycle racks).*

Sediment Removal

Alternative 5, Haul Route Alternative would be confined to the roadway network described in Section 4.8.1, above, and would not adversely affect alternative modes of public transportation such as light rail. Implementation of Alternative 5, Haul Route Alternative would not require closure of any bus stops or disrupt any existing bus routes. The degrading of LOS at intersections, freeway segments, and freeway on- and off-ramps described above under TRANSPORTATION-2 could affect buses using the existing roadway network. This would be a temporary potentially significant impact.

Reservoir Management

The reservoir management associated with Alternative 5, Haul Route Alternative would require periodic management activities at Devil's Gate Reservoir that would not adversely affect traffic level of service on the existing roadway network that could delay bus services. Therefore, reservoir management impacts would be less than significant.

Mitigation Measure

See Mitigation Measures MM TRA-1 and MM TRA-2.

Residual Impacts After Mitigation

Potentially significant traffic impacts associated with the sediment removal phase would be temporary, expected to occur during the drier months (from April to December, except on holidays), and would cease at the end of the sediment removal phase. Implementation of the mitigation measures described above would reduce some but not all of the impacts to traffic and circulation to a level less than significant. Other potential impact reduction measures discussed above could reduce impacts to less than significant. These measures cannot be legally imposed by the LACFCD, however, since the locations are under the jurisdiction of other agencies. Every reasonable effort will be made to coordinate with and receive approval from the jurisdictional agencies to implement the impact reduction measures but LACFCD cannot guarantee that the measures will be implemented. Therefore, these temporary impacts could remain potentially significant. No significant traffic impacts would occur under reservoir management.

Comparison to Proposed Project and Other Alternatives

Alternative 5, Haul Route Alternative is considered environmentally superior to the Proposed Project due to the alternate traffic route and the reduction in traffic impacts associated with the alternative.

Due to the alternate traffic route and the reduction in traffic impacts associated with the alternative, Alternative 5, Haul Route Alternative will also be environmentally superior to Alternative 1, Configuration B; Alternative 2, Configuration C; and Alternative 3, Configuration D.

Alternative 5, Haul Route Alternative will potentially be environmentally superior to Alternative 4, Sluicing if proper sediment transport does not occur under Alternative 4, Sluicing, causing sediment deposits to develop along the route to the ocean. This would result in need for sediment removal from the Arroyo Seco Channel, the Los Angeles River, or the Port of Long Beach and traffic impacts associated with removal activities.

Alternative 5, Haul Route Alternative will be environmentally inferior to Alternative 6, No Project Alternative due to sediment removal and reservoir management activities.

UTILITIES & SERVICE SYSTEMS

UTILITIES-1 *Require or result in construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects.*

Sediment Removal

As with the Proposed Project, during sediment removal Alternative 5, Haul Route Alternative will not result in or require the construction of new or expansion of existing stormwater drainage systems. Sediment and vegetation removal operations will result in alterations of surface drainage characteristics at the project site due to clearing, grading, and excavation activities. Although the drainage characteristics for the site will be altered, the project overall will result in a positive impact to drainage of Devil's Gate Reservoir because it will help restore the flood control capacity of Devil's Gate Dam and Reservoir. As with the Proposed Project, Alternative 5, Haul Route Alternative will add minimal impermeable surface area to the Proposed Project site through paving a portion of the access roads

from Oak Grove Drive. This minimal increase in impervious surface area will not result in any significant increase in stormwater runoff that will require new stormwater drainage facilities.

In addition, these activities will not directly involve the existing storm drain outfalls, power lines, gas line, communication lines, water lines, sewer lines, or water wells. Impacts to these utility facilities will be avoided through compliance with City regulations regarding utility facilities, coordination with utility providers, and implementation of LACDPW BMPs.

Reservoir Management

During reservoir management, Alternative 5, Haul Route Alternative will not result in or require the construction of new or expansion of existing stormwater drainage systems. Sediment that accumulates at the front of the reservoir after the proposed removal will be removed through FAST operations or through mechanical excavation, and sediment accumulated at the back basin will be removed through trucking. The FAST operations are expected to be similar to historic FAST operations, and sediment fines discharged through FAST operations will be transported during storm flows to the Pacific Ocean via Arroyo Seco and the Los Angeles River. No impacts to stormwater facilities are expected during FAST operations. Any necessary mechanical removal during reservoir management is expected to be small (typically 13,000 cy per year). Impacts to stormwater facilities during mechanical removal will be avoided through compliance with City regulations regarding stormwater facilities and implementation of LACDPW BMPs.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

Alternative 5, Haul Route Alternative will not result in any potentially significant impacts to utility facilities.

Comparison to Proposed Project and Other Alternatives

Alternative 5, Haul Route Alternative is considered neither environmentally superior nor inferior to the Proposed Project nor to any of the other alternatives except Alternative 6, No Project Alternative. Alternative 5, Haul Route Alternative will be environmentally inferior to Alternative 6, No Project Alternative due to sediment removal and reservoir management activities.

4.8.4 Conclusion and Relationship to Project Objectives

Alternative 5, Haul Route Alternative will meet the Proposed Project's objectives of satisfactorily reducing flooding risk, creating a configuration suitable for routine operations and maintenance, reducing the possibility of plugging at the dam face, removing sediment from Johnson Field, removing sediment in a timely manner, and delivering sediment to facilities already prepared to accept sediment.

Alternative 5, Haul Route Alternative is considered neither environmentally superior nor inferior to the Proposed Project due to having the same excavation and management area and associated activities;

however, Alternative 5, Haul Route Alternative will be environmentally superior to the Proposed Project regarding impacts associated with traffic.

Due to the increase in sediment removal and reservoir management areas, Alternative 5, Haul Route Alternative will also be environmentally inferior to Alternative 1, Configuration B; Alternative 2, Configuration C; and Alternative 3, Configuration D; however, Alternative 5, Haul Route Alternative will be environmentally superior to these alternatives regarding impacts associated with traffic.

Alternative 5, Haul Route Alternative will initially be environmentally inferior to Alternative 4, Sluicing due to greater amounts of truck traffic. Alternative 5, Haul Route Alternative is considered environmentally superior to Alternative 4, Sluicing due a shorter duration in construction activities and no potential downstream impacts.

Alternative 5, Haul Route Alternative will be environmentally inferior to Alternative 6, No Project Alternative due to sediment removal and reservoir management activities, although aesthetics, biological resources, and recreation resources of the reservoir will likely degrade under Alternative 6, No Project Alternative due to continuous sediment deposition.

4.9 NO PROJECT ALTERNATIVE

§15126.6(e) of the CEQA Guidelines requires analysis of a No Project alternative that (1) discusses existing site conditions at the time the Notice of Preparation (NOP) is prepared or the EIR is commenced, and (2) analyzes what is reasonably expected to occur in the foreseeable future based on current plans if the Proposed Project were not approved.

4.9.1 Alternative Description

Sediment Removal/Reservoir Management

No large-scale sediment removal will take place. The dam face will be kept clear for as long as possible through IMP and FASTing operations, which is the current method of reservoir management.

Excavation/Reservoir Configuration

The IMP allows for the removal of up to 25,000 cy of sediment from the dam face per year.

Removal Method

Sediment removal will be limited to FASTing as long as possible.

Sediment Disposal

It is expected that sediment discharged during the FASTing operations will be transported to the Pacific Ocean via Arroyo Seco and the Los Angeles River either via the discharge flow or subsequent storm flows.

Vegetation Maintenance

No vegetation maintenance would occur under this alternative.

Project Schedule

Continuation of ongoing reservoir management methods.

4.9.2 Impact Analyses and Comparison to Proposed Project

AESTHETICS

AESTHETICS-1 *Have a substantially adverse effect on a scenic vista*.

Sediment Removal/Reservoir Management

The potentially significant impacts associated with the Proposed Project would not immediately occur under this alternative. Instead, over time, the reservoir would fill up with sediment; and the vegetation and adjacent uses could be covered with sediment or water. Although no large-scale sediment removal would take place, changes to scenic vistas and the visual character of the site would occur due to the accumulation of sediment. The current reservoir management methods would still take place, but the Project site would continue to accumulate sediment over time, as FASTing and IMP alone would not be able to move out the accumulated sediment.

Alternative 6, No Project Alternative will not result in obstruction or blockage of views, due to the large difference in elevation between viewpoints and the Proposed Project site.

Under Alternative 6, No Project Alternative, the topography of the reservoir will become higher over time; and vegetation within the excavation limits will either re-establish on top of the sediment or will be covered by the sediment. These elements will result in a moderate degree of contrast from existing visual characteristics but will result in a less than significant impact to scenic vistas. The accumulation of sediment in the reservoir will be highly visible for Viewpoints 1 through 3. For Viewpoints 1 and 3, however, the co-dominant features of Devil's Gate Dam, the reservoir maintenance roads, electrical lines, the debris boom line, and other less dominant features of the San Gabriel Mountains, Oak Grove Drive, JPL facilities, and residential areas will remain unchanged. The existing vegetation throughout the reservoir will not be removed; however, it may be covered by sediment.

Sediment accumulation will be visible from Viewpoint 4 and Viewpoint 5 but will be less dominant due to distance and other more dominant visual elements. The dominant features for Viewpoint 4 (I-210, Devil's Gate Dam, San Gabriel Mountains, and the west side of the reservoir) and Viewpoint 5 (spreading grounds, JPL facilities) will remain unchanged. Impacts associated with Alternative 6, No Project Alternative will be potentially significant.

Mitigation Measure

Not applicable.

Residual Impacts After Mitigation

Alternative 6, No Project Alternative will result in a potentially significant impact to scenic vistas.

Comparison to Proposed Project and Other Alternatives

Alternative 6, No Project Alternative is initially considered environmentally superior to the Proposed Project with respect to impacts on scenic vistas due to the minimal sediment removal and reservoir management areas and associated activities, although in the subsequent years aesthetic resources of the reservoir will likely degrade under Alternative 6, No Project Alternative due to continuous sediment deposition.

Due to the accumulation of sediment in the reservoir, Alternative 6, No Project Alternative will be environmentally inferior to all of the other alternatives.

AESTHETICS-2 *Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway.*

Sediment Removal/Reservoir Management

Alternative 6, No Project Alternative will not involve damage to rock outcroppings or historic buildings or involve removal of vegetation, including native and non-native trees from the site. The Proposed Project site is not visible from the only designated state scenic highway in the vicinity of the Proposed Project site, SR-2. Therefore, implementation of this alternative will not damage scenic resources within the viewshed of a designated state scenic highway.

I-210, located to the south of the Proposed Project site, is identified as "Eligible" in the State Scenic Highway Program. Alternative 6, No Project Alternative will impact the existing visual character of a portion of the viewshed through the buildup of sediment that could result in some covering of vegetation including native and non-native trees on the site. This impact to visual character of a portion of the viewshed will be smaller in comparison to the Proposed Project due to minimal sediment removal and reduced reservoir management activities. In addition, views of the Proposed Project site from I-210 are very brief in nature (visibility for approximately 0.3 mile) and are dominated by views of the JPL facilities and San Gabriel Mountains. Implementation of Alternative 6, No Project Alternative will not obstruct views of these features. Therefore, impacts to scenic resources within this eligible but not designated state scenic highway will be less than significant.

Mitigation Measures

No mitigation is necessary.

Residual Impacts After Mitigation Measure

The Proposed Project site is not visible from any designated state scenic highway and is only briefly visible from an eligible state scenic highway; therefore, impacts related to state scenic highways from sediment removal and reservoir management are less than significant.

Comparison to Proposed Project and Other Alternatives

Alternative 6, No Project Alternative is considered environmentally inferior to the Proposed Project with respect to impacts related to state scenic highways from sediment removal and reservoir management due to the accumulation of sediment in the reservoir over time.

Due to the accumulation of sediment in the reservoir over time, Alternative 6, No Project Alternative will be environmentally inferior to all other alternatives, as aesthetic resources of the reservoir will degrade under Alternative 6, No Project Alternative due to continuous sediment deposition.

AESTHETICS-3 *Substantially degrade the existing visual character or quality of the site and its surroundings.*

Sediment Removal/Reservoir Management

As described above under Aesthetics-1, the Alternative 6, No Project Alternative will adversely change the visual characteristics of the existing Proposed Project site through the accumulation of sediment and the partial to full coverage of trees and vegetation in the reservoir.

Disturbed landscape areas, both man-made and natural, are currently found throughout the basin. The amount and distribution of these areas change on a regular basis and are expected visual elements in the Proposed Project site landscape; however, without a large-scale reservoir cleanout, sediment will continue to accumulate and could cause reduction in vegetation growth, especially in the northern portion of the reservoir.

Mitigation Measures

Not applicable.

Residual Impacts After Mitigation

Alternative 6, No Project Alternative will result in a potentially significant impact to visual character.

Comparison to Proposed Project and Other Alternatives

Alternative 6, No Project Alternative is considered environmentally inferior to the Proposed Project with respect to impacts to visual character, as aesthetic resources of the reservoir will likely degrade under Alternative 6, No Project due to continuous sediment deposition.

Alternative 6, No Project Alternative will be environmentally inferior to all other alternatives, as views of the reservoir will likely degrade under Alternative 6, No Project Alternative due to continuous sediment deposition.

AIR QUALITY

AIR QUALITY-1 *Conflict with or obstruct implementation of the applicable air quality plan.*

Sediment Removal/Reservoir Management

Typically, assessments for air quality plan consistency use four criteria for determining project consistency with the current AQMP. The first and second criteria are from the SCAQMD. According to the SCAQMD, two key criterion of AQMP consistency are: (1) whether the project will not result in an increase in the frequency or severity of existing air quality violations or cause or contribute to new violations, or delay timely attainment of air quality standards or the interim emission reductions specified in the AQMP; and (2) whether the project will exceed the assumptions in the AQMP based on

the year of project build-out and phase (SCAQMD 2006). The third criterion is compliance with the control measures in the AQMP. The fourth criterion is compliance with the SCAQMD regional thresholds.

Alternative 6, No Project Alternative will be consistent with all four criteria, as no emissions will result with implementation of the No Project Alternative.

Mitigation Measures

No mitigation measures are necessary.

Residual Impacts After Mitigation

Alternative 6, No Project Alternative will not violate an air quality standard or contribute substantially to an existing or projected air quality violation. No significant impact would occur.

Comparison to Proposed Project and Other Alternatives

Alternative 6, No Project Alternative is considered environmentally superior to the Proposed Project with respect to impacts to air quality plans due to the minimal sediment removal and reservoir management activities.

Alternative 6, No Project Alternative will be environmentally superior to all other alternatives due to the minimal sediment removal and reservoir management activities.

AIR QUALITY-2 *Violate an air quality standard or contribute substantially to an existing or project air quality violation.*

Sediment Removal/Reservoir Management

Alternative 6, No Project Alternative will not violate any air quality standard or contribute substantially to an existing or projected air quality violation, as no emissions will result with implementation of the No Project Alternative.

Mitigation Measures

No mitigation measures are necessary.

Residual Impacts After Mitigation

Alternative 6, No Project Alternative will not exceed any standard SCAQMD Regional Threshold; therefore, this impact will be less than significant.

Comparison to Proposed Project and Other Alternatives

Alternative 6, No Project Alternative is considered environmentally superior to the Proposed Project with respect to impacts to air quality standards due to the minimal sediment removal and reservoir management activities.

Alternative 6, No Project Alternative will be environmentally superior to all other alternatives due to the minimal sediment removal and reservoir management activities.

AIR QUALITY-3 *Result in a cumulatively considerable net increase of any criteria pollutants for which the project region is nonattainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors).*

Sediment Removal/Reservoir Management

Air Quality Plans

As discussed previously, Alternative 6, No Project Alternative will not have emissions that exceed the SCAQMD regional significance thresholds. This impact will be reduced in comparison to the Proposed Project due to the minimal sediment removal and reservoir management activities.

Cumulative Health Impacts

No localized significance threshold is expected to be exceeded during sediment removal; and no localized significance threshold will be exceeded during Alternative 6, No Project Alternative.

Mitigation Measures

No mitigation measures are necessary.

Residual Impacts After Mitigation

Alternative 6, No Project Alternative will not exceed any localized significance threshold; therefore, this impact will be less than significant.

Comparison to Proposed Project and Other Alternatives

Alternative 6, No Project Alternative is considered environmentally superior to the Proposed Project with respect to impacts to cumulative health due to the minimal sediment removal and reservoir management activities.

Alternative 6, No Project Alternative will be environmentally superior to all other alternatives due to the minimal sediment removal and reservoir management activities.

AIR QUALITY-4 *Expose sensitive receptors to substantial pollutant concentrations.*

Sediment Removal/Reservoir Management

Localized Significance Thresholds

Alternative 6, No Project Alternative will not result in any significant emissions, and no LST thresholds will be exceeded.

Carbon Monoxide Hotspot

The CO Hotspot analysis shows no exceedance of the State or federal CO standard, and no significant impact is expected during Alternative 6, No Project Alternative.

Carcinogenic Or Toxic Contaminants

Alternative 6, No Project Alternative would result in a less than significant non-cancer risk from diesel emissions.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

No thresholds will be exceeded, and impacts will be less than significant.

Comparison to Proposed Project and Other Alternatives

Alternative 6, No Project Alternative is considered environmentally superior to the Proposed Project with respect to impacts to sensitive receptors to substantial pollutant concentrations due to the minimal sediment removal and reservoir management activities.

Alternative 6, No Project Alternative will be environmentally superior to all other alternatives due to the minimal sediment removal and reservoir management activities.

AIR QUALITY-5 *Create objectionable odors affecting a substantial number of people.*

Sediment Removal/Reservoir Management

The CEQA Guidelines indicate that a potentially significant impact would occur if the Proposed Project would create objectionable odors affecting a substantial number of people.

Unlike the Proposed Project, no diesel emissions above existing management activities would result from Alternative 6, No Project Alternative; therefore impacts will be less than significant.

Mitigation Measures

No mitigation measures are necessary.

Residual Impacts After Mitigation

Alternative 6, No Project Alternative is not expected to produce objectionable odors; therefore, this impact will be less than significant.

Comparison to Proposed Project and Other Alternatives

Alternative 6, No Project Alternative is considered environmentally superior to the Proposed Project with respect to impacts regarding objectionable odors due to the minimal sediment removal and reservoir management activities.

Alternative 6, No Project Alternative will be environmentally superior to all other alternatives due to the minimal sediment removal and reservoir management activities.

BIOLOGICAL RESOURCES

BIOLOGY-1 *Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or the U.S. Fish and Wildlife Service.*

Sediment Removal/Reservoir Management

Potential impacts under Alternative 6, No Project Alternative would result from the buildup of sediment in the reservoir over time.

Sensitive Plants

No listed or otherwise sensitive plant species were observed on the Proposed Project site. Therefore, as with the Proposed Project, Alternative 6, No Project Alternative is not expected to have a substantial adverse effect on any plant species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations or by CDFW or USFWS.

Sensitive Wildlife

The Proposed Project site contains habitat and/or potential habitat for five special status species: least Bell's vireo, yellow warbler, southwestern pond turtle, coast range newt, and two-striped garter snake. Least Bell's vireo, yellow warbler, coast range newt, and two-striped garter snake have all been observed on the Proposed Project site. The southwestern pond turtle has not been observed on the Proposed Project site. If it did occur, habitat for this species would be largely limited to ponded areas.

Alternative 6, No Project Alternative will disturb significantly less acreage than will be disturbed under the Proposed Project; however, habitat loss or reduction in habitat quality will result from the accumulation of sediment or scouring throughout the reservoir. Impacts will be potentially significant.

Habitat for the coast range newt, the southwestern pond turtle, and the two-striped garter snake occurs within streams and seasonal ponds found on the Proposed Project site. The amount of this habitat that will be available will depend upon where sediment accumulates and the amount of flows, rainfall, and runoff. Impacts will be potentially significant.

Direct harm or take of these species during reservoir management activities would result in a potentially significant impact. The chance of this occurring during reservoir management activities under this alternative is expected to be lower than the Proposed Project due to minimal reservoir management

activities; however, habitat loss or reduction in habitat quality will result from the accumulation of sediment or scouring throughout the reservoir. Impacts will be potentially significant.

Alternative 6, No Project Alternative would not involve the removal of trees or vegetation and would not have the potential to significantly affect nesting birds and roosting bats, if active nests or roosting bats are present. Impacts to nesting birds and roosting bats will be less than significant.

The availability of streams and seasonal ponds will depend upon where sediment accumulates and the amount of flows, rainfall, and runoff. Special status species have the potential to use the reservoir management area; however, habitat loss or reduction in habitat quality will result from the accumulation of sediment or scouring throughout the reservoir.

Although no habitat will be directly impacted, habitat in the reservoir will likely degrade under Alternative 6, No Project due to continuous sediment deposition. Reduction in sensitive habitat would potentially impact sensitive or special status species, resulting in a potentially significant impact.

Mitigation Measures

Not applicable.

Residual Impacts after Mitigation

Alternative 6, No Project Alternative will result in a potentially significant impact on candidate, sensitive, or special status species.

Comparison to Proposed Project and Other Alternatives

Alternative 6, No Project Alternative is considered environmentally inferior to the Proposed Project with respect to impacts to candidate, sensitive, or special status species, as habitat in the reservoir will likely degrade under Alternative 6, No Project Alternative due to continuous sediment deposition and degradation that will increase over time.

Alternative 6, No Project Alternative will be environmentally inferior to all other alternatives, as habitat in the reservoir will likely degrade under Alternative 6, No Project Alternative due to continuous sediment deposition and degradation that will increase over time.

BIOLOGY-2 *Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service.*

Sediment Removal/Reservoir Management

Alternative 6, No Project Alternative will directly impact less acreage of Riversidean Alluvial Fan Sage Scrub than the Proposed Project; however, due to continuous sediment deposition, Riversidean Alluvial Fan Sage Scrub habitat will degrade over time. Impacts to Riversidean Alluvial Fan Sage Scrub may result in a potentially significant impact requiring mitigation. Impacts will be potentially significant.

This alternative will directly impact less Riparian Woodland and Mule Fat Thickets than the Proposed Project. Riparian Woodland and Mule Fat Thickets are rare plant communities that provide nesting

habitat for riparian species; however, habitat loss or reduction in habitat quality will result from the accumulation of sediment or scouring throughout the reservoir. Impacts will be potentially significant.

Alternative 6, No Project Alternative will directly impact less acreage of drainage, braided channel, and wetland than the Proposed Project; however, habitat loss or reduction in habitat quality will result from the accumulation of sediment or scouring throughout the reservoir. Impacts will be potentially significant.

Although no habitat will be directly impacted, habitat in the reservoir will likely degrade under Alternative 6, No Project due to continuous sediment deposition. Reduction in habitat could impact riparian habitat and other sensitive natural communities, resulting in a potentially significant impact.

Mitigation Measures

Not applicable.

Residual Impacts after Mitigation

Although a lack of direct impacts will occur to sensitive plant communities and riparian habitat, Alternative 6, No Project Alternative would result in habitat loss or reduction in habitat quality due to the accumulation of sediment or scouring throughout the reservoir. A potentially significant impact on riparian habitat and other sensitive natural communities would occur.

Comparison to Proposed Project and Other Alternatives

Alternative 6, No Project Alternative is considered environmentally inferior to the Proposed Project with respect to impacts to riparian habitat and other sensitive natural communities, as habitat in the reservoir will likely degrade under Alternative 6, No Project Alternative due to continuous sediment deposition and degradation that will increase over time.

Alternative 6, No Project Alternative will also be environmentally inferior to all other alternatives, as habitat in the reservoir will likely degrade under Alternative 6, No Project due to continuous sediment deposition and degradation that will increase over time.

BIOLOGY-3 *Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means.*

Sediment Removal/Reservoir Management

Alternative 6, No Project Alternative will impact fewer acres of water features than the Proposed Project. Impacts will be less than significant, although the wetlands in the reservoir will likely degrade under Alternative 6, No Project Alternative due to continuous sediment deposition and degradation that will increase over time. Impacts will be potentially significant.

Mitigation Measures

Not applicable.

Residual Impacts After Mitigation

Impacts to wetlands and drainages under the jurisdiction of CDFW, USACE, and RWQCB, as a result of Alternative 6, No Project Alternative will be potentially significant.

Comparison to Proposed Project and Other Alternatives

Alternative 6, No Project Alternative is considered environmentally inferior to the Proposed Project with respect to impacts on federally protected wetlands, as the wetlands in the reservoir will likely degrade under Alternative 6, No Project Alternative due to continuous sediment deposition and degradation that will increase over time.

Alternative 6, No Project Alternative is also considered environmentally inferior to all other alternatives with respect to impacts on federally protected wetlands, as the wetlands in the reservoir will likely degrade under Alternative 6, No Project Alternative due to continuous sediment deposition and degradation that will increase over time.

BIOLOGY-4 *Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.*

Sediment Removal/Reservoir Management

The Proposed Project area is predominantly open for wildlife movement and habitat connectivity. The minimal reservoir management activities associated with Alternative 6, No Project Alternative will not interfere with the movement of native resident or migratory wildlife species, resulting in a less than significant impact. Although no habitat will be directly impacted, it is likely that habitat in the reservoir will degrade under Alternative 6, No Project Alternative due to continuous sediment deposition and degradation that will increase over time. Reduction in sensitive habitat would interfere with use of the habitat for wildlife nursery sites, resulting in a potentially significant impact.

Mitigation Measures

Not applicable.

Residual Impacts After Mitigation

Impacts to wildlife movement and nursery sites will remain potentially significant.

Comparison to Proposed Project and Other Alternatives

Alternative 6, No Project Alternative is considered environmentally inferior to the Proposed Project with respect to impacts to wildlife movement and habitat connectivity, as habitat in the reservoir will likely degrade under Alternative 6, No Project Alternative due to continuous sediment deposition.

Alternative 6, No Project Alternative is also considered environmentally inferior to all other alternatives with respect to impacts to wildlife movement and habitat connectivity, as habitat in the reservoir will likely degrade under Alternative 6, No Project Alternative due to continuous sediment deposition and degradation that will increase over time.

BIOLOGY-5 *Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.*

Sediment Removal/Reservoir Management

Implementation of Alternative 6, No Project Alternative will not result in the removal of native trees from the Proposed Project site. This impact will be less than the Proposed Project, as no vegetation and trees will be removed; however it is possible that trees will be lost in the reservoir under Alternative 6, No Project due during to a larger storm event that is anticipated in the future. Trees would be lost in a larger storm event because they would be loosely held within the sediment and would be swept away with larger storm flows. Impacts to trees will be potentially significant.

Mitigation Measures

Not applicable.

Residual Impacts After Mitigation

Alternative 6, No Project Alternative will result in a potentially significant impact to city-protected trees.

Comparison to Proposed Project and Other Alternatives

Alternative 6, No Project Alternative is considered environmentally inferior to the Proposed Project with respect to impacts to loss of native trees, as trees in the reservoir will likely be lost under Alternative 6, No Project Alternative due to continuous sediment deposition.

Alternative 6, No Project Alternative is also considered environmentally inferior to all other alternatives with respect to impacts to loss of native trees, as trees in the reservoir will likely be lost under Alternative 6, No Project Alternative due to continuous sediment deposition and degradation that will increase over time.

CULTURAL RESOURCES

CULTURAL-1 *Cause a substantial adverse change in the significance of a historical resource.*

Sediment Removal/Reservoir Management

As with the Proposed Project, no alterations or modifications will be made to any historic resource; and therefore, no significant impact to historical resources is anticipated with this alternative.

Mitigation Measures

No mitigation measures are necessary.

Residual Impacts After Mitigation

No historic resources are within the proposed Project site; therefore, Alternative 6, No Project Alternative will not result in impacts to historic resources.

Comparison to Proposed Project and Other Alternatives

As no historic resources are within the proposed Project site, Alternative 6, No Project Alternative is considered neither environmentally superior nor inferior to the Proposed Project with respect to historic resources.

Alternative 6, No Project Alternative will also be neither environmentally superior nor inferior to any of the other alternatives.

CULTURAL-2 *Cause a substantial adverse change in the significance of an archaeological resource.*

Sediment Removal/Reservoir Management

Alternative 6, No Project Alternative will involve minimal ground-disturbing activities under reservoir management; and, as noted in Section 3.5, most of the soil in the Proposed Project area consists of recently accumulated sediment. In areas filled with recently accumulated sediment, archeological sites are not anticipated to exist, although it is always possible that unidentified archaeological sites exist in native soils below the accumulated sediment. Reservoir management activities would not exceed the depth of the historic flood deposits. Impacts would be less than significant. This impact will be greatly reduced in comparison to the Proposed Project due to the minimal area that would be disturbed during reservoir management.

Mitigation Measures

No mitigation measures required.

Residual Impacts After Mitigation

No significant adverse impacts are expected.

Comparison to Proposed Project and Other Alternatives

Alternative 6, No Project Alternative is considered environmentally superior the Proposed Project with respect to archaeological resources due to the minimal sediment removal and reservoir management activities.

Alternative 6, No Project Alternative is also considered environmentally superior to all other alternatives with respect to archaeological resources.

CULTURAL-3 *Cause a substantial adverse change in the significance of a paleontological resource.*

Sediment Removal/Reservoir Management

No paleontological resources were encountered during the course of the survey and are not expected in the accumulated sediment. It is always possible that unidentified paleontological materials exist in native soil below the accumulated sediment. If sediment removal or reservoir management activities exceed the depth of the historic flood deposits and encounter native soils, unidentified paleontological materials have the potential to be significantly impacted. Alternative 6, No Project Alternative would not include large-scale sediment removal, and reservoir management activities would involve only keeping

the dam face clear; therefore, the depth of historic flood deposits would not be exceeded. This impact will be less in comparison to the Proposed Project due to the minimal area disturbed during sediment removal and reservoir management.

Mitigation Measures

No mitigation measures are necessary.

Residual Impacts After Mitigation

No significant adverse impacts are expected.

Comparison to Proposed Project and Other Alternatives

Alternative 6, No Project Alternative is considered environmentally superior to the Proposed Project with respect to paleontological resources due to minimal sediment removal activities and reduced reservoir management activities.

Alternative 6, No Project Alternative is also considered environmentally superior to all the other alternatives with respect to paleontological resources.

CULTURAL-4 *Potentially impact unknown human remains within the proposed project site.*

Sediment Removal/Reservoir Management

As with the Proposed Project, archival research and the archaeological survey in connection with the present project did not indicate the presence of any known human remains in the project area; however, as reservoir management activities would involve no more than keeping the dam face clear, it is unlikely that human remains would be discovered.

Mitigation Measures

No mitigation measures are necessary.

Residual Impacts After Mitigation

No significant adverse impacts are expected.

Comparison to Proposed Project and Other Alternatives

Alternative 6, No Project Alternative is considered environmentally superior to the Proposed Project with respect to accidental discovery of human remains due to the minimal sediment removal and reservoir management activities.

Alternative 6, No Project Alternative is also considered environmentally superior to all the other alternatives with respect to accidental discovery of human remains.

GEOLOGY & SOILS

GEOLOGY-1 *Potentially result in soil erosion or loss of topsoil during sediment removal activities.*

Sediment Removal/Reservoir Management

Alternative 6, No Project Alternative will not involve any large-scale removal of sediment from the reservoir. Sediment stockpiled at Johnson Field as part of the IMP will not be removed. Sediment will continue to accumulate in the reservoir, and FASTing will occur to keep the dam face clear as much as possible. This impact associated with soil erosion will be less in comparison to the Proposed Project, as Alternative 6, No Project Alternative would not involve sediment excavation that could lead to erosion of the slopes on the perimeter of the excavation area.

Mitigation Measures

No mitigation measures will be required.

Residual Impacts After Mitigation

No significant impacts to geology and soils would occur as a result of Alternative 6, No Project Alternative.

Comparison to Proposed Project and Other Alternatives

Alternative 6, No Project Alternative is considered environmentally superior to the Proposed Project with respect to soil erosion due to the fewer potential erosion impacts.

Due to the fewer potential erosion impacts, Alternative 6, No Project Alternative will also be environmentally superior to all the other alternatives.

GREENHOUSE GAS EMISSIONS

GHG EMISSIONS-1 *Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment.*

Sediment Removal/Reservoir Management

Alternative 6, No Project Alternative will not involve the use of any construction equipment. In addition, this alternative will not involve trucking of sediment or vegetation offsite. As noted in Section 3.6, generation of greenhouse gas emissions under the Proposed Project is not "cumulatively considerable" and is therefore less than significant under CEQA. Alternative 6, No Project Alternative will have a less amount of daily equipment usage and no truck traffic; therefore, this alternative will generate less greenhouse gas emissions than the Proposed Project, which will not be "cumulatively considerable," and is therefore less than significant under CEQA.

Unlike the Proposed Project, Alternative 6, No Project Alternative would not have a positive effect on climate change. High ambient temperatures coupled with important demand for oxygen due to the degradation of substantial amounts of organic matter favor the production of CO_2, the establishment of

anoxic conditions, and thus the production of CH_4. With the reservoir is left as it is, the large quantity of biomass currently existing may exacerbate the condition.

Mitigation Measures

No mitigation measures are necessary.

Residual Impacts After Mitigation

No significant impacts associated with the generation of greenhouse gas emissions will occur as a result of Alternative 6, No Project Alternative.

Comparison to Proposed Project and Other Alternatives

Alternative 6, No Project Alternative will generate less overall greenhouse gas emissions than the Proposed Project and therefore is considered environmentally superior to the Proposed Project due to overall production of greenhouse gas emissions.

Due to overall production of greenhouse gas emissions, Alternative 6, No Project Alternative will also be environmentally superior to all the other alternatives.

GHG EMISSIONS-2 *Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases.*

Sediment Removal/Reservoir Management

AB 32 identified a 2020 target level for GHG emissions in California of 427 MMT of CO_2e, which is approximately 28.5 percent less than the year 2020 BAU emissions estimate of 596 MMT CO_2e. To achieve these GHG reductions, widespread reductions of GHG emissions will have to occur across California. Some of those reductions will need to come in the form of changes in vehicle emissions and mileage standards, changes in the sources of electricity, and increases in energy efficiency by existing facilities. These reductions in mobile-sources and energy production of GHG emissions would occur with or without development of Alternative 6, No Project Alternative. Overall, Alternative 6, No Project Alternative will be consistent with the AB 32 goal of reducing statewide GHG emissions to 1990 levels by year 2020. Currently, no other GHG reduction plan (i.e., SCAG, SCAQMD, or County) applies to Alternative 6, No Project Alternative. As with the Proposed Project, Alternative 6, No Project Alternative will not conflict with any applicable plan, policy, or regulation of an agency adopted for the purpose of reducing the emissions of GHGs; therefore, impacts will be less than significant.

Mitigation Measures

No mitigation measures are necessary.

Residual Impacts After Mitigation

No significant impacts associated with any applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases will occur as a result of Alternative 6, No Project Alternative.

Comparison to Proposed Project and Other Alternatives

Alternative 6, No Project Alternative is considered neither environmentally superior nor inferior to the Proposed Project with respect to applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases.

Alternative 6, No Project Alternative will also be neither environmentally superior nor inferior to any of the other alternatives.

HAZARDS AND HAZARDOUS MATERIALS

HAZARDS-1 *Create a hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials.*

Sediment Removal/Reservoir Management

As with the Proposed Project, no significant impacts associated with hazardous soils are expected. Alternative 6, No Project Alternative will include the use of hazardous materials associated with the construction equipment needed to keep the dam face clear. Adequate BMPs as currently used under the IMP projects will be utilized; and adherence to the regulations set forth by County, State, and federal agencies will reduce the potential for hazardous materials impacts to a less than significant level and will not pose a safety hazard to sensitive receptors.

Mitigation Measures

No mitigation measures are necessary.

Residual Impacts After Mitigation

Implementation of BMPs and adherence to the applicable regulations will reduce the potential for impacts associated with hazardous materials to a less than significant level.

Comparison to Proposed Project and Other Alternatives

Alternative 6, No Project Alternative is considered environmentally superior to the Proposed Project due to the minimal sediment removal and reservoir management activities.

Alternative 6, No Project Alternative will also be environmentally superior to all of the other alternatives due to the minimal sediment removal and reservoir management activities.

HAZARDS-2 *Create a significant hazard to the public or environment through accident conditions involving the release of hazardous materials into the environment.*

As with the Proposed Project, no significant impacts associated with hazardous soils are expected. Alternative 6, No Project Alternative will include the use of hazardous materials associated with the construction equipment needed to keep the dam face clear. Adequate BMPs will be utilized; and adherence to the regulations set forth by County, State, and federal agencies will reduce the potential for hazardous materials impacts to a less than significant level and will not pose a safety hazard to sensitive receptors.

Mitigation Measures

No mitigation measures are necessary.

Residual Impacts After Mitigation

Implementation of BMPs and adherence to the applicable regulations will reduce the potential for impacts associated with hazardous materials to a less than significant level.

Comparison to Proposed Project and Other Alternatives

Alternative 6, No Project Alternative is considered environmentally superior to the Proposed Project due to minimal sediment removal and reservoir management activities.

Alternative 6, No Project Alternative will also be environmentally superior to all of the other alternatives due to minimal sediment removal activities and reduced reservoir management activities.

HAZARDS-3 *Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school.*

Sediment Removal/Reservoir Management

As with the Proposed Project, no significant impacts associated with hazardous soils are expected. Alternative 6, No Project Alternative will include the use of hazardous materials associated with the construction equipment needed to keep the dam face clear. Adequate BMPs will be utilized; and adherence to the regulations set forth by County, State, and federal agencies will reduce the potential for hazardous materials impacts to a less than significant level and will not pose a safety hazard to sensitive receptors.

Mitigation Measures

No mitigation measures are necessary.

Residual Impacts After Mitigation

Implementation of BMPs and adherence to the applicable regulations will reduce the potential for impacts associated with hazardous materials within one-quarter mile of an existing school to a less than significant level.

Comparison to Proposed Project and Other Alternatives

Alternative 6, No Project Alternative is considered environmentally superior to the Proposed Project due to minimal sediment removal and reservoir management activities.

Alternative 6, No Project Alternative will also be environmentally superior to all the other alternatives due to minimal sediment removal and reservoir management activities.

HAZARDS-4 *Located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would create a significant hazard to the public or the environment.*

Sediment Removal/Reservoir Management

EPA included Hahamongna Watershed Park area on the NPL Superfund List due to the presence of detected VOCs and perchlorate in groundwater originating from the JPL property. The impacted groundwater is at 200 feet bgs; and, as with the Proposed Project, the concentrations of organochlorine pesticides, petroleum hydrocarbons (diesel and hydraulic/motor oil range and aromatics), and SVOCs detected in samples collected from Devil's Gate Reservoir are below regulatory thresholds. Therefore, the listing of the watershed on the Superfund List does not present a significant hazard to the public or the environment, and no significant impacts associated with the Alternative 6, No Project Alternative are expected.

Mitigation Measures

No mitigation measures are necessary.

Residual Impacts After Mitigation

No significant adverse impacts were identified.

Comparison to Proposed Project and Other Alternatives

Alternative 6, No Project Alternative is considered neither environmentally superior nor inferior to the Proposed Project.

Alternative 6, No Project Alternative will also be neither environmentally superior nor inferior to any of the other alternatives.

HAZARDS-5 *Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.*

Sediment Removal/Reservoir Management

Alternative 6, No Project Alternative will not increase flood control protection downstream of Devil's Gate Dam. If the dam face cannot be kept clear, the potential for flooding downstream of Devil's Gate Dam will increase. In addition to potentially damaging downstream properties, this flooding could also potentially interfere with access to roadways. Therefore, Alternative 6, No Project Alternative may significantly interfere with the current emergency response plan or emergency evacuation plan for local, State, or federal agencies.

Mitigation Measures

No mitigation measures available.

Residual Impacts After Mitigation

Due to reduction of flood control protection, Alternative 6, No Project Alternative, may significantly interfere with the current emergency response plan or emergency evacuation plan for local, State, or federal agencies.

Comparison to Proposed Project and Other Alternatives

Alternative 6, No Project Alternative is considered environmentally inferior to the Proposed Project, as Alternative 6, No Project Alternative will severely restrict flood control capacity and capability, potentially increasing flooding downstream of Devil's Gate Dam.

Alternative 6, No Project Alternative will also be environmentally inferior to all of the other alternatives as Alternative 6, No Project Alternative will severely restrict flood control capacity and capability, potentially increasing flooding downstream of Devil's Gate Dam.

HYDROLOGY & WATER QUALITY

HYDROLOGY-1 *Violate any water quality standards or waste discharge requirements.*

Sediment Removal/Reservoir Management

FAST operations have been routinely used at Devil's Gate Reservoir and result in relatively small amounts of finer grained sediment passing through the reservoir. During both sediment removal and reservoir management phases, FAST operations will take place during winter rain events, using natural flows to allow the finer grained sediment to pass through the reservoir and downstream of the dam. It is anticipated that these FAST operations will be similar to historic FAST operations and that sediment fines discharged during FAST operations will be transported to the Pacific Ocean via Arroyo Seco and the Los Angeles River, either via the discharge flow or subsequent storm flows. As with the Proposed Project, no significant impacts to water quality standards are expected due to FAST operations.

Alternative 6, No Project Alternative will include the use of hazardous materials associated with the construction equipment needed to keep the dam face clear. Adequate BMPs will be utilized; and adherence to the regulations set forth by County, State, and federal agencies will reduce the potential for hazardous materials impacts to a less than significant level and will not pose a safety hazard to sensitive receptors.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

Impacts to water quality will be less than significant.

Comparison to Proposed Project and Other Alternatives

Alternative 6, No Project Alternative is considered environmentally superior to the Proposed Project.

Alternative 6, No Project Alternative will also be environmentally superior to all of the other alternatives due to minimal sediment removal and reservoir management activities.

HYDROLOGY-2 *Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level.*

Sediment Removal/Reservoir Management

Unlike the Proposed Project, with implementation of Alternative 6, No Project Alternative the reservoir will not have the ability to contain more of the local runoff, which in turn will result in less stormwater penetrating surface sediment in the project area and subsequently recharging the groundwater basin.

In addition, sediment deposition has the potential to build up in the City of Pasadena's spreading grounds on the east side of the basin, reducing their efficiency to provided groundwater recharge. This could result in a potentially significant impact to groundwater supplies.

Mitigation Measures

No mitigation measures available.

Residual Impacts After Mitigation

A potentially significant unavoidable adverse impact would occur to groundwater recharge as a result of Alternative 6, No Project Alternative.

Comparison to Proposed Project and Other Alternatives

Alternative 6, No Project Alternative is considered environmentally inferior to the Proposed Project, due to the reduced amount of area to contain local runoff and potential impacts to adjacent spreading basins.

Alternative 6, No Project Alternative will also be environmentally inferior to any of the other alternatives due to the reduced amount of area to contain local runoff and potential impacts to adjacent spreading basins.

HYDROLOGY-3 *Substantially alter the existing drainage pattern of the site, which would potentially result in substantial erosion or siltation.*

Sediment Removal/Reservoir Management

Drainage patterns within the reservoir change on a regular basis depending on seasonal conditions, water flow, and sediment deposition. Sediment removal and reservoir management will also result in alterations of surface drainage characteristics at the project site due to clearing, grading, and excavation activities. Excavation, grading, and sediment placement activities will occur under LACDPW regulations, which establish protocols for proper design of slopes and temporary sediment-collecting structures.

The drainage characteristics for the site will be only slightly altered; therefore, Alternative 6, No Project Alternative will result in a negative impact to drainage of Devil's Gate Reservoir because it will reduce

the flood control abilities of Devil's Gate Dam. Sediment will continue to accumulate in the reservoir; however, impacts related to offsite erosion will be less than significant.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

Alternative 6, No Project Alternative will result in a less than significant impact on drainage patterns.

Comparison to Proposed Project and Other Alternatives

Alternative 6, No Project Alternative is considered neither environmentally superior nor inferior to the Proposed Project.

Alternative 6, No Project Alternative will also be neither environmentally superior nor inferior to any of the other alternatives, except for Alternative 4, Sluicing. Alternative 6, No Project Alternative will be environmentally superior to Alternative 4, Sluicing due to the potential for erosion associated with the sluicing alternative.

HYDROLOGY-4 *Otherwise substantially degrade water quality.*

Sediment Removal/Reservoir Management

Alternative 6, No Project Alternative will include the use of hazardous materials associated with the construction equipment needed to keep the dam face clear. Adequate BMPs will be utilized; and adherence to the regulations set forth by County, State, and federal agencies will reduce the potential for hazardous materials impacts to a less than significant level and will not pose a safety hazard to sensitive receptors.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

Adequate BMPs will be utilized; and adherence to the regulations set forth by County, State, and federal agencies will reduce the potential for impacts to water quality to a less than significant level.

Comparison to Proposed Project and Other Alternatives

Alternative 6, No Project Alternative is considered environmentally superior to the Proposed Project due to minimal sediment removal and reservoir management activities.

Alternative 6, No Project Alternative will also be environmentally superior to all of the other alternatives due to minimal sediment removal and reservoir management activities.

LAND USE & PLANNING

LAND USE-1 *Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect.*

Sediment Removal

As with the Proposed Project, Alternative 6, No Project Alternative will not conflict with the City's General Plan or zoning designation of Open Space for the Proposed Project site and is consistent with the LACFCD easement.

As discussed in Subsection 3.8.3, Applicable Regulations, the HWPMP emphasizes protection of recreational and natural resources as well as the management of flood control for the downstream watershed. Alternative 6, No Project Alternative is not consistent with HWPMP Goal 2 of managing the flood control basin for protection of the downstream areas by improving and maintaining the flood capacity behind Devil's Gate Dam.

Alternative 6, No Project Alternative may have indirect impacts to existing recreation uses due to the continued accumulation of sediment in the reservoir. In addition, as discussed above in Biological Resources, Alternative 6, No Project Alternative may have potentially significant impacts associated with biological resources due to the accumulation of sediment in the reservoir. Impacts associated with recreational activities coexisting with flood management and water conservation will be significant.

Mitigation Measure

No mitigation measures available.

Residual Impacts After Mitigation

Impacts to consistency with HWPMP Goal 2, habitat restoration and recreation coexisting with flood management and water conservation, will be potentially significant.

Comparison to Proposed Project and Other Alternatives

Alternative 6, No Project Alternative is considered environmentally inferior to the Proposed Project with respect to impacts to land use associated with compatibility to habitat restoration and recreation due to potential impacts that will occur. Habitat in the reservoir is likely to degrade; and recreational activities may be impacted under Alternative 6, No Project Alternative due to continuous sediment deposition.

Alternative 6, No Project Alternative is also considered environmentally inferior to all the other alternatives with respect to impacts to land use associated with compatibility to habitat restoration and recreation. Potential impacts will occur, as habitat in the reservoir is likely to degrade; and recreational activities may be impacted under Alternative 6, No Project Alternative due to continuous sediment deposition.

MINERAL RESOURCES

MINERALS-1 *Result in the loss of availability of a known mineral resource that would be of value to the region and residents of the state.*

Sediment Removal/Reservoir Management

The Proposed Project site contains areas delineated within SMARA zone designated MRZ-2, which indicates that the area contains adequate information to indicate that significant mineral deposits are present or are judged to have a high likelihood for their presence (City of Pasadena 2002). As with the Proposed Project, under Alternative 6, No Project Alternative the Proposed Project site will not be available for mining operations during reservoir management activities; however reservoir management is not expected to involve usable aggregate material or arroyo stone due to unfavorable characteristics such as fine gradation soil and high organic content levels. Impacts will be less than significant.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

Alternative 6, No Project Alternative will not result in any potentially significant impacts to mineral resources that will be of value to the region and residents of the state.

Comparison to Proposed Project and Other Alternatives

Alternative 6, No Project Alternative is considered neither environmentally superior nor inferior to the Proposed Project.

Alternative 6, No Project Alternative will also be neither environmentally superior nor inferior to any of the other alternatives.

MINERALS-2 *Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan.*

While the Arroyo Seco Master Plan EIR (2002) states that the reservoir may contain large quantities of arroyo stone, the Proposed Project site is not delineated as a locally important mineral resource recovery site on a local general plan, specific plan, or other local land use plan. As with the Proposed Project, under Alternative 6, No Project Alternative, the Proposed Project site will not be available for mining operations during reservoir management activities; however, reservoir management is not expected to involve usable aggregate material or arroyo stone due to unfavorable characteristics such as fine gradation soil and high organic content levels. Impacts will be less than significant.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

Alternative 6, No Project Alternative will not result in any potentially significant impacts to availability of a locally important mineral resource recovery site.

Comparison to Proposed Project and Other Alternatives

Alternative 6, No Project Alternative is considered neither environmentally superior nor inferior to the Proposed Project.

Alternative 6, No Project Alternative is considered neither environmentally superior nor inferior to any other alternative.

NOISE & VIBRATION

NOISE-1 *Result in exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.*

Sediment Removal/Reservoir Management

Onsite Construction Equipment Noise

Under Alternative 6, No Project Alternative, less construction equipment will be used at the Proposed Project site.

Offsite Vehicular Noise

Under Alternative 6, No Project Alternative, no haul truck trips will occur, as no material will be trucked offsite. Therefore, for Alternative 6, No Project Alternative potential offsite traffic noise impacts will be less than those generated from the Proposed Project. Overall, as with the Proposed Project, roadway noise impacts will be less than significant.

Mitigation Measures

No mitigation measures are necessary.

Residual Impacts After Mitigation

Alternative 6, No Project Alternative will comply with all local noise ordinances and roadway noise impacts will be less than significant.

Comparison to Proposed Project and Other Alternatives

Alternative 6, No Project Alternative is considered environmentally superior to the Proposed Project with respect to impacts associated with noise levels due to minimal sediment removal and sediment management activities.

Due to minimal sediment removal and sediment management activities associated with the alternative, Alternative 6, No Project Alternative will also be environmentally superior to all the other alternatives.

NOISE-2 *Result in exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels.*

Sediment Removal/Reservoir Management

Unlike the Proposed Project, no sensitive receptors would experience vibration levels that would exceed the 0.01-inch-per-second vibration standard.

Mitigation Measures

No mitigation measures are necessary.

Residual Impacts After Mitigation

Onsite construction equipment vibration impacts to nearby sensitive receptors would be less than significant.

Comparison to Proposed Project and Other Alternatives

Alternative 6, No Project Alternative is considered environmentally superior to the Proposed Project with respect to impacts associated with vibration levels due to the lack of trucks moving material offsite.

Due to the lack of trucks moving material offsite, Alternative 6, No Project Alternative will also be environmentally superior to all other alternatives.

NOISE-3 *Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.*

Sediment Removal/Reservoir Management

Alternative 6, No Project Alternative, will not create a substantial temporary or periodic increase in ambient noise levels in the project vicinity above existing noise levels. In addition, no offsite noise impacts will result as no haul trucks will be used for this alternative and as less construction equipment will be used onsite.

Onsite Construction Equipment Noise

Less onsite equipment will be operated under Alternative 6, No Project Alternative. The alternative will not conflict with any construction noise standards. In addition Alternative 6, No Project Alternative will have lower onsite construction noise levels than those generated from the Proposed Project.

Offsite Vehicular Noise

Unlike the Proposed Project, few offsite vehicular trips will be associated with Alternative 6, No Project Alternative. Therefore, reduction of offsite vehicular noise impacts will result in a less than significant

impact. In addition, Alternative 6, No Project Alternative will have less offsite vehicular noise than those generated from the Proposed Project, due to the lack of trucks moving material offsite.

Mitigation Measures

No mitigation measures are necessary.

Residual Impacts After Mitigation

Temporary noise level increase from onsite construction noise would be less than significant. Less than significant impacts would occur from offsite vehicular noise.

Comparison to Proposed Project and Other Alternatives

Alternative 6, No Project Alternative is considered environmentally superior to the Proposed Project with respect to impacts associated with noise levels due to no haul trucks being used for this Alternative.

Due to the lack of haul truck trips for the Alternative, Alternative 6, No Project Alternative will also be environmentally superior to all the other alternatives.

RECREATION/PUBLIC SERVICES

RECREATION-1 *Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated.*

Alternative 6, No Project Alternative will not result in the construction of new residences, or facilitate the development of residences, or result in an increase in area population. Therefore, implementation of the Alternative 6, No Project Alternative will not result in increased use or the physical deterioration associated with increased use for neighborhood or regional parks or other recreational facilities due to any increases in area population.

Sediment Removal Impacts

Unlike the Proposed Project, under Alternative 6, No Project Alternative sediment would not be removed from the reservoir and would continue to accumulate in the reservoir over time. Although most of the site will remain open to public use, Alternative 6, No Project Alternative will have a potential impact on recreation opportunities if sediment accumulates to the point of covering designated trails within the reservoir.

Maintenance roads within the basin are used by the LACFCD, Southern California Edison (SCE), and the City of Pasadena, among others, for operations and maintenance of Devil's Gate Reservoir and other facilities in the area. The majority of the maintenance roads will eventually be covered as a result of continued sediment accumulation; however, these roads are not officially designated for recreational uses and are often not available for unofficial recreation use due to reservoir water levels or maintenance activities.

Designated Recreational Uses

Implementation of Alternative 6, No Project Alternative may result in impacts to portions of designated trails and indirect impacts to existing recreation uses due to the continued accumulation of sediment in the reservoir. These impacts may increase the use of other area parks and recreational facilities such as those described in Table 3.15-1, Area Recreational Facilities.

The Oak Grove area of Hahamongna Watershed Park and the associated facilities, including Oak Grove Disk Golf Course, will not be impacted and will continue to provide active recreational facilities to the area. Alternative 6, No Project Alternative will not limit the use of the Oak Grove area of Hahamongna Watershed Park by individuals or by organizations such as the Oak Grove Disc Golf Club, the Rose Bowl Riders, MACH 1, or the Tom Sawyer Camp.

Activities such as hiking, biking, horseback riding, bird watching, and nature walks will occur in the same manner as existing conditions until sediment deposition covers any used trails. In addition, Alternative 6, No Project Alternative will not limit or block access to the Oak Grove area and the designated trails and will not result in direct potentially significant impacts to these facilities.

Indirect impacts to recreation associated with Alternative 6, No Project Alternative will initially be less in comparison to the Proposed Project due to the minimal sediment removal activities.

If the reservoir is negatively impacted by the accumulation of sediment, recreational users may choose to visit other area parks, recreational facilities, or trails. Due to the number of other recreational facilities and trails in the vicinity, it is anticipated that these visitors will be dispersed throughout the area and that no substantial increase in use of any one park or facility will occur. Therefore, Alternative 6, No Project Alternative will not increase use of other existing parks or recreation facilities such that substantial physical deterioration of these facilities will occur or be accelerated. Impacts to other existing parks and recreation facilities will be less than significant.

Reservoir Management Impacts

Under the proposed reservoir management, access to Devil's Gate Reservoir will be similar to existing conditions. Reservoir management will include FASTing, which is the existing manner in which sediment is slowly moved downstream during storm events. The Oak Grove area of Hahamongna Park and the designated trails will not be impacted by reservoir management activities and will continue to provide active recreational facilities to the area. Unlike the Proposed Project, trails will not be beneficially impacted, as recreational facilities have the potential to be disrupted through flooding and/or being buried under sediment. Impacts to existing parks and recreation facilities associated with Alternative 6, No Project Alternative reservoir management activities will be less than significant.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

Alternative 6, No Project Alternative will not result in any potentially significant impacts associated with increased use of other existing parks or recreation facilities.

Comparison to Proposed Project and Other Alternatives

Alternative 6, No Project Alternative is considered environmentally inferior to the Proposed Project with respect to recreation uses, as recreational activities will likely be impacted under Alternative 6, No Project Alternative due to continuous sediment deposition and degradation that will increase over time.

Alternative 6, No Project Alternative will also be environmentally inferior to all of the other alternatives, as recreational activities will likely be impacted under Alternative 6, No Project due to continuous sediment deposition and degradation that will increase over time.

RECREATION-2 *Require the construction or expansion of existing recreational facilities which might have an adverse physical effect on the environment.*

As discussed in detail above under RECREATION-1, recreational users may choose to visit other area parks, recreational facilities, or trails if sediment accumulation impacts these facilities through flooding or sediment coverage. It is anticipated that these visitors will be dispersed throughout the area and that a substantial increase in use of any one park or facility will not occur. Therefore, Alternative 6, No Project Alternative will not require the construction or expansion of existing recreational facilities which might have an adverse physical effect on the environment, resulting in a less than significant impact. Although no recreational facilities will be directly impacted, trails in the reservoir will likely be covered under Alternative 6, No Project due to continuous sediment deposition.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

Alternative 6, No Project Alternative will not result in any potentially significant impacts associated with the construction or expansion of existing recreational facilities.

Comparison to Proposed Project and Other Alternatives

Alternative 6, No Project Alternative is considered environmentally inferior to the Proposed Project, as recreational activities will likely be impacted under Alternative 6, No Project Alternative due to continuous sediment deposition and degradation that will increase over time.

Alternative 6, No Project Alternative will also be environmentally inferior to all the other alternatives, as recreational activities will likely be impacted under Alternative 6, No Project Alternative due to continuous sediment deposition and degradation that will increase over time.

PUBLIC SERVICES-1: *Result in substantial adverse impacts associated with the provision of or need for new or physically altered recreational facilities, the construction of which could cause significant environmental impacts.*

As discussed in detail above under RECREATION-2, Alternative 6, No Project Alternative will not result in a substantial increase in use of any one park or facility. Therefore, Alternative 6, No Project Alternative will not require the provision of or need for new or physically altered recreational facilities, the construction of which could cause significant environmental impacts.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

Alternative 6, No Project Alternative will not result in any potentially significant impacts associated with the construction or expansion of existing recreational facilities.

Comparison to Proposed Project and Other Alternatives

Alternative 6, No Project Alternative is considered environmentally inferior to the Proposed Project, as recreational activities will likely be impacted under Alternative 6, No Project Alternative due to continuous sediment deposition and degradation that will increase over time.

Alternative 6, No Project Alternative will also be environmentally inferior to all of the other alternatives, as recreational activities will likely be impacted under Alternative 6, No Project Alternative due to continuous sediment deposition and degradation that will increase over time.

TRANSPORTATION & TRAFFIC

TRANSPORTATION-1 *Conflict with an applicable plan, ordinance, or policy establishing measure of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit.*

Sediment Removal/Reservoir Management

Alternative 6, No Project Alternative would not cause a substantial increase in traffic which would affect the efficiency of the circulation system, including all modes of transportation such as mass transit and non-motorized travel and relevant components of the circulation system, including intersections, streets, highways, freeways, pedestrian and bicycle paths, and mass transit. Alternative 6, No Project Alternative would not involve any truck traffic as no sediment or vegetation will be trucked offsite. Impacts will be less than significant.

Mitigation Measure

No mitigation measures are required.

Residual Impacts after Mitigation

All impacts to traffic and circulation will be less than significant.

Comparison to Proposed Project and Other Alternatives

Alternative 6, No Project Alternative is considered environmentally superior to the Proposed Project due to the lack of traffic associated with the Alternative.

Due to lack of traffic associated with the Alternative, Alternative 6, No Project Alternative will also be environmentally superior to all the other alternatives.

TRANSPORTATION-2 *Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways.*

Alternative 6, No Project Alternative will not significantly impact freeway segments, freeway on- and off-ramps, or intersections. Impacts will be less than significant.

Mitigation Measure

No mitigation measures are necessary.

Residual Impacts After Mitigation

All impacts to traffic and circulation will be less than significant.

Comparison to Proposed Project and Other Alternatives

Alternative 6, No Project Alternative is considered environmentally superior to the Proposed Project due to the lack of trucking associated with the Alternative.

Due to the lack of trucking associated with the Alternative, Alternative 6, No Project Alternative will also be environmentally superior to all the other alternatives.

TRANSPORTATION-3 *Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).*

Sediment Removal

Implementation of the Alternative 6, No Project Alternative would not require mitigation measures that would require modifications to the existing roadway network. Alternative 6, No Project Alternative would not require any trucking and would not introduce any new uses that would be incompatible or substantially increase hazards with the existing roadway system. Therefore, impacts related to traffic hazards would be less than significant.

Reservoir Management

The reservoir management associated with Alternative 6, No Project Alternative would not require any modifications to the existing roadway network and would not introduce any new uses that would be incompatible or substantially increase hazards with the existing roadway system. Therefore, no impact would occur.

Mitigation Measures

No mitigation measures are required.

Residual Impacts After Mitigation

Impacts will be less than significant.

Comparison to Proposed Project and Other Alternatives

Alternative 1, Configuration B is considered neither environmentally superior nor inferior to the Proposed Project or any of the other alternatives as it would not introduce any new uses that would be incompatible with the existing roadway system.

TRANSPORTATION-4 *Result in inadequate emergency access.*

Sediment Removal/Reservoir Management

Alternative 6, No Project Alternative will not increase flood control protection downstream of Devil's Gate Dam. If the dam face cannot be kept clear, the potential for flooding downstream of Devil's Gate Dam will increase. In addition to potentially damaging downstream properties, this flooding could also potentially interfere with access to roadways. Therefore, Alternative 6, No Project Alternative, may significantly impact emergency access.

Mitigation Measures

No mitigation measures available.

Residual Impacts After Mitigation

Due to reduction of flood control protection, Alternative 6, No Project Alternative, may significantly impact emergency access.

Comparison to Proposed Project and Other Alternatives

Alternative 6, No Project Alternative is considered environmentally inferior to the Proposed Project as Alternative 6, No Project Alternative will severely restrict flood control, potentially increasing flooding downstream of Devil's Gate Dam.

Alternative 6, No Project Alternative will also be environmentally inferior to all of the other alternatives as Alternative 6, No Project Alternative will severely restrict flood control, potentially increasing flooding downstream of Devil's Gate Dam.

TRANSPORTATION-5 *Conflict with adopted policies, plans, or programs regarding public transit or bicycle or pedestrian facilities or otherwise decrease the performance or safety of such facilities supporting alternative transportation (e.g., bus turnouts, bicycle racks).*

Sediment Removal/Reservoir Management

Alternative 6, No Project Alternative would not adversely affect alternative modes of public transportation such as light rail. Implementation of Alternative 6, No Project Alternative would not require closure of any bus stops or disrupt any existing bus routes. No impact would occur.

Mitigation Measure

No mitigation measures available.

Residual Impacts After Mitigation

All impacts to traffic and circulation would be less than significant.

Comparison to Proposed Project and Other Alternatives

Alternative 6, No Project Alternative is considered environmentally superior to the Proposed Project due to the lack of trucking and associated traffic impacts.

Due to the lack of trucking and associated traffic impacts, Alternative 6, No Project Alternative will also be environmentally superior to all of the other alternatives.

UTILITIES & SERVICE SYSTEMS

UTILITIES-1 *Require or result in construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects.*

Sediment Removal

As with the Proposed Project, during sediment removal Alternative 6, No Project Alternative will not result in or require the construction of new or expansion of existing stormwater drainage systems; however, the alternative will not result in a positive impact to drainage of Devil's Gate Reservoir because it will not restore the flood control capacity of Devil's Gate Dam and Reservoir. The alternative will not result in any significant increase in stormwater runoff that will require new stormwater drainage facilities.

In addition, the alternative will not directly involve the existing storm drain outfalls, power lines, gas line, communication lines, water lines, sewer lines, or water wells. Impacts to these utility facilities will be avoided through compliance with City regulations regarding utility facilities, coordination with utility providers, and implementation of LACDPW BMPs.

Reservoir Management

During reservoir management, Alternative 6, No Project Alternative will not result in or require the construction of new or expansion of existing stormwater drainage systems.

Mitigation Measure

No mitigation measures are required.

Residual Impacts After Mitigation

Alternative 6, No Project Alternative will not result in any potentially significant impacts to utility facilities.

Comparison to Proposed Project and Other Alternatives

Alternative 6, No Project Alternative is considered neither environmentally superior nor inferior to the Proposed Project nor to any of the other alternatives.

4.9.3 Conclusion and Relationship to Project Objectives

Alternative 6, No Project Alternative will not meet any of the Proposed Project's objectives of satisfactorily reducing flooding risk, creating a configuration suitable for routine operations and maintenance, reducing the possibility of plugging at the dam face, removing sediment from Johnson Field, removing sediment in a timely manner, and delivering sediment to facilities already prepared to accept sediment.

Alternative 6, No Project Alternative is considered environmentally superior to the Proposed Project due to minimal sediment removal and reservoir management activities and associated impacts.

Due to minimal sediment removal and reservoir management activities and associated impacts, Alternative 6, No Project Alternative will also be environmentally superior to all the other alternatives, although aesthetics, biological resources, and recreation resources of the reservoir will likely be impacted under Alternative 6, No Project Alternative due to continuous sediment deposition and degradation that will increase over time.

4.10 ALTERNATIVES CONSIDERED BUT NOT SELECTED FOR ANALYSIS

Section 15126.6(c) of the *CEQA Guidelines* suggests that an EIR identify alternatives that were considered for analysis but rejected as infeasible and briefly explain the reasons for their rejection. According to the CEQA Guidelines, the following factors may be used to eliminate alternatives from detailed consideration: the alternative's failure to meet most of the basic project objectives, the alternative's infeasibility, or the alternative's inability to avoid significant environmental impacts. Alternatives that have been considered by the LACFCD and rejected as infeasible are discussed below.

4.10.1 Conveyor Belt Alternative

Description

The configuration and amount of sediment removal would be the same as the Proposed Project (Configuration A). The removal method, including excavation of sediment from the reservoir, would be the same as the Proposed Project except this removal method involves the construction of a temporary conveyor belt system to transfer sediment out of the reservoir to another location for loading into trucks. The conveyor terminus that was considered for this removal method is a vacant parcel (AIN 5825022902) located within the City of Pasadena. The parcel is bounded by Oak Grove Drive to the north, Weimar Avenue to the south, Yucca Lane to the west, and Windsor Avenue to the east. The parcel has an area of approximately 0.7 acre and is located approximately 1/3 of a mile from the dam spillway. After excavation from the reservoir, the sediment would be loaded onto the conveyor belt system. The length of the temporary conveyor is expected to be approximately 0.5 to 0.75 mile long.

The sediment disposal method is the same as the Proposed Project. Trucks will access the freeway by exiting out of the conveyor terminus lot, turning south on Windsor Avenue, and either east or west onto

I-210, depending upon the location of the disposal site. Once on I-210, the disposal routes are the same as the Proposed Project.

The reservoir management approach would be the same as the Proposed Project.

Reason for Elimination

This alternative was eliminated from further consideration because it would not avoid or substantially reduce any significant environmental effects.

4.10.2 Slurry Pipeline Alternative

Description

The configuration and amount of sediment removal would be the same as the Proposed Project (Configuration A). When the reservoir has sufficient water storage, a slurry pipeline would be used to send the sediment downstream. This method involves allowing the water to build up behind the dam, conducting operations to suspend the sediment in the water, and transporting the sediment slurry downstream of the dam in a pipeline. Two segments of the Arroyo Seco, immediately below the dam and near the crossing at Colorado Street, are not lined with concrete. Due to a concern that the highly concentrated slurry may degrade these areas, the slurry pipeline would extend to a location downstream of the second unlined area near Colorado Street. The length of the pipeline is approximately 3 miles and is expected to be 12 to 24-inches in diameter. The alignment of the pipeline would generally be over or through the dam and along the Arroyo Seco, either above or below grade.

The intent is that the discharged sediment would ultimately be transported to the Pacific Ocean via the Arroyo Seco and the Los Angeles River, either via the discharge flow or subsequent storm flows. Total sediment transport is not expected to occur, therefore, sediment removal from Arroyo Seco, the Los Angeles River, or the Port of Long Beach would be required. Also, the amount of sediment that would be transported through the slurry pipeline is limited by the amount of water available to store. Total sediment transport is not expected to occur, which would likely cause future impacts for cleanouts.

The project duration is variable, as the amount of sediment that can be transported through the slurry pipeline is limited by the amount of water available. While future flows through the system are unknown, using historical reservoir inflow data it is estimated that using a slurry pipeline as the sole sediment removal method will take approximately 75 years to remove the 2.9 million cy of sediment.

Reason for Elimination

The Slurry Pipeline Alternative was rejected due to the high risk to downstream habitat as well as the limitations of being able to quickly and efficiently move sediment out of the reservoir. This alternative would fail to meet the project objectives and would result in greater/additional impacts than the Proposed Project (biological resources, geology).

4.10.3 Dam Removal Alternative

Description

In this alternative, Devil's Gate Dam would be discontinued from operation and removed. The area would be returned to the state it was in before the dam was constructed. Since no flood control mechanism would be in place, areas downstream of the dam could experience sediment accumulation and intermittent flooding. These areas would include both natural and man-made settings and would include the lower Arroyo Seco, the Rose Bowl, and potentially some residential areas. No sediment would be removed mechanically from the dam, but sediment would likely move downstream due to the removal of the dam.

Reason for Rejecting Alternative

This alternative was rejected due to its inconsistency with project objectives, as well as the potential safety concerns. This alternative would fail to meet the project objectives and would result in greater/additional impacts than the Proposed Project (geology, hazards, hydrology, and public services).

4.10.4 Upstream Sediment Management Alternative

Description

In this alternative, reservoir management would be achieved through watershed and sediment maintenance upstream of Devil's Gate Reservoir. This management technique includes removal of sediment from the upstream areas instead of from within the reservoir, as well as providing other sediment control measures upstream including revegetation and other methods. In this alternative, management would not include removal of sediment from the dam and would be restricted to preventative measures upstream.

Reason for Rejecting Alternative

This alternative was rejected due to the fact that the upstream areas are not under the purview of this project and is out of LACFCD jurisdiction. This alternative would fail to meet the project objectives and would result in greater/additional impacts than the Proposed Project (geology, hazards, hydrology, and public services).

4.11 ENVIRONMENTALLY SUPERIOR ALTERNATIVE

Of the alternatives analyzed in the EIR, Alternative 3, Configuration D is considered to be the environmentally superior alternative as it would reduce most of the potential impacts associated with the sediment removal and management of the Proposed Project.

In addition, Alternative 3, Configuration D would result in the fewest environmental impacts as compared to the Proposed Project while still achieving the project objectives of the Proposed Project. Alternative 3, Configuration D is the Environmentally Superior Alternative.

SECTION 5.0 – OTHER CEQA CONSIDERATIONS

This chapter presents the evaluation of other types of environmental impacts required by CEQA that are not covered within the other chapters of this EIR. The other CEQA considerations include environmental effects that were found not to be significant, growth-inducing impacts, and significant and unavoidable adverse impacts.

5.1 ENVIRONMENTAL EFFECTS FOUND NOT TO BE SIGNIFICANT

The Initial Study (IS) for the Proposed Project, completed in August 2011, which is included in the EIR as Appendix A, determined that the Proposed Project would result in no impact or a less than significant impact to 3 of 17 environmental issue areas. The IS for the Proposed Project discusses why the project would have no impact or less than significant impacts for these issue areas, which are subsequently not discussed in detail in this EIR. The issue areas determined to have no impact or a less than significant impact in the IS analysis include the following:

- Agriculture and Forest Resources
- Population and Housing
- Public Services (fire protection, police protection, schools, and other public facilities)

After a more detailed evaluation of the environmental issues associated with the Proposed Project, the EIR determined that impacts would be less than significant or less than significant with incorporation of mitigation measures for the following environmental issue areas:

- Air Quality
- Biological Resources
- Cultural Resources
- Geology and Soils
- Greenhouse Gas Emissions
- Hazards and Hazardous Materials
- Hydrology and Water Quality
- Land Use and Planning
- Mineral Resources
- Noise and Vibration
- Public Services
- Utilities and Service Systems

5.2 IRREVERSIBLE ENVIRONMENTAL CHANGES

According to CEQA Guidelines, "Uses of nonrenewable resources during the initial and continued phases of the project may be irreversible since a large commitment of such resources makes removal or nonuse thereafter unlikely. Primary impacts and, particularly, secondary impacts (such as highway improvement which provides access to a previously inaccessible area) generally commit future generations to similar uses. Also, irreversible damage can result from environmental accidents associated with the project. Irretrievable commitments of resources should be evaluated to assure that such current consumption is justified." Therefore, the purpose of this analysis is to identify any significant irreversible environmental effects of project implementation that cannot be avoided.

Both sediment removal and reservoir management of the Proposed Project would lead to the consumption of limited, slowly renewable and nonrenewable resources, committing such resources to uses that future generations would be unable to reverse. Implementation of the Proposed Project would require the commitment of fuel.

For sediment removal and reservoir management activities associated with the Proposed Project, fossil fuels for construction vehicles and equipment would be consumed. The consumption of such resources would represent a long-term commitment of those resources.

5.3 GROWTH-INDUCING IMPACTS

Pursuant to the CEQA Guidelines: an EIR must address whether a project will directly or indirectly foster growth as follows:

> [An EIR shall] discuss the ways in which the Proposed Project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment. Included in this are projects which would remove obstacles to population growth (a major expansion of wastewater treatment plant, might, for example, allow for more construction in service areas). Increases in the population may further tax existing community service facilities so consideration must be given to this impact. Also, discuss the characteristic of some projects, which may encourage and facilitate other activities that could significantly affect the environment, either individually or cumulatively. It must not be assumed that growth in any area is necessarily beneficial, detrimental, or of little significance to the environment.

As discussed below, this analysis evaluates whether the Proposed Project would directly, or indirectly, induce economic, population, or housing growth in the surrounding environment.

5.3.1 Direct Growth-Inducing Impacts in the Surrounding Environment

Direct growth-inducing impacts occur when the development of a project induces population growth or the construction of additional developments in the same area of a Proposed Project and produces related growth-associated impacts. Growth-inducing projects remove physical obstacles to population growth, such as the construction of a new road into an undeveloped area, a wastewater treatment plant expansion, and projects that allow new development in the service area. Constructions of such infrastructure projects are considered in relation to the potential development and the potential environmental impacts.

Implementation of the Proposed Project would maintain the capacity of the reservoir. The Proposed Project does not include residential development and does not directly induce population growth. The Proposed Project will not remove obstacles to regional growth and related development.

5.3.2 Indirect Growth-Inducing Impacts in the Surrounding Environment

The purpose of the Proposed Project is to remove sediment from Devil's Gate Reservoir to minimize potential flooding impacts to communities downstream of the dam. The Proposed Project does not contain components likely to indirectly induce employment or an employment-related increase in population.

5.4 SIGNIFICANT UNAVOIDABLE ENVIRONMENTAL IMPACT

The potentially adverse effects of the Proposed Project are discussed in Chapter 3.0 of this EIR. Mitigation Measures have been recommended that would reduce impacts for all categories except aesthetics and traffic to less than significant based on each set of significance criteria. The Proposed Project would result in significant unavoidable impacts related to aesthetics and temporary significant unavoidable impacts related to traffic.

SECTION 6.0 – REFERENCES

1. *AEGISS, Inc., 2012. Draft Environmental Assessment NASA Jet Propulsion Laboratory On-Site Parking Structure. June 2012.*
2. *American Golf Website, 2012. http://www.americangolf.com/brookside-golf-club.*
3. *Bean, L.J. and C.R. Smith. 1978. "Gabrielino." In California Handbook of North American Indians, R. F. Heizer, editor. Vol. 8. Washington, D.C.: Smithsonian Institution.*
4. *Bureau Veritas. 2013. Fine Sediment Transport Capacity Analysis for the Arroyo Seco Channel.*
5. *California Air Resources Board (CARB). Climate Change Scoping Plan – "A Framework for Change." December 2008.*
6. *California Air Resources Board (CARB). Almanac Emissions Projection Data. http://www.arb.ca.gov/app/emsinv/. Accessed October 2011.*
7. *California Air Resources Board (CARB). 2012a. Ambient Air Quality Standards. June 7, 2012.*
8. *California Air Resources Board. 2012b. Proposed 2012 Amendments to Area Designations for State Ambient Air Quality Standards. Staff Report: Initial Statement of Reasons for Rulemaking. Attachment C: Maps and Tables of Area Designations for State and National Ambient Air Quality Standards. July 20, 2012.*
9. *California Air Resources Board (CARB). The California Almanac of Emissions and Air Quality, 2009 Edition. Planning and Technical Support Division. http://www.arb.ca.gov/aqd/almanac/almanac09/almanac2009all.pdf. Accessed March 2013.*
10. *California Air Resources Board. Air Quality and Land Use Handbook: A Community Health Perspective. 2005.*
11. *California Air Resources Board. ADAM Air Quality Data Statistics. http://www.arb.ca.gov/adam/welcome.html. Accessed March 2013.*
12. *California Air Resources Board (CARB). The 2011 Carl Moyer Program Guidelines. March 27, 2013.*
13. *California Air Resources Board (CARB). Local Government Operations Protocol: For the quantification and reporting of greenhouse gas emissions inventories. Version 1.1.California Air Resources Board, California Climate Action Registry, ICLEI - Local Governments for Sustainability, and The Climate Registry. May 2010*
14. *California Department of Conservation, California Geological Survey, Division of Mines and Geology (CDMG), 2010. California Non-Fuel Minerals 2010. John Clinkenbeard, Supervising Engineering Geologist (PG#4731) and Joshua Smith, Engineering Geologist (GIT #379), California Geological Survey.*
15. *California Department of Forestry and Fire Protection (CalFire). Top 20 Largest California Wildfires. September 24, 2013.*
16. *California Department of Resources, Recycling and Recovery (CalRecycle). 2013,* http://www.calrecycle.ca.gov/SWFacilities/Directory/
17. *California Department of Toxic Substances Control (DTSC). 2005. Determination of a Southern California Regional Background Arsenic Concentration in Soil.*
18. *California Department of Transportation (Caltrans), Scenic Highway Program, 2013, http://www.dot.ca.gov/dist3/departments/mtce/scenic.htm*
19. *California Department of Transportation (Caltrans), Eligible and Officially Designated Routes, 2011, http://www.dot.ca.gov/hq/LandArch/scenic/cahisys.htm.*
20. *California Department of Water Resources (DWR). 2003. "California's Groundwater Bulletin 118."*
21. *California Division of Land Resource Protection. Farmland Mapping and Monitoring Program. 2006.*
22. *California Environmental Protection Agency, Climate Action Team (CalEPA). Climate Action Team Report to Governor Schwarzenegger and the California Legislature. March 2006.*

23. *Chambers Group, Inc. 2010a. Biological Technical Report for the Devil's Gate Reservoir Project Site in the City of Pasadena, Los Angeles County, California*. November.
24. *Chambers Group, Inc. 2010b. Devil's Gate Reservoir Vegetation Community and Oak Tree Tables (letter report). December.*
25. *Chambers Group, Inc. 2013a. Jurisdictional Delineation Report Devil's Gate Reservoir Sediment Removal and management Project in the in the City of Pasadena, Los Angeles County, California*. *June*.
26. *Chambers Group, Inc. 2013b. Report of Findings for the General Biological Resource and Presence/Absence Fish Surveys, Los Angeles County, California. February.*
27. *Chambers Group, Inc. 2011. Class III Cultural Resources Inventory, Devil's Gate Reservoir Sediment Removal and Management Project, Pasadena, California. November 2011.*
28. *Chambers Group, Inc. 2013c. Focused Protocol Surveys for Least Bell's Vireo at the Devil's Gate Reservoir, Los Angeles County, California.*
29. *City of Azusa General Plan. April 2004.* http://www.ci.azusa.ca.us/index.aspx?nid=160
30. *City of Irwindale General Plan Update. June 2008*
31. *City of La Cañada Flintridge General Plan. Circulation Element. Adopted January 2013.*
32. *City of Los Angeles, Transportation Element of the General Plan. Adopted September 1999.*
33. *City of Pasadena, Devil's Gate Dam and Reservoir Easement Deed, March 1, 1965.*
34. *City of Pasadena. 2004. General Plan Land Use Map.*
35. *City of Pasadena, Draft Master EIR Arroyo Seco Master Plan Project, Volume I, May 16, 2002.*
36. *City of Pasadena Dept. of Public Works website, 2012a. http://www.ci.pasadena.ca.us/PublicWorks/Pasadena_City_Parks/.*
37. *City of Pasadena website, 2013. http://www.ci.pasadena.ca.us/publicworks/arroyo_trails/*
38. *City of Pasadena. (2012b) Hahamongna Multi-Benefit/Multi-Use Project. Initial Study. Prepared July 2012.*
39. *City of Pasadena, Planning Division. (2012c) City of Pasadena General Plan Open Space and Conservation Element. 2012.*
40. *City of Pasadena. (2012d) Personal communication with Raphael Guillen, City of Pasadena.*
41. *City of Pasadena, Planning Division. Land Use and Mobility Elements, Zoning Code Restrictions, and Central District Specific Plan. Final Environmental Impact Report. September 2004.*
42. *City of Pasadena. Green City Action Plan. City of Pasadena, Planning and Development Department. September 18, 2006.*
43. *City of Pasadena. 2010 Green City Indicators Report. City of Pasadena Green Team.*
44. *City of Pasadena. 2007. Green Space, Recreation and Parks Element. Updated November 5, 2007.*
45. *City of Pasadena. Greenhouse Gas Emissions Inventory and Reduction Plan. October 2009.*
46. *City of South Pasadena Parks and Recreation website, 2012. http://www.cityofsouthpasadena.us/parks/parks.html.*
47. *Cleland, Robert G. 1941. The Cattle on a Thousand Hills: Southern California, 1850-1870. Huntington Library, San Marino, California.*
48. *County of Los Angeles Department of Agricultural Commissioner. 2014. Personal communication with Dr. Gevork Arakelian, Senior Biologist, October 2014.*
49. *County of Los Angeles Department of Public Works (LACDPW). 1996. Los Angeles River Master Plan. June. http://ladpw.org/wmd/watershed/LA/LARMP/*
50. *County of Los Angeles Department of Public Works (LACDPW). 2008. Los Angeles County Flood Control District Opens Historic LA River Wetlands Project. http://dpw.lacounty.gov/wmd/documents/DominguezGap_article.cfm*
51. *Environmental Data Resources, Inc. (EDR). 2011. Hazardous Materials Agency Database Review.*

52. *Federal Transit Administration, Transit Noise and Vibration Impact Assessment, May 2006.*
53. *Garza, V.J., Graney, P., Sperling, D. 1997. Transportation Project-Level Carbon Monoxide Protocol. University of California Davis, Institute of Transportation Studies.*
54. *Google Earth, 2011.*
55. *Google Earth, 2012.*
56. *Hahamongna Watershed Park Master Plan (HWPMP). Adopted September 29, 2003. City of Pasadena. Arroyo Seco Master Plans.*
57. *Hall & Foreman, Inc. Traffic Impact Analysis for Devil's Gate Reservoir Sediment Removal and Management Project. September 2013.*
58. *Hall & Foreman, Inc. (2013b) Personal communication with Vulcan Materials, Inc. Email to Hall & Foreman, Inc. from Vulcan Materials, Inc. September 2013.*
59. *Impact Sciences, Inc. 2013. Temporary Use of the Rose Bowl Stadium by the NFL. Environmental Impact Report.*
60. *Kearney Foundation 1996. Kearney Foundation Special Report: Background Concentrations of Trace and Major Elements in California Soils. March 1996.*
61. *Kidspace Museum website, 2012. http://www.kidspacemuseum.org/.*
62. *Kong, D., Huitric, R., Iacoboni, M., and Chan, G. Evaluation of Green Waste Management Impacts on GHG Emissions – Alternative Daily Cover Compared with Composting. Los Angeles County Sanitation Districts, Solid Waste Division, 2008.*
63. *Kroeber, A.L. 1976. Handbook of the Indians of California. Bureau of American Ethnology Bulletin, 78. Washington, D.C.: Smithsonian Institution. (Reprint, New York: Dover Publications.)*
64. *Leighton Consulting, Inc. 2013. Feasibility-Level Geotechnical and Geochemical Exploration Report Devil's Gate Reservoir Sediment Removal and Management Project, Pasadena, California. July 5.*
65. *Los Angeles County Parks and Recreation website, 2012.* http://parks.lacounty.gov/.
66. *Los Angeles County Sanitation District website, 2013. http://www.lacsd.org/solidwaste/swfacilities/landfills/scholl/*
67. *Los Angeles Department of Water and Power. 2012. Tujunga Spreading Grounds Enhancement Project Draft EIR.*
68. *Los Angeles Regional Water Quality Control Board (LARWQCB). 1994. "Los Angeles Region Water Quality Control Plan."*
69. *MACH 1. 2014. Comment letter from Joy Rittenhouse, MACH 1.*
70. *McCawley, William.1996. The First Angelinos: The Gabrielino Indians of Los Angeles. Malki Museum Press, Morongo Indian Reservation, Banning, California.*
71. *Moratto, M.J. 1984. California Archaeology. Orlando: Academic Press.*
72. *Oak Grove Disc Golf Club. 2012. Personal communication with Greg Walchin.*
73. *OB-1 2013. Air Quality Report. Devil's Gate Reservoir Sediment Removal and Management Project. September 2013.*
74. *Pasadena Audubon Society. 2012. Personal communication with Laura Garrett.*
75. *Pasadena Audubon Society website. 2013. http://www.pasadenaaudubon.org/*
76. *Pasadena Star News. 2012. Rare, Endangered Bird Spotted in Pasadena, San Gabriel River. http://www.pasadenastarnews.com/ci_21668432/rare-endangered-bird-spotted-pasadena-san-gabriel-river. October 1.*
77. *Rose Bowl Aquatics Website, 2012.* http://www.rosebowlaquatics.com/.
78. *Rose Bowl Riders. 2012. Personal communication with Heidy Kelman, Rose Bowl Riders.*
79. *Rose Bowl Stadium. 2012.* http://www.rosebowlstadium.com/index.php.
80. *Sawyer and Keeler-Wolf. 1995. A Manual of California Vegetation*. California Native Plant Society, Sacramento, California.

81. *State Water Resources Control Board (SWRCB). Communication with Mr. Patrick Otsuji of SWRCB. 2012.*
82. *South Coast Air Quality Management District (SCAQMD).1993. CEQA Air Quality Handbook.*
83. *South Coast Air Quality Management District (SCAQMD). Final 2012 Air Quality Management Plan. Adopted December 7, 2012.*
84. *South Coast Air Quality Management District (SCAQMD). Air Quality Significance Thresholds. Revised October 2006.*
85. *South Coast Air Quality Management District (SCAQMD). Final Localized Significance Threshold Methodology. Revised July 2008.*
86. *South Coast Air Quality Management District (SCAQMD). Off-Road Engines Mitigation Measure Tables. http://www.aqmd.gov/ceqa/handbook/mitigation/offroad/MM_offroad.html.Accessed May 2013.*
87. *Tom Sawyer Camp. 2012. Personal communication with Sarah Fish.*
88. *University of California, Riverside (UCR). 2014. Polyphagous Shot Hole Borer. https://cisr.ucr.edu/polyphagous_shot_hole_borer.html. October 2014.*
89. *U.S. Army Corps of Engineers (USACE). 2010. "Los Angeles County's Arroyo Seco Watershed Ecosystem Restoration Study."*
90. *U.S. Environmental Protection Agency (USEPA). Compilation of Air Pollutant Emission Factors – AP-42, Volume 1, Fifth Edition. January 1995.*
91. *U.S. Environmental Protection Agency (USEPA). Conversion Factor from Update Heavy Duty Emission Conversion Factors for MOBILE6: Analysis of BSCFs and Calculation of Heavy-Duty Engine Conversion Factors. USEPA, Motor Vehicle Emissions Laboratory. EPA420-P-98-015. May 1998.*
92. *United States Fish and Wildlife Service (USFWS). 2001. Least Bell's vireo survey guidelines. Carlsbad Field Office, Carlsbad, California. Letter dated January 19, 2001.3 pp.*
93. *Vista Environmental. Health Risk Assessment: Devil's Gate Reservoir Sediment Removal and Management Project. September 27, 2013.*
94. *Western Regional Climate Center. Western U.S. Climate Historical Summaries. http://www.wrcc.dri.edu/ Climsum.html. Accessed May 2013.*

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FINAL ENVIRONMENTAL IMPACT REPORT

DEVIL'S GATE RESERVOIR SEDIMENT REMOVAL AND MANAGEMENT PROJECT PASADENA, CA (LOS ANGELES COUNTY)

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SECTION 8.0 – CLARIFICATIONS AND MODIFICATIONS

The following clarifications and revisions are intended to update the Draft EIR in response to the comments received during the public review period. These changes, which have been incorporated into the Draft EIR, constitute the Final EIR, to be presented to the County of Los Angeles Board of Supervisors for certification and approval. These modifications clarify, amplify, or make insignificant changes to the EIR. Revisions to the EIR have not resulted in new significant impacts or mitigation measures or increased the severity of an impact. None of the criteria for recirculation set forth in the CEQA Guidelines section 15088(a) have been met, and recirculation of the EIR is not required.

The changes to the Draft EIR are listed by section and page number. Text which has been removed is shown in this chapter with a strikethrough line, while text that has been added is shown with bold and italics. All of the changes shown in this section have also been made in the corresponding Final EIR sections. Minor editorial corrections (e.g., typographical, grammatical, etc.) have been made throughout the document and are not indicated by strikethrough or ***bold italics*** text. Please refer to Section 9.0 – Response to Comments, for referenced comment letters and corresponding comments.

Section **Executive Summary**

Page **Clarification/Revision**

ES-3 After the 3rd paragraph under E.S.2.2 Project Background, the following paragraphs have been added:

The Los Angeles County Flood Control Act (Act) was adopted by the State Legislature in 1915 after a disastrous regional flood took a heavy toll on lives and property. The Act established the Los Angeles County Flood Control District (LACFCD) and empowered it to provide flood protection and water conservation within its boundaries.

A reservoir storage design capacity of two design debris events (DDEs) below the dam's lowest spillway was determined to be the standard acceptable level of risk at Devil's Gate Dam and Reservoir. The DDE volume of capacity is determined using the January 2006 County of Los Angeles Department of Public Works Hydrology Manual and the March 2006 County of Los Angeles Department of Public Works Sedimentation Manual.

LACFCD established the required design capacity at two DDEs to ensure that the reservoir always has sufficient capacity to maintain the level of downstream flood protection. By establishing the design capacity at two DDEs, the reservoir is likely to have sufficient capacity to experience a design level storm, or several smaller but significant debris events, and still maintain capacity of at least one DDE during the lengthy environmental and construction processes to remove the debris. Further, it should be noted that additional criteria in special circumstances related to dam safety may also dictate the need to remove sediment from a reservoir:

- ***Depending on the structural stability of the dam, the height of sediment against the dam may need to be limited (sediment weighs more than water and increases the forces on the dam during an earthquake).***

- ***The volume of sediment accumulation may also be limited to prevent sediment from blocking valves/operations (if the debris blocks the outlet valves, they cannot be used to regulate storm flows or to empty the dam during an emergency).***

Therefore, to minimize flood risk for Devil's Gate Dam and Reservoir, the required reservoir capacity is based on debris control and is 4.0 million cy (two DDEs) below the spillway elevation of 1,040.50 feet.

For more information on the DDE calculations, please review the Hydrology and Sedimentation Manuals at the following locations:

The Hydrology Manual (January 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_Hydrology_Manual/2006%20Hydrology%20Manual-Divided.pdf

The Sedimentation Manual (March 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_sedimentation_manual/Sedimentation%20Manual-Second%20Edition.pdf

ES-5 In the 1st paragraph under Sediment Disposal, the following details have been added:

Excavated sediment will be trucked offsite to existing disposal site locations which are currently available to accept the sediment. Trucks will travel and place sediment at one of the primary disposal site locations, the Waste Management Facility in Azusa, the Vulcan Materials Reliance Facility in Irwindale, or the Manning Pit Sediment Placement Site (SPS) in Irwindale. Secondary disposal sites are the facilities in Sun Valley (Sheldon Pit, Sun Valley Fill Site, Bradley Landfill, and Boulevard Pit).~~It~~ ***Over the life of the Proposed Project sediment removal phase, it*** is estimated that the eastern disposal sites will be used from 80 to 100 percent of the time. Use of the Sun Valley sites is estimated to occur from 0 to 20 percent of the time ***throughout the Proposed Project sediment removal phase***. Removed vegetation and organic debris will be hauled to Scholl Canyon Landfill located in the City of Glendale.

ES-8 In the 4th and 5th paragraphs under Option 1 – Entire Configuration A Management Area, the following paragraph has been added:

Sediment Excavation/Trucking Offsite: Depending on the efficiency of the FAST operations, some mechanical excavation and trucking offsite may be required for removal of accumulated sediment. Sediment excavation/trucking offsite will use the same methods and trucking routes as under the sediment removal phase. It is estimated, based on past storm events, that sediment excavation/trucking offsite will be required to ***typically*** remove ~~an average of~~ 13,000 cy of sediment annually. Based on an estimated removal of 4,800 cy per day, it is expected this will occur over an estimated two-week period, Monday through Friday. This removal activity will take place during the late summer/early fall following vegetation maintenance.

Moderately large sediment deposits have the potential to occur during a storm season, but it is anticipated that even with this type of event the newly deposited sediment could be removed in one season. A moderately large sediment removal event, anticipated to involve around 170,000 cy, could take place over an estimated 12-week period during the late summer/early fall following the vegetation maintenance.

ES-10 In the 3rd paragraph under E.S.3 Areas of Controversy/Issues To Be Resolved, the following edits have been made:

A Notice of Preparation (NOP) and Initial Study (IS) was released on September 28, 2011 (Appendix A); and two Public Scoping meetings were held on October 5 and October 15, 2011. Comments received during a 45-day comment period were considered and incorporated into this document. ~~Two public scoping meetings were held for the Proposed Project, one on October 5, 2011, and one on October 15, 2011.~~ The scoping meeting introduced the Proposed Project, outlined the environmental review process for the EIR, and invited ***the*** public ***to submit*** comment***s*** on the scope and content of the EIR. Approximately 50 members of the public attended each meeting. Issues and concerns raised at the public scoping meetings included disruption to neighbors, destruction of biodiversity and habitat, restoring natural processes in the reservoir, sluicing sediment as an alternative, sensitivity to surrounding land uses including the high school, and coordination with agencies and affected users. The key issues and areas of controversy are detailed in Section 1.0 – Introduction, subsection 1.4. In addition to the comments provided at the interviews and scoping meetings, several comments were received in response to the Notice of Preparation (NOP)/Initial Study (IS) for this EIR. The primary areas of controversy identified by the public and agencies include impacts to traffic, air quality, noise in the surrounding areas, land use issues, and impacts to recreation.

ES-11 In the 1st paragraph under E.S.5 Summary of Potential Impacts and Mitigation Measures, the following revisions have been made:

The analysis undertaken for this Final EIR has determined that impacts to ***Air Quality,*** Biological Resources, Cultural Resources, Land Use and Planning, and Noise could be mitigated to a level of less than significant. Unmitigable significant impacts include ***significant*** impacts to Aesthetics and ***temporary significant impacts to*** Traffic/Transportation.

ES-12 In the 3rd full row of Table ES-1, the following clarifications have been made:

Air Quality		
Air Quality-1: Conflict with the implementation of SCAQMD air quality management plan due to sediment removal emissions of NO_X exceeding the Daily Regional Threshold will result in a significant impact.	**MM AQ-1**: LACFCD shall require all construction contractors during the sediment removal phase of the Proposed Project to use ***only*** sediment removal dump trucks that meet the EPA's emission standards for Model Year 2007 ***or later*** ~~as reasonably feasible~~. **MM AQ-2**: LACFCD shall require all construction contractors during the sediment removal phase of the Proposed Project to use off-road equipment that meets, at a minimum, EPA's emission standards for Tier 3 equipment.	***Less than Significant*** ~~Full implementation of these mitigations could be unachievable. Therefore, impact remains significant and unavoidable.~~
Air Quality-2 and Air Quality-3: Sediment removal emissions of NO_X will exceed the SCAQMD Daily Regional Threshold, resulting in a significant impact to an air quality standard.	See MM AQ-1 and MM AQ-2.	***Less than Significant*** ~~Full implementation of these mitigations could be unachievable. Therefore, impact remains significant and unavoidable.~~
Air Quality 6: Sediment removal emissions of NO_X will exceed the SCAQMD Daily Regional Threshold, resulting in a cumulatively significant impact.	See MM AQ-1 and MM AQ-2.	***Less than Significant*** ~~Full implementation of these mitigations could be unachievable. Therefore, impact remains significant and unavoidable.~~

ES-12 In the 6th full row of Table ES-1 under Biological Resources, the following clarifications have been made:

Biological Resources		
Biology-1: Removal of habitat during sediment removal will result in a potentially significant impact to five special status wildlife species (least Bell's vireo, yellow warbler, southwestern pond turtle, coast range newt, and two-striped garter snake) and nesting native birds and roosting bats.	**MM BIO – 1**: A qualified biological monitor shall be present during initial ground- or vegetation-disturbing project-related activities ***to provide measures and monitor for wildlife in harm's way. This includes initial ground- or vegetation-disturbing project-related activities at the annual start of each year of sediment removal or maintenance activities***. Following initial project-related activities, a qualified monitoring biologist shall be present as necessary to maintain the implemented protection measures and monitor for additional species in harm's way. ***These protection measures shall include, as appropriate: redirecting wildlife, identifying areas that may require exclusionary devices (e.g., fencing), or capturing and relocating wildlife***	Less than significant

	outside the work area. Any captured species shall be relocated to adjacent appropriate habitat that is contiguous to adjacent habitat and not impacted by project-related disturbance activities. **MM BIO – 2**: Within 90 days prior to ground-disturbing activities, a sensitive species educational briefing shall be conducted by a qualified biologist for construction personnel. The biologist will identify all sensitive resources that may be encountered onsite, and construction personnel will be instructed to avoid and report any sightings of sensitive species to LACFCD or the monitoring biologist. Educational briefings shall be repeated annually for the duration of the sediment removal. **MM BIO – 3**: Within 90 days prior to ground-disturbing activities, a preconstruction survey shall be conducted by a qualified biologist for the presence of any sensitive species in harm's way, including coast range newt, the southwestern pond turtle, and the two-striped garter snake. If sensitive species are observed in harm's way, the qualified biologist will develop and implement appropriate protection measures for that species. These protection measures shall include, as appropriate: redirecting the species, ***constructing*** ~~of~~ exclusionary devices (e.g., fencing), or ***capturing*** ~~capture~~ ***and relocating*** ~~relocation~~ ***wildlife*** outside the work area. Preconstruction ***surveys*** shall be repeated annually for the duration of the sediment removal. ***Observations of special status species made during these surveys shall be recorded onto a CNDDB field data sheet and submitted to CDFW for inclusion into the CNDDB.*** **MM BIO – 4**: LACFCD, in consultation with a qualified biologist, will employ bird exclusionary measures (e.g., mylar flagging) prior to the start of bird breeding season to prevent birds nesting within established boundaries of the project. Prior to commencement of sediment removal activities within bird breeding season (March 1-August 31), a preconstruction bird nesting survey shall be conducted by a qualified biologist for the presence of any nesting bird within 300 feet of the construction work area. The surveys shall be conducted 30 days prior to the disturbance of suitable nesting habitat by a qualified biologist with experience in conducting nesting bird surveys. The surveys shall continue on a weekly basis with the last survey being conducted no more than 3 days prior to the initiation of clearance/construction work. Preconstruction surveys shall be repeated annually for the duration of the sediment removal. If an active nest is found, the qualified biologist will develop and implement appropriate protection measures for that nest. These protection measures shall include, as appropriate, construction of exclusionary devices (e.g., netting) or avoidance buffers. The biologist shall have the discretion to adjust the buffer	

area as appropriate based on the proposed construction activity, the bird species involved, and the status of the nest and nesting activity; but shall be no less than 30 feet. Work in the buffer area can resume once the nest is determined to be inactive by the monitoring biologist.

MM BIO – 5: Within 30 days prior to commencement of vegetation or structure removal activities, a preconstruction bat survey shall be conducted by a qualified biologist for the presence of any roosting bats. ***Acoustic recognition technology shall be used if feasible and appropriate.*** If either a bat maternity roost or hibernacula (structures used by bats for hibernation) ***are*** present, a qualified biologist will develop and implement appropriate protection measures for that maternity roost or hibernacula. These protection measures shall include, as appropriate: safely evicting non-breeding bat hibernacula, establishment of avoidance buffers, or replacement of roosts at a suitable location. ***These measures shall also include as appropriate:***

- ***To the extent feasible, trees that have been identified as roosting sites shall be removed or relocated between October 1 and February 28.***
- ***When trees must be removed during the maternity roost season (March 1 to September 30), a qualified bat specialist shall conduct a preconstruction survey to identify those trees proposed for disturbance that could provide hibernacula or nursery colony roosting habitat for bats.***
- ***Trees identified as potentially supporting an active nursery roost shall be inspected by a qualified biologist no greater than 7 days prior to tree disturbance to determine presence or absence of roosting bats.***
- ***Trees determined to support active maternity roosts will be left in place until the end of the maternity season (September 30).***
- ***If bats are not detected in a tree, but the qualified biologist determined that roosting bats may still be present, trees shall be removed as follows:***
    - ***Pushing the tree down with heavy machinery instead of felling the tree with a chainsaw***
    - ***First pushing the tree lightly 2 to 3 times with a pause of 30 seconds in between each nudge to allow bats to become active, then pushing the tree to the ground slowly***
    - ***Allowing the tree to remain in place for 24 to 48 hours until inspected by the qualified biologist for presence or absence***

	of roosting bats ▪ ***The qualified biologist shall document all bat survey, monitoring, and protection measure activities and prepare a summary report for LACFCD.***	
Biology-2: A significant impact will occur to riparian habitats and sensitive habitats.	MM BIO – 6: Riversidean Alluvial Fan Sage Scrub habitat shall be restored and/or enhanced at a 1:1 ratio by acreage. Areas shall be mapped using aerial photographs. MM BIO – 7: Within 90 days prior to ground-disturbing activities, a qualified biologist shall conduct a tree survey within the project footprint, to identify trees that will be removed or potentially affected by the Proposed Project and trees that can be avoided. LACFCD will replace trees that cannot be avoided. The replacement is expected to be up to 1:1 by acreage. The biological monitor shall implement measures to protect the root zone of oak trees that may be impacted immediately adjacent to the project site and along access roads. MM BIO – 8: A combination of onsite and offsite habitat restoration, enhancement, and exotic removal shall be implemented by LACFCD at a 1:1 ratio for impacted sensitive habitat and jurisdictional waters. Habitat restoration/enhancement shall include use of willow cuttings and exotic species removal. ***Non-native, weedy*** ~~Ruderal~~ habitats within the basin shall be utilized whenever possible as mitigation sites. This mitigation measure shall be monitored for success for five years following implementation. A report of the monitoring results shall be submitted annually, during the five years following implementation, to resource agencies as required by the Section 401 Certification, Section 404 permit, and a Streambed Alteration Agreement.	Less than significant

ES 17 through ES 20 In the four rows of Table ES-1 under Traffic and Transportation, the following clarifications have been made:

Transportation and Traffic		
Transportation-1: ***Temporary*** significant impacts to haul route intersections could cause a substantial increase in traffic which would affect the efficiency of the circulation system.	**MM TRA-1**: Proposed Project haul trucks will not deliver to the Vulcan Material Reliance Facility during the PM peak period. **MM TRA-2**: Proposed Project haul trucks will not deliver to the Boulevard Pit during the PM peak period.	Implementation of the mitigation measures would reduce impacts but not to a level of less than significant. Other potential impact reduction measures could reduce impacts to less than significant; however, these measures cannot be legally imposed by the LACFCD, since the locations are under the jurisdiction of other agencies. Every reasonable effort will be made to coordinate with and receive approval from the jurisdictional agencies to implement the impact reduction measures but LACFCD cannot guarantee that the measures will be implemented. Therefore, this ***temporary*** impact could remain potentially significant.

Transportation-2: Proposed Project traffic associated with sediment removal could adversely affect traffic level of service at the following intersections, resulting in a ***temporary*** significant impact: Berkshire Place and I-210 Eastbound Ramps intersection during the AM peak period; Figueroa St/Scholl Canyon Road and SR-134 Westbound Ramps during the AM and PM peak periods; Irwindale Avenue/Foothill Boulevard intersection during the PM peak hour; Glenoaks Boulevard and Osborne Street intersection during the AM and PM peak periods; Sheldon Street and San Fernando Road intersection during the PM peak period; and Branford Street and San Fernando Road intersection during the PM peak period.	See MM TRA-1 and MM TRA-2.	Implementation of the mitigation measures would reduce impacts but not to a level of less than significant. Other potential impact reduction measures could reduce impacts to less than significant; however, these measures cannot be legally imposed by the LACFCD, since the locations are under the jurisdiction of other agencies. Every reasonable effort will be made to coordinate with and receive approval from the jurisdictional agencies to implement the impact reduction measures but LACFCD cannot guarantee that the measures will be implemented. Therefore, this ***temporary*** impact could remain potentially significant.

Transportation-5: Reduction of LOS at intersections could affect buses using the existing roadway network, resulting in a ***temporary*** significant impact.	See MM TRA-1 and MM TRA-2.	Implementation of the mitigation measures would reduce impacts but not to a level of less than significant. Other potential impact reduction measures could reduce impacts to less than significant; however, these measures cannot be legally imposed by the LACFCD, since the locations are under the jurisdiction of other agencies. Every reasonable effort will be made to coordinate with and receive approval from the jurisdictional agencies to implement the impact reduction measures but LACFCD cannot guarantee that the measures will be implemented. Therefore, this ***temporary*** impact could remain potentially significant.

Transportation-6: During sediment removal the Proposed Project will result in significant delays at the following intersections, resulting in significant cumulative impacts. These intersections include: Berkshire Place and I-210 Eastbound Ramps intersection during the AM peak period; Irwindale Avenue/Foothill Boulevard intersection during the PM peak hour; Figueroa St/Scholl Canyon Road and SR-134 Westbound Ramps during the AM and PM peak periods; Glenoaks Boulevard and Osborne Street intersection during the AM and PM peak periods; Sheldon Street and San Fernando Road intersection during the PM peak period; and Branford Street and San Fernando Road intersection during the PM peak period.	See MM TRA-1 and MM TRA-2.	Implementation of the mitigation measures would reduce impacts but not to a level of less than significant. Other potential impact reduction measures could reduce impacts to less than significant; however, these measures cannot be legally imposed by the LACFCD, since the locations are under the jurisdiction of other agencies. Every reasonable effort will be made to coordinate with and receive approval from the jurisdictional agencies to implement the impact reduction measures but LACFCD cannot guarantee that the measures will be implemented. Therefore, this ***temporary*** impact could remain potentially significant.

ES-21 After the 1st paragraph under E.S.6 Project Alternatives, the following information has been added:

Alternative 3, Configuration D, which was found to be the Environmentally Superior Alternative in the Draft EIR, was based on the City of Pasadena's Hahamongna Watershed Park Master Plan (HWPMP). Alternative 3, Configuration D, Option 2 drastically reduces the project's footprint of 120 acres down to 71 acres. Additionally, the limited maintenance area for Alternative 3 further reduces the permanent habitat impacts down to approximately 51 acres by allowing for site replanting and mitigation to take place within the reservoir footprint. This reduction in project acreages will greatly lessen environmental impacts of the Proposed Project.

As shown in the Draft EIR, Section 4.6, Alternative 3 receives an in-depth analysis which present the potential impacts of each of the alternative and compares the impacts of the alternative to the Proposed Project and each of the other alternatives; providing ample information as to why this alternative was found to be the Environmentally Superior Alternative. Section 4.11 is a summary of these findings. The Draft EIR does not determine and has not designated any of the alternatives, including the Proposed Project, as the "Recommended Alternative." With the completion of the Final EIR, an alternative will be chosen and be presented to the Board of Supervisors as the Recommended Alternative. Any of the alternatives analyzed in the Draft EIR can be chosen as the Recommended Alternative.

ES-22 In the 3rd and 4th columns of Table ES-2, the following information has been added:

2 **Configuration C**	**3** **Configuration D** **(Environmentally Superior Alternative)**	
Back basin provides management area that can only be maintained through mechanical excavation.	**Limits excavation to two deeply excavated channels to provide more natural sediment movement and impact a smaller footprint**	
3,615,000 cy	3,588,000 cy	
Approximately 2 DDEs	***Approximately*** ~~Up to~~ 2 DDEs	
4,000,000 cy	2,425,000 cy	
	Option 1	***Option 2***
83.96 ac	75.99 ac	***70.81 ac***
5 years	5 years	***5 years***
47.10 ac	50.78 ac	***52.57 ac***
1010'	1040'	***1040'***
Allow to regrow above 1010' and plant on side slopes above 1020'	Allow to regrow above 1040' and in the west leg. Keep invert of the east leg clear	***Allow to regrow above 1040'. Replant above 1020' on the side slopes but keep invert clear***

ES-22 In the footnotes of Table ES-2, the following addition has been made:

* Plus any additional sediment received during the project sediment removal phase
***** Project Goal is to restore the design capacity (volume for two DDEs below the spillway elevation of 1,040.5 feet) and establish a reservoir management system to maintain the flood control capacity of the reservoir.***

ES-23 In the 3rd line of Table ES-3, the following clarification has been made:

Air Quality	***Less than Significant with Mitigation*** ~~Significant and Unavoidable~~	Reduced	Increased	Reduced	Potentially Increased	Similar	Reduced

ES-24 Figure ES-4 was revised to include the addition of Alternative 3, Configuration D, Option 2.

ES-25 Figure ES-5 was revised to include the addition of optional haul routes on Alternative 5, Haul Route Alternative.

Section 1.0 Introduction

Page Clarification/Revision

4 Beginning with the full 3rd bullet point on the page, the following edits have been made to 7 bullet points:

- Chapter 5: Other Mandatory CEQA Considerations – Includes a discussion of issues required by CEQA that are not covered in other chapters. This includes unavoidable adverse impacts, impacts found not to be significant, irreversible environmental changes, and growth inducing impacts.
- Chapter 6: References – Identifies the documents and individuals consulted in preparing the Draft EIR.
- Chapter 7: Report Preparation – Lists the individuals involved in preparing the Draft EIR.

- Chapter 8: Clarifications and Modifications – Identifies clarifications and revisions intended to update the Draft EIR in response to the comments received during the public review period.

- Chapter 9: Response to Comments – Provides the comments received during the public review period and the responses to those comments.

- Chapter 10: Mitigation Monitoring and Reporting Program

5 In the 2nd paragraph under 1.4 Areas of Controversy/Issues to Be Resolved, the following edit has been made:

A Notice of Preparation (NOP) and Initial Study (IS) was released on September 28, 2011 (Appendix A) and two Public Scoping meetings were held on October 5 and October 15, 2011. Comments received during a 45-day comment period were considered and incorporated into this document. ~~Two public scoping meetings were held for the Proposed Project, one on October 5, 2011, and one on October 15, 2011.~~ The scoping meeting introduced the Proposed Project, outlined the environmental review process for the EIR, and invited public comment on the scope and content of the EIR. Approximately 50 members of the public attended each meeting. Through this process, several key issues and areas of controversy were identified, including:

6 In the 2nd paragraph on the page, the following clarification has been made:

Another issue to be resolved involves the availability of dump trucks that meet EPA's emission standards for Model Year 2007 and later and the availability of off-road equipment that meets EPA's emission standards for ~~Tier 4~~ ***Tier 3*** equipment. This equipment would be required to conform to the mitigation measures proposed in Section 3.5 Air Quality; however, the availability of this equipment is unknown at this time.

Section 2.0 Project Description

Page Clarification/Revision

7 In the 2nd paragraph under 2.1.1 Location, the following clarifications have been made:

The Arroyo Seco watershed extends approximately ~~11 miles~~***16 miles in length along the centerline of the watershed and 24 miles along the Arroyo Seco from its origin in the*** ~~from the border of the~~ Angeles National Forest to ***the*** ~~it's the~~ ***Arroyo Seco's*** confluence with the Los Angeles River.

10 In the 1st paragraph under 2.1.4 LACFCD Devil's Gate Dam and Reservoir Easement, the following detail has been added:

Through easements granted in May of 1919 and March of 1965, the City of Pasadena granted the LACFCD, under a perpetual easement, the right to construct, reconstruct, inspect, maintain, repair, and operate Devil's Gate Dam, its spillway, ***reservoir,*** bypasses,

tunnels, and other support facilities as may be necessary for the construction and maintenance of a reservoir capable of impounding the waters of the Arroyo Seco for purposes of storage and control, and to control such waters as may be necessary in the prevention of damage by flood (City of Pasadena 1919/1965).

10 In the 1st paragraph under 2.1.6 Surrounding Land Uses, the following detail has been added:

The current leaseholders within Hahamongna Watershed Park include the Los Angeles County Fire Department (Fire Camp 2) and the Rose Bowl Riders, who sublet to the Tom Sawyer Camp ***and MACH 1 (Move a Child Higher).***

12 In the 1st paragraph on the page, the following modification has been made:

The Interim Measures Project (IMP) is currently underway to reduce downstream flood risk. The IMP includes dam modifications to ~~keep~~ ***reduce the risk of*** debris ~~from~~ plugging the outlet works and allow for the removal of up to 25,000 cy of sediment per year from the dam face until the Proposed Project is started. In 2011, approximately 13,000 cy were removed from the dam face and placed at Johnson Field. In 2012, approximately 1,525 cy of sediment and 419 cy of green waste were removed from the dam face and hauled to Johnson Field and Scholl Canyon Landfill, respectively. In 2013, 1,200 cubic yards of sediment and 12 to 14 loads of green waste were removed from the dam face and hauled to Johnson Field and Scholl Canyon Landfill, respectively.

12 After the 1st paragraph under 2.3 Project Need, the following information has been added:

The Los Angeles County Flood Control Act (Act) was adopted by the State Legislature in 1915 after a disastrous regional flood took a heavy toll on lives and property. The Act established the Los Angeles County Flood Control District (LACFCD) and empowered it to provide flood protection and water conservation within its boundaries.

A reservoir storage design capacity of two design debris events (DDEs) below the dam's lowest spillway was determined to be the standard acceptable level of risk at Devil's Gate Dam and Reservoir. The DDE volume of capacity is determined using the January 2006 County of Los Angeles Department of Public Works Hydrology Manual and the March 2006 County of Los Angeles Department of Public Works Sedimentation Manual.

LACFCD established the required design capacity at two DDEs to ensure that the reservoir always has sufficient capacity to maintain the level of downstream flood protection. By establishing the design capacity at two DDEs, the reservoir is likely to have sufficient capacity to experience a design level storm, or several smaller but significant debris events, and still maintain capacity of at least one DDE during the lengthy environmental and construction processes to remove the debris. Further, it should be noted that additional criteria in special circumstances related to dam safety may also dictate the need to remove sediment from a reservoir:

- ***Depending on the structural stability of the dam, the height of sediment against the dam may need to be limited (sediment weighs more than water and increases the forces on the dam during an earthquake).***

- ***The volume of sediment accumulation may also be limited to prevent sediment from blocking valves/operations (if the debris blocks the outlet valves, they cannot be used to regulate storm flows or to empty the dam during an emergency).***

Therefore, to minimize flood risk for Devil's Gate Dam and Reservoir, the required reservoir capacity is based on debris control and is 4.0 million cy (two DDEs) below the spillway elevation of 1,040.50 feet.

For more information on the DDE calculations, please review the Hydrology and Sedimentation Manuals at the following locations:

The Hydrology Manual (January 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_Hydrology_Manual/2006%20Hydrology%20Manual-Divided.pdf

The Sedimentation Manual (March 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_sedimentation_manual/Sedimentation%20Manual-Second%20Edition.pdf

14 In the 1st paragraph under Removal Method, the following clarifications have been made:

Historically, as storm events have deposited sediment in the reservoir, native and non-native vegetation have become established in the sediment. During subsequent storm events some of the vegetation and trees have been washed out by storm flows or submerged when the reservoir level rises, or buried under sedimentation. Despite the dynamic changes to water elevation and flows in the reservoir, mature black willow trees, Riversidean Alluvial Fan Sage Scrub, ~~Mule Fat Scrub~~ ***Mule Fat Thickets***, and riparian vegetation have thrived in the reservoir. During storm events following the 2009 Station Fire, a large portion of the reservoir vegetation was buried in sediment; however, significant amounts of vegetation, including numerous mature willow trees, remain intact.

15 In the 1st paragraph under Sediment Disposal, the following details have been added:

Excavated sediment will be trucked offsite to existing disposal site locations which are currently available to accept the sediment. Trucks will travel and place sediment at one of the primary disposal site locations, the Waste Management Facility in Azusa, the Vulcan Materials Reliance Facility in Irwindale, or the Manning Pit Sediment Placement Site (SPS) in Irwindale. Secondary disposal sites are the facilities in Sun Valley (Sheldon Pit, Sun Valley Fill Site, Bradley Landfill, and Boulevard Pit). It is estimated that ***over the life of the sediment disposal phase of the Proposed Project*** the eastern disposal sites will be used from 80 to 100 percent of the time. Use of the Sun Valley sites is estimated

to occur from 0 to 20 percent of the time ***over the duration of the sediment disposal phase***. Removed vegetation and organic debris will be hauled to Scholl Canyon Landfill located in the City of Glendale. It is estimated that for approximately three weeks during the first year of sediment removal, approximately 50 percent of the total trucking will be vegetation and organic debris hauled to Scholl Canyon Landfill; and the remaining 50 percent will be sediment distributed to the other sites. In the subsequent years of sediment removal, it is estimated that during the first week 25 percent of the total trucking will be vegetation and organic debris hauled to Scholl Canyon Landfill; and the remaining 75 percent will be sediment distributed to the other sites.

15 In the 6th, 7th, and 8th paragraphs under Sediment Disposal, the following clarifications have been made:

Sheldon Pit is an active operating gravel pit owned by Vulcan Materials Company. Hours of operation are 6:00 a.m. to 8:00 p.m., Monday to Saturday. It has no route or load restrictions (***Hall & Foreman, Inc. 2013b*** ~~Vulcan Materials 2013~~). Located at the north end of the Sun Valley Watershed, the pit is bounded by Wentworth Street to the east, Glenoaks Boulevard to the southwest, Tujunga Wash to the northwest, and Hansen Dam Golf Course to the north.

Sun Valley Fill Site (also known as Cal-Mat and Glenoaks Landfill) occupies a 90-acre site bounded by Glenoaks Boulevard on the southwest, Wentworth Street on the northwest, Peoria Street on the southeast, and Dronfield Avenue on the northeast. Hours of operation are 6:00 a.m. to 8:00 p.m., Monday to Saturday. It has a load restriction of 300 trucks per day (***Hall & Foreman, Inc. 2013b*** ~~Vulcan Materials 2013~~). Cal Mat Pit was an active gravel pit until the late 1980s. Since then it has been used as a landfill for inert construction debris including concrete, asphalt, rock, dirt, and brick. Vulcan Materials Company owns and operates Cal Mat Pit under a City of Los Angeles Environmental Affairs Department solid waste facilities permit (Number 19-AR-1160). A reclamation plan for Cal Mat Pit ~~(Conrock and California Portland Cement 1977)~~ has been approved by and is on file at the City of Los Angeles Department of City Planning (LADWP 2012).

Boulevard Pit, an active gravel pit is owned by Vulcan Materials Company. The pit is bounded by Branford Street to the north, San Fernando Road to the east, Sheldon Street to the south, and Laurel Canyon Boulevard to the west. Hours of operation are 6:00 a.m. to 8:00 p.m., Monday to Saturday. It has no route or load restrictions (***Hall & Foreman, Inc. 2013b*** ~~Vulcan Materials 2013~~).

16 In the 1st paragraph under Project Site Access/Staging, the following revisions have been made:

Trucks will enter the reservoir via the upgraded reservoir access road located on the east side of the reservoir. After rehabilitation and minor improvements to the existing west side reservoir access road, trucks will exit the reservoir via this road. As part of the Proposed Project, the existing western access road and the upgraded eastern access road will be improved with new ramps to allow for truck traffic in and out of the reservoir. The eastern access road will allow for one-way truck traffic, and the western access road will allow for one-way truck traffic. The eastern access road will now allow

for traffic to enter the reservoir directly from Oak Grove Drive as opposed to using La Cañada Verdugo Road. The existing western access road is currently unpaved, and the portion of this access road from below the bike path to the reservoir will be widened but remain unpaved. The portion of this access road from Oak Grove Drive to the West Rim Trail bike path will need to be widened and paved. ***The sediment removal equipment will be staged within the Proposed Project site overnight, during sediment removal operations. No staging of sediment removal equipment will take place on city streets. Specifics of the staging area(s) will be dictated by the contractor but will follow all applicable RWQCB requirements. Sediment hauling trucks will be queued within the Proposed Project site during removal activities and will be stored offsite nightly by their respective operators.*** ~~Empty trucks will be staged within the Proposed Project site.~~

22 In the 1st and 2nd paragraphs under Section 2.5.2 Reservoir Management, the following information has been added:

The reservoir management phase of the Proposed Project is expected to start in 2020 after the completion of the ~~main~~ sediment removal phase. The Proposed Project is expected to result in a reservoir configuration and access to facilitate future routine annual management and sediment removal. After the initial proposed sediment removal activities, the reservoir will be managed through vegetation maintenance, sediment excavation/trucking offsite, and Flow-Assisted Sediment Transport (FAST). These activities will take place under one of the options described below. The purpose of the proposed annual management activities, described below, is to reduce buildup of sediment in the reservoir management area and eliminate or substantially reduce the need for large-scale sediment removal. It is estimated that ***typically*** ~~an average of~~ 13,000 cy of sediment will potentially be deposited in the reservoir annually after completion of the Proposed Project. The access roads will be maintained to provide proper road width for access.

Moderately large sediment deposits have the potential to occur during a storm season, but it is anticipated that even with this type of event the newly deposited sediment could be removed in one season. A moderately large sediment removal event, anticipated to involve around 170,000 cy, could take place over an estimated 12-week period during the late summer/early fall following the vegetation maintenance.

23 In the 2nd paragraph under Section 2.5.2 Reservoir Management, Sediment Excavation/Trucking Offsite the following information has been added:

It is estimated, based on past storm events, that sediment excavation/trucking offsite will be required to ***typically*** remove ~~average of~~ 13,000 cy of sediment annually. Based on an estimated removal of ***a maximum of*** 4,800cy per day, it is expected this will occur over an estimated two-week period, Monday through Friday. This removal activity will take place during the late summer/early fall following the vegetation maintenance. ***Removal of the sediment, vegetation, trees, and organic debris is expected to require an average of 50 truck round trips per hour, with an estimated 200 to a maximum of 300 truck round trips per day during excavation activities.***

27 In the 5th bullet point under Section 2.7 Best Management Practices the following clarification has been made:

- If the project may be active during ***rain events*** ~~in the rainy season (October 15 through April 15)~~, the Contractor shall prepare an accumulated precipitation procedure (APP) for review and approval by the LACFCD Engineer before any discharge from the project. The APP shall describe the location of proposed discharges, the BMPs to prevent pollution, and the actual equipment to be used. The APP shall be prepared and submitted in accordance with BMP NS-2 and the LACDPW Construction Site BMPs Manual (BMP Manual) Section 7.

28 Under Section 2.8.3 Reviewing Agencies, the following clarifications have been made:

Regional Agencies

- Southern California Association of Governments (SCAG)
- South Coast Air Quality Management District (SCAQMD)
- ~~City of Pasadena~~
- ~~City of La Cañada Flintridge~~
- ~~City of Azusa~~
- ~~City of Irwindale~~
- ~~City of Los Angeles~~

Local Agencies

- ***City of Pasadena***
- ***City of La Cañada Flintridge***
- ***City of Azusa***
- ***City of Irwindale***
- ***City of Los Angeles***

Section 3.4 Aesthetics

Page Clarification/Revision

50 After the 1st paragraph under 3.4.3 Applicable Regulations, the following edits and additions have been made:

City of Pasadena General Plan

The City of Pasadena General Plan ***Land Use Element*** Objectives and Policies pertaining to the Proposed Project are outlined below.

OBJECTIVE 9 – Open Space Preservation and Acquisition: Preserve and acquire open space in Pasadena in order to enhance the quality of Pasadena life.

Policy 9.5 – Stewardship of the Natural Environment: Encourage and promote the stewardship of Pasadena's natural environment, including water conservation, clean air, natural open space protection, and recycling. Encourage the use of native, water conserving, and regionally appropriate landscaping.

The Green Space, Recreation and Parks Element (City of Pasadena 2007)

Policy 1.2 – Protect Open Spaces: Protect natural open areas, watersheds, and environmentally sensitive areas such as Hahamongna, Eaton Canyon, riparian areas, and other open spaces.

OBJECTIVE 2 – PRESERVATION AND PROTECTION OF THE ARROYO SECO AND ADJACENT OPEN SPACE AREAS: Recognize the importance to Pasadena of the history, cultural resources, and unique character of the Arroyo Seco, and conserve and enhance these assets.

Policy 2.1 – Arroyo Seco Planning: Fully implement all master plans and design guidelines for the Arroyo. This includes the Lower Arroyo Master Plan, the Hahamongna Watershed Park Master Plan, and the Central Arroyo Master Plan. (LUE Policy 9.2)

Policy 2.3 – Balance Recreation with Environmental Protection: Implement the Arroyo Seco Master Plans by balancing recreational opportunities with protection and restoration of the ecosystem, while recognizing the important existing water resources and flood management functions of the area.

Policy 2.4 – Promote multi-faceted use of the Arroyo: Through implementation of the Arroyo Seco Master Plans, continue to maintain and enhance the area as a prime resource for quality of life of Pasadena residents.

60 In the 4th paragraph under Reservoir Management, the following revision has been made:

Under Option 2, at the end of the sediment removal phase, implementation of Mitigation Measures MM BIO-6, MM BIO-7, and MM BIO-8 would involve habitat restoration and enhancement and tree replacement in the remaining approximately ***28.72***~~86.45~~ acres on the northern half of the reservoir.

64 In the 3rd paragraph under Reservoir Management, the following revision has been made:

Under Management Option 2, approximately 91.28 acres on the southern half of the reservoir will exhibit the annual changes from disturbed to low, dense Riparian Herbaceous vegetation; and habitat restoration and enhancement and tree replacement will take place in the remaining approximately ***28.72***~~86.45~~ acres on the northern half of the reservoir.

64 In the 2nd paragraph under Mitigation Measures, the following revision has been made:

For reservoir management under Option 2, at the end of the sediment removal phase, implementation of Mitigation Measures MM BIO-6, MM BIO-7, and MM BIO-8 would involve habitat restoration and enhancement and tree replacement in the remaining approximately ***28.72***~~86.45~~ acres on the northern half of the reservoir.

Section 3.5 Air Quality

Page	**Clarification/Revision**
76	In the 3rd paragraph under Sensitive Receptors, the following detail has been added: The Proposed Project is located adjacent to residential areas, and 10 schools are located within one-half mile: i.e., Crestview Preparatory, Franklin Elementary, Hillside School and Learning Center, Jackson Elementary, La Cañada High School ***(includes La Cañada Junior High School)***, ***Child Education Center,*** Nanny's Nursery, Odyssey Charter, and Woodbury Preschool Village.
85	In the 2nd paragraph of 3.5.6 Impacts and Mitigation, the following clarifications have been made: Use of sediment removal dump trucks that meet EPA's emission standards for Model Year 2007 and use of off-road equipment that meets, at a minimum, EPA's emission standards for Tier 3 interim equipment, would result in a reduction of NO_X emissions to less than the SCAQMD Regional Threshold for NO_X. ~~Every effort will be made to strive for the newest vehicles/equipment reasonably available.~~ Implementation of Mitigation Measures MM AQ-1 and MM AQ-2 will result in a reduction of NO_X emissions to less than the SCAQMD Regional Threshold for NO_X***. Therefore, impacts during sediment removal will be less than significant.***~~; however, the actual vehicles/equipment used may not reach the levels required to reduce the NO_x emissions to a level of less than significant for the sediment removal phase. Therefore, the Proposed Project during sediment removal will not meet the first indicator.~~
85	In the 6th paragraph of 3.5.6 Impacts and Mitigation, the following clarifications have been made: **MM AQ-1**: LACFCD shall require all construction contractors during the sediment removal phase of the Proposed Project to use ***only*** ~~as many~~ sediment removal dump trucks that meet EPA's emission standards for Model Year 2007 ***or later*** ~~as reasonably feasible~~.
86	In the 8th paragraph of 3.5.6 Impacts and Mitigation, the following clarifications have been made: Implementation of these mitigations would reduce the Proposed Project's combined NO_X emissions during the sediment removal phase~~; however while every reasonable effort will be made to strive for the newest vehicles/equipment, the actual~~

~~vehicle/equipment fleet may not reach the levels required to reduce emissions~~ to a level of less than significant***.*** ~~; therefore, this impact remains significant and unavoidable.~~

87 In Table 3.5-6, the following edits have been made:

Table 3.5-6: Unmitigated Sediment Removal Emissions

Category	Maximum Daily Emissions (lbs/d)				
	ROG	CO	NO_X	PM_{10}	$PM_{2.5}$
Off-Road	7.54	33.99	55.18	2.87	2.87
On-Road Trucks	7.15	34.87	314.93	5.33	4.91
Onsite Idling	***0.44***	***1.89***	***7.88***	***0.05***	***0.05***
Employees	0.07	2.44	0.24	0.00	0.00
Fugitive	0.00	0.00	0.00	27.30	4.44
Project Maximum Daily	***15.2~~14.78~~***	***73.2~~71.30~~***	***378.2~~370.30~~***	**13.70**	**8.70**
SCAQMD Daily Threshold	75.00	550.00	100.00	150.00	55.00
Exceeds Threshold?	No	No	**Yes**	No	No

88 In the 1st and 2nd paragraphs under Off-Road, the following revisions have been made:

Reduction of impacts from off-road equipment usage during the sediment removal can be accomplished by requiring the Proposed Project Contractor to use only EPA ***Tier 3*** ~~Tier 4 interim~~ equipment. ***Tier 3*** ~~Tier 4 interim~~ emissions standards are addressed in 40 Code of Federal Regulations (CFR), Part 1039 which addresses new compression-ignition non-road (i.e., CARB off-road equivalent) engines. Standards were phased in for various power categories with the latest being effective in 2011.

The emission factor used to estimate off-road equipment in this AQR was obtained from tables presented in CalEEMod's User Guidelines and represents the statewide average of equipment for each category. The factors for Fleet Year 2015 most closely compare to an average fleet of Tier 2 equivalent equipment. Applying the percentage reductions from Tier 2 to ***Tier 3*** ~~Tier 4 interim~~ to the unmitigated emissions represented above reduces the NO_X emissions from the off-road component for the sediment removal phase of the Proposed Project (SCAQMD 2013).89 In the 12th paragraph of AIR QUALITY-2, the following clarifications have been made:

As shown in Table 3.5-7 below, use of sediment removal dump trucks that meet EPA's emission standards for Model Year 2007 and use of off-road equipment that meets, at a minimum, EPA's emission standards for ***Tier 3*** ~~Tier 4 interim~~ equipment would result in a reduction of the Proposed Project's combined NO_X emissions during the sediment removal to less than the SCAQMD Regional Threshold for NO_X. ~~Every effort will be made to strive for the newest vehicles/equipment reasonably available.~~ Implementation of

Mitigation Measures MM AQ-1 and MM AQ-2 will result in a reduction of NO_X emissions~~; however, the actual vehicles/equipment used may not reach the levels required to~~ ***and will*** reduce the NO_X emissions to a level of less than significant for the sediment removal phase.

89 In Table 3.5-7, the following edits have been made:

Table 3.5-7: Sediment Removal Emissions with Model 2007 Sediment Removal Trucks and *Tier 3* ~~Tier 4 Interim~~ Off-road Equipment

Category	Maximum Daily Emissions (lbs/d)				
	ROG	CO	NO_X	PM_{10}	$PM_{2.5}$
Off-Road	4.7~~120~~	33.99	***22.05***~~21.88~~	***2.60***~~0.22~~	***2.15***~~0.22~~
On-Road Trucks	7.15	34.87	18.90	1.07	0.98
Onsite Idling	***0.44***	***1.89***	***2.48***	***0.01***	***0.01***
Employees	0.07	2.44	0.24	0.00	0.00
Fugitive	0.00	0.00	0.00	5.46	0.89
Project Maximum Daily	***12.4***~~11.47~~	***73.2***~~71.32~~	***81.74***~~1.05~~	***10.5***~~6.80~~	***5.22***~~.10~~
SCAQMD Daily Threshold	75.00	550.00	100.00	150.00	55.00
Exceeds Threshold?	No	No	No	No	No

89 In the 1st paragraph under Reservoir Management, the following changes have been made:

Emissions will be related to the off-road equipment used for reservoir management under both options, including four front loaders with 2-cubic-yard buckets, one bulldozer, an excavator, a grader, water truck, and sorters/crushers. Removal of the sediment, vegetation, trees, and organic debris is expected to require an estimated ***200 to a*** maximum of ~~2~~ ***300*** truck trips per day. It is estimated that during the first week approximately 25 percent of the debris will be green waste trucked to the Scholl Canyon Landfill, and the remaining 75 percent of trucking will be sediment distributed to the other sites. During reservoir management it is estimated that for the total trips, 2 percent will go to Scholl Canyon Landfill, 75 percent will go to the Irwindale sites, and 23 percent will go to the Sun Valley sites. ***Reservoir management activities will use only disposal trucks that meet EPA's emission standards for Model Year 2007 or later and Tier 3 or higher equipment.***

91 In Table 3.5-8, the following edits have been made:

Table 3.5-8: Unmitigated Reservoir Management Activity*

Category	Maximum Daily Emissions (lbs/d)				
	ROG	CO	NO_X	PM_{10}	$PM_{2.5}$
Off-Road	***2.86***~~3.14~~	***17.29***~~16.57~~	19.26	0.9***82***	0.9***82***
On-Road Trucks	2.***82***~~17~~	***17.47***~~12.16~~	***40.56***~~74.62~~	***1.70***~~1.13~~	***1.56***~~1.04~~
Onsite Idling	***0.20***	***0.89***	***1.17***	***0.00***	***0.00***
Employees	0.02	0.76	0.07	0.00	0.00
Fugitive	0.00	0.00	0.00	3.30	0.75
Project Maximum Daily	**5.*90*~~5~~**	***36.40.24***	***61.19*~~4.00~~**	***10.55*~~.40~~**	***3.32*~~.80~~**
SCAQMD Daily Threshold	75.00	550.00	100.00	150.00	55.00
Exceeds Threshold?	No	No	No	No	No

* ***Reservoir management activities will use only disposal trucks that meet EPA's emission standards for Model Year 2007 or later and Tier 3 or higher equipment.***

91 In the 20th paragraph of AIR QUALITY-2, the following clarifications have been made:

Implementation of Mitigation Measures MM AQ-1 and MM AQ-2 would reduce the Proposed Project's combined NO_X emissions during the sediment removal phase~~; however, while every reasonable effort will be made to strive for the newest vehicles/equipment, the actual vehicle/equipment fleet may not reach the levels required to reduce emissions~~ to a level of less than significant. ~~Therefore, this impact remains significant and unavoidable.~~

92 In the 5th paragraph of AIR QUALITY-3, the following clarifications have been made:

The analysis in Air Quality-2 demonstrated that during sediment removal, the significance threshold would not be exceeded for emissions of particulate matter and CO; and no significance threshold would be exceeded during reservoir management under either option. ~~Nevertheless, while every effort will be made to strive for the newest vehicles/equipment, the actual vehicle/equipment fleet may not reach the levels required to reduce the NO_x emissions to a level of less than significant. Therefore, this impact remains significant and unavoidable.~~ ***Implementation of Mitigation Measures MM AQ-1 and MM AQ-2 will result in a reduction of NO_X emissions and will reduce the NO_X emissions to a level of less than significant for the sediment removal phase.***

92 In the 7th paragraph of AIR QUALITY-3, the following clarifications have been made:

Implementation of Mitigation Measures MM AQ-1 and MMAQ-2 would reduce the Proposed Project's combined NO_X emissions during the sediment removal phase~~; however, while every reasonable effort will be made to strive for the newest vehicles/equipment, the actual vehicle/equipment fleet may not reach the levels required to reduce emissions~~ to a level of less than significant. ~~Therefore, this impact remains significant and unavoidable.~~

96 In the 1st paragraph under AIR QUALITY-6, the following clarifications have been made:

The Proposed Project would generate air pollutant emissions from construction over a five-year period. Cumulative projects that could contribute to cumulative air quality impacts would be the cumulative projects that could be under construction during the same time period (Hahamongna Watershed Park MBMU Project, Metro Gold Line Foothill Extension, Arroyo Seco Canyon Project, and Devil's Gate Water Conservation Project). Each of the cumulative projects would have construction emissions contributing to existing air quality violations. All projects would be required to comply with the SCAQMD's air pollution control measures and rules. Implementation of these measures would reduce air emissions~~ As discussed above, the Proposed Project emissions of VOC, PM_{10}, and $PM_{2.5}$ are not expected to result in a cumulatively considerable net increase of any criteria pollutants for which the project region is non-attainment with the exception of NO_x emissions which may remain significant for sediment removal activity. While every effort will be made to strive for the newest vehicles/equipment, the actual Proposed Project vehicle/equipment fleet may not reach the levels required to reduce emissions~~ to a level of less than significant. ~~Therefore, the Proposed Project's contribution to cumulative impacts associated with NO_x emissions remains significant and unavoidable.~~

96 In the 3rd paragraph of AIR QUALITY-6, the following clarifications have been made:

Implementation of these mitigations would reduce the Proposed Project's combined NO_X emissions during the sediment removal phase~~; however, while every reasonable effort will be made to strive for the newest vehicles/equipment, the actual vehicle/equipment fleet may not reach the levels required to reduce emissions~~ to a level of less than significant. ~~Therefore, this impact remains significant and unavoidable.~~

Section 3.6 Biological Resources

Page Clarification/Revision

97 In the 1st paragraph under Vegetation, the following clarifications have been made:

At the time of the 2010 survey (Chambers Group 2010a), the Proposed Project site was primarily composed of riparian and upland communities (see Figure 3.6-1: Devil's Gate Vegetation Communities (2010)). The Proposed Project site was resurveyed in 2013

(Chambers Group 2013) and is shown to be primarily composed of riparian and ***non-native, weedy*** ~~ruderal~~ communities plus large scoured areas created as a consequence of the 2009 Station Fire (see Figure 3.6-2: Devil's Gate Vegetation Communities (2013)). Further descriptions of the Proposed Project site are listed below.

98 Figure 3.6-1 was revised to reflect changes to the naming of vegetation communities.

99 Figure 3.6-2 was revised to reflect changes to the naming of vegetation communities.

100 In Table 3.6-1, the following clarifications have been made:

Vegetation Community	2013 Survey Acreage
RIPARIAN	
~~Mule Fat Scrub~~ ***Mule Fat Thickets***	~~9.3~~***11.1***
~~Riparian Herbaceous~~	~~1.8~~
Riparian Woodland (Black Willow Series)	51.4
UPLAND	
California Sagebrush – California Buckwheat Scrub ~~Coastal Sage Scrub~~	3.1
Riversidean Alluvial Fan Sage Scrub	1.1
OTHER	
Mustard and Annual Brome Semi-Natural Herbaceous Stand ~~Ruderal~~	22.8
Escaped Cultivars ~~Ornamental Landscaping~~	0.4
Disturbed (Barren/Trails)	1.9
Scoured	26.5

100 In the 1st paragraph under Riparian Communities, the following clarifications have been made:

Black Willow Series, as described by Sawyer ***et al.*** ~~and Keeler-Wolf~~ (~~1995~~***2009***), exists when black willow (*Salix gooddingii*) is the sole dominant shrub or tree in the canopy. This community occurs in habitats seasonally flooded and saturated with freshwater. This community occurs in floodplains along rivers and streams and on the edges of meadows. Species that usually occur with black willow include California sycamore (*Platanus racemosa*), coyote brush (*Baccharis pilularis*), Fremont cottonwood (*Populus fremontii*), blue elderberry (*Sambucus nigra* subsp. *caerulea*), mule fat (*Baccharis salicifolia* ***subsp. salicifolia***), white alder (*Alnus rhombifolia*), and other willows (*Salix* sp.).

101 In the 4th through 7th paragraphs under Riparian Communities, the following clarifications have been made:

~~*Mule Fat Scrub*~~ ***Mule Fat Thickets***

Mule Fat Thickets, as described by Sawyer et al. (2009), exists when mule fat is the sole or co-dominant shrub in the canopy. Shrubs are less than 16 feet (5 meters) in

height and the canopy is continuous with two tiers. One tier can reach up to 6 feet in height. The second tier can reach up to 16 feet in height. The herbaceous layer is sparse. This community typically occupies canyon bottoms, floodplains, irrigation ditches, lake margins, and stream channels. Soils are mixed alluvium. Other species associated with this community may include California sagebrush (Artemisia californica), coyote brush, laurel sumac (Malosma laurina), blue elderberry, and other willow species.

~~Mule Fat Scrub consists of dense stands of mule fat with lesser amounts of willow species. This community type is classified as a mixed evergreen-deciduous shrubland with a continuous canopy and a sparse understory. This community typically occupies intermittent streambeds and seeps and occurs at elevations ranging from sea level to 4,100 feet above mean sea level (amsl) (Holland 1986; Gray and Bramlet 1992)~~.

~~The~~ ***Mule Fat Thickets*** ~~Mule Fat Scrub community was~~ ***were*** present in the Proposed Project site during both surveys. The native plant species found included mule fat and black willow. Non-native species found within this community in the Proposed Project site include Italian thistle (*Carduus pycnocephalus*), poison hemlock (*Conium maculatum*), and short-pod mustard(*Hirschfeldia incana*).

~~*Riparian Herbaceous*~~

~~Riparian Herbaceous vegetation is an early successional stage of willow scrub and riparian forest communities. Flooding (or other disturbance factors) often scours woody riparian vegetation away, and the site is rapidly colonized by pioneer wetland herbaceous plants (Gray and Bramlet 1992).~~

Portions of the habitat mapped as Mule Fat Thickets are represented by an early successional stage of the thicket. In 2010, sparse riparian vegetation was present in the northern half of the Proposed Project site, while in 2013, this type of vegetation was concentrated only near the face of the dam. Native plant species found in this early seral stage include young seedlings and saplings of mule fat, black willow, and red willow. Non-native plant species associated with the early successional stage of this community include curly dock (Rumex crispus), wild radish (Raphanus sativus), and short-pod mustard.

~~In 2010, sparse Riparian Herbaceous vegetation was present in the northern half of the Proposed Project site. In 2013, Riparian Herbaceous vegetation was found near the face of the dam. Native plant species found in this community include mule fat, black willow, and red willow. Non-native plant species in this community include curly dock (*Rumex crispus*), wild radish (*Raphanus sativus*), and short-pod mustard.~~

102 In the 1st through 5th paragraphs under Upland Communities, the following clarifications have been made:

<u>Upland Communities</u>

Riversidean Alluvial Fan Sage Scrub

Riversidean Alluvial Fan Sage Scrub occurs in alluvial fans as well as in washes and is a subtype of Riversidean Coastal Scrub (Holland 1986)***or referenced as Scalebroom Scrub by Sawyer et al. (2009)***. Three stages of alluvial fan scrub succession are described by Smith (1980), with density and species diversity varying in direct relationship to the frequency of water scouring each stage receives. Older stages of alluvial scrub are located on high benches and have not been subjected to a recent major flood event. This mature stage can be identified by the presence of larger shrubs, an increase in species diversity, and a groundcover of organic material and annual grasses. Many large shrubs over 10 feet in height are found in the mature community, including laurel (*Malosma laurina*). The intermediate and early stages are located on lower benches closer to the active flood plain and have been subjected to relatively recent flooding events. Intermediate and early stages are progressively more open and less diverse. Medium-sized shrubs up to 4 feet in height can be found in intermediate stage areas, while early stage shrubs are rarely greater than 2 feet in height. Organic material and annual grasses are much less common in intermediate areas and are almost absent in early stages. Scale-broom (*Lepidospartum squamatum*),considered to be an indicator species of alluvial scrub communities, is present in most alluvial scrub communities.

In 2010, Riversidean Alluvial Fan Sage Scrub was present on the northeast portion of the Proposed Project site. Much smaller patches of this community remain in 2013. The reduction in habitat is due to post-fire sediment accumulation. As discussed previously, the significant sediment loading occurring as a result of the 2009 Station Fire has greatly reduced the size of this community and has ~~permanently~~ inhibited its ability for succession.

Plant species found in the Proposed Project site include scale-broom, California sagebrush (*Artemisia californica*), California buckwheat (*Eriogonum fasciculatum*), deerweed (*Acmispon glaber*[*Lotus scoparius*]), our Lord's candle (*Yucca whipplei*), and coastal prickly pear (*Opuntia littoralis*).

California Sagebrush – California Buckwheat Scrub ~~*Coastal Sage Scrub*~~

~~Coastal Sage Scrub communities are open and typically dominated by California sagebrush and California buckwheat, where each attains at least 20 percent cover (Holland 1986). This community usually occurs on steep slopes with severely drained soils or clays that release stored soil moisture slowly. Coastal Sage Scrub may intergrade with other southern California chaparrals at higher elevations. In addition to California sagebrush and California buckwheat, other species present within this community include coyote brush and~~ ***Coastal Sagebrush – California Buckwheat Scrub, as described by Sawyer et al. (2009), exists when both California sagebrush and California buckwheat are codominant in the shrub canopy. Most shrubs are less than 6 feet in height, and some are less than 16 feet in height. The canopy is two-tiered and intermittent to continuous. The herbaceous layer is seasonally present. This community occurs on steep, south-facing slopes with colluvial soils. Other species that may occur within this community include coyote brush, laurel sumac, and*** black sage (*Salvia mellifera*).

In 2010, large patches of ~~Coastal Sage Scrub~~ ***California Sagebrush – California Buckwheat Scrub*** surrounded the riparian habitat in the northern portion of the Proposed Project site. These patches have been largely replaced with scoured areas. As with the Riversidean Alluvial Fan Sage Scrub, only much smaller patches of ~~Coastal Sage Scrub~~ ***California Sagebrush – California Buckwheat Scrub*** remain in 2013. As discussed previously, the recent significant sediment loading experienced in the Reservoir has greatly reduced the size of this community and has ~~permanently~~ inhibited its ability for succession.

104 In the 8th and 9th paragraphs under Other Communities, the following clarifications have been made:

~~*Ornamental Landscaping*~~ ***Escaped Cultivars***

~~Ornamental Landscaping~~ ***Escaped cultivars*** includes areas where the vegetation is dominated by non-native horticultural plants (Gray and Bramlet 1992) ***that have been purposely planted for aesthetic reasons. Often, these horticultural/cultivated plants escape the garden environment and can become established in the natural setting***. Typically, the species composition consists of introduced trees, shrubs, flowers, and turf grass. Several areas within the Proposed Project site have ***escaped cultivars as the dominant vegetation type present*** ~~Ornamental Landscaping~~.

Several small patches of ~~ornamental landscaping~~ ***escaped cultivars*** persist in 2013 (compared to the 2010 survey), but the overall acreage has decreased from 1.44 acres to 0.4 acre dispersed throughout the project site.

Mustard and Annual Brome Semi-Natural Herbaceous Stand ~~Ruderal~~

This herbaceous stand is dominated by a composition of non-native short-pod mustard (Hirschfeldia incana) and non-native annual brome grasses (Bromus spp.). Other non-native annual species within this community include red-stemmed filaree (Erodium cicutarium) and bristly ox-tongue (Helminthotheca echioides). Herbs are less than 6 feet in height and the canopy is continuous. This community responds positively to frequent disturbance and competes with native vegetation (Sawyer et al. 2009). Each of these species has a California Invasive Plant Inventory (Cal-IPC) ranking indicating they have the potential to threaten California wildlands and ecologically impact the physical processes, plant and animal communities, and vegetation structure (Cal-IPC 2006). The presence of non-native plant species in a given area can ultimately lead to a reduction in the diversity of wildlife that use the area for foraging and refuge.

Classified as Ruderal in 2010, this community has been updated to reflect a preference by the Resource Agencies to use Alliance code per Sawyer et al. (2009). The amount of non-native weedy vegetation onsite has increased from 7.64 acres in 2010 to approximately 22.8 acres in 2013 due to frequent disturbance from sedimentation and erosion during storm events.

~~Ruderal vegetation communities are dominated by non-native, weedy species that are adapted to frequent disturbances and compete with native vegetation. Soils in ruderal~~

~~areas are also typically characterized as heavily compacted. Species observed in this community typically include: brome grasses (*Bromus* spp.), red-stemmed filaree (*Erodium cicutarium*), short-pod mustard, and bristly ox-tongue (*Helminthotheca echioides*). The emergence of non-natives will lower the diversity of plants within a community, lower the diversity of wildlife that could potentially use the area for foraging and refuge, and contribute to an overall decrease in habitat value.~~

104 In the 12th through 15th paragraphs under Other Communities, the following clarifications have been made:

Poison Hemlock ***Patches (Semi-Natural Stands)*** ~~*Series*~~

Poison Hemlock ***Patches*** ~~Series is~~ ***ar***ea vegetation community dominated by the herbaceous, weedy species poison hemlock. This biennial plant typically grows up to 10 feet in height and occurs in moist, especially disturbed places at elevations generally less than 3,280 feet ***(Baldwin et al. 2009)*** ~~(Hickman 1993)~~.

In 2010, Poison Hemlock ***Patches were*** ~~Series was~~ present within the watershed near the center of the Proposed Project site. This series was not identified during the 2013 survey and is likely buried by sediment.

Perennial Pepper Weed Patches (Semi-Natural Stands) ~~*Peppergrass Series*~~

Perennial Pepper Weed Patches are ~~Peppergrass Series is~~ a vegetation community dominated by the herbaceous, weedy species peppergrass (*Lepidium latifolium*).

In 2010, ***Perennial Pepper Weed Patches were*** ~~Peppergrass Series was~~ present within the watershed near the center of the Proposed Project site. This series was not identified during the 2013 survey and is likely buried by sediment.

105 In the 1st paragraph under Amphibians and Reptiles, the following clarifications have been made:

Fourteen amphibian and reptile species were observed or detected in the Proposed Project area during the surveys. Species included the California toad (*Anaxyrus boreas halophilus*),~~western toad (*Bufo boreas*),~~ American bullfrog (*Lithobates catesbeianus*),Baja California treefrog (*Pseudacris hypochondriaca hypochondriaca*), California treefrog (~~*Hyla*~~***Pseudacris*** *cadaverina*), San Diego alligator lizard (*Elgaria multicarinata webii*),~~common side-blotch lizard (*Uta stansburiana*),~~western side-blotched lizard (*Uta stansburiana elegans*),Great Basin fence lizard (*Sceloporus occidentalis longipes*), ~~western whiptail (*Aspidoscelis tigris*),~~ coastal whiptail(*Aspidoscelis tigris stejnegeri*), two-striped garter snake (*Thamnophis hammondii*), California kingsnake (*Lampropeltis getula californiae*), and ~~Great Basin~~***San Diego*** gopher snake (*Pituophis catenifer* ***annectens***~~*deserticola*~~).

106 In Table 3.6-2, the following clarification has been made:

Species	Status	Habitat	Potential for Occurrence
Plummer's mariposa lily (*Calochortus plummerae*)	CNPS Rare Plant Rank: ~~1B~~***4***.2	Chaparral, cismontane woodland, coastal scrub, lower montane coniferous forest, and valley and foothill grasslands.	Not observed during survey. Potential habitat exists but not observed during survey. Considered absent from site.

109 In the 1st paragraph under Special Status Animal Species, the following clarifications have been made:

After a literature review and an assessment of the various habitat types in the vicinity of the Proposed Project site, it was determined that ~~14~~***15*** sensitive wildlife species have the potential to occur within the Proposed Project site or were present in the Proposed Project site during the survey. Factors used to determine potential for occurrence include quality of habitat, impact of surrounding residential development, and the date and location of prior California Natural Diversity Database (CNDDB) records of occurrence. These special status animal species and their status are listed in Table 3.6-3.

109 In Table 3.6-3, the following clarifications have been made:

Species	Status	Potential for Occurrence
AMPHIBIANS		
Sierra Madre yellow-legged frog (*Rana muscosa*)	SSC	Low potential to occur due to lack of known historical occurrences within ***5*** miles of Proposed Project site but not observed during survey.
coast range newt (*Taricha torosa torosa*)	SSC	High potential for occurrence, due to the presence of suitable habitat and occurrences within ***5***miles of the Proposed Project site but not observed during survey.
REPTILES		
coast horned lizard (*Phrynosoma blainvillii*)	SSC	Low potential to occur due to lack of known historical occurrences within ***5*** miles of Proposed Project site but not observed during survey.
coast patch-nosed snake	***SSC, FSC***	***Present within the Proposed Project site.***
southwestern pond turtle (*Actinemys marmorata*)	SSC	Moderate potential for occurrence, due to the presence of suitable habitat but not observed during survey.
two-striped garter snake (*Thamnophis hammondii*)	SSC	Present within Proposed Project site.

Species	Status	Potential for Occurrence
BIRDS		
burrowing owl (*Athene cunicularia*)	SSC	Low potential to occur due to lack of known historical occurrences within 5 miles of Proposed Project site but not observed during survey.
southwestern willow flycatcher (*Empidonax traillii extimus*)	FE, SE	Low potential to occur due to lack of known historical occurrences within 5 miles of Proposed Project site but not observed during survey.
least Bell's vireo (*Vireo bellii pusillus*)	FE, SE	Present but not nesting within Proposed Project site.
yellow warbler (*Dendroica petechia brewsteri*	SSC (nesting)	Present ~~but not nesting~~ within Proposed Project site.

110 In the first full paragraph on the page, the following clarifications have been made:

~~Three~~ ***Six*** sensitive wildlife species have a moderate to high potential to occur in the Proposed Project site. One species, least Bell's vireo, is a federally and state listed as endangered species and was present on the site during protocol surveys. Two species, western pond turtle and coast range newt, are California State Species of Special Concern (SSC) and have a moderate or high potential to occur on the site. One species, yellow warbler, is a SSC when nesting and was present on the site during the reconnaissance survey. A two-striped garter snake was observed on the dirt road leading to the spillway. ***The coast patch-nosed snake, a SSC and Federal Species of Concern (FSC), was present during one of the vireo surveys.***

111 In the 3rd full paragraph on the page, the following clarification was made:

Approximately 62.5 acres of suitable habitat (Riparian Woodland~~,~~ ***and Mule Fat Thickets*** ~~Mule Fat Scrub, Riparian Herbaceous habitat~~) for least Bell's vireo are present within the Project site. Historic records do not exist within the *Pasadena*, California USGS 7.5-minute topographic quadrangle; however, known occurrences do exist for this species in the San Gabriel Mountains in Los Angeles County. Because habitat for this species occurs in the Survey Area and occurrences are known in other areas of the San Gabriel Mountains, focused protocol-level least Bell's vireo surveys were conducted from May through August 2010 and from April through July 2013 following modified USFWS *Least Bell's Vireo Survey Guidelines* (Jan. 19, 2001)**.** No least Bell's vireos were observed during the 2010 surveys. In July 2012, an adult and a juvenile least Bell's vireo were observed in the Proposed Project site (CDFW 2013). Because least Bell's vireo have high site fidelity, and are likely to return to the same site to breed every year, focused surveys for least Bell's vireo were conducted in 2013 to determine if they are breeding within the Project site. A single male least Bell's vireo was observed during the first four of six 2013 surveys (April 29, May 23, June 5, and June 17, 2013). The least Bell's vireo male was extremely vocal, continuously singing throughout the mornings, and appeared to be very territorial. It did not appear to be paired, however, and no nesting behavior was observed. Shortly before the June 17, 2013, survey, recreational activities within the

Proposed Project site increased dramatically due to the initiation of children's summer camps within Hahamongna Watershed Park and the flood control reservoir. Camp activities included clearing vegetation for children's play areas within the Riparian Woodland, cutting new trails through the occupied least Bell's vireo habitat, and increasing sound disturbance within the occupied least Bell's vireo habitat. The least Bell's vireo was no longer observed during the June 27 or July 9, 2013, surveys; however, due to Bell's vireo having high site fidelity, this species is considered present within the Proposed Project site.

112 In the 1st paragraph under Coast Range Newt - SSC, the following clarification was made:

The coast range newt is a California Species of ***Special*** Concern found in terrestrial habitats such as grasslands, woodlands, and forests.

112 After the 1st paragraph on the page, the following information has been added:

Coast Patch-nosed Snake – SSC, FSC

This species is a California Species of Special Concern and Federal Species of Concern. This species occurs in California from San Luis Obispo County, along the coast west of the deserts, and into northern coastal Baja California (California Reptiles and Amphibians 2009). This species is a generalist in diet and habitat. It inhabits coastal chaparral in canyons, rocky hillsides, sandy flats, and plains. This species is diurnal and can be found throughout the day in milder temperatures, with greatest activity occurring in May and June, and basking in early morning or late day in hotter temperatures in the summer. This species can move quickly and may climb shrubs in pursuit of prey (California Reptiles and Amphibians 2009). This species has acute vision and can escape quickly if threatened and will also burrow into loose soil.

This species is considered uncommon in the area. Little is known about its natural history. Habitat destruction including development and grazing is the primary threat to this species.

Southwestern Pond Turtle- SSC

This species is a California Species of ***Special*** Concern. This species occurs along the west coast of North

113 In the 1st paragraph under Yellow Warbler (Dendroica petechia brewsteri) - SSC, the following information has been added:

The yellow warbler (nesting) is a California Species of ***Special*** Concern. Its breeding range includes most of North America from northern Alaska and northern Canada to the southern U.S. and Mexico.

114 In the 1st paragraph under Two-Striped Garter Snake, the following information has been added:

The two-striped garter snake is a California Species of ***Special*** Concern.

118 In the 3rd paragraph under Jurisdictional Waters/Wetland Habitats, the following clarifications have been made:

As described above, vegetation in the Proposed Project site has mature riparian trees, pockets of ***Mule Fat Thickets, and*** ~~Mule Fat Scrub,~~ freshwater marshes~~, and emergent Riparian Herbaceous communities~~ growing along scoured areas present due to unstable sediment accumulation and subsequent scouring during storm events occurring since the 2009 Station Fire. Upland vegetation communities and developed areas also exist within the Proposed Project site.

125 After the 1st paragraph under Local, the following information has been added:

The City of Pasadena adopted the City Trees and Trees Protection Ordinance in May 2002, ~~and~~ amended its standards to include a total of 158 species in June 2003***, and also amended in January 25, 2010***. The ordinance seeks to protect public trees, landmark trees, native trees, and specimen trees in certain parts of the City and requires protection measures for new projects to avoid negative impacts that may occur during construction. A permit is required to remove or injure any tree protected under this ordinance, and one of the following findings must be made:

- There is a public benefit or public health safety or welfare benefit to the injury or removal that outweighs the protection of the tree; or
- The present condition of the tree is such that it is not reasonably likely to survive; or
- There is an objective feature of the tree that makes the tree not suitable for the protection of this chapter; or
- There would be a substantial hardship to a private property owner in the enjoyment and use of real property if the injury or removal is not permitted; or
- To not permit injury to, or removal of a tree, would constitute a taking of the underlying real property; or
- The project includes a landscape design plan ***that emphasizes a tree canopy that is sustainable over the long term by adhering to the replacement matrix adopted by resolution of the city council and included in the associated administrative guidelines*** ~~which would result in tree canopy coverage of greater significance than the one removed within a reasonable time after completion of the project~~.

The Los Angeles County Flood Control District was created by State legislation to implement the State-designated objectives of flood control and water conservation within the boundaries of the District. When implementing these State-designated

objectives, the District is not subject to local ordinances like the City's Trees and Tree Protection Ordinance.

The purpose of the Proposed Project is to restore and maintain flood capacity at the Devil's Gate Reservoir, which would directly further the District's regional flood control objective. Accordingly, the Proposed Project would not be subject to the provisions of the Pasadena City Trees and Tree Protection Ordinance.

129 In the 2nd paragraph under Sensitive Wildlife, the following clarification has been made:

The least Bell's vireo is a federal and state listed endangered species. This species has been observed on the Proposed Project site and is considered present. Sediment removal activities will result in the removal of least Bell's vireo habitat within the Riparian Woodland and ***Mule Fat Thickets*** ~~Mule Fat Scrub communities~~.

130 In the 1st paragraph under Reservoir Management, the following clarification has been made:

The reservoir management areas for both management options are expected to be composed of Riparian Herbaceous and ***Mustard and Annual Brome Semi-Natural Herbaceous Stand*** ~~Ruderal~~ communities (see Figure 3.6-5 Vegetation Communities Conditions during Reservoir Management Option 2). As described in Section 2.5, Reservoir Management Option 1 will involve the whole Proposed Project site and Reservoir Management Option 2 will involve approximately 91 acres.

130 In the 1st paragraph under Mitigation Measures, the following details have been added:

MM BIO – 1: A qualified biological monitor shall be present during initial ground- or vegetation-disturbing project-related activities ***to provide protection measures and monitor for wildlife in harm's way. This includes initial ground- or vegetation-disturbing project-related activities at the annual start of each year of sediment removal or maintenance activities***. Following initial project-related activities, a qualified monitoring biologist shall be present as necessary to maintain the implemented protection measures and monitor for additional species in harm's way. ***These protection measures shall include, as appropriate: redirecting the wildlife, identifying areas that may require exclusionary devices (e.g., fencing), or capturing and relocating outside the work area. Any captured species shall be relocated to adjacent appropriate habitat that is contiguous to adjacent habitat and not impacted by project-related disturbance activities.***

131 Figure 3.6-5 was revised to reflect changes to the naming of vegetation communities.

132 In the 3rd paragraph under Mitigation Measures, the following detail has been added:

MM BIO – 3: Within 90 days prior to ground-disturbing activities, a preconstruction survey shall be conducted by a qualified biologist for the presence of any sensitive species in harm's way, including coast range newt, the southwestern pond turtle, and the two-striped garter snake. If sensitive species are observed in harm's way, the

qualified biologist will develop and implement appropriate protection measures for that species. These protection measures shall include, as appropriate, redirecting the species, ***constructing*** ~~construction of~~ exclusionary devices (e.g., fencing), or ***capturing*** ~~capture~~ ***and relocating*** ~~relocation~~ ***wildlife*** outside the work area. Preconstruction surveys shall be repeated annually for the duration of the sediment removal. ***Observations of special status species made during these surveys shall be recorded onto a CNDDB field data sheet and submitted to CDFW for inclusion into the CNDDB.***

132 In the 7th paragraph under Mitigation Measures, the following details have been added:

MM BIO – 5: Within 30 days prior to commencement of vegetation or structure removal activities, a preconstruction bat survey shall be conducted by a qualified biologist for the presence of any roosting bats. ***Acoustic recognition technology shall be used if feasible and appropriate.*** If either a bat maternity roost or hibernacula (structures used by bats for hibernation) are present, a qualified biologist will develop and implement appropriate protection measures for that maternity roost or hibernacula. These protection measures shall include, as appropriate, safely evicting non-breeding bat hibernacula, establishment of avoidance buffers, or replacement of roosts at a suitable location. ***These measures shall also include as appropriate:***

- ***To the extent feasible, trees that have been identified as roosting sites shall be removed or relocated between October 1 and February 28.***
- ***When trees must be removed during the maternity season (March 1 to September 30), a qualified bat specialist shall conduct a preconstruction survey to identify those trees proposed for disturbance that could provide hibernacula or nursery colony roosting habitat for bats.***
- ***Trees identified as potentially supporting an active nursery roost shall be inspected by a qualified biologist no greater than 7 days prior to tree disturbance to determine presence or absence of roosting bats.***
- ***Trees determined to support active maternity roosts will be left in place until the end of the maternity season (September 30).***
- ***If bats are not detected in a tree, but the qualified biologist determines that roosting bats may still be present, trees shall be removed as follows:***
    - ***Pushing a tree down with heavy machinery instead of felling the tree with a chainsaw***
    - ***First pushing the tree lightly 2 to 3 times with a pause of 30 seconds between each nudge to allow bats to become active, then pushing the tree to the ground slowly***
    - ***Allowing the tree to remain in place for 24 to 48 hours until inspected by the qualified biologist for presence or absence of roosting bats***

- ***The qualified biologist shall document all bat survey, monitoring, and protection measure activities and prepare a summary report for LACFCD.***

133 In the 2nd paragraph under BIOLOGY-2, the following clarifications have been made:

The Proposed Project would impact approximately 51.4 acres of Riparian Woodland and ***11.1*** ~~9.3~~ acres of ~~Mule Fat Scrub~~ ***Mule Fat Thickets*** within the Proposed Project site. Riparian Woodland and ~~Mule Fat Scrub~~ ***Mule Fat Thickets*** are rare plant communities and provide nesting habitat for riparian species; impacts to these habitats would result in a significant impact. To minimize impacts due to the loss of Riparian Woodland and ***Mule Fat Thickets*** ~~Mule Fat Scrub~~, Mitigation Measures MM BIO-7 and MM BIO-8have been provided.

134 In Table 3.6-4, the following clarifications have been made:

Table 3.6-4: Jurisdictional Acreage Matrix

Authority	Jurisdictional Area		Total Jurisdiction (acres)
USACE	Riparian Area outside Wetland Area	54.33	101.13
	Wetland Area	11.2	
	Drainage Impacts *Main channel* *Braided channel*	35.6 *6.7* *28.9*	
RWQCB	Riparian Area Outside Wetland Area ***Mule Fat Thickets*** ~~*Mule Fat Scrub*~~ ~~*Riparian Herbaceous*~~ *Riparian Woodland*	2,366,614.8 (sq. ft.) ***406,414.8 (sq. ft.)*** ~~405,108 (sq. ft.)~~ ~~1,306.8 (sq. ft.)~~ 1,960,200 (sq. ft.)	4,405,222.8 (sq. ft.)
	Wetland Area	487,872 (sq. ft.)	
	Drainage Impacts *Main channel* *Braided channel*	1,550,736 (sq. ft.) 291,852 (sq. ft.) 1,258,884 (sq. ft.)	
CDFW	Riparian Area Outside Wetland Area ***Mule Fat Thickets*** ~~*Mule Fat Scrub*~~ ~~*Riparian Herbaceous*~~ *Riparian Woodland*	54.43 *9.3**3*** ~~*0.03*~~ *45.0*	101.13
	Wetland Area	11.2	
	Drainage Impacts *Main channel* *Braided channel*	35.6 *6.7* *28.9*	

135 In MM BIO-8, the following clarifications have been made:

MM BIO – 8: A combination of onsite and offsite habitat restoration, enhancement, and exotic removal shall be implemented by LACFCD at a 1:1 ratio for impacted sensitive habitat and jurisdictional waters. Habitat restoration/enhancement shall include use of willow cuttings and exotic species removal. ***Non-native, weedy*** ~~Ruderal~~ habitats within the basin shall be utilized whenever possible as mitigation sites. This mitigation measure shall be monitored for success for five years following implementation. A report of the monitoring results shall be submitted annually, during the five years following implementation, to resource agencies as required by the Section 401 Certification, Section 404 permit, and a Streambed Alteration Agreement.

136 In the 1st paragraph under BIOLOGY-4, the following additions have been made:

The Proposed Project area is predominantly open for wildlife movement and habitat connectivity. ***Sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays). In addition, sediment removal activities would not completely block the Proposed Project site from surrounding habitat, would occur only during the day, and would not interfere with nighttime wildlife activity. Although some wildlife may be temporarily displaced during construction, wildlife would not be physically prevented from moving around and into the basin area.*** Sediment removal and reservoir management activities would interfere temporarily with the movement of native resident or migratory wildlife species, resulting in a significant impact. Reduction in sensitive habitat would interfere with use of the habitat for wildlife nursery sites, resulting in a significant impact. ***To minimize impacts to less than significant, Mitigation Measures MM BIO-1 through MM BIO-8 has been provided.***

Section 3.7 Cultural Resources

Page Clarification/Revision

143 In the 5th paragraph under City of Pasadena Comprehensive General Plan, the following revisions have been made:

Preservation of cultural resources and the City's historic character is a consistent theme throughout the Land Use ~~and Mobility~~ Element of the City of Pasadena Comprehensive General Plan. The values of the community are laid out in the General Plan's Seven Guiding Principles. Principle No. 2 emphasizes the community's fundamental commitment to preservation of its historic character:

The following policies of the Land Use ~~and Mobility~~ Element are related to the preservation of cultural resources:

Section 3.9 Greenhouse Gas Emissions

Page	Clarification/Revision
158	In the 2nd paragraph under Sediment Removal/Reservoir Management, the following revisions have been made: For reservoir management, removal of the sediment, vegetation, trees, and organic debris is expected to require an estimated ***200 to a*** maximum of ***300***~~200~~ truck trips per day and off-road equipment including four front loaders with 2-cubic-yard buckets, one bulldozer, an excavator, a grader, water truck, and sorters/crushers.
160	In the 1st paragraph under Table 3.9-3, the following additions have been made: Typical development projects have short-term construction and long-term operational GHG emissions, where the operational activities generate the majority of the GHG emissions. In order to assess the overall lifetime project GHG emissions, the SCAQMD developed an Interim Guidance that recommends that construction emissions should be amortized over the life of the project, defined in the Guidance as 30 years, which is then added to the reservoir management emissions, and compared to the applicable interim GHG significance threshold tier. Using the above annual emission rates, the sediment removal phase is expected to produce 5,733 tCO_2e per year for 5 years, for a 5-year total of 28,664 tCO_2e. Amortized over 30 years the sediment removal would produce 951 tCO_2e per year. Adding that amount to the 713 tCO_2e per year expected during reservoir management would yield a Proposed Project total annual emissions of 1,669 tCO_2e, which is less than the Tier 3 threshold of 3,000 tCO_2e; therefore the Proposed Project is not "cumulatively considerable" and is therefore less than significant under CEQA. ***Use of sediment removal dump trucks that meet EPA's emission standards for Model Year 2007 or later and use of off-road equipment that meets, at a minimum, EPA's emission standards for Tier 3 equipment, would result in a reduction of GHG emissions.***

Section 3.10 Hazards & Hazardous Materials

165	In the 2nd paragraph under Table 3.10-1, the following revision, has been made: Site assessments that included soil and groundwater sampling in the 1990s, identified the presence of volatile organic compounds (VOCs), including carbon tetrachloride, trichloroethene (TCE), tetrachloroethene (PCE), total chromium, hexavalent chromium, and ***perchlorates*** ~~rocket fuel~~, detected above regulatory limits.

Section 3.11 Hydrology & Water Quality

179 Table 3.11-3 has been revised:

Table 3.11-3: Potential Sources of Pollution

Activity/Source	Pollutants of Concern
Chemical spills	Engine fuel, diesel, vehicle fluids, hydrocarbons, oil, and grease
Erosion	Sediment, organic matter
Stormwater/nuisance runoff	Particulate matter, associated pollutants, sediment, green waste, organic matter, fuel, oil
Litter and debris	Litter and debris
Loading/unloading areas	Oil and grease, hydrocarbons, litter, heavy metals
Construction activities and storage	Fuel, lubricants, and solvents
Adjacent properties with known hazardous releases	PCBs, VOCs, petroleum hydrocarbons, ~~rocket fuel (~~perchlorate~~)~~, SVOCs, heavy metals, organochlorine pesticide
Parking lot runoff	Oil and grease, hydrocarbons, litter, heavy metals
Pet feces	Coliform bacteria
Utility line maintenance and repairs	Chloramines, chlorine, sediment, adhesive cements, primers

181 In the 1st paragraph under United States Army Corps of Engineers (USACE), the following revision, has been made:

USACE is a federal agency responsible for planning civil engineering projects associated with dams, canals, and flood protection in the United States and is responsible for overseeing issues affecting waters of the United States. ~~Under Section 404 of the CWA, an Individual Permit is required for the proposed sediment removal and placement activities. Additionally, a~~As the proposed sediment removal project is considered to be part of the routine maintenance reservoir, a Nationwide Permit (NWP) 31 for Maintenance of Existing Flood Control Facilities ***will be required Under Section 404 of the CWA*** ~~may also be required~~. The need for this permit and other NWPs (e.g., NWP 3 – Maintenance) can be determined during a pre-application meeting between LACFCD and the USACE Los Angeles District office regulatory branch. The federal mandate associated with the 401 certification of the CWA is addressed and enforced by RWQCB.

Section 3.12 Land Use & Planning

Page Clarification/Revision

188 In the 2nd paragraph under 3.12.2 Existing Environmental Setting, the following detail has been added:

The current leaseholders within Hahamongna Watershed Park include the Los Angeles County Fire Department (Fire Camp 2) and the Rose Bowl Riders, who also sublet to the Tom Sawyer Camp ***and MACH 1***.

Section 3.13 Mineral Resources

194 In the 3rd paragraph under MINERALS-1, the following clarification has been made:

Sediment deposited after the sediment removal phase will be removed on an annual basis. The amount of sediment is expected to be small, ***typically*** 13,000 cy per year. The sediment excavated during reservoir management activities is not expected to involve usable aggregate material or arroyo stone due to unfavorable characteristics such as fine gradation soil and high organic content levels. Impacts involving the loss of availability of a known mineral resource that would be of value to the region and the residents of the state, or a locally important mineral resource recovery site, will be less than significant.

Section 3.15 Recreation & Public Services

Page Clarification/Revision

218 After the 16th paragraph under 3.15.2 Existing Environmental Setting, the following paragraph has been added:

MACH 1

MACH 1 (Move a Child Higher) is a professional therapeutic horsemanship wellness program for people with disabilities. This program also includes MACH 2 (Military and Companion Horses), which offers therapeutic horsemanship activities for military veterans and active duty military personnel. This program is a Professional Association of Therapeutic Horsemanship (PATH) International Premier Accredited Center and has been operated in cooperation with the City of Pasadena for 17 years. MACH 1 is based at the Pasadena Equestrian Center in the Hahamongna Watershed Park. MACH 1 is currently a subtenant of the Rose Bowl Riders. With the support of the City of Pasadena, MACH 1 is developing a new therapeutic riding facility, also located in the Hahamongna Watershed Park's Pasadena Equestrian Center. This facility is expected to be in operation in 2014.

228 In the 4th paragraph under 3.15.6 Impacts and Mitigation, the following detail has been added:

Sediment removal activities will not limit the use of the Oak Grove area of Hahamongna Watershed Park by individuals or by organizations such as the Oak Grove Disc Golf Club, the Rose Bowl Riders, ***MACH 1,*** or Tom Sawyer Camp.

Section 3.16 Transportation & Traffic

Page	Clarification/Revision
250	In the 1st paragraph under Sediment Removal, the following clarifications have been made: The Proposed Project would adhere to traffic regulations regarding truck traffic; however, during sediment removal, Proposed Project truck traffic is expected to impact traffic LOS on the existing roadway network. Potential impacts regarding existing LOS are discussed under TRANSPORTATION-2 below. This increase in traffic would result in ***temporary*** significant impacts to the efficiency of the circulation system. Implementation of Mitigation Measures MM TRA-1 and TRA-2 would reduce this impact but not to a level of less than significant. Other potential impact reduction measures discussed under TRANSPORTATION-2, below, could reduce impacts to less than significant. These measures cannot be legally imposed by the LACFCD, however, since the locations are under the jurisdiction of other agencies. Every reasonable effort will be made to coordinate with and receive approval from the jurisdictional agencies to implement the impact reduction measures but LACFCD cannot guarantee that the measures will be implemented. Therefore, this ***temporary*** impact could remain potentially significant.
251	In the 1st paragraph under Residual Impacts After Mitigation, the following clarifications have been made: ***Potentially significant traffic impacts associated with the sediment removal phase would be temporary, expected to occur during the drier months (from April to December, except on holidays), and would cease at the end of the sediment removal phase.*** Implementation of the mitigation measures described above would reduce impacts to traffic and circulation but not to a level of less than significant. Other potential impact reduction measures discussed under TRANSPORTATION-2, below, could reduce impacts to less than significant. These measures cannot be legally imposed by the LACFCD, however, since the locations are under the jurisdiction of other agencies. Every reasonable effort will be made to coordinate with and receive approval from the jurisdictional agencies to implement the impact reduction measures but LACFCD cannot guarantee that the measures will be implemented. Therefore, this ***temporary*** impact could remain potentially significant. ***No significant traffic impacts would occur under reservoir management.***
251	In the 2nd paragraph under TRANSPORTATION-2, the following clarifications have been made: Table 3.16-3: LOS for Devil's Gate Reservoir to/from I-210 (eastern disposal sites), Year 2014 with Project Traffic AM Peak Period LOS for Devil's Gate Reservoir to/from I-210 (eastern disposal sites), Year 2014 with Project Traffic AM Peak Period shows the LOS for Proposed Project traffic at year 2014 for the intersections between the reservoir and I-210. All the intersections are anticipated to continue to operate at an LOS D or better

for all utilized intersections during the MID-DAY and PM peak periods. Therefore, no significant impacts will occur at these intersections during the MID-DAY and PM peak periods. The Berkshire Place and I-210 eastbound ramps intersection is anticipated to operate at an unacceptable LOS during the AM peak hour, resulting in a ***temporary*** significant impact. Table 3.16-4 shows the contribution of Proposed Project traffic to existing conditions and year 2014 conditions for the AM peak period.

252 In the 5th paragraph under TRANSPORTATION-2, the following clarifications have been made:

The impact reduction measure discussed above cannot be legally imposed by the LACFCD since the location is under the jurisdiction of the City of Pasadena. Every reasonable effort will be made to coordinate with and receive approval to implement this impact reduction measure; however, LACFCD cannot guarantee that this impact reduction measure will be implemented. Therefore this ***temporary*** impact would remain potentially significant.

258 In the 1st paragraph under Vulcan Material Reliance Facility to/from I-210, the following clarifications have been made:

Table 3.16-12 shows the LOS for Proposed Project traffic at year 2014 for the intersections between Vulcan Material Reliance Facility and I-210. All the intersections are anticipated to continue to operate at an LOS D or better for all utilized intersections during the AM and MID-Day peak periods. Therefore, no significant impacts will occur at these intersections during these time periods. The Irwindale Avenue/Foothill Boulevard intersection is anticipated to operate at an unacceptable LOS during the PM peak hour, resulting in a ***temporary*** significant impact. Table 3.16-13 shows the contribution of Proposed Project traffic to existing conditions and year 2014 conditions for the PM peak period. Implementation of Mitigation Measure MM TRA-1 would reduce the impact to the Irwindale Avenue/Foothill Boulevard intersection to less than significant.

259 In the 2nd paragraph under Scholl Canyon Landfill to/from SR-134, the following clarifications have been made:

The Figueroa St/Scholl Canyon Road and SR-134 westbound ramps intersection is anticipated to operate at an unacceptable LOS during the AM and PM peak hours, resulting in a ***temporary*** significant impact.

259 In the 5th paragraph under Scholl Canyon Landfill to/from SR-134, the following clarifications have been made:

This impact reduction measure cannot be legally imposed by the LACFCD. Every reasonable effort will be made to coordinate with and receive approval to implement the impact reduction measure; however, LACFCD cannot guarantee that the measure will be implemented therefore this ***temporary*** impact could remain significant.

261 In the 2nd paragraph under Sheldon Pit to/from I-210, the following clarifications have been made:

Table 3.16-18 and Table 3.16-19 show the contribution of Proposed Project traffic to existing conditions and Year 2014 conditions for the AM and PM peak periods, respectively. The Glenoaks Boulevard and Osborne Street intersection is anticipated to operate at an unacceptable LOS during the AM and PM peak hours, resulting in a ***temporary*** significant impact.

265 In the 1st paragraph under Bradley Landfill to/from I-210, the following clarifications have been made:

Table 3.16-23 and Table 3.16-24 show the contribution of Proposed Project traffic to existing conditions and Year 2014 conditions for the AM and PM Peak Periods, respectively. The Glenoaks Boulevard and Osborne Street intersection is anticipated to operate at an unacceptable LOS during the AM and PM peak hours, resulting in a ***temporary*** significant impact.

268 In the 2nd paragraph under Sun Valley Fill Site to/from I-210, the following clarifications have been made:

Table 3.16-21 and Table 3.16-23 show the contribution of Proposed Project traffic to existing conditions and Year 2014 conditions for the AM and PM peak periods, respectively. The Glenoaks Boulevard and Osborne Street intersection is anticipated to operate at an unacceptable LOS during the AM and PM peak hours, resulting in a ***temporary*** significant impact.

270 In the 2nd paragraph under Boulevard Pit to/from I-210, the following clarifications have been made:

The Sheldon Street and San Fernando Road intersection and the Branford Street and San Fernando Road intersection are anticipated to operate at an unacceptable LOS during the PM peak hour, resulting in ***temporary*** significant impacts.

273 In the 1st paragraph under Residual Impacts After Mitigation, the following clarifications have been made:

Potentially significant traffic impacts associated with the sediment removal phase would be temporary, expected to occur during the drier months (from April to December, except on holidays), and would cease at the end of the sediment removal phase. Implementation of the mitigation measures described above would reduce some but not all of the impacts to traffic and circulation to a level less than significant. Other potential impact reduction measures discussed above could reduce impacts to less than significant. These measures cannot be legally imposed by the LACFCD, however, since the locations are under the jurisdiction of other agencies. Every reasonable effort will be made to coordinate with and receive approval from the jurisdictional agencies to implement the impact reduction measures but LACFCD cannot guarantee that the measures will be implemented. Therefore, these ***temporary*** impacts could remain

potentially significant. ***No significant traffic impacts would occur under reservoir management.***

273 In the 1st paragraph under TRANSPORTATION-3, the following clarifications have been made:

Implementation of the Proposed Project may include impact reduction measures described above that would require modifications to the existing roadway network. These modifications would consist of roadway restriping to reduce potential traffic impacts to a level less than significant. These changes would not alter existing roadway ~~design~~ ***use*** and would be implemented consistently with all applicable traffic safety standards. The Proposed Project is limited to excavation and transportation of sediment that has accumulated in Devil's Gate Reservoir and would not introduce any new uses that would be incompatible ***or substantially increase hazards*** with the existing roadway system. Therefore, impacts related to traffic hazards would be less than significant.

274 In the 1st paragraph under Sediment Removal, the following clarifications have been made:

The Proposed Project would be confined to the roadway network described in Section 3.16.2 and would not adversely affect alternative modes of public transportation such as light rail. Implementation of the Proposed Project would not require closure of any bus stops or disrupt any existing bus routes. The degrading of LOS at intersections, freeway segments, and freeway on- and off-ramps described above under TRANSPORTATION-2 could affect buses using the existing roadway network. This would be a ***temporary*** significant impact.

274 In the 1st paragraph under Residual Impacts After Mitigation, the following clarifications have been made:

Potentially significant traffic impacts associated with the sediment removal phase would be temporary, expected to occur during the drier months (from April to December, except on holidays), and would cease at the end of the sediment removal phase. Implementation of the mitigation measures described above would reduce some but not all of the impacts to traffic and circulation to a level less than significant. Other potential impact reduction measures discussed above could reduce impacts to less than significant. These measures cannot be legally imposed by the LACFCD, however, since the locations are under the jurisdiction of other agencies. Every reasonable effort will be made to coordinate with and receive approval from the jurisdictional agencies to implement the impact reduction measures but LACFCD cannot guarantee that the measures will be implemented. Therefore, these ***temporary*** impacts could remain potentially significant. ***No significant traffic impacts would occur under reservoir management.***

275 In the 1st paragraph under Residual Impacts After Mitigation, the following clarifications have been made:

Potentially significant traffic impacts associated with the sediment removal phase would be temporary, expected to occur during the drier months (from April to December, except on holidays), and would cease at the end of the sediment removal phase. Implementation of the mitigation measures described above would reduce some but not all of the impacts to traffic and circulation to a level less than significant. Other potential impact reduction measures discussed above could reduce impacts to less than significant. These measures cannot be legally imposed by the LACFCD, however, since the locations are under the jurisdiction of other agencies. Every reasonable effort will be made to coordinate with and receive approval from the jurisdictional agencies to implement the impact reduction measures but LACFCD cannot guarantee that the measures will be implemented. Therefore, these ***temporary*** impacts could remain potentially significant. ***No significant traffic impacts would occur under reservoir management***

275 In the 3rd paragraph under TRANSPORTATION-6, the following clarification has been made:

As described above under TRANSPORTATION-2, during sediment removal the Proposed Project will result in significant delays at five intersections, resulting in significant cumulative impacts. Implementation of Mitigation Measures MM TRA-1 and MM TRA-2 would reduce the Proposed Project's contribution to these ***temporary*** impacts but would not reduce the Proposed Project's contribution to a level that is to less than significant.

275 In the 1st paragraph under Residual Impacts After Mitigation, the following clarifications have been made:

Potentially significant traffic impacts associated with the sediment removal phase would be temporary, expected to occur during the drier months (from April to December, except on holidays), and would cease at the end of the sediment removal phase. Implementation of the mitigation measures described above would reduce some but not all of the impacts to traffic and circulation to a level less than significant. Other potential impact reduction measures discussed above could reduce impacts to less than significant. These measures cannot be legally imposed by the LACFCD, however, since the locations are under the jurisdiction of other agencies. Every reasonable effort will be made to coordinate with and receive approval from the jurisdictional agencies to implement the impact reduction measures but LACFCD cannot guarantee that the measures will be implemented. Therefore, these ***temporary*** impacts could remain potentially significant. ***No significant traffic impacts would occur under reservoir management.***

Section 3.17 Utilities and Service Systems

280 In the 5th paragraph under UTILITIES-1, the following clarification has been made:

During reservoir management, the Proposed Project would not result in or require the construction of new or expansion of existing stormwater drainage systems. Sediment that accumulates after the proposed removal will be removed through FAST operations or through mechanical excavation and trucking. The FAST operations are expected to be similar to historic FAST operations, and fine sediment discharged through FAST operations will be transported during storm flows to the Pacific Ocean via Arroyo Seco and the Los Angeles River. No impacts to stormwater facilities are expected during FAST operations. Any necessary mechanical removal during reservoir management is expected to be small (***typically*** 13,000 cubic yards per year). Impacts to stormwater facilities during mechanical removal will be avoided through compliance with City regulations regarding stormwater facilities and implementation of LACDPW BMPs.

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Section 4.3 Alternatives to the Proposed Project

Page Clarification/Revision

284 In Table 4.3-1, the following clarifications have been made:

Conflict with or obstruct implementation of the applicable air quality plan?	~~Potentially~~ ***Less than*** Significant ***with Mitigation***	Reduced (~~remains Potentially~~ ***Less than*** Significant ***with Mitigation***)	Increased (~~remains Potentially~~ ***Less than*** Significant ***with Mitigation***)	Reduced (~~remains Potentially~~ ***Less than*** Significant ***with Mitigation***)	Potentially Increased (~~remains Potentially~~ ***Less than*** Significant ***with Mitigation***)	Similar (~~remains Potentially~~ ***Less than*** Significant ***with Mitigation***)	Reduced (Less than Significant)
Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	~~Potentially~~ ***Less than*** Significant ***with Mitigation***	Reduced (~~remains Potentially~~ ***Less than*** Significant ***with Mitigation***)	Increased (~~remains Potentially~~ ***Less than*** Significant ***with Mitigation***)	Reduced (~~remains Potentially~~ ***Less than*** Significant ***with Mitigation***)	Potentially Increased (~~remains Potentially~~ ***Less than*** Significant ***with Mitigation***)	Similar (~~remains Potentially~~ ***Less than*** Significant ***with Mitigation***)	Reduced (Less than Significant)
Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emission, which exceed quantitative thresholds for ozone precursors)?	~~Potentially~~ ***Less than*** Significant ***with Mitigation***	Reduced (~~remains Potentially~~ ***Less than*** Significant ***with Mitigation***)	Increased (~~remains Potentially~~ ***Less than*** Significant ***with Mitigation***)	Reduced (~~remains Potentially~~ ***Less than*** Significant ***with Mitigation***)	Potentially Increased (~~remains Potentially~~ ***Less than*** Significant ***with Mitigation***)	Similar (~~remains Potentially~~ ***Less than*** Significant ***with Mitigation***)	Reduced (Less than Significant)

Section 4.4 Alternative 1, Configuration B

Page	Clarification/Revision
298	In the 2nd paragraph under Sediment Excavation/Trucking Offsite, the following clarifications have been made: As with the Proposed Project, it is estimated, based on past storm events, that sediment excavation/trucking offsite will be required to remove ***typically*** ~~an average of~~ 13,000 cy of sediment annually. Based on an estimated removal of 4,800cy per day, it is expected this will occur over an estimated two-week period, working Monday through Friday. This sediment excavation activity will take place during the late summer/early fall following the vegetation maintenance.
304	In the 2nd paragraph under AIR QUALITY-1, the following clarifications have been made: As with the Proposed Project (see Section 3.5.6), Alternative 1, Configuration B will be consistent with the second through fourth criteria but will not be consistent with the first criterion. This is due to emissions of NO_X exceeding the Daily Regional Threshold during sediment removal, resulting in a potentially significant impact. Implementation of Mitigation Measures MM AQ-1 and MM AQ-2 will result in a reduction of Alternative 1, Configuration B's combined NO_X emissions during sediment removal~~; however, while every reasonable effort will be made to strive for the newest vehicles/equipment, the actual vehicle/equipment fleet may not reach the levels required to reduce emissions~~ to a level of less than significant. ***Therefore, impacts during sediment removal will be less than significant.*** ~~Therefore, Alternative 1, Configuration B could result in a potentially significant impact.~~ This impact will be reduced in comparison to the Proposed Project due to the reduction in excavation area and associated sediment removal activities.
304	In the 4th paragraph under AIR QUALITY-1, the following clarifications have been made: **MM AQ-1**: LACFCD shall require all construction contractors during the sediment removal phase of the Proposed Project to use ***only*** sediment removal dump trucks that meet the EPA's emission standards for Model Year 2007 ***or later*** ~~as reasonably feasible~~.
304	In the 6th paragraph under AIR QUALITY-1, the following clarifications have been made: Implementation of these mitigations would reduce the Alternative 1, Configuration B's combined NO_X emissions during the sediment removal phase~~; however, while every effort will be made to strive for the newest vehicles/equipment, the actual vehicle/equipment fleet may not reach the levels required to reduce emissions~~ to a level of less than significant. ~~Therefore, this impact remains potentially significant and unavoidable.~~
305	In the 1st paragraph under AIR QUALITY-2, the following clarifications have been made: As with the Proposed Project, under Alternative 1, Configuration B emissions of NO_X exceed the Daily Regional Threshold during sediment removal, resulting in a potentially

significant impact. Implementation of Mitigation Measures MM AQ-1 and MM AQ-2 will result in a reduction of Alternative 1, Configuration B's combined NO_X emissions during sediment removal~~; however, while every reasonable effort will be made to strive for the newest vehicles/equipment, the actual vehicle/equipment fleet may not reach the levels required to reduce emissions~~ to a level of less than significant. ~~Therefore, this impact remains potentially significant and unavoidable.~~ This impact will be reduced in comparison to the Proposed Project due to the reduction in excavation area and associated sediment removal activities.

306 In the 1st paragraph under Residual Impacts After Mitigation, the following clarifications have been made:

Implementation of these mitigations would reduce Alternative 1, Configuration B's combined NO_X emissions during the sediment removal phase~~; however, while every effort will be made to strive for the newest vehicles/equipment, the actual vehicle/equipment fleet may not reach the levels required to reduce the NO_x emissions~~ to a level of less than significant. ~~Therefore, this impact remains potentially significant and unavoidable.~~

307 In the 1st paragraph under Cumulative Health Effects, the following clarifications have been made:

As with the Proposed Project, for Alternative 1, Configuration B, during sediment removal, significance threshold would not be exceeded for emissions of particulate matter and CO; no significance threshold would be exceeded during reservoir management under either option. ~~Nevertheless, while every effort will be made to strive for the newest vehicles/equipment, the actual vehicle/equipment fleet may not reach the levels required to reduce the NO_x emissions to a level of less than significant. Therefore, this impact remains significant and unavoidable.~~ ***Implementation of Mitigation Measures MM AQ-1 and MM AQ-2 will result in a reduction of NO_X emissions and will reduce the NO_X emissions to a level of less than significant for the sediment removal phase.***

307 In the 1st paragraph under Residual Impacts After Mitigation, the following clarifications have been made:

Sediment removal will not exceed any localized significance threshold except for combined NO_X emissions. Implementation of these mitigations would reduce Alternative 1, Configuration B's combined NO_X emissions during the sediment removal phase~~; however, while all effort will be made to strive for the newest vehicles/equipment, the actual vehicle/equipment fleet may not reach the levels required to reduce the NO_x emissions~~ to a level of less than significant.~~ Therefore, this impact remains potentially significant and unavoidable.~~

310 In Table 4.4-1, the following revision has been made:

Vegetation Communities	Estimated Acres of Vegetation Removed During Sediment Removal	
	Proposed Project	Alternative 1 Configuration B
Riversidean Alluvial Fan Sage Scrub	1.1	0.1
~~Coastal Sage Scrub~~ ***California Sagebrush – California Buckwheat Scrub***	3.1	1.9
Scoured	26.5	13.0
~~Ornamental Landscaping~~ ***Escaped Cultivars***	0.4	0.2
Riparian Woodland	51.4	37.2
Mustard and Annual Brome Semi-Natural Herbaceous Stand ~~Ruderal~~	22.8	17.4
Mule Fat ~~Scrub~~ ***Thickets***	***11.1*** ~~9.3~~	***10.4***~~8.6~~
Disturbed	1.9	0.9
~~Riparian Herbaceous~~	~~1.8~~	~~1.8~~

310 In the 3rd paragraph under Sensitive Wildlife, the following clarification has been made:

As shown in Communities and Table 4.4-1, potential impacts to sensitive wildlife will be reduced in comparison to the Proposed Project due to the reduction in habitat disturbed during sediment removal activities. Disturbance of habitat for the least Bell's vireo within Riparian Woodland and ***Mule Fat Thickets*** ~~Mule Fat Scrub communities~~ will be reduced by approximately 14.2 acres (28 percent) and 0.7 acre (7 percent), respectively, as compared to the Proposed Project.

311 Figure 4.4-2 was revised to reflect changes to the naming of vegetation communities.

312 In the 4th paragraph under Sensitive Wildlife, the following clarification has been made:

Disturbance of habitat for the yellow warbler within the Riparian Woodland community will be reduced by approximately 14.2 acres (28 percent), as compared to the Proposed Project. ~~Impacts to Riparian Herbaceous will be the same as for the Proposed Project.~~

312 In the 1st and 2nd paragraphs under Reservoir Management, the following revision has been made:

Figure 4.4-3: Alternative 1, Configuration B Expected Vegetation Communities Under Reservoir Management shows expected conditions of the vegetation communities under reservoir management for Alternative 1, Configuration B in comparison to the Proposed Project. As shown below, Alternative 1, Configuration B will result in a greater diversity of vegetation communities, including a greater amount of Riparian Woodland and ***Mule Fat Thickets*** ~~Mule Fat Scrub~~. Under Alternative 1, Configuration B, a greater area of the Proposed Project site will be left undisturbed during reservoir management, approximately 37.34 acres. In contrast, under the Proposed Project's reservoir management Option 1, the whole Proposed Project

site, approximately 120.42 acres, will be disturbed annually. Under the Proposed Project's reservoir management Option 2, 33.97 acres will be left undisturbed during reservoir management.

The reservoir management area for Alternative 1, Configuration B is expected to be composed of ~~Riparian Herbaceous~~ ***Mule Fat Thickets*** and ***Mustard and Annual Brome Semi-Natural Herbaceous Stand*** ~~ruderal~~ communities. The availability of streams and seasonal ponds will depend upon where sediment accumulates and the amount of flows, rainfall, and runoff.

313 Figure 4.4-3 was revised to reflect changes to the naming of vegetation communities.

314 In the 1st paragraph under Mitigation Measures, the following details have been added:

MM BIO – 1: A qualified biological monitor shall be present during initial ground- or vegetation-disturbing project-related activities ***to provide protection measures and monitor for wildlife in harm's way. This includes initial ground- or vegetation-disturbing project-related activities at the annual start of each year of sediment removal or maintenance activities***. Following initial project-related activities, a qualified monitoring biologist shall be present as necessary to maintain the implemented protection measures and monitor for additional species in harm's way. ***These protection measures shall include, as appropriate: redirecting the wildlife, identifying areas that may require exclusionary devices (e.g., fencing), or capturing and relocating wildlife outside the work area. Any captured species shall be relocated to adjacent appropriate habitat that is contiguous to adjacent habitat and not impacted by project-related disturbance activities.***

314 In the 3rd paragraph under Mitigation Measures, the following detail has been added:

MM BIO – 3: Within 90 days prior to ground-disturbing activities, a preconstruction survey shall be conducted by a qualified biologist for the presence of any sensitive species in harm's way, including coast range newt, the southwestern pond turtle, and the two-striped garter snake. If sensitive species are observed in harm's way, the qualified biologist will develop and implement appropriate protection measures for that species. These protection measures shall include, as appropriate, redirecting the species, ***constructing*** ~~construction of~~ exclusionary devices (e.g., fencing), or ***capturing*** ~~capture~~ ***and relocating*** ~~relocation~~ ***wildlife*** outside the work area. Preconstruction surveys shall be repeated annually for the duration of the sediment removal. ***Observations of special status species made during these surveys shall be recorded onto a CNDDB field data sheet and submitted to CDFW for inclusion into the CNDDB.***

315 In the 7th paragraph under Mitigation Measures, the following details have been added:

MM BIO – 5: Within 30 days prior to commencement of vegetation or structure removal activities, a preconstruction bat survey shall be conducted by a qualified biologist for the presence of any roosting bats. ***Acoustic recognition technology shall be used if feasible and appropriate.*** If either a bat maternity roost or hibernacula (structures used by bats for hibernation) are present, a qualified biologist will develop and implement appropriate protection measures for that maternity roost or hibernacula. These protection measures shall include, as appropriate, safely evicting non-breeding bat hibernacula, establishment of avoidance buffers, or replacement of roosts at a suitable location. ***These measures shall also include as appropriate:***

- ***To the extent feasible, trees that have been identified as roosting sites shall be removed or relocated between October 1 and February 28.***
- ***When trees must be removed during the maternity season (March 1 to September 30), a qualified bat specialist shall conduct a preconstruction survey to identify those trees proposed for disturbance that could provide hibernacula or nursery colony roosting habitat for bats.***
- ***Trees identified as potentially supporting an active nursery roost shall be inspected by a qualified biologist no greater than 7 days prior to tree disturbance to determine presence or absence of roosting bats.***
- ***Trees determined to support active maternity roosts will be left in place until the end of the maternity season (September 30).***
- ***If bats are not detected in a tree, but the qualified biologist determines that roosting bats may still be present, trees shall be removed as follows:***
    - ***Pushing a tree down with heavy machinery instead of felling the tree with a chainsaw***
    - ***First pushing the tree lightly 2 to 3 times with a pause of 30 seconds between each nudge to allow bats to become active, then pushing the tree to the ground slowly***
    - ***Allowing the tree to remain in place for 24 to 48 hours until inspected by the qualified biologist for presence or absence of roosting bats***
- ***The qualified biologist shall document all bat survey, monitoring, and protection measure activities and prepare a summary report for LACFCD.***

316 In the 2nd paragraph under BIOLOGY-2, the following clarifications have been made:

This alternative will impact approximately 37.2 acres of Riparian Woodland and ~~8.6~~ ***10.4*** acres of ***Mule Fat Thickets*** ~~Mule Fat Scrub~~ within the Proposed Project site. Riparian Woodland and ***Mule Fat Thickets*** ~~Mule Fat Scrub~~ are rare plant communities that provide nesting habitat for

riparian species. Impacts to these habitats will result in a significant impact; however, disturbance of Riparian Woodland and ***Mule Fat Thickets*** ~~Mule Fat Scrub~~ will be reduced by approximately 14.2 acres (28 percent) and 0.7 acre (7 percent), respectively, as compared to the Proposed Project. To minimize impacts due to the loss of Riparian Woodland and ***Mule Fat Thickets*** ~~Mule Fat Scrub~~, Mitigation Measures MM BIO-7 and MM BIO-8 have been provided. With implementation of these mitigation measures, impacts to Riparian Woodland and ***Mule Fat Thickets*** ~~Mule Fat Scrub~~ will be reduced to a level below significance.

317 In MM BIO – 8, the following clarifications have been made:

MM BIO – 8: A combination of onsite and offsite habitat restoration, enhancement, and exotic removal shall be implemented by LACFCD at a 1:1 ratio for impacted sensitive habitat and jurisdictional waters. Habitat restoration/enhancement shall include use of willow cuttings and exotic species removal. ***Non-native, weedy*** ~~Ruderal~~ habitats within the basin shall be utilized whenever possible as mitigation sites. This mitigation measure shall be monitored for success for five years following implementation. A report of the monitoring results shall be submitted annually, during the five years following implementation, to resource agencies as required by the Section 401 Certification, Section 404 permit, and a Streambed Alteration Agreement.

320 In the 1st paragraph under BIOLOGY-4, the following information has been added:

The Proposed Project area is predominantly open for wildlife movement and habitat connectivity. ***Sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays). In addition, sediment removal activities would not completely block the Proposed Project site from surrounding habitat, would occur only during the day, and would not interfere with nighttime wildlife activity. Although some wildlife may be temporarily displaced during construction, wildlife would not be physically prevented from moving around and into the basin area.*** Sediment removal and reservoir management activities associated with Alternative 1, Configuration B will interfere temporarily with the movement of native resident or migratory wildlife species, resulting in a significant impact. Reduction in sensitive habitat would interfere with use of the habitat for wildlife nursery sites, resulting in a significant impact. ***To minimize impacts to less than significant, Mitigation Measures MM BIO-1 through MM BIO-8 has been provided.*** This impact will be reduced in comparison to the Proposed Project due to the reduction in area disturbed during sediment removal and either reservoir management option.

325 In the 1st paragraph under GHG EMISSIONS-1, the following information has been added:

Alternative 1, Configuration B will use the same amount and type of construction equipment as the Proposed Project and involve the same number of truck trips on a daily basis for sediment removal and reservoir management; however, sediment removal under this Alternative is expected to have a shorter duration than the Proposed Project due to the reduced amount of sediment to be removed. ***Use of sediment removal dump trucks that meet EPA's emission standards for Model Year 2007 or later and use of off-road equipment that meets, at a minimum, EPA's emission standards***

for Tier 3 equipment, would result in a reduction of GHG emissions. As noted in Section 3.6, generation of greenhouse gas emissions under the Proposed Project is not "cumulatively considerable" and is therefore less than significant under CEQA. Alternative 1, Configuration B will have the same amount of daily equipment usage/truck traffic and reduced overall sediment removal duration; therefore, this alternative will generate less greenhouse gas emissions than the Proposed Project. This impact will not be "cumulatively considerable" and is therefore less than significant under CEQA.

341 In the 4th paragraph under Recreation and Public Services, the following detail has been added:

Sediment removal activities will not limit the use of the Oak Grove area of Hahamongna Watershed Park by individuals or by organizations such as the Oak Grove Disc Golf Club, the Rose Bowl Riders, ***MACH 1,*** or Tom Sawyer Camp.

345 In the 1st and 2nd paragraphs under TRANSPORTATION-1, the following clarifications have been made:

Truck traffic associated with Alternative 1, Configuration B is expected to adhere to traffic regulations; however, during sediment removal, Alternative 1, Configuration B truck traffic is expected to impact traffic LOS on the existing roadway network. Potential impacts regarding existing LOS are discussed under TRANSPORTATION-2 below. This increase in traffic would result in ***temporary*** significant impacts to the efficiency of the circulation system. Implementation of Mitigation Measures MM TRA-1 and TRA-2 would reduce this ***temporary*** impact but not to a level of less than significant.

Sediment removal and associated transportation under this Alternative could potentially have a shorter duration than the Proposed Project due to the reduced amount of sediment to be removed. Other potential impact reduction measures discussed under TRANSPORTATION-2, below, could reduce impacts to less than significant. These measures cannot be legally imposed by the LACFCD, however, since the locations are under the jurisdiction of other agencies. Every reasonable effort will be made to coordinate with and receive approval from the jurisdictional agencies to implement the impact reduction measures but LACFCD cannot guarantee that the measures will be implemented. Therefore, this ***temporary*** impact could remain potentially significant.

346 In the 1st paragraph under Residual Impacts after Mitigation, the following clarifications have been made:

Potentially significant traffic impacts associated with the sediment removal phase would be temporary, expected to occur during the drier months (from April to December, except on holidays), and would cease at the end of the sediment removal phase. Implementation of the mitigation measures described above would reduce ***temporary*** impacts to traffic and circulation but not to a level of less than significant. Other potential impact reduction measures discussed under TRANSPORTATION-2, below, could reduce impacts to less than significant. These measures cannot be legally imposed by the LACFCD, however, since the locations are under the jurisdiction of other

agencies. Every reasonable effort will be made to coordinate with and receive approval from the jurisdictional agencies to implement the impact reduction measures but LACFCD cannot guarantee that the measures will be implemented. Therefore, this ***temporary*** impact could remain potentially significant. ***No significant traffic impacts would occur under reservoir management.***

347 In the 4th paragraph under TRANSPORTATION-2, the following clarifications have been made:

The impact reduction measure discussed above cannot be legally imposed by the LACFCD since the location is under the jurisdiction of the City of Pasadena. Every reasonable effort will be made to coordinate with and receive approval to implement this impact reduction measure; however, LACFCD cannot guarantee that this impact reduction measure will be implemented. Therefore this ***temporary*** impact would remain potentially significant.

348 In the 5th and 6th paragraphs under TRANSPORTATION-2, the following clarifications have been made:

The Irwindale Avenue/Foothill Boulevard intersection is anticipated to operate at an unacceptable LOS during the PM peak hour, resulting in a ***temporary*** significant impact. Mitigation Measure MM TRA-1 would reduce the impact to the Irwindale Avenue/Foothill Boulevard intersection to less than significant.

The Figueroa St/Scholl Canyon Road and SR-134 westbound ramps intersection is anticipated to operate at an unacceptable LOS during the AM and PM peak hours, resulting in a ***temporary*** significant impact.

348 In the 7th, 8th, and 9th paragraphs under TRANSPORTATION-2, the following clarifications have been made:

Implementation of the impact reduction measure discussed above would reduce the impact to the Figueroa St/Scholl Canyon Road and SR-134 westbound ramps intersection to less than significant. This impact reduction measure cannot be legally imposed by the LACFCD. Every reasonable effort will be made to coordinate with and receive approval to implement the impact reduction measure; however, LACFCD cannot guarantee that the measure will be implemented therefore this ***temporary*** impact could remain significant.

The Glenoaks Boulevard and Osborne Street intersection is anticipated to operate at an unacceptable LOS during the AM and PM peak hours, resulting in a ***temporary*** significant impact.

The Sheldon Street and San Fernando Road intersection and the Branford Street and San Fernando Road intersection are anticipated to operate at an unacceptable LOS during the PM peak hour, resulting in ***temporary*** significant impacts. Mitigation Measure MM TRA-2 would reduce the impacts to less than significant.

349 In the 1st paragraph under Residual Impacts After Mitigation, the following clarifications have been made:

Potentially significant traffic impacts associated with the sediment removal phase would be temporary, expected to occur during the drier months (from April to December, except on holidays), and would cease at the end of the sediment removal phase. Implementation of the mitigation measures described above would reduce some but not all of the impacts to traffic and circulation to a level less than significant. Other potential impact reduction measures discussed above could reduce impacts to less than significant. These measures cannot be legally imposed by the LACFCD, however, since the locations are under the jurisdiction of other agencies. Every reasonable effort will be made to coordinate with and receive approval from the jurisdictional agencies to implement the impact reduction measures but LACFCD cannot guarantee that the measures will be implemented. Therefore, these ***temporary*** impacts could remain potentially significant. ***No significant traffic impacts would occur under reservoir management.***

349 In the 1st paragraph under TRANSPORTATION-3, the following clarifications have been made:

Implementation of the Alternative 1, Configuration B may include impact reduction measures described above that would require modifications to the existing roadway network. These modifications would consist of roadway restriping to reduce potential traffic impacts to a level less than significant. These changes would not alter existing roadway ~~design~~ ***use*** and would be implemented consistently with all applicable traffic safety standards. Alternative 1, Configuration B is limited to excavation and transportation of sediment that has accumulated in Devil's Gate Reservoir and would not introduce any new uses that would be incompatible ***or substantially increase hazards*** with the existing roadway system. Therefore, impacts related to traffic hazards would be less than significant.

351 In the 1st paragraph under TRANSPORTATION-5, the following clarifications have been made:

Alternative 1, Configuration B would be confined to the roadway network described in Section 3.16.2 and would not adversely affect alternative modes of public transportation such as light rail. Implementation of Alternative 1, Configuration B would not require closure of any bus stops or disrupt any existing bus routes. The degrading of LOS at intersections, freeway segments, and freeway on- and off-ramps described above under TRANSPORTATION-2 could affect buses using the existing roadway network. This would be a ***temporary*** potentially significant impact.

351 In the 4th paragraph under TRANSPORTATION-5, the following clarifications have been made:

Potentially significant traffic impacts associated with the sediment removal phase would be temporary, expected to occur during the drier months (from April to December, except on holidays), and would cease at the end of the sediment removal

phase. Implementation of the mitigation measures described above would reduce some but not all of the impacts to traffic and circulation to a level less than significant. Other potential impact reduction measures discussed above could reduce impacts to less than significant. These measures cannot be legally imposed by the LACFCD, however, since the locations are under the jurisdiction of other agencies. Every reasonable effort will be made to coordinate with and receive approval from the jurisdictional agencies to implement the impact reduction measures but LACFCD cannot guarantee that the measures will be implemented. Therefore, these ***temporary*** impacts could remain potentially significant. ***No significant traffic impacts would occur under reservoir management.***

352 In the 3rd paragraph under UTILITIES-1, the following clarification has been made:

During reservoir management, Alternative 1, Configuration B will not result in or require the construction of new or expansion of existing stormwater drainage systems. Sediment that accumulates after the proposed removal will be removed through FAST operations or through mechanical excavation and trucking. The FAST operations are expected to be similar to historic FAST operations, and sediment fines discharged through FAST operations will be transported during storm flows to the Pacific Ocean via Arroyo Seco and the Los Angeles River. No impacts to stormwater facilities are expected during FAST operations. Any necessary mechanical removal during reservoir management is expected to be small (***typically*** 13,000 cy per year). Impacts to stormwater facilities during mechanical removal will be avoided through compliance with City regulations regarding stormwater facilities and implementation of LACDPW BMPs.

Section 4.5 Alternative 2, Configuration C

Page Clarification/Revision

357 In the 4th paragraph under Sediment Excavation/Trucking Offsite, the following clarifications have been made:

As with the Proposed Project, it is estimated, based on past storm events, that sediment excavation/trucking offsite will be required to remove ***typically*** ~~an average of~~ 13,000 cy of sediment annually. Based on an estimated removal of 4,800 cy per day, it is expected this will occur over an estimated two-week period, working Monday through Friday. This sediment excavation activity will take place during the late summer/early fall following the vegetation maintenance.

363 In the 2nd paragraph under AIR QUALITY-1, the following clarifications have been made:

As with the Proposed Project (see Section 3.5.6), Alternative 2, Configuration C will be consistent with the second through fourth criteria, but will not be consistent with the first criterion. This is due to emissions of NO_X exceeding the Daily Regional Threshold during sediment removal, resulting in a potentially significant impact. Use of sediment

removal dump trucks that meet EPA's emission standards for Model Year 2007, and use of off-road equipment that meets, at a minimum, EPA's emission standards for ***Tier 3*** ~~Tier 4 interim~~ equipment, would result in a reduction of NO_X emissions to less than the SCAQMD Regional Threshold for NO_X. ~~Every effort will be made to strive for the newest vehicles/equipment reasonably available.~~ Implementation of Mitigation Measures MM AQ-1 and MM AQ-2 will result in a reduction of NO_X emissions to less than the SCAQMD Regional Threshold for NO_X. ~~; however, the actual vehicles/equipment used may not reach the levels required to reduce the NO_x emissions to a level of less than significant for the sediment removal phase. Therefore, Alternative 2, Configuration C could result in a potentially significant impact.~~ ***Therefore, impacts during sediment removal will be less than significant.*** This impact will be greater in comparison to the Proposed Project due to the increase in excavation volume and associated sediment removal activities.

363 In the 1st paragraph under Mitigation Measures, the following clarification has been made:

MM AQ-1: LACFCD shall require all construction contractors during the sediment removal phase of the Proposed Project to use ***only*** sediment removal dump trucks that meet EPA's emission standards for Model Year 2007 ***or later*** ~~as reasonably feasible~~.

364 In the 1st paragraph under Residual Impacts After Mitigation, the following clarifications have been made:

Implementation of these mitigations would reduce Alternative 2, Configuration C's combined NO_X emissions during the sediment removal phase~~. However, while all effort will be made to strive for the newest vehicles/equipment, the actual vehicle/equipment fleet may not reach the levels required to reduce emissions~~ to a level of less than significant. ~~Therefore, this impact remains potentially significant and unavoidable.~~

364 In the 1st paragraph under AIR QUALITY-2, the following clarifications have been made:

Implementation of Mitigation Measures MM AQ-1 and MM AQ-2 will result in a reduction of Alternative 2, Configuration C's combined NO_X emissions during sediment removal~~. However, while every reasonable effort will be made to strive for the newest vehicles/equipment, the actual vehicle/equipment fleet may not reach the levels required to reduce emissions~~ to a level of less than significant. ~~Therefore, this impact remains significant and unavoidable.~~ This impact will be increased in comparison to the Proposed Project due to the increase in excavation volume and associated sediment removal activities.

365 In the 1st paragraph under Residual Impacts After Mitigation, the following clarifications have been made:

Sediment removal will not exceed any standard SCAQMD Regional Threshold except for combined NO_X emissions. Implementation of these mitigations would reduce Alternative 2, Configuration C's combined NO_X emissions during the sediment removal phase~~. While every effort will be made to strive for the newest vehicles/equipment, the actual vehicle/equipment fleet may not reach the levels required to reduce the NO_x~~

~~emissions~~ to a level of less than significant. ~~Therefore, this impact remains potentially significant and unavoidable.~~

366 In the 1st paragraph under Cumulative Health Impacts, the following clarifications have been made:

As with the Proposed Project, for Alternative 2, Configuration C with Mitigation Measures MM AQ-1 and MM AQ-2, a significance threshold would not be exceeded for emissions of particulate matter and CO; and no significance threshold would be exceeded during reservoir management under either option. ~~While every effort will be made to strive for the newest vehicles/equipment, the actual vehicle/equipment fleet may not reach the levels required to reduce the NO_x emissions to a level of less than significant. Therefore, this impact remains potentially significant and unavoidable.~~ ***Implementation of Mitigation Measures MM AQ-1 and MM AQ-2 will result in a reduction of NO_X emissions and will reduce the NO_X emissions to a level of less than significant for the sediment removal phase.***

366 In the 1st paragraph under Residual Impacts After Mitigation, the following clarifications have been made:

Sediment removal will not exceed any localized significance threshold except for combined NO_X emissions. Implementation of these mitigations would reduce Alternative 2, Configuration C's combined NO_X emissions during the sediment removal phase~~; however, while all effort will be made to strive for the newest vehicles/equipment, the actual vehicle/equipment fleet may not reach the levels required to reduce the NO_x emissions~~ to a level of less than significant. ~~Therefore, this impact remains significant and unavoidable.~~

369 In Table 4.5-1, the following clarification has been made:

Vegetation Communities	Estimated Acres of Vegetation Removed During Sediment Removal	
	Proposed Project	Alternative 2 Configuration C
Riversidean Alluvial Fan Sage Scrub	1.1	0.2
~~Coastal Sage Scrub~~ ***California Sagebrush – California Buckwheat Scrub***	3.1	0.2
Scoured	26.5	20.0
~~Ornamental Landscaping~~ ***Escaped Cultivars***	0.4	0.3
Riparian Woodland	51.4	34.1
Mustard and Annual Brome Semi-Natural Herbaceous Stand ~~Ruderal~~	22.8	16.2
Mule Fat Thickets ~~Mule Fat Scrub~~	***11.1*** ~~9.3~~	***9.8*** ~~8.0~~
Disturbed	1.9	0.8
~~Riparian Herbaceous~~	~~1.8~~	~~1.8~~

369 In the 3rd paragraph under Sensitive Wildlife, the following clarification has been made:

As shown in Figure 4.5-2: Alternative 2, Configuration C Sediment Removal Vegetation Communities Impacts and Table 4.5-1, potential impacts to sensitive wildlife will be reduced in comparison to the Proposed Project due to the reduction in habitat disturbed during sediment removal activities. Disturbance of habitat for the least Bell's vireo within Riparian Woodland and ***Mule Fat Thickets*** ~~Mule Fat Scrub~~ communities will be reduced by approximately 17.3 acres (33 percent) and 1.3 acres (14 percent), respectively, as compared to the Proposed Project.

370 Figure 4.5-2 was revised to reflect changes to the naming of vegetation communities.

371 In the 1st paragraph on the page, the following clarification has been made:

Disturbance of habitat for the yellow warbler within the Riparian Woodland community will be reduced by approximately 17.3 acres (33 percent), as compared to the Proposed Project. ~~Impacts to Riparian Herbaceous will be the same as for the Proposed Project.~~

371 In the 1st and 2nd paragraphs under Reservoir Management, the following revision has been made:

Figure 4.5-3: Alternative 2, Configuration C Expected Vegetation Communities Under Reservoir Management shows expected conditions of the vegetation communities under reservoir management for Alternative 2, Configuration C in comparison to the Proposed Project. As shown below, Alternative 2, Configuration C will result in a greater diversity of vegetation communities, including a greater amount of Riparian Woodland and ***Mule Fat Thickets*** ~~Mule Fat Scrub~~. Under Alternative 2, Configuration C, a greater area of the Proposed Project site will be left undisturbed during reservoir management, approximately 36.46 acres. In contrast, under the Proposed Project's reservoir management Option 1, the whole Proposed Project site, approximately 120.42 acres, will be disturbed annually. Under the Proposed Project's reservoir management Option 2, 33.97 acres will be left undisturbed during reservoir management.

The reservoir management area for Alternative 2, Configuration C is expected to be composed of Riparian Herbaceous and ***Mustard and Annual Brome Semi-Natural Herbaceous Stand*** ~~ruderal~~ communities. Streams and seasonal ponds will be available depending upon where sediment accumulates and the amount of flows, rainfall, and runoff. Special status species have the potential to use the reservoir management area.

372 Figure 4.5-3 was revised to reflect changes to the naming of vegetation communities.

373 In the 1st paragraph under Mitigation Measures, the following details have been added:

MM BIO – 1: A qualified biological monitor shall be present during initial ground- or vegetation-disturbing project-related activities ***to provide protection measures and monitor for wildlife in harm's way. This includes initial ground- or vegetation-***

disturbing project-related activities at the annual start of each year of sediment removal or maintenance activities. Following initial project-related activities, a qualified monitoring biologist shall be present as necessary to maintain the implemented protection measures and monitor for additional species in harm's way. ***These protection measures shall include, as appropriate: redirecting the wildlife, identifying areas that may require exclusionary devices (e.g., fencing), or capturing and relocating wildlife outside the work area. Any captured species shall be relocated to adjacent appropriate habitat that is contiguous to adjacent habitat and not impacted by project-related disturbance activities.***

373 In the 3rd paragraph under Mitigation Measures, the following detail has been added:

MM BIO – 3: Within 90 days prior to ground-disturbing activities, a preconstruction survey shall be conducted by a qualified biologist for the presence of any sensitive species in harm's way, including coast range newt, the southwestern pond turtle, and the two-striped garter snake. If sensitive species are observed in harm's way, the qualified biologist will develop and implement appropriate protection measures for that species. These protection measures shall include, as appropriate: redirecting the species, ***constructing*** ~~construction of~~ exclusionary devices (e.g., fencing), or ***capturing*** ~~capture~~ ***and relocating*** ~~relocation~~ ***wildlife*** outside the work area. Preconstruction surveys shall be repeated annually for the duration of the sediment removal. ***Observations of special status species made during these surveys shall be recorded onto a CNDDB field data sheet and submitted to CDFW for inclusion into the CNDDB.***

374 In the 7th paragraph under Mitigation Measures, the following details have been added:

MM BIO – 5: Within 30 days prior to commencement of vegetation or structure removal activities, a preconstruction bat survey shall be conducted by a qualified biologist for the presence of any roosting bats. ***Acoustic recognition technology shall be used if feasible and appropriate.*** If either a bat maternity roost or hibernacula (structures used by bats for hibernation) ***are*** present, a qualified biologist will develop and implement appropriate protection measures for that maternity roost or hibernacula. These protection measures shall include, as appropriate, safely evicting non-breeding bat hibernacula, establishment of avoidance buffers, or replacement of roosts at a suitable location. ***These measures shall also include as appropriate:***

- ***To the extent feasible, trees that have been identified as roosting sites shall be removed or relocated between October 1 and February 28.***
- ***When trees must be removed during the maternity season (March 1 to September 30), a qualified bat specialist shall conduct a preconstruction survey to identify those trees proposed for disturbance that could provide hibernacula or nursery colony roosting habitat for bats.***
- ***Trees identified as potentially supporting an active nursery roost shall be inspected by a qualified biologist no greater than 7 days prior to tree disturbance to determine presence or absence of roosting bats.***

- ***Trees determined to support active maternity roosts will be left in place until the end of the maternity season (September 30).***

- ***If bats are not detected in a tree, but the qualified biologist determines that roosting bats may still be present, trees shall be removed as follows:***

    - ***Pushing a tree down with heavy machinery instead of felling the tree with a chainsaw***

    - ***First pushing the tree lightly 2 to 3 times with a pause of 30 seconds between each nudge to allow bats to become active, then pushing the tree to the ground slowly***

    - ***Allowing the tree to remain in place for 24 to 48 hours until inspected by the qualified biologist for presence or absence of roosting bats***

- ***The qualified biologist shall document all bat survey, monitoring, and protection measure activities and prepare a summary report for LACFCD.***

375 In the 2nd paragraph under BIOLOGY-2, the following clarification has been made:

This alternative will impact approximately 34.1 acres of Riparian Woodland and ~~8.0~~ ***9.8*** acres of ***Mule Fat Thickets*** ~~Mule Fat Scrub~~ within the Proposed Project site. Riparian Woodland and ***Mule Fat Thickets*** ~~Mule Fat Scrub~~ are rare plant communities that provide nesting habitat for riparian species. Impacts to these habitats will result in a potentially significant impact; however, disturbance of Riparian Woodland and ***Mule Fat Thickets*** ~~Mule Fat Scrub~~ will be reduced by approximately 17.3 acres (33 percent) and 1.3 acre (14 percent), respectively, as compared to the Proposed Project. To minimize impacts due to the loss of Riparian Woodland and ***Mule Fat Thickets*** ~~Mule Fat Scrub~~, Mitigation Measures MM BIO-7 and MM BIO-8 have been provided. With implementation of these mitigation measures, impacts to Riparian Woodland and ***Mule Fat Thickets*** ~~Mule Fat Scrub~~ will be reduced to a level below significance.

376 In MM BIO – 8, the following clarifications have been made:

MM BIO – 8: A combination of onsite and offsite habitat restoration, enhancement, and exotic removal shall be implemented by LACFCD at a 1:1 ratio for impacted sensitive habitat and jurisdictional waters. Habitat restoration/enhancement shall include use of willow cuttings and exotic species removal. ***Non-native, weedy*** ~~Ruderal~~ habitats within the basin shall be utilized whenever possible as mitigation sites. This mitigation measure shall be monitored for success for five years following implementation. A report of the monitoring results shall be submitted annually, during the five years following implementation, to resource agencies as required by the Section 401 Certification, Section 404 permit, and a Streambed Alteration Agreement.

379 In the 1st paragraph under BIOLOGY-4, the following information has been added:

The Proposed Project area is predominantly open for wildlife movement and habitat connectivity. ***Sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays). In addition, sediment removal activities would not completely block the Proposed Project site from surrounding habitat, would occur only during the day, and would not interfere with nighttime wildlife activity. Although some wildlife may be temporarily displaced during construction, wildlife would not be physically prevented from moving around and into the basin area.*** Sediment removal and reservoir management activities associated with Alternative 2, Configuration C will interfere temporarily with the movement of native resident or migratory wildlife species, resulting in a potentially significant impact. Reduction in sensitive habitat would interfere with use of the habitat for wildlife nursery sites, resulting in a potentially significant impact. ***To minimize impacts to less than significant, Mitigation Measures MM BIO-1 through MM BIO-8 has been provided.*** This impact will be reduced in comparison to the Proposed Project due to the reduction in area disturbed during sediment removal and both reservoir management options.

385 In the 1st paragraph under GHG EMISSIONS-1, the following information has been added:

Alternative 2, Configuration C will use the same amount and type of construction equipment as the Proposed Project and involve the same number of truck trips on a daily basis for sediment removal and reservoir management; however, sediment removal under this Alternative is expected to have a longer duration than the Proposed Project due to the increased amount of sediment to be removed. ***Use of sediment removal dump trucks that meet EPA's emission standards for Model Year 2007 or later and use of off-road equipment that meets, at a minimum, EPA's emission standards for Tier 3 equipment, would result in a reduction of GHG emissions.*** As noted in Section 3.6, generation of greenhouse gas emissions under the Proposed Project is not "cumulatively considerable" and is therefore less than significant under CEQA. Alternative 2, Configuration C will have the same amount of daily equipment usage/truck traffic and increased overall sediment removal duration; therefore, this alternative will generate greater greenhouse gas emissions than the Proposed Project, but will be not "cumulatively considerable," and is therefore less than significant under CEQA.

400 In the 4th paragraph under Recreation and Public Services, the following detail has been added:

Sediment removal activities will not limit the use of the Oak Grove area of Hahamongna Watershed Park by individuals or by organizations such as the Oak Grove Disc Golf Club, the Rose Bowl Riders, ***MACH 1,*** or Tom Sawyer Camp.

404 In the 1st paragraph under TRANSPORTATION-1, the following clarifications have been made:

Truck traffic associated with the Alternative 2, Configuration C is expected to adhere to traffic regulations; however, during sediment removal, Alternative 2, Configuration C truck traffic is expected to impact traffic LOS on the existing roadway network. Potential impacts regarding existing LOS are discussed under TRANSPORTATION-2 below. This increase in traffic would result in ***temporary*** significant impacts to the efficiency of the circulation system. Implementation of Mitigation Measures MM TRA-1 and TRA-2 would reduce this ***temporary*** impact but not to a level of less than significant.

405 At the end of the 2nd paragraph under TRANSPORTATION-1, the following clarification has been made:

Therefore, this ***temporary*** impact could remain potentially significant.

405 In the 1st paragraph under Residual Impacts After Mitigation, the following clarification has been made:

Potentially significant traffic impacts associated with the sediment removal phase would be temporary, expected to occur during the drier months (from April to December, except on holidays), and would cease at the end of the sediment removal phase. Implementation of the mitigation measures described above would reduce impacts to traffic and circulation but not to a level of less than significant. Other potential impact reduction measures discussed under TRANSPORTATION-2, below, could reduce impacts to less than significant. These measures cannot be legally imposed by the LACFCD, however, since the locations are under the jurisdiction of other agencies. Every reasonable effort will be made to coordinate with and receive approval from the jurisdictional agencies to implement the impact reduction measures but LACFCD cannot guarantee that the measures will be implemented. Therefore, this ***temporary*** impact could remain potentially significant. ***No significant traffic impacts would occur under reservoir management.***

406 In the 4th paragraph under TRANSPORTATION-2, the following clarification has been made:

The impact reduction measure discussed above cannot be legally imposed by the LACFCD since the location is under the jurisdiction of the City of Pasadena. Every reasonable effort will be made to coordinate with and receive approval to implement this impact reduction measure; however, LACFCD cannot guarantee that this impact reduction measure will be implemented. Therefore this ***temporary*** impact would remain potentially significant.

407 In the 5th and 6th paragraphs under TRANSPORTATION-2, the following clarifications have been made:

The Irwindale Avenue/Foothill Boulevard intersection is anticipated to operate at an unacceptable LOS during the PM peak hour, resulting in a ***temporary*** significant impact.

Mitigation Measure MM TRA-1 would reduce the impact to the Irwindale Avenue/Foothill Boulevard intersection to less than significant.

The Figueroa St/Scholl Canyon Road and SR-134 westbound ramps intersection is anticipated to operate at an unacceptable LOS during the AM and PM peak hours, resulting in a ***temporary*** significant impact.

407 In the 7th, 8th, and 9th paragraphs under TRANSPORTATION-2, the following clarifications have been made:

Implementation of the impact reduction measure discussed above would reduce the impact to the Figueroa St/Scholl Canyon Road and SR-134 westbound ramps intersection to less than significant. This impact reduction measure cannot be legally imposed by the LACFCD. Every reasonable effort will be made to coordinate with and receive approval to implement the impact reduction measure; however, LACFCD cannot guarantee that the measure will be implemented therefore this ***temporary*** impact could remain significant.

The Glenoaks Boulevard and Osborne Street intersection is anticipated to operate at an unacceptable LOS during the AM and PM peak hours, resulting in a ***temporary*** significant impact.

The Sheldon Street and San Fernando Road intersection and the Branford Street and San Fernando Road intersection are anticipated to operate at an unacceptable LOS during the PM peak hour, resulting in ***temporary*** significant impacts. Mitigation Measure MM TRA-2 would reduce the impacts to less than significant.

408 In the 1st paragraph under Residual Impacts After Mitigation, the following clarifications have been made:

Potentially significant traffic impacts associated with the sediment removal phase would be temporary, expected to occur during the drier months (from April to December, except on holidays), and would cease at the end of the sediment removal phase. Implementation of the mitigation measures described above would reduce some but not all of the impacts to traffic and circulation to a level less than significant. Other potential impact reduction measures discussed above could reduce impacts to less than significant. These measures cannot be legally imposed by the LACFCD, however, since the locations are under the jurisdiction of other agencies. Every reasonable effort will be made to coordinate with and receive approval from the jurisdictional agencies to implement the impact reduction measures but LACFCD cannot guarantee that the measures will be implemented. Therefore, these ***temporary*** impacts could remain potentially significant. ***No significant traffic impacts would occur under reservoir management.***

408 In the 1st paragraph under TRANSPORTATION-3, the following clarification has been made:

Implementation of Alternative 2, Configuration C may include impact reduction measures described above that would require modifications to the existing roadway network. These modifications would consist of roadway restriping to reduce potential traffic impacts to a level less than significant. These changes would not alter existing roadway ~~design~~ ***use*** and would be implemented consistently with all applicable traffic safety standards. Alternative 2, Configuration C is limited to excavation and transportation of sediment that has accumulated in Devil's Gate Reservoir and would not introduce any new uses that would be incompatible ***or substantially increase hazards*** with the existing roadway system. Therefore, impacts related to traffic hazards would be less than significant.

410 In the 1st paragraph of TRANSPORTATION-5, the following clarification has been made:

Alternative 2, Configuration C would be confined to the roadway network described in Section 3.16.2 and would not adversely affect alternative modes of public transportation such as light rail. Implementation of Alternative 2, Configuration C would not require closure of any bus stops or disrupt any existing bus routes. The degrading of LOS at intersections, freeway segments, and freeway on- and off-ramps described above under TRANSPORTATION-2 could affect buses using the existing roadway network. This would be a ***temporary*** potentially significant impact.

410 In the 1st paragraph under Residual Impacts After Mitigation, the following clarifications have been made:

Potentially significant traffic impacts associated with the sediment removal phase would be temporary, expected to occur during the drier months (from April to December, except on holidays), and would cease at the end of the sediment removal phase. Implementation of the mitigation measures described above would reduce some but not all of the impacts to traffic and circulation to a level less than significant. Other potential impact reduction measures discussed above could reduce impacts to less than significant. These measures cannot be legally imposed by the LACFCD, however, since the locations are under the jurisdiction of other agencies. Every reasonable effort will be made to coordinate with and receive approval from the jurisdictional agencies to implement the impact reduction measures but LACFCD cannot guarantee that the measures will be implemented. Therefore, these ***temporary*** impacts could remain potentially significant. ***No significant traffic impacts would occur under reservoir management.***

411 In the 3rd paragraph under UTILITIES-1, the following clarification has been made:

During reservoir management, Alternative 2, Configuration C will not result in or require the construction of new or expansion of existing stormwater drainage systems. Sediment that accumulates at the front of the reservoir after the proposed removal will be removed through FAST operations or through mechanical excavation, and sediment accumulated at the back basin will be removed through trucking. The FAST operations

are expected to be similar to historic FAST operations, and sediment fines discharged through FAST operations will be transported during storm flows to the Pacific Ocean via Arroyo Seco and the Los Angeles River. No impacts to stormwater facilities are expected during FAST operations. Any necessary mechanical removal during reservoir management is expected to be small (***typically*** 13,000 cy per year). Impacts to stormwater facilities during mechanical removal will be avoided through compliance with City regulations regarding stormwater facilities and implementation of LACDPW BMPs.

Section 4.6 Alternative 3, Configuration D

Page **Clarification/Revision**

413 In the 1st paragraph under 4.6.1 Alternative Description, the following information has been added:

Alternative 3, Configuration D, Option 1

Sediment Removal

Alternative 3, Configuration D***, Option 1*** excavation activities will remove approximately 2.4 million cy of current excess sediment in the reservoir in addition to any additional sediment received during the project.

Excavation/Reservoir Configuration

Specific excavation limits and reservoir configuration for Alternative 3, Configuration D***, Option 1*** are shown in

Figure 4.6-1: Alternative 3, Configuration D*, Option* 1 Sediment Removal and Reservoir Management Areas. As shown in Figure 4.6-1, the basin will be excavated to an elevation of approximately 985 feet at the face of the dam, sloping up to a 995-foot elevation where the basin splits and narrows into two excavation branches. Both branches slope up to a 1,040-foot elevation, at which point the western branch ends and the eastern branch widens and continues to slope up to a 1,060-foot elevation at approximately 4,700 feet north of the dam. The final configuration will involve approximately 76 acres of the reservoir. Additionally, this alternative will include removal of sediment stockpiled as part of the IMP at Johnson Field. Excavation will not involve the Oak Grove area of Hahamongna Park, the area of the reservoir outside the excavation limits shown in Figure 4.6-1, or the City of Pasadena's spreading grounds on the east side of the basin.

Alternative 3, Configuration D, Option 2

Sediment Removal

Alternative 3, Configuration D, Option 2 excavation activities will remove approximately 2.4 million cy of current excess sediment in the reservoir in addition to any additional sediment received during the project.

Excavation/Reservoir Configuration

Specific excavation limits and reservoir configuration for Alternative 3, Configuration D, Option2 are shown in

Figure 4.6-1: Alternative 3, Configuration D, Option 1 Sediment Removal and Reservoir Management Areas***. As shown in Figure 4.6-2, the basin will be excavated to an elevation of approximately 985 feet at the face of the dam, sloping up to a 995-foot elevation where the basin narrows into one excavation branch. The branch, which is in the eastern portion of the reservoir, slopes up to a 1,060-foot elevation at approximately 4,700 feet north of the dam. The final configuration will involve approximately 70 acres of the reservoir. Additionally, this alternative will include removal of sediment stockpiled at Johnson Field as part of the IMP. Excavation will not involve the Oak Grove area of Hahamongna Park, the area of the reservoir outside the excavation limits shown in Figure 4.6-2, or the City of Pasadena's spreading grounds on the east side of the basin.***

414 In the 2nd paragraph under Removal Method, the following addition has been made:

The accumulated sediment will be excavated within the limits shown in Figure 4.6-1***for Alternative 3, Configuration D, Option1 and shown in Figure 4.6-2 for Alternative 3, Configuration D, Option 2***. The excavation will be accomplished using the same removal method as the Proposed Project. Construction equipment will include but not be limited to approximately four front loaders with 4-yard buckets, two bulldozers, one excavator, one grader, one water truck, and two tender trucks. Vegetation and organic debris will be separated from the sediment. Coarse material may need to be processed through sorters and crushers to be hauled offsite. Depending on the moisture content of the sediment removed, the sediment may need to be stockpiled to allow it to dry. If drying is required, stockpiling of the sediment will occur onsite within the excavation limits in Devil's Gate Reservoir.

415 In the 2nd paragraph under Reservoir Management, the following additions have been made:

The reservoir will be maintained with the approximate reservoir management cut and elevation levels shown as the green shaded area in Figure 4.6-1 ***for Option 1 and Figure 4.6-2 for Option 2***. This will include the eastern branch and a portion of the upstream and downstream ends of the western branch every year for total reservoir management acreage of approximately 50.78 acres ***for Option 1 and 52.57 acres for Option 2***. The access roads will be maintained to provide proper road width for access.

416 In the title for Figure 4.6-1, the following edit has been made:

Figure 4.6-1: Alternative 3, Configuration D*, Option* 1 Sediment Removal and Reservoir Management Areas

417 The following Figure has been added:

Figure 4.6-2: Alternative 3, Configuration D, Option 2 Sediment Removal and Reservoir Management Areas

418 In the 3rd paragraph under Sediment Excavation/Trucking Offsite, the following clarifications have been made:

As with the Proposed Project, it is estimated, based on past storm events, that sediment excavation/trucking offsite will be required to remove ***typically*** ~~an average of~~ 13,000 cy of sediment annually. Based on an estimated removal of 4,800 cy per day, it is expected this will occur over an estimated two-week period, working Monday through Friday. This sediment excavation activity will take place during the late summer/early fall following the vegetation maintenance.

418 In the 2nd paragraph under AESTHETICS-1, the following additions have been made:

Sediment removal activities associated with Alternative 3, Configuration D will change the visual characteristics of the reservoir through the removal of sediment and associated vegetation in the reservoir. These changes will be similar to the Proposed Project at the south end of the reservoir; however, these changes will be reduced in magnitude in comparison to the Proposed Project, as Alternative 3, Configuration D***, Option 1*** will leave a greater area along the west and east sides of the reservoir and the area between the two branches undisturbed. ***Alternative 3, Configuration D, Option 2 changes will be reduced in magnitude in comparison to the Proposed Project, as Alternative 3, Configuration D, Option 2 will leave a greater area along the east side and a large, contiguous area on the west side of the reservoir undisturbed.***

419 In Table 4.6-1, the following clarification has been made:

Table 4.6-1: Visual Analysis – Sediment Removal Visual Change

Viewpoint No. (Location, pole, etc.)	Viewpoint		Visual Change				
	Location	Direction Facing	Type of Visual Change	Visual Contrast	Project Dominance	View Blockage	Overall Visual Change
View 1	Bench near the west side of the dam (near La Cañada Verdugo Road)	East	Area of vegetation and soil removal reduced in comparison to the Proposed Project. ***Under Option 1,***large swaths of existing vegetation and topography will remain in the center and on the east and west sides of the Proposed Project site. ***Under Option 2, large swaths of existing vegetation and topography will remain on the east and west sides of the Proposed Project site.*** Removal activities will occur seasonally over a five-year timeframe.	Moderate-High	Moderate	Low	Moderate
View 2	Top of dam	North	Area of vegetation and soil removal reduced in comparison to the Proposed Project. ***Under Option 1,*** large swaths of existing vegetation and topography will remain in the center and on the east and west sides of the Proposed Project site. ***Under Option 2, large swaths of existing vegetation and topography will remain on the east and west sides of the Proposed Project site.*** Removal activities will occur seasonally over a five-year timeframe.	Moderate-High	High	Low	Moderate-High
View 3	East of dam near trail	West	Area of vegetation and soil removal reduced in comparison to the Proposed Project. ***Under Option 1,*** large swaths of existing vegetation and topography will remain in the center and on the east and west sides of the Proposed Project site. ***Under Option 2, large swaths of existing vegetation and topography will remain on the east and west sides of the Proposed Project site.*** Removal activities will occur seasonally over a five-year timeframe.	Moderate-High	Moderate	Low	Moderate
View 4	Normandy Court	North	Area of vegetation and soil removal reduced in comparison to the Proposed Project. ***Under Option 1,*** large swaths of existing vegetation and topography will remain in the center and on the east and west sides of the Proposed Project site. ***Under Option 2, large swaths of existing vegetation and topography will remain on the east and west sides of the Proposed Project site.*** Removal activities will occur seasonally over a five-year timeframe.	Moderate-High	Moderate	Low	Moderate
View 5	Windsor Parking Lot	Southwest	Area of vegetation and soil removal reduced in comparison to the Proposed Project. ***Under Option 1,*** large swaths of existing vegetation and topography will remain in the center and on the east and west sides of the Proposed Project site. ***Under Option 2, large swaths of existing vegetation and topography will remain on the east and west sides of the Proposed Project site.*** Removal activities will occur seasonally over a five-year timeframe.	Moderate	Moderate	Low	Moderate

420 In the 3rd paragraph under AESTHETICS-1, the following additions have been made:

As with the Proposed Project, sediment removal activities associated with Alternative 3, Configuration D***, Option 1 and Alternative 3, Configuration D, Option 2*** will not result in obstruction or blockage of views due to the large difference in elevation between viewpoints and the Proposed Project site.

420 In the 5th paragraph under AESTHETICS-1, the following additions have been made:

With sediment removal under Alternative 3, Configuration D***, Option 1***, the topography of the reservoir will be lower, especially at the south end of the reservoir and within the two branches. ***Vegetation within the excavation limits will be removed. With sediment removal under Alternative 3, Configuration D, Option 2, the topography of the reservoir will be lower, especially at the south end of the reservoir and within the branch located in the eastern portion of the reservoir.*** These elements will result in a high degree of contrast from existing visual characteristics and will result in a potentially significant impact to scenic vistas. These contrasting elements will be highly visible for Viewpoints 1 through 3. For Viewpoints 1 and 3, however, the co-dominant features of Devil's Gate Dam, the reservoir maintenance roads, electrical lines, the debris boom line, and other less dominant features of the San Gabriel Mountains, Oak Grove Drive, JPL facilities, and residential areas will remain unchanged. In addition, ***for Alternative 3, Configuration D, Option 1,*** the existing vegetation along the west and east sides of the reservoir and the area between the two branches will not be removed and will share dominance with the dam and the excavation area. ***For Alternative 3, Configuration D, Option 2, the existing vegetation along the east side of the reservoir and a large, contiguous area in the western portion of the reservoir adjacent to the east branch will not be removed and will share dominance with the dam and the excavation area.***

421 In the 2nd and 3rd paragraph under Reservoir Management, the following details have been added:

Visual simulations were created for Viewpoints 1 through 4 to portray the expected conditions under reservoir management for this Alternative (see Figure 4.6-3, Figure 4.6-4, ~~and~~ Figure 4.6-5***, Figure 4.6-6,and Figure 4.6-7***). Visual simulations were not created for Viewpoint 5 due to dominance of other visual elements (spreading grounds, JPL facilities). As with the Proposed Project, reservoir management will not result in obstruction or blockage of views. Construction equipment will also be visible in the basin but only for short periods of time.

After completion of the proposed sediment removal activities associated with Alternative 3, Configuration D, the disturbed areas outside the reservoir management area are expected to experience natural regrowth with native vegetation, primarily Riparian Herbaceous vegetation. The area available for regrowth will be greater for this alternative than for either reservoir management option under the Proposed Project. Under Alternative 3, Configuration D***, Option 1***, approximately 25.21 acres of previously disturbed area will have natural vegetation regrowth; and 50.78 acres of vegetation will be maintained annually. In addition, 44.43 acres that were not disturbed during sediment removal will remain undisturbed. ***Under Alternative 3, Configuration D,***

Option 2, approximately 18.43 acres of previously disturbed area will have natural vegetation regrowth; and 52.57 acres of vegetation will be maintained annually. In addition, 49.42 acres that were not disturbed during sediment removal will remain undisturbed. In contrast, under the Proposed Project's reservoir management Option 1, approximately 120.42 acres of vegetation will be maintained annually. Under the Proposed Project's reservoir management Option 2, 33.97 acres of previously disturbed area will have natural vegetation regrowth and 91.28 acres of vegetation will be maintained annually.

424 In the title for Figure 4.6-3, the following edit has been made:

Figure 4.6-3: Alternative 3, Configuration D*, Option 1* Viewpoint 1 Reservoir Management Conditions

425 In the title for Figure 4.6-4, the following edit has been made:

Figure 4.6-4: Alternative 3, Configuration D, *Option 1* Viewpoint 2 Reservoir Management Conditions

426 In the title for Figure 4.6-5, the following edit has been made

Figure 4.6-5: Alternative 3, Configuration D, *Option 1* Viewpoint 3 Reservoir Management Conditions

427 In the title for Figure 4.6-6, the following edit has been made:

Figure 4.6-6: Alternative 3, Configuration D, *Option 1* Viewpoint 4 Reservoir Management Conditions

428 The following Figure has been added:

Figure 4.6-7: Alternative 3, Configuration D, Option 2 Viewpoint 4 Reservoir Management Conditions

431 In the 5th paragraph under Aesthetics-3, the following details have been added:

Although the sediment removal associated with this alternative will result in a potentially significant impact to the visual character of the Proposed Project site, the degree of contrast will be reduced in comparison to the Proposed Project due to the reduction in excavation area and associated sediment removal activities. In addition ***for Alternative 3, Configuration D, Option 1***, approximately 44.43 acres of the approximately 120.42 acres of the Proposed Project site will be left undisturbed. This will include swaths along the west and east sides of the site and in the center of the site between the two branches. ***For Alternative 3, Configuration D, Option 2, approximately 49.42 acres of the approximately 120.42 acres of the Proposed Project site will be left undisturbed. This will include a large swath along the east side of the reservoir and a large, contiguous area in the western portion of the reservoir adjacent to the east branch.*** With areas of undisturbed vegetation left throughout, the site will more closely

resemble the mix of disturbed and vegetated areas found under existing conditions than with the Proposed Project.

433 In the 2nd paragraph under AIR QUALITY-1, the following clarifications have been made:

As with the Proposed Project (see Section 3.5.6), Alternative 3, Configuration D will be consistent with the second through fourth criteria but will not be consistent with the first criterion. This is due to emissions of NO_X exceeding the Daily Regional Threshold during sediment removal, resulting in a potentially significant impact. Implementation of Mitigation Measures MM AQ-1 and MM AQ-2 will result in a reduction of Alternative 3, Configuration D's combined NO_X emissions during sediment removal. ~~Implementation of these mitigation measures may not be feasible, however, while every reasonable effort will be made to strive for the newest vehicles/equipment, the actual vehicle/equipment fleet may not reach the levels required to reduce emissions to a level of less than significant. Therefore, Alternative 3, Configuration D could result in a significant impact.~~ ***Therefore, impacts during sediment removal will be less than significant.*** This impact will be reduced in comparison to the Proposed Project due to the reduction in excavation area and associated sediment removal activities.

433 In the 1st paragraph under Mitigation Measures, the following clarification has been made:

MM AQ-1: LACFCD shall require all construction contractors during the sediment removal phase of the Proposed Project to use ***only*** sediment removal dump trucks that meet EPA's emission standards for Model Year 2007 ***or later*** ~~as reasonably feasible~~.

433 In the 1st paragraph under Residual Impacts After Mitigation, the following clarifications have been made:

Implementation of these mitigations would reduce the combined NO_X emissions of Alternative 3, Configuration D during the sediment removal phase~~. While every effort will be made to strive for the newest vehicles/equipment, the actual vehicle/equipment fleet may not reach the levels required to reduce emissions~~ to a level of less than significant. ~~Therefore, this impact remains potentially significant and unavoidable.~~

434 In the 1st paragraph under AIR QUALITY-2, the following clarifications have been made:

As with the Proposed Project, under Alternative 3, Configuration D emissions of NO_X exceed the Daily Regional Threshold during sediment removal, resulting in a potentially significant impact. Implementation of Mitigation Measures MM AQ-1 and MM AQ-2 will result in a reduction of the combined NO_X emissions of Alternative 3, Configuration D during sediment removal. Implementation of these mitigations would reduce the Proposed Project's combined NO_X emissions during the sediment removal phase~~; however, while every reasonable effort will be made to strive for the newest vehicles/equipment, the actual vehicle/equipment fleet may not reach the levels required to reduce emissions~~ to a level of less than significant. ~~Therefore, Alternative 3, Configuration D will result in a potentially significant impact.~~ This impact will be reduced in comparison to the Proposed Project due to the reduction in excavation area and associated sediment removal activities.

435 In the 1st paragraph under Residual Impacts After Mitigation, the following clarifications have been made:

Sediment removal will not exceed any standard SCAQMD Regional Threshold except for combined NO_X emissions. Implementation of these mitigations would reduce the combined NO_X emissions of Alternative 3, Configuration D during the sediment removal phase~~; however, while every effort will be made to strive for the newest vehicles/equipment, the actual vehicle/equipment fleet may not reach the levels required to reduce the NO_x emissions~~ to a level of less than significant. ~~Therefore, this impact remains potentially significant and unavoidable.~~

436 In the 1st paragraph under Cumulative Health Impacts, the following clarifications have been made:

As with the Proposed Project, Alternative 3, Configuration D with Mitigation Measures MM AQ-1 and MM AQ-2, significance threshold would not be exceeded for emissions of particulate matter and CO; and no significance threshold would be exceeded during reservoir management under either option. ~~While every effort will be made to strive for the newest vehicles/equipment, the actual vehicle/equipment fleet may not reach the levels required to reduce the NO_x emissions to a level of less than significant. Therefore, this impact remains potentially significant and unavoidable.~~ ***Implementation of Mitigation Measures MM AQ-1 and MM AQ-2 will result in a reduction of NO_X emissions and will reduce the NO_X emissions to a level of less than significant for the sediment removal phase.***

436 In the 1st paragraph under Residual Impacts After Mitigation, the following clarifications have been made:

Sediment removal will not exceed any localized significance threshold except for combined NO_X emissions. Implementation of these mitigations would reduce the combined NO_X emissions of Alternative 3, Configuration D during the sediment removal phase~~; however, while every effort will be made to strive for the newest vehicles/equipment, the actual vehicle/equipment fleet may not reach the levels required to reduce the NO_x emissions~~ to a level of less than significant. ~~Therefore, this impact remains significant and unavoidable.~~

438 In the 1st paragraph under BIOLOGY-1, the following addition has been made:

As shown in Figure 4.6-8: Alternative 3, Configuration D***, Option 1*** Sediment Removal Vegetation Communities Impacts ***and Figure 4.6-9: Alternative 3, Configuration D, Option 2 Sediment Removal Vegetation Communities Impacts*** and Table 4.6-5: Alternative 3 Configuration D, Sediment Removal Impacts to Vegetation Communities, , potential impacts to vegetation communities will be reduced in comparison to the Proposed Project due to the reduction in area disturbed during excavation and associated sediment removal activities.

439 In Table 4.6-5, the following clarification and additions have been made:

Vegetation Communities	Estimated Acres of Vegetation Removed During Sediment Removal		
	Proposed Project	Alternative 3 Configuration D*, Option 1*	*Alternative 3 Configuration D, Option 2*
Riversidean Alluvial Fan Sage Scrub	1.1	0.4	***0.4***
~~Coastal Sage Scrub~~ ***California Sagebrush – California Buckwheat Scrub***	3.1	2.1	***0.9***
Scoured	26.5	21.0	***22.6***
~~Ornamental Landscaping~~ ***Escaped Cultivars***	0.4	0.2	***0.2***
Riparian Woodland	51.4	28.9	***29.8***
Mustard and Annual Brome Semi-Natural Herbaceous Stand ~~Ruderal~~	22.8	14.8	***12.1***
~~Mule Fat Scrub~~ ***Mule Fat Thickets***	***11.1***~~9.3~~	***6.1***~~4.3~~	***3.7***
Disturbed	1.9	2.0	***1.1***
~~Riparian Herbaceous~~	~~1.8~~	~~1.8~~	~~***2.0***~~

440 In the 2nd paragraph under Sensitive Wildlife, the following additions have been made:

Of the approximately 120.42 acres that will be disturbed under the Proposed Project, approximately 44.43 acres, or 36 percent, will be left undisturbed under Alternative 3, Configuration D***, Option 1***. These undisturbed areas will include swaths along the west and east sides of the site and in the center of the site between the two branches. These undisturbed areas include potential habitat for the five special status species.

440 In the 3rd and 4th paragraph under Sensitive Wildlife, the following additions have been made:

As shown in Figure 4.6-8 and Table 4.6-3, potential impacts to sensitive wildlife will be reduced in comparison to the Proposed Project due to the reduction in habitat disturbed during sediment removal activities. Disturbance of habitat for the least Bell's vireo within Riparian Woodland and ***Mule Fat Thickets*** ~~Mule Fat Scrub~~ communities will be reduced by approximately 22.5 acres (44 percent) and 5.0 acres (54 percent), respectively, as compared to the Proposed Project.

Disturbance of habitat for the yellow warbler within the Riparian Woodland community will be reduced by approximately 22.54 acres (44 percent), as compared to the Proposed Project. ~~Impacts to Riparian Herbaceous will be the same as for the Proposed Project.~~

440 In the 5th paragraph under Sensitive Wildlife, the following additions have been made:

Of the approximately 120.42 acres that will be disturbed under the Proposed Project, approximately 50.42 acres, or 42 percent, will be left undisturbed under Alternative 3, Configuration D, Option 2. These undisturbed areas will include a swath along the east side of the site and a large, contiguous area in the western portion of the reservoir west of the proposed excavation. These undisturbed areas include potential habitat for the six special status species.

As shown in Figure 4.6-8 and Table 4.6-3, potential impacts to sensitive wildlife will be reduced in comparison to the Proposed Project due to the reduction in habitat disturbed during sediment removal activities. Disturbance of habitat for the least Bell's vireo within Riparian Woodland and Mule Fat Thickets communities will be reduced by approximately 21.6 acres (42 percent) and 7.6 acres (82 percent), respectively, as compared to the Proposed Project.

Disturbance of habitat for the yellow warbler within the Riparian Woodland community will be reduced by approximately 21.6 acres (42 percent), as compared to the Proposed Project.

441 In the title for Figure 4.6-8, the following revision has been made:

Figure 4.6-8: Alternative 3, Configuration D*, Option 1* Sediment Removal Vegetation Communities Impacts

441 Figure 4.6-8 was revised to reflect changes to the naming of vegetation communities.

442 The following Figure has been added:

Figure 4.6-9: Alternative 3, Configuration D, Option 2 Sediment Removal Vegetation Communities Impacts

443 In the 1st paragraph under Reservoir Management, the following revisions have been made:

Figure 4.6-8: Alternative 3, Configuration D***, Option 1*** Sediment Removal Vegetation Communities Impacts ***and Figure 4.6-9: Alternative 3, Configuration D, Option 2 Sediment Removal Vegetation Communities Impacts*** sho~~ws~~ expected conditions of the vegetation communities under reservoir management for Alternative 3, Configuration D***, Option 1 and Alternative 3, Configuration D, Option 2, respectively,*** in comparison to the Proposed Project. As shown below, Alternative 3, Configuration D will result in a greater diversity of vegetation communities, including a greater amount of Riparian Woodland and ***Mule Fat Thickets*** ~~Mule Fat Scrub~~. Under Alternative 3, Configuration D, a greater area of the Proposed Project site will be left undisturbed during reservoir management, approximately 69.64 acres ***under Option 1 and 67.85 acres under Option 2***. In contrast, under the Proposed Project's reservoir management Option 1, the whole Proposed Project site, approximately 120.42 acres, will be disturbed annually. Under the Proposed Project's reservoir management Option 2, 33.97 acres will be left undisturbed during reservoir management.

The reservoir management area for Alternative 3, Configuration D is expected to be composed of Riparian Herbaceous and ***Mustard and Annual Brome Semi-Natural Herbaceous Stand*** ~~ruderal~~ communities. Streams and seasonal ponds will be available depending upon where sediment accumulates and the amount of flows, rainfall, and runoff. Special status species have the potential to use the reservoir management area.

444 Figure 4.6-10 was revised to reflect changes to the naming of vegetation communities.

444 The title for Figure 4.6-10 has been revised:

Figure 4.6-10: Alternative 3, Configuration D, *Option 1* Conditions Under Reservoir Management

445 The following Figure has been added:

Figure 4.6-11: Alternative 3, Configuration D, Option 2 Conditions Under Reservoir Management

446 In the 1st paragraph under Mitigation Measures, the following details have been added:

MM BIO – 1: A qualified biological monitor shall be present during initial ground- or vegetation-disturbing project-related activities ***to provide protection measures and monitor for wildlife in harm's way. This includes initial ground- or vegetation-disturbing project-related activities at the annual start of each year of sediment removal or maintenance activities***. Following initial project-related activities, a qualified monitoring biologist shall be present as necessary to maintain the implemented protection measures and monitor for additional species in harm's way. ***These protection measures shall include, as appropriate: redirecting the wildlife, identifying areas that may require exclusionary devices (e.g., fencing), or capturing and relocating wildlife outside the work area. Any captured species shall be relocated to adjacent appropriate habitat that is contiguous to adjacent habitat and not impacted by project-related disturbance activities.***

446 In the 3rd paragraph under Mitigation Measures, the following detail has been added:

MM BIO – 3: Within 90 days prior to ground-disturbing activities, a preconstruction survey shall be conducted by a qualified biologist for the presence of any sensitive species in harm's way, including coast range newt, the southwestern pond turtle, and the two-striped garter snake. If sensitive species are observed in harm's way, the qualified biologist will develop and implement appropriate protection measures for that species. These protection measures shall include, as appropriate: redirecting the species, ***constructing*** ~~construction of~~ exclusionary devices (e.g., fencing), or ***capturing*** ~~capture~~ ***and relocating*** ~~relocation~~ ***wildlife*** outside the work area. Preconstruction surveys shall be repeated annually for the duration of the sediment removal. ***Observations of special status species made during these surveys shall be recorded onto a CNDDB field data sheet and submitted to CDFW for inclusion into the CNDDB.***

447 In the 7th paragraph under Mitigation Measures, the following details have been added:

MM BIO – 5: Within 30 days prior to commencement of vegetation or structure removal activities, a preconstruction bat survey shall be conducted by a qualified biologist for the presence of any roosting bats. ***Acoustic recognition technology shall be used if feasible and appropriate.*** If either a bat maternity roost or hibernacula (structures used by bats for hibernation) ***are*** present, a qualified biologist will develop and implement appropriate protection measures for that maternity roost or hibernacula. These protection measures shall include, as appropriate, safely evicting non-breeding bat hibernacula, establishment of avoidance buffers, or replacement of roosts at a suitable location. ***These measures shall also include as appropriate:***

- ***To the extent feasible, trees that have been identified as roosting sites shall be removed or relocated between October 1 and February 28.***
- ***When trees must be removed during the maternity season (March 1 to September 30), a qualified bat specialist shall conduct a preconstruction survey to identify those trees proposed for disturbance that could provide hibernacula or nursery colony roosting habitat for bats.***
- ***Trees identified as potentially supporting an active nursery roost shall be inspected by a qualified biologist no greater than 7 days prior to tree disturbance to determine presence or absence of roosting bats.***
- ***Trees determined to support active maternity roosts will be left in place until the end of the maternity season (September 30).***
- ***If bats are not detected in a tree, but the qualified biologist determines that roosting bats may still be present, trees shall be removed as follows:***
    - ***Pushing a tree down with heavy machinery instead of felling the tree with a chainsaw***
    - ***First pushing the tree lightly 2 to 3 times with a pause of 30 seconds between each nudge to allow bats to become active, then pushing the tree to the ground slowly***
    - ***Allowing the tree to remain in place for 24 to 48 hours until inspected by the qualified biologist for presence or absence of roosting bats***
- ***The qualified biologist shall document all bat survey, monitoring, and protection measure activities and prepare a summary report for LACFCD.***

448 In the 1st paragraph under BIOLOGY-2, the following additions have been made:

Alternative 3, Configuration D***, Option 1 and Alternative 3 Configuration D, Option 2*** will impact approximately 0.4 acre of Riversidean Alluvial Fan Sage Scrub within the Proposed Project site. Impacts to Riversidean Alluvial Fan Sage Scrub will result in a potentially significant impact requiring mitigation; however, disturbance of this community will be reduced by approximately 0.7 acres (64 percent) as compared to the Proposed Project. To minimize

impacts due to loss of Riversidean Alluvial Fan Sage Scrub, Mitigation Measure MM BIO-6 has been provided. Removing the sediment will benefit the alluvial fan sage scrub since the habitat is currently buried under sediment and therefore considered poor quality. With implementation of this mitigation measure, impacts to Riversidean Alluvial Fan Sage Scrub will be reduced to a level below significance.

448 In the 2nd paragraph under BIOLOGY-2, the following clarifications have been made:

Alternative 3, Configuration D, Option 1 will impact approximately 28.9 acres of Riparian Woodland and ~~4.3~~ ***6.1*** acres of ***Mule Fat Thickets*** ~~Mule Fat Scrub~~ within the Proposed Project site***, while Alternative 3, Configuration D, Option 2 will impact approximately 28.9 acres of Riparian Woodland and 3.7 acres of Mule Fat Thickets***. Riparian Woodland and ***Mule Fat Thickets*** ~~Mule Fat Scrub~~ are rare plant communities that provide nesting habitat for riparian species. Impacts to these habitats will result in a potentially significant impact; however, disturbance of Riparian Woodland and ***Mule Fat Thickets under Option 1*** ~~Mule Fat Scrub~~ will be reduced by approximately 22.5 acres (44 percent) and 5.0 acres (54 percent), respectively, as compared to the Proposed Project. ***In comparison, disturbance of Riparian Woodland and Mule Fat Thickets under Alternative 3, Configuration D, Option 2 will be reduced by approximately 22.5 acres (44 percent) and 7.4 acres (67 percent), respectively as compared to the Proposed Project.*** To minimize impacts due to the loss of Riparian Woodland and ***Mule Fat Thickets*** ~~Mule Fat Scrub~~, Mitigation Measures MM BIO-7 and MM BIO-8 have been provided. With implementation of this mitigation measure, impacts to Riparian Woodland and ***Mule Fat Thickets*** ~~Mule Fat Scrub~~ will be reduced to a level below significance.

449 The title for Figure 4.6-12 has been revised:

Figure 4.6-12: Alternative 3, Configuration D, *Option 1* Impacted Water Features

450 The following Figure has been added:

Figure 4.6-13: Alternative 3, Configuration D, Option 2 Impacted Water Features

451 In the 3rd paragraph under BIOLOGY-2, the following additions have been made:

Figure 4.6-12***:*** Alternative 3, Configuration D***, Option 1*** Impacted Water Features ***and Figure 4.6-13: Alternative 3, Configuration D, Option 2*** shows~~~~ the water features that will be impacted. Compared to the Proposed Project, Alternative 3, Configuration D***, Option 1 and Alternative 3, Configuration D, Option 2*** will reduce impacts to these water features by approximately 19 percent. To minimize impacts to jurisdictional waters found within these water features, Mitigation Measure MM BIO-8 has been provided. With implementation of this mitigation measure, impacts will be reduced to a level below significance

451 In MM BIO – 8, the following clarifications have been made:

MM BIO – 8: A combination of onsite and offsite habitat restoration, enhancement, and exotic removal shall be implemented by LACFCD at a 1:1 ratio for impacted sensitive habitat and jurisdictional waters. Habitat restoration/enhancement shall include use of willow cuttings and exotic species removal. ***Non-native, weedy*** ~~Ruderal~~ habitats within

the basin shall be utilized whenever possible as mitigation sites. This mitigation measure shall be monitored for success for five years following implementation. A report of the monitoring results shall be submitted annually, during the five years following implementation, to resource agencies as required by the Section 401 Certification, Section 404 permit, and a Streambed Alteration Agreement.

452 In the 1st paragraph under BIOLOGY-3, the following edits have been made:

Figures 4.6-12 and 4.6-13 above, show the water features that will be impacted by this alternative. Compared to the Proposed Project, Alternative 3, Configuration D will reduce impacts to these water features by approximately 19 percent. To minimize impacts to jurisdictional waters found within these water features, Mitigation Measure MM BIO-8 has been provided. With implementation of this mitigation measure, impacts will be reduced to a level below significance.

453 In the 1st paragraph under BIOLOGY-4, the following information has been added:

The Proposed Project area is predominantly open for wildlife movement and habitat connectivity. ***Sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays). In addition, sediment removal activities would not completely block the Proposed Project site from surrounding habitat, would occur only during the day, and would not interfere with nighttime wildlife activity. Although some wildlife may be temporarily displaced during construction, wildlife would not be physically prevented from moving around and into the basin area.*** Sediment removal and reservoir management activities associated with Alternative 3, Configuration D will interfere temporarily with the movement of native resident or migratory wildlife species, resulting in a potentially significant impact. Reduction in sensitive habitat would interfere with use of the habitat for wildlife nursery sites, resulting in a potentially significant impact. ***To minimize impacts to less than significant, Mitigation Measures MM BIO-1 through MM BIO-8 has been provided.*** This impact will be reduced in comparison to the Proposed Project due to the reduction in area disturbed during sediment removal and both reservoir management options.

458 In the 1st paragraph under GHG EMISSIONS-1, the following information has been added:

Alternative 3, Configuration D will use the same amount and type of construction equipment as the Proposed Project and involve the same number of truck trips on a daily basis for sediment removal and reservoir management; however, sediment removal under this Alternative is expected to have a shorter duration than the Proposed Project due to the reduced amount of sediment to be removed. ***Use of sediment removal dump trucks that meet EPA's emission standards for Model Year 2007 or later and use of off-road equipment that meets, at a minimum, EPA's emission standards for Tier 3 equipment, would result in a reduction of GHG emissions.*** As noted in Section 3.6, generation of greenhouse gas emissions under the Proposed Project is not "cumulatively considerable" and is therefore less than significant under CEQA. Alternative 3, Configuration D will have the same amount of daily equipment

usage/truck traffic and reduced overall sediment removal duration; therefore, this alternative will generate less greenhouse gas emissions than the Proposed Project, which will not be "cumulatively considerable," and is therefore less than significant under CEQA.

473 In the 2nd paragraph under RECREATION-1, the following detail has been added:

As with the Proposed Project, under Alternative 3, Configuration D sediment removal will occur over the course of five years. During this, most of the Proposed Project site will be closed to public use from the dam face to the edge of this Alternative's excavation limit boundaries (see Figure 4.6-1 ***and Figure 4.6-2***). Alternative 3, Configuration D will have a potential impact on recreational opportunities through temporarily restricted access to trails and long-term alteration of the landscape. Maintenance roads within the basin are used by the LACFCD, Southern California Edison (SCE), and the City of Pasadena, among others, for operations and maintenance of Devil's Gate Reservoir and other facilities in the area. The majority of the maintenance roads will be closed during sediment removal; however, these roads are not officially designated for recreational uses and are often not available for unofficial recreation use due to reservoir water levels or maintenance activities.

474 In the 3rd paragraph under RECREATION-1, the following detail has been added:

Sediment removal activities will not limit the use of the Oak Grove area of Hahamongna Watershed Park by individuals or by organizations such as the Oak Grove Disc Golf Club, the Rose Bowl Riders, ***MACH 1,*** or Tom Sawyer Camp.

474 In the 5th paragraph under RECREATION-1, the following information has been added:

Figure 4.6-14: Alternative 3, Configuration ***D, Option*** 1 Impacts to Designated Trails shows the location of the different access conditions during sediment removal ***for Alternative 3, Configuration D, Option 1***. ***Figure 4.6-15: Alternative 3, Configuration D, Option 2 Impacts to Designated Trails shows the location of the different access conditions during sediment removal for Alternative 3, Configuration D, Option 2.***

474 In the 6th paragraph under RECREATION-1, the following details have been added:

Indirect impacts to recreation associated with sediment removal under Alternative 3, Configuration D will be reduced in comparison to the Proposed Project due to the reduction in excavation area and associated sediment removal activities. In addition, ***for Alternative 3, Configuration D, Option 1*** approximately 44.43 acres of the approximately 120.42 acres of the Proposed Project site will be left undisturbed. This will include swaths along the west and east sides of the site and in the center of the site between the two excavated branches. ***For Alternative 3, Configuration D, Option 2 approximately 50.42 acres of the approximately 120.42 acres of the Proposed Project site will be left undisturbed. This will include a swath along the east side of the site as well as a large, contiguous area on the west side of the reservoir.*** These areas of undisturbed vegetation left throughout will serve to screen some of the ongoing recreation uses from the sediment removal activities and associated construction-related emissions, noise, dust, and visual impacts.

475 The title for Figure 4.6-14 has been revised:

Figure 4.6-14: Alternative 3, Configuration D, *Option 1* Impacts to Designated Trails

476 The following Figure has been added:

Figure 4.6-15 Alternative 3, Configuration D, Option 2 Impacts to Designated Trails

479 In the 1st and 2nd paragraph under TRANSPORTATION-1, the following clarifications have been made:

Truck traffic associated with Alternative 3, Configuration D is expected to adhere to traffic regulations; however, during sediment removal, Alternative 3, Configuration D truck traffic is expected to impact traffic LOS on the existing roadway network. Potential impacts regarding existing LOS are discussed under TRANSPORTATION-2 below. This increase in traffic would result in ***temporary*** significant impacts to the efficiency of the circulation system. Implementation of Mitigation Measures MM TRA-1 and TRA-2 would reduce this impact but not to a level of less than significant.

Sediment removal and associated transportation under this Alternative could potentially have a shorter duration than the Proposed Project, due to the reduced amount of sediment to be removed. Other potential impact reduction measures discussed under TRANSPORTATION-2, below, could reduce impacts to less than significant. These measures cannot be legally imposed by the LACFCD, however, since the locations are under the jurisdiction of other agencies. Every reasonable effort will be made to coordinate with and receive approval from the jurisdictional agencies to implement the impact reduction measures but LACFCD cannot guarantee that the measures will be implemented. Therefore, this ***temporary*** impact could remain potentially significant.

480 In the 1st paragraph under Residual Impacts After Mitigation, the following clarifications have been made:

Potentially significant traffic impacts associated with the sediment removal phase would be temporary, expected to occur during the drier months (from April to December, except on holidays), and would cease at the end of the sediment removal phase. Implementation of the mitigation measures described above would reduce impacts to traffic and circulation but not to a level of less than significant. Other potential impact reduction measures discussed under TRANSPORTATION-2, below, could reduce impacts to less than significant. These measures cannot be legally imposed by the LACFCD, however, since the locations are under the jurisdiction of other agencies. Every reasonable effort will be made to coordinate with and receive approval from the jurisdictional agencies to implement the impact reduction measures but LACFCD cannot guarantee that the measures will be implemented. Therefore, this ***temporary*** impact could remain potentially significant. ***No significant traffic impacts would occur under reservoir management.***

481 In the 4th, 5th, and 6th paragraphs under TRANSPORTATION-2, the following clarifications have been made:

The impact reduction measure discussed above cannot be legally imposed by the LACFCD since the location is under the jurisdiction of the City of Pasadena. Every reasonable effort will be made to coordinate with and receive approval to implement this impact reduction measure; however, LACFCD cannot guarantee that this impact reduction measure will be implemented. Therefore this ***temporary*** impact would remain potentially significant.

The Irwindale Avenue/Foothill Boulevard intersection is anticipated to operate at an unacceptable LOS during the PM peak hour, resulting in a ***temporary*** significant impact. Mitigation Measure MM TRA-1 would reduce the impact to the Irwindale Avenue/Foothill Boulevard intersection to less than significant.

The Figueroa St/Scholl Canyon Road and SR-134 westbound ramps intersection is anticipated to operate at an unacceptable LOS during the AM and PM peak hours, resulting in a ***temporary*** significant impact.

482 In the 7th, 8th, and 9th paragraphs under TRANSPORTATION-2, the following clarifications have been made:

Implementation of the impact reduction measure discussed above would reduce the impact to the Figueroa St/Scholl Canyon Road and SR-134 westbound ramps intersection to less than significant. This impact reduction measure cannot be legally imposed by the LACFCD. Every reasonable effort will be made to coordinate with and receive approval to implement the impact reduction measure; however, LACFCD cannot guarantee that the measure will be implemented therefore this ***temporary*** impact could remain significant.

The Glenoaks Boulevard and Osborne Street intersection is anticipated to operate at an unacceptable LOS during the AM and PM peak hours, resulting in a ***temporary*** significant impact.

The Sheldon Street and San Fernando Road intersection and the Branford Street and San Fernando Road intersection are anticipated to operate at an unacceptable LOS during the PM peak hour, resulting in ***temporary*** significant impacts. Mitigation Measure MM TRA-2 would reduce the impacts to less than significant.

482 In the 1st paragraph under Residual Impacts After Mitigation, the following clarifications have been made:

Potentially significant traffic impacts associated with the sediment removal phase would be temporary, expected to occur during the drier months (from April to December, except on holidays), and would cease at the end of the sediment removal phase. Implementation of the mitigation measures described above would reduce some but not all of the impacts to traffic and circulation to a level less than significant. Other potential impact reduction measures discussed above could reduce impacts to less than significant. These measures cannot be legally imposed by the LACFCD, however, since

the locations are under the jurisdiction of other agencies. Every reasonable effort will be made to coordinate with and receive approval from the jurisdictional agencies to implement the impact reduction measures but LACFCD cannot guarantee that the measures will be implemented. Therefore, these ***temporary*** impacts could remain potentially significant. ***No significant traffic impacts would occur under reservoir management.***

483 In the 1st paragraph under TRANSPORTATION-3, the following clarifications have been made:

Implementation of Alternative 3, Configuration D may include impact reduction measures described above that would require modifications to the existing roadway network. These modifications would consist of roadway restriping to reduce potential traffic impacts to a level less than significant. These changes would not alter existing roadway ~~design~~ ***use*** and would be implemented consistently with all applicable traffic safety standards. Alternative 3, Configuration D is limited to excavation and transportation of sediment that has accumulated in Devil's Gate Reservoir and would not introduce any new uses that would be incompatible ***or substantially increase hazards*** with the existing roadway system. Therefore, impacts related to traffic hazards would be less than significant.

485 In the 1st paragraph under TRANSPORTATION-5, the following clarification has been made:

Alternative 3, Configuration D would be confined to the roadway network described in Section 3.16.2 and would not adversely affect alternative modes of public transportation such as light rail. Implementation of Alternative 3, Configuration D would not require closure of any bus stops or disrupt any existing bus routes. The degrading of LOS at intersections, freeway segments, and freeway on- and off-ramps, described above under TRANSPORTATION-2, could affect buses using the existing roadway network. This would be a potentially ***temporary*** significant impact.

485 In the 1st paragraph under Residual Impacts After Mitigation, the following clarifications have been made:

Potentially significant traffic impacts associated with the sediment removal phase would be temporary, expected to occur during the drier months (from April to December, except on holidays), and would cease at the end of the sediment removal phase. Implementation of the mitigation measures described above would reduce some but not all of the impacts to traffic and circulation to a level less than significant. Other potential impact reduction measures discussed above could reduce impacts to less than significant. These measures cannot be legally imposed by the LACFCD, however, since the locations are under the jurisdiction of other agencies. Every reasonable effort will be made to coordinate with and receive approval from the jurisdictional agencies to implement the impact reduction measures but LACFCD cannot guarantee that the measures will be implemented. Therefore, these ***temporary*** impacts could remain potentially significant. ***No significant traffic impacts would occur under reservoir management.***

486 In the 3rd paragraph under UTILITIES-,1, the following clarification has been made:

During reservoir management, Alternative 3, Configuration D will not result in or require the construction of new or expansion of existing stormwater drainage systems. Sediment that accumulates after the proposed removal will be removed through FAST operations or through mechanical excavation and trucking. The FAST operations are expected to be similar to historic FAST operations, and sediment fines discharged through FAST operations will be transported during storm flows to the Pacific Ocean via Arroyo Seco and the Los Angeles River. No impacts to stormwater facilities are expected during FAST operations. Any necessary mechanical removal during reservoir management is expected to be small (***typically*** 13,000 cy per year). Impacts to stormwater facilities during mechanical removal will be avoided through compliance with City regulations regarding stormwater facilities and implementation of LACDPW BMPs.

Section 4.7 Alternative 4, Sluicing

Page Clarification/Revision

496 In the 2nd paragraph under AIR QUALITY-1, the following clarifications have been made:

As with the Proposed Project (see Section 3.5.6), Alternative 4, Sluicing will be consistent with the second through fourth criteria but would potentially not be consistent with the first criterion, as emissions of NO_X could exceed the Daily Regional Threshold during sediment removal from the Arroyo Seco Channel, the Los Angeles River, or the Port of Long Beach. ~~Therefore, Alternative 4, Sluicing could result in a potentially significant impact.~~ ***Implementation of Mitigation Measures MM AQ-1 and MM AQ-2 will result in a reduction of NO_X emissions to less than the SCAQMD Regional Threshold for NO_X. Therefore, impacts during sediment removal will be less than significant.*** This impact will be increased in comparison to the Proposed Project due to the potentially longer distance of trucking during sediment removal activities from downstream portions of the channel.

496 In the 1st paragraph under Mitigation Measures, the following clarification has been made:

MM AQ-1: LACFCD shall require all construction contractors during the sediment removal phase of the Proposed Project to use ***only*** sediment removal dump trucks that meet EPA's emission standards for Model Year 2007 ***or later*** ~~as reasonably feasible~~.

496 In the 1st paragraph under Residual Impacts After Mitigation, the following clarifications have been made:

Implementation of these mitigations would reduce combined NO_X emissions from Alternative 4, Sluicing during the sediment removal phase~~; however, while every reasonable effort will be made to strive for the newest vehicles/equipment, the actual~~

~~vehicle/equipment fleet may not reach the levels required to reduce emissions~~ to a level of less than significant.

497 In the 1st paragraph under AIR QUALITY-2, the following clarifications have been made:

As with the Proposed Project, emissions of NO_X under Alternative 4, Sluicing could exceed the Daily Regional Threshold during the removal of sediment from further downstream, resulting in a potentially significant impact. Implementation of Mitigation Measures MM AQ-1 and MM AQ-2 will result in a reduction of combined NO_X emissions from Alternative 4, Sluicing during sediment removal. ~~While every reasonable effort will be made to strive for the newest vehicles/equipment, the actual vehicle/equipment fleet may not reach the levels required to reduce emissions to a level of less than significant.~~ Therefore, this impact ***will be reduced to less than significant*** ~~remains significant and unavoidable~~. ~~Therefore, Alternative 4, Sluicing could result in a potentially significant impact.~~ This impact will be increased in comparison to the Proposed Project due to the longer distances required for the trucking sediment offsite.

497 In the 1st paragraph under Residual Impacts After Mitigation, the following clarifications have been made:

Sediment removal will not exceed any standard SCAQMD Regional Threshold except for combined NO_X emissions. Implementation of these mitigations would reduce combined NO_X emissions from Alternative 4, Sluicing during the sediment removal phase~~; however, while every reasonable effort will be made to strive for the newest vehicles/equipment, the actual vehicle/equipment fleet may not reach the levels required to reduce the NO_x emissions~~ to a level of less than significant. ~~Therefore, this impact remains significant and unavoidable.~~

498 In the 1st paragraph under Cumulative Health Impacts, the following clarifications have been made:

As with the Proposed Project, for Alternative 4, Sluicing with Mitigation Measures MM AQ-1 and MM AQ-2, a significance threshold would not be exceeded for emissions of particulate matter and CO; and no significance threshold would be exceeded during reservoir management under either option. ~~While every effort will be made to strive for the newest vehicles/equipment, the actual vehicle/equipment fleet may not reach the levels required to reduce the NO_x emissions to a level of less than significant. Therefore, this impact remains significant and unavoidable.~~ ***Implementation of Mitigation Measures MM AQ-1 and MM AQ-2 will result in a reduction of NO_X emissions and will reduce the NO_X emissions to a level of less than significant for the sediment removal phase.***

498 In the 1st paragraph under Residual Impacts After Mitigation, the following clarifications have been made:

Sediment removal will not exceed any localized significance threshold except for combined NO_X emissions. Implementation of these mitigations would reduce combined NO_X emissions from Alternative 4, Sluicing during the sediment removal phase~~; however, while every effort will be made to strive for the newest vehicles/equipment,~~

~~the actual vehicle/equipment fleet may not reach the levels required to reduce the NO_x emissions~~ to a level of less than significant. ~~Therefore, this impact remains significant and unavoidable.~~

502 In the 1st paragraph under Mitigation Measures, the following details have been added:

MM BIO – 1: A qualified biological monitor shall be present during initial ground- or vegetation-disturbing project-related activities ***to provide protection measures and monitor for wildlife in harm's way. This includes initial ground- or vegetation-disturbing project-related activities at the annual start of each year of sediment removal or maintenance activities***. Following initial project-related activities, a qualified monitoring biologist shall be present as necessary to maintain the implemented protection measures and monitor for additional species in harm's way. ***These protection measures shall include, as appropriate: redirecting the wildlife, identifying areas that may require exclusionary devices (e.g., fencing), or capturing and relocating wildlife outside the work area. Any captured species shall be relocated to adjacent appropriate habitat that is contiguous to adjacent habitat and not impacted by project-related disturbance activities.***

503 In the 3rd paragraph under Mitigation Measures, the following detail has been added:

MM BIO – 3: Within 90 days prior to ground-disturbing activities, a preconstruction survey shall be conducted by a qualified biologist for the presence of any sensitive species in harm's way, including coast range newt, the southwestern pond turtle, and the two-striped garter snake. If sensitive species are observed in harm's way, the qualified biologist will develop and implement appropriate protection measures for that species. These protection measures shall include, as appropriate***:*** redirecting the species, ***constructing*** ~~construction of~~ exclusionary devices (e.g., fencing), or ***capturing*** ~~capture~~ ***and relocating*** ~~relocation~~ ***wildlife*** outside the work area. Preconstruction surveys shall be repeated annually for the duration of the sediment removal. ***Observations of special status species made during these surveys shall be recorded onto a CNDDB field data sheet and submitted to CDFW for inclusion into the CNDDB.***

503 In the 7th paragraph under Mitigation Measures, the following details have been added:

MM BIO – 5: Within 30 days prior to commencement of vegetation or structure removal activities, a preconstruction bat survey shall be conducted by a qualified biologist for the presence of any roosting bats. ***Acoustic recognition technology shall be used if feasible and appropriate.*** If either a bat maternity roost or hibernacula (structures used by bats for hibernation) ***are*** present, a qualified biologist will develop and implement appropriate protection measures for that maternity roost or hibernacula. These protection measures shall include, as appropriate, safely evicting non-breeding bat hibernacula, establishment of avoidance buffers, or replacement of roosts at a suitable location. ***These measures shall also include as appropriate:***

- ***To the extent feasible, trees that have been identified as roosting sites shall be removed or relocated between October 1 and February 28.***

- ***When trees must be removed during the maternity season (March 1 to September 30), a qualified bat specialist shall conduct a preconstruction survey to identify those trees proposed for disturbance that could provide hibernacula or nursery colony roosting habitat for bats.***

- ***Trees identified as potentially supporting an active nursery roost shall be inspected by a qualified biologist no greater than 7 days prior to tree disturbance to determine presence or absence of roosting bats.***

- ***Trees determined to support active maternity roosts will be left in place until the end of the maternity season (September 30).***

- ***If bats are not detected in a tree, but the qualified biologist determines that roosting bats may still be present, trees shall be removed as follows:***

    - ***Pushing a tree down with heavy machinery instead of felling the tree with a chainsaw***

    - ***First pushing the tree lightly 2 to 3 times with a pause of 30 seconds between each nudge to allow bats to become active, then pushing the tree to the ground slowly***

    - ***Allowing the tree to remain in place for 24 to 48 hours until inspected by the qualified biologist for presence or absence of roosting bats***

- ***The qualified biologist shall document all bat survey, monitoring, and protection measure activities and prepare a summary report for LACFCD.***

505 In the 2nd paragraph under BIOLOGY-2, the following clarifications have been made:

This alternative will impact the same amount of Riparian Woodland and ***Mule Fat Thickets*** ~~Mule Fat Scrub~~ as the Proposed Project. Riparian Woodland and ***Mule Fat Thickets*** ~~Mule Fat Scrub~~ are rare plant communities that provide nesting habitat for riparian species. Impacts to these habitats will result in a potentially significant impact. To minimize impacts due to the loss of Riparian Woodland and ***Mule Fat Thickets*** ~~Mule Fat Scrub~~, Mitigation Measures MM BIO-7 and MM BIO-8have been provided. With implementation of these mitigation measures, impacts to Riparian Woodland and ***Mule Fat Thickets*** ~~Mule Fat Scrub~~ will be reduced to a level below significance.

506 In the 3rd paragraph under Mitigation Measures, the following clarifications have been made:

MM BIO – 8: A combination of onsite and offsite habitat restoration, enhancement, and exotic removal shall be implemented by LACFCD at a 1:1 ratio for impacted sensitive habitat and jurisdictional waters. Habitat restoration/enhancement shall include use of willow cuttings and exotic species removal. **Non-native, weedy** ~~Ruderal~~ habitats within the basin shall be utilized whenever possible as mitigation sites. This mitigation measure shall be monitored for success for five years following implementation. A report of the monitoring results shall be submitted annually, during the five years following

implementation, to resource agencies as required by the Section 401 Certification, Section 404 permit, and a Streambed Alteration Agreement.

508 In the 1st paragraph under BIOLOGY-4, the following information has been added:

The Proposed Project area is predominantly open for wildlife movement and habitat connectivity. ***Sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays). In addition, sediment removal activities would not completely block the Proposed Project site from surrounding habitat, would occur only during the day, and would not interfere with nighttime wildlife activity. Although some wildlife may be temporarily displaced during construction, wildlife would not be physically prevented from moving around and into the basin area.*** Sediment removal and reservoir management activities associated with Alternative 4, Sluicing will interfere temporarily with the movement of native resident or migratory wildlife species, resulting in a potentially significant impact. Reduction in sensitive habitat would interfere with use of the habitat for wildlife nursery sites, resulting in a potentially significant impact. ***To minimize impacts to less than significant, Mitigation Measures MM BIO-1 through MM BIO-8 has been provided.*** This impact will be similar in comparison to the Proposed Project due to the similarities in area disturbed during sediment removal and reservoir management Option 1.

514 In the 1st paragraph under GHG EMISSIONS-1, the following details have been added:

Alternative 4, Sluicing will use the same amount and type of construction equipment as the Proposed Project; however, sediment removal under this Alternative will not involve trucking of sediment offsite. The only material to be trucked offsite includes vegetation, which will be transported to Scholl Canyon Landfill. ***Use of sediment removal dump trucks that meet EPA's emission standards for Model Year 2007 or later and use of off-road equipment that meets, at a minimum, EPA's emission standards for Tier 3 equipment, would result in a reduction of GHG emissions.*** As noted in Section 3.6, generation of greenhouse gas emissions under the Proposed Project is not "cumulatively considerable" and is therefore less than significant under CEQA. Alternative 4, Sluicing will have the same amount of daily equipment usage but less truck traffic; therefore, this alternative will generate less greenhouse gas emissions than the Proposed Project, which will not be "cumulatively considerable," and is therefore less than significant under CEQA.

530 In the 4th paragraph under Recreation and Public Services, the following detail has been added:

Sediment removal activities will not limit the use of the Oak Grove area of Hahamongna Watershed Park by individuals or by organizations such as the Oak Grove Disc Golf Club, the Rose Bowl Riders, ***MACH 1,*** or Tom Sawyer Camp.

533 In the 1st and 2nd paragraphs of TRANSPORTATION-1, the following clarifications have been made:

Truck traffic associated with the Alternative 4, Sluicing is expected to adhere to traffic regulations. Potential impacts regarding existing LOS are discussed under

TRANSPORTATION-2 below. This increase in traffic would result in ***temporary*** significant impacts to the efficiency of the circulation system. Implementation of Mitigation Measures MM TRA-1 and TRA-2 would reduce this impact but not to a level of less than significant.

Other potential impact reduction measures discussed under TRANSPORTATION-2, below, could reduce impacts to less than significant. These measures cannot be legally imposed by the LACFCD, however, since the locations are under the jurisdiction of other agencies. Every reasonable effort will be made to coordinate with and receive approval from the jurisdictional agencies to implement the impact reduction measures but LACFCD cannot guarantee that the measures will be implemented. Therefore, this ***temporary*** impact could remain potentially significant.

535 In the 1st paragraph under Residual Impacts After Mitigation, the following clarifications have been made:

Potentially significant traffic impacts associated with the sediment removal phase would be temporary, expected to occur during the drier months (from April to December, except on holidays), and would cease at the end of the sediment removal phase. Implementation of the mitigation measures described above would reduce impacts to traffic and circulation but not to a level of less than significant. Other potential impact reduction measures discussed under TRANSPORTATION-2, below, could reduce impacts to less than significant. These measures cannot be legally imposed by the LACFCD, however, since the locations are under the jurisdiction of other agencies. Every reasonable effort will be made to coordinate with and receive approval from the jurisdictional agencies to implement the impact reduction measures but LACFCD cannot guarantee that the measures will be implemented. Therefore, this ***temporary*** impact could remain potentially significant. ***No significant traffic impacts would occur under reservoir management.***

535 In the 2nd and 3rd paragraphs of TRANSPORTATION-2, the following clarifications have been made:

The Irwindale Avenue/Foothill Boulevard intersection is anticipated to operate at an unacceptable LOS during the PM peak hour, resulting in a ***temporary*** significant impact. Mitigation Measure MM TRA-1 would reduce the impact to the Irwindale Avenue/Foothill Boulevard intersection to less than significant.

The Figueroa St/Scholl Canyon Road and SR-134 westbound ramps intersection is anticipated to operate at an unacceptable LOS during the AM and PM peak hours, resulting in a ***temporary*** significant impact.

535 In the 4th, 5th, and 6th paragraphs of TRANSPORTATION-2, the following clarifications have been made:

Implementation of the impact reduction measure discussed above would reduce the impact to the Figueroa St/Scholl Canyon Road and SR-134 westbound ramps intersection to less than significant. This impact reduction measure cannot be legally imposed by the LACFCD. Every reasonable effort will be made to coordinate with and

receive approval to implement the impact reduction measure; however, LACFCD cannot guarantee that the measure will be implemented therefore this ***temporary*** impact could remain significant.

The Glenoaks Boulevard and Osborne Street intersection is anticipated to operate at an unacceptable LOS during the AM and PM peak hours, resulting in a ***temporary*** significant impact.

The Sheldon Street and San Fernando Road intersection and the Branford Street and San Fernando Road intersection are anticipated to operate at an unacceptable LOS during the PM peak hour, resulting in ***temporary*** significant impacts. Mitigation Measure MM TRA-2 would reduce the impacts to less than significant.

536 In the 1st paragraph under Residual Impacts After Mitigation, the following clarifications have been made:

Potentially significant traffic impacts associated with the sediment removal phase would be temporary, expected to occur during the drier months (from April to December, except on holidays), and would cease at the end of the sediment removal phase. Implementation of the mitigation measures described above would reduce some but not all of the impacts to traffic and circulation to a level less than significant. Other potential impact reduction measures discussed above could reduce impacts to less than significant. These measures cannot be legally imposed by the LACFCD, however, since the locations are under the jurisdiction of other agencies. Every reasonable effort will be made to coordinate with and receive approval from the jurisdictional agencies to implement the impact reduction measures but LACFCD cannot guarantee that the measures will be implemented. Therefore, these ***temporary*** impacts could remain potentially significant. ***No significant traffic impacts would occur under reservoir management.***

536 In the 1st and 2nd paragraphs of TRANSPORTATION-3, the following clarifications have been made:

Implementation of the Alternative 4, Sluicing may include impact reduction measures that would require modifications to the existing roadway network. Alternative 4, Sluicing is limited to excavation and transportation of vegetation that has accumulated in Devil's Gate Reservoir and would not introduce any new uses that would be incompatible ***or substantially increase hazards*** with the existing roadway system. Therefore, impacts related to traffic hazards would be less than significant.

If proper sediment transport does not occur under Alternative 4, Sluicing, sediment deposits will develop along the route to the ocean. This would result in need for sediment removal from the Arroyo Seco Channel, the Los Angeles River, or the Port of Long Beach, which will have impacts associated with transportation and traffic. Even if trucking of sediment further downstream is required, it would not introduce any uses that would be incompatible ***or substantially increase hazards*** with the existing roadway system; and it would have less than significant impacts.

538 In the 1st paragraph of TRANSPORTATION-5, the following clarification has been made:

Alternative 4, Sluicing would be confined to the roadway network described in Section 3.16.2 and would not adversely affect alternative modes of public transportation such as light rail. Implementation of Alternative 4, Sluicing would not require closure of any bus stops or disrupt any existing bus routes. The degrading of LOS at intersections, freeway segments, and freeway on- and off-ramps described above under TRANSPORTATION-2 could affect buses using the existing roadway network. This would be a ***temporary*** potentially significant impact.

538 In the 1st paragraph under Residual Impacts After Mitigation, the following clarification have been made:

Potentially significant traffic impacts associated with the sediment removal phase would be temporary, expected to occur during the drier months (from April to December, except on holidays), and would cease at the end of the sediment removal phase. Implementation of the mitigation measures described above would reduce some but not all of the impacts to traffic and circulation to a level less than significant. Other potential impact reduction measures discussed above could reduce impacts to less than significant. These measures cannot be legally imposed by the LACFCD, however, since the locations are under the jurisdiction of other agencies. Every reasonable effort will be made to coordinate with and receive approval from the jurisdictional agencies to implement the impact reduction measures but LACFCD cannot guarantee that the measures will be implemented. Therefore, these ***temporary*** impacts could remain potentially significant. ***No significant traffic impacts would occur under reservoir management.***

Section 4.8 Alternative 5, Haul Route Alternative

Page Clarification/Revision

541 In the 3rd through 6th paragraphs under Sediment Disposal, the following revisions have been made:

Sediment Disposal Truck Routes

This Alternative analyzes the use of alternative routes for some of the segments of the sediment disposal truck routes.

Project Site and Freeway Access

The sediment disposal truck alternative routes to and from the Proposed Project Site and I-210 are shown in Figure 4.8-1: Haul Route To and From Proposed Site and I-210 Alternative, ***Option 1 and Figure 4.8-2: Haul Route To and From Proposed Site and I-210 Alternative, Option 2. Option 1 haul route*** will avoid La Cañada High School and Hillside School and Learning Center ***and also avoid the Berkshire Place and I-210 eastbound ramps intersection. Under the Proposed Project, this intersection was***

anticipated to operate at an unacceptable LOS during the AM peak hour, resulting in a significant impact. Option 2 haul route will avoid the use of Windsor Avenue.

For Option 1, as shown in Figure 4.8-1 trucks will access the Proposed Project site from I-210 by exiting Windsor Avenue/Arroyo Boulevard, turning right on eastbound Windsor Avenue, turning left onto northbound Oak Grove Drive, and then entering the east reservoir access road.

Loaded trucks will exit the reservoir on the improved, existing westerly access road, turning left onto southbound Oak Grove Drive, then right onto westbound Windsor Avenue, and then east onto I-210 east, to disposal sites in Azusa and Irwindale or I-210 west to the Sun Valley disposal sites.

Alternatively, for Option 2, as shown in Figure 4.8-2, trucks will access the Proposed Project site from I-210 by exiting at Berkshire Place, turning east onto Berkshire Place, turning right onto southbound Oak Grove Drive, then entering the reservoir by making a left onto the ramp on the east side of the reservoir.

Loaded trucks will exit the reservoir on the upgraded existing west side access road, turn right onto northbound Oak Grove Drive, then left onto westbound Berkshire Place, and then to I-210 eastbound to disposal sites in Azusa and Irwindale or to I-210 westbound to disposal sites in Sun Valley.

544 The following figure name was edited:

Figure 4.8-1: Haul Route To and From Proposed Site and I-210 Alternative, Option 1

545 The following figure was added:

Figure 4.8 – 2: Haul Route To and From Proposed Site and I-210 Alternative, Option 2

549 In the 2nd paragraph under Sediment Excavation/Trucking Offsite, the following clarifications have been made:

As with the Proposed Project, it is estimated, based on past storm events, that sediment excavation/trucking offsite will be required to remove ***typically*** ~~an average of~~ 13,000 cy of sediment annually. Based on an estimated removal of 4,800cy per day, it is expected this will occur over an estimated two-week period, working Monday through Friday. This sediment excavation activity will take place during the late summer/early fall following the vegetation maintenance.

554 In the 2nd paragraph under AIR QUALITY-1, the following clarifications have been made:

As with the Proposed Project (see Section 3.5.6), Alternative 5, Haul Route Alternative will be consistent with the second through fourth criteria but will not be consistent with the first criterion. This is due to emissions of NO_X exceeding the Daily Regional Threshold during sediment removal, resulting in a potentially significant impact. Implementation of Mitigation Measures MM AQ-1 and MM AQ-2 will result in a reduction of Alternative 5, Haul Route Alternative's combined NO_X emissions during sediment removal~~; however,~~

~~while every reasonable effort will be made to strive for the newest vehicles/equipment, the actual vehicle/equipment fleet may not reach the levels required to reduce emissions~~ to a level of less than significant. ***Therefore, impacts during sediment removal will be less than significant.*** ~~Therefore, Alternative 5, Haul Route Alternative could result in a potentially significant impact.~~ This impact will be similar in comparison to the Proposed Project due to the identical excavation area and associated sediment removal activities.

555 In the 1st paragraph under Mitigation Measures, the following clarification has been made:

MM AQ-1: LACFCD shall require all construction contractors during the sediment removal phase of the Proposed Project to use ***only*** sediment removal dump trucks that meet EPA's emission standards for Model Year 2007 ***or later*** ~~as reasonably feasible~~.

555 In the 1st paragraph under Residual Impacts After Mitigation, the following clarifications have been made:

Implementation of these mitigations would reduce the Alternative 5, Haul Route Alternative's combined NO_X emissions during the sediment removal phase~~; however, while every effort will be made to strive for the newest vehicles/equipment, the actual vehicle/equipment fleet may not reach the levels required to reduce emissions~~ to a level of less than significant. ~~Therefore, this impact remains significant and unavoidable.~~

555 In the 1st paragraph under AIR QUALITY-2, the following clarifications have been made:

As with the Proposed Project, under Alternative 5, Haul Route Alternative emissions of NO_X exceed the Daily Regional Threshold during sediment removal, resulting in a potentially significant impact. Implementation of Mitigation Measures MM AQ-1 and MM AQ-2 will result in a reduction of Alternative 5, Haul Route Alternative's combined NO_X emissions during sediment removal~~; however, while every reasonable effort will be made to strive for the newest vehicles/equipment, the actual vehicle/equipment fleet may not reach the levels required to reduce emissions~~ to a level of less than significant. ~~Therefore, Alternative 5, Haul Route Alternative will result in a potentially significant impact.~~ This impact will be similar in comparison to the Proposed Project due to the identical excavation area and associated sediment removal activities.

556 In the 1st paragraph under Residual Impacts After Mitigation, the following clarifications have been made:

Sediment removal will not exceed any standard SCAQMD Regional Threshold except for combined NO_X emissions. Implementation of these mitigations would reduce combined NO_X emissions for Alternative 5, Haul Route Alternative during the sediment removal phase~~; however, while every effort will be made to strive for the newest vehicles/equipment, the actual vehicle/equipment fleet may not reach the levels required to reduce the NO_x emissions~~ to a level of less than significant. ~~Therefore, this impact remains significant and unavoidable.~~

557 In the 1st paragraph under Cumulative Health Impacts, the following clarifications have been made:

As with the Proposed Project, Alternative 5, Haul Route Alternative with Mitigation Measures MM AQ-1 and MM AQ-2, a significance threshold would not be exceeded for emissions of particulate matter and CO; and no significance threshold would be exceeded during reservoir management under either option. ~~While every effort will be made to strive for the newest vehicles/equipment, the actual vehicle/equipment fleet may not reach the levels required to reduce the NO_x emissions to a level of less than significant. Therefore, this impact remains significant and unavoidable.~~ ***Implementation of Mitigation Measures MM AQ-1 and MM AQ-2 will result in a reduction of NO_X emissions and will reduce the NO_X emissions to a level of less than significant for the sediment removal phase.***

557 In the 1st paragraph under Residual Impacts After Mitigation, the following clarifications have been made:

Sediment removal under Alternative 5, Haul Route Alternative will not exceed any localized significance threshold except for combined NO_X emissions. Implementation of these mitigations would reduce combined NO_X emissions of Alternative 5, Haul Route Alternative during the sediment removal phase~~; however, while all effort will be made to strive for the newest vehicles/equipment, the actual vehicle/equipment fleet may not reach the levels required to reduce the NOX emissions~~ to a level of less than significant. ~~Therefore, this impact remains significant and unavoidable.~~

561 In the 1st paragraph under Mitigation Measures, the following details have been added:

MM BIO – 1: A qualified biological monitor shall be present during initial ground- or vegetation-disturbing project-related activities ***to provide protection measures and monitor for wildlife in harm's way. This includes initial ground- or vegetation-disturbing project-related activities at the annual start of each year of the sediment removal or maintenance activities***. Following initial project-related activities, a qualified monitoring biologist shall be present as necessary to maintain the implemented protection measures and monitor for additional species in harm's way. ***These protection measures shall include, as appropriate: redirecting the wildlife, identifying areas that may require exclusionary devices (e.g., fencing), or capturing and relocating wildlife outside the work area. Any captured species shall be relocated to adjacent appropriate habitat that is contiguous to adjacent habitat and not impacted by project-related disturbance activities.***

561 In the 3rd paragraph under Mitigation Measures, the following detail has been added:

MM BIO – 3: Within 90 days prior to ground-disturbing activities, a preconstruction survey shall be conducted by a qualified biologist for the presence of any sensitive species in harm's way, including coast range newt, the southwestern pond turtle, and the two-striped garter snake. If sensitive species are observed in harm's way, the qualified biologist will develop and implement appropriate protection measures for that species. These protection measures shall include, as appropriate***:*** redirecting the species, ***constructing*** ~~construction of~~ exclusionary devices (e.g., fencing), or ***capturing***

and relocating wildlife outside the work area. Preconstruction ***surveys*** shall be repeated annually for the duration of the sediment removal. ***Observations of special status species made during these surveys shall be recorded onto a CNDDB field data sheet and submitted to CDFW for inclusion into the CNDDB.***

562 In the 7th paragraph under Mitigation Measures, the following details have been added:

MM BIO – 5: Within 30 days prior to commencement of vegetation or structure removal activities, a preconstruction bat survey shall be conducted by a qualified biologist for the presence of any roosting bats. ***Acoustic recognition technology shall be used if feasible and appropriate.*** If either a bat maternity roost or hibernacula (structures used by bats for hibernation) ***are*** present, a qualified biologist will develop and implement appropriate protection measures for that maternity roost or hibernacula. These protection measures shall include, as appropriate, safely evicting non-breeding bat hibernacula, establishment of avoidance buffers, or replacement of roosts at a suitable location. ***These measures shall also include as appropriate:***

- ***To the extent feasible, trees that have been identified as roosting sites shall be removed or relocated between October 1 and February 28.***
- ***When trees must be removed during the maternity season (March 1 to September 30), a qualified bat specialist shall conduct a preconstruction survey to identify those trees proposed for disturbance that could provide hibernacula or nursery colony roosting habitat for bats.***
- ***Trees identified as potentially supporting an active nursery roost shall be inspected by a qualified biologist no greater than 7 days prior to tree disturbance to determine presence or absence of roosting bats.***
- ***Trees determined to support active maternity roosts will be left in place until the end of the maternity season (September 30).***
- ***If bats are not detected in a tree, but the qualified biologist determines that roosting bats may still be present, trees shall be removed as follows:***
    - ***Pushing a tree down with heavy machinery instead of felling the tree with a chainsaw***
    - ***First pushing the tree lightly 2 to 3 times with a pause of 30 seconds between each nudge to allow bats to become active, then pushing the tree to the ground slowly***
    - ***Allowing the tree to remain in place for 24 to 48 hours until inspected by the qualified biologist for presence or absence of roosting bats***
- ***The qualified biologist shall document all bat survey, monitoring, and protection measure activities and prepare a summary report for LACFCD.***

563 In the 2nd paragraph under BIOLOGY-2, the following clarifications have been made:

This Alternative will impact the same amount of Riparian Woodland and ***Mule Fat Thickets*** ~~Mule Fat Scrub~~ as the Proposed Project. Riparian Woodland and ***Mule Fat Thickets*** ~~Mule Fat Scrub~~ are rare plant communities that provide nesting habitat for riparian species. Impacts to these habitats will result in a potentially significant impact. To minimize impacts due to the loss of Riparian Woodland and ***Mule Fat Thickets*** ~~Mule Fat Scrub~~, Mitigation Measures MM BIO-7 and MM BIO-8 have been provided. With implementation of these mitigation measures, impacts to Riparian Woodland and ***Mule Fat Thickets*** ~~Mule Fat Scrub~~ will be reduced to a level below significance.

564 In the 3rd paragraph under Mitigation Measures, the following clarification has been made:

MM BIO – 8: A combination of onsite and offsite habitat restoration, enhancement, and exotic removal shall be implemented by LACFCD at a 1:1 ratio for impacted sensitive habitat and jurisdictional waters. Habitat restoration/enhancement shall include use of willow cuttings and exotic species removal. ***Non-native, weedy*** ~~Ruderal~~ habitats within the basin shall be utilized whenever possible as mitigation sites. This mitigation measure shall be monitored for success for five years following implementation. A report of the monitoring results shall be submitted annually, during the five years following implementation, to resource agencies as required by the Section 401 Certification, Section 404 permit, and a Streambed Alteration Agreement.

566 In the 1st paragraph under BIOLOGY-4, the following information has been added:

The Proposed Project area is predominantly open for wildlife movement and habitat connectivity. ***Sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays). In addition, sediment removal activities would not completely block the Proposed Project site from surrounding habitat, would occur only during the day, and would not interfere with nighttime wildlife activity. Although some wildlife may be temporarily displaced during construction, wildlife would not be physically prevented from moving around and into the basin area.*** Sediment removal and reservoir management activities associated with Alternative 5, Haul Route Alternative will interfere temporarily with the movement of native resident or migratory wildlife species, resulting in a potentially significant impact. Reduction in sensitive habitat would interfere with use of the habitat for wildlife nursery sites, resulting in a potentially significant impact. ***To minimize impacts to less than significant, Mitigation Measures MM BIO-1 through MM BIO-8 has been provided.*** This impact will be similar in comparison to the Proposed Project due to the similarities in area disturbed during sediment removal and reservoir management Option 1.

571 In the 1st paragraph under GHG EMISSIONS-1, the following information has been added:

Alternative 5, Haul Route Alternative will use the same amount and type of construction equipment as the Proposed Project. ***Use of sediment removal dump trucks that meet EPA's emission standards for Model Year 2007 or later and use of off-road equipment***

that meets, at a minimum, EPA's emission standards for Tier 3 equipment, would result in a reduction of GHG emissions. As noted in Section 3.6, generation of greenhouse gas emissions under the Proposed Project is not "cumulatively considerable" and is therefore less than significant under CEQA. Alternative 5, Haul Route Alternative will have the same amount of daily equipment usage and truck traffic; therefore, this alternative will generate the same greenhouse gas emissions as the Proposed Project, which will not be "cumulatively considerable," and is therefore less than significant under CEQA.

586 In the 4th paragraph under Recreation and Public Services, following detail has been added:

Sediment removal activities will not limit the use of the Oak Grove area of Hahamongna Watershed Park by individuals or by organizations such as the Oak Grove Disc Golf Club, the Rose Bowl Riders, ***MACH 1,*** or Tom Sawyer Camp.

590 In the 1st and 2nd paragraphs under TRANSPORTATION-1, the following clarifications have been made:

Truck traffic associated with the Alternative 5, Haul Route Alternative is expected to adhere to traffic regulations; however, during sediment removal, truck traffic is expected to impact traffic LOS on the existing roadway network. Potential impacts regarding existing LOS are discussed under TRANSPORTATION-2 below. This increase in traffic would result in ***temporary*** significant impacts to the efficiency of the circulation system. Implementation of Mitigation Measures MM TRA-1 and TRA-2 would reduce this impact but not to a level of less than significant.

Sediment removal and associated transportation under this Alternative could potentially have the same duration as the Proposed Project. Other potential impact reduction measures discussed under TRANSPORTATION-2, below, could reduce impacts to less than significant. These measures cannot be legally imposed by the LACFCD, however, since the locations are under the jurisdiction of other agencies. Every reasonable effort will be made to coordinate with and receive approval from the jurisdictional agencies to implement the impact reduction measures but LACFCD cannot guarantee that the measures will be implemented. Therefore, this ***temporary*** impact could remain potentially significant.

590 In the 1st paragraph under Residual Impacts After Mitigation, the following clarifications have been made:

Potentially significant traffic impacts associated with the sediment removal phase would be temporary, expected to occur during the drier months (from April to December, except on holidays), and would cease at the end of the sediment removal phase. Implementation of the mitigation measures described above would reduce impacts to traffic and circulation but not to a level of less than significant. Other potential impact reduction measures discussed under TRANSPORTATION-2, below, could reduce impacts to less than significant. These measures cannot be legally imposed by the LACFCD, however, since the locations are under the jurisdiction of other agencies. Every reasonable effort will be made to coordinate with and receive approval

from the jurisdictional agencies to implement the impact reduction measures but LACFCD cannot guarantee that the measures will be implemented. Therefore, this ***temporary*** impact could remain potentially significant. ***No significant traffic impacts would occur under reservoir management.***

591 Table 4.8-2 has been revised as follows:

Table 4.8-1: Alternative Haul Route Streets

Alternative Haul Routes	Streets To Be Used
To/From Devil's Gate Reservoir to eastern disposal sites*, Option 1*	▪ Exit WB I-210 at Windsor Avenue/Arroyo Boulevard ▪ Turn right onto EB Windsor Avenue and then left onto NB Oak Grove Drive ▪ Enter and exit the project site on Oak Grove Drive ▪ Turn left onto SB Oak Grove Drive and then right onto WB Windsor Avenue ▪ Enter EB I-210 at Windsor Avenue/Arroyo Boulevard
To/From Devil's Gate Reservoir to eastern disposal sites*, Option 2*	▪ ***Exit WB I-210 at Berkshire Place*** ▪ ***Turn right onto EB Berkshire Place and then right onto SB Oak Grove Drive*** ▪ ***Enter and exit the project site on Oak Grove Drive*** ▪ ***Turn right onto NB Oak Grove Drive and then left onto WB Berkshire Place*** ▪ ***Enter EB I-210 at Berkshire Place***
To/From Devil's Gate Reservoir Area to western disposal sites, *Option 1*	▪ Exit EB I-210 at Windsor Avenue/Arroyo Boulevard ▪ Turn right onto EB Windsor Avenue and then left onto NB Oak Grove Drive ▪ Enter and exit the project site on Oak Grove Drive ▪ Turn left onto SB Oak Grove Drive and then right onto WB Windsor Avenue ▪ Enter WB I-210 at Windsor Avenue/Arroyo Boulevard
To/From Devil's Gate Reservoir Area to western disposal sites, Option 2	▪ ***Exit EB I-210 at Berkshire Place*** ▪ ***Turn left onto EB Berkshire Place and then right onto SB Oak Grove Drive*** ▪ ***Enter and exit the project site on Oak Grove Drive*** ▪ ***Turn right onto NB Oak Grove Drive and then left onto WB Berkshire Place*** ▪ ***Enter WB I-210 at Berkshire Place***
To/From Manning Pit	▪ Exit EB I-210 at Irwindale Avenue ▪ Turn right onto SB Irwindale Avenue ▪ Turn left onto EB Gladstone Street and then right onto SB Vincent Avenue ▪ Enter and exit the disposal site on Vincent Avenue ▪ Turn left onto NB Vincent Avenue and then left onto NB Azusa Avenue ▪ Turn right onto EB First Street ▪ Enter WB I-210 at First Street
To/From Scholl Canyon Landfill	▪ Exit EB SR-134 at Figueroa Street ▪ Turn right onto NB Figueroa Street ▪ Enter and exit the disposal site on Scholl Canyon Road ▪ Turn right onto SB Scholl Canyon Road ▪ Enter WB SR-134 at Figueroa Street

Table 4.8-1: Alternative Haul Route Streets

Alternative Haul Routes	Streets To Be Used
To/From Sheldon Pit	▪ Exit WB I-210 at the Wheatland Avenue interchange ▪ Turn right onto NB Wheatland Avenue ▪ Turn right onto EB Foothill Boulevard ▪ Turn right onto WB Wentworth Street ▪ Enter and exit the disposal site on Sheldon Street ▪ Turn left onto EB Sheldon Street ▪ Turn left onto WB Foothill Boulevard ▪ Turn left onto SB Wheatland Avenue ▪ Enter EB I-210 at the left onto SB Wheatland Avenue interchange
To/From Sun Valley Fill Site	▪ Exit WB I-210 at the Wheatland Avenue interchange ▪ Turn right onto NB Wheatland Avenue ▪ Turn right onto EB Foothill Boulevard ▪ Turn right onto WB Wentworth Street ▪ Enter the disposal site on Sheldon Street ▪ Exit the disposal site on Glenoaks Boulevard ▪ Turn right onto NB Glenoaks Boulevard ▪ Turn right onto EB Sheldon Street ▪ Turn left onto WB Foothill Boulevard ▪ Turn left onto SB Wheatland Avenue ▪ Enter EB I-210 at the left onto SB Wheatland Avenue interchange
To/From Bradley Landfill	▪ Exit WB I-210 at the Wheatland Avenue interchange ▪ Turn right onto NB Wheatland Avenue ▪ Turn right onto EB Foothill Boulevard ▪ Turn right onto WB Wentworth Street ▪ Turn left onto SB Glenoaks Boulevard ▪ Turn right onto WB Peoria Street ▪ Enter and exit the disposal site on Peoria Street ▪ Turn left onto EB Peoria Street ▪ Turn left onto NB Glenoaks Boulevard ▪ Turn right onto EB Sheldon Street ▪ Turn left onto WB Foothill Boulevard ▪ Turn left onto SB Wheatland Avenue ▪ Enter EB I-210 at the left onto SB Wheatland Avenue interchange
To/From Boulevard Pit	▪ Exit the SB I-5 at Osborne Street ▪ Turn left onto EB Osborne Street ▪ Turn right onto SB Laurel Canyon Boulevard ▪ Turn left onto EB Branford Street ▪ Enter and exit the disposal site on Branford Street ▪ Turn left onto WB Branford Street ▪ Turn right onto NB Laurel Canyon Boulevard ▪ Turn left onto WB Osborne Street ▪ Enter the NB I-5 at Osborne Street

593 In the 2nd through 4th paragraphs under TRANSPORTATION-2, the following revisions have been made:

Option 1 Haul Route

Table 4.8-3 shows the LOS for Proposed Project traffic at year 2014 for the intersections between the reservoir and I-210 ***Option 1 haul route*** toward the eastern disposal sites.

Table 4.8-4: Alternative Haul Route to I-210 to Eastern Disposal Sites***, Option 1*** AM Peak Hour shows the contribution of Proposed Project traffic to existing conditions and year 2014 conditions for the AM peak period. All the intersections ***between the reservoir and I-210 toward the eastern disposal sites using the Option 1 haul route*** are anticipated to continue to operate at LOS C or better for all utilized intersections throughout the day.

Use of this alternative route would require implementation of the following potential impact reduction measure:

- The median on Oak Grove Drive would be restriped to a Two Way Left Turn Lane (TWLTL). Trucks exiting the Devil's Gate Reservoir driveway will cross the two lanes of oncoming westbound traffic on Oak Grove Drive and utilize the TWLTL if necessary to merge into the eastbound traffic. The changes to Oak Grove Drive would require the approval of the City of Pasadena.

The ***addition of the TWLTL for the*** impact reduction measure discussed above cannot be legally imposed by the LACFCD since the location is under the jurisdiction of the City of Pasadena. Every reasonable effort will be made to coordinate with and receive approval to implement this impact reduction measure; however, LACFCD cannot guarantee that this impact reduction measure will be implemented and cannot guarantee that these alternative haul routes can be used.

594 The following table names were revised:

Table 4.8-3: Alternative Haul Route to I-210 to Eastern Disposal Sites***, Option 1***

Table 4.8-4: Alternative Haul Route to I-210 to Eastern Disposal Sites AM Peak Hour, ***Option 1***

595 After Table 4.8-4, the following information has been added:

Option 2 Haul Route

Table 4.8-5 shows the LOS for Proposed Project traffic at year 2014 for the intersections between the reservoir and I-210 Option 2 haul route toward the eastern disposal sites.

Table 4.8-6: Alternative Haul Route to I-210 to Eastern Disposal Sites, Option 2 AM Peak Hour shows the contribution of Proposed Project traffic to existing conditions and year 2014 conditions for the AM peak period.

All the intersections between the reservoir and I-210 toward the eastern disposal sites using Berkshire Place are anticipated to continue to operate at an LOS C or better for all utilized intersections during the MID-DAY and PM peak periods. Therefore, no significant impacts will occur at these intersections during the MID-DAY and PM peak periods. The Berkshire Place and I-210 eastbound ramps intersection is anticipated to operate at an unacceptable LOS during the AM peak hour, resulting in a temporary significant impact.

Use of this alternative route would require implementation of the following potential impact reduction measure:

The median on Oak Grove Drive would be restriped to a Two Way Left Turn Lane (TWLTL). Trucks traveling eastbound on Oak Grove Drive and entering the Devil's Gate Reservoir east side driveway will utilize the TWLTL if necessary to turn left. The changes to Oak Grove Drive would require the approval of the City of Pasadena.

The addition of the TWLTL for the impact reduction measure discussed above cannot be legally imposed by the LACFCD since the location is under the jurisdiction of the City of Pasadena. Every reasonable effort will be made to coordinate with and receive approval to implement this impact reduction measure; however, LACFCD cannot guarantee that this impact reduction measure will be implemented and cannot guarantee that these alternative haul routes can be used.

596 The following tables have been added:

Table 4.8-5: Alternative Haul Route to I-210 to Eastern Disposal Sites, Option 2

Intersection #/Name		AM				MID-DAY (12-2 PM)				MID-DAY (2-4 PM)				PM			
		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
1	Berkshire Place and I-210 eastbound ramps	F	51.4	-	-	B	10.8	-	-	C	23.7	-	-	D	31.6	-	-
2	Berkshire Place and I-210 westbound ramps	B	13.1	-	-	A	7.0	-	-	A	9.3	-	-	A	5.6	-	-
3	Oak Grove Drive and Berkshire Place	C	26.6	0.97	B	A	6.2	0.30	A	A	7.1	0.49	A	A	8.4	0.57	B

Table 4.8-6: Alternative Haul Route to I-210 to Eastern Disposal Sites AM Peak Hour, Option 2

AM Peak Hour		Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project		Year 2014 with Project and Mitigation		
Intersection #/Name		HCM V/C	HCM LOS	HCM V/C	HCM LOS	Potentially Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Potentially Significant Impact
1	Berkshire Place and I-210 eastbound ramps	-	D	-	E	YES	-	F	N/A*	N/A*	YES
2	Berkshire Place and I-210 westbound ramps	-	A	-	A	NO	-	B	NMR**	NMR**	NO
3	Oak Grove Drive and Berkshire Place	0.50	A	0.67	A	NO	0.97	C	NMR**	NMR**	NO

* No mitigation available.
**No mitigation required.

597 In the 1st paragraph on the page, the following revisions have been made:

Option 1 Haul Route

Table 4.8-7 shows the contribution of Proposed Project traffic to existing conditions and year 2014 conditions for the AM peak period. All the intersections ***between the reservoir and I-210 toward the eastern disposal sites using the Option 1 haul route*** are anticipated to continue to operate at LOS ***D*** or better for all utilized intersections throughout the day. Therefore, no significant impacts will occur at these intersections.

597 The following table name has been revised:

Table 4.8-7: Alternative Haul Route to I-210 to Western Disposal Sites*, Option 1*

597 The following table name has been revised:

Table 4.8-8: Alternative Haul Route to I-210 to Western Disposal Sites AM Peak Hour*, Option 1*

598 In the 1st paragraph after Table 4.8-8, the following information has been added:

Option 2 Haul Route

Table 4.8-9 shows the LOS for Proposed Project traffic at year 2014 for the intersections between the reservoir and I-210 Option 2 haul route toward the western disposal sites.

Table 4.8-10: Alternative Haul Route to I-210 to Western Disposal Sites, Option 2 AM Peak Hour shows the contribution of Proposed Project traffic to existing conditions and year 2014 conditions for the AM peak period.

All the intersections between the reservoir and I-210 toward the western disposal sites using Berkshire Place are anticipated to continue to operate at an LOS C or better for all utilized intersections during the MID-DAY and PM peak periods. Therefore, no significant impacts will occur at these intersections during the MID-DAY and PM peak periods. The Berkshire Place and I-210 eastbound ramps intersection is anticipated to operate at an unacceptable LOS during the AM peak hour, resulting in a temporary significant impact.

Use of this alternative route would require implementation of the following potential impact reduction measure:

- ***The median on Oak Grove Drive would be restriped to a Two Way Left Turn Lane (TWLTL). Trucks traveling eastbound on Oak Grove Drive and entering the Devil's Gate Reservoir east side driveway will utilize the TWLTL if necessary to turn left. The changes to Oak Grove Drive would require the approval of the City of Pasadena.***

The addition of the TWLTL for the impact reduction measure discussed above cannot be legally imposed by the LACFCD since the location is under the jurisdiction of the City of Pasadena. Every reasonable effort will be made to coordinate with and receive approval to implement this impact reduction measure; however, LACFCD cannot guarantee that this impact reduction measure will be implemented and cannot guarantee that these alternative haul routes can be used.

598 The following tables have been added:

Table 4.8-9: Alternative Haul Route to I-210 to Western Disposal Sites, Option 2

Intersection #/Name		AM				MID-DAY (12-2 PM)				MID-DAY (2-4 PM)				PM			
		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
2	Berkshire Place and I-210 westbound ramps	B	11.0	-	-	A	4.7	-	-	A	6.9	-	-	A	3.7	-	-
1	Berkshire Place and I-210 eastbound ramps	E	48.2	-	-	B	10.6	-	-	C	18.9	-	-	C	21.8	-	-
3	Oak Grove Drive and Berkshire Place	C	26.6	0.97	B	A	6.2	0.30	A	A	7.1	0.49	A	A	8.4	0.57	B

Table 4.8-10: Alternative Haul Route to I-210 to Western Disposal Sites AM Peak Hour, Option 2

AM Peak Hour		Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project		Year 2014 with Project and Mitigation		
Intersection #	Name	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Potentially Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Potentially Significant Impact
2	Berkshire Place and I-210 westbound ramps	-	A	-	A	NO-	-	B	NMR**	NMR**	NO
1	Berkshire Place and I-210 eastbound ramps	-	A	-	E	YES	-	E	NMR*	NMR*	YES
3	Oak Grove Drive and Berkshire Place	0.50	A	0.67	A	NO	0.97	c	NMR**	NMR**	NO

* No mitigation available.
**No mitigation required.

599 In the 1st paragraph under Manning Pit Area to/from I-210, the following clarifications have been made:

Table 4.8-11 shows the LOS for Proposed Project traffic at year 2014 for the intersections between Manning Pit and I-210. Table 4.8-12, Table 4.8-13, and Table 4.8-14 show the contribution of Proposed Project traffic to existing conditions and year 2014 conditions for the AM, Mid-Day, and PM peak periods respectively. The Arrow Highway/Lark Ellen Avenue intersection is anticipated to operate at an unacceptable LOS during the AM, Mid-Day, and PM peak periods, resulting in a ***temporary*** significant impact. The Arrow Highway/Enid Avenue intersection, Azusa Avenue/Arrow Highway, Azusa Avenue/Gladstone Street, and First Street and Alameda Street/I-210 Westbound Ramps are anticipated to operate at an unacceptable LOS during the AM peak hour, resulting in a ***temporary*** significant impact. The Arrow Highway/Enid Avenue intersection is anticipated to operate at an unacceptable LOS during the Mid-Day peak hour, resulting in a ***temporary*** significant impact. The Arrow Highway/Enid Avenue intersection and Azusa Avenue/Arrow Highway are anticipated to operate at an unacceptable LOS during the PM peak hour, resulting in a ***temporary*** significant impact.

604 In the 1st paragraph under Vulcan Materials Reliance Facility to/from I-210, the following clarification has been made:

The route to the Vulcan Material Reliance Facility would be the same as for the Proposed Project. All the intersections are anticipated to continue to operate at an LOS D or better for all utilized intersections during the AM and MID-Day peak periods. Therefore, no significant impacts will occur at these intersections during these time periods. The Irwindale Avenue/Foothill Boulevard intersection is anticipated to operate at an unacceptable LOS during the PM peak hour, resulting in a ***temporary*** significant impact. Implementation of Mitigation Measure MM TRA-1 would reduce the impact to the Irwindale Avenue/Foothill Boulevard intersection to less than significant.

604 In the 2nd paragraph under Scholl Canyon Landfill to/from SR-134, the following clarification has been made:

The Figueroa St/Scholl Canyon Road and SR-134 westbound ramps intersection is anticipated to operate at an unacceptable LOS during the AM and PM peak hours, resulting in a ***temporary*** significant impact. Reducing this impact to less than significant would require implementation of the following potential impact reduction measure:

604 In the 4th paragraph under Scholl Canyon Landfill to/from SR-134, the following clarification has been made:

This impact reduction measure cannot be legally imposed by the LACFCD. Every reasonable effort will be made to coordinate with and receive approval to implement the impact reduction measure; however, LACFCD cannot guarantee that the measure will be implemented therefore this ***temporary*** impact could remain significant.

609 In the 2nd paragraph under Boulevard Pit Area to/from I-5, the following clarification has been made:

Table 4.8-25 shows the contribution of Proposed Project traffic to existing conditions and year 2014 conditions for the PM peak period respectively. The Osborne Street /Laurel Canyon Boulevard is anticipated to operate at an unacceptable LOS during the PM peak hour, resulting in a ***temporary*** significant impact. Mitigation Measure MM TRA-2 would reduce the impacts to less than significant.

611 In the 1st paragraph on the page, the following edits were made:

As with the Proposed Project, Alternative 5, Haul Route Alternative will ***temporarily*** significantly impact the following intersection***s***:

- ***Berkshire Place and I-210 eastbound ramps during the AM peak hour (Option 2); and***

- Figueroa Street/Scholl Canyon Road and SR-134 westbound ramps during the AM and PM peak hours

611 In the 3rd paragraph on the page, the following clarification has been made:

In contrast to the Proposed Project, Alternative 5, Haul Route Alternative will ***temporarily*** significantly impact the following intersections:

- Arrow Highway/Lark Ellen Avenue during the AM, Mid-Day, and PM peak periods;
- Arrow Highway/Enid Avenue intersection during the AM, Mid-Day, and PM peak hours;
- Azusa Avenue/Arrow Highway during the AM and PM peak hours; and
- First Street and Alameda Street/I-210 Westbound Ramps during the AM peak hour.

611 In the 4th paragraph on the page, the following information was added:

In contrast to the Proposed Project, Alternative 5, Haul Route Alternative will not significantly impact:

- Berkshire Place and I-210 eastbound ramps during the AM peak hour ***(with exception of Option 2)***; and
- Glenoaks Boulevard/Osborne Street intersection during the AM and PM peak hours.

Potentially significant traffic impacts associated with the sediment removal phase would be temporary, expected to occur during the drier months (from April to December, except on holidays), and would cease at the end of the sediment removal phase. Implementation of the mitigation measures described above would reduce some but not all of the impacts to traffic and circulation to a level less than significant. Other potential impact reduction measures discussed above could reduce impacts to less than significant. These measures cannot be legally imposed by the LACFCD, however, since the locations are under the jurisdiction of other agencies. Every reasonable effort will be made to coordinate with and receive approval from the jurisdictional agencies to implement the impact reduction measures but LACFCD cannot guarantee that the measures will be implemented. Therefore, these ***temporary*** impacts could remain potentially significant. ***No significant traffic impacts would occur under reservoir management.***

611 In the 1st paragraph under Comparison to Proposed Project and Other Alternatives, the following revisions were made:

Overall, Alternative 5, Haul Route Alternative is considered environmentally superior to the Proposed Project due to alternate haul route and reduction in traffic impacts associated with the route. Alternative 5, Haul Route Alternative is considered environmentally superior to the Proposed Project for the following segments: Devil's Gate Reservoir to I-210 ***(with exception of Option 2)***; To/From Sheldon Pit; To/From Sun Valley Fill Site; and To/From Bradley Landfill. Alternative 5, Haul Route Alternative is considered neither environmentally superior nor inferior to the Proposed Project for the following segments: ***Devil's Gate Reservoir to I-210 (Option 2 only);*** To/From Waste Management Facility, To/From Vulcan Materials Reliance Facility, To/From Boulevard Pit, and To/From Scholl Canyon. Alternative 5, Haul Route Alternative is considered environmentally inferior to the Proposed Project for the following segment: To/From Manning Pit.

612 In the 1st and 2nd paragraphs under TRANSPORTATION-3, the following clarifications have been made:

Implementation of the Alternative 5, Haul Route Alternative may include impact reduction measures that would require modifications to the existing roadway network. Alternative 5, Haul Route Alternative would not introduce any new uses that would be incompatible ***or substantially increase hazards*** with the existing roadway system. Therefore, impacts related to traffic hazards would be less than significant.

Reservoir Management

The reservoir management associated with Alternative 5, Haul Route Alternative would not require any modifications to the existing roadway network and would not introduce any new uses that would be incompatible ***or substantially increase hazards*** with the existing roadway system. Therefore, no impact would occur.

613 In the 1st paragraph under TRANSPORTATION-5, the following clarification has been added:

Alternative 5, Haul Route Alternative would be confined to the roadway network described in Section 4.8.1, above, and would not adversely affect alternative modes of public transportation such as light rail. Implementation of Alternative 5, Haul Route Alternative would not require closure of any bus stops or disrupt any existing bus routes. The degrading of LOS at intersections, freeway segments, and freeway on- and off-ramps described above under TRANSPORTATION-2 could affect buses using the existing roadway network. This would be a ***temporary*** potentially significant impact.

614 In the 1st paragraph under Residual Impacts After Mitigation, the following clarifications have been made:

Potentially significant traffic impacts associated with the sediment removal phase would be temporary, expected to occur during the drier months (from April to December, except on holidays), and would cease at the end of the sediment removal phase. Implementation of the mitigation measures described above would reduce some but not all of the impacts to traffic and circulation to a level less than significant. Other potential impact reduction measures discussed above could reduce impacts to less than significant. These measures cannot be legally imposed by the LACFCD, however, since the locations are under the jurisdiction of other agencies. Every reasonable effort will be made to coordinate with and receive approval from the jurisdictional agencies to implement the impact reduction measures but LACFCD cannot guarantee that the measures will be implemented. Therefore, these ***temporary*** impacts could remain potentially significant. ***No significant traffic impacts would occur under reservoir management.***

615 In the 3rd paragraph under UTILITIES-1, the following clarification has been made:

During reservoir management, Alternative 5, Haul Route Alternative will not result in or require the construction of new or expansion of existing stormwater drainage systems. Sediment that accumulates at the front of the reservoir after the proposed removal will be removed through FAST operations or through mechanical excavation, and sediment accumulated at the back basin will be removed through trucking. The FAST operations are expected to be similar to historic FAST operations, and sediment fines discharged through FAST operations will be transported during storm flows to the Pacific Ocean via Arroyo Seco and the Los Angeles River. No impacts to stormwater facilities are expected during FAST operations. Any necessary mechanical removal during reservoir management is expected to be small (***typically*** 13,000 cy per year). Impacts to stormwater facilities during mechanical removal will be avoided through compliance

with City regulations regarding stormwater facilities and implementation of LACDPW BMPs.

Section 4.9 Alternative 6, No Project Alternative

Page	**Clarification/Revision**
624	In the 2nd paragraph under BIOLOGY-2, the following clarifications have been made: This alternative will directly impact less Riparian Woodland and ***Mule Fat Thickets*** ~~Mule Fat Scrub~~ than the Proposed Project. Riparian Woodland and ***Mule Fat Thickets*** ~~Mule Fat Scrub~~ are rare plant communities that provide nesting habitat for riparian species; however, habitat loss or reduction in habitat quality will result from the accumulation of sediment or scouring throughout the reservoir. Impacts will be potentially significant.
643	In the 4th paragraph under Recreation and Public Services, following detail has been added: Sediment removal activities will not limit the use of the Oak Grove area of Hahamongna Watershed Park by individuals or by organizations such as the Oak Grove Disc Golf Club, the Rose Bowl Riders, ***MACH 1,*** or Tom Sawyer Camp.
646	In the 1st and 2nd paragraphs under TRANSPORTATION-3, the following clarifications have been made: Implementation of the Alternative 6, No Project Alternative would not require mitigation measures that would require modifications to the existing roadway network. Alternative 6, No Project Alternative would not require any trucking and would not introduce any new uses that would be incompatible ***or substantially increase hazards*** with the existing roadway system. Therefore, impacts related to traffic hazards would be less than significant. *Reservoir Management* The reservoir management associated with Alternative 6, No Project Alternative would not require any modifications to the existing roadway network and would not introduce any new uses that would be incompatible ***or substantially increase hazards*** with the existing roadway system. Therefore, no impact would occur.

Section 5.1 Environmental Effects Found Not To Be Significant

Page	**Clarification/Revision**
652	In the 3rd paragraph, the following clarifications have been made: After a more detailed evaluation of the environmental issues associated with the Proposed Project, the EIR determined that impacts would be less than significant or less

than significant with incorporation of mitigation measures for the following environmental issue areas:

- ***Air Quality***

Section 5.4 Significant Unavoidable Environmental Impact

Page	**Clarification/Revision**
653	In the 1st paragraph, the following clarifications have been made: The potentially adverse effects of the Proposed Project are discussed in Chapter 3.0 of this EIR. Mitigation Measures have been recommended that would reduce impacts for all categories except aesthetics~~, air quality,~~ and traffic to less than significant based on each set of significance criteria. The Proposed Project would result in significant unavoidable impacts related to aesthetics~~, air quality,~~ and ***temporary significant unavoidable impacts related to*** traffic.

SECTION 9.0 – RESPONSE TO COMMENTS

This section includes all comments received on the Draft EIR during the 90-day public review period between October 23, 2013 to January 21, 2014 (45-day minimum per CEQA, plus 30 days per LACFCD extension, and an additional 15 day LACFCD extension). No new significant environmental impacts or issues were raised during the public review period beyond those already identified in the Draft EIR for the Devil's Gate Reservoir Sediment Removal and Management Project. During this public review period a total of 251 comment letters were received.

LACFCD held three community meetings on November 6, 14, and 16, 2013 to discuss the Draft EIR analysis and alternatives. Formal written public comments were accepted at the meetings. Formal oral public comments were not taken at these meetings; however, a summary of topics and a response to these topics discussed are presented in Comment Letter 252.

As the lead agency under CEQA, LACFCD provided responses to the comments received on the Draft EIR. Pursuant to CEQA Guidelines §15088.5, none of the comments received during the comment period provide any basis to identify any new significant impacts or "significant new information" that would require recirculation of the Draft EIR.

9.1 LIST OF COMMENTERS

The following individuals and representatives of organization and agencies submitted written comments on the Draft EIR.

AGENCIES

California Department of Fish and Wildlife (Comment Letter #171)

California Legislature Assembly member Mike Gatto (Comment Letter #250)

City of Azusa (Comment Letter #170)

City of La Cañada Flintridge (Comment Letters #57, 94)

City of Los Angeles Emergency Management Department (Comment Letter #166)

City of Pasadena (Comment Letter #177)

County of Los Angeles Fire Department (Comment Letter #29)

Native American Heritage Commission (Comment Letter #38)

La Cañada Unified School District (Comment Letters #48, 58)

Santa Monica Mountains Conservancy (Comment Letter #191)

South Coast Air Quality Management District (Comment Letter #230)

State Clearinghouse (Comment Letter #46)

United States Fish and Wildlife Service (Comment Letter #233)

ORGANIZATIONS

Altadena Heritage (Comment Letter #165)

Arroyo Seco Foundation (Comment Letter #216)

California Native Plant Society (Comment Letter #90)

Foothill Family of Water Agencies (Comment Letter #140)

Friends of Hahamongna (Comment Letter #179)

Friends of the Los Angeles River (Comment Letter #180)

La Cañada Flintridge Trails Council (Comment Letter #236)

Linda Vista-Annandale Association (Comment Letter #224)

Move a Child Higher (MACH) 1 (Comment Letter #41)

Pasadena Audubon Society (Comment Letter #189)

Pasadena Sierra Club (Comment Letter #211)

Rose Bowl Riders (Comment Letter #247)

San Gabriel Mountains Chapter of the California Native Plant Society (Comment Letter #90)

The Hillside School and Learning Center (Comment Letter #249)

Tom Sawyer Camps (Comment Letters #61, 62, 65)

West Pasadena Residents Association (Comment Letter #195)

Zanja Madre (Comment Letter #248)

ALL COMMENT LETTERS

Comment Letter #1 – Freddie Hughley

Comment Letter #2 – Evan A. Thompson

Comment Letter #3 – Bob Musselman

Comment Letter #4 – Erika Bennett (TTSI)

Comment Letter #5 – Loyd Kattro (Light Art Consulting)

Comment Letter #6 – Pam Dong (Pasadena Audubon Society Member)

Comment Letter #7 – Wilbur Dong (Pasadena Audubon Society Member)

Comment Letter #8 – Christle Balvin

Comment Letter #9 – Annette Peny

Comment Letter #10 – Elizabeth Bour

Comment Letter #11 – Dessi Sieburth (Pasadena Audubon Society Member)

Comment Letter #12 – Suzanne Martin

Comment Letter #13 – Dorothy Wong

Comment Letter #14 – Peter Pfeiffer

Comment Letter #15 – Icia Belchak

Comment Letter #16 – Richard Booker (Linda Vista Annandale Association)

Comment Letter #17 –Lance Benner

Comment Letter #18 – Virginia Kimball

Comment Letter #19- Timothy Callahan

Comment Letter #20 –Marah Lyvers (Tom Sawyer Camps)

Comment Letter #21 –Marah Lyvers

Comment Letter #22 –Constance Brines

Comment Letter #23 –Laurie Barlow

Comment Letter #24 – Antionette Devereaux

Comment Letter #25 –Marge Nichols

Comment Letter #26 – Janet Aird

Comment Letter #27 –Allen Decker

Comment Letter #28 –Joan Hearst (WPRA)

Comment Letter #29 –Los Angeles County Fire Department

Comment Letter #30 – Doris Finch

Comment Letter #31 – Grace Wong

Comment Letter #32 – Kathleen Warner

Comment Letter #33 – Kathi Ellsworth

Comment Letter #34 – Carolyn Otto

Comment Letter #35 – Sylvia Stachura (Pasadena Audubon Society Member)

Comment Letter #36 – Susan Gilliland

Comment Letter #37 – Frank Gilliland

Comment Letter #38 – Native American Heritage Commission

Comment Letter #39 – R. Stephenson

Comment Letter #40 – Cheryl Wysocki

Comment Letter #41 – Joy Rittenhouse (MACH 1)

Comment Letter #42 – Joyce Locatell (Pasadena Audubon Society Member)

Comment Letter #43 – Susan Gilliland

Comment Letter #44 – Petrea Sandel

Comment Letter # 45 – Thomas Parker

Comment Letter #46 – State Clearinghouse

Comment Letter #47 – Joanne Beckwith

Comment Letter #48 – La Cañada Unified School District

Comment Letter #49 – Madison Keogh (Tom Sawyer Camps Counselor)

Comment Letter #50 – Elizabeth Kotz

Comment Letter #51 – Jill Blaisdell

Comment Letter #52 – Wendy Crowley

Comment Letter #53 – Andrew Binder

Comment Letter #54 – Deni Sinnott (Pasadena Audubon Society)

Comment Letter #55 – Walter Tatum (La Cañada Unified School District)

Comment Letter #56 – Barbara Eisenstein (Friends of the Arroyo Seco)

Comment Letter #57 – City of La Cañada Flintridge

Comment Letter #58 – La Cañada Unified School District

Comment Letter #59 – Louise Carnevale (Tom Sawyer Camps Bookkeeper)

Comment Letter #60 – Kathy Garcia (Tom Sawyer Camps Staff)

Comment Letter #61 – Sarah Horner Fish (Tom Sawyer Camps Executive Director)

Comment Letter #62 – Michael Horner (Tom Sawyer Camps Director)

Comment Letter #63 – Eric Ikari (Tom Sawyer Camps Employee)

Comment Letter #64 – Laura Keen (Tom Sawyer Camps Employee)

Comment Letter #65 – Thomas Horner (Tom Sawyer Camps Co-Owner)

Comment Letter #66 – Robert Staehle, Lori Paul

Comment Letter #67 – Joan Probst

Comment Letter #68 – Brendan Crill

Comment Letter #69 – Marah Lyvers (Tom Sawyer Camps Employee)

Comment Letter #70 – Beatrix Schwarz

Comment Letter #71 – Sylvia Stachura

Comment Letter #72 – Genette Foster

Comment Letter #73 – Jeffrey Toland

Comment Letter #74 – Julie Thurston (La Cañada High School Track & Field Coach)

Comment Letter #75 – Katie Rayburn (Tom Sawyer Camps Counselor)

Comment Letter #76 – Louisa Van Leer (Highland Park Heritage Trust Board Member)

Comment Letter #77 – Marnie Gaede

Comment Letter #78 – Michael Long (Los Angeles County Natural Areas Administrator Retired)

Comment Letter #79 – Michael Olson

Comment Letter #80 – Nina Ehlig (SENCH Neighborhood Watch Association President)

Comment Letter #81 – Polly Wheaton (Pasadena Beautiful Foundation President)

Comment Letter #82 – Stephanie Strout

Comment Letter #83 – Trent Sanders

Comment Letter #84 – Alex Fore

Comment Letter #85 – Andy Carrico

Comment Letter #86 – Bill Burnett

Comment Letter #87 – Brenton Miller

Comment Letter #88 – Brett Godown

Comment Letter #89 – Brian Kernan

Comment Letter #90 – San Gabriel Mountains Chapter of the California Native Plant Society

Comment Letter #91 – Caraly Higuchi

Comment Letter #92 – Catherine Kelly

Comment Letter #93 – Charmain Sauro

Comment Letter #94 – City of La Cañada Flintridge

Comment Letter #95 – Clay Allen

Comment Letter #96 – Connie Branson

Comment Letter #97 – Craig Friedemann

Comment Letter #98 – Damien Baccaro

Comment Letter #99 – Dancingwater Taylor

Comment Letter #100 – Daniel Russell

Comment Letter #101 – David Boettcher

Comment Letter #102 – Dietrich Bartelt (DB Sediments GmbH)

Comment Letter #103 – Dwayne Miles

Comment Letter #104 – Francia DiMase

Comment Letter #105 – Henry Correa

Comment Letter #106 – Howard Tan

Comment Letter #107 – Jeff Nyerges

Comment Letter #108 – John Harris

Comment Letter #109 – John May

Comment Letter #110 – Jonathan Foreman

Comment Letter #111 – Lara Ramsey

Comment Letter #112 – Leigh Adams

Comment Letter #113 – Luis De La O

Comment Letter #114 – Luke A Meyer

Comment Letter #115 – Luke Meyer

Comment Letter #116 – Martyn Belmont (La Casita Foundation Board Member)

Comment Letter #117 – Maura Townley

Comment Letter #118 – Nahuel Zachary

Comment Letter #119 – Salvador Quiroz

Comment Letter #120 – Randy Strapazon

Comment Letter #121 – Richard Williams

Comment Letter #122 – Rick Yenofsky

Comment Letter #123 – Sarah Bales

Comment Letter #124 – Sarah Rodriguez

Comment Letter #125 – Sonja-Sophie Loeffler

Comment Letter #126 – Stephanie Cafiero

Comment Letter #127 – Steven Johnson

Comment Letter #128 – Susanna Dadd

Comment Letter #129 – Terrie Owen

Comment Letter #130 – Thomas Holaday

Comment Letter #131 – Thomas Joyce

Comment Letter #132 – Thomas Seelbinder

Comment Letter #133 – Tim Miranda

Comment Letter #134 – Timothy Callahan

Comment Letter #135 – William Fernandez (Network for a Healthy California)

Comment Letter #136 – D. Carl Ehlig

Comment Letter #137 – Susette Horspool (7th Principle Green Council)

Comment Letter # 138 – Hannah Petrie (Associate Minister of Neighborhood UU Church)

Comment Letter #139 – Christopher Brophy

Comment Letter #140 – Foothill Family of Water Agencies

Comment Letter #141 – Evan McDaniel (Tom Sawyer Camps Assistant Director Equestrian Division)

Comment Letter #142 – Kaitlin Spak

Comment Letter #143 – Jeffrey Heapy

Comment Letter #144 – Jose De La O

Comment Letter #145 – Karen Yenofsky

Comment Letter #146– Kristin McDaniel (Tom Sawyer Camps Assistant Program Director)

Comment Letter #147 – Mario Manzano

Comment Letter #148 – Miriam Fine

Comment Letter #149 – Philip Fitzpatrick

Comment Letter #150 – Raul Garibay

Comment Letter #151 – Thim Reed

Comment Letter #152 – Tom La Torre

Comment Letter #153 – Trevor Mutch

Comment Letter #154 – Bette Cooper (Pasadena Beautiful Foundation Past President)

Comment Letter #155 – Camron Stone

Comment Letter #156 – Ginny Heringer

Comment Letter #157 – John Fauvre

Comment Letter #158 – John Garsow

Comment Letter #159 – Laurel Beck

Comment Letter #160 – Lawren Markle

Comment Letter #161 – R. Marti

Comment Letter #162 – Teina Tuaiva

Comment Letter #163 – Thomas Owens

Comment Letter #164 – Tom Muccio

Comment Letter #165 – Altadena Heritage

Comment Letter #166 – City of Los Angeles Emergency Management Department

Comment Letter #167 – Al Cullen

Comment Letter #168 – Virginia Kimball

Comment Letter #169 – Joanne Watche

Comment Letter #170 – City of Azusa

Comment Letter #171 – California Department of Fish and Wildlife

Comment Letter #172 – Susanna Dadd & James Griffith

Comment Letter #173 – Rob

Comment Letter #174 – Dianne Patrizzi

Comment Letter #175 – Barbara Ellis

Comment Letter #176 – Christle Balvin

Comment Letter #177 – City of Pasadena

Comment Letter #178 – Cliff Towne

Comment Letter #179 – Friends of Hahamongna

Comment Letter #180 – Friends of the Los Angeles River

Comment Letter #181 – Hugh Bowles

Comment Letter #182 – Jim Saake

Comment Letter #183 – John Fauvre

Comment Letter #184 – John Fauvre

Comment Letter #185 – Judith Wright

Comment Letter #186 – Laurie Barlow

Comment Letter #187 – Linda Klibanow

Comment Letter #188 – Michele Zack

Comment Letter #189 – Pasadena Audubon Society

Comment Letter #190 – Ross Plesset

Comment Letter #191 – Santa Monica Mountains Conservancy

Comment Letter #192 – Simon Penny

Comment Letter #193 – Tracy Hirrel

Comment Letter #194 – Vivian Geiseler

Comment Letter #195 – West Pasadena Residents Association

Comment Letter #196 – Asif Ahmed

Comment Letter #197 – William Christian

Comment Letter #198 – William Weisman

Comment Letter #199 – Elizabeth Garrison

Comment Letter #200 – Erick Lankey (Tom Sawyer Camps Counselor)

Comment Letter #201 – Erik Hillard

Comment Letter #202 – Gabrielle Johnston

Comment Letter #203 – Geraldine Johnston

Comment Letter #204 – Gregg Oelker

Comment Letter #205 – Joseph Evelyn

Comment Letter #206 – Joseph Johnston

Comment Letter #207 – Marietta Kruells

Comment Letter #208 – Mark Hunter

Comment Letter #209 – Markus Klemm

Comment Letter #210 – Michael Johnston

Comment Letter #211 – Pasadena Sierra Club

Comment Letter #212 – Peter Kalmus

Comment Letter #213 – Roger Klemm & Laura Newlin

Comment Letter #214 – Ross Heckmann

Comment Letter #215 – S. Robert Snodgrass

Comment Letter #216 – Arroyo Seco Foundation

Comment Letter #217 – Bev Huntsberger

Comment Letter #218 – Dana Kennedy

Comment Letter #219 – Dave Doody

Comment Letter #220 – Edwina Travis Chin

Comment Letter #221 – Grace Wang

Comment Letter #222 – Joyce Dillard

Comment Letter #223 – Kiley Akers

Comment Letter #224 – Linda Vista - Annandale Association

Comment Letter #225 – Lisa Frazier

Comment Letter #226 – Lou Anne Insprucker

Comment Letter #227 – Mignonne Walker

Comment Letter #228 – Peter Kalmus

Comment Letter #229 – Richard and Chieko Rupp

Comment Letter #230 – South Coast Air Quality Management District

Comment Letter #231 – Susan Campisi

Comment Letter #232 – Peter Wohlgemuth

Comment Letter #233 – United States Fish and Wildlife Service

Comment Letter #234 – Darren Dowell

Comment Letter #235 – John West

Comment Letter #236 – Donna Rodriguez (La Cañada Flintridge Trails Council)

Comment Letter #237 – Lori Paul

Comment Letter #238 – Mary Beth Murrill

Comment Letter #239 – Mary Fitzpatrick

Comment Letter #240 – Patrick Phillips

Comment Letter #241 – Rebecca Latta

Comment Letter #242 – Robert Staehle

Comment Letter #243 – Sophia Hansen

Comment Letter #244 – Susan Rudnicki

Comment Letter #245 – Tim Martinez

Comment Letter #246 – Patty Sue Jones

Comment Letter #247 – Rose Bowl Riders

Comment Letter #248 – Zanja Madre

Comment Letter #249 – Hillside School and Learning Center

Comment Letter #250 – Assembly Member Mike Gatto

Comment Letter #251 – Robert Musselman

Comment #252 – Community Meetings Summaries

9.2 REQUIREMENTS FOR RESPONDING TO COMMENTS ON A DRAFT EIR

Lead agencies are required to evaluate all comments on environmental issues received on the Draft EIR and prepare a written response pursuant to CEQA Guidelines §15088. Written responses should address the environmental issue(s) raised and provide a detailed response. Rationale must be provided when specific comments or suggestions (e.g., additional mitigation measures) are not accepted. In addition, the written response must be a good faith and reasoned analysis. As long as a good faith effort at full disclosure is made in the EIR (CEQA Guidelines §15204), lead agencies need only to respond to significant environmental issues associated with the project and do not need to provide all the information requested by commenters.

CEQA Guidelines §15204 recommends that commenters provide detailed comments that focus on the sufficiency of the Draft EIR in identifying and analyzing the possible impacts on the environment and ways in which the significant effects of the project might be avoided or mitigated. CEQA Guidelines §15204 also notes that commenters should provide an explanation and evidence supporting their comments. Pursuant to CEQA Guidelines §15064, an effect shall not be considered significant in the absence of substantial evidence.

CEQA Guidelines §15088 also recommends that where the response to comments results in revisions to the Draft EIR, those revisions should be noted as a revision to the Draft EIR or in a separate section of the Final EIR. Section 8.0 Clarifications and Modifications outlines the revisions to the Draft EIR.

9.3 COMMENTS AND RESPONSE TO COMMENTS

This section excerpts those comments received that specifically pertain to the scope and content of the Draft EIR. The full text of written comment letters received by the County is included at the beginning of each response.

Devil's Gate Reservoir Sediment Removal and Management Project

COMMENT CARD

Date: 11-6-13

Name: FREDDIE HUGHLEY Address: 2874 EL NIDO OR

Email: hughley.freddie@PUSD.US City/Zip: ALTADENA 91001

Organization represented, if any: +

Comment: IS the FOREST SERVICE GOING to help with the STATION FIRE wood. CLEANING UP?

STREAM.

Comment 1-1

Please submit any comments on the proposed project today by placing this card in the comment box or send to LACFCD. **Correspondence should be postmarked by Monday, January 6, 2014.** Comments should include "Devil's Gate Reservoir Sediment Removal and Management Project" in the subject line and the name of a contact person. Comments can be submitted in the following ways:

Mail	Email	Fax
County of Los Angeles Department of Public Works Water Resources Division Reservoir Cleanouts Program P.O. Box 1460 Alhambra, CA 91802-1460	reservoircleanouts@dpw.lacounty.gov	(626) 979-5436

Response to Comment Letter #1 (Freddie Hughley)

Response to Comment 1-1:

Thank you for your input. This comment has been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. As noted in the Draft Environmental Impact Report (EIR), Section 4.10, Alternatives Considered but Not Selected for Analysis, Upstream Sediment Management was an alternative that was considered but not further analyzed as it does not meet the Proposed Project objectives and would result in greater/additional impacts than the Proposed Project. In addition, the areas upstream of Devil's Gate Reservoir, in the National Forest, are outside the jurisdiction of the Los Angeles County Flood Control District (LACFCD).

Devil's Gate Reservoir Sediment Removal and Management Project

COMMENT CARD

Date: 11/6/13

Name: EVAN A. THOMPSON Address: 88 WAPELLO ST.

Email: etchemist@earthlink.net City/Zip: ALTADENA CA 91001

Organization represented, if any: _____

Comment 2-1

Comment: I HAVE BEEN COMING TO THE GREATER OAK GROVE – HAHAMONGA AREA FOR MANY YEARS. NONE OF THE PLANS SEEM TO FOLLOW THE NATURAL CONTOURS OF THE AREA. WALKING THUR THE AREA ONE CAN SEE WHERE SEDIMENT HAS BEEN BUILT UP RECENTLY AND WHERE IT HAS BEEN MANY, MANY YEARS. WHY NOT TAKE OUT THE RECENT SEDIMENT – SAY 15 YEARS – AND LEAVE THE LONG TERM NATURE AREA?

Comment 2-2

THIS PROJECT IS BEING SOLD TO THE PUBLIC AS NEEDED BECAUSE OF THE STATION FIRE. THIS IS PURE B.S. IF THIS PROJECT IS COMPLETED IT WILL LOOK VERY DIFFERENT THAN IT LOOKED 5 years AGO OR EVEN 20 YEARS AGO. WHY NOT TAKE IT BACK 10-15 YEARS NOT 80 YEARS? THIS WILL DESTROY SO MUCH BEAUTY AND REPLACE IT WITH GRASS (WHICH WILL USUALLY BE DEAD BECAUSE OF LACK OF WATER?)

Please submit any comments on the proposed project today by placing this card in the comment box or send to LACFCD. **Correspondence should be postmarked by Monday, January 6, 2014.** Comments should include "Devil's Gate Reservoir Sediment Removal and Management Project" in the subject line and the name of a contact person. Comments can be submitted in the following ways:

Mail	Email	Fax
County of Los Angeles Department of Public Works Water Resources Division Reservoir Cleanouts Program P.O. Box 1460 Alhambra, CA 91802-1460	reservoircleanouts@dpw.lacounty.gov	(626) 979-5436

Response to Comment Letter #2 (Evan A. Thompson)

Response to Comment 2-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. While sediment has accumulated over many decades, sediment accumulation has increased dramatically over the past several years as a result of the 2009 Station Fire. The storms that occurred in the two wet seasons after the fire increased sediment accumulation in the reservoir by approximately 1,300,000 cubic yards (cy), reducing the available capacity to less than one design debris event (DDE). Alternative 3, Configuration D closely resembles the natural contours within the reservoir, affecting the least amount of habitat of all the action alternatives while still achieving Proposed Project objectives (see Section 4.6 of the Final Environmental Impact Report [EIR]). Alternative 3, Configuration D, Option 1 provides a more natural configuration to the reservoir with two branches to carry water and sediment toward the face of the dam, and it avoids disturbing a significant portion of the existing vegetation. To further address your concerns, the Los Angeles County Flood Control District (LACFCD) has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2, which drastically reduces the project's footprint of 120 acres down to 71 acres, would avoid excavation of the western branch, thereby providing a greater habitat buffer on the west side of the reservoir. In addition, the maintenance areas would be smaller than the original sediment removal footprint, allowing for habitat to reestablish and provide additional areas for wildlife movement.

Response to Comment 2-2:

The LACFCD was mandated by the State Legislature to provide flood protection and water conservation within its boundaries. A reservoir storage design capacity of two DDEs below the dam's lowest spillway was determined to be the standard acceptable level of risk at Devil's Gate Dam and Reservoir. The DDE volume of capacity is determined using the January 2006 Los Angeles County Department of Public Works (LACDPW) Hydrology Manual and the March 2006 LACDPW Sedimentation Manual. For Devil's Gate Dam and Reservoir, the required reservoir capacity is 4.0 million cy (two DDEs) below the spillway elevation of 1040.50 feet.

The Hydrology Manual (January 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_Hydrology_Manual/2006%20Hydrology%20Manual-Divided.pdf

The Sedimentation Manual (March 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_sedimentation_manual/Sedimentation%20Manual-Second%20Edition.pdf

Additional information concerning DDE calculation methods has been added to the Final EIR, Section 2.3, Project Need.

Additionally, as noted in the Draft EIR, Section 3.4, Aesthetics and Figures 3.4-1 through 3.4-3, the visual aspects of the Proposed Project site are constantly changing. The Draft EIR does note that the Proposed Project will have significant temporary impacts to aesthetics; however, after the sediment removal phase of the Proposed Project is complete, a habitat restoration plan will be implemented that will allow native plant communities to reestablish outside the reservoir management area. Riparian Herbaceous vegetation is expected to continue to populate and/or reestablish in the management area of the

Proposed Project site between maintenance activities. After the sediment removal project, ground elevations within the reservoir will be in either present or historic levels and will have exposure to flowing stormwater. The habitat restoration plan will include and address monitoring and success criteria, as required by the regulatory agencies.

My name is Bob Musselman
I live in Altadena

3935 Chapman Ct
Altadena, CA 91001

6 NOV 2013

I am an avid hiker, biker, and environmentalist. But I am also an engineer and my experience as a 27 year officer in the Navy nuclear submarine program teaches me that systems must be designed and maintained to perform their function not just in a normal environment but in the most extreme circumstances which test the maximum design parameters.

Comment 3-1

In the case of Devil's Gate that extreme design parameter is what has been called by meteorologists as an atmospheric river event which has occurred every 100 to 200 years along the California coast regularly for over a thousand years. The last event occurred about 150 years ago in 1861 causing megafloods from Sacramento to Los Angeles. This type of event was documented in a peer reviewed article in Scientific American this past January. On a probability adjusted basis, such a megaflood caused by constant rains for up to 6 weeks, poses a higher risk to infrastructure and the economy than an expected major earthquake in the next 50 years.

Comment 3-2

The most significant mitigating measure we can take against this expected event is to return the reservoir to its original function. While I understand the concern of many for the removal of trees, shrubs and animals from this 120 acre area, our leaders should be more concerned with the critical function of the dam and reservoir to protect lives and property. Simply put, this is a debris basin, and was not designed as a park and nature preserve.

Comment 3-3

Currently the dam has a capacity of less than one Design Debris Event which is a 50 year storm effect 4 years after a major fire, or about 2 million cy. This is far less than might be required for the kind of event which I have described. The original design capacity of the reservoir was something like 7 million cy; the current capacity is a fraction of that.

I can tell you that if the fighting capability of a Navy warship were to degrade unnecessarily to such a degree the captain would be fired immediately.

Comment 3-4

You will hear all kinds of arguments that the DWP has not been creative enough in finding a solution without removing leveling the intended 120 acres. I for one don't see a lot of room for creativity. It's a debris basin and we've let debris accumulate for decades. We have to remove it, not matter what might have grown on top over that time. Frankly, I would suggest returning to the original 178 acre removal plan.

I read a accusation that the DWP of complete "disregard of Nature." Let me tell you that not returning the reservoir to its original capacity would, in fact, be a higher disregard for what Nature can and will do in the future.

I know my opinion sticks in the craw of many, but I am facing the reality that the water and mud will come down those Canyons one day in the not too distant future. Unlike anything any of us have ever witnessed. We'd better be ready for it.

Comment 3-5

Recommendations

1. Remove at least 4,000,000 cy of sediment.
2. Accelerate the project to the extent possible.
3. Perform a study of flooding potential downstream of the dam in a 150 year flood (40 day "vapor river" event) in the event of a dam capacity of (a) 2,000,000 cy and (b) 4,000,000 cy. Include in final EIR.
4. Alt 3. Config D provides an unacceptably low amount of debris removal and unacceptably high risk of flooding in the Arroyo Seco.

Response to Comment Letter #3 (Bob Musselman)

Response to Comment 3-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. The Los Angeles County Flood Control District (LACFCD) was mandated by the State Legislature to provide flood protection and water conservation within its boundaries.

LACFCD acknowledges that natural events in exceedance of those considered in LACFCD design standards are possible given the power and unpredictability of nature. LACFCD's goal and responsibility are to reduce the risk posed by natural hazards; however, designing and building to protect against all extreme events for all LACFCD infrastructure is not possible.

Response to Comment 3-2:

The commenter's preference for returning the reservoir to its original function is noted. As described in the Draft EIR, Proposed Project objectives include reducing flood risk and restoring reservoir capacity for flood control and future sediment inflow events. The commenter is correct; in order to remove the necessary amount of sediment from the reservoir some vegetation must be removed, as the vegetation sits atop many layers of accumulated sediment.

Response to Comment 3-3:

The commenter is correct; a design debris event (DDE) is characterized as the estimated amount of sediment that could flow into the facility during a Capital Flood event four years after the undeveloped portion of its tributary watershed is burned, and the capacity in Devil's Gate Reservoir is less than one DDE.

A reservoir storage design capacity of two DDEs below the dam's lowest spillway was determined to be the standard acceptable level of risk at Devil's Gate Dam and Reservoir. The DDE volume of capacity is determined using the January 2006 Los Angeles County Department of Public Works (LACDPW) Hydrology Manual and the March 2006 LACDPW Sedimentation Manual. For Devil's Gate Dam and Reservoir, the required reservoir capacity is 4.0 million cubic yards (cy) (two DDEs) below the spillway elevation of 1040.50 feet.

The Hydrology Manual (January 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_Hydrology_Manual/2006%20Hydrology%20Manual-Divided.pdf

The Sedimentation Manual (March 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_sedimentation_manual/Sedimentation%20Manual-Second%20Edition.pdf

Additional information concerning DDE calculation methods has been added to the Final Environmental Impact Report (EIR), Section 2.3, Project Need.

Response to Comment 3-4:

The commenter's preference for returning the reservoir to its original capacity is noted.

Response to Comment 3-5:

The commenter's recommendations for project design are noted.

The alternatives in the Draft EIR analyzed a range of sediment removal amounts (2,425,000 cy to 4,000,000 cy), obtaining or close to obtaining two DDEs, the standard acceptable level of risk at Devil's Gate Dam and Reservoir.

As described in the Draft EIR, Proposed Project objectives include supporting dam safety by removing sediment accumulated in the reservoir in a timely manner to ensure the ability to empty the reservoir in the event of a dam safety concern. With sediment removal operations moving efficiently, it is reasonable to assume a project duration of no more than five years. It is possible that sediment removal may be achieved in under five years; however, acceleration of the removal beyond the parameters described in the Draft EIR, would be difficult to achieve due to limits associated with truck traffic and the rainy season. The Proposed Project and Alternatives 1, 2, 3, and 5 reflect the maximum efficiencies of removal that are reasonably possible.

See Response to Comment 3-3 regarding determination of acceptable reservoir storage capacity.

LACFCD notes the commenter's preference for the Proposed Project

Devil's Gate Reservoir Sediment Removal and Management Project

COMMENT CARD

Date: 11-6-13

Name: Erika Bennett Address: 19735 s Ferris Pl, Rancho Dominguez

Email: erikab@hs-i.com City/Zip: 90220

Organization represented, if any: TTSI

Comment: regarding the air quality - for the trucking portion of the project are near zero or zero emission trucks being considered?

Comment 4-1

Please submit any comments on the proposed project today by placing this card in the comment box or send to LACFCD. **Correspondence should be postmarked by Monday, January 6, 2014.** Comments should include "Devil's Gate Reservoir Sediment Removal and Management Project" in the subject line and the name of a contact person. Comments can be submitted in the following ways:

Mail	Email	Fax
County of Los Angeles Department of Public Works Water Resources Division Reservoir Cleanouts Program P.O. Box 1460 Alhambra, CA 91802-1460	reservoircleanouts@dpw.lacounty.gov	(626) 979-5436

Response to Comment Letter #4 (Erika Bennett - TTSI)

Response to Comment 4-1:

Thank you for your input. The comment has been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. Lower emission trucks were considered for the Proposed Project; however, the availability of these trucks could not be guaranteed at the time the Draft Environmental Impact Report (EIR) was written. Air quality impacts associated with truck traffic were analyzed in the Draft EIR in Section 3.5. Los Angeles County Flood Control District has conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed the U.S. Environmental Protection Agency's (EPA's) 2007 standards for emissions. Therefore, in order to further reduce emissions, Mitigation Measure MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump trucks that meet or exceed EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality will be reduced to less than significant.

Comment Letter #5

Devil's Gate Reservoir Sediment Removal and Management Project

COMMENT CARD

Date: 11/5/13

Name: LOYD KATTRO Address: 5619 N. FIGUEROA

Email: LOYD.KATTRO@GMAIL.COM City/Zip: LA

Organization represented, if any: ~~LACMTA~~ LIGHTART CONSULTING

Comment: REMOVAL OF THIS MUCH WEIGHT IN A SHORT PERIOD OF TIME WILL INCREASE THE CHANCE OF THE FAULT AT THE NORTHERN END OF DEVILS GATE RESERVOIR. THE MAGNITUDE DISCUSSED 6.3 IS FOR THE RAYMOND FAULT NOT THE SUNLAND-TUJUNGA SECTION OF THE FAULT, IS CAPABLE OF PRODUCING A 7.3 MAGNITUDE QUAKE

Comment 5-1

Removal of this much weight in a short period of time will increase the chance of a fault rupture at the northern end of the Devil's Gate Reservoir. The ~~magnitude~~ nearest fault line discussed in the EIR is not the closest. The Sunland Tujunga Fault travels through the northern end of the reservoir, the anticipated magnitude is a 7.3 event. These faults are shown on the Los Angeles County fault maps. The sediment should be available for use by the Army Corps of Engineers for the restoration of the Arroyo Seco.

(Raymond Fault)

Comment 5-2

Comment 5-3

Comment 5-4

Please submit any comments on the proposed project today by placing this card in the comment box or send to LACFCD. **Correspondence should be postmarked by Monday, January 6, 2014.** Comments should include "Devil's Gate Reservoir Sediment Removal and Management Project" in the subject line and the name of a contact person. Comments can be submitted in the following ways:

Mail	Email	Fax
County of Los Angeles Department of Public Works Water Resources Division Reservoir Cleanouts Program P.O. Box 1460 Alhambra, CA 91802-1460	reservoircleanouts@dpw.lacounty.gov	(626) 979-5436

Response to Comment Letter #5 (Loyd Kattro – Light Art Consulting)

Response to Comment 5-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. The comment was rewritten below for readability purposes per the direction of the commenter. See Response to Comments 5-2, 5-3, and 5-4, below.

Response to Comment 5-2:

Earthquakes tend to initiate in the earth's crust many miles below the ground surface. Given the relatively low weight of the sediment at the ground surface that will be removed and the rate at which it will be removed, it is extremely unlikely that such gradual change in weight could influence stress patterns at depths sufficient to cause fault rupture and earthquakes.

Response to Comment 5-3:

Faulting was discussed in the Geotechnical Report (Appendix F of the Draft Environmental Impact Report [EIR]). In that report (Section 4.0 Geologic-Seismic Hazards, Section 4.1, Faulting), it is noted that the Raymond Hills Fault is the closest active fault to the reservoir that the State of California includes in an Alquist-Priolo Earthquake Fault Zone. The report then notes that the Tujunga Fault (referred to in the comment as the "*Sunland Tujunga Fault*") transects the inlet at the north margin of the reservoir. The commenter is correct that both of these faults are shown on maps included in the Seismic Safety Element of the Los Angeles County General Plan. Both of these faults were evaluated in the Geotechnical Report.

Although the commenter refers to the fault that extends through the northern margin of the Proposed Project site as the *"Sunland-Tujunga"* Fault, this is one of many names used for this fault in the geologic literature. The Geotechnical Report refers to the fault as the "*Tujunga Fault,*" which is a segment of the larger Sierra Madre Fault that constitutes a portion of the frontal fault system of the southern margin of the Transverse Ranges Geomorphic Province in this area. For the analysis of the strong ground motion that could be induced at the site as a result of a regional earthquake, a probabilistic seismic hazard analysis was performed using the 2008 National Seismic Hazard Mapping Project's Probabilistic Seismic Hazard Assessment Interactive Deaggregation web site (see: http://geohazards.usgs.gov/deaggint/2008/). The Sierra Madre Fault was included in the program's database as "*Sierra Madre Connected*" to reflect the fact that the Sierra Madre Fault consists of various fault segments that could all rupture at the same time. The magnitude range that was assigned to the "*Sierra Madre Connected*" entry was 6.5 to 7.3 (see: http://geohazards.usgs.gov/cfusion/hazfaults_search/disp_hf_info.cfm?cfault_id=105b_g). The Geotechnical Report also concludes that the maximum magnitude earthquake that could be produced by the Sierra Madre Fault (referred to as the *"Sunland-Tujunga"* Fault in the comment) is 7.3.

As discussed in the Draft EIR (Section 3.8, Geology and Soils, Section 3.8.1, Introduction, second paragraph), in the Initial Study (Appendix A), impacts associated with Alquist-Priolo Earthquake Fault Zoning and seismic ground shaking were found to have no impact and thus are not discussed within the EIR.

Response to Comment 5-4:

The sediment that came into Devil's Gate Reservoir following the Station Fire has a very fine gradation or consistency. As such, the majority of this material is not readily reusable on a commercial scale and will most likely not be sold; however, sediment placed at sediment placement sites would be available for potential reuse for other projects or sediment reuse opportunities. The sediment removed from the Devil's Gate Reservoir will be transported to the existing placement sites listed in the Draft EIR in Section 2.0, Project Description.

For further information regarding beneficial uses for sediment at the Los Angeles County Flood Control District (LACFCD) sites, please refer to Section 6.5 of LACFCD's 2012 Sediment Management Strategic Plan which can be found at: http://dpw.lacounty.gov/lacfcd/sediment/stplan.aspx.

Devil's Gate Reservoir Sediment Removal and Management Project

COMMENT CARD

Date: 1-6-13

Name: Pam Dong Address: 1205 Orange Grove Ave

Email: pcdong@prodigy.net City/Zip: S. Pas, 91030

Organization represented, if any: Pas. Audubon.

Comment: Why not get rid of the dam and let the arroyo flow naturally to "sluice" the sediment?

Comment 6-1

Please submit any comments on the proposed project today by placing this card in the comment box or send to LACFCD. **Correspondence should be postmarked by Monday, January 6, 2014.** Comments should include "Devil's Gate Reservoir Sediment Removal and Management Project" in the subject line and the name of a contact person. Comments can be submitted in the following ways:

Mail	Email	Fax
County of Los Angeles Department of Public Works Water Resources Division Reservoir Cleanouts Program P.O. Box 1460 Alhambra, CA 91802-1460	reservoircleanouts@dpw.lacounty.gov	(626) 979-5436

Response to Comment Letter #6 (Pam Dong – Pasadena Audubon Society Member)

Response to Comment 6-1:

Thank you for your input. The comment has been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. As discussed in Section 4.10.3 of the Draft Environmental Impact Report (EIR), removal of the Devil's Gate Dam was considered but rejected due to its inconsistency with Proposed Project objectives, as well as the potential safety concerns. This alternative would fail to meet the Proposed Project objectives and would result in greater additional impacts than the Proposed Project (geology, hazards, hydrology, and public services).

The scope of the Proposed Project is to restore capacity for Devil's Gate Reservoir. Removing the dam would remove the only flood attenuation mechanism that is in place along the Arroyo Seco. Areas downstream of the dam would be at high risk of flooding during storm events. Also, sediment would move downstream and accumulate within and adjacent to the channel due to the removal of the dam. Sediment accumulation in the channel would reduce the capacity of the channel in those areas and would further increase the likelihood of flooding. Additionally, flood control operations for the Los Angeles River rely on peak flow attenuations from Devil's Gate Dam.

Devil's Gate Reservoir Sediment Removal and Management Project

COMMENT CARD

Date: 11/6/13

Name: Wilbur Dong Address: 1205 Orange Grove Ave

Email: pcdong@prodigy.net City/Zip: South Pasadena, CA 91030

Organization represented, if any: Member of Pasadena Audubon

Comment: Could you post on-line and notify the public of the hydrology study that was used to determine the capacity needed and therefore the amount of debris removal.

Comment 7-1

Thank You

Please submit any comments on the proposed project today by placing this card in the comment box or send to LACFCD. **Correspondence should be postmarked by Monday, January 6, 2014.** Comments should include "Devil's Gate Reservoir Sediment Removal and Management Project" in the subject line and the name of a contact person. Comments can be submitted in the following ways:

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Response to Comment Letter #7 (Wilbur Dong – Pasadena Audubon Society Member)

Response to Comment 7-1:

Thank you for your input. The comment has been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. As described below, the methodology used to determine the required capacity for the Devil's Gate Dam and Reservoir is posted on the Los Angeles County Department of Public Works (LACDPW) website.

The Los Angeles County Flood Control District (LACFCD) was mandated by the State Legislature to provide flood protection and water conservation within its boundaries. A reservoir storage design capacity of two design debris events (DDEs) below the dam's lowest spillway was determined to be the standard acceptable level of risk at Devil's Gate Dam and Reservoir. The DDE volume of capacity is determined using the January 2006 LACDPW Hydrology Manual and the March 2006 LACDPW Sedimentation Manual. For Devil's Gate Dam and Reservoir, the required reservoir capacity is 4.0 million cubic yards (cy) (two DDEs) below the spillway elevation of 1040.50 feet.

The Hydrology Manual (January 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_Hydrology_Manual/2006%20Hydrology%20Manual-Divided.pdf

The Sedimentation Manual (March 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_sedimentation_manual/Sedimentation%20Manual-Second%20Edition.pdf

Additional information concerning DDE calculation methods has been added to the Final EIR, Section 2.3, Project Need.

Comment Letter #8

Devil's Gate Reservoir Sediment Removal and Management Project

COMMENT CARD

Date: NOV 6

Name: CHRISTIE BALDWIN Address: 695 S. CATALINA AVE

Email: GOBALDWIN@GMAIL.COM City/Zip: CA. 91106

Organization represented, if any: SEVERAL

Comment 8-1

NO ONE DISAGREES WITH NEED TO REMOVE SEDIMENT, THE PROBLEM IS AMOUNT BEING REMOVED AT ONE TIME & HOW IT IS REMOVED.

Comment: 1) A FEW PRINTED DEIR DOCUMENTS SHOULD BE MADE AVAILABLE TO ORGANIZATIONS KNOWN TO CITY OF PAS FOR LONG INVOLVEMENT WITH DEVILS GATE / ARCADIA ISN'T GETTING PUBLIC INVOLVEMENT THE PURPOSE OF WHOLE EIR PROCESS SO SPEND SOME $ ON NON-PDF DOCS TO FACILITATE COMMENTS. COMMUNITY MEMBERS RUNNING OFF 600 pages FOR DISCUSSION AT MEETINGS IS NOT ALWAYS POSSIBLE & PUTS COST ON GROUPS BEST QUALIFIED TO INTELLIGENTLY COMMENT.

Comment 8-2

2) IN PREVIOUS SCOPING MEETINGS, A KEY COMMENT WAS NEED FOR LONG RANGE PLAN & POSSIBILITY OF COMMITTEE WITH OUTSIDE EXPERTS ASSISTING COUNTY. THIS & IMPORTANT OTHER COMMENTS BY PUBLIC WERE IGNORED.

Comment 8-3

3) GRADUAL WINTER-TIME SLUICING HAS REPEATEDLY BEEN RECOMMENDED IN EARLIER SCOPING SESSIONS BUT WITH A CAVEAT -- THERE WOULD BE A DOWNSTREAM DIVERSION WHERE SEDIMENT COULD BE REFINED OR SEPARATED (POSSIBLY NEAR CORNFIELD) WHERE IT COULD BE SENT BY RAIL TO VALCAN PITS OR MADE AVAILABLE TO BEACH CITIES ~~A LONG RANGE, COMPREHENSIVE PLAN WOULD/COULD DEAL WITH THIS~~

Comment 8-4

4) WE ARE NOW LEARNING HOW DUST TRAVELS. HAS THIS PROJECT, WHICH DEMANDS HUGE AMOUNTS OF SEDIMENT REMOVAL TRAVELING BY TRUCKS, BEEN CAREFULLY MONITORED OR REVIEWED FOR AIR QUALITY CONCERNS. DAVID DINER'S SATELITE AIR MONITORING PROJECT MIGHT ASSIST WITH THIS AT JPL OR DINER AVAILABLE AT (818) 354-6379 OVER AT JPL + AEROSOL & CLOUD SCIENCE

Comment 8-5

Please submit any comments on the proposed project today by placing this card in the comment box or send to LACFCD. **Correspondence should be postmarked by Monday, January 6, 2014.** Comments should include "Devil's Gate Reservoir Sediment Removal and Management Project" in the subject line and the name of a contact person. Comments can be submitted in the following ways:

1) Mail

County of Los Angeles
Department of Public Works
Water Resources Division
Reservoir Cleanouts Program
P.O. Box 1460
Alhambra, CA 91802-1460

2) Email

reservoircleanouts@dpw.lacounty.gov

3) Fax

(626) 979-5436

4) AT PUBLIC MEETINGS

Comment 8-6

5) IS IT POSSIBLE TO BASE THIS PROJECT ON ONE DDE + REMOVE LESS SEDIMENT + MORE SLUICING TO A DOWNSTREAM DIVERSION/TREATMENT/REMOVAL AREA

Response to Comment Letter #8 (Christle Balvin)

Response to Comment 8-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. Various amounts of sediment and methods of removal were analyzed under the Alternatives Analysis of the Draft Environmental Impact Report (EIR) (see Chapter 4 of the Draft EIR).

Response to Comment 8-2:

Hard Copies of the Draft EIR were made available at several locations listed in the Draft EIR, including public libraries and the Los Angeles County Department of Public Works (LACDPW) headquarters, in compliance with Section 15087(g) of the California Environmental Quality Act (CEQA) Guidelines. Printed copies were made available for purchase at the LACDPW headquarters. In addition, the Draft EIR was posted on the Los Angeles County Flood Control District (LACFCD) website, and free copies of the Draft EIR on CD were available upon request.

Response to Comment 8-3:

The Draft EIR analyzes long range maintenance of the reservoir under the Reservoir Maintenance phase of the Proposed Project and Alternatives. Outside experts in the community, especially those on the Stakeholder Task Force, were consulted during the formation of the LACFCD's Sediment Management Strategic Plan. Information from that consultation was used in the formulation of the Proposed Project and Alternatives. In addition, the purpose of the scoping process was to gather input from outside experts and agencies as well as the public on what the environmental analysis should consider and what alternatives should be analyzed. Information gathered from the scoping process was used in the formulation of the Proposed Project and Alternatives and preparation of the Draft EIR.

Response to Comment 8-4:

Sluicing was analyzed as part of the Draft EIR in the Alternatives Analysis, Section 4.7, Alternative 4 Sluicing Method. This alternative would involve use of construction equipment and the removal of trees and vegetation over the same footprint as the Proposed Project. The sluicing alternative would potentially have additional significant impacts in comparison to the Proposed Project. Many of these impacts would be associated with the likelihood that large amounts of sediment would not be fully transported through the flood control system; this sediment would need to be mechanically removed and trucked out from numerous downstream locations. Please see Section 4.7 and Appendix K of the Draft EIR for further analysis.

As demonstrated in Section 4.7 and Appendix K of the Draft EIR, it is likely that sediment loads will fall out rapidly after leaving Devil's Gate Reservoir. As such, this sediment could not be diverted adjacent to a railroad yard or any other single convenient location downstream. Therefore, the commenter's suggested alternative would not be feasible and would not reduce impacts or achieve Proposed Project objectives.

Response to Comment 8-5:

Dust impacts from the Proposed Project were carefully evaluated as discussed in the Draft EIR, Section 3.5.6, Impacts and Mitigation, AIR QUALITY-2, Sediment Removal. The Proposed Project's activities, including excavation, grading, material loading, and hauling, would result in less than significant dust emissions due to the project's use of best management practices (BMPs) and would be in full compliance with South Coast Air Quality Management District's (SCAQMD's) fugitive dust regulations.

Response to Comment 8-6:

The LACFCD was mandated by the State Legislature to provide flood protection and water conservation within its boundaries.

A reservoir storage design capacity of two design debris events (DDEs) below the dam's lowest spillway was determined to be the standard acceptable level of risk at Devil's Gate Dam and Reservoir. The DDE volume of capacity is determined using the January 2006 LACDPW Hydrology Manual and the March 2006 LACDPW Sedimentation Manual. For Devil's Gate Dam and Reservoir, the required reservoir capacity is 4.0 million cubic yards (cy) (two DDEs) below the spillway elevation of 1040.50 feet.

The Hydrology Manual (January 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_Hydrology_Manual/2006%20Hydrology%20Manual-Divided.pdf

The Sedimentation Manual (March 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_sedimentation_manual/Sedimentation%20Manual-Second%20Edition.pdf

Additional information concerning DDE calculation methods has been added to the Final EIR, Section 2.3, Project Need.

See Response to Comment 8-4 regarding sluicing and downstream removal.

Devil's Gate Reservoir Sediment Removal and Management Project

COMMENT CARD

Date: _____

Name: Annette Perry Address: 1493 Sierra Dr

Email: lolanicole@gmail.com City/Zip: Pasadena, CA 91103

Organization represented, if any: Resident

Comment 9-1: 1) Study did not address truck traffic with construction of new JPL Garage construction impacts

Comment 9-2: 2) Rose Bowl possible NFL (N)-GR increase in volume attendance.

Comment 9-3: 3) A phasing of any alternative should be studied addressed so as not to need to do it all at once. Give the area a "break" from noise/truck/pollution etc. It does not all need to be achieved at once.

Comment 9-4: 4) Scholl Canyon Routes - service impacts on Glendale, Pasadena, LA trash collection Garbage pick ups due to traffic delays, O.T hours pick up delays loss in revenue working schedules, etc.

Comment 9-5: 5) One water truck not enough, not enough mitigation on dust. Some soil and efforts have poisonous effects, air quality can have better mitigation measures

Please submit any comments on the proposed project today by placing this card in the comment box or send to LACFCD. **Correspondence should be postmarked by Monday, January 6, 2014.** Comments should include "Devil's Gate Reservoir Sediment Removal and Management Project" in the subject line and the name of a contact person. Comments can be submitted in the following ways:

Mail	Email	Fax
County of Los Angeles Department of Public Works Water Resources Division Reservoir Cleanouts Program P.O. Box 1460 Alhambra, CA 91802-1460	reservoircleanouts@dpw.lacounty.gov	(626) 979-5436

Devil's Gate Reservoir Sediment Removal and Management Project

COMMENT CARD

Date: _____

Name: Anette Remy Address: _____

Email: _____ City/Zip: _____

Organization represented, if any: Resident

Comment: (Continued)

Comment 9-6: 6) Annendale Golf Course → (Different from Rose Bowl Course) - "dusting" due to debris dust, affect on greens, golf membership, revenue losses / track passing by near Scholl Canyon.

Comment 9-7: 7) Rose Bowl Golf Course same as above

Comment 9-8: 8) Schools buses, pick up's, parent drop off's affecting schedules of teachers, parents fire trucks, ambulances etc. attending schools.

Comment 9-9: 9) Asthma students who recreate outdoors, and non asthma because Phys Ed is a requirement. Affect on schools to have to change Phys Ed implementation. → Phys Ed is requirement in school, Not an elective.

Comment 9-10: 10) Affect on horses stalled nearby

Please submit any comments on the proposed project today by placing this card in the comment box or send to LACFCD. **Correspondence should be postmarked by Monday, January 6, 2014.** Comments should include "Devil's Gate Reservoir Sediment Removal and Management Project" in the subject line and the name of a contact person. Comments can be submitted in the following ways:

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2/4

Devil's Gate Reservoir Sediment Removal and Management Project

COMMENT CARD

Date: _____

Name: Annette Perry Address: _____

Email: _____ City/Zip: _____

Organization represented, if any: Resident

Comment 9-11 Comment: 11) Impact on home values during construction, potential losses in listing sales etc.

Comment 9-12 12) Air quality affect of any hazardous/poisonous release in air to create cancer in the area

Comment 9-13 13) study on such contamination in soil that when released in air not to create a disease to resident

Comment 9-14 14) Since you already did emergency removal, why is such an amount even necessary, why was a reduced amount to double the emergency removal not studied?

Comment 9-15 15) What is the affect on Lope Like Super Antonovich requested the study in a meeting - you doubled in your study what was requested by Antonovich - why?

Please submit any comments on the proposed project today by placing this card in the comment box or send to LACFCD. **Correspondence should be postmarked by Monday, January 6, 2014.** Comments should include "Devil's Gate Reservoir Sediment Removal and Management Project" in the subject line and the name of a contact person. Comments can be submitted in the following ways:

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3/4

Devil's Gate Reservoir Sediment Removal and Management Project

COMMENT CARD

Date: _____

Name: Amelie Peny Address: _____

Email: _____ City/Zip: _____

Organization represented, if any: Resident

Comment: 16) Truck trips 50 both ways 50 inbound, 50 outbound - totals 100 trucks per hour! plus construction traffic of JRL Garage

Not necessary to do all at once phase Project.

Comment 9-16

17) EIR, expansion, construction, other studies as related to 710 tunnel, 710 extension of 210 to 710 Route. Affect of trucking/traffic etc ~~on~~ if 710 alternatives moves each 5 of forward. alternates to be talked about. tolls affect from the 710.

Comment 9-17

~~18~~)

18) Mitigation measures after completion weren't upheld by county by last management plan, what plan in place to ensure it happens this time?

Comment 9-18

Please submit any comments on the proposed project today by placing this card in the comment box or send to LACFCD. **Correspondence should be postmarked by Monday, January 6, 2014.** Comments should include "Devil's Gate Reservoir Sediment Removal and Management Project" in the subject line and the name of a contact person. Comments can be submitted in the following ways:

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4/4

Response to Comment Letter #9 (Annette Peny)

Response to Comment 9-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. The Jet Propulsion Laboratory (JPL) Parking Structure was analyzed as a cumulative project in the Draft Environmental Impact Report (EIR), as noted in Section 2.9, Cumulative Scenario, and in the Traffic Study, as noted in Section 4, Project Conditions-Year 2014, Project Trip Growth. In addition, the JPL Parking Structure project is currently under construction and will likely be completed prior to the start of the Proposed Project. Therefore, construction traffic from these two projects will not overlap.

Response to Comment 9-2:

The temporary use of the Rose Bowl by a National Football League (NFL) team was analyzed as a cumulative project in the Draft EIR, as noted in Section 2.9, Cumulative Scenario, and in the Traffic Study, as noted in Section 4, Project Conditions-Year 2014, Project Trip Growth.

Response to Comment 9-3:

Although the sediment removal phase of the Proposed Project will occur over a five-year period, the removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays), as described in the Draft EIR, Section 2.5.1, Sediment Removal Phase, Project Schedule. This approach supports dam safety to remove sediment accumulated in the reservoir in a timely manner to ensure the ability to empty the reservoir in the event of a dam safety concern. Also, prolonged periods of high sediment levels in the reservoir increase the potential risk for downstream flooding. With sediment removal operations moving efficiently, it is reasonable to assume a project duration of no more than five years. Extending the project any further would prolong the flood risk to downstream communities and increase the construction impacts to the surrounding communities.

Response to Comment 9-4:

The Traffic Study took all current traffic, including trips to Scholl Canyon Landfill, into account. As discussed in the Draft EIR, Section 3.16.6, the Proposed Project's contribution to traffic in the Scholl Canyon Landfill area would result in a significant impact to the Figueroa Street/Scholl Canyon Road and State Route (SR)-134 westbound ramps intersection during the AM and PM peak hours. However, this impact would occur for only a few weeks during the first year of sediment removal and for only one week during subsequent years. While the speed of movement through this intersection would be temporarily reduced, traffic would not be restricted or prevented from accessing Scholl Canyon Road. In addition, this impact occurs only during the AM and PM peak hours. Trucking to the Scholl Canyon Landfill is not limited to these time periods. No significant impacts are expected during the MID-DAY peak period. Due the short time period that the Proposed Project would increase traffic at this intersection, any impacts to trash collection would be very limited and short-term. Also, this impact occurs with the full rate of 50 trucks an hour directed to Scholl Canyon. In practice, hauling rates and routes may be adjusted to help reduce impacts depending on operational need.

Response to Comment 9-5:

As discussed in the Draft EIR, Section 3.10.6, Impacts and Mitigation, HAZARDS-1, Sediment Removal/Reservoir Management, no hazardous levels of the contaminants were detected in the sediment.

Dust impacts from the Proposed Project were carefully evaluated as discussed in the Draft EIR, Section 3.5.6, Impacts and Mitigation, AIR QUALITY-2, Sediment Removal. The Proposed Project's activities including excavation, grading, material loading, and hauling, would result in less than significant dust emissions due to the project's use of best management practices and would be in full compliance with South Coast Air Quality Management District's (SCAQMD's) fugitive dust regulations.

Response to Comment 9-6:

See Response to Comment 9-5.

Response to Comment 9-7:

See Response to Comment 9-5.

Response to Comment 9-8:

Potential impacts due to the Proposed Project's truck trips were analyzed in the Draft EIR, Section 3.16, Transportation and Traffic. As listed in that section, a single intersection in the immediate vicinity of the Project Site will have a potentially significant impact. In practice, hauling rates and routes may be adjusted to help reduce impacts depending on operational need. In addition, the Proposed Project will not block access to any roadways, and impacts related to emergency access would be less than significant. Los Angeles County Flood Control District (LACFCD) will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the project site.

Response to Comment 9-9:

Air quality impacts associated with truck traffic were analyzed in the Draft EIR in Section 3.5. LACFCD has conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed the United States (U.S.) Environmental Protection Agency's (EPA's) 2007 standards for emissions. Therefore, in order to further reduce emissions, MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump trucks that meet or exceed EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality including those associated with health effects to sensitive uses, will be reduced to less than significant.

Response to Comment 9-10:

Potential effects to horses stalled near the Proposed Project site would be similar to the construction-related impacts from emissions and noise associated with sediment removal to nearby residents and recreational users of Hahamongna Watershed Park. See Response to Comment 9-9. As discussed in

Section 3.14 of the Draft EIR, implementation of the Mitigation Measures would reduce noise impacts to a level of less than significant. It should be noted that construction activities would be temporary and are expected to occur only in the drier months (April to December, excluding holidays); so the maximum construction noise impacts to the horse riding facilities would be much shorter than the five-year duration of the sediment removal phase of the Proposed Project.

Response to Comment 9-11:

Comment Noted.

Response to Comment 9-12:

See Response to Comments 9-5 and 9-9. As discussed in the Draft EIR, Section 3.5, the Health Risk Assessment (HRA) found the Proposed Project would result in less than significant impacts for both the cancer-related and non-cancer-related impacts.

Response to Comment 9-13:

See Response to Comments 9-5, 9-9, and 9-12.

Response to Comment 9-14:

LACFCD was mandated by the State Legislature to provide flood protection and water conservation within its boundaries.

A reservoir storage design capacity of two design debris events (DDEs) below the dam's lowest spillway was determined to be the standard acceptable level of risk at Devil's Gate Dam and Reservoir. The DDE volume of capacity is determined using the January 2006 Los Angeles County Department of Public Works (LACDPW) Hydrology Manual and the March 2006 LACDPW Sedimentation Manual. For Devil's Gate Dam and Reservoir, the required reservoir capacity is 4.0 million cubic yards (cy) (two DDEs) below the spillway elevation of 1040.50 feet.

The Hydrology Manual (January 2006) can be viewed here:
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The Sedimentation Manual (March 2006) can be viewed here:
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Additional information concerning DDE calculation methods has been added to the Final EIR, Section 2.3, Project Need.

Additional information concerning DDE determination methods has been added to the Final EIR, Section 2.3, Project Need and the Sedimentation Manual (March 2006) can be viewed here:

http://dpw.lacounty.gov/wrd/publication/engineering/2006_sedimentation_manual/Sedimentation%20Manual-Second%20Edition.pdf

In 2010, in response to the Station Fire, an emergency project to remove only 1.67 million cy was proposed. The volume of 1.67 million cy is the previously published DDE and this amount was considered justifiable as an emergency exemption to the CEQA. This emergency project was not completed because, in March 2011, the County of Los Angeles Board of Supervisors motioned LACFCD to complete an EIR for a comprehensive sediment removal project at Devil's Gate. LACFCD then initiated project development in accordance with the required level of protection of two DDE's. At that time, LACFCD also began receiving feedback on the concurrent Sediment Management Strategic Plan (Strategic Plan) and the interest to look at more sustainable sediment and reservoir management. As a result of the feedback and recommendations during the development of the Strategic Plan, LACFCD began evaluating ways to create a more sustainable long-term way to manage its sediment and habitat. To emphasize the goals of the project, the Proposed Project was given the name Devil's Gate Sediment Removal and Management Project. Knowing that the EIR would take a considerable amount of time to complete, the County of Los Angeles Board of Supervisors also motioned for an Interim Measures Project to be implemented in order to help reduce the flood risk downstream of the dam until the ultimate sediment removal project commenced.

Response to Comment 9-15:

See Response to Comment 9-14.

Response to Comment 9-16:

See Response to Comments 9-1, 9-2, and 9-3. The Traffic Study considered the effects of the Proposed Project including approximately 50 round trips per truck per hour, as well as cumulative effects from other area projects that will be occurring concurrently. Potential impacts due to the Proposed Project's truck trips were analyzed in the Draft EIR, Section 3.16, Transportation and Traffic. As listed in that section, a single intersection in the immediate vicinity of the Proposed Project Site will have a potentially significant impact. In practice, hauling rates and routes may be adjusted to help reduce impacts depending on operational need. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the Proposed Project Site.

It should be noted that construction activities would be temporary and are expected to occur only in the drier months (April to December, excluding holidays).

Response to Comment 9-17:

The Draft EIR contained a cumulative impact analysis within each of the subsections of Section 3.0 Environmental Analysis. The cumulative analysis contains projects as determined by LACFCD and the surrounding cities and communities to have a potential cumulative effect due to overlapping time frames of the projects. Potential projects that were determined to be outside the area of influence, sediment-removal phase of the project schedule, or lacking sufficient project detail, were not considered to be reasonable foreseeable probable future projects, as set forth in the CEQA Guidelines Section 15130.

The Interstate 710 (I-710) project was not included in the Draft EIR as a cumulative project, as it was determined to be outside the area of influence. A cumulative growth factor was used in the Traffic Study that accounted for future traffic growth and its cumulative effects. The Devil's Gate Reservoir Sediment Removal and Management Project sediment removal phase is scheduled to be completed by 2020, prior

to the initiation of the I-710 tunnel project. At this time the I-710 Extension/Tunnel project is in the preliminary phases and a project schedule has not been established (Caltrans 2010). The growth factor considered in the analysis provided a conservative project condition volume that accounts for expansion and regional growth.

Response to Comment 9-18:

With the certification of the Final EIR, a Mitigation, Monitoring, and Reporting Plan (MMRP) will be submitted which will detail the terms of compliance with the mitigation measures. The MMRP will include the following information for each mitigation measure:

- the phase of the project during which the required mitigation measure must be implemented
- the phase of the project during which the required mitigation measure must be monitored
- the party responsible for carrying out the mitigation measure
- the party responsible for monitoring the implementation of the mitigation measure

The MMRP also includes a checklist to be used during the mitigation monitoring period. The checklist will verify the name of the monitor(s), the date of the monitoring activity, and any related remarks for each mitigation measure. This checklist will be available for review at the LACDPW headquarters.

Devil's Gate Reservoir Sediment Removal and Management Project

COMMENT CARD

Date: 11-6-13

Name: ELIZABETH BOUR Address: 328 E. CALAVERAS ST.

Email: bourel City/Zip: ALTADENA CA 91001

Organization represented, if any:

Comment 10-1: AREAS OF IMPACT THAT ARE ~~NOT~~ UNDERSTATED. INCLUDE BIOLOGICAL RESOURCES AND NOISE. THERE ARE NUMEROUS SPECIES - SOME OF WHICH ARE PROTECTED THAT WILL PERMANENTLY ILLIMINATED FROM THE REGION. THIS AREA IS ALSO A WILDLIFE CORRIDOR AND THERE ARE NO MITIGATIONS MEASURES FOR COYOTES, BOBCATS, BEAR, HERON AND EGRETS

Comment 10-2: TRAFFIC MITIGATION IS STATED AS SIGNIFICANT AND UNAVOIDABLE. WHAT IS NOT ADDRESSED IS ALL THE CARS THAT WILL EXT THE 210 FREEWAY AND DRIVE THROUGH NEIGHBOITOODS TO AVOID THE TUNNELS WITICH ARE SEVERLY CLOGGED NOW AND WILL BE UNUSEABLE DURING THE PROJECT.

Comment 10-3: NOISE WILL BE INTOLERABLE FOR THE RESIDENTS NEAR THE INBOUND SLIP LANE AND THEIR ARE NO MITIGATION MEASURES.

Please submit any comments on the proposed project today by placing this card in the comment box or send to LACFCD. **Correspondence should be postmarked by Monday, January 6, 2014.** Comments should include "Devil's Gate Reservoir Sediment Removal and Management Project" in the subject line and the name of a contact person. Comments can be submitted in the following ways:

Mail	Email	Fax
County of Los Angeles Department of Public Works Water Resources Division Reservoir Cleanouts Program P.O. Box 1460 Alhambra, CA 91802-1460	reservoircleanouts@dpw.lacounty.gov	(626) 979-5436

Response to Comment Letter #10 (Elizabeth Bour)

Response to Comment 10-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. As discussed in Section 3.6.6 of the Draft Environmental Impact Report (EIR), Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats. These measures will also serve to protect and reduce any impacts to all other wildlife, including coyotes, bobcats, heron, egrets, and bear. Sediment removal activities would not completely block the Proposed Project site from surrounding habitat, would occur only during the day, and would not interfere with night time wildlife activity. Although some wildlife may be temporarily displaced during construction, wildlife would not be physically prevented from moving around and into the basin area. Wildlife species currently found in the Proposed Project area would be expected to either remain in the undisturbed areas of the reservoir outside the Proposed Project area or to reestablish once sediment removal activities have been completed.

Response to Comment 10-2:

As shown in the Draft EIR, Section 3.16, the traffic volumes on Interstate-210 (I-210), the on/off ramps, and the local roadways within the Proposed Project area included those potentially impacted by the Proposed Project. The analysis provided a conservative project condition volume that accounts for expansion and regional growth within the Proposed Project area. These volumes account for redistribution of traffic.

Response to Comment 10-3:

The Draft EIR, Section 3.14.6, Sediment Removal/Reservoir Management, Offsite Vehicular Noise, analyzed the noise impacts from the haul trucks. The analysis found that the maximum noise increase on the roads in the immediate vicinity of the Devil's Gate Dam and Reservoir area would be a one decibel (dB) increase on Berkshire Place east of the I-210 northbound ramps. A one dB increase is well below the three dB increase threshold of perception. The roadway noise impact analysis provided in the Draft EIR found that the Proposed Project would result in less than significant impacts for all analyzed alternatives.

Montrose, CA 91020 11.13.13

Dear County Board,

Comment Letter #11

Comment 11-1

My name is Dessi Sieburth, and I am 11 years old. I have been with the Pasadena Audubon Society for 3 years. I like to watch birds, especially in Hahamongo Watershed Park, and I have seen over 60 speeres of birds in Hahamonga. I also try to conserve the birds habitat. I am here to speak against the sediment removal project of LA County. If we removed the sediment, over 60 speeres of birds' habitat will be destroyed. An endangered speeies, the Bell's Vireo, was seen and might be westing in Hahamonga. Many rare birds, including the Indigo Bunting, Lewis's Woodpecker, and Vesper Sparrow. If we destroy the habitat of Hahamonga, these birds will not come back. Please save the habitat of Hahamonga!

Sincerely,
Dessi Sieburth

Dessi Sieburth 2644 Hermosa Ave, Montrose 91020 CA

LA- County Board
County Flood control District
No Sediment Removal

Response to Comment Letter #11 (Dessi Seiburth – Pasadena Audubon Society Member)

Response to Comment 11-1:

Thank you for your input. The comment has been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. As discussed in Section 3.6.6 of the Draft Environmental Impact Report (EIR), Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats. Bird species currently found in the Proposed Project area would be expected to either remain in the undisturbed areas of the reservoir outside the Proposed Project area or to reestablish once sediment removal activities have been completed.

Devil's Gate Reservoir Sediment Removal and Management Project

COMMENT CARD

Date: 11/14/13

Name: Suzanne Martin Address: 2717 Raymond,

Email: Scmartin@alum.exeter.edu City/Zip: Altadena, 91001

Organization represented, if any: (self)

Comment 12-1: Comment: Preference for alternative 3.
Reason: Meets safety & maintence objectives while making more habitat.

Comment 12-2: Please keep recreation uses in mind.

Please submit any comments on the proposed project today by placing this card in the comment box or send to LACFCD. **Correspondence should be postmarked by Monday, January 6, 2014.** Comments should include "Devil's Gate Reservoir Sediment Removal and Management Project" in the subject line and the name of a contact person. Comments can be submitted in the following ways:

Mail	Email	Fax
County of Los Angeles Department of Public Works Water Resources Division Reservoir Cleanouts Program P.O. Box 1460 Alhambra, CA 91802-1460	reservoircleanouts@dpw.lacounty.gov	(626) 979-5436

Response to Comment Letter #12 (Suzanne Martin)

Response to Comment 12-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. Los Angeles County Flood Control District (LACFCD) notes the commenter's preference for Alternative 3. Alternative 3, Configuration D was determined to be the Environmentally Superior Alternative in the Draft Environmental Impact Report (EIR).

Response to Comment 12-2:

Impacts to recreation were analyzed in the Draft EIR, Section 3.15. The Proposed Project will not limit the use of the Oak Grove area of Hahamongna Watershed Park. Sediment removal activities would be temporary and are expected to occur only in the drier months (April to December, excluding holidays), and often will not be adjacent to the Oak Grove area of Hahamongna Watershed Park. The Proposed Project would result in temporary limitations on the recreational use of the Proposed Project site and some of the adjacent trails. Most of these areas would be reopened seasonally or intermittently throughout the sediment removal process. In addition, temporary impacts to designated recreational facilities and trails will be minimized through advance communication and redirection to the nearest facility in the vicinity of the Proposed Project. Furthermore, an east-west trail crossing will continue to provide access at the north end of the reservoir. At the south end of the reservoir, after the reservoir ingress and egress ramps have been fully constructed, access to the upper east side Arroyo Seco Trail from La Cañada Verdugo Road will be maintained and the linkage from the west side Arroyo Seco Trail and the Flint Wash Trail to the upper east side Arroyo Seco Trail (crossing Devil's Gate Dam and also continuing south to the Rose Bowl) will be available after construction activities have ended each day and on non-working days.

Devil's Gate Reservoir Sediment Removal and Management Project

COMMENT CARD

Date: 11/14/13

Name: DOROTHY WONG Address: 3034 OLIVE AVE ALTADENA, CA 91001

Email: DOT@SoCalCross.org City/Zip:

Organization represented, if any: ALTADENA. RESIDENT

Comment 13-1

Comment: PLEASE CONSIDER A LESS 'INVASIVE' ALTERNATIVE THAT ALLOWS A REAL WILDLIFE CORRIDOR AND TRUE ENJOYMENT FOR USERS, HABITAT PRESERVATION INCLUDING MIGRATING BIRDS THAT COME TO THE WATERSHED FOR BREEDING. EQUESTRIANS, RUNNERS, DOG WALKERS ~~USE THE~~ BICYCLISTS CAN ENJOY THIS SPECIAL PLACE. WHILE ALSO REMOVING SEDIMENT FOR FLOOD CONTROL. AND LET'S COME UP WITH A PLAN FOR THE FUTURE & SUSTAINABILITY. NEW

Comment 13-2

PLEASE CONSIDER (BIO ~~DIESEL~~ DIESEL) TRUCKS AND A SHORTER TIMEFRAME FOR REMOVAL ANNUALLY. ~~PLEASE CONSIDER~~ THAT DOES NOT COMPLETELY DISRUPT THE ECO-SYSTEM.

Comment 13-3

PLEASE ANALYZE AND CONSIDER RISK ASSESSMENT AND TRUE NUMBERS TO MINIMIZE IMPACT. THE LARGE AREA SOUTH OF "JOHNSON FIELD" HAS MOST OF THE HABITAT ESPECIALLY WILDLIFE. (OVER) →

Please submit any comments on the proposed project today by placing this card in the comment box or send to LACFCD. **Correspondence should be postmarked by Monday, January 6, 2014.** Comments should include "Devil's Gate Reservoir Sediment Removal and Management Project" in the subject line and the name of a contact person. Comments can be submitted in the following ways:

Mail	Email	Fax
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P.2

Comment 13-4

PLEASE CONSIDER TRAFFIC FLOW IN/OUT OF THE DIRECTLY AFFECTED COMMUNITIES W ALTADENA W PASADENA RESIDENTS HAVE THE CLOSEST IMPACT OF THIS PROJECT PLUS 3 SCHOOLS AND 5,000+ EMPLOYEES +45,000 RESIDENTS PLUS ROSE BOWL ACTIVITIES OFF ARROYO/WINDSOR 210 FRWY.

Comment 13-5

"YEAR ROUND"

HOW CAN YOU IMPLEMENT A PLAN WITH "UNMITIGATED" ??? HEALTH RISKS ...

Comment 13-6

IN THE END THIS IS A WILDLIFE/NATURE TREASURE. THE IMPACT WITH MASSIVE REMOVAL WILL BE PERMANENT. IT IS HARD TO BELIEVE OTHERWISE. THE MASSIVE AMOUNTS OF TRUCKS WILL BRING IN NOW IMPACT UNMEASURED.

Comment 13-7

WHY DONT WE APPROVE REGULAR MAINTENANCE TO MAKE A DIFFERENCE!

I'D LIKE TO SEE THE WORK SCHEDULE WITH ALL THE OTHER USERS SURROUNDING THE 'PARK' TO MINIMIZE OVER-ALL CONFLICTS OF USE.

Comment 13-8

ALTERNATIVES? THEY ARE TOO SIMILAR. I WOULD VOTE FOR NO REMOVAL IN MASS. A REGULAR MAINTENANCE PLAN FOR THE FUTURE

~~IF WE ARE LOOKING TO REMOVE~~

Comment 13-9

RE. TRAFFIC IMPACT. HOW CAN WE BE SURE ARROYO/WINDSOR WILL NOT BE USED FOR TRUCK TRAFFIC OUT OF ALTADENA WHERE CURRENTLY THERE IS NOT ENOUGH ROOM FOR BICYCLES AND CARS (WINDSOR IS VERY POPULAR TRAVEL ROUTE FOR BICYCLISTS) TRUCKS WOULD BE MORE THAN DANGEROUS AS A MAIN THOROUGHFARE FOR CARS AND BICYCLES ADDING TRUCKS THERE WOULD INCREASE RISK.

Comment 13-10

HOW CAN WE BE SURE PASADENA'S ~~HAHAMONGNA~~ WATERSHED MASTERPLAN PROJECTS WILL BE COORDINATED? IT SEEMS LIKE THERE COULD BE SOME CONFLICTS HERE.

WHAT IS THE TRAIL CLOSER PLAN TO GET USERS ACROSS THE ARROYO?

Comment 13-11

HOW WILL RECREATIONAL USERS BE NOTIFIED? EAST. WEST

HOW WILL IMPACTS BE LESSENED BY RECREATIONAL USERS?

HOW WILL THE ~~CHE~~ SUMMER CAMPS + EQUESTRIANS + RUNNERS WALKERS BE NOTIFIED?

Response to Comment Letter #13 (Dorothy Wong)

Response to Comment 13-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. The Draft Environmental Impact Report (EIR) analyzed a range of sediment removal amounts and configurations aimed at addressing the diverse concerns of stakeholders including concerns for long-term habitat preservation and recreational usage. The alternatives presented in the Draft EIR represent the best options available to respond to stakeholders' concerns while adequately reducing flood risk to downstream communities.

Alternative 3, Configuration D affects the least amount of habitat of all the action alternatives, while still achieving Proposed Project objectives (see Section 4.6 of the Final EIR). This alternative would provide a buffer on the west side of the reservoir that would allow for the movement of wildlife (see Section 4.6 of the Final EIR). Alternative 3, Configuration D, Option 1 provides a more natural configuration for the reservoir by having two branches to carry water and sediment toward the face of the dam, avoiding disturbing a significant portion of existing vegetation. To further reduce the Proposed Project's footprint, the Los Angeles County Flood Control District (LACFCD) has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2, which drastically reduces the project's footprint of 120 acres down to 71 acres, would avoid excavation of the western branch, thereby providing a greater habitat buffer on the west side of the reservoir. In addition, the maintenance areas would be smaller than the original sediment removal footprint, allowing for habitat to reestablish and providing additional areas for wildlife movement. The Proposed Project is designed to be a long-term plan, with the reservoir management phase providing management for future sediment inflows. The proposed yearly cleanout of sediment after the completion of the Proposed Project will reduce the necessity for a future large-scale cleanout.

Response to Comment 13-2:

Air quality impacts associated with truck traffic were analyzed in the Draft EIR in Section 3.5. Lower emission trucks were considered for the Proposed Project; however, the availability of these trucks could not be guaranteed at the time the Draft EIR was written. LACFCD has conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed the United States (U.S.) Environmental Protection Agency's (EPA's) 2007 standards for emissions. Therefore, in order to further reduce emissions, Mitigation Measure MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump trucks that meet or exceed EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality will be reduced to less than significant.

Although the sediment removal phase of the Proposed Project will occur over a five-year period, the removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays), as described in the Draft EIR, Section 2.5.1, Sediment Removal Phase, Project Schedule. Reducing the duration of sediment removal activities for each year or for each day would significantly increase the overall project duration and also substantially increase project cost and configuring the reservoir to allow for sustainable future maintenance. Extending the project would prolong the flood risk to downstream communities and increase the construction impacts to the surrounding communities.

As discussed in Section 3.6.6 of the Draft EIR, Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats. These measures will serve to reduce the disruption to the existing ecosystem.

Response to Comment 13-3:

LACFCD was mandated by the State Legislature to provide flood protection and water conservation within its boundaries.

A reservoir storage design capacity of two design debris events (DDEs) below the dam's lowest spillway was determined to be the standard acceptable level of risk at Devil's Gate Dam and Reservoir. The DDE volume of capacity is determined using the January 2006 Los Angeles County Department of Public Works (LACDPW) Hydrology Manual and the March 2006 LACDPW Sedimentation Manual. For Devil's Gate Dam and Reservoir, the required reservoir capacity is 4.0 million cubic yards (cy) (two DDEs) below the spillway elevation of 1,040.50 feet.

The Hydrology Manual (January 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_Hydrology_Manual/2006%20Hydrology%20Manual-Divided.pdf

The Sedimentation Manual (March 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_sedimentation_manual/Sedimentation%20Manual-Second%20Edition.pdf

Additional information concerning DDE calculation methods has been added to the Final EIR, Section 2.3, Project Need.

With implementation of the mitigation measures described in Section 3.6.6 of the Draft EIR, impacts to biological resources would be reduced to less than significant.

Response to Comment 13-4:

Potential impacts due to the Proposed Project's added truck trips were analyzed in the Draft EIR, Section 3.16, Transportation and Traffic. As listed in that section, a single intersection in the immediate vicinity of the Proposed Project site will have a potentially significant impact. In practice, hauling rates and routes may be adjusted to help reduce impacts, depending on operational need. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the Proposed Project site. In addition, during the sediment removal phase, excavation is expected to occur only in the drier months (April to December, excluding holidays).

Response to Comment 13-5:

See Response to Comment 13-2. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality, including those associated with health effects, will be reduced to less than significant.

Response to Comment 13-6:

See Response to Comment 13-3, 13-4, and 13-5.

Response to Comment 13-7:

Flow Assisted Sediment Transport (FASTing), a passive method of transporting sediment downstream, is currently used when possible and would be used during the Maintenance Phase of the Proposed Project; however, FASTing, even in combination with the Interim Measures Project (IMP), will not efficiently remove large amounts of sediment. As discussed under the No Project Alternative, Section 4.9, use of FASTing and IMP alone will not meet Proposed Project objectives. The removal of accumulated sediment on a yearly basis is the proposed management scheme after the original sediment removal is completed. The regular maintenance of the area will lower the potential need for a large-scale sediment removal operation in the future. Please see Section 2.5.2 of the Draft EIR for more information on future maintenance.

Although the sediment removal phase of the Proposed Project will occur over a five-year period, the removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays), as described in the Draft EIR, Section 2.5.1, Sediment Removal Phase, Project Schedule. The Draft EIR outlines a 12-hour trucking schedule, with trucking operations on Saturdays as well. This schedule is used to model the most intensive construction operation, which may not be applicable at the Proposed Project site for the duration of the Proposed Project. Typical trucking schedules are estimated to be 8 hours per day on weekdays.

The Proposed Project will not limit the use of the Oak Grove area of Hahamongna Watershed Park. The Proposed Project would result in temporary limitations on the recreational use of the Proposed Project site and some of the adjacent trails. LACFCD will notify recreational users of these temporary limitations by the placing of signs around the Proposed Project site at least one month prior to the commencement of sediment removal activities. Notifications identifying working locations within the reservoir will be updated on a regular basis, as feasible, to help minimize impacts to recreation users. The notifications will also direct recreational users to the other nearest recreational facilities. See Response to Comment 13-2 regarding reduced work schedule.

Response to Comment 13-8:

The Draft EIR, Section 4, fully analyzed six alternatives including the No Project Alternative. These alternatives substantially lessen one or more significant effects of the Proposed Project and, with the exception of the mandatory No Project Alternative, would feasibly attain most of the basic objectives of the Proposed Project. These alternatives include options for different amounts of removal, different methods of removal, and a different haul route. The alternative closest to the alternative mentioned in the comment is the No Project Alternative, which includes the use of FASTing and IMP alone, which would not meet Proposed Project objectives. Other alternatives were not carried forward as they did not minimize impacts in relation to the Proposed Project and/or did not meet Proposed Project objectives.

Response to Comment 13-9:

As described in the Draft EIR, the proposed and alternative haul routes would briefly access Windsor Avenue between the Interstate-210 (I-210) on- and off-ramps and Oak Grove Drive. Both the proposed

and alternative haul routes use main thoroughfares and do not travel into the residential areas. Access or ingress to the Proposed Project site would be from Oak Grove Drive. Windsor Avenue would not be used for access or ingress to the reservoir. LACFCD will contractually obligate construction crews to use the defined truck routes. In addition, LACFCD will monitor Proposed Project activities for compliance including the proper use of defined truck routes.

Response to Comment 13-10:

Alternative 3, Configuration D, which was found to be the Environmentally Superior Alternative in the Draft EIR, was based on the City of Pasadena's Hahamongna Watershed Park Master Plan (HWPMP). LACFCD has met and will continue to meet with the City of Pasadena regularly to coordinate and ensure resolution of concerns regarding Devil's Gate Reservoir and the HWPMP.

Response to Comment 13-11:

See Response Comment 13-7 regarding notification of recreational users. Impacts to recreation were analyzed in the Draft EIR, Section 3.15. As noted above, the Proposed Project will not limit the use of the Oak Grove area of Hahamongna Watershed Park. Sediment removal activities would be temporary and are expected to occur only in the drier months (April to December, excluding holidays). It is expected that these activities will often not be adjacent to the Oak Grove area of Hahamongna Watershed Park. The Proposed Project would result in temporary limitations on the recreational use of the Proposed Project site and some of the adjacent trails. Most of these areas would be reopened seasonally or intermittently throughout the sediment removal process. In addition, temporary impacts to designated recreational facilities and trails will be minimized through advance communication and redirection to the nearest facility in the vicinity of the Proposed Project. Furthermore, an east-west trail crossing will continue to provide access at the north end of the reservoir. At the south end of the reservoir, after the reservoir ingress and egress ramps have been fully constructed, access to the upper east side Arroyo Seco Trail from La Cañada Verdugo Road will be maintained; and the linkage from the west side Arroyo Seco Trail and the Flint Wash Trail to the upper east side Arroyo Seco Trail (crossing Devil's Gate Dam and also continuing south to the Rose Bowl) will be available after construction activities have ended each day and on nonworking days.

Devil's Gate Reservoir Sediment Removal and Management Project

COMMENT CARD

Date: 11/14/2013

Name: Peter Pfeiffer Address: 389 W. Mendocino St,

Email: maybeman@earthlink.net City/Zip: Altadena, CA 91001

Organization represented, if any:

Comment: As a resident of Altadena, I am deeply concerned with the destruction of wildlife habitat. The removal of the yearly sediment accumulation should be done on a yearly basis with the least amount of truck traffic + habitat destruction.

Comment 14-1

Please submit any comments on the proposed project today by placing this card in the comment box or send to LACFCD. **Correspondence should be postmarked by Monday, January 6, 2014.** Comments should include "Devil's Gate Reservoir Sediment Removal and Management Project" in the subject line and the name of a contact person. Comments can be submitted in the following ways:

Mail	Email	Fax
County of Los Angeles Department of Public Works Water Resources Division Reservoir Cleanouts Program P.O. Box 1460 Alhambra, CA 91802-1460	reservoircleanouts@dpw.lacounty.gov	(626) 979-5436

Response to Comment Letter #14 (Peter Pfeiffer)

Response to Comment 14-1:

Thank you for your input. The comment has been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. Alternative 3, Configuration D creates the least amount of truck traffic and habitat loss and is considered the Environmentally Superior Alternative. In addition, the maintenance areas would be smaller than the original sediment removal footprint, allowing for habitat to reestablish and providing additional areas for wildlife movement (see Section 4.6 of the Final Environmental Impact Report [EIR]). Flow Assisted Sediment Transport, or FASTing, is proposed to be an integral part of the annual maintenance at Devil's Gate after the sediment removal phase of the Proposed Project is completed. Annual FASTing operations will be implemented to reduce future buildups of sediment in the reservoir and to reduce the need for mechanical removal of sediment from the reservoir. Although FASTing is expected to be an effective means of keeping sediment levels low in the reservoir, it is estimated that approximately 13,000 cubic yards (cy) of sediment will be removed by excavation annually. However, a maintenance regime that relies on FASTing greatly reduces the need for and extends the life of future and existing sediment placement sites and improves the future sustainability of the reservoir. Please see Section 2.5.2 of the Draft EIR for more information on future maintenance.

Devil's Gate Reservoir Sediment Removal and Management Project

COMMENT CARD

Date: 11-14-13

Name: Icia Belchak Address: 1806 Camden Ave, S. Pas

Email: iciaebel@yahoo.com City/Zip: 91030

Organization represented, if any: Self Organized

Comment: Also a mitigation

Comment 15-1

We need sediment to make it to the ocean and down stream to replenish beaches,

Comment 15-2

People in L.A. are looking for drought tolerant landscaping - why not sell the sand to mitigate cost, show the changes + impact of sediment removal, decrease trucking

Have a sand shop - make or have people who sell sand pay for it and move it themselves.

Please submit any comments on the proposed project today by placing this card in the comment box or send to LACFCD. **Correspondence should be postmarked by Monday, January 6, 2014.** Comments should include "Devil's Gate Reservoir Sediment Removal and Management Project" in the subject line and the name of a contact person. Comments can be submitted in the following ways:

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County of Los Angeles Department of Public Works Water Resources Division Reservoir Cleanouts Program P.O. Box 1460 Alhambra, CA 91802-1460	reservoircleanouts@dpw.lacounty.gov	(626) 979-5436

Response to Comment Letter #15 (Icia Belchak)

Response to Comment 15-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. Sluicing was analyzed as part of the Draft Environmental Impact Report (EIR) in the Alternatives Analysis, Section 4.7, Alternative 4 Sluicing Method. The sluicing alternative would potentially have additional significant impacts in comparison to the Proposed Project. Many of these impacts would be associated with the likelihood that large amounts of sediment would not be fully transported through the flood control system to the ocean; this sediment would need to be mechanically removed and trucked out from numerous downstream locations. This alternative would also involve use of construction equipment and the removal of trees and vegetation over the same footprint as the Proposed Project. Please see Section 4.7 and Appendix K of the Draft EIR for further analysis.

Response to Comment 15-2:

The sediment that came into Devil's Gate Reservoir following the Station Fire has a very fine gradation or consistency. As such, the majority of this material is not readily reusable on a commercial scale and will most likely not be sold; however, sediment placed at sediment placement sites would be available for potential reuse for other projects or sediment reuse opportunities. The sediment removed from the Devil's Gate Reservoir will be transported to the existing placement sites listed in the Draft EIR in Section 2.0, Project Description.

For further information regarding beneficial uses for sediment at the Los Angeles County Flood Control District (LACFCD) sites, please refer to Section 6.5 of LACFCD's 2012 Sediment Management Strategic Plan which can be found at: http://dpw.lacounty.gov/lacfcd/sediment/stplan.aspx.

With the amount of sediment needing to be removed to improve the capacity of the reservoir, it is unlikely that a sand shop, as suggested in the comment, would remove enough of the sediment in a timely fashion. Thus, the suggested alternative would not meet the Los Angeles County Flood Control District (LACFCD) goals of restoring acceptable levels of flood protection to the downstream communities and removing sediment accumulated in the reservoir in a timely manner. It would also not eliminate the use of vehicles to transport the sediment off site.

Devil's Gate Reservoir Sediment Removal and Management Project

COMMENT CARD

Date: 11-14-13

Name: Richard Booker Address:

Email: Booker7429@SBCglobal.net City/Zip: Pasadena 91103

Organization represented, if any: Linda Vista Annandale Assn.

Comment: To mitigate the traffic congestion that will be caused by all the trucks hauling the sediment, have you considered using the gold line to help haul the sediment to Sierra Madre?

Comment 16-1

Please submit any comments on the proposed project today by placing this card in the comment box or send to LACFCD. **Correspondence should be postmarked by Monday, January 6, 2014.** Comments should include "Devil's Gate Reservoir Sediment Removal and Management Project" in the subject line and the name of a contact person. Comments can be submitted in the following ways:

Mail	Email	Fax
County of Los Angeles Department of Public Works Water Resources Division Reservoir Cleanouts Program P.O. Box 1460 Alhambra, CA 91802-1460	reservoircleanouts@dpw.lacounty.gov	(626) 979-5436

Response to Comment Letter #16 (Richard Booker – Linda Vista Annandale Association)

Response to Comment 16-1:

Thank you for your input. The comment has been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. The Metro Gold Line is designed for public transportation, not freight. In addition, the sediment would have to be transported from the reservoir to the nearest Metro Gold Line Station and then again from a Metro station to the sediment placement sites. As the significant traffic impacts occur either adjacent to the reservoir or one of the placement sites, these impacts would not be reduced by the use of the Gold Line.

Devil's Gate Reservoir Sediment Removal and Management Project

COMMENT CARD

Date: 11/14/2013

Name: LANCE BENNETT Address: 2297 COUNTRY CLUB DRIVE

Email: lbenner@charter.net City/Zip: ALTADENA 91001

Organization represented, if any:

Comment:

(1) How much will each option presented COST? This is a crucial aspect of all this that was not discussed in the presentations nor mentioned in the Draft EIR's summary online.

Comment 17-1

(2) The discussion of flood risk tonight and in the executive summary is vague and it does not provide enough detailed information to justify the massive sediment removal options discussed in the presentations. Where can we read the detailed engineering study that must exist?

Comment 17-2

(3) Parts of Hahamongna Watershed Park are an EPA Superfund site. How does that affect all the proposed options presented?

Comment 17-3

(4) The biological survey mentioned in the executive summary is seriously flawed. Contrary to its statements, 210 + bird species have been recorded at Hahamongna. Least Bell's vireos were present in 2012 and 2013 and nested in 2012. Yellow warblers nest in the willows annually. Yellow-breasted Chats have been recorded in the spring in recent years.

Comment 17-4

Please submit any comments on the proposed project today by placing this card in the comment box or send to LACFCD. **Correspondence should be postmarked by Monday, January 6, 2014.** Comments should include "Devil's Gate Reservoir Sediment Removal and Management Project" in the subject line and the name of a contact person. Comments can be submitted in the following ways:

Mail	Email	Fax
County of Los Angeles Department of Public Works Water Resources Division Reservoir Cleanouts Program P.O. Box 1460 Alhambra, CA 91802-1460	reservoircleanouts@dpw.lacounty.gov	(626) 979-5436

Comment 17-5

BOTTOM line: If this were a NASA proposal it would be summarily rejected because the EIR does not adequately justify what the sediment removal options it proposes.

Response to Comment Letter #17 (Lance Benner)

Response to Comment 17-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. Under California Environmental Quality Act (CEQA), the lead agency is not required to analyze an economic impact associated with a Proposed Project in the Environmental Impact Report (EIR).

The estimated cost for the Proposed Project and for Alternatives 1, 2, 3, and 5 would range from $80 million for the Proposed Project to $65 million for Alternative 3. LACFCD has applied for and received an approximately $28 million grant through the State's Disaster Preparedness and Flood Protection Bond Act of 2006 (Proposition 1E) program. A portion of this grant will be used to help offset the Proposed Project's costs. The remaining cost will be covered by Los Angeles County Flood Control District (LACFCD) Funds. Due to the variety of factors, including the indeterminate locations of the sediment fallout and requirements for removing sediment from these locations, the cost for Alternative 4 is unknown.

Response to Comment 17-2:

LACFCD was mandated by the State Legislature to provide flood protection and water conservation within its boundaries.

A reservoir storage design capacity of two design debris events (DDEs) below the dam's lowest spillway was determined to be the standard acceptable level of risk at Devil's Gate Dam and Reservoir. The DDE volume of capacity is determined using the January 2006 Los Angeles County Department of Public Works (LACDPW) Hydrology Manual and the March 2006 LACDPW Sedimentation Manual. For Devil's Gate Dam and Reservoir, the required reservoir capacity is 4.0 million cubic yards (cy) (two DDEs) below the spillway elevation of 1,040.50 feet.

The Hydrology Manual (January 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_Hydrology_Manual/2006%20Hydrology%20Manual-Divided.pdf

The Sedimentation Manual (March 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_sedimentation_manual/Sedimentation%20Manual-Second%20Edition.pdf

Additional information concerning DDE calculation methods has been added to the Final EIR, Section 2.3, Project Need.

Response to Comment 17-3:

As discussed in the Draft EIR, Section 3.10, United States (U.S.) Environmental Protection Agency (EPA) included Hahamongna Watershed Park area on the National Priorities List (NPL) Superfund List due to the presence of detected volatile organic compounds (VOCs) and perchlorate in groundwater originating from the Jet Propulsion Laboratory (JPL) property. The impacted groundwater is at 200 feet below ground surface (bgs); and, as with the Proposed Project, the concentrations of VOCs, organochlorine pesticides, petroleum hydrocarbons (diesel and hydraulic/motor oil range and aromatics), and semi-

volatile organic compounds (SVOCs) detected in soil samples that were collected from Devil's Gate Reservoir are below regulatory thresholds. No perchlorates, the substance of concern from JPL, were found in the soil sample analysis. As discussed in the Draft EIR, Section 3.10, no significant impacts associated with the Proposed Project due to the inclusion of the Hahamongna Watershed Park area on the NPL Superfund List are expected, as the contamination is found in the local groundwater table, not in the sediment. Therefore, no significant impacts associated with the Proposed Project or Alternatives are expected.

Response to Comment 17-4:

The biological resources of the Proposed Project site are described in Section 3.6 of the Draft EIR. The bird species recorded during surveys conducted specifically for the Proposed Project are presented in the Biological Technical Report (BTR) in Appendix D of the Draft EIR. Factors used to determine the potential for occurrence included the quality of habitat, elevation, and the results of the reconnaissance survey. The locations of prior database records of occurrence were used as additional data; but since the California Natural Diversity Database (CNDDB) is a positive-sighting database, this data was used only in support of the analysis from the previously identified factors. Based on the results of the BTR, additional protocol-level focused surveys were conducted, including for least Bell's vireo. Table 3.6-3 in the Draft EIR includes both least Bell's vireo and yellow warbler as present within the Proposed Project site. Yellow-breasted chats were observed during surveys for least Bell's vireo (see Appendix D of the Draft EIR). Table 3.6-3 of the Draft EIR has been updated to include this species.

Response to Comment 17-5:

See Response to Comment 17-2.

Devil's Gate Reservoir Sediment Removal and Management Project

COMMENT CARD

Date: 11-14-13

Name: VIRGINIA KIMBALL Address: 1685 LA VISTA PLACE

Email: VSkimball@aol.com City/Zip: PASADENA 91103

Organization represented, if any: —

Comment: I recommend using sluicing as the first and primary sediment removal method over a 2-3 year period. There will probably be some large and intense storm events to clear out the sediment with much less harm to the environment and at much less expense.

Comment 18-1

Please submit any comments on the proposed project today by placing this card in the comment box or send to LACFCD. **Correspondence should be postmarked by Monday, January 6, 2014.** Comments should include "Devil's Gate Reservoir Sediment Removal and Management Project" in the subject line and the name of a contact person. Comments can be submitted in the following ways:

Mail	Email	Fax
County of Los Angeles Department of Public Works Water Resources Division Reservoir Cleanouts Program P.O. Box 1460 Alhambra, CA 91802-1460	reservoircleanouts@dpw.lacounty.gov	(626) 979-5436

Response to Comment Letter #18 (Virginia Kimball)

Response to Comment 18-1:

Thank you for your input. The comment has been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. Sluicing was analyzed as part of the Draft Environmental Impact Report (EIR) in the Alternatives Analysis, Section 4.7, Alternative 4 Sluicing Method. This alternative would involve use of construction equipment and the removal of trees and vegetation over the same footprint as the Proposed Project. The sluicing alternative would potentially have additional significant impacts in comparison to the Proposed Project. Many of these impacts would be associated with the likelihood that large amounts of sediment would not be fully transported through the flood control system; this sediment would need to be mechanically removed and trucked out from numerous downstream locations. This analysis took into account historically typical storm events and associated flows. Please see Section 4.7 and Appendix K of the Draft EIR for further analysis.

Devil's Gate Reservoir Sediment Removal and Management Project

COMMENT CARD

Date: 11/14/2013

Name: TIMOTHY P. CALLAHAN Address: 3771 ALZADA RD.

Email: bondatim@dslextreme.com City/Zip: ALTADENA, CA 91001-3601

Organization represented, if any: _____

Comment: YOU SHOULD ONLY REMOVE 1.7 MILLION CUBIC YARDS OF SEDIMENT AS PER THE MOTION BY MICHAEL ANTONOVICH RATHER THAN 4 MILLION CUBIC YARDS. FURTHER, YOU SPREAD THE PROJECT OVER 20 YEARS, NOT 5. AND USE THAT AS THE BASIS FOR INSTITUTING AN ONGOING LOW LEVEL LOW IMPACT MAINTENANCE PROGRAM. THAT WAY, YOU WON'T HAVE TO CREATE AN ARTIFICIAL CRISIS AND TURN THE REGION INTO A MAN MADE DESERT

Comment 19-1

Please submit any comments on the proposed project today by placing this card in the comment box or send to LACFCD. **Correspondence should be postmarked by Monday, January 6, 2014.** Comments should include "Devil's Gate Reservoir Sediment Removal and Management Project" in the subject line and the name of a contact person. Comments can be submitted in the following ways:

Mail	Email	Fax
County of Los Angeles Department of Public Works Water Resources Division Reservoir Cleanouts Program P.O. Box 1460 Alhambra, CA 91802-1460	reservoircleanouts@dpw.lacounty.gov	(626) 979-5436

Response to Comment Letter #19 (Timothy Callahan)

Response to Comment 19-1:

Thank you for your input. The comment has been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

The Los Angeles County Flood Control District (LACFCD) was mandated by the State Legislature to provide flood protection and water conservation within its boundaries.

A reservoir storage design capacity of two design debris events (DDEs) below the dam's lowest spillway was determined to be the standard acceptable level of risk at Devil's Gate Dam and Reservoir. The DDE volume of capacity is determined using the January 2006 Los Angeles County Department of Public Works (LACDPW) Hydrology Manual and the March 2006 LACDPW Sedimentation Manual. For Devil's Gate Dam and Reservoir, the required reservoir capacity is 4.0 million cubic yards (cy) (two DDEs) below the spillway elevation of 1,040.50 feet.

The Hydrology Manual (January 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_Hydrology_Manual/2006%20Hydrology%20Manual-Divided.pdf

The Sedimentation Manual (March 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_sedimentation_manual/Sedimentation%20Manual-Second%20Edition.pdf

Additional information concerning DDE calculation methods has been added to the Final Environmental Impact Report (EIR), Section 2.3, Project Need.

In 2010, in response to the Station Fire, an emergency project to remove only 1.67 million cubic yards (cy) was proposed. The volume of 1.67 million cy is the previously published DDE, and this amount was considered justifiable as an emergency exemption to the California Environmental Quality Act (CEQA). This emergency project was not completed because, in March 2011, the County of Los Angeles Board of Supervisors motioned LACFCD to complete an Environmental Impact Report (EIR) for a comprehensive sediment removal project at Devil's Gate. LACFCD then initiated project development in accordance with the required level of protection of two DDEs. At that time, LACFCD also began receiving feedback on the concurrent Sediment Management Strategic Plan (Strategic Plan) and the interest to look at more sustainable sediment and reservoir management. As a result of the feedback and recommendations during the development of the Strategic Plan, LACFCD began evaluating ways to create a more sustainable long-term way to manage its sediment and habitat. To emphasize the goals of the project, the Proposed Project was given the name Devil's Gate Sediment Removal and Management Project.

LACFCD proposed a project duration of five years to reduce accumulated sediment in a timely fashion. The goal of LACFCD is to restore reservoir flood capacity as soon as feasible while reducing cost, minimizing the duration of environmental and construction impacts to the surrounding communities, and configuring the reservoir to allow for sustainable future maintenance. Extending the project would prolong the flood risk to downstream communities and increase the construction impacts to the surrounding communities.

The Proposed Project will provide a low impact sediment management program. The Proposed Project is designed to be a long-term plan, with the reservoir management phase providing management for future sediment inflows. The proposed yearly cleanout of sediment after the completion of the Proposed Project will reduce the necessity for a future large-scale cleanout.

The Proposed Project site will not be turned into a "manmade desert." As discussed in Section 3.6.6 of the Draft EIR, Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats.

Devil's Gate Reservoir Sediment Removal and Management Project

COMMENT CARD

Date: 11/16/13

Name: MARAH LYVERS Address: 107 W. WOODBURY RD # F

Email: marah@tomsawyercamps.com City/Zip: Altadena CA 91001

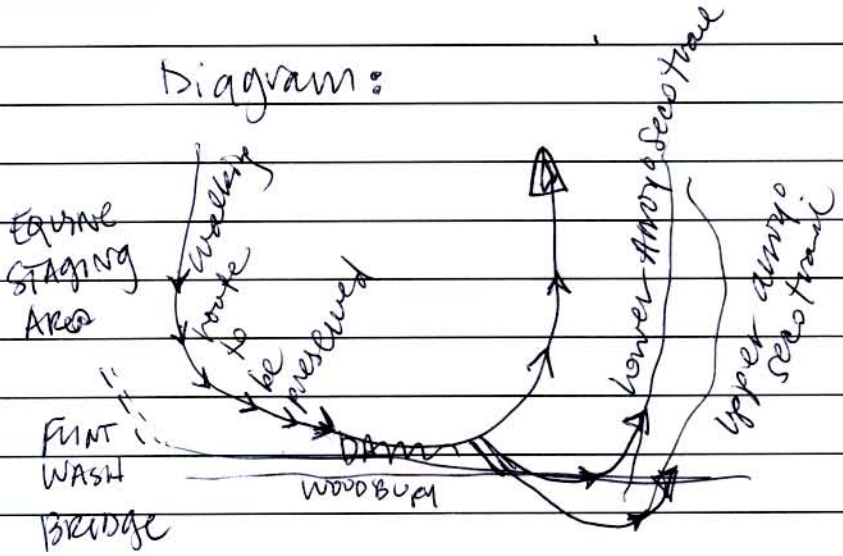
Organization represented, if any: TOM SAWYER CAMPS

Comment:

(1) PLEASE ALLOW USE OF FLINT WASH BRIDGE & TOP OF DAM WALKWAY FOR CONTINUAL FOOT TRAFFIC TO ALLOW THE WALKING/HIKING LOOP TO BE PRESERVED EVEN during the DAILY HAULING HOURS-

Comment 20-1

Diagram:



IS THERE AN ALTERNATIVE WALKING/HIKING TRAIL PROPOSED TO enable the whole loop to be accessed/utilized?

Please submit any comments on the proposed project today by placing this card in the comment box or send to LACFCD. **Correspondence should be postmarked by Monday, January 6, 2014.** Comments should include "Devil's Gate Reservoir Sediment Removal and Management Project" in the subject line and the name of a contact person. Comments can be submitted in the following ways:

Mail	Email	Fax
County of Los Angeles Department of Public Works Water Resources Division Reservoir Cleanouts Program P.O. Box 1460 Alhambra, CA 91802-1460	reservoircleanouts@dpw.lacounty.gov	(626) 979-5436

Response to Comment Letter #20 (Marah Lyvers – Tom Sawyer Camps)

Response to Comment 20-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. Although the sediment removal phase of the Proposed Project will occur over a five-year period, the removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays), as described in the Draft Environmental Impact Report (EIR), Section 2.5.1 Sediment Removal Phase, Project Schedule. In addition, it is expected that these activities will often not be adjacent to the Oak Grove area of Hahamongna Watershed Park.

The Proposed Project will not limit the use of the Oak Grove area of Hahamongna Watershed Park. The Proposed Project would result in temporary limitations on the recreational use of the Proposed Project site and some of the adjacent trails. Most of these areas would be reopened seasonally or intermittently throughout the sediment removal process. In addition, temporary impacts to designated recreational facilities and trails will be minimized through advance communication and redirection to the nearest facility in the vicinity of the Proposed Project. Furthermore, an east-west trail crossing will continue to provide access at the north end of the reservoir. At the south end of the reservoir, after the reservoir ingress and egress ramps have been fully constructed, access to the upper east side Arroyo Seco Trail from La Cañada Verdugo Road will be maintained; and the linkage from the west side Arroyo Seco Trail and the Flint Wash Trail to the upper east side Arroyo Seco Trail (crossing Devil's Gate Dam and also continuing south to the Rose Bowl) will be available after construction activities have ended each day and on nonworking days.

Devil's Gate Reservoir Sediment Removal and Management Project

COMMENT CARD

Date: 11/16/13

Name: Marah Lyvers Address:

Email: marahlyvers@gmail.com City/Zip:

Organization represented, if any: Community / Hahamongna Park User

Comment 21-1

Comment: "ALTERNATIVE 3" (CONFIGURATION ▷) is most ideal so the utility poles can remain in place. (East/west Crossing)

(1)

Comment 21-2

(2) put a traffic officer at Berkshire on ramp* to create a flow at peak** traffic times.

* on ramp & off ramp in all directions.

** peak. 7 AM - 10 AM
2 pm - 7 pm

Please submit any comments on the proposed project today by placing this card in the comment box or send to LACFCD. **Correspondence should be postmarked by Monday, January 6, 2014.** Comments should include "Devil's Gate Reservoir Sediment Removal and Management Project" in the subject line and the name of a contact person. Comments can be submitted in the following ways:

Mail	Email	Fax
County of Los Angeles Department of Public Works Water Resources Division Reservoir Cleanouts Program P.O. Box 1460 Alhambra, CA 91802-1460	reservoircleanouts@dpw.lacounty.gov	(626) 979-5436

Response to Comment Letter #21 (Marah Lyvers)

Response to Comment 21-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. Los Angeles County Flood Control District (LACFCD) notes the commenter's preference for Alternative 3, Configuration D.

Response to Comment 21-2:

Typically, traffic officers are placed at an intersection to guide traffic for special events or after a traffic accident. It is unlikely that the police force could accommodate dedicating an officer at this intersection for the entirety of the Proposed Project; however, LACFCD will implement a flagger as necessitated at the Project's ingress and egress ramps. Additionally, LACFCD will continue to work with local organizations and the Cities of Pasadena and La Cañada Flintridge and the community of Altadena to minimize traffic impacts around the Proposed Project site.

From: Constance Brines [mailto:yconnie.brines@gmail.com] Comment Letter #22
Sent: Friday, November 08, 2013 3:32 PM
To: reservoircleanouts
Subject: Devil's Gate Reservoir Sediment Removal and Management Project

Dear Sirs

Comment 22-1 Sediment is a natural and valuable resource. Storm water can be managed without polluting the environment. Please do not move forward with your current plan to disrupt the rich riparian habitat at Hahamongna.

Comment 22-2 I have just returned from China. Through lack of foresight and impatient, heedless growth, they have fouled their land. We should be constantly thanking our environmental regulators for their persistence in trying to save ours. Please consider our air quality as you plan for our community.

Sincerely,

Constance Bidwell Brines
950 Laguna Road
Pasadena CA 91105
Home: 626-403-0727
Mobile: 703-626-0492

Response to Comment Letter #22 (Constance Brines)

Response to Comment 22-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. Los Angeles County Flood Control District (LACFCD) notes the commenter's objection to the Proposed Project. The sediment that came into Devil's Gate Reservoir following the Station Fire has a very fine gradation or consistency. As such, the majority of this material is not readily reusable on a commercial scale and will most likely not be sold; however, sediment placed at sediment placement sites would be available for potential reuse for other projects or sediment reuse opportunities. The sediment removed from the reservoir will be transported to the sites listed in Section 2.0, Project Description in the Draft Environmental Impact Report (EIR).

For further information regarding beneficial uses for sediment at the Los Angeles County Flood Control District (LACFCD) sites, please refer to Section 6.5 of LACFCD's 2012 Sediment Management Strategic Plan which can be found at: http://dpw.lacounty.gov/lacfcd/sediment/stplan.aspx.

As discussed in Section 3.6.6 of the Draft EIR, Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats. These measures will serve to reduce the disruption to the existing riparian habitat found in the Devil's Gate Reservoir.

Alternative 3, Configuration D affects the least amount of habitat of all the action alternatives, while still achieving Proposed Project objectives (see Section 4.6 of the Final EIR). This alternative would provide a buffer on the west side of the reservoir that would allow for the movement of wildlife (see Section 4.6 of the Final EIR). Alternative 3, Configuration D, Option 1 provides a more natural configuration for the reservoir by having two branches to carry water and sediment toward the face of the dam, avoiding disturbing a significant portion of existing vegetation. To further reduce the Proposed Project's footprint, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2, which drastically reduces the project's footprint of 120 acres down to 71 acres, would avoid excavation of the western branch, thereby providing a greater habitat buffer on the west side of the reservoir. In addition, the maintenance areas would be smaller than the original sediment removal footprint, allowing for habitat to reestablish and providing additional areas for wildlife movement.

Response to Comment 22-2:

Impacts to air quality were analyzed in the Draft EIR, Section 3.5. LACFCD has conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed the United States (U.S.) Environmental Protection Agency's (EPA's) 2007 standards for emissions. Therefore, in order to further reduce emissions, Mitigation Measure MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump trucks that meet or exceed EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality will be reduced to less than significant.

From: L Barlow [mailto:barlow.co@att.net]
Sent: Saturday, November 16, 2013 10:08:39 AM (UTC-08:00) Pacific Time (US & Canada)
To: reservoircleanouts
Subject: Hahamongna Watershed input

Comment Letter #23

Comment 23-1

The "problem" here is that Hahamongna is a Watershed. It's basically all the silt behind the dam. There's an outflow pipe that's supposed to be used to allow the silt to flow from the bottom of the dam, but the County doesn't use it. The dam should be modified somewhat so that the silt & dirt flows when the water reaches a certain level in wet years. What that does ultimately is create a ravine formation into the backside of the dam at the outlet, and that's about it. County is not doing the necessary maintenance because then they can wait for an "emergency" to get the funds to scrape it all away at once, rather than managing the silt flow. Unfortunately that removes the riparian habitat that slows the water flow and helps the ground absorb the water, which is what that kind of dam is supposed to do; even out the water flow and recharge the aquifer. They've let it go because it doesn't produce power, so no loss of revenue, but it's headed for failure because it's starting to fill up.

Comment 23-2

A big issue here is that managing the silt flow produces no truck emissions, whereas these proposed massive trucking operations probably violate AB 32 and air quality regulations. That in addition to the heavy particulate matter when summer activities are held at the Oak Grove area. And, finally, it's far cheaper in the long run just to manage the silt.

Can the County participate in this kind of planning that could fund the management and minor improvement of the dam?

http://www.water.ca.gov/sfmp/resources/Computer_View_Highlight.pdf

--

:: design :: collaboration :: innovation

Laurie Barlow, AIA
http://www.barlowcoweb.com/
http://greenswardcivitas.blogspot.com/

Response to Comment Letter #23 (Laurie Barlow)

Response to Comment 23-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

Sluicing was analyzed as part of the Draft Environmental Impact Report (EIR) in the Alternatives Analysis, Section 4.7, Alternative 4 Sluicing Method. This alternative would involve use of construction equipment and the removal of trees and vegetation over the same footprint as the Proposed Project. The sluicing alternative would potentially have additional significant impacts in comparison to the Proposed Project. Many of these impacts would be associated with the likelihood that large amounts of sediment would not be fully transported through the flood control system; this sediment would need to be mechanically removed and trucked out from numerous downstream locations. Please see Section 4.7 and Appendix K of the Draft EIR for further analysis.

Los Angeles County Flood Control District (LACFCD) has executed several sediment removal projects at Devil's Gate Reservoir in the past, with the last major effort being in 1994. Smaller amounts of sediment were removed in 2006, 2009, and as a part of the Interim Measures Project in 2011, 2012, and 2013. Following the 2009 Station Fire, approximately 1.3 million cy of sediment flowed into Devil's Gate Reservoir after just two average water year storm seasons. In 2010, LACFCD proposed an emergency sediment removal project in response to the large inflow of sediment resulting from the Station Fire.

In early 2011, the County of Los Angeles Board of Supervisors motioned LACFCD to complete an EIR for a comprehensive sediment removal project at Devil's Gate. Knowing that the EIR would take a considerable amount of time to complete, the Board also motioned for an Interim Measures Project to be implemented in order to help reduce the flood risk downstream of the dam until the ultimate sediment removal project commenced.

The Proposed Project is designed to be a long-term plan, with the reservoir management phase providing management for future sediment inflows. The proposed yearly cleanout of sediment after the completion of the Proposed Project will reduce the necessity for a future large-scale cleanout.

Flow Assisted Sediment Transport (FASTing), a passive method of transporting sediment downstream, is currently used when possible and would be used during the Maintenance Phase of the Proposed Project; however, FASTing, even in combination with the Interim Measures Project (IMP), will not efficiently remove large amounts of sediment. As discussed under the No Project Alternative, Section 4.9, use of FASTing and IMP alone will not meet Proposed Project objectives. The removal of accumulated sediment on a yearly basis is the proposed management scheme after the original sediment removal is completed. The regular maintenance of the area will lower the potential need for a large-scale sediment removal operation in the future. Please see Section 2.5.2 of the Draft EIR for more information on future maintenance.

As stated in the Draft EIR, the Proposed Project will remove accumulated sediment deposits within the reservoir. This means the percolation characteristics of the reservoir will return to pre-Station Fire conditions if not improve; and the reservoir will still permit penetration of rainfall and percolation of local runoff to replenish the groundwater basin.

Response to Comment 23-2:

See Response to Comment 23-1.

As discussed in the Draft EIR, Alternatives Analysis, Section 4.7, Alternative 4 Sluicing Method; this alternative would also have significant impacts associated with traffic and air quality.

Air quality impacts associated with truck traffic were analyzed in the Draft EIR in Section 3.5. LACFCD has conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed the United States (U.S.) Environmental Protection Agency's (EPA's) 2007 standards for emissions. Therefore, in order to further reduce emissions, Mitigation Measure MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump trucks that meet or exceed EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality will be reduced to less than significant.

From: Toni Devereaux [mailto:toni_devereaux@yahoo.com]
Sent: Friday, November 15, 2013 5:43 PM
To: reservoircleanouts
Subject: Reservoir Cleanouts

Comment Letter #24

Comment 24-1

I am writing in support of the sluicing alternative to removing the sediment from Hahamonga. If there is a reasonable chance of some progress being made by sluicing, rather than hundreds of trucks on the freeway for 3-5 years, I believe this alternative should be at least attempted before the truck proposal.

Thank you,

Antoinette Devereaux

Response to Comment Letter #24 (Antionette Devereaux)

Response to Comment 24-1:

Thank you for your input. The comment has been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. Los Angeles County Flood Control District (LACFCD) notes the commenter's preference for Alternative 4 Sluicing. Sluicing was analyzed as part of the Draft Environmental Impact Report (EIR) in the Alternatives Analysis, Section 4.7, Alternative 4 Sluicing Method. This alternative would involve use of construction equipment and the removal of trees and vegetation over the same footprint as the Proposed Project. The sluicing alternative would potentially have additional significant impacts in comparison to the Proposed Project. Many of these impacts would be associated with the likelihood that large amounts of sediment would not be fully transported through the flood control system; this sediment would need to be mechanically removed and trucked out from numerous downstream locations. Please see Section 4.7 and Appendix K of the Draft EIR for further analysis.

From: Marge Nichols [mailto:marge@margenichols.com]
Sent: Saturday, November 16, 2013 9:03 PM
To: reservoircleanouts
Subject: Devil's Gate Cleanout

Comment Letter #25

Comment 25-1 I want to register my support for the project. It's natural that people don't like to see the ripanian habitat disrupted, but the problem is that it hasn't been cleared in so long that it developed into a different kind of area - not usual for a dam.

Comment 25-2 It has to be cleared out. People don't remember the huge debris basin problems of 1977-78, when extended rains caused debris and sediment flow to rise to dangerous levels. I have been critical of the county for not clearing these areas on a more frequent basis - and not it's come to the point that it's an enormous problem.

Comment 25-3 Still, the work has to be done and should be done with an effort to maintain at lease some natural parts of the area.

Marge Nichols

Response to Comment Letter #25 (Marge Nichols)

Response to Comment 25-1:

Thank you for your input. Los Angeles County Flood Control District (LACFCD) notes the commenter's support for the Proposed Project. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

Response to Comment 25-2:

LACFCD notes the commenter's support for sediment removal in light of potential debris events, such as those that have occurred in the past.

Response to Comment 25-3:

Many of the alternatives address configurations that allow for the preservation of some natural areas. Alternative 3, Configuration D affects the least amount of habitat of all the action alternatives, while still achieving Proposed Project objectives (see Section 4.6 of the Final EIR). This alternative would provide a buffer on the west side of the reservoir that would allow for the movement of wildlife (see Section 4.6 of the Final EIR). Alternative 3, Configuration D, Option 1 provides a more natural configuration for the reservoir by having two branches to carry water and sediment toward the face of the dam, avoiding disturbing a significant portion of existing vegetation. To further reduce the Proposed Project's footprint, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2, which drastically reduces the project's footprint of 120 acres down to 71 acres, would avoid excavation of the western branch, thereby providing a greater habitat buffer on the west side of the reservoir. In addition, the maintenance areas would be smaller than the original sediment removal footprint, allowing for habitat to reestablish and providing additional areas for wildlife movement.

-----Original Message-----
From: Janet Aird [mailto:janet@janetaird.com]
Sent: Monday, November 18, 2013 11:05 AM
To: reservoircleanouts
Subject: Devil's Gate Reservoir Sediment Removal and Management Project

Comment 26-1

Hello: I understand that it is necessary to remove the sediment from the existing reservoir. Does your plan add to the area of the reservoir? If so, by how much, and why? The current size has been sufficient for almost 100 years.

Comment 26-2

Have you thought of alternatives to enlarging the reservoir, such as techniques for allowing stormwater to infiltrate into the aquifer? Would it be possible to keep some of the dirt from the reservoir onsite for this purpose?

Thank you for your attention.

Janet Aird
626-756-0386

Response to Comment Letter #26 (Janet Aird)

Response to Comment 26-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. Neither the Proposed Project nor any of the alternatives add any acreage to the reservoir. The Proposed Project will occur entirely within the easement for the Los Angeles County Flood Control District (LACFCD). The LACFCD Devil's Gate Dam and Reservoir Easement encompasses approximately 258 acres. The Proposed Project involves approximately 120 acres, all located within the easement. Alternative 3, Configuration D, the environmentally superior alternative, which involves approximately 76 acres under Option 1 and approximately 71 acres under Option 2, is also completely located within the easement.

Response to Comment 26-2:

See Response to Comment 26-1. Accumulated sediment does not contribute to groundwater recharge from stormwater. As stated in the Draft EIR, the Proposed Project will remove accumulated sediment deposits within the reservoir. This means the percolation characteristics of the reservoir will return to pre-Station Fire conditions if not improve, and the reservoir will still permit penetration of rainfall and percolation of local runoff to replenish the groundwater basin. Sediment removal will restore Devil's Gate Reservoir to its current design standard. As such, the reservoir will have the ability to contain more of the local runoff, which in turn could result in more runoff penetrating into the ground in the Proposed Project area and subsequently recharging the groundwater basin. In addition, by keeping the reservoir clear of future sediment deposits, the Proposed Project will reduce the potential for accumulated sediments to negatively impact the percolation rate.

-----Original Message-----
From: Migonne & Al [mailto:oldyellller@earthlink.net]
Sent: Tuesday, November 19, 2013 11:13 AM
To: reservoircleanouts
Subject: Devil.s Gate Reservoir Sediment Removal and Management Project piblic comment from Allen Decker, La Canaada

Comment 27-1

My views on Proposed Project, I have attended the public meetings held in La Canada last week and wanted to give my opinion of the existing different plans. I feel the impacts that can't be mitigated should be changed to a more conservative debris removal plan.I realize the county funds already spent on the planning, but they are in need of major revisions. Your alternatives are being carried out using to many diesel trucks that cause significant air pollution far to close to four schools. in La Canada. The added burden will alter the time it takes to drive to the high The traffic is already heavy with no public bus service. The traffic will add greatly to the air pollution we are already experiencing. Kids are outside exercising within 100 yards of fully loaded trucks and empty trucks. I configuration with the center island left mostly intact is the best. But the removal should be done after school is let out or done in such a manner that our community does not riot when faced with the traffic and new smog. This can be done with a new EIR that requires natural gas trucks that do not pollute and with much less in the way of trucks. The project will have to be a continuing project where each year we maintain with a smaller imprint. Double the time frame to seven years, and require future smog emission requirements that will lower the smog levels. This project will cause an uproar if the current plans are used. The end goals will be met but with a more community based solution.PLease wait until school is out in June to start , then stop when

Comment 27-2

Comment 27-3

Comment 27-3 continued

school start again. Our La Canada school are the cornerstone of our community, and the current plans will not be accepted the current time frame, with smog creation near the many schools, and school exercising fields. La Canada really has no idea what is coming. Thanks for your considerations, Allen Decker, 4250 Beulah Dr., La Canada, Ca. 91011

Response to Comment Letter #27 (Allen Decker)

Response to Comment 27-1:

Thank you for your input. These comments have has been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. Los Angeles County Flood Control District (LACFCD) notes that the commenter prefers a more conservative alternative for impacts that cannot be mitigated.

Air quality impacts associated with truck traffic were analyzed in the Draft Environmental Impact Report (EIR) in Section 3.5. Lower emission trucks were considered for the Proposed Project; however, the availability of these trucks could not be guaranteed at the time the Draft EIR was written. LACFCD has conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed the United States (U.S.) Environmental Protection Agency (EPA) 2007 standards for emissions. Therefore, in order to further reduce emissions, Mitigation Measure MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump trucks that meet or exceed EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality will be reduced to less than significant.

Potential impacts due to the Proposed Project's truck trips were analyzed in the Draft EIR, Section 3.16, Transportation and Traffic. As listed in that section, a single intersection in the immediate vicinity of the Proposed Project site will have a potentially significant impact. In practice, hauling rates and routes may be adjusted to help reduce impacts, depending on operational need. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the Proposed Project site.

As noted in the Draft EIR, Section 3.4, Aesthetics, the Proposed Project will have significant temporary impacts to aesthetics; however, after the sediment removal phase of the Proposed Project is complete, a habitat restoration plan will be implemented that will allow native plant communities to reestablish outside the reservoir management area. Riparian Herbaceous vegetation is expected to continue to populate and/or reestablish in the management area of the Proposed Project site between maintenance activities.

Impacts associated with all the other potential California Environmental Quality Act (CEQA) resource issues were found to be less than significant or mitigated to the level of less than significant.

Response to Comment 27-2:

See Response to Comment 27-1. As noted above, only a single intersection in the immediate vicinity of the Proposed Project site, which includes the nearby schools, will have a potentially significant impact. Other intersections in the immediate vicinity of the Proposed Project site will operate at acceptable levels of service. As noted above, LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the Proposed Project site.

The project-related impacts on air quality in the immediate vicinity of the Proposed Project site, which includes the nearby schools, has been analyzed under Section 3.5.6, Impacts and Mitigation, AIR QUALITY-4, of the Draft EIR. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2,

impacts to air quality, including those associated with health effects, will be reduced to less than significant.

Response to Comment 27-3:

See Response to Comments 27-1 and 27-2. Limiting sediment removal activities to only the period outside the school year would reduce the anticipated project duration each year from 9 months (April to December, excluding holidays) to 2.5 months (June to mid August), which would significantly increase the overall project duration from 5 years up to 15 years and substantially increase project cost. LACFCD proposed a project duration of five years to reduce accumulated sediment in a timely fashion. The goal of LACFCD is to restore reservoir flood capacity as soon as feasible while reducing cost, minimizing the duration of environmental and construction impacts to the surrounding communities, and configuring the reservoir to allow for sustainable future maintenance. Extending the project would prolong the flood risk to downstream communities and increase the construction impacts to the surrounding communities.

Devil's Gate Reservoir Sediment Removal and Management Project

COMMENT CARD

Date: 11/21/2013

Name: Joan Hearst Address: 570 S Arroyo Blvd.

Email: hearst@usc.edu City/Zip: Pasadena 91105

Organization represented, if any: WPRA + self

Comment: It is time to develop a plan to recover water that falls from the sky rather than directing it to the sea!

Comment 28-1: This is a short-sighted plan that needs to be re-thought and whose proponents need to collaborate ~~with~~ & cities & citizens to work to save our water resources. This plan does none of this.

Comment 28-2: Why did you wait for a fire to pay attention to Arcadia?

Comment 28-3: Have you considered the mandible traffic impact? What will you do if the tunnel is closed (e.g. & on accident).

Please submit any comments on the proposed project today by placing this card in the comment box or send to LACFCD. **Correspondence should be postmarked by Monday, January 6, 2014.** Comments should include "Devil's Gate Reservoir Sediment Removal and Management Project" in the subject line and the name of a contact person. Comments can be submitted in the following ways:

Mail	Email	Fax
County of Los Angeles Department of Public Works Water Resources Division Reservoir Cleanouts Program P.O. Box 1460 Alhambra, CA 91802-1460	reservoircleanouts@dpw.lacounty.gov	(626) 979-5436

SUBMITTED TO K. PADILLA ORTIZ @ LVAA MTG NOV 21, 2013 7PM

Response to Comment Letter #28 (Joan Hearst – WPRA)

Response to Comment 28-1:

Thank you for your input. These comments have has been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. The goal of the Proposed Project is to restore reservoir flood capacity and is not a water recovery project. Outside experts in the community, especially those on the Stakeholder Task Force, were consulted during the formation of the Los Angeles County Flood Control District's (LACFCD's) Sediment Management Strategic Plan. Information from that consultation was used in the formulation of the Proposed Project and Alternatives. In addition, the purpose of the scoping process was to gather input from outside experts, cities, and agencies as well as the public on what the environmental analysis should consider and what alternatives should be analyzed. Information gathered from the scoping process was used in the formulation of the Proposed Project and Alternatives and preparation of the Draft EIR.

Response to Comment 28-2:

LACFCD has executed several sediment removal projects at Devil's Gate Reservoir in the past, with the last major effort being in 1994. Smaller amounts of sediment were removed in 2006, 2009, and as a part of the Interim Measures Project in 2011, 2012, and 2013. The average amount of sediment deposited in Devil's Gate Reservoir each year is approximately 130,000 cubic yards (cy). Following the 2009 Station Fire, approximately 1.3 million cy of sediment flowed into Devil's Gate Reservoir after just two average water year storm seasons. This is five times the typical average per year. In 2010, LACFCD proposed an emergency sediment removal project in response to the large inflow of sediment resulting from the Station Fire.

In early 2011, the County of Los Angeles Board of Supervisors motioned LACFCD to complete an EIR for a comprehensive sediment removal project at Devil's Gate. Knowing that the EIR would take a considerable amount of time to complete, the Board also motioned for an Interim Measures Project to be implemented in order to help reduce the flood risk downstream of the dam until the ultimate sediment removal project commenced.

Response to Comment 28-3:

Potential impacts due to the Proposed Project's truck trips were analyzed in the Draft EIR, Section 3.16, Transportation and Traffic. As listed in that section, a single intersection in the immediate vicinity of the Proposed Project site will have a potentially significant impact. In practice, hauling rates and routes may be adjusted to help reduce impacts, depending on operational need. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the Proposed Project site. In addition, the Proposed Project will not block access to any roadways, and impacts related to emergency access would be less than significant.

While the majority of the sediment disposal and associated truck traffic is expected to go to the disposal sites east of the Proposed Project, the Draft EIR also analyzed the use of disposal sites west of the Proposed Project. This will allow for flexibility in case one particular route is temporarily unavailable for use.

COUNTY OF LOS ANGELES

FIRE DEPARTMENT

1320 NORTH EASTERN AVENUE
LOS ANGELES, CALIFORNIA 90063-3294

DARYL L. OSBY
FIRE CHIEF
FORESTER & FIRE WARDEN

November 14, 2013

Jemellee Cruz, Staff Member
Reservoir Cleanouts Program
Department of Public Works
P. O. Box 1460
Alhambra, CA 91802-1460

Dear Jemellee Cruz:

DRAFT ENVIRONMENTAL IMPACT REPORT, SCH NO. 2011091084, "DEVIL'S GATE RESERVOIR SEDIMENT REMOVAL AND MANAGEMENT PROJECT," REMOVE SEDIMENT FROM DEVIL'S GATE RESERVOIR TO RESTORE CAPACITY AND TO PROTECT THE DAM AND ITS VALVES TO REDUCE THE RISK OF FLOODING IN THE COMMUNITIES LOCATED DOWNSTREAM, OAK GROVE AND WINDSOR DRIVE, PASADENA (FFER #201300183)

The Draft Environmental Impact Report has been reviewed by the Planning Division, Land Development Unit, Forestry Division, and Health Hazardous Materials Division of the County of Los Angeles Fire Department. The following are their comments:

PLANNING DIVISION:

Comment 29-1

1. The subject property is entirely within the City of Pasadena which is not a part of the emergency response area of the Los Angeles County Fire Department (also known as the Consolidated Fire Protection District of Los Angeles County). Therefore, this project does not appear to have any impact on the emergency responsibilities of this Department.

LAND DEVELOPMENT UNIT:

1. This project is located entirely in the City of Pasadena. Therefore, the City of Pasadena Fire Department has jurisdiction concerning this project and will be setting conditions. This project is located in close proximity to the jurisdictional area of the Los Angeles County Fire Department. However, this project is unlikely to have an impact that necessitates a comment concerning general requirements from the Land Development Unit of the Los Angeles County Fire Department.

2. The County of Los Angeles Fire Department, Land Development Unit, appreciates the opportunity to comment on this project.

3. The statutory responsibilities of the County of Los Angeles Fire Department, Land Development Unit, are the review of, and comment on all projects within the unincorporated areas of the County of Los Angeles. Our emphasis is on the availability of sufficient water supplies for firefighting operations and local/regional access issues. However, we review all projects for issues that may have a significant impact on the County of Los Angeles Fire Department. We are responsible for the review of all projects within contract cities (cities that contract with the County of Los Angeles Fire Department for fire protection services). We are responsible for all County facilities, located within non-contract cities. The County of Los Angeles Fire Department, Land Development Unit, may also comment on conditions that may be imposed on a project by the Fire Prevention Division, which may create a potentially significant impact to the environment.

Comment 29-2

4. Should any questions arise regarding subdivision, water systems, or access, please contact the County of Los Angeles Fire Department, Land Development Unit Inspector, Claudia Soiza at (323) 890-4243.

FORESTRY DIVISION – OTHER ENVIRONMENTAL CONCERNS:

1. The statutory responsibilities of the County of Los Angeles Fire Department, Forestry Division include erosion control, watershed management, rare and endangered species, vegetation, fuel modification for Very High Fire Hazard Severity Zones or Fire Zone 4, archeological and cultural resources, and the County Oak Tree Ordinance.

Comment 29-3

2. The areas germane to the statutory responsibilities of the County of Los Angeles Fire Department, Forestry Division, have been addressed.

HEALTH HAZARDOUS MATERIALS DIVISION:

Comment 29-4

1. Based on the submitted documents, the Health Hazardous Materials Division has no objection to the proposed project.

If you have any additional questions, please contact this office at (323) 890-4330.

Very truly yours,

Frank Vidales

FRANK VIDALES, CHIEF, FORESTRY DIVISION
PREVENTION SERVICES BUREAU

FV:jl

Response to Comment Letter #29 (Los Angeles County Fire Department)

Response to Comment 29-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. Los Angeles County Flood Control District (LACFCD) notes that the County of Los Angeles Fire Department Planning Division has determined that the Proposed Project does not appear to have an impact on the emergency responsibilities of the Department.

Response to Comment 29-2:

LACFCD notes that the County of Los Angeles Fire Department Land Development Unit has determined that the Proposed Project does not appear to have an impact that necessitates a comment from the Department.

Response to Comment 29-3:

LACFCD notes the responsibilities of the County of Los Angeles Fire Department, Forestry Division.

Response to Comment 29-4:

LACFCD notes that the County of Los Angeles Fire Department, Health Hazardous Materials Division has no objection to the Proposed Project, as stated in the comment letter.

Comment Letter #30

From: Doris Finch [mailto:ifinchi@fabart.net]
Sent: Wednesday, November 20, 2013 12:43 PM
To: reservoircleanouts
Subject: Hahamonga

To all involved in the Hahamonga clearance project,

Comment 30-1

This has clearly become an explosive subject and needs further consideration [or reconsideration]. The park and water areas have become a valuable community asset while at the same time everyone in the area wants decent flood control. Both weigh heavily so serious and creative study needs to be done to accomplish the latter while not destroying the former. There is also the matter

Comment 30-2

of the number of trucks called for, making a huge number of trips per hour six days a week for a period of five years. It is hard to imagine a plan making life intolerable for affected residents for that period of time, plus destroying their property value for those years, even being considered viable.

Comment 30-3

Since the scope of the project seems to change, having become suddenly far larger, one is left to wonder if that is driven by necessity or desire to flatten or seriously wound the environmental protesters. Inundation maps show a far less dire situation that has been presented. A SLOW plan has been offered which does not seem to have received serious consideration. It may in fact be highly preferable. It offers both sustainability and far lower cost, both highly desirable. The attached video makes the case. http://www.youtube.com/watch?v=F7wPWYl_8c8&feature=youtu.be
There is no reason not to incorporate this thinking into the plans.

Respectfully, Doris Finch, Altadena

Response to Comment Letter #30 (Doris Finch)

Response to Comment 30-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. As noted in the Draft Environmental Impact Report (EIR), the purpose of the Proposed Project is to reduce flood risk by restoring reservoir capacity for flood control. The Draft EIR analyzes the effect the Proposed Project will have on the community, including recreation.

Alternative 3, Configuration D affects the least amount of reservoir area of all the action alternatives while still achieving Proposed Project objectives (see Section 4.6 of the Final EIR). This alternative would provide a buffer between the Oak Grove area of Hahamongna Watershed Park and the excavation area (see Section 4.6 of the Final EIR). Alternative 3, Configuration D, Option 1 provides a more natural configuration for the reservoir by having two branches to carry water and sediment toward the face of the dam, avoiding disturbing a significant portion of existing vegetation. To further reduce the Proposed Project's footprint, Los Angeles County Flood Control District (LACFCD) has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2, which drastically reduces the project's footprint of 120 acres down to 71 acres, would avoid excavation of the western branch, thereby providing a greater habitat buffer on the west side of the reservoir. In addition, the maintenance areas would be smaller than the original sediment removal footprint, allowing for habitat to reestablish (see Section 4.6 of the Final EIR).

Response to Comment 30-2:

Although the sediment removal phase of the Proposed Project will occur over a five-year period, the removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays), as described in the Draft EIR, Section 2.5.1 Sediment Removal Phase, Project Schedule.

Potential impacts due to the Proposed Project's truck trips were analyzed in the Draft EIR, Section 3.16, Transportation and Traffic. As listed in that section, a single intersection in the immediate vicinity of the Proposed Project site will have a potentially significant impact. The Draft EIR outlines a 12-hour trucking schedule, with trucking operations on Saturdays as well. This schedule is used to model the most intensive construction operation, which may not be applicable at the Proposed Project site for the duration of the project. Typical trucking schedules are estimated to be 8 hours per day on weekdays. In practice, hauling rates and routes may be adjusted to help reduce impacts, depending on operational need. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the Proposed Project site.

Response to Comment 30-3:

LACFCD was mandated by the State Legislature to provide flood protection and water conservation within its boundaries.

A reservoir storage design capacity of two design debris events (DDEs) below the dam's lowest spillway was determined to be the standard acceptable level of risk at Devil's Gate Dam and Reservoir. The DDE volume of capacity is determined using the January 2006 Los Angeles County Department of Public Works (LACDPW) Hydrology Manual and the March 2006 LACDPW Sedimentation Manual. For Devil's

Gate Dam and Reservoir, the required reservoir capacity is 4.0 million cubic yards (cy) (two DDEs) below the spillway elevation of 1,040.50 feet.

The Hydrology Manual (January 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_Hydrology_Manual/2006%20Hydrology%20Manual-Divided.pdf

The Sedimentation Manual (March 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_sedimentation_manual/Sedimentation%20Manual-Second%20Edition.pdf

Additional information concerning DDE calculation methods has been added to the Final EIR, Section 2.3, Project Need.

In 2010, in response to the Station Fire, an emergency project to remove only 1.67 million cubic yards (cy) was proposed. The volume of 1.67 million cy is the previously published DDE and this amount was considered justifiable as an emergency exemption to the California Environmental Quality Act (CEQA). This emergency project was not completed because in March 2011, the County of Los Angeles Board of Supervisors motioned LACFCD to complete an EIR for a comprehensive sediment removal project at Devil's Gate. LACFCD then initiated project development in accordance with the required level of protection of two DDEs. At that time, LACFCD also began receiving feedback on the concurrent Sediment Management Strategic Plan (Strategic Plan) and the interest to look at more sustainable sediment and reservoir management. As a result of the feedback and recommendations during the development of the Strategic Plan, LACFCD began evaluating ways to create a more sustainable long-term way to manage its sediment and habitat. To emphasize the goals of the project, the Proposed Project was given the name Devil's Gate Sediment Removal and Management Project.

LACFCD goes to great lengths to lessen project impacts and maximize efficiencies. As such, many of the points in the Arroyo Seco Foundation's four-point "Slow Program" are compatible with the LACFCD Proposed Project.

For example, the Draft EIR concluded that Alternative 3 is the Environmentally Superior Alternative. Alternative 3, Configuration D, Option 2 drastically reduces the project's footprint of 120 acres down to 71 acres. Additionally, the limited maintenance area for Alternative 3 further reduces the permanent habitat impacts down to approximately 51 acres by allowing for site replanting and mitigation to take place within the reservoir footprint. This reduction in project acreages will greatly lessen environmental impacts of the Proposed Project.

LACFCD strives to achieve an efficient, low-cost sediment removal project. Sediment removal rates and trucking operations, now utilizing all low-emissions trucks, as explained in Section 3.5 of the Draft EIR, have been carefully planned for economies of scale to realize maximum efficiencies without major delays in project schedule, thus greatly reducing operating costs. Furthermore, LACFCD has applied for and received an approximately $28 million grant through the State's Disaster Preparedness and Flood Protection Bond Act of 2006 (Proposition 1E) program. A portion of this grant will be used to help offset the Proposed Project's costs.

While sluicing is not a viable project alternative, as explained in Section 4.7 of the Draft EIR, Flow Assisted Sediment Transport, or FASTing, will be used for maintenance after the project's main sediment removal phase has been completed, as described in Section 2.5.2 of the Draft EIR.

LACFCD is committed to *Public Service that Works*; and by combining almost 100 years of technical expertise and invaluable input from the community, less invasive flood protection will continue to be a reality.

For a more detailed response to the Arroyo Seco Foundation's four-point "Slow Program", please see the response to the Arroyo Seco Foundation's comment letter (Comment Letter #216, Response to Comment 216-16).

From: Grace Wong [mailto:gywseven7@gmail.com]
Sent: Monday, November 25, 2013 9:00 AM
To: reservoircleanouts
Subject: Devil's Gate Reservoir Sediment Removal and Management Project

Comment Letter #31

To: Water Resources Division
Reservoir Cleanouts Program

Problems with the project:

Comment 31-1 · The project is unsustainable. The County still does not have a plan for where to put all this sediment once these pits are full.

Comment 31-2 · This project will permanently destroy 50-120 acres of regionally significant willow and mulefat forest. This is a critical habitat for a wide variety of birds and wildlife.

Comment 31-3 · It is unacceptable for the neighboring community to endure the noise and pollution of 425 diesel trucks per day, six days a week and at least nine months per year for the next five years.

Comment 31-4 · The County DEIR never makes a science-based case for the need to remove 2-4 million cubic yards of sediment and the need to remove it within five years.

Comment 31-5 · The biological section of the DEIR does not list all wildlife species expected to occur, only report what few were seen. No contact or consultation was made with local organizations, like Pasadena Audubon Society, Arroyo Seco Foundation etc., who regularly conduct surveys in Hahamongna.

What The County Should Do :

Comment 31-6 · The County needs a “forever plan,” one that is sustainable and does not permanently

Comment 31-6 continued

destroy one of the most import open spaces in the region.

- The county is focused only on safety and efficiency. We want safety and sustainability.

Comment 31-7

My children grew up going to the Hahamongna Watershed Park. Many of their school nature field trips, summer camps were all conducted there. They are now ready to be parent and have children of their own. We cannot take away such precious nature playground for our future generation.

Sincerely,
Grace Wong
Altadena, CA

Response to Comment Letter #31 (Grace Wong)

Response to Comment 31-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. The disposal sites located to the east of the Proposed Project currently have sufficient capacity for the entire amount of sediment proposed to be removed. The disposal sites located to the west of the Proposed Project will provide additional capacity if needed. The available pits and disposal sites, as outlined in the Proposed Project Description, have enough capacity for the sediment that is planned to be removed.

After the sediment removal phase has occurred, Flow Assisted Sediment Transport, or FASTing, is proposed to be an integral part of the annual maintenance at Devil's Gate. Annual FASTing operations will be implemented to reduce future buildups of sediment in the reservoir and to reduce the need for mechanical removal of sediment from the reservoir. Although FASTing is expected to be an effective means of keeping sediment levels low in the reservoir, it is estimated that typically 13,000 cy of sediment will be removed by excavation annually. However, a maintenance regime that relies on FASTing greatly reduces the need for and extends the life of future and existing sediment placement sites and improves the future sustainability of the reservoir. Please see Section 2.5.2 of the Draft EIR for more information on future maintenance.

Response to Comment 31-2:

As discussed in Section 3.6.6 of the Draft Environmental Impact Report (EIR), Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats. Wildlife species currently found in the Proposed Project area would be expected to either remain in the undisturbed areas of the reservoir outside the Proposed Project area or to reestablish once sediment removal activities have been completed.

Response to Comment 31-3:

Air quality and noise impacts associated with truck traffic were analyzed in the Draft EIR in Sections 3.5 and 3.14, respectively. As discussed in the Draft EIR, Section 3.14, with implementation of Mitigation Measure MM N-1, noise impacts would be reduced to a level of less than significant. Los Angeles County Flood Control District (LACFCD) has conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed the United States (U.S.) Environmental Protection Agency's (EPA's) 2007 standards for emissions. Therefore, in order to further reduce emissions, Mitigation Measure MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump trucks that meet or exceed EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality will be reduced to less than significant.

Response to Comment 31-4:

The LACFCD was mandated by the State Legislature to provide flood protection and water conservation within its boundaries.

A reservoir storage design capacity of two design debris events (DDEs) below the dam's lowest spillway was determined to be the standard acceptable level of risk at Devil's Gate Dam and Reservoir. The DDE

volume of capacity is determined using the January 2006 Los Angeles County Department of Public Works (LACDPW) Hydrology Manual and the March 2006 LACDPW Sedimentation Manual. For Devil's Gate Dam and Reservoir, the required reservoir capacity is 4.0 million cy (two DDEs) below the spillway elevation of 1,040.50 feet.

The Hydrology Manual (January 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_Hydrology_Manual/2006%20Hydrology%20Manual-Divided.pdf

The Sedimentation Manual (March 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_sedimentation_manual/Sedimentation%20Manual-Second%20Edition.pdf

Additional information concerning DDE calculation methods has been added to the Final EIR, Section 2.3, Project Need.

LACFCD proposed a project duration of five years to reduce accumulated sediment in a timely fashion. The goal of LACFCD is to restore reservoir flood capacity as soon as feasible while reducing cost, minimizing the duration of environmental and construction impacts to the surrounding communities, and configuring the reservoir to allow for sustainable future maintenance. Extending the project would prolong the flood risk to downstream communities and increase the construction impacts to the surrounding communities.

Response to Comment 31-5:

Many local organizations, including the Pasadena Audubon Society, Hahamongna Watershed Park Advisory Committee, the Urbanwild Network, and the Arroyo Seco Foundation, were contacted about the Proposed Project prior to the Draft EIR being prepared. In January 2012, a representative of the Pasadena Audubon Society was contacted for information the Society has concerning birds observed in the Proposed Project area. The information provided was used in preparing the biological resources section of the Draft EIR. Species with the potential to occur within the Proposed Project site and species that were identified during surveys are presented in the biological survey reports in Appendix D of the Draft EIR. Factors used to determine the potential for occurrence included the quality of habitat, elevation, and the results of the reconnaissance survey. The locations of prior database records and species lists of occurrence were used as additional data; but since these are positive-sighting databases, this data was used only in support of the analysis from the previously identified factors. Based on the results of the Biological Technical Report (BTR), additional protocol-level focused surveys were conducted for Proposed Project as described in Section 3.6.2, Special Status Plant Species and Special Status Animal Species of the Draft EIR.

Response to Comment 31-6:

Alternative 3, Configuration D affects the least amount of habitat of all the action alternatives while still achieving Proposed Project objectives (see Section 4.6 of the Final EIR). This alternative would provide a buffer on the west side of the reservoir that would allow for the movement of wildlife. Alternative 3, Configuration D, Option 1 provides a more natural configuration for the reservoir by having two branches to carry water and sediment toward the face of the dam, avoiding disturbing a significant portion of existing vegetation. To further reduce the Proposed Project's footprint, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2, which drastically

reduces the project's footprint of 120 acres down to 71 acres, would avoid excavation of the western branch, thereby providing a greater habitat buffer on the west side of the reservoir. In addition, the maintenance areas would be smaller than the original sediment removal footprint, allowing for habitat to reestablish and providing additional areas for wildlife movement.

After the sediment removal phase has occurred, FASTing is proposed to be an integral part of the annual maintenance at Devil's Gate. Annual FASTing operations will be implemented to reduce future buildups of sediment in the reservoir and to reduce the need for mechanical removal of sediment from the reservoir. Although FASTing is expected to be an effective means of keeping sediment levels low in the reservoir, it is estimated that typically 13,000 cy of sediment will be removed by excavation annually. However, a maintenance regime that relies on FASTing greatly reduces the need for and extends the life of future and existing sediment placement sites and improves the future sustainability of the reservoir. Please see Section 2.5.2 of the Draft EIR for more information on future maintenance.

See Response to Comment 31-4 regarding project duration.

Response to Comment 31-7:

See Response to Comments 31-2 and 31-6.

Alternative 3, Configuration D, which was found to be the Environmentally Superior Alternative in the Draft EIR, was based on the City of Pasadena's Hahamongna Watershed Park Master Plan (HWPMP).

LACFCD has met and will continue to meet with the City of Pasadena regularly to coordinate and ensure resolution of concerns regarding Devil's Gate Reservoir and the HWPMP.

From: Kathleen Warner [mailto:kmwarner3@earthlink.net]
Sent: Saturday, November 23, 2013 6:53 PM
To: reservoircleanouts
Cc: kmwarner3@earthlink.net
Subject: Devil's Gate Reservoir Sediment Removal and Management Project

Comment Letter #32

Comment 32-1

I am writing to protest in the strongest possible terms the proposed project to alter the topography of Hahamonga Park in some misguided belief that the area is in need of "management." This is an environmentally sensitive area that needs protection not pavement. I am incensed that Pasadena's purported need for yet another soccer field and related additional parking takes precedence over the quality of life of La Canada residents. This is unacceptable.

Comment 32-2

As a resident of La Canada not that far from where this work is to take place, I strenuously object to the extremely negative impact this project will have on my family's quality of life not only from a traffic congestion, noise and air pollution standpoint, but I am deeply concerned about the safety of students in the area who while either walking or driving will have to dodge giant dump trucks day after day after day. Pick up and drop off at La Canada High School is already a nightmare. You add all the trucks to that mix and it will be Armageddon.

Comment 32-3

La Canada has only recently put out to bid a sound wall project to limit the amount of freeway truck noise to which we are currently exposed. This project will essentially nullify any anticipated benefit from the construction of any such sound walls.

Comment 32-4 I urge you to immediately stop this project in its tracks and prevent it from being undertaken at any future date.

Regards,

Kathleen M Warner
La Canada, CA

Response to Comment Letter #32 (Kathleen Warner)

Response to Comment 32-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. The purpose and need for the Proposed Project is based on providing the flood control capacity necessary. The area behind the dam will not be paved. Only a small portion of the access roads entering and exiting the reservoir will be paved. In addition, this Proposed Project does not include any soccer fields or parking areas.

Response to Comment 32-2:

Potential impacts due to the Proposed Project's truck trips were analyzed in the Draft Environmental Impact Report (EIR), Section 3.16, Transportation and Traffic. As listed in that section, a single intersection in the immediate vicinity of the Proposed Project site will have a potentially significant impact. In practice, hauling rates and routes may be adjusted to help reduce impacts, depending on operational need. As discussed in the Draft EIR, Section 3.16, Transportation and Traffic, TRANSPORTATION-3, modifications to roadway conditions by the Proposed Project will consist of roadway restriping. These changes would not alter existing roadway use or substantially increase hazards. Thus, impacts related to traffic hazards would be less than significant. Los Angeles County Flood Control District (LACFCD) will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the Proposed Project site.

Air quality and noise impacts associated with truck traffic were analyzed in the Draft EIR in Sections 3.5 and 3.14, respectively. As discussed in the Draft EIR, Section 3.14, with implementation of Mitigation Measure MM N-1, noise impacts would be reduced to a level of less than significant. LACFCD has conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed the United States (U.S.) Environmental Protection Agency's (EPA's) 2007 standards for emissions. Therefore, in order to further reduce emissions, Mitigation Measure MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump trucks that meet or exceed EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality will be reduced to less than significant.

Response to Comment 32-3:

The Draft EIR, Section 3.14.6, Sediment Removal/Reservoir Management, Offsite Vehicular Noise, analyzed the noise impacts from the haul trucks. The analysis found that the maximum noise increase on the roads in the immediate vicinity of the Devil's Gate Dam and Reservoir area would be a 1-decibel (dB) increase on Berkshire Place east of the Interstate-210 (I-210) northbound ramps. A 1-dB increase is well below the 3-dB increase threshold of perception. Therefore, the Proposed Project would not have a significant impact on the anticipated benefit of the sound walls for I-210. Typical trucking schedules are estimated to be 8 hours per day on weekdays. In practice, hauling rates and routes may be adjusted to help reduce impacts, depending on operational need. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the Proposed Project site.

Response to Comment 32-4:

LACFCD notes the commenter's objection to the Proposed Project.

From: Kathi Ellsworth [mailto:pandionsky@yahoo.com]
Sent: Friday, November 22, 2013 12:41 PM
To: reservoircleanouts
Subject: Devil's Gate Reservoir Sediment Removal and Management Project

Comment Letter #33

Devil's Gate Reservoir Sediment Removal and Management Project

COMMENT CARD

Date: November 22, 2013

Name: Kathi Ellsworth Address: 448 Shadyglen Lane

Email: pandionsky@yahoo.com City/Zip: San Dimas, CA

Comment:

Comment 33-1

It is my understanding that this Sediment Removal and Management Project will permanently destroy 50-120 acres of riparian willow-mulefat habitat in the Hahamongna Watershed Park.

I certainly take exception to this project. I have heard that the draft EIR is lacking in

science and the biological survey describing the impact on flora and fauna of the area north of Devil's Gate dam is misleading and insufficient.

It Is my purpose here to define some scientific information that is lacking in the DEIR as it stands today.

My data is derived from a publication by the U.S. Fish and Wildlife Survey titled: The Ecology of Riparian Habitats of the Southern California Coastal Region: A community profile. This publication was extensive (152 pages) and addresses riparian habitats like the flood basin above Devil's Gate Dam. This is what we are dealing with – a riparian habitat; whether it has always been riparian or not is not pertinent, we have a riparian habitat now and must deal with that kind of habitat in all further considerations.

Comment 33-1 continued

In the document, it states "Floodplains and alluvial fans of a number of watercourses flowing out of the San Gabriel, San Bernardino, and San Jacinto Mountain support a distinctive plant community, structurally and floristically diverse, consisting of an unusually large proportion of arborescent evergreen shrubs and a rich assemblage of subshrubs…"

It further describes "the modern riparian plant community of Southern California is derived from a southern madro-tertiary xeric element and a northern arcto-tertial mesic element. Species distribution in this flood-prone habitat is closed tied to the water regime of streams, not only for water supply in a seasonally dry landscape but for a series of events important in plant establishment and succession. Common trees include white alder (a riparian indicator species), willow, cottonwood, and sycamore. The zone closest to the water is most frequently disturbed by storms and is dominated by alder and willow, while cottonwood, sycamore, and oak grow to large sizes on terraces above the river. This part of the riparian community is the most depleted. Species composition varies somewhat from north to south, coastal to inland, and low to high elevational gradients. There are only a few rare or endangered plants associated with riparian habitat, but the riparian community itself is an endangered community due to the activities of man".

It states that "Riparian zones usually have a high rate of recovery and develop a range of successional vegetation where the habitat is protected or appropriately managed."

The publication goes in depth to discuss not only the flora of riparian habitat but also the fauna, from aquatic and terrestrial insects (which have recently been used in some environmental impact reports), fish (both native and introduced), amphibians and reptiles, birds (including distribution, breeding, food & foraging, birds for insect control, changes in status, birds species of concern, expanding species, winter bird use and taxonomic indication), and mammals (riparian-associated mammals and status).

In light of the recent Station Fire, a certain portion of the Fish and Wildlife publication stands out as especially important today:

”Role of Fire in Nutrient Cycling Between Eco-systems

A vast amount of the riparian habitat of Southern California intergrades with chaparral or coastal scrub communities. Chaparral vegetation is particularly prone to fire because of its dense, contiguous growth and lack of moisture. Often the chaparral community produces an abundance of fuel that accumulates faster than it decomposes because of resistance to decay or climatic factors. These plant accumulation are highly flammable; thus fire is a regular occurrence under natural conditions and infrequent but inevitable due to fire-exclusion policies, particularly near urban areas.

Comment 33-1 continued

“R. Vogl (personal communication) suggests that the riparian community serves an important role in fire/flood sequences in Southern California, resulting in energy flows between plant communities. Fires reduce organic matter to a buoyant ash and charcoal. The flotsam component is usually transported in an emulsion that resists burial and assures widespread surface deposition. During winter rains and flood, charcoal and emulsified mineral products are carried into streams, where they are deposited onto the land by flood waters or carried downstream toward coastal wetlands. Nutrients bound in light, non-wettable fragments of charcoal and ash emulsion are buoyant and remain in the upper layers of flood-deposited sediments, readily available to new plant growth. Nutrients derived from a chaparral comminty in a fire/dflood cycle may reamin in the same community or be transported to the banks or floodplain of an adjacent coastal freshwater or saltwater marsh. The riparian corridor thus becomes a kind of circulatory system linking plant communities in the fire/flood model. In area where riparian cover has been removed, leaf-litter levels are reduced or elimination and soils are exposed. As a result, stream sediment loads from erosion are increased and water velocity increases, minimizing the energy-transfer potential of fire/flood cycles. Nutrient may then be transferred in fast-flowing water downstream and lost in the ocean."

Further “the degree of disturbance of riparian habitat is important, particularly where the understory is removed or altered. Where escaped exotics are invasive and dominant, habitat become less valuable to wildlife. In a study along the Santa Clara River, 24 species of birds were observed in a stand of riparian woodland trees with an undisturbed understory, in contrast to 6 species observed in a similar stand of riparian woodland trees with a disturbed understory (Smith, 1979). Nests in the open are more susceptible to predators, inclement weather, and other environmental factors.”

The proposed DEIR describes 50 species utilizing the riparian corridor above Devil’s Gate dam. It is a true shame to think that in five years that number would be decreased 75% to about 10 species due to the habitat destruction described in the plan.

In the scenario suggested by the current DEIR proposed by L.A. County, the natural riparian habitat will be continually removed and disturbed. The loss of natural successional growth by plants, insects, amphibians, reptiles, birds and mammals of the riparian habitat will be lost forever.

It is our choice to keep this from happening! Given that this quoted Fish and Wildlife

Comment 33-1 continued

publication was written in 1989, artificial pressures from the expansion of human population are even greater today in 2013. Existing riparian habitat becomes exponentially more important with it's loss of energy, wildlife, and the human pleasure derived from its existence.

Comment 33-2

I make the case that L.A. County of Public Works make a "forever plan" that is sustainable and does not permanently destroy this important riparian region. A more limited removed of debris would suffice for the safety of the populations below the dam. Please consider the scientific facts and impact of what is proposed and not just the simple solution to arbitrarily remove everything. This is not a solution, it is a travesty being decried by even the humans who have intimate knowledge of that area; dog walkers, joggers, birders, horseback riders, hikers, biologists, etc.

Kathi Ellsworth
448 Shadyglen Lane
San Dimas, CA 91773
(626) 524-0652

Suggested Citation:

Faber, P.A., C. Keller, A. Sands, and B.M. Massey,1989. The Ecology of Riparian Habitats of the Southern Calfornia Coastal Region: A Community Profile. U.S. Fish and Wildlife Serv. Biol. Rep. 85(7.27), 152 pp.

"Only when the last tree has died, the last river has been poisoned, and the last fish has been caught will we realize we cannot eat money." old Cree saying

Response to Comment Letter #33 (Kathi Ellsworth)

Response to Comment 33-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. The Draft Environmental Impact Report (EIR), Biological Technical Report (BTR), and focused surveys provide thorough and accurate existing conditions for biological resources (Draft EIR, Section 3.6; Appendix D, Biological Reports). Species with the potential to occur within the Proposed Project and species that were identified during surveys are presented in the biological survey reports in Appendix D of the Draft EIR. Factors used to determine the potential for occurrence included the quality of habitat, elevation, and the results of the reconnaissance survey. The locations of prior database records and species lists of occurrence were used as additional data; but since these are positive-sighting databases, this data was used only in support of the analysis from the previously identified factors. Based on the results of the BTR, additional protocol-level focused surveys were conducted for Proposed Project. The field surveys were conducted in 2010 and 2013 and included general biological surveys, focused sensitive plant surveys, focused least Bell's vireo surveys, and federal and state jurisdictional waters surveys, as described in Section 3.6 of the Draft EIR. The amount and location of riparian and mulefat habitat and impacts to these habitats vary between the Proposed Project and the action alternatives, as shown in the Draft EIR, Section 4.0 Alternatives Analysis.

As discussed in Section 3.6.6 of the Draft EIR, Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats. Wildlife species currently found in the Proposed Project area would be expected to either remain in the undisturbed areas of the reservoir outside the Proposed Project area or to reestablish once sediment removal activities have been completed.

Response to Comment 33-2:

The Los Angeles County Flood Control District (LACFCD) was mandated by the State Legislature to provide flood protection and water conservation within its boundaries.

A reservoir storage design capacity of two design debris events (DDEs) below the dam's lowest spillway was determined to be the standard acceptable level of risk at Devil's Gate Dam and Reservoir. The DDE volume of capacity is determined using the January 2006 Los Angeles County Department of Public Works (LACDPW) Hydrology Manual and the March 2006 LACDPW Sedimentation Manual. For Devil's Gate Dam and Reservoir, the required reservoir capacity is 4.0 million cubic yards (cy) (two DDEs) below the spillway elevation of 1,040.50 feet.

The Hydrology Manual (January 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_Hydrology_Manual/2006%20Hydrology%20Manual-Divided.pdf

The Sedimentation Manual (March 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_sedimentation_manual/Sedimentation%20Manual-Second%20Edition.pdf

Additional information concerning DDE calculation methods has been added to the Final EIR, Section 2.3, Project Need.

Alternative 3, Configuration D affects the least amount of habitat of all the action alternatives while still achieving Proposed Project objectives (see Section 4.6 of the Final EIR). This alternative would provide a buffer on the west side of the reservoir that would allow for the movement of wildlife (see Section 4.6 of the Final EIR). Alternative 3, Configuration D, Option 1 provides a more natural configuration for the reservoir by having two branches to carry water and sediment toward the face of the dam, avoiding disturbing a significant portion of existing vegetation. To further reduce the Proposed Project's footprint, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2, which drastically reduces the project's footprint of 120 acres down to 71 acres, would avoid excavation of the western branch, thereby providing a greater habitat buffer on the west side of the reservoir. In addition, the maintenance areas would be smaller than the original sediment removal footprint, allowing for habitat to reestablish and providing additional areas for wildlife movement.

After the sediment removal phase has occurred, FASTing is proposed to be an integral part of the annual maintenance at Devil's Gate. Annual FASTing operations will be implemented to reduce future buildups of sediment in the reservoir and to reduce the need for mechanical removal of sediment from the reservoir. Although FASTing is expected to be an effective means of keeping sediment levels low in the reservoir, it is estimated that typically 13,000 cy of sediment will be removed by excavation annually.

The Proposed Project is designed to be a long-term plan, with the reservoir management phase providing management for future sediment inflows. The proposed yearly cleanout of sediment after the completion of the Proposed Project will reduce the necessity for a future large-scale cleanout.

Comment Letter #34

Devil's Gate Reservoir Sediment Removal and Management Project

COMMENT CARD

Date: 11/19/13

Name: Carolyn Otto Address: 4155 Cambridge Rd

Email: toofio@earthlink.net City/Zip: LCF - 91011

Organization represented, if any:

Comment 34-1: As a neighbor of this proposed project I highly recommend that this be re considered - The amount of truck traffic created be VERY detrimental to the high School and surrounding neighbors -

Comment 34-2: It's obvious that those who created this proposal do not live or work in the vicinity -

Comment 34-3: Please reconsider or abandon this project -

Carolyn Otto

Please submit any comments on the proposed project today by placing this card in the comment box or send to LACFCD. **Correspondence should be postmarked by Monday, January 6, 2014.** Comments should include "Devil's Gate Reservoir Sediment Removal and Management Project" in the subject line and the name of a contact person. Comments can be submitted in the following ways:

Mail	Email	Fax
County of Los Angeles Department of Public Works Water Resources Division Reservoir Cleanouts Program P.O. Box 1460 Alhambra, CA 91802-1460	reservoircleanouts@dpw.lacounty.gov	(626) 979-5436

Response to Comment Letter #34 (Carolyn Otto)

Response to Comment 34-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

Potential impacts due to the Proposed Project's truck trips were analyzed in the Draft Environmental Impact Report (EIR), Section 3.16, Transportation and Traffic. As listed in that section, a single intersection in the immediate vicinity of the Proposed Project site will have a potentially significant impact. In practice, hauling rates and routes may be adjusted to help reduce impacts, depending on operational need. Los Angeles County Flood Control District (LACFCD) will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the Proposed Project site.

Response to Comment 34-2:

Comment noted.

Response to Comment 34-3:

LACFCD notes the commenter's objection to the Proposed Project.

From: Sylvia Stachura
To: reservoircleanouts
Subject: Devil"s Gate
Date: Monday, November 25, 2013 9:22:20 PM

Comment 35-1

Dear Sirs: The plan to 'clean' the Hahamonga Wildlife area, part of the Devil's Gate Reservoir must be done on a more human and at a slower pace than the currently
proposed plan. The area is so full of wildlife and has become a wonderful area for
Birding and wild life advocates such as myself that I'm imploring you to take a slower
& more considerate plan to clean out sediment. Please consider a plan that, although it may take more time, will be more compatible for humans and wildlife of the area.

Sincerely, Sylvia Stachura, Pasadena Audubon Society member
236 S. De Anza St.
San Gabriel, CA. 91776

Response to Comment Letter #35 (Sylvia Stachura – Pasadena Audubon Society Member)

Response to Comment 35-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

Los Angeles County Flood Control District (LACFCD) proposed a project duration of five years to reduce accumulated sediment in a timely fashion. The goal of LACFCD is to restore reservoir flood capacity as soon as feasible while reducing cost, minimizing the duration of environmental and construction impacts to the surrounding communities, and configuring the reservoir to allow for sustainable future maintenance. Extending the project would prolong the flood risk to downstream communities and increase the construction impacts to the surrounding communities.

As discussed in Section 3.6.6 of the Draft Environmental Impact Report (EIR), Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats. Sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays). Wildlife species currently found in the Proposed Project area would be expected to either remain in the undisturbed areas of the reservoir outside the Proposed Project area or to reestablish once sediment removal activities have been completed.

Alternative 3, Configuration D affects the least amount of habitat of all the action alternatives while still achieving Proposed Project objectives (see Section 4.6 of the Final EIR). This alternative would provide a buffer on the west side of the reservoir that would allow for the movement of wildlife. Alternative 3, Configuration D, Option 1 provides a more natural configuration for the reservoir by having two branches to carry water and sediment toward the face of the dam, avoiding disturbing a significant portion of existing vegetation. To further reduce the Proposed Project's footprint, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2, which drastically reduces the project's footprint of 120 acres down to 71 acres, would avoid excavation of the western branch, thereby providing a greater habitat buffer on the west side of the reservoir. In addition, the maintenance areas would be smaller than the original sediment removal footprint, allowing for habitat to reestablish and providing additional areas for wildlife movement.

From: Susan Gilliland
To: reservoircleanouts
Subject: Hahamonga Watershed Park
Date: Wednesday, November 27, 2013 11:36:26 AM

Dear Department of Public Works,

Comment 36-1

I am writing to express my deep concern and disapproval of the LA County's plan to remove sediment from the Hahamonga Watershed.

I hope that you will express your concern to this plan that is so extreme that I honestly cannot believe that it is a serious plan. Yet, it is.

Comment 36-2

1. I understand the plan to remove sediment from the Watershed; yet, this plan that is proposed is that it will permanently destroy 50 to 120 acres of willow and mulefat riparian forest. Perhaps the County has not heard that this area provides needed habitat for the Yellow Warbler that is a species of Special Concern in California and also in 2012, Least Bell's Vireo's nested there for the first time. Least Bell's Vireos are a federally endangered species. Many Audubon Societies are watching this project very carefully.

Comment 36-3

2. Another very serious issue is the air pollution that will be generated by this project. Surely you are aware that the County is proposing 425 trucks per day (that's 50 trucks per HOUR) to drive through local neighborhoods and on the 210 freeway. The trucks will operate for nine months or more per year, six days a week – for five years. It doesn't take a lot to understand that those diesel trucks will cause unacceptable levels of air pollution, noise, and odor. Please think about the health impact to citizens of Pasadena – and if fact many communities! The County says the air pollution, nosie pollution and smell are unavoidable and there is nothing they can do to mitigate this. ***Really?*** Please do not carry out this plan as proposed.

Comment 36-4

What I am asking you to do is to carefully examine the proposal offered by Tim Brick of the Arroyo Seco Foundation: Go Slow (10-20 years instead of 3-5 years – the sediment has been building up for nearly 100 years and sediment will continue to flow into the basin), Go with the Flow (allow more sediment to flow through the dam – sluicing), Let the Habitat Grow, and Keep Costs Low. This plan will mean fewer trucks, less air pollution, less noise, less odor, less habitat destruction, and lower costs.

Please, go the Arroyo Seco Foundation website and learn more. http://www.arroyoseco.org/index.htm

Comment 36-4 continued

Thank you for caring about making our County a wonderful, green place to live in harmony with Mother Nature.

Best Regards,

Susan S. Gilliland, PhD, MPH, RN

525 Avon Avenue

Pasadena, CA 91105

Response to Comment Letter #36 (Susan Gilliland)

Response to Comment 36-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. Los Angeles County Flood Control District (LACFCD) notes the commenter's objection to the Proposed Project.

Response to Comment 36-2:

As discussed in Section 3.6.6 of the Draft Environmental Impact Report (EIR), Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species, including sensitive bird species, and to restore and enhance riparian and sensitive habitats. Sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays). Bird species currently found in the Proposed Project area would be expected to either remain in the undisturbed areas of the reservoir outside the Proposed Project area or to reestablish once sediment removal activities have been completed.

Response to Comment 36-3:

Air quality and noise impacts associated with truck traffic were analyzed in the Draft EIR in Sections 3.5 and 3.14, respectively. As discussed in the Draft EIR, Section 3.14, with implementation of Mitigation Measure MM N-1, noise impacts would be reduced to a level of less than significant. LACFCD has conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed the United States (U.S.) Environmental Protection Agency's (EPA's) 2007 standards for emissions. Therefore, in order to further reduce emissions, Mitigation Measure MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump trucks that meet or exceed EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality, including those associated with health effects, will be reduced to less than significant. As discussed in the Draft EIR, Section 3.5, impacts related to odors were determined to be less than significant.

Response to Comment 36-4:

LACFCD goes to great lengths to lessen project impacts and maximize efficiencies. As such, many of the points in the Arroyo Seco Foundation's four-point "Slow Program" are compatible with the LACFCD Proposed Project.

For example, the Draft EIR concluded that Alternative 3 is the Environmentally Superior Alternative. Alternative 3, Configuration D, Option 2 drastically reduces the project's footprint of 120 acres down to 71 acres . Additionally, the limited maintenance area for Alternative 3 further reduces the permanent habitat impacts down to approximately 51 acres by allowing for site replanting and mitigation to take place within the reservoir footprint. This reduction in project acreages will greatly lessen environmental impacts of the Proposed Project.

LACFCD strives to achieve an efficient, low-cost sediment removal project. Sediment removal rates and trucking operations, now utilizing all low-emissions trucks, as explained in Section 3.5 of the Draft EIR, have been carefully planned for economies of scale to realize maximum efficiencies without major delays in project schedule, thus greatly reducing operating costs. Furthermore, LACFCD has applied for

and received an approximately $28 million grant through the State's Disaster Preparedness and Flood Protection Bond Act of 2006 (Proposition 1E) program. A portion of this grant will be used to help offset the Proposed Project's costs.

While sluicing is not a viable project alternative, as explained in Section 4.7 of the Draft EIR, Flow Assisted Sediment Transport, or FASTing, will be used for maintenance after the project's main sediment removal phase has been completed, as described in Section 2.5.2 of the Draft EIR.

LACFCD is committed to *Public Service that Works*; and by combining almost 100 years of technical expertise and invaluable input from the community, less invasive flood protection will continue to be a reality.

For a more detailed response to the Arroyo Seco Foundation's four-point "Slow Program", please see the response to the Arroyo Seco Foundation's comment letter (Comment Letter #216, Response to Comment 216-16).

From: frank Gilliland
To: reservoircleanouts
Subject: Hahamonga Watershed Park
Date: Wednesday, November 27, 2013 12:43:50 PM

Dear Department of Public Works,

Comment 37-1

I am writing to express my deep concern and disapproval of the LA County's plan to remove sediment from the Hahamonga Watershed.

I hope that you will express your concern to this plan that is so extreme that I honestly cannot believe that it is a serious plan. Yet, it is.

Comment 37-2

1. I understand the plan to remove sediment from the Watershed; yet, this plan that is proposed is that it will permanently destroy 50 to 120 acres of willow and mulefat riparian forest. Perhaps the County has not heard that this area provides needed habitat for the Yellow Warbler that is a species of Special Concern in California and also in 2012, Least Bell's Vireo's nested there for the first time. Least Bell's Vireos are a federally endangered species. Many Audubon Societies are watching this project very carefully.

Comment 37-3

2. Another very serious issue is the air pollution that will be generated by this project. Surely you are aware that the County is proposing 425 trucks per day (that's 50 trucks per HOUR) to drive through local neighborhoods and on the 210 freeway. The trucks will operate for nine months or more per year, six days a week – for five years. It doesn't take a lot to understand that those diesel trucks will cause unacceptable levels of air pollution, noise, and odor. Please think about the health impact to citizens of Pasadena – and if fact many communities! The County says the air pollution, nosie pollution and smell are unavoidable and there is nothing they can do to mitigate this. ***This is a completely inadequate response and will be the basis for legal action if not responsively revised***

Comment 37-4

What I am asking you to do is to carefully examine the proposal offered by Tim Brick of the Arroyo Seco Foundation: Go Slow (10-20 years instead of 3-5 years – the sediment has been building up for nearly 100 years and sediment will continue to flow into the basin), Go with the Flow (allow more sediment to flow through the dam – sluicing), Let the Habitat Grow, and Keep Costs Low. This plan will mean fewer trucks, less air pollution, less noise, less odor, less habitat destruction, and lower costs.

Please, go the Arroyo Seco Foundation website and learn more. http ://www.arroyoseco.org/index.htm

Sincerely;

Frank Gilliland MD

525 Avon Avenue

Pasadena, CA 91105

Frank Gilliland MD Ph.D.
Hastings Professor
Keck School of Medicne
University of Southern California
2001 N. Soto Street, MC 9237
Los Angeles, CA 90089

For FEDEX deliveries use zip code 90032

office 323-442-1309
fax 323-442-3272

Response to Comment Letter #37 (Frank Gilliland)

Response to Comment 37-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. Los Angeles County Flood Control District (LACFCD) notes the commenter's objection to the Proposed Project.

Response to Comment 37-2:

As discussed in Section 3.6.6 of the Draft Environmental Impact Report (EIR), Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species, including sensitive bird species, and to restore and enhance riparian and sensitive habitats. Sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays). Bird species currently found in the Proposed Project area would be expected to either remain in the undisturbed areas of the reservoir outside the Proposed Project area or to reestablish once sediment removal activities have been completed.

Response to Comment 37-3:

Air quality and noise impacts associated with truck traffic were analyzed in the Draft EIR in Sections 3.5 and 3.14, respectively. As discussed in the Draft EIR, Section 3.14, with implementation of Mitigation Measure MM N-1, noise impacts would be reduced to a level of less than significant. LACFCD has conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed the United States (U.S.) Environmental Protection Agency's (EPA's) 2007 standards for emissions. Therefore, in order to further reduce emissions, Mitigation Measure MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump trucks that meet or exceed EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality, including those associated with health effects, will be reduced to less than significant. As discussed in the Draft EIR, Section 3.5, impacts related to odors were determined to be less than significant.

Response to Comment 37-4:

LACFCD goes to great lengths to lessen project impacts and maximize efficiencies. As such, many of the points in the Arroyo Seco Foundation's four-point "Slow Program" are compatible with the LACFCD Proposed Project.

For example, the Draft EIR concluded that Alternative 3 is the Environmentally Superior Alternative. Alternative 3, Configuration D, Option 2 drastically reduces the project's footprint of 120 acres down to 71 acres . Additionally, the limited maintenance area for Alternative 3 further reduces the permanent habitat impacts down to approximately 51 acres by allowing for site replanting and mitigation to take place within the reservoir footprint. This reduction in project acreages will greatly lessen environmental impacts of the Proposed Project.

LACFCD strives to achieve an efficient, low-cost sediment removal project. Sediment removal rates and trucking operations, now utilizing all low-emissions trucks, as explained in Section 3.5 of the Draft EIR, have been carefully planned for economies of scale to realize maximum efficiencies without major delays in project schedule, thus greatly reducing operating costs. Furthermore, LACFCD has applied for

and received an approximately $28 million grant through the State's Disaster Preparedness and Flood Protection Bond Act of 2006 (Proposition 1E) program. A portion of this grant will be used to help offset the Proposed Project's costs.

While sluicing is not a viable project alternative, as explained in Section 4.7 of the Draft EIR, Flow Assisted Sediment Transport, or FASTing, will be used for maintenance after the project's main sediment removal phase has been completed, as described in Section 2.5.2 of the Draft EIR.

LACFCD is committed to *Public Service that Works*; and by combining almost 100 years of technical expertise and invaluable input from the community, less invasive flood protection will continue to be a reality.

For a more detailed response to the Arroyo Seco Foundation's four-point "Slow Program", please see the response to the Arroyo Seco Foundation's comment letter (Comment Letter #216, Response to Comment 216-16).

STATE OF CALIFORNIA Edmund G. Brown, Jr.Governor

NATIVE AMERICAN HERITAGE COMMISSION
1550 Harbor Boulevard, Suite 100
West Sacramento, CA 95691
(916) 373-3715
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November 20, 2013

Mr. Christopher Stone

Los Angeles County Flood Control District

P.O. Box 1460
Alhambra, CA 91802-1460

RE: SCH#2011091084; CEQA Notice of Completion; draft Environmental Impact Report (DEIR) for the **"Devil's Gate Reservoir Sediment Removal & Management Project;"** located in the City of Pasadena, along the Arroyo Seco; Los Angeles County, California

Dear Mr. Stone:

The Native American Heritage Commission (NAHC) has reviewed the above-referenced environmental document.

The California Environmental Quality Act (CEQA) states that any project which includes archeological resources, is a significant effect requiring the preparation of an EIR (CEQA guidelines 15064.5(b). To adequately comply with this provision and mitigate project-related impacts on archaeological resources, the Commission recommends the following actions be required:

Comment 38-1

Contact the appropriate Information Center for a record search to determine :If a part or all of the area of project effect (APE) has been previously surveyed for cultural places(s), The NAHC recommends that known traditional cultural resources recorded on or adjacent to the APE be listed in the draft Environmental Impact Report (DEIR).

If an additional archaeological inventory survey is required, the final stage is the preparation of a professional report detailing the findings and recommendations of the records search and field survey. We suggest that this be coordinated with the NAHC, if possible. The final report containing site forms, site significance, and mitigation measurers should be submitted immediately to the planning department. All information regarding site locations, Native American human remains, and associated funerary objects should be in a separate confidential addendum, and not be made available for pubic disclosure pursuant to California Government Code Section 6254.10.

Comment 38-2

A list of appropriate Native American Contacts for consultation concerning the project site has been provided and is attached to this letter to determine if the

Comment 38-2 continued

proposed active might impinge on any cultural resources. Lack of surface evidence of archeological resources does not preclude their subsurface existence.

Comment 38-3

Lead agencies should include in their mitigation plan provisions for the identification and evaluation of accidentally discovered archeological resources, pursuant to California Health & Safety Code Section 7050.5 and California Environmental Quality Act (CEQA) §15064.5(f). In areas of identified archaeological sensitivity, a certified archaeologist and a culturally affiliated Native American, with knowledge in cultural resources, should monitor all ground-disturbing activities. Also, California Public Resources Code Section 21083.2 require documentation and analysis of archaeological items that meet the standard in Section 15064.5 (a)(b)(f).

Comment 38-4

Lead agencies should consider first, avoidance for sacred and/or historical sites, pursuant to CEQA Guidelines 15370(a). Then if the project goes ahead then, lead agencies include in their mitigation plan provisions for the analysis and disposition of recovered artifacts, pursuant to California Public Resources Code Section 21083.2 in consultation with culturally affiliated Native Americans.

Comment 38-5

Lead agencies should include provisions for discovery of Native American human remains in their mitigation plan. Health and Safety Code §7050.5, CEQA §15064.5(e), and Public Resources Code §5097.98 mandates the process to be followed in the event of an accidental discovery of any human remains in a location other than a dedicated cemetery.

Sincerely,

Dave Singleton
Program Analyst

CC: State Clearinghouse

Attachment: Native American Contacts list

Native American Contacts
Los Angeles County, California
November 20, 2013

LA City/County Native American Indian Comm
Ron Andrade, Director
3175 West 6th St, Rm. 403
Los Angeles , CA 90020
randrade@css.lacounty.gov
(213) 351-5324
(213) 386-3995 FAX

Gabrielino Tongva Indians of California Tribal Council
Robert F. Dorame, Tribal Chair/Cultural Resources
P.O. Box 490 Gabrielino Tongva
Bellflower , CA 90707
gtongva@verizon.net
562-761-6417 - voice
562-761-6417- fax

Tongva Ancestral Territorial Tribal Nation
John Tommy Rosas, Tribal Admin.
Private Address Gabrielino Tongva
,
tattnlaw@gmail.com
310-570-6567

Gabrielino-Tongva Tribe
Bernie Acuna, Co-Chairperson
P.O. Box 180 Gabrielino
Bonsall , CA 92003
(619) 294-6660-work
(310) 428-5690 - cell
(760) 636-0854- FAX
bacuna1@gabrielinotribe.org

Gabrieleno/Tongva San Gabriel Band of Mission
Anthony Morales, Chairperson
PO Box 693 Gabrielino Tongva
San Gabriel , CA 91778
GTTribalcouncil@aol.com
(626) 286-1632
(626) 286-1758 - Home
(626) 286-1262 -FAX

Gabrielino-Tongva Tribe
Linda Candelaria, Co-Chairperson
P.O. Box 180 Gabrielino
Bonsall , CA 92003
palmsprings9@yahoo.com
626-676-1184- cell
(760) 636-0854 - FAX

Gabrielino /Tongva Nation
Sandonne Goad, Chairperson
P.O. Box 86908 Gabrielino Tongva
Los Angeles , CA 90086
sgoad@gabrielino-tongva.com
951-845-0443

Gabrieleno Band of Mission Indians
Andrew Salas, Chairperson
P.O. Box 393 Gabrielino
Covina , CA 91723
gabrielenoindians@yahoo.
(626) 926-4131

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of the statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

his list s only applicable for contacting local Native Americans with regard to cultural resources for the proposed SCH#2011091084; CEQA Notice of Completion; draft Environmental Impact Report (DEIR); located in the City of Pasadena; Los Angeles County, California.

Native American Contacts
Los Angeles County, California
November 20, 2013

Gabrielino-Tongva Tribe
Conrad Acuna,
P.O. Box 180 Gabrielino
Bonsall , CA 92003

760-636-0854 - FAX

Gabrielino /Tongva Nation
Sam Dunlap, Cultural Resorces Director
P.O. Box 86908 Gabrielino Tongva
Los Angeles , CA 90086
samdunlap@earthlink.net
909-262-9351

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of the statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

his list s only applicable for contacting local Native Americans with regard to cultural resources for the proposed SCH#2011091084; CEQA Notice of Completion; draft Environmental Impact Report (DEIR); located in the City of Pasadena; Los Angeles County, California.

Response to Comment Letter #38 (Native American Heritage Commission)

Response to Comment 38-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. A cultural resources literature review and records search was conducted for the Proposed Project at the South Central Coastal Information Center (SCCIC) located at California State University in Fullerton. The results of the records search are discussed in the Draft Environmental Impact Report (EIR), Section 3.7.5 and in the Cultural Resources Report (Appendix E of the Draft EIR). As discussed in the Draft EIR, Section 3.7 and in the Cultural Resources Report, Chambers Group conducted an archaeological survey of Devil's Gate Reservoir for the Los Angeles County Flood Control District (LACFCD). The survey was conducted pursuant to Section 15064.5 of the *California Environmental Quality Act (CEQA) Guidelines*, with respect to the identification and preservation of historic resources, and also in accordance with Section 106 of the National Historic Preservation Act of 1966, as amended (16 U.S.C. 470f and 470h-2), and its implementing regulations (36 CFR 800.4), as well as the 2004 Programmatic Agreement (PA) among the Federal Highway Administration, the Advisory Council on Historic Preservation, and the California State Historic Preservation Officer (SHPO), regarding compliance with Section 106 of the PA. The Draft EIR and Cultural Resources Report discuss the findings of the records search and field survey. In addition, the Draft EIR provides Mitigation Measures to reduce potentially significant impacts to less than significant.

Response to Comment 38-2:

The comment advises consultation with the Native American tribes and interested Native American consulting parties in order to determine if the Proposed Project might impinge on any cultural resources. The comment also references a list of Native American contacts in the Proposed Project area attached to the comment letter for consultation. The culturally affiliated tribes and interested Native American individuals provided by the Native American Heritage Commission (NAHC) have been provided pertinent project information as recommended and as documented in the Cultural Resources Report found as Appendix E of the Draft EIR.

Response to Comment 38-3:

As discussed in Section 3.7.6 of the Draft EIR, Mitigation Measures MM CUL-1 and MM CUL-2 are provided for the Proposed Project. These Mitigation Measures include monitoring of ground-disturbing activities if activities encounter native soils and provisions for the identification and evaluation of accidentally discovered archaeological and paleontological resources.

Response to Comment 38-4:

The comment recommends avoidance of Native American cultural resources sites that could be damaged or destroyed. As detailed in the Draft EIR for the Proposed Project, the likelihood of encountering significant subsurface archaeological materials within the Proposed Project area is low. The Proposed Project was found to have a less than significant impact on sacred or historic sites. Excavations in the reservoir will not exceed historic depths, as sediment to be removed from the reservoir is newly deposited above historic ground elevations. Additionally, please see Response to Comment 38-3 for more information.

Response to Comment 38-5

This comment provides citations of codes which provide provisions for inadvertent discovery of human remains outside a dedicated cemetery. As discussed in the Draft EIR, Mitigation Measure MM CUL-3 includes the following: "In the event human remains are discovered, all work in the area must be halted until the County Coroner identifies the remains and makes recommendations regarding their appropriate treatment pursuant to PRC Section 5097.98."

Comments on Devil's Gate DEIR 12/1/2013

1. This project needs to be coordinated with four other activities going on in and around the Arroyo.
    a. Pasadena's West side project (Flint Canyon and the West trail).
    b. Pasadena's Arroyo water intake project (up the Arroyo near the ranger station.)
    c. The reclamation of the JPL East Parking lot.
    d. The JPL parking garage – including restoration of West side trail by the JPL fence.
    e. The CEQA process requires looking at cumulative impacts.

Comment 39-1

2. Is 2.0 DDE of sediment removal really required? Try to minimize this.
    a. 2.0 DDE seems to have been pulled out of the air without an analysis of flood probabilities.
    b. Do a careful analysis of flood flow statistics and debris statistics and try to minimize the amount of sediment that must be removed. See Appendix A.
    c. 1.0 DDE (or 1.5) would be better than 2.0

Comment 39-2

3. Limit the annual removal to 200,000 cu yards or less per year.
    a. Take longer to get to the target reservoir capacity.

Comment 39-3

4. Hours of operation
    a. Start trucks AFTER school starts for grades 7 and 8 and High School
        i. An 8:30 AM start would be much better than 7 AM.
    b. Consider JPL traffic patterns as well
    c. Consider 12 hours days on Saturday and Sunday and shorter days during the week
        i. You might survey residents on this.
    d. Consider the timing of traffic jams on the 210 – especially the 2 lane connections both Eastbound in the afternoon (through the tunnel) and Westbound in the morning.
        i. Travel times to Irwindale will be much longer after 3 PM
        ii. The 210 doesn't need any additional traffic during rush hours.
    e. Question: What is the estimated round trip time at various times of the day? Consider doing an experiment.
    f. Question: How many trucks will be required?
    g. Question: Where will the trucks be parked at night?
    h. Question: What will you do to prevent long queues of trucks waiting to be loaded? Prevent idling.

Comment 39-4

5. Use the Alternate Haul Route back across Woodbury
    a. Do not allow trucks on Berkshire in either direction.

Comment 39-5

6. Use low-emission trucks
    a. EPA 2007 is not good enough. Use at least EPA 2010.
    b. Use latest EPA or CARB emissions standards – whichever is more stringent
        i. Should include SCR and DPF at a minimum

Comment 39-6

Comment 39-6 continued

c. Or use the emission standards that have been implemented at the ports.
d. Require Natural Gas or other Low emission fuels.

Comment 39-7

7. Noise considerations:
    a. Ban Jake Brakes on the downhill road into the Arroyo
    b. Plan routes in the Arroyo to avoid the need for the trucks to back-up
        i. That will avoid the "beep" "beep" "beep" warnings

Comment 39-8

8. The mitigation measures are wholly inadequate. 6 of 7 items do zero mitigation.
    a. Activities like "plan" "survey" "monitor" provide useful baselines but do not accomplish actual mitigation.
    b. Use configuration C – with habitat left in the middle

Comment 39-9

9. Consider reducing the number of settling ponds on the East side in order to mitigate the loss of habitat from the sediment removal area.
    a. Can you find 70 acres to offset the loss of habitat in the removal area?
    b. Work with Pasadena to let some of the existing or new settling ponds revert to natural habitat.
    c. Consider keeping the sediment in Johnson Field and letting it revert to natural habitat.

Comment 39-10

10. Consider a permanent shallow lake near the dam
    a. This will greatly improve the aesthetics.
    b. This will attract waterfowl.

Comment 39-11

11. Consider a conveyor system (horizontal transport) plus two lifting portions so that trucks can be loaded on the Woodbury Bridge.
    a. This will reduce dust, noise, and air pollution going uphill.
    b. Will keep most trucks out of the Arroyo
    c. Will alleviate the invasive species problem on tires

Comment 39-12

12. Question: Will sluicing (FAST) damage the only soft bottom part of the Arroyo South of the Rose Bowl?
    a. Isn't the rest of the channel to the LA River convergence all concrete?
    b. Will sluicing result in the need for more sediment removal downstream?

Comment 39-13

13. For the Eastern access road into the Arroyo, try to save the large Oak trees on Woodbury

Comment 39-14

14. We have a choice of a small surface area and deep versus a large area and shallower.
    a. I prefer small surface area and deep – 70 acres or less

Comment 39-15

15. Do not pump water from the Arroyo to Eaton Canyon. Pump the water into the Pasadena settling ponds and keep it in the Arroyo.

Summary:

Comment 39-16

1. Reduce volume that must be removed
2. Reduce acreage that is denuded
3. Try to find areas that can be converted to native habitat – true mitigation
4. Use natural gas or other low emission trucks
5. Do not start trucks before 8:30 AM. Reduce hours of operation.
6. Stretch out removal period to 10 or 20 years.
7. Use alternative haul route – stay off Berkshire.
8. Use configuration C.

R. Rhoads (Rody) Stephenson
4455 Rockland Place, Unit 10
La Canada, CA 91011
rodys@earthlink.net
(818) 248-7472

Appendix A

Comment 39-17
1. The whole purpose of the dam and this project is to reduce the probability of downstream floods.

Comment 39-18
2. The Draft EIR does not present any analysis for the amount of reservoir capacity needed.

Comment 39-19
3. 2.0 DDE was arbitrarily selected. You may be able to do with less removal.

4. I suggest you do an in-depth analysis and prepare a graph similar to the attached sketch on Page 5.
    a. Y-axis – Probability of flood over the next 50 years.
    b. X-axis – Reservoir capacity in million cu yards
    c. Plot 4 different lines depending on how long you take to remove the sediment

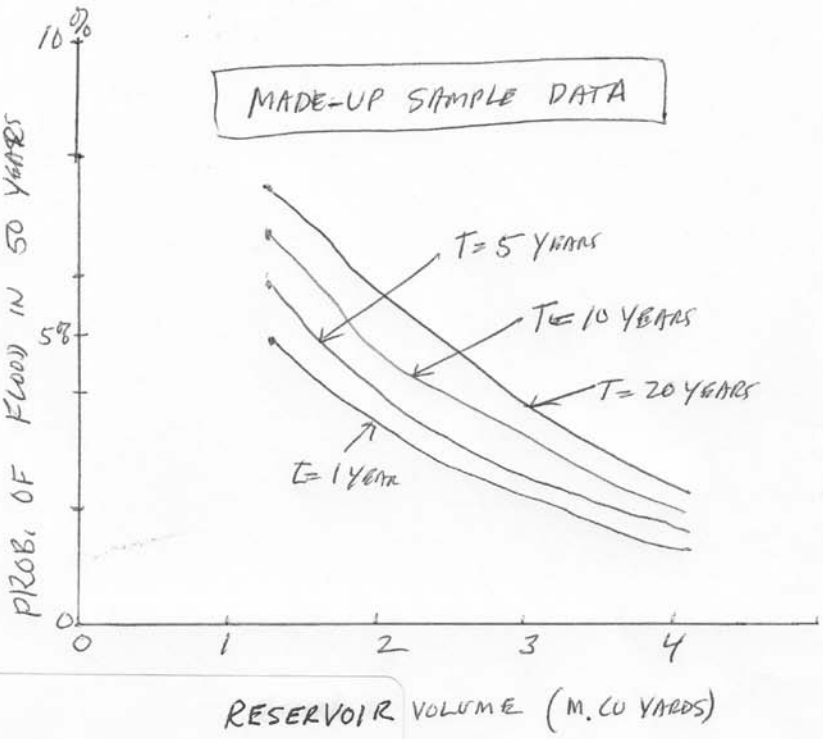
Comment 39-20
        i. One-year – as if the sediment could magically be removed in one year (2015).
        ii. 5 years starting in 2015
        iii. 10 years
        iv. 20 years
    d. A Monte Carlo simulation may be useful
    e. The attached sketch is sample data – just a guess what the curves will look like.
        i. Please replace with real statistical analysis results.

5. Assumptions
    a. "Flood" should be defined as over-topping of the concrete channel somewhere between the dam and the LA River Convergence.

Comment 39-21
    b. The target reservoir capacity will then define how much sediment needs to be removed.
    c. You can include additional sediment additions from year to year.
    d. Consider the UCLA regional climate study for future temperatures and precipitation projections.

Comment 39-22
6. Pick an annual removal rate and then dig each year until you reach the target reservoir volume.

Comment 39-23
7. This is the kind of data that the Board of Supervisors can use to determine the risk versus environmental impact trade-off.


MADE-UP SAMPLE DATA
10%
5%
0
PROB. OF FLOOD IN 50 YEARS
T = 5 YEARS
T = 10 YEARS
T = 20 YEARS
T = 1 YEAR
0
1
2
3
4
RESERVOIR VOLUME (M. CU YARDS)

Response to Comment Letter #39 (R. Stephenson)

Response to Comment 39-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. Los Angeles County Flood Control District (LACFCD) has been and will continue to work closely with the City of Pasadena in coordinating Proposed Project activities with other area projects. The Draft Environmental Impact Report (EIR) contains a cumulative impact analysis within each of the subsections of Section 3.0 Environmental Analysis. The cumulative analysis contains projects as determined by LACFCD and the surrounding cities and communities to have a potential cumulative effect due to overlapping time frames of the projects. The list of these projects is included in Section 2.9 Cumulative Scenario and includes the JPL On-site Parking Structure, Arroyo Seco Canyon Project, and the Hahamongna Watershed Park (HWP) Multi-Benefit/Multi-Use Project (which includes the Westside Perimeter Trail and reclamation of the eastside surface parking lot). Potential projects that were determined to be outside the area of influence, sediment-removal phase of the project schedule, or lacking sufficient project detail, were not considered to be reasonable foreseeable probable future projects, as set forth in the CEQA Guidelines Section 15130.

Response to Comment 39-2

The LACFCD was mandated by the State Legislature to provide flood protection and water conservation within its boundaries.

A reservoir storage design capacity of two design debris events (DDEs) below the dam's lowest spillway was determined to be the standard acceptable level of risk at Devil's Gate Dam and Reservoir. The DDE volume of capacity is determined using the January 2006 Los Angeles County Department of Public Works (LACDPW) Hydrology Manual and the March 2006 LACDPW Sedimentation Manual. For Devil's Gate Dam and Reservoir, the required reservoir capacity is 4.0 million cubic yards (cy) (two DDEs) below the spillway elevation of 1,040.50 feet.

The Hydrology Manual (January 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_Hydrology_Manual/2006%20Hydrology%20Manual-Divided.pdf

The Sedimentation Manual (March 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_sedimentation_manual/Sedimentation%20Manual-Second%20Edition.pdf

Additional information concerning DDE calculation methods has been added to the Final EIR, Section 2.3, Project Need.

Response to Comment 39-3:

Assuming that no sediment flows into the reservoir over the course of the removal project, limiting the annual removal to 200,000 cy per year would increase the project duration as much as 12 to 15 years. Taking into consideration the sediment inflow that could happen during the Proposed Project, the project duration could be increased even further. Historically, large amounts of sediment have been deposited in the reservoir in short time periods. Between 1935 and 1938 over 1.6 million cy of sediment, between 1938 and 1943 over 1.95 million cy of sediment, between 1959 and 1966 over 1.75 million cy

of sediment, and between 2010 and 2012 over 1.3 million cy of sediment was deposited in the reservoir. Since the 1920 dam construction and prior to the Station Fire in 2009, approximately 10.7 million cy of sediment accumulated in the reservoir; and approximately 8.0 million cy was removed by LACFCD. In order for the removal project to be efficient, and therefore reduce costs, the amount of sediment removed every year needs to exceed the amount of sediment deposited. Historically, an average of approximately 130,000 cy was deposited in Devil's Gate Reservoir annually since 1920. If a similar sediment influx occurred during the course of the Proposed Project, the project duration could increase even further.

LACFCD proposed a project duration of five years to reduce accumulated sediment in a timely fashion. The goal of LACFCD is to restore reservoir flood capacity as soon as feasible while reducing cost, minimizing the duration of environmental and construction impacts to the surrounding communities, and configuring the reservoir to allow for sustainable future maintenance. Extending the project would prolong the flood risk to downstream communities and increase the construction impacts to the surrounding communities.

Response to Comment 39-4:

Although the sediment removal phase of the Proposed Project will occur over a five-year period, the removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays), as described in the Draft EIR, Section 2.5.1 Sediment Removal Phase, Project Schedule.

Potential impacts due to the Proposed Project's truck trips were analyzed in the Draft EIR, Section 3.16, Transportation and Traffic. As listed in that section, a single intersection in the immediate vicinity of the Proposed Project site will have a potentially significant impact. The Draft EIR outlines a 12-hour trucking schedule, with trucking operations on Saturdays as well. This schedule is used to model the most intensive construction operation, which may not be applicable at the Proposed Project site for the duration of the Proposed Project. Typical trucking schedules are estimated to be 8 hours per day on weekdays. In practice, hauling rates and routes may be adjusted to help reduce impacts, depending on operational need. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the Proposed Project site. Also as discussed in the Draft EIR, Section 3.16, truck traffic associated with the Proposed Project will not cause any major traffic impacts at the studied freeway segments, along any of the Haul Routes.

As discussed in the Draft EIR, Section 3.5, Air Quality, travel times will vary depending on the time of day and year. For the sediment disposal trucks, an aggregate average for vehicle speeds is expected to be 5 miles per hour (mph) to 45 mph for surface street mileage and 50 mph to 70 mph for highway mileage.

As discussed in the Draft EIR, Section 2.5, Proposed Project Description, the accumulated sediment will be excavated with construction equipment including but not limited to approximately four front loaders with 4-cubic-yard buckets, two bulldozers, one excavator, one grader, one water truck, and two tender trucks (for fuel and maintenance). The number of double dump semi-trucks that will be required to transport sediment to its final placement location will depend on daily construction operations, traffic, and disposal location. The maximum number of truck trips that will occur during one day is 425.

At the end of daily construction activities, sediment removal equipment will be left in a secure area within the Proposed Project site. Sediment hauling trucks be stored offsite nightly by their respective operators. This would include, as necessary, front loaders, bulldozers, excavator, grader, water truck, and tender trucks. All necessary BMPs will be implemented to protect against fuel and other liquid spills. Sediment transport trucks are typically operated by independent owners who will be responsible for offsite storage of the truck after the day's construction activities have ended.

During the sediment removal phase, excavators will be loading sediment into trucks for offsite disposal. All of the trucks will be loaded within the reservoir; and if a queue of trucks develops, the trucks will stage within the reservoir itself to lessen impacts on the adjacent streets. Long queuing and idling times will not occur during the Proposed Project. It is estimated that trucks will briefly idle during loading, but the average loading time per truck is estimated to be one minute. In addition, LACFCD typically requires equipment to shut down if idling time is expected to be more than five minutes.

Response to Comment 39-5:

LACFCD notes that the commenter prefers the haul route alternative that does not use Berkshire Place on ramp/off ramp.

Response to Comment 39-6:

Air quality impacts associated with truck traffic were analyzed in the Draft EIR in Section 3.5. LACFCD has conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed the United States (U.S.) Environmental Protection Agency's (EPA's) 2007 standards for emissions. Therefore, in order to further reduce emissions, Mitigation Measure MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump trucks that meet or exceed EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality will be reduced to less than significant.

Response to Comment 39-7:

The Proposed Project was designed to limit the need for trucks to back up by having trucks enter at one entrance road and exit at a separate road to encourage circular flow. The backup beeps on the trucks and equipment are an Occupational Safety and Health Administration (OSHA) requirement, with the priority being to protect the safety of both the workers on site and the general public. In addition, contractors will be required to comply with local noise ordinances as stated in the Draft EIR, Section 3.14 Noise and Vibration.

Response to Comment 39-8:

Table ES-1 of the Draft EIR, lists all 17 of the Mitigation Measures proposed for the Proposed Project. These Mitigation Measures are enforceable and designed to reduce impacts through methods known to be feasible and effective. The Proposed Project's Mitigation Measures are accepted by agencies that would be involved in consultation, negotiation, and final approval of Mitigation Measures including conceptual restoration plans. As with any project that involves California Department of Fish and Wildlife (CDFW), United States Army Corps of Engineers (USACE), and Regional Water Quality Control Board (RWQCB) jurisdictional areas, the ultimate mitigation for impacts related to the wetlands and drainages under the jurisdiction of the resource agencies is negotiated with the resource agencies during the regulatory permitting process. LACFCD has been and will continue to work closely with CDFW

and USACE to identify appropriate mitigation, replacement ratios, and sites for restoration and enhancement that will offset impacts and satisfy the requirements of all applicable laws. A detailed restoration plan will be prepared and provided to CDFW and USACE for review and approval prior to project implementation. Prior to commencement of the Proposed Project, LACFCD will have obtained all necessary permits for impacts to CDFW, USACE, and RWQCB jurisdictional areas including Section 401 Certification, Section 404 permit, and a Streambed Alteration Agreement. Clean Water Act Section 404 (b)(1) guidelines will be followed as a framework for compensatory mitigation. Through 404(b)(1) negotiations with USACE and negotiations with CDFW under Fish and Game Code Sections 1600-1616, a determination of the functions and values of impacted jurisdictional waters shall result in the coordination of appropriate Mitigation Measures for sediment removal.

LACFCD notes that the commenter prefers Configuration C.

Response to Comment 39-9:

Mitigation locations will comply with the CDFW recommendations as follows: first, on site; second, off site within the Arroyo Seco Watershed; and third, off site within the greater Los Angeles River watershed. If offsite mitigation sites are needed, several offsite areas within the Arroyo Seco/Los Angeles River watershed are being considered for restoration. The spreading basins on the eastern edge of the reservoir are outside the jurisdiction of the LACFCD.

Sediment that was removed and stored at Johnson Field is required to be removed as a condition of permits issued for the Interim Measures Projects.

Once the sediment has been removed from Johnson Field, LACFCD will work closely with CDFW and the City of Pasadena to determine the availability and viability of using Johnson Field as a mitigation site for the Proposed Project.

Response to Comment 39-10:

Holding water behind the dam permanently, as a lake, is not a part of the Proposed Project objectives and is outside the scope of this project.

Response to Comment 39-11:

A conveyor belt system was considered in the Alternatives Analysis; see Section 4.10.1 of the Draft EIR. This alternative was rejected as it would not avoid or substantially reduce any significant environmental effects.

Response to Comment 39-12:

As discussed in the Draft EIR, Section 4.7, Sluicing Alternative, sluicing differs from Flow Assisted Sediment Transport (FASTing) operations in the amount and weight of sediment transported.

Sluicing was analyzed as part of the Draft EIR in the Alternatives Analysis, Section 4.7, Alternative 4 Sluicing Method. This alternative would involve use of construction equipment and the removal of trees and vegetation over the same footprint as the Proposed Project. The sluicing alternative would potentially have additional significant impacts in comparison to the Proposed Project. Many of these impacts would be associated with the likelihood that large amounts of sediment would not be fully

transported through the flood control system; this sediment would need to be mechanically removed and trucked out from numerous downstream locations potentially including the two soft-bottom portions of the channel. As discussed in Section 4.7 and in the Sediment Transport Capacity Analysis (Appendix K), most of these downstream locations would be in the Arroyo Seco, with deposits primarily occurring in and around the two soft bottom areas. Please see Section 4.7 and Appendix K of the Draft EIR for further analysis.

FASTing operations have been routinely used at Devil's Gate Reservoir and result in relatively small amounts of finer grained sediment passing through the reservoir. After the sediment removal phase has occurred, FASTing is proposed to be an integral part of the annual maintenance at Devil's Gate. Annual FASTing operations will be implemented to reduce future buildups of sediment in the reservoir and to reduce the need for mechanical removal of sediment from the reservoir. Although FASTing is expected to be an effective means of keeping sediment levels low in the reservoir, it is estimated that typically 13,000 cy of sediment will be removed by excavation annually. However, a maintenance regime that relies on FASTing greatly reduces the need for and extends the life of future and existing sediment placement sites and improves the future sustainability of the reservoir. Please see Section 2.5.2 of the Draft EIR for more information on future maintenance.

Response to Comment 39-13:

As discussed in the Draft EIR, Section 3.6.6, LACFCD will avoid removal of oak trees if possible and will replace trees whose removal cannot be avoided. In addition, a biological monitor will implement measures to protect the root zone of oak trees that may be impacted immediately adjacent to the Proposed Project site and along access roads.

Response to Comment 39-14:

LACFCD notes that the commenter would prefer that a smaller surface area be used for removal.

Alternative 3, Configuration D affects the least amount of habitat of all the action alternatives, while still achieving Proposed Project objectives (see Section 4.6 of the Final EIR). This alternative would provide a buffer on the west side of the reservoir that would allow for the movement of wildlife (see Section 4.6 of the Final EIR). Alternative 3, Configuration D, Option 1 provides a more natural configuration for the reservoir by having two branches to carry water and sediment toward the face of the dam, avoiding disturbing a significant portion of existing vegetation. To further reduce the Proposed Project's footprint, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D Option 2, which drastically reduces the project's footprint of 120 acres down to 71 acres, would avoid excavation of the western branch, thereby providing a greater habitat buffer on the west side of the reservoir. In addition, the maintenance areas would be smaller than the original sediment removal footprint, allowing for habitat to reestablish and providing additional areas for wildlife movement. A footprint any smaller would decrease the volume removed and the ultimate capacity of the reservoir, which would fail to meet Proposed Project objectives.

Response to Comment 39-15:

The Proposed Project does not involve pumping water into Eaton Canyon. LACFCD notes that the commenter would prefer to keep the water in the Arroyo Seco.

Response to Comment 39-16:

See Response to Comments 39-1 through 39-15.

Response to Comment 39-17:

One of the objectives of the Proposed Project is to return the reservoir to a capacity to provide proper flood protection for downstream areas.

Response to Comment 39-18:

See Response to Comment 39-2.

Response to Comment 39-19:

See Response to Comment 39-2.

Response to Comment 39-20:

See Response to Comment 39-2.

LACFCD evaluates the required capacity behind dams for three functions: flood control operations, water conservation, and capturing debris. The required capacity for capturing debris is based upon a Design Debris Event (DDE). A DDE is characterized as the estimated amount of sediment that could flow into the reservoir four years after the undeveloped portion of the watershed has burned and a 50-year storm (based on a 24-hour duration) occurs. The 50-year storm and the DDE are defined by the County of Los Angeles Department of Public Works Sedimentation Manual (March 2006), which is available online. Each reservoir has its own unique DDE, and the DDE for Devil's Gate Dam is approximately 2 million cubic yards (mcy).

LACFCD's sediment removal criterion for dams providing debris control is to maintain reservoir capacity for two DDEs below a dam's spillway elevation. The reason the LACFCD has established the required capacity at two DDEs is to ensure that sufficient reservoir capacity is always available to maintain the level of downstream flood protection. By requiring two DDEs, the reservoir is likely to have sufficient capacity to experience a design level storm, or several smaller but significant debris events, and still maintain capacity of at least one DDE during the lengthy environmental and construction processes to remove the debris. In addition to requiring the two DDEs for debris control, some dams require additional storage capacity for providing Capital Flood regulation. Further, it should be noted that additional criteria in special circumstances related to dam safety may also dictate the need to remove sediment from a reservoir.

- Depending on the structural stability of the dam, the height of sediment against the dam may need to be limited (sediment weighs more than water and increases the forces on the dam during an earthquake).

- The volume of sediment accumulation may also be limited to prevent sediment from blocking valves/operations (if sediment or debris blocks the outlet valves, they cannot be used to regulate storm flows or to empty the dam during an emergency).

For Devil's Gate Dam, the required reservoir capacity is based on debris control and is 4.0 mcy (two DDEs) below the spillway elevation of 1,040.5 feet.

Response to Comment 39-21:

See Response to Comment 39-2 and 39-20.

Response to Comment 39-22:

See Response to Comment 39-3 and 39-20.

Response to Comment 39-23:

LACFCD notes that the commenter wants this information available to present to the Board. This information is included in this Response to Comments document, which will be a part of the Final EIR submitted to the Board of Supervisors.

Devil's Gate Reservoir Sediment Removal and Management Project

Comment Letter #40

COMMENT CARD

Date: Nov. 21, 2013

Name: Cheryl Wysocki Address: 131 N. Chester Ave.

Email: Cheryl1wysocki@hotmail.com City/Zip: Pasadena, CA 91106

Organization represented, if any:

Comment: Please see the attached comments.

Please submit any comments on the proposed project today by placing this card in the comment box or send to LACFCD. **Correspondence should be postmarked by Monday, January 6, 2014.** Comments should include "Devil's Gate Reservoir Sediment Removal and Management Project" in the subject line and the name of a contact person. Comments can be submitted in the following ways:

Mail	Email	Fax
County of Los Angeles Department of Public Works Water Resources Division Reservoir Cleanouts Program P.O. Box 1460 Alhambra, CA 91802-1460	reservoircleanouts@dpw.lacounty.gov	(626) 979-5436

Comment 40-1

I am a resident of Pasadena and an employee at JPL. The Devil's Gate Reservoir Sediment Removal and Management Project, as outlined at the community meeting in La Canada, strikes me as a project that will cause major disruption to this area. I am particularly concerned about the air pollution issue and the impact to the environment and wildlife in this area. There are approximately 5,000 employees at JPL, as well as six schools and housing all around this area. Those of us who attend school, live, or work in this area will be exposed to the higher levels of diesel fumes. It was suggested at the meeting that you use clean burning trucks, but the response was that while that is a good idea, it might not be possible to get all of the trucks to conform to that standard.

Comment 40-2

I appreciate the attention paid to habitat restoration in your plan, but I believe that the best approach is to create a plan that is much more in line with the one proposed by the Arroyo Seco Foundation. This plan advocates a much slower plan that would result in a far less degradation to the environment and much less air and noise pollution.

Comment 40-3

It seems highly unlikely that we will see another situation like the one that occurred after the station fire. The vegetation has mostly grown back up in the mountains, so even if we were to have a big storm, the amount of sediment that would wash down would not be nearly as great as what came down after the station fire. I've worked at JPL for 30 years and walked out in the Arroyo. For all this time, even in years of high rainfall, the sediment came down in manageable amounts.

Comment 40-4

Given the extremely high cost of the proposed plan and the highly negative impacts to, land, wildlife, and people's health, I urge you to reconsider your plan.

Response to Comment Letter #40 (Cheryl Wysocki)

Response to Comment 40-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

Air quality impacts associated with truck traffic were analyzed in the Draft Environmental Impact Report (EIR) in Section 3.5. Los Angeles County Flood Control District (LACFCD) has conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed the United States (U.S.) Environmental Protection Agency's (EPA's) 2007 standards for emissions. Therefore, in order to further reduce emissions, Mitigation Measure MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump trucks that meet or exceed EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality including those associated with health effects, will be reduced to less than significant.

As discussed in Section 3.6.6 of the Draft EIR, Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats. In addition, sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays). Wildlife species currently found in the Proposed Project area would be expected to either remain in the undisturbed areas of the reservoir outside the Proposed Project area or to reestablish once sediment removal activities have been completed.

Response to Comment 40-2:

LACFCD goes to great lengths to lessen project impacts and maximize efficiencies. As such, many of the points in the Arroyo Seco Foundation's four-point "Slow Program" are compatible with the LACFCD Proposed Project.

For example, the Draft EIR selected Alternative 3 as the Environmentally Superior Alternative. Alternative 3, Configuration D, Option 2 drastically reduces the project's footprint down of 120 acres down to 71 acres. Additionally, the limited maintenance area for Alternative 3 further reduces the permanent habitat impacts down to approximately 51 acres by allowing for site replanting and mitigation to take place within the reservoir footprint. This reduction in project acreages will greatly lessen environmental impacts of the Proposed Project.

LACFCD strives to achieve an efficient, low-cost sediment removal project. Sediment removal rates and trucking operations, now utilizing all low-emissions trucks, as explained in Section 3.5 of the Draft EIR, have been carefully planned for economies of scale to realize maximum efficiencies without major delays in project schedule, thus greatly reducing operating costs. Furthermore, LACFCD has applied for and received an approximately $28 million grant through the State's Disaster Preparedness and Flood Protection Bond Act of 2006 (Proposition 1E) program. A portion of this grant will be used to help offset the Proposed Project's costs.

While sluicing is not a viable project alternative, as explained in Section 4.7 of the Draft EIR, Flow Assisted Sediment Transport, or FASTing, will be used for maintenance after the project's main sediment removal phase has been completed, as described in Section 2.5.2 of the Draft EIR.

LACFCD is committed to *Public Service that Works*; and by combining almost 100 years of technical expertise and invaluable input from the community, less invasive flood protection will continue to be a reality.

For a more detailed response to the Arroyo Seco Foundation's four-point "Slow Program", please see the response to the Arroyo Seco Foundation's comment letter (Comment Letter #216, Response to Comment 216-16).

Response to Comment 40-3:

See Response to Comment 40-2. Since the dam was built, several periods have occurred in which a large amount of sediment was deposited in the reservoir in a short time frame. Between 1935 and 1938 over 1.6 million cy of sediment, between 1938 and 1943 over 1.95 million cy of sediment, between 1959 and 1966 over 1.75 million cy of sediment, and between 2010 and 2012 over 1.3 million cy of sediment was deposited in the reservoir. Over 12.0 million cy of sediment have come into the reservoir since the dam was constructed. Over 92 years, the average amount of sediment deposited each year is approximately 130,000 cy; however, Devil's Gate Reservoir is a dynamic system with constantly changing amounts of sediment deposited from year to year, depending on the frequency and intensity of storm events.

In order for the removal project to be efficient, and therefore reduce impacts and costs, the amount of sediment removed every year needs to exceed the amount of sediment deposited. If the reservoir is left in its current state, the flood risk to downstream communities would be left at an unacceptable level.

Response to Comment 40-4:

See Response to Comments 40-1 and 40-2. LACFCD notes the commenter's objection to the Proposed Project.

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To: **County of Los Angeles County**
Department of Public Works
Water Resources Division
Attn: Reservoir Cleanouts Program
P.O. Box 1460
Alhambra, CA 91802-1460

From: **Joy Rittenhouse, MACH I**
Joymach1@yahoo.com

RE: **Comments: Draft Environmental Impact Report for Devil's Gate Reservoir Sediment Removal and Management Project**

Introduction:

MACH 1 (Move A Child Higher) is a therapeutic horsemanship and horseback riding program that offers equine assisted activities to students with disabilities and is based at the Pasadena Equestrian Center in the Hahamongna Watershed Park in Pasadena. The program is a PATH Int'l Premier Accredited Center and has been in cooperation with the City of Pasadena for 17 years. MACH I is a non-profit 501 (c) (3) corporation that relies upon private contributions for the bulk of its funding as well as the many generous volunteers for assistance with clients and horses.

Comment 41-1

In cooperation with PATH Intl's partnership with the Wounded Warrior Project, we also now offer therapeutic horsemanship activities for military veterans and active duty military personnel. Our horse-partnered activities are tailored to the unique needs of each person. This project offers a period of fully covered scholarship to participating veterans and other military personnel.

We currently conduct our therapeutic operations in the Hahamongna Watershed Park as a sub-tenant of Rose Bowl Riders. About eight years ago, with the support of the City of Pasadena we began development of a new therapeutic riding facility, also in the Hahamongna Watershed Park's Pasadena Equestrian Center. We have already invested over $125,000 with more to go and thousands of volunteer hours to build this new facility. It is almost complete and we anticipate beginning full operations there within the next few months.

Concerns:

Recently, MACH I became aware of the County's project for Devil's Gate sediment removal and management and the availability of the draft environmental impact report (DEIR). Although we support the need for flood management, we noticed that the impacts of the project on MACH I's operations were not commented on, even

Comment 41-2

though there was some discussion around activities at Rose Bowl Riders and Tom Sawyer Camp. It is important that our operations, which involve clients with special needs and sensitivities, be considered in your final environmental impact report. Our concerns relative to potential environmental impacts on our facility and operations are as follows:

- Use of Facilities - According to the DEIR, use of park facilities may be less desirable due to construction-related emissions, noise, dust, visual, and traffic impacts associated with sediment removal. It is suggested that while equestrian activities currently exist in the Hahamongna Watershed Park area, two alternative sites have been identified where equestrians can ride, train, board horses, and park trailers; San Pascual and Griffith Park. Although these facilities are suitable for boarding, they would not work for our program. We must go through a PATH Intl certification process that involves inspection of our facility as well as our methods of operation.

Comment 41-3

Comment 41-4

- Traffic - Although the truck traffic would enter and exit on the south end of the basin, it has been determined that there will be significant and unavoidable impacts to traffic on the 210 freeway, and at most of the streets and intersections surrounding the Hahamongna Watershed Park. It is our understanding from the DEIR that traffic would be significant all day, Monday through Saturday, April through mid-December. This could potentially limit our client's access to the program and significantly impact our hours of operation and instructor schedules, which are during weekdays and Saturdays, daylight hours. Many of our clients need ADA access with the ability to navigate in regards to mobility.

Comment 41-5

- Air Quality - The impact to air quality has been determined to be significant and unavoidable due to project related increases such as emissions from on-road trucks (400+inbound and 400+outbound), off-road vehicles, employee vehicles, and fugitive dust. This will impact our clients as we have strict standards that apply to fugitive dust related issues, namely that we deal with many students that are immune compromised and have serious issues with breathing problems.

Comment 41-6

- Noise – The impact from the noise resulting from heavy equipment, running diesel engines and the beeping that comes with trucks backing up may impact us as well, especially when excavation occurs near the north end of the proposed project site. It is possible that it would make communication to/with clients very difficult as many of our clients have hearing and communication problems.

Comment 41-7

- MACH 1 is concerned that we may lose our PATH Intl certification if our program is in jeopardy of operating under the guidelines and standards of operation they require. Because we operate in the City of Pasadena and because we have completed our RFQ with the City we are required to be a PATH Intl therapeutic program. We are proud of our accomplishments and we are proud that we are an accredited premier center.
-

Comment 41-8

Conclusion:

MACH I is very committed to our special needs clients and our co-operative effort with the City of Pasadena's adaptive recreation dept. It is important that impacts from this project be mitigated in order for our operation to continue in our current location since relocation is not financially feasible.

Please feel free to contact us with any questions you may have regarding our programs and/or facility.

Sincerely,

Joy Rittenhouse. Executive Director/Founder
MACH I

Response to Comment Letter #41 (Joy Rittenhouse – MACH 1)

Response to Comment 41-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. The information provided in this comment regarding the MACH 1 facility will be added to Final Environmental Impact Report (EIR), see Sections 2.1.6, 3.12.2, and 3.15.2.

Response to Comment 41-2:

The information provided in this comment regarding the MACH 1 facility will be added to Final EIR, see Section 3.15.6, Recreation/Public Services, Impacts and Mitigation and Section 4.0 Alternative Analysis, Sections 4.4.3, 4.5.3, 4.6.3, 4.7.3, 4.8.3, and 4.9.3.

Response to Comment 41-3:

The Proposed Project will not limit the use of the Oak Grove area of Hahamongna Watershed Park. Sediment removal activities would be temporary and are expected to occur only in the drier months (April to December, excluding holidays). It is expected that these activities will often not be adjacent to the Oak Grove area of Hahamongna Watershed Park. The Proposed Project would result in temporary limitations on the recreational use of the Proposed Project site and some of the adjacent trails. Most of these areas would be reopened seasonally or intermittently throughout the sediment removal process. Furthermore, an east-west trail crossing will continue to provide access at the north end of the reservoir. At the south end of the reservoir, after the reservoir ingress and egress ramps have been fully constructed, access to the upper east side Arroyo Seco Trail from La Cañada Verdugo Road will be maintained; and the linkage from the west side Arroyo Seco Trail and the Flint Wash Trail to the upper east side Arroyo Seco Trail (crossing Devil's Gate Dam and also continuing south to the Rose Bowl) will be available after construction activities have ended each day and on nonworking days.

Therefore, the maximum impacts to the MACH-1 facilities would be much shorter than the five-year duration of the sediment removal phase of the Proposed Project.

Response to Comment 41-4:

Access to the Oak Grove area of Hahamongna Watershed Park will not be limited by the Proposed Project. Potential impacts due to the Proposed Project's truck trips were analyzed in the Draft EIR, Section 3.16, Transportation and Traffic. As listed in that section, a single intersection in the immediate vicinity of the Proposed Project site will have a potentially significant impact.

LACFCD also notes MACH-1's concerns with traffic impacts relating to MACH 1 participants traveling to and from their facility. The Draft EIR outlines a 12-hour trucking schedule, with trucking operations on Saturdays as well. This schedule is used to model the most intensive construction operation, which may not be applicable at the Proposed Project site for the duration of the Proposed Project. Typical trucking schedules are estimated to be 8 hours per day on weekdays. In practice, hauling rates and routes may be adjusted to help reduce impacts, depending on operational need. Additionally, construction traffic will not pass the Berkshire Place intersection with Oak Grove Drive and thus will not approach the Oak Grove Drive/Foothill Boulevard intersection used for ingress and egress to the MACH 1 facilities. LACFCD

will continue to work with local organizations and the Cities of Pasadena and La Cañada Flintridge and the community of Altadena to minimize traffic impacts around the Proposed Project site.

Response to Comment 41-5:

Air quality impacts associated with truck traffic were analyzed in the Draft EIR in Section 3.5. LACFCD has conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed the United States (U.S.) Environmental Protection Agency's (EPA's) 2007 standards for emissions. Therefore, in order to further reduce emissions, Mitigation Measure MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump trucks that meet or exceed EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality, including those associated with health effects, will be reduced to less than significant.

Dust impacts from the Proposed Project were carefully evaluated, as discussed in the Draft EIR, Section 3.5.6, Impacts and Mitigation, AIR QUALITY-2, Sediment Removal. The Proposed Project's activities including excavation, grading, material loading, and hauling would result in less than significant dust emissions due to the project's use of best management practices and would be in full compliance with South Coast Air Quality Management District's (SCAQMD's) fugitive dust regulations.

Response to Comment 41-6:

The Draft EIR, Section 3.14, analyzed the noise impacts from the Proposed Project's onsite activities within the Hahamongna Watershed Park, where the MACH-1 horse riding facility is located. As discussed in the Draft EIR, with implementation of Mitigation Measure MM N-1, temporary noise impacts would be reduced to a level of less than significant. In addition, the Proposed Project was designed to limit the need for trucks to back up; the trucks will enter at one access road and exit at a separate access road to encourage circular flow. Contractors will be required to comply with local noise ordinances as stated in the Draft EIR, Section 3.14 Noise and Vibration.

Response to Comment 41-7:

See Response to Comments 41-4 through 41-6. LACFCD understands MACH-1's concerns regarding their PATH Intl certification. As stated above, no significant impact to air quality or noise will occur. LACFCD will continue to work with local organizations and the Cities of Pasadena and La Cañada Flintridge and the community of Altadena to minimize traffic impacts around the Proposed Project site; construction traffic will not use the Oak Grove Drive/Foothill Boulevard intersection used for ingress and egress to the MACH 1 facilities; and LACFCD will provide notifications of working locations, as feasible, within the reservoir to MACH-1 to help minimize impacts to the riders.

Response to Comment 41-8:

See Response to Comments 41-4 through 41-7.

Devil's Gate Reservoir Sediment Removal and Management Project

Comment Letter #42

COMMENT CARD

Date: 11/27/13

Name: Joyce Lockwell Address: 1710½ Whitefield Road

Email: ja14533@yahoo.com City/Zip: Pasadena, CA 91104

Organization represented, if any: Pasadena Audubon Society (new member)

Comment: The biggest problem with this project is that it permanently destroys 50-120 acres of regionally significant habitat (willow and mulefat forest). This habitat is important for a large amount of birds, including nesting Yellow Warbler and 'Least' Bells Vireo, which is federally endangered.

Comment 42-1

It also creates a 55 ft deep bare, steep sided pit near the dam and the DEIR states that there will be "temporary restricted access to portions of designated trails." This will be a problem for birders when they need to cross the basin. For at least nine months per year, and six days per week 425 diesal trucks will be creating pollution and a lot of noise. The county has no plans to mitigate this problem.

Comment 42-2

Comment 42-3

The project is unsustainable. The county still does not have a plan for where to put all of the sediment once these pits are full. This will cost $100 million, $3-$5 billion county-wide.

Comment 42-4

Turn over →

Please submit any comments on the proposed project today by placing this card in the comment box or send to LACFCD. **Correspondence should be postmarked by Monday, January 6, 2014.** Comments should include "Devil's Gate Reservoir Sediment Removal and Management Project" in the subject line and the name of a contact person. Comments can be submitted in the following ways:

Mail	Email	Fax
County of Los Angeles Department of Public Works Water Resources Division Reservoir Cleanouts Program P.O. Box 1460 Alhambra, CA 91802-1460	reservoircleanouts@dpw.lacounty.gov	(626) 979-5436

Comment 42-5

What the County should do:

Tim Brick, Managing Director of the Arroyo Seco Foundation, has a four-part solution: Go slow, Go with the flow, let the habitat grow, and keep costs low. To learn more, go to YouTube and search for "Recipe for a Sustainable Sediment Management Program for Hahamonga."

Thank you.

Joyce Kacatell

Response to Comment Letter #42 (Joyce Locatell – Pasadena Audubon Society Member)

Response to Comment 42-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

As discussed in Section 3.6.6 of the Draft Environmental Impact Report (EIR), Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species, including sensitive bird species, and to restore and enhance riparian and sensitive habitats. In addition, sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays). Bird species currently found in the Proposed Project area would be expected to either remain in the undisturbed areas of the reservoir outside the Proposed Project area or to reestablish once sediment removal activities have been completed.

Response to Comment 42-2:

Impacts to recreation were analyzed in the Draft EIR, Section 3.15. The Proposed Project will not limit the use of the Oak Grove area of Hahamongna Watershed Park. Sediment removal activities would be temporary and are expected to occur only in the drier months (April to December, excluding holidays). It is expected that these activities will often not be adjacent to the Oak Grove area of Hahamongna Watershed Park. The Proposed Project would result in temporary limitations on the recreational use of the Proposed Project site and some of the adjacent trails. Most of these areas would be reopened seasonally or intermittently throughout the sediment removal process. In addition, temporary impacts to designated recreational facilities and trails will be minimized through advance communication and redirection to the nearest facility in the vicinity of the Proposed Project. Furthermore, an east-west trail crossing will continue to provide access at the north end of the reservoir. At the south end of the reservoir, after the reservoir ingress and egress ramps have been fully constructed, access to the upper east side Arroyo Seco Trail from La Cañada Verdugo Road will be maintained; and the linkage from the west side Arroyo Seco Trail and the Flint Wash Trail to the upper east side Arroyo Seco Trail (crossing Devil's Gate Dam and also continuing south to the Rose Bowl) will be available after construction activities have ended each day and on nonworking days.

Alternative 3, the Environmentally Superior Alternative, will restore the bottom elevation of Devil's Gate Reservoir to its design elevation of 986 feet, which coincides with the sill elevation of the lowest valve on Devil's Gate Dam, the sluice gate. The final elevations of the reservoir after the sediment removal phase is completed will not exceed historic elevations. Additionally, all side slopes will be excavated at a 3:1 ratio or 3 feet horizontally for every 1 foot rise in elevation. The slope produced by this side cut is relatively shallow.

Response to Comment 42-3:

Air quality and noise impacts associated with truck traffic were analyzed in the Draft EIR in Sections 3.5 and 3.14, respectively. As discussed in the Draft EIR, Section 3.14, with implementation of Mitigation Measure MM N-1, noise impacts would be reduced to a level of less than significant. Los Angeles County Flood Control District (LACFCD) has conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed the United States (U.S.) Environmental Protection Agency's (EPA's) 2007 standards for emissions. Therefore, in order to further reduce emissions, Mitigation Measure MM AQ-1 has been revised; and the contractor will be required

to use only sediment removal dump trucks that meet or exceed EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality will be reduced to less than significant.

Response to Comment 42-4:

The disposal sites located to the east of the Proposed Project currently have sufficient capacity for the entire amount of sediment proposed to be removed. The disposal sites located to the west of the Proposed Project will provide additional capacity if needed. The available pits and disposal sites, as outlined in the Proposed Project Description, have enough capacity for the sediment that is planned to be removed.

After the sediment removal phase has occurred, Flow Assisted Sediment Transport, or FASTing, is proposed to be an integral part of the annual maintenance at Devil's Gate. Annual FASTing operations will be implemented to reduce future buildups of sediment in the reservoir and to reduce the need for mechanical removal of sediment from the reservoir. Although FASTing is expected to be an effective means of keeping sediment levels low in the reservoir, it is estimated that typically 13,000 cy of sediment will be removed by excavation annually. However, a maintenance regime that relies on FASTing greatly reduces the need for and extends the life of future and existing sediment placement sites and improves the future sustainability of the reservoir. Please see Section 2.5.2 of the Draft EIR for more information on future maintenance.

The estimated cost for the Proposed Project and for Alternatives 1, 2, 3, and 5 would range from $80 million for the Proposed Project to $65 million for Alternative 3. LACFCD has applied for and received an approximately $28 million grant through the State's Disaster Preparedness and Flood Protection Bond Act of 2006 (Proposition 1E) program. A portion of this grant will be used to help offset the Proposed Project's costs. The remaining cost will be covered by LACFCD Funds.

Response to Comment 42-5:

LACFCD goes to great lengths to lessen project impacts and maximize efficiencies. As such, many of the points in the Arroyo Seco Foundation's four-point "Slow Program" are compatible with the LACFCD Proposed Project.

For example, the Draft EIR concluded that Alternative 3 is the Environmentally Superior Alternative. Alternative 3, Configuration D, Option 2 drastically reduces the project's footprint of 120 acres down to 71 acres . Additionally, the limited maintenance area for Alternative 3 further reduces the permanent habitat impacts down to approximately 51 acres by allowing for site replanting and mitigation to take place within the reservoir footprint. This reduction in project acreages will greatly lessen environmental impacts of the Proposed Project.

LACFCD strives to achieve an efficient, low-cost sediment removal project. Sediment removal rates and trucking operations, now utilizing all low-emissions trucks, as explained in Section 3.5 of the Draft EIR, have been carefully planned for economies of scale to realize maximum efficiencies without major delays in project schedule, thus greatly reducing operating costs. Furthermore, LACFCD has applied for and received an approximately $28 million grant through the State's Disaster Preparedness and Flood Protection Bond Act of 2006 (Proposition 1E) program. A portion of this grant will be used to help offset the Proposed Project's costs.

While sluicing is not a viable project alternative, as explained in Section 4.7 of the Draft EIR, Flow Assisted Sediment Transport, or FASTing, will be used for maintenance after the project's main sediment removal phase has been completed, as described in Section 2.5.2 of the Draft EIR.

LACFCD is committed to *Public Service that Works*; and by combining almost 100 years of technical expertise and invaluable input from the community, less invasive flood protection will continue to be a reality.

For a more detailed response to the Arroyo Seco Foundation's four-point "Slow Program", please see the response to the Arroyo Seco Foundation's comment letter (Comment Letter #216, Response to Comment 216-16).

November 27, 2013

Dear Department of Public Works,

Comment 43-1

I am writing to express my deep concern and disapproval of the LA County's plan to remove sediment from the Hahamonga Watershed.

I hope that you will express your concern to this plan that is so extreme that I honestly cannot believe that it is a serious plan. Yet, it is.

Comment 43-2

1. I understand the plan to remove sediment from the Watershed; yet, this plan that is proposed is that it will permanently destroy 50 to 120 acres of willow and mulefat riparian forest. Perhaps the County has not heard that this area provides needed habitat for the Yellow Warbler that is a species of Special Concern in California and also in 2012, Least Bell's Vireo's nested there for the first time. Least Bell's Vireos are a federally endangered species. Many Audubon Societies are watching this project very carefully.

Comment 43-3

2. Another very serious issue is the air pollution that will be generated by this project. Surely you are aware that the County is proposing 425 trucks per day (that's 50 trucks per HOUR) to drive through local neighborhoods and on the 210 freeway. The trucks will operate for nine months or more per year, six days a week – for five years. It doesn't take a lot to understand that those diesel trucks will cause unacceptable levels of air pollution, noise, and odor. Please think about the health impact to citizens of Pasadena – and if fact many communities! The County says the air pollution, nosie pollution and smell are unavoidable and there is nothing they can do to mitigate this. ***Really?*** Please do not let them carry out this plan as proposed.

Comment 43-4

3. And finally, the cost of this project - $100 million. Well, I am a docent volunteer at a County facility, and they have cut staff hours back to the bone.

Comment 43-5

What I am asking you to do is to carefully examine the proposal offered by Tim Brick of the Arroyo Seco Foundation: Go Slow (10-20 years instead of 3-5 years – the sediment has been building up for nearly 100 years and sediment will continue to flow into the basin), Go with the Flow (allow more sediment to flow through the dam – sluicing), Let the Habitat Grow, and Keep Costs Low. This plan will mean fewer trucks, less air pollution, less noise, less odor, less habitat destruction, and lower costs.

Please, go the Arroyo Seco Foundation website and learn more.
http://www.arroyoseco.org/index.htm

Thank you for caring about making Pasadena a wonderful, green place to live in harmony with Mother Nature.

Best Regards,

Susan S. Gilliland, PhD, MPH, RN

525 Avon Avenue

Pasadena, CA 91105

Response to Comment Letter #43 (Susan Gilliland)

Response to Comment 43-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. Los Angeles County Flood Control District (LACFCD) notes the commenter's objection to the Proposed Project; however, the Proposed Project is being undertaken to provide downstream protection from flooding potential.

Response to Comment 43-2:

As discussed in Section 3.6.6 of the Draft Environmental Impact Report (EIR), Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species, including sensitive bird species, and to restore and enhance riparian and sensitive habitats. Sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays). Bird species currently found in the Proposed Project area would be expected to either remain in the undisturbed areas of the reservoir outside the Proposed Project area or to reestablish once sediment removal activities have been completed.

Response to Comment 43-3:

Air quality and noise impacts associated with truck traffic were analyzed in the Draft EIR in Sections 3.5 and 3.14, respectively. As discussed in the Draft EIR, Section 3.14, with implementation of Mitigation Measure MM N-1, noise impacts would be reduced to a level of less than significant. LACFCD has conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed the United States (U.S.) Environmental Protection Agency's (EPA's) 2007 standards for emissions. Therefore, in order to further reduce emissions, Mitigation Measure MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump trucks that meet or exceed EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality, including those associated with health effects, will be reduced to less than significant. As discussed in the Draft EIR, Section 3.5, impacts related to odors were determined to be less than significant.

Response to Comment 43-4:

The estimated cost for the Proposed Project and for Alternatives 1, 2, 3, and 5 would range from $80 million for the Proposed Project to $65 million for Alternative 3. LACFCD has applied for and received an approximately $28 million grant through the State's Disaster Preparedness and Flood Protection Bond Act of 2006 (Proposition 1E) program. A portion of this grant will be used to help offset the Proposed Project's costs. The remaining cost will be covered by Los Angeles County Flood Control District (LACFCD) Funds. Under California Environmental Quality Act (CEQA), the lead agency is not required to analyze an economic impact associated with a project in the EIR; as Section 15131(a) of the CEQA Guidelines states: "Economic or social effects of a project shall not be treated as significant effects on the environment." Moreover, CEQA allows economic analysis in the administrative record only if the basis for infeasibility, and thus rejection of a mitigation or alternative, is economic, as described in CEQA Guidelines Sections 15091(a)(3) and 15364. Economic and social factors can be considered by a lead agency when reaching a decision on a project; however, such an evaluation is separate from the process of preparing and certifying an EIR, which is concerned with evaluating the significant environmental

effects of a project. See also *Bakersfield Citizens for Local Control v. City of Bakersfield* (2004) 124 Cal.App. 4th 1184.

Response to Comment 43-5:

LACFCD goes to great lengths to lessen project impacts and maximize efficiencies. As such, many of the points in the Arroyo Seco Foundation's four-point "Slow Program" are compatible with the LACFCD Proposed Project.

For example, the Draft EIR concluded that Alternative 3 is the Environmentally Superior Alternative. Alternative 3, Configuration D, Option 2 drastically reduces the project's footprint of 120 acres down to 71 acres . Additionally, the limited maintenance area for Alternative 3 further reduces the permanent habitat impacts down to approximately 51 acres by allowing for site replanting and mitigation to take place within the reservoir footprint. This reduction in project acreages will greatly lessen environmental impacts of the Proposed Project.

LACFCD strives to achieve an efficient, low-cost sediment removal project. Sediment removal rates and trucking operations, now utilizing all low-emissions trucks, as explained in Section 3.5 of the Draft EIR, have been carefully planned for economies of scale to realize maximum efficiencies without major delays in project schedule, thus greatly reducing operating costs. Furthermore, LACFCD has applied for and received an approximately $28 million grant through the State's Disaster Preparedness and Flood Protection Bond Act of 2006 (Proposition 1E) program. A portion of this grant will be used to help offset the Proposed Project's costs. While sluicing is not a viable project alternative, as explained in Section 4.7 of the Draft EIR, Flow Assisted Sediment Transport, or FASTing, will be used for maintenance after the project's main sediment removal phase has been completed, as described in Section 2.5.2 of the Draft EIR.

LACFCD is committed to *Public Service that Works*; and by combining almost 100 years of technical expertise and invaluable input from the community, less invasive flood protection will continue to be a reality.

For a more detailed response to the Arroyo Seco Foundation's four-point "Slow Program", please see the response to the Arroyo Seco Foundation's comment letter (Comment Letter #216, Response to Comment 216-16).

From: Petrea Burchard
To: reservoircleanouts
Subject: public comment on the Devil"s Gate Dam sediment removal DEIR
Date: Friday, December 06, 2013 10:50:10 AM

Dear DPW,

Comment 44-1

The LA County DWP's DEIR for Devil's Gate Dam sediment removal does not sufficiently demonstrate reason for the draconian plans outlined in the DEIR.

No past or present storm or flooding justifies what Keith Lilley has told us will likely happen:

425 trucks per day
12 hours per day (overtime pay)
6 days per week (overtime pay again)

Comment 44-2

This means 1 truck every 1.69 minutes descending into the Hahamongna Basin. Perhaps a truck can be dumped every 1.69 minutes, but it is impossible to fill trucks that fast. This means trucks lining up, waiting in the neighborhoods, beeping and spewing diesel pollution and engine noise near homes and schools.

This is unacceptable. It is also unnecessary.

Comment 44-3

The Arroyo Seco Foundation has proposed a gentler plan for regular clean-out. Their advisors and scientists are knowledgable about the Arroyo and their advice is well worth taking.

We all know the silt must be removed. But we are not in an emergency situation and to try to make the public think so is disingenuous, at best. There is no reason for the dam clean-up to be at the expense of property values, huge tax dollars, and children's lungs. Please look at Tim Brick's plan via the Arroyo Secon Foundation.

Thank you.

Sincerely,
Petrea Burchard Sandel
Pasadena

Response to Comment Letter #44 (Petrea Sandel)

Response to Comment 44-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

The Los Angeles County Flood Control District (LACFCD) was mandated by the State Legislature to provide flood protection and water conservation within its boundaries.

A reservoir storage design capacity of two design debris events (DDEs) below the dam's lowest spillway was determined to be the standard acceptable level of risk at Devil's Gate Dam and Reservoir. The DDE volume of capacity is determined using the January 2006 Los Angeles County Department of Public Works (LACDPW) Hydrology Manual and the March 2006 LACDPW Sedimentation Manual. For Devil's Gate Dam and Reservoir, the required reservoir capacity is 4.0 million cubic yards (cy) (two DDEs) below the spillway elevation of 1,040.50 feet.

The Hydrology Manual (January 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_Hydrology_Manual/2006%20Hydrology%20Manual-Divided.pdf

The Sedimentation Manual (March 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_sedimentation_manual/Sedimentation%20Manual-Second%20Edition.pdf

Additional information concerning DDE calculation methods has been added to the Final Environmental Impact Report (EIR), Section 2.3, Project Need.

Historically, large amounts of sediment have been deposited in the reservoir in short time periods. Between 1935 and 1938 over 1.6 million cy of sediment, between 1938 and 1943 over 1.95 million cy of sediment, between 1959 and 1966 over 1.75 million cy of sediment, and between 2010 and 2012 over 1.3 million cy of sediment was deposited in the reservoir. Since the 1920 dam construction and prior to the Station Fire in 2009, approximately 10.7 million cy of sediment accumulated in the reservoir; and approximately 8.0 million cy was removed by LACFCD.

As discussed in the Draft EIR, Section 2, due to the sediment deposited in the reservoir from winter storms after the 2009 Station Fire, the current available capacity for Devil's Gate Reservoir is less than one DDE. The goal of LACFCD is to restore reservoir flood capacity as soon as feasible while reducing cost, minimizing the duration of environmental and construction impacts to the surrounding communities, and configuring the reservoir to allow for sustainable future maintenance.

Response to Comment 44-2:

During the sediment removal phase, excavators will be loading sediment into trucks for offsite disposal, at the stated rate, which is obtainable. All of the trucks will be loaded within the reservoir; and if a queue of trucks develops, they will stage within the reservoir itself to lessen impacts on the adjacent streets. It is estimated that trucks will briefly idle during loading, but the average loading time per truck is estimated to be one minute. In addition, LACFCD typically requires equipment to shut down if idling time is expected to be more than five minutes.

Air quality and noise impacts associated with truck traffic were analyzed in the Draft EIR in Sections 3.5 and 3.14, respectively. As discussed in the Draft EIR, Section 3.14, with implementation of Mitigation Measure MM N-1, noise impacts would be reduced to a level of less than significant. LACFCD has conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed EPA's 2007 standards for emissions. Therefore, in order to further reduce emissions, Mitigation Measure MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump trucks that meet or exceed EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality will be reduced to less than significant.

Response to Comment 44-3:

LACFCD goes to great lengths to lessen project impacts and maximize efficiencies. As such, many of the points in the Arroyo Seco Foundation's four-point "Slow Program" are compatible with the LACFCD Proposed Project.

For example, the Draft EIR concluded that Alternative 3 is the Environmentally Superior Alternative. Alternative 3, Configuration D, Option 2 drastically reduces the project's footprint of 120 acres down to 71 acres. Additionally, the limited maintenance area for Alternative 3 further reduces the permanent habitat impacts down to approximately 51 acres by allowing for site replanting and mitigation to take place within the reservoir footprint. This reduction in project acreages will greatly lessen environmental impacts of the Proposed Project.

LACFCD strives to achieve an efficient, low-cost sediment removal project. Sediment removal rates and trucking operations, now utilizing all low-emissions trucks, as explained in Section 3.5 of the Draft EIR, have been carefully planned for economies of scale to realize maximum efficiencies without major delays in project schedule, thus greatly reducing operating costs. Furthermore, LACFCD has applied for and received an approximately $28 million grant through the State's Disaster Preparedness and Flood Protection Bond Act of 2006 (Proposition 1E) program. A portion of this grant will be used to help offset the Proposed Project's costs.

While sluicing is not a viable project alternative, as explained in Section 4.7 of the Draft EIR, Flow Assisted Sediment Transport, or FASTing, will be used for maintenance after the project's main sediment removal phase has been completed, as described in Section 2.5.2 of the Draft EIR.

LACFCD is committed to *Public Service that Works*; and by combining almost 100 years of technical expertise and invaluable input from the community, less invasive flood protection will continue to be a reality.

For a more detailed response to the Arroyo Seco Foundation's four-point "Slow Program", please see the response to the Arroyo Seco Foundation's comment letter (Comment Letter #216, Response to Comment 216-16).

From: Ms Carol Parker
To: reservoircleanouts
Subject: Devils Gate Plan
Date: Friday, December 06, 2013 8:56:41 PM

Greetings:

Comment 45-1

I am a resident of La Canada and aware of the plans suggested for sediment removal from Devils' Gate.

I agree the current sediment deposits are a true threat to the safety and protection of public and private lands below the dam. I can see no rational good reason to accept such large risks.

Comment 45-2

Hopefully the various public and private insurance agencies with policies for the downstream areas have been informed so they can adjust their premiums and coverages for the communities and residents below the dam.

Comment 45-3

The totally artificial "natural" areas behind the dam are temporary and not of high quality value---in fact the area behind the dam should be returned to a more long lasting natural condition prior to recent years of sediment build up.

Comment 45-4

I recommend you engage in the most cost effective and rapid method of sediment reduction. My opinions are based on my decades of homeownership in La Canada and a career as a biologist engaged in environmental impact stuides.

Sincerely

Thomas Parker
367 Knight Way
La Canada CA 91011
rockdale91011@yahoo.com
818-7908246

Response to Comment Letter #45 (Thomas Parker)

Response to Comment 45-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. The purpose and need for the Proposed Project is based on providing the flood control capacity necessary to protect downstream areas.

Response to Comment 45-2:

In preparation for the possibility of an imminent threat to residents downstream of Devil's Gate Dam, Los Angeles County Flood Control District (LACFCD) has been in close coordination with various emergency management agencies in the Cities of Pasadena, South Pasadena, and Los Angeles and with Caltrans to come up with an Arroyo Seco Channel Flood Hazard Warning and Contingency Plan.

Additionally, while LACFCD works regularly with the United States Federal Emergency Management Agency (FEMA), which designates the flood risk zones used by insurance agencies, the increased flood risk due to sediment impacts in Devil's Gate Reservoir will be reduced after successful completion of the Devil's Gate Reservoir Sediment Removal and Management Project; therefore, changes to flood risk zones around the Arroyo Seco are not anticipated to occur.

Response to Comment 45-3:

As noted in the Draft Environmental Impact Report (EIR), Biological Resources section, the habitat value is impacted by the presence of sediment in the reservoir. The sedimentation that has occurred as a result of the 2009 Station Fire, and is expected to continue to occur, has buried existing vegetation, reducing the size of vegetation communities and inhibiting their ability for succession. As discussed in Section 3.6.6 of the Draft EIR, Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats.

Response to Comment 45-4:

LACFCD notes that the commenter prefers the most cost-effective and rapid method of sediment removal.

STATE OF CALIFORNIA
Governor's Office of Planning and Research
State Clearinghouse and Planning Unit

Edmund G. Brown Jr.
Governor

Ken Alex
Director

December 9, 2013

Christopher Stone
Los Angeles County Flood Control District
P.O. Box 1460
Alhambra, CA 91802-1460

Subject: Devil's Gate Reservoir Sediment Removal and Management Project
SCH#: 2011091084

Dear Christopher Stone:

The State Clearinghouse submitted the above named Draft EIR to selected state agencies for review. On the enclosed Document Details Report please note that the Clearinghouse has listed the state agencies that reviewed your document. The review period closed on December 6, 2013, and the comments from the responding agency (ies) is (are) enclosed. If this comment package is not in order, please notify the State Clearinghouse immediately. Please refer to the project's ten-digit State Clearinghouse number in future correspondence so that we may respond promptly.

Please note that Section 21104(c) of the California Public Resources Code states that:

> "A responsible or other public agency shall only make substantive comments regarding those activities involved in a project which are within an area of expertise of the agency or which are required to be carried out or approved by the agency. Those comments shall be supported by specific documentation."

Comment 46-1

These comments are forwarded for use in preparing your final environmental document. Should you need more information or clarification of the enclosed comments, we recommend that you contact the commenting agency directly.

This letter acknowledges that you have complied with the State Clearinghouse review requirements for draft environmental documents, pursuant to the California Environmental Quality Act. Please contact the State Clearinghouse at (916) 445-0613 if you have any questions regarding the environmental review process.

Sincerely,

Scott Morgan
Director, State Clearinghouse

Enclosures
cc: Resources Agency

Document Details Report
State Clearinghouse Data Base

SCH# 2011091084
Project Title Devil's Gate Reservoir Sediment Removal and Management Project
Lead Agency Los Angeles County Flood Control District

Type EIR Draft EIR

Description The Proposed Project will remove sediment from Devil's Gate Reservoir to restore capacity and to protect the dam and its valves to reduce the risk of flooding in the communities located downstream along the Arroyo Seco. This effort will include removal of approximately 2.9 million cubic yards of existing excess sediment in the reservoir in addition to any additional sediment that accumulates during construction. Sediment removal activities are expected to occur over the course of approximately 5 years beginning Summer 2015. Reservoir management is expected to start after 2020. The purpose of the proposed annual management is to reduce buildup of sediment in the reservoir management area and eliminate or substantially reduce the occurrence of another large-scale sediment removal project in the future.

Lead Agency Contact

Name Christopher Stone
Agency Los Angeles County Flood Control District
Phone 626 458 6100 **Fax**
email
Address P.O. Box 1460
City Alhambra **State** CA **Zip** 91802-1460

Project Location

County Los Angeles
City Pasadena
Region
Lat / Long 34° 11' 09" N / 118° 10' 31" W
Cross Streets Oak Grove Drive and Windsor Drive
Parcel No. 5823031900
Township **Range** **Section** **Base**

Proximity to:

Highways Hwy 210, 2
Airports
Railways
Waterways Arroyo Seco
Schools La Canada HS
Land Use Open Space

Project Issues Air Quality; Archaeologic-Historic; Biological Resources; Forest Land/Fire Hazard; Geologic/Seismic; Minerals; Noise; Public Services; Recreation/Parks; Schools/Universities; Soil Erosion/Compaction/Grading; Toxic/Hazardous; Traffic/Circulation; Vegetation; Water Quality; Wetland/Riparian; Landuse; Cumulative Effects; Aesthetic/Visual

Reviewing Agencies Resources Agency; Department of Conservation; Department of Fish and Wildlife, Region 5; Department of Parks and Recreation; Central Valley Flood Protection Board; Department of Water Resources; California Highway Patrol; Caltrans, District 7; Air Resources Board; Regional Water Quality Control Board, Region 4; Native American Heritage Commission

Date Received 10/23/2013 **Start of Review** 10/23/2013 **End of Review** 12/06/2013

Clear
12/06/13
E

STATE OF CALIFORNIA — Edmund G. Brown, Jr.Governor

NATIVE AMERICAN HERITAGE COMMISSION
1550 Harbor Boulevard, Suite 100
West Sacramento, CA 95691
(916) 373-3715
Fax (916) 373-5471
Web Site www.nahc.ca.gov
Ds_nahc@pacbell.net
e-mail: ds_nahc@pacbell.net

RECEIVED
NOV 21 2013
STATE CLEARING HOUSE

November 20, 2013

Mr. Christopher Stone
Los Angeles County Flood Control District
P.O. Box 1460
Alhambra, CA 91802-1460

RE: SCH#2011091084; CEQA Notice of Completion; draft Environmental Impact Report (DEIR) for the **"Devil's Gate Reservoir Sediment Removal & Management Project;"** located in the City of Pasadena, along the Arroyo Seco; Los Angeles County, California

Dear Mr. Stone:

The Native American Heritage Commission (NAHC) has reviewed the above-referenced environmental document.

The California Environmental Quality Act (CEQA) states that any project which includes archeological resources, is a significant effect requiring the preparation of an EIR (CEQA guidelines 15064.5(b). To adequately comply with this provision and mitigate project-related impacts on archaeological resources, the Commission recommends the following actions be required:

Contact the appropriate Information Center for a record search to determine :If a part or all of the area of project effect (APE) has been previously surveyed for cultural places(s), The NAHC recommends that known traditional cultural resources recorded on or adjacent to the APE be listed in the draft Environmental Impact Report (DEIR).

If an additional archaeological inventory survey is required, the final stage is the preparation of a professional report detailing the findings and recommendations of the records search and field survey. We suggest that this be coordinated with the NAHC, if possible. The final report containing site forms, site significance, and mitigation measurers should be submitted immediately to the planning department. All information regarding site locations, Native American human remains, and associated funerary objects should be in a separate confidential addendum, and not be made available for pubic disclosure pursuant to California Government Code Section 6254.10.

A list of appropriate Native American Contacts for consultation concerning the project site has been provided and is attached to this letter to determine if the

proposed active might impinge on any cultural resources. Lack of surface evidence of archeological resources does not preclude their subsurface existence.

Lead agencies should include in their mitigation plan provisions for the identification and evaluation of accidentally discovered archeological resources, pursuant to California Health & Safety Code Section 7050.5 and California Environmental Quality Act (CEQA) §15064.5(f). In areas of identified archaeological sensitivity, a certified archaeologist and a culturally affiliated Native American, with knowledge in cultural resources, should monitor all ground-disturbing activities. Also, California Public Resources Code Section 21083.2 require documentation and analysis of archaeological items that meet the standard in Section 15064.5 (a)(b)(f).

Lead agencies should consider first, avoidance for sacred and/or historical sites, pursuant to CEQA Guidelines 15370(a). Then if the project goes ahead then, lead agencies include in their mitigation plan provisions for the analysis and disposition of recovered artifacts, pursuant to California Public Resources Code Section 21083.2 in consultation with culturally affiliated Native Americans.

Lead agencies should include provisions for discovery of Native American human remains in their mitigation plan. Health and Safety Code §7050.5, CEQA §15064.5(e), and Public Resources Code §5097.98 mandates the process to be followed in the event of an accidental discovery of any human remains in a location other than a dedicated cemetery.

Sincerely,

Dave Singleton
Program Analyst

CC: State Clearinghouse

Attachment: Native American Contacts list

Response to Comment Letter #46 (State Clearinghouse)

Response to Comment 46-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

The letter forwarded by the State Clearinghouse is a duplicate of the letter sent by the Native American Heritage Commission (see Comment Letter #38).

From: Jo Beckwith
To: reservoircleanouts
Subject: Devil"s Gate Dam sediment removal
Date: Thursday, December 19, 2013 10:58:39 AM

To: LA County DPW
From: Joanne Beckwith, 9822 Broadway, Temple City, CA 91780

I strongly oppose the County's proposal for sediment removal.

I support the comments made by Barbara Eisenstein, which are as follows:

Comment 47-1

I am strongly opposed to the Devil's Gate sediment removal project as proposed by the LA County Department of Public Works. A slower, long-term plan to gradually decrease the amount of sediment built up in the dam would allow for the development of sustainable flood-control and water management practices. The accumulation of sediment, though exacerbated by the 2009 Station Fire, is the result of inadequate management of the Devil's Gate Dam prior to the 2009 event. There is still enough capacity in the dam (17%) to move more deliberately to correct for this longstanding, inadequate maintenance. The existing project relies on early 20th Century engineering concepts that predominantly address flood control concerns with no consideration for the accompanying financial, environmental, and health burdens.

Comment 47-2

Sediment accumulation in dams along the front-range of the San Gabriel Mountains is the result of an ongoing process - erosion of a steep, young mountain range - being managed with short-term thinking, deferred maintenance, and reliance on outdated engineering solutions. Rivers were channelized and dams, spreading grounds and sediment basins were built to accommodate rapid development in Southern California, with little concern for the long-term consequences of these massive construction projects.

The repercussions of this type of thinking have become only too clear, and the continued management of our environment and resources as practiced when the dams were built threatens the viability of our region. We have learned that natural forces may be controllable for relatively short periods, but ultimately the only workable solutions are those that are compatible with natural processes and take a long-term, holistic perspective.

As such, plans to remove sediment using inefficient and polluting practices like trucking it away ("away" meaning not here, though room for dumping is finite and nearly exhausted) are truly baffling. This merely "kicks the can down the road" as the sediment keeps coming, habitat continues to decline, and resources are squandered with little concern about the continued release of greenhouse gases into the atmosphere.

Comment 47-3

Nevertheless, the need for flood protection and an adequate water supply cannot be denied. As such, it is critical to include the following considerations in plans to meet these important concerns.

1. A long-term, holistic approach that takes into account flood risk, health of

Comment 47-3 continued

the watershed, diminishing resources, and impacts to habitat, wildlife and humans.

Comment 47-4

2. Proposals should make use of natural forces, such as sediment removal through sluicing, rather than going up against them.

Comment 47-5

3. The concept of "waste" is not applicable in sustainable systems. All materials and processes are resources and should be treated as such. Eroded materials that build up in the dams would normally be deposited along the rivers and at the beaches. Engineered solutions should incorporate the value of these materials.

Comment 47-6

4. Rather than a continued record of degrading the land and resources we rely upon, acceptable proposals should have the long-term goal of solving the more immediate problems while improving the condition of the watershed for the future.

Comment 47-7

Plowing ahead with an expensive "quick fix" that will disrupt and destroy functioning habitat needed by wildlife and humans for a healthy existence is not in the public interest. A slower, more deliberate and cautious approach could save money and resources while allowing time to develop innovative and effective ways to meet these challenges over the long-term.

Response to Comment Letter #47 (Joanne Beckwith)

Response to Comment 47-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. Los Angeles County Flood Control District (LACFCD) notes the commenter's objection to the Proposed Project.

As noted in the Draft Environmental Impact Report (EIR), Section 2.2.1, LACFCD History, sediment removal efforts have previously taken place at the reservoir in order to ensure correct functioning of the outlet works and/or to maintain reservoir capacity. Extending the project duration would limit the amount of sediment removed annually. Historically, large amounts of sediment have been deposited in the reservoir in short time periods. Between 1935 and 1938 over 1.6 million cubic yards (cy) of sediment, between 1938 and 1943 over 1.95 million cy of sediment, between 1959 and 1966 over 1.75 million cy of sediment, and between 2010 and 2012 over 1.3 million cy of sediment was deposited in the reservoir. Since the 1920 dam construction and prior to the Station Fire in 2009, approximately 10.7 million cy of sediment accumulated in the reservoir; and approximately 8.0 million cy was removed by LACFCD.

LACFCD goes to great lengths to lessen project impacts and maximize efficiencies. As such, many of the points in suggested plans, such as the Arroyo Seco Foundation's four-point "Slow Program", are compatible with the LACFCD Proposed Project.

For example, the Draft EIR concluded that Alternative 3 is the Environmentally Superior Alternative. Alternative 3, Configuration D, Option 2 drastically reduces the project's footprint of 120 acres down to 71 acres. Additionally, the limited maintenance area for Alternative 3 further reduces the permanent habitat impacts down to approximately 51 acres by allowing for site replanting and mitigation to take place within the reservoir footprint. This reduction in project acreages will greatly lessen environmental impacts of the Proposed Project.

LACFCD strives to achieve an efficient, low-cost sediment removal project. Sediment removal rates and trucking operations, now utilizing all low-emissions trucks, as explained in Section 3.5 of the Draft EIR, have been carefully planned for economies of scale to realize maximum efficiencies without major delays in project schedule, thus greatly reducing operating costs. Furthermore, LACFCD has applied for and received an approximately $28 million grant through the State's Disaster Preparedness and Flood Protection Bond Act of 2006 (Proposition 1E) program. A portion of this grant will be used to help offset the Proposed Project's costs.

While sluicing is not a viable project alternative, as explained in Section 4.7 of the Draft EIR, Flow Assisted Sediment Transport, or FASTing, will be used for maintenance after the project's main sediment removal phase has been completed, as described in Section 2.5.2 of the Draft EIR.

LACFCD is committed to *Public Service that Works*; and by combining almost 100 years of technical expertise and invaluable input from the community, less invasive flood protection will continue to be a reality.

Response to Comment 47-2:

See Response to Comment 47-1. As discussed in the Proposed Project Description and Purpose and Need (see Section 2.0 of the Draft EIR), Proposed Project objectives include reducing flood risk and

restoring reservoir capacity for flood control and future sediment inflow events. With the restored capacity, future regular maintenance, as discussed in Section 2.5.2 of the Draft EIR, is expected to prevent or significantly reduce the need for another large sediment removal project in the future. Per Section 3.9.6 of the Draft EIR, impacts to greenhouse gas emissions were found to be less than significant, and impacts to biological resources were found to be less than significant with mitigation incorporated as shown in Section 3.6.6 of the Draft EIR.

Response to Comment 47-3:

See Response to Comment 47-2.The Proposed Project is designed to be a long-term plan, with the reservoir management phase providing management for future sediment inflows. After the sediment removal phase has occurred, Flow Assisted Sediment Transport, or FASTing, is proposed to be an integral part of the annual maintenance at Devil's Gate. Annual FASTing operations will be implemented to reduce future buildups of sediment in the reservoir and to reduce the need for mechanical removal of sediment from the reservoir. Although FASTing is expected to be an effective means of keeping sediment levels low in the reservoir, it is estimated that typically 13,000 cy of sediment will be removed by excavation annually. However, a maintenance regime that relies on FASTing greatly reduces the need for and extends the life of future and existing sediment placement sites and improves the future sustainability of the reservoir. Please see Section2.5.2 of the Draft EIR for more information on future maintenance.

Response to Comment 47-4:

Sluicing was analyzed as part of the Alternatives Analysis, Section 4.7, Alternative 4 Sluicing Method. This alternative would involve use of construction equipment and the removal of trees and vegetation over the same footprint as the Proposed Project. The sluicing alternative would potentially have additional significant impacts in comparison to the Proposed Project. Many of these impacts would be associated with the likelihood that large amounts of sediment would not be fully transported through the flood control system; this sediment would need to be mechanically removed and trucked out from numerous downstream locations potentially including the two soft-bottom portions of the channel. Please see Section 4.7 and Appendix K of the Draft EIR for further analysis.

As discussed above, FASTing, a passive method of transporting sediment downstream, is currently used when possible and would be used during the Maintenance Phase of the Proposed Project; however, FASTing, even in combination with the Interim Measures Project (IMP), will not efficiently remove large amounts of sediment. As discussed under the No Project Alternative, Section 4.9, use of FASTing and IMP alone will not meet Proposed Project objectives. The removal of accumulated sediment on a yearly basis is the proposed management scheme after the original sediment removal is completed. The regular maintenance of the area will lower the potential need for a large-scale sediment removal operation in the future. Please see Section 2.5.2 of the Draft EIR for more information on future maintenance.

Response to Comment 47-5:

See Response to Comment 47-4. The sediment that came into Devil's Gate Reservoir following the Station Fire has a very fine gradation or consistency. As such, the majority of this material is not readily reusable on a commercial scale and will most likely not be sold; however, sediment placed at sediment placement sites would be available for potential reuse for other projects or sediment reuse

opportunities. The sediment removed from the reservoir will be transported to the sites listed in Section 2.0, Project Description in the Draft EIR.

For further information regarding beneficial uses for sediment at the Los Angeles County Flood Control District (LACFCD) sites, please refer to Section 6.5 of LACFCD's 2012 Sediment Management Strategic Plan which can be found at: http://dpw.lacounty.gov/lacfcd/sediment/stplan.aspx.

Response to Comment 47-6:

See Response to Comments 47-1 and 47-4.

Response to Comment 47-7:

See Response to Comments 47-1 and 47-2.

LA CAÑADA UNIFIED SCHOOL DISTRICT
RESOLUTION 17-13-14 OF THE GOVERNING BOARD OF LA CAÑADA UNIFIED SCHOOL DISTRICT ADDRESSING THE DISTRICT'S CONCERNS RELATED TO THE DRAFT ENVIRONMENTAL IMPACT REPORT (DEIR) FOR THE DEVIL'S GATE RESERVOIR SEDIMENT REMOVAL AND MAINTENANCE PROJECT

WHEREAS, the La Cañada Unified School District (LCUSD) is aware of a proposed project by Los Angeles County Flood Control District to remove between 2.4 million and 4.0 million cubic yards of sediment and debris from the Devil's Gate Reservoir over a five or more year time period; and

WHEREAS, the LCUSD Governing Board and District staff have reviewed the Draft Environmental Impact Report (DEIR) for the subject project including alternatives, and has held at a public meeting a discussion on the matter; and

Comment 48-1

WHEREAS, the LCUSD Governing Board has numerous concerns related to potential impacts within the city and specifically near La Cañada High School; and

WHEREAS, the LCUSD Governing Board and District staff places the health and safety of its students and families as one of its highest priorities; and

WHEREAS, the LCUSD Governing Board wishes to eliminate or minimize potential adverse environmental, health, and traffic congestion impacts to its students and families.

THEREFORE BE IT RESOLVED that the Governing Board of the La Cañada Unified School District hereby requests that the following comments and concerns be addressed by the Board of Supervisors of the County of Los Angeles before proceeding with the Devil's Gate Reservoir Sediment Removal and Maintenance Project (see DEIR for any specific references):

1. The DEIR determined that there are significant and unavoidable impacts to air quality even after mitigations requiring equipment to meet EPA 2007 standards. This is due to the nature of the debris removal by heavy construction equipment that generates excessive daily NOx emissions. Short and long term health effects due to silica dust, fugitive dust clouds, diesel fumes, carbon monoxide and other pollutants were not fully assessed in the DEIR and students should not be exposed to health risks in the school environment. Student health and safety will be adversely affected. Ensuring student health and safety is a LCUSD Board priority as well as a community and civic responsibility. The Board has determined that the DEIR and the proposed project do not adequately address the severe and adverse impact on the health of our students that would be caused by the project. Furthermore, the Governing Board requests that the County specifically address how the project will ensure the health and safety of our students.

Comment 48-2

2. The LCUSD Governing Board supports the exclusive use of Alternate Haul Routes 1B and 1F (exiting and entering I-210 at Windsor Place) during the entire hauling operation because school congestion would not be worsened, thus avoiding negative impacts to attendance and tardy rates while protecting the integrity of the instructional day and supporting student achievement.

Comment 48-3

Comment 48-4

3. Vehicle noise generated on haul routes near La Cañada High School will disrupt the learning environment and negatively impact student ability to concentrate and access curriculum.

Comment 48-5

4. Implementation of the County's current Preferred Haul Routes 1D and 1H (exiting I-210 at Windsor Avenue and entering I- 210 at Berkshire Place) with a proposed starting time of 7:00 a.m. will cause a significant traffic impact on La Canada High School. The LCUSD Governing Board opposes the use of Haul Routes 1D and 1H.

PASSED AND ADOPTED by the La Canada Unified School District Governing Board December 17, 2013 by the following vote:

AYES: 5

NOES: 0

ABSENT: 0

President of the Board of Education
of the La Cañada Unified School District

Response to Comment Letter #48 (La Cañada Unified School District)

Response to Comment 48-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

Response to Comment 48-2:

The Draft Environmental Impact Report (EIR) analyzed the air quality and health risk impacts of dust, diesel fumes, carbon monoxide, and other pollutants associated with the Proposed Project (see Draft EIR Section 3.5, Appendices B and C) as required by the California Environmental Quality Act (CEQA).

Air quality impacts associated with truck traffic were analyzed in the Draft EIR in Section 3.5. Los Angeles County Flood Control District (LACFCD) has conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed the United States (U.S.) Environmental Protection Agency's (EPA's) 2007 standards for emissions. Therefore, in order to further reduce emissions, Mitigation Measure MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump trucks that meet or exceed EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality, including those associated with health effects, will be reduced to less than significant. As discussed in the Draft EIR, Section 3.5, the Health Risk Assessment (HRA) analyzed both the cancer-related and noncancer-related acute (short-term) and chronic (long-term) impacts from project-related emissions. The HRA analysis found the Proposed Project would result in less than significant impacts for both the cancer-related and non-cancer-related acute short-term and long-term impacts.

As discussed in the Draft EIR, Section 3.10.6, Impacts and Mitigation, HAZARDS-1, Sediment Removal/Reservoir Management, no hazardous levels of the contaminants were detected in the sediment. Dust impacts from the Proposed Project were carefully evaluated, as discussed in the Draft EIR, Section 3.5.6, Impacts and Mitigation, AIR QUALITY-2, Sediment Removal. The Proposed Project's activities, including excavation, grading, material loading, and hauling, would result in less than significant dust emissions due to the Proposed Project's use of best management practices and would be in full compliance with South Coast Air Quality Management District's (SCAQMD's) fugitive dust regulations.

Response to Comment 48-3:

LACFCD notes the commenter's preference for the use of the Alternative Haul Routes 1B and 1F.

Response to Comment 48-4:

The Draft EIR, Section 3.14.6, Sediment Removal/Reservoir Management, Offsite Vehicular Noise, analyzed the noise impacts from the haul trucks. The analysis found that the maximum noise increase on the roads in the immediate vicinity of the Devil's Gate Dam and Reservoir area would be a 1-decibel (dB) increase on Berkshire Place east of the Interstate 210 (I-210) northbound ramps. A 1-dB increase is well below the 3-dB increase threshold of perception and would therefore not be anticipated to disturb the learning environment. The roadway noise impact analysis provided in the Draft EIR found that the Proposed Project would result in less than significant impacts for all analyzed alternatives.

Response to Comment 48-5:

Although significant unavoidable impacts were determined for traffic, the only significant impacts in the immediate vicinity of La Cañada High School occurred at Berkshire Place and I-210 Eastbound ramps intersection during the AM peak period. Therefore, impacts would not be significant all day, and significant impacts would occur only at the intersection and on-ramp/off-ramp listed above. In practice, hauling rates and routes may be adjusted to help reduce impacts, depending on operational need. LACFCD will continue to work with local organizations and the Cities of Pasadena and La Cañada Flintridge and the community of Altadena to minimize traffic impacts around the Proposed Project site. LACFCD notes the commenter's objection to Haul Routes 1D and 1H.

From: Madison Keogh
To: reservoircleanouts
Subject: RE: DEVIL'S GATE RESERVOIR SEDIMENT REMOVAL AND MANAGEMENT PROJECT
Date: Saturday, December 21, 2013 12:51:04 PM

December 21, 2013

Dear Department of Public Works, Water Resource Division,

Comment 49-1

Thank you for the opportunity to comment on the draft EIR for the DEVIL'S GATE RESERVOIR SEDIMENT REMOVAL AND MANAGEMENT PROJECT. I can't imagine what a herculean task you have ahead deciding how best to assess and implement the sediment removal project.

My name is Madison Keogh and I was a camper at Tom Sawyer Camps 3 years and have been a camp counselor for 2 years. As a camper, Tom Sawyer gave me self-confidence to socialize with other campers and made a safe environment for me to explore and learn. Now as a counselor I am still learning and gaining from the Tom Sawyer Camp experience. This camp has taught me how to respect and appreciate life. My sister and I have been in love with this camp since we first started and we both hope to continue this fun-filled journey of camp. Through Tom Sawyer I have gained patience, understanding and leadership skills that I continue to use outside of camp.

Comment 49-2

While we support the sediment clean up in general, we are concerned about the impact as defined in the dEIR on summer camp and are requesting the following modifications: 1) No sediment removal in the willow forest and alluvial scrub areas during the months of June, July, and August; 2) A phased approach that allows for places within the project area that can continue to be used for recreational purposes; 3) A longer timeline for the project to help minimize impact on those who use the park; and, 4) Preservation of the willow forest and the alluvial scrub area from denuding and/or from being used as permanent maintenance zones.

Comment 49-3

Tom Sawyer Camps has been in operation since 1926 and has been using Hahamongna Watershed Park as for the last 70 years (since 1944). Approximately 1250 of our campers and 150 staff use this site each summer, which now includes three generation of campers. This park is critical to our day camp programs and heavy truck traffic during the summer months and denuding the willow forest and alluvial scrub areas would have a critical negative impact on the program, the campers and the staff.

Comment 49-4

Camp is an antidote to bullying, isolation, over reliance on technology and many other challenges facing our youth. At Hahamongna, campers age 3-14 have critical exposure to wilderness adventure. During the summer, they hike, ride horses, build secret forts, observe wildlife, play games, sing songs, build self reliance and self esteem, and develop friendships that last a lifetime. We rely heavily on the access, peace and beauty of the willow forest and the alluvial scrub areas for these experiences, along with other areas of the park. Hahamongna is home to generations of staff and campers whose lives have been directly and dramatically enriched by this natural refuge, including mine.

Comment 49-5

Tom Sawyer Camps is a very important program and my request could easily go unnoticed but I believe the impact that camp has on the children of tomorrow is significant. Summer in the watershed is a rare and unique opportunity for children to be away from noise and disruption and engage with nature and outdoor adventure in a safe, peaceful, and joyful manner. We hope you will see the value of camp and make every attempt to minimize the impact the sediment clean up will have during the summer months and for the generations of children to use the park in the years to come.

Thank you for allowing me the opportunity to share my concerns and needs. Please feel free to contact me if you have any questions.

Sincerely,

Madison Keogh

5125 Cloud Ave La Crescenta, CA 91214

8183317490

madytown@sbcglobal.net

Response to Comment Letter #49 (Madison Keogh - Tom Sawyer Camps Counselor)

Response to Comment 49-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

Response to Comment 49-2:

The Proposed Project will not limit the use of the Oak Grove area of Hahamongna Watershed Park by recreational users such as Tom Sawyer Camps. Sediment removal activities would be temporary and are expected to occur only in the drier months (April to December, excluding holidays). It is expected that these activities will often not be adjacent to the Oak Grove area of Hahamongna Watershed Park. Therefore, the maximum impacts to the adjacent recreational facilities would be much shorter than the five-year duration of the sediment removal phase of the Proposed Project.

During the summer months, sediment is expected to be the driest. Due to the reduction in water weight, each truck can haul more sediment per load during these months. This increases efficiency and decreases project duration, which also decreases impacts and cost. Skipping these crucial dry months would extend the project duration.

The Los Angeles County Flood Control District (LACFCD) proposed a project duration of five years to reduce accumulated sediment in a timely fashion. The goal of LACFCD is to restore reservoir flood capacity as soon as feasible while reducing costs and minimizing the duration of environmental and construction impacts to the surrounding communities. Extending the project would prolong the flood risk to downstream communities and increase the construction impacts to the surrounding communities.

As discussed in Section 3.6.6 of the Draft Environmental Impact Report (EIR), Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats.

Alternative 3, Configuration D affects the least amount of reservoir area of all the action alternatives while still achieving Proposed Project objectives (see Section 4.6 of the Final EIR). This alternative would provide a buffer between the Oak Grove area of Hahamongna Watershed Park and the excavation area. Alternative 3, Configuration D, Option 1 provides a more natural configuration for the reservoir by having two branches to carry water and sediment toward the face of the dam, avoiding disturbing a significant portion of existing vegetation. To further reduce the Proposed Project's footprint, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2, which drastically reduces the project's footprint of 120 acres down to 71 acres, would avoid excavation of the western branch, thereby providing a greater habitat buffer on the west side of the reservoir. In addition, the maintenance areas would be smaller than the original sediment removal footprint, allowing for habitat to reestablish.

Response to Comment 49-3:

See Response to Comment 49-2. Access to the Oak Grove area of Hahamongna Watershed Park will not be limited by the Proposed Project. Potential impacts due to the Proposed Project's truck trips were analyzed in the Draft EIR, Section 3.16, Transportation and Traffic. As listed in that section, a single

intersection in the immediate vicinity of the Proposed Project Site will have a potentially significant impact. In practice, hauling rates and routes may be adjusted to help reduce impacts depending on operational need. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the project site.

LACFCD also notes the commenter's concerns with traffic impacts relating to traveling to and from the Oak Grove area of Hahamongna Watershed Park. The Draft EIR outlines a 12-hour trucking schedule, with trucking operations on Saturdays as well. This schedule is used to model the most intensive construction operation, which may not be applicable at the site for the duration of the project. Typical trucking schedules are estimated to be 8 hours per day on weekdays. Additionally, construction traffic will not pass the Oak Grove Drive/Foothill Boulevard intersection used for ingress and egress to the Oak Grove area of Hahamongna Watershed Park.

Response to Comment 49-4:

See Response to Comment 49-2. LACFCD notes the use of Devil's Gate Reservoir by Tom Sawyer Camps, especially the willow forest and alluvial scrub areas.

Response to Comment 49-5:

See Response to Comment 49-2. LACFCD notes that Tom Sawyer Camps is an important resource to children and is going to great lengths to keep impacts to a minimum. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the Proposed Project site.

From:	Elizabeth Kotz
To:	reservoircleanouts
Cc:	bbogaard@cityofpasadena.net Bogaard
Subject:	"Devil"s Gate Reservoir Sediment Removal and Management Project
Date:	Sunday, December 22, 2013 12:31:17 PM

Comment 50-1

As a Pasadena resident I am deeply concerned about the DWP's current proposals for sediment removal at the Hahamongna Watershed Park.

ALL the current proposals will be destroy enormous areas of natural habitat and pose deeply disruptive and long-term impacts on local residents.

Comment 50-2

Given that most of this sediments has accumulated long before the 2009 Station Fire, the DWP has not provided sufficient justification for removing 2.4 to 4 millions cubic yards of dirt and debris. In addition, the county has failed to make a convincing case for why sediment removal needs to be done by truck, rather than far less disruptive forms of sluicing and flow-assisted sediment removal.

Comment 50-3

At the very least, the public comment period needs to be extended significantly.

Comment 50-4

All of my neighbors who attended meetings this fall expressed a great deal of frustration with them — particularly the DWP's refusal to permit actual discussion or questioning of the plans.

Comment 50-5

I am glad to see that the City of Pasadena is preparing to fight the county proposals.

The DWP needs to start over and work with the City of Pasadena and the Arroyo Seco Foundation to **develop long term, more effective and more natural ways to address the management of the Arroyo Seco watershed**.

Elizabeth Kotz
1396 La Loma Road
Pasadena CA 91105

Response to Comment Letter #50 (Elizabeth Kotz)

Response to Comment 50-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. Los Angeles County Flood Control District (LACFCD) notes the commenter's concern about the Proposed Project.

As discussed in Section 3.6.6 of the Draft Environmental Impact Report (EIR), Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats. In addition, sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays).

Air quality and noise impacts associated with truck traffic were analyzed in the Draft EIR. As discussed in the Draft EIR, Section 3.14, with implementation of Mitigation Measure MM N-1, noise impacts would be reduced to a level of less than significant. LACFCD has conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet the United States (U.S.) Environmental Protection Agency's (EPA's) 2007 standards for emissions. Therefore, in order to further reduce emissions, Mitigation Measure MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump trucks that meet the EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality will be reduced to less than significant.

Response to Comment 50-2:

Historically, large amounts of sediment have been deposited in the reservoir in short time periods. Between 1935 and 1938 over 1.6 million cubic yards (cy) of sediment, between 1938 and 1943 over 1.95 million cy of sediment, between 1959 and 1966 over 1.75 million cy of sediment, and between 2010 and 2012 over 1.3 million cy of sediment was deposited in the reservoir. Since the 1920 dam construction and prior to the Station Fire in 2009, approximately 10.7 million cy of sediment accumulated in the reservoir; and approximately 8.0 million cy was removed by LACFCD.

The storms that occurred in the two wet seasons after the Station Fire increased sediment accumulation in the reservoir by approximately 1.3 million cy, reducing the available flood control capacity to less than one design debris event (DDE).

LACFCD was mandated by the State Legislature to provide flood protection and water conservation within its boundaries.

A reservoir storage design capacity of two DDEs below the dam's lowest spillway was determined to be the standard acceptable level of risk at Devil's Gate Dam and Reservoir. The DDE volume of capacity is determined using the January 2006 Los Angeles County Department of Public Works (LACDPW) Hydrology Manual and the March 2006 LACDPW Sedimentation Manual. For Devil's Gate Dam and Reservoir, the required reservoir capacity is 4.0 million cy (two DDEs) below the spillway elevation of 1,040.50 feet.

The Hydrology Manual (January 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_Hydrology_Manual/2006%20Hydrology%20Manual-Divided.pdf

The Sedimentation Manual (March 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_sedimentation_manual/Sedimentation%20Manual-Second%20Edition.pdf

Additional information concerning DDE calculation methods has been added to the Final EIR, Section 2.3, Project Need.

Sluicing was analyzed as part of the Draft EIR in the Alternatives Analysis, Section 4.7, Alternative 4 Sluicing Method. This alternative would involve use of construction equipment and the removal of trees and vegetation over the same footprint as the Proposed Project. The sluicing alternative would potentially have additional significant impacts in comparison to the Proposed Project. Many of these impacts would be associated with the likelihood that large amounts of sediment would not be fully transported through the flood control system; this sediment would need to be mechanically removed and trucked out from numerous downstream locations potentially including the two soft-bottom portions of the channel. Please see Section 4.7 and Appendix K of the Draft EIR for further analysis. While sluicing is not a viable project alternative, as explained in Section 4.7 of the Draft EIR, Flow Assisted Sediment Transport, or FASTing, will be used for maintenance after the project's main sediment removal phase has been completed, as described in Section 2.5.2 of the Draft EIR.

FASTing, a passive method of transporting sediment downstream, is currently used when possible and as stated above, would be used during the Maintenance Phase of the Proposed Project; however, FASTing, even in combination with the ongoing Interim Measures Project (IMP), will not efficiently remove large amount of sediment. As discussed under Section 4.9, No Project Alternative, use of FASTing and IMP alone will not meet Proposed Project objectives.

Response to Comment 50-3:

The California Environmental Quality Act (CEQA) requires that the public comment period for a Draft EIR be at least 45 days (CEQA Guidelines § 21091). LACFCD extended this review period initially to 75 days and then further extended the review period to 90 days to allow for additional commenting time.

Response to Comment 50-4:

LACFCD held three community meetings to inform the public of the Proposed Project, Alternatives, and the results of the Draft EIR. The meetings included a presentation followed by a question and answer session, workshops where the public could ask specific questions about the project and potential impacts, and the ability to submit formal comments. Members of the public were able to ask questions or pose comments both in a group setting after the presentation or at the individual workshop stations.

Response to Comment 50-5:

LACFCD has met and will continue to meet with the City of Pasadena regularly to coordinate and ensure resolution of concerns regarding Devil's Gate Reservoir and the Hahamongna Watershed Park Master Plan (HWPMP). LACFCD goes to great lengths to lessen project impacts and maximize efficiencies. As

such, many of the points in the Arroyo Seco Foundation's four-point "Slow Program" are compatible with the LACFCD Proposed Project.

For example, the Draft EIR concluded that Alternative 3 is the Environmentally Superior Alternative. Alternative 3, Configuration D, Option 2 drastically reduces the project's footprint of 120 acres down to 71 acres . Additionally, the limited maintenance area for Alternative 3 further reduces the permanent habitat impacts down to approximately 51 acres by allowing for site replanting and mitigation to take place within the reservoir footprint. This reduction in project acreages will greatly lessen environmental impacts of the Proposed Project.

LACFCD strives to achieve an efficient, low-cost sediment removal project. Sediment removal rates and trucking operations, now utilizing all low-emissions trucks, as explained in Section 3.5 of the Draft EIR, have been carefully planned for economies of scale to realize maximum efficiencies without major delays in project schedule, thus greatly reducing operating costs. Furthermore, LACFCD has applied for and received an approximately $28 million grant through the State's Disaster Preparedness and Flood Protection Bond Act of 2006 (Proposition 1E) program. A portion of this grant will be used to help offset the Proposed Project's costs.

While sluicing is not a viable project alternative, as explained in Section 4.7 of the Draft EIR, Flow Assisted Sediment Transport, or FASTing, will be used for maintenance after the project's main sediment removal phase has been completed, as described in Section 2.5.2 of the Draft EIR.

LACFCD is committed to *Public Service that Works*; and by combining almost 100 years of technical expertise and invaluable input from the community, less invasive flood protection will continue to be a reality.

For a more detailed response to the Arroyo Seco Foundation's four-point "Slow Program", please see the response to the Arroyo Seco Foundation's comment letter (Comment Letter #216, Response to Comment 216-16).

From:	Jill Blaisdell
To:	reservoircleanouts@dpw.lacounty.gov; malexander@lcf.ca.gov; ehitti@lcf.ca.gov; ezandvliet@lcf.ca.gov
Subject:	L.A. County Dept. Of Public Works, Reservoir Clean outs
Date:	Sunday, December 22, 2013 8:18:47 PM

Attn. Water Resources Division
P.P. Box 1460
Alhambra Ca.
91802-9974

Attn. Water Resource Board,

Comment 51-1 I am a resident and mother of school aged children living in La Canada, California. I have read in the local newspaper about the proposed Devil's Gate Dam Sediment Removal and Management Project. I am horrified at the scope of this project! How many children are going to have permanent respiratory ailments by the particulate your proposed project will put into the air they breath. The particulate I refer to comes from the sediment being removed and the particulate from the excessive number of trucks driving on our streets.

Comment 51-2 How do you propose to mitigate the traffic disruption to our community? These trucks will be spewing exhaust right next to our schools, athletic fields, and parks.

Comment 51-3 This proposed Public Works project will have great damaging impact on our community, and must be studied and mitigated before being implemented.

Sincerely,
Mrs. Blaisdell

Response to Comment Letter #51 (Jill Blaisdell)

Response to Comment 51-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

Air quality impacts associated with truck traffic were analyzed in the Draft Environmental Impact Report (EIR) in Section 3.5. Los Angeles County Flood Control District (LACFCD) has conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed the United States (U.S.) Environmental Protection Agency's (EPA's) 2007 standards for emissions. Therefore, in order to further reduce emissions, Mitigation Measure MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump trucks that meet or exceed EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality, including those associated with health effects, will be reduced to less than significant. As discussed in the Draft EIR, Section 3.5, the Health Risk Assessment (HRA) found the Proposed Project would result in less than significant impacts for both the cancer-related and non-cancer-related impacts.

Dust impacts from the Proposed Project were carefully evaluated, as discussed in the Draft EIR, Section 3.5.6, Impacts and Mitigation, AIR QUALITY-2, Sediment Removal. The Proposed Project's activities, including excavation, grading, material loading, and hauling, would result in less than significant dust emissions due to the project's use of best management practices and would be in full compliance with South Coast Air Quality Management District's (SCAQMD's) fugitive dust regulations.

Response to Comment 51-2:

Potential impacts due to the Proposed Project's truck trips were analyzed in the Draft EIR, Section 3.16, Transportation and Traffic. As listed in that section, a single intersection in the immediate vicinity of the Proposed Project site will have a potentially significant impact. In practice, hauling rates and routes may be adjusted to help reduce impacts, depending on operational need. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the Proposed Project site.

See Response to Comment 51-2 regarding air quality impacts.

Response to Comment 51-3:

Potential impacts associated with the Proposed Project were analyzed in the Draft EIR. Where available, Mitigation Measures have been provided to reduce any significant impacts. Section 15021(d) of the CEQA Guidelines states: "CEQA recognizes that in determining whether and how a project should be approved, a public agency has an obligation to balance a variety of public objectives, including economic, environmental, and social factors and in particular the goal of providing a decent home and satisfying living environment for every Californian. An agency shall prepare a statement of overriding considerations as described in Section 15093 to reflect the ultimate balancing of competing public objectives when the agency decides to approve a project that will cause one or more significant effects on the environment." Prior to implementation of the Proposed Project, the County of Los Angeles Board of Supervisors must consider the EIR, must certify the EIR, and adopt the Findings of Fact, Mitigation Monitoring Program, and a Statement of Overriding Considerations.

From: wendy crowley
To: reservoircleanouts
Subject: Fwd: Devils Gate Reservoir Sediment Removal
Date: Saturday, December 28, 2013 2:49:55 PM

---------- Forwarded message ----------
From: **wendy crowley** <bonapartemom@gmail.com>
Date: Sat, Dec 28, 2013 at 2:41 PM
Subject: Devils Gate Reservoir Sediment Removal
To: resrvoircleanouts@dpw.lacounty.gov

Dear Sirs,

Comment 52-1

I am a resident of Pasadena would like to weigh in on your proposal:

1 The removal of the vegetation-trees etc will be harmful to the wildlife and their habitat.

Comment 52-2

2 The proposed number of trucks per day to be used for the sediment removal is unbelievable. You have done nothing for 20 years and I guess you want to play catch up.

Comment 52-3

3 The noise , pollution and freeway impact is unacceptable.

Comment 52-4

I hope you will go slow and remove the sediment over a 20 year period, leaving the Hahamonga Water Shed area as it stands for future generations of people and wildlife.

A concerned Citizen
Wendy Crowley

Response to Comment Letter #52 (Wendy Crowley)

Response to Comment 52-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. As discussed in Section 3.6.6 of the Draft Environmental Impact Report (EIR), Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats. In addition, sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays). Wildlife species currently found in the Proposed Project area would be expected to either remain in the undisturbed areas of reservoir outside the Proposed Project area or to reestablish once sediment removal activities have been completed.

Response to Comment 52-2:

As noted in Section 2.2.1, Los Angeles County Flood Control District (LACFCD) History, sediment removal efforts have previously taken place at the reservoir in order to ensure correct functioning of the outlet works and/or to maintain reservoir capacity. Extending the project duration would limit the amount of sediment removed annually. Historically, large amounts of sediment have been deposited in the reservoir in short time periods. Between 1935 and 1938 over 1.6 million cubic yards (cy) of sediment, between 1938 and 1943 over 1.95 million cy of sediment, between 1959 and 1966 over 1.75 million cy of sediment, and between 2010 and 2012 over 1.3 million cy of sediment was deposited in the reservoir. Since the 1920 dam construction and prior to the Station Fire in 2009, approximately 10.7 million cy of sediment accumulated in the reservoir; and approximately 8.0 million cy was removed by LACFCD.

Response to Comment 52-3:

Air quality and noise impacts associated with truck traffic were analyzed in the Draft EIR in Sections 3.5 and 3.14, respectively. As discussed in the Draft EIR, Section 3.14, with implementation of Mitigation Measure MM N-1, noise impacts would be reduced to a level of less than significant. LACFCD has conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed the United States (U.S.) Environmental Protection Agency's (EPA's) 2007 standards for emissions. Therefore, in order to further reduce emissions, Mitigation Measure MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump trucks that meet or exceed EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality will be reduced to less than significant.

Potential impacts due to the Proposed Project's truck trips were analyzed in the Draft EIR, Section 3.16, Transportation and Traffic. As listed in that section, a single intersection in the immediate vicinity of the Proposed Project site will have a potentially significant impact. It was also determined that the increase in Proposed Project truck trips does not cause any major traffic impacts at the identified freeway segments. In practice, hauling rates and routes may be adjusted to help reduce impacts, depending on operational need. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the Proposed Project site.

Response to Comment 52-4:

LACFCD goes to great lengths to lessen project impacts and maximize efficiencies. As such, many of the points in suggested plans, such as the Arroyo Seco Foundation's four-point "Slow Program" are compatible with the LACFCD Proposed Project.

For example, the Draft EIR concluded that Alternative 3 is the Environmentally Superior Alternative. Alternative 3, Configuration D, Option 2 drastically reduces the project's footprint of 120 acres down to 71 acres. Additionally, the limited maintenance area for Alternative 3 further reduces the permanent habitat impacts down to approximately 51 acres by allowing for site replanting and mitigation to take place within the reservoir footprint. This reduction in project acreages will greatly lessen environmental impacts of the Proposed Project.

LACFCD strives to achieve an efficient, low-cost sediment removal project. Sediment removal rates and trucking operations, now utilizing all low-emissions trucks, as explained in Section 3.5 of the Draft EIR, have been carefully planned for economies of scale to realize maximum efficiencies without major delays in project schedule, thus greatly reducing operating costs. Furthermore, LACFCD has applied for and received an approximately $28 million grant through the State's Disaster Preparedness and Flood Protection Bond Act of 2006 (Proposition 1E) program. A portion of this grant will be used to help offset the Proposed Project's costs.

While sluicing is not a viable project alternative, as explained in Section 4.7 of the Draft EIR, Flow Assisted Sediment Transport, or FASTing, will be used for maintenance after the project's main sediment removal phase has been completed, as described in Section 2.5.2 of the Draft EIR.

LACFCD is committed to *Public Service that Works*; and by combining almost 100 years of technical expertise and invaluable input from the community, less invasive flood protection will continue to be a reality.

From: Andrew Binder
To: reservoircleanouts
Subject: Devil's Gate Reservoir Sediment Removal and Management Project
Date: Sunday, December 29, 2013 12:01:40 AM

In regards to the Devil's Gate Reservoir Project,

I am opposed to the outcomes it would have to the Oak Grove Disc Golf Course. Not only is this course historical, it is loved by thousands of patrons and visitors that would be negatively affected by this project. Personally, I grew up playing at this course throughout my childhood. I have many of my fondest memories throughout the course and it would be devastating to lose a portion of it.

Comment 53-1

I am asking for the preservation of the land that is home to Oak Grove Disc Golf Course holes 13 and 14. This would roughly be described as minimally reducing the targeted area of sediment removal in the top third portion of the western border. It is important to maintain this small portion of land. Removal of this portion of land would be taking away a part of disc golf history. "Steady Ed" Headrick, the founder of the Professional Disc Golf Association, founded the first ever course in Oak Grove Park. Losing part of this course would be losing a portion of the sport.

Please reconsider the necessary portion of land that will be altered/removed in order to keep the early beginnings of the sport of Disc Golf in tact.

Sincerely,

Andrew Binder

Response to Comment Letter #53 (Andrew Binder)

Response to Comment 53-1:

Thank you for your input. This comment has been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. No official disc golf course holes located in the Oak Grove area of Hahamongna Watershed Park will be removed by the Proposed Project. As noted in the Draft Environmental Impact Report (EIR), Section 3.15, Los Angeles County Flood Control District (LACFCD) recognizes the importance of the area to those who take advantage of the recreational opportunities offered, including the Oak Grove Disc Golf Course. Where possible, Los Angeles County Flood Control District (LACFCD) will avoid any disc golf course holes located outside the Oak Grove area of Hahamongna Watershed Park. When avoidance is not possible, LACFCD will coordinate with the Oak Grove Disc Golf Club for removal of the disc golf hole equipment.

Alternative 3, Configuration D, the Environmentally Superior Alternative from the Draft Environmental Impact Report (EIR), carefully balances flood control needs and reductions in impacts to habitat by restoring the required reservoir capacity while also minimizing the project footprint (see Section 4.6 of the Final EIR). Furthermore, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2, which drastically reduces the project's footprint of 120 acres down to 71 acres would avoid excavation of the western branch, thereby providing a greater distance between the Oak Grove area of Hahamongna Watershed Park and the excavation area. Alternative 3, Configuration D, Option 2 would also avoid all currently existing Oak Grove Disc Golf Club holes. The Oak Grove area of Hahamongna Watershed Park and the associated facilities would remain open during sediment removal and would continue to provide active recreational facilities to the area.

From: denisinnott25@gmail.com on behalf of Deni Sinnott
To: reservoircleanouts
Subject: Hahamongna Public Comment Submission
Date: Sunday, December 29, 2013 2:03:18 PM
Attachments: PAS Hahamongna letter.doc

Comment 54-1

Below are my comments on the proposed sediment removal at Hahamongna Watershed. I have also attached the letter to this email. I look forward to hearing how the County addresses the public outcry against the project.

To whom it may concern:

Comment 54-2

Hahamongna is the rare spot in the Arroyo Seco at the foot of the San Gabriel Mountains where the mountainous watershed meets the urban plain. Hahamongna contains five unique habitat zones that only exist in alluvial canyons near the mountains. Most sites like this in Southern California have been destroyed.

Comment 54-3

I am writing to ask the County rethink their sediment removal plans in Hahamongna. What amazes me is that the County has done very little to address any of the sediment collection for many years and now have an “emergency” situation on their hands. It seems to me a slow approach to sediment removal is a more prudent solution that will serve the habitat and the neighboring community. Drastic removal of the riparian habitat will create new microclimes along the edges of the Arroyo, further threatening the surrounding ecosystem. Additionally, traffic from trucks, day in and day out, will disrupt the area with a new problem: noise and air pollution. Nature brought sediment down the Arroyo slowly and it can be removed slowly and methodically using sluicing instead of the current “landscape rape” in the plan.

Comment 54-4

By permanently removing acres of habitat from the dam the impact to recreation will not be minimal, but catastrophic. The EIR incorrectly shows 50 bird species Hahamongna, when in fact 206 species have been documented by members of the Audubon Society. The plan will permanently destroy the habitat where the Least Bell's Vireo nested; this bird is on the endangered species list. Had the County done their homework this would have come to light in the EIR.

Comment 54-5

The members of the Pasadena Audubon Society ask the County to rethink the current plan and move to a slower and less invasive solution removing sediment in a more natural manner that will protect the habitat and surrounding neighborhood. I hope you consider this in your plan as you move forward.

--
Deni Sinnott
President
Pasadena Audubon Society

Response to Comment Letter #54 (Deni Sinnott – Pasadena Audubon Society)

Response to Comment 54-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. The letter attached to the email included a copy of the same comments as below.

Response to Comment 54-2:

The types of habitats, including alluvial, found on the Proposed Project site are described in Section 3.6 of the Draft Environmental Impact Report (EIR). As discussed in Section 3.6.6 of the Draft EIR, Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats. In addition, sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays).

Response to Comment 54-3:

As noted in Section 2.2.1, Los Angeles County Flood Control District (LACFCD) History, sediment removal efforts have previously taken place at the reservoir in order to ensure correct functioning of the outlet works and/or to maintain reservoir capacity. Extending the project duration would limit the amount of sediment removed annually. Historically, large amounts of sediment have been deposited in the reservoir in short time periods. Between 1935 and 1938 over 1.6 million cubic yards (cy) of sediment, between 1938 and 1943 over 1.95 million cy of sediment, between 1959 and 1966 over 1.75 million cy of sediment, and between 2010 and 2012 over 1.3 million cy of sediment was deposited in the reservoir. Since the 1920 dam construction and prior to the Station Fire in 2009, approximately 10.7 million cy of sediment accumulated in the reservoir; and approximately 8.0 million cy was removed by LACFCD.

LACFCD goes to great lengths to lessen project impacts and maximize efficiencies. As such, many of the points in plans such as the Arroyo Seco Foundation's four-point "Slow Program" are compatible with the LACFCD Proposed Project.

For example, the Draft EIR concluded that Alternative 3 is the Environmentally Superior Alternative. Alternative 3, Configuration D, Option 2 drastically reduces the project's footprint of 120 acres down to 71 acres. Additionally, the limited maintenance area for Alternative 3 further reduces the permanent habitat impacts down to approximately 51 acres by allowing for site replanting and mitigation to take place within the reservoir footprint. This reduction in project acreages will greatly lessen environmental impacts of the Proposed Project. As noted in the Draft EIR, Section 3.4, Aesthetics, the Proposed Project will have significant temporary impacts to aesthetics; however, after the sediment removal phase of the Proposed Project is complete, a habitat restoration plan will be implemented that will allow native plant communities to reestablish outside the reservoir management area. Riparian Herbaceous vegetation is expected to continue to populate and/or reestablish in the management area of the Proposed Project site between maintenance activities.

LACFCD strives to achieve an efficient, low-cost sediment removal project. Sediment removal rates and trucking operations, now utilizing all low-emissions trucks, as explained in Section 3.5 of the Draft EIR, have been carefully planned for economies of scale to realize maximum efficiencies without major delays in project schedule, thus greatly reducing operating costs. Furthermore, LACFCD has applied for

and received an approximately $28 million grant through the State's Disaster Preparedness and Flood Protection Bond Act of 2006 (Proposition 1E) program. A portion of this grant will be used to help offset the Proposed Project's costs.

Air quality and noise impacts associated with truck traffic were analyzed in the Draft EIR in Sections 3.5 and 3.14, respectively. As discussed in the Draft EIR, Section 3.14, with implementation of Mitigation Measure MM N-1, noise impacts would be reduced to a level of less than significant. LACFCD has conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed the United States (U.S.) Environmental Protection Agency's (EPA's) 2007 standards for emissions. Therefore, in order to further reduce emissions, Mitigation Measure MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump trucks that meet or exceed EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality will be reduced to less than significant.

While sluicing is not a viable project alternative, as explained in Section 4.7 of the Draft EIR, Flow Assisted Sediment Transport, or FASTing, will be used for maintenance after the project's main sediment removal phase has been completed, as described in Section 2.5.2 of the Draft EIR.

LACFCD is committed to *Public Service that Works*; and by combining almost 100 years of technical expertise and invaluable input from the community, less invasive flood protection will continue to be a reality.

Response to Comment 54-4:

Impacts to recreation were analyzed in the Draft EIR, Section 3.15. The Proposed Project will not limit the use of the Oak Grove area of Hahamongna Watershed Park. Sediment removal activities would be temporary and are expected to occur only in the drier months (April to December, excluding holidays). It is expected that these activities will often not be adjacent to the Oak Grove area of Hahamongna Watershed Park. The Proposed Project would result in temporary limitations on the recreational use of the Proposed Project site and some of the adjacent trails. Most of these areas would be reopened seasonally or intermittently throughout the sediment removal process. In addition, temporary impacts to designated recreational facilities and trails will be minimized through advance communication and redirection to the nearest facility in the vicinity of the Proposed Project. Furthermore, an east-west trail crossing will continue to provide access at the north end of the reservoir. At the south end of the reservoir, after the reservoir ingress and egress ramps have been fully constructed, access to the upper east side Arroyo Seco Trail from La Cañada Verdugo Road will be maintained; and the linkage from the west side Arroyo Seco Trail and the Flint Wash Trail to the upper east side Arroyo Seco Trail (crossing Devil's Gate Dam and also continuing south to the Rose Bowl) will be available after construction activities have ended each day and on nonworking days.

The biological resources of the Proposed Project site are described in Section 3.6 of the Draft EIR. The bird species recorded during surveys conducted specifically for the Proposed Project are presented in the Biological Technical Report (BTR) in Appendix D of the Draft EIR. Factors used to determine the potential for occurrence included the quality of habitat, elevation, and the results of the reconnaissance survey. The locations of prior database records of occurrence were used as additional data; but since the California Natural Diversity Database (CNDDB) is a positive-sighting database, this data was used only in support of the analysis from the previously identified factors. Based on the results of the BTR, additional

protocol-level focused surveys were conducted, including for least Bell's vireo. Table 3.6-3 in the Draft EIR includes least Bell's vireo as present within the Proposed Project site.

As discussed in Section 3.6.6 of the Draft EIR, Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats. In addition, sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays). Bird species currently found in the Proposed Project area would be expected to either remain in the undisturbed areas of the reservoir outside the Proposed Project area or to reestablish once sediment removal activities have been completed.

Response to Comment 54-5:

LACFCD notes the commenter's disapproval with the current plan and preference for a slower and less invasive solution. See Response to Comments 54-3 and 54-4.

From: Walter Tatum
To: reservoircleanouts
Cc: Wendy Sinnette
Subject: reservations about traffic, air quality, noise...
Date: Monday, December 30, 2013 11:43:18 AM

Devil's Gate Sediment Removal Project

Sirs:

Being that the project is adjacent to the School District's largest campus, several of the issues that are easily identified include the impact to the health and safety of the students, the coming and going from school, and the learning environment.

Comment 55-1

The most obvious will be the increased truck traffic, intertwined with the traffic of both parents and students, at the beginning and end of the daily session. Also this is a joint use campus, generating an abundance of traffic after school hours and weekend. A majority of the traffic does flow south on Oak Grove to the freeway on ramps. The issue of hurried driver, both from the school and the construction site converging on the intersection and the freeway ramp speaks of an increase possibility that a sever mishap occurring.

Comment 55-2

Do to the proximity of the reservoir to the school campus, air quality concerns also arise as the amount of equipment for removal and transportation of the sediment impact the quality of the air. Besides vehicle emissions, dust and wind direction will play a significant role on the air quality for both students and athletes throughout the day and evening.

Comment 55-3

La Cañada High School is a high performance school. Teachers and staff share the concerned that the level of audible noise and the sub-audible vibrations will disturb a carefully orchestrated learning environment that has produced top API scores in the State.

Comment 55-4

Another concern deals with the impact on our routine and preventative maintenance programs at both the high school, the private school and the day care center which are all located at the site.

Regards,

Walter Tatum
Maintenance and Operations Manager / La Cañada Unified School District
1100 Foothill Blvd. La Cañada, CA 91011 / 818-952-8320

Response to Comment Letter #55 (Walter Tatum – La Cañada Unified School District)

Response to Comment 55-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

Potential impacts due to the Proposed Project's truck trips were analyzed in the Draft Environmental Impact Report (EIR), Section 3.16, Transportation and Traffic. As listed in that section, a single intersection in the immediate vicinity of the Proposed Project site will have a potentially significant impact. In practice, hauling rates and routes may be adjusted to help reduce impacts, depending on operational need. As discussed in the Draft EIR, Section 3.16, Transportation and Traffic, TRANSPORTATION-3, modifications to traffic conditions by the Proposed Project will consist of roadway restriping. These changes would not alter existing roadway use or substantially increase hazards. Thus, impacts related to traffic hazards would be less than significant. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the Proposed Project site.

Response to Comment 55-2:

Air quality impacts associated with truck traffic were analyzed in the Draft EIR in Section 3.5. Los Angeles County Flood Control District (LACFCD) has conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed the United States (U.S.) Environmental Protection Agency's (EPA's) 2007 standards for emissions. Therefore, in order to further reduce emissions, Mitigation Measure MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump trucks that meet or exceed EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality, including those associated with health effects, will be reduced to less than significant.

Dust impacts from the Proposed Project were carefully evaluated, as discussed in the Draft EIR, Section 3.5.6, Impacts and Mitigation, AIR QUALITY-2, Sediment Removal. The Proposed Project's activities, including excavation, grading, material loading, and hauling, would result in less than significant dust emissions due to the Proposed Project's use of best management practices and would be in full compliance with South Coast Air Quality Management District's (SCAQMD's) fugitive dust regulations.

Response to Comment 55-3:

The Draft EIR, Section 3.14.6, Sediment Removal/Reservoir Management, Offsite Vehicular Noise, analyzed the noise impacts from the haul trucks. The analysis found that the maximum noise increase on the roads in the immediate vicinity of the Devil's Gate Dam and Reservoir area would be a 1-decibel (dB) increase on Berkshire Place east of the Interstate 210 (I-210) northbound ramps. A 1-dB increase is well below the 3-dB increase threshold of perception and would therefore not be anticipated to disturb the learning environment. The roadway noise impact analysis provided in the Draft EIR found that the Proposed Project would result in less than significant impacts for all analyzed alternatives. The Draft EIR also analyzed the vibration impacts from the onsite equipment at the nearest sensitive receptors. The Draft EIR found that the Proposed Project would create less than significant vibration impacts with implementation of Mitigation Measure MM N-1.

Response to Comment 55-4:

LACFCD is going to great lengths to keep impacts to a minimum. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the Project site.

1852 Monterey Road
South Pasadena, CA 91030
barbara.eisenstein@gmail.com

December 18, 2013

Los Angeles County Department of Public Works
Attn: Water Resources Division – Reservoir Cleanouts
P.O. Box 1460
Alhambra, CA 91802-9974

To Whom It May Concern:

Comment 56-1

I am strongly opposed to the Devil's Gate sediment removal project as proposed by the LA County Department of Public Works. A slower, long-term plan to gradually decrease the amount of sediment built up in the dam would allow for the development of sustainable flood-control and water management practices. The accumulation of sediment, though exacerbated by the 2009 Station Fire, is the result of inadequate management of the Devil's Gate Dam prior to the 2009 event. There is still enough capacity in the dam (17%) to move more deliberately to correct for this longstanding, inadequate maintenance. The existing project relies on early 20th Century engineering concepts that predominantly address flood control concerns with no consideration for the accompanying financial, environmental, and health burdens.

Comment 56-2

Sediment accumulation in dams along the front-range of the San Gabriel Mountains is the result of an ongoing process - erosion of a steep, young mountain range - being managed with short-term thinking, deferred maintenance, and reliance on outdated engineering solutions. Rivers were channelized and dams, spreading grounds and sediment basins were built to accommodate rapid development in Southern California, with little concern for the long-term consequences of these massive construction projects.

The repercussions of this type of thinking have become only too clear, and the continued management of our environment and resources as practiced when the dams were built threatens the viability of our region. We have learned that natural forces may be controllable for relatively short periods, but ultimately the only workable solutions are those that are compatible with natural processes and take a long-term, holistic perspective.

As such, plans to remove sediment using inefficient and polluting practices like trucking it away ("away" meaning not here, though room for dumping is finite and nearly exhausted) are truly baffling. This merely "kicks the can down the road" as the sediment keeps coming, habitat continues to decline, and resources are squandered with little concern about the continued release of greenhouse gases into the atmosphere.

Comment 56-3

Nevertheless, the need for flood protection and an adequate water supply cannot be denied. As such, it is critical to include the following considerations in plans to meet these important concerns.

1. A long-term, holistic approach that takes into account flood risk, health of the watershed, diminishing resources, and impacts to habitat, wildlife and humans.

Comment 56-4

2. Proposals should make use of natural forces, such as sediment removal through sluicing, rather than going up against them.

Comment 56-5

3. The concept of "waste" is not applicable in sustainable systems. All materials and processes are resources and should be treated as such. Eroded materials that build up in the dams would normally be deposited along the rivers and at the beaches. Engineered solutions should incorporate the value of these materials.

Comment 56-6

4. Rather than a continued record of degrading the land and resources we rely upon, acceptable proposals should have the long-term goal of solving the more immediate problems while improving the condition of the watershed for the future.

Comment 56-7

Plowing ahead with an expensive "quick fix" that will disrupt and destroy functioning habitat needed by wildlife and humans for a healthy existence is not in the public interest. A slower, more deliberate and cautious approach could save money and resources while allowing time to develop innovative and effective ways to meet these challenges over the long-term.

Thank you,

Barbara Eisenstein

Barbara Eisenstein
Founder and Volunteer
Friends of the Arroyo Seco - South Pasadena Woodlands and Wildlife Park

Cc: Supervisor Antonovich
215 N. Marengo Ave., Suite 120
Pasadena, CA 91101

Response to Comment Letter #56 (Barbara Eisenstein – Friends of the Arroyo Seco)

Response to Comment 56-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. Los Angeles County Flood Control District (LACFCD) notes the commenter's objection to the Proposed Project.

As noted in the Draft Environmental Impact Report (EIR), Section 2.2.1, LACFCD History, sediment removal efforts have previously taken place at the reservoir in order to ensure correct functioning of the outlet works and/or to maintain reservoir capacity. Extending the project duration would limit the amount of sediment removed annually. Historically, large amounts of sediment have been deposited in the reservoir in short time periods. Between 1935 and 1938 over 1.6 million cubic yards (cy) of sediment, between 1938 and 1943 over 1.95 million cy of sediment, between 1959 and 1966 over 1.75 million cy of sediment, and between 2010 and 2012 over 1.3 million cy of sediment was deposited in the reservoir. Since the 1920 dam construction and prior to the Station Fire in 2009, approximately 10.7 million cy of sediment accumulated in the reservoir; and approximately 8.0 million cy was removed by LACFCD.

LACFCD goes to great lengths to lessen project impacts and maximize efficiencies. As such, many of the points in suggested plans like Arroyo Seco Foundation's four-point "Slow Program" are compatible with the LACFCD Proposed Project.

For example, the Draft EIR concluded that Alternative 3 is the Environmentally Superior Alternative. Alternative 3, Configuration D, Option 2 drastically reduces the project's footprint of 120 acres down to 71 acres . Additionally, the limited maintenance area for Alternative 3 further reduces the permanent habitat impacts down to approximately 51 acres by allowing for site replanting and mitigation to take place within the reservoir footprint. This reduction in project acreages will greatly lessen environmental impacts of the Proposed Project.

LACFCD strives to achieve an efficient, low-cost sediment removal project. Sediment removal rates and trucking operations, now utilizing all low-emissions trucks, as explained in Section 3.5 of the Draft EIR, have been carefully planned for economies of scale to realize maximum efficiencies without major delays in project schedule, thus greatly reducing operating costs. Furthermore, LACFCD has applied for and received an approximately $28 million grant through the State's Disaster Preparedness and Flood Protection Bond Act of 2006 (Proposition 1E) program. A portion of this grant will be used to help offset the Proposed Project's costs.

While sluicing is not a viable project alternative, as explained in Section 4.7 of the Draft EIR, Flow Assisted Sediment Transport, or FASTing, will be used for maintenance after the project's main sediment removal phase has been completed, as described in Section 2.5.2 of the Draft EIR.

LACFCD is committed to *Public Service that Works*; and by combining almost 100 years of technical expertise and invaluable input from the community, less invasive flood protection will continue to be a reality.

Response to Comment 56-2:

See Response to Comment 56-1. As discussed in the Draft EIR in Proposed Project Description and Purpose and Need (see Section 2.0), Proposed Project objectives include reducing flood risk and

restoring reservoir capacity for flood control and future sediment inflow events. With the restored capacity, future regular maintenance, as discussed in Section 2.5.2 of the Draft EIR, is expected to prevent or significantly reduce the need for another large sediment removal project in the future. Per Section 3.9.6 of the Draft EIR, impacts to greenhouse gas emissions were found to be less than significant; and impacts to biological resources were found to be less than significant with mitigation incorporated as shown in Section 3.6.6 of the Draft EIR.

Response to Comment 56-3:

See Response to Comment 56-2. The Proposed Project is designed to be a long-term plan with the reservoir management phase providing management for future sediment inflows. After the sediment removal phase has occurred, Flow Assisted Sediment Transport, or FASTing, is proposed to be an integral part of the annual maintenance at Devil's Gate. Annual FASTing operations will be implemented to reduce future buildups of sediment in the reservoir and to reduce the need for mechanical removal of sediment from the reservoir. Although FASTing is expected to be an effective means of keeping sediment levels low in the reservoir, it is estimated that typically 13,000 cy of sediment will be removed by excavation annually. However, a maintenance regime that relies on FASTing greatly reduces the need for and extends the life of future and existing sediment placement sites and improves the future sustainability of the reservoir. Please see Section 2.5.2 of the Draft EIR for more information on future maintenance.

Response to Comment 56-4:

Sluicing was analyzed as part of the Alternatives Analysis, Section 4.7, Alternative 4 Sluicing Method. This alternative would involve use of construction equipment and the removal of trees and vegetation over the same footprint as the Proposed Project. The sluicing alternative would potentially have additional significant impacts in comparison to the Proposed Project. Many of these impacts would be associated with the likelihood that large amounts of sediment would not be fully transported through the flood control system; this sediment would need to be mechanically removed and trucked out from numerous downstream locations potentially including the two soft-bottom portions of the channel. Please see Section 4.7 and Appendix K of the Draft EIR for further analysis.

As discussed above, FASTing, a passive method of transporting sediment downstream, is currently used when possible and would be used during the Maintenance Phase of the Proposed Project; however, FASTing, even in combination with the Interim Measures Project (IMP), will not efficiently remove large amounts of sediment. As discussed under the No Project Alternative, Section 4.9, use of FASTing and IMP alone will not meet Proposed Project objectives. The removal of accumulated sediment on a yearly basis is the proposed management scheme after the original sediment removal is completed. The regular maintenance of the area will lower the potential need for a large-scale sediment removal operation in the future. Please see Section 2.5.2 of the Draft EIR for more information on future maintenance.

Response to Comment 56-5:

See Response to Comment 56-4. The sediment that came into Devil's Gate Reservoir following the Station Fire has a very fine gradation or consistency. As such, the majority of this material is not readily reusable on a commercial scale and will most likely not be sold; however, sediment placed at sediment placement sites would be available for potential reuse for other projects or sediment reuse

opportunities. The sediment removed from the reservoir will be transported to the sites listed in the Draft EIR in Section 2.0, Project Description.

For further information regarding beneficial uses for sediment at the Los Angeles County Flood Control District (LACFCD) sites, please refer to Section 6.5 of LACFCD's 2012 Sediment Management Strategic Plan which can be found at: http://dpw.lacounty.gov/lacfcd/sediment/stplan.aspx.

Response to Comment 56-6:

See Response to Comments 56-1 and 56-3.

Response to Comment 56-7:

See Response to Comments 56-1 and 56-2.

CITY COUNCIL

Laura Olhasso, Mayor
Michael Davitt, Mayor Pro Tem
Jonathan C. Curtis
David A. Spence
Donald R. Voss

December 17, 2013

County of Los Angeles
Department of Public Works
Water Resources Division
Attn: Reservoir Cleanouts Program
P.O. Box 1460
Alhambra, CA 91802-1460

SUBJECT: DEVIL'S GATE RESERVOIR SEDIMENT REMOVAL AND MANAGEMENT PROJECT DEIR PUBLIC COMMENT REVIEW PERIOD

To Whom It May Concern:

Comment 57-1

The City of La Cañada Flintridge requests that the public comment period on the Draft Environmental Impact Report (DEIR) for the DEVIL'S GATE RESERVOIR SEDIMENT REMOVAL AND MANAGEMENT PROJECT be extended beyond 75 days from the Notice of Availability on October 23, 2013 The voluminous report and numerous appendices coupled with the review period coinciding with four major holidays make it necessary to give involved agencies and its citizens additional time to read and fully understand the details of the project and its potential consequences to the surrounding community. It is not uncommon for larger projects with several alternatives and multiple affected jurisdictions to remain open for public comments for 90 to 120 days to allow for the responsible agency to show due diligence.

We ask that the County of Los Angeles immediately announce an extension to the review period. If you should have any questions or require additional information, please contact our Director of Public Works, Mr. Edward Hitti, P.E. at (818) 790-8882 or ehitti@lcf.ca.gov .

Sincerely,

Laura Olhasso
Mayor

C: Supervisor Mike Antonovich
Mr. Christopher Stone, P.E., Water Resources Division ✓
City Council
Mark R. Alexander, City Manager
Edward Hitti, P.E, Director of Public Works
Traffic Engineer

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Response to Comment Letter #57 (City of La Cañada Flintridge)

Response to Comment 57-1:

Thank you for your input. This comment has been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. Adequate time for public commenting was provided. The California Environmental Quality Act (CEQA) requires that the public comment period for a Draft EIR be at least 45 days (CEQA Guidelines § 21091**)**. Los Angeles County Flood Control District (LACFCD) extended this review period initially to 75 days and then further extended the review period to 90 days to allow for additional commenting time.

Wendy K. Sinnette
Superintendent

Patricia S. Hager
Associate Superintendent, Human Resources

Anaïs Wenn
Assistant Superintendent, Curriculum & Instruction

La Cañada Unified School District

...a learning community committed to personal growth and academic excellence

December 20, 2013

County of Los Angeles
Department of Public Works
Water Resources Division
Attn: Reservoir Cleanouts Program
P.O. Box 1460
Alhambra, CA 91802-1460

Re: Devil's Gate Reservoir Sediment Removal and Management Project

To Whom It May Concern:

Comment 58-1

On December 17, 2013, the Governing Board of La Cañada Unified School District adopted Resolution 17-13-14 addressing the concerns related to the Draft Environmental Impact Report (DEIR) for the Devil's Gate Reservoir Sediment Removal and Maintenance Project.

A copy of the resolution is attached.

Sincerely,

Kim Bergner
Executive Assistant to the Superintendent
La Cañada Unified School District
(818) 952-8381

LA CAÑADA UNIFIED SCHOOL DISTRICT
RESOLUTION 17-13-14 OF THE GOVERNING BOARD
OF LA CAÑADA UNIFIED SCHOOL DISTRICT
ADDRESSING THE DISTRICT'S CONCERNS RELATED
TO THE DRAFT ENVIRONMENTAL IMPACT REPORT (DEIR)
FOR THE DEVIL'S GATE RESERVOIR SEDIMENT
REMOVAL AND MAINTENANCE PROJECT

WHEREAS, the La Cañada Unified School District (LCUSD) is aware of a proposed project by Los Angeles County Flood Control District to remove between 2.4 million and 4.0 million cubic yards of sediment and debris from the Devil's Gate Reservoir over a five or more year time period; and

WHEREAS, the LCUSD Governing Board and District staff have reviewed the Draft Environmental Impact Report (DEIR) for the subject project including alternatives, and has held at a public meeting a discussion on the matter; and

Comment 58-2

WHEREAS, the LCUSD Governing Board has numerous concerns related to potential impacts within the city and specifically near La Cañada High School; and

WHEREAS, the LCUSD Governing Board and District staff places the health and safety of its students and families as one of its highest priorities; and

WHEREAS, the LCUSD Governing Board wishes to eliminate or minimize potential adverse environmental, health, and traffic congestion impacts to its students and families.

Comment 58-3

THEREFORE BE IT RESOLVED that the Governing Board of the La Cañada Unified School District hereby requests that the following comments and concerns be addressed by the Board of Supervisors of the County of Los Angeles before proceeding with the Devil's Gate Reservoir Sediment Removal and Maintenance Project (see DEIR for any specific references):

Comment 58-4

1. The DEIR determined that there are significant and unavoidable impacts to air quality even after mitigations requiring equipment to meet EPA 2007 standards. This is due to the nature of the debris removal by heavy construction equipment that generates excessive daily NOx emissions. Short and long term health effects due to silica dust, fugitive dust clouds, diesel fumes, carbon monoxide and other pollutants were not fully assessed in the DEIR and students should not be exposed to health risks in the school environment. Student health and safety will be adversely affected. Ensuring student health and safety is a LCUSD Board priority as well as a community and civic responsibility. The Board has determined that the DEIR and the proposed project do not adequately address the severe and adverse impact on the health of our students that would be caused by the project. Furthermore, the Governing Board requests that the County specifically address how the project will ensure the health and safety of our students.

Comment 58-5

2. The LCUSD Governing Board supports the exclusive use of Alternate Haul Routes 1B and 1F (exiting and entering I-210 at Windsor Place) during the entire hauling operation because school congestion would not be worsened, thus avoiding negative impacts to attendance and tardy rates while protecting the integrity of the instructional day and supporting student achievement.

Comment 58-6

3. Vehicle noise generated on haul routes near La Cañada High School will disrupt the learning environment and negatively impact student ability to concentrate and access curriculum.

Comment 58-7

4. Implementation of the County's current Preferred Haul Routes 1D and 1H (exiting I-210 at Windsor Avenue and entering I- 210 at Berkshire Place) with a proposed starting time of 7:00 a.m. will cause a significant traffic impact on La Canada High School. The LCUSD Governing Board opposes the use of Haul Routes 1D and 1H.

PASSED AND ADOPTED by the La Canada Unified School District Governing Board December 17, 2013 by the following vote:

AYES: 5

NOES: 0

ABSENT: 0

President of the Board of Education
of the La Cañada Unified School District

Response to Comment Letter #58 (La Cañada Unified School District)

Response to Comment 58-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

This letter is a duplicate of the letter sent by La Cañada Unified School District, with the exception of the cover letter (see Comment Letter #48).

Dec. 20, 2013

County of Los Angeles
Department of Public Works
Water Resources Division
ATTN: Reservoir Cleanouts Program
PO Box 1460
Alhambra, CA 91802-1460
reservoircleanouts@dpw.lacounty.gov

RE: DEVIL'S GATE RESERVOIR SEDIMENT REMOVAL AND MANAGEMENT PROJECT

Dear Department of Public Works, Water Resource Division,

Comment 59-1

Thank you for the opportunity to comment on the draft EIR for the DEVIL'S GATE RESERVOIR SEDIMENT REMOVAL AND MANAGEMENT PROJECT. I can't imagine what a herculean task you have ahead deciding how best to assess and implement the sediment removal project.

I have been the bookkeeper at Tom Sawyer Camps for 4 and a half years. I am impressed by how much Tom Sawyer cares for the general health of the arroyo. I know they sincerely want whatever is best for the area. Their lively hood is also affected, as is that of other groups that use the arroyo, and it would be a shame to do too much too soon for no good reason.

Comment 59-2

While we support the sediment clean up in general, we are concerned about the impact as defined in the dEIR on summer camp and are requesting the following modifications: 1) No sediment removal in the willow forest and alluvial scrub areas during the months of June, July, and August; 2) A phased approach that allows for places within the project area that can continue to be used for recreational purposes; 3) A longer timeline for the project to help minimize impact on those who use the park; and, 4) Preservation of the willow forest and the alluvial scrub area from denuding and/or from being used as permanent maintenance zones.

Comment 59-3

Tom Sawyer Camps has been in operation since 1926 and has been using Hahamongna Watershed Park as for the last 70 years (since 1944). Approximately 1250 of our campers and 150 staff use this site each summer, which now includes three generation of campers. This park is critical to our day camp programs and heavy truck traffic during the summer months and denuding the willow forest and alluvial scrub areas would have a critical negative impact on

Comment 59-3 continued

the program, the campers and the staff.

Comment 59-4

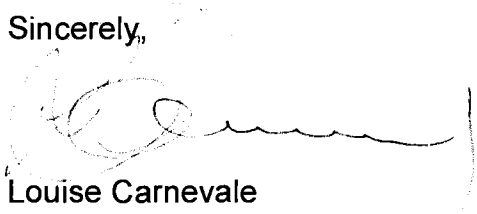
Camp is an antidote to bullying, isolation, over reliance on technology and many other challenges facing our youth. At Hahamongna, campers age 3-14 have critical exposure to wilderness adventure. During the summer, they hike, ride horses, build secret forts, observe wildlife, play games, sing songs, build self reliance and self esteem, and develop friendships that last a lifetime. We rely heavily on the access, peace and beauty of the willow forest and the alluvial scrub areas for these experiences, along with other areas of the park. Hahamongna is home to generations of staff and campers whose lives have been directly and dramatically enriched by this natural refuge, including mine.

Comment 59-5

Tom Sawyer Camps is a very important program and my request could easily go unnoticed but I believe the impact that camp has on the children of tomorrow is significant. Summer in the watershed is a rare and unique opportunity for children to be away from noise and disruption and engage with nature and outdoor adventure in a safe, peaceful, and joyful manner. We hope you will see the value of camp and make every attempt to minimize the impact the sediment clean up will have during the summer months and for the generations of children to use the park in the years to come.

Thank you for allowing me the opportunity to share my concerns and needs. Please feel free to contact me if you have any questions.

Sincerely,



Louise Carnevale
312 El Nido Avenue
Monrovia, CA 91016
loujocar@gmail.com

Response to Comment Letter #59 (Louise Carnevale – Tom Sawyer Camps)

Response to Comment 59-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

Response to Comment 59-2:

The Proposed Project will not limit the use of the Oak Grove area of Hahamongna Watershed Park by recreational users such as Tom Sawyer Camps. Sediment removal activities would be temporary and are expected to occur only in the drier months (April to December, excluding holidays). It is expected that these activities will often not be adjacent to the Oak Grove area of Hahamongna Watershed Park. Therefore, the maximum impacts to the adjacent recreational facilities would be much shorter than the five-year duration of the sediment removal phase of the Proposed Project.

During the summer months, sediment is expected to be the driest. Due to the reduction in water weight, each truck can haul more sediment per load during these months. This increases efficiency and decreases project duration, which also decreases impacts and cost. Skipping these crucial dry months would extend the project duration.

The Los Angeles County Flood Control District (LACFCD) proposed a project duration of five years to reduce accumulated sediment in a timely fashion. The goal of LACFCD is to restore reservoir flood capacity as soon as feasible while reducing costs and minimizing the duration of environmental and construction impacts to the surrounding communities. Extending the project would prolong the flood risk to downstream communities and increase the construction impacts to the surrounding communities.

As discussed in Section 3.6.6 of the Draft Environmental Impact Report (EIR), Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats.

Alternative 3, Configuration D affects the least amount of reservoir area of all the action alternatives while still achieving Proposed Project objectives (see Section 4.6 of the Final EIR). This alternative would provide a buffer between the Oak Grove area of Hahamongna Watershed Park and the excavation area. Alternative 3, Configuration D, Option 1 provides a more natural configuration for the reservoir with two branches to carry water and sediment toward the face of the dam, avoiding disturbing a significant portion of existing vegetation. To further reduce the Proposed Project's footprint, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2 would avoid excavation of the western branch, thereby providing a greater habitat buffer on the west side. In addition, the maintenance areas would be smaller than the original sediment removal footprint, allowing for habitat to reestablish.

Response to Comment 59-3:

See Response to Comment 59-2. Access to the Oak Grove area of Hahamongna Watershed Park will not be limited by the Proposed Project. Potential impacts due to the Proposed Project's truck trips were analyzed in the Draft EIR, Section 3.16, Transportation and Traffic. As listed in that section, a single intersection in the immediate vicinity of the Proposed Project Site will have a potentially significant

impact. In practice, hauling rates and routes may be adjusted to help reduce impacts depending on operational need. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the project site.

LACFCD also notes the commenter's concerns with traffic impacts relating to traveling to and from the Oak Grove area of Hahamongna Watershed Park. The Draft EIR outlines a 12-hour trucking schedule, with trucking operations on Saturdays as well. This schedule is used to model the most intensive construction operation, which may not be applicable at the site for the duration of the project. Typical trucking schedules are estimated to be 8 hours per day on weekdays. Additionally, construction traffic will not pass the Oak Grove Drive/Foothill Boulevard intersection used for ingress and egress to the Oak Grove area of Hahamongna Watershed Park.

Response to Comment 59-4:

See Response to Comment 59-2. LACFCD notes the use of Devil's Gate Reservoir by Tom Sawyer Camps, especially the willow forest and alluvial scrub areas.

Response to Comment 59-5:

See Response to Comment 59-2. LACFCD notes that Tom Sawyer Camps is an important resource to children and is going to great lengths to keep impacts to a minimum. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge and the community of Altadena to minimize traffic impacts around the Proposed Project site.

December 20, 2013

County of Los Angeles
Department of Public Works
Water Resources Division
ATTN: Reservoir Cleanouts Program
PO Box 1460
Alhambra, CA 91802-1460
reservoircleanouts@dpw.lacounty.gov

RE: DEVIL'S GATE RESERVOIR SEDIMENT REMOVAL AND MANAGEMENT PROJECT

Dear Department of Public Works, Water Resource Division,

Thank you for the opportunity to comment on the draft EIR for the DEVIL'S GATE RESERVOIR SEDIMENT REMOVAL AND MANAGEMENT PROJECT. I can't imagine what a herculean task you have ahead deciding how best to assess and implement the sediment removal project.

Comment 60-1

My name is Kathy Garcia and I have enjoyed Hahamongna Watershed Park and the Devil's Gate Dam area for 25 years as a staff member of Tom Sawyer Camps. Through my experiences at camp I have come to truly love the area from Devil's Gate Dam to all the up the Gabrilleno Trail. One of my favorite things to do in the park is bird watch. I see birds in the park that I have not seen anywhere else. Both of my children attend Tom Sawyer Camps and they to have come to love exploring the natural area's that park and wash provide.

While we support the sediment clean up in general, we are concerned about the impact as defined in the dEIR on summer camp and are requesting the following modifications: 1) No sediment removal in the willow forest and alluvial scrub areas during the months of June, July, and August; 2) A phased approach that allows for places within the project area that can continue to be used for recreational purposes; 3) A longer timeline for the project to help minimize impact on those who use the park; and, 4) Preservation of the willow forest and the alluvial scrub area from denuding and/or from being used as permanent maintenance zones.

Comment 60-2

Tom Sawyer Camps has been in operation since 1926 and has been using Hahamongna Watershed Park as for the last 70 years (since 1944). Approximately 1250 of our campers and 150 staff use this site each summer, which now includes three generation of campers. This park is critical to our day

Comment 60-3

Comment 60-3 continued

camp programs and heavy truck traffic during the summer months and denuding the willow forest and alluvial scrub areas would have a critical negative impact on the program, the campers and the staff.

Comment 60-4

Camp is an antidote to bullying, isolation, over reliance on technology and many other challenges facing our youth. At Hahamongna, campers age 3-14 have critical exposure to wilderness adventure. During the summer, they hike, ride horses, build secret forts, observe wildlife, play games, sing songs, build self reliance and self esteem, and develop friendships that last a lifetime. We rely heavily on the access, peace and beauty of the willow forest and the alluvial scrub areas for these experiences, along with other areas of the park. Hahamongna is home to generations of staff and campers whose lives have been directly and dramatically enriched by this natural refuge, including mine.

Comment 60-5

Tom Sawyer Camps is a very important program and my request could easily go unnoticed but I believe the impact that camp has on the children of tomorrow is significant. Summer in the watershed is a rare and unique opportunity for children to be away from noise and disruption and engage with nature and outdoor adventure in a safe, peaceful, and joyful manner. We hope you will see the value of camp and make every attempt to minimize the impact the sediment clean up will have during the summer months and for the generations of children to use the park in the years to come.

Thank you for allowing me the opportunity to share my concerns and needs. Please feel free to contact me if you have any questions.

Sincerely,

Kathy Garcia
3719 Maxson Rd
El Monte, CA 91732
626-794-1156
kathy@tomsawyercamps.com

Response to Comment Letter #60 (Kathy Garcia – Tom Sawyer Camps)

Response to Comment 60-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

Response to Comment 60-2:

The Proposed Project will not limit the use of the Oak Grove area of Hahamongna Watershed Park by recreational users such as Tom Sawyer Camps. Sediment removal activities would be temporary and are expected to occur only in the drier months (April to December, excluding holidays). It is expected that these activities will often not be adjacent to the Oak Grove area of Hahamongna Watershed Park. Therefore, the maximum impacts to the adjacent recreational facilities would be much shorter than the five-year duration of the sediment removal phase of the Proposed Project.

During the summer months, sediment is expected to be the driest. Due to the reduction in water weight, each truck can haul more sediment per load during these months. This increases efficiency and decreases project duration, which also decreases impacts and cost. Skipping these crucial dry months would extend the project duration.

The Los Angeles County Flood Control District (LACFCD) proposed a project duration of five years to reduce accumulated sediment in a timely fashion. The goal of LACFCD is to restore reservoir flood capacity as soon as feasible while reducing costs and minimizing the duration of environmental and construction impacts to the surrounding communities. Extending the project would prolong the flood risk to downstream communities and increase the construction impacts to the surrounding communities.

As discussed in Section 3.6.6 of the Draft Environmental Impact Report (EIR), Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats.

Alternative 3, Configuration D affects the least amount of reservoir area of all the action alternatives while still achieving Proposed Project objectives (see Section 4.6 of the Final EIR). This alternative would provide a buffer between the Oak Grove area of Hahamongna Watershed Park and the excavation area. Alternative 3, Configuration D, Option 1 provides a more natural configuration for the reservoir with two branches to carry water and sediment toward the face of the dam, avoiding disturbing a significant portion of existing vegetation. To further reduce the Proposed Project's footprint, the LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2 would avoid excavation of the western branch, thereby providing a greater habitat buffer on the west side. In addition, the maintenance areas would be smaller than the original sediment removal footprint, allowing for habitat to reestablish.

Response to Comment 60-3:

See Response to Comment 60-2. Access to the Oak Grove area of Hahamongna Watershed Park will not be limited by the Proposed Project. Potential impacts due to the Proposed Project's truck trips were analyzed in the Draft EIR, Section 3.16, Transportation and Traffic. As listed in that section, a single intersection in the immediate vicinity of the Proposed Project Site will have a potentially significant

impact. In practice, hauling rates and routes may be adjusted to help reduce impacts depending on operational need. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the project site.

LACFCD also notes the commenter's concerns with traffic impacts relating to traveling to and from the Oak Grove area of Hahamongna Watershed Park. The Draft EIR outlines a 12-hour trucking schedule, with trucking operations on Saturdays as well. This schedule is used to model the most intensive construction operation, which may not be applicable at the site for the duration of the project. Typical trucking schedules are estimated to be 8 hours per day on weekdays. Additionally, construction traffic will not pass the Oak Grove Drive/Foothill Boulevard intersection used for ingress and egress to the Oak Grove area of Hahamongna Watershed Park.

Response to Comment 60-4:

See Response to Comment 60-2. LACFCD notes the use of Devil's Gate Reservoir by Tom Sawyer Camps, especially the willow forest and alluvial scrub areas.

Response to Comment 60-5:

See Response to Comment 60-2. LACFCD notes that Tom Sawyer Camps is an important resource to children and is going to great lengths to keep impacts to a minimum. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the Proposed Project site.

TOM SAWYER CAMPS, INC.

707 W. Woodbury Road, Ste. F. • Altadena, CA 91001
(626) 794-1156 • www.tomsawyercamps.com

December 17, 2013

County of Los Angeles
Department of Public Works
Water Resources Division
ATTN: Reservoir Cleanouts Program
PO Box 1460
Alhambra, CA 91802-1460
reservoircleanouts@dpw.lacounty.gov

RE: DEVIL'S GATE RESERVOIR SEDIMENT REMOVAL AND MANAGEMENT PROJECT

Dear Department of Public Works, Water Resource Division,

Comment 61-1

Thank you for the opportunity to comment on the draft EIR for the DEVIL'S GATE RESERVOIR SEDIMENT REMOVAL AND MANAGEMENT PROJECT. I can't imagine what a herculean task you have ahead deciding how best to assess and implement the sediment removal project.

Comment 61-2

While we support the sediment clean up in general, we are concerned about the impact as defined in the dEIR on our camp families and our business and are requesting the following modifications: 1) No sediment removal in the willow forest and alluvial scrub areas during the months of June, July, and August; 2) A phased approach that allows for places within the project area that can continue to be used for recreational purposes; 3) A longer timeline for the project to help minimize impact on those who use the park; and, 4) Preservation of the willow forest and the alluvial scrub area from denuding and/or from being used as permanent maintenance zones.

Comment 61-3

Tom Sawyer Camps is our family business and has been in operation since 1926. We have been using Hahamongna Watershed Park as our campsite for the last 70 years (since 1944). Approximately 1250 of our campers and 150 staff use this site each summer, which now includes three generation of campers. This park is critical to our day camp programs and heavy truck traffic during the summer months and denuding the willow forest and alluvial scrub areas would have a critical negative impact on our business as well as the children and families that have come to rely on our programs.

Comment 61-4

Camp is an antidote to bullying, isolation, over reliance on technology and many other challenges facing our youth. At Hahamongna, campers age 3-14 have critical exposure to wilderness adventure. During the summer, they hike, ride

Comment 61-4 continued

horses, build secret forts, observe wildlife, play games, sing songs, build self reliance and self esteem, and develop friendships that last a lifetime. We rely heavily on the access, peace and beauty of the willow forest and the alluvial scrub areas for these experiences, along with other areas of the park. Hahamonga is home to generations of staff and campers whose lives have been directly and dramatically enriched by this natural refuge.

Comment 61-5

We are a small business and our request could easily go unnoticed but we believe the impact we have on the children of tomorrow is significant. Summer in the watershed is a rare and unique opportunity for children to be away from noise and disruption and engage with nature and outdoor adventure in a safe, peaceful, and joyful manner. We hope you will see the value of camp and make every attempt to minimize the impact the sediment clean up will have during the summer months and for the generations of children to use the park in the years to come.

Thank you for allowing us the opportunity to share our concerns and needs. Please let us know if we can be of any assistance.

Sincerely,

Sarah Horner Fish
Executive Director
Tom Sawyer Camps
sarah@tomsawyercamps.com

TOM SAWYER CAMP
Since 1926

Response to Comment Letter #61 (Sarah Horner Fish – Tom Sawyer Camps)

Response to Comment 61-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

Response to Comment 61-2:

The Proposed Project will not limit the use of the Oak Grove area of Hahamongna Watershed Park by recreational users such as Tom Sawyer Camps. Sediment removal activities would be temporary and are expected to occur only in the drier months (April to December, excluding holidays). It is expected that these activities will often not be adjacent to the Oak Grove area of Hahamongna Watershed Park. Therefore, the maximum impacts to the adjacent recreational facilities would be much shorter than the five-year duration of the sediment removal phase of the Proposed Project.

During the summer months, sediment is expected to be the driest. Due to the reduction in water weight, each truck can haul more sediment per load during these months. This increases efficiency and decreases project duration, which also decreases impacts and cost. Skipping these crucial dry months would extend the project duration.

The Los Angeles County Flood Control District (LACFCD) proposed a project duration of five years to reduce accumulated sediment in a timely fashion. The goal of LACFCD is to restore reservoir flood capacity as soon as feasible while reducing costs and minimizing the duration of environmental and construction impacts to the surrounding communities. Extending the project would prolong the flood risk to downstream communities and increase the construction impacts to the surrounding communities.

As discussed in Section 3.6.6 of the Draft Environmental Impact Report (EIR), Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats.

Alternative 3, Configuration D affects the least amount of reservoir area of all the action alternatives while still achieving Proposed Project objectives (see Section 4.6 of the Final EIR). This alternative would provide a buffer between the Oak Grove area of Hahamongna Watershed Park and the excavation area. Alternative 3, Configuration D, Option 1 provides a more natural configuration for the reservoir by having two branches to carry water and sediment toward the face of the dam, avoiding disturbing a significant portion of existing vegetation. To further reduce the Proposed Project's footprint, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2, which drastically reduces the project's footprint of 120 acres down to 71 acres, would avoid excavation of the western branch, thereby providing a greater habitat buffer on the west side of the reservoir. In addition, the maintenance areas would be smaller than the original sediment removal footprint, allowing for habitat to reestablish.

Response to Comment 61-3:

See Response to Comment 61-2. Access to the Oak Grove area of Hahamongna Watershed Park will not be limited by the Proposed Project. Potential impacts due to the Proposed Project's truck trips were analyzed in the Draft EIR, Section 3.16, Transportation and Traffic. As listed in that section, a single

intersection in the immediate vicinity of the Proposed Project Site will have a potentially significant impact. In practice, hauling rates and routes may be adjusted to help reduce impacts depending on operational need. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the project site.

LACFCD also notes the commenter's concerns with traffic impacts relating to traveling to and from the Oak Grove area of Hahamongna Watershed Park. The Draft EIR outlines a 12-hour trucking schedule, with trucking operations on Saturdays as well. This schedule is used to model the most intensive construction operation, which may not be applicable at the site for the duration of the project. Typical trucking schedules are estimated to be 8 hours per day on weekdays. Additionally, construction traffic will not pass the Oak Grove Drive/Foothill Boulevard intersection used for ingress and egress to the Oak Grove area of Hahamongna Watershed Park.

Response to Comment 61-4:

See Response to Comment 61-2. LACFCD notes the use of Devil's Gate Reservoir by Tom Sawyer Camps, especially the willow forest and alluvial scrub areas.

Response to Comment 61-5:

See Response to Comment 61-2. LACFCD notes that Tom Sawyer Camps is an important resource to children and is going to great lengths to keep impacts to a minimum. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the Proposed Project site.

TOM SAWYER CAMPS, INC.

707 W. Woodbury Road, Ste. F. • Altadena, CA 91001
(626) 794-1156 • www.tomsawyercamps.com

December 17, 2013

County of Los Angeles
Department of Public Works
Water Resources Division
ATTN: Reservoir Cleanouts Program
PO Box 1460
Alhambra, CA 91802-1460
reservoircleanouts@dpw.lacounty.gov

RE: DEVIL'S GATE RESERVOIR SEDIMENT REMOVAL AND MANAGEMENT PROJECT

Dear Department of Public Works, Water Resource Division,

Comment 62-1

Thank you for the opportunity to comment on the draft EIR for the DEVIL'S GATE RESERVOIR SEDIMENT REMOVAL AND MANAGEMENT PROJECT. I can't imagine what a herculean task you have ahead deciding how best to assess and implement the sediment removal project.

Comment 62-2

While we support the sediment clean up in general, we are concerned about the impact as defined in the dEIR on our camp families and our business and are requesting the following modifications: 1) No sediment removal in the willow forest and alluvial scrub areas during the months of June, July, and August; 2) A phased approach that allows for places within the project area that can continue to be used for recreational purposes; 3) A longer timeline for the project to help minimize impact on those who use the park; and, 4) Preservation of the willow forest and the alluvial scrub area from denuding and/or from being used as permanent maintenance zones.

Comment 62-3

Tom Sawyer Camps is our family business and has been in operation since 1926. We have been using Hahamongna Watershed Park as our campsite for the last 70 years (since 1944). Approximately 1250 of our campers and 150 staff use this site each summer, which now includes three generation of campers. This park is critical to our day camp programs and heavy truck traffic during the summer months and denuding the willow forest and alluvial scrub areas would have a critical negative impact on our business as well as the children and families that have come to rely on our programs.

Comment 62-4

Camp is an antidote to bullying, isolation, over reliance on technology and many other challenges facing our youth. At Hahamongna, campers age 3-14 have critical exposure to wilderness adventure. During the summer, they hike, ride

horses, build secret forts, observe wildlife, play games, sing songs, build self reliance and self esteem, and develop friendships that last a lifetime. We rely heavily on the access, peace and beauty of the willow forest and the alluvial scrub areas for these experiences, along with other areas of the park. Hahamonga is home to generations of staff and campers whose lives have been directly and dramatically enriched by this natural refuge.

Comment 62-4 continued

We are a small business and our request could easily go unnoticed but we believe the impact we have on the children of tomorrow is significant. Summer in the watershed is a rare and unique opportunity for children to be away from noise and disruption and engage with nature and outdoor adventure in a safe, peaceful, and joyful manner. We hope you will see the value of camp and make every attempt to minimize the impact the sediment clean up will have during the summer months and for the generations of children to use the park in the years to come.

Comment 62-5

Thank you for allowing us the opportunity to share our concerns and needs. Please let us know if we can be of any assistance.

Sincerely,

Michael Horner
President
Tom Sawyer Camps
mike@tomsawyercamps.com

TOM SAWYER CAMP
Since 1926

Response to Comment Letter #62 (Michael Horner – Tom Sawyer Camps)

Response to Comment 62-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

Response to Comment 62-2:

The Proposed Project will not limit the use of the Oak Grove area of Hahamongna Watershed Park by recreational users such as Tom Sawyer Camps. Sediment removal activities would be temporary and are expected to occur only in the drier months (April to December, excluding holidays). It is expected that these activities will often not be adjacent to the Oak Grove area of Hahamongna Watershed Park. Therefore, the maximum impacts to the adjacent recreational facilities would be much shorter than the five-year duration of the sediment removal phase of the Proposed Project.

During the summer months, sediment is expected to be the driest. Due to the reduction in water weight, each truck can haul more sediment per load during these months. This increases efficiency and decreases project duration, which also decreases impacts and cost. Skipping these crucial dry months would extend the project duration.

The Los Angeles County Flood Control District (LACFCD) proposed a project duration of five years to reduce accumulated sediment in a timely fashion. The goal of LACFCD is to restore reservoir flood capacity as soon as feasible while reducing costs and minimizing the duration of environmental and construction impacts to the surrounding communities. Extending the project would prolong the flood risk to downstream communities and increase the construction impacts to the surrounding communities.

As discussed in Section 3.6.6 of the Draft Environmental Impact Report (EIR), Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats.

Alternative 3, Configuration D affects the least amount of reservoir area of all the action alternatives while still achieving Proposed Project objectives (see Section 4.6 of the Final EIR). This alternative would provide a buffer between the Oak Grove area of Hahamongna Watershed Park and the excavation area. Alternative 3, Configuration D, Option 1 provides a more natural configuration for the reservoir by having two branches to carry water and sediment toward the face of the dam, avoiding disturbing a significant portion of existing vegetation. To further reduce the Proposed Project's footprint, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2, which drastically reduces the project's footprint of 120 acres down to 71 acres, would avoid excavation of the western branch, thereby providing a greater habitat buffer on the west side of the reservoir. In addition, the maintenance areas would be smaller than the original sediment removal footprint, allowing for habitat to reestablish.

Response to Comment 62-3:

See Response to Comment 62-2. Access to the Oak Grove area of Hahamongna Watershed Park will not be limited by the Proposed Project. Potential impacts due to the Proposed Project's truck trips were analyzed in the Draft EIR, Section 3.16, Transportation and Traffic. As listed in that section, a single

intersection in the immediate vicinity of the Proposed Project Site will have a potentially significant impact. In practice, hauling rates and routes may be adjusted to help reduce impacts depending on operational need. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the project site.

LACFCD also notes the commenter's concerns with traffic impacts relating to traveling to and from the Oak Grove area of Hahamongna Watershed Park. The Draft EIR outlines a 12-hour trucking schedule, with trucking operations on Saturdays as well. This schedule is used to model the most intensive construction operation, which may not be applicable at the site for the duration of the project. Typical trucking schedules are estimated to be 8 hours per day on weekdays. Additionally, construction traffic will not pass the Oak Grove Drive/Foothill Boulevard intersection used for ingress and egress to the Oak Grove area of Hahamongna Watershed Park.

Response to Comment 62-4:

See Response to Comment 62-2. LACFCD notes the use of Devil's Gate Reservoir by Tom Sawyer Camps, especially the willow forest and alluvial scrub areas.

Response to Comment 62-5:

See Response to Comment 62-2. LACFCD notes that Tom Sawyer Camps is an important resource to children and is going to great lengths to keep impacts to a minimum. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the Proposed Project site.

(12/20/13)

County of Los Angeles
Department of Public Works
Water Resources Division
ATTN: Reservoir Cleanouts Program
PO Box 1460
Alhambra, CA 91802-1460
reservoircleanouts@dpw.lacounty.gov

RE: DEVIL'S GATE RESERVOIR SEDIMENT REMOVAL AND MANAGEMENT PROJECT

Dear Department of Public Works, Water Resource Division,

Thank you for the opportunity to comment on the draft EIR for the DEVIL'S GATE RESERVOIR SEDIMENT REMOVAL AND MANAGEMENT PROJECT. I can't imagine what a herculean task you have ahead deciding how best to assess and implement the sediment removal project.

Comment 63-1

My name is Eric Ikari and I have worked in the arroyo for the pas 15 years, I currently work for TSC. If it was not for companies Like Tom Sawyer I would never found what I was good at. Growing up in areas that did not have so much untouched nature I never had opportunities to feel what it was like to play outdoors. I went from playing out behind a target to hiking and exploring and being in nature. I met my wife at camp I have my kids running around there, most of my Family has worked down there at some part. If it not for places like this I may be a much different man Today.

Comment 63-2

While we support the sediment clean up in general, we are concerned about the impact as defined in the DEIR on summer camp and are requesting the following modifications: 1) No sediment removal in the willow forest and alluvial scrub areas during the months of June, July, and August; 2) A phased approach that allows for places within the project area that can continue to be used for recreational purposes; 3) A longer timeline for the project to help minimize impact on those who use the park; and, 4) Preservation of the willow forest and the alluvial scrub area from denuding and/or from being used as permanent maintenance zones.

Comment 63-3

Tom Sawyer Camps has been in operation since 1926 and has been using Hahamongna Watershed Park as for the last 70 years (since 1944). Approximately 1250 of our campers and 150 staff use this site each summer,

Comment 63-3 continued

which now includes three generation of campers. This park is critical to our day camp programs and heavy truck traffic during the summer months and denuding the willow forest and alluvial scrub areas would have a critical negative impact on the program, the campers and the staff.

Comment 63-4

Camp is an antidote to bullying, isolation, over reliance on technology and many other challenges facing our youth. At Hahamongna, campers age 3-14 have critical exposure to wilderness adventure. During the summer, they hike, ride horses, build secret forts, observe wildlife, play games, sing songs, build self reliance and self esteem, and develop friendships that last a lifetime. We rely heavily on the access, peace and beauty of the willow forest and the alluvial scrub areas for these experiences, along with other areas of the park. Hahamongna is home to generations of staff and campers whose lives have been directly and dramatically enriched by this natural refuge, including mine.

Comment 63-5

Tom Sawyer Camps is a very important program and my request could easily go unnoticed but I believe the impact that camp has on the children of tomorrow is significant. Summer in the watershed is a rare and unique opportunity for children to be away from noise and disruption and engage with nature and outdoor adventure in a safe, peaceful, and joyful manner. We hope you will see the value of camp and make every attempt to minimize the impact the sediment clean up will have during the summer months and for the generations of children to use the park in the years to come.

Thank you for allowing me the opportunity to share my concerns and needs. Please feel free to contact me if you have any questions.

Sincerely,

Eric Ikari
908 Bouquet Ct #F
Azusa CA, 91702
(626)794-1156
Eric@tomsawyercamps.com

Response to Comment Letter #63 (Eric Ikari – Tom Sawyer Camps)

Response to Comment 63-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

Response to Comment 63-2:

The Proposed Project will not limit the use of the Oak Grove area of Hahamongna Watershed Park by recreational users such as Tom Sawyer Camps. Sediment removal activities would be temporary and are expected to occur only in the drier months (April to December, excluding holidays). It is expected that these activities will often not be adjacent to the Oak Grove area of Hahamongna Watershed Park. Therefore, the maximum impacts to the adjacent recreational facilities would be much shorter than the five-year duration of the sediment removal phase of the Proposed Project.

During the summer months, sediment is expected to be the driest. Due to the reduction in water weight, each truck can haul more sediment per load during these months. This increases efficiency and decreases project duration, which also decreases impacts and cost. Skipping these crucial dry months would extend the project duration.

The Los Angeles County Flood Control District (LACFCD) proposed a project duration of five years to reduce accumulated sediment in a timely fashion. The goal of LACFCD is to restore reservoir flood capacity as soon as feasible while reducing costs and minimizing the duration of environmental and construction impacts to the surrounding communities. Extending the project would prolong the flood risk to downstream communities and increase the construction impacts to the surrounding communities.

As discussed in Section 3.6.6 of the Draft Environmental Impact Report (EIR), Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats.

Alternative 3, Configuration D affects the least amount of reservoir area of all the action alternatives while still achieving Proposed Project objectives (see Section 4.6 of the Final EIR). This alternative would provide a buffer between the Oak Grove area of Hahamongna Watershed Park and the excavation area. Alternative 3, Configuration D, Option 1 provides a more natural configuration for the reservoir with two branches to carry water and sediment toward the face of the dam, avoiding disturbing a significant portion of existing vegetation. To further reduce the Proposed Project's footprint, the LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2 would avoid excavation of the western branch, thereby providing a greater habitat buffer on the west side. In addition, the maintenance areas would be smaller than the original sediment removal footprint, allowing for habitat to reestablish.

Response to Comment 63-3:

See Response to Comment 63-2. Access to the Oak Grove area of Hahamongna Watershed Park will not be limited by the Proposed Project. Potential impacts due to the Proposed Project's truck trips were analyzed in the Draft EIR, Section 3.16, Transportation and Traffic. As listed in that section, a single intersection in the immediate vicinity of the Proposed Project Site will have a potentially significant

impact. In practice, hauling rates and routes may be adjusted to help reduce impacts depending on operational need. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the project site.

LACFCD also notes the commenter's concerns with traffic impacts relating to traveling to and from the Oak Grove area of Hahamongna Watershed Park. The Draft EIR outlines a 12-hour trucking schedule, with trucking operations on Saturdays as well. This schedule is used to model the most intensive construction operation, which may not be applicable at the site for the duration of the project. Typical trucking schedules are estimated to be 8 hours per day on weekdays. Additionally, construction traffic will not pass the Oak Grove Drive/Foothill Boulevard intersection used for ingress and egress to the Oak Grove area of Hahamongna Watershed Park.

Response to Comment 63-4:

See Response to Comment 63-2. LACFCD notes the use of Devil's Gate Reservoir by Tom Sawyer Camps, especially the willow forest and alluvial scrub areas.

Response to Comment 63-5:

See Response to Comment 63-2. LACFCD notes that Tom Sawyer Camps is an important resource to children and is going to great lengths to keep impacts to a minimum. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the Proposed Project site.

December 20, 2013

County of Los Angeles
Department of Public Works
Water Resources Division
ATTN: Reservoir Cleanouts Program
PO Box 1460
Alhambra, CA 91802-1460
reservoircleanouts@dpw.lacounty.gov

RE: DEVIL'S GATE RESERVOIR SEDIMENT REMOVAL AND MANAGEMENT PROJECT

Dear Department of Public Works, Water Resource Division,

Comment 64-1

Thank you for the opportunity to comment on the draft EIR for the DEVIL'S GATE RESERVOIR SEDIMENT REMOVAL AND MANAGEMENT PROJECT. I can't imagine what a herculean task you have ahead deciding how best to assess and implement the sediment removal project.

My children have both attended Tom Sawyer Camps since they were three years old. I am currently a year round staff member and have been for the past 5 years and my husband also worked operations back in the early 1980's. Hahamongna is a very special place for our whole family and has been for many years.

Comment 64-2

While we support the sediment clean up in general, we are concerned about the impact as defined in the dEIR on summer camp and are requesting the following modifications: 1) No sediment removal in the willow forest and alluvial scrub areas during the months of June, July, and August; 2) A phased approach that allows for places within the project area that can continue to be used for recreational purposes; 3) A longer timeline for the project to help minimize impact on those who use the park; and, 4) Preservation of the willow forest and the alluvial scrub area from denuding and/or from being used as permanent maintenance zones.

Comment 64-3

Tom Sawyer Camps has been in operation since 1926 and has been using Hahamongna Watershed Park as for the last 70 years (since 1944). Approximately 1250 of our campers and 150 staff use this site each summer, which now includes three generation of campers. This park is critical to our day camp programs and heavy truck traffic during the summer months and denuding the willow forest and alluvial scrub areas would have a critical negative impact on the program, the campers and the staff.

Comment 64-4

Camp is an antidote to bullying, isolation, over reliance on technology and many other challenges facing our youth. At Hahamongna, campers age 3-14 have critical exposure to wilderness adventure. During the summer, they hike, ride

Comment 64-4 continued

horses, build secret forts, observe wildlife, play games, sing songs, build self reliance and self esteem, and develop friendships that last a lifetime. We rely heavily on the access, peace and beauty of the willow forest and the alluvial scrub areas for these experiences, along with other areas of the park. Hahamongna is home to generations of staff and campers whose lives have been directly and dramatically enriched by this natural refuge, including mine.

Comment 64-5

Tom Sawyer Camps is a very important program and my request could easily go unnoticed but I believe the impact that camp has on the children of tomorrow is significant. Summer in the watershed is a rare and unique opportunity for children to be away from noise and disruption and engage with nature and outdoor adventure in a safe, peaceful, and joyful manner. We hope you will see the value of camp and make every attempt to minimize the impact the sediment clean up will have during the summer months and for the generations of children to use the park in the years to come.

Thank you for allowing me the opportunity to share my concerns and needs. Please feel free to contact me if you have any questions.

Sincerely,

Laura Keen

Laura Keen
842 Ridge Drive
Glendale, CA 91206
(818) 244-5435
laurakeen@sbcglobal.net

Response to Comment Letter #64 (Laura Keen– Tom Sawyer Camps)

Response to Comment 64-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

Response to Comment 64-2:

The Proposed Project will not limit the use of the Oak Grove area of Hahamongna Watershed Park by recreational users such as Tom Sawyer Camps. Sediment removal activities would be temporary and are expected to occur only in the drier months (April to December, excluding holidays). It is expected that these activities will often not be adjacent to the Oak Grove area of Hahamongna Watershed Park. Therefore, the maximum impacts to the adjacent recreational facilities would be much shorter than the five-year duration of the sediment removal phase of the Proposed Project.

During the summer months, sediment is expected to be the driest. Due to the reduction in water weight, each truck can haul more sediment per load during these months. This increases efficiency and decreases project duration, which also decreases impacts and cost. Skipping these crucial dry months would extend the project duration.

The Los Angeles County Flood Control District (LACFCD) proposed a project duration of five years to reduce accumulated sediment in a timely fashion. The goal of LACFCD is to restore reservoir flood capacity as soon as feasible while reducing costs and minimizing the duration of environmental and construction impacts to the surrounding communities. Extending the project would prolong the flood risk to downstream communities and increase the construction impacts to the surrounding communities.

As discussed in Section 3.6.6 of the Draft Environmental Impact Report (EIR), Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats.

Alternative 3, Configuration D affects the least amount of reservoir area of all the action alternatives while still achieving Proposed Project objectives (see Section 4.6 of the Final EIR). This alternative would provide a buffer between the Oak Grove area of Hahamongna Watershed Park and the excavation area. Alternative 3, Configuration D, Option 1 provides a more natural configuration for the reservoir with two branches to carry water and sediment toward the face of the dam, avoiding disturbing a significant portion of existing vegetation. To further reduce the Proposed Project's footprint, the LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2 would avoid excavation of the western branch, thereby providing a greater habitat buffer on the west side. In addition, the maintenance areas would be smaller than the original sediment removal footprint, allowing for habitat to reestablish.

Response to Comment 64-3:

See Response to Comment 64-2. Access to the Oak Grove area of Hahamongna Watershed Park will not be limited by the Proposed Project. Potential impacts due to the Proposed Project's truck trips were analyzed in the Draft EIR, Section 3.16, Transportation and Traffic. As listed in that section, a single intersection in the immediate vicinity of the Proposed Project Site will have a potentially significant

impact. In practice, hauling rates and routes may be adjusted to help reduce impacts depending on operational need. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the project site.

LACFCD also notes the commenter's concerns with traffic impacts relating to traveling to and from the Oak Grove area of Hahamongna Watershed Park. The Draft EIR outlines a 12-hour trucking schedule, with trucking operations on Saturdays as well. This schedule is used to model the most intensive construction operation, which may not be applicable at the site for the duration of the project. Typical trucking schedules are estimated to be 8 hours per day on weekdays. Additionally, construction traffic will not pass the Oak Grove Drive/Foothill Boulevard intersection used for ingress and egress to the Oak Grove area of Hahamongna Watershed Park.

Response to Comment 64-4:

See Response to Comment 64-2. LACFCD notes the use of Devil's Gate Reservoir by Tom Sawyer Camps, especially the willow forest and alluvial scrub areas.

Response to Comment 64-5:

See Response to Comment 64-2. LACFCD notes that Tom Sawyer Camps is an important resource to children and is going to great lengths to keep impacts to a minimum. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the Proposed Project site.

TOM SAWYER CAMPS, INC.

707 W. Woodbury Road, Ste. F. • Altadena, CA 91001
(626) 794-1156 • www.tomsawyercamps.com

December 20, 2013

County of Los Angeles
Department of Public Works
Water Resources Division
ATTN: Reservoir Cleanouts Program
PO Box 1460
Alhambra, CA 91802-1460
reservoircleanouts@dpw.lacounty.gov

RE: DEVIL'S GATE RESERVOIR SEDIMENT REMOVAL AND MANAGEMENT PROJECT

Dear Department of Public Works, Water Resource Division,

Comment 65-1

Thank you for the opportunity to comment on the draft EIR for the DEVIL'S GATE RESERVOIR SEDIMENT REMOVAL AND MANAGEMENT PROJECT. I can't imagine what a herculean task you have ahead deciding how best to assess and implement the sediment removal project.

I was a camper, counselor, director and am now co-owner of Tom Sawyer Camps along with my sister, Sarah Horner Fish and my parents, Mike and Sally Horner. My first summer as a camper was 1967.

Comment 65-2

While TSC supports the sediment clean up in general, we are concerned about the impact as defined in the dEIR on summer camp and are requesting the following modifications: 1) No sediment removal in the willow forest and alluvial scrub areas during the months of June, July, and August; 2) A phased approach that allows for places within the project area that can continue to be used for recreational purposes; 3) A longer timeline for the project to help minimize impact on those who use the park; and, 4) Preservation of the willow forest and the alluvial scrub area from denuding and/or from being used as permanent maintenance zones.

Comment 65-3

Tom Sawyer Camps has been in operation since 1926 and has been using Hahamongna Watershed Park as for the last 70 years (since 1944). Approximately 1250 of our campers and 150 staff use this site each summer, which now includes three generation of campers. This park is critical to our day camp programs and heavy truck traffic during the summer months and denuding the willow forest and alluvial scrub areas would have a critical negative impact on the program, the campers and the staff.

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Camp is an antidote to bullying, isolation, over reliance on technology and many other challenges facing our youth. At Hahamongna, campers age 3-14 have critical exposure to wilderness adventure. During the summer, they hike, ride horses, build secret forts, observe wildlife, play games, sing songs, build self reliance and self esteem, and develop friendships that last a lifetime. We rely heavily on the access, peace and beauty of the willow forest and the alluvial scrub areas for these experiences, along with other areas of the park. Hahamongna is home to generations of staff and campers whose lives have been directly and dramatically enriched by this natural refuge, including mine.

Comment 65-5

Tom Sawyer Camps is a very important program and my request could easily go unnoticed but I believe the impact that camp has on the children of tomorrow is significant. Summer in the watershed is a rare and unique opportunity for children to be away from noise and disruption and engage with nature and outdoor adventure in a safe, peaceful, and joyful manner. We hope you will see the value of camp and make every attempt to minimize the impact the sediment clean up will have during the summer months and for the generations of children to use the park in the years to come.

Thank you for allowing me the opportunity to share my concerns and needs. Please feel free to contact me if you have any questions.

Sincerely,

Thomas J Horner
876 W Altadena Dr
Altadena CA 91001
626-296-4040
tom@catalinaislandcamps.com

Response to Comment Letter #65 (Thomas Horner – Tom Sawyer Camps)

Response to Comment 65-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

Response to Comment 65-2:

The Proposed Project will not limit the use of the Oak Grove area of Hahamongna Watershed Park by recreational users such as Tom Sawyer Camps. Sediment removal activities would be temporary and are expected to occur only in the drier months (April to December, excluding holidays). It is expected that these activities will often not be adjacent to the Oak Grove area of Hahamongna Watershed Park. Therefore, the maximum impacts to the adjacent recreational facilities would be much shorter than the five-year duration of the sediment removal phase of the Proposed Project.

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The Los Angeles County Flood Control District (LACFCD) proposed a project duration of five years to reduce accumulated sediment in a timely fashion. The goal of LACFCD is to restore reservoir flood capacity as soon as feasible while reducing costs and minimizing the duration of environmental and construction impacts to the surrounding communities. Extending the project would prolong the flood risk to downstream communities and increase the construction impacts to the surrounding communities.

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Response to Comment 65-3:

See Response to Comment 65-2. Access to the Oak Grove area of Hahamongna Watershed Park will not be limited by the Proposed Project. Potential impacts due to the Proposed Project's truck trips were analyzed in the Draft EIR, Section 3.16, Transportation and Traffic. As listed in that section, a single intersection in the immediate vicinity of the Proposed Project Site will have a potentially significant

impact. In practice, hauling rates and routes may be adjusted to help reduce impacts depending on operational need. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the project site.

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Response to Comment 65-4:

See Response to Comment 65-2. LACFCD notes the use of Devil's Gate Reservoir by Tom Sawyer Camps, especially the willow forest and alluvial scrub areas.

Response to Comment 65-5:

See Response to Comment 65-2. LACFCD notes that Tom Sawyer Camps is an important resource to children and is going to great lengths to keep impacts to a minimum. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the Proposed Project site.

From:	gaboon
To:	reservoircleanouts
Cc:	Michael D. Antonovich; Sussy Nemer; Edel Vizcarra
Subject:	Request for extension of comment period on Draft EIR for Devil"s Gate Reservoir Sediment Removal and Management Project
Date:	Tuesday, December 31, 2013 12:34:35 PM

Dear Department of Public Works Personnel--

Comment 66-1 We hereby request an extension of the deadline for comments on the subject draft EIR. While we have reviewed some of the massive draft, appendices, and associated material, we have found the following:

Comment 66-2 --There has been seriously inadequate posting of notifications and other public outreach to park users, local residents and other stakeholders;

Comment 66-3 -- The comment period for the Draft EIR began and concludes during the holiday season which reduces input from the public and other important stakeholders;

Comment 66-4 -- The Draft EIR is a massive document not easily read in the few libraries where hard copies exist and not easily downloaded by the public and others on home computer systems.

Comment 66-5 -- A December 30 email from DPW notes that "...additional resources such as the overlays on the Hahamongna Watershed Park Master Plan have been posted" earlier in December, thus not being available until late in the comment period, even though this new information would appear to clarify some important aspects of the the environmental impact in a manner that is not clearly portrayed in the material originally released as part of the Draft EIR.

Comment 66-6 On five different occasions in November and December, one of us walked extensively though the proposed project area asking other park users who happened to be there if they were aware of the proposed project, the Draft EIR, and the comment period. Nearly all indicated total surprise, being completely unaware of the proposed project, even though most were frequent visitors to the area. This, combined with the paucity of signage about the proposed project, plus the points made above, convince us that the level of notification does not meet the spirit of the California Environmental Quality Act (CEQA), and may not meet the letter of the law, either.

Comment 66-7 We join the cities of Pasadena and La Canada Flintridge in requesting that the 6 January 2014 deadline for comments on the Draft EIR be extended. We also urge the DPW to improve public outreach and notification, especially within Hahamongna Watershed Park and to neighboring adversely impacted schools and residents.

We look forward to your reply.

Thank you,
Robert L. Staehle
Lori L. Paul

_____
gaboon@sbcglobal.net
626.798.3235

153 Jaxine Drive
Altadena, California 91001 USA

Response to Comment Letter #66 (Robert Staehle, Lori Paul)

Response to Comment 66-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. The California Environmental Quality Act (CEQA) requires that the public comment period for a Draft Environmental Impact Report (EIR) be at least 45 days (CEQA Guidelines § 21091). The Los Angeles County Flood Control District (LACFCD) extended this review period initially to 75 days and then further extended the review period to 90 days to allow for additional commenting time.

Response to Comment 66-2:

Per CEQA Guidelines Section 21902 (b)(3), notice shall be given to the last known name and address of all organizations and individuals who have previously requested notice and shall also be given by at least one of the following procedures:

- publication in a newspaper of general circulation in the area affected by the Proposed Project
- posting of notice by the lead agency on and off site in the area where the Proposed Project is to be located
- direct mailing to the over 1,100 owners and occupants of contiguous property shown on the latest equalized assessment roll

The notices for the Proposed Project, the Notice of Preparation (NOP), and the Notice of Availability/Notice of Completion (NOA/NOC) were:

- sent to agencies, organizations, and individuals who have previously requested notices, in addition to other area agencies and organizations
- published in local newspapers, the *San Gabriel Valley Tribune* and the *Pasadena Star News*
- posted on and off site
- mailed to owners and occupants of contiguous property shown on the latest equalized assessment roll
- filed with the County Clerk and the State Clearinghouse
- posted at eight local libraries
- posted on the Los Angeles County Department of Public Works (LACDPW) website

Therefore notice for the Proposed Project was adequate, as the notice efforts went beyond the CEQA Guidelines requirements.

Response to Comment 66-3:

See Response to Comment 66-1. The public commenting period began October 23, 2013, before the holiday season, and ended January 21, 2014, after the holiday season.

Response to Comment 66-4:

The document was made available at eight local libraries, the County Public Works headquarters, and online. In addition, CDs with the documents were made available upon request, and printed copies were made available for purchase at County Public Works headquarters for interested parties.

Response to Comment 66-5:

The information that was posted on the site was information already available to the public that was provided as a courtesy. Some of this information was referenced in the Draft EIR, so documents were made available on the website in case the public was interested. The Proposed Project and Alternatives boundaries are shown in the Draft EIR, Sections 2 and 4, respectively, and the Hahamongna Watershed Park Master Plan is described in Section 2.1.5. Overlays of the Proposed Project and Alternatives boundaries on the Hahamongna Watershed Park Master Plan were provided LACFCD's website as a quick reference for the public. No new information was posted on the website that was not already available to the public.

Response to Comment 66-6:

See Response to Comment 66-2.

Response to Comment 66-7:

See Response to Comments 66-1 through 66-5.

From: Joan Probst
To: reservoircleanouts
Subject: Devil"s Gate Reservoir Sediment Removal & Management Project
Date: Tuesday, December 31, 2013 2:39:55 PM

To Whom It May Concern:

Comment 67-1

I live near Ave 64 and Colorado and have boarded my horses for the past 17 years on Mountain view in Altadena. Nearly every day I ride my horse across Windsor St and down into the Hahamongna Watershed Park area. Sometimes we cross over the middle of the reservoir area to Rose Bowl Riders where I have been a member for 17 years also. Sometimes we take the trails along Flintridge stables and/or through the Park over to the trail that winds along to Cherry Canyon. We ride the road along the front of Rose Bowl Riders, the Frisbee Golf course and around throughout the area. On the opposite side, we ride the road along Johnson's Field and up to the damn to access the tunnel to the trails along the Rose Bowl and down to San Pasqual. Other days we ride down through the middle, under the JPL bridge and up the Arroyo as far as we can go, or up Brown Mountain.

During these rides I have enjoyed the sight of the Great Blue Herons that nest near the holding ponds, Red tailed and red shouldered hawks, bobcats, deer, woodpeckers, egrets, coyotes, once a mountain lion; and in the evening the bats and owls. I have seen bear tracks.

Comment 67-2

We enjoy an unusually promising and cooperative atmosphere of multi use trails unlike any other area - birders, daily walkers, dog walkers, weekend families and group hikers, campers, mountain bikers, and equestrians all share these beautiful peaceful spaces while coexisting with the flora and fauna.

Comment 67-3

The County's project for Devil's Gate sediment removal and management will impact the recreation in this area to be nearly nonexistent. the Draft Environmental Impact Report underestimates these impacts. The stated "less desirable" emissions, noise, dust, visual, and traffic impacts will make the area unusable for equestrians. There are no other alternatives for equestrians. Stabling facilities are limited. I am concerned about the health of all of the horses and people at Rose Bowl Riders, Flintridge Stable, Altadena Stables and all of the backyard horses in the impact zone.

Comment 67-4

There are days when it is too smoggy to exercise a person or a horse.

Comment 67-4 continued

How can the horses and people live in the dust and emissions as described in the DEIR, let alone exercise and play? There MUST be a way to mitigate the impacts on recreation in this area other than merely cease and desist!

Sincerely

Joan Probst
PO Box 41504
Los Angeles, CA 90041

323 855 0827

Response to Comment Letter #67 (Joan Probst)

Response to Comment 67-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. The Los Angeles County Flood Control District (LACFCD) recognizes that this is an important area for equestrians, as noted in the Draft Environmental Impact Report (EIR), Section 3.15, Recreation/Public Services.

Response to Comment 67-2:

LACFCD recognizes that the area is an important area for recreation, as outlined in Section 3.15, Recreation/Public Services.

Response to Comment 67-3:

Impacts to recreation were analyzed in the Draft EIR, Section 3.15. The Proposed Project will not limit the use of the Oak Grove area of Hahamongna Watershed Park. Sediment removal activities would be temporary and are expected to occur only in the drier months (April to December, excluding holidays). It is expected that these activities will often not be adjacent to the Oak Grove area of Hahamongna Watershed Park. The Proposed Project would result in temporary limitations on the recreational use of the Proposed Project site and some of the adjacent trails. Most of these areas would be reopened seasonally or intermittently throughout the sediment removal process. In addition, temporary impacts to designated recreational facilities and trails will be minimized through advance communication and redirection to the nearest facility in the vicinity of the Proposed Project. Furthermore, an east-west trail crossing will continue to provide access at the north end of the reservoir. At the south end of the reservoir, after the reservoir ingress and egress ramps have been fully constructed, access to the upper east side Arroyo Seco Trail from La Cañada Verdugo Road will be maintained; and the linkage from the west side Arroyo Seco Trail and the Flint Wash Trail to the upper east side Arroyo Seco Trail (crossing Devil's Gate Dam and also continuing south to the Rose Bowl) will be available after construction activities have ended each day and on nonworking days.

Potential effects to horses stalled near the Proposed Project site would be similar to the construction-related impacts from emissions and noise associated with sediment removal to nearby residents and recreational users of Hahamongna Watershed Park. Air quality and noise impacts associated with truck traffic were analyzed in the Draft EIR in Sections 3.5 and 3.14, respectively. As discussed in the Draft EIR, Section 3.14, with implementation of Mitigation Measure MM N-1, noise impacts would be reduced to a level of less than significant. LACFCD has conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed the United States (U.S.) Environmental Protection Agency's (EPA's) 2007 standards for emissions. Therefore, in order to further reduce emissions, Mitigation Measure MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump trucks that meet or exceed EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality, including those associated with health effects, will be reduced to less than significant.

Dust impacts from the Proposed Project were carefully evaluated, as discussed in the Draft EIR, Section 3.5.6, Impacts and Mitigation, AIR QUALITY-2, Sediment Removal. The Proposed Project's activities, including excavation, grading, material loading, and hauling, would result in less than

significant dust emissions due to the project's use of best management practices and would be in full compliance with South Coast Air Quality Management District's (SCAQMD's) fugitive dust regulations.

Additionally, as noted in the Draft EIR, Section 3.4, Aesthetics and Figures 3.4-1 through 3.4-3, the visual aspects of the Proposed Project site are constantly changing. The Draft EIR does note that the Proposed Project will have significant temporary impacts to aesthetics; however, after the sediment removal phase of the Proposed Project is complete, a habitat restoration plan will be implemented that will allow native plant communities to reestablish outside the reservoir management area. Riparian Herbaceous vegetation is expected to continue to populate and/or reestablish in the management area of the Proposed Project site between maintenance activities.

Potential impacts due to the Proposed Project's truck trips were analyzed in the Draft EIR, Section 3.16, Transportation and Traffic. As listed in that section, a single intersection in the immediate vicinity of the Proposed Project site will have a potentially significant impact. In practice, hauling rates and routes may be adjusted to help reduce impacts, depending on operational need. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the Proposed Project site.

Response to Comment 67-4:

See Response to Comment 67-3.

Brendan Crill
1800 Coolidge Ave
Altadena CA 91001

December 31, 2013

Regarding: Devil's Gate Reservoir Sediment Removal and Management Project
County of Los Angeles
Department of Public Works
Water Resources Division
Attn: Reservoir Cleanouts Program
P.O. Box 1460
Alhambra, CA 91802-1460

Dear Sir or Madam:

Comment 68-1

I am a member of the community who lives and works close to Devil's Gate Dam and I am writing to comment on the Draft Environmental Impact Report (DEIR) on the sediment removal project at Devil's Gate Dam. I regularly (3 or 4 times per week) use Hahamongna park and the trails close to the dam for recreation; I enjoy running the trails and also greatly enjoy birding in the exquisite wildlife habitat. In particular the Least Bell's vireo is just barely maintaining a foothold in the area - having nested in 2012 but not in 2013.

Comment 68-2

I understand the need for removing the sediment from behind the dam to help protect us from future flood and debris flow events, and I accept that some vegetation removal must occur. However, my main concerns about the project are:

1. All of the options listed in the DEIR show removal of a huge portion of the willow-mulefat forest.

Comment 68-3

2. Most of the options call for a massive amount of truck traffic in the neighborhood for many years, if not permanantly.

Comment 68-4

First of all, the willow-mulefat forest is what makes the wildlife habitat here so unique in the area. It is hard to overstate just how important it is to have this large area of lush riparian habitat in the very developed foothills of the San Gabriels.

I do not understand why the report doesn't consider more creative options that could provide both the removal of sediment and protection of more habitat. It seems that a clever re-engineering of the water and debris flow could actually take advantage of the presence of the forest. It's a well-known fact that mangrove forests protect tropical coasts from hurricaine storm surges, and the same physics apply to a debris flow.

Comment 68-5

Another worry of mine is that the major truck traffic that will be created by the project is a big problem for the quality of life of us who live and work in the area. Air quality will certainly suffer, there will be noise pollution and increased traffic all the time. The different options don't seem to take this into account in a reasonable way.

Comment 68-6

For these two reasons, I ask that you consider other options than those presented in the DEIR. I am certain there is a solution that truly minimizes the habitat destruction and the local environmental impact while also meeting most of the goals of the project. The willow-mulefat forest near Devil's Gate dam is a unique resource and should be considered an essential part of the Arroyo Seco watershed.

Yours,

Brendan Crill

Response to Comment Letter #68 (Brendan Crill)

Response to Comment 68-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. The biological resources and recreational opportunities found at and around the Proposed Project site were documented in the Draft Environmental Impact Report (EIR), Section 3.6 Biological Resources and Section 3.15, Recreation/Public Services.

Response to Comment 68-2:

As discussed in Section 3.6.6 of the EIR, Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats. In addition, sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays). Wildlife species currently found in the Proposed Project area would be expected to either remain in the undisturbed areas of the reservoir outside the Proposed Project area or to reestablish once sediment removal activities have been completed.

Alternative 3, Configuration D affects the least amount of habitat of all the action alternatives while still achieving Proposed Project objectives (see Section 4.6 of the Final EIR). This alternative would provide a buffer on the west side of the reservoir that would allow for the movement of wildlife. Alternative 3, Configuration D, Option 1 provides a more natural configuration for the reservoir by having two branches to carry water and sediment toward the face of the dam, avoiding disturbing a significant portion of existing vegetation. To further reduce the Proposed Project's footprint, Los Angeles County Flood Control District (LACFCD) has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2, which drastically reduces the project's footprint of 120 acres down to 71 acres, would avoid excavation of the western branch, thereby providing a greater habitat buffer on the west side of the reservoir. In addition, the maintenance areas would be smaller than the original sediment removal footprint, allowing for habitat to reestablish and providing additional areas for wildlife movement.

Response to Comment 68-3:

The addition of truck traffic associated with sediment removal would occur for, at the most, over a five-year period. In addition, this truck traffic will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays), as described in the Draft EIR, Section 2.5.1 Sediment Removal Phase, Proposed Project Schedule. Truck traffic associated with the reservoir maintenance phase would be reduced in comparison to the sediment removal phase and would be limited to a few weeks per year.

Potential impacts due to the Proposed Project's truck trips were analyzed in the Draft EIR, Section 3.16, Transportation and Traffic. As listed in that section, a single intersection in the immediate vicinity of the Proposed Project site will have a potentially significant impact. In practice, hauling rates and routes may be adjusted to help reduce impacts, depending on operational need. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the Proposed Project site.

Response to Comment 68-4:

See Response to Comments 68-2.

The Draft EIR analyzes six alternatives, including the No Project Alternative. Of those, Alternative 3, Configuration D is considered to be the Environmentally Superior Alternative (see Section 4.6 of the Final EIR). As discussed above, Alternative 3 carefully balances flood control needs and reductions in impacts to habitat by restoring the required reservoir capacity while also minimizing the project footprint.

Response to Comment 68-5:

See Response to Comment 68-3. Air quality and noise impacts associated with truck traffic were analyzed in the Draft EIR in Sections 3.5 and 3.14, respectively. As discussed in the Draft EIR, Section 3.14, with implementation of Mitigation Measure MM N-1, noise impacts would be reduced to a level of less than significant. LACFCD has conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed the United States (U.S.) Environmental Protection Agency's (EPA's) 2007 standards for emissions. Therefore, in order to further reduce emissions, Mitigation Measure MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump trucks that meet or exceed EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality will be reduced to less than significant.

Response to Comment 68-6:

See Response to Comments 68-3 through 68-5.

December 23, 2013

County of Los Angeles
Department of Public Works
Water Resources Division
ATTN: Reservoir Cleanouts Program
PO Box 1460
Alhambra, CA 91802-1460
reservoircleanouts@dpw.lacounty.gov

RE: DEVIL'S GATE RESERVOIR SEDIMENT REMOVAL AND MANAGEMENT PROJECT

Dear Department of Public Works, Water Resource Division,

Thank you for the opportunity to comment on the draft EIR for the DEVIL'S GATE RESERVOIR SEDIMENT REMOVAL AND MANAGEMENT PROJECT. I can't imagine what a herculean task you have ahead deciding how best to assess and implement the sediment removal project.

Comment 69-1

I currently work for Tom Sawyer Camps as year-round, full time employee. I spend every working day of my summer at Hahamongna. This will be my 21st summer spending my days at Hahamongna with Tom Sawyer Camps. Additionally, as a local resident, my husband and I (along with our dog) run the loop nearly each morning of the year. We know the park well as it is our primary place to work rest and recreate.

While we support the sediment clean up in general, we are concerned about the impact as defined in the dEIR on summer camp and are requesting the following modifications: 1) No sediment removal in the willow forest and alluvial scrub areas during the months of June, July, and August; 2) A phased approach that allows for places within the project area that can continue to be used for recreational purposes; 3) A longer timeline for the project to help minimize impact on those who use the park; and, 4) Preservation of the willow forest and the alluvial scrub area from denuding and/or from being used as permanent maintenance zones.

Comment 69-2

Tom Sawyer Camps has been in operation since 1926 and has been using Hahamongna Watershed Park as for the last 70 years (since 1944). Approximately 1250 of our campers and 150 staff use this site each summer, which now includes three generation of campers. This park is critical to our day camp programs and heavy truck traffic during the summer months and denuding

Comment 69-3

Comment 69-3 continued

the willow forest and alluvial scrub areas would have a critical negative impact on the program, the campers and the staff.

Comment 69-4

Camp is an antidote to bullying, isolation, over reliance on technology and many other challenges facing our youth. At Hahamongna, campers age 3-14 have critical exposure to wilderness adventure. During the summer, they hike, ride horses, build secret forts, observe wildlife, play games, sing songs, build self reliance and self esteem, and develop friendships that last a lifetime. We rely heavily on the access, peace and beauty of the willow forest and the alluvial scrub areas for these experiences, along with other areas of the park. Hahamongna is home to generations of staff and campers whose lives have been directly and dramatically enriched by this natural refuge, including mine.

Comment 69-5

Tom Sawyer Camps is a very important program and my request could easily go unnoticed but I believe the impact that camp has on the children of tomorrow is significant. Summer in the watershed is a rare and unique opportunity for children to be away from noise and disruption and engage with nature and outdoor adventure in a safe, peaceful, and joyful manner. We hope you will see the value of camp and make every attempt to minimize the impact the sediment clean up will have during the summer months and for the generations of children to use the park in the years to come.

Thank you for allowing me the opportunity to share my concerns and needs. Please feel free to contact me if you have any questions.

Sincerely,

Marah Lyvers
2722 Mayfield Ave
La Crescenta, CA 91214
626-794-1156
marah@tomsawyercamps.com

Response to Comment Letter #69 (Marah Lyvers – Tom Sawyer Camps)

Response to Comment 69-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

Response to Comment 69-2:

The Proposed Project will not limit the use of the Oak Grove area of Hahamongna Watershed Park by recreational users such as Tom Sawyer Camps. Sediment removal activities would be temporary and are expected to occur only in the drier months (April to December, excluding holidays). It is expected that these activities will often not be adjacent to the Oak Grove area of Hahamongna Watershed Park. Therefore, the maximum impacts to the adjacent recreational facilities would be much shorter than the five-year duration of the sediment removal phase of the Proposed Project.

During the summer months, sediment is expected to be the driest. Due to the reduction in water weight, each truck can haul more sediment per load during these months. This increases efficiency and decreases project duration, which also decreases impacts and cost. Skipping these crucial dry months would extend the project duration.

The Los Angeles County Flood Control District (LACFCD) proposed a project duration of five years to reduce accumulated sediment in a timely fashion. The goal of LACFCD is to restore reservoir flood capacity as soon as feasible while reducing costs and minimizing the duration of environmental and construction impacts to the surrounding communities. Extending the project would prolong the flood risk to downstream communities and increase the construction impacts to the surrounding communities.

As discussed in Section 3.6.6 of the Draft Environmental Impact Report (EIR), Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats.

Alternative 3, Configuration D affects the least amount of reservoir area of all the action alternatives while still achieving Proposed Project objectives (see Section 4.6 of the Final EIR). This alternative would provide a buffer between the Oak Grove area of Hahamongna Watershed Park and the excavation area. Alternative 3, Configuration D, Option 1 provides a more natural configuration for the reservoir by having two branches to carry water and sediment toward the face of the dam, avoiding disturbing a significant portion of existing vegetation. To further reduce the Proposed Project's footprint, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2, which drastically reduces the project's footprint of 120 acres down to 71 acres, would avoid excavation of the western branch, thereby providing a greater habitat buffer on the west side of the reservoir. In addition, the maintenance areas would be smaller than the original sediment removal footprint, allowing for habitat to reestablish.

Response to Comment 69-3:

See Response to Comment 69-2. Access to the Oak Grove area of Hahamongna Watershed Park will not be limited by the Proposed Project. Potential impacts due to the Proposed Project's truck trips were analyzed in the Draft EIR, Section 3.16, Transportation and Traffic. As listed in that section, a single

intersection in the immediate vicinity of the Proposed Project Site will have a potentially significant impact. In practice, hauling rates and routes may be adjusted to help reduce impacts depending on operational need. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the project site.

LACFCD also notes the commenter's concerns with traffic impacts relating to traveling to and from the Oak Grove area of Hahamongna Watershed Park. The Draft EIR outlines a 12-hour trucking schedule, with trucking operations on Saturdays as well. This schedule is used to model the most intensive construction operation, which may not be applicable at the site for the duration of the project. Typical trucking schedules are estimated to be 8 hours per day on weekdays. Additionally, construction traffic will not pass the Oak Grove Drive/Foothill Boulevard intersection used for ingress and egress to the Oak Grove area of Hahamongna Watershed Park.

Response to Comment 69-4:

See Response to Comment 69-2. LACFCD notes the use of Devil's Gate Reservoir by Tom Sawyer Camps, especially the willow forest and alluvial scrub areas.

Response to Comment 69-5:

See Response to Comment 69-2. LACFCD notes that Tom Sawyer Camps is an important resource to children and is going to great lengths to keep impacts to a minimum. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the Proposed Project site.

From: Beatrix Schwarz
To: reservoircleanouts
Subject: Devils gate , hahamagna water shed
Date: Tuesday, December 31, 2013 7:12:00 AM

Comment 70-1

I am against the Devils gate project suggested by LA county. I support the approach the Arroyo secco foundation (Tim Bricks)suggests to to the project over 20 Years with only removing a small portion of the habitat at the time.

Comment 70-2

Reasons: the endangered bird bells vireo was found , and over 200 bird species,and other animals were found. Rosebowl riders, Tom Sayers camp and golf frisby are using the water shed for recreation. Traffic of 400 trucks a day causes a major harm to neighborhoods: pollution , traffic stress level.

Beatrix Schwarz
2644 Hermosa ave
Montrose, 91020
phone:
8182499676
e-mail: schwarzbeatrix2009@hotmail.com

Response to Comment Letter #70 (Beatrix Schwarz)

Response to Comment 70-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

The Los Angeles County Flood Control District (LACFCD) goes to great lengths to lessen project impacts and maximize efficiencies. As such, many of the points in the Arroyo Seco Foundation's four-point "Slow Program" are compatible with the LACFCD Proposed Project.

For example, the Draft Environmental Impact Report (EIR) concluded that Alternative 3 is the Environmentally Superior Alternative. Alternative 3, Configuration D, Option 2 drastically reduces the project's footprint of 120 acres down to 71 acres. Additionally, the limited maintenance area for Alternative 3 further reduces the permanent habitat impacts down to approximately 51 acres by allowing for site replanting and mitigation to take place within the reservoir footprint. This reduction in project acreages will greatly lessen environmental impacts of the Proposed Project.

LACFCD strives to achieve an efficient, low-cost sediment removal project. Sediment removal rates and trucking operations, now utilizing all low-emissions trucks, as explained in Section 3.5 of the Draft EIR, have been carefully planned for economies of scale to realize maximum efficiencies without major delays in project schedule, thus greatly reducing operating costs. Furthermore, LACFCD has applied for and received an approximately $28 million grant through the State's Disaster Preparedness and Flood Protection Bond Act of 2006 (Proposition 1E) program. A portion of this grant will be used to help offset the Proposed Project's costs.

While sluicing is not a viable project alternative, as explained in Section 4.7 of the Draft EIR, Flow Assisted Sediment Transport, or FASTing, will be used for maintenance after the project's main sediment removal phase has been completed, as described in Section 2.5.2 of the Draft EIR.

LACFCD is committed to *Public Service that Works*; and by combining almost 100 years of technical expertise and invaluable input from the community, less invasive flood protection will continue to be a reality.

For a more detailed response to the Arroyo Seco Foundation's four-point "Slow Program", please see the response to the Arroyo Seco Foundation's comment letter (Comment Letter #216, Response to Comment 216-16).

Response to Comment 70-2:

As discussed in Section 3.6.6 of the Draft EIR, Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats. In addition, sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays). Wildlife species, including sensitive bird species, currently found in the Proposed Project area would be expected to either remain in the undisturbed areas of the reservoir outside the Proposed Project area or to reestablish once sediment removal activities have been completed.

As discussed in the Draft EIR, Section 3.15, Recreation/Public Services, the Oak Grove Disc Golf Club, the Rose Bowl Riders, and the Tom Sawyer Camps are among the many groups that regularly use the Oak Grove area of Hahamongna Watershed Park. The Oak Grove area of Hahamongna Watershed Park and the associated facilities, including Oak Grove Disk Golf Course, will remain open during sediment removal and will continue to provide active recreational facilities to the area. Sediment removal activities will not limit the use of the Oak Grove area of Hahamongna Watershed Park by individuals or by organizations such as the Oak Grove Disc Golf Club, the Rose Bowl Riders, or the Tom Sawyer Camp.

Sediment removal activities would be temporary and are expected to occur only in the drier months (April to December, excluding holidays). It is expected that these activities will often not be adjacent to the Oak Grove area of Hahamongna Watershed Park. The Proposed Project would result in temporary limitations on the recreational use of the Proposed Project site and some of the adjacent trails. Most of these areas would be reopened seasonally or intermittently throughout the sediment removal process. In addition, temporary impacts to designated recreational facilities and trails will be minimized through advance communication and redirection to the nearest facility in the vicinity of the Proposed Project. Furthermore, an east-west trail crossing will continue to provide access at the north end of the reservoir. At the south end of the reservoir, after the reservoir ingress and egress ramps have been fully constructed, access to the upper east side Arroyo Seco Trail from La Cañada Verdugo Road will be maintained; and the linkage from the west side Arroyo Seco Trail and the Flint Wash Trail to the upper east side Arroyo Seco Trail (crossing Devil's Gate Dam and also continuing south to the Rose Bowl) will be available after construction activities have ended each day and on nonworking days.

Air quality impacts associated with truck traffic were analyzed in the Draft EIR in Section 3.5. LACFCD has conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed the United States (U.S.) Environmental Protection Agency's (EPA's) 2007 standards for emissions. Therefore, in order to further reduce emissions, Mitigation Measure MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump trucks that meet or exceed EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality will be reduced to less than significant.

Potential impacts due to the Proposed Project's truck trips were analyzed in the Draft EIR, Section 3.16, Transportation and Traffic. As listed in that section, a single intersection in the immediate vicinity of the Proposed Project site will have a potentially significant impact. In practice, hauling rates and routes may be adjusted to help reduce impacts, depending on operational need. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the Proposed Project site.

From: Sylvia Stachura
To: reservoircleanouts
Subject: Devil"s Gate
Date: Monday, December 30, 2013 6:26:53 PM

Comment 71-1

Please do not make a mistake like the Army Corps did in Sepulveda dam area and destroy the habitat a some of the world's few remaining birds by wiping out their habitat at Devil's Gate. There are more than one way to deal with that area. Please review them and find an acceptable alternative.

Thank you, Sylvia Stachura, resident of the San Gabriel Valley and environs.

Response to Comment Letter #71 (Sylvia Stachura)

Response to Comment 71-1:

Thank you for your input. This comment has been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

As discussed in Section 3.6.6 of the Draft Environmental Impact Report (EIR), Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats. In addition, sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays). Bird species currently found in the Proposed Project area would be expected to either remain in the undisturbed areas of the reservoir outside the Proposed Project area or to reestablish once sediment removal activities have been completed.

Alternative 3, Configuration D affects the least amount of habitat of all the action alternatives while still achieving Proposed Project objectives (see Section 4.6 of the Final EIR). This alternative would provide a buffer on the west side of the reservoir that would allow for the movement of wildlife. Alternative 3, Configuration D, Option 1 provides a more natural configuration for the reservoir by having two branches to carry water and sediment toward the face of the dam, avoiding disturbing a significant portion of existing vegetation. To further reduce the Proposed Project's footprint, Los Angeles County Flood Control District (LACFCD) has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2, which drastically reduces the project's footprint of 120 acres down to 71 acres, would avoid excavation of the western branch, thereby providing a greater habitat buffer on the west side of the reservoir. In addition, the maintenance areas would be smaller than the original sediment removal footprint, allowing for habitat to reestablish and providing additional areas for wildlife movement.

From: gfoster102@sbcglobal.net
To: reservoircleanouts
Cc: mlmorales@cityofpasadena.net; FifthDistrict@lacbos.org
Subject: Draft EIR Devil"s Gate Reservoir Sediment Removal and Management Project
Date: Thursday, January 02, 2014 4:13:20 PM

January 2, 2014

County of Los Angeles, Department of Public Works
Water Resources Division
Attn: Reservoir Cleanouts Program
P.O. Box 1460
Alhambra CA 91802-1460

RE: Draft EIR Devil's Gate Reservoir Sediment Removal and Management Project

Comment 72-1

I attended the November 14, 2013 public meeting and was shocked to learn that the only alternative which had been analyzed in any detail was Configuration D for which disastrous impacts were simply discounted as "unavoidable". In spite of repeated questioning at this meeting, staff refused to discuss any less drastic alternatives. Table ES-1: Summary of Potential Significant Impacts consistently found no reason to pursue a less drastic plan, pretending instead that terrible impacts on the natural and human environments were unavoidable, or less than significant. The Draft EIR virtually ignored the Hahamonga Watershed Park Master Plan.

Comment 72-2

Configuration D should be abandoned and the County should start over in order to identify the least harmful alternative which would remove only the amount of sediment absolutely required and have the least impact on natural habitat and affected neighborhoods. Virtually no value was attributed to the valuable riparian habitat which would be destroyed or the impact from 425 daily trips by double dump trucks which would make the surrounding communities virtually uninhabitable to say nothing of the air pollution generated by this activity. No scientific rationale was offered for why this sediment must be removed and why it needs to be removed within a 5-year timeframe. At one point, a staff member commented that "the County has plenty of money for this project from the annual Flood Control Assessment on property tax". It appears that staff simply wants to spend these funds quickly and prefers huge capital projects to responsible annual maintenance programs.

Abandon the current plan and start over with a "least impact" approach developed in close collaboration with staff from the City of Pasadena, neighborhood organizations, the Arroyo Seco Foundation, the Sierra Club, the Audubon Society and other interested groups.

Sincerely,

Genette Foster
1748 Monte Vista
Pasadena CA 91106

cc: L.A. County Supervisor Antonovich

City of Pasadena District 2, Councilperson Margaret McAustin

Response to Comment Letter #72 (Genette Foster)

Response to Comment 72-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. The Los Angeles County Flood Control District (LACFCD) analyzed six separate alternatives in detail, as discussed in Section 4.0 of the Draft Environmental Impact Report (EIR). Each alternative has a discussion on potential impacts. Alternative 3, Configuration D is the Environmentally Superior Alternative. Alternative 3, Configuration D, affects the least amount of habitat of all the action alternatives while still achieving Proposed Project objectives (see Section 4.6 of the Final EIR). This alternative would provide a buffer on the west side of the reservoir that would allow for the movement of wildlife. Alternative 3, Configuration D, Option 1 provides a more natural configuration for the reservoir by having two branches to carry water and sediment toward the face of the dam, avoiding disturbing a significant portion of existing vegetation. To further reduce the Proposed Project's footprint, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2, which drastically reduces the project's footprint of 120 acres down to 71 acres, would avoid excavation of the western branch, thereby providing a greater habitat buffer on the west side of the reservoir. In addition, the maintenance areas would be smaller than the original sediment removal footprint, allowing for habitat to reestablish and providing additional areas for wildlife movement.

LACFCD was mandated by the State Legislature to provide flood protection and water conservation within its boundaries.

A reservoir storage design capacity of two design debris events (DDEs) below the dam's lowest spillway was determined to be the standard acceptable level of risk at Devil's Gate Dam and Reservoir. The DDE volume of capacity is determined using the January 2006 Los Angeles County Department of Public Works (LACDPW) Hydrology Manual and the March 2006 LACDPW Sedimentation Manual. For Devil's Gate Dam and Reservoir, the required reservoir capacity is 4.0 million cubic yards (cy) (two DDEs) below the spillway elevation of 1,040.50 feet.

The Hydrology Manual (January 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_Hydrology_Manual/2006%20Hydrology%20Manual-Divided.pdf

The Sedimentation Manual (March 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_sedimentation_manual/Sedimentation%20Manual-Second%20Edition.pdf

Additional information concerning DDE calculation methods has been added to the Final EIR, Section 2.3, Project Need.

As discussed in the Draft EIR, the Proposed Project and Alternatives, except for the No Project Alternative, comply with the Hahamongna Watershed Park Master Plan.

Response to Comment 72-2:

See Response to Comment 72-1.

As discussed in Section 3.6.6 of the Draft EIR, Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats. In addition, sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays).

Potential impacts due to the Proposed Project's truck trips were analyzed in the Draft EIR, Section 3.16, Transportation and Traffic. As listed in that section, a single intersection in the immediate vicinity of the Proposed Project site will have a potentially significant impact. In practice, hauling rates and routes may be adjusted to help reduce impacts, depending on operational need. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the Proposed Project site.

Air quality impacts associated with truck traffic were analyzed in the Draft EIR in Section 3.5. LACFCD has conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed the United States (U.S.) Environmental Protection Agency's (EPA's) 2007 standards for emissions. Therefore, in order to further reduce emissions, Mitigation Measure MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump trucks that meet or exceed EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality will be reduced to less than significant.

LACFCD goes to great lengths to lessen project impacts and maximize efficiencies. As such, many of the points in the Arroyo Seco Foundation's four-point "Slow Program" are compatible with the LACFCD Proposed Project.

For example, the Draft EIR concluded that Alternative 3 is the Environmentally Superior Alternative. Alternative 3, Configuration D, Option 2 drastically reduces the project's footprint of 120 acres down to 71 acres . Additionally, the limited maintenance area for Alternative 3 further reduces the permanent habitat impacts down to approximately 51 acres by allowing for site replanting and mitigation to take place within the reservoir footprint. This reduction in project acreages will greatly lessen environmental impacts of the Proposed Project.

LACFCD strives to achieve an efficient, low-cost sediment removal project. Sediment removal rates and trucking operations, now utilizing all low-emissions trucks, as explained in Section 3.5 of the Draft EIR, have been carefully planned for economies of scale to realize maximum efficiencies without major delays in project schedule, thus greatly reducing operating costs. Furthermore, LACFCD has applied for and received an approximately $28 million grant through the State's Disaster Preparedness and Flood Protection Bond Act of 2006 (Proposition 1E) program. A portion of this grant will be used to help offset the Proposed Project's costs.

While sluicing is not a viable project alternative, as explained in Section 4.7 of the Draft EIR, Flow Assisted Sediment Transport, or FASTing, will be used for maintenance after the project's main sediment removal phase has been completed, as described in Section 2.5.2 of the Draft EIR.

LACFCD is committed to *Public Service that Works*; and by combining almost 100 years of technical expertise and invaluable input from the community, less invasive flood protection will continue to be a reality.

For a more detailed response to the Arroyo Seco Foundation's four-point "Slow Program", please see the response to the Arroyo Seco Foundation's comment letter (Comment Letter #216, Response to Comment 216-16).

From: jptoland
To: reservoircleanouts
Subject: "Devil's Gate Reservoir Sediment Removal and Management Project"
Date: Thursday, January 02, 2014 1:09:41 PM

To Whom it may concern;

Comment 73-1

I am a 10 year resident homeowner in La Canada Flintridge and have been playing disc golf at Oak Grove Park "Hahamongna" since 1978. I have watched the City and county have their way with the Historical 1st ever disc golf course since it was set up. There are now over 5,000 courses world wide and Disc Golf is rising fast in popularity. This is like "The Old Course" in Scotland. If you don't play disc golf you would never know that it will someday soon become a mainstream sport. This course should be protected as it will be a historical piece of history for not only Los Angeles County but also for Pasadena and La Canada.

Comment 73-2

In looking at the proposed plans for the sediment removal I can only say that had the East Branch been maintained there would be no problem.

It seems to me that taking the time to remove all of the proposed west branch area would only require more money while exposing more surface area to potential erosion. Why not just channel out the East Branch and make sure it is properly maintained.

If you make a west branch then you will have twice the maintenance and potential silt build -up.

It seems to me that this has not been well thought out.

Let the water dictate the path and help it to get down to the Dam.

Several holes were simply taken away from the course in the past and we are not ready to let that happen again.

Sincerely,

Jeffrey Toland

Response to Comment Letter #73 (Jeffrey Toland)

Response to Comment 73-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. No official disc golf course holes located in the Oak Grove area of Hahamongna Watershed Park will be removed by the Proposed Project. As noted in the Draft Environmental Impact Report (EIR), Section 3.15, Los Angeles County Flood Control District (LACFCD) recognizes the importance of the area to those who take advantage of the recreational opportunities offered, including the Oak Grove Disc Golf Course. Where possible, Los Angeles County Flood Control District (LACFCD) will avoid any disc golf course holes located outside the Oak Grove area of Hahamongna Watershed Park. When avoidance is not possible, LACFCD will coordinate with the Oak Grove Disc Golf Club for removal of the disc golf hole equipment.

Alternative 3, Configuration D, the Environmentally Superior Alternative from the Draft Environmental Impact Report (EIR), carefully balances flood control needs and reductions in impacts to habitat by restoring the required reservoir capacity while also minimizing the project footprint (see Section 4.6 of the Final EIR). Furthermore, the LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2, with a project footprint of approximately 71 aces, would avoid excavation of the western branch, thereby providing a greater distance between the Oak Grove area of Hahamongna Watershed Park and the excavation area, reducing the project footprint of 120 acres down to 71 acres. Alternative 3, Configuration D, Option 2 would also avoid all currently existing Oak Grove Disc Golf Club holes. The Oak Grove area of Hahamongna Watershed Park and the associated facilities will remain open during sediment removal and will continue to provide active recreational facilities to the area.

Response to Comment 73-2:

Alternative 3, Configuration D, Option 1, presents an opportunity for two channels: one that would be maintained yearly and another that would be allowed to adapt to the natural movement of the water flow.

The commenter's preference to excavate only the east branch of Alternative 3, Configuration D has been noted. As discussed above, Alternative 3, Configuration D, Option 2, would avoid excavation of the western branch.

From: Julie Thurston
To: reservoircleanouts
Subject: Devil"s Gate Reservoir
Date: Thursday, January 02, 2014 2:17:46 PM

Dear Water Resources Division, Reservoir Clean Out Team,

Regarding the: Devil's Gate Reservoir Sediment Removal and Management Project, scheduled to remove 2.4 to 4 million cubic yards of sediment from the dam over a five-year period.

Please consider the following:

Comment 74-1

La Canada Unified school students will suffer adverse health effects and/or need to limit outdoor team sports. Imagine all four years of high school being a noisy, polluted environment. All decisions as to quantity of removal and hours of operation need to be carefully considered. My banner slogan would read, "Less is more, please."

Thank you for your consideration,

Julie Thurston
LCHS Track & Field Coach, Resident, Business owner.

email: jumpgirl12@gmail.com

Response to Comment Letter #74 (Julie Thurston – La Cañada High School)

Response to Comment 74-1:

Thank you for your input. This comment has been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

Air quality and noise impacts associated with truck traffic were analyzed in the Draft Environmental Impact Report (EIR) in Sections 3.5 and 3.14, respectively. As discussed in the Draft EIR, Section 3.14, with implementation of Mitigation Measure MM N-1, noise impacts would be reduced to a level of less than significant. The Los Angeles County Flood Control District (LACFCD) has conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed the United States (U.S.) Environmental Protection Agency's (EPA's) 2007 standards for emissions. Therefore, in order to further reduce emissions, Mitigation Measure MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump trucks that meet or exceed EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality, including those associated with health effects, will be reduced to less than significant. Also as discussed in the Draft EIR, Section 3.5, the Health Risk Assessment (HRA) found the Proposed Project would result in less than significant impacts for both the cancer-related and non-cancer-related impacts.

December 20, 2013

County of Los Angeles
Department of Public Works
Water Resources Division
ATTN: Reservoir Cleanouts Program
PO Box 1460
Alhambra, CA 91802-1460
reservoircleanouts@dpw.lacounty.gov

RE: DEVIL'S GATE RESERVOIR SEDIMENT REMOVAL AND MANAGEMENT PROJECT

Dear Department of Public Works, Water Resource Division,

Thank you for the opportunity to comment on the draft EIR for the DEVIL'S GATE RESERVOIR SEDIMENT REMOVAL AND MANAGEMENT PROJECT. I can't imagine what a herculean task you have ahead deciding how best to assess and implement the sediment removal project.

Comment 75-1

I have been a part of Tom Sawyer Camps for 11 years (6 as a camper and 5 as a counselor). This park is not only my job, but also my safe place. TSC is where I became who I am today and a major part of that process is the environment we are so fortunate to have. I work with the first grade girls and many of them have never been on a real hike before. I have the pleasure to experience this with them. Not only that, but by helping the push out of their comfort zones (many of them are nervous going down steep hills, etc), I earn a sense of trust that is crucial in our camper-counselor dynamic. Also, since Hahamonga is such a home to me, when camp is not in session, I take my boxer puppy running there every afternoon and play disc golf all the time.

Comment 75-2

While we support the sediment clean up in general, we are concerned about the impact as defined in the dEIR on summer camp and are requesting the following modifications: 1) No sediment removal in the willow forest and alluvial scrub areas during the months of June, July, and August; 2) A phased approach that allows for places within the project area that can continue to be used for recreational purposes; 3) A longer timeline for the project to help minimize impact on those who use the park; and, 4) Preservation of the willow forest and the alluvial scrub area from denuding and/or from being used as permanent maintenance zones.

Comment 75-3

Tom Sawyer Camps has been in operation since 1926 and has been using Hahamongna Watershed Park as for the last 70 years (since 1944). Approximately 1250 of our campers and 150 staff use this site each summer, which now includes three generation of campers. This park is critical to our day camp programs and heavy truck traffic during the summer months and denuding the willow forest and alluvial scrub areas would have a critical negative impact on the program, the campers and the staff.

Comment 75-4

Camp is an antidote to bullying, isolation, over reliance on technology and many other challenges facing our youth. At Hahamongna, campers age 3-14 have critical exposure to wilderness adventure. During the summer, they hike, ride horses, build secret forts, observe wildlife, play games, sing songs, build self-reliance and self-esteem, and develop friendships that last a lifetime. We rely heavily on the access, peace and beauty of the willow forest and the alluvial scrub areas for these experiences, along with other areas of the park. Hahamongna is home to generations of staff and campers whose lives have been directly and dramatically enriched by this natural refuge, including mine.

Comment 75-5

Tom Sawyer Camps is a very important program and my request could easily go unnoticed but I believe the impact that camp has on the children of tomorrow is significant. Summer in the watershed is a rare and unique opportunity for children to be away from noise and disruption and engage with nature and outdoor adventure in a safe, peaceful, and joyful manner. We hope you will see the value of camp and make every attempt to minimize the impact the sediment clean-up will have during the summer months and for the generations of children to use the park in the years to come.

Thank you for allowing me the opportunity to share my concerns and needs. Please feel free to contact me if you have any questions.

Sincerely,

Katie Rayburn
4819 Oakwood Avenue
La Canada, CA 91011
(818) 371-3751
katherinerayburn@gmail.com

Response to Comment Letter #75 (Katie Rayburn – Tom Sawyer Camps)

Response to Comment 75-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

Response to Comment 75-2:

The Proposed Project will not limit the use of the Oak Grove area of Hahamongna Watershed Park by recreational users such as Tom Sawyer Camps. Sediment removal activities would be temporary and are expected to occur only in the drier months (April to December, excluding holidays). It is expected that these activities will often not be adjacent to the Oak Grove area of Hahamongna Watershed Park. Therefore, the maximum impacts to the adjacent recreational facilities would be much shorter than the five-year duration of the sediment removal phase of the Proposed Project.

During the summer months, sediment is expected to be the driest. Due to the reduction in water weight, each truck can haul more sediment per load during these months. This increases efficiency and decreases project duration, which also decreases impacts and cost. Skipping these crucial dry months would extend the project duration.

The Los Angeles County Flood Control District (LACFCD) proposed a project duration of five years to reduce accumulated sediment in a timely fashion. The goal of LACFCD is to restore reservoir flood capacity as soon as feasible while reducing costs and minimizing the duration of environmental and construction impacts to the surrounding communities. Extending the project would prolong the flood risk to downstream communities and increase the construction impacts to the surrounding communities.

As discussed in Section 3.6.6 of the Draft Environmental Impact Report (EIR), Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats.

Alternative 3, Configuration D affects the least amount of reservoir area of all the action alternatives while still achieving Proposed Project objectives (see Section 4.6 of the Final EIR). This alternative would provide a buffer between the Oak Grove area of Hahamongna Watershed Park and the excavation area. Alternative 3, Configuration D, Option 1 provides a more natural configuration for the reservoir with two branches to carry water and sediment toward the face of the dam, avoiding disturbing a significant portion of existing vegetation. To further reduce the Proposed Project's footprint, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2 would avoid excavation of the western branch, thereby providing a greater habitat buffer on the west side. In addition, the maintenance areas would be smaller than the original sediment removal footprint, allowing for habitat to reestablish.

Response to Comment 75-3:

See Response to Comment 75-2. Access to the Oak Grove area of Hahamongna Watershed Park will not be limited by the Proposed Project. Potential impacts due to the Proposed Project's truck trips were analyzed in the Draft EIR, Section 3.16, Transportation and Traffic. As listed in that section, a single intersection in the immediate vicinity of the Proposed Project Site will have a potentially significant

impact. In practice, hauling rates and routes may be adjusted to help reduce impacts depending on operational need. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the project site.

LACFCD also notes the commenter's concerns with traffic impacts relating to traveling to and from the Oak Grove area of Hahamongna Watershed Park. The Draft EIR outlines a 12-hour trucking schedule, with trucking operations on Saturdays as well. This schedule is used to model the most intensive construction operation, which may not be applicable at the site for the duration of the project. Typical trucking schedules are estimated to be 8 hours per day on weekdays. Additionally, construction traffic will not pass the Oak Grove Drive/Foothill Boulevard intersection used for ingress and egress to the Oak Grove area of Hahamongna Watershed Park.

Response to Comment 75-4:

See Response to Comment 75-2. LACFCD notes the use of Devil's Gate Reservoir by Tom Sawyer Camps, especially the willow forest and alluvial scrub areas.

Response to Comment 75-5:

See Response to Comment 75-2. LACFCD notes that Tom Sawyer Camps is an important resource to children and is going to great lengths to keep impacts to a minimum. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the Proposed Project site.

From:	Louisa Van Leer
To:	reservoircleanouts
Cc:	scott@arroyoseco.org
Subject:	Devil"s Gate Reservoir Sediment Removal and Management Project
Date:	Thursday, January 02, 2014 2:37:55 PM

Jan. 2, 2014
To: Gail Farber, Director
Los Angeles County Department of Public Works
Attn: Water Resources Division - Reservoir Cleanouts

Dear Ms. Farber,

Comment 76-1

Please record my email as a response to the EIR prepared for Devil's Gate Reservoir Sediment Removal and Management Project (public comment period ending Jan 6, 2014). In planning and scheduling the sediment removal from the Devil's Gate Reservoir, I strongly advocate for alternate approaches not contained in the EIR. The Hahamonga Watershed Park, it's wildlife and habitat would be unnecessarily destroyed by the sediment removal project as proposed in the EIR. Please consider implementing the recommendations proposed by the Arroyo Seco Foundation to go SLOW with the sediment removal in order to conserve habitat. The SLOW Approach has merit and is a reasonable compromise to address all parties legitimate concerns about cost, schedule, safety and habitat.

Sincerely,

Louisa Van Leer, Architect
Highland Park Heritage Trust, Board Member
6113 Piedmont Avenue
Los Angeles, CA 90042
323-633-0497

Response to Comment Letter #76 (Louisa Van Leer – Highland Park Heritage Trust)

Response to Comment 76-1:

Thank you for your input. This comment has been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

The Los Angeles County Flood Control District (LACFCD) goes to great lengths to lessen project impacts and maximize efficiencies. As such, many of the points in the Arroyo Seco Foundation's four-point "Slow Program" are compatible with the LACFCD Proposed Project.

For example, the Draft EIR concluded that Alternative 3 is the Environmentally Superior Alternative. Alternative 3, Configuration D, Option 2, drastically reduces the project's footprint from 120 acres down to 71 acres. Additionally, the limited maintenance area for Alternative 3 further reduces the permanent habitat impacts down to approximately 51 acres by allowing for site replanting and mitigation to take place within the reservoir footprint. This reduction in project acreages will greatly lessen environmental impacts of the Proposed Project.

LACFCD strives to achieve an efficient, low-cost sediment removal project. Sediment removal rates and trucking operations, now utilizing all low-emissions trucks, as explained in Section 3.5 of the Draft EIR, have been carefully planned for economies of scale to realize maximum efficiencies without major delays in project schedule, thus greatly reducing operating costs. Furthermore, LACFCD has applied for and received an approximately $28 million grant through the State's Disaster Preparedness and Flood Protection Bond Act of 2006 (Proposition 1E) program. A portion of this grant will be used to help offset the Proposed Project's costs.

While sluicing is not a viable project alternative, as explained in Section 4.7 of the Draft EIR, Flow Assisted Sediment Transport, or FASTing, will be used for maintenance after the project's main sediment removal phase has been completed, as described in Section 2.5.2 of the Draft EIR.

LACFCD is committed to *Public Service that Works*; and by combining almost 100 years of technical expertise and invaluable input from the community, less invasive flood protection will continue to be a reality.

For a more detailed response to the Arroyo Seco Foundation's four-point "Slow Program", please see the response to the Arroyo Seco Foundation's comment letter (Comment Letter #216, Response to Comment 216-16).

Marnie Gaede
5218 Donna Maria Lane
La Canada, CA 91011

Gail Farber, Director
County of Los Angeles Department of Public Works
Water Resource Division
Attention: Reservoir Cleanouts Program
P.O. Box 1460
Alhambra, California 91802-1460
CC: Mark Petrella
CC: Keith Lilley

January 1, 2014

Comments on Devil's Gate DEIR

General Comment:
The DEIR is inadequate because of the following reasons: it failed to document and address the flood threat, it failed to consider environmentally responsible alternatives, it failed to address air quality and noise impacts on the neighboring community, and it failed to document the potential wildlife habitat destruction and incorporate measures that would reduce those impacts.

Comment 77-1

The goal of the Devil's Gate Sediment removal project, removal of sediment, is not balanced by the concerns of stakeholders and environmental impact. The public is expected to accept the fact that there will be no way to mitigate a 100% certainty of aesthetic, traffic and air quality pollution. The stakeholders are expected to accept a weak argument that there is some unknown probability of a flood that will damage named and unnamed areas below Devil's Gate Dam.

Comment 77-2

My first question to this proposal is what is the probability that such flooding will occur and what is the scientific evidence that it will occur? There is no such data in the DEIR.

The Project:
The initial project, before the DEIR, was 1.67 million cubic yards. The current proposed project is 2.95 million cubic yards, almost double. None of the alternatives under consideration reflect the lower, original estimate.

Why was the project expanded?

Does it have something to do with doubling the DDE to two 50-year events?

Comment 77-3

In the grant application entitled Devil's Gate and Eaton Stormwater Flood Management Project, a component of which is the removal of sediment from behind Devils Gate dam, described in the application as follows:

"To restore reservoir capacity to address the post-Station Fire sediment impacts at Devils Gate Dam, the Devil's Gate Reservoir Sediment Removal and Management Project will remove an estimated 2,000,000 cubic yards of sediment from the reservoir."

Comment 77-3 continued

The reason for the urgency of this project has been pinned on the Station Fire. It is difficult to believe that the same conditions that created the Station Fire, decades of fuel build up and record hot, dry temperatures could be repeated in the next 3-5 decades, and certainly not in the 5-year duration of this project. There is no way such fuel could build up in five years, especially with the current, persistent drought. The estimate for Station Fire sediment is 900,000 cubic yards.

Comment 77-4

Why is the County determined to limit sediment removal to five years when the urgency has not been defined? It took 93 years for 3-4 million cubic yards to be deposited, so why is it necessary to remove that amount in just 5 years? Why can't the sediment be removed over 20 to 25 years without all the damaging impact to the stakeholders and the habitat?

Comment 77-5

Looking at the inundation maps provided by the DEIR, the Rose Bowl is not considered vulnerable to flooding. **Why is the Rose Bowl included in the dialog by the county at the meetings for the public?** I believe that reference of flooding the Rose Bowl, along with the 110 Freeway flooding, are scare tactics. Areas that may be vulnerable to flooding are in the flood plain. **Why isn't there a specific, mathematical and scientifically generated risk assessment for downstream flooding?**

Comment 77-6

None of the 5 alternatives answer the question of urgency. The so-called "emergency" was created for the expediency of this project. There is also no mention that the DPW has failed to conduct ongoing maintenance in recent decades, compounding the current problem.

Comment 77-7

I attended the hearings presented by the Los Angeles County Department of Public Works DPW, aka LA County Flood Control District (LACFCD) in Altadena and La Canada. In both presentations the public was told there would be no way to mitigate the diesel pollution, the noise, the aesthetic damage, the traffic and the ecological destruction to the project area.

Comment 77-8

The stakeholders include, but are not limited to 10 schools, residences, stables, camps, JPL, hikers, bikers, family recreation, commuters, biology field camps, and wildlife. They are being asked to accommodate diesel pollution that is a known carcinogen and can cause heart & lung disease, traffic congestion, noise, and habitat destruction.

Why weren't the stakeholders adequately notified? I personally contacted each of the schools in La Canada, their principals and boards, and was repeatedly told they hadn't been notified and that my letter was their official notice. Every stakeholder expressed dismay that they had little to no time to investigate the DEIR, seek advice or adequately respond to the DEIR.

Air Pollution

Diesel pollution contains more than 40 toxic air contaminants. These include many known or suspected cancer-causing substances such as benzene, arsenic and formaldehyde. It also contains other harmful pollutants, including nitrogen oxides (a component of urban smog). The American Lung Association states, "Those spending time on or near roads and freeways, truck loading and unloading operations, operating diesel-powered machinery or working near diesel equipment face exposure to higher levels of diesel exhaust and face higher health risks."

Comment 77-9

The proposal states that it will encourage contractors to abide by EPA 2008 standards for trucks. It doesn't say it will, nor does it say it will strive to keep up with changing standards.

The EPA is currently studying "Near-Road Exposures to Urban Air Pollution" (NEXUS) to measure the impact of diesel burning trucks on children, the elderly and at-risk population. The results will be available for Federal, State and local governments to make better public health decisions for stakeholders near heavy truck traffic areas.

Comment 77-10

This project is a good example of heavy truck traffic: 425 tandem disposal trucks (with a 16-20 yard squared) a day, along with four front loaders, 2 D-8 dozers, an excavator, a grader, a water truck, a sorters/crushers and employee trucks. **Is the excavating equipment on the site going to run all night preparing for hauling the next day?**

Comment 77-11

My question is if the EPA changes standards during the duration of the project, and determines a specific net reduction in diesel pollution, will the county comply or will it stick to the 2008 specifications? The California Air Resource Board Diesel Reduction plan, when fully implemented will result in a 75 percent reduction in particle emissions from diesel equipment by 2010 (compared to 2000 levels), and an 85 percent reduction by 2020. **Do the standards referenced the DEIR reflect this trend?** I don't believe they do.

Comment 77-12

Also, the graphs and statistics included in the DEIR Appendix B Air Quality Report state that the pollution from the project would not be above a designated threshold. **Does this threshold take into account that the 10 schools and diverse recreational activities are already impacted because they are adjacent to the 210 Freeway? Do the figures presented include the existent pollution? Do they take into account that the geographical characteristics of the project site and surrounding neighborhoods include a narrow valley surrounded by slopes and hillsides, a condition that tends to trap pollution from the project and the freeway? Do the figures combine on-site excavation pollution, the possibility of night pollution, the hauling and idling pollution, and the 210-Freeway pollution?**

Comment 77-13

What limitation will there be on idling, as in when the trucks are waiting in line to be loaded, or entering and exiting the project site? Idling trucks emit the diesel pollutants, and if several trucks are idling, there will be more pollution. **What happens if there is an accident on the Freeway or the access roads and this extensive truck traffic gets backed up?**

Comment 77-14

On a personal note, if my son, who had chronic asthma as a child, had been adjacent to this project, he would have had persistent health problems and would have been unable to attend La Canada High School, Hillside School, Tom Sawyer Camp, or hike in Hahamongna Watershed Park. As a concerned citizen, it would be unconscionable for me to recommend a project that would harm youth, elderly and at-risk population.

Traffic

Comment 77-15

Appendix J describes the impact of traffic. Approximately 50 double trucks per hour will haul and estimated 7.6 thousand cubic yards a day. There is no way to mitigate the impact of this truck traffic. It will create major impacts to the adjacent schools, especially La Canada High School and Hillside, as well as impact JPL, the residences along the route, and the 210 Freeway traffic.

During the La Canada City Council meeting, there was a determination on behalf of the city council members that this impact, especially on Berkshire, was unacceptable. During the Altadena presentation, citizens of Altadena and the adjacent schools that will be impacted from truck travel on Windsor also found the impact as unacceptable.

Comment 77-16

How will the County DPW resolve the fact that La Canada and Altadena will be impacted by the traffic from over 420 trucks per day want the other city to bear the brunt of this imposition?

Comment 77-17

All 10 schools in the area will have traffic in the morning and the afternoon. JPL has a work schedule that will also be impacted. **Is there a plan for when there is an accident or an impediment for traffic to move? Will truck idle while waiting to move? How much diesel pollution could this cause?**

Noise

Comment 77-18

In Appendix I there is a restatement of the project's purpose:
The Los Angeles County Flood Control District (LACFCD) must remove sediment that has accumulated behind the dam in order to restore the flood control capacity of Devil's Gate Reservoir and minimize the level of flood risk to downstream communities along the Arroyo Seco. In its current condition, the reservoir no longer has the available capacity to safely contain another major debris event; and the outlet works have a risk of becoming clogged and inoperable.

Again, just for emphasis, the risk described is not quantified, while the pollution, traffic and noise are a certainty.

Comment 77-19

The Federal Transit Administration regulates noise. Local administration is concerned with regulations of nuisance abatement ordinances and land use planning. **Will the LACFCD comply with the Pasadena and La Canada noise and dust ordinances? Are the noise standards depicted in this Appendix project specific? Does the county combine the on-site noise of dozer and crusher activity with the movement of trucks and the adjacent noise of the freeway?**

Comment 77-20

The length of this project as depicted will doom a succession of school children and residents to constant, distracting noise. The DPW admits that there is no way to mitigate the noise factor.

Comment 77-21

Economic Gain or Conflict with Project
Why are there crushers in this project? Is the sediment going to be sold? Are the taxpayers paying for a project that includes economic benefits? If so, who benefits?

Comment 77-22

A grant for 28 million from the state has allegedly been approved for flood control work in Hahahmongna by the Department of Power and Water. A substantial portion of this involves constructing a pipeline from Hahamongna across Altadena to divert water to the Eaton Canyon spreading grounds. **What connection does the pipeline that moves water from Hahamongna Watershed to Eaton Canyon have to do with the time line in this project? Who benefits from this transfer of water? Has there been an EIR for this project? How will it affect water rights in the Raymond Basin?**

Comment 77-23

There are several possible conflicts with the county's proposal. **How does this project work with the 710 Freeway Extension? How does it work with the JPL Superfund cleanup of perchlorates? What impact will moving water from Hahamongna to Eaton Canyon have on this cleanup? Where will people go for recreation if the Rose Bowl is modernized during this five-year project?** All of these projects are related projects and should have been evaluated by the DEIR. **Why are they not included in the DEIR analysis?**

Comment 77-24

Is it true that the California Regional Water Quality Board denied a permit for a similar, but smaller project in March of 2011? Does this proposed project have a permit from the California Regional Water quality Board?

Comment 77-25

Environmental/Habitat Concerns
The 120 acres in the proposed project represent a wildlife corridor, prime riparian habitat, breeding habitat for diverse bird, reptile and mammal species. Appendix D, the Biological Report, includes a biological survey along with impacts from the project are included. There are 27 species of birds, eight mammal species and several reptile and amphibian species. Some species are state and federally listed as endangered or species of concern. Included in this list are the Least Bell's Vireo, Coast Range Newt, Southwestern Pond Turtle, Two-Striped Garter Snake, and the Yellow Warbler and they have all been identified as part of the proposed site

habitat. Although there is ample documentation of the Least Bell's Vireo, the survey did not observe this species during the brief and inadequate time period that the survey took place.

Comment 77-25 continued

The scorched earth policy of this project will destroy 120 acres of this habitat, along with known nesting sites, territories, breeding grounds, and prime migratory habitat. The mitigation proposed in this report does not take into account that the displacement of wildlife can't be recovered at the level of disturbance proposed or when the annual required maintenance is factored in. Furthermore, the analysis of biological impact is based upon removal of 1.67 million cubic yards (Appendix D, Project Description 1.2. page 6) rather than the much larger alternatives contained in this DEIR.

Comment 77-26

If the project had been doubled from the 1.67 million cubic yards to nearly 4 million cubic yards, then why doesn't the Biology Report reflect twice the impact? If habitat destruction is doubled, how do any of the mitigations proposed remain effective, especially with the areas designated for constant maintenance?

If the project could be changed to a slower project that didn't scrape away the trees and wildlife habitat, the impact on wildlife would be greatly reduced.

Does the DPW believe that mitigation of this impact is possible?

The Big Picture

Comment 77-27

Los Angeles has been moving towards a different approach the LA River, beach sediment, riparian habitat, and restoration of natural systems. Mayor Garcetti advocates tearing up the concrete and restoring the river to a more natural state. Currently the Army Corps of Engineers is supporting a river restoration plan that costs under $500 million, but the Mayor wants a more comprehensive plan. Friends of the LA River is a non-profit organization founded in 1986 to protect and restore the natural and historic heritage of the Los Angeles River and its riparian habitat through inclusive planning, education, and wise stewardship. **Are DPW projects endeavoring to protect and restore the natural heritage with inclusive planning, education and wise stewardship?**

Comment 77-28

The Devil's Gate Reservoir Sediment Removal and Management Project is one of four DPW projects that include Big Tujunga, Cogswell, Morris, and Pacoima. These plans are focused on sediment removal, not flood control and not habitat restoration. They are one-dimensional, old-thinking plans that do not integrate water resources, wildlife habitat, and recreational opportunities. With their near-exclusive reliance on sediment trucking, they do not even adequately address flood protection, the primary charge of LACFCD.

Comment 77-29

Flood protection is not adequately addressed due to a lack of statistical and practical data that can quantify a risk of flooding. Flood control is a tool for scare tactics and to justify an antiquated proposal model.
How does the DPW justify a project that is not in step with the preferred trend of natural restoration?

Comment 77-30

A more sustainable, responsible and forward thinking plan would recognize that sediment removal should not be the focus. Sediment should be removed, but not in the manner or amount proposed.

Comment 77-31

Would the DPW consider a slower project that steadily removes sediment over twenty years? Twenty years would be a more reasonable time line for removing sediment from Devil's Gate and all the other areas under the Sediment Removal Project. It has taken almost 100 years to build up. Instead of 800,000 to 1.2 million cubic yards a year as in the DPW proposal, a more reasonable plan would be to remove 167,000 cubic yards each year for ten years, and after that remove the base amount of inflow into the basin. This slow, ongoing program would illuminate most, if not all of the stakeholder and environmental concerns. It would also better represent ecological, long-rang plans for restoration of Los Angeles River and drainage systems. In a slower, more sustainable approach there would be less traffic, pollution, dust, noise and habitat destruction.

Comment 77-32

Would the DPW consider a more natural, slow process of moving sediment? Sluicing, or flow assisted sediment transfer (FAST) has been the main method of sediment maintenance. A slow sediment removal program allows more periods of critical flushing flows needed to move sediment. Allowing FAST instead of the proposed sediment removal project will also lesson the impacts of traffic, noise, pollution and habitat destruction. It maintains rather than destroys habitat.

Comment 77-33

Would the DPW consider far less habitat destruction for sediment removal? There is no need for permanent large-scale removal of habitat, and no need to have specific, large-scale maintenance areas that are denuded of wildlife riparian habitat. The cost of this project could be as high as $100 million for Devil's Gate and $3-4 billion for the entire county sediment program. This money will be spent trucking sediment from one part of the basin to another, with all the impacts of diesel pollution, traffic and noise.

Has this slower, more cost-effective program ever been considered? It is, by far, the most favored among those that have become engaged with this misguided, poorly conceived DPW Sediment Removal Project.

Comment 77-34

It is my hope that DPW will reconsider this massive project and provide the stakeholders and wildlife with a reasonable alternative that takes twenty not five years, has less impact of traffic, pollution, noise and habitat destruction, and is not as costly. There also needs to be a more scientifically driven evaluation of how much sediment should be removed and how much urgency there is to remove it.

Comment 77-34 continued

The DPW also needs to apply at least the most current EPA standards for diesel pollution, and needs to also apply a progressive compliance during the course of the project.

Would this be possible?

Response to Comment Letter #77 (Marnie Gaede)

Response to Comment 77-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

The Los Angeles County Flood Control District (LACFCD) was mandated by the State Legislature to provide flood protection and water conservation within its boundaries.

A reservoir storage design capacity of two design debris events (DDEs) below the dam's lowest spillway was determined to be the standard acceptable level of risk at Devil's Gate Dam and Reservoir. The DDE volume of capacity is determined using the January 2006 Los Angeles County Department of Public Works (LACDPW) Hydrology Manual and the March 2006 LACDPW Sedimentation Manual. For Devil's Gate Dam and Reservoir, the required reservoir capacity is 4.0 million cubic yards (cy) (two DDEs) below the spillway elevation of 1,040.50 feet.

The Hydrology Manual (January 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_Hydrology_Manual/2006%20Hydrology%20Manual-Divided.pdf

The Sedimentation Manual (March 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_sedimentation_manual/Sedimentation%20Manual-Second%20Edition.pdf

Additional information concerning DDE calculation methods has been added to the Final Environmental Impact Report (EIR), Section 2.3, Project Need.

As discussed in the Draft EIR, Section 2.3, LACFCD must remove sediment that has accumulated behind the dam to restore the capacity of Devil's Gate Reservoir to minimize the level of flood risk to downstream communities along the Arroyo Seco. In its current condition, the reservoir no longer has the capacity to safely contain another major debris event. Since the dam was built, several periods have occurred in which a large amount of sediment was deposited in the reservoir in a short time frame. Approximately 1.3 million cubic yards (cy) of sediment came into the reservoir in just two storm seasons after the 2009 Station Fire. If the reservoir is left in its current state, the flood risk to downstream communities would be left at an unacceptable level.

Pursuant to Section 15126.6(a) of the California Environmental Quality Act (CEQA) Guidelines, "[a]n EIR shall describe a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project, and evaluate the comparative merits of the alternatives." However, "[a]n EIR is not required to consider alternatives which are infeasible" (CEQA Guidelines Section 15126.6(a)) or "which could change the fundamental nature of the proposed project."*(Al Larson Boat Shop, Inc. v. Board of Harbor Comm.(1993)* 18 Cal.App.4th 729, 745.) The alternatives discussed in the EIR must be reasonable alternatives, selected to foster informed decision-making and public participation (CEQA Guidelines 15126.6(a)). An EIR need not consider an alternative whose effect cannot reasonably be ascertained or whose implementation is remote and speculative because unrealistic alternatives do not contribute to a useful analysis (CEQA Guidelines 16126.6(f)(3)). Additionally, an alternative may be rejected from detailed analysis in an EIR if it fails to reduce or avoid the project's

significant environmental effects, does not implement the basic project objectives, is not potentially feasible, or is facially unreasonable. 14 C.C.R. §15126.6(c); Id., see also *Mann v. Community Redevelopment Agency (1991)* 233 Cal. App. 3d 1143; *Del Mar Terrace Conservancy, Inc. v. City Council* (1991) 10 Cal. App. 4th 712.

The Draft EIR, Section 4, fully analyzed six alternatives, including the No Project Alternative. These alternatives substantially lessen one or more significant effects of the Proposed Project and, with the exception of the mandatory No Project Alternative, would feasibly attain most of the basic objectives of the Proposed Project. Alternative 3 was determined to be the Environmentally Superior Alternative in the Draft EIR. Alternative 3, Configuration D, Option 2, drastically reduces the project's footprint from 120 acres down to 71 acres. Additionally, the limited maintenance area for Alternative 3 further reduces the permanent habitat impacts down to approximately 51 acres by allowing for site replanting and mitigation to take place within the reservoir footprint. This reduction in project acreages will greatly lessen environmental impacts of the Proposed Project. Other alternatives were not carried forward as they did not minimize impacts in relation to the Proposed Project and/or did not meet Proposed Project objectives.

Air quality and noise impacts associated with truck traffic were analyzed in the Draft EIR in Sections 3.5 and 3.14, respectively. As discussed in the Draft EIR, Section 3.14, with implementation of Mitigation Measure MM N-1, noise impacts would be reduced to a level of less than significant. LACFCD has conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed the United States (U.S.) Environmental Protection Agency's (EPA's) 2007 standards for emissions. Therefore, in order to further reduce emissions, Mitigation Measure MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump trucks that meet or exceed EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality, including those associated with health effects, will be reduced to less than significant.

Potential impacts due to the Proposed Project's truck trips were analyzed in the Draft EIR, Section 3.16, Transportation and Traffic. As listed in that section, a single intersection in the immediate vicinity of the Proposed Project site will have a potentially significant impact. In practice, hauling rates and routes may be adjusted to help reduce impacts, depending on operational need. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the Proposed Project site.

Habitat loss was analyzed in the Draft EIR, Section 3.6, Biological Resources. As discussed in Section 3.6.6 of the Draft EIR, Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats.

Additionally, as noted in the Draft EIR, Section 3.4, Aesthetics and Figures 3.4-1 through 3.4-3, the visual aspects of the Proposed Project site are constantly changing. The Draft EIR does note that the Proposed Project will have significant temporary impacts to aesthetics; however, after the sediment removal phase of the Proposed Project is complete, a habitat restoration plan will be implemented that will allow native plant communities to reestablish outside the reservoir management area. Riparian Herbaceous vegetation is expected to continue to populate and/or reestablish in the management area of the Proposed Project site between maintenance activities. Also as discussed in Draft EIR, Section 4.9.1, under Alternative 6, the No Project Alternative, aesthetic resources of the reservoir will likely degrade due to continuous sediment deposition.

Response to Comment 77-2:

For LACFCD facilities, including major open channels, dams, and debris basins, the "Capital Flood" level of protection applies and has been analyzed for those facilities. The Capital Flood is the runoff produced by a 50-year frequency design storm falling on a burned (for undeveloped area), saturated watershed. A 50-year frequency design storm has a probability of 1 in 50 (2 percent) of being equaled or exceeded in any year. The Capital Flood inflow to Devil's Gate Dam is 13,969 cubic feet per second (cfs). The method for calculating the Capital Flood is described in the County of Los Angeles Department of Public Works Hydrology Manual (January 2006) which is available online at the link listed above.

Response to Comment 77-3:

In 2010, in response to the Station Fire, an emergency project to remove only 1.67 million cy was proposed. The volume of 1.67 million cy is the previously published DDE, and this amount was considered justifiable as an emergency exemption to the CEQA. This emergency project was not completed because, in March 2011, the County of Los Angeles Board of Supervisors motioned LACFCD to complete an EIR for a comprehensive sediment removal project at Devil's Gate. LACFCD then initiated project development in accordance with the required level of protection of two DDEs. At that time, LACFCD also began receiving feedback on the concurrent Sediment Management Strategic Plan (Strategic Plan) and the interest to look at more sustainable sediment and reservoir management. As a result of the feedback and recommendations during the development of the Strategic Plan, LACFCD began evaluating ways to create a more sustainable long-term way to manage its sediment and habitat. To emphasize the goals of the project, the Proposed Project was given the name Devil's Gate Sediment Removal and Management Project.

Historically, large amounts of sediment have been deposited in the reservoir in short time periods. Between 1935 and 1938 over 1.6 million cy of sediment, between 1938 and 1943 over 1.95 million cy of sediment, and between 1959 and 1966 over 1.75 million cy of sediment, and between 2010 and 2012 over 1.3 million cy of sediment was deposited in the reservoir. Over 92 years, the average amount of sediment deposited each year is approximately 130,000 cy; however, Devil's Gate Reservoir is a dynamic system with constantly changing amounts of sediment deposited from year to year, depending on the frequency and intensity of storm events. If a 1 in 50 years storm were to occur, approximately 2.0 million cy (one DDE) of sediment could be expected to wash into the reservoir. Because of the LACFCD's responsibilities to provide flood protection, LACFCD must be ready at all times for a Design Debris Event to occur.

Response to Comment 77-4:

As discussed above, historically, several periods have occurred in which large amounts of sediment were deposited in the reservoir over a short time period. Since the 1920 dam construction and prior to the Station Fire in 2009, approximately 10.7 million cy of sediment accumulated in the reservoir, and approximately 8.0 million cy was removed by LACFCD.

LACFCD proposed a project duration of five years to reduce accumulated sediment in a timely fashion. The goal of LACFCD is to restore reservoir flood capacity as soon as feasible while reducing costs and minimizing the duration of environmental and construction impacts to the surrounding communities. Extending the project would prolong the flood risk to downstream communities and increase the construction impacts to the surrounding communities.

Response to Comment 77-5:

Constructed in 1920, Devil's Gate Dam was the first dam built by the LACFCD. The dam allowed for the channelization of and development along the Arroyo Seco. The Rose Bowl, built in 1922, and the Arroyo Seco Parkway, also known as State Route 110, completed in 1953, are two examples of downstream development made permissible by the construction of Devil's Gate Dam. Given the current, limited capacity of the reservoir, a 50-year storm event that results in a DDE would result in storm flows with sediment flowing over the spillway. Flooding with mud/sediment would occur along the portions of the Arroyo Seco in the Cities of Pasadena, South Pasadena, and Los Angeles, impacting approximately 650 parcels and requiring closure of Interstate 110 from Orange Grove Avenue to Interstate 5. During a single design event sized storm, the Rose Bowl is not expected to be impacted by flows from the dam; however, if sediment from each storm event is not removed from the downstream floodplain, each subsequent storm would increase the flood risk. Additional information about the potential flood areas and analysis is shown in the Arroyo Seco Channel Hydraulic Analysis prepared by Bureau Veritas North America, Inc., available on the Project website.

Please note that protocols are in place to monitor storms, reservoir conditions, and channel conditions and to communicate with emergency responders and Caltrans to execute any necessary evacuations or freeway closures.

Response to Comment 77-6:

See Response to Comments 77-1 through 77-5, above. As discussed in the Draft EIR, Section 2.3, Project Need, LACFCD must remove sediment that has accumulated behind the dam to restore the capacity of Devil's Gate Reservoir to minimize the level of flood risk to downstream communities along the Arroyo Seco. In its current condition, the reservoir no longer has the capacity to safely contain another major debris event; and the outlet works have a risk of becoming clogged and inoperable. Extending the project would prolong the flood risk to downstream communities and increase the construction impacts to the surrounding communities.

As noted in Section 2.2.1, LACFCD History, sediment removal efforts have previously taken place at the reservoir in order to ensure correct functioning of the outlet works and/or to maintain reservoir capacity.

Response to Comment 77-7:

See Response to Comment 77-1, regarding air quality, noise, aesthetic, traffic, and biological resources impacts.

Response to Comment 77-8:

See Response to Comment 77-1, regarding air quality, traffic, noise, and habitat impacts. In addition, as discussed in the Draft EIR, Section 3.5, the Health Risk Assessment (HRA) found the Proposed Project would result in less than significant impacts for both the cancer-related and non-cancer-related impacts.

Per CEQA Guidelines Section 21902 (b)(3), notice shall be given to the last known name and address of all organizations and individuals who have previously requested notice and shall also be given by at least one of the following procedures:

- publication in a newspaper of general circulation in the area affected by the Proposed Project

- posting of notice by the lead agency on and off site in the area where the Proposed Project is to be located
- direct mailing to the over 1,100 owners and occupants of contiguous property shown on the latest equalized assessment roll

The notices for the Proposed Project, the Notice of Preparation (NOP), and the Notice of Availability/Notice of Completion (NOA/NOC) were:

- sent to agencies, organizations, and individuals who have previously requested notices, in addition to other area agencies and organizations
- published in local newspapers, the *San Gabriel Valley Tribune* and the *Pasadena Star News*
- posted on and off site
- mailed to owners and occupants of contiguous property shown on the latest equalized assessment roll
- filed with the County Clerk and the State Clearinghouse
- posted at eight local libraries
- posted on the LACDPW website

Therefore notice for the Proposed Project was adequate, as the notice efforts went beyond the CEQA Guidelines requirements.

Response to Comment 77-9:

See Response to Comment 77-1. As discussed above, the contractor will be required to use only sediment removal dump trucks that meet or exceed EPA's 2007 emission standards. The haul trucks will be subject to the On-Road Heavy-Duty Vehicles (In-Use) Regulations which require diesel trucks that operate in California to be upgraded to reduce emissions. The air quality analysis purposely used the older standards to estimate emissions from on-road trucks to achieve a worst-case scenario. As fleets become cleaner through regulations and attrition, impacts will decrease.

Response to Comment 77-10:

As described in the Draft EIR, Section 2.5.1 Sediment Removal Phase, Proposed Project Schedule, the maximum hours of operation of equipment are as follows: Monday through Friday between the hours of 7:00 a.m. and 6:00 p.m. Standard Time and between 7:00 a.m. and 7:00 p.m. Daylight Savings Time and on Saturday between 8:00 a.m. and 5:00 p.m. The excavating equipment would not run outside these hours.

Response to Comment 77-11:

See Response to Comments 77-1 and 77-9.

Response to Comment 77-12:

The purpose of CEQA is to analyze the impacts that a project contributes to the existing environment, which is adequately addressed in the Draft EIR. As discussed in the Draft EIR, Section 3.5, Air Quality, the air quality analysis takes into account the existing air quality environmental conditions, the location of nearby populations considered sensitive to air pollution, and discusses the consequences to air quality related to implementation of all Proposed Project activities. Also as discussed in Section 3.5, SCAQMD air quality standards were set to protect the health of sensitive individuals (i.e., elderly, children, and the sick). In developing the locally significant thresholds (LST) methodology, SCAQMD used meteorological data from sites throughout the basin to develop area specific LSTs for 37 different Source Receptor Areas (SRAs). Meteorological data included hourly winds, temperature, atmospheric stability, and mixing heights. See Response to Comments 77-1 and 77-9 regarding air quality. See Response to Comment 77-10 regarding project hours. The excavating equipment would not run outside these hours.

Response to Comment 77-13:

During the sediment removal phase, excavators will be loading sediment into trucks for offsite disposal. All of the trucks will be loaded within the reservoir; and if a queue of trucks develops, the trucks will stage within the reservoir itself to lessen impacts on the adjacent streets. Long queuing and idling times will not occur during the Proposed Project. It is estimated that trucks will briefly idle during loading, but the average loading time per truck is estimated to be one minute. In addition, LACFCD typically requires equipment to shut down if idling time is expected to be more than five minutes. Estimated project idling times were included in the air quality analysis and health risk assessment for the Draft EIR, Section 3.5, and Appendices B and C.

While the majority of the sediment disposal and associated truck traffic is expected to go to the disposal sites east of the Proposed Project, the Draft EIR also analyzed the use of disposal sites west of the Proposed Project. This will allow for flexibility in case one particular route is temporarily unusable.

Response to Comment 77-14:

See Response to Comments 77-1, 77-8, and 77-12.

Response to Comment 77-15:

See Response to Comment 77-1.

Response to Comment 77-16:

See Response to Comment 77-1.

Response to Comment 77-17:

See Response to Comments 77-1 and 77-13.

Response to Comment 77-18:

See Response to Comments 77-1 and 77-2.

Response to Comment 77-19:

As detailed in the Draft EIR, Section 3.14 Noise and Vibration, and Appendix I, Noise Impact Analysis, the Proposed Project would be required to comply with all applicable noise and dust ordinances, including the Cities of Pasadena and La Cañada Flintridge Noise Ordinances. The noise standards in the Draft EIR Appendix I, Noise Impact Analysis, are city-specific, not project-specific; however, as detailed above, the Proposed Project would be required to comply with all applicable noise standards. The Draft EIR analyzed the onsite sources of noise separately from the offsite roadway noise since onsite noise sources are controlled by the applicable noise ordinances, while noise from public roadways is exempt from local noise ordinances; however, it may be controlled through land use planning. The offsite roadway noise impacts were analyzed in context of the existing noise environment.

Dust impacts from the Proposed Project were carefully evaluated, as discussed in the Draft EIR, Section 3.5.6, Impacts and Mitigation, AIR QUALITY-2, Sediment Removal. The Proposed Project's activities, including excavation, grading, material loading, and hauling, would result in less than significant dust emissions due to the project's use of best management practices and would be in full compliance with SCAQMD's fugitive dust regulations.

Response to Comment 77-20:

The Draft EIR, Section 3.14.6, Sediment Removal/Reservoir Management, Offsite Vehicular Noise, analyzed the noise impacts from the haul trucks. The analysis found that the maximum noise increase on the roads in the immediate vicinity of the Devil's Gate Dam and Reservoir area would be a 1-decibel (dB) increase on Berkshire Place east of the Interstate 210 (I-210) northbound ramps. A 1-dB increase is well below the 3-dB increase threshold of perception and would therefore not be anticipated to disturb the learning environment. The roadway noise impact analysis provided in the Draft EIR found that the Proposed Project would result in less than significant impacts for all analyzed alternatives.

Response to Comment 77-21:

Due to fine gradation or particle size of the majority of sediment that entered the reservoir since the Station Fire, crushers are not expected to be used with frequency during the project; however, crushers have been included in the air quality analysis in the Draft EIR in the event that they are needed to break down larger sized rocks for transport.

The material has a very fine gradation or consistency and, therefore, is not readily reusable on a commercial scale and will most likely not be sold; however, sediment placed at sediment placement sites would be available for potential reuse for other projects or sediment reuse opportunities. The sediment will be transported to the sites listed in Section 2.0, Project Description in the Draft EIR.

For further information regarding beneficial uses for sediment at the Los Angeles County Flood Control District (LACFCD) sites, please refer to Section 6.5 of LACFCD's 2012 Sediment Management Strategic Plan which can be found at: http://dpw.lacounty.gov/lacfcd/sediment/stplan.aspx.

Response to Comment 77-22:

See Response to Comment 77-3. The Devil's Gate Water Conservation Project is a separate project that is not part of the Proposed Project or alternatives. The Devil's Gate Water Conservation Project is still in a conceptual design phase, and no environmental report is available for public review at this time; however, this project was analyzed in the Draft EIR as a cumulative project.

Response to Comment 77-23:

The Draft EIR contained a cumulative impact analysis within each of the subsections of Section 3.0 Environmental Analysis. The cumulative analysis contains projects as determined by LACFCD and the surrounding cities and communities to have a potential cumulative effect due to overlapping time frames of the projects. Potential projects that were determined to be outside the area of influence, sediment-removal phase of the project schedule, or lacking sufficient project detail, were not considered to be reasonable foreseeable probable future projects, as set forth in the CEQA Guidelines Section 15130.

The JPL Groundwater Cleanup Project is an ongoing project and considered to be part of existing conditions. As discussed in the Draft EIR, Section 3.10, no significant impacts associated with the Proposed Project due to the inclusion of the Hahamongna Watershed Park area on the NPL Superfund List are expected, as the contamination is found in the local groundwater table, not in the sediment.

The temporary use of the Rose Bowl by a National Football League (NFL) team was analyzed as a cumulative project in the Draft EIR, as noted in Section 2.9 Cumulative Scenario, and in the Traffic Study, as noted in Section 4 Project Conditions-Year 2014, Project Trip Growth.

The Interstate 710 (I-710) project was not included in the Draft EIR as a cumulative project, as it was determined to be outside the area of influence. A cumulative growth factor was used in the Traffic Study that accounted for future traffic growth and its cumulative effects. The Devil's Gate Reservoir Sediment Removal and Management Project sediment removal phase is scheduled to be completed by 2020, prior to the initiation of the I-710 tunnel project. At this time the I-710 Extension/Tunnel project is in the preliminary phases, and a project schedule has not been established (Caltrans 2010). The growth factor considered in the analysis provided a conservative project condition volume that accounts for expansion and regional growth.

See Response to Comment 77-22 for the Devil's Gate Water Conservation Project.

Response to Comment 77-24:

The California Regional Water Quality Control Board denied without prejudice a permit for the emergency project, with the understanding that LACFCD would be initiating an EIR process for a project which would restore the required level of protection. As part of Project approval, LACFCD will obtain the necessary permits from the California Regional Water Quality Control Board.

Response to Comment 77-25:

The biological resources of the Proposed Project site are described in Section 3.6 of the Draft EIR. The bird species recorded during surveys conducted specifically for the Proposed Project are presented in the Biological Technical Report (BTR) in Appendix D of the Draft EIR. Based on the results of the BTR, additional protocol-level focused surveys were conducted, including for least Bell's vireo. Table 3.6-3 in the Draft EIR includes the least Bell's vireo as present within the Proposed Project site.

Initially, a smaller amount of sediment removal was proposed as an emergency project. One of the studies in Appendix D – Biological Reports was completed for the emergency project, which was scoped for 1.67 million cy of sediment removal. The information in the biological report completed for the emergency project is still relevant to the Proposed Project, and additional analyses were completed for the Proposed Project and for each alternative as shown in the Draft EIR.

Response to Comment 77-26:

Habitat loss was adequately addressed in the Draft EIR, Section 3.4, Biological Resources to account for the impacts to biological resources caused by the Proposed Project. As discussed in Section 3.6.6 of the Draft EIR, Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats.

Response to Comment 77-27:

The main function of Devil's Gate Dam is to protect downstream areas from flooding. Alternative 3, Configuration D, the Environmentally Superior Alternative, affects the least amount of habitat of all the action alternatives while still achieving Proposed Project objectives (see Section 4.6 of the Final EIR). This alternative would provide a buffer on the west side of the reservoir that would allow for the movement of wildlife. Alternative 3, Configuration D, Option 1 provides a more natural configuration for the reservoir by having two branches to carry water and sediment toward the face of the dam, avoiding disturbing a significant portion of existing vegetation. To further reduce the Proposed Project's footprint, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2, which drastically reduces the project's footprint of 120 acres down to 71 acres, would avoid excavation of the western branch, thereby providing a greater habitat buffer on the west side of the reservoir. In addition, the maintenance areas would be smaller than the original sediment removal footprint, allowing for habitat to reestablish and providing additional areas for wildlife movement.

The Proposed Project is designed to be a long-term plan, with the reservoir management phase providing management for future sediment inflows. After the sediment removal phase has occurred, Flow Assisted Sediment Transport, or FASTing, is proposed to be an integral part of the annual maintenance at Devil's Gate. Annual FASTing operations will be implemented to reduce future buildups of sediment in the reservoir and to reduce the need for mechanical removal of sediment from the reservoir. Although FASTing is expected to be an effective means of keeping sediment levels low in the reservoir, it is estimated that typically 13,000 cy of sediment will be removed by excavation annually. A maintenance regime that relies on FASTing greatly reduces the need for and extends the life of future and existing sediment placement sites and improves the future sustainability of the reservoir. Please see Section 2.5.2 of the Draft EIR for more information on future maintenance.

Response to Comment 77-28:

Any projects at Big Tujunga, Cogswell, Morris, and Pacoima reservoirs would be separate and are not part of the Proposed Project or alternatives. Removal of sediment deposited in the Devil's Gate Reservoir will directly increase flood protection.

As discussed in the Draft EIR, Section 2.4, Project Goals and Objectives, Proposed Project objectives include reducing flood risk and restoring reservoir capacity for flood control and future sediment inflow events. See Response to Comments 77-2 through 77-5 and 77-27.

LACFCD goes to great lengths to lessen project impacts. LACFCD is committed to *Public Service that Works;* and by combining almost 100 years of technical expertise and invaluable input from the community, less invasive flood protection will continue to be a reality.

Response to Comment 77-29:

See Response to Comments 77-1 through 77-5 and 77-27 through 77-28.

Response to Comment 77-30:

LACFCD notes the commenter's objection to the Proposed Project. See Response to Comment 77-27. As discussed in the Draft EIR, Section 2.4, Project Goals and Objectives, Proposed Project objectives include supporting sustainability by establishing a reservoir configuration more suitable for routine maintenance activities including reservoir management.

Response to Comment 77-31:

See Response to Comment 77-3 and 77-4.

Response to Comment 77-32:

Sluicing was analyzed as part of the Draft EIR in the Alternatives Analysis, Section 4.7, Alternative 4 Sluicing Method. This alternative would involve use of construction equipment and the removal of trees and vegetation over the same footprint as the Proposed Project. The sluicing alternative would potentially have additional significant impacts in comparison to the Proposed Project. Many of these impacts would be associated with the likelihood that large amounts of sediment would not be fully transported through the flood control system; this sediment would need to be mechanically removed and trucked out from numerous downstream locations potentially including the two soft-bottom portions of the channel. Please see Section 4.7 and Appendix K of the Draft EIR for further analysis.

FASTing, a passive method of transporting sediment downstream, is currently used when possible and would be used during the Maintenance Phase of the Proposed Project; however, FASTing, even in combination with the Interim Measures Project (IMP), will not efficiently remove large amounts of sediment. As discussed under the No Project Alternative, Section 4.9, use of FASTing and IMP alone will not meet Proposed Project objectives. The removal of accumulated sediment on a yearly basis is the proposed management scheme after the original sediment removal is completed. The regular maintenance of the area will lower the potential need for a large-scale sediment removal operation in the future. Please see Section 2.5.2 of the Draft EIR for more information on future maintenance.

Response to Comment 77-33:

See Response to Comments 77-1 through 77-5 and 77-27.

LACFCD goes to great lengths to lessen project impacts and maximize efficiencies. LACFCD strives to achieve an efficient, low-cost sediment removal project. Sediment removal rates and trucking operations, now utilizing all low-emissions trucks, as explained in Section 3.5 of the Draft EIR, have been carefully planned for economies of scale to realize maximum efficiencies without major delays in project schedule, thus greatly reducing operating costs. Furthermore, LACFCD has applied for and received an approximately $28 million grant through the State's Disaster Preparedness and Flood Protection Bond

Act of 2006 (Proposition 1E) program. A portion of this grant will be used to help offset the Proposed Project's costs.

The estimated cost for the Proposed Project and for Alternatives 1, 2, 3, and 5 would range from $80 million for the Proposed Project to $65 million for Alternative 3. As stated above, a portion of the cost will be funded by a State grant. The remaining cost will be funded by LACFCD . Due to the variety of factors, including the indeterminate locations of the sediment fallout and requirements for removing sediment from these locations, the cost for Alternative 4 cannot be calculated.

As discussed previously, the limited maintenance area for Alternative 3 further reduces habitat impacts by allowing for site replanting and mitigation to take place within the reservoir footprint.

The sediment removed from the Devil's Gate Reservoir will be transported to the existing placement sites listed in Section 2.0, Project Description in the Draft EIR, not to other debris basins.

Response to Comment 77-34:

See Response to Comments 77-1 through 77-33.

December 31, 2013

To: The Los Angeles County, Department of Public Works, Flood Control District

Re: Devil's Gate Reservoir Sediment Removal and Management Project, Draft Environmental Impact Report

Comment 78-1

This serves to provide my comments on the Devil's Gate Reservoir Sediment Removal and Management Project, Draft Environmental Impact Report and the Project of sediment removal itself. I am Field Biologist by training with over 45 years' experience in Los Angeles County and Southern California and have performed environmental assessments and floral and faunal surveys inside Los Angeles County Flood Control Basins over the years. I have read through much of the Draft EIR and am familiar with all of the alternatives proposed. I do not support any of the alternatives as I believe the entire project is too large and attempts to remove too much sediment in an antiquated manor.

Comment 78-2

All the alternatives permanently remove most of the ecologically valuable Willow Woodlands and understory in the basin. The proposed project is entirely within a Los Angeles County Significant Ecological Area (proposed "Altadena Foothills SEA") which was analyzed and added to this system by the County Department of Regional Planning. This clearly indicates the Hahamongna basin is of high, County-wide ecological importance and should not be disturbed by a massive cleanout project that fails to address the natural resource values.

Specific comments on the Draft EIR.

Comment 78-3

1. Despite requests during the scoping process, from a number of conservation organizations, the proposed project fails to consider maintaining a permanent lake at the south end of the basin, with design during sediment removal aimed at creating a more natural, contoured and uneven-edged body of water that benefits wildlife while providing flood protection. This lake could be designed with one or more islands of vegetation and peninsulas jutting out to provide more edge for vegetation and wildlife. As proposed, all the alternatives call for creating a very deep (approximately 50 ft. deep), steep-sided pit in the wake of sediment removal, and such a pit is both hazardous to hikers and much less effective as functioning wildlife habitat.

Comment 78-4

2. BIO-7 in the Mitigation Measures, and elsewhere, suggests to "replace all trees 1:1 by acreage." Virtually all projects in Southern California that disturb riparian habitat are required by Resource Agencies to apply a 3:1 to 5:1 replacement ratio to ensure effective mitigation for the significant losses. The project proponents must work with the State and Federal Fish & Wildlife agencies to mitigate any loss in the most effective way. The lack of a detailed mitigation plan, including where on-site and off-site mitigation will be conducted, makes it virtually impossible to evaluate the projects impacts.

Comment 78-5

3. The Biologists preparing the DEIR appear to have failed to utilize additional information on wildlife known to be using the project site, specifically Endangered and Sensitive bird species, in spite of this being provided to Los Angeles County Flood Control District staff. I am aware of documented and mapped locations for sightings of Least Bell's Vireo, Yellow Warblers and other breeding birds found in the project area in the last two years, performed by the Pasadena Audubon Society. These additional sightings and locations add constraints to the project and this information should be added to the evaluation of impacts which appear less significant than they are based on the DEIR.

Comment 78-6

4. Page 104 of DEIR: The section on Wildlife – Amphibians and Reptiles contains significant errors in naming species said to have been observed in the project area. Examples include listing two types of toad, "California Toad (*Anaxyrus boreas halophilus*)" and Western Toad (*Bufo boreas*) when in fact these are the same toad, and the only one known from the project site. The former is the current accepted name for the subspecies of our common local toad and the latter is an older name for the species minus a subspecific name. The same problem is carried through for two kinds of Side-blotched Lizard and two kinds of whiptail lizard. The "Great Basin Gopher Snake" is the wrong subspecies for our Gopher Snake in coastal Los Angeles County, which is the San Diego Gopher Snake. Most troubling is this suggests that rather than a clerical error, the preparers were unfamiliar with the local species of reptiles and amphibians and more, it suggests a lack of understanding of species and subspecies concepts. This is very important since many listed (Rare and Endangered) taxa are listed and protected at the subspecies level. The preparers failed to cite some important, specific references for this study, such as Allan Schoenherr's Herpetofauna of the San Gabriel Mountains, and the up-to-date Field Guide to Amphibians and Reptiles of California, 2012, Stebbins and McGinnis.

The report also states elsewhere that the Coast Patch-nosed Snake (*Salvadora hexalepis virgultea*), a Federal and California Species of Concern, was found in the project area during surveys, yet its listed status is not noted. This is a very uncommon snake on the coastal side of the San Gabriel Mountains.

Comment 78-7

5. Recreational Impacts: My form of recreation and relaxation is to regularly walk the Hahamongna basin throughout the trail system both around and through the Willow Woodlands. I record birds, herps and plants seen and I photograph them for teaching presentations and

Comment 78-7 continued

personal enjoyment. The report states repeatedly that "Recreational Impacts were found to be less than significant." The massive magnitude of 5 years of sediment removal truck noise and traffic, and closure of trails coupled with the annual followup clearing of future sediment, constitutes a "significant impact to my recreation", and to the hundreds of others who hike, jog, walk dogs, ride horses, and study birds in the basin.

Comment 78-8

Overall, in spite of problems with the Draft EIR, it is the project that is flawed rather than the DEIR. I ask that a new alternative be prepared that reduces and naturalizes the sediment removal process to meet both the needs for sediment removal and protection of wildlife habitat in the Devil's Gate basin. This includes a greatly reduced sediment removal, an extended timetable rather than the 5 years of continuous removal, creation of a wildlife lake, and a much greater emphasis on sluicing (FASTing) as the most natural way of allowing sediment to flow, as it has for thousands of years.

Sincerely,

Michael C. Long
Los Angeles County Natural Areas Administrator (Retired)
6128 No. Reno Ave.
Temple City, California 91780

Cc: Sup. Michael D. Antonovich
City of Pasadena
Scott Harris, California Department of Fish & Wildlife
Christine Medak, U.S. Fish & Wildlife Service

Response to Comment Letter #78 (Michael Long – Retired Los Angeles County Natural Areas Administrator)

Response to Comment 78-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. Los Angeles County Flood Control District (LACFCD) notes the commenter's objections to the Proposed Project and alternatives.

Response to Comment 78-2:

The Proposed Project is not located in a currently adopted Significant Ecological Area (SEA). The Los Angeles County Department of Regional Planning is currently in the process of updating the SEA Program. The Proposed Project is located within the Proposed Altadena Foothills and Arroyos SEA. Regional Planning's SEA updates including the Proposed SEAs have not been adopted, nor are they covered under the current Hillside Management Area and SEA Ordinance.

The SEA Program is a component of the Los Angeles County Conservation/Open Space Element. This program is a resource identification tool that indicates the existence of important biological resources. SEAs are not preserves; rather, they are areas where the County deems it important to facilitate a balance between limited development and resource conservation. Limited development activities are reviewed closely in these areas where site design is a key element in conserving fragile resources such as streams, oak woodlands, and threatened or endangered species and their habitat.

The Proposed Project does not involve developing the Proposed Project site. The Proposed Project involves returning the reservoir to a capacity to provide proper flood protection for downstream areas.

Response to Comment 78-3:

While holding water behind the dam permanently is outside the scope of this project, Alternative 3, would provide a more natural configuration for the reservoir and a greater habitat buffer on the west side of the reservoir, allowing for habitat to reestablish and providing additional areas for wildlife movement. In addition, Alternative 3 will restore the bottom elevation of Devil's Gate Reservoir to its design elevation of 986 feet, which coincides with the sill elevation of the lowest valve on Devil's Gate Dam, the sluice gate. The final elevations of the reservoir after the sediment removal phase is completed will not exceed historic elevations. Additionally, all side slopes will be excavated at a 3:1 ratio or 3 feet horizontally for every 1 foot rise in elevation. The slope produced by this side cut is relatively shallow.

Response to Comment 78-4:

The Proposed Project's Mitigation Measures are enforceable and designed to reduce impacts through methods known to be feasible and effective. The Proposed Project's Mitigation Measures are accepted by agencies that would be involved in consultation, negotiation, and final approval of Mitigation Measures, including conceptual restoration plans. As with any project that involves California Department of Fish and Wildlife (CDFW), United States Army Corps of Engineers (USACE), and Regional Water Quality Control Board (RWQCB) jurisdictional areas, the ultimate mitigation for impacts related to the wetlands and drainages under the jurisdiction of the resource agencies is negotiated with the resource agencies during the regulatory permitting process. LACFCD has been and will continue to work

closely with CDFW and USACE to identify appropriate mitigation, replacement ratios, and sites for restoration and enhancement that will offset impacts and satisfy the requirements of all applicable laws.

A detailed restoration plan will be prepared and provided to CDFW and USACE for review and approval prior to project implementation. Prior to commencement of the Proposed Project, LACFCD will have obtained all necessary permits for impacts to CDFW, USACE, and RWQCB jurisdictional areas including Section 401 Certification, Section 404 permit, and a Streambed Alteration Agreement. Clean Water Act Section 404 (b)(1) guidelines will be followed as a framework for compensatory mitigation. Through 404(b)(1) negotiations with USACE and negotiations with CDFW under Fish and Game Code Sections 1600-1616, a determination of the functions and values of impacted jurisdictional waters shall result in the coordination of appropriate Mitigation Measures for sediment removal.

Response to Comment 78-5:

Many local organizations, including the Pasadena Audubon Society, Hahamongna Watershed Park Advisory Committee, the Urbanwild Network, and the Arroyo Seco Foundation, were contacted about the Proposed Project prior to the Draft EIR being prepared. In January 2012, a representative of the Pasadena Audubon Society was contacted for information the Society has concerning birds observed in the Proposed Project area. The information provided was used in preparing the biological resources section of the Draft EIR. Species with the potential to occur within the Proposed Project and species that were identified during surveys are presented in the biological survey reports in Appendix D of the Draft EIR. Factors used to determine the potential for occurrence included the quality of habitat, elevation, and the results of the reconnaissance survey. The locations of prior database records and species lists of occurrence were used as additional data; but since these are positive-sighting databases, this data was used only in support of the analysis from the previously identified factors. Based on the results of the Biological Technical Report (BTR), additional protocol-level focused surveys were conducted for Proposed Project as described in Section 3.6.2, Special Status Plant Species and Special Status Animal Species of the Draft EIR.

As shown in Table 3.6-3 in the Draft EIR, both least Bell's vireo and yellow warbler are listed as present within the Proposed Project site. Additional sightings will not affect their status as present, which was accounted for in the Draft EIR within the Proposed Project site, and do not add any additional constraints to those mentioned in the analysis in the Draft EIR. The current Mitigation Measures MM BIO-1, MM BIO-2, MM BIO-3, MM BIO-4, and MM BIO-5 account for these species being present and will serve to protect and avoid impacts to these species and other breeding birds, and will reduce impacts to less than significant.

Response to Comment 78-6:

Species names used in the Draft EIR were consistent with the Hahamongna Watershed Park Master Plan (HWPMP) for Hahamongna Watershed Park by request of the City of Pasadena to maintain consistency with the HWPMP. Species names have been updated, and duplications of species have been eliminated (see Section 3.6 of the Final EIR). Status listings for sensitive species have been updated, as appropriate.

Response to Comment 78-7:

Impacts to recreation were analyzed in the Draft EIR, Section 3.15. The Proposed Project will not limit the use of the Oak Grove area of Hahamongna Watershed Park. Sediment removal activities would be temporary and are expected to occur only in the drier months (April to December, excluding holidays). It

is expected that these activities will often not be adjacent to the Oak Grove area of Hahamongna Watershed Park. The Proposed Project would result in temporary limitations on the recreational use of the Proposed Project site and some of the adjacent trails. Most of these areas would be reopened seasonally or intermittently throughout the sediment removal process. In addition, temporary impacts to designated recreational facilities and trails will be minimized through advance communication and redirection to the nearest facility in the vicinity of the Proposed Project. Furthermore, an east-west trail crossing will continue to provide access at the north end of the reservoir. At the south end of the reservoir, after the reservoir ingress and egress ramps have been fully constructed, access to the upper east side Arroyo Seco Trail from La Cañada Verdugo Road will be maintained; and the linkage from the west side Arroyo Seco Trail and the Flint Wash Trail to the upper east side Arroyo Seco Trail (crossing Devil's Gate Dam and also continuing south to the Rose Bowl) will be available after construction activities have ended each day and on nonworking days.

Response to Comment 78-8:

See Response to Comments 78-2 and 78-3. LACFCD proposed a project duration of five years to reduce accumulated sediment in a timely fashion. The goal of LACFCD is to restore reservoir flood capacity as soon as feasible while reducing costs and minimizing the duration of environmental and construction impacts to the surrounding communities. Extending the project would prolong the flood risk to downstream communities and increase the construction impacts to the surrounding communities.

Sluicing was analyzed as part of the Draft EIR in the Alternatives Analysis, Section 4.7, Alternative 4 Sluicing Method. This alternative would involve use of construction equipment and the removal of trees and vegetation over the same footprint as the Proposed Project. The sluicing alternative would potentially have additional significant impacts in comparison to the Proposed Project. Many of these impacts would be associated with the likelihood that large amounts of sediment would not be fully transported through the flood control system; this sediment would need to be mechanically removed and trucked out from numerous downstream locations potentially including the two soft-bottom portions of the channel. Please see Section 4.7 and Appendix K of the Draft EIR for further analysis.

Flow Assisted Sediment Transport (FASTing), a passive method of transporting sediment downstream, is currently used when possible and would be used during the Maintenance Phase of the Proposed Project; however, FASTing, even in combination with the Interim Measures Project (IMP), will not efficiently remove large amounts of sediment. As discussed under the No Project Alternative, Section 4.9, use of FASTing and IMP alone will not meet Proposed Project objectives. The removal of accumulated sediment on a yearly basis is the proposed management scheme after the original sediment removal is completed. The regular maintenance of the area will lower the potential need for a large-scale sediment removal operation in the future. Please see Section 2.5.2 of the Draft EIR for more information on future maintenance.

MICHAEL E. OLSON

2319 Henrietta Avenue
La Crescenta, California, 91214
Phone: (818) 248-1532
Fax: (818) 248-2666
Email: mtnelect@earthlink.net
Account Number: 891743874

1/3/2014

Los Angeles County
Department of Public Works
Attention: Water Resources Division
Reservoir Cleanouts
Post Office Box 1460
Alhambra, California, 91802-9974

ATTENTION: Water Resources Division

This letter is in response to the Comment Period , Wednesday, October 23, 2013 to Monday, January 6, 2014.

I would like to add a new level of concern, "Public Safety" to the Environmental Impact Report.

Comment 79-1

As a child living on Viro Road, adjacent to Devils Gate Dam between January 1, 1945 to January 1, 1950, I often rode by bike to the dam. It was a wonderful place to play with my friends. Unfortunately for one, it was a dangerous place. The silt was so fine it was called "Quicksand". I do not have the official record, but one child did die from it.

This dam should be posted and patrolled to protect the public against the inherent life threatening hazards of silt. And other dams, that are also adjacent to public access should also be watched. Removing "Silt" is not only important for dam operation, but public safety is also important.

Sincerely,

Michael E. Olson

Response to Comment Letter #79 (Michael Olson)

Response to Comment 79-1:

Thank you for your input. This comment has been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. During the Proposed Project activities, and as noted in the Draft EIR, Section 3.8.6, excavation, grading, and sediment placement activities will adhere to guidelines, permits, and regulations and also follow best management practices to insure stability of soil within the Proposed Project site. Additionally, the active work area will not be accessible to the public to insure safety.

Currently, quicksand-like conditions are not present within the reservoir, but anywhere that loose soil and sediment is mixed with water, a hazardous situation has the potential to arise. While all recreational uses of the area are under the purview of the City of Pasadena, Los Angeles County Flood Control District (LACFCD) encourages recreational users to utilize designated trails when within the vicinity of the dam and reservoir.

From: Nina Koumachian Ehlig
To: reservoircleanouts
Subject: Devils Gate
Date: Thursday, January 02, 2014 10:42:34 AM

DWP,

Comment 80-1

We here in our small community of West Altadena do not support this project.
We here in our small neighborhood watch association, "S.E.N.C.H." do not support this project.
The decimation and disrespect for the environment and sacred hallowed ground of the Tongva Tribe is deplorable.

Thanking You in advance,
Nina E. Koumachian Ehlig
Member & President of SENCH Neighborhood Watch Association
626~840~7733

Response to Comment Letter #80 (Nina Ehlig – SENCH Neighborhood Watch Association)

Response to Comment 80-1:

Thank you for your input. This comment has been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. Los Angeles County Flood Control District (LACFCD) notes the commenter's objections to the Proposed Project, including the objections of the SENCH Neighborhood Watch Association.

As noted in the Draft Environmental Impact Report (EIR), Section 3.7 Cultural Resources, the Tongva were identified as an important ethnographic group in the region. The Native American Heritage Commission (NAHC) was contacted, and a search of the Sacred Lands Inventory found that no Sacred Lands or other cultural resources in the vicinity of Devil's Gate Reservoir were documented. In addition, as discussed in Section 3.7.6 of the Draft EIR, Mitigation Measures MM CUL-1, MM CUL-2, and MM CUL-3 are provided in case sediment removal and reservoir management activities exceed the depth of historic flood deposits and encounter native soils or in the event human remains are discovered. In general, most of the sediment to be removed from the Proposed Project site consists of recently accumulated sediment; and, therefore, no significant impacts to cultural resources are expected.

From: Polly Wheaton
To: reservoircleanouts
Subject: Devil"s Gate Resevoir Sediment Removal
Date: Thursday, January 02, 2014 9:01:32 AM

Comment 81-1 The Board of Directors of Pasadena Beautiful Foundation, having attended many meetings and listened to your proposals,

has the following concerns regarding the proposed sediment removal from Devil's Gate Reservoir:

Comment 81-2 1. The removal of all vegetation from the Hahamongna Water Shed.

Comment 81-3 2.The impact on the wildlife and their habitat in this area.

Comment 81-4 3.Air quality during soil removal in an area of many schools.

Comment 81-5 4. The traffic impact on the 210 freeway during this 5 year period.

Comment 81-6 We encourage you to drastically slow down the sediment removal so as not to cause harm, disruption and disturbance

to the city of Pasadena, surrounding areas and their residents.

Comment 81-7 At the same time, we would strongly urge that the trees, shrubs and all vegetation

remain undisturbed for future generations of people and wildlife.

Respectfully submitted,

Polly Wheaton
President of Pasadena Beautiful Foundation

Response to Comment Letter #81 (Polly Wheaton – Pasadena Beautiful Foundation)

Response to Comment 81-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

Response to Comment 81-2:

As discussed in the Draft Environmental Impact Report (EIR), removal of vegetation will occur only within the Proposed Project boundary and will not include the whole Hahamongna Watershed Park or the full reservoir easement boundary. As discussed in Section 3.6.6 of the Draft EIR, Mitigation Measures MM BIO-6, MM BIO-7, and MM BIO-8 provide mitigation to restore and enhance riparian and sensitive habitats.

The Draft EIR concluded that Alternative 3, Configuration D is the Environmentally Superior Alternative. Alternative 3 affects the least amount of habitat of all the action alternatives while still achieving Proposed Project objectives. This alternative would provide a buffer on the west side of the reservoir that would allow for the movement of wildlife. Alternative 3, Configuration D, Option 1 provides a more natural configuration for the reservoir by having two branches to carry water and sediment toward the face of the dam, avoiding disturbing a significant portion of existing vegetation. To further reduce the Proposed Project's footprint, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2, which drastically reduces the project's footprint of 120 acres down to 71 acres, would avoid excavation of the western branch, thereby providing a greater habitat buffer on the west side of the reservoir. In addition, the maintenance areas would be smaller than the original sediment removal footprint, allowing for habitat to reestablish and providing additional areas for wildlife movement.

Response to Comment 81-3:

See Response to Comment 81-2. As discussed in Section 3.6.6 of the Draft EIR, Mitigation Measures MM BIO-1, MM BIO-2, MM BIO-3, MM BIO-4, and MM BIO-5 provide mitigation to protect and avoid impacts to sensitive species. Wildlife species currently found in the Proposed Project area would be expected to either remain in the undisturbed areas of reservoir outside the Proposed Project area or to reestablish once sediment removal activities have been completed. With implementation of the mitigation measures described in Section 3.6.6 of the Draft EIR, impacts to biological resources would be reduced to less than significant.

Response to Comment 81-4:

Air quality impacts associated with truck traffic were analyzed in the Draft EIR in Section 3.5. Los Angeles County Flood Control District (LACFCD) has conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed the United States (U.S.) Environmental Protection Agency's (EPA's) 2007 standards for emissions. Therefore, in order to further reduce emissions, Mitigation Measure MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump trucks that meet or exceed EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality will be reduced to less than significant.

Response to Comment 81-5:

Although the sediment removal phase of the Proposed Project will occur over a five-year period, the removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays), as described in the Draft EIR, Section 2.5.1, Sediment Removal Phase, Project Schedule.

As discussed in the Draft EIR, Section 3.16, Transportation and Traffic, truck traffic associated with the Proposed Project will not cause any major traffic impacts at the studied freeway segments, along any of the Haul Routes.

Response to Comment 81-6:

LACFCD proposed a project duration of five years to reduce accumulated sediment in a timely fashion. The goal of LACFCD is to restore reservoir flood capacity as soon as feasible while reducing costs, minimizing the duration of environmental and construction impacts to the surrounding communities, and configuring the reservoir to allow for sustainable future maintenance. Extending the project would prolong the flood risk to downstream communities and increase the construction impacts to the surrounding communities.

Response to Comment 81-7:

In order to remove the necessary amount of sediment from the reservoir, some vegetation must be removed, as the vegetation sits atop many layers of accumulated sediment. LACFCD goes to great lengths to balance flood control needs and reductions in impacts to habitat. See Response to Comment 81-2.

From: Stephanie Strout
To: reservoircleanouts
Cc: Bill Bogaard, Mayor; Vice Mayor Jacque Robinson
Subject: Devil"s Gate DEIR Comments
Date: Thursday, January 02, 2014 12:04:38 PM

Comment 82-1

I have read the Draft EIR and attended a community meeting on this project, and I am against the alternatives presented and preferred. My husband and I live on North Arroyo Blvd, and the 210 runs about a block away from our backyard. Here are my comments:

Comment 82-2

Alternative to the Alternatives

Why won't the idea of using sluicing to downstream channels work as an alternative? This would accomplish the objective without the destruction nor the high costs, plus allow sediment to flow out to the ocean where it can replace beach erosion there. Sluicing is the easy, natural, and lower impact way to deal with the problem. The process is quiet, can occur 24/7, does not impact traffic, and does not impact air quality. Alternatives such as conveyor belts, sluicing, launching, and other techniques should be considered. Look at options regarding fewer trucks.

Comment 82-3

Pollution and Noise

Why aren't the vehicles that will be used to transport removed sediment mandated to be low-polluting? Especially considering the number of hours they will be spewing pollution at us. Use a conveyor belt to get the sediment to the trucks lined up on the dam or on Berkshire Drive. Avoid Windsor and residential areas, avoid JPL rush hour traffic, use natural gas powered vehicles, and make sure truck beds are covered. Have DPW announce use of low-emission vehicles now to allow time to find a company that has these trucks, or to give them time to order new trucks. In order to lessen truck impacts, an unpaved access road on the southern end of the park should be used. If sediment must be removed from the north portion of the basin, then a conveyor belt should be used to transport sediment to the southern portion.

Comment 82-4

Habitat

Why must so much of the habitat be removed and destroyed? The cultural and biologic entities impacted are too great not to find a way to reduce it. Remove only the amount of sediment needed to maintain downstream safety. Preserve as much of the surrounding woodland environment as possible. Sediment is not a waste product, it is necessary for habitat, river and beach nourishment, fills valleys and coastal plains and could be used for construction purposes.

Comment 82-5

Human Mitigation

How will we nearby residents be mitigated for the air pollution/negative health effects inflicted on us by all these trucks going by? At minimum, reduce the amount of sediment to be removed each year, and extend the length of time for removal to a decade or two. In

Comment 82-5 continued

addition to that, what else can be done to protect us? Are there going to be more or higher freeway noise walls built? How are we going to be mitigated for this mismanagement of sediment, as we suffer the effects not only of the traffic, noise, and disruption, but more importantly, the negative effects to our health from all the dust and the noxious particulates and fumes from a 5-year, 6-day-a-week, 12-hour-a-day, project schedule?

Comment 82-6

I'll look forward to your responses to address these comments.

Sincerely,

Stephanie Strout
1870 N. Arroyo Blvd.
Pasadena, CA 91103
626-298-6556

Response to Comment Letter #82 (Stephanie Strout)

Response to Comment 82-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. Los Angeles County Flood Control District (LACFCD) notes the commenter's objections to the Proposed Project and alternatives.

Response to Comment 82-2:

Sluicing was analyzed as part of the Draft Environmental Impact Report (EIR) in the Alternatives Analysis, Section 4.7, Alternative 4 Sluicing Method. This alternative would involve use of construction equipment and the removal of trees and vegetation over the same footprint as the Proposed Project. The sluicing alternative would potentially have additional significant impacts in comparison to the Proposed Project, including impacts to traffic and air quality. Many of these impacts would be associated with the likelihood that large amounts of sediment would not be fully transported through the flood control system; this sediment would need to be mechanically removed and trucked out from numerous downstream locations potentially including the two soft-bottom portions of the channel. Please see Section 4.7 and Appendix K of the Draft EIR for further analysis.

Other alternatives were considered in Section 4.0 Alternatives Analysis within the Draft EIR. Alternatives such as the conveyor belt alternative, slurry pipeline alternative, and dam removal alternative were not carried forward for further analysis, as they would either fail to meet Proposed Project objectives or would not avoid or substantially lessen impacts.

Response to Comment 82-3:

Air quality impacts associated with truck traffic were analyzed in the Draft EIR in Section 3.5. LACFCD has conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed the United States (U.S.) Environmental Protection Agency's (EPA's) 2007 standards for emissions. Therefore, in order to further reduce emissions, Mitigation Measure MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump trucks that meet or exceed EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality, including those associated with health effects, will be reduced to less than significant.

As noted in Response to Comment 82-2, the conveyor belt alternative was not carried forward for further analysis as it would not avoid or substantially lessen impacts.

As described in the Draft EIR, the proposed and alternative haul routes would briefly access Windsor between the Interstate 210 (I-210) on- and off-ramps and Oak Grove Drive. As noted in the Draft EIR, Section 2.5 Proposed Project Description trucks will utilize two access roads (one existing and one upgraded) at the southern portion of the reservoir. Only a small portion of the access roads entering and exiting the reservoir will be paved. Both the proposed and alternative haul routes use main thoroughfares and do not travel into residential areas. The Proposed Project's activities, including excavation, grading, material loading, and hauling, would result in less than significant dust emissions due to the Proposed Project's use of best management practices and would be in full compliance with South Coast Air Quality Management District's (SCAQMD's) fugitive dust regulations. SCAQMD Rule 403

implementation will require all haul trucks to have tarps or other suitable enclosures and all loads should have at least 6 inches of freeboard space.

Potential impacts due to the Proposed Project's truck trips were analyzed in the Draft EIR, Section 3.16, Transportation and Traffic. As listed in that section, a single intersection in the immediate vicinity of the Proposed Project site will have a potentially significant impact. Additionally, the Draft EIR outlines a 12-hour trucking schedule, with trucking operations on Saturdays as well. This schedule is used to model the most intensive construction operation, which may not be applicable at the site for the duration of the Proposed Project. Typical trucking schedules are estimated to be 8 hours per day on weekdays. In practice, hauling rates and routes may be adjusted to help reduce impacts, depending on operational need. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the Proposed Project site.

Response to Comment 82-4:

In order to remove the necessary amount of sediment from the reservoir, some vegetation must be removed, as the vegetation sits atop many layers of accumulated sediment. LACFCD goes to great lengths to balance flood control needs and reductions in impacts to habitat. For example, the Draft EIR concluded that Alternative 3, Configuration D is the Environmentally Superior Alternative. Alternative 3 affects the least amount of habitat of all the action alternatives while still achieving Proposed Project objectives (see Section 4.6 of the Final EIR). This alternative would provide a buffer on the west side of the reservoir that would allow for the movement of wildlife. Alternative 3, Configuration D, Option 1 provides a more natural configuration for the reservoir by having two branches to carry water and sediment toward the face of the dam, avoiding disturbing a significant portion of existing vegetation. To further reduce the Proposed Project's footprint, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2, which drastically reduces the project's footprint of 120 acres down to 71 acres, would avoid excavation of the western branch, thereby providing a greater habitat buffer on the west side of the reservoir. In addition, the maintenance areas would be smaller than the original sediment removal footprint, allowing for habitat to reestablish and providing additional areas for wildlife movement.

As noted in the Draft EIR, Section 3.7 Cultural Resources, Mitigation Measures MM CUL-1, MM CUL-2, and MM CUL-3 are provided to avoid significant impacts to cultural resources.

After the sediment removal phase has occurred, Flow Assisted Sediment Transport, or FASTing, is proposed to be an integral part of the annual maintenance at Devil's Gate. Annual FASTing operations will be implemented to reduce future buildups of sediment in the reservoir and to reduce the need for mechanical removal of sediment from the reservoir. Although FASTing is expected to be an effective means of keeping sediment levels low in the reservoir, it is estimated that approximately 13,000 cubic yards (cy) of sediment will be removed by excavation annually. A maintenance regime that relies on FASTing greatly reduces the need for and extends the life of future and existing sediment placement sites and improves the future sustainability of the reservoir. Please see Section2.5.2 of the Draft EIR for more information on future maintenance.

The sediment that came into Devil's Gate Reservoir following the Station Fire has a very fine gradation or consistency. As such, the majority of this material is not readily reusable on a commercial scale and will most likely not be sold; however, sediment placed at sediment placement sites would be available

for potential reuse for other projects or sediment reuse opportunities. The sediment removed from the reservoir will be transported to the sites listed in Section 2.0, Project Description in the Draft EIR.

For further information regarding beneficial uses for sediment at the Los Angeles County Flood Control District (LACFCD) sites, please refer to Section 6.5 of LACFCD's 2012 Sediment Management Strategic Plan which can be found at: http://dpw.lacounty.gov/lacfcd/sediment/stplan.aspx.

Response to Comment 82-5:

See Response to Comment 82-3.

Also, as discussed in the Draft EIR, Section 3.5, the Health Risk Assessment (HRA) found the Proposed Project would result in less than significant impacts for both the cancer-related and non-cancer-related impacts.

As discussed in the Draft EIR, Section 3.14, with implementation of Mitigation Measure MM N-1, noise impacts would be reduced to a level of less than significant. In addition, the Draft EIR, Section 3.14.6, Sediment Removal/Reservoir Management, Offsite Vehicular Noise, analyzed the noise impacts from the haul trucks. The analysis found that the Proposed Project noise impacts to I-210 are too low to quantify and would be well below the thresholds of perceptibility.

LACFCD proposed a project duration of five years to reduce accumulated sediment in a timely fashion. The goal of LACFCD is to restore reservoir flood capacity as soon as feasible while reducing costs, minimizing the duration of environmental and construction impacts to the surrounding communities, and configuring the reservoir to allow for sustainable future maintenance. Extending the project would prolong the flood risk to downstream communities and increase the construction impacts to the surrounding communities.

Response to Comment 82-6:

Responses to all comments received on the Draft EIR will be incorporated into the Final EIR.

From: Trent Sanders
To: reservoircleanouts
Subject: Devils Gate Dam comment
Date: Thursday, January 02, 2014 7:29:21 AM

Comment 83-1

My comment is about a conversation with my 93 year old neighbor who has lived in La Canada for 65 years and who told me about how he watched a wall of water nearly 5 feet high going over the top of the dam in 1969.

If the debris basin behind the dam isn't cleaned out you can kiss the Brookside Golf Course and the structures downstream good-by in the next big flood.

Trent Sanders
La Canada

This email is free from viruses and malware because avast! Antivirus protection is active.

Response to Comment Letter #83 (Trent Sanders)

Response to Comment 83-1:

Thank you for your input. This comment has been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. Los Angeles County Flood Control District (LACFCD) is undertaking this project to protect downstream areas from flooding. LACFCD notes the commenter's acknowledgement of this potential threat.

From: Alex Fore
To: reservoircleanouts
Subject: Devil's Gate Reservoir Sediment Removal and Management Project
Date: Saturday, January 04, 2014 5:06:41 AM

As someone who lives, works, and plays within or very close to the Arroyo Seco I will be heavily impacted by the sediment removal programs. I live at 3124 Ridgeview Dr, Altadena, 91001, work at JPL, and I am an avid disc golfer.

Comment 84-1

I have looked at all the plans for the sediment removal project sponsored by the county, and all the plans will have an impact on our Disc Golf Course. Alternative 3 is the best plan, but the western branch will remove 2 of our playable positions. Please re-visit the sediment removal plans and make an alternative plan that will not impact the disc golf course.

Comment 84-2

Beyond this impact, the plans are gargantuan in scale. I think a more measured approach needs to be taken, that will remove the sediment more slowly and with less impact to the park and communities surrounding it. Why does it have to be all or nothing?

-Alex Fore

Response to Comment Letter #84 (Alex Fore)

Response to Comment 84-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. No official disc golf course holes located in the Oak Grove area of Hahamongna Watershed Park will be removed by the Proposed Project. As noted in the Draft Environmental Impact Report (EIR), Section 3.15, Los Angeles County Flood Control District (LACFCD) recognizes the importance of the area to those who take advantage of the recreational opportunities offered, including the Oak Grove Disc Golf Course. Where possible, Los Angeles County Flood Control District (LACFCD) will avoid any disc golf course holes located outside the Oak Grove area of Hahamongna Watershed Park. When avoidance is not possible, LACFCD will coordinate with the Oak Grove Disc Golf Club for removal of the disc golf hole equipment.

Alternative 3, Configuration D, the Environmentally Superior Alternative from the Draft Environmental Impact Report (EIR), carefully balances flood control needs and reductions in impacts to habitat by restoring the required reservoir capacity while also minimizing the project footprint (see Section 4.6 of the Final EIR). Furthermore, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2 would avoid excavation of the western branch, thereby providing a greater distance between the Oak Grove area of Hahamongna Watershed Park and the excavation area, reducing the project footprint from 120 acres down to 71 acres. Alternative 3, Configuration D, Option 2 would also avoid all currently existing Oak Grove Disc Golf Club holes. Additionally, the limited maintenance area for Alternative 3 further reduces the permanent habitat impacts down to approximately 51 acres by allowing for site replanting and mitigation to take place within the reservoir footprint. The Oak Grove area of Hahamongna Watershed Park and the associated facilities will remain open during sediment removal and will continue to provide active recreational facilities to the area.

Response to Comment 84-2:

LACFCD proposed a project duration of five years to reduce accumulated sediment in a timely fashion. The goal of LACFCD is to restore reservoir flood capacity as soon as feasible while reducing costs, minimizing the duration of environmental and construction impacts to the surrounding communities, and configuring the reservoir to allow for sustainable future maintenance. Extending the project would prolong the flood risk to downstream communities and increase the construction impacts to the surrounding communities.

LACFCD goes to great lengths to lessen project impacts and maximize efficiencies. As described above, Alternative 3 drastically reduces the footprint of the Proposed Project and limits the maintenance area. This reduction in project acreages will greatly lessen environmental impacts of the Proposed Project. Sediment removal rates and trucking operations, now utilizing all low-emissions trucks, as explained in Section 3.5 of the Draft EIR, have been carefully planned for economies of scale to realize maximum efficiencies without major delays in project schedule, thus greatly reducing operating costs.

LACFCD is committed to *Public Service that Works*; and by combining almost 100 years of technical expertise and invaluable input from the community, less invasive flood protection will continue to be a reality.

From: Andy Carrico
To: reservoircleanouts
Subject: Comments on Devil"s Gate Dam DEIR
Date: Friday, January 03, 2014 8:24:28 AM

Comment 85-1 I live on North Arroyo Blvd. and will therefore be significantly impacted by the project to remove the sediment at Devil's Gate dam. I have reviewed the DIER and have the following 6 questions:

Comment 85-2 1. Regardless of the chosen alternative, has consideration been given to lengthening the project? For example, make the project 20 years rather than 5 years? This would reduce the number of truck trips daily, reducing dirt, noise and diesel pollution.

Comment 85-3 2. At this time there is a proposed expansion of the 710 freeway between Alhambra and Pasadena. This could involve boring a 4+ mile tunnel, necessitating removal of massive amounts of debris, using the same 210 freeway between Pasadena and Irwindale to dispose of the debris. What consideration was given to this potential overlap in truck traffic, and the associated polution?

Comment 85-4 3. Air Quality mitigation seems to focus on pollution generated by trucks and earth moving equipment. What about dust blowing from trucks as they move down the freeway and on the ingress and egress roads?

Comment 85-5 4. The DEIR identifies traffic impacts at specific intersections. Currently the I-210 eastbound traffic is extremely slow from 2:30 p.m. to 7:00 p.m. between the Hill St. exit and the Ca-57 intersection Monday through Friday. This seems to be unidentified in the DEIR. How will the project remain on schedule (50 trucks hourly) given the certain lengthening of truck travel times during the hours of 2:30 p.m. to 7:00 p.m. daily?

Comment 85-6 5. Alternative 3, Configuration D appears to be a clearly better alternative. Why is that not the selected alternative?

Comment 85-7 6. Section 3.5.6 has the statement “the actual vehicles/equipment used may not reach the levels required to reduce the NOX emissions to a level of less than significant for the sediment removal phase.” Does that mean vehicles that fail to meet the Tier 4 Interim Equipment standards could be used to remove sediment?

Comment 85-8 I look forward to your responses to these questions.

Andy Carrico
1870 N. Arroyo Blvd.
Pasadena, CA 91103
626-298-6556

Response to Comment Letter #85 (Andy Carrico)

Response to Comment 85-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

Response to Comment 85-2:

Los Angeles County Flood Control District (LACFCD) proposed a project duration of five years to reduce accumulated sediment in a timely fashion. The goal of LACFCD is to restore reservoir flood capacity as soon as feasible while reducing costs, minimizing the duration of environmental and construction impacts to the surrounding communities, and configuring the reservoir to allow for sustainable future maintenance. Extending the project would prolong the flood risk to downstream communities and increase the construction impacts to the surrounding communities.

Response to Comment 85-3:

The Interstate 710 (I-710) project was not included in the Draft Environmental Impact Report (EIR) as a cumulative project, as it was determined to be outside the area of influence. A cumulative growth factor was used in the Traffic Study that accounted for future traffic growth and its cumulative effects. The Devil's Gate Reservoir Sediment Removal and Management Project sediment removal phase is scheduled to be completed by 2020, prior to the initiation of the I-710 tunnel project. At this time the I-710 Extension/Tunnel project is in the preliminary phases, and a project schedule has not been established (Caltrans 2010). The growth factor considered in the analysis provided a conservative project condition volume that accounts for expansion and regional growth.

Response to Comment 85-4:

Dust impacts from the Proposed Project were carefully evaluated, as discussed in the Draft EIR, Section 3.5.6, Impacts and Mitigation, AIR QUALITY-2, Sediment Removal. The Proposed Project's activities, including excavation, grading, material loading, and hauling, would result in less than significant dust emissions due to the Project's use of best management practices and would be in full compliance with South Coast Air Quality Management District's (SCAQMD's) fugitive dust regulations.

Response to Comment 85-5:

As discussed in the Draft EIR, Section 3.16, Transportation and Traffic, truck traffic associated with the Proposed Project will not cause any major traffic impacts at the studied freeway segments along any of the Haul Routes. While the majority of the sediment disposal and associated truck traffic is expected to go to the disposal sites east of the Proposed Project, the Draft EIR also analyzed the use of disposal sites west of the Proposed Project. This will allow for flexibility in case one particular route is temporarily unusable.

Response to Comment 85-6:

LACFCD recognizes Alternative 3 as the Environmentally Superior Alternative. Alternative 3, Configuration D affects the least amount of habitat of all the action alternatives while still achieving Proposed Project objectives (see Section 4.6 of the Final EIR). This alternative would provide a buffer on

the west side of the reservoir that would allow for the movement of wildlife. Alternative 3, Configuration D, Option 1 provides a more natural configuration for the reservoir by having two branches to carry water and sediment toward the face of the dam, avoiding disturbing a significant portion of existing vegetation. To further reduce the Proposed Project's footprint, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2, which drastically reduces the project's footprint of 120 acres down to 71 acres, would avoid excavation of the western branch, thereby providing a greater habitat buffer on the west side of the reservoir. In addition, the maintenance areas would be smaller than the original sediment removal footprint, allowing for habitat to reestablish and providing additional areas for wildlife movement.

The information in the Final EIR will be provided to the County of Los Angeles Board of Supervisors for their consideration in selecting a project alternative.

Response to Comment 85-7:

Air quality impacts associated with truck traffic were analyzed in the Draft EIR in Section 3.5. LACFCD has conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed the United States (U.S.) Environmental Protection Agency's (EPA's) 2007 standards for emissions. Therefore, in order to further reduce emissions, Mitigation Measure MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump trucks that meet or exceed EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2 (involving use of EPA's emission standards for Tier 3 equipment), impacts to air quality will be reduced to less than significant.

Response to Comment 85-8:

Responses to all comments received on the Draft EIR will be incorporated into the Final EIR.

From: Bill Burnett
To: reservoircleanouts
Subject: Don"t Wipe Out Devil"s Gate!
Date: Friday, January 03, 2014 11:06:03 AM

Comment 86-1

The proposed sediment removal at Hahamongna's Devil's Gate Dam is too far reaching and will be too damaging to an environment that is home to much wildlife and many humans cherish.
I believe there are less invasive measures to achieve similar goals. Please explore them and adopt a better policy.
Sincerely

Bill Burnett
2375 Catherine Rd.
Altadena, CA 91001
818-489-7882

Response to Comment Letter #86 (Bill Burnett)

Response to Comment 86-1:

Thank you for your input. This comment has been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

As discussed in Section 3.6.6 of the Draft Environmental Impact Report (EIR), Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats. In addition, sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays).

The goal of Los Angeles County Flood Control District (LACFCD) is to restore reservoir flood capacity as soon as feasible while reducing costs, minimizing the duration of environmental and construction impacts to the surrounding communities, and configuring the reservoir to allow for sustainable future maintenance. LACFCD goes to great lengths to lessen project impacts and maximize efficiencies. For example, the Draft EIR concluded that Alternative 3 is the Environmentally Superior Alternative. Alternative 3, Configuration D, Option 2, drastically reduces the project's footprint from 120 acres down to 71 acres. Additionally, the limited maintenance area for Alternative 3 further reduces the permanent habitat impacts down to approximately 51 acres by allowing for site replanting and mitigation to take place within the reservoir footprint. This reduction in project acreages will greatly lessen environmental impacts of the Proposed Project.

From:	Brenton Miller
To:	reservoircleanouts
Subject:	Devil"s Gate Reservoir Sediment Removal and Management Project
Date:	Friday, January 03, 2014 3:44:52 PM

Hi,

Comment 87-1

My name is Brenton. I live in Montrose California.
I've looked up all the plans for the sediment removal project sponsored by the county, and all the plans will have an impact our disc golf course alternative 3 is the best plan, but the western branch will remove two playable positions. Please re-visit the sediment removal plans and make an alternative plan that will not impact the disc golf course.
Thank you.

Sent with AquaMail for Android
http://www.aqua-mail.com

Response to Comment Letter #87 (Brenton Miller)

Response to Comment 87-1:

Thank you for your input. This comment has been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. No official disc golf course holes located in the Oak Grove area of Hahamongna Watershed Park will be removed by the Proposed Project. As noted in the Draft Environmental Impact Report (EIR), Section 3.15, Los Angeles County Flood Control District (LACFCD) recognizes the importance of the area to those who take advantage of the recreational opportunities offered, including the Oak Grove Disc Golf Course. Where possible, Los Angeles County Flood Control District (LACFCD) will avoid any disc golf course holes located outside the Oak Grove area of Hahamongna Watershed Park. When avoidance is not possible, LACFCD will coordinate with the Oak Grove Disc Golf Club for removal of the disc golf hole equipment.

Alternative 3, Configuration D, the Environmentally Superior Alternative from the Draft Environmental Impact Report (EIR), carefully balances flood control needs and reductions in impacts to habitat by restoring the required reservoir capacity while also minimizing the project footprint (see Section 4.6 of the Final EIR). Furthermore, the LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2 would avoid excavation of the western branch, thereby providing a greater distance between the Oak Grove area of Hahamongna Watershed Park and the excavation area, reducing the project footprint from 120 acres down to 71 acres. Alternative 3, Configuration D, Option 2 would also avoid all currently existing Oak Grove Disc Golf Club holes. The Oak Grove area of Hahamongna Watershed Park and the associated facilities will remain open during sediment removal and will continue to provide active recreational facilities to the area.

From: Brett Godown
To: reservoircleanouts
Subject: Devil"s Gate Reservoir Sediment Removal and Management Project Comments
Date: Thursday, January 02, 2014 9:58:04 PM

Devil's Gate Reservoir Sediment Removal and Management Project

Comment 88-1

I support the need to accomplish sediment removal in the Devil's Gate Reservoir but I request coordination be made with the Oak Grove Disc Golf Club following the public comment period. The Club can provide beneficial recommendations in a manner that is not detrimental to the overall course use, aesthetics, and layout. The Oak Grove Disc Golf Course is a historic landmark because it was the first Disc Golf Course ever constructed. Thousands of disc golfers like myself travel to the course and induce tax dollars to the local area while visiting the course. Disc golfers are one of the current prominent uses in the park. The course, the users, and the disc golf club deserves to be involved following the comment period. If due to the sediment removal, provided this is consistent with the club's recommendation, if holes are removed, alternatives holes should be provided. Options should be provided to install holes in the general vicinity or other locations in the park.

Sincerely,

Brett Godown
Salinas, Ca 93901

Response to Comment Letter #88 (Brett Godown)

Response to Comment 88-1:

Thank you for your input. This comment has been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. As noted in the Draft Environmental Impact Report (EIR), Section 3.15, Los Angeles County Flood Control District (LACFCD) recognizes the importance of the area to those who take advantage of the recreational opportunities offered, including the Oak Grove Disc Golf Course. No official disc golf course holes located in the Oak Grove area of Hahamongna Watershed Park will be removed by the Proposed Project. As noted in the Draft Environmental Impact Report (EIR), Section 3.15, Los Angeles County Flood Control District (LACFCD) recognizes the importance of the area to those who take advantage of the recreational opportunities offered, including the Oak Grove Disc Golf Course. Where possible, LACFCD will avoid any disc golf course holes located outside the Oak Grove area of Hahamongna Watershed Park. When avoidance is not possible, LACFCD will coordinate with the Oak Grove Disc Golf Club for removal of the disc golf hole equipment.

Alternative 3, Configuration D, the Environmentally Superior Alternative from the Draft EIR, carefully balances flood control needs and reductions in impacts to habitat by restoring the required reservoir capacity while also minimizing the project footprint (see Section 4.6 of the Final EIR). Furthermore, the LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2 would avoid excavation of the western branch, thereby providing a greater distance between the Oak Grove area of Hahamongna Watershed Park and the excavation area, reducing the project footprint from 120 acres down to 71 acres. Alternative 3, Configuration D, Option 2 would also avoid all currently existing Oak Grove Disc Golf Club holes. The Oak Grove area of Hahamongna Watershed Park and the associated facilities will remain open during sediment removal and will continue to provide active recreational facilities to the area.

From: Brian Kernan
To: reservoircleanouts
Subject: Devils Gate Reservoir Sediment Removal and Management Project
Date: Friday, January 03, 2014 6:30:15 PM

>
> Hi,
> My name is Brian Kernan. I live at 1815 N. Avon St. Burbank, CA 91505
> I have looked at all of the sediment removal plans sponsored by the county, and all the plans will have an impact on our Disc Golf Course. Alternative 3 is the best plan, but the western branch will remove two of our playable positions. Please re-visit the sediment removal plans and make an alternative plan that doesn't impact the Disc Golf Course.

Comment 89-1

> The Oak Grove Disc Golf Course is unique because it's the first of its kind. The course was established in 1975. When the sport was originated by a JPL employee named Edward Headrick. He made Oak Grove it's birthplace. He also started the PDGA which as of today has more than 62,000 plus members. These members all know that Oak Grove Disc Golf Course is the birth of this fast growing sport. Many of whom make yearly adventures to Pasadena to visit this Great Disc Golf Course. Please take another look at plans for this sediment project to avoid disturbing a Historical place.

Comment 89-2

>
> Thank you,
> Brian Kernan PDGA# 62052
>
>

Response to Comment Letter #89 (Brian Kernan)

Response to Comment 89-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. No official disc golf course holes located in the Oak Grove area of Hahamongna Watershed Park will be removed by the Proposed Project. As noted in the Draft Environmental Impact Report (EIR), Section 3.15, Los Angeles County Flood Control District (LACFCD) recognizes the importance of the area to those who take advantage of the recreational opportunities offered, including the Oak Grove Disc Golf Course. Where possible, Los Angeles County Flood Control District (LACFCD) will avoid any disc golf course holes located outside the Oak Grove area of Hahamongna Watershed Park. When avoidance is not possible, LACFCD will coordinate with the Oak Grove Disc Golf Club for removal of the disc golf hole equipment.

Alternative 3, Configuration D, the Environmentally Superior Alternative from the Draft Environmental Impact Report (EIR), carefully balances flood control needs and reductions in impacts to habitat by restoring the required reservoir capacity while also minimizing the project footprint (see Section 4.6 of the Final EIR). Furthermore, the LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2 would avoid excavation of the western branch, thereby providing a greater distance between the Oak Grove area of Hahamongna Watershed Park and the excavation area, reducing the project footprint from 120 acres down to 71 acres. Alternative 3, Configuration D, Option 2 would also avoid all currently existing Oak Grove Disc Golf Club holes. The Oak Grove area of Hahamongna Watershed Park and the associated facilities will remain open during sediment removal and will continue to provide active recreational facilities to the area.

Response to Comment 89-2:

See Response to Comment 89-1.

As discussed in the Draft EIR, Section 3.15, Recreation/Public Services, the Oak Grove Disc Golf Club is among the many groups that regularly use the Oak Grove area of Hahamongna Watershed Park. The Oak Grove area of Hahamongna Watershed Park and the associated facilities, including Oak Grove Disk Golf Course, will remain open during sediment removal and will continue to provide active recreational facilities to the area.

SAN
GABRIEL
MOUNTAINS
CHAPTER OF THE CALIFORNIA NATIVE PLANT SOCIETY
1750 North Altadena Drive
Pasadena, CA 91107-1046

December 31, 2013

To: Gail Farber, Director
Los Angeles County Department of Public Works, Flood Control District
Re: Devil's Gate Reservoir Sediment Removal and Management Project,
Draft Environmental Impact Report

Dear Ms. Farber,

Comment 90-1

The California Native Plant Society, San Gabriel Mountains Chapter, is an organization of 275 members in the greater San Gabriel Valley and a Chapter of the Statewide California Native Plant Society. We are very concerned about the size and impacts of the proposed sediment removal project at Devil's Gate basin, better known as Hahamongna Watershed Park. We have reviewed the Draft EIR and are opposed to each of the alternatives proposed as they all would permanently remove most of the current Willow woodlands in the basin.

Comment 90-2

Based on the project description presented in the EIR the project would take five years and would require 425 trucks per day, 50 trucks per HOUR, driving through local neighborhoods and on the 210 freeway. The trucks would operate for nine months or more per year, six days a week. Between 50-120 acres of Riparian Willow-Mulefat habitat would be permanently destroyed.

Comment 90-3

The unique community of Alluvial Fan Sage Scrub, which has developed in the upper north end of the basin, is a State-recognized sensitive community, and must be protected and allowed to *expand* into the newly-deposited sediment. Contrary to statements in the DEIR this community is not buried under sediment which has "permanently inhibited its ability for succession", but thrives on sediment, as its name suggests. Alluvium, whether in place for decades or in shifting deposits, is the only substrate on which various forms of this community grow. Why was this community not avoided in project alternatives in the DEIR?

Comment 90-4

Due to the large amount of sediment proposed for removal, there will be very limited on-site space for mitigation planting, and much of the mitigation will take place off-site. This leaves a large net loss of these communities in the Hahamongna Watershed Park. Where will mitigation for all project impacts occur?

Comment 90-5

The habitat mitigation for the loss of native vegetation and wildlife communities proposed in the EIR is preliminary and incomplete, to be determined in consultation with the Resource Agencies, but what is revealed is unacceptable. Riparian woodlands are communities of highest priority to Resource Agencies and losses are routinely required to be replaced at a ratio of between 2:1 and 5:1; NOT "up to 1:1" as proposed in the DEIR. Typically offsite mitigation for riparian resources is preserved at a 5:1 ratio or greater. Onsite mitigation for *temporary* loss of riparian resources may be less. What complete level of mitigation is proposed?

Comment 90-6

We propose a rethinking of the scope of the sediment removal to greatly reduce the amount removed annually, and to retain of most of the Willow Woodlands as an integral component of the basin and future management plans. We see no justification in the EIR for the project to remove 2 to 4.1 million cubic yards of sediment in such a short timeframe. Any incremental reduction in sediment, and allowing newly transferred sediment to flow as it comes into the basin, will make the dam that much safer. Using sluicing (or "FASTing": Flow-Assisted Sediment Transport) to the maximum extent, whenever water flows are available, would reduce; all impacts to the habitat, truck traffic, air quality and pollution, noise, aesthetics, and costs. The wet sediment would not cause particulates, including ash and dust in the sediment, to become airborne and threaten health and safety throughout the area. This technique, used by the County in a very limited way currently, mimics the natural system of the watershed and transports sediment downstream of the dam where it is needed. This can be done in a way to utilize adaptive management as we monitor the sediment deposition downstream and allow it to provided sand bars and edge habitat in a more natural way.

Comment 90-7

We believe that the alternatives presented in the current EIR do not meet the requirements of CEQA for alternatives that meet the "Rule of Reason," in this case the alternatives analyzed do not differ substantially enough to really be considered alternatives. They do not contain an alternative that has a substantially reduced environmental effect as required. The CEQA Guidelines state that "an EIR must describe a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project." We would like to see a revised EIR that contains revised project alternatives that meet these criteria and incorporate those features described above, or contains mitigation measures that incorporate those features. What new alternatives will be offered to meet these required criteria?

Comment 90-8

Finally, we witnessed the destruction of 12 acres of old-growth Oak and Sycamore woodlands in Arcadia by the County Flood Control Division, to provide a sediment dumping ground. This action later proved to be unnecessary and the unused site is now a barren wasteland. As a result, we have little confidence in the statements and proposals by Los Angeles County Flood Control.

Thank you for the opportunity to provide comments on this project and Draft EIR. Our organization urges a greatly-reduced project of sediment removal that utilizes a methodology approach much more attuned to watershed ecology to be truly sustainable in the long term.

Sincerely,

Orchid Black, President

Cc: Sup. Michael D. Antonovich
City of Pasadena
City of La Canada
Scott Harris, California Department of Fish & Wildlife
Christine Medak, U.S. Fish & Wildlife Service

Response to Comment Letter #90 (San Gabriel Mountains Chapter of California Native Plant Society)

Response to Comment 90-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. Los Angeles County Flood Control District (LACFCD) notes the commenter's disapproval with the Proposed Project, especially the removal of willow woodland.

The Draft Environmental Impact Report (EIR) identifies the impacts associated with the removal of riparian habitat. The Draft EIR also identifies habitat restoration Mitigation Measures which will reduce these impacts to less than significant. As discussed in Section 3.6.6 of the Draft EIR, Mitigation Measures MM BIO-6, MM BIO-7, and MM BIO-8 provide mitigation to restore and enhance riparian and sensitive habitats. In addition, sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays).

Los Angeles County Flood Control District (LACFCD) goes to great lengths to lessen project impacts and maximize efficiencies. For example, the Draft EIR concluded that Alternative 3 is the Environmentally Superior Alternative. Alternative 3, Configuration D, Option 2 drastically reduces the project's footprint of 120 acres down to 71 acres. Additionally, the limited maintenance area for Alternative 3 further reduces the permanent habitat impacts down to approximately 51 acres by allowing for site replanting and mitigation to take place within the reservoir footprint. This reduction in project acreages will greatly lessen environmental impacts of the Proposed Project.

Response to Comment 90-2:

See Response to Comment 90-1. Potential impacts due to the Proposed Project's truck trips were analyzed in the Draft EIR, Section 3.16, Transportation and Traffic. As listed in that section, a single intersection in the immediate vicinity of the Proposed Project site will have a potentially significant impact. The Draft EIR outlines a 12-hour trucking schedule, with trucking operations on Saturdays as well. This schedule is used to model the most intensive construction operation, which may not be applicable at the site for the duration of the Proposed Project. Typical trucking schedules are estimated to be 8 hours per day on weekdays. In practice, hauling rates and routes may be adjusted to help reduce impacts depending on operational need. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the Proposed Project site.

Response to Comment 90-3:

Expansion or spreading of sediment does not occur in a relative horizontal direction. With the dam and basin structure, the accumulation of sediment occurs in a more vertical manner, and as much as 20 feet of sediment buildup has occurred in one rainy season, burying existing vegetation.

As noted in the Draft EIR, Biological Resources section, the habitat value is impacted by the presence of sediment in the reservoir. The sedimentation that has occurred as a result of the 2009 Station Fire, and is expected to continue to occur, has buried existing vegetation, reducing the size of vegetation communities and inhibiting their ability for succession; however, it is possible that the community will continue to survive, therefore, the Final EIR, Section 3.6.2, has been revised, removing the phrase "permanently" from the community's description.

As discussed in the Draft EIR, Section 3.6.6, Mitigation Measure MM BIO-6 has been provided to reduce impacts to Riversidean Alluvial Fan Sage Scrub to a level of less than significant. As described in Section 4.0, reduced impacts to Riversidean Alluvial Fan Sage Scrub community was achieved under Alternatives 1, 2, and 3.

Response to Comment 90-4:

Mitigation locations will comply with the California Department of Fish and Wildlife (CDFW) recommendations as follows: first, onsite; second, offsite within the Arroyo Seco Watershed; and third, offsite within the greater Los Angeles River watershed. If offsite mitigation sites are needed, several offsite areas within the Arroyo Seco/Los Angeles River watershed are being considered for restoration. As mentioned above, Alternative 3 will allow for the largest area of site replanting and mitigation to take place within the reservoir easement.

Response to Comment 90-5:

Table ES-1 of the Draft EIR lists all Mitigation Measures proposed for the Proposed Project. These Mitigation Measures are enforceable and designed to reduce impacts through methods known to be feasible and effective. The Proposed Project's Mitigation Measures are accepted by agencies that would be involved in consultation, negotiation, and final approval of Mitigation Measures, including conceptual restoration plans. As with any project that involves CDFW, United States Army Corps of Engineers (USACE), and Regional Water Quality Control Board (RWQCB) jurisdictional areas, the ultimate mitigation for impacts related to the wetlands and drainages under the jurisdiction of the resource agencies is negotiated with the resource agencies during the regulatory permitting process. LACFCD has been and will continue to work closely with CDFW and USACE to identify appropriate mitigation, replacement ratios, and sites for restoration and enhancement that will offset impacts and satisfy the requirements of all applicable laws. A detailed restoration plan will be prepared and provided to CDFW and USACE for review and approval prior to project implementation. Prior to commencement of the Proposed Project, LACFCD will have obtained all necessary permits for impacts to CDFW, USACE, and RWQCB jurisdictional areas including Section 401 Certification, Section 404 permit, and a Streambed Alteration Agreement. Clean Water Act Section 404 (b)(1) guidelines will be followed as a framework for compensatory mitigation. Through 404(b)(1) negotiations with USACE and negotiations with CDFW under Fish and Game Code Sections 1600-1616, a determination of the functions and values of impacted jurisdictional waters shall result in the coordination of appropriate Mitigation Measures for sediment removal.

Response to Comment 90-6:

LACFCD proposed a project duration of five years to reduce accumulated sediment in a timely fashion. The goal of LACFCD is to restore reservoir flood capacity as soon as feasible while reducing costs, minimizing the duration of environmental and construction impacts to the surrounding communities, and configuring the reservoir to allow for sustainable future maintenance. Extending the project would prolong the flood risk to downstream communities and increase the construction impacts to the surrounding communities.

LACFCD was mandated by the State Legislature to provide flood protection and water conservation within its boundaries.

A reservoir storage design capacity of two design debris events (DDEs) below the dam's lowest spillway was determined to be the standard acceptable level of risk at Devil's Gate Dam and Reservoir. The DDE volume of capacity is determined using the January 2006 Los Angeles County Department of Public Works (LACDPW) Hydrology Manual and the March 2006 LACDPW Sedimentation Manual. For Devil's Gate Dam and Reservoir, the required reservoir capacity is 4.0 million cubic yards (cy) (two DDEs) below the spillway elevation of 1,040.50 feet.

The Hydrology Manual (January 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_Hydrology_Manual/2006%20Hydrology%20Manual-Divided.pdf

The Sedimentation Manual (March 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_sedimentation_manual/Sedimentation%20Manual-Second%20Edition.pdf

Additional information concerning DDE calculation methods has been added to the Final Environmental Impact Report (EIR), Section 2.3, Project Need.

Sluicing was analyzed as part of the Draft EIR in the Alternatives Analysis, Section 4.7, Alternative 4 Sluicing Method. The sluicing alternative would potentially have additional significant impacts in comparison to the Proposed Project, including those associated with habitat, truck traffic, air quality, noise, aesthetics, and costs. Many of these impacts would be associated with the likelihood that large amounts of sediment would not be fully transported through the flood control system to the ocean; this sediment would need to be mechanically removed and trucked out from numerous downstream locations potentially including the two soft-bottom portions of the channel. This alternative would also involve use of construction equipment and the removal of trees and vegetation over the same footprint as the Proposed Project. Please see Section 4.7 and Appendix K of the Draft EIR for further analysis.

Flow Assisted Sediment Transport, or FASTing, operations have been routinely used at Devil's Gate Reservoir and result in relatively small amounts of finer grained sediment passing through the reservoir. After the sediment removal phase has occurred, FASTing is proposed to be an integral part of the annual maintenance at Devil's Gate. Annual FASTing operations will be implemented to reduce future buildups of sediment in the reservoir and to reduce the need for mechanical removal of sediment from the reservoir. Although FASTing is expected to be an effective means of keeping sediment levels low in the reservoir, it is estimated that approximately 13,000 cubic yards (cy) of sediment will be removed by excavation annually. A maintenance regime that relies on FASTing greatly reduces the need for and extends the life of future and existing sediment placement sites and improves the future sustainability of the reservoir. Please see Section 2.5.2 of the Draft EIR for more information on future maintenance.

Dust, including ash, impacts from the Proposed Project were carefully evaluated, as discussed in the Draft EIR, Section 3.5.6, Impacts and Mitigation, AIR QUALITY-2, Sediment Removal. The Proposed Project's activities, including excavation, grading, material loading, and hauling, would result in less than significant dust emissions due to the project's use of best management practices and would be in full compliance with South Coast Air Quality Management District's (SCAQMD's) fugitive dust regulations.

Response to Comment 90-7:

Pursuant to Section 15126.6(a) of the California Environmental Quality Act (CEQA) Guidelines, "[a]n EIR shall describe a range of reasonable alternatives to the project, or to the location of the project, which

would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project, and evaluate the comparative merits of the alternatives." However, "[a]n EIR is not required to consider alternatives which are infeasible" (CEQA Guidelines Section 15126.6(a)) or "which could change the fundamental nature of the proposed project." (*Al Larson Boat Shop, Inc*. v. *Board of Harbor Comm*.(1993) 18 Cal.App.4th 729, 745.) The alternatives discussed in the EIR must be reasonable alternatives, selected to foster informed decision-making and public participation (CEQA Guidelines 15126.6(a)). An EIR need not consider an alternative whose effect cannot reasonably be ascertained or whose implementation is remote and speculative because unrealistic alternatives do not contribute to a useful analysis (CEQA Guidelines 16126.6(f)(3)). Additionally, an alternative may be rejected from detailed analysis in an EIR if it fails to reduce or avoid the project's significant environmental effects, does not implement the basic project objectives, is not potentially feasible, or is facially unreasonable. 14 C.C.R. §15126.6(c); Id., see also *Mann v. Community Redevelopment Agency* (1991) 233 Cal. App. 3d 1143; *Del Mar Terrace Conservancy, Inc. v. City Council* (1991) 10 Cal. App. 4th 712.

The Draft EIR, Section 4, fully analyzed six alternatives including the No Project Alternative. These alternatives substantially lessen one or more significant effects of the Proposed Project and, with the exception of the mandatory No Project Alternative, would feasibly attain most of the basic objectives of the Proposed Project. These alternatives include options for different amounts of removal, different methods of removal, and a different haul route. As discussed in Section 4.10 of the Draft EIR, other alternatives were not carried forward as they did not minimize impacts in relation to the Proposed Project and/or did not meet Proposed Project objectives.

Therefore, the Draft EIR did meet the CEQA criteria for analysis of alternatives.

Response to Comment 90-8:

Comment noted.

From: Caraly Higuchi
To: reservoircleanouts
Subject: sediment removal has to be done
Date: Saturday, January 04, 2014 4:57:50 PM

Comment 91-1

We want to be heard and on record as in flavor of the county removing sediment from the Devil's Gate Dam so that the dam can function as it was designed to.

It is very important that the Rose Bowl Stadium and the homes downstream not be destroyed by flooding water.

It would be a terrible waste of resources in the Brookside Recreation Area --- Kidspace, Aquatic Center, the handicap playground, tennis courts, Jackie Robinson Field, etc--- if floodwater destroyed all the city has developed recently.

We are **for** the removal of the 2.7 million cubic yards of soil that has built up around the dam since 1994 and the additional 1 million cubic yards of debris that came down off the foothills after the 2009 Station Fire.

We believe that "the reservoir no longer has the capacity to safely contain another major debris event. The outlet works have a risk of becoming clogged and inoperable," as the EIR states.

Caraly and Dave Higuchi
860 Seco Street
Pasadena CA 91103

higuchi860@gmail.com

Response to Comment Letter #91 (Caraly Higuchi)

Response to Comment 91-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. Los Angeles County Flood Control District (LACFCD) notes that the commenter is in favor of removing sediment from the reservoir so that the dam can function as it was designed.

From: Catherine Kelly
To: reservoircleanouts
Subject: Devil"s Gate reservoir sediment removal and management project
Date: Monday, January 06, 2014 1:22:10 PM

Comment 92-1

my name is Catherine Kelly I live at 2935 Santa Carlotta Street La Crescenta California 91214.
I have looked at all the plans for the settlement removal project sponsored by the county and all the plans we have an impact on a disc golff course. alternative 3 is the best plan but the Western Branch will remove 2 of our playable positions. please revisit the sediment removal plans on making alternative plans that will not impact the disc golf course.
Thank you
Catherine Kelly

Sent from Yahoo Mail on Android

Response to Comment Letter #92 (Catherine Kelly)

Response to Comment 92-1:

Thank you for your input. This comment has been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. No official disc golf course holes located in the Oak Grove area of Hahamongna Watershed Park will be removed by the Proposed Project. As noted in the Draft Environmental Impact Report (EIR), Section 3.15, Los Angeles County Flood Control District (LACFCD) recognizes the importance of the area to those who take advantage of the recreational opportunities offered, including the Oak Grove Disc Golf Course. Where possible, Los Angeles County Flood Control District (LACFCD) will avoid any disc golf course holes located outside the Oak Grove area of Hahamongna Watershed Park. When avoidance is not possible, LACFCD will coordinate with the Oak Grove Disc Golf Club for removal of the disc golf hole equipment.

Alternative 3, Configuration D, the Environmentally Superior Alternative from the Draft Environmental Impact Report (EIR), carefully balances flood control needs and reductions in impacts to habitat by restoring the required reservoir capacity while also minimizing the project footprint (see Section 4.6 of the Final EIR). Furthermore, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2 would avoid excavation of the western branch, providing a greater distance between the Oak Grove area of Hahamongna Watershed Park and the excavation area, reducing the project footprint of 120 acres down to 71 acres. Alternative 3, Configuration D, Option 2 would also avoid all currently existing Oak Grove Disc Golf Club holes. The Oak Grove area of Hahamongna Watershed Park and the associated facilities will remain open during sediment removal and will continue to provide active recreational facilities to the area.

From: Bill Sauro
To: reservoircleanouts
Subject: "Devil"s Gate Reservoir Sediment Removal and Management Project"
Date: Monday, January 06, 2014 3:01:02 PM

To Whom It May Concern,

Comment 93-1

My name is Charmain Sauro and I have been a resident in La Canada for over 30 years. I am very concerned about this proposed project that may begin in the Hahamongna Park area. My concerns are that I have horses boarding at the Flintridge Riding Club. This private club has been around for over 90 years and is partially what make our area so grand for me and my family. This project would not be good at all for the club members as well as the health of our horses. Horses have very sensitive respiratory systems and I am afraid of all the dust and pollution that would be stirred up if this project was approved. The area is beautiful at its current state. My family enjoys riding and using all the trails throughout the wash. I ride my horses, walk our dogs, and ride bikes in that area. Without the use for all the people, it would be a shame to say the least. I am concerned for my nieces and nephew that attend the high school right across the way and their affects to the pollution. My daughter will also be attending there during this project. The amount of trucks and traffic in the area would be atrocious! I really just don't see the point in this project. After the fires and rain there was no flooding. There was debris and such from the fire, but it has been cleaned out and fine. There seems to be no point is such a huge dig out project. At its current state seems more safe where rain water can just soak into the ground. It seems to be just a waste of money. The last thing we need is to waste anymore money. If this project is approved it will affect the club in such a way that may cause it to close the doors which would be an absolute shame. Members will move out their horses including myself. No more horses. No more club. This would hugely affect Rosebowl Riders as well. Please do not approve this project. We have so few areas like this around here. It would be such a shame and waste. Thank you!!

Comment 93-2

Comment 93-3

Comment 93-4

Charmain Sauro

Response to Comment Letter #93 (Charmain Sauro)

Response to Comment 93-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

Potential effects to horses stalled near the Proposed Project site would be similar to the construction-related impacts from emissions and noise associated with sediment removal to nearby residents and recreational users of Hahamongna Watershed Park. Air quality impacts associated with truck traffic were analyzed in the Draft Environmental Impact Report (EIR) in Section 3.5. Los Angeles County Flood Control District (LACFCD) has conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed the United States (U.S.) Environmental Protection Agency's (EPA's) 2007 standards for emissions. Therefore, in order to further reduce emissions, Mitigation Measure MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump trucks that meet or exceed EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality, including those associated with health effects, will be reduced to less than significant.

Dust impacts from the Proposed Project were carefully evaluated, as discussed in the Draft EIR, Section 3.5.6, Impacts and Mitigation, AIR QUALITY-2, Sediment Removal. The Proposed Project's activities, including excavation, grading, material loading, and hauling, would result in less than significant dust emissions due to the project's use of best management practices and would be in full compliance with South Coast Air Quality Management District's (SCAQMD's) fugitive dust regulations.

Response to Comment 93-2:

Impacts to recreation were analyzed in the Draft EIR, Section 3.15. The Proposed Project will not limit the use of the Oak Grove area of Hahamongna Watershed Park. Sediment removal activities would be temporary and are expected to occur only in the drier months (April to December, excluding holidays). It is expected that these activities will often not be adjacent to the Oak Grove area of Hahamongna Watershed Park. The Proposed Project would result in temporary limitations on the recreational use of the Proposed Project site and some of the adjacent trails. Most of these areas would be reopened seasonally or intermittently throughout the sediment removal process. In addition, temporary impacts to designated recreational facilities and trails will be minimized through advance communication and redirection to the nearest facility in the vicinity of the Proposed Project. Furthermore, an east-west trail crossing will continue to provide access at the north end of the reservoir. At the south end of the reservoir, after the reservoir ingress and egress ramps have been fully constructed, access to the upper east side Arroyo Seco Trail from La Cañada Verdugo Road will be maintained; and the linkage from the west side Arroyo Seco Trail and the Flint Wash Trail to the upper east side Arroyo Seco Trail (crossing Devil's Gate Dam and also continuing south to the Rose Bowl) will be available after construction activities have ended each day and on nonworking days.

Additionally, as noted in the Draft EIR, Section 3.4, Aesthetics and Figures 3.4-1 through 3.4-3, the visual aspects of the Proposed Project site are constantly changing. The Draft EIR does note that the Proposed Project will have significant temporary impacts to aesthetics; however, after the sediment removal phase of the Proposed Project is complete, a habitat restoration plan will be implemented that will allow native plant communities to reestablish outside the reservoir management area. Riparian Herbaceous

vegetation is expected to continue to populate and/or reestablish in the management area of the Proposed Project site between maintenance activities.

See Response to Comment 93-1 regarding air quality.

Potential impacts due to the Proposed Project's truck trips were analyzed in the Draft EIR, Section 3.16, Transportation and Traffic. As listed in that section, a single intersection in the immediate vicinity of the Proposed Project site will have a potentially significant impact. In practice, hauling rates and routes may be adjusted to help reduce impacts, depending on operational need. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the Proposed Project site.

Response to Comment 93-3:

LACFCD was mandated by the State Legislature to provide flood protection and water conservation within its boundaries.

A reservoir storage design capacity of two design debris events (DDEs) below the dam's lowest spillway was determined to be the standard acceptable level of risk at Devil's Gate Dam and Reservoir. The DDE volume of capacity is determined using the January 2006 Los Angeles County Department of Public Works (LACDPW) Hydrology Manual and the March 2006 LACDPW Sedimentation Manual. For Devil's Gate Dam and Reservoir, the required reservoir capacity is 4.0 million cubic yards (cy) (two DDEs) below the spillway elevation of 1,040.50 feet.

The Hydrology Manual (January 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_Hydrology_Manual/2006%20Hydrology%20Manual-Divided.pdf

The Sedimentation Manual (March 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_sedimentation_manual/Sedimentation%20Manual-Second%20Edition.pdf

Additional information concerning DDE calculation methods has been added to the Final EIR, Section 2.3, Project Need.

Historically, large amounts of sediment have been deposited in the reservoir in short time periods. Between 1935 and 1938 over 1.6 million cy of sediment, between 1938 and 1943 over 1.95 million cy of sediment, between 1959 and 1966 over 1.75 million cy of sediment, and between 2010 and 2012 over 1.3 million cy of sediment was deposited in the reservoir. Over 92 years, the average amount of sediment deposited each year is approximately 130,000 cy; however, Devil's Gate Reservoir is a dynamic system with constantly changing amounts of sediment deposited from year to year, depending on the frequency and intensity of storm events. If a 1 in 50 years storm were to occur, approximately 2.0 million cy (one DDE) of sediment could be expected to wash into the reservoir. Because of the LACFCD's responsibilities to provide flood protection, LACFCD must be ready at all times for a Design Debris Event to occur. A small Interim Measures Project has been implemented annually since 2011 to clear accumulated sediment near the face of Devil's Gate Dam. Under 10,000 cy total has been removed since 2011. This effort will not efficiently remove the large amounts of sediment necessary to provide adequate downstream flood risk reduction.

LACFCD strives to achieve an efficient, low-cost sediment removal project. Sediment removal rates and trucking operations, now utilizing all low-emissions trucks, as explained in Section 3.5 of the Draft EIR, have been carefully planned for economies of scale to realize maximum efficiencies without major delays in project schedule, thus greatly reducing operating costs. Furthermore, LACFCD has applied for and received an approximately $28 million grant through the State's Disaster Preparedness and Flood Protection Bond Act of 2006 (Proposition 1E) program. A portion of this grant will be used to help offset the Proposed Project's costs.

Response to Comment 93-4:

See Response to Comment 93-2.

City Council
Laura Olhasso, Mayor
Michael T. Davitt, Mayor Pro Tem
Jonathan C. Curtis
David A. Spence
Donald R. Voss

December 30, 2013

Mr. Christopher Stone, P.E., Assistant Deputy Director
Water Resources Division
County of Los Angeles Department of Public Works
Attn: Reservoir Cleanouts Program
P.O. Box 1460
Alhambra, CA 91802-1460

SUBJECT: DEVIL'S GATE RESERVOIR SEDIMENT REMOVAL AND MANAGEMENT PROJECT CITY COMMENTS ON DRAFT ENVIRONMENTAL IMPACT REPORT

To Whom It May Concern,

Comment 94-1

On behalf of the City Council of the City of La Cañada Flintridge, this letter reflects our primary comments and concerns regarding the Draft Environmental Impact Report (DEIR) for the Devil's Gate Reservoir Sediment Removal and Management Project. These comments are based on the City Council's obligation to protect the health and welfare of our residents, students and businesses. The City reserves the right to submit further comments and objections.

Comment 94-2

The project's scope and magnitude is especially important to us because of its proximity to eight (8) public and private schools, two churches, several joint use or private sports facilities, Flintridge Riding Club and JPL (See attached map). These are sensitive receptor locations, where children study, play outside and are dropped off/picked up every day. The project location will affect more people and streets in the City of La Cañada Flintridge than in any other city, with significant disturbance to traffic, noise, air quality, and recreational uses.

Comment 94-3

While we are fully cognizant of the need to clean out the reservoir, and understand the attraction of 'doing it all at once", we believe it is vitally important to fully weigh the advantages of extending the project from 5 to 10 years or more. All of the significant impacts cited in the DEIR will be reduced or eliminated simply by taking a kinder-gentler approach to the sediment removal. (See Attachment 1 - Summary of Comments.)

Comment 94-4

The City Council appreciates this opportunity to comment on this large project with long-term impacts, and the chance to be a partner in minimizing those potential impacts. If you should have any questions or require additional information, please contact our Director of Public Works, Mr. Edward Hitti, P.E. at (818) 790-8882.

Sincerely,

Laura Olhasso
Mayor

cc: Supervisor Michael D. Antonovich (500 West Temple Street, Room 869. Los Angeles, CA 90012)
City Council
City Manager
Public Works Director

P:\City\County\Devils' Gate Sediment Removal\City Letter to LACDPW Devils Gate DEIR comments - FINAL.doc

Attachment 1
City of La Canada Flintridge

SUMMARY OF CITY COMMENTS ON DRAFT ENVIRONMENTAL IMPACT REPORT FOR DEVIL'S GATE RESERVOIR SEDIMENT REMOVAL AND MANAGEMENT PROJECT

PROJECT LOCATION AND SETTING

1. The Draft EIR's description of the project location and setting is inadequate and fails to recognize the environmental setting and uses in the area. In particular, there are eight (8) public and private schools, two churches, several joint use or private sports facilities, the Flintridge Riding Club and JPL. In essence, this area is a highly active school and recreational area. The potential impacts are not just traffic impacts at the beginning and end of the school day, but also the continuing daily athletic uses and practices that start early in the day through the evening. These sensitive uses, including for very young children, will be highly impacted by the project's noise, traffic and air quaiity impacts, especially if the proposed Berkshire Place/I-210 ramp haul route is utiiized at all. In turn, these same type of sensitive uses are not present along the proposed Windsor/Arroyo haul route, which the Draft EIR has not recognized in its evaluation.

Comment 94-5

PROJECT INTENSITY

2. The Draft EIR should be expanded to include study of a project extended from 5 years to 10 years during the initial sediment removal phase to reduce the expected environmental impacts generated by intense truck hauling operations, particularly during the school year. This "Kinder-Gentler" alternative reduces the intensity of the hauling to more manageable levels, and opens up three options: Truck hauling can be limited to summer months only, the number of trucks per hour can be reduced, or the hauling operation hours can be modified to avoid school arrival and dismissal times. By doubling the number of years to complete the project, the annual export amount would be cut in half, which could be accomplished in one of three ways: 1) half the annual days, 2) half the hours per day, or 3) half the hauling frequency. A comparison of the reduced intensity debris removal alternatives is shown below:

Comment 94-6

Reduced Intensity Alternatives Comparison

Option/Description	Proposed Project (Alt. 3, Config. D)	Reduced Intensity Summer Only	Reduced Intensity Reduced Hours	Reduced Intensity Reduced Rate
Project Duration (Yrs)	5	10	10	10
Hauling Months	June-October (5 months)	***June-August (2.5 Months)***	June-October (5 Months)	June-October (5 Months)
Hauling Hours	7am-7pm M-F (12hr) 8am-5pm Sat (9hr)	7am-7pm M-F (12hr) 8am-5pm Sat (9hr)	***9am-2pm M-F (5 hr) 9am-2:30pm (5.5)***	7am-7pm M-F (12hr) 8am-5pm Sat (9hr)
Total Volume Removed (Million Cubic Yards)	2.43 M	2.43 M	2.43 M	2.43 M
Annual Debris Removal (Cubic Yards)	486,000	243,000	243,000	243,000
Max. Daily Removal (Cubic Yards)	7,650	7,650	3,850	3,850
Max. Hauling Frequency (Trips/day)	425	425	***213***	***213***
Hourly Hauling Rate (Trips/hour)	50	50	50	***25***

* ***City's Recommended Alternatives***

Comment 94-6 continued

It should be noted that any hauling operation during school arrival or dismissal times in any of the above alternatives must still be rerouted away from Berkshire Place and the I-210 freeway ramps, in order to mitigate school related congestion. Of these options, the City favors the "Reduced Intensity-Summer Only" option, which would result in fewer overall traffic impacts to the City, especially during sensitive times.

AESTHETICS

Comment 94-7

3. The City urges the County of Los Angeles to pursue the development of a year-round recreational reservoir at the foot of the dam to mitigate the appearance of the excavated land. The water could be recharged from natural drainage flows, ground water, and even a planned Foothill Metropolitan Water District project to generate approximately 1 million gallons per day of recycled water from effluent water in its district.

AIR QUALITY

Comment 94-8

4. Short and long term health effects due to silica dust, fugitive dust clouds, diesel fumes, carbon monoxide, NOx emissions and other pollutants were not fully assessed in the DEIR, and should be evaluated to determine the health risk assessment to the neighboring community and sensitive receptors, such as the schools identified in the attached map. Greater use of alternative fuel vehicles for hauling is needed and should be required as mitigation measures. Based on the expected significant adverse impact due to construction and hauling vehicles, *clean-air low-emissions trucks that meet current EPA low emissions criteria should be required for all hauling operations to minimize expected air quality impacts.*

NOISE AND VIBRATION

Comment 94-9

5. While loud construction noise will be mitigated near residences by restriction on operation of off-road construction equipment with a 200+ horsepower engine within 180 feet of residences, further analysis should be made of haul vehicle noise generated on the haul routes, particularly near schools and churches. There should be limitations on the use of warning alarms on construction vehicles over certain decibels when used in the reservoir.

RECREATION

Comment 94-10

6. While minor disruption to recreation and trail use is to be expected, the project should be required to provide alternate routes or open the existing trails during non-operational hours and Sundays. Also, trail crossings can be intermittently opened between hauling trips. The project should be required to provide alternate trail connections or provide crossing assistance during hauling operations (See Recreation-1 in the DEIR.)

TRAFFIC

Comment 94-11

7. Hauling on Berkshire Place - There are several reasons why hauling should be prohibited on Berkshire Place:
    a. Hauling conditions assume start time of 7am, which will conflict with school traffic on Berkshire Place. The City objects to Haul Routes 1A, 1C, 1D, 1E, 1G and 1H, particularly during school times.
    b. The proposed haul routes will utilize Oak Grove Drive to Berkshire Place to the I-210 ramps, which are in close proximity to over a dozen sensitive receptors, such as schools, sports fields and churches.
    c. The Berkshire Place/Eastbound I-210 Ramps are expected to be significantly impacted from LOS-D to E in the AM peak hour under existing conditions, and degrade to LOS-F under 2014 conditions if Haul Routes 1A, 1D, 1E, and 1G.
    d. Berkshire Place is currently congested between Oak Grove Drive and I-210 Freeway

during weekday mornings and afternoon school pick-up. Trucks will be delayed in reaching the freeway ramps during peak times, block intersection flow, and exacerbate congestion.

Comment 94-11 continued

e. I-210 Westbound on-ramp is severely congested in morning peak hour. Truck acceleration is too slow for proper merging. This ramp must not be used during AM and PM peak school hours.

Based on the above, the *Final EIR should include a mitigation measure to prohibit trucks on Berkshire Place and on Oak Grove Drive north of Berkshire Place.*

8. Hauling During School Hours - Notwithstanding the above comment, if the project is approved with hauling on Berkshire Place, then the Project should be required to fully implement the potential impact reduction measure in Section Transportation-2 of the DEIR (Page 463), as follows: "Proposed project haul trucks would avoid using the Berkshire Place and I-210 eastbound ramps intersection during AM peak period by instead using the Windsor/Arroyo and I-210 ramps. This mitigation would require the painted median on Oak Grove Drive to be restriped to a two-way left turn lane (TWLTL). The changes to Oak Grove Drive would require the approval of the City of Pasadena."

Comment 94-12

The DEIR states that "The optional measures of this intersection are beyond the scope of the project." However, there are at least two mitigation measures available: prohibit truck trips on Berkshire Place during school peak hours and use Haul Routes 1B and 1F, and/or construct a traffic signal at Berkshire Dr/I-210 Ramps.

For these reasons, the City urges the hauling operation to be limited to Haul Routes 1B and 1F during the entire project to avoid the use of Berkshire Place. In addition, the Final EIR should include a mitigation measure to prohibit trucks on Berkshire Place or Oak Grove Drive north of Berkshire Place during school arrival and dismissal times. This is a feasible mitigation measure within control of the project. Flaggers can be used to assist haul trucks to cross a painted median on Oak Grove, so restriping is not mandatory.

9. Trucks on Berkshire Place Freeway Ramps – The DEIR states that there will be a significant impact at Berkshire Place/I-210 eastbound ramps during the AM peak hour. In addition, the existing stop controls at I-210 ramps and Berkshire Place will not have sufficient capacity for the projected traffic volumes. The existing turn pockets are too short to handle the proposed truck volumes. In particular, the slower acceleration rates and large turning radii will severely impact the stop sign-controlled ramp intersections.

Comment 94-13

The study failed to conduct a traffic signal warrant study at the intersection of Berkshire Place and I-210 eastbound and westbound ramps. The Final EIR should evaluate both intersections to determine whether the volume, delay or other warrants for traffic signalization are met at either location during the sediment removal phase or ongoing maintenance. The analysis should also include an analysis of queue lengths for all approaches, and stopped delay to accommodate additional project truck traffic.

10. The Traffic Impact Analysis (TIA) failed to include adjacent freeway ramp volumes and conditions in its ramp merging analysis in its Freeway Ramp HCM Analysis for Ramps #1- I-210 at Berkshire Place WB Off-ramp, and #2 - I-210 at Berkshire Place EB On-ramp (TIA-Appendix J). Both ramps are in close proximity to the Foothill Boulevard ramps to the west. The Traffic Impact Analysis needs to revise the HCM calculations at both ramps for all scenarios to include

Comment 94-14

Comment 94-14 continued

Foothill Boulevard on/off ramp conditions. It is expected that the EB ramp congestion is worsened due to insufficient merging and ramp storage at Foothill Boulevard.

Comment 94-15

11. Due to potential noise and traffic congestion impacts of idling trucks, truck queuing should not be allowed on public streets. All hauling trucks need to be radio-dispatched to prevent queuing on city streets.

Comment 94-16

12. The existing bike lanes along Oak Grove will be adversely impacted during hauling operations. The DEIR should propose remedial measures in Transportation-3 to provide uninterrupted bike lanes along Oak Grove Drive during hauling operations.

ROAD CONDITION

Comment 94-17

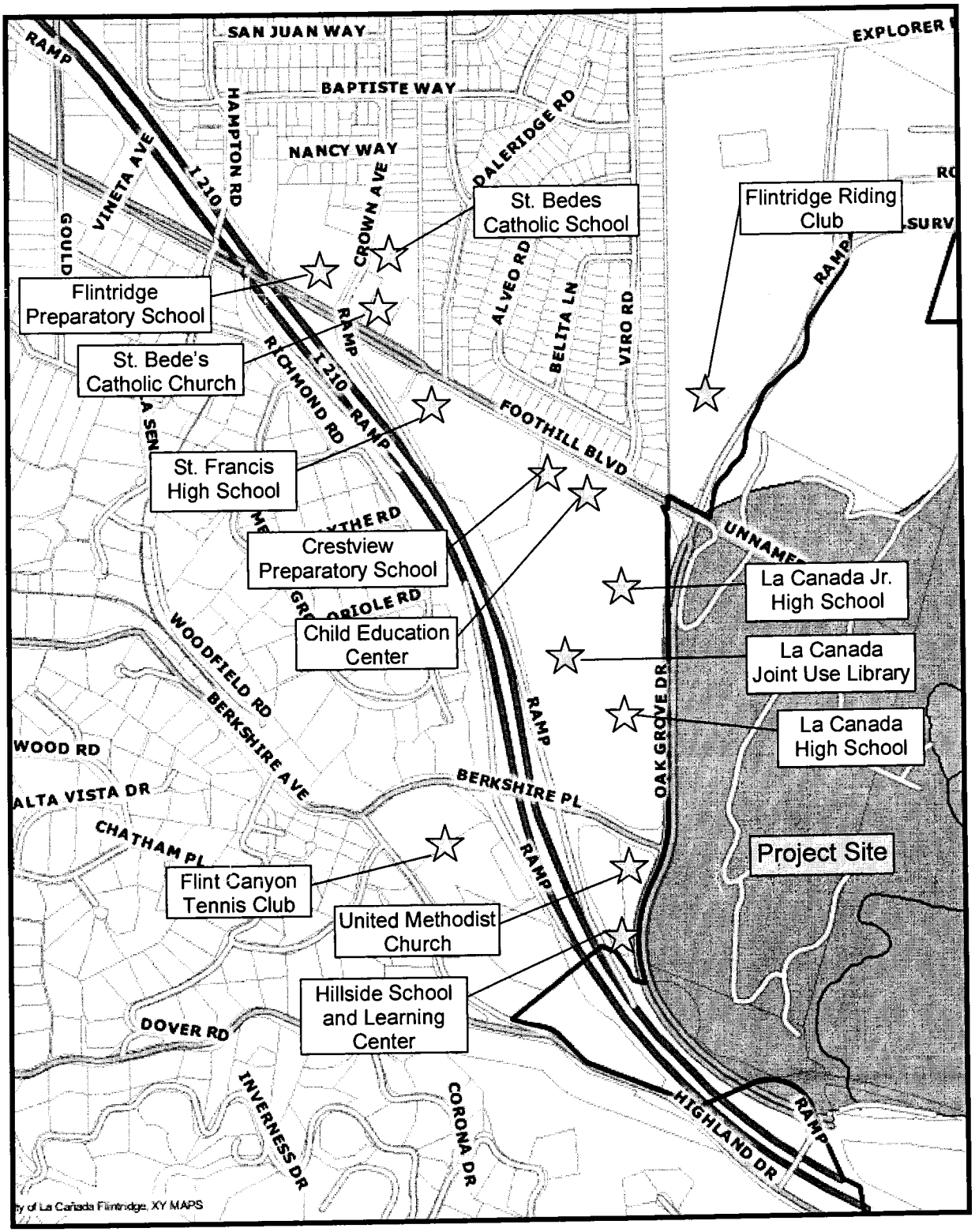
13. The massive hauling volume will significantly and prematurely degrade the pavement on Berkshire Place and Oak Grove Drive along the haul route. Neither street was constructed to handle heavy truck traffic or at the proposed frequency. In addition, ongoing maintenance of the reservoir will require higher truck volumes on both streets on an annual basis. The County should be responsible for reconstructing and/or overlaying the street segments (full width) to meet the future Traffic Index (TI) subsequent to initial debris removal and before maintenance operations begin.

CONCLUSION

Comment 94-18

Overall, the City supports the removal of built-up sediment from the Devil's Gate reservoir to restore flood protection for the surrounding community. However, the City strongly urges the County to (1) take a "kinder-gentler" approach and minimize the amount of sediment removed, (2) extend the project to reduce the potential environmental impacts further, and (3) not utilize Berkshire Avenue/I-210 ramps as a result of all of the schools and other sensitive receptors and rather utilize the Winsor/Arroyo haul route. The City feels that all of the goals of the project are attainable even if it takes a little longer to accomplish.

Attachment 2
City of La Canada Flintridge
SENSITIVE RECEPTOR LOCATIONS



Response to Comment Letter #94 (City of La Cañada Flintridge)

Response to Comment 94-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

Response to Comment 94-2:

Air quality and noise impacts associated with truck traffic were analyzed in the Draft Environmental Impact Report (EIR) in Sections 3.5 and 3.14, respectively. The Draft EIR analyzed impacts to sensitive uses, including residents, recreational uses, and schools, adjacent to the Proposed Project site and along the proposed haul routes. As discussed in the Draft EIR, Section 3.14, with implementation of Mitigation Measure MM N-1, noise impacts would be reduced to a level of less than significant. Los Angeles County Flood Control District (LACFCD) has conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed the United States (U.S.) Environmental Protection Agency's (EPA's) 2007 standards for emissions. Therefore, in order to further reduce emissions, Mitigation Measure MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump trucks that meet or exceed EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality, including those associated with health effects, will be reduced to less than significant.

Potential impacts due to the Proposed Project's truck trips were analyzed in the Draft EIR, Section 3.16, Transportation and Traffic. As listed in that section, a single intersection in the immediate vicinity of the Proposed Project site will have a potentially significant impact. In practice, hauling rates and routes may be adjusted to help reduce impacts, depending on operational need. LACFCD will continue to work with local organizations, the Cities La Cañada Flintridge and Pasadena, and the community of Altadena to minimize traffic impacts around the Proposed Project site.

Impacts to recreation were analyzed in the Draft EIR, Section 3.15. The Proposed Project will not limit the use of the Oak Grove area of Hahamongna Watershed Park. Sediment removal activities would be temporary and are expected to occur only in the drier months (April to December, excluding holidays). It is expected that these activities will often not be adjacent to the Oak Grove area of Hahamongna Watershed Park. The Proposed Project would result in temporary limitations on the recreational use of the Proposed Project site and some of the adjacent trails. Most of these areas would be reopened seasonally or intermittently throughout the sediment removal process. In addition, temporary impacts to designated recreational facilities and trails will be minimized through advance communication and redirection to the nearest facility in the vicinity of the Proposed Project. Furthermore, an east-west trail crossing will continue to provide access at the north end of the reservoir. At the south end of the reservoir, after the reservoir ingress and egress ramps have been fully constructed, access to the upper east side Arroyo Seco Trail from La Cañada Verdugo Road will be maintained; and the linkage from the west side Arroyo Seco Trail and the Flint Wash Trail to the upper east side Arroyo Seco Trail (crossing Devil's Gate Dam and also continuing south to the Rose Bowl) will be available after construction activities have ended each day and on nonworking days.

Response to Comment 94-3:

LACFCD proposed a project duration of five years to reduce accumulated sediment in a timely fashion. The goal of LACFCD is to restore reservoir flood capacity as soon as feasible while reducing costs,

minimizing the duration of environmental and construction impacts to the surrounding communities, and configuring the reservoir to allow for sustainable future maintenance. Extending the project would prolong the flood risk to downstream communities and increase the construction impacts to the surrounding communities.

Response to Comment 94-4:

LACFCD will continue to work with the City of La Cañada Flintridge.

Response to Comment 94-5:

As described in the Project Description, Section 2.1.6, Surrounding Land Uses, the Draft EIR describes the land uses found adjacent to the Proposed Project site, including residential areas, recreational uses (including equestrian) and schools. As discussed above in Response to Comment 94-2, the Draft EIR analyzed impacts to sensitive uses, including residents, recreational uses, and schools, adjacent to the Proposed Project site and along the proposed haul routes. Extending the description of surrounding uses to a greater area would not result in changes to the analysis, as impacts to the nearest uses would be considered the greatest. Therefore, the Project Description contains adequate information for evaluation and review of the environmental impact.

See Response to Comments 94-2 regarding noise, traffic, and air quality impacts.

Response to Comment 94-6:

See Response to Comment 94-3 regarding project duration.

As discussed in Response to Comment 94-2, a single intersection in the immediate vicinity of the Proposed Project site will have a potentially significant impact. The Draft EIR outlines a 12-hour trucking schedule, with trucking operations on Saturdays as well. This schedule is used to model the most intensive construction operation, which may not be applicable at the site for the duration of the Proposed Project. Typical trucking schedules are estimated to be 8 hours per day on weekdays.

LACFCD notes that the commenter prefers a "Reduced Intensity-Summer Only" option.

Response to Comment 94-7:

As noted in the Draft EIR, Section 3.4, Aesthetics and Figures 3.4-1 through 3.4-3, the visual aspects of the Proposed Project site are constantly changing. The Draft EIR does note that the Proposed Project will have significant temporary impacts to aesthetics. Holding water behind the dam permanently, as a lake, is not a part of the Proposed Project objectives and is outside the scope of this project; but, after the sediment removal phase of the Proposed Project is complete, a habitat restoration plan will be implemented that will allow native plant communities to reestablish outside the reservoir management area. Riparian Herbaceous vegetation is expected to continue to populate and/or reestablish in the management area of the Proposed Project site between maintenance activities.

Response to Comment 94-8:

See Response to Comment 94-2. As discussed in the Draft EIR, Section 3.10.6, Impacts and Mitigation, HAZARDS-1, Sediment Removal/Reservoir Management, no hazardous levels of the contaminants were

detected in the sediment. Dust impacts from the Proposed Project were carefully evaluated, as discussed in the Draft EIR, Section 3.5.6, Impacts and Mitigation, AIR QUALITY-2, Sediment Removal. The Proposed Project's activities, including excavation, grading, material loading, and hauling, would result in less than significant dust emissions due to the Proposed Project's use of best management practices and would be in full compliance with South Coast Air Quality Management District's (SCAQMD's) fugitive dust regulations.

As discussed in the Draft EIR, Section 3.5, the Health Risk Assessment (HRA) found the Proposed Project would result in less than significant impacts for both the cancer-related and non-cancer-related impacts.

Response to Comment 94-9:

The Draft EIR, Section 3.14.6, Sediment Removal/Reservoir Management, Offsite Vehicular Noise, analyzed the noise impacts from the haul trucks. The analysis found that the maximum noise increase on the roads in the immediate vicinity of the Devil's Gate Dam and Reservoir area would be a 1-decibel (dB) increase on Berkshire Place east of the Interstate 210 (I-210) northbound ramps. A 1-dB increase is well below the 3-dB increase threshold of perception and would therefore not be anticipated to disturb the learning or church environment. The roadway noise impact analysis provided in the Draft EIR found that the Proposed Project would result in less than significant impacts for all analyzed alternatives.

Contractors will be required to comply with local noise ordinances as stated in the Draft EIR, Section 3.14 Noise and Vibration. Warning alarms on the trucks and equipment are an Occupational Safety and Health Administration (OSHA) requirement, with the priority being to protect the safety of both the workers on site and the general public.

Response to Comment 94-10:

Impacts to recreation were analyzed in the Draft EIR, Section 3.15. The Proposed Project will not limit the use of the Oak Grove area of Hahamongna Watershed Park. Sediment removal activities would be temporary and are expected to occur only in the drier months (April to December, excluding holidays). It is expected that these activities will often not be adjacent to the Oak Grove area of Hahamongna Watershed Park. The Proposed Project would result in temporary limitations on the recreational use of the Proposed Project site and some of the adjacent trails. Most of these areas would be reopened seasonally or intermittently throughout the sediment removal process. In addition, temporary impacts to designated recreational facilities and trails will be minimized through advance communication and redirection to the nearest facility in the vicinity of the Proposed Project. Furthermore, an east-west trail crossing will continue to provide access at the north end of the reservoir. At the south end of the reservoir, after the reservoir ingress and egress ramps have been fully constructed, access to the upper east side Arroyo Seco Trail from La Cañada Verdugo Road will be maintained; and the linkage from the west side Arroyo Seco Trail and the Flint Wash Trail to the upper east side Arroyo Seco Trail (crossing Devil's Gate Dam and also continuing south to the Rose Bowl) will be available after construction activities have ended each day and on nonworking days.

Response to Comment 94-11:

LACFCD notes the multiple reasons the City states that hauling should be prohibited on Berkshire Place. See Response to Comments 94-2 and 94-6. LACFCD will continue to work with local organizations, the Cities of La Cañada Flintridge and Pasadena, and the community of Altadena to minimize traffic impacts around the project site.

Response to Comment 94-12:

See Response to Comments 94-2, 94-6 and 94-11. Even with the use of flaggers, restriping would be required for use of the alternative haul routes. Additionally, no haul routes listed in the Draft EIR have truck traffic on Oak Grove Drive north of Berkshire Place.

Response to Comment 94-13:

Potential impacts due to the Proposed Project's truck trips, including double dump trucks, were analyzed in the Draft EIR, Section 3.16, Transportation and Traffic. The capacity analysis considers what is called a Heavy Vehicle Factor. A heavy vehicle, such as a truck or recreational vehicle, utilizes more roadway capacity than a passenger vehicle. Other considerations include the size, slower start-up times, and maneuverability restrictions of the heavy vehicles. Per the Highway Capacity Manual, the Heavy Vehicle Factor is calculated using the percentage of heavy vehicles and adjusts the saturation flow rate of the roadway. Thus, the analysis of traffic impacts did consider a Heavy Vehicle Factor that took slower start-up times and maneuverability restrictions into consideration and, therefore, adequately analyzed the impacts of slower acceleration rates and larger turning radii on local intersections.

Additionally, restriping of the Berkshire Place/I-210 eastbound ramps intersection has been recommended as part of the Draft EIR. LACFCD will continue to work with local organizations, the Cities of La Cañada Flintridge and Pasadena, and the community of Altadena to minimize traffic impacts around the project site.

Response to Comment 94-14:

See Response to Comment 94-13. The Traffic Report (Appendix J of the Draft EIR) followed the Los Angeles County Congestion Management Program (CMP) Guidelines, California Department of Transportation's (Caltrans') Guide for the Preparation of Traffic Impact Studies, the Highway Capacity Manual (HCM), and Intersection Capacity Utilization (ICU) methods. Each methodology is a governing guideline in preparing a Traffic Impact Analysis set forth by each jurisdiction within the project area as applicable to the intersections, on- and off-ramps, and freeway facilities. The methods used are derived from the 2010 Highway Capacity Manual and 2003 *Intersection Capacity Utilization* (ICU) methods for Synchro for consistency across jurisdictions. This is a generally accepted methodology and compliant with CEQA requirements; therefore, impacts to freeway ramps were adequately analyzed. LACFCD will continue to work with local organizations, the Cities of La Cañada Flintridge and Pasadena, and the community of Altadena to minimize traffic impacts around the project site.

Response to Comment 94-15:

All of the trucks will be loaded within the reservoir; and if a queue of trucks develops, they will stage within the reservoir itself to lessen impacts on the adjacent streets. It is estimated that trucks will briefly idle during loading, but the average loading time per truck is estimated to be one minute. In addition, LACFCD typically requires equipment to shut down if idling time is expected to be more than five minutes.

Response to Comment 94-16:

The Proposed Project would not result in changes to the existing bike lanes along Oak Grove Drive.

The bike lanes on Oak Grove Drive will remain open for the duration of the Project. As discussed in the Draft EIR, Section 3.16, Transportation and Traffic, TRANSPORTATION-3, modifications to roadway conditions by the Project will consist of roadway restriping; however, these changes would not alter existing roadway use nor substantially increase hazards. Thus, impacts related to traffic hazards would be less than significant.

Response to Comment 94-17:

Hauling permits will be obtained as necessary from the appropriate localities, and all conditions of said permits will be followed accordingly.

Response to Comment 94-18:

LACFCD goes to great lengths to lessen project impacts and maximize efficiencies. For example, the Draft EIR concluded that Alternative 3 is the Environmentally Superior Alternative. Alternative 3, Configuration D, Option 2 drastically reduces the project's footprint of 120 acres down to 71 acres. Additionally, the limited maintenance area for Alternative 3 further reduces the permanent habitat impacts down to approximately 51 acres by allowing for site replanting and mitigation to take place within the reservoir footprint. This reduction in project acreages will greatly lessen environmental impacts of the Proposed Project.

LACFCD is committed to *Public Service that Works*; and by combining almost 100 years of technical expertise and invaluable input from the community, less invasive flood protection will continue to be a reality.

From: Clay Allen
To: reservoircleanouts
Subject: Another voter against sediment removal
Date: Thursday, January 02, 2014 8:11:56 PM

Dear Dept of Public Works,

Comment 95-1

I am against the proposed plan to remove sediment from the Devil's Gate Dam. The removal of trees and vegetation and the disruption of wildlife habitat is not acceptable. The project does not provide enough benefit to the county to balance out its many costs.

Thank you,

Clay Allen
1810 Alta Wood Dr, Altadena Calif 91001

Response to Comment Letter #95 (Clay Allen)

Response to Comment 95-1:

Thank you for your input. This comment has been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. Los Angeles County Flood Control District (LACFCD) notes that the commenter does not support the Proposed Project.

The goal of LACFCD is to restore reservoir flood capacity as soon as feasible while reducing costs, minimizing the duration of environmental and construction impacts to the surrounding communities, and configuring the reservoir to allow for sustainable future maintenance.

LACFCD was mandated by the State Legislature to provide flood protection and water conservation within its boundaries.

A reservoir storage design capacity of two design debris events (DDEs) below the dam's lowest spillway was determined to be the standard acceptable level of risk at Devil's Gate Dam and Reservoir. The DDE volume of capacity is determined using the January 2006 Los Angeles County Department of Public Works (LACDPW) Hydrology Manual and the March 2006 LACDPW Sedimentation Manual. For Devil's Gate Dam and Reservoir, the required reservoir capacity is 4.0 million cubic yards (cy) (two DDEs) below the spillway elevation of 1,040.50 feet.

The Hydrology Manual (January 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_Hydrology_Manual/2006%20Hydrology%20Manual-Divided.pdf

The Sedimentation Manual (March 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_sedimentation_manual/Sedimentation%20Manual-Second%20Edition.pdf

As discussed in Section 3.6.6 of the Draft Environmental Impact Report (EIR), Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats. In addition, sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays). Wildlife species currently found in the Proposed Project area would be expected to either remain in the undisturbed areas of the reservoir outside of the Proposed Project area or to reestablish once sediment removal activities have been completed.

LACFCD goes to great lengths to lessen project impacts and maximize efficiencies. For example, the Draft EIR concluded that Alternative 3 is the Environmentally Superior Alternative. Alternative 3, Configuration D, Option 2 drastically reduces the project's footprint of 120 acres down to 71 acres. Additionally, the limited maintenance area for Alternative 3 further reduces the permanent habitat impacts down to approximately 51 acres by allowing for site replanting and mitigation to take place within the reservoir footprint. This reduction in project acreages will greatly lessen environmental impacts of the Proposed Project.

LACFCD is committed to *Public Service that Works*; and by combining almost 100 years of technical expertise and invaluable input from the community, less invasive flood protection will continue to be a reality.

From: Connie Branson
To: reservoircleanouts
Subject: Dam Project
Date: Monday, January 06, 2014 1:55:41 PM

Comment 96-1

I wish to voice my serious concerns about the clean out program. I strongly criticize the methods you have planned--- too much, too dirty, too noisy and too destructive to the wildlife habitats. A slower, less aggressive method would provide a better chance to do the job in a more careful, considerate way. I am a resident locally, I have horses across the street at the riding club, and the noise, air pollution and traffic of the dump trucks hauling would be overwhelming. Of even more

Comment 96-2

concern is the disruption of the wildlife that call the area their home, would be extremely destructive. A slower, less aggressive program would allow wildlife to adjust with less panic, move their habitats to safer areas and be safer for residents and traffic since when animals panic, they run, and can cause more disruption to traffic, local residents and surely, be injured or killed. Also, local pets would be upset by the wildlife crossing into residential areas nearby. As far as the riding club

Comment 96-3

goes, the heavy truck traffic roaring and grinding along the roads is very disruptive to the horses and they become frightened, spooky and that is when both horses and riders get hurt.

Comment 96-4

Another thought is that a longer, slower program would provide stable jobs for the truck drivers and crew working on the project for a much longer time, and that helps the economy. Please slow this project down to a more careful, considerate level, and get the job done slowly and carefully. Thank you Connie Branson

Response to Comment Letter #96 (Connie Branson)

Response to Comment 96-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. Los Angeles County Flood Control District (LACFCD) notes that the commenter does not support the Proposed Project's methods.

Air quality and noise impacts associated with truck traffic were analyzed in the Draft Environmental Impact Report (EIR) in Sections 3.5 and 3.14, respectively. As discussed in the Draft EIR, Section 3.14, with implementation of Mitigation Measure MM N-1, noise impacts would be reduced to a level of less than significant. LACFCD has conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed the United States (U.S.) Environmental Protection Agency's (EPA's) 2007 standards for emissions. Therefore, in order to further reduce emissions, Mitigation Measure MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump trucks that meet or exceed EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality will be reduced to less than significant.

Potential impacts due to the Proposed Project's truck trips were analyzed in the Draft EIR, Section 3.16, Transportation and Traffic. As listed in that section, a single intersection in the immediate vicinity of the Proposed Project site will have a potentially significant impact. In practice, hauling rates and routes may be adjusted to help reduce impacts, depending on operational need. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the Proposed Project site.

LACFCD proposed a project duration of five years to reduce accumulated sediment in a timely fashion. The goal of LACFCD is to restore reservoir flood capacity as soon as feasible while reducing costs, minimizing the duration of environmental and construction impacts to the surrounding communities, and configuring the reservoir to allow for sustainable future maintenance. Extending the project would prolong the flood risk to downstream communities and increase the construction impacts to the surrounding communities.

LACFCD goes to great lengths to lessen project impacts and maximize efficiencies. For example, the Draft EIR concluded that Alternative 3 is the Environmentally Superior Alternative. Alternative 3, Configuration D, Option 2 drastically reduces the project's footprint of 120 acres down to 71 acres. Additionally, the limited maintenance area for Alternative 3 further reduces the permanent habitat impacts down to approximately 51 acres by allowing for site replanting and mitigation to take place within the reservoir footprint. This reduction in project acreages will greatly lessen environmental impacts of the Proposed Project. This alternative would also provide a habitat buffer on the west side of the reservoir that would allow for the movement of wildlife.

Response to Comment 96-2:

Sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays). In addition, sediment removal activities would not completely block the Proposed Project site from surrounding habitat, would occur only during the day, and would not interfere with nighttime wildlife activity. As discussed in Section 3.6.6 of the Draft EIR, Mitigation Measures MM BIO-1, MM BIO-2, MM BIO-3, MM BIO-4, and MM BIO-5 provide mitigation to protect

and avoid impacts to sensitive species. Wildlife species currently found in the Proposed Project area would be expected to either remain in the undisturbed areas of reservoir outside the Proposed Project area or to reestablish once sediment removal activities have been completed. With implementation of the mitigation measures described in Section 3.6.6 of the Draft EIR, impacts to biological resources would be reduced to less than significant.

Response to Comment 96-3:

Existing recreational users of the Hahamongna Watershed Park currently coexist with truck traffic on the surrounding roads and from the Interim Measures Project. The Proposed Project will not limit the use of the Oak Grove area of Hahamongna Watershed Park. Sediment removal activities would be temporary and are expected to occur only in the drier months (April to December, excluding holidays). It is expected that these activities will often not be adjacent to the Oak Grove area of Hahamongna Watershed Park. The Proposed Project would result in temporary limitations on the recreational use of the Proposed Project site and some of the adjacent trails. Most of these areas would be reopened seasonally or intermittently throughout the sediment removal process. In addition, temporary impacts to designated recreational facilities and trails will be minimized through advance communication and redirection to the nearest facility in the vicinity of the Proposed Project. Furthermore, an east-west trail crossing will continue to provide access at the north end of the reservoir. At the south end of the reservoir, after the reservoir ingress and egress ramps have been fully constructed, access to the upper east side Arroyo Seco Trail from La Cañada Verdugo Road will be maintained; and the linkage from the west side Arroyo Seco Trail and the Flint Wash Trail to the upper east side Arroyo Seco Trail (crossing Devil's Gate Dam and also continuing south to the Rose Bowl) will be available after construction activities have ended each day and on nonworking days.

Response to Comment 96-4:

LACFCD notes the commenter's preference for an alternative that would take longer than the Proposed Project. See Response to Comment 96-1.

From: Craig Friedemann
To: reservoircleanouts
Subject: Devil"s Gate Reservoir Sediment Removal and Management Project
Date: Sunday, January 05, 2014 5:37:46 PM

Hello,

My name is Craig Friedemann and though I live in Burbank I frequently use the disc golf course at Hahamongna Watershed Park. I hear that there are potential changes afoot.

I have looked at all the plans for the sediment removal project sponsored by the County. All the plans will have an impact on our disc golf course. Alternative 3 is the best plan, but the western branch will remove two of our playable positions. Please revisit the sediment removal plans and make an alternative plan that will not impact the disc golf course.

I realize that disc golf might still reside in the fringe sport category in most people's view, but this course is, as it is frequently stated, "where it all began". This course really belongs in the state, if not national, register. It is constantly used. I've rarely been there when it isn't in constant use. I usually go at daybreak and I'm not always the first golfer there. Even when I'm there later in the day, it's hard for me to play a round as a single without waiting an inordinate amount of time—and that's OK with me. I'd rather that my sport of choice be popular, than to see it relegated to history as a "funny thing people used to do". The "desert" hole and the "gorge" hole as we golfers know them might not be part of the original course, but I consider the "gorge" as Oak Grove Disc Golf course's signature hole. The desert and gorge are the two positions noted above that will be affected.

Comment 97-1

In February Oak Grove/Hahamongna will host its 36th annual tournament. The Wintertime Open is an event on the pro tour for our sport that attracts internationally known talent. One of the great attractions in the Final 9 for the leaders of the tourney is the throw across the gorge. It would be sad to eliminate such a well-known part of the finals. It might not be the same view we get of the playoff holes of the Masters in South Carolina or the unbelievable views of the playoff holes at Pebble Beach, but to we disc golfers, it is as spectacular.

Our sport requires very little maintenance and it complies easily with our Presidents' requests for us to get out and get moving—not to mention our past Governor. You don't want to anger the Terminator do you? (that was said with humor implied). Since disc golf is so easy to do and as affordable as soccer, I would hope the County of Los Angeles and the City of Pasadena would want to promote people to get out and get moving as well. All that soccer really requires is a ball. On the same lines, all that disc golf really requires is a disc. How much simpler can it be to get people out and moving? I myself, look at my time on the course not so much as practice to overwhelm my competitor, as I do that it is a beautiful walk in the park among some majestic oaks and wildlife. Why do we as a society have to take more of that away from us?

Thank you for your time and consideration.

Sincerely,
Craig Friedemann

Response to Comment Letter #97 (Craig Friedemann)

Response to Comment 97-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. No official disc golf course holes located in the Oak Grove area of Hahamongna Watershed Park will be removed by the Proposed Project. As noted in the Draft Environmental Impact Report (EIR), Section 3.15, Los Angeles County Flood Control District (LACFCD) recognizes the importance of the area to those who take advantage of the recreational opportunities offered, including the Oak Grove Disc Golf Course. Where possible, Los Angeles County Flood Control District (LACFCD) will avoid any disc golf course holes located outside the Oak Grove area of Hahamongna Watershed Park. When avoidance is not possible, LACFCD will coordinate with the Oak Grove Disc Golf Club for removal of the disc golf hole equipment.

Alternative 3, Configuration D, the Environmentally Superior Alternative from the Draft Environmental Impact Report (EIR), carefully balances flood control needs and reductions in impacts to habitat by restoring the required reservoir capacity while also minimizing the project footprint (see Section 4.6 of the Final EIR). Furthermore, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2 would avoid excavation of the western branch, providing a greater distance between the Oak Grove area of Hahamongna Watershed Park and the excavation area, reducing the project footprint of 120 acres down to 71 acres. Alternative 3, Configuration D, Option 2 would also avoid all currently existing Oak Grove Disc Golf Club holes. The Oak Grove area of Hahamongna Watershed Park and the associated facilities will remain open during sediment removal and will continue to provide active recreational facilities to the area.

From: Damien Baccaro
To: reservoircleanouts
Subject: Devils Dam clean out
Date: Friday, January 03, 2014 11:07:20 AM

La Public Works,

Comment 98-1

I don't believe you have given enough time and thought into removing the sediment from Hahamonga. I live right next to the Dam, and all the neighbors I have spoken to have no clue what you are proposing. I feel La Publics Works is proposing the most severe method of removal , with out any regard to the environmental impact, ethical respect, etc.

Comment 98-2

Was there any thought into putting large underground pipe at the top of Hahamonga (near JPL bridge) and ending at the Dam, therefore leaving most of the habitat un scathed?

This project is selfish and greedy.

-Damien Baccaro

Sent from my iPad

Response to Comment Letter #98 (Damien Baccaro)

Response to Comment 98-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. Los Angeles County Flood Control District (LACFCD) notes that the commenter does not support the Proposed Project. A great deal of time and thought was put into conceiving the Proposed Project and each of the Alternatives analyzed and into the preparation of the environmental documentation for the Proposed Project.

Per California Environmental Quality Act (CEQA) Guidelines Section 21902 (b)(3), notice shall be given to the last known name and address of all organizations and individuals who have previously requested notice and shall also be given by at least one of the following procedures:

- publication in a newspaper of general circulation in the area affected by the Proposed Project
- posting of notice by the lead agency on and offsite in the area where the Proposed Project is to be located
- direct mailing to the over 1,100 owners and occupants of contiguous property shown on the latest equalized assessment roll.

The notices for the Proposed Project, the Notice of Preparation (NOP), and the Notice of Availability/Notice of Completion (NOA/NOC) were:

- sent to agencies, organizations, and individuals who have previously requested notices, in addition to other area agencies and organizations
- published in local newspapers, the *San Gabriel Valley Tribune* and the *Pasadena Star News*
- posted on and off site
- mailed to owners and occupants of contiguous property shown on the latest equalized assessment roll
- filed with the County Clerk and the State Clearinghouse
- posted at eight local libraries
- posted on the Los Angeles County Department of Public Works (LACDPW) website

Therefore notice for the Proposed Project was adequate, as the notice efforts went beyond the CEQA Guidelines requirements.

The environmental documentation for the Proposed Project, including the Initial Study and the Draft Environmental Impact Report (EIR) were made available at eight local libraries, the County Public Works headquarters, and online. In addition, CDs with the documents were made available free upon request; and printed copies were made available for purchase at County Public Works headquarters for interested parties.

LACFCD goes to great lengths to lessen project impacts and maximize efficiencies. For example, the Draft EIR concluded that Alternative 3 is the Environmentally Superior Alternative. Alternative 3, Configuration D, Option 2 drastically reduces the project's footprint of 120 acres down to 71 acres. Additionally, the limited maintenance area for Alternative 3 further reduces the permanent habitat impacts down to approximately 51 acres by allowing for site replanting and mitigation to take place within the reservoir footprint. This reduction in project acreages will greatly lessen environmental impacts of the Proposed Project.

Response to Comment 98-2:

Using a pipe to bypass the reservoir would effectively circumvent the flow attenuations that Devil's Gate Dam provides and would thus increase potential downstream flooding.

From:	DT
To:	fifthdistrict@lacbos.org
Cc:	reservoircleanouts
Subject:	DEVIL"S GATE RESERVOIR CLEANOUT PROJECT OPPOSITION
Date:	Friday, January 03, 2014 3:18:33 PM

Dear Los Angeles County Board of Supervisors, and Department of Public Works

Comment 99-1

We cannot afford to have this project go forward, it is not a project for a day, it is an ongoing project that will devastate the health of the area residents, and ecological environment. Please do not permit this project to move forth. We will suffer traumatically with respiratory, cardio, and circulatory devastation.

Thank you, for your attention in this matter.

Sincerely,
Dancingwater Taylor
(626) 797-8857

Response to Comment Letter #99 (Dancingwater Taylor)

Response to Comment 99-1:

Thank you for your input. This comment has been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. Los Angeles County Flood Control District (LACFCD) notes that the commenter does not want the Proposed Project to go forward.

Although the sediment removal phase of the Proposed Project will occur over a five-year period, the removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays), as described in the Draft Environmental Impact Report (EIR), Section 2.5.1, Sediment Removal Phase, Project Schedule.

Air quality impacts associated with truck traffic were analyzed in the Draft EIR in Section 3.5. LACFCD has conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed the United States (U.S.) Environmental Protection Agency's (EPA's) 2007 standards for emissions. Therefore, in order to further reduce emissions, Mitigation Measure MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump trucks that meet or exceed EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality, including those associated with health effects, will be reduced to less than significant.

As discussed in Section 3.6.6 of the Draft EIR, Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats. Wildlife species currently found in the Proposed Project area would be expected to either remain in the Proposed Project area or to reestablish once sediment removal activities have been completed.

LACFCD proposed a project duration of five years to reduce accumulated sediment in a timely fashion. The goal of LACFCD is to restore reservoir flood capacity as soon as feasible while reducing costs, minimizing the duration of environmental and construction impacts to the surrounding communities, and configuring the reservoir to allow for sustainable future maintenance.

From: Daniel Russell
To: reservoircleanouts
Subject: Devil"s Gate Resevoir Sediment Removal and Management Project
Date: Friday, January 03, 2014 4:59:11 PM

Hi,

My name is Daniel Russell I live at 4423 Brookhaven Dr

Comment 100-1

I have looked at all the plans for the sediment removal project sponsored by the county, and all the plans will have an impact on our Disc Golf Course. Alternative 3 is the best plan, but the western branch will remove 2 of our playable positions. Please re-visit the sediment removal plans and make an alternative plan that will not impact the disc golf course.

When I flew out to California I always heard how amazing your disc golf courses were. So the first thing I wanted to do was play and this field was the one I went to and I loved it. I have so many great memories from that trip but that made it that much better.

Response to Comment Letter #100 (Daniel Russell)

Response to Comment 100-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. No official disc golf course holes located in the Oak Grove area of Hahamongna Watershed Park will be removed by the Proposed Project. As noted in the Draft Environmental Impact Report (EIR), Section 3.15, Los Angeles County Flood Control District (LACFCD) recognizes the importance of the area to those who take advantage of the recreational opportunities offered, including the Oak Grove Disc Golf Course. Where possible, Los Angeles County Flood Control District (LACFCD) will avoid any disc golf course holes located outside the Oak Grove area of Hahamongna Watershed Park. When avoidance is not possible, LACFCD will coordinate with the Oak Grove Disc Golf Club for removal of the disc golf hole equipment.

Alternative 3, Configuration D, the Environmentally Superior Alternative from the Draft Environmental Impact Report (EIR), carefully balances flood control needs and reductions in impacts to habitat by restoring the required reservoir capacity while also minimizing the project footprint (see Section 4.6 of the Final EIR). Furthermore, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2 would avoid excavation of the western branch, providing a greater distance between the Oak Grove area of Hahamongna Watershed Park and the excavation area, reducing the project footprint of 120 acres down to 71 acres. Alternative 3, Configuration D, Option 2 would also avoid all currently existing Oak Grove Disc Golf Club holes. The Oak Grove area of Hahamongna Watershed Park and the associated facilities will remain open during sediment removal and will continue to provide active recreational facilities to the area.

From: David Boettcher
To: reservoircleanouts
Subject: Devil's Gate Reservoir Sediment Removal and Management Project
Date: Monday, January 06, 2014 4:07:15 PM

Hi,

My name is David Boettcher. I live at 628 Durwood Dr. La Canada, Ca 91011

Comment 101-1

I have looked at all the plans for the sediment removal project sponsored by the county, and all the plans will have an impact on our Disc Golf Course. Alternative 3 is the best plan, but the western branch will remove 2 of our playable positions. Please re-visit the sediment removal plans and make an alternative plan that will not impact the disc golf course.

Comment 101-2

Oak Grove Disc Golf Course is the first permanent disc golf course in the world. This is a every special course to the disc golf community, everyday there are hundreds of people & families playing the course. Right now disc golf is the fastest growing sport in the world & everyday more & more people pick up the sport. I've only be playing for a few years, this is home course & play 3-4 times a week. This past week I've meet people from Northern California, Michigan' Alabama & Florida playing the course. They came in for the Rose Bowl games, made time to play the course, everyone talked about how beautiful the course & park is. The 2 basket positions we may loss are 2 of the most popular holes to play on the course. There is so much wildlife in those areas that would be displace or killed with moving the sediment there.

Thank you,
David Boettcher.

Response to Comment Letter #101 (David Boettcher)

Response to Comment 101-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. No official disc golf course holes located in the Oak Grove area of Hahamongna Watershed Park will be removed by the Proposed Project. As noted in the Draft Environmental Impact Report (EIR), Section 3.15, Los Angeles County Flood Control District (LACFCD) recognizes the importance of the area to those who take advantage of the recreational opportunities offered, including the Oak Grove Disc Golf Course. Where possible, Los Angeles County Flood Control District (LACFCD) will avoid any disc golf course holes located outside the Oak Grove area of Hahamongna Watershed Park. When avoidance is not possible, LACFCD will coordinate with the Oak Grove Disc Golf Club for removal of the disc golf hole equipment.

Alternative 3, Configuration D, the Environmentally Superior Alternative from the Draft Environmental Impact Report (EIR), carefully balances flood control needs and reductions in impacts to habitat by restoring the required reservoir capacity while also minimizing the project footprint (see Section 4.6 of the Final EIR). Furthermore, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2 would avoid excavation of the western branch, thereby providing a greater distance between the Oak Grove area of Hahamongna Watershed Park and the excavation area, reducing the project footprint of 120 acres down to 71 acres. Alternative 3, Configuration D, Option 2 would also avoid all currently existing Oak Grove Disc Golf Club holes. The Oak Grove area of Hahamongna Watershed Park and the associated facilities would remain open during sediment removal and would continue to provide active recreational facilities to the area.

Response to Comment 101-2:

See Response to Comment 101-1. As discussed in Section 3.6.6 of the Draft (EIR, Mitigation Measures MM BIO-1 through MM-BIO-8 provide mitigation to restore and enhance riparian and sensitive habitats. Wildlife currently found in the project area would be expected to either remain in the undisturbed areas of the reservoir outside of the Proposed Project area or to reestablish once sediment removal activities have been completed.

From: Dietrich Bartelt, DB Sediments
To: reservoircleanouts
Subject: "Devil"s Gate Reservoir Sediment Removal and Management Project"
Date: Sunday, January 05, 2014 4:00:22 PM
Attachments: 63DBC6C8-5DBF-474A-947C-0154803E7D6E[1].png
161D290E-3FC9-4767-803B-92FFCF361A04[1].png

Dear Ladies and Gentlemen,

by chance and through people who addressed us a couple weeks ago, we did get aware of the "Devil's Gate Reservoir Sediment Removal and Management Project“ and the proposed solution.

We want comment and to give input to the draft environmental impact report for the Devil's Gate Sediment Removal and Management Program (and if applicable to further rehabilitation projects), which are sponsored by LACFCD, and are now out for public review with comments closing on January 6, 2014 or at a future date.

We very much appreciated the valuable study and especially the video describing the situation about sediment cycle and the situation with flood protection and reservoirs.

It is following the following video: http://www.youtube.com/watch?v=H8rt8Zrb8ps

Everything in that movie is right up to the minute: 3.35, when it is proposed to take sediments out of the river and the ecosystem.

Comment 102-1

The use and storage of water is eventually resulting in sedimentation and siltation of the storage capacity of the reservoir.

Comment:

Not only in the case of storage for drinking water purposes, the operators often think that every drop of water should be used for just that purpose. It is true that water should not be wasted. It should be used efficiently and caringly. But due to the use of water, there is an impact to the ecosystem that needs to be compensated. Besides storing water, some water should be giving back to the river for guaranteeing minimum flow in the riverbed. Reservoirs that are intended to serve the flood protection and serve, as retention volumes could be equipped with small turbines that can run the electric driven machines to perform the continuous sediment management.

The sediment management should address two main targets:

1st at least keeping the current stage of the volume of the storage capacity

2nd rehabilitating the storage capacity by further measures, including an increase of transferred sediment volume that still meets the framework conditions of a system sensitive approach.

To reach both targets is very challenging. For many cases, we are ready to provide a study (sometimes in parallel to the ongoing studies) to determine the feasibility of continuous sediment

transfer for the silted dam.

Comment 102-1 continued

It should therefore be the question:

"What is the most effective and most efficient way to compensate the impact of using and storing water?" and which method is most efficient for the rehabilitation of the lost storage capacity? and which method has the least (additional) impact when applying the solution?

Current attempts to solve the problem of sedimentation and siltation

Within the current environmental impact report it is proposed to dig or dredge reservoir sediment and dispose it a a far distant site. This is extremely expensive and has a strong impact to the environment and to the community. It is the most expensive method to try to solve the problem of sedimentation. In addition stored or extracted sediment which is missing downstream of reservoirs leads to erosion damages, substrate deficits and ground water problems. Even coast erosion on the beaches is effected indirectly.

Comment 102-1

When removing the sediments or even reducing the sediment volume in reservoirs for the storage of water for drinking water or irrigation, the facilities plant operators are faced with exorbitant costs; we talk several million US Dollars range even for small reservoirs. In the case of LA County they want to run 450 trucks constantly to a dump at a distance of 20 to 30 miles away for 5 years or more to remove about 2 to 4 million m3. Can you imagine the impact of this measure to public and environment?

The ConSedTrans-Method of DB Sediments

We are ready to propose the ConSedTrans-Method, as an alternative and innovative technical approach of DB Sediments that makes reservoirs penetrable for sediment avoiding above-mentioned secondary effects. Incoming as well as already settled sediment is continuously transferred through the reservoir and fed over long time spans in morphologically and ecologically compatible concentrations and with a necessary quantity of rest-water (minimum flow requirements) downstream by applying newly developed equipment. In the eyes of the operator of the reservoir this rest-water-quantity might be lost, but it enables the sustainable and continuous use of the reservoir.

Comment 102-1

Reservoir management and turbidity is not affected when properly applied and the approach is performed during daily reservoir operation. It is applicable to almost any range of plants, small to large drinking water and irrigation water reservoirs - or reservoirs for hydro power generation.

This approach does not only restore the overall sedimentation process to a near to natural state, but also fulfills the requirements of the Water Framework Directive 2000/60 of the European Community as well as the US Sediment Acts. Moreover, as the equipment can be fully automated, it

is also economically very competitive, even without considering the avoided costs of the secondary effects. Furthermore continuous sediment transfer can have positive effects with respect to the characteristics of wave dynamics that is also affecting river flows (and floods).

Comment 102-1

Our invention has received the PLATTS-Award of Excellence as "Leading Global Sustainable Technology-Innovation of the Year 2011" by Platts and Fortune Magazine, has been recently nominated for the Platts Global Energy Award for the third time in a row (2011, 2012, and 2013), was nominated for the Zayed Future Energy Prize, and furthermore has most recently received the Initiative Prize for renewable energies and environment in the state of North-Rhine Westfalia in Germany.

When applying our approach, it is usually one of the first steps that we offer a study, that - scientifically sound - will address the individual framework conditions and finalize on quantifying the overall cost of applying the patented approach. Besides the Global Water System Project - as a network of global researchers in the field of water, we work together with a number of well know German (Excellence) universities, including the RWTH Aachen - technical university of Aachen. Furthermore, just a couple weeks ago, we established closer contacts with Purdue University, University of Illinois and University of Wisconsin (Milwaukee and Madison). Looking at the individual framework conditions, I am very positive to see that there are times when there is enough excess water that could be used for continuous sediment management i.e. without harming the necessary supply of drinking water, irrigation water or water for hydro power generation. Furthermore, the retention volume is kept at the necessary level. The efficient and effective use of this water could extend the lifetime of a reservoir from "just a couple years" to "many years" and besides creating a sustainable use of water, it gives benefits to the overall ecosystem.

Further to the information there is a link to the English brochure on our approach:

http://www.db-sediments.com/tl_files/db_layout/Broschueren/DBS_English.pdf

The following link has some information about the Mississippi and how held back sediments in the Mississippi River is effecting the existence of the Louisiana delta (what has been build up in thousands of years, is about to disappear within about 100 years after building dams and/or locks on the Mississippi):

http://www.nola.com/speced/lastchance/multimedia/flashlandloss1.swf

Comment 102-1

In November 2013, we had a meeting with representatives of the American Association of State Floodplain Managers (http://www.floods.org) in Madison, as well as at MWH Global Offices in Chicago. Our method was very well received! We are currently setting up a project with the Global Water System Project (www.gwsp.org, it will be presented at the Water-Energy-Food Nexus conference in May 2014 http://24488.seu.cleverreach.com/m/6997901/) quantifying the overall benefits of the continuous sediment management for the overall ecosystems (sustainable storage, prevention of bed load erosion, prevention of groundwater levels from falling, enabling irrigation, sustainable flood management, prevention of coast erosion and prevention of a decrease of ground water quality in the delta areas of the rivers). There are a number of other large and small-scale projects that we are currently preparing. For March, we are preparing to have a third round of presentations for experts of the World Bank and international organizations in Washington D.C.

Here is the link to the scientific paper, that was presented at the ACWUA Water Conference in 2012 in Oman:

Comment 102-1

http://www.db-sediments.com/tl_files/db_layout/images/120524%20ACWUA%205th%20BP%20conference%20-%20Paper%20Bartelt,%20Bundesmann,%20Sevis.pdf

and a presentation, held with a Water Technology Seminar of the German American Chambers of Commerce in October and November 2013:
http://www.gaccmidwest.org/fileadmin/ahk_chicago/2013_EVENTS/2013_Water_Roundtable_WI/02_Dietrich_Bartelt.pdf

Resume:

LA County is proposing the “cleaning the reservoirs” in order to rehabilitate lost retention volume for flood protection.

We would like to support LA County with setting up a joint and more system sensitive, more cost effective and sustainable approach with continuous sediment management.

Comment 102-1

Due to the Christmas break, we were not able to set up a project team with participating organizations or companies, but we would be ready to contribute to the success of your project. We had a personal conversation with the Director of NREL - National Renewable Energy Laboratory on Dec 12th, and addressed him for cooperation on the issue of continuous sediment management just before Christmas. Besides, we are waiting for response of further organizations and companies.

Please let us know what you think. Would you be interested to know more? At the cost of travel expenses, we are ready to provide a presentation or a lecture, if asked for, even on short notice.

We want to wish you and your colleagues a good and successful New Year 2014.

Best regards,

Dietrich Bartelt

Dr. Dietrich Bartelt, Dipl.-Ing.
DB Sediments GmbH
Bismarckstr. 142, 47057 Duisburg, Germany

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Sitz der Gesellschaft: Duisburg
Eingetragen beim Amtsgericht Duisburg
Handelsregister-Nr. HRB 21143
USt-IdNr. DE815063955

www.db-sediments.com www.germanwaterpartnership.de

Response to Comment Letter #102 (Dietrich Bartelt – DB Sediments GmbH)

Response to Comment 102-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

Los Angeles County Flood Control District (LACFCD) does not store water in the Devil's Gate Reservoir for drinking water purposes. As noted in the Draft Environmental Impact Report (EIR), the purpose of the Proposed Project is to reduce flood risk by restoring reservoir capacity for flood control. The ConSedTrans Method relies on water held behind the dam for sediment transport operations. On average, Devil's Gate Reservoir does not receive inflow for many months out of the year and is often dry. Therefore, holding water behind the dam permanently would entail having standing water in the reservoir most of the year. Holding water behind the dam permanently is not a part of the Proposed Project objectives and is outside the scope of this project.

From:	Dwayne Miles
To:	reservoircleanouts
Cc:	yellowd100@gamil.com
Subject:	Devil's Gate Reservoir Sediment Removal and Management Project
Date:	Monday, January 06, 2014 3:18:09 PM

Hi,

My name is Dwayne Miles. I live at 1270 Cordova St. Pasadena.

Comment 103-1

I have looked at all the plans for the sediment removal project sponsored by the county, and all the plans will have an impact on our Disc Golf Course. Alternative 3 is the best plan, but the western branch will remove 2 of our playable positions. Please re-visit the sediment removal plans and make an alternative plan that will not impact the disc golf course.

This is the first Disk Golf Course ever built for one of the most rapidly growing sports in the world. The loss of these two "Holes" (two of the most challenging) would be a great loss. Please reconsider changing anything in this part of the Watershed Park.

Thank you,
Dwayne Miles

Response to Comment Letter #103 (Dwayne Miles)

Response to Comment 103-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. No official disc golf course holes located in the Oak Grove area of Hahamongna Watershed Park will be removed by the Proposed Project. As noted in the Draft Environmental Impact Report (EIR), Section 3.15, Los Angeles County Flood Control District (LACFCD) recognizes the importance of the area to those who take advantage of the recreational opportunities offered, including the Oak Grove Disc Golf Course. Where possible, Los Angeles County Flood Control District (LACFCD) will avoid any disc golf course holes located outside the Oak Grove area of Hahamongna Watershed Park. When avoidance is not possible, LACFCD will coordinate with the Oak Grove Disc Golf Club for removal of the disc golf hole equipment.

Alternative 3, Configuration D, the Environmentally Superior Alternative from the Draft Environmental Impact Report (EIR), carefully balances flood control needs and reductions in impacts to habitat by restoring the required reservoir capacity while also minimizing the project footprint (see Section 4.6 of the Final EIR). Furthermore, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2 would avoid excavation of the western branch, thereby providing a greater distance between the Oak Grove area of Hahamongna Watershed Park and the excavation area, reducing the project footprint of 120 acres down to 71 acres. Alternative 3, Configuration D, Option 2 would also avoid all currently existing Oak Grove Disc Golf Club holes. The Oak Grove area of Hahamongna Watershed Park and the associated facilities would remain open during sediment removal and would continue to provide active recreational facilities to the area.

From: Francia DiMase
To: reservoircleanouts
Subject: Devil"s Gate Reservoir Sediment Removal and Management Project
Date: Sunday, January 05, 2014 8:48:02 PM

Dear LACDPW,

Comment 104-1

I am writing to urge that another solution be researched to solve the issue of excess sediment that has built up behind Devil's Dam. The current proposal, trucks hauling non stop for over a five year time period, is completely unacceptable on so many levels. The expense and resources involved in such a gigantic undertaking are illogical.

I stand with my family, my neighbors and the surrounding, tax-paying communities to say this project must NOT go forward as is.

Thank you for your time.

Francia DiMase
818-790-7244

Response to Comment Letter #104 (Francia DiMase)

Response to Comment 104-1:

Thank you for your input. This comment has been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. Los Angeles County Flood Control District (LACFCD) notes the commenter's objection to the Proposed Project.

The goal of Los Angeles County Flood Control District (LACFCD) is to restore reservoir flood capacity as soon as feasible while reducing costs and minimizing the duration of environmental and construction impacts to the surrounding communities.

Although the sediment removal phase of the Proposed Project will occur over a five-year period, the removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays), as described in the Draft Environmental Impact Report (EIR), Section 2.5.1 Sediment Removal Phase, Project Schedule. The Draft EIR outlines a 12-hour trucking schedule, with trucking operations on Saturdays as well. This schedule is used to model the most intensive construction operation, which may not be applicable at the site for the duration of the project. Typical trucking schedules are estimated to be 8 hours per day on weekdays.

Los Angeles County Flood Control District (LACFCD) goes to great lengths to lessen project impacts and maximize efficiencies. For example, the Draft EIR concluded that Alternative 3 is the Environmentally Superior Alternative. Alternative 3, Configuration D, Option 2 drastically reduces the project's footprint of 120 acres down to 71 acres. Additionally, the limited maintenance area for Alternative 3 further reduces the permanent habitat impacts down to approximately 51 acres by allowing for site replanting and mitigation to take place within the reservoir footprint. This reduction in project acreages will greatly lessen environmental impacts of the Proposed Project.

From: Henry@yahoo
To: reservoircleanouts
Subject: Oak Grove Disc Course
Date: Sunday, January 05, 2014 11:16:36 AM

County of Los Angeles Department of Public Works Water Resources Division,

Comment 105-1

Please consider any decision that will impact Oak Grove Disc Golf Course. this course is a historical place to play, any alterations to it may change the feel of it for the worse. I urge any of you on this project to play a round of disc golf here to see for yourself...how special this course really is, especially the holes that would be impacted by this project. There are so much the government needs to fix, start with the bigger issues and leave this course be, stop trying to take people's fun away.

Thanks,

Henry Correa

Sent from my iPhone

Response to Comment Letter #105 (Henry Correa)

Response to Comment 105-1:

Thank you for your input. This comment has been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. No official disc golf course holes located in the Oak Grove area of Hahamongna Watershed Park will be removed by the Proposed Project. As noted in the Draft Environmental Impact Report (EIR), Section 3.15, Los Angeles County Flood Control District (LACFCD) recognizes the importance of the area to those who take advantage of the recreational opportunities offered, including the Oak Grove Disc Golf Course. Where possible, Los Angeles County Flood Control District (LACFCD) will avoid any disc golf course holes located outside the Oak Grove area of Hahamongna Watershed Park. When avoidance is not possible, LACFCD will coordinate with the Oak Grove Disc Golf Club for removal of the disc golf hole equipment.

Alternative 3, Configuration D, the Environmentally Superior Alternative from the Draft Environmental Impact Report (EIR), carefully balances flood control needs and reductions in impacts to habitat by restoring the required reservoir capacity while also minimizing the project footprint (see Section 4.6 of the Final EIR). Furthermore, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2 would avoid excavation of the western branch, thereby providing a greater distance between the Oak Grove area of Hahamongna Watershed Park and the excavation area, reducing the project footprint of 120 acres down to 71 acres. Alternative 3, Configuration D, Option 2 would also avoid all currently existing Oak Grove Disc Golf Club holes. The Oak Grove area of Hahamongna Watershed Park and the associated facilities would remain open during sediment removal and would continue to provide active recreational facilities to the area.

From:	howard.tan@gmail.com on behalf of Howard Tan
To:	reservoircleanouts
Subject:	Devil's Gate Reservoir Sediment Removal and Management Project
Date:	Monday, January 06, 2014 2:46:42 PM

Hi,

My name is Howard Tan. I live at 2884 Sterling Pl, Altadena, CA 91001.

Comment 106-1

I have looked at all the plans for the sediment removal project sponsored by the county, and all the plans will have an impact on our Disc Golf Course. Alternative 3 is the best plan, but the western branch will remove 2 of our playable positions. Please re-visit the sediment removal plans and make an alternative plan that will not impact the disc golf course.

Take care,
Howard

Response to Comment Letter #106 (Howard Tan)

Response to Comment 106-1:

Thank you for your input. This comment has been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. No official disc golf course holes located in the Oak Grove area of Hahamongna Watershed Park will be removed by the Proposed Project. As noted in the Draft Environmental Impact Report (EIR), Section 3.15, Los Angeles County Flood Control District (LACFCD) recognizes the importance of the area to those who take advantage of the recreational opportunities offered, including the Oak Grove Disc Golf Course. Where possible, Los Angeles County Flood Control District (LACFCD) will avoid any disc golf course holes located outside the Oak Grove area of Hahamongna Watershed Park. When avoidance is not possible, LACFCD will coordinate with the Oak Grove Disc Golf Club for removal of the disc golf hole equipment.

Alternative 3, Configuration D, the Environmentally Superior Alternative from the Draft Environmental Impact Report (EIR), carefully balances flood control needs and reductions in impacts to habitat by restoring the required reservoir capacity while also minimizing the project footprint (see Section 4.6 of the Final EIR). Furthermore, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2 would avoid excavation of the western branch, thereby providing a greater distance between the Oak Grove area of Hahamongna Watershed Park and the excavation area, reducing the project footprint of 120 acres down to 71 acres. Alternative 3, Configuration D, Option 2 would also avoid all currently existing Oak Grove Disc Golf Club holes. The Oak Grove area of Hahamongna Watershed Park and the associated facilities would remain open during sediment removal and would continue to provide active recreational facilities to the area.

From: Jeff Nyerges
To: reservoircleanouts
Subject: Devil's Gate Reservoir Sediment Removal and Management Project
Date: Friday, January 03, 2014 2:36:43 PM

Hi,

Comment 107-1

My name is Jeffrey Nyerges. I am a long time user of the disc golf course in Hahumunga Watershed Park. I serve on the Board of Directors for the Southern California Disc Golf Association. I live at 6233 1/2 Temple City Blvd. Temple City, CA 91780

Comment 107-2

I have looked at all the plans for the sediment removal project sponsored by the county, and all the plans will have an impact on our Disc Golf Course. Alternative 3 is the best plan, but the western branch will remove 2 of our playable positions. Please re-visit the sediment removal plans and make an alternative plan that will not impact the disc golf course.

Oak Grove Disc Golf Course is The **1st EVER** permanent disc golf course **IN THE WORLD**. The course should be recognized as a historical Landmark, and we (Oak Grove Disc Golf Club, Southern California Disc Golf Assoc.) will be filing our application for such.

Thank you,
Jeff Nyerges
PDGA #39323

Response to Comment Letter #107 (Jeff Nyerges)

Response to Comment 107-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

Response to Comment 107-2:

No official disc golf course holes located in the Oak Grove area of Hahamongna Watershed Park will be removed by the Proposed Project. As noted in the Draft Environmental Impact Report (EIR), Section 3.15, Los Angeles County Flood Control District (LACFCD) recognizes the importance of the area to those who take advantage of the recreational opportunities offered, including the Oak Grove Disc Golf Course. Where possible, Los Angeles County Flood Control District (LACFCD) will avoid any disc golf course holes located outside the Oak Grove area of Hahamongna Watershed Park. When avoidance is not possible, LACFCD will coordinate with the Oak Grove Disc Golf Club for removal of the disc golf hole equipment.

Alternative 3, Configuration D, the Environmentally Superior Alternative from the Draft Environmental Impact Report (EIR), carefully balances flood control needs and reductions in impacts to habitat by restoring the required reservoir capacity while also minimizing the project footprint (see Section 4.6 of the Final EIR). Furthermore, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2 would avoid excavation of the western branch, thereby providing a greater distance between the Oak Grove area of Hahamongna Watershed Park and the excavation area, reducing the project footprint of 120 acres down to 71 acres. Alternative 3, Configuration D, Option 2 would also avoid all currently existing Oak Grove Disc Golf Club holes. The Oak Grove area of Hahamongna Watershed Park and the associated facilities would remain open during sediment removal and would continue to provide active recreational facilities to the area.

From: John Harris
To: reservoircleanouts
Subject: Devil"s Gate Reservoir Sediment Removal and Management Project
Date: Saturday, January 04, 2014 9:25:29 PM

Dear Sirs,

Comment 108-1

While we all realize something must be done to manage the sediment in Devil's Gate Reservoir, the plan put forward by the LA County Flood Control District will adversely impact the lives of thousands of people who live in the neighborhood and/or who visit Hahamongna Park for recreational purposes.

Comment 108-2

I strongly urge you therefore to consider the slow and sustainable sediment removal program put forward by the Arroyo Seco Foundation—a plan that will maintain flood protection for downstream communities, reduce negative impacts on the surrounding neighborhoods, take advantage of the natural geological processes that transport sediment, and protect the rich habitat and recreational opportunities in Hahamongna Watershed Park.

Sincerely,

John M. Harris, Ph.D.
1515 Washburn Road
Pasadena, CA 91105
(323) 257-3351
jharris@nhm.org

Response to Comment Letter #108 (John Harris)

Response to Comment 108-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

The goal of Los Angeles County Flood Control District (LACFCD) is to restore reservoir flood capacity as soon as feasible while reducing costs and minimizing the duration of environmental and construction impacts to the surrounding communities.

Impacts to recreation were analyzed in the Draft Environmental Impact Report (EIR), Section 3.15. The Proposed Project will not limit the use of the Oak Grove area of Hahamongna Watershed Park. Sediment removal activities would be temporary and are expected to occur only in the drier months (April to December, excluding holidays). It is expected that these activities will often not be adjacent to the Oak Grove area of Hahamongna Watershed Park. The Proposed Project would result in temporary limitations on the recreational use of the Proposed Project site and some of the adjacent trails. Most of these areas would be reopened seasonally or intermittently throughout the sediment removal process. In addition, temporary impacts to designated recreational facilities and trails will be minimized through advance communication and redirection to the nearest facility in the vicinity of the Proposed Project. Furthermore, an east-west trail crossing will continue to provide access at the north end of the reservoir. At the south end of the reservoir, after the reservoir ingress and egress ramps have been fully constructed, access to the upper east side Arroyo Seco Trail from La Cañada Verdugo Road will be maintained and the linkage from the west side Arroyo Seco Trail and the Flint Wash Trail to the upper east side Arroyo Seco Trail (crossing Devil's Gate Dam and also continuing south to the Rose Bowl) will be available after construction activities have ended each day and on nonworking days.

Alternative 3, Configuration D affects the least amount of reservoir area of all the action alternatives, while still achieving Proposed Project objectives (see Section 4.6 of the Final EIR). This alternative would provide a buffer between the Oak Grove area of Hahamongna Watershed Park and the excavation area. Alternative 3, Configuration D, Option 1 provides a more natural configuration for the reservoir by having two branches to carry water and sediment toward the face of the dam, avoiding disturbing a significant portion of existing vegetation. To further reduce the Proposed Project's footprint, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2, which drastically reduces the project's footprint of 120 acres down to 71 acres, would avoid excavation of the western branch, thereby providing a greater habitat buffer on the west side of the reservoir. In addition, the maintenance areas would be smaller than the original sediment removal footprint, allowing for habitat to reestablish.

The Proposed Project is designed to be a long-term plan, with the reservoir management phase providing management for future sediment inflows. The proposed yearly cleanout of sediment after the completion of the Proposed Project will reduce the necessity for a future large-scale cleanout.

Response to Comment 108-2:

LACFCD goes to great lengths to lessen project impacts and maximize efficiencies. As such, many of the points in the Arroyo Seco Foundation's four-point "Slow Program" are compatible with the LACFCD Proposed Project.

For example, the Draft Environmental Impact Report (EIR) concluded that Alternative 3 is the Environmentally Superior Alternative. As discussed above, Alternative 3, Configuration D, Option 2 drastically reduces the project's footprint. This reduction in project acreages will greatly lessen environmental impacts of the Proposed Project.

LACFCD strives to achieve an efficient, low-cost sediment removal project. Sediment removal rates and trucking operations, now utilizing all low-emissions trucks, as explained in Section 3.5 of the Draft EIR, have been carefully planned for economies of scale to realize maximum efficiencies without major delays in project schedule, thus greatly reducing operating costs. Furthermore, LACFCD has applied for and received an approximately $28 million grant through the State's Disaster Preparedness and Flood Protection Bond Act of 2006 (Proposition 1E) program. A portion of this grant will be used to help offset the Proposed Project's costs.

While sluicing is not a viable project alternative, as explained in Section 4.7 of the Draft EIR, Flow Assisted Sediment Transport, or FASTing, will be used for maintenance after the project's main sediment removal phase has been completed, as described in Section 2.5.2 of the Draft EIR.

LACFCD is committed to *Public Service that Works*; and by combining almost 100 years of technical expertise and invaluable input from the community, less invasive flood protection will continue to be a reality.

For a more detailed response to the Arroyo Seco Foundation's four-point "Slow Program", please see the response to the Arroyo Seco Foundation's comment letter (Comment Letter #216, Response to Comment 216-16).

From: John May
To: reservoircleanouts
Subject: Devil's Gate Reservoir Sediment Removal and Management Project
Date: Thursday, January 02, 2014 6:39:14 PM

Dear Los Angeles County Flood Control District Team,

Comment 109-1

I live in Altadena very near to the Hahamogna Watershed Park and I visit the park and play disc golf at the historic Oak Grove Disc Golf Course several times a week. It was brought to my attention by the other members of the Oak Grove Disc Golf Club that all of the plans in the recent draft environmental impact report would result in the destruction of two of the current holes on the course. In our option the best of the proposed plans is alternative 3, but the western branch of alternative 3 still significantly impacts the course. We would prefer that the LACFCD implement another alternative that can preserve the existing disc golf course.

Best,

John P. May, Ph.D
880 Mountain View St.
Altadena, CA

Response to Comment Letter #109 (John May)

Response to Comment 109-1:

Thank you for your input. This comment has been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. Alternative 3, Configuration D, Option 1 would not result in the destruction of any holes, as suggested by the commenter. No official disc golf course holes located in the Oak Grove area of Hahamongna Watershed Park will be removed by the Proposed Project. As noted in the Draft Environmental Impact Report (EIR), Section 3.15, Los Angeles County Flood Control District (LACFCD) recognizes the importance of the area to those who take advantage of the recreational opportunities offered, including the Oak Grove Disc Golf Course. Where possible, Los Angeles County Flood Control District (LACFCD) will avoid any disc golf course holes located outside the Oak Grove area of Hahamongna Watershed Park. When avoidance is not possible, LACFCD will coordinate with the Oak Grove Disc Golf Club for removal of the disc golf hole equipment.

Alternative 3, Configuration D, the Environmentally Superior Alternative from the Draft Environmental Impact Report (EIR), carefully balances flood control needs and reductions in impacts to habitat by restoring the required reservoir capacity while also minimizing the project footprint (see Section 4.6 of the Final EIR). Furthermore, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2 would avoid excavation of the western branch, thereby providing a greater distance between the Oak Grove area of Hahamongna Watershed Park and the excavation area, reducing the project footprint of 120 acres down to 71 acres. Alternative 3, Configuration D, Option 2 would also avoid all currently existing Oak Grove Disc Golf Club holes. The Oak Grove area of Hahamongna Watershed Park and the associated facilities would remain open during sediment removal and would continue to provide active recreational facilities to the area.

From: jon foreman
To: reservoircleanouts
Subject: Devil"s gate reservoir sediment removal and management project
Date: Sunday, January 05, 2014 3:13:11 PM

Hello my name is Jonathan Foreman ,

Comment 110-1 I have seen the plans for the sediment removal project and I feel the plans will have a large impact on the disc golf course. I hope you can revisit the plans and change things up.

Thank you, Jonathan

Response to Comment Letter #110 (Jonathan Foreman)

Response to Comment 110-1:

Thank you for your input. This comment has been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. As noted in the Draft Environmental Impact Report (EIR), Section 3.15, Los Angeles County Flood Control District (LACFCD) recognizes the importance of the area to those who take advantage of the recreational opportunities offered, including the Oak Grove Disc Golf Course. The Proposed Project and Alternatives would not have a "large impact" on the disc golf course as suggested in the comment. No official disc golf course holes located in the Oak Grove area of Hahamongna Watershed Park will be removed by the Proposed Project. Where possible, Los Angeles County Flood Control District (LACFCD) will avoid any disc golf course holes located outside the Oak Grove area of Hahamongna Watershed Park. When avoidance is not possible, LACFCD will coordinate with the Oak Grove Disc Golf Club for removal of the disc golf hole equipment.

Alternative 3, Configuration D, the Environmentally Superior Alternative from the Draft Environmental Impact Report (EIR), carefully balances flood control needs and reductions in impacts to habitat by restoring the required reservoir capacity while also minimizing the project footprint (see Section 4.6 of the Final EIR). Furthermore, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2 would avoid excavation of the western branch, thereby providing a greater distance between the Oak Grove area of Hahamongna Watershed Park and the excavation area, reducing the project footprint of 120 acres down to 71 acres. Alternative 3, Configuration D, Option 2 would also avoid all currently existing Oak Grove Disc Golf Club holes. The Oak Grove area of Hahamongna Watershed Park and the associated facilities would remain open during sediment removal and would continue to provide active recreational facilities to the area.

From: Quiet Alias
To: reservoircleanouts
Subject: Devil"s Gate Reservoir Sediment Removal and Management Project
Date: Friday, January 03, 2014 4:39:35 PM

Hi,

My name is Lara Ramsey. I live at 4802 N 34th DR, Phx, AZ.

Comment 111-1

I have looked at all the plans for the sediment removal project sponsored by the county, and all the plans will have an impact on our Disc Golf Course. Alternative 3 is the best plan, but the western branch will remove 2 of our playable positions. Please re-visit the sediment removal plans and make an alternative plan that will impact the disc golf course.

In honesty, I've never actually been on the course. The course, however... It means a lot to my cousin and a couple of friends of ours. She seems distraught about all of this, and I just want to do everything I can to help her. Due to the fact that I can't even console her at this moment - since we are separated. A lot of people actually do have some kind of connection to this course. Perhaps, you could really re-visit the sediment removal plans and really make an alternative that will not interfere with, well, anyone. Seems like the courteous thing to do, from my point of view, anyway. If you actually can do something different, myself and probably hundreds of other people with sentimental attachment to said course would be forever grateful. I know you probably busy and everything, but if you **can** do something - just please.

Thank you,
Lara Ramsey

Response to Comment Letter #111 (Lara Ramsey)

Response to Comment 111-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. No official disc golf course holes located in the Oak Grove area of Hahamongna Watershed Park will be removed by the Proposed Project. As noted in the Draft Environmental Impact Report (EIR), Section 3.15, Los Angeles County Flood Control District (LACFCD) recognizes the importance of the area to those who take advantage of the recreational opportunities offered, including the Oak Grove Disc Golf Course. Where possible, Los Angeles County Flood Control District (LACFCD) will avoid any disc golf course holes located outside the Oak Grove area of Hahamongna Watershed Park. When avoidance is not possible, LACFCD will coordinate with the Oak Grove Disc Golf Club for removal of the disc golf hole equipment.

Alternative 3, Configuration D, the Environmentally Superior Alternative from the Draft Environmental Impact Report (EIR), carefully balances flood control needs and reductions in impacts to habitat by restoring the required reservoir capacity while also minimizing the project footprint (see Section 4.6 of the Final EIR). Furthermore, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2 would avoid excavation of the western branch, thereby providing a greater distance between the Oak Grove area of Hahamongna Watershed Park and the excavation area, reducing the project footprint of 120 acres down to 71 acres. Alternative 3, Configuration D, Option 2 would also avoid all currently existing Oak Grove Disc Golf Club holes. The Oak Grove area of Hahamongna Watershed Park and the associated facilities would remain open during sediment removal and would continue to provide active recreational facilities to the area.

From: Leigh Adams
To: reservoircleanouts
Cc: Monica Hubbard
Subject: Devil"s Gate Reservoir
Date: Friday, January 03, 2014 10:29:19 PM

Comment 112-1

Hello Public Works, I am a twenty year resident of Altadena and an avid user of the riparian path of the Hahamonga watershed. I enjoy hiking there, walking my dog, hanging out and reading a book, wandering the trails and bird watching. In addition, I have ridden both bikes and horses through those dusty pathways and I remember back when it wasn't so dusty and was much more verdant.

Comment 112-2

I am extremely disturbed by your plan to excavate the Reservoir. I do not believe this is in the best interest of the environment, the wildlife, the domestic life, the eco-system or any other system. In fact, quite the opposite. In this time of drought and global warming, and yes, it's real, the removal of trees is a major step in the process of DESERTIFICATION! The trees are removed, the ground warms up, less rain falls, fewer trees grow.....and it gets hotter and drier. It is simple science; we teach it to kindergartners, can we teach it to county agencies?

It seems to me that we can spend our time, tax dollars and expertise to solve this issue in some way other than the diesel solution that is being proposed. Even the Army Corps of Engineers thinks the current plan is a dreadful idea!

Comment 112-3

Hmmm, who benefits by the destruction of habitat, the use of massive expensive equipment? Who hands out those contracts? Would the old adage "follow the money" bring us closer to an answer as to why other ideas have not been pursued? Do the stakeholders living around the Arroyo have any say in whether or not they are inundated with diesel noise, tractors, trucks and dust for months, many, many loud, dusty months?

Comment 112-4

I understand sediment is an issue. So is the loss of habitat for our native species!!! And the loss of valuable recreation area. We are the taxpayers whose work funds these projects. We demand a say in how OUR problems are solved. Do not move forward with this ill conceived plan!

With all due respect,

Leigh Adams

Response to Comment Letter #112 (Leigh Adams)

Response to Comment 112-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. Los Angeles County Flood Control District (LACFCD) notes, as described in the Draft Environmental Impact Report (EIR), the many recreational opportunities in the reservoir, including hiking, passive recreation, and bird watching.

Response to Comment 112-2:

Los Angeles County Flood Control District (LACFCD) goes to great lengths to lessen project impacts and maximize efficiencies.

As discussed in Section 3.6.6 of the Draft EIR, Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats. In addition, sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays). Also per Section 3.9.6 of the Draft EIR, impacts to greenhouse gas emissions were found to be less than significant.

Additionally, air quality impacts associated with truck traffic were analyzed in the Draft EIR in Section 3.5. LACFCD has conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet the U.S. Environmental Protection Agency's (EPA's) 2007 standards for emissions. Therefore, in order to further reduce emissions, MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump trucks that meet the EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality will be reduced to less than significant.

The Draft EIR analyzed a range of sediment removal amounts and configurations aimed at addressing the diverse concerns of stakeholders, including concerns for long-term habitat preservation and recreational usage. The alternatives presented in the Draft EIR represent the best options available to respond to stakeholders' concerns while adequately reducing flood risk to downstream communities. The Draft EIR, Section 4, fully analyzed six alternatives including the No Project Alternative. These alternatives substantially lessen one or more significant effects of the Proposed Project and, with the exception of the mandatory No Project Alternative, would feasibly attain most of the basic objectives of the Proposed Project.

Alternative 3, Configuration D affects the least amount of habitat of all the action alternatives while still achieving Proposed Project objectives (see Section 4.6 of the Final EIR). This alternative would provide a buffer on the west side of the reservoir that would allow for the movement of wildlife. Alternative 3, Configuration D, Option 1 provides a more natural configuration for the reservoir by having two branches to carry water and sediment toward the face of the dam, avoiding disturbing a significant portion of existing vegetation. To further reduce the Proposed Project's footprint, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2, which drastically reduces the project's footprint of 120 acres down to 71 acres, would avoid excavation of the western branch, thereby providing a greater habitat buffer on the west side of the reservoir. In addition, the maintenance areas would be smaller than the original sediment removal footprint, allowing for habitat to reestablish and providing additional areas for wildlife movement.

The Proposed Project is designed to be a long-term plan, with the reservoir management phase providing management for future sediment inflows. The proposed yearly cleanout of sediment after the completion of the Proposed Project will reduce the necessity for a future large-scale cleanout.

The United States Army Corps of Engineers (USACE) Arroyo Seco Watershed Ecosystem Restoration Study was prepared in partnership with the Los Angeles County Department of Public Works (LACDPW). LACFCD has been and will continue to work closely with USACE to identify appropriate mitigation, replacement ratios, and sites for restoration and enhancement that will offset impacts and satisfy the requirements of all applicable laws.

Response to Comment 112-3:

LACFCD must remove sediment that has accumulated behind the dam to restore the capacity of Devil's Gate Reservoir to minimize the level of flood risk to downstream communities along the Arroyo Seco. In its current condition, the reservoir no longer has the capacity to safely contain another major debris event; and the outlet works have a risk of becoming clogged and inoperable. The goal of LACFCD is to restore reservoir flood capacity as soon as feasible while reducing costs, minimizing the duration of environmental and construction impacts to the surrounding communities, and configuring the reservoir to allow for sustainable future maintenance.

LACFCD uses a formally advertised sealed bid process for public works construction contracting. The goal of the process is to award a contract to the lowest cost "responsive" and "responsible" bidder. California Public Contract Code mandates the use of an advertised bid process for construction contracting. Contractors and service providers must meet certain qualification requirements to be considered by the County for selection and contract award.

More detailed information on the County's construction bidding process can be found in the *County of Los Angeles Countywide Construction Policy Guidelines* available online at the following location: http://dpw.lacounty.gov/aed/construction_manual.pdf

LACFCD actively encouraged stakeholder involvement at the two scoping meetings, during the scoping period, during the 90-day Draft EIR public review period, and at the three community meetings. Additionally, three information meetings regarding the Proposed Project will be held in the near future. See Response to Comment 112-2 regarding other alternatives analyzed.

Response to Comment 112-4:

See Response to Comments 112-2 and 112-3.

Impacts to recreation were analyzed in the Draft EIR, Section 3.15. The Proposed Project will not limit the use of the Oak Grove area of Hahamongna Watershed Park. Sediment removal activities would be temporary and are expected to occur only in the drier months, as mentioned above. It is expected that these activities will often not be adjacent to the Oak Grove area of Hahamongna Watershed Park. The Proposed Project would result in temporary limitations on the recreational use of the Proposed Project site and some of the adjacent trails. Most of these areas would be reopened seasonally or intermittently throughout the sediment removal process. In addition, temporary impacts to designated recreational facilities and trails will be minimized through advance communication and redirection to the nearest facility in the vicinity of the Proposed Project. Furthermore, an east-west trail crossing will continue to provide access at the north end of the reservoir. At the south end of the reservoir, after the reservoir

ingress and egress ramps have been fully constructed, access to the upper east side Arroyo Seco Trail from La Cañada Verdugo Road will be maintained and the linkage from the west side Arroyo Seco Trail and the Flint Wash Trail to the upper east side Arroyo Seco Trail (crossing Devil's Gate Dam and also continuing south to the Rose Bowl) will be available after construction activities have ended each day and on nonworking days.

LACFCD notes the commenter's objection to the Proposed Project.

From: Luis Mistero
To: reservoircleanouts
Subject: Devil's Gate Reservoir Sediment Removal and Management Project
Date: Monday, January 06, 2014 5:05:53 PM

Hi,

My name is Luis De La O. I live at 729 N. Garfield ave pasadena ca 91104.

Comment 113-1

I have looked at all the plans for the sediment removal project sponsored by the county, and all the plans will have an impact on our Disc Golf Course. Alternative 3 is the best plan, but the western branch will remove 2 of our playable positions. Please re-visit the sediment removal plans and make an alternative plan that will not impact the disc golf course.

(I grew up playing here, and now I have a son that is loving the game of DISC GOLF)

Thank you,
Luis De La O.

Response to Comment Letter #113 (Luis De La O)

Response to Comment 113-1:

Thank you for your input. This comment has been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. No official disc golf course holes located in the Oak Grove area of Hahamongna Watershed Park will be removed by the Proposed Project. As noted in the Draft Environmental Impact Report (EIR), Section 3.15, Los Angeles County Flood Control District (LACFCD) recognizes the importance of the area to those who take advantage of the recreational opportunities offered, including the Oak Grove Disc Golf Course. Where possible, Los Angeles County Flood Control District (LACFCD) will avoid any disc golf course holes located outside the Oak Grove area of Hahamongna Watershed Park. When avoidance is not possible, LACFCD will coordinate with the Oak Grove Disc Golf Club for removal of the disc golf hole equipment.

Alternative 3, Configuration D, the Environmentally Superior Alternative from the Draft Environmental Impact Report (EIR), carefully balances flood control needs and reductions in impacts to habitat by restoring the required reservoir capacity while also minimizing the project footprint (see Section 4.6 of the Final EIR). Furthermore, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2 would avoid excavation of the western branch, thereby providing a greater distance between the Oak Grove area of Hahamongna Watershed Park and the excavation area, reducing the project footprint of 120 acres down to 71 acres. Alternative 3, Configuration D, Option 2 would also avoid all currently existing Oak Grove Disc Golf Club holes. The Oak Grove area of Hahamongna Watershed Park and the associated facilities would remain open during sediment removal and would continue to provide active recreational facilities to the area.

From: Luke Meyer
To: reservoircleanouts
Subject: Devil's Gate Reservoir Sediment Removal and Management Project
Date: Monday, January 06, 2014 3:54:52 PM

Hi,

My name is Luke Meyer. I live in Claremont, CA.

Comment 114-1

I have looked at all the plans for the sediment removal project sponsored by the county, and all the plans will have an impact on our Disc Golf Course. Alternative 3 is the best plan, but the western branch will remove 2 of our playable positions. Please re-visit the sediment removal plans and make an alternative plan that will not impact the disc golf course.

Seeing that this is sacred place for disc golfers (first permanent course ever), I think our input should be valued.

Thank you,
Luke Meyer

Response to Comment Letter #114 (Luke A Meyer)

Response to Comment 114-1:

Thank you for your input. This comment has been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. Los Angeles County Flood Control District (LACFCD) recognizes the importance of the Oak Grove Disc Golf Course to the community. Community and agency input during preparation of the Draft Environmental Impact Report (EIR) was valued by LACFCD and used for decision making purposes. No official disc golf course holes located in the Oak Grove area of Hahamongna Watershed Park will be removed by the Proposed Project. Where possible, LACFCD will avoid any disc golf course holes located outside the Oak Grove area of Hahamongna Watershed Park. When avoidance is not possible, LACFCD will coordinate with the Oak Grove Disc Golf Club for removal of the disc golf hole equipment.

Alternative 3, Configuration D, the Environmentally Superior Alternative from the Draft Environmental Impact Report (EIR), carefully balances flood control needs and reductions in impacts to habitat by restoring the required reservoir capacity while also minimizing the project footprint (see Section 4.6 of the Final EIR). Furthermore, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2 would avoid excavation of the western branch, thereby providing a greater distance between the Oak Grove area of Hahamongna Watershed Park and the excavation area, reducing the project footprint of 120 acres down to 71 acres. Alternative 3, Configuration D, Option 2 would also avoid all currently existing Oak Grove Disc Golf Club holes. The Oak Grove area of Hahamongna Watershed Park and the associated facilities would remain open during sediment removal and would continue to provide active recreational facilities to the area.

From: Luke Meyer
To: reservoircleanouts
Subject: Devil's Gate Reservoir Sediment Removal and Management Project
Date: Saturday, January 04, 2014 9:07:18 PM

Comment 115-1 Your alternatives are not good enough. Please make another alternative without the western branch trenching in Alternative 3.

Thank you,
Luke Meyer

Response to Comment Letter #115 (Luke Meyer)

Response to Comment 115-1:

Thank you for your input. This comment has been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. Alternative 3, Configuration D, the Environmentally Superior Alternative from the Draft Environmental Impact Report (EIR), carefully balances flood control needs and reductions in impacts to habitat by restoring the required reservoir capacity while also minimizing the project footprint (see Section 4.6 of the Final EIR). To further address your concern, Los Angeles County Flood Control District (LACFCD) has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2, which drastically reduces the project's footprint of 120 acres down to 71 acres, would avoid excavation of the western branch, thereby providing a greater habitat buffer on the west side of the reservoir. In addition, the maintenance areas would be smaller than the original sediment removal footprint, allowing for habitat to reestablish.

From: MartynBelmont@aol.com
To: reservoircleanouts
Cc: pollywheaton@att.net
Subject: Hahamonga Project
Date: Thursday, January 02, 2014 6:53:49 PM

I am very worried that the proposed project to remove ALL THE SILT as well as ALL THE CHAPPAREL AND NATIVE PLANTS is one of the worst cases of over-kill I have ever seen. I am the past President of the Pasadena Garden Club. The Garden Club of America has many position papers on just this kind of "project over-kill."

Comment 116-1

The silt has been accumulating for many years. We do not have to get rid of ALL OF IT by having a truck every 10 minutes every day for six years on the 210 fwy. And, we should never consider removing all the plant material surrounding Hahamonga as that growth is necessary to prevent floods after we have fires.

Please, reconsider this NAPALM ASSAULT on the Dam area and consider much less invasive cures.

Martyn Belmont
Past President, Pasadena Garden Club
Past President, La Casita Foundation
Member of the Board, La Casita Foundation

Response to Comment Letter #116 (Martyn Belmont – La Casita Foundation)

Response to Comment 116-1:

Thank you for your input. This comment has been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. Los Angeles County Flood Control District (LACFCD) notes the commenter's concern about the Proposed Project, especially the removal of vegetation; however, some vegetation must be removed in order to remove the many layers of sediment that have been deposited.

Approximately 1.3 million cubic yards (cy) of sediment came into the reservoir in just two storm seasons after the 2009 Station Fire. Over 92 years, the average amount of sediment deposited each year is approximately 130,000 cy; however, Devil's Gate Reservoir is a dynamic system with constantly changing amounts of sediment deposited from year to year, depending on the frequency and intensity of storm events. If the reservoir is left in its current state, the flood risk to downstream communities would be left at an unacceptable level.

LACFCD was mandated by the State Legislature to provide flood protection and water conservation within its boundaries.

A reservoir storage design capacity of two design debris events (DDEs) below the dam's lowest spillway was determined to be the standard acceptable level of risk at Devil's Gate Dam and Reservoir. The DDE volume of capacity is determined using the January 2006 Los Angeles County Department of Public Works (LACDPW) Hydrology Manual and the March 2006 LACDPW Sedimentation Manual. For Devil's Gate Dam and Reservoir, the required reservoir capacity is 4.0 million cy (two DDEs) below the spillway elevation of 1,040.50 feet.

The Hydrology Manual (January 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_Hydrology_Manual/2006%20Hydrology%20Manual-Divided.pdf

The Sedimentation Manual (March 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_sedimentation_manual/Sedimentation%20Manual-Second%20Edition.pdf

Additional information concerning DDE calculation methods has been added to the Final Environmental Impact Report (EIR), Section 2.3, Project Need.

Although the sediment removal phase of the Proposed Project will occur over a five-year period, the removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays), as described in the Draft EIR, Section 2.5.1, Sediment Removal Phase, Project Schedule.

The Draft EIR analyzed a range of sediment removal amounts and configurations aimed at addressing the diverse concerns of stakeholders, including concerns for long-term habitat preservation and recreational usage. The alternatives presented in the Draft EIR represent the best options available to respond to stakeholders' concerns while adequately reducing flood risk to downstream communities.

LACFCD goes to great lengths to lessen project impacts and maximize efficiencies. For example, the Draft EIR concluded that Alternative 3 is the Environmentally Superior Alternative. Alternative 3, Configuration D, Option 2 drastically reduces the project's footprint of 120 acres down to 71 acres. Additionally, the limited maintenance area for Alternative 3 further reduces the permanent habitat impacts down to approximately 51 acres by allowing for site replanting and mitigation to take place within the reservoir footprint. This reduction in project acreages will greatly lessen environmental impacts of the Proposed Project.

LACFCD is committed to *Public Service that Works*; and by combining almost 100 years of technical expertise and invaluable input from the community, less invasive flood protection will continue to be a reality.

To: **County of Los Angeles County**
Department of Public Works
Water Resources Division
Attn: Reservoir Cleanouts Program
P.O. Box 1460
Alhambra, CA 91802-1460

From: **Maura Townley**
mauratownley@sbcglobal.net

RE: Comments: Draft Environmental Impact Report for Devil's Gate Reservoir Sediment Removal and Management Project

Introduction:

My husband and I have lived in Altadena for 29 years and we walk our dogs at least 320 days per year in the Hahamongna Watershed Area, of which Devil's Gate is the dam/reservoir section. We enjoy the wildlife in the park; birds; mammals, and varied plant life that the park offers as well as the people we meet in Hahamongna. We enjoy its natural beauty, peaceful surroundings, and wide-open spaces. It represents a unique ecosystem and captures the beauty of the greater Arroyo Seco. The numerous oaks and mature trees provide shaded walking areas for people, pets, and other animals. We have made friends with people who ride their horses on the trails that are shared with people and dogs. It is also a healthy outlet for younger people who play soccer, walk, and play with frisbees. It has adequate and secure bathrooms and parking that other park areas/trails do not offer.

Comment 117-1

Concerns:

Recently, we became aware of the County's project for Devil's Gate sediment removal and management and the availability of the draft environmental impact report (DEIR). In addition, we have been advised that the County is planning a pipeline to pull water from Devil's Gate to Eaton Wash at essentially the same time. We believe that the impacts recreation has been understated and that mitigation measures need to be considered. We also believe that impacts to traffic, while determined to be significant and unavoidable around the reservoir, do not accurately reflect or attempt to mitigate negative impacts in the surrounding communities, especially along the proposed pipeline. It is important that impacts to passive recreational users be accurately stated and remedies toward mitigation be considered. Some of the concerns we have are as follows:

Comment 117-2

Comment 117-3

Recreation - According to the DEIR, use of park facilities may be less desirable due to construction-related emissions, noise, dust, visual, and traffic impacts associated with sediment removal. It is stated in the DEIR that "*recreational users may choose to visit other area parks, recreational facilities, or trails due to the temporary access restrictions or the indirect effects of construction-related activities during reservoir management activities*". The DEIR fails to recognize that there are no other parks that offer the special features that this park has to offer. Recreation uses such as horse-back riding, disc golf, and nature walks cannot relocate. There are no mitigations proposed for recreation impacts. **Why is the determination of recreation impacts determined to be less than significant when the are many uses that cannot continue during the construction phase and possibly beyond and that cannot relocate to other parks in the region? Do planners realize that the other parks do not have the same ample parking as Hahamongna or relative security? Why are there no mitigation measures beyond temporary and / or permanent displacement for all of these activities?**

Comment 117-4

Traffic – We are concerned about the traffic impacts along the Woodbury Corridor and New York Drive in Altadena as a result of this project and the related pipeline project. The impacts to Altadena have not been addressed beyond the immediate project area. However, traffic will exit

Comment 117-5

Comment 117-5 continued

the likely to be congested freeways and attempt to bypass the freeway traffic by driving through northern Pasadena and Altadena. This will have a tremendous impact on the quality of life for Altadena residents.
Why aren't the traffic impacts to alternate routes to the freeways being addressed and mitigated? Why is there no mention in this DEIR of the pipeline project that is described in the March 2013 Devil's Gate and Eaton Storm Water Flood Management Project Proposition 1-E grant funding request?

Conclusion:

Comment 117-6

I respectfully submit that the DEIR has overlooked some critical issues that may be involved with this project. Can the County do a risk assessment to see what the projected risk of flooding in the Arroyo might be? In addition the impact to traffic of trucks lining up to transport dirt is probably enormous, to say nothing of the possible pollution that could accrue from the diesel trucks. The population of birds, mammals, frogs, and other creatures that make up this complex ecosystem could be changed or damaged irreparably without a comprehensive plan. The dust and particulate matter discharged into the air could make the enjoyment of Hahamongna only a memory unless better and realistic mitigation is designed and the impact on traffic in La Canada, Pasadena, and Altadena is addressed—has this been adequately done in your estimation?

Comment 117-7

Hahamongna increases the quality of life of those who use it as well as adding economic value to the surrounding communities, and allows hikers, bikers, and horse lovers to keep away from traffic and allow them and drivers to stay safe. In Altadena there are no uniform sidewalks, for example, so it is very difficult for horsemen and horsewomen to ride on its streets in a safe manner. It is a place of tranquility, harmony, and decompression.

Thank you for your careful consideration of this very important issue. Lets hope that Hahamongna will continue to exist as a "flowing water, fruitful valley" for the generations to come.

Very truly yours,

Maura Townley

Maura Townley
429 East Pine Street
Altadena, CA, 91001

Response to Comment Letter #117 (Maura Townley)

Response to Comment 117-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. Los Angeles County Flood Control District (LACFCD) notes, as described in the Draft Environmental Impact Report (EIR), the many recreational opportunities in the reservoir including hiking, passive recreation, and bird watching.

Response to Comment 117-2:

The Devil's Gate Water Conservation Project is a separate project from the Devil's Gate Reservoir Sediment Removal and Management Project. The Devil's Gate Water Conservation Project is still in a conceptual design phase and is not currently scheduled for construction; however, this project was included in the cumulative analysis, as noted in the Draft EIR in Table 2.9-1: Cumulative Projects.

Response to Comment 117-3:

See Response to Comment 117-2. The Proposed Project does not involve construction of a pipeline. The traffic impacts associated with the Proposed Project were accurately analyzed as described in the Draft EIR, Section 3.16 Transportation and Traffic. The Draft EIR, Section 3.16 Transportation and Traffic included the Devil's Gate Water Conservation Project in the cumulative analysis. Potential impacts due to the Proposed Project's truck trips were analyzed in the Draft EIR, Section 3.16, Transportation and Traffic. As listed in that section, a single intersection in the immediate vicinity of the Proposed Project site will have a potentially significant impact. In practice, hauling rates and routes may be adjusted to help reduce impacts, depending on operational need. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the Proposed Project site.

The impacts to recreation are outlined in the Draft EIR, Section 3.15 Recreation, and note the importance of passive recreation in the area. No significant impacts to recreation were found; therefore, no mitigation measures are required. The Proposed Project will not limit the use of the Oak Grove area of Hahamongna Watershed Park. Sediment removal activities would be temporary and are expected to occur only in the drier months (April to December, excluding holidays). It is expected that these activities will often not be adjacent to the Oak Grove area of Hahamongna Watershed Park. The Proposed Project would result in temporary limitations on the recreational use of the Proposed Project site and some of the adjacent trails. Most of these areas would be reopened seasonally or intermittently throughout the sediment removal process. In addition, temporary impacts to designated recreational facilities and trails will be minimized through advance communication and redirection to the nearest facility in the vicinity of the Proposed Project. Furthermore, an east-west trail crossing will continue to provide access at the north end of the reservoir. At the south end of the reservoir, after the reservoir ingress and egress ramps have been fully constructed, access to the upper east side Arroyo Seco Trail from La Cañada Verdugo Road will be maintained; and the linkage from the west side Arroyo Seco Trail and the Flint Wash Trail to the upper east side Arroyo Seco Trail (crossing Devil's Gate Dam and also continuing south to the Rose Bowl) will be available after construction activities have ended each day and on nonworking days.

Response to Comment 117-4:

See Response to Comment 117-3. LACFCD recognizes that the area is an important area for recreation, as outlined in Section 3.15, Recreation/Public Services.

Although the sediment removal phase of the Proposed Project will occur over a five-year period, the removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays), as described in the Draft EIR, Section 2.5.1, Sediment Removal Phase, Project Schedule. Therefore, the maximum impacts to recreation would be much shorter than the five-year duration of the sediment removal phase of the Proposed Project.

No official disc golf course holes located in the Oak Grove area of Hahamongna Watershed Park will be removed by the Proposed Project. Where possible, LACFCD will avoid any disc golf course holes located outside the Oak Grove area of Hahamongna Watershed Park. When avoidance is not possible, LACFCD will coordinate with the Oak Grove Disc Golf Club for removal of the disc golf hole equipment.

Alternative 3, Configuration D, the Environmentally Superior Alternative from the Draft EIR, carefully balances flood control needs and reductions in impacts to habitat by restoring the required reservoir capacity while also minimizing the project footprint (see Section 4.6 of the Final EIR). Furthermore, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2 would avoid excavation of the western branch, thereby providing a greater distance between the Oak Grove area of Hahamongna Watershed Park and the excavation area, reducing the project footprint of 120 acres down to 71 acres. Alternative 3, Configuration D, Option 2 would also avoid all currently existing Oak Grove Disc Golf Club holes. The Oak Grove area of Hahamongna Watershed Park and the associated facilities would remain open during sediment removal and would continue to provide active recreational facilities to the area.

Response to Comment 117-5:

See Response to Comments 117-2 and 117-3. The Devil's Gate Water Conservation Project, which will include the pipeline, is a separate project from the Proposed Project or alternatives; and since it is still in a conceptual design phase, no environmental report is available for public review at this time. The Proposed Project analyzed cumulative impacts from other projects that may be occurring in the vicinity at the same time, including the Devil's Gate Water Conservation Project. As shown in the Draft EIR, Section 3.16, the traffic volumes on Interstate-210 (I-210), the on-/off-ramps, and the local roadways within the Proposed Project area included those potentially impacted by the Proposed Project. The analysis provided a conservative project condition volume that accounts for expansion and regional growth within the Proposed Project area. These volumes account for redistribution of traffic. None of the freeway segments analyzed in the traffic report would be significantly impacted. LACFCD has applied for and received an approximately $28 million grant through the State's Disaster Preparedness and Flood Protection Bond Act of 2006 (Proposition 1E) program. A portion of this grant will be used to help offset the Proposed Project's costs.

Response to Comment 117-6:

LACFCD was mandated by the State Legislature to provide flood protection and water conservation within its boundaries.

A reservoir storage design capacity of two design debris events (DDEs) below the dam's lowest spillway was determined to be the standard acceptable level of risk at Devil's Gate Dam and Reservoir. The DDE volume of capacity is determined using the January 2006 Los Angeles County Department of Public Works (LACDPW) Hydrology Manual and the March 2006 LACDPW Sedimentation Manual. For Devil's Gate Dam and Reservoir, the required reservoir capacity is 4.0 million cubic yards (cy) (two DDEs) below the spillway elevation of 1,040.50 feet.

The Hydrology Manual (January 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_Hydrology_Manual/2006%20Hydrology%20Manual-Divided.pdf

The Sedimentation Manual (March 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_sedimentation_manual/Sedimentation%20Manual-Second%20Edition.pdf

Additional information concerning DDE calculation methods has been added to the Final EIR, Section 2.3, Project Need.

All of the trucks will be loaded within the reservoir; and if a queue of trucks develops, the trucks will stage within the reservoir itself to lessen impacts on the adjacent streets. Long queuing and idling times will not occur during the Proposed Project.

Air quality impacts associated with truck traffic were analyzed in the Draft EIR in Section 3.5. LACFCD has conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed the United States (U.S.) Environmental Protection Agency's (EPA's) 2007 standards for emissions. Therefore, in order to further reduce emissions, Mitigation Measure MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump trucks that meet or exceed EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality, including those associated with health effects, will be reduced to less than significant.

Dust impacts from the Proposed Project were carefully evaluated, as discussed in the Draft EIR, Section 3.5.6, Impacts and Mitigation, AIR QUALITY-2, Sediment Removal. The Proposed Project's activities, including excavation, grading, material loading, and hauling, would result in less than significant dust emissions due to the project's use of best management practices and would be in full compliance with South Coast Air Quality Management District's (SCAQMD's) fugitive dust regulations.

As discussed in Section 3.6.6 of the Draft Environmental Impact Report (EIR), Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats. In addition, sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays). Wildlife species currently found in the Proposed Project area would be expected to either remain in the undisturbed areas of the reservoir outside of the Proposed Project area or to reestablish once sediment removal activities have been completed.

Response to Comment 117-7:

Comment noted.

From: nahu zachary
To: reservoircleanouts
Subject: Devil"s gate reservoir sediment removal and management project
Date: Friday, January 03, 2014 4:43:16 PM

Hi,my name is nahuel.

Comment 118-1

I have looked at all the plans for the sediment removal Project sponsored by the county,and all the plans will have an impact on our disc golf course.Alternative 3 is the best plan,but the western branch will remove 2 of playables positions.Please re-visite the sediment removal plans and make an Alternative plan that will not impact the disc golf course

Response to Comment Letter #118 (Nahuel Zachary)

Response to Comment 118-1:

Thank you for your input. This comment has been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. No official disc golf course holes located in the Oak Grove area of Hahamongna Watershed Park will be removed by the Proposed Project. As noted in the Draft Environmental Impact Report (EIR), Section 3.15, Los Angeles County Flood Control District (LACFCD) recognizes the importance of the area to those who take advantage of the recreational opportunities offered, including the Oak Grove Disc Golf Course. Where possible, Los Angeles County Flood Control District (LACFCD) will avoid any disc golf course holes located outside the Oak Grove area of Hahamongna Watershed Park. When avoidance is not possible, LACFCD will coordinate with the Oak Grove Disc Golf Club for removal of the disc golf hole equipment.

Alternative 3, Configuration D, the Environmentally Superior Alternative from the Draft Environmental Impact Report (EIR), carefully balances flood control needs and reductions in impacts to habitat by restoring the required reservoir capacity while also minimizing the project footprint (see Section 4.6 of the Final EIR). Furthermore, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2 would avoid excavation of the western branch, thereby providing a greater distance between the Oak Grove area of Hahamongna Watershed Park and the excavation area, reducing the project footprint of 120 acres down to 71 acres. Alternative 3, Configuration D, Option 2 would also avoid all currently existing Oak Grove Disc Golf Club holes. The Oak Grove area of Hahamongna Watershed Park and the associated facilities would remain open during sediment removal and would continue to provide active recreational facilities to the area.

From: Noemi Zamudio Quiroz
To: reservoircleanouts
Subject: Devil"s Gate Reservoir Sediment Removal and Management Project
Date: Friday, January 03, 2014 6:23:21 PM

Hi,

Comment 119-1

My name is Salvador. I have looked at all the plans for the sediment removal project sponsored by the country, and all the plans will have an impact on our disc golf course. Alternative 3 is the best plan, but the western branch will remove 2 of our playable positions. Please re-visit the sediment removal plans and make an alternative plan that will not impact the disc golf course.

Thank You,
Salvador

Response to Comment Letter #119 (Salvador Quiroz)

Response to Comment 119-1:

Thank you for your input. This comment has been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. No official disc golf course holes located in the Oak Grove area of Hahamongna Watershed Park will be removed by the Proposed Project. As noted in the Draft Environmental Impact Report (EIR), Section 3.15, Los Angeles County Flood Control District (LACFCD) recognizes the importance of the area to those who take advantage of the recreational opportunities offered, including the Oak Grove Disc Golf Course. Where possible, Los Angeles County Flood Control District (LACFCD) will avoid any disc golf course holes located outside the Oak Grove area of Hahamongna Watershed Park. When avoidance is not possible, LACFCD will coordinate with the Oak Grove Disc Golf Club for removal of the disc golf hole equipment.

Alternative 3, Configuration D, the Environmentally Superior Alternative from the Draft Environmental Impact Report (EIR), carefully balances flood control needs and reductions in impacts to habitat by restoring the required reservoir capacity while also minimizing the project footprint (see Section 4.6 of the Final EIR). Furthermore, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2 would avoid excavation of the western branch, thereby providing a greater distance between the Oak Grove area of Hahamongna Watershed Park and the excavation area, reducing the project footprint of 120 acres down to 71 acres. Alternative 3, Configuration D, Option 2 would also avoid all currently existing Oak Grove Disc Golf Club holes. The Oak Grove area of Hahamongna Watershed Park and the associated facilities would remain open during sediment removal and would continue to provide active recreational facilities to the area.

From: Randy Strapazon
To: reservoircleanouts
Subject: Devil"s Gate Dam reservoir sediment and management project
Date: Saturday, January 04, 2014 11:43:45 PM

Comment 120-1

I strongly urge you to reconsider the scope of this project. I have attended the presentation by County representatives and were shocked that they admitted that the level of air polluting toxins could not be mitigated. That the use of clean fuel burning trucks could not be guaranteed. The sediment contains toxins from the station fire, disturbing the dust five days a week, eight hours a day for years is inexcusable.
There are school children and two day care centers(where babies and young children spend 8-10 hours a day) within the target area. These are the most vulnerable members of our society, they will experience lifelong chronic diseases and in many cases death. Weigh this devastating consequence against the possibility of, as the County spokesperson admitted, two once in 50 years storm happening together. Can you really take such a responsibility? Would you proceed with this project if your children were exposed? I hope not.

Comment 120-2

In addition to the destruction of a very important ecosystem and wildlife habitat, there are surely to be unforeseen impact on the surrounding community that will bring criticism and citizen outrage. There will be financial loss for homeowners and businesses resulting in lack of confidence in the County and the Supervisors. Do not let this project be Supervisor Antonovich's legacy. He has done too much good for District 5 to be remembered as the person who sponsored so much unnecessary destruction.
Be reasonable and prudent. Reduce the size of the project and extend the timeline. While removing the sediment is necessary the current project's cost to residents, wildlife, and habitat is too high.

Sincerely,
Randy Strapazon
444 Georgian Rd
La Canada. 91011

Response to Comment Letter #120 (Randy Strapazon)

Response to Comment 120-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

Although the sediment removal phase of the Proposed Project will occur over a five-year period, the removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays), as described in the Draft Environmental Impact Report (EIR), Section 2.5.1, Sediment Removal Phase, Project Schedule.

Air quality impacts associated with truck traffic were analyzed in the Draft EIR in Section 3.5. The Draft EIR analyzed impacts to sensitive uses, including residents, recreational uses, and schools, adjacent to the Proposed Project site and along the proposed haul routes. LACFCD has conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed the United States (U.S.) Environmental Protection Agency's (EPA's) 2007 standards for emissions. Therefore, in order to further reduce emissions, Mitigation Measure MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump trucks that meet or exceed EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality, including those associated with health effects, will be reduced to less than significant.

As discussed in the Draft EIR, Section 3.5, the Health Risk Assessment (HRA) analyzed both the cancer-related and noncancer-related acute (short-term) and chronic (long-term) impacts from project-related emissions. The HRA analysis found the Proposed Project would result in less than significant impacts for both the cancer-related and non-cancer-related acute short-term and long-term impacts.

As discussed in the Draft EIR, Section 3.10.6, Impacts and Mitigation, HAZARDS-1, Sediment Removal/Reservoir Management, no hazardous levels of the contaminants were detected in the sediment. Dust impacts from the Proposed Project were carefully evaluated, as discussed in the Draft EIR, Section 3.5.6, Impacts and Mitigation, AIR QUALITY-2, Sediment Removal. The Proposed Project's activities, including excavation, grading, material loading, and hauling, would result in less than significant dust emissions due to the project's use of best management practices and would be in full compliance with South Coast Air Quality Management District's (SCAQMD's) fugitive dust regulations.

LACFCD was mandated by the State Legislature to provide flood protection and water conservation within its boundaries.

A reservoir storage design capacity of two design debris events (DDEs) below the dam's lowest spillway was determined to be the standard acceptable level of risk at Devil's Gate Dam and Reservoir. The DDE volume of capacity is determined using the January 2006 Los Angeles County Department of Public Works (LACDPW) Hydrology Manual and the March 2006 LACDPW Sedimentation Manual. For Devil's Gate Dam and Reservoir, the required reservoir capacity is 4.0 million cubic yards (cy) (two DDEs) below the spillway elevation of 1,040.50 feet.

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Additional information concerning DDE calculation methods has been added to the Final EIR, Section 2.3, Project Need.

Response to Comment 120-2:

As discussed in Section 3.6.6 of the Draft Environmental Impact Report (EIR), Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats. In addition, sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays).

Comment regarding economic impacts to surrounding homeowners and businesses has been noted.

LACFCD goes to great lengths to lessen project impacts and maximize efficiencies. For example, the Draft EIR concluded that Alternative 3 is the Environmentally Superior Alternative. Alternative 3, Configuration D, Option 2 drastically reduces the project's footprint of 120 acres down to 71 acres. Additionally, the limited maintenance area for Alternative 3 further reduces the permanent habitat impacts down to approximately 51 acres by allowing for site replanting and mitigation to take place within the reservoir footprint. This reduction in project acreages will greatly lessen environmental impacts of the Proposed Project.

LACFCD strives to achieve an efficient, low-cost sediment removal project. Sediment removal rates and trucking operations, now utilizing all low-emissions trucks, as explained in Section 3.5 of the Draft EIR, have been carefully planned for economies of scale to realize maximum efficiencies without major delays in project schedule, thus greatly reducing operating costs. LACFCD is committed to *Public Service that Works*; and by combining almost 100 years of technical expertise and invaluable input from the community, less invasive flood protection will continue to be a reality.

From: Dick Williams
To: reservoircleanouts
Subject: Devil's Gate Reservoir Sediment Removal and Management Project
Date: Sunday, January 05, 2014 2:27:08 PM

Comment 121-1

I support sediment removal behind Devils Gate Dam, but in more moderation than any of the current plans. Your plan should provide accommodation for current recreational users, including disc golfers, hikers, horses, and bird watchers. Significant quantities can be removed within these parameters, restoring some of the safety the basin was intended for. I advocate that work start immediately in the less sensitive areas, but leave all of current recreational facilities, and some of the current wildlife habitat, perhaps in islands.

Thank you for your consideration.

Richard and Jill Williams
5303 Crown Ave
La Canada Flintridge, CA
818-952-5508

Response to Comment Letter #121 (Richard Williams)

Response to Comment 121-1:

Thank you for your input. This comment has been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

Impacts to recreation were analyzed in the Draft EIR, Section 3.15. The Proposed Project will not limit the use of the Oak Grove area of Hahamongna Watershed Park. Sediment removal activities would be temporary and are expected to occur only in the drier months (April to December, excluding holidays). It is expected that these activities will often not be adjacent to the Oak Grove area of Hahamongna Watershed Park. The Proposed Project would result in temporary limitations on the recreational use of the Proposed Project site and some of the adjacent trails. Most of these areas would be reopened seasonally or intermittently throughout the sediment removal process. In addition, temporary impacts to designated recreational facilities and trails will be minimized through advance communication and redirection to the nearest facility in the vicinity of the Proposed Project. Furthermore, an east-west trail crossing will continue to provide access at the north end of the reservoir. At the south end of the reservoir, after the reservoir ingress and egress ramps have been fully constructed, access to the upper east side Arroyo Seco Trail from La Cañada Verdugo Road will be maintained and the linkage from the west side Arroyo Seco Trail and the Flint Wash Trail to the upper east side Arroyo Seco Trail (crossing Devil's Gate Dam and also continuing south to the Rose Bowl) will be available after construction activities have ended each day and on nonworking days.

No official disc golf course holes located in the Oak Grove area of Hahamongna Watershed Park will be removed by the Proposed Project. Where possible, Los Angeles County Flood Control District (LACFCD) will avoid any disc golf course holes located outside the Oak Grove area of Hahamongna Watershed Park. When avoidance is not possible, LACFCD will coordinate with the Oak Grove Disc Golf Club for removal of the disc golf hole equipment.

Alternative 3, Configuration D, the Environmentally Superior Alternative from the Draft Environmental Impact Report (EIR), carefully balances flood control needs and reductions in impacts to habitat by restoring the required reservoir capacity while also minimizing the project footprint (see Section 4.6 of the Final EIR). Furthermore, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2 would avoid excavation of the western branch, thereby providing a greater distance between the Oak Grove area of Hahamongna Watershed Park and the excavation area, reducing the project footprint of 120 acres down to 71 acres. Alternative 3, Configuration D, Option 2 would also avoid all currently existing Oak Grove Disc Golf Club holes. The Oak Grove area of Hahamongna Watershed Park and the associated facilities would remain open during sediment removal and would continue to provide active recreational facilities to the area.

Jan 2, 2014

County of Los Angeles
Department of Public Works
Water Resources Division
ATTN: Reservoir Cleanouts Program
PO Box 1460
Alhambra, CA 91802-1460
reservoircleanouts@dpw.lacounty.gov

RE: DEVIL'S GATE RESERVOIR SEDIMENT REMOVAL AND MANAGEMENT PROJECT

Dear Department of Public Works, Water Resource Division,

Comment 122-1

Thank you for the opportunity to comment on the draft EIR for the DEVIL'S GATE RESERVOIR SEDIMENT REMOVAL AND MANAGEMENT PROJECT. I can't imagine what a herculean task you have ahead deciding how best to assess and implement the sediment removal project.

Comment 122-2

While we support the sediment clean up in general, we are concerned about the impact as defined in the dEIR on summer camp and are requesting the following modifications: 1) No sediment removal in the willow forest and alluvial scrub areas during the months of June, July, and August; 2) A phased approach that allows for places within the project area that can continue to be used for recreational purposes; 3) A longer timeline for the project to help minimize impact on those who use the park; and, 4) Preservation of the willow forest and the alluvial scrub area from denuding and/or from being used as permanent maintenance zones.

Comment 122-3

Tom Sawyer Camps has been in operation since 1926 and has been using Hahamongna Watershed Park as for the last 70 years (since 1944). Approximately 1250 of our campers and 150 staff use this site each summer, which now includes three generation of campers. This park is critical to our day camp programs and heavy truck traffic during the summer months and denuding the willow forest and alluvial scrub areas would have a critical negative impact on the program, the campers and the staff.

Comment 122-4

Camp is an antidote to bullying, isolation, over reliance on technology and many other challenges facing our youth. At Hahamongna, campers age 3-14 have critical exposure to wilderness adventure. During the summer, they hike, ride horses, build secret forts, observe wildlife, play games, sing songs, build self reliance and self esteem, and develop friendships that last a lifetime. We rely heavily on the access, peace and beauty of the willow forest and the alluvial

Comment 122-4 continued

scrub areas for these experiences, along with other areas of the park. Hahamongna is home to generations of staff and campers whose lives have been directly and dramatically enriched by this natural refuge, including mine.

Comment 122-5

Tom Sawyer Camps is a very important program and my request could easily go unnoticed but I believe the impact that camp has on the children of tomorrow is significant. Summer in the watershed is a rare and unique opportunity for children to be away from noise and disruption and engage with nature and outdoor adventure in a safe, peaceful, and joyful manner. We hope you will see the value of camp and make every attempt to minimize the impact the sediment clean up will have during the summer months and for the generations of children to use the park in the years to come.

Thank you for allowing me the opportunity to share my concerns and needs. Please feel free to contact me if you have any questions.

Sincerely,

Rick Yenofsky

RICK YENOFSKY
628 W NORMAN AVE
ARCADIA, CA 91007

RYENOFSKY@GMAIL.COM

Response to Comment Letter #122 (Rick Yenofsky)

Response to Comment 122-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

Response to Comment 122-2:

The Proposed Project will not limit the use of the Oak Grove area of Hahamongna Watershed Park by recreational users such as Tom Sawyer Camps. Sediment removal activities would be temporary and are expected to occur only in the drier months (April to December, excluding holidays). It is expected that these activities will often not be adjacent to the Oak Grove area of Hahamongna Watershed Park. Therefore, the maximum impacts to the adjacent recreational facilities would be much shorter than the five-year duration of the sediment removal phase of the Proposed Project.

During the summer months, sediment is expected to be the driest. Due to the reduction in water weight, each truck can haul more sediment per load during these months. This increases efficiency and decreases project duration, which also decreases impacts and cost. Skipping these crucial dry months would extend the project duration.

Los Angeles County Flood Control District (LACFCD) proposed a project duration of five years to reduce accumulated sediment in a timely fashion. The goal of LACFCD is to restore reservoir flood capacity as soon as feasible while reducing costs and minimizing the duration of environmental and construction impacts to the surrounding communities. Extending the project would prolong the flood risk to downstream communities and increase the construction impacts to the surrounding communities.

As discussed in Section 3.6.6 of the Draft EIR, Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats.

Alternative 3, Configuration D affects the least amount of reservoir area of all the action alternatives while still achieving Proposed Project objectives (see Section 4.6 of the Final EIR). This alternative would provide a buffer between the Oak Grove area of Hahamongna Watershed Park and the excavation area. Alternative 3, Configuration D, Option 1 provides a more natural configuration for the reservoir by having two branches to carry water and sediment toward the face of the dam, avoiding disturbing a significant portion of existing vegetation. To further reduce the Proposed Project's footprint, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2, which drastically reduces the project's footprint of 120 acres down to 71 acres, would avoid excavation of the western branch, thereby providing a greater habitat buffer on the west side of the reservoir. In addition, the maintenance areas would be smaller than the original sediment removal footprint, allowing for habitat to reestablish.

Response to Comment 122-3:

See Response to Comment 122-2. Access to the Oak Grove area of Hahamongna Watershed Park will not be limited by the Proposed Project. Potential impacts due to the Proposed Project's truck trips were analyzed in the Draft EIR, Section 3.16, Transportation and Traffic. As listed in that section, a single intersection in the immediate vicinity of the Proposed Project site will have a potentially significant

impact. In practice, hauling rates and routes may be adjusted to help reduce impacts, depending on operational need. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the Proposed Project site.

LACFCD also notes the commenter's concerns with traffic impacts relating to traveling to and from the Oak Grove area of Hahamongna Watershed Park. The Draft EIR outlines a 12-hour trucking schedule, with trucking operations on Saturdays as well. This schedule is used to model the most intensive construction operation, which may not be applicable at the site for the duration of the Proposed Project. Typical trucking schedules are estimated to be 8 hours per day on weekdays. Additionally, construction traffic will not pass the Berkshire Place intersection with Oak Grove Drive and thus will not approach the Oak Grove Drive/Foothill Boulevard intersection used for ingress and egress to the Oak Grove area of Hahamongna Watershed Park.

Response to Comment 122-4:

See Response to Comment 122-2. LACFCD notes the use of Devil's Gate Reservoir by Tom Sawyer Camps, especially the willow forest and alluvial scrub areas.

Response to Comment 122-5:

See Response to Comment 122-2. LACFCD notes that Tom Sawyer Camps is an important resource to children and is going to great lengths to keep impacts to a minimum. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the Proposed Project site.

From: Sarah Bales
To: reservoircleanouts
Subject: Devil"s Gate Reservoir Sediment Removal and Management Project
Date: Friday, January 03, 2014 8:21:20 PM

Hi,

My name is Sarah Bales. I live at 21050 Vanowen St., Woodland Hills, CA 91303.

I have looked at all the plans for the sediment removal project sponsored by the county, and all the plans will have an impact on our Disc Golf Course. Alternative 3 is the best plan, but the western branch will remove 2 of our playable positions. Please re-visit the sediment removal plans and make an alternative plan that will not impact our Disc Golf Course.

Comment 123-1

I have been coming here for as long as I can remember with my family. It means a great deal to me that it doesn't get damaged or ruined in any way. I know that you have important things you need to do, but memories and the simple things like a Disc Gold Course are what keep a community real. And to lose it, any part of it, is a tragedy. I know you can understand that. The joy and love you will be taking away by causing parts of this course to become fragmented is representative of fragmenting our best memories. Please don't.

Thank you,
Sarah Bales

Response to Comment Letter #123 (Sarah Bales)

Response to Comment 123-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. No official disc golf course holes located in the Oak Grove area of Hahamongna Watershed Park will be removed by the Proposed Project. As noted in the Draft Environmental Impact Report (EIR), Section 3.15, Los Angeles County Flood Control District (LACFCD) recognizes the importance of the area to those who take advantage of the recreational opportunities offered, including the Oak Grove Disc Golf Course. Where possible, Los Angeles County Flood Control District (LACFCD) will avoid any disc golf course holes located outside the Oak Grove area of Hahamongna Watershed Park. When avoidance is not possible, LACFCD will coordinate with the Oak Grove Disc Golf Club for removal of the disc golf hole equipment.

Alternative 3, Configuration D, the Environmentally Superior Alternative from the Draft Environmental Impact Report (EIR), carefully balances flood control needs and reductions in impacts to habitat by restoring the required reservoir capacity while also minimizing the project footprint (see Section 4.6 of the Final EIR). Furthermore, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2 would avoid excavation of the western branch, thereby providing a greater distance between the Oak Grove area of Hahamongna Watershed Park and the excavation area, reducing the project footprint of 120 acres down to 71 acres. Alternative 3, Configuration D, Option 2 would also avoid all currently existing Oak Grove Disc Golf Club holes. The Oak Grove area of Hahamongna Watershed Park and the associated facilities would remain open during sediment removal and would continue to provide active recreational facilities to the area.

From: SARAH RODRIGUEZ
To: reservoircleanouts
Subject: Devils Gate Reservoir Sediment Removal and Management Project
Date: Sunday, January 05, 2014 7:34:40 PM

To Whom It May Concern:

I am writing to express my concern regarding the flood control project intended to take place in Hahamongna Watershed Park. I am specifically concerned about the plan to remove all or nearly all of the sediment form the site in a project that will involve 425 diesel trucks per day, nine months a year for the next five to seven years, going into Hahamongna Watershed Park and exiting on Berkshire.

Comment 124-1

Such an expansive and unnecessary project will cause significant traffic, noise and pollution, not to mention extraordinary cost to taxpayers. The Los Angeles County Department of Public Works has made false and exaggerated statements to justify this outrageous project and have consistently denied that it was high risk.

However, it would be impossible to execute a project this stature without such risks and the reasoning that such a project is necessary to prevent another forest fire in an area so recently exposed to one is preposterous.

Comment 124-2

Such a project is not only unnecessary, but will have adverse health affects on residents and visitors to the area, especially the elderly, the pregnant and the young, of whom there are so many due to the number of schools and recreational facilities in the area. The practice of scraping the basin clean with earthmovers, will unleash micro ash particles originally rendered by the Station Fire, forcing us to revisit some of the most dangerous and offensive elements of that unfortunate event everyday, for nine months a year, for five to seven years.

Comment 124-3

There are alternative methods of sediment removal that are slower, less disruptive, less dangerous and less expensive. I sincerely hope that the Department of Public Works and the LA County Board of Supervisors will consider these alternatives and reject the current plan.

Thank you for your time and attention to this very important matter.

Sincerely,
Sarah Rodriguez

Response to Comment Letter #124 (Sarah Rodriguez)

Response to Comment 124-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. Los Angeles County Flood Control District (LACFCD) notes the commenter's objection to the Proposed Project.

LACFCD proposed a project duration of five years to reduce accumulated sediment in a timely fashion. With sediment removal operations moving efficiently, it is reasonable to assume a project duration of no more than five years. Although the sediment removal phase of the Proposed Project will occur over a five-year period, the removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays), as described in the Draft Environmental Impact Report (EIR), Section 2.5.1, Sediment Removal Phase, Project Schedule.

Potential impacts due to the Proposed Project's truck trips were analyzed in the Draft EIR, Section 3.16, Transportation and Traffic. As listed in that section, a single intersection in the immediate vicinity of the Proposed Project site will have a potentially significant impact. In practice, hauling rates and routes may be adjusted to help reduce impacts, depending on operational need. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the Proposed Project site.

Air quality and noise impacts associated with truck traffic were analyzed in the Draft EIR in Sections 3.5 and 3.14, respectively. As discussed in the Draft EIR, Section 3.14, with implementation of Mitigation Measure MM N-1, noise impacts would be reduced to a level of less than significant. LACFCD has conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed the United States (U.S.) Environmental Protection Agency's (EPA's) 2007 standards for emissions. Therefore, in order to further reduce emissions, Mitigation Measure MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump trucks that meet or exceed EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality, including those associated with health effects, will be reduced to less than significant.

LACFCD strives to achieve an efficient, low-cost sediment removal project. Sediment removal rates and trucking operations, now utilizing all low-emissions trucks, as explained in Section 3.5 of the Draft EIR, have been carefully planned for economies of scale to realize maximum efficiencies without major delays in project schedule, thus greatly reducing operating costs. Furthermore, LACFCD has applied for and received an approximately $28 million grant through the State's Disaster Preparedness and Flood Protection Bond Act of 2006 (Proposition 1E) program. A portion of this grant will be used to help offset the Proposed Project's costs.

LACFCD was mandated by the State Legislature to provide flood protection and water conservation within its boundaries.

A reservoir storage design capacity of two design debris events (DDEs) below the dam's lowest spillway was determined to be the standard acceptable level of risk at Devil's Gate Dam and Reservoir. The DDE volume of capacity is determined using the January 2006 Los Angeles County Department of Public Works (LACDPW) Hydrology Manual and the March 2006 LACDPW Sedimentation Manual. For Devil's

Gate Dam and Reservoir, the required reservoir capacity is 4.0 million cubic yards (cy) (two DDEs) below the spillway elevation of 1,040.50 feet.

The Hydrology Manual (January 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_Hydrology_Manual/2006%20Hydrology%20Manual-Divided.pdf

The Sedimentation Manual (March 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_sedimentation_manual/Sedimentation%20Manual-Second%20Edition.pdf

Additional information concerning DDE calculation methods has been added to the Final EIR, Section 2.3, Project Need.

The Proposed Project is not being undertaken to prevent forest fires. The goal of the Proposed Project is to restore it to its current design standard to provide adequate flood control and establish a reservoir configuration more suitable for routine maintenance activities, including sediment management.

Response to Comment 124-2:

See Response to Comment 124-1. Air quality impacts were analyzed in the Draft EIR in Section 3.5. The Draft EIR analyzed impacts to sensitive uses, including residents, recreational uses, and schools, adjacent to the Proposed Project site and along the proposed haul routes. Also as discussed in the Draft EIR, Section 3.5, the Health Risk Assessment (HRA) analyzed both the cancer-related and noncancer-related acute (short-term) and chronic (long-term) impacts from project-related emissions. The HRA analysis found the Proposed Project would result in less than significant impacts for both the cancer-related and non-cancer-related acute short-term and long-term impacts.

As discussed in the Draft EIR, Section 3.10.6, Impacts and Mitigation, HAZARDS-1, Sediment Removal/Reservoir Management, no hazardous levels of the contaminants were detected in the sediment. Dust impacts from the Proposed Project were carefully evaluated, as discussed in the Draft EIR, Section 3.5.6, Impacts and Mitigation, AIR QUALITY-2, Sediment Removal. The Proposed Project's activities, including excavation, grading, material loading, and hauling, would result in less than significant dust emissions due to the Proposed Project's use of best management practices and would be in full compliance with South Coast Air Quality Management District's (SCAQMD's) fugitive dust regulations.

Response to Comment 124-3:

LACFCD proposed a project duration of five years to reduce accumulated sediment in a timely fashion. The goal of LACFCD is to restore reservoir flood capacity as soon as feasible while reducing costs, minimizing the duration of environmental and construction impacts to the surrounding communities, and configuring the reservoir to allow for sustainable future maintenance. Extending the project would prolong the flood risk to downstream communities and increase the construction impacts to the surrounding communities.

LACFCD goes to great lengths to lessen project impacts and maximize efficiencies. For example, the Draft Environmental Impact Report (EIR) concluded that Alternative 3 is the Environmentally Superior Alternative. Alternative 3, Configuration D, Option 2 drastically reduces the project's footprint of 120

acres down to 71 acres. Additionally, the limited maintenance area for Alternative 3 further reduces the permanent habitat impacts down to approximately 51 acres by allowing for site replanting and mitigation to take place within the reservoir footprint. This reduction in project acreages will greatly lessen environmental impacts of the Proposed Project.

LACFCD is committed to *Public Service that Works*; and by combining almost 100 years of technical expertise and invaluable input from the community, less invasive flood protection will continue to be a reality.

From: Sonja-Sophie Loeffler
To: reservoircleanouts
Subject: No on Devil"s Gate Project
Date: Friday, January 03, 2014 11:36:32 AM

To whom it may concern,

Comment 125-1

I would ask you DENY the proposed clearance of sediment in the area in question.
Sometimes the long term consequences of actions that seem to fit in our human thinking pattern are far greater when we consider we do not live in a bubble, but in a living, breathing planet. Not only the heavy machinery needed for excavation create much noise and unnecessary air pollution, it would undeniably destroy the natural habitat in the Hahamongna Water Shed Park for generations to come. We are continuously destroying the planet we rely on for living, and here we have a chance to make a statement and say "We can find another way to address the problems AND keep a wonderful, only once in the world existing ecosystem intact for our selves and our children." With a little out-of the box thinking, I am sure we can accomplish this. The first proposed solution to a problem is not always the best one. We have to begin to look ahead and see the destruction we are causing by our short-term-quick-fix thinking.

I am asking you to put the project to a STOP for now and truly seek and consider other options.

Regards,
Sonja-Sophie and MArkus Loeffler and Jonathan Castillo (11)
Direct: 323-873-6442

Response to Comment Letter #125 (Sonja-Sophie Loeffler)

Response to Comment 125-1:

Thank you for your input. This comment has been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

As discussed in the Draft EIR, Section 2.3, LACFCD must remove sediment that has accumulated behind the dam to restore the capacity of Devil's Gate Reservoir to minimize the level of flood risk to downstream communities along the Arroyo Seco. In its current condition, the reservoir no longer has the capacity to safely contain another major debris event. LACFCD was mandated by the State Legislature to provide flood protection and water conservation within its boundaries.

A reservoir storage design capacity of two design debris events (DDEs) below the dam's lowest spillway was determined to be the standard acceptable level of risk at Devil's Gate Dam and Reservoir. The DDE volume of capacity is determined using the January 2006 Los Angeles County Department of Public Works (LACDPW) Hydrology Manual and the March 2006 LACDPW Sedimentation Manual. For Devil's Gate Dam and Reservoir, the required reservoir capacity is 4.0 million cubic yards (cy) (two DDEs) below the spillway elevation of 1,040.50 feet.

The Hydrology Manual (January 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_Hydrology_Manual/2006%20Hydrology%20Manual-Divided.pdf

The Sedimentation Manual (March 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_sedimentation_manual/Sedimentation%20Manual-Second%20Edition.pdf

Additional information concerning DDE calculation methods has been added to the Final Environmental Impact Report (EIR), Section 2.3, Project Need.

Air quality and noise impacts associated with the Proposed Project were analyzed in the Draft EIR in Sections 3.5 and 3.14, respectively. As discussed in the Draft EIR, Section 3.14, with implementation of Mitigation Measure MM N-1, noise impacts would be reduced to a level of less than significant. LACFCD has conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed the United States (U.S.) Environmental Protection Agency's (EPA's) 2007 standards for emissions. Therefore, in order to further reduce emissions, Mitigation Measure MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump trucks that meet or exceed EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality, including those associated with health effects, will be reduced to less than significant.

As discussed in Section 3.6.6 of the Draft EIR, Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats. In addition, sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays).

The Draft EIR analyzed a range of sediment removal amounts and configurations aimed at addressing the diverse concerns of stakeholders, including concerns for long-term habitat preservation. The

alternatives presented in the Draft EIR represent the best options available to respond to stakeholders' concerns, while adequately reducing flood risk to downstream communities. The Draft EIR, Section 4, fully analyzed six alternatives, including the No Project Alternative. These alternatives substantially lessen one or more significant effects of the Proposed Project and, with the exception of the mandatory No Project Alternative, would feasibly attain most of the basic objectives of the Proposed Project.

LACFCD goes to great lengths to lessen project impacts and maximize efficiencies. For example, the Draft EIR concluded that Alternative 3 is the Environmentally Superior Alternative. Alternative 3, Configuration D, Option 2 drastically reduces the project's footprint of 120 acres down to 71 acres. Additionally, the limited maintenance area for Alternative 3 further reduces the permanent habitat impacts down to approximately 51 acres by allowing for site replanting and mitigation to take place within the reservoir footprint. This reduction in project acreages will greatly lessen environmental impacts of the Proposed Project.

LACFCD is committed to *Public Service that Works*; and by combining almost 100 years of technical expertise and invaluable input from the community, less invasive flood protection will continue to be a reality.

From: stephanie cafiero
To: reservoircleanouts
Subject: Devils Gate Dam Sediment Removal
Date: Friday, January 03, 2014 2:00:50 PM

Comment 126-1

The obliteration of the land behind the dam will not ensure the safety of those down stream. How will the loss of vegetation slow the flow of the rain and accumulated water?

How will the water that enters the park area be manage if there is nothing to contain it? What will slow the flow in the event of a rainstorm?

Stephanie A. Cafiero

Response to Comment Letter #126 (Stephanie Cafiero)

Response to Comment 126-1:

Thank you for your input. This comment has been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

The dam will contain the flows when water enters the reservoir, and the removal of sediment is necessary to provide the necessary capacity to safely contain flows. The vegetation in the reservoir area does not provide flood protection. For more information on dam operations, please go to: http://dpw.lacounty.gov/lacfcd/sediment/dam.aspx

The Los Angeles County Flood Control District (LACFCD) was mandated by the State Legislature to provide flood protection and water conservation within its boundaries.

A reservoir storage design capacity of two design debris events (DDEs) below the dam's lowest spillway was determined to be the standard acceptable level of risk at Devil's Gate Dam and Reservoir. The DDE volume of capacity is determined using the January 2006 Los Angeles County Department of Public Works (LACDPW) Hydrology Manual and the March 2006 LACDPW Sedimentation Manual. For Devil's Gate Dam and Reservoir, the required reservoir capacity is 4.0 million cubic yards (cy) (two DDEs) below the spillway elevation of 1,040.50 feet.

The Hydrology Manual (January 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_Hydrology_Manual/2006%20Hydrology%20Manual-Divided.pdf

The Sedimentation Manual (March 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_sedimentation_manual/Sedimentation%20Manual-Second%20Edition.pdf

Additional information concerning DDE calculation methods has been added to the Final Environmental Impact Report (EIR), Section 2.3, Project Need.

December 23, 2013

County of Los Angeles
Department of Public Works
Water Resources Division
ATTN: Reservoir Cleanouts Program
PO Box 1460
Alhambra, CA 91802-1460
reservoircleanouts@dpw.lacounty.gov

RE: DEVIL'S GATE RESERVOIR SEDIMENT REMOVAL AND MANAGEMENT PROJECT

Dear Department of Public Works, Water Resource Division,

Comment 127-1

Thank you for the opportunity to comment on the draft EIR for the DEVIL'S GATE RESERVOIR SEDIMENT REMOVAL AND MANAGEMENT PROJECT. I can't imagine what a herculean task you have ahead deciding how best to assess and implement the sediment removal project.

Comment 127-2

While we support the sediment clean up in general, we are concerned about the impact as defined in the dEIR on summer camp and are requesting the following modifications: 1) No sediment removal in the willow forest and alluvial scrub areas during the months of June, July, and August; 2) A phased approach that allows for places within the project area that can continue to be used for recreational purposes; 3) A longer timeline for the project to help minimize impact on those who use the park; and, 4) Preservation of the willow forest and the alluvial scrub area from denuding and/or from being used as permanent maintenance zones.

Comment 127-3

Tom Sawyer Camps has been in operation since 1926 and has been using Hahamongna Watershed Park as for the last 70 years (since 1944). Approximately 1250 of our campers and 150 staff use this site each summer, which now includes three generation of campers. This park is critical to our day camp programs, and as a staff member for five years I feel that heavy truck traffic during the summer months and denuding the willow forest and alluvial scrub areas would have a critical negative impact on the program, the campers and the staff.

Comment 127-4

Camp is an antidote to bullying, isolation, over reliance on technology and many other challenges facing our youth. At Hahamongna, campers age 3-14 have critical exposure to wilderness adventure. During the summer, they hike, ride

Comment 127-4 continued

horses, build secret forts, observe wildlife, play games, sing songs, build self-reliance and self-esteem, and develop friendships that last a lifetime. We rely heavily on the access, peace and beauty of the willow forest and the alluvial scrub areas for these experiences, along with other areas of the park. Hahamongna is home to generations of staff and campers whose lives have been directly and dramatically enriched by this natural refuge, including mine. For me personally, the camp has been not only my first employer, but a family of individuals who have dedicated their lives to the positive development of children.

Comment 127-5

Tom Sawyer Camps is a very important program and my request could easily go unnoticed but I believe the impact that camp has on the children of tomorrow is significant. Summer in the watershed is a rare and unique opportunity for children to be away from noise and disruption and engage with nature and outdoor adventure in a safe, peaceful, and joyful manner. We hope you will see the value of camp and make every attempt to minimize the impact the sediment clean-up will have during the summer months and for the generations of children to use the park in the years to come.

Thank you for allowing me the opportunity to share my concerns and needs. Please feel free to contact me if you have any questions.

Sincerely,

Steven Johnson
1001 Paloma Dr.
Arcadia, CA 91007
(626) 353-7518
swjohns@ucdavis.edu

Response to Comment Letter #127 (Steven Johnson)

Response to Comment 127-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

Response to Comment 127-2:

The Proposed Project will not limit the use of the Oak Grove area of Hahamongna Watershed Park by recreational users such as Tom Sawyer Camps. Sediment removal activities would be temporary and are expected to occur only in the drier months (April to December, excluding holidays). It is expected that these activities will often not be adjacent to the Oak Grove area of Hahamongna Watershed Park. Therefore, the maximum impacts to the adjacent recreational facilities would be much shorter than the five-year duration of the sediment removal phase of the Proposed Project.

During the summer months, sediment is expected to be the driest. Due to the reduction in water weight, each truck can haul more sediment per load during these months. This increases efficiency and decreases project duration, which also decreases impacts and cost. Skipping these crucial dry months would extend the project duration.

Los Angeles County Flood Control District (LACFCD) proposed a project duration of five years to reduce accumulated sediment in a timely fashion. The goal of LACFCD is to restore reservoir flood capacity as soon as feasible while reducing costs and minimizing the duration of environmental and construction impacts to the surrounding communities. Extending the project would prolong the flood risk to downstream communities and increase the construction impacts to the surrounding communities.

As discussed in Section 3.6.6 of the Draft Environmental Impact Report (EIR), Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats.

Alternative 3, Configuration D affects the least amount of reservoir area of all the action alternatives while still achieving Proposed Project objectives (see Section 4.6 of the Final EIR). This alternative would provide a buffer between the Oak Grove area of Hahamongna Watershed Park and the excavation area. Alternative 3, Configuration D, Option 1 provides a more natural configuration for the reservoir by having two branches to carry water and sediment toward the face of the dam, avoiding disturbing a significant portion of existing vegetation. To further reduce the Proposed Project's footprint, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2, which drastically reduces the project's footprint of 120 acres down to 71 acres, would avoid excavation of the western branch, thereby providing a greater habitat buffer on the west side of the reservoir. In addition, the maintenance areas would be smaller than the original sediment removal footprint, allowing for habitat to reestablish.

Response to Comment 127-3:

See Response to Comment 127-2. Access to the Oak Grove area of Hahamongna Watershed Park will not be limited by the Proposed Project. Potential impacts due to the Proposed Project's truck trips were analyzed in the Draft EIR, Section 3.16, Transportation and Traffic. As listed in that section, a single intersection in the immediate vicinity of the Proposed Project site will have a potentially significant

impact. In practice, hauling rates and routes may be adjusted to help reduce impacts, depending on operational need. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the Proposed Project site.

LACFCD also notes the commenter's concerns with traffic impacts relating to traveling to and from the Oak Grove area of Hahamongna Watershed Park. The Draft EIR outlines a 12-hour trucking schedule, with trucking operations on Saturdays as well. This schedule is used to model the most intensive construction operation, which may not be applicable at the site for the duration of the Proposed Project. Typical trucking schedules are estimated to be 8 hours per day on weekdays. Additionally, construction traffic will not pass the Berkshire Place intersection with Oak Grove Drive and thus will not approach the Oak Grove Drive/Foothill Boulevard intersection used for ingress and egress to the Oak Grove area of Hahamongna Watershed Park.

Response to Comment 127-4:

See Response to Comment 127-2. LACFCD notes the use of Devil's Gate Reservoir by Tom Sawyer Camps, especially the willow forest and alluvial scrub areas.

Response to Comment 127-5:

See Response to Comment 127-2. LACFCD notes that Tom Sawyer Camps is an important resource to children and is going to great lengths to keep impacts to a minimum. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the Proposed Project site.

From: Susanna Dadd
To: reservoircleanouts
Subject: Hahamongna sediment removal
Date: Friday, January 03, 2014 2:21:55 PM

Dear Sirs:

Comment 128-1 I have read all the alternative plans for sediment removal. I think all of the alternatives are too destructive and much too expensive. I am a taxpayer and I resent the use of my tax dollars for this irresponsible and unaudited project.

Comment 128-2 What is wrong with the DPWs earlier plan from at least ten years ago? Why was that plan not implemented.

Thank you,

--
Susanna Dadd
www.realgardens.net

Response to Comment Letter #128 (Susanna Dadd)

Response to Comment 128-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

The Draft Environmental Impact Report (EIR) analyzed a range of sediment removal amounts and configurations aimed at addressing the diverse concerns of stakeholders including concerns for long-term habitat preservation and recreational usage. The alternatives presented in the Draft EIR represent the best options available to respond to stakeholders' concerns while adequately reducing flood risk to downstream communities. The Draft EIR, Section 4, fully analyzed six alternatives, including the No Project Alternative. These alternatives substantially lessen one or more significant effects of the Proposed Project and, with the exception of the mandatory No Project Alternative, would feasibly attain most of the basic objectives of the Proposed Project.

Los Angeles County Flood Control District (LACFCD) goes to great lengths to lessen project impacts and maximize efficiencies. For example, the Draft Environmental Impact Report (EIR) concluded that Alternative 3 is the Environmentally Superior Alternative. Alternative 3, Configuration D, Option 2 drastically reduces the project's footprint of 120 acres down to 71 acres. Additionally, the limited maintenance area for Alternative 3 further reduces the permanent habitat impacts down to approximately 51 acres by allowing for site replanting and mitigation to take place within the reservoir footprint. This reduction in project acreages will greatly lessen environmental impacts of the Proposed Project.

LACFCD strives to achieve an efficient, low-cost sediment removal project. Sediment removal rates and trucking operations, now utilizing all low-emissions trucks, as explained in Section 3.5 of the Draft EIR, have been carefully planned for economies of scale to realize maximum efficiencies without major delays in project schedule, thus greatly reducing operating costs. Furthermore, LACFCD has applied for and received an approximately $28 million grant through the State's Disaster Preparedness and Flood Protection Bond Act of 2006 (Proposition 1E) program. A portion of this grant will be used to help offset the Proposed Project's costs.

Response to Comment 128-2:

LACFCD was mandated by the State Legislature to provide flood protection and water conservation within its boundaries.

A reservoir storage design capacity of two design debris events (DDEs) below the dam's lowest spillway was determined to be the standard acceptable level of risk at Devil's Gate Dam and Reservoir. The DDE volume of capacity is determined using the January 2006 Los Angeles County Department of Public Works (LACDPW) Hydrology Manual and the March 2006 LACDPW Sedimentation Manual. For Devil's Gate Dam and Reservoir, the required reservoir capacity is 4.0 million cubic yards (cy) (two DDEs) below the spillway elevation of 1040.50 feet.

The Hydrology Manual (January 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_Hydrology_Manual/2006%20Hydrology%20Manual-Divided.pdf

The Sedimentation Manual (March 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_sedimentation_manual/Sedimentation%20Manual-Second%20Edition.pdf

Additional information concerning DDE calculation methods has been added to the Final EIR, Section 2.3, Project Need.

Additional information concerning DDE determination methods has been added to the Final EIR, Section 2.3, Project Need and the Sedimentation Manual (March 2006) and can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_sedimentation_manual/Sedimentation%20Manual-Second%20Edition.pdf

As noted in Section 2.2.1, LACFCD History, sediment removal efforts have previously taken place at the reservoir in order to ensure correct functioning of the outlet works and/or to maintain reservoir capacity.

From: Sparrow Organics
To: reservoircleanouts
Subject: Hahamonga watershed park , please save,
Date: Saturday, January 04, 2014 10:42:06 AM

Hello,

I would like to direct my comments to whom it may concern:

Comment 129-1

Please reconsider the alternatives when it comes to bulldozing precious resources.
Sand, gravel and rock is a resource, not trash, to be excavated and dumped after bulldozing up to 120 acres of trees and riparian habitat extending from the face of the dam north to JPL. The DPW's plan will cost up to $100 million, a staggering amount of money, but will not solve any long term sediment management problems. Trails will be lost in the park. Double trailer diesel truck convoys will operate every minute (6 days per week, 12 hours per day) for 5+ years, driving in and out of the park on new access roads carved into the park across existing trails. Truck convoys will pass through local neighborhoods and onto the 210 freeway, causing massive traffic congestion.

Comment 129-2

In addition to deisel truck fumes, scraping the entire basin in the park, operating earth movers, rock crushers and other noisy industrial equipment will cause dust and abrasive ash pollution that will harm not only park visitors and local horse stables, but nearby schools, residences, and JPL. A permanently denuded basin will be maintained after the major destruction. Birds and wildlife dependent upon the

Comment 129-3

basin will lose their homes or be killed (crushed when they flee into their burrows) when the basin is bulldozed and excavated. Blue herons and egrets, ducks, coveys of quail, hawks, and numerous songbirds... rabbits, squirrels, salamanders, lizards and bobcats... butterflies and hummingbirds... species too numerous to list here that depend upon the natural habitat in the basin, will die or become nuisance "refugees"; in surrounding neighborhoods. Endangered species, such as the Bell's Least Vireo, a rare songbird that has been documented in the basin, will disappear and never return.

Comment 129-4

It is not necessary to destroy Hahamongna Watershed Park to protect property downstream of the dam. There are alternatives to the DPW's costly plan.
Please, I urge you to reconsider .
Kind regards,

Terrie Velazquez Owen
1828 n . Michigan ave.
Pasadena ca.

Response to Comment Letter #129 (Terrie Owen)

Response to Comment 129-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

The sediment that came into Devil's Gate Reservoir following the Station Fire has a very fine gradation or consistency. As such, the majority of this material is not readily reusable on a commercial scale and will most likely not be sold; however, sediment placed at sediment placement sites would be available for potential reuse for other projects or sediment reuse opportunities. The sediment removed from the Devil's Gate Reservoir will be transported to the existing placement sites listed in Section 2.0, Project Description in the Draft Environmental Impact Report (EIR).

For further information regarding beneficial uses for sediment at the Los Angeles County Flood Control District (LACFCD) sites, please refer to Section 6.5 of LACFCD's 2012 Sediment Management Strategic Plan which can be found at: http://dpw.lacounty.gov/lacfcd/sediment/stplan.aspx.

The Proposed Project is designed to be a long-term plan, with the reservoir management phase providing management for future sediment inflows. The proposed yearly cleanout of sediment after the completion of the Proposed Project will reduce the necessity for a future large-scale cleanout. Please see Section 2.5.2 of the Draft EIR for more information on future maintenance.

Los Angeles County Flood Control District (LACFCD) strives to achieve an efficient, low-cost sediment removal project. Sediment removal rates and trucking operations, now utilizing all low-emissions trucks, as explained in Section 3.5 of the Draft EIR, have been carefully planned for economies of scale to realize maximum efficiencies without major delays in project schedule, thus greatly reducing operating costs. The estimated cost for the Proposed Project and for Alternatives 1, 2, 3, and 5 would range from $80 million for the Proposed Project to $65 million for Alternative 3. LACFCD has applied for and received an approximately $28 million grant through the State's Disaster Preparedness and Flood Protection Bond Act of 2006 (Proposition 1E) program. A portion of this grant will be used to help offset the Proposed Project's costs. The remaining cost will be covered by LACFCD funds.

Impacts to recreation were analyzed in the Draft EIR, Section 3.15. The Proposed Project will not limit the use of the Oak Grove area of Hahamongna Watershed Park. Sediment removal activities would be temporary and are expected to occur only in the drier months (April to December, excluding holidays). It is expected that these activities will often not be adjacent to the Oak Grove area of Hahamongna Watershed Park. The Proposed Project would result in temporary limitations on the recreational use of the Proposed Project site and some of the adjacent trails. Most of these areas would be reopened seasonally or intermittently throughout the sediment removal process. In addition, temporary impacts to designated recreational facilities and trails will be minimized through advance communication and redirection to the nearest facility in the vicinity of the Proposed Project. Furthermore, an east-west trail crossing will continue to provide access at the north end of the reservoir. At the south end of the reservoir, after the reservoir ingress and egress ramps have been fully constructed, access to the upper east side Arroyo Seco Trail from La Cañada Verdugo Road will be maintained and the linkage from the west side Arroyo Seco Trail and the Flint Wash Trail to the upper east side Arroyo Seco Trail (crossing Devil's Gate Dam and also continuing south to the Rose Bowl) will be available after construction activities have ended each day and on nonworking days.

Potential impacts due to the Proposed Project's truck trips were analyzed in the Draft EIR, Section 3.16, Transportation and Traffic. As listed in that section, a single intersection in the immediate vicinity of the Proposed Project site will have a potentially significant impact. The Draft EIR outlines a 12-hour trucking schedule, with trucking operations on Saturdays as well. This schedule is used to model the most intensive construction operation, which may not be applicable at the site for the duration of the Proposed Project. Typical trucking schedules are estimated to be 8 hours per day on weekdays. In practice, hauling rates and routes may be adjusted to help reduce impacts depending on operational need. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the Proposed Project site.

Response to Comment 129-2:

Air quality impacts associated with truck traffic were analyzed in the Draft EIR in Section 3.5. The Draft EIR analyzed impacts to sensitive uses, including residents, recreational uses, and schools, adjacent to the Proposed Project site and along the proposed haul routes. LACFCD has conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed the United States (U.S.) Environmental Protection Agency's (EPA's) 2007 standards for emissions. Therefore, in order to further reduce emissions, Mitigation Measure MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump trucks that meet or exceed EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality, including those associated with health effects, will be reduced to less than significant.

Dust impacts from the Proposed Project were carefully evaluated, and compliance with the South Coast Air Quality Management District's (SCAQMD's) Rule 403 has been determined to be sufficient to adequately address the concerns. As discussed in the Draft EIR, Section 3.10.6, Impacts and Mitigation, HAZARDS-1, Sediment Removal/Reservoir Management, no hazardous levels of the contaminants were detected in the sediment. Dust impacts from the Proposed Project were carefully evaluated, as discussed in the Draft EIR, Section 3.5.6, Impacts and Mitigation, AIR QUALITY-2, Sediment Removal. The Proposed Project's activities, including excavation, grading, material loading, and hauling, would result in less than significant dust emissions due to the Proposed Project's use of best management practices and would be in full compliance with SCAQMD's fugitive dust regulations.

Response to Comment 129-3:

As discussed in Section 3.6.6 of the Draft EIR, Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats. In addition, sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays). Wildlife species currently found in the Proposed Project area would be expected to either remain in the undisturbed areas of the reservoir outside of the Proposed Project area or to reestablish once sediment removal activities have been completed. In addition, sediment removal activities would not completely block the Proposed Project site from surrounding habitat, would occur only during the day, and would not interfere with nighttime wildlife activity. Although some wildlife may be temporarily displaced during construction, wildlife would not be physically prevented from moving around and into the basin area.

Alternative 3, Configuration D affects the least amount of habitat of all the action alternatives, while still achieving Proposed Project objectives (see Section 4.6 of the Final EIR). This alternative would provide a

buffer on the west side of the reservoir that would allow for the movement of wildlife. Alternative 3, Configuration D, Option 1 provides a more natural configuration for the reservoir by having two branches to carry water and sediment toward the face of the dam, avoiding disturbing a significant portion of existing vegetation. To further reduce the Proposed Project's footprint, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2, which drastically reduces the project's footprint of 120 acres down to 71 acres, would avoid excavation of the western branch, thereby providing a greater habitat buffer on the west side of the reservoir. In addition, the maintenance areas would be smaller than the original sediment removal footprint, allowing for habitat to reestablish and providing additional areas for wildlife movement.

Response to Comment 129-4:

LACFCD notes the commenter's objection to the Proposed Project.

See Response to Comment 129-1. The Draft Environmental Impact Report (EIR) analyzed a range of sediment removal amounts and configurations aimed at addressing the diverse concerns of stakeholders, including concerns for long-term habitat preservation and recreational usage. The alternatives presented in the Draft EIR represent the best options available to respond to stakeholders' concerns, while adequately reducing flood risk to downstream communities.

LACFCD goes to great lengths to lessen project impacts and maximize efficiencies. For example, Alternative 3, Configuration D, which was found to be the Environmentally Superior Alternative in the Draft EIR, was based on the City of Pasadena's Hahamongna Watershed Park Master Plan (HWPMP). As discussed above in Response to Comment 129-1, Alternative 3, Configuration D, Option 2 drastically reduces the project's footprint of 120 acres down to 71 acres. This reduction in project acreages will greatly lessen environmental impacts of the Proposed Project.

LACFCD is committed to *Public Service that Works*; and by combining almost 100 years of technical expertise and invaluable input from the community, less invasive flood protection will continue to be a reality.

Comments: Devil's Gate Reservoir Sediment Removal and Management Project - Draft EIR

To: LACFCD / County of Los Angeles Department of Public Works
reservoircleanouts@dpw.lacounty.gov

Attn: Water Resources Division – Reservoir Cleanouts
Keith Lilley, Principal Engineer

From: Thomas Holaday, Concerned Citizen of Altadena

Date: December 23, 2013

Re: Los Angeles County Department of Public Works Sediment Removal in Hahamongna Watershed Park / Devil's Gate Reservoir – Draft Environmental Impact Report

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Dear Mr. Lilley,

Comment 130-1

Why is The Los Angeles County Department of Public Works planning a massive five-year sediment removal project at Hahamongna Watershed Park that will cause enormous impacts to the City of Pasadena? The scope of these impacts is so severe that the Public Health and the Health of the Environment are at extreme risk. This is a massive trucking project that offers no sustainability for the future of flood control.

Comment 130-2

Hahamongna Watershed Park, situated above Devil's Gate Dam, is a rare and unique environmental resource for water and biological resources that must not be destroyed. This beautiful and treasured alluvial canyon with its rich riparian habitat must be protected. The DWP's plan as spelled out in this Draft EIR is destructive and detrimental to the future of Hahamongna Watershed Park. Once it is destroyed, it cannot be recreated.

Comment 130-3

There are problems with the project. With the proposed plan, there will be significant air and noise pollution: 425 trucks per day, that is 50 per hour, for 6 days per week, for 9 months, for five years. Why must the Project take 3 to 5 years to complete?
Why not do the sediment removal Project in 10 to 20 years?
Why is it necessary to proceed with this highly aggressive and destructive plan?

We will Lose Our Park. This Aggressive Plan is Unnecessary and Unacceptable.

The Health Risks are disastrous. Significant increases in Traffic locally and regionally. It would create a real danger to the many Students, who attend the five nearby Schools, and all the Residents of Pasadena, Altadena, La Canada, and the SGV region.
Permanent loss of Habitat would occur by scraping out 120 acres of the Park, leaving a 'Moonscape' scar.
Why does The LACDPW offer No Mitigation to its plan?
Why does The DPW claim that all the destruction and risks are unavoidable?

Comment 130-4

We will lose our Park. This is Unacceptable.

There are significant problems with the Draft EIR. Why is there offered no scientific rationale to remove 2.4 to 4 million cubic yards of sediment? The Board of Supervisors authorized the DPW to analyze and develop methods to remove 1.67 million cubic yards, with no specified schedule for completion. Why now does the DPW claim they need to remove 2.4 to 4 million cubic yards without saying why the amount has increased? And, why does the DPW make no case for the need to remove it in five years?

Comment 130-5

Why does the DPW provide no rationale for the Permanent Destruction of Habitat?
Why does the DPW have reason to Clear-Cut 50 to 120 acres of this beautiful green space?
This goes against the Hahamongna section of the Arroyo Seco Master Plan, Pasadena.

Consider the Collateral Damages. Visitors to the Park will lose restorative qualities of life via programs and adventures within this natural beauty of rare riparian habitat:
The Mach 1 Program- Horse Riding Therapy for Disabled Children,
The Tom Sawyer Children's Camps utilize this Park as their main area,
The Rose Bowl Riders and Stables, who ride daily,
Hikers and dog walkers utilize the many important and wonderful Trails daily,
Bird Watchers from everywhere have regular walks here, with remarkable findings.
Under the proposed DPW project, all of this would come to an end.

Comment 130-6

The Health Risks to the public, the nearby Schools, as well as all the Residents of Pasadena and the SGV Region, from airborne pollutants, such as fugitive dust and diesel exhaust, cannot be overstated. Air and noise pollution, traffic congestion, destruction of habitat leads to the destruction of the Recreational Benefits the Hahamongna has always offered to the public.
Why does the DEIR indicate that Increases in Diseases among people of Pasadena are Acceptable, and Unavoidable consequences of the project?
Why does the DEIR Ignore Recreation impacts? How could The DEIR state that Recreation impacts are found to be less significant?

Comment 130-7

The County project would Overburden the Flood Easement, as well as Overburden Outside their Easement. This is Comprehensively Unacceptable.

Comment 130-8

Solutions

Comment 130-9

I agree that sediment needs to be removed to ensure the Public Safety Downstream. But, it should be done in a way that is much less impactful on the public, and much less destructive to the environment. This Hahamongna Watershed Park is a treasured jewel that must not be abused, but protected. Why does the DPW show no reason to protect it? Once it is destroyed, it cannot be recreated.

Comment 130-10

The County needs a long term "Forever Plan" to deal with Flood control. One that is sustainable and does not permanently destroy one of the most important open spaces in the region. This project could serve as a model for other such projects in the region. I believe that the various methods of Sluicing are an important part of the solution. The County has relied on Sluicing for years. Why not continue to use Sluicing methods, flow assisted sediment transport? Instead of spending all this money on trucking, why not repair and improve those few areas that risk overtopping in a severe storm, along the Arroyo Seco River between Devil's Gate Dam, and the LA River confluence??

Comment 130-11

Can The County adopt the proposal offered by Tim Brick, Managing Director of the Arroyo Seco Foundation? Go Slow, Go with the Flow, Let the Habitat Grow, and Keep Costs Low. This plan will mean fewer trucks, less dust, less air pollution, less noise, less habitat destruction, and lower costs. I urge the County to purpose this plan.

Go Slow: The County makes no case for removing the sediment in three-five years. This sediment has been building up for almost 100 years, and the basin has never been fully cleaned out. We would like them to take a longer time, ten-twenty years, which would eliminate the need for the Big Dig approach. The Go Slow approach would allow the sediment to be removed in less destructive ways. Instead of removing 800,000-1,200,000 cubic yards of sediment per year, the County should remove 167,000 cubic yards per year, and then annually remove what is necessary based on the amount of inflow. As long as the County removes more than what flows in, they will increase the capacity of the dam.

Go with the Flow: The County should allow more of the sediment to flow through the dam. This is called sluicing or FASTing (Flow-Assisted Sediment Transport). The County has been sluicing sediment through Devil's Gate Dam for years, and we would like to see more. If they proceed slowly, then they may utilize large storms more effectively to sluice sediment, and can coordinate with the Army Corps of Engineers on its plans to restore habitat in the Los Angeles River. They can conduct pilot programs to determine the effects of increased sluicing downriver. Sluicing returns sediment to where it belongs: the river. This sediment is not a waste product but can be used as an integral part of the restoration of the Arroyo Seco and the Los Angeles River.

Let the Habitat Grow: The County makes no case for keeping 50-120 acres of riparian habitat permanently denuded. This rich riparian habitat should be allowed to grow so it can continue to provide a home for local flora and fauna.

Comment 130-11 continued

Keep Costs Low: This $100 million project can cost a lot less if the County uses the SLOW method. By sluicing more sediment through the dam and working with nature instead of against it, the costs of this project can be greatly reduced. If the County removed more of the sediment with sluicing, that means they will need fewer trucks, which will save money. If the cost is spread out over ten or twenty years, this provides the County and the City an opportunity to reexamine the process and promote best practices from an economic, engineering, and environmental standpoint. More importantly, this project can serve as a model for other projects, and perhaps the County can find ways to work with nature on the other projects, thereby reducing the costs of sediment removal countywide. The County has estimated costs the range of at $3-5 billion over the next 20 years, but as this has become an ongoing maintenance expense, the county needs to find ways to reduce this cost permanently.

Conclusion:

As the City of Pasadena has the responsibility as the property owner of Hahamongna Watershed Park, and is the Responsible Agency to protect the HWP, I urge that the EIR be consistent with the City of Pasadena Plan that is in place, The Master Plan for Hahamongna Watershed Park. As is needed, why cannot the City of Pasadena and The County DPW work together to develop the City's preferred alternative plan?

Comment 130-12

Please be consistent with the Hahamongna Master Plan to preserve habitat and wildlife, to improve opportunities for recreation, to improve water conservation, and to minimize air and noise pollution impacts. Most importantly, to create a feasible project and maintain a long-term management program that keeps us safe, and green.

PLEASE SAVE HAHAMONGNA WATERSHED PARK !

Thomas Holaday
Concerned Citizen of Altadena
thomasholaday@sbcglobal.net

Response to Comment Letter #130 (Thomas Holaday)

Response to Comment 130-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

As discussed in the Draft Environmental Impact Report (EIR), Section 2.3, Project Need, the Los Angeles County Flood Control District (LACFCD) must remove sediment that has accumulated behind the dam to restore the capacity of Devil's Gate Reservoir to minimize the level of flood risk to downstream communities along the Arroyo Seco. In its current condition, the reservoir no longer has the capacity to safely contain another major debris event; and the outlet works have a risk of becoming clogged and inoperable. LACFCD was mandated by the State Legislature to provide flood protection and water conservation within its boundaries.

A reservoir storage design capacity of two design debris events (DDEs) below the dam's lowest spillway was determined to be the standard acceptable level of risk at Devil's Gate Dam and Reservoir. The DDE volume of capacity is determined using the January 2006 Los Angeles County Department of Public Works (LACDPW) Hydrology Manual and the March 2006 LACDPW Sedimentation Manual. For Devil's Gate Dam and Reservoir, the required reservoir capacity is 4.0 million cubic yards (cy) (two DDEs) below the spillway elevation of 1,040.50 feet.

The Hydrology Manual (January 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_Hydrology_Manual/2006%20Hydrology%20Manual-Divided.pdf

The Sedimentation Manual (March 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_sedimentation_manual/Sedimentation%20Manual-Second%20Edition.pdf

Additional information concerning DDE calculation methods has been added to the Final Environmental Impact Report (EIR), Section 2.3, Project Need.

The Proposed Project is designed to be a long-term plan, with the reservoir management phase providing management for future sediment inflows. The proposed yearly cleanout of sediment after the completion of the Proposed Project will reduce the necessity for a future large-scale cleanout. Please see Section 2.5.2 of the Draft EIR for more information on future maintenance.

As discussed in the Draft EIR, Section 3.5, the Health Risk Assessment (HRA) analyzed both the cancer-related and noncancer-related acute (short-term) and chronic (long-term) impacts from project-related emissions. The HRA analysis found the Proposed Project would result in less than significant impacts for both the cancer-related and non-cancer-related acute short-term and long-term impacts.

Response to Comment 130-2:

As discussed in Section 3.6.6 of the Draft EIR, Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats. In addition, sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays). Wildlife species currently

found in the Proposed Project area would be expected to either remain in the undisturbed areas of the reservoir outside of the Proposed Project area or to reestablish once sediment removal activities have been completed.

LACFCD goes to great lengths to lessen project impacts and maximize efficiencies. For example, Alternative 3, Configuration D, which was found to be the Environmentally Superior Alternative in the Draft EIR, was based on the City of Pasadena's Hahamongna Watershed Park Master Plan (HWPMP). Alternative 3 affects the least amount of habitat of all the action alternatives while still achieving Proposed Project objectives (see Section 4.6 of the Final EIR). This alternative would provide a buffer on the west side of the reservoir that would allow for the movement of wildlife. Alternative 3, Configuration D, Option 1 provides a more natural configuration for the reservoir by having two branches to carry water and sediment toward the face of the dam, avoiding disturbing a significant portion of existing vegetation. To further reduce the Proposed Project's footprint, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2, which drastically reduces the project's footprint of 120 acres down to 71 acres, would avoid excavation of the western branch, thereby providing a greater habitat buffer on the west side of the reservoir. In addition, the maintenance areas would be smaller than the original sediment removal footprint, allowing for habitat to reestablish and providing additional areas for wildlife movement.

Response to Comment 130-3:

See Response to Comment 130-1. Although the sediment removal phase of the Proposed Project will occur over a five-year period, the removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays), as described in the Draft EIR, Section 2.5.1, Sediment Removal Phase, Project Schedule.

Air quality and noise impacts associated with truck traffic were analyzed in the Draft EIR in Sections 3.5 and 3.14, respectively. As discussed in the Draft EIR, Section 3.14, with implementation of Mitigation Measure MM N-1, noise impacts would be reduced to a level of less than significant. LACFCD has conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed the United States (U.S.) Environmental Protection Agency's (EPA's) 2007 standards for emissions. Therefore, in order to further reduce emissions, Mitigation Measure MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump trucks that meet or exceed EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality, including those associated with health effects, will be reduced to less than significant.

Potential impacts due to the Proposed Project's truck trips were analyzed in the Draft EIR, Section 3.16, Transportation and Traffic. As listed in that section, a single intersection in the immediate vicinity of the Proposed Project site will have a potentially significant impact. The Draft EIR outlines a 12-hour trucking schedule, with trucking operations on Saturdays as well. This schedule is used to model the most intensive construction operation, which may not be applicable at the site for the duration of the Proposed Project. Typical trucking schedules are estimated to be 8 hours per day on weekdays. In practice, hauling rates and routes may be adjusted to help reduce impacts depending on operational need. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the Proposed Project site.

LACFCD proposed a project duration of five years to reduce accumulated sediment in a timely fashion. The goal of LACFCD is to restore reservoir flood capacity as soon as feasible while reducing costs, minimizing the duration of environmental and construction impacts to the surrounding communities, and configuring the reservoir to allow for sustainable future maintenance. Extending the project would prolong the flood risk to downstream communities and increase the construction impacts to the surrounding communities.

Impacts to recreation were analyzed in the Draft EIR, Section 3.15. The Proposed Project will not limit the use of the Oak Grove area of Hahamongna Watershed Park. Sediment removal activities would be temporary and are expected to occur only in the drier months (April to December, excluding holidays). It is expected that these activities will often not be adjacent to the Oak Grove area of Hahamongna Watershed Park. The Proposed Project would result in temporary limitations on the recreational use of the Proposed Project site and some of the adjacent trails. Most of these areas would be reopened seasonally or intermittently throughout the sediment removal process. In addition, temporary impacts to designated recreational facilities and trails will be minimized through advance communication and redirection to the nearest facility in the vicinity of the Proposed Project. Furthermore, an east-west trail crossing will continue to provide access at the north end of the reservoir. At the south end of the reservoir, after the reservoir ingress and egress ramps have been fully constructed, access to the upper east side Arroyo Seco Trail from La Cañada Verdugo Road will be maintained; and the linkage from the west side Arroyo Seco Trail and the Flint Wash Trail to the upper east side Arroyo Seco Trail (crossing Devil's Gate Dam and also continuing south to the Rose Bowl) will be available after construction activities have ended each day and on nonworking days.

Response to Comment 130-4:

See Response to Comments 130-1 through 130-3. Various mitigation measures are provided throughout the Draft EIR to reduce impacts to the community and the environment.

Table ES-1 of the Draft EIR lists all Mitigation Measures proposed for the Proposed Project. These Mitigation Measures are enforceable and designed to reduce impacts through methods known to be feasible and effective. The Proposed Project's Mitigation Measures are accepted by agencies that would be involved in consultation, negotiation, and final approval of Mitigation Measures, including conceptual restoration plans.

Response to Comment 130-5:

See Response to Comments 130-1 through 130-3.

As discussed in the Draft EIR, Section 2.2.1, LACFCD History, in 2010, in response to the Station Fire, an emergency project to remove only 1.67 million cy was proposed. The volume of 1.67 million cy is the previously published DDE and this amount was considered justifiable to the California Environmental Quality Act (CEQA) as an emergency exemption. This emergency project was not completed because in March 2011 the County of Los Angeles Board of Supervisors motioned LACFCD to complete an EIR for a comprehensive sediment removal project at Devil's Gate. LACFCD then initiated project development in accordance with the required level of protection of two DDEs. At that time, LACFCD also began receiving feedback on the concurrent Sediment Management Strategic Plan (Strategic Plan) and the interest to look at more sustainable sediment and reservoir management. As a result of the feedback and recommendations during the development of the Strategic Plan, LACFCD began evaluating ways to create a more sustainable long-term way to manage its sediment and habitat. To emphasize the goals of

the project, the Proposed Project was given the name Devil's Gate Sediment Removal and Management Project. Knowing that the EIR would take a considerable amount of time to complete, the County of Los Angeles Board of Supervisors also motioned for an Interim Measures Project to be implemented in order to help reduce the flood risk downstream of the dam until the ultimate sediment removal project commenced.

Response to Comment 130-6:

See Response to Comment 130-3. As noted in the Draft EIR, Section 3.15, the Proposed Project will not limit the use of the Oak Grove area of Hahamongna Watershed Park. Although the sediment removal phase of the Proposed Project will occur over a five-year period, the removal will not be continuous, as excavation will occur only in the drier months (April to December, excluding holidays), as described in the Draft EIR, Section 2.5.1 Sediment Removal Phase, Project Schedule.

Response to Comment 130-7:

See Response to Comments 130-1 through 130-3. Dust impacts from the Proposed Project were carefully evaluated, as discussed in the Draft EIR, Section 3.5.6, Impacts and Mitigation, AIR QUALITY-2, Sediment Removal. The Proposed Project's activities, including excavation, grading, material loading, and hauling, would result in less than significant dust emissions due to the project's use of best management practices and would be in full compliance with South Coast Air Quality Management District's (SCAQMD's) fugitive dust regulations.

The Draft EIR does not claim that "increases in diseases among people of Pasadena are acceptable and unavoidable consequences," as suggested in the comment. As noted above, an HRA was performed for the Proposed Project that found that both cancer-related and non-cancer-related impacts would be less than significant. In addition, recreational impacts were addressed in Section 3.15 Recreation, of the Draft EIR and were determined to be less than significant.

Response to Comment 130-8:

LACFCD notes the commenter's disapproval with the Proposed Project; however, the scope of the Proposed Project and Alternatives is entirely within LACFCD's easement. The Proposed Project will not overburden the easement; it will restore the reservoir to the design capacity necessary for flood control storage or to safely contain future sediment inflow (volume for two DDEs below the spillway elevation of 1,040.5 feet).

Response to Comment 130-9:

See Response to Comments 130-1 through 130-4.

Response to Comment 130-10:

Sluicing was analyzed as part of the Draft EIR in the Alternatives Analysis, Section 4.7, Alternative 4 Sluicing Method. This alternative would involve use of construction equipment and the removal of trees and vegetation over the same footprint as the Proposed Project. The sluicing alternative would potentially have additional significant impacts in comparison to the Proposed Project. Many of these impacts would be associated with the likelihood that large amounts of sediment would not be fully transported through the flood control system; this sediment would need to be mechanically removed

and trucked out from numerous downstream locations potentially including the two soft-bottom portions of the channel. As discussed in Section 4.7 and in the Sediment Transport Capacity Analysis (Appendix K), most of these downstream locations would be in the Arroyo Seco, with deposits primarily occurring in and around the two soft bottom areas. Please see Section 4.7 and Appendix K of the Draft EIR for further analysis.

Flow Assisted Sediment Transport, or FASTing, operations have been routinely used at Devil's Gate Reservoir and result in relatively small amounts of finer grained sediment passing through the reservoir. After the sediment removal phase has occurred, FASTing is proposed to be an integral part of the annual maintenance at Devil's Gate. Annual FASTing operations will be implemented to reduce future buildups of sediment in the reservoir and to reduce the need for mechanical removal of sediment from the reservoir. Although FASTing is expected to be an effective means of keeping sediment levels low in the reservoir, it is estimated that typically 13,000 cy of sediment will be removed by excavation annually. A maintenance regime that relies on FASTing greatly reduces the need for and extends the life of future and existing sediment placement sites and improves the future sustainability of the reservoir. Please see Section 2.5.2 of the Draft EIR for more information on future maintenance.

As noted in the Draft EIR, the purpose of the Proposed Project is to reduce flood risk by restoring reservoir capacity for flood control.

Response to Comment 130-11:

LACFCD goes to great lengths to lessen project impacts and maximize efficiencies. As such, many of the points in the Arroyo Seco Foundation's four-point "Slow Program" are compatible with the LACFCD Proposed Project.

For example, the Draft EIR concluded that Alternative 3 is the Environmentally Superior Alternative. As discussed above, Alternative 3, Configuration D, Option 2 drastically reduces the project's footprint. This reduction in project acreages will greatly lessen environmental impacts of the Proposed Project.

LACFCD strives to achieve an efficient, low-cost sediment removal project. Sediment removal rates and trucking operations, now utilizing all low-emissions trucks, as explained in Section 3.5 of the Draft EIR, have been carefully planned for economies of scale to realize maximum efficiencies without major delays in project schedule, thus greatly reducing operating costs. Furthermore, LACFCD has applied for and received an approximately $28 million grant through the State's Disaster Preparedness and Flood Protection Bond Act of 2006 (Proposition 1E) program. A portion of this grant will be used to help offset the Proposed Project's costs.

While sluicing is not a viable project alternative, as explained above, FASTing will be used for maintenance after the project's main sediment removal phase has been completed, as described in Section 2.5.2 of the Draft EIR.

LACFCD is committed to *Public Service that Works*; and by combining almost 100 years of technical expertise and invaluable input from the community, less invasive flood protection will continue to be a reality.

For a more detailed response to the Arroyo Seco Foundation's four-point "Slow Program", please see the response to the Arroyo Seco Foundation's comment letter (Comment Letter #216, Response to Comment 216-16).

Response to Comment 130-12:

Alternative 3, Configuration D, which was found to be the Environmentally Superior Alternative in the Draft EIR, was based on the City of Pasadena's Hahamongna Watershed Park Master Plan (HWPMP). LACFCD has met and will continue to meet with the City of Pasadena regularly to coordinate and ensure resolution of concerns regarding Devil's Gate Reservoir and the HWPMP.

See Response to Comments 130-1, 130-2, 130-3, and 130-11. As stated in the Draft EIR, the Proposed Project will remove accumulated sediment deposits within the reservoir. This means the percolation characteristics of the reservoir will return to pre-Station Fire conditions if not improve; and the reservoir will still permit percolation of rainfall and local runoff to replenish the groundwater basin.

From: Tom Joyce
To: reservoircleanouts
Subject: Clean out
Date: Friday, January 03, 2014 9:40:56 AM

Comment 131-1 Be reasonable and prudent in this matter as many enjoy the way it currently exists!

Thomas T Joyce. Resident of Altadena

Sent from my iPad

Response to Comment Letter #131 (Thomas Joyce)

Response to Comment 131-1:

Thank you for your input. This comment has been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

Los Angeles County Flood Control District (LACFCD) goes to great lengths to lessen project impacts and maximize efficiencies. For example, the Draft Environmental Impact Report (EIR) concluded that Alternative 3 is the Environmentally Superior Alternative. Alternative 3, Configuration D, Option 2 drastically reduces the project's footprint of 120 acres down to 71 acres. Additionally, the limited maintenance area for Alternative 3 further reduces the permanent habitat impacts down to approximately 51 acres by allowing for site replanting and mitigation to take place within the reservoir footprint. This reduction in project acreages will greatly lessen environmental impacts of the Proposed Project.

LACFCD is committed to *Public Service that Works*; and by combining almost 100 years of technical expertise and invaluable input from the community, less invasive flood protection will continue to be a reality.

From: Tom S
To: reservoircleanouts
Subject: Devil's Gate Reservoir Sediment Removal and Management Project
Date: Monday, January 06, 2014 3:19:08 PM

My name is Thomas Seelbinder. I live in the city of Rancho Santa Margarita, CA a small suburb at the far eastern side of Orange County.

Comment 132-1

I have looked at all the plans for the sediment removal project sponsored by the county, and all the plans will have an impact on our Disc Golf Course. Alternative 3 is the best plan, but the western branch will remove 2 of our playable positions. Please re-visit the sediment removal plans and make an alternative plan that will not impact the disc golf course.

I must say that the Oak Grove Disc Golf Course is a staple in the history of Disc Golf. Not only was this the first disc golf course, it is a beautiful course. I have to travel over an hour to reach your city to play at this course, and I don't mind doing so. We usually make a small day out of it.

Thank you,
Thomas Seelbinder

Response to Comment Letter #132 (Thomas Seelbinder)

Response to Comment 132-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

No official disc golf course holes located in the Oak Grove area of Hahamongna Watershed Park will be removed by the Proposed Project. As noted in the Draft Environmental Impact Report (EIR), Section 3.15, Los Angeles County Flood Control District (LACFCD) recognizes the importance of the area to those who take advantage of the recreational opportunities offered, including the Oak Grove Disc Golf Course. Where possible, Los Angeles County Flood Control District (LACFCD) will avoid any disc golf course holes located outside the Oak Grove area of Hahamongna Watershed Park. When avoidance is not possible, LACFCD will coordinate with the Oak Grove Disc Golf Club for removal of the disc golf hole equipment.

Alternative 3, Configuration D, the Environmentally Superior Alternative from the Draft Environmental Impact Report (EIR), carefully balances flood control needs and reductions in impacts to habitat by restoring the required reservoir capacity while also minimizing the project footprint (see Section 4.6 of the Final EIR). Furthermore, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2 would avoid excavation of the western branch, thereby providing a greater distance between the Oak Grove area of Hahamongna Watershed Park and the excavation area, reducing the project footprint of 120 acres down to 71 acres. Alternative 3, Configuration D, Option 2 would also avoid all currently existing Oak Grove Disc Golf Club holes. The Oak Grove area of Hahamongna Watershed Park and the associated facilities would remain open during sediment removal and would continue to provide active recreational facilities to the area.

From:	chaosinmymynd@aol.com
To:	reservoircleanouts
Subject:	DEVIL"S GATE RESERVOIR SEDIMENT REMOVAL AND MANAGEMENT PROJECT
Date:	Thursday, January 02, 2014 7:50:36 PM

To whom it may concern,

Comment 133-1

The Western Branch of Alternative 3 will impact the Oak Grove Disc Golf Course in La Canada Flintridge/Pasadena, California.

There are two holes that will be effected which would compromise the integrity of the course. Oak Grove Disc Golf Course was the first permanent disc golf course and has a rich and endearing history.

I earnestly ask that you reconsider your decision and leave the course alone.

Thank you,
Tim Miranda

Response to Comment Letter #133 (Tim Miranda)

Response to Comment 133-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. No official disc golf course holes located in the Oak Grove area of Hahamongna Watershed Park will be removed by the Proposed Project. As noted in the Draft Environmental Impact Report (EIR), Section 3.15, Los Angeles County Flood Control District (LACFCD) recognizes the importance of the area to those who take advantage of the recreational opportunities offered, including the Oak Grove Disc Golf Course. Where possible, Los Angeles County Flood Control District (LACFCD) will avoid any disc golf course holes located outside the Oak Grove area of Hahamongna Watershed Park. When avoidance is not possible, LACFCD will coordinate with the Oak Grove Disc Golf Club for removal of the disc golf hole equipment.

Alternative 3, Configuration D, the Environmentally Superior Alternative from the Draft Environmental Impact Report (EIR), carefully balances flood control needs and reductions in impacts to habitat by restoring the required reservoir capacity while also minimizing the project footprint (see Section 4.6 of the Final EIR). Furthermore, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2 would avoid excavation of the western branch, thereby providing a greater distance between the Oak Grove area of Hahamongna Watershed Park and the excavation area, reducing the project footprint of 120 acres down to 71 acres. Alternative 3, Configuration D, Option 2 would also avoid all currently existing Oak Grove Disc Golf Club holes. The Oak Grove area of Hahamongna Watershed Park and the associated facilities would remain open during sediment removal and would continue to provide active recreational facilities to the area.

From: bonolatim @dslextreme.com
To: reservoircleanouts
Subject: Draft EIR Comments
Date: Friday, January 03, 2014 9:10:56 AM

Comment 134-1

Let me see if I understand the position of the Department of Public Works (DPW):

In what appears to be one of the driest years in L.A. County history, the DPW is insisting that a massive project to remove sediment (along with trees and an entire riparian ecosystem) must be enacted immediately to avoid flooding.

Comment 134-2

The DPW also contends that it is necessary, in order to protect adjacent neighborhoods, to enact a plan that would subject those same neighborhoods to trucks rumbling through their streets and and considerable dust pollution for a period of at least five years.

Comment 134-3

At a time when funds are tight for schools and other public projects, the DPW proposes a massive, costly, environmentally disruptive project, as opposed to a lesser project that, spread over a greater number of years, would be far less disruptive.

Did I miss anything?

Comment 134-4

Please reject this destructive boondoggle.

Timothy D. Callahan
3771 Alzada Rd.
Altadena, CA 91001-38-1

Response to Comment Letter #134 (Timothy Callahan)

Response to Comment 134-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

The Los Angeles County Flood Control District (LACFCD) was mandated by the State Legislature to provide flood protection and water conservation within its boundaries. A reservoir storage design capacity of two design debris events (DDEs) below the dam's lowest spillway was determined to be the standard acceptable level of risk at Devil's Gate Dam and Reservoir. The DDE volume of capacity is determined using the January 2006 Los Angeles County Department of Public Works (LACDPW) Hydrology Manual and the March 2006 LACDPW Sedimentation Manual. For Devil's Gate Dam and Reservoir, the required reservoir capacity is 4.0 million cubic yards (cy) (two DDEs) below the spillway elevation of 1,040.50 feet.

The Hydrology Manual (January 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_Hydrology_Manual/2006%20Hydrology%20Manual-Divided.pdf

The Sedimentation Manual (March 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_sedimentation_manual/Sedimentation%20Manual-Second%20Edition.pdf

Additional information concerning DDE calculation methods has been added to the Final Environmental Impact Report (EIR), Section 2.3, Project Need.

Over 92 years, the average amount of sediment deposited each year is approximately 130,000 cy; however, Devil's Gate Reservoir is a dynamic system with constantly changing amounts of sediment deposited from year to year, depending on the frequency and intensity of storm events. If a 1 in 50 years storm were to occur, approximately 2.0 million cy (one DDE) of sediment could be expected to wash into the reservoir. Because of the LACFCD's responsibilities to provide flood protection, LACFCD must be ready at all times for a Design Debris Event to occur.

As discussed in Section 3.6.6 of the Draft EIR, Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats. In addition, sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays).

Response to Comment 134-2:

LACFCD proposed a project duration of five years to reduce accumulated sediment in a timely fashion. The goal of LACFCD is to restore reservoir flood capacity as soon as feasible while reducing costs, minimizing the duration of environmental and construction impacts to the surrounding communities, and configuring the reservoir to allow for sustainable future maintenance. Extending the project would prolong the flood risk to downstream communities and increase the construction impacts to the surrounding communities.

Potential impacts due to the Proposed Project's truck trips were analyzed in the Draft EIR, Section 3.16, Transportation and Traffic. As listed in that section, a single intersection in the immediate vicinity of the Proposed Project site will have a potentially significant impact. In practice, hauling rates and routes may be adjusted to help reduce impacts, depending on operational need. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the Proposed Project site.

Dust impacts from the Proposed Project were carefully evaluated, as discussed in the Draft EIR, Section 3.5.6, Impacts and Mitigation, AIR QUALITY-2, Sediment Removal. The Proposed Project's activities, including excavation, grading, material loading, and hauling, would result in less than significant dust emissions due to the project's use of best management practices and would be in full compliance with South Coast Air Quality Management District's (SCAQMD's) fugitive dust regulations.

Response to Comment 134-3:

See Response to Comment 134-1. LACFCD goes to great lengths to lessen project impacts and maximize efficiencies. For example, the Draft EIR concluded that Alternative 3 is the Environmentally Superior Alternative. Alternative 3, Configuration D, Option 2 drastically reduces the project's footprint of 120 acres down to 71 acres. Additionally, the limited maintenance area for Alternative 3 further reduces the permanent habitat impacts down to approximately 51 acres by allowing for site replanting and mitigation to take place within the reservoir footprint. This reduction in project acreages will greatly lessen environmental impacts of the Proposed Project.

LACFCD strives to achieve an efficient, low-cost sediment removal project. Sediment removal rates and trucking operations, now utilizing all low-emissions trucks, as explained in Section 3.5 of the Draft EIR, have been carefully planned for economies of scale to realize maximum efficiencies without major delays in project schedule, thus greatly reducing operating costs. Furthermore, LACFCD has applied for and received an approximately $28 million grant through the State's Disaster Preparedness and Flood Protection Bond Act of 2006 (Proposition 1E) program. A portion of this grant will be used to help offset the Proposed Project's costs.

Response to Comment 134-4:

LACFCD notes that the commenter does not support the Proposed Project.

From: Will Fernandez
To: reservoircleanouts
Subject: Hahamonga sediment removal
Date: Sunday, January 05, 2014 10:55:57 AM

Comment 135-1

Please consider the least impactful alternative 3 proposal for Hahamonga. As an avid disc golfer I am greatly concerned with the original proposal to dredge a rich and biodiverse area, home to countless birds and animals who have no voice. A few weeks ago while playing a round of disc golf I spotted a bobcat on the desert hole where the county is proposing to dredge the dam. I implore you to please consider the ramifications of your actions on wildlife and disc golfers that regularly inhabit the area.
Thank you for your consideration.
William Fernandez
Network for a Healthy California

Sent from my iPod

Response to Comment Letter #135 (William Fernandez)

Response to Comment 135-1:

Thank you for your input. This comment has been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. No official disc golf course holes located in the Oak Grove area of Hahamongna Watershed Park will be removed by the Proposed Project. As noted in the Draft Environmental Impact Report (EIR), Section 3.15, Los Angeles County Flood Control District (LACFCD) recognizes the importance of the area to those who take advantage of the recreational opportunities offered, including the Oak Grove Disc Golf Course. Where possible, Los Angeles County Flood Control District (LACFCD) will avoid any disc golf course holes located outside the Oak Grove area of Hahamongna Watershed Park. When avoidance is not possible, LACFCD will coordinate with the Oak Grove Disc Golf Club for removal of the disc golf hole equipment.

Alternative 3, Configuration D, the Environmentally Superior Alternative from the Draft Environmental Impact Report (EIR), carefully balances flood control needs and reductions in impacts to habitat by restoring the required reservoir capacity while also minimizing the project footprint (see Section 4.6 of the Final EIR). Furthermore, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2 would avoid excavation of the western branch, thereby providing a greater distance between the Oak Grove area of Hahamongna Watershed Park and the excavation area, reducing the project footprint of 120 acres down to 71 acres. Alternative 3, Configuration D, Option 2 would also avoid all currently existing Oak Grove Disc Golf Club holes. The Oak Grove area of Hahamongna Watershed Park and the associated facilities would remain open during sediment removal and would continue to provide active recreational facilities to the area. As discussed in Section 3.6.6 of the Draft EIR, Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats. In addition, sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays). Wildlife species currently found in the Proposed Project area would be expected to either remain in the undisturbed areas of the reservoir outside of the Proposed Project area or to reestablish once sediment removal activities have been completed.

From: Carl Ehlig
To: reservoircleanouts
Subject: Devils Gate Dam
Date: Wednesday, January 08, 2014 8:21:44 AM

Dear DWP,

Comment 136-1

I am infavor of clearing a portion of the built up material behind the dam - yet not infavor of removing the entire habitate. Removing and deepening the area directly behind the dam to a distance of 2,000 feet would be good. Removing the forest that extends beyond there and up the riverbed up to the east parking lot of JPL would be bad. Bad for our neighborhood and bad for the environment.

Sincerely,
D. Carl Ehlig

Response to Comment Letter #136 (D. Carl Ehlig)

Response to Comment 136-1:

Thank you for your input. This comment has been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. Alternative 3 has the deepest configurations achievable while still maintaining the lowest elevation of the reservoir at the lowest outlet of the dam and with adequate grading to assist the flows towards the dam's valves. Any excavation below the lowest valve would pond water that could not be released. Excavating below the lowest outlet could also undermine the dam and ultimately cause dam failure.

Alternative 3, Configuration D, the Environmentally Superior Alternative from the Draft Environmental Impact Report (EIR), affects the least amount of habitat of all the action alternatives while still achieving Proposed Project objectives (see Section 4.6 of the Final EIR). This alternative would provide a buffer on the west side of the reservoir that would allow for the movement of wildlife. Alternative 3, Configuration D, Option 1 provides a more natural configuration for the reservoir by having two branches to carry water and sediment toward the face of the dam, avoiding disturbing a significant portion of existing vegetation. To further reduce the Proposed Project's footprint, Los Angeles County Flood Control District (LACFCD) has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2, which drastically reduces the project's footprint of 120 acres down to 71 acres, would avoid excavation of the western branch, thereby providing a greater habitat buffer on the west side of the reservoir. In addition, the maintenance areas would be smaller than the original sediment removal footprint, allowing for habitat to reestablish and providing additional areas for wildlife movement. A footprint any smaller would decrease the volume removed and the ultimate capacity of the reservoir, which would fail to meet Proposed Project objectives.

From: Susette Horspool
To: reservoircleanouts
Cc: Hannah Petrie; 7thPrincipleNbrhd@yahoogroups.com
Subject: Re: comment about sediment removal at Devil"s Gate Dam
Date: Tuesday, January 07, 2014 6:42:45 PM

Comment 137-1

To whom it may concern - I chair a 15 member Green Council in Pasadena with a 130 member list serve. We, also, are opposed to the county's current plans for moving sediment from behind Devil's Gate Dam. We understood that the EIR just published would likely result in a reasonable plan for removal. Instead, the plan seems to be much the same as the first unworkable plan that the county proposed before the EIR. This smacks of deliberate avoidance of public concern. My list serve and I will join any organized public protest that arises, if the county goes ahead with this proposal.

Sincerely,

Susette

Susette Horspool/Chair
7th Principle Green Council
www.uuneighborhood.org/7thPrinciple.html
626-798-1087

On Jan 7, 2014, at 3:53 PM, Hannah Petrie wrote:

> To whom it may concern,
>
> Thank you for listening to the public comments, and extending the deadline to submit them.
>
> I am the Associate Minister of Neighborhood UU Church, located on N. Orange Grove, next to the Gamble House. We have received numerous awards for instituting many green technologies on our campus. Over the years, we have participated in many environmental activism initiatives that affect the public.
>
> I am personally connected with many pastors in the Pasadena area who would be happy to work with me in making sure your plans to dramatically change the landscape do not go forward. I respect the fact that you are trying to find the best long term solution for dealing with this sediment. But I also want to make sure you know that you would be facing a lot of organized public protest if you proceed with your current proposal.
>
> I do not live far from the area in question. My husband works at JPL, and enjoys riding his bike there. I also have good connections with JPL employees who would join in the fight to oppose this project as it stands, as well as many Ultimate Frisbee players who

enjoy playing at Hahamonga Park on a weekly basis.

From what I understand, it is simply too destructive – there must be a gentler, more reasonable solution to removing sediment than the radical proposal you have set forth twice now.

Again, I appreciate all the work and time this entails to come up with a different solution. Please offer a plan that is something the public and the many inhabitants of this natural area can live with.

Thank you for taking my comments seriously,
Rev. Hannah Petrie

Response to Comment Letter #137 (Susette Horspool – 7th Principle Green Council)

Response to Comment 137-1:

Thank you for your input. This comment has been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. Los Angeles County Flood Control District (LACFCD) notes that the commenter does not support the Proposed Project.

Comments and information received during the scoping process (see Appendix A of the Draft EIR) were taken into consideration for the analysis and formulation of alternatives and mitigation. The Draft EIR analyzed a range of sediment removal amounts and configurations aimed at addressing the diverse concerns of stakeholders, including concerns for long-term habitat preservation. The alternatives presented in the Draft EIR represent the best options available to respond to stakeholders' concerns, while adequately reducing flood risk to downstream communities. The Draft EIR, Section 4, fully analyzed six alternatives, including the No Project Alternative. These alternatives substantially lessen one or more significant effects of the Proposed Project and, with the exception of the mandatory No Project Alternative, would feasibly attain most of the basic objectives of the Proposed Project.

LACFCD goes to great lengths to lessen project impacts and maximize efficiencies. For example, the Draft EIR concluded that Alternative 3 is the Environmentally Superior Alternative. Alternative 3 drastically reduces the project's footprint of 120 acres down to 71 acres. Additionally, the limited maintenance area for Alternative 3 further reduces the permanent habitat impacts down to approximately 51 acres by allowing for site replanting and mitigation to take place within the reservoir footprint. This reduction in project acreages will greatly lessen environmental impacts of the Proposed Project.

From: Hannah Petrie
To: reservoircleanouts
Cc: Susette Horspool (shtiger@att.net); rodys@earthlink.net; nancy.busacc@gmail.com
Subject: comment about sediment removal at Devil"s Gate Dam
Date: Tuesday, January 07, 2014 3:49:50 PM

To whom it may concern,

Comment 138-1 Thank you for listening to the public comments, and extending the deadline to submit them.

Comment 138-2 I am the Associate Minister of Neighborhood UU Church, located on N. Orange Grove, next to the Gamble House. We have received numerous awards for instituting many green technologies on our campus. Over the years, we have participated in many environmental activism initiatives that affect the public.

I am personally connected with many pastors in the Pasadena area who would be happy to work with me in making sure your plans to dramatically change the landscape do not go forward. I respect the fact that you are trying to find the best long term solution for dealing with this sediment. But I also want to make sure you know that you would be facing a lot of organized public protest if you proceed with your current proposal.

Comment 138-3 I do not live far from the area in question. My husband works at JPL, and enjoys riding his bike there. I also have good connections with JPL employees who would join in the fight to oppose this project as it stands, as well as many Ultimate Frisbee players who enjoy playing at Hahamonga Park on a weekly basis.

Comment 138-4 From what I understand, it is simply too destructive – there must be a gentler, more reasonable solution to removing sediment than the radical proposal you have set forth twice now.

Comment 138-5 Again, I appreciate all the work and time this entails to come up with a different solution. Please offer a plan that is something the public and the many inhabitants of this natural area can live with.

Thank you for taking my comments seriously,
Rev. Hannah Petrie

Response to Comment Letter #138 (Hannah Petrie – Neighborhood UU Church)

Response to Comment 138-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

Response to Comment 138-2:

Los Angeles County Flood Control District (LACFCD) goes to great lengths to lessen project impacts and maximize efficiencies. For example, the Draft Environmental Impact Report (EIR) concluded that Alternative 3 is the Environmentally Superior Alternative. Alternative 3 drastically reduces the project's footprint of 120 acres down to 71 acres. Additionally, the limited maintenance area for Alternative 3 further reduces the permanent habitat impacts down to approximately 51 acres by allowing for site replanting and mitigation to take place within the reservoir footprint. This reduction in project acreages will greatly lessen environmental impacts of the Proposed Project.

LACFCD is committed to *Public Service that Works*; and by combining almost 100 years of technical expertise and invaluable input from the community, less invasive flood protection will continue to be a reality.

Response to Comment 138-3:

Impacts to recreation were analyzed in the Draft EIR, Section 3.15. The Proposed Project will not limit the use of the Oak Grove area of Hahamongna Watershed Park. Sediment removal activities would be temporary and are expected to occur only in the drier months (April to December, excluding holidays). It is expected that these activities will often not be adjacent to the Oak Grove area of Hahamongna Watershed Park. The Proposed Project would result in temporary limitations on the recreational use of the Proposed Project site and some of the adjacent trails. Most of these areas would be reopened seasonally or intermittently throughout the sediment removal process. In addition, temporary impacts to designated recreational facilities and trails will be minimized through advance communication and redirection to the nearest facility in the vicinity of the Proposed Project. Furthermore, an east-west trail crossing will continue to provide access at the north end of the reservoir. At the south end of the reservoir, after the reservoir ingress and egress ramps have been fully constructed, access to the upper east side Arroyo Seco Trail from La Cañada Verdugo Road will be maintained; and the linkage from the west side Arroyo Seco Trail and the Flint Wash Trail to the upper east side Arroyo Seco Trail (crossing Devil's Gate Dam and also continuing south to the Rose Bowl) will be available after construction activities have ended each day and on nonworking days.

No official disc golf course holes located in the Oak Grove area of Hahamongna Watershed Park will be removed by the Proposed Project. Where possible, LACFCD will avoid any disc golf course holes located outside the Oak Grove area of Hahamongna Watershed Park. When avoidance is not possible, LACFCD will coordinate with the Oak Grove Disc Golf Club for removal of the disc golf hole equipment. Furthermore, LACFCD has added an optional configuration for Alternative 3, the Environmentally Superior Alternative. Alternative 3, Configuration D, Option 2 would avoid excavation of the western branch, thereby providing a greater distance between the Oak Grove area of Hahamongna Watershed Park and the excavation area. Alternative 3, Configuration D, Option 2 would also avoid all currently existing Oak Grove Disc Golf Club holes (see Section 4.6 of the Final EIR).

Response to Comment 138-4:

See Response to Comment 138-2.

The Draft EIR analyzed a range of sediment removal amounts and configurations aimed at addressing the diverse concerns of stakeholders, including concerns for long-term habitat preservation. The alternatives presented in the Draft EIR represent the best options available to respond to stakeholders' concerns, while adequately reducing flood risk to downstream communities. The Draft EIR, Section 4, fully analyzed six alternatives, including the No Project Alternative. These alternatives substantially lessen one or more significant effects of the Proposed Project and, with the exception of the mandatory No Project Alternative, would feasibly attain most of the basic objectives of the Proposed Project.

Response to Comment 138-5:

See Response to Comment 138-2. As discussed in Section 3.6.6 of the Draft Environmental Impact Report (EIR), Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats.

From: Chris Brophy
To: reservoircleanouts
Subject: Devil's Gate Reservoir Sediment Removal and Management Project
Date: Tuesday, January 07, 2014 8:10:59 AM

Hi,

Comment 139-1

I have looked at all the plans for the sediment removal project sponsored by the county, and all the plans will have an impact on our Disc Golf Course. Alternative 3 is the best plan, but the western branch will remove 2 of our playable positions. Please re-visit the sediment removal plans and make an alternative plan that will not impact the disc golf course.

Oak Grove Disc Golf Course has international significance as the worlds 1st course. I know this is a complicated decision but please keep this in mind when making these important choices for our community.

Thank you,

Christopher Brophy
chrisbrophy33@gmail.com
213-392-3118

Response to Comment Letter #139 (Christopher Brophy)

Response to Comment 139-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

No official disc golf course holes located in the Oak Grove area of Hahamongna Watershed Park will be removed by the Proposed Project. As noted in the Draft Environmental Impact Report (EIR), Section 3.15, Los Angeles County Flood Control District (LACFCD) recognizes the importance of the area to those who take advantage of the recreational opportunities offered, including the Oak Grove Disc Golf Course. Where possible, Los Angeles County Flood Control District (LACFCD) will avoid any disc golf course holes located outside the Oak Grove area of Hahamongna Watershed Park. When avoidance is not possible, LACFCD will coordinate with the Oak Grove Disc Golf Club for removal of the disc golf hole equipment.

Alternative 3, Configuration D, the Environmentally Superior Alternative from the Draft Environmental Impact Report (EIR), carefully balances flood control needs and reductions in impacts to habitat by restoring the required reservoir capacity while also minimizing the project footprint (see Section 4.6 of the Final EIR). Furthermore, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2 would avoid excavation of the western branch, thereby providing a greater distance between the Oak Grove area of Hahamongna Watershed Park and the excavation area, reducing the project footprint of 120 acres down to 71 acres. Alternative 3, Configuration D, Option 2 would also avoid all currently existing Oak Grove Disc Golf Club holes. The Oak Grove area of Hahamongna Watershed Park and the associated facilities would remain open during sediment removal and would continue to provide active recreational facilities to the area.

December 16, 2013

Supervisor Michael Antonovich
500 West Temple Street, Room 869
Los Angeles, CA 90012

Dear Supervisor Antonovich:

Support for Devil's Gate Reservoir Sediment Removal and Management Project

Comment 140-1

On behalf of the Foothill Family of Water Agencies, this letter is intended to express support for the Devil's Gate Reservoir Sediment Removal and Management Project which will protect areas downstream of the dam from flooding. The project will also increase water reliability by allowing runoff to be held behind the dam and recharging the groundwater basin thus increasing groundwater capacity.

Comment 140-2

The area the Foothill Family serves is approximately 22 square miles encompassing the unincorporated Los Angeles County areas of La Crescenta-Montrose and Altadena, plus the incorporated urban area of La Cañada Flintridge.

The Foothill Family of Water Agencies consists of Foothill Municipal Water District and eight retail agencies: Crescenta Valley Water District, La Cañada Irrigation District, Las Flores Water Company, Kinneloa Irrigation District, Mesa Crest Water Company, Lincoln Avenue Water Company, Rubio Cañon Land and Water Association, and Valley Water Company.

FMWD operates as a wholesale water utility that distributes imported water it receives from the Metropolitan Water District of Southern California (MWD) to the retail agencies which are located across three communities. FMWD takes delivery of imported water via a connection to MWD's Upper

Comment 140-2 continued

Feeder in the vicinity of the Rose Bowl located in the City of Pasadena. FMWD maintains infrastructure in this lower region of the Arroyo Seco, including its Arroyo Pumping Station. Without this pump station, FMWD is unable to lift water into the service area thus impacting water supplies to 86,000 people within its service area.

Sediment removal from Devil's Gate Reservoir and the implementation of a regular sediment management system will help to maintain the flood control capacity of the reservoir and protect the dam from any failures. A reservoir configuration that allows for routine maintenance activities will ultimately reduce downstream flood risk to adjacent communities and FMWD infrastructure.

Comment 140-3

Seven of the retail agencies have access to some local groundwater. One member agency is 100 percent dependent on imported water while another member agency takes no imported water. The remaining six agencies are dependent on varying degrees of imported water to augment locally produced groundwater. Some of the agencies also capture surface runoff from the local canyons which they are able to then provide to customers. By having a regular sediment removal maintenance program and managing the water conservation pool behind the dam, stormwater can be captured and held behind the dam, increasing groundwater capacity and individual agencies' ability to pump, maintaining water supply reliability in the area.

If you have any questions, please contact Nina Jazmadarian at (818) 790-4036 or at njazmadarian@fmwd.com.

Sincerely,

Nina Jazmadarian
General Manager
Foothill Municipal Water District

Dennis Erdman
General Manager
Crescenta Valley Water District

Mel Matthews
General Manager
Kinneloa Irrigation District

Doug Caister
General Manager
La Cañada Irrigation District

Bill Kimberling
General Manager
Las Flores Water Company

Bob Hayward
General Manager
Lincoln Avenue Water Company

Tim Flynn
General Manager
Mesa Crest Water Company

Lillian Woods
Operations Manager
Rubio Cañon Land & Water Association

Bob Fan
General Manager
Valley Water Company

cc: Board of Supervisors
FMWD Board of Directors
Gail Farber, Los Angeles County Department of Public Works
Mayor Laura Olhasso, City of La Cañada Flintridge
Mayor Bill Bogard, City of Pasadena
FMWD Member Agencies
Raymond Basin Watermaster
Phyllis Currie, City of Pasadena

Response to Comment Letter #140 (Foothill Family of Water Agencies)

Response to Comment 140-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. Los Angeles County Flood Control District (LACFCD) notes the commenter's support for the Proposed Project. While holding water behind the dam permanently is not part of the Proposed Project objectives, the Proposed Project will have the ability to contain more of the local runoff, which in turn could result in more runoff percolating into the ground in the project area and subsequently recharging the groundwater basin. In addition, by removing sediment deposits, the Proposed Project will return the percolation characteristics of the reservoir to pre-Station Fire conditions, if not improve them.

Response to Comment 140-2:

LACFCD notes the information regarding the Foothill Family of Water Agencies.

Response to Comment 140-3:

LACFCD notes the commenter's support of a regular sediment maintenance program, such as the Proposed Project's. See Response to Comment 140-1, above.

December 30, 2013

County of Los Angeles
Department of Public Works
Water Resources Division
ATTN: Reservoir Cleanouts Program
PO Box 1460
Alhambra, CA 91802-1460
reservoircleanouts@dpw.lacounty.gov

RE: DEVIL'S GATE RESERVOIR SEDIMENT REMOVAL AND MANAGEMENT PROJECT

Dear Department of Public Works, Water Resource Division,

Thank you for the opportunity to comment on the draft EIR for the DEVIL'S GATE RESERVOIR SEDIMENT REMOVAL AND MANAGEMENT PROJECT. I can't imagine what a herculean task you have ahead deciding how best to assess and implement the sediment removal project.

Comment 141-1

I am an Assistant Director for Tom Sawyer Camps' Equestrian division and have spent the greater majority of my life growing up at Hahamonga Watershed Park. I was a camper for years, a junior counselor, an assistant counselor, a senior counselor, and now a director. I can speak, wearing all those different hats, on the importance of children attending a summer camp in an environment where they are playing with each other and positive adult role models, with nature as their canvas. The benefits of summer camp on children is a list longer than this letter, so I am writing to ask for your cooperation in allowing our camp to continue to function out of Hahamonga in a way that will give our campers access to explore the park as I did when I was a child.

Comment 141-2

While we support the sediment clean up in general, we are concerned about the impact as defined in the DEIR on summer camp and are requesting the following modifications: 1) No sediment removal in the willow forest and alluvial scrub areas during the months of June, July, and August; 2) A phased approach that allows for places within the project area that can continue to be used for recreational purposes; 3) A longer timeline for the project to help minimize impact on those who use the park; and, 4) Preservation of the willow forest and the alluvial scrub area from denuding and/or from being used as permanent maintenance zones.

Comment 141-3

Tom Sawyer Camps has been in operation since 1926 and has been using Hahamongna Watershed Park as for the last 70 years (since 1944). Approximately 1250 of our campers and 150 staff use this site each summer, which now includes three generation of campers. This park is critical to our day camp programs and heavy truck traffic during the summer months and denuding

Comment 141-3 continued

the willow forest and alluvial scrub areas would have a critical negative impact on the program, the campers and the staff.

Comment 141-4

Camp is an antidote to bullying, isolation, over reliance on technology and many other challenges facing our youth. At Hahamongna, campers age 3-14 have critical exposure to wilderness adventure. During the summer, they hike, ride horses, build secret forts, observe wildlife, play games, sing songs, build self reliance and self esteem, and develop friendships that last a lifetime. We rely heavily on the access, peace and beauty of the willow forest and the alluvial scrub areas for these experiences, along with other areas of the park. Hahamongna is home to generations of staff and campers whose lives have been directly and dramatically enriched by this natural refuge, including mine.

Comment 141-5

Tom Sawyer Camps is a very important program and my request could easily go unnoticed but I believe the impact that camp has on the children of tomorrow is significant. Summer in the watershed is a rare and unique opportunity for children to be away from noise and disruption and engage with nature and outdoor adventure in a safe, peaceful, and joyful manner. We hope you will see the value of camp and make every attempt to minimize the impact the sediment clean up will have during the summer months and for the generations of children to use the park in the years to come.

Thank you for allowing me the opportunity to share my concerns and needs. Please feel free to contact me if you have any questions.

Sincerely

Evan McDaniel
1252 Norton Ave
(626) 216-2937
evanmcdaniel@hotmail.com

Response to Comment Letter #141 (Evan McDaniel – Tom Sawyer Camps)

Response to Comment 141-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

Response to Comment 141-2:

The Proposed Project will not limit the use of the Oak Grove area of Hahamongna Watershed Park by recreational users such as Tom Sawyer Camps. Sediment removal activities would be temporary and are expected to occur only in the drier months (April to December, excluding holidays). It is expected that these activities will often not be adjacent to the Oak Grove area of Hahamongna Watershed Park. Therefore, the maximum impacts to the adjacent recreational facilities would be much shorter than the five-year duration of the sediment removal phase of the Proposed Project.

During the summer months, sediment is expected to be the driest. Due to the reduction in water weight, each truck can haul more sediment per load during these months. This increases efficiency and decreases project duration, which also decreases impacts and cost. Skipping these crucial dry months would extend the project duration.

Los Angeles County Flood Control District (LACFCD) proposed a project duration of five years to reduce accumulated sediment in a timely fashion. The goal of LACFCD is to restore reservoir flood capacity as soon as feasible while reducing costs and minimizing the duration of environmental and construction impacts to the surrounding communities. Extending the project would prolong the flood risk to downstream communities and increase the construction impacts to the surrounding communities.

As discussed in Section 3.6.6 of the Draft Environmental Impact Report (EIR), Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats.

Alternative 3, Configuration D affects the least amount of reservoir area of all the action alternatives, while still achieving Proposed Project objectives (see Section 4.6 of the Final EIR). This alternative would provide a buffer between the Oak Grove area of Hahamongna Watershed Park and the excavation area (see Section 4.6 of the Final EIR). Alternative 3, Configuration D, Option 1 provides a more natural configuration for the reservoir with two branches to carry water and sediment toward the face of the dam, avoiding disturbing a significant portion of existing vegetation. To further reduce the Proposed Project's footprint, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2 would avoid excavation of the western branch, thereby providing a greater habitat buffer on the west side. In addition, the maintenance areas would be smaller than the original sediment removal footprint, allowing for habitat to reestablish.

Response to Comment 141-3:

See Response to Comment 141-2. Access to the Oak Grove area of Hahamongna Watershed Park will not be limited by the Proposed Project. Potential impacts due to the Proposed Project's truck trips were analyzed in the Draft EIR, Section 3.16, Transportation and Traffic. As listed in that section, a single intersection in the immediate vicinity of the Proposed Project site will have a potentially significant impact. In practice, hauling rates and routes may be adjusted to help reduce impacts depending on

operational need. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the project site.

LACFCD also notes the commenter's concerns with traffic impacts relating to traveling to and from the Oak Grove area of Hahamongna Watershed Park. The Draft EIR outlines a 12-hour trucking schedule, with trucking operations on Saturdays as well. This schedule is used to model the most intensive construction operation, which may not be applicable at the site for the duration of the project. Typical trucking schedules are estimated to be 8 hours per day on weekdays. Additionally, construction traffic will not pass the Berkshire Place intersection with Oak Grove Drive and thus will not approach the Oak Grove Drive/Foothill Boulevard intersection used for ingress and egress to the Oak Grove area of Hahamongna Watershed Park.

Response to Comment 141-4:

See Response to Comment 141-2. LACFCD notes the use of Devil's Gate Reservoir by Tom Sawyer Camps, especially the willow forest and alluvial scrub areas.

Response to Comment 141-5:

See Response to Comment 141-2. LACFCD notes that Tom Sawyer Camps is an important resource to children and is going to great lengths to keep impacts to a minimum. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the Proposed Project site.

From: Kaitlin Spak
To: reservoircleanouts
Subject: Devil"s Gate Reservoir Sediment Removal and Management Project
Date: Tuesday, December 17, 2013 2:10:34 PM

Hello,

Comment 142-1

My name is Kaitlin Spak and I am a Pasadena resident; I keep my horse in Altadena and work at the Jet Propulsion Laboratory, where I can walk to the barn at lunchtime and ride around Hahamongna. You could truthfully say that my daily life literally revolves around the Hahamongna watershed park!

Hahamongna would not be the same if the natural habitat were destroyed and trucks were constantly driving in and out. I understand the necessity of sediment removal to maintain the dam, but please determine a more community and environmentally friendly method that will maintain the quality of the trails and paths through Hahamongna.

Thank you,
Kaitlin Spak

Response to Comment Letter #142 (Kaitlin Spak**)**

Response to Comment 142-1:

Thank you for your input. This comment has been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

As discussed in Section 3.6.6 of the Draft Environmental Impact Report (EIR), Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats. In addition, sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays).

Potential impacts due to the Proposed Project's truck trips were analyzed in the Draft EIR, Section 3.16, Transportation and Traffic. As listed in that section, a single intersection in the immediate vicinity of the Proposed Project site will have a potentially significant impact. In practice, hauling rates and routes may be adjusted to help reduce impacts, depending on operational need. Los Angeles County Flood Control District (LACFCD) will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the Proposed Project site.

Impacts to recreation were analyzed in the Draft EIR, Section 3.15. The Proposed Project will not limit the use of the Oak Grove area of Hahamongna Watershed Park. As discussed above, sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays). It is expected that these activities will often not be adjacent to the Oak Grove area of Hahamongna Watershed Park. The Proposed Project would result in temporary limitations on the recreational use of the Proposed Project site and some of the adjacent trails. Most of these areas would be reopened seasonally or intermittently throughout the sediment removal process. In addition, temporary impacts to designated recreational facilities and trails will be minimized through advance communication and redirection to the nearest facility in the vicinity of the Proposed Project. Furthermore, an east-west trail crossing will continue to provide access at the north end of the reservoir. At the south end of the reservoir, after the reservoir ingress and egress ramps have been fully constructed, access to the upper east side Arroyo Seco Trail from La Cañada Verdugo Road will be maintained; and the linkage from the west side Arroyo Seco Trail and the Flint Wash Trail to the upper east side Arroyo Seco Trail (crossing Devil's Gate Dam and also continuing south to the Rose Bowl) will be available after construction activities have ended each day and on nonworking days.

LACFCD goes to great lengths to lessen project impacts and maximize efficiencies. For example, the Draft EIR concluded that Alternative 3 is the Environmentally Superior Alternative. Alternative 3 drastically reduces the project's footprint of 120 acres down to 71 acres. Additionally, the limited maintenance area for Alternative 3 further reduces the permanent habitat impacts down to approximately 51 acres by allowing for site replanting and mitigation to take place within the reservoir footprint. This reduction in project acreages will greatly lessen environmental impacts of the Proposed Project.

LACFCD is committed to *Public Service that Works*; and by combining almost 100 years of technical expertise and invaluable input from the community, less invasive flood protection will continue to be a reality.

From: Jeff Heapy
To: reservoircleanouts
Subject: Devil's Gate Reservoir Sediment Removal and Management Project
Date: Tuesday, January 07, 2014 10:42:05 AM

Hi,

My name is Jeffrey Heapy. I live at 4011 Scandia Way LA CA 90065.

Comment 143-1

I have looked at all the plans for the sediment removal project sponsored by the county, and all the plans will have an impact on our Disc Golf Course. Alternative 3 is the best plan, but the western branch will remove 2 of our playable positions. Please re-visit the sediment removal plans and make an alternative plan that will not impact the disc golf course.

I have been playing this course since I was a kid and would hate to see it modified. It is the first disc golf course ever and it is very important to the disc golf community. Please look into other options for this historical course. Preserve what natural beauty we have left!

Thank you,
Jeffrey Heapy
310-844-5467
SoCal Health Insurance Agency

Response to Comment Letter #143 (Jeffrey Heapy)

Response to Comment 143-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. No official disc golf course holes located in the Oak Grove area of Hahamongna Watershed Park will be removed by the Proposed Project. As noted in the Draft Environmental Impact Report (EIR), Section 3.15, Los Angeles County Flood Control District (LACFCD) recognizes the importance of the area to those who take advantage of the recreational opportunities offered, including the Oak Grove Disc Golf Course. Where possible, Los Angeles County Flood Control District (LACFCD) will avoid any disc golf course holes located outside the Oak Grove area of Hahamongna Watershed Park. When avoidance is not possible, LACFCD will coordinate with the Oak Grove Disc Golf Club for removal of the disc golf hole equipment.

Alternative 3, Configuration D, the Environmentally Superior Alternative from the Draft Environmental Impact Report (EIR), carefully balances flood control needs and reductions in impacts to habitat by restoring the required reservoir capacity while also minimizing the project footprint (see Section 4.6 of the Final EIR). Furthermore, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2 would avoid excavation of the western branch, thereby providing a greater distance between the Oak Grove area of Hahamongna Watershed Park and the excavation area, reducing the project footprint of 120 acres down to 71 acres. Alternative 3, Configuration D, Option 2 would also avoid all currently existing Oak Grove Disc Golf Club holes. The Oak Grove area of Hahamongna Watershed Park and the associated facilities would remain open during sediment removal and would continue to provide active recreational facilities to the area.

From: luismistero .
To: reservoircleanouts
Subject: Devil's Gate Reservoir Sediment Removal and Management Project
Date: Monday, January 06, 2014 5:18:32 PM

Hi,

My name is Jose D La O . I live at 729 N Garfield ave Pasadena Ca 91104.

Comment 144-1

I have looked at all the plans for the sediment removal project sponsored by the county, and all the plans will have an impact on our Disc Golf Course. Alternative 3 is the best plan, but the western branch will remove 2 of our playable positions. Please re-visit the sediment removal plans and make an alternative plan that will not impact the disc golf course.

My family and I have made counts of memories while golfin at this course please don't change it

Thank you,
Jose De La O.

Response to Comment Letter #144 (Jose De La O)

Response to Comment 144-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. No official disc golf course holes located in the Oak Grove area of Hahamongna Watershed Park will be removed by the Proposed Project. As noted in the Draft Environmental Impact Report (EIR), Section 3.15, Los Angeles County Flood Control District (LACFCD) recognizes the importance of the area to those who take advantage of the recreational opportunities offered, including the Oak Grove Disc Golf Course. Where possible, Los Angeles County Flood Control District (LACFCD) will avoid any disc golf course holes located outside the Oak Grove area of Hahamongna Watershed Park. When avoidance is not possible, LACFCD will coordinate with the Oak Grove Disc Golf Club for removal of the disc golf hole equipment.

Alternative 3, Configuration D, the Environmentally Superior Alternative from the Draft Environmental Impact Report (EIR), carefully balances flood control needs and reductions in impacts to habitat by restoring the required reservoir capacity while also minimizing the project footprint (see Section 4.6 of the Final EIR). Furthermore, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2 would avoid excavation of the western branch, thereby providing a greater distance between the Oak Grove area of Hahamongna Watershed Park and the excavation area, reducing the project footprint of 120 acres down to 71 acres. Alternative 3, Configuration D, Option 2 would also avoid all currently existing Oak Grove Disc Golf Club holes. The Oak Grove area of Hahamongna Watershed Park and the associated facilities would remain open during sediment removal and would continue to provide active recreational facilities to the area.

Jan 3rd, 2014

County of Los Angeles
Department of Public Works
Water Resources Division
ATTN: Reservoir Cleanouts Program
PO Box 1460
Alhambra, CA 91802-1460
reservoircleanouts@dpw.lacounty.gov

RE: DEVIL'S GATE RESERVOIR SEDIMENT REMOVAL AND MANAGEMENT PROJECT

Dear Department of Public Works, Water Resource Division,

Comment 145-1

Thank you for the opportunity to comment on the draft EIR for the DEVIL'S GATE RESERVOIR SEDIMENT REMOVAL AND MANAGEMENT PROJECT. I can't imagine what a herculean task you have ahead deciding how best to assess and implement the sediment removal project.

Comment 145-2

While we support the sediment clean up in general, we are concerned about the impact as defined in the dEIR on summer camp and are requesting the following modifications: 1) No sediment removal in the willow forest and alluvial scrub areas during the months of June, July, and August; 2) A phased approach that allows for places within the project area that can continue to be used for recreational purposes; 3) A longer timeline for the project to help minimize impact on those who use the park; and, 4) Preservation of the willow forest and the alluvial scrub area from denuding and/or from being used as permanent maintenance zones.

Comment 145-3

Tom Sawyer Camps has been in operation since 1926 and has been using Hahamongna Watershed Park as for the last 70 years (since 1944). Approximately 1250 of our campers and 150 staff use this site each summer, which now includes three generation of campers. This park is critical to our day camp programs and heavy truck traffic during the summer months and denuding the willow forest and alluvial scrub areas would have a critical negative impact on the program, the campers and the staff.

Comment 145-4

Camp is an antidote to bullying, isolation, over reliance on technology and many other challenges facing our youth. At Hahamongna, campers age 3-14 have critical exposure to wilderness adventure. During the summer, they hike, ride horses, build secret forts, observe wildlife, play games, sing songs, build self reliance and self esteem, and develop friendships that last a lifetime. We rely heavily on the access, peace and beauty of the willow forest and the alluvial

Comment 145-4 continued

scrub areas for these experiences, along with other areas of the park. Hahamongna is home to generations of staff and campers whose lives have been directly and dramatically enriched by this natural refuge, including mine.

Comment 145-5

Tom Sawyer Camps is a very important program and my request could easily go unnoticed but I believe the impact that camp has on the children of tomorrow is significant. Summer in the watershed is a rare and unique opportunity for children to be away from noise and disruption and engage with nature and outdoor adventure in a safe, peaceful, and joyful manner. We hope you will see the value of camp and make every attempt to minimize the impact the sediment clean up will have during the summer months and for the generations of children to use the park in the years to come.

Thank you for allowing me the opportunity to share my concerns and needs. Please feel free to contact me if you have any questions.

Sincerely,

Karen Yenofsky

Karen Yenofsky
1028 W. Norman Ave.
Arcadia, CA 91007

Response to Comment Letter #145 (Karen Yenofsky)

Response to Comment 145-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

Response to Comment 145-2:

The Proposed Project will not limit the use of the Oak Grove area of Hahamongna Watershed Park by recreational users such as Tom Sawyer Camps. Sediment removal activities would be temporary and are expected to occur only in the drier months (April to December, excluding holidays). It is expected that these activities will often not be adjacent to the Oak Grove area of Hahamongna Watershed Park. Therefore, the maximum impacts to the adjacent recreational facilities would be much shorter than the five-year duration of the sediment removal phase of the Proposed Project.

During the summer months, sediment is expected to be the driest. Due to the reduction in water weight, each truck can haul more sediment per load during these months. This increases efficiency and decreases project duration, which also decreases impacts and cost. Skipping these crucial dry months would extend the project duration.

Los Angeles County Flood Control District (LACFCD) proposed a project duration of five years to reduce accumulated sediment in a timely fashion. The goal of LACFCD is to restore reservoir flood capacity as soon as feasible while reducing costs and minimizing the duration of environmental and construction impacts to the surrounding communities. Extending the project would prolong the flood risk to downstream communities and increase the construction impacts to the surrounding communities.

As discussed in Section 3.6.6 of the Draft Environmental Impact Report (EIR), Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats.

Alternative 3, Configuration D affects the least amount of reservoir area of all the action alternatives, while still achieving Proposed Project objectives (see Section 4.6 of the Final EIR). This alternative would provide a buffer between the Oak Grove area of Hahamongna Watershed Park and the excavation area. Alternative 3, Configuration D, Option 1 provides a more natural configuration for the reservoir with two branches to carry water and sediment toward the face of the dam, avoiding disturbing a significant portion of existing vegetation. To further reduce the Proposed Project's footprint, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2, which drastically reduces the project's footprint of 120 acres down to 71 acres, would avoid excavation of the western branch, thereby providing a greater habitat buffer on the west side of the reservoir. In addition, the maintenance areas would be smaller than the original sediment removal footprint, allowing for habitat to reestablish.

Response to Comment 145-3:

See Response to Comment 145-2. Access to the Oak Grove area of Hahamongna Watershed Park will not be limited by the Proposed Project. Potential impacts due to the Proposed Project's truck trips were analyzed in the Draft EIR, Section 3.16, Transportation and Traffic. As listed in that section, a single intersection in the immediate vicinity of the Proposed Project site will have a potentially significant

impact. In practice, hauling rates and routes may be adjusted to help reduce impacts depending on operational need. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the project site.

LACFCD also notes the commenter's concerns with traffic impacts relating to traveling to and from the Oak Grove area of Hahamongna Watershed Park. The Draft EIR outlines a 12-hour trucking schedule, with trucking operations on Saturdays as well. This schedule is used to model the most intensive construction operation, which may not be applicable at the site for the duration of the project. Typical trucking schedules are estimated to be 8 hours per day on weekdays. Additionally, construction traffic will not pass the Berkshire Place intersection with Oak Grove Drive and thus will not approach the Oak Grove Drive/Foothill Boulevard intersection used for ingress and egress to the Oak Grove area of Hahamongna Watershed Park.

Response to Comment 145-4:

See Response to Comment 145-2. LACFCD notes the use of Devil's Gate Reservoir by Tom Sawyer Camps, especially the willow forest and alluvial scrub areas.

Response to Comment 145-5:

See Response to Comment 145-2. LACFCD notes that Tom Sawyer Camps is an important resource to children and is going to great lengths to keep impacts to a minimum. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the Proposed Project site.

December 30, 2013

County of Los Angeles
Department of Public Works
Water Resources Division
ATTN: Reservoir Cleanouts Program
PO Box 1460
Alhambra, CA 91802-1460
reservoircleanouts@dpw.lacounty.gov

RE: DEVIL'S GATE RESERVOIR SEDIMENT REMOVAL AND MANAGEMENT PROJECT

Dear Department of Public Works, Water Resource Division,

Thank you for the opportunity to comment on the draft EIR for the DEVIL'S GATE RESERVOIR SEDIMENT REMOVAL AND MANAGEMENT PROJECT. I can't imagine what a herculean task you have ahead deciding how best to assess and implement the sediment removal project.

Comment 146-1

I am currently an Assistant Program Director for Tom Sawyer Camps' summer camp program and have been fortunate to experience firsthand the genuine beauty, exploration, and exposure to natural wilderness that Hahamonga Watershed Park offers us of the surrounding communities. This last summer was my nephew's first summer attending camp and the growth I was able to witness of a child I know extremely well was remarkable. Aside from my nephew, I have watched countless children blossom because of Tom Sawyer Camp and this park. I have seen them play, *simply play*, outside, all day, everyday, for ten glorious weeks in the summer. I am writing so we can continue to witness this positive interaction of the outdoors and play.

Comment 146-2

While we support the sediment clean up in general, we are concerned about the impact as defined in the DEIR on summer camp and are requesting the following modifications: 1) No sediment removal in the willow forest and alluvial scrub areas during the months of June, July, and August; 2) A phased approach that allows for places within the project area that can continue to be used for recreational purposes; 3) A longer timeline for the project to help minimize impact on those who use the park; and, 4) Preservation of the willow forest and the alluvial scrub area from denuding and/or from being used as permanent maintenance zones.

Comment 146-3

Tom Sawyer Camps has been in operation since 1926 and has been using Hahamongna Watershed Park as for the last 70 years (since 1944). Approximately 1250 of our campers and 150 staff use this site each summer, which now includes three generation of campers. This park is critical to our day camp programs and heavy truck traffic during the summer months and denuding

Comment 146-3 continued

the willow forest and alluvial scrub areas would have a critical negative impact on the program, the campers and the staff.

Comment 146-4

Camp is an antidote to bullying, isolation, over reliance on technology and many other challenges facing our youth. At Hahamongna, campers age 3-14 have critical exposure to wilderness adventure. During the summer, they hike, ride horses, build secret forts, observe wildlife, play games, sing songs, build self reliance and self esteem, and develop friendships that last a lifetime. We rely heavily on the access, peace and beauty of the willow forest and the alluvial scrub areas for these experiences, along with other areas of the park. Hahamongna is home to generations of staff and campers whose lives have been directly and dramatically enriched by this natural refuge, including mine.

Comment 146-5

Tom Sawyer Camps is a very important program and my request could easily go unnoticed but I believe the impact that camp has on the children of tomorrow is significant. Summer in the watershed is a rare and unique opportunity for children to be away from noise and disruption and engage with nature and outdoor adventure in a safe, peaceful, and joyful manner. We hope you will see the value of camp and make every attempt to minimize the impact the sediment clean up will have during the summer months and for the generations of children to use the park in the years to come.

Thank you for allowing me the opportunity to share my concerns and needs. Please feel free to contact me if you have any questions.

Sincerely

Kristin McDaniel
1252 Norton Ave
(818) 913-6626
kvlockridge@hotmail.com

Response to Comment Letter #146 (Kristin McDaniel – Tom Sawyer Camps)

Response to Comment 146-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

Response to Comment 146-2:

The Proposed Project will not limit the use of the Oak Grove area of Hahamongna Watershed Park by recreational users such as Tom Sawyer Camps. Sediment removal activities would be temporary and are expected to occur only in the drier months (April to December, excluding holidays). It is expected that these activities will often not be adjacent to the Oak Grove area of Hahamongna Watershed Park. Therefore, the maximum impacts to the adjacent recreational facilities would be much shorter than the five-year duration of the sediment removal phase of the Proposed Project.

During the summer months, sediment is expected to be the driest. Due to the reduction in water weight, each truck can haul more sediment per load during these months. This increases efficiency and decreases project duration, which also decreases impacts and cost. Skipping these crucial dry months would extend the project duration.

Los Angeles County Flood Control District (LACFCD) proposed a project duration of five years to reduce accumulated sediment in a timely fashion. The goal of LACFCD is to restore reservoir flood capacity as soon as feasible while reducing costs and minimizing the duration of environmental and construction impacts to the surrounding communities. Extending the project would prolong the flood risk to downstream communities and increase the construction impacts to the surrounding communities.

As discussed in Section 3.6.6 of the Draft Environmental Impact Report (EIR), Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats.

Alternative 3, Configuration D affects the least amount of reservoir area of all the action alternatives, while still achieving Proposed Project objectives (see Section 4.6 of the Final EIR). This alternative would provide a buffer between the Oak Grove area of Hahamongna Watershed Park and the excavation area. Alternative 3, Configuration D, Option 1 provides a more natural configuration for the reservoir with two branches to carry water and sediment toward the face of the dam, avoiding disturbing a significant portion of existing vegetation. To further reduce the Proposed Project's footprint, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2, which drastically reduces the project's footprint of 120 acres down to 71 acres, would avoid excavation of the western branch, thereby providing a greater habitat buffer on the west side of the reservoir. In addition, the maintenance areas would be smaller than the original sediment removal footprint, allowing for habitat to reestablish and provide additional areas for wildlife movement.

Response to Comment 146-3:

See Response to Comment 146-2. Access to the Oak Grove area of Hahamongna Watershed Park will not be limited by the Proposed Project. Potential impacts due to the Proposed Project's truck trips were analyzed in the Draft EIR, Section 3.16, Transportation and Traffic. As listed in that section, a single intersection in the immediate vicinity of the Proposed Project site will have a potentially significant

impact. In practice, hauling rates and routes may be adjusted to help reduce impacts depending on operational need. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the project site.

LACFCD also notes the commenter's concerns with traffic impacts relating to traveling to and from the Oak Grove area of Hahamongna Watershed Park. The Draft EIR outlines a 12-hour trucking schedule, with trucking operations on Saturdays as well. This schedule is used to model the most intensive construction operation, which may not be applicable at the site for the duration of the project. Typical trucking schedules are estimated to be 8 hours per day on weekdays. Additionally, construction traffic will not pass the Berkshire Place intersection with Oak Grove Drive and thus will not approach the Oak Grove Drive/Foothill Boulevard intersection used for ingress and egress to the Oak Grove area of Hahamongna Watershed Park.

Response to Comment 146-4:

See Response to Comment 146-2. LACFCD notes the use of Devil's Gate Reservoir by Tom Sawyer Camps, especially the willow forest and alluvial scrub areas.

Response to Comment 146-5:

See Response to Comment 146-2. LACFCD notes that Tom Sawyer Camps is an important resource to children and is going to great lengths to keep impacts to a minimum. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the Proposed Project site.

From: Mario Manzano
To: reservoircleanouts
Subject: Devil"s Gate Reservoir Sediment Removal and Management Project
Date: Tuesday, January 07, 2014 1:13:37 PM

Hi,

Comment 147-1

My name is Mario Manzano. I live in Norwalk, but I play disc golf in Pasadena.

I have looked at all the plans for the sediment removal project sponsored by the county, and all the plans will have an impact on our Disc Golf Course. Alternative 3 is the best plan, but the western branch will remove 2 of our playable positions. Please re-visit the sediment removal plans and make an alternative plan that will not impact the disc golf course.

this is the original disc golf course. This is where the sport was born and is growing. This course should be granted historical status and preserved for future generations.

Thank you,

Mario Manzano
Disc Golf Player

Response to Comment Letter #147 (Mario Manzano)

Response to Comment 147-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. No official disc golf course holes located in the Oak Grove area of Hahamongna Watershed Park will be removed by the Proposed Project. As noted in the Draft Environmental Impact Report (EIR), Section 3.15, Los Angeles County Flood Control District (LACFCD) recognizes the importance of the area to those who take advantage of the recreational opportunities offered, including the Oak Grove Disc Golf Course. Where possible, Los Angeles County Flood Control District (LACFCD) will avoid any disc golf course holes located outside the Oak Grove area of Hahamongna Watershed Park. When avoidance is not possible, LACFCD will coordinate with the Oak Grove Disc Golf Club for removal of the disc golf hole equipment.

Alternative 3, Configuration D, the Environmentally Superior Alternative from the Draft Environmental Impact Report (EIR), carefully balances flood control needs and reductions in impacts to habitat by restoring the required reservoir capacity while also minimizing the project footprint (see Section 4.6 of the Final EIR). Furthermore, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2 would avoid excavation of the western branch, thereby providing a greater distance between the Oak Grove area of Hahamongna Watershed Park and the excavation area, reducing the project footprint of 120 acres down to 71 acres. Alternative 3, Configuration D, Option 2 would also avoid all currently existing Oak Grove Disc Golf Club holes. The Oak Grove area of Hahamongna Watershed Park and the associated facilities would remain open during sediment removal and would continue to provide active recreational facilities to the area.

Jan 2, 2014

County of Los Angeles
Department of Public Works
Water Resources Division
ATTN: Reservoir Cleanouts Program
PO Box 1460
Alhambra, CA 91802-1460
reservoircleanouts@dpw.lacounty.gov

RE: DEVIL'S GATE RESERVOIR SEDIMENT REMOVAL AND MANAGEMENT PROJECT

Dear Department of Public Works, Water Resource Division,

Comment 148-1

Thank you for the opportunity to comment on the draft EIR for the DEVIL'S GATE RESERVOIR SEDIMENT REMOVAL AND MANAGEMENT PROJECT. I can't imagine what a herculean task you have ahead deciding how best to assess and implement the sediment removal project.

Comment 148-2

While we support the sediment clean up in general, we are concerned about the impact as defined in the dEIR on summer camp and are requesting the following modifications: 1) No sediment removal in the willow forest and alluvial scrub areas during the months of June, July, and August; 2) A phased approach that allows for places within the project area that can continue to be used for recreational purposes; 3) A longer timeline for the project to help minimize impact on those who use the park; and, 4) Preservation of the willow forest and the alluvial scrub area from denuding and/or from being used as permanent maintenance zones.

Comment 148-3

Tom Sawyer Camps has been in operation since 1926 and has been using Hahamongna Watershed Park as for the last 70 years (since 1944). Approximately 1250 of our campers and 150 staff use this site each summer, which now includes three generation of campers. This park is critical to our day camp programs and heavy truck traffic during the summer months and denuding the willow forest and alluvial scrub areas would have a critical negative impact on the program, the campers and the staff.

Comment 148-4

Camp is an antidote to bullying, isolation, over reliance on technology and many other challenges facing our youth. At Hahamongna, campers age 3-14 have critical exposure to wilderness adventure. During the summer, they hike, ride horses, build secret forts, observe wildlife, play games, sing songs, build self reliance and self esteem, and develop friendships that last a lifetime. We rely heavily on the access, peace and beauty of the willow forest and the alluvial

Comment 148-4 continued

scrub areas for these experiences, along with other areas of the park. Hahamongna is home to generations of staff and campers whose lives have been directly and dramatically enriched by this natural refuge, including mine.

Comment 148-5

Tom Sawyer Camps is a very important program and my request could easily go unnoticed but I believe the impact that camp has on the children of tomorrow is significant. Summer in the watershed is a rare and unique opportunity for children to be away from noise and disruption and engage with nature and outdoor adventure in a safe, peaceful, and joyful manner. We hope you will see the value of camp and make every attempt to minimize the impact the sediment clean up will have during the summer months and for the generations of children to use the park in the years to come.

Thank you for allowing me the opportunity to share my concerns and needs. Please feel free to contact me if you have any questions.

Sincerely,

Miriam Fine

Miriam Fine
628 W. Norman Ave
Arcadia, CA 91007
mirfi48@gmail.com

Response to Comment Letter #148 (Miriam Fine)

Response to Comment 148-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

Response to Comment 148-2:

The Proposed Project will not limit the use of the Oak Grove area of Hahamongna Watershed Park by recreational users such as Tom Sawyer Camps. Sediment removal activities would be temporary and are expected to occur only in the drier months (April to December, excluding holidays). It is expected that these activities will often not be adjacent to the Oak Grove area of Hahamongna Watershed Park. Therefore, the maximum impacts to the adjacent recreational facilities would be much shorter than the five-year duration of the sediment removal phase of the Proposed Project.

During the summer months, sediment is expected to be the driest. Due to the reduction in water weight, each truck can haul more sediment per load during these months. This increases efficiency and decreases project duration, which also decreases impacts and cost. Skipping these crucial dry months would extend the project duration.

Los Angeles County Flood Control District (LACFCD) proposed a project duration of five years to reduce accumulated sediment in a timely fashion. The goal of LACFCD is to restore reservoir flood capacity as soon as feasible while reducing costs and minimizing the duration of environmental and construction impacts to the surrounding communities. Extending the project would prolong the flood risk to downstream communities and increase the construction impacts to the surrounding communities.

As discussed in Section 3.6.6 of the Draft Environmental Impact Report (EIR), Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats.

Alternative 3, Configuration D affects the least amount of reservoir area of all the action alternatives, while still achieving Proposed Project objectives (see Section 4.6 of the Final EIR). This alternative would provide a buffer between the Oak Grove area of Hahamongna Watershed Park and the excavation area. Alternative 3, Configuration D, Option 1 provides a more natural configuration for the reservoir with two branches to carry water and sediment toward the face of the dam, avoiding disturbing a significant portion of existing vegetation. To further reduce the Proposed Project's footprint, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2, which drastically reduces the project's footprint of 120 acres down to 71 acres, would avoid excavation of the western branch, thereby providing a greater habitat buffer on the west side of the reservoir. In addition, the maintenance areas would be smaller than the original sediment removal footprint, allowing for habitat to reestablish and provide additional areas for wildlife movement.

Response to Comment 148-3:

See Response to Comment 148-2. Access to the Oak Grove area of Hahamongna Watershed Park will not be limited by the Proposed Project. Potential impacts due to the Proposed Project's truck trips were analyzed in the Draft EIR, Section 3.16, Transportation and Traffic. As listed in that section, a single intersection in the immediate vicinity of the Proposed Project site will have a potentially significant

impact. In practice, hauling rates and routes may be adjusted to help reduce impacts depending on operational need. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the project site.

LACFCD also notes the commenter's concerns with traffic impacts relating to traveling to and from the Oak Grove area of Hahamongna Watershed Park. The Draft EIR outlines a 12-hour trucking schedule, with trucking operations on Saturdays as well. This schedule is used to model the most intensive construction operation, which may not be applicable at the site for the duration of the project. Typical trucking schedules are estimated to be 8 hours per day on weekdays. Additionally, construction traffic will not pass the Berkshire Place intersection with Oak Grove Drive and thus will not approach the Oak Grove Drive/Foothill Boulevard intersection used for ingress and egress to the Oak Grove area of Hahamongna Watershed Park.

Response to Comment 148-4:

See Response to Comment 148-2. LACFCD notes the use of Devil's Gate Reservoir by Tom Sawyer Camps, especially the willow forest and alluvial scrub areas.

Response to Comment 148-5:

See Response to Comment 148-2. LACFCD notes that Tom Sawyer Camps is an important resource to children and is going to great lengths to keep impacts to a minimum. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the Proposed Project site.

From:	Philip Fitzpatrick
To:	reservoircleanouts
Subject:	Devil's Gate Reservoir Sediment Removal and Management Project
Date:	Monday, January 06, 2014 6:29:45 PM

Hi,

My name is Phil Fitzpatrick. I live in Sherman Oaks, CA.

Comment 149-1

I have looked at all the plans for the sediment removal project sponsored by the county, and all the plans will have a tragic impact on our Disc Golf Course. Alternative 3 is the best plan, but the western branch will remove 2 of our playable positions. Please re-visit the sediment removal plans and make an alternative plan that will not impact the disc golf course.

Did you know this Disc Golf course is the first disc golf course in the world? It was installed in the 1970's is a historic site for a global community. Pleas reconsider your plans.

Thank you,

Philip D. Fitzpatrick

(818)267-4722
philipdouglas@mac.com

Response to Comment Letter #149 (Philip Fitzpatrick)

Response to Comment 149-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. No official disc golf course holes located in the Oak Grove area of Hahamongna Watershed Park will be removed by the Proposed Project. As noted in the Draft Environmental Impact Report (EIR), Section 3.15, Los Angeles County Flood Control District (LACFCD) recognizes the importance of the area to those who take advantage of the recreational opportunities offered, including the Oak Grove Disc Golf Course. Where possible, Los Angeles County Flood Control District (LACFCD) will avoid any disc golf course holes located outside the Oak Grove area of Hahamongna Watershed Park. When avoidance is not possible, LACFCD will coordinate with the Oak Grove Disc Golf Club for removal of the disc golf hole equipment.

Alternative 3, Configuration D, the Environmentally Superior Alternative from the Draft Environmental Impact Report (EIR), carefully balances flood control needs and reductions in impacts to habitat by restoring the required reservoir capacity while also minimizing the project footprint (see Section 4.6 of the Final EIR). Furthermore, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2 would avoid excavation of the western branch, thereby providing a greater distance between the Oak Grove area of Hahamongna Watershed Park and the excavation area, reducing the project footprint of 120 acres down to 71 acres. Alternative 3, Configuration D, Option 2 would also avoid all currently existing Oak Grove Disc Golf Club holes. The Oak Grove area of Hahamongna Watershed Park and the associated facilities would remain open during sediment removal and would continue to provide active recreational facilities to the area.

From: Garibay, Raul
To: reservoircleanouts
Subject: Devil"s Gate Dam project
Date: Tuesday, January 07, 2014 11:17:41 AM

Comment 150-1

I am in support of the clean out project for a number of reasons:

1. The dam was retrofitted to current earthquake standards and needs to be fully utilized
2. Full utilization of the dams potential storage lessens the probability of flooding down stream
3. Retention of more water allows more surface water to percolate into the local groundwater basin; local water purveyors use this basin to extract water via wells

Comment 150-2

However, the rate at which the material is removed should be coordinated with the local residents. I do not believe that the County was negligent in removing the material sooner but probably was not able to act until sufficient funding was secured. Some may say that our current weather pattern does not necessitate this action but I would tend to disagree. It is a resource that needs to be maintained.

Response to Comment Letter #150 (Raul Garibay)

Response to Comment 150-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. LACFCD notes the commenter's support for the Proposed Project and fully utilizing the dam and reservoir.

Response to Comment 150-2:

LACFCD proposed a project duration of five years to reduce accumulated sediment in a timely fashion. The goal of LACFCD is to restore reservoir flood capacity as soon as feasible while reducing costs, minimizing the duration of environmental and construction impacts to the surrounding communities, and configuring the reservoir to allow for sustainable future maintenance. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the Project site.

Historically, large amounts of sediment have been deposited in the reservoir in short time periods. Between 1935 and 1938 over 1.6 million cy of sediment, between 1938 and 1943 over 1.95 million cy of sediment, between 1959 and 1966 over 1.75 million cy of sediment and between 2010 and 2012 over 1.3 million cy of sediment was deposited in the reservoir. Over 92 years, the average amount of sediment deposited each year is approximately 130,000 cy; however, Devil's Gate Reservoir is a dynamic system with constantly changing amounts of sediment deposited from year to year, depending on the frequency and intensity of storm events. If a 1 in 50 years storm were to occur, approximately 2.0 million cy (one DDE) of sediment could be expected to wash into the reservoir. Because of the LACFCD's responsibilities to provide flood protection, LACFCD must be ready at all times for a Design Debris Event to occur LACFCD is committed to *Public Service that Works*; and by combining almost 100 years of technical expertise and invaluable input from the community, less invasive flood protection will continue to be a reality.

From: thimreed@yahoo.com
To: reservoircleanouts
Subject: Devil"s Gate Reservoir Sediment Removal and Management Project
Date: Monday, January 06, 2014 5:55:45 PM

Hi,

Comment 151-1

My name is Thim Reed. I live on 1629 Folsom Lane. I have looked at all the plans for the sediment removal project sponsered by the county, and all the plans will have an impact on our Disc Golf Course. Alternative 3 is the best plan, but the western branch will remove 2 of our playable positions. Please re-visit the sediment removal plans and make an alternative plan that will not impact the disc golf course. Please honor and value the place in history this course has the worlds first Dic Golf Course. It would be the equivalent of tampering with the original home of golf in St. Andrews Scotland. I'm asking you please to do the right thing.

Thank You!
Thim Reed

Response to Comment Letter #151 (Thim Reed)

Response to Comment 151-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. No official disc golf course holes located in the Oak Grove area of Hahamongna Watershed Park will be removed by the Proposed Project. As noted in the Draft Environmental Impact Report (EIR), Section 3.15, Los Angeles County Flood Control District (LACFCD) recognizes the importance of the area to those who take advantage of the recreational opportunities offered, including the Oak Grove Disc Golf Course. Where possible, Los Angeles County Flood Control District (LACFCD) will avoid any disc golf course holes located outside the Oak Grove area of Hahamongna Watershed Park. When avoidance is not possible, LACFCD will coordinate with the Oak Grove Disc Golf Club for removal of the disc golf hole equipment.

Alternative 3, Configuration D, the Environmentally Superior Alternative from the Draft Environmental Impact Report (EIR), carefully balances flood control needs and reductions in impacts to habitat by restoring the required reservoir capacity while also minimizing the project footprint (see Section 4.6 of the Final EIR). Furthermore, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2 would avoid excavation of the western branch, thereby providing a greater distance between the Oak Grove area of Hahamongna Watershed Park and the excavation area, reducing the project footprint of 120 acres down to 71 acres. Alternative 3, Configuration D, Option 2 would also avoid all currently existing Oak Grove Disc Golf Club holes. The Oak Grove area of Hahamongna Watershed Park and the associated facilities would remain open during sediment removal and would continue to provide active recreational facilities to the area.

From: tommy
To: reservoircleanouts
Subject: Devil¹s Gate Reservoir Sediment Removal and Management Project
Date: Monday, January 06, 2014 6:46:36 PM

My name is Tom La Torre. I live at 1748 16th street.

Comment 152-1

I have looked at all the plans for the sediment removal project sponsored by the county, and all the plans will have an impact on our Disc Golf Course. Alternative 3 is the best plan, but the western branch will remove 2 of our playable positions. Please re-visit the sediment removal plans and make an alternative plan that will not impact the disc golf course.

This is such an amazing disc golf course for the community, please help save it.

Thank you,
Tom La Torre

Response to Comment Letter #152 (Tom La Torre)

Response to Comment 152-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. As noted in the Draft Environmental Impact Report (EIR), Section 3.15, Los Angeles County Flood Control District (LACFCD) recognizes the importance of the area to those who take advantage of the recreational opportunities offered, including the Oak Grove Disc Golf Course. No official disc golf course holes located in the Oak Grove area of Hahamongna Watershed Park will be removed by the Proposed Project. Where possible, Los Angeles County Flood Control District (LACFCD) will avoid any disc golf course holes located outside the Oak Grove area of Hahamongna Watershed Park. When avoidance is not possible, LACFCD will coordinate with the Oak Grove Disc Golf Club for removal of the disc golf hole equipment.

Alternative 3, Configuration D, the Environmentally Superior Alternative from the Draft Environmental Impact Report (EIR), carefully balances flood control needs and reductions in impacts to habitat by restoring the required reservoir capacity while also minimizing the project footprint (see Section 4.6 of the Final EIR). Furthermore, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2 would avoid excavation of the western branch, thereby providing a greater distance between the Oak Grove area of Hahamongna Watershed Park and the excavation area, reducing the project footprint of 120 acres down to 71 acres. Alternative 3, Configuration D, Option 2 would also avoid all currently existing Oak Grove Disc Golf Club holes. The Oak Grove area of Hahamongna Watershed Park and the associated facilities would remain open during sediment removal and would continue to provide active recreational facilities to the area.

From: Trevor
To: reservoircleanouts
Subject: Devil"s Gate Reservoir Sediment Removal and Management Project
Date: Tuesday, January 07, 2014 1:11:38 PM

Hi,

My name is Trevor Mutch. I live at 1031 Calle Contento, Glendale, CA 91208.

Comment 153-1

I have looked at all the plans for the sediment removal project sponsored by the county, and all the plans will have an impact on our Disc Golf Course. Alternative 3 is the best plan, but the western branch will remove 2 of our playable positions. Please re-visit the sediment removal plans and make an alternative plan that will not impact the disc golf course.

Oak Grove Disc Course, as the world's first permanent disc golf course, has been a rich tradition for the City of Pasadena. Please continue to maintain and protect its historical significance and beauty! The course is widely enjoyed by families, visitors, and local enthusiasts!

Thank you,
Trevor

Response to Comment Letter #153 (Trevor Mutch)

Response to Comment 153-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. As noted in the Draft Environmental Impact Report (EIR), Section 3.15, Los Angeles County Flood Control District (LACFCD) recognizes the importance of the area to those who take advantage of the recreational opportunities offered, including the Oak Grove Disc Golf Course. No official disc golf course holes located in the Oak Grove area of Hahamongna Watershed Park will be removed by the Proposed Project. Where possible, Los Angeles County Flood Control District (LACFCD) will avoid any disc golf course holes located outside the Oak Grove area of Hahamongna Watershed Park. When avoidance is not possible, LACFCD will coordinate with the Oak Grove Disc Golf Club for removal of the disc golf hole equipment.

Alternative 3, Configuration D, the Environmentally Superior Alternative from the Draft Environmental Impact Report (EIR), carefully balances flood control needs and reductions in impacts to habitat by restoring the required reservoir capacity while also minimizing the project footprint (see Section 4.6 of the Final EIR). Furthermore, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2 would avoid excavation of the western branch, thereby providing a greater distance between the Oak Grove area of Hahamongna Watershed Park and the excavation area, reducing the project footprint of 120 acres down to 71 acres. Alternative 3, Configuration D, Option 2 would also avoid all currently existing Oak Grove Disc Golf Club holes. The Oak Grove area of Hahamongna Watershed Park and the associated facilities would remain open during sediment removal and would continue to provide active recreational facilities to the area.

From: Bette Cooper
To: reservoircleanouts
Subject: Hahamonga Project
Date: Friday, January 10, 2014 2:37:46 PM

To Whom It May Concern:

I truly hope that when the People speak/email/twitter/blog about a project such as this, you sit up and take notice. We are aware of the pros and cons, and it is a fact of life these days that people like us, the public, must take the time to bring a different perspective that might help us all to "see the forest from the trees".

Comment 154-1

We all get caught up in our own thoughts, businesses, ideas, etc., and sometimes we cannot get a clear picture of the very serious pros and cons of a situation in order to make a decision that is beneficial to all.

Hahamonga appears to be one of those situations. It's obvious there is too much silt and sediment that has collected over many years. Many years in fact, and why it must be removed in such a concentrated timeframe to the detriment of many interests that use that area and have done so for many years is puzzling.

Comment 154-2

It would be beneficial to the environment, to those who use that area for recreational purposes, for all the wild animals, for the trees that help keep our air clean, for you to come up with a modified and smarter plan. Speaking of our clean air, the existing plans would create an extraordinary amount of dust, dirt, and exhaust to name a few of the negative repurcussions.

Comment 154-3

Also, is there no place where this silt/sediment can be used in a beneficial way, which would make your project a positive one in the long run.

Comment 154-4

Please take a step back and reevaluate these plans before you begin something that we might all regret later. This is a beautiful piece of nature, which would be very sad to ruin or abuse.

Thank you for your attention.

Regards,

Bette Cooper
Past President of Pasadena Beautiful Foundation

Response to Comment Letter #154 (Bette Cooper – Pasadena Beautiful Foundation)

Response to Comment 154-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

Los Angeles County Flood Control District (LACFCD) proposed a project duration of five years to reduce accumulated sediment in a timely fashion. The goal of LACFCD is to restore reservoir flood capacity as soon as feasible while reducing costs, minimizing the duration of environmental and construction impacts to the surrounding communities, and configuring the reservoir to allow for sustainable future maintenance. Extending the project would prolong the flood risk to downstream communities and increase the construction impacts to the surrounding communities.

LACFCD was mandated by the State Legislature to provide flood protection and water conservation within its boundaries.

A reservoir storage design capacity of two design debris events (DDEs) below the dam's lowest spillway was determined to be the standard acceptable level of risk at Devil's Gate Dam and Reservoir. The DDE volume of capacity is determined using the January 2006 Los Angeles County Department of Public Works (LACDPW) Hydrology Manual and the March 2006 LACDPW Sedimentation Manual. For Devil's Gate Dam and Reservoir, the required reservoir capacity is 4.0 million cubic yards (cy) (two DDEs) below the spillway elevation of 1,040.50 feet.

The Hydrology Manual (January 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_Hydrology_Manual/2006%20Hydrology%20Manual-Divided.pdf

The Sedimentation Manual (March 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_sedimentation_manual/Sedimentation%20Manual-Second%20Edition.pdf

Additional information concerning DDE calculation methods has been added to the Final Environmental Impact Report (EIR), Section 2.3, Project Need.

Following the 2009 Station Fire, approximately 1.3 million cy of sediment flowed into Devil's Gate Reservoir after just two average water year storm seasons. Additionally, Over 92 years, the average amount of sediment deposited each year is approximately 130,000 cy; however, ; , due to the dynamic nature of the system and the recent burn of the watershed, the amount could vary greatly. If a 1 in 50 years storm were to occur, approximately 2.0 million cy (one DDE) of sediment could be expected to wash into the reservoir. Because of the LACFCD's responsibilities to provide flood protection, LACFCD must be ready at all times for a Design Debris Event to occur.

Response to Comment 154-2:

LACFCD goes to great lengths to lessen project impacts and maximize efficiencies. For example, the Draft EIR concluded that Alternative 3 is the Environmentally Superior Alternative. Alternative 3 , Configuration D, Option 2 drastically reduces the project's footprint of 120 acres down to 71 acres . Additionally, the limited maintenance area for Alternative 3 further reduces the permanent habitat

impacts down to approximately 51 acres by allowing for site replanting and mitigation to take place within the reservoir footprint. This reduction in project acreages will greatly lessen environmental impacts of the Proposed Project.

Air quality impacts associated with truck traffic were analyzed in the Draft EIR in Section 3.5. LACFCD has conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed the United States (U.S.) Environmental Protection Agency's (EPA's) 2007 standards for emissions. Therefore, in order to further reduce emissions, Mitigation Measure MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump trucks that meet or exceed EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality will be reduced to less than significant.

Dust impacts from the Proposed Project were carefully evaluated, as discussed in the Draft EIR, Section 3.5.6, Impacts and Mitigation, AIR QUALITY-2, Sediment Removal. The Proposed Project's activities, including excavation, grading, material loading, and hauling, would result in less than significant dust emissions due to the project's use of best management practices and would be in full compliance with South Coast Air Quality Management District's (SCAQMD's) fugitive dust regulations.

Response to Comment 154-3:

The sediment that came into Devil's Gate Reservoir following the Station Fire has a very fine gradation or consistency. As such, the majority of this material is not readily reusable on a commercial scale and will most likely not be sold; however, sediment placed at sediment placement sites would be available for potential reuse for other projects or sediment reuse opportunities. The sediment removed from the Devil's Gate Reservoir will be transported to the existing placement sites listed in Section 2.0, Project Description in the Draft EIR.

For further information regarding beneficial uses for sediment at the Los Angeles County Flood Control District (LACFCD) sites, please refer to Section 6.5 of LACFCD's 2012 Sediment Management Strategic Plan which can be found at: http://dpw.lacounty.gov/lacfcd/sediment/stplan.aspx.

Response to Comment 154-4:

Comment noted.

A Common Sense Systems Approach to the Devil's Gate Dam and the Hahamongna Watershed Park

How to Remove the Sediment, Improve the Environment, Increase Water Capture and Reduce Future Maintenance Costs Using Systems Engineering

By
Camron Stone

What to do with the Hahamongna Watershed Park (HWP)?

This is the question that I have been asking myself and everyone connected to the basin that is called the Hahamongna Watershed Park. I still haven't received an answer other than from the LA county Department of Public Works (DPW) who wants to scrape out a 50-acre bowl of sediment (1/3 of a mile in diameter) out of the young Black Willow woodland area that has taken hold adjacent to the face of the Devil's Gate Dam. This project would remove about 1.6 million Cubic Yards (CU) of sediment and create a 50-acre wasteland.

Comment 155-2

To me, this is just plain silly – it is engineers solving a immediate problem with an immediate solution and they plan on spending $35 million of the tax payer's money to do it. They are completely ignoring the fact that that five years down the road, the ¾ mile of built up sediment to the North of their scrape area within the basin will end up sluicing into their newly scraped bowl. Maybe then there will be another "emergency" (clogged valves) that will allow the DPW to grab another $30 million of taxpayer money to do the same thing over again hoping for a different result.

The Importance of Systems Engineering

Systems engineering is the design, implementation and/or study of any kind of system whether it be natural or man-made. There are two types of systems: **Open Loop** and **Closed Loop**. Open loop systems require intervention from outside the system to make the system operate properly. An example of an open loop system is the standard manual air conditioning system in a car. In this case the driver must constantly readjust the fan speed and air temperature controls to stay comfortable.

Comment 155-3

Conversely, a closed loop system operates autonomously and automatically. This is because all closed loop systems have what is called a "feedback loop".

The output and operation of such a system is monitored by sensors which feed back this information to the system so that the system can adjust is operating parameters to obtain the desired result. Automatic "Climate Control" systems on today's modern cars are examples of a closed loop system. Information from temperature sensors in the car's cabin is fed back to the system, which automatically adjusts the fan speed, and air temperature to gracefully reach the desired cabin temperature set by the driver. A poorly designed closed loop system will fluctuate wildly around the desired result so, in the case of the climate control system, an inefficient design would turn on maximum fans and coldest air until it shoots right past the desired temperature causing the heater to turn on full blast and again soar past the proper temperature and so on.

All natural systems or "ecosystems" are closed loop with the desired result being natural diversity. The term "Natural Balance" really refers to an efficiently operating closed loop system. In the simplest of examples, if a given natural ecosystem has too many predators, prey animals will gradually become more scarce and this in turn will cause a gradual reduction in the predator's birthrate and force some to move on to other territories with a shortage of predators. Natural balance is attained seamlessly without wild fluctuations through this feedback mechanism.

Comment 155-3 continued

Geologic systems such as the natural process of mountain erosion into sediment and its resulting flow out to the ocean and beaches are also closed loop systems, albeit extremely slow in their operation. The natural sediment management system in LA County had always operated flawlessly with the relatively even flow of sediment to the ocean regulated by the natural burning process that used to take place in our nearby mountains. Naturally occurring periods of drought and floods would keep the level of sediment in our streams and rivers at fairly constant levels while pushing it along on its journey at exactly the right pace to keep up with the amount of sediment being added to the system.

With the advent of humans to the LA area and the creation of the LA County Flood Control District with its network of dams and debris basins, the feedback loop was broken and sediment management is now a poorly operating and inefficient open loop system. What's more, the desired output of that system was changed by humans from the control and transportation of sediment to replenish the beaches, to the control of water. That change converted sediment from a valuable resource to a waste product of the new system.

Comment 155-4

By designating sediment as a waste product, the LA County Department of public Works (DPW) had to create a whole new open loop system to dispose of it. This new system not only has wildly changing inputs of sediment (due to huge fires caused by forest management) but it also has two additional inputs with extreme fluctuations: Money and Politics. And, unlike the open loop manual air conditioning system in a car that has many control settings for fan speed and air temperature, the DPW's latest version of its sediment management system has

only two settings: “Off” and “Full Blast”. What’s worse, the control input “Full Blast” can only be used in one small part of the system at a time because of scarce resources. Imagine a car that has only three control options: “OFF”, “Max Heat” or “Max Cool” with the fan on “high” the whole time. Nobody would buy it.

The reason that the current sediment management system has only two extreme control inputs is that the other inputs to the system, “money” and “politics” have forced the DPW into a situation where they either do nothing or, promote grandiose super projects. The politics input to the system includes the internal drive of DPW management to keep the status quo until retirement and pass the accumulated problems on to the next generation. Politics also result in the reluctance of the DPW’s politically elected overseers to fund (the “money” input) the infrastructure and manage the DPW in a way that is required for an efficient system with refined levels of control that mimics the closed loop natural sediment management system that used to work so well. As a result of this, the DPW has morphed into a political organization focused on using “emergencies” or “public safety” to provide the motivation for politicians to open the public treasury and allow the DPW to reach in and grab tens of millions of taxpayer dollars (the ”money” input) so that they can “prevent the destruction of property and lives”. The result of all this is a “Full Blast” project focused on a small area of the system that creates havoc on the local environment.

Comment 155-4 continued

I know, most of you are saying: “What’s the big deal about looking at sediment management as a system – What I care about is the environment or flood prevention or public safety or oak trees or natural habitat.” Well, the beauty of designing an efficiently operating system is that no one ever thinks about it – it just works. Back to another climate control example: If you have ever gone to a meeting or worked in a high rise building, you know (but you didn’t think about the fact) that when you walk into the lobby of the building, the temperature is perfect. When you board the elevator and climb to the umpteenth floor, the temperature there is the same. On that floor, you can walk over to the sunny side of the building with the sun blazing into the windows – still the same temp. Then you walk over to the shaded side of the building – nothing changes. When you depart the building, you never once thought about the temperature or your associated comfort. The fact that you didn’t notice the building’s air conditioning system is endemic to an efficiently operating closed loop system. The only time that anyone notices or marvels in an efficient system is when there is an obvious extreme input being applied to the system. In the case of the high rise, if the temperature outside is over 100 degrees, one always approaches the building thinking, “I hope the AC is working in there.” Once inside, we are delighted to find out that the system is working properly.

Comment 155-5

The other case in which a system is noticed is when it is poorly designed, poorly maintained or broken. When this happens, everyone who is affected by such a system begins to complain. If the problem continues, the complaints become demands and the demands become calls for those responsible for the system to

Comment 155-5 continued

be fired or removed from office. If the people on the sunny side of a building are sweating and the people on the shady side of that building are freezing and that situation continues for a long period of time, those responsible for AC system maintenance will eventually get canned.

A Systems Engineering Approach to Managing HWP

The Hahamongna Watershed Park is massively affected by three man-made systems: Flood Control, Water Resource Management and Sediment Management.

HWP Flood Control System

The flood control system in operation at the HWP was first built in the 1920's as an open loop system and consists of the Devil's Gate Dam and its associated outlet valves and tunnels designed to control the amount of water that flows out of the reservoir. At first, it was up to the Dam Keeper to control the amount of water flowing out of the reservoir by weather observations and essentially using a dip stick to determine the amount of water in the reservoir and how fast it was rising or falling.

Comment 155-6

This system has been expanded over the years to allow greater water flow flexibility and provide real time feedback to allow for the system to operate more efficiently and more closely resemble a closed loop system. The Arroyo Seco downstream of the dam was channelized to allow greater flow rates without flooding. In addition, several decision-making parameters (feedback) were added such as weather forecasting, instantaneous rainfall sensors, upstream water flow rates and upstream soil water content reporting. All of this feedback data has allowed more efficient operation of the flood control system at HWP, and it works. Nobody thinks about it except when an extreme input to the system occurs: a series of massive rainstorms. Helicopters fly and the people watch in amazement as the system controls the flow of water sent to the sea and prevents homes and businesses from being flooded.

A failsafe spillway design was incorporated into the dam in the 1990's that will allow the maximum amount of water to pass through the dam (that can be handled by the downstream channel without flooding) in the event of a failure of the dam's valves and tunnels or a 100 year rain event.

The downside of the flood control system design is that it creates a great amount of waste product: Sediment. More on that later.

HWP Water Resource Management System

The Water Resource Management System at the HWP was designed in the mid-20th century to provide a scarce finite resource to the city of Pasadena. This starkly open loop system includes the diversion of incoming Arroyo Seco stream water to the network of 15 settling ponds that line the eastern side of the HWP basin (not including Johnson Field). The water that is sent to the settling ponds percolates down into the aquifer and is later pumped out at wells operated by the Pasadena DWP. The growth of Pasadena has resulted in the ever-increasing importation of water from the Metropolitan Water District (MWD) to the point where today, MWD water now provides about 60% of the water used by the City of Pasadena.

The current Water Resource Management System design in the HWP only diverts water from the Arroyo Seco stream whenever it is in a period of low flow after the winter storms have subsided. The result of this being that the majority of the fresh water that passes through the HWP ends up being sent downstream to the ocean. How could this be, you ask? The answer lies in the fact that when the Arroyo Seco is running hard (high flow rate), there is a great amount of fine sediment suspended in the water. Fine sediment and settling ponds don't mix. If water containing fine sediment were to be piped into the HWP's network of settling ponds, the process of percolation into the aquifer would be stopped cold. Fine sediment acts like a drain stopper in these ponds, completely blocking the percolation process. Therefore, high flow rate water is rejected by the current system and treated like a waste product.

Comment 155-7

Today, the cost of MWD water is skyrocketing and is now costing the City of Pasadena about four times the cost of water derived from the city's HWP Water Resource Management System. This situation has rightly caused the City to look into means of increasing the amount of HWP water that can be captured from the Arroyo Seco and percolated into the local aquifer. It looks to me like the City has chosen to expand the same old method of water capture by promoting an expansion of the number of settling ponds in the basin. In this regard, the City's current plan is to demolish the existing JPL parking lot on the east side of the basin and convert the area to settling ponds. The City believes that the value of additional water to be gained by this conversion would more than offset the lost revenue generated by leasing the property to JPL for parking.

This way of thinking and its reliance on the tried and true methods developed 70-80 years ago is now archaic. It still relies on treating fast moving water as waste. Most of the people in Pasadena are now thinking

Comment 155-7 continued

about this broken system due to their ever-increasing water bills and new laws regulating their use of water.

There **is** a better way that maximizes the capture of water that moves though the basin – stay tuned.

HWP Sediment Management

The HWP Sediment Management "System" is now unquestionably the elephant in the room. The reason for this is that the DPW (and the Flood Control District) has not developed, nor built any infrastructure, for an efficient Sediment Management System in the almost 100 years of its existence. From the beginning, sediment was defined as a waste product of the Flood Control System and until now, this waste product was easily hidden from public view (at what are called "Sediment Placement Sites") close to its source and it doesn't stink.

It is worth mentioning here that a highly efficient and effective closed loop system was built to manage another waste product of our society and that system has been operating in the LA basin for decades. This system operates with very few problems and hence, people rarely ever think about it. What is the waste product that has been so effectively managed? Sewage. Because sewage is not easily hidden, our society made the decision early on to invest in the infrastructure necessary to create a system to transport and treat our sewage such that the end product of the system became a resource: fertilizer. This waste product management system is so well designed that even extreme inputs to the system such as a Super Bowl commercial are handled without a hiccup.

Comment 155-8

The consequences of defining sediment as a waste product instead of a resource and the fact that the existing hiding places (SPS) are almost full has finally created a situation in which more and more people are taking notice of a Sediment Management "System" that has always been poorly designed and is now broken. The DPW's current sediment removal plan for Hahamongna perpetuates and exacerbates the problems associated with this broken "system."

The current "Sediment Management solution" (I can't even call it a system) entails cleaning out the sediment in the 38 debris basins in the Flood Control System on an almost annual basis and hiding the sediment nearby. Without regular sediment removal, the network of small debris basins would fill up quickly, causing flooding of local residences which in turn, generates major customer complaints of a broken flood control system and that would threaten the retirement plans of DPW officials.

Comment 155-8 continued

The eight dams within the system including Devil's Gate (which generate the most sediment waste product) are normally not cleaned out until a "public safety crisis" can be declared by the DPW providing access to the public treasury. In the case of Hahamongna, the last sediment clean out of the HWP basin occurred in 1993 and now it is full again. One local newspaper is already parroting the DPW's crisis playbook with stories and editorials that predict imminent flooding of the Rose Bowl and call our elected officials foolish for wanting to fully study the sediment situation at HWP as well as the DPW's current scorched earth plan to remove the sediment. This study, in the form of an Environmental Impact Report (EIR) will require input from the local community regarding the project's impact on the environment and local residents. This report should be considered a part of that community input.

The whole issue of creating and investing in the infrastructure required for a viable and efficient Sediment Management System that redefines sediment as a valuable resource will be the subject of a future report. Suffice it to say that Nature got a lot of things right by relying on gravity and water to move the sediment to where it was needed. Such a system will take many years to develop and implement, therefore, the following proposed sediment removal plan for the HWP is designed to integrate with a future Sediment Management infrastructure.

Proposed Plan for Sediment Removal at the HWP

If you are still with me and have read this far, then you must be very interested in what happens at the Hahamongna Watershed Park (HWP) in Pasadena. Please note that what follows is a result my personal analysis (and multiple hikes within the basin) of the current condition of the HWP and my first hand experience with the Arcadia Woodlands tragedy. I am not speaking for the many HWP/Arroyo Seco organizations nor any environmental group. My hope is for this document to form the basis of a community consensus and response to the current DPW plan for sediment removal that will leave their characteristic massive scar upon a natural landscape. The DPW's plan is not sustainable and will result in another sediment "crisis" within just a few years forcing everyone involved to go through this process all over again.

Comment 155-9

I fully expect that everyone reading this proposed plan will have a problem with some part of it and that is a good thing. I want to hear about every objection especially those that that expose that my data or assumptions are incorrect. In this way we can all contribute to a community based response to DPW's plans during the EIR process.

It is my firm belief that with the amount of money that the DPW is currently spending on an unsustainable and broken Sediment Management "System", we

Comment 155-9 continued

can begin to build the infrastructure and public policies needed to create an efficient Sediment Management System that redefines sediment as a valuable resource. We will know that we have succeeded with this goal when all of the DPW's sediment projects actually enhance the environment instead of destroying it. I also believe that Systems Engineering is the key to making this possible.

The Sediment in HWP

The DPW reports that 1.67 million cubic yards of sediment needs to be removed from the basin to maintain flood control for the areas downstream of the Devil's Gate Dam. Very few people would argue with this necessity including myself. The purpose of this proposal is to promote a project design that will create a sustainable sediment removal process within the basin such that it will prevent a project of this magnitude from ever happening again in the HWP allowing a truly natural environment to establish and increase the recharge of the aquifer. This proposal focuses on the issues of how, where and the transport methods used in the removal of this sediment. In addition, special emphasis will be placed on preserving the HWP basin as a natural habitat (promoting natural systems) that can be enjoyed by future generations of humans and wildlife alike.

Comment 155-10

Everyone knows where the sediment that has built up behind the Devil's Gate Dam came from. Most people also know that the vast majority of that sediment first enters the basin when it passes under the JPL bridge at the mouth of the Arroyo Seco Canyon. From that point, the sediment is washed gradually down towards the Devil's Gate Dam, 1.3 miles from the JPL Bridge. At this time, after the Station Fire, the entire length of the basin behind the dam is now full of sediment ranging from about 15 feet in depth at the northern end to about 24 feet at the face of the dam (Source: DPW board Motion Report, Page 3).

The DPW has used the same methodology for sediment removal at Devil's Gate ever since the dam was built almost 90 years ago. Sediment is allowed to accumulate behind the dam for a period of 15 – 20 years. During this period, a wetland/riparian environment slowly establishes itself within a roughly circular area immediately upstream of the dam with a diameter of about .3 miles. Black Willow woodlands grow relatively quickly within this area and an annual, man made succession of flooding, stream formation and dry out occurs. Migrating waterfowl use the area during the wet periods and other wildlife moves in during the dry periods. When this semi-natural environment is fully established, the DPW is compelled for "safety" reasons to scrape out this environment forming yet another lunar crater over five football fields in diameter. Three hundred dump trucks every day for months on end and the local residents become

stressed out and agitated. Then the memory fades, history repeats itself and so it goes…

Comment 155-10 continued

As stated earlier, the one-mile of accumulated sediment above this excavated crater is left untouched. Because the elevation of this remaining sediment is much higher than the bottom of the crater, it quickly flows into the crater filling it up almost to its previous level. Then, the gradual flow of sediment begins anew to slowly raise the sediment level of the entire HWP basin, from the dam to the JPL Bridge.

"Lake Hahamongna"

The first element of this proposed solution is to create a lake and waterfowl refuge in the lower HWP. The creation of this lake would entail the removal of 1.0 million cubic yards of sediment from the basin adjacent to the dam. This circular excavation would leave an untouched island of approximately five acres in diameter in the center of the lower basin creating a roughly circular lake with an island in the center of it. Additional black willows and other native wetland trees would be planted on the island and its shores to prevent the sediment forming the island from flowing down into the lake bottom.

The benefits of such a permanent lake here would be tremendous:

Comment 155-11

- HWP would become a permanent stop on the routes of migrating waterfowl and other birds.
- The island would be a safe place for non-migrating waterfowl and other birds to nest safe from predators such as coyotes.
- The lake would become a permanent forty-acre settling pond to recharge the aquifer.
- Recreational opportunities within the basin would be increased by allowing fishing, more varied bird watching and possibly un-powered boating.
- Create habitat for endangered wetland species including frogs, newts, salamanders, toads and birds.
- Enhance the views, vistas and habitat zones experienced by hikers within the park.

Yes, the wetland habitat would be completely flooded with fast moving water during large winter storms, but recovery to normal levels would be relatively quick through intelligent use of the dam's valves. This process would mimic the natural process found in other wetlands.

The creation of a lake within the basin formed by a dam is not a new idea and you don't have to go far to see a successful implementation of this concept. Decades ago, the Army Corps of Engineers created a

Comment 155-11 continued

permanent lake within the Santa Fe Dam basin in Irwindale. Granted, the area immediately around the lake is far more developed than most people would prefer in HWP, but the fact remains that this concept is viable.

At this point, I know you are thinking that engineering a lake here is ridicules due to the fact that sediment coming into the basin would fill in the lake very quickly. The next element of this plan is designed to prevent that from happening.

"The Plunge Pool"

Most people are aware that when they see a raging torrent of fast moving water in a river or stream, a great deal of sediment is suspended in the water and that sediment is traveling downstream at roughly the same speed as the water itself. Conversely, those same rivers and streams in their normal (non-flood stage) condition, with much lower flow rates and speeds, are usually crystal clear with no sediment suspended in the water. The bottom line is that sediment needs fast moving water to stay in the water column and move forward. When the water slows down or stops, the sediment precipitates out of the solution and drops to the bottom of the water column.

Comment 155-12

The only way that the water in a fast moving river can be stopped or slowed down is when it enters a large stationary body of water such as a lake or ocean. When fast moving water enters a stationary body of water and slows down, the sediment suspended within that water is immediately dropped to the bottom of the stationary body of water. That is the reasoning behind the design of a "*plunge pool*". Man made plunge pools are commonly used to precipitate sediment out of a fast moving river or stream before the water in that stream moves downstream.

In a real world example of the usefulness of a "plunge pool", the DPW's current plan to remove the sediment within the Morris Dam Reservoir on the San Gabriel River in Azusa Canyon is to sluice it down canyon to the Santa Fe Dam. The problem with this plan is that the Army Corps of Engineers, who operate the Santa Fe Dam in Irwindale and the recreational park and lake within the reservoir, do not want the sediment from the Morris Dam to flow into their park and lake. Therefore, the Army Corps has required the Department of Public works to excavate a plunge pool near the 210 Freeway such that the sediment will be captured there by the plunge pool prior to flowing into the park. When this plunge pool has filled with sediment, the river will be diverted, the water in the pool will perk down into the aquifer and the DPW will excavate the new sediment and transport it to a nearby quarry pit. A beautiful solution to a complex problem forced on the DPW by the Army Corps.

OK, now back to Hahamongna. This proposal requests that the DPW create a *plunge pool* just south of the JPL bridge by excavating 670 thousand cubic yards of sediment from the bridge south - a distance of about one-half mile. This area currently resembles a sand beach so the excavation of this area would do minimal harm to habitat.

The sediment that has been deposited in this area is made up primarily of sand and gravel and not the fine sediment that has been deposited closer to the dam. The reason for this is that the entire HWP reservoir area acted like a plunge pool during the extreme floods of the 2009 and 2010 Winters. During these flood periods, the reservoir was full of water. As the fast moving water entered the basin, it began to slow down. Because the upper part of the basin is thinner than the lower part, the water slowed down gradually. Therefore, the heavier grains of sediment including gravel and sand precipitated out of the water column first and are deposited in the upper third of the basin. Finer sediments are deposited closer to the dam. The point of all this being that the sediment excavated to create a plunge pool in the northern third of the basin is far more valuable to materials corporations such as Vulcan than the fine sediment closer to the dam. The DPW may be able to convince these companies to take this sand and gravel off their hands or use it in one of their own road building or resurfacing projects.

Comment 155-13

Creating a plunge pool would be essentially like building a debris basin within the Devil's Gate Reservoir. The southern edge of the plunge pool would have to have a boulder and earth dam erected that would be not much higher than the current sediment level is today. The creation of this *plunge pool* would be the first step on the road to the construction of the infrastructure necessary for a sustainable sediment management system on the Arroyo Seco Watershed.

I can already hear "the powers that be" complaining about the cost of building a *Plunge Pool* dam as a part of the HWP sediment removal project. However, I believe that the plunge pool dam can be built for little, if any, extra cost over the $35 million cost of the overall project. The greatest cost of the construction of this dam will be the acquisition and transportation of the large boulders needed for the dam. However, the DPW currently owns more than enough boulders to build this structure. They can all be found on top of the Upper SPS at the DPW's Santa Anita Facility. Here's how the cost is minimized: A small portion of the tucks carrying sediment from HWP to the Manning Pit in Irwindale would instead be diverted to the Santa Anita SPS (reducing travel distance by about 1/3). These trucks would dump their sediment loads on the Upper SPS at Santa Anita and would then be loaded with boulders for the return trip to the HWP. The net effect on the amount of material at the upper SPS at

Comment 155-13 continued

Santa Anita would be nil because the trucks would be carrying away the same amount of material as they deposit at the site.

Additionally, because this structure would be built within an existing reservoir held back by an upgraded, earthquake safe dam, the approval process should be far less expensive than a similar structure built to stand on its own.

Now the question is: "Why build the *Plunge Pool*?" Here are several reasons:

- A *Plunge Pool* located in the upper third of the HWP basin will trap most of the sediment flowing into the reservoir from the mountains. Up to 600,000 cubic yards of sediment could be captured in the plunge pool every year.
- Large quantities of sediment would no longer enter the lower 2/3's of the HWP Reservoir. This would mean that the Hahamongna Lake proposed above would be free to establish itself as a functioning ecosystem for decades without interruption from DPW sediment removal operations.
- The safety of the Devil's Gate Dam and its flood control operations would be greatly enhanced because all of its valves and tunnels would not become clogged with sediment for many decades.

Comment 155-14

- The City of Pasadena would gain a massive new settling pond that will recharge the underground aquifers. This *plunge pool* will not only double the amount of settling pond acreage within the basin. but it will use only fast moving water (rejected by the current network of ponds) to do its job of recharging the aquifer. This will mean that Pasadena will gain a major new low-cost water source.
- The net effect of gaining so much additional settling pond area may allow the City of Pasadena to continue leasing the east side parking lot to JPL instead of converting this lot into ponds. The parking revenue from JPL would be maintained and JPL would not have to construct an unsightly parking garage on the edge of the HWP.
- The *plunge pool*, once constructed, would be maintained like any other debris basin within the DWP's Network and fall into the DWP's operating maintenance budget. Every summer, any sediment that flows into the *plunge pool* would be removed. This regular sediment removal process will also remove fine sediment and break up the bottom of the plunge pool such that its ability to percolate water down into the aquifer will be maintained for the next year.
- For at least half of every year, the *plunge pool* will be a second large lake (within the basin) that can be enjoyed by HWP visitors – humans, animals and birds.

Response to Comment Letter #155 (Camron Stone)

Response to Comment 155-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. Los Angeles County Flood Control District (LACFCD) notes that the commenter does not support the Environmental Impact Report Development Process or the Proposed Project.

Comments within the white paper have been responded to below.

Response to Comment 155-2:

The purpose of the Proposed Project is to remove sediment in order to restore the design capacity of the reservoir. Additionally, the Proposed Project is designed to be a long-term plan, with the reservoir management phase providing management for future sediment inflows. The proposed yearly cleanout of sediment after the completion of the Proposed Project will reduce the necessity for a future large-scale cleanout. Please see Section 2.5.2 of the Draft EIR for more information on future maintenance.

Response to Comment 155-3:

Comment noted.

Response to Comment 155-4:

The Los Angeles County Flood Control District (LACFCD) was mandated by the State Legislature to provide flood protection and water conservation within its boundaries.

A reservoir storage design capacity of two design debris events (DDEs) below the dam's lowest spillway was determined to be the standard acceptable level of risk at Devil's Gate Dam and Reservoir. The DDE volume of capacity is determined using the January 2006 Los Angeles County Department of Public Works (LACDPW) Hydrology Manual and the March 2006 LACDPW Sedimentation Manual. For Devil's Gate Dam and Reservoir, the required reservoir capacity is 4.0 million cubic yards (cy) (two DDEs) below the spillway elevation of 1,040.50 feet.

The Hydrology Manual (January 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_Hydrology_Manual/2006%20Hydrology%20Manual-Divided.pdf

The Sedimentation Manual (March 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_sedimentation_manual/Sedimentation%20Manual-Second%20Edition.pdf

Additional information concerning DDE calculation methods has been added to the Final EIR, Section 2.3, Project Need.

As noted in the Draft Environmental Impact Report (EIR), Section 2.2.1, LACFCD History, sediment removal efforts have previously taken place at the reservoir in order to ensure correct functioning of the outlet works and/or to maintain reservoir capacity. Historically, large amounts of sediment have been

deposited in the reservoir in short time periods. Between 1935 and 1938 over 1.6 million cy of sediment, between 1938 and 1943 over 1.95 million cy of sediment, between 1959 and 1966 over 1.75 million cy of sediment, and between 2010 and 2012 over 1.3 million cy of sediment was deposited in the reservoir. Since the 1920 dam construction and prior to the Station Fire in 2009, approximately 10.7 million cy of sediment accumulated in the reservoir; and approximately 8.0 million cy was removed by LACFCD.

LACFCD goes to great lengths to lessen project impacts and maximize efficiencies. For example, the Draft EIR concluded that Alternative 3 is the Environmentally Superior Alternative. Alternative 3 , Configuration D, Option 2 drastically reduces the project's footprint of 120 acres down to 71 acres . Additionally, the limited maintenance area for Alternative 3 further reduces the permanent habitat impacts down to approximately 51 acres by allowing for site replanting and mitigation to take place within the reservoir footprint. This reduction in project acreages will greatly lessen environmental impacts of the Proposed Project.

LACFCD strives to achieve an efficient, low-cost sediment removal project. Sediment removal rates and trucking operations, now utilizing all low-emissions trucks, as explained in Section 3.5 of the Draft EIR, have been carefully planned for economies of scale to realize maximum efficiencies without major delays in project schedule, thus greatly reducing operating costs. Furthermore, LACFCD has applied for and received an approximately $28 million grant through the State's Disaster Preparedness and Flood Protection Bond Act of 2006 (Proposition 1E) program. A portion of this grant will be used to help offset the Proposed Project's costs.

Response to Comment 155-5:

Comment noted.

Response to Comment 155-6:

Comment noted.

Response to Comment 155-7:

Comment noted.

Response to Comment 155-8:

The sediment that came into Devil's Gate Reservoir following the Station Fire has a very fine gradation or consistency. As such, the majority of this material is not readily reusable on a commercial scale and will most likely not be sold; however, sediment placed at sediment placement sites would be available for potential reuse for other projects or sediment reuse opportunities. The sediment removed from the Devil's Gate Reservoir will be transported to the existing disposal sites listed in Section 2.0, Project Description in the Draft EIR.

For further information regarding beneficial uses for sediment at the Los Angeles County Flood Control District (LACFCD) sites, please refer to Section 6.5 of LACFCD's 2012 Sediment Management Strategic Plan which can be found at: http://dpw.lacounty.gov/lacfcd/sediment/stplan.aspx.

See Response to Comment 155-4. LACFCD has executed several sediment removal projects at Devil's Gate Reservoir in the past, with the last major effort being in 1994. Smaller amounts of sediment were

removed in 2006, 2009, and as a part of the Interim Measures Project in 2011, 2012, and 2013. Following the 2009 Station Fire, approximately 1.3 million cy of sediment flowed into Devil's Gate Reservoir after just two average water year storm seasons. In 2010, LACFCD proposed an emergency sediment removal project in response to the large inflow of sediment resulting from the Station Fire.

After the Proposed Project's main sediment removal has occurred, Flow Assisted Sediment Transport, or FASTing, is proposed to be an integral part of the annual maintenance at Devil's Gate. Annual FASTing operations will be implemented to reduce future buildups of sediment in the reservoir and to reduce the need for mechanical removal of sediment from the reservoir. Although FASTing is expected to be an effective means of keeping sediment levels low in the reservoir, it is estimated that typically 13,000 cy of sediment will be removed by excavation annually. A maintenance regime that relies on FASTing greatly reduces the need for and extends the life of future and existing sediment placement sites. Please see Section2.5.2 of the Draft EIR for more information on future maintenance.

Devil's Gate Dam was the first dam built by LACFCD in 1920. The dam allowed for the channelization of and development along the Arroyo Seco. The Rose Bowl, built in 1922, and the Arroyo Seco Parkway, also known as State Route 110, completed in 1953, are two examples of downstream development made permissible by the construction of Devil's Gate Dam. Given the current, limited capacity of the reservoir, a 50-year storm event that results in a design debris event (DDE) would result in storm flows with sediment flowing over the spillway. Flooding with mud/sediment would occur along the portions of the Arroyo Seco in the Cities of Pasadena, South Pasadena, and Los Angeles, impacting approximately 650 parcels and requiring closure of Interstate 110 from Orange Grove Avenue to Interstate 5. During a single design event sized storm, the Rose Bowl is not expected to be impacted by flows from the dam; however, if sediment from each storm event is not removed from the downstream floodplain, each subsequent storm would increase the flood risk. Additional information about the potential flood areas and analysis is shown in the Arroyo Seco Channel Hydraulic Analysis prepared by Bureau Veritas North America, Inc., available on the Project website.

Please note that protocols are in place to monitor storms, reservoir conditions, and channel conditions and to communicate with emergency responders and the California Department of Transportation (Caltrans) to execute any necessary evacuations or freeway closures.

LACFCD actively encouraged stakeholder involvement at the scoping meetings, during the scoping period, during the Draft EIR public review period, and at the community meetings. Responses to all comments received on the Draft EIR will be incorporated into the Final EIR.

Response to Comment 155-9:

See Response to Comments 155-2, 155-4, and 155-8.

Response to Comment 155-10:

See Response to Comments 155-2, 155-4, and 155-8.

Response to Comment 155-11:

Holding water behind the dam permanently, as a lake, is not a part of the Proposed Project objectives and is outside the scope of this project, and would therefore not be a viable alternative.

Response to Comment 155-12:

Comment noted.

Response to Comment 155-13:

See Response to Comments 155-8 and 155-11 above.

As discussed in the Draft EIR, Section 4.5, Alternative 2, Configuration C, an alternative to the Proposed Project which involved two excavation areas, similar to what the commenter is proposing, was analyzed. The lower excavation area would be excavated to a 985-foot elevation at the face of the dam, sloping up to a 1,045-foot elevation at approximately 2,901 feet north of the dam. The upper excavation area would be excavated to a 1,050-foot elevation at approximately 3,580 feet north of the dam, sloping up to a 1,065-foot elevation at approximately 4,727 feet north of the dam. The upper excavation area would be used for sediment capture. Alternative 2 would involve the removal of approximately 4 million cy of sediment, while the Proposed Project and Alternative 3 would involve the removal of approximately 2.9 million cy and 2.4 million cy of sediment, respectively. Alternative 2, Configuration C is considered environmentally inferior to the Proposed Project and Alternative 3 due to increased air quality, noise, and transportation impacts. These impacts are associated with the larger volume of sediment removal and with the need to maintain the upper of two maintenance areas through mechanical excavation and offsite trucking activities. FASTing operations, which is expected to be an effective means of keeping sediment levels low in the reservoir for the Proposed Project and Alternative 3, can only be used on the lower of the two maintenance areas.

Response to Comment 155-14:

See Response to Comment 155-11 above.

From: ginnyh
To: reservoircleanouts
Subject: Devil"s Gate Reservoir Sediment RemovalPlan comment
Date: Saturday, January 11, 2014 1:34:55 PM

Comment 156-1

This reservoir has not been cleaned out for about 25 years. At that time a commercial gravel company helped keep the sediment level down by removing and selling the gravel. Could a gravel company be invited in again to make use of some of this sediment, thereby lessening the impact of the clean-out?

Comment 156-2

The clean-out of the remaining sediment could be accomplished using the “go slow” approach suggested by Tim Brick of the Arroyo Seco Foundation.

Ginny Heringer

Response to Comment Letter #156 (Ginny Heringer)

Response to Comment 156-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

As noted in the Draft Environmental Impact Report (EIR), Section 2.2.1, LACFCD History, Los Angeles County Flood Control District (LACFCD) has executed several sediment removal projects at Devil's Gate Reservoir in the past, with the last major effort being in 1994. Smaller amounts of sediment were removed in 2006, 2009, and as a part of the Interim Measures Project in 2011, 2012, and 2013. Following the 2009 Station Fire, approximately 1.3 million cubic yards (cy) of sediment flowed into Devil's Gate Reservoir after just two average water year storm seasons. In 2010, LACFCD proposed an emergency sediment removal project in response to the large inflow of sediment resulting from the Station Fire.

The sediment that came into Devil's Gate Reservoir following the Station Fire has a very fine gradation or consistency. As such, the majority of this material is not readily reusable on a commercial scale and will most likely not be sold; however, sediment placed at sediment placement sites would be available for potential reuse for other projects or sediment reuse opportunities. The sediment removed from the Devil's Gate Reservoir will be transported to the existing placement sites listed in Section 2.0, Project Description in the Draft Environmental Impact Report (EIR). In addition, removal of the sediment by a gravel company would not reduce the impacts associated with sediment removal and would not eliminate the use of trucking to transport the sediment offsite.

For further information regarding beneficial uses for sediment at the Los Angeles County Flood Control District (LACFCD) sites, please refer to Section 6.5 of LACFCD's 2012 Sediment Management Strategic Plan which can be found at: http://dpw.lacounty.gov/lacfcd/sediment/stplan.aspx.

Response to Comment 156-2:

LACFCD goes to great lengths to lessen project impacts and maximize efficiencies. As such, many of the points in the Arroyo Seco Foundation's four-point "Slow Program" are compatible with the LACFCD Proposed Project.

For example, the Draft EIR concluded that Alternative 3 is the Environmentally Superior Alternative. Alternative 3 , Configuration D, Option 2 drastically reduces the project's footprint of 120 acres down to 71 acres . Additionally, the limited maintenance area for Alternative 3 further reduces the permanent habitat impacts down to approximately 51 acres by allowing for site replanting and mitigation to take place within the reservoir footprint. This reduction in project acreages will greatly lessen environmental impacts of the Proposed Project.

LACFCD strives to achieve an efficient, low-cost sediment removal project. Sediment removal rates and trucking operations, now utilizing all low-emissions trucks, as explained in Section 3.5 of the Draft EIR, have been carefully planned for economies of scale to realize maximum efficiencies without major delays in project schedule, thus greatly reducing operating costs. Furthermore, LACFCD has applied for and received an approximately $28 million grant through the State's Disaster Preparedness and Flood Protection Bond Act of 2006 (Proposition 1E) program. A portion of this grant will be used to help offset the Proposed Project's costs.

While sluicing is not a viable project alternative, as explained in Section 4.7 of the Draft EIR, Flow Assisted Sediment Transport, or FASTing, will be used for maintenance after the project's main sediment removal phase has been completed, as described in Section 2.5.2 of the Draft EIR.

LACFCD is committed to *Public Service that Works*; and by combining almost 100 years of technical expertise and invaluable input from the community, less invasive flood protection will continue to be a reality.

For a more detailed response to the Arroyo Seco Foundation's four-point "Slow Program", please see the response to the Arroyo Seco Foundation's comment letter (Comment Letter #216, Response to Comment 216-16).

From: John Fauvre
To: reservoircleanouts
Subject: Emergency water collection
Date: Saturday, January 11, 2014 1:55:25 PM

Comment 157-1

The risk of floods,could,be removed by raising the sides of the flood control channel at danger points, possibly only at times of risk, and building new water collection sites, above JPL and at the La Loma St. Bridge. By removing the risk of a flood, silt removal could be slowed to a pace to accommodate reshaping of the Hahamonga Basin. These possibilities should be considerated as mitigation measures to the impacts of silt removal by trucks.

John Fauvre
530 S. Arroyo Blvd.
Pasadena, CA,91105

Sent from my iPad

Response to Comment Letter #157 (John Fauvre)

Response to Comment 157-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. The purpose of the Proposed Project is to remove sediment in order to restore the design capacity of the reservoir, and establish a reservoir management system to maintain the flood control capacity of the reservoir. If additional flood control facility were placed in the Arroyo Seco, sediment would accumulate there and would need to be excavated eventually. In this case, project impacts would not be avoided; they would simply be moved up or downstream. New flood control structures and water collection sites are outside the scope of this project.

From: John Garsow
To: reservoircleanouts
Subject: Devils Gate Reservoir Sediment Removal and Management Project
Date: Sunday, January 12, 2014 5:45:08 PM

To Whom it may concern,

My name is John Garsow. I live in Murrieta Calif. I have been playing Frisby Golf behind he Devils Gate Dam since the early 70's. While I was there recently, I noticed many posters regarding the planned removal of sediment from behind Devils Gate Dam. The General slant of the posters implied that portions of the course were going to be removed.

Having grown up in the Eagle Rock area in the 50's and 60's I understand that this is a necessary project to maintain the viability of what this dam was originally built for, to protect the people and infrastructure down stream. However, I would hope that the powers that be would take into consideration the long history of the park and adjoining flood control area related to recreation and the Frisby Disc Golf Course.

Comment 158-1

Many people not associated with the sport do not realize that approximately 50 years ago, Oak Park was the birth place of Disk Golf. Every Year thousands of people come from around the world to play this course. It is every bit as important to the Disk Golf world as the Rose Bowl is to the the College football world.

All I would ask in your planning is that you consider this as more of a land mark worthy of preservation and improvement rather than as a bunch of dirt needing to be removed.

Thank you for you time.

Respectfully yours,

John Garsow
Owner John E Garsow
Gems & Minerals

Response to Comment Letter #158 (John Garsow)

Response to Comment 158-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. As noted in the Draft Environmental Impact Report (EIR), Section 3.15, Los Angeles County Flood Control District (LACFCD) recognizes the importance of the area to those who take advantage of the recreational opportunities offered, including the Oak Grove Disc Golf Course. No official disc golf course holes located in the Oak Grove area of Hahamongna Watershed Park will be removed by the Proposed Project. Where possible, Los Angeles County Flood Control District (LACFCD) will avoid any disc golf course holes located outside the Oak Grove area of Hahamongna Watershed Park. When avoidance is not possible, LACFCD will coordinate with the Oak Grove Disc Golf Club for removal of the disc golf hole equipment.

Alternative 3, Configuration D, the Environmentally Superior Alternative from the Draft Environmental Impact Report (EIR), carefully balances flood control needs and reductions in impacts to habitat by restoring the required reservoir capacity while also minimizing the project footprint (see Section 4.6 of the Final EIR). Furthermore, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2 would avoid excavation of the western branch, thereby providing a greater distance between the Oak Grove area of Hahamongna Watershed Park and the excavation area, reducing the project footprint of 120 acres down to 71 acres. Alternative 3, Configuration D, Option 2 would also avoid all currently existing Oak Grove Disc Golf Club holes. The Oak Grove area of Hahamongna Watershed Park and the associated facilities would remain open during sediment removal and would continue to provide active recreational facilities to the area.

From: Laurel Beck
To: reservoircleanouts
Subject: Hahamonga Plan
Date: Sunday, January 12, 2014 2:52:50 PM

Comment 159-1

Please do not proceed with the scraping of Hahamonga. This is a deeply flawed project. Instead, we need a new alternative that includes greatly reduced sediment removal, an extended timetable, the creation of a wildlife lake and a much greater emphasis on sluicing.

Laurel Beck
Pasadena, California

Response to Comment Letter #159 (Laurel Beck)

Response to Comment 159-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. Los Angeles County Flood Control District (LACFCD) notes the commenter's objection to the Proposed Project.

While holding water behind the dam permanently, as a lake, is outside the scope of this Proposed Project, the Draft EIR analyzed a range of sediment removal amounts and configurations aimed at addressing the diverse concerns of stakeholders, including concerns for long-term habitat preservation. The alternatives presented in the Draft EIR represent the best options available to respond to stakeholders' concerns, while adequately reducing flood risk to downstream communities. The Draft EIR, Section 4, fully analyzed six alternatives, including the No Project Alternative. These alternatives substantially lessen one or more significant effects of the Proposed Project and, with the exception of the mandatory No Project Alternative, would feasibly attain most of the basic objectives of the Proposed Project.

The Draft Environmental Impact Report (EIR) concluded that Alternative 3 is the Environmentally Superior Alternative. Alternative 3 , Configuration D, Option 2 drastically reduces the project's footprint of 120 acres down to 71 acres. Additionally, the limited maintenance area for Alternative 3 further reduces the permanent habitat impacts down to approximately 51 acres by allowing for site replanting and mitigation to take place within the reservoir footprint. This reduction in project acreages will greatly lessen environmental impacts of the Proposed Project.

LACFCD proposed a project duration of five years to reduce accumulated sediment in a timely fashion. The goal of LACFCD is to restore reservoir flood capacity as soon as feasible while reducing costs, minimizing the duration of environmental and construction impacts to the surrounding communities, and configuring the reservoir to allow for sustainable future maintenance. Extending the project would prolong the flood risk to downstream communities and increase the construction impacts to the surrounding communities.

While sluicing is not a viable project alternative, as explained in Section 4.7 of the Draft EIR, Flow Assisted Sediment Transport, or FASTing, will be used for maintenance after the project's main sediment removal phase has been completed, as described in Section 2.5.2 of the Draft EIR.

LACFCD is committed to *Public Service that Works*; and by combining almost 100 years of technical expertise and invaluable input from the community, less invasive flood protection will continue to be a reality.

From: Lawren Markle
To: reservoircleanouts
Subject: Devil"s Gate Reservoir Sediment Removal and Management Project - Comment
Date: Sunday, January 12, 2014 1:52:16 PM

Hi LA County DPW,

Comment 160-1

I am writing to oppose the current plan for sediment removal at the Pasadena Devil's Gate Dam site. The work would destroy very significant and valuable wildlife habitat in Hahamonga Watershed Park, and create a tremendous amount of air pollution and disruption for the area.

Please reconsider the approach you are taking here. The present plan seems like a moose in a china shop, and reminds me of the thinking 75 years ago when Army Corps channelized all the rivers. We have learned a lot since then but this plan doesn't adequately address environmental common sense.

Comment 160-2

A good alternative might be to remove sediment in a very, very narrow ribbon (from South to North) so that 85% of the trees and vegetation behind the dam are undisturbed. Do that for 5 years at a slow pace. Then allow that section to become natural again (trees slowly regrow) and move the work to a different South-North ribbon on the other side of the wash for 5 years, again leaving 85% of the trees undisturbed.

With this approach, the amount of traffic and noise will be minimized. Cost will be reasonable annually. There will be adequate habitat. And the sediment removal goals will be met at a conservative pace. Over 20 years, perhaps 70% of the basin will be nice and deep, and maybe some areas won't be touched at all, again for reasons of habitat preservation.

Comment 160-3

Please consult with biological experts about timing. Perhaps there would be no work from every December to May, to allow nesting and birthing of wildlife.

Comment 160-4

I would also request you utilize electric trucks or CNG trucks to reduce pollution.

Comment 160-5

A conveyer belt system might move the dirt up onto a loading area on Woodbury Avenue (just east of the dam) to reduce the need to drive trucks through habitat areas.

Thanks!
Lawren Markle
Altadena Resident
300 W. Loma Alta Dr
Altadena, CA 91001

Response to Comment Letter #160 (Lawren Markle)

Response to Comment 160-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. Los Angeles County Flood Control District (LACFCD) notes the commenter's objection to the Proposed Project.

As discussed in Section 3.6.6 of the Draft Environmental Impact Report (EIR), Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats. In addition, sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays). Wildlife species currently found in the Proposed Project area would be expected to either remain in the undisturbed areas of the reservoir outside of the Proposed Project area or to reestablish once sediment removal activities have been completed.

Air quality impacts associated with truck traffic were analyzed in the Draft EIR in Section 3.5. LACFCD has conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed the United States (U.S.) Environmental Protection Agency's (EPA's) 2007 standards for emissions. Therefore, in order to further reduce emissions, Mitigation Measure MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump trucks that meet or exceed EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality will be reduced to less than significant.

The Proposed Project is designed to be a long-term plan, with the reservoir management phase providing management for future sediment inflows. The proposed yearly cleanout of sediment after the completion of the Proposed Project will reduce the necessity for a future large-scale cleanout.

Response to Comment 160-2:

Alternative 3, Configuration D affects the least amount of habitat of all the action alternatives while still achieving Proposed Project objectives (see Section 4.6 of the Final EIR). This alternative would provide a buffer on the west side of the reservoir that would allow for the movement of wildlife. Alternative 3, Configuration D, Option 1 provides a more natural configuration for the reservoir by having two branches to carry water and sediment toward the face of the dam, avoiding disturbing a significant portion of existing vegetation. To further reduce the Proposed Project's footprint, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2, which drastically reduces the project's footprint of 120 acres down to 71 acres, would avoid excavation of the western branch, thereby providing a greater habitat buffer on the west side of the reservoir. In addition, the maintenance areas would be smaller than the original sediment removal footprint, allowing for habitat to reestablish and providing additional areas for wildlife movement. A footprint any smaller would decrease the volume removed and the ultimate capacity of the reservoir, which would fail to meet Proposed Project objectives.

LACFCD proposed a project duration of five years to reduce accumulated sediment in a timely fashion. The goal of LACFCD is to restore reservoir flood capacity as soon as feasible while reducing costs, minimizing the duration of environmental and construction impacts to the surrounding communities, and configuring the reservoir to allow for sustainable future maintenance. Extending the project would

prolong the flood risk to downstream communities and increase the construction impacts to the surrounding communities.

Response to Comment 160-3:

Wildlife and botany experts composed the Biological Reports (Appendix D), as well as the mitigation measures contained in the Draft EIR. It should be noted that construction activities would be temporary and are expected to occur only in the drier months (April to December, excluding holidays). Mitigation Measures MM BIO-1, MM BIO-2, MM BIO-3, MM BIO-4, and MM BIO-5 will serve to protect and avoid impacts to wildlife and include special provisions or requirements during nesting or breeding season.

Response to Comment 160-4:

See Response to Comment 160-1.

Response to Comment 160-5:

A conveyor belt system was considered in the Alternatives Analysis; see Section 4.10.1 of the Draft EIR. This alternative was rejected as it would not avoid or substantially reduce any significant environmental effects.

From: rjmarti
To: reservoircleanouts
Subject: "Devil"s Gate Reservoir Sediment Removal and Management Project"
Date: Friday, January 10, 2014 9:38:18 AM

I have great concern over the county plan to remove millions of tons of sediment from Devil's Gate Dam reservoir in the Hahamongna Watershed Park.

Comment 161-1

I urge Los Angeles County officials to study the needs of the Devil's Gate Sediment Removal and Management Plan in greater detail, adopt a plan that mirrors the Hahamongna Watershed Park Master Plan and involve the city on a staff level in the project's design and engineering aspects. We must seek the least harmful sediment mitigation plan. Large concerns exist over increases to air and noise pollution, traffic and permanent loss of critical habitat.

Comment 161-2

The proposed project would remove anywhere from 2.95 to 4 million cubic yards of sediment, over an area of 120.42 acres for a period of up to five years, according to the project's Draft Environmental Impact Report.

Pasadena's Environmental Advisory Commission found the county's DEIR to be replete with flaws and that it offers "no scientific rationale" to the necessity to remove the sediment or why exactly it needs to be done in the five-year timeframe.

Comment 161-3

I don't want Hahamongna to go the way of other lost environmental treasures in Southern California.

R. Marti
Altadena

Response to Comment Letter #161 (R. Marti)

Response to Comment 161-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. Los Angeles County Flood Control District (LACFCD) notes the commenter's concern over the Proposed Project.

The Draft Environmental Impact Report (EIR) analyzed a range of sediment removal amounts and configurations aimed at addressing the diverse concerns of stakeholders, including concerns for long-term habitat preservation. The alternatives presented in the Draft EIR represent the best options available to respond to stakeholders' concerns, while adequately reducing flood risk to downstream communities. The Draft EIR, Section 4, fully analyzed six alternatives, including the No Project Alternative. These alternatives substantially lessen one or more significant effects of the Proposed Project and, with the exception of the mandatory No Project Alternative, would feasibly attain most of the basic objectives of the Proposed Project.

Alternative 3, Configuration D, which was found to be the Environmentally Superior Alternative in the Draft EIR , was based on the City of Pasadena's Hahamongna Watershed Park Master Plan (HWPMP). Alternative 3, Configuration D affects the least amount of habitat of all the action alternatives while still achieving Proposed Project objectives (see Section 4.6 of the Final EIR). This alternative would provide a buffer on the west side of the reservoir that would allow for the movement of wildlife. Alternative 3, Configuration D, Option 1 provides a more natural configuration for the reservoir by having two branches to carry water and sediment toward the face of the dam, avoiding disturbing a significant portion of existing vegetation. To further reduce the Proposed Project's footprint, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2, which drastically reduces the project's footprint of 120 acres down to 71 acres, would avoid excavation of the western branch, thereby providing a greater habitat buffer on the west side of the reservoir. In addition, the maintenance areas would be smaller than the original sediment removal footprint, allowing for habitat to reestablish and providing additional areas for wildlife movement. LACFCD has met and will continue to meet with the City of Pasadena regularly to coordinate and ensure resolution of concerns regarding Devil's Gate Reservoir and the HWPMP.

Air quality and noise impacts associated with truck traffic were analyzed in the Draft EIR in Sections 3.5 and 3.14, respectively. As discussed in the Draft EIR, Section 3.14, with implementation of Mitigation Measure MM N-1, noise impacts would be reduced to a level of less than significant. LACFCD has conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed the United States (U.S.) Environmental Protection Agency's (EPA's) 2007 standards for emissions. Therefore, in order to further reduce emissions, Mitigation Measure MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump trucks that meet or exceed EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality will be reduced to less than significant.

Potential impacts due to the Proposed Project's truck trips were analyzed in the Draft EIR, Section 3.16, Transportation and Traffic. As listed in that section, a single intersection in the immediate vicinity of the Proposed Project site will have a potentially significant impact. In practice, hauling rates and routes may be adjusted to help reduce impacts, depending on operational need. LACFCD will continue to work with

local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the Proposed Project site.

As discussed in Section 3.6.6 of the Draft EIR, Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats. In addition, sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays). Wildlife species currently found in the Proposed Project area would be expected to either remain in the undisturbed areas of the reservoir outside of the Proposed Project area or to reestablish once sediment removal activities have been completed.

Response to Comment 161-2:

LACFCD was mandated by the State Legislature to provide flood protection and water conservation within its boundaries.

A reservoir storage design capacity of two design debris events (DDEs) below the dam's lowest spillway was determined to be the standard acceptable level of risk at Devil's Gate Dam and Reservoir. The DDE volume of capacity is determined using the January 2006 Los Angeles County Department of Public Works (LACDPW) Hydrology Manual and the March 2006 LACDPW Sedimentation Manual. For Devil's Gate Dam and Reservoir, the required reservoir capacity is 4.0 million cubic yards (cy) (two DDEs) below the spillway elevation of 1,040.50 feet.

The Hydrology Manual (January 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_Hydrology_Manual/2006%20Hydrology%20Manual-Divided.pdf

The Sedimentation Manual (March 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_sedimentation_manual/Sedimentation%20Manual-Second%20Edition.pdf

Additional information concerning DDE calculation methods has been added to the Final EIR, Section 2.3, Project Need.

LACFCD proposed a project duration of five years to reduce accumulated sediment in a timely fashion. The goal of LACFCD is to restore reservoir flood capacity as soon as feasible while reducing costs, minimizing the duration of environmental and construction impacts to the surrounding communities, and configuring the reservoir to allow for sustainable future maintenance. Extending the project would prolong the flood risk to downstream communities and increase the construction impacts to the surrounding communities.

Response to Comment 161-3:

LACFCD notes that the commenter does not support the Proposed Project.

From: Teina TUAIVA
To: reservoircleanouts
Subject: Devil"s Gate Reservoir Sendiment Remeval and Management Project
Date: Sunday, January 12, 2014 12:15:46 AM

Hi,

My name is Teina TUAIVA. I live at MOOREA PaoPao, French Polynesia.

Comment 162-1

I have looked at all the plans for the sediment removal project sponsored by the county, and all the plans will have an impact on our Disc Golf Course.

Alternative 3 is the best plan, but the Western Branch will remove 2 of our playable positions.

Please re-visit the sediment removal plans and make an alternative plan that will not impact the disc golf course.

thank you,
Teina TUAIVA

Response to Comment Letter #162 (Teina Tuaiva)

Response to Comment 162-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. No official disc golf course holes located in the Oak Grove area of Hahamongna Watershed Park will be removed by the Proposed Project. As noted in the Draft Environmental Impact Report (EIR), Section 3.15, Los Angeles County Flood Control District (LACFCD) recognizes the importance of the area to those who take advantage of the recreational opportunities offered, including the Oak Grove Disc Golf Course. Where possible, Los Angeles County Flood Control District (LACFCD) will avoid any disc golf course holes located outside the Oak Grove area of Hahamongna Watershed Park. When avoidance is not possible, LACFCD will coordinate with the Oak Grove Disc Golf Club for removal of the disc golf hole equipment.

Alternative 3, Configuration D, the Environmentally Superior Alternative from the Draft Environmental Impact Report (EIR), carefully balances flood control needs and reductions in impacts to habitat by restoring the required reservoir capacity while also minimizing the project footprint (see Section 4.6 of the Final EIR). Furthermore, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2 would avoid excavation of the western branch, thereby providing a greater distance between the Oak Grove area of Hahamongna Watershed Park and the excavation area, reducing the project footprint of 120 acres down to 71 acres. Alternative 3, Configuration D, Option 2 would also avoid all currently existing Oak Grove Disc Golf Club holes. The Oak Grove area of Hahamongna Watershed Park and the associated facilities would remain open during sediment removal and would continue to provide active recreational facilities to the area.

From: Thomas Owens
To: reservoircleanouts
Subject: Hahamonga
Date: Sunday, January 12, 2014 10:59:48 AM

Comment 163-1

I am a senior citizen. I visit the Hahamonga regularly. I like it because the flat terrain makes it a place in which senior citizens can take a walk. The mountains are too steep Also, it is a place one can walk year around, it is a very unusual a pretty place.

Thomas J. Owens
2439 Highland Ave.
Altadena, CA. 91001

Response to Comment Letter #163 (Thomas Owens)

Response to Comment 163-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. Los Angeles County Flood Control District (LACFCD) notes that walking is one of the many recreational activities that residents and visitors make use of in the reservoir.

3333 CHANEY TRAIL,
ALTADENA, CA 91001
JUNE 6, 2014
(626) 794-3383

Comment Letter #164

Co. of Los Angeles
Public Works
Water Resource
Rosemead Cleanout
P.O. Box 1460
Alhambra, Calif. 91802.

Re: Hahamongna

Dear Sirs:

Comment 164-1 There are three things that can be done with a Dam such as Devil's Gate Dam in Pasadena (Hahamongna area):

Comment 164-2 - # 1 - Keep the Dam maintained for the purpose for which it was constructed, namely, flood control

Comment 164-3 # 2 - Return the area back to its natural State by dismantling the dam.

Comment 164-4 # 3 - Nothing. This is actually an option. In fact it is the option that the City of Pasadena chose to do well over a decade ago when they decided to form the Hahamongna park area behind the Dam. And now, the City of Pasadena is saying,

"We have to do something about all the debris that is accumulating behind the dam". "We" in this case means 'WE' the people of Los Angeles County and not "WE" the city and citizens of the City of Pasadena. Accordingly to the Star News, Mr Gordo of the City Council intimated that the County of Los Angeles had not been doing their job all these years. Mr. Gordo does not realize that the decision of the City of Pasadena to allow Hahamongna to return to its natural state (and to evict the Tree Sod, Rock operators that were removing debris, and just as importantly, Turning that debris into useful products) kept the County of L.A. from doing any debris removal in the first place.

Comment 164-4 continued

All the options above mentioned have environmental consequences. Keeping the dam maintained as a flood control facility requires debris removal. Not only the removal itself causes environmental concerns, but what to do with all that "stuff" poses a problem as well. Years ago it was proposed to turn a local Altadena canyon for a dump site for the debris. Another environmental concern.

Comment 164-5

Dismantling the dam and returning the Arroyo Seco back to its pre-dam natural beauty certainly

Comment 164-6

will put all the folks (including the City of Pasadena's Brookside Park) downstream at flood risk.

Comment 164-6 continued

Dry Hollow, the option chosen by the City of Pasadena years ago, also has its environmental concerns. Once the dam is filled to capacity, what it is will on its way, the area behind the dam will naturalize into a flat plain covered with riparian plant life and wildlife habitat, but its flood control capacity will be greatly diminished. The only flood protection will be that the flood water velocity will be reduced as the waters move slowly across a flat area than on a downslope, but it will no longer hold back any more additional debris.

Comment 164-7

Considering the three options above, the City of Pasadena has to decide what they want to do with Arcadia Wash. Does the City want the dam to fill up to capacity, and allow it to maintain itself that way? It doesn't sound like they do - what about maintaining the current level of the debris by periodically removing any build up above the current level?

Comment 164-8

In any event, maintaining the current level or increasing the current capacity will require debris removal by somebody. Frankly, I am not too thrilled

Comment 164-9

Comment 164-9 continued

about that 'somebody' being the taxpayers of Los Angeles County, especially since it was the city of Pasadena's decision to do nothing that allowed the debris to backup in the first place.

Comment 164-10

I strongly recommend that if debris removal is pursued, that private rock, soil operations be allowed back in to at least removed some, if not all, of the debris.

Sincerely

Tom Nuccio

Tom Nuccio

Copies to:
City Council of Pasadena
Supervisor Mike Antonovich

Response to Comment Letter #164 (Tom Muccio)

Response to Comment 164-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

Response to Comment 164-2:

Comment Noted.

Response to Comment 164-3:

As discussed in Section 4.10.3 of the Draft Environmental Impact Report (EIR), removal of the Devil's Gate Dam was considered but rejected due to its inconsistency with Proposed Project objectives, as well as the potential safety concerns. This alternative would fail to meet the Proposed Project objectives and would result in greater additional impacts than the Proposed Project (geology, hazards, hydrology, and public services). Devil's Gate Dam, built in 1920, was the first dam built by Los Angeles County Flood Control District (LACFCD). The dam was built in response to the severe flooding of Los Angeles in the early 1900s, and allowed for the channelization of and development along the Arroyo Seco. The Arroyo Seco normally carries low flows, but it is periodically inundated from severe floods flowing off of its large, steep watershed that includes mountainous terrain. Prior to the construction of the dam, cities such as Pasadena, South Pasadena, and Los Angeles would experience flooding from the Arroyo Seco during storms. The Rose Bowl, built in 1922, and the Arroyo Seco Parkway also known as State Route 110, completed in 1953, are two examples of downstream development made permissible by the construction of Devil's Gate Dam.

The scope of the project is to restore capacity for Devil's Gate Reservoir. Removing the dam would remove the only flood attenuation mechanism that is in place along the Arroyo Seco. Areas downstream of the dam would be at high risk of flooding during storm events. Also, sediment would move downstream and accumulate within and adjacent to the channel due to the removal of the dam. Sediment accumulation in the channel would reduce the capacity of the channel in those areas and would further increase the likelihood of flooding.

Response to Comment 164-4:

The No Project Alternative was analyzed in Section 4.0, Alternatives Analysis. The analysis determined that Alternative 6, No Project Alternative will not meet any of the Proposed Project's objectives of satisfactorily reducing flooding risk, creating a configuration suitable for routine operations and maintenance, reducing the possibility of plugging at the dam face, removing sediment from Johnson Field, removing sediment in a timely manner, and delivering sediment to facilities already prepared to accept sediment. In addition, although no habitat will be directly impacted, habitat in the reservoir will likely degrade under Alternative 6, No Project due to continuous sediment deposition. Reduction in sensitive habitat would potentially impact sensitive or special status species, resulting in a potentially significant impact.

As noted in Section 2.2.1, LACFCD History, sediment removal efforts have previously taken place at the reservoir.

Response to Comment 164-5:

Comment noted.

Response to Comment 164-6

See Response to Comment 164-3. LACFCD agrees that removing the dam would increase the risk of flooding downstream.

Response to Comment 164-7

See Response to Comment 164-4. LACFCD agrees that the No Project Alternative has environmental impacts as well, as noted in Section 4.9 No Project Alternative in the Draft EIR.

Response to Comment 164-8

See Response to Comments 164-4 and 164-5. Historically, large amounts of sediment have been deposited in the reservoir in short time periods. Between 1935 and 1938 over 1.6 million cy of sediment, between 1938 and 1943 over 1.95 million cy of sediment, between 1959 and 1966 over 1.75 million cy of sediment, and between 2010 and 2012 over 1.3 million cy of sediment was deposited in the reservoir. In order for the removal project to be efficient, and therefore reduce impacts and costs, the amount of sediment removed every year needs to exceed the amount of sediment deposited. Historically, approximately 130,000 cy a year was deposited in Devil's Gate Reservoir annually since 1920. If the reservoir is left in its current state, the flood risk to downstream communities would be left at an unacceptable level.

Response to Comment 164-9

See Response to Comments 164-4 and 164-8.

Response to Comment 164-10

The sediment that came into Devil's Gate Reservoir following the Station Fire has a very fine gradation or consistency. As such, the majority of this material is not readily reusable on a commercial scale and will most likely not be sold; however, sediment placed at sediment placement sites would be available for potential reuse for other projects or sediment reuse opportunities. The sediment removed from the reservoir will be transported to the sites listed in Section 2.0, Project Description in the Draft EIR.

For further information regarding beneficial uses for sediment at the Los Angeles County Flood Control District (LACFCD) sites, please refer to Section 6.5 of LACFCD's 2012 Sediment Management Strategic Plan which can be found at: http://dpw.lacounty.gov/lacfcd/sediment/stplan.aspx.

LACFCD notes commenter's preference for sediment and debris removal.

ALTADENA HERITAGE

ADVOCACY AND PRESERVATION

Date: 7 January 2014

To: County of Los Angeles Department of Public Works
Water Resources Division
Attn: Reservoir Cleanouts Program
P.O. Box 1460
Alhambra, CA 91802-1460

Re: Devil's Gate Reservoir Sediment Removal & Management Project

Comment 165-1

Altadena Heritage is a volunteer-based organization active since 1980 and registered as a 501(c)3 corporation in 1987. We are dedicated to protecting, preserving, and raising awareness of the architectural, environmental, and cultural heritage of our community. We have 450 members interested in preservation and advocating for a more beautiful Altadena. At our annual members meeting on December 15, 2013, members voted to respond to the Draft Environmental Impact Report for Devil's Gate Dam Sediment Removal Project. A major portion of Altadena's western boundary runs along Hahamongna Watershed Park and the Devils Gate Dam area, and any of five alternatives proposed in this DEIR would impact our community immensely. We recognize the need to remove sediment, maintain the dam, and protect downstream public safety, but we have serious questions regarding the project's magnitude and timeline, and are concerned that best management practices for integrated watershed management are not incorporated in any of the proposed alternatives.

Comment 165-2

We look forward to reviewing your responses to our comments and questions as follows:

Comment 165-3

1) Why has the project grown from its original proposed goal of 1.67 million cubic yards of sediment removal to 2.4 – 4 million cubic yards? What hydrological studies or other science justify this major increase in scope? Please refer us to specific reports.

Comment 165-4

2) The sediment basin is Pasadena's, Altadena's and La Cañada's Hahamongna Watershed Park, an important regional resource used for recreation by thousands of local residents. Activities include hiking, horseback riding, bicycling, and bird-watching. Have alternatives that allow debris removal while retaining multiple benefits for multiple users been considered? If yes, why have these alternatives not been presented? If not, why not?

Comment 165-5

3) Proposed construction plans block the two main east-west trails. The top of the dam is the trail connector to north-south trails, and blocking this will prevent passage to Pasadena and trails to the south. East-west blockages will prevent passage west to La Canada Flintridge trails. Is there a way to retain trail connections during debris removal? Is there a plan for trails following debris removal?

Comment 165-6

4) The debris basin provides important wildlife habitat for numerous species of vertebrate and invertebrate animals, and serves as an important wildlife corridor bridging the front range of the San Gabriels with areas to the south. What protections of wildlife habitat and migration routes are being proposed for the project?

Altadena Heritage 730 East Altadena Dr. Altadena,CA 91001 (626) 797-0054 altadenaheritage.com

Mark Goldschmidt, *Chair (ex officio)*
John Zoraster, *Vice Chair, Budgets*
Mabel Duncan, *Recording Secretary*
David Mosher, *Executive Secretary*
Debbi Swanson Patrick, *Treasurer*

Hugo Arteaga
Richard Benson
Karin Bugge
Gail Casburn
Kooshian Clary
Richard Davies
Peggy Sue Davis
Vivien Fortunaso
Nancy Romero
Adele Shakal
Matt-dell Tufenkian
Michele Zack
Alan Zorthian

ALTADENA HERITAGE

ADVOCACY AND PRESERVATION

Comment 165-7

5) Is trucking the only solution for debris removal? The plan for 450 truck trips per day, 6 days per week, up to 12 hours per day, 9-10 months a year for 4-7 years will negatively affect quality of life for Altadena's 43,000 residents — and is both energy intensive and expensive. Altadena will bear major health impacts of increased traffic and pollution for years under all trucking alternatives proposed in this DEIR. Has the cost of these health impacts been assessed in the DEIR?

Comment 165-8

6) The Eaton Canyon/Devil's Gate Water Diversion Project's cumulative impacts, when combined with the Sediment Removal Project, have not been addressed sufficiently, but merely alluded to in this DEIR. We refer to the planned 4,500 acre-foot-per-year (as stated in the Proposition 1E application and other documents) water diversion via a 4.8 mile long 30 to 36-inch pressurized pipeline which is slated to run for virtually its entire length through Altadena from Devil's Gate dam to Eaton Canyon spreading grounds. Estimated cost for the diversion is $10 to $15 million. This project will require a large storage pond and a pumping station within the Devil's Gate Dam area, yet the Diversion Project and Sediment Removal project are not considered together. Why not?

The Diversion Project will result in torn up streets near several schools and in quiet neighborhoods, trucking, traffic delays, and pollution for the one and a half to two year estimated construction period. This will impact Altadena greatly. Why is it necessary to transfer this water 5 miles across Altadena instead of allowing it to settle within the Devils Gate area? The percolation rate in Devil's Gate is similar to that in Eaton Wash, and the water would replenish the Raymond Basin Aquifer if allowed to percolate closer to where it naturally flows. This would benefit Altadenans and Pasadenans without the cost and disruption of a pump and pipeline project. What is the rationale for installing the pipeline rather than allowing natural percolation at Devil's Gate? The estimated cost of $10 to $15 million seems low for this project, is it realistic?

Comment 165-9

7) On the other hand, the size and price tag of sediment removal, $65-100 million, is high. Have less expensive approaches that accomplish identified goals been considered?

Comment 165-10

8) The DEIR consistently treats sediment as trash instead of a resource. Clearly, much of it has value, especially if allowed to work its way down to help build up eroding beaches at the other end of the system. Sediment could be exported by sluicing, or by conveyor belt to existing channels of the Arroyo Seco and on to the LA River. Some sand, rock, and gravel could be separated in Hahamongna for local use. Exporting even a portion of the sediment by means other than trucking via freeways to Irwindale would seem to be more sustainable and could result in substantial savings. Have these alternatives been fully explored and potential cost savings assessed?

Altadena Heritage 730 East Altadena Dr. Altadena,CA 91001 (626) 797-0054 altadenaheritage.com

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Alan Zorthian

ALTADENA HERITAGE

ADVOCACY AND PRESERVATION

Comment 165-11

9) We seriously question the advisability of removing sediment in a single large-scale engineering operation. Debris accumulation is continuous over time, so a debris basin can never be permanently emptied. A maintenance approach limiting work to a few months a year in defined areas of the basin would allow for continuous on-going maintenance, and reduce the size of yearly export with associated dust, noise, hydrocarbon pollution, and freeway congestion. Construction areas could be cordoned off to allow for recreation and wildlife habitat in other areas. An important plus would be guaranteed jobs for workers and local trucking firms into the foreseeable future, and the opportunity to sort valuable building materials on site for sale to local contractors and homeowners. Has such an ongoing maintenance program of debris removal been assessed? If not, why not?

Altadena Heritage understands and supports the need for flood control and dam maintenance but questions the size and detrimental impacts of alternatives described in the DEIR. This DEIR does not appear to make use of current well-accepted multiple beneficial uses and best practices, but instead harkens back to single-goal civil engineering practices of the past. Please consider the quality and health of all in this area, and develop more viable and creative alternatives. In fact, such alternatives may lead to cost savings.

Respectfully yours,

Mark Goldschmidt, Chairman
Altadena Heritage

Altadena Heritage 730 East Altadena Dr. Altadena,CA 91001 (626) 797-0054 altadenaheritage.com

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Vivien Fortunaso
Nancy Romero
Adele Shakal
Matt-dell Tufenkian
Michele Zack
Alan Zorthian

Response to Comment Letter #165 (Altadena Heritage)

Response to Comment 165-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. Los Angeles County Flood Control District (LACFCD) notes the organization's concerns with the Proposed Project and Alternatives. As discussed in the Draft Environmental Impact Report (EIR), mitigation measures and best management practices are proposed to minimize the project impacts.

Response to Comment 165-2:

The comments within this letter have been responded to below.

Response to Comment 165-3:

LACFCD was mandated by the State Legislature to provide flood protection and water conservation within its boundaries.

A reservoir storage design capacity of two design debris events (DDEs) below the dam's lowest spillway was determined to be the standard acceptable level of risk at Devil's Gate Dam and Reservoir. The DDE volume of capacity is determined using the January 2006 Los Angeles County Department of Public Works (LACDPW) Hydrology Manual and the March 2006 LACDPW Sedimentation Manual. For Devil's Gate Dam and Reservoir, the required reservoir capacity is 4.0 million cubic yards (cy) (two DDEs) below the spillway elevation of 1,040.50 feet.

The Hydrology Manual (January 2006) can be viewed here:
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The Sedimentation Manual (March 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_sedimentation_manual/Sedimentation%20Manual-Second%20Edition.pdf

Additional information concerning DDE calculation methods has been added to the Final EIR, Section 2.3, Project Need.

In 2010, in response to the Station Fire, an emergency project to remove only 1.67 million cubic yards (cy) was proposed. The volume of 1.67 million cy is the previously published DDE, and this amount was considered justifiable as an emergency exemption to the California Environmental Quality Act (CEQA). This emergency project was not completed because, in March 2011, the County of Los Angeles Board of Supervisors motioned LACFCD to complete an EIR for a comprehensive sediment removal project at Devil's Gate. LACFCD then initiated project development in accordance with the required level of protection of two DDEs. At that time, LACFCD also began receiving feedback on the concurrent Sediment Management Strategic Plan (Strategic Plan) and the interest to look at more sustainable sediment and reservoir management. As a result of the feedback and recommendations during the development of the Strategic Plan, LACFCD began evaluating ways to create a more sustainable long-term way to manage its sediment and habitat. To emphasize the goals of the project, the Proposed Project was given the name Devil's Gate Sediment Removal and Management Project.

Response to Comment 165-4:

Impacts to recreation were analyzed in the Draft EIR, Section 3.15. The Proposed Project will not limit the use of the Oak Grove area of Hahamongna Watershed Park. Sediment removal activities would be temporary and are expected to occur only in the drier months (April to December, excluding holidays). It is expected that these activities will often not be adjacent to the Oak Grove area of Hahamongna Watershed Park. The Proposed Project would result in temporary limitations on the recreational use of the Proposed Project site and some of the adjacent trails. Most of these areas would be reopened seasonally or intermittently throughout the sediment removal process. In addition, temporary impacts to designated recreational facilities and trails will be minimized through advance communication and redirection to the nearest facility in the vicinity of the Proposed Project. Furthermore, an east-west trail crossing will continue to provide access at the north end of the reservoir. At the south end of the reservoir, after the reservoir ingress and egress ramps have been fully constructed, access to the upper east side Arroyo Seco Trail from La Cañada Verdugo Road will be maintained; and the linkage from the west side Arroyo Seco Trail and the Flint Wash Trail to the upper east side Arroyo Seco Trail (crossing Devil's Gate Dam and also continuing south to the Rose Bowl) will be available after construction activities have ended each day and on nonworking days.

Alternatives to the Proposed Project were analyzed in the Draft EIR, Section 4.0, Alternatives Analysis. Alternative 3 was found to be the Environmentally Superior Alternative. Alternative 3, Configuration D affects the least amount of reservoir area of all the action alternatives, while still achieving Proposed Project objectives (see Section 4.6 of the Final EIR). This alternative would provide a buffer between the Oak Grove area of Hahamongna Watershed Park and the excavation area. Alternative 3, Configuration D, Option 1 provides a more natural configuration for the reservoir by having two branches to carry water and sediment toward the face of the dam, avoiding disturbing a significant portion of existing vegetation. To further reduce the Proposed Project's footprint, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2, which drastically reduces the project's footprint of 120 acres down to 71 acres, would avoid excavation of the western branch, thereby providing a greater habitat buffer on the west side of the reservoir. In addition, the maintenance areas would be smaller than the original sediment removal footprint, allowing for habitat to reestablish.

Response to Comment 165-5:

See Response to Comment 165-4.

Response to Comment 165-6

As discussed in Section 3.6.6 of the Draft EIR, Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats. In addition, sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays). Wildlife species currently found in the Proposed Project area would be expected to either remain in the undisturbed areas of the reservoir outside of the Proposed Project area or to reestablish once sediment removal activities have been completed. In addition, sediment removal activities would not completely block the Proposed Project site from surrounding habitat, would occur only during the day, and would not interfere with nighttime wildlife activity. Although some wildlife may be temporarily displaced during construction, wildlife would not be physically prevented from moving around and into the basin area.

Response to Comment 165-7

Various amounts of sediment and methods of removal were analyzed under the Alternatives Analysis of the Draft EIR (see Section 4 of the Draft EIR). While sluicing is not a viable project alternative, as explained in Section 4.7 of the Draft EIR, Flow Assisted Sediment Transport, or FASTing, will be used for maintenance after the project's main sediment removal phase has been completed, as described in Section 2.5.2 of the Draft EIR.

Air quality impacts associated with truck traffic were analyzed in the Draft EIR in Section 3.5. LACFCD has conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed the United States (U.S.) Environmental Protection Agency's (EPA's) 2007 standards for emissions. Therefore, in order to further reduce emissions, Mitigation Measure MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump trucks that meet or exceed EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality, including those associated with health effects, will be reduced to less than significant. Also as discussed in the Draft EIR, Section 3.5, the Health Risk Assessment (HRA) found the Proposed Project would result in less than significant impacts for both the cancer-related and non-cancer-related impacts.

Potential impacts due to the Proposed Project's truck trips were analyzed in the Draft EIR, Section 3.16, Transportation and Traffic. As listed in that section, a single intersection in the immediate vicinity of the Proposed Project site will have a potentially significant impact. The Draft EIR outlines a 12-hour trucking schedule, with trucking operations on Saturdays as well. This schedule is used to model the most intensive construction operation, which may not be applicable at the site for the duration of the Proposed Project. Typical trucking schedules are estimated to be 8 hours per day on weekdays. In practice, hauling rates and routes may be adjusted to help reduce impacts depending on operational need. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the Proposed Project site.

Response to Comment 165-8

The Devil's Gate Water Conservation Project is a separate project that is not part of the Proposed Project or alternatives. The Devil's Gate Water Conservation Project is still in a conceptual design phase, and no environmental report is available for public review at this time; however, this project was analyzed in the Draft EIR as a cumulative project.

Response to Comment 165-9

LACFCD strives to achieve an efficient, low-cost sediment removal project. Sediment removal rates and trucking operations, now utilizing all low-emissions trucks, as explained in Section 3.5 of the Draft EIR, have been carefully planned for economies of scale to realize maximum efficiencies without major delays in project schedule, thus greatly reducing operating costs. Furthermore, LACFCD has applied for and received an approximately $28 million grant through the State's Disaster Preparedness and Flood Protection Bond Act of 2006 (Proposition 1E) program. A portion of this grant will be used to help offset the Proposed Project's costs. The remaining cost will be covered by LACFCD funds.

The estimated cost for the Proposed Project and for Alternatives 1, 2, 3, and 5 would range from $80 million for the Proposed Project to $65 million for Alternative 3. Due to the variety of factors,

including the indeterminate locations of the sediment fallout and requirements for removing sediment from these locations, the cost for Alternative 4 cannot be calculated.

Response to Comment 165-10

See Response to Comment 165-9.

Sluicing was analyzed as part of the Draft EIR in the Alternatives Analysis, Section 4.7, Alternative 4 Sluicing Method. This alternative would involve use of construction equipment and the removal of trees and vegetation over the same footprint as the Proposed Project. The sluicing alternative would potentially have additional significant impacts in comparison to the Proposed Project. Many of these impacts would be associated with the likelihood that large amounts of sediment would not be fully transported through the flood control system; this sediment would need to be mechanically removed and trucked out from numerous downstream locations potentially including the two soft-bottom portions of the channel. Please see Section 4.7 and Appendix K of the Draft EIR for further analysis.

After the sediment removal phase has occurred, FASTing is proposed to be an integral part of the annual maintenance at Devil's Gate. Annual FASTing operations will be implemented to reduce future buildups of sediment in the reservoir and to reduce the need for mechanical removal of sediment from the reservoir. Although FASTing is expected to be an effective means of keeping sediment levels low in the reservoir, it is estimated that typically 13,000 cy of sediment will be removed by excavation annually. A maintenance regime that relies on FASTing greatly reduces the need for and extends the life of future and existing sediment placement sites and improves the future sustainability of the reservoir. Please see Section2.5.2 of the Draft EIR for more information on future maintenance.

A conveyor belt system was considered in the Alternatives Analysis; see Section 4.10.1 of the Draft EIR. This alternative was rejected as it would not avoid or substantially reduce any significant environmental effects.

The sediment that came into Devil's Gate Reservoir following the Station Fire has a very fine gradation or consistency. As such, the majority of this material is not readily reusable on a commercial scale and will most likely not be sold; however, sediment placed at sediment placement sites would be available for potential reuse for other projects or sediment reuse opportunities. The sediment removed from the Devil's Gate Reservoir will be transported to the existing placement sites listed in Section 2.0, Project Description in the Draft EIR. Separating sand, rock, and gravel for local use would not eliminate impacts associated with sediment removal and would not eliminate the use of vehicles to transport the sediment off site.

For further information regarding beneficial uses for sediment at the Los Angeles County Flood Control District (LACFCD) sites, please refer to Section 6.5 of LACFCD's 2012 Sediment Management Strategic Plan which can be found at: http://dpw.lacounty.gov/lacfcd/sediment/stplan.aspx.

Response to Comment 165-11

See Response to Comments 165-4, 165-6, 165-7, 165-8, and 165-10.

Historically, large amounts of sediment have been deposited in the reservoir in short time periods. Between 1935 and 1938 over 1.6 million cy of sediment, between 1938 and 1943 over 1.95 million cy of sediment, between 1959 and 1966 over 1.75 million cy of sediment, and between 2010 and 2012 over

1.3 million cy of sediment was deposited in the reservoir. Since the 1920 dam construction and prior to the Station Fire in 2009, approximately 10.7 million cy of sediment accumulated in the reservoir; and approximately 8.0 million cy was removed by LACFCD.

Over 92 years, the average amount of sediment deposited each year is approximately 130,000 cy; however, Devil's Gate Reservoir is a dynamic system with constantly changing amounts of sediment deposited from year to year, depending on the frequency and intensity of storm events. If a 1 in 50 years storm were to occur, approximately 2.0 million cy (one DDE) of sediment could be expected to wash into the reservoir. Because of LACFCD's responsibilities to provide flood protection, LACFCD must be ready at all times for a design debris event to occur.

FASTing, a passive method of transporting sediment downstream, is currently used when possible and would be used during the Maintenance Phase of the Proposed Project; however, FASTing, even in combination with the Interim Measures Project (IMP), will not efficiently remove large amounts of sediment. As discussed under the No Project Alternative, Section 4.9, use of FASTing and IMP alone will not meet Proposed Project objectives. The removal of accumulated sediment on a yearly basis is the proposed management scheme after the original sediment removal is completed. The regular maintenance of the area will lower the potential need for a large-scale sediment removal operation in the future. Please see Section 2.5.2 of the Draft EIR for more information on future maintenance.

LACFCD proposed a project duration of five years to reduce accumulated sediment in a timely fashion. The goal of LACFCD is to restore reservoir flood capacity as soon as feasible while reducing cost, minimizing the duration of environmental and construction impacts to the surrounding communities, and configuring the reservoir to allow for sustainable future maintenance. Extending the project would prolong the flood risk to downstream communities and increase the construction impacts to the surrounding communities.

ANNA BURTON
INTERIM GENERAL MANAGER

CITY OF LOS ANGELES

CALIFORNIA

ERIC GARCETTI
MAYOR

EMERGENCY MANAGEMENT DEPARTMENT
200 N. SPRING STREET, ROOM 1533
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www.emergency.lacity.org

December 30, 2013

County of Los Angeles
Department of Public Works
Water Resources Division
Attn: Reservoir Cleanouts Program
P.O. Box 1460
Alhambra, CA 91802-1460

RE: **DEVIL'S GATE RESERVOIR SEDIMENT REMOVAL AND MANAGEMENT PROJECT**

Dear Los Angeles County Flood Control District (LACFCD) Representative:

Comment 166-1

This letter is being sent in support the Devil's Gate Reservoir Sediment and Removal Management Project. The City of Los Angeles Emergency Management Department (EMD) is very concerned about the threat of flooding as a result sediment buildup behind the Devil's Gate Reservoir.

Comment 166-2

Nearly 500 homes in the City of Los Angeles have been identified by LACFCD as a flood risk from water overtopping the Arroyo Seco Channel because of the sediment buildup behind the Reservoir. Although the sediment removal project may inconvenience local residents near the reservoir, not moving forward with this project may result in major consequences to many residents in the City of Los Angeles.

Nearly a year ago, EMD was informed by the LACFCD of this flood threat. As a potential threat to both life and property, EMD has been working in partnership with the LACFCD by identifying homes in the flood inundation areas, mailing resident's preparedness and mitigation information, developing mass notification and evacuation plans, and identifying shelters in and around the area should this threat become a reality.

Comment 166-3

EMD supports this project and all five (5) alternatives identified in the DEIR (Draft Environmental Impact Report). Although the environmental impacts from the project are deemed significant in the DEIR, the threat to both life and property is just as significant. The nearly 500 residents in the City of Los Angeles, and others in surrounding jurisdictions, are at risk of losing their homes and having their lives endangered from major flooding as a result of this sediment buildup.

Please consider this letter of support from the City of Los Angeles Emergency Management Department for the Devil's Gate Reservoir Sediment Removal and Management Project when making your decision. If you have any questions or concerns regarding this memo or the City's efforts to preparing its residents from the potential effects from this flood threat, please contact Larry Meyerhofer at (213) 484-4814.

Sincerely,

Anna Burton

ANNA BURTON
Interim General Manager

Vince Jones, Bureau of Engineering

Response to Comment Letter #166 (City of Los Angeles Emergency Management Department)

Response to Comment 166-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. Los Angeles County Flood Control District (LACFCD) notes the commenter's support for the Proposed Project.

Response to Comment 166-2:

LACFCD recognizes the flood risk for areas downstream of the Devil's Gate Reservoir. The purpose of the Project is to removal sediment from the reservoir to restore the design capacity and establish a reservoir management system to maintain the flood control capacity of the reservoir, thereby managing flood risk to downstream residents.

Response to Comment 166-3:

LACFCD notes the support from the City of Los Angeles Emergency Management Department for the Proposed Project and all five alternatives, as the project is necessary to reduce downstream risk.

From: alton Cullen
To: reservoircleanouts
Subject: Hahamonga project
Date: Tuesday, January 14, 2014 2:41:38 PM

Comment 167-1

The EIR contains so many errors and omissions and does not address the issues using science and common sense and lacks good solid reasoning for the removal of so much sediment in such a short time. The entire report needs to be scrapped and one addressing the issues realistically is the only solution.

Comment 167-2

None of the alternate solutions to the perceived problem are practical nor do thay take into consideration the very negative impacts on the people of the area nor the total destruction of the Hahamonga basin.

Comment 167-3

The only possible method of removal of the sediment is using sluicing over a long period of time (15-25) years to allow the material flow of the sediment from the mountains to the ocean. If sluicing is not used it will be one more step taken to diminish the beaches sand replenishment.

Comment 167-4

It's time to take strong action and approach this issue with science, common sense and what is best for all including the environment.

Al Cullen
385 So. Greenwood Ave.
Pasadena, CA 91107-5018
(626) 796-9844

Response to Comment Letter #167 (Al Cullen)

Response to Comment 167-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

The Draft Environmental Impact Report (EIR) adequately analyzed all issue areas required by the California Environmental Quality Act (CEQA).

LACFCD was mandated by the State Legislature to provide flood protection and water conservation within its boundaries.

A reservoir storage design capacity of two design debris events (DDEs) below the dam's lowest spillway was determined to be the standard acceptable level of risk at Devil's Gate Dam and Reservoir. The DDE volume of capacity is determined using the January 2006 Los Angeles County Department of Public Works (LACDPW) Hydrology Manual and the March 2006 LACDPW Sedimentation Manual. For Devil's Gate Dam and Reservoir, the required reservoir capacity is 4.0 million cubic yards (cy) (two DDEs) below the spillway elevation of 1,040.50 feet.

The Hydrology Manual (January 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_Hydrology_Manual/2006%20Hydrology%20Manual-Divided.pdf

The Sedimentation Manual (March 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_sedimentation_manual/Sedimentation%20Manual-Second%20Edition.pdf

Additional information concerning DDE calculation methods has been added to the Final EIR, Section 2.3, Project Need.

Response to Comment 167-2:

The Draft EIR analyzed a range of sediment removal amounts and configurations aimed at addressing the diverse concerns of stakeholders including concerns for long-term habitat preservation and recreational usage. The alternatives presented in the Draft EIR represent the best options available to respond to stakeholders' concerns while adequately reducing flood risk to downstream communities. The Draft EIR, Section 4, fully analyzed six alternatives, including the No Project Alternative. These alternatives substantially lessen one or more significant effects of the Proposed Project and, with the exception of the mandatory No Project Alternative, would feasibly attain most of the basic objectives of the Proposed Project.

The Proposed Project would not result in the total destruction of the Hahamongna basin. In addition, the Los Angeles County Flood Control District (LACFCD) goes to great lengths to lessen project impacts and maximize efficiencies. For example, the Draft EIR concluded that Alternative 3 is the Environmentally Superior Alternative. Alternative 3, Configuration D, Option 2 drastically reduces the project's footprint of 120 acres down to 71 acres. Additionally, the limited maintenance area for Alternative 3 further reduces the permanent habitat impacts down to approximately 51 acres by

allowing for site replanting and mitigation to take place within the reservoir footprint. This reduction in project acreages will greatly lessen environmental impacts of the Proposed Project.

Response to Comment 167-3:

Sluicing was analyzed as part of the Draft EIR in the Alternatives Analysis, Section 4.7, Alternative 4 Sluicing Method. This alternative would involve use of construction equipment and the removal of trees and vegetation over the same footprint as the Proposed Project. The sluicing alternative would potentially have additional significant impacts in comparison to the Proposed Project. Many of these impacts would be associated with the likelihood that large amounts of sediment would not be fully transported through the flood control system; this sediment would need to be mechanically removed and trucked out from numerous downstream locations, potentially including the two soft-bottom portions of the channel. Please see Section 4.7 and Appendix K of the Draft EIR for further analysis. In addition, the Proposed Project will not decrease the current amount of sediment that flows downstream and, therefore, would not contribute to the erosion of beaches. Also as noted in the Sediment Management Strategic Plan (SMSP), "Without human intervention, most Southern California beaches would naturally be narrow and rocky. The wide beaches in Southern California were created and have been maintained by various agencies through artificial beach nourishment projects (also referred to as beach fill projects) and the construction of protective coastal structures since the 1930s." In addition, the SMSP states, "Since the Los Angeles River changed course in 1825, the largest waterway reaching this region of the coast is Ballona Creek, which has an estimated annual sediment yield of less than 50,000 cubic yards and delivers generally fine-grained sediment that is not appropriate for beach nourishment." For general information on beach nourishment, please see Section 6.5.1 of LACFCD's Sediment Management Strategic Plan Sediment Management Strategic Plan, which can be viewed here: http://dpw.lacounty.gov/lacfcd/sediment/files/FullDoc.pdf

LACFCD proposed a project duration of five years to reduce accumulated sediment in a timely fashion. The goal of LACFCD is to restore reservoir flood capacity as soon as feasible while reducing cost, minimizing the duration of environmental and construction impacts to the surrounding communities, and configuring the reservoir to allow for sustainable future maintenance. Extending the project would prolong the flood risk to downstream communities and increase the construction impacts to the surrounding communities.

Response to Comment 167-4:

Comment noted.

From: VSKimball@aol.com
To: reservoircleanouts
Subject: Comment re. Devil"s Gate Reservoir Sediment Removal & Mgmt Project DEIR
Date: Wednesday, January 15, 2014 4:23:02 PM

Comments on the Draft Environmental Impact Statement for the Devil's Gate Reservoir Sediment Removal and Management Project from Virginia Kimball, 1685 La Vista Place, Pasadena, CA 91103, vskimball@aol.com

Comment 168-1

I oppose this enormous plan, because it is too big and too destructive. There is a danger created by the buildup of sediment behind the dam, but the risk is not so great that 2,950,000 cubic yards of sediment need to be removed, using up to 425 truck round-trips per day April through December, six days per week for up to five years, and clearing a total removal area of 120.42 acres in the area behind Devil's Gate Dam. The proposed plan would create a nightmare for residents and visitors and this hardship is not fully disclosed in the DEIR, although it does determine that there would be significant and unavoidable effects on the aesthetics, air quality, transportation and traffic. These are of sufficient detriment that the Proposed Plan should be abandoned.

Comment 168-2

1. Justification for the project: The worst case scenarios are based on 50-year maximum rainfall events on burned hillsides, such as after the 2009 Station Fire. We had that event recently, and while it might happen again, the likelihood of another big fire in the same area followed by severe rains within the next ten years is unlikely. Certainly there is a risk of heavy rains, as that's how our rains seem to fall lately, but a gradual approach to reducing the risk is logical at the current time. The county's interim measures have worked well and will continue to work while a gradual sediment removal plan that involves some vegetation removal along with Flow Assisted Sediment Transport and sluicing is put into place.

Comment 168-3

2. Impact on biological resources: The DEIR determines the impact to be less than significant with mitigation. The proposed removal of all vegetation in the designated area, regardless of the selected alternative, is drastic. They propose removing the majority of vegetation in the Hahamongna basin, and indicate that wildlife will find another place to go. The basin is a broad wildlife corridor that will be altered drastically for five years or so. Wildlife may find routes around and through the area, including through inhabited areas, but the report does not address the ramifications of that disruption.

Comment 168-4

The proposed project anticipates a period of years to remove the sediment and yet calls for total removal of all vegetation at the beginning of the project. It will probably have to be done again and again through the years of construction as regrowth occurs. Do we have to look at a huge sandpit while work proceeds at the edges? A gradual process, utilizing FAST and sluicing, would rely on a few roads into the area and vegetation removal along likely streambeds through the area along with clearing away the front of the dam. Vegetation removal would be required, but not at the proposed level. Wildlife will be able to accommodate a gradual process much better.

3. Impact on the natural erosion process: The proposed project ignores the natural process that Devil's Gate Dam was built to address. We live in an area adjacent to steep mountainsides that slough off debris through naturally caused erosion. The particles that come off the mountains are transported through streams and rivers to the beach, renewing the sandy beaches. Picking up the sediment, loading it into trucks and transporting it across town doesn't make any sense. Sluicing and FASTing (Flow Assisted Sediment Transport) would be more logical, cost effective and natural. I suggest a test period using FAST or sluicing to determine its effectiveness. This should be done carefully, allowing time for debris to make its way to the Los Angeles River and the ocean, so sediment will need to be sluiced downstream before rainstorms stop, permitting the stream of water to flush the system out.

Comment 168-5

The DEIR concludes that sluicing is environmentally inferior to the proposed project with respect to the likely need for sediment trucking from locations further downstream. I could read nothing in the DEIR to support such a conclusion. Properly done, there should be no need to truck sediment from locations further downstream. I think the DEIR is biased in this conclusion. The DEIR also uses its questionable hypothesis to address air quality concerns. "Therefore, sluicing *could* result in a potentially significant impact. This impact *will* be increased in comparison to the proposed project due to the *potentially* longer distance of trucking during vegetation removal activities." I added italics to this quote from page 478 to emphasize the faulty logic utilized in the DEIR.

4. Impact on Aesthetics: The Proposed Project would scrape everything off a beautiful area, leaving what would look like a gravel pit behind. The process would create clouds of dust with long days of destruction activity. Hiking, bird watching, horseback riding, picnics and outdoor relaxation/recreation would be severely impacted. People with respiratory challenges would be forced to remain indoors.

Comment 168-6

Homes within at least a radius of a few miles will have their property values drop. When we neighbors try to sell our homes, we must honestly disclose all problems. This would certainly include disclosing a nearby project that fills a truck every few minutes, creating a dust cloud over the Hahamongna basin, significant traffic jams, noise and a generally unpleasant atmosphere. We probably wouldn't even have to mention it to prospective buyers; they'd notice it themselves.

Comment 168-7

5. Impact on Transportation and Traffic: Just imagine all those trucks on the 210 freeway, especially at rush hours. From my home in Pasadena, I usually drive north on Linda Vista, turning on Oak Grove Drive/Woodbury Ave., and I would probably encounter slowing and delays. What will happen when there is a football game or other event in the Rose Bowl? Yes, these impacts are significant and unavoidable – except if you decide to take a gradual approach relying more on sluicing and FAST, perhaps using a ten year plan, instead of five.

Comment 168-8

6. Conclusion: I oppose all the alternatives in the Draft Environmental Impact Statement. The least bad alternative would be a combination of Sediment Removal Alternative #3 combined with Alternative #4, Sluicing, both adapted for an incremental sediment and vegetation removal plan.

Comment 168-9

Our home is a mile or so south of the dam. We hike in the lower Arroyo Seco Park weekly and hike through Hahamongna frequently as well. Our family celebrates Thanksgiving with a picnic in Oak Grove Park. Hahamongna and the Arroyo Seco

Comment 168-10

Comment 168-10 continued

are natural treasures that should remain natural – scoured by the natural forces of flooding at times, but protected from this massive deconstruction project.

Virginia Kimball, 1685 La Vista Place, Pasadena, CA 91103

Response to Comment Letter #168 (Virginia Kimball)

Response to Comment 168-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. Los Angeles County Flood Control District (LACFCD) notes the commenter's objection to the Proposed Project.

LACFCD was mandated by the State Legislature to provide flood protection and water conservation within its boundaries.

A reservoir storage design capacity of two design debris events (DDEs) below the dam's lowest spillway was determined to be the standard acceptable level of risk at Devil's Gate Dam and Reservoir. The DDE volume of capacity is determined using the January 2006 Los Angeles County Department of Public Works (LACDPW) Hydrology Manual and the March 2006 LACDPW Sedimentation Manual. For Devil's Gate Dam and Reservoir, the required reservoir capacity is 4.0 million cubic yards (cy) (two DDEs) below the spillway elevation of 1,040.50 feet.

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The Sedimentation Manual (March 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_sedimentation_manual/Sedimentation%20Manual-Second%20Edition.pdf

Additional information concerning DDE calculation methods has been added to the Final Environmental Impact Report (EIR), Section 2.3, Project Need.

The Draft EIR identifies impacts that the Proposed Project will have on the residents and visitors. Air quality impacts associated with truck traffic were analyzed in the Draft EIR in Section 3.5. LACFCD has conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed the United States (U.S.) Environmental Protection Agency's (EPA's) 2007 standards for emissions. Therefore, in order to further reduce emissions, Mitigation Measure MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump trucks that meet or exceed EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality, including those associated with health effects, will be reduced to less than significant.

Potential impacts due to the Proposed Project's truck trips were analyzed in the Draft EIR, Section 3.16, Transportation and Traffic. As listed in that section, a single intersection in the immediate vicinity of the Proposed Project site will have a potentially significant impact. In practice, hauling rates and routes may be adjusted to help reduce impacts, depending on operational need. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the Proposed Project site.

As noted in the Draft EIR, Section 3.4, Aesthetics, the Proposed Project will have significant temporary impacts to aesthetics; however, after the sediment removal phase of the Proposed Project is complete, a habitat restoration plan will be implemented that will allow native plant communities to reestablish.

All other potential California Environmental Quality Act (CEQA) impact categories were found to be fully mitigated or not require further evaluation in the Draft EIR.

While traffic and aesthetic impacts will remain significant during sediment removal; Section 15021(d) of the California Environmental Quality Act (CEQA) Guidelines states: "CEQA recognizes that in determining whether and how a project should be approved, a public agency has an obligation to balance a variety of public objectives, including economic, environmental, and social factors and in particular the goal of providing a decent home and satisfying living environment for every Californian. An agency shall prepare a statement of overriding considerations as described in Section 15093 to reflect the ultimate balancing of competing public objectives when the agency decides to approve a project that will cause one or more significant effects on the environment." Prior to implementation of the Proposed Project, the County of Los Angeles Board of Supervisors must consider the EIR, must certify the EIR, adopt the Findings of Fact, Mitigation Monitoring Program, and a Statement of Overriding Considerations.

Response to Comment 168-2:

See Response to Comment 168-1. Historically, large amounts of sediment have been deposited in the reservoir in short time periods. Between 1935 and 1938 over 1.6 million cy of sediment, between 1938 and 1943 over 1.95 million cy of sediment, between 1959 and 1966 over 1.75 million cy of sediment , and between 2010 and 2012 over 1.3 million cy of sediment was deposited in the reservoir. Over 92 years, the average amount of sediment deposited each year is approximately 130,000 cy; however, Devil's Gate Reservoir is a dynamic system with constantly changing amounts of sediment deposited from year to year, depending on the frequency and intensity of storm events. If a 1 in 50 years storm were to occur, approximately 2.0 million cy (one DDE) of sediment could be expected to wash into the reservoir. Because of LACFCD's responsibilities to provide flood protection, LACFCD must be ready at all times for a design debris event to occur.

Flow Assisted Sediment Transport (FASTing), a passive method of transporting sediment downstream, is currently used when possible and would be used during the Maintenance Phase of the Proposed Project; however, FASTing, even in combination with the Interim Measures Project (IMP), will not efficiently remove large amounts of sediment. As discussed under the No Project Alternative, Section 4.9, use of FASTing and IMP alone will not meet Proposed Project objectives. The removal of accumulated sediment on a yearly basis is the proposed management scheme after the original sediment removal is completed. The regular maintenance of the area will lower the potential need for a large-scale sediment removal operation in the future. Please see Section 2.5.2 of the Draft EIR for more information on future maintenance.

Sluicing was analyzed as part of the Draft EIR in the Alternatives Analysis, Section 4.7, Alternative 4 Sluicing Method. This alternative would involve use of construction equipment and the removal of trees and vegetation over the same footprint as the Proposed Project. The sluicing alternative would potentially have additional significant impacts in comparison to the Proposed Project. Many of these impacts would be associated with the likelihood that large amounts of sediment would not be fully transported through the flood control system; this sediment would need to be mechanically removed and trucked out from numerous downstream locations potentially including the two soft-bottom portions of the channel. Please see Section 4.7 and Appendix K of the Draft EIR for further analysis.

LACFCD proposed a project duration of five years to reduce accumulated sediment in a timely fashion. The goal of LACFCD is to restore reservoir flood capacity as soon as feasible while reducing cost,

minimizing the duration of environmental and construction impacts to the surrounding communities, and configuring the reservoir to allow for sustainable future maintenance. Extending the project would prolong the flood risk to downstream communities and increase the construction impacts to the surrounding communities.

Response to Comment 168-3:

As discussed in Section 3.6.6 of the Draft EIR, Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats. In addition, sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays). Wildlife species currently found in the Proposed Project area would be expected to either remain in the undisturbed areas of the reservoir outside of the Proposed Project area or to reestablish once sediment removal activities have been completed. In addition, sediment removal activities would not completely block the Proposed Project site from surrounding habitat, would occur only during the day, and would not interfere with nighttime wildlife activity. Although some wildlife may be temporarily displaced during construction, wildlife would not be physically prevented from moving around and into the basin area.

Response to Comment 168-4:

See Response to Comments 168-2 and 168-3. As noted in the Draft EIR, Section 3.4, Aesthetics and Figures 3.4-1 through 3.4-3, the visual aspects of the Proposed Project site are constantly changing. The Draft EIR does note that the Proposed Project will have significant temporary impacts to aesthetics; however, after the sediment removal phase of the Proposed Project is complete, a habitat restoration plan will be implemented that will allow native plant communities to reestablish outside the reservoir management area. Riparian Herbaceous vegetation is expected to continue to populate and/or reestablish in the management area of the Proposed Project site between maintenance activities. Also, as discussed in Draft EIR, Section 4.7.1, under Alternative 4, the Sluicing Alternative, this sediment removal method would require removal of all vegetation over an extended time frame.

Response to Comment 168-5:

See Response to Comments 168-2 and 168-3. As discussed in the Draft EIR, Section 4.7, Alternative 4, Sluicing, LACFCD conducted a Sediment Transport Capacity Analysis (Appendix K of the Draft EIR) that did study the effectiveness of sluicing sediment from the reservoir. Sluicing is a sediment removal method that uses construction equipment, such as bulldozers, to push sediment into moving water so that it will flow through the dam's lowest gate. This study determined most of the sediment that would be removed from the reservoir by sluicing would remain in the Arroyo Seco, with deposits primarily occurring in and around the natural reaches due to the lack of water received in the Arroyo Seco. This additional sediment would reduce the Arroyo Seco Channel's flood control capacity and introduce new downstream flooding risks. It is likely that this sediment would need to be mechanically removed and trucked out of the Arroyo Seco Channel. As discussed in the Draft EIR, Alternative 4, Sluicing is considered environmentally inferior to the Proposed Project with respect to impacts to air quality standards due to the likely need for sediment trucking from locations further downstream.

Response to Comment 168-6

See Response to Comment 168-1.

Dust impacts from the Proposed Project were carefully evaluated, as discussed in the Draft EIR, Section 3.5.6, Impacts and Mitigation, AIR QUALITY-2, Sediment Removal. The Proposed Project's activities, including excavation, grading, material loading, and hauling, would result in less than significant dust emissions due to the project's use of best management practices and would be in full compliance with South Coast Air Quality Management District's (SCAQMD's) fugitive dust regulations.

Impacts to recreation were analyzed in the Draft EIR, Section 3.15. The Proposed Project will not limit the use of the Oak Grove area of Hahamongna Watershed Park. Sediment removal activities would be temporary and are expected to occur only in the drier months (April to December, excluding holidays). It is expected that these activities will often not be adjacent to the Oak Grove area of Hahamongna Watershed Park. The Proposed Project would result in temporary limitations on the recreational use of the Proposed Project site and some of the adjacent trails. Most of these areas would be reopened seasonally or intermittently throughout the sediment removal process. In addition, temporary impacts to designated recreational facilities and trails will be minimized through advance communication and redirection to the nearest facility in the vicinity of the Proposed Project. Furthermore, an east-west trail crossing will continue to provide access at the north end of the reservoir. At the south end of the reservoir, after the reservoir ingress and egress ramps have been fully constructed, access to the upper east side Arroyo Seco Trail from La Cañada Verdugo Road will be maintained; and the linkage from the west side Arroyo Seco Trail and the Flint Wash Trail to the upper east side Arroyo Seco Trail (crossing Devil's Gate Dam and also continuing south to the Rose Bowl) will be available after construction activities have ended each day and on nonworking days.

As discussed in the Draft EIR, Section 3.5, the Health Risk Assessment (HRA) analyzed both the cancer-related and noncancer-related acute (short-term) and chronic (long-term) impacts from project-related emissions. The HRA analysis found the Proposed Project would result in less than significant impacts for both the cancer-related and non-cancer-related acute short-term and long-term impacts.

Response to Comment 168-7

See Response to Comment 168-1 and 168-8. As discussed in the Draft EIR, Section 3.14, with implementation of Mitigation Measure MM N-1, noise impacts would be reduced to a level of less than significant.

Comment regarding economic impacts to surrounding homeowners has been noted.

Response to Comment 168-8

See Response to Comments 168-1 and 168-2. As discussed in the Draft EIR, Section 3.16, Transportation and Traffic, truck traffic associated with the Proposed Project will not cause any major traffic impacts at the studied freeway segments along any of the Haul Routes. The Draft EIR outlines a 12-hour trucking schedule, with trucking operations on Saturdays as well. This schedule is used to model the most intensive construction operation, which may not be applicable at the site for the duration of the Proposed Project. Typical trucking schedules are estimated to be 8 hours per day on weekdays. In practice, hauling rates and routes may be adjusted to help reduce impacts depending on operational need. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the Proposed Project site. This will include coordination of sediment transport activities with Rose Bowl special events.

Response to Comment 168-9

LACFCD notes the commenter's preference for the combination of Alternative 3 and Alternative 4.

Response to Comment 168-10

See Response to Comment 168-6.

From:	Joanne Watchie
To:	reservoircleanouts
Cc:	"Tony Bell"; "Pasadena Mayor Bill Bogaard"; "Councilman Steve Madison"
Subject:	Save Hahamongna!
Date:	Wednesday, January 15, 2014 2:59:43 PM

Comment 169-1

Hahamongna is the rare spot in the Arroyo Seco at the foot of the San Gabriel Mountains where the mountainous watershed meets the urban plain.

Hahamongna contains five unique habitat zones that only exist in alluvial canyons near the mountains. Most sites like this in Southern California have been destroyed.

Your plan to permanently remove 42-120 acres of habitat from the dam up to JPL would permanently destroy this unique habitat where many birds next, including the Least Bell's Vireo in 2012.

The earth is a precious place that we must safeguard for future generations! There is no recovering from poor decisions that jeopardize the earth's ecological balance – save Hahamongna!

Joanne Watche
330 Cordova St, #376
Pasadena, CA 91101
jwatchie@sbcglobal.net

Response to Comment Letter #169 (Joanne Watche)

Response to Comment 169-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

As discussed in Section 3.6.6 of the Draft Environmental Impact Report (EIR), Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats. In addition, sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays). Bird species currently found in the Proposed Project area would be expected to either remain in the undisturbed areas of the reservoir outside of the Proposed Project area or to reestablish once sediment removal activities have been completed.

Los Angeles County Flood Control District (LACFCD) goes to great lengths to lessen project impacts and maximize efficiencies. For example, the Draft EIR concluded that Alternative 3 is the Environmentally Superior Alternative. Alternative 3 , Configuration D, Option 2 drastically reduces the project's footprint of 120 acres down to 71 acres. Additionally, the limited maintenance area for Alternative 3 further reduces the permanent habitat impacts down to approximately 51 acres by allowing for site replanting and mitigation to take place within the reservoir footprint. This reduction in project acreages will greatly lessen environmental impacts of the Proposed Project.

LACFCD is committed to *Public Service that Works*; and by combining almost 100 years of technical expertise and invaluable input from the community, less invasive flood protection will continue to be a reality.

From: Hector Gonzalez
To: reservoircleanouts
Cc: Daniel Bobadilla
Subject: City of Azusa Comments - Devil"s Gate Draft EIR
Date: Wednesday, January 15, 2014 2:32:14 PM

Hello,

Comment 170-1 Below are comments from the City of Azusa pertaining to the Devil's Gate Sediment Removal and Management Project Draft EIR.

Comment 170-2 1. A pavement condition study pre and post project construction should be performed on roads impacted by proposed truck routes.
Comment 170-3 2. A cash deposit or improvements will be required to repair roads along haul routes in the City of Azusa.
Comment 170-4 3. Flagmen and/or automatic traffic lights may be required.
Comment 170-5 4. A street sweeper and/or water truck will be required along the haul routes in the City of Azusa to mitigate effects of dirt, mud, or debris in the roadway.
Comment 170-6 5. Truck shall queue on-site and not on city streets.
Comment 170-7 6. Although the proposed Haul Route 2B is within the City designated truck routes, the City requests that the proposed truck route refrain from traveling on Azusa Avenue and instead follow Haul Route 2A.

Have a good Day,

Hector Gonzalez Jr., P.E.
Engineering Assistant
City of Azusa, Engineering Division
213 East Foothill Boulevard
Azusa, CA 91702
(626) 812-5200 Ext. 5464
hgonzalez@ci.azusa.ca.us

Response to Comment Letter #170 (City of Azusa)

Response to Comment 170-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. The comments within the letter have been responded to below.

Response to Comment 170-2:

Trucks hauling sediment from the project site to any of the sediment placement sites will follow the respective cities' Designated Truck Routes. Hauling permits will be obtained as necessary from the appropriate localities, and all conditions of said permits will be followed accordingly.

Response to Comment 170-3:

See Response to Comment 170-2.

Response to Comment 170-4:

See Response to Comment 170-2. No intersections in the City of Azusa will be significantly impacted under the Proposed Haul Route segment to and from Interstate 210 (I-210) to Manning Pit (Traffic Study Haul Route 2A); therefore, no mitigation measures would be required for this segment of the haul route.

Response to Comment 170-5:

See Response to Comment 170-2. With the Proposed Project's full compliance with the South Coast Air Quality Management District's (SCAQMD's) Rule 403, sediment removal trucks are not expected to deposit dirt, mud, or debris along the haul route.

Response to Comment 170-6:

See Response to Comment 170-2. The Proposed Project will not involve queuing on city streets.

Response to Comment 170-7:

Los Angeles County Flood Control District (LACFCD) notes that the City of Azusa would prefer the project to follow Haul Route 2A.

State of California – Natural Resources Agency
DEPARTMENT OF FISH AND WILDLIFE
South Coast Region
3883 Ruffin Road
San Diego, CA 92123
(858) 467-4201
www.wildlife.ca.gov

EDMUND G. BROWN JR., Governor
CHARLTON H. BONHAM, Director

Comment Letter #171

January 14, 2014

Mr. Christopher Stone, Assistant Deputy Director
County of Los Angeles
Department of Public Works, Water Resources Division
Attn: Reservoir Cleanouts Program
P.O. Box 1460
Alhambra, CA 91802-1460
reservoircleanouts@dpw.lacounty.gov

Subject: Draft Environmental Impact Report for Devil's Gate Reservoir Sediment Removal and Management Project, Los Angeles County, California (SCH#2011091084).

Dear Mr. Stone:

The Department of Fish and Wildlife (Department) has reviewed the Draft Environmental Impact Report (DEIR) dated October 23, 2013 for the above-referenced Devil's Gate Reservoir Sediment Removal and Management Project, hereinafter referenced as Project. The document was prepared by Los Angeles County Flood Control District (LACFCD) acting as the Lead Agency (CEQA Guidelines § 15051). The Project approval would allow LACFCD to restore and maintain flood capacity within the Devil's Gate Dam and Reservoir to meet its intended level of flood protection for the communities downstream.

The Devil's Gate Dam and Reservoir are located in the City of Pasadena, in Los Angeles County; west of La Cañada Flintridge, east of the unincorporated community of Altadena, and south of the Los Angeles National Forest. Other land uses directly adjacent to the project site include the California Institute of Technology (Caltech)/National Aeronautics and Space Administration–Jet Propulsion Laboratory located directly to the northwest and east of the reservoir; La Cañada High School and Hillside School and Learning Center to the west; single-family residential uses to the north, east, and south; and Interstate 210 Foothill Freeway (I-210) to the south. The Project site is located within Hahamongna Watershed Park (Park). The Park is owned and operated by the City of Pasadena and includes the Oak Grove area. Southern California Edison, Southern California Gas Company, Pasadena Water and Power, and the LACFCD hold easements within Park.

Comment 171-1

The Project involves a comprehensive sediment removal plan that would restore flood capacity and establish a reservoir management system to maintain the flood control capacity of the reservoir. At the time the Notice of Preparation was released, an area of 178 acres was considered for the proposed project; the Project has been refined in the DEIR to an area of approximately 120 acres (consisting of 51.4 acres riparian woodland, 22.8 acres ruderal, 26.5 acres ephemeral stream (scoured), 9.3 acres mule fat scrub, 3.1 acres coastal sage scrub, 1.9 acres disturbed (trails/barren), 1.8 acres riparian herbaceous, 1.1 acres Riversidean alluvial fan sage scrub (RAFSS) and 0.4 acres ornamental landscaping).

Until this DEIR is adopted and certified, LACFCD has implemented the Interim Measures Project (IMP) which is currently underway at Devil's Gate Dam and Reservoir to reduce

downstream flood risk. The IMP includes minor dam modifications to help keep debris from plugging the outlet works and allows for removal of up to 25,000 cubic yards of sediment per year.

The Project has two distinct phases, the Sediment Removal Phase and the Reservoir Management Phase. The Sediment Removal Phase would remove approximately 2.9 million cubic yards of the existing excess sediment in the reservoir. Specific excavation limits and reservoir configuration for the Project are shown in DEIR Figure 2.5-1 (DEIR page 17). As shown in Figure 2.5-1, the basin will be excavated to a 985-foot elevation at the face of the dam, sloping up to a 1,070-foot elevation at approximately 4,977 feet north of the dam. In addition, any additional sediment that accumulates from storm flows would be managed and removed during the Reservoir Management Phase. The Project would not include excavation within the Oak Grove area of the Park or the City of Pasadena's spreading grounds on the east side of the reservoir.

Construction for the Project is expected to occur over the course of approximately 5 years beginning the summer of 2015. Excavation and associated activities within the reservoir area are expected to take place during drier months, from April to December, Monday through Saturday (except on holidays), as weather permits. During dry years, work could potentially start earlier and/or continue later. The Reservoir Management Phase is expected to start after the completion of the main Sediment Removal Phase and continue as needed for flood control purposes. The purpose of the proposed annual management activities, described below, is to reduce buildup of sediment in the reservoir management area and eliminate or substantially reduce the occurrence of another large-scale sediment removal project in the future.

Comment 171-1 continued

Excavated sediment would be trucked offsite to existing disposal site locations which are currently available to accept the sediment. Trucks would travel and place sediment at one of the primary disposal site locations, the Waste Management Facility in Azusa, the Vulcan Materials Reliance Facility in Irwindale, or the Manning Pit Sediment Placement Site in Irwindale. Secondary disposal sites are facilities in Sun Valley (Sheldon Pit, Sun Valley Fill Site, Bradley Landfill, and Boulevard Pit).

The DEIR identifies the following vegetation communities within the project work area; mule fat scrub, riparian herbaceous, riparian woodland, coastal sage scrub, Riversidean alluvial fan sage scrub, and other habitats (ruderal, ornamental, disturbed, and scoured). Special status animal species observed onsite include least Bell's vireo (*Vireo bellii pusillus*). Two California Species of Special Concern (SSC), the yellow warbler (*Dendroica petechial brewsteri)* and two-striped garter snake (*Thamnophis hammondii*) were also observed on the project site. No special status plant species were observed during survey work.

The Project, through sediment removal, would impact approximately 118 acres of natural vegetation communities, specifically 51.4 acres riparian woodland, 26.5 acres ephemeral stream (scoured), 22.8 acres ruderal, 9.3 acres mule fat scrub, 3.1 acres coastal sage scrub, 1.9 acres disturbed (trails/barren),1.8 acres riparian herbaceous, 1.1 acres of RAFSS, 0.4 acres ornamental landscaping.

Comment 171-2

The following statements and comments have been prepared pursuant to the Department's authority as Trustee Agency with jurisdiction over natural resources affected by the Project (California Environmental Quality Act [CEQA] Guidelines §15386) and pursuant to our authority

Comment 171-2 continued

as a Responsible Agency under CEQA Guidelines Section 15381 over those aspects of the proposed project that come under the purview of the California Endangered Species Act (Fish and Game Code §2050 et seq.) and Fish and Game Code Section 1600 et seq.

1. **Coordination.** The Department has met and continues to collaborate with the LACFCD regarding Project excavation footprint and maintenance activities within Devil's Gate Dam and Reservoir. The Department has worked with the LACFCD on the implementation of the IMP and has had several conversations regarding the proposed Project. The Department and LACFCD met on November 20, 2013 to discuss the specifics of the long term sediment removal included in the DEIR and we continue to coordinate with LACFCD to assist LACFCD in its goal to avoid, minimize, and mitigate project-related impacts to biological resources.

Comment 171-3

A. The Department recommends LACFCD continue coordination with the Department to refine the project description for the Final Environmental Impact Report (FEIR) to minimize impacts to sensitive resources and meet the objectives of the Project (see comment 2).

Comment 171-4

B. The Department recommends LACFCD meet with the Department to discuss the need for a California Endangered Species Act (CESA) Incidental Take Permit (ITP) for impacts to CESA-listed species (see comment 3).

Comment 171-5

C. The Department recommends LACFCD meet with the Department to discuss the Lake or Streambed Alteration Agreement (LSA)(Fish and Game code §1600 et seq) necessary for the completion of this project. The Department has some concerns regarding the details of the jurisdictional delineation. Generally speaking, the Department would take lake or streambed jurisdiction over the entire reservoir area (see comment 9). The Department recommends LACFCD review the Department's current guidance on delineating episodic steams in the December 2010, *A Review of Stream Processes and Forms in Dryland Watersheds* (Dryland Streams Guidance document) available on the Department website at (http://www.dfg.ca.gov/habcon/1600/1600 resources.html).

Comment 171-6

2. **Project Alternatives.** The DEIR analyses five separate alternatives to the proposed Project, which further reduce the biological impacts and still meet the objectives of the Project. Alternative 1, Configuration B was designed to maintain the original capacity in the reservoir but reduce vegetation impacts (54.56 acres) by excavating to 1,040 feet and isolating the impacts to the downstream portion of the reservoir. The DEIR Alternative 3, Configuration D was designated the Environmentally Superior Alternative to the Project, which would impact most of the existing habitat in the reservoir. While Alternative 3, Configuration D does not have the least impacts across all issue areas, the DEIR submits that it substantially reduced impacts to biological resources by reducing the acreage of vegetation removal by up to 44 acres (i.e., 36 percent to be left undisturbed) in comparison to the proposed Project.

Comment 171-7

Comment 171-8

A. *Riparian Impacts.* The Department supports the LACFCD initiative to modify the proposed Project in a manner that reduced impacts to biological resources. The Department's primary concern is to minimize the impacts to RAFSS onsite (see comment 3 below). The secondary goal is to minimize impacts to riparian habitats

Comment 171-8 continued

suitable to support sensitive species know to occur onsite. While Alternative 3, Configuration D is the Environmentally Superior Alternative, the configuration could result in the conversion of sensitive RAFSS and active stream channel in an effort to establish willow riparian habitat within the upstream portion of the reservoir/existing wash.

Comment 171-9

B. *Suitability of Mitigation Sites.* The Department is concerned the proposed mitigation sites do not have the hydrology to support the proposal to revegetate the undisturbed areas in Alternative 3 (swaths of habitat along the west and east sides of the Project and in the center of the site between the two proposed excavated branches) with riparian habitats under Reservoir Management operations given the information provided in the DEIR.

Comment 171-10

C. *Engineering/Maintenance Requirements.* An additional concern of the Department is the amount of engineering that may be necessary to stabilize the proposed Alternatives. An episodic stream system, like the Arroyo Seco Creek (refer to Department's Dryland Steams guidance document, see comment 1 (C) above) requires more active maintenance to stabilize the channel. Episodic stream channels tends to move across the entire alluvial streambed versus a perennial stream utilizing one stable primary channel.

Comment 171-11

D. *Additional Recommendations.* Based on these concerns the Department recommends LACFCD consider the following modifications, measures or studies be included in the FEIR to further minimize, and avoid significant impacts of the Project to biological resources;

Comment 171-12

i. The FEIR should include a measure to require an analysis of the hydrology and hydraulics (including sediment transport) in Arroyo Seco Creek upstream of the dam to determine the indirect effects to the stream and the habitat upstream of the final selected area for Reservoir Management.

Comment 171-13

ii. Continue to work with the Department to modify the final design of the Project that minimizes the impacts to sensitive habitats. A Department hydrologists is available to assist LACFCD and Department staff with input on study and stream design. In addition the Department recommends further analysis of the existing and historical extent of Alluvial Sage Scrub Alliance onsite (see comment 4 below). This analysis will allow LACFCD and the Department to make more appropriate vegetation plans for the upstream portion of the reservoir.

Comment 171-14

iii. The Department recommends the LACFCD include a measure within the FEIR to use the hydrologic information to evaluate and confirm the suitability of riparian vegetation to be established within mitigation sites identified within the reservoir prior to implementation of the a mitigation plan.

Comment 171-15

3. **Impacts to Least Bell's Vireo.** The DEIR on page 108 indicates that least Bell's vireo has not been observed successfully nesting onsite, but is known to be present (based on protocol surveys conducted in 2013). The DEIR indicates sediment removal activities would result in the removal of least Bell's vireo habitat within the riparian woodland and mule fat scrub communities, resulting in direct harm or take of these species, but this

Comment 171-15 continued

impact could be mitigated to less than significant with implementation of mitigation measures MM BIO 1 through 5. The Department recommends LACFCD consult with the Department regarding anticipated Project-related "take" of least Bell's vireo to determine the need for an Incidental Take Permit (ITP) under CESA. If any project activity will result in take of a species designated as endangered or threatened, or a candidate for listing under CESA, the Department recommends that the Applicant seek appropriate take authorization under CESA prior to implementing the Project activities. Appropriate authorization from the Department may include an ITP or a consistency determination in certain circumstances, among other options (Fish and Game Code §§ 2080.1, 2081, subds. (b), (c)). Conditions within an ITP will assure impacts to state listed species will be minimized to the maximum extent feasible and fully mitigated. Early consultation with Department regarding potential permitting obligations under CESA is encouraged since modification of the proposed project may be required to avoid or reduce impacts to State listed species.

Comment 171-16

4. **Vegetation Classification.** The DEIR uses Holland Code (Holland 1986) to classify vegetation communities. We recommend the FEIR vegetation classification mapping follow the Second Edition of the Manual of California Vegetation (MCV). This standardized vegetation classification has been accepted by State and federal agencies. The principal unit in the MCV is called an "Alliance" (or series). Alliances are a floristically defined vegetation type identified by its dominant and/or characteristic species in the upper layer of vegetation (such as in the Scalebroom or *Lepidospartum squamatum* Shrubland Alliance). For example, the DEIR (Figure 3.6-2) classifies 26.5 acres of "scoured" as a vegetation community. In episodic streams scoured soils would be included as part of an Alliance when assessing the stand of vegetation for structural integrity (structure of stand will have a similar history or environmental setting). A stand (as used in MCV) is the basic physical unit of vegetation in a landscape. It has no size limits. Some stands are very small such as wetland seeps, and some maybe several square kilometers in size such as desert stand types. The website (http://www.dfg.ca.gov/ biogeodata/vegcamp/pdfs/NaturalCommunitiesList_Oct07.pdf) and the MCV provide a key that will allow LACFCD to cross reference the Holland Code into the standardized statewide (compliant with the National Vegetation Classification Systems) nomenclature supported by the Department. Additionally, the document, Alluvial Scrub Vegetation of Southern California, A Focus on the Santa Ana River Watershed In Orange, Riverside, and San Bernardino Counties, is available at Californiahttp://cnps.org/cnps/vegetation/pdf/alluvial_scrub-diaz_evans2011.pdf is an additional tool to help the LACFCD cross-reference the Holland Codes to the Vegetation Classification system.

Comment 171-17

5. **Riversidean Alluvial Sage Scrub.** The DEIR adopted mitigation measure MM-BIO-6 to restore and/or enhance RAFSS habitat at a 1:1 ratio by acreage, and to map areas using aerial photographs. The Department recommends LACFCD use archival aerial photos that represent the extent of the vegetation community in conditions before the 2009 Station fire in the FEIR in order to accurately identify the extent of this community. This extent of RAFSS should be used as the baseline existing conditions for RAFSS. RAFSS has different successional stages (e.g., post scouring event, deposition event, and post fire events). The Department recommends using the maximum extent of RAFSS seen in pre-Station fire photos to determine the Project's potential impact.

6. **Sensitive Reptiles and Amphibians.** The project site supports habitat for the federally endangered arroyo toad (*Anaxyrus californicus*). The Department recommends US Fish and Wildlife Service (USFWS) protocol level surveys be performed for this species prior to implementation of ground disturbances associated with both the Sediment Removal and the Reservoir Management Phases because the project site supports appropriate habitat and there are historic records of Arroyo toad. Further survey efforts for SSCs including coast horned lizard (*Phrynosoma blainvillii)* and western spadefoot (*Spea hammondii*) are also recommended to be performed within appropriate habitat on the project site prior to implementation of ground disturbances associated with both the Sediment Removal and the Reservoir Management Phases.

Comment 171-18

7. **Burrowing owl.** Burrowing owl (*Athene cunicularia*), a SSC, may use open areas of the project site, especially during the winter. Proposed maintenance areas may create suitable burrowing owl habitat by maintaining these areas open and clear of vegetation. The Department recommends the FEIR include Burrowing owl surveys using Department recommended 2012 "*Staff Report on Burrowing Owl Mitigation*" prior to Project Sediment Removal Phase and Reservoir Management Phase within appropriate habitats. See website: www.dfg.ca.gov/wildlife/nongame/docs/BUOWStaffReport.pdf.

Comment 171-19

8. **Other Sensitive Species.** The FEIR should include further discussion of regionally unique or rare species pursuant to CEQA Section 15125(c). For example, the DEIR lists western gray squirrel (*Sciurus griseus*) as occurring on the project site. The range of the western gray squirrel in Southern California is declining. This decline is thought to be the result of habitat loss and fragmentation, and competition with eastern fox squirrel (*Sciurus niger*). Impacts to western gray squirrel should be considered a significant direct and cumulative impact because western grey squirrel still persist in the Verdugo Mountains to the east of the project site. Any genetic exchange for this species should be encouraged. The project should be evaluated for impacts to western gray squirrel habitat and movement opportunities between the project site and the Verdugo Mountains through the Devil's Gate Dam via Flint Wash, pedestrian tunnels and at grade crossings.

Comment 171-20

9. **Department Jurisdictional Wetlands.** The Project includes the excavating of a lake and stream within the regulatory authority of the Department. The Department has regulatory authority over activities in streams and/or lakes that will divert or obstruct the natural flow, or change the bed, channel, or bank (which may include associated riparian resources) of a river or stream, or use material from a streambed. For any such activities, the project applicant (or "entity") must provide written notification to the Department pursuant to Section 1600 et seq. of the Fish and Game Code. Based on this notification and other information, the Department determines whether a LSA with the applicant is required prior to conducting the proposed activities. The Department's issuance of a LSA for a project that is subject to CEQA will require CEQA compliance actions by the Department as a responsible agency. The Department as a responsible agency under CEQA may consider the Lead Agency's EIR for the Project. To minimize additional requirements by the Department pursuant to Section 1600 et seq. and/or under CEQA, the document should fully identify the potential impacts to the stream or riparian resources and provide adequate avoidance, mitigation, monitoring and reporting commitments for issuance of the LSA.

Comment 171-21

Comment 171-21 continued

The Department may take jurisdiction on episodic streams, including alluvial fan streams even where flow occurs as sheetflooding. The paper recently published by the Department, *A Review of Steam Processes and Forms in Dryland Watersheds*, discusses the alluvial process and the significance to water resources. The Department recommends the Lead Agency require a jurisdictional delineation be completed by a hydrogeomorphologist familiar with assessments in dryland watersheds to complete a delineation of the stream or lake to be included in the FEIR. The delineation should be conducted pursuant to the USFWS wetland definition adopted by the Department. Please note that some wetland and riparian habitats subject to the Department's authority may extend beyond the jurisdictional limits of the U.S. Army Corps of Engineers.

Comment 171-22

10. **Oak Tree Impacts.** The proposed haul routes may remove oak trees to accommodate route creation or improvements. The Department recommends the FEIR elaborate on how many oak trees are proposed for removal and relate this to, California Public Resources Code Section 21083.4 (2004 Senate Bill 1334). If removal of these oaks are considered significant (either individual impacts or cumulative), then they should be mitigated as directed by the law. Acceptable mitigation measures include, but are not limited to, conservation of other oak woodlands through the use of conservation easements and planting replacement trees, which should be maintained for ten years.

Comment 171-23

11. **Sensitive Plant Species.** The DEIR Biological Technical Report Appendix D (page 50) states "the California Department of Fish and Game (CDFG) [*sic*] California Natural Diversity Database (CNDDB 2012) and the *California Native Plant Society's Electronic Inventory (CNPSEI) of Rare and Endangered Vascular Plants of California* (CNPSEI 2012) were reviewed for the quadrangles containing and surrounding the project site…" The Department recommends performing a nine (9) quadrangle search to develop an inclusive list of potentially occurring plant and animal species. The 9 quadrangle search more accurately reflects what species may have the potential to occur on the project site.

Frequently, plant and animals are observed in areas where they were not detected historically, and by using an inclusive list it allows the project proponent to evaluate these outlier species and manage for them should they occur on the project site. As a recent example, Santa Barbara morning glory (*Calystegia sepium* ssp. Binghamiae) was recently discovered in Chino, San Bernardino County (Brummitt, et al., 2012).

Comment 171-24

12. **Plant Surveys.** The FEIR should clarify when the last floristic surveys were conducted. The DEIR Appendix D page11 indicates botanical surveys were conducted in 2010, however subsequent pages were not observed to update focused surveys information (DEIR Appendix D page 50 indicates surveys were conducted October 31, 2012, November 1, 2012, and November 2, 2012, outside normal floristic survey windows). The Department recommends the LACFCD include in the FEIR the last occurrence when floristic surveys were conducted. In addition, the Department recommends floristic surveys adhere to the Department's Guidelines for Assessing Impacts to Rare Plants and Rare Natural Communities. (See Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities at: http://www.dfg.ca.gov/habcon/plant/. The Department recommends the FEIR require plant surveys to be updated if focused surveys are older two years.

Comment 171-25

13. **Reference Sites.** Appendix D page 11 indicates surveys were conducted June 25, 2010 through June 30, 2010 and August 24, 2010. The Appendix D which includes the Biological Technical Report does not indicate if reference sites were visited to ensure the plants that could potentially occur onsite were observed to be blooming at known locations. For example, California macrophylla (*Erodium macrophylla*), a rare plant that has the potential to occur on-site, blooms between March and May (http://www.calflora.org/cgi-bin/species_query.cgi?where-calrecnum=10468) and could have been missed if surveys were conducted outside this period. California Macrophylla has been found in Los Angeles County in previously unknown areas and should be considered potentially present, among the other listed rare plants.

Comment 171-26

14. **Potential Plant Species.** Table 1 below includes a partial list of species that have the potential to occur on the project site. The Department recommends surveys for these species occur throughout the flowering season (consult the Jepson Manual, Second Edition (*Baldwin et al. 2012*) for a range of blooming times for each species).

Table 1 – Plant Species

Scientific Name	Common Name
Arctostaphylos glandulosa ssp. gabrielensis	San Gabriel manzanita
Arenaria paludicola	marsh sandwort
Astragalus brauntonii	Braunton's milk-vetch
Astragalus tener var. titi	coastal dunes milk-vetch
Atriplex parishii	Parish's brittlescale
Atriplex serenana var. davidsonii	Davidson's saltscale
Berberis nevinii	Nevin's barberry
California macrophylla	round-leaved filaree
California Walnut Woodland	California Walnut Woodland
Calochortus clavatus var. gracilis	slender mariposa-lily
Calochortus palmeri var. palmeri	Palmer's mariposa-lily
Calochortus plummerae	Plummer's mariposa-lily
Calochortus weedii var. intermedius	intermediate mariposa-lily
Calystegia sepium ssp. binghamiae	Santa Barbara morning-glory
Carolella busckana	Busck's gallmoth
Castilleja gleasoni	Mt. Gleason paintbrush
Centromadia parryi ssp. australis	southern tarplant
Chorizanthe parryi var. fernandina	San Fernando Valley spineflower
Chorizanthe parryi var. parryi	Parry's spineflower
Cladium californicum	California saw-grass

Comment 171-26 continued

Comment 171-26 continued

Cuscuta obtusiflora var. glandulosa	Peruvian dodder
Dodecahema leptoceras	slender-horned spineflower
Dudleya multicaulis	many-stemmed dudleya
Galium grande	San Gabriel bedstraw
Helianthus nuttallii ssp. parishii	Los Angeles sunflower
Horkelia cuneata var. puberula	mesa horkelia
Lasthenia glabrata ssp. coulteri	Coulter's goldfields
Lepidium virginicum var. robinsonii	Robinson's pepper-grass
Linanthus concinnus	San Gabriel linanthus
Malacothamnus davidsonii	Davidson's bush-mallow
Muhlenbergia californica	California muhly
Nasturtium gambelii	Gambel's water cress
Navarretia prostrata	prostrate vernal pool navarretia
Open Engelmann Oak Woodland	Open Engelmann Oak Woodland
Opuntia basilaris var. brachyclada	short-joint beavertail
Orobanche valida ssp. valida	Rock Creek broomrape
Phacelia stellaris	Brand's star phacelia
Pseudognaphalium leucocephalum	white rabbit-tobacco
Ribes divaricatum var. parishii	Parish's gooseberry
Riversidean Alluvial Fan Sage Scrub	Riversidean Alluvial Fan Sage Scrub
Scutellaria bolanderi ssp. austromontana	southern mountains skullcap

Comment 171-26 continued

Southern Coast Live Oak Riparian Forest	Southern Coast Live Oak Riparian Forest
Southern Cottonwood Willow Riparian Forest	Southern Cottonwood Willow Riparian Forest
Southern Mixed Riparian Forest	Southern Mixed Riparian Forest
Southern Sycamore Alder Riparian Woodland	Southern Sycamore Alder Riparian Woodland
Symphyotrichum defoliatum	San Bernardino aster
Symphyotrichum greatae	Greata's aster
Thelypteris puberula var. sonorensis	Sonoran maiden fern

The DEIR Appendix D page 51, indicates that all species occurrences older than 1960 were not considered to be potentially present because these records do not reflect current conditions within and adjacent to the Arroyo Seco Creek and the Los Angeles River. The Department recommends that Department survey guidelines, as stated above, be used when conducting plant surveys. The modification of the Arroyo Seco Creek does not mean these plants do not persist in the vicinity of the project area.

Comment 171-27

15. **Plant Taxonomy.** The scientific names used for botanical specimens should reflect the recent revision to the taxonomy of many of the plant families present onsite. The Department recommends the FEIR use the taxonomy used in the second edition to the Jepson Manual (*Baldwin et al. 2012*).

Comment 171-28

16. **Mitigation Measure MM-BIO-8.** DEIR mitigation measure MM-BIO-8 indicates a combination of on-site and off-site compensatory mitigation would be used to replace sensitive habitat and jurisdictional waters removed by the Project at no less than a 1:1 ratio. The Department recommends that any mitigation for unavoidable impacts to biological resources take place in this order of preference; onsite, offsite within the Arroyo Seco Creek, and offsite within the greater Los Angeles River watershed. Compensatory mitigation should be conducted at locations that lend themselves to riparian creation, restoration, and/or enhancement opportunities and wildlife movement preservation and which can be protected and managed in perpetuity by local land conservancies.

    A. An example of riparian mitigation opportunities for consideration includes riparian restoration along portions of the concrete lined section of the Arroyo Seco Creek that flows through the Brookside Golf Course. The golf course site may offers abundant space for opportunities to replace some of the riparian resources removed from the reservoir. LACFCD should evaluate the potential for restoration

at the golf course in coordination with the Stakeholder Taskforce as they develop land use priorities within the community.

B. The Department recommends LACFCD consider discussing potential mitigation opportunities within the Arroyo Seco Creek with entities including but not limited to: Santa Monica Mountains Conservancy (http://www.smmc.ca.gov/contact.html), Arroyo and Foothill Conservancy (http://www.arroyosfoothills.org), the Arroyo Seco Foundation (http://www.arroyoseco.org/index.htm), North East Trees (http://www.northeasttrees.org/index.html), and the U.S. Army Corps of Engineers: (http://www.spl.usace.army.mil/Media/FactSheets/tabid/1321/Article/13010/arroyo-seco-watershed-ca.aspx). These entities may offer assistance or ideas in meeting various habitat mitigation needs.

Comment 171-28 continued

17. **Mitigation Measure MM-BIO-1**. MM BIO-1 in the DEIR describes that a biological monitor will be onsite during the Project's initial ground or vegetation disturbances to implement protective measures. The Department recommends the FEIR clarify what protective measures will be implemented by the biological monitor.

A. The Department recommends a biological monitor be onsite during vegetation and ground disturbance activities during the life of the Project including maintenance activities to capture and relocate out of harm's way any species of low mobility that may be killed or injured. Any captured species should be relocated to adjacent appropriate habitat not impacted by project-related disturbance activities.

Comment 171-29

B. All vegetation removal should take place in a manner that allows wildlife to escape to contiguous, adjacent habitat. This will avoid situations where wildlife seek cover in an islands or isolated of habitat, only to be killed or injured during later removal of this cover.

18. **Mitigation Measure MM-BIO-3**. MM BIO–3 of the DEIR states: "Within 90 days prior to ground-disturbing activities, a preconstruction survey shall be conducted by a qualified biologist for the presence of any sensitive species in harm's way …" The Department recommends the FEIR require any special status species observed on the project site be recorded on a California Natural Diversity Data Base (CNDDB) field data sheet and submitted to the Department for inclusion into the CNDDB.

Comment 171-30

19. **Mitigation Measure MM-BIO-5.** MM BIO–5 of the DIER discusses bat survey and protective measures for bats. It was not clear from our reading of the DEIR if this measure was proposed in order to make conclusions regarding significant impacts from the Project on special status bat species. To avoid the direct loss of bats that could result from removal of trees and/or structures that may provide maternity roost habitat (e.g., in cavities or under loose bark), the Department recommends that the following measures be included in the FEIR:

Comment 171-31

A. The Department recommends the FEIR include the use of acoustic recognition technology to maximize detection of bat species to minimize impacts to sensitive bat species;

B. To the extent feasible, tree removal or relocation would be scheduled between October 1 and February 28, outside of the maternity roosting season;

C. If trees and/or structures must be removed during the maternity season (March 1 to September 30), a qualified bat specialist should conduct a pre-construction survey to identify those trees and/or structures proposed for disturbance that could provide hibernacula or nursery colony roosting habitat for bats;

D. Each tree and/or structure identified as potentially supporting an active maternity roost should be closely inspected by the bat specialist no greater than 7 days prior to tree disturbance to more precisely determine the presence or absence of roosting bats;

Comment 171-31 continued

E. If bats are not detected, but the bat specialist determines that roosting bats may be present at any time of year, it is preferable to push any tree down using heavy machinery rather than felling it with a chainsaw. In order to ensure the optimum warning for any roosting bats that may still be present, the tree should be pushed lightly two to three times, with a pause of approximately 30 seconds between each nudge to allow bats to become active. The tree should then be pushed to the ground slowly and should remain in place until it is inspected by a bat specialist. Trees that are known to be bat roosts should not be sawed up or mulched immediately. A period of at least 24 hours, and preferably 48 hours, should elapse prior to such operations to allow bats to escape. Bats should be allowed to escape prior to demolition of buildings. This may be accomplished by placing one way exclusionary devices into areas where bats are entering a building that allow bats to exit but not enter the building;

F. Maternity season lasts from March 1 to September 30. Trees and/or structures determined to be maternity roosts should be left in place until the end of the maternity season; and,

G. The bat specialist should document all demolition monitoring activities, and prepare a summary report to the City upon completion of tree disturbance and/or building demolition activities.

Comment 171-32

20. **Wildlife Movement**. The Department recommends the FEIR analyze the Project's effects on wildlife movement at a regional level. A complete and accurate description of the existing wildlife movement onsite and in the vicinity is necessary for a complete analysis of project-related wildlife movement impacts. The DEIR (Page 130) in discussing sediment removal and reservoir management states "...Sediment removal and reservoir management activities would interfere temporarily with the movement of native resident or migratory wildlife species, resulting in a significant impact". The Department concurs with these assumptions. In addition, the FEIR should consider the

Projects potential for long-term significant impacts to wildlife movement between the San Gabriel Mountains, location of the Project, and Verdugo Mountains.

A. Several wildlife accessible conveyances are present in Flint Wash, along with pedestrian tunnels and an at grade road crossings in the Project area. These conveyances and open space provide important wildlife movement opportunities past the dam. Wildlife use of these conveyances and open space are not well understood at this present time, but they are reasonably able to provide some of the remaining wildlife crossing opportunities in the region between the San Gabriel and Verdugo Mountains. These remaining crossings are important for maintaining genetic flow between isolated populations, and associated biological diversity between these larger areas of core habitat. The Department recommends the FEIR analyze offsite wildlife movement from and to the Project through any of the conveyances and permeable open spaces that could provide wildlife movement.

Comment 171-32 continued

B. The LACFCD should consider mitigation measures in the FEIR that include tracking stations, camera stations, and any on-going telemetry data currently being conducted in the area. The studies should be conducted for at least a full year to fully document use of conveyances and open space by wildlife. This evaluation would further assist in determining Project impacts to wildlife movement and in implementing avoidance and mitigation measures.

C. The Department recommends LACFCD adopt mitigation measures to avoid using temporary or permanent fencing that could adversely restrict wildlife movement through the Project and to off-site locations. If fencing is determined to be necessary for public safety and/or to direct wildlife to safe passageways through the Project, beneath Oak Grove Drive, and/or the 210 freeway, then the fencing should be constructed with materials that are not harmful to wildlife. Materials to avoid include, but are not limited to spikes, razor, and barbed wire. All hollow fence posts or fence posts with open top holes, and abandoned pipes should be capped, plugged, or crushed and abandoned properly to prevent the entrapment of avian species and other wildlife.

Comment 171-33 We appreciate the opportunity to comment on the DEIR for the Project and to assist the LACFCD in further minimizing and mitigating Project impacts to biological resources. If you have questions regarding this letter, please contact Mr. Matt Chirdon by telephone at (760) 757-1004 or email at Matthew.Chirdon@wildlife.ca.gov.

Sincerely,

Edmund Pert
Regional Manager
South Coast Region

REFERENCES:

Status of Bingham's Morning-Glory in Light of Its Rediscovery, 2012. Brummitt, R.K., White, S.D., and Wood, J.M. Madrono Vol. 59, No. 1, pp 25-27.

The Jepson Manual Vascular Plants of California. Second edition. 2012. Baldwin, B.G., *et al.*

Holland, R. 1986. Preliminary descriptions of the terrestrial natural communities of California. Unpublished document, California Department of Fish and Game, Natural Heritage Division. Sacramento, CA.

Sawyer, J.O., T. Keeler-Wolf, and J.M. Evens. 2009. A Manual of California Vegetation, Second Edition. California Native Plant Society, Sacramento. 1300 pp. Web Link: A Manual of California Vegetation, Second Edition

Smith, L.R., Alluvial Scrub Vegetation of Southern California, A Focus on the Santa Ana River Watershed In Orange, Riverside, and San Bernardino Counties, California; Envicom Corporation, Calabasas California, 1980.

ec: Betty Courtney, CDFW, Santa Clarita
Erinn Wilson, CDFW, Los Alamitos
Matt Chirdon, CDFW, San Diego
Kelly Schmoker, CDFW, Mission Viejo
Scott Harris, CDFW, Pasadena
Sarah Rains, CDFW, Newbury Park
State Clearinghouse, Sacramento

Response to Comment Letter #171 (California Department of Fish and Wildlife)

Response to Comment 171-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. The comment includes Proposed Project Description information from the Draft Environmental Impact Report (EIR).

Response to Comment 171-2:

Los Angeles County Flood Control District (LACFCD) notes that the California Department of Fish and Wildlife (CDFW) is a Responsible Agency for the Proposed Project under CEQA.

Response to Comment 171-3:

As noted in the comment, LACFCD has been conducting ongoing coordination with CDFW. This coordination will continue as the Proposed Project progresses.

Response to Comment 171-4:

As noted in Response to Comment 171-3, above, LACFCD's coordination with CDFW will continue.

Response to Comment 171-5:

LACFCD has been and will continue to work closely with the California Department of Fish and Wildlife (CDFW). Prior to commencement of the Proposed Project, LACFCD will have worked with CDFW to obtain all necessary permits for the Proposed Project.

As discussed in Section 3.6.6 of the Draft EIR, the Proposed Project is not expected to have a substantial adverse effect on any plant species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations or by CDFW or United States Fish and Wildlife Service (USFWS).To ensure no harm or take to any special status wildlife species, Mitigation Measures MM BIO-1, MM BIO-2, and MM BIO-3 have been provided. With implementation of these mitigation measures, direct impacts to special status species would be less than significant.

Response to Comment 171-6:

LACFCD has been and will continue to work closely with CDFW. CDFW jurisdiction applies to the top of the banks, or in the case of this reservoir, the high water mark (HWM) of the Proposed Project. For the Streambed Alteration Agreement, this includes drainage features, wetlands, and the riparian vegetation outside the wetlands within the entire HWM of the Proposed Project. CDFW jurisdictional acreage impacts for the Proposed Project, Configuration A are detailed in the Jurisdictional Delineation, contained in Appendix D – Biological Resources Reports in the Draft EIR.

Response to Comment 171-7:

The comment includes information regarding the Alternatives that was provided in the Draft EIR. Comment noted.

Response to Comment 171-8:

As discussed in the Draft EIR, Section 3.6.2, in 2010, Riversidean Alluvial Fan Sage Scrub was present on the northeast portion of the Proposed Project site. Much smaller patches of this community remain in 2013. The reduction in habitat is due to post-fire sediment accumulation occurring as a result of the 2009 Station Fire, which has greatly reduced the size of this community and has inhibited its ability for succession. Even with the reduction in the community, the Draft EIR determined that impacts to Riversidean Alluvial Fan Sage Scrub (RAFSS) would result in a significant impact requiring mitigation. To minimize impacts due to loss of RAFSS, Mitigation Measure MM BIO-6 has been provided. Removing the accumulated sediment and designing a system that will provide transport of sediment downstream will allow a more natural expansion of sediment that will benefit the alluvial fan sage scrub establishment. With implementation of this mitigation measure, impacts to RAFSS would be reduced to a level below significance.

As analyzed in the Draft EIR, Section 4.0, impacts to RAFSS during the sediment removal phase of Alternatives 1, 2, and 3 would be reduced in comparison to the Proposed Project. With all the Alternatives, impacts to RAFSS would be mitigated through restored and/or enhanced at a ratio of at least 1:1 ratio by acreage. The mitigation details will be finalized during the negotiations with the resource agencies, including CDFW, during the regulatory permitting process.

Response to Comment 171-9:

After the Station Fire in 2009, the following two storm seasons brought 1.3 million cubic yards of sediment into the reservoir, raising the ground elevations within the reservoir and burying most of the established vegetation. Since then, vegetation has reestablished within the reservoir, including in the areas that will remain in place and/or possibly used as mitigation sites under Alternative 3. The sediment removal efforts aim to restore the historic elevations within the reservoir to the conditions existing prior to the impacts caused by the Station Fire. After the sediment removal project, ground elevations within the reservoir will be in either present or historic levels and will have exposure to flowing stormwater. The habitat restoration plan will include and address monitoring and success criteria.

LACFCD will continue to work with CDFW to ensure all revegetation and mitigation plans are viable.

Response to Comment 171-10:

In Alternative 3, the proposed cut at the northern end of the reservoir is approximately 25:1, a very shallow slope, which mimics the historic slopes in that area of the reservoir. With this slope, LACFCD does not expect this project configuration to cause any major cutting or erosion upstream, outside the project boundary or the LACFCD easement. Any loose sediment recently deposited after the Station Fire is expected to continue to move downstream during signification storm events. LACFCD will provide to CDFW the necessary information to assess the historic slopes and hydrology of the reservoir, including historic contours and reservoir inflow data.

Due to the nature of a dam and reservoir system, as the Arroyo Seco enters the reservoir, the slope naturally flattens and stabilizes within the reservoir. As a part of the sediment removal project, the cut plan mimics these historic slopes by incorporating 3:1 side slopes and varying but gradual bottom slopes, all of which are shallow and stable.

The reservoir configuration will provide for natural movement of sediment and water through the reservoir and also to the maintenance area near the face of the dam, efficiently rather than unnecessarily impounding large quantities of sediment in the upper end of the reservoir. During the maintenance activities, the configuration will be maintained in order to help sustain flows and delivery of sediment through the reservoir.

As a part of the maintenance plan, a majority of the incoming sediment will remain suspended in the flows through the reservoir and move through the dam with Flow Assisted Sediment Transport, or FASTing, operations as it has in the past. These FASTing operations will keep sediment suspended in the flowing water, which will further reduce the potential for cutting.

Response to Comment 171-11:

The additional recommendations have been noted and have been responded to below.

Response to Comment 171-12:

See Response to Comment 171-10. It should be noted that unconsolidated and recently deposited post-fire sediment upstream is expected to continue to wash downstream during significant storm events and that this will occur regardless of the Proposed Project. In addition, the area outside the existing easement is beyond the jurisdiction of LACFCD and the scope of this project.

Response to Comment 171-13:

LACFCD is dedicated to minimizing the impacts to biological resources, especially sensitive habitats, as much as feasible and will continue to collaborate with CDFW to ensure reasonable minimization efforts and mitigation are achieved. The purpose of the cut configuration alternatives is to reestablish the reservoir behind Devil's Gate Dam in order to provide capacity for flood control needs.

LACFCD recognizes that any Alluvial Fan Sage Scrub habitat near the upper end of the reservoir is a sensitive habitat and will work with CDFW to minimize any impacts to the habitat while maintaining the flood control function of the reservoir and dam. It should be noted that the majority of the Alluvial Fan Sage Scrub habitat in this area was buried up to approximately 10 feet deep by sediment deposited in the 2010-2012 storm seasons after the Station Fire. The proposed slope in this area near the upper end the reservoir is very shallow, and only a small fraction of the total sediment removed will be from that area; however, the reservoir requires the proper slope to maintain flow through the reservoir towards the dam. LACFCD will provide available records of the existing and historical extent of Alluvial Fan Sage Scrub Alliance onsite in order to facilitate collaboration with CDFW on revegetation plans for the upper portion of the reservoir after the sediment removal project has occurred; however, it should be noted that the baseline biological conditions for the project per the California Environmental Quality Act (CEQA) are set by the biological surveys, as noted in the Draft EIR.

Response to Comment 171-14:

See Response to Comment 171-9.

LACFCD will continue to work with CDFW to ensure all revegetation and mitigation plans are viable. LACFCD will provide to CDFW the necessary information to assess the hydrology of the reservoir, including historic contours and reservoir inflow data.

Response to Comment 171-15:

LACFCD has been and will continue to work closely with CDFW. Prior to commencement of the Proposed Project, LACFCD will have worked with CDFW to obtain all necessary permits for the Proposed Project, including an Incidental Take Permit, if needed.

Response to Comment 171-16:

Species names used in the Draft EIR were consistent with the Master Watershed Plan for the Hahamongna Watershed, by request of the City of Pasadena, to maintain consistency with the Master Plan. Species names have been updated (see Section 3.6 of the Final EIR).

Response to Comment 171-17:

The use of archival aerial photos could indicate the extent of the RAFSS in conditions before the 2009 Station Fire; however, the method of using only historical aerial photos to map the vegetation communities may be inaccurate, particularly for the level of detail necessary to follow the Manual of California Vegetation (MCV). In addition, as noted in Section 3.6.1 of the Draft EIR, conditions in 2011 were severely impacted by sediment deposition, reducing the amount and quality of vegetation communities. In order to achieve a more conservative analysis of the potential impacts to biological resources from the Proposed Project, 2013 conditions were also taken into account.

Response to Comment 171-18:

The arroyo toad (*Anaxyrus californicus*) is not expected to occur on the Proposed Project site. No historic occurrences exist within 5 miles of the Proposed Project; and none were known to occur from local organizations, including the Pasadena Audubon Society and the Arroyo Seco Foundation, who were contacted about the Proposed Project prior to the Draft EIR being prepared. Currently, no habitat for arroyo toads occurs downstream of the dam. Although sandy substrates exist on site, flowing water does not occur during the breeding season. As a result, no breeding habitat exists within the Proposed Project or immediately upstream. Therefore, protocol-level surveys for this species are not warranted.

As discussed in the Draft EIR, Section 3.6.2, Special Status Animal Species, and the Biological Technical Report (BTR), Section 3.1.3, due to the lack of known historical occurrences within 5 miles of the Survey Area, the coast horned lizard (*Phrynosoma blainvillii*) has low potential for occurrence on the Proposed Project site. In addition, the western spadefoot (*Spea hammondii*) is not expected to occur on the Proposed Project site because this species requires clay soils to conserve moisture during aestivation. In addition, as discussed in the Draft EIR, Section 3.6.6, Sensitive Wildlife, to avoid harm or take of any special status wildlife species, mitigation measures MM BIO-1, MM BIO-2, MM BIO-3, MM BIO-4, and MM BIO-5 will be implemented. These include preconstruction surveys, having a biological monitor on site during construction, and measures to avoid impacts to sensitive species. With implementation of these mitigation measures, direct impacts to biological resources would be less than significant. LACFCD will continue to work with CDFW to ensure all revegetation and mitigation plans are viable.

Response to Comment 171-19:

As discussed in the Draft EIR, Section 3.6.2, Special Status Animal Species, and the BTR, Section 3.1.3, due to the lack of known historical occurrences within 5 miles of the Survey Area (burrowing owls exhibit high site fidelity), the quality of breeding habitat, and level of disturbances within the Proposed

Project, the burrowing owl (*Athene cunicularia*) has low potential for occurrence on the Proposed Project site. Surveys of the Proposed Project site indicate no burrowing owls occur within the Proposed Project. In addition, as discussed in the Draft EIR, Section 3.6.6, Sensitive Wildlife, to avoid harm or take of any special status wildlife species, Mitigation Measures MM BIO-1, MM BIO-2, MM BIO-3, MM BIO-4, and MM BIO-5 will be implemented during both sediment removal and maintenance activities. With implementation of these mitigation measures, direct impacts to biological resources would be less than significant. LACFCD will continue to work with CDFW to ensure all revegetation and mitigation plans are viable.

Response to Comment 171-20:

Although the western gray squirrel (*Sciurus griseus)* is not considered to be a sensitive or special status wildlife species, avoidance and minimization measures have been developed to protect wildlife. With implementation of these mitigation measures, direct impacts to biological resources would be less than significant. LACFCD will continue to work with CDFW to ensure all revegetation and mitigation plans are viable.

Response to Comment 171-21:

LACFCD has been and will continue to work closely with CDFW. LACFCD will apply for a Streambed Alteration Agreement for the Proposed Project authorization. For the Streambed Alteration Agreement, this includes all stream and drainage features, wetlands, and the riparian vegetation outside the wetlands within the entire HWM of the Proposed Project. A jurisdictional delineation has been conducted and performed under CDFW and United States Army Corps of Engineers (USACE) guidance for arid regions. The Proposed Project was investigated for hydrological and morphological characteristics of stream environments in dryland regions.

As discussed in the Draft EIR, Section 3.6.6, Sediment Removal/Reservoir Management, Mitigation Measure MM BIO-8 will be implemented for habitat restoration and monitoring over a five-year period. With implementation of conditions within the CDFW Streambed Alteration Agreement and the mitigation measures in the Draft EIR, direct impacts to biological resources would be less than significant. LACFCD will continue to work with CDFW to ensure all revegetation and mitigation plans are viable.

Response to Comment 171-22:

The Draft EIR did analyze whether the Proposed Project would have a significant effect on oak woodlands and determined what mitigation would be necessary, as per Public Resources Code Section 21083.4. As discussed in the Draft EIR, Section 3.6.2, Existing Environmental Setting, Vegetation, Riparian Communities, Riparian Woodland/Black Willow Series, in 2010, Coast Live Oak was present in the Riparian Woodland mostly at the southern end of the Proposed Project site (Chambers Group 2010a). In 2013, only four small patches were identified in the project site, including one located east of the dam face (Chambers Group 2013b). As discussed in the Draft EIR, Section 3.6.6, BIOLOGY-5, the Proposed Project would remove trees from the Proposed Project site. Implementation of Mitigation Measure MM BIO-7 will identify trees that will be removed or potentially affected, the appropriate level of tree replacement, and protection of the root zone of oak trees. Implementation of this mitigation measure will reduce impacts to trees (which includes native oak trees) to a level below significance. Based on Mitigation Measure MM BIO-7, within 90 days prior to ground-disturbing activities, a qualified biologist will conduct a tree survey within the project footprint to identify trees that will be removed or

potentially affected by the Proposed Project and trees that can be avoided. LACFCD will replace trees that cannot be avoided. The replacement is expected to be up to 1:1 by acreage. The biological monitor will implement measures to protect the root zone of oak trees that may be impacted immediately adjacent to the project site and along access roads. LACFCD will continue to work with CDFW to ensure all revegetation and mitigation plans are viable.

Response to Comment 171-23:

A nine-quadrangle search in Los Angeles County would create a list that would include species that occur in habitats found at a great distance from the Proposed Project site, such as deserts and beaches. Chambers Group's review of the California Natural Diversity Database (CNDDB) and California Native Plant Society Electronic Inventory (CNPSEI) databases for the surrounding United States Geological Survey (USGS) 7.5-minute quadrangles took into account the presence or absence of suitable habitat, suitable elevation range, and the presence of potential barriers to the migration of species into the project area. Therefore, an adequate search of the databases was conducted for the Proposed Project.

Response to Comment 171-24:

The dates for floristic surveys will be clarified in the Final EIR (see Section 3.6 of the Final EIR). As discussed in the BTR (Appendix D of the Draft EIR), Chambers Group conducted the reconnaissance-level survey in the Survey Area on May 27, 2010. Focused surveys for special status plants that were floristic in nature (i.e., identified all plants observed to the appropriate taxonomic level to determine rarity and/or special status) took place in June and August 2010, within the appropriate survey windows to observe the target annual species during their blooming periods. Because the sensitive plant species with potential to occur have two different flowering periods, two separate focused plant surveys were conducted. The first focused survey was conducted on June 28 through June 30, 2010. The second focused survey was conducted on August 24, 2010.

The biological resource surveys that occurred in October and November 2012 were general biological surveys that did not focus on special status plants; but if special status plants were observed, they were documented.

As addressed in Comment 171-23, Chambers Group has assessed the preliminary literature review conducted by CDFW which resulted in 41 sensitive species and 7 sensitive habitats that have records of occurrence within 9 USGS 7.5-minute quadrangles where the Proposed Project area is located and the adjacent quadrangles. The plants and communities with potential to occur within the project site were presented in Tables 3.6-2 and 3.6-3 of the Draft EIR.

Factors used to determine the potential for occurrence included the quality of habitat, elevation, and the results of the reconnaissance survey. The locations of prior database records of occurrence were used as additional data; but since the CNDDB is a positive-sighting database, this data was used only in support of the analysis from the previously identified factors. Based on the results of the BTR, additional protocol-level focused surveys were conducted for plants and wildlife.

After reviewing the previous mapped habitats of the existing conditions within the Proposed Project area, the following species have been considered absent from the Proposed Project area due to lack of suitable habitat and/or the species fell outside the elevation range of the Proposed Project area.

- San Gabriel manzanita (*Arctostaphylos gabrielensis*)

- marsh sandwort (*Arenaria paludicola*)
- coastal dunes milk-vetch (*Astragalus tener* var. *titi*)
- Parish's brittlescale (*Atriplex parishii*)
- round-leaved filaree (*California macrophylla*)
- Palmer's mariposa lily (*Calochortus palmeri* var. *palmeri*)
- Mt. Gleason paintbrush (*Castilleja gleasoni*)
- southern tarplant (*Centromadia parryi* ssp. *australis*)
- California saw-grass (*Cladium californicum*)
- San Gabriel bedstraw (*Galium grande*)
- Los Angeles sunflower (*Helianthus nutallii* ssp. *parishii*)
- Coulter's goldfields (*Lasthenia glabrata* ssp. *coulteri*)
- San Gabriel linanthus (*Linanthus concinnus*)
- Gambel's water cress (*Nasturtium gambellii*)
- prostrate vernal pool navarretia (*Navarretia prostrata*)
- short-joint beavertail (*Opuntia basilaris* var. *brachyclada*)
- Rock Creek broomrape (*Orobanche valida* ssp. *valida*)
- southern mountains skullcap (*Scutellaria bolanderi* ssp. *austromontana*)
- Sonoran maiden fern (*Thelypteris puberula* var. *sonorensis*)
- Busck's gallmoth (*Carolella busckana*) (not a plant)

Updates to focused surveys will be conducted for special status plants and significant natural communities (sensitive habitats) with a potential to occur within the Proposed Project area, in accordance with CDFW guidelines, as part of the habitat restoration mitigation measure MM BIO-8.

Response to Comment 171-25:

See Response to Comments 171-23 and 171-24. As 2010 was considered an El Niño year with adequate rainfall for plant surveys, no official reference sites were visited in 2010. Plants with the potential to occur on the site were evaluated and surveyed during the appropriate blooming period.

It was determined that round-leaf filaree (*California macrophylla*) was absent due to lack of suitable habitat found within the reservoir. This species occurs in clay soils in cismontane woodlands and foothill and valley grasslands. The closest vegetation community on site would be a patch of White Alder Woodland; however, soils are very sandy in this location due to constant scouring. Clay soils are important for this species and were lacking on site; therefore, round-leaf filaree is considered absent due to lack of suitable habitat.

Response to Comment 171-26:

See Response to Comments 171-23 and 171-24.

Response to Comment 171-27:

See Response to Comment 171-16.

Response to Comment 171-28:

LACFCD has been working and will continue to work closely with CDFW and USACE to identify appropriate mitigation, replacement ratios, and sites for restoration and enhancement that will offset impacts and satisfy the requirements of all applicable laws. Mitigation locations will comply with CDFW recommendations as follows: first, onsite; second, offsite within the Arroyo Seco Watershed; and third, offsite within the greater Los Angeles River watershed.

Response to Comment 171-29:

Mitigation Measure MM BIO-1 has been revised in the Final EIR, Section 3.6, as follows. Added text is shown in bold and italics.

MM BIO – 1: A qualified biological monitor shall be present during initial ground- or vegetation-disturbing project-related activities ***to provide protection measures and monitor for wildlife in harm's way. This includes initial ground-disturbing project-related activities at the annual start of each year of sediment removal or maintenance activities***. Following initial project-related activities, a qualified monitoring biologist shall be present as necessary to maintain the implemented protection measures and monitor for additional species in harm's way. ***These protection measures shall include, as appropriate: redirecting the wildlife, identifying areas that may require exclusionary devices (e.g., fencing), or capturing and relocating wildlife outside the work area. Any captured species shall be relocated to adjacent appropriate habitat that is contiguous to adjacent habitat and not impacted by project-related disturbance activities.***

Response to Comment 171-30:

Mitigation Measure MM BIO-3 has been revised in the Final EIR, Section 3.6. Added text is shown in bold and italics, and deleted text is shown in strikeout.

MM BIO – 3: Within 90 days prior to ground-disturbing activities, a preconstruction survey shall be conducted by a qualified biologist for the presence of any sensitive species in harm's way, including coast range newt, the southwestern pond turtle, and the two-striped garter snake. If sensitive species are observed in harm's way, the qualified biologist will develop and implement appropriate protection measures for that species. These protection measures shall include, as appropriate, redirecting the species, ***constructing*** ~~construction of~~ exclusionary devices (e.g., fencing), or ***capturing*** ~~capture~~ ***and relocating*** ~~relocation~~ ***wildlife*** outside the work area. Preconstruction surveys shall be repeated annually for the duration of the sediment removal. ***Observations of special status species made during these surveys shall be recorded onto a CNDDB field data sheet and submitted to CDFW for inclusion into the CNDDB.***

Response to Comment 171-31:

See Response to Comment 171-30.

Response to Comment 171-32:

Sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays). In addition, sediment removal activities would not completely block the Proposed Project site from surrounding habitat, would occur only during the day, and would

not interfere with nighttime wildlife activity. Although some wildlife may be temporarily displaced during construction, wildlife would not be physically prevented from moving around and into the basin area.

The protective Mitigation Measures MM BIO-1, MM BIO-2, MM BIO-3, MM BIO-4, and MM BIO-5 would avoid and minimize any impacts associated with Proposed Project activities. Therefore, the potential impacts to wildlife movement and corridors are anticipated to be less than significant.

Alternative 3, Configuration D affects the least amount of habitat of all the action alternatives while still achieving Proposed Project objectives (see Section 4.6 of the Final EIR). This alternative would provide a buffer on the west side of the reservoir that would allow for the movement of wildlife. Alternative 3, Configuration D, Option 1 provides a more natural configuration for the reservoir by having two branches to carry water and sediment toward the face of the dam, avoiding disturbing a significant portion of existing vegetation. To further reduce the Proposed Project's footprint, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2, which drastically reduces the project's footprint of 120 acres down to 71 acres, would avoid excavation of the western branch, thereby providing a greater habitat buffer on the west side of the reservoir. In addition, the maintenance areas would be smaller than the original sediment removal footprint, allowing for habitat to reestablish and providing additional areas for wildlife movement.

Response to Comment 171-33:

The contact person noted in the letter, Mr. Matt Chirdon, will be contacted if any questions regarding the letter arise.

From: Susanna Dadd
To: reservoircleanouts
Subject: Hahamongna Watershed park/debris basin
Date: Sunday, October 27, 2013 12:06:24 PM

Dear Sirs:

Comment 172-1

I do understand that it is necessary to periodically clean out the debris basins of built up silt. However, I oppose the annual grubbing out of all vegetation in Hahamongna after the basin is cleared.

Comment 172-2

We strongly suggest that debris removal is begun at the north end of the basin and the area is allowed to regrow as the work is completed. We have so little habitat remaining since the Station fire, and riparian areas are rare in southern California. We ask that you allow the vegetation and trees to recolonize the area after work is completed. The vegetation will itself suck up a lot of water and will also slow down the speed of flood waters. It will take decades before the basin is filled up again. Let's not create another desert in our midst.

Thank you,

--
Susanna Dadd and James Griffith
626 398 9939
1601 E. Loma Alta Drive
Altadena, CA 91001

Response to Comment Letter #172 (Susanna Dadd)

Response to Comment 172-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. Los Angeles County Flood Control District (LACFCD) notes that the commenter does not approve of the proposed annual grubbing of vegetation during the maintenance phase of the Proposed Project.

A maintenance regime put in place after the main sediment removal project is completed greatly reduces the need for and extends the life of future and existing sediment placement sites and improves the future sustainability of the reservoir. The maintenance area for Alternative 3, Configuration D, the Environmentally Superior Alternative from the Draft Environmental Impact Report (EIR), will be smaller than the original sediment removal footprint, allowing for habitat to reestablish (see Section 4.6 of the Final EIR).

Response to Comment 172-2:

Alternative 3, Configuration D affects the least amount of habitat of all the action alternatives while still achieving Proposed Project objectives (see Section 4.6 of the Final EIR). This alternative would provide a buffer on the west side of the reservoir that would allow for the movement of wildlife. Alternative 3, Configuration D, Option 1 provides a more natural configuration for the reservoir by having two branches to carry water and sediment toward the face of the dam, avoiding disturbing a significant portion of existing vegetation. To further reduce the Proposed Project's footprint, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2, which drastically reduces the project's footprint of 120 acres down to 71 acres, would avoid excavation of the western branch, thereby avoiding more existing vegetation and providing a greater habitat buffer on the west side of the reservoir.

Comment Letter #173

From: robsayhello@
To: reservoircleanouts
Subject: reservoir cleanout
Date: Wednesday, November 06, 2013 7:26:56 PM

Comment 173-1 Is it possible to have those trucks run on natural gas to reduce smog?

Response to Comment Letter #173 (Rob)

Response to Comment 173-1:

Thank you for your input. This comment has been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. Air quality impacts associated with truck traffic were analyzed in the Draft Environmental Impact Report (EIR) in Section 3.5. Los Angeles County Flood Control District (LACFCD) has conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed the United States (U.S.) Environmental Protection Agency's (EPA's) 2007 standards for emissions. Therefore, in order to further reduce emissions, Mitigation Measure MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump trucks that meet or exceed EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality will be reduced to less than significant.

County of Los Angeles Department of Public Works

Attn: Water Resources Division – Reservoir Cleanouts

P.O. Box 1460 Alhambra, CA 91802-9974

fax (626) 979-5436, reservoircleanouts@dpw.lacounty.gov

January 15, 2014

Subject: Devil's Gate Reservoir Sediment Removal and Management Project - Keith Lilley

Dear Mr. Lilley,

This communication is intended as a Public Comment on the Draft Environmental Impact Report for the project.

I have been a property owner and taxpayer in the City of Pasadena, California for eight years. Listed on my Secured Property Tax For Fiscal Year July 1, 2013 to June 30, 2014 are the following Direct Assessments that I pay yearly to Los Angeles County: Flood Control, County Park District, County Sanitation District.

Comment 174-1

With this investment I place my trust in you and other managers in government agencies to make the best choices in how this money is spent. In reading through the description of this project and its many pages of appendixes on a very limited time schedule due to its requirement to be fully digested during a time of year when the Holiday schedule coincides, it appears to be quite alarming in its sloppiness and redundancy. However, I do appreciate the amount of difficulty you are faced with trying to coordinate all the different elements involved. Likewise, my comments are not as complete and detailed as I would like them to be.

Comment 174-2

CUMULATIVE AFFECT ANALYSIS INCOMPLETE

Why isn't there an assessment of the cumulative affect this project will have on the local ecosphere? Why is there no mention of the proposed Metro/ Caltrans extension and tunnel construction of the 710 freeway? Is it lack of information each has of the other or simply expedient for both agencies; Metro/Caltrans and LACFC to coincide EIR studies to leave each other out? What is the logical explanation for this important omission when Gail Farber, your experienced director, spent nineteen years working for Caltrans?

Comment 174-3

CULTURAL RESOURCE ANALYSIS UNDULY MINIMIZED

Did you know that the sand and soils in what you call the Devil's Gate Dam Reservoir are of great value? In addition to being a taxpayer and having a financial investment in Hahamongna Watershed Park well-being, which you have regrettably avoided using its proper identifying name throughout the report, I am an oil painter trained in the technique of the historic High Renaissance period. The sand and soil in Hahamongna Watershed Park is collected to grind and mix with oil mediums to create an unique color palette and chemical alchemy that is distinctive to upper arroyo and mountains.

Comment 174-4

Did you know that the consultants you've hired who claim to have expertise on this subject appear to have failed you? They claim that since no ancient

Comment 174-4 continued

bones have been left in the area you call the reservoir after decades of the site being pillaged and degraded, there could be no possible sacredness or historical significance in this part of the Arroyo Seco. How can you agree with their analysis? Your consultant and agent addressed this concern at a community meeting by rephrasing the question: “Are there any ghosts in the Devil’s Gate Dam Reservoir?

Why were the many artists, painters, spiritualists and naturalists, historians and kin to the native tribes that once camped along the shores of this river not considered? Did you know that this is what makes a place sacred and its rarity culturally important? Why did you not take advantage of the world class curators and experts on arroyo culture and art right here in the San Gabriel Valley?

Comment 174-5

INCOMPLETE DATA ON COMMERCIAL ENTERPRISE OPERATIONS AND LIABILITIES

Is Vulcan Materials, a private business, the likely award for this multi-million dollar trucking contract as well as the excavation job? Are you considering other private companies to avoid the appearance of making an extremely large gift to Vulcan Materials? What is the sales percentage paid out of your budget to the company or companies that receive the contracts?

Did you know that Vulcan Materials is the same company that has chosen, out of its short-term self-interest, to intentionally remove and severely alter the San Gabriel mountain skyline? Why would you pick a company that has demonstrated a lack of respect and care for aesthetics, and historic resources for the very part of this job that requires sensitivity?

Comment 174-6

Why does your report reveal a dismissal of the need to have low emission vehicles perform this massive undertaking? Is your 100 million dollar budget too restrictive? Do you need more money? Do you have enough budgeted for the massive claims and damages that will not be covered by the operators insurance policies?

Comment 174-7

As you can see in other public comments, the health and economic affects on residents will be quite severe and you have been formally noticed prior to taking any action. How will private commercial entities share in intentional liability? Who will be protected from or assume all of it?

Comment 174-8

Do you know of any protection the law provides when a “defendant” (that would be you and your agents/contractors) intentionally activates or causes intensification of a poison? Recently, in People v. Atlantic Richfield Company, et al., Superior Court of California, County of Santa Clara, Case No. 1-00-CV-788657, Proposed Statement of Decision the judge wrote about lead paint poisons being unleashed upon an uninformed public:

“Each Defendant certainly knew or should reasonably have known that exposure to lead at high levels, including exposure to lead paint, was fatal or at least detrimental to children’s health.

That knowledge alone should have caused each Defendant to cease its promotion and sale of lead pigment and/or lead paint for home use.

Instead, after becoming aware of the hazards associated with lead paint, they continued to sell it.”

Comment 174-9

How is what manufactures of poisons did in that case different from what you

Comment 174-9 continued

suggest doing in all of the alternative projects you have presented? Isn't the lack of a long term plan that does not put at risk the health and safety of living beings (not buildings) the same as selling lead paint year after year because nobody is watching? Is it a "So what? We'll just pay the fines and the claims."? As a taxpayer, you and I are partners, we can't operate like malignant psychopathic narcissists.

Comment 174-10

Did you know in July 2013 a report from the California Water Quality Monitoring Council said chromium VI was present in Pasadena water? The source of chromium VI in Pasadena drinking water is "naturally occurring" in contrast to the contamination caused by industry as in the Glendale water system. Whether the source is natural or industrial, chromium VI is especially toxic when made airborne by digging. [1]

Comment 174-11

Do you really think the use of a water spray truck will reduce the risk of contamination and its distribution? What about the dirt from tires and undercarriages? What about inadequate covering on the trucks? What about the surrounding living beings where the sediment will be dumped and poison made airborne again?

Is it a melodramatic scenario where 4,000,000 CY of sediment must be removed on a short, intensive schedule or flood damage will occur downstream? Isn't flood damage defined by property damage? How is property damage ever more important than the health of children and the elderly? Where is the legitimate scientific analysis that supports the extreme reaction? I see only analysis that supports a much more subtle approach presenting much less risk of harm to all living things—not buildings. Why have you interpreted your reports this way?

BEST MANAGEMENT PRACTICES HANDBOOK NOT FOLLOWED

Comment 174-12

In a document still in use by your agency entitled the Stormwater BMP Handbook, January 2003, Construction: Preservation of Vegetation EC-2, published by the California Stormwater Quality Association, it states clearly on the first page as best management practices this: " Carefully planned preservation of existing vegetation minimizes the potential of removing or injuring trees, vines, shrubs, and grasses that protect soil from erosion." Under the next heading, Suitable Applications: "Preservation of existing vegetation is suitable for use on most projects. Large project sites often provide the greatest opportunity for use of the BMP. Suitable applications include the following: Areas within the site where no construction activity occurs, or occurs at a later date. This BMP is especially suitable to multi year projects where grading can be phased.; Areas where natural vegetation exists and is designated for preservation. Such areas often include steep slopes, watercourse, and building sites in wooded areas.; Areas where local, state, and federal government require preservation, such as vernal pools, wetlands, marshes, certain oak trees, etc. These areas are usually designated on the plans, or in the specifications, permits, or environmental documents.; Where vegetation designated for ultimate removal can be temporarily preserved and be utilized for erosion control and sediment control.

On page 2, EC-2 Preservation of Existing Vegetation, Implementation: "The best way to prevent erosion is to not disturb the land."

Page 3, EC-2 Preservation of Existing Vegetation, Costs: There is little cost associated with preserving existing vegetation if properly planned during the project design, and these costs may be offset by aesthetic benefits that

enhance property values. During construction, the cost for preserving existing vegetation will likely be less than the cost of applying erosion and sediment controls to the disturbed area. Replacing vegetation inadvertently destroyed during construction can be extremely expensive, sometimes in excess of $10,000 per tree." (Note: Update that cost to 2014 $$$ and add ,000, per tree).

Comment 174-12 continued

This best management practices manual contains guidelines on the use of soft bottom channel clearing. In these guidelines it describes the many requirements of the vehicles used at the site. It covers fueling, cleaning of equipment, potential chemical and oil spills and side casting. Did you know that side casting is defined as the piling of debris and soil to the side of the soft bottom channel is not permissible? The guidelines suggest: "The soil and sediments from previous storms could be groomed or leveled in a way to allow flow of water and minimize storm water pollution."

Why does this project violate so many provisions in the BMP Manual?

LONG TERM PLAN IS NOT INCLUDED

Comment 174-13

In my written scoping comment on this project, I suggested a **serpentine** type of ravine across the width of Hahamongna incorporating the natural willows and existing habitat as a filtration system and allowing for stream to flow carrying sediment with it. Why was this not studied as an alternative?

Comment 174-14

With respect to our forefathers design and engineering of Devil's Gate Dam and the other dams and debris basins along the foothills, isn't it an error in placement, design and engineering to call it or allow it to become a reservoir when it exists at the base of extremely high and steep, erosive mountains? Is that not a recipe for disaster in and of itself?

Comment 174-15

How do you get the sediment out of there safely? This is the permanent question as long as the dams and debris basins exist in the configuration that they do now. In the future, Devil's Gate Dam should and will be removed. The best possible use of resources is to prepare for that eventuality. The Los Angeles River is being restored. The lower Arroyo Seco at and around the confluence is in need of reconfiguration to protect property from the sometimes flood, help conserve water and filter pollutants. This is a transitional time for Southern California. It is a public works emergency that rises above the polemics. With the increase in climate instability the safest position is returning to a more natural state. It is a time for going with the flow instead of fighting it.

Thank you for the opportunity to comment.

Sincerely,

Dianne Patrizzi

564 N. Oakland Ave.

Pasadena, CA 91101

(626) 390-0750

Email: thaddius.d.patrizzi@gmail.com

[1] (Genesis of hexavalent chromium from natural sources in soil and groundwater By Christopher Oze, Proceedings of the National Academy of Sciences of the United States of America, vol. 104 no. 16, April 17, 2007, Boston, Mass. http://www.pnas.org/content/104/16/6544.full)

Response to Comment Letter #174 (Dianne Patrizzi)

Response to Comment 174-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

Los Angeles County Flood Control District (LACFCD) strives to achieve an efficient, low-cost sediment removal project. Sediment removal rates and trucking operations, utilizing all low-emissions trucks, have been carefully planned for economies of scale to realize maximum efficiencies without major delays in project schedule, thus greatly reducing operating costs. Furthermore, LACFCD has applied for and received an approximately $28 million grant through the State's Disaster Preparedness and Flood Protection Bond Act of 2006 (Proposition 1E) program. A portion of this grant will be used to help offset the Proposed Project's costs.

LACFCD recognized the length of the Draft Environmental Impact Report (EIR) and considered this when providing an extended public review time for the Draft EIR. The California Environmental Quality Act (CEQA) requires that the public comment period for a Draft EIR be 45 days in length. LACFCD extended this review period initially to 75 days and then further extended the review period to 90 days to allow for additional commenting time.

Response to Comment 174-2:

The Draft EIR does contain a cumulative analysis. The cumulative analysis contains projects as determined by LACFCD, California Department of Transportation (Caltrans), and the surrounding cities and communities to have a potential cumulative effect due to overlapping time frames of the projects. Potential projects that were determined to be outside the area of influence, sediment-removal phase of the project schedule, or lacking sufficient project detail, were not considered to be reasonable foreseeable probable future projects, as set forth in the CEQA Guidelines Section 15130. The Interstate 710 (I-710) project was not included in the Draft EIR as a cumulative project, as it was determined to be outside the area of influence. A cumulative growth factor was used in the Traffic Study that accounted for future traffic growth and its cumulative effects. The Devil's Gate Reservoir Sediment Removal and Management Project sediment removal phase is scheduled to be completed by 2020, prior to the initiation of the I-710 tunnel project. At this time the I-710 Extension/Tunnel project is in the preliminary phases, and a project schedule has not been established (Caltrans 2010). The growth factor considered in the analysis provided a conservative project condition volume that accounts for expansion and regional growth.

Response to Comment 174-3:

The sediment that came into Devil's Gate Reservoir following the Station Fire has a very fine gradation or consistency. As such, the majority of this material is not readily reusable on a commercial scale and will most likely not be sold; however, sediment placed at sediment placement sites would be available for potential reuse for other projects or sediment reuse opportunities. The sediment removed from the Devil's Gate Reservoir will be transported to the existing placement sites listed in Section 2.0, Project Description in the Draft EIR.

For further information regarding beneficial uses for sediment at the Los Angeles County Flood Control District (LACFCD) sites, please refer to Section 6.5 of the 2012 LACFCD's Sediment Management Strategic Plan which can be found at: http://dpw.lacounty.gov/lacfcd/sediment/stplan.aspx.

As noted in Section 2.1, Project Location, of the Draft EIR, Devil's Gate Dam and Reservoir is within the City of Pasadena's Hahamongna Watershed Park.

Response to Comment 174-4:

The Draft EIR, Section 3.7 Cultural Resources recognizes the history and ethnography of the site, including the potential to discover unidentified archaeological sites.

As noted in the Draft EIR, the Native American Heritage Commission (NAHC) maintains the Sacred Lands Inventory identifying lands sacred to Native Americans in California and other states. Chambers Group contacted the NAHC in June 2011 and requested a search of the Sacred Lands Inventory for any information regarding Sacred Lands or other cultural resources in the vicinity of Devil's Gate Reservoir (Appendix E). The results of the search were negative. The NAHC provided Chambers Group with a list of tribes affiliated with the Devil's Gate Reservoir area and recommended they be consulted regarding the Proposed Project.

As discussed in the Draft EIR, Chambers Group notified those tribes in August 2011 and invited comments regarding cultural resources in the area (Appendix E – Cultural Resources Report). A response was received from the Gabrieleño Band of Mission Indians stating that the site is considered culturally sensitive by their Elder Committee and Tribal historians.

As discussed in the Draft EIR, most of the soil in the Proposed Project area consists of recently accumulated sediment and archeological sites are not anticipated to exist; however, it is always possible that unidentified archaeological sites exist in native soils below the accumulated sediment. If sediment removal or reservoir management activities exceed the depth of the historic flood deposits and encounter native soils, implementation of Mitigation Measures MM CUL-1 through MM CUL-3 will reduce potential impacts to less than significant.

Response to Comment 174-5:

The bidding process to select a contractor will begin after the County of Los Angeles Board of Supervisors certifies the Final EIR and LACFCD acquires all regulatory permits and finalizes design documents. LACFCD uses a formally advertised sealed bid process for public works construction contracting. The goal of the process is to award a contract to the lowest cost "responsive" and "responsible" bidder. California Public Contract Code mandates the use of an advertised bid process for construction contracting. Contractors and service providers must meet certain qualification requirements to be considered by the County for selection and contract award.

More detailed information on the County's construction bidding process can be found in the *County of Los Angeles Countywide Construction Policy Guidelines,* available online at the following location: http://dpw.lacounty.gov/aed/construction_manual.pdf

Response to Comment 174-6:

Air quality impacts associated with truck traffic were analyzed in the Draft EIR in Section 3.5. LACFCD has conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed the United States (U.S.) Environmental Protection Agency's (EPA's) 2007 standards for emissions. Therefore, in order to further reduce emissions, Mitigation Measure MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump trucks that meet or exceed EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality, including those associated with health effects, will be reduced to less than significant.

Response to Comment 174-7:

See Response to Comment 174-6. As discussed in the Draft EIR, Section 3.5, the Health Risk Assessment (HRA) found the Proposed Project would result in less than significant impacts for both the cancer-related and non-cancer-related impacts.

Under CEQA, the lead agency is not required to analyze an economic impact associated with a project in the EIR; as Section 15131(a) of the CEQA Guidelines states: "Economic or social effects of a project shall not be treated as significant effects on the environment." Moreover, CEQA allows economic analysis in the administrative record only if the basis for infeasibility, and thus rejection of a mitigation or alternative, is economic, as described in CEQA Guidelines Sections 15091(a)(3) and 15364.

Response to Comment 174-8:

See Response to Comment 174-7. The Proposed Project does not involve significant health risk impacts.

Response to Comment 174-9:

See Response to Comment 174-7.

Response to Comment 174-10:

As discussed in the Draft EIR, Section 3.10.6, Impacts and Mitigation, HAZARDS-1, Sediment Removal/Reservoir Management, no hazardous levels of the contaminants were detected in the sediment. Dust impacts from the Proposed Project were carefully evaluated, as discussed in the Draft EIR, Section 3.5.6, Impacts and Mitigation, AIR QUALITY-2, Sediment Removal. The Proposed Project's activities including excavation, grading, material loading, and hauling would result in less than significant dust emissions due to the Proposed Project's use of best management practices and would be in full compliance with South Coast Air Quality Management District's (SCAQMD's) fugitive dust regulations.

Response to Comment 174-11:

See Response to Comments 174-7 and 174-10.

LACFCD was mandated by the State Legislature to provide flood protection and water conservation within its boundaries.

A reservoir storage design capacity of two design debris events (DDEs) below the dam's lowest spillway was determined to be the standard acceptable level of risk at Devil's Gate Dam and Reservoir. The DDE volume of capacity is determined using the January 2006 Los Angeles County Department of Public Works (LACDPW) Hydrology Manual and the March 2006 LACDPW Sedimentation Manual. For Devil's Gate Dam and Reservoir, the required reservoir capacity is 4.0 million cubic yards (cy) (two DDEs) below the spillway elevation of 1,040.50 feet.

The Hydrology Manual (January 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_Hydrology_Manual/2006%20Hydrology%20Manual-Divided.pdf

The Sedimentation Manual (March 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_sedimentation_manual/Sedimentation%20Manual-Second%20Edition.pdf

Additional information concerning DDE calculation methods has been added to the Final EIR, Section 2.3, Project Need.

Response to Comment 174-12:

As noted in Section 2.7 of the Draft EIR, the Proposed Project would be conducted in accordance with applicable standards and best management practices (BMPs). In order to remove the necessary amount of sediment from the reservoir, some vegetation must be removed, as the vegetation sits atop many layers of accumulated sediment. Alternative 3, Configuration D is considered the Environmentally Superior Alternative, as it leaves the greatest amount of vegetation and habitat undisturbed. This alternative will still remove some vegetation; however, it will also remove the amount of sediment necessary to provide downstream protection from flooding. After sediment removal activities are completed, habitat restoration will occur.

Response to Comment 174-13:

Alternative 3, Configuration D, Option 1 is the alternative most closely resembling the alternative that the commenter suggests. In Alternative 3, Configuration D, Option 1 the western edge of the reservoir as well as an island in the middle of the reservoir will remain untouched (see Section 4.6 of the Final EIR). Furthermore, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2 would avoid excavation of the western branch, providing a greater distance between the western side and the excavation area.

Response to Comment 174-14:

Devil's Gate Dam, built in 1920, was the first dam built by LACFCD. The dam was built in response to the severe flooding of Los Angeles in the early 1900s and allowed for the channelization of and development along the Arroyo Seco. The Arroyo Seco normally carries low flows, but it is periodically inundated from severe floods flowing off its large, steep watershed that includes mountainous terrain. Prior to the construction of the dam, cities such as Pasadena, South Pasadena, and Los Angeles would experience flooding from the Arroyo Seco during storms. The Rose Bowl, built in 1922, and the Arroyo Seco Parkway, also known as State Route 110, completed in 1953, are two examples of downstream development made permissible by the construction of Devil's Gate Dam.

Response to Comment 174-15:

See Response to Comment 174-14. The scope of the Proposed Project is to restore capacity for Devil's Gate Reservoir. Removing the dam would remove the only flood attenuation mechanism that is in place along the Arroyo Seco. Areas downstream of the dam would be at high risk of flooding during storm events. Also, sediment would move downstream and accumulate within and adjacent to the channel as a result of removal of the dam. Sediment accumulation in the channel would reduce the capacity of the channel in those areas and would further increase the likelihood of flooding. Dam removal with new flood control downstream is outside the scope of this project and is inconsistent with the Proposed Project objectives. The main objectives of this project are to satisfactorily reduce flood risk, create a configuration suitable for routine operations and maintenance, and reduce the possibility of plugging at the face of the dam. By removing the dam, these objectives would not be met.

The Proposed Project is designed to be a long-term plan. After the sediment removal phase has occurred, FASTing is proposed to be an integral part of the annual maintenance at Devil's Gate. Annual FASTing operations will be implemented to reduce future buildups of sediment in the reservoir and to reduce the need for mechanical removal of sediment from the reservoir. Although FASTing is expected to be an effective means of keeping sediment levels low in the reservoir, it is estimated that typically 13,000 cy of sediment will be removed by excavation annually. A maintenance regime that relies on FASTing greatly reduces the need for and extends the life of future and existing sediment placement sites and improves the future sustainability of the reservoir. Please see Section 2.5.2 of the Draft EIR for more information on future maintenance.

County of Los Angeles
Department of Public Works
Water Resources Division
Attn: Reservoir Cleanouts Program
P.O. Box 1460
Alhambra, CA 91802-1460

January 17, 2014

DEVIL'S GATE RESERVOIR SEDIMENT REMOVAL AND MANAGEMENT PROJECT: COMMENTS ON THE DEIR

Barbara Ellis,
636 West California Boulevard
Pasadena
CA 91105
(Babs.ellis@gmail.com)

1. The draft DEIR has not been publicized correctly according to CEQA rules

The official notices about the DEIR are supposed to be advertised in prominent positions at the Hahamongna entrances. Instead, they have been placed under scratched and dirty Perspex, and are illegible. Despite drawing attention to this early on in the commenting process, nothing has been done to replace the Perspex. A new notice of the extension of the comment period to January 21 was placed under the same dirty covers just a few weeks ago (see photo below). I am a regular user of Hahamongna and have watched all other users walk right by these pedestals without noticing that there was important information to read. Most users of Hahamongna Watershed Park have no idea about the proposals and are shocked when I tell them what is planned. This, and the unfortunate timing of the commenting period between Thanksgiving and the New Year, will have greatly reduced the number of people that have submitted comments.

Comment 175-1

2. Why has the amount of sediment to be removed increased substantially?

In November 2010 the Hahamongna Advisory Committee (HAC) was informed that the sediment removal project would remove 1.67 million cubic yards and scour 50 acres with only 15 of those to remain permanently bare. Now the DEIR project and alternatives will scour up to 120 acres and remove from 2.4 to 4 million cubic yards of sediment. What hydrological studies or other science justify this major increase in scope?

When I attended the HAC meeting in November 2010, we were told that the plan was to increase the capacity of the reservoir to cope with one DDE. This was considered sufficient to ensure the safety of areas downstream in the event of water overflowing the dam's spillway. Why has this since been increased to two DDEs?

Comment 175-2

Much of the sediment resulting from the Station Fire in 2009 has already come down the watershed. And in the intervening 4 years, a significant amount of the remaining sediment has been anchored by new plant growth, especially the dense regrowth of alders, many now 20 feet or more high, along the Arroyo Seco and Millard canyon river banks upstream from Hahamongna. The entire watershed will not burn again significantly for at least 30 years, so it is highly unlikely that even one DDE will occur during that time. Planning for a worst-case scenario of 2 DDEs is unnecessary, expensive, and will permanently destroy most of Hahamongna Watershed Park, which is an invaluable recreational and wildlife area in Pasadena.

3. The DEIR fails to consider the implications of the simultaneous the Eaton Canyon/Devil's Gate Water Diversion Project

This project will require a large storage pond, and a pumping station, within the Devil's Gate Dam area. On the website for the "Devil's Gate and Eaton Stormwater Flood Management Project," it is stated that "Implementation of this Project will reduce flood risks for the downstream communities from high, debris latent flows from Devil's Gate Dam. The pipeline project is a plan to capture most of the 6.900 acre/feet of water that would be sent into the ocean and use it to recharge the aquifer instead."

Comment 175-3

Surely, by removing excess water via this pipeline, the chances of the spillway overflowing will be decreased? Will this not obviate the need to remove the 2.4 to 4 million cubic yards of sediment that are planned for in the DEIR?

This project is due to begin in 2016. It will cause even more disruption to the Hahamongna Watershed Park, with closures for recreation and yet more noise, traffic and air pollution than mentioned in the DEIR.

4. The DEIR does not contain an assessment of the risk of flooding of downstream areas

The DEIR does not identify or document the flood threat. When the spillway overflowed in 2005, massive amounts of water entered the Arroyo Seco channel, yet there was no flooding. The concrete channel was deep enough to contain the water, and will doubtless be deep enough to hold the water in future severe rainstorms. We need a scientific risk analysis by a team of experts, rather than unsubstantiated statements about the risks to the

Comment 175-4

Comment 175-4 continued

Rose Bowl, the golf courses, the Arroyo Seco Parkway, and downstream communities and cities.

5. The DEIR does not provide details of mitigation for habitat loss

It does not even guarantee that the mitigation will be in Hahamongna, rather than in another part of the region, such as Tujunga canyon. Moreover, there are no details of the aftercare of new plantings. Opportunistic non-native weeds will need to be controlled, and the new plantings will need irrigation during the dry months. Has this been taken into account? What guarantee is there that efforts will be made to bring back the rich habitat destroyed by the sediment removal?

Comment 175-5

6. The biological studies in the DEIR are unrepresentative of the plant and animal diversity of Hahamongna

The environmental study was conducted during an unusually dry period. The lack of rain has led to a sharp decrease in insects, frogs, other amphibians, and reptiles. This in turn has affected the animals such as rats, mice, bats, snakes, coyotes, herons, egrets and ducks, as well birds of prey such as hawks, kites, merlins and falcons. In my experience as a regular user of Hahamongna over 12 years, during times of normal or above average rainfall, there are lakes full of frogs and tadpoles, wetlands rich in insects, worms, snails, frogs, snakes and lizards, and numerous animal and bird species, plus deer, coyotes, raccoons, skunks, bobcats and mountain. The biological findings in the report are therefore not representative of the usual rich wildlife and plant life present in non-drought years and underestimate the extent to which the proposed work will damage the ecosystem.

Comment 175-6

COMMENTS ON SPECIFIC STATEMENTS IN THE DEIR

"THE ANALYSIS UNDERTAKEN FOR THIS DRAFT EIR HAS DETERMINED THAT IMPACTS TO BIOLOGICAL RESOURCES, CULTURAL RESOURCES, LAND USE AND PLANNING, AND NOISE COULD BE MITIGATED TO A LEVEL OF LESS THAN SIGNIFICANT."

I disagree strongly that the impact on biological resources can be mitigated to a level that is less than significant.

Comment 175-7

It will not be possible to mitigate the permanent destruction of more than 100 acres of riparian and riversidean mulefat and willow habitat. During the five to ten years of plant and sediment removal, most of the wildlife in this area will die, or move elsewhere. Animals and birds, including the endangered least Bell's vireo, will attempt to find new habitats, though these are becoming increasingly rare in the region. If they can find food and room to reproduce elsewhere, they will not return. The proposed annual maintenance cleaning of the reservoir will remove plants and trees that have taken root, which will permanently prevent the recovery of this ecosystem.

Comment 175-7 continued

The County proposes replacing habitat on a 1:1 basis, but most mitigation programs require significantly higher ratios, on the order of 3:1 to 5:1. While the County promises to perform as much of the mitigation on-site in Hahamongna, there is no way that they can do that since their program will destroy more than 100 acres of riparian and prime habitat and permanently leave a large maintenance area as bare earth. There is also no guarantee that the mitigation planting will be in Hahamongna, rather than in another part of the region.

I disagree strongly that the impact on land use and planning can be mitigated to a level that is less than significant.

Comment 175-8

The diverse range of users of this area includes hikers, dog walkers, runners, picnickers, commuters between Pasadena, JPL and La Canada, soccer and baseball players, disc golfers, mountain bikers, horse riders, riding for disabled children, and Tom Sawyer camp. There are 10 schools in the vicinity that use the area. The Park also connects an extensive trail system, joining trails from Pasadena, Altadena, the San Gabriels and La Canada. None of this will be possible during the greater part of 5 years. The area will not be useable due to disruption, truck traffic, noise, and air pollution. Trails will be disrupted and closed, some permanently. The beauty of the area, especially the willow tree wood in the basin near the dam, attracts people. It's what makes this my favorite place for walking. But if the trees are ripped out, and the area is left permanently bare, I will no longer want to spend time there, and I'm sure many others will feel the same way.

I disagree strongly that the impact of noise can be mitigated to a level that is less than significant.

Comment 175-9

There is no way the noise can be mitigated unless all the dump trucks and earthmoving equipment are electric, and gravel isn't crushed. The beeps from reversing machinery alone are extremely irritating and stressful. Houses in Pasadena to the west of North Windsor Avenue will suffer 5 years of this noise, traffic and air pollution, and will lose their property values. These houses may even be unsellable during the work period. The noise will also affect severely affect pupils at La Canada High School on the western edge of the area.

Comment 175-10

"UNMITIGABLE SIGNIFICANT IMPACTS INCLUDE SIGNIFICANT IMPACTS TO AESTHETICS, AIR QUALITY, AND TRAFFIC/TRANSPORTATION."

These are very serious impacts that cannot be dismissed readily.

Aesthetics

Comment 175-11

The sediment removal will do tremendous and permanent damage to the attractiveness of Hahamongna Watershed Park, Pasadena's largest open space and recreational area. It's presently a rare area of beauty, one that is flat and relatively easy to walk in. It's especially suitable for those not fit enough or confident enough to hike in the San Gabriels, and it is also a very accessible and safe area for children.

Comment 175-11 continued

Removal of all the trees and plants from near the dam wall to two-thirds of the way to JPL and the foothills will definitely destroy the aesthetics. The changing colors of the willow wood in the basin are an annual delight, yet there are no plans to allow these trees to return. And the extensive permanent maintenance areas proposed will destroy the pleasure of walking in this area. The proposed plan will leave a large part of Hahamongna looking like the barren surface of Mars.

Air quality

Comment 175-12

The County will remove 7,650 cubic yards per day over a three to five year period; 425 truck trips in and out per day working on Monday to Friday from 7 am to 7 pm and Saturday from 8 am to 5 pm. These are double trucks, each of which holds 20 cubic yards. Massive earth-moving equipment will fill these trucks. The trucks will descend into the basin just north of the dam and line up to await filling. The DEIR projects that one truck will be filled every two minutes, but this is impossible to achieve. Instead, there will be a long line of idling trucks waiting to be filled. There is no guarantee from the County that these trucks will not cause high levels of air pollution; 425 trucks a day will definitely create unhealthful diesel fumes. There are simply not enough low-emission trucks available for this massive project.

Comment 175-13

Much of the sediment, when dry, becomes a fine dust that blows everywhere. This “fugitive” dust thrown up by the heavy sediment-removal equipment and the trucks will pose a health risk for park users, for the residents nearby, for the children at the 10 schools close to the edges of the reservoir and for the 4,000 or so employees of the Jet Propulsion Laboratory. There will be traces of metals, such as arsenic, and other toxic pollutants in the wet mud by the dam wall and in the watercourses, and in the dry dust in the rest of the basin. Ash from the Station Fire that is now part of the mud and dust in Hahamongna is also unhealthy. Has the sediment been analyzed for toxicity?

Traffic

The proposal cannot go ahead without a detailed traffic study to determine the extra impact of the huge fleet of sediment removal trucks.

Comment 175-14

The large number of trucks leaving the 210 freeway at the Windsor off-ramp and rejoining it at either the Windsor or Berkshire on-ramps will considerably add to the congestion at these junctions, especially when mixed with school and JPL traffic at peak hours. Further, the 210 freeway is already considerably congested to the point of being stationary at key times of the day, and will not be able to cope with so many large trucks constantly coming and going to Azusa or Sunland. In the morning, there’s already a huge traffic jam heading west all the way from the junction with the 57 freeway. In the evening, the 210 east is bumper to bumper from the junction with the 134 freeway to the 605. Of particular concern is the 210 east tunnel in Pasadena, which is very narrow. Eastbound traffic on the 210 is already often stationary from Lincoln or Windsor. Frustrated car drivers will find surface routes through Linda Vista and North Pasadena to get around the congestion, and this will negatively impact the residents there.

SUGGESTIONS

Comment 175-15

1. Cut back the amount of sediment to be removed to that needed in the event of 1 DDE, as in the original proposal.

Comment 175-16

2. Do this slowly over 20 years, disturbing only small areas each year, flushing as much sediment as possible out through the dam, as suggested by the Arroyo Seco Foundation. This would cause much less disturbance to the habitat. Sediment has accumulated ever since the dam was built and has, in past years, been at an even higher level, yet there has never been any incidence of flooding downstream. Why are we being panicked into thinking there is an imminent catastrophe, and why does it have to be done so quickly and at such a great cost?

Comment 175-17

3. None of the alternatives presented are acceptable because of the scale and pace of the sediment clearance proposed. However, of all these proposals, Alternative 3, configuration D would destroy marginally less habitat. But this option should be amended to allow regrowth and new planting on the side slopes above 1020 feet rather than above 1040 feet.

Comment 175-18

4. Consider digging deeper over a narrower area to increase the water capacity of the reservoir and leave more untouched, vegetated land around the edges. These edges provide crucial habitat.

Comment 175-19

5. Also, reduce the proposed area to be stripped out around the edges of the reservoir to preserve as much riparian and riversidean habitat as possible. The willows are very valuable for birds, while the dense mulefat areas provide a sheltered habitat for coyotes, rabbits, snakes, lizards, and the birds that prey on them. These areas should be protected as much as possible.

Comment 175-20

6. Give priority to enhancing the habitat after sediment removal by creating wetland areas for water birds, herons, birds of prey, amphibians, and reptiles. Consider cutting some deeper pits that can fill with water to provide seasonal lakes. This has happened in the past when pits were accidentally dug deeper than intended during previous sediment removal operations. Over the years, I have observed many different kinds of birds using these lakes for breeding. Creating habitat like this is an easy and inexpensive way to enhance the ecology of the area.

Comment 175-21

7. Work with the City of Pasadena to increase the wildlife value of their land in order to create new areas for the displaced animals to go.

Barbara Ellis

(Babs.ellis@gmail.com)

Response to Comment Letter #175 (Barbara Ellis)

Response to Comment 175-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

Per the California Environmental Quality Act (CEQA) Guidelines Section 21902 (b)(3), notice shall be given to the last known name and address of all organizations and individuals who have previously requested notice and shall also be given by at least one of the following procedures:

- publication in a newspaper of general circulation in the area affected by the Proposed Project
- posting of notice by the lead agency on and off site in the area where the Proposed Project is to be located
- direct mailing to the over 1,100 owners and occupants of contiguous property shown on the latest equalized assessment roll

The notices for the Proposed Project, the Notice of Preparation (NOP), and the Notice of Availability/Notice of Completion (NOA/NOC) were:

- sent to agencies, organizations, and individuals who have previously requested notices, in addition to other area agencies and organizations
- published in local newspapers, the *San Gabriel Valley Tribune* and the *Pasadena Star News*
- posted on and off site
- mailed to owners and occupants of contiguous property shown on the latest equalized assessment roll
- filed with the County Clerk and the State Clearinghouse
- posted at eight local libraries
- posted on the LACDPW website

Therefore, notice for the Proposed Project was adequate, as the notice efforts went beyond the CEQA Guidelines requirements.

CEQA requires that the public comment period for a Draft Environmental Impact Report (EIR) be 45 days in length. The public review period for the Draft EIR for the Proposed Project was extended to 90 days, running from October 23rd to January 21st, in order to provide additional opportunity to comment.

Response to Comment 175-2:

The Los Angeles County Flood Control District (LACFCD) was mandated by the State Legislature to provide flood protection and water conservation within its boundaries.

A reservoir storage design capacity of two design debris events (DDEs) below the dam's lowest spillway was determined to be the standard acceptable level of risk at Devil's Gate Dam and Reservoir. The DDE volume of capacity is determined using the January 2006 Los Angeles County Department of Public Works (LACDPW) Hydrology Manual and the March 2006 LACDPW Sedimentation Manual. For Devil's Gate Dam and Reservoir, the required reservoir capacity is 4.0 million cubic yards (cy) (two DDEs) below the spillway elevation of 1,040.50 feet.

The Hydrology Manual (January 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_Hydrology_Manual/2006%20Hydrology%20Manual-Divided.pdf

The Sedimentation Manual (March 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_sedimentation_manual/Sedimentation%20Manual-Second%20Edition.pdf

Additional information concerning DDE calculation methods has been added to the Final Environmental Impact Report (EIR), Section 2.3, Project Need.

In 2010, in response to the Station Fire, an emergency project to remove only 1.67 million cubic yards (cy) was proposed. The volume of 1.67 million cy is the previously published DDE, and this amount was considered justifiable as an emergency exemption to the California Environmental Quality Act (CEQA). This emergency project was not completed because, in March 2011, the County of Los Angeles Board of Supervisors motioned LACFCD to complete an EIR for a comprehensive sediment removal project at Devil's Gate. LACFCD then initiated project development in accordance with the required level of protection of two DDEs. At that time, LACFCD also began receiving feedback on the concurrent Sediment Management Strategic Plan (Strategic Plan) and the interest to look at more sustainable sediment and reservoir management. As a result of the feedback and recommendations during the development of the Strategic Plan, LACFCD began evaluating ways to create a more sustainable long-term way to manage its sediment and habitat. To emphasize the goals of the project, the Proposed Project was given the name Devil's Gate Sediment Removal and Management Project.

Historically, large amounts of sediment have been deposited in the reservoir in short time periods. Between 1935 and 1938 over 1.6 million cy of sediment, between 1938 and 1943 over 1.95 million cy of sediment, between 1959 and 1966 over 1.75 million cy of sediment, and between 2010 and 2012 over 1.3 million cy of sediment was deposited in the reservoir. Since the 1920 dam construction and prior to the Station Fire in 2009, approximately 10.7 million cy of sediment accumulated in the reservoir; and approximately 8.0 million cy was removed by LACFCD.

Following the 2009 Station Fire, approximately 1.3 million cy of sediment flowed into Devil's Gate Reservoir after just two average storm seasons. Additionally, over 92 years, the average amount of sediment deposited each year is approximately 130,000 cy; however, due to the dynamic nature of the system and the recent burn of the watershed, the amount could vary greatly. If a 1 in 50 years storm were to occur, approximately 2.0 million cy (one DDE) of sediment could be expected to wash into the reservoir. Because of LACFCD's responsibilities to provide flood protection, LACFCD must be ready at all times for a design debris event to occur.

Response to Comment 175-3:

See Response to Comment 175-2. The Devil's Gate Water Conservation Project is a separate project from the Devil's Gate Reservoir Sediment Removal and Management Project. The Devil's Gate Water Conservation Project is proposed to conserve stormwater and will not provide any flood protection. The project is still in a conceptual design phase and is not currently scheduled for construction; however, this project was included in the cumulative analysis, as noted in the Draft EIR in Table 2.9-1: Cumulative Projects.

Response to Comment 175-4:

See Response to Comment 175-2.

Devil's Gate Dam, built in 1920, was the first dam built by the LACFCD. The dam allowed for the channelization of and development along the Arroyo Seco. The Rose Bowl, built in 1922, and the Arroyo Seco Parkway, also known as State Route 110, completed in 1953, are two examples of downstream development made permissible by the construction of Devil's Gate Dam. Given the current, limited capacity of the reservoir, a 50-year storm event that results in a DDE would result in storm flows with sediment flowing over the spillway. Flooding with mud/sediment would occur along the portions of the Arroyo Seco in the Cities of Pasadena, South Pasadena, and Los Angeles, impacting approximately 650 parcels and requiring closure of Interstate 110 from Orange Grove Avenue to Interstate 5. During a single design event sized storm, the Rose Bowl is not expected to be impacted by flows from the dam; however, if sediment from each storm event is not removed from the downstream floodplain, each subsequent storm would increase the flood risk. Additional information about the potential flood areas and analysis is shown in the Arroyo Seco Channel Hydraulic Analysis prepared by Bureau Veritas North America, Inc., available on the Project website.

Please note that protocols are in place to monitor storms, reservoir conditions, and channel conditions and to communicate with emergency responders and the California Department of Transportation (Caltrans) to execute any necessary evacuations or freeway closures.

Response to Comment 175-5:

Mitigation locations will comply with the California Department of Fish and Wildlife (CDFW) recommendations as follows: first, onsite; second, offsite within the Arroyo Seco Watershed; and third, offsite within the greater Los Angeles River watershed. If offsite mitigation sites are needed, several offsite areas within the Arroyo Seco/Los Angeles River watershed are being considered for restoration.

A detailed restoration plan will be prepared and provided to the CDFW and USACE for review and approval prior to project implementation and to satisfy permitting requirements. The plan will include and address noxious weed management, monitoring, and success criteria.

Response to Comment 175-6:

The Draft EIR, Biological Technical Report (BTR), and focused surveys provide thorough and accurate existing conditions for biological resources (Draft EIR, Section 3.6; Appendix D, Biological Reports). Species with the potential to occur within the Proposed Project and species that were identified during surveys are presented in the biological survey reports in Appendix D of the Draft EIR. Factors used to determine the potential for occurrence included the quality of habitat, elevation, and the results of the

reconnaissance survey. The locations of prior database records and species lists of occurrence were used as additional data; but since these are positive-sighting databases, this data was used only in support of the analysis from the previously identified factors. Based on the results of the BTR, additional protocol-level focused surveys were conducted for Proposed Project. The field surveys were conducted in 2010 and 2013, including general biological surveys, focused sensitive plant surveys, focused least Bell's vireo, coastal California gnatcatcher, and southwestern willow flycatcher surveys, and federal and state jurisdictional waters surveys.

Response to Comment 175-7:

See Response to Comment 175-5. As discussed in Section 3.6.6 of the Draft EIR, Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats. In addition, sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays). Wildlife species currently found in the Proposed Project area would be expected to either remain in the undisturbed areas of the reservoir outside of the Proposed Project area or to reestablish once sediment removal activities have been completed.

Alternative 3, Configuration D affects the least amount of habitat of all the action alternatives while still achieving Proposed Project objectives (see Section 4.6 of the Final EIR). This alternative would provide a buffer on the west side of the reservoir that would allow for the movement of wildlife. Alternative 3, Configuration D, Option 1 provides a more natural configuration for the reservoir by having two branches to carry water and sediment toward the face of the dam, avoiding disturbing a significant portion of existing vegetation. To further reduce the Proposed Project's footprint, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2, which drastically reduces the project's footprint of 120 acres down to 71 acres, would avoid excavation of the western branch, thereby providing a greater habitat buffer on the west side of the reservoir. In addition, the maintenance areas would be smaller than the original sediment removal footprint, allowing for habitat to reestablish and providing additional areas for wildlife movement.

As with any project that involves CDFW, United States Army Corps of Engineers (USACE), and Regional Water Quality Control Board (RWQCB) jurisdictional areas, the ultimate mitigation for impacts related to the wetlands and drainages under the jurisdiction of the resource agencies is negotiated with the resource agencies during the regulatory permitting process. LACFCD has been and will continue to work closely with CDFW and USACE to identify appropriate mitigation, replacement ratios, and sites for restoration and enhancement that will offset impacts and satisfy the requirements of all applicable laws. A detailed restoration plan will be prepared and provided to CDFW and USACE for review and approval prior to project implementation. Prior to commencement of the Proposed Project, LACFCD will have obtained all necessary permits for impacts to CDFW, USACE, and RWQCB jurisdictional areas including Section 401 Certification, Section 404 permit, and a Streambed Alteration Agreement. Clean Water Act Section 404 (b)(1) guidelines will be followed as a framework for compensatory mitigation. Through 404(b)(1) negotiations with USACE and negotiations with CDFW under Fish and Game Code Sections 1600-1616, a determination of the functions and values of impacted jurisdictional waters shall result in the coordination of appropriate Mitigation Measures for sediment removal.

Response to Comment 175-8:

Impacts to recreation were analyzed in the Draft EIR, Section 3.15. The Proposed Project will not limit the use of the Oak Grove area of Hahamongna Watershed Park. Sediment removal activities would be temporary and are expected to occur only in the drier months (April to December, excluding holidays). It is expected that these activities will often not be adjacent to the Oak Grove area of Hahamongna Watershed Park. The Proposed Project would result in temporary limitations on the recreational use of the Proposed Project site and some of the adjacent trails. Most of these areas would be reopened seasonally or intermittently throughout the sediment removal process. In addition, temporary impacts to designated recreational facilities and trails will be minimized through advance communication and redirection to the nearest facility in the vicinity of the Proposed Project. Furthermore, an east-west trail crossing will continue to provide access at the north end of the reservoir. At the south end of the reservoir, after the reservoir ingress and egress ramps have been fully constructed, access to the upper east side Arroyo Seco Trail from La Cañada Verdugo Road will be maintained; and the linkage from the west side Arroyo Seco Trail and the Flint Wash Trail to the upper east side Arroyo Seco Trail (crossing Devil's Gate Dam and also continuing south to the Rose Bowl) will be available after construction activities have ended each day and on nonworking days.

None of the trails will be closed permanently, as suggested in the comment. In addition, the reservoir will not be permanently left bare, as a habitat restoration plan will be implemented after sediment removal activities are completed.

Response to Comment 175-9:

Although the sediment removal phase of the Proposed Project will occur over a five-year period, the removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays), as described in the Draft EIR, Section 2.5.1, Sediment Removal Phase, Project Schedule.

As discussed in the Draft EIR, Section 3.14, with implementation of Mitigation Measure MM N-1, noise impacts would be reduced to a level of less than significant.

The Draft EIR, Section 3.14.6, Sediment Removal/Reservoir Management, Offsite Vehicular Noise, analyzed the noise impacts from the haul trucks. The analysis found that the maximum noise increase on the roads in the immediate vicinity of the Devil's Gate Dam and Reservoir area would be a 1-decibel (dB) increase on Berkshire Place east of the Interstate 210 (I-210) northbound ramps. A 1-dB increase is well below the 3-dB increase threshold of perception and would therefore not be anticipated to disturb the learning environment. The roadway noise impact analysis provided in the Draft EIR found that the Proposed Project would result in less than significant impacts for all analyzed alternatives.

Due to fine gradation or particle size of the majority of sediment that entered the reservoir since the Station Fire, crushers are not expected to be used with frequency during the project. The Proposed Project was designed to limit the backing up of trucks, as the trucks will enter at one access road and exit at a separate access road to encourage circular flow. The backup beeps on the trucks and equipment are an Occupational Safety and Health Administration (OSHA) requirement, with the priority being to protect the safety of both the workers onsite and the general public. In addition, contractors will be required to comply with local noise ordinances as stated in the Draft EIR, Section 3.14 Noise and Vibration.

Air quality impacts associated with truck traffic were analyzed in the Draft EIR in Section 3.5. LACFCD has conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed the United States (U.S.) Environmental Protection Agency's (EPA's) 2007 standards for emissions. Therefore, in order to further reduce emissions, Mitigation Measure MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump trucks that meet or exceed EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality, including those associated with health effects, will be reduced to less than significant.

Potential impacts due to the Proposed Project's truck trips were analyzed in the Draft EIR, Section 3.16, Transportation and Traffic. As listed in that section, a single intersection in the immediate vicinity of the Proposed Project site will have a potentially significant impact. In practice, hauling rates and routes may be adjusted to help reduce impacts, depending on operational need. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the Proposed Project site.

As noted in the Draft EIR, Section 3.4, Aesthetics and Figures 3.4-1 through 3.4-3, the visual aspects of the Proposed Project site are constantly changing. The Draft EIR does note that the Proposed Project will have significant temporary impacts to aesthetics; however, after the sediment removal phase of the Proposed Project is complete, a habitat restoration plan will be implemented that will allow native plant communities to reestablish outside the reservoir management area. Riparian Herbaceous vegetation is expected to continue to populate and/or reestablish in the management area of the Proposed Project site between maintenance activities.

Comment regarding economic impacts to surrounding homeowners has been noted.

Response to Comment 175-10:

As stated in Response to Comment 175-9, the Draft EIR discussed significant and unmitigable impacts.

Response to Comment 175-11:

See Response to Comments 175-7, 175-8, and 175-9.

Response to Comment 175-12:

See Response to Comment 175-9. During the sediment removal phase, excavators will be loading sediment into trucks for offsite disposal. All of the trucks will be loaded within the reservoir; and if a queue of trucks develops, the trucks will stage within the reservoir itself to lessen impacts on the adjacent streets. Long queuing and idling times will not occur during the Proposed Project. It is estimated that trucks will briefly idle during loading, but the average loading time per truck is estimated to be one minute. In addition, LACFCD typically requires equipment to shut down if idling time is expected to be more than five minutes. Estimated project idling times were included in the air quality analysis and health risk assessment for the Draft EIR, Section 3.5, and Appendices B and C.

The Draft EIR outlines a 12-hour trucking schedule, with trucking operations on Saturdays as well. This schedule is used to model the most intensive construction operation, which may not be applicable at the site for the duration of the Proposed Project. Typical trucking schedules are estimated to be 8 hours

per day on weekdays. In practice, hauling rates and routes may be adjusted to help reduce impacts depending on operational need.

Response to Comment 175-13:

Dust impacts from the Proposed Project were carefully evaluated, as discussed in the Draft EIR, Section 3.5.6, Impacts and Mitigation, AIR QUALITY-2, Sediment Removal. The Proposed Project's activities including excavation, grading, material loading, and hauling would result in less than significant dust emissions due to the project's use of best management practices and would be in full compliance with South Coast Air Quality Management District's (SCAQMD's) fugitive dust regulations. As discussed in the Draft EIR, Section 3.10.6, Impacts and Mitigation, HAZARDS-1, Sediment Removal/Reservoir Management, no hazardous levels of the contaminants were detected in the sediment.

As discussed in the Draft EIR, Section 3.5, the Health Risk Assessment (HRA) analyzed both the cancer-related and noncancer-related acute (short-term) and chronic (long-term) impacts from project-related emissions. The HRA analysis found the Proposed Project would result in less than significant impacts for both the cancer-related and non-cancer-related acute short-term and long-term impacts.

Response to Comment 175-14:

As part of the Draft EIR, a Traffic Impact Analysis (Appendix J of the Draft EIR) was conducted that detailed the impacts of the Proposed Project along the haul routes and surrounding intersections and discussed in Section 3.16 of the Draft EIR. The volumes on Interstate 210 (I-210), the on- and off-ramps, and the local roadways within the study area included those potentially impacted by the project. The analysis provided a conservative project condition volume that accounts for expansion and regional growth within the study area.

No significant impacts were found to occur on the freeway segments studied. Potential impacts due to the added truck trips were analyzed in the Draft EIR, Section 3.16, Transportation and Traffic. As listed in that section, a single intersection in the immediate vicinity of the Proposed Project Site will have a potentially significant impact. In practice, hauling rates and routes may be adjusted to help reduce impacts, depending on operational need. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the Proposed Project site.

Response to Comment 175-15:

See Response to Comment 175-2.

Response to Comment 175-16:

See Response to Comments 175-2 and 175-4.

LACFCD goes to great lengths to lessen project impacts and maximize efficiencies. As such, many of the points in the Arroyo Seco Foundation's four-point "Slow Program" are compatible with the LACFCD Proposed Project.

For example, the Draft EIR determined Alternative 3 is the Environmentally Superior Alternative. Alternative 3, Configuration D, Option 2 drastically reduces the project's footprint of 120 acres down to

71 acres. Additionally, the limited maintenance area for Alternative 3 further reduces the permanent habitat impacts down to approximately 51 acres by allowing for site replanting and mitigation to take place within the reservoir footprint. This reduction in project acreages will greatly lessen environmental impacts of the Proposed Project.

LACFCD strives to achieve an efficient, low-cost sediment removal project. Sediment removal rates and trucking operations, now utilizing all low-emissions trucks, as explained in Section 3.5 of the Draft EIR, have been carefully planned for economies of scale to realize maximum efficiencies without major delays in project schedule, thus greatly reducing operating costs. Furthermore, LACFCD has applied for and received an approximately $28 million grant through the State's Disaster Preparedness and Flood Protection Bond Act of 2006 (Proposition 1E) program. A portion of this grant will be used to help offset the Proposed Project's costs.

While sluicing is not a viable project alternative, as explained in Section 4.7 of the Draft EIR, Flow Assisted Sediment Transport, or FASTing, will be used for maintenance after the project's main sediment removal phase has been completed, as described in Section 2.5.2 of the Draft EIR.

For a more detailed response to the Arroyo Seco Foundation's four-point "Slow Program", please see the response to the Arroyo Seco Foundation's comment letter (Comment Letter #216, Response to Comment 216-16).

Response to Comment 175-17:

LACFCD notes that the commenter would prefer an option that allows regrowth and new planting on the side slopes above 1,020 feet rather than above 1,040 feet.

Response to Comment 175-18:

See Response to Comment 175-7 for a proposed alternative configuration. A footprint any smaller would decrease the volume removed and the ultimate capacity of the reservoir, which would fail to meet Proposed Project objectives.

Response to Comment 175-19:

See Response to Comments 175-7 and 175-18.

Response to Comment 175-20:

See Response to Comment 175-7.

Response to Comment 175-21:

LACFCD has been coordinating and will continue to coordinate with the City of Pasadena. Impacts to habitat and wildlife will be mitigated with Mitigation Measures MM BIO-1 through MM BIO-8.

COMMENTS IN RESPONSE TO

THE DEVIL'S GATE SEDIMENT REMOVAL AND MANAGEMENT PROJECT

1/17/2014

Overview:

The County of Los Angeles Department of Public Works, Flood Control Division is to be commended for moving forward with an Environment Impact Report (EIR) as opposed to trying to obtain a Statement of Overriding Consideration which would not have allowed for this important opportunity for community input.

As someone who is in touch with the multiple agencies and numerous individuals who have been involved with the Devil's Gate and Hahamongna Watershed Park for almost three decades, I know that detailed comments will be forthcoming that touch on many aspects of the project – biology, traffic, air pollution, water conservation, noise, etc. Therefore, these comments deal not so much with specifics as with the goals of sediment management and how best to accomplish them. They emphasize the overriding need for a long-term comprehensive sediment management, water conservation and stream management plan – something long overdue and still, to my knowledge, not contemplated by the Department of Public Works (DPW).

Comment 176-1

Before commenting, I want to make clear that I recognize the tremendous responsibility of DPW, Flood Control Division for protecting the public safety downstream and helping to maintain the structural integrity of Devil's Gate dam. For this reason, it is clear to almost all who have studied the issues that some sediment must be removed. The real question is how much and how best to accomplish it.

Sediment has value:

When the County Sanitation District had a problem with "sludge," once regarded as a waste product, it developed a treatment plant for processing it into fertilizer. That fertilizer now nurtures vegetable fields in Central California. Santa Anita Race Track had a similar problem with horse manure until it struck a deal with nearby mushroom farms. What's to stop DPW from finding creative, cost effective ways of processing or refining sediment for use at beaches, in gardens or on roads or driveways?

Comment 176-2

In this day and age, it's no longer viable to mow down old-growth forests in order to create "sediment placement sites." New methods of reuse must be found. Although transferring some sediment to gravel pits in nearby cities may help, it is not the long-term solution that is needed***. Sediment must be treated as something of value due to its potential for reuse. To make this happen, the talented engineers at DPW should be released and encouraged to analyze and present new opportunities and methods for sediment use.***

Scope of the Devil's Gate Sediment Removal:

In its documents to the County Board of Supervisors and the State of California requesting funding, the DPW Flood Control Division stipulated a project of "up to 2 million cubic yards" of sediment to be removed from behind Devil's Gate Dam. As the project developed and, without further communication with those agencies, (at least not any made available to the public), the project was arbitrarily expanded to approximately 4 million cubic yards. This has raised many questions about how DPW arrived at the increase.

Comment 176-3

Although members of the public have repeatedly asked for answers to the questions listed further on in this document so that they could intelligently comment on some of the technical assumptions and goals of the project, their requests have gone unanswered by DPW. In a community that is home to both JPL and Caltech and where the public consists of numerous highly skilled engineers and scientists, some of whom were seeking this information, such an omission is tragic. DPW lost valuable input that might have enhanced the project and expanded its own understanding.

Given that DPW told both the State of California and the Board of Supervisors that the public safety could be protected with the removal of "up to 2 million cubic yards" of sediment, there is a strong movement within the surrounding communities of Altadena, Pasadena and La Canada to restrict the project to those dimensions while DPW examines other methods for gradual long-term sediment removal.

The Pasadena Connection:

Behind Devil's Gate Dam is Hahamongna Watershed Park which is partly owned by the City of Pasadena and leased to the County. It is an important multi-use area with streams, meadows, hiking and equestrian trails and settling ponds. Uses for the area are governed by the Hahamongna Watershed Park Master Plan as well as the City's Green City Plan.

Comment 176-4

There is every indication that the Devil's Gate DEIR for the removal of 4 million cubic yards as currently proposed by the County would violate important parts of these agreements and could make the City liable. **Therefore, County DPW should honor its agreement with its Board of Supervisors, the State of California (for its grant) and the City of Pasadena by proposing and executing a project of under 2 million cubic yards of sediment.**

Need for Blue Ribbon Committee:

Just as no person has all the answers to any given problem, no agency, even a "stand alone agency," has all the knowledge, experience and creativity to address every problem or issue. Today more than ever before, the Department of Public Works, Flood Control Division is addressing many pressing problems simultaneously. Managing debris, controlling flooding and finding new locations for sediment are among them. So is finding ways to retain more water. Because of the lingering drought, water is California's new gold. The pressure is on DPW to conserve or transfer more of it to nearby settling ponds as well as to reduce the amount of storm water run-off now sent over dam spillways.

Comment 176-5

Many who have been studying the situation at Devil's Gate for decades feel it is time for new thinking at DPW. They are strongly recommending the creation of a Blue Ribbon committee of outside specialists to work with DPW engineers in analyzing past sediment management practices and devising appropriate new approaches. In order to stop the cycle of massive excavation of sediment at long intervals, it may be time for an innovative long-range approach to sediment management and water conservation. No city in the nation has more qualified resources and experts to partner with in seeking solutions then Los Angeles DPW. All that is needed is leadership and the willingness of DPW management and staff to work together with their colleagues in the academic, engineering or business world to bring about change. Many in the community ***strongly encourage such a partnership in the form of a Blue Ribbon committee to develop a long-range comprehensive plan for both sediment management and water conservation for the future of Los Angeles.***

Important unanswered questions:

1. How much sediment needs to be removed?

Comment 176-6

In its own documents, the County told the State of California in its grant application for funding that it would remove "up to 2 million cubic yards" of sediment and not 4 which is the current proposal. The request before the Board of Supervisors was also for the smaller amount. Was the Board of Supervisors informed of the change and did they approve it? As a "stand alone agency," DPW may feel that it is immune to supervision by our elected officials. The public sees it differently. And this kind of conflicting information creates distrust among those who believe that what is promised is what will happen. So ***how did the project expand in size and who authorized an increase from roughly 2 to 4 million cubic yards?***

2. What is the technical basis for providing the capacity for two as opposed to one Debris Design Event (DDE)?

Comment 176-7

Because of the recent Station Fire, it is fairly impossible for the vegetation in the foothills behind Devil's Gate to grow to the extent that they would supply sufficient fuel for another disaster of a similar nature. Because of the lack of fuel, is it reasonable to assume that there is not likely to be another major fire for up to 20 years and this will reduces the risk of even one "worst case disaster" during that period. ***So why 2 DDEs and has the goal of the Sediment Removal Project been adjusted to account for post-fire flood and erosion events?***

3. What is the record of the frequency of Floods?

Comment 176-8

One of the prime purposes of an EIR is to provide information to the public which they may use in preparing their comments. A key question in the Devil's Gate project is how frequently have floods occurred in the past and, in this era of drought, what does it portend for the future. ***So did the engineers at DPW study historical records to determine the maximum discharge for the 50-year design flood used for this DEIR?***

4. Is there a comparison of the costs associated with levels of flood risk based on the removal of different quantities of sediment?

Comment 176-9

It is appropriate to know what level of flood risk might be anticipated during a 50-year design storm. Because flood prevention in the form of sediment removal or channel repairs requires considerable public expense, a cost/benefit analysis at different levels of risk should have been included in the DEIR. ***Therefore, did DPW analyze the level of cost associated with the risk for the removal of 2, 3 and 4 million cubic yards? If so, why was not a cost and risk benefit analysis made available in the DEIR?'***

5. What amount of sluicing is too much?

Comment 176-10

I understand that an independent review of sluicing was done for DPW and it was determined that increased sluicing would not work because of the accumulation of sediment in the storm channels. ***Was any analysis done to compare the costs and effectiveness of reinforcing flood channels at key choke points (Highland Park) where sediment builds up and doing regular maintenance of the channels to prevent build up? Could such a maintenance program reduce the costs and need for the massive excavation at Devil's Gate?***

Thank you for your consideration of these comments in response to the Devil's Gate DEIR on Sediment Removal and Management Project.

Christle Balvin

Response to Comment Letter #176 (Christle Balvin)

Response to Comment 176-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

Response to Comment 176-2:

The sediment that came into Devil's Gate Reservoir following the Station Fire has a very fine gradation or consistency. As such, the majority of this material is not readily reusable and will most likely not be sold; however, sediment placed at sediment placement sites would be available for potential reuse for other projects or sediment reuse opportunities. The sediment removed from the Devil's Gate Reservoir will be transported to the existing placement sites listed in Section 2.0, Project Description in the Draft Environmental Impact Report (EIR).

For further information regarding beneficial uses for sediment at the Los Angeles County Flood Control District (LACFCD) sites, please refer to Section 6.5 of LACFCD's 2012 Sediment Management Strategic Plan which can be found at: http://dpw.lacounty.gov/lacfcd/sediment/stplan.aspx.

Response to Comment 176-3:

LACFCD was mandated by the State Legislature to provide flood protection and water conservation within its boundaries.

A reservoir storage design capacity of two design debris events (DDEs) below the dam's lowest spillway was determined to be the standard acceptable level of risk at Devil's Gate Dam and Reservoir. The DDE volume of capacity is determined using the January 2006 Los Angeles County Department of Public Works (LACDPW) Hydrology Manual and the March 2006 LACDPW Sedimentation Manual. For Devil's Gate Dam and Reservoir, the required reservoir capacity is 4.0 million cubic yards (cy) (two DDEs) below the spillway elevation of 1,040.50 feet.

The Hydrology Manual (January 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_Hydrology_Manual/2006%20Hydrology%20Manual-Divided.pdf

The Sedimentation Manual (March 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_sedimentation_manual/Sedimentation%20Manual-Second%20Edition.pdf

Additional information concerning DDE calculation methods has been added to the Final EIR, Section 2.3, Project Need.

In 2010, in response to the Station Fire, an emergency project to remove only 1.67 million cy was proposed. The volume of 1.67 million cy is the previously published DDE, and this amount was considered justifiable as an emergency exemption to the California Environmental Quality Act (CEQA). This emergency project was not completed because, in March 2011, the County of Los Angeles Board of Supervisors motioned LACFCD to complete an EIR for a comprehensive sediment removal project at Devil's Gate. LACFCD then initiated project development in accordance with the required level of

protection of two DDEs. At that time, LACFCD also began receiving feedback on the concurrent Sediment Management Strategic Plan (Strategic Plan) and the interest to look at more sustainable sediment and reservoir management. As a result of the feedback and recommendations during the development of the Strategic Plan, LACFCD began evaluating ways to create a more sustainable long-term way to manage its sediment and habitat. To emphasize the goals of the project, the Proposed Project was given the name Devil's Gate Sediment Removal and Management Project.

The lowest cost Proposed Project Alternative is expected to cost approximately $65 million. LACFCD has applied for and received an approximately $28 million grant through the State's Disaster Preparedness and Flood Protection Bond Act of 2006 (Proposition 1E) program. A portion of this grant will be used to help offset the Proposed Project's costs. Only a portion of the Proposed Project will be funded through the grant; therefore, only a portion of the Proposed Project was included in the project description in the grant application. As identified in the grant application, the preferred alternative would be identified through the EIR.

Outside experts, especially those on the Stakeholder Task Force, were consulted during the formation of the LACFCD's Sediment Management Strategic Plan. Information from that consultation was used in the formulation of the Proposed Project and Alternatives. In addition, the purpose of the scoping process was to gather input from outside experts, cities, and agencies as well as the public on what the environmental analysis should consider and what alternatives should be analyzed. Information gathered from the scoping process was used in the formulation of the Proposed Project and Alternatives and preparation of the Draft EIR.

Response to Comment 176-4:

See Response to Comment 176-3.

LACFCD does not lease Devil's Gate Dam and Reservoir area. As described in Section 2.1.4 of the Draft EIR, through easements granted in May 1919 and March 1965, the City of Pasadena granted the LACFCD, under a perpetual easement, the right to construct, reconstruct, inspect, maintain, repair, and operate Devil's Gate Dam, its spillway, bypasses, tunnels, and other support facilities as may be necessary for the construction and maintenance of a reservoir capable of impounding the waters of the Arroyo Seco for purposes of storage and control, and to control such waters as may be necessary in the prevention of damage by flood (City of Pasadena 1919/1965). Analysis of consistency with the Hahamongna Watershed Park Master Plan (HWPMP) was included in the Draft EIR, Section 3.12 Land Use and Planning.

Alternative 3, Configuration D, which was found to be the Environmentally Superior Alternative in the Draft EIR, was based on the City of Pasadena's Hahamongna Watershed Park Master Plan (HWPMP). Alternative 3, Configuration D affects the least amount of habitat of all the action alternatives while still achieving Proposed Project objectives (see Section 4.6 of the Final EIR). This alternative would provide a buffer on the west side of the reservoir that would allow for the movement of wildlife. Alternative 3, Configuration D, Option 2 provides a more natural configuration for the reservoir by having two branches to carry water and sediment toward the face of the dam, avoiding disturbing a significant portion of existing vegetation. To further reduce the Proposed Project's footprint, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2, which drastically reduces the project's footprint of 120 acres down to 71 acres, would avoid excavation of the western branch, thereby providing a greater habitat buffer on the west side of the reservoir. In addition, the

maintenance areas would be smaller than the original sediment removal footprint, allowing for habitat to reestablish and providing additional areas for wildlife movement. LACFCD has met and will continue to meet with the City of Pasadena regularly to coordinate and ensure resolution of concerns regarding Devil's Gate Reservoir and the HWPMP.

Impacts to recreation were analyzed in the Draft EIR, Section 3.15. The Proposed Project will not limit the use of the Oak Grove area of Hahamongna Watershed Park. Sediment removal activities would be temporary and are expected to occur only in the drier months (April to December, excluding holidays). It is expected that these activities will often not be adjacent to the Oak Grove area of Hahamongna Watershed Park. The Proposed Project would result in temporary limitations on the recreational use of the Proposed Project site and some of the adjacent trails. Most of these areas would be reopened seasonally or intermittently throughout the sediment removal process. In addition, temporary impacts to designated recreational facilities and trails will be minimized through advance communication and redirection to the nearest facility in the vicinity of the Proposed Project. Furthermore, an east-west trail crossing will continue to provide access at the north end of the reservoir. At the south end of the reservoir, after the reservoir ingress and egress ramps have been fully constructed, access to the upper east side Arroyo Seco Trail from La Cañada Verdugo Road will be maintained; and the linkage from the west side Arroyo Seco Trail and the Flint Wash Trail to the upper east side Arroyo Seco Trail (crossing Devil's Gate Dam and also continuing south to the Rose Bowl) will be available after construction activities have ended each day and on nonworking days.

Response to Comment 176-5:

See Response to Comment 176-3. The Draft EIR analyzes long-range maintenance of the reservoir under the Reservoir Maintenance phase of the Proposed Project and Alternatives.

Please also refer to the Sediment Management Strategic Plan, which can be found at: http://dpw.lacounty.gov/lacfcd/sediment/stplan.aspx.

Response to Comment 176-6:

See Response to Comment 176-3.

Response to Comment 176-7:

See Response to Comments 176-3.

Historically, large amounts of sediment have been deposited in the reservoir in short time periods. Between 1935 and 1938 over 1.6 million cy of sediment, between 1938 and 1943 over 1.95 million cy of sediment, between 1959 and 1966 over 1.75 million cy of sediment, and between 2010 and 2012 over 1.3 million cy of sediment was deposited in the reservoir. Since the 1920 dam construction and prior to the Station Fire in 2009, approximately 10.7 million cy of sediment accumulated in the reservoir; and approximately 8.0 million cy was removed by LACFCD.

Over 92 years, the average amount of sediment deposited each year is approximately 130,000 cy; however, due to the dynamic nature of the system and the recent burn of the watershed, the amount could vary greatly. If a 1 in 50 years storm were to occur, approximately 2.0 million cy (one DDE) of sediment could be expected to wash into the reservoir. It should be noted that design debris amounts can be produced from a freshly burned watershed with rainfall amounts considerably below capital

flood levels (a 5- to 10-year frequency storm). Similarly, higher intensity rainfall could produce more debris. Because of LACFCD's responsibilities to provide flood protection, LACFCD must be ready at all times for a design debris event to occur.

Response to Comment 176-8:

See Response to Comments 176-3 and 176-7.

All facilities, including open channels, dams, bridges, and debris basins under LACFCD jurisdiction are required to meet Capital Flood protection levels. The Capital Flood is characterized by the Hydrology Manual as "the runoff produced by a 50-year frequency design storm falling on a saturated watershed (soil moisture at field capacity)" (Public Works, Hydrology Manual, 2006). A 50-year frequency design storm is defined as the magnitude of a storm that is likely to occur once every 50 years. Therefore, the chance of a 50-year storm occurring in any given year is 1 out of 50, or a 2 percent chance of occurring. "Capital Flood protection also requires adding the effects of fires and erosion under certain conditions" (Public Works, Hydrology Manual, 2006).

The Capital Flood is derived using the Hydrology Manual and is unique for each watershed. Some of the factors that affect the hydrology of a watershed are topography, geology, vegetative cover, land use, and climate. The Intensity-Duration-Frequency equation establishes a relationship between rainfall intensity, duration, and frequency. This equation as well as the Design Storm determination process is explained further on page 37 of the Hydrology Manual.

Response to Comment 176-9:

See Response to Comments 176-6 and 176-7.

Under CEQA, the lead agency is not required to analyze an economic impact associated with a project in the EIR; as Section 15131(a) of the CEQA Guidelines states: "Economic or social effects of a project shall not be treated as significant effects on the environment." Moreover, CEQA allows economic analysis in the administrative record only if the basis for infeasibility, and thus rejection of a mitigation or alternative, is economic, as described in CEQA Guidelines Sections 15091(a)(3) and 15364.

Response to Comment 176-10:

The Sediment Transport Capacity Analysis found that the storm flows received in the reservoir would not move the necessary amount of sediment out of the reservoir, and the sediment moved downstream would fall out and remain in the Arroyo Seco or Los Angeles River. Reinforcing channels downstream and doing regular maintenance of these channels is outside the purview of LACFCD.

The scope of the project is to restore capacity to Devil's Gate Reservoir, a critical flood control facility in the Los Angeles River Watershed. Providing new flood control downstream is outside the scope of this project and is inconsistent with the Proposed Project objectives. LACFCD takes a system-wide approach to flood control management. For that reason, the main objectives of the project are to satisfactorily reduce flood risk, create a configuration suitable for routine operations and maintenance, and reduce the possibility of clogging the outlet works of the dam.

Comment Letter #177

OFFICE OF THE MAYOR

January 16, 2014

County of Los Angeles
Department of Public Works
Water Resources Division
Attn: Reservoir Cleanouts Program
P.O. Box 1460
Alhambra, CA 91802-1460

Re: City of Pasadena Comments on Draft Environmental Impact Report for Devil's Gate Reservoir Sediment Removal and Management Project

Dear County of Los Angeles:

On behalf of the City of Pasadena, I convey our thanks to the County of Los Angeles for the opportunity to comment on the Draft Environmental Impact Report (DEIR) for the Devil's Gate Sediment Removal and Management Project (Project). The City's comments on the DEIR are set forth in this letter and in the attached statement of comments. We ask that both this letter and the statement of comments be reflected in the record of comments received as the DEIR comments of the City of Pasadena.

Comment 177-1

As specifically reflected in the statement of comments, Pasadena City staff have extensively reviewed the DEIR as the basis for the comments provided. Moreover, the City Council reviewed the Project on December 9 and December 16 of last year. The Council's evaluation was preceded by review by the Council's Municipal Services Committee on November 12, as well as by the City's Hahamongna Watershed Park Advisory Committee (HWPAC) on November 13 and the Environmental Advisory Committee (EAC) on November 19.

The City's Next Steps

The City is taking steps to identify a responsible Project design and sediment management program that reflects the configuration, aesthetics, habitat restoration, and vegetation management described in the Hahamongna Watershed Park Master Plan (HWPMP) adopted by the Pasadena City Council in 2003. The City's Project review seeks to answer key questions including the following:

Comment 177-2

- Is the scope of the Proposed Project and Project Alternatives too large?
- Does the County have to play catch up for its failure to maintain the Reservoir over the years at the expense of the City and other impacted communities and will the County specify and adhere to a specific maintenance program?

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- Can a more gradual project approach be effective?
- What is the true downstream flood risk?
- How frequently have storms associated with a design debris event (DDE) occurred? What is the likelihood of two concurrent DDE occurring?

Comment 177-2 continued

The City's efforts include an independent review of the Sediment Removal and Management Project and solicitation of input from key community members with relevant expertise. The City will update the County on its progress at the annual City Council meeting with Supervisor Antonovich on March 19, 2014.

Comment 177-3

We look forward to continuing the cooperation and consultation that have occurred so far in this extremely important project. In that regard, it will perhaps be helpful for us to provide certain background information about matters the City considers critical to a sediment removal and ongoing management project that will be consistent with the best interests of our community.

Hahamongna Watershed Park (HWP)

Comment 177-4

Hahamongna Watershed Park (HWP) is a unique environmental resource, unparalleled in Southern California for its biological and water resources. For decades, the Pasadena community has diligently protected and enhanced the natural character of this alluvial canyon and its rich riparian and stream zone habitat through major community-based planning efforts and City has adopted numerous policy documents relevant to HWP, such as the Hahamongna Watershed Park Master Plan (2003), Arroyo Seco Master Plans and Design Guidelines (2003), United Nations Urban Accords (2006), Green City Action Plan (2006), Hahamongna Watershed Park Master Plan Addendum for the Hahamongna Annex (2010), and Open Space & Conservation Element of the General Plan (2012.)

These efforts commit the City of Pasadena to protect native habitats, conserve and protect the water resources of the Arroyo Seco, reduce greenhouse gases, and provide diverse recreation opportunities for the Pasadena community among other goals. Over the last ten years, between 2003 and 2013, the City has invested $2.7 million in HWP projects. Millions of dollars' worth of projects have been also completed downstream in the Central and Lower Arroyo Seco in furtherance of the City's commitment to preservation of the Arroyo Seco.

Comment 177-5

The adoption in 2003 of the Hahamongna Watershed Park Master Plan (HWPMP) was the culmination of a five-year community planning process with extensive County participation. The HWPMP is the central guiding document for how the City moves forward in planning for this area. There are several goals which would be greatly impacted by the Project as proposed and they are outlined below.

Hahamongna Watershed Park Master Plan (HWPMP) – Goal 1 – Preserve, restore & enhance the native habitats

Comment 177-6

Due to the size of the basin areas and corresponding maintenance plans, the Proposed Project and Project Alternatives are inconsistent with this HWPMP goal. The City expects the County to prepare a final Project design more closely resembling the configuration, aesthetics, habitat restoration and vegetation management described in the HWPMP. The HWPMP establishes a minimum flood control capacity of 2.3 million CY and includes a conceptual grading plan that would create a flood management/conservation pool of 3 million CY. At the time of HWPMP preparation

(2003), the sediment removal required was approximately 800,000 CY. When completed, the basin would have a 69-acre surface area. The Proposed Project would remove 2.95 million CY over a 120-acre area to create a flood control capacity of 4.15 million CY. The Project Alternatives would remove between 2.4 and 4.0 million CY with an affected area of 76 to 120 acres.

The larger footprints of the Proposed Project and Project Alternatives would have a greater initial and ongoing impact to native vegetation and habitat than envisioned in the HWPMP. The HWPMP describes a habitat restoration plan and distinct vegetation types that would occur at various elevations within the basin. Corresponding with the water level of the conservation pool, vegetation below elevation 1030 feet would be periodically removed as a part of regular maintenance, over an approximately 54-acre area. For elevations above 1030 feet, including the side slopes of the basin, the HWPMP describes a habitat restoration plan including periodic replanting due to future sediment removal efforts. The Proposed Project would periodically remove vegetation from the entire basin as a part of regular maintenance, resulting in significantly less habitat than described in the HWPMP. The Project Alternatives describe similar maintenance over areas ranging from 47 to 120 acres.

Comment 177-6 continued

The Proposed Project and Project Alternatives would destroy regionally significant willow and mule fat riparian forest. The forest provides critical habitat for a variety of animals and birds, including nesting Yellow Warbler, which is a species of Special Concern in California. In 2012, 'Least' Bell's Vireo, which is a federally endangered species, nested here for the first time. Other animals found here include mountain lion, bobcat, mule deer, gray fox, gopher snake, pacific tree frog, and other reptiles and mammals. Other types of habitat, including freshwater marsh, alluvial scrub, and chaparral would be destroyed.

Further, the Project offers no habitat mitigation plan. Because the lost habitat is riparian, it should be replaced at the highest ratio possible and as much of the mitigation as possible should occur within the Hahamongna basin. I request the County collaborate with the City of Pasadena to determine the most suitable restoration areas.

Hahamongna Watershed Park Master Plan (HWPMP) – Goal 2 – The Devil's Gate Flood Control basin will be managed to provide protection to the developed and natural downstream area

Comment 177-7

The Proposed Project and Project Alternatives may be consistent with the flood control objectives of this HWPMP goal, but the objectives related to a lower-impact and comprehensive approach to sediment removal and management are either not met or not included in the Proposed Project or Project Alternatives. Accordingly, these reaches of the Arroyo Seco stream could be impacted under the Proposed Project or any of the Project Alternatives and should be included within the Project area. The City requests that the inclusion of the Central and Lower Arroyo Seco downstream areas in a further modeling and sediment transport analysis be conducted since sediment removed from the reservoir by the Flow-Assisted Sediment Transport (FAST) method will move through this area.

Possible impacts of sediment drops in the soft-bottom areas under the 134 Freeway and Colorado Street Bridge include adverse impacts to adjacent lands and downstream City improvements. The County should recognize responsibility for ongoing maintenance of these areas to ensure protection of the soft-bottom sections of the Arroyo Seco and downstream improvements in Pasadena.

Hahamongna Watershed Park Master Plan (HWPMP) – Goal 4 – Provide diverse recreation opportunities for Pasadena community

Comment 177-8

Due to the proposed sizes and Project impacts, the Proposed Project and Project Alternatives could adversely affect the City of Pasadena's ability to meet this goal. Passive recreation within the vegetated areas would be harmed and the presence of a large, industrial operation in the Hahamongna basin, causing significant dust and noise impacts, will harm present and potential park users, notably hikers, equestrians, and bird watchers.

Other DEIR Concerns

Aesthetics

Comment 177-9

The DEIR determined that there will be significant impacts to the appearance of the Reservoir, but identified no feasible mitigation measures. It states that the preservation of existing visual conditions is not required for Reservoir management. The City of Pasadena respectfully disagrees and requests the County prepare a final Project design more closely resembling the configuration, aesthetics, habitat restoration and vegetation management described in the HWPMP, which only allows impacts necessary for Reservoir management.

Air Quality

The DEIR determined that there are significant and unavoidable impacts to air quality even after mitigation requiring equipment to meet EPA 2007 standards. This is due to the nature of the debris removal by heavy construction equipment that generates excessive daily NOx emissions.

Comment 177-10

The Proposed Project anticipates the hauling of 7,650 CY of sediment per day using double dump trucks which have an estimated capacity of 16 to 20 CY. Removal of the sediment, vegetation, trees, and organic debris is expected to require an average of 50- truck round trips per hour, with an estimated maximum of 425 truck round trips per day during excavation activities. The trucks will drive through local neighborhoods and the 134 and 210 Freeways. The diesel trucks will operate for an estimated nine months per year, six days per week.

Short and long term health effects due to silica dust, fugitive dust clouds, diesel fumes, carbon monoxide, NOx emissions and other pollutants should be fully evaluated to determine the health risk assessment to the adjacent neighborhoods and sensitive receptors. Greater use of alternative fuel vehicles for hauling is critical and must be required as a mitigation measure.

Downstream Impacts

Comment 177-11

While the DEIR mentions potential Arroyo Seco Channel overtopping areas (flooding) including locations in Pasadena, Los Angeles, South Pasadena, and the 110 Freeway, impacts are not discussed in depth. Notably, flooding/damage risks to critical Pasadena infrastructure and natural resources, including the historic Rose Bowl, Hahamongna Watershed Park (HWP), Arroyo Seco Golf Course, and the Central and Lower Arroyo Seco are not clear. Without knowing the magnitude of the flood risk, the City of Pasadena will take any and all steps necessary to identify the least

Comment 177-11 continued

impactful Project, one that balances the City's priorities of protecting its public investments, infrastructure and the natural resources of HWP.

Noise

Comment 177-12

Loud construction noise may be mitigated by restriction on operation of off-road construction equipment with a 200+ horsepower engine within 180 feet of residences. Other equipment should be limited to using access roads only.

Further analysis should be made of haul vehicle noise generated on haul routes. There also should be limitations on the use of warning alarms on construction vehicles over certain decibels when used in the reservoir.

Project Scope

Comment 177-13

The DEIR does not present scientific rationale for the need to remove between 2.43 to 4.0 million CY of sediment from the Reservoir within 5 years. When Los Angeles County initiated project planning for a large-scale project to remove sediment from the Reservoir in 2010, the project scope approved by the County Board of Supervisors in March 2011 envisioned a 1.67 million CY sediment removal project. As the City of Pasadena bears a significant burden from the Sediment Removal and Management Project, it is imperative that the Project scope be appropriately scaled to provide adequate flood protection in the most environmentally responsible and respectful manner possible resulting in as little impact to HWP as possible.

Sediment Management Phase

Comment 177-14

Regular maintenance of the Hahamongna basin by the County is essential to lessening the need for future large-scale sediment removal projects. The DEIR fails to specify the County's commitment to an ongoing sediment management program. The document describes an estimated 13,000 CY of annual removal with a periodic removal of approximately 170,000 CY should a heavy rainfall year occur. The City objects to this broad latitude, as it would allow the County to not perform removals some years and initiate larger, periodic removal projects when desired. The City requests that the County commit to a specified maintenance program that defines a minimum and maximum amount of work that the County will perform annually. The annual minimum and maximum should conform to the limitations and responsibilities of the Easement and be only as impactful as necessary to preserve and maintain the Reservoir for water conservation and flood control purposes.

Traffic

Comment 177-15

The DEIR has determined there will be significant and unavoidable traffic impacts caused by the project. To the fullest extent, the County of Los Angles must independently mitigate these impacts without relying on local agencies.

The proposed schedule of eleven to twelve-hour work days during the week and nine hour work days on Saturdays, involving a maximum of 425 truck round trips per day during excavation activities will increase traffic on haul routes and generate burdens to residential and other streets throughout Pasadena and neighboring communities that are <u>not</u> mentioned in the DEIR. Such local

Comment 177-15 continued

burdens, as well as impacts to the 134 and 210 Freeways and area schools must be identified and mitigated before a final project is approved.

Rose Bowl and Brookside Golf Course

Our statement of background information the City considers critical to a reasonable and responsible sediment removal and management project would not be complete without reference to the Rose Bowl and Brookside Golf Course.

Comment 177-16

The historic Rose Bowl and Brookside Golf Course are major attractions that provide significant economic benefits to Pasadena. In 2011, the City of Pasadena embarked on the $182 million renovation of the Rose Bowl, prominently located downstream of the Reservoir in the Central Arroyo Seco. The primary project objectives are to improve public safety, enhance fan experience, maintain the Bowl's National Historic Landmark status, develop revenue sources to fund long-term improvements at the stadium, and enhance facility operations. The renovations, which will preserve the Rose Bowl as a Pasadena icon and enable the facility to stay competitive within the industry, will be completed in FY 2015. The City recognizes the needs to protect both the Rose Bowl and golf course from any potential future flood damages, but this needs to be balanced with a Project that is respectful of the Central Arroyo Master Plan and the expectations of the community. It is imperative that the County coordinate sediment removal and transport activities with Rose Bowl special events, which involve substantial traffic on the 134 and 210 Freeways.

Concluding Comments

Comment 177-17

The City of Pasadena has identified the foregoing Pasadena-specific concerns with the Sediment Removal and Management Project, beginning with impacts to Hahamongna Watershed Park (HWP), followed by concerns with topics studied in the DEIR. Any one of these items is sufficient to warrant review by the County of the impact of this Project on Pasadena. Collectively, the items offer a compelling argument that the Project as proposed is not reasonable or responsible for Pasadena.

While the City acknowledges the need for a responsible sediment removal project and ongoing sediment management program at the Devil's Gate Reservoir, it is strongly committed to protect the vast public assets in the vicinity of the Devil's Gate Reservoir and to preserve the quality of life in adjacent neighborhoods.

Comment 177-18

The Sediment Removal and Management Project as proposed in the DEIR <u>differs</u> from the Los Angeles County Board of Supervisors March 2011 action which authorized the Los Angeles County Department of Public Works to remove 1.67 million CY of sediment from the Reservoir. The DEIR fails to explain this critical difference.

Comment 177-19

We expect the County to carry out this project within the confines of the Easement which the City granted to the County. The City intends to assure the Easement is not overburdened by an aggressive Project that unnecessarily destroys habitat and denudes vegetation. We request the County to collaborate with Pasadena to design and implement a Project that conforms to the limitations and responsibilities of the Easement and is only as impactful as necessary to preserve and maintain the Reservoir for water conservation and flood control purposes.

Comment 177-20

The DEIR does not identify the City as a potential responsible agency pursuant to the California Environmental Quality Act (CEQA.) The City may have discretionary authority over approvals required to implement the Project. As discussed above, the Project must conform to the limitations and responsibilities of the Easement; otherwise the County will have to seek City authority to go beyond those limits. Further, the City may have discretionary permitting authority required to implement the Project or any alternative thereto. The City's analysis of its responsible agency status is ongoing and will require close cooperation between the City and County to ensure that all City permitting requirements are met and that the EIR is adequate for the City's use as a responsible agency.

Comment 177-21

The City requests that the County of Los Angeles include the City's Department of Public Works staff in the ongoing precise design and engineering tasks related to the Project.

Conclusion

Comment 177-22

The City of Pasadena looks forward to continued cooperation and consultation with the County of Los Angeles on this critical initiative. We wish to express sincere appreciation to County staff members, especially Keith Lilley, for their willingness to present the Project in various settings and their responsiveness during the public comment period. The City is also appreciative of the County's affirmative response to our community members' request for an extension of the public comment period.

If you have any questions regarding this letter, please do not hesitate to contact Julie A. Gutierrez, Assistant City Manager, at (626) 744-7371 or jgutierrez@cityofpasadena.net, or me at (626) 744-4311 or bbogaard@cityofpasadena.net.

Respectfully submitted,

Bill Bogaard

BILL BOGAARD
Mayor

Attachments:

1. Hahamongna Watershed Park Master Plan (HWPMP) Goals & Objectives
2. City of Pasadena Comments on Draft Environmental Impact Report (DEIR) for Devil's Gate Reservoir Sediment Removal and Management Project

Copy: Michael D. Antonovich, Los Angeles County Board of Supervisors, District 5
Keith A. Lilley, Senior Civil Engineer, Los Angeles County Department of Public Works
Michael J. Beck, City Manager, City of Pasadena
Julie A. Gutierrez, Assistant City Manager, City of Pasadena
Siobhan Foster, Director of Public Works, City of Pasadena
Brad Fuller, Assistant City Attorney, City of Pasadena

Attachment 1:

Hahamongna Watershed Park Master Plan (HWPMP) Goals & Objectives

1.6 GOALS & OBJECTIVES OF THE HAHAMONGA WATERSHED PARK MASTER PLAN

The following are the goals and objectives specific to Hahamongna Watershed Park:

Goal 1: Preserve, restore, and enhance the native habitats.

Objectives:

- Develop a habitat restoration plan for Hahamongna Watershed Park.
- Protect and enhance the Hahamongna Watershed Park wildlife corridor linkages to the upper watershed and the downstream reaches of the Arroyo Seco.
- Restore, enhance, and reestablish the historical native plant communities of the Arroyo Seco.
- Create wetland and aquatic habitats in HWP to increase the biodiversity.
- Locate new facilities in developed or disturbed areas so as to minimize impact to established habitats.
- Enhance the edges of the spreading basins with native trees and other appropriate plantings to blend these facilities with the riparian setting.
- Limit exterior lighting for security, safety, and operational purposes to lessen the impact on nocturnal wildlife.
- Relocate existing overhead power and communications lines to restore the natural environment and provide adequate, safe maintenance access.
- Develop dam maintenance and flood control procedures that promote preservation of native habitats.
- Repair the harmful impacts of the mining operations by regrading the highly disturbed, unnatural topography within the flood plain to allow for the successful planting of native plant communities to establish quality habitat.
- Establish a monitoring program to study runoff and sediment delivery in the flood basin to determine impacts on plant communities in HWP.
- Restore areas where erosion has occurred.

Goal 2: The Devil's Gate flood control basin will be managed to provide protection to the developed and natural downstream areas.

Objectives:

- Facilitate the dam and reservoir maintenance operations in a manner that is compatible with the proposed features of the Master Plan and will result in minimal impacts to the surrounding area.
- Maintain or improve the flood capacity behind Devil's Gate Dam.
- Develop a sediment removal plan that minimizes the impact to the basin and to the surrounding neighborhoods.
- Develop a grading plan that allows habitat restoration and recreational activities to co-exist with flood management and water conservation.
- Develop a multi-agency task force to review maintenance, sediment removal, dam operation, permit, and liability issues on a continual basis after this plan is adopted.
- Develop dam maintenance and flood control procedures that promote water conservation.
- Establish a monitoring program to study runoff and sediment delivery in the flood basin to determine impacts on flood management/water conservation capabilities.

Goal 3: Conserve and protect the water resources of the Arroyo Seco.

Objectives:

- Maximize groundwater recharge to minimize the amount of water purchased from outside sources.
- Develop a grading plan that allows habitat restoration and recreational activities to coexist with flood management and water conservation.
- Monitor water entering the basin from Flint Wash and various storm drains to ensure safe water quality.
- Develop a program to minimize and provide the means to control the inflow of trash from Flint Wash and various storm drains.
- Develop an alternative to the JPL eastside surface parking area for expanded spreading basins for groundwater recharge.

Goal 4: Provide diverse recreation opportunities for the Pasadena community.

Objectives:

- Balance the recreation needs for active, passive, and educational activities in HWP.
- Develop a grading plan that allows habitat restoration and recreational activities to co-exist with flood management and water conservation.
- Design children's play areas to emphasize learning and connections to the natural environment.
- Distribute recreation facilities to allow equal access from the surrounding neighborhoods.
- Maintain the historic recreational uses within HWP.

Goal 5: Enrich and promote the unique history and culture of Hahamongna Watershed Park.

Objectives:

- Develop HWP as a "living laboratory" for local schools and environmental education programs.
- Preserve and encourage Native American use of HWP as a cultural resource.
- Explore the possibilities of a joint partnership with the U.S. Forest Service and Native Americans in developing an interpretive center and native-plant nursery at HWP.
- Develop design guidelines to ensure aesthetic compatibility and quality construction for any improvements made in HWP.
- Develop passive viewing areas with unique vantage points.
- Create programs that inform and educate the public about the natural processes, the history and the culture of the site.
- Underground or relocate the existing above-ground electrical transmission lines.

Goal 6: Provide a safe and secure park.

Objectives:

- Provide adequate water and sewage infrastructure where needed throughout HWP.
- Develop guidelines and delegate agency responsibilities for recreation, flood management, and water conservation liabilities.

- Retain and enhance, as needed, the recently reestablished Park Ranger Program to ensure compliance with municipal laws, codes, and regulations. Secure entrances and perimeter of HWP.
- Develop an all-weather perimeter trail/road for emergency and maintenance access as well as for passive recreation.

Goal 7: Provide adequate circulation, access and parking.

Objectives:

- Provide public transportation and nonmotorized access to HWP.
- Provide adequate parking throughout the park for all proposed recreation activities and facilities.
- Maintain and restore the trail links to the Central Arroyo, the surrounding neighborhoods, and the Angeles National Forest.
- Develop separate trail systems for bicycles, hikers, and equestrians wherever possible.
- Comply with ADA (Americans with Disabilities Act) standards for a "natural park."
- Develop a signage system that provides clear directional information and informs park visitors without being intrusive.
- Improve the east entrance for better access, circulation, and traffic safety.
- Protect residential neighborhoods from the nuisances related to maintenance equipment, traffic, and noise.
- Improve and enhance regional trail connections.
- Continue to assist JPL in meeting its parking needs.

The *Arroyo Seco Master Plans* were developed by the combined efforts of the Planning and Development Department and the Department of Public Works. The implementing department for the completed *Arroyo Seco Master Plans* will be the Department of Public Works. The projects identified in the *Arroyo Seco Master Plans* are described and listed to easily translate to the City's capital improvement program.

Attachment 2:

City of Pasadena Comments on Draft Environmental Impact Report (DEIR) for Devil's Gate Reservoir Sediment Removal and Management Plan

Comment 177-23

The City of Pasadena offers the following comments on Los Angeles County Flood Control District's Draft Environmental Impact Report (October 2013, State Clearinghouse No. 2011091084) for the Devil's Gate Reservoir Sediment Removal and Management Project. As reflected below, the comments are provided by the following City departments: Fire, Human Services, Water and Power, Planning, Police, Public Health, Public Works, and Transportation.

Unless otherwise specified, these comments are applicable to the project as well as the alternatives.

Section	Paragraph	Comment
The Pasadena Fire Department provides the following comments:		
Comment 177-24 2 - Project Description	2.3	The Fire Dept. understands the need for the project and requires adequate notification, should any obstacles/obstructions occur during the implementation of the project.
The Pasadena Human Services and Recreation Department provides the following comments:		
3.15 – Recreation / Public Services	3.15.2	Use of the park is under-reported and has increased since data was provided. Statistics provided address only those users visiting the park as part of a permit or reservation-based activity, or as part of club or organization activity. Data provided for non-permit or reservation-based activities is insufficient. Passive recreational use such as walking/jogging, bird watching, etc. is not addressed or quantified and represents a significant percentage of overall recreational use within HWP. Comment 177-25
3.15 – Recreation / Public Services	3.15.6	The Department of Human Services and Recreation (HS&R), as the Recreation Manager, must have the opportunity to review all final information and plans, so as to be able to redirect recreation use from Hahamongna, if possible and necessary, during any time during the scope of the project. LACFD must coordinate with HS&R when the need to relocate any use from Hahamongna to another City facility is necessary, to ensure an alternate location is a good match for the use needing relocation. HS&R must be provided with a project schedule 6 months in advance and notified of the likelihood of HWP facility closure or impact with ample time (no less than 30 Comment 177-26

	Section	Paragraph	Comment
Comment 177-26 continued	3.15 – Recreation / Public Services	3.15.6	days), since alternate sites have their own user groups and regularly permitted activities; considerable effort will be necessary to relocate any of the regular HWP permittees. HS&R foresees temporary impacts to regularly permitted recreational activities on the west side of HWP, during the life of the project. Regular and timely coordination between LACDPW and the City of Pasadena HS&R Dept. is necessary.

The Pasadena Water and Power Department provides the following comments:

Comment 177-27	2 - Project Description	2.4	LACFCD is currently using Johnson Field with storing sediment and green waste. The agency acknowledges in the DEIR they will remove the material as part of the project. However, there is no reference if LACFCD will be restoring it to a specified agreed condition per the City prior to placement of the material. Condition #9 of the City permit PW-49-13 (September 3, 2013) states, "County agrees that upon commencement of large-scale sediment removal activity, removal of sediment from Johnson Field and its rehabilitation as a basin will be prioritized."
Comment 177-28	2 - Project Description	2.9	Table 2.9.1 lists projects that may have cumulative impacts with the Proposed Project. Pasadena Water and Power's (PWP) Recycled Water project should be included in the list for potential impacts since this project may undergo construction at the same time as LACFCD's Proposed Project. The proposed Monk Hill Treatment System optimization projects (new well and re-purposing of the Behner Water Treatment Plant) should also be added to the list of other projects evaluated as part of Cumulative Impacts.
Comment 177-29	3 - Environmental Analysis	3.10.2	Recommend not using "rocket fuel" when referring to perchlorate. Perchlorate is a component of solid rocket propellants. There are multiple types of rocket fuel, including various liquid propellants, solid propellants, and hybrid propellants.
Comment 177-30	3.17 - Utilities	3.17.2	This section does not reference or recognize that PWP owns a subterranean infiltration tunnel system, called the Devil's Gate Tunnel that is located below the Devil's Gate Dam and runs both northerly along the project area and southerly to Manholes 1 and 2. The tunnel that runs north of the dam consists of sections that are connected by manholes. A number of these manholes may

Section	Paragraph	Comment
3.17 – Utilities	3.17.2	not be visible at ground surface. Under PWP's Recycled Water project, the Devil's Gate Tunnel will provide a source of non-potable water. LACFCD will need to locate and protect the tunnel and manholes from damages during the Proposed Project and Reservoir Management.
4 – Alternatives Analysis	4.3.0	1. The Proposed Project (Configuration A) with annual Reservoir Management by the Los Angeles County Flood Control District (LACFCD), including alternative Configurations B, C, and D provide a benefit to the Water Department in the long-term by removing current and future sediment deposits in the reservoir thereby increasing percolation rates and recharge of surface runoff in the Monk Hill Sub-basin. The added water to the aquifer is a benefit by maintaining or increasing local groundwater levels. It will also benefit the aquifer and pumpers in the Monk Hill Sub-basin by providing a hedge against the risk for a reduction in future pumping rights similar to actions applied to pumpers of the Pasadena Sub-basin.

Comment 177-30 continued

Comment 177-31

Fresh water is becoming much scarcer in southern California and every effort must be taken to maximize local run-off. Ironically, the Reservoir Management will promote releases of water during the Flow Assisted Sediment Transport (FAST) process, however, it is PWP's belief that the volume of water released or discharged during this process will be outweighed by the benefit gained from increases in recharge when percolation rates rise as less sediment is present behind the dam. There is also likely gain in percolation rates in the upper reservoir under the Proposed Project and annual Reservoir Management when the overall topography is reconfigured. The elevation of the proposed finish grade of the reservoir is higher further north of the dam face which promotes increased flow velocity. At the face of the dam the grade elevation is significantly shallower thus providing storage and results in a drop off in both flow velocity and fines. It is by design that the sediment fines are carried as close to the dam face as possible to maximize removal during the FAST process.

Section	Paragraph	Comment

The Pasadena Planning Department provides the following comments:

Comment 177-32	2 - Project Description	2.1.6	The EIR doesn't properly characterize Hahamongna Watershed Park (HWP) or the nature of the surrounding land. The discussion of recreational facilities in the Hahamongna Watershed Park focuses on the Oak Grove area on the west side of the Hahamongna Basin and implies this area is separate from HWP. The Oak Grove area is contained within HWP. In addition to the facilities described in the DEIR, Hahamongna Watershed Park includes recreational improvements on the east side of the Basin, including trails and picnic areas. In addition, Pasadena Water & Power (PWP) maintains multiple water infrastructure improvements in this area including a series of spreading basins.
Comment 177-33	2 - Project Description	2.5.1	Sediment Removal Phase: This section does not specify the maximum or average size of the site that would be subject to grading activities at any given time or the maximum amount of grading/operations to occur per day. As a result, the EIR does not allow proper consideration of impacts related to biological resources, aesthetics, air quality, greenhouse gas emissions, noise, and traffic.
Comment 177-34			Sediment Disposal: The EIR does not provide enough detail to discern the maximum hourly or average daily impacts, nor can the reasonableness of the stated level of operations be considered. This section states, "The trucks are anticipated to haul an estimated 7,650 cy per day. Removal of the sediment, vegetation, trees, and organic debris is expected to require an average of 50 truck round trips per hour, with an estimated maximum of 425 truck round trips per day during excavation activities." Is the estimated 7,650 cy per day the maximum or average amount to be hauled? The maximum hourly and the average daily operations are not identified and therefore not adequately studied. Construction equipment is described as "including but not limited to approximately four front loaders with 4-cubic-yard buckets, two bulldozers, one excavator, one grader, one water truck, and two tender trucks..." The quantity of equipment listed seems inadequate to acquire the sediment, place 16-20 yards into a truck every 72 seconds, and maintain suitable access for the trucks throughout each day. The EIR

	Section	Paragraph	Comment
Comment 177-34 continued	2 - Project Description	2.5.1	seems to agree by acknowledging there may be more equipment. A more realistic equipment estimate is required to adequately study their impacts.
Comment 177-35	2 - Project Description	2.5.2	Reservoir Management Phase, Vegetation Removal: This section states that vegetation will be removed annually by mowing or grubbing, but does not specify how that determination will be made and the amount of area subject to each method. The EIR does not specify the maximum or average size of the site that would be subject to maintenance activities at any given time. This level of detail must be provided to allow proper consideration of impacts related to biological resources, aesthetics, and air quality. This comment applies to all alternatives as well.
Comment 177-36	2 - Project Description	2.5.2	Reservoir Management Phase, Vegetation Removal: Similar to the Sediment Removal Phase, this section does not identify a revegetation plan for the land disturbance area. How will the disturbed land be revegetated? The EIR must describe: What measures will be taken to prevent the propagation of non-native and/or invasive species? What measures will be taken to ensure that the revegetated areas function ecologically with the existing natural communities in the Hahamongna area? As previously noted, the City of Pasadena requests that 1) a revegetation plan be developed by a qualified restoration ecologist; 2) that only native species be planted; and 3) that revegetation occur concurrently with sediment removal, such that the minimum amount of denuded land necessary to conduct sediment removal activities exist at any given time.
Comment 177-37	2 - Project Description	2.5.2	Reservoir Management Phase, Option 1, Sediment Excavation/Trucking Offsite: This section states, "It is estimated, based on past storm events, that sediment excavation/trucking offsite will be required to remove an average of 13,000 cy of sediment annually. Based on an estimated removal of 4,800 cy per day, it is expected this will occur over an estimated two-week period, Monday through Friday." These estimates must be clarified, as 4,800 cy per day for 10-working days would result in 48,000 cy of sediment removal rather than 13,000 cy. Also, the equipment fleet that would be utilized for this annual operation must be identified, so that the impacts can properly be analyzed.

	Section	Paragraph	Comment
Comment 177-38	2 - Project Description	2.5.2	Reservoir Management Phase, Sediment Excavation/Trucking Offsite: This section further states, "A moderately large sediment removal event, anticipated to involve around 170,000 cy, could take place over an estimated 12-week period during the late summer/early fall following the vegetation maintenance." The EIR must provide details for this level of operation, including average and maximum daily operations, maximum hourly truck trips, the equipment fleet that would be utilized for this annual operation, etc. Such information is necessary to allow proper consideration of impacts related to air quality, greenhouse gas emissions, noise, and traffic. Regarding Option 2, Vegetation Removal: Similar to the Sediment Removal Phase and Option 1, this section does not specify the maximum or average size of the site that would be subject to grading activities at any given time. This level of detail must be provided to allow proper consideration of impacts related to biological resources, aesthetics, and air quality.
Comment 177-39	2 - Project Description	2.5.2	Reservoir Management Phase, Option 2, Vegetation Removal: Similar to the Sediment Removal Phase, this section does not identify a re-vegetation plan for the land disturbance area. In fact, this section states, "All vegetation and sediment outside the reservoir management footprint will be allowed to naturally re-establish and/or remain in place." Should this statement be interpreted to mean that the County does not plan to manage the re-vegetation of the scarred areas? What measures will be taken to prevent the propagation of non-native and/or invasive species? What measures will be taken to ensure that the re-vegetated areas function ecologically with the existing natural communities in the Hahamongna area? As previously noted, the EIR must include 1) a re-vegetation plan be developed by a qualified restoration ecologist; 2) that only native species be planted; and 3) that re-vegetation occurs concurrently with sediment removal, such that the minimum amount of denuded land necessary to conduct sediment removal activities exist at any given time.
Comment 177-40	2 - Project Description	2.9	It is not clear what the criteria are for related projects. The Lincoln Avenue Specific Plan should be considered as a related project as it is relatively close to the project site and envisions additional development on Lincoln Avenue. The EIR can be found at this link: http://cityofpasadena.net/Lincoln_Avenue_Specific_Plan.aspx

Section	Paragraph	Comment
3.4 - Aesthetics	3.4.2	Scenic Vistas: The City does not agree that scenic vistas are not identified in the Hahamongna Watershed Park Master Plan. This EIR section states, "Hahamongna Watershed Park Master Plan area, including the Proposed Project site, does not contain any designated scenic vistas (City of Pasadena 2002)." This citation appears to reference a statement in the Arroyo Seco Master Plan Master EIR, which in turn referenced the City's former (1994) General Plan. A more relevant reference is the Hahamongna Watershed Park Master Plan. This Master Plan recognizes in various narratives the quality of views of the Hahamongna basin from surrounding public vantage points and establishes uses to take advantage of such views including trails and overlooks (e.g., Dam Observation Trail, Sunrise Overlook, and Sunset Overlook).
3.4 - Aesthetics	3.4.3	City of Pasadena General Plan: The reference to Objective 9 and Policy 9.5 are in the Land Use Element of the General Plan, not the generic General Plan. City of Pasadena General Plan: This section should also cite objectives and policies in the Green Space, Parks & Recreation Element and Master Plan adopted November 2007. This element can be found at this link: http://cityofpasadena.net/Planning/CommunityPlanning/Green_Space_Element_and_Master_Plan/ At a minimum, these citations must include: *Policy 1.2 – Protect Open Spaces: Protect natural open areas, watersheds, and environmentally sensitive areas such as Hahamongna, Eaton Canyon, riparian areas, and other open spaces.* *OBJECTIVE 2 – PRESERVATION AND PROTECTION OF THE ARROYO SECO AND ADJACENT OPEN SPACE AREAS: Recognize the importance to Pasadena of the history, cultural resources, and unique character of the Arroyo Seco, and conserve and enhance these assets.*

Comment 177-41

Comment 177-42

Section	Paragraph	Comment
3.4 - Aesthetics	3.4.3	*Policy 2.1 – Arroyo Seco Planning: Fully implement all master plans and design guidelines for the Arroyo. This includes the Lower Arroyo Master Plan, the Hahamongna Watershed Park Master Plan, and the Central Arroyo Master Plan. (LUE Policy 9.2)* *Policy 2.3 – Balance Recreation with Environmental Protection: Implement the Arroyo Seco Master Plans by balancing recreational opportunities with protection and restoration of the ecosystem, while recognizing the important existing water resources and flood management functions of the area.* *Policy 2.4 – Promote multi-faceted use of the Arroyo: Through implementation of the Arroyo Seco Master Plans, continue to maintain and enhance the area as a prime resource for quality of life of Pasadena residents.*
3.4 - Aesthetics	3.4.6	Impacts and Mitigation, Impacts AESTHETICS-1 and AESTHETICS-3: The project's impact on views and visual character/quality are rightfully identified as significant impacts. However, no mitigation measures are offered to reduce such impacts. Suggestions for mitigation include limiting the acreage of the land scar that is visible at any one time and a managed revegetation plan that occurs simultaneously with sediment removal. Furthermore, PM10 emissions identified in Table 3.5-6 are unrealistically low. Given that the project's primary purpose is to move soil, daily excavating, grading, scraping, loading, and hauling activities would be of the most intense variety; and thus would presumably generate dust emissions well in excess of the SCAQMD thresholds of significance (150 lbs/day), not just a mere fraction thereof. As previously noted the DEIR fails to provide adequate detail about the peak daily grading activities (e.g., maximum daily acreage of ground disturbance, maximum daily hauling activities, etc.) and thus fails to provide the reader with the information necessary to adequately consider the air pollution impacts of the project.
3.5 - Air Quality	3.5.6	Table 3.5-6 Unmitigated Sediment Removal Emissions: This table identifies maximum daily PM10 emissions to be 13.70. However, PM10 emissions from fugitive dust alone are estimated to be 27.30. This must be explained and the study revised as necessary.

Comment 177-42 continued

Comment 177-43

Comment 177-44

Comment 177-45

	Section	Paragraph	Comment
Comment 177-46	3.6 - Biological Resources	3.6.3	Applicable Regulations, Local: The City's Tree Protection Ordinance was amended on January 25, 2010. The list of trees was revised and the Finding # 6 was changed to *"The project includes a landscape design plan that emphasizes a tree canopy that is sustainable over the long term by adhering to the adopted replacement matrix. "* The study must be revised to correctly cite the 2010 Tree Protection Ordinance and its revised findings.
Comment 177-47	3.6 - Biological Resources	3.6.6	Impacts and Mitigation, BIOLOGY-1: The conclusion that the project would not significantly impact any special-status plants is based on surveys conducted in 2010. It is unclear how the use of these studies supports the conclusion that vegetation removal to be conducted in 2015-2020 and beyond, would not impact special-status plants. Given the long-term nature of the project and the dynamic nature of the site's ecological system, annual pre-grading plant surveys are warranted.
Comment 177-48	3.6 - Biological Resources	3.6.6	Impacts and Mitigation, BIOLOGY-1: The City does not agree with the EIR findings. The project would substantially reduce habitat for Least Bell's Vireo, a State and fed listed endangered species and four Species of Special Concern. The City views this loss of habitat as a significant impact in contradiction to the County's conclusion.
Comment 177-49	3.6 - Biological Resources	3.6.6	BIOLOGY-2: The City disagrees with the EIR. The project would impact sensitive habitat as detailed below. mitigation is proposed at a 1-1 ratio and impacts are then considered less than significant: • 1.1 acres of Riversidean Alluvial Fan Sage Scrub • 51.4 acres of Riparian Woodland • 9.3 acres of Mule Fat Scrub The loss of sensitive habitat and 1:1 replacement ratio is not sufficient to deem the impact less than significant.
Comment 177-50	3.7 - Cultural Resources	3.7.3	Applicable Regulations, City of Pasadena Comprehensive General Plan: Last sentence – the policies that follow are from the Land Use Element, not the Land Use and Mobility Element.

	Section	Paragraph	Comment
Comment 177-51	3.7 - Cultural Resources	3.7.6	Mitigation Measures: MM CUL-1 states, "If sediment removal or reservoir management activities exceed the depth of the historic flood deposits and encounter native sediments, these activities will be monitored by a qualified archaeologist." How will the County determine if activities will exceed the depth of flood deposits? Will analysis occur prior to grading? The EIR must provide the estimated depth/contours at which "native sediments" would be encountered and consideration of whether excavation below such depths/contours is necessary.
Comment 177-52	3.8 - Geology and Soils	3.9.2	Local GHG Inventory: This DEIR section needs to be completely revised. The 2009 Greenhouse Gas Inventory was a draft that was never adopted and was discredited by the Environmental Advisory Commission and Planning Commission. In 2013, a Greenhouse Gas Inventory was prepared and adopted by the City Council on November 18, 2013, therefore, the DEIR does not provide adequate analysis. The staff report and Inventory can be found at this link: http://ww2.cityofpasadena.net/councilagendas/2013%20agendas/Nov_18_13/agendarecap.asp Also correct the reference #44 on page 631.
Comment 177-53	3.13 - Mineral Resources	3.12.3	Applicable Regulations, City of Pasadena General Plan: Clarify which elements of the Pasadena General Plan were reviewed.
Comment 177-54	3.14 - Noise and Vibration	3.14.3	Local Regulations, City of Pasadena General Plan Noise and Vibration Policies: Need to clarify that these policies (7b, 7c, and 7d) come from the Noise Element of the General Plan. There are additional policies and objectives in this element that might be relevant. http://cityofpasadena.net/Planning/CommunityPlanning/General_Plan_Noise_Element/ References on page 631 should also include the Noise Element of the General Plan.

	Section	Paragraph	Comment
Comment 177-55	3.14 - Noise and Vibration	3.14.3	Regulatory Framework, City of Pasadena Municipal Code: The EIR considers this project to be "construction" and thus applies only the Construction Noise portion of the City's Noise Ordinance (PMC 9.36.070 and 9.39.080). However, the proposed project is both long-term construction and ongoing annual maintenance and operation. Thus, the project should be evaluated against the entire City Noise Ordinance, including 9.36.050 General noise sources.
Comment 177-56	3.15 – Recreation / Public Services	3.15.3	City of Pasadena General Plan: The reference to Objective 9 and related policies are in the Land Use Element of the General Plan, not the generic General Plan.

The Pasadena Police Department provides the following comments:

Comment 177-57	2 - Project Description	2.5.1	In review of the Environmental Impact Report and the Traffic Impact Analysis, the research data did not adequately provide a clear analysis regarding a coordinated traffic plan along the 210 freeway corridor ramps. It is the assessment of the Pasadena Police Department (PD) that the impact will likely occur at the Berkshire Avenue and Arroyo Blvd on/off ramps in the City of La Canada and may cause moderate slowdowns for local Pasadena residents using the freeway system for exits such as Windsor Avenue and Arroyo Blvd. Moreover, the Berkshire Avenue ramp is a primary exit for those who attend La Canada High School, creating significant traffic impacts in the mornings and afternoons. It is recommended that the report reflect an inclusive analysis of the impact at specific on/off ramps such as the Berkshire Avenue exit in coordination with the City of Pasadena and the Pasadena Police Department. The Traffic Impact Analysis did not sufficiently provide calculation data of the potential impact to traffic flows during major events at the Rose Bowl. In 2014, Pasadena will host the UCLA football season between September and December as well as concerts and other special at the Rose Bowl and other Pasadena venues. In review of the report, the PD is concerned with traffic impacts during major events for the duration of the sediment removal

Section	Paragraph	Comment
2 - Project Description	2.5.1	phase which is planned to occur on Saturdays between 8am-5pm. Therefore, it is recommended that the EI report reflect a specific traffic plan regarding the sediment removal with consideration for Rose Bowl and other significant events. This recommendation should assist in the design of a traffic strategy to mitigate potential problems prior to the project start date.

Comment 177-57 continued

The Pasadena Public Health Department provides the following comments:

3.14 - Noise and Vibration	3.14.6	Possible health impacts of dust: Due to the potential risk of soil-endemic pathogens particularly Coccidioidomycosis, LAC or AQMD, or the like, should reduce the risk of exposure by wetting the soil before excavation. This will also help prevent exacerbation of respiratory symptoms of high-risk residents who may be exposed.

Comment 177-58

Noise considerations: Require that any construction equipment comply with the noise ordinance restrictions outlined in the City of Pasadena Municipal Code and all workers must comply with OSHA guidelines for employee safety. In addition, residents, schools and businesses in the impacted area must be notified that the noise levels may be affected beginning 2014 and ending 2019. Require noise monitoring be included as part of the requirement and be funded to ensure that there are no long-term effects.

Comment 177-59

Recommend that an Environmental Impact Assessment be completed to look at all other environmental impacts.

Comment 177-60

The Pasadena Public Works Department provides the following comments:

2 - Project Description	2.1.1	The EIR provides a brief mention of the project's location within the Arroyo Seco watershed but does not include a graphic representation. Provide a map that shows the Arroyo Seco watershed including the project location, the Arroyo Seco stream and the L.A. River. It would contribute to a greater understanding of the Devil's Gate Reservoir's relationship to the Arroyo Seco watershed.

Comment 177-61

	Section	Paragraph	Comment
Comment 177-62	2 - Project Description	2.1.6	Rose Bowl Riders also sublets to Move A Child Higher (MACH1), an organization that provides equine assisted activities to riders with disabilities.
Comment 177-63	2 - Project Description	2.5.1	The City's Berkshire Creek Restoration project will likely require fill material as a part of the implementation. It is anticipated that this work will take place while the County's sediment removal efforts are underway. Coordination between LACFCD and the City of Pasadena to utilize sediment for this fill material, should the material be deemed suitable for this use, that would otherwise be removed from the site will contribute to reductions to traffic and air quality impacts.
Comment 177-64	2 - Project Description	2.5.1	Fig. 2.5-1 shows portions of the access roads to be outside the project boundary but improvements to the road are described in the project description. This discrepancy is confusing and affects a reviewer's ability to fully understand the proposed access road implementation. These access roads must be described in greater detail. The DEIR does not describe or study potential impacts of modifications to the existing paved trail on the west side to protect trail users during sediment removal or maintenance operations or whether the trail surface in this area be strengthened to accommodate truck and equipment traffic. For the east access drive, how will the existing trail be accommodated as a part of this design? Figure 2.5-6 appears to include the approach to the east side trail undercrossing within the proposed access road, but this is not a suitable vehicular route. If there is a specific reason why this area is shown as part of the access road, it must be described in detail in the EIR.
Comment 177-65	2 - Project Description	2.5.1	The City will require street repair for City streets including, but not limited to, Oak Grove Drive, Arroyo Blvd., and Windsor Avenue as deemed necessary to repair damage caused by sediment hauling.
Comment 177-66	2 - Project Description	2.5.2	The EIR does not correctly describe the project footprint related to the reservoir management phase. Section 2.5.2 describes the effects of the Flow-Assisted Sediment Transport (FAST) method as finer grained sediment being transported down the Arroyo Seco Channel. The effects of this process are not studied in the EIR though. The EIR states "the majority of these FAST operations will be similar to historic FAST operations and that finer sediment discharged during FAST operations will be

	Section	Paragraph	Comment
Comment 177-66 continued	2 - Project Description	2.5.2	transported to the Pacific Ocean via Arroyo Seco Channel..." The City's observed results of FAST indicate substantial sediment drops in the soft-bottom areas under the CA-134 and Colorado Street bridges. Over time, sediment build-up can create an adverse effect to adjacent lands and downstream City improvements. The EIR must include a detailed analysis of these downstream effects of FAST including projected sediment accumulation and potential flooding. Additionally, LACFCD must include active sediment removal from these downstream areas as part of the sediment management phase and not rely solely on discharge to move deposited sediment further downstream.
Comment 177-67	2 - Project Description	2.5.2	The County must provide 72 hours minimum notification to the City Public Works (PW) Department in advance of beginning a FAST Operation for all FAST operations described for the project and alternatives.
Comment 177-68	2 - Project Description	2.5.2	Due to sediment accumulation in the Arroyo Seco Channel as a result of FAST operations, a separate sediment management MOU between the City and LACDPW will need to be developed to insure protection to the soft-bottom sections of the Arroyo Seco and downstream improvements in Pasadena.
Comment 177-69	3.4 - Aesthetics	3.4.2	The viewpoint #5 image is misleading and should reflect a more panoramic view, typical of what a viewer's eyes provide. Additionally, a more important viewpoint is found just north at the City's recently implemented Sunset Overlook project. An interpretive sign panel containing a panoramic image of this vista (below) was placed at this location because of the inclusive view of the Park.

	Section	Paragraph	Comment
Comment 177-70	3.4 - Aesthetics	3.4.6	Impacts and Mitigation, Visual Change: The EIR uses "view blockage" as one factor in determining the overall visual change of an area. It is improper and misleading to include this as a measure of project impact. The nature of the project is not to construct something that will block a view; rather it removes something that as a result, affects a view. Including view blockage as a measure and ranking it as "none" for each view results in skewing the overall visual change rankings downward.
Comment 177-71	3.5 - Air Quality	3.5	The City strongly encourages LACDPW to aggressively pursue the reduction of air quality impacts through the requirement of the lowest-emission and alternative-fuel vehicles available for this project. Within the anticipated timeframe of this project, the County will be required to have completed the conversion of heavy trucks to alternative fuel or clean diesel. The County could study the feasibility of imposing such requirements onto the contractor who will perform this work and/or commit to using some or all of their own fleet for hauling.
Comment 177-72	3.5 - Air Quality	3.5.2	The MACH1 organization is a certified Premier Accredited Center (PAC) as determined by the Professional Association of Therapeutic Horsemanship International (PATH). This certification is required for MACH1's professional good-standing and by the City to establish MACH1 as the most qualified provider of their services. Condition F34 of PATH's accreditation standards require MACH1 to have system in place to minimize exposure to dust for both humans and animals. MACH1 does have this system in place, but fugitive dust created by sediment removal and sediment management activities may overwhelm MACH1's efforts and potentially jeopardize their PAC status. The County must: ensure that all best management practices related to fugitive dust control are utilized to their fullest, notify the City and MACH1 in advance of upcoming activities in the vicinity of the MACH1 facility, and coordinate work activities with the City and MACH1 to schedule activities in the vicinity of MACH1 during MACH1's non-operational times.
Comment 177-73	3 - Environmental Analysis	3.6.6	The City has identified areas where habitat mitigation efforts can be prioritized. Refer to 'Habitat Establishment and Restoration Projects' identified on pg.3-18 of the HWP Master Plan as well as the Berkshire Creek Restoration project, as appropriate.

	Section	Paragraph	Comment
Comment 177-74	3 - Environmental Analysis	3.6.6	The City has established a thorough habitat restoration plan as part of the Hahamongna Watershed Park master plan. The City will review the final Habitat Restoration Plan for the project prior to its finalization. The City also requests being a part of any consultations between regulatory agencies dealing with habitat establishment/restoration and the County for this project, to be able to clearly explain the City's habitat restoration projects for the park and to ensure the agencies are aware of the City's overall plans for the park.
Comment 177-75	3.12 - Land Use and Planning	3.12.6	Mitigation Measures, MM LAN-1: The mitigation measure oversimplifies the recreational uses in HWP. It is not sufficient to simply purpose redirecting recreational use to another facility as HWP is a unique setting and similar facilities are not within a close distance. The mitigation measure must be revised to include provisions that the City must review and approve suggested public information and redirection plans related to recreation.
Comment 177-76	3.13 - Mineral Resources	3.13.2	The EIR states that sediment removal is not expected to involve arroyo stone, however, the City's observations indicate the amount of sediment transported into the basin since the Station Fire has completely buried an area where the City was stockpiling a large collection of large boulders for various projects in HWP. For Arroyo stone that may be produced by the sediment removal effort, the City requests coordination with the County and its contractor on the preservation and relocation of these valuable mineral resources.
Comment 177-77	3.14 - Noise and Vibration	3.14.3	The EIR identifies HWP as the most impacted sensitive receptor for noise, but dismisses this due to County and City noise exemptions for public works projects. Park tenants and other recreational users must be made reasonably aware in advance when noise impacts are likely to be greater in areas of the park. The City requests the County provide anticipated work schedules and locations in advance and provide timely notification to the City and HWP tenants of expected work. In the event of HWP tenant events, the County should make every effort to direct work efforts away from these scheduled events.

	Section	Paragraph	Comment
Comment 177-78	3.14 - Noise and Vibration	3.14.3	Table 3.14-5 lists Hahamongna Watershed Park as a sensitive receptor for noise, but table 3.14-11 does not for vibration. HWP must be included as a sensitive receptor for vibration due to potential effects on horses and domestic animals boarded and visiting the park. Panic reactions by animals due to vibration could become a public safety issue and should be adequately studied in the EIR.
Comment 177-79	3.15 – Recreation / Public Services	3.15.2	Existing Conditions: The City disagrees that recreational use of the basin or any other portion of Hahamongna Watershed Park is "unofficial". The park area within the project footprint is a specific recreational draw within the City that is not duplicated elsewhere.
Comment 177-80	3.15 – Recreation / Public Services	3.15.2	Recreation Uses: As stated earlier, the MACH1 organization is not included in the list of recreational users.
Comment 177-81	3.15 – Recreation / Public Services	3.15.2	Area Recreational Facilities. The discussion of Area Recreational Facilities is too broad. Many of the facilities described do not provide similar recreational features, are a considerable distance away, and in 3 cases, are private facilities. This list and discussion must be revised to suggest reasonable recreational alternatives to HWP. Figure 3.15.1 Exhibit is misleading in the way it shows HWP a sitting outside the project boundary. Revise this exhibit to show actual boundaries of HWP and other nearby parks.
Comment 177-82	3.15 – Recreation / Public Services	3.15.6	City staff must coordinate with LACDPW staff and consultants during the precise design and engineering efforts to help establish limits of grading to protect existing and future recreational resources.
Comment 177-83	3.15 – Recreation / Public Services	3.15.6	The EIR improperly states that sediment removal activities will not limit the use Oak Grove Disc Golf Course. The course footprint extends into the project basin area. Implementation of the project or alternatives will result in the permanent loss of a portion of the course or require a reconfiguration of the course to avoid this impact.
Comment 177-84	3.15 – Recreation / Public Services	3.15.6	The City does not agree that the Altadena crest trail must be closed during the sediment removal phase. The County must provide a temporary re-route of the trail segment and way finding signs to maintain the availability of this trail for public use.

	Section	Paragraph	Comment
Comment 177-85	3.15 – Recreation / Public Services	3.15.16	There are potential significant, periodic impacts to Rose Bowl Riders, Tom Sawyer Camps and MACH1 operations. The County must coordinate with the City and these tenants to minimize operational impacts to these organizations and their associated City services.
Comment 177-86	3.16 - Transportation	3.16.0	The Metro Gold Line extension is scheduled to open at end of 2015. The County could adjust their anticipated project start to allow commuters the opportunity to use Metro instead of driving.
Comment 177-87	3.16 - Transportation	3.16.1	The City recommends no work on Sat/Sun/Holidays. This will reduce or eliminate Rose Bowl and other scheduled event conflicts, and preserve greatest amount of recreational enjoyment for park users.

Section	Paragraph	Comment

The Pasadena Transportation Department provides the following comments:

3.16 - Transportation	3.16.2	Proposed Project Site and Freeway Access: • DEIR states: "Trucks will access the Proposed Project site from I-210 by exiting at Windsor Avenue/Arroyo Boulevard, turning north at Windsor Avenue, turning left onto northbound Oak Grove Drive, and then entering the eastern reservoir access road." • With 50 inbound trucks per hour assumed, it is anticipated that a queue of trucks could occur through the intersection and along Oak Grove Drive as they wait to enter the eastern reservoir access road, especially during start and end times for La Canada High School or during Rose Bowl events. This may adversely impact emergency service vehicles entering or existing the Bowl. County needs to evaluate potential impacts and include appropriate mitigation. • Given that the County does not have methodology in place for analyzing street segment levels of significance, the study should include segment analysis based on the City of Pasadena guidelines: (http://www.cityofpasadena.net/WorkArea/DownloadAsset.aspx?id=6442458821) The County must meet with the City to determine the street segments for analysis and appropriate mitigation included. • What is the truck turning radius? The trucks turning into Oak Grove Drive may encroach onto the adjacent traffic lane before entering the site. Please provide a schematic drawing for further evaluation of potential impacts. • Will there be a planned staging area for trucks to queue, and a program in place for communication between queued trucks to enter the site? Without such programming, the project could potentially cause congestion, especially during the school pick-up and drop-off periods or during Rose Bowl events. Please evaluate potential impacts and include appropriate mitigation.

Comment 177-88

Comment 177-89

Section	Paragraph	Comment
3.16 - Transportation	3.16.6	Impacts and Mitigation: Devil's Gate Reservoir to/from I-210:

Comment 177-90

- Given that the County does not have methodology in place for analyzing street segment levels of significance, the study should include segment analysis based on the City of Pasadena guidelines: (http://www.cityofpasadena.net/WorkArea/DownloadAsset.aspx?id=6442458821)
  The County shall meet with the City to determine the street segments for analysis of potential impacts.

Comment 177-91

- DEIR states: "Proposed Project haul trucks would avoid using the Berkshire Place and I-210 eastbound ramps intersection during the AM peak period by instead using the Windsor/Arroyo and I-210 ramps. This would require the median on Oak Grove Drive to be restriped to a Two Way Left Turn Lane (TWLTL). Trucks exiting the Devil's Gate Reservoir driveway will cross the two lanes of oncoming westbound traffic on Oak Grove Drive and utilize the TWLTL if necessary to merge into the eastbound traffic. The changes to Oak Grove Drive would require the approval from the City of Pasadena."

Comment 177-92

- Provide a schematic showing the proposed striping plan and indicate how many cars may be accommodated inside the TWLTL.

Comment 177-93

- 50 outbound trucks per hour suggests that the proposed 2-way left turn lane along Oak Grove Drive may not provide enough queue length to accommodate trucks without encroaching onto through traffic lanes. The truck turning movements may cause congestion, especially during the school pick-up and drop-off periods where congestion at this segment is greatest and may potentially prevent such turning movement from occurring. Please evaluate potential impacts and include appropriate mitigation.

	Section	Paragraph	Comment
Comment 177-94	3.16 - Transportation	3.16.6	Impacts and Mitigation: Table 3.16 LOS for Devil's Gate Reservoir to/from I-210: • Given that the County does not have methodology in place for analyzing street segment levels of significance, the study should include segment analysis based on the City of Pasadena guidelines: (http://www.cityofpasadena.net/WorkArea/DownloadAsset.aspx?id=6442458821) • The County shall meet with the City to determine the street segments for analysis and appropriate mitigation included.
Comment 177-95	J - Traffic Report	Ch. 1	Project Description: With 50 trucks per hour proposed, the proposed 2-way left turn lane along Oak Grove Drive may not provide enough queue length to accommodate the trucks without encroaching onto the thru traffic lanes. Is a staging area planned for trucks to queue, and a program in place for communication between queuing trucks to enter the site? Without such programming, the project could potentially cause congestion, especially during the school pick-up and drop-off periods. Please evaluate potential impacts and include appropriate mitigation.
Comment 177-96	J - Traffic Report	Ch. 2	Level of Service Analysis Criteria For Local Jurisdictions: As stated on p. 31: "It is important to note that each city/jurisdiction has different criteria and thresholds to identify the lowest acceptable service levels." However, the analysis does not reflect City of Pasadena thresholds as conveyed in an email dated August 1, 2011 and stated in the traffic impact study guidelines. Given that the County does not have methodology in place for analyzing street segment levels of significance, the study should include segment analysis based on the City of Pasadena guidelines: (http://www.cityofpasadena.net/WorkArea/DownloadAsset.aspx?id=6442458821) The County must meet with the City to determine the street segments for analysis and appropriate mitigation included.

Section	Paragraph	Comment
J - Traffic Report	Ch. 3	Existing plus Project Traffic Analysis: Given that the County does not have methodology in place for analyzing street segment levels of significance, the study should include segment analysis based on the City of Pasadena guidelines: (http://www.cityofpasadena.net/WorkArea/DownloadAsset.aspx?id=6442458821) The County must meet with the City to determine the street segments for analysis and appropriate mitigation included.
J - Traffic Report	Ch. 4	Project Trip Generation: As stated in a July 6, 2012 email, justify your methodology (and include in the report) for arriving at a PCE of 2.5 for inbound trucks, and 3.0 for outbound trucks.
J - Traffic Report	Ch. 5	Route Summary and Mitigations/Potential Impact Reduction Measures: The report indicates: "Berkshire Place (EW) and I-210 Freeway Eastbound Ramps (NS): The Intersection is anticipated to operate at an unacceptable LOS during the AM peak period. The optional measures of this intersection are beyond of the scope of the project. The Haul Route is, therefore, anticipated to continue to operate at an unacceptable LOS during the AM peak period." It is recommended that school operations not be disrupted during sediment removal operations. Programming to address this issue shall be included in the report. Furthermore, signage at the Devil's Gate Dam and Reservoir driveway as a traffic mitigation measure may not be sufficient to manage traffic during the peak hours. Use of traffic control personnel could provide more guidance and safety to motorists at these locations.

Comment 177-97

Comment 177-98

Comment 177-99

Response to Comment Letter #177 (City of Pasadena)

Response to Comment 177-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. Los Angeles County Flood Control District (LACFCD) will include these in the Response to Comments within the Final Environmental Impact Report (EIR) and will respond to the comments contained in this letter.

Response to Comment 177-2:

Comment noted.

Response to Comment 177-3:

LACFCD appreciates the opportunity to continue to coordinate with the City of Pasadena regarding this Project.

Response to Comment 177-4:

LACFCD notes that the Hahamongna Watershed Park Master Plan (HWPMP) is an important policy document for the area, including the Proposed Project site. Analysis of consistency with the HWPMP was included in the Draft EIR, Section 3.12 Land Use and Planning.

Response to Comment 177-5:

See Response to Comment 177-4.

Response to Comment 177-6:

As noted in the comment, the HWPMP was prepared in 2003. Following the 2009 Station Fire, approximately 1.3 million cy of sediment flowed into Devil's Gate Reservoir after just two average storm seasons; which has correspondingly increased the amount of sediment requiring removal.

LACFCD was mandated by the State Legislature to provide flood protection and water conservation within its boundaries.

A reservoir storage design capacity of two design debris events (DDEs) below the dam's lowest spillway was determined to be the standard acceptable level of risk at Devil's Gate Dam and Reservoir. The DDE volume of capacity is determined using the January 2006 Los Angeles County Department of Public Works (LACDPW) Hydrology Manual and the March 2006 LACDPW Sedimentation Manual. For Devil's Gate Dam and Reservoir, the required reservoir capacity is 4.0 million cubic yards (cy) (two DDEs) below the spillway elevation of 1,040.50 feet.

The Hydrology Manual (January 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_Hydrology_Manual/2006%20Hydrology%20Manual-Divided.pdf

The Sedimentation Manual (March 2006) can be viewed here: http://dpw.lacounty.gov/wrd/publication/engineering/2006_sedimentation_manual/Sedimentation%20Manual-Second%20Edition.pdf

Additional information concerning DDE calculation methods has been added to the Final EIR, Section 2.3, Project Need.

Alternative 3, Configuration D, which was found to be the Environmentally Superior Alternative in the Draft EIR, was based on the City of Pasadena's HWPMP. Alternative 3, Configuration D affects the least amount of habitat of all the action alternatives while still achieving Proposed Project objectives (see Section 4.6 of the Final EIR). This alternative would provide a buffer on the west side of the reservoir that would allow for the movement of wildlife. Alternative 3, Configuration D, Option 1 provides a more natural configuration for the reservoir by having two branches to carry water and sediment toward the face of the dam, avoiding disturbing a significant portion of existing vegetation. To further reduce the Proposed Project's footprint, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2, which drastically reduces the project's footprint of 120 acres down to 71 acres, would avoid excavation of the western branch, thereby providing a greater habitat buffer on the west side of the reservoir. In addition, the maintenance areas would be smaller than the original sediment removal footprint, allowing for habitat to reestablish and providing additional areas for wildlife movement. Overlays of the Proposed Project and Alternatives boundaries on the Hahamongna Watershed Park Master Plan are provided on LACFCD's website as a quick reference. LACFCD has met and will continue to meet with the City of Pasadena regularly to coordinate and ensure resolution of concerns regarding Devil's Gate Reservoir and the HWPMP.

As discussed in Section 3.6.6 of the Draft EIR, Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats. In addition, sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays). Wildlife species currently found in the Proposed Project area would be expected to either remain in the undisturbed areas of the reservoir outside of the Proposed Project area or to reestablish once sediment removal activities have been completed.

Table ES-1 of the Draft EIR lists all Mitigation Measures proposed for the Proposed Project. These Mitigation Measures are enforceable and designed to reduce impacts through methods known to be feasible and effective. The Proposed Project's Mitigation Measures are accepted by agencies that would be involved in consultation, negotiation, and final approval of Mitigation Measures, including conceptual restoration plans. As with any project that involves California Department of Fish and Wildlife (CDFW), United States Army Corps of Engineers (USACE), and Regional Water Quality Control Board (RWQCB) jurisdictional areas, the ultimate mitigation for impacts related to the wetlands and drainages under the jurisdiction of the resource agencies is negotiated with the resource agencies during the regulatory permitting process. LACFCD has been and will continue to work closely with CDFW and USACE to identify appropriate mitigation, replacement ratios, and sites for restoration and enhancement that will offset impacts and satisfy the requirements of all applicable laws. A detailed restoration plan will be prepared and provided to CDFW and USACE for review and approval prior to project implementation. Prior to commencement of the Proposed Project, LACFCD will have obtained all necessary permits for impacts to CDFW, USACE, and RWQCB jurisdictional areas including Section 401 Certification, Section 404 permit, and a Streambed Alteration Agreement. Clean Water Act Section 404 (b)(1) guidelines will be followed as a framework for compensatory mitigation. Through 404(b)(1) negotiations with USACE and

negotiations with CDFW under Fish and Game Code Sections 1600-1616, a determination of the functions and values of impacted jurisdictional waters shall result in the coordination of appropriate Mitigation Measures for sediment removal.

Mitigation locations will comply with CDFW recommendations as follows: first, onsite; second, offsite within the Arroyo Seco Watershed; and third, offsite within the greater Los Angeles River watershed. If offsite mitigation sites are needed, several offsite areas within the Arroyo Seco/Los Angeles River watershed that will conform to the HWPMP are being considered for restoration. As mentioned above, Alternative 3 will allow for the largest area of site replanting and mitigation to take place within the reservoir footprint.

Response to Comment 177-7:

A Sediment Transport Capacity Analysis was conducted to determine how sediment would move through the Arroyo Seco and Los Angeles River under a sluicing alternative. Sluicing was analyzed as part of the Draft EIR in the Alternatives Analysis, Section 4.7, Alternative 4 Sluicing Method. The sluicing alternative would potentially have additional significant impacts in comparison to the Proposed Project. Many of these impacts would be associated with the likelihood that large amounts of sediment would not be fully transported through the flood control system; this sediment would need to be mechanically removed and trucked out from numerous downstream locations potentially including the two soft-bottom portions of the channel. As discussed in Section 4.7 and in the Sediment Transport Capacity Analysis (Appendix K), most of these downstream locations would be in the Arroyo Seco, with deposits primarily occurring in and around the two soft bottom areas. Please see Section 4.7 and Appendix K of the Draft EIR for further analysis.

FASTing operations have been routinely used at Devil's Gate Reservoir and result in relatively small amounts of finer grained sediment passing through the reservoir. After the sediment removal phase has occurred, FASTing is proposed to be an integral part of the annual maintenance at Devil's Gate. Annual FASTing operations will be implemented to reduce future buildups of sediment in the reservoir and to reduce the need for mechanical removal of sediment from the reservoir. As with the ongoing use of FASTing, future FASTing operations would naturally remove sediment of finer particle size from the reservoir through the dam and on to the ocean.

Response to Comment 177-8:

See Response to Comment 177-6. Impacts to recreation were analyzed in the Draft EIR, Section 3.15. The Proposed Project will not limit the use of the Oak Grove area of Hahamongna Watershed Park. Sediment removal activities would be temporary and are expected to occur only in the drier months (April to December, excluding holidays). It is expected that these activities will often not be adjacent to the Oak Grove area of Hahamongna Watershed Park. The Proposed Project would result in temporary limitations on the recreational use of the Proposed Project site and some of the adjacent trails. Most of these areas would be reopened seasonally or intermittently throughout the sediment removal process. In addition, temporary impacts to designated recreational facilities and trails will be minimized through advance communication and redirection to the nearest facility in the vicinity of the Proposed Project. Furthermore, an east-west trail crossing will continue to provide access at the north end of the reservoir. At the south end of the reservoir, after the reservoir ingress and egress ramps have been fully constructed, access to the upper east side Arroyo Seco Trail from La Cañada Verdugo Road will be maintained; and the linkage from the west side Arroyo Seco Trail and the Flint Wash Trail to the upper

east side Arroyo Seco Trail (crossing Devil's Gate Dam and also continuing south to the Rose Bowl) will be available after construction activities have ended each day and on nonworking days.

Response to Comment 177-9:

See Response to Comment 177-6.

As noted in the Draft EIR, Section 3.4, Aesthetics and Figures 3.4-1 through 3.4-3, the visual aspects of the Proposed Project site are constantly changing. The Draft EIR does note that the Proposed Project will have significant temporary impacts to aesthetics; however, after the sediment removal phase of the Proposed Project is complete, a habitat restoration plan will be implemented that will allow native plant communities to reestablish, similar to that described in the HWPMP.

The Draft EIR determined that visual impacts associated with reservoir management will be less than significant and, therefore, will not require mitigation. Reservoir management impacts to visual character under both of the Proposed Project's management options will result in a lower degree of contrast than seen during sediment removal. Due to the rapid growth of wetland herbaceous plants, it is expected that during the majority of the year the Proposed Project site will appear vegetated. In addition, as with existing conditions, vegetation conditions on the Proposed Project site, including height and density, would change on a regular basis due to seasonal conditions, water flow/views, water storage, and sediment conditions.

Alternative 3 would closely resemble the configuration, aesthetics, habitat restoration, and vegetation management as described in the HWPMP.

Response to Comment 177-10:

Air quality and noise impacts were analyzed in the Draft EIR in Sections 3.5 and 3.14, respectively. The Draft EIR analyzed impacts to sensitive uses, including residents, recreational uses, and schools, adjacent to the Proposed Project site and along the proposed haul routes. As discussed in the Draft EIR, Section 3.14, with implementation of Mitigation Measure MM N-1, noise impacts would be reduced to a level of less than significant. LACFCD has conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed the United States (U.S.) Environmental Protection Agency's (EPA's) 2007 standards for emissions. Therefore, in order to further reduce emissions, Mitigation Measure MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump trucks that meet or exceed EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality, including those associated with health effects, will be reduced to less than significant.

As discussed in the Draft EIR, Section 3.10.6, Impacts and Mitigation, HAZARDS-1, Sediment Removal/Reservoir Management, no hazardous levels of the contaminants were detected in the sediment. Dust impacts from the Proposed Project were carefully evaluated, as discussed in the Draft EIR, Section 3.5.6, Impacts and Mitigation, AIR QUALITY-2, Sediment Removal. The Proposed Project's activities, including excavation, grading, material loading, and hauling, would result in less than significant dust emissions due to the Proposed Project's use of best management practices and would be in full compliance with South Coast Air Quality Management District's (SCAQMD's) fugitive dust regulations.

As discussed in the Draft EIR, Section 3.5, the Health Risk Assessment (HRA) found the Proposed Project would result in less than significant impacts for both the cancer-related and non-cancer-related impacts.

Response to Comment 177-11:

See Response to Comment 177-6.

All facilities, including open channels, dams, bridges, and debris basins under LACFCD jurisdiction, are required to meet Capital Flood protection levels. The Capital Flood is characterized by the Hydrology Manual as "the runoff produced by a 50-year frequency design storm falling on a saturated watershed (soil moisture at field capacity)" (Public Works, Hydrology Manual, 2006). A 50-year frequency design storm is defined as the magnitude of a storm that is likely to occur once every 50 years. Therefore, the chance of a 50-year storm occurring in any given year is 1 out of 50, or a 2 percent, chance of occurring. "Capital Flood protection also requires adding the effects of fires and erosion under certain conditions" (Public Works, Hydrology Manual, 2006).

Given the current, limited capacity of the reservoir, a 50-year storm event that results in a DDE would result in storm flows with sediment flowing over the spillway. Flooding with mud/sediment would occur along the portions of the Arroyo Seco in the Cities of Pasadena, South Pasadena, and Los Angeles, impacting approximately 650 parcels and requiring the closure of Interstate 110 from Orange Grove Avenue to Interstate 5. Additional information about the potential for flood areas and analysis is shown in the Arroyo Seco Channel Hydraulic Analysis prepared by Bureau Veritas North America, Inc., available on the Project website.

Please note that protocols are in place to monitor storms, reservoir conditions, and channel conditions and to communicate with emergency responders, including the Pasadena Police and Fire Departments, and the California Department of Transportation (Caltrans) to execute any necessary evacuations or freeway closures.

Response to Comment 177-12:

The Draft EIR, Section 3.14, found that through adherence with all applicable noise regulations, the Proposed Project would result in a less than significant impact from onsite construction noise impacts and no noise mitigation was required. The stated mitigation of restricting 200+ horsepower engines from operating within 180 feet of residences was from mitigation developed to reduce vibration impacts to less than significant levels with implementation of Mitigation Measure MM N-1, as previously listed in the Draft EIR.

The Draft EIR, Section 3.14.6, Sediment Removal/Reservoir Management, Offsite Vehicular Noise, analyzed the noise impacts from the haul trucks. The analysis found that the maximum noise increase on the roads in the immediate vicinity of the Devil's Gate Dam and Reservoir area would be a 1-decibel (dB) increase on Berkshire Place east of the Interstate 210 (I-210) northbound ramps. A 1-dB increase is well below the 3-dB increase threshold of perception. The roadway noise impact analysis provided in the Draft EIR found that the Proposed Project would result in less than significant impacts for all analyzed alternatives. No further analysis is required or warranted.

The Proposed Project was designed to limit the need for trucks to back up by having trucks enter at one entrance road and exit at a separate road to encourage circular flow. The backup beeps on the trucks and equipment are an Occupational Safety and Health Administration (OSHA) requirement, with the

priority being to protect the safety of both the workers on site and the general public. In addition, contractors will be required to comply with local noise ordinances as stated in the Draft EIR, Section 3.14 Noise and Vibration.

Response to Comment 177-13:

See Response to Comment 177-6. In 2010, in response to the Station Fire, an emergency project to remove only 1.67 million cubic yards (cy) was proposed. The volume of 1.67 million cy is the previously published DDE, and this amount was considered justifiable as an emergency exemption to the California Environmental Quality Act (CEQA). This emergency project was not completed because, in March 2011, the County of Los Angeles Board of Supervisors motioned LACFCD to complete an EIR for a comprehensive sediment removal project at Devil's Gate. LACFCD then initiated project development in accordance with the required level of protection of two DDEs. At that time, LACFCD also began receiving feedback on the concurrent Sediment Management Strategic Plan (Strategic Plan) and the interest to look at more sustainable sediment and reservoir management. As a result of the feedback and recommendations during the development of the Strategic Plan, LACFCD began evaluating ways to create a more sustainable long-term way to manage its sediment and habitat. To emphasize the goals of the project, the Proposed Project was given the name Devil's Gate Sediment Removal and Management Project.

Historically, large amounts of sediment have been deposited in the reservoir in short time periods. Between 1935 and 1938 over 1.6 million cy of sediment, between 1938 and 1943 over 1.95 million cy of sediment, between 1959 and 1966 over 1.75 million cy of sediment, and between 2010 and 2012 over 1.3 million cy of sediment was deposited in the reservoir. Since the 1920 dam construction and prior to the Station Fire in 2009, approximately 10.7 million cy of sediment accumulated in the reservoir; and approximately 8.0 million cy was removed by LACFCD.

Over 92 years, the average amount of sediment deposited each year is approximately 130,000 cy; however, due to the dynamic nature of the system and the recent burn of the watershed, the amount could vary greatly. If a 1 in 50 years storm were to occur, approximately 2.0 million cy (one DDE) of sediment could be expected to wash into the reservoir. It should be noted that design debris amounts can be produced from a freshly burned watershed with rainfall amounts considerably below capital flood levels (a 5- to 10-year frequency storm). Similarly, higher intensity rainfall could produce more debris. Because of LACFCD's responsibilities to provide flood protection, LACFCD must be ready at all times for a design debris event to occur.

LACFCD proposed a project duration of five years to reduce accumulated sediment in a timely fashion. The goal of LACFCD is to restore reservoir flood capacity as soon as feasible while reducing costs, minimizing the duration of environmental and construction impacts to the surrounding communities, and configuring the reservoir to allow for sustainable future maintenance. Extending the project would prolong the flood risk to downstream communities and increase the construction impacts to the surrounding communities.

Response to Comment 177-14:

Future maintenance activities are described in Section2.5.2 of the Draft EIR. After the sediment removal phase has occurred, Flow Assisted Sediment Transport, or FASTing, is proposed to be an integral part of the annual maintenance at Devil's Gate. Annual FASTing operations will be implemented to reduce future buildups of sediment in the reservoir and to reduce the need for mechanical removal of sediment

from the reservoir. Although FASTing is expected to be an effective means of keeping sediment levels low in the reservoir, it is estimated that typically 13,000 cy of sediment will be removed by excavation annually. Moderately large sediment deposits have the potential to occur during a storm season; but it is anticipated that, even with this type of event, the newly deposited sediment could be removed in one season. A moderately large sediment removal event, anticipated to involve around 170,000 cy, could take place over an estimated 12-week period during the late summer/early fall following the vegetation maintenance. However, a maintenance regime that relies on FASTing greatly reduces the need for and extends the life of future and existing sediment placement sites and improves the future sustainability of the reservoir. The maintenance activities will take place within the LACFCD easement. Regardless of these estimates, Devil's Gate Reservoir is a dynamic system in which the amount of sediment deposited in the reservoir each year is heavily dependent on rainfall amounts received; and, thus, the amounts vary greatly. For this reason, defining strict sediment removal quantities is not possible due to unforeseeable results of weather conditions.

Response to Comment 177-15:

Potential impacts due to the Proposed Project's truck trips were analyzed in the Draft EIR, Section 3.16, Transportation and Traffic. As listed in that section, a single intersection in the immediate vicinity of the Project Site will have a potentially significant impact. This intersection is located in the City of La Cañada Flintridge and is outside of the City of Pasadena. The Draft EIR outlines a 12-hour trucking schedule, with trucking operations on Saturdays as well. This schedule is used to model the most intensive construction operation, which may not be applicable at the site for the duration of the Proposed Project. Typical trucking schedules are estimated to be 8 hours per day on weekdays. In practice, hauling rates and routes may be adjusted to help reduce impacts depending on operational need. Alternative haul routes with the potential to reduce impacts and/or provide flexibility were analyzed in the Draft EIR, Section 4.8. In order to provide more flexibility, a haul route segment previously analyzed in the Traffic Impact Analysis was included in Alternative 5 as an optional haul route along Berkshire Place to and from the Proposed Project Site and I-210 (see Section 4.8 of the Final EIR).

The volumes on Interstate 210 (I-210), the on/off-ramps, and the local roadways within the study area included those potentially impacted by the Proposed Project. The analysis provided a conservative project condition volume that accounts for expansion and regional growth within the study area. The volumes also account for redistribution of traffic.

LACFCD will implement the mitigation measures described in the Draft EIR, Section 3.16.6. Also as discussed in the Draft EIR, Section 3.16.6, potential impact reduction measures could reduce impacts to less than significant. These measures cannot be legally imposed by LACFCD; however, since the locations are under the jurisdiction of other agencies. Every reasonable effort will be made to coordinate with and receive approval from the jurisdictional agencies to implement the impact reduction measures, but LACFCD cannot guarantee that the measures will be implemented. LACFCD will continue to work with local organizations and the Cities of Pasadena and La Cañada Flintridge and the community of Altadena to minimize traffic impacts around the project site.

Response to Comment 177-16:

LACFCD understands the need to balance flood protection with the goals of the HWPMP and the Central Arroyo Master Plan (the Master Plan area south of the HWPMP), as well as potential impacts to the community. LACFCD will continue to work with local organizations and the Cities of Pasadena and La

Cañada Flintridge and the community of Altadena to minimize traffic impacts around the project site. This will include coordination of sediment transport activities with Rose Bowl special events.

Response to Comment 177-17:

LACFCD notes that the City does not find the Proposed Project reasonable or responsible for Pasadena.

Response to Comment 177-18:

See Response to Comments 177-6 and 177-13.

Response to Comment 177-19:

The Proposed Project and its Alternatives conform to the limits and responsibilities of the easement. LACFCD will continue to work with the City to minimize impacts associated with the Proposed Project.

Response to Comment 177-20:

An easement granted in 1919 and revised in 1965 by the City of Pasadena to LACFCD encompassing Devil's Gate Dam and Reservoir states the easement is for the purpose of flood control and water conservation. The easement states, "Grantor does hereby grant to Grantee a perpetual easement for reservoir, water conservation and flood control purposes, including the right to construct, reconstruct, inspect, maintain, repair and operate a dam, spillway, reservoirs, tunnels, by-passes, channels embankments, protection works, and appurtenant structures for the purposes of controlling, confining, storing and conserving water in, over and across real property hereinafter described." The goal for the Sediment Removal Project is to maintain the reservoir for the purpose of controlling, confining, and storing water within the easement boundaries; and, therefore, the Proposed Project activities fall under the latitude of the easement granted.

The CEQA definition of a responsible agency refers to any agency which has discretionary approval power over the project, discretionary approval being that in which an agency can use its judgment in deciding whether and how to carry out or approve a project as distinguished from ministerial situations where the public agency merely has to determine whether a project is in conformity with applicable statutes, ordinances, or regulations. Ministerial permits are based only upon fixed City standards, with no subjective decisions required for approval.

Due to the location of the Proposed Project within the limits of the City of Pasadena, ministerial permits, such as hauling permits, will be required from the City; however, the conditions outlined in the easement granted to LACFCD do not necessitate discretionary authority from the City for the Proposed Project. LACFCD will continue to coordinate with the City of Pasadena.

Response to Comment 177-21:

LACFCD will continue to coordinate with the City of Pasadena.

Response to Comment 177-22:

LACFCD notes the contact person provided, in case any questions arise.

Response to Comment 177-23:

Comment noted.

Response to Comment 177-24:

Comment noted. LACFCD will provide the Pasadena Fire Department adequate notice as necessary.

Response to Comment 177-25:

See Response to Comment 177-8. Impacts to recreation were analyzed in the Draft EIR, Section 3.15. As discussed previously, the Proposed Project will not limit the use of the Oak Grove area of Hahamongna Watershed Park. LACFCD recognizes that the area is an important area for recreation, including passive recreation, as discussed in Section 3.15, Recreation/Public Services.

Sediment removal activities would be temporary and are expected to occur only in the drier months (April to December, excluding holidays). It is expected that these activities will often not be adjacent to the Oak Grove area of Hahamongna Watershed Park. The Proposed Project would result in temporary limitations on the recreational use of the Proposed Project site and some of the adjacent trails. Most of these areas would be reopened seasonally or intermittently throughout the sediment removal process. In addition, temporary impacts to designated recreational facilities and trails will be minimized through advance communication and redirection to the nearest facility in the vicinity of the Proposed Project. Therefore, the maximum degree of the temporary less than significant impacts to the recreational users of Hahamongna Watershed Park would be much shorter than the five-year duration of the sediment removal phase of the Proposed Project.

Section 3.15 adequately accounts for and describes the types of recreational uses occurring in the Hahamongna Watershed Park. The level of impact to these recreational uses was not predicated on the numbers of users but on limitations to recreational uses. Additional statistics as to the number of recreational users will not affect the impact findings discussed above, which was accounted for in the Draft EIR, and would not add any additional constraints to those mentioned in the analysis in the Draft EIR.

Response to Comment 177-26:

See Response to Comment 177-8. LACFCD will continue to coordinate with the City of Pasadena regarding this project.

Response to Comment 177-27:

LACFCD will follow the conditions of said permit obtained from the City of Pasadena.

Response to Comment 177-28:

LACFCD prepared and consulted with surrounding cities and communities, including the City of Pasadena, to provide a list of past, present, and probable future projects producing related or cumulative impacts to the Proposed Project as established at the time of publication of the Notice of Preparation (NOP). These cumulative projects were determined by LACFCD and the surrounding cities and communities to have a potential cumulative effect due to overlapping time frames of the projects.

Potential projects that were determined to be outside the area of influence, sediment-removal phase of the project schedule, or lacking sufficient project detail, were not considered to be reasonable foreseeable probable future projects, as set forth in the CEQA Guidelines Section 15130.The Pasadena Water and Power's (PWP) Recycled Water project and the Monk Hill Treatment System projects were not identified as a potentially cumulative project. The list of cumulative projects was presented in Table 2.9-1 of the Draft EIR.

Response to Comment 177-29:

Use of the term rocket fuel has been revised to perchlorate in the Final EIR.

Response to Comment 177-30:

Under the Proposed Project and all of the alternatives, excavation limits will not exceed historic elevations. A utilities search will be performed prior to commencement of ground-disturbing activities to ensure that all existing utilities are identified and the limits of excavation are consistent with the design plans.

Response to Comment 177-31:

Comment noted. As stated in the Draft EIR, the Proposed Project will remove accumulated sediment deposits within the reservoir. This means the percolation characteristics of the reservoir will return to pre-Station Fire conditions if not improve, and the reservoir will still permit penetration of rainfall and percolation of local runoff to replenish the groundwater basin. Sediment removal will restore Devil's Gate Reservoir's ability to contain two DDEs. Due to the additional storage capacity of the reservoir more of the local runoff can be held behind the dam, which could result in more runoff penetrating into the ground in the Proposed Project area and subsequently recharging the groundwater basin. In addition, by keeping the reservoir clear of future sediment deposits, the Proposed Project will reduce the potential for accumulated sediments to negatively impact the percolation of stormwater.

Response to Comment 177-32:

See Response to Comment 177-25. Section 3.15 of the Draft EIR adequately describes the recreational facilities throughout the Proposed Project area, including both local and regional recreational opportunities and the existing conditions at the site. The Draft EIR does not imply that the Oak Grove area is separate from the Hahamongna Watershed Park. As stated in Section 3.15.2, Hahamongna Watershed Park includes the Oak Grove area of Hahamongna Watershed Park. The Draft EIR consistently refers to it as the Oak Grove area of Hahamongna Watershed Park, indicating it is part of Hahamongna Watershed Park. This also reflects the way the area is referenced in the HWPMP. Existing trails on both sides of the Proposed Project site are shown in the Draft EIR Figure 3.15.-2. As described in Section 2.5.1, the Proposed Project will not involve the City of Pasadena's spreading grounds on the east side of the basin.

Response to Comment 177-33:

The maximum or average size of the site that will be subject to grading activities at any given time or on a daily basis will vary with the conditions at the site; therefore, estimated maximum daily amount of sediment to be removed and associated estimated maximum number of truck round trips provide the most accurate and worst-case parameters with which to analyze proposed project impacts. The

estimated maximum daily amount of sediment to be removed and associated estimated maximum number of truck round trips was described in the Draft EIR Section 2.5.1 as 7,650 cy of sediment per day and 425 truck round trips per day. Based on these assumptions, the Draft EIR does give proper consideration to impacts associated with the Proposed Project.

Response to Comment 177-34:

The estimated 7,650 cy of sediment per day is the estimated maximum amount to be removed per day as reflected in the stated associated estimated maximum numbers of truck round trips. The Final EIR will be revised to clarify this; however, the estimated maximum amount of 7,650 cy of sediment per day and an estimated maximum of 425 truck round trips per day were consistently used throughout the Draft EIR to estimate impacts associated with the Proposed Project. The construction equipment required for sediment removal is listed in the Draft EIR, Section 2.5.1, Proposed Project Description, Configuration A, Sediment Removal Phase, Removal Method. This list is accurate and realistic, as it is based on LACFCD experience with removing sediment from the Proposed Project area, including the ongoing Interim Measures Project (IMP).

Response to Comment 177-35:

As stated in the Draft EIR, vegetation within the management area will be mowed or removed and grubbed annually. Areas subject to either of these activities will vary every year depending on the amount of vegetation growth and the amount of sediment requiring removal. Devil's Gate Reservoir is a dynamic system in which the amount of sediment deposited in the reservoir each year is heavily dependent on rainfall amounts received; and, thus, the amounts vary greatly. For this reason, defining specific yearly areas for each method is not possible due to unforeseeable results of weather conditions outside LACFCD's control. Therefore impacts associated with the reservoir management phase are accurately analyzed based on parameters described in the Draft EIR including: total management area involved and the estimated average annual sediment removal, daily sediment removal, duration, and maximum of truck trips.

Response to Comment 177-36:

After the sediment removal phase of the Proposed Project is complete, a habitat restoration plan will be implemented that will allow native plant communities to reestablish outside the reservoir management area. Riparian Herbaceous vegetation is expected to continue to populate and/or reestablish in the management area of the Proposed Project site between maintenance activities.

Clearing and grubbing of vegetation must be completed in order to remove the sediment from the reservoir. Vegetation and organic debris will be hauled to a separate facility, Scholl Canyon Landfill.

Habitat restoration/enhancement will include use of willow cuttings and exotic species removal. Ruderal habitats within the basin shall be utilized whenever possible as mitigation sites. LACFCD is continuing to work closely with CDFW and USACE to identify appropriate sites for restoration and enhancement that will offset impacts and allow for sensitive habitat to recover naturally within the Proposed Project site but also to conserve and protect mitigation areas. The plan will include and address invasive species management, monitoring, and success criteria.

Response to Comment 177-37:

Section 2.5.2 of the Draft EIR states that removing the estimated typical amount of 13,000 cy of sediment annually will occur over an estimated two-week period, not that it will necessarily require two weeks. The estimated typical total amount of 13,000 cy could be removed in less than two weeks at the rate of 4,800 cy per day; however, as noted above, defining specific yearly areas for each method is not possible due to unforeseeable results of weather conditions. It is expected that in most years, sediment removal will be accomplished during a two-week period. The estimated 4,800 cy of sediment per day is the estimated maximum amount to be removed per day during sediment management. Removal of the sediment, vegetation, trees, and organic debris is expected to require an average of 50 truck round trips per hour, with an estimated maximum of 300 truck round trips per day during reservoir management excavation activities. The Final EIR will be revised to clarify this.

Moderately large sediment deposits have the potential to occur during a storm season; but it is anticipated that, even with this type of event, the newly deposited sediment could be removed in one season. A moderately large sediment removal event, anticipated to involve around 170,000 cy, could take place over an estimated 12-week period during the late summer/early fall following the vegetation maintenance. However, a maintenance regime that relies on FASTing greatly reduces the need for and extends the life of future and existing sediment placement sites and improves the future sustainability of the reservoir.

As noted in the Draft EIR, Section 2.5.2, sediment excavation/trucking off site will use the same methods and trucking routes as the initial sediment removal activities. Please refer to Section 2.5.1 for the construction equipment required for sediment removal.

Response to Comment 177-38:

See Response to Comments 177-14, 177-34, 177-35, and 177-37.

Response to Comment 177-39:

See Response to Comments 177-7 and 177-36. LACFCD does not plan to conduct habitat restoration within the reservoir management area.

Response to Comment 177-40:

See Response to Comment 177-28.

Response to Comment 177-41:

Although projects within the Hahamongna Watershed Park Master Plan are designed to take advantage of the scenic characteristics at the site, no City or County documents list the project site as a designated scenic resource. As noted in the Draft EIR, Section 3.4, Aesthetics and Figures 3.4-1 through 3.4-3, the visual aspects of the Proposed Project site are constantly changing. The Draft EIR does note that the Proposed Project will have significant temporary impacts to aesthetics; however, after the sediment removal phase of the Proposed Project is complete, a habitat restoration plan will be implemented that will allow native plant communities to reestablish outside the reservoir management area. Riparian Herbaceous vegetation is expected to continue to populate and/or reestablish in the management area of the Proposed Project site between maintenance activities.

The Draft EIR determined that visual impacts associated with reservoir management will be less than significant and, therefore, will not require mitigation. Reservoir management impacts to visual character under both of the Proposed Project's management options will result in a lower degree of contrast than seen during sediment removal. Due to the rapid growth of wetland herbaceous plants, it is expected that during the majority of the year the Proposed Project site will appear vegetated. In addition, as with existing conditions, vegetation conditions on the Proposed Project site, including height and density, would change on a regular basis due to seasonal conditions, water flow/views, water storage, and sediment conditions.

Response to Comment 177-42:

These policies, which are similar to the policies listed in the Draft EIR, will be added to the Final EIR.

Response to Comment 177-43:

See Response to Comments 177- 36 and 177-41.

Response to Comment 177-44:

See Response to Comments 177-10, 177-33, and 177-34.

Response to Comment 177-45:

The correct amount for fugitive PM_{10} is 5.46, as shown in Table 7 of the Air Quality Report, Appendix B. This will be corrected in the Final EIR; however, the total PM_{10} amount of 13.70 as shown in the Draft EIR, Table 3.5.6, is correct.

Response to Comment 177-46:

Information regarding the amendment to the Pasadena Trees and Trees Protection Ordinance will be added to Section 3.6.3 of the Final EIR. This information does not change the findings in Section 3.6.6, IMPACT-5.

The Los Angeles County Flood Control District was created by State legislation to implement the State-designated objectives of flood control and water conservation within the boundaries of the District. When implementing these State-designated objectives, LACFCD is not subject to local ordinances like the City's Trees and Tree Protection Ordinance.

The purpose of the Proposed Project is to restore and maintain flood capacity at the Devil's Gate Reservoir, which would directly further LACFCD's regional flood control objective. Accordingly, the Proposed Project would not be subject to the provisions of the Pasadena's City Trees and Tree Protection Ordinance.

Response to Comment 177-47:

The Draft EIR, Biological Technical Report (BTR), and focused surveys provide thorough and accurate existing conditions for biological resources (Draft EIR, Section 3.6; Appendix D, Biological Reports). The field surveys were conducted in 2010 and 2013 and included general biological surveys, focused sensitive plant surveys, focused least Bell's vireo surveys, and federal and state jurisdictional waters

surveys, as described in Section 3.6 of the Draft EIR. Updates to focused surveys will be conducted for special status plants and significant natural communities (sensitive habitats) with a potential to occur within the Proposed Project area, in accordance with CDFW guidelines, as part of the habitat restoration mitigation measure MM BIO-8.

Response to Comment 177-48:

Impacts to wildlife habitat loss, including those for the least Bell's vireo and other sensitive species, were adequately addressed in the Draft EIR, Section 3.6, Biological Resources. As discussed in Section 3.6.6 of the Draft EIR, Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats. In addition, sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays).

Response to Comment 177-49:

Mitigation Measures MM BIO-1 through MM BIO-8 are enforceable and designed to reduce impacts through methods known to be feasible and effective. These Mitigation Measures are accepted by agencies that would be involved in consultation, negotiation, and final approval of Mitigation Measures, including conceptual restoration plans. As with any project that involves CDFW, USACE, and RWQCB jurisdictional areas, the ultimate mitigation for impacts related to the wetlands and drainages under the jurisdiction of the resource agencies is negotiated with the resource agencies during the regulatory permitting process. LACFCD has been and will continue to work closely with CDFW and USACE to identify appropriate mitigation, replacement ratios, and sites for restoration and enhancement that will offset impacts and satisfy the requirements of all applicable laws. A detailed restoration plan will be prepared and provided to CDFW and USACE for review and approval prior to project implementation. Prior to commencement of the Proposed Project, LACFCD will have obtained all necessary permits for impacts to CDFW, USACE, and RWQCB jurisdictional areas including Section 401 Certification, Section 404 permit, and a Streambed Alteration Agreement. Clean Water Act Section 404 (b)(1) guidelines will be followed as a framework for compensatory mitigation. Through 404(b)(1) negotiations with USACE and negotiations with CDFW under Fish and Game Code Sections 1600-1616, a determination of the functions and values of impacted jurisdictional waters shall result in the coordination of appropriate Mitigation Measures for sediment removal.

Response to Comment 177-50:

Section 3.7.3 of the Final EIR will be revised to show that these policies are from the Land Use Element.

Response to Comment 177-51:

Depths to the native sediments of the reservoir will be determined by using historic contours of the reservoir compared to the existing topography. Construction staking within the reservoir will take place prior to excavation, and periodic surveys will be completed to ensure the limits of excavation are consistent with the design plans.

Response to Comment 177-52:

As discussed in Section 3.9.1 of the Draft EIR, the environmental baseline condition for the analysis of potential climate change/greenhouse gas (GHG) is considered at the time of publication of the NOP,

consistent with CEQA Guidelines Section 15125 (a). The NOP was published on September 28, 2011. Therefore, the GHG analysis uses the appropriate baseline.

Response to Comment 177-53:

All elements of the City of Pasadena General Plan were reviewed for applicable mineral resources discussions or policies. As noted in the Draft EIR, Open Space and Conservation Element (2012) briefly discusses that the Conservation Element must contain goals and policies to protect and maintain natural resources such as minerals.

Response to Comment 177-54:

References to Noise and Vibration Policies will be clarified in the Final EIR.

Response to Comment 177-55:

The Draft EIR correctly evaluates the Proposed Project noise impacts. As stated in the Draft EIR, the City of Pasadena and County of Los Angeles exempt public agencies from the Municipal Code noise requirements.

Response to Comment 177-56:

References to Land Use Policies will be clarified in the Final EIR.

Response to Comment 177-57:

See Response to Comments 177-15 and 177-16. LACFCD will continue to coordinate with the City of Pasadena regarding the Proposed Project.

Response to Comment 177-58:

As discussed in the Draft EIR, Section 3.5.6, the Proposed Project's activities, including excavation, grading, material loading, and hauling, would be in full compliance with SCAQMD's fugitive dust regulations, including applying water or a stabilizing agent during clearing and grubbing, crushing, or earth-moving activities in sufficient quantity to prevent the generation of dust plumes.

Response to Comment 177-59:

See Response to Comment 177-55. As noted in the Draft EIR, the temporary noise level increase from onsite construction noise and offsite vehicular noise would be less than significant; thus, no mitigation measures, such as notification or monitoring, are required.

Response to Comment 177-60:

LACFCD completed a Draft EIR to analyze all environmental impacts covered under CEQA.

Response to Comment 177-61:

Section 2.1.1 of the Final EIR has been revised to state "The Arroyo Seco watershed extends approximately 16 miles in length along the centerline of the watershed and 24 miles along the Arroyo Seco from its origin in the Angeles National Forest to the Arroyo Seco's confluence with the Los Angeles River."

Response to Comment 177-62:

The information regarding the MACH 1 facility will be added to Final EIR, see Sections 2.1.6, 3.12.2, and 3.15.2.

Response to Comment 177-63:

LACFCD appreciates the opportunity to continue to coordinate with the City of Pasadena regarding the City utilizing excavated sediment for future City projects.

Response to Comment 177-64:

See Response to Comment 177-8. Any haul routes, access roads, and staging areas to be used for the Proposed Project are clearly stated in the Draft EIR, Section 2.5.1. All traffic and recreational impacts, including those associated with haul routes, access roads, and staging areas associated with the Proposed Project, have been analyzed in Section 3.15 and 3.16, respectively.

Response to Comment 177-65:

Hauling permits will be obtained as necessary from the appropriate localities, and all conditions of said permits will be followed accordingly.

Response to Comment 177-66:

See Response to Comment 177-7.

Response to Comment 177-67:

See Response to Comment 177-7. As discussed in the Draft EIR, implementation of FASTing operations will be similar to historic FASTing operations. FASTing is a passive method to reducing sediment buildup in which the lowest outlet on the dam is left open during rain events in order to allow finer sediment to flow through the dam. FASTing is and has always been a part of regular and routine operations at Devil's Gate. LACFCD will continue to coordinate with the City of Pasadena regarding this project.

Response to Comment 177-68:

See Response to Comment 177-7.

Response to Comment 177-69:

Viewpoints 1 and 2 provide panoramic views of the Proposed Project site. Viewpoint 5 provides an accurate representation of a view from this location. Additional panoramas would not change the findings in Section 3.4.

Response to Comment 177-70:

Blockage of views is an important criteria in determining impacts to viewsheds. The fact that the Proposed Project will not result in view blockage does not diminish the importance of the criteria.

Response to Comment 177-71:

See Response to Comment 177-10.

Response to Comment 177-72:

See Response to Comments 177-8 and 177-10. LACFCD understands MACH-1's concerns regarding their PATH International certification. As stated above, no significant impact to air quality will occur from the Proposed Project. LACFCD will continue to coordinate with the City of Pasadena regarding this project.

Response to Comment 177-73:

Comment noted.

Response to Comment 177-74:

See Response to Comment 177-49. LACFCD will continue to coordinate with the City of Pasadena regarding this project.

Response to Comment 177-75:

See Response to Comment 177-8. As discussed above and in the Draft EIR, the Proposed Project will not limit the use of the Oak Grove area of Hahamongna Watershed Park; and sediment removal activities would be temporary and will often not be adjacent to the Oak Grove area of Hahamongna Watershed Park. As such, recreational uses will still be available in the Hahamongna Watershed Park during sediment removal. Therefore, with implementation of Mitigation Measure LAN-1, impacts associated with recreational activities coexisting with flood management and water conservation would be reduced to less than significant.

Mitigation Measure MM LAN-1 is enforceable and accepted as effective in reducing impacts to recreation. For example, similar mitigation measures were used by the City of Pasadena in the Hahamongna Multi-Benefit / Multi-Use Project Initial Study, 2012.

Response to Comment 177-76:

LACFCD will continue to coordinate with the City of Pasadena regarding this project.

Response to Comment 177-77:

See Response to Comment 177-8. LACFCD will continue to coordinate with the City of Pasadena regarding this project. It should be noted that construction activities would be temporary and would not occur year-round.

Response to Comment 177-78:

Table 3.14-11 shows representative sensitive receptors around the project site and represents a range of sensitive receptors that are located in the project vicinity. The Draft EIR does not claim that the receptors listed in Table 3.14-11 are the only vibration sensitive receptors that are located in the project vicinity. The vibration analysis in the Draft EIR found that a potentially significant impact would occur from construction-related vibration impacts and provides Mitigation Measure 2, which restricts the use of large bulldozers and other large equipment from operating within 180 feet of any occupied offsite structure. LACFCD considers the boarding structures for horses as "occupied structures" and would apply the restriction of large bulldozers and other large equipment from operating within 180 feet of the horse boarding structures. With implementation of Mitigation Measure 2, the vibration impacts to the horses would be reduced to less than significant levels.

Response to Comment 177-79:

The Draft EIR, Section 3.15, describes official recreational uses found in the Hahamongna Watershed Park. This reflects the description in the City of Pasadena's Hahamongna Watershed Park Master Plan (HWPMP), Exhibit 2-1, Hahamongna Watershed Park Existing Conditions, and Section 2.10 Existing Recreation, showing all official recreational uses are outside the Proposed Project area.

Response to Comment 177-80:

See Response to Comment 177-62.

Response to Comment 177-81:

See Response to Comments 177-8 and 177-75. The discussion of Area Recreational Facilities in the Draft EIR presents existing recreational facilities in the surrounding area for the existing environmental setting, not as alternatives to the Hahamongna Watershed Park. As discussed in the Draft EIR, some of these facilities may see increased use; however, the Proposed Project will not limit the use of the Oak Grove area of Hahamongna Watershed Park, and sediment removal activities would be temporary and will often not be adjacent to the Oak Grove area of Hahamongna Watershed Park.

As with all the recreational facilities shown in Figure 3.15.1, Hahamongna Watershed Park's location is pinpointed to show the general location of the park in relation to the Proposed Project site and other facilities.

Response to Comment 177-82:

See Response to Comments 177-8 and 177-75. LACFCD will continue to coordinate with the City of Pasadena regarding this project.

Response to Comment 177-83:

No official disc golf course holes located in the Oak Grove area of Hahamongna Watershed Park will be removed by the Proposed Project. As noted in the Draft Environmental Impact Report (EIR), Section 3.15, LACFCD recognizes the importance of the area to those who take advantage of the recreational opportunities offered, including the Oak Grove Disc Golf Course. Where possible, LACFCD will avoid any disc golf course holes located outside the Oak Grove area of Hahamongna Watershed

Park. When avoidance is not possible, LACFCD will coordinate with the Oak Grove Disc Golf Club for removal of the disc golf hole equipment. The Oak Grove area of Hahamongna Watershed Park and the associated facilities would remain open during sediment removal and would continue to provide active recreational facilities to the area. Alternative 3, Configuration D, Option 2 will also avoid all currently existing Oak Grove Disc Golf Club holes.

Response to Comment 177-84:

See Response to Comments 177-8 and 177-75. LACFCD will continue to coordinate with the City of Pasadena regarding this project.

Response to Comment 177-85:

As part of the outreach effort, LACFCD has contacted recreational users, including the Pasadena Audubon Society, Rose Bowl Riders, Tom Sawyer Camps, Oak Grove Disc Golf Club, and MACH-1.

Response to Comment 177-86:

See Response to Comment 177-15.

Response to Comment 177-87:

See Response to Comments 177-15 and 177-16.

Response to Comment 177-88:

See Response to Comments 177-15 and 177-16.

All of the trucks will be loaded within the reservoir; and if a queue of trucks develops, the trucks will stage within the reservoir itself to lessen impacts on the adjacent streets.

Potential impacts due to the Proposed Project's truck trips to local roadways were analyzed in the Draft EIR, Section 3.16, Transportation and Traffic. The methods used are derived from the 2010 Highway Capacity Manual and 2003 Intersection Capacity Utilization (ICU) methods for Synchro for consistency across jurisdictions, which is a generally accepted methodology and is compliant with CEQA requirements. Therefore, additional analysis using another methodology would not be required.

The proposed haul routes can accommodate the trucks proposed for the project as they do currently with the IMP.

LACFCD will continue to coordinate with the City of Pasadena regarding this project.

Response to Comment 177-89:

See Response to Comments 177-16 and 177-88. Recommendations involve use of flaggers to control truck movements and direct trucks accordingly to minimize queues and delay conditions along the surface arterials.

Response to Comment 177-90:

See Response to Comment 177-88.

Response to Comment 177-91:

Comment noted. LACFCD will continue to coordinate with the City of Pasadena regarding this project. Use of flaggers would not necessarily require modification to striping, although it is recommended to avoid driver confusion. These and other traffic control details would normally be provided in the permitting phase of the project.

Response to Comment 177-92:

See Response to Comments 177-15, 177-89, and 177-91. LACFCD will continue to coordinate with the City of Pasadena regarding this project, including coordination of the design and implementation the two-way left turn lane (TWLTL).

Response to Comment 177-93:

See Response to Comments 177-88, 177-89, and 177-91.

Response to Comment 177-94:

See Response to Comment 177-88. LACFCD will continue to coordinate with the City of Pasadena regarding this project.

Response to Comment 177-95:

See Response to Comments 177-88, 177-89, and 177-91.

Response to Comment 177-96:

See Response to Comment 177-88.

Response to Comment 177-97:

See Response to Comment 177-88.

Response to Comment 177-98:

Passenger car equivalent (PCE) calculations are explained in Appendix C and D of the Traffic Report, accordingly.

Response to Comment 177-99:

See Response to Comments 177-88, 177-89, and 177-91.

From: Cliff Towne
To: reservoircleanouts
Subject: Devil"s Gate Reservoir Sediment Removal and Management Project - Comments
Date: Monday, January 20, 2014 10:45:13 AM

Dear County,

Comment 178-1

I would like to address the plans that are currently being proposed to remove sediment from behind Devil's Gate Reservoir.

The Draft Environmental Impact Report on the proposed project is inadequate in a number of respects.

The negative environmental impacts of this project could be VASTLY reduced if the removal was phased over a longer time period.

Comment 178-2

Have you properly explored developing a plan that removes less sediment per year over a much long time period?

You could remove 10% of the targeted soil each year for 10 years - while you develop a more sustainable sediment removal plan that includes the correct amount of sluicing to remove sediment.

Comment 178-3

The cost of this project and the very great environmental impacts of it dictate that the County do its due diligence in determining the best method of maintaining the viability of the dam, while preserving the park and the neighborhood from severe environmental damage.

This Draft EIR does not show adequate evaluation of the environmental damage of the project. It does not account properly for the negative effects that the plan holds for the community and insufficient attention has been paid to less damaging and less costly alternatives to the current plan.

Comment 178-4

This area is important bird and wildlife habitat that would be permanently damaged. Why does the Draft EIR fail to adequately account for that?

Comment 178-5

There has never been a full EIR of Devil's Gate Dam and its impacts. This should be done before any sediment removal project of this scope goes forward.

Comment 178-6

The Draft EIR fails to mitigate the impacts on young folks that use the park, nature lovers, equestrians, disc golfers and other members of the public that visit the area for recreation. It fails to adequately address (and the plan fails to mitigate) the air pollution, noise and dust from all of the diesel trucks that will haul all that dirt and it fails to adequately access the traffic impacts for surrounding neighborhoods.

Comment 178-7

The County needs to figure out how to mitigate the negative impacts of air pollution, traffic and the destruction of the beautiful habitat there before proceeding. If the plan going forward is to dodge their responsibility to mitigate the negative impacts by getting the Supervisors to pass a statement of overriding considerations - that is just not right!

Thanks, Cliff Towne
P.O. Box 35525
Los Angeles, CA 90035

Response to Comment Letter #178 (Cliff Towne)

Response to Comment 178-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

The Draft Environmental Impact Report (EIR) adequately analyzed all issue areas required by the California Environmental Quality Act (CEQA).

Los Angeles County Flood Control District (LACFCD) proposed a project duration of five years to reduce accumulated sediment in a timely fashion. The goal of LACFCD is to restore reservoir flood capacity as soon as feasible while reducing costs, minimizing the duration of environmental and construction impacts to the surrounding communities, and configuring the reservoir to allow for sustainable future maintenance. Extending the project would prolong the flood risk to downstream communities and increase the construction impacts to the surrounding communities.

Response to Comment 178-2:

See Response to Comment 178-1.

Various amounts of sediment and methods of removal were analyzed under the Alternatives Analysis of the Draft EIR (see Section 4 of the Draft EIR). While sluicing is not a viable project alternative, as explained in Section 4.7 of the Draft EIR, Flow Assisted Sediment Transport, or FASTing, will be used for maintenance after the project's main sediment removal phase has been completed, as described in Section 2.5.2 of the Draft EIR.

Sluicing was analyzed as part of the Draft EIR in the Alternatives Analysis, Section 4.7, Alternative 4 Sluicing Method. This alternative would involve use of construction equipment and the removal of trees and vegetation over the same footprint as the Proposed Project. The sluicing alternative would potentially have additional significant impacts in comparison to the Proposed Project. Many of these impacts would be associated with the likelihood that large amounts of sediment would not be fully transported through the flood control system; this sediment would need to be mechanically removed and trucked out from numerous downstream locations potentially including the two soft-bottom portions of the channel. Please see Section 4.7 and Appendix K of the Draft EIR for further analysis.

Response to Comment 178-3:

The Draft EIR adequately analyzed all CEQA-required issue areas, including considering the impacts to the community. The Draft EIR, Section 4.0 Alternatives Analysis considers six alternatives, including the No Project Alternative. LACFCD determined that Alternative 3, Configuration D was the environmentally superior alternative that reduced impacts while still meeting the Proposed Project objectives.

LACFCD goes to great lengths to lessen project impacts and maximize efficiencies. For example, the Draft EIR concluded that Alternative 3 is the Environmentally Superior Alternative. Alternative 3 drastically reduces the project's footprint of 120 acres down to 71 acres. Additionally, the limited maintenance area for Alternative 3 further reduces the permanent habitat impacts down to approximately 51 acres by allowing for site replanting and mitigation to take place within the reservoir footprint. This reduction in project acreages will greatly lessen environmental impacts of the Proposed Project.

LACFCD strives to achieve an efficient, low-cost sediment removal project. Sediment removal rates and trucking operations, now utilizing all low-emissions trucks, as explained in Section 3.5 of the Draft EIR, have been carefully planned for economies of scale to realize maximum efficiencies without major delays in project schedule, thus greatly reducing operating costs. Furthermore, LACFCD has applied for and received an approximately $28 million grant through the State's Disaster Preparedness and Flood Protection Bond Act of 2006 (Proposition 1E) program. A portion of this grant will be used to help offset the Proposed Project's costs.

Response to Comment 178-4:

Impacts to wildlife habitat loss was adequately addressed in the Draft EIR, Section 3.6, Biological Resources. As discussed in Section 3.6.6 of the Draft EIR, Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats. In addition, sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays). Wildlife species currently found in the Proposed Project area would be expected to either remain in the undisturbed areas of the reservoir outside the Proposed Project area or to reestablish once sediment removal activities have been completed.

Response to Comment 178-5:

The Devil's Gate Dam was built in 1920 prior to the enactment of CEQA in 1970. Per CEQA Guidelines 15301, operation of existing facilities is exempt from the provisions of CEQA.

Response to Comment 178-6:

Impacts to recreation were analyzed in the Draft EIR, Section 3.15. As discussed in this section, the Proposed Project will not result in any significant impacts associated with recreation and will therefore, not require mitigation. The Proposed Project will not limit the use of the Oak Grove area of Hahamongna Watershed Park. Sediment removal activities would be temporary and are expected to occur only in the drier months (April to December, excluding holidays). It is expected that these activities will often not be adjacent to the Oak Grove area of Hahamongna Watershed Park. The Proposed Project would result in temporary limitations on the recreational use of the Proposed Project site and some of the adjacent trails. Most of these areas would be reopened seasonally or intermittently throughout the sediment removal process. In addition, temporary impacts to designated recreational facilities and trails will be minimized through advance communication and redirection to the nearest facility in the vicinity of the Proposed Project. Furthermore, an east-west trail crossing will continue to provide access at the north end of the reservoir. At the south end of the reservoir, after the reservoir ingress and egress ramps have been fully constructed, access to the upper east side Arroyo Seco Trail from La Cañada Verdugo Road will be maintained; and the linkage from the west side Arroyo Seco Trail and the Flint Wash Trail to the upper east side Arroyo Seco Trail (crossing Devil's Gate Dam and also continuing south to the Rose Bowl) will be available after construction activities have ended each day and on nonworking days.

Air quality and noise impacts associated with truck traffic were analyzed in the Draft EIR in Sections 3.5 and 3.14, respectively. As discussed in the Draft EIR, Section 3.14, with implementation of Mitigation Measure MM N-1, noise impacts would be reduced to a level of less than significant. LACFCD has conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed the EPA's 2007 standards for emissions. Therefore, in order to

further reduce emissions, Mitigation Measure MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump trucks that meet or exceed EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality, including those associated with health effects, will be reduced to less than significant.

Dust impacts from the Proposed Project were carefully evaluated, as discussed in the Draft EIR, Section 3.5.6, Impacts and Mitigation, AIR QUALITY-2, Sediment Removal. The Proposed Project's activities including excavation, grading, material loading, and hauling would result in less than significant dust emissions due to the project's use of best management practices and would be in full compliance with South Coast Air Quality Management District's (SCAQMD's) fugitive dust regulations.

Potential impacts due to the Proposed Project's truck trips were analyzed in the Draft EIR, Section 3.16, Transportation and Traffic. As listed in that section, a single intersection in the immediate vicinity of the Proposed Project site will have a potentially significant impact. In practice, hauling rates and routes may be adjusted to help reduce impacts, depending on operational need. LACFCD will implement the mitigation measures described in the Draft EIR, Section 3.16.6 to reduce impacts to traffic. Also as discussed in the Draft EIR, Section 3.16.6, potential impact reduction measures could reduce impacts to less than significant. These measures cannot be legally imposed by LACFCD, however, since the locations are under the jurisdiction of other agencies. Every reasonable effort will be made to coordinate with and receive approval from the jurisdictional agencies to implement the impact reduction measures but LACFCD cannot guarantee that the measures will be implemented. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the Proposed Project site.

Response to Comment 178-7:

See Response to Comments 178-4 and 178-6. The Proposed Project's Mitigation Measures are enforceable and designed to reduce impacts through methods known to be feasible and effective. The Proposed Project's Mitigation Measures are accepted by agencies that would be involved in consultation, negotiation, and final approval of Mitigation Measures, including conceptual restoration plans.

Comment Letter #179

To: County of Los Angeles
Department of Public Works
Water Resources Division
Attn: Reservoir Cleanouts Program
P.O. Box 1460
Alhambra, CA 91802-1460
reservoircleanouts@dpw.lacounty.gov

From: Friends of Hahamongna - Elizabeth Bour, Mary Barrie, Nina Chomsky
Contact: Mary Barrie, <meb787@aol.com>

RE: Comments: Draft Environmental Impact Report for Devil's Gate Reservoir Sediment Removal and Management Project

DATE: January 19, 2014

I. Introduction

Comment 179-1

Friends of Hahamongna hereby submits its comments on the Los Angeles County Department of Public Works (LACDPW) Devil's Gate Reservoir Sediment Removal Project at Hahamongna Watershed Park. We have reviewed the Draft Environmental Impact Report (DEIR) and related official documents about this proposed project and related projects. One or more of us has attended all of the County presentations.

The proposed project will permanently alter the environment, eliminating the possibility of implementing projects that would meet the goals of the Hahamongna Watershed Park Master Plan (HWPMP) (www.ci.pasadena.ca.us/PublicWorks/HWPMP)

Comment 179-2

We believe that this project would result in serious environmental impacts to the surrounding communities, especially Pasadena, La Canada Flintridge, and Altadena as well as the negative environmental impacts to the park. We would like to address these impacts as well as inaccuracies and inadequacies with the DEIR.

II. Issues with the Project Description:

Comment 179-3

The project description is legally inadequate in that it is inaccurate, inconsistent and incomplete.

A. Inconsistent statements regarding the necessary project scope

There are inconsistent statements in several official LACDPW documents regarding the amount of sediment that will be removed and the remaining capacity for sediment placement behind the dam. It is apparent that the justification for the project, the quantity of sediment to be removed and the excavation acreage are in dispute. Some of the official statements made are:

1. Stated Dam Capacity and Removal Quantity:

Comment 179-4

- A LACDPW presentation to the Pasadena's Hahamongna Watershed Park Advisory Committee (HWPAC) on 11/30/2010 described the original sediment quantity to be removed as 1.67 million cubic yards (mcy) (Exhibit 1). The remaining capacity for sediment placement was stated as 1.242mcy (17%) (Exhibit 2). Finally, in the same presentation, it was stated that this project would regain necessary flood protection (Exhibit 3). (http://www.savehahamongna.org/pdf/HWPAC_Presentation.pdf)

- The LACDPW report to the Los Angeles County Board of Supervisors on March 1, 2011 stated that one Design Debris Event (DDE) for Devil's Gate Dam was 1.67 mcy, the amount of sediment which LACDPW was originally proposing to remove from behind the dam. (Los Angeles County Board of Supervisors Statement of Proceedings, March 1, 2011, Item 60-C, , Item 60-C, Motion 11-1056, (http://bos.co.la.ca.us/Services/RecordsSearch.aspx).

- According to LACDPW Sediment Management Strategic Plan 2012-2032 (http://dpw.lacounty.gov/lacfcd/sediment/stplan.aspx), Table 2-1 Reservoirs in the Flood Control District (Exhibit 4), the remaining capacity is 3.7 mcy (47%), almost 2 Design Debris Events (DDEs). In addition, the Strategic Plan Figure 8-27, Graph of

Historical Sediment Storage at Devil's Gate Reservoir, illustrates that just over two DDEs of storage capacity remained in the basin as of 2010 (Exhibit 5). The DEIR, however, states that available flood control capacity is currently less than one DDE (p.ES-3). This is a critical discrepancy which must be resolved since the size of the project depends directly upon the capacity remaining in the basin.

- A grant application submitted by LACDPW to the CA Water Resources Board (March 2013) for the Devil's Gate and Eaton Stormwater Flood Management Project, (http://www.water.ca.gov/irwm/grants/docs/Archives/Prop1E/Submitted_Applications/P1E_Round2_SWFM/Los%20Angeles%20County%20Flood%20Control%20District%20(201243210009)/Attachment%203%20-%20Att3_SWF_WorkPlan_1of2.pdf) indicated that Phase V of the project would remove an estimated 2mcy of sediment from the reservoir. The discrepancy between the grant application and the DEIR is that, with the exception of the No Project Alternative, the proposed project and the alternatives all remove more than 2 mcy of sediment. The grant application states that "the Devil's Gate Reservoir Sediment Removal and Management Program will remove an estimated 2,000,000 cubic yards of sediment from the reservoir. This will reduce the level of flood risk to the downstream communities along the Arroyo Seco." When the grant application went before the Board of Supervisors for approval, the amount of sediment removed was described as "up to 2,000,000 cubic yards" and the Chief Engineer or her designee was authorized only "to make minor changes in project scope." (Los Angeles County Board of Supervisors, Statement of Proceedings, March 19, 2013, Agenda Item 13).

Comment 179-4 continued

- The DEIR Appendix D, Biological Technical Report dated November 2010 was done before the scope of the project was changed. The text states "the proposed project will remove 1,671,000 cy of sediment debris from Devil's Gate Reservoir." (p.1). Figure 3 of the Biological Resources map in the same Appendix shows an excavation footprint which appears to correspond with that of the project as originally proposed to the HWP Advisory Committee and the Los Angeles County Board of Supervisors. Thus, there is evidence within the DEIR itself that the removal of

Comment 179-4 continued

1.67mcy of sediment was the scope of the project since that is the amount of sediment removal anticipated when the biological reports were done.

The final EIR must answer the following questions:

- ? What is the correct percentage of sediment storage capacity remaining in the reservoir?
- ? How many DDEs of storage capacity remain?
- ? What is the actual minimum amount of sediment removal necessary for downstream flood protection?
- ? Why was no project studied in the DEIR, with the exception of the No Project alternative, within the scope of work for which the grant was obtained from the State of California?

Comment 179-5

- ? Even Alternative 3, Configuration D, the smallest alternative, is 400,000 cy larger than the project described in the grant. Does the California Department of Water Resources consider this “a minor change in project scope?”
- ? Why was the State of California told that the removal of one DDE of sediment would provide safety to the downstream communities when the decision makers and the public are now being told otherwise?
- ? Why were the biological technical reports not redone more recently? The report attached to the DEIR is now over three years old.
- ? Why and when was the project scope of work changed to the removal of from 2.4 to 4mcy of sediment?

2. Excavation Acreage:

- The excavation acreage presented to HWPAC in 2010 by LACDPW was 50 acres (only 15 acres of willows to be permanently removed) and would only occur in the area immediately behind the dam. According to this presentation, removal of 1.67 mcy of sediment and excavation of 50 acres would result in “regaining necessary flood protection” (Exhibit 14).

Comment 179-6

- According to the DEIR, the excavation acreage in the proposed project is 120 acres.

The final EIR must answer the following questions:

Comment 179-7

- Why is there such a significant increase in the acreage for the excavation area between the 2010 project description and this project and the alternatives presented in the DEIR?
- Why is flood protection no longer achieved with the removal of one DDE and the excavation of a much smaller area? What has changed?

B. Incomplete project description, justification and insufficient risk assessment

The project description does not quantify the current actual risk of flooding and what event(s) would be necessary to create that risk. No case is made for the removal of up to 4 million cubic yards of sediment or the need to do so within 5 years. Language from the DEIR (ES-3) related to downstream risk and the likelihood of a Design Debris Event (DDE) event is :

Comment 179-8

The DDE is the estimated amount of sediment that could flow into the reservoir after the undeveloped portion of the tributary watershed is completely burned and a 50-year design storm event occurs after four years of watershed recovery. The 50-year design storm and the DDE are defined by the Los Angeles County Department of Public Works Hydrology and Sedimentation Manuals, respectively. The DDE for Devil's Gate Reservoir is approximately 2 million cubic yards (cy).

The definition of a DDE of 2 million cubic yards (mcy) is an LACDPW internal standard that has, somehow, increased since 2011 from 1.67 mcy. The County Sedimentation Manual was last updated in 2006 so, presumably, the standard has not changed since 2006. In Section 4.2 of the DEIR, Project Objectives (page 275) the following statement is made:

The LACFCD must remove sediment that has accumulated behind the dam to minimize the level of flood risk to downstream communities along the Arroyo Seco. In its current condition, the reservoir no longer has the capacity to safely contain another major debris event".

Again, there is no specific statement of the actual risk to the downstream communities, what event scenario would put these communities at risk and how much this project would reduce that risk. The final EIR should express risk assessment in terms of a scenario-based probability statement such as "there a ___ % chance of _____ event happening and the downstream consequences / cost would be _____". Multiple scenarios should be discussed.

Comment 179-8 continued

There is a **Flood Hazard Warning and Contingency Plan for the Arroyo Seco Channel** and the map of potentially impacted parcels (Exhibit 6) that is included in the grant application but is not included in the DEIR. In addition, the **Arroyo Seco Channel 50-Year Frequency Rainfall Bulked Flows and Superelevation Map** (Exhibit 7) was included in a report to the Board of Supervisors on March 1, 2011 (Los Angeles County Board of Supervisors Statement of Proceedings, March 1, 2011, Item 60C) but is not included in the DEIR. Both these maps show no danger of the Rose Bowl being impacted by flooding. However, information being circulated to the press as recently as October 2013 included: "Officials say locations downstream from the dam along the Arroyo Seco that could be in danger of flooding include the Rose Bowl…" ("County presents options for Devil's Gate Dam sediment removal," Los Angeles Times, October 26, 2013). The final EIR must include these two maps, explain the difference between them, and explain the downstream flood risk in an understandable narrative format.

The final EIR must answer the following questions:

- What is the risk, in terms of a percentage, of downstream flooding and under what conditions?

Comment 179-9

- What is an acceptable amount of risk and what is the minimum amount of sediment that would need to be removed to reduce that risk to an acceptable level?
- What documentation exists that justifies the change in the amount of a DDE?
- How many DDEs are needed to achieve flood control storage capacity in order to assure public safety?

Comment 179-9 continued

? Why is it necessary to remove enough sediment to return the reservoir to pre-1938 levels when this would cause severe environmental damage which cannot be mitigated to a level of less than significance? (Exhibit 8, Sediment Management Strategic Plan, Devil's Gate Reservoir Historical Sediment Accumulation and Removal, Table 8-12)

? How has it been possible to keep the areas south of the dam safe for over 75 years while still retaining between 2.62 mcy and 4.40 mcy in storage behind the dam (Exhibit 8, Sediment Management Strategic Plan, Devil's Gate Reservoir Historical Sediment Accumulation and Removal, Table 8-12)?

? If downstream communities were, in fact, safe during all those years, what is now driving the need to remove most of the sediment in storage behind the dam?

? Why are two important inundation maps which address flood risk downstream not included in the DEIR? Why was the public, including City Officials, misled in presentations and publications relating to flood risk at the Rose Bowl?

Comment 179-10

C. <u>Inadequate and incomplete description of this project's relationship to other regional projects that are not discussed in the DEIR or evaluated for cumulative impacts.</u>
There are several related projects in and around Devil's Gate Dam that have been announced and are partially funded but are inadequately addressed or not mentioned at all in the DEIR and not properly considered for cumulative impacts.

Comment 179-11

1. A Prop 1-E funds grant application was submitted by the LACDPW (March 2013) for a project titled <u>Devil's Gate and Eaton Storm Water Flood Management Project</u> (http://www.water.ca.gov/irwm/grants/docs/Archives/Prop1E/Submitted_Applications/P1E_Round2_SWFM/Los%20Angeles%20County%20Flood%20Control%20District%20(201243210009)/Attachment%203%20-%20Att3_SWF_WorkPlan_1of2.pdf). The Los Angeles County Flood Control District (LACFCD) received $28 million from the California Department of Water Resources toward the total projected project cost of $80 million The five phases of this project are:

   - Eaton Wash spreading grounds improvements

- Eaton Wash dam rehabilitation project
- Eaton Wash spreading grounds intake improvement and basin enlargement
- Devil's Gate Water Conservation Project (Phase IV)
    - Installing a pump to the upstream face of Devil's Gate Dam
    - Installing 27,000 feet of 30-inch reinforced concrete pipe from Devil's Gate Dam to Eaton Wash
    - Installing an outlet structure at Eaton Wash
- Devil's Gate Reservoir Sediment Removal and Management Project(Phase V)
    - Removing 2 million cubic yards of sediment
    - Establishing a reservoir configuration more suitable for routine maintenance

Comment 179-11 continued

The Devil's Gate Water Conservation component will have significant impacts both upon Hahamongna and the surrounding region. According to the DEIR, *"Impacts to biological resources associated with the Arroyo Seco Canyon Project and the Devil's Gate Water Conservation Project are also not known at this time*". The Water Conservation project, although partially funded, is still in the conceptual design phase. The final EIR must include a detailed project description and environmental documents for the Water Conservation project in order to properly evaluate cumulative impacts of the whole of the project.

It is also unclear whether the massive increase in the size of the current sediment removal project is related to the plan to store water behind the dam to be pumped to Eaton Canyon. According to the Technical Justification section of the Prop 1-E grant application, "*The resulting new reservoir configuration will result in the ability to impound stormwater to be conveyed via the new pipeline to Eaton Wash Spreading Grounds for conservation*". This clearly ties these two projects together and it is clear that the completion of the pipeline project depends upon the completion of the sediment removal

Comment 179-11 continued

project. The project in the DEIR appears to be designed to facilitate and/or accommodate this pipeline to Eaton Wash but the pipeline project is not defined or evaluated for cumulative impacts in the DEIR. Since these two projects are described in the grant application as integrated elements of one project, both projects will have the same lead agency and/or responsible agencies, both projects are in the same area, and both are scheduled to be implemented during roughly the same time frame, the project description in the final EIR must include both phases in order to evaluate the impacts of the "whole of the project". The final EIR must answer the following questions:

Comment 179-12

- Are there any of the alternatives studied in the DEIR that are not compatible with the Water Conservation Project?
- Were the proposed project and the alternatives included in the DEIR designed to support the water conservation project?
- Is this why the proposed project and the alternatives are all larger than the project originally proposed to the Los Angeles County Board of Supervisors and the CA Department of Water Resources?

Comment 179-13

2. In March 2013, the Foothill Municipal Water District (FMWD) submitted a grant as part of a Greater Los Angeles County application containing numerous projects for consideration in the California Department of Water Resources (DWR) Integrated Regional Water Management (IRWM) Proposition 84 grant program funds. [Los Angeles County Flood Control District, Prop 84 IRWM Grant Program Implementation Grant, Round 2, 2013] The grant was awarded and the FMWD component of this large grant request is titled Foothill Municipal Water District Recycled Water Project. (http://www.ladpw.org/wmd/irwmp/docs/Prop84Round2ImplGrantApp/Attachment%201%20Eligibility%20Documents%201%20of%201.pdf)

   The County was aware of this component project at the time it was completing this DEIR. As stated in the project description, *"The proposed locations for the MBR* [Membrane Bioreactor Plant] *facility integrate the FMWD Recycled Water Project into the Arroyo Seco Watershed as a key feature supporting a sustainable, local and reliable*

supply within the Raymond Groundwater Basin. As the MBR facility will be neighboring the La Cañada United Methodist Church, La Cañada High School, and Hahamongna Watershed Park … FMWD is currently investigating three discharge methods for the recycled water produced from the MBR facility. All methods operate via indirect potable reuse and demonstrate potential methods of groundwater replenishment for the Raymond Groundwater Basin. These scenarios are outlined below:

- *La Cañada United Methodist Church MBR location:*
    - *Option 1: La Cañada High School Infiltration Galleries*
    - *Option 1a: Devil's Gate Dam Spreading*
    - *Option 1b: Flint Canyon Creek Live Stream*

? *La Cañada High School MBR location:*

Comment 179-13 continued

- *Option 1: La Cañada High School Infiltration Galleries*
- *Option 1a: Devil's Gate Dam Spreading*
- *Option 1b: Flint Canyon Creek Live Stream"*

The Foothill Municipal Water District project is included in the suite of Greater Los Angeles Integrated Regional Water Management projects which were 100% funded in the amount of $23,433,962 as of September 25, 2013. Foothill's portion of this amount was $1,499,500 [Los Angeles County Board of Supervisors Statement of Proceedings, March 19, 2013, Item 35, Board Letter]

As of September 4, 2013, Foothill Municipal announced that the Recycled Water Demonstration Project had been suspended. However, since the project has been suspended rather than cancelled and since it now has grant funding available, it may be undertaken at a later date or by another agency. Thus, the cumulative effects of this project must be studied in the final EIR. The final EIR must answer the following questions:

Comment 179-13 continued

- ? Since two of the three infiltration methods would impact the quality of the water held behind the dam, why is this project not evaluated in the DEIR?
- ? Since this FMWD project has components in Hahamongna/Devil's Gate Dam area, is an anticipated project and, although suspended, is partially funded through County managed IRWMP funds, why is there no mention of this project or consideration of cumulative impacts in this DEIR?
- ? Are there any of the alternatives studied in the DEIR that are not compatible with the Foothill Municipal Water District Recycled Water Project?

3. Another possible project conflict for the immediate area is the NFL Temporary Use of the Rose Bowl. The projected duration of this project is five years and it is possible, indeed likely, that the timeline for these two projects would be the same. The EIR for the NFL use of the Rose Bowl identified several CEQA categories with likely significant impacts, some unavoidable, including recreation, traffic, air quality and noise. (http://cityofpasadena.net/Rose_Bowl_EIR)

Comment 179-14

Although the assertion is made in this DEIR that *"The mere existence of significant cumulative impacts caused by other projects alone shall not constitute substantial evidence that the proposed project's incremental effects are cumulatively considerable."*, the DEIR must analyze the possible cumulative impacts in detail so that the decision makers can fully assess the costs of the project relative to the benefits. For example, traffic impacts and the level of service at intersections in and around Pasadena, especially during weekday NFL events need to be discussed in detail.

The DEIR does not evaluate the impact to recreation as significant and unavoidable and suggests all activities can be relocated. In the proposed project for the NFL's use of the Rose Bowl, one of the mitigations suggested for displaced recreation was to relocate that recreation to neighboring parks, including Hahamongna Watershed Park. However, recreational opportunities in Hahamongna Watershed Park will not be possible during this project and possibly well beyond. The recreational opportunities for

Comment 179-14 continued

hikers and equestrians at both the Rose Bowl and Hahamongna Watershed Park will be displaced with limited or no relocation opportunities. The equestrian trails cannot be relocated. The final EIR must answer the following questions:

Comment 179-15

? Since the NFL project is anticipated, why is there no detailed analysis of the cumulative traffic impacts?

? How will the County address the proposed relocation of recreational activities into Hahamongna if the NFL project moves forward?

D. Inadequate project description in that there is apparent segmentation and pre-commitment to other projects

Comment 179-16

Per CEQA Guideline 15126 "All phases of a project must be considered when evaluating its impact on the environment: planning, acquisition, development, and operation". To properly avoid segmentation, an EIR's project description must include foreseeable related projects, specifically for complete and adequate evaluation of cumulative impacts. The County has announced, defined, and requested grant money for the Devil's Gate Water Conservation project and is in partnership with FMWD for the Foothill Municipal Water District Recycled Water project. These projects must be included in this DEIR project description and evaluated for cumulative impacts. In the DEIR, the Devil's Gate Water Conservation Project is mentioned only once in Table 2.9-1 (p.29), and is described as a project which is still in the conceptual design phase. Even though these two projects are components of the same larger project, there are two separate environmental reviews planned. The Devil's Gate Sediment Removal EIR comment period closes January 21, 2014. The grant application states that the environmental work for the Water Conservation Project component will be done at the same time. However, representatives for the LACDPW have stated during recent public meetings that the Initial Study or Mitigated Negative Declaration for the Water Conservation component will not be available for public review until February or March 2014.

Further, environmental reviews of the Devil's Gate Water Conservation and FMWD Recycled Water projects are not scheduled until after the date by which public comments

Comment 179-16 continued

must be submitted for the sediment removal phase of this project. Consequently, the public and the decision makers are deprived of the opportunity to review and comment on the cumulative environmental impacts of these three very large and costly projects. Not only does this omission appear to be illegal segmentation, but it also raises the question whether there was a pre-commitment to the pipeline and recycled water projects that may have influenced the decision on the preferred/proposed sediment removal project, may have limited alternatives presented, or may have limited the level of environmental review performed on these alternatives. The final EIR must answer the following questions:

- Since the pipeline and recycled water projects are anticipated and even partially funded, why is there no project description for two of the projects or evaluation of the cumulative impacts of these three related projects?
- Why are the three projects that are in the same location and that are being constructed at the same time not being evaluated in one environmental process?

Comment 179-17

- Given that the amount of sediment proposed to be removed from the basin is much greater than was originally proposed in November of 2010, is this increase in sediment removal necessary to support the Water Conservation component or the Foothill Municipal Water District Recycled Water project?
- How much sediment removal is necessary to support the Water Conservation component and in what areas will the basin be cleared to support this project?

E. <u>Inadequate and potentially inaccurate description of the County easement rights and responsible agencies</u>

Comment 179-18

The LACDPW has clearly taken over full management of the proposed project, and is using the easement as a justification for control of this project and the entire park from the sediment removal phase through to the foreseeable future. There is a question as to LACDPW's legal right to do so and whether this project exceeds its rights under the easement between the City of Pasadena and the County. Because permits will be required from Pasadena, Pasadena is a Responsible Agency and the final EIR must directly identify Pasadena as a Responsible Agency. As the land owner and a Responsible Agency,

Comment 179-18 continued

Pasadena must oversee all aspects of this project including all mitigation measures and the relationship between this project and projects planned as a result of the Hahamongna Watershed Park Master Plan.

In addition, another Responsible Agency, the California Regional Water Quality Board, rejected the County's earlier project proposal. In a March 2011 letter, the California Regional Water Quality Control Board denied the Los Angeles County Flood Control District (LACFCD) water quality certification for the original, much smaller, 1,600,000 cy project which would have cleared only 50 acres: (http://www.waterboards.ca.gov/losangeles/water_issues/programs/401_water_quality_certification/final_letters/Documents/2011/10-170DenialWQC.pdf).

The Board was informed that the removal of 1,600,000 cy of sediment would provide a "total cleanout" which would bring the reservoir "back to its original design contours which were developed when the reservoir was constructed." The objections raised by the Board are very similar to those which the public has raised throughout the environmental review process. According to the Board, LACFCD would be required to "demonstrate that appropriate alternatives, in terms of the amount of material to be removed and in terms of the timing or phasing of the removal of materials were considered." These alternatives

Comment 179-19

were to include "cleanout alternatives sufficient to protect public safety other than 'return to design capacity.' LACDPW was directed to "identify the immediate, public safety, capacity need which allows proper function of the flood control system and the corresponding sediment removal need. With this basis, LACFCD shall then develop an alternative(s) for this amount of sediment removal." They were to "identify cleanout alternatives which would minimize the 50-acre impact and identify alternatives for phasing the project to minimize impacts over time." The Board stated that the "final analysis should include the rationale for the determination that the proposed project is the most appropriate design for this project which meets project needs and that there are not other, more appropriate, project designs which avoid or minimize impacts to waterways while also meeting project needs". It is clear from this language that the California Regional Water Board had concerns and

Comment 179-19 continued

was not willing to certify a much smaller project. The final EIR must answer the following questions:

? Do the project boundaries exceed the easement boundaries? This will require a Survey.

? Does the extent of the proposed project exceed the legal rights granted in the easement or legal rights under applicable California law?

? Does the easement allow for the County to construct the infrastructure/ equipment necessary to pump water held behind the dam into the Eaton dam pipeline?

? What will the City of Pasadena's role be for implementation and management rights over all adopted EIR mitigations?

Comment 179-20

? What permits from the City will be required and how will Pasadena be engaged to enforce its permitting authority and application review? There must be strict enforcement over all County future operations in Hahamongna arising out of this project and/or related projects.

? Why doesn't the DEIR state that the Pasadena Tree Protection Ordinance protects native trees and all public trees, native and non-native, within the City including those in Hahamongna Watershed Park? Why doesn't the DEIR discuss the jurisdiction of Pasadena's Urban Forestry Advisory Committee over tree removal in Hahamongna? The DEIR only states that the Pasadena Tree Protection Ordinance applies to trees "in certain parts of the City" (p.121).

? Who will all the other Responsible Agencies be and what permits will be required from each?

? How can the necessary certification from the California Regional Water Board for this project be expected when the Board rejected a much smaller Devil's Gate sediment removal project in March 2011? Why was the Water Quality Board informed that one DDE would bring the reservoir back to its original design contours when the public was subsequently told that the removal of two DDEs would be necessary? Why did LACDPW ignore the Board's directive to develop an alternative which minimized the 50

Comment 179-20 continued

acre impact and, instead, defined the project and all the alternatives as much larger projects?

F. Inadequate Alternatives

1. The DEIR is deficient in that it fails to propose and evaluate alternatives in a legally adequate manner. The extremely confusing alternatives section is dense and impenetrable. Each alternative is considered separately and its environmental impacts are divided into issue areas. The method of presentation is very difficult to follow as this example shows:

Comment 179-21

- Alternative 1, Configuration B is considered environmentally superior to the Proposed Project.
- Alternative 1, Configuration B will also be environmentally superior to Alternative 2, Configuration C; Alternative 4, Sluicing; and Alternative 5, Haul Route Alternative.
- Alternative 1, Configuration B will be environmentally inferior to Alternative 3, Configuration D
- Alternative 1, Configuration B will be environmentally superior to Alternative 6, No Project Alternative

2. Despite the 350 page length of the Alternatives section, there was no simple, straightforward narrative discussion which compares in plain English the pluses and minuses of the alternatives so that the public and the decision makers can make an informed decision as to which alternative would be best. The alternative described as the Environmentally Superior Alternative gets two short paragraphs and no discussion whatsoever as to why it was not chosen by the County as the Preferred Project. In the final EIR, all alternatives must be presented in a format which allows the reader to easily compare the environmental impacts of the alternatives.

Comment 179-22

3. The DEIR failed to consider possible less impactful alternatives. Los Angeles County's own documents and their historical removal of sediment in the basin prove that a slower, more environmentally sensitive approach can keep the downstream areas safe.

Comment 179-23

LACDPW has never removed more than 750,000 cy of sediment at one time from behind Devil's Gate Dam and yet the downstream communities have been safe for 75 years. In 1977, the year that 750,000 cy of sediment was removed, the amount of sediment in storage was 3.9 mcy or about the same amount in storage now (Exhibit 8). Based on the historical record, a sediment removal alternative should have been developed and considered for the removal of a maximum of 750,000 cy of sediment. Removing this amount of sediment along with increased sluicing and extending the timeframe would meet the stated project goals while reducing the level of impacts and would conform to the goals and objectives stated in the HWPMP. This alternative should also provide for a slow, ongoing process of sediment removal which would avoid the kind of massive, environmentally destructive project now proposed.

Comment 179-23 continued

The second possible, although less desirable, alternative would be for LACDPW to return to its initial proposal to remove 1,670,000 cy of sediment which would scour only 50 acres and keep permanently cleared only 15 acres (Exhibit 14). There is ample evidence in the record that Flood Control believed this plan to be sufficient to provide flood protection to the downstream communities despite the far more damaging alternatives now proposed in the DEIR.

The least objectionable of the alternatives proposed in the DEIR is, however, Alternative 3 (Configuration D), referred to in the DEIR as the environmentally superior alternative. In light of the considerable evidence in the record, however, it is clear that there are far more superior alternatives meeting the project objectives which should be considered in the final EIR.

The final EIR must answer the following questions:

Comment 179-24

? Why was a document as important as the Sediment Management Strategic Plan 2012-2032, which has so much critical information about sediment removal behind Devil's Gate Dam, not discussed in the DEIR?

? Does Alternative 2, Configuration 3 also allow for the restoration of previously existing recreational opportunities?

Comment 179-24 continued

? Why will it still take only five years to complete Alternative 2 when it would remove over 1 mcy more sediment than the Proposed Project?

III. Issues with the DEIR:

A. Aesthetics

Comment 179-25

In both this section and in the Biological Resources section, there is a statement that "[m]ost of the vegetation and trees on the Proposed Project site were dead, washed out, or buried under sediment…" Most of the trees in the excavation area are willows which were not only alive but thriving after the influx of sediment. This assertion must be removed in the final EIR.

Comment 179-26

The San Gabriel Mountains are the dominant feature in the scenic vista throughout Hahamongna Watershed Park which is why the City of Pasadena's Master Plan calls for both a Sunset Overlook and a Sunrise Overlook. The recently built pedestrian bridge also has a small park seating area which overlooks both the basin and the mountains.

Comment 179-27

The DEIR states that Management Option 1, the permanent clearing of vegetation from 120 acres of the basin, will "result in a less than significant impact to scenic vistas" and that for most of the year the Proposed Project site will appear vegetated. The Reservoir Management Visual Change Table, p. 58 shows that the overall visual change will be low even though the scoured basin is at the very center of most of these scenic vistas. In reality, except during the rainy season, 120 acres or most of the basin will not be green but rather dirt/sand with brown dry non-native vegetation. The final EIR must accurately state the appearance of the basin today (existing conditions) and the truth about the resulting appearance if the proposed project is implemented. The final EIR must answer the following questions:

Comment 179-28

? Why does the DEIR state that most of the trees in the proposed project site are dead when this assertion is not true?

? Why does the DEIR state that the project site is not a ""designated scenic resource" when the Hahamongna Watershed Park Master Plan has numerous projects, several

Comment 179-28 continued

already implemented, that were designed specifically to take advantage of the scenic vistas?

? What is the actual impact to aesthetics and to the already established scenic vistas?

B. Air Quality

Comment 179-29

Although air quality impacts have been determined to be significant and unavoidable, the impacts have been under-assessed and understated in that the only monitoring performed was at two Source Receptor Areas (SRAs), one in Pasadena, and one in Burbank for the years 2006 through 2011 (Table 3.5-2: Ambient Air Quality Monitoring Summary). There was no monitoring for ambient measurements performed on-site or along the transportation routes to sediment placement sites. Since much of the identified air quality impacts are due to exhaust from the trucks and particulate matter (PM) that may be released during transport, monitoring for ambient air quality during the project must be performed for all impacted areas. The DEIR air quality impacts and mitigations are also deficient in the following areas:

Comment 179-30

1. Degradation of air quality is a serious public health matter. It is essential that accurate and current baseline studies are conducted and that the EIR accurately state the additional project-related air quality degradation so that decision makers and the public will know the environmental cost. Baseline studies for ambient air quality were performed, for the most part, at an SRA in Pasadena five miles from the project site. For particulate matter (PM_{20}) the location for the SRA was in Burbank, eight miles away from the project site and not along the sediment transport route. In order to appropriately assess the ambient air quality, there should have been baseline monitoring at the site location.

Comment 179-31

2. There is limited discussion on mitigating the particulate matter that can and will be released during excavation, loading, and as the sediment is being transported to sediment placement sites. Although tarps are mentioned as a part of the SCAQMD's Rule 403 standards, there must be a mandate that appropriate quality tarps are used to

Comment 179-31 continued

cover the truckloads and that best practices for fugitive dust management are implemented. There is also only one water truck proposed for use (p. 87). Water trucks should be used in the areas of excavation and should be used to water down unpaved access routes. Given that the excavation area is very large, and that there will be up to 400 trucks per day driving on mostly unpaved surfaces, there must be significantly more than one water truck used to minimize fugitive dust. All actions proposed for the management of particulate matter and fugitive dust, including the use of tarps and an adequate number of water trucks must be stated as specific mitigation measures in the final EIR.

Comment 179-32

3. According to Table ES-1 of the DEIR, the proposed mitigations may not be possible. The statement under "*Level of significance after mitigation*" is "*Full implementation of these mitigations could be unachievable. Therefore, impact remains significant and unavoidable*". If mitigation is not possible, it is not mitigation. The feasibility of the mitigations must be determined and documented in the final EIR so that decision makers have an understanding of the full impacts on regional air quality.

Comment 179-33

4. Neighborhood air quality events, such as wildfires that create smoke or large events at the Rose Bowl can further degrade air quality. There must be continuous monitoring of the air quality when such an events occur and there must be a plan to halt all project-related activities if and when the air becomes unhealthy.

C. <u>Biological Resources</u>

Comment 179-34

The DEIR states that the removal of habitat will have a less than significant impact. Under the proposed project, the entire 120 acres will be completely and permanently cleared of all vegetation, habitat, and candidate, sensitive or special status species. This cannot be described as anything but significant and unavoidable.

The DEIR does not discuss the fact that Hahamongna Watershed Park is included within the Los Angeles River/Arroyo Seco Corridor, an area the resources of which have been determined "nationally significant through the Rim of the Valley Special Resource Study

Comment 179-34 continued

(Exhibit 15). The Rim of the Valley Study, spearheaded by Congressmember Adam Schiff, studied the significant natural and cultural resources of the mountains encircling the San Fernando, La Crescenta, Santa Clarita, Simi and Conejo Valleys in California. The study, which is ongoing, analyzed two options: the potential creation of a new unit of the national park system or the potential adjustment of the existing boundary of the Santa Monica Mountains National Recreation Area.

Comment 179-35

The DEIR also does not address the long-term impacts of removing up to 120 acres of habitat from the last remaining wildlife corridor connecting the San Gabriel Mountains and the San Rafael Hills. Recently, the Arroyo Foothills Conservancy (AFC) announced their on-going efforts to purchase Cottonwood Canyon for $1.6 million, just south of Devil's Gate Dam, in order to preserve wildlife corridors throughout the San Rafael Hills, and the Arroyo Seco Canyon, including Hahamongna Watershed Park. According to the 2012 Los Angeles County Department of Regional Planning's SEA Program the project site is located within the Altadena Foothills and Arroyos Significant Ecological Area (SEA). The Significant Ecological Area (SEA) Program is a component of the Los Angeles County General Plan Conservation/Open Space Element: "*SEAs are ecologically important land and water systems that support valuable habitat for plants and animals, often integral to the preservation of rare, threatened or endangered species and the conservation of biological diversity in the County. While SEAs are not preserves, they are areas where the County deems it important to facilitate a balance between development and resource conservation. Development activities in the SEAs are reviewed closely in order to conserve fragile resources such as streams, oak woodlands and threatened or endangered species and their habitat.*" (http://planning.lacounty.gov/assets/upl/sea/2_Altadena_Foothills__Arroyos_SEA_Spring_2012_GP.pdf).

The Arroyos & Foothills Conservancy has identified wildlife corridors in the area and Hahamongna Watershed Park is a critical segment of the corridor that allows migration to and from the Angeles National Forest. (Exhibit 9). The proposed project would permanently remove these sections of the corridors that pass through Hahamongna Watershed Park.

Comment 179-35 continued

Since the proposed project will prevent the recovery of any natural vegetation, many species would not return to the area and the wildlife corridor would never recover. Pasadena has made significant investments toward the preservation of unique environmentally sensitive areas. The final EIR must answer the following questions:

Comment 179-36

? How can the determination for biological resources be less than significant when so much habitat will be destroyed and so many species will be permanently removed?

? How can the determination for biological resources be less than significant when a County designated SEA will be severely impacted, especially as it relates to wildlife corridors?

? Why doesn't the DEIR reference the fact that HWP is included in an ongoing federal study to protect "nationally significant" resources?

? How can the elimination of biological resources in Hahamongna be considered less than significant when these resources are in an area which has been determined to be "nationally significant" in a federal study?

D. Land Use and Planning

Comment 179-37

The development of the HWP Master Plan was a years-long collaboration between Pasadena and the community. The Executive Summary of the HWP Master Plan clearly states the goals and guiding principles established by the City that will control the future of Hahamongna. They are as follows:

- *To encourage and promote the stewardship and enjoyment of the Arroyo Seco in Pasadena.*
- *To balance and integrate the interrelated issues of water resources, recreation, natural resource preservation and restoration, and flood management in the Arroyo Seco.*
- *To provide a safe, secure and accessible Arroyo Seco for public enjoyment.*

- *To recognize the importance to Pasadena of the history, cultural resources and unique character of the Arroyo Seco, and to conserve and enhance these assets.*
- *To preserve and acquire open space in or adjacent to the Arroyo Seco.*
- *To recognize that the Arroyo Seco in Pasadena is comprised of distinct geographical areas that are interconnected by a number of resources and features including, but not limited to, water, habitat, geology, recreation, and culture; and that it is part of a larger watershed.*

And the stated Goals include:

Comment 179-37 continued

- *Preserve, restore, and enhance the native habitats*
- *The Devil's Gate flood control basin will be managed to provide protection to the developed and natural downstream areas.*
- *Conserve and protect the water resources of the Arroyo Seco*
- *Provide diverse recreation opportunities for the Pasadena community*
- *Enrich and promote the unique history and culture of Hahamongna Watershed Park*
- *Provide a safe and secure park*
- *Provide adequate circulation, access and parking*

This project conflicts with a number of the stated Guiding Principles and Goals. It appears that LACDPW is planning for only one of the principles to the detriment of all others. The proposed project, which permanently eliminates natural resources, habitat, wildlife, and much of the recreation, is clearly in conflict with the goals and guiding principles established in the HWP Master Plan.

In addition to LACDPW's failure to comply with the HWPMP, the DEIR does not acknowledge the Spirit of the Sage Council Settlement with the City of Pasadena which restricts any new trails in much of the basin. (Spirit of the Sage Council v. City of Pasadena LASC Case No. BS083201). The DEIR must answer:

Comment 179-38

? Why is the legally binding agreement between the City and the Spirit of the Sage Council not acknowledged or addressed in the DEIR?

The Hahamongna Watershed Master Plan and MEIR cost millions of dollars to complete. Capital Improvement funds, grant funds and in some cases, private funds have been set aside for project implementation. Some of the completed or proposed projects that, with the implementation of the proposed project, will either be destroyed, rendered useless or eliminated are:

1. Flint Wash Bridge restoration – This Master Plan project has been completed but, according to the LACDPW presentation, the bridge and the top of the dam will be closed for the duration of the project, possibly beyond, to accommodate the storage of trucks and equipment. This bridge and the top of the dam are integral parts of the Perimeter Trail.

Comment 179-39

2. Sunset Overlook – This Master Plan project has been completed but will have no value during and after this project. The aesthetic value of the park for which Sunset Overlook was developed will no longer exist.

3. Berkshire Creek Restoration – This Master Plan project is in the planning process. But, according to the proposed project map, the restoration of the natural stream is located in the excavation area. This project will not be possible if the proposed project moves forward. Some of the project alternatives may allow for the Berkshire Creek Restoration after sediment removal but the area will be significantly degraded as a result of truck traffic through the area during sediment removal.

4. Multi-Benefit, Multi-Use (MBMU) Project - Although the Multi-benefit/multi-use project is now being re-scoped by the City of Pasadena, the Perimeter Trail is still an anticipated project as acknowledged in DEIR Table 2.9-1, Cumulative Projects. The City of Pasadena has received considerable grant funding toward the project, including a $789,440 Proposition 50 grant from the California River Parkways Program as well as funding from several other sources (Exhibit 10). Part of the MBMU project is the west-

side perimeter trail restoration but portions of this trail are in the project area and will be permanently eliminated.

Comment 179-39 continued

In the Aesthetics section, p, 67, the DEIR states that Pasadena's Multi-Benefit Multi-use Project (MBMU Project) will be screened from the sediment removal project by mature vegetation reducing the potential for cumulative impacts to less than significant. Since the Initial Study for the MBMU Project is being redone, the specifics are not available about the boundaries of the project, or the number of trees to be removed. The final EIR must answer the following questions:

- ? How can the MBMU project be properly included in cumulative impacts if the project description and boundaries are not yet known?
- ? Why is the environmental impact of eliminating portions of the Perimeter Trail not evaluated in the DEIR?

Comment 179-40

- ? Since the MBMU Project as it was proposed involves the removal of trees and vegetation, how can the DEIR state that the potential for cumulative impacts is less than significant?

5. Perimeter Trail – This trail encompasses several projects in the Master Plan, some are completed, and some are in the planning phase. The City has already received a $789,440 in grant funding (Proposition 50) toward the completion of the Westside Perimeter Trail. For all the alternatives, sections of the Westside Perimeter Trail, especially in the south-west area of the basin, will be closed or severely impacted by noise and dust for the duration of the sediment removal project. It is clear in the DEIR that the Perimeter Trail and several other trails and access points will be closed during the project. In the case of the proposed project, portions of the Perimeter Trail are in the excavation area and, as a result, the trail will be permanently lost and all projects related to restoration must be cancelled.

Comment 179-41

In the Recreation Trails section (3.4) of the HWPMP, the Perimeter Trail is define as:

"an all-weather, permeable surface roadway will loop around the entire basin providing hikers and equestrians an internal recreational trail with links to connecting trails in the Angeles National Forest, the Central Arroyo, and the County-maintained trails to the east and west of the park. The Perimeter Trail will serve as a delineator, separating the stream and its associated restored habitats at the center of HWP from areas of concentrated recreation activity on the westside and water resources facilities on the east side. This delineation helps preserve the streambed and sloped banks as a wildlife corridor." (P.3-42).

Comment 179-41 continued

And, on page 3-11 of the HWPMP the following statement is made about City "designated" trails in the HWPMP, showing that there are "designated" trails in the project area:

There are no designated recreation trails inside this [Perimeter Trail] loop with the exception of one trail, just north of the flood management/water conservation pool that crosses the widened stream corridor at elevation 1027 to connect the east and west recreational areas.

The westside perimeter trail restoration, although partially funded, cannot be completed during the proposed sediment removal project. The Dam Observation Trail will be closed during of sediment removal and on-going maintenance activity. There will be no designated trail in or around the basin that allows for crossing from the east side to the west side. In addition, trail closures will include designated trails that allow access from La Canada Verdugo Road, the tunnel that leads to trails in the Central Arroyo and the Flint Canyon trail that provides access to the southern half of the La Canada Flintridge trail system. For the duration of the sediment removal project and during maintenance activities, there will be no way to get from the Central Arroyo trails to either the Flint Wash Bridge, the Altadena Crest Trail, the remnants of the Perimeter Trail or the Angeles National Forest.

Comment 179-42

According to mitigation measure MM LAN-1, "Temporary impacts to designated recreational facilities and trails shall be minimized through advance communication and redirection to the nearest facility in the vicinity of the Proposed Project". First, this

mitigation measure does not address permanent impacts to portions of the trail that are within the proposed project excavation/maintenance area and will be permanently lost. Second, some of the trail uses such as equestrian trail use cannot be "redirected" elsewhere and connections of several designated trail systems that are defined projects in the HWPMP will be closed during the project period and beyond.

Eliminating trails in Hahamongna has a wider impact than upon the park alone. The trails in the park are of vital importance, tying together an excellent regional trail network which includes the trails of La Canada Flintridge, Pasadena, Altadena, South Pasadena and the Angeles National Forest. Within the past decade, La Canada Flintridge has completed extensive trail repairs and new trail construction to make a great trail system even better. After 40 years, the La Canada Loop Trail has been completed. Los Angeles County and the Altadena Crest Trail Restoration Working Group have been working to reconnect the historic Altadena Crest Trail to the rest of the trail network. Pasadena is upgrading the trails in Hahamongna as well as those trails farther south in the Arroyo. The trails are an important and highly valued recreational resource in our region.

Comment 179-42 continued

The project as proposed will cut off access for trail users coming to the park from Pasadena, from Altadena and from La Canada Flintridge for the nine month duration of the project each year for five years or more. Trail closures such as the Altadena Crest Trail are not necessary and should be temporarily rerouted. Every effort should be made to allow weekend access to all the trails during the project and to make sure the trails are accessible during the months when work is not taking place.

Comment 179-43

6. Establishment of riparian habitat – Implementation is not possible, especially if the proposed project moves forward.

Comment 179-44

7. Establishment of willow and sycamore habitat – Implementation is not possible, especially if the proposed project moves forward.

Comment 179-45

8. Establishment of several woodlands - Implementation is not possible, especially if the proposed project moves forward.

9. Construction of the westside spreading basins - The boundaries of the proposed Project will prevent the City of Pasadena from building the westside water spreading basins which have been approved in the Hahamongna Master Plan. The final EIR must answer the following questions:

Comment 179-46

   - ? Why does the DEIR not discuss the impacts to Pasadena's abilities to percolate water within the basin?
   - ? How many acre feet of water per year will not be recovered within the basin because of the implementation of the sediment removal part of the project?

10. Organizations currently using the park - Tom Sawyer Camps (TSC), the Rose Bowl Riders (RBR) club and charitable services to the community like Move A Child Higher Therapeutic Riding (MACH I) have made significant improvements to the park to support their activities. MACH I is not mentioned in the DEIR except as "*a small special-needs population*" (p. 211) that is a part of the Rose Bowl Riders membership. LACDPW clearly does not understand that MACH I is a PATH-certified <u>therapeutic</u> riding program that is currently a sub-tenant of Rose Bowl Riders <u>and not</u> recreation. MACH I recently completed the construction of a new facility in Hahamongna Watershed Park which involved significant private investment and grant monies as well as hundreds of hours of volunteer work. Tom Sawyer Camps, Rose Bowl Riders and MACH I will experience significant disruption to their operations, at least during the projected 5 year project, and possibly permanently. Relocation for these equestrian organizations is not practical. According to the DEIR, there are two other stables within a 15-mile radius of Hahamongna (p. 211). While it is true that individual horses could be moved to these facilities, Rose Bowl Riders, Tom Sawyer Camp and MACH I, all community organizations, could not.

Comment 179-47

Comment 179-48

Not mentioned in the DEIR s the rich equestrian heritage and active equestrian community in neighboring Altadena, northwest Pasadena, and La Canada Flintridge

Comment 179-48 continued

that rely on Hahamongna. The DEIR does not acknowledge that Rose Bowl Riders moved to the Park at the invitation of the City of Pasadena in the early 1950s and has been a unique recreational resource for the community ever since. The DEIR does not recognize that the facilities of the Club, currently used for boarding, lessons, and horseshows, are an active social gathering place for horse lovers from all over greater Los Angeles. The final EIR must properly recognize the unique organizations that MACH I, Tom Sawyer Camps, and Rose Bowl Riders are and must also properly evaluate the environmental impacts upon them.

E. Noise

Comment 179-49

The DEIR states that Pasadena and Los Angeles County exempt public agencies from the Municipal Code noise requirements, p.201. La Canada Flintridge does not have an ordinance setting maximum noise levels during the proposed construction hours. According to the DEIR, "the Proposed Project will comply with all local noise ordinances, and roadway noise impacts will be less than significant". Given the massive size of the project, LACDPW owes it to the community to provide a frank and forthright assessment of the environmental impacts of five years of construction and traffic noise. The final EIR must answer the following questions:

Comment 179-50

? In addition to diesel engine noise, why doesn't the DEIR evaluate the backup warning beeps on construction equipment?

? Shouldn't the community, particularly those who live on the edge of the Arroyo, be informed that they will be subjected to this intrusive beeping noise six days a week, up to twelve hours a day, for five years or more?

? Why is the LACDPW citing ordinances rather than disclosing the facts?

? How can this been considered less than significant?

F. Recreation

Comment 179-51

The DEIR is deficient in its assessment of the environmental impacts of the project upon recreation, which is one of the primary goals of the HWPMP as adopted by the Pasadena

Comment 179-51 continued

City Council in 2003. Numerous inaccurate and/or inadequate statements are made regarding the impacts to recreational activities in the park and the impacts resulting from this project. For example:

Comment 179-52

1. The DEIR states "*During project sediment removal, most of the Proposed Project site will be closed to public use from the dam face to the edge of the Proposed Project's excavation limit boundaries*." With the proposed project, this encompasses all of the areas used recreationally today within the basin except the trail that runs north along the JPL fence line. However, trail along the JPL fence line is currently closed and unavailable for use indefinitely due to construction for a new JPL parking structure.

Comment 179-53

2. The DEIR *states "The majority of the maintenance roads will be closed during sediment removal; however these roads are not officially designated for recreational uses and are often not available for unofficial recreation use due to reservoir water levels or maintenance activities"*. First, the statement that the maintenance roads are often not available is untrue. They are only unavailable for a short time after major rain falls. Second, the evaluation of recreational and/or land use impacts, including trails, should not be limited by whether the County believes they are designated. The trails are used extensively today, will not be useable at all during and possibly after the project and the current users will be displaced. The impact to trails and trail use is greatly minimized due to this arbitrary distinction between "designated" and "non-designated" trails. In the final EIR, the trails maps must be redrawn to include ALL proposed and existing trails, including the Perimeter Trail.

Comment 179-54

3. The DEIR states "*As detailed below, implementation of sediment removal will result in temporarily restricted access to portions of designated trails and indirect impacts to existing recreation uses associated with construction activities. These impacts may increase the use of other area parks and recreational facilities such as those listed in Table 3.15-1, Area Recreational Facilities*. There are recreational activities that will not be able to be relocated or make use of existing recreational facilities. First, there is no alternate location for the disc golf course half of which is in the proposed project boundaries. Second, Table 3.15-1 includes the Rose Bowl area as an alternate

Comment 179-54 continued

recreational location. The EIR for the NFL's temporary use of the Rose Bowl Stadium states that recreation around the Rose Bowl will be displaced and lists Hahamongna Watershed Park as alternate location for much of that recreational activity (Temporary Use of the Rose Bowl Stadium by the NFL, July 1012, Section 3.6 Recreation). Both of these projects, if implemented, will occur at the same time, displacing all recreation from both project sites.

Comment 179-55

4. The DEIR states "*The Oak Grove area of Hahamongna Watershed Park and the associated facilities including Oak Grove Disk Golf Course will remain open during sediment removal and will continue to provide active recreational facilities to the area. Sediment removal activities will not limit the use of the Oak Grove area of Hahamongna Watershed Park by individuals or by organizations such as the Oak Grove Disc Golf Club, the Rose Bowl Riders, or Tom Sawyer Camp"*. First, the historic Disc Golf Club will lose use of much of their playing area. Second, Tom Sawyer Camp conducts much of its activity, including horseback riding and exploring nature, within the project area. Third, the statement that the sediment removal activities will not limit use of the area is incorrect. Use of the area will, in fact, be eliminated for most recreational activities. Fourth, MACH I is not mentioned in this statement. MACH I currently subleases a portion of Rose Bowl Riders but is a separate non-profit organization with special needs clients. These statement errors must be correct in the final EIR.

Comment 179-56

The final EIR must answer the following questions regarding impacts to recreation:

- ? Who determined and where is the documentation for which trails are "designated" and why only "designated" trails need to be considered in the EIR?
- ? If these trails are listed as "designated" by the City of Pasadena, why do the alignments and trail names not all correspond with the Trail Plan as adopted in the HWP Master Plan (Exhibit 11)?
- ? Why aren't all existing trails, including those within the basin, shown on the existing trails map in the DEIR (Figure 3.15-3) since their elimination will have just as much of an impact upon recreation as will the elimination of the "designated trails"?

Comment 179-56 continued

? How will the final EIR address the fact that this project along with the NFL use of the Rose Bowl create a cumulative impact on recreation and each project site plans to redirect recreation to the other project site?

? Why is there no baseline study of the recreational use of the area?

G. Transportation/Traffic

Comment 179-57

Although traffic has been determined to be a significant and unavoidable impact at the project site, and at Pasadena, La Canada and Altadena intersections, the impacts have been severely understated in the following areas:

Comment 179-58

1. The Mobility Element of Pasadena's General Plan (http://cityofpasadena.net/Planning/CommunityPlanning/General_Plan/) includes the goal of protecting neighborhoods by discouraging traffic from intruding into community neighborhoods. Commuter vehicles attempting to avoid the truck traffic, especially in and around the 210 South to 210 east interchange tunnels will exit the freeway and drive through the neighborhoods.

Comment 179-59

2. In its scoping letter, Caltrans stated that haul trips should be limited to off-peak commute hours. Mitigation measures TRA-1 and TRA-2 propose to prohibit delivery to Boulevard and Vulcan sediment placement sites during PM peak hours. Peak PM hours start at 2pm. Peak AM hours will be from 6am until 9am yet there are no mitigation measures proposed for inbound truck traffic from Irwindale. The PM mitigation proposed will likely extend the hours per day trucking will occur or extend the number of years that the project will take.

Comment 179-60

3. The DEIR does not discuss the cumulative impacts to traffic resulting from this project in conjunction with the Devil's Gate Water Conservation (pipeline) project. The proposed location for the pipeline to Eaton Wash is under Woodbury Street and New York Drive. These streets are currently alternate routes for east-west traffic trying to avoid congestion on the 210 freeway. These two streets are also key access routes to all Altadena residential areas. The Water Conservation Project must be defined in the final EIR and the cumulative impacts must be considered in the final EIR

4. The DEIR is deficient in that traffic patterns within the park are not delineated. Access routes are shown only in the extreme southern area of the park. The public was advised that there would be no particular haul routes within the basin. The DEIR indicates otherwise, however, stating that vehicular activity will be limited to established unpaved roads and unpaved parking lots (p.86). The final EIR must clarify where the access/haul routes will be within the basin. In addition, the final EIR must state how wide the access routes within the park will be. At the project information meetings, County staff indicated the access roads will be 16 feet wide and used for one way traffic only. This needs to be confirmed in the final EIR. The environmental impact of the haul routes and parking lots within the park cannot be accurately assessed when the locations and dimensions have not been fully disclosed. The final EIR must provide a map showing the maintenance roads/trails, parking lots and any other facility that will be used as the haul routes and staging areas within the basin.

Comment 179-61

5. In an article in the Altadena Patch, Kerjon Lee, spokesman for County Public Works was quoted as stating the County might use a road the City of Pasadena was looking at building on the west side of the park ("Devil's Gate Dam Project Could Be Larger than Expected," Altadena Patch, September 26, 2011, www.altadena.patch.com). Since there has been vehement, decades-long community opposition to any new roads in Hahamongna, this quote raised questions which were never adequately answered about how the proposed sediment removal project might be used as a pretext to build new roads in and around the basin. Any discussions between County Public Works and the City of Pasadena staff concerning construction of roads in the basin before, during and after this project must be disclosed now so that the cumulative environmental impacts can be evaluated by the public and the decision makers.

Comment 179-62

The final EIR must answer the following questions regarding impacts to transportation and traffic:

Comment 179-63

- Why is there no discussion of impacts to all neighborhoods along the 210 corridors, including East Pasadena, Arcadia, and Monrovia?

Comment 179-63 continued

- ? How long would the proposed project take if haul trips are only during the off-peak commute hours as suggested in mitigation measures TRA-1 and TRA-2? Why is there no mitigation measures proposed for inbound trucks from Irwindale during AM peak hours?
- ? What will be the cumulative impact when this project is combined with the Water Conservation Project that will shut down a major east-west freeway traffic alternative?
- ? Where are the access routes within the basin and how do these impact the trails and other recreational uses?
- ? Have there been discussions between County Public Works and the City of Pasadena staff concerning road building and/or expansion in Hahamongna?

H. Incomplete Statements of Impacts and Inadequate Mitigations

1. The County was aware of and given the opportunity to comment on the Hahamongna Watershed Park Master Plan (HWPMP). According to the response matrix, the LACDPW submitted two comment letters. The concerns raised by the County were related to the liner to be used in the water conservation pool, the need to adhere to seismic ordinances and codes, concerns about the Superfund Site, the City's need to get County permits for construction, some project costs and sediment removal frequency and quantity. For the most part, the LACDPW was supportive of the projects planned in Hahamongna. (http://www.ci.pasadena.ca.us/PublicWorks/AS_MEIR, Arroyo Seco Master EIR V3 Section 13 Responses to Comments

Comment 179-64

The City of Pasadena was put in a position of detrimental reliance when it moved forward with the cost of planning and implementing numerous projects in the HWPMP. The proposed project, as described in the DEIR, is in direct conflict with the stated guidelines, goals, numerous projects and land use in Hahamongna Watershed Park. Conflicts with the HWPMP are detailed below under "Land Use and Planning".

Comment 179-64 continued

? Why hasn't LACDPW described in detail the impacts to ALL projects listed in the HWPMP?

2. The proposed project and most of the alternatives have environmental impacts which cannot be mitigated to a level of less than significant. Given the size and extent of this project and the environmental impacts, the list of 18 mitigation measures presented is an amazingly short list and, for the most part, ineffective. Essential to the legal adequacy of mitigation measures is that there is a real effort to identify feasible, performance-based mitigations that do not rely on future planning. And, per CEQA, maximum effort needs to be made to present alternatives that allow most if not all mitigation measures to be performed on-site. As discussed above, the actual amount of sediment proposed to be removed should be reduced to what is actually necessary to meet this project's objectives, not to accommodate other projects or to meet other unstated County goals. The amount of sediment to be removed should not exceed the amounts stated in other County documents such as the Devil's Gate and Eaton Storm Water Flood Management Project grant application. It is likely that a smaller amount of sediment and excavating only 50 acres or less immediately behind the dam would allow for much more on-site mitigation. It is clear that slowing the project down and down-scaling the project would reduce the need for mitigation and improve mitigation opportunities.

Comment 179-65

As described, the proposed project would excavate and keep permanently cleared 120 acres, including riparian habitat, a major wildlife corridor, 50+ acres of willows, hundreds of other trees, and endangered and protected species. There is no mitigation for the restoration of wildlife corridors, and several protected species might never return to the area. Since the proposed project will scour 120 acres, mitigation for trees and riparian habitat would certainly have to be primarily offsite. Further, the DEIR suggests for mitigation replacement at a ratio of 1:1. This is less than the standards generally used by the City of Pasadena which, for trees, often uses a ratio of 3:1 in order to insure that at least one tree survives for every 3 planted.

Comment 179-65 continued

The County may not approve or carry out a project for which an EIR identifies one or more significant effects on the environment unless all of the adverse environmental effects have been mitigated to a level of insignificance *or* all feasible mitigations and alternatives have been adopted *and* that project benefits outweigh the significant effects on the environment. Project benefits cannot be mischaracterized and must be supported by substantial evidence. The County must mitigate properly if they want to pursue any statements of overriding consideration as required by CEQA.

Some inadequacies in the mitigation measures are:

- The DEIR does not discuss where the off-site mitigation measures will be.
- MM BIO-8: The DEIR states that mitigation for tree removal is going to be a combination of onsite and offsite habitat restoration at a replacement ration of 1:1 and that ruderal habitats within the park are to be used whenever possible. But, there will be few ruderal habitat opportunities since the 120 acres will be scoured.

Comment 179-66

- MM AQ-1: The mitigation measure states trucks that meet EPA's emission standards for model year 2007 <u>as reasonably feasible</u>. This is not an effective mitigation measure if it is not feasible.
- MM BIO-7: This mitigation measure references trees within the project area "that can be avoided". But, with the proposed project all vegetation will be removed and kept out of the project area. The DEIR does not address how they will obtain the necessary permits for tree removal from the City of Pasadena and what the oversight will be to assure all City regulations are complied with. The mitigation measure references additional measures that will be implemented to protect the root zone of oak trees but does not state what these additional measures will be.
- MM LAN-1: The mitigation measure addresses "temporary" impacts to recreational facilities and trails. The DEIR does not propose any mitigation

Comment 179-66 continued

measures for “permanent” impacts to recreational facilities such as the disc golf course and the numerous trails that will be lost.

The final EIR must address these inadequacies and answer the following questions:

? Where will all off-site mitigation occur?

? What percentage of habitat mitigation will be on-site and what percentage off-site?

? How much of the off-site mitigation will be at locations within the City of Pasadena?

Comment 179-67

? How can LACDPW propose a project of this size and not guarantee the EPA emissions standard will be met? Who will determine what a feasible effort for meeting the standard is? Who will monitor this mitigation to assure that the standard has been met?

? How is it possible to use ruderal habitats within the park for mitigation if the 120 acres of the park are scoured as is stated in the proposed project? What is the acreage of ruderal habitat that would remain in the park to be used for mitigation under the proposed project and each of the alternatives?

? What mitigation measures are proposed for “permanent” impacts to recreational facilities such as the disc golf course and the numerous trails that will be lost?

? How will trees within the project area be “avoided” when all 120 acres will be scoured? At what point will LACDPW obtain the necessary permits for tree removal from Pasadena? Who will oversee that all City regulations are complied with? What “additional” measures will be implemented to protect the root zone of oak trees

IV. Errata and Necessary Clarifications

Comment 179-68

A. The LACDPW Sediment Management Strategic Plan (2012-2032) has specific information on the remaining capacity of the reservoir. However, a search of the DEIR for the word

Comment 179-68 continued

"strategic" did not turn up a single reference to the County's Strategic Plan. In addition to the specific information about Devil's Gate Dam, the Strategic Plan is relevant to the decision makers and the public trying to gain an understanding of the County's entire sediment management plan and how Devil's Gate fits in. The final EIR must include all relevant information from the Strategic Plan concerning Devil's Gate Dam and Reservoir.

Comment 179-69

B. The trails map in the DEIR, Figure 3.15-2 Devil's Gate Area Designated Trails, is drawn incorrectly. It does not correspond with either the trail alignments shown in the trail plan adopted in the HWP Master Plan or the existing Hahamongna trails as shown on the City of Pasadena Arroyo Seco Guide to Public Trails and Recreation, revised 3/23/2010 (Exhibit 12).

Comment 179-70

C. The alignments of the West Rim Trail in the vicinity of the Oak Grove Sports Field do not correspond with those in the adopted HWP Master Plan Trail Plan. Since the West Rim Trail is not even depicted in the Arroyo Seco Guide to Public Trails and Recreation, the source of the alignments in the DEIR is in question. The final EIR must disclose source(s) used for the trail alignments and the alignment of the West Rim Trail must be changed to correspond with that in the adopted HWPMP.

Comment 179-71

D. The DEIR states that maintenance roads in the park are used as "unofficial trails when reservoir water levels and conditions permit," p.211. This is inaccurate. The Perimeter Trail as proposed in the adopted Park Master Plan would utilize the park maintenance roads as part of the official trail network. The most recent version of the Perimeter Trail in Pasadena's Multi-benefit multi-use Project includes a bridge which would raise the trail out of the inundation area. In the final EIR, the trails map must be redrawn to include all proposed and existing trails, including the Perimeter Trail. And, the analysis of impacts must be corrected to reflect the environmental impacts of this project upon all existing and proposed trails in the park as indicated in the park Master Plan adopted by the Pasadena City Council.

Comment 179-72

E. The DEIR states on p.35 that, after the Station Fire, most of the vegetation and trees on the Proposed Project site were dead, washed out, or buried under sediment…". The 2003 picture of the project area was taken in May (Figure 3.4-1). The 2010 picture of the project

Comment 179-72 continued

area (Figure 3.4-2) and the 2011 picture of the project area (Figure 3.4-3) were taken during the month of February when the willow trees in Hahamongna are dormant. A photo taken on November 7, 2010 (Exhibit 13) shows that the willow trees behind the dam were very much alive. The final EIR must present project area photos that accurately reflect the current state so as to not give the misleading impression that the trees behind the dam are dead. Most of the trees behind the dam, primarily willows, not only survived the Station Fire but flourished.

Comment 179-73

F. The public's task in understanding the environmental impacts of the sediment removal project has been made much more difficult by conflicting information in County Public Works documents. As stated in section II-A, there are discrepancies related to project storage capacity between the original Devil's Gate sediment removal plan, the 2010 grant application to the CA Department of Water Resources for the Devil's Gate and Eaton Stormwater Flood Management Project, and the County of Los Angeles Sediment Management Strategic Plan 2012 – 2032. These discrepancies need to be resolved and corrected in the final EIR.

Comment 179-74

G. The DEIR states that Alternative 2, Configuration C will have an increased conflict with bike and pedestrian facilities. The final EIR must clarify this.

Comment 179-75

H. The DEIR states that Alternative 2, Configuration C, as with the Proposed Project, will occur over 5 years. It does not seem likely that Alternative 2 could be completed in 5 years when it proposes removing 1mcy more sediment than with the proposed project.

Comment 179-76

I. The list of schools in the immediate vicinity (p.74) is incomplete. It does not include La Canada Junior High School and the Child Education Center which is immediately adjacent to La Canada High School. The latter omission is significant since the school has programs for infant/toddler (as young as 2 months old), preschool, and school age children.

Comment 179-77

J. In the Air Quality-6 Cumulative Impacts section (p.93), the temporary use of the Rose Bowl by the NFL is not listed as one of the projects which could be going on at the same time as the sediment removal project p.93. This needs to be corrected in the final EIR.

Comment 179-78

K. The Flint Canyon Trail, one of La Canada Flintridge's main trails, is incorrectly identified in the DEIR as the Flint Wash Trail, p.210

Comment 179-79

L. In Appendix D, Biological Reports (p.1), the text states "The proposed project will remove 1,671,000 cy of sediment debris from Devil's Gate Reservoir." The Biological Report was apparently done before the Proposed Project was enlarged from its original scope. Figure 3 of the Biological Resources Map is also incorrect in Appendix D. It shows an excavation footprint which corresponds with that of the project as originally proposed rather than the much larger footprint of the DEIR Proposed Project.

Comment 179-80

M. The Move a Child Higher (MACH I) therapeutic riding program must be accurately define as a stake-holder in and a designated use of Hahamongna Watershed Park. The reference that MACH I is nothing more than "*a small special-needs population*" of Rose Bowl Riders is inaccurate and must be corrected and the impacts to this group need to be analyzed.

V. Conclusion:

Comment 179-81

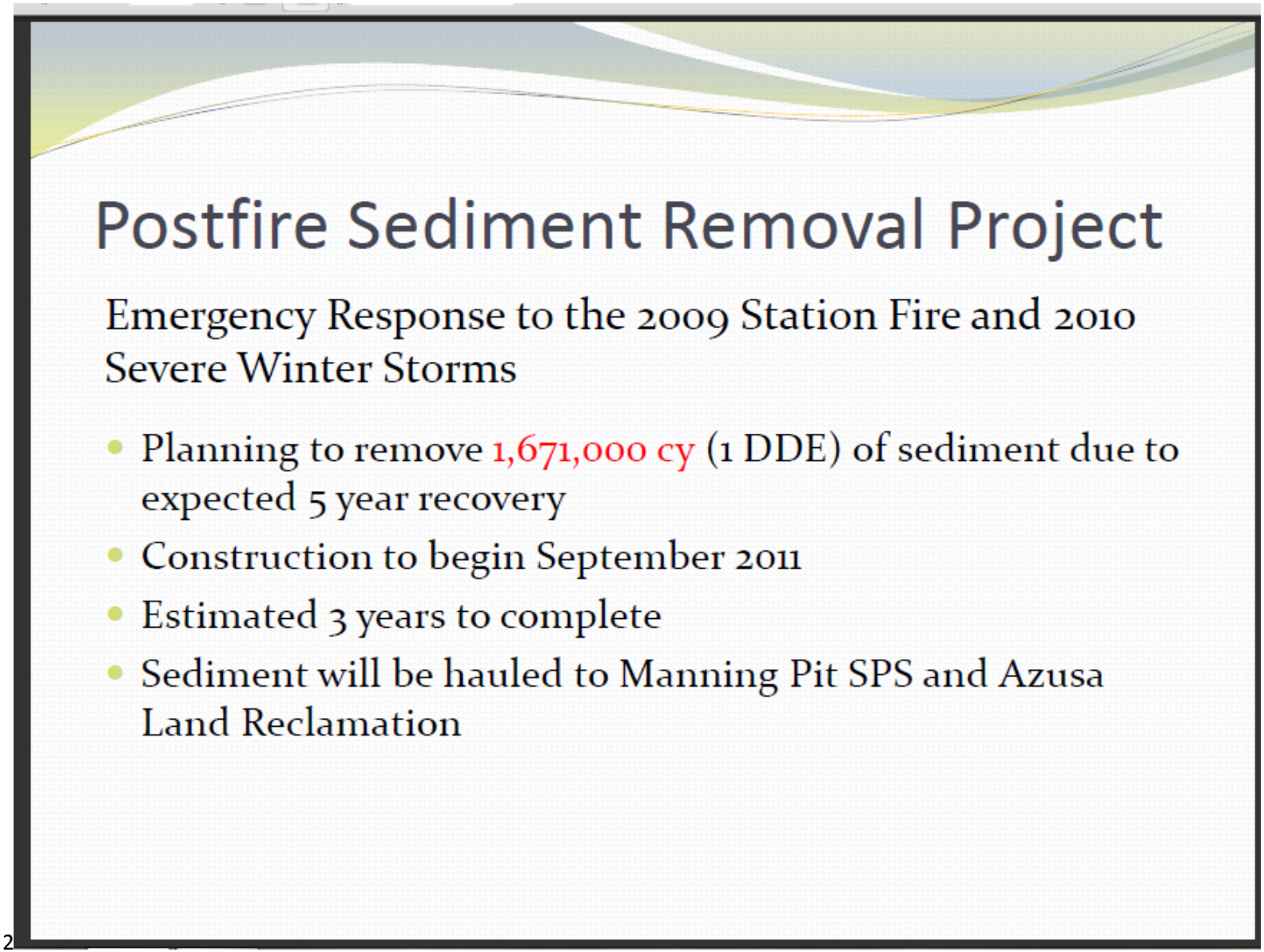
After careful study, Friends of Hahamongna believe there are many problems with the proposed project and all the alternatives. We support a sediment removal alternative that would phase the removal of sediment over a much longer period of time, remove only the amount of sediment that is necessary, make more use of sluicing, destroy a much smaller area of Hahamongna and cost far less. We believe there is a far less impactful alternative that meets the project goals. The concepts advocated by the Arroyo Seco Foundation (ASF) should be used as a basis for the development of an environmentally superior alternative. LACDPW must develop a sediment removal plan which would promote the multiple goals of the Hahamongna Watershed Park Master Plan rather than addressing only flood control to the detriment of all other purposes served by the park such as habitat preservation and recreation.

Comment 179-82

LACDPW should make use of the many community suggestions for an effective yet tolerable solution that does not create such a negative impact on the environment and surrounding communities. It is also important the LACDPW take into consideration and fully respect alternatives presented by Responsible Agencies such as the City of Pasadena.

VI. Exhibits:

Exhibit 1 – LACDPW Presentation to HWPAC – 11/30/2010 – Slide 16



2

Exhibit 2 – LACDPW Presentation to HWPAC – 11/30/2010 – Slide 26

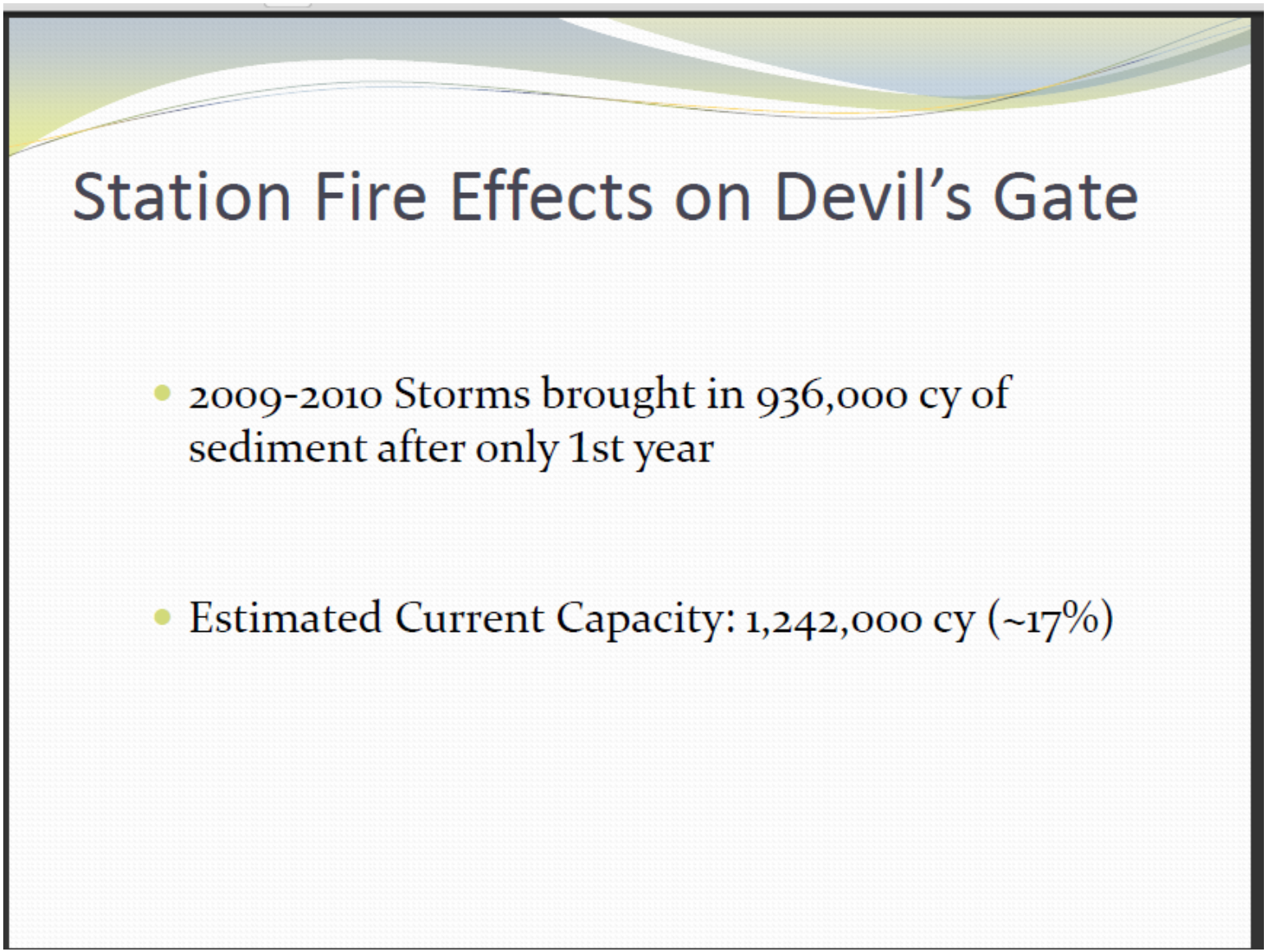


Exhibit 3 – LACDPW Presentation to HWPAC – 11/30/2010 – Slide 33

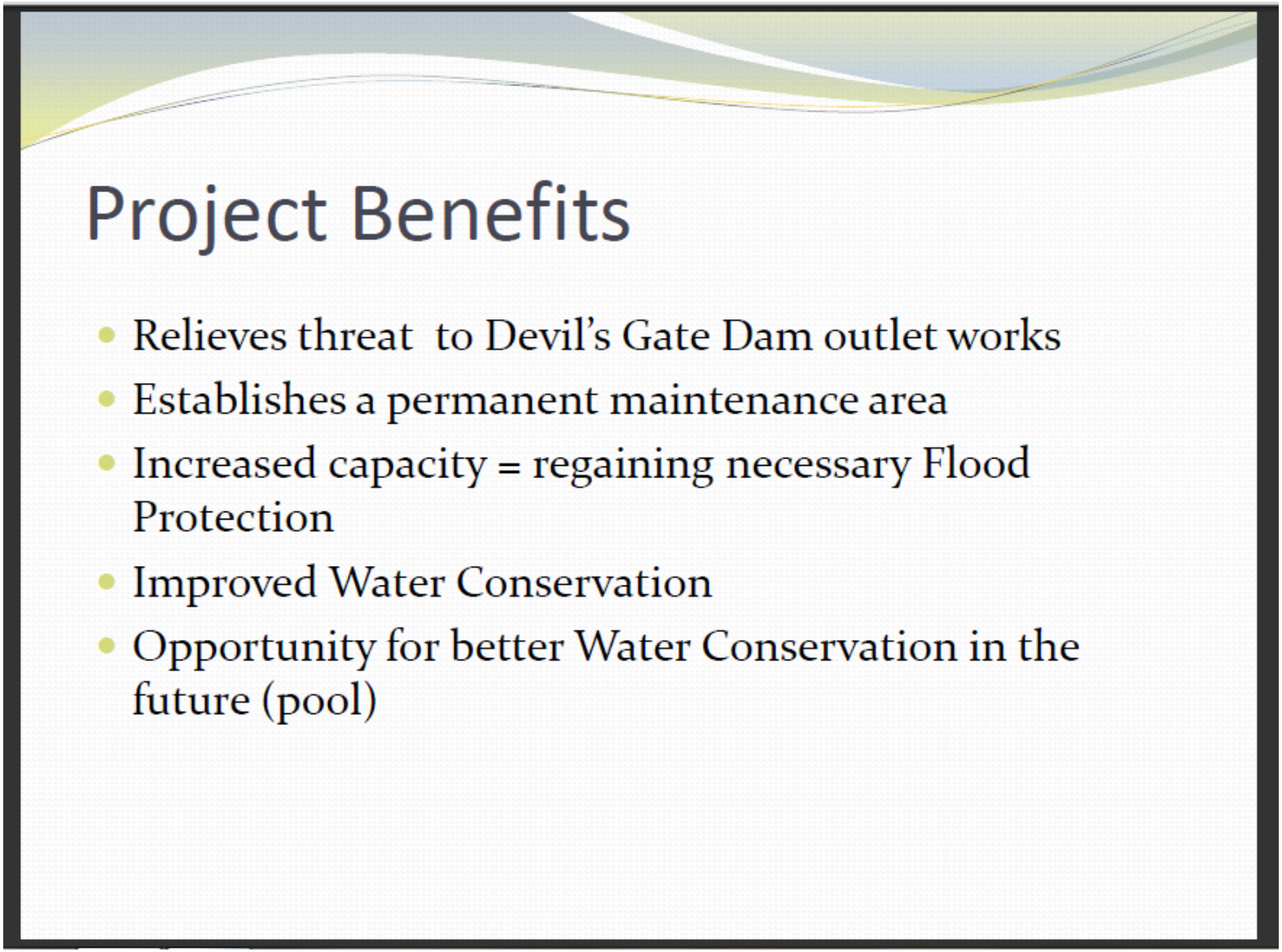


Exhibit 4 – Sediment Management Strategic Plan – Table 2-1

Table 2-1 Reservoirs in the Flood Control District

Reservoir	Original Capacity (MCY)	Historic Sediment Removal		Conditions as of the Last Survey				
		Sluiced (MCY)	Excavated (MCY)	Date of Last Survey	Sediment Quantity in the Reservoir (MCY)	Available Capacity[a] (MCY)	Percent of Capacity Taken Up by Sediment[b]	Percent of Capacity Available[c]
Big Dalton	1.7	0.0	1.6	Jul 2008	0.0	1.7	0%	100%
Big Tujunga	10.1	3.1	10.4	Aug 2011	2.0	8.1	20%	80%
Cogswell	19.8	1.3	4.4	Aug 2011	3.9	16.8	20%	80%
Devils Gate	7.4	2.2	5.9	Mar 2011	3.9	3.7	53%	47%
Eaton	1.5	0.0	3.3	May 2010	0.5	1.1	33%	67%
Live Oak	0.4	0.0	0.6	Nov 2008	0.008	0.4	2%	98%
Morris	52.1	2.6	0.0	Dec 2010	13.1	36.4	25%	75%
Pacoima	9.8	2.2	0.0	Sep 2010	5.1	4.7	52%	48%
Puddingstone	28.1	0.0	0.0	Sep 2004	1.7	26.4	6%	94%
Puddingstone Diversion	0.2	0.0	1.5	May 2005	0.0	0.4[d]	0%	100%
San Dimas	2.4	0.2	4.4	Aug 2009	0.0	2.5[d]	0%	100%
San Gabriel	86.1	11.8	24.3	Dec 2010	14.4	71.7	17%	83%
Santa Anita	2.2	1.9	0.8	Dec 2010	0.3	1.2	14%	86%
Thompson	1.0	0.0	0.4	Jun 2004	0.2	0.8	20%	80%

Notes

a. Available Capacity = Original Capacity – Sediment Quantity in the Reservoir, or as determined based on the surveys.
   Example: San Gabriel Reservoir's Available Capacity = 86.1 MCY – 14.4 MCY = 71.7 MCY

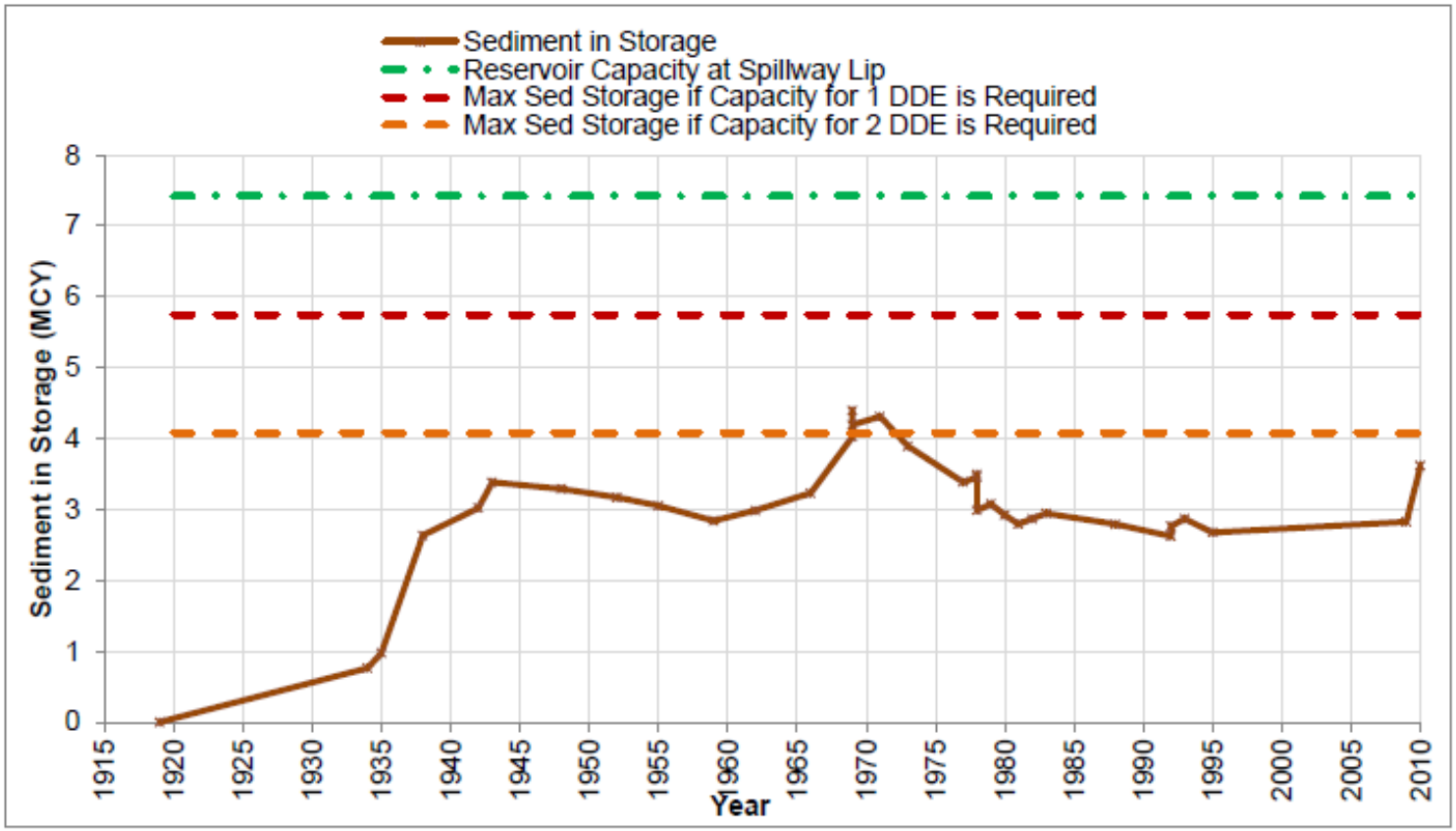
b. Percent of Capacity Taken up by Sediment = Sediment Quantity in the Reservoir / Original Capacity.
   Example: San Gabriel Reservoir's Capacity Taken Up by Sediment = 14.4 MCY / 86.1 MCY = 17%

c. Percent of Capacity Available = 100% - Percent of Capacity Taken Up by Sediment
   Example: San Gabriel Reservoir's Percent of Capacity Available = 100% - 17% = 83%

d. When a reservoir's available capacity is greater than the original capacity, it could be that the reservoir was overexcavated at some point. Alternatively, it could be a reflection of the inaccuracy of bathymetric surveys, which are used to determine sediment quantities in reservoirs.

Exhibit 5 – Sediment Management Strategic Plan – Figure 8-27

Figure 8-27 Graph of Historical Sediment Storage at Devil's Gate Reservoir



Sediment has been removed 32 times in the 92-year life of the reservoir as shown in Table 8-12. Table 8-12 shows that both excavation and sluicing have been used to remove sediment from Devils Gate Reservoir in the past. The majority of the sediment (73 percent) has been removed through excavation.

Exhibit 6 – Flood Hazard Warning and Contingency Plan for the Arroyo Seco Channel Map

Exhibit 7 – Arroyo Seco 50-Year Frequency Rainfall Bulked Flows and Superelevation Map (partial)

Exhibit 8 – Sediment Management Strategic Plan – Devil's Gate Reservoir Historical Sediment

Table 8-12 Devils Gate Reservoir historical sediment accumulation and removal

Survey Date		Reservoir Capacity @ Elevation 1,054 ft (MCY)	Quantity Sluiced (MCY)	Quantity Excavated (MCY)	Sediment Accumulated Between Surveys (MCY)	Sediment in Storage (MCY)
October	1919	7.42	-	-	-	-
September	1934	6.66	-	0.08	0.84	0.76
June	1935	6.45	-	-	0.21	0.98
June	1938	4.79	-	-	1.66	2.64
January	1942	4.40	1.04	0.04	1.46	3.02
December	1943	4.04	0.10	0.03	0.50	3.38
Fall	1948	4.13	0.12	0.07	0.10	3.29
July	1952	4.25	0.41	0.14	0.43	3.17
September	1955	4.37	-	0.12	-	3.05
December	1959	4.58	-	0.28	0.07	2.84
May	1962	4.44	-	0.70	0.84	2.99
September	1966	4.19	0.08	0.60	0.92	3.23
February	1969	3.40	-	0.03	0.83	4.03
March	1969	3.02	-	-	0.37	4.40
November	1969	3.23	0.19	0.01	-	4.19
December	1971	3.11	-	0.23	0.35	4.31
October	1973	3.53	-	0.47	0.06	3.90
March	1977	4.04	-	0.75	0.24	3.39
March	1978	3.97	-	0.24	0.31	3.45
July	1978	3.93	-	-	0.04	3.50
December	1978	4.43	-	0.51	-	2.99
February	1979	4.34	0.25	0.12	0.47	3.08
March	1980	4.50	-	0.45	0.30	2.92
July	1981	4.63	-	0.32	0.19	2.79
September	1982	4.55	-	0.10	0.18	2.87
April	1983	4.48	-	0.05	0.13	2.95
June	1988	4.63	-	0.20	0.05	2.79
February	1992	4.80	-	0.17	-	2.62
July	1992	4.66	-	-	0.14	2.77
April	1993	4.68	-	-	0.10	2.87
November	1995	4.94	-	0.19	-	2.68
April	2009	4.79	-	0.02	0.18	2.83
April	2010	3.99	-	-	0.79	3.62
March	2011	3.72	-	-	0.27	3.89

Exhibit 9 - Wildlife Corridors – Cottonwood Canyon Through Hahamongna Watershed Park (AFC Website)

Exhibit 10 – HWP Perimeter Trail Project Grants (Information compiled from publicly available sources as of 8/8/2012)

NAME and/OR LOCATION	GRANT SOURCE	ENVIRONMENTAL
Trail and Bikeway (Component 7) Upper Arroyo Seco Trail Hub Project	Requested from the CA River Parkways Program, CA Natural Resources Agency (Prop. 84)	Grant denied
Westside Perimeter Trail Improvements – from the northern limits of Sycamore Grove field to the northern limit of Hahamongna Annex	State Environmental Enhancement Mitigation Grant 2010-11 for habitat restoration and trail improvements ($100,000)	Environmental compliance, coordination with LA County and regulatory agencies, and design to be completed in FY 2012
Funds obtained for Westside Perimeter Trail	Los Angeles River Parkway Program (established by the Safe Neighborhood Parks, Clean Water, Clean Air, and Coastal Protection Bond Act of 2002) Riparian and Riverine Habitat Program $400,000 RR-17-003 (Funds obtained in 2002)	Completion due date 3/31/2013?
Trail improvements to the Westside Perimeter Trail (CIP 77507) Project includes the southernmost portion of the Westside Perimeter Trail and the Spur Trail to the expanded parking lot	FEMA $8465 Prop 50 789,440 (Grant R81745-00) Prop A '92 80,000	Environmental compliance and coordination with Los Angeles County and other regulatory agencies and final design to be completed in FY 2013 Hahamongna MBMU Project Initial Study
Berkshire Creek Restoration (including trail)	CA Dept of Water Resources Urban Streams Restoration Program Final Prop 84 Grant Awards – April 2012 Sponsor/cosponsor – Pasadena and the Arroyo Seco Foundation 638,410	

Exhibit 11 – Hahamongna Watershed Park Master Plan – Trail Plan Ex. 3-8

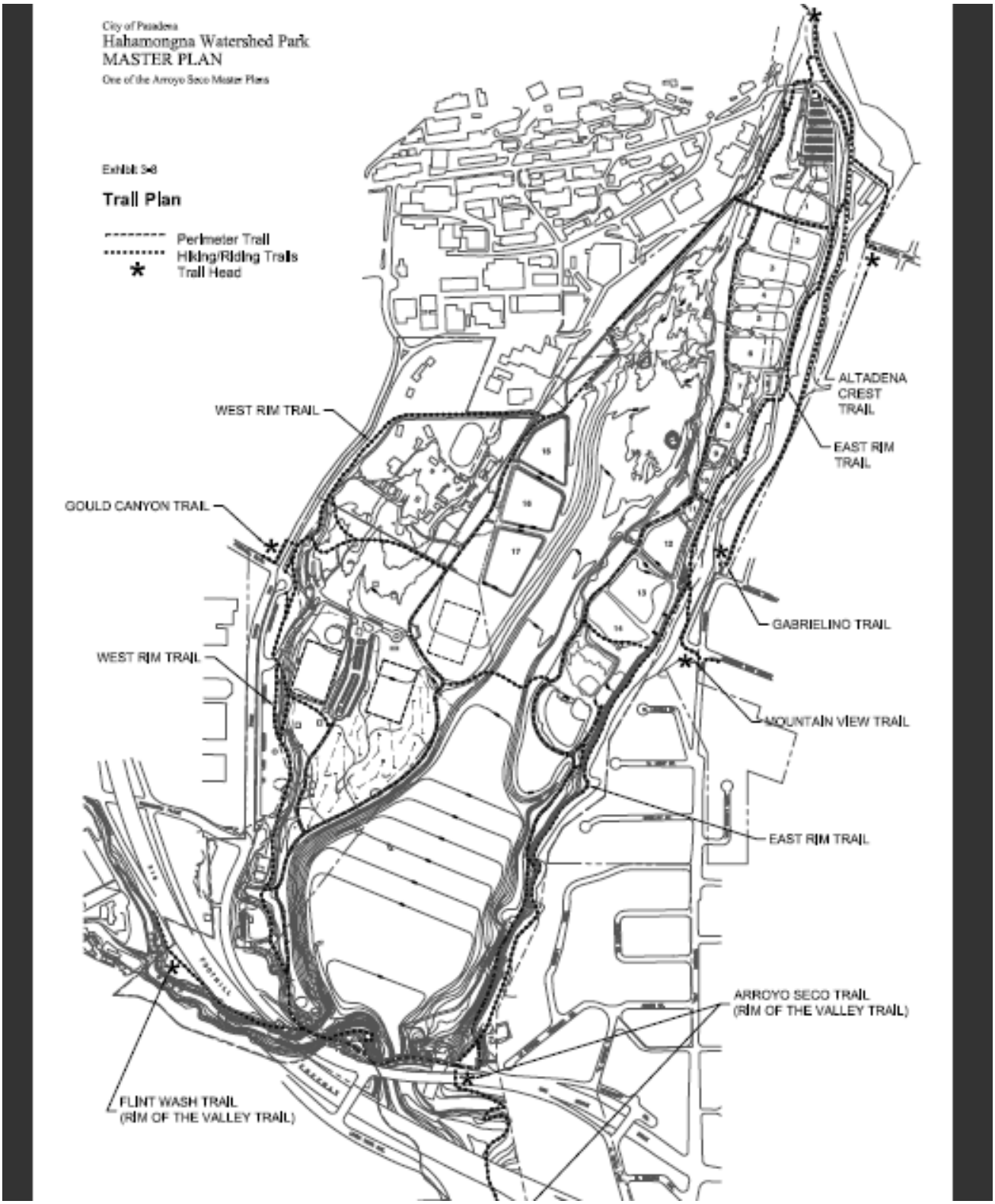


Exhibit 12 – City of Pasadena Arroyo Seco Guide to Public Trails and Recreation (Page 1)

Exhibit 13 – Photo of Hahamongna Watershed Park – November 7, 2010 – Courtesy of Petrea Burchard

Exhibit 14 – LACDPW Presentation to HWPAC – 11/30/2010 – Slide 27

Excavation Site

- Excavation Area: < 50 acres
- Willow Tree Removal (permanent) : ≤ 15 acres
- Avoidance of sensitive species

VEGETATION COMMUNITY

- Alder Woodland
- Alluvial Fan Sage Scrub
- Black Willow Series
- Coast Live Oak Woodland - Disturbed
- Coastal Sage Scrub
- Mule Fat Scrub - Disturbed
- Peppergrass Series
- Posion Hemlock Series/ Mule Fat Scrub - Disturbed
- Riparian Herbaceous
- Stream
- Ephemeral Pond
- Disturbed
- Ornamental

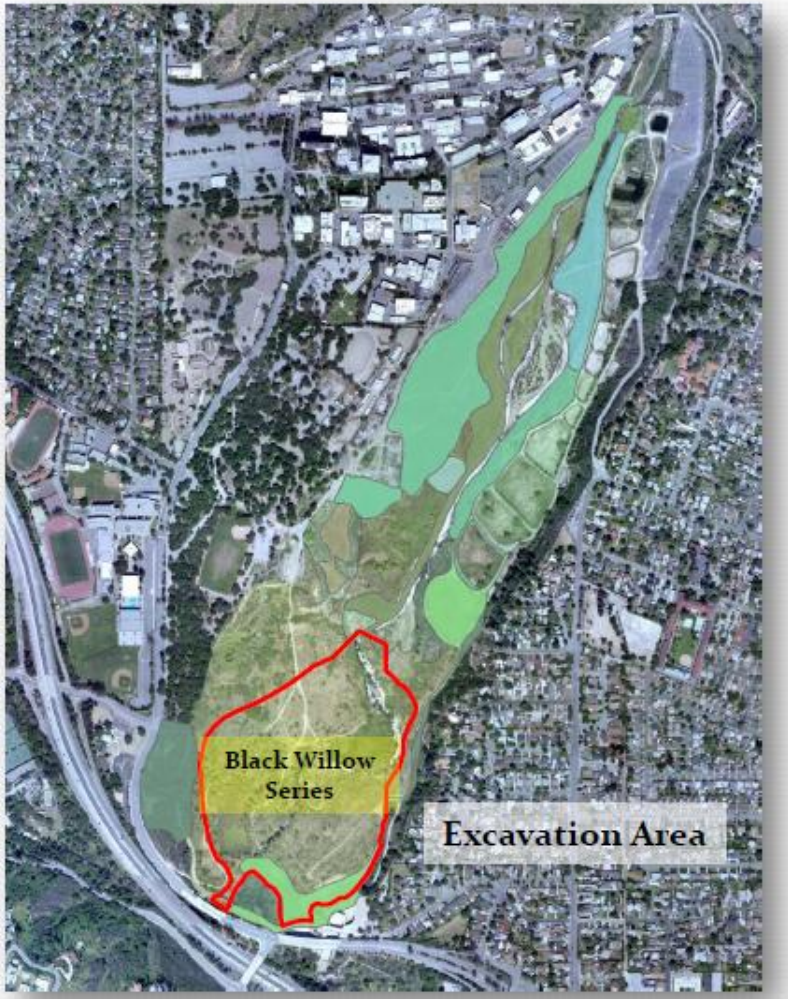
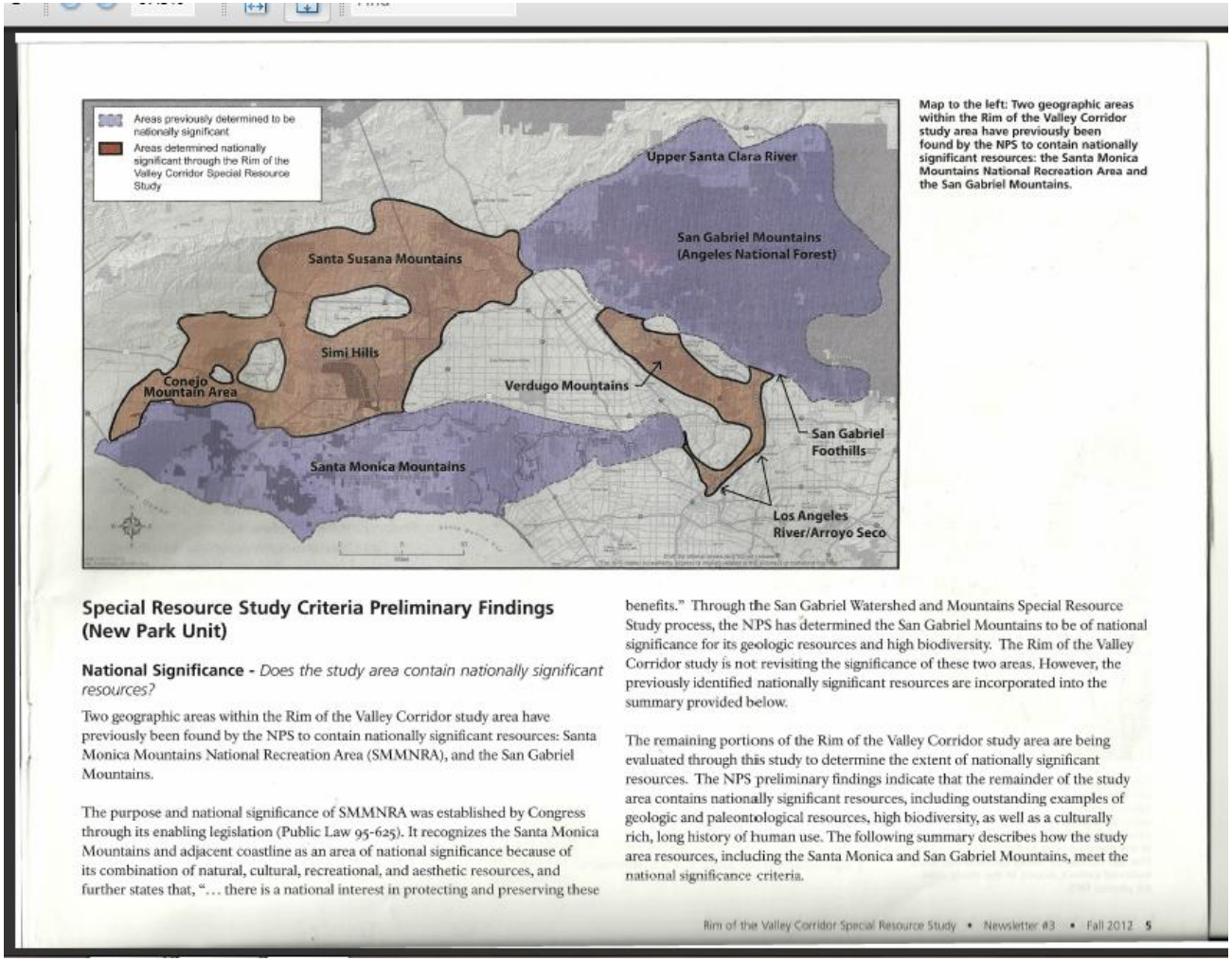


Exhibit 15 – Geographic Areas within the Rim of the Valley Corridor



Map to the left: Two geographic areas within the Rim of the Valley Corridor study area have previously been found by the NPS to contain nationally significant resources: the Santa Monica Mountains National Recreation Area and the San Gabriel Mountains.

Special Resource Study Criteria Preliminary Findings (New Park Unit)

National Significance - *Does the study area contain nationally significant resources?*

Two geographic areas within the Rim of the Valley Corridor study area have previously been found by the NPS to contain nationally significant resources: Santa Monica Mountains National Recreation Area (SMMNRA), and the San Gabriel Mountains.

The purpose and national significance of SMMNRA was established by Congress through its enabling legislation (Public Law 95-625). It recognizes the Santa Monica Mountains and adjacent coastline as an area of national significance because of its combination of natural, cultural, recreational, and aesthetic resources, and further states that, "… there is a national interest in protecting and preserving these benefits." Through the San Gabriel Watershed and Mountains Special Resource Study process, the NPS has determined the San Gabriel Mountains to be of national significance for its geologic resources and high biodiversity. The Rim of the Valley Corridor study is not revisiting the significance of these two areas. However, the previously identified nationally significant resources are incorporated into the summary provided below.

The remaining portions of the Rim of the Valley Corridor study area are being evaluated through this study to determine the extent of nationally significant resources. The NPS preliminary findings indicate that the remainder of the study area contains nationally significant resources, including outstanding examples of geologic and paleontological resources, high biodiversity, as well as a culturally rich, long history of human use. The following summary describes how the study area resources, including the Santa Monica and San Gabriel Mountains, meet the national significance criteria.

Rim of the Valley Corridor Special Resource Study • Newsletter #3 • Fall 2012 5

Response to Comment Letter #179 (Friends of Hahamongna)

Response to Comment 179-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

Response to Comment 179-2:

As discussed in Section 3.12.6 of the Draft Environmental Impact Report (EIR), the Proposed Project will not have any significant impacts or conflict with the applicable land use plans, policies, or regulations of adopted plan, including the Hahamongna Watershed Park Master Plan (HWPMP).

Impacts associated with the Proposed Project and mitigation measures to reduce those impacts were adequately and accurately analyzed per requirements of the California Environmental Quality Act (CEQA) in the Draft EIR for the Proposed Project.

Response to Comment 179-3:

The Draft EIR provided a legally adequate project description as per CEQA Guidelines 15124. As described in Section 2.0 of the Draft EIR, the Proposed Project description provides: the precise location and boundaries of the Proposed Project on a detailed map and on a regional map, a statement of objectives sought by the Proposed Project, a general description of the Proposed Project's characteristics, and the intended uses of the EIR. These were all provided in the Draft EIR, Section 2.0, Project Description.

Response to Comment 179-4:

Exhibits noted. In the Proposed Project scope as listed in the Initial Study (IS) dated September 28, 2011, the official commencement of the Proposed Project has always been listed as:

The proposed project would remove up to 4,000,000 cubic yards of sediment from the reservoir behind Devil's Gate Dam to restore it to its current design standard, (capacity for two DDEs below the spillway elevation of 1040.5 ft) and establish a reservoir configuration more suitable for routine maintenance activities including sediment management.

The presentation and Board of Supervisors report, referenced in the commenter's letter, occurred before this date and referred to the emergency sediment removal project, which was never completed. In 2010, in response to the Station Fire, an emergency project to remove only 1.67 million cubic yards (cy) was proposed. This amount was considered justifiable as an emergency exemption to the CEQA. This emergency project was not completed because in March 2011 the County of Los Angeles Board of Supervisors motioned Los Angeles County Flood Control District (LACFCD) to complete an EIR for a comprehensive sediment removal project at Devil's Gate. LACFCD then initiated project development in accordance with the required level of protection of two DDEs. At that time, LACFCD also began receiving feedback on the concurrent Sediment Management Strategic Plan (Strategic Plan) and the interest to look at more sustainable sediment and reservoir management. As a result of the feedback and recommendations during the development of the Strategic Plan, LACFCD began evaluating ways to create a more sustainable long-term way to manage its sediment and habitat. To emphasize the goals of the project, the Proposed Project was given the name Devil's Gate Sediment Removal and Management

Project. Knowing that the EIR would take a considerable amount of time to complete, the County of Los Angeles Board of Supervisors also motioned for an Interim Measures Project to be implemented in order to help reduce the flood risk downstream of the dam until the ultimate sediment removal project commenced.

For Devil's Gate Dam, the design debris event (DDE) was previously calculated as 1.67 million cy. That previous calculation was based on the presence of debris-retaining structures including Browns Canyon Dam, located within the Angeles National Forest upstream of Devil's Gate Dam. These structures filled with sediment decades ago and no longer provide capacity to "control" any portion of the watershed. A subsequent analysis determined that the correct DDE, based on the absence of sediment control facilities in the Forest, is 2.0 million cy. Following the Station Fire, the Los Angeles County Department of Public Works (LACDPW) reviewed the DDE calculations and confirmed that 2.0 million cy is the current and appropriate volume for the DDE.

A reservoir storage design capacity of two design debris events (DDEs) below the dam's lowest spillway was determined to be the standard acceptable level of risk at Devil's Gate Dam and Reservoir. The DDE volume of capacity is determined using the January 2006 LACDPW Hydrology Manual and the March 2006 LACDPW Sedimentation Manual. For Devil's Gate Dam and Reservoir, the required reservoir capacity is 4.0 million cy (two DDEs) below the spillway elevation of 1,040.50 feet.

The Hydrology Manual (January 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_Hydrology_Manual/2006%20Hydrology%20Manual-Divided.pdf

The Sedimentation Manual (March 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_sedimentation_manual/Sedimentation%20Manual-Second%20Edition.pdf

Additional information concerning DDE calculation methods has been added to the Final EIR, Section 2.3, Project Need. The Sediment Management Strategic Plan (Strategic Plan) is a 20-year plan that pursues new alternatives which can reduce the environmental and social impacts of sediment management. As described in the Strategic Plan, it is intended to be an advisory document. Development of specific cleanout plans for LACFCD's numerous facilities will be guided by the Strategic Plan, which provides opportunities for additional public input, including that from the local communities affected by each cleanout. The Proposed Project follows many of the objectives outlined in the Strategic Plan; however, the Strategic Plan is completely separate from the Proposed Project and is therefore not required to be a part of the environmental document.

The Strategic Plan included sediment history data to demonstrate the volume of sediment deposited into the dams and used that data along with statistical analysis to develop projected 20-year sediment volumes for County facilities. The sediment history provided for Devil's Gate Dam (pages 8-42 and 8-43 of the Sediment Management Strategic Plan) correctly shows the sediment volumes accumulated at the dam; however, the column titled "Reservoir Capacity at Elevation 1,054 ft." can be somewhat confusing with respect to the current capacity in the dam. That column provides the remaining capacity below elevation 1,054 feet, which is the original spillway elevation of the dam. The spillway was rehabilitated in order to pass the Probable Maximum Flood. The rehabilitation entailed lowering the spillway bottom elevation, thereby constructing the spillway ports. The reservoir capacity below the existing spillway ports (elevation of 1,040.5 feet) is the appropriate parameter for determining the currently available

capacity for meeting the sediment volume requirements for the dam. The current capacity in the reservoir below the spillway is 1.3 million cy. This is only 32.5 percent of the required storage capacity and only 65 percent of one DDE. Please note that additional sediment deposits have accumulated within the reservoir easement above the elevation of 1,054 feet. This accumulated sediment has the potential to be washed toward the dam during significant storm events and further reduce the available capacity below the spillway.

The lowest cost Proposed Project Alternative is expected to cost approximately $65 million. LACFCD has applied for and received an approximately $28 million grant through the State's Disaster Preparedness and Flood Protection Bond Act of 2006 (Proposition 1E) program. As only a portion of the Proposed Project will be funded through the grant, only a portion of the Proposed Project was included in the project description in the grant application. As identified in the grant application to the California Department of Water Resources, the preferred project alternative would be identified through the EIR.

The first survey in Appendix D was completed for the emergency project in 2010, but it correctly lists the biological resources found during that survey. The biological resources map created for that survey was the area that was surveyed at that time. The information in the biological report completed for the emergency project is still relevant, as it involves the Proposed Project area. Subsequent biological surveys were completed for the entire Proposed Project area and include maps for the Proposed Project.

The Draft EIR, Biological Technical Report (BTR), and focused surveys provide thorough and accurate existing conditions for biological resources (Draft EIR, Section 3.6; Appendix D, Biological Reports). The field surveys were conducted in 2010 and 2013 and included general biological surveys, focused sensitive plant surveys, focused least Bell's vireo surveys, and federal and state jurisdictional waters surveys, as described in Section 3.6 of the Draft EIR. Updates to focused surveys will be conducted for special status plants and significant natural communities (sensitive habitats) with a potential to occur within the Proposed Project area, in accordance with California Department of Fish and Wildlife (CDFW) guidelines, as part of the habitat restoration mitigation measure MM BIO-8.

The 2013 report was completed less than a year prior to the release of the Draft EIR for public review.

Response to Comment 179-5:

See Response to Comments 179-4.

Pursuant to Section 15126.6(a) of the CEQA Guidelines, "[a]n EIR shall describe a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project, and evaluate the comparative merits of the alternatives." However, "[a]n EIR is not required to consider alternatives which are infeasible" (CEQA Guidelines Section 15126.6(a)) or "which could change the fundamental nature of the proposed project."*(Al Larson Boat Shop, Inc. v. Board of Harbor Comm.(1993)* 18 Cal.App.4th 729, 745.) The alternatives discussed in the EIR must be reasonable alternatives, selected to foster informed decision-making and public participation (CEQA Guidelines 15126.6(a)). An EIR need not consider an alternative whose effect cannot reasonably be ascertained or whose implementation is remote and speculative because unrealistic alternatives do not contribute to a useful analysis (CEQA Guidelines 16126.6(f)(3)). Additionally, an alternative may be rejected from detailed analysis in an EIR if it fails to reduce or avoid the project's significant environmental effects, does not implement the basic project objectives, is not potentially feasible, or is facially unreasonable.

14 C.C.R. §15126.6(c); Id., see also *Mann v. Community Redevelopment Agency (1991)* 233 Cal. App. 3d 1143; *Del Mar Terrace Conservancy, Inc. v. City Council* (1991) 10 Cal. App. 4th 712.

The Draft EIR, Section 4, fully analyzed six alternatives, including the No Project Alternative. These alternatives substantially lessen one or more significant effects of the Proposed Project and, with the exception of the mandatory No Project Alternative, would feasibly attain most of the basic objectives of the Proposed Project.

Response to Comment 179-6:

Exhibit noted. See Response to Comment 179-4.

Response to Comment 179-7:

See Response to Comment 179-4.

Response to Comment 179-8:

Exhibits noted. See Responses to Comments 179-3 and 179-4. As stated above, the Draft EIR provided a legally adequate project description as per CEQA Guidelines 15124; however, additional information concerning DDE calculation methods has been added for clarification to the Final EIR, Section 2.3, Project Need.

Historically, large amounts of sediment have been deposited in the reservoir in short time periods. Between 1935 and 1938 over 1.6 million cy of sediment, between 1938 and 1943 over 1.95 million cy of sediment, between 1959 and 1966 over 1.75 million cy of sediment, and between 2010 and 2012 over 1.3 million cy of sediment was deposited in the reservoir. In order for the removal project to be efficient, and therefore reduce impacts and costs, the amount of sediment removed every year needs to exceed the amount of sediment deposited. Historically, approximately 130,000 cy a year was deposited in Devil's Gate Reservoir annually since 1920.

Over 92 years, the average amount of sediment deposited each year is approximately 130,000 cy; however, due to the dynamic nature of the system and the recent burn of the watershed, the amount could vary greatly. If a 1 in 50 years storm were to occur, approximately 2.0 million cy (one DDE) of sediment could be expected to wash into the reservoir. Because of LACFCD's responsibilities to provide flood protection, LACFCD must be ready at all times for a design debris event to occur.

Given the current, limited capacity of the reservoir, a 50-year storm event that results in a DDE would result in storm flows with sediment flowing over the spillway. Flooding with mud/sediment would occur along the portions of the Arroyo Seco in the Cities of Pasadena, South Pasadena, and Los Angeles, impacting approximately 650 parcels and requiring closure of Interstate 110 from Orange Grove Avenue to Interstate 5. Additional information about the potential flood areas and analysis is shown in the Arroyo Seco Channel Hydraulic Analysis prepared by Bureau Veritas North America, Inc., available on the Project website. Please note that protocols are in place to monitor storms, reservoir conditions, and channel conditions and to communicate with emergency responders and Caltrans to execute any necessary evacuations or freeway closures.

The Flood Hazard Warning and Contingency Plan (FHWCP) for Arroyo Seco Channel was prepared in an effort to coordinate with local and state agencies to minimize negative impacts in anticipated areas of flooding along the Arroyo Seco Channel, should those events occur. This effort is outside the scope of the Proposed Project and will not be included in the Final EIR. The potential flooding analyzed in the FHWCP is anticipated to occur during a Capital Flood Event (caused by a 50-year rainfall event) and under the current impacted reservoir condition of the Devils Gate Dam. The 50-Year Frequency Rainfall Bulked Flows and Super elevation Map in the FHWCP depicts the potential flooding risks along the Arroyo Seco downstream of Devil's Gate Dam.

During a single design-event-sized storm, the Rose Bowl is not expected to be impacted by flows from the dam; however, if sediment from each storm event is not removed from the downstream floodplain, each subsequent storm would increase the flood risk.

Response to Comment 179-9:

Exhibit noted. See Response to Comments 179-4 and 179-8.

The Devil's Gate Dam and Reservoir are part of a fluctuating system dictated by unpredictable forces of nature. As such, capacities in the reservoir fluctuate as well. To manage this and continue to provide adequate downstream flood protection, LACFCD has periodically executed several sediment removal projects at Devil's Gate Reservoir in the past, with the last major effort being in 1994. Smaller amounts of sediment were removed in 2006, 2009, and as a part of the Interim Measures Project in 2011, 2012, and 2013. Following the 2009 Station Fire, approximately 1.3 million cy of sediment flowed into Devil's Gate Reservoir after just two average water year storm seasons.

Response to Comment 179-10:

The Draft EIR contains an adequate and complete cumulative impact analysis within each of the subsections of Section 3.0 Environmental Analysis. The cumulative analysis contains projects as determined by LACFCD and the surrounding cities and communities to have a potential cumulative effect due to overlapping timeframes of the projects. Potential projects that were determined to be outside the area of influence, sediment-removal phase of the project schedule, or lacking sufficient project detail, were not considered to be reasonable foreseeable probable future projects, as set forth in the CEQA Guidelines Section 15130.

Response to Comment 179-11:

See Response to Comment 179-4.

As noted in the Draft EIR, the Devil's Gate Water Conservation Project is still in the design phase, and no environmental report is available for public review at this time. It would be speculative to address impacts to biological resources before the concept of the Devil's Gate Water Conservation Project is finalized. Per CEQA, the project descriptions of cumulative projects are not required to be included in the Draft or Final EIR.

The Proposed Project does not require the implementation of the Devil's Gate Water Conservation Project in order to achieve the Proposed Project's objective to satisfactorily reduce flood risk, create a configuration suitable for routine operations and maintenance, and reduce the possibility of plugging at the face of the dam. The Devil's Gate Water Conservation Project does not require the implementation

of the Proposed Project to be carried out. Neither project is a foreseeable consequence of or a future expansion of the other project; therefore, these projects are separate projects per CEQA.

The Devil's Gate Water Conservation Project is a separate project that is not part of the Proposed Project or alternatives. The Devil's Gate Water Conservation Project is still in a conceptual design phase, and no environmental report is available for public review at this time; however, this project was analyzed in the Draft EIR as a cumulative project.

The Devil's Gate Water Conservation Project would be compatible with all the alternatives; however, none of the alternatives were designed to enable that project. Implementation of the No Project Alternative would require that the Devil's Gate Water Conservation Project be designed to accommodate decreased Devil's Gate Reservoir capacity.

The Eaton Wash Spreading Grounds Improvement, Dam Rehabilitation, and Intake Improvement and Basin Enlargement projects have all been completed.

Response to Comment 179-12:

See Responses to Comments 179-4 and 179-11.

Response to Comment 179-13:

During the preparation of the Draft EIR, LACFCD prepared and consulted with surrounding cities and communities to provide a list of past, present, and probable future projects producing related or cumulative impacts to the Proposed Project. Potential projects that were determined to be outside the area of influence, sediment-removal phase of the project schedule, or lacking sufficient project detail, were not considered to be reasonable foreseeable probable future projects, as set forth in the CEQA Guidelines Section 15130. The Foothill Municipal Water District Project was not identified as a potentially cumulative project. The list of cumulative projects was presented in Table 2.9-1 of the Draft EIR. As noted in the comment, the Recycled Water Demonstration Project has been suspended and is still in the concept phase. As the timing and the project description are unknown, it would be speculative and not reasonably foreseeable to include this project in the cumulative project list.

Response to Comment 179-14:

The temporary use of the Rose Bowl by a National Football League (NFL) team was analyzed as a cumulative project in the Draft EIR, as noted in Section 2.9, Cumulative Scenario, and in the Traffic Study, as noted in Section 4, Project Conditions-Year 2014, Project Trip Growth.

Traffic impacts associated with the Proposed Project were discussed in detail in the Draft EIR, Section 3.16, Transportation and Traffic. As listed in that section, a single intersection in the immediate vicinity of the Proposed Project site will have a potentially significant impact. In practice, hauling rates and routes may be adjusted to help reduce impacts, depending on operational need. LACFCD will continue to work with local organizations and the Cities of Pasadena and La Cañada Flintridge and the community of Altadena to minimize traffic impacts around the project site. This will include coordination of sediment transport activities with Rose Bowl special events.

As discussed in the Draft EIR, the NFL Temporary Use of the Rose Bowl could result in an increase in visitor population to onsite and proximate parks and recreational facilities or disrupt availability of these

facilities; however, this impact would be limited to 25 days per year and will not affect recreation for an extended time period. Impacts to recreation were analyzed in the Draft EIR, Section 3.15. The Proposed Project will not limit the use of the Oak Grove area of Hahamongna Watershed Park. Sediment removal activities would be temporary and are expected to occur only in the drier months (April to December, excluding holidays). It is expected that these activities will often not be adjacent to the Oak Grove area of Hahamongna Watershed Park. The Proposed Project would result in temporary limitations on the recreational use of the Proposed Project site and some of the adjacent trails. Most of these areas would be reopened seasonally or intermittently throughout the sediment removal process. In addition, temporary impacts to designated recreational facilities and trails will be minimized through advance communication and redirection to the nearest facility in the vicinity of the Proposed Project. Furthermore, an east-west trail crossing will continue to provide access at the north end of the reservoir. At the south end of the reservoir, after the reservoir ingress and egress ramps have been fully constructed, access to the upper east side Arroyo Seco Trail from La Cañada Verdugo Road will be maintained; and the linkage from the west side Arroyo Seco Trail and the Flint Wash Trail to the upper east side Arroyo Seco Trail (crossing Devil's Gate Dam and also continuing south to the Rose Bowl) will be available after construction activities have ended each day and on nonworking days.

Response to Comment 179-15:

See Response to Comment 179-14.

As discussed in the Draft EIR, recreational users may choose to visit other area parks, recreational facilities, or trails due to the temporary access restrictions or the indirect effects of construction-related activities during reservoir management activities. It is anticipated that these visitors will be dispersed throughout the area and that no single park or facility will experience a substantial increase in use. Therefore, cumulative impacts to recreation uses are expected to be less than significant.

Response to Comment 179-16:

The Devil's Gate Water Conservation Project, the Foothill Municipal Water District Project, and the Proposed Project are three completely separate projects, not phases of the same project. See Response to Comments 179-4, 179-11, and 179-13. The Devil's Gate Water Conservation Project was analyzed as a cumulative project in the Draft EIR, as noted in Section 2.9, Cumulative Scenario.

Response to Comment 179-17:

See Responses to Comments 179-4, 179-11, 179-13, and 179-16.

The amount of sediment needing to be removed from the reservoir for flood control purposed is based on restoring the reservoir to the design capacity necessary for flood control storage or to safely contain future sediment inflow (volume for two DDEs below the spillway elevation of 1,040.5 feet) and protecting downstream communities from flooding. The amount is in no way related to other projects proposed in the area.

Response to Comment 179-18:

The CEQA definition of a responsible agency refers to any agency which has discretionary approval power over the project, discretionary approval being that in which an agency can use its judgment in deciding whether and how to carry out or approve a project as distinguished from ministerial situations

where the public agency merely has to determine whether a project is in conformity with applicable statutes, ordinances, or regulations. Ministerial permits are based only upon fixed City standards, with no subjective decisions required for approval.

An easement granted in 1919 and revised in 1965 by the City of Pasadena to LACFCD encompassing Devil's Gate Dam and Reservoir states the easement is for the purpose of flood control and water conservation. The easement states "Grantor does hereby grant to Grantee a perpetual easement for reservoir, water conservation and flood control purposes, including the right to construct, reconstruct, inspect, maintain, repair and operate a dam, spillway, reservoirs, tunnels, by-passes, channels embankments, protection works, and appurtenant structures for the purposes of controlling, confining, storing and conserving water in, over and across real property hereinafter described." The goal for the Sediment Removal Project is to maintain the reservoir for the purpose of controlling, confining, and storing water within the easement boundaries; and, therefore, the Proposed Project activities fall under the latitude of the easement granted.

Due to the location of the Proposed Project within the limits of the City of Pasadena, ministerial permits, such as hauling permits, will be required from the City; however, the conditions outlined in the easement granted to LACFCD do not necessitate discretionary authority from the City for the Proposed Project. The Los Angeles County Flood Control District was created by State legislation to implement the State-designated objectives of flood control and water conservation within the boundaries of the District. When implementing these State-designated objectives, LACFCD is not subject to local ordinances. The purpose of the Proposed Project is to restore and maintain flood capacity at the Devil's Gate Reservoir, which would directly further LACFCD's regional flood control objective. Accordingly, the Proposed Project would not be subject to the provisions of the City of Pasadena's ordinances.

Response to Comment 179-19:

The California Regional Water Quality Control Board denied a permit for the emergency project without prejudice, with the understanding that LACFCD would be initiating an EIR process for a project which would restore the required level of protection. As part of Proposed Project approval, LACFCD will obtain the necessary permits from the California Regional Water Quality Control Board.

Response to Comment 179-20:

The Proposed Project and all of the alternative boundaries fall well within and do not exceed the 258-acre easement boundary. As stated in Response to Comment 179-18, the Proposed Project does not exceed the legal rights of the easement that was granted to LACFCD. The Devil's Gate Water Conservation Project and any related easement rights are not part of the Proposed Project and would be analyzed in a separate environmental document. LACFCD as Lead Agency will be responsible for the implementation and management of adopted mitigation measures. Responsible Agencies and required permits and approvals were described in Section 2.8 of the Draft EIR.

The purpose of the Proposed Project is to restore and maintain flood capacity at the Devil's Gate Reservoir, which would directly further LACFCD's regional flood control objective. Accordingly, the Proposed Project would not be subject to the provisions of the Pasadena's City Trees and Tree Protection Ordinance.

See Response to Comments 179-4, 179-6, and 179-19.

Response to Comment 179-21:

The Draft EIR Alternatives Analysis was a comprehensive analysis of each of the alternatives and the impact each would have on the community or environment. Although the section is lengthy, it is provided to present the potential impacts of each of the alternatives. In addition, the analysis compares the impacts of the alternative to the Proposed Project and each of the other alternatives to provide a comparison for the reader. This is to show how each alternative compares to the Proposed Project, the other alternatives, and the No Project Alternative in terms of environmental impacts. The Draft EIR also provided summary discussions and comparisons of each alternative for an easy to read overview of the analyses. Tables ES-2 and ES-3 are provided to outline the specifics of each alternative, as well as provide a comparison of impacts. In addition, Table 4.3-1 in the Alternatives Analysis also provides a comparison of alternatives.

Response to Comment 179-22:

See Response to Comments 179-21.

The findings of the EIR are that Alternative 3 is the Environmentally Superior Alternative. As shown in the Draft EIR, Section 4.6, Alternative 3 receives an in-depth analysis which present the potential impacts of each of the alternative and compares the impacts of the alternative to the Proposed Project and each of the other alternatives; providing ample information as to why this alternative was found to be the Environmentally Superior Alternative. Section 4.11 is a summary of these findings. The Draft EIR does not determine and has not designated any of the alternatives, including the Proposed Project, as the "Preferred Alternative." With the completion of the Final EIR, an alternative will be chosen and be presented to the Board of Supervisors as the Preferred Alternative. Any of the alternatives analyzed in the Draft EIR can be chosen as the Preferred Alternative.

Tables ES-2 and ES-3, and Table 4.3-1 in the Alternatives Analysis provides a comparison of the environmental impacts of each of the alternatives.

Response to Comment 179-23:

Exhibits noted. The Draft EIR analyzed a range of sediment removal amounts that would provide the capacity necessary to achieve the Proposed Project objectives.

The need for the large-scale sediment removal project is primarily due to the sediment deposited in the reservoir after the Station Fire. The Proposed Project will support sustainability by establishing a reservoir configuration more suitable for routine maintenance activities, thereby reducing or avoiding future large-scale sediment removal projects. See Responses to Comments 179-4, 179-8, and 179-9.

The Draft EIR analyzed six alternatives, including the No Project Alternative; and Alternative 3, Configuration D was determined to be the environmentally superior alternative that reduced impacts while still meeting the project objectives.

Response to Comment 179-24:

See Response to Comments 179-3 and 179-4.

As discussed in the Draft EIR, Section4.5, under Alternative 2, Configuration C, during the reservoir management phase, access to Devil's Gate Reservoir will be similar to existing conditions.

LACFCD proposed a project duration of five years to reduce accumulated sediment in a timely fashion. With sediment removal operations moving efficiently, it is reasonable to assume a project duration of no more than five years. It is likely that under the Proposed Project, sediment removal operations may take less than five years; however, for a more conservative analysis, a five-year duration was assumed. As with the Proposed Project, sediment removal under Alternative 2, Configuration C will occur between Summer 2015 and Summer 2020; however, sediment removal under this Alternative could potentially have a longer duration than under the Proposed Project due to the larger amount of sediment to be removed. It is still expected that this amount of sediment can be removed within the five-year time frame.

Response to Comment 179-25:

As discussed in the Draft EIR, Section 3.6, Biological Resources, "…in 2011 these resources were severely impacted by sediment deposition. Most of the vegetation and trees on the Proposed Project site were dead, washed out, or buried under sediment, reducing the amount and quality of vegetation communities and wildlife habitat." In order to achieve a more conservative analysis of the potential impacts to biological resources from the Proposed Project, 2013 conditions were also taken into account. Therefore, the information presented is correct and does not warrant a change.

Response to Comment 179-26:

The Draft EIR, Section 3.4, Aesthetics recognizes the San Gabriel Mountains as part of the vista that can be seen from the various viewpoints surrounding the reservoir.

Response to Comment 179-27:

See Response to Comment 179-25. The Draft EIR does accurately state the expected impacts of the Proposed Project, Management Option 1. As stated in the Draft EIR, vegetation conditions on the Proposed Project site will change annually from disturbed to low and dense. Due to the rapid growth of herbaceous plants, it is expected that during the majority of the year the Proposed Project site will be appear vegetated. Therefore, Management Option 1 will result in a lower degree of contrast than seen during sediment removal and will result in a less than significant impact to scenic vistas. The impacts to aesthetics are, however, identified as potentially significant during the sediment removal phase.

Response to Comment 179-28:

See Responses to Comments 179-25, 179-26, and 179-27. Although projects within the Hahamongna Watershed Park Master Plan are designed to take advantage of the scenic characteristics at the site, no City or County documents list the project site as a designated scenic resource. The Draft EIR does acknowledge that potentially significant, unmitigable impacts to aesthetics will occur during the sediment removal phase; however, the site is not an officially designated scenic vista.

Response to Comment 179-29:

Assessments for air quality impacts follow methodology established and authorized by the South Coast Air Quality Management District (SCAQMD). The SCAQMD does not require project-specific ambient air monitoring before or during project construction. CEQA requires mitigations to be monitored, and

LACFCD will maintain sufficient documentation to allow monitoring of Mitigation Measures MM AQ-1 and MM AQ-2.

Response to Comment 179-30:

Baseline monitoring locations are established by the SCAQMD under requirements of the United States (U.S.) Environmental Protection Agency (EPA) and the California Air Resources Board (CARB), and the locations used in the analysis were the nearest established monitoring sites for each particular pollutant. Project-specific ambient monitoring is not required.

Response to Comment 179-31:

Given the estimated emissions did not reach the threshold for significance for particulate matter; no project-specific mitigations were required. Compliance with SCAQMD Rule 403 is sufficient to moderate and alleviate impacts from particulate matter. Dust impacts from the Proposed Project were carefully evaluated, as discussed in the Draft EIR, Section 3.5.6, Impacts and Mitigation, AIR QUALITY-2, Sediment Removal. The Proposed Project's activities including excavation, grading, material loading, and hauling would result in less than significant dust emissions due to the project's use of best management practices and would be in full compliance with SCAQMD's fugitive dust regulations.

Response to Comment 179-32:

Air quality impacts associated with truck traffic were analyzed in the Draft EIR in Section 3.5. LACFCD has conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed the EPA's 2007 standards for emissions. Therefore, in order to further reduce emissions, Mitigation Measure MM AQ-1 has been revised in the Final EIR; and the contractor will be required to use only sediment removal dump trucks that meet or exceed EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality, will be reduced to less than significant.

Response to Comment 179-33:

Each project is responsible only for its own contribution to the overall air quality. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, the Proposed Project's impacts to air quality, including its contribution to cumulative impacts, will be reduced to less than significant.

Regional events such as events at the Rose Bowl and wildfires are outside the purview of LACFCD. No nexus would require LACFCD to provide ambient monitoring for regional events.

Response to Comment 179-34:

Exhibit noted. Existing biological resources, including special status plant and animal species, are discussed in Section 3.6.2 of the Draft EIR. Impacts to biological resources, including special status plant and animal species, are discussed in Section 3.6.6. As discussed in Section 3.6.6 of the Draft EIR, Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats. In addition, sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays). With implementation of these mitigation measures, direct impacts to biological resources would be less than significant.

The National Park Service is conducting a "special resource study" of the area known as the "Rim of the Valley Corridor." This is the area that generally includes the mountains encircling the San Fernando, La Crescenta, Santa Clarita, Simi, and Conejo valleys of Los Angeles and Ventura counties in southern California. The purpose of this special resource study is to determine whether any portion of the Rim of the Valley Corridor study area is eligible to be designated as a unit of the national park system or added to an existing national park (NPS 2014).

This special resource study will provide recommendations to Congress but would not change current management without further action from Congress. Each of the alternatives considered in this study respects and retains the authorities of existing local, state, and federal agencies.

The area that Congress directed the NPS to study (study area) is not proposed for a national park. It is simply an area in which the NPS is asked to evaluate natural and cultural resources and opportunities for public use and resource preservation. It does not mean that all the land within the study area has nationally significant natural and cultural resources. Resources found to be nationally significant must also meet NPS criteria for suitability and feasibility to be considered for inclusion in the national park system.

As the NPS evaluates resources in the study area, often the focus of the study is narrowed. If significant resources are identified, the NPS will identify a range of options or alternatives to protect these resources and provide for public enjoyment.

The preliminary study findings of the Rim of the Valley Corridor Special Resource Study have not identified the Devil's Gate Reservoir or the Hahamongna Watershed Park as nationally significant natural and cultural resources. The nearest nationally significant resources identified in this study are the Jet Propulsion Laboratory (JPL) and the Rose Bowl. The Proposed Project does not involve either of these resources.

Response to Comment 179-35:

Exhibit noted. See Response to Comment 179-34. Sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays). In addition, sediment removal activities would not completely block the Proposed Project site from surrounding habitat, would occur only during the day, and would not interfere with nighttime wildlife activity. Although some wildlife may be temporarily displaced during construction, wildlife would not be physically prevented from moving around and into the basin area. The protective Mitigation Measures MM BIO-1, MM BIO-2, MM BIO-3, MM BIO-4, and MM BIO-5 would avoid and minimize any impacts associated with Proposed Project activities. Therefore, the potential impacts to wildlife movement and corridors are anticipated to be less than significant. Additionally, Proposed Project alternatives that significantly reduce impacts to existing vegetation have been evaluated.

The Proposed Project is not located in a currently adopted Significant Ecological Area (SEA). The Los Angeles County Department of Regional Planning is currently in the process of updating the SEA Program. The Proposed Project is located within the Proposed Altadena Foothills and Arroyos SEA. Regional Planning's SEA updates including the Proposed SEAs have not been adopted, nor are they covered under the current Hillside Management Area and SEA Ordinance.

The SEA does not change the land use designation or the zoning of a property. The intent of the proposed SEA regulations is not to preclude development but to allow limited, controlled development

that does not jeopardize the unique biotic diversity within the County. Under the Ordinance for the Proposed SEA, safety activities and existing permitted uses are exempt.

As discussed in the Draft EIR, Section 3.12.6, Land Use and Planning, the Proposed Project will not have any significant impacts or conflict with the applicable land use plans, policies, or regulations of adopted plans.

Response to Comment 179-36:

See Responses to Comments 179-34 and 179-35.

Response to Comment 179-37:

See Responses to Comments 179-14, 179-15, and 179-34. Alternative 3, Configuration D, which was found to be the Environmentally Superior Alternative in the Draft EIR, was based on the City of Pasadena's Hahamongna Watershed Park Master Plan (HWPMP). As discussed in the Draft EIR, Subsection 3.12.3, Applicable Regulations, the HWPMP emphasizes protection of recreational and natural resources as well as the management of flood control for the downstream watershed. Key to determining the consistency of the project with the HWPMP is the conformance with the plans Goals and Objectives. As identified in the Applicable Regulations portion of the Existing Conditions, Goal 2 and Goal 6 are the most crucial in determining conformance. These Goals focus on the basin being "managed to provide protection to the developed and natural downstream areas and providing a safe and secure park." The Proposed Project will manage the flood control basin for protection of the downstream areas by improving and maintaining the flood capacity behind Devil's Gate Dam. LACFCD has met and will continue to meet with the City of Pasadena regularly to coordinate and ensure resolution of concerns regarding Devil's Gate Reservoir and the HWPMP.

The Spirit of the Sage Council Settlement pertains to City's implementation of the HWPMP. The Proposed Project is not one of the HWPMP projects.

Response to Comment 179-38:

See Response to Comment 179-37.

Response to Comment 179-39:

Exhibit noted. LACFCD notes that the HWPMP is an important policy document for the area, including the Proposed Project site. Analysis of consistency with the HWPMP was included in the Draft EIR, Section 3.12 Land Use and Planning. The Proposed Project will not permanently destroy, render useless, or eliminate any of the projects mentioned. LACFCD has met and will continue to meet with the City of Pasadena regularly to coordinate and ensure resolution of concerns regarding Devil's Gate Reservoir and the HWPMP.

Response to Comment 179-40:

The cumulative analysis contains projects as determined by LACFCD and the surrounding cities and communities to have a potential cumulative effect due to overlapping timeframes of the projects. Potential projects that were determined to be outside the area of influence, sediment-removal phase of the project schedule, or lacking sufficient project detail, were not considered to be reasonable

foreseeable probable future projects, as set forth in the CEQA Guidelines Section 15130.Although the scope of the Multi-Benefit/Multi-Use (MBMU) Project is being redone, the project was identified by the City of Pasadena as needing to be included in the cumulative impact analysis.

Since the scope of the MBMU Project is being redone, the specifics of any potential tree or vegetation removal are not available; however, the Draft EIR states that It is possible that this project could result in impacts to special status species, riparian habitat and other sensitive natural communities; the movement of native resident or migratory wildlife species; and city-protected trees, resulting in significant cumulative impacts. Implementation of Mitigation Measures MM BIO-1 through MM BIO-8 will reduce the Proposed Project's contribution to cumulative impacts to a level below significance.

Any impacts to the proposed Perimeter Trail were not included in the Draft EIR, as it is one of the improvements previously proposed under the Hahamongna Watershed Park Multi-Benefit/Multi-Use (MBMU) Project, not an existing trail at the site. No designated trails will be permanently closed due to implementation of the Proposed Project. See Response to Comment 179-14.

Response to Comment 179-41:

See Response to Comments 179-14 and 179-40.

Response to Comment 179-42:

Mitigation Measure MM LAN-1 reduces the temporary impacts to trails during the sediment removal period. Once sediment removal is complete, the reservoir will be reopened for recreational use. None of the designated trails will be permanently impacted; thus, no mitigation measures are required for permanent impacts. See Response to Comment 179-14.

Response to Comment 179-43:

As discussed in mitigation measures MM-BIO-6 through MM-BIO-8, a combination of onsite and offsite habitat restoration and enhancement will occur. This will include allowing riparian and other sensitive habitat to reestablish. Habitat restoration/enhancement will include use of willow cuttings for reestablishment and exotic species removal. Ruderal habitats within the basin shall be utilized whenever possible as mitigation sites. The LACFCD is continuing to work closely with CDFW and the U.S. Army Corps of Engineers (USACE) to identify appropriate sites for restoration and enhancement that will offset impacts and allow for sensitive habitat to recover naturally within the Proposed Project site but also to conserve and protect mitigation areas.

Response to Comment 179-44:

See Response to Comment 179-43.

Response to Comment 179-45:

See Response to Comment 179-43.

Response to Comment 179-46:

Alternative 3, Configuration D, the Environmentally Superior Alternative from the Draft EIR, carefully balances flood control needs and reductions in impacts to habitat by restoring the required reservoir capacity while also minimizing the project footprint (see Section 4.6 of the Final EIR). Furthermore, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2 has even further reduced the project's footprint of 120 acres down to 71 acres and would avoid excavation of the western branch, which was previously the only potential for conflict with the City's proposed westside spreading basins.

As stated in the Draft EIR, the Proposed Project will remove accumulated sediment deposits within the reservoir. This means the percolation characteristics of the reservoir will stay the same, if not improve; and the reservoir will still permit penetration of rainfall and percolation of local runoff to replenish the groundwater basin. Sediment removal will restore Devil's Gate Reservoir to its current design standard of the ability to contain two DDEs. As such, the reservoir will have the ability to contain more of the local runoff, which in turn could result in more runoff penetrating into the ground in the Proposed Project area and subsequently recharging the groundwater basin. In addition, by keeping the reservoir clear of future sediment deposits, the Proposed Project will reduce the potential for accumulated sediments to negatively impact the percolation rate.

Response to Comment 179-47:

LACFCD recognizes that the area is an important area for recreation, as discussed in Section 3.15, Recreation/Public Services. Information regarding MACH 1 has been added to the Final EIR. LACFCD notes that MACH 1 is a therapeutic riding program that is a PATH-certified facility. The Proposed Project will not limit the use of the Oak Grove area of Hahamongna Watershed Park. Sediment removal activities would be temporary and are expected to occur only in the drier months (April to December, excluding holidays). It is expected that these activities will often not be adjacent to the Oak Grove area of Hahamongna Watershed Park. The Proposed Project would result in temporary limitations on the recreational use of the Proposed Project site and some of the adjacent trails. Most of these areas would be reopened seasonally or intermittently throughout the sediment removal process. Therefore, the maximum impacts to the recreational users of Hahamongna Watershed Park would be much shorter than the five-year duration of the sediment removal phase of the Proposed Project.

Alternative 3, Configuration D affects the least amount of reservoir area of all the action alternatives, while still achieving the Proposed Project objectives (see Section 4.6 of the Final EIR). This alternative would provide a buffer between the Oak Grove area of Hahamongna Watershed Park and the excavation area. In addition, the maintenance areas would be smaller than the original sediment removal footprint, allowing for habitat to reestablish.

Response to Comment 179-48:

The Draft EIR, Section 3.15, discusses the recreational users of the Hahamongna Watershed Park and analyzes the impacts to them.

Response to Comment 179-49:

The Draft EIR, Section 3.14 Noise and Vibration provides a comprehensive evaluation of noise from the Proposed Project. The analysis provides construction noise levels for the nearby sensitive receptors, for

both onsite noise and project traffic noise; however, as noted in the Draft EIR, the project will comply with all noise ordinances; thus, impacts will be less than significant. Vibration impacts were mitigated through Mitigation Measure MM N-1.

Response to Comment 179-50:

The Draft EIR analyzed the noise impacts from onsite construction equipment through utilization of the FHWA's Roadway Construction Noise Model (RCNM). The RCNM was developed through noise measurements taken of various types of construction equipment operating during the construction of the Central Artery Tunnel project in Boston. The RCNM accounts for all types of noise created from off-road equipment, including warning alarms. The Draft EIR found that through adherence with all applicable noise regulations, the Proposed Project would result in a less than significant impact from onsite construction noise impacts.

The Draft EIR was prepared based on the methodology recommended by the State of California, which provides a set of CEQA checklist questions. The first checklist question for noise asks if the Proposed Project would expose persons to or generate noise levels in excess of standards established in the local general plan or noise ordinance. As detailed in the Draft EIR, the City of Pasadena's General Plan and Municipal Code noise ordinance exempts construction noise that occurs during allowed times, so construction noise was not quantified in addressing this impact. Construction noise was quantified, however, in the analysis of the third noise question that addresses temporary increases in ambient noise levels.

The Proposed Project was designed to limit the backing up of trucks, as the trucks will enter at one access road and exit at a separate access road to encourage circular flow. The backup beeps on the trucks and equipment are an Occupational Safety and Health Administration (OSHA) requirement, with the priority being to protect the safety of both the workers onsite and the general public.

It should be noted that construction activities would be temporary and would not occur year-round. The sediment removal would occur throughout the reservoir in phases, not continuously adjacent to all of the surrounding areas. Therefore, the maximum exposure to construction noise would be much shorter than the five year-duration of the sediment removal phase of the Proposed Project.

Response to Comment 179-51:

Impacts to recreation were adequately analyzed the in Draft EIR, Section 3.15, Recreation/Public Services.

Response to Comment 179-52:

See Response to Comment 179-14.

Response to Comment 179-53:

See Responses to Comments 179-14, 179-41, and 179-42. As noted in the Draft EIR, maintenance roads within the basin are used by LACFCD, Southern California Edison (SCE), and the City of Pasadena, among others, for operations and maintenance of Devil's Gate Reservoir and other facilities in the area. The Draft EIR notes that these roads are used as unofficial trails when reservoir water levels and conditions permit. These maintenance roads are not designated as trails by the City of Pasadena or any other public

agency. For safety, LACFCD encourages all recreational users of Devil's Gate Reservoir to use the designated trails.

Response to Comment 179-54:

See Responses to Comments 179-14, 179-41, 179-47, and 179-52.

No official disc golf course holes located in the Oak Grove area of Hahamongna Watershed Park will be removed by the Proposed Project. As noted in the Draft Environmental Impact Report (EIR), Section 3.15, LACFCD recognizes the importance of the area to those who take advantage of the recreational opportunities offered, including the Oak Grove Disc Golf Course. The Proposed Project boundary overlaps with only two, unofficial holes on the disc golf course, not half as stated in the commenter's letter. Where possible, LACFCD will avoid any disc golf course holes located outside the Oak Grove area of Hahamongna Watershed Park. When avoidance is not possible, LACFCD will coordinate with the Oak Grove Disc Golf Club for removal of the disc golf hole equipment. The Oak Grove area of Hahamongna Watershed Park and the associated facilities would remain open during sediment removal and would continue to provide active recreational facilities to the area. In addition, Alternative 3, Configuration D, Option 2 will also avoid all currently existing Oak Grove Disc Golf Club holes.

Response to Comment 179-55:

See Responses to Comments 179-14, 179-47, and 179-54.

Response to Comment 179-56:

Exhibit noted. See Responses to Comments 179-14, 179-47, 179-53, and 179-54. The trails were designated by the City of Pasadena, as shown on the City of Pasadena Department of Public Works' Arroyo Seco Trail Map. The names do not correspond to the Hahamongna Watershed Park Master Plan trail names, as many of those trails were proposed as part of the Hahamongna Watershed Park Master Plan and are not officially existing trails at this time. As seen on the Arroyo Seco Trail Map, the maintenance roads within the reservoir are not considered trails by the City of Pasadena Department of Public Works. Baseline recreation opportunities, including the use of maintenance roads as unofficial trails, were described in the Draft EIR, Section 3.15, Recreation/Public Services.

Response to Comment 179-57:

The Draft EIR, Section 3.16, and Appendix J, Traffic Report, adequately analyzed the traffic impacts of the Proposed Project. This analysis studied freeway segments, on/off-ramps, and the local roadways that could potentially be impacted.

Response to Comment 179-58:

As discussed in the Draft EIR, Section 3.16, and Appendix J, Traffic Report, the volumes on Interstate 210 (I-210), on/off-ramps, and the local roadways within the study area included those potentially impacted by the Proposed Project. The analysis included a conservative project condition volume that accounts for expansion and regional growth within the study area. The volumes account for redistribution of traffic.

Response to Comment 179-59:

LACFCD notes the suggestions made by Caltrans in their scoping letter. Although the broad suggestion was made to avoid peak traffic hours, Mitigation Measures MM TRA-1 and MM TRA-2 are provided to reduce the specific significant impacts that the Proposed Project would cause on the haul routes. LACFCD will continue to work with local organizations and the Cities of Pasadena and La Cañada Flintridge and the community of Altadena to minimize traffic impacts around the project site.

Response to Comment 179-60:

The Devil's Gate Water Conservation Project was included in the cumulative traffic analysis. The Project Year 2014 Model also included an annual increase factor of 4.5 percent, totaling 9 percent for 2 years. This is a conservative estimated growth factor to account for any construction improvements and cumulative projects expected to occur in the surrounding area.

Response to Comment 179-61:

Any haul routes, access roads, and staging areas to be used for the Proposed Project are clearly stated in the Draft EIR, Section 2.5.1. The air quality management requirement of limiting vehicular activity to established unpaved roads (haul routes) refers to the offsite hauling of sediment. No new permanent offsite roads will be constructed for the Proposed Project. Onsite, existing maintenance roads within the Proposed Project area will be used as appropriate; however, truck traffic within the sediment removal area will be subject to grading activities at any given time or will vary with the conditions at the site. All traffic and recreational impacts, including those associated haul routes, access roads, and staging areas associated with the Proposed Project, have been analyzed in Sections 3.15 and 3.16, respectively.

Response to Comment 179-62:

As noted in the Draft EIR, Section 2.5 Proposed Project Description, trucks will utilize two access roads (one existing and one upgraded) at the southern portion of the reservoir. Only a small portion of the access roads entering and exiting the reservoir will be paved. Please see section 2.5.1 of the Draft EIR for further information on the access roads.

Response to Comment 179-63:

See Response to Comment 179-62. The Traffic Impact Analysis considered the freeway segments that would be impacted by the proposed haul routes. Since trucks would remain on the freeway through the referenced cities, including East Pasadena, Arcadia, and Monrovia, no intersections would be impacted in those areas. While the majority of the sediment disposal and associated truck traffic is expected to go to the disposal sites east of the Proposed Project, the Draft EIR also analyzed the use of disposal sites west of the Proposed Project. This will allow for flexibility in case one particular route is temporarily unusable.

Reduced hours and reduced rate alternatives can decrease the efficiency of the sediment removal operations and increase the project duration. LACFCD proposed a project duration of five years to reduce accumulated sediment in a timely fashion. The goal of LACFCD is to restore reservoir flood capacity as soon as feasible while reducing costs, minimizing the duration of environmental and construction impacts to the surrounding communities, and configuring the reservoir to allow for

sustainable future maintenance. Extending the project would prolong the flood risk to downstream communities and increase the construction impacts to the surrounding communities.

See Responses to Comments 179-14, 179-60, 179-61, and 179-62.

Response to Comment 179-64:

See Response to Comment 179-10. Many of the projects listed in the Hahamongna Watershed Park Master Plan will not be implemented until after the Proposed Project sediment removal phase is complete. LACFCD has met and will continue to meet with the City of Pasadena regularly to coordinate and ensure resolution of concerns regarding Devil's Gate Reservoir and the HWPMP.

Response to Comment 179-65:

Table ES-1 of the Draft EIR lists all Mitigation Measures proposed for the Proposed Project. These Mitigation Measures are enforceable and designed to reduce impacts through methods known to be feasible and effective. The Proposed Project's Mitigation Measures are accepted by agencies that would be involved in consultation, negotiation, and final approval of Mitigation Measures, including conceptual restoration plans. As with any project that involves California Department of Fish and Wildlife (CDFW), U.S. Army Corps of Engineers (USACE), and the Regional Water Quality Control Board (RWQCB) jurisdictional areas, the ultimate mitigation for impacts related to the wetlands and drainages under the jurisdiction of the resource agencies is negotiated with the resource agencies during the regulatory permitting process. LACFCD has been and will continue to work closely with CDFW and USACE to identify appropriate mitigation, replacement ratios, and sites for restoration and enhancement that will offset impacts and satisfy the requirements of all applicable laws. A detailed restoration plan will be prepared and provided to CDFW and USACE for review and approval prior to ground disturbing activities. Mitigation locations will comply with CDFW recommendations as follows: first, onsite; second, offsite within the Arroyo Seco Watershed; and third, offsite within the greater Los Angeles River watershed. If offsite mitigation sites are needed, several offsite areas within the Arroyo Seco/Los Angeles River watershed are being considered for restoration. Prior to commencement of the Proposed Project, LACFCD will have obtained all necessary permits for impacts to CDFW, USACE, and RWQCB jurisdictional areas including Section 401 Certification, Section 404 permit, and a Streambed Alteration Agreement. Clean Water Act Section 404 (b)(1) guidelines will be followed as a framework for compensatory mitigation. Through 404(b)(1) negotiations with USACE and negotiations with CDFW under Fish and Game Code Sections 1600-1616, a determination of the functions and values of impacted jurisdictional waters shall result in the coordination of appropriate mitigation measures for sediment removal.

See Response to Comments 179-4 and 179-34.

The County of Los Angeles Board of Supervisors will be the agency that provides approval of the Project and EIR. The Final EIR for the Proposed Project has incorporated all feasible mitigation measures and has mitigated significant impacts to the extent feasible. Prior to implementation of the Proposed Project, the County of Los Angeles Board of Supervisors must consider the EIR; must certify the EIR; and must adopt the Findings of Fact, Mitigation Monitoring Program, and a Statement of Overriding Considerations.

Response to Comment 179-66:

See Response to Comments 179-4, 179-18, 179-23, 179-32, 179-54, and 179-65.

The Draft EIR, Section 3.6.6, describes the expected vegetation post sediment removal. A detailed restoration plan will be prepared and will include and address noxious weed management, monitoring, and success criteria. Oak tree root protection zones will delineated with flagging approximately 6 feet from the canopy drip line and monitored for avoidance.

Mitigation Measure MM LAN-1 is provided for temporary impacts to land use and recreation. No permanent impacts will occur to designated recreational facilities.

Response to Comment 179-67:

See Response to Comments 179-14, 179-18, 179-20, 179-32, 179-54, and 179-66.

Response to Comment 179-68:

See Response to Comment 179-4.

Response to Comment 179-69:

Exhibit noted. See Response to Comments 179-14 and 179-40.

Figure 3.15-2: Devil's Gate Area Designated Trails depicts the existing trails within the reservoir. This figure is based on the City of Pasadena Department of Public Works' Arroyo Seco Trail Map.

Response to Comment 179-70:

See Response to Comments 179-14 and 179-40.

As noted above, the source of the trail names and locations is the City of Pasadena Department of Public Works' Arroyo Seco Trail Map. Names for trails referred to as secondary trails on the Arroyo Seco Trail Map were taken from the HWPMP Exhibit 2-12 Hiking and Equestrian Trails.

Response to Comment 179-71:

See Response to Comments 179-14 and 179-41.

Response to Comment 179-72:

Exhibit noted. See Response to Comment 179-25.

Response to Comment 179-73:

See Response to Comment 179-4.

Response to Comment 179-74:

As discussed in the Draft EIR, Section 4.5, Alternative 2, Configuration C, the degrading of LOS at intersections, freeway segments, and freeway on- and off-ramps described above under TRANSPORTATION-2 could affect buses using the existing roadway network. This would be a potentially significant impact. This impact would be increased compared to the Proposed Project due to the increase in sediment removal volumes and the associated increase in removal duration. No increased

conflict with bike and pedestrian facilities is associated Alternative 2, Configuration C or the Proposed Project.

Response to Comment 179-75:

See Response to Comment 179-24.

Response to Comment 179-76:

While it is a combined junior/senior high school, this school is identified as **La Cañada High School by the** La Cañada Unified School District and is therefore correctly identified in the Draft EIR. The Child Education Center has been added to the Final EIR, see Section 3.5 Air Quality, under Sensitive Receptors.

Response to Comment 179-77:

Cumulative projects described under Air Quality-6, are the projects that could be under construction during the same time period (Hahamongna Watershed Park MBMU Project, Metro Gold Line Foothill Extension, Arroyo Seco Canyon Project, and Devil's Gate Water Conservation Project). The temporary use of the Rose Bowl by the NFL is not a construction project. In addition, cumulative air quality impacts associated with traffic is based on cumulative traffic which included the temporary use of the Rose Bowl by the NFL. Also, as discussed in the Draft EIR, all cumulative projects would be required to comply with the SCAQMD's air pollution control measures and rules.

Response to Comment 179-78:

See Response to Comment 179-69.

Response to Comment 179-79:

See Response to Comment 179-4.

Response to Comment 179-80:

Additional information regarding the MACH 1 facility has been added to the Final EIR, see Section 3.12 Land Use and Planning under 3.12.2 Existing Environmental Setting and Section 3.15 Recreation/Public Services under 3.15.2 Existing Environmental Setting..

Response to Comment 179-81:

LACFCD goes to great lengths to lessen project impacts and maximize efficiencies. As such, many of the points in the Arroyo Seco Foundation's four-point "Slow Program" are compatible with the LACFCD Proposed Project.

For example, the Draft Environmental Impact Report (EIR) concluded that Alternative 3 is the Environmentally Superior Alternative. Alternative 3 , Configuration D, Option 2 drastically reduces the project's footprint of 120 acres down to 71 acres. Additionally, the limited maintenance area for Alternative 3 further reduces the permanent habitat impacts down to approximately 51 acres by allowing for site replanting and mitigation to take place within the reservoir footprint. This reduction in project acreages will greatly lessen environmental impacts of the Proposed Project.

LACFCD strives to achieve an efficient, low-cost sediment removal project. Sediment removal rates and trucking operations, now utilizing all low-emissions trucks, as explained in Section 3.5 of the Draft EIR, have been carefully planned for economies of scale to realize maximum efficiencies without major delays in project schedule, thus greatly reducing operating costs. Furthermore, LACFCD has applied for and received an approximately $28 million grant through the State's Disaster Preparedness and Flood Protection Bond Act of 2006 (Proposition 1E) program. A portion of this grant will be used to help offset the Proposed Project's costs.

While sluicing is not a viable project alternative, as explained in Section 4.7 of the Draft EIR, Flow Assisted Sediment Transport, or FASTing, will be used for maintenance after the project's main sediment removal phase has been completed, as described in Section 2.5.2 of the Draft EIR.

For a more detailed response to the Arroyo Seco Foundation's four-point "Slow Program", please see the response to the Arroyo Seco Foundation's comment letter (Comment Letter #216, Response to Comment 216-16).

Response to Comment 179-82:

LACFCD has taken community input into consideration when drafting the Alternatives. Outside experts, especially those on the Stakeholder Task Force, were consulted during the formation of the LACFCD's Sediment Management Strategic Plan. Information from that consultation was used in the formulation of the Proposed Project and Alternatives. In addition, the purpose of the scoping process was to gather input from outside experts, cities, and agencies as well as the public on what the environmental analysis should consider and what alternatives should be analyzed. Information gathered from the scoping process was used in the formulation of the Proposed Project and Alternatives and preparation of the Draft EIR. All comments and exhibits are noted and will be provided to the County of Los Angeles Board of Supervisors.

Friends of the Los Angeles River

January 21st, 2014

Gail Farber, Director, L.A. County
Dept. of Public works
P.O. Box 1460
Alhambra, CA 91802

Comment Letter #180

RE: Devil's Gate Reservoir Sediment Removal Draft EIR

Dear Ms. Farber,

As President and Founder of Friends of the Los Angeles River (FoLAR), I am submitting comments regarding the Draft Environmental Impact Report (DEIR) for the Devil's Gate Reservoir Sediment Removal and Management Project issued by the Los Angeles County Department of Public Works on October 23, 2013. Comment 180-1

Comment 180-2

The DEIR fails to identify and quantify the downstream flood threat as well as steps that could be taken to reduce that threat. This is a major concern to FoLAR as it could impact the now and future plans of the Los Angeles River. The DEIR acknowledges that there will be impacts on air quality, yet the DEIR is unclear that steps will be taken to reduce impacts to biological resources and the surrounding communities including the Los Angeles River. We at FoLAR urge to County to find ways to work with natural forces in their management strategy, and to cooperate with the stakeholders to achieve this goal. The DEIR fails to provide genuine alternatives to the project by considering alternate methods of sediment management. The DEIR provides no rationale for permanent destruction of more than 50% of the biologically diverse habitat within the basin, a key piece of wildlife corridor revitalization planned in the US Army Corps Arroyo Seco Study and documented breeding home to avian endangered and sensitive species. To summarize, there are serious gaps in the current DEIS. I strongly urge you to reject the DEIR in its current form and instruct LA County Flood Control District to perform the required further environmental analysis. Alternatives considered in the DEIR vary as to the amount of sediment to be removed (2.4 – 4.0 million cubic yards), where the excavation would occur, and different routes the trucks might take. All of the alternatives include a permanent 50- to 120-acre sediment maintenance area in the streamzone that will be stripped of vegetation each fall. Alternatives do not consider other methods of sediment removal, amounts or additional timeframes for achieving the target reservoir capacity within the Hahamongna basin, part of the Los Angeles River Watershed. The Devil's Gate Reservoir Sediment Removal and Management Project will have important implications for the management of rivers and flood facilities in Southern California for many decades to come, including those downstream.

Comment 180-3

Comment 180-4

Comment 180-5

Comment 180-6

Sincerely,

Lewis MacAdams
President/Founder

FoLAR
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Tel: 323-223-0585
www.folar.org
E-mail: contact@folar.org

Response to Comment Letter #180 (Friends of the Los Angeles River)

Response to Comment 180-1:

Thank you for your input. This comment has been noted and will be provided to the Los Angeles County Board of Supervisors for their consideration. The comments have been noted and have been responded to below.

Response to Comment 180-2:

The Los Angeles County Flood Control District (LACFCD) was mandated by the State Legislature to provide flood protection and water conservation within its boundaries.

A reservoir storage design capacity of two design debris events (DDEs) below the dam's lowest spillway was determined to be the standard acceptable level of risk at Devil's Gate Dam and Reservoir. The DDE volume of capacity is determined using the January 2006 Los Angeles County Department of Public Works (LACDPW) Hydrology Manual and the March 2006 LACDPW Sedimentation Manual. For Devil's Gate Dam and Reservoir, the required reservoir capacity is 4.0 million cubic yards (cy) (two DDEs) below the spillway elevation of 1,040.50 feet.

The Hydrology Manual (January 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_Hydrology_Manual/2006%20Hydrology%20Manual-Divided.pdf

The Sedimentation Manual (March 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_sedimentation_manual/Sedimentation%20Manual-Second%20Edition.pdf

Additional information concerning DDE calculation methods has been added to the Final Environmental Impact Report (EIR), Section 2.3, Project Need.

Given the current, limited capacity of the reservoir, a 50-year storm event that results in a DDE would result in storm flows with sediment flowing over the spillway. Flooding with mud/sediment would occur along portions of the Arroyo Seco in the Cities of Pasadena, South Pasadena, and Los Angeles, impacting approximately 650 parcels and requiring closure of Interstate 110 from Orange Grove Avenue to Interstate 5. Additional information about the potential flood areas and analysis is shown in the Arroyo Seco Channel Hydraulic Analysis prepared by Bureau Veritas North America, Inc., available on the Project website. Please note that protocols are in place to monitor storms, reservoir conditions, and channel conditions and to communicate with emergency responders and Caltrans to execute any necessary evacuations or freeway closures.

LACFCD is undertaking this project to restore acceptable levels of flood protection to the downstream communities.

Air quality and noise impacts associated with truck traffic were analyzed in the Draft EIR in Sections 3.5 and 3.14, respectively. As discussed in the Draft EIR, Section 3.14, with implementation of Mitigation Measure MM N-1, noise impacts would be reduced to a level of less than significant. LACFCD has conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed the United States (U.S.) Environmental Protection Agency's (EPA's)

2007 standards for emissions. Therefore, in order to further reduce emissions, Mitigation Measure MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump trucks that meet or exceed EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality, including those associated with health effects, will be reduced to less than significant.

As discussed in Section 3.6.6 of the Draft EIR, Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats.

The Proposed Project is designed to be a long-term plan, with the reservoir management phase providing management for future sediment inflows. After the sediment removal phase has occurred, Flow Assisted Sediment Transport, or FASTing, is proposed to be an integral part of the annual maintenance at Devil's Gate. Annual FASTing operations will be implemented to reduce future buildups of sediment in the reservoir and to reduce the need for mechanical removal of sediment from the reservoir. Although FASTing is expected to be an effective means of keeping sediment levels low in the reservoir, it is estimated that typically 13,000 cy of sediment will be removed by excavation annually; however, a maintenance regime that relies on FASTing greatly reduces the need for and extends the life of future and existing sediment placement sites and improves the future sustainability of the reservoir. Please see Section2.5.2 of the Draft EIR for more information on future maintenance.

The Draft EIR analyzed a range of sediment removal amounts and configurations aimed at addressing the diverse concerns of stakeholders. The alternatives presented in the Draft EIR represent the best options available to respond to stakeholders' concerns while adequately reducing flood risk to downstream communities. The Draft EIR, Section 4, fully analyzed six alternatives including the No Project Alternative. These alternatives substantially lessen one or more significant effects of the Proposed Project and, with the exception of the mandatory No Project Alternative, would feasibly attain most of the basic objectives of the Proposed Project. These alternatives include options for different amounts of removal, different methods of removal, and a different haul route.

Response to Comment 180-3:

See Response to Comment 180-2. Sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays). In addition, sediment removal activities would not completely block the Proposed Project site from surrounding habitat, would occur only during the day, and would not interfere with nighttime wildlife activity. Although some wildlife may be temporarily displaced during construction, wildlife would not be physically prevented from moving around and into the basin area. The protective Mitigation Measures MM BIO-1, MM BIO-2, MM BIO-3, MM BIO-4, and MM BIO-5 would avoid and minimize any impacts associated with Proposed Project activities. Therefore, the potential impacts to wildlife movement and corridors are anticipated to be less than significant.

Alternative 3, Configuration D affects the least amount of habitat of all the action alternatives while still achieving Proposed Project objectives (see Section 4.6 of the Final EIR). This alternative would provide a buffer on the west side of the reservoir that would allow for the movement of wildlife. Alternative 3, Configuration D, Option 1 provides a more natural configuration for the reservoir by having two branches to carry water and sediment toward the face of the dam, avoiding disturbing a significant portion of existing vegetation. To further reduce the Proposed Project's footprint, LACFCD has added an

optional configuration for this Alternative. Alternative 3, Configuration D, Option 2, which drastically reduces the project's footprint of 120 acres down to 71, would avoid excavation of the western branch, thereby providing a greater habitat buffer on the west side of the reservoir. In addition, the maintenance areas would be smaller than the original sediment removal footprint, allowing for habitat to reestablish and providing additional areas for wildlife movement.

Response to Comment 180-4:

LACFCD notes that the commenter does not support the Draft EIR in its current form.

Response to Comment 180-5:

Pursuant to Section 15126.6(a) of the California Environmental Quality Act (CEQA) Guidelines, "[a]n EIR shall describe a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project, and evaluate the comparative merits of the alternatives." However, "[a]n EIR is not required to consider alternatives which are infeasible" (CEQA Guidelines Section 15126.6(a)) or "which could change the fundamental nature of the proposed project." (*Al Larson Boat Shop, Inc. v. Board of Harbor Comm.*(1993) 18 Cal.App.4th 729, 745.) The alternatives discussed in the EIR must be reasonable alternatives, selected to foster informed decision-making and public participation (CEQA Guidelines 15126.6(a)). An EIR need not consider an alternative whose effect cannot reasonably be ascertained or whose implementation is remote and speculative because unrealistic alternatives do not contribute to a useful analysis (CEQA Guidelines 16126.6(f)(3)). Additionally, an alternative may be rejected from detailed analysis in an EIR if it fails to reduce or avoid the project's significant environmental effects, does not implement the basic project objectives, is not potentially feasible, or is facially unreasonable. 14 C.C.R. §15126.6(c); Id., see also *Mann v. Community Redevelopment Agency* (1991) 233 Cal. App. 3d 1143; *Del Mar Terrace Conservancy, Inc. v. City Council* (1991) 10 Cal. App. 4th 712.

As noted above, the alternatives analysis does include other methods of sediment removal as seen in Alternative 4, Sluicing. The alternatives do not consider an extended time frame for removing the sediment, as one of the Proposed Project objectives is "supporting dam safety by removing sediment accumulated in the reservoir in a timely manner to ensure the ability to empty the reservoir in the event of a dam safety concern."

LACFCD proposed a project duration of five years to reduce accumulated sediment in a timely fashion. The goal of LACFCD is to restore reservoir flood capacity as soon as feasible while reducing costs, minimizing the duration of environmental and construction impacts to the surrounding communities, and configuring the reservoir to allow for sustainable future maintenance. Extending the project would prolong the flood risk to downstream communities and increase the construction impacts to the surrounding communities.

Response to Comment 180-6:

Comment noted.

Hugh Bowles
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Altadena, CA 91001
hsbowles@yahoo.com

County of Los Angeles Department of Public Works Water Resources Division
Attn: Reservoir Cleanouts Program
P.O. Box 1460 Alhambra,
CA 91802-1460
reservoircleanouts@dpw.lacounty.gov

January 17, 2014

Re: Response to Draft EIR for the Devil's Gate Reservoir Sediment Removal and Management Project.

To the Reservoir Cleanouts Program:

This letter covers questions on the environmental review contained in the DEIR for the clean out debris from behind the Devil's Gate Dam.

I have lived in the vicinity of the project site for 24 years. During that period I have engaged with the County and City on approaches to work with not against the natural processes in the basin and to alleviate impacts on the local community. This started with a letter to Ron Perdigo, then director of LACODPW, in 1993 requesting that the banks of the spreading basins were not mown until after the nesting and nursery season for wildlife. Subsequent engagement involves addressing issues with inappropriate projects and non-compliance with the CEQA process. In 2013 I raised issues with the City of Pasadena's application for a $1MM grant to construct a playing field in Hahamongna, this assisted the transfer of that money from a natural area to John Muir High School. I was awarded the Council of Arroyo Seco Organizations "Citizen Activist" award for 2013.

Comment 181-1

I divided the letter into sections. Each section has numbered questions in need of an answer. In the response, please indicate the section and question number being answered.

A. Consideration of Alternatives:

In the scoping meetings for the project there was a recommendation that the County hire experts in the field to assist with less impactful alternatives to the proposed project. This did not occur. Other than the 'No Project' alternative all solutions provided by the County have the same impacts. The County claims the impacts cannot be mitigated by

Comment 181-2

any solution; an exception is the offsite mitigation for habitat loss for which the County provides no mitigation plan. The County attempts no mitigation for noise, traffic, pollution, and ruination of what the City of Pasadena – the owners of the land – describe as "one of the last remaining natural areas in the region". When asked at the DEIR public meetings why the County did not seek outside help to develop a plan with less environmental impact, the response was: "We consider ourselves to be the experts. We do this all the time."

Comment 181-2 continued

Questions:

1. Why did the County fail to use the federal emergency funds – the project is federally funded – to seek expert assistance to find a more environmentally sensitive method for clearing the debris? From the scoping meetings, it was clear this is what the community wanted.

Comment 181-3

2. Why did the County fail to consider less impactful alternatives?

Comment 181-4

3. If the County did consider less impactful alternatives and rejected them, why did this occur? If these alternatives did not meet the County's objectives, what was the reason?

Comment 181-5

B. Environmental Impacts:

The proposed habitat loss behind the Devil's Gate dam is the inner core of a segment of contiguous habitat that allows larger mammals like coyote's and bobcats to breed. The presence of these mammals creates a unique balance within the ecosystem of the project site – for example, 50% of nest predation for the California quail stems from ground squirrels. Coyotes, bob cats, and red tailed hawks breed in the basin behind Devil's Gate dam and naturally control the ground squirrels; this enables a population of California quail to live in the basin. Ground nesting birds like the California quail are key indicator species reflecting the health of the natural environment. The project will leave a fragmented habitat unable to maintain its current diversity.

Comment 181-6

The County's plan includes actively discouraging protected bird species – red tailed and red shouldered hawks, Cooper's hawks – from nesting in the basin. Once the project is complete, even if nesting habitat on the perimeter of the project site is intact, the habitat providing a primary food source will be gone. The project will likely extirpate populations of protected species from the basin – under the law this would constitute a 'take' of those species.

1. If the County does this kind of project "all the time". What projects has the County completed where mitigation for habitat loss was conducted either off site or on site?

Comment 181-7

2. How long did these projects last, and what was the budget?

Comment 181-8

Comment 181-9

3. Who certified that the mitigation for these projects was adequate?

Comment 181-10

4. For the Devil's Gate project, how will the habitat loss be calculated?

Comment 181-11

5. Who counts the number of trees destroyed?

Comment 181-12

6. How much of the restoration will be on site, how much off site?

Comment 181-13

7. Where are the offsite locations and how large? Where are the onsite locations?

Comment 181-14

8. What consultation has the County done with the trustee agencies to mitigate for the possible 'take' of protected species from the basin as part of the project?

Comment 181-15

9. How does the County's mitigation plan provide for an equivalent restoration of habitat to support similar species diversity as currently found in Hahamongna?

Comment 181-16

10. Why is there no detailed mitigation plan in the EIR?

C. Flood Control:

Comment 181-17

Historically, the downstream flood damage occurred before the stream below the dam was channelized. The EIR appears to assume the issues of flooding and property damage are the same as prior to channelization.

Questions:

Comment 181-18

1. What calculations did the County do on the capacity of the stream below the dam to absorb high flows?

Comment 181-19

2. What assessment of downstream capacity did the County make in the calculation of how much debris needs to be removed from behind the dam? Did the capacity downstream influence the amount of debris that needed to be moved within the project period?

Comment 181-20

3. What was the scientific basis for doubling the size of the project once the Board of Supervisors demanded an EIR be completed?

Comment 181-21

When the County reinforced the dam in 1998, the spillway was lowered. This was a conscious decision on the part of the County to reduce the capacity of the dam.

Comment 181-22

1. What was the scientific thinking behind the lowering of the spillway?

Comment 181-23

2. Having purposely reduced the capacity of the dam, why does the County now have to restore the dam capacity to that prior to when the spillway was lowered?

Comment 181-24

3. Why is raising the spillway to the former level not being considered as an alternative to reduce the amount of debris removal?

D. Watershed management

The Station Fire was a human made environmental disaster. The impact was not just to the area behind the Devil's Gate Dam but the whole watershed.

On Sunday, January 12 2014, I spoke with an Angeles National Forest fire crew. I asked if there were efforts to mitigate the possibility of a 100% burn of the watershed again. They responded that it depended on funding and the funding depends on the local and federal agencies communicating. I asked if it was feasible to take measures to reduce the chance of future 100% burns. The fire crew responded:

Comment 181-25

a) The chance of a 100% burn in the foreseeable future is remote. The vegetation recovery is significantly sparser than the vegetation that burnt.
b) Even after 20 years the chance of a fire as damaging as the Station Fire would be remote.
c) With the correct funding it is "totally feasible" to create the necessary fire breaks to protect local cities and reduce the likelihood of a 100% burn occurring again.

Questions:

Comment 181-26

1. Is the County working with the Forest Service to reduce the chance of a 100% burn of the watershed? If not, why not?

Comment 181-27

2. Has the County assessed the likelihood of a 100% burn in the watershed again over the next 20 years?

Comment 181-28

3. What evidence does the County have that if there was a serious burn in the watershed again, that heavy rains would bring into the basin an equivalent amount of debris as the Station Fire?

Comment 181-29

4. The DEIR assumes there could be a 100% burn of the watershed, plus two DDEs bringing an equivalent amount of debris into the basin as the Station Fire. As the County claim to be "the experts" what expert calculations were made to conclude that this is a likely scenario within the next 5 years? Why would a fire crew from the Angeles National Forest imply that the scenario used by the County would be highly unlikely? Why are they wrong?

E. Water Quality and Conservation:

As part of the scoping process, the Raymond Basin Management District requested that the debris removal also assist with aquifer re-charge.

Comment 181-30

Question:

1. Has any consideration been given to this request? If not, why not?

On the approval of the Hahamongna Watershed Park Plan in August 2003, many development type projects on the east side of the Park were removed – widening of roads, parking lots, construction of playing fields. Council Member Joyce Streator proposed the motion to remove these projects: the basis was why would the City bring more traffic into an area that provided the City's water supply? It was inappropriate to risk traffic residues entering the water supply. The projects were removed on this basis.

Comment 181-31

The City of Pasadena receives aquifer pumping credit based on how much water it diverts from the stream into spreading ponds. However, a study by Converse Consultants West in 1997 states that the porosity of the spreading ponds is "by orders of magnitude" less than the surrounding soils in the basin. Maintaining the basins with heavy equipment compacts the soils rendering them impervious.

A further study in 2000 by Philip Williams and Associates points out that the replenishment of the aquifer is most effective during periods when water flows in the stream and collects for short periods behind the dam. They estimated that the natural stream could absorb almost all the City's current diversion before reaching the dam. The Study estimated that in a normal year aquifer re-charge could be improved by up to 160 % if re-charge occurred through the stream in conjunction with holding water for short periods behind the dam.

The City cannot claim pumping credit for water flowing in the stream and the County is not a party to the 40 year old spreading agreement. However, the scientific evidence suggests that the porous alluvium underlying the stream, and the periodic ponding of water behind the dam, is critical to aquifer re-charge. Water in the spreading basins may evaporate, but water absorbed by the stream is underground.

The proposed project will likely have two impacts on the re-charge process:

a) The running of heavy equipment in the basin will compact the underlying soils; this will reduce the ability of the stream and water behind the dam to replenish the aquifer. This is a similar scenario as found in the spreading basins; the impact of the proposed project will be more intense.

Comment 181-31 continued

b) Increased traffic in the basin was not acceptable to the City of Pasadena in 2003 due to issues of water quality. The same applies to the proposed project. The residue from truck and heavy equipment traffic will impact the quality of the water that does seep into the aquifer from the stream or the dam.

Based on this analysis the project has the potential to: "substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level".

Questions:

Comment 181-32

1. There is no assessment of the long term impact to water conductivity, and aquifer replenishment in the DEIR. Based on the scientific evidence that suggests there could be a reduction in the re-charge capability in the basin, why has the County not considered this as an impact?

Comment 181-33

2. What mitigation measures are being taken to prevent run off from the equipment in use in the basin from entering the water supply? Will there never be any fuel spills, or oil leaks over 5 years?

F. Noise and Traffic:

During the scoping meetings the community expressed a desire that the ingress and egress for the project should be on the old construction road to the west of the dam, away from the local community.

Comment 181-34

The project proposes to cut a new access off Windsor to the basin on the east side of the dam for ingress purposes. This is immediately adjacent to the local Pasadena/ Altadena neighborhood.

1. What is the reasoning for this approach?
2. What effort will be made to mitigate the pollution effects of trucks entering the basin adjacent to the neighborhood?

G. Recommendations:

To rectify inadequacies in the current DEIR the County Board of Supervisors should direct staff to:

Comment 181-35

1. Use the emergency federal funds to hire known experts in the field with experience in looking at less damaging alternatives.

2. Partner with the federal and local trustee agencies and the City of Pasadena to work out a watershed based approach to address the issues . This should include a plan to:

a. Mitigate the risk of a 100% burn of the watershed occurring in the future.

b. Remove/flush debris from the basin in a timeframe that takes into account:

Comment 181-36

i. The low likelihood of 2 DDE events with equivalent debris flows occurring within the current proposed project period – 5 years.

ii. The downstream capacity from the dam to absorb high flows.

iii. The need to preserve the conductivity of soils in the basin to maintain aquifer re-charge.

iv. The importance of preserving "one of the last remaining natural areas in the region".

c. Develop a full mitigation plan that the public can respond to and comment on.

Comment 181-37 The project should avoid turning one man made environmental disaster into a second man made environmental disaster.

Sincerely yours,

Hugh Bowles

Hugh Bowles

cc:
LA County Board of Supervisors
Pasadena City Council.
Michael Beck, Pasadena City Manager
Arroyo Seco Foundation
Pasadena Audubon Society
California Department of Fish and Game
U.S. Forest Service
Tony Zampiello, Raymond Basin Management District
Chris Holden, State Assembly Member

Response to Comment Letter #181 (Hugh Bowles)

Response to Comment 181-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

Response to Comment 181-2:

The Draft Environmental Impact Report (EIR) analyzes long-range maintenance of the reservoir under the Reservoir Maintenance phase of the Proposed Project and Alternatives. Outside experts, especially those on the Stakeholder Task Force, were consulted during the formation of LACFCD's Sediment Management Strategic Plan. Information from that consultation was used in the formulation of the Proposed Project and Alternatives. In addition, the purpose of the scoping process was to gather input from outside experts and agencies as well as the public on what the environmental analysis should consider and what alternatives should be analyzed. Information gathered from the scoping process was used in the formulation of the Proposed Project and Alternatives and preparation of the Draft EIR.

The Draft EIR analyzed a range of sediment removal amounts and configurations aimed at addressing the diverse concerns of stakeholders including concerns for long-term habitat preservation and impacts to air quality, traffic, and noise. The alternatives presented in the Draft EIR represent the best options available to respond to stakeholders' concerns while adequately reducing flood risk to downstream communities.

Table ES-1 of the Draft EIR lists all 17 of the Mitigation Measures proposed for the Proposed Project. These Mitigation Measures are enforceable and designed to reduce impacts through methods known to be feasible and effective. The Proposed Project's Mitigation Measures are accepted by agencies that would be involved in consultation, negotiation, and final approval of Mitigation Measures, including conceptual restoration plans.

As discussed in Section 3.6.6 of the Draft EIR, Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats. In addition, sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays).

As with any project that involves California Department of Fish and Wildlife (CDFW), United States Army Corps of Engineers (USACE), and Regional Water Quality Control Board (RWQCB) jurisdictional areas, the ultimate mitigation for impacts related to the wetlands and drainages under the jurisdiction of the resource agencies is negotiated with the resource agencies during the regulatory permitting process. LACFCD has been and will continue to work closely with CDFW and USACE to identify appropriate mitigation, replacement ratios, and sites for restoration and enhancement that will offset impacts and satisfy the requirements of all applicable laws. A detailed restoration plan will be prepared and provided to CDFW and USACE for review and approval prior to project implementation. Prior to commencement of the Proposed Project, LACFCD will have obtained all necessary permits for impacts to CDFW, USACE, and RWQCB jurisdictional areas including Section 401 Certification, Section 404 permit, and a Streambed Alteration Agreement. Clean Water Act Section 404 (b)(1) guidelines will be followed as a framework for compensatory mitigation. Through 404(b)(1) negotiations with USACE and negotiations with CDFW under Fish and Game Code Sections 1600-1616, a determination of the functions and values of impacted

jurisdictional waters shall result in the coordination of appropriate Mitigation Measures for sediment removal.

Air quality and noise impacts associated with truck traffic were analyzed in the Draft EIR in Sections 3.5 and 3.14, respectively. As discussed in the Draft EIR, Section 3.14, with implementation of Mitigation Measure MM N-1, noise impacts would be reduced to a level of less than significant. LACFCD has conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed the United States (U.S.) Environmental Protection Agency's (EPA's) 2007 standards for emissions. Therefore, in order to further reduce emissions, Mitigation Measure MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump trucks that meet or exceed EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality, including those associated with health effects, will be reduced to less than significant.

Potential impacts due to the Proposed Project's truck trips were analyzed in the Draft EIR, Section 3.16, Transportation and Traffic. As listed in that section, a single intersection in the immediate vicinity of the Proposed Project site will have a potentially significant impact. In practice, hauling rates and routes may be adjusted to help reduce impacts, depending on operational need. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the Proposed Project site.

Response to Comment 181-3:

See Response to Comment 181-2. No federal funds have been or will be used to fund the Proposed Project.

Response to Comment 181-4:

See Response to Comment 181-2.

The Draft EIR, Section 4, fully analyzed six alternatives including the No Project Alternative. These alternatives substantially lessen one or more significant effects of the Proposed Project and, with the exception of the mandatory No Project Alternative, would feasibly attain most of the basic objectives of the Proposed Project. These alternatives include options for different amounts of removal, different methods of removal, and a different haul route. Other alternatives were not carried forward as they did not minimize impacts in relation to the Proposed Project and/or did not meet Proposed Project objectives.

Alternative 3, Configuration D was determined to be the environmentally superior alternative that minimizes impacts while still meeting Proposed Project objectives. Alternative 3, Configuration D affects the least amount of habitat of all the action alternatives, while still achieving Proposed Project objectives (see Section 4.6 of the Final EIR). This alternative would provide a buffer on the west side of the reservoir that would allow for the movement of wildlife. Alternative 3, Configuration D, Option 1 provides a more natural configuration for the reservoir by having two branches to carry water and sediment toward the face of the dam, avoiding disturbing a significant portion of existing vegetation. To further reduce the Proposed Project's footprint, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2, which drastically reduces the project's footprint of 120 acres down to 71 acres, would avoid excavation of the western branch, thereby providing a greater habitat buffer on the west side of the reservoir. In addition, the maintenance areas would be smaller

than the original sediment removal footprint, allowing for habitat to reestablish and providing additional areas for wildlife movement. The Proposed Project is designed to be a long-term plan, with the reservoir management phase providing management for future sediment inflows. The proposed yearly cleanout of sediment after the completion of the Proposed Project will reduce the necessity for a future large-scale cleanout.

Response to Comment 181-5:

See Response to Comments 181-2 and 181-4.

Response to Comment 181-6:

See Response to Comment 181-2. Sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays). In addition, sediment removal activities would not completely block the Proposed Project site from surrounding habitat, would occur only during the day, and would not interfere with nighttime wildlife activity. Although some wildlife may be temporarily displaced during construction, wildlife would not be physically prevented from moving around and into the basin area. The protective Mitigation Measures MM BIO-1, MM BIO-2, MM BIO-3, MM BIO-4, and MM BIO-5 would avoid and minimize any impacts associated with Proposed Project activities. Therefore, the potential impacts to wildlife movement and corridors are anticipated to be less than significant.

Health of the environment is determined through many indicators, including water quality, biodiversity, and food sources. Although bobcat and coyote were observed and likely forage in the area and do contribute to ground squirrel population control, breeding areas for bobcats and coyotes were not identified within the Proposed Project area. The species recorded during surveys specifically for the Proposed Project are presented in the Biological Technical Report (BTR) in Appendix D of the Draft EIR. As discussed in the Draft EIR, Section 3.6.6, Sensitive Wildlife, to avoid harm or take of any special status wildlife species, mitigation measures MM BIO-1, MM BIO-2, MM BIO-3, MM BIO-4, and MM BIO-5 will be implemented. These include conducting preconstruction surveys, having a biological monitor on site during construction, and implementing measures to avoid impacts to sensitive species. With implementation of these mitigation measures, direct impacts to biological resources would be less than significant.

Response to Comment 181-7:

LACFCD routinely completes projects that are permitted by the various regulatory agencies and require mitigation for habitat loss. Mitigation is completed either on or off site or a combination of the two locations. Three of the larger cleanout projects that have been completed by LACFCD in the past 20 years which required mitigation are listed below:

- San Gabriel Reservoir Emergency Post-Fire Sediment Removal Project, 2004 – 2006, at a cost of approximately $35 million
- Cogswell Reservoir Phase II, 1995 – 1996, at a cost of approximately $15 million
- Big Tujunga Reservoir Cleanout, 1994 – 1995, at a cost of approximately $7 million.

Response to Comment 181-8:

See Response to Comment 181-7.

Response to Comment 181-9:

These projects underwent the California Environmental Quality Act (CEQA) process and required permitting with jurisdictional agencies. With these projects, a Mitigation, Monitoring, and Reporting Plan (MMRP) was approved as part of these processes by either CDFW, RWQCB, USACE, or the United States Forest Service (USFS), as applicable.

Response to Comment 181-10:

See Response to Comment 181-2. Methodology for analyzing impacts to biological resources, including impacts to habitat, was discussed in Section 3.6.5 of the Draft EIR. LACFCD has been and will continue to work closely with CDFW and USACE to identify appropriate mitigation ratios and sites for restoration and enhancement that will offset impacts and satisfy the requirements of all applicable laws. A detailed restoration plan will be prepared and provided to CDFW and USACE for review and approval prior to project implementation and to satisfy permitting requirements.

Response to Comment 181-11:

As noted in the Draft EIR, Mitigation Measure BIO-7, a qualified biologist shall conduct a tree survey within the project footprint to identify trees that will be removed or potentially affected by the Proposed Project and trees that can be avoided.

Response to Comment 181-12:

See Response to Comment 181-2. Mitigation locations will comply with the CDFW recommendations as follows: first, onsite; second, offsite within the Arroyo Seco Watershed; and third, offsite within the greater Los Angeles River watershed. Several offsite areas within the Arroyo Seco/Los Angeles River watershed are being considered for restoration if offsite mitigation sites are needed.

Response to Comment 181-13:

See Response to Comments 181-2 and 181-12.

Response to Comment 181-14:

See Response to Comment 181-2. Prior to commencement of the Proposed Project, LACFCD will have obtained all necessary permits for impacts to CDFW, USACE, and RWQCB jurisdictional areas including Section 401 Certification, Section 404 permit, and a Streambed Alteration Agreement.

Response to Comment 181-15:

See Response to Comment 181-2.

Response to Comment 181-16:

See Response to Comment 181-2.

Response to Comment 181-17:

LACFCD was mandated by the State Legislature to provide flood protection and water conservation within its boundaries.

A reservoir storage design capacity of two design debris events (DDEs) below the dam's lowest spillway was determined to be the standard acceptable level of risk at Devil's Gate Dam and Reservoir. The DDE volume of capacity is determined using the January 2006 Los Angeles County Department of Public Works (LACDPW) Hydrology Manual and the March 2006 LACDPW Sedimentation Manual. For Devil's Gate Dam and Reservoir, the required reservoir capacity is 4.0 million cubic yards (cy) (two DDEs) below the spillway elevation of 1,040.50 feet.

The Hydrology Manual (January 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_Hydrology_Manual/2006%20Hydrology%20Manual-Divided.pdf

The Sedimentation Manual (March 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_sedimentation_manual/Sedimentation%20Manual-Second%20Edition.pdf

Additional information concerning DDE calculation methods has been added to the Final EIR, Section 2.3, Project Need.

Hydrologic and hydraulic analyses took into consideration the Arroyo Seco's current configuration. Given the current, limited capacity of the reservoir, a 50-year storm event that results in a DDE would result in storm flows with sediment flowing over the spillway. Flooding with mud/sediment would occur along portions of the Arroyo Seco in the Cities of Pasadena, South Pasadena, and Los Angeles, impacting approximately 650 parcels and requiring closure of Interstate 110 from Orange Grove Avenue to Interstate 5. Additional information about the potential flood areas and analysis is shown in the Arroyo Seco Channel Hydraulic Analysis prepared by Bureau Veritas North America, Inc., available on the Project website. Please note that protocols are in place to monitor storms, reservoir conditions, and channel conditions and to communicate with emergency responders and Caltrans to execute any necessary evacuations or freeway closures.

Response to Comment 181-18:

See Response to Comment 181-17.

Response to Comment 181-19:

See Response to Comment 181-17.

Response to Comment 181-20:

See Response to Comment 181-17. In 2010, in response to the Station Fire, an emergency project to remove only 1.67 million cy was proposed. The volume of 1.67 million cy is the previously published DDE, and this amount was considered justifiable as an emergency exemption to CEQA. This emergency project was not completed because, in March 2011, the County of Los Angeles Board of Supervisors motioned LACFCD to complete an Environmental Impact Report (EIR) for a comprehensive sediment

removal project at Devil's Gate. LACFCD then initiated project development in accordance with the required level of protection of two DDEs. At that time, LACFCD also began receiving feedback on the concurrent Sediment Management Strategic Plan (Strategic Plan) and the interest to look at more sustainable sediment and reservoir management. As a result of the feedback and recommendations during the development of the Strategic Plan, LACFCD began evaluating ways to create a more sustainable long-term way to manage its sediment and habitat. To emphasize the goals of the project, the Proposed Project was given the name Devil's Gate Sediment Removal and Management Project.

Response to Comment 181-21:

The spillway was rehabilitated in order to pass the Probable Maximum Flood, as required by the State Division of Safety of Dams (DSOD). The rehabilitation entailed lowering the spillway bottom elevation, thereby constructing the spillway ports. The reservoir capacity below the existing spillway ports (elevation of 1,040.5 feet) is the appropriate parameter for determining the currently available capacity for meeting the sediment volume requirements for the dam. The current capacity in the reservoir below the spillway is 1.3 million cy. This is only 32.5 percent of the required storage capacity and only 65 percent of one DDE. Please note that additional sediment deposits have accumulated within the reservoir easement above the elevation of 1,040.5 feet. This accumulated sediment has the potential to be washed toward the dam during significant storm events and further reduce the available capacity below the spillway.

Response to Comment 181-22:

See Response to Comment 181-21.

Response to Comment 181-23:

See Response to Comment 181-21.

Response to Comment 181-24:

See Response to Comment 181-21.

Response to Comment 181-25:

See Response to Comment 181-17. Many factors affect the potential amount of sediment that will be deposited in a reservoir. These include the location and size of the watershed, the amount of the watershed that is developed, the amount that is undeveloped and subject to wildfire, the portion of the watershed that is "controlled" by other debris-catching facilities such as other dams or debris basins, and the frequency and intensity of storm events.

Historically, large amounts of sediment have been deposited in the reservoir in short time periods. Between 1935 and 1938 over 1.6 million cy of sediment, between 1938 and 1943 over 1.95 million cy of sediment, between 1959 and 1966 over 1.75 million cy of sediment, and between 2010 and 2012 over 1.3 million cy of sediment was deposited in the reservoir. Over 92 years, the average amount of sediment deposited each year is approximately 130,000 cy; however, Devil's Gate Reservoir is a dynamic system with constantly changing amounts of sediment deposited from year to year, depending on the frequency and intensity of storm events. Due to the dynamic nature of the system and the recent burn of the watershed, the amount could vary greatly. If a 1 in 50 years storm were to occur, approximately

2.0 million cy (one DDE) of sediment could be expected to wash into the reservoir. The 3.55 million cy of sediment that was deposited between 1935 and 1943 came in after only 31 percent of the acreage in the upper Arroyo Seco was burned. The 2009 Station Fire burned 68 percent of the acreage in the upper Arroyo Seco, not 100 percent as the commenter states. Because of LACFCD's responsibilities to provide flood protection, LACFCD must be ready at all times for a design debris event to occur. Capacities are based on a 50-year-intensity storm, or a storm that is estimated to happen once every 50 years, a 2 percent chance of occurring.

Response to Comment 181-26:

The watershed north of the Proposed Project site, including the Angeles National Forest, is outside the purview of LACFCD.

Response to Comment 181-27:

See Response to Comment 181-25.

Response to Comment 181-28:

See Response to Comments 181-17 and 181-25.

In order for the removal project to be efficient, and therefore reduce impacts and costs, the amount of sediment removed every year needs to exceed the amount of sediment deposited. If the reservoir is left in its current state, the flood risk to downstream communities would be left at an unacceptable level.

Response to Comment 181-29:

See Response to Comments 181-17, 181-25, and 181-28.

Response to Comment 181-30:

As stated in the Draft EIR, Section 3.11, the Proposed Project will remove accumulated sediment deposits within the reservoir. This means the percolation characteristics of the reservoir will stay the same, if not improve; and the reservoir will still permit penetration of rainfall and percolation of local runoff to replenish the groundwater basin. Sediment removal will restore Devil's Gate Reservoir to its current design standard of the ability to contain two DDEs. As a result, the reservoir will have the ability to contain more of the local runoff, which in turn could result in more runoff penetrating into the ground in the project area and subsequently recharging the groundwater basin. In addition, by keeping the reservoir clear of future sediment deposits, the Proposed Project will reduce the potential for accumulated sediments to negatively impact the percolation rate.

Response to Comment 181-31:

See Response to Comment 181-30. As stated in the Draft EIR, Section 3.11, the Proposed Project activities involving construction equipment will be temporary and involve the limited transport, use, disposal, and storage of fuel and lubricating oil, which are regulated by various agencies. Adequate best management practices (BMPs) will be utilized; and adherence to the regulations set forth by the County, State, and federal agencies will reduce the potential for impacts to water quality to a less than significant level. With adherence

to regulations and permit requirements and implementation of project-specific BMPs, impacts related to otherwise substantially degrading water quality would be less than significant.

Response to Comment 181-32:

See Response to Comment 181-30.

Response to Comment 181-33:

See Response to Comment 181-31.

Response to Comment 181-34:

See Response to Comment 181-2. As noted in the Draft EIR, Section 2.5.1, trucks will utilize two access roads (one existing and one upgraded) at the southern portion of the reservoir. Both access roads directly access Oak Grove Drive, not Windsor Avenue. The idea for the access road on the east side of the reservoir is taken directly from the Hahamongna Watershed Park Master Plan (HWPMP), page 3-57. This allows for a circular route through the reservoir for sediment removal.

Response to Comment 181-35:

See Response to Comments 181-2, 181-3, and 181-4.

Response to Comment 181-36:

See Response to Comments 181-2, 181-10, 181-17, 181-25, and 181-30.

Response to Comment 181-37:

Comment noted.

From:	Jim Saake
To:	reservoircleanouts
Subject:	Devil's Gate Reservoir Sediment Removal and Management Project
Date:	Sunday, January 19, 2014 8:56:20 AM

Dear DPW administrators,

Comment 182-1

I am writing to comment on the Draft EIR for the proposed sediment removal project at Devils Gate Reservoir in Pasadena/La Canada.
I have been a homeowner in La Canada since 1990.

I am OPPOSED to the current project plan. It is NOT the right solution based on the cost and environmental impact.

Comment 182-2

Below is an Op-Ed article that was published in the Los Angeles Times on Jan.17, 2014. I am in agreement with a more moderate solution to managing the sediment and mitigating the risk of a 100 year flood.

Comment 182-3

These days, the risk of a massive flood seems far from reality as California faces record drought conditions.

Respectfully submitted,
Jim Saake

++

latimes.com

Op-Ed

A smarter way to attack L.A.'s sediment problem

Massive, once-a-decade removal projects behind the county's dams are the wrong approach.

By Christle Balvin

January 17, 2014

California's coastal mountains have a compulsion to get to the sea. They are constantly sending sand and sediment downstream to the beaches. Or at least they're trying to. But today, a system of 14 dams along the foothills of the San Gabriels prevents much of the sand from reaching the shore.

The result is a slowly eroding coastline, a network of ugly concrete storm channels where streams once flowed, and an ever-increasing accumulation of earth behind the dams.

Southern California rivers are notoriously unpredictable. Raging torrents in January can be dry arroyos in July, which makes flood control difficult.

In the 1930s, after a period of major flooding in the Los Angeles basin, a group of talented engineers attempted to tame the area's rivers by creating the system of dams and channels we have today. Once viewed as an innovative solution to protecting lives and property downstream, these inland dams are now exploding with tons of accumulated sediment and a diminishing number of nearby places to dump it.

At the Hahamongna basin behind and adjacent to Devil's Gate Dam in Pasadena, where a hotly contested sediment removal project by the flood control division of the L.A. County Department of Public Works is being debated, the county has proposed removing as much as 4 million cubic yards of sediment. The project, which would destroy a thriving willow forest, would require one double-loaded dump truck to leave the excavation site each minute, six days a week between April and December, for five years. The projected cost is $68 million. And that is for just one dam.

Few of those who have studied the county's system of dams would question the need for some sediment removal to protect the public safety downstream and the integrity of the dams themselves. The situation was exacerbated by the Station fire, which left denuded hillsides that washed into dam basins during winter storms, adding some 1.6 million cubic feet of sediment to the Hahamongna basin alone. But there is growing concern about the way the county manages sediment removal and water conservation.

Allowing sediment to accumulate for more than a decade, as happened at Devil's Gate, and then playing catch-up with a massive removal project is causing strong opposition. The area is heavily used by hikers and mountain bikers, and an adjacent park has a busy Frisbee golf course and soccer field. The area abuts residential neighborhoods and is directly across the street from La Cañada High School.

Because many of the county's dams are similarly located in multi-use areas, the objections being voiced about Devil's Gate are likely to be raised again and again as the county considers managing its other sites. Many of those objecting question the wisdom of stopping the flow of sediment behind dams, only to truck it back up into foothill canyons where it doesn't belong and is unlikely to stay put.

Treating sand and sediment as something of value, the way the L.A. County Sanitation District treats sludge, would be a better way. Rather than dump sludge as a waste product, the district processes it for use in the vegetable fields of Central California.

The mountains will continue to seek the sea. And the sole purpose of L.A. County's dams should not be to stop the flow. New and creative solutions are desperately needed for managing the sediment that accumulates behind dams and the water that is diverted and often wasted over

spillways and in concrete channels.

That is why many of those commenting on the environmental impact report now circulating for Devil's Gate are asking for a fuller evaluation of other solutions before embracing a costly and environmentally reckless plan. We've called for the appointment of a blue-ribbon committee to work with county engineers on fully evaluating the options. If we don't come up with a long-range, comprehensive plan for managing both sediment and the valuable rainwater that collects behind dams, we'll find ourselves in this boat all over again in the not-too-distant future.

Massive, once-a-decade removal projects are the wrong approach. As Norman Brooks, professor emeritus of environmental and civil engineering at Caltech, put it in a statement to the county: "In the long run, a more uniform rate of removal might be preferred over the present situation with large amounts of 'catch-up.'"

Let's stop catching up and start planning for the future.

Christle Balvin is president of Hintz & Balvin Communications, which helped design earlier plans for Hahamongna. Her involvement today is as a community member.

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Response to Comment Letter #182 (Jim Saake)

Response to Comment 182-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. Los Angeles County Flood Control District (LACFCD) notes the commenter's objection to the Proposed Project.

Response to Comment 182-2:

Comment and article noted.

Response to Comment 182-3:

LACFCD was mandated by the State Legislature to provide flood protection and water conservation within its boundaries.

A reservoir storage design capacity of two design debris events (DDEs) below the dam's lowest spillway was determined to be the standard acceptable level of risk at Devil's Gate Dam and Reservoir. The DDE volume of capacity is determined using the January 2006 Los Angeles County Department of Public Works (LACDPW) Hydrology Manual and the March 2006 LACDPW Sedimentation Manual. For Devil's Gate Dam and Reservoir, the required reservoir capacity is 4.0 million cy (two DDEs) below the spillway elevation of 1,040.50 feet.

The Hydrology Manual (January 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_Hydrology_Manual/2006%20Hydrology%20Manual-Divided.pdf

The Sedimentation Manual (March 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_sedimentation_manual/Sedimentation%20Manual-Second%20Edition.pdf

Additional information concerning DDE calculation methods has been added to the Final EIR, Section 2.3, Project Need.

Since the dam was built, several periods have occurred in which a large amount of sediment was deposited in the reservoir in a short time frame. Approximately 1.3 million cy of sediment came into the reservoir in just two storm seasons after the 2009 Station Fire. Over 12.0 million cy of sediment has come into the reservoir since the dam was constructed. Over 92 years, the average amount of sediment deposited each year is approximately 130,000 cy; however, Devil's Gate Reservoir is a dynamic system with constantly changing amounts of sediment deposited from year to year, depending on the frequency and intensity of storm events.

If a 1 in 50 years storm were to occur, approximately 2.0 million cy (one DDE) of sediment could be expected to wash into the reservoir. The most sediment that was deposited during a five-year period is 3.1 million cy, which occurred between 1937 and 1942. Because of LACFCD's responsibilities to provide flood protection, LACFCD must be ready at all times for a design debris event to occur.

From: John Fauvre
To: reservoircleanouts
Subject: Silt removal proposal for Hahamongna Basin
Date: Friday, January 17, 2014 3:21:27 PM

Comment 183-1

If the risk of damage from an epic flood can be controlled, then silt removal could take place over an extended period of time. To avoid overwhelming the neighborhood with trucks, here is a conceivable alternative. Use the flood control channel during dry seasons, at night, to truck the silt to the ocean. Use a conveyor device down the face of the dam, load the silt there, clear the natural brush between Brookside Park and the Colorado St. Bridge, and build a workable ramp below the Colorado St. Bridge.

John Fauvre
530 S. Arroyo Blvd.
Pasadena, 91105

Sent from my iPad

Response to Comment Letter #183 (John Fauvre)

Response to Comment 183-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. The purpose of the Proposed Project is to remove sediment from Devil's Gate Reservoir to restore the design capacity and establish a reservoir management system to maintain the flood control capacity of the reservoir.

Los Angeles County Flood Control District (LACFCD) proposed a project duration of five years to reduce accumulated sediment in a timely fashion. The goal of LACFCD is to restore reservoir flood capacity as soon as feasible while reducing costs and minimizing the duration of environmental and construction impacts to the surrounding communities. Extending the project would prolong the flood risk to downstream communities and increase the construction impacts to the surrounding communities. Trucking the sediment to the ocean would, in fact, cause greater impacts, as the distance to the ocean is much further than the distance to the sediment disposal sites. Additionally, the flood control channels were not constructed to handle truck traffic. A conveyor belt system was considered in the Alternatives Analysis; see Section 4.10.1 of the Draft Environmental Impact Report (EIR). This alternative was rejected as it would not avoid or substantially reduce any significant environmental effects.

Comment Letter #184

From: John Fauvre
To: reservoircleanouts
Cc: bbogaard@cityofpasadena.net
Subject: Truck route
Date: Monday, January 20, 2014 7:40:47 AM

Comment 184-1

Here is a truck route to avoid residential areas completely: exit Hahanongna on the southeast and go directly to the 210; go south to the 134; exit at San Rafael and go north towards Linda Vista; turn right through the Cal Trans access under the 134 Freeway Bridge (possibly adding here a sound wall to protect the El Circulo compound); go south on the bird sanctuary along the west bank; build a ramp into the flood control channel and drive down and on to the sea. Use the route only at night in the dry season.

John Fauvre
530 S. Arroyo Blvd.
Pasadena

Sent from my iPad

Response to Comment Letter #184 (John Fauvre)

Response to Comment 184-1:

Thank you for your input. This comment has been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. As described in the Draft Environmental Impact Report (EIR), the proposed and alternative haul routes would briefly access Windsor Avenue between Interstate 210 (I-210) on- and off-ramps and Oak Grove Drive. Both the proposed and alternative haul routes use main thoroughfares and do not travel into the residential areas.

Potential impacts due to the Proposed Project's truck trips were analyzed in the Draft EIR, Section 3.16, Transportation and Traffic. As listed in that section, a single intersection in the immediate vicinity of the Project site will have a potentially significant impact. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the project site. Working only at night would potentially increase impacts associated with aesthetics due to the need for construction lighting, with biological resources due to the potential disruption of nighttime wildlife activity, and with noise due to noncompliance with local noise ordinances. Additionally, the flood control channels were not constructed to handle truck traffic.

From: JUDITH WRIGHT
To: reservoircleanouts
Subject: Devil"s Gate Reservoir Sediment Removal and Management Project
Date: Sunday, January 19, 2014 12:03:30 PM

Comment 185-1

Have you ever been to Hahamonga? Have you seen the beauty of the place, noted how scarce such loveliness is, allowed yourself to feel the serenity and the peace?

The County plan to destroy the area is simply intolerable. It can't be allowed to happen. There is no excuse for it, no rational, no possible way that such an area can be destroyed. It can't be remediated. Your can't just go somewhere and build another. It is unique, sacred to anyone who believes we share this earth with other creatures; sacred to anyone who believes we have obligations to the future.

Don't do it. Don't allow it. Go back and listen, not only to the alternatives but to the land itself. Don't destroy you own soul by allowing this action to proceed. And don't destroy our souls as well.

We can do better. We must do better. This can't be allowed to happen!

Judith Wright
Los Angeles

Response to Comment Letter #185 (Judith Wright)

Response to Comment 185-1:

Thank you for your input. This comment has been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. Los Angeles County Flood Control District (LACFCD) notes the commenter's objection to the Proposed Project.

LACFCD goes to great lengths to lessen project impacts. The Draft Environmental Impact Report (EIR) analyzed a range of sediment removal amounts and configurations aimed at addressing the diverse concerns of stakeholders, including concerns for long-term habitat preservation. The alternatives presented in the Draft EIR represent the best options available to respond to stakeholders' concerns, while adequately reducing flood risk to downstream communities.

Alternative 3, Configuration D affects the least amount of habitat of all the action alternatives while still achieving Proposed Project objectives (see Section 4.6 of the Final EIR). This alternative would provide a buffer on the west side of the reservoir that would allow for the movement of wildlife. Alternative 3, Configuration D, Option 1 provides a more natural configuration for the reservoir by having two branches to carry water and sediment toward the face of the dam, avoiding disturbing a significant portion of existing vegetation. To further reduce the Proposed Project's footprint, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2, which drastically reduces the project's footprint of 120 acres down to 71 acres, would avoid excavation of the western branch, thereby providing a greater habitat buffer on the west side of the reservoir. In addition, the maintenance areas would be smaller than the original sediment removal footprint, allowing for habitat to reestablish and providing additional areas for wildlife movement.

From:	L Barlow
To:	reservoircleanouts
Cc:	Mary Barrie
Subject:	Devil"s Gate Reservoir Sediment Removal and Management Project
Date:	Monday, January 20, 2014 3:52:33 PM

Comment 186-1

Please consider me a signatory to the letter from Friends of Hahamongna, submitted January 19, 2014
I was part of the early conceptual design team for the Hahamongna Watershed Park that found the concept of development to be inadvisable. A slow, careful sediment management program for Devil's Gate Dam that uses natural processes can restore flood protection while protecting the habitat and wildlife.

From: Friends of Hahamongna - Elizabeth Bour, Mary Barrie, Nina Chomsky
Contact: Mary Barrie, <meb787@aol.com>
RE: Comments: Draft Environmental Impact Report for Devil's Gate Reservoir Sediment Removal and Management Project
DATE: January 19, 2014

I. Introduction

Friends of Hahamongna hereby submits its comments on the Los Angeles County Department of Public Works (LACDPW) Devil"s Gate Reservoir Sediment Removal Project at Hahamongna Watershed Park. We have reviewed the Draft Environmental Impact Report (DEIR) and related official documents about this proposed project and related projects. One or more of us has attended all of the County presentations.

--

:: design :: collaboration :: innovation

Laurie Barlow, AIA
1107 Fair Oaks Ave. #14
South Pasadena, CA 91030

http://www.barlowcoweb.com/
http://greenswardcivitas.blogspot.com/

Response to Comment Letter #186 (Laurie Barlow)

Response to Comment 186-1:

Thank you for your input. This comment has been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. Los Angeles County Flood Control District (LACFCD) notes that the commenter, Laurie Barlow, is a signatory on the Friends of Hahamongna Comment Letter.

LACFCD goes to great lengths to lessen project impacts and maximize efficiencies. As such, many of the points of slow sediment management programs like Arroyo Seco Foundation's four-point "Slow Program" are compatible with the LACFCD Proposed Project.

For example, the Draft Environmental Impact Report (EIR) concluded that Alternative 3 is the Environmentally Superior Alternative. Alternative 3 drastically reduces the project's footprint of 120 acres down to 71 acres. Additionally, the limited maintenance area for Alternative 3 further reduces the permanent habitat impacts down to approximately 51 acres by allowing for site replanting and mitigation to take place within the reservoir footprint. This reduction in project acreages will greatly lessen environmental impacts of the Proposed Project.

LACFCD strives to achieve an efficient, low-cost sediment removal project. Sediment removal rates and trucking operations, now utilizing all low-emissions trucks, as explained in Section 3.5 of the Draft EIR, have been carefully planned for economies of scale to realize maximum efficiencies without major delays in project schedule, thus greatly reducing operating costs. Furthermore, LACFCD has applied for and received an approximately $28 million grant through the State's Disaster Preparedness and Flood Protection Bond Act of 2006 (Proposition 1E) program. A portion of this grant will be used to help offset the Proposed Project's costs.

While sluicing is not a viable project alternative, as explained in Section 4.7 of the Draft EIR, Flow Assisted Sediment Transport, or FASTing, will be used for maintenance after the project's main sediment removal phase has been completed, as described in Section 2.5.2 of the Draft EIR.

LACFCD is committed to *Public Service that Works*; and by combining almost 100 years of technical expertise and invaluable input from the community, less invasive flood protection will continue to be a reality.

For a more detailed response to the Arroyo Seco Foundation's four-point "Slow Program", please see the response to the Arroyo Seco Foundation's comment letter (Comment Letter #216, Response to Comment 216-16).

Comments/Questions With Respect to Devil's Gate Dam (Hahamongna) Sediment Removal DEIR

26-Year La Canada Resident Linda S. Klibanow
4574 Belita Ln., La Canada, CA 91011
(About a block from Hahamongna Watershed Park And La Canada High School)

(1) <u>No notice to the neighborhood community or the park users.</u>

Comment 187-1

Why was there effectively no notice provided to neighborhood residents and park users? Signage regarding the project and DEIR should have been posted at park entrances, meeting areas- and delivered to immediately adjacent property owners/residents. This was deliberately not done. Notices I placed were quickly removed. This weekend there was an event at Hahamongna of the Oak Grove Disc Golf Association—no visible notice at any park entrances or parking areas.

Comment 187-2

(2) **<u>Notably the DEIR notes as non-mitigable THREATS ensuing from the project damage to air quality and traffic.</u>**

(a) TRAFFIC

Comment 187-3

Local residents would be up in arms since already there are major traffic difficulties in the immediately adjacent areas. Oak Grove Avenue between Foothill and Berkshire, and from the intersection of Foothill and Viro(at the High School) up to St. Bede's already is a traffic nightmare for local residents (those living on and off Viro Road) due to the fact that this areas is a cluster of schools- La Canada High School (the middle school being on the same campus), St. Francis, Flintridge Prep, Hillsides, and the daycare at the bottom of Foothill and Viro where children play outside all day) as well as a primary access road for NASA's Jet Propulsion Laboratory. Indeed, the City of La Canada has recently been called to respond to the difficulties residents have even exiting from their driveways at certain times of day.

Comment 187-4

Was there any objective traffic simulation devised to assess the impact of a double belly dusty dirt hauling truck departing every minute 10 hours a day 6 days a week…? THIS IS SIMPLY UNWORKABLE. Children will be unable to attend school and residents will be unable to get to work, leaving aside for the moment their difficulty breathing.

(b) BREATHING

As we know air quality already is a problem. I have hiked Hahamongna several days a week for 26 years. The unsettlement and dispersal of very soft porous sediment (possibly including toxics from JPL—since we are all part of a federal Superfund Site already) to neighborhood residents is an ***uwarrantable assault*** on not only ***quality of life***, but also an ***unnecessary- reckless- imposition of potentially fatal respiratory consequences.***

Comment 187-5

Economically, children will be pulled out of schools and residents seeking escape to cleaner air will be unable to sell their homes (with related real estate value declines***).*** Resident equines are equally sensitive to respiratory stressors and the numerous equestrian operations in the area of economic and far more than economic value to the community will suffer likely irremediable injuries.. Such equestrian activities, and the Tom Sawyer children's camp programs, comprise critical yet delicate and endangered components of the community's tradition, identity and vibrancy.

Has anyone done a best science prediction of the associated adverse health effects? Interruption of school attendance? Feasibility of school athletic programs? Children being able to play outside at the local day care and school premises? Residents able to navigate through the endemic traffic quagmires associated with this lunatic plan?

Comment 187-6

(3) Destruction of Spiritual Value of Nearly Natural Place

Why is anything natural (the wildlife, diversity of bird species, plant species, insect, amphibian, etc., etc.) deemed of such little to null value that it's not part of the DPW's equation? This is a microcosm of our destruction of the planet blinded by the almighty dollar. And who will get the economic value of what is removed? Sediment for beaches? Rockery for landscaping?

Comment 187-7

This place (Hahamongna) is an integral component of life for many-- what the DEIR terms "passive recreation" (is the definition one of not involving money?). Park users include hikers, bicyclists, equestrians, bird watchers, picnickers, frisbee golf players, naturalists, botanists, walkers. The place is a holy respite. 26 years ago I purchase my home because I could walk to Hahamongna (then Oak Grove) Park. When initially diagnosed with cancer, I walked there to hear bird song, feel sunshine, wind through trees. Sure, you can hear freeway traffic and see buildings from most vantage points, but such accessible wildness should be treated with reverence and be protected from unnecessary damage.

How is the sediment removal plan reconcilable with local open space/nature preservation, Arroyo Seco restoration goals democratically promulgated into civic obligations and requirements?

Comment 187-8

(4) Bogus Science and Alarmist Tactics for Ulterior Motives

The so-called "justification" for all of the above irremediable destruction is comprised of *bogus* assessments of potential adverse weather events and associated flooding risks and, *actually,* more the product of **funding matters** (***the dollar driving the decision, rather than the scientific evidence and weighing of human values and priorities***). The "objective rationale" seems to lack substance and to be effectively debunked by local area experts regarding water and sediment.

Comment 187-9

What are the interrelationships between the Devil's Gate Sediment Removal Project and the plans to transfer water to Eaton Canyon? Why are these not addressed in the Devil's Gate DEIR?

(5) What Justifications Possibly Exist For Not Following The Expert-Recommended, Far Less Calamitous But More Effective "Go Slow, Go With the Flow" Approach?

Comment 187-10

Response to Comment Letter #187 (Linda Klibanow)

Response to Comment 187-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

Per California Environmental Quality Act (CEQA) Guidelines Section 21902 (b)(3), notice shall be given to the last known name and address of all organizations and individuals who have previously requested notice and shall also be given by at least one of the following procedures:

- publication in a newspaper of general circulation in the area affected by the Proposed Project
- posting of notice by the lead agency on and off site in the area where the Proposed Project is to be located
- direct mailing to the over 1,100 owners and occupants of contiguous property shown on the latest equalized assessment roll

The notices for the Proposed Project, the Notice of Preparation (NOP), and the Notice of Availability/Notice of Completion (NOA/NOC) were:

- sent to agencies, organizations, and individuals who have previously requested notices, in addition to other area agencies and organizations
- published in local newspapers, the *San Gabriel Valley Tribune* and the *Pasadena Star News*
- posted on and off site
- mailed to owners and occupants of contiguous property shown on the latest equalized assessment roll
- filed with the County Clerk and the State Clearinghouse
- posted at eight local libraries
- posted on the Los Angeles County Department of Public Works (LACDPW) website

Therefore, notice for the Proposed Project was adequate, as the notice efforts went beyond the CEQA Guidelines requirements.

Response to Comment 187-2:

Air quality impacts associated with truck traffic were analyzed in the Draft Environmental Impact Report (EIR) in Section 3.5. Los Angeles County Flood Control District (LACFCD) has conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed the United States (U.S.) Environmental Protection Agency's (EPA's) 2007 standards for emissions. Therefore, in order to further reduce emissions, Mitigation Measure MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump trucks that meet or

exceed EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality will be reduced to less than significant.

Potential impacts due to the Proposed Project's truck trips were analyzed in the Draft EIR, Section 3.16, Transportation and Traffic. As listed in that section, a single intersection in the immediate vicinity of the Proposed Project site will have a potentially significant impact. In practice, hauling rates and routes may be adjusted to help reduce impacts, depending on operational need. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the Proposed Project site.

Response to Comment 187-3:

See Response to Comment 187-2.

Response to Comment 187-4:

See Response to Comment 187-2. Potential impacts due to the Proposed Project's truck trips, including double dump trucks, were analyzed in the Draft EIR, Section 3.5, Air Quality, and Section 3.16, Transportation and Traffic. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the Proposed Project site. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality, including those associated with health effects, will be reduced to less than significant. As discussed in the Draft EIR, Section 3.5, the Health Risk Assessment (HRA) analyzed both the cancer-related and noncancer-related acute (short-term) and chronic (long-term) impacts from project-related emissions. The HRA analysis found the Proposed Project would result in less than significant impacts for both the cancer-related and noncancer-related acute short-term and long-term impacts. Asthma-related issues are one of the noncancer acute impacts that the significance thresholds were developed to protect. The HRA found that the Proposed Project would result in a less than significant acute non-cancer risk for all alternative scenarios.

The Draft EIR outlines a 12-hour trucking schedule, with trucking operations on Saturdays as well. This schedule is used to model the most intensive construction operation, which may not be applicable at the site for the duration of the Proposed Project. Typical trucking schedules are estimated to be 8 hours per day on weekdays. In practice, hauling rates and routes may be adjusted to help reduce impacts, depending on operational need.

Response to Comment 187-5:

See Response to Comments 187-2 and 187-4. As discussed in the Draft EIR, Section 3.10.6, Impacts and Mitigation, HAZARDS-1, Sediment Removal/Reservoir Management, no hazardous levels of the contaminants were detected in the sediment. Dust impacts from the Proposed Project were carefully evaluated, as discussed in the Draft EIR, Section 3.5.6, Impacts and Mitigation, AIR QUALITY-2, Sediment Removal. The Proposed Project's activities, including excavation, grading, material loading, and hauling, would result in less than significant dust emissions due to the Proposed Project's use of best management practices and would be in full compliance with South Coast Air Quality Management District's (SCAQMD's) fugitive dust regulations.

The JPL Groundwater Cleanup Project is an ongoing project and considered to be part of existing conditions. As discussed in the Draft EIR, Section 3.10, no significant impacts associated with the

Proposed Project due to the inclusion of the Hahamongna Watershed Park area on the NPL Superfund List are expected, as the contamination is found in the local groundwater table, not in the sediment.

Potential effects to horses stalled near the Proposed Project site would be similar to the construction-related impacts from emissions associated with sediment removal to nearby residents and Hahamongna recreational users. It should be noted that construction activities would be temporary and are expected to occur only in the drier months (April to December, excluding holidays); so the maximum construction impacts would be much shorter than the five-year duration of the sediment removal phase of the Proposed Project.

Comment regarding economic impacts to surrounding homeowners and schools has been noted.

Response to Comment 187-6:

See Response to Comments 187-2, 187-4, and 187-5.

Response to Comment 187-7:

As discussed in Section 3.6.6 of the Draft EIR, Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species, to restore and enhance riparian and sensitive habitats, and to reduce any potential impacts to biological resources to less than significant.

Impacts to recreation were analyzed in the Draft EIR, Section 3.15. The Proposed Project will not limit the use of the Oak Grove area of Hahamongna Watershed Park. Sediment removal activities would be temporary and are expected to occur only in the drier months (April to December, excluding holidays). It is expected that these activities will often not be adjacent to the Oak Grove area of Hahamongna Watershed Park. The Proposed Project would result in temporary limitations on the recreational use of the Proposed Project site and some of the adjacent trails. Most of these areas would be reopened seasonally or intermittently throughout the sediment removal process. In addition, temporary impacts to designated recreational facilities and trails will be minimized through advance communication and redirection to the nearest facility in the vicinity of the Proposed Project. Furthermore, an east-west trail crossing will continue to provide access at the north end of the reservoir. At the south end of the reservoir, after the reservoir ingress and egress ramps have been fully constructed, access to the upper east side Arroyo Seco Trail from La Cañada Verdugo Road will be maintained; and the linkage from the west side Arroyo Seco Trail and the Flint Wash Trail to the upper east side Arroyo Seco Trail (crossing Devil's Gate Dam and also continuing south to the Rose Bowl) will be available after construction activities have ended each day and on nonworking days.

The sediment that came into Devil's Gate Reservoir following the Station Fire has a very fine gradation or consistency. As such, the majority of this material is not readily reusable on a commercial scale and will most likely not be sold; however, sediment placed at sediment placement sites would be available for potential reuse for other projects or sediment reuse opportunities. The sediment removed from the Devil's Gate Reservoir will be transported to the existing placement sites listed in Section 2.0, Project Description in the Draft EIR.

For further information regarding beneficial uses for sediment at LACFCD sites, please refer to Section 6.5 of LACFCD's 2012 Sediment Management Strategic Plan which can be found at: http://dpw.lacounty.gov/lacfcd/sediment/stplan.aspx.

Response to Comment 187-8:

As noted in the Draft EIR, Section 3.12 Land Use and Planning, impacts associated with applicable land use plans and policies would be less than significant with incorporation of mitigation measure MM LAN-1. Alternative 3, Configuration D, which was found to be the Environmentally Superior Alternative in the Draft EIR, was based on the City of Pasadena's Hahamongna Watershed Park Master Plan (HWPMP). Alternative 3, Configuration D affects the least amount of habitat of all the action alternatives while still achieving Proposed Project objectives (see Section 4.6 of the Final EIR). This alternative would provide a buffer on the west side of the reservoir that would allow for the movement of wildlife. Alternative 3, Configuration D, Option 1 provides a more natural configuration for the reservoir by having two branches to carry water and sediment toward the face of the dam, avoiding disturbing a significant portion of existing vegetation. To further reduce the Proposed Project's footprint, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2, which drastically reduces the project's footprint of 120 acres down to 71 acres, would avoid excavation of the western branch, thereby providing a greater habitat buffer on the west side of the reservoir. In addition, the maintenance areas would be smaller than the original sediment removal footprint, allowing for habitat to reestablish and providing additional areas for wildlife movement. LACFCD has met and will continue to meet with the City of Pasadena regularly to coordinate and ensure resolution of concerns regarding Devil's Gate Reservoir and the HWPMP.

Response to Comment 187-9:

LACFCD was mandated by the State Legislature to provide flood protection and water conservation within its boundaries to protect human values of life and property.

LACFCD's standards for determining adequate levels of flood protection are scientifically based on hydrologic design procedures and sedimentation design criteria found in the January 2006 LACDPW Hydrology Manual and the March 2006 LACDPW Sedimentation Manual.

The Hydrology Manual (January 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_Hydrology_Manual/2006%20Hydrology%20Manual-Divided.pdf

The Sedimentation Manual (March 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_sedimentation_manual/Sedimentation%20Manual-Second%20Edition.pdfA reservoir storage design capacity of two design debris events (DDEs) below the dam's lowest spillway was determined to be the standard acceptable level of risk at Devil's Gate Dam and Reservoir. For Devil's Gate Dam and Reservoir, the required reservoir capacity is 4.0 million cubic yards (cy) (two DDEs) below the spillway elevation of 1,040.50 feet.

Additional information concerning DDE calculation methods has been added to the Final EIR, Section 2.3, Project Need.

The Devil's Gate Water Conservation Project is a separate project that is not part of the Proposed Project or alternatives. The Devil's Gate Water Conservation Project is still in a conceptual design phase, and no environmental report is available for public review at this time; however, this project was analyzed in the Draft EIR as a cumulative project.

Response to Comment 187-10:

LACFCD goes to great lengths to lessen project impacts and maximize efficiencies. As such, many of the points in the Arroyo Seco Foundation's four-point "Slow Program" are compatible with the LACFCD Proposed Project.

For example, the Draft EIR concluded that Alternative 3 is the Environmentally Superior Alternative. Alternative 3 drastically reduces the project's footprint of 120 acres down to 71 acres. Additionally, the limited maintenance area for Alternative 3 further reduces the permanent habitat impacts down to approximately 51 acres by allowing for site replanting and mitigation to take place within the reservoir footprint. This reduction in project acreages will greatly lessen environmental impacts of the Proposed Project.

LACFCD strives to achieve an efficient, low-cost sediment removal project. Sediment removal rates and trucking operations, now utilizing all low-emissions trucks, as explained in Section 3.5 of the Draft EIR, have been carefully planned for economies of scale to realize maximum efficiencies without major delays in project schedule, thus greatly reducing operating costs. Furthermore, LACFCD has applied for and received an approximately $28 million grant through the State's Disaster Preparedness and Flood Protection Bond Act of 2006 (Proposition 1E) program. A portion of this grant will be used to help offset the Proposed Project's costs.

While sluicing is not a viable project alternative, as explained in Section 4.7 of the Draft EIR, Flow Assisted Sediment Transport, or FASTing, will be used for maintenance after the project's main sediment removal phase has been completed, as described in Section 2.5.2 of the Draft EIR.

LACFCD is committed to *Public Service that Works*; and by combining almost 100 years of technical expertise and invaluable input from the community, less invasive flood protection will continue to be a reality.

For a more detailed response to the Arroyo Seco Foundation's four-point "Slow Program", please see the response to the Arroyo Seco Foundation's comment letter (Comment Letter #216, Response to Comment 216-16).

From: Altadena Heritage
To: reservoircleanouts
Subject: attn: water resources division, reservoir cleanouts
Date: Monday, January 20, 2014 2:38:49 PM

Dear Director Farber,

Comment 188-1

As a concerned citizen who understands the need to protect public safety and the challenges of managing urban water systems in our particular environment beneath the crumbling San Gabriel Range, I write to you in belief that it is possible to develop a better project to deal with sediment behind Devil's Gate than is presented in any of the four alternatives discussed in the draft EIR.

Comment 188-2

Further, I ask that you consider and plan not just for Devil's Gate, but also for the dozen or so more debris basins that LACPWD is responsible for, in a holistic, system-wide way — not with an emergency, short-term mentality. Let's design something for the present and future that considers multiple benefits, multiple users, and makes best use of integrated resource management of water and power, as well as the wonderful habitats of Hahamongna Watershed Park in the Arroyo Seco, and other important environments in the LA basin.

Comment 188-3

Many well informed, community and science-based comments have been submitted, I ask that you please take the reasonable questions these raise very seriously, particularly those from the Sierra Club, Arroyo Seco Foundation, Altadena Heritage, and City of Pasadena. Let's come up with a world class plan.

Thanks for your attention,
Michele Zack, Altadena
Local historian, hiker, community leader

Response to Comment Letter #188 (Michele Zack)

Response to Comment 188-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. Six alternatives were analyzed in the Draft Environmental Impact Report (EIR), including the No Project Alternative required by the California Environmental Quality Act (CEQA); the Sluicing Alternative; and Alternative 3 which is considered to be the Environmentally Superior Alternative.

Response to Comment 188-2:

LACFCD goes to great lengths to lessen project impacts and maximize efficiencies. For example, the Draft EIR concluded that Alternative 3 is the Environmentally Superior Alternative. Alternative 3, Configuration D affects the least amount of reservoir area of all the action alternatives, while still achieving Proposed Project objectives (see Section 4.6 of the Final EIR). Alternative 3, Configuration D, Option 1 provides a buffer between the Oak Grove area of Hahamongna Watershed Park and the excavation area. This Alternative also would provide a more natural configuration for the reservoir by having two branches to carry water and sediment toward the face of the dam, avoiding disturbing a significant portion of existing vegetation. To further reduce the Proposed Project's footprint, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2, which drastically reduces the project's footprint of 120 acres down to 71 acres, would avoid excavation of the western branch, thereby providing a greater habitat buffer on the west side of the reservoir. In addition, the maintenance areas would be smaller than the original sediment removal footprint, allowing for habitat to reestablish.

The Proposed Project is designed to be a long-term plan, with the reservoir management phase providing management for future sediment inflows. The proposed yearly cleanout of sediment after the completion of the Proposed Project will reduce the necessity for a future large-scale cleanout.

Response to Comment 188-3:

LACFCD recognizes each of the comment letters received during the public review period. All comments are noted and will be provided to the County of Los Angeles Board of Supervisors.

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January 19, 2014

To: Gale Farber, Director, Department of Public Works
Christopher Stone, Assistant Deputy Director, Water Resources Division
ATTN: Reservoir Cleanouts Program
P.O. Box 1460
Alhambra, CA 91802-1460

Re: Los Angeles County Department of Public Works Sediment Removal in Hahamongna Watershed Park (Devil's Gate Dam)—Draft Environmental Impact Report

Dear Ms. Farber and Mr. Stone,

Comment 189-1

On behalf of our over 1500 members, the Board of the Pasadena Audubon Society thanks you for the opportunity to comment and ask questions regarding the DEIR issued by the Los Angeles County Department of Public Works on October 23, 2013. For the last four months, we have read, researched, and discussed the DEIR, and at our January 8th, 2014 Board meeting, we unanimously approved the sending of this letter. Because the impacts of the proposals outlined in the DEIR are devastating and for the most part unable to be mitigated, we find all of the alternative proposals (with the possible exception of "No Project") to be unacceptable and therefore ask the Department of Public Works to rethink their sediment management program, especially in Hahamongna Watershed Park. It needs to be responsible and sustainable, not destructive to one of the most valuable local resources we have. We are especially concerned because recent events such as the unnecessary destruction of the Arcadia Woodlands indicate that we must be very cautious regarding sediment removal and its consequences. We urge the County to find ways to work with natural forces and with the stakeholders to achieve the goal of sustainable, responsible, and ecologically sound sediment management.

Hahamongna – An Unparalleled Environmental Treasure

Comment 189-2

Hahamongna Watershed Park, at the foot of the San Gabriel Mountains, is a rare and unique environmental resource, unparalleled in our region for its importance for water and biological resources. For many decades Pasadena and its residents have worked hard to protect and enhance the natural character of this alluvial canyon and its rich riparian and streamzone habitat. Major community-based planning efforts and city policy documents, such as the Arroyo Seco Master Plan and Open Space Element of the General Plan, have been developed to reflect Pasadena's commitment found in the UN Urban Environmental Accords, adopted by the city, to protect critical habitat, such as that found in Hahamongna. Those accords also commit the city to take major steps to reduce green house gases. The County's plan as outlined in the DEIR will severely undermine Pasadena's efforts to improve air quality as to render them non-existent. The land itself provides key habitat for many species of birds and other animals. Much of the land in

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Comment 189-2 continued

question is made up of willow and mule fat. It is difficult to find this much contiguous willow and mule fat in Southern California, and Pasadena residents have worked hard to protect this habitat from destruction.

We see two categories of problems: problems with the project itself and problems with the DEIR.

Problems with the Project

Comment 189-3

The Pasadena Audubon Society has identified the following problems with the project proposed by the County. Any single one of these concerns is significant enough to warrant review by impact of this project on area residents; taken together, they offer a compelling argument that the project as proposed is unacceptable.

Significant Increases in Air and Noise Pollution: The County's sediment removal project will pollute the air. 425 trucks per day (that is 50 trucks per HOUR) will drive through local neighborhoods and on the 210 freeway. The trucks will operate for nine months or more per year, six days a week. These diesel trucks, which will not meet current EPA standards, let alone the more rigorous standards of the future, will cause unacceptable levels of air pollution, noise, and odor.

Comment 189-4

According to Dr. Frank Gilliland, the Hastings Professor with the Division of Environmental Health in the Department of Preventive Medicine at the University of Southern California, "[e]veryone in Pasadena will be exposed to elevated levels of air pollution, especially diesel exhaust from the heavy truck traffic and off-road equipment used on the site" and "[c]hildren and pregnant women are vulnerable groups for the adverse effects of elevated levels of air pollution and diesel exhaust. A large scientific body of evidence has shown the diesel exhaust exposure is associated with adverse pregnancy outcomes, increased risk for asthma, reduction of lung development and adverse effects on neurodevelopment." Dr. Gilliland also cites the increased risk of lung cancer caused by diesel. This level of risk, unmitigated by the County in any way, is simply unacceptable for our region.

Questions: What is the County's rationale for increasing lung cancer, asthma, and emphysema rates in Pasadena and environs? Why is the County not using clean trucks that do not significantly raise cancer rates?

Comment 189-5

Significant Increases in Traffic: The County's sediment removal project will significantly increase traffic. The proposed schedule of a ten-hour work day six days a week operation will impact the affected communities with constant sound pollution and increased traffic. The freeway onramp the project trucks will access is a main artery for residents of the affected communities. Trucks moving through that area during rush hour would impose an increased traffic burden. The interchanges to the 134 West and the 210

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East are already backed up during morning rush hour. Also, the Woodbury/Arroyo access to the 210 is adjacent to an elementary school and additional morning traffic in the area could negatively impact the access and safety of students and parents entering the school.

Comment 189-5 continued

Questions: How will the County mitigate this increased traffic? How will it guarantee the safety of school children who attend schools adjacent to the work site? What contingency plans has the County developed for traffic accidents? For example, how will the County respond if and when a serious accident occurs on the 210 freeway, especially in the transition tunnel, as happened several weeks ago? Where will the trucks go if the freeway is closed?

Comment 189-6

Permanent Loss of Significant and Critical Habitat: The County's sediment removal project permanently destroys 50-120 acres of regionally significant willow and mulefat riparian forest. Because this forest is quite large, it is very unusual in our region, and it provides critical habitat for a variety of animals and birds, including nesting Yellow Warbler, which is a species of Special Concern in California; in 2012, 'Least' Bell's Vireo, which is a federally endangered species, nested here for the first time. Other animals found here include mountain lion, bobcat, mule deer, gray fox, gopher snake, pacific tree frog, and other reptiles and mammals. The project destroys other types of habitat as well, including freshwater marsh, alluvial scrub, and chaparral. All of these types of habitat are rare in Pasadena and must be protected.

Question: How does the County justify the permanent loss of this significant habitat, especially knowing that it provides resources for key species and that less destructive means of removing the sediment are available?

Comment 189-7

Absent or Inadequate Mitigation of Habitat Loss: The County offers no mitigation plan. This is unacceptable. Because this lost habitat is riparian, it should be replaced at a ratio of between 3:1 and 5:1; not 1:1 as proposed in the DEIR. Much of the mitigation is planned to take place off-site, not in the Hahamongna basin. This means we will lose our park, and, again, this is not acceptable.

Questions: How can we, the public, be expected to comment on a mitigation plan that doesn't exist yet? How can the County justify such a low mitigation rate? Does the County not recognize the value of riparian habitat?

Comment 189-8

Problems with the Draft Environmental Impact Report
The Pasadena Audubon Society has identified the following problems with the draft EIR issued by the County of Los Angeles.

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The DEIR provides no scientific rationale. The County never makes a science-based case for the need to remove 2.4 to 4 million cubic yards of sediment. Originally, the Board of Supervisors authorized the DPW to analyze and develop methods to remove 1.67 million cubic yards. But now the DPW claims they need to remove 2.4 to 4 million cubic yards without saying why the amount has increased. Also, the DPW never makes the case for the need to remove it within five years.

Comment 189-9

Questions: Where is the science to justify this project? Where is the science to show that the sediment must be removed within five years? Where is the science to show that the County needs to remove up to four million CY? Why did the project more than double from 1.67 CY to potentially four million CY? Where is the science to show how much sediment we can expect to come down in a major rain event? Has anyone from the County measured how much loose sediment is in the Arroyo Seco Watershed? When will we see cost/benefit analysis of each project alternative? How is the huge cost justified? Where is the science that shows the risk from flooding? How often does the flow reach a dangerous threshold? When was the last time that the flow reached a dangerous threshold?

The DEIR provides no rationale for permanent destruction of habitat. The County also never makes a case for the need to permanently clear-cut 50-120 acres of willow-mulefat forest, which is particularly rich in biological and environmental values. This constitutes destruction of more than 50% of the Hahamongna/Devil's Gate Basin.

Comment 189-10

Questions: Why do all the alternate plans in the DEIR necessitate turning much of Hahamongna Watershed Park into a maintenance yard? Where is the scientific justification for this? Or is the justification one of convenience? Does the County's easement give it the right to destroy the property and eliminate its purposes of habitat and recreation?

The DEIR does not address the health effects of air pollution. As Dr. Gilliland says, "[t]he DEIR does an inadequate job of reviewing research findings on the health effects of air pollution, especially diesel exhaust, on health. There is not even one study described or referenced in the DEIR that shows the connection between diesel exhaust and lung cancer or other adverse health outcomes such as asthma." We are also concerned that the DEIR makes no mention of the nature of the dust created by this project. Because the Station Fire is listed as a chief cause of the sediment, it would seem that the sediment should be assessed for micro-ash, as its particularly abrasive nature could create health concerns of its own. This section of the DEIR needs to be redone because of its inadequate response to these concerns.

Comment 189-11

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Comment 189-11 continued

Question: Why does the DPW virtually ignore the connection between diesel exhaust and lung cancer and asthma? Has the County assessed the nature of the sediment to ascertain if its makeup includes micro-ash?

Comment 189-12

The DEIR incorrectly states that there are no measures to mitigate these exposures. As Dr. Gilliland points out, "[t]his statement is factually incorrect as there are many measures to reduce exposures. The Ports of Los Angeles and Long Beach have demonstrated effective interventions to reduce impact. The DEIR indicates that increases in diseases among the people of Pasadena are acceptable and unavoidable consequences of the project. This approach is completely inadequate and indicated the DEIR needs to be completely redone with adequate consideration of the health consequences of the project." Again, we submit that this section of the DEIR is completely inadequate and must be redone. We do not agree that these exposures are acceptable for our residents and park users.

Questions: Why did the DPW reject using "clean" trucks to move sediment? Since the health impacts are real and serious, ie. scientifically proven, then shouldn't the DPW take a more careful look at other less toxic means of moving sediment such as FASTing?

Comment 189-13

The DEIR ignores or underutilizes studies that show adverse effects of noise, studies that show the objectionable nature of the odors associated with these trucks, and studies that show a link between diesel trucks and lung cancer. These lung cancer studies are what led the state of California to declare diesel particulate matter as a Toxic Air Contaminant. The DEIR does not address this adequately.

Questions: Where are references to any of the 30 studies that show a connection between diesel exhaust and cancer rates? Where are references to studies that show dangers of dust, particularly dust that is emitted from an EPA clean-up site?

Comment 189-14

The DEIR does not respond to concerns raised by the California Regional Water Quality Control Board. In March 2011, when the County applied for a permit to complete a smaller sediment removal project in Hahamongna Watershed Park, the California Regional Water Quality Control Board denied the permit, asking the County to "identify cleanout alternatives sufficient to protect public safety other than 'return to design capacity.'" They also asked the County to "identify the immediate, public safety, capacity need which allows proper function of the flood control system and the corresponding sediment removal need" and use that to "develop an alternative(s) for this amount of sediment removal." They asked the County to "identify cleanout alternatives which would minimize the 50-acre impact and identify alternatives for phasing the

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Comment 189-14 continued

project to minimize impacts over time," and to "identify alternatives which include lesser initial volumes but repeated cleanouts over several periods including two years and ·five years" and to "analyze these alternatives for cumulative impacts to habitat and affected species using the habitat." This is exactly what we have been asking for too, and we are stunned that the County responded to these concerns with an even larger, more draconian plan.

Question: Why is the County ignoring the concerns raised by the California Regional Water Quality Control Board?

Comment 189-15

The biological section of the DEIR has serious flaws. For example, it reports only 50 species of birds for the basin while Pasadena Audubon reports over 206 (reported on ebird.org). The report claims that no Yellow Warblers, a "species of special concern," have nested there, but Pasadena Audubon Society members have mapped many singing males and photographed parents feeding young in the willow woodlands, all evidence of nesting Yellow Warblers. (Please see Appendix A, "Hahamongna Vulnerable Species.") The report does not list all wildlife species expected to occur, only what few were seen. The biologist did not consult with local organizations, like the Pasadena Audubon Society, who regularly conduct surveys in Hahamongna. Because the 'Least' Bell's Vireo did not nest in 2013, possibly as a result of work done by Edison during a critical period, the DEIR does not see it as an issue. This federally endangered bird nested there in 2012, but if the willow forest is destroyed, it is unlikely that it would return. The report also seems confused about species and subspecies, and plays down listed species at every turn. Astonishingly, it ignores the fact that Hahamongna Watershed Park is part of the Altadena Arroyos & Foothills Significant Ecological Area in the current iteration of the Los Angeles County Master Plan. This indicates that the County finds the area to contain valuable "significant biological resources" and wildlife corridors. These flaws cause us to doubt the credibility of the biological information as it is presented in the DEIR, and cause us to wonder if the true biological value of Hahamongna is being purposefully downplayed.

Questions: Why does the list of birds not include the 150+ other species we know to be there? Where are maps that show the nesting areas of Yellow Warbler? Why does the report confuse current and former names for species such as the Western Toad AKA California Toad? Why does the report not refer to the Coast Patch-nose Snake as a federally listed snake and as a California Species of Special Concern? Why does the report ignore the fact that a federally-listed bird species, the 'Least' Bell's Vireo, nested in the basin in 2012? Why did the biologists not consult organizations, such as ours, that regularly conduct surveys in Hahamongna? Did the biologists consult with the California Native Plant Society regarding plant species of Special Concern? Why does the report ignore the County's designation of Hahamongna Watershed Park as a Significant Ecological Area?

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The DEIR ignores recreation impacts. The DEIR found that "Recreation impacts were found to be less than significant." We know this is not true. The presence of a large industrial operation in the bottom of the Hahamongna basin, causing massive dust and noise impacts, will dissuade many local residents from ever experiencing the magic of Hahamongna, and will reduce the number and enjoyment of those who go there for a restorative nature experience. The Pasadena Audubon Society conducts its monthly bird walk in Hahamongna and has done so for years. This project destroys most of the area where we conduct this walk. PAS conducts monthly bird walk here because of the biodiversity, something the County never addresses. The children in the Tom Sawyer Camps utilize this area, building forts and hiking, and the Rose Bowl Riders ride through here every day. Hikers and dog walkers crisscross the basin, while disc golfers enjoy the nearby oaks. Clearly, this area is critical for a broad spectrum of people.

Comment 189-16

Question: Did the County ask the Pasadena Audubon Society, the California Native Plant Society, the Rose Bowl Riders, Tom Sawyer Camps, the disc golfers, and any of the local residents who walk through Hahamongna if this project would have an impact on their recreation in the basin?

Solutions

The County needs a "forever plan," one that is sustainable and does not permanently destroy one of the most important open spaces in the region.

The County argues for the need to remove sediment because of the Station Fire, and while we do not dispute that some sediment needs to be removed, despite the lack of any science to support removing any sediment, we see no compelling argument in the DEIR for removing it in five years. Most of the debris that is going to come down due to the Station Fire has already done so, and the Devil's Gate Dam reservoir still has capacity, though admittedly it is difficult to know how much capacity as the numbers we see from the County shift markedly, like a moving goal post.

The Pasadena Audubon Society urges the County to adopt the proposal offered by Tim Brick, Managing Director of the Arroyo Seco Foundation: Go Slow, Go with the Flow, Let the Habitat Grow, and Keep Costs Low. This plan will mean fewer trucks, less dust, less air pollution, less noise, less habitat destruction, and lower costs.

Go Slow: The County makes no case for removing the sediment in three-five years. This sediment has been building up for almost 100 years, and the basin has never been fully cleaned out. We would like you to take a longer time, ten-twenty years, which would eliminate the need for the Big Dig approach. The Go Slow approach would allow the sediment to be removed in less destructive ways. Instead of removing 800,000-1,200,000 cubic yards of sediment per year, the County could remove 167,000 cubic yards per year, and then annually remove what is necessary based on the amount of inflow. As long as the County removes more than what flows in, they will increase the capacity of the dam.

Comment 189-17

Go with the Flow: The County should allow more of the sediment to flow through the dam using sluicing or FASTing (Flow-Assisted Sediment Transport). The County has

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been sluicing sediment through Devil's Gate Dam for years, and we would like to see more. If the County proceeds slowly, then it may utilize large storms more effectively to sluice sediment, and can coordinate with the Army Corps of Engineers on its plans to restore habitat in the Los Angeles River. The County can conduct pilot programs to determine the effects of increased sluicing downriver. Sluicing returns sediment to where it belongs: the river. This sediment is not a waste product but can be used as an integral part of the restoration of the Arroyo Seco and the Los Angeles River.

Let the Habitat Grow: The County makes no case for keeping 50-120 acres of riparian habitat permanently denuded. This rich riparian habitat should be allowed to grow so it can continue to provide a home for local flora and fauna, and provide recreation for the many stakeholders who use Hahamongna. Vegetation also slows down the water flow, allowing it to percolate into the aquifer.

Comment 189-17 continued

Keep Costs and Impacts Low: This $100 million project can cost a lot less if the County uses the SLOW method. By sluicing more sediment through the dam and working with nature instead of against it, the costs of this project can be greatly reduced. If the County removed more of the sediment with sluicing, that means that the County will need fewer trucks, which will save money. If the cost is spread out over ten or twenty years, this provides the County and the City an opportunity to reexamine the process and promote best practices from an economic, engineering, and environmental standpoint. More importantly, this project can serve as a model for other projects, and perhaps the County can find ways to work with nature on the other projects, thereby reducing the costs of sediment removal countywide. The County has estimated costs the range of at $3-5 billion over the next 20 years, but as this has become an ongoing maintenance expense, the County needs find ways to reduce this cost permanently. The SLOW method also relies much less on cancer-causing noise-polluting diesel trucks and more on the natural systems that work for free.

Comment 189-18

Again, we thank you for the opportunity to comment on the DEIR for the sediment removal in Hahamongna Watershed Park. The Pasadena Audubon Society does not accept any of the alternative proposals in the DEIR, but we hope that we can use this, along with the hard lessons of the Arcadia Woodlands, as opportunities to improve how sediment is managed and for increased engagement with stakeholders.

Sincerely,

Deni Sinott (signed)
President
Pasadena Audubon Society

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Mickey Long (signed)
Vice President
Pasadena Audubon Society

Laura Garrett (signed)
Conservation Chair
Pasadena Audubon Society

CC: LA County Supervisor Michael Antonovich
Pasadena Mayor Bill Bogaard
Pasadena City Councilmember Terry Tornek
Scott Harris, California Fish & Wildlife
Christine Medak, US Fish & Wildlife
Samuel Unger, California Regional Water Quality Control Board
Los Angeles Mayor Eric Garcetti

Response to Comment Letter #189 (Pasadena Audubon Society)

Response to Comment 189-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. Los Angeles County Flood Control District (LACFCD) notes the commenter's concern with the Proposed Project and the disapproval of all of the alternatives except for the No Project Alternative.

LACFCD goes to great lengths to lessen project impacts and maximize efficiencies. For example, the Draft Environmental Impact Report (EIR) concluded that Alternative 3 is the Environmentally Superior Alternative. Alternative 3, Configuration D affects the least amount of reservoir area of all the action alternatives, while still achieving Proposed Project objectives (see Section 4.6 of the Final EIR). This alternative would provide a buffer between the Oak Grove area of Hahamongna Watershed Park and the excavation area. Alternative 3, Configuration D, Option 1 provides a more natural configuration for the reservoir by having two branches to carry water and sediment toward the face of the dam, avoiding disturbing a significant portion of existing vegetation. To further reduce the Proposed Project's footprint, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2, which drastically reduces the project's footprint of 120 acres down to 71 acres, would avoid excavation of the western branch, thereby providing a greater habitat buffer on the west side of the reservoir. In addition, the maintenance areas would be smaller than the original sediment removal footprint, allowing for habitat to reestablish.

The Proposed Project is designed to be a long-term plan, with the reservoir management phase providing management for future sediment inflows. The proposed yearly cleanout of sediment after the completion of the Proposed Project will reduce the necessity for a future large-scale cleanout.

While sluicing is not a viable project alternative, as explained in Section 4.7 of the Draft EIR, Flow Assisted Sediment Transport, or FASTing, will be used for maintenance after the project's main sediment removal phase has been completed, as described in Section 2.5.2 of the Draft EIR.

After the sediment removal phase has occurred, FASTing is proposed to be an integral part of the annual maintenance at Devil's Gate. Annual FASTing operations will be implemented to reduce future buildups of sediment in the reservoir and to reduce the need for mechanical removal of sediment from the reservoir. Although FASTing is expected to be an effective means of keeping sediment levels low in the reservoir, it is estimated that approximately 13,000 cubic yards (cy) of sediment will be removed by excavation annually; however, a maintenance regime that relies on FASTing greatly reduces the need for and extends the life of future and existing sediment placement sites and improves the future sustainability of the reservoir. Please see Section2.5.2 of the Draft EIR for more information on future maintenance.

Response to Comment 189-2:

LACFCD recognizes the local planning documents written for the area, including the City of Pasadena Open Space Element and the Hahamongna Watershed Park Master Plan.

Air quality and noise impacts associated with truck traffic were analyzed in the Draft EIR in Sections 3.5 and 3.14, respectively. As discussed in the Draft EIR, Section 3.14, with implementation of Mitigation Measure MM N-1, noise impacts would be reduced to a level of less than significant. LACFCD has

conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed the United States (U.S.) Environmental Protection Agency's (EPA's) 2007 standards for emissions. Therefore, in order to further reduce emissions, Mitigation Measure MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump trucks that meet or exceed EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality, including those associated with health effects, will be reduced to less than significant.

As discussed in the Draft EIR, Section 3.5, the Health Risk Assessment (HRA) analyzed both the cancer-related and noncancer-related acute (short-term) and chronic (long-term) impacts from project-related emissions. The HRA analysis found the Proposed Project would result in less than significant impacts for both the cancer-related and noncancer-related acute short-term and long-term impacts. As discussed in the Draft EIR, Section 3.5, impacts related to odors were determined to be less than significant.

As discussed in Section 3.6.6 of the Draft EIR, Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats. In addition, sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays).

Mitigation Measures MM BIO-1 through MM BIO-8 are enforceable and designed to reduce impacts through methods known to be feasible and effective. The Proposed Project's Mitigation Measures are accepted by agencies that would be involved in consultation, negotiation, and final approval of Mitigation Measures, including conceptual restoration plans. As with any project that involves California Department of Fish and Wildlife (CDFW), U.S. Army Corps of Engineers (USACE), and Regional Water Quality Control Board (RWQCB) jurisdictional areas, the ultimate mitigation for impacts related to the wetlands and drainages under the jurisdiction of the resource agencies is negotiated with the resource agencies during the regulatory permitting process. LACFCD has been and will continue to work closely with CDFW and USACE to identify appropriate mitigation, replacement ratios, and sites for restoration and enhancement that will offset impacts and satisfy the requirements of all applicable laws. A detailed restoration plan will be prepared and provided to CDFW and USACE for review and approval prior to project implementation. Prior to commencement of the Proposed Project, LACFCD will have obtained all necessary permits for impacts to CDFW, USACE, and RWQCB jurisdictional areas including Section 401 Certification, Section 404 permit, and a Streambed Alteration Agreement. Clean Water Act Section 404 (b)(1) guidelines will be followed as a framework for compensatory mitigation. Through 404(b)(1) negotiations with USACE and negotiations with CDFW under Fish and Game Code Sections 1600-1616, a determination of the functions and values of impacted jurisdictional waters will result in the coordination of appropriate mitigation measures for sediment removal.

Response to Comment 189-3:

Comment noted. See Response to Comments 189-1 through 189-18.

Response to Comment 189-4:

See Response to Comment 189-2.

Response to Comment 189-5:

Potential impacts due to the Proposed Project's truck trips were analyzed in the Draft EIR, Section 3.16, Transportation and Traffic. As listed in that section, a single intersection in the immediate vicinity of the Proposed Project site will have a potentially significant impact. The Draft EIR outlines a 12-hour trucking schedule, with trucking operations on Saturdays as well. This schedule is used to model the most intensive construction operation, which may not be applicable at the site for the duration of the Proposed Project. Typical trucking schedules are estimated to be 8 hours per day on weekdays. In practice, hauling rates and routes may be adjusted to help reduce impacts depending on operational need. As discussed in the Draft EIR, Section 3.16, Transportation and Traffic, truck traffic associated with the Proposed Project will not cause any major traffic impacts at the studied freeway segments along any of the Haul Routes.

As discussed in the Draft EIR, Section 3.16, Transportation and Traffic, TRANSPORTATION-3, modifications to traffic conditions by the Proposed Project will consist of roadway restriping. These changes would not alter existing roadway use or substantially increase hazards. Thus, impacts related to traffic hazards would be less than significant.

While the majority of the sediment disposal and associated truck traffic is expected to go to the disposal sites east of the Proposed Project, the Draft EIR also analyzed the use of disposal sites west of the Proposed Project. This will allow for flexibility in case one particular route is temporarily unusable.

LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the Proposed Project site.

Response to Comment 189-6:

See Response to Comment 189-2.

Response to Comment 189-7:

See Response to Comment 189-2.

Response to Comment 189-8:

The comments on the Draft EIR are noted and have been responded to as bracketed out.

Response to Comment 189-9:

LACFCD was mandated by the State Legislature to provide flood protection and water conservation within its boundaries.

A reservoir storage design capacity of two design debris events (DDEs) below the dam's lowest spillway was determined to be the standard acceptable level of risk at Devil's Gate Dam and Reservoir. The DDE volume of capacity is determined using the January 2006 Los Angeles County Department of Public Works (LACDPW) Hydrology Manual and the March 2006 LACDPW Sedimentation Manual. For Devil's Gate Dam and Reservoir, the required reservoir capacity is 4.0 million cy (two DDEs) below the spillway elevation of 1,040.50 feet.

The Hydrology Manual (January 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_Hydrology_Manual/2006%20Hydrology%20Manual-Divided.pdf

The Sedimentation Manual (March 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_sedimentation_manual/Sedimentation%20Manual-Second%20Edition.pdf

Additional information concerning DDE calculation methods has been added to the Final EIR, Section 2.3, Project Need.

For Devil's Gate Dam, the DDE was previously calculated as 1.67 million cy. That previous calculation was based on the presence of debris-retaining structures including Browns Canyon Dam, located within the Angeles National Forest upstream of Devil's Gate Dam. These structures filled with sediment decades ago and no longer provide capacity to "control" any portion of the watershed. A subsequent analysis determined that the correct DDE, based on the absence of sediment control facilities in the Forest, is 2.0 million cy. Following the Station Fire, LACDPW reviewed the DDE calculations and confirmed that 2.0 million cy is the current and appropriate volume for the DDE.

In 2010, in response to the Station Fire, an emergency project to remove only 1.67 million cy was proposed. The volume of 1.67 million cy is the previously published DDE, and this amount was considered justifiable as an emergency exemption to CEQA. This emergency project was not completed because, in March 2011, the County of Los Angeles Board of Supervisors motioned LACFCD to complete an EIR for a comprehensive sediment removal project at Devil's Gate. LACFCD then initiated project development in accordance with the required level of protection of two DDEs. At that time, LACFCD also began receiving feedback on the concurrent Sediment Management Strategic Plan (Strategic Plan) and the interest to look at more sustainable sediment and reservoir management. As a result of the feedback and recommendations during the development of the Strategic Plan, LACFCD began evaluating ways to create a more sustainable long-term way to manage its sediment and habitat. To emphasize the goals of the project, the Proposed Project was given the name Devil's Gate Sediment Removal and Management Project.

Historically, large amounts of sediment have been deposited in the reservoir in short time periods. Between 1935 and 1938 over 1.6 million cy of sediment, between 1938 and 1943 over 1.95 million cy of sediment, between 1959 and 1966 over 1.75 million cy of sediment, and between 2010 and 2012 over 1.3 million cy of sediment was deposited in the reservoir. From the construction of the dam in 1920 up to the Station Fire in 2009, approximately 10.7 million cy of sediment accumulated in the reservoir; and approximately 8.0 million cy was removed by LACFCD. Surveys were taken before and after the Station Fire, in January and April 2009, April 2010, and March 2011. The changes in elevations within the reservoir before and after the Station Fire were used to determine the amount of sediment that flowed into the reservoir in the storm seasons following the Station Fire. Following the 2009 Station Fire, approximately 1.3 million cy of sediment flowed into Devil's Gate Reservoir after just two average water year storm seasons. Additionally, over 92 years, the average amount of sediment deposited each year is approximately 130,000 cy; however, due to the dynamic nature of the system and the recent burn of the watershed, the amount could vary greatly. If a 1 in 50 years storm were to occur, approximately 2.0 million cy (one DDE) of sediment could be expected to wash into the reservoir.

Given the current, limited capacity of the reservoir, a 50-year storm event that results in a DDE would result in storm flows with sediment flowing over the spillway. Flooding with mud/sediment would occur along portions of the Arroyo Seco in the Cities of Pasadena, South Pasadena, and Los Angeles, impacting approximately 650 parcels and requiring closure of Interstate 110 from Orange Grove Avenue to Interstate 5. Additional information about the potential flood areas and analysis is shown in the Arroyo Seco Channel Hydraulic Analysis prepared by Bureau Veritas North America, Inc., available on the Project website. Please note that protocols are in place to monitor storms, reservoir conditions, and channel conditions and to communicate with emergency responders and the California Department of Transportation (Caltrans) to execute any necessary evacuations or freeway closures.

LACFCD proposed a project duration of five years to reduce accumulated sediment in a timely fashion. The goal of LACFCD is to restore reservoir flood capacity as soon as feasible while reducing costs, minimizing the duration of environmental and construction impacts to the surrounding communities, and configuring the reservoir to allow for sustainable future maintenance. Extending the project would prolong the flood risk to downstream communities and increase the construction impacts to the surrounding communities.

The last 50-year design storm event recorded at Devil's Gate was during the 1968-1969 storm year.

.Under CEQA, the lead agency is not required to analyze an economic impact associated with a project in the EIR; as Section 15131(a) of the CEQA Guidelines states: "Economic or social effects of a project shall not be treated as significant effects on the environment." Moreover, CEQA allows economic analysis in the administrative record only if the basis for infeasibility, and thus rejection of a mitigation or alternative, is economic, as described in CEQA Guidelines Sections 15091(a)(3) and 15364.

Response to Comment 189-10:

See Response to Comments 189-1 and 189-9. Neither the Proposed Project nor the alternatives involve turning the reservoir into a maintenance yard. The Proposed Project is designed to be a long-term plan, with the reservoir management phase providing management for future sediment inflows. The proposed yearly cleanout of sediment after the completion of the Proposed Project will reduce the necessity for a future large-scale cleanout.

As discussed above, Alternative 3 affects the least amount of habitat and has smaller maintenance areas.

After the sediment removal phase has occurred, Flow Assisted Sediment Transport, or FASTing, is proposed to be an integral part of the annual maintenance at Devil's Gate. Annual FASTing operations will be implemented to reduce future buildups of sediment in the reservoir and to reduce the need for mechanical removal of sediment from the reservoir. Although FASTing is expected to be an effective means of keeping sediment levels low in the reservoir, it is estimated that typically 13,000 cy of sediment will be removed by excavation annually; however, a maintenance regime that relies on FASTing greatly reduces the need for and extends the life of future and existing sediment placement sites and improves the future sustainability of the reservoir. Please see Section 2.5.2 of the Draft EIR for more information on future maintenance.

As described in Section 2.1.4 of the Draft EIR, through easements granted in May 1919 and March 1965, the City of Pasadena granted the LACFCD, under a perpetual easement, the right to construct, reconstruct, inspect, maintain, repair, and operate Devil's Gate Dam, its spillway, bypasses, tunnels, and

other support facilities as may be necessary for the construction and maintenance of a reservoir capable of impounding the waters of the Arroyo Seco for purposes of storage and control, and to control such waters as may be necessary in the prevention of damage by flood (City of Pasadena 1919/1965).

Response to Comment 189-11:

See Response to Comment 189-2.

As discussed in the Draft EIR, Section 3.10.6, Impacts and Mitigation, HAZARDS-1, Sediment Removal/Reservoir Management, no hazardous levels of the contaminants were detected in the sediment. Dust impacts from the Proposed Project were carefully evaluated, as discussed in the Draft EIR, Section 3.5.6, Impacts and Mitigation, AIR QUALITY-2, Sediment Removal. The Proposed Project's activities, including excavation, grading, material loading, and hauling, would result in less than significant dust emissions due to the Proposed Project's use of best management practices and would be in full compliance with South Coast Air Quality Management District's (SCAQMD's) fugitive dust regulations.

As part of the geotechnical study for the Proposed Project, a subsurface exploration was performed at four representative locations within the reservoir. Although a distinct ash layer was not observed, a "burn layer" within otherwise "clean" sediments was encountered at depth at three locations. Representative sampling of the burn layer was performed, and the samples were subjected to various environmental laboratory tests to evaluate the presence and concentrations of pertinent and regulated contaminants of concern. None of the contaminants that were detected in the sediment samples exceeded regulatory screening levels for this project and would not be characterized as hazardous.

The airborne transport of dust, including "micro ash," to offsite locations will be controlled during earth removal operations through the Proposed Project's use of best management practices , such as spraying the material with water. In addition, dust monitoring at the property boundaries will confirm the effectiveness of the water spraying. During offsite transport, the sediment will be covered in each truck to further reduce the potential for dust.

Response to Comment 189-12:

See Response to Comments 189-2 and 189-11.

Response to Comment 189-13:

See Response to Comment 189-2.

Response to Comment 189-14:

The California RWQCB denied without prejudice a permit for the emergency project, with the understanding that LACFCD would be initiating an EIR process for a project which would restore the required level of protection. As part of project approval, LACFCD will obtain the necessary permits from the RWQCB.

Response to Comment 189-15:

Many local organizations, including the Pasadena Audubon Society, Hahamongna Watershed Park Advisory Committee, the Urbanwild Network, and the Arroyo Seco Foundation, were contacted about the Proposed Project prior to the Draft EIR being prepared. In January 2012, a representative of the Pasadena Audubon Society was contacted for information the Society has concerning birds observed in the Proposed Project area. The information provided was used in preparing the biological resources section of the Draft EIR. Species with the potential to occur within the Proposed Project and species that were identified during surveys are presented in the biological survey reports in Appendix D of the Draft EIR. Factors used to determine the potential for occurrence included the quality of habitat, elevation, and the results of the reconnaissance survey. The locations of prior database records and species lists of occurrence were used as additional data; but since these are positive-sighting databases, this data was used only in support of the analysis from the previously identified factors. Based on the results of the Biological Technical Report (BTR), additional protocol-level focused surveys were conducted for Proposed Project as described in Section 3.6.2, Special Status Plant Species and Special Status Animal Species of the Draft EIR.

As shown in Table 3.6-3 in the Draft EIR, both least Bell's vireo and yellow warbler are listed as present within the Proposed Project site. Additional sightings will not affect their status as present, which was accounted for in the Draft EIR within the Proposed Project site, and do not add any additional constraints to those mentioned in the analysis in the Draft EIR. The current Mitigation Measures MM BIO-1, MM BIO-2, MM BIO-3, MM BIO-4, and MM BIO-5 account for these species being present and will serve to protect and avoid impacts to these species and other breeding birds and will reduce impacts to less than significant.

The species recorded during surveys specifically for the Proposed Project are presented in the Biological Technical Report (BTR) in Appendix D of the Draft EIR. The coast patch-nosed snake was observed on site, and the State and federal status has been included in the Draft EIR. As discussed in the Draft EIR, Section 3.6.6, Sensitive Wildlife, to avoid harm or take of any special status wildlife species, mitigation measures MM BIO-1, MM BIO-2, MM BIO-3, MM BIO-4, and MM BIO-5 will be implemented. These include conducting preconstruction surveys, having a biological monitor onsite during construction, and implementing measures to avoid impacts to sensitive species. With implementation of these mitigation measures, direct impacts to biological resources would be less than significant.

Species names used in the Draft EIR were consistent with the Master Watershed Plan for the Hahamongna Watershed by request of the City of Pasadena to maintain consistency with the Master Plan. Species names have been updated, and duplications of species have been eliminated in the Final EIR. Status listings for sensitive species have been updated, as appropriate.

The Proposed Project is not located in a currently adopted Significant Ecological Area (SEA). The Los Angeles County Department of Regional Planning is currently in the process of updating the SEA Program. The Proposed Project is located within the Proposed Altadena Foothills and Arroyos SEA. Regional Planning's SEA updates, including the Proposed SEAs, have not been adopted, nor are they covered under the current Hillside Management Area and SEA Ordinance.

The SEA does not change the land use designation or the zoning of a property. The intent of the proposed SEA regulations is not to preclude development but to allow limited, controlled development

that does not jeopardize the unique biotic diversity within the County. Under the Ordinance for the Proposed SEA, safety activities and existing permitted uses are exempt.

As discussed in the Draft EIR, Section 3.12.6, Land Use and Planning, the Proposed Project will not have any significant impacts or conflict with the applicable land use plans, policies, or regulations of adopted plans.

Response to Comment 189-16:

See Response to Comments 189-2, 189-11, 189-15. LACDPW has also reached out to recreational users, including the Pasadena Audubon Society, Rose Bowl Riders, Tom Sawyer Camps, Oak Grove Disc Golf Club, and MACH-1.

Impacts to recreation were analyzed in the Draft EIR, Section 3.15. The Proposed Project will not limit the use of the Oak Grove area of Hahamongna Watershed Park. Sediment removal activities would be temporary and are expected to occur only in the drier months (April to December, excluding holidays). It is expected that these activities will often not be adjacent to the Oak Grove area of Hahamongna Watershed Park. The Proposed Project would result in temporary limitations on the recreational use of the Proposed Project site and some of the adjacent trails. Most of these areas would be reopened seasonally or intermittently throughout the sediment removal process. In addition, temporary impacts to designated recreational facilities and trails will be minimized through advance communication and redirection to the nearest facility in the vicinity of the Proposed Project. Furthermore, an east-west trail crossing will continue to provide access at the north end of the reservoir. At the south end of the reservoir, after the reservoir ingress and egress ramps have been fully constructed, access to the upper east side Arroyo Seco Trail from La Cañada Verdugo Road will be maintained; and the linkage from the west side Arroyo Seco Trail and the Flint Wash Trail to the upper east side Arroyo Seco Trail (crossing Devil's Gate Dam and also continuing south to the Rose Bowl) will be available after construction activities have ended each day and on nonworking days.

No official disc golf course holes located in the Oak Grove area of Hahamongna Watershed Park will be removed by the Proposed Project. Where possible, LACFCD will avoid any disc golf course holes located outside the Oak Grove area of Hahamongna Watershed Park. When avoidance is not possible, LACFCD will coordinate with the Oak Grove Disc Golf Club for temporary removal of the disc golf hole equipment.

Alternative 3, Configuration D, the Environmentally Superior Alternative from the Draft EIR, carefully balances flood control needs and reductions in impacts to habitat by restoring the required reservoir capacity while also minimizing the project footprint (see Section 4.6 of the Final EIR). Furthermore, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2 would avoid excavation of the western branch, thereby providing a greater distance between the Oak Grove area of Hahamongna Watershed Park and the excavation area, reducing the project footprint of 120 acres down to 71 acres. Alternative 3, Configuration D, Option 2 would also avoid all currently existing Oak Grove Disc Golf Club holes. The Oak Grove area of Hahamongna Watershed Park and the associated facilities would remain open during sediment removal and would continue to provide active recreational facilities to the area.

Response to Comment 189-17:

See Response to Comments 189-1 and 189-9.

LACFCD goes to great lengths to lessen project impacts and maximize efficiencies. As such, many of the points in the Arroyo Seco Foundation's four-point "Slow Program" are compatible with the LACFCD Proposed Project.

For example, the Draft EIR concluded that Alternative 3 is the Environmentally Superior Alternative. Alternative 3 drastically reduces the project's footprint of 120 acres down to 71 acres. Additionally, the limited maintenance area for Alternative 3 further reduces the permanent habitat impacts down to approximately 51 acres by allowing for site replanting and mitigation to take place within the reservoir footprint. This reduction in project acreages will greatly lessen environmental impacts of the Proposed Project.

LACFCD strives to achieve an efficient, low-cost sediment removal project. Sediment removal rates and trucking operations, now utilizing all low-emissions trucks, as explained in Section 3.5 of the Draft EIR, have been carefully planned for economies of scale to realize maximum efficiencies without major delays in project schedule, thus greatly reducing operating costs. Furthermore, LACFCD has applied for and received an approximately $28 million grant through the State's Disaster Preparedness and Flood Protection Bond Act of 2006 (Proposition 1E) program. A portion of this grant will be used to help offset the Proposed Project's costs.

While sluicing is not a viable project alternative, as explained in Section 4.7 of the Draft EIR, Flow Assisted Sediment Transport, or FASTing, will be used for maintenance after the project's main sediment removal phase has been completed, as described in Section 2.5.2 of the Draft EIR.

For a more detailed response to the Arroyo Seco Foundation's four-point "Slow Program", please see the response to the Arroyo Seco Foundation's comment letter (Comment Letter #216, Response to Comment 216-16).

Response to Comment 189-18:

Comment and attachment noted.

From: Ross Plesset
To: reservoircleanouts
Subject: Comment re: Devil"s Gate Reservoir Sediment Removal and Management Project
Date: Monday, January 20, 2014 3:12:59 PM

Dear Sir/Madam:

Comment 190-1

As a resident of Los Angeles County I strongly oppose the county's current plan to restore the Devil's Gate Dam and back the alternative plan supported by the Arroyo Seco Foundation, which is by far more environmentally-sound and would allow sediments to flow to the sea shore where they are needed.

Comment 190-2

The county plan would be devastating for the beautiful, rich, and biologically-diverse land surrounding the dam

Thank you very much for your time and attention.

Sincerely,

Ross Plesset
2240 1/2 Lake Shore Avenue
Los Angeles, CA 90039

Response to Comment Letter #190 (Ross Plesset)

Response to Comment 190-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. Los Angeles County Flood Control District (LACFCD) notes that the commenter opposes the Proposed Project and support's the Arroyo Seco Foundation's proposed alternative.

LACFCD goes to great lengths to lessen project impacts and maximize efficiencies. As such, many of the points in the Arroyo Seco Foundation's four-point "Slow Program" are compatible with the LACFCD Proposed Project.

For example, the Draft Environmental Impact Report (EIR) concluded that Alternative 3 is the Environmentally Superior Alternative. Alternative 3 drastically reduces the project's footprint of 120 acres down to 71 acres. Additionally, the limited maintenance area for Alternative 3 further reduces the permanent habitat impacts down to approximately 51 acres by allowing for site replanting and mitigation to take place within the reservoir footprint. This reduction in project acreages will greatly lessen environmental impacts of the Proposed Project.

LACFCD strives to achieve an efficient, low-cost sediment removal project. Sediment removal rates and trucking operations, now utilizing all low-emissions trucks, as explained in Section 3.5 of the Draft EIR, have been carefully planned for economies of scale to realize maximum efficiencies without major delays in project schedule, thus greatly reducing operating costs. Furthermore, LACFCD has applied for and received an approximately $28 million grant through the State's Disaster Preparedness and Flood Protection Bond Act of 2006 (Proposition 1E) program. A portion of this grant will be used to help offset the Proposed Project's costs.

While sluicing is not a viable project alternative, as explained in Section 4.7 of the Draft EIR, Flow Assisted Sediment Transport, or FASTing, will be used for maintenance after the project's main sediment removal phase has been completed, as described in Section 2.5.2 of the Draft EIR.

LACFCD is committed to *Public Service that Works*; and by combining almost 100 years of technical expertise and invaluable input from the community, less invasive flood protection will continue to be a reality.

For a more detailed response to the Arroyo Seco Foundation's four-point "Slow Program", please see the response to the Arroyo Seco Foundation's comment letter (Comment Letter #216, Response to Comment 216-16).

Response to Comment 190-2:

As discussed in Section 3.6.6 of the Draft Environmental Impact Report (EIR), Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats.

STATE OF CALIFORNIA–THE NATURAL RESOURCES AGENCY EDMUND G. BROWN, JR., *Governor*

SANTA MONICA MOUNTAINS CONSERVANCY
RAMIREZ CANYON PARK
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Comment Letter #191

January 17, 2014

Ms. Gail Farber
Director
Los Angeles County Department of Public Works
Attn: Water Resources Division - Reservoir Cleanouts
P.O. Box 1460
Alhambra, California 91802-9974

Devil's Gate Reservoir Sediment Removal and Management Project
Draft Environmental Impact Report Comments

Dear Ms. Farber:

Comment 191-1

The Santa Monica Mountains Conservancy staff offers the following comments on the proposed Devil's Gate Reservoir Sediment Removal and Management Project proposing the removal of as much as 4 million cubic yards of sediment. The proposed project neither works with natural forces nor integrates key input from stakeholders. The impacts of this massive earth-moving project will have enormous environmental, and public impacts. The impacts cannot be mitigated. Therefore we ask the Department of Public Works to reconsider its sediment management program.

Natural Integrated Approach

The Draft Environmental Impact Report (DEIR) does not make a sufficient science-based argument for the need to remove 2.4 to 4 million cubic yards of sediment. The DEIR is also deficient in making a case for the need to remove this much sediment within a five-year period. The DEIR does not identify or document an immediate flood threat to the Arroyo Seco downstream of the dam that warrants rushing this project.

Comment 191-2

A DEIR map illustrates areas where there may be a downstream flood channel capacity problems in the event of a fifty-year flood, but it does not describe either what the flooding effects are likely to be in the deficient areas or what steps the County Flood Control District is taking to deal with channel capacity. County records reveal that the dam has stored greater amounts of sediment in the past and currently still has about 47 percent capacity. With a low probability of a massive sediment flow similar to the two years after the Station Fire, there does not appear to be a need to remove 2.4- 4 million cubic yards of sediment in 5 years.

Comment 191-3

An integrated approach that works with nature must be analyzed in a CEQA document. Simply extending a time-frame for this project would create a more sustainable sediment management program: A 20-year project will reduce the amount of sediment built up behind Devil's Gate Reservoir and minimize all negative environmental impacts. The County should remove 160,000 cubic yards for ten years instead of the proposed removal of 800,000-1,200,000 cubic yards each year for the shorter project. After ten years the sediment management program can adapt the base amount based on inflow into the basin. As long as the County removes more than what flows in, the capacity of the dam will increase.

Comment 191-4

While the County has used sluicing or flow-assisted sediment transport (FAST) in the past, it has not included it in this proposed program. The County can incorporate this natural hydraulic process to reduce the levels of sediment in the dam. By proceeding with a natural integrated approach the County may utilize large storms more effectively to sluice sediment. Sluicing returns sediment to where it belongs - the river and beaches. The Arroyo Seco and Los Angeles River restoration efforts need sediment. This natural integrated approach provides a low cost, sustainable, low pollution management program rather than the County's proposed big dig.

Permanent Loss of Significant Habitat

Thirteen-hundred-acre Hahamongna Watershed Park, a rare and unique environmental resource, is one of southern California's most spectacular alluvial canyons. Much of the land in the proposed impact area supports willow and mule fat. It is difficult to find an equivalent amount of contiguous willow and mule fat in Southern California. The County's sediment removal project would permanently destroy 50-120 acres of regionally significant willow and mulefat riparian habitat.

Comment 191-5

Given all of the significant habitat found in Hahamongna Watershed Park, how does the County justify the permanent loss of this significant habitat that provides resources for key species when less destructive and less costly means of removing the sediment are available? The DEIR provides no rationale for permanent destruction of habitat as opposed to a slower, smaller, and longer project. A natural integrated program will create only small areas of temporary biological disturbance and will not require a permanently denuded maintenance area of up to 120-acres after the initial removal.

Inadequate Habitat Mitigation

Comment 191-6

The DEIR does not include a mitigation plan. Mitigation measures MM BIO 1-8 contain the underpinngs of a fully vested mitigation plan but these measures alone are not enough to constitute a mitigation plan. The Conservancy cannot comment on a mitigation plan not found in the DEIR.

Comment 191-7

MM BIO - 6, MM BIO - 7, and MM BIO - 8 all propose replacing vegetation on a 1:1 ratio. How can such a low mitigation rate be justified for the pristine riparian, woodland, and Riversidean Alluvial Fan Sage Scrub habitat found at Hahamongna Watershed Park? MM BIO - 8 states that mitigation will occur in a combination of onsite and offsite locations. The odds seem stacked against the County being able to find 120 suitable acres to perform appropriate mitigation.

Comment 191-8

Should you have any questions or clarification requests, please contact Paul Edelman, Deputy Director of Natural Resources and Planning, at 310-589-3200, ext. 128.

Sincerely,

RORIE SKEI
Chief Deputy Director

Response to Comment Letter #191 (Santa Monica Mountains Conservancy)

Response to Comment 191-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

Outside experts, especially those on the Stakeholder Task Force, were consulted during the formation of the Los Angeles County Flood Control District's (LACFCD's) Sediment Management Strategic Plan. Information from that consultation was used in the formulation of the Proposed Project and Alternatives. In addition, the purpose of the scoping process was to gather input from outside experts and agencies as well as the public on what the environmental analysis should consider and what alternatives should be analyzed. Information gathered from the scoping process was used in the formulation of the Proposed Project and Alternatives and preparation of the Draft Environmental Impact Report (EIR).

The Draft EIR analyzed a range of sediment removal amounts and configurations aimed at addressing the diverse concerns of stakeholders including concerns for long-term habitat preservation and recreational usage. The alternatives presented in the Draft EIR represent the best options available to respond to stakeholders' concerns while adequately reducing flood risk to downstream communities.

The reservoir management portion of the Proposed Project will work with natural forces. After the sediment removal phase has occurred, Flow Assisted Sediment Transport, or FASTing, is proposed to be an integral part of the annual maintenance at Devil's Gate. Annual FASTing operations will be implemented to reduce future buildups of sediment in the reservoir and to reduce the need for mechanical removal of sediment from the reservoir. Although FASTing is expected to be an effective means of keeping sediment levels low in the reservoir, it is estimated that approximately 13,000 cubic yards (cy) of sediment will be removed by excavation annually; however, a maintenance regime that relies on FASTing greatly reduces the need for and extends the life of future and existing sediment placement sites and improves the future sustainability of the reservoir. Please see Section 2.5.2 of the Draft EIR for more information on future maintenance.

Air quality impacts associated with truck traffic were analyzed in the Draft EIR in Section 3.5. LACFCD has conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed the United States (U.S.) Environmental Protection Agency's (EPA's) 2007 standards for emissions. Therefore, in order to further reduce emissions, Mitigation Measure MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump trucks that meet or exceed EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality, including those associated with health effects, will be reduced to less than significant.

Potential impacts due to the Proposed Project's truck trips were analyzed in the Draft EIR, Section 3.16, Transportation and Traffic. As listed in that section, a single intersection in the immediate vicinity of the Proposed Project site will have a potentially significant impact. In practice, hauling rates and routes may be adjusted to help reduce impacts, depending on operational need. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the Proposed Project site.

As noted in the Draft EIR, Section 3.4, Aesthetics, the Proposed Project will have significant temporary impacts to aesthetics; however, after the sediment removal phase of the Proposed Project is complete, a habitat restoration plan will be implemented that will allow native plant communities to reestablish outside the reservoir management area. Riparian Herbaceous vegetation is expected to continue to populate and/or reestablish in the management area of the Proposed Project site between maintenance activities.

All other potential California Environmental Quality Act (CEQA) impact categories were found to be fully mitigated or not require further evaluation in the Draft EIR.

Response to Comment 191-2:

LACFCD was mandated by the State Legislature to provide flood protection and water conservation within its boundaries.

A reservoir storage design capacity of two design debris events (DDEs) below the dam's lowest spillway was determined to be the standard acceptable level of risk at Devil's Gate Dam and Reservoir. The DDE volume of capacity is determined using the January 2006 Los Angeles County Department of Public Works (LACDPW) Hydrology Manual and the March 2006 LACDPW Sedimentation Manual. For Devil's Gate Dam and Reservoir, the required reservoir capacity is 4.0 million cy (two DDEs) below the spillway elevation of 1,040.50 feet.

The Hydrology Manual (January 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_Hydrology_Manual/2006%20Hydrology%20Manual-Divided.pdf

The Sedimentation Manual (March 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_sedimentation_manual/Sedimentation%20Manual-Second%20Edition.pdf

Additional information concerning DDE calculation methods has been added to the Final EIR, Section 2.3, Project Need.

The scope of the project is to restore capacity to Devil's Gate Reservoir, a critical flood control facility in the Los Angeles River Watershed. Providing new flood control downstream is outside the scope of this project and is inconsistent with the Proposed Project objectives. LACFCD takes a system-wide approach to flood control management. For that reason, the main objectives of the project are to satisfactorily reduce flood risk, create a configuration suitable for routine operations and maintenance, and reduce the possibility of clogging the outlet works of the dam. Once the sediment removal project is completed, the increased risk of downstream flooding will be removed.

Historically, large amounts of sediment have been deposited in the reservoir in short time periods. Between 1935 and 1938 over 1.6 million cy of sediment, between 1938 and 1943 over 1.95 million cy of sediment, between 1959 and 1966 over 1.75 million cy of sediment, and between 2010 and 2012 over 1.3 million cy of sediment was deposited in the reservoir. From construction of the dam in 1920 up to the Station Fire in 2009, approximately 10.7 million cy of sediment accumulated in the reservoir; and approximately 8.0 million cy was removed by LACFCD.

Over 92 years, the average amount of sediment deposited each year is approximately 130,000 cy; however, due to the dynamic nature of the system and the recent burn of the watershed, the amount could vary greatly. If a 1 in 50 years storm were to occur, approximately 2.0 million cy (one DDE) of sediment could be expected to wash into the reservoir.

Given the current, limited capacity of the reservoir, a 50-year storm event that results in a DDE would result in storm flows with sediment flowing over the spillway. Flooding with mud/sediment would occur along portions of the Arroyo Seco in the Cities of Pasadena, South Pasadena, and Los Angeles, impacting approximately 650 parcels and requiring closure of Interstate 110 from Orange Grove Avenue to Interstate 5. Additional information about the potential flood areas and analysis is shown in the Arroyo Seco Channel Hydraulic Analysis prepared by Bureau Veritas North America, Inc., available on the Project website. Please note that protocols are in place to monitor storms, reservoir conditions, and channel conditions and to communicate with emergency responders and the California Department of Transportation (Caltrans) to execute any necessary evacuations or freeway closures.

Because of LACFCD's responsibilities to provide flood protection, LACFCD must be ready at all times for a design debris event to occur.

LACFCD proposed a project duration of five years to reduce accumulated sediment in a timely fashion. The goal of LACFCD is to restore reservoir flood capacity as soon as feasible while reducing costs, minimizing the duration of environmental and construction impacts to the surrounding communities, and configuring the reservoir to allow for sustainable future maintenance. Extending the project would prolong the flood risk to downstream communities and increase the construction impacts to the surrounding communities.

Response to Comment 191-3:

See Response to Comment 191-2.

In order for the removal project to be efficient, and therefore reduce impacts and costs, the amount of sediment removed every year needs to exceed the amount of sediment deposited. As stated above, historically, approximately 130,000 cy a year was deposited in Devil's Gate Reservoir annually since 1920.

If only 160,000 cy a year were removed, the potential flooding risk and construction activities would be unnecessarily increased.

Response to Comment 191-4:

Sluicing was analyzed as part of the Draft EIR in the Alternatives Analysis, Section 4.7, Alternative 4 Sluicing Method. This alternative would involve use of construction equipment and the removal of trees and vegetation over the same footprint as the Proposed Project. The sluicing alternative would potentially have additional significant impacts in comparison to the Proposed Project. Many of these impacts would be associated with the likelihood that large amounts of sediment would not be fully transported through the flood control system; this sediment would need to be mechanically removed and trucked out from numerous downstream locations potentially including the two soft-bottom portions of the channel. Please see Section 4.7 and Appendix K of the Draft EIR for further analysis.

See Response to Comment 191-1.

Response to Comment 191-5:

See Response to Comments 191-1 and 191-4. The Draft EIR identifies the impacts associated with the removal of riparian and other sensitive habitat. The Draft EIR also identifies habitat restoration mitigation measures which will reduce these impacts to less than significant. As discussed in Section 3.6.6 of the Draft EIR, Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats. In addition, sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays).

Alternative 3, Configuration D affects the least amount of habitat of all the action alternatives while still achieving Proposed Project objectives (see Section 4.6 of the Final EIR). This alternative would provide a buffer on the west side of the reservoir that would allow for the movement of wildlife. Alternative 3, Configuration D, Option 1 provides a more natural configuration for the reservoir by having two branches to carry water and sediment toward the face of the dam, avoiding disturbing a significant portion of existing vegetation. To further reduce the Proposed Project's footprint, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2, which drastically reduces the project's footprint of 120 acres down to 71 acres, would avoid excavation of the western branch, thereby providing a greater habitat buffer on the west side of the reservoir. In addition, the maintenance areas would be smaller than the original sediment removal footprint, allowing for habitat to reestablish and providing additional areas for wildlife movement. A footprint any smaller would decrease the volume removed and the ultimate capacity of the reservoir, which would fail to meet Proposed Project objectives.

Response to Comment 191-6:

Mitigation Measures BIO-1 through BIO-8 are enforceable and designed to reduce impacts through methods known to be feasible and effective. The Proposed Project's Mitigation Measures are accepted by agencies that would be involved in consultation, negotiation, and final approval of Mitigation Measures, including conceptual restoration plans. As with any project that involves California Department of Fish and Wildlife (CDFW), United States Army Corps of Engineers (USACE), and Regional Water Quality Control Board (RWQCB) jurisdictional areas, the ultimate mitigation for impacts related to the wetlands and drainages under the jurisdiction of the resource agencies is negotiated with the resource agencies during the regulatory permitting process. LACFCD has been and will continue to work closely with CDFW and USACE to identify appropriate mitigation, replacement ratios, and sites for restoration and enhancement that will offset impacts and satisfy the requirements of all applicable laws. A detailed restoration plan will be prepared and provided to CDFW and USACE for review and approval prior to project implementation. Prior to commencement of the Proposed Project, LACFCD will have obtained all necessary permits for impacts to CDFW, USACE, and RWQCB jurisdictional areas including Section 401 Certification, Section 404 permit, and a Streambed Alteration Agreement. Clean Water Act Section 404 (b)(1) guidelines will be followed as a framework for compensatory mitigation. Through 404(b)(1) negotiations with USACE and negotiations with CDFW under Fish and Game Code Sections 1600-1616, a determination of the functions and values of impacted jurisdictional waters shall result in the coordination of appropriate mitigation measures for sediment removal.

Response to Comment 191-7:

See Response to Comment 191-6. LACFCD has been and will continue to work closely with CDFW and USACE to identify appropriate mitigation ratios and sites for restoration and enhancement that will offset impacts and satisfy the requirements of all applicable laws. A detailed restoration plan will be prepared and provided to the CDFW and USACE for review and approval prior to project implementation and to satisfy permitting requirements. Mitigation locations will comply with CDFW recommendations as follows: first, onsite; second, offsite within the Arroyo Seco Watershed; and third, offsite within the greater Los Angeles River watershed. If offsite mitigation sites are needed, several offsite areas within the Arroyo Seco/Los Angeles River watershed are being considered for restoration.

Response to Comment 191-8:

LACFCD notes that Paul Edelman is the contact person regarding this comment letter.

Comment Letter #192

From: Simon Penny
To: reservoircleanouts
Cc: Anita Ghazarian
Subject: Devil's Gate Reservoir Sediment Removal and Management Project
Date: Thursday, January 16, 2014 9:18:14 PM

To - Department of Public Works

From - Simon Penny. 2911 Sterling place, Altadena 91001.

Re - Devil's Gate Reservoir Sediment Removal and Management Project

To whom it may concern,
as an immediately local resident with a life-long engagement with environmental, resource and energy issues, I would like to voice my opinions on the Devil's Gate Reservoir Sediment Removal and Management Project and the various plans proposed.

Comment 192-1

The issues that concern me regarding the project include:
1. dust issues and related health issues
2. vermin issues
3. traffic issues
4. property values
5. ecological impact

Comment 192-2

1. Dust is an ongoing issue in the upper Arroyo. Especially since the station fire, and especially in summer, the sightlest breeze picks up superfine ash and dust which has settled in the arroyo and lifts it over the neighbouhood. In my experience and the experience of neighbors, this has led to an increase in allergy related conditions. Five years of constant earth-moving in the Arroyo will create a semi-permanent enivronmental health hazard.

Comment 192-3

2. Movement of vast tonnages of earth in the Arroyo will inevitably lead to the displacement of enormous numbers of rodents and other vermin which will enter adjacent properties.

Comment 192-4

3a. The prospect of huge numbers of heavy trucks entering and leaving 210 at Windsor/Arroyo exit will create a noise and traffic hazzard, and will inevitably create congestion on this main egress route. Note that this exit is already subject to closure during Rosebowl activities.

Comment 192-5

3b. The 210 south connector tunnel under the 134 is jammed many hours of the day. The additions of hundreds of heavy trucks witll make this part of 210 south virtually impassable, creating knock-on congestion effects on surrounding surface streets.

Comment 192-6

4. The combination of factors 1,2 and 3 will lead to reduction of property values in an already depressed, but currently improving part of Altadena.

Comment 192-7

5. Five years heavy trucking up and down the 210 will inevitablty lead to added traffic noise and air pollution loads impacting local residents.

Comment 192-8

By sheer quantity of fill removed, Alternative 3 seems the most intelligent. However, the innovative sluicing approach of Alternative 4 would appear to best address all of my concerns, as:
a. it minimizes dust creation, working in the rain while the other alternatives would presumably stop during rain.
b. it would minimise vermin disruption.
c. it would mitigate entirely all of my traffic related concerns.
d. it is remarkably energy efficient and will cause minimal petrochemical pollution.

Comment 192-9

There are clearly questions regarding sedimentation in the channel further downstream, but logic would commend the solution to us. After all, it is the way sediment from the mountains has been removed,

Comment 192-9 continued

since long before human settlement in the area.

yours sincerely,
Simon Penny (Professor, UCI)

Response to Comment Letter #192 (Simon Penny)

Response to Comment 192-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. The commenter's concerns, including those listed in the comment, have been noted and have been responded to below.

Response to Comment 192-2:

Although the sediment removal phase of the Proposed Project will occur over a five-year period, the removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays), as described in the Draft Environmental Impact Report (EIR), Section 2.5.1, Sediment Removal Phase, Project Schedule.

Dust impacts from the Proposed Project were carefully evaluated. As discussed in the Draft EIR, Section 3.10.6, Impacts and Mitigation, HAZARDS-1, Sediment Removal/Reservoir Management, no hazardous levels of the contaminants were detected in the sediment. As discussed in the Draft EIR, Section 3.5.6, Impacts and Mitigation, AIR QUALITY-2, Sediment Removal, the Proposed Project would result in less than significant dust emissions due to the Proposed Project's full compliance with the SCAQMD's Rule 403.

As discussed in the Draft EIR, Section 3.5, the Health Risk Assessment (HRA) analyzed both the cancer-related and noncancer-related acute (short-term) and chronic (long-term) impacts from project-related emissions. The HRA analysis found the Proposed Project would result in less than significant impacts for both the cancer-related and noncancer-related acute short-term and long-term impacts. Asthma-related issues are one of the noncancer acute impacts that the significance thresholds were developed to protect. The HRA found that the Proposed Project would result in a less than significant acute noncancer risk for all alternative scenarios.

Response to Comment 192-3:

As with many projects that involve the movement of sediment, temporary wildlife displacement will occur. Although rodents were observed during the surveys, it is not anticipated that enormous numbers of rodents will be displaced. Wildlife species currently found in the Proposed Project area would be expected to either remain in the undisturbed areas of the reservoir outside the Proposed Project area or to reestablish once sediment removal activities have been completed.

Response to Comment 192-4:

Potential impacts due to the Proposed Project's truck trips were analyzed in the Draft EIR, Section 3.16, Transportation and Traffic. As listed in that section, a single intersection in the immediate vicinity of the Proposed Project site will have a potentially significant impact. In practice, hauling rates and routes may be adjusted to help reduce impacts, depending on operational need. Los Angeles County Flood Control District (LACFCD) will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the Proposed Project site. This will include coordination of sediment transport activities with Rose Bowl special events.

As discussed in the Draft EIR, Section 3.14, with implementation of Mitigation Measure MM N-1, noise impacts would be reduced to a level of less than significant.

Response to Comment 192-5:

As part of the Draft EIR, a Traffic Impact Analysis (Appendix J of the Draft EIR) was conducted that detailed the impacts of the Proposed Project along the haul routes and surrounding intersections and discussed in Section 3.16 of the Draft EIR. The volumes on Interstate 210 (I-210), the on- and off-ramps, and the local roadways within the study area included those potentially impacted by the project. The analysis provided a conservative project condition volume that accounts for expansion and regional growth within the study area. The volumes also account for redistribution of traffic. As discussed in the Draft EIR, Section 3.16, Transportation and Traffic, truck traffic associated with the Proposed Project will not cause any major traffic impacts at the studied freeway segments, along any of the Haul Routes.

Response to Comment 192-6:

Comment regarding economic impacts to surrounding property values has been noted.

Response to Comment 192-7:

See Response to Comments 192-2 and 192-3. Air quality and noise impacts associated with truck traffic were analyzed in the Draft EIR in Sections 3.5 and 3.14, respectively. As discussed in the Draft EIR, Section 3.14, with implementation of Mitigation Measure MM N-1, noise impacts would be reduced to a level of less than significant. LACFCD has conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed the United States (U.S.) Environmental Protection Agency's (EPA's) 2007 standards for emissions. Therefore, in order to further reduce emissions, Mitigation Measure MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump trucks that meet or exceed EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality, including those associated with health effects, will be reduced to less than significant.

Response to Comment 192-8:

LACFCD notes the commenter's preference for Alternative 4. Sluicing was analyzed as part of the Draft EIR in the Alternatives Analysis, Section 4.7, Alternative 4 Sluicing Method. This alternative would involve use of construction equipment and the removal of trees and vegetation over the same footprint as the Proposed Project. The sluicing alternative would potentially have additional significant impacts in comparison to the Proposed Project. Many of these impacts would be associated with the likelihood that large amounts of sediment would not be fully transported through the flood control system; this sediment would need to be mechanically removed and trucked out from numerous downstream locations potentially including the two soft-bottom portions of the channel. Please see Section 4.7 and Appendix K of the Draft EIR for further analysis.

Alternative 3, Configuration D affects the least amount of habitat of all the action alternatives while still achieving Proposed Project objectives (see Section 4.6 of the Final EIR). This alternative would provide a buffer on the west side of the reservoir that would allow for the movement of wildlife. Alternative 3, Configuration D, Option 1 provides a more natural configuration for the reservoir by having two branches to carry water and sediment toward the face of the dam, avoiding disturbing a significant portion of existing vegetation. To further reduce the Proposed Project's footprint, LACFCD has added an

optional configuration for this Alternative. Alternative 3, Configuration D, Option 2, which drastically reduces the project's footprint of 120 acres down to 71 acres, would avoid excavation of the western branch, thereby providing a greater habitat buffer on the west side of the reservoir. In addition, the maintenance areas would be smaller than the original sediment removal footprint, allowing for habitat to reestablish and providing additional areas for wildlife movement.

Response to Comment 192-9:

See Response to Comment 192-8.

From: Tracy Hirrel
To: reservoircleanouts
Subject: Devil"s Gate Dam
Date: Friday, January 17, 2014 2:56:17 PM

Comment 193-1

I urge you to slow down the sediment removal at Devil's Gate Dam. As a member of the Diggers Garden Club I am concerned about the environmental impact it will have on our area. Many thanks for you consideration.

Sincerely,

Tracy G. Hirrel
trahir@aol.com

Response to Comment Letter #193 (Tracy Hirrel)

Response to Comment 193-1:

Thank you for your input. This comment has been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. Los Angeles County Flood Control District (LACFCD) notes that the commenter prefers a slower alternative.

LACFCD proposed a project duration of five years to reduce accumulated sediment in a timely fashion. The goal of LACFCD is to restore reservoir flood capacity as soon as feasible while reducing costs, minimizing the duration of environmental and construction impacts to the surrounding communities, and configuring the reservoir to allow for sustainable future maintenance. Extending the project would prolong the flood risk to downstream communities and increase the construction impacts to the surrounding communities.

LACFCD goes to great lengths to lessen project impacts and maximize efficiencies. For example, the Draft Environmental Impact Report (EIR) concluded that Alternative 3 is the Environmentally Superior Alternative. Alternative 3 drastically reduces the project's footprint of 120 acres down to 71 acres. Additionally, the limited maintenance area for Alternative 3 further reduces the permanent habitat impacts down to approximately 51 acres by allowing for site replanting and mitigation to take place within the reservoir footprint. This reduction in project acreages will greatly lessen environmental impacts of the Proposed Project.

From:	Vivian Geiseler
To:	reservoircleanouts
Subject:	Devil"s Gate Reservoir Sediment Removal and Management Project
Date:	Saturday, January 18, 2014 12:36:24 PM

Good afternoon,

Comment 194-1

I'd like to express my support for the Save Hahamongna group and their intentions to remove sediment in a sustainable way. Please consider their approach and keep sustainability in mind when reaching a final decision.

Warmly,
Vivian Geiseler
Pasadena resident

Response to Comment Letter #194 (Vivian Geiseler)

Response to Comment 194-1:

Thank you for your input. This comment has been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

Los Angeles County Flood Control District (LACFCD) goes to great lengths to lessen project impacts and maximize efficiencies. As such, many of the points in suggested plans, such as the Arroyo Seco Foundation's four-point "Slow Program" recommended by the Save Hahamongna organization are compatible with the LACFCD Proposed Project.

For example, the Draft Environmental Impact Report (EIR) concluded that Alternative 3 is the Environmentally Superior Alternative. Alternative 3 drastically reduces the project's footprint of 120 acres down to 71 acres. Additionally, the limited maintenance area for Alternative 3 further reduces the permanent habitat impacts down to approximately 51 acres by allowing for site replanting and mitigation to take place within the reservoir footprint. This reduction in project acreages will greatly lessen environmental impacts of the Proposed Project.

LACFCD strives to achieve an efficient, low-cost sediment removal project. Sediment removal rates and trucking operations, now utilizing all low-emissions trucks, as explained in Section 3.5 of the Draft EIR, have been carefully planned for economies of scale to realize maximum efficiencies without major delays in project schedule, thus greatly reducing operating costs. Furthermore, LACFCD has applied for and received an approximately $28 million grant through the State's Disaster Preparedness and Flood Protection Bond Act of 2006 (Proposition 1E) program. A portion of this grant will be used to help offset the Proposed Project's costs.

While sluicing is not a viable project alternative, as explained in Section 4.7 of the Draft EIR, Flow Assisted Sediment Transport, or FASTing, will be used for maintenance after the project's main sediment removal phase has been completed, as described in Section 2.5.2 of the Draft EIR.

LACFCD is committed to *Public Service that Works*; and by combining almost 100 years of technical expertise and invaluable input from the community, less invasive flood protection will continue to be a reality.

January 20, 2014

Via E-Mail
Los Angeles County Flood Control District, reservoircleanouts@dpw.lacounty.gov

Re: **Draft Environmental Impact Report: Sediment removal plan for Devil's Gate Dam**

The West Pasadena Residents' Association (WPRA), which represents an area of 7,000 households and has nearly 1,000 members, strongly opposes the LA County Flood Control District's crash plan to clean out Devil's Gate Dam.

Comment 195-1

The plan, to remove as much as 4 million cubic yards of sediment from the Devil's Gate Dam over a 5-year period, results in substantial impacts on aesthetics, biology, transportation, and air quality which the DEIR says cannot be mitigated. The impacts are far too devastating to the environment and the surrounding communities. WPRA recommends that the plan be scaled down significantly and completed over a much longer period of time, with smaller amounts of sediment removed each year, for as long as it takes. If the County proceeds at a slower pace, the damaging impacts will be greatly reduced and, in fact, somewhat mitigated.

Comment 195-2

In the proposed plan, air quality is ignored. There would be a truck a minute entering the freeway system 6 days each week. These are double-bed diesel trucks, which you said, during at least one of the public meetings, would not meet current air quality standards. This is not acceptable. All the vehicles that are ultimately used must adhere to the air quality standards in effect at that time.

Comment 195-3

The Hahamongna Watershed Park has become an important wildlife area. After the 2009 Station Fire destroyed vast wildlife habitat in the mountains above the Park, its importance was further increased. Hahamongna has become one of the richest riparian and woodland habitats in Los Angeles County. The City of Pasadena and its citizens worked hard to develop the Hahamongna Watershed Park Master Plan, and it remains the City's underlying document for managing water resources, habitat, recreation, flood and sediment management and cultural resources. The sediment removal plan proposed by LA County ignores and obliterates this document.

Comment 195-4

WPRA recognizes that something needs to be done to restore the storage capacity at Devil's Gate Dam. The County needs to reevaluate its plan and develop a project that will be the first of a new generation of sustainable flood management projects, with a measured approach, that only temporarily disturbs small areas and maintains the important, beautiful environment of Hahamongna.

Thank you,

William Urban
WPRA President

WEST PASADENA RESIDENTS' ASSOCIATION
POST OFFICE BOX 50252 ▪ PASADENA, CA 91115

Copies:

City of Pasadena City:
Councilmember Steve Madison smadison@cityofpasadena.net
Michael Beck mbeck@cityofpasadena.net
Steve Mermell smermell@cityofpasadena.net
Mark Jomsky mjomsky@cityofpasadena.net

WPRA Board Members:
board.wpra@wpra.net

Response to Comment Letter #195 (West Pasadena Residents Association)

Response to Comment 195-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. Los Angeles County Flood Control District (LACFCD) notes West Pasadena Residents Association's opposition to the Proposed Project.

LACFCD was mandated by the State Legislature to provide flood protection and water conservation within its boundaries.

A reservoir storage design capacity of two design debris events (DDEs) below the dam's lowest spillway was determined to be the standard acceptable level of risk at Devil's Gate Dam and Reservoir. The DDE volume of capacity is determined using the January 2006 Los Angeles County Department of Public Works (LACDPW) Hydrology Manual and the March 2006 LACDPW Sedimentation Manual. For Devil's Gate Dam and Reservoir, the required reservoir capacity is 4.0 million cubic yards (cy) (two DDEs) below the spillway elevation of 1,040.50 feet.

The Hydrology Manual (January 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_Hydrology_Manual/2006%20Hydrology%20Manual-Divided.pdf

The Sedimentation Manual (March 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_sedimentation_manual/Sedimentation%20Manual-Second%20Edition.pdf

Additional information concerning DDE calculation methods has been added to the Final Environmental Impact Report (EIR), Section 2.3, Project Need.

LACFCD proposed a project duration of five years to reduce accumulated sediment in a timely fashion. The goal of LACFCD is to restore reservoir flood capacity as soon as feasible while reducing costs, minimizing the duration of environmental and construction impacts to the surrounding communities, and configuring the reservoir to allow for sustainable future maintenance. Extending the project would prolong the flood risk to downstream communities and increase the construction impacts to the surrounding communities.

Air quality impacts associated with truck traffic were analyzed in the Draft EIR in Section 3.5. LACFCD has conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed the United States (U.S.) Environmental Protection Agency's (EPA's) 2007 standards for emissions. Therefore, in order to further reduce emissions, Mitigation Measure MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump trucks that meet or exceed EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality, including those associated with health effects, will be reduced to less than significant.

As discussed in Section 3.6.6 of the Draft EIR, Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats. In addition, sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays).

Potential impacts due to the Proposed Project's truck trips were analyzed in the Draft EIR, Section 3.16, Transportation and Traffic. As listed in that section, a single intersection in the immediate vicinity of the Proposed Project site will have a potentially significant impact. In practice, hauling rates and routes may be adjusted to help reduce impacts, depending on operational need. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the Proposed Project site.

As noted in the Draft EIR, Section 3.4, Aesthetics, the Proposed Project will have significant temporary impacts to aesthetics; however, after the sediment removal phase of the Proposed Project is complete, a habitat restoration plan will be implemented that will allow native plant communities to reestablish outside the reservoir management area. Riparian Herbaceous vegetation is expected to continue to populate and/or reestablish site in the management area of the Proposed Project between maintenance activities.

Response to Comment 195-2:

See Response to Comment 195-1. Air quality impacts associated with truck traffic were analyzed in the Draft EIR in Section 3.5.

Response to Comment 195-3:

Analysis of consistency with the Hahamongna Watershed Park Master Plan was included in the Draft EIR, Section 3.12 Land Use and Planning. As noted in the Draft EIR, Section 3.12 Land Use and Planning, impacts associated with applicable land use plans and policies would be less than significant with incorporation of mitigation measure MM LAN-1. Alternative 3, Configuration D, which was found to be the Environmentally Superior Alternative in the Draft EIR, was based on the City of Pasadena's Hahamongna Watershed Park Master Plan (HWPMP).

LACFCD goes to great lengths to lessen project impacts and maximize efficiencies. For example, the Draft EIR concluded that Alternative 3 is the Environmentally Superior Alternative. Alternative 3, Configuration D affects the least amount of habitat of all the action alternatives while still achieving Proposed Project objectives (see Section 4.6 of the Final EIR). This alternative would provide a buffer on the west side of the reservoir that would allow for the movement of wildlife. Alternative 3, Configuration D, Option 1 provides a more natural configuration for the reservoir by having two branches to carry water and sediment toward the face of the dam, avoiding disturbing a significant portion of existing vegetation. To further reduce the Proposed Project's footprint, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2, which drastically reduces the project's footprint of 120 acres down to 71 acres, would avoid excavation of the western branch, thereby providing a greater habitat buffer on the west side of the reservoir. In addition, the maintenance areas would be smaller than the original sediment removal footprint, allowing for habitat to reestablish and providing additional areas for wildlife movement. LACFCD has met and will continue to meet with the City of Pasadena regularly to coordinate and ensure resolution of concerns regarding Devil's Gate Reservoir and the HWPMP.

Response to Comment 195-4:

See Response to Comment 195-3.

From: asif@reelenergy.com
To: reservoircleanouts
Subject: Comments on the EIR for the Sediment Removal Project
Date: Monday, January 20, 2014 11:25:10 PM

To Whom It May Concern,

Here are my comments on the Draft EIR and the Sediment Removal Project.

Comment 196-1 Upon review of the EIR I am not satisfied with analysis of the biodiversity. I don't feel adequate time was provided to properly assess the variety of species in the affected region. I strongly recommend an additional EIR be conducted by another company, preferably a new entity that doesn't have a long history with the county and therefore able to provide a true independent analysis.

Comment 196-2 Upon review of the EIR I would like a deeper explanation on the most favored sediment removal alternatives and how they affect the Pasadena water supply.

Comment 196-3 In the draft EIR I did not find a detailed analysis of the particulates in the sediment and what occurs when these particulates are kicked up into the air due to all the trucks and removal? What will be the air quality in the immediate vicinity?

Comment 196-4 Given the particulates in the sediment and fumes from all the trucks, which will have significant impact on air quality how will the county compensate those suffering from asthma, respiratory issues and small children who may also develop respiratory problems? Will the county provide alternative housing if medical issues arise and cover medical expenses? If the affects are long term who should be sued or named in a lawsuit?

Comment 196-5 Given the current drought conditions, changing climate, what is the percent likelihood for a catastrophic flood?

Comment 196-6 The EIR failed to address with the on-going drought conditions that a habitat might never return to Hahamongha per their restoration plan. Given California entering a drought phase Hahamongha might become perpetual a desert with no chance of restoration. Please address this scenario? Will the restoration plan include watering if its dry year to maintain or stimulate new habitat?

Comment 196-7 The EIR claims nesting birds will return or be minimally affected. As sediment removal will occur during critical nesting times and due to the truck volume, noise and pollution, won't this permanently scare away birds? What other projects of this scale have resulted in the return of rare birds. If the drought continues will the birds ever come back.

Comment 196-8 | Who financially benefits from the sediment removal plan, please name what trucking, hauling companies will do the work and please detail their relationships to the county and their involvement in the EIR process

Comment 196-9 | The EIR failed to address in detail the affects of cities/towns where dams have been completely removed and rivers restored and allowed to run naturally. Has this been explored?

Comment 196-10 | Did the EIR address the erosion of Southern California beaches and the interruption of this natural process.

Comment 196-11 | The EIR failed to address to why the sediment removal can't happen over 20+ years. Instead it just says the 3 year plan will have severe impacts on quality of life in the immediate vicinity. Please provide alternative plans that don't have severe impacts.

Comment 196-12 | What is the true cost of this project, the immediate sediment removal and then maintaining it for the next 20+ years. Given this number what are other alternatives ?

Asif Ahmed
626.379.4475

Response to Comment Letter #196 (Asif Ahmed)

Response to Comment 196-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. The Draft Environmental Impact Report (EIR), Biological Technical Report (BTR), and focused surveys provide a thorough description of existing conditions for biological resources (See the Draft EIR, Section 3.6; Appendix D, Biological Reports). These reports and related impact analyses were based on thorough field surveys conducted in 2010 and 2013, including general biological surveys, focused sensitive plant surveys, focused least Bell's vireo surveys, and federal and state jurisdictional waters surveys.

Response to Comment 196-2:

Alternative 3, Configuration D, the Environmentally Superior Alternative, is discussed in detail in the Draft EIR, Section 4.6. As stated in the Draft EIR, with the removal of accumulated sediment deposits within the reservoir, the percolation characteristics of the reservoir will stay the same, if not improve; and the reservoir will still permit penetration of rainfall and percolation of local runoff to replenish the groundwater basin. Sediment removal will restore Devil's Gate Reservoir to its current design standard of the ability to contain two design debris events (DDEs). As such, the reservoir will have the ability to contain more of the local runoff, which in turn could result in more runoff percolating into the ground in the Proposed Project area and subsequently recharging the groundwater basin. In addition, by keeping the reservoir clear of future sediment deposits, sediment management will reduce the potential for accumulated sediments to negatively impact the percolation rate.

Response to Comment 196-3:

Air quality impacts were analyzed in the Draft EIR in Section 3.5. Los Angeles County Flood Control District (LACFCD) has conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed the United States (U.S.) Environmental Protection Agency's (EPA's) 2007 standards for emissions. Therefore, in order to further reduce emissions, Mitigation Measure MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump trucks that meet or exceed EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality, including those associated with health effects, will be reduced to less than significant.

As discussed in the Draft EIR, Section 3.10.6, Impacts and Mitigation, HAZARDS-1, Sediment Removal/Reservoir Management, no hazardous levels of the contaminants were detected in the sediment. Dust impacts from the Proposed Project were carefully evaluated, as discussed in the Draft EIR, Section 3.5.6, Impacts and Mitigation, AIR QUALITY-2, Sediment Removal. The Proposed Project's activities, including excavation, grading, material loading, and hauling, would result in less than significant dust emissions due to the project's use of best management practices and would be in full compliance with South Coast Air Quality Management District's (SCAQMD's) fugitive dust regulations.

Response to Comment 196-4:

See Response to Comment 196-3. As part of the Draft EIR analysis, a Health Risk Assessment (HRA) was prepared that analyzed the cancer-related and noncancer acute (short-term) and chronic (long-term)

impacts to the nearby sensitive receptors in the project vicinity. The HRA found the Project would result in less than significant impacts for both the cancer-related and noncancer-related impacts.

Response to Comment 196-5:

Given the current, limited capacity of the reservoir, a 50-year storm event that results in a design debris event (DDE) would result in storm flows with sediment flowing over the spillway. Capacities are based on a 50-year-intensity storm, or a storm that is estimated to happen once every 50 years, a 2 percent chance of occurring each year.

Response to Comment 196-6:

After the Station Fire in 2009, the following two storm seasons brought 1.3 million cy of sediment into the reservoir, raising the ground elevations within the reservoir and burying most of the established vegetation. Since then, vegetation, has reestablished within the reservoir, including in the areas that will remain in place and/or possibly be used as mitigation sites under Alternative 3. The sediment removal efforts aim to restore the historic elevations within the reservoir to the conditions existing prior to the impacts caused by the Station Fire.

After the sediment removal project, ground elevations within the reservoir will be in either present or historic levels and will have exposure to flowing stormwater. The habitat restoration plan will include and address monitoring and success criteria, as required by the regulatory agencies.

Response to Comment 196-7:

See Response to Comment 196-6. As discussed in Section 3.6.6 of the Draft EIR, Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats. In addition, sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays). Bird species currently found in the Proposed Project area would be expected to either remain in the undisturbed areas of the reservoir outside of the Proposed Project area or to reestablish once sediment removal activities have been completed. Vegetation clearing will occur outside bird nesting season.

Response to Comment 196-8:

The construction contractors have not been hired yet. LACFCD uses a formally advertised sealed bid process for public works construction contracting. The goal of the process is to award a contract to the lowest cost "responsive" and "responsible" bidder. California Public Contract Code mandates the use of an advertised bid process for construction contracting. Contractors and service providers must meet certain qualification requirements to be considered by the County for selection and contract award.

More detailed information on the County's construction bidding process can be found in the *County of Los Angeles Countywide Construction Policy Guidelines* available online at the following location: http://dpw.lacounty.gov/aed/construction_manual.pdf

Response to Comment 196-9:

As discussed in Section 4.10.3 of the Draft EIR, removal of the Devil's Gate Dam was considered but rejected due to its inconsistency with Proposed Project objectives, as well as the potential safety concerns. This alternative would fail to meet the Proposed Project objectives and would result in greater additional impacts than the Proposed Project (geology, hazards, hydrology, and public services).

The scope of the Proposed Project is to restore capacity for Devil's Gate Reservoir. Removing the dam would remove the only flood attenuation mechanism that is in place along the Arroyo Seco. Areas downstream of the dam would be at high risk of flooding during storm events. Also, removal of the dam would cause sediment to move downstream and accumulate within and adjacent to the channel. Sediment accumulation in the channel would reduce the capacity of the channel in those areas and would further increase the likelihood of flooding. Additionally, flood control operations for the Los Angeles River rely on peak flow attenuations from Devil's Gate Dam.

Response to Comment 196-10:

See Response to Comment 196-10. The Proposed Project will not decrease the current amount of sediment that flows downstream and therefore would not contribute to the erosion of beaches. Also as noted in the Sediment Management Strategic Plan (SMSP), "Without human intervention, most southern California beaches would naturally be narrow and rocky. The wide beaches in southern California were created and have been maintained by various agencies through artificial beach nourishment projects (also referred to as beach fill projects) and the construction of protective coastal structures since the 1930s." In addition, the SMSP states, "Since the Los Angeles River changed course in 1825, the largest waterway reaching this region of the coast is Ballona Creek, which has an estimated annual sediment yield of less than 50,000 cubic yards and delivers generally fine-grained sediment that is not appropriate for beach nourishment." For general information on beach nourishment, please see Section 6.5.1 of LACFCD's Sediment Management Strategic Plan Sediment Management Strategic Plan, which can be viewed here:
http://dpw.lacounty.gov/lacfcd/sediment/files/FullDoc.pdf

Response to Comment 196-11:

See Response to Comment 196-5. LACFCD proposed a project duration of five years to reduce accumulated sediment in a timely fashion. The goal of LACFCD is to restore reservoir flood capacity as soon as feasible while reducing costs, minimizing the duration of environmental and construction impacts to the surrounding communities, and configuring the reservoir to allow for sustainable future maintenance. Extending the project would prolong the flood risk to downstream communities and increase the construction impacts to the surrounding communities.

Response to Comment 196-12:

The estimated cost for the Proposed Project and for Alternatives 1, 2, 3, and 5 would range from $80 million for the Proposed Project to $65 million for Alternative 3. LACFCD has applied for and received an approximately $28 million grant through the State's Disaster Preparedness and Flood Protection Bond Act of 2006 (Proposition 1E) program. A portion of this grant will be used to help offset the Proposed Project's costs. The remaining cost will be covered by LACFCD funds. Due to the variety of factors, including the indeterminate locations of the sediment fallout and requirements for removing sediment from these locations, the cost for Alternative 4 cannot be calculated.

County of Los Angeles Department of Public Works

Water Resources Division

Attn: Reservoir Cleanouts Program

P.O. Box 1460 Alhambra, CA 91802- 1460

reservoircleanouts@dpw.lacounty.gov

Dear Sir/Madam:

Comment 197-1

Attached please find my comments on the proposed Devil's Gate Dam cleanout EIR, filed as an individual citizen who both uses this area almost daily recreationally and is concerned about the adverse effects on the community of this proposed project. Thank you for your consideration of these comments, and I look forward to your responding to the concerns I have expressed, as well as those of others.

Sincerely,

/s/
William Christian
1450 Arroyo View Drive
Pasadena, CA 91103

Comments submitted by email and through regular mail.

Comments on:
Los Angeles County, Department of Public Works
Flood Control District (LACFCD)
Devil's Gate Reservoir Sediment Removal and Management Project (Proposed Project)
Draft Environmental Impact Report (DEIR)

Introduction

My name is William Christian. I am a homeowner in the Linda Vista area of Pasadena. I enjoy the area that would be affected by the sediment removal project for recreation almost daily. I run and walk along the trails and appreciate the vibrant riparian area above and below the dam. I believe that the project as proposed would virtually destroy the beauty and values of the area that I and many others have come to enjoy. The project would also significantly harm the community in other ways, including congesting traffic, degrading air quality, and causing noise, all without a clear justification for this project.

Comment 197-2

Surprisingly, other than baldly asserting that such risks exist, the existing DEIR contains no factual analysis of the flooding risks that building sediment in the dam presents and the project would seek to avert. This is a fatal flaw in the DEIR, since flood risk is the sole legitimate public purpose for the expenditure of perhaps one hundred million of taxpayer funds.

Comment 197-3

Assuming that sediment removal is needed, LACFD should substantially revise the DEIR to include both an evaluation of other less harmful alternatives to move sediment from behind Devil's Gate Dam, as well as a complete analysis of whether dam removal could accomplish that removal while maintaining a reasonable level of flood protection for downstream residents.

Comment 197-4

Project Objectives and Alternatives

The goal of the project is clear: "The goal of the Proposed Project is to restore and maintain flood capacity at Devil's Gate Reservoir to meet its intended level of flood protection for the communities downstream." (EIR, Executive Summary, ES-1) The easement from the City of Pasadena to the LACFCD limits the District to use of the Devil's Gate area for flood control and water storage.

Other project objectives and goals—largely having to do with how, how much and when sediment would be removed and where it would be placed) are clearly subsidiary and justified only if the primary goal is itself necessary and justified, and can be accomplished best or only by the Proposed Project's (as well as those those of Alternatives 1-5) aggressive, destructive and unduly expensive plans.

Comment 197-5

The California Environmental Quality Act (CEQA) and guidelines require analysis of alternatives to the Proposed Project or alternative means to reach the legitimate goal of the project proponent. The DEIR described alternatives fail to comply with CEQA in

Comment 197-6

Comment 197-6 continued

restricting the range of project alternatives to sediment removal options without considering other ways to achieve the county's flood protection goal.

The DEIR evaluation of alternatives also is unreasonably subjective, lacking adequate—or, in some instances, any-- factual foundation and coherent analysis for its conclusions.

Comment 197-7

As just one example, the DEIR evaluation of the No Project alternative (#6) concludes that it is environmentally inferior to other alternatives with respect to effects on aesthetics, recreation, biological resources, riparian habitat, wildlife connectivity, and federally protected wetlands—based solely on the summary opinion of the authors that sediment deposition will continue over time and aversely affect these values. A fair analysis would evaluate the almost total destruction of wetlands and listed species habitat, the practical severing of the wildlife migration corridor from the upper to lower Arroyo Seco, loss of much recreational use and enjoyment, and alteration of the Devil's Gate Dam from a relatively undisturbed riparian zone to an largely permanent industrial area under every other alternative, and weigh those adverse changes against the likelihood that these would be overridden by the amount of future sediment deposition, within any reasonable time period.

Comment 197-8

The DEIR also rejected, without analysis, the dam removal alternative "due to its inconsistency with project objectives, as well as the potential safety concerns. This alternative would fail to meet the project objectives and would result in greater/additional impacts than the Proposed Project (geology, hazards, hydrology, and public services)". And, "Since no flood control mechanism would be in place, areas downstream of the dam **could** experience sediment accumulation and intermittent flooding. These areas would include both natural and man-made settings and would include the lower Arroyo Seco, the Rose Bowl, and potentially some residential areas. DEIR 4.10.3 (emphasis added)

Comment 197-9

The lack of substantive data and analysis in the DEIR's evaluation of alternatives is pervasive, but significantly worsened by an obvious subjective bias in favor of large-scale sediment removal that infects the entire DEIR.

However, perhaps the most fundamental flaw in the DEIR is the lack of any fact-based analysis of downstream flood risk, and the absence of consideration of alternative (and less expensive) ways to avert or minimize any risks that may exist. It is not clear what level of risk actually exists, whether data is available on this issue, and whether approximately the same level of risk is presented, irrespective of how much sediment is removed from behind the dam.

Comment 197-10

Alternatives that should be considered in a new--or revised—CEQA analysis include:

1. A more objective analysis of whether there is a need to remove sediment, and the advantages of allowing natural processes to continue. The No Project Alternative analysis in the DEIR is seriously defective. It should include, as mitigation, whether parapet walls or other downstream flood protection measures could reduce or eliminate flood risk at a much smaller environmental and financial cost.

Comment 197-11

2. Dam removal should be considered as an alternative, including measures to protect downstream residents and assets from harm.

Comment 197-12

3. Slower and much less complete removal of sediment, including whether further modifications (apertures) to the dam face could accelerate transfer of significant quantities of sediment without the need for large scale mechanical removal.

Comment 197-13

Biological Resources—A number of federally listed and state and federal special status species were detected on site during very limited survey periods by the District's contractor. The Hahamongna area that would be adversely affected by the Proposed Project contains extremely valuable habitat for a number of these species, and for other, more common plants and animals. The DEIR concludes that, after unspecified 1:1 mitigation combined with management actions, the effects on biological resources and wetlands would be less than significant. This is clearly incorrect. The Proposed Project would almost completely sever an extremely important animal migration corridor. Habitat types that exist in the area above and below the dam are rare and cannot be replaced by acquisition or restoration on site or in other locations in the Arroyo Seco watershed. CEQA's command that adverse effects be fully mitigated requires the District to more fully state how it would compensate for loss of habitat and connectivity values caused by the massive excavation of the Hahamongna area. Additionally, if the project were to move forward as proposed (in any of the alternatives except #6), the District will have to obtain an incidental take permit under the federal Endangered Species Act (or risk prosecution under Section 9 of the ESA) and a Section 404 permit from the US Army Corps of Engineers, each a sufficient federal nexus triggering the requirement to conduct an environmental review under the federal National Environmental Policy Act.

Comment 197-14

Effects on the JPL Superfund Site—The JPL superfund site plume abuts the Proposed Project removal area. The DEIR dismisses concerns that the excavation may affect the isolation of the hazardous substance plume, but does not fully analyze the issue. Based on a total of only 4 reported soil borings, which found hydrocarbons, pesticides and other hazardous substances at "below regulatory thresholds", the DEIR avoids any further discussion of potential public health impacts of the proposed project. No discussions or consultations with relevant regulatory agencies are reported. This issue should be thoroughly explored, additional, deeper borings conducted, and the potential impacts on the JPL plume and remediation explored.

Comment 197-15

Air Quality, Noise, Traffic, Aesthetics, Recreation—The Proposed Project will impose significant, lasting, irremediable harm on the Pasadena and LaCanada communities with respect to each listed category. The current DEIR does not sufficiently address the size and nature of these effects. Since adequate actions are not available to fully mitigate these effects, the Proposed Project, including all Alternatives 1-5, cannot go forward.

Comment 197-16

Thank you for the opportunity to comment on this document and a project that, if carried out as proposed, would have devastating effects on a unique community resource and life in our communities.

William Christian
1450 Arroyo View Drive
Pasadena, CA 91103
billchristian43@gmail.com
626-441-8171

Response to Comment Letter #197 (William Christian)

Response to Comment 197-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. The comments in the letter are noted, and have been responded to below.

Response to Comment 197-2:

Potential impacts due to the Proposed Project's truck trips were analyzed in the Draft Environmental Impact Report (EIR), Section 3.16, Transportation and Traffic. As listed in that section, a single intersection in the immediate vicinity of the Proposed Project site will have a potentially significant impact. In practice, hauling rates and routes may be adjusted to help reduce impacts, depending on operational need. Los Angeles County Flood Control District (LACFCD) will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the Proposed Project site.

Air quality and noise impacts associated with truck traffic were analyzed in the Draft EIR in Sections 3.5 and 3.14, respectively. As discussed in the Draft EIR, Section 3.14, with implementation of Mitigation Measure MM N-1, noise impacts would be reduced to a level of less than significant. LACFCD has conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed the United States (U.S.) Environmental Protection Agency's (EPA's) 2007 standards for emissions. Therefore, in order to further reduce emissions, Mitigation Measure MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump trucks that meet or exceed EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality, including those associated with health effects, will be reduced to less than significant.

As discussed in Section 3.6.6 of the Draft EIR, Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats. In addition, sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays).

The Draft EIR acknowledges the significant, unmitigable impact to aesthetics; however, after sediment removal activities are complete, habitat restoration would take place in the reservoir and would improve the visual condition of the area.

Response to Comment 197-3:

LACFCD was mandated by the State Legislature to provide flood protection and water conservation within its boundaries.

A reservoir storage design capacity of two design debris events (DDEs) below the dam's lowest spillway was determined to be the standard acceptable level of risk at Devil's Gate Dam and Reservoir. The DDE volume of capacity is determined using the January 2006 Los Angeles County Department of Public Works (LACDPW) Hydrology Manual and the March 2006 LACDPW Sedimentation Manual. For Devil's Gate Dam and Reservoir, the required reservoir capacity is 4.0 million cubic yards (cy) (two DDEs) below the spillway elevation of 1,040.50 feet.

The Hydrology Manual (January 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_Hydrology_Manual/2006%20Hydrology%20Manual-Divided.pdf

The Sedimentation Manual (March 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_sedimentation_manual/Sedimentation%20Manual-Second%20Edition.pdf

Additional information concerning DDE calculation methods has been added to the Final EIR, Section 2.3, Project Need.

Response to Comment 197-4:

See Response to Comment 197-3.

Pursuant to Section 15126.6(a) of the California Environmental Quality Act (CEQA) Guidelines, "[a]n EIR shall describe a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project, and evaluate the comparative merits of the alternatives." However, "[a]n EIR is not required to consider alternatives which are infeasible" (CEQA Guidelines Section 15126.6(a)) or "which could change the fundamental nature of the proposed project." (*Al Larson Boat Shop, Inc. v. Board of Harbor Comm.(*1993) 18 Cal.App.4th 729, 745.) The alternatives discussed in the EIR must be reasonable alternatives, selected to foster informed decision-making and public participation (CEQA Guidelines 15126.6(a)). An EIR need not consider an alternative whose effect cannot reasonably be ascertained or whose implementation is remote and speculative because unrealistic alternatives do not contribute to a useful analysis (CEQA Guidelines 16126.6(f)(3)). Additionally, an alternative may be rejected from detailed analysis in an EIR if it fails to reduce or avoid the project's significant environmental effects, does not implement the basic project objectives, is not potentially feasible, or is facially unreasonable. 14 C.C.R. §15126.6(c); Id., see also *Mann v. Community Redevelopment Agency* (1991) 233 Cal. App. 3d 1143; *Del Mar Terrace Conservancy, Inc. v. City Council* (1991) 10 Cal. App. 4th 712.

The Draft EIR, Section 4, fully analyzed six alternatives including the No Project Alternative. These alternatives substantially lessen one or more significant effects of the Proposed Project and, with the exception of the mandatory No Project Alternative, would feasibly attain most of the basic objectives of the Proposed Project. These alternatives include options for different amounts of removal, different methods of removal, and a different haul route.

As discussed in Section 4.10.3 of the Draft EIR, removal of the Devil's Gate Dam was considered but rejected due to its inconsistency with Proposed Project objectives, as well as the potential safety concerns. This alternative would fail to meet the Proposed Project objectives and would result in greater additional impacts than the Proposed Project (geology, hazards, hydrology, and public services).

The scope of the project is to restore capacity for Devil's Gate Reservoir. Removing the dam would remove the only flood attenuation mechanism that is in place along the Arroyo Seco. Areas downstream of the dam would be at high risk of flooding during storm events. Also, sediment would move downstream and accumulate within and adjacent to the channel due to the removal of the dam. Sediment accumulation in the channel would reduce the capacity of the channel in those areas and would further increase the likelihood of flooding.

Response to Comment 197-5:

See Response to Comments 197-2 and 197-4. As described in Section 2.1.4 of the Draft EIR, through easements granted in May of 1919 and March of 1965, the City of Pasadena granted the LACFCD, under a perpetual easement, the right to construct, reconstruct, inspect, maintain, repair, and operate Devil's Gate Dam, its spillway, bypasses, tunnels, and other support facilities as may be necessary for the construction and maintenance of a reservoir capable of impounding the waters of the Arroyo Seco for purposes of storage and control, and to control such waters as may be necessary in the prevention of damage by flood (City of Pasadena 1919/1965).

Response to Comment 197-6:

See Response to Comments 197-2 and 197-4.

Response to Comment 197-7:

With the No Project Alternative, the continued deposition of sediment in the reservoir is a fact, not an opinion. Without a large-scale cleanout, sediment will continue to build up in the reservoir. Approximately 1.3 million cy of sediment came into the reservoir in just two storm seasons after the 2009 Station Fire. Over 12.0 million cy of sediment has come into the reservoir since the dam was constructed. Over 92 years, the average amount of sediment deposited each year is approximately 130,000 cy; however, Devil's Gate Reservoir is a dynamic system with constantly changing amounts of sediment deposited from year to year, depending on the frequency and intensity of storm events.

The Draft EIR also recognizes the impacts that the other alternatives will have on the environment and community.

Response to Comment 197-8:

The purpose of the Devil's Gate Dam is to protect downstream areas from flooding. The removal of this dam would remove all flood protection for the downstream areas. The Rose Bowl, built in 1922, and the Arroyo Seco Parkway, also known as State Route 110, completed in 1953, are two examples of downstream development made permissible by the construction of Devil's Gate Dam. Without the dam, these two landmarks would be seriously impacted. See Response to Comment 197-4.

Response to Comment 197-9:

See Response to Comments 197-3 and 197-4.

Given the current, limited capacity of the reservoir, a 50-year storm event that results in a DDE would result in storm flows with sediment flowing over the spillway. Flooding with mud/sediment would occur along portions of the Arroyo Seco in the Cities of Pasadena, South Pasadena, and Los Angeles, impacting approximately 650 parcels and requiring closure of Interstate 110 from Orange Grove Avenue to Interstate 5. Additional information about the potential flood areas and analysis is shown in the Arroyo Seco Channel Hydraulic Analysis prepared by Bureau Veritas North America, Inc., available on the Project website. Please note that protocols are in place to monitor storms, reservoir conditions, and channel conditions and to communicate with emergency responders and the California Department of Transportation (Caltrans) to execute any necessary evacuations or freeway closures.

Response to Comment 197-10:

See Response to Comments 197-4 and 197-7.

Response to Comment 197-11:

See Response to Comments 197-4 and 197-8.

Response to Comment 197-12:

See Response to Comments 197-4 and 197-8.

Response to Comment 197-13:

Sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays). In addition, sediment removal activities would not completely block the Proposed Project site from surrounding habitat, would occur only during the day, and would not interfere with nighttime wildlife activity. Although some wildlife may be temporarily displaced during construction, wildlife would not be physically prevented from moving around and into the basin area. The protective Mitigation Measures MM BIO-1, MM BIO-2, MM BIO-3, MM BIO-4, and MM BIO-5 would avoid and minimize any impacts associated with Proposed Project activities. Therefore, the potential impacts to wildlife movement and corridors are anticipated to be less than significant.

Mitigation Measures BIO-1 through BIO-8 are enforceable and designed to reduce impacts through methods known to be feasible and effective. The Proposed Project's Mitigation Measures are accepted by agencies that would be involved in consultation, negotiation, and final approval of Mitigation Measures including conceptual restoration plans. As with any project that involves California Department of Fish and Wildlife (CDFW), U.S. Army Corps of Engineers (USACE), and Regional Water Quality Control Board (RWQCB) jurisdictional areas, the ultimate mitigation for impacts related to the wetlands and drainages under the jurisdiction of the resource agencies is negotiated with the resource agencies during the regulatory permitting process. LACFCD has been and will continue to work closely with CDFW and USACE to identify appropriate mitigation, replacement ratios, and sites for restoration and enhancement that will offset impacts and satisfy the requirements of all applicable laws. A detailed restoration plan will be prepared and provided to CDFW and USACE for review and approval prior to project implementation. Prior to commencement of the Proposed Project, LACFCD will have obtained all necessary permits for impacts to CDFW, USACE, and RWQCB jurisdictional areas including Section 401 Certification, Section 404 permit, a Streambed Alteration Agreement, and an Incidental Take Permit, if needed. Clean Water Act Section 404 (b)(1) guidelines will be followed as a framework for compensatory mitigation. Through 404(b)(1) negotiations with USACE and negotiations with CDFW under Fish and Game Code Sections 1600-1616, a determination of the functions and values of impacted jurisdictional waters shall result in the coordination of appropriate mitigation measures for sediment removal.

Response to Comment 197-14:

As discussed in the Draft EIR, Section 3.10, U.S. EPA included Hahamongna Watershed Park area on the National Priorities List (NPL) Superfund List due to the presence of detected volatile organic compounds (VOCs) and perchlorate in groundwater originating from the Jet Propulsion Laboratory (JPL) property. The impacted groundwater is at 200 feet below ground surface (bgs); and, as with the Proposed Project,

the concentrations of VOCs, organochlorine pesticides, petroleum hydrocarbons (diesel and hydraulic/motor oil range and aromatics), and semi-volatile organic compounds (SVOCs) detected in soil samples that were collected from Devil's Gate Reservoir are below regulatory thresholds. No perchlorates, the substance of concern from JPL, were found in the soil sample analysis. As discussed in the Draft EIR, Section 3.10, no significant impacts associated with the Proposed Project due to the inclusion of the Hahamongna Watershed Park area on the JPL Superfund List are expected, as the contamination is found in the local groundwater table, not in the sediment. Therefore, no significant impacts associated with the Proposed Project or Alternatives are expected.

Also as described in the Draft EIR, Section 3.10, databases maintained by various State and federal regulatory agencies were reviewed for the project site and properties within the immediate vicinity of the site, in accordance with the CEQA statute (Section 21092.6 of the Public Resources Code).

Response to Comment 197-15:

See Response to Comment 197-2.

Impacts to recreation were analyzed in the Draft EIR, Section 3.15. The Proposed Project will not limit the use of the Oak Grove area of Hahamongna Watershed Park. Sediment removal activities would be temporary and are expected to occur only in the drier months (April to December, excluding holidays). It is expected that these activities will often not be adjacent to the Oak Grove area of Hahamongna Watershed Park. The Proposed Project would result in temporary limitations on the recreational use of the Proposed Project site and some of the adjacent trails. Most of these areas would be reopened seasonally or intermittently throughout the sediment removal process. In addition, temporary impacts to designated recreational facilities and trails will be minimized through advance communication and redirection to the nearest facility in the vicinity of the Proposed Project. Furthermore, an east-west trail crossing will continue to provide access at the north end of the reservoir. At the south end of the reservoir, after the reservoir ingress and egress ramps have been fully constructed, access to the upper east side Arroyo Seco Trail from La Cañada Verdugo Road will be maintained; and the linkage from the west side Arroyo Seco Trail and the Flint Wash Trail to the upper east side Arroyo Seco Trail (crossing Devil's Gate Dam and also continuing south to the Rose Bowl) will be available after construction activities have ended each day and on nonworking days.

Under CEQA, the lead agency can approve a project with one or more significant effects on the environment. Section 15021(d) of the CEQA Guidelines states: "CEQA recognizes that in determining whether and how a project should be approved, a public agency has an obligation to balance a variety of public objectives, including economic, environmental, and social factors and in particular the goal of providing a decent home and satisfying living environment for every Californian. An agency shall prepare a statement of overriding considerations as described in Section 15093 to reflect the ultimate balancing of competing public objectives when the agency decides to approve a project that will cause one or more significant effects on the environment." Prior to implementation of the Proposed Project, the County of Los Angeles Board of Supervisors must consider the EIR; must certify the EIR; and must adopt the Findings of Fact, Mitigation Monitoring Program, and a Statement of Overriding Considerations.

Response to Comment 197-16:

LACFCD notes that the commenter is opposed to the Proposed Project and many of the alternatives proposed.

From: Bill Weisman
To: reservoircleanouts
Subject: Devil"s Gate Reservoir Sediment Removal and Management Project
Date: Monday, January 20, 2014 11:42:04 PM

Date: January 20, 2014

To: Los Angeles County Department of Public Works
Water Resources Division
Attn: Reservoir Cleanouts Program
P.O. Box 1460
Alhambra, CA 91802-1460

Re: Devil's Gate Reservoir Sediment Removal and Management Project

Comment 198-1

These comments are being submitted in regards to the Draft Environmental Impact Report (DEIR) for the Devil's Gate Reservoir
Sediment Removal and Management Project issued by the Los Angeles County Department of Public Works .

Comment 198-2

Today we deal with sediment by loading it onto trucks, transporting it to another location, and then either piling it up, or dumping
it into a pit. This paradigm is unsustainable. Eventually, we will run out of places to deposit sediment, and transportation costs
will continue to increase as haul routes lengthen and fuel costs rise. The environmental impacts to air quality and noise levels
associated with large numbers of truck trips over many years are significant, and, in many cases, cannot be mitigated. It is time to
abandon this current stopgap method of sediment management, and begin to learn how to implement a new sustainable paradigm to allow
our stormwater conveyance systems to sluice sediment downstream to the ocean and beaches.

Comment 198-3

The DEIR alternatives are too narrowly focused on an aggressive removal schedule of large amounts of sediment over a relatively
short period of time. The DEIR also provides no alternatives to permanent removal of many acres of riparian habitat in the
streamzone, and stripping all vegetation each fall from a 50- to 120-acre sediment maintenance area. To address these issues,
consideration should be given to alternatives that remove smaller amounts of sediment over longer periods of time. A realistic risk

Comment 198-4

analysis should be performed; one that takes into account the increased stormwater absorption capacity of the watershed due to
regrowth following the Station Fire. Then we can assess whether a removal schedule involving hundreds of thousands of cubic yards of
sediment per year over a period of ten to twenty years might be more appropriate than one that contemplates removing millions of
cubic yards over a period of four to five years.

Comment 198-5

In summary, the DEIR and its alternatives describe a project that will have significant long-term deleterious environmental impacts
- both to the residents of the area in air and noise pollution, and the birds and animals whose habitat will be reduced or
destroyed. I strongly urge the Department of Public Works to reject the DEIR in its current form, and instruct the Los Angeles
County Flood Control District to perform the further required environmental analyses that would support a sustainable long-term

Comment 198-5 continued

sediment management strategy based on:

- Sluicing sediment downstream to the ocean
- Removing smaller quantities of sediment over a longer timeframe
- Minimizing habitat destruction
- Minimizing the amount of trucks and truck trips required to haul sediment.

Sincerely,

William D. Weisman
5001 Carolyn Way
Glendale CA 91214

Response to Comment Letter #198 (William Weisman)

Response to Comment 198-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

Response to Comment 198-2:

The available pits and disposal sites, as outlined in the Proposed Project Description, have enough capacity for the sediment that is planned to be removed.

Sluicing was analyzed as part of the Draft EIR in the Alternatives Analysis, Section 4.7, Alternative 4 Sluicing Method. This alternative would involve use of construction equipment and the removal of trees and vegetation over the same footprint as the Proposed Project. The sluicing alternative would potentially have additional significant impacts in comparison to the Proposed Project. Many of these impacts would be associated with the likelihood that large amounts of sediment would not be fully transported through the flood control system; this sediment would need to be mechanically removed and trucked out from numerous downstream locations, potentially including the two soft-bottom portions of the channel. Please see Section 4.7 and Appendix K of the Draft EIR for further analysis.

While sluicing is not a viable project alternative, as explained in Section 4.7 of the Draft EIR, Flow Assisted Sediment Transport (FASTing) will be used for maintenance after the project's main sediment removal phase has been completed, as described in Section 2.5.2 of the Draft EIR.

As an integral part of the annual maintenance at Devil's Gate, annual FASTing operations will be implemented to reduce future buildups of sediment in the reservoir and to reduce the need for mechanical removal of sediment from the reservoir. Although FASTing is expected to be an effective means of keeping sediment levels low in the reservoir, it is estimated that approximately 13,000 cubic yards (cy) of sediment will be removed by excavation annually; however, a maintenance regime that relies on FASTing greatly reduces the need for and extends the life of future and existing sediment placement sites. Please see Section2.5.2 of the Draft Environmental Impact Report (EIR) for more information on future maintenance.

Air quality and noise impacts associated with truck traffic were analyzed in the Draft EIR in Sections 3.5 and 3.14, respectively. As discussed in the Draft EIR, Section 3.14, with implementation of Mitigation Measure MM N-1, noise impacts would be reduced to a level of less than significant. Los Angeles County Flood Control District (LACFCD) has conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed the United States (U.S.) Environmental Protection Agency's (EPA's) 2007 standards for emissions. Therefore, in order to further reduce emissions, Mitigation Measure MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump trucks that meet or exceed EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality, including those associated with health effects, will be reduced to less than significant.

Response to Comment 198-3:

Pursuant to Section 15126.6(a) of the California Environmental Quality Act (CEQA) Guidelines, "[a]n EIR shall describe a range of reasonable alternatives to the project, or to the location of the project, which

would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project, and evaluate the comparative merits of the alternatives." However, "[a]n EIR is not required to consider alternatives which are infeasible" (CEQA Guidelines Section 15126.6(a)) or "which could change the fundamental nature of the proposed project." (*Al Larson Boat Shop, Inc. v. Board of Harbor Comm.*(1993) 18 Cal.App.4th 729, 745.) The alternatives discussed in the EIR must be reasonable alternatives, selected to foster informed decision-making and public participation (CEQA Guidelines 15126.6(a)). An EIR need not consider an alternative whose effect cannot reasonably be ascertained or whose implementation is remote and speculative because unrealistic alternatives do not contribute to a useful analysis (CEQA Guidelines 16126.6(f)(3)). Additionally, an alternative may be rejected from detailed analysis in an EIR if it fails to reduce or avoid the project's significant environmental effects, does not implement the basic project objectives, is not potentially feasible, or is facially unreasonable. 14 C.C.R. §15126.6(c); Id., see also *Mann v. Community Redevelopment Agency* (1991) 233 Cal. App. 3d 1143; *Del Mar Terrace Conservancy, Inc. v. City Council* (1991) 10 Cal. App. 4th 712.

The Draft EIR, Section 4, fully analyzed six alternatives including the No Project Alternative. These alternatives substantially lessen one or more significant effects of the Proposed Project and, with the exception of the mandatory No Project Alternative, would feasibly attain most of the basic objectives of the Proposed Project. These alternatives include options for different amounts of removal, different methods of removal, and a different haul route.

As discussed in Section 3.6.6 of the Draft EIR, Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats. In addition, sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays).

Alternative 3, Configuration D affects the least amount of habitat of all the action alternatives while still achieving Proposed Project objectives (see Section 4.6 of the Final EIR). This alternative would provide a buffer on the west side of the reservoir that would allow for the movement of wildlife. Alternative 3, Configuration D, Option 1 provides a more natural configuration for the reservoir by having two branches to carry water and sediment toward the face of the dam, avoiding disturbing a significant portion of existing vegetation. To further reduce the Proposed Project's footprint, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2, which drastically reduces the project's footprint of 120 acres down to 71 acres, would avoid excavation of the western branch, thereby providing a greater habitat buffer on the west side of the reservoir. In addition, the maintenance areas would be smaller than the original sediment removal footprint, allowing for habitat to reestablish and providing additional areas for wildlife movement.

Response to Comment 198-4:

LACFCD was mandated by the State Legislature to provide flood protection and water conservation within its boundaries.

A reservoir storage design capacity of two design debris events (DDEs) below the dam's lowest spillway was determined to be the standard acceptable level of risk at Devil's Gate Dam and Reservoir. The DDE volume of capacity is determined using the January 2006 County of Los Angeles Department of Public Works Hydrology Manual and the March 2006 County of Los Angeles Department of Public Works

Sedimentation Manual. For Devil's Gate Dam and Reservoir, the required reservoir capacity is 4.0 million cy (two DDEs) below the spillway elevation of 1,040.50 feet.

The Hydrology Manual (January 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_Hydrology_Manual/2006%20Hydrology%20Manual-Divided.pdf

The Sedimentation Manual (March 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_sedimentation_manual/Sedimentation%20Manual-Second%20Edition.pdf

Additional information concerning DDE calculation methods has been added to the Final EIR, Section 2.3, Project Need.

LACFCD proposed a project duration of five years to reduce accumulated sediment in a timely fashion. The goal of LACFCD is to restore reservoir flood capacity as soon as feasible while reducing costs, minimizing the duration of environmental and construction impacts to the surrounding communities, and configuring the reservoir to allow for sustainable future maintenance. Extending the project would prolong the flood risk to downstream communities and increase the construction impacts to the surrounding communities.

Over 92 years, the average amount of sediment deposited each year is approximately 130,000 cy; however, Devil's Gate Reservoir is a dynamic system with constantly changing amounts of sediment deposited from year to year, depending on the frequency and intensity of storm events. If a 1 in 50 years storm were to occur, approximately 2.0 million cy (one DDE) of sediment could be expected to wash into the reservoir. The most sediment that was deposited during a five-year period is 3.1 million cy, which occurred between 1937 and 1942. Because of LACFCD's responsibilities to provide flood protection, LACFCD must be ready at all times for a design debris event to occur.

Response to Comment 198-5:

See Response to Comments 198-2 and 198-3.

Potential impacts due to the Proposed Project's truck trips were analyzed in the Draft EIR, Section 3.16, Transportation and Traffic. As listed in that section, a single intersection in the immediate vicinity of the Proposed Project site will have a potentially significant impact. In practice, hauling rates and routes may be adjusted to help reduce impacts, depending on operational need. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the Proposed Project site.

From: Elizabeth Garrison
To: reservoircleanouts
Subject: "Devil"s Gate Reservoir Sediment Removal and Management Project"
Date: Monday, January 20, 2014 9:07:57 PM
Attachments: Hahamonga Comment.pages.zip

"Devil's Gate Reservoir Sediment Removal and Management Project"

Gail Farber, Director
Los Angeles County Department of Public Works
Attn: Water Resources Division - Reservoir Cleanouts
P.O. Box 1460
Alhambra, CA 91802-9974

January 15, 2014

To whom it may concern,

Comment 199-1

I have been an avid user/lover of the Arroyo Seco trails beginning in 1973 when I began ownership of a horse I kept down at Arroyo Seco Stables in Highland Park. And I've watched change occur over the years to this contested landscape. Most importantly, wittnessing a tipping point of spirital change reached when Devil's gate dam and environs were renamed Hahamongna. And, over time, Hahamongna has become a place of great beauty. It's importance to the community increases with each passing year.

Comment 199-2

I've attended several meetings centered around the subject of reservoir cleanouts. Completly blindsided by the LACDPW's 'DIER.' It's draconian and your representatives are vague at best. And when you go to each of the team members during their circular 'chat it up' period, one quickly discovers these members don't have a working knowledge of what the other members are up too. No integration between players. We deserve better.

Comment 199-3

Many will write in giving you plenty of reasons to understand why this plan is a hulking collection of bad ideas (air quality; think Owens Valley - traffic issues, habitat destruction etc). What I'd like to do in my comment, is instead introduce the idea of good design. Start listening to other reasonable voices. You are proposing a deep dig that will leave massive birms on the sides of the dam. What about creating a lake there - nothing terribly deep but one fed by a serpintine stream. Maybe creating birms on the edges of that re-worked mountain stream. Such small birms could be replanted with sight specific merridian plants. A start to understanding those possibilities might be to look into the leading pioneers of the eco-art movement, the collaborative team of Newton and Helen Mayer Harrison. They did a wonderful job in creating the stream bed that now runs through the Arroyo underneath the Colorado Street Bridge on both sides of the encapsilated river.

http://theharrisonstudio.net

Comment 199-4

Another sugestion I have, and one that would make the nature lovers of the San Gabriel Valley happy, is if the county uses this sediment as a barginning chip with Vulcan. Their business has blocked the most beautiful waterfall hike in our publicly owned mountains; Fish Canyon. They are not good neighbors. They use access to our public lands as a barginning chip and if anyone questions them, what little limited access they do provide to the community, they remove - as if they were privalliges 'we the people' had to earn through silence. It's vindictive. There alternative trail provided by Vulcan, no one uses because it's akin to climbing Mount Everest.

Comment 199-5

In closing, I would like to say, the choices made for 'us' will no longer be tolerated by a trustful public. We are educated and we demand inovative solutions that are transparent and not agenda driven.

Sincerely,
Elizabeth Garrison
Highland Park Ca. 90042

lizgarrison@sbcglobal.net

Response to Comment Letter #199 (Elizabeth Garrison)

Response to Comment 199-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

As noted in Section 2.1, Project Location, of the Draft EIR, Devil's Gate Dam and Reservoir is within the City of Pasadena's Hahamongna Watershed Park.

Response to Comment 199-2:

The Draft Environmental Impact Report (EIR) provided a detailed and thorough analysis of the Proposed Project and alternatives as required by the California Environmental Quality Act (CEQA) and requested by the public during the scoping period.

Los Angeles County Flood Control District (LACFCD) notes that the commenter was not satisfied with the community meetings. LACFCD held three community meetings to inform the public of the Proposed Project, Alternatives, and the results of the Draft EIR. The meetings included a presentation, workshops where the public could ask specific questions about the project and potential impacts, and the ability to submit formal comments. Members of the public were able to ask questions or pose comments either in a group setting after the presentation or at the individual workshop stations. Workshop stations were established that focused on specific resource issues so the public could easily focus on the issues of most interest to them.

Response to Comment 199-3:

Due to the nature of a dam and reservoir system, as the Arroyo Seco enters the reservoir, the slope naturally flattens and stabilizes within the reservoir. As a part of the sediment removal project, the cut plan mimics these historic slopes by incorporating 3:1 side slopes and varying but gradual bottom slopes, all of which are shallow and stable.

Holding water behind the dam permanently, as a lake, is not a part of the Proposed Project objectives and is outside the scope of this project; however, with the exception of the suggestion of the lake, this alternative most closely resembles Alternative 3, Configuration D. In Alternative 3, the proposed cut at the northern end of the reservoir is approximately 25:1, a very shallow slope, which mimics the historic slopes in that area of the reservoir. This configuration provides two stream channels and will allow for more onsite mitigation, including replanting of slopes. Furthermore, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2, which drastically reduces the project's footprint of 120 acres down to 71 acres, would avoid excavation of the western branch, providing a greater distance between the Oak Grove area of Hahamongna Watershed Park and the excavation area (see Section 4.6 of the Final EIR). Additionally, vegetation mitigation is expected to occur on site, which would be similar to the commenter's proposal once the main sediment removal project is completed.

Response to Comment 199-4:

Fish Canyon and its associated trails are outside the jurisdiction of LACFCD. The sediment that came into Devil's Gate Reservoir following the Station Fire has a very fine gradation or consistency. As such, the

majority of this material is not readily reusable on a commercial scale and will most likely not be sold; however, sediment placed at sediment placement sites would be available for potential reuse for other projects or sediment reuse opportunities. The sediment removed from the Devil's Gate Reservoir will be transported to the existing placement sites listed in the Draft EIR in Section 2.0, Project Description.

For further information regarding beneficial uses for sediment at LACFCD sites, please refer to Section 6.5 of LACFCD's 2012 Sediment Management Strategic Plan which can be found at: http://dpw.lacounty.gov/lacfcd/sediment/stplan.aspx.

Response to Comment 199-5:

LACFCD notes the commenter's opinions. The purpose of CEQA is to provide transparency during the decision-making process. In addition, LACFCD has made an effort to be transparent throughout the EIR process in meeting with stakeholders, elected officials, and organizations, as well as holding multiple community meetings to discuss the Draft EIR. Once the Final EIR is completed, a set of informational presentations will be held to discuss the document before it is presented to the Board of Supervisors.

January 21, 2014

County of Los Angeles
Department of Public Works
Water Resources Division
ATTN: Reservoir Cleanouts Program
PO Box 1460
Alhambra, CA 91802-1460
reservoircleanouts@dpw.lacounty.gov

RE: DEVIL'S GATE RESERVOIR SEDIMENT REMOVAL AND MANAGEMENT PROJECT

Dear Department of Public Works, Water Resource Division,

Thank you for the opportunity to comment on the draft EIR for the DEVIL'S GATE RESERVOIR SEDIMENT REMOVAL AND MANAGEMENT PROJECT. I can't imagine what a herculean task you have ahead deciding how best to assess and implement the sediment removal project.

Comment 200-1

I have been a part of Tom Sawyer Camp ever since I was four years old. I was a camper for 10 years and a camp counselor for 6 years. The watershed has had a huge impact on my life and one of my favorite parts of camp was always being able to hike there during the day. As a counselor, I was able to see how much joy it brought to the campers I was in charge of. I also ran cross country and track at La Canada High School and many days we would run down in the watershed during trail runs. It is very popular trail for local high school to run around. The watershed is an area that is not normally appreciated and there are so few of these places in Southern California.

Comment 200-2

While we support the sediment clean up in general, we are concerned about the impact as defined in the DEIR on summer camp and are requesting the following modifications: 1) No sediment removal in the willow forest and alluvial scrub areas during the months of June, July, and August; 2) A phased approach that allows for places within the project area that can continue to be used for recreational purposes; 3) A longer timeline for the project to help minimize impact on those who use the park; and, 4) Preservation of the willow forest and the alluvial scrub area from denuding and/or from being used as permanent maintenance zones.

Comment 200-3

Tom Sawyer Camps has been in operation since 1926 and has been using Hahamongna Watershed Park as for the last 70 years (since 1944). Approximately 1250 of our campers and 150 staff use this site each summer,

Comment 200-3 continued

which now includes three generation of campers. This park is critical to our day camp programs and heavy truck traffic during the summer months and denuding the willow forest and alluvial scrub areas would have a critical negative impact on the program, the campers and the staff.

Comment 200-4

Camp is an antidote to bullying, isolation, over reliance on technology and many other challenges facing our youth. At Hahamongna, campers age 3-14 have critical exposure to wilderness adventure. During the summer, they hike, ride horses, build secret forts, observe wildlife, play games, sing songs, build self reliance and self esteem, and develop friendships that last a lifetime. We rely heavily on the access, peace and beauty of the willow forest and the alluvial scrub areas for these experiences, along with other areas of the park. Hahamongna is home to generations of staff and campers whose lives have been directly and dramatically enriched by this natural refuge, including mine.

Comment 200-5

Tom Sawyer Camps is a very important program and my request could easily go unnoticed but I believe the impact that camp has on the children of tomorrow is significant. Summer in the watershed is a rare and unique opportunity for children to be away from noise and disruption and engage with nature and outdoor adventure in a safe, peaceful, and joyful manner. We hope you will see the value of camp and make every attempt to minimize the impact the sediment clean up will have during the summer months and for the generations of children to use the park in the years to come.

Thank you for allowing me the opportunity to share my concerns and needs. Please feel free to contact me if you have any questions.

Sincerely,

Erick Lankey
4829 Burgoyne Lane
818-304-1277
lankeyrunner@sbcglobal.net

Response to Comment Letter #200 (Erick Lankey)

Response to Comment 200-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

Response to Comment 200-2:

The Proposed Project will not limit the use of the Oak Grove area of Hahamongna Watershed Park by recreational users such as Tom Sawyer Camps. Sediment removal activities would be temporary and are expected to occur only in the drier months (April to December, excluding holidays). It is expected that these activities will often not be adjacent to the Oak Grove area of Hahamongna Watershed Park. Therefore, the maximum impacts to the adjacent recreational facilities would be much shorter than the five-year duration of the sediment removal phase of the Proposed Project.

During the summer months, sediment is expected to be the driest. Due to the reduction in water weight, each truck can haul more sediment per load during these months. This increases efficiency and decreases project duration, which also decreases impacts and cost. Skipping these crucial dry months would extend the project duration.

Los Angeles County Flood Control District (LACFCD) proposed a project duration of five years to reduce accumulated sediment in a timely fashion. The goal of LACFCD is to restore reservoir flood capacity as soon as feasible while reducing costs and minimizing the duration of environmental and construction impacts to the surrounding communities. Extending the project would prolong the flood risk to downstream communities and increase the construction impacts to the surrounding communities.

As discussed in Section 3.6.6 of the Draft Environmental Impact Report (EIR), Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats.

Alternative 3, Configuration D affects the least amount of reservoir area of all the action alternatives, while still achieving Proposed Project objectives (see Section 4.6 of the Final EIR). This alternative would provide a buffer between the Oak Grove area of Hahamongna Watershed Park and the excavation area. Alternative 3, Configuration D, Option 1 provides a more natural configuration for the reservoir with two branches to carry water and sediment toward the face of the dam, avoiding disturbing a significant portion of existing vegetation. To further reduce the Proposed Project's footprint, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2 would avoid excavation of the western branch, thereby providing a greater habitat buffer on the west side of the reservoir. In addition, the maintenance areas would be smaller than the original sediment removal footprint, allowing for habitat to reestablish.

Response to Comment 200-3:

See Response to Comment 200-2. Access to the Oak Grove area of Hahamongna Watershed Park will not be limited by the Proposed Project. Potential impacts due to the Proposed Project's truck trips were analyzed in the Draft EIR, Section 3.16, Transportation and Traffic. As listed in that section, a single intersection in the immediate vicinity of the Proposed Project Site will have a potentially significant impact. In practice, hauling rates and routes may be adjusted to help reduce impacts depending on

operational need. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the project site.

LACFCD also notes the commenter's concerns with traffic impacts relating to traveling to and from the Oak Grove area of Hahamongna Watershed Park. The Draft EIR outlines a 12-hour trucking schedule, with trucking operations on Saturdays as well. This schedule is used to model the most intensive construction operation, which may not be applicable at the site for the duration of the project. Typical trucking schedules are estimated to be 8 hours per day on weekdays. Additionally, construction traffic will not pass the Berkshire Place intersection with Oak Grove Drive and thus will not approach the Oak Grove Drive/Foothill Boulevard intersection used for ingress and egress to the Oak Grove area of Hahamongna Watershed Park.

Response to Comment 200-4:

See Response to Comment 200-2. LACFCD notes the use of Devil's Gate Reservoir by Tom Sawyer Camps, especially the willow forest and alluvial scrub areas.

Response to Comment 200-5:

See Response to Comment 200-2. LACFCD notes that Tom Sawyer Camps is an important resource to children and is going to great lengths to keep impacts to a minimum. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the Proposed Project site.

From:	Erik Hillard
To:	reservoircleanouts
Cc:	Peggy Casey
Subject:	Devil"s Gate Reservoir Sediment Removal and Management Project
Date:	Monday, January 20, 2014 7:00:00 PM

Dear DPW LA County..

Comment 201-1

We are residents of Altadena very close to the Devil's Gate Reservoir. We are very concerned about the plans to remove sediment from the area and believe further study needs to be done to develop a modern approach the solution. Many other groups and individuals have pointed out the problems and issues with the current plans and we do not need to repeat those.

LA is one of the great cities of the world and we want new ideas for the sediment issues than a 1930s approach to our drainage & sediment flows.

Thank you.

Best,
Erik Hillard & Peggy Casey
3461 Canyon Crest Rd
Altadena, CA 91001
323 259 9390

Response to Comment Letter #201 (Erik Hillard)

Response to Comment 201-1:

Thank you for your input. This comment has been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. Los Angeles County Flood Control District (LACFCD) notes the residents' concerns with the Project.

The goal of LACFCD is to restore reservoir flood capacity as soon as feasible while reducing costs and minimizing the duration of environmental and construction impacts to the surrounding communities. LACFCD is going to great lengths to keep costs and impacts to a minimum. The Draft Environmental Impact Report (EIR) analyzed a range of sediment removal amounts and configurations aimed at addressing the diverse concerns of stakeholders. The alternatives presented in the Draft EIR represent the best options available to respond to stakeholders' concerns while adequately reducing flood risk to downstream communities. Alternative 3, Configuration D, the Environmentally Superior Alternative from the Draft EIR, carefully balances flood control needs and reductions in impacts to habitat by restoring the required reservoir capacity while also minimizing the project footprint (see Section 4.6 of the Final EIR). Furthermore, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2 would avoid excavation of the western branch, thereby providing a greater distance between the Oak Grove area of Hahamongna Park and the excavation area. Additionally, the limited maintenance area for Alternative 3 further reduces habitat impacts by allowing for site replanting and mitigation to take place within the reservoir footprint.

From:	Gaby Johnston
To:	reservoircleanouts
Subject:	Devil"s Gate Reservoir Sediment Removal and Management Project
Date:	Tuesday, January 21, 2014 8:01:58 AM

Dear DPW Administrator,

Comment 202-1

I am writing to comment on the draft EIR for the proposed sentiment removal project at Devi's Gate Reservoir in Pasadena/La Canada.
I am very much against the plan that is being discussed.
I was at the protest and saw the tremendous community support for a more moderate and sensible solution to this problem.

Comment 202-2

The draft EIR proposes a radical and expensive solution that will disrupt the community and cause environmental damage for many years.

Comment 202-3

Please consider the approach outlined by the Arroyo Seco foundation which balances the need for flood control while still preserving the quality of life in Pasadena and La Canada.

Respectfully,

Gabrielle Johnston

Response to Comment Letter #202 (Gabrielle Johnston)

Response to Comment 202-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. Los Angeles County Flood Control District (LACFCD) notes the commenter's objection to the Proposed Project. LACFCD is going to great lengths to keep costs and impacts to a minimum. Alternative 3, Configuration D, the Environmentally Superior Alternative from the Draft Environmental Impact Report (EIR), carefully balances flood control needs and reductions in impacts to habitat by restoring the required reservoir capacity while also minimizing the project footprint (see Section 4.6 of the Final EIR). Furthermore, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2 would avoid excavation of the western branch, thereby providing a greater distance between the Oak Grove area of Hahamongna Park and the excavation area. Additionally, the limited maintenance area for Alternative 3 further reduces habitat impacts by allowing for site replanting and mitigation to take place within the reservoir footprint.

Response to Comment 202-2:

LACFCD proposed a project duration of five years to reduce accumulated sediment in a timely fashion. The goal of LACFCD is to restore reservoir flood capacity as soon as feasible while reducing costs, minimizing the duration of environmental and construction impacts to the surrounding communities, and configuring the reservoir to allow for sustainable future maintenance. Extending the project would prolong the flood risk to downstream communities and increase the construction impacts to the surrounding communities.

Response to Comment 202-3:

LACFCD goes to great lengths to lessen project impacts and maximize efficiencies. As such, many of the points in the Arroyo Seco Foundation's four-point "Slow Program" are compatible with the LACFCD Proposed Project.

For example, the Draft EIR selected Alternative 3 as the Environmentally Superior Alternative. Alternative 3 drastically reduces the project's footprint of 120 acres down to 71 acres. This reduction in project acreages will greatly lessen environmental impacts of the Proposed Project.

LACFCD strives to achieve an efficient, low-cost sediment removal project. Sediment removal rates and trucking operations, now utilizing all low-emissions trucks, as explained in Section 3.5 of the Draft EIR, have been carefully planned for economies of scale to realize maximum efficiencies without major delays in project schedule, thus greatly reducing operating costs. Furthermore, LACFCD has applied for and received an approximately $28 million grant through the State's Disaster Preparedness and Flood Protection Bond Act of 2006 (Proposition 1E) program. A portion of this grant will be used to help offset the Proposed Project's costs.

While sluicing is not a viable project alternative, as explained in Section 4.7 of the Draft EIR, Flow Assisted Sediment Transport, or FASTing, will be used for maintenance after the project's main sediment removal phase has been completed, as described in Section 2.5.2 of the Draft EIR.

LACFCD is committed to *Public Service that Works*; and by combining almost 100 years of technical expertise and invaluable input from the community, less invasive flood protection will continue to be a reality.

For a more detailed response to the Arroyo Seco Foundation's four-point "Slow Program", please see the response to the Arroyo Seco Foundation's comment letter (Comment Letter #216, Response to Comment 216-16).

From: geraldine Manlin
To: reservoircleanouts
Subject: Devil's Gate Reservoir Sediment Removal and Management Project
Date: Tuesday, January 21, 2014 10:18:04 AM

Comment 203-1

Please don't do this unnecessary sediment removal. Although some of your constituents need jobs, this is not a good fit. Devil's Gate Dam is a unique spot that is fine just the way it is. Let's get some rain, a lot of rain and then see what happens. This is not the 1920's. Thank you. Geri Johnston - Born and raised in La Canada.

Response to Comment Letter #203 (Geraldine Johnston)

Response to Comment 203-1:

Thank you for your input. This comment has been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. Los Angeles County Flood Control District (LACFCD) notes the commenter's opposition to the Proposed Project.

LACFCD was mandated by the State Legislature to provide flood protection and water conservation within its boundaries. LACFCD is undertaking the Proposed Project to restore acceptable levels of flood protection to the downstream communities.

A reservoir storage design capacity of two DDEs below the dam's lowest spillway was determined to be the standard acceptable level of risk at Devil's Gate Dam and Reservoir. The DDE volume of capacity is determined using the January 2006 Los Angeles County Department of Public Works (LACDPW) Hydrology Manual and the March 2006 LACDPW Sedimentation Manual. For Devil's Gate Dam and Reservoir, the required reservoir capacity is 4.0 million cubic yards (cy) (two DDEs) below the spillway elevation of 1,040.50 feet.

The Hydrology Manual (January 2006) can be viewed here:

http://dpw.lacounty.gov/wrd/publication/engineering/2006_Hydrology_Manual/2006%20Hydrology%20Manual-Divided.pdf

The Sedimentation Manual (March 2006) can be viewed here:

http://dpw.lacounty.gov/wrd/publication/engineering/2006_sedimentation_manual/Sedimentation%20Manual-Second%20Edition.pdf

Additional information concerning DDE calculation methods has been added to the Final Environmental Impact Report (EIR), Section 2.3, Project Need.

Historically, large amounts of sediment have been deposited in the reservoir in short time periods. Between 1935 and 1938 over 1.6 million cy of sediment, between 1938 and 1943 over 1.95 million cy of sediment, between 1959 and 1966 over 1.75 million cy of sediment, and between 2010 and 2012 over 1.3 million cy of sediment was deposited in the reservoir. Over 92 years, the average amount of sediment deposited each year is approximately 130,000 cy; however, Devil's Gate Reservoir is a dynamic system with constantly changing amounts of sediment deposited from year to year, depending on the frequency and intensity of storm events. Due to the dynamic nature of the system and the recent burn of the watershed, the amount could vary greatly. If a 1 in 50 years storm were to occur, approximately 2.0 million cy (one DDE) of sediment could be expected to wash into the reservoir. Because of LACFCD's responsibilities to provide flood protection, LACFCD must be ready at all times for a design debris event to occur.

LACFCD goes to great lengths to lessen project impacts and maximize efficiencies. For example, the Draft Environmental Impact Report (EIR) selected Alternative 3 as the Environmentally Superior Alternative. Alternative 3 drastically reduces the project's footprint of 120 acres down to 71 acres. Additionally, the limited maintenance area for Alternative 3 further reduces the permanent habitat impacts down to approximately 51 acres by allowing for site replanting and mitigation to take place within the reservoir

footprint. This reduction in project acreages will greatly lessen environmental impacts of the Proposed Project.

From: Gregg
To: reservoircleanouts
Subject: Devil"s Gate Reservoir Sediment Removal and Management Project
Date: Monday, January 20, 2014 7:25:24 PM

Hello,

Comment 204-1

I am sending in my comments regarding the proposed sediment removal and management project in the Hahamongna area behind Devil's Gate Reservoir.

Comment 204-2

I have lived in Pasadena for 36 years, and have lived adjacent to Hahamongna Park for 21 years. The park is my backyard neighbor. Actually, we do not even have a back yard fence, so we can walk down the hill and be in the natural area in seconds. Our back yard experiences a multitude of migratory birds that are drawn by the natural area in the Arroyo. We also have seen in our back yard coyotes, bobcats, foxes, deer and recently a black bear. These animals live in our neighborhood because of the natural areas all around. The natural area in Hahamongna has grown, allowing more natural area for these residents to thrive. It is not time to shrink the park.

Comment 204-3

As residents, my wife and I use the park for hiking and biking every week. We go mostly on the weekends, but my wife has been recovering from cancer, and she walks around the entire park most days. We have many routes through the park following old roads, trails, and even animal trails. Basically, it is a 5 mile loop from our home near the end of Altadena Drive, down and across the JPL bridge, following the JPL fence, up into Hahamongna, then down through the natural area or across the dam to the other side and back home. We enjoy the trails and animals within the reservoir area. The recent fires and sediment that came down have greatly changed the watershed, but the natural area that has built up in the basin is a wonderful habitat for the wildlife that we enjoy.

Comment 204-4

The forest that has grown near the dam is full of wildlife and should be preserved. There are many birds, rabbits, coyotes, foxes, and other wildlife. This area developed because the agency didn't remove sediment for years; why was nothing done before now? The area should be left in the natural state that it has developed into. The current plan for sediment removal goes "overboard". Why was NOTHING done in the 20 years since I moved in to this area? Well, not nothing, but VERY LITTLE, and just near the face of the dam. And now you want to clear acres of land? That seems too much.

Comment 204-5

I do support removal of minimal sediment at the face of the dam and in areas further upstream since the sediment from the fire filled a canyon that used to be 15 to 20 feet deep. This upstream area that used to be a natural streambed should be focused on to recreate the stream to its original depth, then perhaps one-tenth of the four million cubic yards proposed could be removed. Reducing the amount of sediment removal would reduce some of the concerns with noise, pollution, and number of trucks. Redevelop the canyon up to where the new JPL parking structure is being built. That will allow for the sediment that you fear is coming down soon to deposit.

If a smaller amount of sediment upstream were removed, then nature could return to the canyon that was once present. Then the County needs to be able to maintain the area, and remove sediment on a schedule. Shouldn't wait for a disaster in order to take action. Not having a regular schedule of maintenance is what has caused this problem.

Comment 204-6

The natural area that has developed should be left alone; and efforts should be focused on the sediment, not nature. The size of the trees that have grown in the area near the dam is testament to how long it has been since sediment maintenance has been done. We support a more environmentally friendly and sustainable plan. Go slower. Please? There is no need for the speed and severity of your draconian plan. Let the wildlife live in this new natural area that we enjoy so much.

Thank you for your consideration.

-gregg

Gregg and Helen Oelker
3285 Crestford Dr
Altadena, CA 91001

Response to Comment Letter #204 (Gregg Oelker)

Response to Comment 204-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

Response to Comment 204-2:

As discussed in Section 3.6.6 of the Draft Environmental Impact Report (EIR), Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats. In addition, sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays). Wildlife species currently found in the Proposed Project area would be expected to either remain in the undisturbed areas of the reservoir outside of the Proposed Project area or to reestablish once sediment removal activities have been completed.

Alternative 3, Configuration D affects the least amount of habitat of all the action alternatives while still achieving Proposed Project objectives (see Section 4.6 of the Final EIR). This alternative would provide a buffer on the west side of the reservoir that would allow for the movement of wildlife. Alternative 3, Configuration D, Option 1 provides a more natural configuration for the reservoir by having two branches to carry water and sediment toward the face of the dam, avoiding disturbing a significant portion of existing vegetation. To further reduce the Proposed Project's footprint, Los Angeles County Flood Control District (LACFCD) has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2, which drastically reduces the project's footprint of 120 acres down to 71 acres, would avoid excavation of the western branch, thereby providing a greater habitat buffer on the west side of the reservoir. In addition, the maintenance areas would be smaller than the original sediment removal footprint, allowing for habitat to reestablish and providing additional areas for wildlife movement.

Response to Comment 204-3:

See Response to Comment 204-2.

Impacts to recreation were analyzed in the Draft EIR, Section 3.15. The Proposed Project will not limit the use of the Oak Grove area of Hahamongna Watershed Park. Sediment removal activities would be temporary and are expected to occur only in the drier months (April to December, excluding holidays). It is expected that these activities will often not be adjacent to the Oak Grove area of Hahamongna Watershed Park. The Proposed Project would result in temporary limitations on the recreational use of the Proposed Project site and some of the adjacent trails. Most of these areas would be reopened seasonally or intermittently throughout the sediment removal process. In addition, temporary impacts to designated recreational facilities and trails will be minimized through advance communication and redirection to the nearest facility in the vicinity of the Proposed Project. Furthermore, an east-west trail crossing will continue to provide access at the north end of the reservoir. At the south end of the reservoir, after the reservoir ingress and egress ramps have been fully constructed, access to the upper east side Arroyo Seco Trail from La Cañada Verdugo Road will be maintained; and the linkage from the west side Arroyo Seco Trail and the Flint Wash Trail to the upper east side Arroyo Seco Trail (crossing Devil's Gate Dam and also continuing south to the Rose Bowl) will be available after construction activities have ended each day and on nonworking days.

Response to Comment 204-4:

As noted in Section 2.2.1, LACFCD History, sediment removal efforts have previously taken place at the reservoir in order to ensure correct functioning of the outlet works and/or to maintain reservoir capacity. Historically, large amounts of sediment have been deposited in the reservoir in short time periods. Between 1935 and 1938 over 1.6 million cubic yards (cy) of sediment, between 1938 and 1943 over 1.95 million cy of sediment, between 1959 and 1966 over 1.75 million cy of sediment, and between 2010 and 2012 over 1.3 million cy of sediment was deposited in the reservoir. Since the 1920 dam construction and prior to the Station Fire in 2009, approximately 10.7 million cy of sediment accumulated in the reservoir; and approximately 8.0 million cy was removed by LACFCD.

LACFCD has executed several sediment removal projects at Devil's Gate Reservoir in the past, with the last major effort being in 1994. Smaller amounts of sediment were removed in 2006, 2009, and as a part of the Interim Measures Project in 2011, 2012, and 2013. Following the 2009 Station Fire, approximately 1.3 million cy of sediment flowed into Devil's Gate Reservoir after just two average storm seasons. In 2010, LACFCD proposed an emergency sediment removal project in response to the large inflow of sediment resulting from the Station Fire.

In March 2011, the County of Los Angeles Board of Supervisors motioned LACFCD to complete an EIR for a comprehensive sediment removal project at Devil's Gate. LACFCD then initiated project development in accordance with the required level of protection of protection of two design debris events (DDEs). LACFCD began evaluating ways to create a more sustainable long-term way to manage its sediment and habitat. To emphasize the goals of the project, the project was given the name Devil's Gate Sediment Removal and Management Project. The purpose of the Proposed Project is to restore the necessary capacity in Devil's Gate Reservoir and to establish a reservoir configuration more suitable for routine maintenance activities. Therefore, the need for future large-scale sediment removal projects will be reduced or avoided.

The current remaining capacity in the reservoir is 1.3 million cy, whereas a reservoir storage design capacity of two DDEs, or 4.0 million cy, below the dam's lowest spillway was determined to be the standard acceptable level of risk at Devil's Gate Dam and Reservoir. If the reservoir is left in its current state, the flood risk to downstream communities would be left at an unacceptable level.

Response to Comment 204-5:

See Response to Comments 204-2 and 204-4. After the sediment removal phase has occurred, Flow Assisted Sediment Transport, or FASTing, is proposed to be an integral part of the annual maintenance at Devil's Gate. Annual FASTing operations will be implemented to reduce future buildups of sediment in the reservoir and to reduce the need for mechanical removal of sediment from the reservoir. Although FASTing is expected to be an effective means of keeping sediment levels low in the reservoir, it is estimated that typically 13,000 cy of sediment will be removed by excavation annually; however, a maintenance regime that relies on FASTing greatly reduces the need for and extends the life of future and existing sediment placement sites and improves the future sustainability of the reservoir. Please see Section 2.5.2 of the Draft EIR for more information on future maintenance.

LACFCD was mandated by the State Legislature to provide flood protection and water conservation within its boundaries.

A reservoir storage design capacity of two DDEs below the dam's lowest spillway was determined to be the standard acceptable level of risk at Devil's Gate Dam and Reservoir. The DDE volume of capacity is determined using the January 2006 Los Angeles County Department of Public Works (LACDPW) Hydrology Manual and the March 2006 LACDPW Sedimentation Manual. For Devil's Gate Dam and Reservoir, the required reservoir capacity is 4.0 million cy (two DDEs) below the spillway elevation of 1,040.50 feet.

The Hydrology Manual (January 2006) can be viewed here:

http://dpw.lacounty.gov/wrd/publication/engineering/2006_Hydrology_Manual/2006%20Hydrology%20Manual-Divided.pdf

The Sedimentation Manual (March 2006) can be viewed here:

http://dpw.lacounty.gov/wrd/publication/engineering/2006_sedimentation_manual/Sedimentation%20Manual-Second%20Edition.pdf

Additional information concerning DDE calculation methods has been added to the Final EIR, Section 2.3, Project Need.

Response to Comment 204-6:

LACFCD proposed a project duration of five years to reduce accumulated sediment in a timely fashion. The goal of LACFCD is to restore reservoir flood capacity as soon as feasible while reducing costs, minimizing the duration of environmental and construction impacts to the surrounding communities, and configuring the reservoir to allow for sustainable future maintenance. Extending the project would prolong the flood risk to downstream communities and increase the construction impacts to the surrounding communities.

From: Joseph Evelyn
To: reservoircleanouts
Subject: Comments on Devil"s Gate Reservoir Sediment Removal and Management Project Draft EIR dated October 2013
Date: Tuesday, January 21, 2014 10:52:37 AM

Comment 205-1

1. The DEIR is a comprehensive, well written, and informative document describing the effects of the sediment removal alternatives under consideration for Devil's Gate Reservoir. The following comments are provided to clarify certain flood risk reduction aspects of the proposed project as well as propose a more in-depth formulation and evaluation of alternatives based on water transport of sediment (sluicing and slurry pipeline) to the Pacific Ocean.

Comment 205-2

2. The DEIR uses the terminology "flood risk reduction". For clarity it is suggested that the terminology "flood risk reduction" be clearly defined and differentiated from the frequently used phrases "flood protection" and "flood control". "Flood protection" and "flood control" can imply total or complete protection from all flood events regardless of size or the downstream location of interest. Whereas the phrase "flood risk reduction" more accurately conveys the concept that the operation of the dam results in a reduction in the size and frequency of occurrence of downstream floods and floodplain inundation as compared to the without dam condition. The volume of reservoir storage space available and operation of the dam's outlet works determine the extent of downstream flood risk reduction. Large flood events may exceed the capability of the dam to reduce downstream flood magnitude and floodplain inundation to non-damaging levels.

Comment 205-3

3. The DEIR states that Devil's Gate Dam provides flood risk reduction along the Arroyo Seco downstream of the dam. Flood risk reduction from dam operations also extends along the Los Angeles River from its confluence with the Arroyo Seco to the Pacific Ocean. The magnitude of the flood risk reduction along the Arroyo Seco and the Los Angeles River from dam operations progressively diminishes as the uncontrolled drainage area below the dam increases with distance downstream of the dam.

Comment 205-4

4. The rationale for the size of the sediment removal project is somewhat ambiguous. Paragraph 2.4 (Project Goals and Objectives) in the DEIR states "The Proposed Project will remove sediment from Devil's Gate Reservoir to restore the design capacity (volume for two DDEs below the spillway elevation of 1,040.5 feet) and establish a reservoir management system to maintain the flood control capacity of the reservoir." The DEIR should clarify whether the primary design objective is to restore the original reservoir storage volume (4,601 acre-feet), or to enable the dam to capture and store two Design Debris Events (DDE) of approximately 2 million cubic yards (1,240 acre-feet) each. Neither Chapter 4 (Policy on Levels of Protection) of the LACDPW Hydrology Manual dated January 2006 nor Chapter 2 (Public Work's Policy Levels for Flood Protection) in LACDPW's Sedimentation Manual, Second Edition, dated March 2006, prescribe design storage requirements of two DDEs for dams.

Comment 205-5

5. It would be informative for the DEIR to include a table and chart in paragraph 2.2.1 (LACFCD History) depicting the historical sediment management of the reservoir. For each year with sediment related data the table and chart would present in acre-feet the reservoir capacity, sediment deposited, sediment removed by sluicing, sediment removed by excavation, and sediment remaining in storage. This information would provide perspective with regard to size of currently proposed sediment removal volumes and Reservoir Management actions versus historical sediment removal actions.

Comment 205-6

6. Los Angeles County Flood Control District (LACFCD) commitments to the US Army Corps of Engineers (USACE) regarding maintaining the level of flood risk reduction along the lower Los Angeles River have a bearing on the minimum amount of sediment removal from Devil's Gate Dam that should be considered. LACFCD is required to manage stormwater runoff within the Los Angeles County Drainage Area (LACDA) system so as not to reduce the 133-year design flood level of flood risk reduction for the lower Los Angeles River. In accordance with Article II, paragraph Q of the ***Project Cooperation Agreement between Department of the Army and Los Angeles County Flood Control District for Construction of the Los Angeles County Drainage Area,***

California Flood Control Project dated August 7, 1995, LACFCD committed "to ensure that the quantity or concentration of stormwater inflow does not reduce the authorized level of flood protection".

Comment 205-6 continued

The LACDA watershed encompasses 1450 square miles and contains a system of dams, debris basins, and channels along the Los Angeles and San Gabriel Rivers that provide flood risk reduction. Devil's Gate Dam is one component of this system. Modifications to the lower Los Angeles River channel were constructed during the late 1990's and early 2000's by the USACE to increase the hydraulic capacity of the river. The hydrologic basis for USACE planning and design of the lower Los Angeles River channel modifications assumed Devil's Gate Dam would have a minimum of 2,087 acre-feet (3.367 million cubic yards) of storage space available for flood risk reduction above the water conservation pool (reference paragraph 5.1.3 and Table 29 of the USACE ***Los Angeles County Drainage Area Final Feasibility Interim Report, Part I Hydrology Technical Report, Base Conditions, December 1991***). A decision to adopt a sediment removal alternative with a smaller volume would necessitate compensating for the effect of the reduced flood space in Devil's Gate Reservoir by some combination of increased hydraulic capacity in the lower Los Angeles River, the addition or reallocation of reservoir storage space for flood risk reduction elsewhere in the LACDA system, and changes in LACDA reservoir system operation.

7. LACFCD in conjunction with the USACE needs to develop a comprehensive plan for the long-term management of sediment deposition within the LACDA system. The geologic processes that produce sediment inflows from the San Gabriel Mountains will continue in the future just as local sediment disposal sites will gradually be filled to capacity in the coming decades. Given the built-out landscape of the greater Los Angeles floodplain the long-term sediment management plan needs to address how the LACDA system of dams, debris basins, and channels can be operated so that sediment produced by the mountains can be transported to the ocean in a sustainable, cost effective, and environmentally acceptable manner. The plan may include structural modifications of LACDA system components, changed operational procedures, and additional real estate interests (fee or easements). Implementation of the long-term sediment management plan will also require an understanding of the issues by the public and their political representatives. With the long lead times in implementing any such plan it is not too early to address the issue and develop a workable strategy for the future. The benefits of developing a long-term sediment management plan include the ability of local agencies and the public to make future land use, transportation facility, and utility placement decisions consistent with the plan.

Comment 205-7

8. The DEIR addresses the use of the Arroyo Seco Channel and the Los Angeles River to transport Devil's Gate sediment to the Pacific Ocean in the discussion of Alternative #4 (Sluicing), the Slurry Pipeline Alternative(eliminated without a detailed evaluation), and FAST operations. However the treatment of water transport of sediment methods (Sluicing Alternative #4, the Slurry Pipeline Alternative, and FAST operations) in the DEIR is incomplete and uneven. The formulation and evaluation of the sluicing and slurry pipeline alternatives is based on an "all or nothing" approach in which all the sediment to be removed from the reservoir has to be done by these means alone. The DEIR then points to deficiencies of these methods as a basis for eliminating them from consideration. The DEIR dismisses these alternatives largely based on the lengthy period of time (many decades) it would require for dam outflows to carry the sediment to the Los Angeles River. The DEIR thereby misses a potentially beneficial means of removing a sizeable portion of the sediment from the reservoir in a manner that could reduce the adverse effects of the proposed excavation and trucking approach with respect to air quality, traffic, noise, GHG emissions, and dust.

Comment 205-8

9. The annual Reservoir Management operations that are a part of current LACFCD operations and all alternatives are not described in sufficient detail in the DEIR to know how much sediment would normally be removed from the reservoir by water transport. The evaluation of water transport of sediment in the DEIR cites no problems or issues with Reservoir Management activities that place indeterminate quantities of sediment in the Arroyo Seco Channel but

Comment 205-9

Comment 205-9 continued

highlights the potential problems of needing to excavate and truck out sediment deposits in the Arroyo Seco Channel, Los Angeles River, and Port of Long Beach resulting from the sluicing and slurry pipeline alternatives. The DEIR also cites potential environment problems such as air quality impacts with the sluicing and slurry pipeline alternatives but does not address any such issues with the water transport of sediment from the dam for the Reservoir Management operations. This is an uneven treatment of water transport of sediment methods. Inclusion in the DEIR of the table and chart described in comment #5 would be informative with respect to the magnitude of sediment removed by Reservoir Management operations.

Comment 205-10

10. The evaluation of the Sluicing Alternative uses the results of a hydraulic analysis in Appendix K (***Final Detailed Sediment Transport Capacity Analysis for the Arroyo Seco Channel, Devil's Gate Reservoir Sediment Removal and Management Project***, dated January 7, 2013) of the DEIR. Appendix K describes the application of a recognized sediment transport model (FLUVIAL 12) for 3 scenarios (or 3 conditions) to determine the effectiveness of clear water flushing flows from the dam in transporting sediment deposits (from sluicing) along the Arroyo Seco from the dam to the Los Angeles River. The flushing flows used in the sediment transport model were either a "typical" dam release pattern (based on dam operations records from October 15, 2006 to April 15, 2007) or a continuous dam release of a magnitude and duration required to transport the sediment deposited in the Arroyo Seco Channel. The sediment transport modeling leaves out of the analysis the flow contribution from the uncontrolled drainage area (15 square miles) downstream of the dam. The analysis should be conducted using the full historical record of Arroyo Seco flows from streamgage records and dam operations. This period-of-record analysis would provide a more accurate assessment of the sediment transport delivery potential of the Arroyo Seco Channel than selecting a typical or average flow regime based on only dam releases.

Comment 205-11

11. The sluicing and slurry pipeline alternatives could be formulated so they would be feasible by relying on these methods to the extent that water is available in the quantities needed to completely transport sediment downstream. If sluicing or slurry pipeline methods can be used in conjunction with the proposed excavation and trucking approach in a combined alternative then the advantages of both approaches could be realized, and adverse environmental effects reduced.

Comment 205-12

12. The Slurry Pipeline alternative should not be eliminated as infeasible in the DEIR without a more thorough formulation and evaluation. Paragraph 4.10.2 of the DEIR cited concerns related to insufficient water for flushing sediment through the Arroyo Seco Channel and Los Angeles River, and the likely need to reload sediment deposited in these channels in order to transport them to designated disposal site(s). The DEIR including Appendix K did not address quantitatively the flow conditions or sediment transport along the Los Angeles River yet relied on the perceived inability of the Los Angeles River to transport the sediment in deciding the Slurry Pipeline alternative was infeasible. The drainage area of the Los Angeles River at its confluence with the Arroyo Seco Channel is 511 square miles as compared to about 47 square miles for the Arroyo Seco watershed at this location. Therefore flood discharges on the Los Angeles River are typically an order of magnitude or more, and of longer duration, than characteristic of flows on the Arroyo Seco.

Comment 205-13

13. The Slurry Pipeline alternative could be formulated to use an appropriately sized floating hydraulic (suction) dredge operating in the reservoir pool. By controlling the water surface elevation of the reservoir pool the floating dredge could be maneuvered to locations within the reservoir where sediment is to be removed. Water for the slurry pipeline operation would come from flood inflows impounded by the dam and from water pumped upstream from the Los Angeles River to the dam in a pipeline located in or adjacent the Arroyo Seco Channel. Even low flows on the Los Angeles River during the summer months should be sufficient to support a slurry pipeline operation. During the winter flood season (October to April) the pipelines could be temporarily removed until the following non-flood season. The dam outlets (either sluice gate openings or conduits with slide gates) could be temporarily fitted with a closure that enabled the slurry pipeline and freshwater pipeline to pass through the dam. To address the

Comment 205-13 continued

concern of deposition of sediment within the Arroyo Seco Channel, the slurry pipeline could be extended the entire length of the Arroyo Seco Channel to the Los Angeles River.

Comment 205-14

14. An appropriately formulated slurry pipeline alternative has significant advantages. Slurry pipeline transport of bulk materials is a mature technology that has been used worldwide in the mining industry for many years. Use of a hydraulic (suction) dredge in combination with a slurry pipeline would be particularly effective in transporting the finer sediment sizes found close to the dam embankment. It may be possible to use an electric hydraulic dredge which should reduce the adverse environmental aspects of traditional earthmoving equipment and trucking. Pumping of Los Angeles River water upstream to the dam could be accomplished using electric pumps and be conducted primarily during off-peak hours to minimize energy costs. A slurry pipeline approach could be used in conjunction with the proposed excavation and trucking approach to take advantage of the strengths of each approach in removing sediment from the reservoir. A dredge could be used to remove the sediment closer to the dam while the proposed excavation and trucking may be more suited to the upstream portion of the reservoir area. It is recognized that placing larger quantities of sediment in the Los Angeles River will result in more sediment deposition at the mouth of the Los Angeles River. More frequent dredging of the harbor area is likely however the long-term capacity of offshore placement sites for dredged material is much greater than local pits and engineered fill sites within the LACDA watershed.

Thanks for the opportunity to comment on the DEIR for Devil's Gate Reservoir Sediment Removal.

Joseph Evelyn
527 Knight Way
La Canada, CA 91011

January 21, 2014

Response to Comment Letter #205 (Joseph Evelyn)

Response to Comment 205-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

Response to Comment 205-2:

"Flood Risk Management" is defined in County of Los Angeles Department of Public Works (LACDPW) 2013 Sediment Management Strategic Plan (SMSP) as "Various activities and regulations that help reduce or prevent damages caused by flooding." Removing sediment from the Devil's Gate Reservoir is a flood risk management activity used to reduce the downstream flooding risk.

Differing levels of "flood protection" are required based on regulations and standards. For example, State of California jurisdictional dams must be constructed to provide a level of flood protection that can safely pass the Probable Maximum Flood. The term "flood control" is used interchangeably with "flood risk management;" however, Los Angeles County Flood Control District (LACFCD) acknowledges that natural events in exceedance of regulations and design standards are possible given the power and unpredictability of nature.

The Sediment Management Strategic Plan (March 2013) can be viewed here:
http://dpw.lacounty.gov/lacfcd/sediment/files/FullDoc.pdf

Response to Comment 205-3:

Comment noted.

Response to Comment 205-4:

LACFCD was mandated by the State Legislature to provide flood protection and water conservation within its boundaries.

A reservoir storage design capacity of two design debris events (DDEs) below the dam's lowest spillway was determined to be the standard acceptable level of risk at Devil's Gate Dam and Reservoir. The DDE volume of capacity is determined using the January 2006 LACDPW Hydrology Manual and the March 2006 LACDPW Sedimentation Manual. For Devil's Gate Dam and Reservoir, the required reservoir capacity is 4.0 million cubic yards (cy) (two DDEs) below the spillway elevation of 1,040.50 feet.

As stated in the EIR "The Proposed Project will remove sediment from Devil's Gate Reservoir to restore the design capacity (volume for two DDEs below the spillway elevation of 1,040.5 feet)." By restoring two DDEs of capacity below the spillway elevation of 1,045.5 feet, the Project will also be restoring capacity to the total reservoir storage volume.

The Hydrology Manual (January 2006) can be viewed here:

http://dpw.lacounty.gov/wrd/publication/engineering/2006_Hydrology_Manual/2006%20Hydrology%20Manual-Divided.pdf

The Sedimentation Manual (March 2006) can be viewed here:

http://dpw.lacounty.gov/wrd/publication/engineering/2006_sedimentation_manual/Sedimentation%20Manual-Second%20Edition.pdf

Additional information concerning DDE calculation methods has been added to the Final Environmental Impact Report (EIR), Section 2.3, Project Need.

Response to Comment 205-5:

The County of Los Angeles Department of Public Works' 2013 SMSP included sediment history data to demonstrate the volume of sediment deposited into the dams and used that data along with statistical analysis to develop projected 20-year sediment volumes for County facilities. The sediment history provided for Devil's Gate Dam (pages 8-42 and 8-43 of the Sediment Management Strategic Plan) correctly shows the sediment volumes accumulated at the dam; however, a slight adjustment must be made to understand the current capacity in the dam. The column titled "Reservoir Capacity at Elevation 1,054 ft" provides the remaining capacity when considering the original spillway elevation of the dam. The spillway was rehabilitated in the late 1990s in order to pass the Probable Maximum Flood. The rehabilitation entailed lowering the spillway bottom elevation, thereby constructing the spillway ports. The reservoir capacity below the existing spillway ports (elevation of 1,040.5 feet) is the appropriate parameter for determining the currently available capacity for meeting the sediment volume requirements for the dam.

Response to Comment 205-6:

Goal number 5 of the Draft EIR is listed as "Supporting dam safety by removing sediment accumulated in the reservoir in a timely manner to ensure the ability to empty the reservoir in the event of a dam safety concern." Alternative 3, designated as the Environmentally Superior Alternative in the Draft EIR which also achieves Proposed Project objectives, aims to remove 2.4 million cubic yards (cy) of sediment within five years of construction commencement. This would bring the total storage capacity at Devil's Gate Dam and Reservoir up to 3.7 million cy or approximately 2,300 acre-feet. With a project of this size and duration, LACFCD anticipates no changes to the Los Angeles County Drainage Area system.

Response to Comment 205-7:

In recent years, LACFCD has identified new challenges in managing sediment. In particular, the wildfires occurring in 2007 and 2009 burned a large portion of the County and have led to an increased inflow of sediment and debris within LACFCD facilities. This has put pressure on the remaining capacity of existing sediment placement sites, where LACFCD has traditionally placed sediment. As a result, LACFCD has developed a 20-year Sediment Management Strategic Plan (Strategic Plan) for years 2012 through 2032 that pursues new alternatives which can reduce the environmental and social impacts of sediment management.

The Strategic Plan represents the results of a continuing dialogue about sediment management between the LACFCD and numerous stakeholders, including the United States (U.S.) Army Corps of Engineers (USACE), in the region. The Strategic Plan provides an overview of sediment management issues, evaluates various strategies to help identify optimal solutions for sediment management, and identifies

general steps that should be pursued to meet the LACFCD's mission. The Strategic Plan is guided by the following key objectives:

- Maintaining flood risk management and water conservation
- Recognizing opportunities for increased environmental stewardship
- Reducing social impacts related to sediment management
- Identifying ways to use sediment as a resource
- Ensuring LACFCD is fiscally responsible in decision-making

The Strategic Plan is a living document that is open to other alternatives and may be revised in the future as conditions change. This Strategic Plan is intended to be an advisory document. Development of specific cleanout plans for the LACFCD's numerous facilities will be guided by the Strategic Plan. During the development of these specific cleanout plans there will be opportunities for additional public input, including from the local communities affected by each cleanout.

When the County of Los Angeles Board of Supervisors instructed LACFCD to prepare an EIR, project development was begun in accordance with the required level of protection. At that time LACFCD also began receiving feedback on the concurrent Strategic Plan and the interest to look at more sustainable sediment and reservoir management. As a result of the feedback and recommendations during the development of the Strategic Plan, LACFCD began evaluating ways to create a more sustainable long-term way to manage its sediment and habitat. To emphasize the goals of the project, the project was given the name Devil's Gate Sediment Removal and Management Project.

Additionally, for this Proposed Project, after the sediment removal phase has occurred, Flow Assisted Sediment Transport, or FASTing, is proposed to be an integral part of the annual maintenance at Devil's Gate. Annual FASTing operations will be implemented to reduce future buildups of sediment in the reservoir and to reduce the need for mechanical removal of sediment from the reservoir. Although FASTing is expected to be an effective means of keeping sediment levels low in the reservoir, it is estimated that typically 13,000 cy of sediment will be removed by excavation annually; however, a maintenance regime that relies on FASTing greatly reduces the need for and extends the life of future and existing sediment placement sites and improves the future sustainability of the reservoir. Please see Section 2.5.2 of the Draft EIR for more information on future maintenance.

Response to Comment 205-8:

See Response to Comment 205-7.

Pursuant to Section 15126.6(a) of the California Environmental Quality Act (CEQA) Guidelines, "[a]n EIR shall describe a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project, and evaluate the comparative merits of the alternatives." However, "[a]n EIR is not required to consider alternatives which are infeasible" (CEQA Guidelines Section 15126.6(a)) or "which could change the fundamental nature of the proposed project." (*Al Larson Boat Shop, Inc. v. Board of Harbor Comm.* (1993) 18 Cal.App.4th 729, 745.) The alternatives discussed in the EIR must be reasonable alternatives, selected to foster informed decision-making and public participation (CEQA Guidelines 15126.6(a)). An EIR need not consider an alternative whose effect cannot reasonably be ascertained or whose implementation is remote and speculative because unrealistic alternatives do not contribute to a useful analysis (CEQA Guidelines 16126.6(f)(3)). Additionally, an

alternative may be rejected from detailed analysis in an EIR if it fails to reduce or avoid the project's significant environmental effects, does not implement the basic project objectives, is not potentially feasible, or is facially unreasonable. 14 C.C.R. §15126.6(c); Id., see also *Mann v. Community Redevelopment Agency* (1991) 233 Cal. App. 3d 1143; *Del Mar Terrace Conservancy, Inc. v. City Council* (1991) 10 Cal. App. 4th 712.

Alternative 4, Sluicing is addressed and analyzed in the Draft EIR. The Slurry Pipeline Alternative was not carried forward for further analysis because it would not reduce impacts. Flow Assisted Sediment Transport, or FASTing, is included in the reservoir maintenance phases of the Proposed Project, as well as the alternatives. As detailed in the Sediment Transport Capacity Analysis (Appendix K), neither sluicing nor FASTing would be able to move the necessary amount of sediment out of the reservoir to restore full capacity within the required time frame.

LACFCD proposed a project duration of five years to reduce accumulated sediment in a timely fashion. The goal of LACFCD is to restore reservoir flood capacity as soon as feasible while reducing costs, minimizing the duration of environmental and construction impacts to the surrounding communities, and configuring the reservoir to allow for sustainable future maintenance. Extending the project would prolong the flood risk to downstream communities and increase the construction impacts to the surrounding communities.

Response to Comment 205-9:

See Response to Comment 205-7. Future maintenance activities would not increase or decrease the current amount of sediment that flows downstream. As with the ongoing use of FASTing, future FASTing operations would naturally remove sediment of finer particle size from the reservoir, through the dam, and on to the ocean.

FASTing keeps fine sediment that is suspended in flows moving through the dam and Arroyo Seco as opposed to dropping out in the Reservoir. Sluicing on the other hand, attempts to resuspend sediment into slower moving flows through the use of mechanical agitation. This process is often not as successful as FASTing as the larger granulated sediment being transported by the slower flows has greatly increased potential to drop out prior to reaching the ocean. This is the reason why sluicing has more potential impacts to the Arroyo Seco than FASTing does.

Response to Comment 205-10:

While performing additional analysis on a larger range of historic records would produce a variety of outlying data, for planning purposes, a recent, "typical" year of flow data was chosen to provide a representative view of what types of flows could be expected in the near future.

Additionally, Page 8 of the analysis in Appendix K of the Draft EIR provides further reasoning for the omission of the downstream inputs:

"This analysis has been performed under the assumption that the natural stormwater flows occurring in the Arroyo Seco Channel over the period of time being analyzed are governed entirely by the conditions at the outlet of the Devils Gate Dam. Due to the extremely long duration of analysis, and the subsequent amount of hourly flow data, conventional routing methods used to confluence the Dam outflows with additional downstream tributaries as the Channel extends downstream were not a feasible option for this analysis. Omitting the effects of additional downstream inflows into the Channel may reduce the

sediment transport capacity of the Channel, particularly in the most downstream reaches of the Channel as the area of the additional tributaries increases. However, omitting these effects will have a negligible effect on the sediment transport capacity of the Channel in the most upstream reaches, such as in the most upstream natural reach of the Channel where additional tributary areas are negligible and stormwater flow rates are entirely governed by the Dam outflow. Given that the previously performed sediment transport capacity analysis indicated a large volume of sediment would settle out in this natural upstream portion of the Channel, the results presented herein are anticipated to produce an accurate model of the sediment transport characteristics of the Channel, particularly for the previously identified problem areas."

Response to Comment 205-11:

See Response to Comments 205-7, 205-8, and 205-10.

Response to Comment 205-12:

See Response to Comments 205-8 and 205-10, above.

As discussed in Appendix K – Sediment Transport Analysis, the accumulated sediment within Devil's Gate Reservoir cannot be sufficiently transported down the length of the Arroyo Seco Channel with the average quantity of water received. As demonstrated in the analysis, it is likely that sediment loads will fall out rapidly after leaving Devil's Gate Reservoir and remain in the channel before reaching the confluence with the Los Angeles River. This sediment would eventually need to be excavated and trucked out from the Arroyo Seco Channel. Therefore, the flows within the Los Angeles River were not taken into account.

Response to Comment 205-13:

See Response to Comment 205-8, 205-10, and 205-12.

The analysis for the slurry pipeline in Section 4.10.2 of the Draft EIR assumed that the process "involves allowing the water to build up behind the dam, conducting operations to suspend the sediment in the water, and transporting the sediment slurry downstream of the dam in a pipeline." A floating hydraulic dredge operating in the reservoir would fall in line with the outlined plan. Please see Section 4.10.2, Slurry Pipeline Alternative, of the Draft EIR. This alternative was rejected due to the high risk to downstream habitat as well as the limitations of being able to quickly and efficiently move sediment out of the reservoir. This alternative would fail to meet the project objectives and would result in greater/additional impacts than the Proposed Project.

Additionally, pumping water from the Los Angeles River to the top of Devil's Gate Reservoir, 11 miles upstream over approximately 800 feet in elevation, would be cost prohibitive and could potentially have additional environmental impacts and regulations.

Response to Comment 205-14:

See Response to Comment 205-13.

From: Joseph Johnston
To: reservoircleanouts
Subject: Devil's Gate Reservoir Sediment Removal and Management Project
Date: Tuesday, January 21, 2014 10:30:10 AM

To whom it may concern,

Comment 206-1

The L.A. County plan for the Devil's Gate Reservoir is hugely degrading to the natural water shed environment within the Reservoir and surrounding park. In addition the increase in traffic, destruction to roads, and noise pollution for the community and local schools is unacceptable and ludicrous.

Comment 206-2

The Arroyo Seco Foundation solution for the sediment situation at the Devil's Gate Reservoir is by far a more logical idea. It is less expensive and impacting to the taxpayers funding this venture, and offers a more ecologically sound solution. Let's do the right thing and not the easy one.

Sincerely, Joseph A. Johnston, La Crescenta

Response to Comment Letter #206 (Joseph Johnston)

Response to Comment 206-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. Los Angeles County Flood Control District (LACFCD) notes the commenter's objection to the Proposed Project.

As discussed in Section 3.6.6 of the Draft Environmental Impact Report (EIR), Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats. In addition, sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays).

Potential impacts due to the Proposed Project's truck trips were analyzed in the Draft EIR, Section 3.16, Transportation and Traffic. As listed in that section, a single intersection in the immediate vicinity of the Proposed Project site will have a potentially significant impact. In practice, hauling rates and routes may be adjusted to help reduce impacts, depending on operational need. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the Proposed Project site.

As discussed in the Draft EIR, Section 3.14, with implementation of Mitigation Measure MM N-1, noise impacts would be reduced to a level of less than significant.

Response to Comment 206-2:

LACFCD goes to great lengths to lessen project impacts and maximize efficiencies. As such, many of the points in the Arroyo Seco Foundation's four-point "Slow Program" are compatible with the LACFCD Proposed Project.

For example, the Draft EIR selected Alternative 3 as the Environmentally Superior Alternative. Alternative 3 drastically reduces the project's footprint of 120 acres down to 71 acres. Additionally, the limited maintenance area for Alternative 3 further reduces the permanent habitat impacts down to approximately 51 acres by allowing for site replanting and mitigation to take place within the reservoir footprint. This reduction in project acreages will greatly lessen environmental impacts of the Proposed Project.

LACFCD strives to achieve an efficient, low-cost sediment removal project. Sediment removal rates and trucking operations, now utilizing all low-emissions trucks, as explained in Section 3.5 of the Draft EIR, have been carefully planned for economies of scale to realize maximum efficiencies without major delays in project schedule, thus greatly reducing operating costs. Furthermore, LACFCD has applied for and received an approximately $28 million grant through the State's Disaster Preparedness and Flood Protection Bond Act of 2006 (Proposition 1E) program. A portion of this grant will be used to help offset the Proposed Project's costs.

While sluicing is not a viable project alternative, as explained in Section 4.7 of the Draft EIR, Flow Assisted Sediment Transport, or FASTing, will be used for maintenance after the project's main sediment removal phase has been completed, as described in Section 2.5.2 of the Draft EIR.

LACFCD is committed to *Public Service that Works*; and by combining almost 100 years of technical expertise and invaluable input from the community, less invasive flood protection will continue to be a reality.

For a more detailed response to the Arroyo Seco Foundation's four-point "Slow Program", please see the response to the Arroyo Seco Foundation's comment letter (Comment Letter #216, Response to Comment 216-16).

Comment Letter #207

Marietta Kruells
835 West Mariposa Street
Altadena CA 91001
818-468-4239

1/19/2014

County of Los Angeles Department of Public Works Water Resources Division
Attn: Reservoir Cleanouts Program
P O Box 1460
Alhambra CA 91802-1460
reservoircleanouts@dpw.lacounty.gov

To Whom it may concern:

Comment 207-1

Having paid attention to the Devil's Gate Dam for some thirty years, I have, of course, actively watched the ever changing plans to conduct sediment removal since the 2009 Station Fire. The confusing part is why the number of cubic yards and affected acreage have consistently been increasing. In a quest for facts on the dam specifications with updated 1995-8 retrofit data, I have found this information missing. Other than the 1920 specs that are mentioned in this DEIR, I have been unable to locate this information nor the retrofit data. Google searches have led me to sites on the DPW's own website that are no longer available. And, this information is not available independently on the DPW's site. During 1995-8, there was a dam retrofit. The spillway was lowered and this may have been due in no small part to DPW's desire to forego maintenance and allow a greater sediment fill to remain. An intentional decrease in sediment removal lowers the size of the reservoir capacity and the fix was to lower the spillway and add additional tunnels to allow for quicker, immediate releases of storm water. DPW's choice to ignore the retrofit specifications and, instead, rely on the 1920 original dam spec's and a return to original 1920 "design capacity", is not acceptable. The retrofit design capacity, along with any potential flaw that further reduced that capacity must be used in order to arrive at the correct conclusions. Why has this been ignored?

Comment 207-2

It is because of this that I arrive at the flaws of the original "initial study" of this DEIR. The ever shifting amount of sediment removal necessary is highly questionable. This is proven out by DPW's own statements, documents and public comments as well as other governmental documents. I am attaching two such

documents on which I am relying and am asking for responses to these in light of each and every premise contained within them and the DEIR. The first is the 3/18/2011 California Regional Water Quality Board (CRWQB)'s denial of a water quality certification of a 12/1/2010 application. The second is the Proposition 1E application for flood grant money for the Devils Gate and Eaton Stormwater Flood Management Project, of which, I am only attaching pertinent sections as is the document is very large and, obviously, you already have a complete copy of this application and its related attachments. For the record, the Eaton Canyon/Devils Gate diversion project was awarded $28million.

My reliance on these documents and the information contained therein continues to bring into question the quantity of sediment to be removed and acreage to be disturbed and possible reasons why the magnitude continues to increase. Starting with the CRWQB's denial of the original request to remove 1.6million cubic yards of sediment within a 50 acre area, this denial also comes with a list of suggestions and all of this with the knowledge of the Station Fire's sediment issues. The denial reads "...we cannot conclude that impacts to water of the US have been appropriately avoided and minimized and that the project would not result in an unacceptable degradation of water quality..." The denial acknowledges the activities necessary to provide proper function of the flood control system in accordance with its "original" design which I would question (updated "retrofit" specs should be used). Although this denial calls out for alternatives and analysis, it also clearly states

Comment 207-2 continued

"1) LACFCD shall identify cleanout alternatives sufficient to protect public safety other than "return to design capacity."...
2) LACFCD shall identify cleanout alternatives which would minimize the 50-acre impact and identify alternatives for phasing the project to minimize impacts over time ... LACFCD shall identify alternatives which include lesser initial volumes but repeated cleanouts over several periods including two years and five years... The final analysis should include the rationale for the determination that the proposed project is the most appropriate design which meets project needs and that there are not other, more appropriate, project designs which avoid or minimize impacts to waterways while also meeting project needs..."
http://www.waterboards.ca.gov/losangeles/water_issues/programs/401_water_quality_certification/final_letters/Documents/2011/10-170DenialWQC.pdf

Comment 207-3

CRWQB's approvals must be met in order to obtain a CWA Section 401 certification. While it appears that this DEIR accomplishes requests made in CRWQB' denial letter, it ignores the basic demand - to look to reduce the amount of sediment to be removed, reduce acreage to be disturbed and space the project

Comment 207-3 continued

out over time. The DEIR goes the opposite way ignoring the denial comment "... we cannot conclude that impacts to water of the US have been appropriately avoided and minimized and that the project would not result in an unacceptable degradation of water quality..." Instead of seeking to reduce sediment volume to be removed and acreage to be disturbed and using repeated cleanouts over several periods over years, this DEIR doubles down on all three. The base numbers of the DEIR are the ones contained in this Water Quality Certification application and denial. The DEIR ignores the requests of the CRWQB to reduce and instead the sediment removal volume ranges up to 250% of the application's 1.6million cubic yards to 4million, acreage ranges up 150% of the application's 50 acres to 125, and the request to have repeated cleanouts over several periods turns into nonstop, whenever sufficiently dry, don't stop 'til you drop cleanout. Why have these basic requests in this denial letter been ignored in the DEIR? Why did the DEIR instead go in direct opposition to all these suggestions? And, yet, the CRWQB's approval is still required as acknowledged under 2.8.2 of the DEIR.

The next document is the application for Proposition 1E grant money for the Devil's Gate and Eaton Stormwater Flood Management Project.
http://www.water.ca.gov/irwm/grants/docs/Archives/Prop1E/Submitted_Applications/P1E_Round2_SWFM/Los%20Angeles%20County%20Flood%20Control%20District%20(201243210009)/Devil%92s%20Gate%20and%20Eaton%20Stormwater%20Flood%20Management%20Project%20Proposal.pdf
This grant application has 5 projects, the first 3 improve Eaton Spreading Grounds, #4 is the pipeline and pumps, and #5 is the 2,000,000 cubic yards of sediment to be removed from Devil's Gate Dam area. Clearly, Devil's Gate's sediment removal is a big part of this project.

Comment 207-4

http://www.water.ca.gov/irwm/grants/docs/Archives/Prop1E/Submitted_Applications/P1E_Round2_SWFM/Los%20Angeles%20County%20Flood%20Control%20District%20(201243210009)/Attachment%203%20-%20Att3_SWF_WorkPlan_1of2.pdf
As described in this document
(page 3-12) Devil's Gate Water Conservation
Based on the proposed future configuration of Devil's Gate Reservoir, an estimated 4,500 AF can be captured annually for water conservation by conveying it to the Eaton Wash Spreading Grounds (and possibly to Arroyo Seco Spreading Grounds in the future) for infiltration and recharge to the Raymond Basin.
Devil's Gate Reservoir area covers approximately 175 acres (0.27 square miles) and has a design storage capacity of 4,600 acre-feet (AF).
(page 3-14) Phase V: Devil's Gate Reservoir Sediment Removal and Management

Removing 2 million cubic yards of sediment from the reservoir area by means of either trucking, sluicing, flow assisted sediment transport, or a combination thereof Establishing a reservoir configuration more suitable for routine maintenance activities including sediment management

http://www.water.ca.gov/irwm/grants/docs/Archives/Prop1E/Submitted_Applications/P1E_Round2_SWFM/Los%20Angeles%20County%20Flood%20Control%20District%20(201243210009)/Attachment%207%20-%20Att7_SWF_TechJust_1of2.pdf
See page 8, second chart which clearly states: Measure of Benefit Claimed (Name of Units): Acre-Foot Per Year with project to be 4,500 ac ft.

Comment 207-4 continued

It is very revealing as it states "based on the proposed future configuration of Devil's Gate Reservoir, an estimated 4,500 AF can be captured annually ... by conveying it to the Eaton Wash Spreading Grounds..." Clearly, the "proposed future configuration" is planning for the capture and storage of 4,500 AF of water (clearly only when storms generate this quantity). This water transfer not only requires storage in the Arroyo Seco, but a 30-36 inch 5 mile pipeline, several pumps along the way, a pump to be installed either at the upstream face of the dam or in an intake tunnel, and major improvements to the Eaton Spreading Grounds. The Eaton Spreading Grounds improvements have mostly been completed. The preferred pipeline route is mostly an easterly route following Woodbury Road, Lake Avenue and New York Drive. This will mainly affect Altadena residents, especially on New York which is an extremely narrow, residential street with high traffic volume. Unfortunately, the water benefit derived will benefit few, if any, Altadenans. While both areas, the Arroyo Seco and Eaton Wash, are in the Raymond Basin Aquifer, the Arroyo Seco/Hahamongna area is in the "Monk Hill" area of the Basin which serves at least one La Canada Flintridge water purveyor, 3 Altadena water purveyors and Pasadena. The Eaton Wash area of the Basin is in the "Pasadena Subarea" and may minimally serve Altadena through the Pasadena Water Department but most if not all the benefit will go to Pasadena. Allowing water to settle in the Monk Hill area will benefit all users and the entire Raymond Basin aquifer.

Comment 207-5

So here is my premise and question:
Water transfers cannot occur during storm events. Eaton Canyon generates its own storm water which first must use the spreading grounds or be discharged. This can be several months each year. The Devil's Gate Dam area will have to store the water during these wet months and then continue to store the diminishing pond as water is transferred slowly to the Eaton Canyon Spreading Grounds. There is not

Comment 207-5 continued

enough storage capacity at Eaton Canyon to hold this water. The water will be transferred slowly and allowed to percolate. So how much room does it take to store 4,500 AF of water? There are 1,613 cubic yards in an acre foot. 1,613 cu yds x 4,500 AF = 7,258,500 cu yds. This is almost the size of the original design capacity of the 1920 dam, 7.4million cu yds (and this is born out in one of the above documents stating that it has a design storage capacity of 4,600 acre-feet). Interesting isn't it. What does this pond look like - spread over 50 acres, it would be 90 feet deep and over 100 acres it would be 45 feet deep. And, to prevent undermining of water on the sides, it would be a lot deeper if the ponds are earthen ponds and not concrete. This would be a huge, deep pond of water at its maximum and an equally large crater when dry. Due to the highly related nature of these two projects, the combined effects have not been sufficiently addressed or analyzed and have been largely hidden from the public. CEQA requires that these related projects' cumulative impacts be combined and studied together. Why has this not been handled as a combined project?

Comment 207-6

Why would DPW want to use the entire reservoir to hold water for diversion? Wouldn't having a large pond of water endanger flood control and take up the space and during a DDE would double the danger to the downstream area and the dam? How is this protecting the intent of Devil's Gate Dam flood control when it may, in fact, impede or heighten the flood danger? Would this additional load potentially compromise the integrity of the Dam using the 1995-8 retrofit specifications? Would this not increase the seismic safety issues? What other unintended consequences might this cause?

Comment 207-7

I do not deny that having water to replenish the aquifer is a noble cause. But, why, if it is safe to hold water in Devil's Gate Dam, would you want to transfer this water to Eaton Canyon? The percolation in both areas, the Arroyo Seco and Eaton Canyon, is similar. All Raymond Basin users would benefit if the water is allowed to recharge within the Arroyo Seco/Hahamongna area. Why would you want to spend $10-15million dollars and disrupt the neighborhoods with a 5 mile pipeline?

Comment 207-8

Also, another California entity, California Department of Fish and Wildlife (CDFW), requires that a Section 1600 Streambed Alteration Agreement be obtained. These two California Departments will undoubtedly be coordinating documentation and relying on each other's comments. Why is this being ignored?

Comment 207-9

The third document of interest is the study by the United States Army Corp of Engineers (USACE) Arroyo Seco Watershed, Los Angeles County CA Feasibility

Study. It is the Army Corp. from whom a Section 404 Permit must be obtained. And this, well publicized soon to be complete study is not even mentioned in the DEIR. This study of the Arroyo Seco Watershed continues to be an ongoing plan. See Congressman Adam Schiff's website: http://schiff.house.gov/s20091/schiff-secures-federal-funds-for-arroyo-seco/

Comment 207-9 continued

Congressman Schiff's website states:

The focus of the study is to address flood and stream management, habitat, water resources, and ecosystem restoration issues within this vital Southern California watershed. This funding will allow the Corps to conduct technical assessments of ecosystem restoration and watershed management programs to identify projects which will improve the management and conditions of the watershed. The Arroyo Seco Watershed Management Plan is a project supported and coordinated by the County of Los Angeles to develop a comprehensive, environmentally friendly approach to manage the Arroyo Seco Watershed.

Comment 207-10

Once again, this DEIR is looking for a one solution fix for an area with many stakeholders, including the Army Corp of Engineers. Would you explain how the DEIR alternatives fit in with the County's support of this Watershed Management Plan as underlined above?

Comment 207-11

Clearly, there are many other issues either not fully considered or entirely ignored within this DEIR. Undoubtedly, others will comment on these but I still would like to ask why the following items were not appropriately considered and would like these items individually addressed:

Comment 207-12

- Trail Closures – The only 2 east west trails will be closed during all construction hours and may be closed on off hours as well.

Comment 207-13

- JPL parking structure – This construction will cause the closure of the Arroyo Seco's western most trail between JPL's bridge and Rose Bowl Riders. When combined with the first bullet point, this completely closes off east west trail use in Hahamongna.

Comment 207-14

- Complete degradation and elimination of all plants and small animals within the construction area

Comment 207-15

- Air, Noise, and Visual Pollution much of which is ignored or not fully addressed or mitigated.

Comment 207-16

There is not enough time for me to go into all of the shortcomings and, while I will acknowledge the need for sediment removal now and in the future, I stand by the California Regional Water Quality Board's 3/18/2011 denial letter and their request that this project be reduced in both acreage affected and sediment removed

Comment 207-16 continued

and that the project be spread out over time of 2-5 years removing much smaller amounts of sediment. Why would this not be the preferred alternative?

Comment 207-17

I will look forward to your responses to all my comments and questions.

Sincerely,

Marietta Kruells

Marietta Kruells

Cc:
LA County Board of Supervisors
Pasadena City Council
Michael Beck, Pasadena City Manager
Arroyo Seco Foundation
Pasadena Audubon Society
California Department of Fish and Game
U.S. Forest Service
Tony Zampiello, Raymond Basin Management District
Chris Holden, State Assembly Member
California Regional Water Quality Board

California Regional Water Quality Control Board
Los Angeles Region

320 W. 4th Street, Suite 200, Los Angeles, California 90013
Phone (213) 576-6600 FAX (213) 576-6640 - Internet Address: http://www.waterboards.ca.gov/losangeles

Linda S. Adams
Acting Secretary for
Environmental Protection

Edmund G. Brown J
Governor

March 18, 2011

Mr. Christopher Stone
Los Angeles County Flood Control District
900 S. Freemont Ave.
Alhambra, California 91803

DENIAL WITHOUT PREJUDICE OF WATER QUALITY CERTIFICATION FOR PROPOSED DEVIL'S GATE DAM AND RESERVOIR SEDIMENT REMOVAL PROJECT (Corps' Project No. 2010-01122-CO), ARROYO SECO, CITY OF PASADENA, LOS ANGELES COUNTY (File No. 10-170)

Dear Mr. Stone:

On December 1, 2010, the Los Angeles Regional Water Quality Control Board (Regional Board) received an application for a Clean Water Act (CWA) Section 401 Water Quality Certification of the proposed Devil's Gate Dam and Reservoir sediment removal project (Devil's Gate Project) from the Los Angeles County Flood Control District (LACFCD). On December 13, 2010, Regional Board staff, Valerie Carrillo, and LACFCD staff conducted a joint inspection of the project site. The Regional Board sent a request for more information (RFI) for the proposed project application on December 14, 2010 and a response to the RFI was sent by LACFCD dated December 30, 2010. In addition, we have received a revised 'Avoidance and Minimization' Figure dated February 24, 2011.

At this time, we are unable to issue the Certification for the Devil's Gate Project, as proposed, because we cannot conclude that impacts to waters of the United States have been appropriately avoided and minimized and that the project would not result in an unacceptable degradation of water quality. Therefore, I hereby deny your application without prejudice pursuant to §3859(d) of Title 23 of the California Code of Regulations (23 CCR) because it is inadequate.

As described in the application for the proposed Devil's Gate Project and in the response to the RFI, LACFCD is proposing to remove 1.6 million cubic yards of sediment, vegetation and debris from a 50-acre area within the Devil's Gate Reservoir, in the City of Pasadena. The application and supporting documents indicate that the sediment removal activities are required to provide proper function of the flood control system in accordance with its original design in order to protect public safety. The 2009 Station Fires caused significant erosion and contributed significant sediment loading within the Devil's Gate Reservoir basin and resulted in diminished

flood control capacity. Additional considerations associated with required sediment removal activities include limited capacity at sediment placement sites; truck traffic; and potential environmental impacts of maintenance projects.

In our review of your application and the additional materials, we do not find that the potential significant impacts have been minimized to the fullest degree possible and we do not find an analysis of alternatives, which should include alternatives in terms the overall size of the project (the volume of materials to be removed and the acreage impacted) and the timing and staging of the impact. Alternatives need to be identified and adequately analyzed for a project, such as the one proposed, to proceed. Mitigation for unavoidable impacts can be considered when the most appropriate alternative has been identified.

Before a CWA Section 401 Certification can be issued for the proposed Devil's Gate Project, you must demonstrate that appropriate alternatives, in terms of the amount of material to be removed and in terms of the timing or phasing of the removal of materials, were considered. These alternatives should include as a minimum:

1) LACFCD shall identify cleanout alternatives sufficient to protect public safety other than 'return to design capacity.'

LACFCD has proposed a "total cleanout" to bring the project back to its original design contours which were developed when the reservoir was constructed. Based on past cleanout history for this basin, LACFCD has removed sediment from the reservoir in this manner approximately every ten to fifteen years and then the reservoir has been allowed to fill and provide riparian habitat.

We anticipate that the 'total cleanout' alternative will then permit LACFD to not conduct work in this basin for the next ten to fifteen years. The Regional Board is not aware of other plans for the long-term maintenance of this basin.

LACFCD shall identify the immediate, public safety, capacity need which allows proper function of the flood control system and the corresponding sediment removal need. With this basis, LACFCD shall then develop an alternative(s) for this amount of sediment removal. Alternatives may include a long-term maintenance plan or only the short-term plan allowing for the long-term plan to be developed at a later date.

2) LACFCD shall identify cleanout alternatives which would minimize the 50-acre impact and identify alternatives for phasing the project to minimize impacts over time.

Given a 1.6 million cubic yards removal and the associated 50 acres of habitat loss (or other amount as identified, above), LACFD shall identify alternatives which include lesser initial

volumes but repeated cleanouts over several periods including two years and five years. LACFCD shall analyze these alternatives for cumulative impacts to habitat and affected species using the habitat.

When considering the alternatives, the evaluations should analyze all significant impacts including the potential environmental impacts including permanent or temporary loss of habitat, and potential for erosion. **The final analysis should include the rationale for the determination that the proposed project is the most appropriate design for this project which meets project needs and that there are not other, more appropriate, project designs which avoid or minimize impacts to waterways while also meeting project needs.**

In addition, as acknowledged in your letter of December 30, 2010, the issuance of a CWA Section 401 certification will await complete fees, final CEQA determination, and a detailed compensatory mitigation plan,

You may choose to revise or submit any pertinent updated information in the future. Additional fees may be required, pursuant to 23 CCR §3833(4), if the revised application is not filed within twelve months of the date of this action; the revised application does not correct the procedural problems which led to this denial without prejudice; or the project has changed significantly in scope or its potential for adverse impact.

We remain committed to working with LACFCD to develop the best short-term and long-term plans for this Dam and Reservoir, and for the other reservoirs in this region.

Should you have questions concerning this Certification action, please contact Valerie Carrillo, Section 401 Program, at (213) 576-6759 or LB Nye at (213) 576-6785.

Sincerely,

Samuel Unger

Samuel Unger, P.E.
Executive Officer

cc:
Michael D. Antonovich, Los Angeles County Supervisor
Bill Orme, State Water Resources Control Board
Eric Raffini, US Environmental Protection Agency
Cherry Oo (File No. 2010-00833-CO), US Army Corps of Engineers
Sarah Rains, California Department of Fish and Game
Kelly Schmoker, California Department of Fish and Game

Proposal Full View

Print

Applicant Information

Organization Name	Los Angeles County Flood Control District *
Tax ID	**95600092**
Proposal Name	Devil's Gate and Eaton Stormwater Flood Management Project *
Proposal Objective	The Project will improve District facilities to better manage stormwater runoff from the Arroyo Seco and Eaton Wash watersheds and achieve the following goals: 1) reduce the likelihood and extent of flood damage to downstream communities, 2) increase recharge into the local groundwater basin and, 3) improve public safety by remediating seismic safety issues. *

Budget

Other Contribution	$0.00
Local Contribution	$49,757,651.00
Federal Contribution	$0.00
Inkind Contribution	$0.00
Amount Requested	$30,000,000.00 *
Total Project Cost	$79,757,651.00 *

Geographic Information

Latitude *	DD(+/-)	34	MM	10	SS	40
Longitude *	DD(+/-)	-118	MM	7	SS	55

Longitude/Latitude Clarification		Location	Lake Avenue and E Woodbury Road in Altadena, CA
County		Los Angeles *	
Ground Water Basin		Raymond	
Hydrologic Region		South Coast	
Watershed	Los Angeles River		

Legislative Information

Assembly District	41st Assembly District *
Senate District	25th Senate District *
US Congressional District	District 27 (CA) *

Project Information

Project Name: Devil's Gate and Eaton Stormwater Flood Mana

Implementing Organization	Los Angeles County Flood Control District
Secondary Implementing Organization	Not Applicable
Proposed Start Date	6/1/2009
Proposed End Date	6/2/2025
Project Scope	The Project will improve District facilities to better manage stormwater runoff from the Arroyo Seco & Eaton Wash watersheds
Project Description	The Devil's Gate and Eaton Stormwater Flood Management Project (Project) includes improvement of three existing Los Angeles County Flood Control District facilities and the construction of a new interconnecting pipeline. The existing facilities are the Devil's Gate Dam and Reservoir located within the Arroyo Seco Watershed; and the Eaton Wash Dam, and the Eaton Wash Spreading Grounds located within the Eaton Wash watershed. These facilities, which are operated and maintained by the Los Angeles County Flood Control District (District), serve to control the stormwater runoff from their respective watersheds to prevent downstream flood damage. The facilities within the Eaton Wash watershed also serve to conserve the captured stormwater by recharging it into the underlying Raymond Groundwater Basin (Raymond Basin). The Devil's Gate Dam and Reservoir currently has no associated facilities to conserve captured stormwater. Proposed improvements include restoring reservoir capacity at Devil's Gate Reservoir by removing sediment; Improving seismic performance and operational capabilities, and constructing a new toe drain and erosion protection measures at Eaton Wash Dam; and enlarging and enhancing operations of the Eaton Wash Spreading Grounds. The proposed pipeline will provide a connection from the Devil's Gate Dam and Reservoir to the Eaton Wash facilities to enable conservation of stormwater captured at the Devil's Gate Dam and Reservoir.
	The Project will improve District facilities to better manage stormwater runoff from

Project Objective	the Arroyo Seco and Eaton Wash watersheds and achieve the following goals: 1) reduce the likelihood and extent of flood damage to downstream communities, 2) increase recharge into the local groundwater basin and, 3) improve public safety by remediating seismic safety issues.

Project Benefits Information

Project Objective

Budget

Other Contribution	0
Local Contribution	49757651
Federal Contribution	0
Inkind Contribution	0
Amount Requested	30000000
Total Project Cost	79757651

Geographic Information

Latitude DD(+/-)	34	MM 10	SS 40
Longitude DD(+/-)	-118	MM 7	SS 55

Longitude/Latitude Clarification Location Lake Avenue and E Woodb

County Los Angeles Ground Water Basin Raymond Hydrologic Region South Coast WaterShed

Los Angeles River

Legislative Information

Assembly District	41st Assembly District
Senate District	25th Senate District
US Congressional District	District 27 (CA)

Section : Applicant Information Question Tab

APPLICANT INFORMATION QUESTION TAB

Q1. PROPOSAL DESCRIPTION

Provide a brief abstract of the Proposal, including a listing of individual project titles.

The Devil's Gate and Eaton Stormwater Flood Management Project (Project) includes improvement of three existing Los Angeles County Flood Control District facilities and construction of a new interconnecting pipeline. The existing facilities are the Devil's Gate Dam and Reservoir located within the Arroyo Seco Watershed; and the Eaton Wa Dam, and the Eaton Wash Spreading Grounds located within the Eaton Wash watershed. These facilities, which are operated and maintained by the Los Angeles County Flo Control District (District), serve to control the stormwater runoff from their respective watersheds to prevent downstream flood damage. The facilities within the Eaton Wa watershed also serve to conserve the captured stormwater by recharging it into the underlying Raymond Groundwater Basin (Raymond Basin). The Devil's Gate Dam and Reservoir currently has no associated facilities to conserve captured stormwater. Proposed improvements include restoring reservoir capacity at Devil's Gate Reservoir by removing sediment; improving seismic performance and operational capabilities, and constructing a new toe drain and erosion protection measures at Eaton Wash Dam; an enlarging and enhancing operations of the Eaton Wash Spreading Grounds. The proposed pipeline will provide a connection from the Devil's Gate Dam and Reservoir to the E Wash facilities to enable conservation of stormwater captured at the Devil's Gate Dam and Reservoir. The project is broken down into the following phases: - Phase I, Eaton W Spreading Grounds Improvements - Phase II, Eaton Wash Dam Rehabilitation Project - Phase III, Eaton Wash Spreading Grounds Intake Improvement and Basin Enlargeme Phase IV, Devil's Gate Water Conservation - Phase V, Devil's Gate Reservoir Sediment Removal and Management

Q2. PROJECT DIRECTOR

Provide the name and details of the person responsible for executing the grant agreement for the applicant. Persons that are subcontractors to be paid by the grant cannot be listed as the Project Director.

Gail Farber, Chief Engineer, (626)458-4002, GFARBER@dpw.lacounty.gov

Q3. PROJECT MANAGEMENT

Provide the name and contact information (including email) of the Project Manager from the applicant agency or organization that will be the day-to-day contact on this application.

Alma Fuentes, Civil Engineer, (626)458-6158, AFUENTES@dpw.lacounty.gov

Q4. APPLICANT INFORMATION

Provide the agency name, address, city, state and zip code of the applicant submitting the application. Also provide the name and contact information of the person filling out the online application.

Los Angeles County Flood Control District, 900 South Fremont Avenue, Alhambra, CA 91803-1331

Q5. ADDITIONAL INFORMATION

Provide the IRWM funding area(s) in which projects are located.

http://www.water.ca.gov/irwm/grants/fundingarea.cfm

The Project is located in the Los Angeles-Ventura Funding Area

Q6. RESPONSIBLE REGIONAL WATER QUALITY CONTROL BOARD(S)

List the name of the Regional Water Quality Control Board (RWQCB) in which your proposal is located. For a region that extends beyond more than one RWQCB boundary, list the name of each Board.

http://www.waterboards.ca.gov/waterboards_map.shtml

Los Angeles Regional Water Quality Control Board

Q7. ELIGIBILITY

Is the application from an IRWM region approved in the Region Acceptance Process (RAP)? To verify, see RAP website: http://www.water.ca.gov/irwm/grants/rap.cfm . If yes, include the name of the IRWM region. If not, explain.

Yes, this application is submitted by an agency which is part of the approved Greater Los Angeles County Region.

Q8. ELIGIBILITY

Please specify whether the applicant is a local public agency or non-profit organization as defined in Appendix B of the 2012 Guidelines.

Yes, the applicant is a local public agency.

Q9. ELIGIBILITY

List the urban water suppliers that will receive funding from the proposed grant. Please provide the agency name, a contact phone number and e-mail address. Those listed must submit self certification of compliance with CWC §525 et seq. and AB 1420, see Attachment 10. If there are none, so indicate and answer "NA" for Q10 and Q11.

The applicant is not an urban water supplier and the funding will not be received by any urban water suppliers.

Q10. ELIGIBILITY

Have all of the urban water suppliers, listed in Q9 above, submitted complete Urban Water Management Plans (UWMPs) to DWR? Have those plans been verified as complete by DWR? If not, explain and provide the anticipated date for having a complete plan.
Answer "NA" if no urban water supplier identified in Q9 above.

Not applicable.

Q11. ELIGIBILITY

Have any urban water suppliers listed in Q9 recently submitted AB 1420 compliance tables and supporting documentation to DWR for a different grant program on or after November 1, 2012? If so, please list the urban water supplier and the grant program. An urban water supplier must submit AB 1420 compliance documentation to DWR. If the urban water supplier has not submitted AB 1420 documentation, or that documentation was determined to be incomplete by DWR, the urban water supplier's projects will not be considered eligible for grant funding. Refer to Section III.B of the 2012 Guidelines for additional information.

Answer "NA" if no urban water supplier identified in Q9 above.

Not applicable.

Q12. ELIGIBILITY

Does the Proposal include any groundwater projects or other projects that directly affect groundwater levels or quality? If so, provide the name(s) of the project(s) and list the agency(ies) that will implement the project(s).

Answer "NA" if the Proposal does not include groundwater projects or other projects that directly affect groundwater levels or quality.

Yes, all components of the proposed project will allow the Los Angeles County Flood Control District to increase the amount of water conserved and recharged into the Raym Basin by over 4,100 acre feet per year. The Los Angeles County Flood Control District will implement the Project.

Q13. ELIGIBILITY

For the agency(ies) listed in Q12, how has the agency complied with CWC §10753 regarding Groundwater Management Plans (GWMPs), as described in Section III.B of the 2012 Guidelines?

Answer "NA" if the Proposal does not include groundwater projects or other projects that directly affect groundwater levels or quality.

Raymond Basin is an adjudicated groundwater basin which is governed by the judgment dated February 22, 1984. See Attachment 10 for a copy of the judgment.

Q14. ELIGIBILITY

List the agricultural water suppliers that will receive funding from the proposed grant. Please provide the agency/organization name, a contact phone number and e-mail address. If there are none, so indicate and answer "NA" for Q15.

No agricultural water suppliers will receive any funding awarded to this grant proposal.

Q15. ELIGIBILITY

Have all of the agricultural water suppliers, listed in Q14 above, submitted complete Agricultural Water Management Plan to DWR? Have those plans been verified as complete by DWR? If the plan has not been submitted, please indicate the anticipated submittal date.
Answer "NA" if no agricultural water suppliers were identified in Q14 above.

li bl

Q16. ELIGIBILITY

List the surface water diverters that will receive funding from the proposed grant. Please provide the agency/organization name, a contact phone number and e-mail address. If there are none, so indicate and answer "NA" for Q17 below.

No surface water diverters will receive any funding awarded to this grant proposal.

Q17. ELIGIBILITY

Have all of the surface water diverters, listed in Q16 above, submitted surface water diversion reports in compliance with requirements outlined in Part 5.1 (commencing with §5100) of Division 2 of the CWC? If not, explain and provide the anticipated date for meeting the requirements. Answer "NA" if no surface water diverters identified in Q16 above.

Not applicable.

Q18. ELIGIBILITY

List the groundwater users that will receive funding from the proposed grant. Please provide the agency/organization name, a contact phone number and e-mail address. If there are none, so indicate and answer "NA" to Q19.

No groundwater users will receive any funding awarded to this grant proposal.

Q19. ELIGIBILITY

Have all of the groundwater users, listed in Q18 above, met the requirements of DWR's CASGEM Program: http://www.water.ca.gov/groundwater/casgem/? If not, explain and provide the anticipated date for meeting the requirements. Answer "NA" if no groundwater users were identified in Q18 above.

Not applicable.

Section : Application Attachments Tab

APPLICATION ATTACHMENTS TAB

ATTACHMENT 1: AUTHORIZATION AND ELIGIBILITY REQUIREMENTS

Upload Authorization and Eligibility documentation here. Ensure file name is consistent with Section V of the Stormwater Flood Management PSP.

Max file size: 50 MB per file. Up to five files can be uploaded to this upload field. Max file name: 50 character.

Last Uploaded Attachments: Att1_SWF_Eligible_1of1.pdf

Upload additional Authorization and Eligibility documentation here, if necessary.

Max file size: 50 MB per file. Up to five files can be uploaded to this upload field. Max file name: 50 character.

ATTACHMENT 2: PROOF OF FORMAL ADOPTION

Upload Proof of Formal Adoption documentation here. Ensure file name is consistent with Section V of the Stormwater Flood Management PSP.

Max file size: 50 MB per file. Up to five files can uploaded to this upload field. Max file name: 50 character.
Last Uploaded Attachments: Att2_SWF_Adopt_1of1.pdf

Upload additional Proof of Formal Adoption documentation here, if necessary.

Max file size: 50 MB per file. Up to five files can be uploaded to this upload field. Max file name: 50 character.

Upload additional Proof of Formal Adoption documentation here, if necessary.

Max file size: 50 MB per file. Up to five files can be uploaded to this upload field. Max file name: 50 character.

ATTACHMENT 3: WORK PLAN

Upload the Work Plan here. Ensure file name is consistent with Section V of the Stormwater Flood Management PSP.

Max file size: 50 MB per file. Up to five files can be uploaded to this upload field. Max file name: 50 character.
Last Uploaded Attachments: Att3_SWF_WorkPlan_1of2.pdf

Upload additional work plan components here, if necessary.

Max file size: 50 MB per file. Up to five files can be uploaded to this upload field. Max file name: 50 character.

Last Uploaded Attachments: Att3_SWF_WorkPlan_2of2.pdf

Upload additional work plan components here, if necessary.

Max file size: 50 MB per file. Up to five files can be uploaded to this upload field. Max file name: 50 characters.

Upload additional work plan components here, if necessary.

Max file size: 50 MB per file. Up to five files can be uploaded to this upload field. Max file name: 50 character.

ATTACHMENT 4: BUDGET

Upload the Budget documents here. Ensure file name is consistent with Section V of the Stormwater Flood Management PSP.

Max file size: 50 MB per file. Up to five files can be uploaded to this upload field. Max file name: 50 character.
Last Uploaded Attachments: Att4_SWF_Budget_1of2.pdf

Upload additional budget components here, if necessary.

Max file size: 50 MB per file. Up to five files can be uploaded to this upload field. Max file name: 50 character.

Last Uploaded Attachments: Att4_SWF_Budget_2of2.pdf

Upload additional budget components here, if necessary.

Max file size: 50 MB per file. Up to five files can be uploaded to this upload field. Max file name: 50 character.

Upload additional budget components here, if necessary.

Max file size: 50 MB per file. Up to five files can be uploaded to this upload field. Max file name: 50 character.

ATTACHMENT 5: SCHEDULE

Upload the Schedule here. Ensure file name is consistent with Section V of the Stormwater Flood Management PSP.

Max file size: 50 MB per file. Up to five files can be uploaded to this upload field. Max file name: 50 characters.
Last Uploaded Attachments: Att5_SWF_Schedule_1of1.pdf

Upload additional schedule components here, if necessary.

Max file size: 50 MB per file. Up to five files can be uploaded to this upload field. Max file name: 50 characters.

Upload additional schedule components here, if necessary.

Max file size: 50 MB per file. Up to five files can be uploaded to this upload field. Max file name: 50 characters.

ATTACHMENT 6: MONITORING, ASSESSMENT, AND PERFORMANCE MEASURES

Upload Monitoring, Assessment, and Performance Measures here. Ensure file name is consistent with Section V of the Stormwater Flood Management PSP.

Max file size: 50 MB per file. Up to five files can be uploaded to this upload field. Max file name: 50 characters.
Last Uploaded Attachments: Att6_SWF_Measures_1of1.pdf

Upload additional Monitoring, Assessment, and Performance Measures here, if necessary.

Max file size: 50 MB per file. Up to five files can be uploaded to this upload field. Max file name: 50 characters.

Upload additional Monitoring, Assessment, and Performance Measures here, if necessary.

Max file size: 50 MB per file. Up to five files can be uploaded to this upload field. Max file name: 50 characters.

ATTACHMENT 7: TECHNICAL JUSTIFICATION OF PROJECTS

Upload Technical Justification of Projects here. Ensure file name is consistent with Section V of the Stormwater Flood Management PSP.

Max file size: 50 MB per file. Up to five files can be uploaded to this upload field. Max file name: 50 characters.
Last Uploaded Attachments: Att7_SWF_TechJust_1of2.pdf

Upload additional Technical Justification of Projects here, if necessary.

Max file size: 50 MB per file. Up to five files can be uploaded to this upload field. Max file name: 50 characters.

Last Uploaded Attachments: Att7_SWF_TechJust_2of2.pdf

Upload additional Technical Justification of Projects here, if necessary.

Max file size: 50 MB per file. Up to five files can be uploaded to this upload field. Max file name: 50 characters.

ATTACHMENT 8: BENEFITS AND COST ANALYSIS

Upload Benefits and Cost Analysis here. Ensure file name is consistent with Section V of the Stormwater Flood Management PSP.

Max file size: 50 MB per file. Up to five files can be uploaded to this upload field. Max file name: 50 characters.

Last Uploaded Attachments: Att8_SWF_BenCost_1of2.pdf

Upload additional Benefits and Cost Analysis documentation here, if necessary.

Max file size: 50 MB per file. Up to five files can be uploaded to this upload field. Max file name: 50 characters.

Last Uploaded Attachments: Att8_SWF_BenCost_2of2.pdf

Upload additional Benefits and Cost Analysis documentation here, if necessary.

Max file size: 50 MB per file. Up to five files can be uploaded to this upload field. Max file name: 50 characters.

ATTACHMENT 9: PROGRAM PREFERENCES

Upload Program Preference documentation here. Ensure file name is consistent with Section V of the Stormwater Flood Management PSP.

Max file size: 50 MB per file. Up to five files can be uploaded to this upload field. Max file name: 50 characters.

Last Uploaded Attachments: Att9_SWF_Preference_1of1.pdf

Upload additional Program Preference documentation here, if necessary.

Max file size: 50 MB per file. Up to five files can be uploaded to this upload field. Max file name: 50 characters.

ATTACHMENT 10: GWMP, AB 1420, AND WATER METER COMPLIANCE INFORMATION

If your proposal does not include 1) a groundwater project or a project that directly affects groundwater levels or quality, or 2) an urban water supplier who would receive grant funding, you MUST still upload a document that indicates this attachment is not applicable to your proposal. If the upload field to this attachment is left blank, your proposal cannot be saved or completed.

Upload GWMP, AB 1420, and Water Meter Compliance documents here. Ensure file name is consistent with Section V of the Stormwater Flood Management PSP.

Max file size: 50 MB per file. Up to five files can be uploaded to this upload field. Max file name: 50 characters.

Last Uploaded Attachments: Att10_SWF_SelfCert_1of1.pdf

and lower watersheds of the Arroyo Seco Channel and provides significant storage capacity for stormwater runoff originating from approximately 20,416 acres (31.9 square miles) of mostly undeveloped land north in the San Gabriel Mountains. The Raymond Basin underlies the dam and reservoir area.

Devil's Gate Reservoir area covers approximately 175 acres (0.27 square miles) and has a design storage capacity of 4,600 acre-feet (AF). Devil's Gate Dam is a Concrete Gravity Arch Structure. It is 100 feet high, 310 feet long, and 30 feet wide at its crest and 99 feet wide at its buttress. The dam is under the jurisdiction of the California Department of Water Resources Division of Safety of Dams (DSOD).

Completed in 1920, the Devil's Gate Dam and Reservoir facility was the first flood control facility built by the Los Angeles County Flood Control District to provide flood protection to the Cities of Pasadena, South Pasadena, and Los Angeles. It continues to serve this function today by capturing sediment washed into the reservoir by storm flows, attenuating storm flows, and subsequently controlling water releases to the downstream Arroyo Seco Channel. The Dam protects an inundation area of 1,783 acres including 3,590 parcels, and 10.3 million square-feet of structures. Downstream of Devil's Gate Dam, the lower half of the Arroyo Seco watershed is distinctly different from the upper watershed. The stream is mostly channelized downstream and the watershed is highly urbanized.

Eaton Wash Dam and Reservoir

Eaton Wash Dam and Reservoir is a stormwater and flood management facility located in the City of Pasadena, approximately 15 miles northeast of downtown Los Angeles. The dam separates the upper and lower watersheds of Eaton Wash and provides significant storage capacity for stormwater runoff originating from a drainage area of 7,949 acres (12.4 square miles) of mostly undeveloped land in the upstream San Gabriel Mountains. The Raymond Basin underlies the dam and reservoir area.

Eaton Wash Reservoir has a capacity of 956 AF. Eaton Wash Dam is an Earthfilled Structure with a clay core. The dam is 62 feet high, 1,525 feet long, has a bottom width of 375 feet and a crest width of 15 feet. The dam is under the jurisdiction of DSOD. The Sierra Madre (0.5 miles to the northeast), Raymond Hill (3 miles to the southeast), and San Andreas (21 miles to the northeast) fault zones are all possible sources of seismic activity that could affect Eaton Wash Dam. The dam protects and inundation area of 828 acres including 1,791 parcels, and 8.8 million square-feet of structures.

The United States Army Corps of Engineers finished construction on Eaton Wash Dam in 1937 and ownership of the dam was subsequently transferred to the District. The facility was constructed to provide debris storage, flood control, and water conservation. It continues to

intake gates are closed, the water continues through the drop inlet until it ends and then the water flows back into the main wash.

To aid the water diversion into the Spreading Grounds, Flood Maintenance Staff do two things within the wash. First, they place sandbags across the vehicle access slab. This blocks water from flowing across the slab and instead causes it to drop into the inlet channel. Second, they place wooden flashboards across the drop inlet channel, just downstream of the Spreading Grounds intake gates to block water from continuing to the end of the drop inlet. This forces the water to flow into the Spreading Grounds intake gates. The sandbags and flashboards cannot adequately divert flows up to 125 cfs.

Second, the original design of the Spreading Grounds includes a levee (and sewer line) between Basins No. 1 and No. 2. There is significant seepage through the levee from one large basin to the other. Because of this, the inflow into the basins must be constricted and monitored carefully to avoid levee failure.

Third, a corrugated metal pipe that conveys flow from the intake canal to the shallow basins south of Sierra Madre Avenue was heavily damaged and no longer conveys flows to shallow Basins No. 4 through 14. The loss of use of Basins 4 through 14 also limits available storage capacity.

A recent study determined that addressing the three problems indicated would significantly increase overall groundwater recharge based on historical releases from Eaton Dam.

Project List

The Devil's Gate and Eaton Stormwater Flood Management Project is the sole Project being submitted with this proposal. The Project has multiple components that satisfy the program eligibility requirements of the Proposition 1E grant and will meet the goals discussed previously. While each component on its own provides benefits, it is through their linkages and synergies that the benefits are optimized to meet the overall goals and objectives. The Project will be constructed in phases. The following information describes the status of each of the Project's components.

Devil's Gate Reservoir

To restore reservoir capacity to address the post-Station Fire sediment impacts at Devil's Gate Dam, the Devil's Gate Reservoir Sediment Removal and Management Project will remove an estimated 2,000,000 cubic yards of sediment from the reservoir. This will reduce the level of flood risk to downstream communities along the Arroyo Seco. Removal of sediment will enable the reservoir to capture future sediment inflows and attenuate major storm inflows

Devil's Gate and Eaton Stormwater Flood Management Project

The Devil's Gate Reservoir Sediment Removal and Management Project will also establish a reservoir configuration that will be more suitable for future routine maintenance activities including sediment management. This will enable the timely removal of sediment in locations, such as those near the dam's valves that are critical to dam safety.

Devil's Gate Water Conservation

Based on the proposed future configuration of Devil's Gate Reservoir, an estimated 4,500 AF can be captured annually for water conservation by conveying it to the Eaton Wash Spreading Grounds (and possibly to Arroyo Seco Spreading Grounds in the future) for infiltration and recharge to the Raymond Basin.

This proposed Project element includes installing a pump house and intake on the upstream face of Devil's Gate Dam and an outlet in Eaton Wash. Approximately 5 miles of pipeline will be installed through the City of Pasadena and County Unincorporated road rights-of-way. The pipeline will allow water to be directed from the Devil's Gate Reservoir where no downstream recharge facilities exist, to the Eaton Wash Spreading Grounds for conservation. A split valve connected to the pump will also allow for a possible future connection to the upstream Arroyo Seco Spreading Grounds. The Arroyo Seco Spreading Grounds, owned and operated by the City of Pasadena capture limited runoff from the upper Arroyo Seco above the dam, but cannot currently utilize water captured at the dam. All of the facilities in this region recharge the Raymond Basin. This proposed Project element will increase local groundwater supplies in the Raymond Basin and reduce the region's reliance on water imports, without compromising flood control functions of the dams.

Eaton Wash Dam

Remediation of the seismic deficiencies will be completed through the Eaton Wash Dam and Reservoir Rehabilitation Element. This willconsist of removing the existing seismically deficient outlet tower, gate control house, trashrack, and the metal footbridge. Once these major components are removed, rehabilitation of the outlet gates, replacement of the debris racks, addition of a hydraulic power system with a shelter building and control systems, and structural modification of the outlet works will be completed. The dam embankment will be improved by installation of erosion protection measures on the downstream face. Also, the risk of a piping failure of the embankment will be reduced by the construction of a toe drain on the downstream face.

Additionally, this Project will improve the water quality of water conservation releases from the dam by constructing a concrete apron from the gate intakes to the upstream wing walls and fifty-feet of rip-rap stone to provide erosion protection. One of the four outlet gates will be sized to match the Spreadin Grounds intake capacity and will be raised to take flow from a higher elevation within the reservoir that would be less turbid.

Devil's Gate and Eaton Stormwater Flood Management Project

Status

The following is a table of the specific Project components that are included in this Proposal. The table includes abstracts of each Project component, the current status of each Project component's percent completion of design, and the implementing agency:

Project Component	Abstract	Status (% Design Completion)	Implementing Agency
Phase I Eaton Wash Spreading Grounds Improvements	Combine spreading basins, repair pipeline, construct interbasin structures	100	District
Phase II Eaton Wash Dam Rehabilitation Project	Seismic remediation and mechanical and control systems upgrades	100	District
Phase III Eaton Wash Spreading Grounds Intake Improvement and Basin Enlargement	Replace diversion structure from channel, expand spreading basin, install landscaping improvements	100	District
Phase IV Devil's Gate Water Conservation	Construction of a pump and pipeline from Devil's Gate Dam to Eaton Wash	30	District
Phase V Devil's Gate Reservoir Sediment Removal and Management	Removal of 2 million cubic yards of sediment, establishment of reservoir configuration	30	District

Project Name: **Phase III-Eaton Wash Spreading Grounds Intake Improvement and Basin Enlargement**			
Measure of Benefit Claimed (Name of Units): Acre-Foot Per Year			
Additional Information About this Measure: Flows are based on a high-rainfall year expected to occur 1 in 10 years			
(a)	(b)	(c)	(d)
	Physical Benefits		
Measure of Benefit Claimed	Without Project	With Project	Change Resulting from Project (b) – (c)
Flow in Eaton Wash Flood Control Channel	5893	5793	100

Project Name: **Phase IV- Devil's Gate Water Conservation**			
Measure of Benefit Claimed (Name of Units): Acre-Foot Per Year			
Additional Information About this Measure: Flows are based on an average rainfall year			
(a)	(b)	(c)	(d)
	Physical Benefits		
Measure of Benefit Claimed	Without Project	With Project	Change Resulting from Project (b) – (c)
Flow in Arroyo Seco Flood Control Channel	6900	2400	4500

Water Supply

The Project will maximize conservation of local ground water resources. In addition to providing a local sustainable groundwater supply, this will generate cost savings through avoided purchase of imported water. Attachment 8 has additional information regarding the cost savings. The following table lists the quantity of additional groundwater the Project can supply on a yearly average basis. The following tables list the quantity of additional groundwater that each phase will conserve during an average rainfall year. This was determined by modeling each component's proposed attributes with historical stream flow/dam release data. The stream flow data is in **Appendix 7-B**.

Schiff Secures Federal Funds for Arroyo Seco

October 1, 2009

Official Seal of the US House of Representatives

Thursday, October 01, 2009

Contact: Sean Oblack (202) 225-4176

SCHIFF SECURES FEDERAL FUNDS FOR ARROYO SECO

Washington, D.C. - Today, the House passed the Energy and Water Appropriations Act, which included federal funds secured by Rep. Adam Schiff for the Arroyo Seco. The bill allocates $224,000 to allow the Army Corps of Engineers to complete a Watershed Management Plan Feasibility Study.

"Restoration and conservation of our scarce open spaces is vitally important to ensuring a good quality of life," Schiff said. "This funding will help ensure that the Arroyo Seco returns to its natural state - an environmental gem. Once it's restored, it will provide enjoyable open space and recreation areas for generations to come."

The focus of the study is to address flood and stream management, habitat, water resources, and ecosystem restoration issues within this vital Southern California watershed. This funding will allow the Corps to conduct technical assessments of ecosystem restoration and watershed management programs to identify projects which will improve the management and conditions of the watershed.

The Arroyo Seco Watershed Management Plan is a project supported and coordinated by the County of Los Angeles to develop a comprehensive, environmentally friendly approach to manage the Arroyo Seco Watershed. The project is supported by the Arroyo Seco Foundation, North East Trees, the California Coastal Conservancy, the Mountains Recreation and Conservation Authority, and the cities in the watershed.

Response to Comment Letter #207 (Marietta Kruells)

Response to Comment 207-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

As noted in the Draft Environmental Impact Report (EIR), Section 2.2.1, Los Angeles County Flood Control District (LACFCD) History in the Draft EIR, "Following the 1971 Sylmar Earthquake, heightened safety concerns and better understanding of seismic behavior prompted new investigations and analysis of LACFCD dams, including Devil's Gate Dam. In response to findings from these studies, in 1978 the State Department of Water Resources Division of Safety of Dams (DSOD) officially imposed an operational restriction preventing the holding of water at Devil's Gate Dam due to concerns with the dam's ability to withstand a major earthquake. In 1998, LACFCD completed a construction project that seismically rehabilitated Devil's Gate Dam. The rehabilitation project also enlarged the spillway to safely pass the tributary watershed's updated Probable Maximum Flood, the required level of flood protection, without overtopping the dam. After project completion, the DSOD restriction was removed, restoring use of the dam and reservoir to its full operational capacity, thus providing its potential for water conservation. The project improvements resulted in Devil's Gate Dam meeting current maximum credible earthquake design standards and probable maximum flood design standards."

As noted in the Draft EIR, the seismic rehabilitation project resulted in the Devil's Gate Dam meeting current maximum credible earthquake design standards and probable maximum flood design standards.

A reservoir storage design capacity of two design debris events (DDEs) below the dam's lowest spillway was determined to be the standard acceptable level of risk at Devil's Gate Dam and Reservoir. The DDE volume of capacity is determined using the January 2006 Los Angeles County Department of Public Works (LACDPW) Hydrology Manual and the March 2006 LACDPW Sedimentation Manual. For Devil's Gate Dam and Reservoir, the required reservoir capacity is 4.0 million cubic yards (cy) (two DDEs) below the spillway elevation of 1,040.50 feet.

The Hydrology Manual (January 2006) can be viewed here:

http://dpw.lacounty.gov/wrd/publication/engineering/2006_Hydrology_Manual/2006%20Hydrology%20Manual-Divided.pdf

The Sedimentation Manual (March 2006) can be viewed here:

http://dpw.lacounty.gov/wrd/publication/engineering/2006_sedimentation_manual/Sedimentation%20Manual-Second%20Edition.pdf

Additional information concerning DDE calculation methods has been added to the Final EIR, Section 2.3, Project Need.

For Devil's Gate Dam, the DDE was previously calculated as 1.67 million cy. That previous calculation was based on the presence of debris retaining structures including Browns Canyon Dam, located within the Angeles National Forest upstream of Devil's Gate Dam. These structures filled with sediment decades ago and no longer provide capacity to "control" any portion of the watershed. A subsequent analysis determined that the correct DDE, based on the absence of sediment control facilities in the Forest, is

2.0 million cy. Following the Station Fire, LACDPW reviewed the DDE calculations and confirmed that 2.0 million cy is the current and appropriate volume for the DDE.

As stated above, LACDPW's criterion is that reservoir sediment levels be maintained at a level equivalent to two design debris events below spillway; however, in response to the Station Fire, an emergency project to remove only 1.67 million cy was initially proposed. The volume of 1.67 million cy is the previously published DDE and was considered justifiable as an emergency exemption to the California Environmental Quality Act (CEQA). In March 2011, the County of Los Angeles Board of Supervisors motioned LACFCD to complete an EIR for a comprehensive sediment removal project at Devil's Gate. LACFCD then initiated project development in accordance with the required level of protection of protection of two DDEs.

Response to Comment 207-2:

See Response to Comment 207-1. Attachments noted. The California Regional Water Quality Control Board denied a permit for the emergency project without prejudice, with the understanding that LACFCD would be initiating an EIR process for a project which would restore the required level of protection. As part of Proposed Project approval, LACFCD will obtain the necessary permits from the California Regional Water Quality Control Board.

The Proposition 1E grant will fund only a portion of the Proposed Project. Therefore, only a portion of the Proposed Project was included in the grant application. As identified in the grant application, the preferred alternative would be identified through the Draft EIR.

Response to Comment 207-3:

See Response to Comments 207-1 and 207-2.

Response to Comment 207-4:

See Response to Comment 207-2. The Proposed Project does not require the implementation of the Devil's Gate Water Conservation Project in order to achieve the Proposed Project's objective to satisfactorily reduce flood risk, create a configuration suitable for routine operations and maintenance, and reduce the possibility of plugging at the face of the dam. The Devil's Gate Water Conservation Project does not require the implementation of the Proposed Project to be carried out. Neither project is a foreseeable consequence of or a future expansion of the other project; therefore, these projects are separate projects per CEQA.

The Devil's Gate Water Conservation Project is a separate project that is not part of the Proposed Project or alternatives. The Devil's Gate Water Conservation Project is still in a conceptual design phase, and no environmental report is available for public review at this time; however, this project was analyzed in the Draft EIR as a cumulative project.

Response to Comment 207-5:

See Response to Comment 207-4.

Response to Comment 207-6:

See Response to Comment 207-4. The Proposed Project does not involve holding water in the entire reservoir. As discussed in the Draft EIR, Section 2.2.1, the Devil's Gate Reservoir captures stormwater, sediment, and debris during storm events and retains stormwater to prevent high flow rates from overwhelming the downstream flood control channel. The stormwater can then be released in a controlled fashion.

Response to Comment 207-7:

See Response to Comment 207-4.

Response to Comment 207-8:

As noted in the Draft EIR, Section 2.8 Required Permits and Approvals, a Section 1600 Streambed Alteration Agreement will be obtained. LACFCD is currently coordinating with the California Department of Fish and Wildlife (CDFW) regarding the Section 1600, as well as other potential permits.

Response to Comment 207-9:

As noted in the Draft EIR, Section 2.8 Required Permits and Approvals, a Section 404 Permit will be obtained from the United States (U.S.) Army Corps of Engineers (USACE). LACFCD is currently coordinating with USACE regarding the Section 404 Permit. In addition, LACFCD is a local sponsor of the USACE's *Los Angeles County's Arroyo Seco Watershed Ecosystem Restoration Study,* and the study was used in the preparation of the Draft EIR.

Response to Comment 207-10:

See Response to Comment 207-9. LACFCD continues to coordinate with USACE concerning Arroyo Seco Watershed Management.

Response to Comment 207-11:

LACFCD notes the commenter's disapproval with the analysis in the Draft EIR. The comments have been responded to below.

Response to Comment 207-12:

Impacts to recreation were analyzed in the Draft EIR, Section 3.15. The Proposed Project will not limit the use of the Oak Grove area of Hahamongna Watershed Park. Sediment removal activities would be temporary and are expected to occur only in the drier months (April to December, excluding holidays). It is expected that these activities will often not be adjacent to the Oak Grove area of Hahamongna Watershed Park. The Proposed Project would result in temporary limitations on the recreational use of the Proposed Project site and some of the adjacent trails. Most of these areas would be reopened seasonally or intermittently throughout the sediment removal process. In addition, temporary impacts to designated recreational facilities and trails will be minimized through advance communication and redirection to the nearest facility in the vicinity of the Proposed Project. Furthermore, an east-west trail crossing will continue to provide access at the north end of the reservoir. At the south end of the reservoir, after the reservoir ingress and egress ramps have been fully constructed, access to the upper

east side Arroyo Seco Trail from La Cañada Verdugo Road will be maintained; and the linkage from the west side Arroyo Seco Trail and the Flint Wash Trail to the upper east side Arroyo Seco Trail (crossing Devil's Gate Dam and also continuing south to the Rose Bowl) will be available after construction activities have ended each day and on nonworking days.

Response to Comment 207-13:

See Response to Comment 207-12.

Response to Comment 207-14:

As discussed in Section 3.6.6 of the Draft EIR, Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats. In addition, sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays). Wildlife species currently found in the Proposed Project area would be expected to either remain in the undisturbed areas of the reservoir outside of the Proposed Project area or to reestablish once sediment removal activities have been completed.

Response to Comment 207-15:

The Draft EIR addresses impacts to aesthetics, air quality, and noise.

Air quality and noise impacts associated with truck traffic were analyzed in the Draft EIR in Sections 3.5 and 3.14, respectively. As discussed in the Draft EIR, Section 3.14, with implementation of Mitigation Measure MM N-1, noise impacts would be reduced to a level of less than significant. LACFCD has conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed the U.S. Environmental Protection Agency's (EPA's) 2007 standards for emissions. Therefore, in order to further reduce emissions, Mitigation Measure MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump trucks that meet or exceed EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality, including those associated with health effects, will be reduced to less than significant.

As noted in the Draft EIR, Section 3.4, Aesthetics and Figures 3.4-1 through 3.4-3, the visual aspects of the Proposed Project site are constantly changing. The Draft EIR does note that the Proposed Project will have significant temporary impacts to aesthetics; however, after the sediment removal phase of the Proposed Project is complete, a habitat restoration plan will be implemented that will allow native plant communities to reestablish outside the reservoir management area. Riparian Herbaceous vegetation is expected to continue to populate and/or reestablish in the management area of the Proposed Project site between maintenance activities.

Response to Comment 207-16:

See Response to Comments 207-1 and 207-2.

Alternative 3, Configuration D, the Environmentally Superior Alternative from the Draft EIR, affects the least amount of habitat of all the action alternatives while still achieving Proposed Project objectives (see Section 4.6 of the Final EIR). This alternative would provide a buffer on the west side of the

reservoir that would allow for the movement of wildlife. Alternative 3, Configuration D, Option 1 provides a more natural configuration for the reservoir by having two branches to carry water and sediment toward the face of the dam, avoiding disturbing a significant portion of existing vegetation. To further reduce the Proposed Project's footprint, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2, which drastically reduces the project's footprint of 120 acres down to 71 acres, would avoid excavation of the western branch, thereby providing a greater habitat buffer on the west side of the reservoir. In addition, the maintenance areas would be smaller than the original sediment removal footprint, allowing for habitat to reestablish and providing additional areas for wildlife movement.

LACFCD proposed a project duration of five years to reduce accumulated sediment in a timely fashion. The goal of LACFCD is to restore reservoir flood capacity as soon as feasible while reducing costs, minimizing the duration of environmental and construction impacts to the surrounding communities, and configuring the reservoir to allow for sustainable future maintenance. Extending the project would prolong the flood risk to downstream communities and increase the construction impacts to the surrounding communities.

The Proposed Project is designed to be a long-term plan, with the reservoir management phase providing management for future sediment inflows. The proposed yearly cleanout of sediment after the completion of the Proposed Project will reduce the necessity for a future large-scale cleanout.

Response to Comment 207-17:

Responses to all comments received on the Draft EIR will be incorporated into the Final EIR.

From: Mark Hunter
To: reservoircleanouts
Subject: My comments on the Devil"s Gate / Hahamongna DEIR
Date: Monday, January 20, 2014 3:52:34 PM

These are my comments on the DEIR. My contact information is:
Mark Hunter
2056 Rancho Canada Pl
La Canada, CA 91011

Comment 208-1

1. On the official web site at http://dpw.lacounty.gov/lacfcd/sediment/prj.aspx?prj=1, there is a link, "Frequently Asked Questions have been added FAQs" which, when clicked, simply pops up a page saying "Coming Soon". Why weren't the FAQs listed as promised?

Comment 208-2

2. Section 2.2.1 of the DEIR describes past sediment removal projects. The accumulated total of three different projects, just over 200,000 cubic yards, is only 5% of the proposed project's 4 million cubic yards. If the reservoir was so compromised that another million cubic yards would push it into the danger zone, then why was there no alarm during the years prior to 2009? How is it that the inflow of 1.3 million cubic yards since the Station Fire has triggered an urgent need to remove 3 million cubic yards? Why the sudden alarm? Were the previous DWP engineers simply asleep or incompetent? Why the massive discrepancy between these two numbers?

Comment 208-3

3. That section also notes the the inflow since the Station Fire has reduced "the available capacity to less than one DDE [Dynamic Debris Event]". I submit that the Station Fire itself, which the DEIR notes burned "approximately 100 percent of the undeveloped portion" of the Arroyo Seco watershed above Hahamongna, was itself a DDE, and that watershed is incapable of producing any larger event than that in the near future. The DEIR notes that "The 50-year design storm and the DDE are defined by the Los Angeles County Department of Public Works Hydrology and Sedimentation Manuals respectively. The DDE for the Devil’s Gate Reservoir is approximately 2 million cy." What scientific basis does DPW use to forecast a larger event than the two years that followed the Station Fire? None of this is detailed in the DEIR.

Comment 208-4

4. The DPW has recent experience at conducting ecologically devastating projects based on poor math skills. Please explain what happened in the Arcadia Woodlands, when an entire grove of oaks up to 300 years old was bulldozed based on an urgent need to deposit sediment, and then no sediment was ever deposited? Answer, please, why the public should believe that the same engineers and managers responsible for that blunder should be trusted to come up with the right numbers for Hahamongna. Why is the scientific basis for the DDE number reduced to one sentence? Why is the need for two DDE's worth of capacity limited to one sentence, in a DEIR that is hundreds of pages long? If these numbers are valid, why is it that no one in DPW proposed significant action before the Station Fire?

Where is the science???

Comment 208-5

5. Why does the DEIR envision an area 50 to 100 acres in size being scraped bare, and then scraped bare again each year, when this area supports such rich plant life and wildlife, including endangered species? The presence of vegetation has a

Comment 208-5 continued

negligible effect on reservoir capacity. I understand that a vegetated area poses additional challenges to keep dam facilities from being clogged, but why should the entire habitat be destroyed just to ease the burden on dam maintenance? The value of the current habitat, for the thousands of people who use and enjoy it, far outweighs the extra expense of protecting dam facilities from vegetation. Therefore, why is the basin being scraped bare?

Comment 208-6

6. Why was the biological survey that was conducted so limited in duration and scope? Why did DPW not reach out to the many individuals and organizations who have conducted surveys in Hahamongna before?

Comment 208-7

7. Why was the option of sluicing sediment to the ocean rejected? Indicate whether this option was studied only by theoretical calculations or by actual experimentation. I have heard, second-hand, that DPW has actually conducted sluicing from Devil's Gate Dam on a small scale. Is this true? What were the results? Provide details.

Comment 208-8

8. Why is there a current project to build a pipeline that carries water from the Arroyo Seco to Eaton Canyon? If sluicing proves to be a viable partial solution to sediment removal, all of the Arroyo Seco's water should be available for that task. Who on the Devil's Gate team has reviewed the pipeline project and commented on it?

Response to Comment Letter #208 (Mark Hunter)

Response to Comment 208-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. Since the comment letter was written, the Frequently Asked Questions (FAQs) have been posted on the Los Angeles County Flood Control District (LACFCD) website. Posting of FAQs was done to facilitate the public's understanding of the Proposed Project. It is not a requirement of the California Environmental Quality Act (CEQA) to post FAQs.

Response to Comment 208-2:

As noted in the Draft Environmental Impact Report (EIR), Section 2.2.1 LACFCD History, sediment removal efforts have previously taken place at the reservoir in order to ensure correct functioning of the outlet works and/or to maintain reservoir capacity. Historically, large amounts of sediment have been deposited in the reservoir in short time periods. Between 1935 and 1938 over 1.6 million cubic yards (cy) of sediment, between 1938 and 1943 over 1.95 million cy of sediment, between 1959 and 1966 over 1.75 million cy of sediment, and between 2010 and 2012 over 1.3 million cy of sediment was deposited in the reservoir. Since the 1920 dam construction and prior to the Station Fire in 2009, approximately 10.7 million cy of sediment accumulated in the reservoir; and approximately 8.0 million cy was removed by LACFCD.

LACFCD has executed several sediment removal projects at Devil's Gate Reservoir in the past, with the last major effort being in 1994. Smaller amounts of sediment were removed in 2006, 2009, and as a part of the Interim Measures Project in 2011, 2012, and 2013. Following the 2009 Station Fire, approximately 1.3 million cy of sediment flowed into Devil's Gate Reservoir after just two average storm seasons. In 2010, LACFCD proposed an emergency sediment removal project in response to the large inflow of sediment resulting from the Station Fire.

In March 2011, the County of Los Angeles Board of Supervisors motioned LACFCD to complete an EIR for a comprehensive sediment removal project at Devil's Gate. LACFCD then initiated project development in accordance with the required level of protection of two design debris events (DDEs). At that time, LACFCD also began receiving feedback on the concurrent Sediment Management Strategic Plan (Strategic Plan) and the interest to look at more sustainable sediment and reservoir management. As a result of the feedback and recommendations during the development of the Strategic Plan, LACFCD began evaluating ways to create a more sustainable long-term way to manage its sediment and habitat. To emphasize the goals of the project, the Proposed Project was given the name Devil's Gate Sediment Removal and Management Project.

The current remaining capacity in the reservoir is 1.3 million cy, whereas a reservoir storage design capacity of two DDEs, or 4.0 million cy, below the dam's lowest spillway was determined to be the standard acceptable level of risk at Devil's Gate Dam and Reservoir. If the reservoir is left in its current state, the flood risk to downstream communities would remain at an unacceptable level.

Response to Comment 208-3:

See Response to Comment 208-2. LACFCD was mandated by the State Legislature to provide flood protection and water conservation within its boundaries.

A DDE refers to a quantity of sediment, not the acreage of a fire. A reservoir storage design capacity of two DDEs below the dam's lowest spillway was determined to be the standard acceptable level of risk at Devil's Gate Dam and Reservoir. The DDE volume of capacity is determined using the January 2006 Los Angeles County Department of Public Works (LACDPW) Hydrology Manual and the March 2006 LACDPW Sedimentation Manual. For Devil's Gate Dam and Reservoir, the required reservoir capacity is 4.0 million cy (two DDEs) below the spillway elevation of 1,040.50 feet.

The Hydrology Manual (January 2006) can be viewed here:

http://dpw.lacounty.gov/wrd/publication/engineering/2006_Hydrology_Manual/2006%20Hydrology%20Manual-Divided.pdf

The Sedimentation Manual (March 2006) can be viewed here:

http://dpw.lacounty.gov/wrd/publication/engineering/2006_sedimentation_manual/Sedimentation%20Manual-Second%20Edition.pdf

Additional information concerning DDE calculation methods has been added to the Final EIR, Section 2.3, Project Need.

Historically, large amounts of sediment have been deposited in the reservoir in short time periods. Between 1935 and 1938 over 1.6 million cy of sediment, between 1938 and 1943 over 1.95 million cy of sediment, and between 1959 and 1966 over 1.75 million cy of sediment, and between 2010 and 2012 over 1.3 million cy of sediment was deposited in the reservoir. Over 92 years, the average amount of sediment deposited each year is approximately 130,000 cy; however, Devil's Gate Reservoir is a dynamic system with constantly changing amounts of sediment deposited from year to year, depending on the frequency and intensity of storm events. If a 1 in 50 years storm were to occur, approximately 2.0 million cy (one DDE) of sediment could be expected to wash into the reservoir. Because of the LACFCD's responsibilities to provide flood protection, LACFCD must be ready at all times for a design debris event to occur.

Response to Comment 208-4:

See Response to Comments 208-2 and 208-3. All LACFCD projects comply with the requirements of CEQA, and all necessary permits are obtained before any action is taken on a project.

Response to Comment 208-5:

See Response to Comment 208-2. In order to remove the necessary amount of sediment from the reservoir, some vegetation must be removed, as the vegetation sits atop many layers of accumulated sediment.

Alternative 3, Configuration D affects the least amount of habitat of all the action alternatives while still achieving Proposed Project objectives (see Section 4.6 of the Final EIR). This alternative would provide a buffer on the west side of the reservoir that would allow for the movement of wildlife. Alternative 3, Configuration D, Option 1 provides a more natural configuration for the reservoir by having two branches to carry water and sediment toward the face of the dam, avoiding disturbing a significant portion of existing vegetation. To further reduce the Proposed Project's footprint, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2, which drastically

reduces the project's footprint of 120 acres down to 71 acres, would avoid excavation of the western branch, thereby providing a greater habitat buffer on the west side of the reservoir. In addition, the maintenance areas would be smaller than the original sediment removal footprint, allowing for habitat to reestablish and providing additional areas for wildlife movement.

Response to Comment 208-6:

The Draft EIR, Biological Technical Report (BTR), and focused surveys provide thorough and accurate existing conditions for biological resources (Draft EIR, Section 3.6; Appendix D, Biological Reports). The field surveys were conducted in 2010 and 2013 and included general biological surveys, focused sensitive plant surveys, focused least Bell's vireo surveys, and federal and state jurisdictional waters surveys, as described in Section 3.6 of the Draft EIR.

Many local organizations, including the Pasadena Audubon Society and the Arroyo Seco Foundation, were contacted about the Proposed Project prior to the Draft EIR being prepared. LACDPW reached out to representatives of several organizations in August 2011 to receive their opinions on the Proposed Project and what they wanted to see in the Proposed Project's EIR. These included representatives from the Pasadena Audubon Society, the Hahamongna Watershed Park Advisory Committee, the Urbanwild Network, and the Arroyo Seco Foundation. These and many other local organizations, agencies, adjacent residents and businesses, and interested individuals received the Notice of Preparation (NOP) for the Draft EIR in September 2011. Comments and information received during the scoping process (see Appendix A of the Draft EIR) were taken into consideration for the analysis and formulation of alternatives and mitigation. In addition, in January 2012, a representative of the Pasadena Audubon Society was contacted for information the Society has concerning birds observed in the Proposed Project area. The information provided by these organizations and individuals was used in preparing the biological resources section of the Draft EIR. Species with the potential to occur within the Proposed Project and species that were identified during surveys are presented in the biological survey reports in Appendix D of the Draft EIR. Factors used to determine the potential for occurrence included the quality of habitat, elevation, and the results of the reconnaissance survey. The locations of prior database records and species lists of occurrence were used as additional data; but since these are positive-sighting databases, this data was used only in support of the analysis from the previously identified factors. Based on the results of the BTR, additional protocol-level focused surveys were conducted for Proposed Project as described in Section 3.6.2, Special Status Plant Species and Special Status Animal Species of the Draft EIR.

Response to Comment 208-7:

Sluicing was analyzed as part of the Draft EIR in the Alternatives Analysis, Section 4.7, Alternative 4 Sluicing Method. This alternative would involve use of construction equipment and the removal of trees and vegetation over the same footprint as the Proposed Project. The sluicing alternative would potentially have additional significant impacts in comparison to the Proposed Project. Many of these impacts would be associated with the likelihood that large amounts of sediment would not be fully transported through the flood control system; this sediment would need to be mechanically removed and trucked out from numerous downstream locations potentially including the two soft-bottom portions of the channel. The sluicing analysis was conducted based on typical historical flow rates and, separately, based on ideal flow rates. Please see Section 4.7 and Appendix K of the Draft EIR for further explanation.

Flow Assisted Sediment Transport (FASTing), a passive method of transporting sediment downstream, is currently used when possible and would be used during the Maintenance Phase of the Proposed Project; however, FASTing, even in combination with the Interim Measures Project (IMP), will not efficiently remove large amounts of sediment. As discussed under the No Project Alternative, Section 4.9, use of FASTing and IMP alone will not meet Proposed Project objectives. The removal of accumulated sediment on a yearly basis is the proposed management scheme after the original sediment removal is completed. The regular maintenance of the area will lower the potential need for a large-scale sediment removal operation in the future. Please see Section 2.5.2 of the Draft EIR for more information on future maintenance.

Response to Comment 208-8:

See Response to Comment 208-7. The Devil's Gate Water Conservation Project is a separate project that is not part of the Proposed Project or alternatives. The Devil's Gate Water Conservation Project is still in a conceptual design phase, and no environmental report is available for public review at this time; however, this project was analyzed in the Draft EIR as a cumulative project.

Comment Letter #209

10604 Walnut Drive
Shadow Hills, CA 91040
21 January 2014

Gail Farber, Director
Los Angeles County Department of Public Works
Attn: Water Resources Division – Reservoir Cleanouts
P.O. Box 1460
Alhambra, CA 91802-9974

Re: Comments to the Draft Environmental Impact Report for the Devils Gate Reservoir Sediment Removal and Management Project

Dear Ms. Farber:

I am a junior at La Canada High School, and have attended Tom Sawyer Camp as a camper for six summers, and as a counselor for two.

Comment 209-1 The Tom Sawyer Camp program depends heavily on the recreational opportunities present in the Hahamongna Basin. The Devils Gate Sediment Removal project, as currently proposed, would be incredibly disruptive to the camp program, not only while the sediment removal is occurring, but also during the post-removal reservoir management.

Comment 209-2 I am particularly disappointed in the mitigations proposed for recreational impacts. There is no other park in the area that could offer anywhere near the unique mix of recreational opportunities present at Hahamongna. There just isn't anywhere like it.

Comment 209-3 Furthermore, to suggest that trails through a vast expanse of mowed vegetation would offer an improvement on the current state of the basin demonstrates a clear lack of understanding for what is there now and how it is utilized. The Tom Sawyer Camp recreational use of the Hahamongna basin depends on the rich habitat, with intermittent berms, bushes, and trees, providing places for people and wildlife alike to hide.

Comment 209-4 And while one could argue that Tom Sawyer Camp is "just" a summer camp for kids, and there are plenty of other summer camp programs to choose from, I would like to note that this program, where kids make forays into a complicated natural environment, provides many benefits to these developing children that are not available elsewhere. Our world is too regimented, too sterile, and we suffer because of it. I have learned and grown a great deal by experiencing nature first-hand in the Hahamongna basin. To cut that experience off from future generations would be a real shame.

Comment 209-5 I urge you to rethink the proposed sediment management project. For the kids. Please!

Sincerely,

Markus Klemm

Markus Klemm

Response to Comment Letter #209 (Markus Klemm)

Response to Comment 209-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

Impacts to recreation were analyzed in the Draft Environmental Impact Report (EIR), Section 3.15. The Proposed Project will not limit the use of the Oak Grove area of Hahamongna Watershed Park. Sediment removal activities would be temporary and are expected to occur only in the drier months (April to December, excluding holidays). It is expected that these activities will often not be adjacent to the Oak Grove area of Hahamongna Watershed Park. The Proposed Project would result in temporary limitations on the recreational use of the Proposed Project site and some of the adjacent trails. Most of these areas would be reopened seasonally or intermittently throughout the sediment removal process. In addition, temporary impacts to designated recreational facilities and trails will be minimized through advance communication and redirection to the nearest facility in the vicinity of the Proposed Project. Furthermore, an east-west trail crossing will continue to provide access at the north end of the reservoir. At the south end of the reservoir, after the reservoir ingress and egress ramps have been fully constructed, access to the upper east side Arroyo Seco Trail from La Cañada Verdugo Road will be maintained; and the linkage from the west side Arroyo Seco Trail and the Flint Wash Trail to the upper east side Arroyo Seco Trail (crossing Devil's Gate Dam and also continuing south to the Rose Bowl) will be available after construction activities have ended each day and on nonworking days.

Response to Comment 209-2:

See Response to Comment 209-1.

Response to Comment 209-3:

See Response to Comment 209-1. Alternative 3, Configuration D affects the least amount of reservoir area of all the action alternatives, while still achieving Proposed Project objectives (see Section 4.6 of the Final EIR). This alternative would provide a buffer between the Oak Grove area of Hahamongna Watershed Park and the excavation area. Alternative 3, Configuration D, Option 1 provides a more natural configuration for the reservoir by having two branches to carry water and sediment toward the face of the dam, avoiding disturbing a significant portion of existing vegetation. To further reduce the Proposed Project's footprint, Los Angeles County Flood Control District (LACFCD) has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2, which drastically reduces the project's footprint of 120 acres down to 71 acres, would avoid excavation of the western branch, thereby providing a greater habitat buffer on the west side of the reservoir. In addition, the maintenance areas would be smaller than the original sediment removal footprint, allowing for habitat to reestablish.

Response to Comment 209-4:

As discussed in Section 3.15 of the Draft EIR, the Tom Sawyer Camps is recognized as one of many groups that regularly use the Oak Grove area of Hahamongna Watershed Park. See Response to Comments 209-1 and 209-3.

Response to Comment 209-5:

Comment noted.

From: michael johnston
To: reservoircleanouts
Date: Tuesday, January 21, 2014 10:58:11 AM

Comment 210-1 I support the Arroyo Seco foundation plan

Response to Comment Letter #210 (Michael Johnston)

Response to Comment 210-1:

Los Angeles County Flood Control District (LACFCD) notes that the commenter supports the Arroyo Seco Foundation's "Slow Program."

LACFCD goes to great lengths to lessen project impacts and maximize efficiencies. As such, many of the points in the four-point "Slow Program" are compatible with the LACFCD Proposed Project.

For example, the Draft Environmental Impact Report (EIR) selected Alternative 3 as the Environmentally Superior Alternative. Alternative 3 drastically reduces the project's footprint of 120 acres down to 71 acres. Additionally, the limited maintenance area for Alternative 3 further reduces the permanent habitat impacts down to approximately 51 acres by allowing for site replanting and mitigation to take place within the reservoir footprint. This reduction in project acreages will greatly lessen environmental impacts of the Proposed Project.

LACFCD strives to achieve an efficient, low-cost sediment removal project. Sediment removal rates and trucking operations, now utilizing all low-emissions trucks, as explained in Section 3.5 of the Draft EIR, have been carefully planned for economies of scale to realize maximum efficiencies without major delays in project schedule, thus greatly reducing operating costs. Furthermore, LACFCD has applied for and received an approximately $28 million grant through the State's Disaster Preparedness and Flood Protection Bond Act of 2006 (Proposition 1E) program. A portion of this grant will be used to help offset the Proposed Project's costs.

While sluicing is not a viable project alternative, as explained in Section 4.7 of the Draft EIR, Flow Assisted Sediment Transport, or FASTing, will be used for maintenance after the project's main sediment removal phase has been completed, as described in Section 2.5.2 of the Draft EIR.

LACFCD is committed to *Public Service that Works*; and by combining almost 100 years of technical expertise and invaluable input from the community, less invasive flood protection will continue to be a reality.

For a more detailed response to the Arroyo Seco Foundation's four-point "Slow Program", please see the response to the Arroyo Seco Foundation's comment letter (Comment Letter #216, Response to Comment 216-16).

SIERRA CLUB
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Pasadena Group

January 20, 2014

To: County of Los Angeles
Department of Public Works
Water Resources Division
Attn: Reservoir Cleanouts Program
P.O. Box 1460
Alhambra, CA 91802-1460

reservoircleanouts@dpw.lacounty.gov

From: Pasadena Sierra Club

Re: Draft Environmental Impact Report for Devil's Gate Reservoir Sediment Removal and Management Project

Comment 211-1 We have reviewed the Draft Environmental Impact Report for removal of sediment behind Devil's Gate Dam and welcome this opportunity to submit these comments.

Overview

Comment 211-2 Hahamongna Watershed Park is one of Pasadena's most prized environmental sites. Located in northwest Pasadena where the Arroyo Seco emerges from the San Gabriel Mountains, its alluvial canyon and riparian habitat provide a home for a wide variety of plants and animals. Pasadena is committed to preserving its ecological and recreational values. The sediment that Hahamongna accumulates from its hillside watershed has to be managed, but in a way that does the least damage to the environment – with small amounts removed on a regular basis rather than a massive cleanout.

Comment 211-3 This Draft Environmental Impact Report starts with the premise that the Devil's Gate Dam/Hahamongna basin must have the capacity for two Design Debris Events to ensure that the dam will not be overwhelmed, which could result in downstream flooding. It defines a DDE for Hahamongna as 2 million cubic yards, multiplies that by two, and proceeds to analyze the proposed project's impacts without serious consideration of less aggressive alternatives.

This basic premise of requiring capacity for two DDEs needs to be examined critically. Would public safety be adequately ensured by removing less than the projected 2.4 to 4 million cubic yards of sediment? What degree of risk would that entail? How much would a smaller, more

gradual approach reduce the environmental impacts? This DEIR is inadequate because it fails to provide the public and decision makers a broad range of reasonable alternatives to balance flood safety and environmental impacts. This failing is reflected in the six "Primary Project Objectives" listed in Sec. 2.4, which refer only to sediment removal, dam operation and flood control with no reference to environmental impacts or even mention of the word "environmental," although this is a Draft **Environmental** Impact Report.

Comment 211-3 continued

This DEIR should be supplemented with one or more alternatives for removing smaller amounts of sediment each year, perhaps 150,000 to 200,000 cubic yards a year, over a longer period than four or five years, with a rigorous analysis of the risks of flooding compared with the project proposed in this DEIR, as well as the comparative environmental impacts of those less aggressive approaches. Then decision makers, stakeholders and the community would have the information needed for an informed decision on how to proceed.

Comment 211-4

Assessing the Risk

The DEIR states that the Design Debris Event is ***"the predicted amount of sediment that can flow into the reservoir after the undeveloped portion of the tributary watershed is completely burned and a 50-year design storm event occurs after four years of watershed recovery. The 50-year design storm and the DDE are defined by the Los Angeles County Department of Public Works Hydrology and Sedimentation Manuals respectively. The DDE for the Devil's Gate Reservoir is approximately 2 million cy."***

Comment 211-5

The first part of that definition has already happened. The 2009 Station Fire burned the entire undeveloped watershed in the San Gabriel Mountains. How likely is a repeat of this fire? Not likely any time soon, since it will take many years for the vegetation to grow into enough fuel to sustain such a devastating fire. Meanwhile, each year the watershed is recovering its ability to hold storm water so it doesn't rush down hillsides and wash unusual amounts of sediment into the Hahamongna basin. In short, the destructive fire part of the DDE definition, and its effects on erosion of the watershed, seems to be diminishing each year, and unlikely to increase significantly for many years to come.

What about the likelihood of a 50-year design storm event? And what exactly is that for the Arroyo Seco watershed? The DPW Sedimentation Manual defines a DDE as ***"the quantity of sediment produced by a saturated watershed significantly recovered from a burn (after four years) as a result of a 50-year, 24-hour rainfall amount."***

Comment 211-6

Is the past any guide? When was the last 50-year design storm event in the San Gabriel Mountains, and what was its 24-hour rainfall? These facts ought to be in a DEIR that hinges on such a storm. (During my 46 years living in Pasadena, the rainiest year I can recall was 2004-2005. I have a backyard rain gauge, and have recorded every rain event since 1993. My notes show nearly 6 inches of rain on Jan. 10, 1995, and 50 inches of rain between mid-October 2004 and February 2005, with more than 5 inches on one day, Oct. 19, 2004. The 24-hour period of Dec. 21-22, 2010 produced 6 inches of rain in Pasadena – there probably was more than that in the mountains -- which, coming so soon after the 2009 Station Fire, must have brought down a lot of the sediment that flowed into the basin. The period Dec. 18-22, 2010, had 13 inches of rain, but that was spread over five days, not 24 hours. Many of us have watched water pouring

Comment 211-7

Comment 211-7 continued

through or over Devil's Gate Dam during a major storm. Was there any flooding below the dam during or after any of these storms?)

Comment 211-8

What about the potential effects of climate change? While these will be very gradual, they may have some bearing on a 50-year time scale. The science seems to indicate that Southern California will receive less rainfall in the decades ahead because of climate change. How reliable is the science, and what can it tell us about the strength of future storms?

Previous Sediment Removals

The County Flood Control District's Sediment Management Strategic Plan 2012-2032 indicates that the most recent large sediment removal was 190,000 cubic yards in 1995. As of March 2011 – after the basin had received more than 1.1 million c/y of sediment in the two winters following the Station Fire – this plan listed the reservoir's capacity at elevation 1054 ft. as 3.2 million c/y. (The spillway floor elevation is 1040 ft.) But, a graph indicates that the storage capacity drops sharply if 1 or 2 DDEs are required,

Comment 211-9

Given the varied figures for the basin's storage capacity cited in the Strategic Plan, and in other County documents, the Devil's Gate Dam DEIR must provide a clear set of figures for available storage capacity each year over the last decade or two, how those measurements were made, the amounts of sediment removed in that period, and remaining storage capacity, figured with and without DDEs. These figures would help in judging the urgency of removing any given amount of sediment over the next few years. Has maintenance been neglected? Is the County now "playing catch-up" with a huge project to make up for neglecting more routine sediment removal over the last 15 or 20 years, as one Pasadena City Council member has asserted? Does the inflow of 1.1 million cubic yards of sediment after the Station Fire really require the removal of 2.4 to 4 million cubic yards now?

Comment 211-10

As part of evaluating the effects of the fire and resulting sediment inflow, the DEIR also should describe the modifications to the trash racks and other fixtures on the dam face since the Station Fire and their role in preventing debris from clogging the dam's outlet works.

Related Project Not Analyzed

Comment 211-11

The DEIR mentions in passing the proposed pump and 30-inch pipeline to move water from just above Devil's Gate Dam about 5 miles eastward to the Eaton Wash Spreading Grounds. The volume of water moved could range from 2,000 to 4,500 acre feet a year. Because this project is closely related to the Devil's Gate Dam project, with possible cumulative impacts, these questions must be answered:

1. Would pumping water to Eaton Wash affect the Hahamongna basin's storage capacity during a storm?
2. Would it decrease the volume of water available for sluicing sediment through Devil's Gate Dam to the ocean?
3. Was the size and scope of the sediment removal project adjusted to fit it to the Eaton Wash diversion?

COORDINATION WITH OTHER AGENCIES

The projects in this DEIR are not coordinated with the operations or visions of other agencies.

Comment 211-12

The City of Pasadena maintains Hahamongna Watershed Park in the basin and surrounding higher ground, and City officials appear to be alarmed at the scope of this sediment removal project and its impacts on the park. The County must coordinate with the City to strike the best possible balance between their different missions and objectives.

Comment 211-13

The U.S. Army Corps of Engineers is working on an Arroyo Seco Watershed Feasibility Study, which will provide long-term management practices to improve watershed health, water quality, and increase water conservation while maintaining flood control. The Army Corps' Arroyo Seco Watershed Feasibility Study scoping document of 2011 sketches potential ecosystem restoration measures for Hahamongna and other sections of the Arroyo, leaving to a later report the specific projects to implement them. The L.A. County Flood Control District is working with the Army Corps on this important study. In May 2013, the County's director of public works, Gail Farber, wrote a letter to Army Corps officials saying that "It is critical that we finalize this effort and move forward with the feasibility portion of the Study, which will allow us to identify potential projects that will benefit the environment and improve the quality of life for the community."

A sediment removal project as aggressive as proposed in the County's DEIR could well reshape the Hahamongna basin and defeat any beneficial projects envisioned by the Army Corps study.

Significant Impacts

Air Quality and Pollution

Comment 211-14

The DEIR minimizes the potential harm from air quality impacts of this aggressive sediment removal project. Even with best management practices, particulate matter from excavation activities is bound to escape the site and reach adjacent schools and recreational users. The DEIR notes that there are 10 schools within half a mile. This is a large and particularly vulnerable population to expose to any more pollution than absolutely necessary, and a project of this scale would do just that. Exhaust from the stream of diesel-powered trucks – nearly one a minute – will add to the unhealthful air. The DEIR states that the County will try to use trucks meeting the latest emission standards, but can't ensure that all trucks will meet the standards. Scaling the project down would allow the County to use fewer trucks and ensure that they all meet the newest emission standards.

Biological Resources

Comment 211-15

The DEIR offers scant comfort to those dismayed at the prospect of destroying so much riparian habitat in this semi-natural area in a major City park. The proposed mitigation of 1:1 is too low. Trees and other vegetation in this kind of area should be replaced at a 3:1 ratio or more. And the "management areas" that would be permanently cleared of vegetation, mowed and grubbed every year, would ensure a barren wasteland of 50 or more acres in this prime Pasadena City park. This would be not only an aesthetic loss, as illustrated in the views shown in the DEIR, but a permanent loss of habitat for wildlife and a turn-off for many recreational users.

Land Use and Planning

The City of Pasadena owns the land, and has granted a permanent easement to the County to build and operate the dam for flood control purposes. Both City and County want to minimize the risk of downstream flooding. But while the County's primary mission is to operate the dam so as to avoid flooding – and to promote water conservation – the City's mission also includes preserving open space, conserving habitat and wildlife, promoting recreation. These obvious objectives are spelled out in the City's General Plan which in a recent update calls for "Zoning Changes: Protect the existing natural open space within the Hahamongna Watershed Park Master Plan area." The 2003 Hahamongna Master Plan calls for developing "a sediment removal plan that minimizes the impact to the basin and to the surrounding neighborhoods" and for "a grading plan that allows habitat restoration and recreational activities to coexist with flood management and water conservation." It also calls for development of "a multi-agency task force to review maintenance, sediment removal, dam operation, permit, and liability issues on a continual basis after this plan is adopted."

Comment 211-16

These references underline the need for the County and the City to work together to develop a plan that will minimize the risk of flooding, preserve the Hahamongna Watershed Park environment, and have the smallest possible environmental impacts.

Recreation/Public Services

Recreational activities at Hahamongna and adjacent trails include disc golf, Tom Sawyer Camp, Rose Bowl Riders, MACH 1, hiking, biking, horseback riding, bird-watching, and nature walks. In addition, approximately 10,200 visitors came to Hahamongna Watershed Park during 2010 to utilize the sports and recreational facilities available by permit through the City. These included sporting events and tournaments, City events, picnics, and equine-related clinics and shows.

Comment 211-17

The sediment removal project would curtail some of these activities by closing trails, and affect others with noise and air pollution. Many recreational users will be dissuaded from using the park by the large-scale, industrial-type of activity. The DEIR notes that these users can go elsewhere for their recreation, and lists the many parks and other sites in the Pasadena community. But Hahamongna is unique in this area, and other sites cannot offer the same experience. The impact on recreation in Pasadena will be significant, in contrast with the DEIR's conclusions. As with other impacts noted earlier, the effects on recreation would be greatly reduced by a less aggressive sediment-removal plan that removed sediment more gradually over a longer period.

Thank you for considering our comments.

Don Bremner

Don Bremner, Conservation Chair
Pasadena Group, Angeles Chapter-Sierra Club

P.O. Box 94086 Pasadena, CA 91109-4086

Response to Comment Letter #211 (Pasadena Sierra Club)

Response to Comment 211-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

Response to Comment 211-2:

Los Angeles County Flood Control District (LACFCD) notes that the commenter prefers small amounts of sediment removal on a regular basis.

Response to Comment 211-3:

LACFCD was mandated by the State Legislature to provide flood protection and water conservation within its boundaries.

A reservoir storage design capacity of two design debris events (DDEs) below the dam's lowest spillway was determined to be the standard acceptable level of risk at Devil's Gate Dam and Reservoir. The DDE volume of capacity is determined using the January 2006 Los Angeles County Department of Public Works (LACDPW) Hydrology Manual and the March 2006 LACDPW Sedimentation Manual. For Devil's Gate Dam and Reservoir, the required reservoir capacity is 4.0 million cubic yards (cy) (two DDEs) below the spillway elevation of 1,040.50 feet.

The Hydrology Manual (January 2006) can be viewed here:

http://dpw.lacounty.gov/wrd/publication/engineering/2006_Hydrology_Manual/2006%20Hydrology%20Manual-Divided.pdf

The Sedimentation Manual (March 2006) can be viewed here:

http://dpw.lacounty.gov/wrd/publication/engineering/2006_sedimentation_manual/Sedimentation%20Manual-Second%20Edition.pdf

Additional information concerning DDE calculation methods has been added to the Final Environmental Impact Report (EIR), Section 2.3, Project Need.

The Draft EIR did consider a reasonable range of alternatives. The Draft EIR, Section 4, fully analyzed six alternatives including the No Project Alternative. These alternatives substantially lessen one or more significant effects of the Proposed Project and, with the exception of the mandatory No Project Alternative, would feasibly attain most of the basic objectives of the Proposed Project. These alternatives include options for different amounts of removal, different methods of removal, and a different haul route. The alternative closest to the alternative mentioned in the comment is the No Project Alternative, which includes the use of FASTing and IMP alone, which would not meet Proposed Project objectives. Other alternatives were not carried forward as they did not minimize impacts in relation to the Proposed Project and/or did not meet Proposed Project objectives.

Per the California Environmental Quality Act (CEQA), Section 15124, the statement of objectives should include the underlying purpose of the project. All of the Proposed Project objectives support the

underlying purpose of the project which is: The Proposed Project will remove sediment from Devil's Gate Reservoir to restore the design capacity (volume for two DDEs below the spillway elevation of 1,040.5 feet) and establish a reservoir management system to maintain the flood control capacity of the reservoir. Therefore, the Proposed Project objectives are satisfactory per CEQA.

Response to Comment 211-4:

See Response to Comment 211-3. LACFCD proposed a project duration of five years to reduce accumulated sediment in a timely fashion. The goal of LACFCD is to restore reservoir flood capacity as soon as feasible while reducing costs and minimizing the duration of environmental and construction impacts to the surrounding communities. Extending the project would prolong the flood risk to downstream communities and increase the construction impacts to the surrounding communities.

Response to Comment 211-5:

Historically, large amounts of sediment have been deposited in the reservoir in short time periods. Between 1935 and 1938 over 1.6 million cy of sediment, between 1938 and 1943 over 1.95 million cy of sediment, between 1959 and 1966 over 1.75 million cy of sediment, and between 2010 and 2012 over 1.3 million cy of sediment was deposited in the reservoir. Since the dam's construction in 1920 and prior to the Station Fire in 2009, approximately 10.7 million cy of sediment accumulated in the reservoir; and approximately 8.0 million cy was removed by LACFCD.

Over 92 years, the average amount of sediment deposited each year is approximately 130,000 cy; however, due to the dynamic nature of the system and the recent burn of the watershed, the amount could vary greatly. If a 1 in 50 years storm were to occur, approximately 2.0 million cy (one DDE) of sediment could be expected to wash into the reservoir. It should be noted that design debris amounts can be produced from a freshly burned watershed with rainfall amounts considerably below capital flood levels (a 5- to 10-year frequency storm). Similarly, higher intensity rainfall could produce more debris. Because of LACFCD's responsibilities to provide flood protection, LACFCD must be ready at all times for a design debris event to occur.

Response to Comment 211-6:

See Response to Comments 211-3 and 211-5. A 50-year frequency design storm is defined as the magnitude of a storm that is likely to occur once every 50 years. Therefore, the chance of a 50-year storm occurring in any given year is 1 out of 50, or a 2 percent, chance of occurring in any one-year period.

Response to Comment 211-7:

The last 50-year design storm event recorded at Devil's Gate was during the 1968-1969 storm year.

The storms of 1969 and 1983 both caused severe damage to the Arroyo Seco Channel; however, only limited localized flooding occurred directly adjacent to the Arroyo Seco due to erosion during these storms. Flooding was limited due to previous sediment removal efforts that ensured correct functioning of the outlet works and maintenance of reservoir capacity.

During the 1969 storm year, damage to improved channels and storm drains consisted mostly of plugging from debris flows but also included major structural damage to the Arroyo Seco downstream of

Devil's Gate Dam. That same storm year, water conservation efforts at the Arroyo Seco Spreading Grounds were impeded due to the heavy debris inflow caused by the storm. From 1966 to 1969, approximately 1,166,000 cy of sediment was deposited into the reservoir, even without a burned watershed. Regular large sediment removal efforts occurred throughout the 1970s following the 1969 storm year, restoring capacity to the reservoir.

During the 1983 storm, portions of the concrete channel bottom of the Arroyo Seco eroded, allowing flows to undermine and damage a 1,100-foot reach of channel between Washington Boulevard and the Rose Bowl in Pasadena.

Following the 2009 Station Fire, approximately 1.3 million cy of sediment flowed into Devil's Gate Reservoir after just two average storm seasons.

Response to Comment 211-8:

See Response to Comment 211-5 and 211-6. According to the Unincorporated Los Angeles County Community Climate Action Plan 2020, climate change is expected to increase the frequency, intensity, and duration of extreme storms (County of Los Angeles, Department of Regional Planning, July 2014). Increased winter storm events could also affect peak stream flows and flooding.

Response to Comment 211-9:

See Response to Comment 211-3.

The Sediment Management Strategic Plan included sediment history data to demonstrate the volume of sediment deposited into the dams and used that data along with statistical analysis to develop projected 20-year sediment volumes for County facilities. The sediment history provided for Devil's Gate Dam (pages 8-42 and 8-43 of the Sediment Management Strategic Plan) correctly shows the sediment volumes accumulated at the dam; however, the column titled "Reservoir Capacity at Elevation 1,054 ft." can be somewhat confusing with respect to the current capacity in the dam. That column provides the remaining capacity below elevation 1,054 feet, which is the original spillway elevation of the dam. The spillway was rehabilitated in order to pass the Probable Maximum Flood. The rehabilitation entailed lowering the spillway bottom elevation, thereby constructing the spillway ports. The reservoir capacity below the existing spillway ports (elevation of 1,040.5 feet) is the appropriate parameter for determining the currently available capacity for meeting the sediment volume requirements for the dam. The current capacity in the reservoir below the spillway is 1.3 million cy. This is only 32.5 percent of the required storage capacity and only 65 percent of one DDE. Please note that additional sediment deposits have accumulated within the reservoir easement above the elevation of 1,054 feet. This accumulated sediment has the potential to be washed toward the dam during significant storm events and further reduce the available capacity below the spillway.

LACFCD has executed several sediment removal projects at Devil's Gate Reservoir in the past, with the last major effort being in 1994. Smaller amounts of sediment were removed in 2006, 2009, and as a part of the Interim Measures Project in 2011, 2012, and 2013. Following the 2009 Station Fire, approximately 1.3 million cy of sediment flowed into Devil's Gate Reservoir after just two average storm seasons. In 2010, LACFCD proposed an emergency sediment removal project in response to the large inflow of sediment resulting from the Station Fire.

In March 2011, the County of Los Angeles Board of Supervisors motioned LACFCD to complete an EIR for a comprehensive sediment removal project at Devil's Gate. LACFCD then initiated project development in accordance with the required level of protection of protection of two DDEs. LACFCD began evaluating ways to create a more sustainable long-term way to manage its sediment and habitat. To emphasize the goals of the project, the project was given the name Devil's Gate Sediment Removal and Management Project. The purpose of the Proposed Project is to restore the necessary capacity in Devil's Gate Reservoir and to establish a reservoir configuration more suitable for routine maintenance activities. Therefore, the need for future large-scale sediment removal projects will be reduced or avoided.

The current remaining capacity in the reservoir is 1.3 million cy, whereas a reservoir storage design capacity of two DDEs, or 4.0 million cy, below the dam's lowest spillway was determined to be the standard acceptable level of risk at Devil's Gate Dam and Reservoir. If the reservoir is left in its current state, the flood risk to downstream communities would remain at an unacceptable level.

Response to Comment 211-10:

Dam modifications were included as part of the existing conditions, as noted in the Draft EIR, Section 2.21, LACFCD History.

Response to Comment 211-11:

The Proposed Project does not involve pumping water into Eaton Canyon. The Devil's Gate Water Conservation Project is a separate project from the Devil's Gate Reservoir Sediment Removal and Management Project. The Devil's Gate Water Conservation Project is still in a conceptual design phase and is not currently scheduled for construction; however, this project was included in the cumulative analysis, as noted in the Draft EIR in Table 2.9-1: Cumulative Projects. If the Devil's Gate Water Conservation Project is implemented, operation of both projects would be coordinated. Whether or not the Devil's Gate Water Conservation Project is implemented, the Sediment Transport Capacity Analysis for the Proposed Project found that the storm flows received in the reservoir would not move the necessary amount of sediment out of the reservoir, and the sediment moved downstream would fall out and remain in the Arroyo Seco or Los Angeles River. The Proposed Project's size and scope is necessary to achieve the Proposed Project's objective to satisfactorily reduce flood risk, create a configuration suitable for routine operations and maintenance, and reduce the possibility of plugging at the face of the dam. The Devil's Gate Water Conservation Project would not affect the reservoir's storage capacity.

Response to Comment 211-12:

LACFCD is coordinating with local agencies, including the City of Pasadena. Alternative 3, Configuration D, which was found to be the Environmentally Superior Alternative in the Draft EIR, was based on the City of Pasadena's Hahamongna Watershed Park Master Plan (HWPMP). Alternative 3, Configuration D affects the least amount of habitat of all the action alternatives while still achieving Proposed Project objectives (see Section 4.6 of the Final EIR). Alternative 3, Configuration D, Option 2, which drastically reduces the project's footprint of 120 acres down to 71 acres, would avoid excavation of the western branch, thereby providing a greater cohesion with the HWPMP. LACFCD has met and will continue to meet with the City of Pasadena regularly to coordinate and ensure resolution of concerns regarding Devil's Gate Reservoir and the HWPMP.

Analysis of consistency with the HWPMP was included in the Draft EIR, Section 3.12 Land Use and Planning.

Response to Comment 211-13:

LACFCD continues to coordinate with the United States (U.S.) Army Corps of Engineers (USACE) concerning Arroyo Seco Watershed Management. As noted in the Draft EIR, Section 2.8 Required Permits and Approvals, a Section 404 Permit will be obtained from USACE. LACFCD is currently coordinating with USACE regarding the Section 404 Permit. In addition, LACFCD is a local sponsor of USACE's *Los Angeles County's Arroyo Seco Watershed Ecosystem Restoration Study,* and the study was used in the preparation of the Draft EIR.

Response to Comment 211-14:

Air quality impacts associated with truck traffic were analyzed in the Draft EIR in Section 3.5. LACFCD has conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed the U.S. Environmental Protection Agency's (EPA's) 2007 standards for emissions. Therefore, in order to further reduce emissions, Mitigation Measure MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump trucks that meet or exceed EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality, including those associated with health effects, will be reduced to less than significant.

Dust impacts from the Proposed Project were carefully evaluated, as discussed in the Draft EIR, Section 3.5.6, Impacts and Mitigation, AIR QUALITY-2, Sediment Removal. The Proposed Project's activities, including excavation, grading, material loading, and hauling, would result in less than significant dust emissions due to the project's use of best management practices and would be in full compliance with South Coast Air Quality Management District's (SCAQMD's) fugitive dust regulations.

Response to Comment 211-15:

As discussed in Section 3.6.6 of the Draft EIR, Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats. In addition, sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays). Wildlife species currently found in the Proposed Project area would be expected to either remain in the undisturbed areas of the reservoir outside of the Proposed Project area or to reestablish once sediment removal activities have been completed.

As with any project that involves California Department of Fish and Wildlife (CDFW), USACE, and Regional Water Quality Control Board (RWQCB) jurisdictional areas, the ultimate mitigation for impacts related to the wetlands and drainages under the jurisdiction of the resource agencies is negotiated with the resource agencies during the regulatory permitting process. LACFCD has been and will continue to work closely with CDFW and USACE to identify appropriate mitigation, replacement ratios, and sites for restoration and enhancement that will offset impacts and satisfy the requirements of all applicable laws. A detailed restoration plan will be prepared and provided to CDFW and USACE for review and approval prior to project implementation. Prior to commencement of the Proposed Project, LACFCD will have obtained all necessary permits for impacts to CDFW, USACE, and RWQCB jurisdictional areas including Section 401 Certification, Section 404 permit, and a Streambed Alteration Agreement. Clean Water Act Section 404 (b)(1) guidelines will be followed as a framework for compensatory mitigation. Through

404(b)(1) negotiations with USACE and negotiations with CDFW under Fish and Game Code Sections 1600-1616, a determination of the functions and values of impacted jurisdictional waters shall result in the coordination of appropriate mitigation measures for sediment removal.

As noted in the Draft EIR, Section 3.4, Aesthetics and Figures 3.4-1 through 3.4-3, the visual aspects of the Proposed Project site are constantly changing. The Draft EIR does note that the Proposed Project will have significant temporary impacts to aesthetics; however, after the sediment removal phase of the Proposed Project is complete, a habitat restoration plan will be implemented that will allow native plant communities to reestablish outside the reservoir management area. Riparian Herbaceous vegetation is expected to continue to populate and/or reestablish in the management area of the Proposed Project site between maintenance activities.

The Draft EIR determined that visual impacts associated with reservoir management will be less than significant and, therefore, will not require mitigation. Reservoir management impacts to visual character under both of the Proposed Project's management options will result in a lower degree of contrast than seen during sediment removal. Due to the rapid growth of herbaceous plants, it is expected that during the majority of the year the Proposed Project site will appear vegetated. In addition, as with existing conditions, vegetation conditions on the Proposed Project site, including height and density, would change on a regular basis due to seasonal conditions, water flow/views, water storage, and sediment conditions.

Response to Comment 211-16:

See Response to Comment 211-12.

Response to Comment 211-17:

See Response to Comment 211-12. Impacts to recreation were analyzed in the Draft EIR, Section 3.15. The Proposed Project will not limit the use of the Oak Grove area of Hahamongna Watershed Park. Sediment removal activities would be temporary and are expected to occur only in the drier months (April to December, excluding holidays). It is expected that these activities will often not be adjacent to the Oak Grove area of Hahamongna Watershed Park. The Proposed Project would result in temporary limitations on the recreational use of the Proposed Project site and some of the adjacent trails. Most of these areas would be reopened seasonally or intermittently throughout the sediment removal process. In addition, temporary impacts to designated recreational facilities and trails will be minimized through advance communication and redirection to the nearest facility in the vicinity of the Proposed Project. Furthermore, an east-west trail crossing will continue to provide access at the north end of the reservoir. At the south end of the reservoir, after the reservoir ingress and egress ramps have been fully constructed, access to the upper east side Arroyo Seco Trail from La Cañada Verdugo Road will be maintained; and the linkage from the west side Arroyo Seco Trail and the Flint Wash Trail to the upper east side Arroyo Seco Trail (crossing Devil's Gate Dam and also continuing south to the Rose Bowl) will be available after construction activities have ended each day and on nonworking days.

Peter Kalmus
494 Alberta Street
Altadena, CA 91001

Gail Farber, Director
County of Los Angeles Department of Public Works Water Resource Division
Attention: Reservoir Cleanouts Program
P.O. Box 1460
Alhambra, California 91802-1460
CC: Mark Petrella
CC: Keith Lilley

Comments on Devil's Gate DEIR

Comment 212-1 The proposed project is to excavate and remove 2.9 million cubic yards of sediment behind the Devil's Gate Dam, over an area of 120 acres, over the next 5 years, and deposit it about 20 miles away in Azusa and Irwindale. The means of removal are dump trucks, operated at the rate of about one every minute, 9 hours per day, six days a week.

Comment 212-2 An additional potential impact in the aesthetics category is the post-project, permanently denuded maintenance phase. This impact would be very significant to me, and probably to many other members of the community, but it is not included in Table ES-1. How can the post-project visual impact be mitigated, i.e. how can the post project look like a natural wetland landscape (i.e. a willow forest) and not a trashed, denuded field as indicated in the post-project visualizations in the DEIR?

Comment 212-3 An additional potential impact in the air quality category is the CO_2 released by the loading of sediment and the transport of sediment, and is not included in Table ES-1. How much CO_2 will be released by this project? How much impact will this released CO_2 have on the climate? How much impact will maintenance activities have on the climate?

Comment 212-4 How much is the all-cause mortality of nearby residents, school children, workers, and recreational visitors estimated to increase due to e.g. significant diesel exhaust including particulate matter? This can be estimated. It is irresponsible and immoral to subject the above-mentioned stakeholders to this risk without a comprehensive and state-of-the-art estimate of increase in all-cause mortality. In addition, a morbidity study must also be carried out. The results of these studies must be mailed to every stakeholder, e.g. all business, schools, and residents in the radius of increased mortality or morbidity (if any). In the event of health issues caused by this project, the county would be liable for damages.

Comment 212-5 I am not convinced that the impact of habitat destruction for the 5 special status species mentioned in Table ES-1 will be "less than significant." It doesn't matter how many qualified biologists are have on the scene; if the habitat is destroyed, these species will have one less place to live. What metric was used to determine that the nearly complete destruction of this unique habitat will be "less than significant"? This metric is not defined in the DEIR.

Comment 212-6 What has the rate of sediment removal from FAST been in the past? Was this the maximum possible FAST rate? What could be done to increase the rate of sediment removal through FAST events?

Comment 212-7 The DEIR does not make a convincing case as to why the project needs to be completed in 5 years. What is the quantitative risk of flooding, based on the site history and sediment flow models? What sites would be at risk? In the case of floods, what would be the cost of damage? How much flooding would be required before the cost of damage exceeded the cost of this project, and what is the statistical probability of that level of flooding over various timescales, including a longer possible project timescale of 20 years, or 30 years?

Comment 212-8 What is the justification for needing to remove 2 DDE?

Comment 212-9 Has an alternative of removing the minimum sediment to maintain 1 DDE, and using FAST thereafter, been considered? If so, I would like to see this considered carefully.

Comment 212-10 The current plan will have a huge impact on my family's recreation. We use the willow forest for recreation and education approximately once every two weeks. These recreation and education opportunities will vanish completely and permanently if this project is carried out.

Comment 212-11 Sluicing has worked successfully in the past at this site. Compared to the DEIR proposal it is essentially free. What is the reason that sluicing or FAST is not the primary means for removing sediment at this time?

Comment 212-12

The DEIR trucking proposal will cost $100 million. Is there a cheaper alternative than the trucking that will still get the job done? Will sluicing as primary removal strategy, with some trucking as as secondary strategy if needed (and at a lower volume than sluicing) also get the job done?

Comment 212-13

Who stands to profit from the DEIR proposal? How have any benefitting parties been involved in the process of lobbying for the proposed project, draftin the DEIR, or any other participation in this process? Can the county please demonstrate that their has been no such participation by parties who stand to benefit financially?

Comment 212-14

Is there an alternative that can allow for most of the habitat to remain? The denuded terrain is a big impact in my opinion. It will look terrible. Every time I ride to JPL in the morning, and ride home at night, I will wince.

Comment 212-15

I'm not convinced that the DEIR has adequately examined the possibility of slucing as the primary method of sediment removal. I would like to see a state-of-the-art appraisal of sluicing, its potential and its limitations, based on recent scientific studies. In the case that some questions on the potential and limitations of sluicing cannot be answered based on the current scientific studies, I would like to see further scientific research done before we rush to spend $100 million on a project that is understudied and may well prove to be a terrible mistake.

Comment 212-16

How much carbon dioxide would the proposed project release into the atmosphere? Has the climate impact of this project, and the continued necessary maintenance, been adequatly considered? What would the climate impact of a sluicing-based approach be?

Response to Comment Letter #212 (Peter Kalmus)

Response to Comment 212-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

Response to Comment 212-2:

As noted in the Draft Environmental Impact Report (EIR), Section 3.4, Aesthetics and Figures 3.4-1 through 3.4-3, the visual aspects of the Proposed Project site are constantly changing. The Draft EIR does note that the Proposed Project will have significant temporary impacts to aesthetics; however, after the sediment removal phase of the Proposed Project is complete, a habitat restoration plan will be implemented that will allow native plant communities to reestablish outside the reservoir management area. Riparian Herbaceous vegetation is expected to continue to populate and/or reestablish in the management area of the Proposed Project site between maintenance activities.

The Draft EIR determined that visual impacts associated with reservoir management will be less than significant and, therefore, will not require mitigation. Since impacts are less than significant and do not require mitigation measures, this impact is not included in Table ES-1. Reservoir management impacts to visual character under both of the Proposed Project's management options will result in a lower degree of contrast than seen during sediment removal. Due to the rapid growth of herbaceous plants, it is expected that during the majority of the year the Proposed Project site will appear vegetated. In addition, as with existing conditions, vegetation conditions on the Proposed Project site, including height and density, would change on a regular basis due to seasonal conditions, water flow/views, water storage, and sediment conditions.

Alternative 3, Configuration D affects the least amount of habitat of all the action alternatives while still achieving Proposed Project objectives (see Section 4.6 of the Final EIR). This alternative would provide a buffer on the west side of the reservoir that would allow for the movement of wildlife. Alternative 3, Configuration D, Option 1 provides a more natural configuration for the reservoir by having two branches to carry water and sediment toward the face of the dam, avoiding disturbing a significant portion of existing vegetation. To further reduce the Proposed Project's footprint, Los Angeles County Flood Control District (LACFCD) has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2, which drastically reduces the project's footprint of 120 acres down to 71 acres, would avoid excavation of the western branch, thereby providing a greater habitat buffer on the west side of the reservoir. In addition, the maintenance areas would be smaller than the original sediment removal footprint, allowing for habitat to reestablish and providing additional areas for wildlife movement.

Response to Comment 212-3:

Emissions of carbon dioxide (CO_2) are detailed in the Draft EIR, Section 3.9 Greenhouse Gas Emissions. As noted in the discussion, impacts related to greenhouse gas emissions are considered less than significant, as CO_2 emissions do not exceed the established South Coast Air Quality Management District (SCAQMD) thresholds. Since impacts are less than significant and do not require mitigation measures, this impact is not included in Table ES-1.

Response to Comment 212-4:

As discussed in the Draft EIR, Section 3.5, the Health Risk Assessment (HRA) analyzed both the cancer-related and noncancer-related acute (short-term) and chronic (long-term) impacts from project-related emissions. The HRA analysis found the Proposed Project would result in less than significant impacts for both the cancer-related and noncancer-related acute short-term and long-term impacts.

Response to Comment 212-5:

Significant impacts to sensitive species was defined in the Draft EIR, Section 3.6.6, "Would the project have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or the U.S. Fish and Wildlife Service?" In this section significant impacts to sensitive species were identified. These impacts will be reduced to less than significant through implementation of mitigation measures MM BIO-1 through MM BIO-8, which will serve to protect and avoid impacts to wildlife species and will provide for habitat restoration and enhancement.

Although the sediment removal phase of the Proposed Project will occur over a five-year period, the removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays), as described in the Draft EIR, Section 2.5.1, Sediment Removal Phase, Project Schedule.

Response to Comment 212-6:

Flow Assisted Sediment Transport (FASTing), a passive method of transporting sediment downstream, is currently used when possible and would be used during the Maintenance Phase of the Proposed Project; however, FASTing, even in combination with the Interim Measures Project (IMP), will not efficiently remove large amounts of sediment. As discussed under the No Project Alternative, Section 4.9, use of FASTing and IMP alone will not meet Proposed Project objectives. The removal of accumulated sediment on a yearly basis is the proposed management scheme after the original sediment removal is completed. The regular maintenance of the area will lower the potential need for a large-scale sediment removal operation in the future. Please see Section 2.5.2 of the Draft EIR for more information on future maintenance.

Response to Comment 212-7:

LACFCD proposed a project duration of five years to reduce accumulated sediment in a timely fashion. The goal of LACFCD is to restore reservoir flood capacity as soon as feasible while reducing costs, minimizing the duration of environmental and construction impacts to the surrounding communities, and configuring the reservoir to allow for sustainable future maintenance. Extending the project would prolong the flood risk to downstream communities and increase the construction impacts to the surrounding communities.

LACFCD was mandated by the State Legislature to provide flood protection and water conservation within its boundaries.

A reservoir storage design capacity of two design debris events (DDEs) below the dam's lowest spillway was determined to be the standard acceptable level of risk at Devil's Gate Dam and Reservoir. The DDE

volume of capacity is determined using the January 2006 Los Angeles County Department of Public Works (LACDPW) Hydrology Manual and the March 2006 LACDPW Sedimentation Manual. For Devil's Gate Dam and Reservoir, the required reservoir capacity is 4.0 million cubic yards (cy) (two DDEs) below the spillway elevation of 1,040.50 feet.

The Hydrology Manual (January 2006) can be viewed here:

http://dpw.lacounty.gov/wrd/publication/engineering/2006_Hydrology_Manual/2006%20Hydrology%20Manual-Divided.pdf

The Sedimentation Manual (March 2006) can be viewed here:

http://dpw.lacounty.gov/wrd/publication/engineering/2006_sedimentation_manual/Sedimentation%20Manual-Second%20Edition.pdf

Additional information concerning DDE calculation methods has been added to the Final EIR, Section 2.3, Project Need.

All facilities, including open channels, dams, bridges, and debris basins under LACFCD jurisdiction are required to meet the Capital Flood protection level. The Capital Flood is characterized by the Hydrology Manual as "the runoff produced by a 50-year frequency design storm falling on a saturated watershed (soil moisture at field capacity)" (Public Works, Hydrology Manual 2006). A 50-year frequency design storm is defined as the magnitude of a storm that is likely to occur once every 50 years. Therefore, the chance of a 50 year storm occurring in any given year is 1 out of 50, or a 2 percent chance of occurring. "Capital Flood protection also requires adding the effects of fires and erosion under certain conditions" (Public Works, Hydrology Manual 2006).

Response to Comment 212-8:

See Response to Comment 212-7.

Response to Comment 212-9:

See Response to Comments 212-6 and 212-7.

Response to Comment 212-10:

See Response to Comment 212-2.

LACFCD recognizes that the area is an important area for recreation, as outlined in Section 3.15, Recreation/Public Services.

Impacts to recreation were analyzed in the Draft EIR, Section 3.15. The Proposed Project will not limit the use of the Oak Grove area of Hahamongna Watershed Park. Sediment removal activities would be temporary and are expected to occur only in the drier months (April to December, excluding holidays). It is expected that these activities will often not be adjacent to the Oak Grove area of Hahamongna Watershed Park. The Proposed Project would result in temporary limitations on the recreational use of the Proposed Project site and some of the adjacent trails. Most of these areas would be reopened seasonally or intermittently throughout the sediment removal process. In addition, temporary impacts

to designated recreational facilities and trails will be minimized through advance communication and redirection to the nearest facility in the vicinity of the Proposed Project. Furthermore, an east-west trail crossing will continue to provide access at the north end of the reservoir. At the south end of the reservoir, after the reservoir ingress and egress ramps have been fully constructed, access to the upper east side Arroyo Seco Trail from La Cañada Verdugo Road will be maintained; and the linkage from the west side Arroyo Seco Trail and the Flint Wash Trail to the upper east side Arroyo Seco Trail (crossing Devil's Gate Dam and also continuing south to the Rose Bowl) will be available after construction activities have ended each day and on nonworking days.

Response to Comment 212-11:

See Response to Comments 212-6. Sluicing was analyzed as part of the Draft EIR in the Alternatives Analysis, Section 4.7, Alternative 4 Sluicing Method. This alternative would involve use of construction equipment and the removal of trees and vegetation over the same footprint as the Proposed Project. The sluicing alternative would potentially have additional significant impacts in comparison to the Proposed Project. Many of these impacts would be associated with the likelihood that large amounts of sediment would not be fully transported through the flood control system; this sediment would need to be mechanically removed and trucked out from numerous downstream locations potentially including the two soft-bottom portions of the channel. Please see Section 4.7 and Appendix K of the Draft EIR for further analysis.

Response to Comment 212-12:

See Response to Comment 212-11. The estimated cost for the Proposed Project and for Alternatives 1, 2, 3, and 5 would range from $80 million for the Proposed Project to $65 million for Alternative 3. Due to the variety of factors, including the indeterminate locations of the sediment fallout and requirements for removing sediment from these locations, the cost for Alternative 4 cannot be calculated.

Response to Comment 212-13:

LACFCD is undertaking this project to increase the flood control capacity of the reservoir. The CEQA process is intended to inform and include the public and interested agencies in the process of analyzing the Proposed Project and Alternatives.

The construction contractors have not been hired yet. LACFCD uses a formally advertised sealed bid process for public works construction contracting. The goal of the process is to award a contract to the lowest cost "responsive" and "responsible" bidder. California Public Contract Code mandates the use of an advertised bid process for construction contracting. Contractors and service providers must meet certain qualification requirements to be considered by the County for selection and contract award.

More detailed information on the County's construction bidding process can be found in the *County of Los Angeles Countywide Construction Policy Guidelines* available online at the following location: http://dpw.lacounty.gov/aed/construction_manual.pdf.

Response to Comment 212-14:

See Response to Comment 212-2. Alternative 3, Configuration D was determined to be the environmentally superior alternative that reduces impacts while still meeting Proposed Project objectives.

Response to Comment 212-15:

See Response to Comment 212-11. A detailed, thorough Sediment Transport Capacity Analysis for the Arroyo Seco Channel, Appendix K in Draft EIR, analyzed the feasibility of sediment transport down the Arroyo Seco. This analysis included consultation with Change Consultants, specifically Howard H. Chang, Ph.D., P.E., of San Diego State University.

Response to Comment 212-16:

See Response to Comment 212-3. As discussed in Section 4.7, Alternative 4, Sluicing will potentially generate more overall greenhouse gas emissions than the Proposed Project and therefore is considered environmentally inferior to the Proposed Project due to overall production of greenhouse gas emissions.

Comment Letter #213

10604 Walnut Drive
Shadow Hills, CA 91040
21 January 2014

Gail Farber, Director
Los Angeles County Department of Public Works
Attn: Water Resources Division – Reservoir Cleanouts
P.O. Box 1460
Alhambra, CA 91802-9974

Re: Comments to the Draft Environmental Impact Report for the Devils Gate Reservoir Sediment Removal and Management Project

Dear Ms. Farber:

Comment 213-1 Thank you for extending the comment period for the Draft Environmental Impact Report (DEIR) for the Devils Gate Reservoir Sediment Removal and Management Project.

Comment 213-2 In preparing my comments to the DEIR, I re-read the comments I'd submitted to the Scoping Meeting, and am saddened that these comments are all still relevant. I am disappointed that the comments that I and others made at that time seem to have been completely disregarded in the very statement of the project objectives. Objectives 5 and 6, in particular, virtually ensure that the sediment be trucked to a landfill, and that other real alternatives cannot be selected. The document is rigged, and any discussion of real alternatives is effectively rendered moot because of how the project objectives have been stated. This is certainly not the intent of CEQA, and renders the document inadequate from the start.

Comment 213-3 What is the scientific basis for determining the amount of sediment to be removed from the basin, and the timeframe in which to do the removal? The basin still has some capacity, and sluicing has been successfully utilized in the past, to discharge in excess of a million cubic yards of sediment from behind Devils Gate Dam. If there is no factual emergency driving quick removal of such a large amount of sediment, why ***not*** employ a method that has worked in the past, and which requires so little effort? Without adequate rationale, it seems foolish to embark on such a costly and destructive project.

Comment 213-4 The DEIR is inadequate in specifying meaningful biological mitigations. Of what use is it to monitor, when the entirety of the habitat is to be razed anyway? It's as though my house were in the way of a freeway project and the mitigation measure is to make sure the bulldozers don't touch my house while I'm in it. That's all well and good, but the minute I step out, the bulldozers obliterate my house, and I'm left with nowhere to go. At the end of the day, of what benefit is that mitigation measure? Additionally, under whose jurisdiction is the biological monitor? If the monitor is employed by the County, does this not create a conflict of interest?

Comment 213-5 The DEIR is inadequate in specifying meaningful recreational mitigations. The existing willow forest is unique habitat for wildlife, and provides unique recreational opportunities for people. An expanse of vegetation that is mowed annually does not provide much in the way of

Comment 213-5 continued

recreational opportunities; redirecting people to use other facilities is not a meaningful mitigation.

Comment 213-6

There are plenty of other inadequacies in the DEIR. The document should be rejected in its entirety, and a new plan be undertaken that takes into account the many comments stakeholders have made in the Scoping Meetings held over two years ago. This new plan should embody more respect for the natural world, and consider that sediment has value. The coarser components can be extracted and used in construction, while the finer sediments can (and really should) be sent downstream to nourish our beaches. Looking at sediment with a new paradigm can have many benefits, and save much money.

Thank you for your attention.

Sincerely,

Roger Klemm

Laura Newlin

c Supervisor Antonovich

Response to Comment Letter #213 (Roger Klemm & Laura Newlin)

Response to Comment 213-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

Response to Comment 213-2:

Per the California Environmental Quality Act (CEQA), Section 15124, the statement of objectives should include the underlying purpose of the project. All of the Proposed Project objectives support the underlying purpose of the project which is: The Proposed Project will remove sediment from Devil's Gate Reservoir to restore the design capacity (volume for two design debris events (DDEs) below the spillway elevation of 1,040.5 feet) and establish a reservoir management system to maintain the flood control capacity of the reservoir. Therefore, the Proposed Project objectives are satisfactory per CEQA.

Pursuant to Section 15126.6(a) of the CEQA Guidelines, "[a]n EIR shall describe a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project, and evaluate the comparative merits of the alternatives." However, "[a]n EIR is not required to consider alternatives which are infeasible" (CEQA Guidelines Section 15126.6(a)) or "which could change the fundamental nature of the proposed project." (*Al Larson Boat Shop, Inc. v. Board of Harbor Comm.* (1993) 18 Cal.App.4th 729, 745.) The alternatives discussed in the EIR must be reasonable alternatives, selected to foster informed decision-making and public participation (CEQA Guidelines 15126.6(a)). An Environmental Impact Report (EIR) need not consider an alternative whose effect cannot reasonably be ascertained or whose implementation is remote and speculative because unrealistic alternatives do not contribute to a useful analysis (CEQA Guidelines 16126.6(f)(3)). Additionally, an alternative may be rejected from detailed analysis in an EIR if it fails to reduce or avoid the project's significant environmental effects, does not implement the basic project objectives, is not potentially feasible, or is facially unreasonable. 14 C.C.R. §15126.6(c); Id., see also *Mann v. Community Redevelopment Agency* (1991) 233 Cal. App. 3d 1143; *Del Mar Terrace Conservancy, Inc. v. City Council* (1991) 10 Cal. App. 4th 712.

Comments and information received during the scoping process (see Appendix A of the Draft EIR) were taken into consideration for the analysis and formulation of alternatives and mitigation. The Draft EIR, Section 4, fully analyzed six alternatives including the No Project Alternative. These alternatives substantially lessen one or more significant effects of the Proposed Project and, with the exception of the mandatory No Project Alternative, would feasibly attain most of the basic objectives of the Proposed Project. These alternatives include options for different amounts of removal, different methods of removal, and a different haul route.

Response to Comment 213-3:

The Los Angeles County Flood Control District (LACFCD) was mandated by the State Legislature to provide flood protection and water conservation within its boundaries.

A reservoir storage design capacity of two design debris events (DDEs) below the dam's lowest spillway was determined to be the standard acceptable level of risk at Devil's Gate Dam and Reservoir. The DDE volume of capacity is determined using the January 2006 Los Angeles County Department of Public

Works (LACDPW) Hydrology Manual and the March 2006 LACDPW Sedimentation Manual. For Devil's Gate Dam and Reservoir, the required reservoir capacity is 4.0 million cubic yards (cy) (two DDEs) below the spillway elevation of 1,040.50 feet.

The Hydrology Manual (January 2006) can be viewed here:

http://dpw.lacounty.gov/wrd/publication/engineering/2006_Hydrology_Manual/2006%20Hydrology%20Manual-Divided.pdf

The Sedimentation Manual (March 2006) can be viewed here:

http://dpw.lacounty.gov/wrd/publication/engineering/2006_sedimentation_manual/Sedimentation%20Manual-Second%20Edition.pdf

Additional information concerning DDE calculation methods has been added to the Final EIR, Section 2.3, Project Need.

LACFCD proposed a project duration of five years to reduce accumulated sediment in a timely fashion. The goal of LACFCD is to restore reservoir flood capacity as soon as feasible while reducing costs, minimizing the duration of environmental and construction impacts to the surrounding communities, and configuring the reservoir to allow for sustainable future maintenance. Extending the project would prolong the flood risk to downstream communities and increase the construction impacts to the surrounding communities.

Historically, large amounts of sediment have been deposited in the reservoir in short time periods. Between 1935 and 1938 over 1.6 million cy of sediment, between 1938 and 1943 over 1.95 million cy of sediment, and between 1959 and 1966 over 1.75 million cy of sediment was deposited and between 2010 and 2012 over 1.3 million cy of sediment was deposited in the reservoir. Over 92 years, the average amount of sediment deposited each year is approximately 130,000 cy; however, Devil's Gate Reservoir is a dynamic system with constantly changing amounts of sediment deposited from year to year, depending on the frequency and intensity of storm events. If a 1 in 50 years storm were to occur, approximately 2.0 million cy (one DDE) of sediment could be expected to wash into the reservoir. Because of the LACFCD's responsibilities to provide flood protection, LACFCD must be ready at all times for a Design Debris Event to occur.

As discussed above, since the dam's construction in 1920 and prior to the Station Fire in 2009, approximately 10.7 million cy of sediment accumulated in the reservoir; and approximately 8.0 million cy was removed by LACFCD; but this removal was not done through sluicing, as suggested by the commenter. A Sediment Transport Capacity Analysis was conducted to determine how sediment would move through the Arroyo Seco and Los Angeles River under a sluicing alternative. Sluicing was analyzed as part of the Draft EIR in the Alternatives Analysis, Section 4.7, Alternative 4 Sluicing Method. The sluicing alternative would potentially have additional significant impacts in comparison to the Proposed Project. Many of these impacts would be associated with the likelihood that large amounts of sediment would not be fully transported through the flood control system; this sediment would need to be mechanically removed and trucked out from numerous downstream locations, potentially including the two soft-bottom portions of the channel. As discussed in Section 4.7 and in the Sediment Transport Capacity Analysis (Appendix K), most of these downstream locations would be in the Arroyo Seco, with deposits primarily occurring in and around the two soft bottom areas. Please see Section 4.7 and Appendix K of the Draft EIR for further analysis.

Response to Comment 213-4:

As discussed in Section 3.6.6 of the Draft EIR, Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats. In addition, sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays). Wildlife species currently found in the Proposed Project area would be expected to either remain in the undisturbed areas of the reservoir outside of the Proposed Project area or to reestablish once sediment removal activities have been completed.

A detailed restoration plan will be prepared and provided to California Department of Fish and Wildlife (CDFW) and United States (U.S.) Army Corps of Engineers (USACE) for review and approval prior to project implementation. Prior to commencement of the Proposed Project, LACFCD will have obtained all necessary permits for impacts to CDFW, USACE, and Regional Water Quality Control Board (RWQCB) jurisdictional areas including Section 401 Certification, Section 404 permit, and a Streambed Alteration Agreement. Clean Water Act Section 404 (b)(1) guidelines will be followed as a framework for compensatory mitigation. Through 404(b)(1) negotiations with USACE and negotiations with CDFW under Fish and Game Code Sections 1600-1616, a determination of the functions and values of impacted jurisdictional waters shall result in the coordination of appropriate mitigation measures for sediment removal.

As discussed in Section 3.6.6 of the Draft EIR, Mitigation Measures MM BIO-1, MM BIO-2, MM BIO-3, MM BIO-4, and MM BIO-5 will serve to protect and avoid impacts to wildlife. The biological monitors will be local biologists with knowledge of the flora and fauna found on site and will be hired as contractors for the Proposed Project. LACFCD has been and will continue to work closely with CDFW and USACE to identify appropriate mitigation and monitoring for the Proposed Project. The monitors will document and report compliance and noncompliance issues with the protection measures outlined in the CDFW/USACE/RWQCB permits and the agency-approved mitigation monitoring plan.

Alternative 3, Configuration D affects the least amount of habitat of all the action alternatives while still achieving Proposed Project objectives (see Section 4.6 of the Final EIR). This alternative would provide a buffer on the west side of the reservoir that would allow for the movement of wildlife. Alternative 3, Configuration D, Option 1 provides a more natural configuration for the reservoir by having two branches to carry water and sediment toward the face of the dam, avoiding disturbing a significant portion of existing vegetation. To further reduce the Proposed Project's footprint, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2, which drastically reduces the project's footprint of 120 acres down to 71 acres, would avoid excavation of the western branch, thereby providing a greater habitat buffer on the west side of the reservoir. In addition, the maintenance areas would be smaller than the original sediment removal footprint, allowing for habitat to reestablish and providing additional areas for wildlife movement.

Response to Comment 213-5:

See Response to Comment 213-4.

Impacts to recreation were analyzed in the Draft EIR, Section 3.15. The Proposed Project will not limit the use of the Oak Grove area of Hahamongna Watershed Park. Sediment removal activities would be temporary and are expected to occur only in the drier months (April to December, excluding holidays). It is expected that these activities will often not be adjacent to the Oak Grove area of Hahamongna

Watershed Park. The Proposed Project would result in temporary limitations on the recreational use of the Proposed Project site and some of the adjacent trails. Most of these areas would be reopened seasonally or intermittently throughout the sediment removal process. In addition, temporary impacts to designated recreational facilities and trails will be minimized through advance communication and redirection to the nearest facility in the vicinity of the Proposed Project. Furthermore, an east-west trail crossing will continue to provide access at the north end of the reservoir. At the south end of the reservoir, after the reservoir ingress and egress ramps have been fully constructed, access to the upper east side Arroyo Seco Trail from La Cañada Verdugo Road will be maintained; and the linkage from the west side Arroyo Seco Trail and the Flint Wash Trail to the upper east side Arroyo Seco Trail (crossing Devil's Gate Dam and also continuing south to the Rose Bowl) will be available after construction activities have ended each day and on nonworking days.

Response to Comment 213-6:

See Response to Comment 213-3.

The sediment that came into Devil's Gate Reservoir following the Station Fire has a very fine gradation or consistency. As such, the majority of this material is not readily reusable on a commercial scale and will most likely not be sold; however, sediment placed at sediment placement sites would be available for potential reuse for other projects or sediment reuse opportunities. The sediment removed from the Devil's Gate Reservoir will be transported to the existing placement sites listed in Section 2.0, Project Description in the Draft EIR.

For further information regarding beneficial uses for sediment at LACFCD sites, please refer to Section 6.5 of LACFCD's 2012 Sediment Management Strategic Plan, which can be found at: http://dpw.lacounty.gov/lacfcd/sediment/stplan.aspx.

Outside experts, especially those on the Stakeholder Task Force, were consulted during the formation of LACFCD's Sediment Management Strategic Plan. Information from that consultation was used in the formulation of the Proposed Project and Alternatives. In addition, the purpose of the scoping process was to gather input from outside experts, cities, and agencies as well as the public on what the environmental analysis should consider and what alternatives should be analyzed. Information gathered from the scoping process was used in the formulation of the Proposed Project and Alternatives and preparation of the Draft EIR.

The Proposed Project will not decrease the current amount of sediment that flows downstream and therefore would not contribute to the erosion of beaches. Also as noted in the Sediment Management Strategic Plan (SMSP), "Without human intervention, most Southern California beaches would naturally be narrow and rocky. The wide beaches in Southern California were created and have been maintained by various agencies through artificial beach nourishment projects (also referred to as beach fill projects) and the construction of protective coastal structures since the 1930s." In addition, the SMSP states "Since the Los Angeles River changed course in 1825, the largest waterway reaching this region of the coast is Ballona Creek, which has an estimated annual sediment yield of less than 50,000 cubic yards and delivers generally fine-grained sediment that is not appropriate for beach nourishment."

For more information see: http://dpw.lacounty.gov/lacfcd/sediment/dcon/429.pdf

Comment Letter #214

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January 22, 2014

Gail Farber, Director
Los Angeles County Department of Public Works
Attn: Water Resources Division – Reservoir Cleanouts
P.O. Box 1460
Alhambra, CA 91802-9974

Re: Devil's Gate Reservoir Sediment Removal and Management Project Draft Environmental Impact Report

Dear Ms. Farber:

Comment 214-1

The Draft Environmental Impact Report is inadequate because it fails to present any genuine alternatives to that of an unnecessarily sudden, drastic, and massive removal of sediment, and fails to adequately evaluate the negative impacts resulting therefrom and consider how those impacts could be mitigated. Those negative impacts include:

1) the destruction of dozens of acres of forest that provide critical habitat for birds and wildlife, without a sufficient mitigation plan;
2) a massive increase in traffic, resulting in a substantial increase in air pollution and noise;
3) a substantial diminution in the value of the area to recreational users, including those like myself who have enjoyed its peaceful, natural beauty.

Comment 214-2

The Draft Environmental Impact Report ("DEIR") is inadequate because it fails to demonstrate why a substantially less sudden, drastic, and massive removal of sediment having substantially less adverse impacts would not be sufficient both to maintain the reservoir and to cause the danger of flooding to be kept to an acceptable level of risk. The alternative plan set forth in the Arroyo Seco Foundation's January 21, 2014, letter to you, would appear to be an example of a less drastic alternative that the DEIR failed to consider. Why was no such less drastic option given serious consideration in the DEIR? Why was the DEIR and its purported alternatives drafted in such a way so as to virtually foreordain an alternative entailing such unnecessary drastic, virtually unmitigated, destruction?

Comment 214-3

Please reject the DEIR in its current form, and cause it to be redrafted to genuinely consider both other alternatives and how to minimize adverse impacts resulting from the project.

Very truly yours,

/s/_____
Ross S. Heckmann

Response to Comment Letter #214 (Ross Heckmann)

Response to Comment 214-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

Pursuant to Section 15126.6(a) of the California Environmental Quality Act (CEQA) Guidelines, "[a]n EIR shall describe a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project, and evaluate the comparative merits of the alternatives." However, "[a]n EIR is not required to consider alternatives which are infeasible" (CEQA Guidelines Section 15126.6(a)) or "which could change the fundamental nature of the proposed project." (*Al Larson Boat Shop, Inc. v. Board of Harbor Comm. (*1993) 18 Cal.App.4th 729, 745.) The alternatives discussed in the Environmental Impact Report (EIR) must be reasonable alternatives, selected to foster informed decision-making and public participation (CEQA Guidelines 15126.6(a)). An EIR need not consider an alternative whose effect cannot reasonably be ascertained or whose implementation is remote and speculative because unrealistic alternatives do not contribute to a useful analysis (CEQA Guidelines 16126.6(f)(3)). Additionally, an alternative may be rejected from detailed analysis in an EIR if it fails to reduce or avoid the project's significant environmental effects, does not implement the basic project objectives, is not potentially feasible, or is facially unreasonable. 14 C.C.R. §15126.6(c); Id., see also *Mann v. Community Redevelopment Agency* (1991) 233 Cal. App. 3d 1143; *Del Mar Terrace Conservancy, Inc. v. City Council* (1991) 10 Cal. App. 4th 712.

The Draft EIR, Section 4, fully analyzed six alternatives including the No Project Alternative. These alternatives substantially lessen one or more significant effects of the Proposed Project and, with the exception of the mandatory No Project Alternative, would feasibly attain most of the basic objectives of the Proposed Project. These alternatives include options for different amounts of removal, different methods of removal, and a different haul route.

As discussed in Section 3.6.6 of the Draft EIR, Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats. In addition, sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays). Wildlife species currently found in the Proposed Project area would be expected to either remain in the undisturbed areas of the reservoir outside of the Proposed Project area or to reestablish once sediment removal activities have been completed.

Mitigation Measures BIO-1 through BIO-8 are enforceable and designed to reduce impacts through methods known to be feasible and effective. The Proposed Project's Mitigation Measures are accepted by agencies that would be involved in consultation, negotiation, and final approval of Mitigation Measures including conceptual restoration plans. As with any project that involves California Department of Fish and Wildlife (CDFW), United States (U.S.) Army Corps of Engineers (USACE), and Regional Water Quality Control Board (RWQCB) jurisdictional areas, the ultimate mitigation for impacts related to the wetlands and drainages under the jurisdiction of the resource agencies is negotiated with the resource agencies during the regulatory permitting process. Los Angeles County Flood Control District (LACFCD) has been and will continue to work closely with CDFW and USACE to identify appropriate mitigation, replacement ratios, and sites for restoration and enhancement that will offset

impacts and satisfy the requirements of all applicable laws. A detailed restoration plan will be prepared and provided to CDFW and USACE for review and approval prior to project implementation. Prior to commencement of the Proposed Project, LACFCD will have obtained all necessary permits for impacts to CDFW, USACE, and RWQCB jurisdictional areas including Section 401 Certification, Section 404 permit, a Streambed Alteration Agreement, and an Incidental Take Permit, if needed. Clean Water Act Section 404 (b)(1) guidelines will be followed as a framework for compensatory mitigation. Through 404(b)(1) negotiations with USACE and negotiations with CDFW under Fish and Game Code Sections 1600-1616, a determination of the functions and values of impacted jurisdictional waters shall result in the coordination of appropriate mitigation measures for sediment removal.

Potential impacts due to the Proposed Project's truck trips were analyzed in the Draft EIR, Section 3.16, Transportation and Traffic. As listed in that section, a single intersection in the immediate vicinity of the Proposed Project site will have a potentially significant impact. In practice, hauling rates and routes may be adjusted to help reduce impacts, depending on operational need. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the Proposed Project site.

Air quality and noise impacts associated with truck traffic were analyzed in the Draft EIR in Sections 3.5 and 3.14, respectively. As discussed in the Draft EIR, Section 3.14, with implementation of Mitigation Measure MM N-1, noise impacts would be reduced to a level of less than significant. LACFCD has conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed the U.S. Environmental Protection Agency's (EPA's) 2007 standards for emissions. Therefore, in order to further reduce emissions, Mitigation Measure MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump trucks that meet or exceed EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality, including those associated with health effects, will be reduced to less than significant.

Impacts to recreation were analyzed in the Draft EIR, Section 3.15. The Proposed Project will not limit the use of the Oak Grove area of Hahamongna Watershed Park. Sediment removal activities would be temporary and are expected to occur only in the drier months (April to December, excluding holidays). It is expected that these activities will often not be adjacent to the Oak Grove area of Hahamongna Watershed Park. The Proposed Project would result in temporary limitations on the recreational use of the Proposed Project site and some of the adjacent trails. Most of these areas would be reopened seasonally or intermittently throughout the sediment removal process. In addition, temporary impacts to designated recreational facilities and trails will be minimized through advance communication and redirection to the nearest facility in the vicinity of the Proposed Project. Furthermore, an east-west trail crossing will continue to provide access at the north end of the reservoir. At the south end of the reservoir, after the reservoir ingress and egress ramps have been fully constructed, access to the upper east side Arroyo Seco Trail from La Cañada Verdugo Road will be maintained; and the linkage from the west side Arroyo Seco Trail and the Flint Wash Trail to the upper east side Arroyo Seco Trail (crossing Devil's Gate Dam and also continuing south to the Rose Bowl) will be available after construction activities have ended each day and on nonworking days.

As noted in the Draft EIR, Section 3.4, Aesthetics and Figures 3.4-1 through 3.4-3, the visual aspects of the Proposed Project site are constantly changing. The Draft EIR does note that the Proposed Project will have significant temporary impacts to aesthetics; however, after the sediment removal phase of the Proposed Project is complete, a habitat restoration plan will be implemented that will allow native plant

communities to reestablish outside the reservoir management area. Riparian Herbaceous vegetation is expected to continue to populate and/or reestablish in the management area of the Proposed Project site between maintenance activities.

The Draft EIR determined that visual impacts associated with reservoir management will be less than significant and, therefore, will not require mitigation. Since impacts are less than significant and do not require mitigation measures, this impact is not included in Table ES-1. Reservoir management impacts to visual character under both of the Proposed Project's management options will result in a lower degree of contrast than seen during sediment removal. Due to the rapid growth of herbaceous plants, it is expected that during the majority of the year the Proposed Project site will appear vegetated. In addition, as with existing conditions, vegetation conditions on the Proposed Project site, including height and density, would change on a regular basis due to seasonal conditions, water flow/views, water storage, and sediment conditions.

Alternative 3, Configuration D affects the least amount of habitat of all the action alternatives while still achieving Proposed Project objectives (see Section 4.6 of the Final EIR). This alternative would provide a buffer on the west side of the reservoir that would allow for the movement of wildlife. Alternative 3, Configuration D, Option 1 provides a more natural configuration for the reservoir by having two branches to carry water and sediment toward the face of the dam, avoiding disturbing a significant portion of existing vegetation. To further reduce the Proposed Project's footprint, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2, which drastically reduces the project's footprint of 120 acres down to 71 acres, would avoid excavation of the western branch, thereby providing a greater habitat buffer on the west side of the reservoir. In addition, the maintenance areas would be smaller than the original sediment removal footprint, allowing for habitat to reestablish and providing additional areas for wildlife movement.

Response to Comment 214-2:

LACFCD was mandated by the State Legislature to provide flood protection and water conservation within its boundaries.

A reservoir storage design capacity of two design debris events (DDEs) below the dam's lowest spillway was determined to be the standard acceptable level of risk at Devil's Gate Dam and Reservoir. The DDE volume of capacity is determined using the January 2006 Los Angeles County Department of Public Works (LACDPW) Hydrology Manual and the March 2006 LACDPW Sedimentation Manual. For Devil's Gate Dam and Reservoir, the required reservoir capacity is 4.0 million cubic yards (cy) (two DDEs) below the spillway elevation of 1,040.50 feet.

The Hydrology Manual (January 2006) can be viewed here:

http://dpw.lacounty.gov/wrd/publication/engineering/2006_Hydrology_Manual/2006%20Hydrology%20Manual-Divided.pdf

The Sedimentation Manual (March 2006) can be viewed here:

http://dpw.lacounty.gov/wrd/publication/engineering/2006_sedimentation_manual/Sedimentation%20Manual-Second%20Edition.pdf

Additional information concerning DDE calculation methods has been added to the Final EIR, Section 2.3, Project Need.

LACFCD proposed a project duration of five years to reduce accumulated sediment in a timely fashion. The goal of LACFCD is to restore reservoir flood capacity as soon as feasible while reducing costs, minimizing the duration of environmental and construction impacts to the surrounding communities, and configuring the reservoir to allow for sustainable future maintenance. Extending the project would prolong the flood risk to downstream communities and increase the construction impacts to the surrounding communities.

LACFCD goes to great lengths to lessen project impacts and maximize efficiencies. As such, many of the points in the Arroyo Seco Foundation's four-point "Slow Program" are compatible with the LACFCD Proposed Project.

For example, the Draft Environmental Impact Report (EIR) selected Alternative 3 as the Environmentally Superior Alternative. Alternative 3 drastically reduces the project's footprint of 120 acres down to 71 acres. Additionally, the limited maintenance area for Alternative 3 further reduces the permanent habitat impacts down to approximately 51 acres by allowing for site replanting and mitigation to take place within the reservoir footprint. This reduction in project acreages will greatly lessen environmental impacts of the Proposed Project.

LACFCD strives to achieve an efficient, low-cost sediment removal project. Sediment removal rates and trucking operations, now utilizing all low-emissions trucks, as explained in Section 3.5 of the Draft EIR, have been carefully planned for economies of scale to realize maximum efficiencies without major delays in project schedule, thus greatly reducing operating costs. Furthermore, LACFCD has applied for and received an approximately $28 million grant through the State's Disaster Preparedness and Flood Protection Bond Act of 2006 (Proposition 1E) program. A portion of this grant will be used to help offset the Proposed Project's costs.

While sluicing is not a viable project alternative, as explained in Section 4.7 of the Draft EIR, Flow Assisted Sediment Transport, or FASTing, will be used for maintenance after the project's main sediment removal phase has been completed, as described in Section 2.5.2 of the Draft EIR.

For a more detailed response to the Arroyo Seco Foundation's four-point "Slow Program", please see the response to the Arroyo Seco Foundation's comment letter (Comment Letter #216, Response to Comment 216-16).

Response to Comment 214-3:

LACFCD notes that the commenter opposes the Draft EIR in its current form.

Los Angeles County Flood Control District
Devil's Gate Reservoir Sediment Removal and Management Project
RE: comments for Devil's Gate Sediment Removal Project
Submitted by email to reservoircleanouts@dpw.lacounty.gov

Comment 215-1

Thank you for the opportunity to comment on this complex project. My wife and I live near to the Devil's Gate Dam and use the area north of the dam for hiking, nature walks, and other outdoor recreation.

Comment 215-2

I General comments: The public suffers the combined adverse effects of this project: air pollution, traffic, noise, loss of natural habitat and recreational area. They can and should be combined in a single loss function to be jointly minimized rather than considering each problem and its mitigation separately.

Comment 215-3

The project is **too large**; it grew from to a planned removal of 1.5 million cubic yards (in 2011) to a much larger project where the largest of the 4 alternatives (alternative 2) would remove 4 million cubic yards of sediment, and would impose much greater hardship on those living near to the 210 freeway.

Comment 215-4

This is a warm weather project- sediment removal and extensive truck traffic would be limited or absent from October to April- the project would be most active during the time that children and adults spend more time outdoors and during the ozone season, when ozone pollution is maximal. Particulate pollution doesn't have a single seasonal maximum, but is generally greatest in summer and fall.

Comment 215-5

We can't rely exclusively on theoretical calculations of predicted air pollution because a. we have no data about near roadway pollutant concentrations and b. Excessive levels of some pollutants are more harmful than others. Particulates are more injurious than ozone pollution; the smallest particulates are the most injurious. We must collect real time near roadway air pollution data in the first project year and scale the project back if there is a greater than 10% increase in any of the major air pollutants.

Comment 215-6

Alternative 3, Configuration D is the best plan; it should be stretched out to 7 years with no trucks loading and leaving the reservoir before 9 AM to reduce stress on nearby La Canada High School and Hillside school. This would decrease the number of trucks on the road each day and thereby reduce air pollution, health, noise and traffic impacts. Stretching out the project to ten years or more, as suggested by some environmental groups, is not a good idea because it would increase the environmental harm and loss of recreation caused by the project.

Comment 215-7

II Background air pollution
The Pasadena area already has excessive air pollution using state and national guidelines. Table 2 of Appendix B, found on page 17, shows that Federal and State air quality standards are exceeded for many pollutants; ozone concentrations are characterized as extreme nonattainment, and fine particulate pollution (PM 2.5) as serious nonattainment. I attach a copy of an EPA air quality map on page 4 showing that the Los Angeles basin and the San Joaquin Valley are the only areas in EPA region 9 not in compliance with EPA air quality standards for fine particulates (PM 2.5) . The data from Table 3.5-2 shows that fine particulates, the most dangerous air pollutants have not improved significantly since 2006. They increased in the boom

Comment 215-7 continued

years of 2007 & 2008 and then decreased, but 2011 was very similar to the 2006 value and we can predict an increase in 2012 and 2013. A test of slope (Mann trend statistic) shows that it isn't significantly different from zero, i.e. no significant overall change in fine particulates measured in Pasadena, far from the 210 freeway.

Comment 215-8

It is ridiculous to state as the DEIR does that health impacts will be less than significant. Air pollution is currently believed to be a major factor in 10% of Los Angeles County deaths every year. The project, even the reduced and stretched out alternative 3, configuration D which I favor, will increase air pollution with maximal impact on people living close to reservoir and the 210 freeway. This fact that more air pollution in our already seriously polluted region will increase the number of deaths and hospitalizations is discussed under section III below.

Comment 215-9

The presentation in section 3.5 of the DEIR is an optimistic best-case scenario:

a. Each pollutant is considered separately ignoring interactions between pollutants (see Greenbaum & Shaikh, 2010, Hart, et al, 2011) and their cumulative sum. This is a serious deficiency, see note 1.

Comment 215-10

b. While Table 3.5.8 on p 130 appears reassuring because it shows that none of the estimated emissions of ROG, CO, NOx, PM10 & PM 2.5 exceed threshold even without mitigation, we must remember that:
1. Project air pollution will be added to existing air pollution that is already severe and significantly exceeds state and federal guidelines.
2. There is evidence that chronic exposure to particulate levels below the national and California standards is associated with increased all-cause mortality (Beelen, et al, 2013). Hence the fact that the standard is not exceeded in the DEIR theoretical model does not mean that the project will have no effect on health and mortality.
3. The table does not consider loading site idling by trucks (see note 2), the fact that basal emissions already exceed threshold, and that it relies on computer estimates rather than field data. We can only estimate pollution before the project begins, but there must be collection of real air quality data after the project begins, particularly for residential sites very close to the highway and idling trucks. Data available from the AQMD, http://www.aqmd.gov/tao/AQ-Reports/AQMonitoringNetworkPlan/Special-Monitoring-Studies.pdf, suggest that some pollutants fall off rapidly with distance from the freeway; we don't have adequate information on ultrafine particulates and black carbon (an indicator of diesel particulate pollution). Recognition that existing AQMD sites are far from highways and may minimize health risks has stimulated plans for new AQMD monitoring sites near to freeways.
We've known for more than 10 years that the smallest or ultrafine particulates are especially damaging. They have greater ability to enter cells, some enter the brain, and produce relatively more oxidative stress than larger particles do. Much of this work came from the UCLA particle center and involved data from the Los Angeles Basin (Li, et al, 2003) but the AQMD still does not measure ultrafine particles (less than 0.15 μm) at any site and the DEIR presents lengthy and misleading calculations in Appendix C. They are misleading because they focus on cancer risk, which is only a small part of the health impact of air pollution and because they are limited to calculations based on PM 10 particulates, which are less harmful than the smaller

Comment 215-10 continued

particulates and are extrapolated from air quality at the Burbank monitoring station, far from Hahamongna and the 210 freeway.

c. This section assumes that there are no major changes in traffic on the 210 Freeway. California and the country are emerging from a severe recession with more cars and trucks on the road each year; the baseline is artificially low, see part V. Approved projects that will increase this traffic separate from the Devil's Gate project include the Parsons-Lincoln Property project. The biggest project is the 710 freeway extension project, which is only a possible project, but a very large one.

Comment 215-11

III Health impacts We are told that there will be no significant health impacts from this project, because the calculated pollutant production does not exceed SCAQMD standards. Fann, et al, of the EPA, studied air pollution due to ozone and PM 2.5 particulates, using 2005 data. They estimated that "Among the 10 most populous counties, the percentage of ***deaths attributable to PM 2.5 and ozone ranges from 3.5% in San Jose to 10% in Los Angeles County".*** These are premature deaths in persons with other health problems, somewhat like deaths from influenza. These premature deaths are a partial estimate of 'sensitive receptors' in CEQA terms. PM 2.5 particulates, which have improved very little in the Pasadena area, cause the great majority of these deaths. Ozone pollution, which has done better, causes some deaths but less than 1/50 as much as PM 2.5 particulates. A more recent paper from MIT, (Caiazzo, et al, Atmospheric Environment 79:2013) estimates an **even larger number of US premature deaths (200,000) due to air pollution** (mostly particulate emissions) and makes the interesting claim that the air quality impact of highways in terms of premature deaths may exceed the number of fatal accidents by about 30%. One might argue that hastening the death of children and elderly with chronic illness is less significant than causing the death of relatively healthy young males (most auto fatalities involve relatively healthy young males) but the point is that air pollution and particularly fine particulates have large health effects.

Comment 215-12

Los Angeles County had 57, 620 deaths in 2009. We could say that 10% of deaths would be 5-6,000 annual deaths in Los Angeles County. Pollution produced by this project will increase the number of premature deaths in persons living near to the 210 Freeway. However, it's impossible to predict just how many more premature deaths will result. This is because the relationship between health and pollutant exposure is probably nonlinear; furthermore we have no data about particulate emissions near the 210 freeway. What is certain (see Beelen paper) is that the project will increase air pollution and decrease health even if the amount of added pollution doesn't exceed SCAQMD standards (as in Table 3.5-4, Regional thresholds of significance, p 81). The public may be willing to accept this because failure to remove a significant amount of sediment may be more dangerous than even the reduced and stretched out sediment removal project that I favor. The County should be honest about this.

IV Project impact on recreation is discussed on pages 209-226 of the DEIR. The DEIR notes activities that I and other users of the project area engage in: hiking, biking, horseback riding, and bird-watching/nature activities. Table 3.15-1 lists 27 area recreational facilities but most are irrelevant for Hahamongna area activities. For example, the Annandale Golf Course, Brookside Golf Course, Chevy Chase Golf Course, la Canada- Flintridge Country Club and the Scholl Canyon golf course are irrelevant because *nobody plays golf in the Upper Arroyo*, and 3 of the 5 golf

Comment 215-13

courses are private clubs open to members only. The Rose Bowl Aquatic Center is a fine place but *we don't swim in the upper Arroyo either* so it is irrelevant. The Rose Bowl stadium is a place to watch athletic events, it is not a venue for any of the active recreational activities mentioned. Urban parks like Pasadena Central and Memorial Parks and the Eagle Rock recreation center are poor substitutes for loss of the upper Arroyo. Villa Parke, listed in the table, is an indoor facility.

Comment 215-13 continued

Some trails will remain open during the project but the sediment removal activities will disturb the natural ambience and mark them less valuable during the time that the project continues. Substitute facilities such as the Angeles Crest National Forest will be more costly (I can't walk to there). This loss of recreation is a significant harm to frequent Hahamongna visitors. Loss of this recreational resource for ten years is unreasonable and unacceptable.

V Traffic problems will increase. Unfortunately the conventional Level of Service (LOS) methodology used in this DEIR confuses more than it helps, as does the meaningless list of alternative recreational facilities in Table 3.15-1. LOS estimates are technology from the 1950s. The tomtom index shows that traffic in the Los Angeles metropolitan area was the worst of any North American metropolitan area and increased 2% in the most recent report (2nd quarter, 2013). Drivers in the Los Angeles basin lost an average of 92 hours per year (assuming a 30 minute commute) compared to 87 hours in San Francisco and 81 hours in Houston. We are told (pages 34-36 of the DEIR) that LOS for certain intersections, such as the Berkshire Place and I-210 Eastbound Ramps intersection, will be worse during the project. This is expected, what is surprising is the small number of intersections predicted to have a significantly worse LOS. We need to estimate the severity of traffic impacts including average changes in freeway speeds at selected points along the 210 freeway and predicted increases in travel time, for example in driving from selected points in Pasadena to points in Arcadia, Duarte, La Canada-Flintridge, Monrovia and vice versa at different times of day.

Comment 215-14

Summary: Sediment removal is necessary; alternative 3, configuration D with a longer performance period of seven years and no truck loading before 9 AM offers the best balance of harmful impacts. The project will inevitably have some negative health effects. Pollution data should be gathered from the Berkshire Place and I-210 Eastbound Ramps intersection, within 100 yards of the I-210 between SR 134 and Lake Avenue and within 100 yards of the I-210 between Irwindale Avenue and Azusa Avenue. If any of these stations reveal an average increase during the months of truck traffic of more than 10% in ozone, NOx, CO, SOx, PM 10 or PM 2.5 adjustments must be made in truck traffic, idling, etc until these values fall below a 10% increase compared to the average value for a two month run-in period before the project begins (we can't compare near roadway measurements to measurements in Burbank which is too far from the action). I have not included monitoring of ultrafine particulates which is necessary for comprehensive analysis of air pollution only because they are not currently measured by the AQMD.

Comment 215-15

Note 1 Noise from traffic or aircraft is known to aggravate harmful effects of pollution, see Beelen and Babisch references.

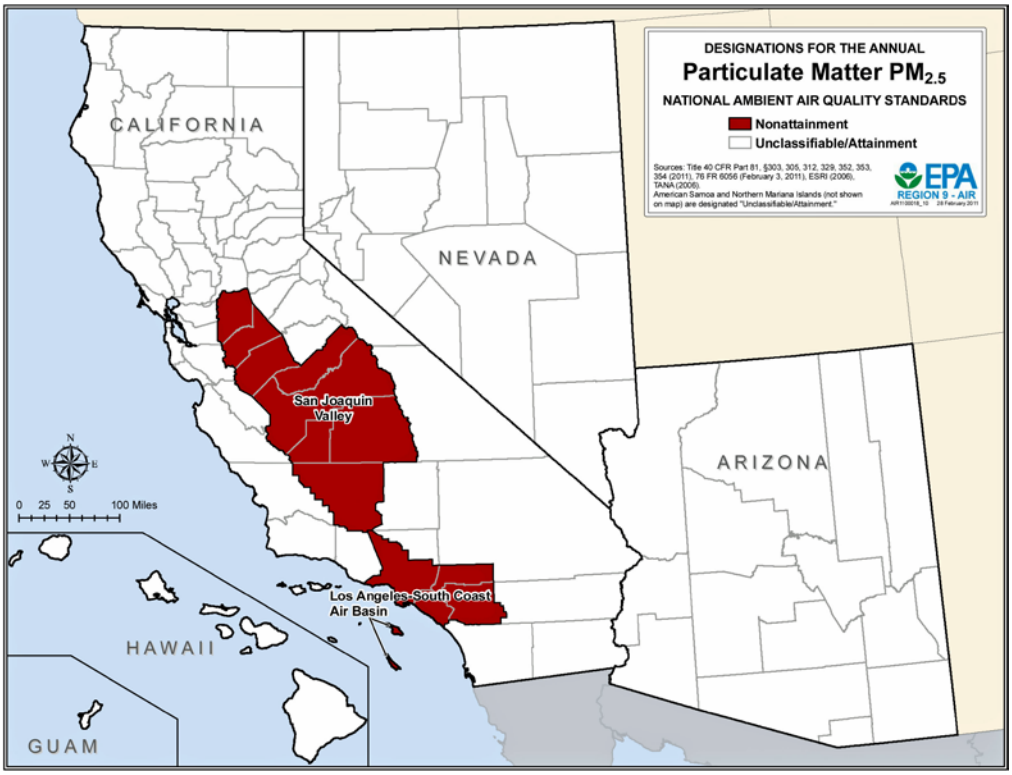
Comment 215-16

Note 2 Idling trucks must be considered because these double dump trucks will be unloaded much more rapidly than they can be filled; idling produces significant emissions that are not included in the DEIR calculations. These extra

Comment 215-17

Comment 215-17 continued

emissions will affect those nearest to the Hahamongna site. That's why we need real pollution measurements in addition to predictions of pollutants.



This figure is copied from http://www.epa.gov/region9/air/maps/index.html. 2012.

References

Babisch, W. Cardiovascular effects of noise. Noise & Health 2011; 13: 201-204.

Beelen, R, et al, Effects of long-term exposure to air pollution on natural-cause mortality: an analysis of 22 European cohorts within the multicentre ESCAPE project. Lancet. 2013 Dec 6. pii: S0140-6736(13)62158-3. doi: 10.1016/S0140-6736(13)62158-3. [Epub ahead of print]

Caiazzo, F, et al, Air pollution and early deaths in the United States. Part I: Quantifying the impact of major sectors in 2005. Atmospheric Environment 79: 198, 2013

California Air Resources Board, "Area Designations Maps/State and National," http://www.arb.ca.gov/desig/adm/adm.htm. 2012.

Greenbaum, D & Shaikh, R. First Steps Toward Multipollutant Science for Air Quality Decisions. Epidemiology. 2010; 21:195-7

Fann, N, et al, Estimating the national public health burden associated with exposure to ambient PM 2.5 and ozone. Risk Anal. 2012; 32:81-95.

Fine, P. AQMD Near Roadway Monitoring Studies, http://www.aqmd.gov/tao/AQ-Reports/AQMonitoringNetworkPlan/Special-Monitoring-Studies.pdf

Hart, JE, et al, Long-Term Ambient Multipollutant Exposures and Mortality. Am J Respir Crit Care Med. 2011; 183:73-8.

Li, N, et al. Ultrafine particulate pollutants induce oxidative stress and mitochondrial damage. Environ Health Perspect 2003; 111:455-460.

Los Angeles County Public Health department, Health impacts of Air Pollution in Los Angeles County, January 31, 2007, available at *publichealth.la**county**.gov/plan/docs/Smart%20*.

References continued
http://www.tomtom.com/lib/doc/trafficindex/2013-1101%20TomTomTrafficIndex2013Q2AME-mi.pdf
US Environmental Protection Agency, "Air Quality Maps," http://www.epa.gov/region9/air/maps/index.html. 2012.

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Response to Comment Letter #215 (S Robert Snodgrass)

Response to Comment 215-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

Response to Comment 215-2:

Per the California Environmental Quality Act (CEQA), the impact areas are each analyzed individually; however, Los Angeles County Flood Control District (LACFCD) considers the cumulative effects of other projects that may be occurring at the same time. Impacts are not jointly analyzed, as significance thresholds are set for each of the impact areas, not through a "single loss function."

Response to Comment 215-3:

LACFCD was mandated by the State Legislature to provide flood protection and water conservation within its boundaries.

A reservoir storage design capacity of two design debris events (DDEs) below the dam's lowest spillway was determined to be the standard acceptable level of risk at Devil's Gate Dam and Reservoir. The DDE volume of capacity is determined using the January 2006 Los Angeles County Department of Public Works (LACDPW) Hydrology Manual and the March 2006 LACDPW Sedimentation Manual. For Devil's Gate Dam and Reservoir, the required reservoir capacity is 4.0 million cubic yards (cy) (two DDEs) below the spillway elevation of 1,040.50 feet.

The Hydrology Manual (January 2006) can be viewed here:

http://dpw.lacounty.gov/wrd/publication/engineering/2006_Hydrology_Manual/2006%20Hydrology%20Manual-Divided.pdf

The Sedimentation Manual (March 2006) can be viewed here:

http://dpw.lacounty.gov/wrd/publication/engineering/2006_sedimentation_manual/Sedimentation%20Manual-Second%20Edition.pdf

Additional information concerning DDE calculation methods has been added to the Final Environmental Impact Report (EIR), Section 2.3, Project Need.

In 2010, in response to the Station Fire, an emergency project to remove only 1.67 million cubic yards (cy) was proposed. The volume of 1.67 million cy is the previously published DDE, and this amount was considered justifiable as an emergency exemption to CEQA. This emergency project was not completed because, in March 2011, the County of Los Angeles Board of Supervisors motioned LACFCD to complete an EIR for a comprehensive sediment removal project at Devil's Gate. LACFCD then initiated project development in accordance with the required level of protection of two DDEs. At that time, LACFCD also began receiving feedback on the concurrent Sediment Management Strategic Plan (Strategic Plan) and the interest to look at more sustainable sediment and reservoir management. As a result of the feedback and recommendations during the development of the Strategic Plan, LACFCD began evaluating ways to create a more sustainable long-term way to manage its sediment and habitat. To emphasize the

goals of the project, the Proposed Project was given the name Devil's Gate Sediment Removal and Management Project.

Response to Comment 215-4:

The nature of the project requires the work to be accomplished during dry months.

Air quality impacts associated with truck traffic were analyzed in the Draft EIR in Section 3.5. LACFCD has conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed the United States (U.S.) Environmental Protection Agency's (EPA's) 2007 standards for emissions. Therefore, in order to further reduce emissions, Mitigation Measure MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump trucks that meet or exceed EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality, including those associated with health effects, will be reduced to less than significant.

Response to Comment 215-5:

Emissions were calculated using methodologies and formulas from various agencies including the California Air Resources Board (CARB), EPA, and the Southern California Air Quality Management District (SCAQMD). Modeled emissions were compared with applicable SCAQMD thresholds to determine significance. These calculations are the accepted methodology for comparison to significance thresholds, and there is no nexus showing cause to require this project to provide different analyses.

Response to Comment 215-6:

Potential impacts due to the Proposed Project's truck trips were analyzed in the Draft EIR, Section 3.16, Transportation and Traffic. As listed in that section, a single intersection in the immediate vicinity of the Proposed Project site will have a potentially significant impact. The Draft EIR outlines a 12-hour trucking schedule, with trucking operations on Saturdays as well. This schedule is used to model the most intensive construction operation, which may not be applicable at the site for the duration of the Proposed Project. Typical trucking schedules are estimated to be 8 hours per day on weekdays. In practice, hauling rates and routes may be adjusted to help reduce impacts depending on operational need. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the Proposed Project site.

LACFCD proposed a project duration of five years to reduce accumulated sediment in a timely fashion. The goal of LACFCD is to restore reservoir flood capacity as soon as feasible while reducing costs, minimizing the duration of environmental and construction impacts to the surrounding communities, and configuring the reservoir to allow for sustainable future maintenance. Extending the project would prolong the flood risk to downstream communities and increase the construction impacts to the surrounding communities.

Response to Comment 215-7:

The commenter is correct that Pasadena already shows standards being exceeded for many pollutants and that the region is extreme nonattainment for ozone and serious nonattainment for particulate matter smaller than 2.5 micrometers ($PM_{2.5}$). However, the EPA air quality map shows only areas (South Coast and San Joaquin Valley) designated nonattainment with the 1997 $PM_{2.5}$ standard. For the 2006

$PM_{2.5}$ standard, these two areas are joined by Sacramento, Yuba City-Marysville, San Francisco Bay Area, and a portion of Imperial County with a nonattainment designation. In addition, the commenter attempts to describe a trend for $PM_{2.5}$ using the monitoring data presented in the air quality document. Trend analyses with only six years of data are sometimes misleading. Trend analysis graph for all the years $PM_{2.5}$ has been monitored in Pasadena (1999 to 2013) shows a definite downward trend in degree of exceedances.

Response to Comment 215-8:

See Response to Comment 215-4. As discussed in the Draft EIR, Section 3.5, the Health Risk Assessment (HRA) analyzed both the cancer-related and noncancer-related acute (short-term) and chronic (long-term) impacts from project-related emissions. The HRA analysis found the Proposed Project would result in less than significant impacts for both the cancer-related and noncancer-related acute short-term and long-term impacts.

Response to Comment 215-9:

While the commenter is accurate that current work is being done regarding the possibility of a multipollutant approach to air quality regulations, this approach is still in the early stages of efforts. In fact, EPA has a current research project dealing with the subject. A grant titled "Optimization of Multipollutant Air Quality Management Strategies" is currently underway by Texas A&M University with results due in May 2015. Since results of this study are not completed and, therefore, do not affect current official regulations or strategies, this Draft EIR would be remiss in using any undeveloped multipollutant approach.

Response to Comment 215-10:

See Response to Comments 215-4 and 215-8. Air quality impacts on the neighboring community were adequately analyzed in the Draft EIR, Section 3.5, Air Quality.

Impacts from trucks idling on the haul routes were included in the analysis. Significant queuing and idling times will not occur during the project. During the sediment removal phase, excavators will be loading sediment into trucks for offsite disposal. All of the trucks will be loaded within the reservoir; and, if a queue of trucks develops, the trucks will stage within the reservoir itself to lessen impacts on the adjacent streets. It is estimated that trucks will briefly idle during loading, but the average loading time per truck is estimated to be one minute. In addition, LACFCD typically requires equipment to shut down if idling time is expected to be more than five minutes. Estimated project idling times were included in the air quality analysis and health risk assessment for the Draft EIR, Section 3.5, and Appendices B and C.

The project-related contribution to local air concentrations of criteria pollutants from on-road and off-road vehicle emissions as well as fugitive dust emissions have been analyzed in the Draft EIR under Section 3.5.6, AIR QUALITY-4 and Impact 4 in the Air Quality Report (Appendix B), which found that the local criteria pollutant concentrations from both the onsite sediment removal activities and onsite maintenance activities would be below the South Coast Air Quality Management District's (SCAQMD's) threshold of significance for carbon monoxide (CO), nitrous oxides (NO_x), and particulate matter (PM_{10} and $PM_{2.5}$).

Response to Comment 215-11:

The Draft EIR does take into account cumulative increase in area traffic. The analysis of air quality impacts associated with truck traffic based traffic flow and distribution on information from the Traffic Report (Appendix J) prepared for the Proposed Project. The Traffic Report took into account future projects as well as a cumulative growth factor. The Interstate 710 (I-710) project was not included in the Draft EIR as a cumulative project, as it was determined to be outside the area of influence. A cumulative growth factor was used in the Traffic Study that accounted for future traffic growth and its cumulative effects. The Devil's Gate Reservoir Sediment Removal and Management Project sediment removal phase is scheduled to be completed by 2020, prior to the initiation of the I-710 tunnel project. At this time the I-710 Extension/Tunnel project is in the preliminary phases, and a project schedule has not been established (Caltrans 2010). The growth factor considered in the analysis provided a conservative project condition volume that accounts for expansion and regional growth.

Response to Comment 215-12:

See Response to Comment 215-10. The SCAQMD air emissions thresholds have been developed by the SCAQMD in order to reduce the criteria pollutant concentration in the Basin to within the state and national standards for each pollutant. The EPA is constantly refining the national standards based on new research such as the referenced studies; and on December 4, 2012, the EPA revised primary annual $PM_{2.5}$ National Ambient Air Quality Standard (NAAQS) from 15 µg/m^3 to 12 µg/m^3. It should be noted that even if the change in the NAAQS results in a reduced SCAQMD standard, the Proposed Project is well below the current regional and local standards for $PM_{2.5}$.

Furthermore, the Draft EIR analyzed the potential health risks associated with PM_{10} emissions from diesel exhaust in the HRA provided in the Draft EIR, Section 3.5. The PM_{10} diesel truck emissions from the Proposed Project were found to be well below the cancer and noncancer risk thresholds developed by the SCAQMD, and the potential health impacts are well documented in the Draft EIR.

Response to Comment 215-13:

Table 3.15-1 provides a list of existing recreational resources in the area in order to provide an outline of existing conditions in the vicinity of the Proposed Project site. Although some of the activities noted in the table do not occur at the Proposed Project site, it is important to note all the existing recreational opportunities available for the area.

Impacts to recreation were analyzed in the Draft EIR, Section 3.15. The Proposed Project will not limit the use of the Oak Grove area of Hahamongna Watershed Park. Sediment removal activities would be temporary and are expected to occur only in the drier months (April to December, excluding holidays). It is expected that these activities will often not be adjacent to the Oak Grove area of Hahamongna Watershed Park. The Proposed Project would result in temporary limitations on the recreational use of the Proposed Project site and some of the adjacent trails. Most of these areas would be reopened seasonally or intermittently throughout the sediment removal process. In addition, temporary impacts to designated recreational facilities and trails will be minimized through advance communication and redirection to the nearest facility in the vicinity of the Proposed Project. Furthermore, an east-west trail crossing will continue to provide access at the north end of the reservoir. At the south end of the reservoir, after the reservoir ingress and egress ramps have been fully constructed, access to the upper east side Arroyo Seco Trail from La Cañada Verdugo Road will be maintained; and the linkage from the west side Arroyo Seco Trail and the Flint Wash Trail to the upper east side Arroyo Seco Trail (crossing

Devil's Gate Dam and also continuing south to the Rose Bowl) will be available after construction activities have ended each day and on nonworking days. Therefore, the maximum impacts to the adjacent recreational facilities would be much shorter than the five-year duration of the sediment removal phase of the Proposed Project.

Alternative 3, Configuration D affects the least amount of reservoir area of all the action alternatives, while still achieving Proposed Project objectives (see Section 4.6 of the Final EIR). This alternative would provide a buffer between the Oak Grove area of Hahamongna Watershed Park and the excavation area. Alternative 3, Configuration D, Option 1 provides a more natural configuration for the reservoir by having two branches to carry water and sediment toward the face of the dam, avoiding disturbing a significant portion of existing vegetation. To further reduce the Proposed Project's footprint, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2, which drastically reduces the project's footprint of 120 acres down to 71 acres, would avoid excavation of the western branch, thereby providing a greater habitat buffer on the west side of the reservoir. In addition, the maintenance areas would be smaller than the original sediment removal footprint, allowing for habitat to reestablish.

Response to Comment 215-14:

The Traffic Report for the Proposed Project followed the Los Angeles County Congestion Management Program (CMP) Guidelines, California Department of Transportation's (Caltrans') Guide for the Preparation of Traffic Impact Studies, the Highway Capacity Manual (HCM), and Intersection Capacity Utilization (ICU) methods. Each methodology is a governing guideline in preparing a traffic impact analysis set forth by each jurisdiction within the project area as applicable to the intersections, on- and off-ramps, and freeway facilities. These methodologies are continually updated and improved upon based on the dynamic nature of traffic. The Traffic Impact Analysis considered the freeway segments that would be impacted by the proposed haul routes. Since trucks would remain on the freeway through the referenced cities, including East Pasadena, Arcadia, and Monrovia, no intersections would be impacted in those areas. While the majority of the sediment disposal and associated truck traffic is expected to go to the disposal sites east of the Proposed Project, the Draft EIR also analyzed the use of disposal sites west of the Proposed Project. This will allow for flexibility in case one particular route is temporarily unusable.

Response to Comment 215-15:

LACFCD notes that the commenter prefers the Alternative 3, Configuration D with an extended removal period of seven years and no truck loading before 9 a.m. As noted in the Draft EIR, the Proposed Project as well as Alternative 3 would have less than significant impacts on health. See Response to Comments 215-4 and 215-6, above. As noted above, theoretical calculations are the accepted methodology for comparison to significance thresholds, and there is no nexus showing cause to require this project to provide different analyses. Therefore, onsite monitoring of emissions during project activities is not required.

Response to Comment 215-16:

As noted in the Draft EIR, impacts from noise were determined to be less than significant based on the established thresholds.

Response to Comment 215-17:

See Response to Comments 215-7, 215-9, 215-10, 215-11, and 215-12. Figure and references noted.

ARROYO SECO FOUNDATION

Comment Letter #216

January 21, 2014

Gail Farber, Director
County of Los Angeles
Department of Public Works
Water Resources Division
Attn: Reservoir Cleanouts Program
P.O. Box 1460
Alhambra, CA 91802-1460

Re: Devil's Gate Reservoir Sediment Removal and Management Project

Dear Ms. Farber:

Comment 216-1 We at the Arroyo Seco Foundation (ASF) have reviewed the Draft Environmental Impact Report (DEIR) for the Devil's Gate Dam Sediment Removal and Management Project and find it inadequate for numerous reasons:

Comment 216-2
- The DEIR fails to provide genuine alternatives to the project;

Comment 216-3
- The DEIR fails to consider steps that could be taken to mitigate the negative impacts of the project;

Comment 216-4
- The DEIR is not responsive to numerous scoping comments offered by ASF and other stakeholders;

Comment 216-5
- The DEIR fails to incorporate an integrated approach to the management of the Devil's Gate Basin, but focuses narrowly on a massive sediment trucking operation;

Comment 216-6
- The DEIR fails to consider and protect the rare environmental values found in the Hahamongna basin;

Comment 216-7
- The DEIR fails to identify and quantify the downstream flood threat as well as steps that could be taken to reduce that threat;

Comment 216-8
- The project, as outlined in the DEIR, does not take into account the fact that the project site rests squarely in the middle of Hahamongna Watershed Park and that it would abuse the property rights of the City of Pasadena and overburden Los Angeles County Flood Control District's (LACFCD) easement;

Comment 216-9
- The DEIR fails to appropriately measure the impacts on hydrology, water quality, and recreation; the subsequent dismissal of these impacts as less than significant is gratuitous;

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Comment 216-10
- The DEIR fails to provide a plan to mitigate the impacts on noise, land use and planning to levels of less than significant;

Comment 216-11
- The DEIR fails to present a biological mitigation program for the project and offers a completely inadequate 1:1 standard for the replacement or enhancement of invaluable riparian and alluvial canyon habitat.

Comment 216-12
The Arroyo Seco Foundation has worked with the LACFCD for more than twenty years to encourage an integrated watershed-based approach to the management of Devil's Gate Dam and the Arroyo Seco River. As vice-president of the Devil's Gate Multi-Use Project Joint Powers Authority and the Executive Director of Pasadena's Hahamongna Operating Company, ASF's Managing Director Tim Brick played an important role in the rehabilitation of Devil's Gate Dam in 1996-95 as well as in shaping Pasadena's Arroyo Seco Master Plan and the Arroyo Seco Watershed Restoration Feasibility Study, which emphasized the importance of an ongoing sediment management program for the Devil's Gate/Hahamongna Basin. More recently Mr. Brick served on the County of Los Angeles' task force to develop the Sediment Management Strategic Plan for the Los Angeles County Flood Control District.

Comment 216-13
ASF is very concerned that the program outlined in the Devil's Gate Dam Sediment Removal and Management Project (project) DEIR fails to incorporate the important principles of watershed management and integrated water resources planning that have been the focus of these previous efforts extending over more than twenty years.

Comment 216-14
The most fundamental failure of the DEIR is the omission of a detailed evaluation of the potential flood threat that may be a direct result of the accumulation of sediment behind Devil's Gate Reservoir (reservoir) and of a clearly defined plan to reduce that threat. The project description lacks the detail necessary to sufficiently evaluate the impacts of the project, and thus, severely hinders our ability and that of concerned agencies, organizations and citizens to make meaningful comments on the document.

Comment 216-15
This project will have extraordinarily negative environmental impacts on the habitat in the Hahamongna basin behind the dam, the neighborhoods surrounding the reservoir and around the freeways along the route, the Arroyo Seco downstream of the dam and the Los Angeles River, air quality throughout the region, the safety of surrounding schools and the financial resources of taxpayers in Los Angeles County and throughout California. While this project may temporarily increase the storage capacity of the reservoir, it will not solve the sediment problem and does not represent even an attempt to sustainably manage the natural resources of the region in an integrated fashion.

Comment 216-16
There is a sensible, sustainable way to manage sediment in Devil's Gate Reservoir, which the Arroyo Seco Foundation has developed with stakeholders and the communities affected. We call it the Slow Program. This solution would maintain flood protection for downstream communities, reduce negative impacts on the surrounding neighborhoods, and take advantage of the Arroyo Seco's natural ability to transport sediment. It would also protect the rich habitat and

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recreational opportunities in Hahamongna Watershed Park. This plan involves four key elements: timing, transfer method, the permanent footprint and the neighborhood impacts of sediment removal:

Go Slow. LACFCD has not provided any direct evidence of an immediate flood threat to the Arroyo Seco downstream of the dam. The Sediment Management Strategic Plan, issued by the LACFCD in 2012, reveals that the dam has stored greater amounts of sediment in the past and currently still has about 47% capacity. With very low probability of a sediment flow similar to the two years after the Station Fire, there is no need to remove 4 MCY in five years. A 20-year project will minimize the negative environmental impacts. Instead of removing as much as a million cubic yards each year, LACFCD should remove 160,000 cubic yards. After a suitable storage capacity is restored, sediment removal should be an ongoing maintenance task based on the amount that flows into the basin annually.

Comment 216-16 continued

Go With the Flow. LACFCD should use natural stream flows through the dam to remove sediment from the reservoir to the greatest extent possible. Large quantities of sediment have been removed in the past using this method. Using hydrology and hydraulics will very substantially reduce the need for heavy, noisy, air-polluting diesel trucks on our already overcrowded streets and freeways.

Let the Habitat Grow. LACFCD proposes to leave a permanently denuded maintenance area of up to 120 acres after their removal program, but the alluvial Hahamongna basin is now home to some of the richest riparian and woodland habitat in Los Angeles County. The Slow Program will not necessitate this permanent scar, creating only small areas of temporary biological disturbance.

Keep Costs and Neighborhood Impacts Low. The Slow Program can reduce the cataclysmic impacts of the project, which will be hard on everyone in this region but especially on residents of Pasadena, Altadena and La Cañada Flintridge. The Slow Program will reduce harmful air pollution levels, noise, dust and traffic impacts that the DEIR describes as unmitigable.

Comment 216-17

There is no dispute that something needs to be done to restore storage capacity at Devil's Gate Dam, but the solution needs to be ongoing and sustainable, while reducing neighborhood impacts. The purpose should be clearly defined as flood protection in the context of a comprehensive watershed management and restoration program. The sediment in Devil's Gate Dam should be evaluated as a component and product of LACFCD's flood protection program including the ten miles of concrete flood channel downstream of the dam.

Comment 216-18

We urge the Los Angeles County Flood Control District to go back to the drawing boards and work with the Arroyo Seco Foundation, the cities of the watershed and other stakeholders to develop a true alternative to be evaluated as part of the Final EIR. This alternative should be

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Comment 216-18 continued

designed in a way that integrates water resources, water quality, habitat conservation and restoration, and recreation with the flood protection goals. Such a program, we believe, would be far superior to the one-dimensional sediment-trucking program contained in the current DEIR.

Comment 216-19

The Devil's Gate project should be the first of a new generation of sustainable flood management for Southern California. The Slow Program will ensure that it is.

Sincerely yours,

Tim Brick

Tim Brick
Managing Director

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	ID	Topic	Page	Comment
Comment 216-20	1	Introduction - Flood protection	ES-1	What is the "intended level of flood protection"? The DEIR fails to state this clearly. Please define this and specify a reservoir capacity requirement based on this number. This key planning assumption is critical to evaluate both the short-term sediment removal program and the long-term ongoing sediment maintenance program.
Comment 216-21	2	Project Goals and Objectives	ES-3	The DEIR fails to document the basis for a key planning assumption that it is necessary to restore the design capacity volume for two Design Debris Events (DDE) below the spillway elevation of 1,040.5 feet. What design capacity does this refer to? What is the basis for a standard of two design debris events? Why is the spillway elevation of 1,040.5 feet chosen rather than the historic pre-rehab capacity level of 1054 feel? Is it LACFCD's position that the Devil's Gate Dam rehabilitation that occurred in the 1990's necessitates additional storage capacity in the reservoir? By what process was LACFCD's new standard of two DDEs developed and approved? The project description and objectives should consider the dam and sediment buildup as part of the flood control system and thoroughly evaluate downstream flood threats and facilities as well as other means that can be used to diminish the flood threat.
Comment 216-22	3	Project Need	ES-3, 11,	The expansion of the spillway for Devil's Gate Dam accomplished by the dam rehabilitation project in 1996-97 was intended to lower the capacity needed in the reservoir. Please evaluate the post-rehab spillway and how that changes the need for the magnitude of sediment removal discussed in the DEIR.
Comment 216-23	4	Proposed Project Description	ES-4	The project description is insufficient because it only describes the sediment removal and maintenance elements of the County's flood protection program. The description is that of a sediment-trucking project without considering the broader implications and impacts of the project.
Comment 216-24	5	Air Quality	ES-11, 68, 73, 74, 80, 85, 87, 91-93	The DEIR is inadequate because it fails to adequately address air pollution problems that will be associated with the project and to adopt equipment and procedures that would mitigate them. The DEIR identifies that sensitive populations and the structures that house them (sensitive receptors) are adjacent to and within ½ mile of the proposed project area on pp 73-74, and must be considered in the AIR QUALITY-4 Significance Criteria (p 80). In the analysis of this criterion on pp 91-93, the CO and carcinogenic analyses are only performed for impacts on surface streets. Without a clear description of the staging area for vehicles, or potential backups for departing vehicles,

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Comment 216-24 continued				this analysis is incomplete. Trucks on-site may have significant queuing and idling times, and may create significant impacts on sensitive receptors adjacent to the proposed project area. These impacts should be examined in the DEIR. The DEIR states ""Implementation of Mitigation Measures MM AQ-1 and MM AQ-2 will result in a reduction of NOx emissions; however, the actual vehicles/equipment used may not reach the levels required to reduce the NOX emissions to a level of less than significant for the sediment removal phase. . . . Full implementation of these mitigations could be unachievable. Therefore, impact remains significant." Given the severe health impacts of diesel pollution, LACFCD should use state-of-the-art low-emission vehicles for sediment removal and not rely on the use of vehicles that only meet EPA air quality standards when "feasible."
Comment 216-25	6	Biological Mitigation	ES-11-13	The DEIR fails to identify a biological mitigation program. Instead it lists a series of guidelines that may be observed, such as a 1:1 replacement of critical habitat. MM BIO-6 lists only Riversidean Alluvial Fan Sage Scrub habitat as a habitat to be restored and/or enhanced. What scientific basis was used to list only this habitat type as appropriate for restoration or enhancement? Will other types of habitat be restored and/or enhanced if destroyed or damaged by this project? Why is the value of this habitat as a significant part of a wildlife corridor not considered? What steps will be taken to preserve the value and function of the wildlife corridor in the project area? Additionally, a 1:1 replacement of habitat is insufficient because it fails to replace the biological value of well-established habitat. What is the basis of this low replacement ratio? 1:1 replacement does not meet the standard of mitigation for areas of environmental sensitivity, where the level of 3:1 to 5:1 is more standard and appropriate. This project should implement habitat restoration at a ratio greater than 3 acres of restoration for each acre of habitat destruction. MM BIO-7 indicates that a biologist will conduct a tree survey prior to ground disturbing activities. Several species in the area to be disturbed could be classified as either shrubs or trees. What will be used as a guideline for determination of tree status? Will all willows and other species with significant representation on site be counted as trees? A seedling does not replace a tree, making a 1:1 replacement ratio for trees removed inadequate restoration. MM BIO-8 lists mitigation measures including habitat restoration, enhancement, and invasive removal as the measures LACFCD will undertake to conduct the proposed 1:1 mitigation. Which of these activities will be prioritized? How will invasive species removal prioritize different species, and will it prioritize removal on site? Will restoration and enhancement include activities beyond use of willow cuttings? Single species plantings are not sufficient to recreate or restore habitat. What

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Comment 216-25 continued				additional measures will be taken, and will LACFCD take on these measures themselves or work with restoration specialists? The activities are also proposed at a 1:1 rate only for 'impacted sensitive habitat and jurisdictional waters.' What measurement will be used to determine what habitat within the impacted area will meet these guidelines? Will any weight be given to habitat composing the wildlife corridor connection in the project area? The DEIR states that attempts will be made to conduct habitat mitigation on-site, but even at the inadequate level of 1:1, it will not be possible for LACFCD to do so because the area of destruction considered in the various alternatives is so great. The DEIR is inadequate because it does not detail a complete habitat restoration program, considering both on-site and off-site components.
Comment 216-26	7	Land Use and Planning	ES-14	The DEIR identifies that the impacts to recreational uses of the project site will be significant. The mitigation measure MM LAN-1 of communication to users and redirection to nearby facilities does not make this a less than significant impact unless there are equable facilities within reasonable distance for existing users. What are the expected costs to users to relocate their activities to nearby facilities? What is the communication plan for making closures and alternatives known to the public? Several long-term programs serving children use the current facilities, including the Tom Sawyer Camp and MACH One program, and would be significantly burdened by the loss of these facilities. Neighborhoods surrounding the facility will also be significantly impacted, as there are no equivalent facilities within walking distance and public transit in the area is limited. LACFCD's communication and outreach, as demonstrated by the release of this DEIR and related communications, have not proven to be effective. A clear plan for the communication of trail and other facility closures should be outlined, and the cost of impacts to these community users should be clearly demonstrated.
Comment 216-27	8	Project Location	7	The description of the Arroyo Seco Watershed is misleading and incorrect. The watershed begins in the San Gabriel Mountains in the Angeles National Forest, and extends approximately 24 miles to the confluence with the Los Angeles River. The Arroyo Seco is a main tributary to the Los Angeles River Watershed.
Comment 216-28	9	Flood Protection	11	Please define the Probable Maximum Flood for the Arroyo Seco. What stream discharge is this flood associated with and what are the potential hazards from this flood? What reservoir discharge level will aggravate flood hazards? What flood hazards will be unaffected by potential reservoir discharges?

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Comment 216-28 continued				The DEIR also fails to adequately describe the downstream flood threat and alternative steps that could be taken to enhance flood protection there. The description of the project area is incorrect because it fails to consider the downstream impacts of the program.
Comment 216-29	10	Sediment Accumulation	11	Many inconsistencies exist between this DEIR and the LACFCD's Long Term Sediment Management Strategic Plan (March, 2013), such as the sediment yield post-Station Fire, average annual sediment yield and the capacity of Devil's Gate reservoir. These inconsistencies mislead the public about the gravity of the problem the project attempts to address. Please address these inconsistencies and clarify them for the final EIR.
Comment 216-30	11	Reservoir Capacity	11	The DEIR states that the storage capacity in the reservoir after the Station Fire and subsequent storms is below one DDE. The Sediment Management Strategic Plan (pp. 8-42 to 8-43) gives different data. Using the County's historic method of calculating reservoir capacity, it indicates that as of the March 2011, there are two DDEs and 3.73 MCY of storage capacity in the basin. Please explain these discrepancies and estimate the current capacity behind the reservoir in terms of percentage and volume. Please also indicate why the historic method of calculating DDEs and storage capacity is not appropriate and why a new standard of two DDEs is required.
Comment 216-31	12	Flood Risk	12	The DEIR states that emergency steps have been taken "to minimize the level of flood risk to downstream communities along the Arroyo Seco." What level of flood risk exists with the current sediment accumulation, and what level of flood risk and reservoir capacity is desirable? What are the specific neighborhoods at risk of flood damage with and without the project and what steps are being taken to reduce potential damage? The key planning assumptions regarding the flood threat from sediment buildup at Devil's Gate Dam should be subject to a technically sound risk analysis. LACFCD's assertions that a flood threat is imminent or that it is necessary to have capacity in the dam basin for two Design Debris Events (DDEs) needs to be carefully scrutinized. Pasadena resident Charles ("Charley") Kohlhase worked for forty years at NASA/JPL leading the design of many deep-space missions during his extended career, including Mariner, Viking, Voyager, and Cassini missions. For his sustained robotic exploration contributions over the last 40 years of the 20th century and solid success record, he received the NASA Distinguished Service Medal. Mr. Kohlhase analyzed the flood threat related to sediment in the Devi's Gate basins and concludes that the probability of a catastrophic event is

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Comment 216-31 continued				very remote. He points out that the likelihood a 50 year storm in a ten year period of time is 20%. He states: "If a 50-year event has a probability of 100% of occurring, then the probability for each year would be 2% or 0.02 or 1/50. As independent probability events are multiplied to determine the likelihood of two 50-yr events occurring in the same year, that probability would be 1 chance in 2500 ... not at all very likely. Even assessed over a 10-yr period, the likelihood would only be 10 x (1/2500) or 1/250 ... still very unlikely. And if a second 50-yr event were to occur closely after the first 50-yr event, there would not likely be additional fire debris to raise the sediment level as much as for the first 50-yr event, so the threat level would have been over-estimated. So you really do not need to lower the existing sediment levels unless you are being extremely conservative in avoiding an overflow of the Devils Gate dam. And given the station fire, why not just wait until the next 50-yr event before taking any action to truck out sediment?" Question: How has LACFCD calculated the risk involved and why has it chosen such an expensive and conservative metric?
Comment 216-32	13	Supporting Sustainability	12	A long-term plan for reservoir management would support sustainability but is not sufficient for sustainability on its own. Addressing some maintenance difficulties should be part of a overall strategy of reducing the need for maintenance by improving the function of the flood control system as a part of an Integrated Watershed Management Program, including considerations of water quality, the water basin, groundwater resources, stream health, recreational opportunities, and economic strategies for the watershed. What is the LACFCD's plan for improving overall sustainability of the reservoir and the flood control system? How does this proposed project fit into such a plan?
Comment 216-33	14	Project Access and Staging	16	Please clarify the statement that "empty trucks will be staged within the Proposed Project site." Does this mean that they will be staged there overnight? How many trucks at one time will be allowed in the staging area or on adjoining roads? What other equipment besides trucks will be used to process and transfer the sediment? How big will the staging area for those trucks be, and will the staging area move as the location of sediment removal changes?
Comment 216-34	15	Reservoir Management	21	"It is estimated that an average of 13,000 cy of sediment will potentially be deposited in the reservoir annually after completion of the Proposed Project." Please explain how this number was estimated. According to the Flood Control District's Sediment Management Strategic Plan, the average annual sediment deposition is over 100,000 cy. Such a dramatic underestimate of the average sediment loading of the Devil's Gate basin is misleading and deceptive.

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Comment 216-35	16	Project Area	21	The downstream Arroyo Seco River flood control channel is a critical component of the Devil's Gate Dam flood system and should be evaluated as such. Please include the downstream channel in the project area and include the impacts of flooding and the sediment removal program there.
Comment 216-36	17	Cumulative Projects	28	The DEIR is inadequate because it fails to consider a number of closely related projects, including: • The NASA/Jet Propulsion Laboratory water contamination well now being planned, • The JPL parking structure, • The Arroyo Seco Canyon Project, • Pasadena's Berkshire Creek Program, and • The cross-town pipeline from the Devil's Gate area to Eaton Canyon proposed by LACFCD; and • The US Army Corps of Engineers (USACE) Arroyo Seco Ecosystem Restoration Study. The proposed project, when combined with these planned projects, could have a significant net effect on the hydrological functioning of the Arroyo Seco, which must be explored. Since the proposed project to divert water from the Devil's Gate Reservoir to the Eaton Canyon Watershed is a project of LACFCD and was included as part of a successful grant application to the CA Department of Water Resources for flood funding, the pipeline across Pasadena should be fully evaluated in this DEIR. The Feasibility Scoping Meeting Documentation Final Report for the USACE Arroyo Seco Ecosystem Restoration Program, prepared in August 2011, contains a remarkably different description as well as conflicting recommendations for the Devil's Gate/Hahamongna basin. On page 2-3 that document states: "Alteration of the riparian conditions has resulted in fragmented, diminished or eradicated fish and wildlife habitat, and has resulted in water quality impacts that have diminished ecosystem function. For example, in the Hahamongna Watershed Park (HWP), the stream spreads over the floodplain in a braided pattern, as would be expected in a bedload-dominated alluvial system, but current land use does not provide a riparian vegetation border along the braided stream margin. Thus, the water is exposed to direct sunlight and is subject to heating, thereby reducing aquatic habitat quality for native species and contributing to harmful algal blooms." We note that LACFCD is the lead local sponsor of the USACE Arroyo Seco Watershed Ecosystem Restoration study and has expressed support for completing and implementing that program for many years, but the DEIR does not incorporate the principles of integrated watershed and ecosystem management that characterize that program. ASF believes that the USACE program offers the basis for a sediment removal and management program that will be truly sustainable and respect the rare

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Comment 216-36 continued				ecosystem values found in the Hahamongna basin. Why was the USACE program not included in the DEIR analysis? Will its findings and recommendations be incorporated into LACFCD's final EIR and sediment management program?
Comment 216-37	18	Regional Water Quality Control Board	26	Please explain in detail the permit denial from the Regional Water Quality Control Board in March 2011 for the 1.67 million cubic yard project proposed by LACFCD for the Hahamongna basin. What measures have been taken to meet the directives of the Regional Board's letter?
Comment 216-38	19	Native Soils	141	Please provide information regarding depths to "native soils" in the basin. What is being used a reference? Will there be any monitoring on site to determine that the data is accurate? This is not only important for evaluating archaeological resources as herein, but also for contamination and management purposes.
Comment 216-39	20	Alternatives Analysis	274-626	The DEIR is inadequate because it fails to analyze true alternatives to the proposed project. Aside from the "no project" alternative, there is no alternative that is significantly smaller in scale or in environmental impacts than the proposed project. Alternatives 1, 2 and 3 are all sediment trucking programs and not true alternatives, simply variations of the proposed project with different footprints and amounts of sediment to be excavated. Dig a hole here; dig a hole there. Dig two bigger holes there. The scope of all three is significantly larger than the November 2010 original project description (1.67 MCY) despite the Regional Water Quality Control Boards directive from March 2011 to consider more modest alternatives that would have less environmental impact. Why does LACFCD fail to abide by this directive? Alternative 4 (Sluicing Method) gives a narrow definition to sluicing and flow-assisted sediment transport and posits the ridiculous premise that all sediment transport would be accomplished through a passive sediment program that would take forever. Clearly this is a dismissive pseudo-analysis and not a true alternative to the sediment-trucking program outlined by LACFCD. Alternative 5 (Haul Route Alternative) describes a different route for trucks to leave the Devil's Gate basin and travel to the 210 Freeway, using the Arroyo/Windsor on-ramp primarily instead of the Windsor on-ramp. This is not a true alternative to the project itself, but simply a variation that could be used for the project or any of the three pseudo-alternatives (1-3).
Comment 216-40	21	Sluicing Alternative	469	Alternative 4, the Sluicing Alternative, is poorly conceived and set up to be easily dismissed. ASF has long advocated using the flow of the Arroyo Seco River to transport sediment out of the reservoir, but it is very obvious that, because of long-deferred maintenance, this method cannot transport the entire volume of sediment necessary at this time.

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Comment 216-40 continued				Alternative 4 suggests that sluicing be used as the only method of sediment removal from the basin, which is clearly infeasible. This alternative should consider maximizing the amount of sediment sluiced given projected future weather conditions. It is specious to assert that since sluicing cannot meet the entire removal need, it is not a viable option or methodology that could significantly reduce negative impacts of sediment removal. Appendix K shows that during a historically "typical" year of stream flow, sluicing 20,000 cubic yards is possible. This result does not justify dismissing sluicing as an alternative. Even in years of typical rainfall levels, sluicing should be maximized to transport about 20,000 cubic yards from the reservoir. During periods of low rainfall levels, no sluicing will be possible, but in years of high rainfall, the potential for flow assisted sediment transport is much greater, and should be exploited. The definition of the historically typical year for the sluicing analysis uses only a narrow and unrepresentative sample of recent years rather than considering the historical variations in hydrology and rainfall and the potential impacts of climate change. Question: Please justify your selection of the "historically typical year." According to Table 8-12 in the LACFCD Sediment Management Strategic Plan, in 1942 over one million cubic yards of sediment were sluiced from the Devil's Gate Reservoir. This magnitude of sluicing will very rarely be possible and should not be depended on, but it does demonstrate the possibility for maximizing sluicing as a removal method. In 1952, 410,000 cubic yards were sluiced from Devil's Gate Reservoir, and in 1979 an additional 250,000 cubic yards were sluiced. The DEIR uses sluicing as a red herring to dismiss alternative removal methods. Sluicing should be considered a viable removal method that can be optimized as a major component of a sediment removal and management program.
Comment 216-41	22	Haul Route Alternative	521	The Haul Route "alternative" is simply a variation on truck routes and not an alternative to the project. This 'alternative' does not demonstrate a reduction in overall air quality or traffic impacts. Instead of evaluating this minor route difference as an alternative, the LACFCD should evaluate an adaptive route alternative based on the hourly/daily/weekly/monthly haul route on seasons, events, burden, school times, work times, rush hour, and even unforeseeable circumstances.
Comment 216-42	23	CEQA Process	Appendix A	Stakeholder comments on the Scope of the EIR are presented in Appendix A, but the County provides no responses to those comments. Please address each comment individually and how they were incorporated into the DEIR. At this point it seems that the comments were ignored.

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Comment 216-43	24	CEQA Process	Appendix A	LACFCD has not undertaken a sufficient outreach program to stakeholders about the project and its impacts. Most stakeholders and neighbors of Hahamongna Watershed Park who will be affected by the project remain unaware of it. The three community meetings held did not meet the requirements of CEQA. They were styled to limit public input and exchange on the project, and the meeting facilitators filtered participant input in a prejudicial way. The format of the meeting did not give sufficient opportunity to get answers to key questions that were necessary to understand in order to make effective comments on the DEIR. This DEIR is a massive document that is extremely difficult to review in electronic form, yet few hard copies were made available to the public and only at local libraries where they are difficult to review due to limited hours and availability. Question: Why did LACFCD not provide full and complete hard copies of the DEIR, including appendices, to key agencies and stakeholder organizations?

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Response to Comment Letter #216 (Arroyo Seco Foundation)

Response to Comment 216-1:

Los Angeles County Flood Control District (LACFCD) notes that the Arroyo Seco Foundation finds the Draft Environmental Impact Report (EIR) to be inadequate. The comments have been responded to below.

Response to Comment 216-2:

Pursuant to Section 15126.6(a) of the California Environmental Quality Act (CEQA) Guidelines, "[a]n EIR shall describe a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project, and evaluate the comparative merits of the alternatives." However, "[a]n EIR is not required to consider alternatives which are infeasible" (CEQA Guidelines Section 15126.6(a)) or "which could change the fundamental nature of the proposed project." (*Al Larson Boat Shop, Inc. v. Board of Harbor Comm*. (1993) 18 Cal.App.4th 729, 745.) The alternatives discussed in the EIR must be reasonable alternatives, selected to foster informed decision-making and public participation (CEQA Guidelines 15126.6(a)). An EIR need not consider an alternative whose effect cannot reasonably be ascertained or whose implementation is remote and speculative because unrealistic alternatives do not contribute to a useful analysis (CEQA Guidelines 16126.6(f)(3)). Additionally, an alternative may be rejected from detailed analysis in an EIR if it fails to reduce or avoid the project's significant environmental effects, does not implement the basic project objectives, is not potentially feasible, or is facially unreasonable. 14 C.C.R. §15126.6(c); Id., see also *Mann v. Community Redevelopment Agency* (1991) 233 Cal. App. 3d 1143; *Del Mar Terrace Conservancy, Inc. v. City Council* (1991) 10 Cal. App. 4th 712.

The Draft EIR, Section 4, fully analyzed six alternatives including the No Project Alternative. These alternatives substantially lessen one or more significant effects of the Proposed Project and, with the exception of the mandatory No Project Alternative, would feasibly attain most of the basic objectives of the Proposed Project. These alternatives include options for different amounts of removal, different methods of removal, and a different haul route.

Response to Comment 216-3:

Table ES-1 of the Draft EIR, lists all 17 of the Mitigation Measures proposed for the Proposed Project. These Mitigation Measures are enforceable and designed to reduce impacts through methods known to be feasible and effective. The list of feasible Mitigation Measures is common to CEQA and accepted by agencies that would be involved in consultation, negotiation, and final approval of Mitigation Measures including conceptual restoration plans.

Response to Comment 216-4:

The purpose of the scoping process was to gather input from outside experts, cities, and agencies as well as the public on what the environmental analysis should consider and what alternatives should be analyzed. Information gathered from the scoping process was used in the formulation of the Proposed Project and Alternatives and preparation of the Draft EIR.

Response to Comment 216-5:

After the sediment removal phase has occurred, Flow Assisted Sediment Transport, or FASTing, is proposed to be an integral part of the annual maintenance at Devil's Gate. Annual FASTing operations will be implemented to reduce future buildups of sediment in the reservoir and to reduce the need for mechanical removal of sediment from the reservoir. Although FASTing is expected to be an effective means of keeping sediment levels low in the reservoir, it is estimated that approximately 13,000 cubic yards (cy) of sediment will be removed by excavation annually; however, a maintenance regime that relies on FASTing greatly reduces the need for and extends the life of future and existing sediment placement sites and improves the future sustainability of the reservoir. Please see Section 2.5.2 of the Draft EIR for more information on future maintenance.

Response to Comment 216-6:

The Draft EIR does address impacts to both the environment and community. Various mitigation measures are provided throughout the Draft EIR to reduce impacts to the community and the environment.

Response to Comment 216-7:

LACFCD was mandated by the State Legislature to provide flood protection and water conservation within its boundaries.

A reservoir storage design capacity of two design debris events (DDEs) below the dam's lowest spillway was determined to be the standard acceptable level of risk at Devil's Gate Dam and Reservoir. The DDE volume of capacity is determined using the January 2006 Los Angeles County Department of Public Works (LACDPW) Hydrology Manual and the March 2006 LACDPW Sedimentation Manual. For Devil's Gate Dam and Reservoir, the required reservoir capacity is 4.0 million cy (two DDEs) below the spillway elevation of 1,040.50 feet.

The Hydrology Manual (January 2006) can be viewed here:

http://dpw.lacounty.gov/wrd/publication/engineering/2006_Hydrology_Manual/2006%20Hydrology%20Manual-Divided.pdf

The Sedimentation Manual (March 2006) can be viewed here:

http://dpw.lacounty.gov/wrd/publication/engineering/2006_sedimentation_manual/Sedimentation%20Manual-Second%20Edition.pdf

Additional information concerning DDE calculation methods has been added to the Final EIR, Section 2.3, Project Need.

With the current, limited capacity of the reservoir, a 50-year storm event that results in a DDE would result in storm flows with sediment flowing over the spillway. A 50-year frequency storm event is defined as the magnitude of a storm that is likely to occur once every 50 years. Therefore, the chance of a 50-year storm occurring in any given year is 1 out of 50, or a 2 percent chance of occurring. Flooding with mud/sediment would occur along the portions of the Arroyo Seco in the Cities of Pasadena, South Pasadena, and Los Angeles, impacting approximately 650 parcels and requiring closure of Interstate 110

from Orange Grove Avenue to Interstate 5. Additional information about the potential flood areas and analysis is shown in the Arroyo Seco Channel Hydraulic Analysis prepared by Bureau Veritas North America, Inc., available on the Project website. Please note that protocols are in place to monitor storms, reservoir conditions, and channel conditions and to communicate with emergency responders and the California Department of Transportation (Caltrans) to execute any necessary evacuations or freeway closures.

Historically, large amounts of sediment have been deposited in the reservoir in short time periods. Between 1935 and 1938 over 1.6 million cy of sediment, between 1938 and 1943 over 1.95 million cy of sediment, between 1959 and 1966 over 1.75 million cy of sediment, and between 2010 and 2012 over 1.3 million cy of sediment was deposited in the reservoir. Following the 2009 Station Fire, approximately 1.3 million cy of sediment flowed into Devil's Gate Reservoir after just two average storm seasons. Additionally, Over 92 years, the average amount of sediment deposited each year is approximately 130,000 cy; however, due to the dynamic nature of the system and the recent burn of the watershed, the amount could vary greatly. If a 1 in 50 years storm were to occur, approximately 2.0 million cy (one DDE) of sediment could be expected to wash into the reservoir. It should be noted that design debris amounts can be produced from a freshly burned watershed with rainfall amounts considerably below capital flood levels (a 5- to 10-year frequency storm). Similarly, higher intensity rainfall could produce more debris. Because of LACFCD's responsibilities to provide flood protection, LACFCD must be ready at all times for a design debris event to occur.

Response to Comment 216-8:

LACFCD recognizes that the Proposed Project site is located within Hahamongna Watershed Park, as stated in the Draft EIR, Section 3.12, Land Use and Planning. The scope of the Proposed Project and Alternatives is entirely within LACFCD's 258-acre easement. The Proposed Project will not overburden the easement; it will restore the reservoir to the design capacity necessary for flood control storage or to safely contain future sediment inflow (volume for two DDEs below the spillway elevation of 1,040.5 feet). As noted in the Draft EIR, through easements granted in May 1919 and March 1965, the City of Pasadena granted LACFCD, under a perpetual easement, the right to construct, reconstruct, inspect, maintain, repair, and operate Devil's Gate Dam, its spillway, bypasses, tunnels, and other support facilities as may be necessary for the construction and maintenance of a reservoir capable of impounding the waters of the Arroyo Seco for purposes of storage and control and to control such waters as may be necessary in the prevention of damage by flood. LACFCD has been and will continue to conform to the limits and responsibilities of the easement and will continue to work with the City to minimize impacts associated with the Proposed Project.

Response to Comment 216-9:

The Draft EIR adequately addresses impacts from the Proposed Project on Hydrology and Water Quality, as well as Recreation in Sections 3.11 and 3.15 respectively.

Response to Comment 216-10:

As discussed in the Draft EIR, Section 3.14, with implementation of Mitigation Measure MM N-1, noise impacts would be reduced to a level of less than significant. As discussed in the Draft EIR, Section 3.12 Land Use and Planning, with the implementation of Mitigation Measure MM LU-1, impacts will be reduced to less than significant.

Response to Comment 216-11:

As discussed in Section 3.6.6 of the Draft EIR, Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats. In addition, sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays).

As with any project that involves California Department of Fish and Wildlife (CDFW), United States (U.S.) Army Corps of Engineers (USACE), and Regional Water Quality Control Board (RWQCB) jurisdictional areas, the ultimate mitigation for impacts related to the wetlands and drainages under the jurisdiction of the resource agencies is negotiated with the resource agencies during the regulatory permitting process. LACFCD has been and will continue to work closely with CDFW and USACE to identify appropriate mitigation, replacement ratios, and sites for restoration and enhancement that will offset impacts and satisfy the requirements of all applicable laws. A detailed restoration plan will be prepared and provided to CDFW and USACE for review and approval prior to project implementation and to satisfy permitting requirements. The plan will include and address noxious weed management, monitoring, and success criteria. Based on MM BIO-8, a combination of onsite and offsite habitat restoration, enhancement, and exotic removal shall be implemented by LACFCD at a 1:1 ratio for impacted sensitive habitat and jurisdictional waters. In addition, five years of success monitoring and reporting will be implemented. Mitigation locations will comply with the CDFW recommendations as follows: first, onsite; second, offsite within the Arroyo Seco Watershed; and third, offsite within the greater Los Angeles River watershed. If offsite mitigation sites are needed, several offsite areas within the Arroyo Seco/Los Angeles River watershed are being considered for restoration.

Prior to commencement of the Proposed Project, LACFCD will have obtained all necessary permits for impacts to CDFW, USACE, and RWQCB jurisdictional areas including Section 401 Certification, Section 404 permit, and a Streambed Alteration Agreement. Clean Water Act Section 404 (b)(1) guidelines will be followed as a framework for compensatory mitigation. Through 404(b)(1) negotiations with USACE and negotiations with CDFW under Fish and Game Code Sections 1600-1616, a determination of the functions and values of impacted jurisdictional waters shall result in the coordination of appropriate mitigation measures for sediment removal.

As discussed in the Draft EIR, Section 3.6.6, BIOLOGY-2, Riversidean Alluvial Fan Sage Scrub is considered to be of high priority for inventory by CDFW because of its significance and rarity. To minimize impacts due to loss of Riversidean Alluvial Fan Sage Scrub, Mitigation Measure MM BIO-6 has been provided.

Response to Comment 216-12:

LACFCD recognizes that the Arroyo Seco Foundation has worked with LACFCD over the past 20 years and that the organization has been involved in the activities and planning aspects of Hahamongna Watershed Park, including the Arroyo Seco Master Plan and Sediment Management Strategic Plan.

Response to Comment 216-13:

See Response to Comment 216-4. The Draft EIR analyzes long-range maintenance of the reservoir under the Reservoir Maintenance phase of the Proposed Project and Alternatives. Outside experts, especially those on the Stakeholder Task Force, were consulted during the formation of the Sediment Management Strategic Plan. Information from that consultation was used in the formulation of the Proposed Project and Alternatives.

Response to Comment 216-14:

See Response to Comment 216-7.

The Draft EIR provided a legally adequate project description as per California Environmental Quality Act (CEQA) Guidelines 15124. As described in Section 2.0 of the Draft EIR, the Proposed Project description provides: the precise location and boundaries of the Proposed Project on a detailed map and on a regional map, a statement of objectives sought by the Proposed Project, a general description of the Proposed Project's characteristics, and the intended uses of the EIR.

Response to Comment 216-15:

See Response to Comment 216-11. Air quality impacts associated with truck traffic were analyzed in the Draft EIR in Section 3.5. LACFCD has conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed the U.S. Environmental Protection Agency's (EPA's) 2007 standards for emissions. Therefore, in order to further reduce emissions, Mitigation Measure MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump trucks that meet or exceed EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality, including those associated with health effects, will be reduced to less than significant.

Potential impacts due to the Proposed Project's truck trips were analyzed in the Draft EIR, Section 3.16, Transportation and Traffic. As listed in that section, a single intersection in the immediate vicinity of the Proposed Project site will have a potentially significant impact. The Draft EIR outlines a 12-hour trucking schedule, with trucking operations on Saturdays as well. This schedule is used to model the most intensive construction operation, which may not be applicable at the site for the duration of the Proposed Project. Typical trucking schedules are estimated to be 8 hours per day on weekdays. In practice, hauling rates and routes may be adjusted to help reduce impacts depending on operational need. As discussed in the Draft EIR, Section 3.16, Transportation and Traffic, truck traffic associated with the Proposed Project will not cause any major traffic impacts at the studied freeway segments along any of the haul routes.

As discussed in the Draft EIR, Section 3.16, Transportation and Traffic, TRANSPORTATION-3, modifications to traffic conditions by the Proposed Project will consist of roadway restriping. These changes would not alter existing roadway use or substantially increase hazards. Thus, impacts related to traffic hazards would be less than significant.

LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the Proposed Project site.

As discussed in Response to Comment 216-5, FASTing operations will be regularly used to naturally flush sediment through the reservoir area, which will improve the sustainability of the reservoir. Additionally, the Proposed Project alternatives were specifically designed to enable a more sustainable long-term way to manage sediment and habitat in the reservoir area.

Response to Comment 216-16:

See Response to Comment 216-22 for the existing reservoir storage capacity.

The "Slow Program," as proposed by the Arroyo Seco Foundation, is a narrative discussing ways to reduce impacts of sediment removal at Devil's Gate Reservoir by reducing the sediment removal rate and extending the project duration by using natural stream flows and not disturbing habitat areas, which would keep costs low. Few details and no engineering analysis of the "Slow Program" are provided. While Los Angeles County Flood Control District shares the common goal to minimize impacts due to the Proposed Project, the methods described in the "Slow Program" are inconsistent with other important project objectives.

The "Slow Program" suggests removing sediment from the reservoir over a period of 20 years rather than the Proposed Project's 5-year duration. Accumulated sediment, including 1.3 million cubic yards (cy) from the Station Fire, has reduced the reservoir's storage capacity for new sediment, which is delivered with every storm. The reduced storage capacity increases the risk of flooding to downstream communities. It is necessary to remove 2.4 million cy of sediment in order to meet the project objective of "reducing flood risk to the communities downstream of the reservoir adjacent to the Arroyo Seco by restoring reservoir capacity for flood control and future sediment inflow events."

Removing sediment at a slower rate, as suggested by the "Slow Program," increases the chances that a major storm and flooding event will occur before the accumulated sediment can be removed. The "Slow Program" proposes to remove approximately 160,000 cy per year for 20 years. Based on historical records, an average of approximately 130,000 cy of sediment enters the reservoir annually. Considering this natural inflow of sediment, the "Slow Program's" proposed removal amount would never restore the reservoir's required storage capacity. After 20 years of average sediment inflow, the "Slow Program" would have reduced the accumulated sediment by only 600,000 cubic yards. This would mean that the downstream flood risk would continue to be elevated for 20 years from project initiation and beyond. This is not an acceptable risk for the downstream communities.

While sediment slowly accumulated in the reservoir leading up to 2009, the catalyst for the Proposed Project was the 2009 Station Fire, since subsequent storm events so significantly and quickly reduced the reservoir's capacity, which in turn, quickly elevated the flood risk. The reservoir does not currently have capacity for a major storm event; therefore, it is urgent to remove the sediment as quickly as possible. Sediment removal over five years will prudently ensure that the risk of downstream flooding will be resolved in a timely manner while also balancing impacts associated with the rate of removal. This is also consistent with the project objective of "Reducing flood risk to the communities downstream of the reservoir adjacent to the Arroyo Seco by restoring reservoir capacity for flood control and future sediment inflow events" and "Supporting dam safety by removing sediment accumulated in the reservoir in a timely manner to ensure the ability to empty the reservoir in the event of a dam safety concern."

The "Slow Program" suggests removing sediment from the reservoir by using natural stream flows rather than trucking. The Draft Environmental Impact Report (EIR) thoroughly analyzed sluicing, which uses natural stream flows; and the report concluded that sluicing is not feasible for this reservoir because the reservoir is impacted with such high levels of sediment. According to the Final Detailed Sediment Transport Capacity Analysis for the Arroyo Seco Channel report in Appendix K of the Draft EIR, approximately 20,000 cy of sediment would be successfully conveyed to the Arroyo Seco's confluence with the Los Angeles River, but over 200,000 cy would be left in the channel. This sediment would affect the channel's hydraulics and increase the risk for flooding. The analysis shows that, based on average historical rainfall and flow rates, sluicing 2.4 million cy of sediment out of the reservoir and through the Arroyo Seco Channel would take approximately 150 years.

The "Slow Program" also refers to letting the habitat grow as opposed to removing vegetation where the sediment removal will take place; however, if sluicing were used to remove sediment, as proposed by the "Slow Program," vegetation in the reservoir would still need to be removed. Sluicing requires mechanical equipment to push the sediment currently covered in vegetation into the water flows to transport it out of the reservoir. The process would require the removal of any vegetation growing in the area where sediment deposits will be removed.

As identified in the Proposed Project's Draft EIR, an alternative (Alternative 3, Option 2) reduces habitat impacts from the Proposed Project's 120 acres down to 71 acres. This is a 41 percent (49-acre) reduction of vegetation impacts as compared to the Proposed Project. Additionally, with this alternative, 18 of the 71 acres impacted by the sediment removal would be restored with habitat. The remaining 53 acres of impact are required for the reservoir to properly function as corroborated by the City of Pasadena's Hahamongna Watershed Park Master Plan, which outlines a nearly identical reservoir configuration in terms of area and capacity. Onsite mitigation would occur with vegetation replanting or regrowth above elevation 1,020 feet. Riparian Herbaceous vegetation would be expected to continue to populate and/or reestablish between maintenance activities below this elevation in the reservoir and also temporarily in the management area of the Proposed Project site.

The "Slow Program" claims that its suggested method of removal will keep sediment removal costs low. The project cost of Alternative 3, Option 2, estimated at $65 million, includes sediment removal and mitigation efforts. Since sluicing has been determined to be an ineffective removal method, removing the same quantity of sediment utilizing trucking over a longer period of time would be less cost effective. Efficiency of the operations, additional annual mobilization and demobilization, clearing and grubbing, and contractor costs all have a negative effect on cost savings. In addition to the basic principles of "economies of scale," if the project duration were increased, further administration/project management costs and ever rising costs for labor, fuel, and equipment would push the project costs well over the estimated $65 million.

The Proposed Project and all of the alternatives, as described in the Draft EIR, are designed as long-term plans to meet the project objective of "supporting sustainability by establishing a reservoir configuration more suitable for routine maintenance activities including reservoir management." After the sediment removal phase is completed, regular sediment removal will occur to prevent gradual accumulation which would otherwise require future major sediment removal projects. Additionally, the habitat restoration areas in the reservoir will be designed to coexist with the maintenance areas, which will provide for a more sustainable and integrated reservoir area than currently exists.

Response to Comment 216-17:

See Response to Comments 216-13, 216-15, and 216-16.

Response to Comment 216-18:

See Response to Comments 216-13, 216-15, and 216-16.

Response to Comment 216-19:

See Response to Comment 216-16.

Response to Comment 216-20:

See Response to Comment 216-7.

Response to Comment 216-21:

See Response to Comments 216-7 and 216-22.

Response to Comment 216-22:

The dam rehabilitation project did not lower the required capacity of the reservoir. The spillway was rehabilitated in order to pass the Probable Maximum Flood. The rehabilitation entailed lowering the spillway bottom elevation, thereby constructing the spillway ports. The reservoir capacity below the existing spillway ports (elevation of 1,040.5 feet) is the appropriate parameter for determining the currently available capacity for meeting the sediment volume requirements for the dam. The current capacity in the reservoir below the spillway is 1.3 million cy. This is only 32.5 percent of the required storage capacity and only 65 percent of one DDE. Please note that additional sediment deposits have accumulated within the reservoir easement above the elevation of 1,054 feet. This accumulated sediment has the potential to be washed toward the dam during significant storm events and further reduce the available capacity below the spillway.

Response to Comment 216-23:

See Response to Comment 216-14. The Proposed Project description is intended to describe the action being undertaken and is adequately described in the Draft EIR. The impact analysis associated with the Proposed Project is discussed in Section 3.0 Environmental Analysis of the Draft EIR.

Response to Comment 216-24:

See Response to Comment 216-15. During the sediment removal phase, excavators will be loading sediment into trucks for offsite disposal. All of the trucks will be loaded within the reservoir; and, if a queue of trucks develops, the trucks will stage within the reservoir itself to lessen impacts on the adjacent streets. Significant queuing and idling times will not occur during the project. It is estimated that trucks will briefly idle during loading, but the average loading time per truck is estimated to be one minute. In addition, LACFCD typically requires equipment to shut down if idling time is expected to be more than five minutes. Estimated project idling times were included in the air quality analysis and health risk assessment for the Draft EIR, Section 3.5, and Appendices B and C.

Impacts from trucks idling on the haul routes were included in the analysis. Significant queuing and idling times will not occur during the project.

Response to Comment 216-25:

See Response to Comment 216-11.

As discussed above, sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays). In addition, sediment removal activities would not completely block the Proposed Project site from surrounding habitat, would occur only during the day, and would not interfere with nighttime wildlife activity. Although some wildlife may be temporarily

displaced during construction, wildlife would not be physically prevented from moving around and into the basin area. The protective Mitigation Measures MM BIO-1, MM BIO-2, MM BIO-3, MM BIO-4, and MM BIO-5 would avoid and minimize any impacts associated with Proposed Project activities. Therefore, the potential impacts to wildlife movement and corridors are anticipated to be less than significant.

As discussed in the Draft EIR, Section 3.6.6, Mitigation Measure MM BIO-6 has been provided to minimize impacts due to loss of Riversidean Alluvial Fan Sage Scrub; however, as discussed in this section, impacts to other habitats, including riparian woodland, Mule fat scrub, and wetland, will also be minimized through implementation of Mitigation Measures MM BIO-7 and MM BIO-8. Based on MM BIO-7, within 90 days prior to ground-disturbing activities, a qualified biologist will conduct a tree survey within the project footprint to identify trees that will be removed or potentially affected by the Proposed Project and trees that can be avoided. LACFCD will replace trees that cannot be avoided. The replacement is expected to be up to 1:1 by acreage. The biological monitor will implement measures to protect the root zone of oak trees that may be impacted immediately adjacent to the project site and along access roads.

Alternative 3, Configuration D affects the least amount of habitat of all the action alternatives while still achieving Proposed Project objectives (see Section 4.6 of the Final EIR). This alternative would provide a buffer on the west side of the reservoir that would allow for the movement of wildlife. Alternative 3, Configuration D, Option 1 provides a more natural configuration for the reservoir by having two branches to carry water and sediment toward the face of the dam, avoiding disturbing a significant portion of existing vegetation. To further reduce the Proposed Project's footprint, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2, which drastically reduces the project's footprint of 120 acres down to 71 acres, would avoid excavation of the western branch, thereby providing a greater habitat buffer on the west side of the reservoir. In addition, the maintenance areas would be smaller than the original sediment removal footprint, allowing for habitat to reestablish and providing additional areas for wildlife movement.

Response to Comment 216-26:

The Proposed Project will not limit the use of the Oak Grove area of Hahamongna Watershed Park by recreational users such as Tom Sawyer Camps, Oak Grove Disc Golf Club, and MACH-1. Impacts to recreation were analyzed in the Draft EIR, Section 3.15. The Proposed Project will not limit the use of the Oak Grove area of Hahamongna Watershed Park. Sediment removal activities would be temporary and are expected to occur only in the drier months (April to December, excluding holidays). It is expected that these activities will often not be adjacent to the Oak Grove area of Hahamongna Watershed Park. The Proposed Project would result in temporary limitations on the recreational use of the Proposed Project site and some of the adjacent trails. Most of these areas would be reopened seasonally or intermittently throughout the sediment removal process. In addition, temporary impacts to designated recreational facilities and trails will be minimized through advance communication and redirection to the nearest facility in the vicinity of the Proposed Project. Furthermore, an east-west trail crossing will continue to provide access at the north end of the reservoir. At the south end of the reservoir, after the reservoir ingress and egress ramps have been fully constructed, access to the upper east side Arroyo Seco Trail from La Cañada Verdugo Road will be maintained; and the linkage from the west side Arroyo Seco Trail and the Flint Wash Trail to the upper east side Arroyo Seco Trail (crossing Devil's Gate Dam and also continuing south to the Rose Bowl) will be available after construction activities have ended each day and on nonworking days. Therefore, the maximum impacts to recreation would be much shorter than the five-year duration of the sediment removal phase of the Proposed Project.

No official disc golf course holes located in the Oak Grove area of Hahamongna Watershed Park will be removed by the Proposed Project. Where possible, LACFCD will avoid any disc golf course holes located outside the Oak Grove area of Hahamongna Watershed Park. When avoidance is not possible, LACFCD will coordinate with the Oak Grove Disc Golf Club for removal of the disc golf hole equipment.

Alternative 3, Configuration D, the Environmentally Superior Alternative from the Draft EIR, also carefully balances flood control needs and reductions in impacts to habitat by restoring the required reservoir capacity while also minimizing the project footprint (see Section 4.6 of the Final EIR). Furthermore, Alternative 3, Configuration D, Option 2 would also avoid all currently existing Oak Grove Disc Golf Club holes.

Under CEQA, the lead agency is not required to analyze an economic impact associated with a project in the EIR; as Section 15131(a) of the CEQA Guidelines states: "Economic or social effects of a project shall not be treated as significant effects on the environment." Moreover, CEQA allows economic analysis in the administrative record only if the basis for infeasibility, and thus rejection of a mitigation or alternative, is economic, as described in CEQA Guidelines Sections 15091(a)(3) and 15364.

Response to Comment 216-27:

The comment has been noted, and Final EIR has been revised to state "The Arroyo Seco watershed extends approximately 16 miles in length along the centerline of the watershed and 24 miles along the Arroyo Seco from its origin in the Angeles National Forest to the Arroyo Seco's confluence with the Los Angeles River."

Response to Comment 216-28:

See Response to Comment 216-7. State of California laws require that dams be constructed to safely pass the probable maximum flood, which is determined from the probable maximum precipitation, as defined by the National Weather Service.

Response to Comment 216-29:

For Devil's Gate Dam, the DDE was previously calculated as 1.67 million cy. That previous calculation was based on the presence of debris-retaining structures including Browns Canyon Dam, located within the Angeles National Forest upstream of Devil's Gate Dam. These structures filled with sediment decades ago and no longer provide capacity to "control" any portion of the watershed. A subsequent analysis determined that the correct DDE, based on the absence of sediment control facilities in the Forest, is 2.0 million cy. Following the Station Fire, LACDPW reviewed the DDE calculations and confirmed that 2.0 million cy is the current and appropriate volume for the DDE.

As stated above, LACDPW's criterion is that reservoir sediment levels be maintained at a level equivalent to two design debris events below spillway; however, in response to the Station Fire, an emergency project to remove only 1.67 million cy was initially proposed. The volume of 1.67 million cy is the previously published DDE and was considered justifiable as an emergency exemption to the California Environmental Quality Act (CEQA). In March 2011, the County of Los Angeles Board of Supervisors motioned LACFCD to complete an EIR for a comprehensive sediment removal project at Devil's Gate. LACFCD then initiated project development in accordance with the required level of protection of protection of two DDEs.

The Sediment Management Strategic Plan included sediment history data to demonstrate the volume of sediment deposited into the dams and used that data along with statistical analysis to develop projected 20-year sediment volumes for County facilities. The sediment history provided for Devil's Gate Dam (pages 8-42 and 8-43 of the Sediment Management Strategic Plan) correctly shows the sediment volumes accumulated at the dam; however, the column titled "Reservoir Capacity at Elevation 1,054 ft." can be somewhat confusing with respect to the current capacity in the dam. That column provides the remaining capacity below elevation 1,054 feet, which is the original spillway elevation of the dam. The spillway was rehabilitated in order to pass the Probable Maximum Flood. See Response to Comment 216-22.

Response to Comment 216-30:

See Response to Comments 216-7 and 216-29.

Response to Comment 216-31:

See Response to Comment 216-7.

Response to Comment 216-32:

See Response to Comment 216-5. Please see the Sediment Management Strategic Plan for an overview of sediment management issues and alternatives. The Sediment Management Strategic Plan can be viewed here:
http://dpw.lacounty.gov/lacfcd/sediment/files/FullDoc.pdf

Response to Comment 216-33:

The construction equipment required for sediment removal is listed in the Draft EIR, Section 2.5.1, Proposed Project Description, Configuration A, Sediment Removal Phase, Removal Method. The sediment removal equipment will be staged within the reservoir overnight, during sediment removal operations. No staging of sediment removal equipment will take place on city streets. Specifics of the staging area(s) will be dictated by the contractor but will follow all applicable RWQCB requirements. Sediment hauling trucks will be queued within the reservoir during removal activities and will be stored offsite nightly by their respective operators.

Response to Comment 216-34:

The average of 13,000 cy of sediment annually refers to the amount estimated, based on past storm events, which would require removal through sediment excavation/trucking offsite. Although FASTing is expected to be an effective means of keeping sediment levels lower in the reservoir, historically an average of 130,000 cy of sediment is deposited in the reservoir annually. An effective FASTing regime will still require an estimated 13,000 cy of sediment to be removed by excavation annually.

Response to Comment 216-35:

The Proposed Project involves removal of sediment from the Devil's Gate Reservoir and does not involve removal of sediment from downstream flood control facilities; however, removal of sediment from downstream flood control facilities would be likely under Alternative 4, Sluicing Alternative. Impacts associated with this alternative are discussed in the Draft EIR, Section 4.7.

Response to Comment 216-36:

The Draft EIR contains a cumulative impact analysis within each of the subsections of Section 3.0 Environmental Analysis. The cumulative analysis contains projects determined by LACFCD and the surrounding cities and communities to have a potential cumulative effect due to overlapping time frames of the projects. The list of these projects is included in Section 2.9 Cumulative Scenario. Potential projects that were determined to be outside the area of influence or sediment-removal phase of the project schedule, or lacking sufficient project detail, were not considered to be reasonable foreseeable probable future projects, as set forth in the CEQA Guidelines Section 15130.

The Proposed Project does not require the implementation of the Devil's Gate Water Conservation Project in order to achieve the Proposed Project's objective to satisfactorily reduce flood risk, create a configuration suitable for routine operations and maintenance, and reduce the possibility of plugging at the face of the dam. The Devil's Gate Water Conservation Project does not require the implementation of the Proposed Project to be carried out. Neither project is a foreseeable consequence of or a future expansion of the other project; therefore, these projects are separate projects per CEQA.

The Devil's Gate Water Conservation Project is still in a conceptual design phase, and no environmental report is available for public review at this time; however, this project was analyzed in the Draft EIR as a cumulative project.

LACFCD continues to coordinate with USACE concerning Arroyo Seco Watershed Management. In addition, LACFCD is a local sponsor of the USACE's *Los Angeles County's Arroyo Seco Watershed Ecosystem Restoration Study,* and the study was used in the preparation of the Draft EIR.

Response to Comment 216-37:

The California RWQCB denied a permit for the emergency project without prejudice, with the understanding that LACFCD would be initiating an EIR process for a project which would restore the required level of protection. As part of Proposed Project approval, LACFCD will obtain the necessary permits from the RWQCB.

Response to Comment 216-38:

Depths to the "native soils" of the reservoir will be determined by using historic contours of the reservoir compared to the existing topography. Construction staking within the reservoir will take place prior to excavation, and periodic surveys will be completed to ensure the limits of excavation are consistent with the design plans.

Response to Comment 216-39:

See Response to Comments 216-2, 216-4, and 216-37. Sluicing was analyzed as part of the Draft EIR in the Alternatives Analysis, Section 4.7, Alternative 4 Sluicing Method. This alternative would involve use of construction equipment and the removal of trees and vegetation over the same footprint as the Proposed Project. The sluicing alternative would potentially have additional significant impacts in comparison to the Proposed Project. Many of these impacts would be associated with the likelihood that large amounts of sediment would not be fully transported through the flood control system; this sediment would need to be mechanically removed and trucked out from numerous downstream locations potentially including the two soft-bottom portions of the channel. Please see Section 4.7 and

Appendix K of the Draft EIR for further analysis. Alternative 5, Haul Route Alternative provides another haul route option that reduces traffic impacts at two intersections to a less than significant level. Alternative 5 is a reasonable alternative as it substantially lessens one or more significant effects of the Proposed Project and would feasibly attain most of the basic objectives of the Proposed Project; see Section 4.8.

Response to Comment 216-40:

See Response to Comment 216-39. LACFCD designated three required characteristics in selecting the "typical" year to be used for Appendix K Final Detailed Sediment Transport Capacity Analysis for the Arroyo Seco Channel. The first requirement was that the total rainfall for the particular year matched the historic average total. Secondly, the inflow data to Devil's Gate Reservoir had to be readily available in hourly increments for the duration of the chosen storm season, as that information is required for an accurate model. And thirdly, the inflow data for a particular year had to have an average, well distributed number of peaks indicating a series of multiple, distinct storms.

In the process of defining the typical year, annual rainfall data from 1938 to present was analyzed. Of that information, inflow data was readily available in hourly format for most years since 1972 to present. Finally, the inflow data was evaluated for its distribution of rain events. The January 1, 2006, to April 15, 2007, period was chosen due to its being a representative sample for the historic inflow to Devil's Gate Reservoir.

Response to Comment 216-41:

See Response to Comment 216-39.

The Draft EIR outlines a 12-hour trucking schedule, with trucking operations on Saturdays as well. This schedule is used to model the most intensive construction operation, which may not be applicable at the site for the duration of the Proposed Project. Typical trucking schedules are estimated to be 8 hours per day on weekdays. In practice, hauling rates and routes may be adjusted to help reduce impacts depending on operational need. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the Proposed Project site. This will include coordination of sediment transport activities with unforeseen events.

Response to Comment 216-42:

Per CEQA, scoping comments are not required to be responded to in the EIR. Only comments received during the Draft EIR Public Review Period are required to be responded to, and these responses are included in this Response to Comments document. LACFCD took the comments and concerns raised by cities and other agencies and citizens during the scoping process into account when designing the Proposed Project and the Alternatives.

Response to Comment 216-43:

Adequate time for public commenting was provided. CEQA requires that the public comment period for a Draft EIR be at least 45 days (CEQA Guidelines § 21091). LACFCD extended this review period initially to 75 days and then further extended the review period to 90 days to allow for additional commenting time.

LACFCD held three community meetings to inform the public of the Proposed Project, Alternatives, and the results of the Draft EIR. The meetings included a presentation, workshops where the public could ask specific questions about the project and potential impacts, and the ability to submit formal comments. Members of the public were able to ask questions or pose comments either in a group setting after the presentation or at the individual workshop stations.

Per CEQA, "Public hearings may be conducted on the environmental documents, either in separate proceedings or in conjunction with other proceedings of the public agency. Public hearings are encouraged, but not required as an element of the CEQA process." Therefore, the community meetings held to inform the public about the Proposed Project and Draft EIR met and exceeded the requirements of CEQA.

The document was made available at eight local libraries, the County Public Works headquarters, and online. In addition, CDs with the documents were made available upon request, and printed copies were made available for purchase at County Public Works headquarters for interested parties.

Per CEQA, "To make copies of EIRs available to the public, Lead Agencies should furnish copies of draft EIRs to public library systems serving the area involved. Copies should also be available in offices of the Lead Agency."

Noticing for the Proposed Project went beyond that required by CEQA Guidelines. The notices for the Proposed Project, the Notice of Preparation (NOP), and the Notice of Availability/Notice of Completion (NOA/NOC) were:

- sent to agencies, organizations, and individuals who have previously requested notices, in addition to other area agencies and organizations
- published in local newspapers, the *San Gabriel Valley Tribune* and the *Pasadena Star News*
- posted on and off site
- mailed to over 1,100 owners and occupants of contiguous property shown on the latest equalized assessment roll
- filed with the County Clerk and the State Clearinghouse
- posted at eight local libraries
- posted on the LACDPW website

Re: Public Comment on Devil's Gate Reservoir Sediment Removal DEIR 2014 January 21

To: Director Gale Farber, L.A. County Dept of Public Works

Comment 217-1

The Devil's Gate Reservoir Sediment Removal and Management Project Draft Environmental Impact Report is inadequate because it does not fulfill its mandate. A legitimate DEIR must address the reasonable, legitimate questions and concerns raised by the people who live, work and play in the surrounding communities.

After years of local government meetings, kitchen table dialogues and online conservations, regarding the Devil's Gate Reservoir, also known as Hahamongna Park, the community's concerns remain, and repeated questions go unanswered:

Comment 217-2

What are the potential impacts and possible mitigations regarding the unique educational, natural, outdoor experience and exercise that Hahamongna Park provides such as nature walks, birdwatching, horse-riding, hiking?

Comment 217-3

What are the potential impacts and possible mitigations regarding the specific forms of health hazards from pollution; specifically the consequences of upturning, dispersing and transporting decades-buried debris: dust, invasive organisms, metals, and other chemicals?

Comment 217-4

What are the potential impacts and possible mitigations regarding Hahamongna Park's significant, extensive ecosystem, watershed, view-shed, soil micro-organisms and habitat for plants and wildlife?

Comment 217-5

What are the potential impacts and possible mitigations regarding the many ongoing Regional projects aimed at protecting what little remains of our recreational trails, urban parks, seasonal wetlands, and wildlife corridors?

Comment 217-6

What are the potential impacts and possible mitigations regarding the noise, fumes and traffic of earthmoving vehicles operating all day, everyday?

Comment 217-7

Finally, where are the studies of smaller-scale, alternatives wrt this flood control basin, which the community has repeatedly asked for in meetings and comments?

Comment 217-8

Additionally, there are many large and small omissions and inaccuracies in the Draft Environmental Impact Report, including:

Comment 217-9

Lack of analysis of smaller-scale, less impactful alternatives.
Baseless assumptions regarding the risk of smaller-scale alternatives.

Comment 217-10

Inadequate survey of wildlife, habitat and ecosystems.
Characterizations of healthy deciduous trees in winter as "dead."
Inadequate mitigation plan for replacement of urban/wild parkland.

Comment 217-11

Effects of short-sighted flood control policies on water quality, beach erosion, carbon emissions and other longer range, bigger picture issues.

Bev A Huntsberger, Altadena CA.
(626) 398-5607. bev@phlogiston-inc.com

Response to Comment Letter #217 (Bev Huntsberger)

Response to Comment 217-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

As discussed in Section 1.0 of the Draft Environmental Impact Report (EIR), the purpose of the California Environmental Quality Act (CEQA) is to disclose to decision makers and to the public the significant environmental effects of a proposed project and identify possible ways to avoid or minimize significant environmental effects of a project by requiring implementation of mitigation measures or recommending feasible alternatives. The Draft EIR fulfills this purpose.

This Response to Comments Section of the Final EIR responds to questions and concerns raised by the public. Per CEQA, scoping comments are not required to be responded to in the EIR. Only comments received during the Draft EIR Public Review Period are required to be responded to, and these responses are included in this Response to Comments document. The scoping comments were taken into consideration when drafting the Project Alternatives and analyzing the project impacts.

Response to Comment 217-2:

Impacts to recreation were analyzed in the Draft EIR, Section 3.15. The Proposed Project will not limit the use of the Oak Grove area of Hahamongna Watershed Park. Sediment removal activities would be temporary and are expected to occur only in the drier months (April to December, excluding holidays). It is expected that these activities will often not be adjacent to the Oak Grove area of Hahamongna Watershed Park. The Proposed Project would result in temporary limitations on the recreational use of the Proposed Project site and some of the adjacent trails. Most of these areas would be reopened seasonally or intermittently throughout the sediment removal process. In addition, temporary impacts to designated recreational facilities and trails will be minimized through advance communication and redirection to the nearest facility in the vicinity of the Proposed Project. Furthermore, an east-west trail crossing will continue to provide access at the north end of the reservoir. At the south end of the reservoir, after the reservoir ingress and egress ramps have been fully constructed, access to the upper east side Arroyo Seco Trail from La Cañada Verdugo Road will be maintained; and the linkage from the west side Arroyo Seco Trail and the Flint Wash Trail to the upper east side Arroyo Seco Trail (crossing Devil's Gate Dam and also continuing south to the Rose Bowl) will be available after construction activities have ended each day and on nonworking days. Therefore, the maximum impacts to the recreational users of Hahamongna Watershed Park would be much shorter than the five year duration of the sediment removal phase of the Proposed Project.

Alternative 3, Configuration D affects the least amount of habitat of all the action alternatives while still achieving Proposed Project objectives (see Section 4.6 of the Final EIR). This alternative would provide a buffer on the west side of the reservoir that would allow for the movement of wildlife. Alternative 3, Configuration D, Option 1 provides a more natural configuration for the reservoir by having two branches to carry water and sediment toward the face of the dam, avoiding disturbing a significant portion of existing vegetation. To further reduce the Proposed Project's footprint, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2, which drastically reduces the project's footprint of 120 acres down to 71 acres, would avoid excavation of the western branch, thereby providing a greater habitat buffer on the west side of the reservoir. In addition, the

maintenance areas would be smaller than the original sediment removal footprint, allowing for habitat to reestablish and providing additional areas for wildlife movement.

Response to Comment 217-3:

As discussed in the Draft EIR, Section 3.10.6, Impacts and Mitigation, HAZARDS-1, Sediment Removal/Reservoir Management, no hazardous levels of the contaminants were detected in the sediment. Dust impacts from the Proposed Project were carefully evaluated, as discussed in the Draft EIR, Section 3.5.6, Impacts and Mitigation, AIR QUALITY-2, Sediment Removal. The Proposed Project's activities, including excavation, grading, material loading, and hauling, would result in less than significant dust emissions due to the Proposed Project's use of best management practices and would be in full compliance with South Coast Air Quality Management District's (SCAQMD's) fugitive dust regulations. As discussed in the Draft EIR, Section 3.5, the Health Risk Assessment (HRA) analyzed both the cancer-related and noncancer-related acute (short-term) and chronic (long-term) impacts from project-related emissions. The HRA analysis found the Proposed Project would result in less than significant impacts for both the cancer-related and non-cancer-related acute short-term and long-term impacts.

Response to Comment 217-4:

The project impacts to biological resources can be found in the Draft EIR, Section 3.6 Biological Resources. Impacts were found to be less than significant with the incorporation of Mitigation Measures MM BIO-1 through MM BIO-8, which include both monitoring and habitat restoration.

Response to Comment 217-5:

See Response to Comment 217-2 and 217-4.

As discussed in Section 3.12 of the Draft EIR, Mitigation Measure MM LAN-1 reduces the temporary impacts to trails during the sediment removal period. Once sediment removal is complete, the reservoir will be reopened for recreational use. None of the designated trails will be permanently impacted; thus, no mitigation measures are required for permanent impacts. Also, the Proposed Project would not contribute to cumulative impacts to future and reasonably foreseeable projects.

Response to Comment 217-6:

Potential impacts due to the Proposed Project's truck trips were analyzed in the Draft EIR, Section 3.16, Transportation and Traffic. As listed in that section, a single intersection in the immediate vicinity of the Proposed Project site will have a potentially significant impact. The Draft EIR outlines a 12-hour trucking schedule, with trucking operations on Saturdays as well. This schedule is used to model the most intensive construction operation, which may not be applicable at the site for the duration of the Proposed Project. Typical trucking schedules are estimated to be 8 hours per day on weekdays. In practice, hauling rates and routes may be adjusted to help reduce impacts depending on operational need. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the Proposed Project site.

Air quality and noise impacts were analyzed in the Draft EIR in Sections 3.5 and 3.14, respectively. As discussed in the Draft EIR, Section 3.14, with implementation of Mitigation Measure MM N-1, noise impacts would be reduced to a level of less than significant. LACFCD has conducted an availability study

and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed the United States (U.S.) Environmental Protection Agency's (EPA's) 2007 standards for emissions. Therefore, in order to further reduce emissions, Mitigation Measure MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump trucks that meet or exceed EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality, including those associated with health effects, will be reduced to less than significant.

Response to Comment 217-7:

See Response to Comment 217-2. LACFCD was mandated by the State Legislature to provide flood protection and water conservation within its boundaries.

A reservoir storage design capacity of two design debris events (DDEs) below the dam's lowest spillway was determined to be the standard acceptable level of risk at Devil's Gate Dam and Reservoir. The DDE volume of capacity is determined using the January 2006 Los Angeles County Department of Public Works (LACDPW) Hydrology Manual and the March 2006 LACDPW Sedimentation Manual. For Devil's Gate Dam and Reservoir, the required reservoir capacity is 4.0 million cubic yards (cy) (two DDEs) below the spillway elevation of 1,040.50 feet.

The Hydrology Manual (January 2006) can be viewed here:

http://dpw.lacounty.gov/wrd/publication/engineering/2006_Hydrology_Manual/2006%20Hydrology%20Manual-Divided.pdf

The Sedimentation Manual (March 2006) can be viewed here:

http://dpw.lacounty.gov/wrd/publication/engineering/2006_sedimentation_manual/Sedimentation%20Manual-Second%20Edition.pdf

Additional information concerning DDE calculation methods has been added to the Final EIR, Section 2.3, Project Need.

LACFCD analyzed alternatives to the Proposed Project in the Draft EIR, Section 4.0 Alternatives Analysis. The Draft EIR analyzed a range of sediment removal amounts that would obtain the two DDEs. The analysis concluded that Alternative 3, Configuration D was the Environmentally Superior Alternative that would reduce impacts while still meeting Proposed Project objectives. Removing less sediment would not provide the capacity necessary to achieve the Proposed Project objectives.

Response to Comment 217-8:

LACFCD notes that the commenter believes there are many omissions and inaccuracies in the Draft EIR. The specific comments have been responded to below.

Response to Comment 217-9:

See Response to Comment 217-7. Pursuant to Section 15126.6(a) of the California Environmental Quality Act (CEQA) Guidelines, "[a]n EIR shall describe a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project

but would avoid or substantially lessen any of the significant effects of the project, and evaluate the comparative merits of the alternatives." However, "[a]n EIR is not required to consider alternatives which are infeasible" (CEQA Guidelines Section 15126.6(a)) or "which could change the fundamental nature of the proposed project."*(Al Larson Boat Shop, Inc. v. Board of Harbor Comm. (1993)* 18 Cal.App.4th 729, 745.) The alternatives discussed in the EIR must be reasonable alternatives, selected to foster informed decision-making and public participation (CEQA Guidelines 15126.6(a)). An EIR need not consider an alternative whose effect cannot reasonably be ascertained or whose implementation is remote and speculative because unrealistic alternatives do not contribute to a useful analysis (CEQA Guidelines 16126.6(f)(3)). Additionally, an alternative may be rejected from detailed analysis in an EIR if it fails to reduce or avoid the project's significant environmental effects, does not implement the basic project objectives, is not potentially feasible, or is facially unreasonable. 14 C.C.R. §15126.6(c); Id., see also *Mann v. Community Redevelopment Agency (1991)* 233 Cal. App. 3d 1143; *Del Mar Terrace Conservancy, Inc. v. City Council* (1991) 10 Cal. App. 4th 712.

The Draft EIR, Section 4, fully analyzed six alternatives, including the No Project Alternative. These alternatives substantially lessen one or more significant effects of the Proposed Project and, with the exception of the mandatory No Project Alternative, would feasibly attain most of the basic objectives of the Proposed Project.

Response to Comment 217-10:

See Response to Comment 217-2.

In Section 3.6.1, first paragraph, that statement was referring to the 2011 survey results, "As discussed above, in 2011 these resources were severely impacted by sediment deposition. Most of the vegetation and trees on the Proposed Project site were dead, washed out, or buried under sediment, reducing the amount and quality of vegetation communities and wildlife habitat." However, immediately following that statement, it continues, "Since publication of the NOP, some of the vegetation and trees have re-established, improving the amount and quality of vegetation communities and wildlife habitat of the Proposed Project site. In order to achieve a more conservative analysis of the potential impacts to biological resources from the Proposed Project, 2013 conditions were also taken into account." Therefore, the information presented is correct and does not warrant a change.

Table ES-1 of the Draft EIR, lists all 17 of the Mitigation Measures proposed for the Proposed Project. These Mitigation Measures are enforceable and designed to reduce impacts through methods known to be feasible and effective. The list of feasible Mitigation Measures is common to CEQA and accepted by agencies that would be involved in consultation, negotiation, and final approval of Mitigation Measures including conceptual restoration plans. As with any project that involves California Department of Fish and Wildlife (CDFW), United States (U.S.) Army Corps of Engineers (USACE), and Regional Water Quality Control Board (RWQCB) jurisdictional areas, the ultimate mitigation for impacts related to the wetlands and drainages under the jurisdiction of the resource agencies is negotiated with the resource agencies during the regulatory permitting process. LACFCD has been and will continue to work closely with CDFW and USACE to identify appropriate mitigation, replacement ratios, and sites for restoration and enhancement that will offset impacts and satisfy the requirements of all applicable laws. A detailed restoration plan will be prepared and provided to CDFW and USACE for review and approval prior to project implementation. Prior to commencement of the Proposed Project, LACFCD will have obtained all necessary permits for impacts to CDFW, USACE, and RWQCB jurisdictional areas including Section 401 Certification, Section 404 permit, and a Streambed Alteration Agreement. Clean Water Act Section 404

(b)(1) guidelines will be followed as a framework for compensatory mitigation. Through 404(b)(1) negotiations with USACE and negotiations with CDFW under Fish and Game Code Sections 1600-1616, a determination of the functions and values of impacted jurisdictional waters shall result in the coordination of appropriate Mitigation Measures for sediment removal.

Response to Comment 217-11:

The Draft EIR analyzes carbon emissions in Section 3.9 Greenhouse Gas Emissions; impacts were found to be less than significant. The Draft EIR analyzes water quality in Section 3.11 Hydrology and Water Quality; impacts were found to be less than significant. The Proposed Project will not decrease the current amount of sediment that flows downstream and therefore would not contribute to the erosion of beaches. Also, as noted in the Sediment Management Strategic Plan (SMSP), "Without human intervention, most Southern California beaches would naturally be narrow and rocky. The wide beaches in Southern California were created and have been maintained by various agencies through artificial beach nourishment projects (also referred to as beach fill projects) and the construction of protective coastal structures since the 1930s." In addition, the SMSP states "Since the Los Angeles River changed course in 1825, the largest waterway reaching this region of the coast is Ballona Creek, which has an estimated annual sediment yield of less than 50,000 cubic yards and delivers generally fine-grained sediment that is not appropriate for beach nourishment."

For more information see: http://dpw.lacounty.gov/lacfcd/sediment/dcon/429.pdf

From: Dana Kennedy
To: reservoircleanouts
Subject: Devil"s gate EIR
Date: Tuesday, January 21, 2014 1:03:59 PM

To Los Angeles County Department of Public Works:

Comment 218-1

As residents of Altadena with a home situated on the edge of an eroding hillside above Hahamongna, we are very concerned about the County's proposed plan to clean out the Arroyo and Hahamongna above Devil's Gate Dam. We are also long-time users of the Park, and do not wish to see its habitat destroyed. We are also VERY concerned about the noise and air pollution that will result from thousands of trucks entering and exiting the park daily for years, not to mention what effect all of that motion may have on the surrounding hillsides. We are strongly opposed to this plan as it stands.

Thank you,

Barbara B. Minton
Dana B. Kennedy
Julian Becerra
Altadena, CA

Response to Comment Letter #218 (Dana Kennedy)

Response to Comment 218-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. Los Angeles County Flood Control District (LACFCD) notes the commenter's' opposition to the Proposed Project.

The Proposed Project involves the removal of accumulated sediment in the Devil's Gate reservoir deposited from stormflows and would not involve or contribute to erosion to surrounding hillsides. As discussed the Geology and Soils subsection Section 3.8.6 of the Draft Environmental Impact Report (EIR), "disturbed sediments are more susceptible to erosion; however, as discussed above in Air Quality, these impacts will be reduced to less than significant through implementation of [Southern California Air Quality Management District] SCAQMD Rule 403 and BMPs." Additionally, sediment removal activities will not be close enough to the toe of the slope on the east side of the reservoir to cause any slope stability issues.

As discussed in Section 3.6.6 of the Draft Environmental Impact Report (EIR), Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats. In addition, sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays). Wildlife species currently found in the Proposed Project area would be expected to either remain in the undisturbed areas of the reservoir outside of the Proposed Project area or to reestablish once sediment removal activities have been completed. Impacts to biological resources would be less than significant.

Alternative 3, Configuration D affects the least amount of habitat of all the action alternatives while still achieving Proposed Project objectives (see Section 4.6 of the Final EIR). This alternative would provide a buffer on the west side of the reservoir that would allow for the movement of wildlife. Alternative 3, Configuration D, Option 1 provides a more natural configuration for the reservoir by having two branches to carry water and sediment toward the face of the dam, avoiding disturbing a significant portion of existing vegetation. To further reduce the Proposed Project's footprint, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2, which drastically reduces the project's footprint of 120 acres down to 71 acres, would avoid excavation of the western branch, thereby providing a greater habitat buffer on the west side of the reservoir. In addition, the maintenance areas would be smaller than the original sediment removal footprint, allowing for habitat to reestablish and providing additional areas for wildlife movement.

Air quality and noise impacts associated with truck traffic were analyzed in the Draft EIR in Sections 3.5 and 3.14, respectively. As discussed in the Draft EIR, Section 3.14, with implementation of Mitigation Measure MM N-1, noise impacts would be reduced to a level of less than significant. LACFCD has conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed the U.S. Environmental Protection Agency's (EPA's) 2007 standards for emissions. Therefore, in order to further reduce emissions, Mitigation Measure MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump trucks that meet or exceed EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality, including those associated with health effects, will be reduced to less than significant.

From: Dave Doody
To: reservoircleanouts
Subject: Comment: Devil"s Gate Reservoir Sediment Removal and Management Project
Date: Tuesday, January 21, 2014 3:44:20 PM

Gail Farber, Director
Los Angeles County Department of Public Works
Attn: Water Resources Division - Reservoir Cleanouts

RE: Devil's Gate Reservoir Sediment Removal and Management Project

Dear Ms. Farber:

Comment 219-1 I learned very late about the opportunity to comment on the Draft Environmental Impact Report for the Devil's Gate Reservoir Sediment Removal and Management Project.

Comment 219-2 Please realize that the Draft Environment Impact Report appears inadequate in that it does not give proper weight to longer-term, more sustainable means of sediment removal such as Flow Assisted Sediment Transport (FAST) which has been proven in this location in the past, and which would obviate much of the expensive, environmentally degrading truck-based removal.

Comment 219-3 Further, it does not address the effects the project would have on LA County communities in Altadena situated up the canyons - northward up the Arroyo Seco, Millard, and El Prieto Canyons. The natural marine layer atmospheric flow would carry intolerable amounts of noise and probably substantial dust into these residential areas.

Comment 219-4 The DEIR also seems to inadequately incorporate long-term biological survey data. I also have concerns about the impact of the extensive

Comment 219-5 trucking on the nearby roads and freeways, which are saturated now at rush hour.

Comment 219-6 Please respond to this question: Would it be possible to further extend the deadline for public comment? It has only lately come to my attention, and I am in contact with many others who have no idea that the DEIR exists, nor that they have (had) an opportunity to review and comment.

Thank you.

Regards,

Dave Doody
4239 Canyon Crest Road
Altadena,
CA 91001
626.398.5133
dave@SpacecraftKits.com

Response to Comment Letter #219 (Dave Doody)

Response to Comment 219-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

Response to Comment 219-2:

Flow Assisted Sediment Transport (FASTing), a passive method of transporting sediment downstream, is currently used when possible and would be used during the Maintenance Phase of the Proposed Project; however, FASTing, even in combination with the Interim Measures Project (IMP), will not efficiently remove large amounts of sediment. As discussed under the No Project Alternative, Section 4.9, use of FASTing and IMP alone will not meet Proposed Project objectives. The removal of accumulated sediment on a yearly basis is the proposed management scheme after the original sediment removal is completed. The regular maintenance of the area will lower the potential need for a large-scale sediment removal operation in the future. Please see Section 2.5.2 of the Draft Environmental Impact Report (EIR) for more information on future maintenance.

Response to Comment 219-3:

Dust impacts from the Proposed Project were carefully evaluated, as discussed in the Draft EIR, Section 3.5.6, Impacts and Mitigation, AIR QUALITY-2, Sediment Removal. The Proposed Project's activities, including excavation, grading, material loading, and hauling, would result in less than significant dust emissions due to the project's use of best management practices and would be in full compliance with South Coast Air Quality Management District's (SCAQMD's) fugitive dust regulations.

The geography was analyzed prior to the performing of the noise calculations provided in the Draft EIR, and it was determined that the geography would have a minimal effect of the nearest homes and other sensitive receptors to the project site. According to California Department of Transportation (Caltrans) Technical Noise Supplement, it is theoretically possible that narrow canyons with steep slopes could result in an increase of noise greater than 3 decibels (dB); however, the slopes would need to be free of vegetation and perfectly vertical. Angled slopes, such as those located at the Proposed Project site, typically do not increase noise levels, since noise reflections are directed skyward. Although temperature and humidity have the potential to affect the propagation of noise, the impacts to noise calculations are typically nominal except for extreme examples, such as the desert with a very high temperature and low humidity, or a very cold and foggy location. Since the climate of Pasadena is moderate, the construction noise was accounted for in the Roadway Construction Noise Model (RCNM) that was utilized in the Draft EIR to calculate the onsite construction noise impacts, and it was accounted for in the FHWA-RD-77-108 model that was utilized in the Draft EIR to calculate the offsite roadway noise impacts. As discussed in the Draft EIR, Section 3.14, with implementation of Mitigation Measure MM N-1, noise impacts would be reduced to a level of less than significant.

Response to Comment 219-4:

The Draft EIR Biological Technical Report (BTR) and focused surveys provide rigorous existing conditions for biological resources (Draft EIR, Section 3.6; Appendix D, Biological Reports). These reports and related impact analyses were based on thorough field surveys conducted in 2010 and 2013, including

general biological surveys, focused sensitive plant surveys, focused least Bell's vireo and southwestern willow flycatcher surveys, and federal and state jurisdictional waters surveys.

Response to Comment 219-5:

Potential impacts due to the Proposed Project's truck trips were analyzed in the Draft EIR, Section 3.16, Transportation and Traffic. As listed in that section, a single intersection in the immediate vicinity of the Proposed Project site will have a potentially significant impact. In practice, hauling rates and routes may be adjusted to help reduce impacts, depending on operational need. As discussed in the Draft EIR, Section 3.16, Transportation and Traffic, truck traffic associated with the Proposed Project will not cause any major traffic impacts at the studied freeway segments, along any of the Haul Routes. Los Angeles County Flood Control District (LACFCD) will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the Proposed Project site.

Response to Comment 219-6:

The California Environmental Quality Act (CEQA) requires that the public comment period for a Draft EIR be at least 45 days (CEQA Guidelines § 21091). LACFCD extended this review period initially to 75 days and then further extended the review period to 90 days to allow for additional commenting time.

The document was made available at eight local libraries, the Los Angeles County Department of Public Works (LACDPW) headquarters, and online. In addition, CDs with the documents were made available upon request, and printed copies were made available for purchase at County Public Works headquarters for interested parties.

Noticing for the Proposed Project went beyond that required by CEQA Guidelines. The notices for the Proposed Project, the Notice of Preparation (NOP), and the Notice of Availability/Notice of Completion (NOA/NOC) were:

- sent to agencies, organizations, and individuals who have previously requested notices, in addition to other area agencies and organizations
- published in local newspapers, the *San Gabriel Valley Tribune* and the *Pasadena Star News*
- posted on and off site
- mailed to over 1,100 owners and occupants of contiguous property shown on the latest equalized assessment roll
- filed with the County Clerk and the State Clearinghouse
- posted at eight local libraries
- posted on the LACDPW website

From: Edwina Travis Chin
To: reservoircleanouts
Subject: DEVIL"S GATE RESERVOIR SEDIMENT REMOVAL AND MANAGEMENT PROJECT
Date: Tuesday, January 21, 2014 1:51:14 PM

January 21, 2014

To: County of Los Angeles Department of Public Works / Water Resources Division
Attn: Reservoir Cleanouts Program

Re: DEVIL'S GATE RESERVOIR SEDIMENT REMOVAL AND MANAGEMENT PROJECT

To Whom It May Concern:

Comment 220-1 I am writing to comment on the Draft Environmental Impact Report that has been submitted by the Los Angeles County Department of Public Works regarding sediment removal in the Hahamongna Watershed Park.

Comment 220-2 I feel that this massive sediment removal plan has failed to adequately address community concerns regarding impacts on natural habitat, air pollution, recreational opportunities and traffic . Additionally, I do not feel that the EIR looks at the overall potential long-term impacts on the site past the initial five-year project period.

Comment 220-3 As the saying goes, "if all you have is a hammer, everything looks like a nail". In this case, using the lens of sediment removal and flood control to look at the Devil's Gate project has resulted in an EIR report that does not fully take into consideration the importance that this site holds for the local community. Rather, conditions and attributes the community sees as resources (vegetation & wildlife) within the project area are instead presented by the report as impediments.

Comment 220-4 The area north of Devil's Gate is one of the few remaining significant open space areas in the city of Pasadena, and is important not only for flood control, but also as one of our major wildlife habitat and recreational areas. In recent years, Pasadena has renewed and strengthened its commitment to preserving our natural environment through the adoption of the Arroyo Seco Master Plan, the Open Space Element of the General Plan, and adoption of the UN Urban Environmental Accords. These documents also commit the city to reducing the impacts of vehicular traffic and greenhouse gases.

Comment 220-5 My main areas of concern that I would like to bring to your attention are Traffic, Air Quality, Recreation, Hydrology and Natural Environment.

Comment 220-6 **TRAFFIC AND AIR QUALITY**
The EIR calls for an incredibly high volume of truck traffic: 25 round trips per hour, equaling 425

round trips per day. This would take place for at least 9 and up to 12 hours a day, for 6 days a week. The months of operation would extend from April through December, but could be extended beyond that 7 month period if the weather is dry. All of this would continue for a period of 5 years. The sheer number of trips by heavy machinery will have an adverse affect on our local and regional air quality and affect traffic patterns. The resulting commuter traffic jams created by the increased truck traffic have not been factored into the potential impact on decreased air quality.

Comment 220-6 continued

RECREATION

The truck traffic and sediment removal machinery will make it almost impossible to use the Hahamongna basin for recreational purposes in the way for which this area was originally intended. Not only will there be noise and dust, but the work will be taking place 6 days a week during the daytime hours when people would be most likely to want to use the area for various outdoor activities. People visit this area to enjoy the scenery, appreciate the relative quiet, and listen to the birds – the sound of heavy machinery would destroy this experience. While there are other recreation areas listed as alternatives to the Hahamongna Basin, the EIR fails to acknowledge the unique experience and environment that this particular site offers, and which is not to be found at any of the other sites. Additionally, with the scraping out of 50 – 120 acres in the middle of the basin, the overall impact of the outdoor experience will be greatly altered.

Comment 220-7

HYDROLOGY

In addition to the Devil's Gate Reservoir area being important for flood control, it is also an important water storage area for the city of Pasadena. Vegetation cover can help with water infiltration and contribute to increased water retention. Bare earth loses some of this ability to absorb and store water when it is allowed to dry out completely, which would be the result of the intense scraping that is planned. Given the importance of maintaining and protecting our local water supplies, regularly scraping large swaths of vegetation is not the most effective way of managing our water supplies.

Comment 220-8

Tim Brick of the Arroyo Seco Foundation proposes a "Go Slow, Go With The Flow, Let The Habitat Grow, Keep Costs Low" approach. He suggests spreading the sediment removal process over a longer period of time (10 – 20 years), so that a less destructive way of cleaning out the basin can be used instead. By utilizing sluicing (Flow Assisted Sediment Transfer) rather than trucking all of the sediment out, the truck traffic and accompanying problems can be reduced, and the sediment that flows downstream can help replenish the beaches where it is needed. The natural riparian areas should be allowed to grow and continue to serve as a home for local flora and fauna. All of these above practices can help to amortize the costs over a longer period of time, potentially reducing costs of the project. By extending the project, there are opportunities to reexamine the process from economic, engineering and environmental standpoints and then adopt best practices .

Comment 220-9

NATURAL ENVIRONMENT

Some of the questions used by the California Governor's Office Of Planning and Research in CEQA review is the publication "Thresholds of Significance: Criteria for Defining Environmental

Comment 220-10

Comment 220-10 continued

Significance (OPR 1994), which includes the following:

Comment 220-11

Will this project substantially degrade the environmental quality of the existing wildlife habitat?
Under the EIR "Biological Resources" section 3.6, Figure 3.6.2 shows that 51.4 acres is Riparian Woodland (which represents over 40% of the project area.) Riparian Woodlands are relatively rare in California, comprising less than 1 percent of California's total forest acreage, yet they support one of the most diverse communities of plants and animals. All of the EIR proposed alternatives would destroy most (if not all) of the Riparian Woodland habitat within the 120 acre project area. Where is the scientific data to support this level of habitat destruction and degradation? Given this habitat's relative rarity in California, why would we be so eager to destroy it?

Comment 220-12

Will this project threaten to eliminate a plant or animal community?
There are large portions of the project area that would be scraped to bare earth on a regular basis, permanently removing all vegetation and eliminating those areas as habitat for the native and migratory animal communities.

Comment 220-13

Will this project reduce the numbers or range of a rare, threatened or endangered species?
There have been sightings in the Hahamongna basin of the Yellow Warbler (a "State species of special concern") and the Least Bell's Vireo (a federally endangered species). These species are not likely to revisit the area if the proposed destruction of the willow forest area (part of the Riparian Woodlands) is allowed to take place. Also present is the two-striped garter snake which is also a State species of special concern.

Comment 220-14

Will this project achieve short-term goals to the disadvantage of long-term goals?
Because there is such an emphasis on getting a huge amount of sediment removed in relatively short period of time, I feel that this proposed plan is more of a "slash and burn" approach, resulting in extensive damage to the existing plant and animal communities. There is nothing in the report explaining the reasoning behind a five-year project timeframe, nor is there anything in the report that would preclude having the work take place over a longer period of time, with a less drastic scouring of the project area. There is also minimal information on the plans for long-term maintenance, and no indication that there will be the opportunity to regularly review the effectiveness of the maintenance plan to make adjustments as needed.

Comment 220-15

Will this project have environmental effects that are individually limited – but cumulatively substantial – when viewed in the context of past, current and reasonably anticipated future projects?
If the focus is on moving dirt and water, then at first glance, the project appears to accomplish its objectives. However, as pointed out previously, there are a number of other factors that are important to the community and which need to be taken into consideration. Under "Section 5 – Other CEQA Considerations" the EIR has listed "significant unavoidable impacts" related to aesthetics, air quality and traffic. Additionally, the EIR states that that "Recreation impacts are less than significant", which I have already disputed above. Lastly, Pasadena already has the Arroyo Seco Master Plan, Hahamongna Master Plan, Open Space Element of the General Plan, and has adopted the UN Urban Environmental Accords and designated this site as "Natural Open Space." It is not clear from the EIR that this proposed plan complies with the objectives and guidelines in the

Comment 220-15 continued

Pasadena city documents. As Pasadena is the owner of the property, I feel that consistency with the city's plans is crucial.

Comment 220-16

It is important to note that the Environmental Advisory Commission for the City of Pasadena feels so strongly about the shortcomings of the Devil's Gate Reservoir EIR that they wrote a memo to the Pasadena City Council urging them to meet with LA County to address a number of concerns, including the ones raised in this letter and many other points.

Comment 220-17

I agree that flood and sediment control in the Devil's Gate Reservoir area is an important issue of public safety. However, I don't feel that any of the plan alternatives presented in the current draft EIR do an adequate job of explaining why the sediment removal plan calls for such extensive and drastic removal of existing flora and fauna and why mitigation measures presented are often nebulous (and frequently not listed as being necessary at all.)

Comment 220-18

I would encourage the LA County of Public Works to address the following:

Comment 220-19

- Address the gaps in this report regarding the scientific justification for the numbers in the EIR, particularly with regard to the amount of sediment removal being recommended and the proposed timetable.

Comment 220-20

- Consider the alternate "Go Slow, Go With The Flow, Let The Habitat Grow, Keep Costs Low" work plan suggested by Tim Brick of the Arroyo Seco Foundation.

Comment 220-21

- Work with the City of Pasadena to come up with a long-term plan for the Hahamongna Watershed Park that will be more environmentally sensitive and consistent with Pasadena's existing Arroyo Seco Master Plan,Hahmongna Master Plan, Open Space Element of the General Plan and the area's zoning as Natural Open Space.

Thank you for your consideration of the above.

Sincerely,

Edwina Travis-Chin
1398 N. Sierra Bonita Ave.
Pasadena CA 91104

Response to Comment Letter #220 (Edvina Travis Chin)

Response to Comment 220-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

Response to Comment 220-2:

The Draft Environmental Impact Report (EIR) adequately analyzes impacts to natural habitat in Section 3.6 Biological Resources, to air quality in Section 3.5 Air Quality, to recreational opportunities in Section 3.15 Recreation, and to traffic in Section 3.16 Transportation and Traffic. Within each issue analysis, the impacts are discussed in terms of sediment removal phase, which is the initial five-year period, and reservoir management phase, which is after the initial sediment removal and involves the long-term management of the project.

Response to Comment 220-3:

Los Angeles County Flood Control District (LACFCD) recognizes the importance of the reservoir to the community, and the Draft EIR analyzes impacts to the vegetation and wildlife. As discussed in Section 3.6.6 of the Draft EIR, Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats. In addition, sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays). Wildlife species currently found in the Proposed Project area would be expected to either remain in the undisturbed areas of the reservoir outside of the Proposed Project area or to reestablish once sediment removal activities have been completed.

Alternative 3, Configuration D affects the least amount of habitat of all the action alternatives while still achieving Proposed Project objectives (see Section 4.6 of the Final EIR). This alternative would provide a buffer on the west side of the reservoir that would allow for the movement of wildlife. Alternative 3, Configuration D, Option 1 provides a more natural configuration for the reservoir by having two branches to carry water and sediment toward the face of the dam, avoiding disturbing a significant portion of existing vegetation. To further reduce the Proposed Project's footprint, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2, which drastically reduces the project's footprint of 120 acres down to 71 acres, would avoid excavation of the western branch, thereby providing a greater habitat buffer on the west side of the reservoir. In addition, the maintenance areas would be smaller than the original sediment removal footprint, allowing for habitat to reestablish and providing additional areas for wildlife movement.

Response to Comment 220-4:

See Response to Comment 220-3. LACFCD recognizes that the reservoir is not only important for flood control but is also a significant open space area where unique habitat and wildlife are present. Alternative 3, Configuration D, which was found to be the Environmentally Superior Alternative in the Draft EIR, was based on the City of Pasadena's Hahamongna Watershed Park Master Plan (HWPMP). LACFCD has met and will continue to meet with the City of Pasadena regularly to coordinate and ensure resolution of concerns regarding Devil's Gate Reservoir and the HWPMP. As discussed in the Draft EIR,

Section 3.12.6, Land Use and Planning, the Proposed Project will not have any significant impacts or conflict with the applicable land use plans, policies, or regulations of adopted plans.

Impacts to recreation were analyzed in the Draft EIR, Section 3.15. The Proposed Project will not limit the use of the Oak Grove area of Hahamongna Watershed Park. Sediment removal activities would be temporary and are expected to occur only in the drier months (April to December, excluding holidays). It is expected that these activities will often not be adjacent to the Oak Grove area of Hahamongna Watershed Park. The Proposed Project would result in temporary limitations on the recreational use of the Proposed Project site and some of the adjacent trails. Most of these areas would be reopened seasonally or intermittently throughout the sediment removal process. In addition, temporary impacts to designated recreational facilities and trails will be minimized through advance communication and redirection to the nearest facility in the vicinity of the Proposed Project. Furthermore, an east-west trail crossing will continue to provide access at the north end of the reservoir. At the south end of the reservoir, after the reservoir ingress and egress ramps have been fully constructed, access to the upper east side Arroyo Seco Trail from La Cañada Verdugo Road will be maintained; and the linkage from the west side Arroyo Seco Trail and the Flint Wash Trail to the upper east side Arroyo Seco Trail (crossing Devil's Gate Dam and also continuing south to the Rose Bowl) will be available after construction activities have ended each day and on nonworking days.

Potential impacts due to the Proposed Project's truck trips were analyzed in the Draft EIR, Section 3.16, Transportation and Traffic. As listed in that section, a single intersection in the immediate vicinity of the Proposed Project site will have a potentially significant impact.

Per Section 3.9.6 of the Draft EIR, impacts to greenhouse gas emissions were found to be less than significant, and impacts to biological resources were found to be less than significant with mitigation incorporated as shown in Section 3.6.6 of the Draft EIR.

Response to Comment 220-5:

LACFCD notes the commenter's main areas of concern. The specific comments have been responded to below.

Response to Comment 220-6:

See Response to Comment 220-4. The Draft EIR traffic analysis provided conservative roadway condition volumes that accounted for peak hours, expansion and regional growth within the study area. Air quality impacts associated with truck traffic were analyzed in the Draft EIR in Section 3.5. LACFCD has conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed the United States (U.S.) Environmental Protection Agency's (EPA's) 2007 standards for emissions. Therefore, in order to further reduce emissions, Mitigation Measure MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump trucks that meet or exceed EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality, including those associated with health effects, will be reduced to less than significant.

The Draft EIR outlines a 12-hour trucking schedule, with trucking operations on Saturdays as well. This schedule is used to model the most intensive construction operation, which may not be applicable at the site for the duration of the Proposed Project. Typical trucking schedules are estimated to be 8 hours per day on weekdays. In practice, hauling rates and routes may be adjusted to help reduce impacts,

depending on operational need. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the Proposed Project site.

Response to Comment 220-7:

See Response to Comments 220-4 and 220-6. As discussed in the Draft EIR, Section 3.14, with implementation of Mitigation Measure MM N-1, noise impacts would be reduced to a level of less than significant.

Response to Comment 220-8:

As stated in the Draft EIR, the Proposed Project will remove accumulated sediment deposits within the reservoir. This means the percolation characteristics of the reservoir will return to pre-Station Fire conditions if not improve; and the reservoir will still permit penetration of rainfall and percolation of local runoff to replenish the groundwater basin. Sediment removal will restore Devil's Gate Reservoir to its current design standard of the ability to contain two design debris events (DDEs). As such, the reservoir will have the ability to contain more of the local runoff, which in turn could result in more runoff penetrating into the ground in the Proposed Project area and subsequently recharging the groundwater basin. In addition, by keeping the reservoir clear of future sediment deposits, the Proposed Project will reduce the potential for accumulated sediment to negatively impact the percolation rate.

Response to Comment 220-9:

LACFCD goes to great lengths to lessen project impacts and maximize efficiencies. As such, many of the points in the Arroyo Seco Foundation's four-point "Slow Program" are compatible with the LACFCD Proposed Project.

For example, the Draft Environmental Impact Report (EIR) selected Alternative 3 as the Environmentally Superior Alternative. Alternative 3 drastically reduces the project's footprint of 120 acres down to 71 acres. Additionally, the limited maintenance area for Alternative 3 further reduces the permanent habitat impacts down to approximately 51 acres by allowing for site replanting and mitigation to take place within the reservoir footprint. This reduction in project acreages will greatly lessen environmental impacts of the Proposed Project.

LACFCD strives to achieve an efficient, low-cost sediment removal project. Sediment removal rates and trucking operations, now utilizing all low-emissions trucks, as explained in Section 3.5 of the Draft EIR, have been carefully planned for economies of scale to realize maximum efficiencies without major delays in project schedule, thus greatly reducing operating costs. Furthermore, LACFCD has applied for and received an approximately $28 million grant through the State's Disaster Preparedness and Flood Protection Bond Act of 2006 (Proposition 1E) program. A portion of this grant will be used to help offset the Proposed Project's costs.

While sluicing is not a viable project alternative, as explained in Section 4.7 of the Draft EIR, Flow Assisted Sediment Transport, or FASTing, will be used for maintenance after the project's main sediment removal phase has been completed, as described in Section 2.5.2 of the Draft EIR.

For a more detailed response to the Arroyo Seco Foundation's four-point "Slow Program", please see the response to the Arroyo Seco Foundation's comment letter (Comment Letter #216, Response to Comment 216-16).

Response to Comment 220-10:

The Draft EIR used the 2013 California Environmental Quality Act (CEQA) Statues and Guidelines Thresholds, which include significance thresholds similar to those mentioned in the commenter's letter.

Response to Comment 220-11:

See Response to Comment 220-3.

LACFCD was mandated by the State Legislature to provide flood protection and water conservation within its boundaries.

A reservoir storage design capacity of two DDEs below the dam's lowest spillway was determined to be the standard acceptable level of risk at Devil's Gate Dam and Reservoir. The DDE volume of capacity is determined using the January 2006 Los Angeles County Department of Public Works (LACDPW) Hydrology Manual and the March 2006 LACDPW Sedimentation Manual. For Devil's Gate Dam and Reservoir, the required reservoir capacity is 4.0 million cubic yards (cy) (two DDEs) below the spillway elevation of 1,040.50 feet.

The Hydrology Manual (January 2006) can be viewed here:

http://dpw.lacounty.gov/wrd/publication/engineering/2006_Hydrology_Manual/2006%20Hydrology%20Manual-Divided.pdf

The Sedimentation Manual (March 2006) can be viewed here:

http://dpw.lacounty.gov/wrd/publication/engineering/2006_sedimentation_manual/Sedimentation%20Manual-Second%20Edition.pdf

Additional information concerning DDE calculation methods has been added to the Final EIR, Section 2.3, Project Need.

Sediment removal will restore Devil's Gate Reservoir to its current design standard of the ability to contain two DDEs. If the reservoir is left in its current state, the flood risk to downstream communities would remain at an unacceptable level. In order to remove the necessary amount of sediment from the reservoir, some vegetation must be removed, as the vegetation sits atop many layers of accumulated sediment.

Response to Comment 220-12:

See Response to Comment 220-3. Sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays). In addition, sediment removal activities would not completely block the Proposed Project site from surrounding habitat, would occur

only during the day, and would not interfere with nighttime wildlife activity. Although some wildlife may be temporarily displaced during construction, wildlife would not be physically prevented from moving around and into the basin area.

The protective Mitigation Measures MM BIO-1, MM BIO-2, MM BIO-3, MM BIO-4, and MM BIO-5 would avoid and minimize any impacts associated with Proposed Project activities. Therefore, the potential impacts to wildlife movement and corridors are anticipated to be less than significant.

Response to Comment 220-13:

See Response to Comments 220-3 and 220-12. Impacts to rare, threatened, or endangered species are discussed in Section 3.6 Biological Resources, under BIOLOGY-1.

Response to Comment 220-14:

See Response to Comment 220-11.

LACFCD proposed a project duration of five years to reduce accumulated sediment in a timely fashion. The goal of LACFCD is to restore reservoir flood capacity as soon as feasible while reducing costs, minimizing the duration of environmental and construction impacts to the surrounding communities, and configuring the reservoir to allow for sustainable future maintenance. Extending the project would prolong the flood risk to downstream communities and increase the construction impacts to the surrounding communities.

After the sediment removal phase has occurred, FASTing is proposed to be an integral part of the annual maintenance at Devil's Gate. Annual FASTing operations will be implemented to reduce future buildups of sediment in the reservoir and to reduce the need for mechanical removal of sediment from the reservoir. Although FASTing is expected to be an effective means of keeping sediment levels low in the reservoir, it is estimated that typically 13,000 cy of sediment will be removed by excavation annually; however, a maintenance regime that relies on FASTing greatly reduces the need for and extends the life of future and existing sediment placement sites and improves the future sustainability of the reservoir. Please see Section 2.5.2 of the Draft EIR for more information on future maintenance.

Response to Comment 220-15:

Response to Comments 220-4 and 220-6. The Draft EIR analyzes cumulative impacts under each of the impact area discussions. The cumulative analysis contains projects determined by LACFCD and the surrounding cities and communities to have a potential cumulative effect due to overlapping time frames of the projects. Potential projects that were determined to be outside the area of influence or sediment-removal phase of the project schedule, or lacking sufficient project detail, were not considered to be reasonable foreseeable probable future projects, as set forth in the CEQA Guidelines Section 15130. As noted in the Draft EIR, Section 3.4, Aesthetics, the Proposed Project will have significant temporary impacts to aesthetics; however, after the sediment removal phase of the Proposed Project is complete, a habitat restoration plan will be implemented that will allow native plant communities to reestablish outside the reservoir management area. Riparian Herbaceous vegetation is expected to continue to populate and/or reestablish in the management area of the Proposed Project site between maintenance activities.

Response to Comment 220-16:

A comment letter was received from the City of Pasadena and is included in this Response to Comments document.

Response to Comment 220-17:

See Response to Comment 220-11, above. Table ES-1 of the Draft EIR, lists all 17 of the Mitigation Measures proposed for the Proposed Project. These Mitigation Measures are enforceable and designed to reduce impacts through methods known to be feasible and effective. The Proposed Project's Mitigation Measures are accepted by agencies that would be involved in consultation, negotiation, and final approval of Mitigation Measures, including conceptual restoration plans. Mitigation measures are implemented for impacts that are potentially significant. Therefore, impacts that are less than significant do not require mitigation.

Response to Comment 220-18:

The specific comments have been addressed below.

Response to Comment 220-19:

See Response to Comments 220-11 and 220-14.

Response to Comment 220-20:

See Response to Comment 220-9.

Response to Comment 220-21:

See Response to Comment 220-4.

From: Grace Wang
To: reservoircleanouts
Subject: Devil"s Gate Reservoir Sediment Removal and Management Project
Date: Tuesday, January 21, 2014 5:02:07 PM

To: Gale Farber, Director, Department of Public Works
Christopher Stone, Assistant Deputy Director, Water Resources Division
ATTN: Reservoir Cleanouts Program
P.O. Box 1460
Alhambra, CA 91802-1460

Hi Director Farber,

I fully support the comments made by the Pasadena Audubon Society and oppose the current plan for the following reasons:

Comment 221-1

- Significant Increases in Air and Noise Pollution

- Permanent Loss of Significant and Critical Habitat

- Absent or Inadequate Mitigation of Habitat Loss

Especially of concern is the inadequacy of the biological section of the report. Of specific concern are raised by the following questions:

Comment 221-2

Why does the list of birds not include the 150+ other species we know to be there? Where are maps that show the nesting areas of Yellow Warbler? Why does the report confuse current and former names for species such as the Western Toad AKA California Toad? Why does the report not refer to the Coast Patch-nose Snake as a federally listed snake and as a California Species of Special Concern? Why does the report ignore the fact that a federally-listed bird species, the 'Least' Bell's Vireo, nested in the basin in 2012? Why did the biologists not consult organizations, such as ours, that regularly conduct surveys in Hahamongna? Did the biologists consult with the California Native Plant Society regarding plant species of Special Concern? Why does the report ignore the County's designation of Hahamongna Watershed Park as a Significant Ecological Area?

Thank you for your attention.

Grace Wang

Response to Comment Letter #221 (Grace Wang)

Response to Comment 221-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

Air quality and noise impacts associated with truck traffic were analyzed in the Draft Environmental Impact Report (EIR) in Sections 3.5 and 3.14, respectively. As discussed in the Draft EIR, Section 3.14, with implementation of Mitigation Measure MM N-1, noise impacts would be reduced to a level of less than significant. Los Angeles County Flood Control District (LACFCD) has conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed the United States (U.S.) Environmental Protection Agency's (EPA's) 2007 standards for emissions. Therefore, in order to further reduce emissions, Mitigation Measure MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump trucks that meet or exceed EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality, including those associated with health effects, will be reduced to less than significant.

As discussed in Section 3.6.6 of the Draft EIR, Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats. In addition, sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays).

Mitigation Measures BIO-1 through BIO-8 are enforceable and designed to reduce impacts through methods known to be feasible and effective. These mitigation measures are common to the California Environmental Quality Act (CEQA) and accepted by agencies that would be involved in consultation, negotiation, and final approval of mitigation measures, including conceptual restoration plans. As with any project that involves California Department of Fish and Wildlife (CDFW), U.S. Army Corps of Engineers (USACE), and Regional Water Quality Control Board (RWQCB) jurisdictional areas, the ultimate mitigation for impacts related to the wetlands and drainages under the jurisdiction of the resource agencies is negotiated with the resource agencies during the regulatory permitting process. LACFCD has been and will continue to work closely with CDFW and USACE to identify appropriate mitigation, replacement ratios, and sites for restoration and enhancement that will offset impacts and satisfy the requirements of all applicable laws. A detailed restoration plan will be prepared and provided to CDFW and USACE for review and approval prior to project implementation. Prior to commencement of the Proposed Project, LACFCD will have obtained all necessary permits for impacts to CDFW, USACE, and RWQCB jurisdictional areas including Section 401 Certification, Section 404 permit, and a Streambed Alteration Agreement. Clean Water Act Section 404 (b)(1) guidelines will be followed as a framework for compensatory mitigation. Through 404(b)(1) negotiations with USACE and negotiations with CDFW under Fish and Game Code Sections 1600-1616, a determination of the functions and values of impacted jurisdictional waters shall result in the coordination of appropriate mitigation measures for sediment removal.

Alternative 3, Configuration D affects the least amount of habitat of all the action alternatives while still achieving Proposed Project objectives (see Section 4.6 of the Final EIR). This alternative would provide a buffer on the west side of the reservoir that would allow for the movement of wildlife. Alternative 3, Configuration D, Option 1 provides a more natural configuration for the reservoir by having two

branches to carry water and sediment toward the face of the dam, avoiding disturbing a significant portion of existing vegetation. To further reduce the Proposed Project's footprint, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2, which drastically reduces the project's footprint of 120 acres down to 71 acres, would avoid excavation of the western branch, thereby providing a greater habitat buffer on the west side of the reservoir. In addition, the maintenance areas would be smaller than the original sediment removal footprint, allowing for habitat to reestablish and providing additional areas for wildlife movement.

Response to Comment 221-2:

Many local organizations, including the Pasadena Audubon Society, Hahamongna Watershed Park Advisory Committee, the Urbanwild Network, and the Arroyo Seco Foundation, were contacted about the Proposed Project prior to the Draft EIR being prepared. In January 2012, a representative of the Pasadena Audubon Society was contacted for information the Society has concerning birds observed in the Proposed Project area. The information provided was used in preparing the biological resources section of the Draft EIR. Species with the potential to occur within the Proposed Project and species that were identified during surveys are presented in the biological survey reports in Appendix D of the Draft EIR. Factors used to determine the potential for occurrence included the quality of habitat, elevation, and the results of the reconnaissance survey. The locations of prior database records and species lists of occurrence were used as additional data; but since these are positive-sighting databases, this data was used only in support of the analysis from the previously identified factors. Based on the results of the Biological Technical Report (BTR), additional protocol level focused surveys were conducted for Proposed Project as described in Section 3.6.2, Special Status Plant Species and Special Status Animal Species of the Draft EIR.

As shown in Table 3.6-3 in the Draft EIR, both least Bell's vireo and yellow warbler are listed as present within the Proposed Project site. Additional sightings will not affect their status as present, which was accounted for in the Draft EIR within the Proposed Project site, and do not add any additional constraints to those mentioned in the analysis in the Draft EIR. The species recorded during surveys specifically for the Proposed Project are presented in the (BTR in Appendix D of the Draft EIR. The coast patch-nosed snake was observed on site, and the state and federal status has been included in the Draft EIR. As discussed in the Draft EIR, Section 3.6.6, Sensitive Wildlife, to avoid harm or take of any special status wildlife species, mitigation measures MM BIO-1, MM BIO-2, MM BIO-3, MM BIO-4, and MM BIO-5 will be implemented. These include preconstruction surveys, having a biological monitor on site during construction, and measures to avoid impacts to sensitive species. With implementation of these mitigation measures, direct impacts to biological resources would be less than significant.

Species names used in the Draft EIR were consistent with the Hahamongna Watershed Park Master Plan (HWPMP) by request of the City of Pasadena to maintain consistency with the HWPMP. Species names have been updated, and duplications of species have been eliminated in the Final EIR. Status listings for sensitive species have been updated, as appropriate.

The Proposed Project is not located in a currently adopted Significant Ecological Area (SEA). The Los Angeles County Department of Regional Planning is currently in the process of updating the SEA Program. The Proposed Project is located within the Proposed Altadena Foothills and Arroyos SEA. Regional Planning's SEA updates, including the Proposed SEAs, have not been adopted, nor are they covered under the current Hillside Management Area and SEA Ordinance.

Nevertheless, the SEA does not change the land use designation or the zoning of a property. The intent of the proposed SEA regulations is not to preclude development but to allow limited, controlled development that does not jeopardize the unique biotic diversity within the County. Under the Ordinance for the Proposed SEA, safety activities and existing permitted uses are exempt.

As discussed in the Draft EIR, Section 3.12.6, Land Use and Planning, the Proposed Project will not have any significant impacts or conflict with the applicable land use plans, policies, or regulations of adopted plans.

From: Joyce Dillard
To: reservoircleanouts
Subject: Comments to Devil"s Gate Reservoir Sediment Removal and Management Project due 1.21.2014
Date: Tuesday, January 21, 2014 4:06:30 PM

Comment 222-1

The projects removal percentages for the Alternatives are:

Proposed A-70.94%
Proposed B-70.25%
Proposed C-110.65%
Alternative 1-70.25%
Alternative 2-110.65%
Alternative 3-67.59%
Alternative 4-71.03%

There is not enough differential information to conclude that there are true alternatives.

Comment 222-2

Cost benefit factors are missing as are operations and maintenance factors outside the capital cost.

Comment 222-3

We disagree and believe the following factors need analysis for this report:

Agriculture and Forest Resources
Public Services (fire protection, police protection, schools, and other public facilities)

Comment 222-4

The following should be analyzed in relationship to growth, recreationally and land use and the effects of flooding:

Population and Housing

Joyce Dillard
P.O. Box 31377
Los Angeles, CA 90031

Response to Comment Letter #222 (Joyce Dillard)

Response to Comment 222-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

Pursuant to Section 15126.6(a) of the California Environmental Quality Act (CEQA) Guidelines, "[a]n EIR shall describe a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project, and evaluate the comparative merits of the alternatives." However, "[a]n EIR is not required to consider alternatives which are infeasible" (CEQA Guidelines Section 15126.6(a)) or "which could change the fundamental nature of the proposed project." (*Al Larson Boat Shop, Inc. v. Board of Harbor Comm. (*1993) 18 Cal.App.4th 729, 745.) The alternatives discussed in the Environmental Impact Report (EIR) must be reasonable alternatives, selected to foster informed decision-making and public participation (CEQA Guidelines 15126.6(a)). An EIR need not consider an alternative whose effect cannot reasonably be ascertained or whose implementation is remote and speculative because unrealistic alternatives do not contribute to a useful analysis (CEQA Guidelines 16126.6(f)(3)). Additionally, an alternative may be rejected from detailed analysis in an EIR if it fails to reduce or avoid the project's significant environmental effects, does not implement the basic project objectives, is not potentially feasible, or is facially unreasonable. 14 C.C.R. §15126.6(c); Id., see also *Mann v. Community Redevelopment Agency* (1991) 233 Cal. App. 3d 1143; *Del Mar Terrace Conservancy, Inc. v. City Council* (1991) 10 Cal. App. 4th 712.

The Draft EIR, Section 4, fully analyzed six alternatives including the No Project Alternative. These alternatives substantially lessen one or more significant effects of the Proposed Project and, with the exception of the mandatory No Project Alternative, would feasibly attain most of the basic objectives of the Proposed Project. These alternatives include options for different amounts of removal, different methods of removal, and a different haul route.

Response to Comment 222-2:

Under CEQA, the lead agency is not required to analyze an economic impact associated with a project in the EIR; as Section 15131(a) of the CEQA Guidelines states: "Economic or social effects of a project shall not be treated as significant effects on the environment." Moreover, CEQA allows economic analysis in the administrative record only if the basis for infeasibility, and thus rejection of a mitigation or alternative, is economic, as described in CEQA Guidelines Sections 15091(a)(3) and 15364.

Response to Comment 222-3:

The Draft EIR for the Proposed Project is a full EIR; the only issues not covered in the Draft EIR were issues identified as not significant environmental issues during the Initial Study/Notice of Preparation phase, in order to narrow the focus of the EIR as directed under CEQA Guidelines Section 15063. See Appendix A of the Draft EIR.

These impact areas were scoped out during the Initial Study process. As noted in Appendix A of the Draft EIR, no agricultural activities presently occur on site. The site is not designated as Prime Farmland, Unique Farmland, or Farmland of Statewide Importance; and there is no farmland in the immediate

vicinity of the project site. In addition, the Proposed Project site does not contain any forest land or timberland.

In addition, as noted in Appendix A of the Draft EIR, project activities may temporarily increase the need for fire protection services; however, avoidance measures will be coordinated with the Pasadena Fire Department prior to sediment removal activities to reduce the potential for accidental fire during project implementation. The Proposed Project is not expected to increase the need for police protection services, as project activities would not change the existing land uses or increase the number of service calls. No impacts associated with the need for new or expanded schools are anticipated to result from project implementation, as levels of populations will not be affected; thus, no new schools will need to be built as a result of the proposed project that would cause significant environmental impacts.

Response to Comment 222-4:

This impact area was scoped out during the Initial Study process. As noted in Appendix A of the Draft EIR, the Proposed Project involves restoration and maintenance of the existing reservoir and would not stimulate population growth. Recreation and land use are addressed in the Draft EIR in Section 3.15 Recreation and Section 3.12 Land Use and Planning.

As noted in Appendix A of the Draft EIR, the Proposed Project involves sediment removal from the reservoir behind Devil's Gate Dam, which will, in fact, decrease the risk of loss, injury, or death involving flooding, both above and below the dam. In its current state, the reservoir has accumulated a large volume of sediment behind the dam, which puts the surrounding communities at risk for potential flooding. The sediment removal will alleviate the heightened level of this risk. Therefore, the Proposed Project will not expose people or structures to a significant risk of loss, injury, or death involving flooding; and no further study of the issue is required.

From: Kiley Akers
To: reservoircleanouts
Subject: Hahamongna / Devil"s Gate - A more sustainable plan is needed.
Date: Tuesday, January 21, 2014 4:05:55 PM

Comment 223-1

I'm writing to you with regard to saving the Hahamonga Watershed and the proposed sediment removal project put forth by the L.A. County DPW.

I'm of the opinion that sediment can be removed in a more sustainable fashion than what is being suggested by the DPW. The thought of losing habitat, animals, recreation and precious open space is heart breaking.

Comment 223-2

I also am concerned about the pollution (noise and air) and congestion that may very well result from the proposed project. Two schools are adjacent to Hahamogna.

Comment 223-3

I am a runner and Coach with Team in Training (www.teamintraining.org). In a nutshell we train for endurance events and raise funds for The Leukemia and Lymphoma Society. We are in Hahamongna Watershed Park training almost every Saturday. The soft trails free of cars are appreciated. I personally train in the area at least a few times a week. I see many others out their enjoying the space and it's beauty (equestrians, hikers' dog walkers, young people, older people etc.)

Comment 223-4

My hope is that a more sustainable approach will be taken to remove sediment from behind Devil's Gate. The one proposed by DWP seems too aggressive and destructive to this valuable open space that many enjoy and value. Go slow and go with the flow.

Respectfully,

Kiley Akers

Response to Comment Letter #223 (Kiley Akers)

Response to Comment 223-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. Los Angeles County Flood Control District (LACFCD) notes the commenter's opinion that sediment can be removed in a more sustainable fashion.

As discussed in Section 3.6.6 of the Draft Environmental Impact Report (EIR), Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats. In addition, sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays). Wildlife species currently found in the Proposed Project area would be expected to either remain in the undisturbed areas of the reservoir outside of the Proposed Project area or to reestablish once sediment removal activities have been completed.

Impacts to recreation were analyzed in the Draft EIR, Section 3.15. The Proposed Project will not limit the use of the Oak Grove area of Hahamongna Watershed Park. Sediment removal activities would be temporary and are expected to occur only in the drier months (April to December, excluding holidays). It is expected that these activities will often not be adjacent to the Oak Grove area of Hahamongna Watershed Park. The Proposed Project would result in temporary limitations on the recreational use of the Proposed Project site and some of the adjacent trails. Most of these areas would be reopened seasonally or intermittently throughout the sediment removal process. In addition, temporary impacts to designated recreational facilities and trails will be minimized through advance communication and redirection to the nearest facility in the vicinity of the Proposed Project. Furthermore, an east-west trail crossing will continue to provide access at the north end of the reservoir. At the south end of the reservoir, after the reservoir ingress and egress ramps have been fully constructed, access to the upper east side Arroyo Seco Trail from La Cañada Verdugo Road will be maintained; and the linkage from the west side Arroyo Seco Trail and the Flint Wash Trail to the upper east side Arroyo Seco Trail (crossing Devil's Gate Dam and also continuing south to the Rose Bowl) will be available after construction activities have ended each day and on nonworking days.

Alternative 3, Configuration D affects the least amount of habitat of all the action alternatives while still achieving Proposed Project objectives (see Section 4.6 of the Final EIR). This alternative would provide a buffer on the west side of the reservoir that would allow for the movement of wildlife. Alternative 3, Configuration D, Option 1 provides a more natural configuration for the reservoir by having two branches to carry water and sediment toward the face of the dam, avoiding disturbing a significant portion of existing vegetation. To further reduce the Proposed Project's footprint, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2, which drastically reduces the project's footprint of 120 acres down to 71 acres, would avoid excavation of the western branch, thereby providing a greater habitat buffer on the west side of the reservoir. In addition, the maintenance areas would be smaller than the original sediment removal footprint, allowing for habitat to reestablish and providing additional areas for wildlife movement.

Response to Comment 223-2:

Air quality and noise impacts associated with truck traffic were analyzed in the Draft EIR in Sections 3.5 and 3.14, respectively. As discussed in the Draft EIR, Section 3.14, with implementation of Mitigation Measure MM N-1, noise impacts would be reduced to a level of less than significant. LACFCD has

conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed the United States (U.S.) Environmental Protection Agency's (EPA's) 2007 standards for emissions. Therefore, in order to further reduce emissions, Mitigation Measure MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump trucks that meet or exceed EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality, including those associated with health effects, will be reduced to less than significant.

Potential impacts due to the Proposed Project's truck trips were analyzed in the Draft EIR, Section 3.16, Transportation and Traffic. As listed in that section, a single intersection in the immediate vicinity of the Proposed Project site will have a potentially significant impact. In practice, hauling rates and routes may be adjusted to help reduce impacts, depending on operational need. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the Proposed Project site.

Response to Comment 223-3:

See Response to Comment 223-1.

Response to Comment 223-4:

LACFCD goes to great lengths to lessen project impacts and maximize efficiencies. As such, many of the points in the Arroyo Seco Foundation's four-point "Slow Program" are compatible with the LACFCD Proposed Project.

For example, the Draft Environmental Impact Report (EIR) selected Alternative 3 as the Environmentally Superior Alternative. Alternative 3 drastically reduces the project's footprint of 120 acres down to 71 acres. Additionally, the limited maintenance area for Alternative 3 further reduces the permanent habitat impacts down to approximately 51 acres by allowing for site replanting and mitigation to take place within the reservoir footprint. This reduction in project acreages will greatly lessen environmental impacts of the Proposed Project.

LACFCD strives to achieve an efficient, low-cost sediment removal project. Sediment removal rates and trucking operations, now utilizing all low-emissions trucks, as explained in Section 3.5 of the Draft EIR, have been carefully planned for economies of scale to realize maximum efficiencies without major delays in project schedule, thus greatly reducing operating costs. Furthermore, LACFCD has applied for and received an approximately $28 million grant through the State's Disaster Preparedness and Flood Protection Bond Act of 2006 (Proposition 1E) program. A portion of this grant will be used to help offset the Proposed Project's costs.

While sluicing is not a viable project alternative, as explained in Section 4.7 of the Draft EIR, Flow Assisted Sediment Transport, or FASTing, will be used for maintenance after the project's main sediment removal phase has been completed, as described in Section 2.5.2 of the Draft EIR.

LACFCD is committed to *Public Service that Works*; and by combining almost 100 years of technical expertise and invaluable input from the community, less invasive flood protection will continue to be a reality.

For a more detailed response to the Arroyo Seco Foundation's four-point "Slow Program", please see the response to the Arroyo Seco Foundation's comment letter (Comment Letter #216, Response to Comment 216-16).

LINDA VISTA-ANNANDALE ASSOCIATION
P. O. Box 94364
Pasadena, CA 91109

January 20, 2014

To: County of Los Angeles
Department of Public Works
Water Resources Division
Attn: Reservoir Cleanouts Program
P.O. Box 1460
Alhambra, CA 91802-1460
reservoircleanouts@dpw.lacounty.gov

From: Linda Vista-Annandale Association (LVAA)

Contact: Nina Chomsky, President; email: president@lvaa.net

RE: Comments: Draft Environmental Impact Report for Devil's Gate Reservoir Sediment Removal and Management Project

The Linda Vista-Annandale Association (LVAA) appreciates this opportunity to comment on the Draft Environmental Impact Report (DEIR) for the proposed Project entitled Devil's Gate reservoir Sediment Removal Management Project.

Incorporated in 1930, LVAA is a California non-profit, mutual benefit corporation, tax exempt under IRC Section 501(c)(4), and corresponding California lax law. LVAA is dedicated to the preservation, protection, improvement and development of the Linda Vista~Annandale neighborhood area of Pasadena, and to the promotion of the general welfare of Linda Vista~Annandale residents. LVAA is registered with the City of Pasadena as a recognized neighborhood association.

Comment 224-1

The Linda Vista~Annandale area consists of roughly 2.5 square miles, extending from the west bank of the Arroyo Seco to the western City of Pasadena limits, and from the Devil's Gate Dam and the 210 Freeway on the north to the 134 Freeway on the south. The Linda Vista-Annandale area runs continuously along the Western edge of

Comment 224-1 continued

the Central Arroyo portion of the Central Arroyo, and is immediately adjacent to the Rose Bowl.

The neighborhood includes, and LVAA represents, approximately 1,350 single-family homes.

1. **Project Description.** The Project description is legally inadequate in that it includes apparent inaccuracies, inconsistencies, and is incomplete, as to the necessary project scope. There are apparently inaccurate, inconsistent or incomplete statements in a number of official LACDPW documents and public meetings and hearings regarding the amount of sediment that will be removed and the remaining capacity for sediment placement behind the dam. It is apparent that the justification for the project, the quantity of sediment to be removed, and the excavation acreage are in dispute. Reference is made to the Comment Letter submitted by Friends of Hahamongna dated January 19, 2014, for a detailed analyses of the apparent inaccuracies, inconsistencies

Comment 224-2

and incomplete aspects of the Project description which make it impossible for the public and decision makers to determine from the DEIR what exactly is the current Dam capacity; what exactly is the current risk of downstream flooding, and, what exactly is the amount of sediment that must be removed to meet Project objectives. Without accurate and reliable information, decision makers cannot determine downstream public safety while preserving and maintaining Hahamongna as well as the communities and residential neighborhoods surrounding the Arroyo Seco by reducing and mitigating significant project impacts.

2. Project Alternatives. It should be noted that LVAA accepts the proposition that it is necessary to remove sediment from behind Devils Gate dam. However, the DEIR does

Comment 224-3

not identify and analyze a truly environmentally superior alternative, and, therefore, is deficient in that it fails to propose and evaluate alternatives in a legally adequate manner.

Comment 224-4

First, the alternatives section is extremely confusing and difficult to follow. Each alternative is considered separately and its environmental impacts are divided into issue

areas. Despite the 350 page length of the Alternatives section, there is no simple, straightforward narrative discussion which compares and contrasts understandably the several alternatives so that the public and decision makers can make an informed decision as to which alternative would be best. The DEIR alternative described as the Environmentally Superior Alternative gets two short paragraphs and no discussion as to why it was not chosen by the County as the Preferred Project. In the final EIR, all alternatives must be presented in a format which allows the reader to easily compare the environmental impacts of the alternatives.

Comment 224-4 continued

The least objectionable of the alternatives proposed in the DEIR is Alternative 3 (Configuration D), referred to in the DEIR as the Environmentally Superior Alternative. In light of considerable evidence in the public record, however, it is clear that there are far more superior alternatives meeting the project objectives which should be considered in the final EIR.

Comment 224-5

A possible, although less environmentally desirable, non-DEIR alternative would be for LACDPW to return to its initial proposal to remove 1,670,000 cy of sediment which would scour only 50 acres and keep permanently cleared only 15 acres. There is ample evidence in the public record that Flood Control believed this plan to be sufficient to provide flood protection to the downstream communities despite the far more damaging alternatives now proposed in the DEIR.

Comment 224-6

Further, the DEIR fails to consider other possible less impactful alternatives. Los Angeles County's own documents and their historical removal of sediment in the basin prove that a slower, more environmentally sensitive approach can keep the downstream areas safe. LACDPW has never removed more than 750,000 cy of sediment at one time from behind Devil's Gate Dam and yet the downstream communities have been safe for 75 years. In 1977, the year that 750,000 cy of sediment was removed, the amount of sediment in storage was 3.9 mcy or about the same amount in storage now per public record information. Based on the historical record, a sediment removal alternative should have been developed and considered for the removal of a maximum of 750,000 cy of sediment. Removing this amount of sediment along with increased

Comment 224-7

Comment 224-7 continued

sluicing and extending the timeframe would meet the stated project goals while reducing the level of impacts and would conform to the goals and objectives stated in the City of Pasadena's Hahamongna Watershed Park Master Plan (HWPMP). This alternative would also provide for a slow, ongoing process of sediment removal which would avoid the kind of massive, environmentally destructive project now proposed.

Comment 224-8

LVAA joins other community groups in supporting a sediment removal alternative that would phase the removal of sediment over a much longer period of time, remove only the amount of sediment that is necessary, make more use of strategic sluicing, destroy a much smaller area of Hahamongna and cost less. We believe there is a far less impactful alternative that meets the project goals. The concepts advocated by the Arroyo Seco Foundation (ASF) should be used as a basis for the development of a truly environmentally superior alternative. LACDPW must develop a sediment removal plan, preferably in cooperation with impacted jurisdictions, which would promote the multiple goals of the Hahamongna Watershed Park Master Plan rather than addressing only flood control to the detriment of all other purposes served by the Hahamongna park such as habitat preservation and recreation, and to the detriment of adjacent neighborhoods and surrounding communities, particularly the City of Pasadena.

Comment 224-9

LACDPW should make use of the many community suggestions for an effective yet tolerable solution that does not create such a negative impact on the environment and surrounding communities. It is also important the LACDPW take into consideration and fully respect alternatives presented by CEQA Responsible Agencies such as the City of Pasadena.

3. DEIR Issues By Category.

A. Air Quality

Comment 224-10

Although air quality impacts have been determined to be significant and unavoidable, the impacts have been under-assessed and understated in that the only monitoring performed was at two Source Receptor Areas (SRAs), one in Pasadena, and one in Burbank for the years 2006 through 2011 (Table 3.5-2: Ambient Air Quality Monitoring

Summary). There was no Baseline monitoring for ambient measurements performed on-site or along the transportation routes to sediment placement sites. Since much of the identified air quality impacts are due to diesel exhaust from the trucks and particulate matter (PM) that may be released during the physical destruction/scouring of Hahamongna and the resulting transport, Baseline studies and ongoing monitoring for ambient air quality during the project itself must be performed for all impacted areas. The DEIR air quality impacts and mitigations are also deficient in the following areas:

Comment 224-10 continued

- Degradation of air quality is a serious public health matter. It is essential that accurate and current baseline studies are conducted and that the EIR accurately state the additional project-related air quality degradation so that decision makers and the public will know the environmental cost of the project on Air Quality. Baseline studies for ambient air quality were performed, for the most part, at an SRA in Pasadena five miles from the project site. For particulate matter (PM_{20}) the location for the SRA was in Burbank, eight miles away from the project site and not along the sediment transport routes. In order to appropriately assess the ambient air quality, there should have been baseline study at the site location, and, then ongoing study and mitigation must be required during the project as a specific mitigation measure..

Comment 224-11

- Further, neighborhood air quality events, such as wildfires that create smoke or large events at the Rose Bowl (including all current proposed "Major Events" at the Rose Bowl including 5-year NFL use) can further degrade air quality. There must be continuous monitoring of the air quality on an ongoing basis during the entire project and when such Major Events occur and, pursuant to adequate mitigation, project-related activities should be suspended if and when the ambient air becomes unhealthy.

Comment 224-12

- There is limited discussion on mitigating the particulate matter that can and will be released during excavation, loading, and as the sediment is

Comment 224-13

Comment 224-13 continued

being transported to sediment placement sites. Although tarps are mentioned as a part of the SCAQMD's Rule 403 standards, there must be a mitigation mandate that appropriate quality tarps are used to cover the truckloads and that best practices for fugitive dust management are implemented. There is also only one water truck proposed for use (DEIR, p. 87). Water trucks in sufficient numbers must be required in the areas of excavation and should be used to water down unpaved access routes. Given that the excavation area is very large, and that there will be up to 425 trucks per day driving on mostly unpaved surfaces, there must be significantly more than one water truck used to minimize fugitive dust.

Comment 224-14

- According to Table ES-1 of the DEIR, the proposed mitigations may not be possible. The statement under *"Level of significance after mitigation*" is *"Full implementation of these mitigations could be unachievable. Therefore, impact remains significant and unavoidable*". If mitigation is not possible, it is not legally adequate mitigation. The feasibility of the mitigations must be determined and documented in the final EIR so that decision makers have an understanding of the full impacts on regional air quality.

Comment 224-15

- All actions proposed for the management of particulate matter and fugitive dust, including ongoing monitoring for public health impacts, and the use of tarps and an adequate number of water trucks, must be stated as specific, enforceable, performance-based mitigation measures in the final EIR.

B. <u>Biological Resources.</u>

Comment 224-16

The DEIR states that the removal of habitat will have a less than significant impact. Under the proposed project, 120 entire acres of Hahamongna Watershed Park will be completely and permanently cleared of all vegetation, habitat, and candidate, sensitive or special status species. This cannot be described as anything but significant and

Comment 224-16 continued

unavoidable. The DEIR is legally inadequate in that it does not recognize or mitigate significant impacts to Biological Resources.

Comment 224-17

The DEIR does not discuss the fact that Hahamongna Watershed Park is included within the Los Angeles River/Arroyo Seco Corridor, an area the resources of which have been determined "nationally significant through the Rim of the Valley Special Resource Study. The Rim of the Valley Study, spearheaded by Congressmember Adam Schiff, studied the significant natural and cultural resources of the mountains encircling the San Fernando, La Crescenta, Santa Clarita, Simi and Conejo Valleys in California. The study, which is ongoing, analyzes two options: the potential creation of a new unit of the national park system or the potential adjustment of the existing boundary of the Santa Monica Mountains National Recreation Area.

Comment 224-18

The DEIR also does not address the long-term impacts of removing up to 120 acres of habitat from the last remaining wildlife corridor connecting the San Gabriel Mountains and the San Rafael Hills and Linda Vista Hills areas which comprise the Linda Vista-Annandale neighborhood. The wildlife corridors which bring numerous species of wildlife and birds into and out of the Linda Vista-Annandale neighborhood support the character and distinctive quality of life of our neighborhood as well as the character of the entire Arroyo from Hahamongna through the Central Arroyo to the Lower Arroyo.

Comment 224-19

According to the 2012 Los Angeles County Department of Regional Planning's SEA Program the project site is located within the Altadena Foothills and Arroyos Significant Ecological Area (SEA). The Significant Ecological Area (SEA) Program is a component of the Los Angeles County General Plan Conservation/Open Space Element: "*SEAs are ecologically important land and water systems that support valuable habitat for plants and animals, often integral to the preservation of rare, threatened or endangered species and the conservation of biological diversity in the County. While SEAs are not preserves, they are areas where the County deems it important to facilitate a balance between development and resource conservation. Development activities in the SEAs are reviewed closely in order to conserve fragile resources such as streams, oak woodlands and threatened or endangered species and their habitat.*"

Comment 224-19 continued

(http://planning.lacounty.gov/assets/upl/sea/2_Altadena_Foothills__Arroyos_SEA_Spring_2012_GP.pdf).

Comment 224-20

Recently, the Arroyo Foothills Conservancy (AFC), announced their on-going efforts to purchase Cottonwood Canyon, a surviving open space area in the Linda Vista-Annandale neighborhood just south of Devil's Gate Dam, for $1.6 million , in order to preserve wildlife corridors throughout the San Rafael and Linda Vista Hills, and the Arroyo Seco Canyon, including Hahamongna Watershed Park. The Arroyos & Foothills Conservancy has identified wildlife corridors in the area and Hahamongna Watershed Park as a critical segment of the corridor that allows migration to and from the Angeles National Forest. (See the Corridors Map attached as Exhibit 9 to the Friends of Hahamongna Comment Letter dated January 19, 2014). The proposed project would permanently remove these sections of the corridors that pass through Hahamongna Watershed Park.

Comment 224-21

Since the proposed project will prevent the recovery of any natural vegetation, many species would not return to the area and the wildlife corridor would never recover. Further, through its Master Plans and other planning throughout the Arroyo, Pasadena has made significant investments toward the preservation of unique environmentally sensitive habitat areas. The Final EIR must include specific, performance-based, enforceable mitigations that preserve on-site to the maximum extent feasible the wildlife corridors through Hahamongna as well as all ecologically important habitat for plants and animals.

C. Land Use and Planning

Comment 224-22

The development of the Hahamongna Watershed Park Master Plan (HWPMP) was a years-long collaboration between Pasadena and the community. The Executive Summary of the HWPMP clearly states the goals and guiding principles established by the City that will control the future of Hahamongna. They are as follows:

- *To encourage and promote the stewardship and enjoyment of the Arroyo Seco in Pasadena.*

- *To balance and integrate the interrelated issues of water resources, recreation, natural resource preservation and restoration, and flood management in the Arroyo Seco.*
- *To provide a safe, secure and accessible Arroyo Seco for public enjoyment.*
- *To recognize the importance to Pasadena of the history, cultural resources and unique character of the Arroyo Seco, and to conserve and enhance these assets.*

Comment 224-22 continued

- *To preserve and acquire open space in or adjacent to the Arroyo Seco.*
- *To recognize that the Arroyo Seco in Pasadena is comprised of distinct geographical areas that are interconnected by a number of resources and features including, but not limited to, water, habitat, geology, recreation, and culture; and that it is part of a larger watershed.*

And the stated Goals include:

- *Preserve, restore, and enhance the native habitats*
- *The Devil's Gate flood control basin will be managed to provide protection to the developed and natural downstream areas.*
- *Conserve and protect the water resources of the Arroyo Seco*
- *Provide diverse recreation opportunities for the Pasadena community*
- *Enrich and promote the unique history and culture of Hahamongna Watershed Park*
- *Provide a safe and secure park*
- *Provide adequate circulation, access and parking*

This project conflicts with a number of the stated Guiding Principles and Goals. It appears that LACDPW is planning for only one of the principles and goals (flood control)

Comment 224-22 continued

to the detriment of all others. The proposed project, which permanently eliminates natural resources, habitat, wildlife, and much of the recreation, is clearly in conflict with the goals and guiding principles established in the HWP Master Plan.

Comment 224-23

The Hahamongna Watershed Master Plan and MEIR together cost millions of dollars to complete. Capital Improvement funds, grant funds and in some cases, private funds have been set aside and used for project implementation. A number of the completed or proposed projects with the implementation of the proposed project will either be destroyed, rendered useless or eliminated entirely. The DEIR is legally inadequate in that it does not adequately analyze, evaluate and mitigate the conflicts between the project and the HWPMP.

Comment 224-24

LACDPW, in proposing the project, in effect asserts that it has all required legal rights and jurisdiction under the County's Easement with the City of Pasadena to conduct the project. The DEIR is legally inadequate in that it does not include a current Survey establishing the exact boundaries of the Easement and its relationship to the project and all alternatives. The DEIR also is inadequate without a full analysis and evaluation, and, mitigation as necessary, of the legal rights, scope and jurisdiction of the Easement according to its terms, and according to applicable law including applicable California law.

D. <u>Noise.</u>

The Noise section of the DEIR is inadequate in that the Project will expose the Linda Vista-Annandale neighborhood, particularly the northern part of the neighborhood, as well as other residential neighborhoods and the Central Arroyo, to excessive noise that is in violation of CEQA. Specifically:

Comment 224-25

- The DEIR states that Pasadena and Los Angeles County exempt public agencies from Municipal Code noise requirements, (DEIR. p.201). La Canada Flintridge does not have an ordinance setting maximum noise levels during the proposed construction hours. According to the DEIR, "the Proposed Project will comply with all local noise ordinances, and roadway noise impacts will be less than significant". Given the massive size of the

Comment 224-25 continued

project and the nearly continuous significant construction and traffic noise over up to 5 years that will be created and spread over a wide area, CEQA excessive noise restrictions must be applied in order to adequately asses and mitigate significant impacts on all impacted communities, particularly residential neighborhoods.

Comment 224-26

- The Noise section of the DEIR ignores several physical principles in that it does not take into account the variables that affect sound propagation in the Arroyo, particularly the adjacent Central Arroyo, and the Linda Vista-Annandale neighborhood, which varies with applicable geography characterized by the deep cut canyon that is the Arroyo itself and the surrounding numerous canyons that form the neighborhood land area, temperature, humidity, and frequency.

Comment 224-27

- All noise measurements cited use the “A” weighted method of measurement. However, the frequencies below 500 hertz have a significant impact and effect on the quality of life including public health impacts, and are essentially excluded from the “A” weighted measurements. The lower frequencies are prevalent in construction activities such as those that will take place during the project, and attenuate much less as a function of distance than the higher frequencies.. Thus, the “A: weighted noise measurement methodology ignores the true spectrum of noise that would be generated by this project and its propagation in violation of CEQA.

Comment 224-28

- The true and accurate spectrum of noise that would be generated by this project, and, therefore, the legally adequate spectrum, is the “C” weighted method of measurement with its inclusion of the lower frequencies generated that will arise out of this project.

Comment 224-29

- The traffic baseline noise measurements for the DEIR were taken in the sensitive areas at non-peak traffic hours and then for only 15 minutes at a time. As a result, the current impact of excessive noise is understated,

Comment 224-29 continued

including the cumulative impacts of such sources of traffic noise as the 210 Freeway.

Comment 224-30

- The DEIR fails to analyze how the project will monitor truck noise to ensure compliance with the California Vehicle Code or the construction equipment on-site as is represented in Table E, DEIR Noise Report, page 25.

E. Transportation/Traffic.

Comment 224-31

The Traffic analysis is legally inadequate in that it fails to analyze, evaluate and mitigate with feasible, performance-based, enforceable mitigations the direct and cumulative impacts of the proposed project schedule of 11-12 work days during the week and 9 hour work days on Saturdays, involving a maximum of 425 double-haul truck round trips per day during project excavation activities, which will increase traffic on haul routes and burden residential and other streets throughout Pasadena and neighboring communities. Specifically:

Comment 224-32

- Normal peak hour traffic will avoid the 134 and 210 Freeways to avoid the congestion caused by the project truck traffic, particularly as it impacts the already overburdened 210 to 134 Freeway transition tunnel, by leaving the Freeways for east-west and north-south Pasadena streets. LVAA is particularly concerned about this predictable impact on Linda Vista Ave. and Lida Street, and the DEIR is inadequate unless the impacts on these residential streets are mitigated.

Comment 224-33

- The DEIR fails to consider, analyze and mitigate the California law requirement that the haul double-load trucks are limited on the Freeways to and from the disposal locations to the right two Freeway lanes only.

Comment 224-34

The Traffic analysis appears to be based on multiple manual and computer mathematical analyses rather than on true and accurate conditions existing in the project area. There are many practical realities and foreseeable impacts that affect traffic and safety that have not been analyzed, evaluated or even addressed in the DEIR which create DEIR inadequacies, including:

Comment 224-35
- Lack of haul truck and equipment wash down to keep public and project roadways clean;

Comment 224-36
- Lack of load cover to prevent truck load drop and fugitive dust;

Comment 224-37
- No provision for street sweeping when or where preventive measures are inadequate;

Comment 224-38
- No mitigation for public and project area roadway deterioration and repair;

Comment 224-39
- No mitigation provisions for flagmen, flashing lights, and similar feasible measures for the public safety of passenger and other vehicles were project trucks and equipment enter public streets;

Comment 224-40
- Treatment in the DEIR of haul trucks with two trailers as the same as passenger vehicles for intersection congestion analysis purposes;

Comment 224-41
- Failure to treat truck/trailer rate of acceleration on Freeway on-ramps as a congestion matter, and, failure to failure to consider release by the trucks of material on the on-ramps and the Freeway routes;

Comment 224-42
- Failure to analyze and evaluate, and mitigate, the cumulative impacts which will arise out of Rose Bowl Major Events, including NFL events;

Comment 224-43
- No attempt to mitigate the significant Levels of Service deficiencies during peak traffic hours as required by CEQA;

Comment 224-44
- No evidence of any attempt to coordinate traffic impacts and mitigation with Pasadena and adjoining impacted cities and jurisdictions' Transportation Department(s);

Comment 224-45
- No analyses or mitigation for conflicts with various California Vehicle Code safety requirements.

Comment 224-46
Thank you for your attention to LVAA's concerns and comments. Please contact LVAA's President, Nina Chomsky, if you have any comments or questions.

Response to Comment Letter #224 (Linda Vista-Annandale Association)

Response to Comment 224-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. Los Angeles County Flood Control District (LACFCD) notes the details provided about the Linda Vista-Annandale Association.

Response to Comment 224-2:

The Draft Environmental Impact Report (EIR) provided a legally adequate project description as per the California Environmental Quality Act (CEQA) Guidelines 15124. As described in Section 2.0 of the Draft EIR, the Proposed Project description provides: the precise location and boundaries of the Proposed Project on a detailed map and on a regional map, a statement of objectives sought by the Proposed Project, a general description of the Proposed Project's characteristics, and the intended uses of the EIR. These were all provided in the Draft EIR, Section 2.0, Project Description. The details listed in the Section 2.0, Project Description of the Draft EIR are the correct figures regarding the remaining capacity and the amount of sediment to be removed.

LACFCD was mandated by the State Legislature to provide flood protection and water conservation within its boundaries.

A reservoir storage design capacity of two design debris events (DDEs) below the dam's lowest spillway was determined to be the standard acceptable level of risk at Devil's Gate Dam and Reservoir. The DDE volume of capacity is determined using the January 2006 Los Angeles County Department of Public Works (LACDPW) Hydrology Manual and the March 2006 LACDPW Sedimentation Manual. For Devil's Gate Dam and Reservoir, the required reservoir capacity is 4.0 million cubic yards (cy) (two DDEs) below the spillway elevation of 1,040.50 feet.

The Hydrology Manual (January 2006) can be viewed here:

http://dpw.lacounty.gov/wrd/publication/engineering/2006_Hydrology_Manual/2006%20Hydrology%20Manual-Divided.pdf

The Sedimentation Manual (March 2006) can be viewed here:

http://dpw.lacounty.gov/wrd/publication/engineering/2006_sedimentation_manual/Sedimentation%20Manual-Second%20Edition.pdf

Additional information concerning DDE calculation methods has been added to the Final EIR, Section 2.3, Project Need.

Historically, large amounts of sediment have been deposited in the reservoir in short time periods. Between 1935 and 1938 over 1.6 million cy of sediment, between 1938 and 1943 over 1.95 million cy of sediment, between 1959 and 1966 over 1.75 million cy of sediment, and between 2010 and 2012 over 1.3 million cy of sediment was deposited in the reservoir. In order for the removal project to be efficient, and therefore reduce impacts and costs, the amount of sediment removed every year needs to exceed the amount of sediment deposited. Historically, approximately 130,000 cy a year was deposited in Devil's Gate Reservoir annually since 1920.

Over 92 years, the average amount of sediment deposited each year is approximately 130,000 cy; however, due to the dynamic nature of the system and the recent burn of the watershed, the amount could vary greatly. If a 1 in 50 years storm were to occur, approximately 2.0 million cy (one DDE) of sediment could be expected to wash into the reservoir. Because of LACFCD's responsibilities to provide flood protection, LACFCD must be ready at all times for a design debris event to occur.

Given the current, limited capacity of the reservoir, a 50-year storm event that results in a DDE would result in storm flows with sediment flowing over the spillway. Flooding with mud/sediment would occur along the portions of the Arroyo Seco in the Cities of Pasadena, South Pasadena, and Los Angeles, impacting approximately 650 parcels and requiring closure of Interstate 110 from Orange Grove Avenue to Interstate 5. Additional information about the potential flood areas and analysis is shown in the Arroyo Seco Channel Hydraulic Analysis prepared by Bureau Veritas North America, Inc., available on the Project website. Please note that protocols are in place to monitor storms, reservoir conditions, and channel conditions and to communicate with emergency responders and the California Department of Transportation (Caltrans) to execute any necessary evacuations or freeway closures.

Response to Comment 224-3:

Pursuant to Section 15126.6(a) of the CEQA Guidelines, "[a]n EIR shall describe a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project, and evaluate the comparative merits of the alternatives." However, "[a]n EIR is not required to consider alternatives which are infeasible" (CEQA Guidelines Section 15126.6(a)) or "which could change the fundamental nature of the proposed project." (*Al Larson Boat Shop, Inc. v. Board of Harbor Comm*. (1993) 18 Cal.App.4th 729, 745.) The alternatives discussed in the EIR must be reasonable alternatives, selected to foster informed decision-making and public participation (CEQA Guidelines 15126.6(a)). An EIR need not consider an alternative whose effect cannot reasonably be ascertained or whose implementation is remote and speculative because unrealistic alternatives do not contribute to a useful analysis (CEQA Guidelines 16126.6(f)(3)). Additionally, an alternative may be rejected from detailed analysis in an EIR if it fails to reduce or avoid the project's significant environmental effects, does not implement the basic project objectives, is not potentially feasible, or is facially unreasonable. 14 C.C.R. §15126.6(c); Id., see also *Mann v. Community Redevelopment Agency* (1991) 233 Cal. App. 3d 1143; *Del Mar Terrace Conservancy, Inc. v. City Council* (1991) 10 Cal. App. 4th 712.

The Draft EIR, Section 4, fully analyzed six alternatives including the No Project Alternative. These alternatives substantially lessen one or more significant effects of the Proposed Project and, with the exception of the mandatory No Project Alternative, would feasibly attain most of the basic objectives of the Proposed Project. These alternatives include options for different amounts of removal, different methods of removal, and a different haul route.

The Environmentally Superior Alternative was determined to be Alternative 3, Configuration D, as it reduces impacts while still meeting Proposed Project objectives; see Sections 4.6 and 4.11 of the Draft EIR.

Response to Comment 224-4:

The Draft EIR Alternatives Analysis was a comprehensive analysis of each of the alternatives and the impact each would have on the community or environment. Although the section is lengthy, it is provided to present the potential impacts of each of the alternatives. In addition, the analysis compares

the impacts of the alternative to the Proposed Project and each of the other alternatives to provide a comparison for the reader. This is to show how each alternative compares to the Proposed Project, the other alternatives, and the No Project Alternative in terms of environmental impacts. The Draft EIR also provided summary discussions and comparisons of each alternative for an easy to read overview of the analyses. Tables ES-2 and ES-3 are provided to outline the specifics of each alternative, as well as provide a comparison of impacts. In addition, Table 4.3-1 in the Alternatives Analysis also provides a comparison of alternatives.

The findings of the EIR are that Alternative 3, Configuration D is the Environmentally Superior Alternative. As shown in the Draft EIR, Section 4.6, Alternative 3 receives an in-depth analysis which presents the potential impacts of each of the alternatives and compares the impacts of the alternatives to the Proposed Project and each of the other alternatives. This provides ample information as to why Alternative 3, Configuration D was found to be the Environmentally Superior Alternative. Section 4.11 is a summary of these findings. The Draft EIR does not determine and has not designated any of the alternatives, including the Proposed Project, as the "Preferred Alternative." With the completion of the Final EIR, an alternative will be chosen and will be presented to the Board of Supervisors as the Preferred Alternative. Any of the alternatives analyzed in the Draft EIR may be chosen as the Preferred Alternative.

Tables ES-2 and ES-3, and Table 4.3-1 in the Alternatives Analysis provide a comparison of the environmental impacts of each of the alternatives.

Response to Comment 224-5:

See Response to Comments 224-3 and 224-4. An EIR is not required to consider alternatives that are infeasible, and an EIR need not consider every conceivable alternative to a project. LACFCD evaluated notable alternatives, including alternate configurations and the method of sluicing. Alternative 3, Configuration D was determined to be the Environmentally Superior Alternative that reduces impacts while still meeting Proposed Project objectives.

Alternative 3, Configuration D affects the least amount of habitat of all the action alternatives while still achieving Proposed Project objectives (see Section 4.6 of the Final EIR). Alternative 3, Configuration D, Option 2, which drastically reduces the project's footprint of 120 acres down to 71 acres, would avoid excavation of the western branch, thereby providing a greater cohesion with the HWPMP. LACFCD has met and will continue to meet with the City of Pasadena regularly to coordinate and ensure resolution of concerns regarding Devil's Gate Reservoir and the HWPMP.

Response to Comment 224-6:

See Response to Comment 224-2.

For Devil's Gate Dam, the DDE was previously calculated as 1.67 million cubic yards (cy). That previous calculation was based on the presence of debris-retaining structures, including Browns Canyon Dam, located within the Angeles National Forest upstream of Devil's Gate Dam. These structures filled with sediment decades ago and no longer provide capacity to "control" any portion of the watershed. A subsequent analysis determined that the correct DDE, based on the absence of sediment control facilities in the Forest, is 2.0 million cy. Following the Station Fire, Los Angeles County Department of Public Works (LACDPW) reviewed the DDE calculations and confirmed that 2.0 million cy is the current and appropriate volume for the DDE.

As stated above, LACDPW's criterion is that reservoir sediment levels be maintained at a level equivalent to two design debris events below spillway; however, in response to the Station Fire, an emergency project to remove only 1.67 million cy was initially proposed. The volume of 1.67 million cy is the previously published DDE and was considered justifiable as an emergency exemption to CEQA. In March 2011, the County of Los Angeles Board of Supervisors motioned LACFCD to complete an EIR for a comprehensive sediment removal project at Devil's Gate. LACFCD then initiated project development in accordance with the required level of protection of two DDEs. At that time LACFCD also began receiving feedback on the concurrent Sediment Management Strategic Plan (Strategic Plan) and the interest to look at more sustainable sediment and reservoir management. As a result of the feedback and recommendations during the development of the Strategic Plan, LACFCD began evaluating ways to create a more sustainable long-term way to manage its sediment and habitat. To emphasize the goals of the project, the project was given the name Devil's Gate Sediment Removal and Management Project.

Response to Comment 224-7:

See Response to Comments 224-2 and 224-6. LACFCD has executed several sediment removal projects at Devil's Gate Reservoir in the past, with the last major effort being in 1994. Smaller amounts of sediment were removed in 2006, 2009, and as a part of the Interim Measures Project in 2011, 2012, and 2013. Following the 2009 Station Fire, approximately 1.3 million cy of sediment flowed into Devil's Gate Reservoir after just two average storm seasons. In 2010, LACFCD proposed an emergency sediment removal project in response to the large inflow of sediment resulting from the Station Fire.

The current remaining capacity in the reservoir is 1.3 million cy, whereas a reservoir storage design capacity of two DDEs, or 4.0 million cy, below the dam's lowest spillway was determined to be the standard acceptable level of risk at Devil's Gate Dam and Reservoir. If the reservoir is left in its current state, the flood risk to downstream communities would remain at an unacceptable level.

LACFCD proposed a project duration of five years to reduce accumulated sediment in a timely fashion. The goal of LACFCD is to restore reservoir flood capacity as soon as feasible while reducing costs, minimizing the duration of environmental and construction impacts to the surrounding communities, and configuring the reservoir to allow for sustainable future maintenance. Extending the project would prolong the flood risk to downstream communities and increase the construction impacts to the surrounding communities.

LACFCD is coordinating with local agencies, including the City of Pasadena. Alternative 3, Configuration D, which was found to be the Environmentally Superior Alternative in the Draft EIR, was based on the City of Pasadena's Hahamongna Watershed Park Master Plan (HWPMP).

Sluicing was analyzed as part of the Draft EIR in the Alternatives Analysis, Section 4.7, Alternative 4 Sluicing Method. This alternative would involve use of construction equipment and the removal of trees and vegetation over the same footprint as the Proposed Project. The sluicing alternative would have additional impacts in comparison to the Proposed Project. Many of these impacts would be associated with the likelihood that large amounts of sediment would not be fully transported through the flood control system; this sediment would need to be mechanically removed and trucked out from numerous downstream locations potentially including the two soft-bottom portions of the channel. Please see Section 4.7 and Appendix K of the Draft EIR for further analysis.

Response to Comment 224-8:

LACFCD notes that the Linda Vista-Annandale Association supports an alternative that would remove sediment over a longer period of time, make more use of sluicing, and impact a smaller area.

LACFCD goes to great lengths to lessen project impacts and maximize efficiencies. As such, many of the points in the Arroyo Seco Foundation's four-point "Slow Program" are compatible with the LACFCD Proposed Project.

For example, the Draft EIR selected Alternative 3 as the Environmentally Superior Alternative. Alternative 3 drastically reduces the project's footprint of 120 acres down to 71 acres. Additionally, the limited maintenance area for Alternative 3 further reduces the permanent habitat impacts down to approximately 51 acres by allowing for site replanting and mitigation to take place within the reservoir footprint. This reduction in project acreages will greatly lessen environmental impacts of the Proposed Project.

LACFCD strives to achieve an efficient, low-cost sediment removal project. Sediment removal rates and trucking operations, now utilizing all low-emissions trucks, as explained in Section 3.5 of the Draft EIR, have been carefully planned for economies of scale to realize maximum efficiencies without major delays in project schedule, thus greatly reducing operating costs. Furthermore, LACFCD has applied for and received an approximately $28 million grant through the State's Disaster Preparedness and Flood Protection Bond Act of 2006 (Proposition 1E) program. A portion of this grant will be used to help offset the Proposed Project's costs.

While sluicing is not a viable project alternative, as explained in Section 4.7 of the Draft EIR, Flow Assisted Sediment Transport, or FASTing, will be used for maintenance after the project's main sediment removal phase has been completed, as described in Section 2.5.2 of the Draft EIR.

LACFCD is committed to *Public Service that Works*; and by combining almost 100 years of technical expertise and invaluable input from the community, less invasive flood protection will continue to be a reality.

For a more detailed response to the Arroyo Seco Foundation's four-point "Slow Program", please see the response to the Arroyo Seco Foundation's comment letter (Comment Letter #216, Response to Comment 216-16).

Response to Comment 224-9:

LACFCD has taken input from responsible agencies and the community into consideration when drafting the Alternatives. All comments are noted and will be provided to the County of Los Angeles Board of Supervisors.

Response to Comment 224-10:

Air quality impacts associated with truck traffic were analyzed in the Draft EIR in Section 3.5. LACFCD has conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed the United States (U.S.) Environmental Protection Agency's (EPA's) 2007 standards for emissions. Therefore, in order to further reduce emissions, Mitigation Measure MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump

trucks that meet or exceed EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality, including those associated with health effects, will be reduced to less than significant.

Assessments for air quality impacts follows methodology established and authored by the South Coast Air Quality Management District (SCAQMD). SCAQMD does not require project-specific ambient air monitoring before or during project construction. CEQA requires mitigations to be monitored, and LACFCD will maintain sufficient documentation to allow monitoring of Mitigation Measures MM AQ-1 and MM AQ-2.

Response to Comment 224-11:

See Response to Comment 224-10. As noted above, with implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality, including those associated with health effects, will be reduced to less than significant. As discussed in the Draft EIR, Section 3.5, the Health Risk Assessment (HRA) analyzed both the cancer-related and noncancer-related acute (short-term) and chronic (long-term) impacts from project-related emissions. The HRA analysis found the Proposed Project would result in less than significant impacts for both the cancer-related and noncancer-related acute short-term and long-term impacts.

Baseline monitoring locations are established by SCAQMD under requirements of the EPA and California Air Resources Board (CARB), and the locations used in the analysis were the nearest established monitoring sites for each particular pollutant. There are no requirements for project-specific ambient monitoring.

Response to Comment 224-12:

Each project is responsible only for its own contribution to the overall air quality. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, the Proposed Project's impacts to air quality, including its contribution to cumulative impacts, will be reduced to less than significant.

Regional events such as events at the Rose Bowl and wildfires are outside the purview of LACFCD. No nexus would require LACFCD to provide ambient monitoring for regional events.

Response to Comment 224-13:

Dust impacts from the Proposed Project were carefully evaluated, as discussed in the Draft EIR, Section 3.5.6, Impacts and Mitigation, AIR QUALITY-2, Sediment Removal. The Proposed Project's activities, including excavation, grading, material loading, and hauling, would result in less than significant dust emissions due to the project's use of best management practices and would be in full compliance with SCAQMD's fugitive dust regulations.

Response to Comment 224-14:

See Response to Comment 224-10.

Response to Comment 224-15:

See Response to Comments 224-10 and 224-13.

Response to Comment 224-16:

As discussed in Section 3.6.6 of the Draft EIR, Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats. In addition, sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays).

Mitigation Measures BIO-1 through BIO-8 are enforceable and designed to reduce impacts through methods known to be feasible and effective. These mitigation measures are common to CEQA and accepted by agencies that would be involved in consultation, negotiation, and final approval of mitigation measures, including conceptual restoration plans. As with any project that involves California Department of Fish and Wildlife (CDFW), U.S. Army Corps of Engineers (USACE), and Regional Water Quality Control Board (RWQCB) jurisdictional areas, the ultimate mitigation for impacts related to the wetlands and drainages under the jurisdiction of the resource agencies is negotiated with the resource agencies during the regulatory permitting process. LACFCD has been and will continue to work closely with CDFW and USACE to identify appropriate mitigation, replacement ratios, and sites for restoration and enhancement that will offset impacts and satisfy the requirements of all applicable laws. A detailed restoration plan will be prepared and provided to CDFW and USACE for review and approval prior to project implementation. Prior to commencement of the Proposed Project, LACFCD will have obtained all necessary permits for impacts to CDFW, USACE, and RWQCB jurisdictional areas including Section 401 Certification, Section 404 permit, and a Streambed Alteration Agreement. Clean Water Act Section 404 (b)(1) guidelines will be followed as a framework for compensatory mitigation. Through 404(b)(1) negotiations with USACE and negotiations with CDFW under Fish and Game Code Sections 1600-1616, a determination of the functions and values of impacted jurisdictional waters shall result in the coordination of appropriate mitigation measures for sediment removal.

Alternative 3, Configuration D affects the least amount of habitat of all the action alternatives while still achieving Proposed Project objectives (see Section 4.6 of the Final EIR). This alternative would provide a buffer on the west side of the reservoir that would allow for the movement of wildlife. Alternative 3, Configuration D, Option 1 provides a more natural configuration for the reservoir by having two branches to carry water and sediment toward the face of the dam, avoiding disturbing a significant portion of existing vegetation. To further reduce the Proposed Project's footprint, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2, which drastically reduces the project's footprint of 120 acres down to 71 acres, would avoid excavation of the western branch, thereby providing a greater habitat buffer on the west side of the reservoir. In addition, the maintenance areas would be smaller than the original sediment removal footprint, allowing for habitat to reestablish and providing additional areas for wildlife movement.

Response to Comment 224-17:

The National Park Service is conducting a "special resource study" of the area known as the "Rim of the Valley Corridor." This is the area that generally includes the mountains encircling the San Fernando, La Crescenta, Santa Clarita, Simi, and Conejo valleys of Los Angeles and Ventura counties in southern California. The purpose of this special resource study is to determine whether any portion of the Rim of the Valley Corridor study area is eligible to be designated as a unit of the national park system or added to an existing national park (NPS 2014).

This special resource study will provide recommendations to Congress but would not change current management without further action from Congress. Each of the alternatives considered in this study respects and retains the authorities of existing local, state, and federal agencies.

The area that Congress directed the NPS to study (study area) is not proposed for a national park. It is simply an area in which the NPS is asked to evaluate natural and cultural resources and opportunities for public use and resource preservation. It does not mean that all the land within the study area has nationally significant natural and cultural resources. Resources found to be nationally significant must also meet NPS criteria for suitability and feasibility to be considered for inclusion in the national park system.

As the NPS evaluates resources in the study area, often the focus of the study is narrowed. If significant resources are identified, the NPS will identify a range of options or alternatives to protect these resources and provide for public enjoyment.

The preliminary study findings of the Rim of the Valley Corridor Special Resource Study have not identified the Devil's Gate Reservoir or the Hahamongna Watershed Park as nationally significant natural and cultural resources. The nearest nationally significant resources identified in this study are the Jet Propulsion Laboratory (JPL) and the Rose Bowl. The Proposed Project does not involve either of these resources.

Response to Comment 224-18:

Sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays). In addition, sediment removal activities would not completely block the Proposed Project site from surrounding habitat, would occur only during the day, and would not interfere with nighttime wildlife activity. Although some wildlife may be temporarily displaced during construction, wildlife would not be physically prevented from moving around and into the basin area. Wildlife species currently found in the Proposed Project area would be expected to either remain in the undisturbed areas of the reservoir outside the Proposed Project area or to reestablish once sediment removal activities have been completed.

The protective Mitigation Measures MM BIO-1, MM BIO-2, MM BIO-3, MM BIO-4, and MM BIO-5 would avoid and minimize any impacts associated with Proposed Project activities. Therefore, the potential impacts to wildlife movement and corridors are anticipated to be less than significant.

Response to Comment 224-19:

The Proposed Project is not located in a currently adopted Significant Ecological Area (SEA). The Los Angeles County Department of Regional Planning is currently in the process of updating the SEA Program. The Proposed Project is located within the Proposed Altadena Foothills and Arroyos SEA. Regional Planning's SEA updates, including the Proposed SEAs, have not been adopted, nor are they covered under the current Hillside Management Area and SEA Ordinance.

The SEA does not change the land use designation or the zoning of a property. The intent of the proposed SEA regulations is not to preclude development but to allow limited, controlled development that does not jeopardize the unique biotic diversity within the County. Under the Ordinance for the Proposed SEA, safety activities and existing permitted uses are exempt.

As discussed in the Draft EIR, Section 3.12.6, Land Use and Planning, the Proposed Project will not have any significant impacts or conflict with the applicable land use plans, policies, or regulations of adopted plans.

Response to Comment 224-20:

See Response to Comment 224-18.

Response to Comment 224-21:

See Response to Comment 224-16 and 224-18.

Response to Comment 224-22:

See Responses to Comments 224-16 and 224-18.

Impacts to recreation were analyzed in the Draft EIR, Section 3.15. The Proposed Project will not limit the use of the Oak Grove area of Hahamongna Watershed Park. Sediment removal activities would be temporary and are expected to occur only in the drier months (April to December, excluding holidays). It is expected that these activities will often not be adjacent to the Oak Grove area of Hahamongna Watershed Park. The Proposed Project would result in temporary limitations on the recreational use of the Proposed Project site and some of the adjacent trails. Most of these areas would be reopened seasonally or intermittently throughout the sediment removal process. In addition, temporary impacts to designated recreational facilities and trails will be minimized through advance communication and redirection to the nearest facility in the vicinity of the Proposed Project. Furthermore, an east-west trail crossing will continue to provide access at the north end of the reservoir. At the south end of the reservoir, after the reservoir ingress and egress ramps have been fully constructed, access to the upper east side Arroyo Seco Trail from La Cañada Verdugo Road will be maintained; and the linkage from the west side Arroyo Seco Trail and the Flint Wash Trail to the upper east side Arroyo Seco Trail (crossing Devil's Gate Dam and also continuing south to the Rose Bowl) will be available after construction activities have ended each day and on nonworking days.

Alternative 3, Configuration D, which was found to be the Environmentally Superior Alternative in the Draft EIR, was based on the City of Pasadena's Hahamongna Watershed Park Master Plan (HWPMP). As discussed in the Draft EIR, Subsection 3.12.3, Applicable Regulations, the HWPMP emphasizes protection of recreational and natural resources as well as the management of flood control for the downstream watershed. Key to determining the consistency of the project with the HWPMP is the conformance with the plan's Goals and Objectives. As identified in the Applicable Regulations portion of the Existing Conditions, Goal 2 and Goal 6 are the most crucial in determining conformance. These Goals focus on the basin being "managed to provide protection to the developed and natural downstream areas and providing a safe and secure park." The Proposed Project will manage the flood control basin for protection of the downstream areas by improving and maintaining the flood capacity behind Devil's Gate Dam. LACFCD has met and will continue to meet with the City of Pasadena regularly to coordinate and ensure resolution of concerns regarding Devil's Gate Reservoir and the HWPMP.

Response to Comment 224-23:

LACFCD notes that the HWPMP is an important policy document for the area, including the Proposed Project site. Analysis of consistency with the HWPMP was included in the Draft EIR, Section 3.12 Land Use and Planning. The Proposed Project will not permanently destroy, render useless, or eliminate any of the projects mentioned in the comment.

Response to Comment 224-24:

As noted in Draft EIR, Section 2.1. Project Location, an easement granted by the City of Pasadena to LACFCD encompassing Devil's Gate Dam and Reservoir in 1919 and revised in 1965 states the easement is for the purpose of flood control and water conservation. The easement states, "Grantor does hereby grant to Grantee a perpetual easement for reservoir, water conservation and flood control purposes, including the right to construct, reconstruct, inspect, maintain, repair and operate a dam, spillway, reservoirs, tunnels, by-passes, channels embankments, protection works, and appurtenant structures for the purposes of controlling, confining, storing and conserving water in, over and across real property hereinafter described." The goal for the Sediment Removal Project is to maintain the reservoir for the purpose of controlling, confining, and storing water within the easement boundaries; and, therefore, the Proposed Project activities fall under the latitude of the easement granted. As noted in the Draft EIR, the Proposed Project and Alternatives are located entirely within the boundaries of the easement. The project will not overburden the easement; it will restore the reservoir to the design capacity necessary for flood control storage or to safely contain future sediment inflow (volume for two DDEs below the spillway elevation of 1,040.5 feet).

Response to Comment 224-25:

As discussed in the Draft EIR, Section 3.14, with implementation of Mitigation Measure MM N-1, noise impacts would be reduced to a level of less than significant.

The Draft EIR, Section 3.14.6, Sediment Removal/Reservoir Management, Offsite Vehicular Noise, analyzed the noise impacts from the haul trucks. The analysis found that the maximum noise increase on the roads in the immediate vicinity of the Devil's Gate Dam and Reservoir area would be a 1-decibel (dB) increase on Berkshire Place east of the Interstate 210 (I-210) northbound ramps. A 1-dB increase is well below the 3-dB increase threshold of perception and would therefore not be anticipated to disturb the learning environment. The roadway noise impact analysis provided in the Draft EIR found that the Proposed Project would result in less than significant impacts for all analyzed alternatives.

Response to Comment 224-26:

The geography was analyzed prior to the performing of the noise calculations provided in the Draft EIR, and it was determined that the geography would have a minimal effect of the nearest homes and other sensitive receptors to the project site. According to Caltrans Technical Noise Supplement, it is theoretically possible that narrow canyons with steep slopes could result in an increase of noise greater than 3 decibels (dB); however, the slopes would need to be free of vegetation and perfectly vertical. Angled slopes, such as those located at the Proposed Project, typically do not increase noise levels, since noise reflections are directed skyward. Although temperature and humidity have the potential to affect the propagation of noise, the impacts to noise calculations are typically nominal except for extreme examples, such as the desert with a very high temperature and low humidity, or a very cold and foggy location. Since the climate of Pasadena is moderate, the construction noise was accounted for in the

Roadway Construction Noise Model (RCNM) that was utilized in the Draft EIR to calculate the onsite construction noise impacts, and it was accounted for in the FHWA-RD-77-108 model that was utilized in the Draft EIR to calculate the offsite roadway noise impacts.

Response to Comment 224-27:

Human hearing is limited not only to a range of frequencies but also in the perception sound pressure throughout that range. The A-weighted scale was developed from averaging the statistics of many psychoacoustic tests involving large groups of people with normal hearing. The internationally standardized A-weighted curve is used worldwide to address environmental noise. Furthermore, the Los Angeles County Noise Ordinance, La Cañada Flintridge Noise Ordinance, and Pasadena Noise Ordinance all rely on the A-weighted decibel. For these reasons, the noise analysis provided in the Draft EIR utilized the A-weighting.

Response to Comment 224-28:

As detailed in Response to Comment 224-27, the A-weighting noise levels is the most acceptable noise standard for the Proposed Project.

Response to Comment 224-29:

The noise measurements provided in the Draft EIR were taken based on the methodology detailed in the Caltrans Technical Noise Supplement and the noise measurement procedure detailed in the Los Angeles County Noise Ordinance as well as the professional judgment of the noise analyst. The noise measurements in the Draft EIR were adequately taken to appropriately assess the cumulative impacts from traffic noise.

It should be noted that the Proposed Project would create noise only between 7:00 a.m. and 6:00 p.m. Standard Time or between 7:00 a.m. and 7:00 p.m. Daylight Savings Time on weekdays or between 7:00 a.m. and 5:00 p.m. on Saturdays, which are the allowable construction times detailed in the applicable Cities' noise ordinances.

The noise from freeways in southern California is different than most other roadways, since the quietest noise levels from freeways typically occur during the morning and evening rush hours, when the freeways are congested, which greatly reduces the speed of the vehicles and associated noise levels. The noise measurements were taken at a period of the day when traffic was free-flowing on Interstate 210 (I-210) and when construction activities would be anticipated to be at full operation. The duration of the noise measurements were based on the recommended measurement durations detailed in Section 3.3.2 of the Caltrans Technical Noise Supplement.

Response to Comment 224-30:

As noted in the Draft EIR, Section 3.14 Noise and Vibration, the Proposed Project will comply with all local ordinances that apply to sediment removal and reservoir management activities taking place during the allowed hours. In addition, LACFCD will monitor Proposed Project activities for compliance including the type of trucks and equipment used.

Response to Comment 224-31:

The Traffic Analysis is legally adequate, as it analyzes impacts to roads and freeway segments that would be impacted by the project, evaluates these impacts in the Draft EIR, and provides mitigation that was determined to be feasible for the Proposed Project. Potential impacts due to the Proposed Project's truck trips were analyzed in the Draft EIR, Section 3.16, Transportation and Traffic. As listed in that section, a single intersection in the immediate vicinity of the Proposed Project Site will have a potentially significant impact. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the Proposed Project site.

Response to Comment 224-32:

See Response to Comment 224-31. The volumes on I-210, the on- and off-ramps, and the local roadways within the study area included those potentially impacted by the Proposed Project. The analysis provided a conservative project condition volume that accounts for expansion and regional growth within the study area. The volumes account for redistribution of traffic.

Response to Comment 224-33:

The Traffic Analysis followed the Los Angeles County Congestion Management Program (CMP) Guidelines, Caltrans' Guide for the Preparation of Traffic Impact Studies, the Highway Capacity Manual (HCM), and Intersection Capacity Utilization (ICU) methods. Each methodology is a governing guideline in preparing a Traffic Impact Analysis set forth by each jurisdiction within the project area, as applicable to the intersections, on and off ramps, and freeway facilities. These methodologies are continually updated and improved upon based on the dynamic nature of traffic. In addition, the Draft EIR analyzes the traffic impacts based on established thresholds of significance.

Response to Comment 224-34:

See Response to Comments 224-31 and 224-32.

Response to Comment 224-35:

See Response to Comment 224-13. In addition, hauling permits will be obtained as necessary from the appropriate localities; and all conditions of said permits will be followed accordingly.

Response to Comment 224-36:

See Response to Comment 224-13. SCAQMD Rule 403 requires, "During exporting of materials, using tarps or other suitable enclosures on all haul trucks. Haul loads should have at least 6 inches of freeboard space."

Response to Comment 224-37:

See Response to Comment 224-35.

Response to Comment 224-38:

See Response to Comment 224-35.

Response to Comment 224-39:

See Response to Comment 224-35.

As discussed in the Draft EIR, Section 3.16, Transportation and Traffic, TRANSPORTATION-3, modifications to traffic conditions by the Proposed Project will consist of roadway restriping. These changes would not alter existing roadway use or substantially increase hazards. Thus, impacts related to traffic hazards would be less than significant.

Response to Comment 224-40:

Potential impacts due to the Proposed Project's truck trips, including double dump trucks, were analyzed in the Draft EIR, Section 3.16, Transportation and Traffic. The capacity analysis considers what is called a Heavy Vehicle Factor. A heavy vehicle, such as a truck or recreational vehicle, utilizes more roadway capacity than a passenger vehicle. Other considerations include the size, slower start-up times, and maneuverability restrictions of the heavy vehicles. Per the Highway Capacity Manual, the Heavy Vehicle Factor is calculated using the percentage of heavy vehicles and adjusts the saturation flow rate of the roadway.

Response to Comment 224-41:

As noted in Response to Comment 224-40 above, the analysis of traffic impacts did consider a Heavy Vehicle Factor that took slower start-up times and maneuverability restrictions into consideration. The release of materials on the on-ramps and off-ramps will be controlled through complying with SCAQMD Rule 403, which includes the use of tarps over truck beds to limit the release of materials on roadways.

Response to Comment 224-42:

The temporary use of the Rose Bowl by a National Football League (NFL) team was analyzed as a cumulative project in the Draft EIR, as noted in Section 2.9 Cumulative Scenario, and in the Traffic Study, as noted in Section 4 Project Conditions-Year 2014, Project Trip Growth.

Response to Comment 224-43:

See Response to Comment 224-31. LACFCD will implement the mitigation measures described in the Draft EIR, Section 3.16.6. Also as discussed in the Draft EIR, Section 3.16.6, potential impact reduction measures could reduce impacts to less than significant. These measures cannot be legally imposed by the LACFCD, however, since the locations are under the jurisdiction of other agencies. Every reasonable effort will be made to coordinate with and receive approval from the jurisdictional agencies to implement the impact reduction measures, but LACFCD cannot guarantee that the measures will be implemented. LACFCD will continue to work with local organizations and the Cities of Pasadena and La Cañada Flintridge and the community of Altadena to minimize traffic impacts around the project site. The Proposed Project is compliant with CEQA as per Section 15126.4 of the CEQA Guidelines, "If the lead

agency determines that a mitigation measure cannot be legally imposed, the measure need not be proposed or analyzed. Instead, the EIR may simply reference that fact and briefly explain the reasons underlying the lead agency's determination." Per Section 21002 of the CEQA Guidelines, "The Legislature further finds and declares that in the event specific economic, social, or other conditions make infeasible such project alternatives or such mitigation measures, individual projects may be approved in spite of one or more significant effects thereof."

Response to Comment 224-44:

LACFCD held meetings with each city's and jurisdiction's Transportation Department within the Proposed Project area; concerns and requests from each were included in the Traffic Analysis. Extensive meetings were held with the Cities of Pasadena and La Cañada Flintridge regarding other area projects and identification of potential routes. In addition, LACFCD will continue to work with local organizations and the Cities of Pasadena and La Cañada Flintridge and the community of Altadena to minimize traffic impacts around the project site.

Response to Comment 224-45:

The Traffic Report (Appendix J of the Draft EIR) followed the Los Angeles County Congestion Management Program (CMP) Guidelines, Caltrans' Guide for the Preparation of Traffic Impact Studies, the Highway Capacity Manual (HCM), and Intersection Capacity Utilization (ICU) methods. Each methodology is a governing guideline in preparing a Traffic Impact Analysis set forth by each jurisdiction within the project area as applicable to the intersections, on- and off-ramps, and freeway facilities. The California Vehicle Code is a guideline to drivers and does not provide guidelines in preparing a Traffic Impact Analysis.

Response to Comment 224-46:

LACFCD notes that Nina Chomsky is the contact person for the organization in regard to this comment letter.

From: Frazier, Lisa L
To: reservoircleanouts
Cc: savehahamongna@arroyoseco.org
Subject: "Devil"s Gate Reservoir Sediment Removal and Management Project
Date: Tuesday, January 21, 2014 3:38:03 PM

Comment 225-1

I'm writing to you with regard to saving Hahamonga Park. I train with the Leukemia & Lymphoma Society's Team in Training for marathons and half-marathons and one of the places that we totally enjoy walking and running is at the Hahamonga Park and Wetlands. I have been informed that there are drastic changes in the planning stage for this area that would destroy the entire area which includes habitats for numerous species of animals and plants, in addition to taking away from not only great trails for us humans to utilize, but for horse riders, as well. Since I sincerely believe that destroying these lands will have a huge environmental impact on the area for years to come, I hope you will take this matter under serious advisement before making your decision.

Respectfully,

Lisa L. Frazier

Email: lisa.frazier1@verizon.net
(213) 687-5131 - Work
(909) 268-5742 - Cell
(909) 865-3842 - Home

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Further information about the firm, a list of the Partners and their professional qualifications will be provided upon request.
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Response to Comment Letter #225 (Lisa Frazier)

Response to Comment 225-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

As discussed in Section 3.6.6 of the Draft Environmental Impact Report (EIR), Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats. In addition, sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays). Wildlife species currently found in the Proposed Project area would be expected to either remain in the undisturbed areas of the reservoir outside the Proposed Project area or to reestablish once sediment removal activities have been completed. With implementation of Mitigation Measures MM BIO-1 through MM BIO-8, impacts to biological resources to less than significant.

Impacts to recreation were analyzed in the Draft EIR, Section 3.15. The Proposed Project will not limit the use of the Oak Grove area of Hahamongna Watershed Park. Sediment removal activities would be temporary, are expected to occur only in the drier months (April to December, excluding holidays). It is expected that these activities will often not be adjacent to the Oak Grove area of Hahamongna Watershed Park. The Proposed Project would result in temporary limitations on the recreational use of the Proposed Project site and some of the adjacent trails. Most of these areas would be reopened seasonally or intermittently throughout the sediment removal process. In addition, temporary impacts to designated recreational facilities and trails will be minimized through advance communication and redirection to the nearest facility in the vicinity of the Proposed Project. Furthermore, an east-west trail crossing will continue to provide access at the north end of the reservoir. At the south end of the reservoir, after the reservoir ingress and egress ramps have been fully constructed, access to the upper east side Arroyo Seco Trail from La Cañada Verdugo Road will be maintained; and the linkage from the west side Arroyo Seco Trail and the Flint Wash Trail to the upper east side Arroyo Seco Trail (crossing Devil's Gate Dam and also continuing south to the Rose Bowl) will be available after construction activities have ended each day and on nonworking days.

From: Lou Anne Insprucker
To: reservoircleanouts
Subject: Devil's Gate Reservoir Sediment Removal and Management Project
Date: Tuesday, January 21, 2014 3:43:18 PM

Comment 226-1

Please support the Arroyo Seco Foundation plan. It is moderate and has long-term vision.

Sincerely,
L.A. Insprucker
La Canada, CA

Response to Comment Letter #226 (Lou Anne Insprucker)

Response to Comment 226-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. Los Angeles County Flood Control District (LACFCD) notes that the commenter supports the Arroyo Seco Foundation's proposed alternative.

LACFCD goes to great lengths to lessen project impacts and maximize efficiencies. As such, many of the points in the Arroyo Seco Foundation's four-point "Slow Program" are compatible with the LACFCD Proposed Project.

For example, the Draft Environmental Impact Report (EIR) concluded that Alternative 3 is the Environmentally Superior Alternative. Alternative 3 drastically reduces the project's footprint of 120 acres down to 71 acres. Additionally, the limited maintenance area for Alternative 3 further reduces the permanent habitat impacts down to approximately 51 acres by allowing for site replanting and mitigation to take place within the reservoir footprint. This reduction in project acreages will greatly lessen environmental impacts of the Proposed Project.

LACFCD strives to achieve an efficient, low-cost sediment removal project. Sediment removal rates and trucking operations, now utilizing all low-emissions trucks, as explained in Section 3.5 of the Draft EIR, have been carefully planned for economies of scale to realize maximum efficiencies without major delays in project schedule, thus greatly reducing operating costs. Furthermore, LACFCD has applied for and received an approximately $28 million grant through the State's Disaster Preparedness and Flood Protection Bond Act of 2006 (Proposition 1E) program. A portion of this grant will be used to help offset the Proposed Project's costs.

The Proposed Project is designed to be a long-term plan. While sluicing is not a viable project alternative, as explained in Section 4.7 of the Draft EIR, Flow Assisted Sediment Transport, or FASTing, will be used for maintenance after the project's main sediment removal phase has been completed. Annual FASTing operations will be implemented to reduce future buildups of sediment in the reservoir and to reduce the need for mechanical removal of sediment from the reservoir. Although FASTing is expected to be an effective means of keeping sediment levels low in the reservoir, it is estimated that typically 13,000 cy of sediment will be removed by excavation annually. A maintenance regime that relies on FASTing greatly reduces the need for and extends the life of future and existing sediment placement sites and improves the future sustainability of the reservoir. Please see Section 2.5.2 of the Draft EIR for more information on future maintenance.

LACFCD is committed to *Public Service that Works*; and by combining almost 100 years of technical expertise and invaluable input from the community, less invasive flood protection will continue to be a reality.

For a more detailed response to the Arroyo Seco Foundation's four-point "Slow Program", please see the response to the Arroyo Seco Foundation's comment letter (Comment Letter #216, Response to Comment 216-16, Response to Comment 216-16).

From: Mignonne & Allen
To: reservoircleanouts
Subject: DEVIL"S GATE SEDIMENT REMOVAL AND MANAGEMENT PROJECT
Date: Tuesday, January 21, 2014 1:56:10 PM

FROM: MIgnonne D. Walker
4250 Beulah Drive
Flintridge, CA 91011
oldyelller@earthlink.net

TO: Gail Farber, Director
County of Los Angeles Department of Public Works
P.O. Box 1460
Alhambra, CA 91802-1460
CC: Mark Petrella
CC:Keith Lilley

Jan. 20, 2014

COMMENTS ON DEVIL'S GATE DAM DEIR

Comment 227-1 The Deir is inadequate

Comment 227-2 Why did you change from 1.67Million cubic yards to 2.9 Million cubic yards

Comment 227-3 Ca. is in a Drought

Comment 227-4 You can't mitigate the diesel double trucks one a minute by our schools in La Canada diesel has terrible chemicals autism alzheimers what are you thinking???????????????

Comment 227-5 Why is the Rose Bowl included there is no proof it would flood are these SCARE TACTICS ??? ????????

Comment 227-6 NO TO ALL 5 ALTERNATIVES NO NO NO NO NO NO NO NO NO NO NO NO NO NO NO NO NO NO NO NO NO NO NO NO NO NO

Comment 227-7 WHY WERE THE FOLLOWING NOT EVEN NOTIFIED. AFRAID OF THEIR REACTION??????????? 10 schools Residences Stables Camps JPL hikers bikers horseback riders family recreation commuters biology camps the wildlife the birds migrating birds at that

Comment 227-8 Air Pollution you are using 2008 standards THAT IS NOT RIGHT one double truck a minute what about idling trucks Is there a plan for accidents when they occur???????????

Comment 227-9 Noise Pollution what is your plan for that????????

Comment 227-10 Are you selling the Sediment ??????????? Profits go where ?????????????

Comment 227-11 Does the project have a permit from CALIFORNIA REGIONAL WATER QUALITY BOARD ???????? Does Pasadena have a secret water deal planned????????????? Is there rocket fuel involved??????????

Comment 227-12 You have a scorched earth policy plan they said you would replant the area AND JUST HOW ARE YOU GOING TO WATER THESE NEW PLANTS AND HABITAT EXACTLY HOW ARE YOU GOING TO DO THAT???????????????????????????????

Comment 227-13 I went to two of the meetings. I was not satisfied with the answers we got. It seems to me you tried

Comment 227-13 continued

to rush this through right before and during xmas. Wow I wonder why??????????????

I think you were hoping no one would notice your terrible plan.

Comment 227-14

I am very upset by all of this I get terrible headaches already from diesel pollution and now what am I supposed to do Move away for 5 years.

Sincerely, Mignonne Walker

Response to Comment Letter #227 (Mignonne Walker)

Response to Comment 227-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. The Draft Environmental Impact Report (EIR) does adequately analyze the potential impacts associated with the Proposed Project.

Response to Comment 227-2:

The Los Angeles County Flood Control District (LACFCD) was mandated by the State Legislature to provide flood protection and water conservation within its boundaries.

A reservoir storage design capacity of two design debris events (DDEs) below the dam's lowest spillway was determined to be the standard acceptable level of risk at Devil's Gate Dam and Reservoir. The DDE volume of capacity is determined using the January 2006 Los Angeles County Department of Public Works (LACDPW) Hydrology Manual and the March 2006 LACDPW Sedimentation Manual. For Devil's Gate Dam and Reservoir, the required reservoir capacity is 4.0 million cubic yards (cy) (two DDEs) below the spillway elevation of 1,040.50 feet.

The Hydrology Manual (January 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_Hydrology_Manual/2006%20Hydrology%20Manual-Divided.pdf

The Sedimentation Manual (March 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_sedimentation_manual/Sedimentation%20Manual-Second%20Edition.pdf

Additional information concerning DDE calculation methods has been added to the Final EIR, Section 2.3, Project Need.

For Devil's Gate Dam, the DDE was previously calculated as 1.67 million cy. That previous calculation was based on the presence of debris-retaining structures including Browns Canyon Dam, located within the Angeles National Forest upstream of Devil's Gate Dam. These structures filled with sediment decades ago and no longer provide capacity to "control" any portion of the watershed. A subsequent analysis determined that the correct DDE, based on the absence of sediment control facilities in the Forest, is 2.0 million cy. Following the Station Fire, the LACDPW reviewed the DDE calculations and confirmed that 2.0 million cy is the current and appropriate volume for the DDE.

LACFCD's criterion is that reservoir sediment levels be maintained at a level equivalent to two design debris events below spillway; however, in response to the Station Fire, an emergency project to remove only 1.67 million cy was initially proposed. The volume of 1.67 million cy is the previously published DDE and was considered justifiable as an emergency exemption to the California Environmental Quality Act (CEQA). In March 2011, the County of Los Angeles Board of Supervisors motioned LACFCD to complete an EIR for a comprehensive sediment removal project at Devil's Gate. LACFCD then initiated project development in accordance with the required level of protection of two DDEs. At that time LACFCD also began receiving feedback on the concurrent Sediment Management Strategic Plan (Strategic Plan) and the interest to look at more sustainable sediment and reservoir management. As a result of the feedback and recommendations during the development of the Strategic Plan, LACFCD began evaluating

ways to create a more sustainable long-term way to manage its sediment and habitat. To emphasize the goals of the project, the project was given the name Devil's Gate Sediment Removal and Management Project.

Response to Comment 227-3:

Over 92 years, the average amount of sediment deposited each year is approximately 130,000 cy; however, Devil's Gate Reservoir is a dynamic system with constantly changing amounts of sediment deposited from year to year, depending on the frequency and intensity of storm events. If a 1 in 50 years storm were to occur, approximately 2.0 million cy (one DDE) of sediment could be expected to wash into the reservoir. The most sediment that was deposited during a five-year period was 3.1 million cy, which occurred between 1937 and 1942. Because of LACFCD's responsibilities to provide flood protection, LACFCD must be ready at all times for a Design Debris Event to occur.

Response to Comment 227-4:

Air quality impacts associated with truck traffic were analyzed in the Draft EIR in Section 3.5. LACFCD has conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed the United States (U.S.) Environmental Protection Agency's (EPA's) 2007 standards for emissions. Therefore, in order to further reduce emissions, Mitigation Measure MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump trucks that meet or exceed EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality, including those associated with health effects, will be reduced to less than significant.

As discussed in the Draft EIR, Section 3.5, the Health Risk Assessment (HRA) analyzed both the cancer-related and noncancer-related acute (short-term) and chronic (long-term) impacts from project-related emissions. The HRA analysis found the Proposed Project would result in less than significant impacts for both the cancer-related and noncancer-related acute short-term and long-term impacts.

Response to Comment 227-5:

Devil's Gate Dam, built in 1920, was the first dam built by LACFCD. The dam allowed for the channelization of and development along the Arroyo Seco. The Rose Bowl, built in 1922, and the Arroyo Seco Parkway, also known as State Route 110, completed in 1953, are two examples of downstream development made permissible by the construction of Devil's Gate Dam.

Given the current, limited capacity of the reservoir, a 50-year storm event that results in a DDE would result in storm flows with sediment flowing over the spillway. Flooding with mud/sediment would occur along portions of the Arroyo Seco in the Cities of Pasadena, South Pasadena, and Los Angeles, impacting approximately 650 parcels and requiring closure of Interstate 110 from Orange Grove Avenue to Interstate 5. Additional information about the potential flood areas and analysis is shown in the Arroyo Seco Channel Hydraulic Analysis prepared by Bureau Veritas North America, Inc., available on the Project website. Please note that protocols are in place to monitor storms, reservoir conditions, and channel conditions and to communicate with emergency responders and California Department of Transportation (Caltrans) to execute any necessary evacuations or freeway closures.

During a single design event sized storm, the Rose Bowl is not expected to be impacted by flows from the dam; however, if sediment from each storm event is not removed from the downstream floodplain, each subsequent storm would increase the flood risk.

Response to Comment 227-6:

LACFCD notes that the commenter does not support any of the five Alternatives. The Draft EIR analyzes six Alternatives in addition to the Proposed Project, including the CEQA-required No Project Alternative.

Response to Comment 227-7:

Per CEQA Guidelines Section 21902 (b)(3), notice shall be given to the last known name and address of all organizations and individuals who have previously requested notice and shall also be given by at least one of the following procedures:

- publication in a newspaper of general circulation in the area affected by the Proposed Project
- posting of notice by the lead agency on and off site in the area where the Proposed Project is to be located
- direct mailing to the owners and occupants of contiguous property shown on the latest equalized assessment roll

The notices for the Proposed Project, the Notice of Preparation (NOP), and the Notice of Availability/Notice of Completion (NOA/NOC) were:

- sent to agencies, organizations, and individuals who have previously requested notices, in addition to other area agencies and organizations
- published in local newspapers, the *San Gabriel Valley Tribune* and the *Pasadena Star News*
- posted on and off site
- mailed to over 1,100 owners and occupants of contiguous property shown on the latest equalized assessment roll
- filed with the County Clerk and the State Clearinghouse
- posted at eight local libraries
- posted on the LACDPW website

Therefore, notice for the Proposed Project was adequate, as the notice efforts went beyond the CEQA Guidelines requirements.

As part of the outreach effort, LACDPW has reached out to recreational users, including the Pasadena Audubon Society, Rose Bowl Riders, Tom Sawyer Camps, Oak Grove Disc Golf Club, and MACH-1.

Response to Comment 227-8:

See Response to Comment 227-4.

It is estimated that trucks will briefly idle during loading, but the average loading time per truck is estimated to be one minute. In addition, LACFCD typically requires equipment to shut down if idling time is expected to be more than five minutes. Estimated project idling times were included in the air quality analysis and health risk assessment for the Draft EIR, Section 3.5, and Appendices B and C. While the majority of the sediment disposal and associated truck traffic is expected to go to the disposal sites east of the Proposed Project, the Draft EIR also analyzed the use of disposal sites west of the Proposed Project. This will allow for flexibility in case one particular route is temporarily unusable.

Response to Comment 227-9:

As noted in Section 3.14.6 of the Draft EIR, the Proposed Project will comply with all local ordinances that apply to sediment removal and reservoir management activities taking place during the allowed hours. In addition, roadway noise impacts will be less than significant. Through implementation of Mitigation Measure MM N-1, the impacts to nearby sensitive receptors from vibrations of onsite construction equipment would be reduced to less than significant.

Response to Comment 227-10:

The sediment that came into Devil's Gate Reservoir following the Station Fire has a very fine gradation or consistency. As such, the majority of this material is not readily reusable on a commercial scale and will most likely not be sold; however, sediment placed at sediment placement sites would be available for potential reuse for other projects or sediment reuse opportunities. The sediment removed from the Devil's Gate Reservoir will be transported to the existing placement sites listed in Section 2.0, Project Description in the Draft EIR.

For further information regarding beneficial uses for sediment at the LACFCD sites, please refer to Section 6.5 of LACFCD's 2012 Sediment Management Strategic Plan which can be found at: http://dpw.lacounty.gov/lacfcd/sediment/stplan.aspx.

Response to Comment 227-11:

As part of project approval, LACFCD will obtain the necessary permits from the California Regional Water Quality Control Board. The Proposed Project does not involve any water deals or rocket fuel/perchlorates.

Response to Comment 227-12:

After the Station Fire in 2009, the following two storm seasons brought 1.3 million cubic yards of sediment into the reservoir, raising the ground elevations within the reservoir and burying most of the established vegetation. Since then, vegetation, has reestablished within the reservoir, including in the areas that will remain in place and/or possibly used as mitigation sites under Alternative 3. The sediment removal efforts aim to restore the historic elevations within the reservoir to the conditions existing prior to the impacts caused by the Station Fire.

After the sediment removal project, ground elevations within the reservoir will be in either present or historic levels and will have exposure to flowing stormwater. The habitat restoration plan will include and address monitoring and success criteria, as required by the regulatory agencies.

As discussed in mitigation measures MM-BIO-6 through MM-BIO-8, a combination of onsite and offsite habitat restoration and enhancement will occur. This will include allowing riparian habitat to establish. Habitat restoration/enhancement will include use of willow cuttings for reestablishment and exotic species removal. Ruderal habitats within the basin shall be utilized whenever possible as mitigation sites. LACFCD is continuing to work closely with California Department of Fish and Wildlife (CDFW) and U.S. Army Corps of Engineers (USACE) to identify appropriate restoration and enhancement that will offset impacts and allow for sensitive habitat to recover naturally within the Proposed Project site but also to conserve and protect mitigation areas.

Response to Comment 227-13:

Adequate time for public commenting was provided. CEQA requires that the public comment period for a Draft EIR be at least 45 days (CEQA Guidelines § 21091). LACFCD extended this review period initially to 75 days and then further extended the review period to 90 days to allow for additional commenting time.

LACFCD held three community meetings to inform the public of the Proposed Project, Alternatives, and the results of the Draft EIR. The meetings included a presentation, workshops where the public could ask specific questions about the project and potential impacts, and had the opportunity to submit formal comments. Members of the public were able to ask questions or pose comments either in a group setting after the presentation or at the individual workshop stations.

Response to Comment 227-14:

See Response to Comment 227-4.

LACFCD proposed a project duration of five years to reduce accumulated sediment in a timely fashion. The goal of LACFCD is to restore reservoir flood capacity as soon as feasible while reducing costs, minimizing the duration of environmental and construction impacts to the surrounding communities, and configuring the reservoir to allow for sustainable future maintenance. Extending the project would prolong the flood risk to downstream communities and increase the construction impacts to the surrounding communities.

Comment Letter #228

Peter Kalmus
494 Alberta Street
Altadena, CA 91001

Gail Farber, Director
County of Los Angeles Department of Public Works Water Resource Division
Attention: Reservoir Cleanouts Program
P.O. Box 1460
Alhambra, California 91802-1460
CC: Mark Petrella
CC: Keith Lilley

Comments on Devil's Gate DEIR
January 21, 2014

Dear Ms. Farber,

Comment 228-1 The DEIR proposes to excavate and remove 2.9 million cubic yards of sediment behind the Devil's Gate Dam, over an area of 120 acres, over the next 5 years, and deposit it about 20 miles away in Azusa and Irwindale. The means of removal are dump trucks, operated at the rate of about one every minute, 9 hours per day, six days a week.

Comment 228-2 After reading the DEIR, I have several questions which I feel are critical to address conclusively before moving forward on this proposal. I respectfully submit that the DEIR is inadequate, at this point, for the project to proceed, and must be reconsidered even at the level of its objectives. I give some few of my reasons below.

Comment 228-3 An additional potential impact in the aesthetics category is the post-project, permanently denuded maintenance phase. This impact would be very significant to me, and probably to many other members of the community, but it is not included in Table ES-1. How can the post-project visual impact be mitigated, i.e. how can the post project look like a natural wetland landscape (i.e. a willow forest) and not a trashed and / or denuded field as indicated in the post-project visualizations in the DEIR? To my aesthetic sense, the aesthetic degradation depicted in the DEIR is truly significant, even shocking. These visualizations were a prime motivator for my taking the time to write this comment.

Comment 228-4 An additional potential impact in the air quality category is the CO_2 released by the loading of sediment and the transport of sediment, and is not included in Table ES-1. How much CO_2 will be released by this project? How much impact will this released CO_2 have on the climate? How much impact will maintenance activities have on the climate? I do not feel that a thorough EIR can plausibly exclude this impact, and I'm frankly surprised it was excluded.

Comment 228-5 How much is the all-cause mortality of nearby residents, school children, workers, and recreational visitors estimated to increase due to e.g. significant diesel exhaust including particulate matter? This can be estimated. I feel that it is irresponsible and immoral to subject the above-mentioned stakeholders to this risk without a comprehensive and state-of-the-art estimate of increase in all-cause mortality. I suspect that such a study, carried out by experts, will find that the average number of days of life lost to vicinity stakeholders will be very significant. In addition, a morbidity study must also be carried out. I am not sure what the legal implications are for a project that will probably shorten the lifespans of those in the vicinity, especially when it appears that there is a viable alternative that would not have this impact, but I feel that at the very least the results of these studies should be mailed to every stakeholder, e.g. all business, schools, and residents in the radius of increased mortality or morbidity (if any). These stakeholders should be given the chance to understand that this project might lower their lifespan, and they should be given time to seek legal advice if they desire. In the event of serious health issues caused by this project, who would be liable for damages?

Comment 228-6 I am not convinced that the impact of habitat destruction for the 5 special status species mentioned in Table ES-1 will be "less than significant." It doesn't matter how many qualified biologists are on the scene; if the habitat is destroyed, these species will have one less place to live. I am not a biologist, but I do suspect that if you destroy this habitat, these animals will end up dying; again, this would be independent of whether or not a qualified biologist is present when the habitat is destroyed. What metric was used to determine that the nearly complete destruction of this unique habitat will be "less than significant"? This metric is not defined in the DEIR.

Comment 228-7 What has the rate of sediment removal from FAST been in the past? Was this the maximum possible FAST rate? What could be done to increase the rate of sediment removal through FAST events?

Comment 228-8 The DEIR does not make a convincing case as to why the project needs to be completed in 5 years. What is the quantitative risk of flooding, based on the site history and sediment flow models? What downstream sites would be at risk? In the case of floods, what would be the cost of damage? How much flooding would be required before the cost of damage exceeded the cost of this project, and what is the statistical probability of that level of flooding over various timescales, including a longer possible project timescale of 20 years, or 30 years?

Comment 228-9 What is the justification for needing to remove 2 DDE?

Comment 228-10 Has an alternative of removing the minimum sediment to maintain 1 DDE, and using FAST thereafter, been considered? If not, I would like to see this considered carefully. What would be the minimum safe removal amount (if followed by a steady maintenance plan) based on sediment models? I do not the the DEIR adequately addresses these questions.

Comment 228-11 The current plan will have a very significant impact on my family's recreation. We use the willow forest for recreation and education approximately once every two weeks. These recreation and education opportunities will vanish completely and permanently if this project is carried out.

Comment 228-12 My understanding is that sluicing or FAST has worked successfully in the past at this site at removing large amounts of sediment, but I do not see this history addressed carefully in the DEIR. Compared to the DEIR proposal

Comment 228-12 continued

it is essentially free. What is the reason that sluicing or FAST is not the primary means for removing sediment at this time?

Comment 228-13

The DEIR trucking proposal will cost $100 million. Is there a cheaper alternative than trucking that will still get the job done? Will sluicing and or FAST as primary removal strategy, with some trucking as as secondary strategy if needed (and at a lower volume than sluicing) also get the job done?

Comment 228-14

Do all stakeholders agree on the stated objectives? Is there an alternate set of objectives which will allow for the sustainable management of the dam and the safety of downstream structures, while not requiring the massive removal and trucking outlined in this proposal? I am not convinced that these objectives are the one true set of objectives, and the rest of the DEIR follows from them. It is very easy to eliminate alternative proposals by simply picking objectives that point to the one desired proposal. I would like to see a much more careful justification for these objectives in the DEIR.

Comment 228-15

Who stands to profit from the DEIR proposal? How have any benefiting parties been involved in the process of lobbying for the proposed project, drafting the DEIR, or any other participation in this process? Can the DEIR please address this and demonstrate that there has been no such participation by parties who stand to benefit financially?

Comment 228-16

Is there an alternative that can allow for most of the habitat to remain, while still allowing the dam to function over the long term? The denuded terrain is a big impact in my opinion. It will look terrible. Every time I ride to JPL in the morning, and ride home at night, I will wince.

Comment 228-17

How much carbon dioxide would the proposed project release into the atmosphere? Has the climate impact of this project, and the continued necessary maintenance, been adequately considered? What would the climate impact of a sluicing- or FAST-based approach be? Would the latter approach emit less CO2?

Comment 228-18

I'm not convinced that the DEIR has adequately examined the possibility of sluicing or FAST as the primary method of sediment removal. I would like to see a state-of-the-art appraisal of sluicing, its potential and its limitations, based on recent scientific studies. In the case that some questions on the potential and limitations of sluicing cannot be answered based on the current scientific studies, I would like to see further scientific research done before we rush to spend $100 million on a project that is understudied and may well prove to be a terrible mistake, in the sense that habitat is destroyed that need not have been destroyed, and in the sense that a huge sum of money was spent that need not have been spent, and in the sense that people in the vicinity are subjected to increased mortality and morbidity.

Sincerely,
Peter Kalmus

Response to Comment Letter #228 (Peter Kalmus)

Response to Comment 228-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

Potential impacts due to the Proposed Project's truck trips were analyzed in the Draft Environmental Impact Report (EIR), Section 3.16, Transportation and Traffic. As listed in that section, a single intersection in the immediate vicinity of the Proposed Project site will have a potentially significant impact. The Draft EIR outlines a 12-hour trucking schedule, with trucking operations on Saturdays as well. This schedule is used to model the most intensive construction operation, which may not be applicable at the site for the duration of the Proposed Project. Typical trucking schedules are estimated to be 8 hours per day on weekdays. In practice, hauling rates and routes may be adjusted to help reduce impacts, depending on operational need. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the Proposed Project site.

Response to Comment 228-2:

The Draft EIR adequately analyzed all California Environmental Quality Act (CEQA)-required issue areas.

Response to Comment 228-3:

As noted in the Draft EIR, Section 3.4, Aesthetics and Figures 3.4-1 through 3.4-3, the visual aspects of the Proposed Project site are constantly changing. The Draft EIR does note that the Proposed Project will have significant temporary impacts to aesthetics; however, after the sediment removal phase of the Proposed Project is complete, a habitat restoration plan will be implemented that will allow native plant communities to reestablish outside the reservoir management area. Riparian Herbaceous vegetation is expected to continue to populate and/or reestablish in the management area of the Proposed Project site between maintenance activities.

The Draft EIR determined that visual impacts associated with reservoir management will be less than significant and, therefore, will not require mitigation. Since impacts are less than significant and do not require mitigation measures, this impact is not included in Table ES-1. Reservoir management impacts to visual character under both of the Proposed Project's management options will result in a lower degree of contrast than seen during sediment removal. Due to the rapid growth of herbaceous plants, it is expected that during the majority of the year the Proposed Project site will appear vegetated. In addition, as with existing conditions, vegetation conditions on the Proposed Project site, including height and density, would change on a regular basis due to seasonal conditions, water flow/views, water storage, and sediment conditions.

Alternative 3, Configuration D affects the least amount of habitat of all the action alternatives while still achieving Proposed Project objectives (see Section 4.6 of the Final EIR). This alternative would provide a buffer on the west side of the reservoir that would allow for the movement of wildlife. Alternative 3, Configuration D, Option 1 provides a more natural configuration for the reservoir by having two branches to carry water and sediment toward the face of the dam, avoiding disturbing a significant portion of existing vegetation. To further reduce the Proposed Project's footprint, Los Angeles County Flood Control District (LACFCD) has added an optional configuration for this Alternative. Alternative 3,

Configuration D, Option 2, which drastically reduces the project's footprint of 120 acres down to 71 acres, would avoid excavation of the western branch, thereby providing a greater habitat buffer on the west side of the reservoir. In addition, the maintenance areas would be smaller than the original sediment removal footprint, allowing for habitat to reestablish and providing additional areas for wildlife movement.

Response to Comment 228-4:

Emissions of carbon dioxide (CO_2) are detailed in the Draft EIR, Section 3.9 Greenhouse Gas Emissions. As noted in the discussion, impacts related to greenhouse gas emissions are considered less than significant, as CO_2 emissions do not exceed the established South Coast Air Quality Management District's (SCAQMD) thresholds. Since impacts are less than significant and do not require mitigation measures, this impact is not included in Table ES-1.

Response to Comment 228-5:

As discussed in the Draft EIR, Section 3.5, the Health Risk Assessment (HRA) analyzed both the cancer-related and noncancer-related acute (short-term) and chronic (long-term) impacts from project-related emissions. The HRA analysis found the Proposed Project would result in less than significant impacts for both the cancer-related and noncancer-related acute short-term and long-term impacts.

Response to Comment 228-6:

Significant impacts to sensitive species were defined in the Draft EIR, Section 3.6.6, "Would the project have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or the U.S. Fish and Wildlife Service?" In this section significant impacts to sensitive species were identified. These impacts will be reduced to less than significant through implementation of mitigation measures MM BIO-1 through MM BIO-8, which will serve to protect and avoid impacts to wildlife species and will provide for habitat restoration and enhancement.

Although the sediment removal phase of the Proposed Project will occur over a five-year period, the removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays), as described in the Draft EIR, Section 2.5.1, Sediment Removal Phase, Project Schedule. Wildlife species currently found in the Proposed Project area would be expected to either remain in the undisturbed areas of the reservoir outside the Proposed Project area or to reestablish once sediment removal activities have been completed. Impacts to biological resources would be less than significant.

Response to Comment 228-7:

Flow Assisted Sediment Transport (FASTing), a passive method of transporting sediment downstream, is currently used when possible and would be used during the Maintenance Phase of the Proposed Project; however, FASTing, even in combination with the Interim Measures Project (IMP), will not efficiently remove large amounts of sediment. As discussed under the No Project Alternative, Section 4.9, use of FASTing and IMP alone will not meet Proposed Project objectives. After the Proposed Project's main sediment removal has occurred, FASTing is proposed to be an integral part of the annual maintenance at Devil's Gate. Annual FASTing operations will be implemented to reduce future buildups

of sediment in the reservoir and to reduce the need for mechanical removal of sediment from the reservoir. Although FASTing is expected to be an effective means of keeping sediment levels low in the reservoir, it is estimated that typically 13,000 cy of sediment will be removed by excavation annually; however, a maintenance regime that relies on FASTing greatly reduces the need for and extends the life of future and existing sediment placement sites. Please see Section 2.5.2 of the Draft EIR for more information on future maintenance.

Response to Comment 228-8:

LACFCD proposed a project duration of five years to reduce accumulated sediment in a timely fashion. The goal of LACFCD is to restore reservoir flood capacity as soon as feasible while reducing costs, minimizing the duration of environmental and construction impacts to the surrounding communities, and configuring the reservoir to allow for sustainable future maintenance. Extending the project would prolong the flood risk to downstream communities and increase the construction impacts to the surrounding communities.

LACFCD was mandated by the State Legislature to provide flood protection and water conservation within its boundaries.

A reservoir storage design capacity of two design debris events (DDEs) below the dam's lowest spillway was determined to be the standard acceptable level of risk at Devil's Gate Dam and Reservoir. The DDE volume of capacity is determined using the January 2006 Los Angeles County Department of Public Works (LACDPW) Hydrology Manual and the March 2006 LACDPW Sedimentation Manual. For Devil's Gate Dam and Reservoir, the required reservoir capacity is 4.0 million cubic yards (cy) (two DDEs) below the spillway elevation of 1,040.50 feet.

The Hydrology Manual (January 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_Hydrology_Manual/2006%20Hydrology%20Manual-Divided.pdf

The Sedimentation Manual (March 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_sedimentation_manual/Sedimentation%20Manual-Second%20Edition.pdf

Additional information concerning DDE calculation methods has been added to the Final EIR, Section 2.3, Project Need.

With the current, limited capacity of the reservoir, a 50-year storm event that results in a DDE would result in storm flows with sediment flowing over the spillway. Flooding with mud/sediment would occur along the portions of the Arroyo Seco in the Cities of Pasadena, South Pasadena, and Los Angeles, impacting approximately 650 parcels and requiring closure of Interstate 110 from Orange Grove Avenue to Interstate 5. Additional information about the potential flood areas and analysis is shown in the Arroyo Seco Channel Hydraulic Analysis prepared by Bureau Veritas North America, Inc., available on the Project website. Please note that protocols are in place to monitor storms, reservoir conditions, and channel conditions and to communicate with emergency responders and California Department of Transportation (Caltrans) to execute any necessary evacuations or freeway closures.

Historically, large amounts of sediment have been deposited in the reservoir in short time periods. Between 1935 and 1938 over 1.6 million cy of sediment, between 1938 and 1943 over 1.95 million cy of

sediment, between 1959 and 1966 over 1.75 million cy of sediment, and between 2010 and 2012 over 1.3 million cy of sediment was deposited in the reservoir. Over 92 years, the average amount of sediment deposited each year is approximately 130,000 cy; however, Devil's Gate Reservoir is a dynamic system with constantly changing amounts of sediment deposited from year to year, depending on the frequency and intensity of storm events. If a 1 in 50 years storm were to occur, approximately 2.0 million cy (one DDE) of sediment could be expected to wash into the reservoir. Because of the LACFCD's responsibilities to provide flood protection, LACFCD must be ready at all times for a Design Debris Event to occur.

Response to Comment 228-9:

See Response to Comment 212-8.

Response to Comment 228-10:

See Response to Comments 212-7 and 212-8.

Response to Comment 228-11:

LACFCD recognizes that the area is an important area for recreation, as outlined in Section 3.15, Recreation/Public Services.

Impacts to recreation were analyzed in the Draft EIR, Section 3.15. The Proposed Project will not limit the use of the Oak Grove area of Hahamongna Watershed Park. Sediment removal activities would be temporary, are expected to occur only in the drier months (April to December, excluding holidays). It is expected that these activities will often not be adjacent to the Oak Grove area of Hahamongna Watershed Park. The Proposed Project would result in temporary limitations on the recreational use of the Proposed Project site and some of the adjacent trails. Most of these areas would be reopened seasonally or intermittently throughout the sediment removal process. In addition, temporary impacts to designated recreational facilities and trails will be minimized through advance communication and redirection to the nearest facility in the vicinity of the Proposed Project. Furthermore, an east-west trail crossing will continue to provide access at the north end of the reservoir. At the south end of the reservoir, after the reservoir ingress and egress ramps have been fully constructed, access to the upper east side Arroyo Seco Trail from La Cañada Verdugo Road will be maintained; and the linkage from the west side Arroyo Seco Trail and the Flint Wash Trail to the upper east side Arroyo Seco Trail (crossing Devil's Gate Dam and also continuing south to the Rose Bowl) will be available after construction activities have ended each day and on nonworking days.

Alternative 3, Configuration D affects the least amount of reservoir area of all the action alternatives, while still achieving Proposed Project objectives (see Section 4.6 of the Final EIR). Both configuration options of this alternative would provide a buffer between the Oak Grove area of Hahamongna Watershed Park and the excavation area. Alternative 3, Configuration D, Option 2, which drastically reduces the project's footprint of 120 acres down to 71 acres, would avoid excavation of the western branch, thereby providing a greater habitat buffer on the west side of the reservoir. In addition, the maintenance areas would be smaller than the original sediment removal footprint, allowing for habitat to reestablish.

Response to Comment 228-12:

See Response to Comments 212-7. Sluicing was analyzed as part of the Draft EIR in the Alternatives Analysis, Section 4.7, Alternative 4 Sluicing Method. This alternative would involve use of construction equipment and the removal of trees and vegetation over the same footprint as the Proposed Project. The sluicing alternative would potentially have additional significant impacts in comparison to the Proposed Project. Many of these impacts would be associated with the likelihood that large amounts of sediment would not be fully transported through the flood control system; this sediment would need to be mechanically removed and trucked out from numerous downstream locations, potentially including the two soft-bottom portions of the channel. Please see Section 4.7 and Appendix K of the Draft EIR for further analysis.

Response to Comment 228-13:

See Response to Comment 212-12. Under CEQA, the lead agency is not required to analyze an economic impact associated with a project in the EIR; as Section 15131(a) of the CEQA Guidelines states: "Economic or social effects of a project shall not be treated as significant effects on the environment." Moreover, CEQA allows economic analysis in the administrative record only if the basis for infeasibility, and thus rejection of a mitigation or alternative, is economic, as described in CEQA Guidelines Sections 15091(a)(3) and 15364.

The estimated cost for the Proposed Project and for Alternatives 1, 2, 3, and 5 would range from $80 million for the Proposed Project to $65 million for Alternative 3. Due to the variety of factors, including the indeterminate locations of the sediment fallout and requirements for removing sediment from these locations, the cost for Alternative 4 cannot be calculated.

Response to Comment 228-14:

Per CEQA, Section 15124, the statement of objectives should include the underlying purpose of the project. All of the Proposed Project objectives support the underlying purpose of the project, which is to restore and maintain flood capacity at Devil's Gate Reservoir to meet its intended level of flood protection for the communities downstream. This requires restoring the design capacity of the reservoir and establishing a reservoir management system to maintain the flood control capacity of the reservoir. Therefore, the Proposed Project objectives are satisfactory per CEQA. Also, based on input received during the public scoping period and in conformance with CEQA Guidelines, several alternatives were developed that meet most of the basic objectives of the project, address diverse concerns of stakeholders, and lessen potentially significant effects of the project.

Response to Comment 228-15:

LACFCD is undertaking this project to increase the flood control capacity of the reservoir. The CEQA process is intended to inform and include the public and interested agencies in the process of analyzing the Proposed Project and Alternatives.

The construction contractors have not been hired yet. LACFCD uses a formally advertised sealed bid process for public works construction contracting. The goal of the process is to award a contract to the lowest cost "responsive" and "responsible" bidder. California Public Contract Code mandates the use of an advertised bid process for construction contracting. Contractors and service providers must meet certain qualification requirements to be considered by the County for selection and contract award.

More detailed information on the County's construction bidding process can be found in the *County of Los Angeles Countywide Construction Policy Guidelines* available online at the following location: http://dpw.lacounty.gov/aed/construction_manual.pdf.

Response to Comment 228-16:

See Response to Comment 228-3.

Response to Comment 228-17:

See Response to Comment 228-4. As noted above, emissions of CO_2 are detailed in the Draft EIR, Section 3.9 Greenhouse Gas Emissions. As noted in the discussion, impacts related to greenhouse gas emissions are considered less than significant, as CO_2 emissions do not exceed the established SCAQMD thresholds. As discussed in Section 4.7, Alternative 4, Sluicing will potentially generate more overall greenhouse gas emissions than the Proposed Project and therefore is considered environmentally inferior to the Proposed Project due to overall production of greenhouse gas emissions.

Response to Comment 228-18:

See Response to Comments 228-7 and 228-12. The Detailed Sediment Transport Capacity Analysis for the Arroyo Seco Channel, Appendix K in Draft EIR, analyzed the feasibility of sediment transport down the Arroyo Seco.

Comment Letter #229

From: Richard Rupp
To: reservoircleanouts
Subject: Devil"s Gate Reservoir Sediment Removal and Management Project
Date: Tuesday, January 21, 2014 11:54:57 AM

To Whom it may Concern:

Comment 229-1

We are very concerned about the proposed project to clear sediment from behind Devil's Gate Dam in Pasadena. The assumption driving this seems to be that, with the basin presently over 80% full, removal is imperative. This seems to ignore the fact that the present sediment accumulation is the result of a century - a hundred years' - sediment flow from the mountains to the North, including the disastrous Station fire and two subsequent wet winters, which occurred before flora could regrow and hold the topsoil. This means that future heavy flows from those hillsides are extremely unlikely. Essentially, creating a cleaned-out flood basin at Devil's Gate is closing the barn door after the horses escaped. The chances of debris and sediment flows that would fill the remaining capacity of the basin are miniscule. That debris has already flowed! The hillsides have regrown underbrush on what topsoil is left, and future rains would find little sediment to move.

Comment 229-2

Secondly, removal of the willow forest presently covering much of the basin would actually create more sediment flow - particularly sediment that would then move to the base of the dam and clog the drain at its base - and if you talk to the workers at the dam, that has been what they regard as their major headache - no one who actually works there is worried about the basin filling up. Those of us who have watched the basin over the last few decades have observed that the area covered with the forest has been immune to significant erosion - even the heaviest rains cut only a narrow channel through the basin as it now stands. The County's plan envisions a "cleaned-out" basin, when in actuality such a basin never has existed, and if it did, it would be MORE, not less vulnerable, to erosion. As for the need for a basin that can accommodate future sediment flows, see above. There aren't going to be any huge ones, at least in the next couple of decades.

Comment 229-3

Thirdly, what about the side effects of such a foolishly huge project carried out in the heart of a very upscale community, disrupting one of the major recreational spots in the Northeast County? I haven't heard this discussed, but I think that once those trucks start moving, the dust starts flying, and the bulldozers start tearing out the forest and the wildlife habitat it has created, the County and the Flood Control District will find itself with a case of "710 Freeway Syndrome," wherein an engaged, motivated community, with powerful resources and connections, both financially and politically, becomes enraged and starts filing enough lawsuits to guarantee lifetime job security in the County legal department, not to mention protests, petition drives - you name it.

Comment 229-4

Forth, the proposed destruction of the wildlife habitat and the recreational area is in itself simply outrageous. The Tom Sawyer day camps, the hikers, the equestrians, the dog walkers and mountain bikers, all would be deprived of using an area that, as taxpaying citizens, belongs to them. If NOT doing this removal actually put anyone, or any community, in imminent danger, of course that is the Flood Control District's mandate - but it is patently not true. Those of us who grew up in this area remember this basin from the 1950's, and it was essentially unchanged for the last 50+ years, until the Station fire and its aftermath caused a huge amount of sediment to flow into it. And, I remember, in those times, the Flood Control District was a lot more aggressive about keeping channels and basins cleared out. I'm thinking of the L.A. river as it goes through Eastern Glendale, down through Lincoln Heights. Fortunes were spent keeping it clear, from the 50's until just a decade or two ago, seemingly wasted fortunes. We have seen that allowing some sediment to accumulate, and trees and brush to grow in the concrete channel itself, has had NO impact upon the channel's ability to move floodwaters. The channels continue to function. Further, the sediment that is held in place by those trees, etc, seems to be pretty immune to erosion. Major flood waters cover the trees, they recede, and the landscape re-emerges, unscathed. And, of course, people have now become so enamored of this newly alive river, in the middle of a concrete channel, that if the District were to propose removal of that sediment it would be buried under the protest. As we have seen, the mayor dedicated one of his first days in office to boating down the L.A. river, in what used to be an ugly concrete basin. And "Save the River" looks like a reality, not a joke. The sentiment that favors letting this habitat grow and prosper is now pretty universal - I'm sure that frustrates the bulldozer salesmen who count the District as their

Comment 229-4 continued

customers.

Comment 229-5

So why does the District want, all of a sudden, after 100 years, to denude THIS basin, pollute this community, destroy the wildlife habitat and recreational area, and - by the way - spend a hundred million of our tax dollars to do so? One is tempted to think that the availability of funds and the need for a big project to soak them up is more of a motivating factor than any actual need. Devil's Gate and the basin behind, and the public, and the mandate of the District, would be much better served by a gradual approach. One in which a small amount of sediment is removed every year, then the forest is allowed to heal itself and regrow over the scarred surface, while a small area adjacent is done the year after, and so on. A basin in which sediment is removed gradually (while still at a rate much greater that new sediment is likely to accumulate), and then heal - that is sustainable, affordable, sensible. The end result, even if the District were to remain obsessed with cleaning out all 100 years' accumulation, would be a basin, still covered with a willow forest, still habitat to rare birds, wildlife, and still usable by its owners - that is, us.

Richard F. Rupp
Chieko N. Rupp

(Lifelong Residents of this Area)

Response to Comment Letter #229 (Richard Rupp)

Response to Comment 229-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

The Los Angeles County Flood Control District (LACFCD) was mandated by the State Legislature to provide flood protection and water conservation within its boundaries.

A reservoir storage design capacity of two design debris events (DDEs) below the dam's lowest spillway was determined to be the standard acceptable level of risk at Devil's Gate Dam and Reservoir. The DDE volume of capacity is determined using the January 2006 Los Angeles County Department of Public Works (LACDPW) Hydrology Manual and the March 2006 LACDPW Sedimentation Manual. For Devil's Gate Dam and Reservoir, the required reservoir capacity is 4.0 million cubic yards (cy) (two DDEs) below the spillway elevation of 1,040.50 feet.

The Hydrology Manual (January 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_Hydrology_Manual/2006%20Hydrology%20Manual-Divided.pdf

The Sedimentation Manual (March 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_sedimentation_manual/Sedimentation%20Manual-Second%20Edition.pdf

Additional information concerning DDE calculation methods has been added to the Final Environmental Impact Report (EIR), Section 2.3, Project Need.

As noted in Section 2.2.1, LACFCD History, sediment removal efforts have previously taken place at the reservoir in order to ensure correct functioning of the outlet works and/or to maintain reservoir capacity. Historically, large amounts of sediment have been deposited in the reservoir in short time periods. Between 1935 and 1938 over 1.6 million cy of sediment, between 1938 and 1943 over 1.95 million cy of sediment, between 1959 and 1966 over 1.75 million cy of sediment, and between 2010 and 2012 over 1.3 million cy of sediment was deposited in the reservoir. Since the 1920 dam construction and prior to the Station Fire in 2009, approximately 10.7 million cy of sediment accumulated in the reservoir; and approximately 8.0 million cy was removed by LACFCD.

Over 92 years, the average amount of sediment deposited each year is approximately 130,000 cy; however, Devil's Gate Reservoir is a dynamic system with constantly changing amounts of sediment deposited from year to year, depending on the frequency and intensity of storm events. If a 1 in 50 years storm were to occur, approximately 2.0 million cy (one DDE) of sediment could be expected to wash into the reservoir. The most sediment that was deposited during a five-year period was 3.1 million cy, which occurred between 1937 and 1942. Because of LACFCD's responsibilities to provide flood protection, LACFCD must be ready at all times for a Design Debris Event to occur.

Response to Comment 229-2:

See Response to Comment 229-1. Historically, gravel mining operations which routinely denuded the reservoir of vegetation have occurred in the reservoir. Vegetation growth in the reservoir is a recent

development, within the last 20 years since mining operations have ceased to exist. Additionally, sediment inflows to the reservoir since the Station Fire have exceeded 18 feet in many locations, burying large swaths of vegetation in the reservoir and creating an unstable sediment condition within the reservoir. Since the 2009 Station Fire, the reservoir has annually received less than average inflows of water; thus, no recent large movements of sediment have occurred within the reservoir.

Sediment flows through the reservoir are not only desired, but are a natural process of the Arroyo Seco. One of the project's objectives is to establish a reservoir configuration more suitable for routine maintenance activities, including reservoir management. Flow Assisted Sediment Transport or FASTing will be used for maintenance after the project's main construction phase has been completed, as described in Section 2.5.2 of the Draft EIR, and will help sediment naturally flow through the system.

When sediment is trapped in the reservoir, it reduces the volume available to provide adequate flood protection. When volume in the reservoir is reduced, sediment then moves to the base of the dam and clogs the valves and gates, which is not desired. Once the large sediment buildup in the reservoir is removed, the risk of clogging the outlet works with sediment is greatly reduced. LACFCD is committed to providing adequate flood control protection which requires anticipating future, larger storms in addition to the drought-like conditions since the Station Fire. By completing a large-scale sediment removal project at Devil's Gate, LACFCD is restoring the reservoir's capacity to previously existing historic levels.

Response to Comment 229-3:

LACFCD engaged in many community outreach efforts including a scoping meeting, multiple community meetings during the Draft EIR comment period, conducting briefings with elected officials and stakeholders, reaching out to the cities and many organizations, and submitting press releases and email notices. Outside experts, especially those on the Stakeholder Task Force, were consulted during the formation of the Sediment Management Strategic Plan. Information from that consultation was used in the formulation of the Proposed Project and Alternatives. In addition, the purpose of the scoping process was to gather input from outside experts and agencies as well as the public on what the environmental analysis should consider and what alternatives should be analyzed. Information gathered from the scoping process was used in the formulation of the Proposed Project and Alternatives and preparation of the Draft EIR.

As discussed in Section 3.6.6 of the Draft EIR, Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats. In addition, sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays). Wildlife species currently found in the Proposed Project area would be expected to either remain in the undisturbed areas of the reservoir outside the Proposed Project area or to reestablish once sediment removal activities have been completed.

Alternative 3, Configuration D, the Environmentally Superior Alternative from the Draft EIR, carefully balances flood control needs and reductions in impacts to habitat by restoring the required reservoir capacity while also minimizing the project footprint. Alternative 3 affects the least amount of habitat of all the action alternatives while still achieving Proposed Project objectives (see Section 4.6 of the Final EIR). This alternative would provide a buffer on the west side of the reservoir that would allow for the movement of wildlife. Alternative 3, Configuration D, Option 1 provides a more natural configuration for the reservoir by having two branches to carry water and sediment toward the face of the dam, avoiding

disturbing a significant portion of existing vegetation. To further reduce the Proposed Project's footprint, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2, which drastically reduces the project's footprint of 120 acres down to 71 acres, would avoid excavation of the western branch, thereby providing a greater habitat buffer on the west side of the reservoir. In addition, the maintenance areas would be smaller than the original sediment removal footprint, allowing for habitat to reestablish and providing additional areas for wildlife movement.

Impacts to recreation were analyzed in the Draft EIR, Section 3.15. The Proposed Project will not limit the use of the Oak Grove area of Hahamongna Watershed Park. Sediment removal activities would be temporary and are expected to occur only in the drier months (April to December, excluding holidays). It is expected that these activities will often not be adjacent to the Oak Grove area of Hahamongna Watershed Park. The Proposed Project would result in temporary limitations on the recreational use of the Proposed Project site and some of the adjacent trails. Most of these areas would be reopened seasonally or intermittently throughout the sediment removal process. In addition, temporary impacts to designated recreational facilities and trails will be minimized through advance communication and redirection to the nearest facility in the vicinity of the Proposed Project. Furthermore, an east-west trail crossing will continue to provide access at the north end of the reservoir. At the south end of the reservoir, after the reservoir ingress and egress ramps have been fully constructed, access to the upper east side Arroyo Seco Trail from La Cañada Verdugo Road will be maintained; and the linkage from the west side Arroyo Seco Trail and the Flint Wash Trail to the upper east side Arroyo Seco Trail (crossing Devil's Gate Dam and also continuing south to the Rose Bowl) will be available after construction activities have ended each day and on nonworking days.

Air quality impacts associated with truck traffic were analyzed in the Draft EIR in Section 3.5. LACFCD has conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed the United States (U.S.) Environmental Protection Agency's (EPA's) 2007 standards for emissions. Therefore, in order to further reduce emissions, Mitigation Measure MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump trucks that meet or exceed EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality, including those associated with health effects, will be reduced to less than significant.

Dust impacts from the Proposed Project were carefully evaluated, as discussed in the Draft EIR, Section 3.5.6, Impacts and Mitigation, AIR QUALITY-2, Sediment Removal. The Proposed Project's activities, including excavation, grading, material loading, and hauling, would result in less than significant dust emissions due to the Proposed Project's use of best management practices and would be in full compliance with South Coast Air Quality Management District's (SCAQMD's) fugitive dust regulations.

Response to Comment 229-4:

See Response to Comments 229-1 and 229-3.

Response to Comment 229-5:

See Response to Comments 229-1 and 229-3.

LACFCD proposed a project duration of five years to reduce accumulated sediment in a timely fashion. The goal of LACFCD is to restore reservoir flood capacity as soon as feasible while reducing costs,

minimizing the duration of environmental and construction impacts to the surrounding communities, and configuring the reservoir to allow for sustainable future maintenance. Extending the project would prolong the flood risk to downstream communities and increase the construction impacts to the surrounding communities.

South Coast
Air Quality Management District
21865 Copley Drive, Diamond Bar, CA 91765-4178
(909) 396-2000 • www.aqmd.gov

SENT VIA USPS AND E-MAIL:
reservoircleanouts@dpw.lacounty.gov

January 21, 2014

Los Angeles County Flood Control District
Department of Public Works
Water Resources Division
Attn: Reservoir Cleanouts Program
P.O. Box 1460
Alhambra, CA 91802-1460

Draft Environmental Impact Report (Draft EIR) for the Proposed Devil's Gate Reservoir Sediment Removal and Management Project (SCH #2011091084)

Comment 230-1

The South Coast Air Quality Management District (SCAQMD) staff appreciates the opportunity to comment on the above-mentioned document. The following comments are meant as guidance for the Lead Agency and should be incorporated into the Final CEQA document.

Comment 230-2

The Lead Agency proposes to remove approximately 2.9 million cubic yards of sediment from the Devil's Gate Reservoir plus any additional sediment that accumulates during construction. Removal activities will include approximately 425 daily truck round trips during excavation with 25 percent of the truck haul trips transporting green waste debris to a local landfill with the remaining 75 percent of the truck trips hauling sediment to other sites. The project will take approximately five years to complete beginning in the summer of 2015. Reservoir management will then start after 2020 to reduce sediment buildup in the future and to reduce or eliminate the need of another large-scale removal activity.

Comment 230-3

On page 30 of the Air Quality Report, the Lead Agency cites a U.S. Environmental Protection Agency (EPA) conversion factor guideline for using EMFAC emission factors when estimating vehicle emissions for on-road trucks. This guideline discusses using a NOx conversion factor from grams per mile to grams per brake-horsepower per hour when estimating heavy-duty truck engine emissions. The SCAQMD staff notes that the conversion guideline document published by the U.S. Environmental Protection Agency (EPA) cited in Appendix B on page 30 in the Air Quality Report is outdated and does not apply to California. EMFAC2011 should be used instead in order to calculate emission benefits for cleaner trucks. In addition, the Lead Agency proposes to use EPA 2007 model year trucks during sediment removal activities as mitigation.[1] Since 2007 model year trucks are generally considered to have only PM controls but no NOx controls,[2] the Draft EIR should be revised omitting reference to reduced NOx emissions in the Final

[1]DEIR, Air Quality Report, page 31, Mitigation AQ-1
[2]California Air Resources Board: http://www.arb.ca.gov/msprog/onrdiesel/regulation.htm

Comment 230-3 continued

EIR. If the Lead Agency will require only 2007 model year trucks during project activities, NOx reduction credit should not be taken in the air quality analysis. Finally, in order to determine the feasibility of the mitigation proposed starting on page 29 in Appendix B, the SCAQMD staff recommends that the proportion of 2007 and 2010 model year trucks during the applicable project years be reviewed using EMFAC2011 to determine if the measure is feasible in the Final EIR.

Comment 230-4

Pursuant to Public Resources Code Section 21092.5, please provide the SCAQMD staff with written responses to all comments contained herein prior to the adoption of the Final Environmental Impact Report. The SCAQMD staff is available to work with the Lead Agency to address these issues and any other air quality questions that may arise. Please contact Gordon Mize, Air Quality Specialist – CEQA Section, at (909) 396-3302, if you have any questions regarding these comments.

Sincerely,

Ian MacMillan
Program Supervisor, Inter-Governmental Review
Planning, Rule Development & Area Sources

IM:GM

LAC131105-01
Control Number

Response to Comment Letter #230 (SCAQMD)

Response to Comment 230-1:

The comments by the South Coast Air Quality Management District's (SCAQMD) have been noted as guidance for Los Angeles County Flood Control District (LACFCD), as the Lead Agency.

Response to Comment 230-2:

LACFCD notes the details regarding the Proposed Project, including amount of removal, number of truck trips per day, and timing of sediment removal versus reservoir management.

Response to Comment 230-3:

The revisions have used EMFAC2011 for reduction analysis by comparing the aggregate fleet mix emission factors for 2015 to the specific emission factors for Model Year 2010 (MY2010). This revision used MY2010, since LACFCD can now ensure that all trucks used to transport sediment for the Proposed Project will meet the United States (U.S.) Environmental Protection Agency's (EPA's) 2007 standards for emissions, which would equate to MY2010 levels.

Response to Comment 230-4:

Written responses will be provided to SCAQMD after completion of the Response to Comments document. These will be provided before the Final EIR is adopted, as the Response to Comments document will be finished as part of the Final Environmental Impact Report (EIR) process. LACFCD notes that Gordon Mize is the contact person regarding this comment letter.

From: Susan Campisi
To: reservoircleanouts
Cc: fifthdistrict@lacbos.org; evizcarra@lacbos.org; SNemer@lacbos.org
Subject: Fwd: Devil"s Gate Reservoir Sediment Removal and Management Project
Date: Tuesday, January 21, 2014 4:36:57 PM

Gail Farber, Director
Los Angeles County Department of Public Works
Attn: Water Resources Division - Reservoir Cleanouts
P.O. Box 1460

Dear Ms. Farber,

Comment 231-1

Below are my comments on the Draft Environmental Impact Report for the Devil's Gate Reservoir Sediment Removal Plan.

Comment 231-2

California is in a severe drought. Water conservation and protection of our water resources need to be an integral part of any plan that impacts the Hahamongna Watershed Park and Devil's Gate Dam. The approach of dredging up a natural habitat, essentially creating a moon-like basin, is an old-school paradigm, one that belongs in the middle of the last century. We need a forward thinking, community-based, innovative design solution that works with natural forces and takes into account the larger ecology of the region. Why didn't the county consider true alternatives to each of these massively destructive options?

Comment 231-3

This project is far too massive in scope and unjustifiably destructive. The DPW is looking at the problem of flood control in a myopic way, failing to look at the larger ecosystem. Did the county consider this plan's potential negative impacts on regional habitat restoration projects, such as the LA River revitalization project? Did the county take into consideration erosion of the shoreline and how this sediment removal plan might impact the shoreline? Did the county consider that sediment has value and that there could be a potential use for it (and potential monetary value associated with it)? Did the county look into the possibility of selling the sediment or donating it to beach restoration projects? Did the county consider doing anything with dredged-up sediment other than hauling it off in trucks to be dumped, essentially treating it as trash that will end up destroying another piece of land?

Comment 231-4

How was flood risk assessment determined?
1. How did the county come up with 2.0 DDE and the need to remove 4 million cubic yards of sediment that forms the basis of this plan?
2. How did they assess risk of flood to justify removing this amount of sediment?
3. What's the risk assessment that underlies the need to remove 4 million cubic yards of sediment? And how did they determine that risk?
4. Why didn't the county consider removing less sediment over a longer period of time to avoid such an ecologically destructive plan?
5. A massive run-off of sediment occurred in the years following the Station Fire. Did the county take into account that the sediment coming down from the San Gabriel Mountains will be significantly reduced during any future big rainfalls? If no, why not?

Comment 231-5

Time frame
1. What is the basis for a 5-year plan for sediment removal?
2. Why isn't the county considering a slower, longer term plan, one that is comprehensive, sustainable, and less environmentally destructive?

Comment 231-6

Consider surrounding projects
Why didn't the county consider in their plan these other activities in and near the Arroyo?
1. The proposed flood control pipeline to run between Hahamongna and Eaton Canyon
2. Pasadena's West side project (Flint Canyon and the West trail)
3. Pasadena's Arroyo water intake project (up the Arroyo near the ranger station)
4. The reclamation of the JPL East Parking lot
5. The JPL parking garage – including restoration of West side trail by the JPL fence

Comment 231-7

Trees and vegetation as flood control

Comment 231-7 continued

1. Did the county consider that trees and natural vegetation aid in flood control?
2. How does the county justify denuding the Hahamongna area of trees and vegetation as a plan for flood control?
3. Why isn't the county considering a flood control plan that includes the natural ability of trees and vegetation to reduce flooding as part of that plan? Why not work with natural forces rather than against them?

Comment 231-8

Water conservation

Did the county consult with other agencies and organizations that deal with water conservation and watershed health? What about the LA River Restoration? Did the county consult with Pasadena Water & Power?

Comment 231-9

Local residential communities

Is the county planning on evacuating local communities during the massive dig-out?

Comment 231-10

Other Dams and sediment removal projects

Why is the county approaching each of the 16 sediment removal projects in this region as separate, isolated dig-outs instead of developing a comprehensive strategy that not only protects communities but also protects and restores habitat and conserves water? What does the county plan to do with all the sediment? Why can't the county look at all these dams collectively and come up with a more holistic, comprehensive, ecologically sound plan for the region? Has the county considered ways to use any sediment removed from all these dams? Has the county considered the possibility of selling sediment rather than create a dump site for it?

What is the county planning on doing with all this sediment? Why doesn't the county come up with a more visionary innovative solution that restores rather than destroys ecological balance?

The county is working from a paradigm of old-school thinking. The community is progressive and forward-thinking and environmentally conscious. Why can't the county work with the community to come up with a plan to protect the natural gifts of this region rather than destroy it?

Thank you for your time and consideration.

Sincerely,

Susan Campisi
3349 Alicia Avenue
Altadena, CA 91001

Response to Comment Letter #231 (Susan Campisi)

Response to Comment 231-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. The comments are noted and have been responded to below.

Response to Comment 231-2:

Pursuant to Section 15126.6(a) of the California Environmental Quality Act (CEQA) Guidelines, "[a]n EIR shall describe a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project, and evaluate the comparative merits of the alternatives." However, "[a]n EIR is not required to consider alternatives which are infeasible" (CEQA Guidelines Section 15126.6(a)) or "which could change the fundamental nature of the proposed project." (*Al Larson Boat Shop, Inc. v. Board of Harbor Comm*. (1993) 18 Cal.App.4th 729, 745.) The alternatives discussed in the Environmental Impact Report (EIR) must be reasonable alternatives, selected to foster informed decision-making and public participation (CEQA Guidelines 15126.6(a)). An EIR need not consider an alternative whose effect cannot reasonably be ascertained or whose implementation is remote and speculative because unrealistic alternatives do not contribute to a useful analysis (CEQA Guidelines 16126.6(f)(3)). Additionally, an alternative may be rejected from detailed analysis in an EIR if it fails to reduce or avoid the project's significant environmental effects, does not implement the basic project objectives, is not potentially feasible, or is facially unreasonable. 14 C.C.R. §15126.6(c); Id., see also *Mann v. Community Redevelopment Agency* (1991) 233 Cal. App. 3d 1143; *Del Mar Terrace Conservancy, Inc. v. City Council* (1991) 10 Cal. App. 4th 712.

The Draft EIR, Section 4, fully analyzed six alternatives including the No Project Alternative. These alternatives substantially lessen one or more significant effects of the Proposed Project and, with the exception of the mandatory No Project Alternative, would feasibly attain most of the basic objectives of the Proposed Project. These alternatives include options for different amounts of removal, different methods of removal, and a different haul route.

Los Angeles County Flood Control District (LACFCD) goes to great lengths to lessen project impacts and maximize efficiencies. For example, the Draft EIR concluded that Alternative 3 is the Environmentally Superior Alternative. Alternative 3 drastically reduces the project's footprint of 120 acres down to 71 acres. Additionally, the limited maintenance area for Alternative 3, Configuration D, Option 2 further reduces the permanent habitat impacts down to approximately 51 acres by allowing for site replanting and mitigation to take place within the reservoir footprint. This reduction in project acreages will greatly lessen environmental impacts of the Proposed Project. See Section 4.6 of the EIR for more information on Alternative 3.

Response to Comment 231-3:

The Proposed Project will not decrease the current amount of sediment that flows downstream and therefore would not contribute to the erosion of beaches. Also as noted in the Sediment Management Strategic Plan (SMSP), "Without human intervention, most Southern California beaches would naturally be narrow and rocky. The wide beaches in Southern California were created and have been maintained by various agencies through artificial beach nourishment projects (also referred to as beach fill projects)

and the construction of protective coastal structures since the 1930s." In addition, the SMSP states, "Since the Los Angeles River changed course in 1825, the largest waterway reaching this region of the coast is Ballona Creek, which has an estimated annual sediment yield of less than 50,000 cubic yards and delivers generally fine-grained sediment that is not appropriate for beach nourishment." For general information on beach nourishment, please see Section 6.5.1 of LACFCD's Sediment Management Strategic Plan Sediment Management Strategic Plan, which can be viewed here: http://dpw.lacounty.gov/lacfcd/sediment/files/FullDoc.pdf

The sediment that came into Devil's Gate Reservoir following the Station Fire has a very fine gradation or consistency. As such, the majority of this material is not readily reusable on a commercial scale and will most likely not be sold; however, sediment placed at sediment placement sites would be available for potential reuse for other projects or sediment reuse opportunities. The sediment removed from the Devil's Gate Reservoir will be transported to the existing placement sites listed in Section 2.0, Project Description in the Draft EIR.

For further information regarding beneficial uses for sediment at the LACFCD sites, please refer to Section 6.5 of LACFCD's 2012 Sediment Management Strategic Plan which can be found at: http://dpw.lacounty.gov/lacfcd/sediment/stplan.aspx.

Response to Comment 231-4:

LACFCD was mandated by the State Legislature to provide flood protection and water conservation within its boundaries.

A reservoir storage design capacity of two design debris events (DDEs) below the dam's lowest spillway was determined to be the standard acceptable level of risk at Devil's Gate Dam and Reservoir. The DDE volume of capacity is determined using the January 2006 Los Angeles County Department of Public Works (LACDPW) Hydrology Manual and the March 2006 LACDPW Sedimentation Manual. For Devil's Gate Dam and Reservoir, the required reservoir capacity is 4.0 million cubic yards (cy) (two DDEs) below the spillway elevation of 1,040.50 feet.

The Hydrology Manual (January 2006) can be viewed here: http://dpw.lacounty.gov/wrd/publication/engineering/2006_Hydrology_Manual/2006%20Hydrology%20Manual-Divided.pdf

The Sedimentation Manual (March 2006) can be viewed here: http://dpw.lacounty.gov/wrd/publication/engineering/2006_sedimentation_manual/Sedimentation%20Manual-Second%20Edition.pdf

Additional information concerning DDE calculation methods has been added to the Final EIR, Section 2.3, Project Need.

LACFCD proposed a project duration of five years to reduce accumulated sediment in a timely fashion. The goal of LACFCD is to restore reservoir flood capacity as soon as feasible while reducing costs, minimizing the duration of environmental and construction impacts to the surrounding communities, and configuring the reservoir to allow for sustainable future maintenance. Extending the project would prolong the flood risk to downstream communities and increase the construction impacts to the surrounding communities.

Historically, large amounts of sediment have been deposited in the reservoir in short time periods. Between 1935 and 1938 over 1.6 million cy of sediment, between 1938 and 1943 over 1.95 million cy of sediment, between 1959 and 1966 over 1.75 million cy of sediment, and between 2010 and 2012 over 1.3 million cy of sediment was deposited in the reservoir. Over 92 years, the average amount of sediment deposited each year is approximately 130,000 cy; however, Devil's Gate Reservoir is a dynamic system with constantly changing amounts of sediment deposited from year to year, depending on the frequency and intensity of storm events. If a 1 in 50 years storm were to occur, approximately 2.0 million cy (one DDE) of sediment could be expected to wash into the reservoir. Because of LACFCD's responsibilities to provide flood protection, LACFCD must be ready at all times for a Design Debris Event to occur.

Response to Comment 231-5:

See Response to Comment 231-4.

Response to Comment 231-6:

The Draft EIR contains a cumulative impact analysis within each of the subsections of Section 3.0 Environmental Analysis. The cumulative analysis contains projects determined by LACFCD and the surrounding cities and communities to have a potential cumulative effect due to overlapping time frames of the projects. The list of these projects is included in Section 2.9 Cumulative Scenario and includes the Jet Propulsion Laboratory (JPL) On-site Parking Structure, Devil's Gate Water Conservation Project, Arroyo Seco Canyon Project, and the Hahamongna Watershed Park Multi-Benefit/Multi-Use Project (which includes the Westside Perimeter Trail and reclamation of the eastside surface parking lot). Potential projects that were determined to be outside the area of influence, sediment-removal phase of the project schedule, or lacking sufficient project detail were not considered to be reasonable foreseeable probable future projects, as set forth in the CEQA Guidelines Section 15130.

Response to Comment 231-7:

See Response to Comments 231-3 and 231-4. In order to remove the necessary amount of sediment from the reservoir some vegetation must be removed, as the vegetation sits atop many layers of accumulated sediment. While sluicing is not a viable project alternative, as explained in Section 4.7 of the Draft EIR, Flow Assisted Sediment Transport, or FASTing, will be used for maintenance after the project's main sediment removal phase has been completed.

Sediment flows through the reservoir are not only desired but are a natural process of the Arroyo Seco. One of the project's objectives is to establish a reservoir configuration more suitable for routine maintenance activities, including reservoir management. Flow Assisted Sediment Transport, or FASTing, will be used for maintenance after the project's main construction phase has been completed, as described in Section 2.5.2 of the Draft EIR, and will help sediment naturally flow through the system.

When sediment is trapped in the reservoir, it reduces the volume available to provide adequate flood protection. When volume in the reservoir is reduced, sediment then moves to the base of the dam and clogs the valves and gates, which is not desired. Once the large sediment buildup in the reservoir is removed, the risk of clogging the outlet works with sediment is greatly reduced. LACFCD is committed to providing adequate flood control protection which requires anticipating future, larger storms in addition to the drought-like conditions since the Station Fire. By completing a large-scale sediment removal project at Devil's Gate, LACFCD is restoring the reservoir's capacity to previously existing historic levels.

FASTing, a passive method of transporting sediment downstream, is currently used when possible and would be used during the Maintenance Phase of the Proposed Project; however, FASTing, even in combination with the Interim Measures Project (IMP), will not efficiently remove large amounts of sediment. As discussed under the No Project Alternative, Section 4.9, use of FASTing and IMP alone will not meet Proposed Project objectives. The removal of accumulated sediment on a yearly basis is the proposed management scheme after the original sediment removal is completed. The regular maintenance of the area will lower the potential need for a large-scale sediment removal operation in the future. Please see Section 2.5.2 of the Draft EIR for more information on future maintenance.

Response to Comment 231-8:

Outside experts, especially those on the Stakeholder Task Force and from the City of Pasadena, were consulted during the formation of the Sediment Management Strategic Plan. Information from that consultation was used in the formulation of the Proposed Project and Alternatives. In addition, the purpose of the scoping process was to gather input from outside experts and agencies as well as the public on what the environmental analysis should consider and what alternatives should be analyzed. Information gathered from the scoping process was used in the formulation of the Proposed Project and Alternatives and preparation of the Draft EIR.

The goal of the Proposed Project is to maintain the flood control capacity of the reservoir; however, the Proposed Project is likely to improve groundwater recharge. The Proposed Project is designed to be a long-term plan with the reservoir management phase providing management for future sediment inflows. The yearly cleanout of sediment will reduce the possibility for the need of a future large-scale cleanout.

Response to Comment 231-9:

The goal of LACFCD is to restore reservoir flood capacity as soon as feasible while reducing costs and minimizing the duration of environmental and construction impacts to the surrounding communities. LACFCD is not planning on moving any residents during the Proposed Project implementation.

Given the current, limited capacity of the reservoir, however, a 50-year storm event that results in a DDE would result in storm flows with sediment flowing over the spillway. Flooding with mud/sediment would occur along portions of the Arroyo Seco in the Cities of Pasadena, South Pasadena, and Los Angeles, impacting approximately 650 parcels and requiring closure of Interstate 110 from Orange Grove Avenue to Interstate 5. Additional information about the potential flood areas and analysis is shown in the Arroyo Seco Channel Hydraulic Analysis prepared by Bureau Veritas North America, Inc., available on the Project website. Please note that protocols are in place to monitor storms, reservoir conditions, and channel conditions and to communicate with emergency responders and California Department of Transportation (Caltrans) to execute any necessary evacuations or freeway closures.

Response to Comment 231-10:

See Response to Comment 231-3.

In recent years, LACFCD has identified new challenges in managing sediment. In particular, the wildfires occurring in 2007 and 2009 burned a large portion of the County and have led to an increased inflow of sediment and debris within LACFCD facilities. This has put pressure on the remaining capacity of existing sediment placement sites where LACFCD has traditionally placed sediment. As a result, LACFCD has

developed a 20-year Sediment Management Strategic Plan (Strategic Plan) for years 2012 through 2032 that pursues new alternatives which can reduce the environmental and social impacts of sediment management.

The Strategic Plan represents the results of a continuing dialogue about sediment management between the LACFCD and numerous stakeholders, including the United States (U.S.) Army Corps of Engineers (USACE), in the region. The Strategic Plan provides an overview of sediment management issues, evaluates various strategies to help identify optimal solutions for sediment management, and identifies general steps that should be pursued to meet the LACFCD's mission. The Strategic Plan is guided by the following key objectives:

- Maintaining flood risk management and water conservation
- Recognizing opportunities for increased environmental stewardship
- Reducing social impacts related to sediment management
- Identifying ways to use sediment as a resource
- Ensuring LACFCD is fiscally responsible in decision-making

The Strategic Plan is a living document that is open to other alternatives and may be revised in the future as conditions change. This Strategic Plan is intended to be an advisory document. Development of specific cleanout plans for the LACFCD's numerous facilities are guided by the Strategic Plan. During the development of these specific cleanout plans there will be opportunities for additional public input, including from the local communities affected by each cleanout. LACFCD is undertaking the Proposed Project to provide long-term sediment management for the area. LACFCD recognizes the many comments submitted by the public and agencies.

The disposal sites located to the east of the Proposed Project currently have sufficient capacity for the entire amount of sediment proposed to be removed. The disposal sites located to the west of the Proposed Project will provide additional capacity if needed. The available pits and disposal sites, as outlined in the Proposed Project Description, have enough capacity for the sediment that is planned to be removed.

Additionally, after the Proposed Project's main sediment removal has occurred FASTing is proposed to be an integral part of the annual maintenance at Devil's Gate. Annual FASTing operations will be implemented to reduce future buildups of sediment in the reservoir and to reduce the need for mechanical removal of sediment from the reservoir. Although FASTing is expected to be an effective means of keeping sediment levels low in the reservoir, it is estimated that typically 13,000 cy of sediment will be removed by excavation annually; however, a maintenance regime that relies on FASTing greatly reduces the need for and extends the life of future and existing sediment placement sites. Please see Section2.5.2 of the Draft EIR for more information on future maintenance.

United States Department of Agriculture
Forest Service
Pacific Southwest Research Station
4955 Canyon Crest Drive
Riverside, CA., 92507-6099
(951) 680-1500
FAX (951) 680-1501

January 21, 2014

To: Los Angeles County Department of Public Works

Comment Letter #232

RE: Devil's Gate Dam Sediment Removal Proposed Project

Comment 232-1

After reviewing the Devil's Gate Reservoir Sediment Removal and Management Project Draft Environmental Impact Report (DEIR), I have a few comments. I preface these comments with a general admiration for the scope of the DEIR and the apparent attention to the many details encompassed by the various alternatives, potential impacts, and proposed mitigations. I can also appreciate the complexity and entanglements produced when a city park is established in part on the accumulated sediments behind a county flood control reservoir.

Comment 232-2

It seems that the justification of the proposed sediment removal (and reservoir maintenance) project hinges on the LACDPW directive to provide flood control to the Lower Arroyo Seco and the Los Angeles River below its confluence with Arroyo Seco. In order to support the need for this project it would be helpful to provide an analysis of the likelihood that flood-producing storms will occur in the future. While nobody has a crystal ball to see what will happen next year and beyond, with over a century of rainfall and runoff measurements within Arroyo Seco, the probabilities of specific storms can be estimated. With storm size and watershed conditions, the probability of sediment events could also be determined. LACDPW routinely performs these estimates and they should be presented in the DEIR.

Comment 232-3

Similarly, it would be helpful to the project justification if an analysis of the potential downstream damage in Lower Arroyo Seco and the Los Angeles River were performed assuming a DDE would occur without any of the proposed work being done. Residents and taxpayers need to know the potential costs of the no project alternative if the worst case scenario is realized.

Comment 232-4

As proposed, the project is to be completed in five years. Presumably there would be less impacts to the surrounding communities (traffic, schools, residents) if the project timeline could be extended, with less intensive activity during any one year. If the project area is currently at risk with inadequate reservoir capacity, a delay in project completion only exacerbates this risk. However, a risk analysis should be included in the DEIR to quantify the impacts of potential floods and sediment events caused by project delays, whether accidental or intentional.

Comment 232-5

Under any alternative (except the no project), sediment would be excavated away from the upstream side of the dam. This would lower the local base level to which the channel upstream would adjust by downcutting. An analysis should be made of the values at risk (if any) that could be impacted by this channel incision and the need for any mitigation measures to protect these values (bridges, trail crossings, pipelines, structures, etc.).

Thank you for the opportunity to comment on this DEIR.

Sincerely,

/s/ PETER M. WOHLGEMUTH

Hydrologist
USDA Forest Service
Pacific Southwest Research Station
4955 Canyon Crest Drive
Riverside, CA 92507

From: Chavez, Deborah -FS
Sent: Friday, February 07, 2014 10:51:27 AM (UTC-08:00) Pacific Time (US & Canada)
To: reservoircleanouts
Subject: RE: Devil's Gate Reservoir Sediment Removal and Management Project

This is your official notice that the letter was not a USDA Forest Service response to the DEIR.

Debbie

Deborah J Chavez, PhD
USDA Forest Service
Pacific Southwest Research Station
Program Manager Urban Ecosystems & Social Dynamics Program
Acting Program Manager Fire & Fuels
tel 951-680-1558 / cell 951-315-3610
email dchavez@fs.fed.us

Response to Comment Letter #232 (Peter Wohlgemuth)

Note: Per Dr. Deborah J. Chavez, Program Manager Urban Ecosystems & Social Dynamics Program, USDA Forest Service, despite the letterhead this is not a USDA Forest Service response to the Draft EIR. See correspondence from Dr. Chavez above.

Response to Comment 232-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

Response to Comment 232-2:

The Los Angeles County Flood Control District (LACFCD) was mandated by the State Legislature to provide flood protection and water conservation within its boundaries.

A reservoir storage design capacity of two design debris events (DDEs) below the dam's lowest spillway was determined to be the standard acceptable level of risk at Devil's Gate Dam and Reservoir. The DDE volume of capacity is determined using the January 2006 Los Angeles County Department of Public Works (LACDPW) Hydrology Manual and the March 2006 LACDPW Sedimentation Manual. For Devil's Gate Dam and Reservoir, the required reservoir capacity is 4.0 million cubic yards (cy) (two DDEs) below the spillway elevation of 1,040.50 feet.

The Hydrology Manual (January 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_Hydrology_Manual/2006%20Hydrology%20Manual-Divided.pdf

The Sedimentation Manual (March 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_sedimentation_manual/Sedimentation%20Manual-Second%20Edition.pdf

Additional information concerning DDE calculation methods has been added to the Final Environmental Impact Report (EIR), Section 2.3, Project Need.

Historically, large amounts of sediment have been deposited in the reservoir in short time periods. Between 1935 and 1938 over 1.6 million cy of sediment, between 1938 and 1943 over 1.95 million cy of sediment, between 1959 and 1966 over 1.75 million cy of sediment, and between 2010 and 2012 over 1.3 million cy of sediment was deposited in the reservoir. Over 92 years, the average amount of sediment deposited each year is approximately 130,000 cy; however, Devil's Gate Reservoir is a dynamic system with constantly changing amounts of sediment deposited from year to year, depending on the frequency and intensity of storm events. If a 1 in 50 years storm were to occur, approximately 2.0 million cy (one DDE) of sediment could be expected to wash into the reservoir. Because of LACFCD's responsibilities to provide flood protection, LACFCD does not plan for "average" amounts of sediment and must be ready at all times for a Design Debris Event to occur.

Response to Comment 232-3:

Given the current, limited capacity of the reservoir, a 50-year storm event that results in a DDE would result in storm flows with sediment flowing over the spillway. Flooding with mud/sediment would occur

along the portions of the Arroyo Seco in the Cities of Pasadena, South Pasadena, and Los Angeles, impacting approximately 650 parcels and requiring closure of Interstate 110 from Orange Grove Avenue to Interstate 5. Additional information about the potential flood areas and analysis is shown in the Arroyo Seco Hydraulic Analysis prepared by Bureau Veritas North America, Inc., available on the Project website. Please note that protocols are in place to monitor storms, reservoir conditions, and channel conditions and to communicate with emergency responders and California Department of Transportation (Caltrans) to execute any necessary evacuations or freeway closures.

Response to Comment 232-4:

See Response to Comments 232-2 and 232-3.

LACFCD proposed a project duration of five years to reduce accumulated sediment in a timely fashion. The goal of LACFCD is to restore reservoir flood capacity as soon as feasible while reducing costs, minimizing the duration of environmental and construction impacts to the surrounding communities, and configuring the reservoir to allow for sustainable future maintenance. Extending the project would prolong the flood risk to downstream communities and increase the construction impacts to the surrounding communities.

Response to Comment 232-5:

Due to the nature of a dam and reservoir system, as the Arroyo Seco enters the reservoir, the slope naturally flattens and stabilizes within the reservoir. As a part of the sediment removal project, the cut plan mimics these historic slopes by incorporating 3:1 side slopes and varying but gradual bottom slopes, all of which are shallow and stable. In Alternative 3, the proposed cut at the northern end of the reservoir is approximately 25:1, a very shallow slope, which mimics the historic slopes in that area of the reservoir.

In addition, as stated in the Draft EIR Section 2.7, "To reduce potential impacts to erosion and water quality, the Proposed Project would be conducted in accordance with applicable standards and BMPs. The Proposed Project will also conform to the requirements in the latest edition of the LACDPW "Construction Site Best Management Practices Manual" (BMP Manual)." Implementation of adequate BMPs and Proposed Project activities occurring mostly during the dry season would avoid erosion of susceptible slopes along the borders of excavation and/or reservoir management areas.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Carlsbad Fish and Wildlife Office
2177 Salk Avenue, Suite 250
Carlsbad, California 92008

In Reply Refer To:
FWS-LA-14B0081-14TA0122

JAN 21 2014

County of Los Angeles Department of Public Works
Water Resources Division
P.O. Box 1460
Alhambra, California 91802-1460

Attention: Reservoir Cleanouts Program

Subject: Draft Environmental Impact Report for the Devil's Gate Reservoir Sediment Removal and Management Project, City of Pasadena, Los Angeles County, California

To Whom It May Concern:

Comment 233-1

The U.S. Fish and Wildlife Service (Service) has reviewed the Draft Environmental Impact Report (Draft EIR) for the Devil's Gate Reservoir Sediment Removal and Management Project in the City of Pasadena, Los Angeles County, California. The Los Angeles County Flood Control District (LACFCD) proposes to excavate of approximately 2.9 million cubic yards of sediment from the reservoir. The project will impact 120 acres of active floodplain within the Arroyo Seco watershed. Sediment removal will occur over a 5-year period beginning in the summer of 2015. Following completion of the project, vegetation will be removed annually to prevent it from re-establishing in the project footprint, and an average of 13,000 cubic yards of sediment will be removed annually to maintain capacity.

Comment 233-2

The primary concern and mandate of the Service is the protection of public fish and wildlife resources and their habitats. Specifically, the Service administers the Endangered Species Act (Act) of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*) and provides support to other Federal agencies in accordance with the provisions of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 *et seq.*). Section 7 of the Act requires Federal agencies to consult with the Service should it be determined that their actions may affect federally listed threatened or endangered species or their critical habitats. Section 9 of the Act prohibits the "take" (e.g., harm, harassment, pursuit, injury, kill) of federally listed wildlife. Take incidental to otherwise lawful activities can be permitted under the provisions of section 7 (Federal consultations) and section 10 of the Act.

The Service met with the LACFCD and the U. S. Army Corps of Engineers (Corps) on December 18, 2013, to discuss the proposed project and visit the project site. We appreciate the early coordination in preparation for a future potential section 7 consultation. Our primary concerns with respect to this project are the extent of impacts to the federally endangered least Bell's vireo (*Vireo bellii pusillus*, vireo) and its habitat, and to other sensitive habitat types and wildlife species. We recommend that additional alternatives, including reduced sediment removal and a smaller maintenance footprint, be evaluated to increase the extent of native habitats avoided, preserved, and restored within the project site. We offer the following specific comments and recommendations regarding project-associated biological impacts based on our review of the DEIR and our knowledge of declining habitat types and species within Los Angeles County. These comments are provided in keeping with our agency's mission to "work with others to conserve, protect, and enhance fish, wildlife, and plants and their habitats for the continuing benefit of the American people."

Comment 233-3

1. **Project Purpose** – Clarify how removing 2.9 million cubic yards of sediment meets the target objectives and whether the objectives could be met while initially removing smaller volumes of sediment. We are concerned that the proposed level of capacity may have been derived to allow for water conservation operations within the reservoir, which is not the stated objective in the DEIR. We request the Final Environmental Impact Report provide the following additional information to clarify the need for this level of capacity:

   a. The current capacity of the basin relative to the original design capacity of 7,423,000 cubic yards.

   b. Any changes in dam operations associated with the proposed project.

Comment 233-4

   c. The relationship between the proposed capacity and the capacity restored in 1998. It is our understanding that the project completed in 1998 restored the dam and reservoir to its full operational capacity (DEIR, page 11), including capacity for water conservation, but water conservation is not listed as an objective of the project.

   d. The amount of sediment capacity required in absence of water conservation activities (i.e., water outflow matches inflow up to the downstream channel capacity).

   e. The proposed frequency of sediment removal and how the frequency of removal relates to the proposed capacity

Comment 233-5

2. **Environmentally Superior Alternative (Alternative 3)** – Alterative 3 reduces the extent of sediment removal from 2.9 to 2.4 million cubic yards and reduces the permanent maintenance footprint to approximately 51 acres. Although this alternative would result in a substantial reduction in impacts to sensitive habitats and species relative to the proposed project, given that the vast majority resources within the Los Angeles River Watershed have already been lost, we request the LACFCD to consider additional alternatives that may

Comment 233-5 continued

further reduce the temporary and permanent impacts associated with the project. None of the alternatives considered evaluate potential changes in dam operations that may assist in reducing cumulative sediment (i.e., increasing release rates during smaller storm events to pass more sediment through the dam) or the potential to increase frequency of sediment maintenance to reduce the permanent impact footprint. In addition, it is not clear how the change in geomorphology and regular disturbance associated maintenance will affect the quality and extent of native riparian and scrub vegetation remaining outside the permanent maintenance footprint following completion of sediment removal.

Comment 233-6

We recommend evaluating the risks associated with a reduction in the initial quantity of sediment removed and reducing the maintenance footprint to a pilot channel with a smaller basin directly in front of the dam. The pilot channel would direct sediment into the basin where it can be removed annually from a smaller maintenance area. This should substantially reduce the long-term maintenance costs associated with the project and will prevent the distribution of sediment throughout the reservoir, except during very large storm events. A larger maintenance footprint may then only be required during the extremely rare 50-year storm event following a fire that burns the entire watershed.

Comment 233-7

3. **Impacts to the Active Floodplain** - The proposed project will impact 120 acres of active floodplain within the Arroyo Seco Watershed in an area that has remained largely undisturbed since at least 1994. A minimum of 91 acres within the project footprint are proposed to be cleared of all vegetation annually. The proposed mitigation measures (MM BIO 6-8) do not provide sufficient detail to determine if biological resources within the project area will be adequately mitigated (see below). In addition, no mitigation is provided for coastal sage scrub which is a sensitive vegetation community with potential to support the federally threatened coastal California gnatcatcher (*Polioptila californica californica*, gnatcatcher). Given the paucity of mitigation opportunities in the project vicinity, the feasibility of mitigating proposed impacts should be evaluated, and a conceptual restoration plan should be prepared for inclusion in the Final Environmental Impact Report. This plan should consider the following:

Comment 233-8

   a. **Riversidean Alluvial Fan Sage Scrub** – The DEIR acknowledges the significance and rarity of this habitat; however, proposed mitigation includes restoring and/or enhancing the vegetation at a 1:1 ratio, for a total of 1.1 acres (MM BIO 6). The extent of Riversidean alluvial fan sage scrub was reduced, and the extent of area mapped as "scoured" was increased between 2010 and 2013. The change in extent of habitats was the result flow events during the winter 2010/2011 storm season and is expected in an active floodplain. Riversidean alluvial fan sage scrub depends on the dynamic natural processes of riverine systems, including scour and sediment deposition, for continued renewal of its habitat. Without the proposed project, we would expect Riversidean alluvial fan sage scrub to re-establish on top of sediment deposits with sufficient elevation to support the vegetation. The proposed project may permanently inhibit this process by reducing the elevation of streambed below what is necessary to support the

Comment 233-8 continued

vegetation and/or removing the vegetation in conjunction with annual maintenance activities. Permanent impacts to the alluvial fan should be avoided. The restoration plan should include provisions for collecting native seed from the alluvial fan prior to the initiation of sediment removal to assist in the restoration of Riversidean alluvial fan sage scrub within the active floodplain, outside the maintenance area, following completion of sediment removal.

Comment 233-9

b. Coastal Sage Scrub - The proposed project will impact 3.1 acres of coastal sage scrub, potential habitat for the gnatcatcher. Protocol surveys for the gnatcatcher should be conducted by a qualified biologist prior to initiating project activities. Regardless of whether gnatcatchers are observed, we recommend that coastal sage scrub impacts be mitigated by restoring existing degraded upland areas adjacent to the project area. Dispersal of gnatcatchers from the San Jose Hills and Puente Hills (southeast of the project site) to occupied habitat in the Santa Monica Mountains (northwest of the project site) is likely difficult and infrequent due to the paucity of available habitat between these areas. Remaining fragmented patches of coastal sage scrub along the foothills of the San Gabriel Mountains, such as the vegetation in the project footprint, provide important stepping stones for gnatcatcher population dispersal and genetic exchange.

Comment 233-10

c. Riparian Vegetation and Wetland – The proposed project will mitigate for impacts to trees within the project area at a 1:1 ratio (MM BIO – 7), and 101.13 acres of jurisdictional waters of the United States, including 62.5 acres of suitable habitat for the vireo, at a 1:1 ratio (MM BIO – 8). We do not believe that the proposed mitigation is adequate to offset impacts to the vireo; however, we anticipate that impacts to the vireo and its habitat can be addressed through the section 7 consultation process with the Corps. We are concerned that the current extent of vegetation under-represents the permanent impact to riparian vegetation in the project footprint. It appears many areas mapped as riparian vegetation in 2010 are mapped as “ruderal” or “scoured” in 2013 and that the extent of ruderal vegetation increased from 7.64 acres in 2010 to 22.8 acres in 2013. While ruderal areas are likely to develop into riparian vegetation in absence of the project, the proposed project will permanently prevent the development of riparian vegetation in the project area. Mitigation should be adequate to offset impacts to the entire extent of active floodplain where riparian vegetation will be precluded from developing.

Comment 233-11

Although the proposed mitigation measure (MM BIO-8) identifies the potential for onsite restoration of habitat, it appears there will be minimal opportunities for restoration of riparian vegetation in the project area, as only 1.2 acres of riparian vegetation was previously supported outside the proposed management area (Figure 3.6-5). The Corps is currently evaluating opportunities for restoration of portions of the Los Angeles River Watershed, including Arroyo Seco, as part of the Los Angeles River Ecosystem

Comment 233-11 continued

Restoration Plan.[1] Underfunded portions of this plan may provide mitigation opportunities for the proposed project.

Comment 233-12

d. Invasive Species – Regular disturbance associated with annual maintenance of vegetation will result in an increase in the extent of invasive plant species within the project area. To ensure the proposed project does not result in spread of invasive plant species to adjacent undisturbed areas of native habitat, annual vegetation maintenance should include the requirement to remove invasive vegetation from all native habitat areas adjoining the project area.

Comment 233-13

We appreciate the opportunity to comment on the subject Draft EIR. If you have any questions regarding these comments, please contact Christine Medak of this office at 760-431-9440, extension 298.

Sincerely,

Karen A. Goebel
Assistant Field Supervisor

cc:
Erinn Wilson, California Department of Fish and Wildlife
Bonnie Rogers, U. S. Army Corps of Engineers

[1] http://www.spl.usace.army.mil/Portal/17/docs/publicnotices/DraftIntegratedReport.pdf

Response to Comment Letter #233 (United States Fish and Wildlife Service)

Response to Comment 233-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. Los Angeles County Flood Control District (LACFCD) notes the comment addresses the details of the Proposed Project.

Response to Comment 233-2:

LACFCD has been coordinating with the United States (U.S.) Fish and Wildlife Service (USFWS) regarding the Section 7 consultation for endangered species.

Response to Comment 233-3:

LACFCD notes the meeting that USFWS had with LACFCD to discuss the Proposed Project and initiate coordination regarding the Section 7 consultation for least Bell's vireo.

USFWS recommends alternatives including reduced sediment removal and a smaller maintenance footprint. The Environmentally Superior Alternative, Alternative 3, Configuration D, most closely resembles these suggestions. Alternative 3, Configuration D drastically reduces the project's footprint and limits the maintenance area, allowing for site replanting and mitigation to take place within the reservoir footprint. This reduction in project acreages will greatly lessen environmental impacts of the Proposed Project.

Furthermore, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2 would avoid excavation of the western branch, providing a greater distance between the western side and the excavation area. In addition, the maintenance areas would be smaller than the original sediment removal footprint, allowing for habitat to reestablish and providing additional areas for wildlife movement.

Specific comments and recommendations regarding project-associated biological impacts are responded to below.

Response to Comment 233-4:

The Proposed Project, as stated in the Draft Environmental Impact Report (EIR), Section 2.4, Project Goals and Objectives is being undertaken to restore the flood control capacity of the reservoir. The Proposed Project does not involve changes to dam operations.

LACFCD was mandated by the State Legislature to provide flood protection and water conservation within its boundaries.

A reservoir storage design capacity of two design debris events (DDEs) below the dam's lowest spillway was determined to be the standard acceptable level of risk at Devil's Gate Dam and Reservoir. The DDE volume of capacity is determined using the January 2006 Los Angeles County Department of Public Works (LACDPW) Hydrology Manual and the March 2006 LACDPW Sedimentation Manual. For Devil's Gate Dam and Reservoir, the required reservoir capacity is 4.0 million cubic yards (cy) (two DDEs) below the spillway elevation of 1,040.50 feet.

The Hydrology Manual (January 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_Hydrology_Manual/2006%20Hydrology%20Manual-Divided.pdf

The Sedimentation Manual (March 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_sedimentation_manual/Sedimentation%20Manual-Second%20Edition.pdf

Additional information concerning DDE calculation methods has been added to the Final EIR, Section 2.3, Project Need.

The amount of sediment needing to be removed from the reservoir for flood control purposed is based on restoring the reservoir to the design capacity necessary for flood control storage or to safely contain future sediment inflow (volume for two DDEs below the spillway elevation of 1,040.5 feet) and protecting downstream communities from flooding. The amount is in no way related to other projects proposed in the area. The details listed in the Section 2.0, Project Description of the Draft EIR are the correct figures regarding the remaining capacity and the amount of sediment to be removed. The current remaining capacity in the reservoir is 1.3 million cy.

As stated in Section 2.2.1 of the Draft EIR, "Following the 1971 Sylmar Earthquake, heightened safety concerns and better understanding of seismic behavior prompted new investigations and analysis of LACFCD dams, including Devil's Gate Dam. In response to findings from these studies, in 1978 the State Department of Water Resources Division of Safety of Dams (DSOD) officially imposed an operational restriction preventing the holding of water at Devil's Gate Dam due to concerns with the dam's ability to withstand a major earthquake."

The 1998 rehabilitation project removed the DSOD restriction and restored use of the dam and reservoir to its full operational capacity. At that time, full reservoir capacity was not available; but the DSOD restriction on using full capacity was lifted. Clarification has been added to the Final EIR.

After the sediment removal phase has occurred, Flow Assisted Sediment Transport, or FASTing, is proposed to be an integral part of the annual maintenance at Devil's Gate. Annual FASTing operations will be implemented to reduce future buildups of sediment in the reservoir and to reduce the need for mechanical removal of sediment from the reservoir. FASTing is expected to be an effective means of keeping sediment levels low in the reservoir, and a maintenance regime that relies on FASTing greatly reduces the need for and extends the life of future and existing sediment placement sites and improves the future sustainability of the reservoir. Nevertheless, it is estimated that typically 13,000 cy of sediment will be removed by excavation annually. Please see Section 2.5.2 of the Draft EIR for more information on future maintenance.

Response to Comment 233-5:

See Response to Comments 233-4. The Draft EIR analyzed a range of sediment removal amounts that would obtain the two Design Debris Events (DDEs). Removing less sediment would not provide the capacity necessary to achieve the Proposed Project objectives.

LACFCD determined that Alternative 3 would be the environmentally superior alternative, affecting the least amount of habitat of all the action alternatives while still achieving Proposed Project objectives. Alternative 3, Configuration D, Option 1 would provide a buffer on the west side of the reservoir that

would allow for the movement of wildlife (see Section 4.6 of the Final EIR). Furthermore, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2 would avoid excavation of the western branch, providing a greater distance between the western side and the excavation area. In addition, the maintenance areas would be smaller than the original sediment removal footprint, allowing for habitat to reestablish and providing additional areas for wildlife movement. Alternative 3 Option 2 reduces the project footprint from 120 acres for the Proposed Project down to 71 acres.

After the sediment removal phase has occurred, Flow Assisted Sediment Transport, or FASTing, is proposed to be an integral part of the annual maintenance at Devil's Gate. Annual FASTing operations will be implemented to reduce future buildups of sediment in the reservoir and to reduce the need for mechanical removal of sediment from the reservoir. FASTing is expected to be an effective means of keeping sediment levels low in the reservoir, and a maintenance regime that relies on FASTing greatly reduces the need for and extends the life of future and existing sediment placement sites and improves the future sustainability of the reservoir. Nevertheless, it is estimated that typically 13,000 cy of sediment will be removed by excavation annually. Please see Section 2.5.2 of the Draft EIR for more information on future maintenance.

Due to the nature of a dam and reservoir system, as the Arroyo Seco enters the reservoir, the slope naturally flattens and stabilizes within the reservoir. As a part of the sediment removal project, the cut plan mimics these historic slopes by incorporating 3:1 side slopes and varying but gradual bottom slopes, all of which are shallow and stable. In Alternative 3, the proposed cut at the northern end of the reservoir is approximately 25:1, a very shallow slope, which mimics the historic slopes in that area of the reservoir.

In addition, as stated in the Draft EIR Section 2.7, "To reduce potential impacts to erosion and water quality, the Proposed Project would be conducted in accordance with applicable standards and BMPs. The Proposed Project will also conform to the requirements in the latest edition of the LACDPW "Construction Site Best Management Practices Manual" (BMP Manual)." Implementation of adequate BMPs and Proposed Project activities occurring mostly during the dry season would avoid erosion of susceptible slopes along the borders of excavation and/or reservoir management areas.

As such, no impacts to the stream or habitat are expected in the northern area of the reservoir, outside the project boundary, or outside the LACFCD easement. It should be noted that unconsolidated and recently deposited post fire sediment upstream is expected to continue to wash downstream during significant storm evens and that this will occur regardless of the Proposed Project.

Response to Comment 233-6:

See Response to Comments 233-4 and 233-5.

Response to Comment 233-7:

Mitigation Measures MM BIO-1 through MM BIO-8 are enforceable and designed to reduce impacts through methods known to be feasible and effective. These Mitigation Measures are accepted by agencies that would be involved in consultation, negotiation, and final approval of Mitigation Measures, including conceptual restoration plans. As with any project that involves California Department of Fish and Wildlife (CDFW), United States Army Corps of Engineers (USACE), and Regional Water Quality Control Board (RWQCB) jurisdictional areas, the ultimate mitigation for impacts related to the wetlands

and drainages under the jurisdiction of the resource agencies is negotiated with the resource agencies during the regulatory permitting process. LACFCD has been and will continue to work closely with CDFW and USACE to identify appropriate mitigation, replacement ratios, and sites for restoration and enhancement that will offset impacts and satisfy the requirements of all applicable laws. A detailed restoration plan will be prepared and provided to CDFW and USACE for review and approval prior to project implementation. Prior to commencement of the Proposed Project, LACFCD will have obtained all necessary permits for impacts to CDFW, USACE, and RWQCB jurisdictional areas including Section 401 Certification, Section 404 permit, and a Streambed Alteration Agreement. Clean Water Act Section 404 (b)(1) guidelines will be followed as a framework for compensatory mitigation. Through 404(b)(1) negotiations with USACE and negotiations with CDFW under Fish and Game Code Sections 1600-1616, a determination of the functions and values of impacted jurisdictional waters shall result in the coordination of appropriate Mitigation Measures for sediment removal.

As discussed in the Draft EIR, Section 3.6.6, Sensitive Wildlife, to avoid harm or take of any special status wildlife species, mitigation measures MM BIO-1, MM BIO-2, MM BIO-3, MM BIO-4, and MM BIO-5 will be implemented. These include conducting preconstruction surveys, having a biological monitor onsite during construction, and implementing measures to avoid impacts to sensitive species. In addition, coastal California gnatcatchers surveys will be conducted in 2015. If coastal California gnatcatchers are identified on site, LACDPW will work with the agencies regarding additional mitigation measures through a formal consultation process. With implementation of these mitigation measures, direct impacts to biological resources would be less than significant.

Response to Comment 233-8:

Due to the structure of the dam and basin, the amount of sediment entering the basin far exceeds the amount of sediment leaving the basin. Expansion or spreading of sediment does not occur in a relative horizontal direction but rather the accumulation of sediment occurs in a more vertical manner; and as much as 20 feet of sediment buildup has occurred in one rainy season, burying existing vegetation.

The sedimentation that has occurred as a result of the 2009 Station Fire, and is expected to continue to occur, has greatly reduced the size of this community and has inhibited its ability for succession.

Impacts to Riversidean Alluvial Fan Sage Scrub (RAFSS) would result in a significant impact requiring mitigation. To minimize impacts due to loss of RAFSS, Mitigation Measure MM BIO-6 has been provided. Removing the accumulated sediment and designing a system that will provide transport of sediment downstream will allow a more natural expansion of sediment that will benefit the alluvial fan sage scrub establishment. With implementation of this mitigation measure, impacts to RAFSS would be reduced to a level below significance.

As analyzed in the Draft EIR, Section 4.0, impacts to RAFSS during the sediment removal phase of Alternatives 1, 2, and 3 would be reduced in comparison to the Proposed Project. With all the Alternatives, impacts to RAFSS would be mitigated through restored and/or enhanced at a ratio of at least 1:1 ratio by acreage. This ratio will be finalized during the negotiations with the resource agencies, including CDFW, during the regulatory permitting process.

LACFCD has been and will continue to work closely with CDFW and USACE to determine a mitigation and restoration plan to identify appropriate mitigation, replacement ratios, and sites for restoration and enhancement that will offset impacts and satisfy the requirements of all applicable laws. With

implementation of this mitigation measure, impacts to Riversidean Alluvial Fan Sage Scrub would be reduced to a level below significance.

Response to Comment 233-9:

Protocol focused surveys for least Bell's vireo and coastal California gnatcatcher are being conducted in 2014. The LACFCD has been and will continue to work closely with the CDFW and USACE to determine a mitigation and restoration plan to identify appropriate mitigation, replacement ratios, and sites for restoration and enhancement that will offset impacts and satisfy the requirements of all applicable laws.

Response to Comment 233-10:

Vegetation mapping is provided to capture changes in vegetation communities. With the dam and basin structure, the accumulation of as much as 20 feet of sediment buildup has occurred in one rainy season, burying existing vegetation and altering community composition. The LACFCD is working closely with CDFW and USACE regarding mitigation and restoration for the Proposed Project. This includes areas identified as scoured, which is considered under state and federal jurisdictions. Additional mitigation requirements will be provided in the CDFW and USACE permits.

Response to Comment 233-11:

The LACFCD is working closely with CDFW and USACE regarding mitigation and restoration for the Proposed Project. This will include onsite and offsite opportunities and will be discussed with the agencies and incorporated into the mitigation/restoration plan and Streambed Alteration Agreement and 404 permits. The County of Los Angeles Department of Public Works is a local sponsor of the USACE's *Arroyo Seco Watershed Ecosystem Restoration Study* and thus will continue to coordinate accordingly.

Response to Comment 233-12:

A detailed restoration plan will be prepared and provided to CDFW and USACE for review and approval prior to project implementation and to satisfy permitting requirements. The plan will include and address invasive species management, monitoring, and success criteria.

Response to Comment 233-13:

LACFCD notes that Christine Medak is the contact person for USFWS regarding this comment letter.

From: Darren Dowell
To: reservoircleanouts
Subject: Devil's Gate Reservoir Sediment Removal and Management Project
Date: Tuesday, January 21, 2014 9:42:35 PM

January 21, 2014

Comment 234-1 Thank you for addressing the following comments and concerns about the Devil's Gate Reservoir Sediment Removal and Management Project as described in the Draft Environmental Impact Report, dated October 2013.

Comment 234-2 1) Mitigation measures BIO-7 and -8 do not have sufficient detail in the report to be evaluated for credibility in achieving the claimed "less than significant" impact to riparian and sensitive habitats.

Comment 234-3 a) Given the size of the proposed project, there is an 'acreage problem' with implementing the mitigation on site. Since no information is given about off-site mitigation, it cannot be established if the mitigation provides equivalent biological value to what is proposed to be removed from Hahamongna.

Comment 234-4 b) The description of tree replacement as "up to 1:1 by acreage" in BIO-7 is problematic since, mathematically speaking, zero replacement is consistent with "up to 1:1". Mitigation at a level below 1:1 is clearly unacceptable.

Comment 234-5 2) The classification of habitat in the 2010 and 2013 surveys does not appear to be consistent or objective.

Comment 234-6 a) For example, p. 99 states that "In 2010, Coast Live Oak was present in the Riparian Woodland mostly at the southern end of the Proposed Project site (Chambers Group 2010a). In 2013, only four small patches were identified in the Project site, including one located east of the dam face (Chambers Group 2013b)." The wording implies that there has been a significant change to the content of Coast Live Oak in Hahamongna between 2010 and 2013. However, to my knowledge, this is not the case.

Comment 234-7 b) Page 95 states that "At the time of the 2010 survey (Chambers Group 2010a), the Proposed Project site was primarily composed of riparian and upland communities (see Figure 3.6-1: Devil's Gate Vegetation Communities (2010)). The Proposed Project site was resurveyed in 2013 (Chambers Group 2013) and is shown to be primarily composed of riparian and ruderal communities plus large scoured areas created as a consequence of the 2009 Station Fire". However, the impact of the scouring should have been readily apparent during the 2010 survey, due to the large rains and debris flow in January and February 2010 following the station fire in 2009.

Comment 234-8

c) Page 100 states that "much smaller patches of [the riversidean alluvial fan sage scrub] community remain 2013" in comparison to 2010. However, inspection of Figures 3.6-1 and 3.6-2 suggests that this change in acreage is merely an artifact of changing the survey boundary between the two years.

Comment 234-9

3) The statement on page 106 that the yellow warbler is not nesting within the proposed project site is factually incorrect and raises serious concerns about either the quality of the biological surveys or the fair presentation of the facts in the summaries.

Comment 234-10

4) The yellow-breasted chat is a California Bird Species of Special Concern which is present and likely nesting in Hahamongna, but is not listed in Table 3.6-3.

Contact: C. Darren Dowell, resident of Pasadena, CA

Response to Comment Letter #234 (Darren Dowell)

Response to Comment 234-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. The comments have been responded to below.

Response to Comment 234-2:

As discussed in Section 3.6.6 of the Draft Environmental Impact Report (EIR), Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats. In addition, sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays). Wildlife species currently found in the Proposed Project area would be expected to either remain in the undisturbed areas of the reservoir outside the Proposed Project area or to reestablish once sediment removal activities have been completed.

Mitigation Measures MM BIO-1 through MM BIO-8 are enforceable and designed to reduce impacts through methods known to be feasible and effective. These Mitigation Measures are accepted by agencies that would be involved in consultation, negotiation, and final approval of Mitigation Measures, including conceptual restoration plans. As with any project that involves California Department of Fish and Wildlife (CDFW), United States Army Corps of Engineers (USACE), and Regional Water Quality Control Board (RWQCB) jurisdictional areas, the ultimate mitigation for impacts related to the wetlands and drainages under the jurisdiction of the resource agencies is negotiated with the resource agencies during the regulatory permitting process. Los Angeles County Flood Control District (LACFCD) has been and will continue to work closely with CDFW and USACE to identify appropriate mitigation, replacement ratios, and sites for restoration and enhancement that will offset impacts and satisfy the requirements of all applicable laws. A detailed restoration plan will be prepared and provided to CDFW and USACE for review and approval prior to project implementation. Prior to commencement of the Proposed Project, LACFCD will have obtained all necessary permits for impacts to CDFW, USACE, and RWQCB jurisdictional areas including Section 401 Certification, Section 404 permit, and a Streambed Alteration Agreement. Clean Water Act Section 404 (b)(1) guidelines will be followed as a framework for compensatory mitigation. Through 404(b)(1) negotiations with USACE and negotiations with CDFW under Fish and Game Code Sections 1600-1616, a determination of the functions and values of impacted jurisdictional waters shall result in the coordination of appropriate Mitigation Measures for sediment removal.

Response to Comment 234-3:

See Response to Comment 234-2, above. Mitigation locations will comply with CDFW recommendations as follows: first onsite, offsite within the Arroyo Seco Creek, and offsite within the greater Los Angeles River watershed.

LACFCD determined that Alternative 3, Configuration D would be the Environmentally Superior Alternative, affecting the least amount of habitat of all the action alternatives while still achieving Proposed Project objectives. Alternative 3, Configuration D, Option 1 would provide a buffer on the west side of the reservoir that would allow for the movement of wildlife (see Section 4.6 of the Final EIR). Furthermore, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2, which drastically reduces the project's footprint of 120 acres down to 71 acres, would avoid excavation of the western branch, providing a greater habitat buffer on the west

side. In addition, the maintenance areas would be smaller than the original sediment removal footprint, allowing for habitat to reestablish and provide additional areas for wildlife movement.

Response to Comment 234-4:

See Response to Comment 234-2, above. As discussed in the Draft EIR, Section 3.6.6, Impacts and Mitigation, the Proposed Project would remove trees from the Proposed Project site. Implementation of Mitigation Measure MM BIO-7 will identify trees that will be removed or potentially affected, the appropriate level of tree replacement, and protection of the root zone of oak trees. Implementation of this mitigation measure will reduce impacts to a level below significance. LACFCD has been and will continue to work closely with CDFW to identify appropriate mitigation and replacement ratios, and sites for restoration and enhancement that will offset impacts and satisfy the requirements of all applicable laws. A detailed restoration plan will be prepared and provided to CDFW for review and approval prior to project implementation.

Response to Comment 234-5:

The 2010 vegetation survey was conducted before the Proposed Project was formulated, and the entire reservoir was mapped for established vegetation communities. Once the Proposed Project configuration was formulated, vegetation mapping was conducted again in 2013 in order to achieve a more conservative analysis of the potential impacts to biological resources from the Proposed Project.

Response to Comment 234-6:

The four small patches refers to the vegetation community Riparian Woodland mentioned in the preceding sentence. As discussed in that sentence, Coast Live Oak is part of that community. The discussion refers to a reduction in the Riparian Woodland community, not the number of Coast Live Oak. This has been clarified in the Final EIR.

Response to Comment 234-7:

Vegetation mapping is provided to capture changes in vegetation communities. With the dam and basin structure, the accumulation of as much as 20 feet of sediment buildup has occurred in one rainy season, burying existing vegetation and altering community composition. Within the storms following the Station Fire, 1.3 million cubic yards (cy) of sediment flowed into the reservoir, with each subsequent storm bringing the sediment closer to the dam face. Devil's Gate Dam and Reservoir is a dynamic system that is constantly changing. With the intermittent heavy flows that occur through the reservoir, sediment accumulates and washes throughout the basin. With this, the established vegetation communities are subjected to varying conditions and will continue to change throughout the life of the reservoir. During small rain events in the reservoir, flows typically rise to 6 and 8 cubic feet per second (cfs). Large rain events can take place several times per year where flows can rise from 2 cfs to over 300 cfs in the span of one hour; with extremely heavy rains producing flows of nearly of 1,350 cfs. The changes to vegetation composition, sediment buildup, and scouring due to these high flow events occurred over several years since the Station Fire and were captured during the 2013 mapping efforts.

Response to Comment 234-8:

There is a slight difference between the survey areas from the 2010 and 2013 surveys, and a portion of the Riversidean Alluvial Fan Sage Scrub community acreage in 2010 is not a part of the 2013 survey area. Further,

comparing the same area, the Riversidean Alluvial Fan Sage Scrub community was identified with more sediment composition within this community in 2013. This sedimentation that has occurred as a result of the 2009 Station Fire is expected to continue to occur if sediment removal is not implemented.

Response to Comment 234-9:

As discussed in the Draft EIR, Section 3.6, Wildlife, and in Appendix D, yellow warblers were identified within the basin and are considered to be present. Table 3.6-3 *Special Status Animal Species Occurring in Proposed Project Vicinity* has been corrected, and "but not nesting" has been removed from the table in the Final EIR. Locations of yellow warbler nest sites will vary from season to season. To remain in compliance with the Migratory Bird Treaty Act and CDFW Code Sections 3503 and 3503.5, a nesting bird survey will be conducted prior to ground-disturbing activities. LACFCD will continue to work closely with the CDFW and USACE regarding avoidance and protection measures outlined in the Streambed Alteration Agreement and 404 permits.

Response to Comment 234-10:

Yellow-breasted chats were observed during surveys for least Bell's vireo (see Appendix D of the Draft EIR). Table 3.6-3 has been updated in the Final EIR to include this species.

From: John West
To: reservoircleanouts
Subject: Devil"s Gate Reservoir Sediment Removal and Management Project Draft EIR Comments
Date: Wednesday, January 22, 2014 12:12:54 AM

Gentlemen:

Please accept the following comments:

Comment 235-1

1) Justification for Sediment Removal: Before any plan for sediment removal is approved, the Department of Public Works, Water Resources Division, County of Los Angeles, should thoroughly review the justification for the original construction of the dam and the specifications to which it was constructed. Both the original justification and the dam's specifications were based on knowledge about storm probabilities and projected run-off in the region known almost 100 years ago. At that time, there was almost no climatological database from which to derive projections of the probability that storms of the magnitude that caused the flooding in the 1920's would happen nor to estimate the amount of the run-off. A lot has been learned since then. It may well be that that new knowledge may show a dam of the size and volume of the current dam is not needed or that a smaller or entirely different approach to manage the risk of flooding in the area is entirely acceptable. Given the cost and inconvenience to the public and impact to the environment of this project, proceeding with the project without such a review would be both financially irresponsible and disrespectful of the interests of the people the project is represented to serve.

Comment 235-2

2) Cooperation with Other Public Agencies to Reduce Project Impact to Affected Communities: Should the review called for in #1, Justification for Sediment Removal, be substantiated, before any work on sediment removal is initiated, the Department of Public Works, Water Resources Division, County of Los Angeles, should make every reasonable and prudent effort to examine how the pubic's interest may be best served by LADPW cooperation with any and all public agencies whose participation in the project could lessen the project's impact on the affected communities. Since impact on traffic to accommodate the number of trucks necessary to remove the sediment is one of the paramount and most broadly acceped negative impacts of the project, this means LADWP outreach to the public agencies with which responsibility for management of the principal roads on which the sediments will be transported rests. In particular, given the volume of sediment which will require transport to the east San Gabriel Valley, this means LADWP outreach to the agency responsible for the transition ramp from the eastbound 210 freeway to the eastboud 134 where the 210 freeway and eastbound 134 freeway meet at the uncompleted 210 freeway connection with the 710 south freeway. Already this is a major chokepoint. With the sediment removal project in place, and no relief in sight during the period of the sediment removal from completion of the 210-710 connection, it will only get worse. What is recommended for serious multi-public agency cooperation to address this longstanding bottleneck both in the interests of the public immediately affected by the sedimant removal and the public affected every day by the bottleneck at this location is widening and redesign of the 210E-134E transition ramp. Were the 710 south never have been intended to be completed, this connection would never have beed designed to permanently choke a four-lane frewway to one lane at such an important freeway connection point. This is an opprtunity for multi-agency

Comment 235-2 continued

cooperation to fix a longstanding issue with major positive impact to a broad section of the public.

Response to Comment Letter #235 (John West)

Response to Comment 235-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

Devil's Gate Dam, built in 1920, was the first dam built by the Los Angeles County Flood Control District (LACFCD). The dam was built in response to the severe flooding of Los Angeles in the early 1900s and allowed for the channelization of and development along the Arroyo Seco. The Arroyo Seco normally carries low flows, but it is periodically inundated from severe floods flowing off its large, steep watershed that includes mountainous terrain. Prior to the construction of the dam, cities such as Pasadena, South Pasadena, and Los Angeles would experience flooding from the Arroyo Seco during storms. The Rose Bowl, built in 1922, and the Arroyo Seco Parkway, also known as State Route 110, completed in 1953, are two examples of downstream development made permissible by the construction of Devil's Gate Dam.

As stated in Section 2.2.1 of the Draft Environmental Impact Report (EIR), "Following the 1971 Sylmar Earthquake, heightened safety concerns and better understanding of seismic behavior prompted new investigations and analysis of LACFCD dams, including Devil's Gate Dam. In response to findings from these studies, in 1978 the State Department of Water Resources Division of Safety of Dams (DSOD) officially imposed an operational restriction preventing the holding of water at Devil's Gate Dam due to concerns with the dam's ability to withstand a major earthquake." The 1998 rehabilitation project removed the DSOD restriction and restored use of the dam and reservoir to its full operational capacity.

LACFCD has and continues to evaluate hydrologic, climate, and other environmental conditions as they relate to their facilities. In recent years, LACFCD has identified new challenges in managing sediment. In particular, the wildfires occurring in 2007 and 2009 burned a large portion of the County and have led to an increased inflow of sediment and debris within LACFCD facilities. This has put pressure on the remaining capacity of existing sediment placement sites where LACFCD has traditionally placed sediment. As a result, LACFCD has developed a 20-year Sediment Management Strategic Plan (Strategic Plan) for years 2012 through 2032 that pursues new alternatives which can reduce the environmental and social impacts of sediment management.

The Strategic Plan represents the results of a continuing dialogue about sediment management between the LACFCD and numerous stakeholders, including the United States (U.S.) Army Corps of Engineers (USACE), in the region. The Strategic Plan provides an overview of sediment management issues, evaluates various strategies to help identify optimal solutions for sediment management, and identifies general steps that should be pursued to meet the LACFCD's mission. The Strategic Plan is guided by the following key objectives:

- Maintaining flood risk management and water conservation
- Recognizing opportunities for increased environmental stewardship
- Reducing social impacts related to sediment management
- Identifying ways to use sediment as a resource
- Ensuring LACFCD is fiscally responsible in decision-making

The Strategic Plan is a living document that is open to other alternatives and may be revised in the future as conditions change. This Strategic Plan is intended to be an advisory document. Development of specific cleanout plans for the LACFCD's numerous facilities are guided by the Strategic Plan. During the development of these specific cleanout plans there will be opportunities for additional public input, including from the local communities affected by each cleanout.

LACFCD was mandated by the State Legislature to provide flood protection and water conservation within its boundaries.

A reservoir storage design capacity of two Design Debris Events (DDE) below the dam's lowest spillway was determined to be the standard acceptable level of risk at Devil's Gate Dam and Reservoir. The DDE volume of capacity is determined using the January 2006 County of Los Angeles Department of Public Works Hydrology Manual and the March 2006 County of Los Angeles Department of Public Works Sedimentation Manual. For Devil's Gate Dam and Reservoir, the required reservoir capacity is 4.0 million CY (two DDEs) below the spillway elevation of 1040.50 feet.

The Hydrology Manual (January 2006) can be viewed here:

http://dpw.lacounty.gov/wrd/publication/engineering/2006_Hydrology_Manual/2006%20Hydrology%20Manual-Divided.pdf

The Sedimentation Manual (March 2006) can be viewed here:

http://dpw.lacounty.gov/wrd/publication/engineering/2006_sedimentation_manual/Sedimentation%20Manual-Second%20Edition.pdf

Response to Comment 235-2:

LACFCD has been and will continue to coordinate with public agencies, including those listed in the Draft EIR Section 2.8 Required Permits and Approvals.

Potential impacts due to the Proposed Project's truck trips were analyzed in the Draft EIR, Section 3.16, Transportation and Traffic. Truck traffic associated with the Proposed Project will not cause any major traffic impacts at the studied freeway segments along any of the haul routes. While the majority of the sediment disposal and associated truck traffic is expected to go to the disposal sites east of the Proposed Project, the Draft EIR also analyzed the use of disposal sites west of the Proposed Project. This will allow for flexibility in case one particular route is temporarily unusable.

In practice, hauling rates and routes may be adjusted to help reduce impacts, depending on operational need. As discussed in the Draft EIR, Section 3.16, Transportation and Traffic, LACFCD will continue to work with local organizations, cities, and communities to minimize traffic impacts around the Proposed Project site.

From: Donna Rodriguez
To: reservoircleanouts
Subject: Devil"s Gate Reservoir Sediment Removal and Management Project
Date: Tuesday, January 21, 2014 10:51:28 PM

>

Comment 236-1

> The La Canada Flintridge Trails Council(LCFTC) is writing to you regarding our concerns with the Devils Gate Reservoir Sediment Removal and Management project. The LCFTC is a non-profit organization run by volunteers that watch over and protect the La Canada Flintridge trails since the mid nineteen seventies.

> The following are specific concerns:

Comment 236-2

> According to the Draft Environmental Impact Report(DEIR), for the following five years the Flint Canyon Trail will be closed for eight months each of those years. The street alternative, along Berkshire Place which has been used in the past will no longer be an alternative. The reason for this according to DEIR is that fifty trucks an hour will be using this street to access the freeway. Hence, the southern portion of the city will be cut off from the trails in Hahamongna.

> Also, all trail users coming north from Pasadena will be unable to access Hahamongna for eight months of the year. We would ask that every effort be made to keep the trails open as much as possible especially on weekends during construction. We strongly request that during the part of the year when construction is not taking place, the park should be left in a condition so that all trails in Hahamongna are open and accessible.

>

Comment 236-3

> Both the projects and alternatives, with the exception of the sluicing and the no project alternatives require that most of the trails in the park be closed since work is going on in their vicinity. We strongly suggest that the work be done in phases so that not all the trails need to be closed at one time.

>

Comment 236-4

> The DEIR trail map is misleading since it focuses upon specific designated trails. As a result of this emphasis many of the existing trails are not included in the report. The environmental impact of their removal is not considered nor is it at all mentioned. Clarification of the criteria used and who designated these trails is essential since some trails in this category were not represented in the DEIR. The DEIR is incorrect in stating that there are "trails adjacent to but not within the reservoir," noted on page 209 of the report. There is a network of existing trails which have been used for decades. We are curious to why these trails are not shown on the trails map in the DEIR and the environmental impact of their removal is not studied.

>

Comment 236-5

> The Perimeter Trail, the most important trail in the Hahamongna trail network, is also omitted in the DEIR. The LCFTC has worked very closely over the years with the Altadena Crest Trail Working Group that has been working to reconnect the Altadena Crest Trail portions of which need consistent maintenance. The trails of Hahamongna, and the Perimeter Trail in particular, are at the center of the regional trail network of Pasadena, South Pasadena, Altadena, La Canada- Flintridge and the Angeles Crest National Forest. Portions of the Perimeter Trail clearly appear to be within the footprint of the project. So the LCFTC emphasizes that the Perimeter Trail be represented and evaluated within the scope of the project.

>

Comment 236-6

> According to the DEIR, a small portion of the Altadena Crest Trail will be closed for the duration of the construction project. This will cut off trail users to and from Altadena. We would ask that efforts be made to keep this historic and important trail open.

>

Comment 236-7

> The DEIR is also deficient in not indicating where the access routes will be within the basin. The report only states that vehicular activity will be limited to established unpaved roads and unpaved parking lots, as noted on page 86. If the access routes within the park are not indicated, how can the public assess what the impact of these routes and parking lots will be upon he trails.

> We look forward to having you address our concerns,
Donna Rodriguez
LCFTC Vice President

Response to Comment Letter #236 (Donna Rodriguez)

Response to Comment 236-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. Los Angeles County Flood Control District (LACFCD) notes the details regarding the La Cañada Flintridge Trails Council.

Response to Comment 236-2:

Impacts to recreation were analyzed in the Draft Environmental Impact Report (EIR), Section 3.15. The Proposed Project will not limit the use of the Oak Grove area of Hahamongna Watershed Park. Sediment removal activities would be temporary, are expected to occur only in the drier months (April to December, excluding holidays). It is expected that these activities will often not be adjacent to the Oak Grove area of Hahamongna Watershed Park. The Proposed Project would result in temporary limitations on the recreational use of the Proposed Project site and some of the adjacent trails. Most of these areas would be reopened seasonally or intermittently throughout the sediment removal process. In addition, temporary impacts to designated recreational facilities and trails will be minimized through advance communication and redirection to the nearest facility in the vicinity of the Proposed Project. Furthermore, an east-west trail crossing will continue to provide access at the north end of the reservoir. At the south end of the reservoir, after the reservoir ingress and egress ramps have been fully constructed, access to the upper east side Arroyo Seco Trail from La Cañada Verdugo Road will be maintained; and the linkage from the west side Arroyo Seco Trail and the Flint Wash Trail to the upper east side Arroyo Seco Trail (crossing Devil's Gate Dam and also continuing south to the Rose Bowl) will be available after construction activities have ended each day and on nonworking days.

Response to Comment 236-3:

See Response to Comment 236-2.

Response to Comment 236-4:

Baseline recreation opportunities were described in the Draft EIR, Section 3.15, Recreation/Public Services. The trails were designated by the City of Pasadena, as shown on the City of Pasadena Department of Public Works' Arroyo Seco Trail Map. As seen on the Arroyo Seco Trail Map, the maintenance roads within the reservoir are not designated as trails by the City of Pasadena Department of Public Works. As noted in the Draft EIR, Section 3.15, maintenance roads within the basin are used by LACFCD, Southern California Edison (SCE), and the City of Pasadena, among others, for operations and maintenance of Devil's Gate Reservoir and other facilities in the area. The Draft EIR notes that these roads are used as unofficial trails when reservoir water levels and conditions permit. These maintenance roads are not designated as trails by the City of Pasadena or any other public agency. LACFCD encourages all recreational users of Devil's Gate Reservoir to use the designated trails.

Response to Comment 236-5:

See Response to Comment 236-4. Any impacts to the proposed Perimeter Trail were not included in the Draft EIR, as it is one of the improvements previously proposed under the Hahamongna Watershed Park Multi-Benefit/Multi-Use (MBMU) Project, not an existing trail at the site. No designated trails will be permanently closed due to implementation of the Proposed Project.

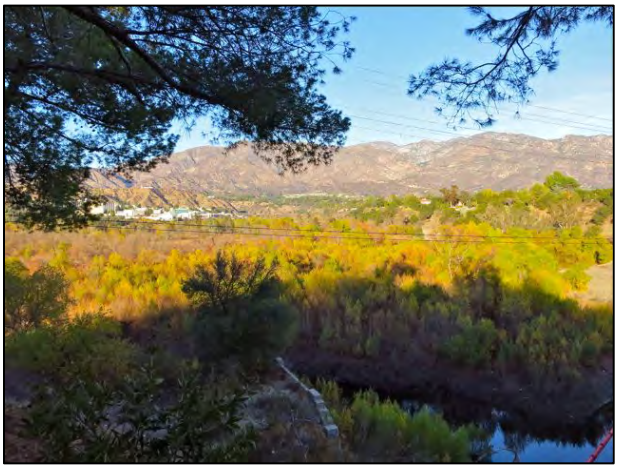
Response to Comment 236-6:

See Response to Comment 236-2.

Response to Comment 236-7:

As described in the Draft EIR, Section 2.5, Proposed Project Description, trucks will utilize two access roads (one existing and one upgraded) at the southern portion of the reservoir. The trucks will enter at one access road and exit at a separate access road to encourage circular flow. Within the work area, the truck path will vary depending on the location of the work. Please see Section 2.5.1 of the Draft EIR for further information on the access roads.

20 January 2014



The winter colors of the trees in HWP basin were enhanced near sunset on 1 December 2013. (Photo by L. Paul)

Gale Farber, Director
Los Angeles County Department of Public Works
Los Angeles County Flood Control District,
Water Resources Division, Reservoir Cleanouts
P. O. Box 1460
Alhambra, CA 91802-9974

Re: **Devil's Gate Reservoir Sediment Removal and Management Project Draft Environmental Impact Report (DEIR) / October 2013**

Dear Ms. Farber and DPW Staff,

Comment 237-1

Please enter my comments regarding the *Devil's Gate Reservoir Sediment Removal and Management Project Draft Environmental Impact Report* (hereafter DEIR) into the official record. Regrettably, I find the massive DEIR unacceptable for so many reasons that it is difficult to prioritize my concerns. I intend to focus most on issues I believe others may not have emphasized, though this in no way reduces the importance of the criticisms submitted by others in their own areas of expertise or personal interest. I concur wholeheartedly with submissions by noted regional stakeholders, including *Friends of Hahamongna*, *Arroyo Seco Foundation*, *Pasadena Audubon*, *Santa Monica Mountains Conservancy*, *Friends of the Los Angeles River*, and individuals long devoted to protection of HWP, including its wildlife and water projects, Robert Staehle, Christle Balvin, Hugh Bowles and Marietta Kruells, plus arborist Rebecca Latta.

Comment 237-2

I have enjoyed, and acted to protect, Hahamongna Watershed Park (HWP) for several decades. As a local Altadena resident, hiker, and wildlife biologist, I am particularly devoted to the park's flora and fauna, its trails that connect four regional trail systems, and support pastoral recreational activities that encourage exercise. This natural park… where ancient oak woodland meets seasonal ponds, wetlands, and streams; alluvial scrub; and arid chaparral… provides numerous benefits to local communities. I also value HWP's importance as a functional watershed, biodiverse habitat, and critical (if tenuous) wildlife corridor that connects the San Gabriel Mountains (Angeles National Forest) with the remnant natural stretches of the lower Arroyo Seco, with the San Raphael Hills and, from there, the Verdugo Mountains. HWP is the last viable connection between species in the San Gabriels and the Verdugo Mountains.

Comment 237-3

While I recognize the multifaceted role of HWP as a popular recreational destination, wildlife habitat, and flood control structure (Devil's Gate Dam), and I respect the need to protect property below the dam from damage during high flood events, I adamantly oppose the assertion by the DPW that the current level of sediment constitutes an emergency that justifies the proposed obliteration of this incredible natural resource and beloved park. From the frisbee golfers and dog walkers, to horse riders and hikers, to birders, runners, and mountain bikers, and to its many other visitors and neighbors, HWP is irreplaceable. Yet the DPW has set itself on a course with this DEIR to destroy HWP as thoroughly, and with as little justification and regard, as it destroyed the ancient oaks in the Acradia Oak Woodland in January 2011 to create a Sediment Placement Site (SPS) for Santa Anita Dam sediments that the County has never used (see Concern VII).

Comment 237-4

The DPW has failed from inception of its sediment removal approach (Project Goals and Objectives in the DEIR) to acknowledge the importance and sacredness of the park. It's first assumption *should have been* to respect and commit to protect the park, its habitat, and its visitors… then work from that premise to design a project which preserves those high values while achieving flood control goals. I, and many others, believe that such a conservative project plan is not only possible; it is imperative.

As an analogy, if the DPW concluded that Disneyland or Yosemite Valley posed a potential future flood risk to nearby communities, its first conclusion would certainly not be to mar and destroy those iconic places. Instead, the first priority would be to study ways to preserve these important landmarks while reducing the risk they pose. First, *commit to cause less harm*, then plan and innovate from there. Though of less overt

Comment 237-4 continued

grandeur and flamboyance than either Disneyland or Yosemite, HWP is a multi-valued resource, as evidenced by the many protective designations and jurisdictions it holds (see concern II), the many persons who visit the park every day, the abundant wildlife that depends upon it for survival, and the freshwater it returns to the earth. The DPW's very first priority should be dedicated to preserving what is there, while also maintaining the integrity of Devil's Gate Dam, or designing a replacement plan for removing the outdated dam that would restore the Arroyo Seco's natural flow of sediment to the sea while protecting vulnerable property along the historic water course.

I am not the only one who feels the DPW has inappropriately scoped and undervalued HWP in its blind rush to correct decades of neglected maintenance behind Devil's Gate Dam.

Comment 237-5

Notably, the **California Regional Water Quality Control Board (**CRWQCB), Los Angeles Region, in a letter to Christopher Stone dated 18 March 2011: "*Denial without prejudice of water quality certification for proposed Devil's Gate Dam and Reservoir Sediment Removal Project (Corps' Project No. 2010-01122-CO, Arroyo Seco, City of Pasadena, Los Angeles County (File No. 10-170)*" refused to issue a required Certification for the originally proposed sediment removal level of 1.6 million cubic yards because "We do not find that the potential significant impacts have been minimized to the fullest degree possible and we do not find an analysis of alternatives, which should include alternatives in terms [of] the overall size of the project..." The CRWQCB denied Certification approval because the *1.67 million cubic yard excavation was too big and there was insufficient analysis of "alternatives for cumulative impacts to habitat and affected species using the habitat."*

Comment 237-6

Additionally, scoping comments from numerous stakeholders prior to the publication of the October DEIR appear to have been disregarded. For example, Norman ("Norm") Brooks, Professor Emeritus of Caltech, who literally wrote the book on sediment management, provided extensive comments and asked questions which, to my knowledge, have never been adequately answered.

Comment 237-7

Why has the DPW failed to provide appropriate cost benefit and flood risk analysis for the proposed project and, instead of reducing the amount of sediment and acreage of habitat destroyed as required by the CRWQCB, significantly *increased* the amount of sediment removal from an unacceptable 1.6 million to a far greater 4 million cubic yards, involving the destruction of up to120 acres of natural habitat?

Comment 237-8

Adult San Diego nightsnake (*Hysiglena ochrorhyncha klauberi*) that was was injured, but survived. This is a small, seldom seen species with a splotchy brown dorsal pattern of brown spots and a beautiful, opalescent white underbelly. (Photo by R. Staehle)

What alternatives has the DPW explored for improving flood control near the only downstream areas at high risk in a future Design Debris Event (DDE) in the vicinity of Highland Park? Why did the DPW promote inappropriate panic and inaccurate media sensationalism by implying that the Rose Bowl and Pasadena homes might be flooded during rain storms and suggest that local freeways might be "over-topped" when that is not the case according to official inundation maps? Why were the two inundation maps requested by myself and others never presented at the public briefings about the sediment removal project; thereby perpetuating the myth of imminent inundation in Pasadena and downstream necessitating "emergency" sediment removal?

Comment 237-9

The DEIR repeatedly characterizes obviously severe impacts as "less than significant." For example, under "Aesthetics," it is stated that large scale excavation and removal of hundreds of acres of all natural terrain and vegetation in HWP basin, including establishment of a permanent maintenance facility, will "result in a less than significant impact to scenic vistas." This is demonstrably untrue, since scenic overlooks from the top of the dam, from the Oak Grove day use area, and from Sunset Ridge Overlook… indeed from vantage points all over the park that now look upon stands of willows,

Comment 237-9 continued

sycamores, sage and red buckwheat shrubs, low contoured hills and open water… visitors would instead see a barren and lifeless wasteland if any alternative in the DEIR becomes a reality.

Why has the DPW inaccurately categorized so many obviously adverse impacts as "less than significant?"

Comment 237-10

Why is there no detailed mitigation plan for this draconian project? The public and stakeholders cannot comment on important mitigation issues and options for HWP without a mitigation plan in the DEIR.

Comment 237-11

Questions like these are the tip of the iceberg for a DEIR that appears to be bulked out by the environmental consultant with boilerplate content and conflicting or inaccurate information. The alternatives offered in the DEIR are not authentic alternatives representing significant differences; instead, they are essentially identical repetitions of a theme involving permanent destruction of HWP basin utilizing polluting truck convoys that resort to outdated sediment dumping instead of exploring different sustainable sediment management options.

I. Inaccurate Biological Survey and Adverse Impacts on Native Plant Assemblages & Wildlife

Comment 237-12

The DEIR asserts that the extensive obliteration of all trees and native vegetation, resulting in the death or displacement of resident wildlife, for the creation of a steeply sloped barren pit approximately 50 feet deep will result in a "less than significant impact" to biological resources. The proposed large crater will eliminate the heart of HWP, its expansive living basin, leaving only a "Friar Tuck" fringe of living trees around the perimeter of the park. I would certainly call that a "significant impact."

Comment 237-13

The biological surveys conducted in HWP were incomplete and inaccurate. For example, in the Biological Resources section, the DEIR states that "most of the vegetation and trees in the Proposed Project area site were dead, washed out, or buried under sediment." Photos in the DEIR were taken during natural dormancy for the *deciduous* willow trees, which were not dead, but simply losing their leaves for the season (see photo of willow leaves turning yellow). In fact, the willows, mulefat, California sycamores and other vegetation thrived in the fresh sediments and water that flowed through the park. The referenced statement and photos of "brown," allegedly dead vegetation in the DEIR are either the result of shocking ignorance, or were deliberately intended to give a false, negative impression of HWP's basin ecosystem.

Deciduous willow leaves in HWP, winter 2013. Photo by L. Paul

Comment 237-14

Species present in HWP were not listed accurately, as present and/or breeding, such as the federally endangered Least Bell's Vireo (*Vireo bellii pusillus*) in 2013. After damage caused by illicit SCE road grading near riparian areas in the park that spring, the vireos may have been driven away from nesting in the basin for a season; however, their presence has been well documented in the past. Yellow warblers (*Setophaga petechial*, formerly *Dendroica petechial*) have also been confirmed in HWP.

Comment 237-15

Several reptile species, including, for example, the San Diego nightsnake (*Hysiglena ochrorhyncha klauberi*) pictured on page 2, are present in the park. The rare coast patch-nosed snake (*Salvadora hexalepsis virgultea*) is listed in the DEIR, but it was not noted that this snake is a U.S. Fish & Wildlife Service and California Department of Fish & Wildlife "Species of Special Concern." http://www.californiaherps.com/snakes/pages/s.h.virgultea.html

Comment 237-16

Worse, the DEIR lists both the western toad (*Bufo boreas*) and the California toad (*Anaxyrus boreas halophilus*), which are actually the same toad species. The genus Bufo is the former (older) name while the genus Anaxyrus is the current scientific name including sub-species: http://www.californiaherps.com/frogs/pages/b.b.halophilus.html

Comment 237-17

Western Side-blotched Lizard (*Uta stansburiana elegans*) photographed in HWP in February 2013 (Photo by L. Paul)

The subspecies of gopher snake cited in the DEIR is not the one present in HWP: the Sand Diego gopher snake (*Pituophis catenifer annectens*): http://www.californiaherps.com/snakes/pages/p.c.annectens.html

Comment 237-18

Why does the DEIR list of birds omit over 150 species, including migratory birds dependent upon the basin along the Pacific Flyway, that have been verified as present in the HWP? How many biological surveys were conducted over what time period? What surveys, if any, were conducted to ascertain the presence of rare butterflies, insects, arachnids, scorpions, and invertebrates?

Comment 237-19

The list of native plants is insufficient, as well. For example, Plummer's (aka hairy) mariposa lily (*Calochortus plummerae*) is not listed as documented in HWP, though several of these perennial bulbs grow in the margins of the basin among chaparral species. This beautiful and rare lily, formerly classified by the California Native Plant Society as a California Rare Plant Rank 1B, remains on the "watch list" (Rank 4) and its presence should be noted: http://www.rareplants.cnps.org/detail/1599

Comment 237-20

BIO-7 in the Mitigation Measures section suggests replacement of all trees in the basin 1:1. This ratio is paltry compared to the standard replacement ratio of 3:1 to 5:1 for the loss of riparian, alluvial sage scrub, chaparral and trees across Southern California. Furthermore, HWP contains one of the largest contiguous assemblages of willow and mulefat habitat remaining in the region, which means that adequate mitigation lands for this large park in the "urban wildland interface," where there are important wildlife corridors and recreational trails, may not be possible. Without an actual mitigation plan, no accurate critique of DPW plans is possible. This is unacceptable under CEQA.

I. a. Polyphagous Shot Hole Borer (PSHB) in HWP

Biological consideration for the proposed project alternatives failed to recognize and address impact of a new, highly invasive tree pest, the **polyphagous shot hole borer** (*Euwallacea sp.*, see photo of a female borer at right) that is rapidly spreading across Los Angeles County. I emphasized the importance of this highly "contagious" tiny ambrosia beetle, that introduces a deadly fungus, *Fusarium euwallaceae,* into trees, back at an initial "coffee klatch" briefing about the DEIR alternatives with Keith Lilley and a project consultant; however, this important information was still omitted from the DEIR.

Comment 237-21

The polyphagous shot hole borer (PSHB) is widely present in HWP, in much of the surrounding neighborhoods, and in trees within local Angeles National Forest Canyons (including live oaks, scrub oaks, California sycamore, willows, alders, big leaf maple and other native tree species). The DPW cannot cut down basin trees for the project and stockpile or haul the wood out without spreading this devastating insect and its accompanying fungal disease. All downed wood will need to be ground with a tub grinder (into chips less than 2 inches in diameter) on site and spread in the immediate project area. No firewood can be collected or wood recycled from HWP due to the presence and threat of spreading PSHB.

That is the latest information on this introduced pest from the U.S. Forest Service and University of California Cooperative Extension experts. Local botanists speculate that 30-40% of the mature native willows, white alders, sycamores and other mature trees in the foothills will be dead within 3-5 years from PSHB attack. Can we really afford to take down uninfected trees across the HWP basin

Comment 237-21 continued

or risk spreading this new pest? How does the DPW intend to manage PSHB borer infestation and control in all of its project alternatives?

I. b. Displacement of Wildlife = Risk to Sensitive Species & Creation of Neighborhood Intrusions

The following photo was taken on 5 January 2010. Though of poor quality, it clearly documents a Western grey squirrel (*Sciurus griseus*) foraging within Hahamongna Watershed Park in the woodland portion of the Annex (near JPL). Western grey tree squirrel populations are in decline and classified by the U. S. Fish and Wildlife Service as a "Federal Species of Concern." Locally, these squirrels are usually found at higher elevations. Those that survived the 2009 Station Fire have been forced, like other surviving wildlife, to move down into transitional habitat, including HWP. Western grey squirrels, Merriam's Chipmunk (*Neotamias merriami*) and numerous woodland birds and reptiles, including listed and declining species, will suffer increased predation if excavation of the basin "evicts" coyotes, bobcats, grey foxes, raptors, rattlesnakes, and other predatory species that will move into the remaining fringe of woodland in the park to hunt.

Comment 237-22

Predators and other species, including wood rats, mice, voles, ground squirrels, pocket gophers, moles, snakes, rabbits, skunks, raccoons, rattlesnakes and other snakes, lizards… along with larger species, such as mule deer, bears, and cougars displaced by the catastrophic loss of 50 to 120 acres of diverse habitat… will move into the territory of wildlife residing in surrounding neighborhoods and wild areas, causing stress and competition that will result in death of many individual animals and creating nuisance conflicts with surrounding homeowners, schools, and the JPL campus. With much of the Angeles National Forest above HWP burned and not fully re-vegetated, and destruction of the basin commencing with trucks and rock crushers generating noise, dust and blocking movement across Flint Wash Bridge down into the Lower Arroyo Seco or up into the San Raphael Hills, displaced wildlife has few options for successful relocation.

Comment 237-23

Additionally, increased truck convoy traffic and massive earth-moving in the basin will result in widespread fatalities as small animals become alarmed and retreat into burrows, where they will be buried alive or crushed. On site "biological monitors" will not see the small animals that flee underground as vegetation and trees are uprooted. How can the DPW reduce loss of wildlife, including listed species, during and after proposed excavation of HWP basin?

Comment 237-24

Migratory bird species, including several species of hummingbirds, songbirds, raptors, and waterfowl, depend upon HWP for sustenance, concealment, and water during their movement along the great Pacific Flyway. If any proposed alternative is implemented, migratory birds, as well as local species who nest in the basin, will be deprived of needed habitat. Why has the DEIR not taken this adverse impact into full consideration?

I. c. Denuded Regions of HWP Will Type Convert to Invasive, Flammable Weeds, Necessitating Use of Toxic Herbicides

Comment 237-25

Permanently scoured areas of HWP will lack organic soil and native vegetation cover, resulting in permanent "type conversion" to non-native, invasive weed species, such as star-thistle, tamarisk, black mustard, castor bean, Spanish broom, and annual foreign grasses. These undesirable weed species are flammable and will present an unsightly fire hazard to surrounding neighborhoods, schools, JPL, and the adjacent Angeles National Forest below the Station Fire burn zone. As a

Comment 237-25 continued

result, the DPW is likely to attempt control of these invasive weeds by spraying pre-emergent herbicide “cocktails” (including products such as Round Up) as is routinely done at local SPSs and catch basins. It is inappropriate for such toxic chemicals to be sprayed in heavily used parkland and on a natural watershed. How will the DPW avoid type-conversion of permanently graded areas of HWP to weed species? Will there be use of herbicides to control inevitable non-native, flammable weed growth in the basin? Why was this issue not covered in the DEIR?

II. Failure to Recognize Protective Designations and Jurisdictions over HWP

HWP is protected by several special designations and jurisdictions, including, but not limitied to:

Altadena Arroyos & Foothills Significant Ecological Area (SEA) was reviewed and accepted by County staff and can be viewed in the current version of the General Plan at:
http://planning.lacounty.gov/view/altadena_foothills_sea/
This SEA encompasses all of HWP.

Comment 237-26

The **City of Pasadena** owns HWP and is heavily invested in preserving their wild parkland for the enjoyment of the public. Pasadena has installed interpretive signage at Sunset Overlook and elsewhere that educates visitors about the habitat and wildlife values in the park and Upper Arroyo Seco. Pasadena administers the easement for DPW flood control work above Devil’s Gate Dam. It also is responsible for honoring a settlement agreement with the **Spirit of the Sage** that requires wildlife habitat to remain intact in HWP basin. All alternatives in the DEIR would destroy park values and abrogate the legal settlement Pasadena is obligated to defend.

Comment 237-27

Why has the DPW failed to note the environmental importance of the biodiverse habitat in the basin, which qualifies as a Significant Ecological Area in Los Angeles County and is a preserved natural parkland owned by the City of Pasadena? Pasadena has spent years and funds on developing a **Hahamongna Watershed Park Master Plan** that would be largely invalidated by any alternative in the DEIR.

Comment 237-28

HWP is also located on the **Rim of the Valley Trail Corridor** and is included in the federal **Rim of the Valley Special Resources Study** originally sponsored by Congressman Adam Schiff and conducted by the National Park Service.

HWP is a hub for four popular regional trail systems:
-- **La Canada Flintridge Trails** to the west
-- **Lower Arroyo Seco trail** into Pasadena south of the park
-- Gateway trails, including the **Gabrielino Trail**, north into **Angeles National Forest**
-- and the **Altadena Crest Trail** to the east of HWP provides further connections to Angeles Forest destinations. Efforts are in progress to reconnect the historic Altadena Crest Trail from HWP to Eaton Canyon with support from the **Altadena Crest Trail Restoration Working Group** (ACTRWG).

Comment 237-29

The **U. S. Army Corps of Engineers** is involved in Arroyo Seco stream and habitat restoration, according to their recently released study. **Friends of the Los Angeles River** and the **City of Los Angeles**, are moving towards restoration of the L. A. River habitat, linear park design, and removal of concrete channelization. This trend is occurring as the DPW intends to scour thriving habitat and maintain access roads and a permanent graded zone within natural HWP.

Comment 237-30

What is the DPW doing to move towards sustainable sediment management and restoration of habitat and away from repeated, costly trucking of sediment? (See Concern IV.)

III. Disturbance of Station Fire Micro-Abrasive Ash and Associated Dust Pollution / Health Hazards

Comment 237-31

In all Draft EIR alternatives, a massive amount of excavation will occur, disturbing the upper layers (10-15 feet?) of Station Fire debris flows containing a significant percentage of ash. Most of the fine, micro-abrasive ash particles that have not been washed away on the surface of the basin are currently embedded safely

among vegetation and tree roots that keep these fine particles from becoming airborne. However, the proposed sediment removal activities will disturb the ash and add it to the fugitive dust caused by habitat destruction and sediment loading onto trucks. High winds that typically blow down local canyons will loft these tiny particles high into the air, increasing, along with other particulates, the air pollution that poses a serious health risk to park users, local schools, JPL employees, neighbors of the park, resident wildlife, along with visiting dogs and horses.

Comment 237-31 continued

There is ample evidence indicating that wildfire ash contains toxic components. In addition, the small size and abrasive nature of ash can be breathed deep into lung tissue with devastating results even in healthy persons. Those with compromised health, such as asthmatics and those with seasonal allergies or other respiratory conditions, are at the highest risk. See excerpts below.

Wetting down the excavation site as described in the DEIR with one water truck (page 87) will not be sufficient to eliminate the profound health risks associated with fine particulate pollution in HWP basin during sediment removal. Even adding multiple water trucks will not change the fact that the extensive excavation of the living basin into a barren, denuded crater will cause ongoing particulate pollution in the typically arid (low humidity) environment that is frequently prone to high winds.

Why does the DEIR fail to acknowledge the additional particulate pollution caused by sediment removal disturbing in situ Station Fire ash carried into the basin by post-fire debris flows?

White Mulefat (*Baccharis salicifolia*) flowers resemble tiny Edelweiss from the Swiss Alps. It is difficult to find extensive stands of native willow and mulefat in Los Angeles County. HWP represents one of the few remaining multi-acre groupings. (Photo by L. Paul, HWP. Dec. 2013)

Comment 237-32

Healthy riparian vegetation, for example dense stands of willow and mulefat, not only serve to slow flood waters and enhance recapture of freshwater through their roots and associated animal burrows, but also serve to entomb and convert post-Station Fire ash and sandy sediment into organic soil.

Why hasn't the DPW recognized the high value of intact native vegetation for reduction of micro-abrasive ash in addition to other fine, fugitive dust pollution? How will the DPW protect surrounding trees and native plants from heavy "dust fall" onto their foliage, which will block photosynthesis and dehydrate plants, especially during summer heat waves and the current extended drought.

Comment 237-33

Add to dust pollution to cancer-causing diesel emissions from the truck convoys (that will not meet current EPA standards) operating and idling in staging lines 12 hours per day, 6 days per week, for up to 9 months per year for a duration of at least 5 years, and it becomes obvious that Hahamongna Watershed Park will become a source of intense air pollution and a health risk instead of an asset to the community if any alternative in the DEIR becomes a reality.

Why has the DPW not considered alternative sediment management strategies that do not cause serious and prolonged health hazards in the region?

Comment 237-34

Health Impacts of Wildfires
November 2, 2012
Finlay SE, Moffat A, Gazzard R, Baker D, Murray V. PLOS Currents Disasters. Edition 1.
http://currents.plos.org/disasters/article/health-impacts-of-wildfires/

A review of the published evidence shows that human health can be severely affected by wildfires. Certain populations are particularly vulnerable. Wood smoke ash contains high levels of particulate matter and toxins. Respiratory morbidity predominates, but cardiovascular, ophthalmic and even psychiatric problems can also result… However more research is needed to evaluate longer term health effects from wildfires.

Particulate matter is the predominant air pollutant seen in wildfire smoke, caused especially by the burning of vegetation and wood into micro-abrasive ash. PM_{10} particles (which are able to pass through the upper respiratory tract and are deposited in the airways), and $PM_{2.5}$ particles (may be respired deeper within the lungs and deposited in the gaseous exchange region of terminal bronchi and alveoli) are produced by burning vegetation.

> -- Boman BC, Forsberg AB, Jarvholm BG. "Adverse health effects from ambient air pollution in relation to residential wood combustion in modern society." Scand J Work Environ Health 2003 Aug;29(4):251-60.

Comment 237-34 continued

Ash debris following the Californian wildfires of 2007 was found to contain high levels of heavy metals, including arsenic, cadmium, copper, and lead. A national clean up campaign was organised because of concerns that exposure to high levels of such metals could cause long term health effects.

> -- Wittig V, Williams S, DuTeaux SB. "Public Health Impacts of Residential Wildfires: Analysis of Ash and Debris from the 2007 Southern California Fires" in Epidemiology 2008;19(6).

A study looking at symptoms of 21 local patients with chronic obstructive pulmonary disease (COPD) in the two months following the Denver wildfires of 2002 revealed that dyspnoea, cough, chest tightness, wheeze and sputum production all increased on days when $PM_{2.5}$, PM_{10} ash particle levels increased, thus illustrating the link between air pollution resulting from wildfires and COPD exacerbation.

> -- Sutherland ERMM, Make BJM, Vedal SM, Zhang LP, Dutton SJM, Murphy JRP, et al. "Wildfire and respiratory symptoms in patients with chronic obstructive pulmonary disease." [Letter] Journal of Allergy & Clinical Immunology 2005 Feb;115(2):420-2.

IV. Sediment Is a Resource Not Trash

Comment 237-35

Why does the DPW continue to treat sediment as costly "trash" to be dug out, trucked to a remote site, and dumped? Sediment is a resource that should be removed in a way that emulates natural processes as much as possible and may involve sale of sand, gravel aggregate, and rock for useful purposes, such as reduction of beach erosion, as construction materials, and so forth.

The DPW lacks an authentic long term, beyond 20 year, sustainable plan. Future sediment will not be recycled and used, or sent to the ocean to replenish beaches, etc. It will simply be trucked out, over and over again, at ever-increasing high cost, to a dump site in some pit or, worse, in a local wild canyon that will also be destroyed... until there is nowhere left to dump. Then what? It makes far more economic and conservation sense to explore alternatives now, while there is something left to save. Even the U.S. Army Corps of Engineers has been rethinking the value of HWP and its associated drainages down the Arroyo Seco.

Comment 237-36

The time is long overdue for the DPW to work with talented specialists, at institutions like Caltech, JPL, UCLA's Institute of the Environment & Sustainability, or wherever there is special, creative expertise. Other communities and countries handle flood and sediment management very differently. Why is the DPW stuck in the past, repeating the same sediment removals over and over again?

Why isn't the Los Angeles County DPW leading the charge to rethink how sediment and flood hazards can be managed creatively and in a more cost effective manner? Why hasn't the DPW answered numerous calls to work with an independent, objective, highly innovative "blue-ribbon committee" of hydrology, geology and engineering specialists from regional academic institutions?

Spending millions of dollars to destroy riparian habitat, pollute the air, and noisily truck OUT sediment for years via congested freeways, while also spending millions of dollars to truck IN sediment, sand, and rock to severely eroding beaches, no longer makes sense. We can no longer afford the financial and environmental cost for DPW's insular tunnel vision.

VI. Devil's Gate and Eaton Storm Water Flood Management Project (Proposition 1E) and other Concurrent Projects in HWP.

Comment 237-37

Others will undoubtedly question the $28 million grant approved to, in part, construct a diversion pipeline to pump water (according to the grant application 4500 acre feet!) from HWP basin to Eaton Canyon spreading grounds. It is unclear why water present in HWP must be pumped across a costly pipeline to be built across Altadena to Eaton Canyon, where soil percolation is virtually identical to HWP, though one suspects that money has something to do with the motivation for this project. That said, why has the DPW not included this concurrent project as a cumulative Project in its DEIR?

VII. Arcadia Oak Woodlands to Wasteland / DPW "Track Record" Adversely Affects Public Trust

In January of 2011, the DPW culminated a deeply flawed and corrupted EIR process with the destruction of an ancient live oak and California sycamore woodland ostensibly needed as an emergency dump site for the removal of sediment from behind Santa Anita Dam. Public protest was intense and alternatives were available; however, the DPW refused to listen to reason and, in fact, made attempts to circumvent required approval for the project from the California Department of Fish & Game (now CA Dept. of Fish & Wildlife) and to misrepresent the scope of the project. Most shocking of all, after a beautiful and biologically valuable 11+ acres of biodiverse woodland at the northern end of the Santa Anita Wash Trail had been graded and literally wiped bare of all its trees and wildlife, *no sediment from behind Santa Anita Dam was ever dumped on the site.* Before and After photos and other documentation of this fact are readily available. I can provide further information upon request. Thus the blighted Santa Anita Wasteland was created where once stood magnificent oaks, toyons laden with red berries, sycamores, fragrant bay laurel trees, and where the songs of many birds and frogs were heard.

Comment 237-38

The mitigation plan for the Arcadia SPS, debuted in June 2013, is woefully inadequate and restoration of the site to authentic native habitat is, according to many experts, impossible. One wonders how the $650,000.00 the Board of Supervisors provided for restoration in "compensation" for the loss of the oak woodland will ultimately be spent.

This tragedy is the end result of insular arrogance that has unfortunately become a hallmark of the DPW. The unnecessary loss of the Arcadia Oak Woodland was caused either by *blatantly incompetent miscalculation of the capacity needed for placement of sediment* from above the dam; or, the destruction of the woodland was *deliberately duplicitious*, by claiming an emergency that did not exist for ulterior motives, perhaps to "get rid" of the oaks and wildlife so that a future site would be available for dumping that would not otherwise have been approved by any agency.

It is astonishing to me and many others that those responsible for the misrepresentations and manipulations of CEQA process involved in the loss of the Arcadia Oak Woodland have, to general knowledge, faced no official consequences for their actions, which constituted a profound betrayal of public trust. Even more shocking, those same managers have been assigned to… manage the EIR process for the proposed excavation and destruction of habitat in HWP.

This revelation is extremely disturbing. What evidence can the DPW provide that the proposed project urgency expressed in the DEIR is authentic, unlike the inaccurate assertions made to justify removal of the Arcadia Oak Woodland?

BEFORE the Arcadia Oak Woodland was "removed."

Comment
237-38
continued

(Photos by Lori Paul unless otherwise credited)

AFTER

Comment 237-38 continued

The former site of the Arcadia Oak Woodland in June 2013: The site looks almost as desolate as it did a week after all the life there had been toppled, bull-dozed, buried or hauled away.

Comment 237-39

In conclusion, I urge the DPW and County Supervisors to reject the October 2013 DEIR in its entirety pending a revised, accurate, independent risk / benefit / and cost analysis of flood risk below Devil's Gate Dam.

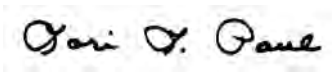
Comment 237-40

I also request that expertise from outside the DPW be assembled to provide needed objective review of sediment management for the County and to explore sustainable, less destructive options for maintaining flood control safety while restoring natural riparian habitat and streams for this region and for future public benefit.

Comment 237-41

Thank you for your consideration. Please retain my contact information and keep me on all mailing lists associated with DPW sediment removal in HWP and other reservoir or potential sediment placement sites in Los Angeles County.

Respectfully,



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Response to Comment Letter #237 (Lori Paul)

Response to Comment 237-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

Response to Comment 237-2:

Comment noted.

Response to Comment 237-3:

Los Angeles County Flood Control District (LACFCD) was mandated by the State Legislature to provide flood protection and water conservation within its boundaries.

A reservoir storage design capacity of two design debris events (DDEs) below the dam's lowest spillway was determined to be the standard acceptable level of risk at Devil's Gate Dam and Reservoir. The DDE volume of capacity is determined using the January 2006 Los Angeles County Department of Public Works (LACDPW) Hydrology Manual and the March 2006 LACDPW Sedimentation Manual. For Devil's Gate Dam and Reservoir, the required reservoir capacity is 4.0 million cubic yards (cy) (two DDEs) below the spillway elevation of 1,040.50 feet.

The Hydrology Manual (January 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_Hydrology_Manual/2006%20Hydrology%20Manual-Divided.pdf

The Sedimentation Manual (March 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_sedimentation_manual/Sedimentation%20Manual-Second%20Edition.pdf

Additional information concerning DDE calculation methods has been added to the Final Environmental Impact Report (EIR), Section 2.3, Project Need.

Impacts to recreation were analyzed in the Draft EIR, Section 3.15. The Proposed Project will not limit the use of the Oak Grove area of Hahamongna Watershed Park. Sediment removal activities would be temporary, are expected to occur only in the drier months (April to December, excluding holidays). It is expected that these activities will often not be adjacent to the Oak Grove area of Hahamongna Watershed Park. The Proposed Project would result in temporary limitations on the recreational use of the Proposed Project site and some of the adjacent trails. Most of these areas would be reopened seasonally or intermittently throughout the sediment removal process. In addition, temporary impacts to designated recreational facilities and trails will be minimized through advance communication and redirection to the nearest facility in the vicinity of the Proposed Project. Furthermore, an east-west trail crossing will continue to provide access at the north end of the reservoir. At the south end of the reservoir, after the reservoir ingress and egress ramps have been fully constructed, access to the upper east side Arroyo Seco Trail from La Cañada Verdugo Road will be maintained; and the linkage from the west side Arroyo Seco Trail and the Flint Wash Trail to the upper east side Arroyo Seco Trail (crossing Devil's Gate Dam and also continuing south to the Rose Bowl) will be available after construction activities have ended each day and on nonworking days.

Alternative 3, Configuration D affects the least amount of reservoir area of all the action alternatives, while still achieving Proposed Project objectives (see Section 4.6 of the Final EIR). This alternative would provide a buffer between the Oak Grove area of Hahamongna Watershed Park and the excavation area. Alternative 3, Configuration D, Option 1 provides a more natural configuration for the reservoir by having two branches to carry water and sediment toward the face of the dam, avoiding disturbing a significant portion of existing vegetation. To further reduce the Proposed Project's footprint, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2, which drastically reduces the project's footprint of 120 acres down to 71 acres, would avoid excavation of the western branch, thereby providing a greater habitat buffer on the west side of the reservoir. In addition, the maintenance areas would be smaller than the original sediment removal footprint, allowing for habitat to reestablish. Alternative 3, Configuration D, Option 2 will also avoid all currently existing Oak Grove Disc Golf holes.

Response to Comment 237-4:

See Response to Comment 237-3. The amount of sediment needing to be removed from the reservoir is based on design capacity necessary to reduce flood risk to downstream communities. LACFCD goes to great lengths to lessen project impacts. The Draft EIR provides alternatives that avoid large areas of habitat in order to respond to stakeholders' concerns while adequately reducing flood risk to downstream communities. As discussed in Section 3.6.6 of the Draft EIR, Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats. In addition, sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays).

The Devil's Gate Dam was built in response to the severe flooding of Los Angeles in the early 1900s and allowed for the channelization of and development along the Arroyo Seco. The Arroyo Seco normally carries low flows, but it is periodically inundated from severe floods flowing off its large, steep watershed that includes mountainous terrain. Prior to the construction of the dam, cities such as Pasadena, South Pasadena, and Los Angeles would experience flooding from the Arroyo Seco during storms. The Rose Bowl, built in 1922, and the Arroyo Seco Parkway, also known as State Route 110, completed in 1953, are two examples of downstream development made permissible by the construction of Devil's Gate Dam. Removing the dam would remove the only flood attenuation mechanism that is in place along the Arroyo Seco. Areas downstream of the dam would be at high risk of flooding during storm events. Also, sediment would move downstream and accumulate within and adjacent to the channel as a result of removal of the dam. Sediment accumulation in the channel would reduce the capacity of the channel in those areas and would further increase the likelihood of flooding. As discussed in Section 4.10.3 of the Draft Environmental Impact Report (EIR), removal of the Devil's Gate Dam was considered but rejected due to its inconsistency with Proposed Project objectives, as well as the potential safety concerns. This alternative would fail to meet the Proposed Project objectives and would result in greater additional impacts than the Proposed Project (geology, hazards, hydrology, and public services). Also as discussed under the No Project Alternative, Section 4.9, use of FASTing, a passive method of transporting sediment downstream, even in combination with the Interim Measures Project (IMP) will not any of the meet Proposed Project objectives.

As discussed in Section 2.2.1 of the Draft EIR, LACFCD has executed several sediment removal projects at Devil's Gate Reservoir in the past, with the last major effort being in 1994. Smaller amounts of sediment were removed in 2006, 2009, and as a part of the Interim Measures Project in 2011, 2012, and 2013. Following the 2009 Station Fire, approximately 1.3 million cy of sediment flowed into Devil's Gate

Reservoir after just two average water year storm seasons. In 2010, LACFCD proposed an emergency sediment removal project in response to the large inflow of sediment resulting from the Station Fire.

In 2010, in response to the Station Fire, an emergency project to remove only 1.67 million cy was proposed. The volume of 1.67 million cy is the previously published DDE, and this amount was considered justifiable as an emergency exemption to the California Environmental Quality Act (CEQA). This emergency project was not completed because, in March 2011, the County of Los Angeles Board of Supervisors motioned LACFCD to complete an EIR for a comprehensive sediment removal project at Devil's Gate. LACFCD then initiated project development in accordance with the required level of protection of two DDEs. At that time, LACFCD also began receiving feedback on the concurrent Sediment Management Strategic Plan (Strategic Plan) and the interest to look at more sustainable sediment and reservoir management. As a result of the feedback and recommendations during the development of the Strategic Plan, LACFCD began evaluating ways to create a more sustainable long-term way to manage its sediment and habitat. To emphasize the goals of the project, the Proposed Project was given the name Devil's Gate Sediment Removal and Management Project.

Response to Comment 237-5:

The California Regional Water Quality Control Board denied without prejudice a permit for the emergency project, with the understanding that the LACFCD would be initiating an EIR process for a project which would restore the required level of protection. As part of project approval, LACFCD will obtain the necessary permits from the California Regional Water Quality Control Board.

Response to Comment 237-6:

Per the CEQA, scoping comments are not required to be responded to in the EIR. Only comments received during the Draft EIR Public Review Period are required to be responded to, and these responses are included in this Response to Comments document. Outside experts in the community, especially those on the Stakeholder Task Force, were consulted during the formation of the Sediment Management Strategic Plan. Information from that consultation was used in the formulation of the Proposed Project and Alternatives. In addition, the purpose of the scoping process was to gather input from outside experts and agencies as well as the public on what the environmental analysis should consider and what alternatives should be analyzed. Information gathered from the scoping process was used in the formulation of the Proposed Project and Alternatives and preparation of the Draft EIR.

Response to Comment 237-7:

See Responses to Comments 237-3 and 237-4.

Under CEQA, the lead agency is not required to analyze an economic impact associated with a project in the EIR; as Section 15131(a) of the CEQA Guidelines states: "Economic or social effects of a project shall not be treated as significant effects on the environment." Moreover, CEQA allows economic analysis in the administrative record only if the basis for infeasibility, and thus rejection of a mitigation or alternative, is economic, as described in CEQA Guidelines Sections 15091(a)(3) and 15364.

Response to Comment 237-8:

See Responses to Comments 237-3 and 237-4.

The purpose of the Devil's Gate Dam and Reservoir is to provide downstream flood protection. If another flood control facility were placed downstream, sediment would accumulate there and would need to be excavated eventually. In this case, project impacts would not be avoided; they would simply be moved downstream.

Historically, large amounts of sediment have been deposited in the reservoir in short time periods. Between 1935 and 1938 over 1.6 million cy of sediment, between 1938 and 1943 over 1.95 million cy of sediment, between 1959 and 1966 over 1.75 million cy of sediment, and between 2010 and 2012 over 1.3 million cy of sediment was deposited in the reservoir. In order for the removal project to be efficient, and therefore reduce impacts and costs, the amount of sediment removed every year needs to exceed the amount of sediment deposited. Over 92 years, the average amount of sediment deposited each year is approximately 130,000 cy; however, Devil's Gate Reservoir is a dynamic system with constantly changing amounts of sediment deposited from year to year, depending on the frequency and intensity of storm events. If a 1 in 50 years storm were to occur, approximately 2.0 million cy (one DDE) of sediment could be expected to wash into the reservoir. Because of LACFCD's responsibilities to provide flood protection, LACFCD must be ready at all times for a design debris event to occur.

Given the current, limited capacity of the reservoir, a 50-year storm event that results in a DDE would result in storm flows with sediment flowing over the spillway. Flooding with mud/sediment would occur along the portions of the Arroyo Seco in the Cities of Pasadena, South Pasadena, and Los Angeles, impacting approximately 650 parcels and requiring closure of Interstate 110 from Orange Grove Avenue to Interstate 5. Additional information about the potential flood areas and analysis is shown in the Arroyo Seco Channel Hydraulic Analysis prepared by Bureau Veritas North America, Inc., available on the Project website. Please note that protocols are in place to monitor storms, reservoir conditions, and channel conditions and to communicate with emergency responders and the California Department of Transportation (Caltrans) to execute any necessary evacuations or freeway closures.

The Flood Hazard Warning and Contingency Plan (FHWCP) for Arroyo Seco Channel was prepared in an effort to coordinate with local and state agencies to minimize negative impacts in anticipated areas of flooding along the Arroyo Seco Channel, should those events occur. This effort is outside the scope of the Proposed Project and will not be included in the Final EIR. The potential flooding analyzed in the FHWCP is anticipated to occur during a Capital Flood Event (caused by a 50-year rainfall event) and under the current impacted reservoir condition of the Devils Gate Dam. The 50-Year Frequency Rainfall Bulked Flows and Superelevation Map in the FHWCP depicts the potential flooding risks along the Arroyo Seco downstream of Devil's Gate Dam.

During a single design-event-sized storm, the Rose Bowl is not expected to be impacted by flows from the dam; however, if sediment from each storm event is not removed from the downstream floodplain, each subsequent storm would increase the flood risk.

Response to Comment 237-9:

Although projects within the Hahamongna Watershed Park Master Plan are designed to take advantage of the scenic characteristics at the site, no City or County documents list the project site as a designated scenic resource. As noted in the Draft EIR, Section 3.4, Aesthetics and Figures 3.4-1 through 3.4-3, the visual aspects of the Proposed Project site are constantly changing. The Draft EIR does note that the Proposed Project will have significant temporary impacts to aesthetics; however, after the sediment removal phase of the Proposed Project is complete, a habitat restoration plan will be implemented that

will allow native plant communities to reestablish outside the reservoir management area. Riparian Herbaceous vegetation is expected to continue to populate and/or reestablish in the management area of the Proposed Project site between maintenance activities.

The Draft EIR determined that visual impacts associated with reservoir management will be less than significant and, therefore, will not require mitigation. Reservoir management impacts to visual character under both of the Proposed Project's management options will result in a lower degree of contrast than seen during sediment removal. Due to the rapid growth of herbaceous plants, it is expected that during the majority of the year the Proposed Project site will appear vegetated. In addition, as with existing conditions, vegetation conditions on the Proposed Project site, including height and density, would change on a regular basis due to seasonal conditions, water flow/views, water storage, and sediment conditions.

Response to Comment 237-10:

See Response to Comment 237-3. Mitigation Measures MM BIO-1 through MM BIO-8 are enforceable and designed to reduce impacts through methods known to be feasible and effective. These Mitigation Measures are accepted by agencies that would be involved in consultation, negotiation, and final approval of Mitigation Measures including conceptual restoration plans. As with any project that involves California Department of Fish and Wildlife (CDFW), United States Army Corps of Engineers (USACE), and Regional Water Quality Control Board (RWQCB) jurisdictional areas, the ultimate mitigation for impacts related to the wetlands and drainages under the jurisdiction of the resource agencies is negotiated with the resource agencies during the regulatory permitting process. LACFCD has been and will continue to work closely with CDFW and USACE to identify appropriate mitigation, replacement ratios, and sites for restoration and enhancement that will offset impacts and satisfy the requirements of all applicable laws. A detailed restoration plan will be prepared and provided to CDFW and USACE for review and approval prior to project implementation. Prior to commencement of the Proposed Project, LACFCD will have obtained all necessary permits for impacts to CDFW, USACE, and RWQCB jurisdictional areas including Section 401 Certification, Section 404 permit, and a Streambed Alteration Agreement. Clean Water Act Section 404 (b)(1) guidelines will be followed as a framework for compensatory mitigation. Through 404(b)(1) negotiations with USACE and negotiations with CDFW under Fish and Game Code Sections 1600-1616, a determination of the functions and values of impacted jurisdictional waters shall result in the coordination of appropriate Mitigation Measures for sediment removal.

Response to Comment 237-11:

Pursuant to Section 15126.6(a) of the CEQA Guidelines, "[a]n EIR shall describe a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project, and evaluate the comparative merits of the alternatives." However, "[a]n EIR is not required to consider alternatives which are infeasible" (CEQA Guidelines Section 15126.6(a)) or "which could change the fundamental nature of the proposed project." (*Al Larson Boat Shop, Inc. v. Board of Harbor Comm*.(1993) 18 Cal.App.4th 729, 745.) The alternatives discussed in the EIR must be reasonable alternatives, selected to foster informed decision-making and public participation (CEQA Guidelines 15126.6(a)). An EIR need not consider an alternative whose effect cannot reasonably be ascertained or whose implementation is remote and speculative because unrealistic alternatives do not contribute to a useful analysis (CEQA Guidelines 16126.6(f)(3)). Additionally, an alternative may be rejected from

detailed analysis in an EIR if it fails to reduce or avoid the project's significant environmental effects, does not implement the basic project objectives, is not potentially feasible, or is facially unreasonable. 14 C.C.R. §15126.6(c); Id., see also *Mann v. Community Redevelopment Agency* (1991) 233 Cal. App. 3d 1143; *Del Mar Terrace Conservancy, Inc. v. City Council* (1991) 10 Cal. App. 4th 712.

The Draft EIR, Section 4, fully analyzed six alternatives, including the No Project Alternative. These alternatives substantially lessen one or more significant effects of the Proposed Project and, with the exception of the mandatory No Project Alternative, would feasibly attain most of the basic objectives of the Proposed Project. These alternatives include options for different amounts of removal, different methods of removal, and a different haul route.

Response to Comment 237-12:

See Response to Comment 237-3.

As discussed above, Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats. Wildlife species currently found in the Proposed Project area would be expected to either remain in the Proposed Project area or to reestablish once sediment removal activities have been completed.

Alternative 3, the Environmentally Superior Alternative, will restore the bottom elevation of Devil's Gate Reservoir to its design elevation of 986 feet, which coincides with the sill elevation of the lowest valve on Devil's Gate Dam, the sluice gate. The final elevations of the reservoir after the sediment removal phase is completed will not exceed historic elevations. Additionally, all side slopes will be excavated at a 3:1 ratio, or 3 feet horizontally for every 1 foot rise in elevation. The slope produced by this side cut is relatively shallow.

Response to Comment 237-13:

In Section 3.6.1, first paragraph, that statement was referring to the 2011 survey results, "As discussed above, in 2011 these resources were severely impacted by sediment deposition. Most of the vegetation and trees on the Proposed Project site were dead, washed out, or buried under sediment, reducing the amount and quality of vegetation communities and wildlife habitat." However, immediately following that statement, it continues, "Since publication of the NOP, some of the vegetation and trees have re-established, improving the amount and quality of vegetation communities and wildlife habitat of the Proposed Project site. In order to achieve a more conservative analysis of the potential impacts to biological resources from the Proposed Project, 2013 conditions were also taken into account." Therefore, the information presented is correct and does not warrant a change.

Response to Comment 237-14:

The biological resources of the Proposed Project site are described in Section 3.6 of the Draft EIR. The bird species recorded during surveys conducted specifically for the Proposed Project are presented in the Biological Technical Report (BTR) in Appendix D of the Draft EIR. Table 3.6-3 in the Draft EIR includes both least Bell's vireo and yellow warbler as present within the project site.

Response to Comment 237-15:

The species recorded during surveys specifically for the Proposed Project are presented in the BTR in Appendix D of the Draft EIR. The coast patch nosed snake was observed on site and the state and federal status has been included in the Draft EIR. As discussed in the Draft EIR, Section 3.6.6, Sensitive Wildlife, to avoid harm or take of any special status wildlife species, mitigation measures MM BIO-1, MM BIO-2, MM BIO-3, MM BIO-4, and MM BIO-5 will be implemented. These include conducting preconstruction surveys, having a biological monitor onsite during construction, and implementing measures to avoid impacts to sensitive species. With implementation of these mitigation measures, direct impacts to biological resources would be less than significant.

Response to Comment 237-16:

Species names used in the Draft EIR were consistent with the Master Watershed Plan for the Hahamongna Watershed by request of the City of Pasadena to maintain consistency with the Master Plan. Species names have been updated, and duplications of species have been eliminated in the Final EIR (see Section 3.6 of the Final EIR).

Response to Comment 237-17:

See Response to Comment 237-16.

Response to Comment 237-18:

The Draft EIR, BTR, and focused surveys provide rigorous existing conditions for biological resources (Draft EIR, Section 3.6; Appendix D, Biological Reports). These reports and related impact analyses were based on thorough field surveys conducted in 2010 and 2013, including general biological surveys, focused sensitive plant surveys, focused least Bell's vireo surveys, and federal and state jurisdictional waters surveys. Species with the potential to occur within the Proposed Project and species that were identified during surveys are presented in the biological survey reports in Appendix D of the Draft EIR. Factors used to determine the potential for occurrence included the quality of habitat, elevation, and the results of the reconnaissance survey. The locations of prior database records and species lists of occurrence were used as additional data; but since these are positive-sighting databases, this data was used only in support of the analysis from the previously identified factors. Based on the results of the BTR, additional protocol-level focused surveys were conducted for Proposed Project.

Response to Comment 237-19:

As discussed in the BTR (Appendix D of the Draft EIR), Chambers Group conducted the reconnaissance-level survey in the Survey Area on May 27, 2010. Focused surveys for special status plants that were floristic in nature (i.e., all plants observed were identified to the appropriate taxonomic level to determine rarity and/or special status) took place in June and August 2010, within the appropriate blooming periods. Because the sensitive plant species with potential to occur have two different flowering periods, two separate focused plant surveys were conducted. The first focused survey was conducted on June 28 through June 30, 2010. The second focused survey was conducted on August 24, 2010. As discussed in the BTR, Plummer's mariposa lily was surveyed for during the flowering period during focus plant surveys; it was not observed and, therefore, was determined absent from the site.

Response to Comment 237-20:

See Response to Comments 237-4 and 237-10.

As discussed in the Draft EIR, Section 3.6.6, Impacts and Mitigation, the Proposed Project would remove trees from the Proposed Project site. Implementation of Mitigation Measure MM BIO-7 will identify trees that will be removed or potentially affected, the appropriate level of tree replacement, and protection of the root zone of oak trees. Implementation of this mitigation measure will reduce impacts to a level below significance. LACFCD has been and will continue to work closely with CDFW to identify appropriate mitigation and replacement ratios, and sites for restoration and enhancement that will offset impacts and satisfy the requirements of all applicable laws. A detailed restoration plan will be prepared and provided to CDFW for review and approval prior to project implementation.

Sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays). In addition, sediment removal activities would not completely block the Proposed Project site from surrounding habitat, would occur only during the day, and would not interfere with nighttime wildlife activity. Although some wildlife may be temporarily displaced during construction, wildlife would not be physically prevented from moving around and into the basin area.

The protective Mitigation Measures MM BIO-1, MM BIO-2, MM BIO-3, MM BIO-4, and MM BIO-5 would avoid and minimize any impacts associated with Proposed Project activities. Therefore, the potential impacts to wildlife movement and corridors are anticipated to be less than significant.

Response to Comment 237-21:

The County of Los Angeles Agricultural Commissioner acknowledges that Polyphagous Shot Hole Borer (PSHB) infestations are already widespread in many areas of the County dating back to 2003 and that there is little that can be done to prevent PSHB infestations from occurring over a wider geographic area in the future. To this end, local infestations of PSHB are considered as part of the Project's 2010 existing conditions base line. In addition, all trees, branches, shrubs, and any other woody material that are cut and cleared from the debris basin would be chipped on-site and then loaded it into covered dump trucks to be hauled to the Scholl Canyon Landfill for final disposal; therefore, the Project would not result in significant impacts associated with infestations of PSHB at the Project Site or Scholl Canyon Landfill.

Response to Comment 237-22:

See Response to Comment 237-20. Although the western gray squirrel (*Sciurus griseus)* is not considered to be a sensitive or special status wildlife species, avoidance and minimization measures have been developed to protect wildlife. With implementation of these mitigation measures, direct impacts to biological resources would be less than significant. Wildlife species currently found in the Proposed Project area would be expected to either remain in the undisturbed areas of the reservoir outside the Proposed Project area or to reestablish once sediment removal activities have been completed.

Response to Comment 237-23:

As discussed in the Draft EIR, Section 3.6.6, Sensitive Wildlife, to avoid harm or take of any special status wildlife species, Mitigation Measures MM BIO-1, MM BIO-2, MM BIO-3, MM BIO-4, and MM BIO-5 will be implemented. These include conducting preconstruction surveys, having a biological monitor onsite

during construction, and implementing measures to avoid impacts to sensitive species. Biological monitoring will include slowing down equipment to allow species to disperse from the area, and capture and relocation of species, if needed. With implementation of these mitigation measures, direct impacts to biological resources would be less than significant. LACFCD has been and will continue to work closely with the CDFW and USACE to identify appropriate mitigation and monitoring for the Proposed Project.

Response to Comment 237-24:

See Response to Comment 237-20. As discussed in the Draft EIR, Section 3.6.6, Sensitive Wildlife, Mitigation Measure MM BIO-4 will reduce any impacts associated with the Migratory Bird Treaty Act to less than significant.

Response to Comment 237-25:

LACFCD will continue to work closely with the CDFW and USACE regarding mitigation and restoration requirements for the Proposed Project. Weed abatement will be conducted in accordance with CDFW and USACE regulations, and the methods will be outlined in the project mitigation/restoration plan and Streambed Alteration Agreement and 404 permits.

Response to Comment 237-26:

Alternative 3, Configuration D, which was found to be the Environmentally Superior Alternative in the Draft EIR, was based on the City of Pasadena's Hahamongna Watershed Park Master Plan (HWPMP). As discussed in the Draft EIR, Subsection 3.12.3, Applicable Regulations, the HWPMP emphasizes protection of recreational and natural resources as well as the management of flood control for the downstream watershed. Key to determining the consistency of the project with the HWPMP is the conformance with the plan's Goals and Objectives. As identified in the Applicable Regulations portion of the Existing Conditions, Goal 2 and Goal 6 are the most crucial in determining conformance. These Goals focus on the basin being "managed to provide protection to the developed and natural downstream areas and providing a safe and secure park." The Proposed Project will manage the flood control basin for protection of the downstream areas by improving and maintaining the flood capacity behind Devil's Gate Dam. LACFCD has met and will continue to meet with the City of Pasadena regularly to coordinate and ensure resolution of concerns regarding Devil's Gate Reservoir and the HWPMP.

The Proposed Project is not located in a currently adopted Significant Ecological Area (SEA). The Los Angeles County Department of Regional Planning is currently in the process of updating the SEA Program. The Proposed Project is located within the Proposed Altadena Foothills and Arroyos SEA. Regional Planning's SEA updates, including the Proposed SEAs, have not been adopted nor are they covered under the current Hillside Management Area and SEA Ordinance.

The SEA does not change the land use designation or the zoning of a property. The intent of the proposed SEA regulations is not to preclude development but to allow limited, controlled development that does not jeopardize the unique biotic diversity within the County. Under the Ordinance for the Proposed SEA, safety activities and existing permitted uses are exempt.

As discussed in the Draft EIR, Section 3.12.6, Land Use and Planning, the Proposed Project will not have any significant impacts or conflict with the applicable land use plans, policies, or regulations of adopted plans.

The Spirit of the Sage Council Settlement pertains to City's implementation of the HWPMP. The Proposed Project is not one of the HWPMP projects.

Response to Comment 237-27:

See Response to Comment 237-26.

Response to Comment 237-28:

The National Park Service is conducting a "special resource study" of the area known as the "Rim of the Valley Corridor." This is the area that generally includes the mountains encircling the San Fernando, La Crescenta, Santa Clarita, Simi, and Conejo valleys of Los Angeles and Ventura counties in southern California. The purpose of this special resource study is to determine whether any portion of the Rim of the Valley Corridor study area is eligible to be designated as a unit of the national park system or added to an existing national park (NPS 2014).

This special resource study will provide recommendations to Congress but would not change current management without further action from Congress. Each of the alternatives considered in this study respects and retains the authorities of existing local, state, and federal agencies.

The area that Congress directed the NPS to study (study area) is not proposed for a national park. It is simply an area in which the NPS is asked to evaluate natural and cultural resources and opportunities for public use and resource preservation. It does not mean that all the land within the study area has nationally significant natural and cultural resources. Resources found to be nationally significant must also meet NPS criteria for suitability and feasibility to be considered for inclusion in the national park system.

As the NPS evaluates resources in the study area, often the focus of the study is narrowed. If significant resources are identified, the NPS will identify a range of options or alternatives to protect these resources and provide for public enjoyment.

The preliminary study findings of the Rim of the Valley Corridor Special Resource Study have not identified the Devil's Gate Reservoir or the Hahamongna Watershed Park as nationally significant natural and cultural resources. The nearest nationally significant resources identified in this study are the Jet Propulsion Laboratory (JPL) and the Rose Bowl. The Proposed Project does not involve either of these resources.

Impacts to recreation were analyzed in the Draft EIR, Section 3.15. The Proposed Project will not limit the use of the Oak Grove area of Hahamongna Watershed Park. Sediment removal activities would be temporary, are expected to occur only in the drier months (April to December, excluding holidays) e. It is expected that these activities will often not be adjacent to the Oak Grove area of Hahamongna Watershed Park. The Proposed Project would result in temporary limitations on the recreational use of the Proposed Project site and some of the adjacent trails. Most of these areas would be reopened seasonally or intermittently throughout the sediment removal process. In addition, temporary impacts to designated recreational facilities and trails will be minimized through advance communication and redirection to the nearest facility in the vicinity of the Proposed Project. Furthermore, an east-west trail crossing will continue to provide access at the north end of the reservoir. At the south end of the reservoir, after the reservoir ingress and egress ramps have been fully constructed, access to the upper east side Arroyo Seco Trail from La Cañada Verdugo Road will be maintained; and the linkage from the

west side Arroyo Seco Trail and the Flint Wash Trail to the upper east side Arroyo Seco Trail (crossing Devil's Gate Dam and also continuing south to the Rose Bowl) will be available after construction activities have ended each day and on nonworking days.

Response to Comment 237-29:

As noted in the Draft EIR, Section 2.8 Required Permits and Approvals, a Section 404 Permit will be obtained from the USACE. LACFCD is currently coordinating with the USACE regarding the Section 404 Permit. In addition, LACFCD is a local sponsor of the USACE's *Los Angeles County's Arroyo Seco Watershed Ecosystem Restoration Study,* and the study was used in the preparation of the Draft EIR.

Response to Comment 237-30:

See Response to Comments 237-3 and 237-4.

Response to Comment 237-31:

As discussed in the Draft EIR, Section 3.10.6, Impacts and Mitigation, HAZARDS-1, Sediment Removal/Reservoir Management, no hazardous levels of the contaminants were detected in the sediment. Dust impacts from the Proposed Project were carefully evaluated, as discussed in the Draft EIR, Section 3.5.6, Impacts and Mitigation, AIR QUALITY-2, Sediment Removal. The Proposed Project's activities, including excavation, grading, material loading, and hauling, would result in less than significant dust emissions due to the Proposed Project's use of best management practices and would be in full compliance with South Coast Air Quality Management District's (SCAQMD's) fugitive dust regulations. As discussed in the Draft EIR, Section 3.5, the Health Risk Assessment (HRA) analyzed both the cancer-related and noncancer-related acute (short-term) and chronic (long-term) impacts from project-related emissions. The HRA analysis found the Proposed Project would result in less than significant impacts for both the cancer-related and non-cancer-related acute short-term and long-term impacts.

As part of the geotechnical study for the Proposed Project, a subsurface exploration was performed at four representative locations within the reservoir. Although a distinct ash layer was not observed, a "burn layer" within otherwise "clean" sediments was encountered at depth at three locations. Representative sampling of the burn layer was performed, and the samples were subjected to various environmental laboratory tests to evaluate the presence and concentrations of pertinent and regulated contaminants of concern. None of the contaminants that were detected in the sediment samples exceeded regulatory screening levels for this project, nor would they be characterized as hazardous.

The airborne transport of dust, including "micro ash," to offsite locations can be controlled through methods that are usually employed during earth removal operations, such as spraying the material with water. In addition, dust monitoring at the property boundaries will confirm the effectiveness of the water spraying. During offsite transport, the sediment will be covered in each truck to further reduce the potential for dust.

Response to Comment 237-32:

See Response to Comment 237-31.

Response to Comment 237-33:

See Response to Comment 237-31.

Air quality impacts associated with truck traffic were analyzed in the Draft EIR in Section 3.5. LACFCD has conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed the U.S. Environmental Protection Agency's (EPA's) 2007 standards for emissions. Therefore, in order to further reduce emissions, Mitigation Measure MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump trucks that meet or exceed EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality, including those associated with health effects, will be reduced to less than significant.

Response to Comment 237-34:

See Response to Comment 237-31.

Response to Comment 237-35:

The sediment that came into Devil's Gate Reservoir following the Station Fire has a very fine gradation or consistency. As a result, the majority of this material is not readily reusable on a commercial scale and will most likely not be sold; however, sediment placed at sediment placement sites would be available for potential reuse for other projects or sediment reuse opportunities. The sediment removed from the reservoir will be transported to the placement sites listed in Section 2.0, Project Description in the Draft EIR.

For further information regarding beneficial uses for sediment at LACFCD sites, please refer to Section 6.5 of LACFCD's 2012 Sediment Management Strategic Plan which can be found at: http://dpw.lacounty.gov/lacfcd/sediment/stplan.aspx.

Response to Comment 237-36:

See Response to Comments 237-11, 237-30, and 237-35.

The Draft EIR analyzes long-range maintenance of the reservoir under the Reservoir Maintenance phase of the Proposed Project and Alternatives. Outside experts in the community, especially those on the Stakeholder Task Force, were consulted during the formation of the Sediment Management Strategic Plan. Information from that consultation was used in the formulation of the Proposed Project and Alternatives. In addition, the purpose of the scoping process was to gather input from outside experts and agencies as well as the public on what the environmental analysis should consider and what alternatives should be analyzed. Information gathered from the scoping process was used in the formulation of the Proposed Project and Alternatives and preparation of the Draft EIR.

Response to Comment 237-37:

The Devil's Gate Water Conservation Project is a separate project that is not part of the Proposed Project or alternatives. The Devil's Gate Water Conservation Project is still in a conceptual design phase, and no environmental report is available for public review at this time; however, this project was

analyzed in the Draft EIR as a cumulative project, as described in Section 2.9. The Proposed Project does not involve construction of a pipeline.

Response to Comment 237-38:

A detailed restoration plan will be prepared and provided to CDFW and USACE for review and approval prior to project implementation and to satisfy permitting requirements. The plan will include and address monitoring and success criteria.

Response to Comment 237-39:

See Response to Comment 237-7. LACFCD notes that the commenter disapproves of the October 2013 Draft EIR, and would like a revised analysis that includes a cost-benefit analysis.

Response to Comment 237-40:

See Response to Comment 237-36.

Response to Comment 237-41:

The commenter's contact information has been retained and added to the mailing list.

From: dmdurham52@gmail.com
To: reservoircleanouts
Subject: Devil"s Gate Reservoir Sediment Removal and Management Project comment from citizen
Date: Tuesday, January 21, 2014 7:48:12 PM

To Whom It May Concern:

These are my comment on the EIR for the Devil's Gate Reservoir Sediment Removal and Management Project.

Comment 238-1 I believe there is inadequate measure of the environmental impact on residents, businesses, recreation areas and schools to the west of the Arroyo and assert that the proposed action would disproportionately impact economically disadvantaged populations, and that these effects would comprise a grave environmental injustice.

Comment 238-2 Why is the sediment removal transport focused on the west side? Is it because the voices of Altadena come from citizens with less political influence and wealth than their La Canada counterparts? the damage to the natural habitat, traffic, air pollution and noise pollution will be bad everywhere around the dam, but do you acknowledge the people of Altadena will suffer disproportionately compared to Pasadena and La Canada populations?

Comment 238-3 The proposed project is short-sighted and is a temporary bandage on a problems that are ongoing and actually caused by the dam. It also exacerbates long term environmental impacts to the larger environment, preventing the delivery of sand to the eroding coastline.

Comment 238-4 Did the county consider a 100-year plan that would involve acquisition of Arroyo properties that would be threatened in a flood?

Will the county consider an imminent domain campaign over the next century to take custody of potentially threatened homes and businesses so that these areas could be restored to their natural states and serve as a buffer against flood?

Comment 238-5 I have worked at JPL since 1980 and have seen it evolve from a gravel pit wasteland, raided by dozens of trucks daily, to a splendid' rich riparian environment and unique recreational area. I believe your current plan inadequately addresses the rarity of this environment and does not do enough to protect the birds and wildlife that now reside there. The habitat should remain intact.

Comment 238-6 Will you please consider a 20-year or longer plan to more gently remove the sediment that is necessary? Will you please devise a sluicing system to allow the sand of the San Gabriels to reach the beach to help mitigate the out-of-control erosion.

Please take the long view, allow the natural habitat of the Arroyo to thrive, and build a better plan with greater input from all stakeholders, which your current plan does not reflect.

Sincerely,
Mary Beth Murrill
3293 Alegre Lane

Altadena CA 91001

Response to Comment Letter #238 (Mary Beth Murrill)

Response to Comment 238-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. The Draft Environmental Impact Report (EIR) adequately analyzes impacts to the environment and community.

Response to Comment 238-2:

Potential impacts due to the Proposed Project's truck trips were analyzed in the Draft EIR, Section 3.16, Transportation and Traffic. As listed in that section, a single intersection in the immediate vicinity of the Proposed Project site, will have a potentially significant impact. This intersection is not located in Altadena but in La Cañada Flintridge. In practice, hauling rates and routes may be adjusted to help reduce impacts, depending on operational need. Los Angeles County Flood Control District (LACFCD) will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the Proposed Project site.

Air quality and noise impacts associated with truck traffic were analyzed in the Draft EIR in Sections 3.5 and 3.14, respectively. This includes impacts to the surrounding areas of the Proposed Project site, including the Altadena area. As discussed in the Draft EIR, Section 3.14, with implementation of Mitigation Measure MM N-1, noise impacts would be reduced to a level of less than significant. LACFCD has conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed the United States (U.S.) Environmental Protection Agency's (EPA's) 2007 standards for emissions. Therefore, in order to further reduce emissions, Mitigation Measure MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump trucks that meet or exceed EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality, including those associated with health effects, will be reduced to less than significant.

As discussed in Section 3.6.6 of the Draft EIR, Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats. In addition, sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays).

Response to Comment 238-3:

Devil's Gate Dam, built in 1920, was the first dam built by LACFCD. The dam was built in response to the severe flooding of Los Angeles in the early 1900s and allowed for the channelization of and development along the Arroyo Seco. The Arroyo Seco normally carries low flows, but it is periodically inundated from severe floods flowing off its large, steep watershed that includes mountainous terrain. Prior to the construction of the dam, cities such as Pasadena, South Pasadena, and Los Angeles would experience flooding from the Arroyo Seco during storms. The Rose Bowl, built in 1922, and the Arroyo Seco Parkway, also known as State Route 110, completed in 1953, are two examples of downstream development made permissible by the construction of Devil's Gate Dam.

The scope of the project is to restore capacity for Devil's Gate Reservoir. The dam provides the only flood attenuation mechanism that is in place along the Arroyo Seco. Without the dam, areas downstream would be at high risk of flooding during storm events. Also, sediment would move

downstream and accumulate within and adjacent to the channel as a result of removal of the dam. Sediment accumulation in the channel would reduce the capacity of the channel in those areas and would further increase the likelihood of flooding.

The Proposed Project will not decrease the current amount of sediment that flows downstream and therefore would not contribute to the erosion of beaches. Also as noted in the Sediment Management Strategic Plan (SMSP), "Without human intervention, most Southern California beaches would naturally be narrow and rocky. The wide beaches in Southern California were created and have been maintained by various agencies through artificial beach nourishment projects (also referred to as beach fill projects) and the construction of protective coastal structures since the 1930s." In addition, the SMSP states, "Since the Los Angeles River changed course in 1825, the largest waterway reaching this region of the coast is Ballona Creek, which has an estimated annual sediment yield of less than 50,000 cubic yards and delivers generally fine-grained sediment that is not appropriate for beach nourishment." For general information on beach nourishment, please see Section 6.5.1 of LACFCD's Sediment Management Strategic Plan Sediment Management Strategic Plan, which can be viewed here: http://dpw.lacounty.gov/lacfcd/sediment/files/FullDoc.pdf

After the sediment removal phase has occurred, Flow Assisted Sediment Transport, or FASTing, is proposed to be an integral part of the annual maintenance at Devil's Gate. Annual FASTing operations will be implemented to reduce future buildups of sediment in the reservoir and to reduce the need for mechanical removal of sediment from the reservoir. FASTing is expected to be an effective means of keeping sediment levels low in the reservoir, and a maintenance regime that relies on FASTing greatly reduces the need for and extends the life of future and existing sediment placement sites and improves the future sustainability of the reservoir. Nevertheless, it is estimated that approximately 13,000 cubic yards (cy) of sediment will be removed by excavation annually. Please see Section 2.5.2 of the Draft EIR for more information on future maintenance.

Response to Comment 238-4:

See Response to Comment 238-3. Taking custody of downstream properties is outside the scope of this project.

Response to Comment 238-5:

See Response to Comment 238-2.

Alternative 3, Configuration D is considered the Environmentally Superior Alternative. Alternative 3 affects the least amount of habitat of all the action alternatives while still achieving Proposed Project objectives (see Section 4.6 of the Final EIR). This alternative would provide a buffer on the west side of the reservoir that would allow for the movement of wildlife. Alternative 3, Configuration D, Option 1 provides a more natural configuration for the reservoir by having two branches to carry water and sediment toward the face of the dam, avoiding disturbing a significant portion of existing vegetation. To further reduce the Proposed Project's footprint, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2, which drastically reduces the project's footprint of 120 acres down to 71 acres, would avoid excavation of the western branch, thereby providing a greater habitat buffer on the west side of the reservoir. In addition, the maintenance areas would be smaller than the original sediment removal footprint, allowing for habitat to reestablish and providing additional areas for wildlife movement.

Response to Comment 238-6:

See Response to Comment 238-2 and 238-3. LACFCD proposed a project duration of five years to reduce accumulated sediment in a timely fashion. The goal of LACFCD is to restore reservoir flood capacity as soon as feasible while reducing costs, minimizing the duration of environmental and construction impacts to the surrounding communities, and configuring the reservoir to allow for sustainable future maintenance. Extending the project would prolong the flood risk to downstream communities and increase the construction impacts to the surrounding communities.

Sluicing was analyzed as part of the Draft EIR in the Alternatives Analysis, Section 4.7, Alternative 4 Sluicing Method. This alternative would involve use of construction equipment and the removal of trees and vegetation over the same footprint as the Proposed Project. The sluicing alternative would potentially have additional significant impacts in comparison to the Proposed Project. Many of these impacts would be associated with the likelihood that large amounts of sediment would not be fully transported through the flood control system; this sediment would need to be mechanically removed and trucked out from numerous downstream locations potentially including the two soft-bottom portions of the channel. Please see Section 4.7 and Appendix K of the Draft EIR for further analysis.

Outside experts in the community, especially those on the Stakeholder Task Force, were consulted during the formation of LACFCD's Sediment Management Strategic Plan. Information from that consultation was used in the formulation of the Proposed Project and Alternatives. In addition, the purpose of the scoping process was to gather input from outside experts, cities, and agencies as well as the public on what the environmental analysis should consider and what alternatives should be analyzed. Information gathered from the scoping process was used in the formulation of the Proposed Project and Alternatives and preparation of the Draft EIR.

The Proposed Project is designed to be a long-term plan, with the reservoir management phase providing management for future sediment inflows. The proposed yearly cleanout of sediment after the completion of the Proposed Project will reduce the necessity for a future large-scale cleanout. Also, as mentioned in Response to Comment 238-5, the Proposed Project Alternatives provide options that would allow for habitat to reestablish outside the maintenance areas.

From: Mary Fitzpatrick
To: reservoircleanouts
Subject: Comments on EIR & Hahamonga
Date: Tuesday, January 21, 2014 8:38:48 PM

Comment 239-1

I would like to voice my opposition to a drastic, "clear-cut" type of sediment removal and advocate for a more gradual and continual process, over many years, and in favor of protecting the trees, plants, and wildlife that make the Hahamonga Basin a special place.

Let's not do to Hahamonga what happened in Arcadia. There is no need for wholesale destruction. I value my oaks and gnatcatchers.

Mary Fitzpatrick
wordfitz@aol.com

Response to Comment Letter #239 (Mary Fitzpatrick)

Response to Comment 239-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. Los Angeles County Flood Control District (LACFCD) notes the commenter's opposition for the Proposed Project and support for a more gradual process that protect wildlife and vegetation.

LACFCD goes to great lengths to lessen project impacts and maximize efficiencies. For example, the Draft Environmental Impact Report (EIR) concluded that Alternative 3 is the Environmentally Superior Alternative. Alternative 3, Configuration D drastically reduces the project's footprint of 120 acres down to 71 acres. Additionally, the limited maintenance area for Alternative 3 further reduces the permanent habitat impacts down to approximately 51 acres by allowing for site replanting and mitigation to take place within the reservoir footprint. This reduction in project acreages will greatly lessen environmental impacts of the Proposed Project.

As discussed in Section 3.6.6 of the Draft EIR, Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats. Also, implementation of Mitigation Measure MM BIO-7 will identify trees that will be removed or potentially affected, the appropriate level of tree replacement, and protection of the root zone of oak trees. Implementation of this mitigation measure will reduce impacts to a level below significance.

LACFCD proposed a project duration of five years to reduce accumulated sediment in a timely fashion. The goal of LACFCD is to restore reservoir flood capacity as soon as feasible while reducing costs, minimizing the duration of environmental and construction impacts to the surrounding communities, and configuring the reservoir to allow for sustainable future maintenance. Extending the project would prolong the flood risk to downstream communities and increase the construction impacts to the surrounding communities.

While sluicing is not a viable project alternative, as explained in Section 4.7 of the Draft EIR, Flow Assisted Sediment Transport, or FASTing, will be used for maintenance after the project's main sediment removal phase has been completed, as described in Section 2.5.2 of the Draft EIR.

LACFCD is committed to *Public Service that Works*; and by combining almost 100 years of technical expertise and invaluable input from the community, less invasive flood protection will continue to be a reality.

From: Pat Phillips
To: reservoircleanouts
Subject: Devil"s Gate Reservoir Sediment Removal and Management Project
Date: Wednesday, January 22, 2014 8:08:26 AM

To:
County of Los Angeles County
Department of Public Works
Water Resources Division
Attn: Reservoir Cleanouts Program
P.O. Box 1460

RE Devil's Gate Reservoir Sediment Removal and Management Project

Comment 240-1

I am a 25-year resident who owns horse property and a horse-boarding business in Altadena and live a half a block away from Devil's Gate dam. As an equestrian I specifically chose to purchase my property because it has stables and because it's so close to the mountain trails. I've enjoyed riding my horse, mountain biking, running and hiking in the Devil's Gate Dam, La Canada-Flintridge trails, and Brown Mountain trails which are all extremely close to my home. My family and I are active in the mountains on a daily basis. My three children have grown up enjoying the trails that we live by. In the 1980s I assisted with establishing trails along the dam and in the mountains and played a major part in the "share the trail" project where mountain bikes, hikers and equestrians have learned how to enjoy the trails together. Currently I'm a member of CORBA and have logged many hours assisting trail restoration in the mountains and along the dam so that others may enjoy the natural habitat that we're so fortunate to live by.

Comment 240-2

I am concerned about the sediment removal project because as a home owner my property value will go down. Should I desire to sell my property and relocate, it will be extremely difficult to sell the benefits of living so close to nature and the mountains to prospective buyers. Forget about selling to a family with small children. The health risks to small children and their respiratory systems is too great for a young family to find my home during the sediment removal project desireable. The location of my property has always been a selling point because my home is so close to the trails. I have stables in my backyard and have enjoyed a horse-boarding business for the last twenty years. The selling point for my stables is that I live a half a block away from the trails. This project puts my business at risk as well as the horses and riders. It puts my business at risk because my boarders will leave to another location because they can no longer enjoy riding in the trails so close to my home. Their health and wellbeing are put in jeopardy because it will no longer be safe to cross Windsor Ave. nor will it be safe to ride their horses around the dam or in the trails closeby. This project puts my livelihood at risk and then what happens when I can no longer afford my home, but I will be unable to receive the fair market value for my home because of your 5-year project which decreases the value of my property as well as its desireability.

Comment 240-3

If you're unfamiliar with horses they're extremely perceptive to their environment. For example, when the horses leave my house to go for a ride they exit my gate and walk a half a block to Windsor Ave. At the stop sign we wait to cross the street. The traffic currently is already busy with commuters. However, the inundation of traffic with semi-trucks and utility trucks will make the congestion on Windsor Ave. even more significant and dangerous. Horses spook easily with an unfamiliar stimulus and/or unexpected stimulus. Should one of my boarders, my

wife, my daughter or myself begins to cross the road during this proposed project and our horses becomes startled by the air breaks of the semi-truck the horse could potentially rear up in fear and land on the rider: which is often fatal occurence. Or, it could run into the truck because it doesn't know where to go and can't beat the speed of the truck.

Comment 240-3 continued

Will the drivers of the semi-trucks be sufficiently trained to ensure the safety of equestrians - inclusive of the rider and the horse? Will they be trained to respond safely so as not to spook the horse with unexpected movements or air-break sounds? If you've never seen a horse spook due to an unexpected sound or movement I can assure you it is a pontentially dangerous experience - which can and does cause physical harm. Should this unfortunate occurrance happen and the equestrian is seriously injured or dies, then most certainly the County of Public Works Water Resource Division has been put on notice that you have been informed and have knowledge of the potential harm, risk and danger this project puts to equestrians and the public at large should God-forbid this happen during the project.

Recently, we've become aware of the County's project for Devil's Gate sediment removal and management and the availability of the draft environmental impact report (DEIR). In addition, we have been advised that the County is planning a pipeline to pull water from Devil's Gate to Eaton Wash at essentially the same time. We know the recreational impact has been grossly underestimated and biased and that it's imperative that mitigation measures are considered and evaluated. We also know that the impact on traffic while considered an unavoidable and significant result of the proposal, the reports also do not accurately reflect the adverse effects and impacts on the surrounding communities, including Linda Vista and the Rose Bowl, especially as it pertains to the proposed pipeline. It's imperative that the environmental impact reports accurately reflect the adverse effects on the constituents who are both recreational users and residents of the the surrounding communities of Devil's Gate dam, including Pasadena, Altadena, Linda Vista, La Vina, La Canada-Flintridge, Montrose, La Crescenta. and Chevy Chase Canyon.

Comment 240-4

Notable concerns are the following:

Recreation - According to the DEIR, use of the park facilities may be less desirable due to construction-related emissions, noise, dust, visual, and traffic impacts associated with the sediment removal. It is stated in the DEIR that "recreational users may choose to visit other area parks, recreational facilities, or trails due to the temporary access restrictions or the indirect effects of construction-related activities during reservoir management activities." The DEIR fails to recognize that there are no other park options in the area that offer the unique features that Devil's Gate dam and its natural habit offers. Recreational uses such as horse-back riding, disc golf, ornithological societies, and environmental enthusiasts have no alternatives within a 20 mile radius. These activities are endemic to Devil's Gate dam and is what brings people at large to the area as well as why myself and other homeowners have chosen to purchase real estate in this particular location. This project greatly adversely impacts my real estate value as well as the personal reasons I've chosen to reside in this particular area of Altadena.

Comment 240-5

The dirty little secret that is the report fails to refer to and none of the powers that be want to reveal is the permanent desecration of Devil's Gate dam natural habitat.

Comment 240-6

Traffic - The traffic impacts on the community as well as the Woodbury Corridor and New York Drive in Altadena as a result of this project and the related pipeline have not bee accurately nor adequately addressed and no assurances provided to curb the negative impact. Nor have their been any preventatives presented to alleviate

Comment 240-7

the disruption of natural flow of traffic. Since the Windsor/Arroyo freeway entrances exits are extremely popular and heavily used, the report does not address this. Beyond the traffic impact is the human risk factor. On or about the year 2010 the City of Pasadena inadequately re-striped the northbound and southbound Windsor Ave. thereby eliminating the safety zone for cyclists riding on Windsor Ave. This inherently creates a potential litigation quagmire adverse to the City of Pasadena. This safety zone is currently almost non-existent with everyday commuters and is most assuredly eliminated with heavy utility trucks and semi-trucks traveling northbound and southbound on Windsor Ave. This creation of this situation by the county of Los Angeles Department of Public Works Water Resources Division puts them, the City of Pasadena, and the private utility trucks and corporations and anyone else involved in the project culpable during litigation should an accident or multiple accidents arise from this removal event, especially since each of the governing bodies have been forewarned about the potential health risks and safety risks involved in this proposed project.

Comment 240-7 continued

Furthermore, there is extreme suspicion regarding the failure to mention or address the pipeline project described in the March 2013 Devil's Gate and Eaton Storm Water Flood Management Project Proposition 1-E grant funding request.

Comment 240-8

And finally, due the extreme health hazards and high risk to the respiratory health of the children in the surrounding area as a result of this project there is a potential class action lawsuit in the coming years. The city of Los Angeles and the County of Los Angeles have been advised and forewarned of the extreme adverse health risks and effects on the children in the surrounding schools including the many early childhood schools and preschools as well as the high schools and elementary schools in the surrounding areas including: Crestview Preparatory School, Child Educational Center, Saint Francis High School, La Canada High School, Paradise Canyon, Flintridge Preparatory School, the magnet schools in Altadena, Muir High School and others. There is a huge population of youth and future constituents that each of the governing factions are putting at risk.

Comment 240-9

Sincerely,
Patrick Phillips
Altadena, CA 91001

Response to Comment Letter #240 (Patrick Phillips)

Response to Comment 240-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

Response to Comment 240-2:

Air quality impacts associated with truck traffic were analyzed in the Draft Environmental Impact Report (EIR) in Section 3.5. Los Angeles County Flood Control District (LACFCD) has conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed the United States (U.S.) Environmental Protection Agency's (EPA's) 2007 standards for emissions. Therefore, in order to further reduce emissions, Mitigation Measure MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump trucks that meet or exceed EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality will be reduced to less than significant. As discussed in the Draft EIR, Section 3.5, the Health Risk Assessment (HRA) analyzed both the cancer-related and noncancer-related acute (short-term) and chronic (long-term) impacts from project-related emissions. The HRA analysis found the Proposed Project would result in less than significant impacts for both the cancer-related and noncancer-related acute short-term and long-term impacts.

Potential effects to horses stalled near the Proposed Project site would be similar to the construction-related impacts from emissions associated with sediment removal to nearby residents and Hahamongna recreational users. It should be noted that construction activities would be temporary, are expected to occur only in the drier months (April to December, excluding holidays); so the maximum construction impacts would be much shorter than the five-year duration of the sediment removal phase of the Proposed Project. Additionally, hauling traffic will not occur on Windsor Avenue north of Oak Grove Drive.

Impacts to recreation were analyzed in the Draft EIR, Section 3.15. The Proposed Project will not limit the use of the Oak Grove area of Hahamongna Watershed Park. Sediment removal activities would be temporary, are expected to occur only in the drier months (April to December, excluding holidays). It is expected that these activities will often not be adjacent to the Oak Grove area of Hahamongna Watershed Park. The Proposed Project would result in temporary limitations on the recreational use of the Proposed Project site and some of the adjacent trails. Most of these areas would be reopened seasonally or intermittently throughout the sediment removal process. In addition, temporary impacts to designated recreational facilities and trails will be minimized through advance communication and redirection to the nearest facility in the vicinity of the Proposed Project. Furthermore, an east-west trail crossing will continue to provide access at the north end of the reservoir. At the south end of the reservoir, after the reservoir ingress and egress ramps have been fully constructed, access to the upper east side Arroyo Seco Trail from La Cañada Verdugo Road will be maintained; and the linkage from the west side Arroyo Seco Trail and the Flint Wash Trail to the upper east side Arroyo Seco Trail (crossing Devil's Gate Dam and also continuing south to the Rose Bowl) will be available after construction activities have ended each day and on nonworking days.

Comment regarding economic impacts to surrounding homeowners has been noted.

Response to Comment 240-3:

See Response to Comment 240-2. The Proposed Project is limited to excavation and transportation of sediment that has accumulated in Devil's Gate Reservoir and would not introduce any new uses that do not currently occur in and around the Reservoir. As discussed in the Draft EIR, Section 3.16, Transportation and Traffic, TRANSPORTATION-3, the Proposed Project will consist of roadway restriping. These changes would not alter existing roadway use or substantially increase hazards. Thus, impacts related to traffic hazards would be less than significant.

Response to Comment 240-4:

See Response to Comment 240-2.

Potential impacts due to the Proposed Project's truck trips were analyzed in the Draft EIR, Section 3.16, Transportation and Traffic. As listed in that section, a single intersection in the immediate vicinity of the Proposed Project site will have a potentially significant impact. In practice, hauling rates and routes may be adjusted to help reduce impacts, depending on operational need. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the Proposed Project site.

The Devil's Gate Water Conservation Project is a separate project that is not part of the Proposed Project or alternatives. The Devil's Gate Water Conservation Project is still in a conceptual design phase, and no environmental report is available for public review at this time; however, this project was analyzed in the Draft EIR as a cumulative project.

Response to Comment 240-5:

See Response to Comment 240-2.

Response to Comment 240-6:

As discussed in Section 3.6.6 of the Draft Environmental Impact Report (EIR), Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats. In addition, sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays). Wildlife species currently found in the Proposed Project area would be expected to either remain in the undisturbed areas of the reservoir outside the Proposed Project area or to reestablish once sediment removal activities have been completed.

Alternative 3, Configuration D affects the least amount of habitat of all the action alternatives while still achieving Proposed Project objectives (see Section 4.6 of the Final EIR). This alternative would provide a buffer on the west side of the reservoir that would allow for the movement of wildlife. Alternative 3, Configuration D, Option 1 provides a more natural configuration for the reservoir by having two branches to carry water and sediment toward the face of the dam, avoiding disturbing a significant portion of existing vegetation. To further reduce the Proposed Project's footprint, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2, which drastically reduces the project's footprint of 120 acres down to 71 acres, would avoid excavation of the western branch, thereby providing a greater habitat buffer on the west side of the reservoir. In addition, the

maintenance areas would be smaller than the original sediment removal footprint, allowing for habitat to reestablish and providing additional areas for wildlife movement.

Response to Comment 240-7:

As noted above, the Devil's Gate Water Conservation Project is a separate project from the Proposed Project, and those impacts will be analyzed in a separate environmental document. The Proposed Project does not involve construction of a pipeline. The traffic impacts associated with the Proposed Project were accurately analyzed as described in the Draft EIR, Section 3.16 Transportation and Traffic. The Draft EIR, Section 3.16 Transportation and Traffic, included the Devil's Gate Water Conservation Project in the cumulative analysis.

See Response to Comments 240-3 and 240-4.

Response to Comment 240-8:

The Draft EIR did mention the Devil's Gate Water Conservation Project in Section 2.9 Cumulative Scenario as one of the projects included in the cumulative analysis. See Response to Comment 240-4.

Response to Comment 240-9:

See Response to Comment 240-2.

Rebecca Latta Arboricultural Consulting
359 North Westridge Avenue, Glendora, CA 91741 (626) 272-8444
rebecca@rebeccalattaconsulting.com ISA #4264A

January 21, 2014

County of Los Angeles
Department of Public Works, Water Resources Division
Attn: Reservoir Cleanouts Program
PO Box 1460
Alhambra, California 91802-1460

Subject: Comments on Devil's Gate Sediment Removal and Management Project Draft and Environmental Impact Report (DEIR), State Clearinghouse No. 2011091084, October 2013

Letter transmitted via e-mail to: reservoircleanouts@dpw.lacounty.org

Dear Department of Public Works Personnel,

Comment 241-1

Please accept for the official record my comments and questions regarding the DEIR and the proposed project for reservoir cleanouts. In my opinion, the project was not adequately noticed to the public, it hypes the threat of downstream flooding and minimizes the potential for less damaging, slower sediment removal alternatives. The cumulative impacts of the proposed pipeline to carry water to Eaton Canyon in combination with the proposed project impacts have not been adequately considered.

Comment 241-2

The University of California Eskalen Laboratory has confirmed the presence of an invasive insect/fungal complex in the willows, sycamore, alders, castor bean and other plants in the basin. The Polyphagous shot hole borer carries and farms several fungus pathogens that can kill trees. Since it is a fairly new pest, the extent of potential damage is unknown. At this point, the insect/fungal disease complex has killed trees along the foothills from La Canada to Ontario. The DEIR does not discuss the insect and treatments required to prevent the spread of the insect. The insect is an ambrosia beetle, the same insect responsible for the mortality of woodlands in Florida, Northern California and San Diego Counties.

Comment 241-3

I have concerns about the proposed project and believe that none of the proposed alternatives are acceptable. In my opinion, the County needs to revisit the project and find an alternative that removed sediment in a slower, steadier fashion allowing the vegetation to recover between events. The area is an alluvial fan and the vegetation is used to disturbance. However, the County's plans to denude the area of vegetation are shortsighted and unnecessary. Growing up in Altadena, I watched Jim, the gravel and

Comment 241-3 continued

rock operator remove sediment and gravel slowly and move around the basin. The vegetation would be destroyed in an area and then regrow between removal events.

Comment 241-4

The project notification failed. As a regular user of Hahamongna Watershed Park and the Arroyo Seco Trails, I did not see notification at the beginning of the trails at the parking lot corner of Ventura and Windsor in Altadena where many people start walking/running/biking. When I asked visitors if they knew about the project, they did not.

Comment 241-5

Some of my clients in Altadena live adjacent to spreading basins where wood was stored after the 2010 Windstorm. These clients have infestations of PSHB (Polyphagous shot hole borer) that may be directly linked to the wood storage activities. I am concerned that if the County does not properly handle the wood from the tree removal operations, the insect could be spread to currently uninfested areas and cause property damage (loss of trees = loss of property value).

Questions:

Comment 241-6

1. Will the County seriously consider the slower sediment removal alternatives?

Comment 241-7

2. Did the County consider the impact of the PSHB insect/fungus? Were they in contact with County Agriculture (Gevork Arkalian) and UC Riverside (Akif Eskalen) to discuss the spread and extent of the insect?

Comment 241-8

3. How will the County adjust their operations to prevent the spread of the insect/fungal complex?

Comment 241-9

4. How will the County contain the dust that will be generated from the operations and protect the trees from the impacts? Dust on the leaves prevents the trees from photosynthesizing.

Comment 241-10

5. How will the County protect the nearby schools (LCHS, Flintridge prep, St. Francis) from dust and noise?

Comment 241-11

6. Removal of trees impacts carbon sequestration, storm water interception and pollution filtration. Will the County quantify these impacts and mitigate?

Sincerely,

Rebecca Latta

Rebecca Latta
Consulting Arborist, Horticulturalist

ISA Certified Arborist WE4264A, Certified Tree Risk Assessor #1217
Member, American Society of Consulting Arborists
Board Member, Inland Urban Forest Council
Member California Native Plant Society

Response to Comment Letter #241 (Rebecca Latta)

Response to Comment 241-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. These comments are included in the Response to Comments document for the Final Environmental Impact Report (EIR) and have been responded to below.

The Devil's Gate Water Conservation Project is a separate project that is not part of the Proposed Project or alternatives. The Devil's Gate Water Conservation Project is still in a conceptual design phase, and no environmental report is available for public review at this time; however, this project was analyzed in the Draft EIR as a cumulative project.

Response to Comment 241-2:

The County of Los Angeles Agricultural Commissioner acknowledges that Polyphagous Shot Hole Borer (PSHB) infestations are already widespread in many areas of the County dating back to 2003 and that there is little that can be done to prevent PSHB infestations from occurring over a wider geographic area in the future. To this end, local infestations of PSHB are considered as part of the Project's 2010 existing conditions base line. In addition, all trees, branches, shrubs, and any other woody material that are cut and cleared from the debris basin would be chipped on-site and then loaded it into covered dump trucks to be hauled to the Scholl Canyon Landfill for final disposal; therefore, the Project would not result in significant impacts associated with infestations of PSHB at the Project Site or Scholl Canyon Landfill.

Response to Comment 241-3:

As discussed in Section 3.6.6 of the Draft EIR, Mitigation Measures MM BIO-6, MM BIO-7, and MM BIO-8 provide mitigation to restore and enhance riparian and sensitive habitats.

LACFCD proposed a project duration of five years to reduce accumulated sediment in a timely fashion. The goal of LACFCD is to restore reservoir flood capacity as soon as feasible while reducing costs, minimizing the duration of environmental and construction impacts to the surrounding communities, and configuring the reservoir to allow for sustainable future maintenance. Extending the project would prolong the flood risk to downstream communities and increase the construction impacts to the surrounding communities.

Pursuant to Section 15126.6(a) of the California Environmental Quality Act (CEQA) Guidelines, "[a]n EIR shall describe a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project, and evaluate the comparative merits of the alternatives." However, "[a]n EIR is not required to consider alternatives which are infeasible" (CEQA Guidelines Section 15126.6(a)) or "which could change the fundamental nature of the proposed project." (*Al Larson Boat Shop, Inc. v. Board of Harbor Comm.(*1993) 18 Cal.App.4th 729, 745.) The alternatives discussed in the EIR must be reasonable alternatives, selected to foster informed decision-making and public participation (CEQA Guidelines 15126.6(a)). An EIR need not consider an alternative whose effect cannot reasonably be ascertained or whose implementation is remote and speculative because unrealistic alternatives do not contribute to a useful analysis (CEQA Guidelines 16126.6(f)(3)). Additionally, an alternative may be rejected from detailed analysis in an EIR if it fails to reduce or avoid the project's

significant environmental effects, does not implement the basic project objectives, is not potentially feasible, or is facially unreasonable. 14 C.C.R. §15126.6(c); Id., see also *Mann v. Community Redevelopment Agency* (1991) 233 Cal. App. 3d 1143; *Del Mar Terrace Conservancy, Inc. v. City Council* (1991) 10 Cal. App. 4th 712.

The Draft EIR, Section 4, fully analyzed six alternatives, including the No Project Alternative. These alternatives substantially lessen one or more significant effects of the Proposed Project and, with the exception of the mandatory No Project Alternative, would feasibly attain most of the basic objectives of the Proposed Project. These alternatives include options for different amounts of removal, different methods of removal, and a different haul route.

Response to Comment 241-4:

Per CEQA Guidelines Section 21902 (b)(3), notice shall be given to the last known name and address of all organizations and individuals who have previously requested notice and shall also be given by at least one of the following procedures:

- publication in a newspaper of general circulation in the area affected by the Proposed Project
- posting of notice by the lead agency on and off site in the area where the Proposed Project is to be located
- direct mailing to the owners and occupants of contiguous property shown on the latest equalized assessment roll

The notices for the Proposed Project, the Notice of Preparation (NOP), and the Notice of Availability/Notice of Completion (NOA/NOC) were:

- sent to agencies, organizations, and individuals who have previously requested notices, in addition to other area agencies and organizations
- published in local newspapers, the *San Gabriel Valley Tribune* and the *Pasadena Star News*
- posted on and off site
- mailed to over 1,100 owners and occupants of contiguous property shown on the latest equalized assessment roll
- filed with the County Clerk and the State Clearinghouse
- posted at eight local libraries
- posted on the Los Angeles County Department of Public Works (LACDPW) website

Therefore, notice for the Proposed Project was adequate, as the notice efforts went beyond the CEQA Guidelines requirements.

Response to Comment 241-5:

See Response to Comment 241-2.

Response to Comment 241-6:

See Response to Comment 241-3.

Response to Comment 241-7:

See Response to Comment 241-2.

Response to Comment 241-8:

See Response to Comment 241-5.

Response to Comment 241-9:

Dust impacts from the Proposed Project were carefully evaluated, as discussed in the Draft EIR, Section 3.5.6, Impacts and Mitigation, AIR QUALITY-2, Sediment Removal. The Proposed Project's activities, including excavation, grading, material loading, and hauling, would result in less than significant dust emissions due to the project's use of best management practices (BMPs) and would be in full compliance with South Coast Air Quality Management District's (SCAQMD's) fugitive dust regulations.

Response to Comment 241-10:

See Response to Comment 241-9.

Air quality and noise impacts associated with truck traffic were analyzed in the Draft EIR in Sections 3.5 and 3.14, respectively. Impact analyses took in to account the location of nearby schools. As discussed in the Draft EIR, Section 3.14, with implementation of Mitigation Measure MM N-1, noise impacts would be reduced to a level of less than significant. LACFCD has conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed the U.S. Environmental Protection Agency's (EPA's) 2007 standards for emissions. Therefore, in order to further reduce emissions, Mitigation Measure MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump trucks that meet or exceed EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality, including those associated with health effects, will be reduced to less than significant.

Response to Comment 241-11:

The Draft EIR, Section 3.9 Greenhouse Gas Emissions analyzes greenhouse gases and associated impacts from the Proposed Project. As noted in the Draft EIR, impacts to greenhouse gas emissions would be less than significant.

The Draft EIR, Section 3.11 Hydrology and Water Quality analyzes Proposed Project impacts on hydrology within the reservoir. As noted in the Draft EIR, Section 3.11 Hydrology and Water Quality, "The Proposed Project will remove accumulated sediment deposits within the reservoir. This means the percolation characteristics of the reservoir will stay the same, if not improve; and the reservoir will still permit penetration of rainfall and percolation of local runoff to replenish the groundwater basin. Additionally, sediment removal will restore Devil's Gate Reservoir to its current design standard of the ability to contain two DDEs. As a result, the reservoir will have the ability to contain more of the local

runoff, which in turn could result in more runoff penetrating into the ground in the project area and subsequently recharging the groundwater basin. In addition, by keeping the reservoir clear of future sediment deposits, the Proposed Project will reduce the potential for accumulated sediments to impact the percolation rate." As stated in the Draft EIR, Section 3.11, the Proposed Project activities involving construction equipment will be temporary and involve the limited transport, use, disposal, and storage of fuel and lubricating oil, which are regulated by various agencies. Adequate BMPs will be utilized; and adherence to the regulations set forth by the County, State, and federal agencies will reduce the potential for impacts to water quality to a less than significant level. With adherence to regulations and permit requirements and implementation of project-specific BMPs, impacts related to otherwise substantially degrading water quality would be less than significant.

ROBERT L. STAEHLE
153 JAXINE DRIVE
ALTADENA, CALIFORNIA 91001

2014 January 21

County of Los Angeles
Department of Public Works
Water Resources Division
Attn: Reservoir Cleanouts Program
P.O. Box 1460
Alhambra, California 91802-1460
reservoircleanouts@dpw.lacounty.org

Re: Comments on *Devil's Gate Reservoir Sediment Removal and Management Project Draft Environmental Impact Report (DEIR),* State Clearinghouse No. 2011091084, October 2013.

Dear Department of Public Works Personnel,

Comment 242-1

Please accept for the official record my comments and questions as follows regarding the subject report and the proposed Project it describes. In general, I find the proposed Project dramatically over-scoped beyond what is necessary for safety. The DEIR manifests an insularity on the part of the Department through its promotion of a long-used but unsustainable method of trucking sediment at great expense from one place to another. At the same time other County budgets are being sought to restore sand to beaches that are eroding, and exposing coastal structures to their own set of hazards, precisely because an early 20th-Century "solution" to what was then a much smaller sediment removal problem is being offered in the 21st Century in answer to a scale of problem never envisaged when the trucking practice was begun. Further, contrary to CEQA requirements, the subject DEIR does not cover the entire scope of relevant actions, because the proposed pipeline to carry water from the Arroyo Seco drainage to the Rubio Canyon drainage is not considered in sufficient detail, even though the depth of excavation proposed, and the volume of sediment to be removed, appears to be driven in part by the latter action, which itself is poorly considered.

Comment 242-2

Therefore I conclude that the proposed Project as described is seriously flawed, and I conclude that the DEIR as a document describing the proposed Project is also seriously flawed. Many other commentors have taken up these issues and more. My detailed comments and questions concern the following three topics, of which I have some personal knowledge:

1. Lack of notice to park users.
2. Trail closure and home value impact.
3. Assessment of impact at sediment destinations, and points in between.

Comment 242-3

1. Lack of Adequate Notice to Park Users.

An informal survey was conducted by Lori Paul and Robert Staehle visiting the proposed Project area within Hahamongna Watershed Park (hereafter "HWP" or "Park") on a number of days

during 2013 November and December, and 2014 January, entirely within the period during which comments on the draft EIR were solicited from the affected public. Park users who were encountered at random were asked if they had heard of the proposed sediment removal project. Of >120 people encountered and asked, all were surprised at mention of the project, and zero were aware of the proposed project before being asked if they knew about it. These results included my most recent excursions in the Park on January 10, and January 20, both after the DEIR comment period was extended, and the latter being one day before the extended comment due date. (These results are cited for days exclusive of the December 14 "Hands Across the Dam" event sponsored by Save Hahamongna.org. By definition, anyone coming to that event knew about the proposed project, and most, if not all, were there to protest its anticipated scope and/or impact.)

Under CEQA, users of the Park and the land proposed for sediment removal are considered an impacted group, so it is surprising to find so few (in fact none) of those surveyed aware of the project described in the DEIR. Why might this be?

A survey of some of the more popular park entrances and traverse routes conducted on January 10 and 20 offers at least a partial explanation. There was no signage at the following entrances, features, and trail intersections making any mention of the proposed Project (see photos on pages 5 – 14 below keyed to these location numbers):

Comment 242-3 continued

1. West end of Altadena Drive trailhead.
2. Intersection of the trail that descends from the west end of Altadena Drive with the paved service road above the JPL east parking lot (identified in Google Maps and other places as both the Gabrielino Trail and N. Arroyo Blvd).
3. Intersections of the trail that crosses the JPL east parking lot with the entering-JPL traffic lane on the east side of the parking lot, and the exiting-JPL traffic lane on the west side of the parking lot.
4. The trail where it leaves the public road to enter the Park from between JPL's south and west corner and the Los Angeles County Fire Department Camp 2 Air Attack installation.
5. The above trail, where it enters the open area of the Park from between the fence on one side delineating NASA/JPL property and the fence on the other side of this trail delineating the area used by Rose Bowl Riders.
6. The parking area on the east side of the Park located along N Windsor Avenue between W. Mountain View Street and Ventura Street.
7. The top of the trail that descends from the middle of the west edge of the same parking area down toward the middle of the Park.
8. The Gabrielino trailhead, which serves also as a Park trail entrance, just north of the parking area noted above.
9. The Park's "Sunset Overlook" a few hundred feet north on the footpath west of and parallel to the paved "N Arroyo Blvd/Gabrielino Trail".

Most of the above locations had general signage when visited. There was reasonably elaborate signage about the Park at locations 6, 8 and 9 above, but nothing at all about the proposed Project described in the DEIR, or even mention of the DEIR comment period, etc. Zero. The accompanying photographs of these locations document the signage there on January 10 or 20, depending on location.

Exactly two signs with a single notice on one sheet of 8.5 X 11 inch paper under scratched plexiglass facing were found in the Park that made mention of the DEIR, but did not describe the scope of the project. One was near the east end of Devil's Gate Dam, and the second at the

intersection of a north-south and east/west trail near the middle of the Park (see Photos #10 on pages 15-16). A third was said to have been posted in a January 2 email from Edel Vizcarra to Lori Paul and Robert Staehle, but was not found in the Park (it may have been present, as not every possible signage location was examined). While some of those Park users who were encountered and asked if they were aware of the proposed Project appeared to have passed by one or the other of these signs, apparently none of those people had taken any notice. Others, many of whom expressed themselves to be frequent Park users, could have entered and left the Park repeatedly without ever encountering one of the signs mentioning the proposed Project.

Comment 242-3 continued

The sign mentioned above near the middle of the Park (see photo) does not actually even hint at the scope of the proposed project, and is only a notice of the extension of the deadline to receive comments for an additional 15 days, to January 21.

A sign near the bottom of the trail that leads down from the Windsor/Ventura parking area, photographed on 2013 November 16 (see "Devil's Gate Dam Interim Measures 2013" sign in photo on next page), refers to a project in which "Public Works will remove up to 5,000 cubic yards of sediment…to again be temporarily placed at Johnson Field," (which is within the Park) and where "The green waste will be hauled to Scholl Canyon Landfill at a rate of no more than 10 trucks per day to avoid impacts to the neighborhood along the haul route on Windsor Avenue." Therefore, this sign clearly does not refer to the proposed Project described in the DEIR to which this set of comments is addressed. On November 16, well into the comment period, there was no sign nearby describing or giving notice of said Project or DEIR.

Questions:

Comment 242-4 By what quantitative measure and methods can DPW assure that an adequate number of Park users were notified about the proposed Project?

Comment 242-5 When did signs advising of the proposed Project first appear, where, and by what measure were they of adequate format and size, type size, graphic design, and descriptive content to draw adequate attention of Park users? How long did each of these signs remain in place?

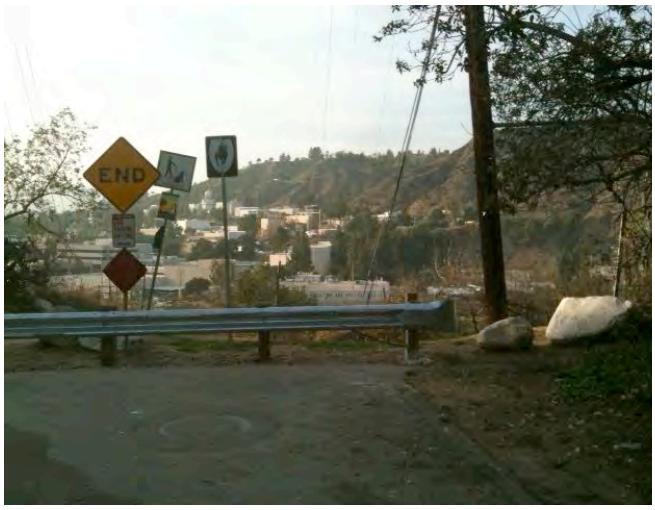
Comment 242-6 Were any of the signs placed in locations accessible to disabled persons? (The sign in photos #10 was hundreds of feet from any wheelchair-accessible location.) With which provisions of the Americans with Disabilities Act were these signs, their locations, and accessibility not compliant?

Comment 242-7 How can it be explained that out of >120 Park users encountered at random over three months during the comment period, not one of them was aware of the proposed Project, DEIR, or comment period?

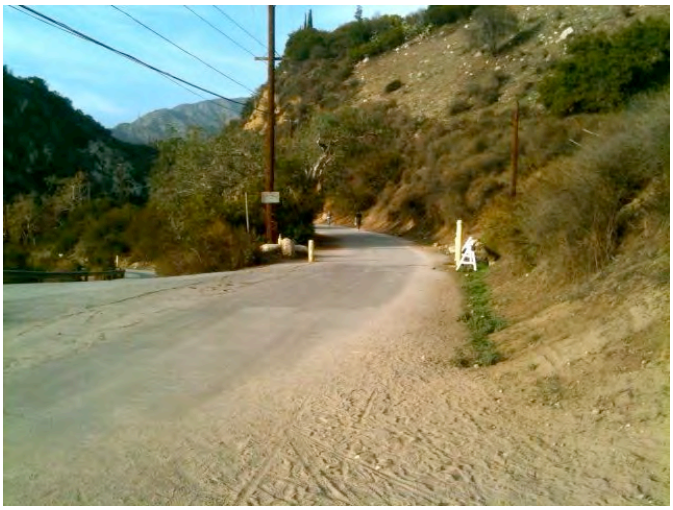
Comment 242-8 Why were prominent signs not placed at sites of other signs frequently seen by Park visitors describing the proposed Project scope, DEIR, and opportunity to comment, for the duration of the comment period? Poor as it was, the "Devil's Gate Dam Interim Measures 2013" sign photographed 2013/11/16 near the bottom of the trail that leads down from the Windsor/Ventura parking area provided a map and summary description of an earlier project to remove only 5,000 cubic yards of sediment and green waste. Why was it possible to place a sign describing such a small project, with a map included, and yet a descriptive sign could not be placed at the same location, and elsewhere, for the entire comment period, for this Project proposed to be as much as 800 times larger in terms of the volume of sediment removed?

Above: Prior project sign from 2013 November 16 (Lori Paul photo.)

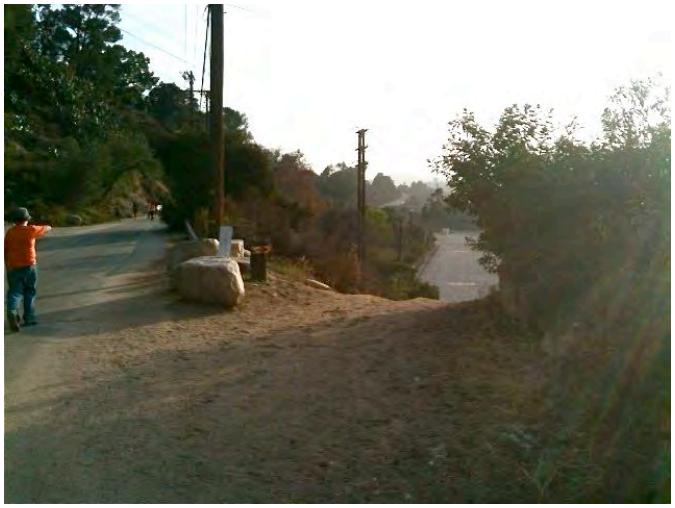
1. a, b, & c: West end of Altadena Drive trailhead. No Project or DEIR sign. 2014 January 10

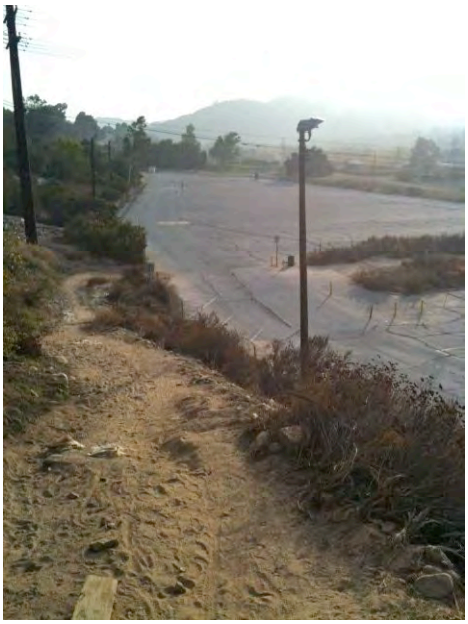


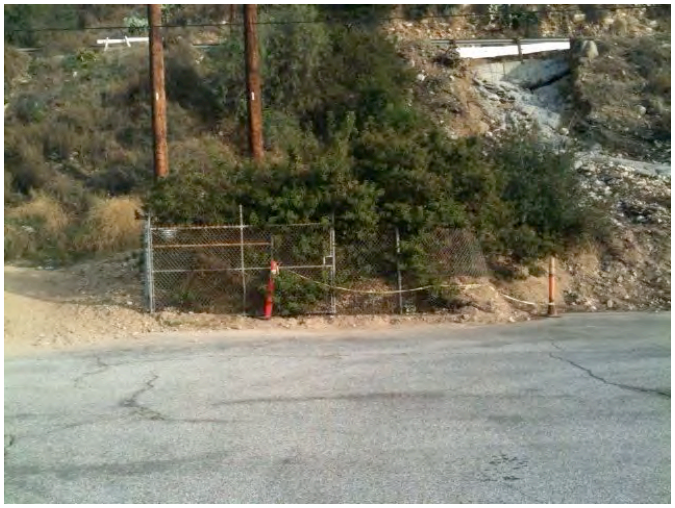
2. a, b, & c: Intersection of the trail that descends from the west end of Altadena Drive with the paved service road above the JPL east parking lot (identified in Google Maps and other places as both the Gabrielino Trail and N. Arroyo Blvd). No Project or DEIR sign. 2014 January 10



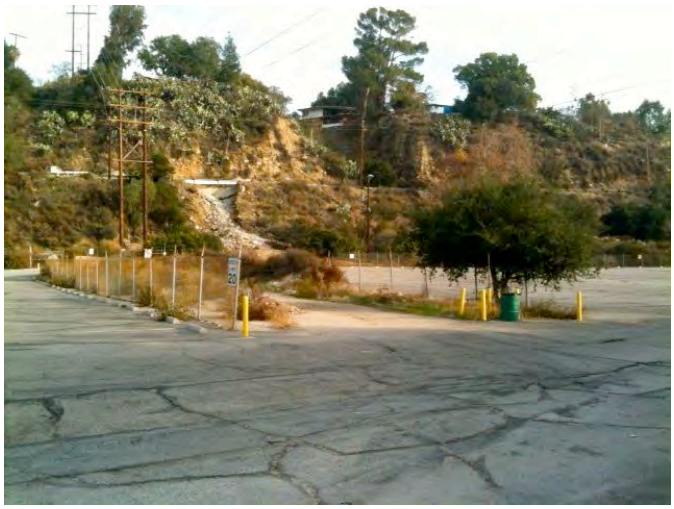
3. a, b, c, d, e, f, g, h, i, j, k, l, m, n: Descent (a, b, c, d) from east to intersection of the trail that crosses the center of the JPL east parking lot with the entering-JPL traffic lane on the east side of the parking lot (e, f, g), and the exiting-JPL traffic lane on the west side of the parking lot (h, i, j, k, l) and ~100 feet west of there (m, n). No Project or DEIR sign. 2014 January 10

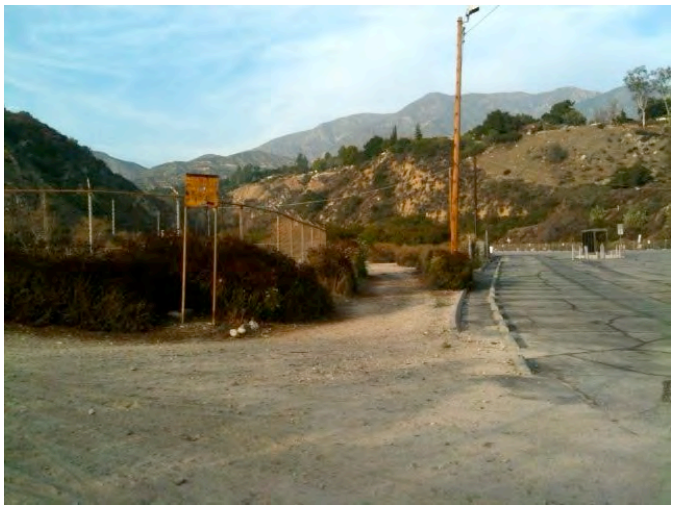


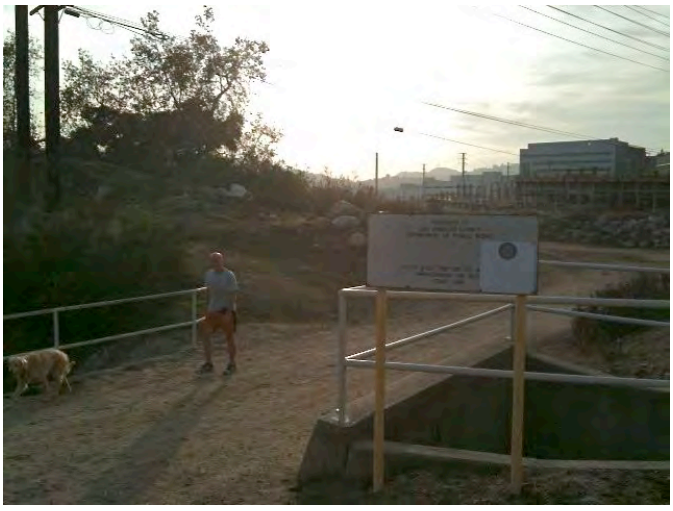




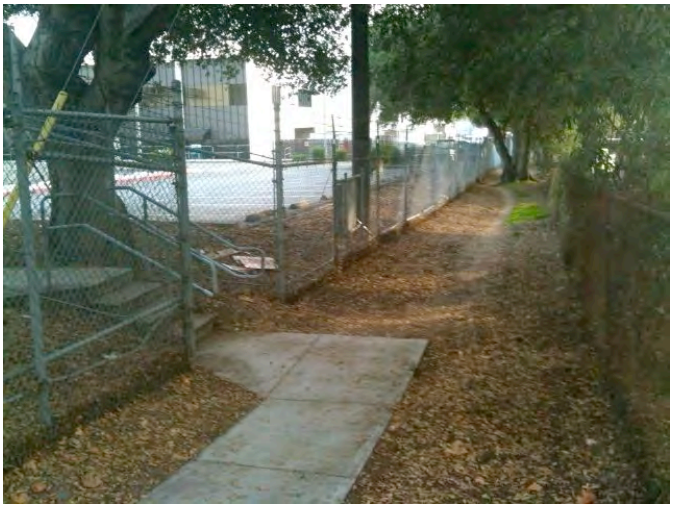
BUS
STOP
P.M.

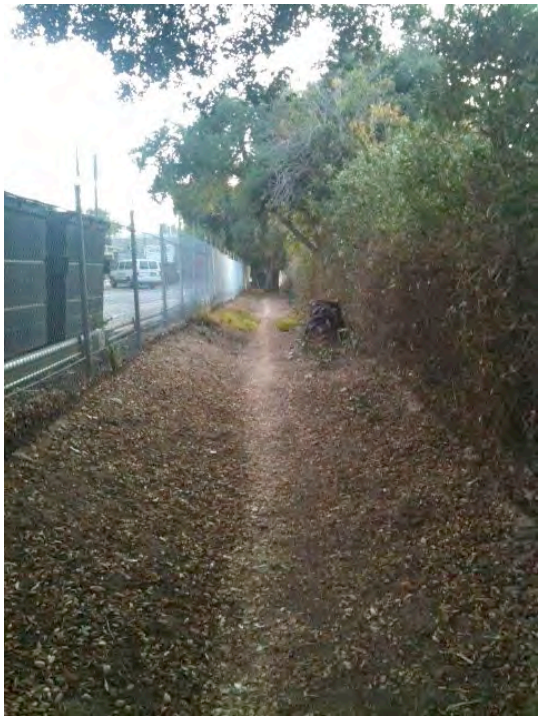






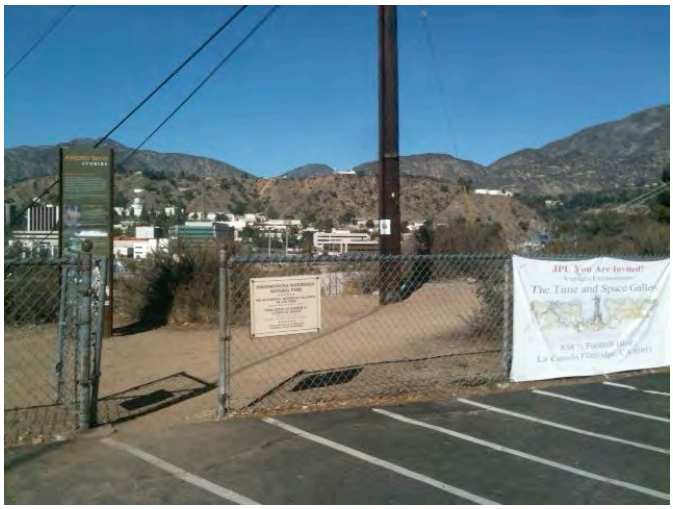
4. a, b, c, d, e, f: The trail near JPL's South Gate, where it leaves the public road to enter the Park from between JPL's south and west corner and the Los Angeles County Fire Department Camp 2 Air Attack installation. No Project or DEIR sign. 2014 January 10



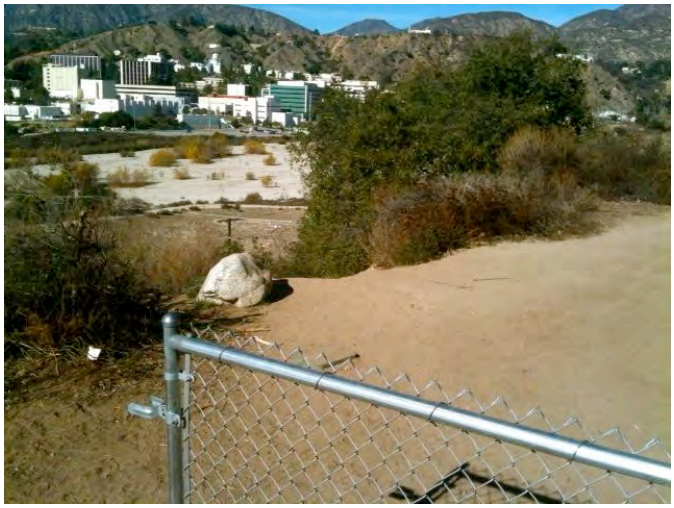


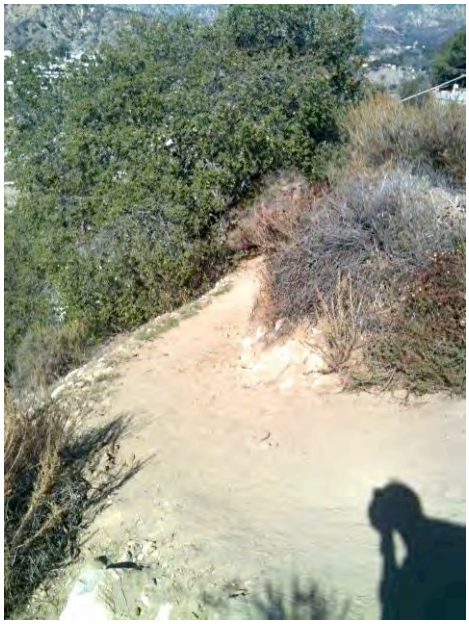
5. a, b, c, d: The above trail, where it enters the open area of the Park from between the fence on one side delineating NASA/JPL property and the fence on the other side of this trail delineating the area used by Rose Bowl Riders. No Project or DEIR sign. 2014 January 10

6. a, b: The parking area on the east side of the Park located along N Windsor Avenue between W. Mountain View Street and Ventura Street. No Project or DEIR sign. 2014 January 20

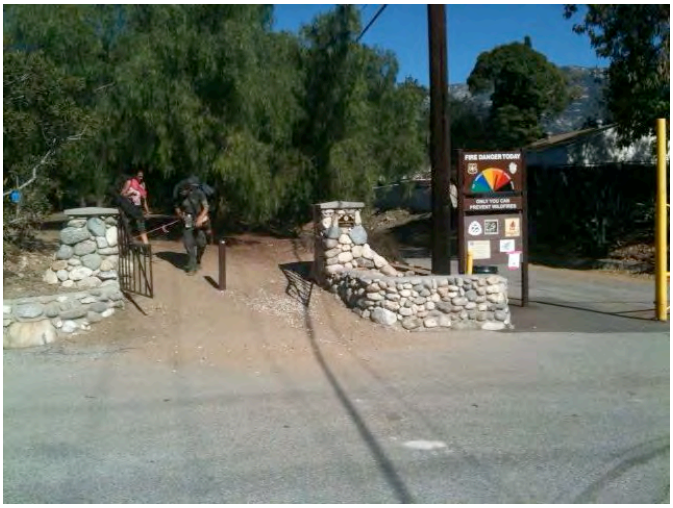


7. a, b, c: The top of the trail that descends from the middle of the west edge of the same parking area down toward the middle of the Park. No Project or DEIR sign. 2014 January 20

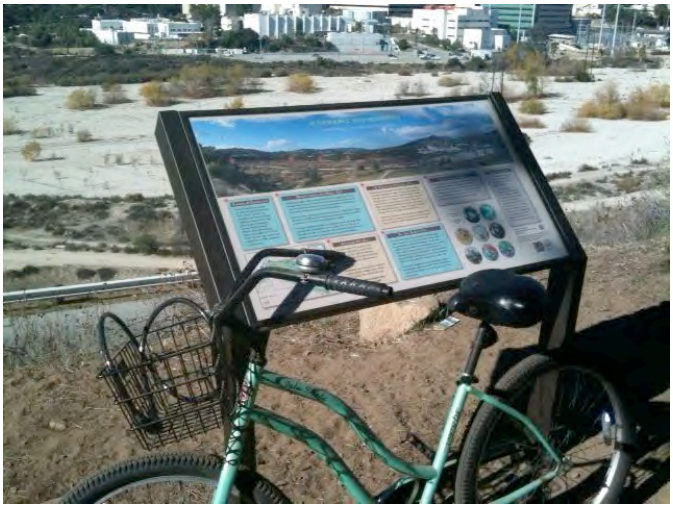




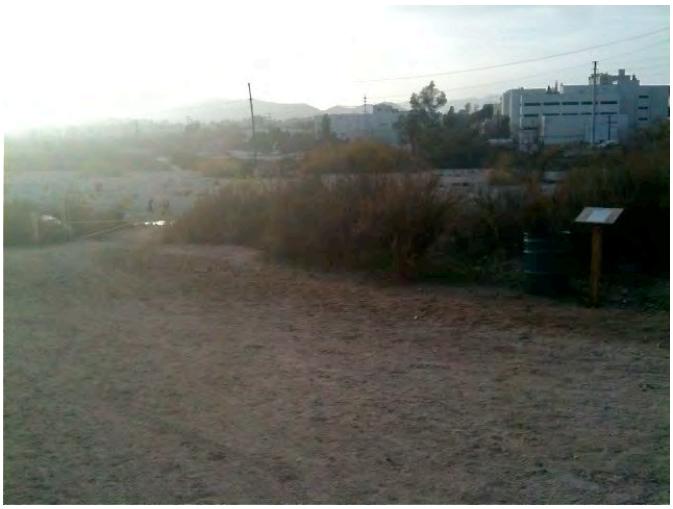
8. a: The Gabrielino trailhead, which serves also as a Park trail entrance, just north of the parking area noted above. No Project or DEIR sign. 2014 January 20

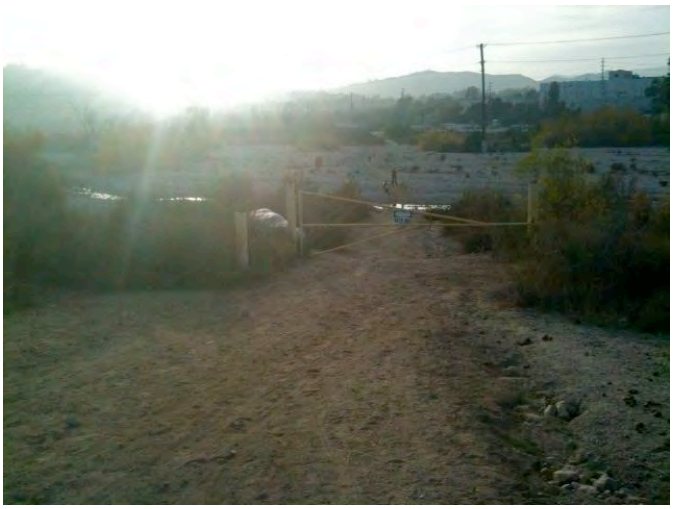


9. a, b: HWP's "Sunset Overlook" a few hundred feet north on the footpath west of and parallel to the paved "N Arroyo Blvd/Gabrielino Trail". No Project or DEIR sign. 2014 January 20



10. a, b, c, d: Finally, near the intersection of a north-south and east-west trail near the middle of the Park, is a small sign missed by most who pass it, noting the new due date for comments, but omitting any hint of the proposed Project scope. 2014 January 10





Devil's Gate Reservoir Sediment Removal and Management Project

Devil's Gate Reservoir Sediment Removal and Management Project
Draft EIR Comments To Be Accepted Through January 21, 2014

Due to the high volume of content in the Devil's Gate Reservoir Sediment Removal and Management Project Draft EIR and requests for additional time to review the document, we will now be accepting comments for an additional 15 days, 90 days in total, through **Tuesday, January 21, 2014**.

If you have not done so already, comments emailed to reservoircleanouts@dpw.lacounty.gov, mailed, or faxed to LA County Public Works will be included in the official Response to Comments Log that will be attached to the Final EIR.

Please check out the project website at http://www.LASedimentManagement.com/DevilsGate

Mail	Email	Fax
County of Los Angeles Department of Public Works Water Resources Division Attn: Reservoir Cleanouts Program P.O. Box 1460 Alhambra, CA 91802-1460	reservoircleanouts@dpw.lacounty.gov	(626) 979-5436

2. Trail Closure and Home Value Impact

Comment 242-9

In addition to its natural values described by a number of other commentors, Hahamongna Watershed Park is host to a large number of trail users. Such trail use centers on recreation, physical fitness maintenance and training, commuting to and from NASA's Jet Propulsion Laboratory (the region's largest employer), educational field trips by local student and adult groups, bird watching, dog walking, mountain biking, and equestrian use by probably a few thousand users of all ages. Local parking areas are often full on weekends, with many cars coming and going during a single hour of a popular day with good weather. On January 20, for example, at the Windsor/Ventura parking area, there were approximately 40 cars parked in the lot and nearby when I visited in the early afternoon. During a single 15 minute period, approximately 5 cars departed and 5 entered and parked, with some carrying as many as four people. Nearly all the parked cars were empty, indicating that their occupants were almost certainly using trails in the Park. Clearly other Park users simply walked, ran, or rode their bikes from their residences to use the Park, and could be missed in a parking survey.

Comment 242-10

As Chair of the Steering Committee of the County-chartered Altadena Crest Trail Restoration Working Group (ACTRWG), which holds monthly public meetings at the Altadena Community Center approximately 9 times per year, I can indicate that the topic of connecting the Altadena Crest Trail (ACT) and other Altadena trails with three neighboring trail systems is a priority for many of the trail users who attend ACTRWG meetings, and has been adopted as a goal by the group as a whole, and endorsed by vote on more than one occasion without any opposition. Said connection is precisely within and across Hahamongna Watershed Park, to the La Canada Flintridge trail system to the west, to the Gabrielino Trail into Angeles National Forest to the north, and to trails south down the Arroyo Seco into Pasadena. This multi-system connection increases the value of the trail experience to users of all these trail systems, and increases property values of all nearby residential properties.

The proposed Project would sever this four-way connection and/or make it hazardous during many parts of the year and part or all of many days when intensive digging and trucking operations are going on with attendant traffic hazard, dust, toxic pollutant, and noise impacts. A considerably smaller operation than the favored alternative could be fashioned to reduce these impacts to a level that does not necessitate severing the connection among the four trail systems, while still removing an adequate volume of sediment.

Questions:

Comment 242-11

What quantitative measures of trail use have been made, using what methodologies, against which the impact of the proposed Project on trail use can be assessed?

Comment 242-12

What alternatives can be put forward that enable unbroken, or infrequently broken (as perhaps required during flood or fire emergencies) connection among a) the Altadena Crest Trail (ACT) and other Altadena trails with three neighboring trail systems b) to the La Canada Flintridge trail system to the west, c) to the Gabrielino Trail into Angeles National Forest to the north, and d) to trails south down the Arroyo Seco into Pasadena? One would think that the ACT-to-Gabrielino Trail linkage need never be severed by the proposed Project, but what about Altadena-to-La Canada, Altadena to South Arroyo Seco, and La Canada-to-Gabrielino Trail connections? How many trail users does the proposed Project impact, and what activities are curtailed or eliminated?

Comment 242-13

How many birds of how many species will be left to watch, and how does this compare with past Audubon-sponsored bird counts made by qualified observers? What will be the impact to physical fitness in the community, increased emergency room visits from cardiovascular and pulmonary disease, allergies, and other ailments that result from direct impact of the project, and

Comment 242-13 continued

indirect loss of health because of reduced physical fitness resulting from reduced trail use? What increased medical expenses will result that must be borne by taxpayers and insurance plan members?

Comment 242-14

What fraction of trail users will divert to other trail areas less convenient, and what will be the impact to those locations in terms of parking, habitat disturbance, and crowding?

Comment 242-15

How many people use the trails and Park today to walk and bike to and from work at JPL and other employers? What will be the impact on their habits, and on JPL's compliance with average vehicle ridership targets and other parameters set by the South Coast Air Quality Management District (AQMD)? I personally rode my mountain bike between my home in Altadena and JPL, crossing the Arroyo through the Park, and using the west end of the Altadena Crest Trail from the west end of Altadena Drive, 42 times in 2013, starting February 25. I have used this commuting method on many days in most prior years back into the 1990s. This year, I started earlier, on January 9, and expect to ride to/from work ~60 times. I will definitely curtail my riding any time the safe link is severed, e.g., by frequent truck traffic, diesel smoke, dust, toxic ash, and other Project-related hazards or route closures. What will be the impact of the reduction in lowest-impact commuting (e.g., by walking and bicycles) that results from the proposed Project, and how were these quantities measured, estimated, and/or derived? I am clearly not the only commuter using this method near or across the proposed Project Area, but I am unaware of any reliable surveys estimating this population, automobile emissions saved, and other environmentally relevant parameters. What surveys has DWP used in and around HWP, and why should they be considered reliable?

Comment 242-16

There is significant literature linking public trail proximity, quality and usage to home values, with examples in different parts of the country. Likewise, similar literature exists concerning the impact on home sale prices of nearby large construction projects. For houses sold during the duration of the proposed Project, what is the expected aggregate value lost to sellers as compared to if these houses had been sold during a period without the proposed Project in progress? Clearly such an estimate can only be made on a statistical comparison basis, so what historical records were used, what assumptions applied, and what range of answers emerged? (For example, if 1,000 homes within earshot, downwind dust and traffic impact are estimated to be sold during the proposed period leading up to and during the proposed work, and the average home value is impacted negatively by $10,000, then the total impact to home sellers would be $10 million, with some error bars.)

3. Assessment of Impact at Sediment Destinations, and Points In Between.

Questions:

Comment 242-17

The bulk of the DEIR is focused on impacts in and around the "Project Location" where sediment is to be removed. How thorough and accurate are the assessments of impact where the proposed huge volume of sediment is to be deposited? For example, none of the maps in the DEIR Section E.S.2 Project Summary show the haul routes or destination beyond the immediate areas of Hahamongna Watershed Park. Do not the residents and commuters along those routes and near those destinations deserve some focused attention in the Executive Summary? Surely similar threats exist concerning diesel exhaust, traffic interruption, sediment dust, its toxic components, pulmonary effects on downwind residents and schools, etc.

Comment 242-18

Has comment been sought in an effective manner from commuters on the 210 Freeway who will be slowed by the ponderous chain of trucks carrying sediment, and their slightly less ponderous

return journey to pick up more? What fraction of these commuters have any idea that this Project is proposed and will directly affect their lives every day that sediment is being hauled? One can expect all the Los Angeles traffic reporters to be prominently noting the slowing effects of a new truck every 70 seconds on traffic flow, especially during "rush hours" in the morning and afternoon. Is another lane needed on the freeway to offset these effects, who will pay for that, and when will its construction start, with what environmental impacts? What is the estimated impact of greater fossil fuel burn, commuter car maintenance expense, increased costly child care hours, and lost work time from the inevitable traffic snarls that will result? What methods were used in making such quantitative assessments, and how can we be sure they are accurate? What are the error bars on these impact quantity estimates, and what error budget and/or statistical analysis backs them up?

Comment 242-18 continued

Thank you for your consideration of these matters and answers to the questions posed. They are clearly relevant to any complete assessment of the environmental impact of the proposed Project.

Comment 242-19

Sincerely,

/s/
Robert L. Staehle

Note: all photos by Robert Staehle, except as noted. Permission hereby granted for unlimited reproduction for non-commercial use.

Response to Comment Letter #242 (Robert Staehle)

Response to Comment 242-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

The Los Angeles County Flood Control District (LACFCD) was mandated by the State Legislature to provide flood protection and water conservation within its boundaries.

A reservoir storage design capacity of two design debris events (DDEs) below the dam's lowest spillway was determined to be the standard acceptable level of risk at Devil's Gate Dam and Reservoir. The DDE volume of capacity is determined using the January 2006 Los Angeles County Department of Public Works (LACDPW) Hydrology Manual and the March 2006 LACDPW Sedimentation Manual. For Devil's Gate Dam and Reservoir, the required reservoir capacity is 4.0 million cubic yards (cy) (two DDEs) below the spillway elevation of 1,040.50 feet.

The Hydrology Manual (January 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_Hydrology_Manual/2006%20Hydrology%20Manual-Divided.pdf

The Sedimentation Manual (March 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_sedimentation_manual/Sedimentation%20Manual-Second%20Edition.pdf

Additional information concerning DDE calculation methods has been added to the Final Environmental Impact Report (EIR), Section 2.3, Project Need.

After the sediment removal phase has occurred, Flow Assisted Sediment Transport, or FASTing, is proposed to be an integral part of the annual maintenance at Devil's Gate. Annual FASTing operations will be implemented to reduce future buildups of sediment in the reservoir and to reduce the need for mechanical removal of sediment from the reservoir. FASTing is expected to be an effective means of keeping sediment levels low in the reservoir, and a maintenance regime that relies on FASTing greatly reduces the need for and extends the life of future and existing sediment placement sites and improves the future sustainability of the reservoir. Nevertheless, it is estimated that typically 13,000 cy of sediment will be removed by excavation annually. Please see Section 2.5.2 of the Draft EIR for more information on future maintenance.

The Proposed Project will not decrease the current amount of sediment that flows downstream and therefore would not contribute to the erosion of beaches. Also as noted in the Sediment Management Strategic Plan (SMSP), "Without human intervention, most Southern California beaches would naturally be narrow and rocky. The wide beaches in Southern California were created and have been maintained by various agencies through artificial beach nourishment projects (also referred to as beach fill projects) and the construction of protective coastal structures since the 1930s." In addition, the SMSP states, "Since the Los Angeles River changed course in 1825, the largest waterway reaching this region of the coast is Ballona Creek, which has an estimated annual sediment yield of less than 50,000 cubic yards and delivers generally fine-grained sediment that is not appropriate for beach nourishment."

For general information on beach nourishment, please see Section 6.5.1 of LACFCD's Sediment Management Strategic Plan, which can be viewed here:
http://dpw.lacounty.gov/lacfcd/sediment/files/FullDoc.pdf

The Proposed Project does not require the implementation of the Devil's Gate Water Conservation Project in order to achieve the Proposed Project's objective to satisfactorily reduce flood risk, create a configuration suitable for routine operations and maintenance, and reduce the possibility of plugging at the face of the dam. The Devil's Gate Water Conservation Project does not require the implementation of the Proposed Project to be carried out. Neither project is a foreseeable consequence of or a future expansion of the other project; therefore, these projects are separate projects per CEQA.

The Devil's Gate Water Conservation Project is a separate project that is not part of the Proposed Project or alternatives. The Devil's Gate Water Conservation Project is still in a conceptual design phase, and no environmental report is available for public review at this time; however, this project was analyzed in the Draft EIR as a cumulative project.

Response to Comment 242-2:

LACFCD notes the commenter's concerns and the commenter's opinion that the Proposed Project is flawed. The specific comments have been responded to below.

Response to Comment 242-3:

Per California Environmental Quality Act (CEQA) Guidelines Section 21902 (b)(3), notice shall be given to the last known name and address of all organizations and individuals who have previously requested notice and shall also be given by at least one of the following procedures:

- publication in a newspaper of general circulation in the area affected by the Proposed Project
- posting of notice by the lead agency on and off site in the area where the Proposed Project is to be located
- direct mailing to the owners and occupants of contiguous property shown on the latest equalized assessment roll

The notices for the Proposed Project, the Notice of Preparation (NOP), and the Notice of Availability/Notice of Completion (NOA/NOC) were:

- sent to agencies, organizations, and individuals who have previously requested notices, in addition to other area agencies and organizations
- published in local newspapers, the *San Gabriel Valley Tribune* and the *Pasadena Star News*
- posted on and off site
- mailed to over 1,100 owners and occupants of contiguous property shown on the latest equalized assessment roll
- filed with the County Clerk and the State Clearinghouse

- posted at eight local libraries
- posted on the LACDPW website

Therefore, notice for the Proposed Project was adequate, as the notice efforts went beyond the CEQA Guidelines requirements.

Response to Comment 242-4:

See Response to Comment 242-3.

Response to Comment 242-5:

See Response to Comment 242-3. Notice for the Proposed Project was adequate, as the notice efforts went beyond the CEQA Guidelines requirements.

Notices placed onsite were placed at both the east and west entrances to the dam, as well as along a trail on the upper east side of the reservoir. These notices were placed at the start of the public review period, on October 23, 2013. They defined the Proposed Project, the timeline for the public review period, location and dates of the community meetings, and the extension of the public review period. The notices remained in place until after the public review period closed on January 21, 2014.

Response to Comment 242-6:

See Response to Comment 242-3.

Response to Comment 242-7:

See Response to Comment 242-3.

Response to Comment 242-8:

See Response to Comment 242-3 and 242-5.

As stated above, notices placed onsite were placed at both the east and west entrances to the dam, as well as along a trail on the northeastern side of the reservoir. Notices were placed at all three locations, including the location shown in the commenter's letter, at the start of the public review period, on October 23, 2013 and remained in place until after the public review period closed on January 21, 2014.

Response to Comment 242-9:

LACFCD notes, as described in Section 3.15 of the Draft EIR, the many recreational opportunities in the reservoir including hiking, passive recreation, and bird watching.

Response to Comment 242-10:

Impacts to recreation were analyzed in the Draft EIR, Section 3.15. The Proposed Project will not limit the use of the Oak Grove area of Hahamongna Watershed Park. Sediment removal activities would be temporary, are expected to occur only in the drier months (April to December, excluding holidays). It is expected that these activities will often not be adjacent to the Oak Grove area of Hahamongna

Watershed Park. The Proposed Project would result in temporary limitations on the recreational use of the Proposed Project site and some of the adjacent trails. Most of these areas would be reopened seasonally or intermittently throughout the sediment removal process. In addition, temporary impacts to designated recreational facilities and trails will be minimized through advance communication and redirection to the nearest facility in the vicinity of the Proposed Project. Furthermore, an east-west trail crossing will continue to provide access at the north end of the reservoir. At the south end of the reservoir, after the reservoir ingress and egress ramps have been fully constructed, access to the upper east side Arroyo Seco Trail from La Cañada Verdugo Road will be maintained; and the linkage from the west side Arroyo Seco Trail and the Flint Wash Trail to the upper east side Arroyo Seco Trail (crossing Devil's Gate Dam and also continuing south to the Rose Bowl) will be available after construction activities have ended each day and on nonworking days.

Potential impacts due to the Proposed Project's truck trips were analyzed in the Draft EIR, Section 3.16, Transportation and Traffic. As listed in that section, a single intersection in the immediate vicinity of the Proposed Project site will have a potentially significant impact. In practice, hauling rates and routes may be adjusted to help reduce impacts, depending on operational need. Also as discussed in the Draft EIR, Section 3.16, Transportation and Traffic, TRANSPORTATION-3, modifications to traffic conditions by the Proposed Project will consist of roadway restriping. These changes would not alter existing roadway use or substantially increase hazards. Thus, impacts related to traffic hazards would be less than significant. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the Proposed Project site.

Air quality and noise impacts associated with truck traffic were analyzed in the Draft EIR in Sections 3.5 and 3.14, respectively. As discussed in the Draft EIR, Section 3.14, with implementation of Mitigation Measure MM N-1, noise impacts would be reduced to a level of less than significant. LACFCD has conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed the United States (U.S.) Environmental Protection Agency's (EPA's) 2007 standards for emissions. Therefore, in order to further reduce emissions, Mitigation Measure MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump trucks that meet or exceed EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality, including those associated with health effects, will be reduced to less than significant.

As discussed in the Draft EIR, Section 3.10.6, Impacts and Mitigation, HAZARDS-1, Sediment Removal/Reservoir Management, no hazardous levels of the contaminants were detected in the sediment. Dust impacts from the Proposed Project were carefully evaluated, as discussed in the Draft EIR, Section 3.5.6, Impacts and Mitigation, AIR QUALITY-2, Sediment Removal. The Proposed Project's activities, including excavation, grading, material loading, and hauling, would result in less than significant dust emissions due to the Proposed Project's use of best management practices and would be in full compliance with South Coast Air Quality Management District's (SCAQMD's) fugitive dust regulations.

See Response to Comment 242-1. Alternative 3, Configuration D, is the Environmentally Superior Alternative. Alternative 3, Configuration D affects the least amount of habitat of all the action alternatives while still achieving Proposed Project objectives (see Section 4.6 of the Final EIR). This alternative would provide a buffer on the west side of the reservoir that would allow for the movement of wildlife. Alternative 3, Configuration D, Option 1 provides a more natural configuration for the reservoir by having two branches to carry water and sediment toward the face of the dam, avoiding

disturbing a significant portion of existing vegetation. To further reduce the Proposed Project's footprint, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2, which drastically reduces the project's footprint of 120 acres down to 71 acres, would avoid excavation of the western branch, thereby providing a greater habitat buffer on the west side of the reservoir. In addition, the maintenance areas would be smaller than the original sediment removal footprint, allowing for habitat to reestablish and providing additional areas for wildlife movement. A footprint any smaller would decrease the volume removed and the ultimate capacity of the reservoir, which would fail to meet Proposed Project objectives.

Response to Comment 242-11:

Methodology for determining impacts to recreation is found in the Draft EIR, Section 3.15.5. The City of Pasadena General Plan and the Hahamongna Watershed Park Master Plan were utilized to aid in the development of this analysis. Interviews with several individuals associated with various recreational activities that take place in and around the Proposed Project site also provided information for this analysis. Additionally, site visits were conducted, and aerial and topographic maps were examined to determine existing recreational uses. Locations of existing designated recreational facilities in and near the Hahamongna Watershed Park were mapped with the Proposed Project boundaries.

See Response to Comment 242-10.

Response to Comment 242-12:

See Response to Comment 242-10.

Response to Comment 242-13:

As discussed in Section 3.6.6 of the Draft EIR, Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats. In addition, sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays). Wildlife species currently found in the Proposed Project area would be expected to either remain in the undisturbed areas of the reservoir outside the Proposed Project area or to reestablish once sediment removal activities have been completed.

See Response to Comment 242-10.

Response to Comment 242-14:

The Draft EIR, Section 3.15 Recreation analyzes impacts to other recreational facilities due to relocation of some uses. As noted in the Draft EIR, "due to the number of other recreational facilities and trails in the vicinity, it is anticipated that these visitors will be dispersed throughout the area and that no single park or facility will experience a substantial increase in use. Therefore, the Proposed Project will not increase use of other existing parks or recreation facilities such that substantial physical deterioration of these facilities will occur or be accelerated."

Response to Comment 242-15:

See Responses to Comments 242-10 and 242-11.

Response to Comment 242-16:

Although the sediment removal phase of the Proposed Project will occur over a five-year period, the removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays), as described in the Draft EIR, Section 2.5.1, Sediment Removal Phase, Project Schedule.

Comment regarding economic impacts to surrounding homeowners has been noted.

Under CEQA, the lead agency is not required to analyze an economic impact associated with a project in the EIR; as Section 15131(a) of the CEQA Guidelines states: "Economic or social effects of a project shall not be treated as significant effects on the environment." Moreover, CEQA allows economic analysis in the administrative record only if the basis for infeasibility, and thus rejection of a mitigation or alternative, is economic, as described in CEQA Guidelines Sections 15091(a)(3) and 15364. Economic and social factors can be considered by a lead agency when reaching a decision on a project; however, such an evaluation is separate from the process of preparing and certifying an EIR, which is concerned with evaluating the significant environmental effects of a project. See also *Bakersfield Citizens for Local Control v. City of Bakersfield* (2004) 124 Cal.App. 4th 1184.

Response to Comment 242-17:

The Draft EIR analyzes impacts at the Proposed Project site and along the haul routes. Figures 2.5-2 through 2.5-4 depict the location of the haul routes to the sediment disposal sites and the Scholl Canyon Landfill. Analysis of air quality, noise, and traffic along the haul routes is included in the Draft EIR including in Sections 3.5 Air Quality, 3.14 Noise and Vibration, and 3.16 Transportation and Traffic. Additional information on the haul routes to the disposal sites can be found in the Traffic Report in Appendix J.

Response to Comment 242-18:

See Response to Comment 242-4 regarding public noticing. The traffic impacts were analyzed in the Draft EIR Section 3.16 Transportation and Traffic. As noted in the analysis, no mainline freeway segments will be significantly impacted by the Proposed Project. Therefore, no new lanes are needed on the freeways. Both the Air Quality and Greenhouse Gas Emissions sections of the Draft EIR, Sections 3.5 and 3.9 respectively analyze air quality impacts including the addition of traffic to the roadways.

Response to Comment 242-19:

Comment noted. The comments have been responded to above.

From: Sophia Hansen
To: reservoircleanouts
Subject: Devil"s Gate Reservoir Sediment Removal and Management Project
Date: Wednesday, January 22, 2014 7:18:55 AM

To:
County of Los Angeles County
Department of Public Works
Water Resources Division
Attn: Reservoir Cleanouts Program
P.O. Box 1460

RE Devil's Gate Reservoir Sediment Removal and Management Project

I am a 33-year resident of the La Crescenta-La Canada-Altadena area and currently live a half a block away from Devil's Gate dam. I run on a daily basis around the dam as well as take my 6-year old son bike riding around the dam as well. My husband, daughter and eldest son are avid mountain bike riders who ride around the dam weekly. My fondest times running around the dam is when I see the wild life habit in action. I recall one afternoon while running I witnessed a red-tailed hawk pick up a snake and fly across the air with it...this was nature at it's finest. Another memorable moment was when I witnessed a flock of 19 snowy egrets land on the tree near the pond nearest to the oak tree that grows next to the main gated road. Yes, I literally counted each bird because I was so awestruck at the magnificence and volume of snowy egrets flying together and landing together. This moment stopped me dead in my tracks from running just so I could watch them in wonder.

Comment 243-1

The other memorable moment that I've enjoyed the dam was when the space shuttle flew by. We've enjoyed stabilizing the trails so we can ride our horses around the dam and up the trails. My son and I have spent many days walking around the dam and he even learned how to ride his bike around the dam when he was 2 and a half. Needless to say our mountains and Devil's Gate Dam have provided me and my family so many priceless and enjoyable moments in our lives and it's a tragedy that a conglomerate corporation that is five times removed from the beauty and bounty of this natural habitat and finds it acceptable to destroy one of the few remaining natural habitats in the name of the All Mighty Dollar.

Concerns:

Recently, we've become aware of the County's project for Devil's Gate sediment removal and management and the availability of the draft environmental impact report (DEIR). In addition, we have been advised that the County is planning a pipeline to pull water from Devil's Gate to Eaton Wash at essentially the same time. We know the recreational impact has been grossly underestimated and biased and that it's imperative that mitigation measures are considered and evaluated. We also know that the impact on traffic while considered an unavoidable and significant result of the proposal, the reports also do not accurately reflect the adverse effects and impacts on the surrounding communities, including Linda Vista and the Rose Bowl, especially as it pertains to the proposed pipeline. It's imperative that the environmental impact reports accurately reflect the adverse effects on the constituents who are both recreational users and residents of the the surrounding communities of Devil's Gate dam, including Pasadena, Altadena, Linda Vista, La Vina, La Canada-Flintridge, Montrose, La Crescenta. and Chevy Chase Canyon.

Comment 243-2

Notable concerns are the following:

Comment 243-3

Recreation - According to the DEIR, use of the park facilities may be less desirable due to construction-related emissions, noise, dust, visual, and traffic impacts associated with the sediment removal. It is stated in the DEIR that "recreational users may choose to visit other area parks, recreational facilities, or trails due to the temporary access restrictions or the indirect effects of construction-related activities during reservoir management activities." The DEIR fails to recognize that there are no other park options in the area that offer the unique features that Devil's Gate dam and its natural habit offers. Recreational uses such as horse-back riding, disc golf, ornithological societies, and environmental enthusiasts have no alternatives within a 20 mile radius. These activities are endemic to Devil's Gate dam and is what brings people at large to the area as well as why myself and other homeowners have chosen to purchase real estate in this particular location. This project greatly adversely impacts my real estate value as well as the personal reasons I've chosen to reside in this particular area of Altadena.

Comment 243-4

The dirty little secret that is the report fails to refer to and none of the powers that be want to reveal is the permanent desecration of Devil's Gate dam natural habitat.

Comment 243-5

Traffic - The traffic impacts on the community as well as the Woodbury Corridor and New York Drive in Altadena as a result of this project and the related pipeline have not bee accurately nor adequately addressed and no assurances provided to curb the negative impact. Nor have their been any preventatives presented to alleviate the disruption of natural flow of traffic. Since the Windsor/Arroyo freeway entrances exits are extremely popular and heavily used, the report does not address this.

Comment 243-6

Beyond the traffic impact is the human risk factor. On or about the year 2010 the City of Pasadena inadequately re-striped the northbound and southbound Windsor Ave. thereby eliminating the safety zone for cyclists riding on Windsor Ave. This inherently creates a potential litigation quagmire adverse to the City of Pasadena. This safety zone is currently almost non-existent with everyday commuters and is most assuredly eliminated with heavy utility trucks and semi-trucks traveling northbound and southbound on Windsor Ave. This creation of this situation by the county of Los Angeles Department of Public Works Water Resources Division puts them, the City of Pasadena, and the private utility trucks and corporations and anyone else involved in the project culpable during litigation should an accident or multiple accidents arise from this removal event, especially since each of the governing bodies have been forewarned about the potential health risks and safety risks involved in this proposed project.

Comment 243-7

Furthermore, there is extreme suspicion regarding the failure to mention or address the pipeline project described in the March 2013 Devil's Gate and Eaton Storm Water Flood Management Project Proposition 1-E grant funding request.

Comment 243-8

And finally, due the extreme health hazards and high risk to the respiratory health of the children in the surrounding area as a result of this project there is a potential class action lawsuit in the coming years. The city of Los Angeles and the County of Los Angeles have been advised and forewarned of the extreme adverse health risks and effects on the children in the surrounding schools including the many early childhood schools and preschools as well as the high schools and elementary schools in the surrounding areas including: Crestview Preparatory School, Child Educational Center, Saint Francis High School, La Canada High School, Paradise Canyon,

Comment 243-8 continued

Flintridge Preparatory School, the magnet schools in Altadena, Muir High School and others. There is a huge population of youth and future constituents that each of the governing factions are putting at risk.

Sincerely,

Sophia Hansen
Altadena, CA 91001

Response to Comment Letter #243 (Sophia Hansen)

Response to Comment 243-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. Los Angeles County Flood Control District (LACFCD) recognizes that the area is an important area for recreation, as outlined in Section 3.15, Recreation/Public Services. LACFCD notes, as described in the Draft Environmental Impact Report (EIR), the many recreational opportunities in the reservoir including hiking, passive recreation, and bird watching.

Response to Comment 243-2:

Impacts to recreation were analyzed in the Draft EIR, Section 3.15. The Proposed Project will not limit the use of the Oak Grove area of Hahamongna Watershed Park. Sediment removal activities would be temporary, are expected to occur only in the drier months (April to December, excluding holidays). It is expected that these activities will often not be adjacent to the Oak Grove area of Hahamongna Watershed Park. The Proposed Project would result in temporary limitations on the recreational use of the Proposed Project site and some of the adjacent trails. Most of these areas would be reopened seasonally or intermittently throughout the sediment removal process. In addition, temporary impacts to designated recreational facilities and trails will be minimized through advance communication and redirection to the nearest facility in the vicinity of the Proposed Project. Furthermore, an east-west trail crossing will continue to provide access at the north end of the reservoir. At the south end of the reservoir, after the reservoir ingress and egress ramps have been fully constructed, access to the upper east side Arroyo Seco Trail from La Cañada Verdugo Road will be maintained; and the linkage from the west side Arroyo Seco Trail and the Flint Wash Trail to the upper east side Arroyo Seco Trail (crossing Devil's Gate Dam and also continuing south to the Rose Bowl) will be available after construction activities have ended each day and on nonworking days.

The Devil's Gate Water Conservation Project is a separate project from the Proposed Project, and those impacts will be analyzed in a separate environmental document. The Proposed Project does not involve construction of a pipeline. The traffic impacts associated with the Proposed Project were accurately analyzed as described in the Draft EIR, Section 3.16 Transportation and Traffic, including impacts to surrounding communities. The Draft EIR, Section 3.16 Transportation and Traffic, included the Devil's Gate Water Conservation Project in the cumulative analysis.

Potential impacts due to the Proposed Project's truck trips were analyzed in the Draft EIR, Section 3.16, Transportation and Traffic. As listed in that section, a single intersection in the immediate vicinity of the Project Site will have a potentially significant impact. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the project site. Additionally, hauling traffic will not occur on Windsor Avenue north of Oak Grove Drive.

Response to Comment 243-3:

See Response to Comment 242-2.

Comment regarding economic impacts to surrounding homeowners has been noted.

Response to Comment 243-4:

As discussed in Section 3.6.6 of the Draft EIR, Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats. In addition, sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays). Wildlife species currently found in the Proposed Project area would be expected to either remain in the undisturbed areas of the reservoir outside the Proposed Project area or to reestablish once sediment removal activities have been completed.

The Draft EIR concluded that Alternative 3 is the Environmentally Superior Alternative. Alternative 3, Configuration D affects the least amount of habitat of all the action alternatives while still achieving Proposed Project objectives (see Section 4.6 of the Final EIR). This alternative would provide a buffer on the west side of the reservoir that would allow for the movement of wildlife. Alternative 3, Configuration D, Option 1 provides a more natural configuration for the reservoir by having two branches to carry water and sediment toward the face of the dam, avoiding disturbing a significant portion of existing vegetation. To further reduce the Proposed Project's footprint, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2, which drastically reduces the project's footprint of 120 acres down to 71 acres, would avoid excavation of the western branch, thereby providing a greater habitat buffer on the west side of the reservoir. In addition, the maintenance areas would be smaller than the original sediment removal footprint, allowing for habitat to reestablish and providing additional areas for wildlife movement.

Response to Comment 243-5:

See Response to Comment 242-2.

Response to Comment 243-6:

As discussed in the Draft EIR, Section 3.16, Transportation and Traffic, TRANSPORTATION-3, modifications to traffic conditions by the Proposed Project will consist of roadway restriping. These changes would not alter existing roadway use or substantially increase hazards. Thus, impacts related to traffic hazards would be less than significant. Additionally, hauling traffic will not occur on Windsor Avenue north of Oak Grove Drive.

Response to Comment 243-7:

See Response to Comment 242-2.

Response to Comment 243-8:

Air quality impacts associated with truck traffic were analyzed in the Draft EIR in Section 3.5. LACFCD has conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed the United States (U.S.) Environmental Protection Agency's (EPA's) 2007 standards for emissions. Therefore, in order to further reduce emissions, Mitigation Measure MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump trucks that meet or exceed EPA's 2007 emission standards. With implementation of Mitigation

Measures MM AQ-1 and MM AQ-2, impacts to air quality, including those associated with health effects, will be reduced to less than significant.

As discussed in the Draft EIR, Section 3.5, the Health Risk Assessment (HRA) analyzed both the cancer-related and noncancer-related acute (short-term) and chronic (long-term) impacts from project-related emissions. The HRA analysis found the Proposed Project would result in less than significant impacts for both the cancer-related and noncancer-related acute short-term and long-term impacts.

From: Susan Rudnicki
To: reservoircleanouts
Subject: Fwd: Comments on Devil's Gate Reservoir Sediment Removal and Management Project Draft Environmental Impact Report (DEIR), State Clearinghouse No. 2011091084
Date: Wednesday, January 22, 2014 11:37:10 AM

Comment 244-1

Department of Public Works---I have just received a reject message for my comments. It appears, on checking, that the address was not formatted properly, as I addressed it to ".org" and not ".gov" Why it took over 24 hours to advise me the note was undeliverable is strange..... Please advise if this is going to render my carefully crafted letter of remarks on the Hahamonga Watershed Park proposed "project" invalid for coming in under the deadline. It is time stamped in the original message Date: Tue, Jan 21, 2014 at 9:44 AM so this would seem to verify compliance for submission I await your response
Susan Rudnicki

---------- Forwarded message ----------
From: **Susan Rudnicki** <susanrudnicki@gmail.com>
Date: Tue, Jan 21, 2014 at 9:44 AM
Subject: Comments on Devil's Gate Reservoir Sediment Removal and Management Project Draft Environmental Impact Report (DEIR), State Clearinghouse No. 2011091084
To: reservoircleanouts@dpw.lacounty.org

County of Los Angeles
Department of Public Works
Water Resources Division
Attn: Reservoir Cleanouts Program
P.O. Box 1460
Alhambra, California 91802-1460

Department of Public Works---

Comment 244-2

As a member of the impacted public citizenry, I am submitting comments for the record regarding the DEIR report and the proposed project it "describes".

Comment 244-3

Do NOT make the assumption, based on my address in the beach area, that I am not acquainted fully with this issue, the nature of the operations of DWP and alleged transparency, or the vastly destructive scope of this project. The geologic processes that convey sediments to our beaches begin in the foothills (and higher) and these beaches have been rapidly eroding since the advent of increased sediment "management" by DPW---erosion which is now being exacerbated by Climate Change. Yet, DPW continues to operate in its "plumbing mindset", as if in the last 80 years no advancement in ecological, biological, and geological knowledge has accrued. As a homeowner in the LA Basin who has friends I visit in Altadena, Pasadena, and Sierra Madre, I am a frequent visitor to the trails of the area under scope for this egregious project.

Comment 244-4

There are significant impacts the DPW analysis completely ignores in its rush to

Comment 244-4 continued

denude and destroy a thriving wildlife habitat and a recreational outlet zone for beleaguered urban citizens. The methods employed to supposedly make the area "safe" harken to a last century human-devised "bulldoze and bury" model that makes NO long-term sense in geologic terms, environmental impact terms, or financial terms.

The DEIR is seriously deficient, non-compliant with CEQA requirements, and ultimately flawed as a template for work in Hahamonga watershed park.

Comment 244-5

Below are particularly grating deficiencies noted in my visits to hike at the Hahamonga Park trails.

Comment 244-6

The supposed "public announcement" notices posted at various points in the park are pathetically poor advisement to users. Under CEQA, users of the Park and the land proposed for sediment removal are considered an "impacted group". One has the clear impression the city was exercising the absolute lowest possible meeting of the requirement to "advise". I saw only TWO notices, posted on letter-head, under scratched Plexi-glass, in areas divorced from the larger, general information signs which give rules and regulations about all manner of behavior allowed in the park and other information. My asking many trail users, over the course of some weeks, if they had seen these low-profile signs or knew ANYTHING about the proposed project or its scope as laid out by DPW, was that NONE of them knew about it. It was clear to me the subversion of public opinion by DPW to avoid outcry and push back by impacted users could not have been more successful. Though an informal data collection of the numbers of trail riders, walkers, bird watchers, and cars coming/going from the parking areas would indicate a great interest in the opportunities afforded at Hahamonga, the DPW appears to have made no quantitative or qualitative analysis of these usages. How can this document purport to be a complete analysis of the issues when the thousands of users and adjacent homeowners know nothing about it or what they will lose if the City turns this area into a lifeless, denuded "flood control" channel?

Comment 244-7

I am appalled and dismayed by the arrogance and lack of transparency continually employed by the DPW, using citizen's monies, to advance a ecosystem destruction program that has no relevance to modern education or understanding of immutable Nature. The dust, noise, diesel fumes, traffic impacts to surrounding roads and freeways goes far beyond the site just around the proposed project---and DPW ignores these issues, as well.

Comment 244-8

We, in the Los Angeles Basin, are learning that government agencies often act in renegade fashion, writing self-serving documents, and loathe the participation of impacted citizens on these "projects" As was amply seen in the destructive bulldozing of the Sepulveda Basin Wildlife Refuge by the Army Corps of Engineers over the Christmas holidays in 2012, we have learned that no amount of data gathering, documentation of existent features, lifeforms, and public rest spaces (as compiled in a 500 page examination by Tetra-Tech Inc.) will stop the summary and capricious destruction of irreplaceable wildlife and recreational resources when the "State" tries to justify a "emergency"

Comment 244-9

Thus, I reject the Devil's Gate Reservoir Sediment Removal and Management Project Draft Environmental Impact Report--for all the reasons noted above and many more that I have not detailed.

Susan Rudnicki
804 Fifth St
Manhattan Beach, CA 90266

Response to Comment Letter #244 (Susan Rudnicki)

Response to Comment 244-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. The comment letter has been recorded and included in this Response to Comments document.

Response to Comment 244-2:

The specific comments are responded to below.

Response to Comment 244-3:

Los Angeles County Flood Control District (LACFCD) notes that the commenter is a frequent visitor to the trails in the area of the Proposed Project. LACFCD also notes that the commenter disapproves of the Proposed Project methods.

The Proposed Project will not decrease the current amount of sediment that flows downstream and therefore would not contribute to the erosion of beaches. Also as noted in the Sediment Management Strategic Plan (SMSP), "Without human intervention, most Southern California beaches would naturally be narrow and rocky. The wide beaches in Southern California were created and have been maintained by various agencies through artificial beach nourishment projects (also referred to as beach fill projects) and the construction of protective coastal structures since the 1930s." In addition, the SMSP states, "Since the Los Angeles River changed course in 1825, the largest waterway reaching this region of the coast is Ballona Creek, which has an estimated annual sediment yield of less than 50,000 cubic yards and delivers generally fine-grained sediment that is not appropriate for beach nourishment." For general information on beach nourishment, please see Section 6.5.1 of LACFCD's Sediment Management Strategic Plan Sediment Management Strategic Plan, which can be viewed here:
http://dpw.lacounty.gov/lacfcd/sediment/files/FullDoc.pdf

Response to Comment 244-4:

The Draft Environmental Impact Report (EIR) is adequate and compliant with California Environmental Quality Act (CEQA) regulations.

As discussed in Section 3.6.6 of the Draft EIR, Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats. In addition, sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays). Wildlife species currently found in the Proposed Project area would be expected to either remain in the undisturbed areas of the reservoir outside the Proposed Project area or to reestablish once sediment removal activities have been completed.

Impacts to recreation were analyzed in the Draft EIR, Section 3.15. The Proposed Project will not limit the use of the Oak Grove area of Hahamongna Watershed Park. Sediment removal activities would be temporary, are expected to occur only in the drier months (April to December, excluding holidays). It is expected that these activities will often not be adjacent to the Oak Grove area of Hahamongna Watershed Park. The Proposed Project would result in temporary limitations on the recreational use of

the Proposed Project site and some of the adjacent trails. Most of these areas would be reopened seasonally or intermittently throughout the sediment removal process. In addition, temporary impacts to designated recreational facilities and trails will be minimized through advance communication and redirection to the nearest facility in the vicinity of the Proposed Project. Furthermore, an east-west trail crossing will continue to provide access at the north end of the reservoir. At the south end of the reservoir, after the reservoir ingress and egress ramps have been fully constructed, access to the upper east side Arroyo Seco Trail from La Cañada Verdugo Road will be maintained; and the linkage from the west side Arroyo Seco Trail and the Flint Wash Trail to the upper east side Arroyo Seco Trail (crossing Devil's Gate Dam and also continuing south to the Rose Bowl) will be available after construction activities have ended each day and on nonworking days.

Response to Comment 244-5:

Specific comments have been responded to below.

Response to Comment 244-6:

Per CEQA Guidelines Section 21902 (b)(3), notice shall be given to the last known name and address of all organizations and individuals who have previously requested notice and shall also be given by at least one of the following procedures:

- publication in a newspaper of general circulation in the area affected by the Proposed Project
- posting of notice by the lead agency on and off site in the area where the Proposed Project is to be located
- direct mailing to the owners and occupants of contiguous property shown on the latest equalized assessment roll

The notices for the Proposed Project, the Notice of Preparation (NOP), and the Notice of Availability/Notice of Completion (NOA/NOC) were:

- sent to agencies, organizations, and individuals who have previously requested notices, in addition to other area agencies and organizations
- published in local newspapers, the *San Gabriel Valley Tribune* and the *Pasadena Star News*
- posted on and off site
- mailed to over 1,100 owners and occupants of contiguous property shown on the latest equalized assessment roll
- filed with the County Clerk and the State Clearinghouse
- posted at eight local libraries
- posted on the LACDPW website

Therefore, notice for the Proposed Project was adequate, as the notice efforts went beyond the CEQA Guidelines requirements.

See Response to Comment 244-4.

As part of the outreach effort, the Los Angeles County Department of Public Works (LACDPW) has reached out to recreational users, including the Pasadena Audubon Society, Rose Bowl Riders, Tom Sawyer Camps, Oak Grove Disc Golf Club, and MACH-1.

Response to Comment 244-7:

See Response to Comment 244-6. LACFCD was transparent throughout the EIR process in meeting with stakeholders, elected officials, and organizations, as well as holding multiple community meetings to discuss the Draft EIR. LACFCD held three community meetings to inform the public of the Proposed Project, Alternatives, and the results of the Draft EIR. The meetings included a presentation, workshops where the public could ask specific questions about the project and potential impacts and had the opportunity to submit formal comments. Members of the public were able to ask questions or pose comments either in a group setting after the presentation or at the individual workshop stations.

The Draft EIR did analyze impacts to air quality, noise, and traffic on the surrounding roads and freeways, as well as at the project site. The analysis is included in the Draft EIR in Sections 3.5 Air Quality, 3.9 Noise and Vibration, and 3.16 Transportation and Traffic.

Air quality and noise impacts associated with truck traffic were analyzed in the Draft EIR in Sections 3.5 and 3.14, respectively. As discussed in the Draft EIR, Section 3.14, with implementation of Mitigation Measure MM N-1, noise impacts would be reduced to a level of less than significant. LACFCD has conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed the United States (U.S.) Environmental Protection Agency's (EPA's) 2007 standards for emissions. Therefore, in order to further reduce emissions, Mitigation Measure MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump trucks that meet or exceed EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality, including those associated with health effects, will be reduced to less than significant.

Dust impacts from the Proposed Project were carefully evaluated, as discussed in the Draft EIR, Section 3.5.6, Impacts and Mitigation, AIR QUALITY-2, Sediment Removal. The Proposed Project's activities, including excavation, grading, material loading, and hauling, would result in less than significant dust emissions due to the project's use of best management practices and would be in full compliance with South Coast Air Quality Management District's (SCAQMD's) fugitive dust regulations.

Potential impacts due to the Proposed Project's truck trips were analyzed in the Draft EIR, Section 3.16, Transportation and Traffic. As listed in that section, a single intersection in the immediate vicinity of the Proposed Project site will have a potentially significant impact. In practice, hauling rates and routes may be adjusted to help reduce impacts, depending on operational need. As discussed in the Draft EIR, Section 3.16, Transportation and Traffic, truck traffic associated with the Proposed Project will not cause any major traffic impacts at the studied freeway segments along any of the Haul Routes. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the Proposed Project site.

Response to Comment 244-8:

See Response to Comments 244-6 and 244-7.

Response to Comment 244-9:

LACFCD notes that the commenter does not support the Draft EIR in its current form.

From: Tim Martinez
To: reservoircleanouts
Subject: Devil"s Gate Reservoir Sediment Removal and Management Project
Date: Tuesday, January 21, 2014 9:14:43 PM

Comment 245-1 I am writing to submit my comments for the Devil's Gate Reservoir Sediment Removal and Management Project DEIR. I do not believe any of the proposed alternatives for sediment removal behind Devil's Gate Dam are acceptable, and request that the final EIR consider the following:

Habitat Destruction

- Comment 245-2 Study the effects of an increase in herbicide application that would become necessary by permanently clearing the Hahamongna basin of it's habitat on a yearly basis.
- Comment 245-3 Study the impact of destroying trail networks and the vast open space of Hahamongna, behind Devil's Gate Dam on the recreational users of Hahamongna Watershed Park, along with local high school cross-country teams who utilize the park.
- Comment 245-4 Study the impact that permanently scraping the basin would have on local wildlife corridors. The alternatives as presented in the DEIR would all destroy a vital habitat corridor connecting the Arroyo Seco and Angeles National Forest with the San Rafael Hills and Arroyo Seco habitat further south at Debs Park in Los Angeles. Bears, mule deer, coyotes and a recently discovered bobcat at Debs Park in Los Angeles are all known to utilize this irreplaceable habitat corridor which is threatened with destruction under the current alternatives.
- Comment 245-5 This area is a superfund cleanup site. Would any toxic materials become exposed through the sediment removal process?
- Comment 245-6 Study the impacts on the health of the surrounding community that would result from exposing buried ash deposited in the sediment behind Devil's Gate Dam during the sediment removal process.
- Comment 245-7 Study the inevitable increase in invasive plant species which is sure to occur with a permanent removal of native habitat behind the dam, along with the increased fire risk which such dried, invasive mustards and grasses will present.

Traffic

- Comment 245-8 Any route chosen for County trucks to carry away loads of removed sediment from the dam will be heavily used by hundreds of new drivers from the surrounding local high schools. Flintridge Sacred Heart Academy, Hillside Academy, La Canada High School, Flintridge Preparatory School, and Saint Francis High School students will all be on the road with County trucks, and many of these students are sixteen-year-old new drivers and especially prone to car accidents. 425 truck trips digging out sediment five or six days a week on these roads is an accident waiting to happen.
- Comment 245-9 The above listed schools, along with the surrounding community and

Comment 245-9 continued

surrounding elementary schools will be more prone to asthma, cancer, and other diseases due to so many truck trips. Is it really necessary to destroy so much habitat and to conduct this sediment removal in so short a timespan as five years?

Conclusion

Ultimately, you should change this plan from a five-year clean-out of the dam (following years of neglect) to a more sustainable model of sediment management which would remove the accumulation of debris behind Devil's Gate Dam on a yearly basis, and on a much smaller scale. I support the Arroyo Seco Foundation's plan for sustainable sediment removal, and urge you to adopt it.

Comment 245-10

- Adopt a 20 year program for sediment removal. Rather than removing 4 MCY in five years, remove an initial 160,000 cubic yards, and then maintain a much smaller area, closer to the Dam, on a yearly basis.
- Use the natural stream flow to move sediment down the Arroyo Seco naturally.

This plan would save the precious riparian habitat behind the dam, reduce pollution and traffic in the area considerably, save money, and keep downstream communities safe, while sustainably and more regularly removing sediment buildup behind Devil's Gate Dam. Please join members of the community in La Canada Flintridge, Pasadena, Altadena, environmental and neighborhood organizations in support of this plan.

Thank you.

Tim Martinez

Response to Comment Letter #245 (Tim Martinez)

Response to Comment 245-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. Los Angeles County Flood Control District (LACFCD) notes that the commenter opposes the alternatives considered in the Draft EIR. The specific comments have been responded to below.

Response to Comment 245-2:

LACFCD will continue to work closely with California Department of Fish and Wildlife (CDFW) and United States (U.S.) Army Corps of Engineers (USACE) regarding mitigation and restoration requirements for the Proposed Project. Weed abatement will be conducted in accordance with CDFW and USACE regulations, and the methods will be outlined in the Project mitigation/restoration plan and Streambed Alteration Agreement and 404 permits.

Response to Comment 245-3:

Impacts to recreation were analyzed in the Draft EIR, Section 3.15. Impacts to recreation would be less than significant. The Proposed Project will not limit the use of the Oak Grove area of Hahamongna Watershed Park. Sediment removal activities would be temporary, are expected to occur only in the drier months (April to December, excluding holidays). It is expected that these activities will often not be adjacent to the Oak Grove area of Hahamongna Watershed Park. The Proposed Project would result in temporary limitations on the recreational use of the Proposed Project site and some of the adjacent trails. Most of these areas would be reopened seasonally or intermittently throughout the sediment removal process. In addition, temporary impacts to designated recreational facilities and trails will be minimized through advance communication and redirection to the nearest facility in the vicinity of the Proposed Project. Furthermore, an east-west trail crossing will continue to provide access at the north end of the reservoir. At the south end of the reservoir, after the reservoir ingress and egress ramps have been fully constructed, access to the upper east side Arroyo Seco Trail from La Cañada Verdugo Road will be maintained; and the linkage from the west side Arroyo Seco Trail and the Flint Wash Trail to the upper east side Arroyo Seco Trail (crossing Devil's Gate Dam and also continuing south to the Rose Bowl) will be available after construction activities have ended each day and on nonworking days.

Response to Comment 245-4:

Sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays). In addition, sediment removal activities would not completely block the Proposed Project site from surrounding habitat, would occur only during the day, and would not interfere with nighttime wildlife activity. Although some wildlife may be temporarily displaced during construction, wildlife would not be physically prevented from moving around and into the basin area. Wildlife species currently found in the Proposed Project area would be expected to either remain in the undisturbed areas of the reservoir outside the Proposed Project area or to reestablish once sediment removal activities have been completed.

The protective Mitigation Measures MM BIO-1, MM BIO-2, MM BIO-3, MM BIO-4, and MM BIO-5 would avoid and minimize any impacts associated with Proposed Project activities. Therefore, the potential impacts to wildlife movement and corridors are anticipated to be less than significant.

Response to Comment 245-5:

As discussed in the Draft EIR, Section 3.10, the U.S. Environmental Protection Agency (EPA) included Hahamongna Watershed Park area on the National Priorities Superfund List due to the presence of detected volatile organic compounds (VOCs) and perchlorate in groundwater originating from the Jet Propulsion Laboratory (JPL) property. The impacted groundwater is at 200 feet below ground surface (bgs); and, as with the Proposed Project, the concentrations of VOCs, organochlorine pesticides, petroleum hydrocarbons (diesel and hydraulic/motor oil range and aromatics), and semi-volatile organic compounds (SVOCs) detected in samples that were collected from Devil's Gate Reservoir are below regulatory thresholds. No perchlorates, the substance of concern from JPL, were found in the soil sample analysis. The JPL Groundwater Cleanup Project is an ongoing project and considered to be part of existing conditions. As discussed in the Draft EIR, Section 3.10, no significant impacts associated with the Proposed Project due to the inclusion of the Hahamongna Watershed Park area on the JPL Superfund List are expected, as the contamination is found in the local groundwater table, not in the sediment. Therefore, the listing of the watershed on the Superfund List does not present a significant hazard to the public or the environment; and no significant impacts associated with the Proposed Project or Alternatives are expected.

Response to Comment 245-6:

As discussed in the Draft EIR, Section 3.5, the Health Risk Assessment (HRA) analyzed both the cancer-related and noncancer-related acute (short-term) and chronic (long-term) impacts from project-related emissions. The HRA analysis found the Proposed Project would result in less than significant impacts for both the cancer-related and noncancer-related acute short-term and long-term impacts.

As part of the geotechnical study for the Proposed Project, a subsurface exploration was performed at four representative locations within the reservoir. Although a distinct ash layer was not observed, a "burn layer" within otherwise "clean" sediments was encountered at depth at three locations. Representative sampling of the burn layer was performed, and the samples were subjected to various environmental laboratory tests to evaluate the presence and concentrations of pertinent and regulated contaminants of concern. None of the contaminants that were detected in the sediment samples exceeded regulatory screening levels for this project and would not be characterized as hazardous.

The airborne transport of dust, including "micro ash," to offsite locations will be controlled during earth removal operations through the Proposed Project's use of best management practices, such as spraying the material with water. In addition, dust monitoring at the property boundaries will confirm the effectiveness of the water spraying. During offsite transport, the sediment will be covered in each truck to further reduce the potential for dust.

Response to Comment 245-7:

A detailed restoration plan will be prepared and provided to CDFW and USACE for review and approval prior to project implementation and to satisfy permitting requirements. The plan will include and address invasive species management, monitoring, and success criteria. Management of these invasive species will reduce the risk of fire danger.

Response to Comment 245-8:

Potential impacts due to the Proposed Project's truck trips were analyzed in the Draft EIR, Section 3.16, Transportation and Traffic. As listed in that section, a single intersection in the immediate vicinity of the Project Site will have a potentially significant impact. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the project site.

As discussed in the Draft EIR, Section 3.16, Transportation and Traffic, TRANSPORTATION-3, modifications to traffic conditions by the Proposed Project will consist of roadway restriping. These changes would not alter existing roadway use or substantially increase hazards. Thus, impacts related to traffic hazards would be less than significant.

Response to Comment 245-9:

See Response to Comments 245-4 and 245-6.

Air quality impacts associated with truck traffic were analyzed in the Draft EIR in Section 3.5. LACFCD has conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed the EPA's 2007 standards for emissions. Therefore, in order to further reduce emissions, Mitigation Measure MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump trucks that meet or exceed EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality, including those associated with health effects, will be reduced to less than significant.

LACFCD proposed a project duration of five years to reduce accumulated sediment in a timely fashion. The goal of LACFCD is to restore reservoir flood capacity as soon as feasible while reducing costs, minimizing the duration of environmental and construction impacts to the surrounding communities, and configuring the reservoir to allow for sustainable future maintenance. Extending the project would prolong the flood risk to downstream communities and increase the construction impacts to the surrounding communities.

Response to Comment 245-10:

LACFCD goes to great lengths to lessen project impacts and maximize efficiencies. As such, many of the points in the Arroyo Seco Foundation's four-point "Slow Program" are compatible with the LACFCD Proposed Project.

For example, the Draft EIR concluded that Alternative 3 is the Environmentally Superior Alternative. Alternative 3, Configuration D drastically reduces the project's footprint of 120 acres down to 71 acres. Additionally, the limited maintenance area for Alternative 3, Configuration D, Option 2 further reduces the permanent habitat impacts down to approximately 51 acres by allowing for site replanting and mitigation to take place within the reservoir footprint. This reduction in project acreages will greatly lessen environmental impacts of the Proposed Project.

LACFCD strives to achieve an efficient, low-cost sediment removal project. Sediment removal rates and trucking operations, now utilizing all low-emissions trucks, as explained in Section 3.5 of the Draft EIR, have been carefully planned for economies of scale to realize maximum efficiencies without major delays in project schedule, thus greatly reducing operating costs. Furthermore, LACFCD has applied for

and received an approximately $28 million grant through the State's Disaster Preparedness and Flood Protection Bond Act of 2006 (Proposition 1E) program. A portion of this grant will be used to help offset the Proposed Project's costs.

While sluicing is not a viable project alternative, as explained in Section 4.7 of the Draft EIR, Flow Assisted Sediment Transport, or FASTing, will be used for maintenance after the project's main sediment removal phase has been completed, as described in Section 2.5.2 of the Draft EIR.

LACFCD is committed to *Public Service that Works*; and by combining almost 100 years of technical expertise and invaluable input from the community, less invasive flood protection will continue to be a reality.

For a more detailed response to the Arroyo Seco Foundation's four-point "Slow Program", please see the response to the Arroyo Seco Foundation's comment letter (Comment Letter #216, Response to Comment 216-16).

January 17, 2014
Patty Sue Jones
311 N. Ave. 66
LA, CA 90042

County of Los Angeles
Department of Public Works
Water Resources Division
Attn. Reservoir Cleanouts Program
P.O. Box 1460
Alhambra, CA 91802-1460

Comment Letter #246

RE: Comments: Draft Environmental Impact Report for Devil's Gate Reservoir Sediment Removal and Management Project

Comment 246-1

I've ridden my horse and walked my dogs in the Hahamongna Watershed Park, daily since 1984. I am a witness to the ecological changes in the terrain of this robust wild area. I've forged swirling waters from the west to the east banks and watched the waters flow diligently through Devil's Gate Dam. It functions just fine, the sediment flows through with the water.

The Hahamongna Watershed Park is alive with water, trees, native plants, deer, coyote, bobcats, snakes, birds, rabbits, squirrels, ducks, toads, snowy white egrets, and blue herons. I've seen a fox and a mountain lion.

Comment 246-2

The Recreational Uses of the Hahamongna that I view daily include: family picnics under live oak trees, bird watchers, scout troops learning nature lessons, Pasadena Police Dept. K9 training, softball and soccer games on the field, dog walkers, equestrians on horses, frisbee disc golfers, mountain bikers, school field trips, guided native plant tours, runners from local schools, parents pushing baby strollers, TSC children campers learning how to trail ride horses, JPL employees walking on their lunch hours, running marathons from the Rose Bowl, Search and Rescue Team training, LA County Fire Dept. firemen running and training, and artists painting landscapes of the Hahamongna.

Comment 246-3

I have witnessed sediment removal several times. A convoy of trucks drove the east side from the dam through the Hahamongna past JPL parking, up the hill and onto Windsor Ave. to the 210 Fwy. East. I have also seen trucks dump sediment from the dam area onto Johnson's field, east side

You have not employed an annual sediment removal program in decades, only occasional removal. Your sediment removal proposals will exter-i minate a rich native habitat of animals and vegetation along with the happiness folks feel when they exercise recreational pleasures in the Hahamongna Watershed Park.

Comment 246-4

If the LA County Dept. of Public Works moves forward with this proposed sediment removal project in the Devil's Gate Dam area of the Hahamongna Watershed Park, I ask that you address in the final EIR the loss of habitat and recreational uses that I have specified in this letter and witness daily in the Hahamongna.

Comment 246-5

I am opposed to your proposal of turning the Hahamongna into a barren wasteland devoid of animals, plants and humans.

Happy Trails, Patty Sue Jones

Patty Sue Jones 311 No. Ave. 66 Los Angeles, CA. 90042 323-255-8641

Response to Comment Letter #246 (Patty Sue Jones)

Response to Comment 246-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration.

After the Station Fire in 2009, the following two storm seasons brought 1.3 million cy of sediment into the reservoir, raising the ground elevations over 18 feet in some locations within the reservoir and burying most of the established vegetation. The sediment removal efforts aim to restore the historic elevations within the reservoir to the conditions existing prior to the impacts caused by the Station Fire. If the reservoir is left in its current state, the flood risk to downstream communities would be left at an unacceptable level.

Response to Comment 246-2:

Los Angeles County Flood Control District (LACFCD) notes, as described in the Draft Environmental Impact Report (EIR), Section 3.15 the many recreational opportunities in the reservoir including hiking, passive recreation, and bird watching. Impacts to recreation were analyzed in the Draft EIR, Section 3.15. The Proposed Project will not limit the use of the Oak Grove area of Hahamongna Watershed Park. Sediment removal activities would be temporary, are expected to occur only in the drier months (April to December, excluding holidays). It is expected that these activities will often not be adjacent to the Oak Grove area of Hahamongna Watershed Park. The Proposed Project would result in temporary limitations on the recreational use of the Proposed Project site and some of the adjacent trails. Most of these areas would be reopened seasonally or intermittently throughout the sediment removal process. In addition, temporary impacts to designated recreational facilities and trails will be minimized through advance communication and redirection to the nearest facility in the vicinity of the Proposed Project. Furthermore, an east-west trail crossing will continue to provide access at the north end of the reservoir. At the south end of the reservoir, after the reservoir ingress and egress ramps have been fully constructed, access to the upper east side Arroyo Seco Trail from La Cañada Verdugo Road will be maintained; and the linkage from the west side Arroyo Seco Trail and the Flint Wash Trail to the upper east side Arroyo Seco Trail (crossing Devil's Gate Dam and also continuing south to the Rose Bowl) will be available after construction activities have ended each day and on nonworking days.

Response to Comment 246-3:

As noted in the Draft EIR in Section 2.2.1, LACFCD History, sediment removal efforts have previously taken place at the reservoir in order to ensure correct functioning of the outlet works and/or to maintain reservoir capacity. Historically, large amounts of sediment have been deposited in the reservoir in short time periods. Between 1935 and 1938 over 1.6 million cubic yards (cy) of sediment, between 1938 and 1943 over 1.95 million cy of sediment, between 1959 and 1966 over 1.75 million cy of sediment, and between 2010 and 2012 over 1.3 million cy of sediment was deposited in the reservoir. Since the 1920 dam construction and prior to the Station Fire in 2009, approximately 10.7 million cy of sediment accumulated in the reservoir; and approximately 8.0 million cy was removed by LACFCD.

LACFCD has executed several sediment removal projects at Devil's Gate Reservoir in the past, with the last major effort being in 1994. Smaller amounts of sediment were removed in 2006, 2009, and as a part of the Interim Measures Project in 2011, 2012, and 2013. Following the 2009 Station Fire, approximately 1.3 million cy of sediment flowed into Devil's Gate Reservoir after just two average water year storm

seasons. In 2010, LACFCD proposed an emergency sediment removal project in response to the large inflow of sediment resulting from the Station Fire.

The Proposed Project is designed to be a long-term plan. Flow Assisted Sediment Transport, or FASTing, will be used for maintenance after the project's main sediment removal phase has been completed. Annual FASTing operations will be implemented to reduce future buildups of sediment in the reservoir and to reduce the need for mechanical removal of sediment from the reservoir. Although FASTing is expected to be an effective means of keeping sediment levels low in the reservoir, it is estimated that typically 13,000 cy of sediment will be removed by excavation annually. A maintenance regime that relies on FASTing greatly reduces the need for and extends the life of future and existing sediment placement sites and improves the future sustainability of the reservoir. Please see Section 2.5.2 of the Draft EIR for more information on future maintenance.

As discussed in Section 3.6.6 of the Draft EIR, Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats. In addition, sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays). Wildlife species currently found in the Proposed Project area would be expected to either remain in the undisturbed areas of the reservoir outside the Proposed Project area or to reestablish once sediment removal activities have been completed.

See Response to Comment 246-2.

Alternative 3, Configuration D affects the least amount of habitat of all the action alternatives while still achieving Proposed Project objectives (see Section 4.6 of the Final EIR). This alternative would provide a buffer on the west side of the reservoir that would allow for the movement of wildlife. Alternative 3, Configuration D, Option 1 provides a more natural configuration for the reservoir by having two branches to carry water and sediment toward the face of the dam, avoiding disturbing a significant portion of existing vegetation. To further reduce the Proposed Project's footprint, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2, which drastically reduces the project's footprint of 120 acres down to 71 acres, would avoid excavation of the western branch, thereby providing a greater habitat buffer on the west side of the reservoir. In addition, the maintenance areas would be smaller than the original sediment removal footprint, allowing for habitat to reestablish and providing additional areas for wildlife movement.

Response to Comment 246-4:

See Response to Comments 246-2 and 246-3. The Draft EIR addresses impacts to biological resources and recreation in Sections 3.6 and 3.15, respectively.

Response to Comment 246-5:

See Response to Comments 246-2 and 246-3.

Rose Bowl Riders, Inc.

Mailing Address: P.O. Box 533, Pasadena, CA 91102

January 17, 2014

County of Los Angeles
Department of Public Works
Water Resources Division
ATTN: Reservoir Cleanouts Program
PO Box 1460
Alhambra CA 91802-1460
reservoircleanouts@dpw.lacounty.gov

RE: Devil's Gate Reservoir Sediment Removal and Management Project

Department of Public Works, Water Resource Division;

Comment 247-1: Rose Bowl Riders (RBR) is a not-for profit, volunteer-operated horse facility and social club in Pasadena, CA with 200 memberships – mostly families. RBR was founded in 1946 and moved to 12 acres in the Hahamongna Watershed Park in the early 1950s. We are located immediately south of JPL. The property consists of horse boarding facilities, riding arenas, turn out pens, a clubhouse, a wrangler residence, and is home to our club, Tom Sawyer Camps and MACH 1.

Comment 247-2: Many of our members have attended the meetings on the Draft Environmental Impact Report for Devil's Gate Reservoir Sediment Removal and Management Project. (DEIR). While we understand the need for removal of the sediment for proper flood control, RBR members have grave concerns about the plan.

Comment 247-3: 1. The RBR property is used every day, year round by members and the community. There are three lesson programs going six days a week, morning to evening. Members ride every day in the arenas and on the trails. The fugitive dust generated from the removal process will adversely affect these riders, both children and adults.

Comment 247-4: 2. RBR is home to 70 horses year-round and up to 100 during the summer months. Daily exposure to fugitive dust will impact the animals evenly more severely than the humans.

Comment 247-5: 3. Proposed closure of trails and access to trails will mean limited ability to utilize our park.

Comment 247-6: 4. The removal of sediment in the willow forest and alluvial scrub areas will leave the area void of native vegetation, destroy needed wildlife habitat, and forever change the beauty of the arroyo.

Comment 247-7

We trust you will consider the negative impacts a project of this magnitude will have on all the users of the Hahamongna Watershed Park and especially your friends at RBR who utilize this wonderful area every day of the year. There must be a way to minimize the negative impact on all of us who use the park and still accomplish the task of protecting our community from flooding.

Sincerely yours,

Ann Regan
President
Rose Bowl Riders, Inc

annregan@sbcglobal.net

Response to Comment Letter #247 (Rose Bowl Riders)

Response to Comment 247-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. Los Angeles County Flood Control District (LACFCD) notes the information regarding the Rose Bowl Riders organization.

Response to Comment 247-2:

LACFCD notes the Rose Bowl Riders' concerns. The specific comments have been responded to below.

Response to Comment 247-3:

Dust impacts from the Proposed Project were carefully evaluated, as discussed in the Draft Environmental Impact Report (EIR), Section 3.5.6, Impacts and Mitigation, AIR QUALITY-2, Sediment Removal. The Proposed Project's activities, including excavation, grading, material loading, and hauling, would result in less than significant dust emissions due to the project's use of best management practices and would be in full compliance with South Coast Air Quality Management District's (SCAQMD's) fugitive dust regulations.

As discussed in the Draft EIR, Section 3.5, the Health Risk Assessment (HRA) analyzed both the cancer-related and noncancer-related acute (short-term) and chronic (long-term) impacts from project-related emissions. The HRA analysis found the Proposed Project would result in less than significant impacts for both the cancer-related and noncancer-related acute short-term and long-term impacts.

Response to Comment 247-4:

Potential effects to horses near the Proposed Project site would be similar to the construction-related impacts from emissions to nearby residents and Hahamongna recreational users. See Response to Comment 247-3. It should be noted that construction activities would be temporary, and construction would occur throughout the reservoir in phases, so the maximum impacts to the horse riding facilities would be much shorter than the five-year duration of the sediment removal phase of the Proposed Project.

Response to Comment 247-5:

Impacts to recreation were analyzed in the Draft EIR, Section 3.15. The Proposed Project will not limit the use of the Oak Grove area of Hahamongna Watershed Park. Sediment removal activities would be temporary, are expected to occur only in the drier months (April to December, excluding holidays). It is expected that these activities will often not be adjacent to the Oak Grove area of Hahamongna Watershed Park. The Proposed Project would result in temporary limitations on the recreational use of the Proposed Project site and some of the adjacent trails. Most of these areas would be reopened seasonally or intermittently throughout the sediment removal process. In addition, temporary impacts to designated recreational facilities and trails will be minimized through advance communication and redirection to the nearest facility in the vicinity of the Proposed Project. Furthermore, an east-west trail crossing will continue to provide access at the north end of the reservoir. At the south end of the reservoir, after the reservoir ingress and egress ramps have been fully constructed, access to the upper east side Arroyo Seco Trail from La Cañada Verdugo Road will be maintained; and the linkage from the

west side Arroyo Seco Trail and the Flint Wash Trail to the upper east side Arroyo Seco Trail (crossing Devil's Gate Dam and also continuing south to the Rose Bowl) will be available after construction activities have ended each day and on nonworking days.

Response to Comment 247-6:

As discussed in Section 3.6.6 of the Draft EIR, Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats. In addition, sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays). Wildlife species currently found in the Proposed Project area would be expected to either remain in the undisturbed areas of the reservoir outside the Proposed Project area or to reestablish once sediment removal activities have been completed.

As noted in the Draft EIR, Section 3.4, Aesthetics and Figures 3.4-1 through 3.4-3, the visual aspects of the Proposed Project site are constantly changing. The Draft EIR does note that the Proposed Project will have significant temporary impacts to aesthetics; however, after the sediment removal phase of the Proposed Project is complete, a habitat restoration plan will be implemented that will allow native plant communities to reestablish outside the reservoir management area. Riparian Herbaceous vegetation is expected to continue to populate and/or reestablish in the management area of the Proposed Project site between maintenance activities.

Alternative 3, Configuration D affects the least amount of habitat of all the action alternatives while still achieving Proposed Project objectives (see Section 4.6 of the Final EIR). This alternative would provide a buffer on the west side of the reservoir that would allow for the movement of wildlife. Alternative 3, Configuration D, Option 1 provides a more natural configuration for the reservoir by having two branches to carry water and sediment toward the face of the dam, avoiding disturbing a significant portion of existing vegetation. To further reduce the Proposed Project's footprint, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2, which drastically reduces the project's footprint of 120 acres down to 71 acres, would avoid excavation of the western branch, thereby providing a greater habitat buffer on the west side of the reservoir. In addition, the maintenance areas would be smaller than the original sediment removal footprint, allowing for habitat to reestablish and providing additional areas for wildlife movement.

Response to Comment 247-7:

The goal of LACFCD is to restore reservoir flood capacity as soon as feasible while minimizing the duration of environmental and construction impacts to the surrounding communities. LACFCD is going to great lengths to keep impacts to a minimum. The Draft EIR analyzed a range of sediment removal amounts and configurations aimed at addressing the diverse concerns of stakeholders. The alternatives presented in the Draft EIR represent the best options available to respond to stakeholders' concerns while adequately reducing flood risk to downstream communities. Alternative 3 was determined to be the Environmentally Superior Alternative that reduces impacts while still meeting Proposed Project objectives.

ZANJA MADRE
1355 Lincoln Ave. · Pasadena CA 91103 · info@zanjamadre.org

Elizabeth Brennan
Mary Ferguson
Veronica Franco
Rishi Kumar
Michelle Matthews
Elizabeth Tang
Iesha Wadala

January 21, 2014

County of Los Angeles
Department of Public Works
Water Resources Division
Attn: Reservoir Cleanouts Program
P.O. Box 1460
Alhambra, CA 91802-1460

Comment Letter #248

Re: Zanja Madre Comments on Draft Environmental Impact Report for Devil's Gate Reservoir Sediment Removal and Management Project

Dear County of Los Angeles,

Board members of Zanja Madre, a nonprofit located in Pasadena, have attended public hearings, reviewed the Draft Environmental Impact Report (DEIR) for the Devil's Gate Reservoir Sediment Removal and Management Project, and the January 16th, 2014 letter from the City of Pasadena regarding the DEIR.

Comment 248-1

Zanja Madre concurs with the concerns as outlined by the City of Pasadena, particularly regarding the need for a long-term approach to sediment removal behind Devil's Gate Dam. While there may seem like a need to remove the sediment build up behind the dam, the process should be slowed down, and supplemented with alternative sustainable methods to mitigate several enviromentally degrading impacts of sediment removal, including poor air quality, destruction of riparian habitat and loss of recreational space.

Comment 248-2

The Project Description section of the DEIR states that there would be, "an estimated maximum of 425 truck round trips per day during excavation activities." This aspect alone impacts residents and sensitive receptors in the area, including nearby schools and residential communities, with an overwhelming amount of noise, air pollution and traffic. As the City of Pasadena advises, a full evaluation should be done on NOx emissions and other pollutants to mitigate any risks to sensitive receptors in the area.

Comment 248-3

The Devil's Gate Reservoir requires a long-term plan for regular maintenance to avoid numerous negative impacts associated with a quick and large-scale plan, such as the alternatives laid out in the DEIR. The issues that have arisen from the Devil's Gate Dam and the Hahamogna watershed, are numerous and fall outside the scope of a singular agency, the Los Angeles County Public Works. Ideally a coalition made up of a broad cross-section of partners including Los Angeles Public Works, surrounding cities, engineers, scientists, activists and laborers, would provide the opportunity to create a long-term comprehensive plan for this ongoing issue of sediment removal.

The Board of Directors

Response to Comment Letter #248 (Zanja Madre)

Response to Comment 248-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. Los Angeles County Flood Control District (LACFCD) notes Zanja Madre's concerns and that the organization concurs with the City of Pasadena's concerns.

The Los Angeles County Flood Control District (LACFCD) was mandated by the State Legislature to provide flood protection and water conservation within its boundaries.

A reservoir storage design capacity of two design debris events (DDEs) below the dam's lowest spillway was determined to be the standard acceptable level of risk at Devil's Gate Dam and Reservoir. The DDE volume of capacity is determined using the January 2006 Los Angeles County Department of Public Works (LACDPW) Hydrology Manual and the March 2006 LACDPW Sedimentation Manual. For Devil's Gate Dam and Reservoir, the required reservoir capacity is 4.0 million cubic yards (cy) (two DDEs) below the spillway elevation of 1,040.50 feet.

The Hydrology Manual (January 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_Hydrology_Manual/2006%20Hydrology%20Manual-Divided.pdf

The Sedimentation Manual (March 2006) can be viewed here:
http://dpw.lacounty.gov/wrd/publication/engineering/2006_sedimentation_manual/Sedimentation%20Manual-Second%20Edition.pdf

Additional information concerning DDE calculation methods has been added to the Final Environmental Impact Report (EIR), Section 2.3, Project Need.

LACFCD proposed a project duration of five years to reduce accumulated sediment in a timely fashion. The goal of LACFCD is to restore reservoir flood capacity as soon as feasible while reducing costs, minimizing the duration of environmental and construction impacts to the surrounding communities, and configuring the reservoir to allow for sustainable future maintenance. Extending the project would prolong the flood risk to downstream communities and increase the construction impacts to the surrounding communities.

Air quality impacts associated with truck traffic were analyzed in the Draft EIR in Section 3.5. LACFCD has conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed the United States (U.S.) Environmental Protection Agency's (EPA's) 2007 standards for emissions. Therefore, in order to further reduce emissions, Mitigation Measure MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump trucks that meet or exceed EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality, including those associated with health effects, will be reduced to less than significant.

As discussed in Section 3.6.6 of the Draft EIR, Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats. In addition, sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays).

Impacts to recreation were analyzed in the Draft EIR, Section 3.15. The Proposed Project will not limit the use of the Oak Grove area of Hahamongna Watershed Park. Sediment removal activities would be temporary, are expected to occur only in the drier months (April to December, excluding holidays). It is expected that these activities will often not be adjacent to the Oak Grove area of Hahamongna Watershed Park. The Proposed Project would result in temporary limitations on the recreational use of the Proposed Project site and some of the adjacent trails. Most of these areas would be reopened seasonally or intermittently throughout the sediment removal process. In addition, temporary impacts to designated recreational facilities and trails will be minimized through advance communication and redirection to the nearest facility in the vicinity of the Proposed Project. Furthermore, an east-west trail crossing will continue to provide access at the north end of the reservoir. At the south end of the reservoir, after the reservoir ingress and egress ramps have been fully constructed, access to the upper east side Arroyo Seco Trail from La Cañada Verdugo Road will be maintained; and the linkage from the west side Arroyo Seco Trail and the Flint Wash Trail to the upper east side Arroyo Seco Trail (crossing Devil's Gate Dam and also continuing south to the Rose Bowl) will be available after construction activities have ended each day and on nonworking days.

Response to Comment 248-2:

See Response to Comment 248-1. As discussed in the Draft EIR, Section 3.5, Air Quality, the air quality analysis takes into account the existing air quality environmental conditions and the location of nearby populations considered sensitive to air pollution and discusses the consequences to air quality related to implementation of all Proposed Project activities. Also, as discussed in Section 3.5, SCAQMD air quality standards were set to protect the health of sensitive individuals (i.e., elderly, children, and the sick). With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality, including those associated with nitrous oxide (NO_x) emissions, will be reduced to less than significant.

As discussed in the Draft EIR, Section 3.14, with implementation of Mitigation Measure MM N-1, noise impacts would be reduced to a level of less than significant and would not be anticipated to disturb sensitive uses, including schools.

Potential impacts due to the Proposed Project's truck trips were analyzed in the Draft EIR, Section 3.16, Transportation and Traffic. As listed in that section, a single intersection in the immediate vicinity of the Proposed Project site will have a potentially significant impact. In practice, hauling rates and routes may be adjusted to help reduce impacts, depending on operational need. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the Proposed Project site.

Response to Comment 248-3:

The Draft EIR analyzes long- range maintenance of the reservoir under the Reservoir Maintenance phase of the Proposed Project and Alternatives. Outside experts, especially those on the Stakeholder Task Force, were consulted during the formation of the Sediment Management Strategic Plan. Information from that consultation was used in the formulation of the Proposed Project and Alternatives. In addition, the purpose of the scoping process was to gather input from outside experts and agencies as well as the public on what the environmental analysis should consider and what alternatives should be analyzed. Information gathered from the scoping process was used in the formulation of the Proposed Project and Alternatives and preparation of the Draft EIR.

After the sediment removal phase has occurred, Flow Assisted Sediment Transport, or FASTing, is proposed to be an integral part of the annual maintenance at Devil's Gate. Annual FASTing operations will be implemented to reduce future buildups of sediment in the reservoir and to reduce the need for mechanical removal of sediment from the reservoir. FASTing is expected to be an effective means of keeping sediment levels low in the reservoir, and a maintenance regime that relies on FASTing greatly reduces the need for and extends the life of future and existing sediment placement sites and improves the future sustainability of the reservoir. Nevertheless, it is estimated that typically 13,000 cy of sediment will be removed by excavation annually. Please see Section 2.5.2 of the Draft EIR for more information on future maintenance.

Comment Letter #249

HILLSIDE
The Hillside School
and Learning Center

EV
SN

MDA

January 17, 2014

Supervisor Michael D. Antonovich
Los Angeles County Fifth District
500 West Temple Street, Rm. 869
Los Angeles, CA 90012

Dear Mr. Antonovich,

Comment 249-1

I know you have probably heard from many people about the flood control project in Hahamongna Watershed Park (HWP) but since I am the Director of The Hillside School and Learning Center, located across the street from the project, I thought I should weigh in on the subject since, we are located directly across from the current planned exit for the trucks.

Comment 249-2

First of all, we agree there needs to be a systematic removal of sediment from the basin. Our concern is the removal estimate shows 400 plus truck-loads exiting from the basin daily in front of our school on Oak Grove Drive. Even the perception of this amount is slowing down the rate of student applications for our school. The noise, pollution, dust, and dirt create other issues for our students. We currently use the park for physical education and parents are already talking about the health hazards associated with this project.

Comment 249-3

Is there any way to re-direct truck traffic through a different route or limit hours of the project to non-school hours or work at night? What about extending the project over a longer period of time?

Comment 249-4

We appreciate all you do for our district and if there is any way of mitigating this situation we would be extremely grateful.

Sincerely,

Robert A. Frank
Executive Director
The Hillside School and Learning Center

4331 Oak Grove Drive, La Cañada Flintridge, CA 91011
Phone: 818.790.3044 | Fax: 818.790.4225 | Email: Frank@hillsidelc.org | Website: www.hillsideforsuccess.org

Response to Comment Letter #249 (Hillside School and Learning Center)

Response to Comment 249-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. Los Angeles County Flood Control District (LACFCD) notes the location of the school, as described in the Proposed Project Description, Section 2.1.6 Surrounding Land Uses. The specific comments made by the Hillside School and Learning Center have been responded to below.

Response to Comment 249-2:

Air quality and noise impacts associated with truck traffic were analyzed in the Draft Environmental Impact Report (EIR) in Sections 3.5 and 3.14, respectively. As discussed in the Draft EIR, Section 3.14, with implementation of Mitigation Measure MM N-1, noise impacts would be reduced to a level of less than significant. LACFCD has conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed the United States (U.S.) Environmental Protection Agency's (EPA's) 2007 standards for emissions. Therefore, in order to further reduce emissions, Mitigation Measure MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump trucks that meet or exceed EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality, including those associated with health effects, will be reduced to less than significant.

Dust impacts from the Proposed Project were carefully evaluated, as discussed in the Draft EIR, Section 3.5.6, Impacts and Mitigation, AIR QUALITY-2, Sediment Removal. The Proposed Project's activities, including excavation, grading, material loading, and hauling, would result in less than significant dust emissions due to the project's use of best management practices and would be in full compliance with South Coast Air Quality Management District's (SCAQMD's) fugitive dust regulations.

As discussed in the Draft EIR, Section 3.5, the Health Risk Assessment (HRA) analyzed both the cancer-related and noncancer-related acute (short-term) and chronic (long-term) impacts from project-related emissions. The HRA analysis found the Proposed Project would result in less than significant impacts for both the cancer-related and noncancer-related acute short-term and long-term impacts.

Response to Comment 249-3:

Potential impacts due to the Proposed Project's truck trips were analyzed in the Draft EIR, Section 3.16, Transportation and Traffic. As listed in that section, a single intersection in the immediate vicinity of the Proposed Project site will have a potentially significant impact. The Draft EIR outlines a 12-hour trucking schedule, with trucking operations on Saturdays as well. This schedule is used to model the most intensive construction operation, which may not be applicable at the site for the duration of the Proposed Project. Typical trucking schedules are estimated to be 8 hours per day on weekdays. In practice, hauling rates and routes may be adjusted to help reduce impacts depending on operational need. In addition, potential use of Alternative 5, Haul Route Alternative, Site Access Option 1, would allow trucks to avoid passing by the Hillside School and Learning Center (See Figure 4.8-1 of the Draft EIR). LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the Proposed Project site.

LACFCD proposed a project duration of five years to reduce accumulated sediment in a timely fashion. The goal of LACFCD is to restore reservoir flood capacity as soon as feasible while reducing costs, minimizing the duration of environmental and construction impacts to the surrounding communities, and configuring the reservoir to allow for sustainable future maintenance. Extending the project would prolong the flood risk to downstream communities and increase the construction impacts to the surrounding communities.

Response to Comment 249-4:

LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize impacts around the Proposed Project site.

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SUITE 504
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(818) 558-3043
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Assembly
California Legislature

MIKE GATTO
ASSEMBLYMEMBER, FORTY-THIRD DISTRICT

COMMITTEES
APPROPRIATIONS
ARTS, ENTERTAINMENT, SPORTS, TOURISM AND INTERNET MEDIA
BANKING AND FINANCE
GOVERNMENTAL ORGANIZATION
WATER, PARKS AND WILDLIFE

Comment Letter #250

January 13, 2014

Mr. Christopher Stone
P.E., Assistant Deputy Director
Water Resources Division
County of Los Angeles Department of Public Works
Attn: Reservoir Cleanouts Program
P.O. Box 1460
Alhambra, CA 91802-1460

RE: Devil's Gate Reservoir Sediment Removal and Management Project

Dear Mr. Stone,

Comment 250-1

I am writing to urge the Los Angeles Department of Public Works to conduct a more extensive analysis of environmental impacts and options associated with the proposed Devil's Gate Reservoir Sediment Removal and Management Project. The proposals released by the Department of Public Works as part of the draft Environmental Impact Report do not fully appreciate the ecosystem which the Hahamongna Watershed Park has become since the Devil's Gate Dam was built in 1920, nor does it fully account for the impact of the proposed project on local schools and residents. While it is imperative that our communities be kept safe from catastrophic events, especially as global climate change contributes to the frequency of extreme weather events, it is also critical that we take a strong stance in favor of protecting our valuable environmental resources from destruction.

Comment 250-2

Proponents of the Sediment Removal Project argue that the Devil's Gate Dam was originally constructed as flood-protection and water-conservation infrastructure, protecting the residents of Pasadena and Los Angeles from dangerous flood waters coursing through the Arroyo Seco watershed. However, over the years sediment buildup behind the dam has transformed this flood-protection infrastructure into a diverse habitat that fosters native plant growth and houses several species of birds and mammals. Like the Salton Sea, this man-made ecosystem now plays a vital role for local wildlife, as well as migratory birds. Additionally, the Hahamongna Watershed Park itself is frequented by bird watchers, hikers, joggers, and families seeking to escape the fast pace of urban life in Los Angeles for the peace of the outdoors. The current proposals, which recommends hauling between 2.4 and 4 million cubic yards of dirt and debris from Hahamongna Watershed Park, threatens to disrupt not only the local ecosystem but also local opportunities for recreation. The draft EIR should be amended to balance the traditional goals of flood protection and water conservation with the new ecological and recreational attributes of the area.

Comment 250-3

The proposed alternatives in the draft EIR also represent an aggressive approach to solving the sediment problem, as oppose to a balanced approach that seeks to minimize impacts on the local

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Comment 250-3 continued

community. The project site abuts several schools, churches, sports facilities, businesses, and private residences, all of which would be affected by the traffic, noise, and air quality problems associated with the project. The Department of Public Works should seriously consider extending the project length to allow for reduced daily truck trips and allow for flexible work hours to prevent working during peak commuting times for local schools and businesses. The Department should also consider changing truck routes to minimize traffic impacts for local residents and commuters and maximizing the use of low-emissions trucks to minimize local air-quality impacts.

Comment 250-4

For these reasons, I encourage the Los Angeles Department of Public Works to reevaluate the project proposals put forth in the draft EIR for the Devil's Gate Reservoir Sediment Removal and Management Project and to develop additional options that better balance the flood-protection needs of the community with the health of local residents and of the local environment. Thank you for your consideration. If you have further questions, please feel free to contact Katerina Robinson in my office at (916) 319-2043.

Very truly yours,

Mike Gatto

Mike Gatto
Chair, Assembly Committee on Appropriations
Assemblyman, 43rd District

Response to Comment Letter #250 (Assembly Member Mike Gatto)

Response to Comment 250-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. The Draft Environmental Impact Report (EIR) analyzes impacts to biological resources and the community.

Response to Comment 250-2:

The Los Angeles County Flood Control District (LACFCD) was mandated by the State Legislature to provide flood protection and water conservation within its boundaries.

A reservoir storage design capacity of two design debris events (DDEs) below the dam's lowest spillway was determined to be the standard acceptable level of risk at Devil's Gate Dam and Reservoir. The DDE volume of capacity is determined using the January 2006 Los Angeles County Department of Public Works (LACDPW) Hydrology Manual and the March 2006 LACDPW Sedimentation Manual. For Devil's Gate Dam and Reservoir, the required reservoir capacity is 4.0 million cubic yards (cy) (two DDEs) below the spillway elevation of 1,040.50 feet.

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Additional information concerning DDE calculation methods has been added to the Final EIR, Section 2.3, Project Need.

As discussed in Section 3.6.6 of the Draft EIR, Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats. In addition, sediment removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays). Wildlife species currently found in the Proposed Project area would be expected to either remain in the undisturbed areas of the reservoir outside the Proposed Project area or to reestablish once sediment removal activities have been completed.

Impacts to recreation were analyzed in the Draft EIR, Section 3.15. The Proposed Project will not limit the use of the Oak Grove area of Hahamongna Watershed Park. Sediment removal activities would be temporary, are expected to occur only in the drier months (April to December, excluding holidays). It is expected that these activities will often not be adjacent to the Oak Grove area of Hahamongna Watershed Park. The Proposed Project would result in temporary limitations on the recreational use of the Proposed Project site and some of the adjacent trails. Most of these areas would be reopened seasonally or intermittently throughout the sediment removal process. In addition, temporary impacts to designated recreational facilities and trails will be minimized through advance communication and redirection to the nearest facility in the vicinity of the Proposed Project. Furthermore, an east-west trail crossing will continue to provide access at the north end of the reservoir. At the south end of the

reservoir, after the reservoir ingress and egress ramps have been fully constructed, access to the upper east side Arroyo Seco Trail from La Cañada Verdugo Road will be maintained; and the linkage from the west side Arroyo Seco Trail and the Flint Wash Trail to the upper east side Arroyo Seco Trail (crossing Devil's Gate Dam and also continuing south to the Rose Bowl) will be available after construction activities have ended each day and on nonworking days.

The goal of LACFCD is to restore reservoir flood capacity as soon as feasible while reducing costs, minimizing the duration of environmental and construction impacts to the surrounding communities, and configuring the reservoir to allow for sustainable future maintenance. LACFCD is going to great lengths to keep impacts to a minimum. The Draft EIR analyzed a range of sediment removal amounts and configurations aimed at addressing the diverse concerns of stakeholders. The alternatives presented in the Draft EIR represent the best options available to respond to stakeholders' concerns while adequately reducing flood risk to downstream communities. For example, the EIR concluded that Alternative 3 is the Environmentally Superior Alternative. Alternative 3, Configuration D drastically reduces the project's footprint of 120 acres down to 71 acres. Additionally, the limited maintenance area for Alternative 3, Configuration D, Option 2 further reduces the permanent habitat impacts down to approximately 51 acres by allowing for site replanting and mitigation to take place within the reservoir footprint. This reduction in project acreages will greatly lessen environmental impacts of the Proposed Project.

LACFCD is committed to *Public Service that Works*; and by combining almost 100 years of technical expertise and invaluable input from the community, less invasive flood protection will continue to be a reality.

Response to Comment 250-3:

See Response to Comment 250-2.

Pursuant to Section 15126.6(a) of the California Environmental Quality Act (CEQA) Guidelines, "[a]n EIR shall describe a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project, and evaluate the comparative merits of the alternatives." However, "[a]n EIR is not required to consider alternatives which are infeasible" (CEQA Guidelines Section 15126.6(a)) or "which could change the fundamental nature of the proposed project." (*Al Larson Boat Shop, Inc. v. Board of Harbor Comm.* (1993) 18 Cal.App.4th 729, 745.) The alternatives discussed in the EIR must be reasonable alternatives, selected to foster informed decision-making and public participation (CEQA Guidelines 15126.6(a)). An EIR need not consider an alternative whose effect cannot reasonably be ascertained or whose implementation is remote and speculative because unrealistic alternatives do not contribute to a useful analysis (CEQA Guidelines 16126.6(f)(3)). Additionally, an alternative may be rejected from detailed analysis in an EIR if it fails to reduce or avoid the project's significant environmental effects, does not implement the basic project objectives, is not potentially feasible, or is facially unreasonable. 14 C.C.R. §15126.6(c); Id., see also *Mann v. Community Redevelopment Agency* (1991) 233 Cal. App. 3d 1143; *Del Mar Terrace Conservancy, Inc. v. City Council* (1991) 10 Cal. App. 4th 712.

Section 4 of the Draft EIR fully analyzed six alternatives, including the No Project Alternative. These alternatives substantially lessen one or more significant effects of the Proposed Project and, with the exception of the mandatory No Project Alternative, would feasibly attain most of the basic objectives of

the Proposed Project. These alternatives include options for different amounts of removal, different methods of removal, and a different haul route.

Potential impacts due to the Proposed Project's truck trips were analyzed in the Draft EIR, Section 3.16, Transportation and Traffic. As listed in that section, a single intersection in the immediate vicinity of the Proposed Project site will have a potentially significant impact. In practice, hauling rates and routes may be adjusted to help reduce impacts, depending on operational need. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the Proposed Project site.

Air quality and noise impacts associated with truck traffic were analyzed in the Draft EIR in Sections 3.5 and 3.14, respectively. As discussed in the Draft EIR, Section 3.14, with implementation of Mitigation Measure MM N-1, noise impacts would be reduced to a level of less than significant. LACFCD has conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed the United States (U.S.) Environmental Protection Agency's (EPA's) 2007 standards for emissions. Therefore, in order to further reduce emissions, Mitigation Measure MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump trucks that meet or exceed EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality, including those associated with health effects, will be reduced to less than significant.

LACFCD proposed a project duration of five years to reduce accumulated sediment in a timely fashion. Extending the project would prolong the flood risk to downstream communities and increase the construction impacts to the surrounding communities.

Response to Comment 250-4:

See Response to Comment 250-3.

From: Bob Musselman
To: reservoircleanouts
Cc: bbogaard@cityofpasadena.net; smadison@cityofpasadena.net
Subject: Devil"s Gate Reservoir Sediment Removal Project
Date: Wednesday, October 23, 2013 6:36:08 PM

Comment 251-1

I relatively new to the area and just started to study this project. Frankly I can't believe the amount of wasted time and effort has gone into accommodating interests that are minor in comparison to the critical function of the dam and reservoir to protect lives and property.

This is a debris basin, not a park or a nature preserve. It serves to protect an incredible wealth of life and property downstream and that should be the overriding concern.

Comment 251-2

Currently the dam has a capacity of less than one DDE (50 year storm effect 4 years after a major fire). The proposed alternative will result (in five years!) of a capacity of well under 2 DDEs.

If you think 1 or 2 DDEs is sufficient you are kidding yourselves. Most respected meteorologists and climatologists suggest a megastorm such as occurred in 1861-1862 every 100 to 200 years:

Scientific American: California Megaflood: Lessons from a Forgotten Catastrophe

Several peer reviewed studies have estimated the probability adjusted cost of this almost-certain future event to be far in excess of a similarly certain major earthquake.

Comment 251-3

You get opinions from everyone for sure. This one is mine. Forget the garter snakes and turtles and return the basin to its original function as a debris basin to protect Pasadena and the Arroyo Seco.

Respectfully,

Robert Musselman
3935 Chapman Court
Altadena, CA 91001
612-325-9638 (cell)
626-421-6411 (home)
bob@mobiusenergy.com
Skype: musselmanrp
www.linkedin.com/in/rpmusselman/

Response to Comment Letter #251 (Robert Musselman)

Response to Comment 251-1:

Thank you for your input. These comments have been noted and will be provided to the County of Los Angeles Board of Supervisors for their consideration. Los Angeles County Flood Control District (LACFCD) notes that the commenter believes downstream protection is more important than the potential impacts of the Proposed Project. As noted in the comment, the primary purpose of the reservoir is as a flood control facility.

Response to Comment 251-2:

As noted in the comment, the current capacity of the dam is less than one design debris event (DDE). A reservoir storage design capacity of two design debris events (DDEs below the dam's lowest spillway was determined to be the standard acceptable level of risk at Devil's Gate Dam and Reservoir. The alternatives in the Draft EIR analyzed a range of sediment removal amounts (2,425,000 cy to 4,000,000 cy), obtaining or close to obtaining two DDEs.

Reference and the commenter's suggestion for designing for megastorms are noted.

Response to Comment 251-3:

LACFCD notes the commenter's opinion that the reservoir should be returned to its original function as a flood control facility to protect areas and property downstream.

Comment Letter #252 Devil's Gate Community Meetings Comment Summaries

OUTREACH AND COMMUNICATION

Los Angeles County Department of Public Works (LACDPW) on behalf of the Los Angeles County Flood Control District (LACFCD) held three community meetings to inform stakeholders about the Project and the Draft Environmental Impact Report (EIR). The meetings were held on:

1) Wednesday, November 6, 2013 from 6:00 p.m. – 8:00 p.m. at Rose Bowl Stadium, Visitor's Locker Room, 1001 Rose Bowl Drive, Pasadena, CA 91103. Seventy-two (72) stakeholders signed-in.

2) Thursday, November 14, 2013 from 6:30 p.m. – 8:30 p.m. at Jackson Elementary School Auditorium, 593 West Woodbury Road, Altadena, CA 91001. Fifty-seven (57) stakeholders signed-in.

3) Saturday, November 16, 2013 from 2:00 p.m. – 4:00 p.m. at the Community Center of La Cañada Flintridge, 4469 Chevy Chase Drive, La Cañada Flintridge, CA 91011. Fifty-seven (57) stakeholders signed in.

At each meeting, LACFCD presented information about the Proposed Project and the various alternatives, the environmental process, the conclusions reached in the Draft EIR and the procedure for submitting formal written public comments. Team members were available to discuss various aspects of the Project and to answer stakeholder questions. Formal written public comments were accepted at the meetings. Formal oral public comments were not taken at these meetings; however, a summary of topics and a response to these topics discussed are presented below.

SUMMARY OF TOPIC DISCUSSIONS AND RESPONSES

Comments on Proposed Project, Objectives, Purpose and Need

Flooding Risk Justification

The LACFCD was mandated by the State Legislature to provide flood protection and water conservation within its boundaries.

A reservoir storage design capacity of two design debris events (DDEs) below the dam's lowest spillway was determined to be the standard acceptable level of risk at Devil's Gate Dam and Reservoir. The DDE volume of capacity is determined using the January 2006 LACDPW Hydrology Manual and the March 2006 LACDPW Sedimentation Manual. For Devil's Gate Dam and Reservoir, the required reservoir capacity is 4.0 million cubic yards (cy) (two DDEs) below the spillway elevation of 1040.50 feet.

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Additional information concerning DDE calculation methods has been added to the Final EIR, Section 2.3, Project Need.

Why Was There an Increase in the Amount of Sediment Removal?

In 2010, in response to the Station Fire, an emergency project to remove only 1.67 million cy was proposed. The volume of 1.67 million cy is the previously published DDE, and this amount was considered justifiable as an emergency exemption to the California Environmental Quality Act (CEQA). In March 2011, the County of Los Angeles Board of Supervisors motioned LACFCD to complete an EIR for a comprehensive sediment removal project at Devil's Gate. LACFCD then initiated project development in accordance with the required level of protection of two DDEs. At that time, LACFCD also began receiving feedback on the concurrent Sediment Management Strategic Plan and the interest to look at more sustainable sediment and reservoir management. As a result of the feedback and recommendations during the development of the Strategic Plan, LACFCD began evaluating ways to create a more sustainable long-term way to manage its sediment and habitat. To emphasize the goals of the project, the Proposed Project was given the name Devil's Gate Sediment Removal and Management Project.

Reuse of Sediment / Sediment Disposal Sites

The sediment that came into Devil's Gate Reservoir following the Station Fire has a very fine gradation or consistency. As such, the majority of this material is not readily reusable on a commercial scale and will most likely not be sold; however, sediment placed at sediment placement sites would be available for potential reuse for other projects or sediment reuse opportunities. The sediment removed from the Devil's Gate Reservoir will be transported to the existing placement sites listed in the Draft EIR in Section 2.0, Project Description.

For further information regarding beneficial uses for sediment at LACFCD sites, please refer to Section 6.5 of LACFCD's 2012 Sediment Management Strategic Plan which can be found at: http://dpw.lacounty.gov/lacfcd/sediment/stplan.aspx.

Length of Project

Although the sediment removal phase of the Proposed Project will occur over a five-year period, the removal will not be continuous, as excavation is expected to occur only in the drier months (April to December, excluding holidays), as described in the Draft EIR, Section 2.5.1, Sediment Removal Phase, Project Schedule. This approach supports dam safety to remove sediment accumulated in the reservoir in a timely manner to ensure the ability to empty the reservoir in the event of a dam safety concern. Prolonged periods of high sediment levels in the reservoir increase the potential risk for downstream flooding. With sediment removal operations moving efficiently, it is reasonable to assume a project duration of no more than five years. Extending the project any further would prolong the flood risk to downstream communities and increase the construction impacts to the surrounding communities.

Gathering Community Concerns

Outside experts in the community, especially those on the Stakeholder Task Force, were consulted during the formation of the LACFCD's Sediment Management Strategic Plan. Information from that consultation was used in the formulation of the Proposed Project and Alternatives. In addition, the purpose of the scoping process was to gather input from outside experts, cities, and

agencies as well as the public on what the environmental analysis should consider and what alternatives should be analyzed. Information gathered from the scoping process was used in the formulation of the Proposed Project and Alternatives and preparation of the Draft EIR.

LACFCD has met and will continue to meet with the City of Pasadena regularly to coordinate and ensure resolution of concerns regarding Devil's Gate Reservoir and the Hahamongna Watershed Park Master Plan (HWPMP). LACFCD goes to great lengths to lessen project impacts and maximize efficiencies.

Impacts to Air Quality Impacts

Lower emission trucks were considered for the Proposed Project; however, the availability of these trucks could not be guaranteed at the time the Draft EIR was written. Air quality impacts associated with truck traffic were analyzed in the Draft EIR in Section 3.5. Los Angeles County Flood Control District has conducted an availability study and can now ensure that all trucks used to transport sediment for the Proposed Project will meet or exceed the U.S. Environmental Protection Agency's (EPA's) 2007 standards for emissions. Therefore, in order to further reduce emissions, Mitigation Measure MM AQ-1 has been revised; and the contractor will be required to use only sediment removal dump trucks that meet or exceed EPA's 2007 emission standards. With implementation of Mitigation Measures MM AQ-1 and MM AQ-2, impacts to air quality will be reduced to less than significant.

As discussed in the Draft EIR, Section 3.10.6, Impacts and Mitigation, HAZARDS-1, Sediment Removal/Reservoir Management, no hazardous levels of the contaminants were detected in the sediment. Dust impacts from the Proposed Project were carefully evaluated, as discussed in the Draft EIR, Section 3.5.6, Impacts and Mitigation, AIR QUALITY-2, Sediment Removal. The Proposed Project's activities, including excavation, grading, material loading, and hauling, would result in less than significant dust emissions due to the Proposed Project's use of best management practices and would be in full compliance with SCAQMD's fugitive dust regulations.

Impacts to Biological Resources

The biological resources of the Proposed Project site are described in Section 3.6 of the Draft EIR. The bird species recorded during surveys conducted specifically for the Proposed Project are presented in the Biological Technical Report (BTR) in Appendix D of the Draft EIR. Factors used to determine the potential for occurrence included the quality of habitat, elevation, and the results of the reconnaissance survey. The locations of prior database records of occurrence were used as additional data; but since the California Natural Diversity Database (CNDDB) is a positive-sighting database, this data was used only in support of the analysis from the previously identified factors.

As discussed in Section 3.6.6 of the Draft EIR, Mitigation Measures MM BIO-1 through MM BIO-8 provide mitigation to protect and avoid impacts to sensitive species and to restore and enhance riparian and sensitive habitats. These measures will also serve to protect and reduce any impacts to all other wildlife, including coyotes, bobcats, heron, egrets, and bear. Sediment removal activities would not completely block the Proposed Project site from surrounding habitat, would occur only during the day, and would not interfere with night time wildlife activity. Although some wildlife may be temporarily displaced during construction, wildlife would not be physically prevented from moving around and into the basin area. Wildlife species currently found in the Proposed Project area would be expected to either remain in the undisturbed areas of the

reservoir outside the Proposed Project area or to reestablish once sediment removal activities have been completed.

Impacts to Cultural Resources

A cultural resources literature review and records search was conducted for the Proposed Project at the South Central Coastal Information Center (SCCIC) located at California State University in Fullerton. The results of the records search are discussed in the Draft Environmental Impact Report (EIR), Section 3.7.5 and in the Cultural Resources Report (Appendix E of the Draft EIR). As discussed in the Draft EIR, Section 3.7 and in the Cultural Resources Report, Chambers Group conducted an archaeological survey of Devil's Gate Reservoir for the LACFCD. The survey was conducted pursuant to Section 15064.5 of the *CEQA Guidelines*, with respect to the identification and preservation of historic resources, and also in accordance with Section 106 of the National Historic Preservation Act of 1966, as amended (16 U.S.C. 470f and 470h-2), and its implementing regulations (36 CFR 800.4), as well as the 2004 Programmatic Agreement (PA) among the Federal Highway Administration, the Advisory Council on Historic Preservation, and the California State Historic Preservation Officer (SHPO), regarding compliance with Section 106 of the PA. The Draft EIR and Cultural Resources Report discuss the findings of the records search and field survey. In addition, the Draft EIR provides Mitigation Measures to reduce potentially significant impacts to less than significant.

Effect on Hydrology/Groundwater Recharge

Accumulated sediment does not contribute to groundwater recharge of stormwater. As stated in the Draft EIR, the Proposed Project will remove accumulated sediment deposits within the reservoir. This means the percolation characteristics of the reservoir will return to pre-Station Fire conditions if not improve, and the reservoir will still permit penetration of rainfall and percolation of local runoff to replenish the groundwater basin. Sediment removal will restore Devil's Gate Reservoir to its current design standard. As such, the reservoir will have the ability to contain more of the local runoff, which in turn could result in more runoff penetrating into the ground in the Proposed Project area and subsequently recharging the groundwater basin. In addition, by keeping the reservoir clear of future sediment deposits, the Proposed Project will reduce the potential for accumulated sediments to negatively impact the percolation rate.

Noise Impacts

The Draft EIR, Section 3.14.6, Sediment Removal/Reservoir Management, Offsite Vehicular Noise, analyzed the noise impacts from the haul trucks. The analysis found that the maximum noise increase on the roads in the immediate vicinity of the Devil's Gate Dam and Reservoir area would be a 1-decibel (dB) increase on Berkshire Place east of the Interstate 210 (I-210) northbound ramps. A 1-dB increase is well below the 3-dB increase threshold of perception and would therefore not be anticipated to disturb the learning environment. The roadway noise impact analysis provided in the Draft EIR found that the Proposed Project would result in less than significant impacts for all analyzed alternatives.

As discussed in the Draft EIR, Section 3.14, with implementation of Mitigation Measure MM N-1, noise impacts would be reduced to a level of less than significant.

Impacts to Traffic Impacts

Potential impacts due to the Proposed Project's truck trips were analyzed in the Draft EIR, Section 3.16, Transportation and Traffic. As listed in that section, a single intersection in the immediate vicinity of the Proposed Project site, Berkshire Place and I-210 Eastbound ramps intersection during the AM peak period, will have a potentially significant impact. Therefore, impacts would not be significant all day, and significant impacts would occur only at the intersection and on-ramp/off-ramp listed above. In practice, hauling rates and routes may be adjusted to help reduce impacts, depending on operational need. In addition, construction activities would be temporary and are expected to occur only in the drier months (April to December, excluding holidays). As discussed in the Draft EIR, Section 3.16, Transportation and Traffic, TRANSPORTATION-3, modifications to roadway conditions by the Proposed Project will consist of roadway restriping. These changes would not alter existing roadway use or substantially increase hazards. Thus, impacts related to traffic hazards would be less than significant. LACFCD will continue to work with local organizations, the Cities of Pasadena and La Cañada Flintridge, and the community of Altadena to minimize traffic impacts around the Proposed Project site.

Impacts to Recreation

Impacts to recreation were analyzed in the Draft EIR, Section 3.15. The Proposed Project will not limit the use of the Oak Grove area of Hahamongna Watershed Park. Sediment removal activities would be temporary and are expected to occur only in the drier months (April to December, excluding holidays), and often will not be adjacent to the Oak Grove area of Hahamongna Watershed Park. The Proposed Project would result in temporary limitations on the recreational use of the Proposed Project site and some of the adjacent trails. Most of these areas would be reopened seasonally or intermittently throughout the sediment removal process. In addition, temporary impacts to designated recreational facilities and trails will be minimized through advance communication and redirection to the nearest facility in the vicinity of the Proposed Project. Furthermore, an east-west trail crossing will continue to provide access at the north end of the reservoir. At the south end of the reservoir, after the reservoir ingress and egress ramps have been fully constructed, access to the upper east side Arroyo Seco Trail from La Cañada Verdugo Road will be maintained and the linkage from the west side Arroyo Seco Trail and the Flint Wash Trail to the upper east side Arroyo Seco Trail (crossing Devil's Gate Dam and also continuing south to the Rose Bowl) will be available after construction activities have ended each day and on non-working days.

No official disc golf course holes located in the Oak Grove area of Hahamongna Watershed Park will be removed by the Proposed Project. As noted in the Draft EIR, Section 3.15, LACFCD recognizes the importance of the area to those who take advantage of the recreational opportunities offered, including the Oak Grove Disc Golf Course. Where possible, LACFCD will avoid any disc golf course holes located outside the Oak Grove area of Hahamongna Watershed Park. When avoidance is not possible, LACFCD will coordinate with the Oak Grove Disc Golf Club for removal of the disc golf hole equipment. In addition, Alternative 3, Configuration D, Option 2 will also avoid all currently existing Oak Grove Disc Golf Club holes.

Cumulative Projects and Impacts

The Draft EIR contained a cumulative impact analysis within each of the subsections of Section 3.0 Environmental Analysis. The cumulative analysis contains projects as determined by LACFCD and

the surrounding cities and communities to have a potential cumulative effect due to overlapping time frames of the projects. Potential projects that were determined to be outside the area of influence, sediment-removal phase of the project schedule, or lacking sufficient project detail, were not considered to be reasonable foreseeable probable future projects, as set forth in the CEQA Guidelines Section 15130.

Comments on Alternatives

The Draft EIR, Section 4.0 Alternatives Analysis considers six alternatives, including the No Project Alternative. LACFCD determined that Alternative 3, Configuration D was the environmentally superior alternative that reduced impacts while still meeting the Proposed Project objectives.

Alternative 3, Configuration D closely resembles the natural contours within the reservoir, affecting the least amount of habitat of all the action alternatives while still achieving Proposed Project objectives (see Section 4.6 of the Final EIR). Alternative 3, Configuration D, Option 1 provides a more natural configuration to the reservoir with two branches to carry water and sediment toward the face of the dam, and it avoids disturbing a significant portion of the existing vegetation. In addition, LACFCD has added an optional configuration for this Alternative. Alternative 3, Configuration D, Option 2, which drastically reduces the project's footprint of 120 acres down to 71 acres, would avoid excavation of the western branch, thereby providing a greater habitat buffer on the west side of the reservoir. In addition, the maintenance areas would be smaller than the original sediment removal footprint, allowing for habitat to reestablish and provide additional areas for wildlife movement.

Alternative 3, Configuration D, which was found to be the Environmentally Superior Alternative in the Draft EIR, was based on the City of Pasadena's HWPMP. LACFCD has met and will continue to meet with the City of Pasadena regularly to coordinate and ensure resolution of concerns regarding Devil's Gate Reservoir and the HWPMP.

Sluicing was analyzed as part of the Draft EIR in the Alternatives Analysis, Section 4.7, Alternative 4 Sluicing Method. The sluicing alternative would potentially have additional significant impacts in comparison to the Proposed Project. Many of these impacts would be associated with the likelihood that large amounts of sediment would not be fully transported through the flood control system to the ocean; this sediment would need to be mechanically removed and trucked out from numerous downstream locations. This alternative would also involve use of construction equipment and the removal of trees and vegetation over the same footprint as the Proposed Project. Please see Section 4.7 and Appendix K of the Draft EIR for further analysis.

While sluicing is not a viable project alternative, as discussed above, Flow Assisted Sediment Transport, or FASTing, will be used for maintenance after the project's main sediment removal phase has been completed, as described in Section 2.5.2 of the Draft EIR.

The Proposed Project is designed to be a long-term plan, with the reservoir management phase providing management for future sediment inflows. After the sediment removal phase has occurred, FASTing, is proposed to be an integral part of the annual maintenance at Devil's Gate. Annual FASTing operations will be implemented to reduce future buildups of sediment in the reservoir and to reduce the need for mechanical removal of sediment from the reservoir. Although FASTing is expected to be an effective means of keeping sediment levels low in the reservoir, it is estimated that typically 13,000 cy of sediment will be removed by excavation

annually. However, a maintenance regime that relies on FASTing greatly reduces the need for and extends the life of future and existing sediment placement sites and improves the future sustainability of the reservoir. Please see Section 2.5.2 of the Draft EIR for more information on future maintenance.

SECTION 10.0 – MITIGATION MONITORING AND REPORTING PROGRAM

Public Resources Code, Section 21081.6 (Assembly Bill 3180) requires that mitigation measures identified in environmental review documents prepared in accordance with California Environmental Quality Act (CEQA) are implemented after a project is approved. Therefore, this Mitigation Monitoring and Reporting Program (MMRP) has been prepared to ensure compliance with the adopted mitigation measures during the pre-sediment removal, sediment removal, and reservoir management phases of the Devil's Gate Sediment Removal and Management Project (Project).

LACFCD is the agency responsible for implementation of the mitigation measures identified in the EIR. This MMRP provides LACFCD with a convenient mechanism for quickly reviewing all the mitigation measures including the ability to focus on select information such as timing. LACDPW is carrying out the Project on behalf of LACFCD. The MMRP includes the following information for each mitigation measure:

- The phase of the project during which the required mitigation measure must be implemented;
- The phase of the project during which the required mitigation measure must be monitored;
- The enforcement agency; and
- The monitoring agency.

The MMRP includes a checklist to be used during the mitigation monitoring period. The checklist will verify the name of the monitor, the date of the monitoring activity, and any related remarks for each mitigation measure.

MITIGATION MONITORING AND REPORTING PROGRAM Devil's Gate Reservoir Sediment Removal and Management Project							
Mitigation Measure	**Implementation Phase***	**Monitoring Phase***	**Enforcement Agency**	**Level of Significance After Mitigation**	**Verification of Compliance**		
					Initial	**Date**	**Remarks**
AIR QUALITY							
MM AQ-1: LACFCD shall require all construction contractors during the sediment removal phase of the Proposed Project to use only sediment removal dump trucks that meet the EPA's emission standards for Model Year 2007 or later.	Final Plans and Specifications; Pre-Sediment Removal; Sediment Removal; Reservoir Management	Sediment Removal; Reservoir Management	Los Angeles County Flood Control District	Less than significant			
MM AQ-2: LACFCD shall require all construction contractors during the sediment removal phase of the Proposed Project to use off-road equipment that meets, at a minimum, EPA's emission standards for Tier 3 equipment.	Final Plans and Specifications; Pre-Sediment Removal; Sediment Removal; Reservoir Management	Sediment Removal; Reservoir Management	Los Angeles County Flood Control District	Less than significant			
BIOLOGICAL RESOURCES							
MM BIO – 1: A qualified biological monitor shall be present during initial ground- or vegetation-disturbing project-related activities to provide measures and monitor for wildlife in harm's way. This includes initial ground- or vegetation-disturbing project-related activities at the annual start of each year of sediment removal or maintenance activities. Following initial project-related activities, a qualified monitoring biologist shall be present as necessary to maintain the implemented protection measures and monitor for additional species in harm's way. These protection measures shall include, as appropriate: redirecting wildlife, identifying areas that may require exclusionary devices (e.g., fencing), or capturing and relocating wildlife outside the work area. Any captured species shall be relocated to adjacent appropriate habitat that is contiguous to adjacent habitat and not impacted by project-related disturbance activities.	Pre-Sediment Removal; Sediment Removal; Reservoir Management	Pre-Sediment Removal; Sediment Removal; Reservoir Management	Los Angeles County Flood Control District	Less than significant			
MM BIO – 2: Within 90 days prior to ground-disturbing activities, a sensitive species educational briefing shall be conducted by a qualified biologist for construction personnel. The biologist will identify all sensitive resources that may be encountered onsite, and construction personnel will be instructed to avoid and report any sightings of sensitive species to LACFCD or the monitoring biologist. Educational briefings shall be repeated annually for the duration of the sediment removal.	Final Plans and Specifications; Pre-Sediment Removal; Sediment Removal; Reservoir Management	Pre-Sediment Removal; Sediment Removal; Reservoir Management	Los Angeles County Flood Control District	Less than significant			
MM BIO – 3: Within 90 days prior to ground-disturbing activities, a preconstruction survey shall be conducted by a qualified biologist for the presence of any sensitive species in harm's way, including coast range newt, the southwestern pond turtle, and the two-striped garter snake. If sensitive species are observed in harm's way, the qualified biologist will develop and implement appropriate protection measures for that species. These protection measures shall include, as appropriate: redirecting the species, constructing exclusionary devices (e.g., fencing), or capturing and relocating wildlife outside the work area. Preconstruction surveys shall be repeated annually for the duration of the sediment removal. Observations of special status species made during these surveys shall be recorded onto a CNDDB field data sheet and submitted to CDFW for inclusion into the CNDDB.	Pre-Sediment Removal; Sediment Removal; Reservoir Management	Pre-Sediment Removal; Sediment Removal; Reservoir Management	Los Angeles County Flood Control District	Less than significant			

MITIGATION MONITORING AND REPORTING PROGRAM Devil's Gate Reservoir Sediment Removal and Management Project							
Mitigation Measure	**Implementation Phase***	**Monitoring Phase***	**Enforcement Agency**	**Level of Significance After Mitigation**	**Verification of Compliance**		
					Initial	**Date**	**Remarks**
MM BIO – 4: LACFCD, in consultation with a qualified biologist, will employ bird exclusionary measures (e.g., mylar flagging) prior to the start of bird breeding season to prevent birds nesting within established boundaries of the project. Prior to commencement of sediment removal activities within bird breeding season (March 1-August 31), a preconstruction bird nesting survey shall be conducted by a qualified biologist for the presence of any nesting bird within 300 feet of the construction work area. The surveys shall be conducted 30 days prior to the disturbance of suitable nesting habitat by a qualified biologist with experience in conducting nesting bird surveys. The surveys shall continue on a weekly basis with the last survey being conducted no more than 3 days prior to the initiation of clearance/construction work. Preconstruction surveys shall be repeated annually for the duration of the sediment removal. If an active nest is found, the qualified biologist will develop and implement appropriate protection measures for that nest. These protection measures shall include, as appropriate, construction of exclusionary devices (e.g., netting) or avoidance buffers. The biologist shall have the discretion to adjust the buffer area as appropriate based on the proposed construction activity, the bird species involved, and the status of the nest and nesting activity; but shall be no less than 30 feet. Work in the buffer area can resume once the nest is determined to be inactive by the monitoring biologist.	Final Plans and Specifications; Pre-Sediment Removal; Sediment Removal; Reservoir Management	Pre-Sediment Removal; Sediment Removal; Reservoir Management	Los Angeles County Flood Control District	Less than significant			

MITIGATION MONITORING AND REPORTING PROGRAM Devil's Gate Reservoir Sediment Removal and Management Project							
Mitigation Measure	**Implementation Phase***	**Monitoring Phase***	**Enforcement Agency**	**Level of Significance After Mitigation**	**Verification of Compliance**		
					Initial	**Date**	**Remarks**
MM BIO – 5: Within 30 days prior to commencement of vegetation or structure removal activities, a preconstruction bat survey shall be conducted by a qualified biologist for the presence of any roosting bats. Acoustic recognition technology shall be used if feasible and appropriate. If either a bat maternity roost or hibernacula (structures used by bats for hibernation) are present, a qualified biologist will develop and implement appropriate protection measures for that maternity roost or hibernacula. These protection measures shall include, as appropriate: safely evicting non-breeding bat hibernacula, establishment of avoidance buffers, or replacement of roosts at a suitable location. These measures shall also include as appropriate: • To the extent feasible, trees that have been identified as roosting sites shall be removed or relocated between October 1 and February 28. • When trees must be removed during the maternity roost season (March 1 to September 30), a qualified bat specialist shall conduct a preconstruction survey to identify those trees proposed for disturbance that could provide hibernacula or nursery colony roosting habitat for bats. • Trees identified as potentially supporting an active nursery roost shall be inspected by a qualified biologist no greater than 7 days prior to tree disturbance to determine presence or absence of roosting bats. • Trees determined to support active maternity roosts will be left in place until the end of the maternity season (September 30). • If bats are not detected in a tree, but the qualified biologist determined that roosting bats may still be present, trees shall be removed as follows: o Pushing the tree down with heavy machinery instead of felling the tree with a chainsaw o First pushing the tree lightly 2 to 3 times with a pause of 30 seconds in between each nudge to allow bats to become active, and then pushing the tree to the ground slowly. o Allowing the tree to remain in place for 24 to 48 hours until inspected by the qualified biologist for presence or absence of roosting bats. • The qualified biologist shall document all bat survey, monitoring, and protection measure activities and prepare a summary report for LACFCD.	Final Plans and Specifications; Pre-Sediment Removal; Sediment Removal; Reservoir Management	Pre-Sediment Removal; Sediment Removal; Reservoir Management	Los Angeles County Flood Control District	Less than significant			
MM BIO – 6: Riversidean Alluvial Fan Sage Scrub habitat shall be restored and/or enhanced at a 1:1 ratio by acreage. Areas shall be mapped using aerial photographs.	Reservoir Management	Reservoir Management	Los Angeles County Flood Control District	Less than significant			
MM BIO – 7: Within 90 days prior to ground-disturbing activities, a qualified biologist shall conduct a tree survey within the project footprint, to identify trees that will be removed or potentially affected by the Proposed Project and trees that can be avoided. LACFCD will replace trees that cannot be avoided. The replacement is expected to be up to 1:1 by acreage. The biological monitor shall implement measures to protect the root zone of oak trees that may be impacted immediately adjacent to the project site and along access roads.	Pre-Sediment Removal; Sediment Removal; Reservoir Management	Pre-Sediment Removal; Sediment Removal; Reservoir Management	Los Angeles County Flood Control District	Less than significant			

MITIGATION MONITORING AND REPORTING PROGRAM Devil's Gate Reservoir Sediment Removal and Management Project							
Mitigation Measure	**Implementation Phase***	**Monitoring Phase***	**Enforcement Agency**	**Level of Significance After Mitigation**	**Verification of Compliance**		
					Initial	**Date**	**Remarks**
MM BIO – 8: A combination of onsite and offsite habitat restoration, enhancement, and exotic removal shall be implemented by LACFCD at a 1:1 ratio for impacted sensitive habitat and jurisdictional waters. Habitat restoration/enhancement shall include use of willow cuttings and exotic species removal. Non-native, weedy habitats within the basin shall be utilized whenever possible as mitigation sites. This mitigation measure shall be monitored for success for five years following implementation. A report of the monitoring results shall be submitted annually, during the five years following implementation, to resource agencies as required by the Section 401 Certification, Section 404 permit, and a Streambed Alteration Agreement.	Reservoir Management	Reservoir Management	Los Angeles County Flood Control District	Less than significant			
CULTURAL RESOURCES							
MM CUL-1: If sediment removal or reservoir management activities exceed the depth of the historic flood deposits and encounter native sediments, these activities will be monitored by a qualified archaeologist. In the event this occurs and historic or archaeological materials are observed, the excavation in the proximity of the discovery should be diverted until a qualified archaeologist and/or paleontologist evaluates the discovery.	Final Plans and Specifications; Pre-Sediment Removal; Sediment Removal; Reservoir Management	Sediment Removal; Reservoir Management	Los Angeles County Flood Control District	Less than significant			
MM CUL-2: If sediment removal or reservoir management activities exceed the depth of the historic flood deposits and encounter native sediments, these activities will be monitored by a qualified paleontologist. In the event that this occurs and paleontological materials are observed, the excavation in the proximity of the discovery should be diverted until a qualified paleontologist evaluates the discovery.	Final Plans and Specifications; Pre-Sediment Removal; Sediment Removal; Reservoir Management	Sediment Removal; Reservoir Management	Los Angeles County Flood Control District	Less than significant			
MM CUL-3: In the event human remains are discovered, all work in the area must be halted until the County Coroner identifies the remains and makes recommendations regarding their appropriate treatment pursuant to PRC Section 5097.98.	Final Plans and Specifications; Sediment Removal; Reservoir Management	Sediment Removal; Reservoir Management	Los Angeles County Flood Control District	Less than significant			
LAND USE AND PLANNING							
MM LAN-1: Temporary impacts to designated recreational facilities and trails shall be minimized through advance communication and redirection to the nearest facility in the vicinity of the Proposed Project. Prior to completion of final plans and specifications, the LACFCD shall review the plans and specifications to ensure that they contain proper language requiring that signs be posted at the nearby parking lots and trailheads at least one month in advance of sediment removal activities.	Final Plans and Specifications; Pre-Sediment Removal; Sediment Removal; Reservoir Management	Pre-Sediment Removal; Sediment Removal; Reservoir Management	Los Angeles County Flood Control District	Less than significant			
NOISE/VIBRATION							
MM N-1: The LACFCD shall restrict the operation of any off-road construction equipment that is powered by a greater than 200-horsepower engine from operating within 180 feet of any offsite residential structure. Equipment that is not performing any earth-moving activities and is solely operating for entering or leaving the site via the access roads to the reservoir is exempted from this requirement.	Final Plans and Specifications; Pre-Sediment Removal; Sediment Removal; Reservoir Management	Sediment Removal; Reservoir Management	Los Angeles County Flood Control District	Less than significant			

MITIGATION MONITORING AND REPORTING PROGRAM Devil's Gate Reservoir Sediment Removal and Management Project							
Mitigation Measure	Implementation Phase*	Monitoring Phase*	Enforcement Agency	Level of Significance After Mitigation	Verification of Compliance		
					Initial	Date	Remarks
TRANSPORTATION/TRAFFIC							
MM TRA-1: Proposed Project haul trucks will not deliver to the Vulcan Material Reliance Facility during the PM peak period.	Final Plans and Specifications; Pre-Sediment Removal; Sediment Removal; Reservoir Management	Sediment Removal; Reservoir Management	Los Angeles County Flood Control District	Implementation of mitigation measures would reduce impacts but not to a level of less than significant			
MM TRA-2: Proposed Project haul trucks will not deliver to the Boulevard Pit during the PM peak period.	Final Plans and Specifications; Pre-Sediment Removal; Sediment Removal; Reservoir Management	Sediment Removal; Reservoir Management	Los Angeles County Flood Control District	Implementation of mitigation measures would reduce impacts but not to a level of less than significant			

*The Implementation and Monitoring phases are broken down into four categories: Final Plans and Specifications; Pre- Sediment Removal; Sediment Removal; and Reservoir Management. "Final Plans and Specifications" indicates that the mitigation measure must be incorporated into the final approved design, plans, and specifications for the project. "Pre- Sediment Removal" refers to measures that are required prior to the start of the sediment removal phase. "Sediment Removal" refers to all aspects of the Sediment Removal phase. "Reservoir Management" refers to all aspects of the Reservoir Management phase.

APPENDIX A – Initial Study / Notice of Preparation /Scoping Comments

APPENDIX A1 – Initial Study / Notice of Preparation

NOTICE OF PREPARATION
INITIAL STUDY

DEVIL'S GATE RESERVOIR SEDIMENT REMOVAL AND MANAGEMENT PROJECT PASADENA, CA (LOS ANGELES COUNTY)

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SECTION 1.0 – INTRODUCTION

1.1. PURPOSE OF THE NOTICE OF PREPARATION AND INITIAL STUDY

The Los Angeles County Flood Control District (LACFCD) proposes a comprehensive sediment removal project at Devil's Gate Reservoir that will restore flood control capacity and establish a reservoir configuration more suitable for routine maintenance activities including sediment management.

"Projects" within the State of California are required to undergo environmental review to determine the environmental impacts associated with implementation of the project in accordance with the California Environmental Quality Act (CEQA) unless a project is exempt. CEQA was enacted in 1970 by the California Legislature to disclose to decision makers and the public the significant environmental effects of a proposed project and identify possible ways to avoid or minimize significant environmental effects of a project by requiring implementation of mitigation measures or recommending feasible alternatives. CEQA applies to all California public agencies at all levels, including local, regional and state, as well as boards, commissions, and special districts (such as LACFCD). As such, LACFCD is required to conduct an environmental review to analyze the potential environmental effects associated with the proposed project.

The attached IS analyzes the potential for the Devil's Gate Reservoir Sediment Removal and Management Project (proposed project) to result in environmental impacts. The findings in this Initial Study (IS) have determined that an Environmental Impact Report (EIR) is the appropriate level of environmental documentation because the project could result in potentially significant impacts. These potential impacts are discussed below and will be further addressed in the EIR.

LACFCD will be the Lead Agency for purposes of CEQA as it is the agency charged with carrying out or approving the project. This Notice of Preparation (NOP)/IS is the first step in the process to inform the public of the project and its potential impacts and to invite input.

LACFCD seeks community input regarding the scope and content of the environmental information that should be included in the EIR. The EIR will be prepared by LACFCD and will include any information necessary for public agencies to meet their respective responsibilities related to the proposed project. These agencies will need to use the EIR when considering any permit or other approvals necessary to implement the project. A preliminary list of the environmental topics identified for study in the EIR is provided in the IS checklist (Section 5). If the topics of concern to you have already been identified for analysis in the IS, you need not provide a response to this notice.

The project description, location, and the environmental issues to be addressed in the EIR are contained in the attached materials.

A forty-five-day (45-day) public review period shall commence on **Wednesday, September 28, 2011**. Written comments must be sent to the LACFCD by **Friday, November 11, 2011**. The LACFCD will hold two public scoping meetings to allow public agencies and members of the public to provide input on which environmental issues merit further analysis in the EIR. These scoping meetings will occur on **Wednesday, October 5, 2011** at 6:30 p.m. in the Rose Bowl Locker Room (1001 Rose Bowl Drive, Pasadena, 91103, park in Lot F, enter at Gate A) and **Saturday, October 15, 2011** at 9:00 a.m. in the La Canada High School Cafeteria (4463 Oak Grove Drive, La Canada, 91011).

Correspondence and comments can be delivered to:

Los Angeles County Flood Control District
Attn: Water Resources Division – Reservoir Cleanouts
P.O. Box 1460
Alhambra, CA 91802-9974.

Comments can also be sent by email to reservoircleanouts@dpw.lacounty.gov, or by FAX to (626) 979-5436. Include "Devil's Gate Reservoir Sediment Removal and Management Project" in the subject line. Agency responses to the NOP should include the name of a contact person within the commenting agency.

1.2. AVAILABILITY OF THE NOP/IS

The NOP/IS for the Devil's Gate Reservoir Sediment Removal and Management Project is being distributed through the State Clearinghouse and directly to numerous agencies, organizations, and interested groups and persons for comment during the scoping period. The NOP/IS is also available for review at the following locations:

- Linda Vista Library, 1281 Bryant Street, Pasadena
- San Rafael Branch Library, 1240 Nithsdale, Pasadena
- Pasadena Central Library, 285 East Walnut Street, Pasadena
- Altadena Library District, 600 East Mariposa Street, Altadena
- Bob Lucas Memorial Library, 2659 Lincoln Avenue, Altadena
- La Canada Flintridge Library, 4545 North Oakwood Avenue, La Canada Flintridge
- Irwindale Public Library, 5050 Irwindale Avenue, Irwindale
- County of Los Angeles Department of Public Works, 900 South Fremont Avenue, Alhambra

In addition, the NOP/IS is also available online at the following website: www.lasedimentmanagement.com/devilsgate.

SECTION 2.0 – PROJECT DESCRIPTION AND ENVIRONMENTAL SETTING

2.1. INTRODUCTION

Devil's Gate Dam and Reservoir was built in 1920 to provide flood protection to the Cities of Pasadena, South Pasadena, and Los Angeles and to facilitate water conservation. The City of Pasadena is the landowner of the project site, and the LACFCD holds an inundation easement granting LACFCD the right to construct, reconstruct, inspect, maintain, repair and operate the dam, spillway, reservoir and other support structures for the purposes of flood protection and water conservation. The project is being undertaken in order to restore reservoir capacity to the facility to meet its intended level of flood protection for downstream communities.

2.2. PROJECT LOCATION AND SITE CHARACTERISTICS

2.2.1 Location

The Devil's Gate Reservoir Sediment Removal and Management Project is located in the City of Pasadena, in Los Angeles County approximately 14 miles north of downtown Los Angeles (see Figure 1, Project Vicinity Map). The City of La Canada Flintridge and the community of Altadena are located near the project site to the west and east, respectively.

Lying south of the San Gabriel Mountains, the project site is located within the Arroyo Seco watershed. The Arroyo Seco extends approximately 11 miles from the border of the Angeles National Forest to its confluence with the Los Angeles River. Stormwater runoff from approximately 20,416 acres (31.9 square miles) of both residential and undeveloped land drains into Devil's Gate Reservoir.

The project site includes transportation and placement of material at facilities already prepared and designated to accept such material. For the purposes of this IS, Waste Management Facility in Azusa, Manning Pit Sediment Placement Site in Irwindale, and Scholl Canyon Landfill were considered as facilities available for the project.

2.2.2 Project Site

The proposed project site (see Figure 2, Project Boundary Map) includes the Devil's Gate Dam and Reservoir and covers approximately 175 acres (0.27 square miles). The topography in the vicinity of the project site is generally flat, with a slight incline to the north. The San Gabriel Mountains are located to the north of the project site, and are characterized by both the foothills and steep slopes associated with mountainous terrain. The proposed project site can be accessed via Oak Grove Drive and Foothill Boulevard on the west through the City of Pasadena Hahamongna Watershed Park and Windsor Avenue via La Canada Verdugo Road on the southeast and Explorer on the northeast.

2.2.3 General Plan Designation/Zoning

The proposed project site has a General Plan Land Use designation of Open Space and is zoned as Open Space under City of Pasadena General Plan (City of Pasadena, 1994).

2.2.4 Adjacent Land Uses

The project site is located within the reservoir behind Devil's Gate Dam. The Hahamongna Watershed Park is approximately 1,300 acres of open space extending up the Arroyo Seco Canyon from the Devil's Gate Dam. The park includes areas within and adjacent to the reservoir. The Hahamongna Watershed Park is owned and operated by the City of Pasadena and includes Oak Grove Park. Oak Grove Park contains picnic facilities, restrooms, a play field, an equestrian staging area, trails, and a disc golf course. The current leaseholders within the Hahamongna Watershed Park include the United States Forest Service (USFS), Los Angeles County Fire Camp 2, and the Rose Bowl Riders who sublet to the Tom Sawyer Camp. In addition, Southern California Edison, Southern California Gas Company, and Pasadena Water and Power hold easements within the Hahamongna Watershed Park. Other land uses directly adjacent to the project area include the California Institute of Technology – Jet Propulsion Laboratory (JPL) to the northwest, La Canada High School and Hillside School and Learning Center to the west, single-family residential uses to the south, north, and east, and the 210 Foothill Freeway to the south.

2.3. PROJECT BACKGROUND

2.3.1 LACFCD History

Since 1860, major flood events have occurred along the Arroyo Seco, which led to the development of the Los Angeles River and Arroyo Seco flood control channels. Flooding over the past century has caused loss of life and severe damage to structures and infrastructure.

The Arroyo Seco has a long history of flooding from winter storms including:

- In 1861, severe flooding occurred along the Arroyo Seco.
- In 1884, the most destructive flood recorded in Los Angeles County.
- In 1889, Arroyo Seco experienced severe flooding.
- In 1914, a devastating flood occurred in Los Angeles County, primarily the result of floodwaters originating in the San Gabriel Mountains. The flood caused over $10 million in property damage, destroyed 10 bridges, 30 homes, and claimed many lives. Peak flows in the Arroyo Seco at the USGS Gage 11098000, located approximately 2.2 miles upstream of the reservoir, were recorded at 5,800 cubic feet per second (cfs).
- In 1916, a flood recorded peak flows at 3,150 cfs occurred on January 17.
- In 1938, flooding damaged the Angeles Crest Highway (SR-2). The USGS gage station recorded a maximum peak flow of 8,620 cfs on March 2.
- In 1943, a flood damaged portions of the Arroyo Seco flood control channel.

The Los Angeles County Flood Control Act was adopted in 1915 by the State Legislature after a regional flood took a toll on both lives and property. The Los Angeles County Flood Control Act established the LACFCD, tasked with controlling and conserving the flood waters of the LACFCD. The LACFCD encompasses 2,760 square miles: all of Los Angeles County except Catalina and San Clemente islands and everything north of Avenue S in Antelope Valley.

2.3.2 Hahamongna Watershed Master Plan

In 1993, the City of Pasadena established the Hahamongna Watershed Park which includes the Devil's Gate Reservoir area. Recreational uses in the park include hiking, bicycling, horseback riding, picnicking, and disc golf.

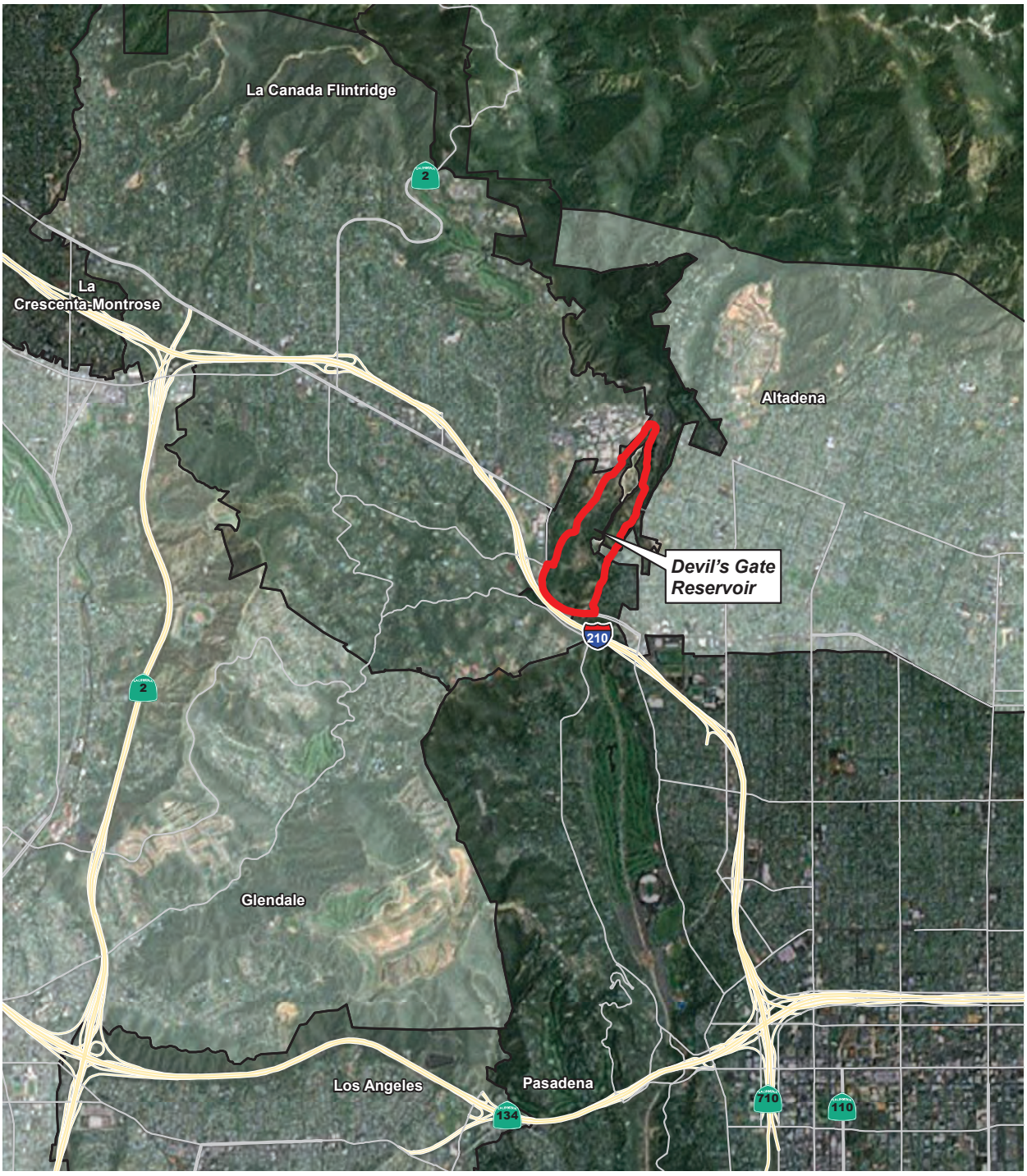

Figure 1 - Project Vicinity Map

Figure 2 - Project Boundary Map

The City of Pasadena has developed and adopted (between 2003 and 2005) three separate master plans that govern Pasadena parks along the Arroyo Seco: the Lower Arroyo Master Plan, the Central Arroyo Master Plan, and the Hahamongna Watershed Master Plan. These plans attempt to balance many competing objectives, including habitat restoration, recreational access, water supply, and other uses.

2.3.3 Devil's Gate Dam and Reservoir History

Following the floods of 1914 and 1916, the Devil's Gate Dam was built in 1920, for the purposes of water conservation and flood control. Devil's Gate Dam is the oldest dam constructed by the LACFCD. Devil's Gate Dam and Reservoir had an original storage capacity of approximately 7,423,000 cubic yards. Between 1934 and 1947, most of the Arroyo Seco downstream of the dam (approximately 450 feet south of the dam) was channelized.

Following the 1971 Sylmar Earthquake, heightened safety concerns and better understanding of seismic behavior prompted new investigations and analysis of LACFCD dams, including Devil's Gate Dam. In response to findings from these studies, in 1978 the State Department of Water Resources Division of Safety of Dams (DSOD) officially imposed an operational restriction preventing the holding of water at Devil's Gate Dam due to concerns with the dam's ability to withstand a major earthquake. In 1998, the District completed a construction project that seismically rehabilitated Devil's Gate Dam. The rehabilitation project also enlarged the spillway to safely pass the Probable Maximum Flood, the required level of flood protection, without overtopping the dam. After project completion, the DSOD restriction was removed restoring the dam and reservoir to its full operational capacity, thus providing its potential for water conservation. The project improvements resulted in Devil's Gate Dam meeting current maximum credible earthquake design standards and probable maximum flood design standards.

The reservoir captures storm water, sediment and debris during storm events and retains storm water to prevent high flow rates from overwhelming the downstream flood control channel. The outflow from the reservoir is controlled by three outlet corridors; a low level gate, the outlet valve, and the outlet tunnel gates. These allow the dam to discharge up to 5,500 cfs. Controlled releases are made through the outlet valve and tunnel gates after the reservoir has impounded storm water. During major storm events that exceed the capacity of the valves and gates, the dam is designed such that the reservoir level rises until flow discharges, uncontrolled thru the spillway ports (openings in the spillway structure) and then over the spillway.

2.3.3.1 Recent Sediment Removal

The need for a sediment removal project is determined based on the amount of sediment deposition behind the dam. Too much sediment accumulation can affect the ability of the outlet works (valves, gates and spillway) to function correctly or reduce available reservoir capacity below that necessary for flood control storage or to safety contain future sediment inflow including the Design Debris Event (DDE). The "Design Debris Event" is the predicted amount of sediment that will flow into the reservoir after the undeveloped portion of the tributary watershed is completely burned and a 50-year design storm event occurs after four years of watershed recovery. The 50-year design storm and the DDE are defined by the Los Angeles County Department of Public Works Hydrology and Sedimentation Manuals respectively. The DDE for the Devil's Gate Reservoir is approximately 2,000,000 cubic yards.

The last major reservoir sediment removal project occurred in 1994, when 190,000 cubic yards of sediment were removed. Sediment was trucked off site via a maintenance road just west of the dam which exits on to Oak Grove Drive. Since then, two smaller sediment removal operations have taken

place with 14,000 cubic yards removed in 2006 and 3,800 cubic yards removed in 2009. The volume of these sediment removal projects was limited in order to prevent impacts to vegetation growing in the accumulated sediment within the reservoir.

The 2009 Station Fire was the largest fire in recorded history of the Angeles National Forest (est. 1892) and the 10th largest fire in California since 1933. It burned over 160,000 acres leaving vast areas of the San Gabriel Mountains denuded and susceptible to sediment flows. The fire impacted five of the LACFCD's dams and reservoirs, one of which is the Devil's Gate Dam and Reservoir. Approximately 68% of the watershed tributary to Devil's Gate Reservoir (approximately 100% of the undeveloped portion) was burned, making sediment deposition inevitable during subsequent storm events. The storms that occurred in the two wet seasons after the fire increased sediment accumulation in the reservoir by approximately 1,300,000 cubic yards reducing the available capacity to less than one DDE. In October 2010, the California DSOD recommended the removal of sediment build-up behind the dam as well as the removal of vegetation growth.

In 2010, LACFCD initiated project planning to remove 1,670,000 cubic yards from the reservoir. This activity was found to be exempt from CEQA. In March 2011, in recognition of stakeholder and environmental concerns, the Los Angeles County Board of Supervisors directed LACFCD to complete an EIR to assess the impacts associated with removing sediment from the project site. Since the EIR would take considerable time to complete, LACFCD was also directed to implement interim measures to reduce downstream flood risk until the EIR is completed and a sediment removal project is implemented.

The Interim Measures Project (IMP), is currently underway to reduce downstream flood risk. The interim measures include dam modifications to keep debris from plugging the outlet works and allow for the removal of up to 25,000 cubic yards of sediment per year from the dam face until the project associated with the EIR is started. In 2011, 13,000 cubic yards were removed from the dam face and placed at Johnson Field.

2.4. PROJECT GOALS AND OBJECTIVES

The LACFCD must remove sediment that has accumulated behind the dam to restore the capacity of Devil's Gate Reservoir to minimize the level of flood risk to downstream communities along the Arroyo Seco. In its current condition, the reservoir no longer has the capacity to safely contain another major debris event; and the outlet works have a risk of becoming clogged and inoperable. The proposed project would remove up to 4,000,000 cubic yards of sediment from the reservoir behind Devil's Gate Dam to restore it to its current design standard, (capacity for two DDEs below the spillway elevation of 1040.5 ft) and establish a reservoir configuration more suitable for routine maintenance activities including sediment management.

Primary project objectives include:

- Reducing flood risk to the communities downstream of the reservoir adjacent to the Arroyo Seco by restoring reservoir capacity for flood control and future sediment inflow events;
- Supporting sustainability by establishing a reservoir configuration more suitable for routine maintenance activities including sediment management;
- Removing sediment in front of the dam to facilitate an operational reservoir pool to reduce the possibility of plugging the outlet works with sediment or debris during subsequent storm events

- Removing sediment placed at Johnson Field during the Devil's Gate Reservoir Interim Measures Project;
- Supporting dam safety by removing sediment accumulated in the reservoir in a timely manner to ensure the ability to empty the reservoir in the event of a dam safety concern.
- Delivering the sediment to placement or reuse facilities that are already prepared and designated to accept such material without native vegetation and habitat removal.

2.4.1 Sediment Removal

Approximately 2.6 million cubic yards of sediment is the current excess amount of sediment in the reservoir. However, additional sediment accumulation is anticipated during the upcoming storm seasons due to the burned condition of the watershed. Proposed project excavation activities would take place within the project's excavation limit boundaries (see Figure 3, Project Excavation Boundary). The specific excavation limits, ultimate reservoir configuration, and volume of sediment to be removed within the boundary will be determined based on locations of access roads; areas for preservation or restoration of native vegetation; and the amount and location of sediment inflow that occur during the upcoming storm seasons.

Over the years, as storm events deposited sediment in the reservoir, native and non-native vegetation established itself in the sediment deposits. During subsequent storm events some of the vegetation is washed out by storm flows or submerged when the reservoir level rises. Despite the dynamic changes to vegetation over time, much of the reservoir has recently contained areas of mature black willow trees, Riversidian alluvial fan sage scrub, mule fat scrub and riparian vegetation. During storm events following the Station Fire, a large portion of the reservoir vegetation was buried in sediment; however significant amounts of vegetation, including numerous mature willow trees remain present. In order to remove the sediment from the reservoir, vegetation growing in it within excavation areas will require removal. The accumulated sediment will be removed with construction equipment including but not limited to: bulldozers, front-end loaders, excavators, scrapers and trucks. Removed vegetation and organic debris will be separated from sediment and hauled to Scholl Canyon Landfill. Coarse material may need to be processed through sorters and crushers to prepare it to be hauled off-site. Depending on the moisture content of the sediment removed, the sediment may need to be stockpiled for drying to occur. Stockpiling of the sediment would occur on-site, within the Devil's Gate Reservoir.

The sediment and organic materials will be trucked off-site via local roads accessing the 210 Freeway and then taken to sites that are already prepared and designated to accept such material without native vegetation and habitat removal.

For the purpose of assessing the level of potential impacts to the various environment factors, this IS considered the following potential traffic routes and existing disposal sites/placement locations which are currently available to accept the sediment/organic material: The sediment will be trucked off-site to either the Waste Management Facility in Azusa or the Manning Pit Sediment Placement Site (SPS) in Irwindale. In addition to the sediment excavated as part of the proposed project, sediment stockpiled as part of the IMP will also be removed. For sediment removal, the trucks will take maintenance road, west of the reservoir, to Oak Grove Drive, following it until Berkshire Place, and then merge onto the eastbound Interstate 210 Foothill Freeway. Trucks carrying sediment will continue to follow the 210 Freeway east until exiting Irwindale Avenue southbound, turning eastward onto Gladstone (Waste Management Facility) and then south onto Vincent (Manning Pit SPS). To return to the reservoir, the trucks will follow Arrow Highway eastward, turn north onto Azusa Avenue, and take the 210 Foothill

freeway westbound on-ramp. The access road used to access Oak Grove Drive will be widened to accommodate the truck traffic. For organic material, the trucks will follow the 210 Freeway east until the 134 Ventura Freeway west, exit Figueroa Street northbound, and then following Scholl Canyon Road to the Scholl Canyon Landfill.

2.4.2 Project Schedule

The proposed project is expected to occur between Spring 2014 and Winter 2019. Excavation and associated activities within the reservoir area is expected to take place during dryer months, from April to December, Monday through Saturday (except on holidays), as weather permits. Activities will take place between the hours of 7:00 a.m. to 7:00 p.m. on Monday through Friday and 8:00 a.m. to 5:00 p.m. on Saturday. Removal of sediment and organic materials off-site is expected to take place between these hours but specific hours may be further defined to avoid sensitive travel times.

2.5.3 Sediment Management

The proposed project is expected to result in a reservoir configuration and appropriate access ways to facilitate future routine periodic maintenance and sediment removal and minimize any environmental impacts associated with these future activities.

2.4.3 Environmental Commitments / Best Management Practices

The proposed project lies within the boundaries of the County of Los Angeles and shall conform to the following requirements:

- Waste Discharge Requirements for Municipal Storm Water and Urban Runoff Discharges within the County of Los Angeles, and the Incorporated Cities therein, except the City of Long Beach (Order No. 01-182, NPDES No. CAS004001).
- Within the unincorporated areas of the County of Los Angeles, Los Angeles County Code, Chapter 12.80.
- Other applicable Federal, State, and local requirements.

To reduce potential impacts to water quality, the proposed project would be conducted in accordance with applicable standards and BMPs. The following environmental safeguards would be implemented as part of the proposed project:

- Sediments shall not be discharged to the storm drain system or receiving waters.
- Sediments generated on the project site shall be contained within the project site using appropriate Best Management Practices (BMPs).
- No project activity-related materials: waste, spills, or residue shall be discharged from the project site to streets, drainage facilities, receiving waters, or adjacent property by wind or runoff.

Figure 3 - Project Excavation Boundary

- Non-storm water runoff from equipment, vehicle washing, or any other activity shall be contained within the project site using appropriate BMPs.
- Erosion from exposed topsoil slopes and channels shall be prevented.
- Minimize grading during the wet season. All erosion susceptible slopes shall be covered, planted, or protected in any way that prevents sediment discharge from the project site.
- If the project is active during the rainy season (October 15 – April 15), the Contractor shall prepare an accumulated precipitation procedure (APP) for review and approval by the LACFCD Project Engineer before any discharge from the project. The APP shall describe the location of proposed discharges, the BMPs to prevent pollution, and the actual equipment to be used. The APP shall be prepared and submitted in accordance with BMP NS-2 and the LACDPW Construction Site BMPs Manual (BMP Manual) Section 7.

2.5. REQUIRED PERMITS AND APPROVALS

2.5.1 Lead Agency Approval

The Final EIR must be certified by the Los Angeles County Board of Supervisors (Board) as the governing board of the LACFCD as to its adequacy in complying with the requirements of CEQA before taking any action on the proposed project. The Board will consider the information contained in the EIR in making a decision to approve or deny the Devil's Gate Reservoir Sediment Removal and Management Project (Proposed Project). The analysis in the EIR is intended to provide a full disclosure of the proposed project's potential environmental impacts in accordance with CEQA requirements.

2.5.2 Other Required Permits and Approvals

A Responsible Agency is a public agency, other than the lead agency, that has discretionary approval authority over a project. The Responsible Agencies, and their corresponding approvals, for this project include the following:

City of Pasadena - Pasadena Tree Protection Ordinance Permit

Department of Fish and Game – Section 1600 Streambed Alteration Agreement

Regional Water Quality Control Board – Section 401 Water Quality Certification

US Army Corps of Engineers – Section 404 Permit

2.5.3 Reviewing Agencies

Reviewing Agencies include those agencies that do not have discretionary powers, but that may review the IS for adequacy and accuracy. Potential Reviewing Agencies include the following:

State of California

- Office of Historic Preservation
- Department of Transportation (Caltrans)

- Resources Agency
- Department of Conservation, Division of Oil, Gas and Geothermal Resources
- Native American Heritage Commission
- State Lands Commission
- California Highway Patrol

Regional Agencies

- Southern California Association of Governments
- South Coast Air Quality Management District

SECTION 3.0 – ENVIRONMENTAL DETERMINATION

3.1. ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED:

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a "Potentially Significant Impact" as indicated by the checklist on the following pages.

☒ *Aesthetics*	☐ *Agriculture Resources*	☒ *Air Quality/GHG Emissions*
☒ *Biological Resources*	☒ *Cultural Resources*	☒ *Geology /Soils*
☒ *Hazards & Hazardous Materials*	☒ *Hydrology / Water Quality*	☒ *Land Use / Planning*
☒ *Mineral Resources*	☒ *Noise*	☐ *Population / Housing*
☒ *Public Services*	☒ *Recreation*	☒ *Transportation / Traffic*
☒ *Utilities / Service Systems*	☒ *Mandatory Finding of Significance*	

3.2. DETERMINATION

On the basis of this initial evaluation:

1. I find that the project **could not** have a significant effect on the environment, and a **NEGATIVE DECLARATION** will be prepared. ☐
2. I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent A **MITIGATED NEGATIVE DECLARATION** will be prepared. ☐
3. I find the proposed project **may have a significant effect** on the environment, and an **ENVIRONMENTAL IMPACT REPORT** is required. ☒
4. I find that the proposed project **may have a "potentially significant impact" or "potentially significant unless mitigated impact"** on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An **ENVIRONMENTAL IMPACT REPORT** is required, but it must analyze only the effects that remain to be addressed. ☐
5. I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or Negative Declaration pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or Negative Declaration, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required. ☐

Ryan C. Butler — 9/27/11

Signature — Date

Ryan C Butler — Associate Civil Engineer

Name, Title

SECTION 4.0 – EVALUATION OF ENVIRONMENTAL IMPACTS

1. A brief explanation is required for all answers except "No Impact" answers that are adequately supported by the information sources a lead agency cites. A "No Impact" answer is adequately supported if the referenced information sources show that the impact simply does not apply to projects like the one involved (e.g., the project falls outside a fault rupture zone). A "No Impact" answer should be explained where it is based on project-specific factors as well as general standards (e.g., the project will not expose sensitive receptors to pollutants, based on a project-specific screening analysis).

2. All answers must take account of the whole action involved, including off-site as well as on-site, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts.

3. Once the lead agency has determined that a particular physical impact may occur, then the checklist answers must indicate whether the impact is potentially significant, less than significant with mitigation, or less than significant. "Potentially Significant Impact" is appropriate if there is substantial evidence that an effect may be significant. If there are one or more "Potentially Significant Impact" entries when the determination is made, an EIR is required.

4. "Negative Declaration: Less Than Significant With Mitigation Incorporated" applies where the incorporation of mitigation measures has reduced an effect from "Potentially Significant Impact" to a "Less Than Significant Impact." The lead agency must describe the mitigation measures, and briefly explain how they reduce the effect to a less than significant level (mitigation measures from earlier analyses," may be cross-referenced).

5. Earlier analyses may be used where, pursuant to the tiering, program EIR, or other CEQA process, an effect has been adequately analyzed in an earlier EIR or negative declaration. Section 15063(c)(3)(D). In this case, a brief discussion should identify the following:

   a. Earlier Analysis Used. Identify and state where they are available for review.

   b. Impacts Adequately Addressed. Identify which effects from the above checklist were within the scope of and adequately analyzed in an earlier document pursuant to applicable legal standards, and state whether such effects were addressed by mitigation measures based on the earlier analysis.

   c. Mitigation Measures. For effects that are "Less than Significant with Mitigation Measures Incorporated," describe the mitigation measures which were incorporated or refined from the earlier document and the extent to which they address site-specific conditions for the project.

6. Lead agencies are encouraged to incorporate into the checklist references to information sources for potential impacts (e.g., general plans, zoning ordinances). Reference to a previously prepared or outside document should, where appropriate, include a reference to the page or pages where the statement is substantiated.

7. Supporting Information Sources: A source list should be attached, and other sources used or individuals contacted should be cited in the discussion.

8. The explanation of each issue should identify:

    a. the significance criteria or threshold, if any, used to evaluate each question; and

    b. the mitigation measure identified, if any, to reduce the impact to less than significance

*Note: Instructions may be omitted from final document.

SECTION 5.0 – CHECKLIST OF ENVIRONMENTAL ISSUES

5.1. AESTHETICS

1.	AESTHETICS. Would the project:	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
(a)	Have a substantial adverse effect on a scenic vista?	☒	☐	☐	☐
(b)	Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☒	☐	☐	☐
(c)	Substantially degrade the existing visual character or quality of the site and its surroundings?	☒	☐	☐	☐
(d)	Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☐	☐	☒	☐

5.1.1 Impact Analysis

(a) The proposed project site is located in the City of Pasadena within the Devil's Gate Reservoir. There are no designated scenic vistas in the project vicinity (City of Pasadena, 1994), however, public views of the proposed project site are available from various viewpoints along the reservoir and Hahamongna Watershed Park including trails and lookouts that are readily accessible by the public. The project site would also be visible from private residences and the private property within JPL. Views of the project site from both public and private vantage points may be impacted by the sediment and vegetation removal. Changes to views associated with the proposed project site will be further analyzed in the EIR.

(b) The California Department of Transportation designates Official and Eligible scenic highways within the State. The proposed project is located approximately 1.8 miles from State Highway 2 - Angeles Crest Highway, an Officially Designated State Scenic Highway; and is located in close proximity to the 210 Freeway, an Eligible State Scenic Highway (Caltrans, 2011). The Los Angeles County General Plan has assigned the same designations to these highways (LACDRP, 2011). State Highway 2 – Angeles Crest Highway does not provide views of the proposed project site (City of Pasadena, 2002). Therefore, the proposed project would not damage scenic resources within an officially designated state scenic highway. As the site is characterized by its open space park features, views of the site from the 210 Freeway could be altered. Changes to views of scenic resources from the 210 Freeway, an Eligible State Scenic Highway, will be further analyzed in the EIR.

(c) Views of the proposed project site and the immediate area are characterized by open space, active and passive recreation facilities, trails, and native and non-native vegetation surrounded by urban development against the backdrop of the San Gabriel Mountains. The proposed project would remove both sediment and vegetation from the reservoir, which would change

the visual character of the site and alter public and private views of the site. Changes to the existing visual character and quality of the project site will be further analyzed in the EIR.

(d) The proposed project would remove sediment and vegetation from the reservoir and eventually transport the sediment and vegetation to approved disposal sites. The proposed project would involve limited addition of lights or structures that would cause glare. There would be no significant impacts related to effects from added sources of light or glare. No further study of the issue is required.

5.2. AGRICULTURE & FOREST RESOURCES

2.	**AGRICULTURE & FOREST RESOURCES. (In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Department of Conservation as an optional model to use in assessing impacts on agriculture and farmland.) In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board.) Would the project:**	**Potentially Significant Impact**	**Less than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
(a)	Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	☒
(b)	Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	☒
(c)	Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?	☐	☐	☐	☒
(d)	Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☒

(e)	Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or the conversion of forest land to non-forest use?	☐	☐	☐	☒

5.2.1 Impact Analysis

(a) The proposed project site is designated as Open Space by the City of Pasadena General Plan. No agricultural activities presently occur on site. The site is not designated as Prime Farmland, Unique Farmland, or Farmland of Statewide Importance; and there is no farmland in the immediate vicinity of the project site (FMMP, 2011). Therefore, the proposed project would not convert Farmland to non-agricultural use. No impact would result, and no further study of the issue is required.

(b) The proposed project would not conflict with agricultural zoning or a Williamson Act contract. There are no Williamson Act contracts applicable to the proposed project site; the site is zoned Open Space and contains no agricultural uses. No impact would result, and no further study of the issue is required.

(c) through (e). The proposed project site does not contain any forest land or timberland. The site is zoned for Open Space; and although it contains trees and other vegetation, it is not designated as forest land. No impact would result, and no further study of the issue is required.

5.3. AIR QUALITY

3.	**AIR QUALITY. (Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations.) Would the project:**	**Potentially Significant Impact**	**Less than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
(a)	Conflict with or obstruct implementation of the applicable air quality plan?	☒	☐	☐	☐
(b)	Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	☒	☐	☐	☐
(c)	Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	☒	☐	☐	☐
(d)	Expose sensitive receptors to substantial pollutant concentrations?	☒	☐	☐	☐
(e)	Create objectionable odors affecting a substantial number of people?	☒	☐	☐	☐

5.3.1 Impact Analysis

(a) The proposed project is located in the South Coast Air Basin (SCAB), which is under the South Coast Air Quality Management District (SCAQMD). The Air Quality Management Plan (AQMP) for the SCAB sets forth a comprehensive program that will lead the SCAB into compliance with all federal and state ambient air quality standards. The AQMP control measures and related emission reduction estimates are based upon emissions projections for a future development scenario derived from land use, population, and employment characteristics defined in consultation with the Southern California Association of Governments (SCAG). Accordingly, conformance with the AQMP for development projects is determined by demonstrating compliance with local land use plans, population projections, and SCAQMD Regulations. The proposed project involves sediment removal and sediment transport. Impacts related the obstruction or conflicts with the implementation of the applicable air quality plan will be analyzed in the EIR.

(b) CEQA inquires as to whether a project would violate any air quality standard or contribute substantially to an existing or projected air quality violation. A violation could occur over the short-term during sediment removal, or over the long-term during subsequent maintenance activities. The SCAQMD has established standards for air quality constituents generated by construction and by operational activities for such pollutants as ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), and particulate matter (PM_{10} and $PM_{2.5}$). The SCAQMD maintains an extensive air quality-monitoring network to measure criteria pollutant concentrations throughout the SCAB. Violations of air quality standards or contribution to an existing or projected air quality violation will be analyzed in the EIR.

(c) In addressing cumulative impacts for air quality, the AQMP is the most appropriate document to use because the AQMP sets forth a comprehensive program that will lead the SCAB, including the project area, into compliance with all federal and state air quality standards. The proposed project could potentially result in a cumulatively considerable net increase of criteria pollutants for which the project region is in non-attainment under the applicable federal or state ambient air quality standard. Impacts related to a cumulatively considerable net increase of any criteria pollutant will be analyzed in the EIR.

(d) Sensitive receptors are land uses such as residences, schools, daycare centers, and medical and recreational facilities that are more susceptible to the effects of air pollution than are the population at large. The proposed project would remove sediment and vegetation from the proposed project site and truck the sediment and vegetation to various off site locations. The haul routes pass near schools, both in the vicinity of the proposed project and the off site disposal locations. In addition, the proposed project site contains, and is immediately adjacent to, recreational uses. The proposed project could emit air pollutants in substantial concentrations that would affect both off-site and on-site receptors. Impacts associated with exposing sensitive receptors to substantial pollutant concentrations will be analyzed in the EIR.

(e) The proposed project does not propose an odor generating use identified in the SCAQMD (e.g. wastewater treatment plants, agricultural operations, landfills, composting, food processing plants, chemical plants, refineries, etc.) and would not create an odor nuisance pursuant to Rule 402. Project sediment removal would involve the use of heavy equipment creating exhaust pollutants from on-site earth movement and from equipment hauling the sediment and vegetation off-site. With regard to nuisance odors, any air quality impacts will be confined to

the immediate vicinity of the equipment itself. However, recreational uses as well as residences are located in the immediate vicinity of the proposed project site. The EIR will further analyze objectionable odors that could occur as a result of the proposed project.

5.4. BIOLOGICAL RESOURCES

4.	BIOLOGICAL RESOURCES. Would the project:	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
(a)	Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☒	☐	☐	☐
(b)	Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☒	☐	☐	☐
(c)	Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☒	☐	☐	☐
(d)	Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☒	☐	☐	☐
(e)	Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☒	☐	☐	☐
(f)	Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☐	☒

5.4.1 Background

Over the years, as storm events deposited sediment in the reservoir, native and non native vegetation established itself in the sediment deposits. During subsequent storm events some of the vegetation is washed out by storm flows or submerged when the reservoir level rises; however much of the reservoir recently included areas of riparian vegetation and upland vegetation communities such as mature black willow trees, riversidian alluvial fan sage scrub, and mule fat scrub. During the major sediment inflows following the Station Fire, a large portion of the reservoir vegetation was buried in sediment; however

significant amounts of vegetation, including mature willow trees remain present. In order to remove sediment from the reservoir, some of the vegetation growing within it will require removal.

5.4.2 Impact Analysis

(a) The proposed project site is located in the reservoir behind Devil's Gate Dam, where vegetation has grown over the accumulated sediment. The proposed project involves the removal of both the sediment and vegetation located within the reservoir. Due to the amount of sediment and vegetation to be removed, the proposed project has the potential to affect a candidate, sensitive, or special status species. The EIR will further analyze impacts on any species identified as a candidate, sensitive, or species status species.

(b) The proposed project would remove vegetation as well as sediment from riparian habitats. Therefore, the proposed project would have the potential to have an adverse effect on a riparian habitat. The EIR will further analyze impacts to the riparian habitat and any other sensitive natural communities.

(c) Biological surveys will be undertaken and a detailed biological resources technical report completed for the proposed project in order to fully characterize the existing biological and hydrological conditions of the project site and to evaluate the potential impacts associated with the proposed project. The technical report will be included as an appendix to the EIR and the results of the biological resource surveys will be summarized and incorporated into the EIR.

(d) The proposed amount of sediment and vegetation proposed to be removed could have an effect on wildlife corridors or native wildlife nursery sites. The EIR will further analyze impacts of the proposed project on the movement of wildlife and wildlife nursery sites.

(e) The proposed project will remove vegetation, including trees, from the proposed project site. As the proposed project site is located within the City of Pasadena, it is subject to the Pasadena Tree Protection Ordinance. Due to the volume of vegetation to be removed from the proposed project site, the proposed project has the potential to conflict with local policies or ordinances protecting biological resources, including the Pasadena Tree Protection Ordinance. The EIR will analyze conflicts with any local policies or ordinances protecting biological resources on the proposed project site.

(f) The project site is not within a City-designated or County-designated Significant Ecological Area (SEA), habitat conservation plan, or natural community conservation plan (LACDRP, 2009). No impact would result, and no further study of the issue is required.

5.5. CULTURAL RESOURCES

5.	CULTURAL RESOURCES. Would the project:	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
(a)	Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?	☒	☐	☐	☐

(b)	Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?	☒	☐	☐	☐
(c)	Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☒	☐	☐	☐
(d)	Disturb any human remains, including those interred outside of formal cemeteries?	☒	☐	☐	☐

5.5.1 Impact Analysis

(a) through (d). Field surveys and a records search will determine if there are historical, archaeological, or paleontological resources in the vicinity. A technical report will be prepared and included as an appendix to the EIR. The EIR will further analyze impacts to historical, cultural, and paleontological resources on the proposed project site.

(d) The records search and field survey will determine if there is the potential to encounter buried resources during project sediment removal. The EIR will further analyze potential impacts to human remains on the proposed project site.

5.6. GEOLOGY AND SOILS

6.	GEOLOGY AND SOILS. Would the project:	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
(a)	Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:				
	i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	☐	☐	☐	☒
	ii) Strong seismic ground shaking?	☐	☐	☐	☒
	iii) Seismic-related ground failure, including liquefaction?	☐	☐	☐	☒
	iv) Landslides?	☐	☐	☐	☒
(b)	Result in substantial soil erosion or the loss of topsoil?	☒	☐	☐	☐
(c)	Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	☐	☐	☐	☒

6.	GEOLOGY AND SOILS. Would the project:	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
(d)	Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	☐	☐	☐	☒
(e)	Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?	☐	☐	☐	☒

5.6.1 Impact Analysis

(a) The proposed project site is located in the seismically active region of southern California. However, the site is not located within an Alquist-Priolo Earthquake Fault Zone. There are various unnamed faults to the west, south, and east of the proposed project site; however none traverse the site. The nearest faults include the Raymond Fault and the Sierra Madre Fault. Because southern California is a seismically active region, it is highly likely that regional earthquakes would occur in the vicinity of the proposed project site. The proposed project site could be subjected to moderate to severe ground shaking in the event of a major earthquake on any of the faults listed above or other faults in Southern California. The proposed project site is also located in an area identified area that could be subject to liquefaction, but is not identified as an area subject to landslides (California Geological Survey, 2011). The proposed project does not involve the construction or placement of any buildings on the proposed project site. Therefore, the proposed project would not create substantial risks to life or property associated with earthquake faults, seismic ground shaking, ground failure, and landslides. No impacts would occur. No further study of this issue is required.

(b) The proposed project involves the removal and hauling of sediment and vegetation from the site. Erosion could occur within the reservoir during excavation and sediment loading, and possibly during sediment transport. Impacts related to sediment excavation and transport will be further analyzed in the EIR.

(c) Liquefaction occurs when seismic-induced groundshaking causes water-laden, cohesionless soils to form a quicksand-like condition below the ground surface. The proposed project does not involve the construction or placement of any buildings on the proposed project site. Therefore, the proposed project would not create substantial risks to life or property associated with liquefaction. No impacts associated with liquefaction would occur. No further study of this issue is required.

(d) Expansive soil is defined as soil that expands to a significant degree upon wetting and shrinks upon drying. A hazardous condition is created when buildings are placed on expansive soils and structural damage could occur. The proposed project does not involve the construction or placement of any buildings on the proposed project site. Therefore, the proposed project would not create substantial risks to life or property due to being located on expansive soil. No impacts associated with expansive soils would occur. No further study of this issue is required.

(e) The proposed project involves the removal of sediment from a reservoir and debris basin, and would not construct any buildings. Therefore, the proposed project will not use septic tanks or alternative wastewater disposal systems. No impacts associated with the use of a septic system would occur. No further study of this issue is required.

5.7. GREENHOUSE GAS EMISSIONS

7.	GREENHOUSE GAS EMISSIONS. Would the project:	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
(a)	Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☒	☐	☐	☐
(b)	Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☒	☐	☐	☐

5.7.1 Impact Analysis

(a) The proposed project will generate emissions of greenhouse gases (GHGs) from mobile sources mostly related to the operation of machinery on site associated with sediment removal and transport of sediment and vegetation from the proposed project site to the disposal sites. The California Air Resources Board (CARB) has statutory responsibility to maintain a statewide inventory of GHG emissions. The California GHG inventory compiles statewide anthropogenic GHG emissions and sinks. An analysis of GHG emissions from the proposed project is being prepared as part of the EIR. The EIR will further analyze impacts related to the generation of GHG emissions.

(b) An analysis of the proposed project's impacts on applicable plans, policies, and regulations adopted for the purpose of reducing the emissions of GHGs will be included in the EIR.

5.8. HAZARDS AND HAZARDOUS MATERIALS

8.	HAZARDS AND HAZARDOUS MATERIALS. Would the project:	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
(a)	Create a significant hazard to the public or the environment through the routine transport, use or disposal of hazardous materials?	☒	☐	☐	☐
(b)	Create a significant hazard to the public or the environment through reasonable foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☒	☐	☐	☐

(c)	Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☒	☐	☐	☐
(d)	Be located on a site which is included on a list of hazardous materials sites complied pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☒	☐	☐	☐
(e)	For a project located within an airport land use plan or, where such a plan had not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
(f)	For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
(g)	Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☒	☐	☐	☐
(h)	Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	☐	☐	☒	☐

5.8.1 Impact Analysis

(a) through (b) The proposed project would not require the extended use of acutely hazardous materials or substances. Project activities, involving construction equipment, would be short term and would involve the limited transport, use, disposal, and storage of hazardous materials. Some examples of the hazardous materials that may be handled include fuels, lubricating fluids, and solvents. These types of materials, however, are not acutely hazardous, and all storage, handling, and disposal of these materials is regulated by the California Department of Toxic Substances Control (DTSC), U.S. Environmental Protection Agency (EPA), the Occupational Safety & Health Administration (OSHA), the Los Angeles County Fire Department, and the Los Angeles County Health Department. Adherence to the regulations set forth by County, state, and federal agencies would reduce the potential for hazardous materials impacts to a less than significant level and would not pose a safety hazard to sensitive receptors. No further study of this issue involving construction equipment is required.

The proposed project involves the excavation and transportation of sediment. A Hazards and Hazardous Materials Study will be prepared to analyze impacts associated with hazards to the public or the environment through the excavation, transportation, and disposal of this sediment. The results of this study will be analyzed in the EIR.

(c) There are two schools located within one-quarter mile of the proposed project site, La Canada High School (4463 Oak Grove Drive) and Hillside School and Learning Center (4331 Oak Grove

Drive), located to the west of the project site. Additionally, the haul route away from the Manning Pit SPS and Waste Management SPS passes near Azusa High School (1340 N. Enid Avenue) (Google Earth, 2011). The EIR will analyze impacts of hazardous emissions and hazardous materials within one-quarter mile of an existing or proposed school.

(d) A Hazards and Hazardous Materials Study will be undertaken and will include an electronic database review of federal, state and local files to investigate known occurrences of hazardous materials sites. The Hazards and Hazardous Materials Study, as well as the EIR, will further analyze the location of hazardous materials sites and the creation of a hazard to the public or environment.

(e) The nearest airport to the proposed project site is the Bob Hope Airport in Burbank, approximately 10.45 miles to the west. El Monte Airport is located 10.8 miles to the southeast of the project site; and Whiteman Airport, another public use airport, is located 14.5 miles to the northwest of the site (Google Earth, 2011). Therefore, the proposed project would not result in an airplane safety hazard for people residing or working in the project area. No further study of this issue is required.

(f) There are no private airports or airstrips in the vicinity of the proposed project site. Therefore, the proposed project would not result in an airplane safety hazard for people residing or working in the project area. No further study of this issue is required.

(g) Emergency response facilities are located in and adjacent to the Hahamongna Watershed Park. The County of Los Angeles Fire Department Camp 2 facility is located in the northwestern part of Hahamongna Watershed Park. Camp 2 is supported by a helipad that is used for emergency operations. A second helipad, operated by the City of Pasadena Police Department is located at 2175 Yucca Lane, southeast of Devil's Gate Dam (City of Pasadena, 2002). The EIR will analyze impacts to emergency response plans or emergency evacuation plans.

(h) The project site is located in an open space area with native and non-native vegetation existing on the site. Adjacent land uses are mostly urban, with some additional open space areas to the west and north. Due to the open space and existing vegetation, there is some potential for wildfire. Wildfire avoidance measures will be coordinated with the Pasadena Fire Department prior to sediment removal activities. Impacts related to wildland fires would be less than significant and no further analysis of this issue is required.

5.9. HYDROLOGY AND WATER QUALITY

9.	HYDROLOGY AND WATER QUALITY. Would the project:	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
(a)	Violate any water quality standards or waste discharge requirements?	☒	☐	☐	☐

9.	HYDROLOGY AND WATER QUALITY. Would the project:	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
(b)	Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	☐	☐	☐	☒
(c)	Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in a substantial erosion or siltation on- or off-site.	☒	☐	☐	☐
(d)	Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?	☐	☐	☐	☒
(e)	Create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff?	☐	☐	☐	☒
(f)	Otherwise substantially degrade water quality?	☒	☐	☐	☐
(g)	Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	☐	☐	☐	☒
(h)	Place within a 100-year flood hazard area structures which would impede or redirect flood flows?	☐	☐	☐	☒
(i)	Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?	☐	☐	☐	☒
(j)	Inundation by seiche, tsunami, or mudflow?	☐	☐	☒	☐

5.9.1 Impact Analysis

(a) The California Regional Water Quality Control Board (RWQCB) is the authority in charge of protecting the water quality of surface and ground waters in the region. The proposed project would involve the removal of sediment that could cause the deterioration of water quality if sediment or excavation-related pollutants wash into the surface water system. Since the

proposed project site is greater than one acre, the proposed project would require the preparation and compliance with a Storm Water Pollution Prevention Plan (SWPPP), which would feature erosion control measures. In addition, the proposed project would require compliance with the Storm Water Construction Activities General Permit and obtain a National Pollution Discharge Elimination System (NPDES) permit. The Hydrology/Water Quality Report, as well as the EIR, will further analyze impacts of the proposed project on water quality standards and waste discharge requirements.

(b) The proposed project does not involve the withdrawal of groundwater and would not increase the impervious surface area on the proposed project site. In addition, the proposed project would not increase the impervious surface area on the proposed project site. No impacts would occur and no further study of the issue is required.

(c) The proposed project involves the removal of sediment from the reservoir, which would alter the existing drainage pattern of the site. Due to the amount of sediment removal that is required and potential impacts to biological resources, a Streambed Alteration Agreement from the CDFG may be required. The EIR will further analyze impacts of the proposed project on erosion or siltation on- or off-site.

(d) The proposed project, in removing sediment and vegetation from the reservoir, will alter the existing drainage pattern of the site. Since the proposed project site is located within the reservoir behind Devil's Gate Dam, it is not expected to increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site. In fact, the removal of sediment would reduce the potential for flooding. No impacts would occur and no further study of the issue is required.

(e) The storm water runoff from the proposed project site drains into the Arroyo Seco through the outlet works in the dam. As the proposed sediment removal is not expected to create or contribute runoff water, the proposed project would not exceed the capacity of existing or planned storm water drainage systems, nor would it significantly increase polluted runoff originating from the site. The proposed project would improve the reservoir's capacity for stormwater runoff. No impacts would occur and no further study of the issue is required.

(f) The proposed project involves removal of sediment from the reservoir. During the removal of and the hauling of the sediment, all applicable water quality requirements would need to be followed. The project would be required to comply with NPDES regulations and require the preparation and implementation of a SWPPP, which would avoid significant water quality impacts from sediment removal runoff. The EIR will further analyze impacts of the proposed project on water quality.

(g) through (h). The proposed project involves sediment removal from the reservoir, and would not involve any construction or placement of structures on the proposed project site. The proposed project would not place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map. Therefore, no flood related impact would result, and no further study of the issue is required.

(i) The proposed project involves sediment removal from the reservoir behind Devil's Gate Dam, which will, in fact, decrease the risk of loss, injury or death involving flooding both above and below the dam. In its current state the reservoir has accumulated a large volume of sediment

behind the dam, which puts the surrounding communities at risk for potential flooding. The sediment removal will alleviate the heightened level of this risk. Therefore, the proposed project will not expose people or structures to a significant risk of loss, injury or death involving flooding; and no further study of the issue is required.

(j) The proposed project is located inland and is not within the vicinity of any large bodies of water. At designated instances the reservoir may hold water before releasing the runoff into the downstream Arroyo Seco; however this would be temporary and infrequent. The proposed project site located at the foothills of the San Gabriel Mountains, and may be subject to mudflow. However, the reservoir is designed to be able to retain runoff, sediment flow and debris from the upstream watershed. Therefore impacts will be less than significant; and no further study of this issue is required.

5.10. LAND USE AND PLANNING

10.	LAND USE/PLANNING Would the project:	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
(a)	Physically divide an established community?	☐	☐	☒	☐
(b)	Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	☒	☐	☐	☐
(c)	Conflict with any applicable habitat conservation plan or natural community conservation plan?	☐	☐	☐	☒

5.10.1 Impact Analysis

(a) The proposed project site is located within the City of Pasadena, and shares borders with the City of La Canada-Flintridge and the community of Altadena. The proposed project site serves as a defining feature in the landscape as well as the community, and serves to provide recreational opportunities for many of the surrounding cities and communities. The proposed project involves sediment removal from the reservoir and would not change the existing land use. Although the site would be physically altered, it would remain as open space. Therefore impacts will be less than significant; and no further study of this issue is required.

(b) The proposed project site has a General Plan land use designation of Open Space and is zoned as Open Space (Pasadena, 1994). The adjacent land in Pasadena, La Canada-Flintridge, and Altadena is zoned Residential. The proposed project will not conflict with or require any change to the zoning or General Plan land use designations for the site.

Hahamongna Watershed Park is located within and adjacent to the project site. The Hahamongna Watershed Park is regulated by the Hahamongna Watershed Park Master Plan

(HWPMP) (City of Pasadena, 2003). The proposed project may delay or required changes in implementation of aspects of the HWPMP. An analysis of the proposed project's impacts on the HWPMP will be included in the EIR.

(c) As noted in Section 4 (f), the project site is not within a City-designated or County-designated Significant Ecological Area (SEA), habitat conservation plan, or natural community conservation plan (LACDRP 2011). No impact would result, and no further study of the issue is required.

5.11. MINERAL RESOURCES

11.	MINERAL RESOURCES Would the project:	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
(a)	Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☒	☐	☐	☐
(b)	Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	☒	☐	☐	☐

5.11.1 Impact Analysis

(a) through (b). The proposed project site was once used for sand and gravel mining operations. However, all mining operations within the proposed project site ceased in December 1994. Since that time, actions have been taken to rehabilitate the basin from past mining operations. However, multiple areas remain disturbed due to the past mining operations. The City of Pasadena is responsible for assuring resource conservation in areas that contain significant mineral resources. These areas are designated on mineral land use classification maps that delineate Mineral Resource Zones (MRZs). The Devil's Gate Reservoir is designated MRZ-2. The MRZ-2 designation is for areas where there is adequate information that significant mineral resource deposits are present, or there is a high likelihood that significant mineral resources are present, such as sand, gravel, and stone (City of Pasadena, 2002). The proposed project would likely remove mineral resources as part of sediment removal activities. An analysis of the proposed project's impacts on significant mineral resources will be included in the EIR.

5.12. NOISE

12.	NOISE Would the project result in:	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
(a)	Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☒	☐	☐	☐

(b)	Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	☒	☐	☐	☐
(c)	A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☐	☒
(d)	A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	☒	☐	☐	☐
(e)	For a project located within an airport land use plan or, where such a plan had not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒
(f)	For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒

5.12.1 Impact Analysis

(a) through (b). The proposed project involves the removal of sediment and vegetation from the site, as well as the hauling of the sediment and vegetation to various off-site locations for disposal. The sediment excavation, as well as the hauling of sediment away from the site could potentially disturb nearby sensitive receptors. These activities could also have the potential to expose sensitive receptors to groundbourne vibration or groundbourne noise. The Noise and Vibration Study, as well as the EIR, will analyze impacts of the proposed project on generation of excessive noise levels or excessive groundbourne vibration.

(c) After the proposed removal of sediment to restore reservoir storage capacity is complete, maintenance of the proposed project will involve annual inspection and periodic small-scale cleanout of sediment from the reservoir. These minor sediment removal efforts will result in a temporary increase in ambient noise levels in the project vicinity but would be periodic and temporary and would not result in a substantial permanent increase in ambient noise levels. Therefore no further study of this issue is required.

(d) The proposed project involves both the excavation and hauling of sediment and vegetation from the proposed project site. These activities would result in a temporary increase in ambient noise levels in the project vicinity. The Noise and Vibration Study, as well as the EIR, will further analyze impacts of the proposed project on temporary or periodic increases in ambient noise levels in the project vicinity.

(e) through (f). The proposed project site is not in the vicinity of any airports or airstrips. The nearest airport to the proposed project site is the Bob Hope Airport in Burbank, approximately 10.45 miles to the west. Further, the project does not involve a change in land use that would generate new residents or employment. Therefore, the proposed project would not expose people residing or working in the project area to excessive noise levels. No further study of this issue is required.

5.13. POPULATION AND HOUSING

13.	POPULATION AND HOUSING. Would the project:	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
(a)	Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☐	☒
(b)	Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒
(c)	Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒

5.13.1 Impact Analysis

(a) The proposed project site is currently used by LACDPW for flood control. The proposed project involves restoration and maintenance of the existing reservoir and would not stimulate population growth; no further study of this issue is required.

(b) through (c). There is no housing located on the proposed project site. The proposed project site is currently used for flood control. No housing units or persons would be displaced as a result of the proposed project. The proposed project would have no impact on housing or populations that would require the construction of replacement housing elsewhere; no further study of this issue is required.

5.14. PUBLIC SERVICES

14.	PUBLIC SERVICES. Would the project result in substantial adverse physical impacts associated with the provision of or need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services::	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
(a)	Fire Protection?	☐	☐	☐	☒
(b)	Police Protection?	☐	☐	☐	☒
(c)	Schools?	☐	☐	☐	☒
(d)	Parks?	☒	☐	☐	☐
(e)	Other public facilities?	☐	☐	☐	☒

5.14.1 Impact Analysis

(a) through (b). Fire protection for the project area is currently provided by the Pasadena Fire Department. The Pasadena Fire Station that would respond to calls in the area of the proposed project site is Fire Station 38, located approximately 1.32 miles from the site at 1150 Linda Vista Avenue. Police protection is provided by the Pasadena Police Department located approximately 3.08 miles from the proposed project site at 207 North Garfield Avenue. Project activities may temporarily increase the need for fire protection services; however, avoidance measures will be coordinated with the Pasadena Fire Department prior to sediment removal activities to reduce the potential for accidental fire during project implementation. The proposed project is not expected to increase the need for police protection services as project activities would not change the existing land uses or increase the number of service calls. Impacts to fire and police protection services would not be significant; no further study of this issue is required.

(c) No impacts to schools are anticipated to result from project implementation, as populations will not be affected. As such, no new schools will need to be built as a result of the proposed project that would cause significant environmental impacts; no further study of this issue is required.

(d) The proposed project involves sediment and vegetation removal activities within the Hahamongna Watershed Park. The sediment and vegetation removal activities may have an impact on the existing recreational uses within the Hahamongna Watershed Park. The area is frequented by hikers, bicyclists, and equestrians. No new construction of parks would be required. However, the sediment and removal vegetation operations would occur over a period of approximately five years, and may affect recreational opportunities within the Hahamongna Watershed Park. This regional park provides recreational opportunities for many of the surrounding cities and communities and therefore, the EIR will further analyze impacts of the proposed project the park.

(e) No other public facilities are anticipated to be impacted by the proposed project; no further study of this issue is required.

5.15. RECREATION

15.	RECREATION. Would the project:	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
(a)	Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☒	☐	☐	☐
(b)	Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	☒	☐	☐	☐

5.15.1 Impact Analysis

(a) through (b). The proposed project involves sediment removal from within the Hahamongna Watershed Park. Existing recreational facilities include Oak Grove Park on the west side of the reservoir. Oak Grove Park includes an upper and lower terrace, and its facilities include picnic facilities, restrooms, an equestrian staging area, group picnicking facilities, an amphitheater, Oak Grove field, and a disc golf course. The proposed project would remove sediment and vegetation adjacent to both recreational facilities. In addition, there are multiple trails within the Hahamongna Watershed Park, for pedestrian, bike, and equestrian use. The proposed project, through the sediment and vegetation removal, could affect recreational uses within the Hahamongna Watershed Park. Other recreational facilities in the surrounding area include Friedman Field, Upper Arroyo Park, Charles White Park, and Loma Alta Park, all located within 1.5 miles of the proposed project site (Google Earth, 2011). These parks or recreational facilities could also be affected indirectly by the proposed project through a potential increase in use during project activities which would occur over a period of approximately five years. No long-term impacts are anticipated, as the proposed project will not induce population growth; however, short-term impacts could occur. The EIR will further analyze the impacts of the proposed project on recreational facilities.

5.16. TRANSPORTATION AND TRAFFIC

16.	TRANSPORTATION/TRAFFIC. Would the project:	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
(a)	Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?	☒	☐	☐	☐
(b)	Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?	☒	☐	☐	☐
(c)	Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	☐	☐	☐	☒
(d)	Substantially increase hazards due to a design feature (e. g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☒	☐	☐	☐

16.	TRANSPORTATION/TRAFFIC. Would the project:	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
(e)	Result in inadequate emergency access?	☒	☐	☐	☐
(f)	Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities supporting alternative transportation (e.g., bus turnouts, bicycle racks)?	☒	☐	☐	☐

5.16.1 Impact Analysis

(a) through (b). Implementation of the proposed project has the potential to cause an increase in traffic that could conflict with the performance of the circulation system and decrease level of service standards on the roadways. Construction workers would need to access the site during the various stages of the project. Sediment removal and hauling activities would take place over a period of approximately five years and would add traffic to the existing roadways. The Traffic Study, as well as the EIR, will further analyze impacts of the proposed project on the circulation system, congestion management program, and level of service standards.

(c) The proposed project would not result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks. The nearest airport to the proposed project site is the Bob Hope Airport in Burbank, approximately 10.45 miles to the west. Because the proposed project is over two miles from the nearest airport, the proposed project would not have any impact on air traffic patterns; no further study of this issue is required.

(d) The proposed project involves the removal of sediment and vegetation, and the hauling of that material to various off-site locations. The hauling of sediment will increase truck traffic on various streets and freeways in the vicinity of the proposed project. These impacts could be potentially significant. The Traffic Study, as well as the EIR, will further analyze impacts of the proposed project related to the increase of traffic hazards.

(e) The hauling of sediment will increase truck traffic on various streets and freeways in the vicinity of the proposed project. These impacts could be potentially significant. The Traffic Study, as well as the EIR, will further analyze impacts of the proposed project related to inadequate emergency access.

(f) The proposed project involves the removal of sediment from the reservoir behind Devil's Gate Dam.. This could impact trails within the reservoir that are used by pedestrians, bicyclists, and equestrians. Additionally, the hauling of sediment and vegetation away from the site would increase truck traffic on the streets and freeways in the vicinity of the proposed project. The increase in traffic has the potential to conflict with alternative transportation routes. The Traffic Study, as well as the EIR, will further analyze impacts of the proposed project on adopted plans, policies, or programs regarding public transit, bicycle, or pedestrian facilities.

5.17. UTILITIES AND SERVICE SYSTEMS

17.	UTILITIES/SERVICE SYSTEMS. Would the project:	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
(a)	Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☐	☐	☐	☒
(b)	Require or result in the construction of new water or wastewater treatment facilities (including sewer (waste water) collection facilities) or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☒
(c)	Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☒	☐	☐	☐
(d)	Have sufficient water supplies available to serve the project (including large-scale developments as defined by Public Resources Code Section 21151.9 and described in Question No. 20 of the Environmental Information Form) from existing entitlements and resources, or are new or expanded entitlements needed?	☐	☐	☒	☐
(e)	Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☒	☐
(f)	Be served by a landfill with insufficient permitted capacity to accommodate the project's solid waste disposal needs?	☐	☐	☒	☐
(g)	Comply with federal, state, and local statutes and regulations related to solid wastes?	☐	☐	☒	☐

5.17.1 Impact Analysis

(a) through (b). The proposed project would not directly generate wastewater, and thus would not exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board. Additionally, the proposed project would not require the use of water or wastewater treatment facilities, as the proposed project would not involve long term water use or wastewater generation. Therefore, the proposed project would not have significant impacts on wastewater treatment requirements, or water or wastewater treatment facilities. No further study of this issue is required.

(c) The proposed project involves the removal of sediment and vegetation from the proposed project site to restore a portion of the original storage capacity within the reservoir. The impacts associated with the improvements to an existing facility will be examined in the EIR.

(d) The proposed project does not involve the long term use of water supplies. The proposed project would not require new or expanded water entitlements; no further study of this issue is required.

(e) The proposed project would not produce any wastewater or require expanded wastewater treatment capacity. No further study of this issue is required.

(f) As part of the proposed project, sediment that is not hauled to a SPS, would be hauled to the Waste Management Facility in Azusa. The Waste Management Site – Azusa Land Reclamation Landfill is permitted to accept up to 6,500 tons per day (tpd) of non-hazardous waste and has over 66 million cubic yards of capacity remaining. The Waste Management Facility also has an agreement with the LACDPW to accept 4.5 million tons of sediment until approximately 2028 (CalRecycle, 2011). The vegetation removed as part of the proposed project would be hauled to the Scholl Canyon Landfill in the City of Los Angeles. The Scholl Canyon Landfill has an estimated 20% of its capacity remaining, over 12,000,000 cubic yards, and its estimated closure date is December of 2024 (CalRecycle, 2011). These sites all have adequate storage capacity for the sediment and green waste that will be disposed of as part of the proposed project. There would be a less than significant impact on landfills; no further study of this issue is required.

(g) The sediment, vegetation, and any other materials disposed of would be required to comply with all federal, state, and local statutes and regulations related to solid waste. As the proposed project would comply with these existing regulations, it would ensure a less than significant impact in regards to solid waste regulations. No further study of this issue is required.

5.18. MANDATORY FINDINGS OF SIGNIFICANCE

18.	MANDATORY FINDINGS OF SIGNIFICANCE.	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
(a)	Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☒	☐	☐	☐

18.	MANDATORY FINDINGS OF SIGNIFICANCE.	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
(b)	Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects?)	☒	☐	☐	☐
(c)	Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☒	☐	☐	☐

5.18.1 Impact Analysis

(a) As mentioned in sections 5.4 and 5.5, the proposed project, due to the scale of the sediment removal, has the potential to affect both biological and cultural resources on the proposed project site. The Biological Resources Report and Cultural Resources Report, as well as the EIR, will further analyze the proposed project impacts on the quality of the environment, wildlife and plant populations, and important examples of the major periods of California history or prehistory.

(b) Due to the scale and location of the project, the proposed project has the potential to result in significant cumulative impacts. Both the sediment removal and sediment hauling could occur at the same time as other projects in the area, and the incremental effect could result in potentially significant impacts as the impacts could be cumulatively considerable. This issue will be further analyzed in the EIR.

(c) Both the sediment removal and sediment hauling activities have the potential to result in substantial adverse effects on human beings, either directly or indirectly. The excavation and hauling activities of the proposed project would generate air pollutants, noise, and traffic volumes that would directly and indirectly impact the nearby residents, recreational users, and travelers on the haul routes. Further analysis of the proposed project's impacts on human beings will be provided in the EIR; and the EIR will examine ways to minimize potential impacts through project design and the use of mitigation measures, to the extent feasible.

SECTION 6.0 – SOURCE REFERENCES

The following is a list of references used in the preparation of this document.

1) *California Department of Transportation (Caltrans), California Scenic Highway Mapping System. Accessed online July 2011 at http://www.dot.ca.gov/hq/LandArch/scenic_highways/index.htm.*

2) *California Geological Survey. Alquist-Priolo Earthquake Fault Zone Maps. Accessed online July 2011 at http://www.quake.ca.gov/gmaps/ap/ap_maps.htm.*

3) *CalRecycle. California Department of Resources, Recycling, and Recovery. Active Landfills Profile. Accessed online July 2011 at http://www.calrecycle.ca.gov/profiles/Facility/Landfill/.*

4) *CEQA Guidelines*. CCR Title 14, Division 6, Chapter 3, Section 15381, 2008.

5) *City of Pasadena. Planning Division. City of Pasadena General Plan. 1994.*

6) *City of Pasadena. Arroyo Seco Master EIR. May 2002.*

7) *City of Pasadena. Hahamongna Watershed Park Master Plan (HWPMP). September 2003.*

8) *Farmland Mapping and Monitoring Program (FMMP). California Resources Agency. Accessed online July 2011 at ftp://ftp.consrv.ca.gov/pub/dlrp/FMMP/pdf/2008/.*

9) *Google Earth, 2011.*

10) *Los Angeles County Department of Regional Planning (LACDRP). "Significant Ecological Areas" figure. December 2009.*

11) *Los Angeles County Department of Regional Planning (LACDRP). Los Angeles County Draft 2035 General Plan. April 2011.*

SECTION 7.0 – REPORT AUTHORS AND CONSULTANTS

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Project Manager/Senior Environmental Planner

Meghan Directo
Associate Environmental Planner

APPENDIX A2 – Notice of Preparation

NOTICE OF PREPARATION

TO: Agencies, Organizations and Interested Parties

SUBJECT: Notice of Preparation of a Draft Environmental Impact Report in Compliance with Title 14, Section 15082(a), 15103, and 15375 of the California Code of Regulations

The Los Angeles County Flood Control District (LACFCD) is the Lead Agency under the California Environmental Quality Act (CEQA) in the preparation of the Environmental Impact Report (EIR) for the project identified below. The Lead Agency has prepared this Notice of Preparation (NOP) for the EIR in order to provide the widest exposure and opportunity for input from public agencies, stakeholders, organizations, and individuals on the scope of the environmental analysis addressing the potential effects of the proposed project.

PROJECT TITLE: Devil's Gate Reservoir Sediment Removal and Management Project

AGENCIES: LACFCD requests your agency's views on the scope and content of the environmental information relevant to your agency's statutory responsibilities in connection with the proposed project, in accordance with California Code of Regulations, Title 14, Section 15082(b).

ORGANIZATIONS AND INTERESTED PARTIES: LACFCD requests your input on which environmental issues associated with the proposed project which merit further analysis in the EIR.

PROJECT LOCATION: The Devil's Gate Reservoir Sediment Removal and Management Project is located in the City of Pasadena, in Los Angeles County approximately 14 miles north of downtown Los Angeles (see Figure 1, Project Vicinity Map and Figure 2, Project Boundary Map).

PROJECT DESCRIPTION: The proposed project would remove up to 4.0 million cubic yards of sediment from the reservoir behind Devil's Gate Dam to restore it to its current design standard, and establish a reservoir configuration more suitable for routine maintenance activities including sediment management. Although approximately 2.6 million cubic yards of sediment is the current excess amount of sediment in the reservoir, additional sediment accumulation is anticipated during the upcoming storm seasons due to the burned condition of the watershed that will have to be removed. The ultimate reservoir configuration and volume of sediment to be removed will be determined based on locations of access roads; areas for preservation or restoration of native vegetation; and the amount and location of sediment inflow that occur during the upcoming storm seasons.

Over the years, as storm events deposited sediment in the reservoir, native and non-native vegetation established itself in the sediment deposits. During storm events following the Station Fire, a large portion of the reservoir vegetation was buried in sediment; however significant amounts of vegetation, including numerous mature willow trees remain present. In order to remove the sediment from the reservoir, vegetation growing within excavation areas will require removal. The sediment and organic materials will be trucked off-site via local roads accessing the 210 Freeway and then taken to sites that are already prepared and designated to accept such material without additional construction or vegetation and habitat removal.

The goal of this project is to return adequate flood control capacity to the facility and establish a reservoir configuration more suitable to Los Angeles County Department of Public Works' routine maintenance activities. Primary project objectives include:

- Reducing flood risk to the communities downstream of the reservoir adjacent to the Arroyo Seco by restoring reservoir capacity for flood control and future sediment inflow events;

- Supporting sustainability by establishing a reservoir configuration more suitable for routine maintenance activities including sediment management;
- Removing sediment in front of the dam to facilitate an operational reservoir pool to reduce the possibility of plugging the outlet works with sediment or debris during subsequent storm events;
- Removing sediment placed at Johnson Field during the Devil's Gate Reservoir Interim Measures Project;
- Supporting dam safety by removing sediment accumulated in the reservoir in a timely manner to ensure the ability to empty the reservoir in the event of a dam safety concern.

PROJECT SCHEDULE: The proposed project is expected to occur between Spring 2014 and Winter 2019. Excavation and associated activities within the reservoir area is expected to take place during dryer months, from April to December, Monday through Saturday (except on holidays), as weather permits. Activities will take place between the hours of 7:00 a.m. to 7:00 p.m. on Monday through Friday and 8:00 a.m. to 5:00 p.m. on Saturday. Removal of sediment and organic materials off-site is expected to take place between these hours but specific hours may be further defined to avoid sensitive travel times.

POTENTIAL ENVIRONMENTAL EFFECTS: LACFCD has prepared an Initial Study that describes the potential environmental effects of the proposed project. Based on the conclusions of the Initial Study, it has been determined that an EIR is the appropriate level of environmental documentation. The topic areas to be discussed in the EIR are Aesthetics, Air Quality/GHG Emissions, Biological Resources, Cultural Resources, Geology/Soils, Hazards & Hazardous Materials, Hydrology/Water Quality, Land Use/Planning, Mineral Resources, Noise, Public Services (Parks), Recreation, and Transportation/Traffic. The EIR will include the provision of alternatives.

PUBLIC SCOPING PERIOD: LACFCD has determined to make this NOP and Initial Study available for public review and comment pursuant to California Code of Regulations, Title 14, Section 15082(b). *LACFCD will accept written comments for the NOP regarding the scoping of the EIR between September 28, 2011 and November 11, 2011.* The LACFCD will hold two public scoping meetings to allow the agencies and members of the public to provide input on which environmental issues merit further analysis in the EIR. These scoping meetings will occur on **Wednesday, October 5, 2011** at 6:30 p.m. in the Rose Bowl Locker Room (1001 Rose Bowl Drive, Pasadena, 91103, park in Lot F, enter at Gate A) and **Saturday, October 15, 2011** at 9:00 a.m. in the La Canada High School Cafeteria (4463 Oak Grove Drive, La Canada, 91011).

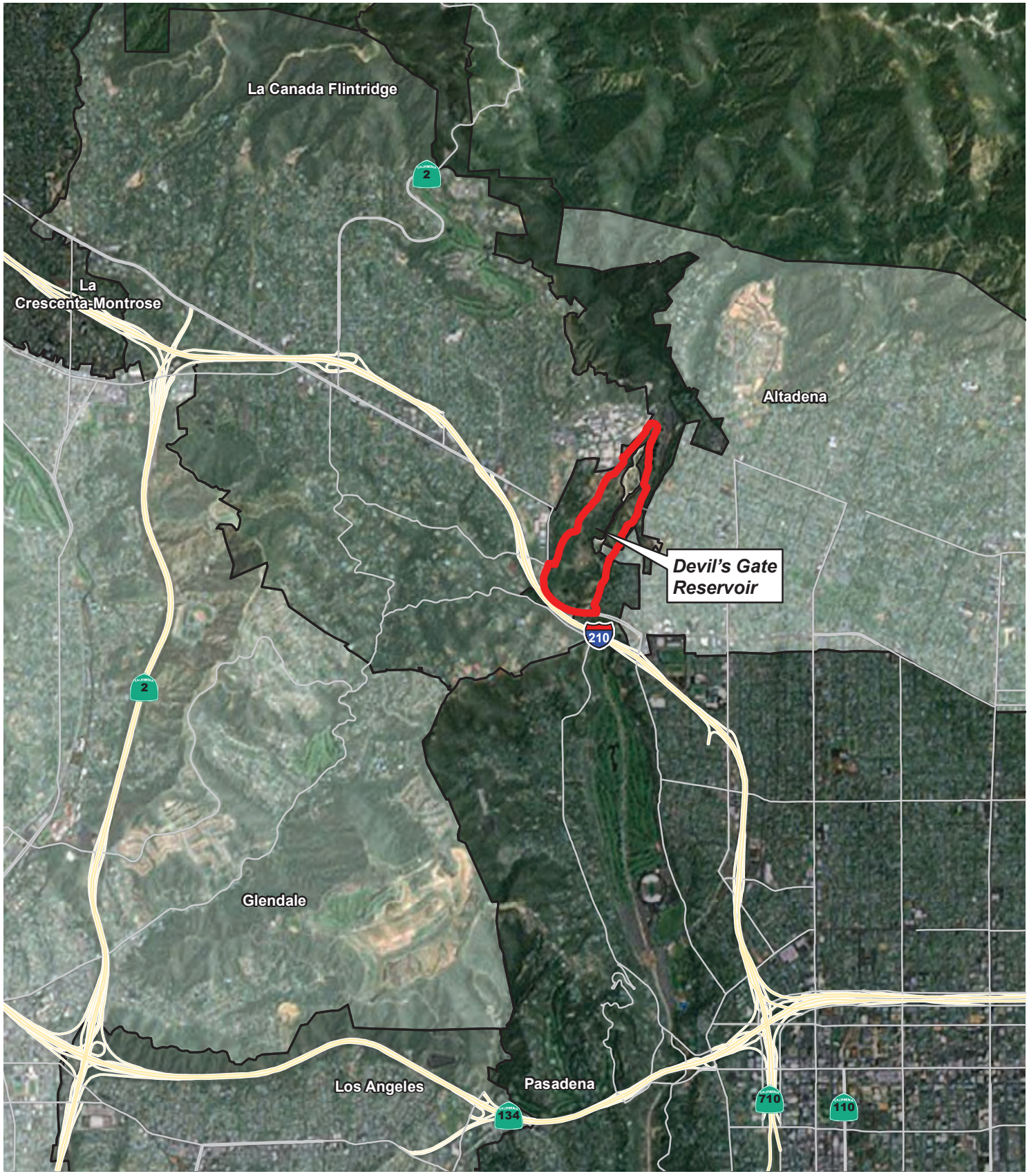
RESPONSES AND COMMENTS: Please indicate a contact person for your agency or organization and send your comments to:
Los Angeles County Department of Public Works
Attn: Water Resources Division – Reservoir Cleanouts
P.O. Box 1460
Alhambra, CA 91802-9974

Your comments may also be sent by FAX to (626) 979-5436 or by email to reservoircleanouts@dpw.lacounty.gov and include "Devil's Gate Reservoir Sediment Removal and Management Project" in the subject line.

DOCUMENT AVAILABILITY: The Initial Study is available for public review during regular business hours at the locations listed below.

- Linda Vista Library, 1281 Bryant Street, Pasadena, California
- Pasadena Central Library, 285 East Walnut Street, Pasadena, California
- San Rafael Branch Library, 1240 Nithsdale, Pasadena, California
- Altadena Library District, 600 East Mariposa Street, Altadena, California
- Bob Lucas Memorial Library, 2659 Lincoln Avenue, Altadena, California
- La Canada Flintridge Library, 4545 North Oakwood Avenue, La Canada Flintridge, California
- Irwindale Public Library, 5050 Irwindale Avenue, Irwindale, California
- County of Los Angeles Department of Public Works, 900 South Fremont Avenue, Alhambra, California

In addition, the NOP/IS is available online at the website (www.lasedimentmanagement.com/devilsgate).



Legend

Proposed Project Site

City Limit

N
W E
S

1:50,000

0 0.5 1
Miles

Figure 1
Project Vicinity Map

Chambers Group Inc.

Figure 2
Project Boundary Map

APPENDIX A3 – Scoping Comments

SCOPING COMMENTS & SCOPING SUMMARIES

FOR

DEVIL'S GATE RESERVOIR SEDIMENT REMOVAL AND MANAGEMENT PROJECT

LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS

DEVIL'S GATE RESERVOIR SEDIMENT REMOVAL AND MANAGEMENT PROJECT
WRITTEN SCOPING COMMENT SUMMARIES

Alison Snow

- Only remove the amount of sediment necessary to maintain downstream safety.
- Disturb as little as possible of the natural environment in the watershed.
- Investigate any and all alternatives possible for future sediment removal and initiate long range comprehensive planning strategies to avoid the need for future digging and trucking of sediment.

Allen and Mignonne Decker

- Please leave Devil's Gate Dam the way it is now.
- We don't want parking lots, a soccer field, and modern improvements.

Altadena Town Council – Harold J. Bissner III, Corresponding Secretary

- Altadena Town Council unanimously voted to support Route 2 (from Oak Grove to Berkshire to the 210 Freeway) for the removal of sediment.
- The motion was introduced by Councilman Shackelford.

Arroyo Seco Foundation – Tim Brick, Managing Director

- Sustainable and long-term approach is necessary for flood protection and the health of the watershed.
- Sediment is not waste, it is a valuable natural resource.
- All impacts to habitat, wildlife, and humans from the proposed project should be evaluated.
- Evaluate an alternative that restores the downstream watershed, and that minimizes impacts.
- The project description should give a detailed description of sediment removal and management.
- Water resource management should be included with sediment management.
- Stream restoration alternative for the Arroyo Seco should be included
- Sensitive habitat that needs to be protected includes riparian habitat, riversidian alluvial scrub, wetlands, and a pond marsh.
- Use the Arroyo Seco channel to transport sediment downstream.

- Consider an alternative to trucks to move sediment from the basin to a truck loading area outside the basin
- Evaluate the relationship between the Devil's Gate Project and the Los Angeles River Watershed.
- Evaluate low-impact/Green building design, SMART and LID development.
- Address sediment and storm water as valuable resources of the Arroyo Seco basin
- Study the natural sedimentation process
- Review previous studies such as the "Flood Hazard Sediment Management, And Water Feature Analysis, Hahamongna Watershed Park," (Philip Williams & Associates Study, 2000) and the Army Corps of Engineer's Arroyo Seco Watershed Ecosystem Restoration Study.
- Evaluate the effectiveness and environmental impact of Devil's Gate Dam
- Educate the public to understand the natural processes involved in the Devil's Gate Dam.
- Consider using low-emission vehicles for the transport of sediment.

Arroyo Park Estates Home Owner's Association – Pat Merrill, President

- The need for the project is understood, but a more expeditious and feasible alternative should be found rather than the three-year, 400,000 truck current option. With the amount of trucks, there will be added noise, dust, and traffic.
- Route 2 (from Oak Grove to Berkshire to the 210 Freeway) is the preferred route, rather than using neighborhood streets.

Asif Ahmed

- Is a member of the Winsor Arroyo Homeowners Association, and is opposed to the sediment removal project.
- Agrees with the interim project to clear debris from the front of the dam, but is opposed to thousands of trucks destroying important habitat over the next three years. It would be similar to someone driving a bulldozer through your backyard.
- The Hahamongna basin has become a rare habitat and sanctuary for families, hikers, naturalists, and others. Real wildlife lives in the basin, and people go there to enjoy it.
- Instead of destroying this resource, please look at other alternatives.

Betsy Bour, Friends of Hahamongna

- The Friends of Hahamongna is an advocacy group dedicated to protecting the Hahamongna Watershed Park.
- The now proposed four million cubic yards is a significant increase from the original 1.7 million cubic yards of removal that was the original plan. Limit the amount of debris removed to only what is necessary to protect the operation of the dam and manage the flood waters. Then, the removal effort could be supplemented with an ongoing maintenance plan to remove new sediment as necessary.
- The existing Master Plan and cumulative projects should be considered in the planning process for this project. DPW should also review and respect the concerns of the Spirit of the Sage Council as stated in the legal settlement with the City of Pasadena.
- Although the sediment removal initiative overlaps with some of the projects in the Master Plan, however the County should recognize that some of the elements of the Master Plan were controversial such as roads, paved surfaces, and multi-purpose playing fields. Therefore, the Friends of Hahamongna urges the County to not co-mingle projects related to the Master Plan.
- Hahamongna Watershed Park provides habitat for many species including blue heron, egrets, mallard ducks, and many reptile species. Since the habitat destruction that occurred during the Station Fire, the

need for habitat has increased. Preservation of habitat should be a priority when developing the project scope and assessing impacts.

- Alternatives to trucking, such as sluicing, should be considered. Trucking activity within the basin should be minimized, and could be achieved by conveyance of the sediment from the northern portion of the reservoir to the southern portion. Environmental review should be performed on this and any other feasible alternatives.
- For aesthetics, the proposed project would degrade existing scenic resources and visual character both in the short-term and long-term. In addition, portions of the site are visible from private property on the eastern edge of the basin.
- For air quality, impacts would include airborne dust from grading and dirt hauling, and gaseous emissions from heavy equipment, hauling trucks, and employee vehicles. Pollutant concentrations, especially carbon monoxide, would increase due to an increase in traffic in the immediate vicinity of the project. The degraded air quality could impact schools, playing fields, and residences.
- For biological resources, the project would modify habitat and impact species found in the basin, and there would be a substantial adverse impact on riparian habitats and other sensitive natural communities. Migratory wildlife species and wildlife corridors would also be adversely affected.
- For cultural resources, buried resources could be encountered during excavation.
- For geology and soils, the project could result in soil erosion, loss of topsoil, changes in topography, or unstable soil conditions due to excavation and grading. There could also be impacts from fault surface rupture, liquefaction, and unstable slopes.
- For hazardous materials, impacts to the public could result from potential vehicle fueling onsite, servicing construction equipment onsite, and transporting fuels, lubricating fluids, and solvents. Construction workers could be exposed to contaminated soil or water near the Superfund site in the northwest portion of the basin.
- For water quality, the project would alter the existing drainage pattern of the area, including the alteration of the course of a stream. Construction activity could impact water in the basin and in the spreading ponds along the eastern edge of the basin.
- For noise, high noise levels would be generated during sediment removal, and the excavation and hauling activities would disturb nearby residents as well as schools in the area.
- For recreation, existing recreational activities would be impacted from the closure of trails, and potential long-term impacts could result from the sediment management plan.
- For transportation and traffic, the substantial number of truck trips in and out of the basin would affect the surrounding streets, as well as the freeways and streets used to transport the sediment to other sites. The impact analysis needs to address disruption of normal traffic flow to area schools, JPL, and the Rose Bowl during events.
- For utilities and service systems, there would be impacts to the storm drain system due to construction activities necessary for repair and renovation of the drains. There are also power lines and phone poles located on the proposed project site that could potentially be impacted.
- Use the Friends of Hahamongna as a resource, as they have extensive knowledge of Hahamongna Watershed Park and the history of past projects and controversy.

Carla Bollinger

- Need to balance the need to remove sediment with the need to protect the natural areas.
- The County should minimize the removal of sediment to enable water flow to minimize destruction within Hahamongna Park.
- Alternative structures or mechanisms need to be developed to better control sediment flow. Ongoing systematic removal is a better alternative than complete destruction of habitats and open space.

City of La Canada – Flintridge – Erik Zandvliet, City Traffic Engineer

- The City of La Canada – Flintridge has ownership over the main haul routes intended to be used by this Project. Multiple sensitive receptors occur along those routes. The City requests to be fully involved in the preparation of the EIR.
- The City asks for the ability to review scoping documents for all elements of the EIR prior to County approval to ensure critical impacts are correctly analyzed.
- Any hauling or construction activities that use streets in La Canada Flintridge will require a Haul Route Permit, and other permits that impose special conditions on days, times, and frequency of truck trips.
- An alternatives analysis should be done for alternative haul routes, including splitting in-bound and out-bound trips on different streets. The City will not allow hauling on Foothill Boulevard or on Oak Grove between Foothill Boulevard and Oak Grove adjacent to several schools.
- The high number of truck trips will accelerate the deterioration of the roadways used along the truck route; therefore the project should include reconstruction of the roadways or other measures.
- The potential impacts from the permanent access road need to be evaluated.
- Long term impacts of ongoing sediment management need to be addressed in the EIR.
- The Traffic Study should include a LOS analysis for any stop intersections in the area. Mid-day analysis (2-4pm) should also be completed. JPL work shifts, bus schedules, school schedules, and an ambient growth factor need to be considered.
- A hauling and construction management plan should be required as a mitigation measure
- Construction parking will need to be identified, as well as analyzing cueing at ramps, left-turn pockets, and staging areas.
- Maximum hauling frequencies need to be identified and construction area traffic control. All traffic signals along the proposed haul route need to be analyzed to see if they can handle the additional truck volume.
- A full Air Quality Analysis needs to be completed, including particulate matter from diesel engines.
- A full Noise Study needs to be completed, with special attention given to the proximity of schools and other sensitive noise receptors.

City of Pasadena – Julie A. Gutierrez, Assistant City Manager

- The City of Pasadena is a responsible agency pursuant to CEQA.
- The adopted Hahamongna Watershed Park Master Plan should be consulted regarding the proposed project and any alternatives.
- Regarding light and glare, there will need to be an evaluation of the impacts to wildlife if lights are to be used during the dark hours.
- The City's Green Action Plan outlines goals to reduce greenhouse gas emissions; this plan should be considered and evaluated.
- The Project's impact to fire does need to be evaluated for work in the summer months, as it is designated a high fire zone by the LA County and Pasadena Fire Departments.
- The City feels that security issues do need to be addressed, since the construction contractor will retain a presence on site during non-construction times.
- Sending green waste to a landfill is not consistent with the City's Green Action Plan to reduce waste, other options than the landfill should be considered.
- There should be coordination between LACDPW, the City of Pasadena, and the Rose Bowl Operating Committee to ensure that there will be no impacts to Rose Bowl events.
- Coordination between the City and County regarding haul routes needs to be completed to ensure the protection of neighborhoods and to minimize traffic conflicts.

- The City supports sustainable sediment management plans for Hahamongna as well as the central and lower arroyos.
- The County should consider secondary downstream impacts.
- The City has several approved projects on-site that may help reduce impacts from the sediment removal.
- In anticipation of loss of habitat the County should consult the HWPMP for appropriate mitigation. The EIR should be consistent with the Arroyo Seco MEIR and HWPMP, especially in reference to the biological communities.
- The LACDPW needs to protect the infrastructure of Pasadena's Tunnel Water is the southeast quadrant of the dam, near the basin.
- Cumulative impacts should consider the following projects: JPL's proposed parking structure and the newly funded IRWMP projects in the basin and upper Arroyo Seco.
- Any impacts to the adjacent oak woodland needs to be evaluated.

Claudette E. Buddie

- Will the removal of sediment negatively impact human health?
- Wants the haul route to be from Oak Grove to Berkshire to the 210 Freeway.

Constance Brines

- Understands that sediment must be removed for flood control, but any impact to the natural Hahamongna environment should be minimized.
- No new development should be implemented in the Hahamongna Watershed area.

Cosmo Bua

- Only long-range, comprehensive, area-wide solutions should be considered. We need to preserve the natural environment that is remaining in the area. The destruction of the Arcadia Woodlands brought these issues to the public's attention.

County of Los Angeles Fire Department – John R. Todd, Chief, Forestry Division

- Since the project is entirely within the City of Pasadena, so City of Pasadena Fire Department has jurisdiction. It is not a part of the emergency response area for the Los Angeles County Fire Department.
- The project is in close proximity to the jurisdictional area of the Los Angeles County Fire Department, but is unlikely to have a negative impact.
- Potential impacts to erosion control, watershed management, rare and endangered species, vegetation, fuel modification, archaeological and cultural resources, and the County Oak Tree Ordinance should be discussed in the EIR.

Dana Kennedy

- Understands that the issue of sediment removal does need to be addressed. The bigger concern is how to address the issue.
- Trucking large amounts of sediment out is the easy option. Instead, alternatives seriously need to be considered in order to solve the problem creatively, and in a less damaging way.
- Sluicing feasibility should be considered, letting natural processes carry the sediment to the sea.
- Hopes that the sediment at Johnson Field will be removed at some point in the relatively near future.

Darren Dowell – on behalf of Pasadena Audubon Society

- Sent a list of bird sightings in Hahamongna, including rare species and California Bird Species of Special Concern.
- Sent observations of recent bird nesting activity in Hahamongna
- Requests that impacts on birds and other wildlife be minimized, by scheduling work outside of the nesting season, minimizing the disturbance of habitat, and using appropriate and local mitigation.

Department of Water Resources Division of Safety of Dams – Michael Waggoner, Chief

- Based on the project description, maintenance work will not affect the safety of the dam, provided that the work does not occur within ten feet of the dam or other appurtenant structures.
- If alterations or modifications to the dam are necessary, an alteration application must be filed along with plans and specifications.

Dianne Patrizzi

- Wonders if a deep channel with living levee walls could be constructed to move depending on water flow activity based on levees that move based on seismic activity. If this is used for the Devil's Gate project maintenance will be confined to the channel. Additionally, sediment will be allowed to reach the ocean, where it is needed.
- The proposed channel with living levees would also have a serpentine alignment through the reservoir.
- Included attachments of other projects, reports that outline this "sliding levee" plan.

Don Bremner, Chair, Hahamongna Watershed Park Advisory Committee

- Because the project is so important, the EIR should address some alternatives that seem unlikely or unfeasible.
- The project should minimize downstream flooding risks.
- Be consistent with the Hahamongna Master Plan, preserve habitat and wildlife, improve opportunities for recreation, improve water conservation, minimize noise, dust, and pollution impacts, be feasible, and maintain a long term management plan.
- Alternatives that should be considered include using a conveyor belt system, using natural gas or electric vehicles, reduce the size of the excavation, excavate sediment at the northern end of the reservoir, do more sluicing, consider using sediment for beneficial uses, and look at cost feasibility.

Doris L. Stewart

- Windsor should be used for hauling since other streets are too narrow for heavy trucks.

Gabrieleno Band of Mission Indians – Christina Swindall Martinez, Secretary

- The Arroyo Seco basin is an extremely culturally sensitive area. In 1826, a massacre occurred in the Arroyo Seco, and evidence of this massacre has been found in the area.
- The tribe's history is very rich in the area, and the tribe is requesting one or more of their certified monitors to be onsite during ground disturbing activities.

Grace Wong

- The removal of sediment will leave the basin barren and destroy valuable natural habitat.
- Trucking out sediment is not a viable, long-term solution.
- Best practices and new technology should be used.

Gregg Oelker

- Has lived in Pasadena for 35 years, and has lived adjacent to Hahamongna Park for 20 years, with the park bordering his backyard. As residents, they use the park for hiking and biking every weekend, and enjoy the trails and animals within the reservoir. The recent fires have greatly changed the watershed.
- The forest near the dam is full of wildlife and should be preserved. There are many birds, rabbits, coyotes, foxes, and other wildlife. This area developed because the agency didn't remove sediment for years; why was nothing done before now? The area should be left in the natural state that it has developed into.
- Somewhat supports removal at the face of the dam and in areas further upstream since the sediment from the fire filled a canyon that used to be 15 to 20 feet deep. This upstream area that used to be a natural streambed should be focused on to recreate the stream to its original depth, then perhaps one-tenth of the four million cubic yards could be removed. Reducing the amount of sediment removal would reduce some of the concerns with noise, pollution, and number of trucks.
- If a smaller amount of sediment upstream were removed, then nature could return to the canyon that was once present. Then the County needs to be able to maintain the area, and remove sediment on a schedule. Shouldn't wait for a disaster in order to take action.
- The natural area that has developed should be left alone; and efforts should be focused on the sediment, not nature. Would like a more environmentally friendly and sustainable plan.

H. Guido Meindl

- Although there is a lot of uproar about this project, the debris needs to be removed to maintain the basin's primary function. Overall, the inconvenience is a small price to pay for adequate flood control.

Hill Penfold

- Remove only the amount of sediment necessary to maintain the safety of downstream areas.
- Preserve as much of the natural habitat as possible.
- Begin a long-range comprehensive study of alternatives for sediment removal including the upper watershed and downstream channels and the other 14 dams. Look into different transportation models for sediment removal.

Hugh Bowles – Hahamongna Watchdog Group

- There should be a strong focus on finding less impactful alternatives in the EIR.
- The County needs to issue a RFP to find a qualified hydrological consultant to find a less impactful alternative than the four million or two million cubic yards of sediment removal. Phillip Williams and Associates and Flow Science should be consulted.
- Included a scope for a hydrological consultant.
- The County's original proposal to allow sediment to flow into a smaller area with planned periodic cleanout should be looked at.
- What was the impact of lowering the spillway? What's the ability of the Arroyo Seco to handle spillway flow? What role do willow trees play in slowing intense storm flows and preventing large debris from getting to the dam? What's the chance of having another large flow of sediment into the basin in the next 5 to 20 years?
- The EIR should include a mitigation and restoration plan, with associated costs, budget, and a commitment to follow through. Objectives and benchmarks need to be outlined, as well as designating experts to monitor the restoration and mitigation.

- As part of the City of Pasadena's approval to use Johnson Field, the County was required to repair damage to a trail that had eroded due to a leaky storm drain. This trail was repaired, but the storm drain was not, and the erosion continues. The County needs to follow through with mitigation.
- The EIR must show a full budget, and all sources of funding for the project.
- The EIR needs to outline an ongoing maintenance plan and budget after removal takes place.

Jack Lindblad

- Remove only the amount of sediment needed to maintain downstream safety.
- Preserve as much of the surrounding woodland environment as possible. No oak removal.
- Begin a long-range comprehensive study for this and the other 14 dams.
- Sediment is not a waste product, it is necessary for habitat, river and beach nourishment, fills valleys and coastal plains and could be used for construction purposes.
- Different transportation models need to be studied for sediment removal. Hahamongna is a vital link between the upper and lower Arroyo Seco watershed.
- The current sediment management system fails due to costs, human health risks, and denying downstream systems of sediment.
- This project is an opportunity to set a new paradigm. Pursue sediment management options that apply bio-mimicry, promote SMART development, apply prudent land use regulations, lowered impact development, and a carbon-neutral building design.

Jaime Parker

- Opposed to the continued debris removal in the Hahamongna Watershed, lives only a few houses from the entrance to the watershed on La Canada Verdugo Road. Offended that 400,000 truck trips over the next three years is being considered as the plan.
- Many families use the watershed every day, and having to deal with the noise, number of trucks, and pollution is "unacceptable."
- The watershed is an extension of many people's backyard, and it is used by hundreds of people everyday by walkers, bikers, naturalists, and runners, who are inconvenienced and annoyed by the ongoing construction. The construction disturbs the natural beauty and wildlife habitat that both humans and wildlife use the watershed for.
- This proposed project is very "close to home" for the residents surrounding the reservoir, and will have a large impact on the community.

Jake Robbins – Advocacy for Pacoima Canyon

- The sediment removal project should preserve the wildlife habitat, especially oak woodlands. Contact biologists to survey for any rare and endangered species.
- Only remove the amount of sediment necessary to preserve downstream safety.
- Conduct a thorough study of methods of sediment removal.

Jill Boddie

- Will the hauling times be controlled to avoid peak commuting hours?
- How much sediment will be removed per day?
- Will the trucks be low-emission fuel vehicles since diesel is harmful to human health?
- What will be the long-term management process to prevent future build-up of sediment?

Laurel Beck

- A long term study of alternatives needs to be completed to include all the dams under the County's supervision.
- The amount of sediment removed needs to be reduced, since preserving natural areas is of much importance. It is just as important as saving lives or saving money.

Laurie Barlow

- A long term study of sediment management is needed instead of short-term, costly remedies.
- Dam reconstruction would allow natural ecosystems to be restored.
- Natural flood plain protection could be attained through restoring wetlands and floodplains, and restoring the natural flow of a river's meandering channel.
- The County should partner with professionals and non-profits to create a strategic plan. Reconstruction and modification of the dam will allow water to carry the sediment downstream. A floodplain easement program could minimize flood impacts, and could store water for beneficial uses.
- Check dams upstream can be used for sediment, water contaminants and garbage catchment.

Madeline Schleimer

- The excessive use of dams and concrete channels has diverted water from the aquifer, and sand for beaches or stream banks.
- Stream restoration is important to consider along with sediment management.
- Check dams and paved channels isolate the larger community from the natural system.
- The removal of sediment will not address the concerns of alluvial buildup or restoring water to the aquifer.
- The truck trips transporting sediment will further increase air pollution in the communities between Pasadena and Irwindale.
- Consultation should be done with professionals and public agencies to better understand sediment and watershed management as well as ecosystem recovery.
- Waterways should be restored to their original condition as much as possible.

Mark Hunter

- How is the sediment in the reservoir an emergency all of the sudden, even though the sediment has been accumulating for years? Shouldn't the project address a smaller, emergency amount and then have a separate project address the remainder of the sediment?
- Why does the reservoir need to accommodate two worst case storm events? Perhaps it would make more sense to use reality instead of models.
- Sluicing is the easy, natural, and lower impact way to deal with the problem. The process is quiet, can occur 24/7, does not impact traffic, and does not impact air quality. Has the DPW calculated the amount of sediment the Arroyo Seco could carry? This should be included in the EIR.
- The City of Pasadena diverts water above Hahamongna; what if they didn't divert the water? Could the County use this for sluicing and reimburse the City for the water replacement costs? Or are there other sources of water to aid in sluicing, such as using reclaimed water?
- How have other jurisdictions handled sediment management in alternative ways?

Markus Klemm

- Every year, in the summer time, the reservoir is used to educate children about nature. This experience could be harmed by the removal of sediment and natural habitat. The park needs to be preserved for recreation, education, and retaining natural habitats.

- If the sediment is removed in smaller portions, perhaps the park could still be used for recreation. This would promote re-growth of natural habitat rather than invasive species.
- Many people use the reservoir for recreation purposes, and keeping people out of the area for the five year duration of the project would not be a good option.

Marnie Gaete – Fund for Wild Nature

- The wetland habitat is unique to the area and should be completely protected. Taking all the sediment out of the reservoir will eliminate any chance for wildlife to exist there.
- The project will impact the schools, equestrian centers, the proximate community, and the people that use the reservoir for recreation.
- The pollution from the truck trips will negatively impact human health.

Mary E. Barrie

- There is no disagreement that the sediment needs to be removed. However, a comprehensive study needs to be done to study the methods for all 14 dams looking at different transportation models for sediment removal.
- The alternative should protect Hahamongna's diverse and important habitats, while protecting the air quality of the surrounding communities. The County should remove enough sediment to protect public safety, but not heavily impact the natural resources. Mitigation should be done in Hahamongna.
- Alternatives such as conveyor belts, sluicing, launching, and other techniques should be considered. Look at options regarding fewer trucks.
- The project should not facilitate future development within the park, including future roads.
- Other projects being considered in the park need to be considered for the cumulative impacts. These projects include the Sycamore Grove Multi-Purpose Field, an expanded parking lot, the Westside Perimeter Trail, and the restoration of Berkshire Creek, spreading basin development on east and west sides, a pump system from Devil's Gate reservoir to the spreading basins and Eaton Canyon.
- In order to lessen truck impacts, an unpaved access road on the southern end of the park should be used. If sediment must be removed from the north portion of the basin, then a conveyor belt should be used to transport sediment to the southern portion.
- Tree removal impact on wildlife needs to be considered, even if the removal is phased.
- JPL parking and a road through the basin are complex issues and have been for the past 20+ years.

Metropolitan Water District of Southern California

- The Metropolitan Water District of Southern California has no existing facilities or rights of way within the limits of the project.

Michael Long

- Watershed management needs to include all functioning parts of the watershed system, needs a holistic approach.
- County process should incorporate all aspects of biological resource management.
- Incorporate natural areas into all flood and sediment management projects. Areas should be treated as a lake-reservoir, not just a flood reservoir. Through sediment removal, consider creating a meandering stream in the upper portion of the watershed. (Included a design concept.)
- All construction and sediment removal must avoid the nesting bird season.
- Any loss of riparian vegetation needs to be mitigated at a ratio of 2:1. Impacts could occur to waters of the U.S. including wetlands. Alluvial sage scrub should be able to remain intact, or should be restored if any impacts take place.

- The Hahamongna basin has high value as a passive recreation area; this should be an integrated component of the watershed management plan.

Mitzi Shpak

- The project description is limited and does not discuss the complexity and the full scope of total actions necessary. The EIR must encompass the sediment management plan for the entire watershed (14 dams and 162 basins in the LACFCD); otherwise the report is overlooking the cumulative impact.
- The management of the Devil's Gate Reservoir should be informed by the Integrated Regional Water Management Plan (IRWMP).
- Sediment management should include feasible, alternative technology to mitigate human health risks from emissions, noise, traffic, dust, and other harmful outcomes. Trucks should not operate during school hours. Feasible alternatives include using compressed natural gas vehicles and adopting a no idling rule.
- The truck trips on the I-210 will increase traffic, increase commute times, and increase the pollutants in the area.
- The sediment should be tested for pollutants before the sediment is placed somewhere else. Possible pollutants could include fire retardants and perchlorate.

Native American Heritage Commission

- A Native American Heritage Commission Sacred Lands File search was conducted and Native American cultural resources were not identified within the coordinates identified for the proposed project.
- The absence of archaeological resources does not preclude their existence.
- Consultation with Native American tribes in the area of the project is the best way to avoid unanticipated discoveries of cultural resources or burial sites. A list of Native American contacts was attached to the comment letter; the NAHC strongly urged making contact with the listed tribes.
- The Secretary of the Interior's standards regarding Historic Properties recommends that lead agencies consider the historic context of proposed projects and research the cultural landscape that might include the area of potential effect.
- The Public Resources Code, California Government Code, and Health & Safety Code provide provisions for accidentally discovered archaeological resources during construction and mandate specific processes to be followed in the event of accidental discovery of any human remains in a project location other than a dedicated cemetery.
- To be effective, the project should have ongoing consultation between the lead agency, Native American Tribes, project proponents, and contractors.

Norman H. Brooks – Professor of Civil Engineering, Cal Tech

- Agree that there needs to be an ongoing program to address sediment removal and sees no better way to remove sediment than trucking
- What is the technical basis for needing to provide capacity for two DDEs? Is there public access to DPW Hydrology and Sedimentation Manuals? Why hasn't the project goal taken into account the large fire and post-fire events that have occurred recently? Another fire is not possible until regrowth takes place.
- Interested in the maximum discharge and hydrographs for the 50-year flood design used for the project, as well as historical flood frequency data and graphs for the Arroyo Seco.
- Analyze rational for design criteria for both sediment volumes and predicted flood control benefits.
- Present a clearer overall reservoir sediment and storage inventory
- Are hydraulic report analyses available? What is the flow capacity of the existing downstream channel?

- If only two million cubic yards of debris are removed, what are the resulting impacts and risks? Why are four million cubic yards planned to be removed when there is only 2.6 million cubic yards current stored in the reservoir?
- Present alternatives for sediment removal and flood control volumes with clear accounting of benefits, costs, and community impacts.
- Long-term objectives need to be considered with short-term goals.

Neal Turner

- With the project, the basin would become a wasteland of bare dirt and rock. The trees and habitat that attracts the migratory birds and other wildlife would be destroyed. The large number of truck trips would negatively impact nearby residents for a long period of time.
- A long-term plan needs to be developed that leaves the vegetation in place and keeps alterations gradual.

Ninarose Mayer

- In favor of placing sediment at Johnson Field and then trucking it out at a later date.
- Not in favor of removing the trees and vegetation.
- There are sufficient areas for recreation in Oak Grove Park; does not want development of additional recreation areas within the stream bed region.

Pamela Folgert

- The amount of sediment removed should be kept to the minimum amount necessary for public safety. This way impacts to the natural areas as well as the community will be reduced.
- More study is needed to reduce the impact of removing and relocating the sediment.

Pasadena Audubon Society – Laura Garrett, Conservation Chair

- Sediment removal should be done at times and in places that will not harm or disturb nesting birds. Although a biologist will survey the area, the Audubon Society is concerned about the thoroughness of previous biological surveys in the Hahamongna basin. The Audubon society is offering their knowledge and expertise of the area and known birds in the area.
- The Audubon society asks that work be done with sensitivity and respect, going slowly and carefully, and to destroy as little habitat as possible.
- The willow and alluvial scrub habitats are very rare in Southern California. Due to this fact, mitigation should be done within the Hahamongna Reservoir or in the Arroyo Seco, not in some distant location. DPW should restore as much habitat as possible and leave Hahamongna in better shape than it is now.
- Sediment is a valuable resource that has environmental value, and the Arroyo Seco could be restored with some of the sediment present.
- Look for alternate ways to remove sediment such as launching or sluicing. Examine how other agencies around the country and world have managed this process.
- The Hahamongna Watershed Park should be treated as part of a complete watershed system. A plan needs to be put in place to make the watershed function as naturally as possible.

R. Rhoads Stephenson

- Keep the cubic yards to be removed as small as possible. Make the perimeter as small as possible, and instead make it as deep as possible. Avoid as many trees as possible.
- Protect the perimeter by cleaning out unwanted vegetation every year
- Consider presorting sediment at the site

- Include water settling ponds to replace those that will be removed.
- Partner with local organizations such as Tom Sawyer Camps and the Audubon Society to monitor habitat.
- For transportation options, consider all of the options included in the 20-year study.
- Use a conveyor belt to get the sediment to the trucks lined up on the dam or on Berkshire Drive.
- Avoid Windsor and residential areas, avoid JPL rush hour traffic, use natural gas powered vehicles, and make sure truck beds are covered. Have DPW announce use of low-emission vehicles now to allow time to find a company that has these trucks, or to give them time to order new trucks.
- Consider all destination alternatives being developed in 20 year study. Consider using Iwindale/Azusa Pit or other pits. Do not use La Tuna Canyon for sediment placement; La Tuna Canyon should transfer ownership to a conservancy group.

Raymond Basin Management Board – Anthony Zampiello, Executive Officer

- The Raymond Basin Management Board is supportive of the LACFCD's efforts to enhance flood protection.
- The DEIR should address groundwater replenishment and the ability for water to percolate.
- Section 5.9 of the IS states that there is no impact to the depletion of groundwater supplies; however the Raymond Basin Management Board requests that this concern be addressed.

Roger Klemm

- Sediment Management needs to be an ongoing program, not just for five or 20 years. Dump sites are a finite plan. The best vegetation for minimizing erosion is mature chaparral, so modifying vegetation will hamper chaparral recovery and increase erosion.
- Become the first in a new generation of sediment management, based on the knowledge that has been gained regarding sediment management in the past 90 years.
- Sluicing is a better option, downstream channels may need to be modified to carry this amount of sediment, but sluicing will also restore the streams. Options need to be considered that can both improve flood protection as well as improve groundwater recharge.
- Consider full environmental costs of every alternative. Atmospheric pollutants need to be addressed, and the Port of Los Angeles could be used as an example of using low-emission vehicles to attempt to reduce pollutants from trucking.
- If plant material is to be removed, perhaps it could be relocated to another portion of the reservoir. In addition, a program should be implemented to minimize invasive exotic species.

Sanitation Districts of Los Angeles County - Mark Giljum, Civil Engineer

- They have no specific areas of concern at this time, but would like to be considered an Interested Party due to the use of their landfills, particularly Scholl Canyon Landfill.

Sierra Club, Pasadena Group – David Czamanske, Vice Chair

- A comprehensive study should be done that addresses each and every environmentally and economically feasible alternative.
- The EIR needs to address the source of the problem, the erosion of debris from the upstream watershed. Recommend consulting with the Forest Service staff to address this issue.
- Alternative methods need to be comprehensively evaluated including sluicing, a slurry pipeline, and short-term and long-term environmental and economic benefits and costs. Trucking is not a sustainable method of dealing with sediment accumulation.

- The EIR should discuss water conservation and water quality impacts, impacts to sensitive species, recreation impacts, and cumulative impacts.
- Sierra Club strongly urges the use of low-emission trucks for this project.

South Coast Air Quality Management District – Ian McMillan, Program Supervisor

- Upon completion of the DEIR, forward a copy directly to the SCAQMD (not through the State Clearinghouse) as well as all air quality and greenhouse gas studies, modeling, health risk assessments and emission calculations.
- URBEMIS 2007 and CalEEMod can be used to estimate emissions. Look at the CEQA Air Quality Handbook, PM2.5 emissions and PM2.5 significance thresholds, SCAQMD's Localized Significance Thresholds, and Health Risk Assessment Guidance on the SCAQMD website (links in letter).
- If the project impacts air quality adversely, all feasible mitigation measures that go above and beyond the law should be utilized during project construction and operation. Refer to chapter 11 of the SCAQMD CEQA Air Quality Handbook for sample mitigation measures. Links provided in letter for measures to reduce air quality impacts.
- Relevant air quality reports are available from the SCAQMD.

Steven S. Lamb

- Since the County has a legal obligation to remove sediment, why does environmental documentation need to be completed?
- The area above the dam is not natural habitat; the only reason any habitat is there is due to accumulation of debris. The vegetation and wildlife would not exist if the dam was not there. With the accumulation of sediment the wildlife and vegetation is being altered; the removal of sediment would get the area closer to its natural state.
- A temporary road at the southwestern end of the dam would be the best route.
  Sediment removal needs to be done to provide flood control and protect the lives and property of those below the dam.

Sylvia Stachura

- The project will disrupt wildlife, especially birds, in the Hahamongna area. Research environmentally sensitive ways to clean up the dam while preserving wildlife in the area. Hahamongna is an important area for people who want to get in touch with nature.

State of California Department of Transportation – Dianna Watson, Program Manager

- Complete a traffic study to evaluate impacts from the haul trips to and from the project sites during AM and PM peak periods, including existing traffic volumes and LOS on the 210 Freeway, affected on/off ramps, and freeway intersections .
- If the project will have a significant impact, mitigation measures will need to be included.
- Based on the NOP, the access road to Oak Grove Drive will need to be widened.
- If there are potential freeway access control issues on Berkshire Drive, a Caltrans Encroachment Permit may be required.
- If work is performed downstream of the dam, a Caltrans permit will be needed due to the proximity to the I-210 Freeway bridge.
- To the extent feasible, haul trips should be limited to off-peak commute hours, and avoid "platooning" of truck trips on the freeways.
- If over-sized or overweight vehicles will be using State highways, a Caltrans Transportation Permit will be needed.

Takako Suzuki, field representative to Pasadena Councilmember Steve Madison, District 6

- A streambed restoration project just north of the Colorado Bridge was destroyed by the surge of water from the storm.
- What mitigation will be included for work south of the dam, especially around the Colorado Bridge?

Thomas Holaday

- Opposed to LACDPW's plan to remove 2.6 or 4 million cubic yards of sediment from the reservoir. This would cause catastrophic destruction of the watershed.
- New thinking and new ideas regarding management of excess sediment and abatement should be used.
- Supports maintaining downstream safety and flood protection
- "Mini-digs" should be used to keep the face of the dam, trash racks, gates and valves clear. Along with small-scale removal, a "natural" method of sluicing the sediment through the dam should be used.
- If more than the "mini-digs" and sluicing are done, a lifeless scar like the basin below Eaton Canyon would be created.
- To keep the dam clear of obstructions, natural sluicing should be used. Natural sluicing has occurred in the Arroyo Seco for years. If sediment is placed below the dam, through conveyor belt or other method, it could be sluiced downstream with daily runoff.
- Develop new ways to sluice the sediment out of the watershed, and develop new ways and means to recycle the sediment. Some options include beach replenishment or use in the construction industry.
- The sediment that was placed at Johnson Field during the Interim Measures Project should be removed.
- Independent, expert sources should be contacted to gain insight into sediment abatement and protecting the environment. For example, hydrologists could help protect downstream safety, the Audubon society and expert environmentalists or naturalists would know about biological resources present in the Hahamongna Watershed.
- Creative thinking is needed for the dam maintenance for all 14 dams within the San Gabriel Mountains. Along with thinking about all 14 dams, careful thinking about the broader impact on the watershed systems is necessary.
- The current plan is unsustainable.

Unknown

- Do not scrape 50 acres of Hahamongna Basin to remove sediment.
- Do not using diesel trucks, use natural gas vehicles.
- Sluice the dam, use natural processes as much as possible. Sluicing is the way to make the plan more sustainable.
- Use conveyor belts to extract sediment to transport to trucks waiting on Oak Grove Drive. Do not build a new road.
- Preserve all trees and natural habitat, and do not develop projects in the Hahamongna basin.
- Delineate the natural Hahamongna flow path
- Can keep the face of the dam clear, but do not remove four million cubic yards of sediment. Could also place sediment outside the dam at the south face to sluice sediment downstream.
- Wetland restoration is needed throughout the Arroyo Seco; better research needs to be done regarding the wildlife and habitat in the reservoir.
- About 10-15% of the master budget should be spent in advance of the project on preparation and research.
- City of Pasadena needs to have environmentally educated staff overseeing the project.

Windsor-Arroyo Neighborhood Association – Tecumseh Shackelford, Vice-President

- The Windsor-Arroyo Neighborhood Association supports the use of Route 2 (from Oak Grove to Berkshire to the 210 Freeway) for debris removal.

From: Lilley, Keith
Sent: Wednesday, November 09, 2011 6:41 AM
To: Butler, Ryan
Subject: FW: Hahamongna watershed protection

Categories: Scoping Comments

Please add to the official comments

-----Original Message-----
From: Alison Snow [mailto:alpal@linkline.com]
Sent: Tuesday, November 08, 2011 8:35 PM
To: Lilley, Keith
Subject: Hahamongna watershed protection

Dear Mr. Lilley,

Please take the time and effort to help direct removal of sediment from behind Devil's Gate Dam to include ONLY THAT WHICH IS NECESSARY to assure downstream safety, AND in so doing disturb AS LITTLE AS POSSIBLE the natural environment of this crucial and beautiful watershed area. I also implore you to investigate any and all alternatives possible for future sediment removal and initiate IMMEDIATE LONG RANGE COMPREHENSIVE PLANNING STRATEGIES that will help avoid the present shortsighted methods of digging and trucking out of sediment.

Thank you,
Alison Snow

From: Migonne & Al [oldyelller@earthlink.net]
Sent: Wednesday, November 09, 2011 5:34 PM
To: reservoircleanouts
Subject: Devils gate

Categories: Scoping Comments

Dear sirs, Please leave Devils Gate Dam the way it is now. We don't want smog from the deisel trucks poisoning our school children .The floodplain will continue to fill forever. we love the area the way it is without new parking lots. soccer fielDs and modern improvements. Thanks you ALLEN AND MIGNONNE DECKER

ALTADENA TOWN COUNCIL

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730 East Altadena Drive • Altadena, California 91001

Los Angeles County Department of Public Works
Attn: water Resources Division-Reservoir Cleanouts
P.O. Box 1460
Alhambra.CA 91802-9974

October 23, 2011

Re: Debris removal from Devil's Gate Dam

On October 18, 2011 at their regularly scheduled meeting the Altadena Town Council a motion was made and passed with a unanimous vote supporting the adoption of route 2 for removal of sediment and debris from Devils Gate Dam.

The following is from the minute's transcript:
"...Devil's Gate vote on the removal of the dirt settlement. Councilman Shackelford proposed that the trucks use route# 2 where the trucks will not have to go through Windsor to remove the dirt. Councilman Shackelford made a motion that the Altadena Town Council sends a letter to the Los Angeles County Public Works Department stating our position in support of Route Number Two on the Devils Gate Dam Project. Selecting Route 2 will impact the community the least by going from Oakgrove Drive to Berkshire, and then entering onto the 210 Freeway. The motion was carried and seconded by the Council. The Corresponding Secretary is hereby asked to draft this letter as stated in the motion by Councilman Shackelford. So moved..."

Sincerely,

Harold J Bissner III
Corresponding Secretary

Cc: Dr. Sandra Thomas, Chair Altadena Town Council

Harold J Bissner III
Altadena Town Council
730 East Altadena Drive
Altadena, CA 91001

SANTA CLARITA
CA 913 7 L
04 NOV 2011 PM

Los Angeles County Department of Public Works
Attn: water Resources Division-Reservoir
Cleanouts
P.O. Box 1460
Alhambra.CA 91802-9974

91802+2460

From: Elverie Merrill [e_patmerrill@yahoo.com]
Sent: Friday, November 11, 2011 3:26 PM
To: reservoircleanouts
Subject: Devil's Gate Reservoir Sediment Removal and Management

Categories: Scoping Comments

To: Whom It May Concern

Whereas, I understand the purpose and necessity of removing the sediment in the Hahamonga Watershed, I ask that you find a more expeditious, feasible way to complete this task, rather than (1) prolong this task over a three year period and (2) utilize 400,000 trucks in our neighborhood to remove this sediment over a three year period. This disrupts our neighborhood with noise, dust and increased traffic.

Additionally, for sediment removal as well as work being done in conjunction with this project by the County of Los Angeles or City of Pasadena, I support the use of Route 2 (Berkshire to 210 Freeway) rather than neighborhood streets such as LA CANADA VERDUGO ROAD.

Again, please for the reasons listed above, find a more expeditious way to accomplish the aforementioned project.

Best Regards,

Pat Merrill
President
Arroyo Park Estates Home Owners' Association

(626) 296-0696

ARROYO SECO
FOUNDATION

November 14, 2011

Los Angeles County Department of Public Works (LACDPW)
Attn: Water Resources Division - Reservoir Cleanouts
P.O. Box 1460
Alhambra, CA 91802-9974
reservoircleanouts@dpw.lacounty.gov

RE: Scoping Comments - Devil's Gate Reservoir Sediment Removal and Management Project

Dear LACDPW,

Thank you for the opportunity to comment on the scope of the draft environmental impact report on the Devil's Gate Reservoir Sediment Removal and Management Project. It is appropriate that your environmental review considers not only sediment removal but the management of ongoing sediment in the basin. We believe a sustainable and long-term approach to sediment management is critical flood protection and the health of the Arroyo Seco Watershed.

The Arroyo Seco Foundation would like to ask that the draft EIR include all of our comments, which are summarized by these underlying principles:

- Sediment is a valuable natural resource and not a waste product; sediment management should be evaluated in a watershed context incorporating the principles of Integrated Regional Water Management
- All negative impacts on habitat, wildlife and people from the proposed project and its related flood control system including Devil's Gate Dam and the downstream concrete lined flood channel should be evaluated
- The preferred project and proposed alternatives should minimize these negative impacts, and an alternative that incorporates restoration of the downstream river channel and comprehensive watershed management should be evaluated

A complete and detailed list of our comments is attached. Thank you very much for the consideration of our comments. The Arroyo Seco Foundation looks forward to working with the LACDPW on this project in the future. As part of our Watershed Coordination program we would be glad to help with education and outreach efforts for this project.

Sincerely,

Tim Brick

Managing Director

Arroyo Seco Foundation, 570 W. Avenue 26 #300, Los Angeles, CA, 90065 (323) 405-7326

Arroyo Seco Foundation
Scoping Comments –
Devil's Gate Reservoir Sediment Removal and Management Project

The Arroyo Seco Foundation asks the County of Los Angeles Department of Public Works to review and respond to these comments on the notice of preparation of the draft environmental impact report on the Devil's Gate Dam Sediment Removal and Management Project.

Provide a detailed proposed action for both the sediment removal and sediment management

The project description in the notice of preparation provides only a broad overview of the goals of the removal portion of the project. There is no clear proposed action for the sediment removal method. This makes it difficult to anticipate potential impacts. There is no proposed action for the management portion of the project. Please provide a detailed proposed action for both the removal and management and briefly extend the public comment period prior to completing the draft EIR.

The notice of preparation states: "The ultimate reservoir configuration and volume of sediment to be removed will be determined based on location of access roads; areas for preservation of restoration of native vegetation; and the amount and location of sediment inflow that occur during the upcoming storm season." Please propose an action based on planned access roads, areas for preservation of restoration of native vegetation; and estimates of the amount and location of sediment inflow that occur during the upcoming storm season given maximum and minimum hypothetical seasonal rainfall totals.

Propose a sediment management program that integrates water resource management.

- It is important to integrate the sediment management and water resources management, as these two are highly dependent on each other. This should include consideration of:
- A conservation pool within Hahamongna
- Expanding percolation (Is sediment excavation good or bad for percolation?)
- Increasing storm water capture
- Other measures to increase sustainable water resource management

Stream restoration alternative

Evaluate in the draft environmental impact report an alternative that involves the restoration of the Arroyo Seco which substantially restores the hydrologic function of the stream downstream of the Devil's Gate Dam. This alternative should include restoring available land in the floodplain of the Arroyo Seco downstream of the Devil's Gate Dam, to be made available for flooding and sediment and floodwater storage in wetlands. With the Arroyo Seco restored to close to its natural conditions, the high flow events can carry sediment downstream and the sediment would be processed in a more natural and less expensive manner.

It is of critical importance that this project protects sensitive habitat including:

- Riparian habitat
- Riversidian Alluvial scrub
- Wetlands

- Pond Marsh such at that found near the dam on the west side

Address in the draft EIR how this project will impact these habitat types. Propose alternative to the project that will minimize any disturbance and enhance these habitat zones.

Evaluate the redesign of the current channel and the dam operating regime to transport more sediment

Use the Arroyo Seco channel to transport sediment downstream from Devil's Gate Dam to the extent feasible. Evaluate re-engineering the concrete lined portion of the Arroyo Seco to transport more sediment during low flow conditions. This would provide an opportunity to retrofit an old and weathered, and in some cases deficient, flood channel.

Consider an alternative that makes full use of the Arroyo Seco's current sediment carrying capacity

Analyze the channel, as it is, to transport sediment from the reservoir. This entails saturating the flow with a healthy amount of sediment.

Consider an alternative to trucks to move sediment from within the basin to a truck loading station outside of the basin

This will limit the need for constructed or paved roads, limit activity that will cause sediment compaction within the basin, and limit habitat disturbance. Note that the alternative does not need to transport the sediment all the way to the placement sites, it only needs to transport the sediment out of the basin its self.

Propose a sediment management program that encompasses the entire Arroyo Seco Watershed from the peaks to the confluence and integrates the Los Angeles River Watershed to the Pacific Ocean.

Devil's Gate Dam is part of a system, the Los Angele River system. Sediment management that occurs within the reservoir will affect sediment issues downstream. Assess how the proposed sediment management plan affects sediment management from the most upstream point of influence to the Pacific Ocean. Propose alternative sediment management programs that work in cooperation with all other sediment management throughout the watershed. Evaluate the relationship between sediment capacity in the Devil's Gate Dam and the ability of the concrete downstream channel to protect property from flood damage.

Pursue sediment management options that safely mimic natural processes from the top of the watershed to the bottom (sluicing, stream and floodplain restoration, and others).
The Arroyo Seco, and the whole of the Los Angeles Basin, has been responding to the high sedimentation rate of the San Gabriel Mountains for millions of years. Evaluate which natural processes or pseudo natural processes of sediment transport can be restored to remove sediment from the Devil's Gate Reservoir.

Evaluate SMART and LID development and re-development

Include land use regulations (green buffers, density, proximity to wildlands, defensible space, distance from geologic hazards) and mandate low-impact/Green building design.

Address sediment and storm water as valuable resources of the Arroyo Seco basin

Dispel the myth that both sediment and storm water are waste products. Acknowledge that both sediment and waste water are valuable resources of the Arroyo Seco. Sediment is a critical component of a stream system. Sediment can be collected and used for construction and beach nourishment. Sediment can also be hydrologically transported downstream where it can aid in the restoration of the Arroyo Seco River. Storm water can be captured, treated and used for multiple purposes including ground water recharge and irrigation.

Address the natural sedimentation process

To adequately develop a sediment management program, sedimentation must be examined from a geologic perspective. Begin with the uplift of the San Gabriel Mountains. Address in detail the source and fate of sediment within the Arroyo Seco. Evaluate the source of sediment. Evaluate the sediment load into the Devil's Gate Basin based on factors such as uplift, erosion and condition of the upper watershed.

Review the recommendations of the Philip Williams & Associates Study, "Flood Hazard Sediment Management, And Water Feature Analysis, Hahamongna Watershed Park," (2000) and analyze them for their applicability to this project.

Consider the US Army Corps of Engineers' Arroyo Seco Watershed Ecosystem Restoration Study

This study raises important concerns and suggests improvement to the current state of the Arroyo Seco Watershed.

Fully evaluate the stakeholder concerns listed in section 2.3. Describe in detail how these concerns have been addressed.

Evaluate and report in detail how this project increases or mitigates relevant problems described in section 2.4.1 such as:

- Devil's Gate Dam barrier to fish passage
- Disturbance of the Hydrologic Regime
- Reduced Groundwater Recharge
- Channelized Stream Bottom
- Uncertainty regarding flood risk management
- Limited Flood Storage at Devil's Gate Dam

Evaluate and report in detail how this project supports relevant opportunities for watershed improvement described in section 2.4.2 such as:

- Opportunities exist to provide for fish passage over or around the Devil's Gate Dam
- The opportunity exists for removal of the concrete flood control channel along Arroyo Seco
- The opportunity exists to develop a basin-wide sediment management plan to protect and improve the health of the watershed.
- The opportunity exists to identify where flooding problems exist and where flood risk management mechanisms need to be put in place

Review the effectiveness and viability of flood control methods

Evaluate and report on the effectiveness and viability of the Devil's Gate Dam. Evaluate alternative flood control measures.

Review the environmental impact of the Devil's Gate Dam

The flood control and debris basins were for the most part constructed without regard to environmental consequence. Devil's Gate Dam was built in 1920 and the flood control channel in the 1930s and 1940s, before the current environmental review process. Evaluate and report on the full environmental impact of Devil's Gate Dam. Include the intended and unintended environmental consequences of the dam. Evaluate the effectiveness of upper watershed debris control structures and their impact on Devil's Gate Dam sediment input.

Conduct educational outreach to the public to improve understanding about natural processes

Residents within the watershed should be aware of the purpose of the Devil's Gate Dam and the role of sediment in flood protection and watershed management. This project should educate the public about the dam outside the realm of an environmental impact report scoping session.

Evaluate the potential for low carbon emission vehicles to be used for the transportation of sediment from the basin to the destination

Low emission vehicles can lower the air pollution concerns of the project, which are likely to be massive. Steps should be taken to reduce any air quality impacts in this region.

From: Asif Ahmed [asifahmed@attinteractive.com]
Sent: Thursday, November 10, 2011 1:15 PM
To: reservoircleanouts
Cc: savehahamongna@arroyoseco.org; Jaime Parker
Subject: Devil's Gate Reservoir Sediment Removal and Management Project

Categories: Scoping Comments

To Whom It May Concern:

As a resident of 895 Arwin St., Pasadena and member of Windsor Arroyo Homeowners Association, I wanted to express my opposition to the sediment removal project. While i agree with the interim project to clear debris in front of the dam and could see this happening every few years I am vehemently opposed to thousands of trucks for the next year 3 years destroying a precious habitat. It would be akin to me driving a bull dozer and destroying your backyard.

The Hahamongna basin has evolved into a rare habitat that has become a sanctuary from everyday life for families, hikers, nature lovers, children, and more. There is real wildlife living there and each day I can witness something new. I also make new friends down there as the folks that visit the basin are all warm, friendly souls.

Please don't destroy this precious resource. There must be better alternatives.

Sincerely,
Asif Ahmed

To: **Gale Farber, Director, Los Angeles County Department of Public Works**
ATTN: Water Resources Division – Reservoir Management
PO Box 1460
Alhambra, CA 91802-9974

From: **Betsy Bour, Friends of Hahamongna**
bourel@sbcglobal.net

RE: **Scoping Comments: Environmental Impact Report for Devils Gate Dam Reservoir Sediment Removal and Management Project**

Introduction:

The Friends of Hahamongna (FOH) is an advocacy group of Pasadena, La Canada and Altadena residents working together for the protection of Hahamongna Watershed Park, one of Pasadena's last great open spaces. Our members are united in our support of this environmental treasure. We have attended hundreds of meetings over the past decade monitoring Pasadena's Hahamongna master planning. We have been working cooperatively with the Spirit of the Sage Council, the Hahamongna Watch Group and other park advocacy groups as the City of Pasadena moves forward to implement the Hahamongna Watershed Park Master Plan, a component of the Arroyo Seco Master Plan. Because this initiative may significantly impact the Hahamongna Watershed Park and the existing Master Plan, we plan to be active participants in this scoping effort as well as the overall sediment removal initiative. Our request for general considerations for project development as well as required environmental review categories are outlined below:

General Considerations:

- FOH has heard that this project may now be planning to remove up to 4 million cubic yards of sediment from the basin. This is a significant increase from the original plan to remove approximately 1.7 million cubic yards. FOH urges the DPW to limit the scale of this project to remove only the excess debris that is necessary to protect the operation of the dam and to manage flood waters. We ask that the DPW supplement this sediment removal effort with an on-going maintenance plan that will remove new sediment deposits as necessary.

- For the past 14 years, Hahamongna Watershed Park has gone through an extensive Master Planning Process that includes 100+ projects, many of which are in the basin area. FOH asks that the existing Master Plan and cumulative environmental impacts identified in the Master EIR be considered in the planning process for this project. It is also important that the DPW review and respect the concerns of the Spirit of the Sage Council as stated in the legal settlement with the City of Pasadena.

- FOH recognizes that there is some overlap in the Master Plan projects and anticipated projects for the sediment removal initiative. However, it is important that DPW recognize that some of these Master Plan projects, including but not limited to roads, paved surfaces and multi-use playing fields, were controversial. It is the public's expectation is that they will have the opportunity to review these projects as they are implemented for both focused environmental impact and overall merit. For that reason, FOH urges you not to comingle projects related to the Master Plan with anticipated projects necessary for sediment removal.

- Hahamongna Watershed Park provides significant habitat for many species including Egrets, Blue Heron, Mallard Ducks, and numerous reptile species. Since the devastation from the Station Fire, the need for this habitat has become more significant, if not critical. FOH asks that the preservation of the habitat be a priority in developing project scope and environmental impact statements.

- FOH asks that alternatives to trucking out all the sediment, such as sluicing, be considered. We further ask that trucking activity within the basin be minimized, perhaps through the use of sediment conveyance from the northern portion of the basin to the southern portion. Finally, we ask that full environmental review be performed on this and other reasonable alternatives.

Required Environmental Review Categories:

- Aesthetics
    - Degradation of existing scenic resources and visual character both temporarily and long term
    - Portions of the project site that will be visible from private properties along the eastern edge of the basin.
- Air quality
    - Impacts, including airborne dust from grading, and dirt hauling and gaseous emissions from heavy equipment, delivery and dirt hauling trucks, and employee vehicles.
    - Impacts from pollutant concentrations, primarily carbon monoxide, resulting from traffic increases in the immediate vicinity of a project
    - Impact of the degraded air quality on schools, athletic fields and residences in the immediate area.
- Biological Resources
    - Substantial adverse effect from habitat modifications impacting any of the species currently found in the basin.
    - Substantial adverse effect on any riparian habitat or other sensitive natural community
    - Substantial adverse effect on migratory wildlife species or with established migratory wildlife corridors
- Cultural resources
    - Impact to cultural resources in the project vicinity due to the potential to encounter buried resources during excavation.
- Geology and soils
    - Impacts from potential soil erosion, loss of topsoil, changes in topography or unstable soil conditions from excavation, grading,
    - Potential impacts from fault surface rupture, liquefaction, and unstable slopes.
- Hazardous materials
    - Impacts to the public or the environment from the handling of hazardous materials including fueling and servicing construction equipment onsite, and the transport of fuels, lubricating fluids, and solvents.
    - Impacts to construction workers due to potential exposure to contaminated soils or groundwater at and around the “superfund site” in the northwest portion of the basin.
- Water quality
    - Impacts from potential alteration of existing drainage patterns in the site area, including the alteration of the course of the stream.
    - Construction impacts on the water in the basin and the spreading ponds along the eastern edge.
- Noise
    - Impacts from high noise levels generated during sediment removal. Excavation and sediment hauling activities would potentially disturb nearby residences to the east and south of the project site, as well as several nearby schools.
- Recreation
    - Limitation to existing recreational activities due to trail closures during the sediment hauling phase.
    - Impacts caused by a permanent sediment management plan
- Transportation/traffic
    - Impacts of the substantial number of truck trips in and out of the basin for sediment removal on surrounding streets. The analysis must consider traffic impacts beyond the immediate project site in that the area freeways will be impacted by truck traffic to landfills and sediment placement sites.

    - Impact analysis must address disruptions to normal traffic flows to area schools, JPL and the Rose Bowl during events.
- Utilities and service systems
    - Impact to the storm drain system in Hahamongna Watershed Park due to the construction activities necessary for to repair or renovation of the drains.
    - Impact to power poles and/or phone service poles that are positioned in the basin and likely within the project site.

FOH members have extensive historical knowledge on Hahamongna Watershed Park, the projects planned for the area and the controversies that have arisen over the past 15 years. Please feel free to use us as a knowledge source and please feel free to contact with any questions regarding our scoping comments.

Sincerely,
Betsy Bour
Friends of Hahamongna

From: Lilley, Keith
Sent: Wednesday, November 09, 2011 8:16 AM
To: Butler, Ryan
Subject: FW: EIR for Hahamongna/Devil's Gate Dam

Categories: Scoping Comments

Please include with the official comments

From: Carlamamay@aol.com [mailto:Carlamamay@aol.com]
Sent: Wednesday, November 09, 2011 7:55 AM
To: Lilley, Keith
Cc: meb787@aol.com; hopebird@lafn.org; fifthdistrict@lacbos.org; newSSMPAofficers@yahoogroups.com
Subject: EIR for Hahamongna/Devil's Gate Dam

Dear Keith Lilley,

My apology: My first e-mail was accidentally sent before completing my comments.

I recognize the complexity of DWP needing to remove sediment behind the dams to prevent an overflow catastrophe. However, we also need to balance the need to protect the natural wild lands in these areas. The Arcadia Oaks Woodland was destroyed without alternative consideration to preserve this region. This destruction of our open space/native plants and trees/wildlife habitat can't keep happening throughout Los Angeles County.

We urge DWP to consider alternatives:

1) Minimize the removal of sediment to enable water flow with minimal destruction of Hahamongna Park.

2) Develop alternative supportive structures/mechanisms that can be built to better control sediment flow to avoid the inevitable mud choking basin buildup behind dams.

3) Consider alternatives to destruction of the surrounding open space/wild lands/wildlife habitats by removal in on-going systematic removal rather than waiting until the buildup is overwhelming and threatening.

Sincerely,

Carla Bollinger

Affiliations: Board Member of Santa Susana Mountain Park Association, Member of SFV Audubon Society, LA.Chapter Sierra Club and Allied Artists of Santa Monica Mountains and Seashore.

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City Council
David A. Spence, Mayor
Stephen A. Del Guercio, Mayor Pro Tem
Michael T. Davitt
Laura Olhasso
Donald R. Voss

November 10, 2011

VIA EMAIL AND U.S. MAIL

Los Angeles County Department of Public Works
Attn: Water Resources Division – Reservoir Cleanouts
P.O. Box 1460
Alhambra, CA 91802-9974

Subject: City of La Cañada Flintridge Comments on
Notice of Preparation and Scope of a Draft Environmental Impact Report
Devil's Gate Reservoir Sediment Removal and Management Project

Dear Water Resources Division Personnel:

Thank you for the opportunity to comment on the Notice of Preparation (NOP) and scope of the proposed Environmental Impact Report ("EIR") for the Devil's Gate Reservoir Sediment Removal and Management Project. As a responsible agency within the affected project area, we reserve the right to submit further comments and objections. The City has identified several comments and issues to be addressed in the EIR and supporting studies and analyses. A summary of the primary concerns are listed below:

GENERAL

1. The City of La Cañada Flintridge has ownership of the main haul routes intended to be used by the project. There are several sensitive receptors along the proposed route, including a high school, church, equestrian trails, bike lanes, and natural resources. As such, we request that the City be fully involved in the preparation of the EIR as a participant in meetings, conference calls, working sessions, etc. with the County and the County's consultants.

2. We request that the City be given the ability to review scoping documents for all elements of the EIR prior to the County's approvals to ensure that critical potential impacts affecting the City are correctly analyzed.

3. Please note that any hauling and construction activities that use streets in La Cañada Flintridge will require a Haul Route Permit and other permits that will impose special conditions on the days, hours and frequency of truck trips as well as Stormwater and Urban Runoff best management practices. Hauling will generally be prohibited between 7-8:30am and 2-4pm on school days to avoid conflict with high school and JPL peak traffic hours.

4. An alternatives analysis should be made for alternate haul routes, including splitting inbound and outbound routes on different streets to determine the minimal potential traffic impacts. One recommended alternative is an inbound route via freeway ramps at Arroyo Boulevard. It should be noted that the City will not allow hauling on Foothill Boulevard or on Oak Grove between Foothill Boulevard and Oak Grove adjacent to several schools.

5. It is expected that the high volume of truck trips will significantly accelerate the deterioration of the roadways used along the truck route. As such, the project description shall either include reconstruction of those roadways, namely Oak Grove Drive and Berkshire Drive, or the EIR needs to include measures to address this impact.

6. The potential impacts of a permanent access road from the project site to Oak Grove Drive will need to be identified, with particular emphasis on biological resources, recreation, and transportation access to bicycle, equestrian and walking paths.

7. Long term impacts of ongoing sediment management will need to be addressed in the EIR, such as future sediment removal activities and emergency stormwater events. Alternatives to the current debris basin configuration should be considered as a way to minimize future maintenance needs and to preserve the natural and recreational resources of the reservoir area.

TRAFFIC

8. The traffic study should include a Level-of-Service analysis of any stopped or signalized intersections along the haul route within the City. At a minimum, the study intersections should include: Berkshire Place/I-210 Eastbound Ramps, Berkshire Place/I-210 Westbound Ramps, Oak Grove Drive/Berkshire Place, and Oak Grove Drive/La Canada High School, Oak Grove Drive/Foothill Boulevard.

9. Mid-afternoon traffic counts and Level-of-Service analysis need to be conducted between 2 and 4pm on a typical school day for intersections in the City to capture school related traffic, which is the peak period of the street.
10. Work shifts at Jet Propulsion Laboratory (JPL) will need to be considered in the traffic study with recommendations proposed to mitigate traffic impacts.
11. Potential impacts to bus service on Oak Grove Drive and Berkshire Avenue caused by construction traffic will need to be addressed and mitigated.
12. The traffic study shall consider the high school schedule and activities in the preparation of mitigation measures to avoid traffic impacts. Hours of operation and non-work days will need to be identified to mitigate adverse impacts to sensitive land uses.
13. The traffic study should apply an ambient growth factor on future year scenarios per LA County Congestion Management Plan rates.
14. The traffic study will need to apply a truck equivalency factor for truck trips and queuing analyses.
15. A hauling and construction management plan should be required as a mitigation measure to enforce limitations and regulations due to construction activity.
16. Construction parking will need to be identified for the project and made part of the hauling and construction management plan.
17. The traffic study will need to analyze vehicle queuing at freeway ramps, intersection left-turn pockets and any project site entry/exit driveway(s) especially during school hours. Any impacts will need to be mitigated.
18. The traffic study will need to identify the staging area for unloaded trucks. The City of La Cañada Flintridge does not allow staging on city streets.
19. The traffic study will need to identify the maximum hauling frequency in loads per hour and loads per day allowed to avoid adverse impacts to nearby sensitive land uses.
20. The traffic study will need to analyze the potential impacts of construction area traffic control on the roadway network due to reduced lane capacity.
21. The traffic signal at Oak Grove Drive/Berkshire Place and both freeway ramp intersections need to be analyzed to determine if the existing operation can accommodate the added truck volume. Traffic signalization and/or additional signal equipment may be necessary to mitigate impacts due to construction trips.

AIR QUALITY

22. A full air quality analysis will be needed to identify potential impacts of construction activity and hauling on sensitive receptors within the project vicinity

and along the haul route(s). In addition, the study will need to analyze particulate matter (PM-10 and PM-25) generated by diesel engines, tires, and earthmoving in addition to regulated pollutants. This study should compare alternative solutions and construction methods to minimize this impact.

NOISE

23. A full noise study will be needed to identify and quantify noise generating activities due to the project, including excavation and hauling operations. Special attention needs to be given to the proximity of schools and other sensitive noise receptors along the truck routes and near excavating operation. Noise impacts need to be addressed by time-of-day.

Thank you for your consideration of these preliminary comments in response to the NOP. Please ensure that we are provided with advanced written notice of any and all meetings, hearings, actions and votes related to this matter. Please contact us with any questions or comments.

Sincerely,

Erik Zandvliet, P.E.
City Traffic Engineer

OFFICE OF THE CITY MANAGER

November 10, 2011

Los Angeles County Department of Public Works
Keith A. Lilley
Senior Civil Engineer Water Resources Division
Water Resources Division – Reservoir Cleanouts
P.O. Box 1460
Alhambra, CA 91802-9974

Re: City of Pasadena Comments on the Notice of Preparation and Initial Study for the Devil's Gate Reservoir Sediment Removal and Management Project

Dear Mr. Lilley:

Thank you for forwarding a copy of the Notice of Preparation (NOP) and Initial Study (IS) for the Devil's Gate Reservoir Sediment Removal and Management Project. The project as described would remove up to 4.0 million cubic yards of sediment from the reservoir behind Devil's Gate Dam to restore it to its current design standard, and establish a reservoir configuration more suitable for routine maintenance activities including sediment management. Although approximately 2.6 million cubic yards of sediment is the current excess amount of sediment in the reservoir, additional sediment accumulation is anticipated during the upcoming storm seasons due to the burned condition of the watershed that will have to be removed. The ultimate reservoir configuration and volume of sediment to be removed will be determined based on locations of access roads; areas for preservation or restoration of native vegetation; and the amount and location of sediment inflow that occur during the upcoming storm seasons. In order to remove the sediment from the reservoir, vegetation growing within excavation areas will require removal. We understand the sediment and organic materials are planned to be trucked off-site and then taken to sites that are already prepared and designated to accept such material without additional construction or vegetation and habitat removal. We also understand the primary goal of this project is to return adequate flood control capacity to the facility and establish a reservoir configuration more suitable to Los Angeles County Department of Public Works' (LACDPW) routine maintenance activities. Based on our review of the NOP and IS we believe that the project's primary potential impacts to the City of Pasadena are related to Air Quality, Noise and Traffic and Transportation.

The City is a responsible agency pursuant to CEQA, and looks forward to consultation with LACDPW throughout the CEQA process. The following comments from the Department of Public

City Hall
100 N. Garfield Avenue
Mailing Address: P.O. Box 7115 · Pasadena 91109-7215
(626) 744-4333 · Fax (626) 744-4774

Works, Department of Transportation and Water and Power Department are provided based on review of the Notice of Preparation and Initial Study:

1. The adopted Hahamongna Watershed Park Master Plan must be considered in the project's design as well as in all alternatives. LACDPW may recall the discussions and collaboration between our two agencies in developing a strategy and conceptual grading plan, which is part of the adopted HWPMP, for sediment removal in the basin that helped achieve the best possible balance between all the other competing issues in the basin including water resources, habitat, recreation, flood & sediment management and cultural resources. We provide the following link to the HWPMP and can provide hard copies upon request.
   http://www.cityofpasadena.net/PublicWorks/arroyo_plans_and_projects/

2. Page 18 - 5.1.1d – Light and glare: The City disagrees; there will need to be an evaluation of the impacts to wildlife if lights are used during the dark hours.

3. Page 25 - 5.7.1 Greenhouse Gases – The City's Green Action Plan, Action #3, identifies goals to reduce greenhouse gases which should be considered and evaluated.
   http://www.ci.pasadena.ca.us/GreenCity/Green_Team/

4. Page 26 - 5.8.1h – Fire: The City disagrees; the area is designated a high fire zone by LA County Fire and the Pasadena Fire Department; work during the summer months in Hahamongna and the project's impact to fire needs to be evaluated.

5. Page 34 - 5.14.1 – Security protection: The City disagrees with IS; since it is anticipated that the construction contractor will retain a presence on site during non-construction times, the City feels there is a need to address the project's impacts to the security issues of the site during non-construction times.

6. Page 37 - 5.17.1 Green Waste to Landfill – This is not consistent with Action 4 of the City's Green Action Plan to reduce waste. Alternatives to green waste going to the landfill should be considered.

7. Coordination between LACDPW, The City of Pasadena and the Rose Bowl Operating Company will be necessary to ensure there are no or minimal impacts to planned Rose Bowl events.

8. There must be coordination between the County and the City regarding the details on the project's truck haul routes and overall traffic/staging plan to ensure the neighborhoods are protected and to minimize and traffic conflicts.

9. The City is supportive of sustainable sediment management proposals for Hahamongna and the Central and Lower Arroyos.

10. The City asks that the County consider and analyze any secondary impacts downstream of Devil's Gate Dam.

11. In anticipation of the need to replace lost habitat, the City is supportive of the County considering the habitat projects identified in the HWPMP as appropriate mitigation.

12. In anticipation of the need to remove sediment from the basin, the City would like to make LACDPW aware of several approved projects on-site that have anticipated the County's sediment project and that may help reduce impacts through collaborative construction efforts with the City.

13. The HWPMP and the Master EIR are well known documents in the community. The City suggest that the EIR/bio studies to be prepared for the project are consistent with the studies of the Arroyo Seco MEIR and the HWPMP, specifically in their reference to plant communities/biological terminology, for the benefit of the public's understanding.

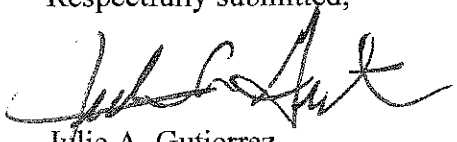
14. LACDPW must protect the infrastructure for Pasadena's Tunnel Water in the southeast quadrant of the basin, near the dam.

15. There are several related projects that the County needs to be aware of for purposes of evaluating cumulative impacts. These projects include: a) JPL's proposed parking structure; and b) the newly funded Prop. 84 IRWMP projects in both the basin and in the upper Arroyo Seco.

16. Tree protection: Any potential impacts to the adjacent oak woodland in the Oak Grove area of HWP needs to be evaluated. This project will be subject to review by the City's Urban Forestry Advisory Committee.

The City of Pasadena is pleased to coordinate with Los Angeles County Department of Public Works those topics of particular interest and impact to Pasadena residents pursuant to State CEQA Guidelines Section 15086. Pasadena looks forward to further participation in the comment and review period for the EIR, and continued cooperation and consultation with the County/Flood Control District. At this time Pasadena is commenting as a responsible agency since discretionary approval is required by Pasadena per the lease agreement between our two agencies. Pasadena requests to receive future CEQA notices for the project. The City of Pasadena appreciates the opportunity to comment on the referenced documents. Should you have any questions regarding this letter, please do not hesitate to contact me at (626)744-7371.

Respectfully submitted,



Julie A. Gutierrez
Assistant City Manager
City of Pasadena

cc: Siobhan Foster, Director, Department of Public Works (PW)
Dan Rix, PW
Loren Pluth, PW
Rosa Laveaga, PW
Elise Jackson, PW
Rich Yee, PW
Theresa Fuentes, Office of the City Attorney
Brad Boman, Department of Water and Power
Jennifer Paige Saiki, Planning Department
David Sinclair, Planning Department
Michael Bagheri, Department of Transportation

From: Constance Brines [yconnie.brines@gmail.com]
Sent: Monday, November 07, 2011 3:49 PM
To: reservoircleanouts
Subject: Devil's Gate Reservoir Sediment Removal and Management Project

Categories: Scoping Comments

While I realize that sediment must be removed for flood control, I wish to add my comment that any impact to the natural Hahamongna environment should be minimized and that NO NEW Development should be implemented in the Hahamongna watershed area.

Thank you

--
Constance Bidwell Brines
950 Laguna Road
Pasadena, CA 91105
Home Office: 626.403.7500

From: Lilley, Keith
Sent: Wednesday, November 09, 2011 3:15 PM
To: Butler, Ryan
Subject: FW: Devil's Gate Dam Sediment

Categories: Scoping Comments

Please add this to the official comments

From: Cosmo Bua [mailto:philemata@gmail.com]
Sent: Wednesday, November 09, 2011 3:13 PM
To: Lilley, Keith
Subject: Devil's Gate Dam Sediment

Los Angeles Department of Public Works
Mr. Lilley, Project Manager

RE: **Devil's Gate Dam Sediment**

Dear Manager Lilley:

I am concerned that the analysis of all possible sediment removal actions be thorough. All possible alternatives must actually be considered, with the highest priority given to doing the least possible harm to the area and it's wildlife. Only long-range and comprehensive, area-wide solutions (going well beyond Hahamongna to include all of our dams and their entire watersheds) should be considered.

We can not have our government destroying rather than preserving what little natural environment we have left. These areas do not belong to DPW, but are held in trust for all. More crimes like the violent destruction of the Arcadia Woodlands would be unconscionable. Now that there has been so much public attention to these issues - and so much relevant information provided to your department by the public - such unnecessary destruction will no longer be excusable.

Thank you for your consideration,

Cosmo Bua,
Santa Monica

COUNTY OF LOS ANGELES

FIRE DEPARTMENT

1320 NORTH EASTERN AVENUE
LOS ANGELES, CALIFORNIA 90063-3294
(323) 881-2401

DARYL L. OSBY
FIRE CHIEF
FORESTER & FIRE WARDEN

October 19, 2011

Christopher Stone, Assistant Deputy Director
Department of Public Works
Water Resources Division
P.O. Box 1460
Alhambra, CA 91802-9974

Dear Mr. Stone:

NOTICE OF PREPARATION OF A DRAFT ENVIRONMENTAL IMPACT REPORT, DEVIL'S GATE RESERVOIR SEDIMENT REMOVAL AND MANAGEMENT PROJECT, CITY OF PASADENA, (FFER#201100161)

The Notice of Preparation has been reviewed by the Planning Division, Land Development Unit, Forestry Division, and Health Hazardous Materials Division of the County of Los Angeles Fire Department. The following are their comments:

PLANNING DIVISION:

1. The subject property is entirely within the City of Pasadena, which is not a part of the emergency response area of the Los Angeles County Fire Department (also known as the Consolidated Fire Protection District of Los Angeles County). Therefore, this project does not appear to have any impact on the emergency responsibilities of this Department.

LAND DEVELOPMENT UNIT:

1. This project is located entirely in the City of Pasadena. Therefore the City of Pasadena Fire Department has jurisdiction concerning this project and will be setting conditions. This project is located in close proximity to the jurisdictional area of the Los Angeles County Fire Department. However this project is unlikely to have an impact that necessitates a comment concerning general requirements from the Land Development Unit of the Los Angeles County Fire Department.

2. The statutory responsibilities of the County of Los Angeles Fire Department, Land Development Unit, are the review of, and comment on, all projects within the unincorporated areas of the County of Los Angeles. Our emphasis is on the availability of sufficient water supplies for fire fighting operations and local/regional access issues. However we review all projects for issues that may have a significant impact on the County of Los Angeles Fire Department. We are responsible for the review of all projects within Contract Cities (Cities that contract with the County of Los Angeles Fire Department for fire protection services). We are responsible for all County facilities located within non-contract Cities. The County of Los Angeles Fire Department, Land Development Unit, may also comment on conditions that may be imposed on a project by the Fire Prevention Division, which may create a potentially significant impact to the environment.

3. The County of Los Angeles Fire Department, Land Development Unit, appreciates the opportunity to comment on this project.

4. Should any questions arise regarding subdivision, water systems, or access, please contact the County of Los Angeles Fire Department, Land Development Unit Inspector, Claudia Soiza, at (323) 890-4243.

FORESTRY DIVISION – OTHER ENVIRONMENTAL CONCERNS:

1. The statutory responsibilities of the County of Los Angeles Fire Department, Forestry Division include erosion control, watershed management, rare and endangered species, vegetation, fuel modification for Very High Fire Hazard Severity Zones or Fire Zone 4, archeological and cultural resources, and the County Oak Tree Ordinance. Potential impacts in these areas should be addressed in the Draft Environmental Impact Report.

HEALTH HAZARDOUS MATERIALS DIVISION:

1. We have no comments at this time.

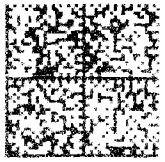
If you have any additional questions, please contact this office at (323) 890-4330.

Very truly yours,

JOHN R. TODD, CHIEF, FORESTRY DIVISION
PREVENTION SERVICES BUREAU

JRT:sc

COUNTY OF LOS ANGELES
FIRE DEPARTMENT
Forestry Division
5823 Rickenbacker Road, Room #123
Commerce, CA 90040



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CHRISTOPHER STONE
ASSISTANT DEPUTY DIRECTOR
DEPARTMENT OF PUBLIC WORKS
P.O. BOX 1460
ALHAMBRA CA 91802-9974

9160232460 BSCO

Devil's Gate Reservoir Sediment Removal
and Management Project

COMMENT CARD

Name Dianne Patrizzi Address 564 N. Oakland Ave., Pasadena, CA 91101

Email thaddius.d.patrizzi@gmail.com

Organization, if any None

I would like to provide the following comment:

You have a great opportunity to be the engineers that solve this problem for Devil's Gate and be the innovators of a new age in flood, watershed, and wetlands management. In my research, so many places are in need of a solution, if one can be developed and tested here, it could be crucial to life sustainability all over our watery planet. So with that, let me plant some seeds for you.

Since I am more of a visual person than a verbal one, please refer to my drawings (enclosed 4 pgs). It is a proposed living levee/canal system. It is based on an idea borrowed from Curt Schmutte of DWR (enclosed 1996 original proposal, 7 pgs). I have highlighted my lightbulb moments on the hard copy mailed to you via USPS.

When I heard Mr. Schmutte explain that the levees in his project moved then returned to place as a reaction to seismic activity, it made me wonder if we could create living levees of the same construction to move depending on water flow activity. He said that when they were excavating sediment for another project the shovels hit a barrier. It was a rhizome netting or network that although buried under soil for at least several hundred years, appeared to still be alive--just simply dormant.

In my drawings, the rhizome material covers a berm of sediment, at its base is a slippery peat or clay layer creating mobility. My theory is when water flow is heavy instead of breaching the

levee it would move out to accommodate it. Then when the water flow subsides, it would move back in place by gravity. The depth of the channel, and slant for the sliding levee wall would be calibrated to the least average flow position.

This would optimize the rate of water flow and thereby decrease sediment settling out of the water and depositing itself. Adding the serpentine element, as discussed in the Hobble Creek Flow Recommendation Report (enclosed 57 pgs) would provide additional flow enhancement and allow for the ability to protect certain flora/fauna locations within Hahamongna.

Maintenance of sediment removal from the channel would be reduced or at least confined to the channel, summer weed abatement from the channel may be regular, and sediment/debris clean-out from 100 yards of the dam would be maintained until such a time in the future when the dam could be safely disassembled. Then the Arroyo Seco will be contiguous, as it should be, and sediment will flow downstream helped with collaboration along its way to reach the sea. The ocean ecosystems have been starved for it.

One day, I hope to stand before a room of people and tell them how proud I am of this generation (or multi-generations) of engineers, scientists, biologists, and cultural enablers through cooperation have created a paradise by devising a plan that solved one of the most difficult and universally important problems in history.

Respectfully Submitted,

Dianne Patrizzi

STATE OF CALIFORNIA – CALIFORNIA NATURAL RESOURCES AGENCY **EDMUND G. BROWN JR.**, *Governor*

DEPARTMENT OF WATER RESOURCES
1416 NINTH STREET, P.O. BOX 942836
SACRAMENTO, CA 94236-0001
(916) 653-5791

NOV - 4 2011

Mr. Ryan Butler
Los Angeles County Flood Control District
Post Office Box 1460
Alhambra, California 91802-9947

SCH #2011091084, Notice of Preparation for the Devil's Gate Reservoir Sediment Removal and Management Project Draft Environmental Impact Report
Los Angeles County

Dear Mr. Butler:

We have reviewed the subject Notice for the above referenced project, which entails removal of up to 4 million cubic yards of reservoir sediment behind Devil's Gate Dam to restore the reservoir's original storage capacity. Work to complete the proposed project is expected to take place between Spring 2014 and Winter 2019.

Devil's Gate Dam, No. 32-3, is currently under State jurisdiction for dam safety. Based on the information provided, the maintenance work described will not affect the safety of the dam. An application will not be required for this project, provided that the work does not encroach within 10 feet of the dam or its appurtenances. If this criterion is not met, we will need to be notified beforehand to review and approve the work.

If any alterations or modifications to this jurisdictional dam are necessary as part of the scope of work, an alteration application, together with plans and specifications, must be filed with the Division prior to the construction of the project. All dam safety related issues must be resolved prior to approval of the application, and the work must be performed under the direction of a Civil Engineer registered in California. Sharon Tapia, our Design Engineering Branch Chief, is responsible for the application process and can be reached at (916) 227-4660.

If you have any questions or need additional information, you may contact Office Engineer Randy Fessler at (916) 227-4601 or Regional Engineer Shawn Jones at (916) 227-4600.

Sincerely,

Michael Waggoner

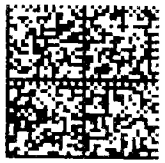
Michael G. Waggoner, Chief
Field Engineering Branch
Division of Safety of Dams

cc: (See attached list.)

cc: Ms. Nadell Gayou
Resources Agency Project Coordinator
Environmental Review Section
Division of Statewide Integrated Water Management
901 P Street
Sacramento, California 95814

Governor's Office of Planning and Research
State Clearinghouse
Post Office Box 3044
Sacramento, California 95812-3044

STATE OF CALIFORNIA
CALIFORNIA NATURAL RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
P.O. BOX 942836
SACRAMENTO, CALIFORNIA 94236-0001



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MR RYAN BUTLER
LOS ANGELES COUNTY FLOOD
CONTROL DISTRICT
POST OFFICE BOX 1460
ALHAMBRA CA 91802-9947

9180242460

November 9, 2011

To: L.A. County Flood Control District
Water Resources Division – Reservoir Cleanouts

From: Don Bremner
1680 Walworth Ave.
Pasadena, CA 91104
Tel: 626-794-2603
Email: donbremner@earthlink.net

Re: EIR for Devil's Gate Dam Project

INTRODUCTION:

The Devil's Gate project comes amid a growing sense that flood control in Los Angeles County must evolve to consider entirely new ways of dealing with sediment at our dams and debris basins. The series of public meetings in 2011 to discuss a Sediment Management Strategic Plan underscores the estimate of County officials that known placement sites for sediment may be adequate for only two more years.

If we really are running out of conventional placement sites, it's time to analyze and test methods that may not have been considered earlier. Because the Devil's Gate Dam sediment project will begin to set a pattern for future big cleanouts, the Devil's Gate Environmental Impact Report should include alternatives that may seem unlikely or unfeasible. In the process, we can seek to restore some of the hydrologic function the Arroyo Seco once had before the dam and downstream channelization ended natural sediment transport and distribution. This could benefit the environment and help in future sediment management.

Environmental impacts are especially critical at Devil's Gate reservoir because of its location in the City of Pasadena's Hahamongna Watershed Park, a sensitive ecological region, recreation and water conservation area.

OBJECTIVES:

The Devil's Gate project must:

- Minimize downstream flooding risks through sediment management and dam operation

- Be consistent with Pasadena's Master Plan for Hahamongna, and with the Integrated Regional Water Management Plan (IRWMP).

- Preserve habitat and wildlife

- Not harm opportunities for recreation – hiking, biking, bird watching, etc. -- and improve conditions if possible.

- Maintain or improve water conservation and percolation into the basin

- Minimize impacts on residents from noise, dust and fumes

- Aim for a sustainable pattern of sediment management that deals with sediment accumulation regularly, not on a semi-emergency basis.

- Be feasible and cost-effective.

ALTERNATIVES:

The EIR should describe and analyze these alternatives for managing sediment in Hahamongna:

1. The project proposed by the County Flood Control District. This would remove 2.6 million to 4 million cubic yards of material, mainly from a 50-acre site just north of the dam. The resulting steep-sided bowl would be expected to receive most of the sediment entering the basin in future years.
   The excavation would remove many mature black willow trees and other vegetation and their wildlife habitat. It would leave a continuing scar on the environment.

   Environmental impacts could be reduced by use of a conveyor, if feasible, to carry sediment to trucks on top of the dam, or to Oak Grove Drive, rather than widening the access road up the west side of the basin for a haul route. Electric trucks or very low-emission vehicles should be used to reduce emissions, especially near two schools in the vicinity.

2. Reduce the size of the excavation just north of the dam. When this project was first publicly described in November 2010, it was to remove 1.67 million cubic yards. The excess sediment now is estimated at 2.6 million cubic yards, with more expected during the coming storm seasons, and the Initial Study says the proposed project would remove up to 4 million cubic yards. In their planning, County officials cite a “Design Debris Event” -- a 50-year storm, four years after a fire in the watershed, that would bring an estimated 2 million cubic yards into the reservoir. How likely is a 50-year storm during the next few years?

   Given these varying figures, the unpredictability of future sediment flows, and recent improvements to the dam’s trash racks and other features, would a

smaller project be adequate, something considerably less than 2 million cubic yards? That would reduce environmental impacts, although it might mean that the interval before the next sediment removal project would be shorter.

3. Excavate sediment at the north end of the reservoir, downstream from the JPL bridge, in addition to the area near the dam. This will require analysis of the effects on coastal sage scrub, oaks and other vegetation and habitat in the surrounding area and the reach between the northern excavation site and the one near the dam. And its effects on water percolation in the City's spreading ponds and in the streambed need to be assessed, as well as potential enhancement of recreational opportunities.

4. Do more sluicing. How can storm flows be used to improve transport of sediment through the dam and downstream channel system? How much could be sluiced effectively, and how much water would be "wasted" by reduced ponding and percolation behind the dam? A conduit or pipeline down the Arroyo Seco to carry sediment toward the beach, or to some place short of the beach, could transport sediment with less water than sluicing.

5. Arrange for beneficial uses of usable portions of the sediment removed from Hahamongna. With proper processing, some may be suitable for beach replenishment, for agricultural purposes, or in sand and gravel operations. Sales of this sediment would offset the costs of processing.

6. Recognizing the huge long-term costs of removing sediment from Devil's Gate and other dams (not to mention the problem of space to put the sediment), one alternative could sketch the feasibility and costs of letting the stream return to its natural state, or to something closer to its natural state than it is now. What might it cost to buy out property owners in critical areas downstream, or to protect them against flooding? This approach may be unfeasible, but it would emphasize the importance of restricting development in flood plains in the future.

   It will be argued that the purpose of this project is simply to clean out sediment at Devil's Gate with minimal environmental impact, and that time and funds don't allow a study of the feasibility of returning the Arroyo Seco and other streams to a more natural state a generation or two from now. And the EIR for Devil's Gate may not be the best forum for a look at the distant future. But such an alternative could draw on the general findings of the County's Sediment Management Strategic Plan Task Force, and add the particular focus of the consultants and engineers who will shape the Devil's Gate project, to produce a valuable case study of how sediment in one of our major streams might be managed more effectively in the future.

   Don Bremner
   November 9, 2011

Andrew Salas
Chairman

Nadine Salas
Vice-Chairman

Christina Swindall-Martinez
Secretary

Albert Perez
Treasurer I

Martha Gonzalez-Lemos
Treasurer II

Albert Acuna, Jr
Chairman of the
Council of Elders

Ernest P. Salas Tautimez
Chief and Spiritual Leader

GABRIELEÑO BAND OF MISSION INDIANS
Historically known as The San Gabriel Band of Mission Indians
recognized by the State of California as the aboriginal tribe of the Los Angeles basin

County Department of Public Works
900 S Fremont Ave
Alhambra, CA 91803

Re: Hahamonga Watershed project

Dear Department of Public Works,

August 22, 2011

We are writing to express our great concern over the moving of earth at Hahamongna. While we understand the delay in obtaining an EIR, we are making you well aware that the Arroyo Seco basin is an extremely culturally sensitive area. We have documents from the Huntington Library dictating a massacre in the Arroyo Seco area in 1826 where thousands of Indians from Mission San Gabriel were marched to the area of the village of Hahamongna. They were massacred as a result of their uprising during the mission secularization period. Around 1874, a citizen of Pasadena found a pistol in the Arroyo Seco almost consumed by rust, on the barrel of which was the date of its manufacture 1810. It was probably lost in this battle. More recently a human skull was found in this area and is currently in our possession awaiting reinterrment.

Our tribe's history is very rich in this area. The primary Gabrieleno village of this area was Hahamongna (a variation of Povomeparngna which was the original name for the Pasadena Arroyo Seco area) of which its inhabitants occupied what is now known as the Arroyo Seco. The name for the City of Pasadena came from the village of Puntitavjatngna. Haramoknga is another village located in Pasadena.

In order to protect our resources, we're requesting one (or more depending on the scope of work) of our experienced and certified Native American monitors to be on site during all ground disturbances. While we have concerns about this project and it's environmental impacts, the purpose of having Native American monitors on site is not to delay or stop construction. The purpose of monitors is to protect and preserve our resources and our culture. There is so little of it left that even the smallest artifacts are priceless to us and the future of our children. We hope to hear from you soon.

Sincerely,

Christina Swindall

Christina Swindall Martinez, secretary
cell (818)406-1392
email: christinaswindall@yahoo.com

cc: City of Pasadena
Don Bremner, Chair of Hahamongna Watershed Park Advisory Committee
Supervisor Michael Antonovich
Larry Myers, Native American Heritage Commission

From: Grace Wong [gywseven7@gmail.com]
Sent: Thursday, October 20, 2011 10:20 AM
To: reservoircleanouts
Subject: Devil's Gate Reservoir Sediment Removal & Management Project

Categories: Scoping Comments

Dear DPW,

I like to comment on you current plan on the sediment removal at the Devil's Gate Reservoir. This plan of scrape out the basin leaving it barren will severely destroy many valuable nature habitat for wild lives.
Trucking out sediment only when it causes concern is not viable solution. We need a sustainable plan of less impact methods of sediment removal.
We should look for the very best practices and the newest technology and strategies and see this as an opportunity to rethink and redo sediment management.
Hahamongna is a valuable habitat and a necessary open space for the community. Do not take away this diminishing haven in the urban world!

Sincerely,

Grace Wong
Altadena, CA

From: Oelker, Gregg [Gregg.Oelker@UnitedWater.com]
Sent: Wednesday, November 09, 2011 7:19 PM
To: reservoircleanouts
Subject: Devil's Gate Reservoir Sediment Removal and Management Project

Categories: Scoping Comments

Hello,

I am a 35 year resident of Pasadena, and 20 year next-door neighbor to Hahamongna Park. Frankly, it's literally my back yard neighbor, as my yard ends at the park. We live on Crestford Dr. near the end of Altadena Drive. My wife and I hike and bike in the upper Arroyo from the JPL bridge to Devil's Gate Dam and back at least once every weekend. When I'm on vacation, I go down there every day. I know all the trails, and animal trails throughout this part of the Arroyo. We have watched the basin change and evolve over the years. It's really nature in action. The recent fire and sediment deposition have made changes come in rapid time.

The forest that has developed near the dam is certainly a place full of wildlife that should be saved. We often walk there near sunset, and wildlife there is abundant. The migratory birds living there are numerous, and amazing, not to mention the rabbits, coyotes, foxes, and other wildlife. We've even seen cougar tracks in that area. Many places like this used to exist, and this one developed due to your agency not removing sediment for many years. If you are worried so much about the sediment now, why did you do NOTHING for many years before now? I cannot remember any sediment removal except at the face of the dam in the 20 years I have lived in this area. This area should be left in the natural state it has developed into.

I somewhat support sediment removal at the face of the dam and in areas further upstream. It seems that after the fires of two years ago, sediment has filled the canyon 15-20 feet deep. Where once was a stream bed, now is meters of sand and rock. I think this is the place to focus your efforts on. Re-create the stream at the depth it once was. Instead of 4 million cubic yards as you plan, perhaps $1/10^{th}$ that much could be removed to recreate the stream bed. Limiting it as such would reduce the negative comments I have heard. Noise, pollution, 400,000 trucks all could be reduced with a more focused effort.

This should be done in a way to remove the sediment, then allow nature to retake the canyon bottom. Then, of course, you need to maintain the area, removing sediment on a schedule. Don't wait for disaster to come. Your current plans would change the Arroyo (my back yard!) in ways I cannot imagine. Leave the natural area that has developed alone! Let the plants and animals live! Focus your efforts on sediment, not nature.

Please consider this a comment against your plans, and hope for a more environmentally friendly and sustainable plan.

Thank you,

-gregg

Gregg Oelker
Pasadena, CA

From: Guido [guidoserious@charter.net]
Sent: Wednesday, October 05, 2011 3:45 PM
To: reservoircleanouts
Subject: Comments

Categories: Scoping Comments

Regarding Devils Gate Sediment Removal

The uproar re Sediment Removal by members of the community in the affected area is uncalled for. Devils Gate was not built in the 20's to provide better access to La Canada, but as a Catch Basin for mountain water runnoff. Unfortunately the County has been remiss in maintaining the Hahomonga Catch Basin for many years and it has become a convenient Recreational Area. Mother Nature in the mean time has provided the green amenities.

Now that the County has finally committed to remove the accumulated debris and reestablish the basin's primary function the surrounding community is upset. Yes there will be some inconvenience, but it is a small price to pay for the Greate Good, i.e. down stream Flood Control.

It also appears that our Dry Spell is over and we must be prepared for the present and future.

Sincerely,

H. Guido Meindl

From: Lilley, Keith
Sent: Wednesday, November 09, 2011 6:40 AM
To: Butler, Ryan
Subject: FW: HAHAMONGNA/DEVIL'S GATE DAM

Categories: Scoping Comments

Please add to the official comments

From: Hill Penfold [mailto:hpenfold@gmail.com]
Sent: Tuesday, November 08, 2011 9:58 PM
To: Lilley, Keith
Subject: HAHAMONGNA/DEVIL'S GATE DAM

Remove only the amount of sediment necessary to assure downstream safety.
Preserve as much of the natural surrounding environment as possible.
Immediately begin a **long-range comprehensive study** of alternatives to traditional DPW sediment removal methods for Hahamongna and all other 14 dams. Comprehensive means going beyond simply digging and trucking out the sediment. Among other things, it means looking at different transportation models for sediment removal. It also means including the upper watershed and the downstream storm channels in the analysis.

Hill Penfold
Tujunga

From: Beck, Michael
Sent: Monday, November 07, 2011 7:07 AM
To: Foster, Siobhan
Subject: FW: Initial Study Public Comment -- Hahamongna Sediment Removal

Siobhan,

FYI,

...Michael

From: Hugh Bowles [mailto:hsbowles@yahoo.com]
Sent: Sunday, November 06, 2011 5:26 PM
To: resevoircleanouts@dpw.lacounty.gov
Cc: molina@bos.lacounty.gov; seconddistrict@bos.lacounty.gov; zev@bos.lacounty.gov; aavila@lacbos.org; fifthdistrict@lacbos.org; Tornek, Terry; Bogaard, Bill; Gordo, Victor; Madison, Steve; Masuda, Gene; Robinson, Jacque; McAustin, Margaret; Holden, Chris; tim brick; tim wendler; ann scheid; donbremner@earthlink.net; Lori Paul; leeona@earthlink.net; mariettaemail@aol.com; Laura Garrett; Beck, Michael; Gutierrez, Julie; Williams, Tina; breauxarts@sbcglobal.net; mlbrowne@pasadena.edu; lbh@sprintmail.com; meb787@aol.com
Subject: Initial Study Public Comment -- Hahamongna Sediment Removal

This e-mail is a follow up to comment made at the EIR scoping session at La Canada High School cafeteria on Saturday, October 15 2011. These comments are submitted on behalf of the Hahamongna Watchdog Group.

1. Due to the large number of items in the Initial Study checked with “Potentially Significant Impact”,

there should be a strong focus on finding less impactful alternatives within the EIR. This is required by CEQA. The County's only alternative so far is to move from a project that plans to excavate 2 million cubic yards of sediment, to a project to excavate 4 million cubic yards of sediment. The expanded plan also includes a mining component with a plan to sell marketable materials as part of the excavation process. The County has moved from one proposal with a significant impact to a second proposal with even more significant impact. The County is going in the opposite direction required by law. To satisfactorily, and convincingly bring the EIR process within CEQA, the County must issue an RFP and distribute the RFP to independent firms of qualified hydrological consultants with a proven experience in working with water conservation, sediment management, and dams. The express purpose of the RFP must be to assist the County with finding a less impactful alternative to the sediment issue in Hahamongna and avert the many significant impacts the project will currently create.

The plan to expand the scope of the impacted area indicates the County cannot credibly assess alternatives on its own. There has to be a demonstrable effort to find less impactful options. If the County decides not to adopt those options in the EIR, this must be discussed in detail and backed up with full scientific analysis. The standard cursory examination of alternatives by the lead agent in an EIR is inadequate for a project with this level of impact on the environment.

The RFP distribution should include Philip Williams and Associates:

San Francisco: 550 Kearny Street, 9th Floor
San Francisco, CA 94108-2404

And Flow Science (Pasadena location):

723 East Green Street
Pasadena, CA 91101

2. Within the scope of alternatives there should be an assessment of:
    - The County's original proposal to allow sediment to flow into a smaller area with planned periodic clean out.
    - The impact the lowering of the dam spillway in 1998. This lowered the overall capacity of the dam to fulfill its flood control function. Is the planned scope of the clean out area enlarged as the County purposely reduced the dam capacity by lowering the spillway?
    - The large storm event that occurred in December 2005 where water was held behind the dam for over two weeks. While the dam was full we had a significant storm event of approximately 6 inches of rain. The flood control impact of the dam was minimal during this storm – the dam was already full. The water went uncontrolled over the spillway. What was the damage from this storm event downstream? There needs to not only be an assessment of the dam's capacity to engage in flood control, but also the downstream channel's ability to absorb significant uncontrolled storm flows over the dam spillway. (Note: During the 2005/2006 season 60 inches of rain were recorded at JPL).
    - The role mature willows play in slowing intense storm flows, and preventing large debris items from inhibiting the dam function. The heavy flows of the storm seasons after the Station Fire brought large debris items into the basin – the trunks of charred pine trees –the willows acted as a significant brake on the water flow, and prevented many of these items from reaching the dam.
    - The fact that 60% of the watershed burned in the Station Fire, a large proportion of the moveable debris within the watershed is already in the basin, and the likelihood within the proposed project period of 50% of the watershed burning again, with equivalent debris

deposits. In effect, the fact that components of the worst case scenario are already present, and the major impacts realized, how likely is this to occur again? Is it reasonable to assume that we will not likely have a 50% burn of the watershed again within a 5, 10, 20 year period – there just is not the material? This then reduces the risk of the worst case disaster event occurring during that period, and reduces the need for such an invasive approach to removing the sediment now.

3. The EIR must include a documented mitigation and restoration plan, with associated costs, a budget, and a demonstrated commitment to follow through. The mitigation and restoration plan should:

- Outline objectives and benchmarks for achieving those objectives.
- Assign designated and publicly acceptable experts to monitor restoration and mitigation – e.g. Pasadena Audubon should monitor the recovery of bird populations and measure against the planned objectives.
- Provide for enforceable sanctions if the County fails to meet the objectives.

In 1998 during the dam refurbishment, there was a requirement under the mitigated negative declaration for 3 years of restoration work consisting of re-seeding the project area with native plants and removing invasive species. This never occurred and is the reason for the large number of eucalyptus trees in the middle of the basin now.

Also, as part of the City of Pasadena's approval of the use of Johnson Field to store debris for the intermediary project, there was a condition placed that damage to the upper trail on the east side of the basin caused by a leaking storm drain be repaired along with the storm drain. The trail was repaired, but the storm drain was not. The storm drain has now started to erode the trail just to the south of the repaired section.

The County has a poor record on following through on mitigation and restoration efforts.

4. The EIR must contain full budget projects for the whole project and the source of funding for the project. For example if the County plans to sell gravel from the excavation, how much of that sale will go toward the project costs. All sources of funding need to be identified – disaster funds, property taxes, bond measures etc.

5. The EIR must outline an ongoing maintenance plan and budget once the project is complete. Does the County intend to maintain the whole excavation area as free of vegetation? How will this be managed, how will this be funded over time?

No one doubts the severity of the situation, or the need for action. The key is how to prevent the remediation of one man made environmental disaster by creating another man made environmental disaster.

Please ensure these comments are added to the administrative record.

Sincerely yours,

Hugh Bowles

Hahamongna Watchdog Group
Shelly Street
Altadena
626 482 9116

From: Lilley, Keith
Sent: Monday, November 14, 2011 7:04 AM
To: Butler, Ryan
Subject: FW: Hahamongna Sediment Scoping Comments

Categories: Scoping Comments

Please add to official comments

From: Jack Lindblad [mailto:jplindblad@gmail.com]
Sent: Friday, November 11, 2011 4:30 AM
To: Lilley, Keith
Subject: Hahamongna Sediment Scoping Comments

Similar to ecological disfigurement, social and environmental degradation and associated costs the offending corporation is responsible for - is Pacoima Canyon strip mining - yet another San Gabriel Mountains debasement in the making: Hahamongna Sediment 'Removal'

Attention: Keith Lilley, DPW Project Manager

It has come to my attention that the Los Angeles County Department of Public Works (DPW) has conducted two EIR scoping meetings addressing the removal the sediment from behind Devil's Gate Dam. The dam is located in Pasadena's Hahamongna Watershed Park which includes over 300 acres of beautiful and ecologically essential watershed above JPL - the Jet Propulsion Laboratory.

In keeping with the highest standards and practices of watershed management, and revitalization in these perilous times of Extreme Climate Disruption-caused weather events:
- Remove only the amount of sediment necessary to assure downstream safety.
- Preserve as much of the natural surrounding woodland environment as possible. Harm or remove No Oaks!
- Immediately begin a long-range comprehensive study of alternatives to the usual DPW sediment removal methods for Hahamongna and all other 14 dams. "Comprehensive:" in terms of moving beyond the argument of myopic digging and trucking out sediment.
- Sediment is not a waste by-product.
- Sediment provides habitat for fish and aquatic species.
- Sediment nourishes rivers and beaches.
- Sediment fills our valleys and the coastal plain.
- Sediment can be used for construction purposes.
- Study different transportation models for sediment removal. A conveyor belt may not have the least footprint. Include the upper watershed and the downstream storm channels in the analysis.
- Hahamongna is the vital link between the Upper and Lower Watershed...between the mountains and the city.

The current system of sediment management in Southern California is economically and environmentally unsustainable and Fails by:
- costing $3-5 billion in the next 20 years.
- aggravating human health risks (heavy equipment emissions, noise, traffic, dust, precludes natural flushing events).
- denying downstream landscapes and ecosystems of their essential building blocks (fine sediments, sands, gravel, nutrients, etc.)

This work presents an opportunity to set a new, positive paradigm to develop a Sustainable Integrated

Sediment Management Program by:
- Pursuing sediment management options that applies biomimicry to restore natural processes from the top of the watershed to the bottom (sluicing, stream and floodplain restoration, and others).
- Promoting SMART development and re-development.
- Applying prudent Land use regulations (green buffers, density, proximity to wildlands, defensible space, distance from geologic hazards).
- Mandating lowered impact development (LID)/Green, carbon-neutral building design.

Thanks,

Jack Lindblad

2012 - 2010 - 2008 Green Party candidate for the 39th California Assembly District seat
Accepts no corporate donations. Accepts donations only from human beings.
http://cambioconjack.com/
http://lindbladforassembly.blogspot.com/p/welcome_02.html
http://apps.facebook.com/jack_lindblad/
https://www.facebook.com/jack.lindblad
https://www.facebook.com/pages/Lindblad-for-Assembly-2012-Cambio-con-Jack/218484541520144
Lindblad for Assembly Cambio con Jack 2012 - 2010 - 2008
East San Fernando Valley Greens Local
East San Fernando Valley Community-based Economics: Locally-grown Produce
Move to Amend - East San Fernando Valley
Advocacy for Pacoima Canyon
(818) 785-2724

From: Jaime Parker [jaimepkr@yahoo.com]
Sent: Thursday, November 10, 2011 1:19 PM
To: reservoircleanouts
Cc: Pat Merrill
Subject: Devil's Gate Reservoir Sediment Removal and Management Project

Categories: Scoping Comments

To whom it may concern.

My family and I are very oppossed to the continued construction, dirt, and debris removal of the sediment in the Hahamonga Watershed. We live only a few houses from the entrance to the watershed on La Canada Verdugo Rd. and are offended that anyone would think it is ok to continue the ongoing removal of sediment that will require an additional 400,000 truckloads of sediment to be removed over the next three years. We, and other families, use the watershed everyday and having to deal with all the heavy trucks, noise, and pollution is unacceptable. The watershed is an extension of our backyard and used by hundreds of people everyday (i.e. bikers, runners, walkers, naturalists, etc) who are extremely inconvenienced and annoyed by the ongoing construction as it disturbs the natural beauty, wildlife habitat, and tranquility that we, and our local wild animals,seek in the wathershed rufuge. Place yourself in our position for one moment and how would you like it if we showed up in your backyard tomorrow and ran a bulldozer each and everyday for the next few years.....that's how 'close to home' your proposal for ongoing works hits all of us in this community.

Please leave it alone.

Sincerely,

Jaime E. Parker
p. (818) 281-8236

From: Lilley, Keith
Sent: Monday, November 14, 2011 7:07 AM
To: Butler, Ryan
Subject: FW: Hahamongna Watershed Park & Dam

Categories: Scoping Comments

Please add to official comments.

Looks like he is involved in opposing the mining operation at Pacoima and should be added to a contact list for that project.

From: jake robbins [mailto:kukumat@gmail.com]
Sent: Friday, November 11, 2011 2:35 AM
To: Lilley, Keith
Subject: Hahamongna Watershed Park & Dam

Keith Lilley
L.A. County Dept. Public Works

Mr. Lilley:

Urbanwild has informed me that your next project, after leveling and destroying the Arcadia Woodlands, will inevitably be to erect a dam and remove sediment at Hahamongna. As per Supervisor Mike Antonovich, who stands to profit from the endeavor, I understand you will be hoping to erect a total of 14 dams in the San Gabriel Mountains.

Let Hahamongna Watershed Park be an ideal model for what can be accomplished without removing the mature oak woodland. In other words, should your sediment removal program successfully preserve the wildlife habitat, others can be approved.

Please remove ONLY the amount of sediment necessary, as such, to preserve downstream safety AND the integrity of the oak woodland.

Please conduct a THOROUGH study of methods of sediment removal that accomplish this.

Please contact knowledgable biologists to survey for any rare or endangered species and habitat requirements, and leave ALL mature oaks standing.

Sincerely,

Jake Robbins
Advocacy for Pacoima Canyon
Green Party of California

From: Lilley, Keith
Sent: Wednesday, November 09, 2011 3:22 PM
To: Butler, Ryan
Subject: FW: Hahamonga

Categories: Scoping Comments

Please add...

-----Original Message-----
From: Laurel Beck [mailto:lifebloom@earthlink.net]
Sent: Wednesday, November 09, 2011 3:21 PM
To: Lilley, Keith
Subject: Hahamonga

Dear Mr. Lilley --

I am writing to urge that a long-term study of alternatives to current DPW methods of sediment removal, a study that would encompass the whole chain of dams under your supervision. I would also request a significant reduction in the amount of sediment to be removed from Hahamonga in the near future (less than half of that stated in the IER). Preserving our natural areas should be among the highest priorities, and is compatible with protecting lives, property and saving money.

Sincerely,
Laurel Beck
Pasadena resident

From: L Barlow [barlow.co@att.net]
Sent: Wednesday, October 05, 2011 9:22 PM
To: reservoircleanouts
Subject: Further comments on the Sediment EIR

Categories: Scoping Comments

Per my comments tonight, further elaboration. Submitted in writing, this is the digital copy.

DPW must begin a long-term study of sediment management rather than continuing with short-term remedies that require costly sediment removal programs year-after-year:

Dam reconstruction is effective and entirely feasible in the restoration of natural processes which carry away the sediment instead of trucking it from behind an outdated and unmaintained dam. The short-term costs to change the dam structure and clear out the obstructions to natural flow are vastly smaller than ongoing sediment removal programs which are not actually carried out, for cost reasons, endangering all the communities downstream of the dam. Life cycle estimates (100 years) should be the basis for cost comparisons that include the maintenance and repair for all structures, and this would integrate the value of natural ecosystems into the equation.

Sediment management is the self-inflicted result of placing dams in the way of natural water processes that carry the sediment to the base of the mountains and create a fertile alluvial plain. In order to replenish nutrients in the soil, as well as recharge the natural aquifers that supply well water, these natural drainage patterns must be restored. That doesn't preclude artificial water storage, but these strategies must engage the natural terrain properties that exist free of charge. Water flow moves sediment, and managing that flow rather than stopping it provides a sustainable way to provide water, soil nutrients, sand, gravel and mud into areas that sustain the ecology of the region.

Natural flood protection can be attained by protecting and restoring wetlands and floodplains, and by restoring a river's natural flow and meandering channel. Giving at least some floodplain back to a river will give the river more room to spread out. Furthermore, wetlands act as natural sponges, storing and slowly releasing floodwaters after peak flood flows have passed.

The following steps should be taken:

1. Adopt a strategic conceptual plan identifying the watershed region and its component functioning parts. Begin implementation of this concept by adopting public-private partnerships that can continually fund the ongoing restoration efforts through private fiscal investment repaid with bond or tax structures. Partner with communities and their leadership, mountains conservancies, conservation nonprofits and the County. Everyone working together can make this happen.

2. Implement reconstruction/modification of the dam to allow water and sediment flows downstream into the areas that need these natural flows. Develop water storage strategies that are effective and multivalent, possibly a series of check dams* that work in optimal natural locations and recharge the Raymond Aquifer.

3. Establish a flood plain easement program to minimize flood impacts, reduce repeat damages and store floodwaters for benefits of downstream residents and communities.

*Many check dams tend to form stream pools. Under low-flow circumstances, water either infiltrates into the ground, evaporates, or seeps through or under the dam. Under high flow (flood) conditions, water flows over or through the structure. Coarse and medium-grained sediment from runoff tends to be deposited behind check dams, while finer grains are usually allowed through. Extra nutrients, phosphorus, nitrogen, heavy metals, and floating garbage are also trapped or eliminated by the presence of check dams, increasing their effectiveness as water quality control measures. In nearly all instances, erosion control blankets, which are biodegradable open-weave blankets, are used in conjunction with check dams. These blankets help enforce vegetation growth on the slopes, shorelines and ditch bottoms.

Laurie Barlow, AIA
October 5, 2011
Hahamongna/Devil's Gate sediment removal scoping meeting

--

:: design :: collaboration :: innovation

Laurie Barlow, AIA
http://www.barlowcoweb.com/
http://greenswardcivitas.blogspot.com/

From: Madeline Schleimer [mdimbi@gmail.com]
Sent: Friday, November 11, 2011 8:34 PM
To: reservoircleanouts
Cc: Madeline Schleimer
Subject: comments regarding environmental impact of Devil's Gate Reservoir Sediment Removal and Management Project

Categories: Scoping Comments

Dear persons involved with this project and members of the larger community,

the system of check dams and concrete channels and excessive pavement of our communities has robbed
the community of the water destined for the aquifer, the sand for the beaches and the streamside areas belonging to all of us, wildlife included.

Stream restoration has to be an essential part of the management of sediment.
the continuation of the check dam and paved channel system only serves to isolate the larger community from the natural system which has inestimable value for our overall health in the long term. we have built our communities in the floodplain and have sought to protect them from flooding through check dams and channels.

the slated removal of the sediment is projected to cost around 3 to five billion dollars over the next 20 years, and it while it may address current concerns of excessive alluvial buildup, it neither prevents the recurring buildup
of sediment behind the dam nor restores water to the aquifer.
the use of hundreds of trucks a day will add to the already polluted air suffered by the folks living between pasadena and irwindale, where the sediment is intended to be placed.

there needs to be an alternative to the current plan of the county.
is one environmental disaster to be remedied by throwing great amounts of treasure to create another environmental disaster?
there must be great effort made to consult with ethical, competent professionals and public agencies who deal with sediment and watercourse management as well as ecosystem recovery in urban settings to uncover more environmentally sound approaches.
perhaps it is time to seek places where communities are coexisting with their waterways so as to restore the original ecosystems as much as possible.
there have been other comments made by folks who have experience dealing with this sort of thing.
at least one city council member in pasadena supports the developing of alternate approaches to the current plan.

in the past winter, the plants in the gathered sediment have stopped the progress of burned logs heading for the dam

there are 600,000 acre feet flowing out to the sea through arroyo and the los angeles river.
communities throughout the county are seeking water sources from as far as the great lakes.
restoration of streams and riparian areas throughout the watershed on it way to the ocean will return the water to the aquifer as it is intended.
these dams were built before we had environmental protection laws brought about by our more lately acquired environmental awareness.

we would not use technology from less aware early-last-century mindsets to solve most other problems before us today.

thank you

madeline schleimer
po box 731
altadena ca
91003-0731

the sediments contain essential minerals that contribute to the fertile valleys we know and love.
we must use our eyes that have been educated to the requirements for a healthy ecosystem and we will also restore our blighted communities

From: Mark Hunter [fishingyak@yahoo.com]
Sent: Sunday, November 06, 2011 9:42 AM
To: reservoircleanouts
Subject: Devil's Gate Reservoir Sediment Removal and Management Project

Categories: Scoping Comments

I attended the scoping meeting at La Canada High School on October 15, and got a lot of useful information. But I was still left with some questions. I want to be sure that the draft EIR will cover those questions.

Thanks,
Mark Hunter
818-957-5044

The County is treating the Devil's Gate sediment situation as an emergency. But the numbers don't add up. DPW did no serious sediment removal for 15 years. Then in autumn 2009 a huge, disastrous fire occurred, followed by a rainy winter, and the reservoir filled up with about a million cubic yards of new sediment. That is indeed a frightening development. But in response, the County wants to remove *4* million cubic yards. So in spring 2009 the County saw no emergency but now, in retrospect, they have decided that Hahamongna was actually 3 million cubic yards too full, even then? Doesn't make sense. How about removing the 1 million cubic yards quickly, then we can talk in a non-emergency way about the rest?

The County says they got to the 4 million number by calculating the absolute worst case model for a 50-year storm (2 million yards), then deciding that they needed to accommodate two of those events in rapid succession. Huh? Why two in succession, if this is such a rare event? Using reality instead of models, in the winters after the *entire* undeveloped watershed of Hahamongna was denuded by fire, they only got 1 million yards of sediment. That was a real, catastrophic event that yielded only half the problem forecast by their model. So maybe this storm model of theirs is flawed? I'd like to see a better justification for the proposed target of 4 million yards removed, quickly, rather than working in a lower-impact and more sustainable way.

The DPW is failing to use easy, natural, low-impact ways to clear sediment. (I'll use the term "sluicing" to mean deliberately allowing outflow water to mix with sediment and carry it downstream. I'm told there are additional terms for this process depending upon how and when it occurs, but the goal is the same in all cases.) Although DPW sluice a little sediment through the dam at the beginning of each rainy season, they subsequently stop sluicing later in the season. Nor do they sluice during the dry season, although there is still a steady flow of water then. But sluicing is:

(a) quiet
(b) active 24/7, without regard to working hours or rush hours
(c) without any traffic impact
(d) with almost no pollution or greenhouse gas impacts
(e) without the need to dry the sediment before transport - the wetter, the better

Some additional questions for DPW:

1. The Arroyo Seco below Devil's Gate is a fast, well-engineered channel. It seems it could carry quite a bit of sediment. Have you calculated that number? For example, for every 10 cubic feet of stream flow, how much fine sediment (the kind that is most troublesome to the dam) could be carried? That would be a year-round, sustainable, permanent way to reduce sediment. That number would be an important fact to mention in the EIR.

2. The City of Pasadena diverts a major portion of the Arroyo Seco flow at a station in the canyon above Hahamongna. What would happen if Pasadena stopped diverting water there during dry season, thus increasing the dry-season flow in Hahamongna? What effect would that have on dry-season sluicing efforts? Certainly Pasadena would be reluctant to stop diversions, because they would have to replace that water with more expensive MWD water. However, the heavy equipment and trucks used by the County are very expensive, too. What if the County used the extra stream flow for

sluicing or launching sediment instead of trucking, and reimbursed Pasadena for the extra water replacement costs? That might actually save the County money, and it would certainly reduce environmental impacts. This possibility should be addressed in the EIR.

3. Are there other sources of water that could aid in sluicing? Reclaimed sewage water?

From: Mark Hunter [fishingyak@yahoo.com]
Sent: Sunday, November 06, 2011 9:50 AM
To: reservoircleanouts
Subject: Re: Devil's Gate Reservoir Sediment Removal and Management Project

Categories: Scoping Comments

Sorry, I pressed "Send" just a little too quickly - bad habit of mine.

One additional area I would like to see treated in the EIR is a study of how other jurisdictions have handled sediment buildup in alternative ways. The "dig, truck, and dump" protocol was reasonable in the early days of flood control when the natural environment wasn't under much stress and Southern California wasn't so crowded. But that protocol now raises serious concerns in the areas of pollution, disturbance of neighborhoods, and degradation of scarce riparian habitat. It seemed to me, at the scoping meeting, that DPW had already decided to dig, truck, and dump, and now they were just noodling about details and mitigation. I would like to see DPW take two giant steps backward, expand the scope of their vision somewhat, and truly research the alternatives, such as helping the sediment run down stream channels to the sea, as it has for millions of years.

Thanks,
Mark Hunter

From: Mark Hunter <fishingyak@yahoo.com>
To: "reservoircleanouts@dpw.lacounty.gov" <reservoircleanouts@dpw.lacounty.gov>
Sent: Sunday, November 6, 2011 9:42 AM
Subject: Devil's Gate Reservoir Sediment Removal and Management Project

I attended the scoping meeting at La Canada High School on October 15, and got a lot of useful information. But I was still left with some questions. I want to be sure that the draft EIR will cover those questions.

Thanks,
Mark Hunter
818-957-5044

The County is treating the Devil's Gate sediment situation as an emergency. But the numbers don't add up. DPW did no serious sediment removal for 15 years. Then in autumn 2009 a huge, disastrous fire occurred, followed by a rainy winter, and the reservoir filled up with about a million cubic yards of new sediment. That is indeed a frightening development. But in response, the County wants to remove *4* million cubic yards. So in spring 2009 the County saw no emergency but now, in retrospect, they have decided that Hahamongna was actually 3 million cubic yards too full, even then? Doesn't make sense. How about removing the 1 million cubic yards quickly, then we can talk in a non-emergency way about the rest?

The County says they got to the 4 million number by calculating the absolute worst case model for a 50-year storm (2 million yards), then deciding that they needed to accommodate two of those events in rapid succession. Huh? Why two in succession, if this is such a rare event? Using reality instead of models, in the winters after the *entire* undeveloped watershed of Hahamongna was denuded by fire, they only got 1 million yards of sediment. That was a real, catastrophic event that yielded only half the problem forecast by their model. So maybe this storm model of theirs is flawed? I'd like to see a better justification for the proposed target of 4 million yards removed, quickly, rather than working in a lower-impact and more sustainable way.

The DPW is failing to use easy, natural, low-impact ways to clear sediment. (I'll use the term "sluicing" to mean deliberately allowing outflow water to mix with sediment and carry it downstream. I'm told there are additional terms for this process depending upon how and when it occurs, but the goal is the same in all cases.) Although DPW sluice a little sediment through the dam at the beginning of each rainy season, they subsequently stop sluicing later in the season. Nor do they sluice during the dry season, although there is still a steady flow of water then. But sluicing is:

(a) quiet
(b) active 24/7, without regard to working hours or rush hours
(c) without any traffic impact
(d) with almost no pollution or greenhouse gas impacts
(e) without the need to dry the sediment before transport - the wetter, the better

Some additional questions for DPW:

1. The Arroyo Seco below Devil's Gate is a fast, well-engineered channel. It seems it could carry quite a bit of sediment. Have you calculated that number? For example, for every 10 cubic feet of stream flow, how much fine sediment (the kind that is most troublesome to the dam) could be carried? That would be a year-round, sustainable, permanent way to reduce sediment. That number would be an important fact to mention in the EIR.

2. The City of Pasadena diverts a major portion of the Arroyo Seco flow at a station in the canyon above Hahamongna. What would happen if Pasadena stopped diverting water there during dry season, thus increasing the dry-season flow in Hahamongna? What effect would that have on dry-season sluicing efforts? Certainly Pasadena would be reluctant to stop diversions, because they would have to replace that water with more expensive MWD water. However, the heavy equipment and trucks used by the County are very expensive, too. What if the County used the extra stream flow for sluicing or launching sediment instead of trucking, and reimbursed Pasadena for the extra water replacement costs? That might actually save the County money, and it would certainly reduce environmental impacts. This possibility should be addressed in the EIR.

3. Are there other sources of water that could aid in sluicing? Reclaimed sewage water?

10604 Walnut Drive
Shadow Hills, CA 91040
11 November 2011

Los Angeles County Department of Public Works
Attn: Water Resources Division – Reservoir Cleanouts
P.O. Box 1460
Alhambra, CA 91802-9974

Re: Devils Gate Reservoir Sediment Removal and Management Project Public Scoping Meeting

Dear Mr. Lilley:

The entirety of Hahamongna Watershed Park is used for recreational purposes, be it Frisbee golfers, horseback riders, hikers, geo-cachers, cross-country runners, or summer day-campers. The day-campers explore through the area that is marked in your excavation plan. If no one were allowed in the entire area for five years, everyone on the aforementioned list would be unhappy. The horses would not get as much exercise, and the day-campers would lose a significant portion of their experience with nature. This experience with nature is important, and especially so in the youngest campers (2 – 5 year-olds), and is therefore a major part or the camp culture.

As the project was presented in the initial study document, for the five year duration of the sediment removal, no one will be allowed into the designated area. Once the area has been excavated, it will take time for the vegetation to regrow. Since the vegetation takes time to grow back, the campers would not be able to use the basin the way they use it now, which is to frolic amongst mature trees and to seek shade from the occasional clump of willow trees while on a hike, among other things.

However, if you excavate in sections, people can use the majority of the park, and hopefully by the time you get to the last portion of the park, some portions of the park will have regrown their ***NATURAL*** habitats, not some invasive exotic species like Castor Bean, Ivy, Tree Tobacco, or other such non-native species.

It is imperative that the park be preserved, for the aforementioned reasons of education of nature, and retaining natural habitats. There are other ways for the park to remove sediment from the basin while still maintaining recreational operability within the park, but this is the option that I urge you to consider, because it fits in perfectly with the schedule of the day camp that I went to (Tom Sawyer Camp), and it should fit in reasonably well with the schedules of everyone else that uses the park. It will also allow the park to still be used for all the current recreational purposes.

Sincerely,

Markus Klemm (age 14)

From: Meb787@aol.com
Sent: Thursday, November 10, 2011 1:28 PM
To: reservoircleanouts
Cc: evizcarra@lacbos.org; Stone, Christopher; Sharp, Daniel B.; Lilley, Keith; cbalvin@sbcglobal.net
Subject: Scoping letter - Devil's Gate Reservoir Sediment Removal and Management Project

Categories: Scoping Comments

November 10, 2011

Los Angeles County Department of Public Works
Water Resources Division—Reservoir Cleanouts
P.O. Box 1460
Alhambra, CA 91802-9974

To LA County DPW Water Resources Division:

The Devil's Gate Reservoir Sediment Removal and Management Project calls for the removal of up to 4.0 million cubic yards of sediment within a project area which has now grown to 175 acres. Despite the impact the project will have on Hahamongna, the Los Angeles County Flood Control District's Initial Study does not define the project in sufficient detail. This is unfortunate because the scope of the project is such that it will shape what sort of park Hahamongna is to be for decades to come. The massive inflow of sediment caused by the Station Fire must be dealt with, of course. There is no disagreement about that; the disagreement is about how this is to be done.

I concur with the comments made by the Urbanwild Network that the County should immediately begin a long-range comprehensive study of alternatives to traditional DPW sediment removal methods for Hahamongna and all other 14 dams. "Comprehensive" means going beyond simply digging and trucking out the sediment. It means looking at different transportation models for sediment removal and looking beyond the immediate Hahamongna basin to include the upper watershed and the downstream storm channels in the analysis.

As the Initial Study shows, the project will have a wide variety of significant environmental impacts upon such areas as biological resources, air quality, recreation, transportation, and noise. Since the immediate surroundings of the park include residential neighborhoods and several schools, it is critical that the plan alternative chosen be that which best addresses air quality issues.

The alternative chosen should also best protect Hahamongna's rich and diverse habitats: coast live oak woodland, willow scrub, mule fat scrub, riversidian alluvial fan sage scrub, sage scrub, and southern sycamore riparian woodland. These deserve protection not only for their ecological importance but also because the park with its scenic beauty and abundant natural life has become a haven for the community seeking a respite from an ever more hectic urban environment. The alternative chosen should remove enough sediment from the basin to ensure public safety while at the same time allowing time for the County to develop a long-term sediment management strategy for Hahamongna. I concur with the comments made by the Pasadena Audubon Society that as little of the habitat as necessary should be disturbed and that all mitigation for what must be removed should be done in Hahamongna, not offsite.

The environmental report should investigate alternatives such as the use of conveyor belts within the park, the use of sluicing, launching, and other techniques which would lessen the need for trucks and roads within Hahamongna. The fewer trucks are required, the less the impacts upon the park as well as the surrounding communities.

This is not a typical scoping letter because this is not a typical reservoir cleanout project. As Pasadena stated in its Master Plan for the park, Hahamongna meets many needs: flood control, water conservation, wildlife habitat and recreation. The city has adopted an ambitious plan which will have many environmental impacts upon the park. The DPW reservoir cleanout will not proceed in a vacuum but rather at the same time Pasadena is undertaking many of its projects. My comments which follow will focus upon this issue as well as addressing the recent history of development plans in Hahamongna. The County should study this so as to accomplish its sediment removal objectives without facilitating further development in the park which the community has been opposing since the late 1980s.

DPW's sediment removal project is only one of many projects planned for the park in the near future. The cumulative environmental impacts of all these projects must be studied together so that the community and the decision makers can fully assess their impacts.

Among these, one of the most significant is the Hahamongna Basin Multi-use Project, a joint project of the Arroyo Seco Foundation, the City of Pasadena and the County Flood Control District. This is the title of the project as it was presented for Prop. 84 Integrated Regional Water Management Plan funds. Pasadena subsequently designated certain projects within the scope of the Hahamongna Basin Multi-use Project as the Hahamongna Multi-benefit Project. These include the controversial Sycamore Grove Multi-Purpose Field and the expanded parking lot, the Westside Perimeter Trail, and the restoration of Berkshire Creek.

Pasadena's project includes moving between 250,000 and 500,000 cubic yards of sediment to create 23 acres of land for the sports field and expanded parking above the flood plain and so will have environmental impacts of the same nature, if not scale, as those of DPW's project. There will be extensive removal of trees and a major reconstruction of a natural area.

The restoration of Berkshire Creek, according to the Hahamongna Master Plan, includes the widening of what is now a one lane road which crosses over the creek. The plan is to open up what is now a serene, wooded area of the park to vehicle traffic. The most recent version of the Hahamongna Multi-Benefit Project shows a new connection to the sediment removal area and the enlarging of the project area. The changes were not explained to the Hahamongna Advisory Committee so their significance is not known. <u>The significance to DPW's sediment removal project planning, however, is that the community is relying upon the County to choose alternatives which do not have the potential to become future roads in the park.</u> More park roads in Hahamongna have been rejected time and time again.

One alternative which would greatly lessen truck impacts both upon the park and the neighborhoods would be to use an unpaved road at the southern end of the park for sediment removal. If there was an access on both sides of the dam, the width of the road could be reduced and trucks could enter on one side and exit on the other, allowing for a simple one way path of travel. This is exactly what Pasadena proposed in the Hahamongna Master Plan, Summary of Proposed Projects. A new entry slip lane on the east side from Oak Grove Drive would allow direct access to the dam and basin. On the west side Pasadena proposed using the existing unpaved access road which was used during prior construction projects on the dam. Traffic would only be allowed to turn right and would access the freeway at Berkshire Place. If sediment must be removed in the northern portion of the basin, it should be moved by conveyor belt to the southern end of the basin so as to cause as little disruption as possible to the park and the surrounding neighborhoods.

The environmental impacts of the tree removals for DPW's project must also be considered in light of Pasadena' stated policy that all non-native trees are to be removed in Hahamongna. An inventory should be completed which shows how many trees are ultimately to be removed in the park, taking in to account DPW's project as well as the various city projects, the time frame within which the trees will be removed, and what will be the effects upon the wildlife in the park even if the tree removals are done on a phased basis.

Among other Pasadena projects which will impact the park in the next few years are the renovation of the spreading basins on the east side of the park, the building of new spreading basins on the west, and a pumpback system which will draw water from the storage pool behind the dam back up to the spreading basins. Another water project is discussed in Pasadena's Water Integrated Resources Plan but not in the Hahamongna Master Plan. This would pump water stored behind Devil's Gate Dam over to the Eaton Canyon spreading basins for additional ground water recharge. The city plans to coordinate with Los Angeles County with the goal of construction by 2015.

Recently the Greater Los Angeles Integrated Regional Water Management was awarded $25.6 million for twelve water projects, one of which is the Central Los Angeles County Regional Water Recycling Program, a plan involving the Los Angeles Department of Water & Power, the Foothill Municipal Water District, Pasadena Water & Power and Glendale Water & Power, according to the IRWMP grant application. The plan is to support a regional expansion of recycled water to be supplied by the LA-Glendale Water Reclamation plan to replace potable water consumption. The plan is also studying the feasibility of spreading recycled water in the Eaton Canyon spreading basins for groundwater recharge. The map for the Groundwater Replenishment Facilities Planning Study in the IRWMP grant application includes the Arroyo Seco spreading grounds in Hahamongna as well. (This may be the same project described in the Pasadena Water Integrated Resources Plan.)

All of the above suggests big changes ahead for Hahamongna. The environmental impacts of all these upcoming projects should be considered when the impacts of the DPW sediment removal project are considered. If they are not, the total impacts will not be known nor will they be properly mitigated.

The other issue of concern is somewhat unique to Hahamongna. It will not be found on any standard CEQA checklist but is nevertheless critical to the future of the park. For over twenty-five years the community has resisted further development and worked steadfastly to keep the park as natural as possible. There is concern, however, that the tragedy of the Station Fire may be compounded by a sediment removal plan with haul routes within the park which would allow for the future roads and expanded development the community has opposed for so long.

The following is a brief summary of the development proposals for the west side of the park beginning in the late 1980s, both those of the City of Pasadena and others, which show the enormous pressure the park has been under.

Pasadena decided in the early 1990s to take out the east side Jet Propulsion Lab (JPL) parking lot and replace it with water spreading basins. A parking garage was to be built in the park to house the displaced cars, thus generating revenue from increased water percolation while still retaining the JPL parking revenues. One of the locations proposed for this garage as early as 1992 was the JPL West Arroyo parking lot, carved out of open space as a temporary parking lot in 1986. In the 2002 Hahamongna Watershed Park Master Plan, park user access to this garage was proposed via a new road to be built across the Annex property. According to city documents, as many as 600 cars were projected to pass through the park to access the garage on weekends. One consultant even suggested that revenue could be generated by using this parking garage for off-site parking for the Rose Bowl.

But to return to 1986 – it was actually two west Hahamongna open space parcels, including one on the Hahamongna Annex (the 30 acres which Pasadena purchased from the Metropolitan Water District(MWD) in 2005), which were rezoned so that the JPL West Arroyo parking lot could be created. These two open space parcels became Planned Development-16. Although the Annex parcel was never used for JPL parking, it still to this day retains the PD zoning. The strange result is that part of the Annex, protected in perpetuity by an open space easement, is zoned for a planned development!

In 2007, JPL received notification from Pasadena that in 2013 the spreading basin project would begin and JPL would have to vacate the east parking lot as of spring 2013. Where those 1200 cars would park in the future and how that would impact Hahamongna became questions of more than academic interest. As of today, JPL is planning to build a parking garage on its own campus although the funding has not yet been approved by the federal government. Until this funding is secured, the issue of JPL parking will continue to impact the park.

Over the years, various developments have been proposed for the park in addition to the parking garage. In 1988, William H. Pickering, a former JPL Director, sent a letter to the City expressing interest in building a Hall of Science in Oak Grove Park. In 1991, a Devil's Gate draft park plan map shows a general science museum located immediately to the east of the Annex property with a large parking lot just to the north. A year later, a Pasadena staff report mentions the south knoll near the Equestrian Staging Area as a possible location for a science museum. In 1993 Pasadena staff submitted to the City Council a proposal to bring the Southwest Museum to Hahamongna. This was an ambitious project which would have changed the nature of the park forever – an influx of 300,000 visitors was projected!

Five year later, in 1998, Pasadena approached MWD expressing interest in purchasing the Annex property where Los Angeles County Fire, the U.S. Forest Service, Rose Bowl Riders and Tom Sawyer Camps had been located for many years. At the time MWD was not ready to sell but proposed instead a low cost long-term lease. For over 5 years the lease negotiations dragged on without success. MWD wanted to retain the existing tenants while Pasadena wanted a lease which would give them the ability to substitute users and change the intensity of land uses on the property in the future. Foothill Municipal Water District also wanted to retain part of the property for a water storage tank which further complicated the lease negotiations.

In 2005 MWD's Board of Directors reversed course. They decided the property was no longer needed for any water purpose and could be sold. Pasadena then purchased the property and began the Annex planning process which resulted in the reappearance of the road to the west JPL parking lot, a critical component of earlier development proposals.

Pasadena was not the only entity still interested in developing the Annex, however. In 2001, JPL met with MWD staff and set forth a plan for a science museum and a parking garage on what is now the Annex property. The JPL Master Plan, released in 2003, identified the Annex property as having acquisition potential for Laboratory expansion. There was interest from the private sector as well. In 2003, when word got out that the Forest Service was not interested in renewing their lease, a real estate broker contacted MWD about putting an office park on the Annex. About the same time, another broker offered his services to find what he considered a suitable tenant for the property such as a private school campus.

Throughout the years, despite this enormous development pressure, the community remained steadfast in its commitment to a natural, rustic Hahamongna, attending hundreds of meetings over the years. The equestrian community was particularly active, concerned that the plan was eventually to move Rose Bowl Riders, Tom Sawyer Camps and MACH 1 off the Annex and out of the Arroyo in favor of higher intensity uses which would generate more revenue.

The community was so concerned about Hahamongna and the rest of the Arroyo that, in 2003, over 600 comments were sent in concerning the Arroyo Seco Master Environmental Impact Report. In response to those comments, Pasadena removed the parking garage and the road through the Annex from the Hahamongna Watershed Park Master Plan.

The specter of the road reappeared once again, however, after Pasadena purchased the Annex from MWD and began planning for the use of the property. A long, complicated planning process took place which involved options including a road and a "trail corridor" wide enough to become a road at some future date. There was community protest led by the Friends of Hahamongna demanding that the road be removed once and for all. The Planning Commission, the Design Commission, the Hahamongna Advisory Committee, and the City Council heard the community loud and clear. The Council issued a set of Guidelines for Staff which directed staff to prepare "a design for a 10 foot wide (maximum) bikeway along the northern perimeter of the HWP Annex with a design... that does not lend itself to becoming a road..." Has the road finally been laid to rest? There are a few worrisome signs that this may not be the case, however, as planning for the park moves forward.

All those who have worked to protect Hahamongna from development over the past twenty-five years look to the County of Los Angeles to design a sediment removal project which will accomplish its objectives without facilitating more intensive development of the park. The community looks to the County because, despite all of Pasadena's master planning and all the community input over all these years, development plans for Hahamongna never seem to be beaten down for good.

Thank you for the opportunity to comment.

Sincerely,

Mary E. Barrie

Cc: Edel Vizcarra, Planning Deputy for Supervisor Mike Antonovich
Chris Stone, Assistant Deputy Director, LA County Department of Public Works
Dan Sharp, Sediment Management Strategic Plan Manager, LA County DPW
Keith Lilley, Principal Engineer, LA County DPW, Water Resources Division
Christle Balvin, Urbanwild Network

METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA HAS NO EXISTING FACILITIES OR RIGHTS OF WITHIN THE LIMITS OF THE PROJECT.
10/10/2011
JOB NO.: 201101003

NOTICE OF PREPARATION

TO: Agencies, Organizations and Interested Parties

SUBJECT: Notice of Preparation of a Draft Environmental Impact Report in Compliance with Title 14, Section 15082(a), 15103, and 15375 of the California Code of Regulations

The Los Angeles County Flood Control District (LACFCD) is the Lead Agency under the California Environmental Quality Act (CEQA) in the preparation of the Environmental Impact Report (EIR) for the project identified below. The Lead Agency has prepared this Notice of Preparation (NOP) for the EIR in order to provide the widest exposure and opportunity for input from public agencies, stakeholders, organizations, and individuals on the scope of the environmental analysis addressing the potential effects of the proposed project.

PROJECT TITLE: Devil's Gate Reservoir Sediment Removal and Management Project

AGENCIES: LACFCD requests your agency's views on the scope and content of the environmental information relevant to your agency's statutory responsibilities in connection with the proposed project, in accordance with California Code of Regulations, Title 14, Section 15082(b).

ORGANIZATIONS AND INTERESTED PARTIES: LACFCD requests your input on which environmental issues associated with the proposed project which merit further analysis in the EIR.

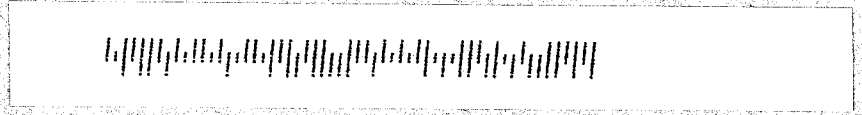
PROJECT LOCATION: The Devil's Gate Reservoir Sediment Removal and Management Project is located in the City of Pasadena, in Los Angeles County approximately 14 miles north of downtown Los Angeles (see Figure 1, Project Vicinity Map and Figure 2, Project Boundary Map).

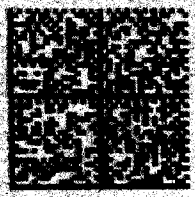
PROJECT DESCRIPTION: The proposed project would remove up to 4.0 million cubic yards of sediment from the reservoir behind Devil's Gate Dam to restore it to its current design standard, and establish a reservoir configuration more suitable for routine maintenance activities including sediment management. Although approximately 2.6 million cubic yards of sediment is the current excess amount of sediment in the reservoir, additional sediment accumulation is anticipated during the upcoming storm seasons due to the burned condition of the watershed that will have to be removed. The ultimate reservoir configuration and volume of sediment to be removed will be determined based on locations of access roads; areas for preservation or restoration of native vegetation; and the amount and location of sediment inflow that occur during the upcoming storm seasons.

Over the years, as storm events deposited sediment in the reservoir, native and non-native vegetation established itself in the sediment deposits. During storm events following the Station Fire, a large portion of the reservoir vegetation was buried in sediment; however significant amounts of vegetation, including numerous mature willow trees remain present. In order to remove the sediment from the reservoir, vegetation growing within excavation areas will require removal. The sediment and organic materials will be trucked off-site via local roads accessing the 210 Freeway and then taken to sites that are already prepared and designated to accept such material without additional construction or vegetation and habitat removal.

The goal of this project is to return adequate flood control capacity to the facility and establish a reservoir configuration more suitable to Los Angeles County Department of Public Works' routine maintenance activities. Primary project objectives include:

- Reducing flood risk to the communities downstream of the reservoir adjacent to the Arroyo Seco by restoring reservoir capacity for flood control and future sediment inflow events;





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Devils Gate

MWD
METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA
Box 54153, Los Angeles, California 90054-0153

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L.A. County Dept. of Public Works
Attn: (Water Resources Div.) 162
P.O. Box 1460
Alhambra, CA 91802-9974

Form 136 3/94

Comments on Devil's Gate Reservoir Sediment Removal and Management Project
Sediment Removal and Habitat Enhancement Concepts Mickey Long

November 9, 2011

Watershed is much more than water and sediment. Therefore a Watershed Management program must include all functioning parts of the watershed ecosystem, including, but not limited to vegetation, wildlife and phenology (timing of ecosystem functions, such as flowering, bird nesting seasons, etc.) into sustainable planning for the watershed.

Therefore a County Watershed Management Division must broaden its thinking, planning and actions to encompass this Holistic approach to this Watershed Management mission.

County Public Works has applied Physical and Engineering management into its work in the past, with obvious success in terms of flood control, sediment capture and ground water recharge. It is critical that the County planning process incorporates all aspects of Biological resource management into the plans to make the mission complete. This would be Ecological Engineering, or "Eco-engineering".

At Hahamongna the following concepts should be recognized and included in any sediment removal and overall maintenance plan.

1. One stated goal in the Devil's Gate Reservoir Sediment Removal and Management Project is "Supporting sustainability by establishing a reservoir configuration more suitable for routine maintenance activities including sediment management."

2. The Devil's Gate Dam interrupted natural processes and those processes of water flow and sediment movement downstream along with vegetation dynamics (establishment and re-establishment of riparian vegetation) need to be restored by reincorporating these functions into the management plan. Holistic, ecosystem planning must be incorporated into the project process in order to have real sustainability.

3. Incorporate natural areas and native vegetation and functioning ecosystems into all flood and sediment planning. Integrate wildlife habitat into the Hahamongna Basin plan. The southern and central portion, behind the dam, floods most often and forms a lake, and is utilized as a buffer pool for sediment dropout to protect the dam valve. Treat that feature and surrounding area as a wildlife lake-reservoir, not just a flood reservoir. Design sediment removal to create such a lake with irregular, meandering shorelines, peninsulas and stands of willows along the shore. Maintain a wide buffer perimeter of riparian woodland around the central pool, not disturbed by periodic debris removal. Conceptual drawing attached as Page 3.

4. Strongly consider a meandering stream course created by sediment removal in more linear fashion above the reservoir/lake. Not all the sediment needs removal in the upper basin and can be left as terraces to the sides of a more natural stream channel or braided stream to recover naturally or be restored to riparian and alluvial scrub vegetation.

5. All sediment removal or construction work in and near riparian stands and other vegetation must, by law (California State Code 3503 and Federal Migratory Bird Treaty Act), avoid the bird nesting season. California Department of Fish and Game provides guidelines.

6. The losses of native riparian stands during sediment removal mitigated and restoration should be at ratio of at least 2 to 1. Agency consultation and input needed (U.S. Fish and Wildlife, Department of Fish and Game).

7. There are stands of emergent native wetland vegetation, cattails and bulrush, surrounding seasonal pools in the southwestern end of the basin near the dam. Impacts could occur to waters of the U.S., including wetlands, as a result of sediment removal in this area.

8. There remain stands of rare Alluvial Sage Scrub in the northern portion of the basin, and the recent sediment deposition does not destroy this community. Indeed, the plant community and the ecosystem it supports rests upon layers of alluvium deposited over millennia. This dynamic community depends on sediment movement and flooding to rejuvenate the vegetation. Terraces and banks supporting current and naturally re-establishing Alluvial Sage Scrub should be allowed to remain intact.

9. As briefly shown in the County slide presentation, the entire Hahamongna basin has high value on a daily basis as a passive recreation area, supporting hiking, horseback riding, nature study, birding, plant study, photography. This all should be an integrated component of the watershed management plan. Maintain or create new access points to the riparian woodlands and lake for the passive, low impact uses such as hiking, birding, and nature study.

Wildlife Lake-Reservoir design concept

Michael Long
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Temple City, CA 91780
mlongbird@gmail.com

Public Comments – Devil's Gate Reservoir Sediment Removal Project and Management Project

Commenter: Mitzi Shpak, 2062 Lewis Ave., Altadena, CA 91001
Contact Info: email – msmshpak@gmail.com mshpak@caltech.edu
Phone – 626-825-9795

COMMENTS

- Project description is over-limited, truncated, and misleading and does not reflect the true scope of total actions necessary to maintain and manage this reservoir and does not address the larger issue of Best Management Practices (BMP) for flood control using the knowledge base that exists in 2011, watershed management according to the 2008 Strategic Plan of the Los Angeles County Department of Public Works, and reduction of Green House Gas (GHG) emissions as mandated by the State of California in AB 32. Any significant action taken in any part of the Los Angeles Drainage Basin affects the basin as a whole and **this EIR must encompass the sediment management plan for the entire watershed. At the very least it must include the currently proposed projects for Devil's Gate (4.0 million cu.yds.), Big Tujunga (4.4 million cu.yds.), Cogswell (3.31 million cu.yds.) Morris (unstated amount), and Pacoima (2.424 million cu.yds.) (a total of 14-17 million cu.yds.) that are scheduled to be removed in the near future---a million and a half truck trips---this constitutes a major environmental impact to the region and must be considered as a single project under CEQA.**
    - The California courts have consistently stated: "Only through an accurate view of the project may affected outsiders and public decision-makers balance the proposal's benefit against its environmental cost, consider mitigation measures, assess the advantage of terminating the proposal…and weigh other alternatives in the balance"[1, 2]
    - The courts have repeatedly observed: "A narrow view of a project could result in the fallacy of division, that is, overlooking its **cumulative impact** by separately focusing on isolated parts of the whole.[3]
    - The 14 dams and 162 debris basins of the Los Angeles Flood control District were designed and built prior to NEPA and CEQA and an overall plan for their management has never been vetted through either the NEPA or CEQA process.
    - Neither the LACDPW's Strategic Plan nor the Los Angeles River Master Plan address (or even mention) the Arroyo Seco which feeds directly into the Los Angeles River.
    - LACDPW is currently in the process of developing an Integrated Regional Water Management Plan (IRWMP). The management of the Devil's Gate Reservoir should be informed by this IRWMP and the entire dam and debris basin system should be included in a comprehensive EIR that addresses sediment removal/management as a holistic

system as informed by the USEPA's memorandum and documents on Achieving Water Quality Through Integrated Municipal Stormwater and Wastewater Plans.[4]

- To effectively implement CEQA, NEPA and the USEPA's guidelines for IRWMP it is required that a comprehensive study of the larger environmental impact of continuing the current piecemeal, 'putting out fires', approach to stormwater and sediment management be conducted and as part of this comprehensive study, alternative, currently feasible, management practices be studied and compared.
    - There are 14 dams and 162 debris basins in the flood control district. In the next 20 years it is estimated that 82+ million cubic yards of sediment will need to be removed at a cost of $3-5 billion (($30-$60/cu. Yd.) (Arroyo Seco Foundation) .
- The sediment removal should use feasible, alternative technology wherever possible to mitigate human health risks from truck and equipment emissions[6], noise[5], traffic, dust, and other harmful outcomes. This should not be limited to mechanical and equipment considerations, but should include all 'least harmful' alternatives to sediment removal.
    - More than 30 human epidemiological studies have found that diesel exhaust increases cancer risks, and a 2000 California study found that diesel exhaust is responsible for 70 percent of the cancer risk from air pollution.[6] More recent studies have linked diesel exhaust with asthma.[7] Major air pollutants from diesel engines that can affect human health include particulate matter (PM), volatile organic compounds (VOCs), nitrogen oxides (NOx), and sulfur oxides (SOx).
    - The health effects of pollution from diesel exhaust may include asthma, other respiratory diseases, cardiovascular disease, lung cancer, and premature death. In children, these pollutants have been linked with asthma and bronchitis, and high levels of the pollutants have been associated with increases in school absenteeism and emergency room visits. In fact, numerous studies have shown that children living near busy diesel trucking routes are more likely to suffer from decreased lung function, wheezing, bronchitis, and allergies.[8,9,10]
    - A new study has linked pm 2.5 with obesity[11].
    - A new study has linked pm 2.5 with diabetes type II[12].
    - The cumulative impacts from the increased risk and adverse health impacts must be assessed for the region since increased emissions, traffic, noise and dust will affect the entire transportation corridor as well as the air basin as a whole, which already has the worst air pollution in the nation. The AQMD's current assessment of carcinogenic risk in the immediate area of the project is 508 per million[13] –a significant level of risk. Any additional pollution burden may increase that risk exponentially since air pollution levels are already high in this basin and the project is adjacent to is a major transportation corridor. A baseline study is required to assess current levels of emissions, noise, traffic, dust, etc. and to locate sensitive receptors[14] adjacent to the project and the entire truck route. Trucks should not operate during school hours.
    - Feasible alternative technology exists in the form of CNG (compressed natural gas) trucks and earth moving equipment. This equipment exists and is currently in operation at the Los Angeles International Airport (LAX) and the Port of Los Angeles (POLA). This

equipment was mandated by the LAX Community Benefits Agreement[15] for the expansion of LAX as well as the Clean Trucks Program and Memorandum of Understanding for the TraPac Expansion at POLA. POLA has already met 70% of its emissions goals for 2020 since implementation. As the LAX expansion project nears completion a significant amount of this equipment will become available. This equipment is fiscally advantageous with the fuel averaging $1.00/gal.

- A "No Idling" rule should be adopted[16]. Idling diesel fuelled vehicles emit higher concentrations of soot and fine particulate matter than when moving.

- Increased Greenhouse Gas (GHG) emissions must be taken into account when considering the environmental impact of this project[1,2,17].
- In considering the environmental setting of the project—it being immediately adjacent to the I-210 , which is also integral to the transporting of the sediment, the impact of increased traffic congestion on the I-210 must be assessed and mitigated. Caltrans spent $16.4 million on their recent FOOTHILL FREEWAY (I-210) CONGESTION RELIEF PROJECT to reduce traffic congestion between the Glendale freeway and the San Bernardino County line[18]. The sediment removal project would significantly increase large truck traffic in this same corridor, which is part of the busiest freeway system in the nation. In addition to increasing commute times and slowing goods movement, traffic congestion greatly increases the pollutants produced (stop-and-go, idling) and increases their concentration in the area where traffic is slowed.
    - Traffic congestion has a number of negative effects:
        - Wasted fuel increasing air pollution and carbon dioxide emissions owing to increased idling, acceleration and braking.
        - Wear and tear on vehicles as a result of idling in traffic and frequent acceleration and braking, leading to more frequent repairs and replacements.
        - Stressed and frustrated motorists, encouraging road rage and reduced health of motorists
        - Emergencies: blocked traffic may interfere with the passage of emergency vehicles traveling to their destinations where they are urgently needed.
        - Spillover effect from congested main arteries to secondary roads and side streets as alternative routes are attempted ('rat running'), which may affect neighborhood amenity and real estate prices
        - Wasting time of motorists and passengers ("opportunity cost"). As a non-productive activity for most people, congestion reduces regional economic health.
        - Delays, which may result in late arrival for employment, meetings, and education, resulting in lost business, disciplinary action or other personal losses.
        - Inability to forecast travel time accurately, leading to drivers allocating more time to travel "just in case", and less time on productive activities.
        - Inability to forecast travel time accurately, leading to drivers allocating more time to travel "just in case", and less time on productive activities.

- Sediment should be tested for pollutants (esp. fire retardants and supressants from the Station Fire and perchlorate from JPL) and results should be considered before placing sediment over another aquifer. The US Forest Service is currently producing a PEIR regarding the use of fire retardants and the harm they do to the environment[19] , esp. waterways. Sediment should also be tested for soil nutrients---if found to be free of chemical contaminants, sediment can be used to replenish soil fertility in farmland, landscapes, and gardens.

[1] *See* USEPA, State Inventory Guidance, at *http://www.epa.gov/climatechange/emissions/state_guidance.html* (describing various resources for estimating GHG emissions); *see also Planning and Conservation League v. Dept of Water Resources*, 83 Cal. App. 4th 892, 919 (200) ("CEQA does compel reasonable forecasting"). Compliance demonstrations for the Clean Air Act are based largely on emissions budgets that state and local agencies develop by predicting the likely emissions from individual projects. *See* 42 U.S.C. 7502(c)(4).

[2] Compare 14 Cal. Code Regs. Par. 15144-45 (stating that agencies need not "foresee the unforeseeable or address matters "too speculative for evaluation"). As described in detail in the numerous reports cited herein, the connection between GHG emissions and climate change are no longer unforeseeable or speculative.

[3] *See* San Luis Obispo County Air pollution Control District, *supra* note 152: SOLANO TRANSPORTATION AUTH. ET AL., *supra* note 152.

[4] http://cfpub.epa.gov/npdes/integratedplans.cfm

[5] World Health Organization (WHO), Guidelines for Community Noise, *http://www.who.int/docstore/peh/noise/guidelines2.html*

[6] California Air Resources Board, *Diesel Risk Reduction Plan*, October 2000.

[7] RJ Pandya, GM Solomon, A Kinner, JR Balmes, "Diesel exhaust and asthma: Hypotheses and molecular mechanisms of action," *Environmental Health Perspectives*, Vol. 110, Supplement 1 (2002):103-112.

[8]. B Brunekreef, NA Janssen, J de Hartog, H Haressema, M Knape, P van Vliet, "Air pollution from truck traffic and lung function in children living near motorways," *Epidemiology*, Vol. 8 (1997): 298-303.

[9] G Ciccone, F Fostastiere, N Agabati, A Biggeri, L Bisanti, E Chellini, "Road traffic and adverse respiratory effects in children," *Occupational and Environmental Medicine*, Vol. 55 (1998): 771-778.

[10] H Duhme, SK Weiland, U Keil, B Kraemer, M Schmid, M Stender, L Chambless, "The association between self-reported symptoms of asthma and allergic rhinitis and self-reported traffic density on street of residence in adolescents," *Epidemiology*, Vol. 7 (1996): 578-[11]

[11] X Xioahua, Y Zubin, "Effect of Early Particulate Air Pollution Exposure On Obesity in Mice", *Arteriosclerosis, Thrombosis, and Vascular Biology.* 2010; 30: 2518-2527.

[12] JF Pearson, C Bachireddy, "Association between Fine Particulate Matter and Diabetes Prevalence in the US", *Diabetes Care* 33:2196–2201, 2010

[13] SCAQMD, Multiple Air Toxics Exposure Study III, Model Estimated Carcinogenic Risk, interactive map, http://www2.aqmd.gov/webappl/matesiii/

[14] Potential Health Effects Related to Traffic Emissions, https://www.aqmd.gov/ej/school_traffic_advisory.htm ; Air Pollution from Nearby Traffic and Children's Health: Information for Schools http://www.oehha.ca.gov/public_info/facts/pdf/Factsheetschools.pdf .

[15] http://communitybenefits.org/downloads/LAX%20Community%20Benefits%20Agreement.pdf

[16] SCAQMD, "Health Risk Assessment Guidance for Analyzing Cancer Risks from Mobile Source Diesel Idling Emissions for CEQA Air Quality Analysis", http://www.aqmd.gov/ceqa/handbook/mobile_toxic/mobile_toxic.html .

[17] http://ag.ca.gov/globalwarming/pdf/Port_of_Los_Angeles_Agreement.pdf

[18] Caltrans, http://www.dot.ca.gov/dist07/sync/cpimages/file/fact%20sheet(1).pdf .

[19] US Forest Service, http://www.fs.fed.us/news/2011/releases/05/fire-retardant.shtml . "In July 2010, a U.S. District Court in Montana directed the Forest Service to develop the environmental impact statement after an organization sued the agency claiming that fire retardant drops were harming waterways."

NATIVE AMERICAN HERITAGE COMMISSION
915 CAPITOL MALL, ROOM 364
SACRAMENTO, CA 95814
(916) 653-6251
Fax (916) 657-5390
Web Site www.nahc.ca.gov
ds_nahc@pacbell.net

October 5, 2011

Mr. Ryan Butler, Project Planner
Los Angeles County Flood Control District
P.O. Box 1460
Alhambra, CA 91802-9947

Re: SCH#2011091084; CEQA Notice of Preparation (NOP); draft Environmental Impact Report (DEIR) for the **"Devil's Gate Reservoir Sediment Removal and Management Project;"** located in the Pasadena area; Los Angeles County, California

Dear Mr. Butler:

The Native American Heritage Commission (NAHC), the State of California 'Trustee Agency' for the protection and preservation of Native American cultural resources pursuant to California Public Resources Code §21070 and affirmed by the Third Appellate Court in the case of EPIC v. Johnson (1985: 170 Cal App. 3rd 604). The court held that the NAHC has jurisdiction and special expertise, as a state agency, over affected Native American resources, impacted by proposed projects including archaeological, places of religious significance to Native Americans and burial sites. The NAHC wishes to comment on the proposed project.

This letter includes state and federal statutes relating to Native American historic properties of religious and cultural significance to American Indian tribes and interested Native American individuals as 'consulting parties' under both state and federal law. State law also addresses the freedom of Native American Religious Expression in Public Resources Code §5097.9.

The California Environmental Quality Act (CEQA – CA Public Resources Code 21000-21177, amendments effective 3/18/2010) requires that any project that causes a substantial adverse change in the significance of an historical resource, that includes archaeological resources, is a 'significant effect' requiring the preparation of an Environmental Impact Report (EIR) per the CEQA Guidelines defines a significant impact on the environment as 'a substantial, or potentially substantial, adverse change in any of physical conditions within an area affected by the proposed project, including ...objects of historic or aesthetic significance." In order to comply with this provision, the lead agency is required to assess whether the project will have an adverse impact on these resources within the 'area of potential effect (APE), and if so, to mitigate that effect. The NAHC Sacred Lands File (SLF) search resulted as follows: **Native American cultural resources were not identified** within the USGS coordinates identified. However, the absence of archaeological resources does not preclude their existence.

The NAHC "Sacred Sites,' as defined by the Native American Heritage Commission and the California Legislature in California Public Resources Code §§5097.94(a) and 5097.96. Items in the NAHC Sacred Lands Inventory are confidential and exempt from the Public Records Act pursuant to California Government Code §6254 (r).

Early consultation with Native American tribes in your area is the best way to avoid unanticipated discoveries of cultural resources or burial sites once a project is underway. Culturally affiliated tribes and individuals may have knowledge of the religious and cultural significance of the historic properties in the project area (e.g. APE). We strongly urge that you make contact with the list of Native American Contacts on the attached list of Native American contacts, to see if your proposed project might impact Native American cultural resources and to obtain their recommendations concerning the proposed project. Special reference is made to the *Tribal Consultation* requirements of the California 2006 Senate Bill 1059: enabling legislation to the federal Energy Policy Act of 2005 (P.L. 109-58), mandates consultation with Native American tribes (both federally recognized and non federally recognized) where electrically transmission lines are proposed. This is codified in the California Public Resources Code, Chapter 4.3 and §25330 to Division 15.

Furthermore, pursuant to CA Public Resources Code § 5097.95, the NAHC requests that the Native American consulting parties be provided pertinent project information. Consultation with Native American communities is also a matter of environmental justice as defined by California Government Code §65040.12(e). Pursuant to CA Public Resources Code §5097.95, the NAHC requests that pertinent project information be provided consulting tribal parties. The NAHC recommends *avoidance* as defined by CEQA Guidelines §15370(a) to pursuing a project that would damage or destroy Native American cultural resources and Section 2183.2 that requires documentation, data recovery of cultural resources.

Consultation with tribes and interested Native American consulting parties, on the NAHC list, should be conducted in compliance with the requirements of federal NEPA and Section 106 and 4(f) of federal NHPA (16 U.S.C. 470 *et seq*), 36 CFR Part 800.3 (f) (2) & .5, the President's Council on Environmental Quality (CSQ, 42 U.S.C 4371 *et seq.* and NAGPRA (25 U.S.C. 3001-3013) as appropriate. The 1992 *Secretary of the Interiors Standards for the Treatment of Historic Properties* were revised so that they could be applied to all historic resource types included in the National Register of Historic Places and including cultural landscapes. Also, federal Executive Orders Nos. 11593 (preservation of cultural environment), 13175 (coordination & consultation) and 13007 (Sacred Sites) are helpful, supportive guides for Section 106 consultation. The aforementioned Secretary of the Interior's *Standards* include recommendations for all 'lead agencies' to consider the historic context of proposed projects and to "research" the cultural landscape that might include the 'area of potential effect.'

Confidentiality of "historic properties of religious and cultural significance" should also be considered as protected by California Government Code §6254(r) and may also be protected under Section 304 of he NHPA or at the Secretary of the Interior discretion if not eligible for listing on the National Register of Historic Places. The Secretary may also be advised by the federal Indian Religious Freedom Act (cf. 42 U.S.C., 1996) in issuing a decision on whether or not to disclose items of religious and/or cultural significance identified in or near the APEs and possibility threatened by proposed project activity.

Furthermore, Public Resources Code Section 5097.98, California Government Code §27491 and Health & Safety Code Section 7050.5 provide for provisions for accidentally discovered archeological resources during construction and mandate the processes to be followed in the event of an accidental discovery of any human remains in a project location other than a 'dedicated cemetery'.

To be effective, consultation on specific projects must be the result of an ongoing relationship between Native American tribes and lead agencies, project proponents and their contractors, in the opinion of the NAHC. Regarding tribal consultation, a relationship built around regular meetings and informal involvement with local tribes will lead to more qualitative consultation tribal input on specific projects.

If you have any questions about this response to your request, please do not hesitate to contact me at (916) 653-6251.

Sincerely,

Dave Singleton
Program Analyst

Cc: State Clearinghouse

Attachment: Native American Contact List

Native American Contacts
Los Angeles County
October 5, 2011

LA City/County Native American Indian Comm
Ron Andrade, Director
3175 West 6th St, Rm. 403
Los Angeles , CA 90020
randrade@css.lacounty.gov
(213) 351-5324
(213) 386-3995 FAX

Gabrielino Tongva Nation
Sam Dunlap, Chairperson
P.O. Box 86908 Gabrielino Tongva
Los Angeles , CA 90086
samdunlap@earthlink.net

(909) 262-9351 - cell

Ti'At Society/Inter-Tribal Council of Pimu
Cindi M. Alvitre, Chairwoman-Manisar
3098 Mace Avenue, Aapt. D Gabrielino
Costa Mesa, , CA 92626
calvitre@yahoo.com
(714) 504-2468 Cell

Gabrielino Tongva Indians of California Tribal Council
Robert F. Dorame, Tribal Chair/Cultural Resources
P.O. Box 490 Gabrielino Tongva
Bellflower , CA 90707
gtongva@verizon.net
562-761-6417 - voice
562-761-6417- fax

Tongva Ancestral Territorial Tribal Nation
John Tommy Rosas, Tribal Admin.
Private Address Gabrielino Tongva
,
tattnlaw@gmail.com
310-570-6567

Gabrielino-Tongva Tribe
Bernie Acuna
1875 Century Pk East #1500 Gabrielino
Los Angeles , CA 90067
(619) 294-6660-work
(310) 428-5690 - cell
(310) 587-0170 - FAX
bacuna1@gabrieinotribe.org

Gabrieleno/Tongva San Gabriel Band of Mission
Anthony Morales, Chairperson
PO Box 693 Gabrielino Tongva
San Gabriel , CA 91778
GTTribalcouncil@aol.com
(626) 286-1632
(626) 286-1758 - Home
(626) 286-1262 -FAX

Gabrielino-Tongva Tribe
Linda Candelaria, Chairwoman
1875 Century Park East, Suite 1500
Los Angeles , CA 90067 Gabrielino
lcandelaria1@gabrielinoTribe.org
626-676-1184- cell
(310) 587-0170 - FAX
760-904-6533-home

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of the statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list is applicable for contacting local Native Americans with regard to cultural resources for the proposed SCH#2011091084; CEQA Notice of Preparation (NOP); draft Environmental Impact Report (DEIR) for the Devil's Gate Reservoir Sediment Removal and Management Project; Los Angeles County Flood Control District; Los Angeles County, California.

Native American Contacts
Los Angeles County
October 5, 2011

Gabrieleno Band of Mission Indians
Andrew Salas, Chairperson
P.O. Box 393
Covina , CA 91723
(626) 926-4131
gabrielenoindians@yahoo.com

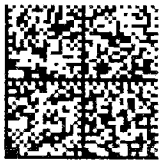
Gabirelino Tongva

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of the statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list is applicable for contacting local Native Americans with regard to cultural resources for the proposed SCH#2011091084; CEQA Notice of Preparation (NOP); draft Environmental Impact Report (DEIR) for the Devil's Gate Reservoir Sediment Removal and Management Project; Los Angeles County Flood Control District; Los Angeles County, California.

State of California
Native American Heritage Commission
915 Capitol Mall, Room 364
Sacramento, CA 95814



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MAILED FROM ZIP CODE 95814

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From: Neal Turner [njjturner@yahoo.com]
Sent: Monday, November 07, 2011 4:58 PM
To: reservoircleanouts
Subject: Devil's Gate Reservoir Sediment Removal and Management Plan

Categories: Scoping Comments

Dear LA County Department of Public Works,

I wish to comment on the County's plan to remove up to four million cubic yards of sediment from behind Devil's Gate Dam in Hahamongna Watershed Park.

As described in the County's Initial Report, the basin would become a wasteland of bare rock and dirt, with few of the trees and shrubs that make the park worth visiting and attract the migratory birds that nest there. The enormous number of truck trips needed would make life unpleasant for nearby residents through noise, fumes and dust, six days a week over a span of about five years.

I urge you to develop a long-term plan that leaves most of the vegetation in place and keeps future alterations gradual, consistent with the park's multiple roles as debris control basin, river channel, nesting site and neighborhood park.

Yours sincerely,
-Neal Turner, 380 South Mentor Ave #3, Pasadena 91106, 626/793-8897.

From: Lilley, Keith
Sent: Wednesday, November 09, 2011 7:16 AM
To: Butler, Ryan
Subject: FW: HAHAMONGA SEDIMENT REMOVAL PROJECT & FUTURE...

Categories: Scoping Comments

Please add to the official comments

From: ninarose mayer [mailto:lifelongwalker@dslextreme.com]
Sent: Wednesday, November 09, 2011 7:14 AM
To: Lilley, Keith
Subject: rE: HAHAMONGA SEDIMENT REMOVAL PROJECT & FUTURE...

As a regular dog walker at the Devil's Gate Dam area, I am quite familiar with what's happening. So far I like the manner of sediment removal & placing it in "bowl" of Johnson's Rock to dry out. Then trucking it elsewhere.at a later date..

What I do NOT WANT to see happen is removal of trees in the stream bed North of the dam. The vegetation in that region is vital & serves extremely important uses to the animal life in region, be it bob cat, mountain lion (occasionally), coyote, birds, & humans.....

And I do not want to have more frisbee toss games in the stream bed region below Oak Grove Park. From my view, there are sufficient spots now in Oak Grove area for players to use. I've seen & watched them play over time....

These are just my thoughts on the issues due you by Nov. 11th., I am a 50 yr. resident/home owner in Altadena, and know this region well.

Ninarose Mayer
Altadena, Calif.

NORMAN H. BROOKS, Ph.D.
Civil Engineer
2521 N. Santa Anita Avenue
Altadena, California 91001
Tel: 626-798-5590 E-mail: normanbrooks@earthlink.net

TO: Los Angeles County Flood Control District
Attn.: Water Resources Division -- Reservoir Cleanouts

SUBJECT: **Devil's Gate Reservoir Sediment Removal and Management Project - Comments**

I appreciate the opportunity to submit some questions and comments for the abovementioned project. I was not able to attend either of the scoping meetings, but I did access internet postings regarding them. I have also downloaded and reviewed "Initial Study, Devil's Gate Reservoir Sediment Removal and Management Project ", prepared by Chambers Group, Sept. 2011.

My questions and comments should be taken as preliminary, because they might change as more information becomes available to me during the EIR process.

Introduction

I concur that there must be a program of sediment removal due to the inevitable geologic processes of erosion of the mountains, and the human occupancy of the adjacent alluvial fans. Managing the sediment yield has become a major problem for long-term sustainability of developments along the foothills of Southern California mountains; but at the same time many beaches and shorelines are suffering erosion from lack of sediment outflow from rivers.

At present I see no better way for removal of the sediments and organic debris than by trucking. For Devil's Gate Reservoir the volume of sediments to be trucked through the surrounding community is very large, with quantities of up to 4,000,000 cubic yards being proposed by the Los Angeles County Flood Control District for this Environmental Impact Report.

Questions and Comments

1. Explain the technical bases for the project goal of providing capacity for two DDE's (Debris Design Events), with more facts and figures relative to the Arroyo Seco watershed. Is there public access to the LA County DPW "Hydrology and Sedimentation Manuals", referred to on p. 7 of "Initial Study"? If not, can they be made available for review by interested individuals?

2. Why hasn't the project goal of two DDE's been adjusted to account for the large fire and post-fire flood and erosion events which have occurred recently? Another major fire cannot occur until there is regrowth of significant fuel, taking 20 years or more. And at five years or so after a fire, the erodability of the natural watershed drops several fold to near non-fire normal. The use of two DDE's instead of only one results in an increase of 2,000,000 cubic yards to be removed.

3. Please provide the maximum discharge and hydrograph(s) for the 50-year design flood used for this project. Also of interest would be the historical flood frequency data/graphs for the Arroyo Seco.

4. The EIR needs to deal with the rationale for the design criteria for both sediment volumes and predicted flood control benefits, rather than presenting project objectives as firmly fixed.

5. Present a clearer overall reservoir sediment and storage inventory: total storage; storage now occupied by sediment and debris; free water storage needed for flood control at various risk levels; and water storage presently available for flood control. Also of interest would be the cumulative historical record of sediment inflows and removals, to the extent that it exists. In addition, some data on sediment size distributions would be helpful.

6. Are there reports giving hydraulic analyses of flood control for various flood hydrographs and sediment volumes in the reservoir? They would be of value for review. What is the flow capacity of the existing downstream channel?

7. If 2,000,000 cubic yards of debris is removed, what is the remaining flood risk downstream? What level of damages might be expected during a 50 year design storm? Then what are the answers to the same question for removal of 3,000,000 or 4,000,000 cubic yards? Does the improvement in flood safety and reduction of flood risk justify the additional expenditure and community impacts for larger removal?

8. Explain why a limit of 4 million cubic yards is being sought when only 2.6 million cubic yards is the recent measurement of stored sediment?

9. The EIR analysis should present several alternative project goals for sediment removal and available flood control volumes with clear accounting of benefits, costs, and community impacts. The public can then have a clearer idea of choices, and express preferences.

10. Some long-term objectives need to be considered along with short-term project goals. For example, if it were found that only 2 million cubic yards needed to be removed for flood control now, the removal of the other 2 million would still have to be done sometime. So the question of timing should be opened up---e.g. if 4 million is to be removed, it might be scheduled in segments over say 10 or 12 years, rather than all at once in a single long multi-year effort. In the long run, a more uniform rate of removal might be preferred over the present situation with large amounts of "catch-up".

I will be glad to discuss or clarify these comments.

Submitted by:

Norman H. Brooks
Irvine Professor of Environmental and Civil Engineering,
Emeritus, California Institute of Technology, Pasadena CA
Registered Civil Engineer in California, No. CE 9823

From: Lilley, Keith
Sent: Monday, November 14, 2011 7:08 AM
To: Butler, Ryan
Subject: FW: Devil's Gate Sediment Removal Project

Categories: Scoping Comments

Please add to official comments

From: Pam Folgert [mailto:pamnchas@att.net]
Sent: Thursday, November 10, 2011 7:26 PM
To: Lilley, Keith
Subject: Devil's Gate Sediment Removal Project

Dear Mr. Lilley,

I am very concerned about the consequences of the above mentioned project.
The amount of sediment removed at this time should be kept to the minimum amount amount necessary for public safety so as to reduce the impact on the nature of this area and maintain quality of life for the residents.
Further study is needed to reduce the effect of transporting and relocating the sediment.
Yours respectfully,
Pamela Folgert

PASADENA AUDUBON SOCIETY
Founded April 1904
1750 N. Altadena Drive
Pasadena, CA 91107
WWW.PASADENAAUDUBON.ORG

November 8, 2011

Los Angeles County Department of Public Works
Water Resources Division—Reservoir Cleanouts
P.O. Box 1460
Alhambra, CA 91802-9974

To the Water Resources Division of the LA County DPW:

Thank you for the opportunity to comment on the sediment removal project for Devil's Gate Dam in Hahamongna Watershed Park. As an organization that cares about birds and their habitats, we the members of the Board of the Pasadena Audubon Society have some serious concerns regarding this project, and we look forward to working with the County to find a solution that will benefit the birds while protecting the people.

Our first concern is that the sediment removal be done at times and in places that will not harm or disturb nesting birds, as specified by the Migratory Bird Treaty Act of 1918. We recognize the challenge this poses, as birds nest almost year-round in Hahamongna Watershed Park, but we need assurances that the work will be done at places and times that will not disturb the birds that nest there. We know a biologist will survey these areas, but we have some concerns about the thoroughness of previous biological surveys in Hahamongna, and so we would also like to offer our knowledge and expertise of dates and locations of when and where birds have nested in the past.

Another concern is that this project will cause serious loss of habitat. While we recognize that a project of this scope will lead to the loss and destruction of some habitat, we still insist that the value and quality of habitat in Hahamongna requires that this project be done with incredible sensitivity and respect. We ask that the work be done slowly and carefully, destroying as little habitat as possible, and providing for effective restoration of any habitat that is disturbed or destroyed. If the work is done this way, this will also make it easier to protect nesting birds.

Another concern we have is the location and quality of mitigation. Hahamongna is comprised of several types of habitats, including willow and alluvial scrub. These types of habitats are increasingly rare in Southern California, and Hahamongna is one of the few places where people and birds can find these habitats. Because the willow, alluvial scrub, and other habitats are so valuable in Los Angeles, we insist that the mitigation for this be done in Hahamongna or the Arroyo Seco, not some distant location. We ask that the habitats that are destroyed be restored properly, and that the County leave Hahamongna in better shape than it found it, with more of the land restored to its natural

PASADENA AUDUBON SOCIETY
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state. We know that the DPW would like to maintain some areas of the park as permanent working space for sediment removal, and while we see the possible wisdom of this plan, we urge the DPW to preserve and restore as much of the habitat as possible and to keep the footprint of the permanent work area as small and unobtrusive as possible.

We urge the County to see sediment not as a waste product but as a valuable resource. Not only can sediment be a commodity, but it can also be valuable to the environment. If we treat the Arroyo Seco like the watershed system that it is, then we can see that the sediment can have environmental value. We'd like to see a restored Arroyo Seco, with some of the sediment in the river where it belongs.

We also urge the County to continue researching to look for alternate ways to move sediment besides digging, trucking, and dumping. We insist that the County to revisit ideas like launching and sluicing, and to keep examining how other agencies around the country and the world have managed this process. We expect to see a full report of these alternates listed and described in the EIR, with complete explanations of their benefits and drawbacks.

Lastly, we ask that the Department of Public Works treat Hahamongna Watershed Park as part of a watershed system, one that stretches from the mountains to the ocean, and that the DPW continue to work on creating a system that will allow the watershed to function as naturally as possible. We need a "forever plan" for sediment and watershed, not one that is already obsolete. We thank you for your time and look forward to working with you.

On behalf of the Board of the Pasadena Audubon Society,

Laura Garrett (signed)
Conservation Chair

Scoping Suggestions; 15 Oct 2011 (Rev. 1)

A. Sediment source
    a. Keep cubic yards as small as possible – base totally on statistics of flooding plus consideration of how climate change might change those statistics over 50-100 years. Should not be a political decision. How high will you allow water to go? Is a spillway flow acceptable once in a long period?
    b. Make perimeter as small as possible. Avoid as many trees as possible – esp. old oaks
        i. Make as deep as possible. It can be even deeper upstream of the dam. A small permanent (or semi-permanent) lake would be a plus for habitat, hikers, and birders.
        ii. Assume people will want to hike down there.
    c. Assume you will never increase the cubic yards or perimeter
    d. Protect the perimeter – clean out new unwanted vegetation every year – include annual maintenance in scope
    e. Consider presorting sediment at the site.
    f. Include water settling ponds at the new lower level – to replace the existing ones you will be taking out.
    g. To respond to the comment by the child from Tom Sawyer Camp, I suggest you make a partnership with them to get them to help with the habitat monitoring before, during, and after the project. You could also let them examine the dam, learn about flood control, ground water resupply, sediment management, etc. Also consider a partnership with the local Audubon Society.

B. Transportation
    a. Consider all alternatives being developed by the 20 year study – you may get different answers – they have done most of the work for you
    b. Consider a conveyor belt to get sediment to trucks lined up on dam road or on Oak Grove Drive over the dam.
        i. If you load on the dam you will need to build a road to connect with Oak Grove South of Berkshire.
        ii. If you load on Oak Grove, you may need to shut down the North two lanes, and let traffic use the south two lanes – there is very little traffic on that road.
        iii. Either of these routes would allow you to use a route that gets off the 210 at Woodbury, and gets back on at Berkshire. This would NOT require any backing up and alleviate the buzzer noise problem discussed this morning.
    c. Avoid Windsor and other residential areas
    d. Avoid JPL rush hour traffic
    e. Use natural gas powered vehicles only – NO diesel.

i. Recommendation: Get DPW management to make and announce a decision NOW, that you will *only* hire trucks that use natural gas (or lower polluting) engines. The technology is here now, and such an announcement will allow plenty of time for them to convert existing trucks, or to order new trucks.
ii. Consider a similar requirement for the equipment that will operate in the basin.
iii. Such steps could substantially improve the DPWs reputation and make you a leader of green technology.

f. Make sure truck beds are well covered to reduce broken windshields

C. Destination
a. Consider all alternatives being developed by the 20 year study – you may get different answers
b. Irwindale/Azusa pit
c. Other pits
d. Not Tuna Canyon or any other place where trees would be destroyed
e. Transfer Tuna Canyon ownership or management to the Nature Conservancy or Santa Monica Mountain Conservancy (which manages Verdugo mountain property nearby.) Such a decision made now could also improve the reputation of the DPW.

R. Rhoads (Rody) Stephenson
4455 Rockland Place, Unit 10
La Canada, CA 91011
(818)248-7472

RAYMOND BASIN MANAGEMENT BOARD

725 North Azusa Avenue, Azusa, CA 91702 (626) 815-1300 FAX (626) 815-1303

City of Alhambra
City of Arcadia
California-American Water Company
East Pasadena Water Company
H.E. Huntington Library and Art Gallery
Kinneloa Irrigation District
La Cañada Irrigation District
Las Flores Water Company
Lincoln Avenue Water Company
Pasadena Cemetery Association
City of Pasadena
Rubio Cañon Land and Water Association
San Gabriel County Water District
City of Sierra Madre
Sunny Slope Water Company
Valley Water Company

November 9, 2011

Los Angeles County Flood Control District
Attn: Water Resources Division – Reservoir Cleanouts
P.O. Box 1460
Alhambra, CA 91802-9974

RE: Devil's Gate Reservoir Sediment Removal and Management Project

Water Resources Division:

Thank you for furnishing the Raymond Basin Management Board (RBMB) with a copy of the document entitled, "Notice of Preparation and Initial Study (NOP/IS) – Devil's Gate Reservoir Sediment Removal and Management Project." It is RBMB's understanding the Los Angeles County Flood Control District (LACFCD) is proposing "...a comprehensive sediment removal project at Devil's Gate Reservoir that will restore flood control capacity...". The NOP/IS notes that during the 2009 Station Fire, approximately 68 percent of the watershed tributary to the Devil's Gate Reservoir was burned. Following the Station Fire, LACFCD experienced two wet seasons which increased sediment accumulation in the reservoir by approximately 1,300,000 cubic yards, reducing the available flood control capacity of the reservoir. The NOP/IS indicates LACFCD proposes to remove up to 4,000,000 cubic yards of sediment from behind the Devil's Gate Reservoir to restore the reservoir to its current design standard of the ability to contain two Design Debris Events (DDEs) below the spillway elevation of 1046.5 feet (LACFCD indicates each DDE is 2,000,000 cubic yards).

The RBMB is supportive of LACFCD efforts to enhance flood control protection. As the Court appointed entity to manage the Raymond Basin groundwater supplies, the RBMB has an interest in projects which may impact surface run-off and the ability to percolate such run-off water into the Raymond Basin. RBMB requests the following be addressed in the Draft Environmental Impact Report (DEIR).

- The DEIR should clearly address circumstances under which the sediment removal activities could impact the ability to percolate local run-off and include measures to mitigate those impacts. The RBMB recognizes sediment removal to promote flood control is very important, and would like the DEIR to carefully consider groundwater replenishment.
- Section 5.9 of the IS asks whether the proposed project could "substantially deplete groundwater supplies or interfere substantially with groundwater recharge..." The RBMB requests the DEIR address mitigation measures that will ensure the proposed project does not interfere with the ability to percolate local

runoff to replenish the groundwater basin. In the event this RBMB concern can be adequately addressed, the RBMB requests the response for Section 5.9 be changed from "No Impact" to "Less than Significant with Mitigation Incorporated".

Thank you for the opportunity to provide these comments. We look forward to the opportunity to review and comment on the DEIR as it becomes available. If you have any questions, please don't hesitate to contact me at (626) 815-1300.

Sincerely,

Anthony C. Zampiello
Executive Officer

cc: Stetson Engineers Inc.

RAYMOND BASIN MANAGEMENT BOARD
725 North Azusa Avenue
Azusa, CA 91702

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Los Angeles County Flood Control District
Attn: Water Resources Division – Reservoir Cleanouts
P.O. Box 1460
Alhambra, CA 91802-9974

91802Z2460 B900

10604 Walnut Drive
Shadow Hills, CA 91040
11 November 2011

Los Angeles County Department of Public Works
Attn: Water Resources Division – Reservoir Cleanouts
P.O. Box 1460
Alhambra, CA 91802-9974

Re: Devils Gate Reservoir Sediment Removal and Management Project Public Scoping Meeting

Dear Mr. Lilley:

Thank you for extending the comment period for the Devils Gate Reservoir Sediment Removal and Management Project. I attended the Scoping Meeting on October 15 at La Canada High School and addressed many issues there. My intent with this letter is primarily to reiterate these issues and make my comments available in written form for the betterment of the project.

Sediment Management needs to be an ongoing program. Not a 5-year plan, not a 20-year plan, but a forever plan. The upper parts of the watershed are highly erodable, and even once the predominantly chaparral vegetation has matured, there will still be sediment flow. Any management plan that contains at its core the transporting of sediment to a dump site is not a forever plan. Dump sites are finite, and almost all of the land in the Los Angeles basin has been developed.

(As a side note, one of the other speakers at the Scoping Meeting suggested modifying the vegetation in the upper watershed to reduce erosion. Mature chaparral is the best vegetation for retaining soil in this watershed, so the best management regime to minimize erosion is to minimize fire and other disturbances in the upper watershed. Any efforts to modify the vegetation will hamper the recovery of the chaparral and increase erosion)

There has been much learned in the fields of sediment and watershed management in the 90 or so years since the Devils Gate Dam was built. Let's incorporate some of that knowledge into the planning for this project and subsequent operation of the reservoir area. We want the Devils Gate Dam to be the first in a new generation of sediment management rather than the last of an old generation.

Rivers move sediment for free. The downstream channels may need to be modified or even redesigned to carry sediment. Let us take the opportunity to restore the streams, and improve flood protection and recharge our groundwater in the process. Let's value our water resources, rather than relegating them to a concrete ditch.

The downstream channel modifications that may be necessary to carry sediment are not free, but neither is the historical process of trucking sediment to a dump site. In addition to an accurate comparison of the financial costs among alternatives (specifically, hauling the sediment to a dump vs. outfit the river to carry it to the beach), please consider a full accounting of the environmental costs of each way of doing business, including the amount of carbon dioxide

released to the atmosphere by the burning of diesel or other fuel to power all of the heavy equipment involved in each process.

Please consider the broader issue of atmospheric pollutants. There is much sensitivity to particulate pollutants resulting from diesel fuels, but I'd like to encourage you to consider overall greenhouse gas emissions as well. Running vehicles on Compressed Natural Gas results in less carbon dioxide released to the atmosphere than using diesel fuel. Vehicles can be converted to run on CNG, and contractors can be required to operate their vehicles on CNG. The Port of Los Angeles provides a recent example of how to do this.

Realizing that there will be a need for revegetating areas disturbed in the process of removing sediment, and that the best plants with which to revegetate are those which were there before a disturbance, please consider setting up a nursery to propagate the plant material currently growing in the areas where sediment is to be removed. There is space in the Hahamongna Watershed Park that could be used for this purpose. I would like to suggest working with the City of Pasadena and possibly a nonprofit organization such as the Arroyo Seco Foundation to establish a native plant nursery for the benefit of this project and the local community. Taking a step such as this early in the current EIR process and starting the propagation efforts for the eventual revegetation portion of the project would be a refreshing and beneficial step in improving the Department's image with the greater environmental community.

As the project necessarily impacts the area, please consider a comprehensive program to minimize invasive exotic (plant) species. Weeds such as Castor Bean (from which the potent poison Ricin is derived) will show up, but bare and disturbed dirt can be managed to minimize such unwanted vegetation. Coarsely chipped organic material makes a good mulch to suppress weeds, and there will be plenty of material available for chipping once the sediment removal starts in earnest. Weeds are much easier to remove when they're small (and even easier to pull out when they grow through a generous layer of mulch), so with a little bit of thoughtful effort along the way, it's not too hard to keep these alien invaders from taking over. This issue is especially important in a habitat area such as the Hahamongna Watershed Park, which is already impacted by invasive non-native vegetation. Please pay attention to the weeds!

In closing, I'd like to recognize that sediment has accumulated in the Hahamongna basin and the local environment has adapted over the course of the 90+ years that the Devil's Gate dam has been here. Please don't insult the environment with a sudden traumatic wholesale cleanout of the basin, but rather take a longer time and work in smaller sections, revegetating as each phase of the work is completed, to achieve a more sustainable configuration with lower and more manageable impacts to the local and global environments.

Thank you for your attention.

Sincerely,

Roger Klemm

From: Giljum, Mark [MGiljum@lacsd.org]
Sent: Thursday, October 20, 2011 2:59 PM
To: reservoircleanouts
Subject: Devil's Gate Reservoir Sediment Removal and Management Project

Categories: Scoping Comments

The Sanitation Districts of Los Angeles County (Districts) have received the NOP of the Draft EIR for this project. Thank you for the opportunity to review and comment on the scoping effort. While we have no specific areas of environmental study/concern at this time, we would like to be considered an Interested Party during this process because our landfills (particularly the nearby Scholl Canyon Landfill) may be an appropriate location for removed sediment (i.e. either for disposal or beneficial use of the material as landfill cover). I will be the District's contact for this project.

Thank you,

Mark Giljum, P.E.
Civil Engineer
Facilities Planning Section
Phone (562) 908-4288 x2456
Fax (562) 695-1874

Devil's Gate Reservoir Sediment Removal and Management Project

COMMENT CARD

Name Claudette E. Budden Address 926 W La Canada Verdugo Rd

Email _____ City/ZIP Altadena Ca. 91001

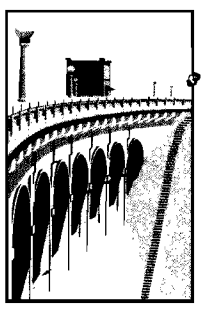
Organization, if any _____

I would like to provide the following comment:

with the removal of the sediment will it cause any contamination of diseases that will impact our health.

also the routes of the removal of the sediment on oak Grove to Berkshire to the 210 freeway.

we have alot of seniors & children on our neighborhood and walkers.



FOR MORE INFORMATION

Visit our website:
www.lasedimentmanagement.com/devilsgate

Send an email:
reservoircleanouts@dpw.lacounty.gov

or Write to:
Los Angeles County Department of Public Works
Attn: Water Resources Division - Reservoir Cleanouts
P.O. Box 1460
Alhambra, CA 91802-9974

Devil's Gate Reservoir Sediment Removal and Management Project

COMMENT CARD

Name Takako Suzuki Address

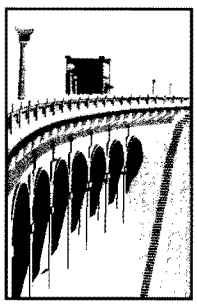
Email tsuzuki@cityofpasadena.net City/ZIP

Organization, if any

I would like to provide the following comment:

There was a major streambed restoration project just North of the Colorado Bridge that was destroyed by the surge of water from the storm.

What mitigation will be provided for work South of the dam and particularly around the Colorado bridge.



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or Write to:
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P.O. Box 1460
Alhambra, CA 91802-9974

Devil's Gate Reservoir Sediment Removal and Management Project

COMMENT CARD

Name Markus Klemm Address 20604 Walnut Dr.

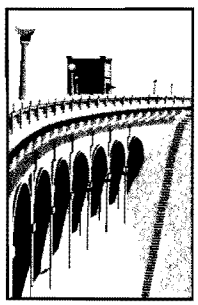
Email treehuggers@cairr.com City/ZIP Shadow Hills, CA 91040

Organization, if any

I would like to provide the following comment:

Every year, for 10 weeks in the summer, approximately 400 kids explore through the park, learning about nature. If all the sediment is removed, there will be a generation of children that will not get to experience natural habitat as they currently are experiencing it.

Perhaps the sediment should be removed in small portions, so that the park can still be used, and the sediment can still be removed. It will take longer, but be better for the habitat, and for the park users such as horse riders, frisbee golfers, hikers, geocachers, and bird watchers.



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P.O. Box 1460
Alhambra, CA 91802-9974

Devil's Gate Reservoir Sediment Removal and Management Project

COMMENT CARD

Name Jill Boddie Address 926 W. La Canada Verdugo Rd

Email 4moons2u@att.net City/ZIP Altadena, CA 91001

Organization, if any N/A

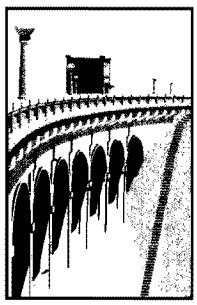
I would like to provide the following comment:

(1) The proposed hauling time is M-F 7am - 7pm & 8am - Sat.
Will you control the hauling times of the trucks in the peak hours of commuting?

(2) in the given timeframes of removal how much Sediment will be removed in a day?

(3) Will the hauling trucks use be low emission fuel since diesel fuel is hazardous to our health?

(4) What is the long term process of management of the sediment in the dam to prevent large deposits of build up?



FOR MORE INFORMATION

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Send an email:
reservoircleanouts@dpw.lacounty.gov

or Write to:
Los Angeles County Department of Public Works
Attn: Water Resources Division - Reservoir Cleanouts
P.O. Box 1460
Alhambra, CA 91802-9974

Devil's Gate Reservoir Sediment Removal and Management Project

COMMENT CARD

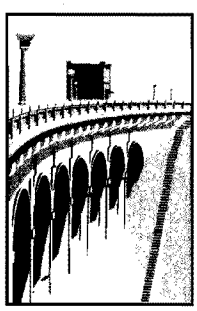
Name DIANNE PATRIZZI Address 564 N. Oakland Ave

Email thaddius.d.patrizzi@gmail.com City/ZIP 91101

Organization, if any

I would like to provide the following comment:

my comments will be submitted through US. MAIL, email, & by fax - submitted prior to November 11, 2011 deadline



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P.O. Box 1460
Alhambra, CA 91802-9974

Devil's Gate Reservoir Sediment Removal and Management Project

COMMENT CARD

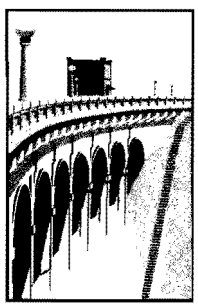
Name Doris L. Stewart Address 915 La Canada Verdugo Rd.

Email _____ City/ZIP Pasa. Ca. 91103-1016

Organization, if any _____

I would like to provide the following comment:

Heavy Trucks Coming through the area. Curving heavy Equipment. The street is to narrow. Windsor should be used. Trucks have had to back up go out Arwin to Windsor.



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Alhambra, CA 91802-9974

9/29/11

Hahamongna IDEAS For "LADWP Scoping" and Planning Meetings For EIR:

NO NO NO - DO NOT Scrape 50 Acres of Haha to relieve Sediment

NO - Do NOT Have 180 Trucks per Day Haul Out – Get Ride of Diesel; OK, CNG, Natural Gas Trucks

YES - SLUECE the Dam, Naturally, as much as possible. It Has been done, as in Aug. '11 Mini-Removal. 25K cubic yards was estimated, and only 16 K was needed. IT WORKED.

YES - Use a Conveyer Belt System to Extract Sediment and bring TO (Trucks) at Oak Grove Ave.

YES – CHANGE THE ENTIRE SYSTEM TO REMOVE SEDIMENT From Devil's Gate Dam. THIS ENTIRE PLAN IS UN-SUSTAINABLE. SLUECING IS A WAY !

YES - Preserve ALL the Trees and Habitats.

NO – Do Not Develop Haha.

YES – Delineate the Natural Haha River. Find out Where the Natural Flow is.

NO – Do NOT Remove 4.0 million Cubic Yards of Sediment.

YES – Maintain Devil's Gate Dam Inside Face, No. Face. Keep Windows clear, Keep Trash Rack Clear 100-200 Ft in front of dam.

YES – Place Sediment Outside Dam, South Face, in order that Water flow will Sluice Sediment Downstream

NO – Do NOT Build a Road for Trucks!!!! Use Conveyers Belts.

YES – Stream & Wetlands Restoration and is needed all along the Arroyo Seco

YES – LADPW Needs to Do Better Research!! They Need to KNOW Exactly What Animals, Birds, Trees live in Haha !! Original Study was a simple cursory visual, Not Well Done, very poor

YES – LADPW Needs to do More Preparation and Research in Advance of This Project. Typically, 10-15% of the Master Budget is spent on this. Now, they are spending Less than 0.1%

YES – The City of Pasadena Need to have Environmentally Educated Staff Overseeing

Devil's Gate Reservoir Sediment Removal and Management Project

COMMENT CARD

Name Marnie Gaede Address 5218 Donna Maria Lane

Email chacopress@earthlink.net City/ZIP La Cañada, CA 91011

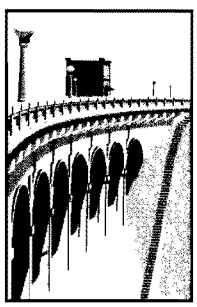
Organization, if any Fund for Wild Nature

I would like to provide the following comment:

The current project is unacceptable. There are far too few riparian habitats for wildlife. Hahamonga is unique and deserves the utmost protection. Removal of the sediment, as proposed, would scrape away most of the connections that support the fragile web of life. I have spent countless mornings appreciating this oasis of life in an urban setting — and see many families enjoying the wildlife.

There is another issue that impacts the schools, the equestrian centers, the local proximate community and the people that spend time in Hahamonga — the pollution from the trucks is damaging to health.

The current project represents an option that is so destructive that it eliminates future options. If the full amount of sediment is taken, then the natural integrity of Hahamonga will be permanently destroyed. Once this option is exercised, the natural community of plants and animals will expire or move on.



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or Write to:
Los Angeles County Department of Public Works
Attn: Water Resources Division - Reservoir Cleanouts
P.O. Box 1460
Alhambra, CA 91802-9974

PLEASE INCLUDE ALL ITEMS

Scoping Suggestions; 15 Oct 2011

A. Sediment source
   a. Keep Cubic yards as small as possible – base totally on statistics of flooding plus consideration of how climate change might change those statistics over 50-100 years.
   b. Make perimeter as small as possible. Avoid as many trees as possible – esp. old oaks
      i. Make as deep as possible. It can be even deeper upstream of the dam.
      ii. Assume people will want to hike down there.
   c. Assume you will never increase the cu yds or perimeter
   d. Protect the perimeter – clean out new vegetation every year – include in scope
   e. Consider presorting sediment at the site.
   f. Include water settling ponds at the new lower level – to replace the ones you will be taking out.

B. Transportation
   a. Consider all alternatives being developed by the 20 year study – you may get different answers – they have done most of the work for you
   b. Consider a conveyor belt to get sediment to trucks lined up on dam road or on Berkshire drive over the dam.
   c. Avoid Windsor and other residential areas
   d. Avoid JPL rush hour traffic
   e. Use natural gas powered vehicles only – NO diesel.
   f. Make sure truck beds are well covered to reduce broken windshields

C. Destination
   a. Consider all alternatives being developed by the 20 year study – you may get different answers
   b. Irwindale pit
   c. Other pit
   d. Not Tuna Canyon or any other place where trees would be destroyed
   e. Transfer Tuna Canyon ownership or management to Nature Conservancy or Santa Monica Mountain Conservancy (which manages Verdugo mountain property nearby.)

R. Rhoads (Rody) Stephenson
4455 Rockland Place, Unit 10
La Canada, CA 91011
(818)248-7472

SIERRA CLUB
FOUNDED 1892

Pasadena Group

November 11, 2011

Gale Farber, Director, Los Angeles County Department of Public Works
ATTN: Water Resources Division – Reservoir Management
PO Box 1460
Alhambra, CA 91802-9974

RE: Scoping Comments: Environmental Impact Report for Devils Gate Dam Reservoir Sediment Removal and Management Project

This appears to be first large-scale project to remove sediment resulting from the aftermath of the 2009 Station Fire from one of DPW's major reservoirs, and to address the topic of managing sediment from anticipated reservoir inflows that are expected in future years.

Your department has a once-in-a-generation opportunity to make a comprehensive study and evaluation of each and every environmentally and economically feasible alternative method of addressing this significant problem.

We therefore urge that the EIR for the Devils Gate Dam project do just that.

As a start, the EIR needs to address the source of the problem: the continued erosion of rock, soil, and debris that enters the reservoir from the dam's upstream watershed. We realize this watershed is primarily within the legal and management jurisdiction of Angeles National Forest, and therefore urge DPW's EIR consultant and its own staff to work collaboratively with the Forest Service in evaluating ways in which this sediment inflow might be better controlled. In this evaluative process we suggest that research staff of the Forest Service's San Dimas Experimental Forest (a separate jurisdictional unit, with a long history of studying sediment flow from the Forest's chaparral hillsides – contact the Glendora Ranger District office) be consulted in addition to staff at the Angeles National Forest Supervisor's office in Arcadia.

In addition, alternative methods of removing the existing sediment which impedes efficient functioning of the reservoir for flood control and water conservation purposes need to be comprehensively evaluated.

P.O. Box 94086, Pasadena, CA 91109-4086

Alternative methods of removing sediment that must be fully evaluated include:

Sluicing: According to information presented at scoping meetings for this project, this method was utilized in 1945 to remove sediment from the dam. The EIR should describe in detail the quantity of material sluiced, sluicing methods used, the time (days, hours) that it took to do the sluicing, as well as the results in terms of efficiency of the process, the downstream deposition locations of the material sluiced, the acceptability of the process and results to affected communities, and all direct and indirect costs.

Using this baseline information, the EIR should then evaluate this alternative as a possible means of removing some or all the sediment needed to restore Devils Gate Dam Reservoir to its intended function. Evaluation should address all aspects of this alternative, such as those mentioned in the paragraph above.

Slurry pipeline: During scoping meetings several speakers pointed out that Devils Gate Dam, like other dams on the southern side of the San Gabriel Mountains, interrupts sediment flow that otherwise would flow down to the Pacific Ocean, providing sand and other material to replenish the beaches there. The alternative of constructing a slurry pipeline to remove some or all the sediment needed to restore the reservoir to its intended function should be evaluated in detail.

This evaluation should carefully consider different lengths of pipeline that might be appropriate. It would not be necessary to construct such a pipeline all the way to the ocean; a pipeline that ended at the confluence of the Arroyo Seco with the Los Angeles River, or immediately downstream of the unpaved portion of the Los Angeles River, might be feasible alternatives that would deposit measured amounts of sediment at specific times during which the Los Angeles River was flowing at sufficient rates to move the sediment down to the ocean.

Discussion of this alternative needs to address the obvious topics of differing lengths of pipeline, pipeline size and material (concrete? metal?), construction and maintenance costs, seasons and conditions during which sediment would be conveyed down the pipeline, deposition locations, environmental and other impacts on these locations, and anticipated public acceptability to this process.

Both the short-term and long-term environmental and economic benefits and costs of the two alternatives discussed above must be fully evaluated in comparison to the environmental and economic costs of DPW's traditional methods of sediment removal via trucks. These two alternatives have the positive environmental benefit of moving sediment to the ocean where it would have naturally flowed had Devils Gate Dam not been constructed.

In comparison, trucking has several negative environmental impacts, including fuel consumption of increasingly expensive petroleum products, generation of undesirable air emissions (including particulate matter if diesel fuel is used),

generation of greenhouse gas emissions, annoying noise from both truck travel on streets through nearby residential and/or school neighborhoods and from the frequent movement of trucks in reverse gear (which generates a safety beeping required by state law), damage to the streets and roads over which trucks travel, and generation of pollutants spilled on the ground during truck operation which pollute both the ground and surface and subsurface water.

Trucking also involves forever ongoing costs to the County in terms of the purchase or rental of trucks to perform the work assigned, payment for truck drivers and staff who must coordinate their work, as well as indirect costs to nearby communities such as Pasadena and La Canada Flintridge which must monitor trucking operations in order to minimize impacts to their communities.

Trucking is not a sustainable method of dealing with sediment accumulation that will continue to occur, at varying rates, into the indefinite future. The reduction of sediment inflow, and the removal of sediment from county-owned reservoirs, as well as reservoirs owned by other entities, in the foothills of the San Gabriel Mountains requires a sustainable approach if ever-increasing costs of sediment removal are to be avoided.

Water conservation and water quality impacts: The EIR must address issues related to water conservation and water supply, including positive and negative impacts on the operation of spreading basins upstream and (potentially) downstream of the dam, impacts to the Raymond Basin Aquifer and other impacted aquifers, and impacts to surface and underground water quality.

Terrestrial, avian, riparian, and aquatic flora and fauna: The EIR must fully evaluate these impacts, including impacts on any endangered, threatened or sensitive species, and must propose mitigation measures for flora and fauna that would be impacted by the project.

Recreation: The land area immediately upstream of and surrounding Devils Gate Dam Reservoir is a heavily used recreation area known as Hahamongna Watershed Park. Short-term and long-term impacts on the numerous types and quantities of recreation use in this area need to be fully discussed and evaluated, and mitigation measures for these impacts need to be proposed.

Cumulative Impacts: The EIR must evaluate the cumulative impacts of this project along with proposed projects to manage and remove sediment from several other reservoirs in the foothills of the San Gabriel Mountains that are owned and operated by the Los Angeles County Department of Public Works. The Department's Watershed Division has initiated a Sediment Management Strategic Planning process that is currently preparing a 20-year plan to address this topic. Preparation of the EIR for the Devils Gate Dam Reservoir Sediment Management Project must be coordinated with, and incorporate information and analysis, prepared in and for that planning process.

In conclusion, we recognize that a limited amount of trucking may occasionally be necessary to remove sediment immediately adjacent to the upstream face of the dam. If and when such trucking is done, we strongly urge the Department to either purchase low-emission trucks for its own use, or require that the Department only issue contracts for rental vehicles which meet the highest low-emission standard available. By so doing, the Department, along with other public entities, can play a role in forcing low-emissions standards for trucks and other vehicles throughout the public works community.

In recognizing this limited role for use of low-emission trucks for the specific purpose noted above, we in no way want to minimize our strong belief that trucking is an outmoded means of dealing with sediment flow into foothill reservoirs. On the contrary, we want to re-emphasize the need for the Department to move to sustainable solutions such as sluicing and/or the use of slurry pipelines to facilitate the movement of sediment down to the ocean.

Please feel free to contact us should you have any questions regarding our comments.

Sincerely,

David Czamanske, Vice-Chair, Pasadena Group of Sierra Club

South Coast
Air Quality Management District
21865 Copley Drive, Diamond Bar, CA 91765-4178
(909) 396-2000 • www.aqmd.gov

October 28, 2011

Los Angeles County Department of Public Works
Attn: Water Resources Division – Reservoir Cleanouts
P.O. Box 1460
Alhambra, CA 91802

Notice of Preparation of a CEQA Document for the
Devil's Gate Reservoir Sediment Removal and Management Project

The South Coast Air Quality Management District (SCAQMD) appreciates the opportunity to comment on the above-mentioned document. The SCAQMD's comments are recommendations regarding the analysis of potential air quality impacts from the proposed project that should be included in the draft CEQA document. Please send the SCAQMD a copy of the Draft EIR upon its completion. Note that copies of the Draft EIR that are submitted to the State Clearinghouse are not forwarded to the SCAQMD. Please forward a copy of the Draft EIR directly to SCAQMD at the address in our letterhead. **In addition, please send with the draft EIR all appendices or technical documents related to the air quality and greenhouse gas analyses and electronic versions of all air quality modeling and health risk assessment files. These include original emission calculation spreadsheets and modeling files (not Adobe PDF files). Without all files and supporting air quality documentation, the SCAQMD will be unable to complete its review of the air quality analysis in a timely manner. Any delays in providing all supporting air quality documentation will require additional time for review beyond the end of the comment period.**

Air Quality Analysis
The SCAQMD adopted its California Environmental Quality Act (CEQA) Air Quality Handbook in 1993 to assist other public agencies with the preparation of air quality analyses. The SCAQMD recommends that the Lead Agency use this Handbook as guidance when preparing its air quality analysis. Copies of the Handbook are available from the SCAQMD's Subscription Services Department by calling (909) 396-3720. The lead agency may wish to consider using land use emissions estimating software such as URBEMIS 2007 or the recently released CalEEMod. These models are available on the SCAQMD Website at: http://www.aqmd.gov/ceqa/models.html.

The Lead Agency should identify any potential adverse air quality impacts that could occur from all phases of the project and all air pollutant sources related to the project. Air quality impacts from both construction (including demolition, if any) and operations should be calculated. Construction-related air quality impacts typically include, but are not limited to, emissions from the use of heavy-duty equipment from grading, earth-loading/unloading, paving, architectural coatings, off-road mobile sources (e.g., heavy-duty construction equipment) and on-road mobile sources (e.g., construction worker vehicle trips, material transport trips). Operation-related air quality impacts may include, but are not limited to, emissions from stationary sources (e.g., boilers), area sources (e.g., solvents and coatings), and vehicular trips (e.g., on- and off-road tailpipe emissions and entrained dust). Air quality impacts from indirect sources, that is, sources that generate or attract vehicular trips should be included in the analysis.

The SCAQMD has developed a methodology for calculating PM2.5 emissions from construction and operational activities and processes. In connection with developing PM2.5 calculation methodologies, the SCAQMD has also developed both regional and localized significance thresholds. The SCAQMD requests that the lead agency quantify PM2.5 emissions and compare the results to the recommended PM2.5 significance thresholds. Guidance for calculating PM2.5 emissions and PM2.5 significance thresholds can be found at the following internet address: http://www.aqmd.gov/ceqa/handbook/PM2_5/PM2_5.html.

In addition to analyzing regional air quality impacts the SCAQMD recommends calculating localized air quality impacts and comparing the results to localized significance thresholds (LSTs). LST's can be used in addition to the

recommended regional significance thresholds as a second indication of air quality impacts when preparing a CEQA document. Therefore, when preparing the air quality analysis for the proposed project, it is recommended that the lead agency perform a localized significance analysis by either using the LSTs developed by the SCAQMD or performing dispersion modeling as necessary. Guidance for performing a localized air quality analysis can be found at http://www.aqmd.gov/ceqa/handbook/LST/LST.html.

In the event that the proposed project generates or attracts vehicular trips, especially heavy-duty diesel-fueled vehicles, it is recommended that the lead agency perform a mobile source health risk assessment. Guidance for performing a mobile source health risk assessment ("Health Risk Assessment Guidance for Analyzing Cancer Risk from Mobile Source Diesel Idling Emissions for CEQA Air Quality Analysis") can be found on the SCAQMD's CEQA web pages at the following internet address: http://www.aqmd.gov/ceqa/handbook/mobile_toxic/mobile_toxic.html. An analysis of all toxic air contaminant impacts due to the decommissioning or use of equipment potentially generating such air pollutants should also be included.

Mitigation Measures

In the event that the project generates significant adverse air quality impacts, CEQA requires that all feasible mitigation measures that go beyond what is required by law be utilized during project construction and operation to minimize or eliminate significant adverse air quality impacts. To assist the Lead Agency with identifying possible mitigation measures for the project, please refer to Chapter 11 of the SCAQMD CEQA Air Quality Handbook for sample air quality mitigation measures. Additional mitigation measures can be found on the SCAQMD's CEQA web pages at the following internet address: www.aqmd.gov/ceqa/handbook/mitigation/MM_intro.html Additionally, SCAQMD's Rule 403 – Fugitive Dust, and the Implementation Handbook contain numerous measures for controlling construction-related emissions that should be considered for use as CEQA mitigation if not otherwise required. Other measures to reduce air quality impacts from land use projects can be found in the SCAQMD's Guidance Document for Addressing Air Quality Issues in General Plans and Local Planning. This document can be found at the following internet address: http://www.aqmd.gov/prdas/aqguide/aqguide.html. In addition, guidance on siting incompatible land uses can be found in the California Air Resources Board's Air Quality and Land Use Handbook: A Community Perspective, which can be found at the following internet address: http://www.arb.ca.gov/ch/handbook.pdf. CARB's Land Use Handbook is a general reference guide for evaluating and reducing air pollution impacts associated with new projects that go through the land use decision-making process. Pursuant to state CEQA Guidelines §15126.4 (a)(1)(D), any impacts resulting from mitigation measures must also be discussed.

Data Sources

SCAQMD rules and relevant air quality reports and data are available by calling the SCAQMD's Public Information Center at (909) 396-2039. Much of the information available through the Public Information Center is also available via the SCAQMD's World Wide Web Homepage (http://www.aqmd.gov).

The SCAQMD is willing to work with the Lead Agency to ensure that project-related emissions are accurately identified, categorized, and evaluated. If you have any questions regarding this letter, please call Ian MacMillan, Program Supervisor, CEQA Section, at (909) 396-3244.

Sincerely,

Ian MacMillan
Program Supervisor, CEQA Inter-Governmental Review
Planning, Rule Development & Area Sources

IM
LAC110928-01
Control Number

South Coast
Air Quality Management District
Headquarters
21865 Copley Drive Diamond Bar CA 91765-4178

AQMD

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DEPARTMENT OF TRANSPORTATION
DISTRICT 7, OFFICE OF REGIONAL PLANNING
IGR/CEQA BRANCH
100 MAIN STREET, MS # 16
LOS ANGELES, CA 90012-3606
PHONE: (213) 897-9140
FAX: (213) 897-1337

Flex your power!
Be energy efficient!

October 13, 2011

Mr. Ryan Butler
Los Angeles County Flood Control District
P.O. Box 1460
Alhambra, CA 91802-9947

Re: Devil's Gate Reservoir Sediment Removal and Management Project (NOP)
IGR/CEQA No. 111011/CS
Vic: LA-210-22.14, SCH# 2011091084

Dear Mr. Butler:

Thank you for including the California Department of Transportation (Caltrans) in the environmental review process for the Notice of Preparation (NOP) for the above mentioned project.. Based on the information received we have the following comments:

A traffic study will be necessary to evaluate the traffic impacts of construction haul trips to and from the project site during AM and PM peak periods. Please include the existing traffic volumes and level-of-service (LOS) on the mainline I-210 Foothill Freeway between Berkshire Drive and the Cities of Irwindale and Azusa, the mainline SR-134 Ventura Freeway between the I-210 and Figueroa Street, and the affected freeway on/off ramps and freeway ramp intersections. Also include project traffic volumes and level-of-service calculations for the affected freeway segments, freeway on/off-ramps and freeway ramp intersections.

If it is determined that the project will have a significant impact on freeway operating conditions, include mitigation measures to address the impacts that are caused by the additional truck trips on the I-210 and SR-134 freeways.

The NOP mentioned that return haul trips would travel westbound on I-210 and exit onto Berkshire Drive to the project site. The impact from construction related haul route truck trips will require the widening of the access road to Oak Grove Drive to accommodate truck traffic. Any impact to the freeway access control along Berkshire Drive may require a Caltrans Encroachment Permit.

Any work to be performed within the channel, downstream from the Devil's Gate Dam, will need a Caltrans permit due to the close proximity to the I-210 Freeway bridge structure.

Truck trips whenever feasible should be limited to off-peak commute hours. Caltrans requests that the contractor avoid bunching or platooning of truck trips on mainline freeways, on freeway on/off-ramps and at freeway ramp intersections.

Additionally, transport of over-size or over-weight vehicles on State highways will require a Caltrans Transportation Permit.

If you have any questions regarding these comments, you may contact Carl Shiigi, project coordinator at (213) 897-1726. Please refer to our internal record number 111011/CS.

Sincerely,

DIANNA WATSON
IGR/CEQA Program Manager
Caltrans, District 7

cc: Scott Morgan, State Clearinghouse

State of California
Department of Transportation
100 S. Main Street
Los Angeles, CA 90012

049J82034712
$00.44⁰
10/14/2011
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US POSTAGE

Mr. Ryan Butler
Los Angeles County Flood Control District
P.O. Box 1460
Alhambra, CA 91802-9947

STEVE LAMB RESIDENTIAL DESIGNS
P.O.BOX 333,ALTADENA CA. 91001 626 797 6464

7 October, 2011

To: Los Angeles County Department of Public Works

Re: Devils Gate Reservoir Sediment Removal and Management Project

To whom it may Concern:

First of all, allow me to express my thanks to the Department for finally taking up the issue of removing debris flow from behind the Devil's Gate Dam. As you know, the Joint Operating agreement between the City of Pasadena and the County of Los Angeles mandates the County remove all debris below the spillway line at Devils Gate. As you know, in the main this has never been done and debris dating from major floods of 1938, 1968, 1992 and the years between and since are still present behind the Devils Gate Dam.

Second, I cannot understand exactly how it is that the County of Los Angeles is being forced to do environmental documentation for this project. The County of Los Angeles has had a legal obligation to regularly remove the debris since the 1920's.The Obligation existed long before CEQA was even a glimmer in anyone's eye, let alone law. How can this legal obligation now be frustrated?

Third, there is absolutely no natural area behind the dam below the line of the spillway. There is no natural wild land habitat to protect here. Every bit of soil that the present vegetation is growing in is flood debris that where it not for the existence of the dam would not be present. All of the vegetation growing here, even the few native California species present, are in un natural locations where they would not grow were the soil not being retained by the dam. Most of the rodents, birds, lizards and small mammals, in the area behind the dam and below the spillway line would not be here were it not for the un naturally maintained flora. For some reason confused people who mistakenly believe they are supporting "The Environment" are rallying to "protect Hahamongna and Mother Nature." Nothing could be farther from the truth. Leaving the debris there is ruining the stream bed course, altering the species of vegetation present and altering the animal life present. Removing the debris will be the

most major first step to restoring the area behind the dam and below the spillway line to its natural condition.

Fourth there is legitimate concern that the route chosen for trucks removing debris do the least harm possible to residential neighborhoods, the quiet enjoyment of property, the local road beds and be conducted so as to use the least amount of fuel, resulting therefore in the least pollution possible. Oddly, again the people claiming to be “environmentalists” are rallying for the least environmentally reasonable, most damaging position, arguing that the route used should be one that leaves the East end of the Devils Gate Dam area and runs trucks through Altadena in the longest route possible to the freeway. Obviously, a temporary road exiting at the south western area of the Devils Gate basin would be the best plan, giving the shortest distance to a freeway, conserving fuel and the most area of road and directly disturbing no residents at all. The so called earth centric opposition to the South East exit makes no sense at all and is a mystery.

Fifth, many of these so called objections are organized through people working for not for profit groups that have City of Pasadena employees or Commissioners on their Boards of Directors. I for one cannot help but think that this organizing has something to do with organizational hatred between Pasadena and LA County Public Works and is related to some kind of attempt to force the County of Los Angeles to make some bargain with Pasadena not in it’s or the People’s interests, but I am at a loss as to what that could be. On the one hand Pasadena demands the debris be removed; on the other it frustrates the efforts to remove them. Bizarre behavior, to say the very least.

Finally, Please proceed with the removal of these flood debris with all deliberate speed. We have had recent fires that will pose a flood danger for another three years. Every cubic yard of debris still lying below the spillway line and behind the dam is a cubic yard the dam cannot take during a major flood. The dam’s usefulness and safety is thereby reduced. While I live far above the spillway line and not in line with the dam, as a citizen oft eh County of Los Angeles I am very concerned that the dam be safe and that people’s lives and homes not be endangered, especially by pretend, ridiculous, and either insincere or ignorant false environmental assertions that do damage to the entire Environmental Movement.

Sincerely,

Steven S. Lamb

Altadena Ca. 91001

From: Sylvia Stachura [sstach236@earthlink.net]
Sent: Friday, November 11, 2011 11:21 PM
To: reservoircleanouts
Subject: Devil's GateRes. Sediment Removal & Mgmnt. Plan

Categories: Scoping Comments

Dear Sirs: Please be aware of the great disruption you may cause to the wildlife and especially the Birds of the Hahamonga area. Please try and research environmentally sensitive ways to clean out the dam and save the habitats of so many wild birds, mammals, etc. Also it will help humans to be able to go to an area like Hahamonga to get in touch with the outdoors and the creatures that live there.

Sincerely, Sylvia Stachura
San Gabriel, CA

From: THOMAS HOLADAY [thomasholaday@sbcglobal.net]
Sent: Friday, November 11, 2011 2:50 PM
To: Lilley, Keith; reservoircleanouts
Subject: Devil's Gate Reservoir Sediment Removal and Management Project / Draft EIR

Categories: Scoping Comments

HAHAMONGNA WATERSHED SEDIMENT DRAFT EIR SCOPING COMMENTS /

DEVIL'S GATE RESERVOIR SEDIMENT REMOVAL AND MANAGEMENT PROJECT

Page 1 - November 7, 2011

To Whom It may Concern:

I am a local resident, avid hiker and seasoned lover of The Hahamongna Watershed / Devil's Gate Reservoir. I am committed to the preservation of the natural state of the Hahamongna Watershed.

I am opposed to the current Los Angeles County Dept. of Public Works plan to remove 2.6 or 4 million cubic yards of sediment from the Devil's Gate Reservoir / Hahamongna Watershed.

I am opposed to the disruption or destruction of any of the natural habitats of the Hahamongna Watershed, i.e. the flora and fauna.

According to the LADPW's plan for sediment removal, the Hahamongna Watershed would incur widespread and catastrophic destruction.

I am a proponent for new thinking, new ideas regarding how to deal with excess sediment and its abatement and removal.

I am a proponent for assuring downstream safety and flood protection in the entire Arroyo Seco and its tributaries.

PROPOSAL OF METHODS FOR SEDIMENT MAINTENANCE, DEVIL'S GATE RESERVOIR:

MINI-DIGS:

Maintain the integrity of Devil's Gate Dam by use of 'mini-digs', or what was used in Summer 2011 to do the 'Devil's Gate Reservoir Interim Measures Project'. Which was to remove sediment within 100 feet of the dam t keep the gates, valves, windows and trash rack clear of debris. At the time, approx. 13,000 cubic yards was removed.

Clear the face of the dam as needed. Keep the trash rack clear, and the gates and valves clear as needed. Perforı maintenance on a modest scale, to prevent this proposed destruction of our treasured Hahamongna natural habita This will also promote a method of 'natural' sluicing of sediment through and passed the dam.

Page 2 -

It is not necessary to do much more than this. If you did more, you create another grotesque basin, as is the basi below Eaton Canyon. You simply scrape it all out, and leave a huge lifeless scar.

SLUICING:

Create Methods of sluicing the sediment downstream. As a daily hiker in the Arroyo, I have witnessed natural sluicing down the Arroyo Seco for years.

Keeping the dam clear of obstructions, will promote sluicing.

Place sediment below the dam, via conveyer or such, and this will promote sluicing with the normal daily runoff

Without the destruction of habitat, allow the natural daily flow of water through Hahamongna to sluice the sediment among the trees and vegetation that exist there now. Thereby, sluicing through the watershed, and through a 'clean' Devil's Gate Dam, via 'mini-digs'.

Develop new ideas, ways and means to sluice the sediment out of the watershed.

Develop new ways and means to recycle the unwanted sediment. The ocean beaches are a viable resolve. The construction industry has a constant need for material.

Remove the sediment that was placed in Johnson Field for the "Devil's Gate Reservoir Interim Measures Project

MORE RESEARCH AND DEVELOPMENT:

Please consult independent expert sources (not LADPW) to gain real insight into dealing with sediment abateme and assuring protections for the environment, i.e.:

Hydrologists to maintain water health and downstream safety;

The Audubon Society to know what is there and what is threatened;

We can learn from Expert Naturalists and Environmentalists of Watersheds, the San Gabriel Mountains, and specifically, The Hahamongna Watershed.

Creative thinking is needed for dam maintenance for all 14 dams of the San Gabriel Mountains.

Creative and careful thinking of the impact on the much broader scheme of the systems above, as well as below t dam(s) is essential.

This current plan is unsustainable.

Page 3 –

Thank you for your time and consideration.

Sincerely,

Thomas Holaday

thomasholaday@sbcglobal.net

WINDSOR ARROYO

WINDSOR-ARROYO NEIGHBORHOOD ASSOCIATION

P.O. Box 354
Altadena, CA 91003

Tel: (626) 794-4666

email:
WindsorArroyo@charter.net

Los Angeles County Department of Public Works
Attn: Water Resources Division-Reservoir Cleanouts
P.O. Box 1460
Alhambra.CA 91802-9974

November 3, 2011

RE: Debris Removal from Devil's Gate Dam

The Windsor Arroyo Neighborhood Association supports the use of truck Route 2 for the Devil's Gate Dam debris removal. This route will travel from Oakgrove to Berkshire to the 210 Freeway.

Sincerely,
Tecumseh Shackelford
Vice-President
Windsor-Arroyo Neighborhood Association

WINDSOR-ARROYO

WINDSOR-ARROYO
NEIGHBORHOOD ASSOCIATION
P.O. BOX 354
Altadena, CA 91003-0354

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Los Angeles County Department of Public Works
Attn: (Water Resources Division) Reservoir Cleanouts
P.O. Box 1460
Alhambra.CA 91802-9974

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91802246060

APPENDIX B – Air Quality Report

AIR QUALITY REPORT

DEVIL'S GATE RESERVOIR SEDIMENT REMOVAL AND MANAGEMENT PROJECT

Pasadena, California
(Los Angeles County)

Prepared for:

CHAMBERS GROUP, INC.
5 Hutton Centre Drive, Suite 750
Santa Ana, California 92707

Prepared by:

OB-1 Air Analyses, Inc.
308 San Dimas Ave.
Oceanside, California 92057
(760) 691-6486

September 2013
(October 2014 Revision)

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Acronyms and Abbreviations

µg/m^3	microgram per cubic meter
AAQS	Ambient Air Quality Standards
AP-42	EPA's Compilation of Air Pollution Emission Factors
AQMP	air quality maintenance plan
AQR	Air Quality Report
ATCM	airborne toxics control measure
BACM	best available control measure
BACT	best available control technology
Basin	South Coast Air Basin
BSCF	brake-specific fuel consumption
CAAQS	California Ambient Air Quality Standards
CalEEMod	California Emissions Estimator Model
CALINE4	Caltrans Model to assess air quality impacts near transportation facilities
CARB	California Air Resources Board
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CO	carbon monoxide
CO_2	carbon dioxide
CO Protocol	Transportation Project-Level Carbon Monoxide Protocol
DPM	diesel particulate matter
EMFAC2011	CARB's tool for estimating emissions from on-road vehicles
EPA	United States Environmental Protection Agency
FCAA	Federal Clean Air Act
g/bhp-hr	grams per brake-horsepower-hour
g/m	grams per mile
HAP	hazardous air pollutants
HRA	health risk assessment
I-210	Interstate 210
IPCC	Intergovernmental Panel on Climate Change
LACDPW	Los Angeles County Department of Public Works
LOS	level of service
LST	localized significance thresholds
MACT	maximum available control technology
mph	miles per hour
MY2010	Model Year 2010
NAAQS	National Ambient Air Quality Standards
NESHAP	National Emissions Standards for Hazardous Air Pollutants
NO	nitric oxide
NO_2	nitrogen dioxide
NO_X	nitrogen oxides
OFFROAD	CARB Model to estimate emissions from off-road equipment
PM	particulate matter
PM_{10}	respirable particulate matter of 10 micrograms or less in size

Acronyms and Abbreviations (cont.)

$PM_{2.5}$	fine particulate matter of 2.5 micrograms or less in size
ppm	parts per million
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
SO_2	sulfur dioxide
SRA	Source-Receptor Area
TAC	toxic air contaminant
TIA	Traffic Impact Analysis
tpy	tons per year
VMT	vehicle miles traveled
VOC	volatile organic compound
WRCC	Western Regional Climate Center
yd^3	cubic yards

SECTION 1.0 – INTRODUCTION

1.1. REPORT PURPOSE

The purpose of this Air Quality Report (AQR) is to analyze the potential air quality impacts that could occur with the sediment removal and management at the Devil's Gate Reservoir Sediment Removal and Management Project (Project). The Proposed Project consists of a comprehensive sediment removal program at Devil's Gate Reservoir that will restore flood capacity and establish a reservoir configuration more suitable for routine maintenance activities including on-going sediment management. The Project is being undertaken in order to restore reservoir capacity to the facility to meet its intended level of flood protection for downstream communities. This AQR was conducted within the context of the California Environmental Quality Act (CEQA, California Public Resources Code Sections 21000 et seq.). The methodology follows the CEQA Air Quality Handbook[1] prepared by the South Coast Air Quality Management District (SCAQMD) for quantification of emissions.

1.2. PROJECT LOCATION

The Proposed Project is located in the City of Pasadena, in Los Angeles County approximately 14 miles north of downtown Los Angeles. The City of La Cañada Flintridge and the community of Altadena are located near the Proposed Project site to the west and east, respectively. Lying south of the San Gabriel Mountains, the Proposed Project site is located in the lower portion of the Arroyo Seco watershed. The Arroyo Seco extends approximately 11 miles from the border of the Angeles National Forest to its confluence with the Los Angeles River. Approximately 20,416 acres (39.1 square miles) of both residential and undeveloped land drain into Devil's Gate Reservoir.

1.3. PROJECT PURPOSE AND NEED

The Proposed Project is designed to remove sediment that has accumulated behind the dam to restore the capacity of Devil's Gate Reservoir to minimize the level of flood risk to downstream communities along the Arroyo Seco. In its current condition, the reservoir no longer has the capacity to contain another major debris event safely and the outlet works have a risk of becoming clogged and inoperable. The Proposed Project would remove sediment from the reservoir behind Devil's Gate Dam to restore flood control capacity and establish a reservoir configuration more suitable for routine maintenance activities including sediment management.

The proposed excavation will remove approximately 2.9 million cubic yards of current excess sediment in the reservoir in addition to any sediment that accumulates prior to project commencement. The proposed configuration will involve approximately 178 acres of the reservoir. Excavated sediment will be trucked off-site to existing disposal site locations which are currently available to accept the sediment. The sediment will be trucked off-site either to the east and placed at the primary disposal site locations, the Vulcan Materials and the Waste Management facilities in Azusa or the Manning Pit Sediment Placement Site in Irwindale, or to the west and placed in one of the facilities in Sun Valley. Removed vegetation and organic debris will be hauled to Scholl Canyon Landfill, located in the City of Glendale.

[1] CEQA Air Quality Handbook. South Coast Air Quality Management District. 1993.

SECTION 2.0 – EXISTING ENVIRONMENT

2.1. ATMOSPHERIC SETTING

The Project site will be located wholly within the South Coast Air Basin (Basin), which includes all of Orange County, as well as the non-desert portions of Los Angeles, Riverside, and San Bernardino Counties. The distinctive climate of the Basin is determined by its terrain and geographical location. The Basin is located in a coastal plain with connecting broad valleys and low hills, bounded by the Pacific Ocean in the southwest quadrant with high mountains forming the remainder of the perimeter. The general region lies in the semi-permanent high-pressure zone of the eastern Pacific. As a result, the climate is mild, tempered by cool sea breezes. This usually mild climatological pattern is interrupted infrequently by periods of extremely hot weather, winter storms, or Santa Ana winds.

Meteorology is the study of weather and climate. Weather refers to the state of the atmosphere at a given time and place with regard to temperature, air pressure, humidity, cloudiness, and precipitation. The term "weather" refers to conditions over short periods; conditions over long periods, generally at least 30 to 50 years, are referred to as climate. Climate, in a narrow sense, is usually defined as the "average weather," or more rigorously as the statistical description in terms of the mean and variability of relevant quantities over a period ranging from months to thousands or millions of years. These quantities are most often surface variables such as temperature, precipitation, and wind.

2.1.1 Temperature and Precipitation

The annual average temperature varies little throughout the 6,600 square-mile Basin ranging from the low 60's to the high 80's. However, with a less pronounced oceanic influence, the inland portion shows greater variability in the annual minimum and maximum temperatures. The mean annual high and low temperatures in the project area — as determined from the nearest weather station in Altadena[2], which has a period of record from 1922 to 2010— are 74.1 degrees Fahrenheit (°F) and 50.0 °F, respectively. The overall climate is a mild Mediterranean, with average monthly maximum temperatures reaching to over 86 °F in the summer and dipping to 42 °F in the winter.

In contrast to a fairly steady pattern of temperature, rainfall is seasonally and annually highly variable. The total average annual precipitation is 22.01 inches, with 83 percent of precipitation occurring between November and March.

2.1.2 Humidity

Although the Basin has a semi-arid climate, the air near the surface is typically moist because of the presence of a shallow marine layer. Except for infrequent periods when dry, continental air is brought into the Basin by offshore winds, the ocean effect is dominant. Periods of heavy fog, especially along the coastline, are frequent; and low stratus clouds, often referred to as "high fog" are a characteristic climatic feature. Annual average humidity ranges from a high of about 72 percent at the coast to about 58 percent in the eastern portion of the Basin.

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[2] Western U.S. Climate Historical Summaries. Western Regional Climate Center. http://www.wrcc.dri.edu/Climsum.html. Accessed May 2013.

2.1.3 Wind

Wind patterns across the south coastal region are characterized by westerly and southwesterly on-shore winds during the day and easterly or northeasterly breezes at night. Wind speed is somewhat greater during the dry summer months than during the rainy winter season. Typical summer winds in the project area range from 4 to 7 miles per hour (mph) during the day and 2 to 6 mph during the night.

Between the periods of dominant airflow, periods of air stagnation may occur, both in the morning and evening hours. Whether such a period of stagnation occurs is one of the critical determinants of air quality conditions on any given day. During periods of low inversions and low wind speeds, air pollutants generated in urbanized areas are transported predominantly onshore into Riverside and San Bernardino Counties. In the winter, the greatest pollution problems are carbon monoxide (CO) and nitrogen oxides (NO_X), because of extremely low inversions and air stagnation during the night and early morning hours. In the summer, the longer daylight hours and the brighter sunshine combine to cause a reaction between hydrocarbons and NO_X to form photochemical smog.

During the winter and fall months, surface high-pressure systems over the Basin, combined with other meteorological conditions, can result in very strong, downslope Santa Ana winds. These winds normally have a duration of a few days before predominant meteorological conditions are reestablished. Within the project area, Santa Ana winds have a decidedly distinct pattern. Santa Ana winds from a northerly direction flow through the Cajon Pass and then follow the Santa Ana River in a southwestward motion direction to the coast. The highest wind speeds typically occur during the afternoon due to daytime thermal convection caused by surface heating. This convection brings about a downward transfer of momentum from stronger winds aloft. While the maximum wind speed during Santa Ana conditions is undefined, sustained winds of 60 mph with higher gusts are not uncommon in the project vicinity.

2.1.4 Inversions

In conjunction with the two characteristic wind patterns that affect the rate and orientation of horizontal pollutant transport, there are two similarly distinct types of temperature inversions that control the vertical depth through which pollutants are mixed. These inversions are the marine/subsidence inversion and the radiation inversion. The height of the base of the inversion at any given time is known as the “mixing height.” This mixing height can change under conditions when the top of the inversion does not change. The combination of winds and inversions are critical determinants in leading to the highly degraded air quality in summer, and the generally good air quality in the winter in the project area.

2.2. AIR QUALITY ENVIRONMENT

2.2.1 Criteria Air Pollutants

As required by the Federal Clean Air Act (FCAA), the Environmental Protection Agency (EPA) has identified criteria pollutants and established National Ambient Air Quality Standards (NAAQS) to protect public health and welfare. NAAQS have been established for ozone, CO, nitrogen dioxide (NO_2), sulfur dioxide (SO_2), suspended particulate matter (PM), and lead. Suspended PM has standards for both PM with an aerodynamic diameter of 10 microns or less (respirable PM, or PM_{10}) and PM with an aerodynamic diameter of 2.5 microns or less (fine PM, or $PM_{2.5}$). The CARB has established separate

standards for the State, i.e. the California Ambient Air Quality Standards (CAAQS). The CARB established CAAQS for all the federal pollutants and sulfates, hydrogen sulfide, and visibility-reducing particles.

For some of the pollutants, the identified air quality standards are expressed in more than one averaging time in order to address the typical exposures found in the environment. For example, CO is expressed as a one-hour averaging time and an eight-hour averaging time. Regulations have set NAAQS and CAAQS limits in parts per million (ppm) or micrograms per cubic meter ($\mu g/m^3$). Table 1 summarizes the State and federal ambient air quality standards for all criteria pollutants.

2.2.1.1 Pollutants of Concern

As discussed below, the area surrounding the project is nonattainment or maintenance for ozone, PM, NO_2, and CO. Since reactive hydrocarbons and nitrogen oxides are precursors to ozone, that is, are photochemically combined to create ozone, these are considered pollutants of concern. Following is a brief description of these pollutants of concern, including health effects and the relative level of contributed emissions.

- **Carbon monoxide** (CO) is a colorless, odorless gas produced by incomplete combustion of carbon-containing fuels (e.g., gasoline, diesel fuel, and biomass). CO levels tend to be highest during the winter months and low wind speed when the meteorological conditions favor the accumulation of the pollutants. This occurs when relatively low inversion levels trap pollutants near the ground and concentrate the CO. CO is essentially inert to plants and materials but can have significant effects on human health. CO gas enters the body through the lungs, dissolves in the blood, and creates a solid bond to hemoglobin, not allowing it to form a loose bond with carbon dioxide (CO_2), which is essential to the CO_2/oxygen exchange to occur. This firm binding therefore reduces available oxygen in the blood and oxygen delivery to the body's organs and tissues.

  A review of CARB's 2010 Emission Inventory[3] shows that the primary source of CO is from on-road motor vehicles, which contributes almost 60 percent of the total CO in the Basin portion of Los Angeles County. Other off-road engines and vehicles (such as construction equipment and recreational boats) contribute another 32 percent. Higher levels of CO generally occur in areas with heavy traffic congestion.

- **Volatile organic compounds**[4] (VOC) are defined as any compound of carbon, excluding CO, CO_2, carbonic acid, metallic carbides or carbonates, and ammonium carbonate, which participates in atmospheric photochemical reactions. It should be noted that there are no state or national ambient air quality standard for VOC because they are not classified as criteria pollutants. They are regulated, however, because a reduction in VOC emissions reduces certain chemical reactions that contribute to the formulation of ozone. VOC are also transformed into organic aerosols in the atmosphere, which contribute to higher PM_{10} and lower visibility.

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3 Almanac Emissions Projection Data. California Air Resources Board. http://www.arb.ca.gov/app/emsinv/. Accessed October 2011.

4 VOCs are sometimes referred to as reactive organic gases (ROG), in this document the two terms are considered synonymous.

Table 1 – National and State Ambient Air Quality Standards[5]

Air Pollutant	Averaging Time	California Standard	National Standard
Ozone (O_3)	1 hour	0.09 ppm	—
	8 hour	0.070 ppm	0.075 ppm
Respirable particulate matter (PM_{10})	24 hour	50 µg/m^3	150 µg/m^3
	Mean*	20 µg/m^3	—
Fine particulate matter ($PM_{2.5}$)	24 hour	—	35 µg/m^3
	Mean	12 µg/m^3	15 µg/m^3
Carbon monoxide (CO)	1 hour	20 ppm	35 ppm
	8 hour	9.0 ppm	9 ppm
Nitrogen dioxide (NO_2)	1 hour	0.18 ppm	0.100 ppm ***
	Mean	0.030 ppm	0.053 ppm
Sulfur dioxide (SO_2)	1 hour	0.25 ppm	0.075 ppm ***
	24 hour	0.04 ppm	—
Lead	30-day	1.5 µg/m^3	—
	Rolling 3-month	—	0.15 µg/m^3
	Quarter	—	1.5 µg/m^3
Sulfates	24 hour	25 µg/m^3	**No Federal Standard**
Hydrogen sulfide	1 hour	0.03 ppm	
Vinyl chloride**	24 hour	0.01 ppm	
Visibility-reducing particles	8 hour	Extinction coefficient of 0.23 per kilometer, visibility of ten miles or more due to particles when relative humidity is less than 70%.	

Abbreviations:
ppm = parts per million
µg/m^3 = micrograms per cubic meter
30-day = 30-day average
Quarter = Calendar quarter

* Mean = Annual Arithmetic Mean

** The CARB has identified lead and vinyl chloride as "toxic air contaminants" with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

*** The new 1-hour and annual mean NO_2 standards and 1-hour SO_2 standard are parts per billion (ppb) but in order to compare national and California standards directly, it has been converted to ppm.

[5] Ambient Air Quality Standards. California Air Resources Board. June 7, 2012.

VOC emissions result primarily from incomplete fuel combustion and the evaporation of chemical solvents and fuels. On-road mobile sources are the largest single contributor to VOC emissions in the Basin portion of Los Angeles County with almost 30 percent of the total VOC emissions, with most of that coming from light-duty vehicles. Another 21 percent is contributed by off-road sources like construction equipment and recreational boats. Solvent evaporation VOC sources in the area contribute another 21 percent and are primarily from the use of consumer products.

- **Nitrogen oxides** (NO_X) serve as integral participants in the process of photochemical smog production. The two major forms of NO_X are nitric oxide (NO) and NO_2. NO is a colorless, odorless gas formed from atmospheric nitrogen and oxygen when combustion takes place under high temperature and/or high pressure. NO_2 is a reddish-brown irritating gas formed by the combination of NO and oxygen. The Basin is designated a maintenance area for NO_2 but the primary concern is from the combined NO_X and its relationship to ozone. NO_X is an ozone precursor. A precursor is a directly emitted air contaminant that, when released into the atmosphere, forms, causes to be formed, or contributes to the formation of a secondary air contaminant for which an ambient air standard has been adopted, or whose presence in the atmosphere will contribute to the violation of one or more standards. When NO_X and VOC are released in the atmosphere, they can chemically react with one another in the presence of sunlight to form ozone.

  A review of the 2010 Emission Inventory shows that 86 percent of the total NO_X emissions in the Basin portion of Los Angeles County come from on- and off-road vehicles (50% from on-road and 39% from off-road). The largest portion of on-road NO_X emissions come from heavy-duty diesel trucks (36% of the total for on-road) and light-duty cars and trucks (28%). The largest contributors from off-road sources are construction and demolition equipment (55% of total off-road NO_X).

- **Particulate matter** (PM). Particle pollution is a mixture of microscopic solids and liquid droplets suspended in air. This pollution, also known as particulate matter, is made up of a number of components, including acids (such as nitrates and sulfates), organic chemicals, metals, soil or dust particles, and allergens (such as fragments of pollen or mold spores). The size of particles is directly linked to their potential for causing health problems. Small particles less than 10 micrometers in diameter pose the greatest problems, because they can get deep into lungs and the bloodstream. Being even smaller, $PM_{2.5}$ will travel further into the lungs. Exposure to such particles can affect both lungs and heart.

  A review of the 2010 Emission Inventory shows that almost 69 percent of the total PM_{10} emissions in the Basin portion of Los Angeles County come from the category labeled Miscellaneous Processes. The largest portion of the PM_{10} emissions from miscellaneous processes come from paved road dust (66% of the total for miscellaneous processes) and construction and demolition (13%). Whereas a significant portion of PM_{10} emissions come from dislocation processes, $PM_{2.5}$ is smaller and is more often a result of particulates coming from combustion sources. Subsequently, Miscellaneous Processes only represent 42 percent of the total $PM_{2.5}$, with paved road dust (39% of Miscellaneous Processes $PM_{2.5}$), cooking (32%), and residential fuel combustion (14%) being the main contributors.

2.2.1.2 Other Criteria Pollutants

The standards for other criteria pollutants are either being met, maintained, or are unclassified in the Basin, and the latest pollutant trends suggest that these standards will not be exceeded in the foreseeable future.

2.2.2 Toxic Air Contaminants

In addition to the above-listed criteria pollutants, toxic air contaminants (TACs) are another group of pollutants of concern. According to the California's latest Almanac[6], the Health and Safety Code defines a TAC as an air pollutant which may cause or contribute to an increase in mortality or serious illness, or which may pose a present or potential hazard to human health. There are almost 200 compounds that have been designated as TACs in California. The ten TACs posing the greatest known health risk in California, based primarily on ambient air quality data, are acetaldehyde, benzene, 1,3-butadiene, carbon tetrachloride, hexavalent chromium, formaldehyde, methylene chloride, para-dichlorobenzene, perchloroethylene, and diesel particulate matter (DPM). Similar to the criteria pollutants, TACs are emitted from stationary sources, area-wide sources, and mobile sources.

The Almanac relates that an analysis of 2007 State-wide health risks demonstrated that 79 percent of entire State's risks from TACs are attributed to DPM. The California Air Resources Board (CARB) identified the PM emissions from diesel-fueled engines as a TAC in August 1998 under California's TAC program. In California, diesel engine exhaust has been identified as a carcinogen. DPM is emitted from both mobile and stationary sources but in California, on-road diesel-fueled vehicles contribute approximately 38 percent of the statewide total, with an additional 60 percent attributed to other mobile sources such as construction and mining equipment, agricultural equipment, and transport refrigeration units. Stationary sources, contributing about one percent of emissions, include shipyards, warehouses, heavy equipment repair yards, and oil and gas production operations.

Existing sources of TAC emissions in the Project area is primarily Highway I-210.

2.2.3 Sensitive Receptors

Some members of the population are especially sensitive to air pollutant emissions and should be given special consideration when evaluating air quality impacts from projects. These people include children, the elderly, persons with preexisting respiratory or cardiovascular illness, and athletes and others who engage in frequent exercise. Structures that house these persons or places where they gather are defined as sensitive receptors by SCAQMD.

Residential areas are considered sensitive to air pollution because residents (including children and the elderly) tend to be at home for extended periods of time, resulting in sustained exposure to any pollutants present. Recreational land uses are considered moderately sensitive to air pollution. Exercise places a high demand on respiratory functions, which can be impaired by air pollution even though exposure periods during exercise are generally short. In addition, noticeable air pollution can detract

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6 The California Almanac of Emissions and Air Quality, 2009 Edition. Planning and Technical Support Division. California Air Resources Board. www.arb.ca.gov/aqd/almanac/almanac09/almanac2009all.pdf. Accessed March 2013.

from the enjoyment of recreation. Industrial and commercial areas are considered the least sensitive to air pollution. Exposure periods are relatively short and intermittent, as the majority of the workers tend to stay indoors most of the time. In addition, the working population is generally the healthiest segment of the public.

The Project is located adjacent to residential areas and 10 schools within one half mile; i.e. Crestview Preparatory, Franklin Elementary, Hillside, Jackson Elementary, La Cañada High, Nanny's Nursery, Odyssey Charter, Pasadena Unified, Sycamore, and Woodbury Preschool Village.

SECTION 3.0 – REGULATORY CONTEXT

Air pollutants are regulated at the national, State, and air basin level; each agency has a different degree of control. The EPA regulates at the national level; the CARB regulates at the State level; and the SCAQMD regulates at the air basin level in the Project area.

3.1. REGULATORY AGENCIES

3.1.1 Environmental Protection Agency (EPA)

The EPA is the federal agency responsible for overseeing state air programs as they relate to the FCAA, approving State Implementation Plans (SIP), establishing NAAQS and setting emission standards for mobile sources under federal jurisdiction. EPA has delegated the authority to implement many of the federal programs to the states while retaining an oversight role to ensure that the programs continue to be implemented.

3.1.2 California Air Resources Board (CARB)

CARB is the State agency responsible for establishing CAAQS, adopting and enforcing emission standards for various sources including mobile sources (except where federal law preempts their authority), fuels, consumer products, and toxic air contaminants. CARB is also responsible for providing technical support to California's 35 local air districts, which are organized at the county or regional level, overseeing local air district compliance with State and federal law, approving local air plans and submitting the SIP to the EPA. CARB also regulates mobile emission sources in California, such as construction equipment, trucks, and automobiles.

For the purposes of managing air quality in California, the California Health & Safety Codes Section 39606(a)(2) gave CARB the responsibility "based upon similar meteorological and geographic conditions and consideration for political boundary lines whenever practicable" to divide the State into air basins. Los Angeles County is located within three different air basins, i.e. the Mojave Desert Air Basin; Salton Sea Air Basin, and the Basin. The Project area is in the Basin portion of Los Angeles County.

3.1.3 South Coast Air Quality Management District (SCAQMD)

The air pollution control agency designated the authority for regulating air quality for the Basin is the SCAQMD. SCAQMD is responsible for controlling emissions primarily from stationary sources and maintains air quality monitoring stations throughout the Basin to document ambient conditions. The Basin contains an area of 10,743 square miles that is home to over 16.7 million people - about half the population of the whole state of California. It is the second most populated urban area in the United States and one of the smoggiest.

3.2. ATTAINMENT STATUS

3.2.1 Federal

EPA has identified nonattainment and attainment areas for each criteria air pollutant. Under amendments to the FCAA, EPA has classified air basins, or portions thereof, as "attainment," "nonattainment," or "unclassifiable," based on whether or not the national standards have been achieved. EPA uses two categories to designate areas with respect to $PM_{2.5}$ and NO_2, which include (1)

does not meet the standard (nonattainment) and (2) cannot be classified or better than national standards (unclassifiable/attainment). EPA uses four categories to designate for SO_2 but the only two that are applicable in California are nonattainment or unclassifiable. EPA uses three categories to designate for PM_{10}: attainment, nonattainment, and unclassifiable.

The FCAA uses the classification system to design clean-up requirements appropriate for the severity of the pollution and set realistic deadlines for reaching clean-up goals. If an air basin is not in federal attainment (that is, it does not meet federal standards) for a particular pollutant, the basin is classified as a marginal, moderate, serious, severe, or extreme nonattainment area, based on the estimated time it would take to reach attainment. Nonattainment areas must take steps towards attainment by a specific timeline. Table 2 shows the federal attainment designations and classifications for the Basin.

3.2.2 State

The current State Area Designations[7] were adopted by CARB December 28, 2012 and became effective April 1, 2013. The area designations are made on a pollutant-by-pollutant basis, for all pollutants listed above. The State designation criteria specify four categories: nonattainment, nonattainment-transitional, attainment, and unclassified. A nonattainment designation indicates one or more violations of the State standard have occurred. A nonattainment-transitional designation is a subcategory of nonattainment that indicates improving air quality, with only occasional violations or exceedances of the State standard. In contrast, an attainment designation indicates no violations of the State standard. Finally, an unclassified designation indicates either there are no air quality data or an incomplete set of air quality data. State attainment designations in the affected area are listed in Table 2.

Table 2 – Designations/Classifications for the Basin

Pollutant	State Designation	Federal Designation (Classification)
Ozone	Nonattainment	Nonattainment (Extreme)
Suspended Particulate Matter (PM_{10})	Nonattainment	Nonattainment (Serious)
Fine Particulate Matter ($PM_{2.5}$)	Nonattainment	Nonattainment
Carbon Monoxide (CO)	Attainment	Attainment (Maintenance)
Nitrogen Dioxide (NO_2)	Nonattainment	Attainment (Maintenance)
Sulfur Dioxide (SO_2)	Attainment	Attainment
Lead	Attainment	Unclassifiable/Attainment
Sulfates	Attainment	**No federal standards**
Hydrogen Sulfide (H_2S)	Unclassified	
Visibility Reducing Particles	Unclassified	

[7] Proposed 2012 Amendments to Area Designations for State Ambient Air Quality Standards. Staff Report: Initial Statement of Reasons for Rulemaking. Attachment C: Maps and Tables of Area Designations for State and National Ambient Air Quality Standards. California Air Resources Board. July 20, 2012.

3.2.3 Federal Clean Air Act Requirements

The FCAA requires plans to provide for the implementation of all reasonably available control measures including the adoption of reasonably available control technology for reducing emissions from existing sources. The FCAA encourages market-based approaches to emission control innovations. Other federal requirements addressed include mechanisms to track plan implementation and milestone compliance for ozone and CO.

3.2.4 2007 Air Quality Management Plan (AQMP)

To ensure continued progress toward clean air and comply with State and federal requirements, the SCAQMD, in conjunction with CARB and Southern California Association of Governments (SCAG), prepared the 2012 revision to its AQMP[8]. The AQMP incorporated the latest scientific and technological information and planning assumptions, including the 2012 Regional Transportation Plan/Sustainable Communities Strategy and updated emission inventory methodologies for various source categories.

The AQMP was designed to address the federal 24-hour $PM_{2.5}$ air quality standards in the Basin, to satisfy the planning requirements of the FCAA, and to provide an update on the strategy to meet the 8-hour ozone standard. The AQMP established basin-wide and episodic short-term $PM_{2.5}$ measures; 8-hour ozone implementation measures; and transportation control measures.

In the AQMP, $PM_{2.5}$ measures focused primarily on directly emitted $PM_{2.5}$ and NO_X reductions which could be feasibly achieved by the attainment date of 2014. Direct $PM_{2.5}$ emissions could be substantially reduced by episodically curtailing residential wood burning and open burning from agricultural or prescribed (e.g., brush clearing) sources. NO_X is a precursor to both $PM_{2.5}$ and ozone, and thus NO_X reductions are preferred since they are also needed for ozone.

The 8-hour ozone strategy is more complex since the deadline for attainment is 2023. The SCAQMD has another scheduled AQMP for 2015. The AQMP pursues actions that need to be implemented over the next two to three years to work towards meeting the 8-hour ozone standards. Proposed measures to reduce ozone include emission reductions from coatings, consumer products, and RECLAIM facilities as well as early transitions to cleaner technologies.

3.2.5 SCAQMD Rules and Regulations

All projects are subject to SCAQMD rules and regulations in effect at the time of construction. Specific rules applicable to the construction of the Proposed Project may include, but are not limited to, the following:

- **Rule 401 – Visible Emissions.** A person shall not discharge into the atmosphere from any single source of emission whatsoever any air contaminant for a period or periods aggregating more than three minutes in any one hour which is as dark or darker in shade as that designated No. 1 on the Ringelmann Chart, as published by the United States Bureau of Mines.

[8] Final 2012 Air Quality Management Plan. South Coast Air Quality Management District. Adopted December 7, 2012.

- **Rule 402 – Nuisance.** This Rule prohibits discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health or safety of any such persons or the public, or which cause, or have a natural tendency to cause injury or damage to business or property. The provisions of this rule do not apply to odors emanating from agricultural operations necessary for the growing of crops or the raising of fowl or animals.
- **Rule 403 – Fugitive Dust.** This rule is intended to reduce the amount of particulate matter entrained in the ambient air as a result of anthropogenic (man-made) fugitive dust sources by requiring actions to prevent, reduce, or mitigate fugitive dust emissions. Rule 403 applies to any activity or man-made condition capable of generating fugitive dust. Some specific requirements of Rule 403 are addressed below:
    - Use of applicable best available control measures (BACMs) included in Tables 1 and 2 of Rule 403.
    - No vehicular track-out beyond 25 feet and all track-out shall be removed daily.
- **Rule 431.1 and 431.2 – Sulfur Content of Gaseous Fuels and Sulfur Content of Liquid Fuels.** This Rule requires the use of low sulfur fuel for stationary construction equipment
- **Rule 1108 – Emulsified Asphalt.** This Rule sets limitations on VOC content in asphalt.

3.3. TOXIC AIR CONTAMINANTS

Air quality regulations also focus on TACs. In general, for those TACs that may cause cancer, there is no concentration that does not present some risk. In other words, there is no threshold level below which adverse health impacts may not be expected to occur. This contrasts with the criteria air pollutants for which acceptable levels of exposure can be determined and for which the ambient standards have been established. Instead, EPA and CARB regulate hazardous air pollutants (HAPs) and TACs, respectively, through statutes and regulations that generally require the use of the maximum or best available control technology (MACT or BACT) for toxics to limit emissions at the source. These, in conjunction with additional rules set forth by SCAQMD, establish the regulatory framework for TACs.

3.3.1 Federal Hazardous Air Pollutant Programs

EPA has programs for identifying and regulating HAPs. Title III of the FCAA directed EPA to promulgate National Emissions Standards for HAPs (NESHAP). The NESHAP may be different for major sources than for area sources of HAPs. Major sources are defined as stationary sources with potential to emit more than 10 tons per year (tpy) of any HAP or more than 25 tpy of any combination of HAPs; all other sources are considered area sources. The FCAA called on EPA to promulgate emissions standards in two phases. In the first phase (1992 through 2000), EPA developed technology-based emission standards designed to produce the maximum emission reduction achievable. These standards are generally referred to as requiring MACT. For area sources, the standards may be different, based on generally available control technology. In the second phase (2001–2008), EPA is required to promulgate health risk-based emissions standards, where deemed necessary to address risks remaining after implementation of the technology-based NESHAP standards.

The FCAA also required EPA to promulgate vehicle or fuel standards containing reasonable requirements that control toxic emissions, at a minimum for benzene and formaldehyde. Performance criteria were established to limit mobile-source emissions of toxics, including benzene, formaldehyde, and 1,3-butadiene. In addition, Section 219 of the FCAA required the use of reformulated gasoline in selected areas with the most severe ozone nonattainment conditions to further reduce mobile-source emissions.

3.3.2 State and Local Toxic Air Contaminant Programs

TACs in California are primarily regulated through the Tanner Air Toxics Act (Assembly Bill [AB] 1807) and the Air Toxics Hot Spots Information and Assessment Act of 1987 (Hot Spots Act) (AB 2588). AB 1807 sets forth a formal procedure for CARB to designate substances as TACs. Research, public participation, and scientific peer review must occur before CARB can designate a substance as a TAC. To date, CARB has identified more than 21 TACs and adopted EPA's list of HAPs as TACs. DPM was added to the CARB list of TACs in 1998.

Once a TAC is identified, CARB adopts an airborne toxics control measure (ATCM) for sources that emit that particular TAC. If there is a safe threshold for a substance at which there is no toxic effect, the control measure must reduce exposure below that threshold. If there is no safe threshold, the measure must incorporate BACT to minimize emissions (e.g., an ATCM limits truck idling to 5 minutes).

CARB published an Air Quality and Land Use Handbook[9], which provides guidance concerning land use compatibility with TAC sources. While not a law or adopted policy, the Handbook offers advisory recommendations for the siting of sensitive receptors near uses associated with TACs, such as freeways and high-traffic roads, commercial distribution centers, rail yards, ports, refineries, dry cleaners, gasoline stations, and industrial facilities, to help protect children and other sensitive populations.

At the local level, air pollution control or management districts may adopt and enforce CARB control measures. Under SCAQMD Regulation XIV (Toxics and Other Non-Criteria Pollutants), and in particular Rule 1401 (New Source Review), all sources that possess the potential to emit TACs are required to obtain permits from the district. Permits may be granted to these operations if they are constructed and operated in accordance with applicable regulations, including new source review standards and air toxics control measures. SCAQMD limits emissions and public exposure to TACs through a number of programs. SCAQMD prioritizes TAC-emitting stationary sources based on the quantity and toxicity of the TAC emissions and the proximity of the facilities to sensitive receptors.

[9] Air Quality and Land Use Handbook: A Community Health Perspective. California Air Resources Board. 2005.

SECTION 4.0 – HISTORICAL AMBIENT CONDITIONS

4.1. LOCAL AMBIENT AIR QUALITY

Existing levels of ambient air quality and historical trends and projections in the Project area are best documented by ambient measurements made by the SCAQMD. The SCAQMD has an extensive air-monitoring network that measures levels of several air pollutants throughout the Basin. The SCAQMD has subdivided the Basin into 38 Source-Receptor Areas (SRA), each containing one or more monitoring station. These SRAs provide a general representation of the local meteorological and air quality conditions within the particular area.

The Project is located within the western portion of the San Gabriel Valley Area. The Project site is in SRA 8 and has a monitoring station located only 5 miles southeast of the Project site. However, this site (the Pasadena, S. Wilson Ave Site) only measures ozone, CO, NO_2, and $PM_{2.5}$. The nearest site that measures PM_{10} is located in Burbank on West Palm (8 miles west). Table 3 summarizes 2007 through 2012 published monitoring data from the CARB's Aerometric Data Analysis and Management System (ADAM)[10] for the Pasadena and Burbank Stations.

The monitoring data shows that there were no violations of CO or NO_2 in the most recent six years, however the Pasadena Station demonstrates the general air quality problems of the Basin in that it exceeded both federal and State 8-hour ozone standards and the State 1-hour ozone standard in all the last six years. The State PM_{10} in Burbank was exceeded in five of the six years and the federal $PM_{2.5}$ standards in Pasadena was exceeded in four of the six years, with the 2010 season not exceeding either. The federal PM_{10} standard was not exceeded in Burbank in any of the years.

[10] ADAM Air Quality Data Statistics. California Air Resources Board. http://www.arb.ca.gov/adam/welcome.html. Accessed October 2014.

Table 3 – Ambient Air Quality Monitoring Summary[11]

Air Pollutant	2007	2008	2009	2010	2011	2012
Ozone (O_3) – Pasadena						
Max 1 Hour (ppm)	**0.149**	**0.122**	**0.176**	**0.101**	**0.107**	**0.111**
Days > CAAQS (0.09 ppm)	13	16	12	1	5	8
Max 8 Hour (ppm)	**0.101**	**0.100**	**0.114**	**0.081**	**0.084**	**0.086**
Days > NAAQS (0.08 ppm)	11	16	12	3	5	9
Days > CAAQS (0.070 ppm)	21	26	19	6	13	20
Carbon Monoxide (CO) – Pasadena						
Max 8 Hour (ppm)	2.28	2.21	2.13	1.94	2.15	1.58
Days > NAAQS (9 ppm)	0	0	0	0	0	0
Days > CAAQS (9.0 ppm)	0	0	0	0	0	0
Nitrogen Dioxide (NO_2) – Pasadena						
Max 1 Hour (ppm)	0.092	0.105	0.080	0.071	0.102	0.071
Days > CAAQS (0.18 ppm)	0	0	0	0	0	0
Particulate Matter (PM_{10}) – Burbank						
Max Daily California Measurement	**107**	**61**	**76**	50	**60**	**54**
Days > NAAQS (150 µg/m^3)	0	0	0	0	0	0
Days > CAAQS (50 µg/m^3)	5	5	10	0	2	1
Particulate Matter ($PM_{2.5}$) – Pasadena						
Max Daily National Measurement	**68.8**	**66.0**	**51.9**	35.2	**43.8**	30.5
Days > NAAQS (35 µg/m^3)	3	2	3	0	1	0

Abbreviations:

> = exceed — ppm = parts per million — µg/m^3 = micrograms per cubic meter
CAAQS = California Ambient Air Quality Standard — NAAQS = National Ambient Air Quality Standard
Mean = Annual Arithmetic Mean — **Bold** = exceedance
* No Data / Insufficient Data

[11] *ibid*

SECTION 5.0 – THRESHOLDS OF SIGNIFICANCE

5.1. CEQA THRESHOLDS OF SIGNIFICANCE

The State CEQA Guidelines suggest, from an "air quality" perspective, that a project would normally be judged to produce a significant or potentially significant effect on the environment if the project were to:

a) Conflict with or obstruct implementation of the applicable air quality plan.

b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation.

c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or State ambient air quality standards.

d) Expose sensitive receptors to substantial air pollutant concentrations.

e) Create objectionable odors affecting a substantial number of people.

As indicated in Section 15064(i)(1) of the State CEQA Guidelines, "cumulatively considerable" is defined to mean "that the incremental effects of an individual project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects."

As stated in CEQA Guidelines Appendix G, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the above determinations. SCAQMD has established regional thresholds, as shown in Table 4. SCAQMD's regional significance thresholds approximately correlate to the reduction requirements to ensure that a project does not contribute to an existing or projected air quality violation, create new violations, or result in a cumulatively considerable net increase in nonattainment criteria pollutant or ozone precursor concentrations.

5.2. REGIONAL THRESHOLDS OF SIGNIFICANCE

The following regional significance thresholds (Table 4) for air quality have been established by the SCAQMD on a daily basis for construction and operations emissions. During construction or operation, if any of the identified daily air pollutant thresholds are exceeded by the Proposed Project, then the project's air quality impacts may be considered significant. The SCAQMD indicates in Chapter 6 of its CEQA Handbook that it considers a project to be mitigated to a level of insignificance if its primary effects are mitigated below the thresholds provided in Table 4.

Table 4 – Regional Thresholds of Significance[12]

Pollutant	Emissions in lbs/day	
	Construction	Operations
ROG	75	55
NO_X	100	55
CO	550	550
PM_{10}	150	150
$PM_{2.5}$	55	55
SO_X	150	150

5.3. LOCALIZED SIGNIFICANCE THRESHOLDS (LSTS)

The SCAQMD Governing Board adopted a methodology for calculating localized air quality impacts through Localized Significance Thresholds[13] (LSTs), which is consistent with SCAQMD's Environmental Justice Enhancement Initiative I-4. LSTs represent the maximum emissions from a project that will not cause or contribute to an exceedance of the most stringent applicable state or national ambient air quality standard. The LSTs are developed based on the ambient concentrations of that pollutant for each source receptor area and are applicable to NO_X, CO, PM_{10}, and $PM_{2.5}$. The LST guidelines states that, for LST purposes, emissions include only on-site activities and that the $PM_{2.5}$ and PM_{10} emissions include both fugitive dust and exhaust from the stationary/mobile equipment on-site.

The Project is located in SRA 8. It is assumed that construction will disturb no more than 5 acres per day and that sensitive receptors are within 25 meters. Using the 2006-2008 look-up tables provided in the LST Guidelines for a conservative 5 acres per day disturbed at a receptor distance of 25 meters, Table 5 shows the appropriate LSTs for construction activity. Since on-going maintenance activity will be essentially be a reduce intensity version of the Project, construction LSTs will be used for maintenance.

Table 5 – SCAQMD Localized Thresholds for Construction[14]

Pollutant	Localized Significance Threshold (lbs/day)
Nitrogen Dioxide (NO_2)	148
Carbon Monoxide (CO)	1,540
Inhalable Particulate Matter (PM_{10})	12
Fine Particulate Matter ($PM_{2.5}$)	7

12 Air Quality Significance Thresholds. South Coast Air Quality Management District. Revised October 2006.

13 Final Localized Significance Threshold Methodology. South Coast Air Quality Management District. Revised July 2008.

14 *ibid.*

5.4. ADDITIONAL INDICATORS

The SCAQMD recommends that "additional indicators" should be used as screening criteria with respect to air quality. Additional factors relevant to the project at hand identified in the Handbook include the following significance criteria:

- Interference with the attainment of the federal or State ambient air quality standards by either violating or contributing to an existing or projected air quality violation.
- Emit carcinogenic or toxic contaminants that exceed the maximum individual cancer risk of 10 in one million.

Again, the SCAQMD indicates in Chapter 6 of its Handbook that it considers a project to be mitigated to a level of insignificance if its effects are mitigated below the thresholds provided above.

SECTION 6.0 – ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

6.1. ANALYSIS METHODOLOGY

Short-term activities related to the sediment removal and emissions from on-going maintenance activities of criteria air pollutants were assessed in accordance with methodologies recommended by CARB and SCAQMD. Emissions were calculated using methodologies and formulas from various agencies including CARB, EPA, and the SCAQMD. Modeled emissions were compared with applicable SCAQMD thresholds to determine significance. Calculations were based, in part, on information about vehicle trip generation from the Traffic Impact Analysis[15] (TIA) prepared for this project. Information on off-road equipment and project scheduling and logistics were supplied by the Los Angeles County Department of Public Works (LACDPW).

6.2. ANALYSIS OF ENVIRONMENTAL IMPACTS

IMPACT 1: Would the Project conflict with or obstruct implementation of the applicable air quality plan?

Typically assessments for air quality plan consistency uses four criteria for determining project consistency with the current AQMP. The first and second criteria are from the SCAQMD. According to the SCAQMD, there are two key indicators of AQMP consistency: 1) whether the project will not result in an increase in the frequency or severity of existing air quality violations or cause or contribute to new violations, or delay timely attainment of air quality standards or the interim emission reductions specified in the AQMP; and 2) whether the project will exceed the assumptions in the AQMP based on the year of project build out and phase[16]. The third criterion is compliance with the control measures in the AQMP. The fourth criterion is compliance with the SCAQMD regional thresholds.

- Project's Contribution to Air Quality Violations

  As shown in Impact 2, the Project has the potential to violate air quality standard or contribute substantially to an existing or projected air quality violation. Mitigations were proposed but deemed unreasonable and unachievable; therefore, the Project would not meet the first indicator.

- AQMP Assumptions

  One way to assess project compliance with the AQMP assumptions is to ensure that the population density and land use are consistent with the growth assumptions used in the air plans for the air basin. According to CARB transportation performance standards, the rate of growth in vehicle miles traveled (VMT) and trips should be held to the rate of population growth[17]. Compliance with this performance standard is one way suggested by CARB of showing compliance with the growth assumptions used in the AQMP. If the total VMT generated by the Proposed Project at build-out is at

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15 Traffic Impact Analysis for Devil's Gate Reservoir Sediment Removal and Management Project. Hall & Foreman, Inc. September 2013.

16 Air Quality Significance Thresholds. South Coast Air Quality Management District. Revised October 2006.

17 *ibid*

or below that predicted by the AQMP, then the Proposed Project's mobile emissions is consistent with the AQMP. It is assumed that the existing and future pollutant emissions computed in the AQMP were based on land uses from area general plans.

The Proposed Project does not create any overall population growth therefore having no effect on growth assumptions used in the latest SCAQMD AQMP[18]. Total long-term VMT generated by the project is related to maintenance activities and is considered minimal and will not affect consistency with the AQMP.

Level of Significance before Mitigation
The Proposed Project would result in a potentially significant impact.

Mitigation
Mitigations AQ-1 and AQ-2 are addressed in Impact 2.

Level of Significance After Mitigation
This Project will be mitigated to a level of less than significant.

IMPACT 2: Would the Project violate any air quality standard or contribute to an existing or projected air quality violation?

Emissions related to the off-road equipment used to remove the sediment, including four front loaders with 4 yd^3 capacity buckets, two D-8 dozers, an excavator, a grader, water truck, and sorters/crushers. In addition, disposal trucks with 16 to 20 yd^3 of capacity are proposed to haul approximately 7,650 yd^3 per day. Removal of the sediment, vegetation, and organic debris is expected to require an average of 50 truck trips per hour, with an estimated maximum of 425 truck trips per day during excavation activities and only 300 truck trips per day during maintenance activity. The sediment disposal trucks will dispose of material either to the east and placed at the primary disposal site locations, the Vulcan Materials or Waste Management facilities in Azusa or the Manning Pit Sediment Placement Site in Irwindale or to the west and placed in one of the facilities in Sun Valley. Removed vegetation and organic debris will be hauled to Scholl Canyon Landfill, located in the City of Glendale. It is estimated that for approximately 3 weeks during the first year of the Proposed Project approximately 50 percent of the total trucking will be green waste debris trucked to greenwaste facility at Scholl Canyon and the remaining will be distributed to the other sites. After the first year including maintenance activities, during the first week approximately 25 percent of the debris will be trucked to the Scholl site and the remaining 75 percent of trucking will be sediment distributed to the other sites.

Construction activities emissions, including soil disturbance dust emissions and combustion pollutants from on-site construction equipment; from idling of haul trucks at loading and staging sites; from off-site trucks hauling sediment material; and from employees working on the Project would create a temporary

[18] Final 2012 Air Quality Management Plan. South Coast Air Quality Management District. Adopted December 7, 2012.

addition of pollutants to the local airshed. These emissions were estimated using the following assumptions and methods:

On-Road Truck Emissions

To estimate emissions from on-road sediment disposal trucks, mileages between the Project site and each of the disposal sites, using haul routes assumed in the TIA, were measured. Highway mileages were separated from surface street mileage in order to estimate emissions more accurately, since the VMT ratio between highways and surface streets may not mirror the general fleet average. For the five year life of the Proposed Project it is estimated that approximately 3 percent of the trips will travel to the Scholl Canyon site with green waste, and sediment will account for78 percent of the trips be delivered to the Irwindale sites, and 19 percent will go to the Sun Valley sites. During Maintenance activities, only 2 percent of the trips are assigned to Scholl Canyon, 75 percent will be delivered to the Irwindale sites, and 23 percent will go to the Sun Valley sites.

To generate expected exhaust emissions, this AQR used CARB's EMFAC2011 Web Based Data Access[19] with emission rate data for Los Angeles County for the years 2015 and 2020. This AQR used EMFAC2011's aggregate model years, which is an average age of vehicles specific for Los Angeles County for the specific years modeled. Since the average fleet emissions in the State is getting cleaner each year, the more conservative first year of sediment removal, Year 2015, was used. For maintenance activity Year 2020 emission factors were used. This AQR used "T7 single construction" as the most representative EMFAC2011 vehicle category for the sediment disposal trucks and generated an aggregate average emission factor for vehicle speeds 5 miles per hour (mph) to 45 mph for surface street mileage and 50 mph to 70 mph for highway mileage.

Off-Road Equipment Emissions

Off-road equipment brake horsepower and emission factors were obtained from the CalEEMod Users Guide[20]. Since CalEEMod uses 2007OFFROAD default load factors and CARB has released an updated load factor list which demonstrates that, for most equipment types, the 2007OFFROAD model will result in a fairly significant overestimation of emissions; this AQR uses equipment load factors from the Carl Moyer Program Guidelines[21].

Employee Vehicle Emissions

To generate expected exhaust emissions, this AQR used CARB's EMFAC2011 Web Based Data Access as mentioned in the on-road trucks section. In order to more accurately represent the type of vehicles used by the potential employee work pool, a weighted average emission factor was generated using 69 percent of the pool using light-duty automobiles and the rest using light-duty trucks. The percentages were derived from the distributions of VMT from EMFAC2011.

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19 http://www.arb.ca.gov/msei/modeling.htm#emfac2011_web_based_data

20 CalEEMod Users Guide - Appendix D, CalEEMod User's Tips (June 2011)

21 The 2011 Carl Moyer Program Guidelines. California Air Resources Board. March 27, 2013.

Fugitive Dust Emissions

Emissions of PM_{10} and $PM_{2.5}$ from fugitive sources were calculated using various methods. Fugitive dust from excavation activities, grading, and material loading were calculated using EPA's AP-42[22] methods. Emissions estimates were reduced to reflect the Applicant's full compliance with the SCAQMD's Rule 403, including, but not limited to:

- Implementation of one of the measures in subparagraphs (d)(5)(A) through (d)(5)(E) at each vehicle egress from the site to a paved public road to reduce impacts from track-out;
- Submission of a Large Operation Notification (SCAQMD Form 403 N) to the SCAQMD Executive Officer within 7 days of qualifying as a large operation;
- Apply water or stabilizing agent during clearing and grubbing, crushing, or earth-moving activities in sufficient quantity to prevent the generation of dust plumes. Soil should be maintained in a damp condition so that visible emissions do not exceed 100 feet in any direction;
- During exporting of materials, use tarps or other suitable enclosures on all haul trucks. Haul loads should have at least six inches of freeboard space;
- Stabilize all off-road traffic on haul routes and in parking areas and stabilize all staging areas and stockpiled materials. Limit speeds of vehicles on haul routes, staging areas, and parking lots;
- Limit vehicular activity to established unpaved roads (haul routes) and unpaved parking lots;
- For all earth-moving activity within 100 feet of property lines, maintain soil moisture content at a minimum of 12 percent, as determined by American Society for Testing and Materials (ASTM) method D-2216 or other equivalent approved method.

Table 6 provides a summary of the unmitigated emission estimates for sediment removal activity. Operational emissions, defined as the on-going maintenance activities beginning in 2020, were calculated using the same methodology. Table 7 shows estimated emissions from on-going maintenance activities. Details of the air quality calculations are included in Appendix A.

[22] Compilation of Air Pollutant Emission Factors – AP-42, Volume 1, Fifth Edition. United States Environmental Protection Agency. January 1995.

Table 6 – Unmitigated Sediment Removal Emissions

Category	Maximum Daily Emissions (lbs/d)				
	ROG	CO	NO_X	PM_{10}	$PM_{2.5}$
Off-Road	7.54	33.99	55.18	2.87	2.87
On-Road Trucks	7.15	34.87	314.93	5.33	4.91
Onsite Idling	0.44	1.89	7.88	0.05	0.05
Employees	0.07	2.44	0.24	0.00	0.00
Fugitive	0.00	0.00	0.00	5.46	0.89
Project Maximum Daily	**15.2**	**73.2**	**378.2**	**13.7**	**8.7**
SCAQMD Daily Threshold	75	550	100	150	55
Exceeds Threshold?	No	No	**Yes**	No	No

Table 7 – Unmitigated Maintenance Activity

Category	Maximum Daily Emissions (lbs/d)				
	ROG	CO	NO_X	PM_{10}	$PM_{2.5}$
Off-Road	2.86	17.29	19.26	0.98	0.98
On-Road Trucks	2.82	17.47	104.22	1.71	1.57
Onsite Idling	0.20	0.89	3.71	0.02	0.02
Employees	0.02	0.76	0.07	0.00	0.00
Fugitive	0.00	0.00	0.00	3.30	0.75
Project Maximum Daily	**5.9**	**36.4**	**127.3**	**6.0**	**3.3**
SCAQMD Daily Threshold	75	550	100	150	55
Exceeds Threshold?	No	No	No	No	No

As shown in the above tables, during both the sediment removal and maintenance portions Project emissions of NO_X would exceed the Daily Regional Threshold.

Level of Significance before Mitigation

The Proposed Project would result in a potentially significant impact during both the sediment removal and maintenance phases.

Mitigation

The two categories that combine to contribute most to the potentially significant impact are the emissions from on-road trucks and the off-road equipment.

On-Road – Mitigation of on-road trucks can be accomplished by requiring the contractor that receives the work make all efforts to utilize disposal trucks that meet EPA's emission standards for Model Year 2007 (MY2007) and later. Since the 2007 standards were established with a three year phase-in period, the effects of reduced emissions from the standard are not apparent until Model Year 2010 (MY2010).

To estimate the impacts of this mitigation, this AQR used EMFAC2011 emission factors for MY2010 trucks only and compared to the aggregate truck fleet for Year 2015 for sediment removal and Year 2020 for Maintenance, which resulted in the MY2010 trucks yielding a 79 percent NO_X reduction on surface roads and 83 percent reduction on highways and yielding a 68 percent PM_{10} and $PM_{2.5}$ reduction on surface roads and 53 percent reduction on highways for Year 2015 and a 59 percent NO_X reduction on surface roads and 62 percent reduction on highways and yielding a 5 percent PM_{10} and $PM_{2.5}$ reduction on surface roads and only 0.2 percent reduction on highways for Year 2020.

Off-Road – Mitigation of off-road equipment usage could be assisted by requiring the contractor to make all efforts to utilize new EPA Tier 3 or better equipment. Tier 4 emissions standards are addressed in 40 Code of Federal Regulations (CFR), Part 1039 and addresses new compression-ignition nonroad (i.e. CARB off-road equivalent) engines. Standards were phased in for various power categories with the latest being effective in 2011.

The emission factor used to estimate off-road equipment in this AQR was obtained from tables presented in CalEEMod's User Guidelines and represents the statewide average of equipment for each category. The factors for fleet year 2015 most closely compare to an average fleet of Tier 2 equivalent equipment. Using SCAQMD's Table II-E of the Off-Road Mitigation Measure Tables[23] and applying the percentage reductions from Tier 2 to Tier 3 to the unmitigated emissions represented above reduces the NO_X emissions from the off-road component for the sediment removal and maintenance portions of the Project.

In summary, sufficient reductions could potentially be achieved by implementing the following mitigations:

Mitigation AQ-1 – The Applicant could require all construction contractors during the sediment removal and maintenance portions of the Project to use dump trucks that meet the EPA's final phase emission standards for Model Year 2007.

[23] Off-Road Engines Mitigation Measure Tables. South Coast Air Quality Management District. http://www.aqmd.gov/ceqa/handbook/mitigation/offroad/MM_offroad.html. Accessed May 2013.

Mitigation AQ-2 – The Applicant could require all construction contractors during the sediment removal and maintenance portions of the Project to use off-road equipment that meet the EPA's emission standards for Tier 3 or 4 equipment. After January 1, 2015, the Construction Contractor shall supply a copy of each unit's certified tier specification, BACT documentation, and CARB or SCAQMD operating permit at the time of mobilization of each applicable unit of equipment.

Table 8 – Mitigated Sediment Removal Emissions

Category	Maximum Daily Emissions (lbs/d)				
	ROG	CO	NO_X	PM_{10}	$PM_{2.5}$
Off-Road	4.71	33.99	22.05	2.60	2.15
On-Road Trucks	7.15	34.87	56.90	2.40	2.20
Onsite Idling	0.44	1.89	2.48	0.01	0.01
Employees	0.07	2.44	0.24	0.00	0.00
Fugitive	0.00	0.00	0.00	5.46	0.89
Project Maximum Daily	**12.4**	**73.2**	**81.7**	**10.5**	**5.2**
SCAQMD Daily Threshold	75	550	100	150	55
Exceeds Threshold?	No	No	No	No	No

Table 9 – Mitigated Maintenance Emissions

Category	Maximum Daily Emissions (lbs/d)				
	ROG	CO	NO_X	PM_{10}	$PM_{2.5}$
Off-Road	2.86	17.29	19.26	0.98	0.98
On-Road Trucks	2.82	17.47	40.56	1.70	1.56
Onsite Idling	0.20	0.89	1.17	0.00	0.00
Employees	0.02	0.76	0.07	0.00	0.00
Fugitive	0.00	0.00	0.00	3.30	0.75
Project Maximum Daily	**5.9**	**36.4**	**61.1**	**10.5**	**3.3**
SCAQMD Daily Threshold	75	550	100	150	55
Exceeds Threshold?	No	No	No	No	No

Level of Significance After Mitigation
As shown in Table 8 and Table 9, implementation of these mitigations would result in a reduction of the Proposed Project's combined NO_X emissions during both the sediment removal and maintenance portions to less than the SCAQMD Regional Threshold for NO_X.

IMPACT 3: Would the Project result in cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors)?

In accordance with CEQA Guidelines 15130(b), this analysis of cumulative impacts incorporates a summary of projections. The following three-tiered approach is to assess cumulative air quality impacts.

- Consistency with the SCAQMD project specific thresholds for construction and operation;
- Project consistency with existing air quality plans; and
- Assessment of the cumulative health effects of the pollutants.

Project Specific Thresholds

Although emissions of VOC, PM_{10}, and $PM_{2.5}$ are not expected to exceed the SCAQMD regional significance thresholds during sediment removal or on-going maintenance activities, NO_X emissions may remain significant for sediment removal activity.

Air Quality Plans

The Basin, in which the Project is located, is in nonattainment for ozone, PM_{10}, and $PM_{2.5}$. As such, the SCAQMD is required to prepare and maintain an AQMP and a SIP to document the strategies and measures to be undertaken to reach attainment of air quality standards. While the SCAQMD does not have direct authority over land use decisions, it was recognized that changes in land use and circulation planning were necessary to maintain clean air. As discussed above in Impact 1, the Project is compliant with the AQMP.

Cumulative Health Impacts

The Basin is in nonattainment for ozone, PM_{10}, and $PM_{2.5}$, which means that the background levels of those pollutants are at times higher than the air quality standards. The air quality standards were set to protect the health of sensitive individuals (i.e., elderly, children, and the sick). Therefore, when the concentration of those pollutants exceed the standard, it is likely that some of the sensitive individuals of the population experience adverse health effects.

The localized significance analysis in Impact 3 demonstrated that with mitigation during sediment removal or on-going maintenance activities, no localized significance threshold was expected to be exceeded; therefore, the emissions of particulate matter, NO_2, and CO would not result in a significant cumulative health impact.

Level of Significance before Mitigation
The Proposed Project would result in a potentially significant impact.

Mitigation
Mitigations AQ-1 and AQ-2 are addressed in Impact 2.

Level of Significance After Mitigation
The Project would be mitigated to less than significant.

IMPACT 4: Would the Project expose the public (especially schools, day care centers, hospitals, retirement homes convalescence facilities, and residences) to substantial pollutant concentrations?

An impact is potentially significant if emissions levels exceed the State or federal Ambient Air Quality Standards.

Localized Significance Thresholds

The SCAQMD's LST methodology was developed to be used as a tool to assist lead agencies to analyze localized impacts associated with project-specific level Proposed Projects. The LST methodology and associated mass rates are not designed to evaluate localized impacts from mobile sources traveling over the roadways. The emissions used for the purpose of LST analysis include only on-site activities. The on-site emissions for sediment removal operations are presented in Table 10 and the on-site emissions for maintenance activities are presented in Table 11, which show that no LST thresholds are exceeded.

Table 10 – On-Site Sediment Removal Emissions

Category	Maximum Daily Emissions (lbs/d)			
	CO	NO_X	PM_{10}	$PM_{2.5}$
Off-Road	33.99	55.18	2.87	2.87
Idling	1.89	7.88	0.05	0.05
Fugitive	0.00	0.00	5.46	0.89
Max Daily Emissions	**35.9**	**63.1**	**8.4**	**3.8**
LST Threshold	1,540	148	12	7
Exceeds Threshold?	No	No	No	No

Carbon Monoxide Hotspot

Because CO is produced in greatest quantities from vehicle combustion and does not readily disperse into the atmosphere, adherence to the AAQSs is typically demonstrated through an analysis of localized CO concentrations. Areas of vehicle congestion have the potential to create "pockets" of CO called "hot spots." Hot spots are usually created in locations where vehicles are subject to congestion, reduced speeds, and queuing. These are most typically at intersections, but can also be along congested major arterials and freeways. Typically, for vehicles to produce a hot spot, the roadway/intersection level of service (LOS) must be degraded to "D" or worse.

Table 11 – On-Site Maintenance Emissions

Category	Maximum Daily Emissions (lbs/d)			
	CO	NO_X	PM_{10}	$PM_{2.5}$
Off-Road	17.29	19.26	0.98	0.98
Idling	0.89	3.71	0.02	0.02
Fugitive	0.00	0.00	3.30	0.75
Max Daily Emissions	**18.2**	**23.0**	**4.3**	**1.8**
LST Threshold	1,540	148	12	7
Exceeds Threshold?	No	No	No	No

The TIA[24] prepared for this project shows that there are five intersections that are modeled to be an LOS F or worse in 2014 with the Project. A CO hot-spot analysis was prepared in accordance with the Transportation Project-Level Carbon Monoxide Protocol[25] (CO Protocol). According to the CO Protocol, intersections with an LOS E or F could require detailed analysis.

The hot-spot analysis was performed on the five intersections. CALINE4 was used to predict the potential CO concentrations at these intersections. CALINE4 is a dispersion model produced by Caltrans that predicts CO impacts near roadways. CO modeling results are available in Appendix B.

There are several inputs to the CALINE4 model. One input is the traffic volumes, which was provided in the TIA, and another input is roadway widths. Table 12 shows estimated CO concentrations at the worst-case receptor location for these intersections. The CALINE4 output is added to the 1-hour and 8-hour backgrounds to produce the concentrations. Backgrounds were obtained from 2011 air quality data[26] of 8-hour CO monitoring data and dividing the 8-hour by a persistence factor of 0.7 to generate the 1-hour background. Significance impact shows the comparison of the 1-hour concentration to the State standard of 20 ppm and the 8-hour concentration to the State/national standard of 9 ppm.

24 Traffic Impact Analysis for Devil's Gate Reservoir Sediment Removal and Management Project. Hall & Foreman, Inc. September, 2013.

25 Transportation Project-Level Carbon Monoxide Protocol. Garza, V.J., Graney, P., Sperling, D. University of California Davis, Institute of Transportation Studies. 1997.

26 2011 Air Quality. South Coast Air Quality Management District. http://www.aqmd.gov/smog/historicaldata.htm. Accessed May 2013.

Table 12 – CO Concentrations Summary

Intersection Number[27] and Description		CO Concentration (ppm)	
		1-hour	8-hour
#11	Irwindale Ave @ Gladstone St	3.54	2.48
#13	Vincent Ave @ Arrow Hwy	3.74	2.62
#21	Figueroa St/Scholl Canyon @ SR-134 WB Ramps	3.34	2.34
#22	Figueroa St @ Eagle Vista Dr	3.34	2.34
#23	Figueroa St @ SR-134 EB Ramps	3.44	2.41
	Significance Thresholds	20	9
	Exceeds Threshold?	No	No

Level of Significance before Mitigation
The Proposed Project would result in less than significant impacts.

Mitigation
No mitigation measures are necessary.

Level of Significance After Mitigation
The Project would remain less than significant.

IMPACT 5: Would the Project create objectionable odors affecting a substantial number of people?

Impact Analysis: The CEQA guidelines indicate that a significant impact would occur if the Proposed Project would create objectionable odors affecting a substantial number of people.

Diesel exhaust will be emitted during sediment removal process, which is objectionable to some; however, as demonstrated in Impact 6, concentrations will disperse rapidly from the Project site; therefore impacts should not be at a level to induce a negative response.

Level of Significance before Mitigation
The Proposed Project would result in less than significant impacts.

Mitigation
No mitigation measures are necessary.

Level of Significance After Mitigation
The Project would remain less than significant.

27 Intersection number as represented in the Traffic Impact Analysis

IMPACT 6: Would the Project emit carcinogenic or toxic contaminants that exceed the maximum individual cancer risk of 10 in one million?

In order to ascertain the potential for the Proposed Project to emit carcinogenic or toxic contaminants that exceed the maximum individual cancer risk of 10 in one million, a Health Risk Assessment (HRA)[28] was performed and attached in Appendix C. The Proposed Project would generate TAC emissions from diesel truck emissions and on-site diesel equipment used during both the sediment removal activities and the annual maintenance activities. According to SCAQMD methodology, health effects from carcinogenic air toxics are usually described in terms of individual cancer risk. "Individual Cancer Risk" is the likelihood that a person exposed to concentrations of TACs over a 70-year lifetime will contract cancer, based on the use of standard risk-assessment methodology.

Since, the diesel truck emissions would operate in the closest proximity to sensitive receptors while on surface streets, the diesel truck travel modeling has been limited to the portion of the trips that would occur on surface streets. Two separate routes were modeled from the Project site to I-210, Haul Routes 1A /1E and Haul Routes 1B/1F. Even though the Project will use Haul Route 1D/H, these two routes were chosen as a worst-case, conservative comparison, since they would place all of the truck trips on the same roadway and would result in the greatest impact. In addition, Haul Route 2A and 4A were analyzed since they are the most likely two haul routes to be utilized by the Proposed Project.

Results of ISC-AERMOD modeling presented in the HRA show that the maximum off-site diesel cancer risk impact predicted from Haul Routes 1A/1E and 1B/1F were found to be 1.9 in a million and the maximum off-site diesel concentration cancer risk impact predicted from Haul Route 2A was only 0.34 in a million; thus significantly below the 10 in a million cancer risk threshold. In addition, all routes modeled resulted in less than significant non-cancer risk from diesel emissions created by the Proposed Project.

Level of Significance before Mitigation
The Proposed Project would result in less than significant impacts.

Mitigation
No mitigation measures are necessary.

Level of Significance After Mitigation
The Project would remain less than significant.

[28] Health Risk Assessment: Devil's Gate Reservoir Sediment Removal and Management Project. Vista Environmental. September 27, 2013.

SECTION 7.0 – ALTERNATIVES ANALYSIS

7.1. ALTERNATIVE 1 – CONFIGURATION B

Alternative 1 will only remove 2.8 million yd^3 of sediment instead of the 2.9 million yd^3 in the Proposed Project. Additionally the area excavated in Alternative 1 would only involve approximately 83 acres instead of the 178 acres of the Proposed Project. However, Alternative 1 has the same removal method, sediment disposal method, sediment removal truck routes, project schedule, and long-term sediment management methods as the Proposed Project.

7.1.1 Alt 1 - Impact 1

Alternative 1 would provide no significant difference in impacts to the AQMP from the Proposed Project.

7.1.2 Alt 1 - Impact 2

Even though the quantity of sediment removed would be slightly less for Alternative 1 than the Proposed Project and less acreage would be affected, the daily activity level of Alternative 1 would be no different from the Proposed Project. For Alternative 1, the LACDPW still estimates a rate of removal of 7,650 yd^3 per day and an average of 425 trucks per day travelling to the same disposal sites. The LACDPW expects the staffing needs and schedules to remain the same. Therefore, Alternative 1 would provide no significant difference in air quality emissions from the Proposed Project.

7.1.3 Alt 1 - Impact 3

Alternative 1 would provide no significant difference in any cumulatively considerable net increase of any criteria pollutant from the Proposed Project.

7.1.4 Alt 1 - Impact 4

Even though the quantity of sediment removed would be slightly less for Alternative 1 than the Proposed Project and less acreage would be affected, the daily activity level of Alternative 1 would be no different from the Proposed Project. For Alternative 1, the LACDPW still estimates a rate of removal of 7,650 yd^3 per day and off-road equipment operating at 10 hours per day. The LACDPW expects the staffing needs and schedules to remain the same. Therefore, Alternative 1 would provide no significant difference in CO concentrations at intersections or exceedances of localized significant thresholds from the Proposed Project.

7.1.5 Alt 1 - Impact 5

Alternative 1 would provide no significant difference in the creation of objectionable odors from the Proposed Project.

7.1.6 Alt 1 - Impact 6

Alternative 1 would provide no significant difference in the emissions of carcinogenic or toxic contaminants from the Proposed Project.

7.2. ALTERNATIVE 2 – CONFIGURATION C

Alternative 2 will remove approximately 4 million yd^3 instead of the 2.9 million yd^3 in the Proposed Project. The area excavated for Alternative 2 will only involve approximately 84 acres instead of the 178 acres of the Proposed Project. Alternative 2 will require 6 years to complete instead of 5 years for the Proposed Project but has the same daily activity level, removal method, sediment disposal method, and sediment removal truck routes as in the Proposed Project. Sediment management methods in Alternative 2 will involve approximately 47 acres and the southern end of the basin would need to be armored and maintained to prevent erosion using either concrete or stones and upstream adjustable weirs for directional discharge.

7.2.1 Alt 2 - Impact 1

Alternative 2 would provide no significant difference in impacts to the AQMP from the Proposed Project.

7.2.2 Alt 2 - Impact 2

Even though the quantity of sediment removed would be significantly more for Alternative 2 than the Proposed Project, Alternative 2 would disturb less overall acreage. However, even though Alternative 2 would require 6 years to complete the initial sediment removal, the daily activity level of the Proposed would not be expected to be different that the Proposed Project. The LACDPW still estimates a rate of removal of 7,650 yd^3 per day and off-road equipment operating at 10 hours per day. The LACDPW expects the staffing needs and schedules to remain the same. Alternative 2 would provide no significant difference in CO concentrations at intersections or exceedances of locally significant thresholds from the Proposed Project. In addition, maximum off-site diesel cancer risk impact predicted from Haul Route 1B/1F was found to be 2.3 in a million, still well below the 10 in a million threshold.

7.2.3 Alt 2 - Impact 3

Alternative 2 would provide no significant difference in any cumulatively considerable net increase of any criteria pollutant from the Proposed Project.

7.2.4 Alt 2 - Impact 4

Even though the quantity of sediment removed would be significantly more than the Proposed Project, Alternative 2 would disturb less overall acreage. However, even though Alternative 2 would require 6 years to complete the initial sediment removal, the daily activity level of the Proposed would not be expected to be different that the Proposed Project. The LACDPW still estimates a rate of removal of 7,650 yd^3 per day and an average of 425 trucks per day travelling to the same disposal sites. The LACDPW expects the staffing needs and schedules to remain the same. Alternative 2 would provide no significant difference in air quality emissions from the Proposed Project.

7.2.5 Alt 2 - Impact 5

Alternative 2 would provide no significant difference in the creation of objectionable odors from the Proposed Project.

7.2.6 Alt 2 - Impact 6

Alternative 2 would provide a slight risk from carcinogenic or toxic contaminants, i.e. 2.3 in a million as opposed to 1.9 in a million from the Proposed Project, but this is still less than significant.

7.3. ALTERNATIVE 3 – CONFIGURATION D

Alternative 3 will only remove 2.4 million yd^3 of current sediment instead of the 2.9 million yd^3 in the Proposed Project and the area excavated will only involve approximately 76 acres instead of the 178 acres of the Proposed Project. It has the same removal method, sediment disposal method, sediment removal truck routes, and long-term sediment management methods as Option 1 in the Proposed Project.

7.3.1 Alt 3 - Impact 1

Alternative 3 would provide no significant difference in impacts to the AQMP from the Proposed Project.

7.3.2 Alt 3 - Impact 2

Even though the quantity of sediment removed would be slightly less than the Proposed Project and less acreage would be affected, the LACDPW has indicated the daily activity level would not be less. The LACDPW still estimates a rate of removal of 7,650 yd^3 per day and an average of 425 trucks per day travelling to the same disposal sites. The LACDPW expects the staffing needs and schedules to remain the same. Alternative 3 would provide no significant difference in air quality emissions from the Proposed Project.

7.3.3 Alt 3 - Impact 3

Alternative 3 would provide no significant difference in any cumulatively considerable net increase of any criteria pollutant from the Proposed Project.

7.3.4 Alt 3 - Impact 4

Even though the quantity of sediment removed would be slightly less for Alternative 3 than the Proposed Project and less acreage would be affected, the daily activity level of the Proposed would not be expected to lessen. The LACDPW still estimates a rate of removal of 7,650 yd^3 per day and off-road equipment operating 10 hours per day. The LACDPW expects the staffing needs and schedules to remain the same. Alternative 3 would provide no significant difference in CO concentrations at intersections or exceedances of locally significant thresholds from the Proposed Project.

7.3.5 Alt 3 - Impact 5

Alternative 3 would provide no significant difference in the creation of objectionable odors from the Proposed Project.

7.3.6 Alt 3 - Impact 6

Alternative 3 would provide no significant difference in the emissions of carcinogenic or toxic contaminants from the Proposed Project.

7.4. ALTERNATIVE 4 – SLUICING METHOD

Alternative 4 will remove the 2.9 million yd^3 by a sluicing method. Sluicing utilizes flowing water to transport sediment. Therefore this Alternative does not include off-site sediment disposal using disposal trucks. Sluicing would only take place during the rainy season. In order to remove large amounts of accumulated sediment, the sluicing operation involves mechanical agitation, which would be achieved by using bulldozers and other heavy equipment to actively push sediment into the flow path of the water. Any heavy equipment activity would occur on the same daily/weekly schedule as in the Proposed Project but the amounts of usage would be unknown since sluicing activities without mechanical agitation can occur during all hours of the day and all days of the week as a passive removal system with lower efficiency rates. Total project duration of this alternative will depend on future yearly storm flows and is therefore difficult to estimate. Sediment transport studies indicate, if successful, it could take several decades to achieve removal of the 2.9 million yd^3 of sediment.

7.4.1 Alt 4 - Impact 1

Alternative 4 would provide no significant difference in impacts to the AQMP from the Proposed Project.

7.4.2 Alt 4 - Impact 2

While Alternative 4 would still require some off-road equipment usage to push the material for sluicing and some trucking to remove organics, exhaust emissions from on-road disposal trucks and off-road equipment would be greatly reduced. This would reduce the daily emissions levels for all criteria pollutants. In fact, the exceedance of the daily NO_X emissions that occurs in with the Proposed Project would be eliminated, thus eliminating the potential significance and the need for the mitigation measures proposed.

7.4.3 Alt 4 - Impact 3

Alternative 4 would provide no significant difference in any cumulatively considerable net increase of any criteria pollutant from the Proposed Project.

7.4.4 Alt 4 - Impact 4

While Alternative 4 would still require some off-road equipment usage to push the material for sluicing and some trucking to remove organics, exhaust emissions from on-road disposal trucks and off-road equipment would be greatly reduced.. This would reduce CO emissions levels and resultant concentrations. In addition, the heavy equipment operations would not produce emissions that would violate any LST, thus eliminating the potential significance and the need for the mitigation measure proposed.

7.4.5 Alt 4 - Impact 5

Alternative 4 would provide no significant difference in the creation of objectionable odors from the Proposed Project.

7.4.6 Alt 4 - Impact 6

Alternative 4 would provide no significant difference in the emissions of carcinogenic or toxic contaminants from the Proposed Project.

7.5. ALTERNATIVE 5 – HAUL ROUTE ALTERNATIVE

Alternative 5 is identical to the Proposed Project with a change in haul routes from the site to the freeway.

7.5.1 Alt 5 - Impact 1

Alternative 5 would provide no significant difference in impacts to the AQMP from the Proposed Project.

7.5.2 Alt 5 - Impact 2

The change in haul routes from the project site to the highway creates only minimal changes in emissions estimates from that for the Proposed Project. Alternative 5 would provide no significant difference in air quality emissions from the Proposed Project.

7.5.3 Alt 5 - Impact 3

Alternative 5 would provide no significant difference in any cumulatively considerable net increase of any criteria pollutant from the Proposed Project.

7.5.4 Alt 5 - Impact 4

The change in haul routes from the project site to the highway creates only minimal changes in emissions estimates from that for the Proposed Project. Alternative 5 would provide no significant difference in CO concentrations at intersections or exceedances of locally significant thresholds from the Proposed Project.

7.5.5 Alt 5 - Impact 5

Alternative 5 would provide no significant difference in the creation of objectionable odors from the Proposed Project.

7.5.6 Alt 5 - Impact 6

Alternative 5 would provide no significant difference in the emissions of carcinogenic or toxic contaminants from the Proposed Project.

7.6. ALTERNATIVE 6 – NO PROJECT

With Alternative 6 there would be no change from the existing conditions/activities and therefore Alternative 6 would have no air quality impact.

Air Quality Report Appendix A

Criteria Emissions Summary

Sediment Removal — Unmitigated

Emission Source	Criteria Emissions (lbs/d)				
	ROG	CO	NO_X	PM_{10}	$PM_{2.5}$
Off-road	7.54	33.99	55.18	2.87	2.87
On-road Trucks	7.15	34.87	314.93	5.33	4.91
Onsite Idling	0.44	1.89	7.88	0.05	0.05
Employees	0.07	2.44	0.24	0.00	0.00
Fugitive	0.00	0.00	0.00	5.46	0.89
TOTALS	***15.2***	***73.2***	***378.2***	***13.7***	***8.7***
SCAQMD Daily Threshold	*75*	*550*	*100*	*150*	*55*
ON-SITE TOTALS	***8.0***	***35.9***	***63.1***	***8.4***	***3.8***
LST Threshold	*N/A*	*1,540*	*148*	*12*	*7*

Sediment Removal — Mitigated

Emission Source	Criteria Emissions (lbs/d)				
	ROG	CO	NO_X	PM_{10}	$PM_{2.5}$
Off-road	4.71	33.99	22.05	2.60	2.15
On-road Trucks	7.15	34.87	56.90	2.40	2.20
Onsite Idling	0.44	1.89	2.48	0.01	0.01
Employees	0.07	2.44	0.24	0.00	0.00
Fugitive	0.00	0.00	0.00	5.46	0.89
TOTALS	***12.4***	***73.2***	***81.7***	***10.5***	***5.2***
SCAQMD Daily Threshold	*75*	*550*	*100*	*150*	*55*
ON-SITE TOTALS	***5.2***	***35.9***	***24.5***	***8.1***	***3.0***
LST Threshold	*N/A*	*1,540*	*148*	*12*	*7*

Maintenance Activities — Unmitigated

Emission Source	Criteria Emissions (lbs/d)				
	ROG	CO	NO_X	PM_{10}	$PM_{2.5}$
Off-road	2.86	17.29	19.26	0.98	0.98
On-road Trucks	2.82	17.47	104.22	1.71	1.57
Onsite Idling	0.20	0.89	3.71	0.02	0.02
Employees	0.02	0.76	0.07	0.00	0.00
Fugitive	0.00	0.00	0.00	3.30	0.75
TOTALS	***5.9***	***36.4***	***127.3***	***6.0***	***3.3***
SCAQMD Daily Threshold	*75*	*550*	*100*	*150*	*55*
ON-SITE TOTALS	***3.1***	***18.2***	***23.0***	***4.3***	***1.8***
LST Threshold	*N/A*	*1,540*	*148*	*12*	*7*

Maintenance Activities — Mitigated

Emission Source	Criteria Emissions (lbs/d)				
	ROG	CO	NO_X	PM_{10}	$PM_{2.5}$
Off-road	2.86	17.29	19.26	0.98	0.98
On-road Trucks	2.82	17.47	40.56	1.70	1.56
Onsite Idling	0.20	0.89	1.17	0.00	0.00
Employees	0.02	0.76	0.07	0.00	0.00
Fugitive	0.00	0.00	0.00	3.30	0.75
TOTALS	***5.9***	***36.4***	***61.1***	***6.0***	***3.3***
SCAQMD Daily Threshold	*75*	*550*	*100*	*150*	*55*
ON-SITE TOTALS	***3.1***	***18.2***	***20.4***	***4.3***	***1.7***
LST Threshold	*N/A*	*1,540*	*148*	*12*	*7*

GHG Emissions Summary

Sediment Removal

Emission Source	Total GHG Emissions (tonnes)			
	CO_2	CH_4	N_2O	CO_2e
Off-road	745.8	0.071	N/A	747.3
On-road Trucks	4,422.6	1.681	1.546	4,937.3
Employees	46.4	0.005	0.005	48.2
TOTALS	***5,215***	***1.76***	***1.55***	***5,733***

Maintenance

Emission Source	Total GHG Emissions (tonnes)			
	CO_2	CH_4	N_2O	CO_2e
Off-road	96.8	0.007	N/A	96.9
On-road Trucks	819.1	0.312	0.287	914.6
Employees	6.5	0.001	0.001	6.7
TOTALS	***922***	***0.32***	***0.29***	***1,018***

Construction Amortization

Year #	CO_2e		
1	5,733		
2	5,733		
3	5,733		
4	5,733		
5	5,733		**Plus Maintenance**
Total	**28,664**		
Amortized over 30 years =		955	1,974

Mileages for Disposal Sites

Disposal Area	Haul Route #	Mileage (round trip)			
		P-H	Highway	H-D	Total
Vulcan Materials	9	1.4	31.0	1.0	33.4
Manning's Pit	2A	1.4	31.0	4.7	37.1
Waste Management Pit	3A	1.4	31.0	3.2	35.5
Average of Irwindale Sites		**1.4**	**31.0**	**3.0**	**35.3**
Scholl Canyon Landfill	4A	1.4	8.6	3.2	13.2
Greenwaste Site		**1.4**	**8.6**	**3.2**	**13.2**
Sheldon Pit	5C	1.1	24.4	10.0	35.5
Cal-Mat Pit	6C	1.1	24.4	10.1	35.7
Bradley Landfill	7C	1.1	24.4	12.8	38.3
Boulevard Pit	8C	1.1	24.4	18.8	44.3
Average of Sun Valley Sites		**1.1**	**24.4**	**12.9**	**38.5**

Distributions	SedRem	Maint
Estimated Total Truck Trips per Day =	425	300
% of trips to Scholl Canyon =	3%	2%
% of trips to Irwindale sites =	78%	75%
% of trips to Sun Valley sites =	19%	23%
Scholl Canyon Trips per Day =	11	6
Irwindale Trips per Day =	333	225
Sun Valley Trips per Day =	81	69

P-H = Project to highway
H-D = Highway to disposal site

"Percent to Scholl" Calculations

	3	weeks	2015	5.8%
	1	week	2016+	1.9%
For first 5 years	7	weeks	SedRem	2.7%

On-Road Trucks Criteria Emissions
Unmitigated

Sediment Removal - Unmitigated

Route/Type	Round Trip (mi)	Trips per day	VMT per day	Emissions (lbs/day)				
				ROG	CO	NO_X	PM_{10}	$PM_{2.5}$
Scholl Canyon Site - Surface Streets	5	11	53	0.04	0.16	1.18	0.02	0.02
Scholl Canyon Site - Highways	8.6		99	0.04	0.21	2.04	0.04	0.03
Irwindale Sites - Surface Streets	4	333	1,445	1.01	4.46	32.45	0.47	0.43
Irwindale Sites - Highways	31		10,323	4.43	22.29	213.12	3.74	3.44
Sun Valley Sites - Surface Streets	14	81	1,135	0.79	3.50	25.47	0.37	0.34
Sun Valley Sites - Highways	24.4		1,970	0.85	4.25	40.68	0.71	0.66
Totals		***425***	***15,024***	***7.2***	***34.9***	***314.9***	***5.3***	***4.9***

Maintenance - Unmitigated

Route/Type	Round Trip (mi)	Trips per day	VMT per day	Emissions (lbs/day)				
				ROG	CO	NO_X	PM_{10}	$PM_{2.5}$
Scholl Canyon Site - Surface Streets	5	6	26	0.01	0.04	0.30	0.00	0.00
Scholl Canyon Site - Highways	8.6		49	0.01	0.08	0.46	0.01	0.01
Irwindale Sites - Surface Streets	4	225	977	0.43	1.58	11.19	0.11	0.10
Irwindale Sites - Highways	31		6,975	1.56	11.44	65.38	1.20	1.10
Sun Valley Sites - Surface Streets	14	69	969	0.43	1.57	11.11	0.11	0.10
Sun Valley Sites - Highways	24.4		1,684	0.38	2.76	15.78	0.29	0.27
Totals		***300***	***10,605***	***2.8***	***17.5***	***104.2***	***1.7***	***1.6***

Notes:

Trip distribution during sediment removal is 3% Scholl Canyon, 78% Irwindale SitesIrwindale, and 19% Sun Valley.

Trip distribution during maintenance is 2% Scholl Canyon, 79% Irwindale, and 19% Sun Valley.

Surface streets use vehicle speeds from 5 to 45 mph

Highway use vehicle speeds from 50 to 70 mph

On-Road Trucks Criteria Emissions
Mitigated

Sediment Removal — Mitigated

Route/Type	Round Trip (mi)	Trips per day	VMT per day	Emissions (lbs/day)		
				NO_X	PM_{10}	$PM_{2.5}$
Scholl Canyon Site - Surface Streets	5	11	53	0.25	0.01	0.00
Scholl Canyon Site - Highways	8.6		99	0.35	0.02	0.02
Irwindale Sites - Surface Streets	4	333	1,445	6.86	0.15	0.14
Irwindale Sites - Highways	31		10,323	36.98	1.77	1.63
Sun Valley Sites - Surface Streets	14	81	1,135	5.39	0.12	0.11
Sun Valley Sites - Highways	24.4		1,970	7.06	0.34	0.31
Totals		***425***	***15,024***	***56.9***	***2.4***	***2.2***

Maintenance — Mitigated

Route/Type	Round Trip (mi)	Trips per day	VMT per day	Emissions (lbs/day)		
				NO_X	PM_{10}	$PM_{2.5}$
Scholl Canyon Site - Surface Streets	5	6	26	0.12	0.00	0.00
Scholl Canyon Site - Highways	8.6		49	0.18	0.01	0.01
Irwindale Sites - Surface Streets	4	225	977	4.64	0.10	0.09
Irwindale Sites - Highways	31		6,975	24.99	1.20	1.10
Sun Valley Sites - Surface Streets	14	69	969	4.60	0.10	0.09
Sun Valley Sites - Highways	24.4		1,684	6.03	0.29	0.27
Totals		***300***	***10,680***	***40.6***	***1.7***	***1.6***

On-Road Trucks Total GHG Emissions

Sediment Removal

Disposal Sites	Round Trip (mi)	Trips per day	Trips per year	VMT per year
Scholl Canyon Site - Surface Streets	5	11	2,693	12,332
Scholl Canyon Site - Highways	8.6			23,156
Irwindale Sites - Surface Streets	4	333	78,136	339,111
Irwindale Sites - Highways	31			2,422,218
Sun Valley Sites - Surface Streets	14	81	18,947	266,211
Sun Valley Sites - Highways	24.4			462,317
Totals		***425***	***80,829***	***2,784,484***

Emissions (tonnes per year)

CO_2	CH_4	N_2O	CO_2e
23	0.007	0.007	25
36	0.014	0.013	40
622	0.205	0.188	685
3,764	1.462	1.345	4,212
488	0.161	0.148	538
718	0.279	0.257	804
4,423	***1.681***	***1.546***	***4,937***

Maintenance

Disposal Sites	Round Trip (mi)	Trips per day	Trips per year	VMT per year
Scholl Canyon Site - Surface Streets	5	6	372	1,702
Scholl Canyon Site - Highways	8.6			3,195
Irwindale Sites - Surface Streets	4	225	14,665	58,661
Irwindale Sites - Highways	31			454,621
Sun Valley Sites - Surface Streets	14	69	4,497	62,963
Sun Valley Sites - Highways	24.4			109,735
Totals		***300***	***15,037***	***516,476***

Emissions (tonnes per year)

CO_2	CH_4	N_2O	CO_2e
3	0.001	0.001	3
5	0.002	0.002	6
108	0.035	0.033	118
707	0.274	0.252	791
116	0.038	0.035	127
171	0.066	0.061	191
819	***0.312***	***0.287***	***915***

Notes:

	Sed	Main
Months per year =	9	3
Days per month =	26.1	21.7
Days per year =	235	65

Employee Commute

Vehicle Activity

Activity	Days per Year	Trips per Day	Round Trip (mi)	VMT per day	VMT per Year
Sediment Removal	235	17	40	680	159,557
Maintenance	65	9	40	340	22,161

Criteria Emissions

Activity	Pounds per day				
	ROG	CO	NO_X	PM_{10}	$PM_{2.5}$
Sediment Removal	0.07	2.44	0.24	0.00	0.00
Maintenance	0.02	0.76	0.07	0.00	0.00

GHG

Activity	Total Tonnes per Year			
	CO_2	CH_4	N_2O	CO_2e
Sediment Removal	46.4	0.0046	0.0054	48.2
Maintenance	6.5	0.0006	0.0007	6.7

Notes:

Months per year =	9
Days per month =	30.4
Days per year =	274

Sediment Removal - Off-Road

Unmitigated

Equipment Activity

Type	BHP	Load Factor	Hours/Day	Total Days/Year	Total Hours/Year
Front Loaders	87	0.36	8	235	1,877
Front Loaders	87	0.36	8	235	1,877
Front Loaders	87	0.36	8	235	1,877
Front Loaders	87	0.36	8	235	1,877
D-8 Dozer	358	0.40	8	235	1,877
D-8 Dozer	358	0.40	8	235	1,877
Excavator	157	0.38	8	235	1,877
Grader	162	0.41	8	235	1,877
Water Truck	381	0.38	8	235	1,877
Sorters/Crushers	85	0.78	2	235	469

Notes:

Months per year = 9
Days per month = 26.1
Days per year = 235

Criteria Emissions - Unmitigated

Type	Pounds per day				
	ROG	CO	NO_X	PM_{10}	$PM_{2.5}$
Front Loaders	0.44	2.18	2.78	0.23	0.23
Front Loaders	0.44	2.18	2.78	0.23	0.23
Front Loaders	0.44	2.18	2.78	0.23	0.23
Front Loaders	0.44	2.18	2.78	0.23	0.23
D-8 Dozer	1.59	6.75	12.98	0.53	0.53
D-8 Dozer	1.59	6.75	12.98	0.53	0.53
Excavator	0.56	3.54	3.95	0.21	0.21
Grader	0.70	3.93	5.12	0.28	0.28
Water Truck	1.10	3.17	7.55	0.27	0.27
Sorters/Crushers	0.23	1.13	1.47	0.13	0.13
Totals	***7.54***	***33.99***	***55.18***	***2.87***	***2.87***

GHG Emissions

Type	tonnes per year		
	CO_2	CH_4	CO_2e
Front Loaders	33.41	0.0042	33.50
Front Loaders	33.41	0.0042	33.50
Front Loaders	33.41	0.0042	33.50
Front Loaders	33.41	0.0042	33.50
D-8 Dozer	152.76	0.0151	153.08
D-8 Dozer	152.76	0.0151	153.08
Excavator	63.64	0.0054	63.76
Grader	70.86	0.0066	70.99
Water Truck	154.45	0.0098	154.65
Sorters/Crushers	17.68	0.0022	17.73
Totals	***745.80***	***0.0710***	***747.29***

Sediment Removal - Mitigated Off-Road

Equipment Activity

Type	BHP	Load Factor	Hours/Day	Total Days/Year	Total Hours/Year
Front Loaders	87	0.36	8	235	1,877
Front Loaders	87	0.36	8	235	1,877
Front Loaders	87	0.36	8	235	1,877
Front Loaders	87	0.36	8	235	1,877
D-8 Dozer	358	0.40	8	235	1,877
D-8 Dozer	358	0.40	8	235	1,877
Excavator	157	0.38	8	235	1,877
Grader	162	0.41	8	235	1,877
Water Truck	381	0.38	8	235	1,877
Sorters/Crushers	85	0.78	2	235	469

Notes:

Months per year = 9
Days per month = 26.1
Days per year = 235

Mitigated Criteria Emissions

Type	Pounds per day				
	ROG	CO	NO_X	PM_{10}	$PM_{2.5}$
Front Loaders	0.28	2.18	1.17	0.13	0.01
Front Loaders	0.28	2.18	1.17	0.13	0.01
Front Loaders	0.28	2.18	1.17	0.13	0.01
Front Loaders	0.28	2.18	1.17	0.13	0.01
D-8 Dozer	0.98	6.75	5.67	0.53	0.53
D-8 Dozer	0.98	6.75	5.67	0.53	0.53
Excavator	0.34	3.54	1.26	0.21	0.21
Grader	0.38	3.93	1.40	0.24	0.24
Water Truck	0.83	3.17	3.05	0.52	0.52
Sorters/Crushers	0.09	1.13	0.35	0.06	0.06
Totals	***4.71***	***33.99***	***22.05***	***2.60***	***2.15***

Maintenance - Off-Road

Unmitigated

Equipment Activity

Type	BHP	Load Factor	Hours/Day	Total Days/Year	Total Hours/Year
Front Loaders	87	0.36	8	61	487
Front Loaders	87	0.36	8	61	487
D-8 Dozer	358	0.40	8	61	487
Excavator	157	0.38	8	61	487
Water Truck	381	0.38	1	61	61
Sorters/Crushers	85	0.78	8	61	487

Notes:

Months per year = 2
Days per month = 21.7
Days per year = 61

Criteria Emissions

Type	Pounds per day				
	ROG	CO	NO_X	PM_{10}	$PM_{2.5}$
Front Loaders	0.30	2.01	1.88	0.13	0.13
Front Loaders	0.30	2.01	1.88	0.13	0.13
D-8 Dozer	1.24	5.03	9.14	0.36	0.36
Excavator	0.37	3.54	2.06	0.10	0.10
Water Truck	0.10	0.36	0.50	0.02	0.02
Sorters/Crushers	0.55	4.35	3.80	0.24	0.24
Totals	***2.86***	***17.29***	***19.26***	***0.98***	***0.98***

GHG Emissions

Type	tonnes per year		
	CO_2	CH_4	CO_2e
Front Loaders	8.66	0.0007	8.68
Front Loaders	8.66	0.0007	8.68
D-8 Dozer	39.61	0.0031	39.67
Excavator	16.50	0.0009	16.52
Water Truck	5.01	0.0002	5.01
Sorters/Crushers	18.34	0.0014	18.37
Totals	***96.77***	***0.0071***	***96.92***

Maintenance - Off-Road

Mitigated

Equipment Activity

Type	BHP	Load Factor	Hours/Day	Total Days/Year	Total Hours/Year
Front Loaders	87	0.36	8	61	487
Front Loaders	87	0.36	8	61	487
D-8 Dozer	358	0.40	8	61	487
Excavator	157	0.38	8	61	487
Water Truck	381	0.38	1	61	61
Sorters/Crushers	85	0.78	8	61	487

Notes:

Months per year = 2
Days per month = 21.7
Days per year = 61

Criteria Emissions

Type	Pounds per day				
	ROG	CO	NO_X	PM_{10}	$PM_{2.5}$
Front Loaders	0.19	2.01	1.17	0.13	0.13
Front Loaders	0.19	2.01	1.17	0.13	0.13
D-8 Dozer	0.77	5.03	5.67	0.36	0.36
Excavator	0.23	3.54	1.26	0.10	0.10
Water Truck	0.06	0.36	0.31	0.02	0.02
Sorters/Crushers	0.34	4.35	2.36	0.24	0.24
Totals	***1.77***	***17.29***	***11.92***	***0.98***	***0.98***

GHG Emissions

Type	tonnes per year		
	CO_2	CH_4	CO_2e
Front Loaders	8.66	0.0007	8.68
Front Loaders	8.66	0.0007	8.68
D-8 Dozer	39.61	0.0031	39.67
Excavator	16.50	0.0009	16.52
Water Truck	5.01	0.0002	5.01
Sorters/Crushers	18.34	0.0014	18.37
Totals	***96.77***	***0.0071***	***96.92***

2015 Off-road Emission Factors

Veh Type	BHP	Load Factor	Emission Factor (g/bhp-hr)						
			ROG	CO	NO_X	PM_{10}	$PM_{2.5}$	CO_2	CH_4
Front loaders	87	0.36	0.805	3.945	5.041	0.415	0.415	568.3	0.072
D-8 dozers	358	0.40	0.628	2.672	5.138	0.211	0.211	568.3	0.056
Excavator	157	0.38	0.532	3.369	3.751	0.204	0.204	568.3	0.048
Grader	162	0.41	0.595	3.356	4.372	0.241	0.241	568.3	0.053
Water truck	381	0.38	0.431	1.241	2.956	0.105	0.105	568.3	0.036
Sorters/Crushers	85	0.78	0.797	3.859	5.040	0.430	0.430	568.3	0.071

2020 Off-road Emission Factors

Veh Type	BHP	Load Factor	Emission Factor (g/bhp-hr)						
			ROG	CO	NO_X	PM_{10}	$PM_{2.5}$	CO_2	CH_4
Front loaders	87	0.36	0.542	3.636	3.404	0.228	0.228	568.3	0.048
D-8 dozers	358	0.40	0.491	1.990	3.619	0.144	0.144	568.3	0.044
Excavator	157	0.38	0.355	3.361	1.958	0.098	0.098	568.3	0.032
Water truck	381	0.38	0.310	1.136	1.561	0.057	0.057	568.3	0.028
Sorters/Crushers	85	0.78	0.473	3.722	3.249	0.206	0.206	568.3	0.042

SCAQMD Off-Road Emission Rates Table II

Percentage Reduction from Tier 2 to Tier 3

Engine Size (hp)	Percent Reduction		
	ROG	NO_X	PM_{10}
75 to 99	38%	38%	0%
100 to 174	39%	39%	0%
175 to 299	39%	39%	0%
300 to 600	38%	38%	0%

2015 Off-road Mitigated Emission Factors

Veh Type	BHP	Load Factor	Emission Factor (g/bhp-hr)						
			ROG	CO	NO_X	PM_{10}	$PM_{2.5}$	CO_2	CH_4
Front loaders	87	0.36	0.499	3.945	3.125	0.415	0.415	568.3	0.072
D-8 dozers	358	0.40	0.389	2.672	3.186	0.211	0.211	568.3	0.056
Excavator	157	0.38	0.325	3.369	2.288	0.204	0.204	568.3	0.048
Grader	162	0.41	0.363	3.356	2.667	0.241	0.241	568.3	0.053
Water truck	381	0.38	0.267	1.241	1.833	0.105	0.105	568.3	0.036
Sorters/Crushers	85	0.78	0.494	3.859	3.125	0.430	0.430	568.3	0.071

2020 Off-road Mitigated Emission Factors

Veh Type	BHP	Load Factor	Emission Factor (g/bhp-hr)						
			ROG	CO	NO_X	PM_{10}	$PM_{2.5}$	CO_2	CH_4
Front loaders	87	0.36	0.336	3.636	2.110	0.228	0.228	568.3	0.048
D-8 dozers	358	0.40	0.304	1.990	2.244	0.144	0.144	568.3	0.044
Excavator	157	0.38	0.217	3.361	1.194	0.098	0.098	568.3	0.032
Water truck	381	0.38	0.192	1.136	0.968	0.057	0.057	568.3	0.028
Sorters/Crushers	85	0.78	0.293	3.722	2.014	0.206	0.206	568.3	0.042

From: CalEEMod Users Guide - Appendix D, CalEEMod User's Tips (June 2011), and 2011 Carl Moyer Program Guideline

2015 Estimated Annual Emission Rates

EMFAC 2011

EMFAC 2011 Vehicle Categories

Los Angeles County

EMPLOYEE VEHICLES

Veh_Class	Fuel	VMT per day	Running Exhaust Emissions (grams per mile)					
			ROG	CO	NO_X	CO_2	PM_{10}	$PM_{2.5}$
LDA	GAS	124,228,301	0.0399	1.3180	0.1154	318.20	0.0022	0.0020
	DSL	421,930	0.0490	0.2495	0.4813	275.97	0.0367	0.0337
LDA - Average		**124,650,231**	**0.0399**	**1.3143**	**0.1167**	**318.05**	**0.0023**	**0.0021**
LDT1	GAS	13,920,097	0.1158	3.6095	0.3503	378.39	0.0056	0.0051
	DSL	19,325	0.0948	0.4229	0.6895	294.64	0.0793	0.0729
LDT1 - Average		**13,939,422**	**0.1158**	**3.6051**	**0.3508**	**378.28**	**0.0057**	**0.0052**
LDT2	GAS	41,671,607	0.0528	1.9112	0.2241	454.73	0.0024	0.0022
	DSL	19,382	0.0632	0.3251	0.6529	294.15	0.0506	0.0465
LDT2 - Average		**41,690,989**	**0.0528**	**1.9105**	**0.2243**	**454.65**	**0.0024**	**0.0022**
Employee Weighted Average			***0.0488***	***1.6293***	***0.1597***	***354.30***	***0.0026***	***0.0023***

DIESEL TRUCKS

Veh_Class	Speed (mph)	VMT per day	Running Exhaust Emissions (grams per mile)					
			ROG	CO	NO_X	CO_2	PM_{10}	$PM_{2.5}$
T7 single construction	5	273	3.5045	6.0256	30.4992	3,919.55	0.6823	0.6277
T7 single construction	10	1,111	2.0592	4.2149	21.1424	3,237.84	0.4737	0.4358
T7 single construction	15	3,273	1.0518	2.8594	14.7722	2,658.53	0.3148	0.2896
T7 single construction	20	8,864	0.4283	1.8513	11.0830	2,097.32	0.1942	0.1787
T7 single construction	25	19,082	0.3519	1.5998	10.5006	1,956.84	0.1622	0.1493
T7 single construction	30	25,882	0.2890	1.3886	10.0244	1,836.80	0.1384	0.1273
T7 single construction	35	19,419	0.2394	1.2176	9.6540	1,737.17	0.1226	0.1128
T7 single construction	40	18,869	0.2031	1.0867	9.3942	1,657.98	0.1150	0.1058
T7 single construction	45	18,189	0.1803	0.9965	9.2244	1,599.20	0.1155	0.1063
T7 single construction - Surface Streets		**114,962**	**0.3170**	**1.3991**	**10.1837**	**1,834.92**	**0.1461**	**0.1344**
T7 single construction	50	17,465	0.1709	0.9466	9.1607	1,560.84	0.1242	0.1142
T7 single construction	55	17,232	0.1748	0.9369	9.2018	1,542.90	0.1409	0.1296
T7 single construction	60	40,396	0.1922	0.9676	9.3450	1,545.38	0.1658	0.1525
T7 single construction	65	29,825	0.2228	1.0384	9.5996	1,568.30	0.1988	0.1829
T7 single construction	70	73	0.2730	1.1037	11.0294	1,612.93	0.2421	0.2228
T7 single construction - Highways		**104,990**	**0.1945**	**0.9793**	**9.3643**	**1,554.10**	**0.1642**	**0.1511**

Notes:

- *Surface street speeds are from 5 mph to 45 mph*
- *Highway speeds are from 50 mph to 70 mph*
- *Employee average = 69% LDA + 8% LDT1 + 23% LDT2 based on VMT*

2020 Estimated Annual Emission Rates

EMFAC 2011

EMFAC 2011 Vehicle Categories
Los Angeles County

EMPLOYEE VEHICLES

Veh_Class	Fuel	VMT per day	Running Exhaust Emissions (grams per mile)					
			ROG	CO	NO_X	CO_2	PM_{10}	$PM_{2.5}$
LDA	GAS	127,356,491	0.0173	0.8226	0.0746	257.22	0.0020	0.0019
	DSL	434,476	0.0227	0.1407	0.3355	225.91	0.0162	0.0149
LDA - Average		**127,790,967**	**0.0173**	**0.8203**	**0.0755**	**257.11**	**0.0021**	**0.0019**
LDT1	GAS	14,187,931	0.0577	2.3382	0.2328	317.17	0.0042	0.0039
	DSL	20,940	0.0490	0.2398	0.4558	231.83	0.0395	0.0363
LDT1 - Average		**14,208,871**	**0.0577**	**2.3351**	**0.2331**	**317.04**	**0.0042**	**0.0039**
LDT2	GAS	43,317,321	0.0241	1.1652	0.1284	382.80	0.0021	0.0019
	DSL	20,329	0.0299	0.1759	0.4450	243.31	0.0210	0.0194
LDT2 - Average		**43,337,650**	**0.0241**	**1.1647**	**0.1285**	**382.74**	**0.0021**	**0.0019**
Employee Weighted Average			***0.0220***	***1.0170***	***0.1000***	***291.08***	***0.0022***	***0.0021***

DIESEL TRUCKS

Veh_Class	Speed (mph)	VMT per day	Running Exhaust Emissions (grams per mile)					
			ROG	CO	NO_X	CO_2	PM_{10}	$PM_{2.5}$
T7 single construction	5	422	1.9483	3.8034	15.3144	3,600.96	0.0896	0.0824
T7 single construction	10	1,387	1.1342	2.3921	11.1428	2,974.64	0.0743	0.0684
T7 single construction	15	3,732	0.5763	1.4076	8.1470	2,442.41	0.0618	0.0568
T7 single construction	20	10,499	0.2464	0.7769	6.1362	1,926.81	0.0509	0.0468
T7 single construction	25	22,096	0.2139	0.7260	5.6152	1,797.75	0.0474	0.0436
T7 single construction	30	29,986	0.1854	0.6886	5.1763	1,687.47	0.0459	0.0423
T7 single construction	35	23,319	0.1610	0.6648	4.8200	1,595.96	0.0465	0.0428
T7 single construction	40	22,600	0.1405	0.6544	4.5465	1,523.23	0.0491	0.0452
T7 single construction	45	21,535	0.1240	0.6578	4.3446	1,469.21	0.0537	0.0494
T7 single construction - Surface Streets		**135,576**	**0.1993**	**0.7337**	**5.1982**	**1,686.10**	**0.0493**	**0.0453**
T7 single construction	50	23,100	0.1115	0.6747	4.2229	1,433.95	0.0604	0.0556
T7 single construction	55	27,435	0.1031	0.7052	4.1830	1,417.46	0.0691	0.0635
T7 single construction	60	48,002	0.0986	0.7493	4.2250	1,419.74	0.0798	0.0734
T7 single construction	65	38,081	0.0981	0.8068	4.3501	1,440.80	0.0925	0.0851
T7 single construction	70	95	0.0998	0.8564	5.2530	1,484.20	0.1105	0.1016
T7 single construction - Highways		**136,714**	**0.1015**	**0.7440**	**4.2518**	**1,427.60**	**0.0779**	**0.0717**

Notes:

Surface street speeds are from 5 mph to 45 mph
Highway speeds are from 50 mph to 70 mph
Employee average = 69% LDA + 8% LDT1 + 23% LDT2 based on VMT

2015 EMFAC2011 On-road Vehicle Emission Factors

Veh Type	Emission Factors (grams per mile)							
	ROG	CO	NO_X	CO_2	PM_{10}	$PM_{2.5}$	CH_4	N_2O
LDA	0.0399	1.3143	0.1167	318.1	0.0023	0.0021	0.0278	0.0294
LDT1	0.1158	3.6051	0.3508	378.3	0.0057	0.0052	0.0315	0.0433
LDT2	0.0528	1.9105	0.2243	454.7	0.0024	0.0022	0.0315	0.0433
Weighted Average - Surface Streets	*0.0488*	*1.6293*	*0.1597*	*354.3*	*0.0026*	*0.0023*	*0.0289*	*0.0337*
T7 single construction - Surface Streets	0.3170	1.3991	10.1837	1,834.9	0.1461	0.1344	0.6037	0.5554
T7 single construction - Highways	0.1945	0.9793	9.3643	1,554.1	0.1642	0.1511	0.6037	0.5554

2020 EMFAC2011 On-road Vehicle Emission Factors

Veh Type	Emission Factors (grams per mile)							
	ROG	CO	NO_X	CO_2	PM_{10}	$PM_{2.5}$	CH_4	N_2O
LDA	0.0173	0.8203	0.0755	257.1	0.0021	0.0019	0.0278	0.0294
LDT1	0.0577	2.3351	0.2331	317.0	0.0042	0.0039	0.0315	0.0433
LDT2	0.0241	1.1647	0.1285	382.7	0.0021	0.0019	0.0315	0.0433
Weighted Average - Surface Streets	*0.0220*	*1.0170*	*0.1000*	*291.1*	*0.0022*	*0.0021*	*0.0289*	*0.0337*
T7 single construction - Surface Streets	0.1993	0.7337	5.1982	1,686.1	0.0493	0.0453	0.6037	0.5554
T7 single construction - Highways	0.1015	0.7440	4.2518	1,427.6	0.0779	0.0717	0.6037	0.5554

Notes: -

Criteria and CO_2 factors come from 2013 EMFAC2011 and represent Estimated Annual Emission Rates for Los Angeles County in the South Coast Air Basin

CH_4 and N_2O factors come from Local Government Operations Protocol: For the quantification and reporting of greenhouse gas emissions inventories. Version 1.1. California Air Resources Board, California Climate Action Registry, ICLEI - Local Governments for Sustainability, and The Climate Registry. May 2010

Surface street emission factors are generated from weighted factors for vehicle speeds from 5 to 45 mph

Highway emission factors are generated from weighted factors for vehicle speeds from 50 to 70 mph

Weighted Average is 69% LDA + 8% LDT1 + 23% LDT2 based on VMT

EMFAC2011 Emission Rates

Region: Los Angeles -- Calendar Year: 2015

2010 Model Year Diesel Trucks

Veh_Class	Speed (mph)	VMT per day	Running Exhaust (grams per mile)		
			NO_X	PM_{10}	$PM_{2.5}$
T7 single construction	5	16	6.2652	0.0610	0.0562
T7 single construction	10	66	4.7102	0.0560	0.0515
T7 single construction	15	196	3.5437	0.0511	0.0470
T7 single construction	20	531	2.6785	0.0459	0.0422
T7 single construction	25	1,144	2.4014	0.0438	0.0403
T7 single construction	30	1,551	2.1653	0.0435	0.0400
T7 single construction	35	1,162	1.9701	0.0450	0.0414
T7 single construction	40	1,125	1.8159	0.0483	0.0444
T7 single construction	45	1,087	1.7026	0.0533	0.0490
Surface Streets		**6,879**	**2.1546**	**0.0467**	**0.0430**
T7 single construction	50	1,045	1.6303	0.0601	0.0553
T7 single construction	55	1,032	1.5989	0.0687	0.0632
T7 single construction	60	2,423	1.6085	0.0791	0.0728
T7 single construction	65	1,787	1.6591	0.0913	0.0840
T7 single construction	70	3	1.7610	0.1053	0.0969
Highways		**6,289**	**1.6250**	**0.0778**	**0.0715**

Veh_Class		Running Exhaust (grams per mile)		
		NO_X	PM_{10}	$PM_{2.5}$
2015 Aggregated	Surface	10.1837	0.1461	0.1344
	Highways	9.3643	0.1642	0.1511
2010 Model Year	Surface	2.1546	0.0467	0.0430
	Highways	1.6250	0.0778	0.0715
% Change	Surface	*-78.8%*	*-68.0%*	*-68.0%*
% Change	Highways	*-82.6%*	*-52.7%*	*-52.7%*

EMFAC2011 Emission Rates

Region: Los Angeles -- Calendar Year: 2020

2010 Model Year Diesel Trucks

Veh_Class	Speed (mph)	VMT per day	Running Exhaust (grams per mile)		
			NO_X	PM_{10}	$PM_{2.5}$
T7 single construction	5	16	6.2652	0.0610	0.0562
T7 single construction	10	66	4.7102	0.0560	0.0515
T7 single construction	15	196	3.5437	0.0511	0.0470
T7 single construction	20	531	2.6785	0.0459	0.0422
T7 single construction	25	1,144	2.4014	0.0438	0.0403
T7 single construction	30	1,551	2.1653	0.0435	0.0400
T7 single construction	35	1,162	1.9701	0.0450	0.0414
T7 single construction	40	1,125	1.8159	0.0483	0.0444
T7 single construction	45	1,087	1.7026	0.0533	0.0490
Surface Streets		**6,879**	**2.1546**	**0.0467**	**0.0430**
T7 single construction	50	1,045	1.6303	0.0601	0.0553
T7 single construction	55	1,032	1.5989	0.0687	0.0632
T7 single construction	60	2,423	1.6085	0.0791	0.0728
T7 single construction	65	1,787	1.6591	0.0913	0.0840
T7 single construction	70	3	1.7610	0.1053	0.0969
Highways		**6,289**	**1.6250**	**0.0778**	**0.0715**

Veh_Class		Running Exhaust (grams per mile)		
		NO_X	PM_{10}	$PM_{2.5}$
2020 Aggregated	Surface	5.1982	0.0493	0.0453
	Highways	4.2518	0.0779	0.0717
2010 Model Year	Surface	2.1546	0.0467	0.0430
	Highways	1.6250	0.0778	0.0715
% Change	Surface	*-58.6%*	*-5.3%*	*-5.3%*
% Change	Highways	*-61.8%*	*-0.2%*	*-0.2%*

Loading & Staging Idling Emissions

Activity Data

425 trucks per day during sediment removal
200 trucks per day during maintenance activities

Idling assumptions

1 minute per truck during loading
3 minutes per truck idling in queue
therefore
4 minutes per truck idling per load cycle

1,700 total minutes per day for sediment removal
800 total minutes per day for maintenance

Project Trucks	Emission Factor (grams per minute per vehicle)				
	CO	NO_X	PM_{10}	$PM_{2.5}$	ROG
2003-2006	0.505	2.104	0.014	0.013	0.116
2007-2040	0.505	0.661	0.002	0.001	0.116

Unmitigated Emissions

Project Trucks	Emissions (lbs/day)				
	CO	NO_X	PM_{10}	$PM_{2.5}$	ROG
Sediment removal	1.894	7.884	0.051	0.047	0.435
Maintenance	0.891	3.710	0.024	0.022	0.205

Mitigated Emissions

Project Trucks	Emissions (lbs/day)				
	CO	NO_X	PM_{10}	$PM_{2.5}$	ROG
Sediment removal	1.894	2.476	0.006	0.005	0.435
Maintenance	0.891	1.165	0.003	0.002	0.205

Idling Emission Factors for T7 -Single Construction Vehicles

SCAB Air Basin, Calendar Year 2015 - Summer

Model Year Range	Emission Factor (grams per hour per vehicle)					
	CO	NO_X	PM_{10}	$PM_{2.5}$	CO_2	ROG
1965-1986	51.915	60.352	5.442	5.006	6,289.7	30.252
1987-1990	42.801	92.707	2.714	2.497	6,637.1	17.716
1991-1993	39.380	103.626	2.030	1.867	6,789.2	14.136
1994-1997	36.244	112.670	1.524	1.402	6,941.2	11.306
1998-2002	32.577	121.671	1.054	0.970	7,136.6	8.484
2003-2006	30.319	126.211	0.818	0.752	7,266.9	6.970
2007-2040	30.319	39.644	0.091	0.084	7,266.9	6.970

Fugitive Dust - Excavation

Fugitive dust emissions from excavation are estimated using the methodology described in Section 11.9, Western Surface Coal Mining, of the EPA AP-42.

AP-42 estimates the emission factor of PM_{10} applying a scaling factor to that of PM_{15}. Similarly, the emission factor of $PM_{2.5}$ is scaled from that of total suspended particulates (TSP). The equations used to calculate the emission factors for PM_{15} and TSP and the scaling factor for those of PM_{10} and $PM_{2.5}$ are presented below:

Emission Factors (Dragline Overburden)

EF PM_{15} =	$0.0021 \times d^{0.7} \div M^{0.3}$ =	0.003 lb/hr
EF PM_{TSP} =	$0.0021 \times d^{1.1} \div M^{0.3}$ =	0.006 lb/hr

where: d = *drop height (ft)* *5* *(estimate)*

and: M = *material moisture content (%)=* *12* *(SCAQMD Handbook Table A9-9-G-1)*

EF PM_{10} =	$EF_{PM15} \times F_{PM10}$ =	0.002 lb/hr
EF $PM_{2.5}$ =	$EF_{PMTSP} \times F_{PM2.5}$ =	0.000 lb/hr

Where: EF_{PM10} = *PM_{10} scaling factor. The AP-42 default value is* *0.75*

and $EF_{PM2.5}$ = *$PM_{2.5}$ scaling factor. The AP-42 default value is* *0.017*

(Based on excavation of 7,650 yd^3 /d)

Pollutant	Emissions *(lbs/day)*	
	Unmitigated	Mitigated
PM_{10}	17.64	3.53
$PM_{2.5}$	0.76	0.15

Control Effectiveness for Rule 403 compliance

80%

Fugitive Dust - Grading

Fugitive dust emissions from excavation are estimated using the methodology described in Section 11.9, Western Surface Coal Mining, of the EPA AP-42.

AP-42 estimates the emission factor of PM_{10} applying a scaling factor to that of PM_{15}. Similarly, the emission factor of $PM_{2.5}$ is scaled from that of total suspended particulates (TSP). The equations used to calculate the emission factors for PM_{15} and TSP and the scaling factor for those of PM_{10} and $PM_{2.5}$ are presented below:

Emission Factors (Bulldozing Overburden)

EF PM_{15} =	$1.0 \times s^{1.5} \div M^{1.4}$ =	0.764	lb/hr
EF PM_{TSP} =	$5.7 \times s^{1.2} \div M^{1.3}$ =	2.939	lb/hr

where: s =	*material silt content (%)*	*8.5*	*(estimate)*
and: M =	*material moisture content (%)=*	*12*	*(SCAQMD Handbook Table A9-9-G-1)*

EF PM_{10} =	$EF_{PM15} \times F_{PM10}$ =	0.573	lb/hr
EF $PM_{2.5}$ =	$EF_{PMTSP} \times F_{PM2.5}$ =	0.309	lb/hr

Where: EF $_{PM10}$ =	*PM_{10} scaling factor. The AP-42 default value is*	*0.75*
and EF $_{PM2.5}$ =	*$PM_{2.5}$ scaling factor. The AP-42 default value is*	*0.105*

(Based on 10 hours per day of grading)

Pollutant	Emissions *(lbs/day)*	
	Unmitigated	Mitigated
PM_{10}	5.73	1.15
$PM_{2.5}$	3.09	0.62

Control Effectiveness for Rule 403 compliance

80%

Fugitive Dust - Material Loading

Fugitive dust emissions from excavation are estimated using the methodology described in Section 13.4.2, *Aggregate Handling and Storage Piles* , of the EPA AP-42.

Emission Factor Formula

Emissions = $k \times 0.0032 \times (U \div 5)^{1.3} \div (M \div 2)^{1.4}$ lb/ton

where: k = *aerodynamic particle size multiplier* *PM $_{10}$ = 0.35* *PM $_{2.5}$ = 0.053*

U = *average wind speed (mph)* *15* *(AP-42)*

M = *material moisture content (%)* *12* *(SCAQMD Handbook Table A9-9-G-1)*

EF PM_{10} =	3.80E-04	lb-PM_{10}/ton_{mat}
EF $PM_{2.5}$ =	5.76E-05	lb-$PM_{2.5}$/ton_{mat}
or		
EF PM_{10} =	1.90E-07	lb-PM_{10}/lb_{mat}
EF $PM_{2.5}$ =	2.88E-08	lb-$PM_{2.5}$/lb_{mat}
or		
EF PM_{10} =	5.13E-04	lb-PM_{10}/yd^3_{mat}
EF $PM_{2.5}$ =	7.77E-05	lb-$PM_{2.5}$/yd^3_{mat}

(based on 2,600 lbs/yd ^{3} density for aggregate)

(Based on excavation of 7,650 yd ^{3} /d)

Pollutant	Emissions *(lbs/day)*	
	Uncontrolled	Compliance
PM_{10}	3.93	0.79
$PM_{2.5}$	0.59	0.12

Control Effectiveness for Rule 403 compliance

80%

Fugitive Dust - Summary

Uncontrolled

Category	Emissions (lb/day)	
	PM_{10}	$PM_{2.5}$
Excavation	17.64	0.76
Grading	5.73	3.09
Material Unloading/Loading	3.93	0.59
Total	***27.30***	***4.44***

Compliance

Category	Emissions (lb/day)	
	PM_{10}	$PM_{2.5}$
Excavation	3.53	0.15
Grading	1.15	0.62
Material Unloading/Loading	0.79	0.12
Total	***5.46***	***0.89***

Maintenance Fugitive Dust - Excavation

Fugitive dust emissions from excavation are estimated using the methodology described in Section 11.9, Western Surface Coal Mining, of the EPA AP-42.

AP-42 estimates the emission factor of PM_{10} applying a scaling factor to that of PM_{15}. Similarly, the emission factor of $PM_{2.5}$ is scaled from that of total suspended particulates (TSP). The equations used to calculate the emission factors for PM_{15} and TSP and the scaling factor for those of PM_{10} and $PM_{2.5}$ are presented below:

Emission Factors (Dragline Overburden)

EF PM_{15} =	$0.0021 \times d^{0.7} \div M^{0.3}$ =	0.003 lb/hr
EF PM_{TSP} =	$0.0021 \times d^{1.1} \div M^{0.3}$ =	0.006 lb/hr

where: d = *drop height (ft)* *5* *(estimate)*

and: M = *material moisture content (%)=* *12* *(SCAQMD Handbook Table A9-9-G-1)*

EF PM_{10} =	$EF_{PM15} \times F_{PM10}$ =	0.002 lb/hr
EF $PM_{2.5}$ =	$EF_{PMTSP} \times F_{PM2.5}$ =	0.000 lb/hr

Where: EF_{PM10} = *PM_{10} scaling factor. The AP-42 default value is* *0.75*

and $EF_{PM2.5}$ = *$PM_{2.5}$ scaling factor. The AP-42 default value is* *0.017*

(Based on excavation of 3,825 yd^3 /d)

Pollutant	Emissions *(lbs/day)*	
	Unmitigated	Mitigated
PM_{10}	8.82	1.76
$PM_{2.5}$	0.38	0.08

Control Effectiveness for Rule 403 compliance

80%

Maintenance Fugitive Dust - Grading

Fugitive dust emissions from excavation are estimated using the methodology described in Section 11.9, Western Surface Coal Mining, of the EPA AP-42.

AP-42 estimates the emission factor of PM_{10} applying a scaling factor to that of PM_{15}. Similarly, the emission factor of $PM_{2.5}$ is scaled from that of total suspended particulates (TSP). The equations used to calculate the emission factors for PM_{15} and TSP and the scaling factor for those of PM_{10} and $PM_{2.5}$ are presented below:

Emission Factors (Bulldozing Overburden)

EF PM_{15} =	$1.0 \times s^{1.5} \div M^{1.4}$ =	0.764	lb/hr
EF PM_{TSP} =	$5.7 \times s^{1.2} \div M^{1.3}$ =	2.939	lb/hr

where: s =	*material silt content (%)*	*8.5*	*(estimate)*
and: M =	*material moisture content (%)=*	*12*	*(SCAQMD Handbook Table A9-9-G-1)*

EF PM_{10} =	$EF_{PM15} \times F_{PM10}$ =	0.573	lb/hr
EF $PM_{2.5}$ =	$EF_{PMTSP} \times F_{PM2.5}$ =	0.309	lb/hr

Where: EF_{PM10} = PM_{10} scaling factor. The AP-42 default value is *0.75*

and $EF_{PM2.5}$ = $PM_{2.5}$ scaling factor. The AP-42 default value is *0.105*

(Based on 10 hours per day of grading)

Pollutant	Emissions *(lbs/day)*	
	Unmitigated	Mitigated
PM_{10}	5.73	1.15
$PM_{2.5}$	3.09	0.62

Control Effectiveness for Rule 403 compliance

80%

Maintenance Fugitive Dust - Material Loading

Fugitive dust emissions from excavation are estimated using the methodology described in Section 13.4.2, *Aggregate Handling and Storage Piles* , of the EPA AP-42.

Emission Factor Formula

Emissions = $k \times 0.0032 \times (U \div 5)^{1.3} \div (M \div 2)^{1.4}$ lb/ton

where: k = *aerodynamic particle size multiplier* PM_{10} = *0.35* $PM_{2.5}$ = *0.053*

U = *average wind speed (mph)* *15* *(AP-42)*

M = *material moisture content (%)* *12* *(SCAQMD Handbook Table A9-9-G-1)*

EF PM_{10} =	3.80E-04	lb-PM_{10}/ton_{mat}
EF $PM_{2.5}$ =	5.76E-05	lb-$PM_{2.5}$/ton_{mat}
or		
EF PM_{10} =	1.90E-07	lb-PM_{10}/lb_{mat}
EF $PM_{2.5}$ =	2.88E-08	lb-$PM_{2.5}$/lb_{mat}
or		
EF PM_{10} =	5.13E-04	lb-PM_{10}/yd^3_{mat}
EF $PM_{2.5}$ =	7.77E-05	lb-$PM_{2.5}$/yd^3_{mat}

(based on 2,600 lbs/yd^3 density for aggregate)

(Based on excavation of 3,825 yd^3/d)

Pollutant	Emissions *(lbs/day)*	
	Unmitigated	Mitigated
PM_{10}	1.96	0.39
$PM_{2.5}$	0.30	0.06

Control Effectiveness for Rule 403 compliance

80%

Maintenance Fugitive Dust - Summary

Unmitigated

Category	Emissions (lb/day)	
	PM_{10}	$PM_{2.5}$
Excavation	8.82	0.38
Grading	5.73	3.09
Material Unloading/Loading	1.96	0.30
Total	***16.52***	***3.76***

Mitigated

Category	Emissions (lb/day)	
	PM_{10}	$PM_{2.5}$
Excavation	1.76	0.08
Grading	1.15	0.62
Material Unloading/Loading	0.39	0.06
Total	***3.30***	***0.75***

Air Quality Report Appendix B

OB-1
AIR ANALYSES

APPENDIX B

CALINE4 Outputs

JOB: Irwindale Ave @ Gladstone St
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (M) X	Y	Z
1. Receptor	-9	742	2.0
2. Receptor	20	742	2.0
3. Receptor	20	769	2.0
4. Receptor	-9	769	2.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. Receptor	82.	0.7	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
2. Receptor	353.	0.9	0.0	0.0	0.4	0.0	0.0	0.1	0.1	0.1
3. Receptor	190.	0.7	0.0	0.2	0.1	0.0	0.0	0.0	0.0	0.0
4. Receptor	95.	0.8	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. Receptor	0.2	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.1
2. Receptor	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1
3. Receptor	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1
4. Receptor	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.0	0.0	0.0	0.1

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION

JOB: Vincent Ave @ Arrow Hwy
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U=	1.0 M/S	Z0=	100. CM	ALT=	325. (M)
BRG=	WORST CASE	VD=	0.0 CM/S		
CLAS=	7 (G)	VS=	0.0 CM/S		
MIXH=	1000. M	AMB=	0.0 PPM		
SIGTH=	5. DEGREES	TEMP=	10.0 DEGREE (C)		

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (M) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. NB External	8	0	8	600	AG	640	2.5	0.0	11.4
B. NB Approach	8	600	8	755	AG	455	4.1	0.0	11.4
C. NB Depart	8	755	8	911	AG	525	4.1	0.0	11.4
D. NB External	8	911	8	1511	AG	525	2.5	0.0	11.4
E. NB Left	8	600	4	755	AG	185	4.1	0.0	11.4
F. SB Left	0	911	4	755	AG	35	4.1	0.0	11.4
G. SB External	0	1511	0	911	AG	455	2.5	0.0	11.4
H. SB Approach	0	911	0	755	AG	420	4.1	0.0	11.4
I. SB Depart	0	755	0	600	AG	560	4.1	0.0	11.4
J. SB External	0	600	0	0	AG	560	2.5	0.0	11.4
K. EB External	-750	750	-150	750	AG	725	2.5	0.0	13.7
L. EB Approach	-150	750	4	750	AG	665	4.1	0.0	13.7
M. EB Depart	4	750	158	750	AG	705	4.1	0.0	13.7
N. EB External	158	750	758	750	AG	705	2.5	0.0	13.7
O. WB External	758	761	158	761	AG	1555	2.5	0.0	13.7
P. WB Approach	158	761	4	761	AG	1425	4.1	0.0	13.7
Q. WB Depart	4	761	-150	761	AG	1585	4.1	0.0	13.7
R. WB External	-150	761	-750	761	AG	1585	2.5	0.0	13.7
S. EB Left	-150	750	4	755	AG	60	4.1	0.0	13.7
T. WB Left	158	761	4	755	AG	130	4.1	0.0	13.7

JOB: Vincent Ave @ Arrow Hwy
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (M) X	Y	Z
1. Receptor	-7	742	2.0
2. Receptor	16	742	2.0
3. Receptor	16	769	2.0
4. Receptor	-7	769	2.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. Receptor	82.	0.7	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
2. Receptor	277.	0.7	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
3. Receptor	264.	0.9	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
4. Receptor	96.	0.9	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. Receptor	0.1	0.0	0.0	0.0	0.3	0.0	0.1	0.2	0.0	0.0	0.0	0.0
2. Receptor	0.1	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.0
3. Receptor	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.6	0.1	0.0	0.0
4. Receptor	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.5	0.0	0.0	0.0	0.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION

JOB: Figueroa St/Scholl Canyon @ SR-134 WB Ra
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U=	1.0 M/S	Z0=	100. CM	ALT=	325. (M)
BRG=	WORST CASE	VD=	0.0 CM/S		
CLAS=	7 (G)	VS=	0.0 CM/S		
MIXH=	1000. M	AMB=	0.0 PPM		
SIGTH=	5. DEGREES	TEMP=	10.0 DEGREE (C)		

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (M) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. NB External	8	0	8	600	AG	515	2.5	0.0	11.4
B. NB Approach	8	600	8	755	AG	515	4.1	0.0	11.4
C. NB Depart	8	755	8	910	AG	80	4.1	0.0	11.4
D. NB External	8	910	8	1510	AG	80	2.5	0.0	11.4
E. NB Left	8	600	4	755	AG	0	4.1	0.0	11.4
F. SB Left	0	910	4	755	AG	20	4.1	0.0	11.4
G. SB External	0	1510	0	910	AG	110	2.5	0.0	11.4
H. SB Approach	0	910	0	755	AG	90	4.1	0.0	11.4
I. SB Depart	0	755	0	600	AG	560	4.1	0.0	11.4
J. SB External	0	600	0	0	AG	560	2.5	0.0	11.4
K. EB External	-750	750	-150	750	AG	0	2.5	0.0	12.6
L. EB Approach	-150	750	4	750	AG	0	4.1	0.0	12.6
M. EB Depart	4	750	158	750	AG	520	4.1	0.0	12.6
N. EB External	158	750	758	750	AG	520	2.5	0.0	12.6
O. WB External	758	760	158	760	AG	535	2.5	0.0	12.6
P. WB Approach	158	760	4	760	AG	65	4.1	0.0	12.6
Q. WB Depart	4	760	-150	760	AG	0	4.1	0.0	12.6
R. WB External	-150	760	-750	760	AG	0	2.5	0.0	12.6
S. EB Left	-150	750	4	755	AG	0	4.1	0.0	12.6
T. WB Left	158	760	4	755	AG	470	4.1	0.0	12.6

JOB: Figueroa St/Scholl Canyon @ SR-134 WB Ra
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (M) X	Y	Z
1. Receptor	-7	742	2.0
2. Receptor	16	742	2.0
3. Receptor	16	767	2.0
4. Receptor	-7	767	2.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. Receptor	84.	0.5	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
2. Receptor	82.	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3. Receptor	186.	0.5	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0
4. Receptor	175.	0.4	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. Receptor	0.1	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.1
2. Receptor	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.1
3. Receptor	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1
4. Receptor	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION

JOB: Figueroa St @ Eagle Vista Dr
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U=	1.0 M/S	Z0=	100. CM	ALT=	325. (M)
BRG=	WORST CASE	VD=	0.0 CM/S		
CLAS=	7 (G)	VS=	0.0 CM/S		
MIXH=	1000. M	AMB=	0.0 PPM		
SIGTH=	5. DEGREES	TEMP=	10.0 DEGREE (C)		

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (M) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. NB External	10	0	10	600	AG	585	2.5	0.0	12.9
B. NB Approach	10	600	10	753	AG	470	4.1	0.0	12.9
C. NB Depart	10	753	10	907	AG	515	4.1	0.0	12.9
D. NB External	10	907	10	1507	AG	515	2.5	0.0	12.9
E. NB Left	10	600	5	753	AG	115	4.1	0.0	12.9
F. SB Left	0	907	5	753	AG	0	4.1	0.0	12.9
G. SB External	0	1507	0	907	AG	560	2.5	0.0	12.9
H. SB Approach	0	907	0	753	AG	560	4.1	0.0	12.9
I. SB Depart	0	753	0	600	AG	605	4.1	0.0	12.9
J. SB External	0	600	0	0	AG	605	2.5	0.0	12.9
K. EB External	-750	750	-150	750	AG	120	2.5	0.0	10.0
L. EB Approach	-150	750	5	750	AG	75	4.1	0.0	10.0
M. EB Depart	5	750	160	750	AG	0	4.1	0.0	10.0
N. EB External	160	750	760	750	AG	0	2.5	0.0	10.0
O. WB External	760	757	160	757	AG	0	2.5	0.0	10.0
P. WB Approach	160	757	5	757	AG	0	4.1	0.0	10.0
Q. WB Depart	5	757	-150	757	AG	145	4.1	0.0	10.0
R. WB External	-150	757	-750	757	AG	145	2.5	0.0	10.0
S. EB Left	-150	750	5	753	AG	45	4.1	0.0	10.0
T. WB Left	160	757	5	753	AG	0	4.1	0.0	10.0

JOB: Figueroa St @ Eagle Vista Dr
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (M) X	Y	Z
1. Receptor	-8	744	2.0
2. Receptor	18	744	2.0
3. Receptor	18	763	2.0
4. Receptor	-8	763	2.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. Receptor	173.	0.4	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
2. Receptor	186.	0.4	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0
3. Receptor	186.	0.4	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0
4. Receptor	174.	0.4	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. Receptor	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2. Receptor	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3. Receptor	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4. Receptor	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION

JOB: Figueroa St @ SR-134 EB Ramps
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U=	1.0 M/S	Z0=	100. CM	ALT=	325. (M)
BRG=	WORST CASE	VD=	0.0 CM/S		
CLAS=	7 (G)	VS=	0.0 CM/S		
MIXH=	1000. M	AMB=	0.0 PPM		
SIGTH=	5. DEGREES	TEMP=	10.0 DEGREE (C)		

II. LINK VARIABLES

LINK DESCRIPTION	*	LINK COORDINATES (M) X1	Y1	X2	Y2	* TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. NB External	*	10	0	10	600	* AG	815	2.5	0.0	12.9
B. NB Approach	*	10	600	10	755	* AG	815	4.1	0.0	12.9
C. NB Depart	*	10	755	10	909	* AG	585	4.1	0.0	12.9
D. NB External	*	10	909	10	1509	* AG	585	2.5	0.0	12.9
E. NB Left	*	10	600	5	755	* AG	0	4.1	0.0	12.9
F. SB Left	*	0	909	5	755	* AG	115	4.1	0.0	12.9
G. SB External	*	0	1509	0	909	* AG	600	2.5	0.0	12.9
H. SB Approach	*	0	909	0	755	* AG	485	4.1	0.0	12.9
I. SB Depart	*	0	755	0	600	* AG	980	4.1	0.0	12.9
J. SB External	*	0	600	0	0	* AG	980	2.5	0.0	12.9
K. EB External	*	-750	750	-150	750	* AG	0	2.5	0.0	12.2
L. EB Approach	*	-150	750	5	750	* AG	0	4.1	0.0	12.2
M. EB Depart	*	5	750	160	750	* AG	405	4.1	0.0	12.2
N. EB External	*	160	750	760	750	* AG	405	2.5	0.0	12.2
O. WB External	*	760	759	160	759	* AG	555	2.5	0.0	12.2
P. WB Approach	*	160	759	5	759	* AG	60	4.1	0.0	12.2
Q. WB Depart	*	5	759	-150	759	* AG	0	4.1	0.0	12.2
R. WB External	*	-150	759	-750	759	* AG	0	2.5	0.0	12.2
S. EB Left	*	-150	750	5	755	* AG	0	4.1	0.0	12.2
T. WB Left	*	160	759	5	755	* AG	495	4.1	0.0	12.2

JOB: Figueroa St @ SR-134 EB Ramps
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (M) X	Y	Z
1. Receptor	-8	742	2.0
2. Receptor	18	742	2.0
3. Receptor	18	767	2.0
4. Receptor	-8	767	2.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. Receptor	84.	0.6	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
2. Receptor	353.	0.5	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.1
3. Receptor	186.	0.6	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0
4. Receptor	174.	0.6	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. Receptor	0.1	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.1
2. Receptor	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1
3. Receptor	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
4. Receptor	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

APPENDIX C – Health Risk Assessment

HEALTH RISK ASSESSMENT

DEVIL'S GATE RESERVOIR SEDIMENT REMOVAL AND MANAGEMENT PROJECT

CITY OF PASADENA

LEAD AGENCY:
LOS ANGELES COUNTY FLOOD CONTROL DISTRICT

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PROJECT NO. 11057

SEPTEMBER 27, 2013

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Appendix B – AERMOD Model Printouts for Haul Routes 1B and 1F to Devil's Gate Reservoir

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ACRONYMS AND ABBREVIATIONS

Basin	South Coast Air Basin
CAAQS	California Ambient Air Quality Standards
CARB	California Air Resources Board
CCAA	California Clean Air Act
CEQA	California Environmental Quality Act
DPM	Diesel particulate matter
EPA	Environmental Protection Agency
FAST	Flow-Assisted Sediment Transport
HAP	Hazardous Air Pollutants
HRA	Health Risk Assessment
LACFCD	Los Angeles County Flood Control District
LST	Localized Significant Thresholds
MICR	Maximum Individual Cancer Risk
NAAQS	National Ambient Air Quality Standards
NSPS	New Source Performance Standards
PM	Particle matter
PM10	Particles that are less than 10 micrometers in diameter
PM2.5	Particles that are less than 2.5 micrometers in diameter
PMI	Point of Maximum Impact
PPM	Parts per million
SCAQMD	South Coast Air Quality Management District
TAC	Toxic air contaminants

1.0 INTRODUCTION

1.1 Purpose of Analysis and Study Objectives

This Health Risk Assessment has been completed to determine the potential cancer risks with the proposed Devil's Gate Reservoir Sediment Removal and Management project (proposed project). The following is provided in this report:

- A description of the proposed project;
- A description of toxic air contaminants;
- A description of health risk standards;
- An analysis of the diesel particulate emissions from the proposed project;
- An analysis of the cancer risk from the proposed project;

1.2 Site Location and Study Area

The project site is located in the City of Pasadena, in Los Angeles County. The City of La Canada Flintridge is located on the west side of the project site and the unincorporated community of Altadena is located on the east side of the project site. The project site includes the Devil's Gate Dam and Reservoir that covers approximately 175 acres. The project site is bounded by: NASA's JPL facility and park uses on the northwest side; parking for NASA JPL facility, park uses, and residential uses on the east side; Oak Grove Drive and Interstate 210 on the south side; and Oak Grove Drive and La Canada High School on the west side of the project site. The Project Location Map is shown in Figure 1.

1.3 Proposed Project Description

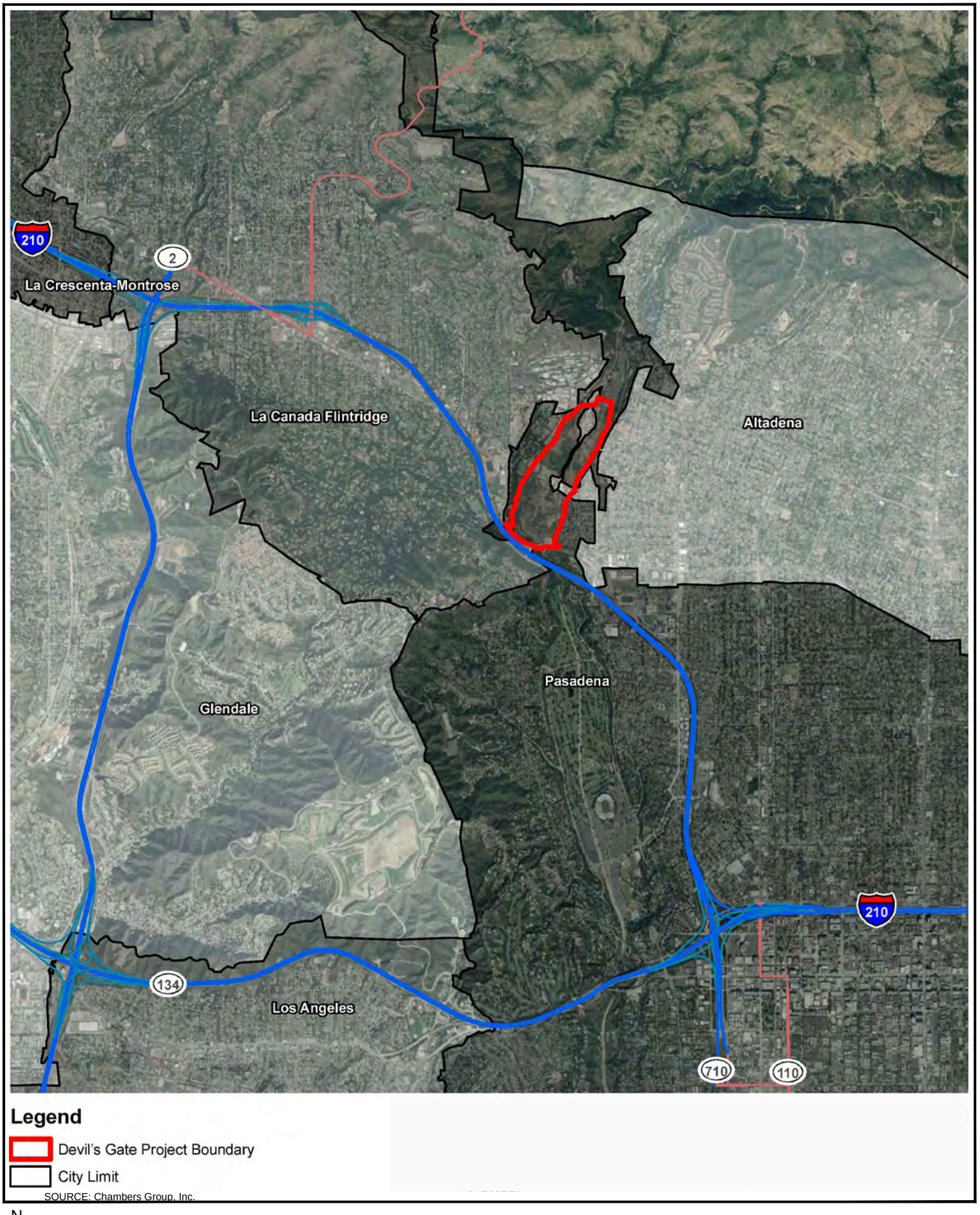
The Los Angeles County Flood Control District (LACFCD) must remove sediment that has accumulated behind the dam in order to restore the capacity of Devil's Gate Reservoir to minimize the level of flood risk to downstream communities along the Arroyo Seco. In its current condition, the reservoir no longer has the capacity to safely contain another major debris event; and the outlet works have a risk of becoming clogged and inoperable. The proposed project would remove sediment from the reservoir behind Devil's Gate Dam to restore it to its current design standard, and establish a reservoir configuration more suitable for routine maintenance activities including sediment management.

Sediment Removal Activities

There is currently approximately 2.9 million cubic yards of excess sediment in the reservoir, however additional sediment accumulation is anticipated during the upcoming storm seasons due to the denuded surfaces of the watershed created by the 2009 Station Fire. It is estimated that an average of 13,000 cubic yards will potentially be deposited in the reservoir annually. There are four sediment removal alternatives that are detailed below

<u>Preferred Alternative</u>

The proposed project would remove approximately 2.9 million cubic yards of current excess sediment in the reservoir plus any additional sediment received prior to removal commencement.



VISTA ENVIRONMENTAL

Figure 1
Project Location Map

Figure 2 shows the project excavation boundary. As shown in Figure 2, the basin will be excavated to an elevation of approximately 985 feet at the face of the dam, sloping up to approximately 1,070 feet at the northern end of the reservoir. This configuration will involve approximately 178 acres of the reservoir. In addition to the sediment excavated as part of the proposed project, sediment stockpiled at Johnson Field will also be removed.

Excavated sediment will be trucked off-site to existing disposal site locations which are currently available to accept the sediment. Possible sediment disposal locations include the Waste Management Pit in Azusa, the Manning Pit and Vulcan Materials in Irwindale, or one of four sites in Sun Valley that include Bradley Landfill, Boulevard Pit, Cal-Mat Pit, and Sheldon Pit. It is estimated that the eastern disposal sites (Waste Management Pit, Manning Pit, and Vulcan Materials) would be used 80 percent to 100 percent of the time, while the western disposal sites would be used 0 percent to 20 percent of the time. Vegetation and organic debris removed from the project site would be hauled to the Scholl Canyon Landfill, located in the City of Glendale.

Construction of the proposed project is anticipated to occur between summer 2015 and summer 2020. Excavation and associated activities within the reservoir area are expected to take place during the dryer months, from April to December, Monday through Saturday (except on holidays), as weather permits. During dry years work could potentially start earlier and/or continue later. Onsite excavation activities will take place between the hours of 7:00 a.m. and 6:00 p.m. Standard Time and between 7:00 a.m. and 7:00 p.m. Daylight Savings Time, Monday through Friday and between 8:00 a.m. and 5:00 p.m. on Saturday.

Alternative 1, Configuration B

Alternative 1, Configuration B would remove approximately 2.8 million cubic yards of current excess sediment in the reservoir plus any additional sediment received prior to removal commencement. Figure 3 shows the Alternative 1, Configuration B site plan. As shown in the plan, the basin will be excavated to an elevation of approximately 985 feet at the face of the dam, sloping up to approximately 1,055 feet at the northern end of the basin. This configuration will involve approximately 83 acres of the reservoir. As part of this Alternative, sediment stockpiled at Johnson Field as part of the IMP will also be removed.

Alternative 2, Configuration C

Alternative 2, Configuration C would remove approximately 4 million cubic yards of current excess sediment in the reservoir plus any additional sediment received prior to removal commencement. Figure 4 shows the Alternative 2, Configuration C site plan. As shown in the plan, the downstream basin will be excavated from the face of the dam to approximately half the distance back from the dam face. The downstream basin will be excavated to an elevation of approximately 985 feet at the face of the dam, sloping up to approximately 1,045 feet at the northern end of the basin. An upstream basin, at the back of the reservoir, will be excavated down to 1,015 feet. The southern edge of the upstream basin will be excavated to an elevation of approximately 1,050 feet and the northern edge will be excavated to approximately 1,065 feet. This configuration in total will involve approximately 84 acres of the reservoir. As part of this Alternative, sediment stockpiled at Johnson Field as part of the IMP will also be removed. Alternative 2, Configuration C is anticipated to take 6 years of construction to complete.

Alternative 3, Configuration D

Alternative 3, Configuration D would remove approximately 2.4 million cubic yards of current excess sediment in the reservoir plus any additional sediment received prior to removal commencement. Figure 5 shows the Alternative 3, Configuration D site plan. As shown in the plan, the basin will be excavated to an elevation of approximately 985 feet at the face of the dam, sloping up to approximately 995 feet where the basin splits and narrows into two branches. The eastern branch slopes up to an elevation of 1,040 feet at which point it widens and continues to slope up to an elevation of 1,060 feet at the northern end of the basin. The western branch slopes up to an elevation of 1,040 feet. The branches will be excavated in two phases. The phases for excavating the western branch will take place after the sediment flow for the eastern branch is established. The final cut of the eastern branch may be adjusted depending on sediment flow. This configuration will involve approximately 76 acres of the reservoir. As part of this Alternative, sediment stockpiled at Johnson Field as part of the IMP will also be removed.

Alternative 4

Alternative 4 would remove approximately 2.9 million cubic yards of current excess sediment in the reservoir through sluicing and no haul trucks would be used with this method.

Maintenance Activities

The proposed project is expected to result in a reservoir configuration and access to facilitate future routine periodic maintenance and sediment removal. Post the initial proposed sediment removal activities, sediment will be managed through vegetation maintenance, sediment excavation/trucking off-site, and Flow-Assisted Sediment Transport (FAST). These activities will take place under one of the options described below.

Option 1 – Full Maintenance

The reservoir will be maintained with the approximate cut and elevation levels that exist at the conclusion of construction activities. The vegetation within the reservoir configuration will be mowed or removed annually. During rain events FAST will be used to naturally pass sediment through the reservoir and downstream of the dam. If proper transport does not occur, sediment removal through use of mechanical equipment would be required. Based on past storm events, it is anticipated that 13,000 cubic yards of sediment would have to be excavated and trucked off-site annually. It is anticipated that this could be accomplished over a two week period, working Monday through Friday, during the late summer or early fall following the vegetation maintenance. A moderately large storm event would result in the removal of up to 170,000 cubic yards of material and would take approximately 12 weeks of excavation and hauling activities.

Option 2 – Reduced Maintenance

The area from the dam upstream to an elevation 1,040 feet, which covers an approximately 91 acre area will be maintained, while the remainder area above 1,040 feet will be allowed to naturally re-establish vegetation. The area under 1,040 will be maintained in a similar manner as Option 1, however if sediment above the 1,040 foot elevation exceeds 1 million cubic yards, the Public Works will initiate the CEQA process for a new large-scale sediment removal process. Figure 3 shows the extents of the reduced maintenance boundary for Option 2.

Devil's Gate Excavation Limit

Devil's Gate Project Boundary

SOURCE: Chambers Group, Inc.

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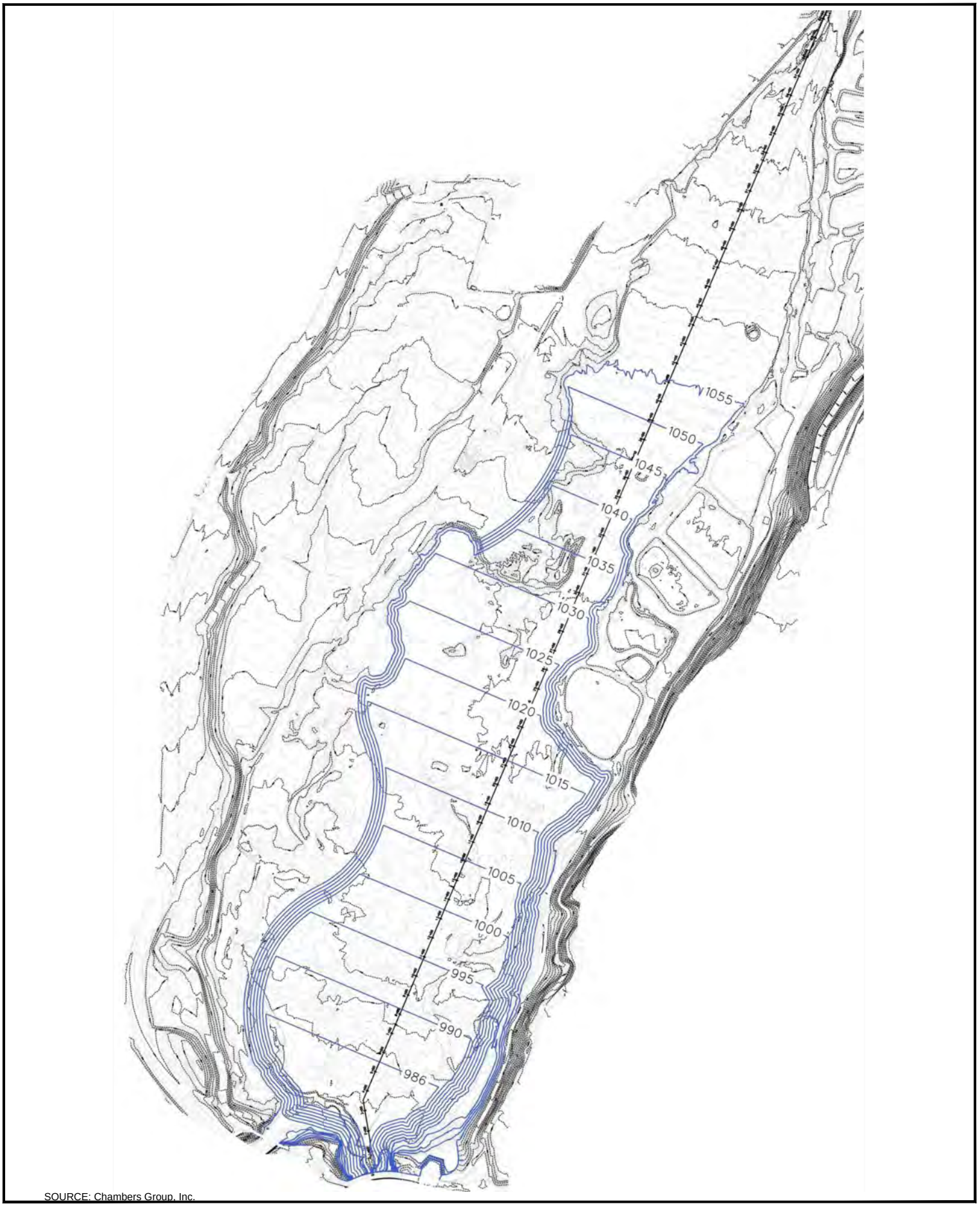
Figure 2
Preferred Alternative Site Plan



SOURCE: Chambers Group, Inc.

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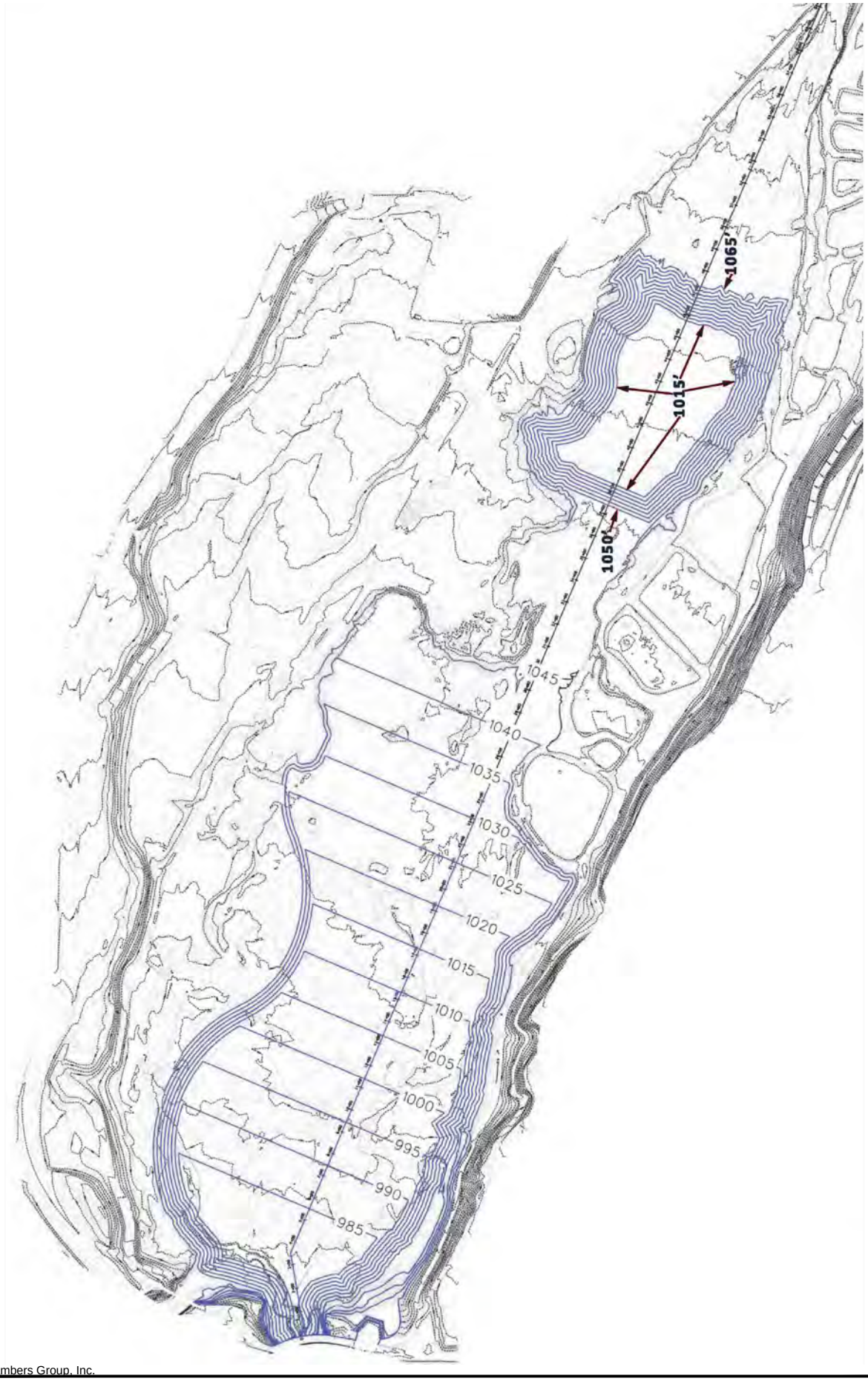
VISTA ENVIRONMENTAL

Figure 3
Alternative 1 Site Plan Configuration B



SOURCE: Chambers Group, Inc.

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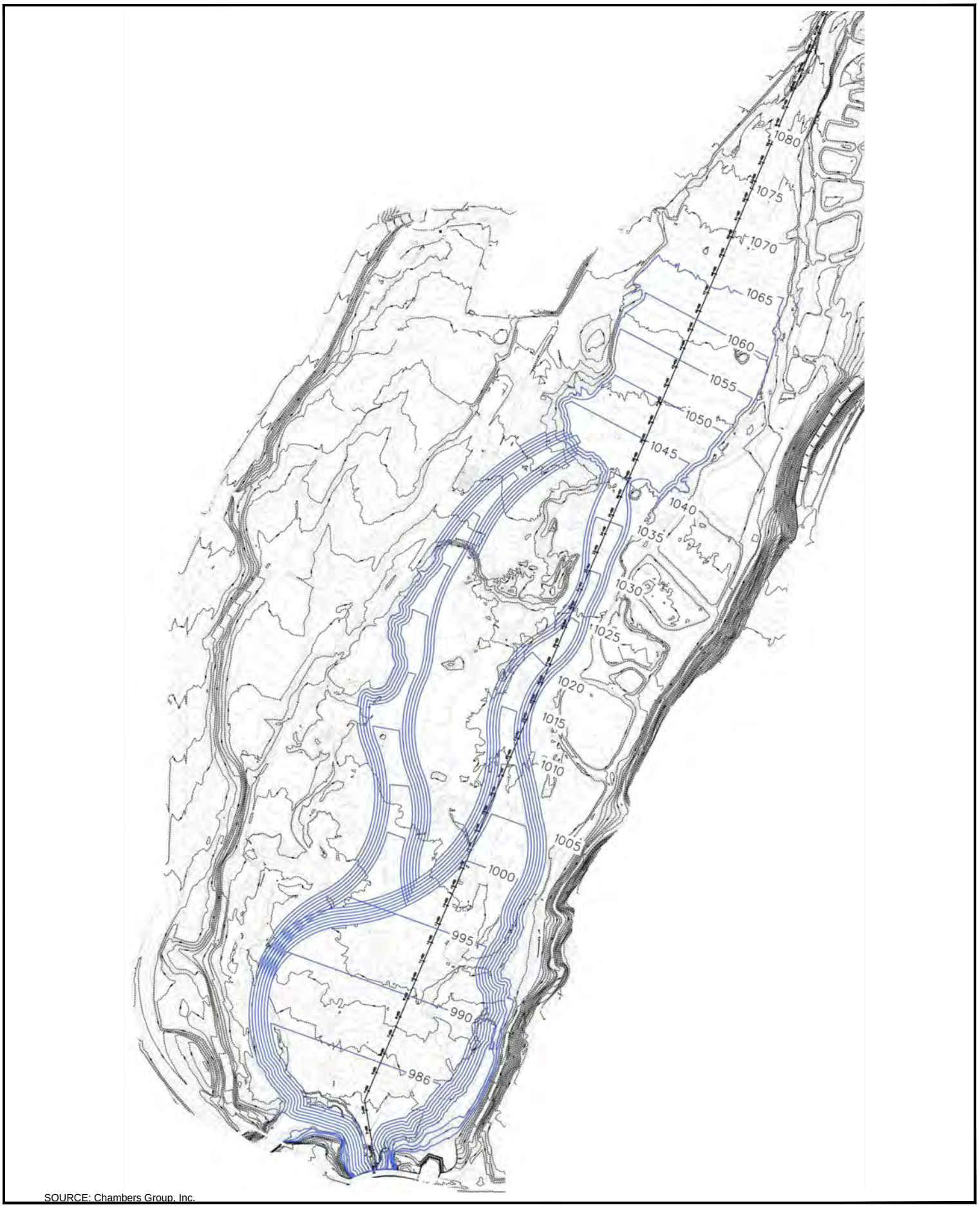
VISTA ENVIRONMENTAL

Figure 4
Alternative 2 Site Plan Configuration C



SOURCE: Chambers Group, Inc.

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VISTA ENVIRONMENTAL

Figure 5
Alternative 3 Site Plan Configuration D

2.0 TOXIC AIR CONTAMINANTS

Sources of toxic air contaminants include industrial processes such as petroleum refining and chrome plating operations, commercial operations such as gasoline stations and dry cleaners, and motor vehicle exhaust. Cars and trucks release at least forty different toxic air contaminants. The most important of these toxic air contaminants, in terms of health risk, are diesel particulates, benzene, formaldehyde, 1,3-butadiene, and acetaldehyde. Public exposure to toxic air contaminants can result from emissions from normal operations as well as accidental releases. Health effects of toxic air contaminants include cancer, birth defects, neurological damage, and death.

Toxic air contaminants are less pervasive in the urban atmosphere than criteria air pollutants, however they are linked to short-term (acute) or long-term (chronic or carcinogenic) adverse human health effects. There are hundreds of different types of toxic air contaminants with varying degrees of toxicity. Sources of toxic air contaminants include industrial processes, commercial operations (e.g., gasoline stations and dry cleaners), and motor vehicle exhaust.

According to the 2005 California Almanac of Emissions and Air Quality, the majority of the estimated health risk from toxic air contaminants can be attributed to relatively few compounds, the most important of which is diesel particulate matter (DPM). Diesel particulate matter is a subset of PM2.5 because the size of diesel particles are typically 2.5 microns and smaller. The identification of diesel particulate matter as a toxic air contaminant in 1998 led the California Air Resources Board (CARB) to adopt the Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-fueled Engines and Vehicles in September 2000. The plan's goals are a 75-percent reduction in diesel particulate matter by 2010 and an 85-percent reduction by 2020 from the 2000 baseline. Diesel engines emit a complex mixture of air pollutants, composed of gaseous and solid material. The visible emissions in diesel exhaust are known as particulate matter or PM, which includes carbon particles or "soot." Diesel exhaust also contains a variety of harmful gases and over 40 other cancer-causing substances. California's identification of diesel particulate matter as a toxic air contaminant was based on its potential to cause cancer, premature deaths, and other health problems. Exposure to diesel particulate matter is a health hazard, particularly to children whose lungs are still developing and the elderly who may have other serious health problems. Overall, diesel engine emissions are responsible for the majority of California's potential airborne cancer risk from combustion sources.

The SCAQMD developed the Multiple Air Toxics Exposure Study in the South Coast Air Basin MATES-III, January 2008, in order to calculate the toxic emissions levels throughout the South Coast Air Basin (Basin) and associated cancer risks. According to SCAQMD's MATES-III study, the southern portion of the Devil's Gate Reservoir has an estimated cancer risk of 508 in one million persons chance of cancer and the northern portion of the Devil's Gate Reservoir has an estimated cancer risk of 391 in one million persons chance of cancer. In comparison the average cancer risk for Los Angeles County is 912 in one million persons. The increased cancer risk on the southern portion of the project site is primarily due to the proximity of Interstate 210 (I-210) Freeway.

3.0 HEALTH RISK STANDARDS

According to the SCAQMD CEQA Handbook, any project that has the potential to expose the public to toxic air contaminants in excess of the following thresholds would be considered to have a significant air quality impact:

- If the Maximum Incremental Cancer Risk is 10 in one million or greater; or
- Toxic air contaminants from the proposed project would result in a Hazard Index increase of 1 or greater.

In order to determine if the proposed project may have a significant impact related to hazardous air pollutants (HAP), the *Health Risk Assessment Guidance for analyzing Cancer Risks from Mobile Source Diesel Idling Emissions for CEQA Air Quality Analysis*, (Diesel Analysis) prepared by SCAQMD, August 2003, recommends that if the proposed project is anticipated to create HAPs through stationary sources or regular operations of diesel trucks on the project site, then the proximity of the nearest receptors to the source of the HAP and the toxicity of the HAP should be analyzed through a comprehensive facility-wide health risk assessment (HRA).

4.0 PROJECT IMPACTS

The proposed project would generate toxic air contaminant emissions from diesel truck emissions and on-site diesel equipment used during both the sediment removal activities and the annual maintenance activities for of the proposed project. According to SCAQMD methodology, health effects from carcinogenic air toxics are usually described in terms of individual cancer risk. "Individual Cancer Risk" is the likelihood that a person exposed to concentrations of toxic air contaminants over a 70-year lifetime will contract cancer, based on the use of standard risk-assessment methodology.

The cancer risks have been calculated for both the Preferred Alternative and Alternative 2, Configuration C. The Preferred Alternative was chosen, since it is the most likely alternative to be implemented and Alternative 2, Configuration C was chosen, since it would require the greatest amount material to be exported by truck from the project site. Since both alternatives would require the operation of the same on-site diesel equipment and the same number of daily truck trips, with regard to cancer risk, the only consequential difference between these two alternatives is that the Preferred Alternative sediment removal activities would occur for five years, while Alternative 2, Configuration C would last for 6 years.

4.1 Dispersion Modeling

Important issues that affect the dispersion modeling include the following: 1) Model Selection, 2) Source Treatment, 3) Meteorological Data, and 4) Receptor Grid. Each of these issues is addressed below.

Model Selection

The AERMOD View Version 8.2.0 Model was used for all dispersion modeling. Key dispersion modeling options selected include the regulatory default option and urban modeling option based on a population of 9,862,049 for Los Angeles County. Flagpole receptor height was set to 0 meters. AERMAP was run with a 7.5 minute USGS DEM Map of Pasadena for the Devil's Gate Reservoir and Scholl Canyon Landfill areas and a 1 degree USGS DEM Map of San Bernardino West for the Manning Pit area. These modeling options were selected to be consistent with guidance from SCAQMD.

Source Treatment

The sediment removal and operational maintenance activities would generate 425 double trailer haul trucks round trips per day and would require the on-site operation of four front loaders, two dozers, one excavator, one grader, one water truck, and one sorter/crusher. The sediment removal activities were based on operating 9 months per year (April to December) and the operational maintenance activities were based on operating 2 weeks per year in July.

Diesel Truck Travel

Since, the diesel truck emissions would operate in the closest proximity to sensitive receptors while on surface street, the diesel truck travel modeling has been limited to the portion of the trips that would occur on surface streets. The preferred truck routes from I-210 to the project site are Haul Routes 1D and 1H, which consists of exiting I-210 at Windsor Avenue and entering I-

210 at Berkshire Place. However, in order to provide worst-case analyses, Haul Routes 1A and 1E and Haul Routes 1B and 1F have been analyzed, since these routes place all of the inbound and outbound trucks on the same roadway. Haul Routes 1A and 1E, consists of exiting and entering I-210 at Berkshire Place and Haul Routes 1B and 1F consists of exiting and entering I-210 at Windsor Avenue. These two routes were chosen since they would place all of the truck trips on the same roadway and would result in the greatest impact. For the portion of the truck trips that would occur from the freeway to the disposal site, Haul Route 2A, which goes to Waste Management Pit and Manning Pit and Haul Route 4A, which goes to Scholl Canyon Landfill, were analyzed since they are the most likely two haul routes to be utilized by the proposed project.

Each haul route was modeled by using a volume line source in AERMOD. Each haul route was modeled as a line volume source with a release height of 13.6 feet, plume height of 6.3 feet, plume width of 18.6 feet, and based on each of the 425 daily round trip truck trips traveling the length of the modeled roadway. The PM10 emission factors used for the roadway line sources were obtained from the Air Quality Analysis, which utilized the EMFAC2011 Model to calculate the emissions rates for T7 single construction trucks for the years of 2015, 2017, and 2020 based on vehicle speeds from 5 to 45 miles per hour. The Air Quality Analysis found that the haul trucks on surface streets would have PM10 emissions rates of 0.1461 grams per mile during the sediment removal activities (year 2015) and 0.0493 grams per mile during the operational maintenance activities (year 2020). Based on 850 one-way truck trips at an average speed of 25 miles per hour and running 6 days per week. This results in emission rates of 4.340E-06 grams per second for the sediment removal phase and 1.465E-06 grams per second for the operational maintenance phase, which was used in AERMOD for all road volume line sources.

On-Site Construction Equipment

The diesel PM10 emissions from the on-site construction equipment has been previously calculated in the Air Quality Analysis, which found that during the sediment removal phase, the off-road equipment would generate PM10 emissions of 2.87 pounds per day during the sediment removal activities and 0.92 pounds per day during the operational maintenance activities. The on-site construction equipment emissions were analyzed as an area source based on covering the entire area to be disturbed for the Preferred Alternative. This resulted in PM10 emission rates of 2.852E-08 grams per second for the sediment removal phase and 9.143E-09 grams per second for the operational maintenance phase.

Meteorological Data

Meteorological data from the Air District's Burbank Monitoring Station was selected for this modeling application. Five full years of sequential meteorological data was collected at the Burbank Station from 2005 to 2009 by the SCAQMD, which was the closest station with meteorological data to the project. The SCAQMD processed the data for input to the model. The data was obtained at SCAQMD's http://www.aqmd.gov/smog/metdata/AERMOD.html.

Receptor Grid

Discrete receptors were placed at the locations of the nearest off-site residential, school, church, and office structures and grid receptors were used out to 500 meters (1,640 feet).

4.2 Estimation of Health Risks

Health risks from diesel particulate matter are twofold. First, diesel particulate matter is a carcinogen according to the State of California. Second, long-term chronic exposure to diesel particulate matter can cause health effects to the respiratory system. Each of these health risks is discussed below.

Cancer Risks

According to the in Health Risk Assessment for Proposed Land Use Projects, prepared by CAPCOA, July 2009, the cancer risk should be calculated using the following formula:

[Dose-inh (mg/(Kg-day)] * [Oral Slope Factor (kg-day)/mg]*[1x106] = Potential Cancer Risk

Where:
Oral Slope Factor = 1.1
Dose-inh = (C¬air * DBR * A * EF * ED * 10-6) / AT

Where:

Cair [Concentration in air (µg/m3)] = (Calculated by AERMOD Model)

DBR [Daily breathing rate (L/kg body weight – day)] = 302 for residential and 101 for off-site worker and school uses and 50 for park uses.

A [Inhalation absorption factor] = 1

EF [Exposure frequency (days/year)] = 350

ED [Exposure duration (years)] = 70

10^6 [Micrograms to milligrams conversion]

AT [Average time period over which exposure is averaged in days] = 25,550

According to the OEHHA formula the residential receptors equates to Cair * 318.5 = Potential Cancer Risk; the offsite worker and school area receptors equates to Cair * 106.2 = Potential Cancer Risk, and the park receptors equates to Cair * 53.1 = Potential Cancer Risk.

The AERMOD model was run for two alternative truck routes from Devil's Gate Reservoir to I-210 and for the portion of the truck trips that would occur from the freeway to the disposal site, Haul Route 2A, which goes to Waste Management Pit and Manning Pit and Haul Route 4A, which goes to Scholl Canyon Landfill, were also analyzed since they are the most likely two haul routes to be utilized by the proposed project. In addition, the cancer risk from both the Preferred Alternative and Alternative 2, Configuration C were calculated. The following details the results of the different model runs.

<u>Devil's Gate Reservoir On-Site Equipment and Haul Routes 1A and 1E</u>

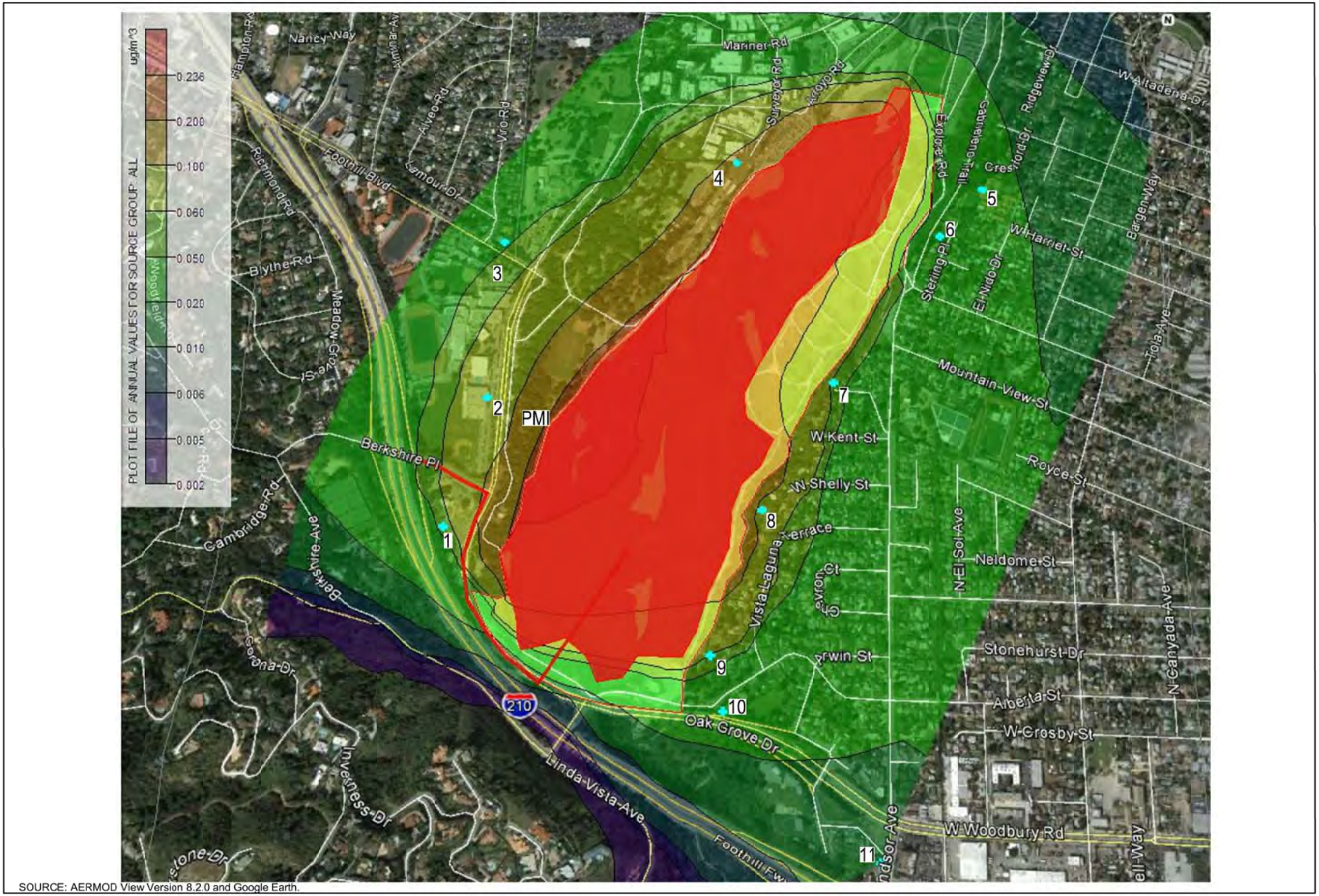
The diesel particulate cancer risk created from the operation of the on-site diesel equipment and Haul Routes 1A and 1E are shown below on Figure 6 and Appendix A. Table A provides a summary of the calculated diesel emission concentrations at the nearest sensitive receptors, including the point of maximum impact (PMI).

Table A – Diesel PM10 Levels and Cancer Risk from Routes 1A and 1E

Sensitive Receptor	Receptor Type	Receptor Location		Annual Concentration (µg/m^3)		Cancer Risk Per Million People[1]	
		X	Y	Sediment Removal	Operational Maintenance	Preferred Alternative[2]	Alternative 2 Config. C
1	Church	391,316	3,783,682	0.0534	0.00144	0.5	0.6
2	High School	391,392	3,783,989	0.0749	0.00192	0.8	0.9
3	Residential	391,405	3,784,381	0.0481	0.00117	1.4	1.7
4	Office	391,964	3,784,620	0.1121	0.00244	1.1	1.3
5	School	392,559	3,784,546	0.0275	0.00015	0.2	0.3
6	Residential	392,453	3,784,419	0.0340	0.00016	0.8	1.0
7	Residential	392,197	3,784,046	0.0561	0.00027	1.4	1.6
8	Residential	392,034	3,783,741	0.0800	0.00034	1.9	2.3
9	Residential	391,925	3,783,416	0.0583	0.00012	1.4	1.6
10	Residential	391,955	3,783,299	0.0301	0.00003	0.7	0.8
11	Residential	392,291	3,783,005	0.0116	0.00001	0.3	0.3
PMI[4]	Park	391,594	3,784,008	0.2356	0.00537	1.2	1.3
				Threshold of Significance		**10**	**10**

Notes:
[1] Cancer risk based on a residential receptor cancer risk = 318.5 x Cair; off-site worker and school cancer risk = 106.2 x Cair; or park cancer risk = 53.1 x Cair.
[2] Preferred Alternative cancer risk calculated by averaging 5 years of sediment removal and 65 years of operational maintenance by 70 years.
[3] Alternative 2 Configuration C cancer risk calculated by averaging 6 years of sediment removal and 64 years of operational maintenance by 70 years.
[4] Point of Maximum Impact.
Source: Calculated from ISC-AERMOD View Version 8.2.0.

Table A shows that the point of maximum impact (PMI) of off-site PM10 emissions would occur on the southwestern edge of the Devil's Gate Reservoir excavation activities, with concentration levels of 0.2356 µg per m^3 during the sediment removal and 0.00537 µg per m^3 during the operational maintenance activities. The cancer risk has been calculated at the PMI was found to result in a cancer risk increase of 1.2 per million people for the Preferred Alternative and 1.3 per million people for Alternative 2 Configuration C. Sensitive Receptor 8, represents the nearest residence on Vista Laguna Terrace Road to the project site that would experience the highest level of project-related diesel emissions and would result in a cancer risk increase of 1.4 per million people for the Preferred Alternative and 1.6 per million people for Alternative 2 Configuration C. All off-site diesel emissions concentrations were found to be below the 10.0 in a million cancer risk threshold that has been discussed above in Section 5.3. Therefore, no significant long-term health impacts from the operation of diesel trucks on the project site would occur from the on-site operation of diesel equipment and from Haul Routes 1A and 1E.



SOURCE: AERMOD View Version 8.2.0 and Google Earth.

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Figure 6

Modeled On-Site Equipment and Haul Routes 1A and 1E Annual Diesel PM10 Concentrations during Sediment Removal

Devil's Gate Reservoir On-Site Equipment and Haul Routes 1B and 1F

The diesel particulate cancer risk created from the operation of the on-site diesel equipment and Haul Routes 1B and 1F are shown below on Figure 7 and Appendix B. Table B provides a summary of the calculated diesel emission concentrations at the nearest sensitive receptors, including the PMI.

Table B – Diesel PM10 Levels and Cancer Risk from Routes 1B and 1F

Sensitive Receptor	Receptor Type	Receptor Location		Annual Concentration ($\mu g/m^3$)		Cancer Risk Per Million People[1]	
		X	Y	Sediment Removal	Operational Maintenance	Preferred Alternative[2]	Alternative 2 Config. C
1	Church	391,316	3,783,682	0.0533	0.00144	0.5	0.6
2	High School	391,392	3,783,989	0.0749	0.00192	0.8	0.9
3	Residential	391,405	3,784,381	0.0481	0.00117	1.4	1.7
4	Office	391,964	3,784,620	0.1121	0.00244	1.1	1.3
5	School	392,559	3,784,546	0.0275	0.00015	0.2	0.3
6	Residential	392,453	3,784,419	0.0340	0.00016	0.8	1.0
7	Residential	392,197	3,784,046	0.0561	0.00027	1.4	1.6
8	Residential	392,034	3,783,741	0.0800	0.00034	1.9	2.3
9	Residential	391,925	3,783,416	0.0583	0.00012	1.4	1.6
10	Residential	391,955	3,783,299	0.0303	0.00003	0.7	0.8
11	Residential	392,291	3,783,005	0.0119	0.00001	0.3	0.3
PMI[4]	Park	391,594	3,784,008	0.2356	0.00537	1.2	1.3
				Threshold of Significance		**10**	**10**

Notes:
[1] Cancer risk based on a residential receptor cancer risk = 318.5 x Cair; off-site worker and school cancer risk = 106.2 x Cair; or park cancer risk = 53.1 x Cair.
[2] Preferred Alternative cancer risk calculated by averaging 5 years of sediment removal and 65 years of operational maintenance by 70 years.
[3] Alternative 2 Configuration C cancer risk calculated by averaging 6 years of sediment removal and 64 years of operational maintenance by 70 years.
[4] Point of Maximum Impact.
Source: Calculated from ISC-AERMOD View Version 8.2.0.

Table B shows that the point of maximum impact (PMI) of off-site PM10 emissions would occur on the southern edge of the Devil's Gate Reservoir excavation activities, with concentration levels of 0.2356 µg per m^3 during the sediment removal and 0.00537 µg per m^3 during the operational maintenance activities. The cancer risk has been calculated at the PMI was found to result in a cancer risk increase of 1.2 per million people for the Preferred Alternative and 1.3 per million people for Alternative 2 Configuration C. Sensitive Receptor 8, represents the residence on Vista Laguna Terrace that would experience the highest level of project-related diesel emissions and would result in a cancer risk increase of 1.9 per million people for the Preferred Alternative 2.3 per million people for Alternative 2 Configuration C. All off-site diesel emissions concentrations were found to be below the 10.0 in a million cancer risk threshold that has been discussed above in Section 5.3. Therefore, no significant long-term health impacts from the operation of diesel trucks on the project site would occur from the on-site operation of diesel equipment and from Haul Routes 1B and 1F.

SOURCE: AERMOD View Version 8.2.0.

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Figure 7

Modeled On-Site Equipment and Haul Routes 1B and 1F Annual Diesel PM10 Concentrations during Sediment Removal

Manning Pit Haul Route 2A

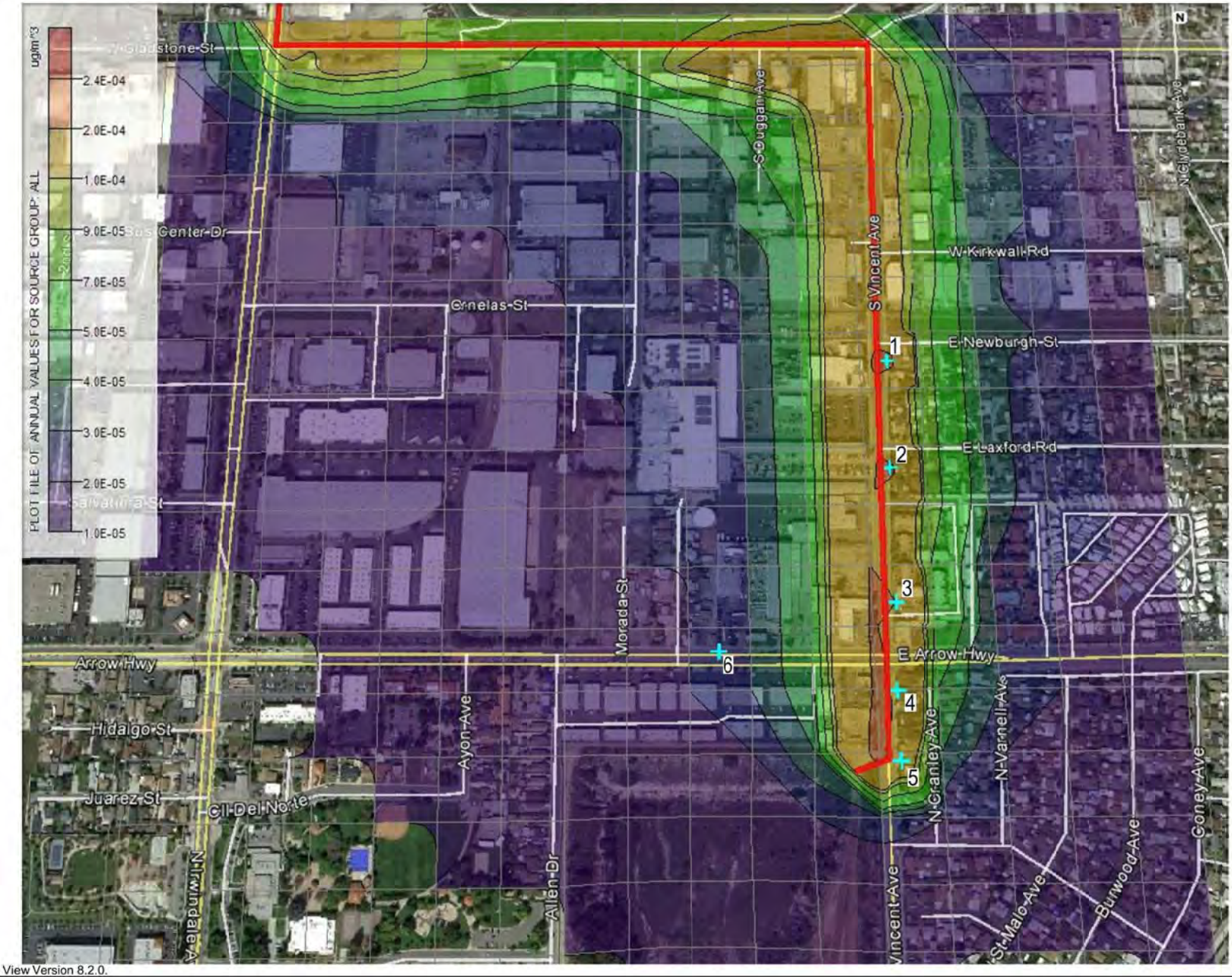
The diesel particulate cancer risk created from Haul Route 2A to Manning Pit is shown below on Figure 8 and Appendix C. Table C provides a summary of the calculated diesel emission concentrations at the nearest sensitive receptors. Since there is no project site in the Manning Pit area, there is no PMI, instead discrete sensitive receptors were placed at the anticipated maximum impacts and are shown below as sensitive receptors 1 through 6.

Table C – Diesel PM10 Levels and Cancer Risk from Haul Route 2A

Sensitive Receptor	Receptor Type	Receptor Location		Annual Concentration (µg/m^3)		Cancer Risk Per Million People[1]	
		X	Y	Sediment Removal	Operational Maintenance	Preferred Alternative[2]	Alternative 2 Config. C
1	Residential	414,672	3,774,779	0.0089	0.00043	0.3	0.4
2	Residential	414,669	3,774,640	0.0089	0.00040	0.3	0.4
3	Residential	414,668	3,774,472	0.0075	0.00019	0.2	0.3
4	Residential	414,664	3,774,366	0.0077	0.00016	0.2	0.3
5	Residential	414,664	3,774,283	0.0050	0.00028	0.2	0.2
6	Residential	414,449	3,774,414	0.0007	0.00005	0.0	0.0
				Threshold of Significance		**10**	**10**

Notes:
[1] Cancer risk based on a residential receptor cancer risk = 318.5 x Cair.
[2] Preferred Alternative cancer risk calculated by averaging 5 years of sediment removal and 65 years of operational maintenance by 70 years.
[3] Alternative 2 Configuration C cancer risk calculated by averaging 6 years of sediment removal and 64 years of operational maintenance by 70 years.
Source: Calculated from ISC-AERMOD View Version 8.2.0.

Table C shows that the residence at Sensitive Receptor 1 would experience the highest diesel particulate emissions, with concentration levels of 0.0089 µg per m^3 during the sediment removal activities and 0.00043 µg per m^3 during the operational maintenance activities. The cancer risk has been calculated at the PMI was found to result in a cancer risk increase of 0.3 per million people for the Preferred Alternative and 0.4 per million people for Alternative 2 Configuration C. All off-site diesel emissions concentrations were found to be below the 10.0 in a million cancer risk threshold that has been discussed above in Section 5.3. Therefore, no significant long-term health impacts from the operation of diesel trucks on the project site would occur from Haul Route 2A.



SOURCE: AERMOD View Version 8.2.0.

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Figure 8
Modeled Haul Route 2A Annual Diesel PM10 Concentrations during Sediment Removal

Scholl Canyon Road Haul Routes 4A and 4B

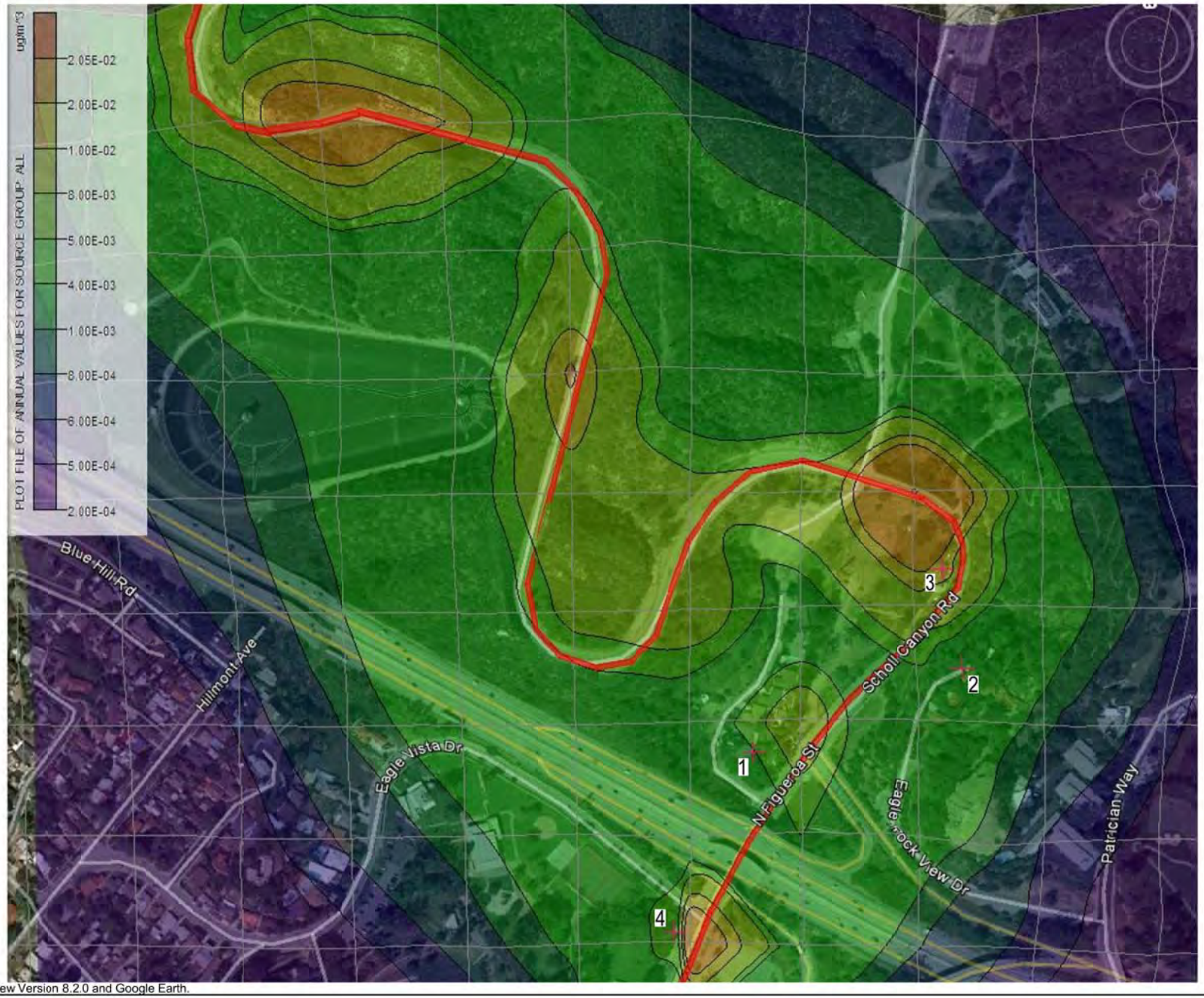
The diesel particulate cancer risk created from Haul Routes 4A and 4B to Scholl Canyon Landfill are shown below on Figure 9 and Appendix D. Table D provides a summary of the calculated diesel emission concentrations at the nearest sensitive receptors. Since there is no project site in the Scholl Canyon Landfill area, there is no PMI, instead discrete sensitive receptors were placed at the anticipated maximum impacts and are shown below as sensitive receptors 1 through 4.

Table D – Diesel PM10 Levels and Cancer Risk from Haul Routes 4A and 4B

Sensitive Receptor	Receptor Type	Receptor Location X	Receptor Location Y	Annual Concentration (µg/m^3) Sediment Removal	Annual Concentration (µg/m^3) Operational Maintenance	Cancer Risk Per Million People[1] Preferred Alternative[2]	Cancer Risk Per Million People[1] Alternative 2 Config. C
1	Residential	390,707	3,778,721	0.0039	0.00022	0.2	0.2
2	Residential	390,886	3,778,796	0.0020	0.00008	0.1	0.1
3	Residential	390,875	3,778,881	0.0089	0.00051	0.4	0.4
4	Park	390,636	3,778,559	0.0050	0.00028	0.0	0.0
				Threshold of Significance		**10**	**10**

Notes:
[1] Cancer risk based on a residential receptor cancer risk = 318.5 x Cair; off-site worker and school cancer risk = 106.2 x Cair; or park cancer risk = 53.1 x Cair.
[2] Preferred Alternative cancer risk calculated by averaging 5 years of sediment removal and 65 years of operational maintenance by 70 years.
[3] Alternative 2 Configuration C cancer risk calculated by averaging 6 years of sediment removal and 64 years of operational maintenance by 70 years.
Source: Calculated from ISC-AERMOD View Version 8.2.0.

Table D shows that the residence at Sensitive Receptor 3 would experience the highest diesel particulate emissions, with concentration levels of 0.0089 µg per m^3 during the sediment removal activities and 0.00051 µg per m^3 during the operational maintenance activities. The cancer risk has been calculated at the PMI was found to result in a cancer risk increase of 0.4 per million people for both the Preferred Alternative and Alternative 2 Configuration C. All off-site diesel emissions concentrations were found to be below the 10.0 in a million cancer risk threshold that has been discussed above in Section 5.3. Therefore, no significant long-term health impacts from the operation of diesel trucks on the project site would occur from Haul Routes 4A and 4B.



SOURCE: AERMOD View Version 8.2.0 and Google Earth.

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VISTA ENVIRONMENTAL

Figure 9
Modeled Haul Routes 4A and 4B Annual Diesel PM10 Concentrations during Sediment Removal

Non-Cancer Risks

The relationship for non-cancer health effects is given by the equation:

$$HI_{DPM} = C_{DPM}/REL_{DPM}$$

Where,

HI_{DPM} = Hazard Index; an expression of the potential for non-cancer health effects.

C_{DPM} = Annual average diesel particulate matter concentration in $\mu g/m^3$.

REL_{DPM} = Reference Exposure Level (REL) for diesel particulate matter; the diesel particulate matter concentration at which no adverse health effects are anticipated.

The REL_{DPM} is 5 µg/m3. The Office of Environmental Health Hazard Assessment as protective for the respiratory system has established this concentration. The resulting maximum Hazard Index for each scenario analyzed above is shown in Table E.

Table E – Acute Non-Cancer Risks from Diesel Particulate Emissions

Scenario	Maximum PM Concentration ($\mu g/m^3$)	Hazard Index
Devil's Gate Reservoir On-Site Equipment and Haul Routes 1A and 1E	0.2356	0.04712
Devil's Gate Reservoir On-Site Equipment and Haul Routes 1B and 1F	0.2356	0.04712
Haul Route 2A to Manning Pit	0.0089	0.00178
Haul Routes 4A and 4B to Scholl Canyon Landfill	0.0089	0.00178
	Threshold of Significance	**1.0**

Source: Calculated from ISC-AERMOD View Version 8.2.0.

The criterion for significance is a Hazard Index increase of 1.0 or greater. Therefore, the proposed project would result in a less than significant impact due to the non-cancer risk from diesel emissions created by the proposed project.

5.0 REFERENCES

California Air Pollution Control Officers Association, *Health Risk Assessments for Proposed Land Use Projects,* 2009.

California Air Resources Board, *Resolution 08-43,* December 12, 2008.

California Air Resources Board, *Airborne Toxic Control Measure for in-use Diesel-Fueled Transport Refrigeration Units (TRU) and TRU Generator Sets, Section 2477 of Division 3, Chapter 9, Title 13, California Code of Regulations*.

California Air Resources Board, *Recommended Approaches for Setting Interim Significance Thresholds for Greenhouse Gases under the California Environmental Quality Act,* on October 24, 2008.

California Air Resources Board, *Appendix VII Risk Characterization Scenarios,* on October, 2000.

Environmental Protection Agency, *Nonattainment Major New Source Review Implementation Under 8-Hour Ozone National Ambient Air Quality Standard: Reconsideration*, June 30, 2005.

Hall & Foreman, Inc., *Devil's Gate Reservoir Sediment Removal and Management Project Traffic Impact Analysis,* September, 2013.

South Coast Air Quality Management District, *CEQA Air Quality Handbook, April 1993.*

South Coast Air Quality Management District, *Final Localized Significance Threshold Methodology*, Revised July 2008.

South Coast Air Quality Management District, *Draft Report Multiple Air Toxics Exposure Study in the South Coast Air Basin, MATES III,* January 2008.

APPENDIX A

AERMOD Model Printouts for Haul Routes 1A and 1E to Devil's Gate Reservoir

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**
** AERMOD Input Produced by:
** AERMOD View Ver. 8.2.0
** Lakes Environmental Software Inc.
** Date: 8/24/2013
** File: C:\Vista Env\2011\11057-Devils Gate Reservoir\DGT ConstA\DGT ConstA.ADI
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**************************************
**
**
**************************************
** AERMOD Control Pathway
**************************************
**
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   MODELOPT DFAULT CONC
   AVERTIME ANNUAL
   URBANOPT 9862049 Los_Angeles_County
   POLLUTID PM_10
   RUNORNOT RUN
   ERRORFIL "DGT ConstA.err"
CO FINISHED
**
**************************************
** AERMOD Source Pathway
**************************************
**
**
SO STARTING
** Source Location **
** Source ID - Type - X Coord. - Y Coord. **
** ------------------------------------------------------------------------
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** LINE VOLUME Source ID = RDRTE1A
** DESCRSRC Road Routes 1A and 1E
** PREFIX
** Length of Side = 5.67
** Configuration = Adjacent
** Emission Rate = 4.34E-06
** Vertical Dimension = 1.92
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** 391366.74, 3783612.02, 326.97, 4.15, 2.64
** 391385.81, 3783519.11, 328.95, 4.15, 2.64
** 391433.86, 3783449.31, 328.85, 4.15, 2.64
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SRCPARAM L0000129     0.00000002385      4.15      2.64      0.89
SRCPARAM L0000130     0.00000002385      4.15      2.64      0.89
SRCPARAM L0000131     0.00000002385      4.15      2.64      0.89
SRCPARAM L0000132     0.00000002385      4.15      2.64      0.89
SRCPARAM L0000133     0.00000002385      4.15      2.64      0.89
SRCPARAM L0000134     0.00000002385      4.15      2.64      0.89
SRCPARAM L0000135     0.00000002385      4.15      2.64      0.89
SRCPARAM L0000136     0.00000002385      4.15      2.64      0.89
SRCPARAM L0000137     0.00000002385      4.15      2.64      0.89
SRCPARAM L0000138     0.00000002385      4.15      2.64      0.89
SRCPARAM L0000139     0.00000002385      4.15      2.64      0.89
SRCPARAM L0000140     0.00000002385      4.15      2.64      0.89
SRCPARAM L0000141     0.00000002385      4.15      2.64      0.89
SRCPARAM L0000142     0.00000002385      4.15      2.64      0.89
SRCPARAM L0000143     0.00000002385      4.15      2.64      0.89
SRCPARAM L0000144     0.00000002385      4.15      2.64      0.89
SRCPARAM L0000145     0.00000002385      4.15      2.64      0.89
SRCPARAM L0000146     0.00000002385      4.15      2.64      0.89
SRCPARAM L0000147     0.00000002385      4.15      2.64      0.89
SRCPARAM L0000148     0.00000002385      4.15      2.64      0.89
SRCPARAM L0000149     0.00000002385      4.15      2.64      0.89
SRCPARAM L0000150     0.00000002385      4.15      2.64      0.89
SRCPARAM L0000151     0.00000002385      4.15      2.64      0.89
SRCPARAM L0000152     0.00000002385      4.15      2.64      0.89
SRCPARAM L0000153     0.00000002385      4.15      2.64      0.89
SRCPARAM L0000154     0.00000002385      4.15      2.64      0.89
SRCPARAM L0000155     0.00000002385      4.15      2.64      0.89
SRCPARAM L0000156     0.00000002385      4.15      2.64      0.89
SRCPARAM L0000157     0.00000002385      4.15      2.64      0.89
SRCPARAM L0000158     0.00000002385      4.15      2.64      0.89
SRCPARAM L0000159     0.00000002385      4.15      2.64      0.89
SRCPARAM L0000160     0.00000002385      4.15      2.64      0.89
SRCPARAM L0000161     0.00000002385      4.15      2.64      0.89
SRCPARAM L0000162     0.00000002385      4.15      2.64      0.89
SRCPARAM L0000163     0.00000002385      4.15      2.64      0.89
SRCPARAM L0000164     0.00000002385      4.15      2.64      0.89
SRCPARAM L0000165     0.00000002385      4.15      2.64      0.89
SRCPARAM L0000166     0.00000002385      4.15      2.64      0.89
SRCPARAM L0000167     0.00000002385      4.15      2.64      0.89
SRCPARAM L0000168     0.00000002385      4.15      2.64      0.89
SRCPARAM L0000169     0.00000002385      4.15      2.64      0.89
SRCPARAM L0000170     0.00000002385      4.15      2.64      0.89
SRCPARAM L0000171     0.00000002385      4.15      2.64      0.89
SRCPARAM L0000172     0.00000002385      4.15      2.64      0.89
SRCPARAM L0000173     0.00000002385      4.15      2.64      0.89
SRCPARAM L0000174     0.00000002385      4.15      2.64      0.89
SRCPARAM L0000175     0.00000002385      4.15      2.64      0.89
SRCPARAM L0000176     0.00000002385      4.15      2.64      0.89
SRCPARAM L0000177     0.00000002385      4.15      2.64      0.89
SRCPARAM L0000178     0.00000002385      4.15      2.64      0.89
SRCPARAM L0000179     0.00000002385      4.15      2.64      0.89
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   SRCPARAM L0000180     0.00000002385      4.15      2.64      0.89
   SRCPARAM L0000181     0.00000002385      4.15      2.64      0.89
   SRCPARAM L0000182     0.00000002385      4.15      2.64      0.89
** ------------------------------------------------------------------
   SRCPARAM PAREA1       2.852E-08     0.610        50     3.960
   AREAVERT PAREA1       391678.348 3783352.608 391734.098 3783363.194
   AREAVERT PAREA1       391765.148 3783411.887 391863.240 3783410.475
   AREAVERT PAREA1       391894.290 3783470.459 391918.284 3783555.142
   AREAVERT PAREA1       391962.709 3783655.080 391967.888 3783744.217
   AREAVERT PAREA1       391988.883 3783806.002 392031.096 3783848.246
   AREAVERT PAREA1       392061.089 3783913.632 391996.303 3783963.421
   AREAVERT PAREA1       391990.304 3784021.009 392024.003 3784092.535
   AREAVERT PAREA1       392112.806 3784255.629 392177.029 3784321.969
   AREAVERT PAREA1       392225.020 3784391.839 392298.342 3784435.360
   AREAVERT PAREA1       392331.201 3784484.273 392355.197 3784569.461
   AREAVERT PAREA1       392377.654 3784638.902 392390.852 3784698.894
   AREAVERT PAREA1       392396.851 3784762.486 392398.651 3784836.276
   AREAVERT PAREA1       392361.059 3784844.991 392328.489 3784773.901
   AREAVERT PAREA1       392157.550 3784727.212 392068.238 3784618.672
   AREAVERT PAREA1       392011.355 3784588.459 391960.509 3784515.950
   AREAVERT PAREA1       391915.727 3784399.571 391901.725 3784366.039
   AREAVERT PAREA1       391837.835 3784297.912 391736.432 3784173.108
   AREAVERT PAREA1       391651.263 3784084.743 391602.661 3784006.139
   AREAVERT PAREA1       391540.402 3783923.718 391514.968 3783809.472
   AREAVERT PAREA1       391495.167 3783791.471 391488.152 3783720.029
   AREAVERT PAREA1       391467.240 3783660.863 391450.408 3783626.180
   AREAVERT PAREA1       391475.161 3783535.072 391490.977 3783496.558
   AREAVERT PAREA1       391497.027 3783468.269 391499.139 3783439.572
   AREAVERT PAREA1       391509.425 3783415.529 391547.495 3783425.018
   AREAVERT PAREA1       391603.862 3783444.530 391653.725 3783405.073
   URBANSRC ALL

** Variable Emissions Type: "By Month (MONTH)"
** Variable Emission Scenario: "Scenario 2"
   EMISFACT PAREA1       MONTH 0.0 0.0 0.0 1.0 1.0 1.0
   EMISFACT PAREA1       MONTH 1.0 1.0 1.0 1.0 1.0 1.0
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   EMISFACT L0000001     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
   EMISFACT L0000002     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
   EMISFACT L0000002     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
   EMISFACT L0000003     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
   EMISFACT L0000003     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
   EMISFACT L0000004     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
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   EMISFACT L0000006     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
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   EMISFACT L0000007     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
   EMISFACT L0000007     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
   EMISFACT L0000008     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
   EMISFACT L0000008     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
   EMISFACT L0000009     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
   EMISFACT L0000009     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
   EMISFACT L0000010     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
   EMISFACT L0000010     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
   EMISFACT L0000011     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
   EMISFACT L0000011     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
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   EMISFACT L0000012     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
   EMISFACT L0000013     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
   EMISFACT L0000013     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
   EMISFACT L0000014     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
   EMISFACT L0000014     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
   EMISFACT L0000015     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
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   EMISFACT L0000025     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
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EMISFACT L0000027     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
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EMISFACT L0000040     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
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EMISFACT L0000067     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
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   EMISFACT L0000182     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
   SRCGROUP ALL
SO FINISHED
**
**************************************
** AERMOD Receptor Pathway
**************************************
**
**
RE STARTING
   INCLUDED "DGT ConstA.rou"
RE FINISHED
**
**************************************
** AERMOD Meteorology Pathway
**************************************
**
**
ME STARTING
   SURFFILE ..\burk6.sfc
   PROFFILE ..\burk6.PFL
   SURFDATA 0 2005 Burbank 378.62 3782.24
   UAIRDATA 3190 2005
   SITEDATA 99999 2005
   PROFBASE 175.0 METERS
ME FINISHED
```

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**
**************************************
** AERMOD Output Pathway
**************************************
**
**
OU STARTING
** Auto-Generated Plotfiles
   PLOTFILE ANNUAL ALL "DGT ConstA.AD\AN00GALL.PLT" 31
   SUMMFILE "DGT ConstA.sum"
OU FINISHED

 *********************************
 *** SETUP Finishes Successfully ***
 *********************************
```

**MODELOPTs: RegDFAULT CONC   ELEV

                                        ***   MODEL SETUP OPTIONS SUMMARY   ***
- -

**Model Is Setup For Calculation of Average CONCentration Values.

  -- DEPOSITION LOGIC --
**NO GAS DEPOSITION Data Provided.
**NO PARTICLE DEPOSITION Data Provided.
**Model Uses NO DRY DEPLETION. DRYDPLT = F
**Model Uses NO WET DEPLETION. WETDPLT = F

**Model Uses URBAN Dispersion Algorithm for the SBL for   183 Source(s),
  for Total of   1 Urban Area(s):
  Urban Population =   9862049.0 ; Urban Roughness Length = 1.000 m

**Model Uses Regulatory DEFAULT Options:
       1. Stack-tip Downwash.
       2. Model Accounts for ELEVated Terrain Effects.
       3. Use Calms Processing Routine.
       4. Use Missing Data Processing Routine.
       5. No Exponential Decay for URBAN/Non-SO2.
       6. Urban Roughness Length of 1.0 Meter Assumed.

**Model Assumes No FLAGPOLE Receptor Heights.

**Model Calculates ANNUAL Averages Only

**This Run Includes: 183 Source(s);   1 Source Group(s); and   307 Receptor(s)

**The Model Assumes A Pollutant Type of: PM_10

**Model Set To Continue RUNning After the Setup Testing.

**Output Options Selected:
        Model Outputs Tables of ANNUAL Averages by Receptor
        Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)
        Model Outputs Separate Summary File of High Ranked Values (SUMMFILE Keyword)

**NOTE: The Following Flags May Appear Following CONC Values: c for Calm Hours
                                                                m for Missing Hours
                                                                b for Both Calm and Missing Hours

**Misc. Inputs: Base Elev. for Pot. Temp. Profile (m MSL) =   175.00 ; Decay Coef. =   0.000   ; Rot. Angle =   0.0
                 Emission Units = GRAMS/SEC   ; Emission Rate Unit Factor =   0.10000E+07
                 Output Units   = MICROGRAMS/M**3

**Approximate Storage Requirements of Model =   3.8 MB of RAM.

**Detailed Error/Message File: DGT ConstA.err
**File for Summary of Results: DGT ConstA.sum

**MODELOPTs: RegDFAULT CONC ELEV

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0000001	0	0.23850E-07	391236.3	3783836.3	329.5	4.15	2.64	0.89	YES	MONTH
L0000002	0	0.23850E-07	391241.8	3783834.8	329.3	4.15	2.64	0.89	YES	MONTH
L0000003	0	0.23850E-07	391247.2	3783833.2	329.2	4.15	2.64	0.89	YES	MONTH
L0000004	0	0.23850E-07	391252.7	3783831.6	329.2	4.15	2.64	0.89	YES	MONTH
L0000005	0	0.23850E-07	391258.1	3783830.1	329.1	4.15	2.64	0.89	YES	MONTH
L0000006	0	0.23850E-07	391263.5	3783828.5	329.1	4.15	2.64	0.89	YES	MONTH
L0000007	0	0.23850E-07	391269.0	3783826.9	329.0	4.15	2.64	0.89	YES	MONTH
L0000008	0	0.23850E-07	391274.4	3783825.4	328.8	4.15	2.64	0.89	YES	MONTH
L0000009	0	0.23850E-07	391279.9	3783823.8	328.7	4.15	2.64	0.89	YES	MONTH
L0000010	0	0.23850E-07	391285.3	3783822.2	328.5	4.15	2.64	0.89	YES	MONTH
L0000011	0	0.23850E-07	391290.8	3783820.7	328.4	4.15	2.64	0.89	YES	MONTH
L0000012	0	0.23850E-07	391296.2	3783819.0	328.3	4.15	2.64	0.89	YES	MONTH
L0000013	0	0.23850E-07	391301.2	3783816.3	328.4	4.15	2.64	0.89	YES	MONTH
L0000014	0	0.23850E-07	391306.1	3783813.6	328.5	4.15	2.64	0.89	YES	MONTH
L0000015	0	0.23850E-07	391311.1	3783810.8	328.5	4.15	2.64	0.89	YES	MONTH
L0000016	0	0.23850E-07	391316.1	3783808.1	328.5	4.15	2.64	0.89	YES	MONTH
L0000017	0	0.23850E-07	391321.0	3783805.3	328.4	4.15	2.64	0.89	YES	MONTH
L0000018	0	0.23850E-07	391326.0	3783802.6	328.3	4.15	2.64	0.89	YES	MONTH
L0000019	0	0.23850E-07	391331.0	3783799.9	328.1	4.15	2.64	0.89	YES	MONTH
L0000020	0	0.23850E-07	391335.9	3783797.1	328.0	4.15	2.64	0.89	YES	MONTH
L0000021	0	0.23850E-07	391340.9	3783794.4	328.0	4.15	2.64	0.89	YES	MONTH
L0000022	0	0.23850E-07	391345.9	3783791.7	328.1	4.15	2.64	0.89	YES	MONTH
L0000023	0	0.23850E-07	391351.0	3783789.3	328.1	4.15	2.64	0.89	YES	MONTH
L0000024	0	0.23850E-07	391356.2	3783786.9	328.0	4.15	2.64	0.89	YES	MONTH
L0000025	0	0.23850E-07	391361.3	3783784.5	328.0	4.15	2.64	0.89	YES	MONTH
L0000026	0	0.23850E-07	391366.4	3783782.1	327.9	4.15	2.64	0.89	YES	MONTH
L0000027	0	0.23850E-07	391371.5	3783779.7	327.7	4.15	2.64	0.89	YES	MONTH
L0000028	0	0.23850E-07	391376.7	3783777.3	327.4	4.15	2.64	0.89	YES	MONTH
L0000029	0	0.23850E-07	391381.8	3783774.8	327.1	4.15	2.64	0.89	YES	MONTH
L0000030	0	0.23850E-07	391386.9	3783772.4	326.7	4.15	2.64	0.89	YES	MONTH
L0000031	0	0.23850E-07	391392.1	3783770.0	326.2	4.15	2.64	0.89	YES	MONTH
L0000032	0	0.23850E-07	391397.2	3783767.6	325.8	4.15	2.64	0.89	YES	MONTH
L0000033	0	0.23850E-07	391402.3	3783765.2	325.5	4.15	2.64	0.89	YES	MONTH
L0000034	0	0.23850E-07	391407.5	3783762.8	325.2	4.15	2.64	0.89	YES	MONTH
L0000035	0	0.23850E-07	391409.4	3783759.0	324.9	4.15	2.64	0.89	YES	MONTH
L0000036	0	0.23850E-07	391407.5	3783753.7	324.7	4.15	2.64	0.89	YES	MONTH
L0000037	0	0.23850E-07	391405.5	3783748.4	324.5	4.15	2.64	0.89	YES	MONTH
L0000038	0	0.23850E-07	391403.6	3783743.1	324.4	4.15	2.64	0.89	YES	MONTH
L0000039	0	0.23850E-07	391401.7	3783737.7	324.2	4.15	2.64	0.89	YES	MONTH
L0000040	0	0.23850E-07	391399.7	3783732.4	324.2	4.15	2.64	0.89	YES	MONTH

**MODELOPTs: RegDFAULT CONC ELEV

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0000041	0	0.23850E-07	391397.8	3783727.1	324.3	4.15	2.64	0.89	YES	MONTH
L0000042	0	0.23850E-07	391395.9	3783721.7	324.4	4.15	2.64	0.89	YES	MONTH
L0000043	0	0.23850E-07	391393.9	3783716.4	324.6	4.15	2.64	0.89	YES	MONTH
L0000044	0	0.23850E-07	391392.0	3783711.1	324.7	4.15	2.64	0.89	YES	MONTH
L0000045	0	0.23850E-07	391390.1	3783705.7	324.9	4.15	2.64	0.89	YES	MONTH
L0000046	0	0.23850E-07	391388.4	3783700.3	325.0	4.15	2.64	0.89	YES	MONTH
L0000047	0	0.23850E-07	391387.1	3783694.8	325.1	4.15	2.64	0.89	YES	MONTH
L0000048	0	0.23850E-07	391385.7	3783689.3	325.2	4.15	2.64	0.89	YES	MONTH
L0000049	0	0.23850E-07	391384.4	3783683.8	325.3	4.15	2.64	0.89	YES	MONTH
L0000050	0	0.23850E-07	391383.0	3783678.3	325.4	4.15	2.64	0.89	YES	MONTH
L0000051	0	0.23850E-07	391381.7	3783672.8	325.5	4.15	2.64	0.89	YES	MONTH
L0000052	0	0.23850E-07	391380.3	3783667.3	325.6	4.15	2.64	0.89	YES	MONTH
L0000053	0	0.23850E-07	391379.0	3783661.8	325.7	4.15	2.64	0.89	YES	MONTH
L0000054	0	0.23850E-07	391377.6	3783656.3	325.8	4.15	2.64	0.89	YES	MONTH
L0000055	0	0.23850E-07	391376.2	3783650.8	325.9	4.15	2.64	0.89	YES	MONTH
L0000056	0	0.23850E-07	391374.9	3783645.3	325.9	4.15	2.64	0.89	YES	MONTH
L0000057	0	0.23850E-07	391373.5	3783639.8	326.0	4.15	2.64	0.89	YES	MONTH
L0000058	0	0.23850E-07	391372.2	3783634.3	326.1	4.15	2.64	0.89	YES	MONTH
L0000059	0	0.23850E-07	391370.8	3783628.8	326.2	4.15	2.64	0.89	YES	MONTH
L0000060	0	0.23850E-07	391369.5	3783623.2	326.3	4.15	2.64	0.89	YES	MONTH
L0000061	0	0.23850E-07	391368.1	3783617.7	326.4	4.15	2.64	0.89	YES	MONTH
L0000062	0	0.23850E-07	391366.8	3783612.2	326.7	4.15	2.64	0.89	YES	MONTH
L0000063	0	0.23850E-07	391367.8	3783606.7	326.8	4.15	2.64	0.89	YES	MONTH
L0000064	0	0.23850E-07	391369.0	3783601.1	327.0	4.15	2.64	0.89	YES	MONTH
L0000065	0	0.23850E-07	391370.1	3783595.6	327.2	4.15	2.64	0.89	YES	MONTH
L0000066	0	0.23850E-07	391371.3	3783590.0	327.4	4.15	2.64	0.89	YES	MONTH
L0000067	0	0.23850E-07	391372.4	3783584.5	327.7	4.15	2.64	0.89	YES	MONTH
L0000068	0	0.23850E-07	391373.5	3783578.9	327.9	4.15	2.64	0.89	YES	MONTH
L0000069	0	0.23850E-07	391374.7	3783573.4	328.2	4.15	2.64	0.89	YES	MONTH
L0000070	0	0.23850E-07	391375.8	3783567.8	328.4	4.15	2.64	0.89	YES	MONTH
L0000071	0	0.23850E-07	391377.0	3783562.3	328.7	4.15	2.64	0.89	YES	MONTH
L0000072	0	0.23850E-07	391378.1	3783556.7	329.0	4.15	2.64	0.89	YES	MONTH
L0000073	0	0.23850E-07	391379.2	3783551.2	329.0	4.15	2.64	0.89	YES	MONTH
L0000074	0	0.23850E-07	391380.4	3783545.6	329.0	4.15	2.64	0.89	YES	MONTH
L0000075	0	0.23850E-07	391381.5	3783540.0	329.0	4.15	2.64	0.89	YES	MONTH
L0000076	0	0.23850E-07	391382.7	3783534.5	329.0	4.15	2.64	0.89	YES	MONTH
L0000077	0	0.23850E-07	391383.8	3783528.9	329.0	4.15	2.64	0.89	YES	MONTH
L0000078	0	0.23850E-07	391384.9	3783523.4	329.0	4.15	2.64	0.89	YES	MONTH
L0000079	0	0.23850E-07	391386.6	3783518.0	329.0	4.15	2.64	0.89	YES	MONTH
L0000080	0	0.23850E-07	391389.8	3783513.4	329.0	4.15	2.64	0.89	YES	MONTH

**MODELOPTs: RegDFAULT CONC ELEV

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0000081	0	0.23850E-07	391393.0	3783508.7	328.9	4.15	2.64	0.89	YES	MONTH
L0000082	0	0.23850E-07	391396.2	3783504.0	328.9	4.15	2.64	0.89	YES	MONTH
L0000083	0	0.23850E-07	391399.4	3783499.4	329.0	4.15	2.64	0.89	YES	MONTH
L0000084	0	0.23850E-07	391402.6	3783494.7	329.0	4.15	2.64	0.89	YES	MONTH
L0000085	0	0.23850E-07	391405.8	3783490.0	329.0	4.15	2.64	0.89	YES	MONTH
L0000086	0	0.23850E-07	391409.1	3783485.3	329.0	4.15	2.64	0.89	YES	MONTH
L0000087	0	0.23850E-07	391412.3	3783480.7	329.0	4.15	2.64	0.89	YES	MONTH
L0000088	0	0.23850E-07	391415.5	3783476.0	329.0	4.15	2.64	0.89	YES	MONTH
L0000089	0	0.23850E-07	391418.7	3783471.3	329.0	4.15	2.64	0.89	YES	MONTH
L0000090	0	0.23850E-07	391421.9	3783466.7	329.0	4.15	2.64	0.89	YES	MONTH
L0000091	0	0.23850E-07	391425.1	3783462.0	329.0	4.15	2.64	0.89	YES	MONTH
L0000092	0	0.23850E-07	391428.3	3783457.3	329.0	4.15	2.64	0.89	YES	MONTH
L0000093	0	0.23850E-07	391431.6	3783452.7	329.0	4.15	2.64	0.89	YES	MONTH
L0000094	0	0.23850E-07	391434.9	3783448.1	329.0	4.15	2.64	0.89	YES	MONTH
L0000095	0	0.23850E-07	391438.8	3783443.9	329.0	4.15	2.64	0.89	YES	MONTH
L0000096	0	0.23850E-07	391442.6	3783439.8	329.0	4.15	2.64	0.89	YES	MONTH
L0000097	0	0.23850E-07	391446.4	3783435.6	329.0	4.15	2.64	0.89	YES	MONTH
L0000098	0	0.23850E-07	391450.2	3783431.4	328.8	4.15	2.64	0.89	YES	MONTH
L0000099	0	0.23850E-07	391454.1	3783427.2	328.4	4.15	2.64	0.89	YES	MONTH
L0000100	0	0.23850E-07	391457.9	3783423.0	328.0	4.15	2.64	0.89	YES	MONTH
L0000101	0	0.23850E-07	391461.7	3783418.8	327.5	4.15	2.64	0.89	YES	MONTH
L0000102	0	0.23850E-07	391465.5	3783414.6	326.9	4.15	2.64	0.89	YES	MONTH
L0000103	0	0.23850E-07	391469.4	3783410.5	326.3	4.15	2.64	0.89	YES	MONTH
L0000104	0	0.23850E-07	391473.2	3783406.3	325.5	4.15	2.64	0.89	YES	MONTH
L0000105	0	0.23850E-07	391477.0	3783402.1	324.5	4.15	2.64	0.89	YES	MONTH
L0000106	0	0.23850E-07	391480.8	3783397.9	323.5	4.15	2.64	0.89	YES	MONTH
L0000107	0	0.23850E-07	391485.3	3783394.5	322.7	4.15	2.64	0.89	YES	MONTH
L0000108	0	0.23850E-07	391489.9	3783391.2	321.9	4.15	2.64	0.89	YES	MONTH
L0000109	0	0.23850E-07	391494.5	3783387.9	321.0	4.15	2.64	0.89	YES	MONTH
L0000110	0	0.23850E-07	391499.1	3783384.5	320.2	4.15	2.64	0.89	YES	MONTH
L0000111	0	0.23850E-07	391503.7	3783381.2	319.2	4.15	2.64	0.89	YES	MONTH
L0000112	0	0.23850E-07	391508.3	3783377.9	318.3	4.15	2.64	0.89	YES	MONTH
L0000113	0	0.23850E-07	391512.9	3783374.6	317.7	4.15	2.64	0.89	YES	MONTH
L0000114	0	0.23850E-07	391517.5	3783371.3	317.4	4.15	2.64	0.89	YES	MONTH
L0000115	0	0.23850E-07	391522.1	3783368.0	317.1	4.15	2.64	0.89	YES	MONTH
L0000116	0	0.23850E-07	391526.8	3783364.7	316.9	4.15	2.64	0.89	YES	MONTH
L0000117	0	0.23850E-07	391531.4	3783361.4	316.8	4.15	2.64	0.89	YES	MONTH
L0000118	0	0.23850E-07	391536.0	3783358.0	316.7	4.15	2.64	0.89	YES	MONTH
L0000119	0	0.23850E-07	391540.6	3783354.7	317.0	4.15	2.64	0.89	YES	MONTH
L0000120	0	0.23850E-07	391545.2	3783351.4	318.0	4.15	2.64	0.89	YES	MONTH

**MODELOPTs: RegDFAULT CONC ELEV

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0000121	0	0.23850E-07	391549.8	3783348.1	319.3	4.15	2.64	0.89	YES	MONTH
L0000122	0	0.23850E-07	391554.2	3783345.5	320.8	4.15	2.64	0.89	YES	MONTH
L0000123	0	0.23850E-07	391557.2	3783350.4	320.5	4.15	2.64	0.89	YES	MONTH
L0000124	0	0.23850E-07	391560.1	3783355.2	320.0	4.15	2.64	0.89	YES	MONTH
L0000125	0	0.23850E-07	391563.1	3783360.0	319.3	4.15	2.64	0.89	YES	MONTH
L0000126	0	0.23850E-07	391566.0	3783364.9	318.3	4.15	2.64	0.89	YES	MONTH
L0000127	0	0.23850E-07	391569.0	3783369.7	317.1	4.15	2.64	0.89	YES	MONTH
L0000128	0	0.23850E-07	391571.9	3783374.6	316.0	4.15	2.64	0.89	YES	MONTH
L0000129	0	0.23850E-07	391574.9	3783379.4	315.7	4.15	2.64	0.89	YES	MONTH
L0000130	0	0.23850E-07	391577.8	3783384.2	315.9	4.15	2.64	0.89	YES	MONTH
L0000131	0	0.23850E-07	391580.8	3783389.1	315.9	4.15	2.64	0.89	YES	MONTH
L0000132	0	0.23850E-07	391583.8	3783393.9	315.8	4.15	2.64	0.89	YES	MONTH
L0000133	0	0.23850E-07	391586.7	3783398.8	315.6	4.15	2.64	0.89	YES	MONTH
L0000134	0	0.23850E-07	391589.7	3783403.6	315.3	4.15	2.64	0.89	YES	MONTH
L0000135	0	0.23850E-07	391592.6	3783408.4	314.9	4.15	2.64	0.89	YES	MONTH
L0000136	0	0.23850E-07	391595.6	3783413.3	314.8	4.15	2.64	0.89	YES	MONTH
L0000137	0	0.23850E-07	391598.5	3783418.1	314.6	4.15	2.64	0.89	YES	MONTH
L0000138	0	0.23850E-07	391601.5	3783422.9	314.4	4.15	2.64	0.89	YES	MONTH
L0000139	0	0.23850E-07	391604.4	3783427.8	314.1	4.15	2.64	0.89	YES	MONTH
L0000140	0	0.23850E-07	391607.4	3783432.6	313.9	4.15	2.64	0.89	YES	MONTH
L0000141	0	0.23850E-07	391610.3	3783437.5	313.6	4.15	2.64	0.89	YES	MONTH
L0000142	0	0.23850E-07	391613.3	3783442.3	313.3	4.15	2.64	0.89	YES	MONTH
L0000143	0	0.23850E-07	391616.3	3783447.1	313.1	4.15	2.64	0.89	YES	MONTH
L0000144	0	0.23850E-07	391619.2	3783452.0	312.8	4.15	2.64	0.89	YES	MONTH
L0000145	0	0.23850E-07	391622.2	3783456.8	312.6	4.15	2.64	0.89	YES	MONTH
L0000146	0	0.23850E-07	391625.1	3783461.7	312.3	4.15	2.64	0.89	YES	MONTH
L0000147	0	0.23850E-07	391628.1	3783466.5	312.0	4.15	2.64	0.89	YES	MONTH
L0000148	0	0.23850E-07	391631.0	3783471.3	312.1	4.15	2.64	0.89	YES	MONTH
L0000149	0	0.23850E-07	391634.0	3783476.2	312.1	4.15	2.64	0.89	YES	MONTH
L0000150	0	0.23850E-07	391636.9	3783481.0	312.1	4.15	2.64	0.89	YES	MONTH
L0000151	0	0.23850E-07	391639.9	3783485.8	312.1	4.15	2.64	0.89	YES	MONTH
L0000152	0	0.23850E-07	391642.8	3783490.7	312.1	4.15	2.64	0.89	YES	MONTH
L0000153	0	0.23850E-07	391645.8	3783495.5	312.0	4.15	2.64	0.89	YES	MONTH
L0000154	0	0.23850E-07	391648.7	3783500.4	312.0	4.15	2.64	0.89	YES	MONTH
L0000155	0	0.23850E-07	391651.7	3783505.2	312.0	4.15	2.64	0.89	YES	MONTH
L0000156	0	0.23850E-07	391654.7	3783510.0	312.0	4.15	2.64	0.89	YES	MONTH
L0000157	0	0.23850E-07	391657.6	3783514.9	312.0	4.15	2.64	0.89	YES	MONTH
L0000158	0	0.23850E-07	391660.6	3783519.7	312.1	4.15	2.64	0.89	YES	MONTH
L0000159	0	0.23850E-07	391663.5	3783524.6	312.2	4.15	2.64	0.89	YES	MONTH
L0000160	0	0.23850E-07	391666.5	3783529.4	312.2	4.15	2.64	0.89	YES	MONTH

**MODELOPTs: RegDFAULT CONC ELEV

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0000161	0	0.23850E-07	391669.4	3783534.2	312.3	4.15	2.64	0.89	YES	MONTH
L0000162	0	0.23850E-07	391672.4	3783539.1	312.3	4.15	2.64	0.89	YES	MONTH
L0000163	0	0.23850E-07	391675.3	3783543.9	312.2	4.15	2.64	0.89	YES	MONTH
L0000164	0	0.23850E-07	391678.3	3783548.8	312.2	4.15	2.64	0.89	YES	MONTH
L0000165	0	0.23850E-07	391681.2	3783553.6	312.1	4.15	2.64	0.89	YES	MONTH
L0000166	0	0.23850E-07	391684.2	3783558.4	312.0	4.15	2.64	0.89	YES	MONTH
L0000167	0	0.23850E-07	391687.1	3783563.3	312.0	4.15	2.64	0.89	YES	MONTH
L0000168	0	0.23850E-07	391690.1	3783568.1	312.0	4.15	2.64	0.89	YES	MONTH
L0000169	0	0.23850E-07	391693.1	3783572.9	312.0	4.15	2.64	0.89	YES	MONTH
L0000170	0	0.23850E-07	391696.0	3783577.8	312.0	4.15	2.64	0.89	YES	MONTH
L0000171	0	0.23850E-07	391699.0	3783582.6	312.0	4.15	2.64	0.89	YES	MONTH
L0000172	0	0.23850E-07	391701.9	3783587.5	312.0	4.15	2.64	0.89	YES	MONTH
L0000173	0	0.23850E-07	391704.9	3783592.3	312.0	4.15	2.64	0.89	YES	MONTH
L0000174	0	0.23850E-07	391707.8	3783597.1	312.0	4.15	2.64	0.89	YES	MONTH
L0000175	0	0.23850E-07	391710.8	3783602.0	312.0	4.15	2.64	0.89	YES	MONTH
L0000176	0	0.23850E-07	391713.7	3783606.8	312.0	4.15	2.64	0.89	YES	MONTH
L0000177	0	0.23850E-07	391716.7	3783611.7	312.0	4.15	2.64	0.89	YES	MONTH
L0000178	0	0.23850E-07	391719.6	3783616.5	312.0	4.15	2.64	0.89	YES	MONTH
L0000179	0	0.23850E-07	391722.6	3783621.3	312.0	4.15	2.64	0.89	YES	MONTH
L0000180	0	0.23850E-07	391725.6	3783626.2	312.0	4.15	2.64	0.89	YES	MONTH
L0000181	0	0.23850E-07	391728.5	3783631.0	312.0	4.15	2.64	0.89	YES	MONTH
L0000182	0	0.23850E-07	391731.5	3783635.9	312.0	4.15	2.64	0.89	YES	MONTH

**MODELOPTs: RegDFAULT CONC ELEV

*** AREAPOLY SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC /METER**2)	LOCATION OF AREA X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	NUMBER OF VERTS.	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
PAREA1	0	0.28520E-07	391678.3	3783352.6	317.7	0.61	50	3.96	YES	MONTH

**MODELOPTs: RegDFAULT CONC ELEV

*** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID	SOURCE IDs
ALL	L0000001 , L0000002 , L0000003 , L0000004 , L0000005 , L0000006 , L0000007 , L0000008 ,
	L0000009 , L0000010 , L0000011 , L0000012 , L0000013 , L0000014 , L0000015 , L0000016 ,
	L0000017 , L0000018 , L0000019 , L0000020 , L0000021 , L0000022 , L0000023 , L0000024 ,
	L0000025 , L0000026 , L0000027 , L0000028 , L0000029 , L0000030 , L0000031 , L0000032 ,
	L0000033 , L0000034 , L0000035 , L0000036 , L0000037 , L0000038 , L0000039 , L0000040 ,
	L0000041 , L0000042 , L0000043 , L0000044 , L0000045 , L0000046 , L0000047 , L0000048 ,
	L0000049 , L0000050 , L0000051 , L0000052 , L0000053 , L0000054 , L0000055 , L0000056 ,
	L0000057 , L0000058 , L0000059 , L0000060 , L0000061 , L0000062 , L0000063 , L0000064 ,
	L0000065 , L0000066 , L0000067 , L0000068 , L0000069 , L0000070 , L0000071 , L0000072 ,
	L0000073 , L0000074 , L0000075 , L0000076 , L0000077 , L0000078 , L0000079 , L0000080 ,
	L0000081 , L0000082 , L0000083 , L0000084 , L0000085 , L0000086 , L0000087 , L0000088 ,
	L0000089 , L0000090 , L0000091 , L0000092 , L0000093 , L0000094 , L0000095 , L0000096 ,
	L0000097 , L0000098 , L0000099 , L0000100 , L0000101 , L0000102 , L0000103 , L0000104 ,
	L0000105 , L0000106 , L0000107 , L0000108 , L0000109 , L0000110 , L0000111 , L0000112 ,
	L0000113 , L0000114 , L0000115 , L0000116 , L0000117 , L0000118 , L0000119 , L0000120 ,
	L0000121 , L0000122 , L0000123 , L0000124 , L0000125 , L0000126 , L0000127 , L0000128 ,
	L0000129 , L0000130 , L0000131 , L0000132 , L0000133 , L0000134 , L0000135 , L0000136 ,
	L0000137 , L0000138 , L0000139 , L0000140 , L0000141 , L0000142 , L0000143 , L0000144 ,
	L0000145 , L0000146 , L0000147 , L0000148 , L0000149 , L0000150 , L0000151 , L0000152 ,
	L0000153 , L0000154 , L0000155 , L0000156 , L0000157 , L0000158 , L0000159 , L0000160 ,

**MODELOPTs: RegDFAULT CONC   ELEV

*** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID	SOURCE IDs
	L0000161 , L0000162 , L0000163 , L0000164 , L0000165 , L0000166 , L0000167 , L0000168 ,
	L0000169 , L0000170 , L0000171 , L0000172 , L0000173 , L0000174 , L0000175 , L0000176 ,
	L0000177 , L0000178 , L0000179 , L0000180 , L0000181 , L0000182 , PAREA1 ,

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000001   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000002   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000003   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000004   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000005   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000006   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000007   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000008   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000009   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000010   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000011   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000012   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000013   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000014   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000015   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000016   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000017   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000018   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000019   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000020   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000021   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000022   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000023   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000024   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000025   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000026   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000027   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000028   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000029   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000030   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000031   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000032   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000033   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000034   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000035   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000036   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000037   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000038   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000039   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000040   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000041   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000042   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000043   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000044   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000045   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000046   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000047   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000048   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000049   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000050   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000051   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000052   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000053   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000054   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000055 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000056 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000057 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000058 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000059 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000060 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000061   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000062   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000063   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000064   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000065   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000066   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

JANUARY FEBRUARY MARCH APRIL MAY JUNE JULY AUGUST SEPTEMBER OCTOBER NOVEMBER DECEMBER

- -

SOURCE ID = L0000067 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000068 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000069 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000070 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000071 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000072 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000073   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000074   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000075   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000076   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000077   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000078   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000079   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000080   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000081   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000082   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000083   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000084   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000085   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000086   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000087   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000088   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000089   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000090   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000091   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000092   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000093   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000094   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000095   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000096   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

JANUARY FEBRUARY MARCH APRIL MAY JUNE JULY AUGUST SEPTEMBER OCTOBER NOVEMBER DECEMBER

- -

SOURCE ID = L0000097 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000098 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000099 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000100 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000101 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000102 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000103   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000104   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000105   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000106   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000107   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000108   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000109   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000110   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000111   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000112   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000113   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000114   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

JANUARY FEBRUARY MARCH APRIL MAY JUNE JULY AUGUST SEPTEMBER OCTOBER NOVEMBER DECEMBER

- -

SOURCE ID = L0000115 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000116 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000117 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000118 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000119 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000120 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000121   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000122   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000123   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000124   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000125   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000126   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000127   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000128   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000129   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000130   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000131   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000132   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000133   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000134   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000135   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000136   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000137   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000138   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000139   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000140   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000141   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000142   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000143   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000144   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000145   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000146   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000147   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000148   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000149   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000150   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

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                                         * SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

      JANUARY  FEBRUARY   MARCH     APRIL      MAY       JUNE      JULY     AUGUST   SEPTEMBER  OCTOBER  NOVEMBER  DECEMBER

 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- -

 SOURCE ID = L0000151     ; SOURCE TYPE = VOLUME   :
     0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

 SOURCE ID = L0000152     ; SOURCE TYPE = VOLUME   :
     0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

 SOURCE ID = L0000153     ; SOURCE TYPE = VOLUME   :
     0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

 SOURCE ID = L0000154     ; SOURCE TYPE = VOLUME   :
     0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

 SOURCE ID = L0000155     ; SOURCE TYPE = VOLUME   :
     0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

 SOURCE ID = L0000156     ; SOURCE TYPE = VOLUME   :
     0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01
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**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000157   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000158   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000159   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000160   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000161   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000162   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000163 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000164 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000165 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000166 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000167 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000168 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000169   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000170   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000171   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000172   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000173   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000174   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000175   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000176   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000177   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000178   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000179   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000180   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000181   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000182   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = PAREA1   ; SOURCE TYPE = AREAPOLY :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

**MODELOPTs: RegDFAULT CONC ELEV

*** DISCRETE CARTESIAN RECEPTORS ***
(X-COORD, Y-COORD, ZELEV, ZHILL, ZFLAG)
(METERS)

(	391316.0,	3783682.0,	328.5,	1466.0,	0.0);	(	391392.0,	3783989.0,	332.9,	1466.0,	0.0);
(	391405.0,	3784381.0,	334.9,	1466.0,	0.0);	(	391964.0,	3784620.0,	329.4,	1466.0,	0.0);
(	392559.0,	3784546.0,	356.0,	1466.0,	0.0);	(	392453.0,	3784419.0,	356.5,	1466.0,	0.0);
(	392197.0,	3784046.0,	337.2,	1466.0,	0.0);	(	392034.0,	3783741.0,	337.0,	1466.0,	0.0);
(	391925.0,	3783416.0,	333.0,	1466.0,	0.0);	(	391955.0,	3783299.0,	328.7,	1466.0,	0.0);
(	392291.0,	3783005.0,	329.0,	1466.0,	0.0);	(	391377.5,	3783505.5,	329.0,	1466.0,	0.0);
(	391350.3,	3783600.7,	328.0,	1466.0,	0.0);	(	391281.3,	3783478.0,	327.6,	1466.0,	0.0);
(	391254.1,	3783573.2,	328.5,	1466.0,	0.0);	(	391185.2,	3783450.6,	349.5,	1466.0,	0.0);
(	391158.0,	3783545.7,	327.2,	1466.0,	0.0);	(	391089.0,	3783423.1,	373.1,	1466.0,	0.0);
(	391061.8,	3783518.2,	340.7,	1466.0,	0.0);	(	390992.9,	3783395.6,	387.8,	1466.0,	0.0);
(	390965.7,	3783490.7,	375.0,	1466.0,	0.0);	(	391374.8,	3783708.7,	326.0,	1466.0,	0.0);
(	391264.1,	3783681.2,	329.2,	1466.0,	0.0);	(	391174.5,	3783725.8,	327.5,	1466.0,	0.0);
(	391085.0,	3783770.3,	327.1,	1466.0,	0.0);	(	391075.1,	3783662.3,	328.7,	1466.0,	0.0);
(	390995.1,	3783810.8,	328.1,	1466.0,	0.0);	(	390984.1,	3783690.8,	334.0,	1466.0,	0.0);
(	391294.4,	3783785.7,	329.1,	1466.0,	0.0);	(	391199.6,	3783817.8,	331.2,	1466.0,	0.0);
(	391393.4,	3783810.2,	329.2,	1466.0,	0.0);	(	391446.0,	3783889.6,	330.1,	1466.0,	0.0);
(	391357.1,	3783937.0,	332.7,	1466.0,	0.0);	(	391292.9,	3784012.9,	336.2,	1466.0,	0.0);
(	391243.8,	3783923.0,	334.4,	1466.0,	0.0);	(	391229.8,	3784090.6,	339.4,	1466.0,	0.0);
(	391181.8,	3784002.8,	343.4,	1466.0,	0.0);	(	391133.8,	3783915.0,	343.3,	1466.0,	0.0);
(	391166.1,	3784167.3,	342.4,	1466.0,	0.0);	(	391116.1,	3784075.8,	352.0,	1466.0,	0.0);
(	391066.1,	3783984.3,	354.5,	1466.0,	0.0);	(	391454.7,	3783989.7,	330.8,	1466.0,	0.0);
(	391515.0,	3784068.4,	327.4,	1466.0,	0.0);	(	391375.3,	3784050.5,	333.5,	1466.0,	0.0);
(	391435.6,	3784129.2,	331.4,	1466.0,	0.0);	(	391356.2,	3784190.0,	335.1,	1466.0,	0.0);
(	391276.8,	3784250.8,	336.8,	1466.0,	0.0);	(	391197.4,	3784311.6,	339.0,	1466.0,	0.0);
(	391570.1,	3784156.6,	325.9,	1466.0,	0.0);	(	391632.5,	3784227.2,	324.2,	1466.0,	0.0);
(	391495.2,	3784222.9,	330.5,	1466.0,	0.0);	(	391557.6,	3784293.4,	328.4,	1466.0,	0.0);
(	391420.3,	3784289.2,	333.0,	1466.0,	0.0);	(	391482.7,	3784359.7,	330.9,	1466.0,	0.0);
(	391345.4,	3784355.4,	336.3,	1466.0,	0.0);	(	391407.8,	3784425.9,	336.4,	1466.0,	0.0);
(	391270.5,	3784421.7,	338.9,	1466.0,	0.0);	(	391332.9,	3784492.2,	339.9,	1466.0,	0.0);
(	391404.2,	3784559.5,	341.4,	1466.0,	0.0);	(	391700.6,	3784307.7,	323.6,	1466.0,	0.0);
(	391620.8,	3784368.0,	327.3,	1466.0,	0.0);	(	391761.9,	3784382.7,	323.8,	1466.0,	0.0);
(	391684.6,	3784446.1,	326.7,	1466.0,	0.0);	(	391548.2,	3784437.5,	331.3,	1466.0,	0.0);
(	391607.2,	3784509.5,	332.7,	1466.0,	0.0);	(	391529.9,	3784572.8,	342.9,	1466.0,	0.0);
(	391452.5,	3784636.2,	345.0,	1466.0,	0.0);	(	391822.9,	3784449.4,	324.3,	1466.0,	0.0);
(	391746.7,	3784514.2,	327.0,	1466.0,	0.0);	(	391670.6,	3784579.1,	339.0,	1466.0,	0.0);
(	391594.4,	3784643.9,	344.0,	1466.0,	0.0);	(	391518.3,	3784708.7,	347.4,	1466.0,	0.0);
(	391859.6,	3784553.6,	327.2,	1466.0,	0.0);	(	391923.9,	3784651.3,	330.6,	1466.0,	0.0);
(	391790.3,	3784635.2,	331.5,	1466.0,	0.0);	(	391708.5,	3784692.7,	341.3,	1466.0,	0.0);
(	391760.3,	3784766.4,	341.5,	1466.0,	0.0);	(	391626.7,	3784750.3,	345.9,	1466.0,	0.0);
(	391678.6,	3784823.9,	346.1,	1466.0,	0.0);	(	391544.9,	3784807.8,	351.3,	1466.0,	0.0);
(	391596.8,	3784881.5,	353.2,	1466.0,	0.0);	(	392025.1,	3784712.4,	331.1,	1466.0,	0.0);
(	391882.5,	3784742.3,	335.8,	1466.0,	0.0);	(	391983.7,	3784803.4,	337.1,	1466.0,	0.0);
(	391841.2,	3784833.4,	339.5,	1466.0,	0.0);	(	391942.4,	3784894.5,	342.8,	1466.0,	0.0);
(	391799.8,	3784924.4,	346.4,	1466.0,	0.0);	(	391901.0,	3784985.5,	351.9,	1466.0,	0.0);
(	391748.4,	3785007.1,	355.8,	1466.0,	0.0);	(	391859.7,	3785076.6,	363.7,	1466.0,	0.0);

**MODELOPTs: RegDFAULT CONC ELEV

*** DISCRETE CARTESIAN RECEPTORS ***
(X-COORD, Y-COORD, ZELEV, ZHILL, ZFLAG)
(METERS)

(	392080.4,	3784792.8,	334.3,	1466.0,	0.0);	(	392216.1,	3784847.9,	331.5,	1466.0,	0.0);
(	392054.3,	3784889.4,	342.2,	1466.0,	0.0);	(	392190.0,	3784944.4,	337.6,	1466.0,	0.0);
(	392028.3,	3784985.9,	350.3,	1466.0,	0.0);	(	392163.9,	3785041.0,	346.0,	1466.0,	0.0);
(	391985.4,	3785071.8,	360.1,	1466.0,	0.0);	(	392137.8,	3785137.5,	361.2,	1466.0,	0.0);
(	391963.5,	3785171.0,	371.9,	1466.0,	0.0);	(	392111.7,	3785234.0,	372.5,	1466.0,	0.0);
(	392349.1,	3784940.3,	334.2,	1466.0,	0.0);	(	392443.2,	3784930.3,	335.0,	1466.0,	0.0);
(	392360.3,	3785036.4,	339.5,	1466.0,	0.0);	(	392465.5,	3785027.8,	337.0,	1466.0,	0.0);
(	392377.0,	3785133.3,	346.3,	1466.0,	0.0);	(	392276.9,	3785121.4,	352.6,	1466.0,	0.0);
(	392487.9,	3785125.3,	338.4,	1466.0,	0.0);	(	392396.0,	3785230.3,	354.7,	1466.0,	0.0);
(	392289.2,	3785217.7,	362.7,	1466.0,	0.0);	(	392510.2,	3785222.8,	339.9,	1466.0,	0.0);
(	392416.2,	3785327.5,	396.3,	1466.0,	0.0);	(	392304.8,	3785314.4,	398.2,	1466.0,	0.0);
(	392193.5,	3785301.2,	385.3,	1466.0,	0.0);	(	392532.5,	3785320.2,	343.5,	1466.0,	0.0);
(	392580.2,	3784802.1,	346.5,	1466.0,	0.0);	(	392564.1,	3784708.0,	348.7,	1466.0,	0.0);
(	392663.4,	3784857.6,	368.5,	1466.0,	0.0);	(	392587.1,	3784971.9,	337.9,	1466.0,	0.0);
(	392662.7,	3784691.2,	366.9,	1466.0,	0.0);	(	392762.0,	3784840.7,	370.8,	1466.0,	0.0);
(	392670.3,	3785027.4,	352.3,	1466.0,	0.0);	(	392761.2,	3784674.3,	369.7,	1466.0,	0.0);
(	392860.5,	3784823.9,	375.1,	1466.0,	0.0);	(	392829.8,	3784968.5,	372.1,	1466.0,	0.0);
(	392753.5,	3785082.9,	369.1,	1466.0,	0.0);	(	392631.8,	3785166.8,	343.7,	1466.0,	0.0);
(	392859.8,	3784657.5,	372.0,	1466.0,	0.0);	(	392955.2,	3784825.1,	378.5,	1466.0,	0.0);
(	392936.0,	3784915.5,	378.1,	1466.0,	0.0);	(	392916.8,	3785005.9,	376.6,	1466.0,	0.0);
(	392821.5,	3785148.8,	379.8,	1466.0,	0.0);	(	392745.4,	3785201.3,	376.7,	1466.0,	0.0);
(	392669.4,	3785253.8,	376.5,	1466.0,	0.0);	(	392974.5,	3784734.7,	376.9,	1466.0,	0.0);
(	392958.4,	3784640.6,	374.4,	1466.0,	0.0);	(	392546.5,	3784564.6,	353.5,	1466.0,	0.0);
(	392645.7,	3784552.3,	363.8,	1466.0,	0.0);	(	392745.0,	3784540.1,	367.0,	1466.0,	0.0);
(	392844.2,	3784527.8,	369.2,	1466.0,	0.0);	(	392943.5,	3784515.5,	371.0,	1466.0,	0.0);
(	392528.3,	3784467.5,	358.0,	1466.0,	0.0);	(	392609.5,	3784409.2,	360.7,	1466.0,	0.0);
(	392692.6,	3784355.4,	362.3,	1466.0,	0.0);	(	392773.2,	3784295.8,	362.8,	1466.0,	0.0);
(	392814.5,	3784401.1,	365.7,	1466.0,	0.0);	(	392855.4,	3784239.9,	362.8,	1466.0,	0.0);
(	392889.2,	3784326.3,	366.0,	1466.0,	0.0);	(	392923.1,	3784412.7,	368.6,	1466.0,	0.0);
(	392473.0,	3784373.6,	357.1,	1466.0,	0.0);	(	392558.0,	3784320.9,	358.5,	1466.0,	0.0);
(	392643.0,	3784268.2,	359.5,	1466.0,	0.0);	(	392728.0,	3784215.5,	359.6,	1466.0,	0.0);
(	392442.1,	3784280.4,	356.0,	1466.0,	0.0);	(	392518.6,	3784216.0,	356.6,	1466.0,	0.0);
(	392595.1,	3784151.6,	355.9,	1466.0,	0.0);	(	392671.6,	3784087.2,	355.5,	1466.0,	0.0);
(	392775.9,	3784083.8,	356.8,	1466.0,	0.0);	(	392703.8,	3783970.2,	352.7,	1466.0,	0.0);
(	392385.8,	3784203.3,	354.6,	1466.0,	0.0);	(	392460.5,	3784130.0,	353.8,	1466.0,	0.0);
(	392326.5,	3784091.3,	348.3,	1466.0,	0.0);	(	392414.7,	3784044.2,	350.4,	1466.0,	0.0);
(	392502.9,	3783997.1,	350.7,	1466.0,	0.0);	(	392591.1,	3783950.1,	351.0,	1466.0,	0.0);
(	392243.0,	3783981.7,	344.5,	1466.0,	0.0);	(	392359.0,	3783967.9,	347.8,	1466.0,	0.0);
(	392437.9,	3783906.4,	347.7,	1466.0,	0.0);	(	392516.8,	3783845.0,	347.4,	1466.0,	0.0);
(	392656.1,	3783867.1,	349.5,	1466.0,	0.0);	(	392595.7,	3783783.6,	346.7,	1466.0,	0.0);
(	392196.2,	3783888.2,	342.9,	1466.0,	0.0);	(	392308.5,	3783886.5,	345.7,	1466.0,	0.0);
(	392372.7,	3783794.3,	344.9,	1466.0,	0.0);	(	392461.0,	3783747.3,	344.4,	1466.0,	0.0);
(	392549.3,	3783700.4,	343.9,	1466.0,	0.0);	(	392273.7,	3783793.2,	343.9,	1466.0,	0.0);
(	392343.3,	3783701.3,	342.7,	1466.0,	0.0);	(	392429.2,	3783650.1,	342.1,	1466.0,	0.0);
(	392515.1,	3783598.9,	341.2,	1466.0,	0.0);	(	392151.5,	3783779.6,	342.4,	1466.0,	0.0);

**MODELOPTs: RegDFAULT CONC ELEV

*** DISCRETE CARTESIAN RECEPTORS ***
(X-COORD, Y-COORD, ZELEV, ZHILL, ZFLAG)
(METERS)

(	392217.3,	3783704.4,	341.9,	1466.0,	0.0);	(	392283.2,	3783629.2,	340.4,	1466.0,	0.0);
(	392349.1,	3783554.0,	339.9,	1466.0,	0.0);	(	392448.4,	3783518.8,	339.7,	1466.0,	0.0);
(	392364.5,	3783434.5,	337.9,	1466.0,	0.0);	(	392073.5,	3783676.7,	339.8,	1466.0,	0.0);
(	392158.7,	3783624.4,	340.2,	1466.0,	0.0);	(	392078.5,	3783582.1,	338.0,	1466.0,	0.0);
(	392162.3,	3783529.3,	338.1,	1466.0,	0.0);	(	392245.8,	3783475.0,	338.0,	1466.0,	0.0);
(	392407.6,	3783342.8,	336.0,	1466.0,	0.0);	(	392106.3,	3783443.9,	336.2,	1466.0,	0.0);
(	392197.8,	3783395.4,	336.0,	1466.0,	0.0);	(	392284.4,	3783344.3,	335.9,	1466.0,	0.0);
(	392344.4,	3783259.3,	334.1,	1466.0,	0.0);	(	392013.5,	3783419.3,	335.4,	1466.0,	0.0);
(	392064.4,	3783313.2,	331.4,	1466.0,	0.0);	(	392148.7,	3783259.4,	330.5,	1466.0,	0.0);
(	392232.9,	3783205.6,	330.4,	1466.0,	0.0);	(	392317.2,	3783151.8,	330.5,	1466.0,	0.0);
(	391952.6,	3783322.4,	330.0,	1466.0,	0.0);	(	391858.8,	3783193.7,	297.8,	1466.0,	0.0);
(	391689.2,	3783206.1,	328.6,	1466.0,	0.0);	(	391926.3,	3783119.9,	295.0,	1466.0,	0.0);
(	392033.5,	3783217.9,	325.7,	1466.0,	0.0);	(	391766.7,	3783100.1,	324.0,	1466.0,	0.0);
(	391919.0,	3783020.2,	289.1,	1466.0,	0.0);	(	392101.0,	3783144.1,	328.9,	1466.0,	0.0);
(	391759.5,	3783000.4,	353.7,	1466.0,	0.0);	(	391911.7,	3782920.4,	288.0,	1466.0,	0.0);
(	392061.2,	3782972.3,	315.2,	1466.0,	0.0);	(	392168.5,	3783070.3,	329.0,	1466.0,	0.0);
(	391752.2,	3782900.7,	337.4,	1466.0,	0.0);	(	391904.5,	3782820.7,	288.8,	1466.0,	0.0);
(	392053.9,	3782872.5,	320.5,	1466.0,	0.0);	(	392235.9,	3782996.5,	328.5,	1466.0,	0.0);
(	391744.9,	3782800.9,	324.1,	1466.0,	0.0);	(	391654.6,	3783110.2,	360.9,	1466.0,	0.0);
(	391633.6,	3783012.5,	374.5,	1466.0,	0.0);	(	391612.6,	3782914.7,	386.5,	1466.0,	0.0);
(	391591.7,	3782816.9,	369.3,	1466.0,	0.0);	(	391577.9,	3783232.0,	359.4,	1466.0,	0.0);
(	391491.0,	3783274.8,	358.6,	1466.0,	0.0);	(	391533.8,	3783142.3,	382.2,	1466.0,	0.0);
(	391446.8,	3783185.1,	389.3,	1466.0,	0.0);	(	391489.6,	3783052.6,	399.8,	1466.0,	0.0);
(	391402.7,	3783095.3,	410.4,	1466.0,	0.0);	(	391491.8,	3782946.8,	397.7,	1466.0,	0.0);
(	391358.5,	3783005.6,	423.1,	1466.0,	0.0);	(	391459.3,	3782853.0,	410.8,	1466.0,	0.0);
(	391314.4,	3782915.9,	447.1,	1466.0,	0.0);	(	391416.7,	3783330.5,	337.5,	1466.0,	0.0);
(	391354.8,	3783251.9,	370.1,	1466.0,	0.0);	(	391293.0,	3783173.4,	382.8,	1466.0,	0.0);
(	391231.1,	3783094.8,	416.8,	1466.0,	0.0);	(	391225.8,	3782971.7,	444.7,	1466.0,	0.0);
(	391352.5,	3783399.5,	327.9,	1466.0,	0.0);	(	391278.2,	3783332.6,	368.8,	1466.0,	0.0);
(	391203.9,	3783265.7,	395.2,	1466.0,	0.0);	(	391129.6,	3783198.8,	415.7,	1466.0,	0.0);
(	391138.1,	3783045.3,	441.2,	1466.0,	0.0);	(	391055.3,	3783131.8,	426.2,	1466.0,	0.0);
(	391066.7,	3783292.5,	400.1,	1466.0,	0.0);	(	390996.3,	3783219.7,	417.8,	1466.0,	0.0);
(	391438.7,	3783626.7,	320.7,	1466.0,	0.0);	(	391391.6,	3783540.4,	328.9,	1466.0,	0.0);
(	391408.1,	3783505.3,	328.8,	1466.0,	0.0);	(	391426.8,	3783466.5,	329.0,	1466.0,	0.0);
(	391478.5,	3783409.1,	325.3,	1466.0,	0.0);	(	391535.1,	3783364.5,	316.6,	1466.0,	0.0);
(	391622.0,	3783321.8,	331.3,	1466.0,	0.0);	(	391696.5,	3783305.8,	317.0,	1466.0,	0.0);
(	391866.1,	3783293.4,	323.4,	1466.0,	0.0);	(	391867.5,	3783374.8,	325.7,	1466.0,	0.0);
(	391895.8,	3783420.9,	327.2,	1466.0,	0.0);	(	391929.2,	3783473.1,	330.9,	1466.0,	0.0);
(	391945.8,	3783532.4,	329.4,	1466.0,	0.0);	(	391959.8,	3783580.0,	326.0,	1466.0,	0.0);
(	391977.9,	3783599.5,	327.0,	1466.0,	0.0);	(	391991.3,	3783619.7,	326.6,	1466.0,	0.0);
(	391985.7,	3783654.2,	322.9,	1466.0,	0.0);	(	392000.3,	3783700.5,	326.1,	1466.0,	0.0);
(	391993.4,	3783718.5,	323.2,	1466.0,	0.0);	(	391988.3,	3783729.0,	321.1,	1466.0,	0.0);
(	392020.5,	3783781.6,	323.6,	1466.0,	0.0);	(	392035.0,	3783810.6,	322.4,	1466.0,	0.0);
(	392085.5,	3783854.8,	327.0,	1466.0,	0.0);	(	392097.4,	3783874.8,	327.5,	1466.0,	0.0);
(	392094.2,	3783902.7,	327.0,	1466.0,	0.0);	(	392107.9,	3783935.2,	327.9,	1466.0,	0.0);

**MODELOPTs: RegDFAULT CONC ELEV

*** DISCRETE CARTESIAN RECEPTORS ***
(X-COORD, Y-COORD, ZELEV, ZHILL, ZFLAG)
(METERS)

(	392131.9,	3783980.4,	328.4,	1466.0,	0.0);	(	392147.5,	3784021.5,	328.6,	1466.0,	0.0);
(	392164.1,	3784043.1,	327.6,	1466.0,	0.0);	(	392238.2,	3784138.4,	328.7,	1466.0,	0.0);
(	392283.1,	3784222.5,	327.6,	1466.0,	0.0);	(	392298.8,	3784252.6,	328.9,	1466.0,	0.0);
(	392321.3,	3784292.2,	329.2,	1466.0,	0.0);	(	392365.6,	3784344.8,	346.1,	1466.0,	0.0);
(	392373.0,	3784391.6,	342.8,	1466.0,	0.0);	(	392388.0,	3784426.3,	343.0,	1466.0,	0.0);
(	392419.1,	3784476.3,	341.0,	1466.0,	0.0);	(	392438.1,	3784502.8,	341.7,	1466.0,	0.0);
(	392465.5,	3784724.8,	336.7,	1466.0,	0.0);	(	392481.6,	3784818.9,	336.4,	1466.0,	0.0);
(	392360.1,	3784846.8,	330.4,	1466.0,	0.0);	(	392327.5,	3784774.4,	329.3,	1466.0,	0.0);
(	392156.8,	3784728.3,	328.1,	1466.0,	0.0);	(	392066.5,	3784621.3,	327.7,	1466.0,	0.0);
(	392005.7,	3784593.7,	327.8,	1466.0,	0.0);	(	391953.8,	3784520.0,	325.1,	1466.0,	0.0);
(	391928.9,	3784450.1,	322.8,	1466.0,	0.0);	(	391899.0,	3784384.6,	320.6,	1466.0,	0.0);
(	391867.1,	3784347.2,	319.4,	1466.0,	0.0);	(	391839.3,	3784319.4,	319.4,	1466.0,	0.0);
(	391780.3,	3784247.4,	320.0,	1466.0,	0.0);	(	391728.5,	3784178.9,	318.9,	1466.0,	0.0);
(	391707.4,	3784160.9,	319.1,	1466.0,	0.0);	(	391645.0,	3784090.4,	317.4,	1466.0,	0.0);
(	391594.4,	3784007.6,	317.5,	1466.0,	0.0);	(	391534.1,	3783928.9,	321.2,	1466.0,	0.0);
(	391509.3,	3783812.2,	318.0,	1466.0,	0.0);	(	391492.7,	3783798.7,	319.5,	1466.0,	0.0);
(	391483.8,	3783721.5,	318.7,	1466.0,	0.0);	(	391464.4,	3783664.2,	318.3,	1466.0,	0.0);
(	391446.4,	3783628.1,	319.9,	1466.0,	0.0);	(	391473.6,	3783533.0,	325.3,	1466.0,	0.0);
(	391451.9,	3783524.9,	327.0,	1466.0,	0.0);						

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE-RECEPTOR COMBINATIONS FOR WHICH CALCULATIONS MAY NOT BE PERFORMED *
LESS THAN 1.0 METER; WITHIN OPENPIT; OR BEYOND 80KM FOR FASTAREA/FASTALL

SOURCE ID	- - RECEPTOR LOCATION - - XR (METERS)	YR (METERS)	DISTANCE (METERS)
L0000090	391426.8	3783466.5	-0.75
L0000091	391426.8	3783466.5	-0.88
L0000104	391478.5	3783409.1	0.37
L0000117	391535.1	3783364.5	-0.77
L0000118	391535.1	3783364.5	0.87

**MODELOPTs: RegDFAULT CONC ELEV

*** METEOROLOGICAL DAYS SELECTED FOR PROCESSING ***
(1=YES; 0=NO)

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1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
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NOTE: METEOROLOGICAL DATA ACTUALLY PROCESSED WILL ALSO DEPEND ON WHAT IS INCLUDED IN THE DATA FILE.

*** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***
(METERS/SEC)

1.54, 3.09, 5.14, 8.23, 10.80,

**MODELOPTs: RegDFAULT CONC   ELEV

*** UP TO THE FIRST 24 HOURS OF METEOROLOGICAL DATA ***

  Surface file: ..\burk6.sfc   Met Version: 12345
  Profile file: ..\burk6.PFL
  Surface format: FREE
  Profile format: FREE
  Surface station no.:   0   Upper air station no.:   3190
                Name: BURBANK   Name: UNKNOWN
                Year: 2005   Year: 2005

First 24 hours of scalar data

YR	MO	DY	JDY	HR	H0	U*	W*	DT/DZ	ZICNV	ZIMCH	M-O LEN	Z0	BOWEN	ALBEDO	REF WS	WD	HT	REF TA	HT
05	01	01	1	01	-3.2	0.063	-9.000	-9.000	-999.	37.	7.1	0.53	1.00	1.00	0.90	285.	9.1	279.9	5.5
05	01	01	1	02	-2.6	0.063	-9.000	-9.000	-999.	37.	8.7	0.53	1.00	1.00	0.90	277.	9.1	279.9	5.5
05	01	01	1	03	-2.6	0.063	-9.000	-9.000	-999.	37.	8.7	0.53	1.00	1.00	0.90	335.	9.1	279.2	5.5
05	01	01	1	04	-2.6	0.063	-9.000	-9.000	-999.	37.	8.6	0.53	1.00	1.00	0.90	291.	9.1	278.8	5.5
05	01	01	1	05	-3.0	0.063	-9.000	-9.000	-999.	37.	7.4	0.53	1.00	1.00	0.90	334.	9.1	278.1	5.5
05	01	01	1	06	-0.5	0.028	-9.000	-9.000	-999.	11.	3.8	0.53	1.00	1.00	0.40	309.	9.1	278.8	5.5
05	01	01	1	07	-2.6	0.063	-9.000	-9.000	-999.	37.	8.6	0.53	1.00	1.00	0.90	313.	9.1	278.8	5.5
05	01	01	1	08	-0.4	0.028	-9.000	-9.000	-999.	11.	4.5	0.53	1.00	0.56	0.40	256.	9.1	279.2	5.5
05	01	01	1	09	0.1	0.128	0.022	0.005	4.	105.	-1838.7	0.53	1.00	0.33	0.90	298.	9.1	282.5	5.5
05	01	01	1	10	0.1	0.128	0.025	0.005	5.	105.	-1838.7	0.53	1.00	0.25	0.90	103.	9.1	286.4	5.5
05	01	01	1	11	0.1	0.310	0.027	0.005	7.	397.	-8888.0	0.53	1.00	0.22	2.20	136.	9.1	287.0	5.5
05	01	01	1	12	0.1	0.310	0.028	0.005	8.	397.	-8888.0	0.53	1.00	0.21	2.20	152.	9.1	287.0	5.5
05	01	01	1	13	0.1	0.254	0.029	0.005	9.	295.	-8888.0	0.53	1.00	0.21	1.80	187.	9.1	285.9	5.5
05	01	01	1	14	0.1	0.184	0.030	0.005	9.	182.	-5471.6	0.53	1.00	0.22	1.30	157.	9.1	287.0	5.5
05	01	01	1	15	0.1	0.184	0.031	0.005	10.	181.	-5471.6	0.53	1.00	0.26	1.30	192.	9.1	286.4	5.5
05	01	01	1	16	0.1	0.254	0.031	0.005	11.	294.	-8888.0	0.53	1.00	0.34	1.80	188.	9.1	285.9	5.5
05	01	01	1	17	-4.9	0.092	-9.000	-9.000	-999.	88.	13.8	0.53	1.00	0.61	1.30	200.	9.1	285.4	5.5
05	01	01	1	18	-2.6	0.063	-9.000	-9.000	-999.	37.	8.7	0.53	1.00	1.00	0.90	162.	9.1	284.9	5.5
05	01	01	1	19	-3.0	0.063	-9.000	-9.000	-999.	37.	7.5	0.53	1.00	1.00	0.90	176.	9.1	284.9	5.5
05	01	01	1	20	-0.4	0.028	-9.000	-9.000	-999.	11.	4.5	0.53	1.00	1.00	0.40	210.	9.1	284.2	5.5
05	01	01	1	21	-0.4	0.028	-9.000	-9.000	-999.	11.	4.5	0.53	1.00	1.00	0.40	236.	9.1	284.2	5.5
05	01	01	1	22	-0.4	0.028	-9.000	-9.000	-999.	11.	4.5	0.53	1.00	1.00	0.40	272.	9.1	283.8	5.5
05	01	01	1	23	-0.4	0.028	-9.000	-9.000	-999.	11.	4.5	0.53	1.00	1.00	0.40	251.	9.1	283.1	5.5
05	01	01	1	24	-0.4	0.028	-9.000	-9.000	-999.	11.	4.5	0.53	1.00	1.00	0.40	301.	9.1	282.5	5.5

First hour of profile data

YR	MO	DY	HR	HEIGHT	F	WDIR	WSPD	AMB_TMP	sigmaA	sigmaW	sigmaV
05	01	01	01	5.5	0	-999.	-99.00	279.9	99.0	-99.00	-99.00
05	01	01	01	9.1	1	285.	0.90	-999.0	99.0	-99.00	-99.00

F indicates top of profile (=1) or below (=0)

**MODELOPTs: RegDFAULT CONC ELEV

*** THE ANNUAL AVERAGE CONCENTRATION VALUES AVERAGED OVER 5 YEARS FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): L0000001 , L0000002 , L0000003 , L0000004 , L0000005
,
L0000006 , L0000007 , L0000008 , L0000009 , L0000010 , L0000011 , L0000012 , L0000013
,
L0000014 , L0000015 , L0000016 , L0000017 , L0000018 , L0000019 , L0000020 , L0000021
,
L0000022 , L0000023 , L0000024 , L0000025 , L0000026 , L0000027 , L0000028 , . . .
,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF PM_10 IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC
391316.00	3783682.00	0.05338	391392.00	3783989.00	0.07488
391405.00	3784381.00	0.04810	391964.00	3784620.00	0.11209
392559.00	3784546.00	0.02746	392453.00	3784419.00	0.03397
392197.00	3784046.00	0.05612	392034.00	3783741.00	0.07998
391925.00	3783416.00	0.05828	391955.00	3783299.00	0.03010
392291.00	3783005.00	0.01156	391377.48	3783505.54	0.02556
391350.29	3783600.66	0.04653	391281.33	3783478.05	0.01155
391254.14	3783573.17	0.02202	391185.18	3783450.57	0.00399
391157.99	3783545.69	0.01249	391089.03	3783423.08	0.00221
391061.84	3783518.20	0.00608	390992.89	3783395.60	0.00161
390965.70	3783490.72	0.00261	391374.85	3783708.74	0.08071
391264.07	3783681.21	0.04061	391174.54	3783725.75	0.03288
391085.00	3783770.30	0.02747	391075.08	3783662.26	0.01757
390995.10	3783810.84	0.02320	390984.08	3783690.79	0.01398
391294.37	3783785.67	0.05877	391199.65	3783817.76	0.04293
391393.41	3783810.18	0.08597	391445.98	3783889.61	0.10045
391357.08	3783936.97	0.06982	391292.93	3784012.86	0.05470
391243.83	3783923.04	0.05065	391229.81	3784090.65	0.04468
391181.81	3784002.83	0.03698	391133.81	3783915.00	0.03143
391166.08	3784167.31	0.03727	391116.08	3784075.83	0.02775
391066.07	3783984.34	0.02294	391454.69	3783989.72	0.09460
391514.97	3784068.44	0.10879	391375.30	3784050.51	0.06825
391435.58	3784129.23	0.07461	391356.18	3784190.03	0.05621
391276.79	3784250.83	0.04619	391197.39	3784311.63	0.03866
391570.14	3784156.65	0.10932	391632.52	3784227.17	0.10978
391495.24	3784222.90	0.07447	391557.62	3784293.42	0.07573
391420.34	3784289.16	0.05718	391482.72	3784359.68	0.05819
391345.43	3784355.41	0.04538	391407.81	3784425.93	0.04452
391270.53	3784421.67	0.03758	391332.91	3784492.19	0.03619
391404.23	3784559.46	0.03480	391700.57	3784307.69	0.10614
391620.82	3784368.03	0.07456	391761.94	3784382.73	0.10216
391684.58	3784446.10	0.07316	391548.24	3784437.47	0.05639
391607.22	3784509.47	0.05440	391529.87	3784572.84	0.03723
391452.51	3784636.21	0.03137	391822.86	3784449.41	0.10394
391746.72	3784514.23	0.07479	391670.58	3784579.06	0.04829
391594.44	3784643.89	0.03684	391518.30	3784708.72	0.02996
391859.63	3784553.64	0.09573	391923.90	3784651.28	0.08853
391790.26	3784635.16	0.06676	391708.49	3784692.71	0.04380
391760.35	3784766.39	0.04252	391626.71	3784750.27	0.03370
391678.57	3784823.95	0.03262	391544.94	3784807.83	0.02620

**MODELOPTs: RegDFAULT CONC ELEV

*** THE ANNUAL AVERAGE CONCENTRATION VALUES AVERAGED OVER 5 YEARS FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): L0000001 , L0000002 , L0000003 , L0000004 , L0000005
,
L0000006 , L0000007 , L0000008 , L0000009 , L0000010 , L0000011 , L0000012 , L0000013
,
L0000014 , L0000015 , L0000016 , L0000017 , L0000018 , L0000019 , L0000020 , L0000021
,
L0000022 , L0000023 , L0000024 , L0000025 , L0000026 , L0000027 , L0000028 , . . .
,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF PM_10 IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC
391596.80	3784881.51	0.02448	392025.09	3784712.38	0.09297
391882.54	3784742.32	0.05909	391983.73	3784803.42	0.05653
391841.18	3784833.37	0.04320	391942.37	3784894.47	0.03693
391799.82	3784924.42	0.02987	391901.01	3784985.52	0.02387
391748.36	3785007.09	0.02088	391859.66	3785076.56	0.01642
392080.44	3784792.85	0.07093	392216.07	3784847.91	0.06119
392054.35	3784889.38	0.03886	392189.98	3784944.45	0.03342
392028.26	3784985.92	0.02401	392163.89	3785040.98	0.02038
391985.40	3785071.79	0.01667	392137.80	3785137.52	0.01298
391963.50	3785170.99	0.01191	392111.70	3785234.05	0.00987
392349.09	3784940.29	0.02909	392443.21	3784930.33	0.02339
392360.29	3785036.45	0.01874	392465.55	3785027.80	0.01613
392377.05	3785133.26	0.01318	392276.86	3785121.41	0.01372
392487.88	3785125.28	0.01249	392396.05	3785230.34	0.00961
392289.17	3785217.70	0.01001	392510.22	3785222.75	0.01021
392416.16	3785327.55	0.00623	392304.83	3785314.38	0.00719
392193.50	3785301.21	0.00811	392532.55	3785320.23	0.00840
392580.18	3784802.09	0.02166	392564.10	3784708.00	0.02646
392663.38	3784857.58	0.01237	392587.14	3784971.90	0.01555
392662.67	3784691.16	0.01686	392761.95	3784840.73	0.01084
392670.34	3785027.38	0.01017	392761.24	3784674.31	0.01373
392860.52	3784823.88	0.00949	392829.77	3784968.54	0.00810
392753.54	3785082.86	0.00709	392631.81	3785166.84	0.00896
392859.81	3784657.47	0.01164	392955.25	3784825.12	0.00830
392936.03	3784915.53	0.00764	392916.81	3785005.94	0.00692
392821.52	3785148.84	0.00567	392745.44	3785201.33	0.00536
392669.36	3785253.82	0.00511	392974.46	3784734.71	0.00895
392958.38	3784640.62	0.01008	392546.50	3784564.58	0.02936
392645.74	3784552.32	0.02030	392744.99	3784540.07	0.01615
392844.23	3784527.81	0.01345	392943.48	3784515.55	0.01153
392528.34	3784467.52	0.02868	392609.54	3784409.17	0.02280
392692.56	3784355.42	0.01916	392773.25	3784295.75	0.01680
392814.48	3784401.12	0.01526	392855.42	3784239.86	0.01506
392889.24	3784326.30	0.01385	392923.07	3784412.73	0.01267
392473.02	3784373.58	0.03048	392558.00	3784320.88	0.02463
392642.99	3784268.18	0.02087	392727.98	3784215.48	0.01835
392442.08	3784280.40	0.02947	392518.57	3784215.99	0.02503
392595.07	3784151.59	0.02238	392671.56	3784087.18	0.02019
392775.91	3784083.80	0.01761	392703.78	3783970.18	0.01973
392385.79	3784203.27	0.03040	392460.47	3784130.05	0.02685

**MODELOPTs: RegDFAULT CONC ELEV

*** THE ANNUAL AVERAGE CONCENTRATION VALUES AVERAGED OVER 5 YEARS FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): L0000001 , L0000002 , L0000003 , L0000004 , L0000005
,
L0000006 , L0000007 , L0000008 , L0000009 , L0000010 , L0000011 , L0000012 , L0000013
,
L0000014 , L0000015 , L0000016 , L0000017 , L0000018 , L0000019 , L0000020 , L0000021
,
L0000022 , L0000023 , L0000024 , L0000025 , L0000026 , L0000027 , L0000028 , . . .
,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF PM_10 IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC
392326.46	3784091.29	0.03490	392414.69	3784044.22	0.02921
392502.91	3783997.14	0.02569	392591.14	3783950.07	0.02273
392242.98	3783981.66	0.04247	392358.97	3783967.87	0.03249
392437.88	3783906.45	0.02869	392516.79	3783845.02	0.02551
392656.08	3783867.11	0.02112	392595.70	3783783.60	0.02291
392196.16	3783888.22	0.04848	392308.50	3783886.49	0.03614
392372.74	3783794.31	0.03197	392461.03	3783747.35	0.02772
392549.32	3783700.40	0.02423	392273.71	3783793.24	0.03872
392343.26	3783701.26	0.03310	392429.17	3783650.07	0.02824
392515.07	3783598.88	0.02449	392151.45	3783779.61	0.05184
392217.34	3783704.40	0.04231	392283.24	3783629.18	0.03588
392349.14	3783553.96	0.02999	392448.38	3783518.79	0.02525
392364.51	3783434.48	0.02598	392073.51	3783676.74	0.06023
392158.73	3783624.43	0.04546	392078.45	3783582.15	0.05424
392162.27	3783529.32	0.04095	392245.75	3783474.96	0.03245
392407.64	3783342.75	0.02200	392106.35	3783443.90	0.03956
392197.79	3783395.42	0.03083	392284.38	3783344.26	0.02501
392344.36	3783259.34	0.02026	392013.47	3783419.30	0.04464
392064.38	3783313.23	0.02991	392148.66	3783259.40	0.02366
392232.93	3783205.58	0.01944	392317.21	3783151.75	0.01647
391952.62	3783322.39	0.03385	391858.81	3783193.70	0.01410
391689.22	3783206.07	0.00696	391926.27	3783119.89	0.01142
392033.53	3783217.93	0.02112	391766.74	3783100.15	0.00626
391919.00	3783020.16	0.00727	392101.00	3783144.12	0.01610
391759.46	3783000.42	0.00254	391911.72	3782920.42	0.00500
392061.21	3782972.27	0.00876	392168.47	3783070.31	0.01311
391752.19	3782900.68	0.00251	391904.45	3782820.69	0.00363
392053.93	3782872.53	0.00632	392235.93	3782996.50	0.01106
391744.91	3782800.95	0.00218	391654.56	3783110.25	0.00206
391633.60	3783012.48	0.00131	391612.64	3782914.70	0.00095
391591.67	3782816.92	0.00084	391577.92	3783232.04	0.00231
391490.96	3783274.81	0.00192	391533.78	3783142.30	0.00123
391446.82	3783185.07	0.00109	391489.65	3783052.57	0.00084
391402.69	3783095.34	0.00078	391491.85	3782946.75	0.00070
391358.55	3783005.60	0.00059	391459.31	3782852.99	0.00056
391314.42	3782915.87	0.00047	391416.69	3783330.49	0.00324
391354.82	3783251.93	0.00122	391292.96	3783173.36	0.00083
391231.09	3783094.79	0.00061	391225.77	3782971.70	0.00047
391352.53	3783399.55	0.00651	391278.23	3783332.63	0.00166
391203.92	3783265.70	0.00104	391129.62	3783198.77	0.00076

**MODELOPTs: RegDFAULT CONC ELEV

*** THE ANNUAL AVERAGE CONCENTRATION VALUES AVERAGED OVER 5 YEARS FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): L0000001 , L0000002 , L0000003 , L0000004 , L0000005
,
L0000006 , L0000007 , L0000008 , L0000009 , L0000010 , L0000011 , L0000012 , L0000013
,
L0000014 , L0000015 , L0000016 , L0000017 , L0000018 , L0000019 , L0000020 , L0000021
,
L0000022 , L0000023 , L0000024 , L0000025 , L0000026 , L0000027 , L0000028 , . . .
,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF PM_10 IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC
391138.13	3783045.33	0.00051	391055.32	3783131.85	0.00060
391066.66	3783292.47	0.00107	390996.29	3783219.69	0.00078
391438.72	3783626.73	0.13610	391391.56	3783540.40	0.04007
391408.08	3783505.29	0.03284	391426.83	3783466.48	0.02342
391478.55	3783409.06	0.01384	391535.09	3783364.54	0.01305
391622.05	3783321.77	0.01035	391696.49	3783305.81	0.01818
391866.08	3783293.44	0.02863	391867.46	3783374.81	0.05466
391895.82	3783420.88	0.08118	391929.19	3783473.13	0.08321
391945.82	3783532.43	0.09893	391959.78	3783579.98	0.11692
391977.94	3783599.54	0.10842	391991.33	3783619.67	0.10725
391985.70	3783654.24	0.13254	392000.31	3783700.54	0.12075
391993.43	3783718.47	0.13806	391988.28	3783729.05	0.15071
392020.51	3783781.56	0.12698	392035.03	3783810.57	0.12981
392085.55	3783854.83	0.10406	392097.42	3783874.75	0.09937
392094.21	3783902.69	0.10378	392107.87	3783935.18	0.09134
392131.92	3783980.40	0.07932	392147.46	3784021.47	0.07476
392164.07	3784043.09	0.07224	392238.23	3784138.36	0.06237
392283.10	3784222.46	0.06253	392298.83	3784252.65	0.06228
392321.30	3784292.22	0.06292	392365.58	3784344.81	0.04318
392372.96	3784391.60	0.05013	392388.03	3784426.28	0.05157
392419.06	3784476.32	0.05330	392438.11	3784502.83	0.05060
392465.53	3784724.85	0.04840	392481.61	3784818.94	0.03345
392360.15	3784846.77	0.07486	392327.50	3784774.44	0.13028
392156.83	3784728.31	0.16238	392066.45	3784621.33	0.18183
392005.67	3784593.72	0.16286	391953.81	3784520.04	0.17792
391928.86	3784450.11	0.20135	391899.00	3784384.58	0.20445
391867.14	3784347.16	0.20353	391839.30	3784319.36	0.20082
391780.32	3784247.36	0.20766	391728.51	3784178.88	0.22638
391707.42	3784160.91	0.21843	391645.04	3784090.39	0.22771
391594.37	3784007.64	0.23562	391534.09	3783928.92	0.20987
391509.31	3783812.22	0.23036	391492.74	3783798.66	0.20610
391483.79	3783721.49	0.21231	391464.38	3783664.20	0.20197
391446.44	3783628.14	0.16126	391473.63	3783533.02	0.11240
391451.89	3783524.92	0.06723			

**MODELOPTs: RegDFAULT CONC ELEV

*** THE SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 5 YEARS ***

** CONC OF PM_10 IN MICROGRAMS/M**3 **

GROUP ID		AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	NETWORK GRID-ID
ALL	1ST HIGHEST VALUE IS	0.23562	AT (391594.37, 3784007.64, 317.50, 1466.00, 0.00)	DC	
	2ND HIGHEST VALUE IS	0.23036	AT (391509.31, 3783812.22, 318.00, 1466.00, 0.00)	DC	
	3RD HIGHEST VALUE IS	0.22771	AT (391645.04, 3784090.39, 317.37, 1466.00, 0.00)	DC	
	4TH HIGHEST VALUE IS	0.22638	AT (391728.51, 3784178.88, 318.92, 1466.00, 0.00)	DC	
	5TH HIGHEST VALUE IS	0.21843	AT (391707.42, 3784160.91, 319.06, 1466.00, 0.00)	DC	
	6TH HIGHEST VALUE IS	0.21231	AT (391483.79, 3783721.49, 318.68, 1466.00, 0.00)	DC	
	7TH HIGHEST VALUE IS	0.20987	AT (391534.09, 3783928.92, 321.16, 1466.00, 0.00)	DC	
	8TH HIGHEST VALUE IS	0.20766	AT (391780.32, 3784247.36, 319.98, 1466.00, 0.00)	DC	
	9TH HIGHEST VALUE IS	0.20610	AT (391492.74, 3783798.66, 319.53, 1466.00, 0.00)	DC	
	10TH HIGHEST VALUE IS	0.20445	AT (391899.00, 3784384.58, 320.60, 1466.00, 0.00)	DC	

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR

**MODELOPTs: RegDFAULT CONC ELEV

*** Message Summary : AERMOD Model Execution ***

--------- Summary of Total Messages --------

A Total of 0 Fatal Error Message(s)
A Total of 6 Warning Message(s)
A Total of 889 Informational Message(s)

A Total of 43824 Hours Were Processed

A Total of 0 Calm Hours Identified

A Total of 889 Missing Hours Identified (2.03 Percent)

******** FATAL ERROR MESSAGES ********
*** NONE ***

******** WARNING MESSAGES ********

```
MX W420   35935  METQA:Wind Speed Out-of-Range.   KURDAT =                    09020607
MX W432   35935  METQA:Friction Velocity Out-of-Range.   KURDAT =             09020607
MX W420   43325  METQA:Wind Speed Out-of-Range.   KURDAT =                    09121105
MX W432   43325  METQA:Friction Velocity Out-of-Range.   KURDAT =             09121105
MX W420   43326  METQA:Wind Speed Out-of-Range.   KURDAT =                    09121106
MX W432   43326  METQA:Friction Velocity Out-of-Range.   KURDAT =             09121106
```

****
*** AERMOD Finishes Successfully ***
****

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**
**************************************
**
** AERMOD Input Produced by:
** AERMOD View Ver. 8.2.0
** Lakes Environmental Software Inc.
** Date: 8/24/2013
** File: C:\Vista Env\2011\11057-Devils Gate Reservoir\DG Operat A\DG Operat A.ADI
**
**************************************
**
**
**************************************
** AERMOD Control Pathway
**************************************
**
**
CO STARTING
   TITLEONE Devil's Gate Reservoir - Operational Maintenance
   TITLETWO PM10 Diesel Emissions - Route A
   MODELOPT DFAULT CONC
   AVERTIME ANNUAL
   URBANOPT 9862049 Los_Angeles_County
   POLLUTID PM_10
   RUNORNOT RUN
   ERRORFIL "DG Operat A.err"
CO FINISHED
**
**************************************
** AERMOD Source Pathway
**************************************
**
**
SO STARTING
** Source Location **
** Source ID - Type - X Coord. - Y Coord. **
** ------------------------------------------------------------------------
** Line Source Represented by Adjacent Volume Sources
** LINE VOLUME Source ID = RDRTE1A
** DESCRSRC Road Routes 1A and 1E
** PREFIX
** Length of Side = 5.67
** Configuration = Adjacent
** Emission Rate = 1.465E-06
** Vertical Dimension = 1.92
** SZINIT = 0.89
** Nodes = 11
** 391233.58, 3783837.10, 329.40, 4.15, 2.64
** 391295.84, 3783819.23, 328.27, 4.15, 2.64
** 391344.60, 3783792.35, 328.18, 4.15, 2.64
** 391410.26, 3783761.46, 324.77, 4.15, 2.64
** 391389.09, 3783703.08, 324.98, 4.15, 2.64
** 391366.74, 3783612.02, 326.97, 4.15, 2.64
** 391385.81, 3783519.11, 328.95, 4.15, 2.64
** 391433.86, 3783449.31, 328.85, 4.15, 2.64
** 391481.35, 3783397.35, 324.15, 4.15, 2.64
** 391553.95, 3783345.10, 320.55, 4.15, 2.64
** 391733.99, 3783639.99, 312.00, 4.15, 2.64
** ------------------------------------------------------------------------
   LOCATION L0000001     VOLUME   391236.303 3783836.321 329.47
   LOCATION L0000002     VOLUME   391241.752 3783834.757 329.27
   LOCATION L0000003     VOLUME   391247.202 3783833.193 329.22
   LOCATION L0000004     VOLUME   391252.651 3783831.629 329.17
   LOCATION L0000005     VOLUME   391258.100 3783830.065 329.12
   LOCATION L0000006     VOLUME   391263.549 3783828.501 329.06
   LOCATION L0000007     VOLUME   391268.999 3783826.937 329.01
   LOCATION L0000008     VOLUME   391274.448 3783825.373 328.83
   LOCATION L0000009     VOLUME   391279.897 3783823.809 328.67
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SRCPARAM L0000136     0.000000008049      4.15      2.64      0.89
SRCPARAM L0000137     0.000000008049      4.15      2.64      0.89
SRCPARAM L0000138     0.000000008049      4.15      2.64      0.89
SRCPARAM L0000139     0.000000008049      4.15      2.64      0.89
SRCPARAM L0000140     0.000000008049      4.15      2.64      0.89
SRCPARAM L0000141     0.000000008049      4.15      2.64      0.89
SRCPARAM L0000142     0.000000008049      4.15      2.64      0.89
SRCPARAM L0000143     0.000000008049      4.15      2.64      0.89
SRCPARAM L0000144     0.000000008049      4.15      2.64      0.89
SRCPARAM L0000145     0.000000008049      4.15      2.64      0.89
SRCPARAM L0000146     0.000000008049      4.15      2.64      0.89
SRCPARAM L0000147     0.000000008049      4.15      2.64      0.89
SRCPARAM L0000148     0.000000008049      4.15      2.64      0.89
SRCPARAM L0000149     0.000000008049      4.15      2.64      0.89
SRCPARAM L0000150     0.000000008049      4.15      2.64      0.89
SRCPARAM L0000151     0.000000008049      4.15      2.64      0.89
SRCPARAM L0000152     0.000000008049      4.15      2.64      0.89
SRCPARAM L0000153     0.000000008049      4.15      2.64      0.89
SRCPARAM L0000154     0.000000008049      4.15      2.64      0.89
SRCPARAM L0000155     0.000000008049      4.15      2.64      0.89
SRCPARAM L0000156     0.000000008049      4.15      2.64      0.89
SRCPARAM L0000157     0.000000008049      4.15      2.64      0.89
SRCPARAM L0000158     0.000000008049      4.15      2.64      0.89
SRCPARAM L0000159     0.000000008049      4.15      2.64      0.89
SRCPARAM L0000160     0.000000008049      4.15      2.64      0.89
SRCPARAM L0000161     0.000000008049      4.15      2.64      0.89
SRCPARAM L0000162     0.000000008049      4.15      2.64      0.89
SRCPARAM L0000163     0.000000008049      4.15      2.64      0.89
SRCPARAM L0000164     0.000000008049      4.15      2.64      0.89
SRCPARAM L0000165     0.000000008049      4.15      2.64      0.89
SRCPARAM L0000166     0.000000008049      4.15      2.64      0.89
SRCPARAM L0000167     0.000000008049      4.15      2.64      0.89
SRCPARAM L0000168     0.000000008049      4.15      2.64      0.89
SRCPARAM L0000169     0.000000008049      4.15      2.64      0.89
SRCPARAM L0000170     0.000000008049      4.15      2.64      0.89
SRCPARAM L0000171     0.000000008049      4.15      2.64      0.89
SRCPARAM L0000172     0.000000008049      4.15      2.64      0.89
SRCPARAM L0000173     0.000000008049      4.15      2.64      0.89
SRCPARAM L0000174     0.000000008049      4.15      2.64      0.89
SRCPARAM L0000175     0.000000008049      4.15      2.64      0.89
SRCPARAM L0000176     0.000000008049      4.15      2.64      0.89
SRCPARAM L0000177     0.000000008049      4.15      2.64      0.89
SRCPARAM L0000178     0.000000008049      4.15      2.64      0.89
SRCPARAM L0000179     0.000000008049      4.15      2.64      0.89
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   SRCPARAM L0000180     0.000000008049      4.15      2.64      0.89
   SRCPARAM L0000181     0.000000008049      4.15      2.64      0.89
   SRCPARAM L0000182     0.000000008049      4.15      2.64      0.89
** ------------------------------------------------------------------
   SRCPARAM PAREA1       9.143E-09     0.610        50     3.960
   AREAVERT PAREA1       391678.348 3783352.608 391734.098 3783363.194
   AREAVERT PAREA1       391765.148 3783411.887 391863.240 3783410.475
   AREAVERT PAREA1       391894.290 3783470.459 391918.284 3783555.142
   AREAVERT PAREA1       391962.709 3783655.080 391967.888 3783744.217
   AREAVERT PAREA1       391988.883 3783806.002 392031.096 3783848.246
   AREAVERT PAREA1       392061.089 3783913.632 391996.303 3783963.421
   AREAVERT PAREA1       391990.304 3784021.009 392024.003 3784092.535
   AREAVERT PAREA1       392112.806 3784255.629 392177.029 3784321.969
   AREAVERT PAREA1       392225.020 3784391.839 392298.342 3784435.360
   AREAVERT PAREA1       392331.201 3784484.273 392355.197 3784569.461
   AREAVERT PAREA1       392377.654 3784638.902 392390.852 3784698.894
   AREAVERT PAREA1       392396.851 3784762.486 392398.651 3784836.276
   AREAVERT PAREA1       392361.059 3784844.991 392328.489 3784773.901
   AREAVERT PAREA1       392157.550 3784727.212 392068.238 3784618.672
   AREAVERT PAREA1       392011.355 3784588.459 391960.509 3784515.950
   AREAVERT PAREA1       391915.727 3784399.571 391901.725 3784366.039
   AREAVERT PAREA1       391837.835 3784297.912 391736.432 3784173.108
   AREAVERT PAREA1       391651.263 3784084.743 391602.661 3784006.139
   AREAVERT PAREA1       391540.402 3783923.718 391514.968 3783809.472
   AREAVERT PAREA1       391495.167 3783791.471 391488.152 3783720.029
   AREAVERT PAREA1       391467.240 3783660.863 391450.408 3783626.180
   AREAVERT PAREA1       391475.161 3783535.072 391490.977 3783496.558
   AREAVERT PAREA1       391497.027 3783468.269 391499.139 3783439.572
   AREAVERT PAREA1       391509.425 3783415.529 391547.495 3783425.018
   AREAVERT PAREA1       391603.862 3783444.530 391653.725 3783405.073
   URBANSRC ALL

** Variable Emissions Type: "By Month (MONTH)"
** Variable Emission Scenario: "Scenario 2"
   EMISFACT PAREA1       MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT PAREA1       MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000001     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000001     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000002     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000002     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000003     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000003     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000004     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
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   EMISFACT L0000005     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000005     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000006     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000006     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000007     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000007     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000008     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000008     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000009     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000009     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000010     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000010     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000011     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000011     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000012     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000012     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000013     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000013     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000014     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000014     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000015     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000015     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
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   EMISFACT L0000017     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
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   EMISFACT L0000019     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000019     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
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   EMISFACT L0000020     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000021     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000021     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000022     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000022     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000023     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000023     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000024     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000024     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000025     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
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EMISFACT L0000026     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000027     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000027     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000028     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000028     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000029     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000029     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
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EMISFACT L0000031     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
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EMISFACT L0000033     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000033     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000034     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
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EMISFACT L0000035     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
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EMISFACT L0000040     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000041     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000041     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
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EMISFACT L0000048     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
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EMISFACT L0000053     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
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EMISFACT L0000067     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000067     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
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EMISFACT L0000098     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000098     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000099     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000099     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000100     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000100     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
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EMISFACT L0000102     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
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EMISFACT L0000104     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
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EMISFACT L0000105     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
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EMISFACT L0000106     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000107     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000107     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000108     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000108     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000109     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000109     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000110     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
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EMISFACT L0000110     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
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EMISFACT L0000112     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000113     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
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EMISFACT L0000116     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
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EMISFACT L0000117     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000118     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000118     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000119     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000119     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000120     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000120     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
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EMISFACT L0000121     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000122     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000122     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000123     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000123     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000124     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
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EMISFACT L0000125     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000126     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000126     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000127     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000127     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
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EMISFACT L0000129     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000129     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000130     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000130     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
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EMISFACT L0000135     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
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EMISFACT L0000140     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
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EMISFACT L0000142     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000143     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000143     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000144     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000144     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000145     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000145     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000146     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000146     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000147     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000147     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000148     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000148     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000149     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000149     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000150     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000150     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000151     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000151     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000152     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000152     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
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   EMISFACT L0000160     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000161     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
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   EMISFACT L0000163     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
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   EMISFACT L0000164     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
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   EMISFACT L0000167     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
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   EMISFACT L0000168     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000169     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
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   EMISFACT L0000173     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
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   EMISFACT L0000176     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000177     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000177     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000178     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000178     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000179     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000179     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000180     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000180     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000181     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000181     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000182     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000182     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   SRCGROUP ALL
SO FINISHED
**
**************************************
** AERMOD Receptor Pathway
**************************************
**
**
RE STARTING
   INCLUDED "DG Operat A.rou"
RE FINISHED
**
**************************************
** AERMOD Meteorology Pathway
**************************************
**
**
ME STARTING
   SURFFILE ..\burk6.sfc
   PROFFILE ..\burk6.PFL
   SURFDATA 0 2005 Burbank 378.62 3782.24
   UAIRDATA 3190 2005
   SITEDATA 99999 2005
   PROFBASE 175.0 METERS
ME FINISHED
```

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**
**************************************
** AERMOD Output Pathway
**************************************
**
**
OU STARTING
** Auto-Generated Plotfiles
   PLOTFILE ANNUAL ALL "DG OPERAT A.AD\AN00GALL.PLT" 31
   SUMMFILE "DG Operat A.sum"
OU FINISHED

 *********************************
 *** SETUP Finishes Successfully ***
 *********************************
```

**MODELOPTs: RegDFAULT CONC   ELEV

                                          ***   MODEL SETUP OPTIONS SUMMARY   ***
- -

**Model Is Setup For Calculation of Average CONCentration Values.

  -- DEPOSITION LOGIC --
**NO GAS DEPOSITION Data Provided.
**NO PARTICLE DEPOSITION Data Provided.
**Model Uses NO DRY DEPLETION. DRYDPLT = F
**Model Uses NO WET DEPLETION. WETDPLT = F

**Model Uses URBAN Dispersion Algorithm for the SBL for   183 Source(s),
  for Total of   1 Urban Area(s):
  Urban Population =   9862049.0 ; Urban Roughness Length = 1.000 m

**Model Uses Regulatory DEFAULT Options:
       1. Stack-tip Downwash.
       2. Model Accounts for ELEVated Terrain Effects.
       3. Use Calms Processing Routine.
       4. Use Missing Data Processing Routine.
       5. No Exponential Decay for URBAN/Non-SO2.
       6. Urban Roughness Length of 1.0 Meter Assumed.

**Model Assumes No FLAGPOLE Receptor Heights.

**Model Calculates ANNUAL Averages Only

**This Run Includes: 183 Source(s);   1 Source Group(s); and   307 Receptor(s)

**The Model Assumes A Pollutant Type of: PM_10

**Model Set To Continue RUNning After the Setup Testing.

**Output Options Selected:
        Model Outputs Tables of ANNUAL Averages by Receptor
        Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)
        Model Outputs Separate Summary File of High Ranked Values (SUMMFILE Keyword)

**NOTE: The Following Flags May Appear Following CONC Values: c for Calm Hours
                                                                m for Missing Hours
                                                                b for Both Calm and Missing Hours

**Misc. Inputs: Base Elev. for Pot. Temp. Profile (m MSL) =   175.00 ; Decay Coef. =   0.000   ; Rot. Angle =   0.0
                 Emission Units = GRAMS/SEC   ; Emission Rate Unit Factor =   0.10000E+07
                 Output Units   = MICROGRAMS/M**3

**Approximate Storage Requirements of Model =   3.8 MB of RAM.

**Detailed Error/Message File: DG Operat A.err
**File for Summary of Results: DG Operat A.sum

**MODELOPTs: RegDFAULT CONC ELEV

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0000001	0	0.80490E-08	391236.3	3783836.3	329.5	4.15	2.64	0.89	YES	MONTH
L0000002	0	0.80490E-08	391241.8	3783834.8	329.3	4.15	2.64	0.89	YES	MONTH
L0000003	0	0.80490E-08	391247.2	3783833.2	329.2	4.15	2.64	0.89	YES	MONTH
L0000004	0	0.80490E-08	391252.7	3783831.6	329.2	4.15	2.64	0.89	YES	MONTH
L0000005	0	0.80490E-08	391258.1	3783830.1	329.1	4.15	2.64	0.89	YES	MONTH
L0000006	0	0.80490E-08	391263.5	3783828.5	329.1	4.15	2.64	0.89	YES	MONTH
L0000007	0	0.80490E-08	391269.0	3783826.9	329.0	4.15	2.64	0.89	YES	MONTH
L0000008	0	0.80490E-08	391274.4	3783825.4	328.8	4.15	2.64	0.89	YES	MONTH
L0000009	0	0.80490E-08	391279.9	3783823.8	328.7	4.15	2.64	0.89	YES	MONTH
L0000010	0	0.80490E-08	391285.3	3783822.2	328.5	4.15	2.64	0.89	YES	MONTH
L0000011	0	0.80490E-08	391290.8	3783820.7	328.4	4.15	2.64	0.89	YES	MONTH
L0000012	0	0.80490E-08	391296.2	3783819.0	328.3	4.15	2.64	0.89	YES	MONTH
L0000013	0	0.80490E-08	391301.2	3783816.3	328.4	4.15	2.64	0.89	YES	MONTH
L0000014	0	0.80490E-08	391306.1	3783813.6	328.5	4.15	2.64	0.89	YES	MONTH
L0000015	0	0.80490E-08	391311.1	3783810.8	328.5	4.15	2.64	0.89	YES	MONTH
L0000016	0	0.80490E-08	391316.1	3783808.1	328.5	4.15	2.64	0.89	YES	MONTH
L0000017	0	0.80490E-08	391321.0	3783805.3	328.4	4.15	2.64	0.89	YES	MONTH
L0000018	0	0.80490E-08	391326.0	3783802.6	328.3	4.15	2.64	0.89	YES	MONTH
L0000019	0	0.80490E-08	391331.0	3783799.9	328.1	4.15	2.64	0.89	YES	MONTH
L0000020	0	0.80490E-08	391335.9	3783797.1	328.0	4.15	2.64	0.89	YES	MONTH
L0000021	0	0.80490E-08	391340.9	3783794.4	328.0	4.15	2.64	0.89	YES	MONTH
L0000022	0	0.80490E-08	391345.9	3783791.7	328.1	4.15	2.64	0.89	YES	MONTH
L0000023	0	0.80490E-08	391351.0	3783789.3	328.1	4.15	2.64	0.89	YES	MONTH
L0000024	0	0.80490E-08	391356.2	3783786.9	328.0	4.15	2.64	0.89	YES	MONTH
L0000025	0	0.80490E-08	391361.3	3783784.5	328.0	4.15	2.64	0.89	YES	MONTH
L0000026	0	0.80490E-08	391366.4	3783782.1	327.9	4.15	2.64	0.89	YES	MONTH
L0000027	0	0.80490E-08	391371.5	3783779.7	327.7	4.15	2.64	0.89	YES	MONTH
L0000028	0	0.80490E-08	391376.7	3783777.3	327.4	4.15	2.64	0.89	YES	MONTH
L0000029	0	0.80490E-08	391381.8	3783774.8	327.1	4.15	2.64	0.89	YES	MONTH
L0000030	0	0.80490E-08	391386.9	3783772.4	326.7	4.15	2.64	0.89	YES	MONTH
L0000031	0	0.80490E-08	391392.1	3783770.0	326.2	4.15	2.64	0.89	YES	MONTH
L0000032	0	0.80490E-08	391397.2	3783767.6	325.8	4.15	2.64	0.89	YES	MONTH
L0000033	0	0.80490E-08	391402.3	3783765.2	325.5	4.15	2.64	0.89	YES	MONTH
L0000034	0	0.80490E-08	391407.5	3783762.8	325.2	4.15	2.64	0.89	YES	MONTH
L0000035	0	0.80490E-08	391409.4	3783759.0	324.9	4.15	2.64	0.89	YES	MONTH
L0000036	0	0.80490E-08	391407.5	3783753.7	324.7	4.15	2.64	0.89	YES	MONTH
L0000037	0	0.80490E-08	391405.5	3783748.4	324.5	4.15	2.64	0.89	YES	MONTH
L0000038	0	0.80490E-08	391403.6	3783743.1	324.4	4.15	2.64	0.89	YES	MONTH
L0000039	0	0.80490E-08	391401.7	3783737.7	324.2	4.15	2.64	0.89	YES	MONTH
L0000040	0	0.80490E-08	391399.7	3783732.4	324.2	4.15	2.64	0.89	YES	MONTH

**MODELOPTs: RegDFAULT CONC ELEV

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0000041	0	0.80490E-08	391397.8	3783727.1	324.3	4.15	2.64	0.89	YES	MONTH
L0000042	0	0.80490E-08	391395.9	3783721.7	324.4	4.15	2.64	0.89	YES	MONTH
L0000043	0	0.80490E-08	391393.9	3783716.4	324.6	4.15	2.64	0.89	YES	MONTH
L0000044	0	0.80490E-08	391392.0	3783711.1	324.7	4.15	2.64	0.89	YES	MONTH
L0000045	0	0.80490E-08	391390.1	3783705.7	324.9	4.15	2.64	0.89	YES	MONTH
L0000046	0	0.80490E-08	391388.4	3783700.3	325.0	4.15	2.64	0.89	YES	MONTH
L0000047	0	0.80490E-08	391387.1	3783694.8	325.1	4.15	2.64	0.89	YES	MONTH
L0000048	0	0.80490E-08	391385.7	3783689.3	325.2	4.15	2.64	0.89	YES	MONTH
L0000049	0	0.80490E-08	391384.4	3783683.8	325.3	4.15	2.64	0.89	YES	MONTH
L0000050	0	0.80490E-08	391383.0	3783678.3	325.4	4.15	2.64	0.89	YES	MONTH
L0000051	0	0.80490E-08	391381.7	3783672.8	325.5	4.15	2.64	0.89	YES	MONTH
L0000052	0	0.80490E-08	391380.3	3783667.3	325.6	4.15	2.64	0.89	YES	MONTH
L0000053	0	0.80490E-08	391379.0	3783661.8	325.7	4.15	2.64	0.89	YES	MONTH
L0000054	0	0.80490E-08	391377.6	3783656.3	325.8	4.15	2.64	0.89	YES	MONTH
L0000055	0	0.80490E-08	391376.2	3783650.8	325.9	4.15	2.64	0.89	YES	MONTH
L0000056	0	0.80490E-08	391374.9	3783645.3	325.9	4.15	2.64	0.89	YES	MONTH
L0000057	0	0.80490E-08	391373.5	3783639.8	326.0	4.15	2.64	0.89	YES	MONTH
L0000058	0	0.80490E-08	391372.2	3783634.3	326.1	4.15	2.64	0.89	YES	MONTH
L0000059	0	0.80490E-08	391370.8	3783628.8	326.2	4.15	2.64	0.89	YES	MONTH
L0000060	0	0.80490E-08	391369.5	3783623.2	326.3	4.15	2.64	0.89	YES	MONTH
L0000061	0	0.80490E-08	391368.1	3783617.7	326.4	4.15	2.64	0.89	YES	MONTH
L0000062	0	0.80490E-08	391366.8	3783612.2	326.7	4.15	2.64	0.89	YES	MONTH
L0000063	0	0.80490E-08	391367.8	3783606.7	326.8	4.15	2.64	0.89	YES	MONTH
L0000064	0	0.80490E-08	391369.0	3783601.1	327.0	4.15	2.64	0.89	YES	MONTH
L0000065	0	0.80490E-08	391370.1	3783595.6	327.2	4.15	2.64	0.89	YES	MONTH
L0000066	0	0.80490E-08	391371.3	3783590.0	327.4	4.15	2.64	0.89	YES	MONTH
L0000067	0	0.80490E-08	391372.4	3783584.5	327.7	4.15	2.64	0.89	YES	MONTH
L0000068	0	0.80490E-08	391373.5	3783578.9	327.9	4.15	2.64	0.89	YES	MONTH
L0000069	0	0.80490E-08	391374.7	3783573.4	328.2	4.15	2.64	0.89	YES	MONTH
L0000070	0	0.80490E-08	391375.8	3783567.8	328.4	4.15	2.64	0.89	YES	MONTH
L0000071	0	0.80490E-08	391377.0	3783562.3	328.7	4.15	2.64	0.89	YES	MONTH
L0000072	0	0.80490E-08	391378.1	3783556.7	329.0	4.15	2.64	0.89	YES	MONTH
L0000073	0	0.80490E-08	391379.2	3783551.2	329.0	4.15	2.64	0.89	YES	MONTH
L0000074	0	0.80490E-08	391380.4	3783545.6	329.0	4.15	2.64	0.89	YES	MONTH
L0000075	0	0.80490E-08	391381.5	3783540.0	329.0	4.15	2.64	0.89	YES	MONTH
L0000076	0	0.80490E-08	391382.7	3783534.5	329.0	4.15	2.64	0.89	YES	MONTH
L0000077	0	0.80490E-08	391383.8	3783528.9	329.0	4.15	2.64	0.89	YES	MONTH
L0000078	0	0.80490E-08	391384.9	3783523.4	329.0	4.15	2.64	0.89	YES	MONTH
L0000079	0	0.80490E-08	391386.6	3783518.0	329.0	4.15	2.64	0.89	YES	MONTH
L0000080	0	0.80490E-08	391389.8	3783513.4	329.0	4.15	2.64	0.89	YES	MONTH

**MODELOPTs: RegDFAULT CONC ELEV

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0000081	0	0.80490E-08	391393.0	3783508.7	328.9	4.15	2.64	0.89	YES	MONTH
L0000082	0	0.80490E-08	391396.2	3783504.0	328.9	4.15	2.64	0.89	YES	MONTH
L0000083	0	0.80490E-08	391399.4	3783499.4	329.0	4.15	2.64	0.89	YES	MONTH
L0000084	0	0.80490E-08	391402.6	3783494.7	329.0	4.15	2.64	0.89	YES	MONTH
L0000085	0	0.80490E-08	391405.8	3783490.0	329.0	4.15	2.64	0.89	YES	MONTH
L0000086	0	0.80490E-08	391409.1	3783485.3	329.0	4.15	2.64	0.89	YES	MONTH
L0000087	0	0.80490E-08	391412.3	3783480.7	329.0	4.15	2.64	0.89	YES	MONTH
L0000088	0	0.80490E-08	391415.5	3783476.0	329.0	4.15	2.64	0.89	YES	MONTH
L0000089	0	0.80490E-08	391418.7	3783471.3	329.0	4.15	2.64	0.89	YES	MONTH
L0000090	0	0.80490E-08	391421.9	3783466.7	329.0	4.15	2.64	0.89	YES	MONTH
L0000091	0	0.80490E-08	391425.1	3783462.0	329.0	4.15	2.64	0.89	YES	MONTH
L0000092	0	0.80490E-08	391428.3	3783457.3	329.0	4.15	2.64	0.89	YES	MONTH
L0000093	0	0.80490E-08	391431.6	3783452.7	329.0	4.15	2.64	0.89	YES	MONTH
L0000094	0	0.80490E-08	391434.9	3783448.1	329.0	4.15	2.64	0.89	YES	MONTH
L0000095	0	0.80490E-08	391438.8	3783443.9	329.0	4.15	2.64	0.89	YES	MONTH
L0000096	0	0.80490E-08	391442.6	3783439.8	329.0	4.15	2.64	0.89	YES	MONTH
L0000097	0	0.80490E-08	391446.4	3783435.6	329.0	4.15	2.64	0.89	YES	MONTH
L0000098	0	0.80490E-08	391450.2	3783431.4	328.8	4.15	2.64	0.89	YES	MONTH
L0000099	0	0.80490E-08	391454.1	3783427.2	328.4	4.15	2.64	0.89	YES	MONTH
L0000100	0	0.80490E-08	391457.9	3783423.0	328.0	4.15	2.64	0.89	YES	MONTH
L0000101	0	0.80490E-08	391461.7	3783418.8	327.5	4.15	2.64	0.89	YES	MONTH
L0000102	0	0.80490E-08	391465.5	3783414.6	326.9	4.15	2.64	0.89	YES	MONTH
L0000103	0	0.80490E-08	391469.4	3783410.5	326.3	4.15	2.64	0.89	YES	MONTH
L0000104	0	0.80490E-08	391473.2	3783406.3	325.5	4.15	2.64	0.89	YES	MONTH
L0000105	0	0.80490E-08	391477.0	3783402.1	324.5	4.15	2.64	0.89	YES	MONTH
L0000106	0	0.80490E-08	391480.8	3783397.9	323.5	4.15	2.64	0.89	YES	MONTH
L0000107	0	0.80490E-08	391485.3	3783394.5	322.7	4.15	2.64	0.89	YES	MONTH
L0000108	0	0.80490E-08	391489.9	3783391.2	321.9	4.15	2.64	0.89	YES	MONTH
L0000109	0	0.80490E-08	391494.5	3783387.9	321.0	4.15	2.64	0.89	YES	MONTH
L0000110	0	0.80490E-08	391499.1	3783384.5	320.2	4.15	2.64	0.89	YES	MONTH
L0000111	0	0.80490E-08	391503.7	3783381.2	319.2	4.15	2.64	0.89	YES	MONTH
L0000112	0	0.80490E-08	391508.3	3783377.9	318.3	4.15	2.64	0.89	YES	MONTH
L0000113	0	0.80490E-08	391512.9	3783374.6	317.7	4.15	2.64	0.89	YES	MONTH
L0000114	0	0.80490E-08	391517.5	3783371.3	317.4	4.15	2.64	0.89	YES	MONTH
L0000115	0	0.80490E-08	391522.1	3783368.0	317.1	4.15	2.64	0.89	YES	MONTH
L0000116	0	0.80490E-08	391526.8	3783364.7	316.9	4.15	2.64	0.89	YES	MONTH
L0000117	0	0.80490E-08	391531.4	3783361.4	316.8	4.15	2.64	0.89	YES	MONTH
L0000118	0	0.80490E-08	391536.0	3783358.0	316.7	4.15	2.64	0.89	YES	MONTH
L0000119	0	0.80490E-08	391540.6	3783354.7	317.0	4.15	2.64	0.89	YES	MONTH
L0000120	0	0.80490E-08	391545.2	3783351.4	318.0	4.15	2.64	0.89	YES	MONTH

**MODELOPTs: RegDFAULT CONC ELEV

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0000121	0	0.80490E-08	391549.8	3783348.1	319.3	4.15	2.64	0.89	YES	MONTH
L0000122	0	0.80490E-08	391554.2	3783345.5	320.8	4.15	2.64	0.89	YES	MONTH
L0000123	0	0.80490E-08	391557.2	3783350.4	320.5	4.15	2.64	0.89	YES	MONTH
L0000124	0	0.80490E-08	391560.1	3783355.2	320.0	4.15	2.64	0.89	YES	MONTH
L0000125	0	0.80490E-08	391563.1	3783360.0	319.3	4.15	2.64	0.89	YES	MONTH
L0000126	0	0.80490E-08	391566.0	3783364.9	318.3	4.15	2.64	0.89	YES	MONTH
L0000127	0	0.80490E-08	391569.0	3783369.7	317.1	4.15	2.64	0.89	YES	MONTH
L0000128	0	0.80490E-08	391571.9	3783374.6	316.0	4.15	2.64	0.89	YES	MONTH
L0000129	0	0.80490E-08	391574.9	3783379.4	315.7	4.15	2.64	0.89	YES	MONTH
L0000130	0	0.80490E-08	391577.8	3783384.2	315.9	4.15	2.64	0.89	YES	MONTH
L0000131	0	0.80490E-08	391580.8	3783389.1	315.9	4.15	2.64	0.89	YES	MONTH
L0000132	0	0.80490E-08	391583.8	3783393.9	315.8	4.15	2.64	0.89	YES	MONTH
L0000133	0	0.80490E-08	391586.7	3783398.8	315.6	4.15	2.64	0.89	YES	MONTH
L0000134	0	0.80490E-08	391589.7	3783403.6	315.3	4.15	2.64	0.89	YES	MONTH
L0000135	0	0.80490E-08	391592.6	3783408.4	314.9	4.15	2.64	0.89	YES	MONTH
L0000136	0	0.80490E-08	391595.6	3783413.3	314.8	4.15	2.64	0.89	YES	MONTH
L0000137	0	0.80490E-08	391598.5	3783418.1	314.6	4.15	2.64	0.89	YES	MONTH
L0000138	0	0.80490E-08	391601.5	3783422.9	314.4	4.15	2.64	0.89	YES	MONTH
L0000139	0	0.80490E-08	391604.4	3783427.8	314.1	4.15	2.64	0.89	YES	MONTH
L0000140	0	0.80490E-08	391607.4	3783432.6	313.9	4.15	2.64	0.89	YES	MONTH
L0000141	0	0.80490E-08	391610.3	3783437.5	313.6	4.15	2.64	0.89	YES	MONTH
L0000142	0	0.80490E-08	391613.3	3783442.3	313.3	4.15	2.64	0.89	YES	MONTH
L0000143	0	0.80490E-08	391616.3	3783447.1	313.1	4.15	2.64	0.89	YES	MONTH
L0000144	0	0.80490E-08	391619.2	3783452.0	312.8	4.15	2.64	0.89	YES	MONTH
L0000145	0	0.80490E-08	391622.2	3783456.8	312.6	4.15	2.64	0.89	YES	MONTH
L0000146	0	0.80490E-08	391625.1	3783461.7	312.3	4.15	2.64	0.89	YES	MONTH
L0000147	0	0.80490E-08	391628.1	3783466.5	312.0	4.15	2.64	0.89	YES	MONTH
L0000148	0	0.80490E-08	391631.0	3783471.3	312.1	4.15	2.64	0.89	YES	MONTH
L0000149	0	0.80490E-08	391634.0	3783476.2	312.1	4.15	2.64	0.89	YES	MONTH
L0000150	0	0.80490E-08	391636.9	3783481.0	312.1	4.15	2.64	0.89	YES	MONTH
L0000151	0	0.80490E-08	391639.9	3783485.8	312.1	4.15	2.64	0.89	YES	MONTH
L0000152	0	0.80490E-08	391642.8	3783490.7	312.1	4.15	2.64	0.89	YES	MONTH
L0000153	0	0.80490E-08	391645.8	3783495.5	312.0	4.15	2.64	0.89	YES	MONTH
L0000154	0	0.80490E-08	391648.7	3783500.4	312.0	4.15	2.64	0.89	YES	MONTH
L0000155	0	0.80490E-08	391651.7	3783505.2	312.0	4.15	2.64	0.89	YES	MONTH
L0000156	0	0.80490E-08	391654.7	3783510.0	312.0	4.15	2.64	0.89	YES	MONTH
L0000157	0	0.80490E-08	391657.6	3783514.9	312.0	4.15	2.64	0.89	YES	MONTH
L0000158	0	0.80490E-08	391660.6	3783519.7	312.1	4.15	2.64	0.89	YES	MONTH
L0000159	0	0.80490E-08	391663.5	3783524.6	312.2	4.15	2.64	0.89	YES	MONTH
L0000160	0	0.80490E-08	391666.5	3783529.4	312.2	4.15	2.64	0.89	YES	MONTH

**MODELOPTs: RegDFAULT CONC ELEV

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0000161	0	0.80490E-08	391669.4	3783534.2	312.3	4.15	2.64	0.89	YES	MONTH
L0000162	0	0.80490E-08	391672.4	3783539.1	312.3	4.15	2.64	0.89	YES	MONTH
L0000163	0	0.80490E-08	391675.3	3783543.9	312.2	4.15	2.64	0.89	YES	MONTH
L0000164	0	0.80490E-08	391678.3	3783548.8	312.2	4.15	2.64	0.89	YES	MONTH
L0000165	0	0.80490E-08	391681.2	3783553.6	312.1	4.15	2.64	0.89	YES	MONTH
L0000166	0	0.80490E-08	391684.2	3783558.4	312.0	4.15	2.64	0.89	YES	MONTH
L0000167	0	0.80490E-08	391687.1	3783563.3	312.0	4.15	2.64	0.89	YES	MONTH
L0000168	0	0.80490E-08	391690.1	3783568.1	312.0	4.15	2.64	0.89	YES	MONTH
L0000169	0	0.80490E-08	391693.1	3783572.9	312.0	4.15	2.64	0.89	YES	MONTH
L0000170	0	0.80490E-08	391696.0	3783577.8	312.0	4.15	2.64	0.89	YES	MONTH
L0000171	0	0.80490E-08	391699.0	3783582.6	312.0	4.15	2.64	0.89	YES	MONTH
L0000172	0	0.80490E-08	391701.9	3783587.5	312.0	4.15	2.64	0.89	YES	MONTH
L0000173	0	0.80490E-08	391704.9	3783592.3	312.0	4.15	2.64	0.89	YES	MONTH
L0000174	0	0.80490E-08	391707.8	3783597.1	312.0	4.15	2.64	0.89	YES	MONTH
L0000175	0	0.80490E-08	391710.8	3783602.0	312.0	4.15	2.64	0.89	YES	MONTH
L0000176	0	0.80490E-08	391713.7	3783606.8	312.0	4.15	2.64	0.89	YES	MONTH
L0000177	0	0.80490E-08	391716.7	3783611.7	312.0	4.15	2.64	0.89	YES	MONTH
L0000178	0	0.80490E-08	391719.6	3783616.5	312.0	4.15	2.64	0.89	YES	MONTH
L0000179	0	0.80490E-08	391722.6	3783621.3	312.0	4.15	2.64	0.89	YES	MONTH
L0000180	0	0.80490E-08	391725.6	3783626.2	312.0	4.15	2.64	0.89	YES	MONTH
L0000181	0	0.80490E-08	391728.5	3783631.0	312.0	4.15	2.64	0.89	YES	MONTH
L0000182	0	0.80490E-08	391731.5	3783635.9	312.0	4.15	2.64	0.89	YES	MONTH

**MODELOPTs: RegDFAULT CONC ELEV

*** AREAPOLY SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC /METER**2)	LOCATION OF AREA X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	NUMBER OF VERTS.	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
PAREA1	0	0.91430E-08	391678.3	3783352.6	317.7	0.61	50	3.96	YES	MONTH

**MODELOPTs: RegDFAULT CONC ELEV

*** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID	SOURCE IDs
ALL	L0000001 , L0000002 , L0000003 , L0000004 , L0000005 , L0000006 , L0000007 , L0000008 ,
	L0000009 , L0000010 , L0000011 , L0000012 , L0000013 , L0000014 , L0000015 , L0000016 ,
	L0000017 , L0000018 , L0000019 , L0000020 , L0000021 , L0000022 , L0000023 , L0000024 ,
	L0000025 , L0000026 , L0000027 , L0000028 , L0000029 , L0000030 , L0000031 , L0000032 ,
	L0000033 , L0000034 , L0000035 , L0000036 , L0000037 , L0000038 , L0000039 , L0000040 ,
	L0000041 , L0000042 , L0000043 , L0000044 , L0000045 , L0000046 , L0000047 , L0000048 ,
	L0000049 , L0000050 , L0000051 , L0000052 , L0000053 , L0000054 , L0000055 , L0000056 ,
	L0000057 , L0000058 , L0000059 , L0000060 , L0000061 , L0000062 , L0000063 , L0000064 ,
	L0000065 , L0000066 , L0000067 , L0000068 , L0000069 , L0000070 , L0000071 , L0000072 ,
	L0000073 , L0000074 , L0000075 , L0000076 , L0000077 , L0000078 , L0000079 , L0000080 ,
	L0000081 , L0000082 , L0000083 , L0000084 , L0000085 , L0000086 , L0000087 , L0000088 ,
	L0000089 , L0000090 , L0000091 , L0000092 , L0000093 , L0000094 , L0000095 , L0000096 ,
	L0000097 , L0000098 , L0000099 , L0000100 , L0000101 , L0000102 , L0000103 , L0000104 ,
	L0000105 , L0000106 , L0000107 , L0000108 , L0000109 , L0000110 , L0000111 , L0000112 ,
	L0000113 , L0000114 , L0000115 , L0000116 , L0000117 , L0000118 , L0000119 , L0000120 ,
	L0000121 , L0000122 , L0000123 , L0000124 , L0000125 , L0000126 , L0000127 , L0000128 ,
	L0000129 , L0000130 , L0000131 , L0000132 , L0000133 , L0000134 , L0000135 , L0000136 ,
	L0000137 , L0000138 , L0000139 , L0000140 , L0000141 , L0000142 , L0000143 , L0000144 ,
	L0000145 , L0000146 , L0000147 , L0000148 , L0000149 , L0000150 , L0000151 , L0000152 ,
	L0000153 , L0000154 , L0000155 , L0000156 , L0000157 , L0000158 , L0000159 , L0000160 ,

**MODELOPTs: RegDFAULT CONC   ELEV

*** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID	SOURCE IDs
	L0000161 , L0000162 , L0000163 , L0000164 , L0000165 , L0000166 , L0000167 , L0000168 ,
	L0000169 , L0000170 , L0000171 , L0000172 , L0000173 , L0000174 , L0000175 , L0000176 ,
	L0000177 , L0000178 , L0000179 , L0000180 , L0000181 , L0000182 , PAREA1 ,

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000001   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000002   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000003   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000004   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000005   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000006   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000007   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000008   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000009   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000010   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000011   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000012   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000013   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000014   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000015   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000016   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000017   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000018   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000019   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000020   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000021   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000022   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000023   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000024   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000025   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000026   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000027   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000028   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000029   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000030   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000031   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000032   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000033   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000034   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000035   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000036   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000037   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000038   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000039   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000040   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000041   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000042   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000043   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000044   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000045   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000046   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000047   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000048   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000049   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000050   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000051   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000052   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000053   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000054   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000055 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000056 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000057 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000058 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000059 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000060 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000061 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000062 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000063 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000064 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000065 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000066 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000067 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000068 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000069 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000070 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000071 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000072 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000073 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000074 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000075 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000076 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000077 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000078 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000079 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000080 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000081 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000082 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000083 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000084 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

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SOURCE ID = L0000085   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000086   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000087   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000088   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000089   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000090   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

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* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

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SOURCE ID = L0000091 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000092 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000093 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000094 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000095 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000096 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

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* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000097   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000098   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000099   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000100   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000101   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000102   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

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	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000103 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000104 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000105 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000106 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000107 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000108 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

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	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000109 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000110 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000111 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000112 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000113 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000114 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

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	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000115 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000116 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000117 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000118 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000119 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000120 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

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	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000121 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000122 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000123 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000124 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000125 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000126 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

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SOURCE ID = L0000127 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000128 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000129 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000130 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000131 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000132 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

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SOURCE ID = L0000133   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000134   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000135   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000136   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000137   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000138   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

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SOURCE ID = L0000139   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000140   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000141   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000142   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000143   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000144   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

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SOURCE ID = L0000145   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000146   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000147   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000148   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000149   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000150   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

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	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000151   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000152   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000153   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000154   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000155   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000156   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000157 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000158 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000159 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000160 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000161 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000162 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000163 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000164 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000165 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000166 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000167 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000168 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000169 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000170 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000171 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000172 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000173 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000174 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000175   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000176   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000177   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000178   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000179   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000180   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000181   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000182   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = PAREA1   ; SOURCE TYPE = AREAPOLY :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

*** DISCRETE CARTESIAN RECEPTORS ***
(X-COORD, Y-COORD, ZELEV, ZHILL, ZFLAG)
(METERS)

(391316.0,	3783682.0,	328.5,	1466.0,	0.0);	(391392.0,	3783989.0,	332.9,	1466.0,	0.0);
(391405.0,	3784381.0,	334.9,	1466.0,	0.0);	(391964.0,	3784620.0,	329.4,	1466.0,	0.0);
(392559.0,	3784546.0,	356.0,	1466.0,	0.0);	(392453.0,	3784419.0,	356.5,	1466.0,	0.0);
(392197.0,	3784046.0,	337.2,	1466.0,	0.0);	(392034.0,	3783741.0,	337.0,	1466.0,	0.0);
(391925.0,	3783416.0,	333.0,	1466.0,	0.0);	(391955.0,	3783299.0,	328.7,	1466.0,	0.0);
(392291.0,	3783005.0,	329.0,	1466.0,	0.0);	(391377.5,	3783505.5,	329.0,	1466.0,	0.0);
(391350.3,	3783600.7,	328.0,	1466.0,	0.0);	(391281.3,	3783478.0,	327.6,	1466.0,	0.0);
(391254.1,	3783573.2,	328.5,	1466.0,	0.0);	(391185.2,	3783450.6,	349.5,	1466.0,	0.0);
(391158.0,	3783545.7,	327.2,	1466.0,	0.0);	(391089.0,	3783423.1,	373.1,	1466.0,	0.0);
(391061.8,	3783518.2,	340.7,	1466.0,	0.0);	(390992.9,	3783395.6,	387.8,	1466.0,	0.0);
(390965.7,	3783490.7,	375.0,	1466.0,	0.0);	(391374.8,	3783708.7,	326.0,	1466.0,	0.0);
(391264.1,	3783681.2,	329.2,	1466.0,	0.0);	(391174.5,	3783725.8,	327.5,	1466.0,	0.0);
(391085.0,	3783770.3,	327.1,	1466.0,	0.0);	(391075.1,	3783662.3,	328.7,	1466.0,	0.0);
(390995.1,	3783810.8,	328.1,	1466.0,	0.0);	(390984.1,	3783690.8,	334.0,	1466.0,	0.0);
(391294.4,	3783785.7,	329.1,	1466.0,	0.0);	(391199.6,	3783817.8,	331.2,	1466.0,	0.0);
(391393.4,	3783810.2,	329.2,	1466.0,	0.0);	(391446.0,	3783889.6,	330.1,	1466.0,	0.0);
(391357.1,	3783937.0,	332.7,	1466.0,	0.0);	(391292.9,	3784012.9,	336.2,	1466.0,	0.0);
(391243.8,	3783923.0,	334.4,	1466.0,	0.0);	(391229.8,	3784090.6,	339.4,	1466.0,	0.0);
(391181.8,	3784002.8,	343.4,	1466.0,	0.0);	(391133.8,	3783915.0,	343.3,	1466.0,	0.0);
(391166.1,	3784167.3,	342.4,	1466.0,	0.0);	(391116.1,	3784075.8,	352.0,	1466.0,	0.0);
(391066.1,	3783984.3,	354.5,	1466.0,	0.0);	(391454.7,	3783989.7,	330.8,	1466.0,	0.0);
(391515.0,	3784068.4,	327.4,	1466.0,	0.0);	(391375.3,	3784050.5,	333.5,	1466.0,	0.0);
(391435.6,	3784129.2,	331.4,	1466.0,	0.0);	(391356.2,	3784190.0,	335.1,	1466.0,	0.0);
(391276.8,	3784250.8,	336.8,	1466.0,	0.0);	(391197.4,	3784311.6,	339.0,	1466.0,	0.0);
(391570.1,	3784156.6,	325.9,	1466.0,	0.0);	(391632.5,	3784227.2,	324.2,	1466.0,	0.0);
(391495.2,	3784222.9,	330.5,	1466.0,	0.0);	(391557.6,	3784293.4,	328.4,	1466.0,	0.0);
(391420.3,	3784289.2,	333.0,	1466.0,	0.0);	(391482.7,	3784359.7,	330.9,	1466.0,	0.0);
(391345.4,	3784355.4,	336.3,	1466.0,	0.0);	(391407.8,	3784425.9,	336.4,	1466.0,	0.0);
(391270.5,	3784421.7,	338.9,	1466.0,	0.0);	(391332.9,	3784492.2,	339.9,	1466.0,	0.0);
(391404.2,	3784559.5,	341.4,	1466.0,	0.0);	(391700.6,	3784307.7,	323.6,	1466.0,	0.0);
(391620.8,	3784368.0,	327.3,	1466.0,	0.0);	(391761.9,	3784382.7,	323.8,	1466.0,	0.0);
(391684.6,	3784446.1,	326.7,	1466.0,	0.0);	(391548.2,	3784437.5,	331.3,	1466.0,	0.0);
(391607.2,	3784509.5,	332.7,	1466.0,	0.0);	(391529.9,	3784572.8,	342.9,	1466.0,	0.0);
(391452.5,	3784636.2,	345.0,	1466.0,	0.0);	(391822.9,	3784449.4,	324.3,	1466.0,	0.0);
(391746.7,	3784514.2,	327.0,	1466.0,	0.0);	(391670.6,	3784579.1,	339.0,	1466.0,	0.0);
(391594.4,	3784643.9,	344.0,	1466.0,	0.0);	(391518.3,	3784708.7,	347.4,	1466.0,	0.0);
(391859.6,	3784553.6,	327.2,	1466.0,	0.0);	(391923.9,	3784651.3,	330.6,	1466.0,	0.0);
(391790.3,	3784635.2,	331.5,	1466.0,	0.0);	(391708.5,	3784692.7,	341.3,	1466.0,	0.0);
(391760.3,	3784766.4,	341.5,	1466.0,	0.0);	(391626.7,	3784750.3,	345.9,	1466.0,	0.0);
(391678.6,	3784823.9,	346.1,	1466.0,	0.0);	(391544.9,	3784807.8,	351.3,	1466.0,	0.0);
(391596.8,	3784881.5,	353.2,	1466.0,	0.0);	(392025.1,	3784712.4,	331.1,	1466.0,	0.0);
(391882.5,	3784742.3,	335.8,	1466.0,	0.0);	(391983.7,	3784803.4,	337.1,	1466.0,	0.0);
(391841.2,	3784833.4,	339.5,	1466.0,	0.0);	(391942.4,	3784894.5,	342.8,	1466.0,	0.0);
(391799.8,	3784924.4,	346.4,	1466.0,	0.0);	(391901.0,	3784985.5,	351.9,	1466.0,	0.0);
(391748.4,	3785007.1,	355.8,	1466.0,	0.0);	(391859.7,	3785076.6,	363.7,	1466.0,	0.0);

**MODELOPTs: RegDFAULT CONC ELEV

*** DISCRETE CARTESIAN RECEPTORS ***
(X-COORD, Y-COORD, ZELEV, ZHILL, ZFLAG)
(METERS)

(	392080.4,	3784792.8,	334.3,	1466.0,	0.0);	(	392216.1,	3784847.9,	331.5,	1466.0,	0.0);
(	392054.3,	3784889.4,	342.2,	1466.0,	0.0);	(	392190.0,	3784944.4,	337.6,	1466.0,	0.0);
(	392028.3,	3784985.9,	350.3,	1466.0,	0.0);	(	392163.9,	3785041.0,	346.0,	1466.0,	0.0);
(	391985.4,	3785071.8,	360.1,	1466.0,	0.0);	(	392137.8,	3785137.5,	361.2,	1466.0,	0.0);
(	391963.5,	3785171.0,	371.9,	1466.0,	0.0);	(	392111.7,	3785234.0,	372.5,	1466.0,	0.0);
(	392349.1,	3784940.3,	334.2,	1466.0,	0.0);	(	392443.2,	3784930.3,	335.0,	1466.0,	0.0);
(	392360.3,	3785036.4,	339.5,	1466.0,	0.0);	(	392465.5,	3785027.8,	337.0,	1466.0,	0.0);
(	392377.0,	3785133.3,	346.3,	1466.0,	0.0);	(	392276.9,	3785121.4,	352.6,	1466.0,	0.0);
(	392487.9,	3785125.3,	338.4,	1466.0,	0.0);	(	392396.0,	3785230.3,	354.7,	1466.0,	0.0);
(	392289.2,	3785217.7,	362.7,	1466.0,	0.0);	(	392510.2,	3785222.8,	339.9,	1466.0,	0.0);
(	392416.2,	3785327.5,	396.3,	1466.0,	0.0);	(	392304.8,	3785314.4,	398.2,	1466.0,	0.0);
(	392193.5,	3785301.2,	385.3,	1466.0,	0.0);	(	392532.5,	3785320.2,	343.5,	1466.0,	0.0);
(	392580.2,	3784802.1,	346.5,	1466.0,	0.0);	(	392564.1,	3784708.0,	348.7,	1466.0,	0.0);
(	392663.4,	3784857.6,	368.5,	1466.0,	0.0);	(	392587.1,	3784971.9,	337.9,	1466.0,	0.0);
(	392662.7,	3784691.2,	366.9,	1466.0,	0.0);	(	392762.0,	3784840.7,	370.8,	1466.0,	0.0);
(	392670.3,	3785027.4,	352.3,	1466.0,	0.0);	(	392761.2,	3784674.3,	369.7,	1466.0,	0.0);
(	392860.5,	3784823.9,	375.1,	1466.0,	0.0);	(	392829.8,	3784968.5,	372.1,	1466.0,	0.0);
(	392753.5,	3785082.9,	369.1,	1466.0,	0.0);	(	392631.8,	3785166.8,	343.7,	1466.0,	0.0);
(	392859.8,	3784657.5,	372.0,	1466.0,	0.0);	(	392955.2,	3784825.1,	378.5,	1466.0,	0.0);
(	392936.0,	3784915.5,	378.1,	1466.0,	0.0);	(	392916.8,	3785005.9,	376.6,	1466.0,	0.0);
(	392821.5,	3785148.8,	379.8,	1466.0,	0.0);	(	392745.4,	3785201.3,	376.7,	1466.0,	0.0);
(	392669.4,	3785253.8,	376.5,	1466.0,	0.0);	(	392974.5,	3784734.7,	376.9,	1466.0,	0.0);
(	392958.4,	3784640.6,	374.4,	1466.0,	0.0);	(	392546.5,	3784564.6,	353.5,	1466.0,	0.0);
(	392645.7,	3784552.3,	363.8,	1466.0,	0.0);	(	392745.0,	3784540.1,	367.0,	1466.0,	0.0);
(	392844.2,	3784527.8,	369.2,	1466.0,	0.0);	(	392943.5,	3784515.5,	371.0,	1466.0,	0.0);
(	392528.3,	3784467.5,	358.0,	1466.0,	0.0);	(	392609.5,	3784409.2,	360.7,	1466.0,	0.0);
(	392692.6,	3784355.4,	362.3,	1466.0,	0.0);	(	392773.2,	3784295.8,	362.8,	1466.0,	0.0);
(	392814.5,	3784401.1,	365.7,	1466.0,	0.0);	(	392855.4,	3784239.9,	362.8,	1466.0,	0.0);
(	392889.2,	3784326.3,	366.0,	1466.0,	0.0);	(	392923.1,	3784412.7,	368.6,	1466.0,	0.0);
(	392473.0,	3784373.6,	357.1,	1466.0,	0.0);	(	392558.0,	3784320.9,	358.5,	1466.0,	0.0);
(	392643.0,	3784268.2,	359.5,	1466.0,	0.0);	(	392728.0,	3784215.5,	359.6,	1466.0,	0.0);
(	392442.1,	3784280.4,	356.0,	1466.0,	0.0);	(	392518.6,	3784216.0,	356.6,	1466.0,	0.0);
(	392595.1,	3784151.6,	355.9,	1466.0,	0.0);	(	392671.6,	3784087.2,	355.5,	1466.0,	0.0);
(	392775.9,	3784083.8,	356.8,	1466.0,	0.0);	(	392703.8,	3783970.2,	352.7,	1466.0,	0.0);
(	392385.8,	3784203.3,	354.6,	1466.0,	0.0);	(	392460.5,	3784130.0,	353.8,	1466.0,	0.0);
(	392326.5,	3784091.3,	348.3,	1466.0,	0.0);	(	392414.7,	3784044.2,	350.4,	1466.0,	0.0);
(	392502.9,	3783997.1,	350.7,	1466.0,	0.0);	(	392591.1,	3783950.1,	351.0,	1466.0,	0.0);
(	392243.0,	3783981.7,	344.5,	1466.0,	0.0);	(	392359.0,	3783967.9,	347.8,	1466.0,	0.0);
(	392437.9,	3783906.4,	347.7,	1466.0,	0.0);	(	392516.8,	3783845.0,	347.4,	1466.0,	0.0);
(	392656.1,	3783867.1,	349.5,	1466.0,	0.0);	(	392595.7,	3783783.6,	346.7,	1466.0,	0.0);
(	392196.2,	3783888.2,	342.9,	1466.0,	0.0);	(	392308.5,	3783886.5,	345.7,	1466.0,	0.0);
(	392372.7,	3783794.3,	344.9,	1466.0,	0.0);	(	392461.0,	3783747.3,	344.4,	1466.0,	0.0);
(	392549.3,	3783700.4,	343.9,	1466.0,	0.0);	(	392273.7,	3783793.2,	343.9,	1466.0,	0.0);
(	392343.3,	3783701.3,	342.7,	1466.0,	0.0);	(	392429.2,	3783650.1,	342.1,	1466.0,	0.0);
(	392515.1,	3783598.9,	341.2,	1466.0,	0.0);	(	392151.5,	3783779.6,	342.4,	1466.0,	0.0);

**MODELOPTs: RegDFAULT CONC ELEV

*** DISCRETE CARTESIAN RECEPTORS ***
(X-COORD, Y-COORD, ZELEV, ZHILL, ZFLAG)
(METERS)

(	392217.3,	3783704.4,	341.9,	1466.0,	0.0);	(	392283.2,	3783629.2,	340.4,	1466.0,	0.0);
(	392349.1,	3783554.0,	339.9,	1466.0,	0.0);	(	392448.4,	3783518.8,	339.7,	1466.0,	0.0);
(	392364.5,	3783434.5,	337.9,	1466.0,	0.0);	(	392073.5,	3783676.7,	339.8,	1466.0,	0.0);
(	392158.7,	3783624.4,	340.2,	1466.0,	0.0);	(	392078.5,	3783582.1,	338.0,	1466.0,	0.0);
(	392162.3,	3783529.3,	338.1,	1466.0,	0.0);	(	392245.8,	3783475.0,	338.0,	1466.0,	0.0);
(	392407.6,	3783342.8,	336.0,	1466.0,	0.0);	(	392106.3,	3783443.9,	336.2,	1466.0,	0.0);
(	392197.8,	3783395.4,	336.0,	1466.0,	0.0);	(	392284.4,	3783344.3,	335.9,	1466.0,	0.0);
(	392344.4,	3783259.3,	334.1,	1466.0,	0.0);	(	392013.5,	3783419.3,	335.4,	1466.0,	0.0);
(	392064.4,	3783313.2,	331.4,	1466.0,	0.0);	(	392148.7,	3783259.4,	330.5,	1466.0,	0.0);
(	392232.9,	3783205.6,	330.4,	1466.0,	0.0);	(	392317.2,	3783151.8,	330.5,	1466.0,	0.0);
(	391952.6,	3783322.4,	330.0,	1466.0,	0.0);	(	391858.8,	3783193.7,	297.8,	1466.0,	0.0);
(	391689.2,	3783206.1,	328.6,	1466.0,	0.0);	(	391926.3,	3783119.9,	295.0,	1466.0,	0.0);
(	392033.5,	3783217.9,	325.7,	1466.0,	0.0);	(	391766.7,	3783100.1,	324.0,	1466.0,	0.0);
(	391919.0,	3783020.2,	289.1,	1466.0,	0.0);	(	392101.0,	3783144.1,	328.9,	1466.0,	0.0);
(	391759.5,	3783000.4,	353.7,	1466.0,	0.0);	(	391911.7,	3782920.4,	288.0,	1466.0,	0.0);
(	392061.2,	3782972.3,	315.2,	1466.0,	0.0);	(	392168.5,	3783070.3,	329.0,	1466.0,	0.0);
(	391752.2,	3782900.7,	337.4,	1466.0,	0.0);	(	391904.5,	3782820.7,	288.8,	1466.0,	0.0);
(	392053.9,	3782872.5,	320.5,	1466.0,	0.0);	(	392235.9,	3782996.5,	328.5,	1466.0,	0.0);
(	391744.9,	3782800.9,	324.1,	1466.0,	0.0);	(	391654.6,	3783110.2,	360.9,	1466.0,	0.0);
(	391633.6,	3783012.5,	374.5,	1466.0,	0.0);	(	391612.6,	3782914.7,	386.5,	1466.0,	0.0);
(	391591.7,	3782816.9,	369.3,	1466.0,	0.0);	(	391577.9,	3783232.0,	359.4,	1466.0,	0.0);
(	391491.0,	3783274.8,	358.6,	1466.0,	0.0);	(	391533.8,	3783142.3,	382.2,	1466.0,	0.0);
(	391446.8,	3783185.1,	389.3,	1466.0,	0.0);	(	391489.6,	3783052.6,	399.8,	1466.0,	0.0);
(	391402.7,	3783095.3,	410.4,	1466.0,	0.0);	(	391491.8,	3782946.8,	397.7,	1466.0,	0.0);
(	391358.5,	3783005.6,	423.1,	1466.0,	0.0);	(	391459.3,	3782853.0,	410.8,	1466.0,	0.0);
(	391314.4,	3782915.9,	447.1,	1466.0,	0.0);	(	391416.7,	3783330.5,	337.5,	1466.0,	0.0);
(	391354.8,	3783251.9,	370.1,	1466.0,	0.0);	(	391293.0,	3783173.4,	382.8,	1466.0,	0.0);
(	391231.1,	3783094.8,	416.8,	1466.0,	0.0);	(	391225.8,	3782971.7,	444.7,	1466.0,	0.0);
(	391352.5,	3783399.5,	327.9,	1466.0,	0.0);	(	391278.2,	3783332.6,	368.8,	1466.0,	0.0);
(	391203.9,	3783265.7,	395.2,	1466.0,	0.0);	(	391129.6,	3783198.8,	415.7,	1466.0,	0.0);
(	391138.1,	3783045.3,	441.2,	1466.0,	0.0);	(	391055.3,	3783131.8,	426.2,	1466.0,	0.0);
(	391066.7,	3783292.5,	400.1,	1466.0,	0.0);	(	390996.3,	3783219.7,	417.8,	1466.0,	0.0);
(	391438.7,	3783626.7,	320.7,	1466.0,	0.0);	(	391391.6,	3783540.4,	328.9,	1466.0,	0.0);
(	391408.1,	3783505.3,	328.8,	1466.0,	0.0);	(	391426.8,	3783466.5,	329.0,	1466.0,	0.0);
(	391478.5,	3783409.1,	325.3,	1466.0,	0.0);	(	391535.1,	3783364.5,	316.6,	1466.0,	0.0);
(	391622.0,	3783321.8,	331.3,	1466.0,	0.0);	(	391696.5,	3783305.8,	317.0,	1466.0,	0.0);
(	391866.1,	3783293.4,	323.4,	1466.0,	0.0);	(	391867.5,	3783374.8,	325.7,	1466.0,	0.0);
(	391895.8,	3783420.9,	327.2,	1466.0,	0.0);	(	391929.2,	3783473.1,	330.9,	1466.0,	0.0);
(	391945.8,	3783532.4,	329.4,	1466.0,	0.0);	(	391959.8,	3783580.0,	326.0,	1466.0,	0.0);
(	391977.9,	3783599.5,	327.0,	1466.0,	0.0);	(	391991.3,	3783619.7,	326.6,	1466.0,	0.0);
(	391985.7,	3783654.2,	322.9,	1466.0,	0.0);	(	392000.3,	3783700.5,	326.1,	1466.0,	0.0);
(	391993.4,	3783718.5,	323.2,	1466.0,	0.0);	(	391988.3,	3783729.0,	321.1,	1466.0,	0.0);
(	392020.5,	3783781.6,	323.6,	1466.0,	0.0);	(	392035.0,	3783810.6,	322.4,	1466.0,	0.0);
(	392085.5,	3783854.8,	327.0,	1466.0,	0.0);	(	392097.4,	3783874.8,	327.5,	1466.0,	0.0);
(	392094.2,	3783902.7,	327.0,	1466.0,	0.0);	(	392107.9,	3783935.2,	327.9,	1466.0,	0.0);

**MODELOPTs: RegDFAULT CONC ELEV

*** DISCRETE CARTESIAN RECEPTORS ***
(X-COORD, Y-COORD, ZELEV, ZHILL, ZFLAG)
(METERS)

(	392131.9,	3783980.4,	328.4,	1466.0,	0.0);	(	392147.5,	3784021.5,	328.6,	1466.0,	0.0);
(	392164.1,	3784043.1,	327.6,	1466.0,	0.0);	(	392238.2,	3784138.4,	328.7,	1466.0,	0.0);
(	392283.1,	3784222.5,	327.6,	1466.0,	0.0);	(	392298.8,	3784252.6,	328.9,	1466.0,	0.0);
(	392321.3,	3784292.2,	329.2,	1466.0,	0.0);	(	392365.6,	3784344.8,	346.1,	1466.0,	0.0);
(	392373.0,	3784391.6,	342.8,	1466.0,	0.0);	(	392388.0,	3784426.3,	343.0,	1466.0,	0.0);
(	392419.1,	3784476.3,	341.0,	1466.0,	0.0);	(	392438.1,	3784502.8,	341.7,	1466.0,	0.0);
(	392465.5,	3784724.8,	336.7,	1466.0,	0.0);	(	392481.6,	3784818.9,	336.4,	1466.0,	0.0);
(	392360.1,	3784846.8,	330.4,	1466.0,	0.0);	(	392327.5,	3784774.4,	329.3,	1466.0,	0.0);
(	392156.8,	3784728.3,	328.1,	1466.0,	0.0);	(	392066.5,	3784621.3,	327.7,	1466.0,	0.0);
(	392005.7,	3784593.7,	327.8,	1466.0,	0.0);	(	391953.8,	3784520.0,	325.1,	1466.0,	0.0);
(	391928.9,	3784450.1,	322.8,	1466.0,	0.0);	(	391899.0,	3784384.6,	320.6,	1466.0,	0.0);
(	391867.1,	3784347.2,	319.4,	1466.0,	0.0);	(	391839.3,	3784319.4,	319.4,	1466.0,	0.0);
(	391780.3,	3784247.4,	320.0,	1466.0,	0.0);	(	391728.5,	3784178.9,	318.9,	1466.0,	0.0);
(	391707.4,	3784160.9,	319.1,	1466.0,	0.0);	(	391645.0,	3784090.4,	317.4,	1466.0,	0.0);
(	391594.4,	3784007.6,	317.5,	1466.0,	0.0);	(	391534.1,	3783928.9,	321.2,	1466.0,	0.0);
(	391509.3,	3783812.2,	318.0,	1466.0,	0.0);	(	391492.7,	3783798.7,	319.5,	1466.0,	0.0);
(	391483.8,	3783721.5,	318.7,	1466.0,	0.0);	(	391464.4,	3783664.2,	318.3,	1466.0,	0.0);
(	391446.4,	3783628.1,	319.9,	1466.0,	0.0);	(	391473.6,	3783533.0,	325.3,	1466.0,	0.0);
(	391451.9,	3783524.9,	327.0,	1466.0,	0.0);						

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE-RECEPTOR COMBINATIONS FOR WHICH CALCULATIONS MAY NOT BE PERFORMED *
LESS THAN 1.0 METER; WITHIN OPENPIT; OR BEYOND 80KM FOR FASTAREA/FASTALL

SOURCE ID	- - RECEPTOR LOCATION - - XR (METERS)	YR (METERS)	DISTANCE (METERS)
L0000090	391426.8	3783466.5	-0.75
L0000091	391426.8	3783466.5	-0.88
L0000104	391478.5	3783409.1	0.37
L0000117	391535.1	3783364.5	-0.77
L0000118	391535.1	3783364.5	0.87

**MODELOPTs: RegDFAULT CONC ELEV

*** METEOROLOGICAL DAYS SELECTED FOR PROCESSING ***
(1=YES; 0=NO)

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1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
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NOTE: METEOROLOGICAL DATA ACTUALLY PROCESSED WILL ALSO DEPEND ON WHAT IS INCLUDED IN THE DATA FILE.

*** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***
(METERS/SEC)

1.54, 3.09, 5.14, 8.23, 10.80,

**MODELOPTs: RegDFAULT CONC ELEV

*** UP TO THE FIRST 24 HOURS OF METEOROLOGICAL DATA ***

Surface file: ..\burk6.sfc Met Version: 12345
Profile file: ..\burk6.PFL
Surface format: FREE
Profile format: FREE
Surface station no.: 0 Upper air station no.: 3190
Name: BURBANK Name: UNKNOWN
Year: 2005 Year: 2005

First 24 hours of scalar data

YR	MO	DY	JDY	HR	H0	U*	W*	DT/DZ	ZICNV	ZIMCH	M-O LEN	Z0	BOWEN	ALBEDO	REF WS	WD	HT	REF TA	HT
05	01	01	1	01	-3.2	0.063	-9.000	-9.000	-999.	37.	7.1	0.53	1.00	1.00	0.90	285.	9.1	279.9	5.5
05	01	01	1	02	-2.6	0.063	-9.000	-9.000	-999.	37.	8.7	0.53	1.00	1.00	0.90	277.	9.1	279.9	5.5
05	01	01	1	03	-2.6	0.063	-9.000	-9.000	-999.	37.	8.7	0.53	1.00	1.00	0.90	335.	9.1	279.2	5.5
05	01	01	1	04	-2.6	0.063	-9.000	-9.000	-999.	37.	8.6	0.53	1.00	1.00	0.90	291.	9.1	278.8	5.5
05	01	01	1	05	-3.0	0.063	-9.000	-9.000	-999.	37.	7.4	0.53	1.00	1.00	0.90	334.	9.1	278.1	5.5
05	01	01	1	06	-0.5	0.028	-9.000	-9.000	-999.	11.	3.8	0.53	1.00	1.00	0.40	309.	9.1	278.8	5.5
05	01	01	1	07	-2.6	0.063	-9.000	-9.000	-999.	37.	8.6	0.53	1.00	1.00	0.90	313.	9.1	278.8	5.5
05	01	01	1	08	-0.4	0.028	-9.000	-9.000	-999.	11.	4.5	0.53	1.00	0.56	0.40	256.	9.1	279.2	5.5
05	01	01	1	09	0.1	0.128	0.022	0.005	4.	105.	-1838.7	0.53	1.00	0.33	0.90	298.	9.1	282.5	5.5
05	01	01	1	10	0.1	0.128	0.025	0.005	5.	105.	-1838.7	0.53	1.00	0.25	0.90	103.	9.1	286.4	5.5
05	01	01	1	11	0.1	0.310	0.027	0.005	7.	397.	-8888.0	0.53	1.00	0.22	2.20	136.	9.1	287.0	5.5
05	01	01	1	12	0.1	0.310	0.028	0.005	8.	397.	-8888.0	0.53	1.00	0.21	2.20	152.	9.1	287.0	5.5
05	01	01	1	13	0.1	0.254	0.029	0.005	9.	295.	-8888.0	0.53	1.00	0.21	1.80	187.	9.1	285.9	5.5
05	01	01	1	14	0.1	0.184	0.030	0.005	9.	182.	-5471.6	0.53	1.00	0.22	1.30	157.	9.1	287.0	5.5
05	01	01	1	15	0.1	0.184	0.031	0.005	10.	181.	-5471.6	0.53	1.00	0.26	1.30	192.	9.1	286.4	5.5
05	01	01	1	16	0.1	0.254	0.031	0.005	11.	294.	-8888.0	0.53	1.00	0.34	1.80	188.	9.1	285.9	5.5
05	01	01	1	17	-4.9	0.092	-9.000	-9.000	-999.	88.	13.8	0.53	1.00	0.61	1.30	200.	9.1	285.4	5.5
05	01	01	1	18	-2.6	0.063	-9.000	-9.000	-999.	37.	8.7	0.53	1.00	1.00	0.90	162.	9.1	284.9	5.5
05	01	01	1	19	-3.0	0.063	-9.000	-9.000	-999.	37.	7.5	0.53	1.00	1.00	0.90	176.	9.1	284.9	5.5
05	01	01	1	20	-0.4	0.028	-9.000	-9.000	-999.	11.	4.5	0.53	1.00	1.00	0.40	210.	9.1	284.2	5.5
05	01	01	1	21	-0.4	0.028	-9.000	-9.000	-999.	11.	4.5	0.53	1.00	1.00	0.40	236.	9.1	284.2	5.5
05	01	01	1	22	-0.4	0.028	-9.000	-9.000	-999.	11.	4.5	0.53	1.00	1.00	0.40	272.	9.1	283.8	5.5
05	01	01	1	23	-0.4	0.028	-9.000	-9.000	-999.	11.	4.5	0.53	1.00	1.00	0.40	251.	9.1	283.1	5.5
05	01	01	1	24	-0.4	0.028	-9.000	-9.000	-999.	11.	4.5	0.53	1.00	1.00	0.40	301.	9.1	282.5	5.5

First hour of profile data

YR	MO	DY	HR	HEIGHT	F	WDIR	WSPD	AMB_TMP	sigmaA	sigmaW	sigmaV
05	01	01	01	5.5	0	-999.	-99.00	279.9	99.0	-99.00	-99.00
05	01	01	01	9.1	1	285.	0.90	-999.0	99.0	-99.00	-99.00

F indicates top of profile (=1) or below (=0)

**MODELOPTs: RegDFAULT CONC ELEV

*** THE ANNUAL AVERAGE CONCENTRATION VALUES AVERAGED OVER 5 YEARS FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): L0000001 , L0000002 , L0000003 , L0000004 , L0000005
,
L0000006 , L0000007 , L0000008 , L0000009 , L0000010 , L0000011 , L0000012 , L0000013
,
L0000014 , L0000015 , L0000016 , L0000017 , L0000018 , L0000019 , L0000020 , L0000021
,
L0000022 , L0000023 , L0000024 , L0000025 , L0000026 , L0000027 , L0000028 , . . .
,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF PM_10 IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC
391316.00	3783682.00	0.00144	391392.00	3783989.00	0.00192
391405.00	3784381.00	0.00117	391964.00	3784620.00	0.00244
392559.00	3784546.00	0.00015	392453.00	3784419.00	0.00016
392197.00	3784046.00	0.00027	392034.00	3783741.00	0.00034
391925.00	3783416.00	0.00012	391955.00	3783299.00	0.00003
392291.00	3783005.00	0.00001	391377.48	3783505.54	0.00062
391350.29	3783600.66	0.00123	391281.33	3783478.05	0.00025
391254.14	3783573.17	0.00056	391185.18	3783450.57	0.00007
391157.99	3783545.69	0.00030	391089.03	3783423.08	0.00003
391061.84	3783518.20	0.00013	390992.89	3783395.60	0.00002
390965.70	3783490.72	0.00005	391374.85	3783708.74	0.00215
391264.07	3783681.21	0.00109	391174.54	3783725.75	0.00089
391085.00	3783770.30	0.00075	391075.08	3783662.26	0.00046
390995.10	3783810.84	0.00063	390984.08	3783690.79	0.00036
391294.37	3783785.67	0.00159	391199.65	3783817.76	0.00117
391393.41	3783810.18	0.00224	391445.98	3783889.61	0.00252
391357.08	3783936.97	0.00182	391292.93	3784012.86	0.00144
391243.83	3783923.04	0.00137	391229.81	3784090.65	0.00119
391181.81	3784002.83	0.00100	391133.81	3783915.00	0.00086
391166.08	3784167.31	0.00100	391116.08	3784075.83	0.00075
391066.07	3783984.34	0.00063	391454.69	3783989.72	0.00236
391514.97	3784068.44	0.00263	391375.30	3784050.51	0.00175
391435.58	3784129.23	0.00186	391356.18	3784190.03	0.00143
391276.79	3784250.83	0.00119	391197.39	3784311.63	0.00101
391570.14	3784156.65	0.00257	391632.52	3784227.17	0.00250
391495.24	3784222.90	0.00179	391557.62	3784293.42	0.00176
391420.34	3784289.16	0.00140	391482.72	3784359.68	0.00138
391345.43	3784355.41	0.00113	391407.81	3784425.93	0.00107
391270.53	3784421.67	0.00095	391332.91	3784492.19	0.00088
391404.23	3784559.46	0.00082	391700.57	3784307.69	0.00235
391620.82	3784368.03	0.00168	391761.94	3784382.73	0.00223
391684.58	3784446.10	0.00162	391548.24	3784437.47	0.00130
391607.22	3784509.47	0.00122	391529.87	3784572.84	0.00084
391452.51	3784636.21	0.00073	391822.86	3784449.41	0.00226
391746.72	3784514.23	0.00166	391670.58	3784579.06	0.00106
391594.44	3784643.89	0.00082	391518.30	3784708.72	0.00068
391859.63	3784553.64	0.00213	391923.90	3784651.28	0.00195
391790.26	3784635.16	0.00149	391708.49	3784692.71	0.00097
391760.35	3784766.39	0.00093	391626.71	3784750.27	0.00076
391678.57	3784823.95	0.00072	391544.94	3784807.83	0.00060

**MODELOPTs: RegDFAULT CONC ELEV

*** THE ANNUAL AVERAGE CONCENTRATION VALUES AVERAGED OVER 5 YEARS FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): L0000001 , L0000002 , L0000003 , L0000004 , L0000005
,
L0000006 , L0000007 , L0000008 , L0000009 , L0000010 , L0000011 , L0000012 , L0000013
,
L0000014 , L0000015 , L0000016 , L0000017 , L0000018 , L0000019 , L0000020 , L0000021
,
L0000022 , L0000023 , L0000024 , L0000025 , L0000026 , L0000027 , L0000028 , . . .
,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF PM_10 IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC
391596.80	3784881.51	0.00055	392025.09	3784712.38	0.00197
391882.54	3784742.32	0.00128	391983.73	3784803.42	0.00117
391841.18	3784833.37	0.00092	391942.37	3784894.47	0.00073
391799.82	3784924.42	0.00062	391901.01	3784985.52	0.00045
391748.36	3785007.09	0.00043	391859.66	3785076.56	0.00030
392080.44	3784792.85	0.00143	392216.07	3784847.91	0.00107
392054.35	3784889.38	0.00072	392189.98	3784944.45	0.00052
392028.26	3784985.92	0.00041	392163.89	3785040.98	0.00028
391985.40	3785071.79	0.00027	392137.80	3785137.52	0.00017
391963.50	3785170.99	0.00018	392111.70	3785234.05	0.00013
392349.09	3784940.29	0.00037	392443.21	3784930.33	0.00027
392360.29	3785036.45	0.00023	392465.55	3785027.80	0.00020
392377.05	3785133.26	0.00016	392276.86	3785121.41	0.00017
392487.88	3785125.28	0.00016	392396.05	3785230.34	0.00012
392289.17	3785217.70	0.00012	392510.22	3785222.75	0.00013
392416.16	3785327.55	0.00007	392304.83	3785314.38	0.00009
392193.50	3785301.21	0.00010	392532.55	3785320.23	0.00011
392580.18	3784802.09	0.00017	392564.10	3784708.00	0.00018
392663.38	3784857.58	0.00010	392587.14	3784971.90	0.00015
392662.67	3784691.16	0.00011	392761.95	3784840.73	0.00008
392670.34	3785027.38	0.00010	392761.24	3784674.31	0.00009
392860.52	3784823.88	0.00007	392829.77	3784968.54	0.00006
392753.54	3785082.86	0.00006	392631.81	3785166.84	0.00011
392859.81	3784657.47	0.00007	392955.25	3784825.12	0.00006
392936.03	3784915.53	0.00006	392916.81	3785005.94	0.00005
392821.52	3785148.84	0.00005	392745.44	3785201.33	0.00006
392669.36	3785253.82	0.00006	392974.46	3784734.71	0.00006
392958.38	3784640.62	0.00006	392546.50	3784564.58	0.00016
392645.74	3784552.32	0.00011	392744.99	3784540.07	0.00009
392844.23	3784527.81	0.00007	392943.48	3784515.55	0.00006
392528.34	3784467.52	0.00014	392609.54	3784409.17	0.00011
392692.56	3784355.42	0.00009	392773.25	3784295.75	0.00008
392814.48	3784401.12	0.00008	392855.42	3784239.86	0.00007
392889.24	3784326.30	0.00007	392923.07	3784412.73	0.00007
392473.02	3784373.58	0.00014	392558.00	3784320.88	0.00011
392642.99	3784268.18	0.00009	392727.98	3784215.48	0.00008
392442.08	3784280.40	0.00013	392518.57	3784215.99	0.00011
392595.07	3784151.59	0.00009	392671.56	3784087.18	0.00008
392775.91	3784083.80	0.00007	392703.78	3783970.18	0.00007
392385.79	3784203.27	0.00014	392460.47	3784130.05	0.00012

**MODELOPTs: RegDFAULT CONC ELEV

*** THE ANNUAL AVERAGE CONCENTRATION VALUES AVERAGED OVER 5 YEARS FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): L0000001 , L0000002 , L0000003 , L0000004 , L0000005
,
L0000006 , L0000007 , L0000008 , L0000009 , L0000010 , L0000011 , L0000012 , L0000013
,
L0000014 , L0000015 , L0000016 , L0000017 , L0000018 , L0000019 , L0000020 , L0000021
,
L0000022 , L0000023 , L0000024 , L0000025 , L0000026 , L0000027 , L0000028 , . . .
,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF PM_10 IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC
392326.46	3784091.29	0.00016	392414.69	3784044.22	0.00013
392502.91	3783997.14	0.00010	392591.14	3783950.07	0.00009
392242.98	3783981.66	0.00019	392358.97	3783967.87	0.00014
392437.88	3783906.45	0.00011	392516.79	3783845.02	0.00009
392656.08	3783867.11	0.00008	392595.70	3783783.60	0.00008
392196.16	3783888.22	0.00021	392308.50	3783886.49	0.00015
392372.74	3783794.31	0.00012	392461.03	3783747.35	0.00009
392549.32	3783700.40	0.00008	392273.71	3783793.24	0.00015
392343.26	3783701.26	0.00011	392429.17	3783650.07	0.00008
392515.07	3783598.88	0.00007	392151.45	3783779.61	0.00020
392217.34	3783704.40	0.00014	392283.24	3783629.18	0.00011
392349.14	3783553.96	0.00008	392448.38	3783518.79	0.00006
392364.51	3783434.48	0.00005	392073.51	3783676.74	0.00022
392158.73	3783624.43	0.00014	392078.45	3783582.15	0.00017
392162.27	3783529.32	0.00011	392245.75	3783474.96	0.00007
392407.64	3783342.75	0.00004	392106.35	3783443.90	0.00008
392197.79	3783395.42	0.00006	392284.38	3783344.26	0.00004
392344.36	3783259.34	0.00003	392013.47	3783419.30	0.00009
392064.38	3783313.23	0.00004	392148.66	3783259.40	0.00003
392232.93	3783205.58	0.00002	392317.21	3783151.75	0.00002
391952.62	3783322.39	0.00004	391858.81	3783193.70	0.00001
391689.22	3783206.07	0.00001	391926.27	3783119.89	0.00001
392033.53	3783217.93	0.00002	391766.74	3783100.15	0.00000
391919.00	3783020.16	0.00000	392101.00	3783144.12	0.00001
391759.46	3783000.42	0.00000	391911.72	3782920.42	0.00000
392061.21	3782972.27	0.00000	392168.47	3783070.31	0.00001
391752.19	3782900.68	0.00000	391904.45	3782820.69	0.00000
392053.93	3782872.53	0.00000	392235.93	3782996.50	0.00001
391744.91	3782800.95	0.00000	391654.56	3783110.25	0.00000
391633.60	3783012.48	0.00000	391612.64	3782914.70	0.00000
391591.67	3782816.92	0.00000	391577.92	3783232.04	0.00001
391490.96	3783274.81	0.00001	391533.78	3783142.30	0.00000
391446.82	3783185.07	0.00000	391489.65	3783052.57	0.00000
391402.69	3783095.34	0.00000	391491.85	3782946.75	0.00000
391358.55	3783005.60	0.00000	391459.31	3782852.99	0.00000
391314.42	3782915.87	0.00000	391416.69	3783330.49	0.00003
391354.82	3783251.93	0.00001	391292.96	3783173.36	0.00000
391231.09	3783094.79	0.00000	391225.77	3782971.70	0.00000
391352.53	3783399.55	0.00011	391278.23	3783332.63	0.00002
391203.92	3783265.70	0.00001	391129.62	3783198.77	0.00001

**MODELOPTs: RegDFAULT CONC ELEV

*** THE ANNUAL AVERAGE CONCENTRATION VALUES AVERAGED OVER 5 YEARS FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): L0000001 , L0000002 , L0000003 , L0000004 , L0000005
,
L0000006 , L0000007 , L0000008 , L0000009 , L0000010 , L0000011 , L0000012 , L0000013
,
L0000014 , L0000015 , L0000016 , L0000017 , L0000018 , L0000019 , L0000020 , L0000021
,
L0000022 , L0000023 , L0000024 , L0000025 , L0000026 , L0000027 , L0000028 , . . .
,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF PM_10 IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC
391138.13	3783045.33	0.00000	391055.32	3783131.85	0.00000
391066.66	3783292.47	0.00001	390996.29	3783219.69	0.00001
391438.72	3783626.73	0.00353	391391.56	3783540.40	0.00103
391408.08	3783505.29	0.00081	391426.83	3783466.48	0.00054
391478.55	3783409.06	0.00023	391535.09	3783364.54	0.00013
391622.05	3783321.77	0.00002	391696.49	3783305.81	0.00002
391866.08	3783293.44	0.00003	391867.46	3783374.81	0.00009
391895.82	3783420.88	0.00019	391929.19	3783473.13	0.00025
391945.82	3783532.43	0.00035	391959.78	3783579.98	0.00045
391977.94	3783599.54	0.00041	391991.33	3783619.67	0.00041
391985.70	3783654.24	0.00056	392000.31	3783700.54	0.00053
391993.43	3783718.47	0.00064	391988.28	3783729.05	0.00073
392020.51	3783781.56	0.00057	392035.03	3783810.57	0.00057
392085.55	3783854.83	0.00045	392097.42	3783874.75	0.00045
392094.21	3783902.69	0.00050	392107.87	3783935.18	0.00046
392131.92	3783980.40	0.00040	392147.46	3784021.47	0.00038
392164.07	3784043.09	0.00036	392238.23	3784138.36	0.00029
392283.10	3784222.46	0.00028	392298.83	3784252.65	0.00028
392321.30	3784292.22	0.00028	392365.58	3784344.81	0.00020
392372.96	3784391.60	0.00023	392388.03	3784426.28	0.00024
392419.06	3784476.32	0.00026	392438.11	3784502.83	0.00026
392465.53	3784724.85	0.00034	392481.61	3784818.94	0.00029
392360.15	3784846.77	0.00117	392327.50	3784774.44	0.00208
392156.83	3784728.31	0.00331	392066.45	3784621.33	0.00368
392005.67	3784593.72	0.00348	391953.81	3784520.04	0.00389
391928.86	3784450.11	0.00438	391899.00	3784384.58	0.00437
391867.14	3784347.16	0.00433	391839.30	3784319.36	0.00430
391780.32	3784247.36	0.00449	391728.51	3784178.88	0.00492
391707.42	3784160.91	0.00480	391645.04	3784090.39	0.00515
391594.37	3784007.64	0.00537	391534.09	3783928.92	0.00501
391509.31	3783812.22	0.00538	391492.74	3783798.66	0.00499
391483.79	3783721.49	0.00509	391464.38	3783664.20	0.00491
391446.44	3783628.14	0.00412	391473.63	3783533.02	0.00278
391451.89	3783524.92	0.00172			

**MODELOPTs: RegDFAULT CONC ELEV

*** THE SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 5 YEARS ***

** CONC OF PM_10 IN MICROGRAMS/M**3 **

GROUP ID		AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	NETWORK GRID-ID
ALL	1ST HIGHEST VALUE IS	0.00538	AT (391509.31, 3783812.22, 318.00, 1466.00, 0.00)	DC	
	2ND HIGHEST VALUE IS	0.00537	AT (391594.37, 3784007.64, 317.50, 1466.00, 0.00)	DC	
	3RD HIGHEST VALUE IS	0.00515	AT (391645.04, 3784090.39, 317.37, 1466.00, 0.00)	DC	
	4TH HIGHEST VALUE IS	0.00509	AT (391483.79, 3783721.49, 318.68, 1466.00, 0.00)	DC	
	5TH HIGHEST VALUE IS	0.00501	AT (391534.09, 3783928.92, 321.16, 1466.00, 0.00)	DC	
	6TH HIGHEST VALUE IS	0.00499	AT (391492.74, 3783798.66, 319.53, 1466.00, 0.00)	DC	
	7TH HIGHEST VALUE IS	0.00492	AT (391728.51, 3784178.88, 318.92, 1466.00, 0.00)	DC	
	8TH HIGHEST VALUE IS	0.00491	AT (391464.38, 3783664.20, 318.28, 1466.00, 0.00)	DC	
	9TH HIGHEST VALUE IS	0.00480	AT (391707.42, 3784160.91, 319.06, 1466.00, 0.00)	DC	
	10TH HIGHEST VALUE IS	0.00449	AT (391780.32, 3784247.36, 319.98, 1466.00, 0.00)	DC	

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR

**MODELOPTs: RegDFAULT CONC   ELEV

*** Message Summary : AERMOD Model Execution ***

 --------- Summary of Total Messages --------

A Total of   0 Fatal Error Message(s)
A Total of   6 Warning Message(s)
A Total of   889 Informational Message(s)

A Total of   43824 Hours Were Processed

A Total of   0 Calm Hours Identified

A Total of   889 Missing Hours Identified (2.03 Percent)

   ******** FATAL ERROR MESSAGES ********
              *** NONE ***

   ********   WARNING MESSAGES   ********
MX W420   35935 METQA:Wind Speed Out-of-Range.   KURDAT =   09020607
MX W432   35935 METQA:Friction Velocity Out-of-Range.   KURDAT =   09020607
MX W420   43325 METQA:Wind Speed Out-of-Range.   KURDAT =   09121105
MX W432   43325 METQA:Friction Velocity Out-of-Range.   KURDAT =   09121105
MX W420   43326 METQA:Wind Speed Out-of-Range.   KURDAT =   09121106
MX W432   43326 METQA:Friction Velocity Out-of-Range.   KURDAT =   09121106

   ****
   *** AERMOD Finishes Successfully ***
   ****

APPENDIX B

AERMOD Model Printouts for Haul Routes 1B and 1F to Devil's Gate Reservoir

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**
**************************************
**
** AERMOD Input Produced by:
** AERMOD View Ver. 8.2.0
** Lakes Environmental Software Inc.
** Date: 8/24/2013
** File: C:\Vista Env\2011\11057-Devils Gate Reservoir\DG Const B\DG Const B.ADI
**
**************************************
**
**
**************************************
** AERMOD Control Pathway
**************************************
**
**
CO STARTING
   TITLEONE Devil's Gate Reservoir - Sediment Removal
   TITLETWO PM10 Diesel Emissions - Routes 1B and 1F
   MODELOPT DFAULT CONC
   AVERTIME ANNUAL
   URBANOPT 9862049 Los_Angeles_County
   POLLUTID PM_10
   RUNORNOT RUN
   ERRORFIL "DG Const B.err"
CO FINISHED
**
**************************************
** AERMOD Source Pathway
**************************************
**
**
SO STARTING
** Source Location **
** Source ID - Type - X Coord. - Y Coord. **
   LOCATION PAREA1       AREAPOLY   391678.348  3783352.608      317.690
** DESCRSRC On-Site Equipment
** ------------------------------------------------------------------
** Line Source Represented by Adjacent Volume Sources
** LINE VOLUME Source ID = RDRTE1B
** DESCRSRC Road Route 1B and 1F
** PREFIX
** Length of Side = 5.67
** Configuration = Adjacent
** Emission Rate = 4.34E-06
** Vertical Dimension = 1.92
** SZINIT = 0.89
** Nodes = 15
** 391733.43, 3783640.61, 312.00, 4.15, 2.64
** 391554.47, 3783344.61, 320.76, 4.15, 2.64
** 391612.23, 3783312.16, 333.22, 4.15, 2.64
** 391676.84, 3783300.26, 326.57, 4.15, 2.64
** 391741.71, 3783293.14, 306.12, 4.15, 2.64
** 391897.72, 3783280.48, 324.80, 4.15, 2.64
** 391959.92, 3783268.62, 324.64, 4.15, 2.64
** 392031.26, 3783248.62, 327.05, 4.15, 2.64
** 392092.82, 3783218.30, 327.69, 4.15, 2.64
** 392183.03, 3783159.47, 329.00, 4.15, 2.64
** 392257.79, 3783107.96, 329.00, 4.15, 2.64
** 392296.15, 3783085.52, 329.00, 4.15, 2.64
** 392317.73, 3783078.21, 329.00, 4.15, 2.64
** 392311.74, 3783032.97, 329.00, 4.15, 2.64
** 392278.02, 3782917.49, 328.00, 4.15, 2.64
** ------------------------------------------------------------------
   LOCATION L0000001     VOLUME   391731.963 3783638.180 312.00
   LOCATION L0000002     VOLUME   391729.030 3783633.329 312.00
   LOCATION L0000003     VOLUME   391726.097 3783628.477 312.00
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SRCPARAM L0000082     0.00000001839      4.15      2.64      0.89
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SRCPARAM L0000092     0.00000001839      4.15      2.64      0.89
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SRCPARAM L0000095     0.00000001839      4.15      2.64      0.89
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** ----------------------------------------------------------------------
   URBANSRC ALL

** Variable Emissions Type: "By Month (MONTH)"
** Variable Emission Scenario: "Scenario 2"
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   EMISFACT PAREA1       MONTH 1.0 1.0 1.0 1.0 1.0 1.0
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   EMISFACT L0000007     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
   EMISFACT L0000007     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
   EMISFACT L0000008     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
   EMISFACT L0000008     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
   EMISFACT L0000009     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
   EMISFACT L0000009     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
   EMISFACT L0000010     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
   EMISFACT L0000010     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
   EMISFACT L0000011     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
   EMISFACT L0000011     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
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EMISFACT L0000012     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
EMISFACT L0000012     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
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EMISFACT L0000013     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT L0000014     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
EMISFACT L0000014     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT L0000015     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
EMISFACT L0000015     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT L0000016     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
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EMISFACT L0000022     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
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EMISFACT L0000024     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
EMISFACT L0000024     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT L0000025     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
EMISFACT L0000025     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT L0000026     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
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EMISFACT L0000027     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT L0000028     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
EMISFACT L0000028     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT L0000029     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
EMISFACT L0000029     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
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EMISFACT L0000031     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
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EMISFACT L0000032     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
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EMISFACT L0000033     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
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EMISFACT L0000034     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
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EMISFACT L0000036     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT L0000037     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
EMISFACT L0000037     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
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EMISFACT L0000048     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT L0000049     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
EMISFACT L0000049     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
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EMISFACT L0000050     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT L0000051     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
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EMISFACT L0000187     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT L0000188     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
EMISFACT L0000188     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT L0000189     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
EMISFACT L0000189     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT L0000190     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
EMISFACT L0000190     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT L0000191     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
EMISFACT L0000191     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT L0000192     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
EMISFACT L0000192     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT L0000193     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
EMISFACT L0000193     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT L0000194     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
EMISFACT L0000194     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT L0000195     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
EMISFACT L0000195     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT L0000196     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
EMISFACT L0000196     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT L0000197     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
EMISFACT L0000197     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT L0000198     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
EMISFACT L0000198     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT L0000199     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
EMISFACT L0000199     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT L0000200     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
EMISFACT L0000200     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT L0000201     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
EMISFACT L0000201     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT L0000202     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
EMISFACT L0000202     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT L0000203     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
EMISFACT L0000203     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT L0000204     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
EMISFACT L0000204     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT L0000205     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
EMISFACT L0000205     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT L0000206     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
EMISFACT L0000206     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT L0000207     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
EMISFACT L0000207     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT L0000208     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
EMISFACT L0000208     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT L0000209     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
EMISFACT L0000209     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT L0000210     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
EMISFACT L0000210     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT L0000211     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
EMISFACT L0000211     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT L0000212     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
EMISFACT L0000212     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT L0000213     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
EMISFACT L0000213     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT L0000214     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
EMISFACT L0000214     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT L0000215     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
EMISFACT L0000215     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT L0000216     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
EMISFACT L0000216     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT L0000217     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
EMISFACT L0000217     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT L0000218     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
EMISFACT L0000218     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT L0000219     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
EMISFACT L0000219     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT L0000220     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
EMISFACT L0000220     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT L0000221     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
EMISFACT L0000221     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT L0000222     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
EMISFACT L0000222     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT L0000223     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
EMISFACT L0000223     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT L0000224     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
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   EMISFACT L0000224     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
   EMISFACT L0000225     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
   EMISFACT L0000225     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
   EMISFACT L0000226     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
   EMISFACT L0000226     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
   EMISFACT L0000227     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
   EMISFACT L0000227     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
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   EMISFACT L0000229     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
   EMISFACT L0000229     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
   EMISFACT L0000230     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
   EMISFACT L0000230     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
   EMISFACT L0000231     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
   EMISFACT L0000231     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
   EMISFACT L0000232     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
   EMISFACT L0000232     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
   EMISFACT L0000233     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
   EMISFACT L0000233     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
   EMISFACT L0000234     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
   EMISFACT L0000234     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
   EMISFACT L0000235     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
   EMISFACT L0000235     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
   EMISFACT L0000236     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
   EMISFACT L0000236     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
   SRCGROUP ALL
SO FINISHED
**
**************************************
** AERMOD Receptor Pathway
**************************************
**
**
RE STARTING
   INCLUDED "DG Const B.rou"
RE FINISHED
**
**************************************
** AERMOD Meteorology Pathway
**************************************
**
**
ME STARTING
   SURFFILE ..\burk6.sfc
   PROFFILE ..\burk6.PFL
   SURFDATA 0 2005 Burbank 378.62 3782.24
   UAIRDATA 3190 2005
   SITEDATA 99999 2005
   PROFBASE 175.0 METERS
ME FINISHED
**
**************************************
** AERMOD Output Pathway
**************************************
**
**
OU STARTING
** Auto-Generated Plotfiles
   PLOTFILE ANNUAL ALL "DG CONST B.AD\AN00GALL.PLT" 31
   SUMMFILE "DG Const B.sum"
OU FINISHED

 *********************************
 *** SETUP Finishes Successfully ***
 *********************************
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**MODELOPTs: RegDFAULT CONC   ELEV

                                        ***   MODEL SETUP OPTIONS SUMMARY   ***
- -

**Model Is Setup For Calculation of Average CONCentration Values.

  -- DEPOSITION LOGIC --
**NO GAS DEPOSITION Data Provided.
**NO PARTICLE DEPOSITION Data Provided.
**Model Uses NO DRY DEPLETION. DRYDPLT = F
**Model Uses NO WET DEPLETION. WETDPLT = F

**Model Uses URBAN Dispersion Algorithm for the SBL for   237 Source(s),
  for Total of   1 Urban Area(s):
  Urban Population =   9862049.0 ; Urban Roughness Length = 1.000 m

**Model Uses Regulatory DEFAULT Options:
       1. Stack-tip Downwash.
       2. Model Accounts for ELEVated Terrain Effects.
       3. Use Calms Processing Routine.
       4. Use Missing Data Processing Routine.
       5. No Exponential Decay for URBAN/Non-SO2.
       6. Urban Roughness Length of 1.0 Meter Assumed.

**Model Assumes No FLAGPOLE Receptor Heights.

**Model Calculates ANNUAL Averages Only

**This Run Includes: 237 Source(s);   1 Source Group(s); and   307 Receptor(s)

**The Model Assumes A Pollutant Type of: PM_10

**Model Set To Continue RUNning After the Setup Testing.

**Output Options Selected:
        Model Outputs Tables of ANNUAL Averages by Receptor
        Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)
        Model Outputs Separate Summary File of High Ranked Values (SUMMFILE Keyword)

**NOTE: The Following Flags May Appear Following CONC Values: c for Calm Hours
                                                                m for Missing Hours
                                                                b for Both Calm and Missing Hours

**Misc. Inputs: Base Elev. for Pot. Temp. Profile (m MSL) =   175.00 ; Decay Coef. =   0.000   ; Rot. Angle =   0.0
                 Emission Units = GRAMS/SEC   ; Emission Rate Unit Factor =   0.10000E+07
                 Output Units   = MICROGRAMS/M**3

**Approximate Storage Requirements of Model =   3.9 MB of RAM.

**Detailed Error/Message File: DG Const B.err
**File for Summary of Results: DG Const B.sum

**MODELOPTs: RegDFAULT CONC ELEV

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0000001	0	0.18390E-07	391732.0	3783638.2	312.0	4.15	2.64	0.89	YES	MONTH
L0000002	0	0.18390E-07	391729.0	3783633.3	312.0	4.15	2.64	0.89	YES	MONTH
L0000003	0	0.18390E-07	391726.1	3783628.5	312.0	4.15	2.64	0.89	YES	MONTH
L0000004	0	0.18390E-07	391723.2	3783623.6	312.0	4.15	2.64	0.89	YES	MONTH
L0000005	0	0.18390E-07	391720.2	3783618.8	312.0	4.15	2.64	0.89	YES	MONTH
L0000006	0	0.18390E-07	391717.3	3783613.9	312.0	4.15	2.64	0.89	YES	MONTH
L0000007	0	0.18390E-07	391714.4	3783609.1	312.0	4.15	2.64	0.89	YES	MONTH
L0000008	0	0.18390E-07	391711.4	3783604.2	312.0	4.15	2.64	0.89	YES	MONTH
L0000009	0	0.18390E-07	391708.5	3783599.4	312.0	4.15	2.64	0.89	YES	MONTH
L0000010	0	0.18390E-07	391705.6	3783594.5	312.0	4.15	2.64	0.89	YES	MONTH
L0000011	0	0.18390E-07	391702.6	3783589.7	312.0	4.15	2.64	0.89	YES	MONTH
L0000012	0	0.18390E-07	391699.7	3783584.8	312.0	4.15	2.64	0.89	YES	MONTH
L0000013	0	0.18390E-07	391696.8	3783580.0	312.0	4.15	2.64	0.89	YES	MONTH
L0000014	0	0.18390E-07	391693.8	3783575.1	312.0	4.15	2.64	0.89	YES	MONTH
L0000015	0	0.18390E-07	391690.9	3783570.3	312.0	4.15	2.64	0.89	YES	MONTH
L0000016	0	0.18390E-07	391688.0	3783565.4	312.0	4.15	2.64	0.89	YES	MONTH
L0000017	0	0.18390E-07	391685.0	3783560.6	312.0	4.15	2.64	0.89	YES	MONTH
L0000018	0	0.18390E-07	391682.1	3783555.7	312.0	4.15	2.64	0.89	YES	MONTH
L0000019	0	0.18390E-07	391679.2	3783550.9	312.1	4.15	2.64	0.89	YES	MONTH
L0000020	0	0.18390E-07	391676.2	3783546.0	312.2	4.15	2.64	0.89	YES	MONTH
L0000021	0	0.18390E-07	391673.3	3783541.2	312.2	4.15	2.64	0.89	YES	MONTH
L0000022	0	0.18390E-07	391670.4	3783536.3	312.3	4.15	2.64	0.89	YES	MONTH
L0000023	0	0.18390E-07	391667.4	3783531.4	312.2	4.15	2.64	0.89	YES	MONTH
L0000024	0	0.18390E-07	391664.5	3783526.6	312.2	4.15	2.64	0.89	YES	MONTH
L0000025	0	0.18390E-07	391661.6	3783521.7	312.1	4.15	2.64	0.89	YES	MONTH
L0000026	0	0.18390E-07	391658.6	3783516.9	312.0	4.15	2.64	0.89	YES	MONTH
L0000027	0	0.18390E-07	391655.7	3783512.0	312.0	4.15	2.64	0.89	YES	MONTH
L0000028	0	0.18390E-07	391652.8	3783507.2	312.0	4.15	2.64	0.89	YES	MONTH
L0000029	0	0.18390E-07	391649.8	3783502.3	312.0	4.15	2.64	0.89	YES	MONTH
L0000030	0	0.18390E-07	391646.9	3783497.5	312.0	4.15	2.64	0.89	YES	MONTH
L0000031	0	0.18390E-07	391644.0	3783492.6	312.1	4.15	2.64	0.89	YES	MONTH
L0000032	0	0.18390E-07	391641.0	3783487.8	312.1	4.15	2.64	0.89	YES	MONTH
L0000033	0	0.18390E-07	391638.1	3783482.9	312.1	4.15	2.64	0.89	YES	MONTH
L0000034	0	0.18390E-07	391635.2	3783478.1	312.1	4.15	2.64	0.89	YES	MONTH
L0000035	0	0.18390E-07	391632.2	3783473.2	312.1	4.15	2.64	0.89	YES	MONTH
L0000036	0	0.18390E-07	391629.3	3783468.4	312.0	4.15	2.64	0.89	YES	MONTH
L0000037	0	0.18390E-07	391626.4	3783463.5	312.2	4.15	2.64	0.89	YES	MONTH
L0000038	0	0.18390E-07	391623.4	3783458.7	312.4	4.15	2.64	0.89	YES	MONTH
L0000039	0	0.18390E-07	391620.5	3783453.8	312.7	4.15	2.64	0.89	YES	MONTH
L0000040	0	0.18390E-07	391617.6	3783449.0	313.0	4.15	2.64	0.89	YES	MONTH

**MODELOPTs: RegDFAULT CONC ELEV

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0000041	0	0.18390E-07	391614.6	3783444.1	313.2	4.15	2.64	0.89	YES	MONTH
L0000042	0	0.18390E-07	391611.7	3783439.3	313.5	4.15	2.64	0.89	YES	MONTH
L0000043	0	0.18390E-07	391608.8	3783434.4	313.8	4.15	2.64	0.89	YES	MONTH
L0000044	0	0.18390E-07	391605.8	3783429.6	314.0	4.15	2.64	0.89	YES	MONTH
L0000045	0	0.18390E-07	391602.9	3783424.7	314.3	4.15	2.64	0.89	YES	MONTH
L0000046	0	0.18390E-07	391600.0	3783419.9	314.5	4.15	2.64	0.89	YES	MONTH
L0000047	0	0.18390E-07	391597.0	3783415.0	314.7	4.15	2.64	0.89	YES	MONTH
L0000048	0	0.18390E-07	391594.1	3783410.2	314.9	4.15	2.64	0.89	YES	MONTH
L0000049	0	0.18390E-07	391591.2	3783405.3	315.1	4.15	2.64	0.89	YES	MONTH
L0000050	0	0.18390E-07	391588.2	3783400.5	315.5	4.15	2.64	0.89	YES	MONTH
L0000051	0	0.18390E-07	391585.3	3783395.6	315.8	4.15	2.64	0.89	YES	MONTH
L0000052	0	0.18390E-07	391582.4	3783390.8	315.9	4.15	2.64	0.89	YES	MONTH
L0000053	0	0.18390E-07	391579.4	3783385.9	316.0	4.15	2.64	0.89	YES	MONTH
L0000054	0	0.18390E-07	391576.5	3783381.1	315.9	4.15	2.64	0.89	YES	MONTH
L0000055	0	0.18390E-07	391573.6	3783376.2	315.7	4.15	2.64	0.89	YES	MONTH
L0000056	0	0.18390E-07	391570.6	3783371.3	316.8	4.15	2.64	0.89	YES	MONTH
L0000057	0	0.18390E-07	391567.7	3783366.5	318.0	4.15	2.64	0.89	YES	MONTH
L0000058	0	0.18390E-07	391564.8	3783361.6	319.1	4.15	2.64	0.89	YES	MONTH
L0000059	0	0.18390E-07	391561.8	3783356.8	319.9	4.15	2.64	0.89	YES	MONTH
L0000060	0	0.18390E-07	391558.9	3783351.9	320.5	4.15	2.64	0.89	YES	MONTH
L0000061	0	0.18390E-07	391556.0	3783347.1	320.9	4.15	2.64	0.89	YES	MONTH
L0000062	0	0.18390E-07	391556.9	3783343.3	321.9	4.15	2.64	0.89	YES	MONTH
L0000063	0	0.18390E-07	391561.8	3783340.5	323.4	4.15	2.64	0.89	YES	MONTH
L0000064	0	0.18390E-07	391566.8	3783337.7	324.8	4.15	2.64	0.89	YES	MONTH
L0000065	0	0.18390E-07	391571.7	3783334.9	325.9	4.15	2.64	0.89	YES	MONTH
L0000066	0	0.18390E-07	391576.7	3783332.1	326.9	4.15	2.64	0.89	YES	MONTH
L0000067	0	0.18390E-07	391581.6	3783329.4	328.0	4.15	2.64	0.89	YES	MONTH
L0000068	0	0.18390E-07	391586.5	3783326.6	329.2	4.15	2.64	0.89	YES	MONTH
L0000069	0	0.18390E-07	391591.5	3783323.8	330.4	4.15	2.64	0.89	YES	MONTH
L0000070	0	0.18390E-07	391596.4	3783321.0	331.7	4.15	2.64	0.89	YES	MONTH
L0000071	0	0.18390E-07	391601.4	3783318.3	332.6	4.15	2.64	0.89	YES	MONTH
L0000072	0	0.18390E-07	391606.3	3783315.5	332.9	4.15	2.64	0.89	YES	MONTH
L0000073	0	0.18390E-07	391611.3	3783312.7	333.2	4.15	2.64	0.89	YES	MONTH
L0000074	0	0.18390E-07	391616.7	3783311.3	333.2	4.15	2.64	0.89	YES	MONTH
L0000075	0	0.18390E-07	391622.3	3783310.3	333.0	4.15	2.64	0.89	YES	MONTH
L0000076	0	0.18390E-07	391627.9	3783309.3	332.8	4.15	2.64	0.89	YES	MONTH
L0000077	0	0.18390E-07	391633.4	3783308.3	332.3	4.15	2.64	0.89	YES	MONTH
L0000078	0	0.18390E-07	391639.0	3783307.2	331.6	4.15	2.64	0.89	YES	MONTH
L0000079	0	0.18390E-07	391644.6	3783306.2	330.9	4.15	2.64	0.89	YES	MONTH
L0000080	0	0.18390E-07	391650.2	3783305.2	330.2	4.15	2.64	0.89	YES	MONTH

**MODELOPTs: RegDFAULT CONC ELEV

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0000081	0	0.18390E-07	391655.7	3783304.2	329.5	4.15	2.64	0.89	YES	MONTH
L0000082	0	0.18390E-07	391661.3	3783303.1	328.4	4.15	2.64	0.89	YES	MONTH
L0000083	0	0.18390E-07	391666.9	3783302.1	327.0	4.15	2.64	0.89	YES	MONTH
L0000084	0	0.18390E-07	391672.5	3783301.1	325.6	4.15	2.64	0.89	YES	MONTH
L0000085	0	0.18390E-07	391678.0	3783300.1	324.3	4.15	2.64	0.89	YES	MONTH
L0000086	0	0.18390E-07	391683.7	3783299.5	322.9	4.15	2.64	0.89	YES	MONTH
L0000087	0	0.18390E-07	391689.3	3783298.9	321.4	4.15	2.64	0.89	YES	MONTH
L0000088	0	0.18390E-07	391695.0	3783298.3	318.1	4.15	2.64	0.89	YES	MONTH
L0000089	0	0.18390E-07	391700.6	3783297.7	314.8	4.15	2.64	0.89	YES	MONTH
L0000090	0	0.18390E-07	391706.2	3783297.0	311.5	4.15	2.64	0.89	YES	MONTH
L0000091	0	0.18390E-07	391711.9	3783296.4	308.2	4.15	2.64	0.89	YES	MONTH
L0000092	0	0.18390E-07	391717.5	3783295.8	304.9	4.15	2.64	0.89	YES	MONTH
L0000093	0	0.18390E-07	391723.1	3783295.2	304.2	4.15	2.64	0.89	YES	MONTH
L0000094	0	0.18390E-07	391728.8	3783294.6	304.6	4.15	2.64	0.89	YES	MONTH
L0000095	0	0.18390E-07	391734.4	3783293.9	304.9	4.15	2.64	0.89	YES	MONTH
L0000096	0	0.18390E-07	391740.0	3783293.3	305.2	4.15	2.64	0.89	YES	MONTH
L0000097	0	0.18390E-07	391745.7	3783292.8	305.6	4.15	2.64	0.89	YES	MONTH
L0000098	0	0.18390E-07	391751.3	3783292.4	306.9	4.15	2.64	0.89	YES	MONTH
L0000099	0	0.18390E-07	391757.0	3783291.9	309.7	4.15	2.64	0.89	YES	MONTH
L0000100	0	0.18390E-07	391762.6	3783291.4	312.5	4.15	2.64	0.89	YES	MONTH
L0000101	0	0.18390E-07	391768.3	3783291.0	315.3	4.15	2.64	0.89	YES	MONTH
L0000102	0	0.18390E-07	391773.9	3783290.5	318.1	4.15	2.64	0.89	YES	MONTH
L0000103	0	0.18390E-07	391779.6	3783290.1	320.7	4.15	2.64	0.89	YES	MONTH
L0000104	0	0.18390E-07	391785.2	3783289.6	321.1	4.15	2.64	0.89	YES	MONTH
L0000105	0	0.18390E-07	391790.9	3783289.1	321.5	4.15	2.64	0.89	YES	MONTH
L0000106	0	0.18390E-07	391796.5	3783288.7	322.0	4.15	2.64	0.89	YES	MONTH
L0000107	0	0.18390E-07	391802.2	3783288.2	322.4	4.15	2.64	0.89	YES	MONTH
L0000108	0	0.18390E-07	391807.8	3783287.8	322.8	4.15	2.64	0.89	YES	MONTH
L0000109	0	0.18390E-07	391813.5	3783287.3	322.9	4.15	2.64	0.89	YES	MONTH
L0000110	0	0.18390E-07	391819.1	3783286.9	323.0	4.15	2.64	0.89	YES	MONTH
L0000111	0	0.18390E-07	391824.8	3783286.4	323.0	4.15	2.64	0.89	YES	MONTH
L0000112	0	0.18390E-07	391830.4	3783285.9	323.0	4.15	2.64	0.89	YES	MONTH
L0000113	0	0.18390E-07	391836.1	3783285.5	322.9	4.15	2.64	0.89	YES	MONTH
L0000114	0	0.18390E-07	391841.7	3783285.0	322.9	4.15	2.64	0.89	YES	MONTH
L0000115	0	0.18390E-07	391847.4	3783284.6	322.9	4.15	2.64	0.89	YES	MONTH
L0000116	0	0.18390E-07	391853.0	3783284.1	322.9	4.15	2.64	0.89	YES	MONTH
L0000117	0	0.18390E-07	391858.7	3783283.6	322.9	4.15	2.64	0.89	YES	MONTH
L0000118	0	0.18390E-07	391864.3	3783283.2	322.9	4.15	2.64	0.89	YES	MONTH
L0000119	0	0.18390E-07	391870.0	3783282.7	322.9	4.15	2.64	0.89	YES	MONTH
L0000120	0	0.18390E-07	391875.6	3783282.3	323.3	4.15	2.64	0.89	YES	MONTH

**MODELOPTs: RegDFAULT CONC ELEV

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0000121	0	0.18390E-07	391881.3	3783281.8	323.6	4.15	2.64	0.89	YES	MONTH
L0000122	0	0.18390E-07	391887.0	3783281.3	323.9	4.15	2.64	0.89	YES	MONTH
L0000123	0	0.18390E-07	391892.6	3783280.9	324.2	4.15	2.64	0.89	YES	MONTH
L0000124	0	0.18390E-07	391898.2	3783280.4	324.5	4.15	2.64	0.89	YES	MONTH
L0000125	0	0.18390E-07	391903.8	3783279.3	324.8	4.15	2.64	0.89	YES	MONTH
L0000126	0	0.18390E-07	391909.4	3783278.3	324.9	4.15	2.64	0.89	YES	MONTH
L0000127	0	0.18390E-07	391915.0	3783277.2	325.1	4.15	2.64	0.89	YES	MONTH
L0000128	0	0.18390E-07	391920.5	3783276.1	325.2	4.15	2.64	0.89	YES	MONTH
L0000129	0	0.18390E-07	391926.1	3783275.1	325.3	4.15	2.64	0.89	YES	MONTH
L0000130	0	0.18390E-07	391931.7	3783274.0	325.4	4.15	2.64	0.89	YES	MONTH
L0000131	0	0.18390E-07	391937.2	3783272.9	325.6	4.15	2.64	0.89	YES	MONTH
L0000132	0	0.18390E-07	391942.8	3783271.9	325.7	4.15	2.64	0.89	YES	MONTH
L0000133	0	0.18390E-07	391948.4	3783270.8	325.9	4.15	2.64	0.89	YES	MONTH
L0000134	0	0.18390E-07	391953.9	3783269.8	326.1	4.15	2.64	0.89	YES	MONTH
L0000135	0	0.18390E-07	391959.5	3783268.7	326.2	4.15	2.64	0.89	YES	MONTH
L0000136	0	0.18390E-07	391965.0	3783267.2	326.3	4.15	2.64	0.89	YES	MONTH
L0000137	0	0.18390E-07	391970.4	3783265.7	326.3	4.15	2.64	0.89	YES	MONTH
L0000138	0	0.18390E-07	391975.9	3783264.1	326.3	4.15	2.64	0.89	YES	MONTH
L0000139	0	0.18390E-07	391981.3	3783262.6	326.4	4.15	2.64	0.89	YES	MONTH
L0000140	0	0.18390E-07	391986.8	3783261.1	326.4	4.15	2.64	0.89	YES	MONTH
L0000141	0	0.18390E-07	391992.3	3783259.6	326.4	4.15	2.64	0.89	YES	MONTH
L0000142	0	0.18390E-07	391997.7	3783258.0	326.4	4.15	2.64	0.89	YES	MONTH
L0000143	0	0.18390E-07	392003.2	3783256.5	326.5	4.15	2.64	0.89	YES	MONTH
L0000144	0	0.18390E-07	392008.6	3783255.0	326.6	4.15	2.64	0.89	YES	MONTH
L0000145	0	0.18390E-07	392014.1	3783253.4	326.6	4.15	2.64	0.89	YES	MONTH
L0000146	0	0.18390E-07	392019.6	3783251.9	326.7	4.15	2.64	0.89	YES	MONTH
L0000147	0	0.18390E-07	392025.0	3783250.4	327.0	4.15	2.64	0.89	YES	MONTH
L0000148	0	0.18390E-07	392030.5	3783248.8	327.2	4.15	2.64	0.89	YES	MONTH
L0000149	0	0.18390E-07	392035.6	3783246.5	327.4	4.15	2.64	0.89	YES	MONTH
L0000150	0	0.18390E-07	392040.7	3783244.0	327.6	4.15	2.64	0.89	YES	MONTH
L0000151	0	0.18390E-07	392045.8	3783241.5	327.8	4.15	2.64	0.89	YES	MONTH
L0000152	0	0.18390E-07	392050.9	3783239.0	327.8	4.15	2.64	0.89	YES	MONTH
L0000153	0	0.18390E-07	392056.0	3783236.5	327.7	4.15	2.64	0.89	YES	MONTH
L0000154	0	0.18390E-07	392061.0	3783234.0	327.5	4.15	2.64	0.89	YES	MONTH
L0000155	0	0.18390E-07	392066.1	3783231.4	327.3	4.15	2.64	0.89	YES	MONTH
L0000156	0	0.18390E-07	392071.2	3783228.9	327.2	4.15	2.64	0.89	YES	MONTH
L0000157	0	0.18390E-07	392076.3	3783226.4	327.0	4.15	2.64	0.89	YES	MONTH
L0000158	0	0.18390E-07	392081.4	3783223.9	327.2	4.15	2.64	0.89	YES	MONTH
L0000159	0	0.18390E-07	392086.5	3783221.4	327.6	4.15	2.64	0.89	YES	MONTH
L0000160	0	0.18390E-07	392091.6	3783218.9	327.8	4.15	2.64	0.89	YES	MONTH

**MODELOPTs: RegDFAULT CONC ELEV

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0000161	0	0.18390E-07	392096.4	3783216.0	328.1	4.15	2.64	0.89	YES	MONTH
L0000162	0	0.18390E-07	392101.1	3783212.9	328.3	4.15	2.64	0.89	YES	MONTH
L0000163	0	0.18390E-07	392105.9	3783209.8	328.5	4.15	2.64	0.89	YES	MONTH
L0000164	0	0.18390E-07	392110.6	3783206.7	328.7	4.15	2.64	0.89	YES	MONTH
L0000165	0	0.18390E-07	392115.4	3783203.6	328.8	4.15	2.64	0.89	YES	MONTH
L0000166	0	0.18390E-07	392120.1	3783200.5	328.9	4.15	2.64	0.89	YES	MONTH
L0000167	0	0.18390E-07	392124.9	3783197.4	329.0	4.15	2.64	0.89	YES	MONTH
L0000168	0	0.18390E-07	392129.6	3783194.3	329.0	4.15	2.64	0.89	YES	MONTH
L0000169	0	0.18390E-07	392134.4	3783191.2	329.0	4.15	2.64	0.89	YES	MONTH
L0000170	0	0.18390E-07	392139.1	3783188.1	329.0	4.15	2.64	0.89	YES	MONTH
L0000171	0	0.18390E-07	392143.9	3783185.0	329.0	4.15	2.64	0.89	YES	MONTH
L0000172	0	0.18390E-07	392148.6	3783181.9	329.0	4.15	2.64	0.89	YES	MONTH
L0000173	0	0.18390E-07	392153.4	3783178.8	329.0	4.15	2.64	0.89	YES	MONTH
L0000174	0	0.18390E-07	392158.1	3783175.7	329.0	4.15	2.64	0.89	YES	MONTH
L0000175	0	0.18390E-07	392162.9	3783172.6	329.0	4.15	2.64	0.89	YES	MONTH
L0000176	0	0.18390E-07	392167.6	3783169.5	329.0	4.15	2.64	0.89	YES	MONTH
L0000177	0	0.18390E-07	392172.4	3783166.4	329.0	4.15	2.64	0.89	YES	MONTH
L0000178	0	0.18390E-07	392177.1	3783163.3	329.0	4.15	2.64	0.89	YES	MONTH
L0000179	0	0.18390E-07	392181.9	3783160.2	329.0	4.15	2.64	0.89	YES	MONTH
L0000180	0	0.18390E-07	392186.6	3783157.0	329.0	4.15	2.64	0.89	YES	MONTH
L0000181	0	0.18390E-07	392191.2	3783153.8	329.0	4.15	2.64	0.89	YES	MONTH
L0000182	0	0.18390E-07	392195.9	3783150.6	329.0	4.15	2.64	0.89	YES	MONTH
L0000183	0	0.18390E-07	392200.6	3783147.4	329.0	4.15	2.64	0.89	YES	MONTH
L0000184	0	0.18390E-07	392205.2	3783144.2	329.0	4.15	2.64	0.89	YES	MONTH
L0000185	0	0.18390E-07	392209.9	3783141.0	329.0	4.15	2.64	0.89	YES	MONTH
L0000186	0	0.18390E-07	392214.6	3783137.7	329.0	4.15	2.64	0.89	YES	MONTH
L0000187	0	0.18390E-07	392219.2	3783134.5	329.0	4.15	2.64	0.89	YES	MONTH
L0000188	0	0.18390E-07	392223.9	3783131.3	329.0	4.15	2.64	0.89	YES	MONTH
L0000189	0	0.18390E-07	392228.6	3783128.1	329.0	4.15	2.64	0.89	YES	MONTH
L0000190	0	0.18390E-07	392233.2	3783124.9	329.0	4.15	2.64	0.89	YES	MONTH
L0000191	0	0.18390E-07	392237.9	3783121.7	329.0	4.15	2.64	0.89	YES	MONTH
L0000192	0	0.18390E-07	392242.6	3783118.4	329.0	4.15	2.64	0.89	YES	MONTH
L0000193	0	0.18390E-07	392247.2	3783115.2	329.0	4.15	2.64	0.89	YES	MONTH
L0000194	0	0.18390E-07	392251.9	3783112.0	329.0	4.15	2.64	0.89	YES	MONTH
L0000195	0	0.18390E-07	392256.6	3783108.8	329.0	4.15	2.64	0.89	YES	MONTH
L0000196	0	0.18390E-07	392261.4	3783105.8	329.0	4.15	2.64	0.89	YES	MONTH
L0000197	0	0.18390E-07	392266.3	3783103.0	329.0	4.15	2.64	0.89	YES	MONTH
L0000198	0	0.18390E-07	392271.2	3783100.1	329.0	4.15	2.64	0.89	YES	MONTH
L0000199	0	0.18390E-07	392276.1	3783097.2	329.0	4.15	2.64	0.89	YES	MONTH
L0000200	0	0.18390E-07	392281.0	3783094.4	329.0	4.15	2.64	0.89	YES	MONTH

**MODELOPTs: RegDFAULT CONC ELEV

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0000201	0	0.18390E-07	392285.9	3783091.5	329.0	4.15	2.64	0.89	YES	MONTH
L0000202	0	0.18390E-07	392290.8	3783088.7	329.0	4.15	2.64	0.89	YES	MONTH
L0000203	0	0.18390E-07	392295.7	3783085.8	329.1	4.15	2.64	0.89	YES	MONTH
L0000204	0	0.18390E-07	392301.0	3783083.9	329.1	4.15	2.64	0.89	YES	MONTH
L0000205	0	0.18390E-07	392306.4	3783082.1	329.1	4.15	2.64	0.89	YES	MONTH
L0000206	0	0.18390E-07	392311.7	3783080.2	329.1	4.15	2.64	0.89	YES	MONTH
L0000207	0	0.18390E-07	392317.1	3783078.4	329.1	4.15	2.64	0.89	YES	MONTH
L0000208	0	0.18390E-07	392317.1	3783073.2	329.0	4.15	2.64	0.89	YES	MONTH
L0000209	0	0.18390E-07	392316.3	3783067.6	329.0	4.15	2.64	0.89	YES	MONTH
L0000210	0	0.18390E-07	392315.6	3783062.0	329.0	4.15	2.64	0.89	YES	MONTH
L0000211	0	0.18390E-07	392314.8	3783056.4	329.0	4.15	2.64	0.89	YES	MONTH
L0000212	0	0.18390E-07	392314.1	3783050.8	329.0	4.15	2.64	0.89	YES	MONTH
L0000213	0	0.18390E-07	392313.4	3783045.1	329.0	4.15	2.64	0.89	YES	MONTH
L0000214	0	0.18390E-07	392312.6	3783039.5	329.0	4.15	2.64	0.89	YES	MONTH
L0000215	0	0.18390E-07	392311.9	3783033.9	329.0	4.15	2.64	0.89	YES	MONTH
L0000216	0	0.18390E-07	392310.4	3783028.4	329.0	4.15	2.64	0.89	YES	MONTH
L0000217	0	0.18390E-07	392308.8	3783023.0	329.0	4.15	2.64	0.89	YES	MONTH
L0000218	0	0.18390E-07	392307.2	3783017.5	329.0	4.15	2.64	0.89	YES	MONTH
L0000219	0	0.18390E-07	392305.6	3783012.1	329.0	4.15	2.64	0.89	YES	MONTH
L0000220	0	0.18390E-07	392304.1	3783006.7	329.0	4.15	2.64	0.89	YES	MONTH
L0000221	0	0.18390E-07	392302.5	3783001.2	329.0	4.15	2.64	0.89	YES	MONTH
L0000222	0	0.18390E-07	392300.9	3782995.8	329.0	4.15	2.64	0.89	YES	MONTH
L0000223	0	0.18390E-07	392299.3	3782990.3	329.0	4.15	2.64	0.89	YES	MONTH
L0000224	0	0.18390E-07	392297.7	3782984.9	329.0	4.15	2.64	0.89	YES	MONTH
L0000225	0	0.18390E-07	392296.1	3782979.5	329.0	4.15	2.64	0.89	YES	MONTH
L0000226	0	0.18390E-07	392294.5	3782974.0	329.0	4.15	2.64	0.89	YES	MONTH
L0000227	0	0.18390E-07	392292.9	3782968.6	329.0	4.15	2.64	0.89	YES	MONTH
L0000228	0	0.18390E-07	392291.3	3782963.1	329.0	4.15	2.64	0.89	YES	MONTH
L0000229	0	0.18390E-07	392289.8	3782957.7	329.0	4.15	2.64	0.89	YES	MONTH
L0000230	0	0.18390E-07	392288.2	3782952.2	328.8	4.15	2.64	0.89	YES	MONTH
L0000231	0	0.18390E-07	392286.6	3782946.8	328.6	4.15	2.64	0.89	YES	MONTH
L0000232	0	0.18390E-07	392285.0	3782941.4	328.4	4.15	2.64	0.89	YES	MONTH
L0000233	0	0.18390E-07	392283.4	3782935.9	328.2	4.15	2.64	0.89	YES	MONTH
L0000234	0	0.18390E-07	392281.8	3782930.5	328.1	4.15	2.64	0.89	YES	MONTH
L0000235	0	0.18390E-07	392280.2	3782925.0	328.0	4.15	2.64	0.89	YES	MONTH
L0000236	0	0.18390E-07	392278.6	3782919.6	327.9	4.15	2.64	0.89	YES	MONTH

**MODELOPTs: RegDFAULT CONC ELEV

*** AREAPOLY SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC /METER**2)	LOCATION OF AREA X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	NUMBER OF VERTS.	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
PAREA1	0	0.28520E-07	391678.3	3783352.6	317.7	0.61	50	3.96	YES	MONTH

**MODELOPTs: RegDFAULT CONC ELEV

*** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID	SOURCE IDs
ALL	PAREA1 , L0000001 , L0000002 , L0000003 , L0000004 , L0000005 , L0000006 , L0000007 ,
	L0000008 , L0000009 , L0000010 , L0000011 , L0000012 , L0000013 , L0000014 , L0000015 ,
	L0000016 , L0000017 , L0000018 , L0000019 , L0000020 , L0000021 , L0000022 , L0000023 ,
	L0000024 , L0000025 , L0000026 , L0000027 , L0000028 , L0000029 , L0000030 , L0000031 ,
	L0000032 , L0000033 , L0000034 , L0000035 , L0000036 , L0000037 , L0000038 , L0000039 ,
	L0000040 , L0000041 , L0000042 , L0000043 , L0000044 , L0000045 , L0000046 , L0000047 ,
	L0000048 , L0000049 , L0000050 , L0000051 , L0000052 , L0000053 , L0000054 , L0000055 ,
	L0000056 , L0000057 , L0000058 , L0000059 , L0000060 , L0000061 , L0000062 , L0000063 ,
	L0000064 , L0000065 , L0000066 , L0000067 , L0000068 , L0000069 , L0000070 , L0000071 ,
	L0000072 , L0000073 , L0000074 , L0000075 , L0000076 , L0000077 , L0000078 , L0000079 ,
	L0000080 , L0000081 , L0000082 , L0000083 , L0000084 , L0000085 , L0000086 , L0000087 ,
	L0000088 , L0000089 , L0000090 , L0000091 , L0000092 , L0000093 , L0000094 , L0000095 ,
	L0000096 , L0000097 , L0000098 , L0000099 , L0000100 , L0000101 , L0000102 , L0000103 ,
	L0000104 , L0000105 , L0000106 , L0000107 , L0000108 , L0000109 , L0000110 , L0000111 ,
	L0000112 , L0000113 , L0000114 , L0000115 , L0000116 , L0000117 , L0000118 , L0000119 ,
	L0000120 , L0000121 , L0000122 , L0000123 , L0000124 , L0000125 , L0000126 , L0000127 ,
	L0000128 , L0000129 , L0000130 , L0000131 , L0000132 , L0000133 , L0000134 , L0000135 ,
	L0000136 , L0000137 , L0000138 , L0000139 , L0000140 , L0000141 , L0000142 , L0000143 ,
	L0000144 , L0000145 , L0000146 , L0000147 , L0000148 , L0000149 , L0000150 , L0000151 ,
	L0000152 , L0000153 , L0000154 , L0000155 , L0000156 , L0000157 , L0000158 , L0000159 ,

**MODELOPTs: RegDFAULT CONC ELEV

*** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID SOURCE IDs

L0000160 , L0000161 , L0000162 , L0000163 , L0000164 , L0000165 , L0000166 , L0000167 ,
L0000168 , L0000169 , L0000170 , L0000171 , L0000172 , L0000173 , L0000174 , L0000175 ,
L0000176 , L0000177 , L0000178 , L0000179 , L0000180 , L0000181 , L0000182 , L0000183 ,
L0000184 , L0000185 , L0000186 , L0000187 , L0000188 , L0000189 , L0000190 , L0000191 ,
L0000192 , L0000193 , L0000194 , L0000195 , L0000196 , L0000197 , L0000198 , L0000199 ,
L0000200 , L0000201 , L0000202 , L0000203 , L0000204 , L0000205 , L0000206 , L0000207 ,
L0000208 , L0000209 , L0000210 , L0000211 , L0000212 , L0000213 , L0000214 , L0000215 ,
L0000216 , L0000217 , L0000218 , L0000219 , L0000220 , L0000221 , L0000222 , L0000223 ,
L0000224 , L0000225 , L0000226 , L0000227 , L0000228 , L0000229 , L0000230 , L0000231 ,
L0000232 , L0000233 , L0000234 , L0000235 , L0000236 ,

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = PAREA1   ; SOURCE TYPE = AREAPOLY :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000001   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000002   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000003   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000004   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000005   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000006   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000007   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000008   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000009   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000010   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000011   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000012   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000013   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000014   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000015   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000016   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000017   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

JANUARY FEBRUARY MARCH APRIL MAY JUNE JULY AUGUST SEPTEMBER OCTOBER NOVEMBER DECEMBER

- -

SOURCE ID = L0000018 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000019 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000020 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000021 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000022 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000023 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000024   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000025   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000026   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000027   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000028   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000029   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000030   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000031   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000032   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000033   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000034   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000035   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000036 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000037 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000038 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000039 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000040 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000041 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000042 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000043 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000044 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000045 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000046 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000047 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000048   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000049   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000050   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000051   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000052   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000053   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000054   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000055   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000056   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000057   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000058   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000059   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000060   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000061   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000062   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000063   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000064   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000065   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000066   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000067   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000068   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000069   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000070   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000071   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000072 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000073 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000074 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000075 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000076 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000077 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000078   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000079   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000080   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000081   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000082   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000083   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000084   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000085   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000086   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000087   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000088   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000089   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000090   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000091   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000092   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000093   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000094   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000095   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000096   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000097   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000098   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000099   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000100   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000101   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000102 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000103 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000104 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000105 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000106 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000107 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000108   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000109   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000110   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000111   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000112   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000113   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000114 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000115 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000116 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000117 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000118 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000119 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000120   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000121   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000122   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000123   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000124   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000125   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000126 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000127 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000128 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000129 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000130 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000131 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000132 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000133 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000134 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000135 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000136 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000137 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000138   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000139   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000140   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000141   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000142   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000143   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000144   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000145   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000146   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000147   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000148   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000149   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000150 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000151 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000152 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000153 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000154 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000155 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000156 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000157 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000158 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000159 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000160 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000161 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000162 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000163 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000164 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000165 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000166 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000167 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000168 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000169 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000170 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000171 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000172 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000173 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000174   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000175   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000176   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000177   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000178   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000179   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000180   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000181   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000182   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000183   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000184   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000185   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

JANUARY FEBRUARY MARCH APRIL MAY JUNE JULY AUGUST SEPTEMBER OCTOBER NOVEMBER DECEMBER

- -

SOURCE ID = L0000186 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000187 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000188 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000189 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000190 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000191 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000192   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000193   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000194   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000195   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000196   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000197   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000198   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000199   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000200   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000201   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000202   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000203   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

JANUARY FEBRUARY MARCH APRIL MAY JUNE JULY AUGUST SEPTEMBER OCTOBER NOVEMBER DECEMBER

- -

SOURCE ID = L0000204 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000205 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000206 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000207 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000208 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000209 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000210   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000211   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000212   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000213   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000214   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000215   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000216   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000217   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000218   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000219   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000220   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000221   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000222 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000223 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000224 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000225 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000226 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000227 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000228   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000229   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000230   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000231   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000232   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000233   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000234   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000235   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000236   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

**MODELOPTs: RegDFAULT CONC ELEV

*** DISCRETE CARTESIAN RECEPTORS ***
(X-COORD, Y-COORD, ZELEV, ZHILL, ZFLAG)
(METERS)

(391316.0,	3783682.0,	328.5,	1466.0,	0.0);	(391392.0,	3783989.0,	332.9,	1466.0,	0.0);
(391405.0,	3784381.0,	334.9,	1466.0,	0.0);	(391964.0,	3784620.0,	329.4,	1466.0,	0.0);
(392559.0,	3784546.0,	356.0,	1466.0,	0.0);	(392453.0,	3784419.0,	356.5,	1466.0,	0.0);
(392197.0,	3784046.0,	337.2,	1466.0,	0.0);	(392034.0,	3783741.0,	337.0,	1466.0,	0.0);
(391925.0,	3783416.0,	333.0,	1466.0,	0.0);	(391955.0,	3783299.0,	328.7,	1466.0,	0.0);
(392291.0,	3783005.0,	329.0,	1466.0,	0.0);	(391377.5,	3783505.5,	329.0,	1466.0,	0.0);
(391350.3,	3783600.7,	328.0,	1466.0,	0.0);	(391281.3,	3783478.0,	327.6,	1466.0,	0.0);
(391254.1,	3783573.2,	328.5,	1466.0,	0.0);	(391185.2,	3783450.6,	349.5,	1466.0,	0.0);
(391158.0,	3783545.7,	327.2,	1466.0,	0.0);	(391089.0,	3783423.1,	373.1,	1466.0,	0.0);
(391061.8,	3783518.2,	340.7,	1466.0,	0.0);	(390992.9,	3783395.6,	387.8,	1466.0,	0.0);
(390965.7,	3783490.7,	375.0,	1466.0,	0.0);	(391374.8,	3783708.7,	326.0,	1466.0,	0.0);
(391264.1,	3783681.2,	329.2,	1466.0,	0.0);	(391174.5,	3783725.8,	327.5,	1466.0,	0.0);
(391085.0,	3783770.3,	327.1,	1466.0,	0.0);	(391075.1,	3783662.3,	328.7,	1466.0,	0.0);
(390995.1,	3783810.8,	328.1,	1466.0,	0.0);	(390984.1,	3783690.8,	334.0,	1466.0,	0.0);
(391294.4,	3783785.7,	329.1,	1466.0,	0.0);	(391199.6,	3783817.8,	331.2,	1466.0,	0.0);
(391393.4,	3783810.2,	329.2,	1466.0,	0.0);	(391446.0,	3783889.6,	330.1,	1466.0,	0.0);
(391357.1,	3783937.0,	332.7,	1466.0,	0.0);	(391292.9,	3784012.9,	336.2,	1466.0,	0.0);
(391243.8,	3783923.0,	334.4,	1466.0,	0.0);	(391229.8,	3784090.6,	339.4,	1466.0,	0.0);
(391181.8,	3784002.8,	343.4,	1466.0,	0.0);	(391133.8,	3783915.0,	343.3,	1466.0,	0.0);
(391166.1,	3784167.3,	342.4,	1466.0,	0.0);	(391116.1,	3784075.8,	352.0,	1466.0,	0.0);
(391066.1,	3783984.3,	354.5,	1466.0,	0.0);	(391454.7,	3783989.7,	330.8,	1466.0,	0.0);
(391515.0,	3784068.4,	327.4,	1466.0,	0.0);	(391375.3,	3784050.5,	333.5,	1466.0,	0.0);
(391435.6,	3784129.2,	331.4,	1466.0,	0.0);	(391356.2,	3784190.0,	335.1,	1466.0,	0.0);
(391276.8,	3784250.8,	336.8,	1466.0,	0.0);	(391197.4,	3784311.6,	339.0,	1466.0,	0.0);
(391570.1,	3784156.6,	325.9,	1466.0,	0.0);	(391632.5,	3784227.2,	324.2,	1466.0,	0.0);
(391495.2,	3784222.9,	330.5,	1466.0,	0.0);	(391557.6,	3784293.4,	328.4,	1466.0,	0.0);
(391420.3,	3784289.2,	333.0,	1466.0,	0.0);	(391482.7,	3784359.7,	330.9,	1466.0,	0.0);
(391345.4,	3784355.4,	336.3,	1466.0,	0.0);	(391407.8,	3784425.9,	336.4,	1466.0,	0.0);
(391270.5,	3784421.7,	338.9,	1466.0,	0.0);	(391332.9,	3784492.2,	339.9,	1466.0,	0.0);
(391404.2,	3784559.5,	341.4,	1466.0,	0.0);	(391700.6,	3784307.7,	323.6,	1466.0,	0.0);
(391620.8,	3784368.0,	327.3,	1466.0,	0.0);	(391761.9,	3784382.7,	323.8,	1466.0,	0.0);
(391684.6,	3784446.1,	326.7,	1466.0,	0.0);	(391548.2,	3784437.5,	331.3,	1466.0,	0.0);
(391607.2,	3784509.5,	332.7,	1466.0,	0.0);	(391529.9,	3784572.8,	342.9,	1466.0,	0.0);
(391452.5,	3784636.2,	345.0,	1466.0,	0.0);	(391822.9,	3784449.4,	324.3,	1466.0,	0.0);
(391746.7,	3784514.2,	327.0,	1466.0,	0.0);	(391670.6,	3784579.1,	339.0,	1466.0,	0.0);
(391594.4,	3784643.9,	344.0,	1466.0,	0.0);	(391518.3,	3784708.7,	347.4,	1466.0,	0.0);
(391859.6,	3784553.6,	327.2,	1466.0,	0.0);	(391923.9,	3784651.3,	330.6,	1466.0,	0.0);
(391790.3,	3784635.2,	331.5,	1466.0,	0.0);	(391708.5,	3784692.7,	341.3,	1466.0,	0.0);
(391760.3,	3784766.4,	341.5,	1466.0,	0.0);	(391626.7,	3784750.3,	345.9,	1466.0,	0.0);
(391678.6,	3784823.9,	346.1,	1466.0,	0.0);	(391544.9,	3784807.8,	351.3,	1466.0,	0.0);
(391596.8,	3784881.5,	353.2,	1466.0,	0.0);	(392025.1,	3784712.4,	331.1,	1466.0,	0.0);
(391882.5,	3784742.3,	335.8,	1466.0,	0.0);	(391983.7,	3784803.4,	337.1,	1466.0,	0.0);
(391841.2,	3784833.4,	339.5,	1466.0,	0.0);	(391942.4,	3784894.5,	342.8,	1466.0,	0.0);
(391799.8,	3784924.4,	346.4,	1466.0,	0.0);	(391901.0,	3784985.5,	351.9,	1466.0,	0.0);
(391748.4,	3785007.1,	355.8,	1466.0,	0.0);	(391859.7,	3785076.6,	363.7,	1466.0,	0.0);

**MODELOPTs: RegDFAULT CONC ELEV

*** DISCRETE CARTESIAN RECEPTORS ***
(X-COORD, Y-COORD, ZELEV, ZHILL, ZFLAG)
(METERS)

(	392080.4,	3784792.8,	334.3,	1466.0,	0.0);	(	392216.1,	3784847.9,	331.5,	1466.0,	0.0);
(	392054.3,	3784889.4,	342.2,	1466.0,	0.0);	(	392190.0,	3784944.4,	337.6,	1466.0,	0.0);
(	392028.3,	3784985.9,	350.3,	1466.0,	0.0);	(	392163.9,	3785041.0,	346.0,	1466.0,	0.0);
(	391985.4,	3785071.8,	360.1,	1466.0,	0.0);	(	392137.8,	3785137.5,	361.2,	1466.0,	0.0);
(	391963.5,	3785171.0,	371.9,	1466.0,	0.0);	(	392111.7,	3785234.0,	372.5,	1466.0,	0.0);
(	392349.1,	3784940.3,	334.2,	1466.0,	0.0);	(	392443.2,	3784930.3,	335.0,	1466.0,	0.0);
(	392360.3,	3785036.4,	339.5,	1466.0,	0.0);	(	392465.5,	3785027.8,	337.0,	1466.0,	0.0);
(	392377.0,	3785133.3,	346.3,	1466.0,	0.0);	(	392276.9,	3785121.4,	352.6,	1466.0,	0.0);
(	392487.9,	3785125.3,	338.4,	1466.0,	0.0);	(	392396.0,	3785230.3,	354.7,	1466.0,	0.0);
(	392289.2,	3785217.7,	362.7,	1466.0,	0.0);	(	392510.2,	3785222.8,	339.9,	1466.0,	0.0);
(	392416.2,	3785327.5,	396.3,	1466.0,	0.0);	(	392304.8,	3785314.4,	398.2,	1466.0,	0.0);
(	392193.5,	3785301.2,	385.3,	1466.0,	0.0);	(	392532.5,	3785320.2,	343.5,	1466.0,	0.0);
(	392580.2,	3784802.1,	346.5,	1466.0,	0.0);	(	392564.1,	3784708.0,	348.7,	1466.0,	0.0);
(	392663.4,	3784857.6,	368.5,	1466.0,	0.0);	(	392587.1,	3784971.9,	337.9,	1466.0,	0.0);
(	392662.7,	3784691.2,	366.9,	1466.0,	0.0);	(	392762.0,	3784840.7,	370.8,	1466.0,	0.0);
(	392670.3,	3785027.4,	352.3,	1466.0,	0.0);	(	392761.2,	3784674.3,	369.7,	1466.0,	0.0);
(	392860.5,	3784823.9,	375.1,	1466.0,	0.0);	(	392829.8,	3784968.5,	372.1,	1466.0,	0.0);
(	392753.5,	3785082.9,	369.1,	1466.0,	0.0);	(	392631.8,	3785166.8,	343.7,	1466.0,	0.0);
(	392859.8,	3784657.5,	372.0,	1466.0,	0.0);	(	392955.2,	3784825.1,	378.5,	1466.0,	0.0);
(	392936.0,	3784915.5,	378.1,	1466.0,	0.0);	(	392916.8,	3785005.9,	376.6,	1466.0,	0.0);
(	392821.5,	3785148.8,	379.8,	1466.0,	0.0);	(	392745.4,	3785201.3,	376.7,	1466.0,	0.0);
(	392669.4,	3785253.8,	376.5,	1466.0,	0.0);	(	392974.5,	3784734.7,	376.9,	1466.0,	0.0);
(	392958.4,	3784640.6,	374.4,	1466.0,	0.0);	(	392546.5,	3784564.6,	353.5,	1466.0,	0.0);
(	392645.7,	3784552.3,	363.8,	1466.0,	0.0);	(	392745.0,	3784540.1,	367.0,	1466.0,	0.0);
(	392844.2,	3784527.8,	369.2,	1466.0,	0.0);	(	392943.5,	3784515.5,	371.0,	1466.0,	0.0);
(	392528.3,	3784467.5,	358.0,	1466.0,	0.0);	(	392609.5,	3784409.2,	360.7,	1466.0,	0.0);
(	392692.6,	3784355.4,	362.3,	1466.0,	0.0);	(	392773.2,	3784295.8,	362.8,	1466.0,	0.0);
(	392814.5,	3784401.1,	365.7,	1466.0,	0.0);	(	392855.4,	3784239.9,	362.8,	1466.0,	0.0);
(	392889.2,	3784326.3,	366.0,	1466.0,	0.0);	(	392923.1,	3784412.7,	368.6,	1466.0,	0.0);
(	392473.0,	3784373.6,	357.1,	1466.0,	0.0);	(	392558.0,	3784320.9,	358.5,	1466.0,	0.0);
(	392643.0,	3784268.2,	359.5,	1466.0,	0.0);	(	392728.0,	3784215.5,	359.6,	1466.0,	0.0);
(	392442.1,	3784280.4,	356.0,	1466.0,	0.0);	(	392518.6,	3784216.0,	356.6,	1466.0,	0.0);
(	392595.1,	3784151.6,	355.9,	1466.0,	0.0);	(	392671.6,	3784087.2,	355.5,	1466.0,	0.0);
(	392775.9,	3784083.8,	356.8,	1466.0,	0.0);	(	392703.8,	3783970.2,	352.7,	1466.0,	0.0);
(	392385.8,	3784203.3,	354.6,	1466.0,	0.0);	(	392460.5,	3784130.0,	353.8,	1466.0,	0.0);
(	392326.5,	3784091.3,	348.3,	1466.0,	0.0);	(	392414.7,	3784044.2,	350.4,	1466.0,	0.0);
(	392502.9,	3783997.1,	350.7,	1466.0,	0.0);	(	392591.1,	3783950.1,	351.0,	1466.0,	0.0);
(	392243.0,	3783981.7,	344.5,	1466.0,	0.0);	(	392359.0,	3783967.9,	347.8,	1466.0,	0.0);
(	392437.9,	3783906.4,	347.7,	1466.0,	0.0);	(	392516.8,	3783845.0,	347.4,	1466.0,	0.0);
(	392656.1,	3783867.1,	349.5,	1466.0,	0.0);	(	392595.7,	3783783.6,	346.7,	1466.0,	0.0);
(	392196.2,	3783888.2,	342.9,	1466.0,	0.0);	(	392308.5,	3783886.5,	345.7,	1466.0,	0.0);
(	392372.7,	3783794.3,	344.9,	1466.0,	0.0);	(	392461.0,	3783747.3,	344.4,	1466.0,	0.0);
(	392549.3,	3783700.4,	343.9,	1466.0,	0.0);	(	392273.7,	3783793.2,	343.9,	1466.0,	0.0);
(	392343.3,	3783701.3,	342.7,	1466.0,	0.0);	(	392429.2,	3783650.1,	342.1,	1466.0,	0.0);
(	392515.1,	3783598.9,	341.2,	1466.0,	0.0);	(	392151.5,	3783779.6,	342.4,	1466.0,	0.0);

**MODELOPTs: RegDFAULT CONC ELEV

*** DISCRETE CARTESIAN RECEPTORS ***
(X-COORD, Y-COORD, ZELEV, ZHILL, ZFLAG)
(METERS)

(	392217.3,	3783704.4,	341.9,	1466.0,	0.0);	(	392283.2,	3783629.2,	340.4,	1466.0,	0.0);
(	392349.1,	3783554.0,	339.9,	1466.0,	0.0);	(	392448.4,	3783518.8,	339.7,	1466.0,	0.0);
(	392364.5,	3783434.5,	337.9,	1466.0,	0.0);	(	392073.5,	3783676.7,	339.8,	1466.0,	0.0);
(	392158.7,	3783624.4,	340.2,	1466.0,	0.0);	(	392078.5,	3783582.1,	338.0,	1466.0,	0.0);
(	392162.3,	3783529.3,	338.1,	1466.0,	0.0);	(	392245.8,	3783475.0,	338.0,	1466.0,	0.0);
(	392407.6,	3783342.8,	336.0,	1466.0,	0.0);	(	392106.3,	3783443.9,	336.2,	1466.0,	0.0);
(	392197.8,	3783395.4,	336.0,	1466.0,	0.0);	(	392284.4,	3783344.3,	335.9,	1466.0,	0.0);
(	392344.4,	3783259.3,	334.1,	1466.0,	0.0);	(	392013.5,	3783419.3,	335.4,	1466.0,	0.0);
(	392064.4,	3783313.2,	331.4,	1466.0,	0.0);	(	392148.7,	3783259.4,	330.5,	1466.0,	0.0);
(	392232.9,	3783205.6,	330.4,	1466.0,	0.0);	(	392317.2,	3783151.8,	330.5,	1466.0,	0.0);
(	391952.6,	3783322.4,	330.0,	1466.0,	0.0);	(	391858.8,	3783193.7,	297.8,	1466.0,	0.0);
(	391689.2,	3783206.1,	328.6,	1466.0,	0.0);	(	391926.3,	3783119.9,	295.0,	1466.0,	0.0);
(	392033.5,	3783217.9,	325.7,	1466.0,	0.0);	(	391766.7,	3783100.1,	324.0,	1466.0,	0.0);
(	391919.0,	3783020.2,	289.1,	1466.0,	0.0);	(	392101.0,	3783144.1,	328.9,	1466.0,	0.0);
(	391759.5,	3783000.4,	353.7,	1466.0,	0.0);	(	391911.7,	3782920.4,	288.0,	1466.0,	0.0);
(	392061.2,	3782972.3,	315.2,	1466.0,	0.0);	(	392168.5,	3783070.3,	329.0,	1466.0,	0.0);
(	391752.2,	3782900.7,	337.4,	1466.0,	0.0);	(	391904.5,	3782820.7,	288.8,	1466.0,	0.0);
(	392053.9,	3782872.5,	320.5,	1466.0,	0.0);	(	392235.9,	3782996.5,	328.5,	1466.0,	0.0);
(	391744.9,	3782800.9,	324.1,	1466.0,	0.0);	(	391654.6,	3783110.2,	360.9,	1466.0,	0.0);
(	391633.6,	3783012.5,	374.5,	1466.0,	0.0);	(	391612.6,	3782914.7,	386.5,	1466.0,	0.0);
(	391591.7,	3782816.9,	369.3,	1466.0,	0.0);	(	391577.9,	3783232.0,	359.4,	1466.0,	0.0);
(	391491.0,	3783274.8,	358.6,	1466.0,	0.0);	(	391533.8,	3783142.3,	382.2,	1466.0,	0.0);
(	391446.8,	3783185.1,	389.3,	1466.0,	0.0);	(	391489.6,	3783052.6,	399.8,	1466.0,	0.0);
(	391402.7,	3783095.3,	410.4,	1466.0,	0.0);	(	391491.8,	3782946.8,	397.7,	1466.0,	0.0);
(	391358.5,	3783005.6,	423.1,	1466.0,	0.0);	(	391459.3,	3782853.0,	410.8,	1466.0,	0.0);
(	391314.4,	3782915.9,	447.1,	1466.0,	0.0);	(	391416.7,	3783330.5,	337.5,	1466.0,	0.0);
(	391354.8,	3783251.9,	370.1,	1466.0,	0.0);	(	391293.0,	3783173.4,	382.8,	1466.0,	0.0);
(	391231.1,	3783094.8,	416.8,	1466.0,	0.0);	(	391225.8,	3782971.7,	444.7,	1466.0,	0.0);
(	391352.5,	3783399.5,	327.9,	1466.0,	0.0);	(	391278.2,	3783332.6,	368.8,	1466.0,	0.0);
(	391203.9,	3783265.7,	395.2,	1466.0,	0.0);	(	391129.6,	3783198.8,	415.7,	1466.0,	0.0);
(	391138.1,	3783045.3,	441.2,	1466.0,	0.0);	(	391055.3,	3783131.8,	426.2,	1466.0,	0.0);
(	391066.7,	3783292.5,	400.1,	1466.0,	0.0);	(	390996.3,	3783219.7,	417.8,	1466.0,	0.0);
(	391438.7,	3783626.7,	320.7,	1466.0,	0.0);	(	391391.6,	3783540.4,	328.9,	1466.0,	0.0);
(	391408.1,	3783505.3,	328.8,	1466.0,	0.0);	(	391426.8,	3783466.5,	329.0,	1466.0,	0.0);
(	391478.5,	3783409.1,	325.3,	1466.0,	0.0);	(	391535.1,	3783364.5,	316.6,	1466.0,	0.0);
(	391622.0,	3783321.8,	331.3,	1466.0,	0.0);	(	391696.5,	3783305.8,	317.0,	1466.0,	0.0);
(	391866.1,	3783293.4,	323.4,	1466.0,	0.0);	(	391867.5,	3783374.8,	325.7,	1466.0,	0.0);
(	391895.8,	3783420.9,	327.2,	1466.0,	0.0);	(	391929.2,	3783473.1,	330.9,	1466.0,	0.0);
(	391945.8,	3783532.4,	329.4,	1466.0,	0.0);	(	391959.8,	3783580.0,	326.0,	1466.0,	0.0);
(	391977.9,	3783599.5,	327.0,	1466.0,	0.0);	(	391991.3,	3783619.7,	326.6,	1466.0,	0.0);
(	391985.7,	3783654.2,	322.9,	1466.0,	0.0);	(	392000.3,	3783700.5,	326.1,	1466.0,	0.0);
(	391993.4,	3783718.5,	323.2,	1466.0,	0.0);	(	391988.3,	3783729.0,	321.1,	1466.0,	0.0);
(	392020.5,	3783781.6,	323.6,	1466.0,	0.0);	(	392035.0,	3783810.6,	322.4,	1466.0,	0.0);
(	392085.5,	3783854.8,	327.0,	1466.0,	0.0);	(	392097.4,	3783874.8,	327.5,	1466.0,	0.0);
(	392094.2,	3783902.7,	327.0,	1466.0,	0.0);	(	392107.9,	3783935.2,	327.9,	1466.0,	0.0);

**MODELOPTs: RegDFAULT CONC ELEV

*** DISCRETE CARTESIAN RECEPTORS ***
(X-COORD, Y-COORD, ZELEV, ZHILL, ZFLAG)
(METERS)

(	392131.9,	3783980.4,	328.4,	1466.0,	0.0);	(	392147.5,	3784021.5,	328.6,	1466.0,	0.0);
(	392164.1,	3784043.1,	327.6,	1466.0,	0.0);	(	392238.2,	3784138.4,	328.7,	1466.0,	0.0);
(	392283.1,	3784222.5,	327.6,	1466.0,	0.0);	(	392298.8,	3784252.6,	328.9,	1466.0,	0.0);
(	392321.3,	3784292.2,	329.2,	1466.0,	0.0);	(	392365.6,	3784344.8,	346.1,	1466.0,	0.0);
(	392373.0,	3784391.6,	342.8,	1466.0,	0.0);	(	392388.0,	3784426.3,	343.0,	1466.0,	0.0);
(	392419.1,	3784476.3,	341.0,	1466.0,	0.0);	(	392438.1,	3784502.8,	341.7,	1466.0,	0.0);
(	392465.5,	3784724.8,	336.7,	1466.0,	0.0);	(	392481.6,	3784818.9,	336.4,	1466.0,	0.0);
(	392360.1,	3784846.8,	330.4,	1466.0,	0.0);	(	392327.5,	3784774.4,	329.3,	1466.0,	0.0);
(	392156.8,	3784728.3,	328.1,	1466.0,	0.0);	(	392066.5,	3784621.3,	327.7,	1466.0,	0.0);
(	392005.7,	3784593.7,	327.8,	1466.0,	0.0);	(	391953.8,	3784520.0,	325.1,	1466.0,	0.0);
(	391928.9,	3784450.1,	322.8,	1466.0,	0.0);	(	391899.0,	3784384.6,	320.6,	1466.0,	0.0);
(	391867.1,	3784347.2,	319.4,	1466.0,	0.0);	(	391839.3,	3784319.4,	319.4,	1466.0,	0.0);
(	391780.3,	3784247.4,	320.0,	1466.0,	0.0);	(	391728.5,	3784178.9,	318.9,	1466.0,	0.0);
(	391707.4,	3784160.9,	319.1,	1466.0,	0.0);	(	391645.0,	3784090.4,	317.4,	1466.0,	0.0);
(	391594.4,	3784007.6,	317.5,	1466.0,	0.0);	(	391534.1,	3783928.9,	321.2,	1466.0,	0.0);
(	391509.3,	3783812.2,	318.0,	1466.0,	0.0);	(	391492.7,	3783798.7,	319.5,	1466.0,	0.0);
(	391483.8,	3783721.5,	318.7,	1466.0,	0.0);	(	391464.4,	3783664.2,	318.3,	1466.0,	0.0);
(	391446.4,	3783628.1,	319.9,	1466.0,	0.0);	(	391473.6,	3783533.0,	325.3,	1466.0,	0.0);
(	391451.9,	3783524.9,	327.0,	1466.0,	0.0);						

*** METEOROLOGICAL DAYS SELECTED FOR PROCESSING ***
(1=YES; 0=NO)

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1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
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1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
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NOTE: METEOROLOGICAL DATA ACTUALLY PROCESSED WILL ALSO DEPEND ON WHAT IS INCLUDED IN THE DATA FILE.

*** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***
(METERS/SEC)

1.54, 3.09, 5.14, 8.23, 10.80,

**MODELOPTs: RegDFAULT CONC ELEV

*** UP TO THE FIRST 24 HOURS OF METEOROLOGICAL DATA ***

Surface file: ..\burk6.sfc Met Version: 12345
Profile file: ..\burk6.PFL
Surface format: FREE
Profile format: FREE
Surface station no.: 0 Upper air station no.: 3190
Name: BURBANK Name: UNKNOWN
Year: 2005 Year: 2005

First 24 hours of scalar data

YR	MO	DY	JDY	HR	H0	U*	W*	DT/DZ	ZICNV	ZIMCH	M-O LEN	Z0	BOWEN	ALBEDO	REF WS	WD	HT	REF TA	HT
05	01	01	1	01	-3.2	0.063	-9.000	-9.000	-999.	37.	7.1	0.53	1.00	1.00	0.90	285.	9.1	279.9	5.5
05	01	01	1	02	-2.6	0.063	-9.000	-9.000	-999.	37.	8.7	0.53	1.00	1.00	0.90	277.	9.1	279.9	5.5
05	01	01	1	03	-2.6	0.063	-9.000	-9.000	-999.	37.	8.7	0.53	1.00	1.00	0.90	335.	9.1	279.2	5.5
05	01	01	1	04	-2.6	0.063	-9.000	-9.000	-999.	37.	8.6	0.53	1.00	1.00	0.90	291.	9.1	278.8	5.5
05	01	01	1	05	-3.0	0.063	-9.000	-9.000	-999.	37.	7.4	0.53	1.00	1.00	0.90	334.	9.1	278.1	5.5
05	01	01	1	06	-0.5	0.028	-9.000	-9.000	-999.	11.	3.8	0.53	1.00	1.00	0.40	309.	9.1	278.8	5.5
05	01	01	1	07	-2.6	0.063	-9.000	-9.000	-999.	37.	8.6	0.53	1.00	1.00	0.90	313.	9.1	278.8	5.5
05	01	01	1	08	-0.4	0.028	-9.000	-9.000	-999.	11.	4.5	0.53	1.00	0.56	0.40	256.	9.1	279.2	5.5
05	01	01	1	09	0.1	0.128	0.022	0.005	4.	105.	-1838.7	0.53	1.00	0.33	0.90	298.	9.1	282.5	5.5
05	01	01	1	10	0.1	0.128	0.025	0.005	5.	105.	-1838.7	0.53	1.00	0.25	0.90	103.	9.1	286.4	5.5
05	01	01	1	11	0.1	0.310	0.027	0.005	7.	397.	-8888.0	0.53	1.00	0.22	2.20	136.	9.1	287.0	5.5
05	01	01	1	12	0.1	0.310	0.028	0.005	8.	397.	-8888.0	0.53	1.00	0.21	2.20	152.	9.1	287.0	5.5
05	01	01	1	13	0.1	0.254	0.029	0.005	9.	295.	-8888.0	0.53	1.00	0.21	1.80	187.	9.1	285.9	5.5
05	01	01	1	14	0.1	0.184	0.030	0.005	9.	182.	-5471.6	0.53	1.00	0.22	1.30	157.	9.1	287.0	5.5
05	01	01	1	15	0.1	0.184	0.031	0.005	10.	181.	-5471.6	0.53	1.00	0.26	1.30	192.	9.1	286.4	5.5
05	01	01	1	16	0.1	0.254	0.031	0.005	11.	294.	-8888.0	0.53	1.00	0.34	1.80	188.	9.1	285.9	5.5
05	01	01	1	17	-4.9	0.092	-9.000	-9.000	-999.	88.	13.8	0.53	1.00	0.61	1.30	200.	9.1	285.4	5.5
05	01	01	1	18	-2.6	0.063	-9.000	-9.000	-999.	37.	8.7	0.53	1.00	1.00	0.90	162.	9.1	284.9	5.5
05	01	01	1	19	-3.0	0.063	-9.000	-9.000	-999.	37.	7.5	0.53	1.00	1.00	0.90	176.	9.1	284.9	5.5
05	01	01	1	20	-0.4	0.028	-9.000	-9.000	-999.	11.	4.5	0.53	1.00	1.00	0.40	210.	9.1	284.2	5.5
05	01	01	1	21	-0.4	0.028	-9.000	-9.000	-999.	11.	4.5	0.53	1.00	1.00	0.40	236.	9.1	284.2	5.5
05	01	01	1	22	-0.4	0.028	-9.000	-9.000	-999.	11.	4.5	0.53	1.00	1.00	0.40	272.	9.1	283.8	5.5
05	01	01	1	23	-0.4	0.028	-9.000	-9.000	-999.	11.	4.5	0.53	1.00	1.00	0.40	251.	9.1	283.1	5.5
05	01	01	1	24	-0.4	0.028	-9.000	-9.000	-999.	11.	4.5	0.53	1.00	1.00	0.40	301.	9.1	282.5	5.5

First hour of profile data

YR	MO	DY	HR	HEIGHT	F	WDIR	WSPD	AMB_TMP	sigmaA	sigmaW	sigmaV
05	01	01	01	5.5	0	-999.	-99.00	279.9	99.0	-99.00	-99.00
05	01	01	01	9.1	1	285.	0.90	-999.0	99.0	-99.00	-99.00

F indicates top of profile (=1) or below (=0)

**MODELOPTs: RegDFAULT CONC ELEV

*** THE ANNUAL AVERAGE CONCENTRATION VALUES AVERAGED OVER 5 YEARS FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): PAREA1 , L0000001 , L0000002 , L0000003 , L0000004
,
L0000005 , L0000006 , L0000007 , L0000008 , L0000009 , L0000010 , L0000011 , L0000012
,
L0000013 , L0000014 , L0000015 , L0000016 , L0000017 , L0000018 , L0000019 , L0000020
,
L0000021 , L0000022 , L0000023 , L0000024 , L0000025 , L0000026 , L0000027 , . . .
,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF PM_10 IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC
391316.00	3783682.00	0.05326	391392.00	3783989.00	0.07485
391405.00	3784381.00	0.04810	391964.00	3784620.00	0.11209
392559.00	3784546.00	0.02746	392453.00	3784419.00	0.03397
392197.00	3784046.00	0.05612	392034.00	3783741.00	0.07999
391925.00	3783416.00	0.05832	391955.00	3783299.00	0.03027
392291.00	3783005.00	0.01188	391377.48	3783505.54	0.02521
391350.29	3783600.66	0.04623	391281.33	3783478.05	0.01150
391254.14	3783573.17	0.02197	391185.18	3783450.57	0.00399
391157.99	3783545.69	0.01246	391089.03	3783423.08	0.00221
391061.84	3783518.20	0.00608	390992.89	3783395.60	0.00161
390965.70	3783490.72	0.00261	391374.85	3783708.74	0.08034
391264.07	3783681.21	0.04054	391174.54	3783725.75	0.03284
391085.00	3783770.30	0.02745	391075.08	3783662.26	0.01755
390995.10	3783810.84	0.02319	390984.08	3783690.79	0.01397
391294.37	3783785.67	0.05856	391199.65	3783817.76	0.04285
391393.41	3783810.18	0.08579	391445.98	3783889.61	0.10041
391357.08	3783936.97	0.06978	391292.93	3784012.86	0.05468
391243.83	3783923.04	0.05060	391229.81	3784090.65	0.04467
391181.81	3784002.83	0.03697	391133.81	3783915.00	0.03140
391166.08	3784167.31	0.03727	391116.08	3784075.83	0.02775
391066.07	3783984.34	0.02293	391454.69	3783989.72	0.09458
391514.97	3784068.44	0.10878	391375.30	3784050.51	0.06823
391435.58	3784129.23	0.07460	391356.18	3784190.03	0.05620
391276.79	3784250.83	0.04619	391197.39	3784311.63	0.03866
391570.14	3784156.65	0.10931	391632.52	3784227.17	0.10978
391495.24	3784222.90	0.07446	391557.62	3784293.42	0.07573
391420.34	3784289.16	0.05718	391482.72	3784359.68	0.05819
391345.43	3784355.41	0.04537	391407.81	3784425.93	0.04452
391270.53	3784421.67	0.03757	391332.91	3784492.19	0.03619
391404.23	3784559.46	0.03479	391700.57	3784307.69	0.10613
391620.82	3784368.03	0.07455	391761.94	3784382.73	0.10216
391684.58	3784446.10	0.07316	391548.24	3784437.47	0.05639
391607.22	3784509.47	0.05440	391529.87	3784572.84	0.03723
391452.51	3784636.21	0.03137	391822.86	3784449.41	0.10394
391746.72	3784514.23	0.07479	391670.58	3784579.06	0.04829
391594.44	3784643.89	0.03684	391518.30	3784708.72	0.02996
391859.63	3784553.64	0.09573	391923.90	3784651.28	0.08853
391790.26	3784635.16	0.06676	391708.49	3784692.71	0.04380
391760.35	3784766.39	0.04252	391626.71	3784750.27	0.03370
391678.57	3784823.95	0.03262	391544.94	3784807.83	0.02620

**MODELOPTs: RegDFAULT CONC ELEV

*** THE ANNUAL AVERAGE CONCENTRATION VALUES AVERAGED OVER 5 YEARS FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): PAREA1 , L0000001 , L0000002 , L0000003 , L0000004
,
L0000005 , L0000006 , L0000007 , L0000008 , L0000009 , L0000010 , L0000011 , L0000012
,
L0000013 , L0000014 , L0000015 , L0000016 , L0000017 , L0000018 , L0000019 , L0000020
,
L0000021 , L0000022 , L0000023 , L0000024 , L0000025 , L0000026 , L0000027 , . . .
,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF PM_10 IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC
391596.80	3784881.51	0.02448	392025.09	3784712.38	0.09297
391882.54	3784742.32	0.05909	391983.73	3784803.42	0.05653
391841.18	3784833.37	0.04320	391942.37	3784894.47	0.03693
391799.82	3784924.42	0.02987	391901.01	3784985.52	0.02387
391748.36	3785007.09	0.02088	391859.66	3785076.56	0.01642
392080.44	3784792.85	0.07093	392216.07	3784847.91	0.06119
392054.35	3784889.38	0.03886	392189.98	3784944.45	0.03342
392028.26	3784985.92	0.02401	392163.89	3785040.98	0.02038
391985.40	3785071.79	0.01667	392137.80	3785137.52	0.01298
391963.50	3785170.99	0.01191	392111.70	3785234.05	0.00987
392349.09	3784940.29	0.02909	392443.21	3784930.33	0.02339
392360.29	3785036.45	0.01874	392465.55	3785027.80	0.01613
392377.05	3785133.26	0.01318	392276.86	3785121.41	0.01372
392487.88	3785125.28	0.01249	392396.05	3785230.34	0.00961
392289.17	3785217.70	0.01001	392510.22	3785222.75	0.01021
392416.16	3785327.55	0.00623	392304.83	3785314.38	0.00719
392193.50	3785301.21	0.00811	392532.55	3785320.23	0.00840
392580.18	3784802.09	0.02166	392564.10	3784708.00	0.02646
392663.38	3784857.58	0.01237	392587.14	3784971.90	0.01555
392662.67	3784691.16	0.01686	392761.95	3784840.73	0.01084
392670.34	3785027.38	0.01017	392761.24	3784674.31	0.01373
392860.52	3784823.88	0.00949	392829.77	3784968.54	0.00810
392753.54	3785082.86	0.00709	392631.81	3785166.84	0.00896
392859.81	3784657.47	0.01164	392955.25	3784825.12	0.00830
392936.03	3784915.53	0.00764	392916.81	3785005.94	0.00692
392821.52	3785148.84	0.00567	392745.44	3785201.33	0.00536
392669.36	3785253.82	0.00511	392974.46	3784734.71	0.00895
392958.38	3784640.62	0.01008	392546.50	3784564.58	0.02936
392645.74	3784552.32	0.02030	392744.99	3784540.07	0.01615
392844.23	3784527.81	0.01345	392943.48	3784515.55	0.01153
392528.34	3784467.52	0.02868	392609.54	3784409.17	0.02280
392692.56	3784355.42	0.01916	392773.25	3784295.75	0.01680
392814.48	3784401.12	0.01526	392855.42	3784239.86	0.01506
392889.24	3784326.30	0.01385	392923.07	3784412.73	0.01267
392473.02	3784373.58	0.03048	392558.00	3784320.88	0.02463
392642.99	3784268.18	0.02087	392727.98	3784215.48	0.01835
392442.08	3784280.40	0.02947	392518.57	3784215.99	0.02503
392595.07	3784151.59	0.02238	392671.56	3784087.18	0.02019
392775.91	3784083.80	0.01761	392703.78	3783970.18	0.01973
392385.79	3784203.27	0.03040	392460.47	3784130.05	0.02685

**MODELOPTs: RegDFAULT CONC ELEV

*** THE ANNUAL AVERAGE CONCENTRATION VALUES AVERAGED OVER 5 YEARS FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): PAREA1 , L0000001 , L0000002 , L0000003 , L0000004
,
L0000005 , L0000006 , L0000007 , L0000008 , L0000009 , L0000010 , L0000011 , L0000012
,
L0000013 , L0000014 , L0000015 , L0000016 , L0000017 , L0000018 , L0000019 , L0000020
,
L0000021 , L0000022 , L0000023 , L0000024 , L0000025 , L0000026 , L0000027 , . . .
,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF PM_10 IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC
392326.46	3784091.29	0.03490	392414.69	3784044.22	0.02921
392502.91	3783997.14	0.02569	392591.14	3783950.07	0.02273
392242.98	3783981.66	0.04248	392358.97	3783967.87	0.03249
392437.88	3783906.45	0.02869	392516.79	3783845.02	0.02551
392656.08	3783867.11	0.02112	392595.70	3783783.60	0.02291
392196.16	3783888.22	0.04849	392308.50	3783886.49	0.03614
392372.74	3783794.31	0.03197	392461.03	3783747.35	0.02772
392549.32	3783700.40	0.02423	392273.71	3783793.24	0.03873
392343.26	3783701.26	0.03310	392429.17	3783650.07	0.02824
392515.07	3783598.88	0.02450	392151.45	3783779.61	0.05184
392217.34	3783704.40	0.04232	392283.24	3783629.18	0.03588
392349.14	3783553.96	0.03000	392448.38	3783518.79	0.02526
392364.51	3783434.48	0.02599	392073.51	3783676.74	0.06023
392158.73	3783624.43	0.04547	392078.45	3783582.15	0.05425
392162.27	3783529.32	0.04096	392245.75	3783474.96	0.03246
392407.64	3783342.75	0.02201	392106.35	3783443.90	0.03958
392197.79	3783395.42	0.03085	392284.38	3783344.26	0.02504
392344.36	3783259.34	0.02028	392013.47	3783419.30	0.04467
392064.38	3783313.23	0.02998	392148.66	3783259.40	0.02374
392232.93	3783205.58	0.01953	392317.21	3783151.75	0.01655
391952.62	3783322.39	0.03395	391858.81	3783193.70	0.01415
391689.22	3783206.07	0.00699	391926.27	3783119.89	0.01145
392033.53	3783217.93	0.02130	391766.74	3783100.15	0.00627
391919.00	3783020.16	0.00729	392101.00	3783144.12	0.01619
391759.46	3783000.42	0.00254	391911.72	3782920.42	0.00501
392061.21	3782972.27	0.00878	392168.47	3783070.31	0.01318
391752.19	3782900.68	0.00252	391904.45	3782820.69	0.00364
392053.93	3782872.53	0.00634	392235.93	3782996.50	0.01115
391744.91	3782800.95	0.00219	391654.56	3783110.25	0.00206
391633.60	3783012.48	0.00131	391612.64	3782914.70	0.00095
391591.67	3782816.92	0.00084	391577.92	3783232.04	0.00231
391490.96	3783274.81	0.00192	391533.78	3783142.30	0.00123
391446.82	3783185.07	0.00109	391489.65	3783052.57	0.00084
391402.69	3783095.34	0.00078	391491.85	3782946.75	0.00070
391358.55	3783005.60	0.00059	391459.31	3782852.99	0.00056
391314.42	3782915.87	0.00047	391416.69	3783330.49	0.00323
391354.82	3783251.93	0.00122	391292.96	3783173.36	0.00083
391231.09	3783094.79	0.00061	391225.77	3782971.70	0.00047
391352.53	3783399.55	0.00645	391278.23	3783332.63	0.00166
391203.92	3783265.70	0.00104	391129.62	3783198.77	0.00076

**MODELOPTs: RegDFAULT CONC ELEV

*** THE ANNUAL AVERAGE CONCENTRATION VALUES AVERAGED OVER 5 YEARS FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): PAREA1 , L0000001 , L0000002 , L0000003 , L0000004
,
L0000005 , L0000006 , L0000007 , L0000008 , L0000009 , L0000010 , L0000011 , L0000012
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L0000013 , L0000014 , L0000015 , L0000016 , L0000017 , L0000018 , L0000019 , L0000020
,
L0000021 , L0000022 , L0000023 , L0000024 , L0000025 , L0000026 , L0000027 , . . .
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*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF PM_10 IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC
391138.13	3783045.33	0.00051	391055.32	3783131.85	0.00060
391066.66	3783292.47	0.00107	390996.29	3783219.69	0.00078
391438.72	3783626.73	0.13598	391391.56	3783540.40	0.03962
391408.08	3783505.29	0.03240	391426.83	3783466.48	0.02303
391478.55	3783409.06	0.01345	391535.09	3783364.54	0.01278
391622.05	3783321.77	0.01060	391696.49	3783305.81	0.01843
391866.08	3783293.44	0.02896	391867.46	3783374.81	0.05471
391895.82	3783420.88	0.08121	391929.19	3783473.13	0.08322
391945.82	3783532.43	0.09894	391959.78	3783579.98	0.11693
391977.94	3783599.54	0.10843	391991.33	3783619.67	0.10726
391985.70	3783654.24	0.13254	392000.31	3783700.54	0.12075
391993.43	3783718.47	0.13806	391988.28	3783729.05	0.15071
392020.51	3783781.56	0.12698	392035.03	3783810.57	0.12981
392085.55	3783854.83	0.10406	392097.42	3783874.75	0.09937
392094.21	3783902.69	0.10378	392107.87	3783935.18	0.09134
392131.92	3783980.40	0.07932	392147.46	3784021.47	0.07476
392164.07	3784043.09	0.07224	392238.23	3784138.36	0.06237
392283.10	3784222.46	0.06253	392298.83	3784252.65	0.06228
392321.30	3784292.22	0.06292	392365.58	3784344.81	0.04318
392372.96	3784391.60	0.05013	392388.03	3784426.28	0.05157
392419.06	3784476.32	0.05330	392438.11	3784502.83	0.05060
392465.53	3784724.85	0.04840	392481.61	3784818.94	0.03345
392360.15	3784846.77	0.07486	392327.50	3784774.44	0.13028
392156.83	3784728.31	0.16238	392066.45	3784621.33	0.18182
392005.67	3784593.72	0.16286	391953.81	3784520.04	0.17792
391928.86	3784450.11	0.20135	391899.00	3784384.58	0.20445
391867.14	3784347.16	0.20353	391839.30	3784319.36	0.20082
391780.32	3784247.36	0.20765	391728.51	3784178.88	0.22638
391707.42	3784160.91	0.21842	391645.04	3784090.39	0.22770
391594.37	3784007.64	0.23561	391534.09	3783928.92	0.20985
391509.31	3783812.22	0.23032	391492.74	3783798.66	0.20605
391483.79	3783721.49	0.21224	391464.38	3783664.20	0.20189
391446.44	3783628.14	0.16116	391473.63	3783533.02	0.11230
391451.89	3783524.92	0.06711			

**MODELOPTs: RegDFAULT CONC ELEV

*** THE SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 5 YEARS ***

** CONC OF PM_10 IN MICROGRAMS/M**3 **

GROUP ID		AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	NETWORK GRID-ID
ALL	1ST HIGHEST VALUE IS	0.23561	AT (391594.37, 3784007.64, 317.50, 1466.00, 0.00)	DC	
	2ND HIGHEST VALUE IS	0.23032	AT (391509.31, 3783812.22, 318.00, 1466.00, 0.00)	DC	
	3RD HIGHEST VALUE IS	0.22770	AT (391645.04, 3784090.39, 317.37, 1466.00, 0.00)	DC	
	4TH HIGHEST VALUE IS	0.22638	AT (391728.51, 3784178.88, 318.92, 1466.00, 0.00)	DC	
	5TH HIGHEST VALUE IS	0.21842	AT (391707.42, 3784160.91, 319.06, 1466.00, 0.00)	DC	
	6TH HIGHEST VALUE IS	0.21224	AT (391483.79, 3783721.49, 318.68, 1466.00, 0.00)	DC	
	7TH HIGHEST VALUE IS	0.20985	AT (391534.09, 3783928.92, 321.16, 1466.00, 0.00)	DC	
	8TH HIGHEST VALUE IS	0.20765	AT (391780.32, 3784247.36, 319.98, 1466.00, 0.00)	DC	
	9TH HIGHEST VALUE IS	0.20605	AT (391492.74, 3783798.66, 319.53, 1466.00, 0.00)	DC	
	10TH HIGHEST VALUE IS	0.20445	AT (391899.00, 3784384.58, 320.60, 1466.00, 0.00)	DC	

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR

**MODELOPTs: RegDFAULT CONC   ELEV

*** Message Summary : AERMOD Model Execution ***

 --------- Summary of Total Messages --------

A Total of   0 Fatal Error Message(s)
A Total of   6 Warning Message(s)
A Total of   889 Informational Message(s)

A Total of   43824 Hours Were Processed

A Total of   0 Calm Hours Identified

A Total of   889 Missing Hours Identified (2.03 Percent)

   ******** FATAL ERROR MESSAGES ********
              *** NONE ***

   ********   WARNING MESSAGES   ********
MX W420   35935 METQA:Wind Speed Out-of-Range.   KURDAT =   09020607
MX W432   35935 METQA:Friction Velocity Out-of-Range.   KURDAT =   09020607
MX W420   43325 METQA:Wind Speed Out-of-Range.   KURDAT =   09121105
MX W432   43325 METQA:Friction Velocity Out-of-Range.   KURDAT =   09121105
MX W420   43326 METQA:Wind Speed Out-of-Range.   KURDAT =   09121106
MX W432   43326 METQA:Friction Velocity Out-of-Range.   KURDAT =   09121106

   ****
   *** AERMOD Finishes Successfully ***
   ****

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**
** AERMOD Input Produced by:
** AERMOD View Ver. 8.2.0
** Lakes Environmental Software Inc.
** Date: 8/24/2013
** File: C:\Vista Env\2011\11057-Devils Gate Reservoir\DG Operat B\DG Operat B.ADI
**
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**
**
****************************************
** AERMOD Control Pathway
****************************************
**
**
CO STARTING
   TITLEONE Devil's Gate Reservoir - Operational Maintenance
   TITLETWO PM10 Diesel Emissions - Route A
   MODELOPT DFAULT CONC
   AVERTIME ANNUAL
   URBANOPT 9862049 Los_Angeles_County
   POLLUTID PM_10
   RUNORNOT RUN
   ERRORFIL "DG Operat B.err"
CO FINISHED
**
****************************************
** AERMOD Source Pathway
****************************************
**
**
SO STARTING
** Source Location **
** Source ID - Type - X Coord. - Y Coord. **
   LOCATION PAREA1       AREAPOLY   391678.348  3783352.608      317.690
** DESCRSRC On-Site Equipment
** ------------------------------------------------------------------------
** Line Source Represented by Adjacent Volume Sources
** LINE VOLUME Source ID = RDRTE1B
** DESCRSRC Road Route 1B and 1F
** PREFIX
** Length of Side = 5.67
** Configuration = Adjacent
** Emission Rate = 1.465E-06
** Vertical Dimension = 1.92
** SZINIT = 0.89
** Nodes = 15
** 391733.43, 3783640.61, 312.00, 4.15, 2.64
** 391554.47, 3783344.61, 320.76, 4.15, 2.64
** 391612.23, 3783312.16, 333.22, 4.15, 2.64
** 391676.84, 3783300.26, 326.57, 4.15, 2.64
** 391741.71, 3783293.14, 306.12, 4.15, 2.64
** 391897.72, 3783280.48, 324.80, 4.15, 2.64
** 391959.92, 3783268.62, 324.64, 4.15, 2.64
** 392031.26, 3783248.62, 327.05, 4.15, 2.64
** 392092.82, 3783218.30, 327.69, 4.15, 2.64
** 392183.03, 3783159.47, 329.00, 4.15, 2.64
** 392257.79, 3783107.96, 329.00, 4.15, 2.64
** 392296.15, 3783085.52, 329.00, 4.15, 2.64
** 392317.73, 3783078.21, 329.00, 4.15, 2.64
** 392311.74, 3783032.97, 329.00, 4.15, 2.64
** 392278.02, 3782917.49, 328.00, 4.15, 2.64
** ------------------------------------------------------------------------
   LOCATION L0000001     VOLUME   391731.963 3783638.180 312.00
   LOCATION L0000002     VOLUME   391729.030 3783633.329 312.00
   LOCATION L0000003     VOLUME   391726.097 3783628.477 312.00
   LOCATION L0000004     VOLUME   391723.163 3783623.626 312.00
   LOCATION L0000005     VOLUME   391720.230 3783618.774 312.00
   LOCATION L0000006     VOLUME   391717.297 3783613.923 312.00
   LOCATION L0000007     VOLUME   391714.364 3783609.071 312.00
   LOCATION L0000008     VOLUME   391711.430 3783604.220 312.00
   LOCATION L0000009     VOLUME   391708.497 3783599.368 312.00
   LOCATION L0000010     VOLUME   391705.564 3783594.517 312.00
   LOCATION L0000011     VOLUME   391702.631 3783589.665 312.00
   LOCATION L0000012     VOLUME   391699.697 3783584.814 312.00
   LOCATION L0000013     VOLUME   391696.764 3783579.962 312.00
   LOCATION L0000014     VOLUME   391693.831 3783575.111 312.00
   LOCATION L0000015     VOLUME   391690.898 3783570.259 312.00
   LOCATION L0000016     VOLUME   391687.964 3783565.408 312.00
   LOCATION L0000017     VOLUME   391685.031 3783560.557 312.00
   LOCATION L0000018     VOLUME   391682.098 3783555.705 312.02
   LOCATION L0000019     VOLUME   391679.165 3783550.854 312.13
   LOCATION L0000020     VOLUME   391676.232 3783546.002 312.20
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LOCATION L0000021 VOLUME 391673.298 3783541.151 312.25
LOCATION L0000022 VOLUME 391670.365 3783536.299 312.26
LOCATION L0000023 VOLUME 391667.432 3783531.448 312.24
LOCATION L0000024 VOLUME 391664.499 3783526.596 312.18
LOCATION L0000025 VOLUME 391661.565 3783521.745 312.09
LOCATION L0000026 VOLUME 391658.632 3783516.893 312.00
LOCATION L0000027 VOLUME 391655.699 3783512.042 312.00
LOCATION L0000028 VOLUME 391652.766 3783507.190 312.00
LOCATION L0000029 VOLUME 391649.832 3783502.339 312.00
LOCATION L0000030 VOLUME 391646.899 3783497.487 312.00
LOCATION L0000031 VOLUME 391643.966 3783492.636 312.07
LOCATION L0000032 VOLUME 391641.033 3783487.784 312.12
LOCATION L0000033 VOLUME 391638.099 3783482.933 312.14
LOCATION L0000034 VOLUME 391635.166 3783478.081 312.13
LOCATION L0000035 VOLUME 391632.233 3783473.230 312.08
LOCATION L0000036 VOLUME 391629.300 3783468.378 312.01
LOCATION L0000037 VOLUME 391626.366 3783463.527 312.19
LOCATION L0000038 VOLUME 391623.433 3783458.675 312.45
LOCATION L0000039 VOLUME 391620.500 3783453.824 312.71
LOCATION L0000040 VOLUME 391617.567 3783448.972 312.97
LOCATION L0000041 VOLUME 391614.634 3783444.121 313.23
LOCATION L0000042 VOLUME 391611.700 3783439.270 313.49
LOCATION L0000043 VOLUME 391608.767 3783434.418 313.75
LOCATION L0000044 VOLUME 391605.834 3783429.567 314.01
LOCATION L0000045 VOLUME 391602.901 3783424.715 314.27
LOCATION L0000046 VOLUME 391599.967 3783419.864 314.53
LOCATION L0000047 VOLUME 391597.034 3783415.012 314.74
LOCATION L0000048 VOLUME 391594.101 3783410.161 314.90
LOCATION L0000049 VOLUME 391591.168 3783405.309 315.13
LOCATION L0000050 VOLUME 391588.234 3783400.458 315.52
LOCATION L0000051 VOLUME 391585.301 3783395.606 315.80
LOCATION L0000052 VOLUME 391582.368 3783390.755 315.94
LOCATION L0000053 VOLUME 391579.435 3783385.903 315.96
LOCATION L0000054 VOLUME 391576.501 3783381.052 315.85
LOCATION L0000055 VOLUME 391573.568 3783376.200 315.73
LOCATION L0000056 VOLUME 391570.635 3783371.349 316.78
LOCATION L0000057 VOLUME 391567.702 3783366.497 317.96
LOCATION L0000058 VOLUME 391564.768 3783361.646 319.06
LOCATION L0000059 VOLUME 391561.835 3783356.794 319.92
LOCATION L0000060 VOLUME 391558.902 3783351.943 320.52
LOCATION L0000061 VOLUME 391555.969 3783347.091 320.87
LOCATION L0000062 VOLUME 391556.882 3783343.254 321.85
LOCATION L0000063 VOLUME 391561.825 3783340.477 323.39
LOCATION L0000064 VOLUME 391566.768 3783337.701 324.78
LOCATION L0000065 VOLUME 391571.711 3783334.925 325.90
LOCATION L0000066 VOLUME 391576.654 3783332.148 326.94
LOCATION L0000067 VOLUME 391581.597 3783329.372 328.04
LOCATION L0000068 VOLUME 391586.540 3783326.596 329.20
LOCATION L0000069 VOLUME 391591.483 3783323.820 330.42
LOCATION L0000070 VOLUME 391596.426 3783321.043 331.71
LOCATION L0000071 VOLUME 391601.369 3783318.267 332.59
LOCATION L0000072 VOLUME 391606.312 3783315.491 332.95
LOCATION L0000073 VOLUME 391611.255 3783312.714 333.21
LOCATION L0000074 VOLUME 391616.705 3783311.341 333.15
LOCATION L0000075 VOLUME 391622.281 3783310.314 332.99
LOCATION L0000076 VOLUME 391627.856 3783309.287 332.80
LOCATION L0000077 VOLUME 391633.432 3783308.260 332.27
LOCATION L0000078 VOLUME 391639.007 3783307.233 331.62
LOCATION L0000079 VOLUME 391644.583 3783306.206 330.94
LOCATION L0000080 VOLUME 391650.158 3783305.178 330.22
LOCATION L0000081 VOLUME 391655.734 3783304.151 329.46
LOCATION L0000082 VOLUME 391661.309 3783303.124 328.42
LOCATION L0000083 VOLUME 391666.885 3783302.097 327.02
LOCATION L0000084 VOLUME 391672.460 3783301.070 325.64
LOCATION L0000085 VOLUME 391678.048 3783300.131 324.27
LOCATION L0000086 VOLUME 391683.684 3783299.512 322.88
LOCATION L0000087 VOLUME 391689.319 3783298.894 321.40
LOCATION L0000088 VOLUME 391694.955 3783298.275 318.11
LOCATION L0000089 VOLUME 391700.590 3783297.657 314.82
LOCATION L0000090 VOLUME 391706.226 3783297.038 311.51
LOCATION L0000091 VOLUME 391711.861 3783296.419 308.20
LOCATION L0000092 VOLUME 391717.496 3783295.801 304.88
LOCATION L0000093 VOLUME 391723.132 3783295.182 304.24
LOCATION L0000094 VOLUME 391728.767 3783294.564 304.56
LOCATION L0000095 VOLUME 391734.403 3783293.945 304.90
LOCATION L0000096 VOLUME 391740.038 3783293.327 305.25
LOCATION L0000097 VOLUME 391745.684 3783292.821 305.59
LOCATION L0000098 VOLUME 391751.335 3783292.362 306.95
LOCATION L0000099 VOLUME 391756.986 3783291.903 309.72
LOCATION L0000100 VOLUME 391762.636 3783291.444 312.51
LOCATION L0000101 VOLUME 391768.287 3783290.985 315.31
LOCATION L0000102 VOLUME 391773.938 3783290.527 318.12
LOCATION L0000103 VOLUME 391779.588 3783290.068 320.69
LOCATION L0000104 VOLUME 391785.239 3783289.609 321.11
LOCATION L0000105 VOLUME 391790.890 3783289.150 321.54

LOCATION L0000106 VOLUME 391796.540 3783288.691 321.96
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SRCPARAM L0000151     0.000000006208      4.15      2.64      0.89
SRCPARAM L0000152     0.000000006208      4.15      2.64      0.89
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SRCPARAM L0000154     0.000000006208      4.15      2.64      0.89
SRCPARAM L0000155     0.000000006208      4.15      2.64      0.89
SRCPARAM L0000156     0.000000006208      4.15      2.64      0.89
SRCPARAM L0000157     0.000000006208      4.15      2.64      0.89
SRCPARAM L0000158     0.000000006208      4.15      2.64      0.89
SRCPARAM L0000159     0.000000006208      4.15      2.64      0.89
SRCPARAM L0000160     0.000000006208      4.15      2.64      0.89
SRCPARAM L0000161     0.000000006208      4.15      2.64      0.89
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SRCPARAM L0000163     0.000000006208      4.15      2.64      0.89
SRCPARAM L0000164     0.000000006208      4.15      2.64      0.89
SRCPARAM L0000165     0.000000006208      4.15      2.64      0.89
SRCPARAM L0000166     0.000000006208      4.15      2.64      0.89
SRCPARAM L0000167     0.000000006208      4.15      2.64      0.89
SRCPARAM L0000168     0.000000006208      4.15      2.64      0.89
SRCPARAM L0000169     0.000000006208      4.15      2.64      0.89
SRCPARAM L0000170     0.000000006208      4.15      2.64      0.89
SRCPARAM L0000171     0.000000006208      4.15      2.64      0.89
SRCPARAM L0000172     0.000000006208      4.15      2.64      0.89
SRCPARAM L0000173     0.000000006208      4.15      2.64      0.89
SRCPARAM L0000174     0.000000006208      4.15      2.64      0.89
SRCPARAM L0000175     0.000000006208      4.15      2.64      0.89
SRCPARAM L0000176     0.000000006208      4.15      2.64      0.89
SRCPARAM L0000177     0.000000006208      4.15      2.64      0.89
SRCPARAM L0000178     0.000000006208      4.15      2.64      0.89
SRCPARAM L0000179     0.000000006208      4.15      2.64      0.89
SRCPARAM L0000180     0.000000006208      4.15      2.64      0.89
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   SRCPARAM L0000184     0.000000006208      4.15      2.64      0.89
   SRCPARAM L0000185     0.000000006208      4.15      2.64      0.89
   SRCPARAM L0000186     0.000000006208      4.15      2.64      0.89
   SRCPARAM L0000187     0.000000006208      4.15      2.64      0.89
   SRCPARAM L0000188     0.000000006208      4.15      2.64      0.89
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   SRCPARAM L0000235     0.000000006208      4.15      2.64      0.89
   SRCPARAM L0000236     0.000000006208      4.15      2.64      0.89
** ------------------------------------------------------------------------
   URBANSRC ALL

** Variable Emissions Type: "By Month (MONTH)"
** Variable Emission Scenario: "Scenario 2"
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   EMISFACT PAREA1       MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000001     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000001     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000002     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000002     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000003     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
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   EMISFACT L0000006     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000007     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000007     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000008     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000008     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000009     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000009     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000010     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000010     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000011     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000011     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
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EMISFACT L0000013     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000013     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000014     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000014     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000015     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000015     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000016     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
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EMISFACT L0000019     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
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EMISFACT L0000021     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
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EMISFACT L0000022     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000022     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
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EMISFACT L0000025     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000026     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
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EMISFACT L0000027     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000028     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000028     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000029     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000029     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000030     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
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EMISFACT L0000031     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000032     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000032     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
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EMISFACT L0000096     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
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   EMISFACT L0000228     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000228     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000229     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000229     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000230     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000230     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000231     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000231     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000232     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000232     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000233     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000233     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000234     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000234     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000235     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000235     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000236     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000236     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   SRCGROUP ALL
SO FINISHED
**
**************************************
** AERMOD Receptor Pathway
**************************************
**
**
RE STARTING
   INCLUDED "DG Operat B.rou"
RE FINISHED
**
**************************************
** AERMOD Meteorology Pathway
**************************************
**
**
ME STARTING
   SURFFILE ..\burk6.sfc
   PROFFILE ..\burk6.PFL
   SURFDATA 0 2005 Burbank 378.62 3782.24
   UAIRDATA 3190 2005
   SITEDATA 99999 2005
   PROFBASE 175.0 METERS
ME FINISHED
**
**************************************
** AERMOD Output Pathway
**************************************
**
**
OU STARTING
** Auto-Generated Plotfiles
   PLOTFILE ANNUAL ALL "DG OPERAT B.AD\AN00GALL.PLT" 31
   SUMMFILE "DG Operat B.sum"
OU FINISHED

 *********************************
 *** SETUP Finishes Successfully ***
 *********************************
```

**MODELOPTs: RegDFAULT CONC   ELEV

                                          ***   MODEL SETUP OPTIONS SUMMARY   ***
- -

**Model Is Setup For Calculation of Average CONCentration Values.

  -- DEPOSITION LOGIC --
**NO GAS DEPOSITION Data Provided.
**NO PARTICLE DEPOSITION Data Provided.
**Model Uses NO DRY DEPLETION. DRYDPLT = F
**Model Uses NO WET DEPLETION. WETDPLT = F

**Model Uses URBAN Dispersion Algorithm for the SBL for   237 Source(s),
  for Total of   1 Urban Area(s):
  Urban Population =   9862049.0 ; Urban Roughness Length = 1.000 m

**Model Uses Regulatory DEFAULT Options:
       1. Stack-tip Downwash.
       2. Model Accounts for ELEVated Terrain Effects.
       3. Use Calms Processing Routine.
       4. Use Missing Data Processing Routine.
       5. No Exponential Decay for URBAN/Non-SO2.
       6. Urban Roughness Length of 1.0 Meter Assumed.

**Model Assumes No FLAGPOLE Receptor Heights.

**Model Calculates ANNUAL Averages Only

**This Run Includes: 237 Source(s);   1 Source Group(s); and   307 Receptor(s)

**The Model Assumes A Pollutant Type of: PM_10

**Model Set To Continue RUNning After the Setup Testing.

**Output Options Selected:
        Model Outputs Tables of ANNUAL Averages by Receptor
        Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)
        Model Outputs Separate Summary File of High Ranked Values (SUMMFILE Keyword)

**NOTE: The Following Flags May Appear Following CONC Values: c for Calm Hours
                                                                m for Missing Hours
                                                                b for Both Calm and Missing Hours

**Misc. Inputs: Base Elev. for Pot. Temp. Profile (m MSL) =   175.00 ; Decay Coef. =   0.000   ; Rot. Angle =   0.0
                 Emission Units = GRAMS/SEC   ; Emission Rate Unit Factor =   0.10000E+07
                 Output Units   = MICROGRAMS/M**3

**Approximate Storage Requirements of Model =   3.9 MB of RAM.

**Detailed Error/Message File: DG Operat B.err
**File for Summary of Results: DG Operat B.sum

**MODELOPTs: RegDFAULT CONC ELEV

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0000001	0	0.62080E-08	391732.0	3783638.2	312.0	4.15	2.64	0.89	YES	MONTH
L0000002	0	0.62080E-08	391729.0	3783633.3	312.0	4.15	2.64	0.89	YES	MONTH
L0000003	0	0.62080E-08	391726.1	3783628.5	312.0	4.15	2.64	0.89	YES	MONTH
L0000004	0	0.62080E-08	391723.2	3783623.6	312.0	4.15	2.64	0.89	YES	MONTH
L0000005	0	0.62080E-08	391720.2	3783618.8	312.0	4.15	2.64	0.89	YES	MONTH
L0000006	0	0.62080E-08	391717.3	3783613.9	312.0	4.15	2.64	0.89	YES	MONTH
L0000007	0	0.62080E-08	391714.4	3783609.1	312.0	4.15	2.64	0.89	YES	MONTH
L0000008	0	0.62080E-08	391711.4	3783604.2	312.0	4.15	2.64	0.89	YES	MONTH
L0000009	0	0.62080E-08	391708.5	3783599.4	312.0	4.15	2.64	0.89	YES	MONTH
L0000010	0	0.62080E-08	391705.6	3783594.5	312.0	4.15	2.64	0.89	YES	MONTH
L0000011	0	0.62080E-08	391702.6	3783589.7	312.0	4.15	2.64	0.89	YES	MONTH
L0000012	0	0.62080E-08	391699.7	3783584.8	312.0	4.15	2.64	0.89	YES	MONTH
L0000013	0	0.62080E-08	391696.8	3783580.0	312.0	4.15	2.64	0.89	YES	MONTH
L0000014	0	0.62080E-08	391693.8	3783575.1	312.0	4.15	2.64	0.89	YES	MONTH
L0000015	0	0.62080E-08	391690.9	3783570.3	312.0	4.15	2.64	0.89	YES	MONTH
L0000016	0	0.62080E-08	391688.0	3783565.4	312.0	4.15	2.64	0.89	YES	MONTH
L0000017	0	0.62080E-08	391685.0	3783560.6	312.0	4.15	2.64	0.89	YES	MONTH
L0000018	0	0.62080E-08	391682.1	3783555.7	312.0	4.15	2.64	0.89	YES	MONTH
L0000019	0	0.62080E-08	391679.2	3783550.9	312.1	4.15	2.64	0.89	YES	MONTH
L0000020	0	0.62080E-08	391676.2	3783546.0	312.2	4.15	2.64	0.89	YES	MONTH
L0000021	0	0.62080E-08	391673.3	3783541.2	312.2	4.15	2.64	0.89	YES	MONTH
L0000022	0	0.62080E-08	391670.4	3783536.3	312.3	4.15	2.64	0.89	YES	MONTH
L0000023	0	0.62080E-08	391667.4	3783531.4	312.2	4.15	2.64	0.89	YES	MONTH
L0000024	0	0.62080E-08	391664.5	3783526.6	312.2	4.15	2.64	0.89	YES	MONTH
L0000025	0	0.62080E-08	391661.6	3783521.7	312.1	4.15	2.64	0.89	YES	MONTH
L0000026	0	0.62080E-08	391658.6	3783516.9	312.0	4.15	2.64	0.89	YES	MONTH
L0000027	0	0.62080E-08	391655.7	3783512.0	312.0	4.15	2.64	0.89	YES	MONTH
L0000028	0	0.62080E-08	391652.8	3783507.2	312.0	4.15	2.64	0.89	YES	MONTH
L0000029	0	0.62080E-08	391649.8	3783502.3	312.0	4.15	2.64	0.89	YES	MONTH
L0000030	0	0.62080E-08	391646.9	3783497.5	312.0	4.15	2.64	0.89	YES	MONTH
L0000031	0	0.62080E-08	391644.0	3783492.6	312.1	4.15	2.64	0.89	YES	MONTH
L0000032	0	0.62080E-08	391641.0	3783487.8	312.1	4.15	2.64	0.89	YES	MONTH
L0000033	0	0.62080E-08	391638.1	3783482.9	312.1	4.15	2.64	0.89	YES	MONTH
L0000034	0	0.62080E-08	391635.2	3783478.1	312.1	4.15	2.64	0.89	YES	MONTH
L0000035	0	0.62080E-08	391632.2	3783473.2	312.1	4.15	2.64	0.89	YES	MONTH
L0000036	0	0.62080E-08	391629.3	3783468.4	312.0	4.15	2.64	0.89	YES	MONTH
L0000037	0	0.62080E-08	391626.4	3783463.5	312.2	4.15	2.64	0.89	YES	MONTH
L0000038	0	0.62080E-08	391623.4	3783458.7	312.4	4.15	2.64	0.89	YES	MONTH
L0000039	0	0.62080E-08	391620.5	3783453.8	312.7	4.15	2.64	0.89	YES	MONTH
L0000040	0	0.62080E-08	391617.6	3783449.0	313.0	4.15	2.64	0.89	YES	MONTH

**MODELOPTs: RegDFAULT CONC ELEV

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0000041	0	0.62080E-08	391614.6	3783444.1	313.2	4.15	2.64	0.89	YES	MONTH
L0000042	0	0.62080E-08	391611.7	3783439.3	313.5	4.15	2.64	0.89	YES	MONTH
L0000043	0	0.62080E-08	391608.8	3783434.4	313.8	4.15	2.64	0.89	YES	MONTH
L0000044	0	0.62080E-08	391605.8	3783429.6	314.0	4.15	2.64	0.89	YES	MONTH
L0000045	0	0.62080E-08	391602.9	3783424.7	314.3	4.15	2.64	0.89	YES	MONTH
L0000046	0	0.62080E-08	391600.0	3783419.9	314.5	4.15	2.64	0.89	YES	MONTH
L0000047	0	0.62080E-08	391597.0	3783415.0	314.7	4.15	2.64	0.89	YES	MONTH
L0000048	0	0.62080E-08	391594.1	3783410.2	314.9	4.15	2.64	0.89	YES	MONTH
L0000049	0	0.62080E-08	391591.2	3783405.3	315.1	4.15	2.64	0.89	YES	MONTH
L0000050	0	0.62080E-08	391588.2	3783400.5	315.5	4.15	2.64	0.89	YES	MONTH
L0000051	0	0.62080E-08	391585.3	3783395.6	315.8	4.15	2.64	0.89	YES	MONTH
L0000052	0	0.62080E-08	391582.4	3783390.8	315.9	4.15	2.64	0.89	YES	MONTH
L0000053	0	0.62080E-08	391579.4	3783385.9	316.0	4.15	2.64	0.89	YES	MONTH
L0000054	0	0.62080E-08	391576.5	3783381.1	315.9	4.15	2.64	0.89	YES	MONTH
L0000055	0	0.62080E-08	391573.6	3783376.2	315.7	4.15	2.64	0.89	YES	MONTH
L0000056	0	0.62080E-08	391570.6	3783371.3	316.8	4.15	2.64	0.89	YES	MONTH
L0000057	0	0.62080E-08	391567.7	3783366.5	318.0	4.15	2.64	0.89	YES	MONTH
L0000058	0	0.62080E-08	391564.8	3783361.6	319.1	4.15	2.64	0.89	YES	MONTH
L0000059	0	0.62080E-08	391561.8	3783356.8	319.9	4.15	2.64	0.89	YES	MONTH
L0000060	0	0.62080E-08	391558.9	3783351.9	320.5	4.15	2.64	0.89	YES	MONTH
L0000061	0	0.62080E-08	391556.0	3783347.1	320.9	4.15	2.64	0.89	YES	MONTH
L0000062	0	0.62080E-08	391556.9	3783343.3	321.9	4.15	2.64	0.89	YES	MONTH
L0000063	0	0.62080E-08	391561.8	3783340.5	323.4	4.15	2.64	0.89	YES	MONTH
L0000064	0	0.62080E-08	391566.8	3783337.7	324.8	4.15	2.64	0.89	YES	MONTH
L0000065	0	0.62080E-08	391571.7	3783334.9	325.9	4.15	2.64	0.89	YES	MONTH
L0000066	0	0.62080E-08	391576.7	3783332.1	326.9	4.15	2.64	0.89	YES	MONTH
L0000067	0	0.62080E-08	391581.6	3783329.4	328.0	4.15	2.64	0.89	YES	MONTH
L0000068	0	0.62080E-08	391586.5	3783326.6	329.2	4.15	2.64	0.89	YES	MONTH
L0000069	0	0.62080E-08	391591.5	3783323.8	330.4	4.15	2.64	0.89	YES	MONTH
L0000070	0	0.62080E-08	391596.4	3783321.0	331.7	4.15	2.64	0.89	YES	MONTH
L0000071	0	0.62080E-08	391601.4	3783318.3	332.6	4.15	2.64	0.89	YES	MONTH
L0000072	0	0.62080E-08	391606.3	3783315.5	332.9	4.15	2.64	0.89	YES	MONTH
L0000073	0	0.62080E-08	391611.3	3783312.7	333.2	4.15	2.64	0.89	YES	MONTH
L0000074	0	0.62080E-08	391616.7	3783311.3	333.2	4.15	2.64	0.89	YES	MONTH
L0000075	0	0.62080E-08	391622.3	3783310.3	333.0	4.15	2.64	0.89	YES	MONTH
L0000076	0	0.62080E-08	391627.9	3783309.3	332.8	4.15	2.64	0.89	YES	MONTH
L0000077	0	0.62080E-08	391633.4	3783308.3	332.3	4.15	2.64	0.89	YES	MONTH
L0000078	0	0.62080E-08	391639.0	3783307.2	331.6	4.15	2.64	0.89	YES	MONTH
L0000079	0	0.62080E-08	391644.6	3783306.2	330.9	4.15	2.64	0.89	YES	MONTH
L0000080	0	0.62080E-08	391650.2	3783305.2	330.2	4.15	2.64	0.89	YES	MONTH

**MODELOPTs: RegDFAULT CONC ELEV

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0000081	0	0.62080E-08	391655.7	3783304.2	329.5	4.15	2.64	0.89	YES	MONTH
L0000082	0	0.62080E-08	391661.3	3783303.1	328.4	4.15	2.64	0.89	YES	MONTH
L0000083	0	0.62080E-08	391666.9	3783302.1	327.0	4.15	2.64	0.89	YES	MONTH
L0000084	0	0.62080E-08	391672.5	3783301.1	325.6	4.15	2.64	0.89	YES	MONTH
L0000085	0	0.62080E-08	391678.0	3783300.1	324.3	4.15	2.64	0.89	YES	MONTH
L0000086	0	0.62080E-08	391683.7	3783299.5	322.9	4.15	2.64	0.89	YES	MONTH
L0000087	0	0.62080E-08	391689.3	3783298.9	321.4	4.15	2.64	0.89	YES	MONTH
L0000088	0	0.62080E-08	391695.0	3783298.3	318.1	4.15	2.64	0.89	YES	MONTH
L0000089	0	0.62080E-08	391700.6	3783297.7	314.8	4.15	2.64	0.89	YES	MONTH
L0000090	0	0.62080E-08	391706.2	3783297.0	311.5	4.15	2.64	0.89	YES	MONTH
L0000091	0	0.62080E-08	391711.9	3783296.4	308.2	4.15	2.64	0.89	YES	MONTH
L0000092	0	0.62080E-08	391717.5	3783295.8	304.9	4.15	2.64	0.89	YES	MONTH
L0000093	0	0.62080E-08	391723.1	3783295.2	304.2	4.15	2.64	0.89	YES	MONTH
L0000094	0	0.62080E-08	391728.8	3783294.6	304.6	4.15	2.64	0.89	YES	MONTH
L0000095	0	0.62080E-08	391734.4	3783293.9	304.9	4.15	2.64	0.89	YES	MONTH
L0000096	0	0.62080E-08	391740.0	3783293.3	305.2	4.15	2.64	0.89	YES	MONTH
L0000097	0	0.62080E-08	391745.7	3783292.8	305.6	4.15	2.64	0.89	YES	MONTH
L0000098	0	0.62080E-08	391751.3	3783292.4	306.9	4.15	2.64	0.89	YES	MONTH
L0000099	0	0.62080E-08	391757.0	3783291.9	309.7	4.15	2.64	0.89	YES	MONTH
L0000100	0	0.62080E-08	391762.6	3783291.4	312.5	4.15	2.64	0.89	YES	MONTH
L0000101	0	0.62080E-08	391768.3	3783291.0	315.3	4.15	2.64	0.89	YES	MONTH
L0000102	0	0.62080E-08	391773.9	3783290.5	318.1	4.15	2.64	0.89	YES	MONTH
L0000103	0	0.62080E-08	391779.6	3783290.1	320.7	4.15	2.64	0.89	YES	MONTH
L0000104	0	0.62080E-08	391785.2	3783289.6	321.1	4.15	2.64	0.89	YES	MONTH
L0000105	0	0.62080E-08	391790.9	3783289.1	321.5	4.15	2.64	0.89	YES	MONTH
L0000106	0	0.62080E-08	391796.5	3783288.7	322.0	4.15	2.64	0.89	YES	MONTH
L0000107	0	0.62080E-08	391802.2	3783288.2	322.4	4.15	2.64	0.89	YES	MONTH
L0000108	0	0.62080E-08	391807.8	3783287.8	322.8	4.15	2.64	0.89	YES	MONTH
L0000109	0	0.62080E-08	391813.5	3783287.3	322.9	4.15	2.64	0.89	YES	MONTH
L0000110	0	0.62080E-08	391819.1	3783286.9	323.0	4.15	2.64	0.89	YES	MONTH
L0000111	0	0.62080E-08	391824.8	3783286.4	323.0	4.15	2.64	0.89	YES	MONTH
L0000112	0	0.62080E-08	391830.4	3783285.9	323.0	4.15	2.64	0.89	YES	MONTH
L0000113	0	0.62080E-08	391836.1	3783285.5	322.9	4.15	2.64	0.89	YES	MONTH
L0000114	0	0.62080E-08	391841.7	3783285.0	322.9	4.15	2.64	0.89	YES	MONTH
L0000115	0	0.62080E-08	391847.4	3783284.6	322.9	4.15	2.64	0.89	YES	MONTH
L0000116	0	0.62080E-08	391853.0	3783284.1	322.9	4.15	2.64	0.89	YES	MONTH
L0000117	0	0.62080E-08	391858.7	3783283.6	322.9	4.15	2.64	0.89	YES	MONTH
L0000118	0	0.62080E-08	391864.3	3783283.2	322.9	4.15	2.64	0.89	YES	MONTH
L0000119	0	0.62080E-08	391870.0	3783282.7	322.9	4.15	2.64	0.89	YES	MONTH
L0000120	0	0.62080E-08	391875.6	3783282.3	323.3	4.15	2.64	0.89	YES	MONTH

**MODELOPTs: RegDFAULT CONC ELEV

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0000121	0	0.62080E-08	391881.3	3783281.8	323.6	4.15	2.64	0.89	YES	MONTH
L0000122	0	0.62080E-08	391887.0	3783281.3	323.9	4.15	2.64	0.89	YES	MONTH
L0000123	0	0.62080E-08	391892.6	3783280.9	324.2	4.15	2.64	0.89	YES	MONTH
L0000124	0	0.62080E-08	391898.2	3783280.4	324.5	4.15	2.64	0.89	YES	MONTH
L0000125	0	0.62080E-08	391903.8	3783279.3	324.8	4.15	2.64	0.89	YES	MONTH
L0000126	0	0.62080E-08	391909.4	3783278.3	324.9	4.15	2.64	0.89	YES	MONTH
L0000127	0	0.62080E-08	391915.0	3783277.2	325.1	4.15	2.64	0.89	YES	MONTH
L0000128	0	0.62080E-08	391920.5	3783276.1	325.2	4.15	2.64	0.89	YES	MONTH
L0000129	0	0.62080E-08	391926.1	3783275.1	325.3	4.15	2.64	0.89	YES	MONTH
L0000130	0	0.62080E-08	391931.7	3783274.0	325.4	4.15	2.64	0.89	YES	MONTH
L0000131	0	0.62080E-08	391937.2	3783272.9	325.6	4.15	2.64	0.89	YES	MONTH
L0000132	0	0.62080E-08	391942.8	3783271.9	325.7	4.15	2.64	0.89	YES	MONTH
L0000133	0	0.62080E-08	391948.4	3783270.8	325.9	4.15	2.64	0.89	YES	MONTH
L0000134	0	0.62080E-08	391953.9	3783269.8	326.1	4.15	2.64	0.89	YES	MONTH
L0000135	0	0.62080E-08	391959.5	3783268.7	326.2	4.15	2.64	0.89	YES	MONTH
L0000136	0	0.62080E-08	391965.0	3783267.2	326.3	4.15	2.64	0.89	YES	MONTH
L0000137	0	0.62080E-08	391970.4	3783265.7	326.3	4.15	2.64	0.89	YES	MONTH
L0000138	0	0.62080E-08	391975.9	3783264.1	326.3	4.15	2.64	0.89	YES	MONTH
L0000139	0	0.62080E-08	391981.3	3783262.6	326.4	4.15	2.64	0.89	YES	MONTH
L0000140	0	0.62080E-08	391986.8	3783261.1	326.4	4.15	2.64	0.89	YES	MONTH
L0000141	0	0.62080E-08	391992.3	3783259.6	326.4	4.15	2.64	0.89	YES	MONTH
L0000142	0	0.62080E-08	391997.7	3783258.0	326.4	4.15	2.64	0.89	YES	MONTH
L0000143	0	0.62080E-08	392003.2	3783256.5	326.5	4.15	2.64	0.89	YES	MONTH
L0000144	0	0.62080E-08	392008.6	3783255.0	326.6	4.15	2.64	0.89	YES	MONTH
L0000145	0	0.62080E-08	392014.1	3783253.4	326.6	4.15	2.64	0.89	YES	MONTH
L0000146	0	0.62080E-08	392019.6	3783251.9	326.7	4.15	2.64	0.89	YES	MONTH
L0000147	0	0.62080E-08	392025.0	3783250.4	327.0	4.15	2.64	0.89	YES	MONTH
L0000148	0	0.62080E-08	392030.5	3783248.8	327.2	4.15	2.64	0.89	YES	MONTH
L0000149	0	0.62080E-08	392035.6	3783246.5	327.4	4.15	2.64	0.89	YES	MONTH
L0000150	0	0.62080E-08	392040.7	3783244.0	327.6	4.15	2.64	0.89	YES	MONTH
L0000151	0	0.62080E-08	392045.8	3783241.5	327.8	4.15	2.64	0.89	YES	MONTH
L0000152	0	0.62080E-08	392050.9	3783239.0	327.8	4.15	2.64	0.89	YES	MONTH
L0000153	0	0.62080E-08	392056.0	3783236.5	327.7	4.15	2.64	0.89	YES	MONTH
L0000154	0	0.62080E-08	392061.0	3783234.0	327.5	4.15	2.64	0.89	YES	MONTH
L0000155	0	0.62080E-08	392066.1	3783231.4	327.3	4.15	2.64	0.89	YES	MONTH
L0000156	0	0.62080E-08	392071.2	3783228.9	327.2	4.15	2.64	0.89	YES	MONTH
L0000157	0	0.62080E-08	392076.3	3783226.4	327.0	4.15	2.64	0.89	YES	MONTH
L0000158	0	0.62080E-08	392081.4	3783223.9	327.2	4.15	2.64	0.89	YES	MONTH
L0000159	0	0.62080E-08	392086.5	3783221.4	327.6	4.15	2.64	0.89	YES	MONTH
L0000160	0	0.62080E-08	392091.6	3783218.9	327.8	4.15	2.64	0.89	YES	MONTH

**MODELOPTs: RegDFAULT CONC ELEV

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0000161	0	0.62080E-08	392096.4	3783216.0	328.1	4.15	2.64	0.89	YES	MONTH
L0000162	0	0.62080E-08	392101.1	3783212.9	328.3	4.15	2.64	0.89	YES	MONTH
L0000163	0	0.62080E-08	392105.9	3783209.8	328.5	4.15	2.64	0.89	YES	MONTH
L0000164	0	0.62080E-08	392110.6	3783206.7	328.7	4.15	2.64	0.89	YES	MONTH
L0000165	0	0.62080E-08	392115.4	3783203.6	328.8	4.15	2.64	0.89	YES	MONTH
L0000166	0	0.62080E-08	392120.1	3783200.5	328.9	4.15	2.64	0.89	YES	MONTH
L0000167	0	0.62080E-08	392124.9	3783197.4	329.0	4.15	2.64	0.89	YES	MONTH
L0000168	0	0.62080E-08	392129.6	3783194.3	329.0	4.15	2.64	0.89	YES	MONTH
L0000169	0	0.62080E-08	392134.4	3783191.2	329.0	4.15	2.64	0.89	YES	MONTH
L0000170	0	0.62080E-08	392139.1	3783188.1	329.0	4.15	2.64	0.89	YES	MONTH
L0000171	0	0.62080E-08	392143.9	3783185.0	329.0	4.15	2.64	0.89	YES	MONTH
L0000172	0	0.62080E-08	392148.6	3783181.9	329.0	4.15	2.64	0.89	YES	MONTH
L0000173	0	0.62080E-08	392153.4	3783178.8	329.0	4.15	2.64	0.89	YES	MONTH
L0000174	0	0.62080E-08	392158.1	3783175.7	329.0	4.15	2.64	0.89	YES	MONTH
L0000175	0	0.62080E-08	392162.9	3783172.6	329.0	4.15	2.64	0.89	YES	MONTH
L0000176	0	0.62080E-08	392167.6	3783169.5	329.0	4.15	2.64	0.89	YES	MONTH
L0000177	0	0.62080E-08	392172.4	3783166.4	329.0	4.15	2.64	0.89	YES	MONTH
L0000178	0	0.62080E-08	392177.1	3783163.3	329.0	4.15	2.64	0.89	YES	MONTH
L0000179	0	0.62080E-08	392181.9	3783160.2	329.0	4.15	2.64	0.89	YES	MONTH
L0000180	0	0.62080E-08	392186.6	3783157.0	329.0	4.15	2.64	0.89	YES	MONTH
L0000181	0	0.62080E-08	392191.2	3783153.8	329.0	4.15	2.64	0.89	YES	MONTH
L0000182	0	0.62080E-08	392195.9	3783150.6	329.0	4.15	2.64	0.89	YES	MONTH
L0000183	0	0.62080E-08	392200.6	3783147.4	329.0	4.15	2.64	0.89	YES	MONTH
L0000184	0	0.62080E-08	392205.2	3783144.2	329.0	4.15	2.64	0.89	YES	MONTH
L0000185	0	0.62080E-08	392209.9	3783141.0	329.0	4.15	2.64	0.89	YES	MONTH
L0000186	0	0.62080E-08	392214.6	3783137.7	329.0	4.15	2.64	0.89	YES	MONTH
L0000187	0	0.62080E-08	392219.2	3783134.5	329.0	4.15	2.64	0.89	YES	MONTH
L0000188	0	0.62080E-08	392223.9	3783131.3	329.0	4.15	2.64	0.89	YES	MONTH
L0000189	0	0.62080E-08	392228.6	3783128.1	329.0	4.15	2.64	0.89	YES	MONTH
L0000190	0	0.62080E-08	392233.2	3783124.9	329.0	4.15	2.64	0.89	YES	MONTH
L0000191	0	0.62080E-08	392237.9	3783121.7	329.0	4.15	2.64	0.89	YES	MONTH
L0000192	0	0.62080E-08	392242.6	3783118.4	329.0	4.15	2.64	0.89	YES	MONTH
L0000193	0	0.62080E-08	392247.2	3783115.2	329.0	4.15	2.64	0.89	YES	MONTH
L0000194	0	0.62080E-08	392251.9	3783112.0	329.0	4.15	2.64	0.89	YES	MONTH
L0000195	0	0.62080E-08	392256.6	3783108.8	329.0	4.15	2.64	0.89	YES	MONTH
L0000196	0	0.62080E-08	392261.4	3783105.8	329.0	4.15	2.64	0.89	YES	MONTH
L0000197	0	0.62080E-08	392266.3	3783103.0	329.0	4.15	2.64	0.89	YES	MONTH
L0000198	0	0.62080E-08	392271.2	3783100.1	329.0	4.15	2.64	0.89	YES	MONTH
L0000199	0	0.62080E-08	392276.1	3783097.2	329.0	4.15	2.64	0.89	YES	MONTH
L0000200	0	0.62080E-08	392281.0	3783094.4	329.0	4.15	2.64	0.89	YES	MONTH

**MODELOPTs: RegDFAULT CONC ELEV

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0000201	0	0.62080E-08	392285.9	3783091.5	329.0	4.15	2.64	0.89	YES	MONTH
L0000202	0	0.62080E-08	392290.8	3783088.7	329.0	4.15	2.64	0.89	YES	MONTH
L0000203	0	0.62080E-08	392295.7	3783085.8	329.1	4.15	2.64	0.89	YES	MONTH
L0000204	0	0.62080E-08	392301.0	3783083.9	329.1	4.15	2.64	0.89	YES	MONTH
L0000205	0	0.62080E-08	392306.4	3783082.1	329.1	4.15	2.64	0.89	YES	MONTH
L0000206	0	0.62080E-08	392311.7	3783080.2	329.1	4.15	2.64	0.89	YES	MONTH
L0000207	0	0.62080E-08	392317.1	3783078.4	329.1	4.15	2.64	0.89	YES	MONTH
L0000208	0	0.62080E-08	392317.1	3783073.2	329.0	4.15	2.64	0.89	YES	MONTH
L0000209	0	0.62080E-08	392316.3	3783067.6	329.0	4.15	2.64	0.89	YES	MONTH
L0000210	0	0.62080E-08	392315.6	3783062.0	329.0	4.15	2.64	0.89	YES	MONTH
L0000211	0	0.62080E-08	392314.8	3783056.4	329.0	4.15	2.64	0.89	YES	MONTH
L0000212	0	0.62080E-08	392314.1	3783050.8	329.0	4.15	2.64	0.89	YES	MONTH
L0000213	0	0.62080E-08	392313.4	3783045.1	329.0	4.15	2.64	0.89	YES	MONTH
L0000214	0	0.62080E-08	392312.6	3783039.5	329.0	4.15	2.64	0.89	YES	MONTH
L0000215	0	0.62080E-08	392311.9	3783033.9	329.0	4.15	2.64	0.89	YES	MONTH
L0000216	0	0.62080E-08	392310.4	3783028.4	329.0	4.15	2.64	0.89	YES	MONTH
L0000217	0	0.62080E-08	392308.8	3783023.0	329.0	4.15	2.64	0.89	YES	MONTH
L0000218	0	0.62080E-08	392307.2	3783017.5	329.0	4.15	2.64	0.89	YES	MONTH
L0000219	0	0.62080E-08	392305.6	3783012.1	329.0	4.15	2.64	0.89	YES	MONTH
L0000220	0	0.62080E-08	392304.1	3783006.7	329.0	4.15	2.64	0.89	YES	MONTH
L0000221	0	0.62080E-08	392302.5	3783001.2	329.0	4.15	2.64	0.89	YES	MONTH
L0000222	0	0.62080E-08	392300.9	3782995.8	329.0	4.15	2.64	0.89	YES	MONTH
L0000223	0	0.62080E-08	392299.3	3782990.3	329.0	4.15	2.64	0.89	YES	MONTH
L0000224	0	0.62080E-08	392297.7	3782984.9	329.0	4.15	2.64	0.89	YES	MONTH
L0000225	0	0.62080E-08	392296.1	3782979.5	329.0	4.15	2.64	0.89	YES	MONTH
L0000226	0	0.62080E-08	392294.5	3782974.0	329.0	4.15	2.64	0.89	YES	MONTH
L0000227	0	0.62080E-08	392292.9	3782968.6	329.0	4.15	2.64	0.89	YES	MONTH
L0000228	0	0.62080E-08	392291.3	3782963.1	329.0	4.15	2.64	0.89	YES	MONTH
L0000229	0	0.62080E-08	392289.8	3782957.7	329.0	4.15	2.64	0.89	YES	MONTH
L0000230	0	0.62080E-08	392288.2	3782952.2	328.8	4.15	2.64	0.89	YES	MONTH
L0000231	0	0.62080E-08	392286.6	3782946.8	328.6	4.15	2.64	0.89	YES	MONTH
L0000232	0	0.62080E-08	392285.0	3782941.4	328.4	4.15	2.64	0.89	YES	MONTH
L0000233	0	0.62080E-08	392283.4	3782935.9	328.2	4.15	2.64	0.89	YES	MONTH
L0000234	0	0.62080E-08	392281.8	3782930.5	328.1	4.15	2.64	0.89	YES	MONTH
L0000235	0	0.62080E-08	392280.2	3782925.0	328.0	4.15	2.64	0.89	YES	MONTH
L0000236	0	0.62080E-08	392278.6	3782919.6	327.9	4.15	2.64	0.89	YES	MONTH

**MODELOPTs: RegDFAULT CONC ELEV

*** AREAPOLY SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC /METER**2)	LOCATION OF AREA X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	NUMBER OF VERTS.	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
PAREA1	0	0.91430E-08	391678.3	3783352.6	317.7	0.61	50	3.96	YES	MONTH

**MODELOPTs: RegDFAULT CONC ELEV

*** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID	SOURCE IDs
ALL	PAREA1 , L0000001 , L0000002 , L0000003 , L0000004 , L0000005 , L0000006 , L0000007 ,
	L0000008 , L0000009 , L0000010 , L0000011 , L0000012 , L0000013 , L0000014 , L0000015 ,
	L0000016 , L0000017 , L0000018 , L0000019 , L0000020 , L0000021 , L0000022 , L0000023 ,
	L0000024 , L0000025 , L0000026 , L0000027 , L0000028 , L0000029 , L0000030 , L0000031 ,
	L0000032 , L0000033 , L0000034 , L0000035 , L0000036 , L0000037 , L0000038 , L0000039 ,
	L0000040 , L0000041 , L0000042 , L0000043 , L0000044 , L0000045 , L0000046 , L0000047 ,
	L0000048 , L0000049 , L0000050 , L0000051 , L0000052 , L0000053 , L0000054 , L0000055 ,
	L0000056 , L0000057 , L0000058 , L0000059 , L0000060 , L0000061 , L0000062 , L0000063 ,
	L0000064 , L0000065 , L0000066 , L0000067 , L0000068 , L0000069 , L0000070 , L0000071 ,
	L0000072 , L0000073 , L0000074 , L0000075 , L0000076 , L0000077 , L0000078 , L0000079 ,
	L0000080 , L0000081 , L0000082 , L0000083 , L0000084 , L0000085 , L0000086 , L0000087 ,
	L0000088 , L0000089 , L0000090 , L0000091 , L0000092 , L0000093 , L0000094 , L0000095 ,
	L0000096 , L0000097 , L0000098 , L0000099 , L0000100 , L0000101 , L0000102 , L0000103 ,
	L0000104 , L0000105 , L0000106 , L0000107 , L0000108 , L0000109 , L0000110 , L0000111 ,
	L0000112 , L0000113 , L0000114 , L0000115 , L0000116 , L0000117 , L0000118 , L0000119 ,
	L0000120 , L0000121 , L0000122 , L0000123 , L0000124 , L0000125 , L0000126 , L0000127 ,
	L0000128 , L0000129 , L0000130 , L0000131 , L0000132 , L0000133 , L0000134 , L0000135 ,
	L0000136 , L0000137 , L0000138 , L0000139 , L0000140 , L0000141 , L0000142 , L0000143 ,
	L0000144 , L0000145 , L0000146 , L0000147 , L0000148 , L0000149 , L0000150 , L0000151 ,
	L0000152 , L0000153 , L0000154 , L0000155 , L0000156 , L0000157 , L0000158 , L0000159 ,

**MODELOPTs: RegDFAULT CONC ELEV

*** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID SOURCE IDs

L0000160 , L0000161 , L0000162 , L0000163 , L0000164 , L0000165 , L0000166 , L0000167 ,
L0000168 , L0000169 , L0000170 , L0000171 , L0000172 , L0000173 , L0000174 , L0000175 ,
L0000176 , L0000177 , L0000178 , L0000179 , L0000180 , L0000181 , L0000182 , L0000183 ,
L0000184 , L0000185 , L0000186 , L0000187 , L0000188 , L0000189 , L0000190 , L0000191 ,
L0000192 , L0000193 , L0000194 , L0000195 , L0000196 , L0000197 , L0000198 , L0000199 ,
L0000200 , L0000201 , L0000202 , L0000203 , L0000204 , L0000205 , L0000206 , L0000207 ,
L0000208 , L0000209 , L0000210 , L0000211 , L0000212 , L0000213 , L0000214 , L0000215 ,
L0000216 , L0000217 , L0000218 , L0000219 , L0000220 , L0000221 , L0000222 , L0000223 ,
L0000224 , L0000225 , L0000226 , L0000227 , L0000228 , L0000229 , L0000230 , L0000231 ,
L0000232 , L0000233 , L0000234 , L0000235 , L0000236 ,

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = PAREA1   ; SOURCE TYPE = AREAPOLY :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000001   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000002   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000003   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000004   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000005   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000006   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000007   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000008   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000009   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000010   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000011   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000012   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000013   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000014   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000015   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000016   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000017   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000018   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000019   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000020   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000021   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000022   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000023   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000024   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000025   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000026   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000027   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000028   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000029   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000030   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000031   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000032   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000033   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000034   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000035   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000036   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000037   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000038   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000039   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000040   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000041   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000042 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000043 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000044 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000045 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000046 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000047 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000048 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000049 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000050 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000051 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000052 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000053 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000054   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000055   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000056   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000057   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000058   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000059   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000060   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000061   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000062   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000063   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000064   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000065   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000066   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000067   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000068   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000069   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000070   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000071   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000072   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000073   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000074   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000075   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000076   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000077   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000078   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000079   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000080   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000081   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000082   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000083   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000084   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000085   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000086   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000087   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000088   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000089   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000090   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000091   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000092   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000093   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000094   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000095   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000096   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000097   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000098   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000099   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000100   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000101   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000102 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000103 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000104 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000105 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000106 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000107 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000108   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000109   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000110   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000111   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000112   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000113   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000114 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000115 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000116 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000117 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000118 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000119 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000120   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000121   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000122   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000123   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000124   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000125   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000126 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000127 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000128 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000129 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000130 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000131 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000132   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000133   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000134   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000135   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000136   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000137   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000138   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000139   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000140   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000141   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000142   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000143   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000144   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000145   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000146   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000147   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000148   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000149   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000150   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000151   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000152   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000153   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000154   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000155   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000156 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000157 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000158 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000159 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000160 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000161 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000162   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000163   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000164   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000165   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000166   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000167   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000168   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000169   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000170   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000171   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000172   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000173   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000174   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000175   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000176   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000177   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000178   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000179   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000180   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000181   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000182   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000183   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000184   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000185   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000186   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000187   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000188   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000189   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000190   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000191   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000192   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000193   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000194   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000195   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000196   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000197   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000198   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000199   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000200   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000201   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000202   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000203   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000204 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000205 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000206 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000207 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000208 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000209 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000210   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000211   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000212   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000213   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000214   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000215   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000216   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000217   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000218   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000219   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000220   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000221   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000222   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000223   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000224   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000225   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000226   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000227   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000228 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000229 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000230 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000231 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000232 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000233 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000234   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000235   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000236   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

*** DISCRETE CARTESIAN RECEPTORS ***
(X-COORD, Y-COORD, ZELEV, ZHILL, ZFLAG)
(METERS)

(	391316.0,	3783682.0,	328.5,	1466.0,	0.0);	(	391392.0,	3783989.0,	332.9,	1466.0,	0.0);
(	391405.0,	3784381.0,	334.9,	1466.0,	0.0);	(	391964.0,	3784620.0,	329.4,	1466.0,	0.0);
(	392559.0,	3784546.0,	356.0,	1466.0,	0.0);	(	392453.0,	3784419.0,	356.5,	1466.0,	0.0);
(	392197.0,	3784046.0,	337.2,	1466.0,	0.0);	(	392034.0,	3783741.0,	337.0,	1466.0,	0.0);
(	391925.0,	3783416.0,	333.0,	1466.0,	0.0);	(	391955.0,	3783299.0,	328.7,	1466.0,	0.0);
(	392291.0,	3783005.0,	329.0,	1466.0,	0.0);	(	391377.5,	3783505.5,	329.0,	1466.0,	0.0);
(	391350.3,	3783600.7,	328.0,	1466.0,	0.0);	(	391281.3,	3783478.0,	327.6,	1466.0,	0.0);
(	391254.1,	3783573.2,	328.5,	1466.0,	0.0);	(	391185.2,	3783450.6,	349.5,	1466.0,	0.0);
(	391158.0,	3783545.7,	327.2,	1466.0,	0.0);	(	391089.0,	3783423.1,	373.1,	1466.0,	0.0);
(	391061.8,	3783518.2,	340.7,	1466.0,	0.0);	(	390992.9,	3783395.6,	387.8,	1466.0,	0.0);
(	390965.7,	3783490.7,	375.0,	1466.0,	0.0);	(	391374.8,	3783708.7,	326.0,	1466.0,	0.0);
(	391264.1,	3783681.2,	329.2,	1466.0,	0.0);	(	391174.5,	3783725.8,	327.5,	1466.0,	0.0);
(	391085.0,	3783770.3,	327.1,	1466.0,	0.0);	(	391075.1,	3783662.3,	328.7,	1466.0,	0.0);
(	390995.1,	3783810.8,	328.1,	1466.0,	0.0);	(	390984.1,	3783690.8,	334.0,	1466.0,	0.0);
(	391294.4,	3783785.7,	329.1,	1466.0,	0.0);	(	391199.6,	3783817.8,	331.2,	1466.0,	0.0);
(	391393.4,	3783810.2,	329.2,	1466.0,	0.0);	(	391446.0,	3783889.6,	330.1,	1466.0,	0.0);
(	391357.1,	3783937.0,	332.7,	1466.0,	0.0);	(	391292.9,	3784012.9,	336.2,	1466.0,	0.0);
(	391243.8,	3783923.0,	334.4,	1466.0,	0.0);	(	391229.8,	3784090.6,	339.4,	1466.0,	0.0);
(	391181.8,	3784002.8,	343.4,	1466.0,	0.0);	(	391133.8,	3783915.0,	343.3,	1466.0,	0.0);
(	391166.1,	3784167.3,	342.4,	1466.0,	0.0);	(	391116.1,	3784075.8,	352.0,	1466.0,	0.0);
(	391066.1,	3783984.3,	354.5,	1466.0,	0.0);	(	391454.7,	3783989.7,	330.8,	1466.0,	0.0);
(	391515.0,	3784068.4,	327.4,	1466.0,	0.0);	(	391375.3,	3784050.5,	333.5,	1466.0,	0.0);
(	391435.6,	3784129.2,	331.4,	1466.0,	0.0);	(	391356.2,	3784190.0,	335.1,	1466.0,	0.0);
(	391276.8,	3784250.8,	336.8,	1466.0,	0.0);	(	391197.4,	3784311.6,	339.0,	1466.0,	0.0);
(	391570.1,	3784156.6,	325.9,	1466.0,	0.0);	(	391632.5,	3784227.2,	324.2,	1466.0,	0.0);
(	391495.2,	3784222.9,	330.5,	1466.0,	0.0);	(	391557.6,	3784293.4,	328.4,	1466.0,	0.0);
(	391420.3,	3784289.2,	333.0,	1466.0,	0.0);	(	391482.7,	3784359.7,	330.9,	1466.0,	0.0);
(	391345.4,	3784355.4,	336.3,	1466.0,	0.0);	(	391407.8,	3784425.9,	336.4,	1466.0,	0.0);
(	391270.5,	3784421.7,	338.9,	1466.0,	0.0);	(	391332.9,	3784492.2,	339.9,	1466.0,	0.0);
(	391404.2,	3784559.5,	341.4,	1466.0,	0.0);	(	391700.6,	3784307.7,	323.6,	1466.0,	0.0);
(	391620.8,	3784368.0,	327.3,	1466.0,	0.0);	(	391761.9,	3784382.7,	323.8,	1466.0,	0.0);
(	391684.6,	3784446.1,	326.7,	1466.0,	0.0);	(	391548.2,	3784437.5,	331.3,	1466.0,	0.0);
(	391607.2,	3784509.5,	332.7,	1466.0,	0.0);	(	391529.9,	3784572.8,	342.9,	1466.0,	0.0);
(	391452.5,	3784636.2,	345.0,	1466.0,	0.0);	(	391822.9,	3784449.4,	324.3,	1466.0,	0.0);
(	391746.7,	3784514.2,	327.0,	1466.0,	0.0);	(	391670.6,	3784579.1,	339.0,	1466.0,	0.0);
(	391594.4,	3784643.9,	344.0,	1466.0,	0.0);	(	391518.3,	3784708.7,	347.4,	1466.0,	0.0);
(	391859.6,	3784553.6,	327.2,	1466.0,	0.0);	(	391923.9,	3784651.3,	330.6,	1466.0,	0.0);
(	391790.3,	3784635.2,	331.5,	1466.0,	0.0);	(	391708.5,	3784692.7,	341.3,	1466.0,	0.0);
(	391760.3,	3784766.4,	341.5,	1466.0,	0.0);	(	391626.7,	3784750.3,	345.9,	1466.0,	0.0);
(	391678.6,	3784823.9,	346.1,	1466.0,	0.0);	(	391544.9,	3784807.8,	351.3,	1466.0,	0.0);
(	391596.8,	3784881.5,	353.2,	1466.0,	0.0);	(	392025.1,	3784712.4,	331.1,	1466.0,	0.0);
(	391882.5,	3784742.3,	335.8,	1466.0,	0.0);	(	391983.7,	3784803.4,	337.1,	1466.0,	0.0);
(	391841.2,	3784833.4,	339.5,	1466.0,	0.0);	(	391942.4,	3784894.5,	342.8,	1466.0,	0.0);
(	391799.8,	3784924.4,	346.4,	1466.0,	0.0);	(	391901.0,	3784985.5,	351.9,	1466.0,	0.0);
(	391748.4,	3785007.1,	355.8,	1466.0,	0.0);	(	391859.7,	3785076.6,	363.7,	1466.0,	0.0);

**MODELOPTs: RegDFAULT CONC ELEV

*** DISCRETE CARTESIAN RECEPTORS ***
(X-COORD, Y-COORD, ZELEV, ZHILL, ZFLAG)
(METERS)

(	392080.4,	3784792.8,	334.3,	1466.0,	0.0);	(	392216.1,	3784847.9,	331.5,	1466.0,	0.0);
(	392054.3,	3784889.4,	342.2,	1466.0,	0.0);	(	392190.0,	3784944.4,	337.6,	1466.0,	0.0);
(	392028.3,	3784985.9,	350.3,	1466.0,	0.0);	(	392163.9,	3785041.0,	346.0,	1466.0,	0.0);
(	391985.4,	3785071.8,	360.1,	1466.0,	0.0);	(	392137.8,	3785137.5,	361.2,	1466.0,	0.0);
(	391963.5,	3785171.0,	371.9,	1466.0,	0.0);	(	392111.7,	3785234.0,	372.5,	1466.0,	0.0);
(	392349.1,	3784940.3,	334.2,	1466.0,	0.0);	(	392443.2,	3784930.3,	335.0,	1466.0,	0.0);
(	392360.3,	3785036.4,	339.5,	1466.0,	0.0);	(	392465.5,	3785027.8,	337.0,	1466.0,	0.0);
(	392377.0,	3785133.3,	346.3,	1466.0,	0.0);	(	392276.9,	3785121.4,	352.6,	1466.0,	0.0);
(	392487.9,	3785125.3,	338.4,	1466.0,	0.0);	(	392396.0,	3785230.3,	354.7,	1466.0,	0.0);
(	392289.2,	3785217.7,	362.7,	1466.0,	0.0);	(	392510.2,	3785222.8,	339.9,	1466.0,	0.0);
(	392416.2,	3785327.5,	396.3,	1466.0,	0.0);	(	392304.8,	3785314.4,	398.2,	1466.0,	0.0);
(	392193.5,	3785301.2,	385.3,	1466.0,	0.0);	(	392532.5,	3785320.2,	343.5,	1466.0,	0.0);
(	392580.2,	3784802.1,	346.5,	1466.0,	0.0);	(	392564.1,	3784708.0,	348.7,	1466.0,	0.0);
(	392663.4,	3784857.6,	368.5,	1466.0,	0.0);	(	392587.1,	3784971.9,	337.9,	1466.0,	0.0);
(	392662.7,	3784691.2,	366.9,	1466.0,	0.0);	(	392762.0,	3784840.7,	370.8,	1466.0,	0.0);
(	392670.3,	3785027.4,	352.3,	1466.0,	0.0);	(	392761.2,	3784674.3,	369.7,	1466.0,	0.0);
(	392860.5,	3784823.9,	375.1,	1466.0,	0.0);	(	392829.8,	3784968.5,	372.1,	1466.0,	0.0);
(	392753.5,	3785082.9,	369.1,	1466.0,	0.0);	(	392631.8,	3785166.8,	343.7,	1466.0,	0.0);
(	392859.8,	3784657.5,	372.0,	1466.0,	0.0);	(	392955.2,	3784825.1,	378.5,	1466.0,	0.0);
(	392936.0,	3784915.5,	378.1,	1466.0,	0.0);	(	392916.8,	3785005.9,	376.6,	1466.0,	0.0);
(	392821.5,	3785148.8,	379.8,	1466.0,	0.0);	(	392745.4,	3785201.3,	376.7,	1466.0,	0.0);
(	392669.4,	3785253.8,	376.5,	1466.0,	0.0);	(	392974.5,	3784734.7,	376.9,	1466.0,	0.0);
(	392958.4,	3784640.6,	374.4,	1466.0,	0.0);	(	392546.5,	3784564.6,	353.5,	1466.0,	0.0);
(	392645.7,	3784552.3,	363.8,	1466.0,	0.0);	(	392745.0,	3784540.1,	367.0,	1466.0,	0.0);
(	392844.2,	3784527.8,	369.2,	1466.0,	0.0);	(	392943.5,	3784515.5,	371.0,	1466.0,	0.0);
(	392528.3,	3784467.5,	358.0,	1466.0,	0.0);	(	392609.5,	3784409.2,	360.7,	1466.0,	0.0);
(	392692.6,	3784355.4,	362.3,	1466.0,	0.0);	(	392773.2,	3784295.8,	362.8,	1466.0,	0.0);
(	392814.5,	3784401.1,	365.7,	1466.0,	0.0);	(	392855.4,	3784239.9,	362.8,	1466.0,	0.0);
(	392889.2,	3784326.3,	366.0,	1466.0,	0.0);	(	392923.1,	3784412.7,	368.6,	1466.0,	0.0);
(	392473.0,	3784373.6,	357.1,	1466.0,	0.0);	(	392558.0,	3784320.9,	358.5,	1466.0,	0.0);
(	392643.0,	3784268.2,	359.5,	1466.0,	0.0);	(	392728.0,	3784215.5,	359.6,	1466.0,	0.0);
(	392442.1,	3784280.4,	356.0,	1466.0,	0.0);	(	392518.6,	3784216.0,	356.6,	1466.0,	0.0);
(	392595.1,	3784151.6,	355.9,	1466.0,	0.0);	(	392671.6,	3784087.2,	355.5,	1466.0,	0.0);
(	392775.9,	3784083.8,	356.8,	1466.0,	0.0);	(	392703.8,	3783970.2,	352.7,	1466.0,	0.0);
(	392385.8,	3784203.3,	354.6,	1466.0,	0.0);	(	392460.5,	3784130.0,	353.8,	1466.0,	0.0);
(	392326.5,	3784091.3,	348.3,	1466.0,	0.0);	(	392414.7,	3784044.2,	350.4,	1466.0,	0.0);
(	392502.9,	3783997.1,	350.7,	1466.0,	0.0);	(	392591.1,	3783950.1,	351.0,	1466.0,	0.0);
(	392243.0,	3783981.7,	344.5,	1466.0,	0.0);	(	392359.0,	3783967.9,	347.8,	1466.0,	0.0);
(	392437.9,	3783906.4,	347.7,	1466.0,	0.0);	(	392516.8,	3783845.0,	347.4,	1466.0,	0.0);
(	392656.1,	3783867.1,	349.5,	1466.0,	0.0);	(	392595.7,	3783783.6,	346.7,	1466.0,	0.0);
(	392196.2,	3783888.2,	342.9,	1466.0,	0.0);	(	392308.5,	3783886.5,	345.7,	1466.0,	0.0);
(	392372.7,	3783794.3,	344.9,	1466.0,	0.0);	(	392461.0,	3783747.3,	344.4,	1466.0,	0.0);
(	392549.3,	3783700.4,	343.9,	1466.0,	0.0);	(	392273.7,	3783793.2,	343.9,	1466.0,	0.0);
(	392343.3,	3783701.3,	342.7,	1466.0,	0.0);	(	392429.2,	3783650.1,	342.1,	1466.0,	0.0);
(	392515.1,	3783598.9,	341.2,	1466.0,	0.0);	(	392151.5,	3783779.6,	342.4,	1466.0,	0.0);

**MODELOPTs: RegDFAULT CONC ELEV

*** DISCRETE CARTESIAN RECEPTORS ***
(X-COORD, Y-COORD, ZELEV, ZHILL, ZFLAG)
(METERS)

(	392217.3,	3783704.4,	341.9,	1466.0,	0.0);	(	392283.2,	3783629.2,	340.4,	1466.0,	0.0);
(	392349.1,	3783554.0,	339.9,	1466.0,	0.0);	(	392448.4,	3783518.8,	339.7,	1466.0,	0.0);
(	392364.5,	3783434.5,	337.9,	1466.0,	0.0);	(	392073.5,	3783676.7,	339.8,	1466.0,	0.0);
(	392158.7,	3783624.4,	340.2,	1466.0,	0.0);	(	392078.5,	3783582.1,	338.0,	1466.0,	0.0);
(	392162.3,	3783529.3,	338.1,	1466.0,	0.0);	(	392245.8,	3783475.0,	338.0,	1466.0,	0.0);
(	392407.6,	3783342.8,	336.0,	1466.0,	0.0);	(	392106.3,	3783443.9,	336.2,	1466.0,	0.0);
(	392197.8,	3783395.4,	336.0,	1466.0,	0.0);	(	392284.4,	3783344.3,	335.9,	1466.0,	0.0);
(	392344.4,	3783259.3,	334.1,	1466.0,	0.0);	(	392013.5,	3783419.3,	335.4,	1466.0,	0.0);
(	392064.4,	3783313.2,	331.4,	1466.0,	0.0);	(	392148.7,	3783259.4,	330.5,	1466.0,	0.0);
(	392232.9,	3783205.6,	330.4,	1466.0,	0.0);	(	392317.2,	3783151.8,	330.5,	1466.0,	0.0);
(	391952.6,	3783322.4,	330.0,	1466.0,	0.0);	(	391858.8,	3783193.7,	297.8,	1466.0,	0.0);
(	391689.2,	3783206.1,	328.6,	1466.0,	0.0);	(	391926.3,	3783119.9,	295.0,	1466.0,	0.0);
(	392033.5,	3783217.9,	325.7,	1466.0,	0.0);	(	391766.7,	3783100.1,	324.0,	1466.0,	0.0);
(	391919.0,	3783020.2,	289.1,	1466.0,	0.0);	(	392101.0,	3783144.1,	328.9,	1466.0,	0.0);
(	391759.5,	3783000.4,	353.7,	1466.0,	0.0);	(	391911.7,	3782920.4,	288.0,	1466.0,	0.0);
(	392061.2,	3782972.3,	315.2,	1466.0,	0.0);	(	392168.5,	3783070.3,	329.0,	1466.0,	0.0);
(	391752.2,	3782900.7,	337.4,	1466.0,	0.0);	(	391904.5,	3782820.7,	288.8,	1466.0,	0.0);
(	392053.9,	3782872.5,	320.5,	1466.0,	0.0);	(	392235.9,	3782996.5,	328.5,	1466.0,	0.0);
(	391744.9,	3782800.9,	324.1,	1466.0,	0.0);	(	391654.6,	3783110.2,	360.9,	1466.0,	0.0);
(	391633.6,	3783012.5,	374.5,	1466.0,	0.0);	(	391612.6,	3782914.7,	386.5,	1466.0,	0.0);
(	391591.7,	3782816.9,	369.3,	1466.0,	0.0);	(	391577.9,	3783232.0,	359.4,	1466.0,	0.0);
(	391491.0,	3783274.8,	358.6,	1466.0,	0.0);	(	391533.8,	3783142.3,	382.2,	1466.0,	0.0);
(	391446.8,	3783185.1,	389.3,	1466.0,	0.0);	(	391489.6,	3783052.6,	399.8,	1466.0,	0.0);
(	391402.7,	3783095.3,	410.4,	1466.0,	0.0);	(	391491.8,	3782946.8,	397.7,	1466.0,	0.0);
(	391358.5,	3783005.6,	423.1,	1466.0,	0.0);	(	391459.3,	3782853.0,	410.8,	1466.0,	0.0);
(	391314.4,	3782915.9,	447.1,	1466.0,	0.0);	(	391416.7,	3783330.5,	337.5,	1466.0,	0.0);
(	391354.8,	3783251.9,	370.1,	1466.0,	0.0);	(	391293.0,	3783173.4,	382.8,	1466.0,	0.0);
(	391231.1,	3783094.8,	416.8,	1466.0,	0.0);	(	391225.8,	3782971.7,	444.7,	1466.0,	0.0);
(	391352.5,	3783399.5,	327.9,	1466.0,	0.0);	(	391278.2,	3783332.6,	368.8,	1466.0,	0.0);
(	391203.9,	3783265.7,	395.2,	1466.0,	0.0);	(	391129.6,	3783198.8,	415.7,	1466.0,	0.0);
(	391138.1,	3783045.3,	441.2,	1466.0,	0.0);	(	391055.3,	3783131.8,	426.2,	1466.0,	0.0);
(	391066.7,	3783292.5,	400.1,	1466.0,	0.0);	(	390996.3,	3783219.7,	417.8,	1466.0,	0.0);
(	391438.7,	3783626.7,	320.7,	1466.0,	0.0);	(	391391.6,	3783540.4,	328.9,	1466.0,	0.0);
(	391408.1,	3783505.3,	328.8,	1466.0,	0.0);	(	391426.8,	3783466.5,	329.0,	1466.0,	0.0);
(	391478.5,	3783409.1,	325.3,	1466.0,	0.0);	(	391535.1,	3783364.5,	316.6,	1466.0,	0.0);
(	391622.0,	3783321.8,	331.3,	1466.0,	0.0);	(	391696.5,	3783305.8,	317.0,	1466.0,	0.0);
(	391866.1,	3783293.4,	323.4,	1466.0,	0.0);	(	391867.5,	3783374.8,	325.7,	1466.0,	0.0);
(	391895.8,	3783420.9,	327.2,	1466.0,	0.0);	(	391929.2,	3783473.1,	330.9,	1466.0,	0.0);
(	391945.8,	3783532.4,	329.4,	1466.0,	0.0);	(	391959.8,	3783580.0,	326.0,	1466.0,	0.0);
(	391977.9,	3783599.5,	327.0,	1466.0,	0.0);	(	391991.3,	3783619.7,	326.6,	1466.0,	0.0);
(	391985.7,	3783654.2,	322.9,	1466.0,	0.0);	(	392000.3,	3783700.5,	326.1,	1466.0,	0.0);
(	391993.4,	3783718.5,	323.2,	1466.0,	0.0);	(	391988.3,	3783729.0,	321.1,	1466.0,	0.0);
(	392020.5,	3783781.6,	323.6,	1466.0,	0.0);	(	392035.0,	3783810.6,	322.4,	1466.0,	0.0);
(	392085.5,	3783854.8,	327.0,	1466.0,	0.0);	(	392097.4,	3783874.8,	327.5,	1466.0,	0.0);
(	392094.2,	3783902.7,	327.0,	1466.0,	0.0);	(	392107.9,	3783935.2,	327.9,	1466.0,	0.0);

**MODELOPTs: RegDFAULT CONC ELEV

*** DISCRETE CARTESIAN RECEPTORS ***
(X-COORD, Y-COORD, ZELEV, ZHILL, ZFLAG)
(METERS)

(	392131.9,	3783980.4,	328.4,	1466.0,	0.0);	(	392147.5,	3784021.5,	328.6,	1466.0,	0.0);
(	392164.1,	3784043.1,	327.6,	1466.0,	0.0);	(	392238.2,	3784138.4,	328.7,	1466.0,	0.0);
(	392283.1,	3784222.5,	327.6,	1466.0,	0.0);	(	392298.8,	3784252.6,	328.9,	1466.0,	0.0);
(	392321.3,	3784292.2,	329.2,	1466.0,	0.0);	(	392365.6,	3784344.8,	346.1,	1466.0,	0.0);
(	392373.0,	3784391.6,	342.8,	1466.0,	0.0);	(	392388.0,	3784426.3,	343.0,	1466.0,	0.0);
(	392419.1,	3784476.3,	341.0,	1466.0,	0.0);	(	392438.1,	3784502.8,	341.7,	1466.0,	0.0);
(	392465.5,	3784724.8,	336.7,	1466.0,	0.0);	(	392481.6,	3784818.9,	336.4,	1466.0,	0.0);
(	392360.1,	3784846.8,	330.4,	1466.0,	0.0);	(	392327.5,	3784774.4,	329.3,	1466.0,	0.0);
(	392156.8,	3784728.3,	328.1,	1466.0,	0.0);	(	392066.5,	3784621.3,	327.7,	1466.0,	0.0);
(	392005.7,	3784593.7,	327.8,	1466.0,	0.0);	(	391953.8,	3784520.0,	325.1,	1466.0,	0.0);
(	391928.9,	3784450.1,	322.8,	1466.0,	0.0);	(	391899.0,	3784384.6,	320.6,	1466.0,	0.0);
(	391867.1,	3784347.2,	319.4,	1466.0,	0.0);	(	391839.3,	3784319.4,	319.4,	1466.0,	0.0);
(	391780.3,	3784247.4,	320.0,	1466.0,	0.0);	(	391728.5,	3784178.9,	318.9,	1466.0,	0.0);
(	391707.4,	3784160.9,	319.1,	1466.0,	0.0);	(	391645.0,	3784090.4,	317.4,	1466.0,	0.0);
(	391594.4,	3784007.6,	317.5,	1466.0,	0.0);	(	391534.1,	3783928.9,	321.2,	1466.0,	0.0);
(	391509.3,	3783812.2,	318.0,	1466.0,	0.0);	(	391492.7,	3783798.7,	319.5,	1466.0,	0.0);
(	391483.8,	3783721.5,	318.7,	1466.0,	0.0);	(	391464.4,	3783664.2,	318.3,	1466.0,	0.0);
(	391446.4,	3783628.1,	319.9,	1466.0,	0.0);	(	391473.6,	3783533.0,	325.3,	1466.0,	0.0);
(	391451.9,	3783524.9,	327.0,	1466.0,	0.0);						

```
                                         *** METEOROLOGICAL DAYS SELECTED FOR PROCESSING ***
                                                           (1=YES; 0=NO)

          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1

              NOTE:  METEOROLOGICAL DATA ACTUALLY PROCESSED WILL ALSO DEPEND ON WHAT IS INCLUDED IN THE DATA FILE.


                                    *** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***
                                                           (METERS/SEC)

                                                1.54,   3.09,   5.14,   8.23,  10.80,
```

**MODELOPTs: RegDFAULT CONC ELEV

*** UP TO THE FIRST 24 HOURS OF METEOROLOGICAL DATA ***

Surface file: ..\burk6.sfc Met Version: 12345
Profile file: ..\burk6.PFL
Surface format: FREE
Profile format: FREE
Surface station no.: 0 Upper air station no.: 3190
Name: BURBANK Name: UNKNOWN
Year: 2005 Year: 2005

First 24 hours of scalar data

YR	MO	DY	JDY	HR	H0	U*	W*	DT/DZ	ZICNV	ZIMCH	M-O LEN	Z0	BOWEN	ALBEDO	REF WS	WD	HT	REF TA	HT
05	01	01	1	01	-3.2	0.063	-9.000	-9.000	-999.	37.	7.1	0.53	1.00	1.00	0.90	285.	9.1	279.9	5.5
05	01	01	1	02	-2.6	0.063	-9.000	-9.000	-999.	37.	8.7	0.53	1.00	1.00	0.90	277.	9.1	279.9	5.5
05	01	01	1	03	-2.6	0.063	-9.000	-9.000	-999.	37.	8.7	0.53	1.00	1.00	0.90	335.	9.1	279.2	5.5
05	01	01	1	04	-2.6	0.063	-9.000	-9.000	-999.	37.	8.6	0.53	1.00	1.00	0.90	291.	9.1	278.8	5.5
05	01	01	1	05	-3.0	0.063	-9.000	-9.000	-999.	37.	7.4	0.53	1.00	1.00	0.90	334.	9.1	278.1	5.5
05	01	01	1	06	-0.5	0.028	-9.000	-9.000	-999.	11.	3.8	0.53	1.00	1.00	0.40	309.	9.1	278.8	5.5
05	01	01	1	07	-2.6	0.063	-9.000	-9.000	-999.	37.	8.6	0.53	1.00	1.00	0.90	313.	9.1	278.8	5.5
05	01	01	1	08	-0.4	0.028	-9.000	-9.000	-999.	11.	4.5	0.53	1.00	0.56	0.40	256.	9.1	279.2	5.5
05	01	01	1	09	0.1	0.128	0.022	0.005	4.	105.	-1838.7	0.53	1.00	0.33	0.90	298.	9.1	282.5	5.5
05	01	01	1	10	0.1	0.128	0.025	0.005	5.	105.	-1838.7	0.53	1.00	0.25	0.90	103.	9.1	286.4	5.5
05	01	01	1	11	0.1	0.310	0.027	0.005	7.	397.	-8888.0	0.53	1.00	0.22	2.20	136.	9.1	287.0	5.5
05	01	01	1	12	0.1	0.310	0.028	0.005	8.	397.	-8888.0	0.53	1.00	0.21	2.20	152.	9.1	287.0	5.5
05	01	01	1	13	0.1	0.254	0.029	0.005	9.	295.	-8888.0	0.53	1.00	0.21	1.80	187.	9.1	285.9	5.5
05	01	01	1	14	0.1	0.184	0.030	0.005	9.	182.	-5471.6	0.53	1.00	0.22	1.30	157.	9.1	287.0	5.5
05	01	01	1	15	0.1	0.184	0.031	0.005	10.	181.	-5471.6	0.53	1.00	0.26	1.30	192.	9.1	286.4	5.5
05	01	01	1	16	0.1	0.254	0.031	0.005	11.	294.	-8888.0	0.53	1.00	0.34	1.80	188.	9.1	285.9	5.5
05	01	01	1	17	-4.9	0.092	-9.000	-9.000	-999.	88.	13.8	0.53	1.00	0.61	1.30	200.	9.1	285.4	5.5
05	01	01	1	18	-2.6	0.063	-9.000	-9.000	-999.	37.	8.7	0.53	1.00	1.00	0.90	162.	9.1	284.9	5.5
05	01	01	1	19	-3.0	0.063	-9.000	-9.000	-999.	37.	7.5	0.53	1.00	1.00	0.90	176.	9.1	284.9	5.5
05	01	01	1	20	-0.4	0.028	-9.000	-9.000	-999.	11.	4.5	0.53	1.00	1.00	0.40	210.	9.1	284.2	5.5
05	01	01	1	21	-0.4	0.028	-9.000	-9.000	-999.	11.	4.5	0.53	1.00	1.00	0.40	236.	9.1	284.2	5.5
05	01	01	1	22	-0.4	0.028	-9.000	-9.000	-999.	11.	4.5	0.53	1.00	1.00	0.40	272.	9.1	283.8	5.5
05	01	01	1	23	-0.4	0.028	-9.000	-9.000	-999.	11.	4.5	0.53	1.00	1.00	0.40	251.	9.1	283.1	5.5
05	01	01	1	24	-0.4	0.028	-9.000	-9.000	-999.	11.	4.5	0.53	1.00	1.00	0.40	301.	9.1	282.5	5.5

First hour of profile data

YR	MO	DY	HR	HEIGHT	F	WDIR	WSPD	AMB_TMP	sigmaA	sigmaW	sigmaV
05	01	01	01	5.5	0	-999.	-99.00	279.9	99.0	-99.00	-99.00
05	01	01	01	9.1	1	285.	0.90	-999.0	99.0	-99.00	-99.00

F indicates top of profile (=1) or below (=0)

**MODELOPTs: RegDFAULT CONC ELEV

*** THE ANNUAL AVERAGE CONCENTRATION VALUES AVERAGED OVER 5 YEARS FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): PAREA1 , L0000001 , L0000002 , L0000003 , L0000004
,
L0000005 , L0000006 , L0000007 , L0000008 , L0000009 , L0000010 , L0000011 , L0000012
,
L0000013 , L0000014 , L0000015 , L0000016 , L0000017 , L0000018 , L0000019 , L0000020
,
L0000021 , L0000022 , L0000023 , L0000024 , L0000025 , L0000026 , L0000027 , . . .
,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF PM_10 IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC
391316.00	3783682.00	0.00144	391392.00	3783989.00	0.00192
391405.00	3784381.00	0.00117	391964.00	3784620.00	0.00244
392559.00	3784546.00	0.00015	392453.00	3784419.00	0.00016
392197.00	3784046.00	0.00027	392034.00	3783741.00	0.00034
391925.00	3783416.00	0.00012	391955.00	3783299.00	0.00003
392291.00	3783005.00	0.00001	391377.48	3783505.54	0.00062
391350.29	3783600.66	0.00123	391281.33	3783478.05	0.00025
391254.14	3783573.17	0.00056	391185.18	3783450.57	0.00007
391157.99	3783545.69	0.00030	391089.03	3783423.08	0.00003
391061.84	3783518.20	0.00013	390992.89	3783395.60	0.00002
390965.70	3783490.72	0.00005	391374.85	3783708.74	0.00214
391264.07	3783681.21	0.00109	391174.54	3783725.75	0.00089
391085.00	3783770.30	0.00075	391075.08	3783662.26	0.00046
390995.10	3783810.84	0.00063	390984.08	3783690.79	0.00036
391294.37	3783785.67	0.00158	391199.65	3783817.76	0.00117
391393.41	3783810.18	0.00224	391445.98	3783889.61	0.00252
391357.08	3783936.97	0.00182	391292.93	3784012.86	0.00144
391243.83	3783923.04	0.00137	391229.81	3784090.65	0.00119
391181.81	3784002.83	0.00100	391133.81	3783915.00	0.00086
391166.08	3784167.31	0.00100	391116.08	3784075.83	0.00075
391066.07	3783984.34	0.00063	391454.69	3783989.72	0.00236
391514.97	3784068.44	0.00263	391375.30	3784050.51	0.00175
391435.58	3784129.23	0.00186	391356.18	3784190.03	0.00143
391276.79	3784250.83	0.00119	391197.39	3784311.63	0.00101
391570.14	3784156.65	0.00257	391632.52	3784227.17	0.00250
391495.24	3784222.90	0.00179	391557.62	3784293.42	0.00176
391420.34	3784289.16	0.00140	391482.72	3784359.68	0.00138
391345.43	3784355.41	0.00113	391407.81	3784425.93	0.00107
391270.53	3784421.67	0.00095	391332.91	3784492.19	0.00088
391404.23	3784559.46	0.00082	391700.57	3784307.69	0.00235
391620.82	3784368.03	0.00168	391761.94	3784382.73	0.00223
391684.58	3784446.10	0.00162	391548.24	3784437.47	0.00130
391607.22	3784509.47	0.00122	391529.87	3784572.84	0.00084
391452.51	3784636.21	0.00073	391822.86	3784449.41	0.00226
391746.72	3784514.23	0.00166	391670.58	3784579.06	0.00106
391594.44	3784643.89	0.00082	391518.30	3784708.72	0.00068
391859.63	3784553.64	0.00213	391923.90	3784651.28	0.00195
391790.26	3784635.16	0.00149	391708.49	3784692.71	0.00097
391760.35	3784766.39	0.00093	391626.71	3784750.27	0.00076
391678.57	3784823.95	0.00072	391544.94	3784807.83	0.00060

**MODELOPTs: RegDFAULT CONC ELEV

*** THE ANNUAL AVERAGE CONCENTRATION VALUES AVERAGED OVER 5 YEARS FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): PAREA1 , L0000001 , L0000002 , L0000003 , L0000004
,
L0000005 , L0000006 , L0000007 , L0000008 , L0000009 , L0000010 , L0000011 , L0000012
,
L0000013 , L0000014 , L0000015 , L0000016 , L0000017 , L0000018 , L0000019 , L0000020
,
L0000021 , L0000022 , L0000023 , L0000024 , L0000025 , L0000026 , L0000027 , . . .
,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF PM_10 IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC
391596.80	3784881.51	0.00055	392025.09	3784712.38	0.00197
391882.54	3784742.32	0.00128	391983.73	3784803.42	0.00117
391841.18	3784833.37	0.00092	391942.37	3784894.47	0.00073
391799.82	3784924.42	0.00062	391901.01	3784985.52	0.00045
391748.36	3785007.09	0.00043	391859.66	3785076.56	0.00030
392080.44	3784792.85	0.00143	392216.07	3784847.91	0.00107
392054.35	3784889.38	0.00072	392189.98	3784944.45	0.00052
392028.26	3784985.92	0.00041	392163.89	3785040.98	0.00028
391985.40	3785071.79	0.00027	392137.80	3785137.52	0.00017
391963.50	3785170.99	0.00018	392111.70	3785234.05	0.00013
392349.09	3784940.29	0.00037	392443.21	3784930.33	0.00027
392360.29	3785036.45	0.00023	392465.55	3785027.80	0.00020
392377.05	3785133.26	0.00016	392276.86	3785121.41	0.00017
392487.88	3785125.28	0.00016	392396.05	3785230.34	0.00012
392289.17	3785217.70	0.00012	392510.22	3785222.75	0.00013
392416.16	3785327.55	0.00007	392304.83	3785314.38	0.00009
392193.50	3785301.21	0.00010	392532.55	3785320.23	0.00011
392580.18	3784802.09	0.00017	392564.10	3784708.00	0.00018
392663.38	3784857.58	0.00010	392587.14	3784971.90	0.00015
392662.67	3784691.16	0.00011	392761.95	3784840.73	0.00008
392670.34	3785027.38	0.00010	392761.24	3784674.31	0.00009
392860.52	3784823.88	0.00007	392829.77	3784968.54	0.00006
392753.54	3785082.86	0.00006	392631.81	3785166.84	0.00011
392859.81	3784657.47	0.00007	392955.25	3784825.12	0.00006
392936.03	3784915.53	0.00006	392916.81	3785005.94	0.00005
392821.52	3785148.84	0.00005	392745.44	3785201.33	0.00006
392669.36	3785253.82	0.00006	392974.46	3784734.71	0.00006
392958.38	3784640.62	0.00006	392546.50	3784564.58	0.00016
392645.74	3784552.32	0.00011	392744.99	3784540.07	0.00009
392844.23	3784527.81	0.00007	392943.48	3784515.55	0.00006
392528.34	3784467.52	0.00014	392609.54	3784409.17	0.00011
392692.56	3784355.42	0.00009	392773.25	3784295.75	0.00008
392814.48	3784401.12	0.00008	392855.42	3784239.86	0.00007
392889.24	3784326.30	0.00007	392923.07	3784412.73	0.00007
392473.02	3784373.58	0.00014	392558.00	3784320.88	0.00011
392642.99	3784268.18	0.00009	392727.98	3784215.48	0.00008
392442.08	3784280.40	0.00013	392518.57	3784215.99	0.00011
392595.07	3784151.59	0.00009	392671.56	3784087.18	0.00008
392775.91	3784083.80	0.00007	392703.78	3783970.18	0.00007
392385.79	3784203.27	0.00014	392460.47	3784130.05	0.00012

**MODELOPTs: RegDFAULT CONC ELEV

*** THE ANNUAL AVERAGE CONCENTRATION VALUES AVERAGED OVER 5 YEARS FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): PAREA1 , L0000001 , L0000002 , L0000003 , L0000004
,
L0000005 , L0000006 , L0000007 , L0000008 , L0000009 , L0000010 , L0000011 , L0000012
,
L0000013 , L0000014 , L0000015 , L0000016 , L0000017 , L0000018 , L0000019 , L0000020
,
L0000021 , L0000022 , L0000023 , L0000024 , L0000025 , L0000026 , L0000027 , . . .
,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF PM_10 IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC
392326.46	3784091.29	0.00016	392414.69	3784044.22	0.00013
392502.91	3783997.14	0.00010	392591.14	3783950.07	0.00009
392242.98	3783981.66	0.00020	392358.97	3783967.87	0.00014
392437.88	3783906.45	0.00011	392516.79	3783845.02	0.00009
392656.08	3783867.11	0.00008	392595.70	3783783.60	0.00008
392196.16	3783888.22	0.00021	392308.50	3783886.49	0.00015
392372.74	3783794.31	0.00012	392461.03	3783747.35	0.00009
392549.32	3783700.40	0.00008	392273.71	3783793.24	0.00015
392343.26	3783701.26	0.00011	392429.17	3783650.07	0.00008
392515.07	3783598.88	0.00007	392151.45	3783779.61	0.00020
392217.34	3783704.40	0.00014	392283.24	3783629.18	0.00011
392349.14	3783553.96	0.00008	392448.38	3783518.79	0.00006
392364.51	3783434.48	0.00005	392073.51	3783676.74	0.00022
392158.73	3783624.43	0.00014	392078.45	3783582.15	0.00017
392162.27	3783529.32	0.00011	392245.75	3783474.96	0.00007
392407.64	3783342.75	0.00004	392106.35	3783443.90	0.00008
392197.79	3783395.42	0.00006	392284.38	3783344.26	0.00004
392344.36	3783259.34	0.00003	392013.47	3783419.30	0.00009
392064.38	3783313.23	0.00004	392148.66	3783259.40	0.00003
392232.93	3783205.58	0.00002	392317.21	3783151.75	0.00002
391952.62	3783322.39	0.00004	391858.81	3783193.70	0.00001
391689.22	3783206.07	0.00001	391926.27	3783119.89	0.00001
392033.53	3783217.93	0.00002	391766.74	3783100.15	0.00000
391919.00	3783020.16	0.00000	392101.00	3783144.12	0.00001
391759.46	3783000.42	0.00000	391911.72	3782920.42	0.00000
392061.21	3782972.27	0.00001	392168.47	3783070.31	0.00001
391752.19	3782900.68	0.00000	391904.45	3782820.69	0.00000
392053.93	3782872.53	0.00000	392235.93	3782996.50	0.00001
391744.91	3782800.95	0.00000	391654.56	3783110.25	0.00000
391633.60	3783012.48	0.00000	391612.64	3782914.70	0.00000
391591.67	3782816.92	0.00000	391577.92	3783232.04	0.00001
391490.96	3783274.81	0.00001	391533.78	3783142.30	0.00000
391446.82	3783185.07	0.00000	391489.65	3783052.57	0.00000
391402.69	3783095.34	0.00000	391491.85	3782946.75	0.00000
391358.55	3783005.60	0.00000	391459.31	3782852.99	0.00000
391314.42	3782915.87	0.00000	391416.69	3783330.49	0.00003
391354.82	3783251.93	0.00001	391292.96	3783173.36	0.00000
391231.09	3783094.79	0.00000	391225.77	3782971.70	0.00000
391352.53	3783399.55	0.00010	391278.23	3783332.63	0.00002
391203.92	3783265.70	0.00001	391129.62	3783198.77	0.00001

**MODELOPTs: RegDFAULT CONC ELEV

*** THE ANNUAL AVERAGE CONCENTRATION VALUES AVERAGED OVER 5 YEARS FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): PAREA1 , L0000001 , L0000002 , L0000003 , L0000004
,
L0000005 , L0000006 , L0000007 , L0000008 , L0000009 , L0000010 , L0000011 , L0000012
,
L0000013 , L0000014 , L0000015 , L0000016 , L0000017 , L0000018 , L0000019 , L0000020
,
L0000021 , L0000022 , L0000023 , L0000024 , L0000025 , L0000026 , L0000027 , . . .
,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF PM_10 IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC
391138.13	3783045.33	0.00000	391055.32	3783131.85	0.00000
391066.66	3783292.47	0.00001	390996.29	3783219.69	0.00001
391438.72	3783626.73	0.00353	391391.56	3783540.40	0.00102
391408.08	3783505.29	0.00081	391426.83	3783466.48	0.00053
391478.55	3783409.06	0.00022	391535.09	3783364.54	0.00013
391622.05	3783321.77	0.00003	391696.49	3783305.81	0.00003
391866.08	3783293.44	0.00003	391867.46	3783374.81	0.00009
391895.82	3783420.88	0.00019	391929.19	3783473.13	0.00025
391945.82	3783532.43	0.00035	391959.78	3783579.98	0.00045
391977.94	3783599.54	0.00041	391991.33	3783619.67	0.00041
391985.70	3783654.24	0.00056	392000.31	3783700.54	0.00053
391993.43	3783718.47	0.00064	391988.28	3783729.05	0.00073
392020.51	3783781.56	0.00057	392035.03	3783810.57	0.00057
392085.55	3783854.83	0.00045	392097.42	3783874.75	0.00045
392094.21	3783902.69	0.00050	392107.87	3783935.18	0.00046
392131.92	3783980.40	0.00040	392147.46	3784021.47	0.00038
392164.07	3784043.09	0.00036	392238.23	3784138.36	0.00029
392283.10	3784222.46	0.00028	392298.83	3784252.65	0.00028
392321.30	3784292.22	0.00028	392365.58	3784344.81	0.00020
392372.96	3784391.60	0.00023	392388.03	3784426.28	0.00024
392419.06	3784476.32	0.00026	392438.11	3784502.83	0.00026
392465.53	3784724.85	0.00034	392481.61	3784818.94	0.00029
392360.15	3784846.77	0.00117	392327.50	3784774.44	0.00208
392156.83	3784728.31	0.00331	392066.45	3784621.33	0.00368
392005.67	3784593.72	0.00348	391953.81	3784520.04	0.00389
391928.86	3784450.11	0.00437	391899.00	3784384.58	0.00437
391867.14	3784347.16	0.00433	391839.30	3784319.36	0.00430
391780.32	3784247.36	0.00449	391728.51	3784178.88	0.00492
391707.42	3784160.91	0.00480	391645.04	3784090.39	0.00515
391594.37	3784007.64	0.00537	391534.09	3783928.92	0.00501
391509.31	3783812.22	0.00538	391492.74	3783798.66	0.00499
391483.79	3783721.49	0.00509	391464.38	3783664.20	0.00490
391446.44	3783628.14	0.00412	391473.63	3783533.02	0.00278
391451.89	3783524.92	0.00171			

**MODELOPTs: RegDFAULT CONC ELEV

*** THE SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 5 YEARS ***

** CONC OF PM_10 IN MICROGRAMS/M**3 **

GROUP ID		AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	NETWORK GRID-ID
ALL	1ST HIGHEST VALUE IS	0.00538	AT (391509.31, 3783812.22, 318.00, 1466.00, 0.00)	DC	
	2ND HIGHEST VALUE IS	0.00537	AT (391594.37, 3784007.64, 317.50, 1466.00, 0.00)	DC	
	3RD HIGHEST VALUE IS	0.00515	AT (391645.04, 3784090.39, 317.37, 1466.00, 0.00)	DC	
	4TH HIGHEST VALUE IS	0.00509	AT (391483.79, 3783721.49, 318.68, 1466.00, 0.00)	DC	
	5TH HIGHEST VALUE IS	0.00501	AT (391534.09, 3783928.92, 321.16, 1466.00, 0.00)	DC	
	6TH HIGHEST VALUE IS	0.00499	AT (391492.74, 3783798.66, 319.53, 1466.00, 0.00)	DC	
	7TH HIGHEST VALUE IS	0.00492	AT (391728.51, 3784178.88, 318.92, 1466.00, 0.00)	DC	
	8TH HIGHEST VALUE IS	0.00490	AT (391464.38, 3783664.20, 318.28, 1466.00, 0.00)	DC	
	9TH HIGHEST VALUE IS	0.00480	AT (391707.42, 3784160.91, 319.06, 1466.00, 0.00)	DC	
	10TH HIGHEST VALUE IS	0.00449	AT (391780.32, 3784247.36, 319.98, 1466.00, 0.00)	DC	

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR

**MODELOPTs: RegDFAULT CONC   ELEV

*** Message Summary : AERMOD Model Execution ***

 --------- Summary of Total Messages --------

A Total of   0 Fatal Error Message(s)
A Total of   6 Warning Message(s)
A Total of   889 Informational Message(s)

A Total of   43824 Hours Were Processed

A Total of   0 Calm Hours Identified

A Total of   889 Missing Hours Identified (2.03 Percent)

   ******** FATAL ERROR MESSAGES ********
              *** NONE ***

   ********   WARNING MESSAGES   ********
MX W420   35935 METQA:Wind Speed Out-of-Range.   KURDAT =   09020607
MX W432   35935 METQA:Friction Velocity Out-of-Range.   KURDAT =   09020607
MX W420   43325 METQA:Wind Speed Out-of-Range.   KURDAT =   09121105
MX W432   43325 METQA:Friction Velocity Out-of-Range.   KURDAT =   09121105
MX W420   43326 METQA:Wind Speed Out-of-Range.   KURDAT =   09121106
MX W432   43326 METQA:Friction Velocity Out-of-Range.   KURDAT =   09121106

   ****
   *** AERMOD Finishes Successfully ***
   ****

APPENDIX C

AERMOD Model Printouts for Haul Route 2A to Manning Pit

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**
**************************************
**
** AERMOD Input Produced by:
** AERMOD View Ver. 8.2.0
** Lakes Environmental Software Inc.
** Date: 6/1/2013
** File: C:\Vista Env\2011\11057-Devils Gate Reservoir\Manning Const2A\Manning Const2A.ADI
**
**************************************
**
**
**************************************
** AERMOD Control Pathway
**************************************
**
**
CO STARTING
   TITLEONE Manning Pit Haul Route 2A - Sediment Removal
   TITLETWO PM10 Diesel Truck Emissions
   MODELOPT DFAULT CONC
   AVERTIME ANNUAL
   URBANOPT 9862049 Los_Angeles_County
   POLLUTID PM_10
   RUNORNOT RUN
   ERRORFIL "Manning Const2A.err"
CO FINISHED
**
**************************************
** AERMOD Source Pathway
**************************************
**
**
SO STARTING
** Source Location **
** Source ID - Type - X Coord. - Y Coord. **
** ------------------------------------------------------------------------
** Line Source Represented by Separated Volume Sources
** LINE VOLUME Source ID = RDRTE2A
** DESCRSRC Road Haul Route 2A to Manning Pit
** PREFIX
** Length of Side = 3.66
** Configuration = Separated
** Emission Rate = 0.0001388
** Vertical Dimension = 3.66
** SZINIT = 1.70
** Nodes = 5
** 413874.65, 3775298.99, 151.03, 0.00, 3.40
** 413872.78, 3775227.87, 144.00, 0.00, 3.40
** 414668.02, 3775220.74, 146.04, 0.00, 3.40
** 414648.15, 3774285.35, 124.37, 0.00, 3.40
** 414607.37, 3774271.45, 116.00, 0.00, 3.40
** ------------------------------------------------------------------------
   LOCATION L0000001     VOLUME   413874.601 3775297.161 151.01
   LOCATION L0000002     VOLUME   413874.409 3775289.856 150.46
   LOCATION L0000003     VOLUME   413874.217 3775282.552 149.92
   LOCATION L0000004     VOLUME   413874.025 3775275.247 149.37
   LOCATION L0000005     VOLUME   413873.833 3775267.942 148.83
   LOCATION L0000006     VOLUME   413873.641 3775260.637 148.28
   LOCATION L0000007     VOLUME   413873.449 3775253.332 147.73
   LOCATION L0000008     VOLUME   413873.257 3775246.028 147.18
   LOCATION L0000009     VOLUME   413873.065 3775238.723 146.63
   LOCATION L0000010     VOLUME   413872.873 3775231.418 146.08
   LOCATION L0000011     VOLUME   413876.535 3775227.833 145.84
   LOCATION L0000012     VOLUME   413883.842 3775227.768 145.87
   LOCATION L0000013     VOLUME   413891.149 3775227.702 145.90
   LOCATION L0000014     VOLUME   413898.456 3775227.637 145.94
   LOCATION L0000015     VOLUME   413905.763 3775227.571 145.97
   LOCATION L0000016     VOLUME   413913.070 3775227.506 146.01
   LOCATION L0000017     VOLUME   413920.377 3775227.440 146.04
   LOCATION L0000018     VOLUME   413927.684 3775227.375 145.95
   LOCATION L0000019     VOLUME   413934.991 3775227.309 145.79
   LOCATION L0000020     VOLUME   413942.298 3775227.244 145.63
   LOCATION L0000021     VOLUME   413949.605 3775227.178 145.47
   LOCATION L0000022     VOLUME   413956.912 3775227.113 145.31
   LOCATION L0000023     VOLUME   413964.219 3775227.047 145.15
   LOCATION L0000024     VOLUME   413971.526 3775226.982 144.99
   LOCATION L0000025     VOLUME   413978.833 3775226.916 144.83
   LOCATION L0000026     VOLUME   413986.141 3775226.851 144.67
   LOCATION L0000027     VOLUME   413993.448 3775226.785 144.51
   LOCATION L0000028     VOLUME   414000.755 3775226.720 144.29
   LOCATION L0000029     VOLUME   414008.062 3775226.654 143.76
   LOCATION L0000030     VOLUME   414015.369 3775226.589 143.23
   LOCATION L0000031     VOLUME   414022.676 3775226.524 142.70
   LOCATION L0000032     VOLUME   414029.983 3775226.458 142.17
   LOCATION L0000033     VOLUME   414037.290 3775226.393 141.63
   LOCATION L0000034     VOLUME   414044.597 3775226.327 141.10
   LOCATION L0000035     VOLUME   414051.904 3775226.262 140.57
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LOCATION L0000038 VOLUME 414073.825 3775226.065 138.97
LOCATION L0000039 VOLUME 414081.132 3775226.000 138.27
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LOCATION L0000041 VOLUME 414095.746 3775225.869 136.67
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LOCATION L0000043 VOLUME 414110.360 3775225.738 135.06
LOCATION L0000044 VOLUME 414117.668 3775225.672 134.26
LOCATION L0000045 VOLUME 414124.975 3775225.607 133.45
LOCATION L0000046 VOLUME 414132.282 3775225.541 132.65
LOCATION L0000047 VOLUME 414139.589 3775225.476 131.85
LOCATION L0000048 VOLUME 414146.896 3775225.410 131.05
LOCATION L0000049 VOLUME 414154.203 3775225.345 130.26
LOCATION L0000050 VOLUME 414161.510 3775225.279 129.65
LOCATION L0000051 VOLUME 414168.817 3775225.214 129.04
LOCATION L0000052 VOLUME 414176.124 3775225.148 128.44
LOCATION L0000053 VOLUME 414183.431 3775225.083 127.83
LOCATION L0000054 VOLUME 414190.738 3775225.017 127.22
LOCATION L0000055 VOLUME 414198.045 3775224.952 126.61
LOCATION L0000056 VOLUME 414205.352 3775224.886 126.01
LOCATION L0000057 VOLUME 414212.659 3775224.821 125.40
LOCATION L0000058 VOLUME 414219.966 3775224.756 124.79
LOCATION L0000059 VOLUME 414227.273 3775224.690 124.18
LOCATION L0000060 VOLUME 414234.580 3775224.625 123.96
LOCATION L0000061 VOLUME 414241.887 3775224.559 124.02
LOCATION L0000062 VOLUME 414249.195 3775224.494 124.08
LOCATION L0000063 VOLUME 414256.502 3775224.428 124.14
LOCATION L0000064 VOLUME 414263.809 3775224.363 124.20
LOCATION L0000065 VOLUME 414271.116 3775224.297 124.26
LOCATION L0000066 VOLUME 414278.423 3775224.232 124.32
LOCATION L0000067 VOLUME 414285.730 3775224.166 124.38
LOCATION L0000068 VOLUME 414293.037 3775224.101 124.44
LOCATION L0000069 VOLUME 414300.344 3775224.035 124.50
LOCATION L0000070 VOLUME 414307.651 3775223.970 124.58
LOCATION L0000071 VOLUME 414314.958 3775223.904 124.96
LOCATION L0000072 VOLUME 414322.265 3775223.839 125.34
LOCATION L0000073 VOLUME 414329.572 3775223.773 125.72
LOCATION L0000074 VOLUME 414336.879 3775223.708 126.11
LOCATION L0000075 VOLUME 414344.186 3775223.642 126.49
LOCATION L0000076 VOLUME 414351.493 3775223.577 126.87
LOCATION L0000077 VOLUME 414358.800 3775223.511 127.25
LOCATION L0000078 VOLUME 414366.107 3775223.446 127.64
LOCATION L0000079 VOLUME 414373.414 3775223.380 128.02
LOCATION L0000080 VOLUME 414380.722 3775223.315 128.40
LOCATION L0000081 VOLUME 414388.029 3775223.249 128.96
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LOCATION L0000175 VOLUME 414659.379 3774813.941 140.42
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LOCATION L0000178 VOLUME 414658.913 3774792.024 140.48
LOCATION L0000179 VOLUME 414658.758 3774784.718 140.50
LOCATION L0000180 VOLUME 414658.603 3774777.412 140.52
LOCATION L0000181 VOLUME 414658.448 3774770.107 140.54
LOCATION L0000182 VOLUME 414658.293 3774762.801 140.56
LOCATION L0000183 VOLUME 414658.138 3774755.495 140.58
LOCATION L0000184 VOLUME 414657.983 3774748.190 140.60
LOCATION L0000185 VOLUME 414657.827 3774740.884 140.61
LOCATION L0000186 VOLUME 414657.672 3774733.578 140.46
LOCATION L0000187 VOLUME 414657.517 3774726.273 140.25
LOCATION L0000188 VOLUME 414657.362 3774718.967 140.04
LOCATION L0000189 VOLUME 414657.207 3774711.661 139.84
LOCATION L0000190 VOLUME 414657.052 3774704.355 139.63
LOCATION L0000191 VOLUME 414656.897 3774697.050 139.42
LOCATION L0000192 VOLUME 414656.741 3774689.744 139.21
LOCATION L0000193 VOLUME 414656.586 3774682.438 139.01
LOCATION L0000194 VOLUME 414656.431 3774675.133 138.80
LOCATION L0000195 VOLUME 414656.276 3774667.827 138.59
LOCATION L0000196 VOLUME 414656.121 3774660.521 138.39
LOCATION L0000197 VOLUME 414655.966 3774653.216 138.18
LOCATION L0000198 VOLUME 414655.811 3774645.910 138.01
LOCATION L0000199 VOLUME 414655.655 3774638.604 138.14
LOCATION L0000200 VOLUME 414655.500 3774631.298 138.27
LOCATION L0000201 VOLUME 414655.345 3774623.993 138.39
LOCATION L0000202 VOLUME 414655.190 3774616.687 138.52
LOCATION L0000203 VOLUME 414655.035 3774609.381 138.65
LOCATION L0000204 VOLUME 414654.880 3774602.076 138.77
LOCATION L0000205 VOLUME 414654.725 3774594.770 138.90
LOCATION L0000206 VOLUME 414654.570 3774587.464 139.02
LOCATION L0000207 VOLUME 414654.414 3774580.159 139.15
LOCATION L0000208 VOLUME 414654.259 3774572.853 139.27
LOCATION L0000209 VOLUME 414654.104 3774565.547 139.40
LOCATION L0000210 VOLUME 414653.949 3774558.241 139.52
LOCATION L0000211 VOLUME 414653.794 3774550.936 139.60

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   LOCATION L0000213     VOLUME   414653.484 3774536.324 139.67
   LOCATION L0000214     VOLUME   414653.328 3774529.019 139.70
   LOCATION L0000215     VOLUME   414653.173 3774521.713 139.73
   LOCATION L0000216     VOLUME   414653.018 3774514.407 139.76
   LOCATION L0000217     VOLUME   414652.863 3774507.101 139.80
   LOCATION L0000218     VOLUME   414652.708 3774499.796 139.83
   LOCATION L0000219     VOLUME   414652.553 3774492.490 139.86
   LOCATION L0000220     VOLUME   414652.398 3774485.184 139.89
   LOCATION L0000221     VOLUME   414652.242 3774477.879 139.93
   LOCATION L0000222     VOLUME   414652.087 3774470.573 139.96
   LOCATION L0000223     VOLUME   414651.932 3774463.267 139.99
   LOCATION L0000224     VOLUME   414651.777 3774455.962 140.02
   LOCATION L0000225     VOLUME   414651.622 3774448.656 140.04
   LOCATION L0000226     VOLUME   414651.467 3774441.350 140.06
   LOCATION L0000227     VOLUME   414651.312 3774434.044 140.08
   LOCATION L0000228     VOLUME   414651.157 3774426.739 140.10
   LOCATION L0000229     VOLUME   414651.001 3774419.433 140.12
   LOCATION L0000230     VOLUME   414650.846 3774412.127 140.14
   LOCATION L0000231     VOLUME   414650.691 3774404.822 140.16
   LOCATION L0000232     VOLUME   414650.536 3774397.516 140.18
   LOCATION L0000233     VOLUME   414650.381 3774390.210 140.20
   LOCATION L0000234     VOLUME   414650.226 3774382.905 140.21
   LOCATION L0000235     VOLUME   414650.071 3774375.599 140.23
   LOCATION L0000236     VOLUME   414649.915 3774368.293 140.00
   LOCATION L0000237     VOLUME   414649.760 3774360.987 138.66
   LOCATION L0000238     VOLUME   414649.605 3774353.682 137.31
   LOCATION L0000239     VOLUME   414649.450 3774346.376 135.96
   LOCATION L0000240     VOLUME   414649.295 3774339.070 134.61
   LOCATION L0000241     VOLUME   414649.140 3774331.765 133.25
   LOCATION L0000242     VOLUME   414648.985 3774324.459 131.90
   LOCATION L0000243     VOLUME   414648.829 3774317.153 130.54
   LOCATION L0000244     VOLUME   414648.674 3774309.848 129.18
   LOCATION L0000245     VOLUME   414648.519 3774302.542 127.82
   LOCATION L0000246     VOLUME   414648.364 3774295.236 126.46
   LOCATION L0000247     VOLUME   414648.209 3774287.930 125.10
   LOCATION L0000248     VOLUME   414643.678 3774283.827 123.61
   LOCATION L0000249     VOLUME   414636.762 3774281.469 122.02
   LOCATION L0000250     VOLUME   414629.845 3774279.110 120.38
   LOCATION L0000251     VOLUME   414622.929 3774276.752 118.76
   LOCATION L0000252     VOLUME   414616.012 3774274.394 117.22
   LOCATION L0000253     VOLUME   414609.096 3774272.036 115.64
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** Source Parameters **
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** ------------------------------------------------------------------
   URBANSRC ALL

** Variable Emissions Type: "By Month (MONTH)"
** Variable Emission Scenario: "Scenario 2"
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EMISFACT L0000147     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
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EMISFACT L0000157     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
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   EMISFACT L0000253     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
   SRCGROUP ALL
SO FINISHED
**
**************************************
** AERMOD Receptor Pathway
**************************************
**
**
RE STARTING
   INCLUDED "Manning Const2A.rou"
RE FINISHED
**
**************************************
** AERMOD Meteorology Pathway
**************************************
**
**
ME STARTING
   SURFFILE ..\burk6.sfc
   PROFFILE ..\burk6.PFL
   SURFDATA 0 2005 Burbank 378.62 3782.24
   UAIRDATA 3190 2005
   SITEDATA 99999 2005
   PROFBASE 175.0 METERS
ME FINISHED
**
**************************************
** AERMOD Output Pathway
**************************************
**
**
OU STARTING
** Auto-Generated Plotfiles
   PLOTFILE ANNUAL ALL "Manning Const2A.AD\AN00GALL.PLT" 31
   SUMMFILE "Manning Const2A.sum"
OU FINISHED

 *********************************
 *** SETUP Finishes Successfully ***
 *********************************
```

**MODELOPTs: RegDFAULT CONC   ELEV

                                        ***   MODEL SETUP OPTIONS SUMMARY   ***
- -

**Model Is Setup For Calculation of Average CONCentration Values.

  -- DEPOSITION LOGIC --
**NO GAS DEPOSITION Data Provided.
**NO PARTICLE DEPOSITION Data Provided.
**Model Uses NO DRY DEPLETION. DRYDPLT = F
**Model Uses NO WET DEPLETION. WETDPLT = F

**Model Uses URBAN Dispersion Algorithm for the SBL for   253 Source(s),
  for Total of   1 Urban Area(s):
  Urban Population =   9862049.0 ; Urban Roughness Length = 1.000 m

**Model Uses Regulatory DEFAULT Options:
        1. Stack-tip Downwash.
        2. Model Accounts for ELEVated Terrain Effects.
        3. Use Calms Processing Routine.
        4. Use Missing Data Processing Routine.
        5. No Exponential Decay for URBAN/Non-SO2.
        6. Urban Roughness Length of 1.0 Meter Assumed.

**Model Assumes No FLAGPOLE Receptor Heights.

**Model Calculates ANNUAL Averages Only

**This Run Includes: 253 Source(s);   1 Source Group(s); and   202 Receptor(s)

**The Model Assumes A Pollutant Type of: PM_10

**Model Set To Continue RUNning After the Setup Testing.

**Output Options Selected:
         Model Outputs Tables of ANNUAL Averages by Receptor
         Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)
         Model Outputs Separate Summary File of High Ranked Values (SUMMFILE Keyword)

**NOTE: The Following Flags May Appear Following CONC Values: c for Calm Hours
                                                                m for Missing Hours
                                                                b for Both Calm and Missing Hours

**Misc. Inputs: Base Elev. for Pot. Temp. Profile (m MSL) =   175.00 ; Decay Coef. =   0.000   ; Rot. Angle =   0.0
                 Emission Units = GRAMS/SEC   ; Emission Rate Unit Factor =   0.10000E+07
                 Output Units   = MICROGRAMS/M**3

**Approximate Storage Requirements of Model =   3.7 MB of RAM.

**Detailed Error/Message File: Manning Const2A.err
**File for Summary of Results: Manning Const2A.sum

**MODELOPTs: RegDFAULT CONC ELEV

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0000001	0	0.54860E-06	413874.6	3775297.2	151.0	0.00	3.40	1.70	YES	MONTH
L0000002	0	0.54860E-06	413874.4	3775289.9	150.5	0.00	3.40	1.70	YES	MONTH
L0000003	0	0.54860E-06	413874.2	3775282.6	149.9	0.00	3.40	1.70	YES	MONTH
L0000004	0	0.54860E-06	413874.0	3775275.2	149.4	0.00	3.40	1.70	YES	MONTH
L0000005	0	0.54860E-06	413873.8	3775267.9	148.8	0.00	3.40	1.70	YES	MONTH
L0000006	0	0.54860E-06	413873.6	3775260.6	148.3	0.00	3.40	1.70	YES	MONTH
L0000007	0	0.54860E-06	413873.4	3775253.3	147.7	0.00	3.40	1.70	YES	MONTH
L0000008	0	0.54860E-06	413873.3	3775246.0	147.2	0.00	3.40	1.70	YES	MONTH
L0000009	0	0.54860E-06	413873.1	3775238.7	146.6	0.00	3.40	1.70	YES	MONTH
L0000010	0	0.54860E-06	413872.9	3775231.4	146.1	0.00	3.40	1.70	YES	MONTH
L0000011	0	0.54860E-06	413876.5	3775227.8	145.8	0.00	3.40	1.70	YES	MONTH
L0000012	0	0.54860E-06	413883.8	3775227.8	145.9	0.00	3.40	1.70	YES	MONTH
L0000013	0	0.54860E-06	413891.1	3775227.7	145.9	0.00	3.40	1.70	YES	MONTH
L0000014	0	0.54860E-06	413898.5	3775227.6	145.9	0.00	3.40	1.70	YES	MONTH
L0000015	0	0.54860E-06	413905.8	3775227.6	146.0	0.00	3.40	1.70	YES	MONTH
L0000016	0	0.54860E-06	413913.1	3775227.5	146.0	0.00	3.40	1.70	YES	MONTH
L0000017	0	0.54860E-06	413920.4	3775227.4	146.0	0.00	3.40	1.70	YES	MONTH
L0000018	0	0.54860E-06	413927.7	3775227.4	146.0	0.00	3.40	1.70	YES	MONTH
L0000019	0	0.54860E-06	413935.0	3775227.3	145.8	0.00	3.40	1.70	YES	MONTH
L0000020	0	0.54860E-06	413942.3	3775227.2	145.6	0.00	3.40	1.70	YES	MONTH
L0000021	0	0.54860E-06	413949.6	3775227.2	145.5	0.00	3.40	1.70	YES	MONTH
L0000022	0	0.54860E-06	413956.9	3775227.1	145.3	0.00	3.40	1.70	YES	MONTH
L0000023	0	0.54860E-06	413964.2	3775227.0	145.2	0.00	3.40	1.70	YES	MONTH
L0000024	0	0.54860E-06	413971.5	3775227.0	145.0	0.00	3.40	1.70	YES	MONTH
L0000025	0	0.54860E-06	413978.8	3775226.9	144.8	0.00	3.40	1.70	YES	MONTH
L0000026	0	0.54860E-06	413986.1	3775226.9	144.7	0.00	3.40	1.70	YES	MONTH
L0000027	0	0.54860E-06	413993.4	3775226.8	144.5	0.00	3.40	1.70	YES	MONTH
L0000028	0	0.54860E-06	414000.8	3775226.7	144.3	0.00	3.40	1.70	YES	MONTH
L0000029	0	0.54860E-06	414008.1	3775226.7	143.8	0.00	3.40	1.70	YES	MONTH
L0000030	0	0.54860E-06	414015.4	3775226.6	143.2	0.00	3.40	1.70	YES	MONTH
L0000031	0	0.54860E-06	414022.7	3775226.5	142.7	0.00	3.40	1.70	YES	MONTH
L0000032	0	0.54860E-06	414030.0	3775226.5	142.2	0.00	3.40	1.70	YES	MONTH
L0000033	0	0.54860E-06	414037.3	3775226.4	141.6	0.00	3.40	1.70	YES	MONTH
L0000034	0	0.54860E-06	414044.6	3775226.3	141.1	0.00	3.40	1.70	YES	MONTH
L0000035	0	0.54860E-06	414051.9	3775226.3	140.6	0.00	3.40	1.70	YES	MONTH
L0000036	0	0.54860E-06	414059.2	3775226.2	140.0	0.00	3.40	1.70	YES	MONTH
L0000037	0	0.54860E-06	414066.5	3775226.1	139.5	0.00	3.40	1.70	YES	MONTH
L0000038	0	0.54860E-06	414073.8	3775226.1	139.0	0.00	3.40	1.70	YES	MONTH
L0000039	0	0.54860E-06	414081.1	3775226.0	138.3	0.00	3.40	1.70	YES	MONTH
L0000040	0	0.54860E-06	414088.4	3775225.9	137.5	0.00	3.40	1.70	YES	MONTH

**MODELOPTs: RegDFAULT CONC ELEV

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0000041	0	0.54860E-06	414095.7	3775225.9	136.7	0.00	3.40	1.70	YES	MONTH
L0000042	0	0.54860E-06	414103.1	3775225.8	135.9	0.00	3.40	1.70	YES	MONTH
L0000043	0	0.54860E-06	414110.4	3775225.7	135.1	0.00	3.40	1.70	YES	MONTH
L0000044	0	0.54860E-06	414117.7	3775225.7	134.3	0.00	3.40	1.70	YES	MONTH
L0000045	0	0.54860E-06	414125.0	3775225.6	133.5	0.00	3.40	1.70	YES	MONTH
L0000046	0	0.54860E-06	414132.3	3775225.5	132.7	0.00	3.40	1.70	YES	MONTH
L0000047	0	0.54860E-06	414139.6	3775225.5	131.9	0.00	3.40	1.70	YES	MONTH
L0000048	0	0.54860E-06	414146.9	3775225.4	131.1	0.00	3.40	1.70	YES	MONTH
L0000049	0	0.54860E-06	414154.2	3775225.3	130.3	0.00	3.40	1.70	YES	MONTH
L0000050	0	0.54860E-06	414161.5	3775225.3	129.7	0.00	3.40	1.70	YES	MONTH
L0000051	0	0.54860E-06	414168.8	3775225.2	129.0	0.00	3.40	1.70	YES	MONTH
L0000052	0	0.54860E-06	414176.1	3775225.1	128.4	0.00	3.40	1.70	YES	MONTH
L0000053	0	0.54860E-06	414183.4	3775225.1	127.8	0.00	3.40	1.70	YES	MONTH
L0000054	0	0.54860E-06	414190.7	3775225.0	127.2	0.00	3.40	1.70	YES	MONTH
L0000055	0	0.54860E-06	414198.0	3775225.0	126.6	0.00	3.40	1.70	YES	MONTH
L0000056	0	0.54860E-06	414205.4	3775224.9	126.0	0.00	3.40	1.70	YES	MONTH
L0000057	0	0.54860E-06	414212.7	3775224.8	125.4	0.00	3.40	1.70	YES	MONTH
L0000058	0	0.54860E-06	414220.0	3775224.8	124.8	0.00	3.40	1.70	YES	MONTH
L0000059	0	0.54860E-06	414227.3	3775224.7	124.2	0.00	3.40	1.70	YES	MONTH
L0000060	0	0.54860E-06	414234.6	3775224.6	124.0	0.00	3.40	1.70	YES	MONTH
L0000061	0	0.54860E-06	414241.9	3775224.6	124.0	0.00	3.40	1.70	YES	MONTH
L0000062	0	0.54860E-06	414249.2	3775224.5	124.1	0.00	3.40	1.70	YES	MONTH
L0000063	0	0.54860E-06	414256.5	3775224.4	124.1	0.00	3.40	1.70	YES	MONTH
L0000064	0	0.54860E-06	414263.8	3775224.4	124.2	0.00	3.40	1.70	YES	MONTH
L0000065	0	0.54860E-06	414271.1	3775224.3	124.3	0.00	3.40	1.70	YES	MONTH
L0000066	0	0.54860E-06	414278.4	3775224.2	124.3	0.00	3.40	1.70	YES	MONTH
L0000067	0	0.54860E-06	414285.7	3775224.2	124.4	0.00	3.40	1.70	YES	MONTH
L0000068	0	0.54860E-06	414293.0	3775224.1	124.4	0.00	3.40	1.70	YES	MONTH
L0000069	0	0.54860E-06	414300.3	3775224.0	124.5	0.00	3.40	1.70	YES	MONTH
L0000070	0	0.54860E-06	414307.7	3775224.0	124.6	0.00	3.40	1.70	YES	MONTH
L0000071	0	0.54860E-06	414315.0	3775223.9	125.0	0.00	3.40	1.70	YES	MONTH
L0000072	0	0.54860E-06	414322.3	3775223.8	125.3	0.00	3.40	1.70	YES	MONTH
L0000073	0	0.54860E-06	414329.6	3775223.8	125.7	0.00	3.40	1.70	YES	MONTH
L0000074	0	0.54860E-06	414336.9	3775223.7	126.1	0.00	3.40	1.70	YES	MONTH
L0000075	0	0.54860E-06	414344.2	3775223.6	126.5	0.00	3.40	1.70	YES	MONTH
L0000076	0	0.54860E-06	414351.5	3775223.6	126.9	0.00	3.40	1.70	YES	MONTH
L0000077	0	0.54860E-06	414358.8	3775223.5	127.2	0.00	3.40	1.70	YES	MONTH
L0000078	0	0.54860E-06	414366.1	3775223.4	127.6	0.00	3.40	1.70	YES	MONTH
L0000079	0	0.54860E-06	414373.4	3775223.4	128.0	0.00	3.40	1.70	YES	MONTH
L0000080	0	0.54860E-06	414380.7	3775223.3	128.4	0.00	3.40	1.70	YES	MONTH

**MODELOPTs: RegDFAULT CONC ELEV

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0000081	0	0.54860E-06	414388.0	3775223.2	129.0	0.00	3.40	1.70	YES	MONTH
L0000082	0	0.54860E-06	414395.3	3775223.2	129.7	0.00	3.40	1.70	YES	MONTH
L0000083	0	0.54860E-06	414402.6	3775223.1	130.4	0.00	3.40	1.70	YES	MONTH
L0000084	0	0.54860E-06	414410.0	3775223.1	131.1	0.00	3.40	1.70	YES	MONTH
L0000085	0	0.54860E-06	414417.3	3775223.0	131.8	0.00	3.40	1.70	YES	MONTH
L0000086	0	0.54860E-06	414424.6	3775222.9	132.5	0.00	3.40	1.70	YES	MONTH
L0000087	0	0.54860E-06	414431.9	3775222.9	133.2	0.00	3.40	1.70	YES	MONTH
L0000088	0	0.54860E-06	414439.2	3775222.8	133.9	0.00	3.40	1.70	YES	MONTH
L0000089	0	0.54860E-06	414446.5	3775222.7	134.6	0.00	3.40	1.70	YES	MONTH
L0000090	0	0.54860E-06	414453.8	3775222.7	135.3	0.00	3.40	1.70	YES	MONTH
L0000091	0	0.54860E-06	414461.1	3775222.6	136.0	0.00	3.40	1.70	YES	MONTH
L0000092	0	0.54860E-06	414468.4	3775222.5	136.8	0.00	3.40	1.70	YES	MONTH
L0000093	0	0.54860E-06	414475.7	3775222.5	137.6	0.00	3.40	1.70	YES	MONTH
L0000094	0	0.54860E-06	414483.0	3775222.4	138.4	0.00	3.40	1.70	YES	MONTH
L0000095	0	0.54860E-06	414490.3	3775222.3	139.2	0.00	3.40	1.70	YES	MONTH
L0000096	0	0.54860E-06	414497.6	3775222.3	140.0	0.00	3.40	1.70	YES	MONTH
L0000097	0	0.54860E-06	414504.9	3775222.2	140.7	0.00	3.40	1.70	YES	MONTH
L0000098	0	0.54860E-06	414512.2	3775222.1	141.5	0.00	3.40	1.70	YES	MONTH
L0000099	0	0.54860E-06	414519.6	3775222.1	142.3	0.00	3.40	1.70	YES	MONTH
L0000100	0	0.54860E-06	414526.9	3775222.0	143.1	0.00	3.40	1.70	YES	MONTH
L0000101	0	0.54860E-06	414534.2	3775221.9	143.9	0.00	3.40	1.70	YES	MONTH
L0000102	0	0.54860E-06	414541.5	3775221.9	144.4	0.00	3.40	1.70	YES	MONTH
L0000103	0	0.54860E-06	414548.8	3775221.8	144.7	0.00	3.40	1.70	YES	MONTH
L0000104	0	0.54860E-06	414556.1	3775221.7	144.9	0.00	3.40	1.70	YES	MONTH
L0000105	0	0.54860E-06	414563.4	3775221.7	145.2	0.00	3.40	1.70	YES	MONTH
L0000106	0	0.54860E-06	414570.7	3775221.6	145.4	0.00	3.40	1.70	YES	MONTH
L0000107	0	0.54860E-06	414578.0	3775221.5	145.6	0.00	3.40	1.70	YES	MONTH
L0000108	0	0.54860E-06	414585.3	3775221.5	145.9	0.00	3.40	1.70	YES	MONTH
L0000109	0	0.54860E-06	414592.6	3775221.4	146.1	0.00	3.40	1.70	YES	MONTH
L0000110	0	0.54860E-06	414599.9	3775221.3	146.4	0.00	3.40	1.70	YES	MONTH
L0000111	0	0.54860E-06	414607.2	3775221.3	146.6	0.00	3.40	1.70	YES	MONTH
L0000112	0	0.54860E-06	414614.5	3775221.2	146.9	0.00	3.40	1.70	YES	MONTH
L0000113	0	0.54860E-06	414621.9	3775221.2	147.1	0.00	3.40	1.70	YES	MONTH
L0000114	0	0.54860E-06	414629.2	3775221.1	147.2	0.00	3.40	1.70	YES	MONTH
L0000115	0	0.54860E-06	414636.5	3775221.0	147.5	0.00	3.40	1.70	YES	MONTH
L0000116	0	0.54860E-06	414643.8	3775221.0	147.7	0.00	3.40	1.70	YES	MONTH
L0000117	0	0.54860E-06	414651.1	3775220.9	147.9	0.00	3.40	1.70	YES	MONTH
L0000118	0	0.54860E-06	414658.4	3775220.8	148.1	0.00	3.40	1.70	YES	MONTH
L0000119	0	0.54860E-06	414665.7	3775220.8	148.3	0.00	3.40	1.70	YES	MONTH
L0000120	0	0.54860E-06	414667.9	3775215.8	147.7	0.00	3.40	1.70	YES	MONTH

**MODELOPTs: RegDFAULT CONC ELEV

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0000121	0	0.54860E-06	414667.8	3775208.4	146.9	0.00	3.40	1.70	YES	MONTH
L0000122	0	0.54860E-06	414667.6	3775201.1	146.0	0.00	3.40	1.70	YES	MONTH
L0000123	0	0.54860E-06	414667.4	3775193.8	145.8	0.00	3.40	1.70	YES	MONTH
L0000124	0	0.54860E-06	414667.3	3775186.5	145.5	0.00	3.40	1.70	YES	MONTH
L0000125	0	0.54860E-06	414667.1	3775179.2	145.3	0.00	3.40	1.70	YES	MONTH
L0000126	0	0.54860E-06	414667.0	3775171.9	145.1	0.00	3.40	1.70	YES	MONTH
L0000127	0	0.54860E-06	414666.8	3775164.6	144.8	0.00	3.40	1.70	YES	MONTH
L0000128	0	0.54860E-06	414666.7	3775157.3	144.6	0.00	3.40	1.70	YES	MONTH
L0000129	0	0.54860E-06	414666.5	3775150.0	144.3	0.00	3.40	1.70	YES	MONTH
L0000130	0	0.54860E-06	414666.4	3775142.7	144.1	0.00	3.40	1.70	YES	MONTH
L0000131	0	0.54860E-06	414666.2	3775135.4	143.9	0.00	3.40	1.70	YES	MONTH
L0000132	0	0.54860E-06	414666.0	3775128.1	143.6	0.00	3.40	1.70	YES	MONTH
L0000133	0	0.54860E-06	414665.9	3775120.8	143.4	0.00	3.40	1.70	YES	MONTH
L0000134	0	0.54860E-06	414665.7	3775113.5	143.2	0.00	3.40	1.70	YES	MONTH
L0000135	0	0.54860E-06	414665.6	3775106.2	143.0	0.00	3.40	1.70	YES	MONTH
L0000136	0	0.54860E-06	414665.4	3775098.9	143.0	0.00	3.40	1.70	YES	MONTH
L0000137	0	0.54860E-06	414665.3	3775091.6	143.0	0.00	3.40	1.70	YES	MONTH
L0000138	0	0.54860E-06	414665.1	3775084.3	143.0	0.00	3.40	1.70	YES	MONTH
L0000139	0	0.54860E-06	414665.0	3775076.9	143.0	0.00	3.40	1.70	YES	MONTH
L0000140	0	0.54860E-06	414664.8	3775069.6	143.0	0.00	3.40	1.70	YES	MONTH
L0000141	0	0.54860E-06	414664.7	3775062.3	143.0	0.00	3.40	1.70	YES	MONTH
L0000142	0	0.54860E-06	414664.5	3775055.0	143.0	0.00	3.40	1.70	YES	MONTH
L0000143	0	0.54860E-06	414664.3	3775047.7	143.0	0.00	3.40	1.70	YES	MONTH
L0000144	0	0.54860E-06	414664.2	3775040.4	143.0	0.00	3.40	1.70	YES	MONTH
L0000145	0	0.54860E-06	414664.0	3775033.1	143.0	0.00	3.40	1.70	YES	MONTH
L0000146	0	0.54860E-06	414663.9	3775025.8	143.0	0.00	3.40	1.70	YES	MONTH
L0000147	0	0.54860E-06	414663.7	3775018.5	143.0	0.00	3.40	1.70	YES	MONTH
L0000148	0	0.54860E-06	414663.6	3775011.2	143.2	0.00	3.40	1.70	YES	MONTH
L0000149	0	0.54860E-06	414663.4	3775003.9	143.4	0.00	3.40	1.70	YES	MONTH
L0000150	0	0.54860E-06	414663.3	3774996.6	143.6	0.00	3.40	1.70	YES	MONTH
L0000151	0	0.54860E-06	414663.1	3774989.3	143.8	0.00	3.40	1.70	YES	MONTH
L0000152	0	0.54860E-06	414662.9	3774982.0	144.0	0.00	3.40	1.70	YES	MONTH
L0000153	0	0.54860E-06	414662.8	3774974.7	144.2	0.00	3.40	1.70	YES	MONTH
L0000154	0	0.54860E-06	414662.6	3774967.4	144.4	0.00	3.40	1.70	YES	MONTH
L0000155	0	0.54860E-06	414662.5	3774960.1	144.6	0.00	3.40	1.70	YES	MONTH
L0000156	0	0.54860E-06	414662.3	3774952.7	144.8	0.00	3.40	1.70	YES	MONTH
L0000157	0	0.54860E-06	414662.2	3774945.4	145.0	0.00	3.40	1.70	YES	MONTH
L0000158	0	0.54860E-06	414662.0	3774938.1	145.2	0.00	3.40	1.70	YES	MONTH
L0000159	0	0.54860E-06	414661.9	3774930.8	145.5	0.00	3.40	1.70	YES	MONTH
L0000160	0	0.54860E-06	414661.7	3774923.5	145.6	0.00	3.40	1.70	YES	MONTH

**MODELOPTs: RegDFAULT CONC ELEV

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0000161	0	0.54860E-06	414661.6	3774916.2	145.2	0.00	3.40	1.70	YES	MONTH
L0000162	0	0.54860E-06	414661.4	3774908.9	144.8	0.00	3.40	1.70	YES	MONTH
L0000163	0	0.54860E-06	414661.2	3774901.6	144.4	0.00	3.40	1.70	YES	MONTH
L0000164	0	0.54860E-06	414661.1	3774894.3	144.0	0.00	3.40	1.70	YES	MONTH
L0000165	0	0.54860E-06	414660.9	3774887.0	143.5	0.00	3.40	1.70	YES	MONTH
L0000166	0	0.54860E-06	414660.8	3774879.7	143.1	0.00	3.40	1.70	YES	MONTH
L0000167	0	0.54860E-06	414660.6	3774872.4	142.7	0.00	3.40	1.70	YES	MONTH
L0000168	0	0.54860E-06	414660.5	3774865.1	142.3	0.00	3.40	1.70	YES	MONTH
L0000169	0	0.54860E-06	414660.3	3774857.8	141.9	0.00	3.40	1.70	YES	MONTH
L0000170	0	0.54860E-06	414660.2	3774850.5	141.4	0.00	3.40	1.70	YES	MONTH
L0000171	0	0.54860E-06	414660.0	3774843.2	141.0	0.00	3.40	1.70	YES	MONTH
L0000172	0	0.54860E-06	414659.8	3774835.9	140.6	0.00	3.40	1.70	YES	MONTH
L0000173	0	0.54860E-06	414659.7	3774828.6	140.4	0.00	3.40	1.70	YES	MONTH
L0000174	0	0.54860E-06	414659.5	3774821.2	140.4	0.00	3.40	1.70	YES	MONTH
L0000175	0	0.54860E-06	414659.4	3774813.9	140.4	0.00	3.40	1.70	YES	MONTH
L0000176	0	0.54860E-06	414659.2	3774806.6	140.4	0.00	3.40	1.70	YES	MONTH
L0000177	0	0.54860E-06	414659.1	3774799.3	140.5	0.00	3.40	1.70	YES	MONTH
L0000178	0	0.54860E-06	414658.9	3774792.0	140.5	0.00	3.40	1.70	YES	MONTH
L0000179	0	0.54860E-06	414658.8	3774784.7	140.5	0.00	3.40	1.70	YES	MONTH
L0000180	0	0.54860E-06	414658.6	3774777.4	140.5	0.00	3.40	1.70	YES	MONTH
L0000181	0	0.54860E-06	414658.4	3774770.1	140.5	0.00	3.40	1.70	YES	MONTH
L0000182	0	0.54860E-06	414658.3	3774762.8	140.6	0.00	3.40	1.70	YES	MONTH
L0000183	0	0.54860E-06	414658.1	3774755.5	140.6	0.00	3.40	1.70	YES	MONTH
L0000184	0	0.54860E-06	414658.0	3774748.2	140.6	0.00	3.40	1.70	YES	MONTH
L0000185	0	0.54860E-06	414657.8	3774740.9	140.6	0.00	3.40	1.70	YES	MONTH
L0000186	0	0.54860E-06	414657.7	3774733.6	140.5	0.00	3.40	1.70	YES	MONTH
L0000187	0	0.54860E-06	414657.5	3774726.3	140.2	0.00	3.40	1.70	YES	MONTH
L0000188	0	0.54860E-06	414657.4	3774719.0	140.0	0.00	3.40	1.70	YES	MONTH
L0000189	0	0.54860E-06	414657.2	3774711.7	139.8	0.00	3.40	1.70	YES	MONTH
L0000190	0	0.54860E-06	414657.1	3774704.4	139.6	0.00	3.40	1.70	YES	MONTH
L0000191	0	0.54860E-06	414656.9	3774697.0	139.4	0.00	3.40	1.70	YES	MONTH
L0000192	0	0.54860E-06	414656.7	3774689.7	139.2	0.00	3.40	1.70	YES	MONTH
L0000193	0	0.54860E-06	414656.6	3774682.4	139.0	0.00	3.40	1.70	YES	MONTH
L0000194	0	0.54860E-06	414656.4	3774675.1	138.8	0.00	3.40	1.70	YES	MONTH
L0000195	0	0.54860E-06	414656.3	3774667.8	138.6	0.00	3.40	1.70	YES	MONTH
L0000196	0	0.54860E-06	414656.1	3774660.5	138.4	0.00	3.40	1.70	YES	MONTH
L0000197	0	0.54860E-06	414656.0	3774653.2	138.2	0.00	3.40	1.70	YES	MONTH
L0000198	0	0.54860E-06	414655.8	3774645.9	138.0	0.00	3.40	1.70	YES	MONTH
L0000199	0	0.54860E-06	414655.7	3774638.6	138.1	0.00	3.40	1.70	YES	MONTH
L0000200	0	0.54860E-06	414655.5	3774631.3	138.3	0.00	3.40	1.70	YES	MONTH

**MODELOPTs: RegDFAULT CONC ELEV

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0000201	0	0.54860E-06	414655.3	3774624.0	138.4	0.00	3.40	1.70	YES	MONTH
L0000202	0	0.54860E-06	414655.2	3774616.7	138.5	0.00	3.40	1.70	YES	MONTH
L0000203	0	0.54860E-06	414655.0	3774609.4	138.7	0.00	3.40	1.70	YES	MONTH
L0000204	0	0.54860E-06	414654.9	3774602.1	138.8	0.00	3.40	1.70	YES	MONTH
L0000205	0	0.54860E-06	414654.7	3774594.8	138.9	0.00	3.40	1.70	YES	MONTH
L0000206	0	0.54860E-06	414654.6	3774587.5	139.0	0.00	3.40	1.70	YES	MONTH
L0000207	0	0.54860E-06	414654.4	3774580.2	139.2	0.00	3.40	1.70	YES	MONTH
L0000208	0	0.54860E-06	414654.3	3774572.9	139.3	0.00	3.40	1.70	YES	MONTH
L0000209	0	0.54860E-06	414654.1	3774565.5	139.4	0.00	3.40	1.70	YES	MONTH
L0000210	0	0.54860E-06	414653.9	3774558.2	139.5	0.00	3.40	1.70	YES	MONTH
L0000211	0	0.54860E-06	414653.8	3774550.9	139.6	0.00	3.40	1.70	YES	MONTH
L0000212	0	0.54860E-06	414653.6	3774543.6	139.6	0.00	3.40	1.70	YES	MONTH
L0000213	0	0.54860E-06	414653.5	3774536.3	139.7	0.00	3.40	1.70	YES	MONTH
L0000214	0	0.54860E-06	414653.3	3774529.0	139.7	0.00	3.40	1.70	YES	MONTH
L0000215	0	0.54860E-06	414653.2	3774521.7	139.7	0.00	3.40	1.70	YES	MONTH
L0000216	0	0.54860E-06	414653.0	3774514.4	139.8	0.00	3.40	1.70	YES	MONTH
L0000217	0	0.54860E-06	414652.9	3774507.1	139.8	0.00	3.40	1.70	YES	MONTH
L0000218	0	0.54860E-06	414652.7	3774499.8	139.8	0.00	3.40	1.70	YES	MONTH
L0000219	0	0.54860E-06	414652.6	3774492.5	139.9	0.00	3.40	1.70	YES	MONTH
L0000220	0	0.54860E-06	414652.4	3774485.2	139.9	0.00	3.40	1.70	YES	MONTH
L0000221	0	0.54860E-06	414652.2	3774477.9	139.9	0.00	3.40	1.70	YES	MONTH
L0000222	0	0.54860E-06	414652.1	3774470.6	140.0	0.00	3.40	1.70	YES	MONTH
L0000223	0	0.54860E-06	414651.9	3774463.3	140.0	0.00	3.40	1.70	YES	MONTH
L0000224	0	0.54860E-06	414651.8	3774456.0	140.0	0.00	3.40	1.70	YES	MONTH
L0000225	0	0.54860E-06	414651.6	3774448.7	140.0	0.00	3.40	1.70	YES	MONTH
L0000226	0	0.54860E-06	414651.5	3774441.3	140.1	0.00	3.40	1.70	YES	MONTH
L0000227	0	0.54860E-06	414651.3	3774434.0	140.1	0.00	3.40	1.70	YES	MONTH
L0000228	0	0.54860E-06	414651.2	3774426.7	140.1	0.00	3.40	1.70	YES	MONTH
L0000229	0	0.54860E-06	414651.0	3774419.4	140.1	0.00	3.40	1.70	YES	MONTH
L0000230	0	0.54860E-06	414650.8	3774412.1	140.1	0.00	3.40	1.70	YES	MONTH
L0000231	0	0.54860E-06	414650.7	3774404.8	140.2	0.00	3.40	1.70	YES	MONTH
L0000232	0	0.54860E-06	414650.5	3774397.5	140.2	0.00	3.40	1.70	YES	MONTH
L0000233	0	0.54860E-06	414650.4	3774390.2	140.2	0.00	3.40	1.70	YES	MONTH
L0000234	0	0.54860E-06	414650.2	3774382.9	140.2	0.00	3.40	1.70	YES	MONTH
L0000235	0	0.54860E-06	414650.1	3774375.6	140.2	0.00	3.40	1.70	YES	MONTH
L0000236	0	0.54860E-06	414649.9	3774368.3	140.0	0.00	3.40	1.70	YES	MONTH
L0000237	0	0.54860E-06	414649.8	3774361.0	138.7	0.00	3.40	1.70	YES	MONTH
L0000238	0	0.54860E-06	414649.6	3774353.7	137.3	0.00	3.40	1.70	YES	MONTH
L0000239	0	0.54860E-06	414649.5	3774346.4	136.0	0.00	3.40	1.70	YES	MONTH
L0000240	0	0.54860E-06	414649.3	3774339.1	134.6	0.00	3.40	1.70	YES	MONTH

**MODELOPTs: RegDFAULT CONC ELEV

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0000241	0	0.54860E-06	414649.1	3774331.8	133.2	0.00	3.40	1.70	YES	MONTH
L0000242	0	0.54860E-06	414649.0	3774324.5	131.9	0.00	3.40	1.70	YES	MONTH
L0000243	0	0.54860E-06	414648.8	3774317.2	130.5	0.00	3.40	1.70	YES	MONTH
L0000244	0	0.54860E-06	414648.7	3774309.8	129.2	0.00	3.40	1.70	YES	MONTH
L0000245	0	0.54860E-06	414648.5	3774302.5	127.8	0.00	3.40	1.70	YES	MONTH
L0000246	0	0.54860E-06	414648.4	3774295.2	126.5	0.00	3.40	1.70	YES	MONTH
L0000247	0	0.54860E-06	414648.2	3774287.9	125.1	0.00	3.40	1.70	YES	MONTH
L0000248	0	0.54860E-06	414643.7	3774283.8	123.6	0.00	3.40	1.70	YES	MONTH
L0000249	0	0.54860E-06	414636.8	3774281.5	122.0	0.00	3.40	1.70	YES	MONTH
L0000250	0	0.54860E-06	414629.8	3774279.1	120.4	0.00	3.40	1.70	YES	MONTH
L0000251	0	0.54860E-06	414622.9	3774276.8	118.8	0.00	3.40	1.70	YES	MONTH
L0000252	0	0.54860E-06	414616.0	3774274.4	117.2	0.00	3.40	1.70	YES	MONTH
L0000253	0	0.54860E-06	414609.1	3774272.0	115.6	0.00	3.40	1.70	YES	MONTH

**MODELOPTs: RegDFAULT CONC ELEV

*** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID	SOURCE IDs
ALL	L0000001 , L0000002 , L0000003 , L0000004 , L0000005 , L0000006 , L0000007 , L0000008 ,
	L0000009 , L0000010 , L0000011 , L0000012 , L0000013 , L0000014 , L0000015 , L0000016 ,
	L0000017 , L0000018 , L0000019 , L0000020 , L0000021 , L0000022 , L0000023 , L0000024 ,
	L0000025 , L0000026 , L0000027 , L0000028 , L0000029 , L0000030 , L0000031 , L0000032 ,
	L0000033 , L0000034 , L0000035 , L0000036 , L0000037 , L0000038 , L0000039 , L0000040 ,
	L0000041 , L0000042 , L0000043 , L0000044 , L0000045 , L0000046 , L0000047 , L0000048 ,
	L0000049 , L0000050 , L0000051 , L0000052 , L0000053 , L0000054 , L0000055 , L0000056 ,
	L0000057 , L0000058 , L0000059 , L0000060 , L0000061 , L0000062 , L0000063 , L0000064 ,
	L0000065 , L0000066 , L0000067 , L0000068 , L0000069 , L0000070 , L0000071 , L0000072 ,
	L0000073 , L0000074 , L0000075 , L0000076 , L0000077 , L0000078 , L0000079 , L0000080 ,
	L0000081 , L0000082 , L0000083 , L0000084 , L0000085 , L0000086 , L0000087 , L0000088 ,
	L0000089 , L0000090 , L0000091 , L0000092 , L0000093 , L0000094 , L0000095 , L0000096 ,
	L0000097 , L0000098 , L0000099 , L0000100 , L0000101 , L0000102 , L0000103 , L0000104 ,
	L0000105 , L0000106 , L0000107 , L0000108 , L0000109 , L0000110 , L0000111 , L0000112 ,
	L0000113 , L0000114 , L0000115 , L0000116 , L0000117 , L0000118 , L0000119 , L0000120 ,
	L0000121 , L0000122 , L0000123 , L0000124 , L0000125 , L0000126 , L0000127 , L0000128 ,
	L0000129 , L0000130 , L0000131 , L0000132 , L0000133 , L0000134 , L0000135 , L0000136 ,
	L0000137 , L0000138 , L0000139 , L0000140 , L0000141 , L0000142 , L0000143 , L0000144 ,
	L0000145 , L0000146 , L0000147 , L0000148 , L0000149 , L0000150 , L0000151 , L0000152 ,
	L0000153 , L0000154 , L0000155 , L0000156 , L0000157 , L0000158 , L0000159 , L0000160 ,

**MODELOPTs: RegDFAULT CONC ELEV

*** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID SOURCE IDs

L0000161 , L0000162 , L0000163 , L0000164 , L0000165 , L0000166 , L0000167 , L0000168 ,
L0000169 , L0000170 , L0000171 , L0000172 , L0000173 , L0000174 , L0000175 , L0000176 ,
L0000177 , L0000178 , L0000179 , L0000180 , L0000181 , L0000182 , L0000183 , L0000184 ,
L0000185 , L0000186 , L0000187 , L0000188 , L0000189 , L0000190 , L0000191 , L0000192 ,
L0000193 , L0000194 , L0000195 , L0000196 , L0000197 , L0000198 , L0000199 , L0000200 ,
L0000201 , L0000202 , L0000203 , L0000204 , L0000205 , L0000206 , L0000207 , L0000208 ,
L0000209 , L0000210 , L0000211 , L0000212 , L0000213 , L0000214 , L0000215 , L0000216 ,
L0000217 , L0000218 , L0000219 , L0000220 , L0000221 , L0000222 , L0000223 , L0000224 ,
L0000225 , L0000226 , L0000227 , L0000228 , L0000229 , L0000230 , L0000231 , L0000232 ,
L0000233 , L0000234 , L0000235 , L0000236 , L0000237 , L0000238 , L0000239 , L0000240 ,
L0000241 , L0000242 , L0000243 , L0000244 , L0000245 , L0000246 , L0000247 , L0000248 ,
L0000249 , L0000250 , L0000251 , L0000252 , L0000253 ,

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000001 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000002 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000003 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000004 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000005 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000006 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000007 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000008 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000009 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000010 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000011 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000012 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000013 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000014 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000015 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000016 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000017 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000018 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000019 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000020 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000021 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000022 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000023 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000024 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000025   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000026   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000027   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000028   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000029   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000030   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000031 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000032 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000033 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000034 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000035 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000036 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000037 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000038 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000039 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000040 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000041 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000042 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000043 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000044 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000045 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000046 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000047 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000048 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000049 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000050 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000051 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000052 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000053 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000054 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000055 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000056 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000057 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000058 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000059 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000060 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000061   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000062   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000063   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000064   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000065   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000066   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000067 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000068 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000069 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000070 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000071 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000072 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000073 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000074 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000075 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000076 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000077 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000078 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000079 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000080 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000081 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000082 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000083 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000084 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000085 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000086 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000087 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000088 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000089 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000090 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000091 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000092 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000093 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000094 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000095 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000096 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000097 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000098 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000099 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000100 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000101 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000102 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000103 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000104 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000105 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000106 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000107 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000108 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000109 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000110 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000111 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000112 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000113 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000114 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000115 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000116 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000117 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000118 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000119 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000120 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000121   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000122   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000123   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000124   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000125   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000126   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000127 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000128 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000129 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000130 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000131 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000132 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000133 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000134 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000135 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000136 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000137 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000138 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000139 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000140 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000141 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000142 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000143 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000144 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000145 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000146 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000147 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000148 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000149 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000150 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000151 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000152 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000153 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000154 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000155 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000156 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000157 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000158 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000159 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000160 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000161 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000162 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000163 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000164 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000165 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000166 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000167 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000168 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000169 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000170 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000171 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000172 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000173 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000174 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000175 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000176 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000177 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000178 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000179 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000180 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000181 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000182 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000183 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000184 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000185 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000186 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000187 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000188 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000189 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000190 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000191 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000192 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

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* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000193 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000194 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000195 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000196 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000197 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000198 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000199 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000200 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000201 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000202 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000203 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000204 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

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	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000205 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000206 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000207 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000208 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000209 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000210 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

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	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000211   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000212   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000213   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000214   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000215   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000216   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

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	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000217 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000218 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000219 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000220 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000221 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000222 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000223 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000224 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000225 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000226 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000227 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000228 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000229 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000230 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000231 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000232 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000233 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000234 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000235 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000236 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000237 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000238 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000239 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000240 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000241 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000242 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000243 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000244 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000245 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000246 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000247 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000248 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000249 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000250 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000251 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000252 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000253   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

**MODELOPTs: RegDFAULT CONC ELEV

*** GRIDDED RECEPTOR NETWORK SUMMARY ***

*** NETWORK ID: UCART1 ; NETWORK TYPE: GRIDCART ***

*** X-COORDINATES OF GRID ***
(METERS)

413725.0, 413825.0, 413925.0, 414025.0, 414125.0, 414225.0, 414325.0, 414425.0, 414525.0, 414625.0,
414725.0, 414825.0, 414925.0, 415025.0,

*** Y-COORDINATES OF GRID ***
(METERS)

3773980.0, 3774080.0, 3774180.0, 3774280.0, 3774380.0, 3774480.0, 3774580.0, 3774680.0, 3774780.0, 3774880.0,
3774980.0, 3775080.0, 3775180.0, 3775280.0,

**MODELOPTs: RegDFAULT CONC ELEV

*** NETWORK ID: UCART1 ; NETWORK TYPE: GRIDCART ***

* ELEVATION HEIGHTS IN METERS *

Y-COORD (METERS)	X-COORD (METERS)							
	413725.00	413825.00	413925.00	414025.00	414125.00	414225.00	414325.00	414425.00
414525.00								
3775280.00	150.40	150.10	148.80	137.70	114.00	91.00	95.20	116.00
136.60								
3775180.00	144.80	143.10	144.40	144.60	142.00	139.10	138.30	139.60
144.80								
3775080.00	139.20	139.40	141.90	144.10	146.40	148.00	147.10	145.60
145.00								
3774980.00	136.70	139.30	141.40	142.30	144.60	145.60	147.20	146.40
145.80								
3774880.00	140.90	143.90	144.00	142.40	141.20	141.50	142.50	142.50
142.50								
3774780.00	140.70	142.80	142.30	140.00	139.20	141.20	143.20	142.20
140.60								
3774680.00	137.90	138.70	139.50	138.90	138.70	140.00	141.90	141.70
140.10								
3774580.00	139.50	139.60	139.80	139.80	139.80	140.00	140.30	139.90
139.30								
3774480.00	146.70	146.40	144.30	143.10	142.60	143.40	142.00	140.70
139.90								
3774380.00	143.70	146.70	148.70	147.80	147.70	147.70	145.70	140.90
137.40								
3774280.00	130.30	133.20	139.10	145.80	139.50	131.10	134.60	121.20
111.70								
3774180.00	131.10	136.80	140.90	144.10	137.80	125.00	105.60	82.50
83.60								
3774080.00	126.10	133.30	140.70	147.30	151.10	143.90	120.10	88.00
84.40								
3773980.00	125.30	139.30	149.60	153.80	156.20	150.80	125.60	98.30
94.20								

**MODELOPTs: RegDFAULT CONC ELEV

*** NETWORK ID: UCART1 ; NETWORK TYPE: GRIDCART ***

* ELEVATION HEIGHTS IN METERS *

Y-COORD (METERS)	X-COORD (METERS) 414625.00	414725.00	414825.00	414925.00	415025.00
3775280.00	150.50	160.40	166.10	167.90	164.40
3775180.00	145.30	146.50	150.30	157.00	156.80
3775080.00	143.50	142.70	143.70	145.30	145.60
3774980.00	144.80	143.20	144.80	146.80	147.70
3774880.00	143.10	143.70	144.30	145.30	146.10
3774780.00	140.50	141.00	141.20	141.50	141.90
3774680.00	138.80	139.60	139.10	137.90	138.60
3774580.00	138.90	139.60	138.70	137.30	136.40
3774480.00	139.90	139.60	139.70	139.50	139.40
3774380.00	139.10	142.20	143.30	142.60	142.20
3774280.00	119.80	134.80	140.00	141.10	141.50
3774180.00	106.50	130.80	145.50	145.30	142.00
3774080.00	113.40	137.90	141.70	138.70	136.70
3773980.00	119.20	142.80	149.90	145.30	139.40

**MODELOPTs: RegDFAULT CONC ELEV

*** NETWORK ID: UCART1 ; NETWORK TYPE: GRIDCART ***

* HILL HEIGHT SCALES IN METERS *

Y-COORD (METERS)	X-COORD (METERS)							
	413725.00	413825.00	413925.00	414025.00	414125.00	414225.00	414325.00	414425.00
414525.00								
3775280.00	1646.00	1646.00	1646.00	1646.00	2350.00	2350.00	2350.00	2350.00
1646.00								
3775180.00	1646.00	1646.00	1646.00	1646.00	1646.00	1646.00	1646.00	1646.00
1646.00								
3775080.00	1646.00	1646.00	1646.00	1646.00	1646.00	1646.00	1646.00	1646.00
1646.00								
3774980.00	1646.00	1646.00	1646.00	1646.00	1646.00	1646.00	1646.00	1646.00
1646.00								
3774880.00	1646.00	1646.00	1646.00	1646.00	1646.00	1646.00	1646.00	1646.00
1646.00								
3774780.00	1646.00	1646.00	1646.00	1646.00	1646.00	1646.00	1646.00	1646.00
1646.00								
3774680.00	1646.00	1646.00	1646.00	1646.00	1646.00	1646.00	1646.00	1646.00
1646.00								
3774580.00	1646.00	1646.00	1646.00	1646.00	1646.00	1646.00	1646.00	1646.00
1646.00								
3774480.00	1646.00	1646.00	1646.00	1646.00	1646.00	1646.00	1646.00	1646.00
1646.00								
3774380.00	1646.00	1646.00	1646.00	1646.00	1646.00	1646.00	1646.00	1646.00
1646.00								
3774280.00	1646.00	1646.00	1646.00	1646.00	1646.00	1646.00	1646.00	1646.00
1646.00								
3774180.00	1646.00	1646.00	1646.00	1646.00	1646.00	1646.00	1646.00	1646.00
1646.00								
3774080.00	1646.00	1646.00	1646.00	1646.00	1646.00	1646.00	1646.00	1646.00
1646.00								
3773980.00	1646.00	1646.00	1646.00	1646.00	1646.00	1646.00	1646.00	1646.00
1646.00								

**MODELOPTs: RegDFAULT CONC ELEV

*** NETWORK ID: UCART1 ; NETWORK TYPE: GRIDCART ***

* HILL HEIGHT SCALES IN METERS *

Y-COORD (METERS)	X-COORD (METERS) 414625.00	414725.00	414825.00	414925.00	415025.00
3775280.00	1646.00	1646.00	1646.00	1646.00	1646.00
3775180.00	1646.00	1646.00	1646.00	1646.00	1646.00
3775080.00	1646.00	1646.00	1646.00	1646.00	1646.00
3774980.00	1646.00	1646.00	1646.00	1646.00	1646.00
3774880.00	1646.00	1646.00	1646.00	1646.00	1646.00
3774780.00	1646.00	1646.00	1646.00	1646.00	1646.00
3774680.00	1646.00	1646.00	1646.00	1646.00	1646.00
3774580.00	1646.00	1646.00	1646.00	1646.00	1646.00
3774480.00	1646.00	1646.00	1646.00	1646.00	1646.00
3774380.00	1646.00	1646.00	1646.00	1646.00	1646.00
3774280.00	1646.00	1646.00	1646.00	1646.00	1646.00
3774180.00	1646.00	1646.00	1646.00	1646.00	1646.00
3774080.00	1646.00	1646.00	1646.00	1646.00	1646.00
3773980.00	1646.00	1646.00	1646.00	1646.00	1646.00

**MODELOPTs: RegDFAULT CONC ELEV

*** DISCRETE CARTESIAN RECEPTORS ***
(X-COORD, Y-COORD, ZELEV, ZHILL, ZFLAG)
(METERS)

(	414672.0,	3774779.0,	140.5,	1646.0,	0.0);	(	414669.0,	3774640.0,	138.1,	1646.0,	0.0);
(	414668.0,	3774472.0,	140.0,	1646.0,	0.0);	(	414664.0,	3774366.0,	140.4,	1646.0,	0.0);
(	414664.0,	3774283.0,	126.8,	1646.0,	0.0);	(	414449.0,	3774414.0,	140.1,	1646.0,	0.0);

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE-RECEPTOR COMBINATIONS FOR WHICH CALCULATIONS MAY NOT BE PERFORMED *
LESS THAN 1.0 METER; WITHIN OPENPIT; OR BEYOND 80KM FOR FASTAREA/FASTALL

SOURCE ID	- - RECEPTOR LOCATION - - XR (METERS)	YR (METERS)	DISTANCE (METERS)
L0000250	414625.0	3774280.0	-2.38
L0000251	414625.0	3774280.0	-3.46

**MODELOPTs: RegDFAULT CONC ELEV

*** METEOROLOGICAL DAYS SELECTED FOR PROCESSING ***
(1=YES; 0=NO)

```
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1
```

NOTE: METEOROLOGICAL DATA ACTUALLY PROCESSED WILL ALSO DEPEND ON WHAT IS INCLUDED IN THE DATA FILE.

*** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***
(METERS/SEC)

1.54, 3.09, 5.14, 8.23, 10.80,

**MODELOPTs: RegDFAULT CONC ELEV

*** UP TO THE FIRST 24 HOURS OF METEOROLOGICAL DATA ***

Surface file: ..\burk6.sfc Met Version: 12345
Profile file: ..\burk6.PFL
Surface format: FREE
Profile format: FREE
Surface station no.: 0 Upper air station no.: 3190
Name: BURBANK Name: UNKNOWN
Year: 2005 Year: 2005

First 24 hours of scalar data

YR	MO	DY	JDY	HR	H0	U*	W*	DT/DZ	ZICNV	ZIMCH	M-O LEN	Z0	BOWEN	ALBEDO	REF WS	WD	HT	REF TA	HT
05	01	01	1	01	-3.2	0.063	-9.000	-9.000	-999.	37.	7.1	0.53	1.00	1.00	0.90	285.	9.1	279.9	5.5
05	01	01	1	02	-2.6	0.063	-9.000	-9.000	-999.	37.	8.7	0.53	1.00	1.00	0.90	277.	9.1	279.9	5.5
05	01	01	1	03	-2.6	0.063	-9.000	-9.000	-999.	37.	8.7	0.53	1.00	1.00	0.90	335.	9.1	279.2	5.5
05	01	01	1	04	-2.6	0.063	-9.000	-9.000	-999.	37.	8.6	0.53	1.00	1.00	0.90	291.	9.1	278.8	5.5
05	01	01	1	05	-3.0	0.063	-9.000	-9.000	-999.	37.	7.4	0.53	1.00	1.00	0.90	334.	9.1	278.1	5.5
05	01	01	1	06	-0.5	0.028	-9.000	-9.000	-999.	11.	3.8	0.53	1.00	1.00	0.40	309.	9.1	278.8	5.5
05	01	01	1	07	-2.6	0.063	-9.000	-9.000	-999.	37.	8.6	0.53	1.00	1.00	0.90	313.	9.1	278.8	5.5
05	01	01	1	08	-0.4	0.028	-9.000	-9.000	-999.	11.	4.5	0.53	1.00	0.56	0.40	256.	9.1	279.2	5.5
05	01	01	1	09	0.1	0.128	0.022	0.005	4.	105.	-1838.7	0.53	1.00	0.33	0.90	298.	9.1	282.5	5.5
05	01	01	1	10	0.1	0.128	0.025	0.005	5.	105.	-1838.7	0.53	1.00	0.25	0.90	103.	9.1	286.4	5.5
05	01	01	1	11	0.1	0.310	0.027	0.005	7.	397.	-8888.0	0.53	1.00	0.22	2.20	136.	9.1	287.0	5.5
05	01	01	1	12	0.1	0.310	0.028	0.005	8.	397.	-8888.0	0.53	1.00	0.21	2.20	152.	9.1	287.0	5.5
05	01	01	1	13	0.1	0.254	0.029	0.005	9.	295.	-8888.0	0.53	1.00	0.21	1.80	187.	9.1	285.9	5.5
05	01	01	1	14	0.1	0.184	0.030	0.005	9.	182.	-5471.6	0.53	1.00	0.22	1.30	157.	9.1	287.0	5.5
05	01	01	1	15	0.1	0.184	0.031	0.005	10.	181.	-5471.6	0.53	1.00	0.26	1.30	192.	9.1	286.4	5.5
05	01	01	1	16	0.1	0.254	0.031	0.005	11.	294.	-8888.0	0.53	1.00	0.34	1.80	188.	9.1	285.9	5.5
05	01	01	1	17	-4.9	0.092	-9.000	-9.000	-999.	88.	13.8	0.53	1.00	0.61	1.30	200.	9.1	285.4	5.5
05	01	01	1	18	-2.6	0.063	-9.000	-9.000	-999.	37.	8.7	0.53	1.00	1.00	0.90	162.	9.1	284.9	5.5
05	01	01	1	19	-3.0	0.063	-9.000	-9.000	-999.	37.	7.5	0.53	1.00	1.00	0.90	176.	9.1	284.9	5.5
05	01	01	1	20	-0.4	0.028	-9.000	-9.000	-999.	11.	4.5	0.53	1.00	1.00	0.40	210.	9.1	284.2	5.5
05	01	01	1	21	-0.4	0.028	-9.000	-9.000	-999.	11.	4.5	0.53	1.00	1.00	0.40	236.	9.1	284.2	5.5
05	01	01	1	22	-0.4	0.028	-9.000	-9.000	-999.	11.	4.5	0.53	1.00	1.00	0.40	272.	9.1	283.8	5.5
05	01	01	1	23	-0.4	0.028	-9.000	-9.000	-999.	11.	4.5	0.53	1.00	1.00	0.40	251.	9.1	283.1	5.5
05	01	01	1	24	-0.4	0.028	-9.000	-9.000	-999.	11.	4.5	0.53	1.00	1.00	0.40	301.	9.1	282.5	5.5

First hour of profile data

YR	MO	DY	HR	HEIGHT	F	WDIR	WSPD	AMB_TMP	sigmaA	sigmaW	sigmaV
05	01	01	01	5.5	0	-999.	-99.00	279.9	99.0	-99.00	-99.00
05	01	01	01	9.1	1	285.	0.90	-999.0	99.0	-99.00	-99.00

F indicates top of profile (=1) or below (=0)

**MODELOPTs: RegDFAULT CONC ELEV

*** THE ANNUAL AVERAGE CONCENTRATION VALUES AVERAGED OVER 5 YEARS FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): L0000001 , L0000002 , L0000003 , L0000004 , L0000005 ,
L0000006 , L0000007 , L0000008 , L0000009 , L0000010 , L0000011 , L0000012 , L0000013 ,
L0000014 , L0000015 , L0000016 , L0000017 , L0000018 , L0000019 , L0000020 , L0000021 ,
L0000022 , L0000023 , L0000024 , L0000025 , L0000026 , L0000027 , L0000028 , . . . ,

*** NETWORK ID: UCART1 ; NETWORK TYPE: GRIDCART ***

** CONC OF PM_10 IN MICROGRAMS/M**3 **

Y-COORD (METERS)	X-COORD (METERS)							
	413725.00	413825.00	413925.00	414025.00	414125.00	414225.00	414325.00	414425.00	414525.00
3775280.00	0.00062	0.00195	0.00314	0.00261	0.00217	0.00203	0.00204	0.00221	0.00245
3775180.00	0.00053	0.00123	0.00264	0.00273	0.00234	0.00201	0.00224	0.00292	0.00346
3775080.00	0.00042	0.00062	0.00082	0.00090	0.00083	0.00080	0.00092	0.00119	0.00163
3774980.00	0.00033	0.00042	0.00051	0.00057	0.00059	0.00063	0.00073	0.00093	0.00138
3774880.00	0.00027	0.00032	0.00037	0.00043	0.00049	0.00055	0.00065	0.00085	0.00131
3774780.00	0.00024	0.00027	0.00032	0.00037	0.00042	0.00049	0.00059	0.00079	0.00126
3774680.00	0.00021	0.00024	0.00028	0.00032	0.00038	0.00045	0.00055	0.00075	0.00123
3774580.00	0.00019	0.00021	0.00025	0.00029	0.00034	0.00041	0.00052	0.00071	0.00120
3774480.00	0.00016	0.00018	0.00021	0.00025	0.00030	0.00037	0.00049	0.00069	0.00116
3774380.00	0.00014	0.00016	0.00017	0.00020	0.00024	0.00030	0.00041	0.00063	0.00113
3774280.00	0.00014	0.00015	0.00017	0.00018	0.00022	0.00028	0.00035	0.00047	0.00080
3774180.00	0.00013	0.00014	0.00015	0.00016	0.00020	0.00023	0.00027	0.00031	0.00043
3774080.00	0.00011	0.00012	0.00013	0.00014	0.00013	0.00018	0.00023	0.00024	0.00028
3773980.00	0.00010	0.00011	0.00010	0.00009	0.00009	0.00013	0.00019	0.00019	0.00021

**MODELOPTs: RegDFAULT CONC ELEV

*** THE ANNUAL AVERAGE CONCENTRATION VALUES AVERAGED OVER 5 YEARS FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): L0000001 , L0000002 , L0000003 , L0000004 , L0000005 ,
L0000006 , L0000007 , L0000008 , L0000009 , L0000010 , L0000011 , L0000012 , L0000013 ,
L0000014 , L0000015 , L0000016 , L0000017 , L0000018 , L0000019 , L0000020 , L0000021 ,
L0000022 , L0000023 , L0000024 , L0000025 , L0000026 , L0000027 , L0000028 , . . . ,

*** NETWORK ID: UCART1 ; NETWORK TYPE: GRIDCART ***

** CONC OF PM_10 IN MICROGRAMS/M**3 **

Y-COORD (METERS)	X-COORD (METERS) 414625.00	414725.00	414825.00	414925.00	415025.00
3775280.00	0.00235	0.00100	0.00050	0.00034	0.00028
3775180.00	0.00488	0.00245	0.00090	0.00047	0.00033
3775080.00	0.00377	0.00253	0.00101	0.00060	0.00042
3774980.00	0.00380	0.00245	0.00102	0.00062	0.00043
3774880.00	0.00391	0.00236	0.00101	0.00062	0.00043
3774780.00	0.00408	0.00226	0.00098	0.00060	0.00042
3774680.00	0.00427	0.00216	0.00094	0.00058	0.00041
3774580.00	0.00449	0.00206	0.00089	0.00055	0.00039
3774480.00	0.00471	0.00192	0.00082	0.00050	0.00036
3774380.00	0.00482	0.00161	0.00069	0.00044	0.00032
3774280.00	0.00680	0.00112	0.00055	0.00037	0.00028
3774180.00	0.00065	0.00057	0.00037	0.00029	0.00024
3774080.00	0.00035	0.00032	0.00027	0.00024	0.00020
3773980.00	0.00024	0.00021	0.00018	0.00018	0.00017

**MODELOPTs: RegDFAULT CONC ELEV

*** THE ANNUAL AVERAGE CONCENTRATION VALUES AVERAGED OVER 5 YEARS FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): L0000001 , L0000002 , L0000003 , L0000004 , L0000005 ,
L0000006 , L0000007 , L0000008 , L0000009 , L0000010 , L0000011 , L0000012 , L0000013 ,
L0000014 , L0000015 , L0000016 , L0000017 , L0000018 , L0000019 , L0000020 , L0000021 ,
L0000022 , L0000023 , L0000024 , L0000025 , L0000026 , L0000027 , L0000028 , . . . ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF PM_10 IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC
414672.00	3774779.00	0.00889	414669.00	3774640.00	0.00886
414668.00	3774472.00	0.00752	414664.00	3774366.00	0.00772
414664.00	3774283.00	0.00502	414449.00	3774414.00	0.00074

**MODELOPTs: RegDFAULT CONC ELEV

*** THE SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 5 YEARS ***

** CONC OF PM_10 IN MICROGRAMS/M**3 **

GROUP ID	AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	NETWORK GRID-ID
ALL	1ST HIGHEST VALUE IS	0.00889 AT (414672.00, 3774779.00, 140.54, 1646.00, 0.00)	DC	
	2ND HIGHEST VALUE IS	0.00886 AT (414669.00, 3774640.00, 138.13, 1646.00, 0.00)	DC	
	3RD HIGHEST VALUE IS	0.00772 AT (414664.00, 3774366.00, 140.40, 1646.00, 0.00)	DC	
	4TH HIGHEST VALUE IS	0.00752 AT (414668.00, 3774472.00, 139.98, 1646.00, 0.00)	DC	
	5TH HIGHEST VALUE IS	0.00680 AT (414625.00, 3774280.00, 119.80, 1646.00, 0.00)	GC	UCART1
	6TH HIGHEST VALUE IS	0.00502 AT (414664.00, 3774283.00, 126.77, 1646.00, 0.00)	DC	
	7TH HIGHEST VALUE IS	0.00488 AT (414625.00, 3775180.00, 145.30, 1646.00, 0.00)	GC	UCART1
	8TH HIGHEST VALUE IS	0.00482 AT (414625.00, 3774380.00, 139.10, 1646.00, 0.00)	GC	UCART1
	9TH HIGHEST VALUE IS	0.00471 AT (414625.00, 3774480.00, 139.90, 1646.00, 0.00)	GC	UCART1
	10TH HIGHEST VALUE IS	0.00449 AT (414625.00, 3774580.00, 138.90, 1646.00, 0.00)	GC	UCART1

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR

**MODELOPTs: RegDFAULT CONC   ELEV

*** Message Summary : AERMOD Model Execution ***

 --------- Summary of Total Messages --------

A Total of   0 Fatal Error Message(s)
A Total of   6 Warning Message(s)
A Total of   889 Informational Message(s)

A Total of   43824 Hours Were Processed

A Total of   0 Calm Hours Identified

A Total of   889 Missing Hours Identified (2.03 Percent)

   ******** FATAL ERROR MESSAGES ********
              *** NONE ***

   ********   WARNING MESSAGES   ********
MX W420   35935 METQA:Wind Speed Out-of-Range.   KURDAT =   09020607
MX W432   35935 METQA:Friction Velocity Out-of-Range.   KURDAT =   09020607
MX W420   43325 METQA:Wind Speed Out-of-Range.   KURDAT =   09121105
MX W432   43325 METQA:Friction Velocity Out-of-Range.   KURDAT =   09121105
MX W420   43326 METQA:Wind Speed Out-of-Range.   KURDAT =   09121106
MX W432   43326 METQA:Friction Velocity Out-of-Range.   KURDAT =   09121106

   ****
   *** AERMOD Finishes Successfully ***
   ****

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**
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**
** AERMOD Input Produced by:
** AERMOD View Ver. 8.2.0
** Lakes Environmental Software Inc.
** Date: 6/1/2013
** File: C:\Vista Env\2011\11057-Devils Gate Reservoir\Manning Operat2A\Manning Operat2A.ADI
**
**************************************
**
**
**************************************
** AERMOD Control Pathway
**************************************
**
**
CO STARTING
   TITLEONE Manning Pit Haul Route 2A - Operational Maintenance
   TITLETWO PM10 Diesel Truck Emissions
   MODELOPT DFAULT CONC
   AVERTIME ANNUAL
   URBANOPT 9862049 Los_Angeles_County
   POLLUTID PM_10
   RUNORNOT RUN
   ERRORFIL "Manning Operat2A.err"
CO FINISHED
**
**************************************
** AERMOD Source Pathway
**************************************
**
**
SO STARTING
** Source Location **
** Source ID - Type - X Coord. - Y Coord. **
** ------------------------------------------------------------------------
** Line Source Represented by Separated Volume Sources
** LINE VOLUME Source ID = RDRTE2A
** DESCRSRC Road Haul Route 2A to Manning Pit
** PREFIX
** Length of Side = 3.66
** Configuration = Separated
** Emission Rate = 0.0001619
** Vertical Dimension = 3.66
** SZINIT = 1.70
** Nodes = 5
** 413874.65, 3775298.99, 151.03, 0.00, 3.40
** 413872.78, 3775227.87, 144.00, 0.00, 3.40
** 414668.02, 3775220.74, 146.04, 0.00, 3.40
** 414648.15, 3774285.35, 124.37, 0.00, 3.40
** 414607.37, 3774271.45, 116.00, 0.00, 3.40
** ------------------------------------------------------------------------
   LOCATION L0000001     VOLUME   413874.601 3775297.161 150.85
   LOCATION L0000002     VOLUME   413874.409 3775289.856 150.13
   LOCATION L0000003     VOLUME   413874.217 3775282.552 149.41
   LOCATION L0000004     VOLUME   413874.025 3775275.247 148.68
   LOCATION L0000005     VOLUME   413873.833 3775267.942 147.96
   LOCATION L0000006     VOLUME   413873.641 3775260.637 147.24
   LOCATION L0000007     VOLUME   413873.449 3775253.332 146.52
   LOCATION L0000008     VOLUME   413873.257 3775246.028 145.80
   LOCATION L0000009     VOLUME   413873.065 3775238.723 145.07
   LOCATION L0000010     VOLUME   413872.873 3775231.418 144.35
   LOCATION L0000011     VOLUME   413876.535 3775227.833 144.01
   LOCATION L0000012     VOLUME   413883.842 3775227.768 144.03
   LOCATION L0000013     VOLUME   413891.149 3775227.702 144.05
   LOCATION L0000014     VOLUME   413898.456 3775227.637 144.07
   LOCATION L0000015     VOLUME   413905.763 3775227.571 144.08
   LOCATION L0000016     VOLUME   413913.070 3775227.506 144.10
   LOCATION L0000017     VOLUME   413920.377 3775227.440 144.12
   LOCATION L0000018     VOLUME   413927.684 3775227.375 144.14
   LOCATION L0000019     VOLUME   413934.991 3775227.309 144.16
   LOCATION L0000020     VOLUME   413942.298 3775227.244 144.18
   LOCATION L0000021     VOLUME   413949.605 3775227.178 144.20
   LOCATION L0000022     VOLUME   413956.912 3775227.113 144.22
   LOCATION L0000023     VOLUME   413964.219 3775227.047 144.23
   LOCATION L0000024     VOLUME   413971.526 3775226.982 144.25
   LOCATION L0000025     VOLUME   413978.833 3775226.916 144.27
   LOCATION L0000026     VOLUME   413986.141 3775226.851 144.29
   LOCATION L0000027     VOLUME   413993.448 3775226.785 144.31
   LOCATION L0000028     VOLUME   414000.755 3775226.720 144.33
   LOCATION L0000029     VOLUME   414008.062 3775226.654 144.35
   LOCATION L0000030     VOLUME   414015.369 3775226.589 144.37
   LOCATION L0000031     VOLUME   414022.676 3775226.524 144.38
   LOCATION L0000032     VOLUME   414029.983 3775226.458 144.40
   LOCATION L0000033     VOLUME   414037.290 3775226.393 144.42
   LOCATION L0000034     VOLUME   414044.597 3775226.327 144.44
   LOCATION L0000035     VOLUME   414051.904 3775226.262 144.46
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LOCATION L0000036 VOLUME 414059.211 3775226.196 144.48
LOCATION L0000037 VOLUME 414066.518 3775226.131 144.50
LOCATION L0000038 VOLUME 414073.825 3775226.065 144.52
LOCATION L0000039 VOLUME 414081.132 3775226.000 144.53
LOCATION L0000040 VOLUME 414088.439 3775225.934 144.55
LOCATION L0000041 VOLUME 414095.746 3775225.869 144.57
LOCATION L0000042 VOLUME 414103.053 3775225.803 144.59
LOCATION L0000043 VOLUME 414110.360 3775225.738 144.61
LOCATION L0000044 VOLUME 414117.668 3775225.672 144.63
LOCATION L0000045 VOLUME 414124.975 3775225.607 144.65
LOCATION L0000046 VOLUME 414132.282 3775225.541 144.67
LOCATION L0000047 VOLUME 414139.589 3775225.476 144.68
LOCATION L0000048 VOLUME 414146.896 3775225.410 144.70
LOCATION L0000049 VOLUME 414154.203 3775225.345 144.72
LOCATION L0000050 VOLUME 414161.510 3775225.279 144.74
LOCATION L0000051 VOLUME 414168.817 3775225.214 144.76
LOCATION L0000052 VOLUME 414176.124 3775225.148 144.78
LOCATION L0000053 VOLUME 414183.431 3775225.083 144.80
LOCATION L0000054 VOLUME 414190.738 3775225.017 144.82
LOCATION L0000055 VOLUME 414198.045 3775224.952 144.83
LOCATION L0000056 VOLUME 414205.352 3775224.886 144.85
LOCATION L0000057 VOLUME 414212.659 3775224.821 144.87
LOCATION L0000058 VOLUME 414219.966 3775224.756 144.89
LOCATION L0000059 VOLUME 414227.273 3775224.690 144.91
LOCATION L0000060 VOLUME 414234.580 3775224.625 144.93
LOCATION L0000061 VOLUME 414241.887 3775224.559 144.95
LOCATION L0000062 VOLUME 414249.195 3775224.494 144.97
LOCATION L0000063 VOLUME 414256.502 3775224.428 144.98
LOCATION L0000064 VOLUME 414263.809 3775224.363 145.00
LOCATION L0000065 VOLUME 414271.116 3775224.297 145.02
LOCATION L0000066 VOLUME 414278.423 3775224.232 145.04
LOCATION L0000067 VOLUME 414285.730 3775224.166 145.06
LOCATION L0000068 VOLUME 414293.037 3775224.101 145.08
LOCATION L0000069 VOLUME 414300.344 3775224.035 145.10
LOCATION L0000070 VOLUME 414307.651 3775223.970 145.12
LOCATION L0000071 VOLUME 414314.958 3775223.904 145.13
LOCATION L0000072 VOLUME 414322.265 3775223.839 145.15
LOCATION L0000073 VOLUME 414329.572 3775223.773 145.17
LOCATION L0000074 VOLUME 414336.879 3775223.708 145.19
LOCATION L0000075 VOLUME 414344.186 3775223.642 145.21
LOCATION L0000076 VOLUME 414351.493 3775223.577 145.23
LOCATION L0000077 VOLUME 414358.800 3775223.511 145.25
LOCATION L0000078 VOLUME 414366.107 3775223.446 145.27
LOCATION L0000079 VOLUME 414373.414 3775223.380 145.28
LOCATION L0000080 VOLUME 414380.722 3775223.315 145.30
LOCATION L0000081 VOLUME 414388.029 3775223.249 145.32
LOCATION L0000082 VOLUME 414395.336 3775223.184 145.34
LOCATION L0000083 VOLUME 414402.643 3775223.118 145.36
LOCATION L0000084 VOLUME 414409.950 3775223.053 145.38
LOCATION L0000085 VOLUME 414417.257 3775222.988 145.40
LOCATION L0000086 VOLUME 414424.564 3775222.922 145.42
LOCATION L0000087 VOLUME 414431.871 3775222.857 145.43
LOCATION L0000088 VOLUME 414439.178 3775222.791 145.45
LOCATION L0000089 VOLUME 414446.485 3775222.726 145.47
LOCATION L0000090 VOLUME 414453.792 3775222.660 145.49
LOCATION L0000091 VOLUME 414461.099 3775222.595 145.51
LOCATION L0000092 VOLUME 414468.406 3775222.529 145.53
LOCATION L0000093 VOLUME 414475.713 3775222.464 145.55
LOCATION L0000094 VOLUME 414483.020 3775222.398 145.57
LOCATION L0000095 VOLUME 414490.327 3775222.333 145.58
LOCATION L0000096 VOLUME 414497.634 3775222.267 145.60
LOCATION L0000097 VOLUME 414504.941 3775222.202 145.62
LOCATION L0000098 VOLUME 414512.249 3775222.136 145.64
LOCATION L0000099 VOLUME 414519.556 3775222.071 145.66
LOCATION L0000100 VOLUME 414526.863 3775222.005 145.68
LOCATION L0000101 VOLUME 414534.170 3775221.940 145.70
LOCATION L0000102 VOLUME 414541.477 3775221.874 145.72
LOCATION L0000103 VOLUME 414548.784 3775221.809 145.73
LOCATION L0000104 VOLUME 414556.091 3775221.743 145.75
LOCATION L0000105 VOLUME 414563.398 3775221.678 145.77
LOCATION L0000106 VOLUME 414570.705 3775221.612 145.79
LOCATION L0000107 VOLUME 414578.012 3775221.547 145.81
LOCATION L0000108 VOLUME 414585.319 3775221.481 145.83
LOCATION L0000109 VOLUME 414592.626 3775221.416 145.85
LOCATION L0000110 VOLUME 414599.933 3775221.350 145.87
LOCATION L0000111 VOLUME 414607.240 3775221.285 145.88
LOCATION L0000112 VOLUME 414614.547 3775221.220 145.90
LOCATION L0000113 VOLUME 414621.854 3775221.154 145.92
LOCATION L0000114 VOLUME 414629.161 3775221.089 145.94
LOCATION L0000115 VOLUME 414636.468 3775221.023 145.96
LOCATION L0000116 VOLUME 414643.776 3775220.958 145.98
LOCATION L0000117 VOLUME 414651.083 3775220.892 146.00
LOCATION L0000118 VOLUME 414658.390 3775220.827 146.02
LOCATION L0000119 VOLUME 414665.697 3775220.761 146.03
LOCATION L0000120 VOLUME 414667.911 3775215.755 145.92
LOCATION L0000121 VOLUME 414667.756 3775208.449 145.76
LOCATION L0000122 VOLUME 414667.601 3775201.143 145.59
LOCATION L0000123 VOLUME 414667.446 3775193.838 145.42

LOCATION L0000124 VOLUME 414667.291 3775186.532 145.25
LOCATION L0000125 VOLUME 414667.136 3775179.226 145.08
LOCATION L0000126 VOLUME 414666.980 3775171.920 144.91
LOCATION L0000127 VOLUME 414666.825 3775164.615 144.74
LOCATION L0000128 VOLUME 414666.670 3775157.309 144.57
LOCATION L0000129 VOLUME 414666.515 3775150.003 144.40
LOCATION L0000130 VOLUME 414666.360 3775142.698 144.23
LOCATION L0000131 VOLUME 414666.205 3775135.392 144.06
LOCATION L0000132 VOLUME 414666.050 3775128.086 143.89
LOCATION L0000133 VOLUME 414665.894 3775120.780 143.72
LOCATION L0000134 VOLUME 414665.739 3775113.475 143.55
LOCATION L0000135 VOLUME 414665.584 3775106.169 143.39
LOCATION L0000136 VOLUME 414665.429 3775098.863 143.22
LOCATION L0000137 VOLUME 414665.274 3775091.558 143.05
LOCATION L0000138 VOLUME 414665.119 3775084.252 142.88
LOCATION L0000139 VOLUME 414664.964 3775076.946 142.71
LOCATION L0000140 VOLUME 414664.809 3775069.641 142.54
LOCATION L0000141 VOLUME 414664.653 3775062.335 142.37
LOCATION L0000142 VOLUME 414664.498 3775055.029 142.20
LOCATION L0000143 VOLUME 414664.343 3775047.723 142.03
LOCATION L0000144 VOLUME 414664.188 3775040.418 141.86
LOCATION L0000145 VOLUME 414664.033 3775033.112 141.69
LOCATION L0000146 VOLUME 414663.878 3775025.806 141.52
LOCATION L0000147 VOLUME 414663.723 3775018.501 141.35
LOCATION L0000148 VOLUME 414663.567 3775011.195 141.19
LOCATION L0000149 VOLUME 414663.412 3775003.889 141.02
LOCATION L0000150 VOLUME 414663.257 3774996.584 140.85
LOCATION L0000151 VOLUME 414663.102 3774989.278 140.68
LOCATION L0000152 VOLUME 414662.947 3774981.972 140.51
LOCATION L0000153 VOLUME 414662.792 3774974.666 140.34
LOCATION L0000154 VOLUME 414662.637 3774967.361 140.17
LOCATION L0000155 VOLUME 414662.481 3774960.055 140.00
LOCATION L0000156 VOLUME 414662.326 3774952.749 139.83
LOCATION L0000157 VOLUME 414662.171 3774945.444 139.66
LOCATION L0000158 VOLUME 414662.016 3774938.138 139.49
LOCATION L0000159 VOLUME 414661.861 3774930.832 139.32
LOCATION L0000160 VOLUME 414661.706 3774923.527 139.15
LOCATION L0000161 VOLUME 414661.551 3774916.221 138.99
LOCATION L0000162 VOLUME 414661.396 3774908.915 138.82
LOCATION L0000163 VOLUME 414661.240 3774901.609 138.65
LOCATION L0000164 VOLUME 414661.085 3774894.304 138.48
LOCATION L0000165 VOLUME 414660.930 3774886.998 138.31
LOCATION L0000166 VOLUME 414660.775 3774879.692 138.14
LOCATION L0000167 VOLUME 414660.620 3774872.387 137.97
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** Source Parameters **
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   SRCPARAM L0000221     0.0000006399      0.00      3.40      1.70
   SRCPARAM L0000222     0.0000006399      0.00      3.40      1.70
   SRCPARAM L0000223     0.0000006399      0.00      3.40      1.70
   SRCPARAM L0000224     0.0000006399      0.00      3.40      1.70
   SRCPARAM L0000225     0.0000006399      0.00      3.40      1.70
   SRCPARAM L0000226     0.0000006399      0.00      3.40      1.70
   SRCPARAM L0000227     0.0000006399      0.00      3.40      1.70
   SRCPARAM L0000228     0.0000006399      0.00      3.40      1.70
   SRCPARAM L0000229     0.0000006399      0.00      3.40      1.70
   SRCPARAM L0000230     0.0000006399      0.00      3.40      1.70
   SRCPARAM L0000231     0.0000006399      0.00      3.40      1.70
   SRCPARAM L0000232     0.0000006399      0.00      3.40      1.70
   SRCPARAM L0000233     0.0000006399      0.00      3.40      1.70
   SRCPARAM L0000234     0.0000006399      0.00      3.40      1.70
   SRCPARAM L0000235     0.0000006399      0.00      3.40      1.70
   SRCPARAM L0000236     0.0000006399      0.00      3.40      1.70
   SRCPARAM L0000237     0.0000006399      0.00      3.40      1.70
   SRCPARAM L0000238     0.0000006399      0.00      3.40      1.70
   SRCPARAM L0000239     0.0000006399      0.00      3.40      1.70
   SRCPARAM L0000240     0.0000006399      0.00      3.40      1.70
   SRCPARAM L0000241     0.0000006399      0.00      3.40      1.70
   SRCPARAM L0000242     0.0000006399      0.00      3.40      1.70
   SRCPARAM L0000243     0.0000006399      0.00      3.40      1.70
   SRCPARAM L0000244     0.0000006399      0.00      3.40      1.70
   SRCPARAM L0000245     0.0000006399      0.00      3.40      1.70
   SRCPARAM L0000246     0.0000006399      0.00      3.40      1.70
   SRCPARAM L0000247     0.0000006399      0.00      3.40      1.70
   SRCPARAM L0000248     0.0000006399      0.00      3.40      1.70
   SRCPARAM L0000249     0.0000006399      0.00      3.40      1.70
   SRCPARAM L0000250     0.0000006399      0.00      3.40      1.70
   SRCPARAM L0000251     0.0000006399      0.00      3.40      1.70
   SRCPARAM L0000252     0.0000006399      0.00      3.40      1.70
   SRCPARAM L0000253     0.0000006399      0.00      3.40      1.70
** ------------------------------------------------------------------
   URBANSRC ALL

** Variable Emissions Type: "By Month (MONTH)"
** Variable Emission Scenario: "Scenario 2"
   EMISFACT L0000001     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000001     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000002     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000002     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000003     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000003     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000004     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000004     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000005     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000005     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000006     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000006     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000007     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000007     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000008     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000008     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000009     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000009     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000010     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000010     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000011     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000011     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000012     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000012     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000013     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000013     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000014     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000014     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000015     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000015     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000016     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000016     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000017     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000017     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000018     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000018     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000019     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000019     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000020     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000020     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
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   EMISFACT L0000021     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000022     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000022     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000023     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000023     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000024     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000024     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000025     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
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EMISFACT L0000025     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000026     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000026     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000027     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000027     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000028     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000028     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000029     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000029     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000030     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000030     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000031     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000031     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000032     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000032     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000033     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000033     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000034     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000034     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000035     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000035     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000036     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000036     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000037     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000037     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000038     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000038     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000039     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000039     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000040     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000040     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000041     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000041     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000042     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000042     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000043     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
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EMISFACT L0000044     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000045     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000045     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
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EMISFACT L0000046     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
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EMISFACT L0000047     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000048     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000048     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000049     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000049     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000050     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000050     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
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EMISFACT L0000051     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000052     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000052     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000053     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000053     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000054     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000054     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000055     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000055     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000056     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000056     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
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EMISFACT L0000058     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000058     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000059     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000059     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000060     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
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EMISFACT L0000063     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
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EMISFACT L0000064     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
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EMISFACT L0000065     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000066     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000066     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
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EMISFACT L0000067     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000068     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000068     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000069     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
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EMISFACT L0000070     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
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EMISFACT L0000071     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
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EMISFACT L0000072     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
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EMISFACT L0000073     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
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EMISFACT L0000089     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
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EMISFACT L0000090     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
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EMISFACT L0000091     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000092     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
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EMISFACT L0000094     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000095     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000095     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000096     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000096     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000097     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
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EMISFACT L0000098     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000098     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
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EMISFACT L0000103     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000104     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000104     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000105     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000105     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000106     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000106     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000107     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000107     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000108     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000108     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000109     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000109     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000110     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000110     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000111     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000111     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000112     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000112     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000113     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
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EMISFACT L0000114     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000115     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000115     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000116     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000116     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000117     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000117     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000118     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
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**************************************
** AERMOD Receptor Pathway
**************************************
**
**
RE STARTING
   INCLUDED "Manning Operat2A.rou"
RE FINISHED
**
**************************************
** AERMOD Meteorology Pathway
**************************************
**
**
ME STARTING
   SURFFILE ..\burk6.sfc
   PROFFILE ..\burk6.PFL
   SURFDATA 0 2005 Burbank 378.62 3782.24
   UAIRDATA 3190 2005
   SITEDATA 99999 2005
   PROFBASE 175.0 METERS
ME FINISHED
**
**************************************
** AERMOD Output Pathway
**************************************
**
**
OU STARTING
** Auto-Generated Plotfiles
   PLOTFILE ANNUAL ALL "MANNING OPERAT2A.AD\AN00GALL.PLT" 31
   SUMMFILE "Manning Operat2A.sum"
OU FINISHED

 *********************************
 *** SETUP Finishes Successfully ***
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**MODELOPTs: RegDFAULT CONC   ELEV

                                          ***   MODEL SETUP OPTIONS SUMMARY   ***
- -

**Model Is Setup For Calculation of Average CONCentration Values.

  -- DEPOSITION LOGIC --
**NO GAS DEPOSITION Data Provided.
**NO PARTICLE DEPOSITION Data Provided.
**Model Uses NO DRY DEPLETION. DRYDPLT = F
**Model Uses NO WET DEPLETION. WETDPLT = F

**Model Uses URBAN Dispersion Algorithm for the SBL for   253 Source(s),
  for Total of   1 Urban Area(s):
  Urban Population =   9862049.0 ; Urban Roughness Length = 1.000 m

**Model Uses Regulatory DEFAULT Options:
        1. Stack-tip Downwash.
        2. Model Accounts for ELEVated Terrain Effects.
        3. Use Calms Processing Routine.
        4. Use Missing Data Processing Routine.
        5. No Exponential Decay for URBAN/Non-SO2.
        6. Urban Roughness Length of 1.0 Meter Assumed.

**Model Assumes No FLAGPOLE Receptor Heights.

**Model Calculates ANNUAL Averages Only

**This Run Includes: 253 Source(s);   1 Source Group(s); and   202 Receptor(s)

**The Model Assumes A Pollutant Type of: PM_10

**Model Set To Continue RUNning After the Setup Testing.

**Output Options Selected:
         Model Outputs Tables of ANNUAL Averages by Receptor
         Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)
         Model Outputs Separate Summary File of High Ranked Values (SUMMFILE Keyword)

**NOTE: The Following Flags May Appear Following CONC Values: c for Calm Hours
                                                                m for Missing Hours
                                                                b for Both Calm and Missing Hours

**Misc. Inputs: Base Elev. for Pot. Temp. Profile (m MSL) =   175.00 ; Decay Coef. =   0.000   ; Rot. Angle =   0.0
                 Emission Units = GRAMS/SEC   ; Emission Rate Unit Factor =   0.10000E+07
                 Output Units   = MICROGRAMS/M**3

**Approximate Storage Requirements of Model =   3.7 MB of RAM.

**Detailed Error/Message File: Manning Operat2A.err
**File for Summary of Results: Manning Operat2A.sum

**MODELOPTs: RegDFAULT CONC ELEV

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0000001	0	0.63990E-06	413874.6	3775297.2	150.9	0.00	3.40	1.70	YES	MONTH
L0000002	0	0.63990E-06	413874.4	3775289.9	150.1	0.00	3.40	1.70	YES	MONTH
L0000003	0	0.63990E-06	413874.2	3775282.6	149.4	0.00	3.40	1.70	YES	MONTH
L0000004	0	0.63990E-06	413874.0	3775275.2	148.7	0.00	3.40	1.70	YES	MONTH
L0000005	0	0.63990E-06	413873.8	3775267.9	148.0	0.00	3.40	1.70	YES	MONTH
L0000006	0	0.63990E-06	413873.6	3775260.6	147.2	0.00	3.40	1.70	YES	MONTH
L0000007	0	0.63990E-06	413873.4	3775253.3	146.5	0.00	3.40	1.70	YES	MONTH
L0000008	0	0.63990E-06	413873.3	3775246.0	145.8	0.00	3.40	1.70	YES	MONTH
L0000009	0	0.63990E-06	413873.1	3775238.7	145.1	0.00	3.40	1.70	YES	MONTH
L0000010	0	0.63990E-06	413872.9	3775231.4	144.4	0.00	3.40	1.70	YES	MONTH
L0000011	0	0.63990E-06	413876.5	3775227.8	144.0	0.00	3.40	1.70	YES	MONTH
L0000012	0	0.63990E-06	413883.8	3775227.8	144.0	0.00	3.40	1.70	YES	MONTH
L0000013	0	0.63990E-06	413891.1	3775227.7	144.1	0.00	3.40	1.70	YES	MONTH
L0000014	0	0.63990E-06	413898.5	3775227.6	144.1	0.00	3.40	1.70	YES	MONTH
L0000015	0	0.63990E-06	413905.8	3775227.6	144.1	0.00	3.40	1.70	YES	MONTH
L0000016	0	0.63990E-06	413913.1	3775227.5	144.1	0.00	3.40	1.70	YES	MONTH
L0000017	0	0.63990E-06	413920.4	3775227.4	144.1	0.00	3.40	1.70	YES	MONTH
L0000018	0	0.63990E-06	413927.7	3775227.4	144.1	0.00	3.40	1.70	YES	MONTH
L0000019	0	0.63990E-06	413935.0	3775227.3	144.2	0.00	3.40	1.70	YES	MONTH
L0000020	0	0.63990E-06	413942.3	3775227.2	144.2	0.00	3.40	1.70	YES	MONTH
L0000021	0	0.63990E-06	413949.6	3775227.2	144.2	0.00	3.40	1.70	YES	MONTH
L0000022	0	0.63990E-06	413956.9	3775227.1	144.2	0.00	3.40	1.70	YES	MONTH
L0000023	0	0.63990E-06	413964.2	3775227.0	144.2	0.00	3.40	1.70	YES	MONTH
L0000024	0	0.63990E-06	413971.5	3775227.0	144.2	0.00	3.40	1.70	YES	MONTH
L0000025	0	0.63990E-06	413978.8	3775226.9	144.3	0.00	3.40	1.70	YES	MONTH
L0000026	0	0.63990E-06	413986.1	3775226.9	144.3	0.00	3.40	1.70	YES	MONTH
L0000027	0	0.63990E-06	413993.4	3775226.8	144.3	0.00	3.40	1.70	YES	MONTH
L0000028	0	0.63990E-06	414000.8	3775226.7	144.3	0.00	3.40	1.70	YES	MONTH
L0000029	0	0.63990E-06	414008.1	3775226.7	144.4	0.00	3.40	1.70	YES	MONTH
L0000030	0	0.63990E-06	414015.4	3775226.6	144.4	0.00	3.40	1.70	YES	MONTH
L0000031	0	0.63990E-06	414022.7	3775226.5	144.4	0.00	3.40	1.70	YES	MONTH
L0000032	0	0.63990E-06	414030.0	3775226.5	144.4	0.00	3.40	1.70	YES	MONTH
L0000033	0	0.63990E-06	414037.3	3775226.4	144.4	0.00	3.40	1.70	YES	MONTH
L0000034	0	0.63990E-06	414044.6	3775226.3	144.4	0.00	3.40	1.70	YES	MONTH
L0000035	0	0.63990E-06	414051.9	3775226.3	144.5	0.00	3.40	1.70	YES	MONTH
L0000036	0	0.63990E-06	414059.2	3775226.2	144.5	0.00	3.40	1.70	YES	MONTH
L0000037	0	0.63990E-06	414066.5	3775226.1	144.5	0.00	3.40	1.70	YES	MONTH
L0000038	0	0.63990E-06	414073.8	3775226.1	144.5	0.00	3.40	1.70	YES	MONTH
L0000039	0	0.63990E-06	414081.1	3775226.0	144.5	0.00	3.40	1.70	YES	MONTH
L0000040	0	0.63990E-06	414088.4	3775225.9	144.6	0.00	3.40	1.70	YES	MONTH

**MODELOPTs: RegDFAULT CONC ELEV

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0000041	0	0.63990E-06	414095.7	3775225.9	144.6	0.00	3.40	1.70	YES	MONTH
L0000042	0	0.63990E-06	414103.1	3775225.8	144.6	0.00	3.40	1.70	YES	MONTH
L0000043	0	0.63990E-06	414110.4	3775225.7	144.6	0.00	3.40	1.70	YES	MONTH
L0000044	0	0.63990E-06	414117.7	3775225.7	144.6	0.00	3.40	1.70	YES	MONTH
L0000045	0	0.63990E-06	414125.0	3775225.6	144.7	0.00	3.40	1.70	YES	MONTH
L0000046	0	0.63990E-06	414132.3	3775225.5	144.7	0.00	3.40	1.70	YES	MONTH
L0000047	0	0.63990E-06	414139.6	3775225.5	144.7	0.00	3.40	1.70	YES	MONTH
L0000048	0	0.63990E-06	414146.9	3775225.4	144.7	0.00	3.40	1.70	YES	MONTH
L0000049	0	0.63990E-06	414154.2	3775225.3	144.7	0.00	3.40	1.70	YES	MONTH
L0000050	0	0.63990E-06	414161.5	3775225.3	144.7	0.00	3.40	1.70	YES	MONTH
L0000051	0	0.63990E-06	414168.8	3775225.2	144.8	0.00	3.40	1.70	YES	MONTH
L0000052	0	0.63990E-06	414176.1	3775225.1	144.8	0.00	3.40	1.70	YES	MONTH
L0000053	0	0.63990E-06	414183.4	3775225.1	144.8	0.00	3.40	1.70	YES	MONTH
L0000054	0	0.63990E-06	414190.7	3775225.0	144.8	0.00	3.40	1.70	YES	MONTH
L0000055	0	0.63990E-06	414198.0	3775225.0	144.8	0.00	3.40	1.70	YES	MONTH
L0000056	0	0.63990E-06	414205.4	3775224.9	144.9	0.00	3.40	1.70	YES	MONTH
L0000057	0	0.63990E-06	414212.7	3775224.8	144.9	0.00	3.40	1.70	YES	MONTH
L0000058	0	0.63990E-06	414220.0	3775224.8	144.9	0.00	3.40	1.70	YES	MONTH
L0000059	0	0.63990E-06	414227.3	3775224.7	144.9	0.00	3.40	1.70	YES	MONTH
L0000060	0	0.63990E-06	414234.6	3775224.6	144.9	0.00	3.40	1.70	YES	MONTH
L0000061	0	0.63990E-06	414241.9	3775224.6	145.0	0.00	3.40	1.70	YES	MONTH
L0000062	0	0.63990E-06	414249.2	3775224.5	145.0	0.00	3.40	1.70	YES	MONTH
L0000063	0	0.63990E-06	414256.5	3775224.4	145.0	0.00	3.40	1.70	YES	MONTH
L0000064	0	0.63990E-06	414263.8	3775224.4	145.0	0.00	3.40	1.70	YES	MONTH
L0000065	0	0.63990E-06	414271.1	3775224.3	145.0	0.00	3.40	1.70	YES	MONTH
L0000066	0	0.63990E-06	414278.4	3775224.2	145.0	0.00	3.40	1.70	YES	MONTH
L0000067	0	0.63990E-06	414285.7	3775224.2	145.1	0.00	3.40	1.70	YES	MONTH
L0000068	0	0.63990E-06	414293.0	3775224.1	145.1	0.00	3.40	1.70	YES	MONTH
L0000069	0	0.63990E-06	414300.3	3775224.0	145.1	0.00	3.40	1.70	YES	MONTH
L0000070	0	0.63990E-06	414307.7	3775224.0	145.1	0.00	3.40	1.70	YES	MONTH
L0000071	0	0.63990E-06	414315.0	3775223.9	145.1	0.00	3.40	1.70	YES	MONTH
L0000072	0	0.63990E-06	414322.3	3775223.8	145.2	0.00	3.40	1.70	YES	MONTH
L0000073	0	0.63990E-06	414329.6	3775223.8	145.2	0.00	3.40	1.70	YES	MONTH
L0000074	0	0.63990E-06	414336.9	3775223.7	145.2	0.00	3.40	1.70	YES	MONTH
L0000075	0	0.63990E-06	414344.2	3775223.6	145.2	0.00	3.40	1.70	YES	MONTH
L0000076	0	0.63990E-06	414351.5	3775223.6	145.2	0.00	3.40	1.70	YES	MONTH
L0000077	0	0.63990E-06	414358.8	3775223.5	145.2	0.00	3.40	1.70	YES	MONTH
L0000078	0	0.63990E-06	414366.1	3775223.4	145.3	0.00	3.40	1.70	YES	MONTH
L0000079	0	0.63990E-06	414373.4	3775223.4	145.3	0.00	3.40	1.70	YES	MONTH
L0000080	0	0.63990E-06	414380.7	3775223.3	145.3	0.00	3.40	1.70	YES	MONTH

**MODELOPTs: RegDFAULT CONC ELEV

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0000081	0	0.63990E-06	414388.0	3775223.2	145.3	0.00	3.40	1.70	YES	MONTH
L0000082	0	0.63990E-06	414395.3	3775223.2	145.3	0.00	3.40	1.70	YES	MONTH
L0000083	0	0.63990E-06	414402.6	3775223.1	145.4	0.00	3.40	1.70	YES	MONTH
L0000084	0	0.63990E-06	414410.0	3775223.1	145.4	0.00	3.40	1.70	YES	MONTH
L0000085	0	0.63990E-06	414417.3	3775223.0	145.4	0.00	3.40	1.70	YES	MONTH
L0000086	0	0.63990E-06	414424.6	3775222.9	145.4	0.00	3.40	1.70	YES	MONTH
L0000087	0	0.63990E-06	414431.9	3775222.9	145.4	0.00	3.40	1.70	YES	MONTH
L0000088	0	0.63990E-06	414439.2	3775222.8	145.5	0.00	3.40	1.70	YES	MONTH
L0000089	0	0.63990E-06	414446.5	3775222.7	145.5	0.00	3.40	1.70	YES	MONTH
L0000090	0	0.63990E-06	414453.8	3775222.7	145.5	0.00	3.40	1.70	YES	MONTH
L0000091	0	0.63990E-06	414461.1	3775222.6	145.5	0.00	3.40	1.70	YES	MONTH
L0000092	0	0.63990E-06	414468.4	3775222.5	145.5	0.00	3.40	1.70	YES	MONTH
L0000093	0	0.63990E-06	414475.7	3775222.5	145.6	0.00	3.40	1.70	YES	MONTH
L0000094	0	0.63990E-06	414483.0	3775222.4	145.6	0.00	3.40	1.70	YES	MONTH
L0000095	0	0.63990E-06	414490.3	3775222.3	145.6	0.00	3.40	1.70	YES	MONTH
L0000096	0	0.63990E-06	414497.6	3775222.3	145.6	0.00	3.40	1.70	YES	MONTH
L0000097	0	0.63990E-06	414504.9	3775222.2	145.6	0.00	3.40	1.70	YES	MONTH
L0000098	0	0.63990E-06	414512.2	3775222.1	145.6	0.00	3.40	1.70	YES	MONTH
L0000099	0	0.63990E-06	414519.6	3775222.1	145.7	0.00	3.40	1.70	YES	MONTH
L0000100	0	0.63990E-06	414526.9	3775222.0	145.7	0.00	3.40	1.70	YES	MONTH
L0000101	0	0.63990E-06	414534.2	3775221.9	145.7	0.00	3.40	1.70	YES	MONTH
L0000102	0	0.63990E-06	414541.5	3775221.9	145.7	0.00	3.40	1.70	YES	MONTH
L0000103	0	0.63990E-06	414548.8	3775221.8	145.7	0.00	3.40	1.70	YES	MONTH
L0000104	0	0.63990E-06	414556.1	3775221.7	145.8	0.00	3.40	1.70	YES	MONTH
L0000105	0	0.63990E-06	414563.4	3775221.7	145.8	0.00	3.40	1.70	YES	MONTH
L0000106	0	0.63990E-06	414570.7	3775221.6	145.8	0.00	3.40	1.70	YES	MONTH
L0000107	0	0.63990E-06	414578.0	3775221.5	145.8	0.00	3.40	1.70	YES	MONTH
L0000108	0	0.63990E-06	414585.3	3775221.5	145.8	0.00	3.40	1.70	YES	MONTH
L0000109	0	0.63990E-06	414592.6	3775221.4	145.9	0.00	3.40	1.70	YES	MONTH
L0000110	0	0.63990E-06	414599.9	3775221.3	145.9	0.00	3.40	1.70	YES	MONTH
L0000111	0	0.63990E-06	414607.2	3775221.3	145.9	0.00	3.40	1.70	YES	MONTH
L0000112	0	0.63990E-06	414614.5	3775221.2	145.9	0.00	3.40	1.70	YES	MONTH
L0000113	0	0.63990E-06	414621.9	3775221.2	145.9	0.00	3.40	1.70	YES	MONTH
L0000114	0	0.63990E-06	414629.2	3775221.1	145.9	0.00	3.40	1.70	YES	MONTH
L0000115	0	0.63990E-06	414636.5	3775221.0	146.0	0.00	3.40	1.70	YES	MONTH
L0000116	0	0.63990E-06	414643.8	3775221.0	146.0	0.00	3.40	1.70	YES	MONTH
L0000117	0	0.63990E-06	414651.1	3775220.9	146.0	0.00	3.40	1.70	YES	MONTH
L0000118	0	0.63990E-06	414658.4	3775220.8	146.0	0.00	3.40	1.70	YES	MONTH
L0000119	0	0.63990E-06	414665.7	3775220.8	146.0	0.00	3.40	1.70	YES	MONTH
L0000120	0	0.63990E-06	414667.9	3775215.8	145.9	0.00	3.40	1.70	YES	MONTH

**MODELOPTs: RegDFAULT CONC ELEV

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0000121	0	0.63990E-06	414667.8	3775208.4	145.8	0.00	3.40	1.70	YES	MONTH
L0000122	0	0.63990E-06	414667.6	3775201.1	145.6	0.00	3.40	1.70	YES	MONTH
L0000123	0	0.63990E-06	414667.4	3775193.8	145.4	0.00	3.40	1.70	YES	MONTH
L0000124	0	0.63990E-06	414667.3	3775186.5	145.2	0.00	3.40	1.70	YES	MONTH
L0000125	0	0.63990E-06	414667.1	3775179.2	145.1	0.00	3.40	1.70	YES	MONTH
L0000126	0	0.63990E-06	414667.0	3775171.9	144.9	0.00	3.40	1.70	YES	MONTH
L0000127	0	0.63990E-06	414666.8	3775164.6	144.7	0.00	3.40	1.70	YES	MONTH
L0000128	0	0.63990E-06	414666.7	3775157.3	144.6	0.00	3.40	1.70	YES	MONTH
L0000129	0	0.63990E-06	414666.5	3775150.0	144.4	0.00	3.40	1.70	YES	MONTH
L0000130	0	0.63990E-06	414666.4	3775142.7	144.2	0.00	3.40	1.70	YES	MONTH
L0000131	0	0.63990E-06	414666.2	3775135.4	144.1	0.00	3.40	1.70	YES	MONTH
L0000132	0	0.63990E-06	414666.0	3775128.1	143.9	0.00	3.40	1.70	YES	MONTH
L0000133	0	0.63990E-06	414665.9	3775120.8	143.7	0.00	3.40	1.70	YES	MONTH
L0000134	0	0.63990E-06	414665.7	3775113.5	143.6	0.00	3.40	1.70	YES	MONTH
L0000135	0	0.63990E-06	414665.6	3775106.2	143.4	0.00	3.40	1.70	YES	MONTH
L0000136	0	0.63990E-06	414665.4	3775098.9	143.2	0.00	3.40	1.70	YES	MONTH
L0000137	0	0.63990E-06	414665.3	3775091.6	143.1	0.00	3.40	1.70	YES	MONTH
L0000138	0	0.63990E-06	414665.1	3775084.3	142.9	0.00	3.40	1.70	YES	MONTH
L0000139	0	0.63990E-06	414665.0	3775076.9	142.7	0.00	3.40	1.70	YES	MONTH
L0000140	0	0.63990E-06	414664.8	3775069.6	142.5	0.00	3.40	1.70	YES	MONTH
L0000141	0	0.63990E-06	414664.7	3775062.3	142.4	0.00	3.40	1.70	YES	MONTH
L0000142	0	0.63990E-06	414664.5	3775055.0	142.2	0.00	3.40	1.70	YES	MONTH
L0000143	0	0.63990E-06	414664.3	3775047.7	142.0	0.00	3.40	1.70	YES	MONTH
L0000144	0	0.63990E-06	414664.2	3775040.4	141.9	0.00	3.40	1.70	YES	MONTH
L0000145	0	0.63990E-06	414664.0	3775033.1	141.7	0.00	3.40	1.70	YES	MONTH
L0000146	0	0.63990E-06	414663.9	3775025.8	141.5	0.00	3.40	1.70	YES	MONTH
L0000147	0	0.63990E-06	414663.7	3775018.5	141.4	0.00	3.40	1.70	YES	MONTH
L0000148	0	0.63990E-06	414663.6	3775011.2	141.2	0.00	3.40	1.70	YES	MONTH
L0000149	0	0.63990E-06	414663.4	3775003.9	141.0	0.00	3.40	1.70	YES	MONTH
L0000150	0	0.63990E-06	414663.3	3774996.6	140.9	0.00	3.40	1.70	YES	MONTH
L0000151	0	0.63990E-06	414663.1	3774989.3	140.7	0.00	3.40	1.70	YES	MONTH
L0000152	0	0.63990E-06	414662.9	3774982.0	140.5	0.00	3.40	1.70	YES	MONTH
L0000153	0	0.63990E-06	414662.8	3774974.7	140.3	0.00	3.40	1.70	YES	MONTH
L0000154	0	0.63990E-06	414662.6	3774967.4	140.2	0.00	3.40	1.70	YES	MONTH
L0000155	0	0.63990E-06	414662.5	3774960.1	140.0	0.00	3.40	1.70	YES	MONTH
L0000156	0	0.63990E-06	414662.3	3774952.7	139.8	0.00	3.40	1.70	YES	MONTH
L0000157	0	0.63990E-06	414662.2	3774945.4	139.7	0.00	3.40	1.70	YES	MONTH
L0000158	0	0.63990E-06	414662.0	3774938.1	139.5	0.00	3.40	1.70	YES	MONTH
L0000159	0	0.63990E-06	414661.9	3774930.8	139.3	0.00	3.40	1.70	YES	MONTH
L0000160	0	0.63990E-06	414661.7	3774923.5	139.2	0.00	3.40	1.70	YES	MONTH

**MODELOPTs: RegDFAULT CONC ELEV

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0000161	0	0.63990E-06	414661.6	3774916.2	139.0	0.00	3.40	1.70	YES	MONTH
L0000162	0	0.63990E-06	414661.4	3774908.9	138.8	0.00	3.40	1.70	YES	MONTH
L0000163	0	0.63990E-06	414661.2	3774901.6	138.7	0.00	3.40	1.70	YES	MONTH
L0000164	0	0.63990E-06	414661.1	3774894.3	138.5	0.00	3.40	1.70	YES	MONTH
L0000165	0	0.63990E-06	414660.9	3774887.0	138.3	0.00	3.40	1.70	YES	MONTH
L0000166	0	0.63990E-06	414660.8	3774879.7	138.1	0.00	3.40	1.70	YES	MONTH
L0000167	0	0.63990E-06	414660.6	3774872.4	138.0	0.00	3.40	1.70	YES	MONTH
L0000168	0	0.63990E-06	414660.5	3774865.1	137.8	0.00	3.40	1.70	YES	MONTH
L0000169	0	0.63990E-06	414660.3	3774857.8	137.6	0.00	3.40	1.70	YES	MONTH
L0000170	0	0.63990E-06	414660.2	3774850.5	137.5	0.00	3.40	1.70	YES	MONTH
L0000171	0	0.63990E-06	414660.0	3774843.2	137.3	0.00	3.40	1.70	YES	MONTH
L0000172	0	0.63990E-06	414659.8	3774835.9	137.1	0.00	3.40	1.70	YES	MONTH
L0000173	0	0.63990E-06	414659.7	3774828.6	137.0	0.00	3.40	1.70	YES	MONTH
L0000174	0	0.63990E-06	414659.5	3774821.2	136.8	0.00	3.40	1.70	YES	MONTH
L0000175	0	0.63990E-06	414659.4	3774813.9	136.6	0.00	3.40	1.70	YES	MONTH
L0000176	0	0.63990E-06	414659.2	3774806.6	136.5	0.00	3.40	1.70	YES	MONTH
L0000177	0	0.63990E-06	414659.1	3774799.3	136.3	0.00	3.40	1.70	YES	MONTH
L0000178	0	0.63990E-06	414658.9	3774792.0	136.1	0.00	3.40	1.70	YES	MONTH
L0000179	0	0.63990E-06	414658.8	3774784.7	135.9	0.00	3.40	1.70	YES	MONTH
L0000180	0	0.63990E-06	414658.6	3774777.4	135.8	0.00	3.40	1.70	YES	MONTH
L0000181	0	0.63990E-06	414658.4	3774770.1	135.6	0.00	3.40	1.70	YES	MONTH
L0000182	0	0.63990E-06	414658.3	3774762.8	135.4	0.00	3.40	1.70	YES	MONTH
L0000183	0	0.63990E-06	414658.1	3774755.5	135.3	0.00	3.40	1.70	YES	MONTH
L0000184	0	0.63990E-06	414658.0	3774748.2	135.1	0.00	3.40	1.70	YES	MONTH
L0000185	0	0.63990E-06	414657.8	3774740.9	134.9	0.00	3.40	1.70	YES	MONTH
L0000186	0	0.63990E-06	414657.7	3774733.6	134.8	0.00	3.40	1.70	YES	MONTH
L0000187	0	0.63990E-06	414657.5	3774726.3	134.6	0.00	3.40	1.70	YES	MONTH
L0000188	0	0.63990E-06	414657.4	3774719.0	134.4	0.00	3.40	1.70	YES	MONTH
L0000189	0	0.63990E-06	414657.2	3774711.7	134.2	0.00	3.40	1.70	YES	MONTH
L0000190	0	0.63990E-06	414657.1	3774704.4	134.1	0.00	3.40	1.70	YES	MONTH
L0000191	0	0.63990E-06	414656.9	3774697.0	133.9	0.00	3.40	1.70	YES	MONTH
L0000192	0	0.63990E-06	414656.7	3774689.7	133.7	0.00	3.40	1.70	YES	MONTH
L0000193	0	0.63990E-06	414656.6	3774682.4	133.6	0.00	3.40	1.70	YES	MONTH
L0000194	0	0.63990E-06	414656.4	3774675.1	133.4	0.00	3.40	1.70	YES	MONTH
L0000195	0	0.63990E-06	414656.3	3774667.8	133.2	0.00	3.40	1.70	YES	MONTH
L0000196	0	0.63990E-06	414656.1	3774660.5	133.1	0.00	3.40	1.70	YES	MONTH
L0000197	0	0.63990E-06	414656.0	3774653.2	132.9	0.00	3.40	1.70	YES	MONTH
L0000198	0	0.63990E-06	414655.8	3774645.9	132.7	0.00	3.40	1.70	YES	MONTH
L0000199	0	0.63990E-06	414655.7	3774638.6	132.6	0.00	3.40	1.70	YES	MONTH
L0000200	0	0.63990E-06	414655.5	3774631.3	132.4	0.00	3.40	1.70	YES	MONTH

**MODELOPTs: RegDFAULT CONC ELEV

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0000201	0	0.63990E-06	414655.3	3774624.0	132.2	0.00	3.40	1.70	YES	MONTH
L0000202	0	0.63990E-06	414655.2	3774616.7	132.1	0.00	3.40	1.70	YES	MONTH
L0000203	0	0.63990E-06	414655.0	3774609.4	131.9	0.00	3.40	1.70	YES	MONTH
L0000204	0	0.63990E-06	414654.9	3774602.1	131.7	0.00	3.40	1.70	YES	MONTH
L0000205	0	0.63990E-06	414654.7	3774594.8	131.5	0.00	3.40	1.70	YES	MONTH
L0000206	0	0.63990E-06	414654.6	3774587.5	131.4	0.00	3.40	1.70	YES	MONTH
L0000207	0	0.63990E-06	414654.4	3774580.2	131.2	0.00	3.40	1.70	YES	MONTH
L0000208	0	0.63990E-06	414654.3	3774572.9	131.0	0.00	3.40	1.70	YES	MONTH
L0000209	0	0.63990E-06	414654.1	3774565.5	130.9	0.00	3.40	1.70	YES	MONTH
L0000210	0	0.63990E-06	414653.9	3774558.2	130.7	0.00	3.40	1.70	YES	MONTH
L0000211	0	0.63990E-06	414653.8	3774550.9	130.5	0.00	3.40	1.70	YES	MONTH
L0000212	0	0.63990E-06	414653.6	3774543.6	130.4	0.00	3.40	1.70	YES	MONTH
L0000213	0	0.63990E-06	414653.5	3774536.3	130.2	0.00	3.40	1.70	YES	MONTH
L0000214	0	0.63990E-06	414653.3	3774529.0	130.0	0.00	3.40	1.70	YES	MONTH
L0000215	0	0.63990E-06	414653.2	3774521.7	129.9	0.00	3.40	1.70	YES	MONTH
L0000216	0	0.63990E-06	414653.0	3774514.4	129.7	0.00	3.40	1.70	YES	MONTH
L0000217	0	0.63990E-06	414652.9	3774507.1	129.5	0.00	3.40	1.70	YES	MONTH
L0000218	0	0.63990E-06	414652.7	3774499.8	129.3	0.00	3.40	1.70	YES	MONTH
L0000219	0	0.63990E-06	414652.6	3774492.5	129.2	0.00	3.40	1.70	YES	MONTH
L0000220	0	0.63990E-06	414652.4	3774485.2	129.0	0.00	3.40	1.70	YES	MONTH
L0000221	0	0.63990E-06	414652.2	3774477.9	128.8	0.00	3.40	1.70	YES	MONTH
L0000222	0	0.63990E-06	414652.1	3774470.6	128.7	0.00	3.40	1.70	YES	MONTH
L0000223	0	0.63990E-06	414651.9	3774463.3	128.5	0.00	3.40	1.70	YES	MONTH
L0000224	0	0.63990E-06	414651.8	3774456.0	128.3	0.00	3.40	1.70	YES	MONTH
L0000225	0	0.63990E-06	414651.6	3774448.7	128.2	0.00	3.40	1.70	YES	MONTH
L0000226	0	0.63990E-06	414651.5	3774441.3	128.0	0.00	3.40	1.70	YES	MONTH
L0000227	0	0.63990E-06	414651.3	3774434.0	127.8	0.00	3.40	1.70	YES	MONTH
L0000228	0	0.63990E-06	414651.2	3774426.7	127.6	0.00	3.40	1.70	YES	MONTH
L0000229	0	0.63990E-06	414651.0	3774419.4	127.5	0.00	3.40	1.70	YES	MONTH
L0000230	0	0.63990E-06	414650.8	3774412.1	127.3	0.00	3.40	1.70	YES	MONTH
L0000231	0	0.63990E-06	414650.7	3774404.8	127.1	0.00	3.40	1.70	YES	MONTH
L0000232	0	0.63990E-06	414650.5	3774397.5	127.0	0.00	3.40	1.70	YES	MONTH
L0000233	0	0.63990E-06	414650.4	3774390.2	126.8	0.00	3.40	1.70	YES	MONTH
L0000234	0	0.63990E-06	414650.2	3774382.9	126.6	0.00	3.40	1.70	YES	MONTH
L0000235	0	0.63990E-06	414650.1	3774375.6	126.5	0.00	3.40	1.70	YES	MONTH
L0000236	0	0.63990E-06	414649.9	3774368.3	126.3	0.00	3.40	1.70	YES	MONTH
L0000237	0	0.63990E-06	414649.8	3774361.0	126.1	0.00	3.40	1.70	YES	MONTH
L0000238	0	0.63990E-06	414649.6	3774353.7	126.0	0.00	3.40	1.70	YES	MONTH
L0000239	0	0.63990E-06	414649.5	3774346.4	125.8	0.00	3.40	1.70	YES	MONTH
L0000240	0	0.63990E-06	414649.3	3774339.1	125.6	0.00	3.40	1.70	YES	MONTH

**MODELOPTs: RegDFAULT CONC ELEV

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0000241	0	0.63990E-06	414649.1	3774331.8	125.5	0.00	3.40	1.70	YES	MONTH
L0000242	0	0.63990E-06	414649.0	3774324.5	125.3	0.00	3.40	1.70	YES	MONTH
L0000243	0	0.63990E-06	414648.8	3774317.2	125.1	0.00	3.40	1.70	YES	MONTH
L0000244	0	0.63990E-06	414648.7	3774309.8	124.9	0.00	3.40	1.70	YES	MONTH
L0000245	0	0.63990E-06	414648.5	3774302.5	124.8	0.00	3.40	1.70	YES	MONTH
L0000246	0	0.63990E-06	414648.4	3774295.2	124.6	0.00	3.40	1.70	YES	MONTH
L0000247	0	0.63990E-06	414648.2	3774287.9	124.4	0.00	3.40	1.70	YES	MONTH
L0000248	0	0.63990E-06	414643.7	3774283.8	123.5	0.00	3.40	1.70	YES	MONTH
L0000249	0	0.63990E-06	414636.8	3774281.5	122.0	0.00	3.40	1.70	YES	MONTH
L0000250	0	0.63990E-06	414629.8	3774279.1	120.6	0.00	3.40	1.70	YES	MONTH
L0000251	0	0.63990E-06	414622.9	3774276.8	119.2	0.00	3.40	1.70	YES	MONTH
L0000252	0	0.63990E-06	414616.0	3774274.4	117.8	0.00	3.40	1.70	YES	MONTH
L0000253	0	0.63990E-06	414609.1	3774272.0	116.4	0.00	3.40	1.70	YES	MONTH

**MODELOPTs: RegDFAULT CONC ELEV

*** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID	SOURCE IDs
ALL	L0000001 , L0000002 , L0000003 , L0000004 , L0000005 , L0000006 , L0000007 , L0000008 ,
	L0000009 , L0000010 , L0000011 , L0000012 , L0000013 , L0000014 , L0000015 , L0000016 ,
	L0000017 , L0000018 , L0000019 , L0000020 , L0000021 , L0000022 , L0000023 , L0000024 ,
	L0000025 , L0000026 , L0000027 , L0000028 , L0000029 , L0000030 , L0000031 , L0000032 ,
	L0000033 , L0000034 , L0000035 , L0000036 , L0000037 , L0000038 , L0000039 , L0000040 ,
	L0000041 , L0000042 , L0000043 , L0000044 , L0000045 , L0000046 , L0000047 , L0000048 ,
	L0000049 , L0000050 , L0000051 , L0000052 , L0000053 , L0000054 , L0000055 , L0000056 ,
	L0000057 , L0000058 , L0000059 , L0000060 , L0000061 , L0000062 , L0000063 , L0000064 ,
	L0000065 , L0000066 , L0000067 , L0000068 , L0000069 , L0000070 , L0000071 , L0000072 ,
	L0000073 , L0000074 , L0000075 , L0000076 , L0000077 , L0000078 , L0000079 , L0000080 ,
	L0000081 , L0000082 , L0000083 , L0000084 , L0000085 , L0000086 , L0000087 , L0000088 ,
	L0000089 , L0000090 , L0000091 , L0000092 , L0000093 , L0000094 , L0000095 , L0000096 ,
	L0000097 , L0000098 , L0000099 , L0000100 , L0000101 , L0000102 , L0000103 , L0000104 ,
	L0000105 , L0000106 , L0000107 , L0000108 , L0000109 , L0000110 , L0000111 , L0000112 ,
	L0000113 , L0000114 , L0000115 , L0000116 , L0000117 , L0000118 , L0000119 , L0000120 ,
	L0000121 , L0000122 , L0000123 , L0000124 , L0000125 , L0000126 , L0000127 , L0000128 ,
	L0000129 , L0000130 , L0000131 , L0000132 , L0000133 , L0000134 , L0000135 , L0000136 ,
	L0000137 , L0000138 , L0000139 , L0000140 , L0000141 , L0000142 , L0000143 , L0000144 ,
	L0000145 , L0000146 , L0000147 , L0000148 , L0000149 , L0000150 , L0000151 , L0000152 ,
	L0000153 , L0000154 , L0000155 , L0000156 , L0000157 , L0000158 , L0000159 , L0000160 ,

**MODELOPTs: RegDFAULT CONC ELEV

*** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID SOURCE IDs

L0000161 , L0000162 , L0000163 , L0000164 , L0000165 , L0000166 , L0000167 , L0000168 ,
L0000169 , L0000170 , L0000171 , L0000172 , L0000173 , L0000174 , L0000175 , L0000176 ,
L0000177 , L0000178 , L0000179 , L0000180 , L0000181 , L0000182 , L0000183 , L0000184 ,
L0000185 , L0000186 , L0000187 , L0000188 , L0000189 , L0000190 , L0000191 , L0000192 ,
L0000193 , L0000194 , L0000195 , L0000196 , L0000197 , L0000198 , L0000199 , L0000200 ,
L0000201 , L0000202 , L0000203 , L0000204 , L0000205 , L0000206 , L0000207 , L0000208 ,
L0000209 , L0000210 , L0000211 , L0000212 , L0000213 , L0000214 , L0000215 , L0000216 ,
L0000217 , L0000218 , L0000219 , L0000220 , L0000221 , L0000222 , L0000223 , L0000224 ,
L0000225 , L0000226 , L0000227 , L0000228 , L0000229 , L0000230 , L0000231 , L0000232 ,
L0000233 , L0000234 , L0000235 , L0000236 , L0000237 , L0000238 , L0000239 , L0000240 ,
L0000241 , L0000242 , L0000243 , L0000244 , L0000245 , L0000246 , L0000247 , L0000248 ,
L0000249 , L0000250 , L0000251 , L0000252 , L0000253 ,

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000001 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000002 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000003 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000004 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000005 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000006 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000007 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000008 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000009 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000010 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000011 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000012 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000013 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000014 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000015 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000016 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000017 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000018 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000019 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000020 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000021 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000022 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000023 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000024 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000025 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000026 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000027 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000028 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000029 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000030 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000031 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000032 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000033 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000034 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000035 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000036 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000037 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000038 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000039 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000040 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000041 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000042 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000043 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000044 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000045 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000046 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000047 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000048 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000049 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000050 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000051 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000052 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000053 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000054 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000055 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000056 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000057 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000058 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000059 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000060 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000061 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000062 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000063 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000064 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000065 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000066 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000067 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000068 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000069 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000070 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000071 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000072 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000073 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000074 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000075 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000076 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000077 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000078 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000079 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000080 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000081 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000082 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000083 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000084 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000085 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000086 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000087 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000088 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000089 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000090 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

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* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000091 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000092 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000093 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000094 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000095 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000096 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

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* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000097 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000098 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000099 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000100 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000101 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000102 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

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* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000103 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000104 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000105 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000106 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000107 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000108 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

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* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000109 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000110 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000111 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000112 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000113 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000114 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

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* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000115 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000116 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000117 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000118 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000119 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000120 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

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* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000121 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000122 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000123 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000124 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000125 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000126 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

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* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000127 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000128 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000129 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000130 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000131 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000132 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

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* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000133 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000134 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000135 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000136 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000137 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000138 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

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* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000139 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000140 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000141 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000142 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000143 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000144 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

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* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000145 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000146 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000147 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000148 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000149 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000150 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000151 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000152 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000153 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000154 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000155 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000156 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000157 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000158 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000159 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000160 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000161 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000162 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000163 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000164 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000165 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000166 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000167 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000168 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000169 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000170 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000171 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000172 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000173 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000174 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000175 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000176 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000177 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000178 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000179 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000180 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000181 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000182 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000183 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000184 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000185 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

SOURCE ID = L0000186 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000187 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000188 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000189 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000190 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000191 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000192 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000193 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000194 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000195 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000196 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000197 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000198 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000199 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000200 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000201 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000202 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000203 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000204 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000205 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000206 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000207 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000208 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000209 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000210 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000211 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000212 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000213 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000214 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000215 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000216 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000217 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000218 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000219 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000220 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000221 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000222 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000223 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000224 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000225 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000226 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000227 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000228 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000229 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000230 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000231 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000232 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000233 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000234 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000235 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000236 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000237 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000238 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000239 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000240 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000241 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000242 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000243 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000244 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000245 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000246 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000247 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000248 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000249 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000250 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000251 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000252 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000253 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+000.5000E+000.0000E+000.0000E+000.0000E+000.0000E+000.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

*** GRIDDED RECEPTOR NETWORK SUMMARY ***

*** NETWORK ID: UCART1 ; NETWORK TYPE: GRIDCART ***

*** X-COORDINATES OF GRID ***
(METERS)

413725.0, 413825.0, 413925.0, 414025.0, 414125.0, 414225.0, 414325.0, 414425.0, 414525.0, 414625.0,
414725.0, 414825.0, 414925.0, 415025.0,

*** Y-COORDINATES OF GRID ***
(METERS)

3773980.0, 3774080.0, 3774180.0, 3774280.0, 3774380.0, 3774480.0, 3774580.0, 3774680.0, 3774780.0, 3774880.0,
3774980.0, 3775080.0, 3775180.0, 3775280.0,

**MODELOPTs: RegDFAULT CONC ELEV

*** NETWORK ID: UCART1 ; NETWORK TYPE: GRIDCART ***

* ELEVATION HEIGHTS IN METERS *

Y-COORD (METERS)	X-COORD (METERS)							
	413725.00	413825.00	413925.00	414025.00	414125.00	414225.00	414325.00	414425.00
414525.00								
3775280.00	150.40	150.10	148.80	137.70	114.00	91.00	95.20	116.00
136.60								
3775180.00	144.80	143.10	144.40	144.60	142.00	139.10	138.30	139.60
144.80								
3775080.00	139.20	139.40	141.90	144.10	146.40	148.00	147.10	145.60
145.00								
3774980.00	136.70	139.30	141.40	142.30	144.60	145.60	147.20	146.40
145.80								
3774880.00	140.90	143.90	144.00	142.40	141.20	141.50	142.50	142.50
142.50								
3774780.00	140.70	142.80	142.30	140.00	139.20	141.20	143.20	142.20
140.60								
3774680.00	137.90	138.70	139.50	138.90	138.70	140.00	141.90	141.70
140.10								
3774580.00	139.50	139.60	139.80	139.80	139.80	140.00	140.30	139.90
139.30								
3774480.00	146.70	146.40	144.30	143.10	142.60	143.40	142.00	140.70
139.90								
3774380.00	143.70	146.70	148.70	147.80	147.70	147.70	145.70	140.90
137.40								
3774280.00	130.30	133.20	139.10	145.80	139.50	131.10	134.60	121.20
111.70								
3774180.00	131.10	136.80	140.90	144.10	137.80	125.00	105.60	82.50
83.60								
3774080.00	126.10	133.30	140.70	147.30	151.10	143.90	120.10	88.00
84.40								
3773980.00	125.30	139.30	149.60	153.80	156.20	150.80	125.60	98.30
94.20								

**MODELOPTs: RegDFAULT CONC ELEV

*** NETWORK ID: UCART1 ; NETWORK TYPE: GRIDCART ***

* ELEVATION HEIGHTS IN METERS *

Y-COORD (METERS)	X-COORD (METERS) 414625.00	414725.00	414825.00	414925.00	415025.00
3775280.00	150.50	160.40	166.10	167.90	164.40
3775180.00	145.30	146.50	150.30	157.00	156.80
3775080.00	143.50	142.70	143.70	145.30	145.60
3774980.00	144.80	143.20	144.80	146.80	147.70
3774880.00	143.10	143.70	144.30	145.30	146.10
3774780.00	140.50	141.00	141.20	141.50	141.90
3774680.00	138.80	139.60	139.10	137.90	138.60
3774580.00	138.90	139.60	138.70	137.30	136.40
3774480.00	139.90	139.60	139.70	139.50	139.40
3774380.00	139.10	142.20	143.30	142.60	142.20
3774280.00	119.80	134.80	140.00	141.10	141.50
3774180.00	106.50	130.80	145.50	145.30	142.00
3774080.00	113.40	137.90	141.70	138.70	136.70
3773980.00	119.20	142.80	149.90	145.30	139.40

**MODELOPTs: RegDFAULT CONC ELEV

*** NETWORK ID: UCART1 ; NETWORK TYPE: GRIDCART ***

* HILL HEIGHT SCALES IN METERS *

Y-COORD (METERS)	X-COORD (METERS)							
	413725.00	413825.00	413925.00	414025.00	414125.00	414225.00	414325.00	414425.00
414525.00								
3775280.00	1646.00	1646.00	1646.00	1646.00	2350.00	2350.00	2350.00	2350.00
1646.00								
3775180.00	1646.00	1646.00	1646.00	1646.00	1646.00	1646.00	1646.00	1646.00
1646.00								
3775080.00	1646.00	1646.00	1646.00	1646.00	1646.00	1646.00	1646.00	1646.00
1646.00								
3774980.00	1646.00	1646.00	1646.00	1646.00	1646.00	1646.00	1646.00	1646.00
1646.00								
3774880.00	1646.00	1646.00	1646.00	1646.00	1646.00	1646.00	1646.00	1646.00
1646.00								
3774780.00	1646.00	1646.00	1646.00	1646.00	1646.00	1646.00	1646.00	1646.00
1646.00								
3774680.00	1646.00	1646.00	1646.00	1646.00	1646.00	1646.00	1646.00	1646.00
1646.00								
3774580.00	1646.00	1646.00	1646.00	1646.00	1646.00	1646.00	1646.00	1646.00
1646.00								
3774480.00	1646.00	1646.00	1646.00	1646.00	1646.00	1646.00	1646.00	1646.00
1646.00								
3774380.00	1646.00	1646.00	1646.00	1646.00	1646.00	1646.00	1646.00	1646.00
1646.00								
3774280.00	1646.00	1646.00	1646.00	1646.00	1646.00	1646.00	1646.00	1646.00
1646.00								
3774180.00	1646.00	1646.00	1646.00	1646.00	1646.00	1646.00	1646.00	1646.00
1646.00								
3774080.00	1646.00	1646.00	1646.00	1646.00	1646.00	1646.00	1646.00	1646.00
1646.00								
3773980.00	1646.00	1646.00	1646.00	1646.00	1646.00	1646.00	1646.00	1646.00
1646.00								

**MODELOPTs: RegDFAULT CONC ELEV

*** NETWORK ID: UCART1 ; NETWORK TYPE: GRIDCART ***

* HILL HEIGHT SCALES IN METERS *

Y-COORD (METERS)	X-COORD (METERS) 414625.00	414725.00	414825.00	414925.00	415025.00
3775280.00	1646.00	1646.00	1646.00	1646.00	1646.00
3775180.00	1646.00	1646.00	1646.00	1646.00	1646.00
3775080.00	1646.00	1646.00	1646.00	1646.00	1646.00
3774980.00	1646.00	1646.00	1646.00	1646.00	1646.00
3774880.00	1646.00	1646.00	1646.00	1646.00	1646.00
3774780.00	1646.00	1646.00	1646.00	1646.00	1646.00
3774680.00	1646.00	1646.00	1646.00	1646.00	1646.00
3774580.00	1646.00	1646.00	1646.00	1646.00	1646.00
3774480.00	1646.00	1646.00	1646.00	1646.00	1646.00
3774380.00	1646.00	1646.00	1646.00	1646.00	1646.00
3774280.00	1646.00	1646.00	1646.00	1646.00	1646.00
3774180.00	1646.00	1646.00	1646.00	1646.00	1646.00
3774080.00	1646.00	1646.00	1646.00	1646.00	1646.00
3773980.00	1646.00	1646.00	1646.00	1646.00	1646.00

**MODELOPTs: RegDFAULT CONC ELEV

*** DISCRETE CARTESIAN RECEPTORS ***
(X-COORD, Y-COORD, ZELEV, ZHILL, ZFLAG)
(METERS)

(	414672.0,	3774779.0,	140.5,	1646.0,	0.0);	(	414669.0,	3774640.0,	138.1,	1646.0,	0.0);
(	414668.0,	3774472.0,	140.0,	1646.0,	0.0);	(	414664.0,	3774366.0,	140.4,	1646.0,	0.0);
(	414664.0,	3774283.0,	126.8,	1646.0,	0.0);	(	414449.0,	3774414.0,	140.1,	1646.0,	0.0);

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE-RECEPTOR COMBINATIONS FOR WHICH CALCULATIONS MAY NOT BE PERFORMED *
LESS THAN 1.0 METER; WITHIN OPENPIT; OR BEYOND 80KM FOR FASTAREA/FASTALL

SOURCE ID	- - RECEPTOR LOCATION - - XR (METERS)	YR (METERS)	DISTANCE (METERS)
L0000250	414625.0	3774280.0	-2.38
L0000251	414625.0	3774280.0	-3.46

**MODELOPTs: RegDFAULT CONC   ELEV

*** METEOROLOGICAL DAYS SELECTED FOR PROCESSING ***
(1=YES; 0=NO)

```
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
```

NOTE: METEOROLOGICAL DATA ACTUALLY PROCESSED WILL ALSO DEPEND ON WHAT IS INCLUDED IN THE DATA FILE.

*** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***
(METERS/SEC)

1.54,   3.09,   5.14,   8.23, 10.80,

**MODELOPTs: RegDFAULT CONC ELEV

*** UP TO THE FIRST 24 HOURS OF METEOROLOGICAL DATA ***

Surface file: ..\burk6.sfc Met Version: 12345
Profile file: ..\burk6.PFL
Surface format: FREE
Profile format: FREE
Surface station no.: 0 Upper air station no.: 3190
Name: BURBANK Name: UNKNOWN
Year: 2005 Year: 2005

First 24 hours of scalar data

YR	MO	DY	JDY	HR	H0	U*	W*	DT/DZ	ZICNV	ZIMCH	M-O LEN	Z0	BOWEN	ALBEDO	REF WS	WD	HT	REF TA	HT
05	01	01	1	01	-3.2	0.063	-9.000	-9.000	-999.	37.	7.1	0.53	1.00	1.00	0.90	285.	9.1	279.9	5.5
05	01	01	1	02	-2.6	0.063	-9.000	-9.000	-999.	37.	8.7	0.53	1.00	1.00	0.90	277.	9.1	279.9	5.5
05	01	01	1	03	-2.6	0.063	-9.000	-9.000	-999.	37.	8.7	0.53	1.00	1.00	0.90	335.	9.1	279.2	5.5
05	01	01	1	04	-2.6	0.063	-9.000	-9.000	-999.	37.	8.6	0.53	1.00	1.00	0.90	291.	9.1	278.8	5.5
05	01	01	1	05	-3.0	0.063	-9.000	-9.000	-999.	37.	7.4	0.53	1.00	1.00	0.90	334.	9.1	278.1	5.5
05	01	01	1	06	-0.5	0.028	-9.000	-9.000	-999.	11.	3.8	0.53	1.00	1.00	0.40	309.	9.1	278.8	5.5
05	01	01	1	07	-2.6	0.063	-9.000	-9.000	-999.	37.	8.6	0.53	1.00	1.00	0.90	313.	9.1	278.8	5.5
05	01	01	1	08	-0.4	0.028	-9.000	-9.000	-999.	11.	4.5	0.53	1.00	0.56	0.40	256.	9.1	279.2	5.5
05	01	01	1	09	0.1	0.128	0.022	0.005	4.	105.	-1838.7	0.53	1.00	0.33	0.90	298.	9.1	282.5	5.5
05	01	01	1	10	0.1	0.128	0.025	0.005	5.	105.	-1838.7	0.53	1.00	0.25	0.90	103.	9.1	286.4	5.5
05	01	01	1	11	0.1	0.310	0.027	0.005	7.	397.	-8888.0	0.53	1.00	0.22	2.20	136.	9.1	287.0	5.5
05	01	01	1	12	0.1	0.310	0.028	0.005	8.	397.	-8888.0	0.53	1.00	0.21	2.20	152.	9.1	287.0	5.5
05	01	01	1	13	0.1	0.254	0.029	0.005	9.	295.	-8888.0	0.53	1.00	0.21	1.80	187.	9.1	285.9	5.5
05	01	01	1	14	0.1	0.184	0.030	0.005	9.	182.	-5471.6	0.53	1.00	0.22	1.30	157.	9.1	287.0	5.5
05	01	01	1	15	0.1	0.184	0.031	0.005	10.	181.	-5471.6	0.53	1.00	0.26	1.30	192.	9.1	286.4	5.5
05	01	01	1	16	0.1	0.254	0.031	0.005	11.	294.	-8888.0	0.53	1.00	0.34	1.80	188.	9.1	285.9	5.5
05	01	01	1	17	-4.9	0.092	-9.000	-9.000	-999.	88.	13.8	0.53	1.00	0.61	1.30	200.	9.1	285.4	5.5
05	01	01	1	18	-2.6	0.063	-9.000	-9.000	-999.	37.	8.7	0.53	1.00	1.00	0.90	162.	9.1	284.9	5.5
05	01	01	1	19	-3.0	0.063	-9.000	-9.000	-999.	37.	7.5	0.53	1.00	1.00	0.90	176.	9.1	284.9	5.5
05	01	01	1	20	-0.4	0.028	-9.000	-9.000	-999.	11.	4.5	0.53	1.00	1.00	0.40	210.	9.1	284.2	5.5
05	01	01	1	21	-0.4	0.028	-9.000	-9.000	-999.	11.	4.5	0.53	1.00	1.00	0.40	236.	9.1	284.2	5.5
05	01	01	1	22	-0.4	0.028	-9.000	-9.000	-999.	11.	4.5	0.53	1.00	1.00	0.40	272.	9.1	283.8	5.5
05	01	01	1	23	-0.4	0.028	-9.000	-9.000	-999.	11.	4.5	0.53	1.00	1.00	0.40	251.	9.1	283.1	5.5
05	01	01	1	24	-0.4	0.028	-9.000	-9.000	-999.	11.	4.5	0.53	1.00	1.00	0.40	301.	9.1	282.5	5.5

First hour of profile data

YR	MO	DY	HR	HEIGHT	F	WDIR	WSPD	AMB_TMP	sigmaA	sigmaW	sigmaV
05	01	01	01	5.5	0	-999.	-99.00	279.9	99.0	-99.00	-99.00
05	01	01	01	9.1	1	285.	0.90	-999.0	99.0	-99.00	-99.00

F indicates top of profile (=1) or below (=0)

**MODELOPTs: RegDFAULT CONC ELEV

*** THE ANNUAL AVERAGE CONCENTRATION VALUES AVERAGED OVER 5 YEARS FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): L0000001 , L0000002 , L0000003 , L0000004 , L0000005 ,
L0000006 , L0000007 , L0000008 , L0000009 , L0000010 , L0000011 , L0000012 , L0000013 ,
L0000014 , L0000015 , L0000016 , L0000017 , L0000018 , L0000019 , L0000020 , L0000021 ,
L0000022 , L0000023 , L0000024 , L0000025 , L0000026 , L0000027 , L0000028 , . . . ,

*** NETWORK ID: UCART1 ; NETWORK TYPE: GRIDCART ***

** CONC OF PM_10 IN MICROGRAMS/M**3 **

Y-COORD (METERS)	X-COORD (METERS)							
	413725.00	413825.00	413925.00	414025.00	414125.00	414225.00	414325.00	414425.00	414525.00
3775280.00	0.00004	0.00012	0.00018	0.00014	0.00012	0.00011	0.00011	0.00012	0.00013
3775180.00	0.00004	0.00007	0.00016	0.00017	0.00017	0.00017	0.00017	0.00018	0.00020
3775080.00	0.00003	0.00004	0.00005	0.00006	0.00007	0.00007	0.00008	0.00008	0.00010
3774980.00	0.00002	0.00003	0.00003	0.00004	0.00005	0.00005	0.00006	0.00007	0.00008
3774880.00	0.00002	0.00002	0.00003	0.00003	0.00004	0.00004	0.00005	0.00005	0.00008
3774780.00	0.00002	0.00002	0.00002	0.00003	0.00003	0.00004	0.00005	0.00006	0.00008
3774680.00	0.00001	0.00002	0.00002	0.00002	0.00003	0.00003	0.00004	0.00006	0.00008
3774580.00	0.00001	0.00001	0.00002	0.00002	0.00002	0.00003	0.00004	0.00005	0.00008
3774480.00	0.00001	0.00001	0.00001	0.00002	0.00002	0.00002	0.00003	0.00005	0.00008
3774380.00	0.00001	0.00001	0.00001	0.00001	0.00001	0.00002	0.00002	0.00004	0.00007
3774280.00	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00002	0.00003	0.00004
3774180.00	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00002	0.00002
3774080.00	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001
3773980.00	0.00001	0.00001	0.00000	0.00000	0.00000	0.00001	0.00001	0.00001	0.00001

**MODELOPTs: RegDFAULT CONC ELEV

*** THE ANNUAL AVERAGE CONCENTRATION VALUES AVERAGED OVER 5 YEARS FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): L0000001 , L0000002 , L0000003 , L0000004 , L0000005 ,
L0000006 , L0000007 , L0000008 , L0000009 , L0000010 , L0000011 , L0000012 , L0000013 ,
L0000014 , L0000015 , L0000016 , L0000017 , L0000018 , L0000019 , L0000020 , L0000021 ,
L0000022 , L0000023 , L0000024 , L0000025 , L0000026 , L0000027 , L0000028 , . . . ,

*** NETWORK ID: UCART1 ; NETWORK TYPE: GRIDCART ***

** CONC OF PM_10 IN MICROGRAMS/M**3 **

Y-COORD (METERS)	X-COORD (METERS) 414625.00	414725.00	414825.00	414925.00	415025.00
3775280.00	0.00013	0.00004	0.00002	0.00001	0.00001
3775180.00	0.00028	0.00014	0.00004	0.00002	0.00001
3775080.00	0.00021	0.00014	0.00005	0.00003	0.00002
3774980.00	0.00021	0.00013	0.00005	0.00003	0.00002
3774880.00	0.00021	0.00012	0.00005	0.00003	0.00002
3774780.00	0.00022	0.00012	0.00005	0.00003	0.00002
3774680.00	0.00022	0.00011	0.00005	0.00003	0.00002
3774580.00	0.00022	0.00009	0.00004	0.00003	0.00002
3774480.00	0.00021	0.00007	0.00004	0.00002	0.00002
3774380.00	0.00020	0.00005	0.00002	0.00002	0.00001
3774280.00	0.00039	0.00005	0.00002	0.00002	0.00001
3774180.00	0.00004	0.00003	0.00001	0.00001	0.00001
3774080.00	0.00002	0.00001	0.00001	0.00001	0.00001
3773980.00	0.00001	0.00001	0.00001	0.00001	0.00001

**MODELOPTs: RegDFAULT CONC ELEV

*** THE ANNUAL AVERAGE CONCENTRATION VALUES AVERAGED OVER 5 YEARS FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): L0000001 , L0000002 , L0000003 , L0000004 , L0000005 ,
L0000006 , L0000007 , L0000008 , L0000009 , L0000010 , L0000011 , L0000012 , L0000013 ,
L0000014 , L0000015 , L0000016 , L0000017 , L0000018 , L0000019 , L0000020 , L0000021 ,
L0000022 , L0000023 , L0000024 , L0000025 , L0000026 , L0000027 , L0000028 , . . . ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF PM_10 IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC
414672.00	3774779.00	0.00043	414669.00	3774640.00	0.00040
414668.00	3774472.00	0.00019	414664.00	3774366.00	0.00016
414664.00	3774283.00	0.00028	414449.00	3774414.00	0.00005

**MODELOPTs: RegDFAULT CONC ELEV

*** THE SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 5 YEARS ***

** CONC OF PM_10 IN MICROGRAMS/M**3 **

GROUP ID		AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	NETWORK GRID-ID
ALL	1ST HIGHEST VALUE IS	0.00043 AT	(414672.00, 3774779.00, 140.54, 1646.00, 0.00)	DC	
	2ND HIGHEST VALUE IS	0.00040 AT	(414669.00, 3774640.00, 138.13, 1646.00, 0.00)	DC	
	3RD HIGHEST VALUE IS	0.00039 AT	(414625.00, 3774280.00, 119.80, 1646.00, 0.00)	GC	UCART1
	4TH HIGHEST VALUE IS	0.00028 AT	(414664.00, 3774283.00, 126.77, 1646.00, 0.00)	DC	
	5TH HIGHEST VALUE IS	0.00028 AT	(414625.00, 3775180.00, 145.30, 1646.00, 0.00)	GC	UCART1
	6TH HIGHEST VALUE IS	0.00022 AT	(414625.00, 3774680.00, 138.80, 1646.00, 0.00)	GC	UCART1
	7TH HIGHEST VALUE IS	0.00022 AT	(414625.00, 3774580.00, 138.90, 1646.00, 0.00)	GC	UCART1
	8TH HIGHEST VALUE IS	0.00022 AT	(414625.00, 3774780.00, 140.50, 1646.00, 0.00)	GC	UCART1
	9TH HIGHEST VALUE IS	0.00021 AT	(414625.00, 3775080.00, 143.50, 1646.00, 0.00)	GC	UCART1
	10TH HIGHEST VALUE IS	0.00021 AT	(414625.00, 3774880.00, 143.10, 1646.00, 0.00)	GC	UCART1

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR

**MODELOPTs: RegDFAULT CONC ELEV

*** Message Summary : AERMOD Model Execution ***

--------- Summary of Total Messages --------

A Total of 0 Fatal Error Message(s)
A Total of 6 Warning Message(s)
A Total of 889 Informational Message(s)

A Total of 43824 Hours Were Processed

A Total of 0 Calm Hours Identified

A Total of 889 Missing Hours Identified (2.03 Percent)

******** FATAL ERROR MESSAGES ********
*** NONE ***

******** WARNING MESSAGES ********

```
MX W420   35935  METQA:Wind Speed Out-of-Range.   KURDAT =                    09020607
MX W432   35935  METQA:Friction Velocity Out-of-Range.   KURDAT =             09020607
MX W420   43325  METQA:Wind Speed Out-of-Range.   KURDAT =                    09121105
MX W432   43325  METQA:Friction Velocity Out-of-Range.   KURDAT =             09121105
MX W420   43326  METQA:Wind Speed Out-of-Range.   KURDAT =                    09121106
MX W432   43326  METQA:Friction Velocity Out-of-Range.   KURDAT =             09121106
```

****
*** AERMOD Finishes Successfully ***
****

APPENDIX D

AERMOD Model Printouts for Haul Routes 4A and 4B to Scholl Canyon Landfill

```
**
**************************************
**
** AERMOD Input Produced by:
** AERMOD View Ver. 8.2.0
** Lakes Environmental Software Inc.
** Date: 6/1/2013
** File: C:\Vista Env\2011\11057-Devils Gate Reservoir\Scholl Const\Scholl Const.ADI
**
**************************************
**
**
**************************************
** AERMOD Control Pathway
**************************************
**
**
CO STARTING
   TITLEONE Scholl Canyon Rd - Sediment Removal
   TITLETWO PM10 Diesel Truck Emissions Route 4
   MODELOPT DFAULT CONC
   AVERTIME ANNUAL
   URBANOPT 9862049 Los_Angeles_County
   POLLUTID PM_10
   RUNORNOT RUN
   ERRORFIL "Scholl Const.err"
CO FINISHED
**
**************************************
** AERMOD Source Pathway
**************************************
**
**
SO STARTING
** Source Location **
** Source ID - Type - X Coord. - Y Coord. **
** ------------------------------------------------------------------------
** Line Source Represented by Adjacent Volume Sources
** LINE VOLUME Source ID = RDRTE4
** DESCRSRC Scholl Cyn Rd Route 4
** PREFIX
** Length of Side = 3.66
** Configuration = Adjacent
** Emission Rate = 0.0001388
** Vertical Dimension = 3.66
** SZINIT = 1.70
** Nodes = 34
** 390641.41, 3778510.69, 246.87, 0.00, 1.70
** 390668.13, 3778578.36, 250.99, 0.00, 1.70
** 390707.34, 3778651.10, 256.63, 0.00, 1.70
** 390760.85, 3778728.71, 255.01, 0.00, 1.70
** 390792.68, 3778767.70, 256.02, 0.00, 1.70
** 390828.44, 3778800.14, 258.45, 0.00, 1.70
** 390857.61, 3778828.82, 263.84, 0.00, 1.70
** 390886.92, 3778864.58, 265.09, 0.00, 1.70
** 390891.73, 3778888.34, 266.10, 0.00, 1.70
** 390890.89, 3778904.61, 268.61, 0.00, 1.70
** 390882.78, 3778923.22, 270.18, 0.00, 1.70
** 390856.86, 3778942.91, 267.25, 0.00, 1.70
** 390750.58, 3778977.12, 281.68, 0.00, 1.70
** 390704.58, 3778967.72, 284.86, 0.00, 1.70
** 390672.97, 3778941.97, 282.95, 0.00, 1.70
** 390649.39, 3778908.93, 286.51, 0.00, 1.70
** 390619.94, 3778829.01, 290.40, 0.00, 1.70
** 390598.43, 3778807.25, 294.38, 0.00, 1.70
** 390569.15, 3778802.52, 295.70, 0.00, 1.70
** 390538.07, 3778813.24, 297.08, 0.00, 1.70
** 390518.32, 3778835.85, 301.28, 0.00, 1.70
** 390511.51, 3778874.33, 305.94, 0.00, 1.70
** 390582.30, 3779130.58, 325.56, 0.00, 1.70
** 390576.20, 3779163.37, 326.91, 0.00, 1.70
** 390557.79, 3779196.13, 323.64, 0.00, 1.70
** 390532.09, 3779221.25, 324.54, 0.00, 1.70
** 390382.01, 3779257.77, 338.95, 0.00, 1.70
** 390350.82, 3779249.56, 336.55, 0.00, 1.70
** 390311.31, 3779240.33, 345.03, 0.00, 1.70
** 390283.63, 3779245.94, 352.21, 0.00, 1.70
** 390251.41, 3779273.18, 342.96, 0.00, 1.70
** 390247.73, 3779314.34, 343.33, 0.00, 1.70
** 390257.63, 3779343.21, 338.52, 0.00, 1.70
** 390278.64, 3779363.31, 345.07, 0.00, 1.70
** ------------------------------------------------------------------------
   LOCATION L0000001     VOLUME   390642.078 3778512.395 246.75
   LOCATION L0000002     VOLUME   390643.422 3778515.797 246.82
   LOCATION L0000003     VOLUME   390644.765 3778519.199 247.04
   LOCATION L0000004     VOLUME   390646.109 3778522.601 247.31
   LOCATION L0000005     VOLUME   390647.452 3778526.003 247.56
   LOCATION L0000006     VOLUME   390648.796 3778529.405 247.81
```

LOCATION L0000007 VOLUME 390650.139 3778532.807 248.04
LOCATION L0000008 VOLUME 390651.483 3778536.209 248.27
LOCATION L0000009 VOLUME 390652.827 3778539.610 248.48
LOCATION L0000010 VOLUME 390654.170 3778543.012 248.68
LOCATION L0000011 VOLUME 390655.514 3778546.414 248.88
LOCATION L0000012 VOLUME 390656.857 3778549.816 249.12
LOCATION L0000013 VOLUME 390658.201 3778553.218 249.37
LOCATION L0000014 VOLUME 390659.544 3778556.620 249.62
LOCATION L0000015 VOLUME 390660.888 3778560.022 249.87
LOCATION L0000016 VOLUME 390662.231 3778563.424 250.13
LOCATION L0000017 VOLUME 390663.575 3778566.826 250.38
LOCATION L0000018 VOLUME 390664.919 3778570.227 250.63
LOCATION L0000019 VOLUME 390666.262 3778573.629 250.88
LOCATION L0000020 VOLUME 390667.606 3778577.031 251.13
LOCATION L0000021 VOLUME 390669.189 3778580.322 251.35
LOCATION L0000022 VOLUME 390670.924 3778583.541 251.57
LOCATION L0000023 VOLUME 390672.659 3778586.761 251.81
LOCATION L0000024 VOLUME 390674.395 3778589.981 252.05
LOCATION L0000025 VOLUME 390676.130 3778593.201 252.31
LOCATION L0000026 VOLUME 390677.866 3778596.420 252.58
LOCATION L0000027 VOLUME 390679.601 3778599.640 252.86
LOCATION L0000028 VOLUME 390681.337 3778602.860 253.16
LOCATION L0000029 VOLUME 390683.072 3778606.079 253.46
LOCATION L0000030 VOLUME 390684.808 3778609.299 253.74
LOCATION L0000031 VOLUME 390686.543 3778612.519 254.00
LOCATION L0000032 VOLUME 390688.278 3778615.738 254.26
LOCATION L0000033 VOLUME 390690.014 3778618.958 254.53
LOCATION L0000034 VOLUME 390691.749 3778622.178 254.79
LOCATION L0000035 VOLUME 390693.485 3778625.397 255.06
LOCATION L0000036 VOLUME 390695.220 3778628.617 255.32
LOCATION L0000037 VOLUME 390696.956 3778631.837 255.58
LOCATION L0000038 VOLUME 390698.691 3778635.056 255.85
LOCATION L0000039 VOLUME 390700.426 3778638.276 255.96
LOCATION L0000040 VOLUME 390702.162 3778641.496 255.99
LOCATION L0000041 VOLUME 390703.897 3778644.715 256.00
LOCATION L0000042 VOLUME 390705.633 3778647.935 256.00
LOCATION L0000043 VOLUME 390707.374 3778651.151 255.99
LOCATION L0000044 VOLUME 390709.450 3778654.162 255.91
LOCATION L0000045 VOLUME 390711.526 3778657.174 255.83
LOCATION L0000046 VOLUME 390713.603 3778660.185 255.72
LOCATION L0000047 VOLUME 390715.679 3778663.196 255.60
LOCATION L0000048 VOLUME 390717.755 3778666.207 255.47
LOCATION L0000049 VOLUME 390719.831 3778669.218 255.34
LOCATION L0000050 VOLUME 390721.908 3778672.229 255.22
LOCATION L0000051 VOLUME 390723.984 3778675.241 255.14
LOCATION L0000052 VOLUME 390726.060 3778678.252 255.09
LOCATION L0000053 VOLUME 390728.136 3778681.263 255.06
LOCATION L0000054 VOLUME 390730.213 3778684.274 255.15
LOCATION L0000055 VOLUME 390732.289 3778687.285 255.30
LOCATION L0000056 VOLUME 390734.365 3778690.296 255.43
LOCATION L0000057 VOLUME 390736.442 3778693.308 255.56
LOCATION L0000058 VOLUME 390738.518 3778696.319 255.66
LOCATION L0000059 VOLUME 390740.594 3778699.330 255.67
LOCATION L0000060 VOLUME 390742.670 3778702.341 255.65
LOCATION L0000061 VOLUME 390744.747 3778705.352 255.61
LOCATION L0000062 VOLUME 390746.823 3778708.363 255.56
LOCATION L0000063 VOLUME 390748.899 3778711.375 255.50
LOCATION L0000064 VOLUME 390750.975 3778714.386 255.42
LOCATION L0000065 VOLUME 390753.052 3778717.397 255.33
LOCATION L0000066 VOLUME 390755.128 3778720.408 255.23
LOCATION L0000067 VOLUME 390757.204 3778723.419 255.11
LOCATION L0000068 VOLUME 390759.281 3778726.430 255.01
LOCATION L0000069 VOLUME 390761.414 3778729.398 255.16
LOCATION L0000070 VOLUME 390763.728 3778732.232 255.29
LOCATION L0000071 VOLUME 390766.041 3778735.065 255.38
LOCATION L0000072 VOLUME 390768.354 3778737.898 255.45
LOCATION L0000073 VOLUME 390770.667 3778740.731 255.49
LOCATION L0000074 VOLUME 390772.980 3778743.564 255.50
LOCATION L0000075 VOLUME 390775.294 3778746.398 255.49
LOCATION L0000076 VOLUME 390777.607 3778749.231 255.44
LOCATION L0000077 VOLUME 390779.920 3778752.064 255.36
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** ------------------------------------------------------------------------
   URBANSRC ALL

** Variable Emissions Type: "By Month (MONTH)"
** Variable Emission Scenario: "Scenario 2"
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   EMISFACT L0000003     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
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   EMISFACT L0000006     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
   EMISFACT L0000007     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
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   EMISFACT L0000008     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
   EMISFACT L0000008     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
   EMISFACT L0000009     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
   EMISFACT L0000009     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
   EMISFACT L0000010     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
   EMISFACT L0000010     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
   EMISFACT L0000011     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
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   EMISFACT L0000014     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
   EMISFACT L0000015     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
   EMISFACT L0000015     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
   EMISFACT L0000016     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
   EMISFACT L0000016     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
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EMISFACT L0000432     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT L0000433     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
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EMISFACT L0000434     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
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EMISFACT L0000443     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
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EMISFACT L0000449     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
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EMISFACT L0000451     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
EMISFACT L0000451     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT L0000452     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
EMISFACT L0000452     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT L0000453     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
EMISFACT L0000453     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT L0000454     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
EMISFACT L0000454     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
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EMISFACT L0000455     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT L0000456     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
EMISFACT L0000456     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
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EMISFACT L0000458     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
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EMISFACT L0000460     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
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EMISFACT L0000461     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
EMISFACT L0000461     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT L0000462     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
EMISFACT L0000462     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
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EMISFACT L0000465     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
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EMISFACT L0000466     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT L0000467     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
EMISFACT L0000467     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
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EMISFACT L0000469     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
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EMISFACT L0000471     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
EMISFACT L0000471     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
EMISFACT L0000472     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
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EMISFACT L0000473     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
EMISFACT L0000473     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
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EMISFACT L0000475     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
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EMISFACT L0000478     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
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   EMISFACT L0000484     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
   EMISFACT L0000485     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
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   EMISFACT L0000486     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
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   EMISFACT L0000487     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
   EMISFACT L0000487     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
   EMISFACT L0000488     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
   EMISFACT L0000488     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
   EMISFACT L0000489     MONTH 0.0 0.0 0.0 1.0 1.0 1.0
   EMISFACT L0000489     MONTH 1.0 1.0 1.0 1.0 1.0 1.0
   SRCGROUP ALL
SO FINISHED
**
**************************************
** AERMOD Receptor Pathway
**************************************
**
**
RE STARTING
   INCLUDED "Scholl Const.rou"
RE FINISHED
**
**************************************
** AERMOD Meteorology Pathway
**************************************
**
**
ME STARTING
   SURFFILE ..\burk6.sfc
   PROFFILE ..\burk6.PFL
   SURFDATA 0 2005 Burbank 378.62 3782.24
   UAIRDATA 3190 2005
   SITEDATA 99999 2005
   PROFBASE 175.0 METERS
ME FINISHED
**
**************************************
** AERMOD Output Pathway
**************************************
**
**
OU STARTING
** Auto-Generated Plotfiles
   PLOTFILE ANNUAL ALL "Scholl Const.AD\AN00GALL.PLT" 31
   SUMMFILE "Scholl Const.sum"
OU FINISHED

 *********************************
 *** SETUP Finishes Successfully ***
 *********************************
```

**MODELOPTs: RegDFAULT CONC   ELEV

                                          ***   MODEL SETUP OPTIONS SUMMARY   ***
- -

**Model Is Setup For Calculation of Average CONCentration Values.

  -- DEPOSITION LOGIC --
**NO GAS DEPOSITION Data Provided.
**NO PARTICLE DEPOSITION Data Provided.
**Model Uses NO DRY DEPLETION. DRYDPLT = F
**Model Uses NO WET DEPLETION. WETDPLT = F

**Model Uses URBAN Dispersion Algorithm for the SBL for   489 Source(s),
  for Total of   1 Urban Area(s):
  Urban Population =   9862049.0 ; Urban Roughness Length = 1.000 m

**Model Uses Regulatory DEFAULT Options:
        1. Stack-tip Downwash.
        2. Model Accounts for ELEVated Terrain Effects.
        3. Use Calms Processing Routine.
        4. Use Missing Data Processing Routine.
        5. No Exponential Decay for URBAN/Non-SO2.
        6. Urban Roughness Length of 1.0 Meter Assumed.

**Model Assumes No FLAGPOLE Receptor Heights.

**Model Calculates ANNUAL Averages Only

**This Run Includes: 489 Source(s);   1 Source Group(s); and   154 Receptor(s)

**The Model Assumes A Pollutant Type of: PM_10

**Model Set To Continue RUNning After the Setup Testing.

**Output Options Selected:
         Model Outputs Tables of ANNUAL Averages by Receptor
         Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)
         Model Outputs Separate Summary File of High Ranked Values (SUMMFILE Keyword)

**NOTE: The Following Flags May Appear Following CONC Values: c for Calm Hours
                                                                m for Missing Hours
                                                                b for Both Calm and Missing Hours

**Misc. Inputs: Base Elev. for Pot. Temp. Profile (m MSL) =   175.00 ; Decay Coef. =   0.000   ; Rot. Angle =   0.0
                 Emission Units = GRAMS/SEC   ; Emission Rate Unit Factor =   0.10000E+07
                 Output Units   = MICROGRAMS/M**3

**Approximate Storage Requirements of Model =   3.8 MB of RAM.

**Detailed Error/Message File: Scholl Const.err
**File for Summary of Results: Scholl Const.sum

**MODELOPTs: RegDFAULT CONC ELEV

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0000001	0	0.28380E-06	390642.1	3778512.4	246.8	0.00	1.70	1.70	YES	MONTH
L0000002	0	0.28380E-06	390643.4	3778515.8	246.8	0.00	1.70	1.70	YES	MONTH
L0000003	0	0.28380E-06	390644.8	3778519.2	247.0	0.00	1.70	1.70	YES	MONTH
L0000004	0	0.28380E-06	390646.1	3778522.6	247.3	0.00	1.70	1.70	YES	MONTH
L0000005	0	0.28380E-06	390647.5	3778526.0	247.6	0.00	1.70	1.70	YES	MONTH
L0000006	0	0.28380E-06	390648.8	3778529.4	247.8	0.00	1.70	1.70	YES	MONTH
L0000007	0	0.28380E-06	390650.1	3778532.8	248.0	0.00	1.70	1.70	YES	MONTH
L0000008	0	0.28380E-06	390651.5	3778536.2	248.3	0.00	1.70	1.70	YES	MONTH
L0000009	0	0.28380E-06	390652.8	3778539.6	248.5	0.00	1.70	1.70	YES	MONTH
L0000010	0	0.28380E-06	390654.2	3778543.0	248.7	0.00	1.70	1.70	YES	MONTH
L0000011	0	0.28380E-06	390655.5	3778546.4	248.9	0.00	1.70	1.70	YES	MONTH
L0000012	0	0.28380E-06	390656.9	3778549.8	249.1	0.00	1.70	1.70	YES	MONTH
L0000013	0	0.28380E-06	390658.2	3778553.2	249.4	0.00	1.70	1.70	YES	MONTH
L0000014	0	0.28380E-06	390659.5	3778556.6	249.6	0.00	1.70	1.70	YES	MONTH
L0000015	0	0.28380E-06	390660.9	3778560.0	249.9	0.00	1.70	1.70	YES	MONTH
L0000016	0	0.28380E-06	390662.2	3778563.4	250.1	0.00	1.70	1.70	YES	MONTH
L0000017	0	0.28380E-06	390663.6	3778566.8	250.4	0.00	1.70	1.70	YES	MONTH
L0000018	0	0.28380E-06	390664.9	3778570.2	250.6	0.00	1.70	1.70	YES	MONTH
L0000019	0	0.28380E-06	390666.3	3778573.6	250.9	0.00	1.70	1.70	YES	MONTH
L0000020	0	0.28380E-06	390667.6	3778577.0	251.1	0.00	1.70	1.70	YES	MONTH
L0000021	0	0.28380E-06	390669.2	3778580.3	251.4	0.00	1.70	1.70	YES	MONTH
L0000022	0	0.28380E-06	390670.9	3778583.5	251.6	0.00	1.70	1.70	YES	MONTH
L0000023	0	0.28380E-06	390672.7	3778586.8	251.8	0.00	1.70	1.70	YES	MONTH
L0000024	0	0.28380E-06	390674.4	3778590.0	252.1	0.00	1.70	1.70	YES	MONTH
L0000025	0	0.28380E-06	390676.1	3778593.2	252.3	0.00	1.70	1.70	YES	MONTH
L0000026	0	0.28380E-06	390677.9	3778596.4	252.6	0.00	1.70	1.70	YES	MONTH
L0000027	0	0.28380E-06	390679.6	3778599.6	252.9	0.00	1.70	1.70	YES	MONTH
L0000028	0	0.28380E-06	390681.3	3778602.9	253.2	0.00	1.70	1.70	YES	MONTH
L0000029	0	0.28380E-06	390683.1	3778606.1	253.5	0.00	1.70	1.70	YES	MONTH
L0000030	0	0.28380E-06	390684.8	3778609.3	253.7	0.00	1.70	1.70	YES	MONTH
L0000031	0	0.28380E-06	390686.5	3778612.5	254.0	0.00	1.70	1.70	YES	MONTH
L0000032	0	0.28380E-06	390688.3	3778615.7	254.3	0.00	1.70	1.70	YES	MONTH
L0000033	0	0.28380E-06	390690.0	3778619.0	254.5	0.00	1.70	1.70	YES	MONTH
L0000034	0	0.28380E-06	390691.7	3778622.2	254.8	0.00	1.70	1.70	YES	MONTH
L0000035	0	0.28380E-06	390693.5	3778625.4	255.1	0.00	1.70	1.70	YES	MONTH
L0000036	0	0.28380E-06	390695.2	3778628.6	255.3	0.00	1.70	1.70	YES	MONTH
L0000037	0	0.28380E-06	390697.0	3778631.8	255.6	0.00	1.70	1.70	YES	MONTH
L0000038	0	0.28380E-06	390698.7	3778635.1	255.9	0.00	1.70	1.70	YES	MONTH
L0000039	0	0.28380E-06	390700.4	3778638.3	256.0	0.00	1.70	1.70	YES	MONTH
L0000040	0	0.28380E-06	390702.2	3778641.5	256.0	0.00	1.70	1.70	YES	MONTH

**MODELOPTs: RegDFAULT CONC ELEV

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0000041	0	0.28380E-06	390703.9	3778644.7	256.0	0.00	1.70	1.70	YES	MONTH
L0000042	0	0.28380E-06	390705.6	3778647.9	256.0	0.00	1.70	1.70	YES	MONTH
L0000043	0	0.28380E-06	390707.4	3778651.2	256.0	0.00	1.70	1.70	YES	MONTH
L0000044	0	0.28380E-06	390709.5	3778654.2	255.9	0.00	1.70	1.70	YES	MONTH
L0000045	0	0.28380E-06	390711.5	3778657.2	255.8	0.00	1.70	1.70	YES	MONTH
L0000046	0	0.28380E-06	390713.6	3778660.2	255.7	0.00	1.70	1.70	YES	MONTH
L0000047	0	0.28380E-06	390715.7	3778663.2	255.6	0.00	1.70	1.70	YES	MONTH
L0000048	0	0.28380E-06	390717.8	3778666.2	255.5	0.00	1.70	1.70	YES	MONTH
L0000049	0	0.28380E-06	390719.8	3778669.2	255.3	0.00	1.70	1.70	YES	MONTH
L0000050	0	0.28380E-06	390721.9	3778672.2	255.2	0.00	1.70	1.70	YES	MONTH
L0000051	0	0.28380E-06	390724.0	3778675.2	255.1	0.00	1.70	1.70	YES	MONTH
L0000052	0	0.28380E-06	390726.1	3778678.3	255.1	0.00	1.70	1.70	YES	MONTH
L0000053	0	0.28380E-06	390728.1	3778681.3	255.1	0.00	1.70	1.70	YES	MONTH
L0000054	0	0.28380E-06	390730.2	3778684.3	255.2	0.00	1.70	1.70	YES	MONTH
L0000055	0	0.28380E-06	390732.3	3778687.3	255.3	0.00	1.70	1.70	YES	MONTH
L0000056	0	0.28380E-06	390734.4	3778690.3	255.4	0.00	1.70	1.70	YES	MONTH
L0000057	0	0.28380E-06	390736.4	3778693.3	255.6	0.00	1.70	1.70	YES	MONTH
L0000058	0	0.28380E-06	390738.5	3778696.3	255.7	0.00	1.70	1.70	YES	MONTH
L0000059	0	0.28380E-06	390740.6	3778699.3	255.7	0.00	1.70	1.70	YES	MONTH
L0000060	0	0.28380E-06	390742.7	3778702.3	255.7	0.00	1.70	1.70	YES	MONTH
L0000061	0	0.28380E-06	390744.7	3778705.4	255.6	0.00	1.70	1.70	YES	MONTH
L0000062	0	0.28380E-06	390746.8	3778708.4	255.6	0.00	1.70	1.70	YES	MONTH
L0000063	0	0.28380E-06	390748.9	3778711.4	255.5	0.00	1.70	1.70	YES	MONTH
L0000064	0	0.28380E-06	390751.0	3778714.4	255.4	0.00	1.70	1.70	YES	MONTH
L0000065	0	0.28380E-06	390753.1	3778717.4	255.3	0.00	1.70	1.70	YES	MONTH
L0000066	0	0.28380E-06	390755.1	3778720.4	255.2	0.00	1.70	1.70	YES	MONTH
L0000067	0	0.28380E-06	390757.2	3778723.4	255.1	0.00	1.70	1.70	YES	MONTH
L0000068	0	0.28380E-06	390759.3	3778726.4	255.0	0.00	1.70	1.70	YES	MONTH
L0000069	0	0.28380E-06	390761.4	3778729.4	255.2	0.00	1.70	1.70	YES	MONTH
L0000070	0	0.28380E-06	390763.7	3778732.2	255.3	0.00	1.70	1.70	YES	MONTH
L0000071	0	0.28380E-06	390766.0	3778735.1	255.4	0.00	1.70	1.70	YES	MONTH
L0000072	0	0.28380E-06	390768.4	3778737.9	255.5	0.00	1.70	1.70	YES	MONTH
L0000073	0	0.28380E-06	390770.7	3778740.7	255.5	0.00	1.70	1.70	YES	MONTH
L0000074	0	0.28380E-06	390773.0	3778743.6	255.5	0.00	1.70	1.70	YES	MONTH
L0000075	0	0.28380E-06	390775.3	3778746.4	255.5	0.00	1.70	1.70	YES	MONTH
L0000076	0	0.28380E-06	390777.6	3778749.2	255.4	0.00	1.70	1.70	YES	MONTH
L0000077	0	0.28380E-06	390779.9	3778752.1	255.4	0.00	1.70	1.70	YES	MONTH
L0000078	0	0.28380E-06	390782.2	3778754.9	255.3	0.00	1.70	1.70	YES	MONTH
L0000079	0	0.28380E-06	390784.5	3778757.7	255.2	0.00	1.70	1.70	YES	MONTH
L0000080	0	0.28380E-06	390786.9	3778760.6	255.1	0.00	1.70	1.70	YES	MONTH

**MODELOPTs: RegDFAULT CONC ELEV

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0000081	0	0.28380E-06	390789.2	3778763.4	255.1	0.00	1.70	1.70	YES	MONTH
L0000082	0	0.28380E-06	390791.5	3778766.2	255.6	0.00	1.70	1.70	YES	MONTH
L0000083	0	0.28380E-06	390794.0	3778768.9	256.2	0.00	1.70	1.70	YES	MONTH
L0000084	0	0.28380E-06	390796.7	3778771.3	256.7	0.00	1.70	1.70	YES	MONTH
L0000085	0	0.28380E-06	390799.4	3778773.8	257.1	0.00	1.70	1.70	YES	MONTH
L0000086	0	0.28380E-06	390802.1	3778776.3	257.5	0.00	1.70	1.70	YES	MONTH
L0000087	0	0.28380E-06	390804.8	3778778.7	257.8	0.00	1.70	1.70	YES	MONTH
L0000088	0	0.28380E-06	390807.5	3778781.2	258.0	0.00	1.70	1.70	YES	MONTH
L0000089	0	0.28380E-06	390810.2	3778783.6	258.2	0.00	1.70	1.70	YES	MONTH
L0000090	0	0.28380E-06	390813.0	3778786.1	258.3	0.00	1.70	1.70	YES	MONTH
L0000091	0	0.28380E-06	390815.7	3778788.5	258.4	0.00	1.70	1.70	YES	MONTH
L0000092	0	0.28380E-06	390818.4	3778791.0	258.5	0.00	1.70	1.70	YES	MONTH
L0000093	0	0.28380E-06	390821.1	3778793.5	259.0	0.00	1.70	1.70	YES	MONTH
L0000094	0	0.28380E-06	390823.8	3778795.9	259.5	0.00	1.70	1.70	YES	MONTH
L0000095	0	0.28380E-06	390826.5	3778798.4	260.0	0.00	1.70	1.70	YES	MONTH
L0000096	0	0.28380E-06	390829.2	3778800.9	260.5	0.00	1.70	1.70	YES	MONTH
L0000097	0	0.28380E-06	390831.8	3778803.4	260.9	0.00	1.70	1.70	YES	MONTH
L0000098	0	0.28380E-06	390834.4	3778806.0	261.2	0.00	1.70	1.70	YES	MONTH
L0000099	0	0.28380E-06	390837.0	3778808.6	261.5	0.00	1.70	1.70	YES	MONTH
L0000100	0	0.28380E-06	390839.6	3778811.1	261.8	0.00	1.70	1.70	YES	MONTH
L0000101	0	0.28380E-06	390842.2	3778813.7	261.9	0.00	1.70	1.70	YES	MONTH
L0000102	0	0.28380E-06	390844.8	3778816.3	262.1	0.00	1.70	1.70	YES	MONTH
L0000103	0	0.28380E-06	390847.4	3778818.8	262.4	0.00	1.70	1.70	YES	MONTH
L0000104	0	0.28380E-06	390850.0	3778821.4	262.7	0.00	1.70	1.70	YES	MONTH
L0000105	0	0.28380E-06	390852.6	3778823.9	262.9	0.00	1.70	1.70	YES	MONTH
L0000106	0	0.28380E-06	390855.3	3778826.5	263.0	0.00	1.70	1.70	YES	MONTH
L0000107	0	0.28380E-06	390857.8	3778829.1	263.1	0.00	1.70	1.70	YES	MONTH
L0000108	0	0.28380E-06	390860.2	3778831.9	263.2	0.00	1.70	1.70	YES	MONTH
L0000109	0	0.28380E-06	390862.5	3778834.8	263.2	0.00	1.70	1.70	YES	MONTH
L0000110	0	0.28380E-06	390864.8	3778837.6	263.2	0.00	1.70	1.70	YES	MONTH
L0000111	0	0.28380E-06	390867.1	3778840.4	263.2	0.00	1.70	1.70	YES	MONTH
L0000112	0	0.28380E-06	390869.4	3778843.2	263.2	0.00	1.70	1.70	YES	MONTH
L0000113	0	0.28380E-06	390871.7	3778846.1	263.1	0.00	1.70	1.70	YES	MONTH
L0000114	0	0.28380E-06	390874.1	3778848.9	263.4	0.00	1.70	1.70	YES	MONTH
L0000115	0	0.28380E-06	390876.4	3778851.7	263.8	0.00	1.70	1.70	YES	MONTH
L0000116	0	0.28380E-06	390878.7	3778854.6	264.2	0.00	1.70	1.70	YES	MONTH
L0000117	0	0.28380E-06	390881.0	3778857.4	264.8	0.00	1.70	1.70	YES	MONTH
L0000118	0	0.28380E-06	390883.3	3778860.2	265.3	0.00	1.70	1.70	YES	MONTH
L0000119	0	0.28380E-06	390885.7	3778863.0	265.9	0.00	1.70	1.70	YES	MONTH
L0000120	0	0.28380E-06	390887.3	3778866.2	266.2	0.00	1.70	1.70	YES	MONTH

**MODELOPTs: RegDFAULT CONC ELEV

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0000121	0	0.28380E-06	390888.0	3778869.8	266.4	0.00	1.70	1.70	YES	MONTH
L0000122	0	0.28380E-06	390888.7	3778873.4	266.6	0.00	1.70	1.70	YES	MONTH
L0000123	0	0.28380E-06	390889.4	3778877.0	266.8	0.00	1.70	1.70	YES	MONTH
L0000124	0	0.28380E-06	390890.2	3778880.6	267.3	0.00	1.70	1.70	YES	MONTH
L0000125	0	0.28380E-06	390890.9	3778884.1	267.9	0.00	1.70	1.70	YES	MONTH
L0000126	0	0.28380E-06	390891.6	3778887.7	268.5	0.00	1.70	1.70	YES	MONTH
L0000127	0	0.28380E-06	390891.6	3778891.4	268.9	0.00	1.70	1.70	YES	MONTH
L0000128	0	0.28380E-06	390891.4	3778895.0	269.3	0.00	1.70	1.70	YES	MONTH
L0000129	0	0.28380E-06	390891.2	3778898.7	269.7	0.00	1.70	1.70	YES	MONTH
L0000130	0	0.28380E-06	390891.0	3778902.3	270.1	0.00	1.70	1.70	YES	MONTH
L0000131	0	0.28380E-06	390890.3	3778905.9	270.3	0.00	1.70	1.70	YES	MONTH
L0000132	0	0.28380E-06	390888.9	3778909.2	270.3	0.00	1.70	1.70	YES	MONTH
L0000133	0	0.28380E-06	390887.4	3778912.6	270.4	0.00	1.70	1.70	YES	MONTH
L0000134	0	0.28380E-06	390886.0	3778915.9	270.4	0.00	1.70	1.70	YES	MONTH
L0000135	0	0.28380E-06	390884.5	3778919.3	270.4	0.00	1.70	1.70	YES	MONTH
L0000136	0	0.28380E-06	390883.0	3778922.6	270.4	0.00	1.70	1.70	YES	MONTH
L0000137	0	0.28380E-06	390880.4	3778925.0	269.9	0.00	1.70	1.70	YES	MONTH
L0000138	0	0.28380E-06	390877.5	3778927.3	269.6	0.00	1.70	1.70	YES	MONTH
L0000139	0	0.28380E-06	390874.6	3778929.5	269.4	0.00	1.70	1.70	YES	MONTH
L0000140	0	0.28380E-06	390871.6	3778931.7	269.4	0.00	1.70	1.70	YES	MONTH
L0000141	0	0.28380E-06	390868.7	3778933.9	269.3	0.00	1.70	1.70	YES	MONTH
L0000142	0	0.28380E-06	390865.8	3778936.1	269.2	0.00	1.70	1.70	YES	MONTH
L0000143	0	0.28380E-06	390862.9	3778938.3	268.9	0.00	1.70	1.70	YES	MONTH
L0000144	0	0.28380E-06	390860.0	3778940.5	268.5	0.00	1.70	1.70	YES	MONTH
L0000145	0	0.28380E-06	390857.1	3778942.7	268.2	0.00	1.70	1.70	YES	MONTH
L0000146	0	0.28380E-06	390853.6	3778943.9	267.8	0.00	1.70	1.70	YES	MONTH
L0000147	0	0.28380E-06	390850.2	3778945.1	267.4	0.00	1.70	1.70	YES	MONTH
L0000148	0	0.28380E-06	390846.7	3778946.2	267.4	0.00	1.70	1.70	YES	MONTH
L0000149	0	0.28380E-06	390843.2	3778947.3	267.5	0.00	1.70	1.70	YES	MONTH
L0000150	0	0.28380E-06	390839.7	3778948.4	267.6	0.00	1.70	1.70	YES	MONTH
L0000151	0	0.28380E-06	390836.2	3778949.5	267.8	0.00	1.70	1.70	YES	MONTH
L0000152	0	0.28380E-06	390832.8	3778950.7	268.0	0.00	1.70	1.70	YES	MONTH
L0000153	0	0.28380E-06	390829.3	3778951.8	268.2	0.00	1.70	1.70	YES	MONTH
L0000154	0	0.28380E-06	390825.8	3778952.9	268.4	0.00	1.70	1.70	YES	MONTH
L0000155	0	0.28380E-06	390822.3	3778954.0	268.6	0.00	1.70	1.70	YES	MONTH
L0000156	0	0.28380E-06	390818.8	3778955.2	268.9	0.00	1.70	1.70	YES	MONTH
L0000157	0	0.28380E-06	390815.3	3778956.3	269.7	0.00	1.70	1.70	YES	MONTH
L0000158	0	0.28380E-06	390811.9	3778957.4	270.5	0.00	1.70	1.70	YES	MONTH
L0000159	0	0.28380E-06	390808.4	3778958.5	271.4	0.00	1.70	1.70	YES	MONTH
L0000160	0	0.28380E-06	390804.9	3778959.6	272.2	0.00	1.70	1.70	YES	MONTH

**MODELOPTs: RegDFAULT CONC ELEV

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0000161	0	0.28380E-06	390801.4	3778960.8	273.2	0.00	1.70	1.70	YES	MONTH
L0000162	0	0.28380E-06	390797.9	3778961.9	274.1	0.00	1.70	1.70	YES	MONTH
L0000163	0	0.28380E-06	390794.5	3778963.0	275.1	0.00	1.70	1.70	YES	MONTH
L0000164	0	0.28380E-06	390791.0	3778964.1	276.0	0.00	1.70	1.70	YES	MONTH
L0000165	0	0.28380E-06	390787.5	3778965.2	277.0	0.00	1.70	1.70	YES	MONTH
L0000166	0	0.28380E-06	390784.0	3778966.4	277.9	0.00	1.70	1.70	YES	MONTH
L0000167	0	0.28380E-06	390780.5	3778967.5	279.0	0.00	1.70	1.70	YES	MONTH
L0000168	0	0.28380E-06	390777.0	3778968.6	280.1	0.00	1.70	1.70	YES	MONTH
L0000169	0	0.28380E-06	390773.6	3778969.7	281.1	0.00	1.70	1.70	YES	MONTH
L0000170	0	0.28380E-06	390770.1	3778970.8	282.1	0.00	1.70	1.70	YES	MONTH
L0000171	0	0.28380E-06	390766.6	3778972.0	283.1	0.00	1.70	1.70	YES	MONTH
L0000172	0	0.28380E-06	390763.1	3778973.1	284.0	0.00	1.70	1.70	YES	MONTH
L0000173	0	0.28380E-06	390759.6	3778974.2	284.9	0.00	1.70	1.70	YES	MONTH
L0000174	0	0.28380E-06	390756.2	3778975.3	285.2	0.00	1.70	1.70	YES	MONTH
L0000175	0	0.28380E-06	390752.7	3778976.4	285.4	0.00	1.70	1.70	YES	MONTH
L0000176	0	0.28380E-06	390749.1	3778976.8	285.4	0.00	1.70	1.70	YES	MONTH
L0000177	0	0.28380E-06	390745.6	3778976.1	285.0	0.00	1.70	1.70	YES	MONTH
L0000178	0	0.28380E-06	390742.0	3778975.4	284.7	0.00	1.70	1.70	YES	MONTH
L0000179	0	0.28380E-06	390738.4	3778974.6	284.3	0.00	1.70	1.70	YES	MONTH
L0000180	0	0.28380E-06	390734.8	3778973.9	283.9	0.00	1.70	1.70	YES	MONTH
L0000181	0	0.28380E-06	390731.2	3778973.2	283.5	0.00	1.70	1.70	YES	MONTH
L0000182	0	0.28380E-06	390727.6	3778972.4	283.3	0.00	1.70	1.70	YES	MONTH
L0000183	0	0.28380E-06	390724.1	3778971.7	283.5	0.00	1.70	1.70	YES	MONTH
L0000184	0	0.28380E-06	390720.5	3778971.0	283.7	0.00	1.70	1.70	YES	MONTH
L0000185	0	0.28380E-06	390716.9	3778970.2	283.9	0.00	1.70	1.70	YES	MONTH
L0000186	0	0.28380E-06	390713.3	3778969.5	284.1	0.00	1.70	1.70	YES	MONTH
L0000187	0	0.28380E-06	390709.7	3778968.8	284.3	0.00	1.70	1.70	YES	MONTH
L0000188	0	0.28380E-06	390706.1	3778968.0	284.5	0.00	1.70	1.70	YES	MONTH
L0000189	0	0.28380E-06	390703.0	3778966.4	284.4	0.00	1.70	1.70	YES	MONTH
L0000190	0	0.28380E-06	390700.1	3778964.1	284.4	0.00	1.70	1.70	YES	MONTH
L0000191	0	0.28380E-06	390697.3	3778961.8	284.5	0.00	1.70	1.70	YES	MONTH
L0000192	0	0.28380E-06	390694.5	3778959.5	284.6	0.00	1.70	1.70	YES	MONTH
L0000193	0	0.28380E-06	390691.6	3778957.2	284.7	0.00	1.70	1.70	YES	MONTH
L0000194	0	0.28380E-06	390688.8	3778954.9	284.7	0.00	1.70	1.70	YES	MONTH
L0000195	0	0.28380E-06	390686.0	3778952.6	284.6	0.00	1.70	1.70	YES	MONTH
L0000196	0	0.28380E-06	390683.1	3778950.3	284.6	0.00	1.70	1.70	YES	MONTH
L0000197	0	0.28380E-06	390680.3	3778947.9	284.4	0.00	1.70	1.70	YES	MONTH
L0000198	0	0.28380E-06	390677.5	3778945.6	284.3	0.00	1.70	1.70	YES	MONTH
L0000199	0	0.28380E-06	390674.6	3778943.3	284.1	0.00	1.70	1.70	YES	MONTH
L0000200	0	0.28380E-06	390672.1	3778940.7	283.7	0.00	1.70	1.70	YES	MONTH

**MODELOPTs: RegDFAULT CONC ELEV

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0000201	0	0.28380E-06	390670.0	3778937.8	283.2	0.00	1.70	1.70	YES	MONTH
L0000202	0	0.28380E-06	390667.8	3778934.8	283.0	0.00	1.70	1.70	YES	MONTH
L0000203	0	0.28380E-06	390665.7	3778931.8	283.1	0.00	1.70	1.70	YES	MONTH
L0000204	0	0.28380E-06	390663.6	3778928.8	283.2	0.00	1.70	1.70	YES	MONTH
L0000205	0	0.28380E-06	390661.5	3778925.8	283.4	0.00	1.70	1.70	YES	MONTH
L0000206	0	0.28380E-06	390659.3	3778922.9	283.5	0.00	1.70	1.70	YES	MONTH
L0000207	0	0.28380E-06	390657.2	3778919.9	283.7	0.00	1.70	1.70	YES	MONTH
L0000208	0	0.28380E-06	390655.1	3778916.9	283.9	0.00	1.70	1.70	YES	MONTH
L0000209	0	0.28380E-06	390653.0	3778913.9	284.2	0.00	1.70	1.70	YES	MONTH
L0000210	0	0.28380E-06	390650.8	3778911.0	284.5	0.00	1.70	1.70	YES	MONTH
L0000211	0	0.28380E-06	390649.0	3778907.8	284.7	0.00	1.70	1.70	YES	MONTH
L0000212	0	0.28380E-06	390647.7	3778904.4	285.5	0.00	1.70	1.70	YES	MONTH
L0000213	0	0.28380E-06	390646.5	3778901.0	286.6	0.00	1.70	1.70	YES	MONTH
L0000214	0	0.28380E-06	390645.2	3778897.5	287.7	0.00	1.70	1.70	YES	MONTH
L0000215	0	0.28380E-06	390643.9	3778894.1	288.7	0.00	1.70	1.70	YES	MONTH
L0000216	0	0.28380E-06	390642.7	3778890.7	289.7	0.00	1.70	1.70	YES	MONTH
L0000217	0	0.28380E-06	390641.4	3778887.2	290.6	0.00	1.70	1.70	YES	MONTH
L0000218	0	0.28380E-06	390640.1	3778883.8	291.4	0.00	1.70	1.70	YES	MONTH
L0000219	0	0.28380E-06	390638.9	3778880.4	292.3	0.00	1.70	1.70	YES	MONTH
L0000220	0	0.28380E-06	390637.6	3778876.9	293.0	0.00	1.70	1.70	YES	MONTH
L0000221	0	0.28380E-06	390636.3	3778873.5	293.2	0.00	1.70	1.70	YES	MONTH
L0000222	0	0.28380E-06	390635.1	3778870.1	293.3	0.00	1.70	1.70	YES	MONTH
L0000223	0	0.28380E-06	390633.8	3778866.7	293.4	0.00	1.70	1.70	YES	MONTH
L0000224	0	0.28380E-06	390632.5	3778863.2	293.5	0.00	1.70	1.70	YES	MONTH
L0000225	0	0.28380E-06	390631.3	3778859.8	293.7	0.00	1.70	1.70	YES	MONTH
L0000226	0	0.28380E-06	390630.0	3778856.4	293.8	0.00	1.70	1.70	YES	MONTH
L0000227	0	0.28380E-06	390628.8	3778852.9	293.9	0.00	1.70	1.70	YES	MONTH
L0000228	0	0.28380E-06	390627.5	3778849.5	294.1	0.00	1.70	1.70	YES	MONTH
L0000229	0	0.28380E-06	390626.2	3778846.1	294.2	0.00	1.70	1.70	YES	MONTH
L0000230	0	0.28380E-06	390625.0	3778842.6	293.6	0.00	1.70	1.70	YES	MONTH
L0000231	0	0.28380E-06	390623.7	3778839.2	293.1	0.00	1.70	1.70	YES	MONTH
L0000232	0	0.28380E-06	390622.4	3778835.8	292.6	0.00	1.70	1.70	YES	MONTH
L0000233	0	0.28380E-06	390621.2	3778832.3	292.2	0.00	1.70	1.70	YES	MONTH
L0000234	0	0.28380E-06	390619.9	3778828.9	291.9	0.00	1.70	1.70	YES	MONTH
L0000235	0	0.28380E-06	390617.3	3778826.3	292.0	0.00	1.70	1.70	YES	MONTH
L0000236	0	0.28380E-06	390614.7	3778823.7	292.2	0.00	1.70	1.70	YES	MONTH
L0000237	0	0.28380E-06	390612.1	3778821.1	292.6	0.00	1.70	1.70	YES	MONTH
L0000238	0	0.28380E-06	390609.6	3778818.5	293.0	0.00	1.70	1.70	YES	MONTH
L0000239	0	0.28380E-06	390607.0	3778815.9	293.1	0.00	1.70	1.70	YES	MONTH
L0000240	0	0.28380E-06	390604.4	3778813.3	292.8	0.00	1.70	1.70	YES	MONTH

**MODELOPTs: RegDFAULT CONC ELEV

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0000241	0	0.28380E-06	390601.9	3778810.7	292.6	0.00	1.70	1.70	YES	MONTH
L0000242	0	0.28380E-06	390599.3	3778808.1	292.4	0.00	1.70	1.70	YES	MONTH
L0000243	0	0.28380E-06	390596.0	3778806.9	292.7	0.00	1.70	1.70	YES	MONTH
L0000244	0	0.28380E-06	390592.4	3778806.3	293.2	0.00	1.70	1.70	YES	MONTH
L0000245	0	0.28380E-06	390588.8	3778805.7	293.8	0.00	1.70	1.70	YES	MONTH
L0000246	0	0.28380E-06	390585.2	3778805.1	294.3	0.00	1.70	1.70	YES	MONTH
L0000247	0	0.28380E-06	390581.6	3778804.5	294.9	0.00	1.70	1.70	YES	MONTH
L0000248	0	0.28380E-06	390578.0	3778803.9	295.3	0.00	1.70	1.70	YES	MONTH
L0000249	0	0.28380E-06	390574.4	3778803.4	295.2	0.00	1.70	1.70	YES	MONTH
L0000250	0	0.28380E-06	390570.7	3778802.8	295.1	0.00	1.70	1.70	YES	MONTH
L0000251	0	0.28380E-06	390567.2	3778803.2	295.1	0.00	1.70	1.70	YES	MONTH
L0000252	0	0.28380E-06	390563.8	3778804.4	295.3	0.00	1.70	1.70	YES	MONTH
L0000253	0	0.28380E-06	390560.3	3778805.6	295.6	0.00	1.70	1.70	YES	MONTH
L0000254	0	0.28380E-06	390556.9	3778806.8	295.9	0.00	1.70	1.70	YES	MONTH
L0000255	0	0.28380E-06	390553.4	3778808.0	296.3	0.00	1.70	1.70	YES	MONTH
L0000256	0	0.28380E-06	390549.9	3778809.1	296.7	0.00	1.70	1.70	YES	MONTH
L0000257	0	0.28380E-06	390546.5	3778810.3	296.9	0.00	1.70	1.70	YES	MONTH
L0000258	0	0.28380E-06	390543.0	3778811.5	297.0	0.00	1.70	1.70	YES	MONTH
L0000259	0	0.28380E-06	390539.6	3778812.7	297.1	0.00	1.70	1.70	YES	MONTH
L0000260	0	0.28380E-06	390536.7	3778814.8	297.6	0.00	1.70	1.70	YES	MONTH
L0000261	0	0.28380E-06	390534.3	3778817.6	298.2	0.00	1.70	1.70	YES	MONTH
L0000262	0	0.28380E-06	390531.9	3778820.3	298.5	0.00	1.70	1.70	YES	MONTH
L0000263	0	0.28380E-06	390529.5	3778823.1	298.9	0.00	1.70	1.70	YES	MONTH
L0000264	0	0.28380E-06	390527.1	3778825.8	299.2	0.00	1.70	1.70	YES	MONTH
L0000265	0	0.28380E-06	390524.7	3778828.6	299.4	0.00	1.70	1.70	YES	MONTH
L0000266	0	0.28380E-06	390522.3	3778831.3	299.7	0.00	1.70	1.70	YES	MONTH
L0000267	0	0.28380E-06	390519.9	3778834.1	300.0	0.00	1.70	1.70	YES	MONTH
L0000268	0	0.28380E-06	390518.1	3778837.2	300.5	0.00	1.70	1.70	YES	MONTH
L0000269	0	0.28380E-06	390517.5	3778840.8	301.2	0.00	1.70	1.70	YES	MONTH
L0000270	0	0.28380E-06	390516.8	3778844.4	301.9	0.00	1.70	1.70	YES	MONTH
L0000271	0	0.28380E-06	390516.2	3778848.0	302.5	0.00	1.70	1.70	YES	MONTH
L0000272	0	0.28380E-06	390515.5	3778851.6	303.1	0.00	1.70	1.70	YES	MONTH
L0000273	0	0.28380E-06	390514.9	3778855.2	303.6	0.00	1.70	1.70	YES	MONTH
L0000274	0	0.28380E-06	390514.3	3778858.8	304.2	0.00	1.70	1.70	YES	MONTH
L0000275	0	0.28380E-06	390513.6	3778862.4	304.7	0.00	1.70	1.70	YES	MONTH
L0000276	0	0.28380E-06	390513.0	3778866.0	305.2	0.00	1.70	1.70	YES	MONTH
L0000277	0	0.28380E-06	390512.4	3778869.6	305.8	0.00	1.70	1.70	YES	MONTH
L0000278	0	0.28380E-06	390511.7	3778873.2	306.3	0.00	1.70	1.70	YES	MONTH
L0000279	0	0.28380E-06	390512.2	3778876.7	306.7	0.00	1.70	1.70	YES	MONTH
L0000280	0	0.28380E-06	390513.1	3778880.2	307.6	0.00	1.70	1.70	YES	MONTH

**MODELOPTs: RegDFAULT CONC ELEV

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0000281	0	0.28380E-06	390514.1	3778883.8	308.5	0.00	1.70	1.70	YES	MONTH
L0000282	0	0.28380E-06	390515.1	3778887.3	309.4	0.00	1.70	1.70	YES	MONTH
L0000283	0	0.28380E-06	390516.1	3778890.8	310.2	0.00	1.70	1.70	YES	MONTH
L0000284	0	0.28380E-06	390517.0	3778894.3	311.1	0.00	1.70	1.70	YES	MONTH
L0000285	0	0.28380E-06	390518.0	3778897.9	311.8	0.00	1.70	1.70	YES	MONTH
L0000286	0	0.28380E-06	390519.0	3778901.4	312.6	0.00	1.70	1.70	YES	MONTH
L0000287	0	0.28380E-06	390520.0	3778904.9	313.5	0.00	1.70	1.70	YES	MONTH
L0000288	0	0.28380E-06	390520.9	3778908.4	314.1	0.00	1.70	1.70	YES	MONTH
L0000289	0	0.28380E-06	390521.9	3778912.0	314.3	0.00	1.70	1.70	YES	MONTH
L0000290	0	0.28380E-06	390522.9	3778915.5	314.4	0.00	1.70	1.70	YES	MONTH
L0000291	0	0.28380E-06	390523.9	3778919.0	314.5	0.00	1.70	1.70	YES	MONTH
L0000292	0	0.28380E-06	390524.8	3778922.6	314.5	0.00	1.70	1.70	YES	MONTH
L0000293	0	0.28380E-06	390525.8	3778926.1	314.6	0.00	1.70	1.70	YES	MONTH
L0000294	0	0.28380E-06	390526.8	3778929.6	314.5	0.00	1.70	1.70	YES	MONTH
L0000295	0	0.28380E-06	390527.8	3778933.1	314.5	0.00	1.70	1.70	YES	MONTH
L0000296	0	0.28380E-06	390528.7	3778936.7	314.4	0.00	1.70	1.70	YES	MONTH
L0000297	0	0.28380E-06	390529.7	3778940.2	314.3	0.00	1.70	1.70	YES	MONTH
L0000298	0	0.28380E-06	390530.7	3778943.7	314.2	0.00	1.70	1.70	YES	MONTH
L0000299	0	0.28380E-06	390531.7	3778947.2	314.0	0.00	1.70	1.70	YES	MONTH
L0000300	0	0.28380E-06	390532.6	3778950.8	313.8	0.00	1.70	1.70	YES	MONTH
L0000301	0	0.28380E-06	390533.6	3778954.3	313.6	0.00	1.70	1.70	YES	MONTH
L0000302	0	0.28380E-06	390534.6	3778957.8	313.3	0.00	1.70	1.70	YES	MONTH
L0000303	0	0.28380E-06	390535.5	3778961.3	313.1	0.00	1.70	1.70	YES	MONTH
L0000304	0	0.28380E-06	390536.5	3778964.9	312.8	0.00	1.70	1.70	YES	MONTH
L0000305	0	0.28380E-06	390537.5	3778968.4	312.7	0.00	1.70	1.70	YES	MONTH
L0000306	0	0.28380E-06	390538.5	3778971.9	312.9	0.00	1.70	1.70	YES	MONTH
L0000307	0	0.28380E-06	390539.4	3778975.4	313.2	0.00	1.70	1.70	YES	MONTH
L0000308	0	0.28380E-06	390540.4	3778979.0	313.6	0.00	1.70	1.70	YES	MONTH
L0000309	0	0.28380E-06	390541.4	3778982.5	314.0	0.00	1.70	1.70	YES	MONTH
L0000310	0	0.28380E-06	390542.4	3778986.0	314.5	0.00	1.70	1.70	YES	MONTH
L0000311	0	0.28380E-06	390543.3	3778989.5	315.0	0.00	1.70	1.70	YES	MONTH
L0000312	0	0.28380E-06	390544.3	3778993.1	315.6	0.00	1.70	1.70	YES	MONTH
L0000313	0	0.28380E-06	390545.3	3778996.6	316.2	0.00	1.70	1.70	YES	MONTH
L0000314	0	0.28380E-06	390546.3	3779000.1	315.9	0.00	1.70	1.70	YES	MONTH
L0000315	0	0.28380E-06	390547.2	3779003.6	315.5	0.00	1.70	1.70	YES	MONTH
L0000316	0	0.28380E-06	390548.2	3779007.2	315.3	0.00	1.70	1.70	YES	MONTH
L0000317	0	0.28380E-06	390549.2	3779010.7	315.2	0.00	1.70	1.70	YES	MONTH
L0000318	0	0.28380E-06	390550.2	3779014.2	315.4	0.00	1.70	1.70	YES	MONTH
L0000319	0	0.28380E-06	390551.1	3779017.7	315.6	0.00	1.70	1.70	YES	MONTH
L0000320	0	0.28380E-06	390552.1	3779021.3	316.0	0.00	1.70	1.70	YES	MONTH

**MODELOPTs: RegDFAULT CONC ELEV

*** VOLUME SOURCE DATA ***

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L0000321	0	0.28380E-06	390553.1	3779024.8	316.5	0.00	1.70	1.70	YES	MONTH
L0000322	0	0.28380E-06	390554.1	3779028.3	316.8	0.00	1.70	1.70	YES	MONTH
L0000323	0	0.28380E-06	390555.0	3779031.8	316.9	0.00	1.70	1.70	YES	MONTH
L0000324	0	0.28380E-06	390556.0	3779035.4	317.0	0.00	1.70	1.70	YES	MONTH
L0000325	0	0.28380E-06	390557.0	3779038.9	317.0	0.00	1.70	1.70	YES	MONTH
L0000326	0	0.28380E-06	390557.9	3779042.4	317.0	0.00	1.70	1.70	YES	MONTH
L0000327	0	0.28380E-06	390558.9	3779045.9	317.0	0.00	1.70	1.70	YES	MONTH
L0000328	0	0.28380E-06	390559.9	3779049.5	316.9	0.00	1.70	1.70	YES	MONTH
L0000329	0	0.28380E-06	390560.9	3779053.0	316.8	0.00	1.70	1.70	YES	MONTH
L0000330	0	0.28380E-06	390561.8	3779056.5	316.6	0.00	1.70	1.70	YES	MONTH
L0000331	0	0.28380E-06	390562.8	3779060.0	317.1	0.00	1.70	1.70	YES	MONTH
L0000332	0	0.28380E-06	390563.8	3779063.6	317.5	0.00	1.70	1.70	YES	MONTH
L0000333	0	0.28380E-06	390564.8	3779067.1	318.0	0.00	1.70	1.70	YES	MONTH
L0000334	0	0.28380E-06	390565.7	3779070.6	318.4	0.00	1.70	1.70	YES	MONTH
L0000335	0	0.28380E-06	390566.7	3779074.1	318.8	0.00	1.70	1.70	YES	MONTH
L0000336	0	0.28380E-06	390567.7	3779077.7	319.2	0.00	1.70	1.70	YES	MONTH
L0000337	0	0.28380E-06	390568.7	3779081.2	319.6	0.00	1.70	1.70	YES	MONTH
L0000338	0	0.28380E-06	390569.6	3779084.7	319.9	0.00	1.70	1.70	YES	MONTH
L0000339	0	0.28380E-06	390570.6	3779088.3	320.3	0.00	1.70	1.70	YES	MONTH
L0000340	0	0.28380E-06	390571.6	3779091.8	320.8	0.00	1.70	1.70	YES	MONTH
L0000341	0	0.28380E-06	390572.6	3779095.3	321.2	0.00	1.70	1.70	YES	MONTH
L0000342	0	0.28380E-06	390573.5	3779098.8	321.7	0.00	1.70	1.70	YES	MONTH
L0000343	0	0.28380E-06	390574.5	3779102.4	322.1	0.00	1.70	1.70	YES	MONTH
L0000344	0	0.28380E-06	390575.5	3779105.9	322.6	0.00	1.70	1.70	YES	MONTH
L0000345	0	0.28380E-06	390576.5	3779109.4	323.0	0.00	1.70	1.70	YES	MONTH
L0000346	0	0.28380E-06	390577.4	3779112.9	323.4	0.00	1.70	1.70	YES	MONTH
L0000347	0	0.28380E-06	390578.4	3779116.5	323.8	0.00	1.70	1.70	YES	MONTH
L0000348	0	0.28380E-06	390579.4	3779120.0	324.4	0.00	1.70	1.70	YES	MONTH
L0000349	0	0.28380E-06	390580.3	3779123.5	325.0	0.00	1.70	1.70	YES	MONTH
L0000350	0	0.28380E-06	390581.3	3779127.0	325.7	0.00	1.70	1.70	YES	MONTH
L0000351	0	0.28380E-06	390582.3	3779130.6	326.3	0.00	1.70	1.70	YES	MONTH
L0000352	0	0.28380E-06	390581.6	3779134.2	326.3	0.00	1.70	1.70	YES	MONTH
L0000353	0	0.28380E-06	390581.0	3779137.8	326.2	0.00	1.70	1.70	YES	MONTH
L0000354	0	0.28380E-06	390580.3	3779141.3	326.2	0.00	1.70	1.70	YES	MONTH
L0000355	0	0.28380E-06	390579.6	3779144.9	326.2	0.00	1.70	1.70	YES	MONTH
L0000356	0	0.28380E-06	390579.0	3779148.5	326.1	0.00	1.70	1.70	YES	MONTH
L0000357	0	0.28380E-06	390578.3	3779152.1	326.0	0.00	1.70	1.70	YES	MONTH
L0000358	0	0.28380E-06	390577.6	3779155.7	326.0	0.00	1.70	1.70	YES	MONTH
L0000359	0	0.28380E-06	390577.0	3779159.3	326.0	0.00	1.70	1.70	YES	MONTH
L0000360	0	0.28380E-06	390576.3	3779162.9	326.0	0.00	1.70	1.70	YES	MONTH

**MODELOPTs: RegDFAULT CONC ELEV

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0000361	0	0.28380E-06	390574.6	3779166.2	325.7	0.00	1.70	1.70	YES	MONTH
L0000362	0	0.28380E-06	390572.8	3779169.3	325.5	0.00	1.70	1.70	YES	MONTH
L0000363	0	0.28380E-06	390571.1	3779172.5	325.2	0.00	1.70	1.70	YES	MONTH
L0000364	0	0.28380E-06	390569.3	3779175.7	325.0	0.00	1.70	1.70	YES	MONTH
L0000365	0	0.28380E-06	390567.5	3779178.9	324.8	0.00	1.70	1.70	YES	MONTH
L0000366	0	0.28380E-06	390565.7	3779182.1	324.7	0.00	1.70	1.70	YES	MONTH
L0000367	0	0.28380E-06	390563.9	3779185.3	324.6	0.00	1.70	1.70	YES	MONTH
L0000368	0	0.28380E-06	390562.1	3779188.5	324.5	0.00	1.70	1.70	YES	MONTH
L0000369	0	0.28380E-06	390560.3	3779191.7	324.4	0.00	1.70	1.70	YES	MONTH
L0000370	0	0.28380E-06	390558.5	3779194.9	324.3	0.00	1.70	1.70	YES	MONTH
L0000371	0	0.28380E-06	390556.2	3779197.7	324.2	0.00	1.70	1.70	YES	MONTH
L0000372	0	0.28380E-06	390553.6	3779200.2	324.0	0.00	1.70	1.70	YES	MONTH
L0000373	0	0.28380E-06	390551.0	3779202.8	323.9	0.00	1.70	1.70	YES	MONTH
L0000374	0	0.28380E-06	390548.4	3779205.3	323.8	0.00	1.70	1.70	YES	MONTH
L0000375	0	0.28380E-06	390545.8	3779207.9	323.8	0.00	1.70	1.70	YES	MONTH
L0000376	0	0.28380E-06	390543.1	3779210.4	323.9	0.00	1.70	1.70	YES	MONTH
L0000377	0	0.28380E-06	390540.5	3779213.0	324.0	0.00	1.70	1.70	YES	MONTH
L0000378	0	0.28380E-06	390537.9	3779215.6	324.1	0.00	1.70	1.70	YES	MONTH
L0000379	0	0.28380E-06	390535.3	3779218.1	324.3	0.00	1.70	1.70	YES	MONTH
L0000380	0	0.28380E-06	390532.7	3779220.7	324.4	0.00	1.70	1.70	YES	MONTH
L0000381	0	0.28380E-06	390529.3	3779221.9	324.3	0.00	1.70	1.70	YES	MONTH
L0000382	0	0.28380E-06	390525.8	3779222.8	324.0	0.00	1.70	1.70	YES	MONTH
L0000383	0	0.28380E-06	390522.2	3779223.7	323.8	0.00	1.70	1.70	YES	MONTH
L0000384	0	0.28380E-06	390518.7	3779224.5	323.6	0.00	1.70	1.70	YES	MONTH
L0000385	0	0.28380E-06	390515.1	3779225.4	324.6	0.00	1.70	1.70	YES	MONTH
L0000386	0	0.28380E-06	390511.6	3779226.2	325.6	0.00	1.70	1.70	YES	MONTH
L0000387	0	0.28380E-06	390508.0	3779227.1	326.5	0.00	1.70	1.70	YES	MONTH
L0000388	0	0.28380E-06	390504.5	3779228.0	327.3	0.00	1.70	1.70	YES	MONTH
L0000389	0	0.28380E-06	390500.9	3779228.8	328.1	0.00	1.70	1.70	YES	MONTH
L0000390	0	0.28380E-06	390497.4	3779229.7	328.8	0.00	1.70	1.70	YES	MONTH
L0000391	0	0.28380E-06	390493.8	3779230.6	329.5	0.00	1.70	1.70	YES	MONTH
L0000392	0	0.28380E-06	390490.2	3779231.4	330.1	0.00	1.70	1.70	YES	MONTH
L0000393	0	0.28380E-06	390486.7	3779232.3	330.8	0.00	1.70	1.70	YES	MONTH
L0000394	0	0.28380E-06	390483.1	3779233.2	331.6	0.00	1.70	1.70	YES	MONTH
L0000395	0	0.28380E-06	390479.6	3779234.0	332.3	0.00	1.70	1.70	YES	MONTH
L0000396	0	0.28380E-06	390476.0	3779234.9	332.9	0.00	1.70	1.70	YES	MONTH
L0000397	0	0.28380E-06	390472.5	3779235.8	333.5	0.00	1.70	1.70	YES	MONTH
L0000398	0	0.28380E-06	390468.9	3779236.6	334.0	0.00	1.70	1.70	YES	MONTH
L0000399	0	0.28380E-06	390465.4	3779237.5	335.2	0.00	1.70	1.70	YES	MONTH
L0000400	0	0.28380E-06	390461.8	3779238.4	336.6	0.00	1.70	1.70	YES	MONTH

**MODELOPTs: RegDFAULT CONC ELEV

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0000401	0	0.28380E-06	390458.3	3779239.2	337.8	0.00	1.70	1.70	YES	MONTH
L0000402	0	0.28380E-06	390454.7	3779240.1	338.7	0.00	1.70	1.70	YES	MONTH
L0000403	0	0.28380E-06	390451.1	3779240.9	339.5	0.00	1.70	1.70	YES	MONTH
L0000404	0	0.28380E-06	390447.6	3779241.8	340.3	0.00	1.70	1.70	YES	MONTH
L0000405	0	0.28380E-06	390444.0	3779242.7	341.1	0.00	1.70	1.70	YES	MONTH
L0000406	0	0.28380E-06	390440.5	3779243.5	341.9	0.00	1.70	1.70	YES	MONTH
L0000407	0	0.28380E-06	390436.9	3779244.4	342.7	0.00	1.70	1.70	YES	MONTH
L0000408	0	0.28380E-06	390433.4	3779245.3	343.5	0.00	1.70	1.70	YES	MONTH
L0000409	0	0.28380E-06	390429.8	3779246.1	344.3	0.00	1.70	1.70	YES	MONTH
L0000410	0	0.28380E-06	390426.3	3779247.0	344.0	0.00	1.70	1.70	YES	MONTH
L0000411	0	0.28380E-06	390422.7	3779247.9	343.4	0.00	1.70	1.70	YES	MONTH
L0000412	0	0.28380E-06	390419.2	3779248.7	342.7	0.00	1.70	1.70	YES	MONTH
L0000413	0	0.28380E-06	390415.6	3779249.6	341.9	0.00	1.70	1.70	YES	MONTH
L0000414	0	0.28380E-06	390412.1	3779250.5	341.0	0.00	1.70	1.70	YES	MONTH
L0000415	0	0.28380E-06	390408.5	3779251.3	340.0	0.00	1.70	1.70	YES	MONTH
L0000416	0	0.28380E-06	390405.0	3779252.2	339.0	0.00	1.70	1.70	YES	MONTH
L0000417	0	0.28380E-06	390401.4	3779253.1	337.9	0.00	1.70	1.70	YES	MONTH
L0000418	0	0.28380E-06	390397.8	3779253.9	337.1	0.00	1.70	1.70	YES	MONTH
L0000419	0	0.28380E-06	390394.3	3779254.8	337.3	0.00	1.70	1.70	YES	MONTH
L0000420	0	0.28380E-06	390390.7	3779255.7	337.4	0.00	1.70	1.70	YES	MONTH
L0000421	0	0.28380E-06	390387.2	3779256.5	337.6	0.00	1.70	1.70	YES	MONTH
L0000422	0	0.28380E-06	390383.6	3779257.4	337.7	0.00	1.70	1.70	YES	MONTH
L0000423	0	0.28380E-06	390380.1	3779257.3	337.6	0.00	1.70	1.70	YES	MONTH
L0000424	0	0.28380E-06	390376.5	3779256.3	337.2	0.00	1.70	1.70	YES	MONTH
L0000425	0	0.28380E-06	390373.0	3779255.4	336.8	0.00	1.70	1.70	YES	MONTH
L0000426	0	0.28380E-06	390369.5	3779254.5	336.4	0.00	1.70	1.70	YES	MONTH
L0000427	0	0.28380E-06	390365.9	3779253.5	336.9	0.00	1.70	1.70	YES	MONTH
L0000428	0	0.28380E-06	390362.4	3779252.6	337.6	0.00	1.70	1.70	YES	MONTH
L0000429	0	0.28380E-06	390358.9	3779251.7	338.2	0.00	1.70	1.70	YES	MONTH
L0000430	0	0.28380E-06	390355.3	3779250.7	338.8	0.00	1.70	1.70	YES	MONTH
L0000431	0	0.28380E-06	390351.8	3779249.8	339.5	0.00	1.70	1.70	YES	MONTH
L0000432	0	0.28380E-06	390348.2	3779249.0	340.1	0.00	1.70	1.70	YES	MONTH
L0000433	0	0.28380E-06	390344.7	3779248.1	340.7	0.00	1.70	1.70	YES	MONTH
L0000434	0	0.28380E-06	390341.1	3779247.3	341.4	0.00	1.70	1.70	YES	MONTH
L0000435	0	0.28380E-06	390337.5	3779246.5	342.1	0.00	1.70	1.70	YES	MONTH
L0000436	0	0.28380E-06	390334.0	3779245.6	342.9	0.00	1.70	1.70	YES	MONTH
L0000437	0	0.28380E-06	390330.4	3779244.8	343.8	0.00	1.70	1.70	YES	MONTH
L0000438	0	0.28380E-06	390326.9	3779244.0	344.5	0.00	1.70	1.70	YES	MONTH
L0000439	0	0.28380E-06	390323.3	3779243.1	345.2	0.00	1.70	1.70	YES	MONTH
L0000440	0	0.28380E-06	390319.7	3779242.3	345.8	0.00	1.70	1.70	YES	MONTH

**MODELOPTs: RegDFAULT CONC ELEV

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0000441	0	0.28380E-06	390316.2	3779241.5	346.3	0.00	1.70	1.70	YES	MONTH
L0000442	0	0.28380E-06	390312.6	3779240.6	346.8	0.00	1.70	1.70	YES	MONTH
L0000443	0	0.28380E-06	390309.0	3779240.8	347.9	0.00	1.70	1.70	YES	MONTH
L0000444	0	0.28380E-06	390305.5	3779241.5	349.0	0.00	1.70	1.70	YES	MONTH
L0000445	0	0.28380E-06	390301.9	3779242.2	350.0	0.00	1.70	1.70	YES	MONTH
L0000446	0	0.28380E-06	390298.3	3779243.0	350.9	0.00	1.70	1.70	YES	MONTH
L0000447	0	0.28380E-06	390294.7	3779243.7	351.6	0.00	1.70	1.70	YES	MONTH
L0000448	0	0.28380E-06	390291.1	3779244.4	352.2	0.00	1.70	1.70	YES	MONTH
L0000449	0	0.28380E-06	390287.5	3779245.2	352.7	0.00	1.70	1.70	YES	MONTH
L0000450	0	0.28380E-06	390283.9	3779245.9	353.1	0.00	1.70	1.70	YES	MONTH
L0000451	0	0.28380E-06	390281.1	3779248.1	353.2	0.00	1.70	1.70	YES	MONTH
L0000452	0	0.28380E-06	390278.3	3779250.5	352.9	0.00	1.70	1.70	YES	MONTH
L0000453	0	0.28380E-06	390275.5	3779252.8	351.9	0.00	1.70	1.70	YES	MONTH
L0000454	0	0.28380E-06	390272.7	3779255.2	350.9	0.00	1.70	1.70	YES	MONTH
L0000455	0	0.28380E-06	390269.9	3779257.5	349.9	0.00	1.70	1.70	YES	MONTH
L0000456	0	0.28380E-06	390267.1	3779259.9	348.9	0.00	1.70	1.70	YES	MONTH
L0000457	0	0.28380E-06	390264.3	3779262.3	347.9	0.00	1.70	1.70	YES	MONTH
L0000458	0	0.28380E-06	390261.5	3779264.6	346.9	0.00	1.70	1.70	YES	MONTH
L0000459	0	0.28380E-06	390258.7	3779267.0	346.0	0.00	1.70	1.70	YES	MONTH
L0000460	0	0.28380E-06	390255.9	3779269.3	345.3	0.00	1.70	1.70	YES	MONTH
L0000461	0	0.28380E-06	390253.2	3779271.7	344.6	0.00	1.70	1.70	YES	MONTH
L0000462	0	0.28380E-06	390251.3	3779274.6	344.1	0.00	1.70	1.70	YES	MONTH
L0000463	0	0.28380E-06	390251.0	3779278.2	344.1	0.00	1.70	1.70	YES	MONTH
L0000464	0	0.28380E-06	390250.6	3779281.8	344.2	0.00	1.70	1.70	YES	MONTH
L0000465	0	0.28380E-06	390250.3	3779285.5	344.2	0.00	1.70	1.70	YES	MONTH
L0000466	0	0.28380E-06	390250.0	3779289.1	344.2	0.00	1.70	1.70	YES	MONTH
L0000467	0	0.28380E-06	390249.7	3779292.8	344.2	0.00	1.70	1.70	YES	MONTH
L0000468	0	0.28380E-06	390249.3	3779296.4	344.2	0.00	1.70	1.70	YES	MONTH
L0000469	0	0.28380E-06	390249.0	3779300.1	344.0	0.00	1.70	1.70	YES	MONTH
L0000470	0	0.28380E-06	390248.7	3779303.7	343.9	0.00	1.70	1.70	YES	MONTH
L0000471	0	0.28380E-06	390248.4	3779307.3	343.7	0.00	1.70	1.70	YES	MONTH
L0000472	0	0.28380E-06	390248.0	3779311.0	343.6	0.00	1.70	1.70	YES	MONTH
L0000473	0	0.28380E-06	390247.8	3779314.6	343.5	0.00	1.70	1.70	YES	MONTH
L0000474	0	0.28380E-06	390249.0	3779318.1	344.0	0.00	1.70	1.70	YES	MONTH
L0000475	0	0.28380E-06	390250.2	3779321.5	344.4	0.00	1.70	1.70	YES	MONTH
L0000476	0	0.28380E-06	390251.4	3779325.0	344.8	0.00	1.70	1.70	YES	MONTH
L0000477	0	0.28380E-06	390252.6	3779328.5	344.5	0.00	1.70	1.70	YES	MONTH
L0000478	0	0.28380E-06	390253.8	3779331.9	343.7	0.00	1.70	1.70	YES	MONTH
L0000479	0	0.28380E-06	390254.9	3779335.4	343.0	0.00	1.70	1.70	YES	MONTH
L0000480	0	0.28380E-06	390256.1	3779338.8	342.3	0.00	1.70	1.70	YES	MONTH

**MODELOPTs: RegDFAULT CONC ELEV

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0000481	0	0.28380E-06	390257.3	3779342.3	341.6	0.00	1.70	1.70	YES	MONTH
L0000482	0	0.28380E-06	390259.6	3779345.1	341.5	0.00	1.70	1.70	YES	MONTH
L0000483	0	0.28380E-06	390262.2	3779347.6	341.6	0.00	1.70	1.70	YES	MONTH
L0000484	0	0.28380E-06	390264.9	3779350.1	341.8	0.00	1.70	1.70	YES	MONTH
L0000485	0	0.28380E-06	390267.5	3779352.7	342.0	0.00	1.70	1.70	YES	MONTH
L0000486	0	0.28380E-06	390270.1	3779355.2	342.2	0.00	1.70	1.70	YES	MONTH
L0000487	0	0.28380E-06	390272.8	3779357.7	342.5	0.00	1.70	1.70	YES	MONTH
L0000488	0	0.28380E-06	390275.4	3779360.2	342.9	0.00	1.70	1.70	YES	MONTH
L0000489	0	0.28380E-06	390278.1	3779362.8	343.2	0.00	1.70	1.70	YES	MONTH

**MODELOPTs: RegDFAULT CONC ELEV

*** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID	SOURCE IDs
ALL	L0000001 , L0000002 , L0000003 , L0000004 , L0000005 , L0000006 , L0000007 , L0000008 ,
	L0000009 , L0000010 , L0000011 , L0000012 , L0000013 , L0000014 , L0000015 , L0000016 ,
	L0000017 , L0000018 , L0000019 , L0000020 , L0000021 , L0000022 , L0000023 , L0000024 ,
	L0000025 , L0000026 , L0000027 , L0000028 , L0000029 , L0000030 , L0000031 , L0000032 ,
	L0000033 , L0000034 , L0000035 , L0000036 , L0000037 , L0000038 , L0000039 , L0000040 ,
	L0000041 , L0000042 , L0000043 , L0000044 , L0000045 , L0000046 , L0000047 , L0000048 ,
	L0000049 , L0000050 , L0000051 , L0000052 , L0000053 , L0000054 , L0000055 , L0000056 ,
	L0000057 , L0000058 , L0000059 , L0000060 , L0000061 , L0000062 , L0000063 , L0000064 ,
	L0000065 , L0000066 , L0000067 , L0000068 , L0000069 , L0000070 , L0000071 , L0000072 ,
	L0000073 , L0000074 , L0000075 , L0000076 , L0000077 , L0000078 , L0000079 , L0000080 ,
	L0000081 , L0000082 , L0000083 , L0000084 , L0000085 , L0000086 , L0000087 , L0000088 ,
	L0000089 , L0000090 , L0000091 , L0000092 , L0000093 , L0000094 , L0000095 , L0000096 ,
	L0000097 , L0000098 , L0000099 , L0000100 , L0000101 , L0000102 , L0000103 , L0000104 ,
	L0000105 , L0000106 , L0000107 , L0000108 , L0000109 , L0000110 , L0000111 , L0000112 ,
	L0000113 , L0000114 , L0000115 , L0000116 , L0000117 , L0000118 , L0000119 , L0000120 ,
	L0000121 , L0000122 , L0000123 , L0000124 , L0000125 , L0000126 , L0000127 , L0000128 ,
	L0000129 , L0000130 , L0000131 , L0000132 , L0000133 , L0000134 , L0000135 , L0000136 ,
	L0000137 , L0000138 , L0000139 , L0000140 , L0000141 , L0000142 , L0000143 , L0000144 ,
	L0000145 , L0000146 , L0000147 , L0000148 , L0000149 , L0000150 , L0000151 , L0000152 ,
	L0000153 , L0000154 , L0000155 , L0000156 , L0000157 , L0000158 , L0000159 , L0000160 ,

**MODELOPTs: RegDFAULT CONC ELEV

*** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID SOURCE IDs

L0000161 , L0000162 , L0000163 , L0000164 , L0000165 , L0000166 , L0000167 , L0000168 ,
L0000169 , L0000170 , L0000171 , L0000172 , L0000173 , L0000174 , L0000175 , L0000176 ,
L0000177 , L0000178 , L0000179 , L0000180 , L0000181 , L0000182 , L0000183 , L0000184 ,
L0000185 , L0000186 , L0000187 , L0000188 , L0000189 , L0000190 , L0000191 , L0000192 ,
L0000193 , L0000194 , L0000195 , L0000196 , L0000197 , L0000198 , L0000199 , L0000200 ,
L0000201 , L0000202 , L0000203 , L0000204 , L0000205 , L0000206 , L0000207 , L0000208 ,
L0000209 , L0000210 , L0000211 , L0000212 , L0000213 , L0000214 , L0000215 , L0000216 ,
L0000217 , L0000218 , L0000219 , L0000220 , L0000221 , L0000222 , L0000223 , L0000224 ,
L0000225 , L0000226 , L0000227 , L0000228 , L0000229 , L0000230 , L0000231 , L0000232 ,
L0000233 , L0000234 , L0000235 , L0000236 , L0000237 , L0000238 , L0000239 , L0000240 ,
L0000241 , L0000242 , L0000243 , L0000244 , L0000245 , L0000246 , L0000247 , L0000248 ,
L0000249 , L0000250 , L0000251 , L0000252 , L0000253 , L0000254 , L0000255 , L0000256 ,
L0000257 , L0000258 , L0000259 , L0000260 , L0000261 , L0000262 , L0000263 , L0000264 ,
L0000265 , L0000266 , L0000267 , L0000268 , L0000269 , L0000270 , L0000271 , L0000272 ,
L0000273 , L0000274 , L0000275 , L0000276 , L0000277 , L0000278 , L0000279 , L0000280 ,
L0000281 , L0000282 , L0000283 , L0000284 , L0000285 , L0000286 , L0000287 , L0000288 ,
L0000289 , L0000290 , L0000291 , L0000292 , L0000293 , L0000294 , L0000295 , L0000296 ,
L0000297 , L0000298 , L0000299 , L0000300 , L0000301 , L0000302 , L0000303 , L0000304 ,
L0000305 , L0000306 , L0000307 , L0000308 , L0000309 , L0000310 , L0000311 , L0000312 ,
L0000313 , L0000314 , L0000315 , L0000316 , L0000317 , L0000318 , L0000319 , L0000320 ,

**MODELOPTs: RegDFAULT CONC ELEV

*** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID SOURCE IDs

L0000321 , L0000322 , L0000323 , L0000324 , L0000325 , L0000326 , L0000327 , L0000328 ,
L0000329 , L0000330 , L0000331 , L0000332 , L0000333 , L0000334 , L0000335 , L0000336 ,
L0000337 , L0000338 , L0000339 , L0000340 , L0000341 , L0000342 , L0000343 , L0000344 ,
L0000345 , L0000346 , L0000347 , L0000348 , L0000349 , L0000350 , L0000351 , L0000352 ,
L0000353 , L0000354 , L0000355 , L0000356 , L0000357 , L0000358 , L0000359 , L0000360 ,
L0000361 , L0000362 , L0000363 , L0000364 , L0000365 , L0000366 , L0000367 , L0000368 ,
L0000369 , L0000370 , L0000371 , L0000372 , L0000373 , L0000374 , L0000375 , L0000376 ,
L0000377 , L0000378 , L0000379 , L0000380 , L0000381 , L0000382 , L0000383 , L0000384 ,
L0000385 , L0000386 , L0000387 , L0000388 , L0000389 , L0000390 , L0000391 , L0000392 ,
L0000393 , L0000394 , L0000395 , L0000396 , L0000397 , L0000398 , L0000399 , L0000400 ,
L0000401 , L0000402 , L0000403 , L0000404 , L0000405 , L0000406 , L0000407 , L0000408 ,
L0000409 , L0000410 , L0000411 , L0000412 , L0000413 , L0000414 , L0000415 , L0000416 ,
L0000417 , L0000418 , L0000419 , L0000420 , L0000421 , L0000422 , L0000423 , L0000424 ,
L0000425 , L0000426 , L0000427 , L0000428 , L0000429 , L0000430 , L0000431 , L0000432 ,
L0000433 , L0000434 , L0000435 , L0000436 , L0000437 , L0000438 , L0000439 , L0000440 ,
L0000441 , L0000442 , L0000443 , L0000444 , L0000445 , L0000446 , L0000447 , L0000448 ,
L0000449 , L0000450 , L0000451 , L0000452 , L0000453 , L0000454 , L0000455 , L0000456 ,
L0000457 , L0000458 , L0000459 , L0000460 , L0000461 , L0000462 , L0000463 , L0000464 ,
L0000465 , L0000466 , L0000467 , L0000468 , L0000469 , L0000470 , L0000471 , L0000472 ,
L0000473 , L0000474 , L0000475 , L0000476 , L0000477 , L0000478 , L0000479 , L0000480 ,

**MODELOPTs: RegDFAULT CONC ELEV

*** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID	SOURCE IDs
	L0000481 , L0000482 , L0000483 , L0000484 , L0000485 , L0000486 , L0000487 , L0000488 , L0000489 ,

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000001 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000002 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000003 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000004 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000005 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000006 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000007 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000008 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000009 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000010 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000011 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000012 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000013   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000014   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000015   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000016   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000017   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000018   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000019 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000020 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000021 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000022 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000023 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000024 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000025 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000026 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000027 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000028 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000029 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000030 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000031 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000032 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000033 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000034 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000035 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000036 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000037 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000038 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000039 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000040 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000041 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000042 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000043 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000044 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000045 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000046 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000047 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000048 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000049 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000050 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000051 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000052 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000053 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000054 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000055 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000056 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000057 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000058 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000059 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000060 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000061 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000062 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000063 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000064 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000065 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000066 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000067 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000068 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000069 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000070 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000071 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000072 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000073 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000074 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000075 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000076 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000077 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000078 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000079 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000080 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000081 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000082 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000083 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000084 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000085 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000086 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000087 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000088 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000089 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000090 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000091 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000092 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000093 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000094 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000095 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000096 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000097 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000098 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000099 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000100 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000101 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000102 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000103 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000104 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000105 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000106 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000107 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000108 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000109 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000110 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000111 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000112 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000113 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000114 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000115 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000116 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000117 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000118 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000119 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000120 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000121   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000122   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000123   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000124   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000125   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000126   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000127 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000128 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000129 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000130 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000131 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000132 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000133 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000134 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000135 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000136 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000137 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000138 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000139   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000140   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000141   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000142   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000143   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000144   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000145 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000146 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000147 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000148 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000149 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000150 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000151 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000152 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000153 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000154 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000155 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000156 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000157   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000158   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000159   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000160   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000161   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000162   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000163 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000164 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000165 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000166 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000167 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000168 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000169 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000170 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000171 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000172 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000173 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000174 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000175 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000176 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000177 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000178 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000179 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000180 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

JANUARY FEBRUARY MARCH APRIL MAY JUNE JULY AUGUST SEPTEMBER OCTOBER NOVEMBER DECEMBER

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SOURCE ID = L0000181 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000182 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000183 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000184 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000185 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000186 ; SOURCE TYPE = VOLUME :
0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000187 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000188 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000189 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000190 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000191 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000192 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000193 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000194 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000195 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000196 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000197 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000198 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000199 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000200 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000201 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000202 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000203 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000204 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000205 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000206 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000207 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000208 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000209 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000210 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000211 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000212 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000213 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000214 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000215 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000216 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000217 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000218 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000219 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000220 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000221 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000222 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000223 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000224 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000225 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000226 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000227 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000228 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000229 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000230 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000231 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000232 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000233 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000234 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000235 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000236 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000237 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000238 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000239 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000240 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000241   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000242   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000243   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000244   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000245   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000246   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000247 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000248 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000249 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000250 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000251 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000252 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000253 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000254 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000255 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000256 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000257 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000258 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000259 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000260 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000261 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000262 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000263 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000264 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000265 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000266 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000267 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000268 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000269 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000270 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000271 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000272 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000273 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000274 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000275 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000276 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000277 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000278 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000279 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000280 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000281 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000282 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000283 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000284 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000285 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000286 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000287 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000288 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000289 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000290 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000291 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000292 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000293 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000294 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000295 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000296 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000297 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000298 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000299 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000300 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000301 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000302 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000303 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000304 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000305 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000306 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000307 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000308 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000309 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000310 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000311 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000312 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000313 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000314 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000315 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000316 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000317 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000318 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000319 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000320 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000321 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000322 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000323 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000324 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000325 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000326 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000327 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000328 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000329 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000330 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000331 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000332 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000333 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000334 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000335 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000336 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000337 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000338 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000339 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000340 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000341 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000342 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000343 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000344 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000345 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000346 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000347 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000348 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000349 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000350 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000351 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000352 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000353 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000354 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000355 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000356 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000357 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000358 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000359 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000360 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER

SOURCE ID = L0000361   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000362   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000363   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000364   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000365   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

SOURCE ID = L0000366   ; SOURCE TYPE = VOLUME   :
    0.0000E+000.0000E+000.0000E+000.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+010.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000367 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000368 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000369 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000370 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000371 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000372 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000373 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000374 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000375 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000376 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000377 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000378 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000379 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000380 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000381 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000382 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000383 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000384 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000385 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000386 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000387 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000388 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000389 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000390 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000391 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000392 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000393 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000394 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000395 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000396 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000397 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000398 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000399 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000400 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000401 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000402 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000403 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000404 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000405 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000406 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000407 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000408 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000409 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000410 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000411 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000412 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000413 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000414 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000415 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000416 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000417 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000418 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000419 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000420 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000421 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000422 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000423 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000424 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000425 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000426 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000427 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000428 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000429 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000430 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000431 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000432 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000433 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000434 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000435 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000436 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000437 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000438 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000439 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000440 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000441 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000442 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000443 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000444 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000445 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000446 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000447 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000448 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000449 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000450 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000451 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000452 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000453 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000454 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000455 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000456 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000457 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000458 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000459 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000460 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000461 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000462 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000463 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000464 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000465 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000466 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000467 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000468 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000469 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000470 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000471 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000472 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000473 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000474 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000475 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000476 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000477 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000478 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000479 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000480 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000481 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000482 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000483 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000484 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000485 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000486 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000487 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000488 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01
SOURCE ID = L0000489 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01	0.1000E+01

**MODELOPTs: RegDFAULT CONC ELEV

*** GRIDDED RECEPTOR NETWORK SUMMARY ***

*** NETWORK ID: UCART1 ; NETWORK TYPE: GRIDCART ***

*** X-COORDINATES OF GRID ***
(METERS)

389850.0, 389950.0, 390050.0, 390150.0, 390250.0, 390350.0, 390450.0, 390550.0, 390650.0, 390750.0,
390850.0, 390950.0, 391050.0, 391150.0, 391250.0,

*** Y-COORDINATES OF GRID ***
(METERS)

3778450.0, 3778550.0, 3778650.0, 3778750.0, 3778850.0, 3778950.0, 3779050.0, 3779150.0, 3779250.0, 3779350.0,

**MODELOPTs: RegDFAULT CONC ELEV

*** NETWORK ID: UCART1 ; NETWORK TYPE: GRIDCART ***

* ELEVATION HEIGHTS IN METERS *

Y-COORD (METERS)	X-COORD (METERS)							
	389850.00	389950.00	390050.00	390150.00	390250.00	390350.00	390450.00	390550.00
390650.00								
3779350.00	350.80	353.20	319.70	324.20	336.60	379.80	374.40	367.80
361.90								
3779250.00	309.00	333.60	298.70	307.40	344.40	340.00	345.80	332.00
351.30								
3779150.00	292.60	294.90	278.70	308.80	316.50	314.60	330.40	319.50
336.00								
3779050.00	264.00	265.30	273.20	308.50	289.00	289.00	289.00	312.20
335.50								
3778950.00	252.10	258.50	263.30	275.40	289.00	294.60	314.50	309.70
290.80								
3778850.00	249.60	258.00	249.50	264.20	266.90	271.50	294.10	304.60
291.30								
3778750.00	242.30	242.70	244.70	253.70	255.60	268.40	267.30	277.00
266.30								
3778650.00	238.00	235.40	242.50	247.50	257.20	263.60	260.20	261.30
259.00								
3778550.00	230.00	233.10	238.80	244.40	254.30	255.70	253.90	254.90
249.60								
3778450.00	226.50	230.00	240.50	244.20	251.70	249.20	246.40	243.50
245.90								

**MODELOPTs: RegDFAULT CONC ELEV

*** NETWORK ID: UCART1 ; NETWORK TYPE: GRIDCART ***

* ELEVATION HEIGHTS IN METERS *

Y-COORD (METERS)	X-COORD (METERS) 390750.00	390850.00	390950.00	391050.00	391150.00	391250.00
3779350.00	339.40	305.30	295.80	326.60	347.90	333.00
3779250.00	310.70	287.00	287.70	320.70	343.50	326.70
3779150.00	298.90	282.20	296.00	315.40	326.20	327.60
3779050.00	305.60	270.30	278.50	286.80	315.30	328.80
3778950.00	279.00	267.60	296.30	313.30	321.80	326.90
3778850.00	266.90	260.10	291.00	341.00	344.10	320.50
3778750.00	256.80	274.10	298.30	308.00	323.20	331.70
3778650.00	253.80	269.70	297.40	292.50	296.20	309.50
3778550.00	247.30	266.40	271.60	293.20	285.00	283.00
3778450.00	250.80	260.90	266.10	267.20	267.20	268.00

**MODELOPTs: RegDFAULT CONC ELEV

*** NETWORK ID: UCART1 ; NETWORK TYPE: GRIDCART ***

* HILL HEIGHT SCALES IN METERS *

Y-COORD (METERS)	X-COORD (METERS)							
	389850.00	389950.00	390050.00	390150.00	390250.00	390350.00	390450.00	390550.00
390650.00								
3779350.00	1422.00	1422.00	1422.00	1422.00	1422.00	576.00	1422.00	1422.00
1422.00								
3779250.00	1422.00	1422.00	1422.00	1422.00	1422.00	1422.00	1422.00	1422.00
1422.00								
3779150.00	1422.00	1422.00	1422.00	1422.00	1422.00	1422.00	1422.00	1422.00
1422.00								
3779050.00	1422.00	1422.00	1422.00	1422.00	1422.00	1422.00	1422.00	1422.00
1422.00								
3778950.00	1422.00	1422.00	1422.00	1422.00	1422.00	1422.00	1422.00	1422.00
1422.00								
3778850.00	1422.00	1422.00	1422.00	1422.00	1422.00	1422.00	1422.00	1422.00
1422.00								
3778750.00	1422.00	1422.00	1422.00	1422.00	1422.00	1422.00	1422.00	1422.00
1422.00								
3778650.00	1422.00	1422.00	1422.00	1422.00	1422.00	1422.00	1422.00	1422.00
1422.00								
3778550.00	1422.00	1422.00	1422.00	1422.00	1422.00	1422.00	1422.00	1422.00
1422.00								
3778450.00	1422.00	1422.00	1422.00	1422.00	1422.00	1422.00	1422.00	1422.00
1422.00								

**MODELOPTs: RegDFAULT CONC ELEV

*** NETWORK ID: UCART1 ; NETWORK TYPE: GRIDCART ***

* HILL HEIGHT SCALES IN METERS *

Y-COORD (METERS)	X-COORD (METERS) 390750.00	390850.00	390950.00	391050.00	391150.00	391250.00
3779350.00	1422.00	1422.00	1422.00	1422.00	1422.00	1422.00
3779250.00	1422.00	1422.00	1422.00	1422.00	1422.00	1422.00
3779150.00	1422.00	1422.00	1422.00	1422.00	1422.00	1422.00
3779050.00	1422.00	1422.00	1422.00	1422.00	1422.00	1422.00
3778950.00	1422.00	1422.00	1422.00	1422.00	1422.00	1422.00
3778850.00	1422.00	1422.00	1422.00	1422.00	1422.00	1422.00
3778750.00	1422.00	1422.00	1422.00	1422.00	1422.00	1422.00
3778650.00	1422.00	1422.00	1422.00	1422.00	1422.00	1422.00
3778550.00	1422.00	1422.00	1422.00	1422.00	1422.00	1422.00
3778450.00	1422.00	1422.00	1422.00	1422.00	1422.00	1422.00

**MODELOPTs: RegDFAULT CONC ELEV

*** DISCRETE CARTESIAN RECEPTORS ***
(X-COORD, Y-COORD, ZELEV, ZHILL, ZFLAG)
(METERS)

(	390707.0,	3778721.0,	259.5,	1422.0,	0.0);	(	390886.0,	3778796.0,	280.0,	1422.0,	0.0);
(	390875.0,	3778881.0,	264.7,	1422.0,	0.0);	(	390636.0,	3778559.0,	251.3,	1422.0,	0.0);

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE-RECEPTOR COMBINATIONS FOR WHICH CALCULATIONS MAY NOT BE PERFORMED *
LESS THAN 1.0 METER; WITHIN OPENPIT; OR BEYOND 80KM FOR FASTAREA/FASTALL

SOURCE ID	- - RECEPTOR LOCATION - - XR (METERS)	YR (METERS)	DISTANCE (METERS)
L0000431	390350.0	3779250.0	-1.86
L0000432	390350.0	3779250.0	-1.60

*** METEOROLOGICAL DAYS SELECTED FOR PROCESSING ***
(1=YES; 0=NO)

```
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
```

NOTE: METEOROLOGICAL DATA ACTUALLY PROCESSED WILL ALSO DEPEND ON WHAT IS INCLUDED IN THE DATA FILE.

*** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***
(METERS/SEC)

1.54,   3.09,   5.14,   8.23, 10.80,

**MODELOPTs: RegDFAULT CONC ELEV

*** UP TO THE FIRST 24 HOURS OF METEOROLOGICAL DATA ***

Surface file: ..\burk6.sfc Met Version: 12345
Profile file: ..\burk6.PFL
Surface format: FREE
Profile format: FREE
Surface station no.: 0 Upper air station no.: 3190
Name: BURBANK Name: UNKNOWN
Year: 2005 Year: 2005

First 24 hours of scalar data

YR	MO	DY	JDY	HR	H0	U*	W*	DT/DZ	ZICNV	ZIMCH	M-O LEN	Z0	BOWEN	ALBEDO	REF WS	WD	HT	REF TA	HT
05	01	01	1	01	-3.2	0.063	-9.000	-9.000	-999.	37.	7.1	0.53	1.00	1.00	0.90	285.	9.1	279.9	5.5
05	01	01	1	02	-2.6	0.063	-9.000	-9.000	-999.	37.	8.7	0.53	1.00	1.00	0.90	277.	9.1	279.9	5.5
05	01	01	1	03	-2.6	0.063	-9.000	-9.000	-999.	37.	8.7	0.53	1.00	1.00	0.90	335.	9.1	279.2	5.5
05	01	01	1	04	-2.6	0.063	-9.000	-9.000	-999.	37.	8.6	0.53	1.00	1.00	0.90	291.	9.1	278.8	5.5
05	01	01	1	05	-3.0	0.063	-9.000	-9.000	-999.	37.	7.4	0.53	1.00	1.00	0.90	334.	9.1	278.1	5.5
05	01	01	1	06	-0.5	0.028	-9.000	-9.000	-999.	11.	3.8	0.53	1.00	1.00	0.40	309.	9.1	278.8	5.5
05	01	01	1	07	-2.6	0.063	-9.000	-9.000	-999.	37.	8.6	0.53	1.00	1.00	0.90	313.	9.1	278.8	5.5
05	01	01	1	08	-0.4	0.028	-9.000	-9.000	-999.	11.	4.5	0.53	1.00	0.56	0.40	256.	9.1	279.2	5.5
05	01	01	1	09	0.1	0.128	0.022	0.005	4.	105.	-1838.7	0.53	1.00	0.33	0.90	298.	9.1	282.5	5.5
05	01	01	1	10	0.1	0.128	0.025	0.005	5.	105.	-1838.7	0.53	1.00	0.25	0.90	103.	9.1	286.4	5.5
05	01	01	1	11	0.1	0.310	0.027	0.005	7.	397.	-8888.0	0.53	1.00	0.22	2.20	136.	9.1	287.0	5.5
05	01	01	1	12	0.1	0.310	0.028	0.005	8.	397.	-8888.0	0.53	1.00	0.21	2.20	152.	9.1	287.0	5.5
05	01	01	1	13	0.1	0.254	0.029	0.005	9.	295.	-8888.0	0.53	1.00	0.21	1.80	187.	9.1	285.9	5.5
05	01	01	1	14	0.1	0.184	0.030	0.005	9.	182.	-5471.6	0.53	1.00	0.22	1.30	157.	9.1	287.0	5.5
05	01	01	1	15	0.1	0.184	0.031	0.005	10.	181.	-5471.6	0.53	1.00	0.26	1.30	192.	9.1	286.4	5.5
05	01	01	1	16	0.1	0.254	0.031	0.005	11.	294.	-8888.0	0.53	1.00	0.34	1.80	188.	9.1	285.9	5.5
05	01	01	1	17	-4.9	0.092	-9.000	-9.000	-999.	88.	13.8	0.53	1.00	0.61	1.30	200.	9.1	285.4	5.5
05	01	01	1	18	-2.6	0.063	-9.000	-9.000	-999.	37.	8.7	0.53	1.00	1.00	0.90	162.	9.1	284.9	5.5
05	01	01	1	19	-3.0	0.063	-9.000	-9.000	-999.	37.	7.5	0.53	1.00	1.00	0.90	176.	9.1	284.9	5.5
05	01	01	1	20	-0.4	0.028	-9.000	-9.000	-999.	11.	4.5	0.53	1.00	1.00	0.40	210.	9.1	284.2	5.5
05	01	01	1	21	-0.4	0.028	-9.000	-9.000	-999.	11.	4.5	0.53	1.00	1.00	0.40	236.	9.1	284.2	5.5
05	01	01	1	22	-0.4	0.028	-9.000	-9.000	-999.	11.	4.5	0.53	1.00	1.00	0.40	272.	9.1	283.8	5.5
05	01	01	1	23	-0.4	0.028	-9.000	-9.000	-999.	11.	4.5	0.53	1.00	1.00	0.40	251.	9.1	283.1	5.5
05	01	01	1	24	-0.4	0.028	-9.000	-9.000	-999.	11.	4.5	0.53	1.00	1.00	0.40	301.	9.1	282.5	5.5

First hour of profile data

YR	MO	DY	HR	HEIGHT	F	WDIR	WSPD	AMB_TMP	sigmaA	sigmaW	sigmaV
05	01	01	01	5.5	0	-999.	-99.00	279.9	99.0	-99.00	-99.00
05	01	01	01	9.1	1	285.	0.90	-999.0	99.0	-99.00	-99.00

F indicates top of profile (=1) or below (=0)

**MODELOPTs: RegDFAULT CONC ELEV

*** THE ANNUAL AVERAGE CONCENTRATION VALUES AVERAGED OVER 5 YEARS FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): L0000001 , L0000002 , L0000003 , L0000004 , L0000005 ,
L0000006 , L0000007 , L0000008 , L0000009 , L0000010 , L0000011 , L0000012 , L0000013 ,
L0000014 , L0000015 , L0000016 , L0000017 , L0000018 , L0000019 , L0000020 , L0000021 ,
L0000022 , L0000023 , L0000024 , L0000025 , L0000026 , L0000027 , L0000028 , . . . ,

*** NETWORK ID: UCART1 ; NETWORK TYPE: GRIDCART ***

** CONC OF PM_10 IN MICROGRAMS/M**3 **

Y-COORD (METERS)	X-COORD (METERS)							
	389850.00	389950.00	390050.00	390150.00	390250.00	390350.00	390450.00	390550.00	390650.00
3779350.00	0.00034	0.00046	0.00056	0.00096	0.00748	0.00137	0.00093	0.00073	0.00053
3779250.00	0.00032	0.00046	0.00055	0.00100	0.00608	0.01549	0.01011	0.00332	0.00089
3779150.00	0.00029	0.00037	0.00050	0.00081	0.00129	0.00172	0.00248	0.00542	0.00168
3779050.00	0.00025	0.00033	0.00046	0.00067	0.00085	0.00117	0.00181	0.01051	0.00216
3778950.00	0.00022	0.00029	0.00039	0.00055	0.00073	0.00108	0.00232	0.00758	0.00556
3778850.00	0.00021	0.00027	0.00032	0.00047	0.00065	0.00100	0.00212	0.00562	0.00672
3778750.00	0.00019	0.00023	0.00029	0.00038	0.00051	0.00082	0.00134	0.00231	0.00258
3778650.00	0.00018	0.00021	0.00026	0.00033	0.00044	0.00063	0.00090	0.00141	0.00297
3778550.00	0.00016	0.00019	0.00023	0.00029	0.00037	0.00047	0.00065	0.00110	0.01516
3778450.00	0.00015	0.00017	0.00021	0.00025	0.00030	0.00038	0.00048	0.00068	0.00102

**MODELOPTs: RegDFAULT CONC ELEV

*** THE ANNUAL AVERAGE CONCENTRATION VALUES AVERAGED OVER 5 YEARS FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): L0000001 , L0000002 , L0000003 , L0000004 , L0000005 ,
L0000006 , L0000007 , L0000008 , L0000009 , L0000010 , L0000011 , L0000012 , L0000013 ,
L0000014 , L0000015 , L0000016 , L0000017 , L0000018 , L0000019 , L0000020 , L0000021 ,
L0000022 , L0000023 , L0000024 , L0000025 , L0000026 , L0000027 , L0000028 , . . . ,

*** NETWORK ID: UCART1 ; NETWORK TYPE: GRIDCART ***

** CONC OF PM_10 IN MICROGRAMS/M**3 **

Y-COORD (METERS)	X-COORD (METERS) 390750.00	390850.00	390950.00	391050.00	391150.00	391250.00
3779350.00	0.00050	0.00045	0.00037	0.00025	0.00018	0.00016
3779250.00	0.00079	0.00064	0.00048	0.00030	0.00021	0.00019
3779150.00	0.00113	0.00091	0.00056	0.00036	0.00027	0.00021
3779050.00	0.00183	0.00161	0.00095	0.00053	0.00033	0.00024
3778950.00	0.00617	0.02045	0.00110	0.00055	0.00036	0.00026
3778850.00	0.00290	0.00695	0.00130	0.00057	0.00037	0.00028
3778750.00	0.00634	0.00206	0.00083	0.00053	0.00037	0.00027
3778650.00	0.00405	0.00119	0.00059	0.00046	0.00034	0.00026
3778550.00	0.00159	0.00081	0.00057	0.00036	0.00032	0.00026
3778450.00	0.00080	0.00057	0.00044	0.00035	0.00028	0.00023

**MODELOPTs: RegDFAULT CONC ELEV

*** THE ANNUAL AVERAGE CONCENTRATION VALUES AVERAGED OVER 5 YEARS FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): L0000001 , L0000002 , L0000003 , L0000004 , L0000005 ,
L0000006 , L0000007 , L0000008 , L0000009 , L0000010 , L0000011 , L0000012 , L0000013 ,
L0000014 , L0000015 , L0000016 , L0000017 , L0000018 , L0000019 , L0000020 , L0000021 ,
L0000022 , L0000023 , L0000024 , L0000025 , L0000026 , L0000027 , L0000028 , . . . ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF PM_10 IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC
390707.00	3778721.00	0.00392	390886.00	3778796.00	0.00201
390875.00	3778881.00	0.00892	390636.00	3778559.00	0.00497

**MODELOPTs: RegDFAULT CONC ELEV

*** THE SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 5 YEARS ***

** CONC OF PM_10 IN MICROGRAMS/M**3 **

GROUP ID		AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	NETWORK GRID-ID
ALL	1ST HIGHEST VALUE IS	0.02045 AT	(390850.00, 3778950.00, 267.60, 1422.00, 0.00)	GC	UCART1
	2ND HIGHEST VALUE IS	0.01549 AT	(390350.00, 3779250.00, 340.00, 1422.00, 0.00)	GC	UCART1
	3RD HIGHEST VALUE IS	0.01516 AT	(390650.00, 3778550.00, 249.60, 1422.00, 0.00)	GC	UCART1
	4TH HIGHEST VALUE IS	0.01051 AT	(390550.00, 3779050.00, 312.20, 1422.00, 0.00)	GC	UCART1
	5TH HIGHEST VALUE IS	0.01011 AT	(390450.00, 3779250.00, 345.80, 1422.00, 0.00)	GC	UCART1
	6TH HIGHEST VALUE IS	0.00892 AT	(390875.00, 3778881.00, 264.65, 1422.00, 0.00)	DC	
	7TH HIGHEST VALUE IS	0.00758 AT	(390550.00, 3778950.00, 309.70, 1422.00, 0.00)	GC	UCART1
	8TH HIGHEST VALUE IS	0.00748 AT	(390250.00, 3779350.00, 336.60, 1422.00, 0.00)	GC	UCART1
	9TH HIGHEST VALUE IS	0.00695 AT	(390850.00, 3778850.00, 260.10, 1422.00, 0.00)	GC	UCART1
	10TH HIGHEST VALUE IS	0.00672 AT	(390650.00, 3778850.00, 291.30, 1422.00, 0.00)	GC	UCART1

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR

**MODELOPTs: RegDFAULT CONC ELEV

*** Message Summary : AERMOD Model Execution ***

--------- Summary of Total Messages --------

A Total of 0 Fatal Error Message(s)
A Total of 6 Warning Message(s)
A Total of 889 Informational Message(s)

A Total of 43824 Hours Were Processed

A Total of 0 Calm Hours Identified

A Total of 889 Missing Hours Identified (2.03 Percent)

******** FATAL ERROR MESSAGES ********
*** NONE ***

******** WARNING MESSAGES ********

```
MX W420   35935  METQA:Wind Speed Out-of-Range.   KURDAT =                    09020607
MX W432   35935  METQA:Friction Velocity Out-of-Range.   KURDAT =             09020607
MX W420   43325  METQA:Wind Speed Out-of-Range.   KURDAT =                    09121105
MX W432   43325  METQA:Friction Velocity Out-of-Range.   KURDAT =             09121105
MX W420   43326  METQA:Wind Speed Out-of-Range.   KURDAT =                    09121106
MX W432   43326  METQA:Friction Velocity Out-of-Range.   KURDAT =             09121106
```

****
*** AERMOD Finishes Successfully ***
****

```
**
**************************************
**
** AERMOD Input Produced by:
** AERMOD View Ver. 8.2.0
** Lakes Environmental Software Inc.
** Date: 6/1/2013
** File: C:\Vista Env\2011\11057-Devils Gate Reservoir\Scholl Ops\Scholl Ops.ADI
**
**************************************
**
**
**************************************
** AERMOD Control Pathway
**************************************
**
**
CO STARTING
   TITLEONE Scholl Canyon Rd - Operational Maintenance
   TITLETWO PM10 Diesel Truck Emissions Route 4
   MODELOPT DFAULT CONC
   AVERTIME ANNUAL
   URBANOPT 9862049 Los_Angeles_County
   POLLUTID PM_10
   RUNORNOT RUN
   ERRORFIL "Scholl Ops.err"
CO FINISHED
**
**************************************
** AERMOD Source Pathway
**************************************
**
**
SO STARTING
** Source Location **
** Source ID - Type - X Coord. - Y Coord. **
** ------------------------------------------------------------------------
** Line Source Represented by Adjacent Volume Sources
** LINE VOLUME Source ID = RDRTE4
** DESCRSRC Scholl Cyn Rd Route 4
** PREFIX
** Length of Side = 3.66
** Configuration = Adjacent
** Emission Rate = 0.0001619
** Vertical Dimension = 3.66
** SZINIT = 1.70
** Nodes = 34
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** 390668.13, 3778578.36, 250.99, 0.00, 1.70
** 390707.34, 3778651.10, 256.63, 0.00, 1.70
** 390760.85, 3778728.71, 255.01, 0.00, 1.70
** 390792.68, 3778767.70, 256.02, 0.00, 1.70
** 390828.44, 3778800.14, 258.45, 0.00, 1.70
** 390857.61, 3778828.82, 263.84, 0.00, 1.70
** 390886.92, 3778864.58, 265.09, 0.00, 1.70
** 390891.73, 3778888.34, 266.10, 0.00, 1.70
** 390890.89, 3778904.61, 268.61, 0.00, 1.70
** 390882.78, 3778923.22, 270.18, 0.00, 1.70
** 390856.86, 3778942.91, 267.25, 0.00, 1.70
** 390750.58, 3778977.12, 281.68, 0.00, 1.70
** 390704.58, 3778967.72, 284.86, 0.00, 1.70
** 390672.97, 3778941.97, 282.95, 0.00, 1.70
** 390649.39, 3778908.93, 286.51, 0.00, 1.70
** 390619.94, 3778829.01, 290.40, 0.00, 1.70
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** 390569.15, 3778802.52, 295.70, 0.00, 1.70
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** 390518.32, 3778835.85, 301.28, 0.00, 1.70
** 390511.51, 3778874.33, 305.94, 0.00, 1.70
** 390582.30, 3779130.58, 325.56, 0.00, 1.70
** 390576.20, 3779163.37, 326.91, 0.00, 1.70
** 390557.79, 3779196.13, 323.64, 0.00, 1.70
** 390532.09, 3779221.25, 324.54, 0.00, 1.70
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** 390350.82, 3779249.56, 336.55, 0.00, 1.70
** 390311.31, 3779240.33, 345.03, 0.00, 1.70
** 390283.63, 3779245.94, 352.21, 0.00, 1.70
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   LOCATION L0000002     VOLUME   390643.422 3778515.797 247.18
   LOCATION L0000003     VOLUME   390644.765 3778519.199 247.39
   LOCATION L0000004     VOLUME   390646.109 3778522.601 247.60
   LOCATION L0000005     VOLUME   390647.452 3778526.003 247.80
   LOCATION L0000006     VOLUME   390648.796 3778529.405 248.01
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LOCATION L0000009 VOLUME 390652.827 3778539.610 248.63
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LOCATION L0000012 VOLUME 390656.857 3778549.816 249.25
LOCATION L0000013 VOLUME 390658.201 3778553.218 249.46
LOCATION L0000014 VOLUME 390659.544 3778556.620 249.67
LOCATION L0000015 VOLUME 390660.888 3778560.022 249.87
LOCATION L0000016 VOLUME 390662.231 3778563.424 250.08
LOCATION L0000017 VOLUME 390663.575 3778566.826 250.29
LOCATION L0000018 VOLUME 390664.919 3778570.227 250.50
LOCATION L0000019 VOLUME 390666.262 3778573.629 250.70
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** Source Parameters **
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SRCPARAM L0000408     0.0000003311      0.00      1.70      1.70
SRCPARAM L0000409     0.0000003311      0.00      1.70      1.70
SRCPARAM L0000410     0.0000003311      0.00      1.70      1.70
SRCPARAM L0000411     0.0000003311      0.00      1.70      1.70
SRCPARAM L0000412     0.0000003311      0.00      1.70      1.70
SRCPARAM L0000413     0.0000003311      0.00      1.70      1.70
SRCPARAM L0000414     0.0000003311      0.00      1.70      1.70
SRCPARAM L0000415     0.0000003311      0.00      1.70      1.70
SRCPARAM L0000416     0.0000003311      0.00      1.70      1.70
SRCPARAM L0000417     0.0000003311      0.00      1.70      1.70
SRCPARAM L0000418     0.0000003311      0.00      1.70      1.70
SRCPARAM L0000419     0.0000003311      0.00      1.70      1.70
SRCPARAM L0000420     0.0000003311      0.00      1.70      1.70
SRCPARAM L0000421     0.0000003311      0.00      1.70      1.70
SRCPARAM L0000422     0.0000003311      0.00      1.70      1.70
SRCPARAM L0000423     0.0000003311      0.00      1.70      1.70
SRCPARAM L0000424     0.0000003311      0.00      1.70      1.70
SRCPARAM L0000425     0.0000003311      0.00      1.70      1.70
SRCPARAM L0000426     0.0000003311      0.00      1.70      1.70
SRCPARAM L0000427     0.0000003311      0.00      1.70      1.70
SRCPARAM L0000428     0.0000003311      0.00      1.70      1.70
SRCPARAM L0000429     0.0000003311      0.00      1.70      1.70
SRCPARAM L0000430     0.0000003311      0.00      1.70      1.70
SRCPARAM L0000431     0.0000003311      0.00      1.70      1.70
SRCPARAM L0000432     0.0000003311      0.00      1.70      1.70
SRCPARAM L0000433     0.0000003311      0.00      1.70      1.70
SRCPARAM L0000434     0.0000003311      0.00      1.70      1.70
SRCPARAM L0000435     0.0000003311      0.00      1.70      1.70
SRCPARAM L0000436     0.0000003311      0.00      1.70      1.70
SRCPARAM L0000437     0.0000003311      0.00      1.70      1.70
SRCPARAM L0000438     0.0000003311      0.00      1.70      1.70
SRCPARAM L0000439     0.0000003311      0.00      1.70      1.70
SRCPARAM L0000440     0.0000003311      0.00      1.70      1.70
SRCPARAM L0000441     0.0000003311      0.00      1.70      1.70
SRCPARAM L0000442     0.0000003311      0.00      1.70      1.70
SRCPARAM L0000443     0.0000003311      0.00      1.70      1.70
SRCPARAM L0000444     0.0000003311      0.00      1.70      1.70
SRCPARAM L0000445     0.0000003311      0.00      1.70      1.70
SRCPARAM L0000446     0.0000003311      0.00      1.70      1.70
SRCPARAM L0000447     0.0000003311      0.00      1.70      1.70
SRCPARAM L0000448     0.0000003311      0.00      1.70      1.70
SRCPARAM L0000449     0.0000003311      0.00      1.70      1.70
SRCPARAM L0000450     0.0000003311      0.00      1.70      1.70
SRCPARAM L0000451     0.0000003311      0.00      1.70      1.70
SRCPARAM L0000452     0.0000003311      0.00      1.70      1.70
SRCPARAM L0000453     0.0000003311      0.00      1.70      1.70
SRCPARAM L0000454     0.0000003311      0.00      1.70      1.70
SRCPARAM L0000455     0.0000003311      0.00      1.70      1.70
SRCPARAM L0000456     0.0000003311      0.00      1.70      1.70
SRCPARAM L0000457     0.0000003311      0.00      1.70      1.70
SRCPARAM L0000458     0.0000003311      0.00      1.70      1.70
SRCPARAM L0000459     0.0000003311      0.00      1.70      1.70
SRCPARAM L0000460     0.0000003311      0.00      1.70      1.70
SRCPARAM L0000461     0.0000003311      0.00      1.70      1.70
SRCPARAM L0000462     0.0000003311      0.00      1.70      1.70
SRCPARAM L0000463     0.0000003311      0.00      1.70      1.70
SRCPARAM L0000464     0.0000003311      0.00      1.70      1.70
SRCPARAM L0000465     0.0000003311      0.00      1.70      1.70
SRCPARAM L0000466     0.0000003311      0.00      1.70      1.70
SRCPARAM L0000467     0.0000003311      0.00      1.70      1.70
SRCPARAM L0000468     0.0000003311      0.00      1.70      1.70
SRCPARAM L0000469     0.0000003311      0.00      1.70      1.70
SRCPARAM L0000470     0.0000003311      0.00      1.70      1.70
SRCPARAM L0000471     0.0000003311      0.00      1.70      1.70
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SRCPARAM L0000473     0.0000003311      0.00      1.70      1.70
SRCPARAM L0000474     0.0000003311      0.00      1.70      1.70
SRCPARAM L0000475     0.0000003311      0.00      1.70      1.70
SRCPARAM L0000476     0.0000003311      0.00      1.70      1.70
SRCPARAM L0000477     0.0000003311      0.00      1.70      1.70
SRCPARAM L0000478     0.0000003311      0.00      1.70      1.70
SRCPARAM L0000479     0.0000003311      0.00      1.70      1.70
SRCPARAM L0000480     0.0000003311      0.00      1.70      1.70
SRCPARAM L0000481     0.0000003311      0.00      1.70      1.70
SRCPARAM L0000482     0.0000003311      0.00      1.70      1.70
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   SRCPARAM L0000484     0.0000003311      0.00      1.70      1.70
   SRCPARAM L0000485     0.0000003311      0.00      1.70      1.70
   SRCPARAM L0000486     0.0000003311      0.00      1.70      1.70
   SRCPARAM L0000487     0.0000003311      0.00      1.70      1.70
   SRCPARAM L0000488     0.0000003311      0.00      1.70      1.70
   SRCPARAM L0000489     0.0000003311      0.00      1.70      1.70
** ------------------------------------------------------------------------
   URBANSRC ALL

** Variable Emissions Type: "By Month (MONTH)"
** Variable Emission Scenario: "Scenario 2"
   EMISFACT L0000001     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000001     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000002     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000002     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000003     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000003     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000004     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000004     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000005     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000005     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000006     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000006     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000007     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000007     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000008     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000008     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000009     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000009     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000010     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000010     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000011     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000011     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000012     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000012     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000013     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000013     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000014     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000014     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000015     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000015     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000016     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000016     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000017     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000017     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000018     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000018     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000019     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000019     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000020     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
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   EMISFACT L0000022     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000022     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000023     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000023     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000024     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000024     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000025     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000025     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000026     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000026     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
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   EMISFACT L0000028     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000028     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000029     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000029     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
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   EMISFACT L0000030     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
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   EMISFACT L0000032     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000033     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000033     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000034     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000034     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000035     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
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   EMISFACT L0000036     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
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   EMISFACT L0000037     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000038     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
   EMISFACT L0000038     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
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EMISFACT L0000040     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000041     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000041     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000042     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000042     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
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EMISFACT L0000044     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
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EMISFACT L0000046     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000047     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
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EMISFACT L0000048     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000049     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000049     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000050     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000050     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000051     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000051     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000052     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000052     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000053     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
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EMISFACT L0000055     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
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EMISFACT L0000059     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
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EMISFACT L0000061     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
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EMISFACT L0000063     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
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EMISFACT L0000067     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
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EMISFACT L0000082     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000082     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
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EMISFACT L0000086     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
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EMISFACT L0000088     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
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EMISFACT L0000094     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000094     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000095     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT L0000095     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
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EMISFACT L0000367     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
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EMISFACT L0000368     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
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EMISFACT L0000373     MONTH 0.0 0.0 0.0 0.0 0.0 0.0
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   EMISFACT L0000489     MONTH 0.5 0.0 0.0 0.0 0.0 0.0
   SRCGROUP ALL
SO FINISHED
**
**************************************
** AERMOD Receptor Pathway
**************************************
**
**
RE STARTING
   INCLUDED "Scholl Ops.rou"
RE FINISHED
**
**************************************
** AERMOD Meteorology Pathway
**************************************
**
**
ME STARTING
   SURFFILE ..\burk6.sfc
   PROFFILE ..\burk6.PFL
   SURFDATA 0 2005 Burbank 378.62 3782.24
   UAIRDATA 3190 2005
   SITEDATA 99999 2005
   PROFBASE 175.0 METERS
ME FINISHED
**
**************************************
** AERMOD Output Pathway
**************************************
**
**
OU STARTING
** Auto-Generated Plotfiles
   PLOTFILE ANNUAL ALL "SCHOLL OPS.AD\AN00GALL.PLT" 31
   SUMMFILE "Scholl Ops.sum"
OU FINISHED

 *********************************
 *** SETUP Finishes Successfully ***
 *********************************
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**MODELOPTs: RegDFAULT CONC   ELEV

                                        ***   MODEL SETUP OPTIONS SUMMARY   ***
- -

**Model Is Setup For Calculation of Average CONCentration Values.

  -- DEPOSITION LOGIC --
**NO GAS DEPOSITION Data Provided.
**NO PARTICLE DEPOSITION Data Provided.
**Model Uses NO DRY DEPLETION. DRYDPLT = F
**Model Uses NO WET DEPLETION. WETDPLT = F

**Model Uses URBAN Dispersion Algorithm for the SBL for   489 Source(s),
  for Total of   1 Urban Area(s):
  Urban Population =   9862049.0 ; Urban Roughness Length = 1.000 m

**Model Uses Regulatory DEFAULT Options:
        1. Stack-tip Downwash.
        2. Model Accounts for ELEVated Terrain Effects.
        3. Use Calms Processing Routine.
        4. Use Missing Data Processing Routine.
        5. No Exponential Decay for URBAN/Non-SO2.
        6. Urban Roughness Length of 1.0 Meter Assumed.

**Model Assumes No FLAGPOLE Receptor Heights.

**Model Calculates ANNUAL Averages Only

**This Run Includes: 489 Source(s);   1 Source Group(s); and   154 Receptor(s)

**The Model Assumes A Pollutant Type of: PM_10

**Model Set To Continue RUNning After the Setup Testing.

**Output Options Selected:
         Model Outputs Tables of ANNUAL Averages by Receptor
         Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)
         Model Outputs Separate Summary File of High Ranked Values (SUMMFILE Keyword)

**NOTE: The Following Flags May Appear Following CONC Values: c for Calm Hours
                                                                m for Missing Hours
                                                                b for Both Calm and Missing Hours

**Misc. Inputs: Base Elev. for Pot. Temp. Profile (m MSL) =   175.00 ; Decay Coef. =   0.000   ; Rot. Angle =   0.0
                 Emission Units = GRAMS/SEC   ; Emission Rate Unit Factor =   0.10000E+07
                 Output Units   = MICROGRAMS/M**3

**Approximate Storage Requirements of Model =   3.8 MB of RAM.

**Detailed Error/Message File: Scholl Ops.err
**File for Summary of Results: Scholl Ops.sum

**MODELOPTs: RegDFAULT CONC ELEV

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0000001	0	0.33110E-06	390642.1	3778512.4	247.0	0.00	1.70	1.70	YES	MONTH
L0000002	0	0.33110E-06	390643.4	3778515.8	247.2	0.00	1.70	1.70	YES	MONTH
L0000003	0	0.33110E-06	390644.8	3778519.2	247.4	0.00	1.70	1.70	YES	MONTH
L0000004	0	0.33110E-06	390646.1	3778522.6	247.6	0.00	1.70	1.70	YES	MONTH
L0000005	0	0.33110E-06	390647.5	3778526.0	247.8	0.00	1.70	1.70	YES	MONTH
L0000006	0	0.33110E-06	390648.8	3778529.4	248.0	0.00	1.70	1.70	YES	MONTH
L0000007	0	0.33110E-06	390650.1	3778532.8	248.2	0.00	1.70	1.70	YES	MONTH
L0000008	0	0.33110E-06	390651.5	3778536.2	248.4	0.00	1.70	1.70	YES	MONTH
L0000009	0	0.33110E-06	390652.8	3778539.6	248.6	0.00	1.70	1.70	YES	MONTH
L0000010	0	0.33110E-06	390654.2	3778543.0	248.8	0.00	1.70	1.70	YES	MONTH
L0000011	0	0.33110E-06	390655.5	3778546.4	249.1	0.00	1.70	1.70	YES	MONTH
L0000012	0	0.33110E-06	390656.9	3778549.8	249.2	0.00	1.70	1.70	YES	MONTH
L0000013	0	0.33110E-06	390658.2	3778553.2	249.5	0.00	1.70	1.70	YES	MONTH
L0000014	0	0.33110E-06	390659.5	3778556.6	249.7	0.00	1.70	1.70	YES	MONTH
L0000015	0	0.33110E-06	390660.9	3778560.0	249.9	0.00	1.70	1.70	YES	MONTH
L0000016	0	0.33110E-06	390662.2	3778563.4	250.1	0.00	1.70	1.70	YES	MONTH
L0000017	0	0.33110E-06	390663.6	3778566.8	250.3	0.00	1.70	1.70	YES	MONTH
L0000018	0	0.33110E-06	390664.9	3778570.2	250.5	0.00	1.70	1.70	YES	MONTH
L0000019	0	0.33110E-06	390666.3	3778573.6	250.7	0.00	1.70	1.70	YES	MONTH
L0000020	0	0.33110E-06	390667.6	3778577.0	250.9	0.00	1.70	1.70	YES	MONTH
L0000021	0	0.33110E-06	390669.2	3778580.3	251.1	0.00	1.70	1.70	YES	MONTH
L0000022	0	0.33110E-06	390670.9	3778583.5	251.4	0.00	1.70	1.70	YES	MONTH
L0000023	0	0.33110E-06	390672.7	3778586.8	251.6	0.00	1.70	1.70	YES	MONTH
L0000024	0	0.33110E-06	390674.4	3778590.0	251.9	0.00	1.70	1.70	YES	MONTH
L0000025	0	0.33110E-06	390676.1	3778593.2	252.1	0.00	1.70	1.70	YES	MONTH
L0000026	0	0.33110E-06	390677.9	3778596.4	252.4	0.00	1.70	1.70	YES	MONTH
L0000027	0	0.33110E-06	390679.6	3778599.6	252.6	0.00	1.70	1.70	YES	MONTH
L0000028	0	0.33110E-06	390681.3	3778602.9	252.9	0.00	1.70	1.70	YES	MONTH
L0000029	0	0.33110E-06	390683.1	3778606.1	253.1	0.00	1.70	1.70	YES	MONTH
L0000030	0	0.33110E-06	390684.8	3778609.3	253.4	0.00	1.70	1.70	YES	MONTH
L0000031	0	0.33110E-06	390686.5	3778612.5	253.6	0.00	1.70	1.70	YES	MONTH
L0000032	0	0.33110E-06	390688.3	3778615.7	253.9	0.00	1.70	1.70	YES	MONTH
L0000033	0	0.33110E-06	390690.0	3778619.0	254.1	0.00	1.70	1.70	YES	MONTH
L0000034	0	0.33110E-06	390691.7	3778622.2	254.4	0.00	1.70	1.70	YES	MONTH
L0000035	0	0.33110E-06	390693.5	3778625.4	254.6	0.00	1.70	1.70	YES	MONTH
L0000036	0	0.33110E-06	390695.2	3778628.6	254.9	0.00	1.70	1.70	YES	MONTH
L0000037	0	0.33110E-06	390697.0	3778631.8	255.1	0.00	1.70	1.70	YES	MONTH
L0000038	0	0.33110E-06	390698.7	3778635.1	255.4	0.00	1.70	1.70	YES	MONTH
L0000039	0	0.33110E-06	390700.4	3778638.3	255.6	0.00	1.70	1.70	YES	MONTH
L0000040	0	0.33110E-06	390702.2	3778641.5	255.9	0.00	1.70	1.70	YES	MONTH

**MODELOPTs: RegDFAULT CONC ELEV

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0000041	0	0.33110E-06	390703.9	3778644.7	256.1	0.00	1.70	1.70	YES	MONTH
L0000042	0	0.33110E-06	390705.6	3778647.9	256.4	0.00	1.70	1.70	YES	MONTH
L0000043	0	0.33110E-06	390707.4	3778651.2	256.6	0.00	1.70	1.70	YES	MONTH
L0000044	0	0.33110E-06	390709.5	3778654.2	256.6	0.00	1.70	1.70	YES	MONTH
L0000045	0	0.33110E-06	390711.5	3778657.2	256.5	0.00	1.70	1.70	YES	MONTH
L0000046	0	0.33110E-06	390713.6	3778660.2	256.4	0.00	1.70	1.70	YES	MONTH
L0000047	0	0.33110E-06	390715.7	3778663.2	256.4	0.00	1.70	1.70	YES	MONTH
L0000048	0	0.33110E-06	390717.8	3778666.2	256.3	0.00	1.70	1.70	YES	MONTH
L0000049	0	0.33110E-06	390719.8	3778669.2	256.2	0.00	1.70	1.70	YES	MONTH
L0000050	0	0.33110E-06	390721.9	3778672.2	256.2	0.00	1.70	1.70	YES	MONTH
L0000051	0	0.33110E-06	390724.0	3778675.2	256.1	0.00	1.70	1.70	YES	MONTH
L0000052	0	0.33110E-06	390726.1	3778678.3	256.1	0.00	1.70	1.70	YES	MONTH
L0000053	0	0.33110E-06	390728.1	3778681.3	256.0	0.00	1.70	1.70	YES	MONTH
L0000054	0	0.33110E-06	390730.2	3778684.3	255.9	0.00	1.70	1.70	YES	MONTH
L0000055	0	0.33110E-06	390732.3	3778687.3	255.9	0.00	1.70	1.70	YES	MONTH
L0000056	0	0.33110E-06	390734.4	3778690.3	255.8	0.00	1.70	1.70	YES	MONTH
L0000057	0	0.33110E-06	390736.4	3778693.3	255.8	0.00	1.70	1.70	YES	MONTH
L0000058	0	0.33110E-06	390738.5	3778696.3	255.7	0.00	1.70	1.70	YES	MONTH
L0000059	0	0.33110E-06	390740.6	3778699.3	255.6	0.00	1.70	1.70	YES	MONTH
L0000060	0	0.33110E-06	390742.7	3778702.3	255.6	0.00	1.70	1.70	YES	MONTH
L0000061	0	0.33110E-06	390744.7	3778705.4	255.5	0.00	1.70	1.70	YES	MONTH
L0000062	0	0.33110E-06	390746.8	3778708.4	255.4	0.00	1.70	1.70	YES	MONTH
L0000063	0	0.33110E-06	390748.9	3778711.4	255.4	0.00	1.70	1.70	YES	MONTH
L0000064	0	0.33110E-06	390751.0	3778714.4	255.3	0.00	1.70	1.70	YES	MONTH
L0000065	0	0.33110E-06	390753.1	3778717.4	255.2	0.00	1.70	1.70	YES	MONTH
L0000066	0	0.33110E-06	390755.1	3778720.4	255.2	0.00	1.70	1.70	YES	MONTH
L0000067	0	0.33110E-06	390757.2	3778723.4	255.1	0.00	1.70	1.70	YES	MONTH
L0000068	0	0.33110E-06	390759.3	3778726.4	255.1	0.00	1.70	1.70	YES	MONTH
L0000069	0	0.33110E-06	390761.4	3778729.4	255.0	0.00	1.70	1.70	YES	MONTH
L0000070	0	0.33110E-06	390763.7	3778732.2	255.1	0.00	1.70	1.70	YES	MONTH
L0000071	0	0.33110E-06	390766.0	3778735.1	255.2	0.00	1.70	1.70	YES	MONTH
L0000072	0	0.33110E-06	390768.4	3778737.9	255.2	0.00	1.70	1.70	YES	MONTH
L0000073	0	0.33110E-06	390770.7	3778740.7	255.3	0.00	1.70	1.70	YES	MONTH
L0000074	0	0.33110E-06	390773.0	3778743.6	255.4	0.00	1.70	1.70	YES	MONTH
L0000075	0	0.33110E-06	390775.3	3778746.4	255.5	0.00	1.70	1.70	YES	MONTH
L0000076	0	0.33110E-06	390777.6	3778749.2	255.5	0.00	1.70	1.70	YES	MONTH
L0000077	0	0.33110E-06	390779.9	3778752.1	255.6	0.00	1.70	1.70	YES	MONTH
L0000078	0	0.33110E-06	390782.2	3778754.9	255.7	0.00	1.70	1.70	YES	MONTH
L0000079	0	0.33110E-06	390784.5	3778757.7	255.8	0.00	1.70	1.70	YES	MONTH
L0000080	0	0.33110E-06	390786.9	3778760.6	255.8	0.00	1.70	1.70	YES	MONTH

**MODELOPTs: RegDFAULT CONC ELEV

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0000081	0	0.33110E-06	390789.2	3778763.4	255.9	0.00	1.70	1.70	YES	MONTH
L0000082	0	0.33110E-06	390791.5	3778766.2	256.0	0.00	1.70	1.70	YES	MONTH
L0000083	0	0.33110E-06	390794.0	3778768.9	256.1	0.00	1.70	1.70	YES	MONTH
L0000084	0	0.33110E-06	390796.7	3778771.3	256.3	0.00	1.70	1.70	YES	MONTH
L0000085	0	0.33110E-06	390799.4	3778773.8	256.5	0.00	1.70	1.70	YES	MONTH
L0000086	0	0.33110E-06	390802.1	3778776.3	256.7	0.00	1.70	1.70	YES	MONTH
L0000087	0	0.33110E-06	390804.8	3778778.7	256.9	0.00	1.70	1.70	YES	MONTH
L0000088	0	0.33110E-06	390807.5	3778781.2	257.0	0.00	1.70	1.70	YES	MONTH
L0000089	0	0.33110E-06	390810.2	3778783.6	257.2	0.00	1.70	1.70	YES	MONTH
L0000090	0	0.33110E-06	390813.0	3778786.1	257.4	0.00	1.70	1.70	YES	MONTH
L0000091	0	0.33110E-06	390815.7	3778788.5	257.6	0.00	1.70	1.70	YES	MONTH
L0000092	0	0.33110E-06	390818.4	3778791.0	257.8	0.00	1.70	1.70	YES	MONTH
L0000093	0	0.33110E-06	390821.1	3778793.5	257.9	0.00	1.70	1.70	YES	MONTH
L0000094	0	0.33110E-06	390823.8	3778795.9	258.1	0.00	1.70	1.70	YES	MONTH
L0000095	0	0.33110E-06	390826.5	3778798.4	258.3	0.00	1.70	1.70	YES	MONTH
L0000096	0	0.33110E-06	390829.2	3778800.9	258.6	0.00	1.70	1.70	YES	MONTH
L0000097	0	0.33110E-06	390831.8	3778803.4	259.1	0.00	1.70	1.70	YES	MONTH
L0000098	0	0.33110E-06	390834.4	3778806.0	259.6	0.00	1.70	1.70	YES	MONTH
L0000099	0	0.33110E-06	390837.0	3778808.6	260.0	0.00	1.70	1.70	YES	MONTH
L0000100	0	0.33110E-06	390839.6	3778811.1	260.5	0.00	1.70	1.70	YES	MONTH
L0000101	0	0.33110E-06	390842.2	3778813.7	261.0	0.00	1.70	1.70	YES	MONTH
L0000102	0	0.33110E-06	390844.8	3778816.3	261.5	0.00	1.70	1.70	YES	MONTH
L0000103	0	0.33110E-06	390847.4	3778818.8	262.0	0.00	1.70	1.70	YES	MONTH
L0000104	0	0.33110E-06	390850.0	3778821.4	262.4	0.00	1.70	1.70	YES	MONTH
L0000105	0	0.33110E-06	390852.6	3778823.9	262.9	0.00	1.70	1.70	YES	MONTH
L0000106	0	0.33110E-06	390855.3	3778826.5	263.4	0.00	1.70	1.70	YES	MONTH
L0000107	0	0.33110E-06	390857.8	3778829.1	263.9	0.00	1.70	1.70	YES	MONTH
L0000108	0	0.33110E-06	390860.2	3778831.9	263.9	0.00	1.70	1.70	YES	MONTH
L0000109	0	0.33110E-06	390862.5	3778834.8	264.1	0.00	1.70	1.70	YES	MONTH
L0000110	0	0.33110E-06	390864.8	3778837.6	264.2	0.00	1.70	1.70	YES	MONTH
L0000111	0	0.33110E-06	390867.1	3778840.4	264.2	0.00	1.70	1.70	YES	MONTH
L0000112	0	0.33110E-06	390869.4	3778843.2	264.3	0.00	1.70	1.70	YES	MONTH
L0000113	0	0.33110E-06	390871.7	3778846.1	264.4	0.00	1.70	1.70	YES	MONTH
L0000114	0	0.33110E-06	390874.1	3778848.9	264.5	0.00	1.70	1.70	YES	MONTH
L0000115	0	0.33110E-06	390876.4	3778851.7	264.6	0.00	1.70	1.70	YES	MONTH
L0000116	0	0.33110E-06	390878.7	3778854.6	264.7	0.00	1.70	1.70	YES	MONTH
L0000117	0	0.33110E-06	390881.0	3778857.4	264.8	0.00	1.70	1.70	YES	MONTH
L0000118	0	0.33110E-06	390883.3	3778860.2	264.9	0.00	1.70	1.70	YES	MONTH
L0000119	0	0.33110E-06	390885.7	3778863.0	265.0	0.00	1.70	1.70	YES	MONTH
L0000120	0	0.33110E-06	390887.3	3778866.2	265.2	0.00	1.70	1.70	YES	MONTH

**MODELOPTs: RegDFAULT CONC ELEV

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0000121	0	0.33110E-06	390888.0	3778869.8	265.3	0.00	1.70	1.70	YES	MONTH
L0000122	0	0.33110E-06	390888.7	3778873.4	265.5	0.00	1.70	1.70	YES	MONTH
L0000123	0	0.33110E-06	390889.4	3778877.0	265.6	0.00	1.70	1.70	YES	MONTH
L0000124	0	0.33110E-06	390890.2	3778880.6	265.8	0.00	1.70	1.70	YES	MONTH
L0000125	0	0.33110E-06	390890.9	3778884.1	265.9	0.00	1.70	1.70	YES	MONTH
L0000126	0	0.33110E-06	390891.6	3778887.7	266.1	0.00	1.70	1.70	YES	MONTH
L0000127	0	0.33110E-06	390891.6	3778891.4	266.6	0.00	1.70	1.70	YES	MONTH
L0000128	0	0.33110E-06	390891.4	3778895.0	267.1	0.00	1.70	1.70	YES	MONTH
L0000129	0	0.33110E-06	390891.2	3778898.7	267.7	0.00	1.70	1.70	YES	MONTH
L0000130	0	0.33110E-06	390891.0	3778902.3	268.3	0.00	1.70	1.70	YES	MONTH
L0000131	0	0.33110E-06	390890.3	3778905.9	268.7	0.00	1.70	1.70	YES	MONTH
L0000132	0	0.33110E-06	390888.9	3778909.2	269.0	0.00	1.70	1.70	YES	MONTH
L0000133	0	0.33110E-06	390887.4	3778912.6	269.3	0.00	1.70	1.70	YES	MONTH
L0000134	0	0.33110E-06	390886.0	3778915.9	269.6	0.00	1.70	1.70	YES	MONTH
L0000135	0	0.33110E-06	390884.5	3778919.3	269.9	0.00	1.70	1.70	YES	MONTH
L0000136	0	0.33110E-06	390883.0	3778922.6	270.1	0.00	1.70	1.70	YES	MONTH
L0000137	0	0.33110E-06	390880.4	3778925.0	269.9	0.00	1.70	1.70	YES	MONTH
L0000138	0	0.33110E-06	390877.5	3778927.3	269.6	0.00	1.70	1.70	YES	MONTH
L0000139	0	0.33110E-06	390874.6	3778929.5	269.2	0.00	1.70	1.70	YES	MONTH
L0000140	0	0.33110E-06	390871.6	3778931.7	268.9	0.00	1.70	1.70	YES	MONTH
L0000141	0	0.33110E-06	390868.7	3778933.9	268.6	0.00	1.70	1.70	YES	MONTH
L0000142	0	0.33110E-06	390865.8	3778936.1	268.3	0.00	1.70	1.70	YES	MONTH
L0000143	0	0.33110E-06	390862.9	3778938.3	267.9	0.00	1.70	1.70	YES	MONTH
L0000144	0	0.33110E-06	390860.0	3778940.5	267.6	0.00	1.70	1.70	YES	MONTH
L0000145	0	0.33110E-06	390857.1	3778942.7	267.3	0.00	1.70	1.70	YES	MONTH
L0000146	0	0.33110E-06	390853.6	3778943.9	267.7	0.00	1.70	1.70	YES	MONTH
L0000147	0	0.33110E-06	390850.2	3778945.1	268.2	0.00	1.70	1.70	YES	MONTH
L0000148	0	0.33110E-06	390846.7	3778946.2	268.6	0.00	1.70	1.70	YES	MONTH
L0000149	0	0.33110E-06	390843.2	3778947.3	269.1	0.00	1.70	1.70	YES	MONTH
L0000150	0	0.33110E-06	390839.7	3778948.4	269.6	0.00	1.70	1.70	YES	MONTH
L0000151	0	0.33110E-06	390836.2	3778949.5	270.1	0.00	1.70	1.70	YES	MONTH
L0000152	0	0.33110E-06	390832.8	3778950.7	270.5	0.00	1.70	1.70	YES	MONTH
L0000153	0	0.33110E-06	390829.3	3778951.8	271.0	0.00	1.70	1.70	YES	MONTH
L0000154	0	0.33110E-06	390825.8	3778952.9	271.5	0.00	1.70	1.70	YES	MONTH
L0000155	0	0.33110E-06	390822.3	3778954.0	271.9	0.00	1.70	1.70	YES	MONTH
L0000156	0	0.33110E-06	390818.8	3778955.2	272.4	0.00	1.70	1.70	YES	MONTH
L0000157	0	0.33110E-06	390815.3	3778956.3	272.9	0.00	1.70	1.70	YES	MONTH
L0000158	0	0.33110E-06	390811.9	3778957.4	273.4	0.00	1.70	1.70	YES	MONTH
L0000159	0	0.33110E-06	390808.4	3778958.5	273.8	0.00	1.70	1.70	YES	MONTH
L0000160	0	0.33110E-06	390804.9	3778959.6	274.3	0.00	1.70	1.70	YES	MONTH

**MODELOPTs: RegDFAULT CONC ELEV

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0000161	0	0.33110E-06	390801.4	3778960.8	274.8	0.00	1.70	1.70	YES	MONTH
L0000162	0	0.33110E-06	390797.9	3778961.9	275.2	0.00	1.70	1.70	YES	MONTH
L0000163	0	0.33110E-06	390794.5	3778963.0	275.7	0.00	1.70	1.70	YES	MONTH
L0000164	0	0.33110E-06	390791.0	3778964.1	276.2	0.00	1.70	1.70	YES	MONTH
L0000165	0	0.33110E-06	390787.5	3778965.2	276.7	0.00	1.70	1.70	YES	MONTH
L0000166	0	0.33110E-06	390784.0	3778966.4	277.1	0.00	1.70	1.70	YES	MONTH
L0000167	0	0.33110E-06	390780.5	3778967.5	277.6	0.00	1.70	1.70	YES	MONTH
L0000168	0	0.33110E-06	390777.0	3778968.6	278.1	0.00	1.70	1.70	YES	MONTH
L0000169	0	0.33110E-06	390773.6	3778969.7	278.6	0.00	1.70	1.70	YES	MONTH
L0000170	0	0.33110E-06	390770.1	3778970.8	279.0	0.00	1.70	1.70	YES	MONTH
L0000171	0	0.33110E-06	390766.6	3778972.0	279.5	0.00	1.70	1.70	YES	MONTH
L0000172	0	0.33110E-06	390763.1	3778973.1	280.0	0.00	1.70	1.70	YES	MONTH
L0000173	0	0.33110E-06	390759.6	3778974.2	280.4	0.00	1.70	1.70	YES	MONTH
L0000174	0	0.33110E-06	390756.2	3778975.3	280.9	0.00	1.70	1.70	YES	MONTH
L0000175	0	0.33110E-06	390752.7	3778976.4	281.4	0.00	1.70	1.70	YES	MONTH
L0000176	0	0.33110E-06	390749.1	3778976.8	281.8	0.00	1.70	1.70	YES	MONTH
L0000177	0	0.33110E-06	390745.6	3778976.1	282.0	0.00	1.70	1.70	YES	MONTH
L0000178	0	0.33110E-06	390742.0	3778975.4	282.3	0.00	1.70	1.70	YES	MONTH
L0000179	0	0.33110E-06	390738.4	3778974.6	282.5	0.00	1.70	1.70	YES	MONTH
L0000180	0	0.33110E-06	390734.8	3778973.9	282.8	0.00	1.70	1.70	YES	MONTH
L0000181	0	0.33110E-06	390731.2	3778973.2	283.0	0.00	1.70	1.70	YES	MONTH
L0000182	0	0.33110E-06	390727.6	3778972.4	283.3	0.00	1.70	1.70	YES	MONTH
L0000183	0	0.33110E-06	390724.1	3778971.7	283.5	0.00	1.70	1.70	YES	MONTH
L0000184	0	0.33110E-06	390720.5	3778971.0	283.8	0.00	1.70	1.70	YES	MONTH
L0000185	0	0.33110E-06	390716.9	3778970.2	284.0	0.00	1.70	1.70	YES	MONTH
L0000186	0	0.33110E-06	390713.3	3778969.5	284.3	0.00	1.70	1.70	YES	MONTH
L0000187	0	0.33110E-06	390709.7	3778968.8	284.5	0.00	1.70	1.70	YES	MONTH
L0000188	0	0.33110E-06	390706.1	3778968.0	284.8	0.00	1.70	1.70	YES	MONTH
L0000189	0	0.33110E-06	390703.0	3778966.4	284.8	0.00	1.70	1.70	YES	MONTH
L0000190	0	0.33110E-06	390700.1	3778964.1	284.6	0.00	1.70	1.70	YES	MONTH
L0000191	0	0.33110E-06	390697.3	3778961.8	284.4	0.00	1.70	1.70	YES	MONTH
L0000192	0	0.33110E-06	390694.5	3778959.5	284.2	0.00	1.70	1.70	YES	MONTH
L0000193	0	0.33110E-06	390691.6	3778957.2	284.1	0.00	1.70	1.70	YES	MONTH
L0000194	0	0.33110E-06	390688.8	3778954.9	283.9	0.00	1.70	1.70	YES	MONTH
L0000195	0	0.33110E-06	390686.0	3778952.6	283.7	0.00	1.70	1.70	YES	MONTH
L0000196	0	0.33110E-06	390683.1	3778950.3	283.6	0.00	1.70	1.70	YES	MONTH
L0000197	0	0.33110E-06	390680.3	3778947.9	283.4	0.00	1.70	1.70	YES	MONTH
L0000198	0	0.33110E-06	390677.5	3778945.6	283.2	0.00	1.70	1.70	YES	MONTH
L0000199	0	0.33110E-06	390674.6	3778943.3	283.1	0.00	1.70	1.70	YES	MONTH
L0000200	0	0.33110E-06	390672.1	3778940.7	283.1	0.00	1.70	1.70	YES	MONTH

**MODELOPTs: RegDFAULT CONC ELEV

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0000201	0	0.33110E-06	390670.0	3778937.8	283.4	0.00	1.70	1.70	YES	MONTH
L0000202	0	0.33110E-06	390667.8	3778934.8	283.7	0.00	1.70	1.70	YES	MONTH
L0000203	0	0.33110E-06	390665.7	3778931.8	284.1	0.00	1.70	1.70	YES	MONTH
L0000204	0	0.33110E-06	390663.6	3778928.8	284.4	0.00	1.70	1.70	YES	MONTH
L0000205	0	0.33110E-06	390661.5	3778925.8	284.7	0.00	1.70	1.70	YES	MONTH
L0000206	0	0.33110E-06	390659.3	3778922.9	285.0	0.00	1.70	1.70	YES	MONTH
L0000207	0	0.33110E-06	390657.2	3778919.9	285.3	0.00	1.70	1.70	YES	MONTH
L0000208	0	0.33110E-06	390655.1	3778916.9	285.7	0.00	1.70	1.70	YES	MONTH
L0000209	0	0.33110E-06	390653.0	3778913.9	286.0	0.00	1.70	1.70	YES	MONTH
L0000210	0	0.33110E-06	390650.8	3778911.0	286.3	0.00	1.70	1.70	YES	MONTH
L0000211	0	0.33110E-06	390649.0	3778907.8	286.6	0.00	1.70	1.70	YES	MONTH
L0000212	0	0.33110E-06	390647.7	3778904.4	286.7	0.00	1.70	1.70	YES	MONTH
L0000213	0	0.33110E-06	390646.5	3778901.0	286.9	0.00	1.70	1.70	YES	MONTH
L0000214	0	0.33110E-06	390645.2	3778897.5	287.1	0.00	1.70	1.70	YES	MONTH
L0000215	0	0.33110E-06	390643.9	3778894.1	287.2	0.00	1.70	1.70	YES	MONTH
L0000216	0	0.33110E-06	390642.7	3778890.7	287.4	0.00	1.70	1.70	YES	MONTH
L0000217	0	0.33110E-06	390641.4	3778887.2	287.6	0.00	1.70	1.70	YES	MONTH
L0000218	0	0.33110E-06	390640.1	3778883.8	287.7	0.00	1.70	1.70	YES	MONTH
L0000219	0	0.33110E-06	390638.9	3778880.4	287.9	0.00	1.70	1.70	YES	MONTH
L0000220	0	0.33110E-06	390637.6	3778876.9	288.1	0.00	1.70	1.70	YES	MONTH
L0000221	0	0.33110E-06	390636.3	3778873.5	288.2	0.00	1.70	1.70	YES	MONTH
L0000222	0	0.33110E-06	390635.1	3778870.1	288.4	0.00	1.70	1.70	YES	MONTH
L0000223	0	0.33110E-06	390633.8	3778866.7	288.6	0.00	1.70	1.70	YES	MONTH
L0000224	0	0.33110E-06	390632.5	3778863.2	288.7	0.00	1.70	1.70	YES	MONTH
L0000225	0	0.33110E-06	390631.3	3778859.8	288.9	0.00	1.70	1.70	YES	MONTH
L0000226	0	0.33110E-06	390630.0	3778856.4	289.1	0.00	1.70	1.70	YES	MONTH
L0000227	0	0.33110E-06	390628.8	3778852.9	289.2	0.00	1.70	1.70	YES	MONTH
L0000228	0	0.33110E-06	390627.5	3778849.5	289.4	0.00	1.70	1.70	YES	MONTH
L0000229	0	0.33110E-06	390626.2	3778846.1	289.6	0.00	1.70	1.70	YES	MONTH
L0000230	0	0.33110E-06	390625.0	3778842.6	289.7	0.00	1.70	1.70	YES	MONTH
L0000231	0	0.33110E-06	390623.7	3778839.2	289.9	0.00	1.70	1.70	YES	MONTH
L0000232	0	0.33110E-06	390622.4	3778835.8	290.1	0.00	1.70	1.70	YES	MONTH
L0000233	0	0.33110E-06	390621.2	3778832.3	290.2	0.00	1.70	1.70	YES	MONTH
L0000234	0	0.33110E-06	390619.9	3778828.9	290.4	0.00	1.70	1.70	YES	MONTH
L0000235	0	0.33110E-06	390617.3	3778826.3	290.9	0.00	1.70	1.70	YES	MONTH
L0000236	0	0.33110E-06	390614.7	3778823.7	291.4	0.00	1.70	1.70	YES	MONTH
L0000237	0	0.33110E-06	390612.1	3778821.1	291.8	0.00	1.70	1.70	YES	MONTH
L0000238	0	0.33110E-06	390609.6	3778818.5	292.3	0.00	1.70	1.70	YES	MONTH
L0000239	0	0.33110E-06	390607.0	3778815.9	292.8	0.00	1.70	1.70	YES	MONTH
L0000240	0	0.33110E-06	390604.4	3778813.3	293.3	0.00	1.70	1.70	YES	MONTH

**MODELOPTs: RegDFAULT CONC ELEV

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0000241	0	0.33110E-06	390601.9	3778810.7	293.8	0.00	1.70	1.70	YES	MONTH
L0000242	0	0.33110E-06	390599.3	3778808.1	294.2	0.00	1.70	1.70	YES	MONTH
L0000243	0	0.33110E-06	390596.0	3778806.9	294.5	0.00	1.70	1.70	YES	MONTH
L0000244	0	0.33110E-06	390592.4	3778806.3	294.7	0.00	1.70	1.70	YES	MONTH
L0000245	0	0.33110E-06	390588.8	3778805.7	294.8	0.00	1.70	1.70	YES	MONTH
L0000246	0	0.33110E-06	390585.2	3778805.1	295.0	0.00	1.70	1.70	YES	MONTH
L0000247	0	0.33110E-06	390581.6	3778804.5	295.1	0.00	1.70	1.70	YES	MONTH
L0000248	0	0.33110E-06	390578.0	3778803.9	295.3	0.00	1.70	1.70	YES	MONTH
L0000249	0	0.33110E-06	390574.4	3778803.4	295.5	0.00	1.70	1.70	YES	MONTH
L0000250	0	0.33110E-06	390570.7	3778802.8	295.6	0.00	1.70	1.70	YES	MONTH
L0000251	0	0.33110E-06	390567.2	3778803.2	295.8	0.00	1.70	1.70	YES	MONTH
L0000252	0	0.33110E-06	390563.8	3778804.4	295.9	0.00	1.70	1.70	YES	MONTH
L0000253	0	0.33110E-06	390560.3	3778805.6	296.1	0.00	1.70	1.70	YES	MONTH
L0000254	0	0.33110E-06	390556.9	3778806.8	296.2	0.00	1.70	1.70	YES	MONTH
L0000255	0	0.33110E-06	390553.4	3778808.0	296.4	0.00	1.70	1.70	YES	MONTH
L0000256	0	0.33110E-06	390549.9	3778809.1	296.6	0.00	1.70	1.70	YES	MONTH
L0000257	0	0.33110E-06	390546.5	3778810.3	296.7	0.00	1.70	1.70	YES	MONTH
L0000258	0	0.33110E-06	390543.0	3778811.5	296.9	0.00	1.70	1.70	YES	MONTH
L0000259	0	0.33110E-06	390539.6	3778812.7	297.0	0.00	1.70	1.70	YES	MONTH
L0000260	0	0.33110E-06	390536.7	3778814.8	297.4	0.00	1.70	1.70	YES	MONTH
L0000261	0	0.33110E-06	390534.3	3778817.6	297.9	0.00	1.70	1.70	YES	MONTH
L0000262	0	0.33110E-06	390531.9	3778820.3	298.4	0.00	1.70	1.70	YES	MONTH
L0000263	0	0.33110E-06	390529.5	3778823.1	298.9	0.00	1.70	1.70	YES	MONTH
L0000264	0	0.33110E-06	390527.1	3778825.8	299.4	0.00	1.70	1.70	YES	MONTH
L0000265	0	0.33110E-06	390524.7	3778828.6	299.9	0.00	1.70	1.70	YES	MONTH
L0000266	0	0.33110E-06	390522.3	3778831.3	300.4	0.00	1.70	1.70	YES	MONTH
L0000267	0	0.33110E-06	390519.9	3778834.1	300.9	0.00	1.70	1.70	YES	MONTH
L0000268	0	0.33110E-06	390518.1	3778837.2	301.4	0.00	1.70	1.70	YES	MONTH
L0000269	0	0.33110E-06	390517.5	3778840.8	301.9	0.00	1.70	1.70	YES	MONTH
L0000270	0	0.33110E-06	390516.8	3778844.4	302.3	0.00	1.70	1.70	YES	MONTH
L0000271	0	0.33110E-06	390516.2	3778848.0	302.8	0.00	1.70	1.70	YES	MONTH
L0000272	0	0.33110E-06	390515.5	3778851.6	303.2	0.00	1.70	1.70	YES	MONTH
L0000273	0	0.33110E-06	390514.9	3778855.2	303.6	0.00	1.70	1.70	YES	MONTH
L0000274	0	0.33110E-06	390514.3	3778858.8	304.1	0.00	1.70	1.70	YES	MONTH
L0000275	0	0.33110E-06	390513.6	3778862.4	304.5	0.00	1.70	1.70	YES	MONTH
L0000276	0	0.33110E-06	390513.0	3778866.0	304.9	0.00	1.70	1.70	YES	MONTH
L0000277	0	0.33110E-06	390512.4	3778869.6	305.4	0.00	1.70	1.70	YES	MONTH
L0000278	0	0.33110E-06	390511.7	3778873.2	305.8	0.00	1.70	1.70	YES	MONTH
L0000279	0	0.33110E-06	390512.2	3778876.7	306.1	0.00	1.70	1.70	YES	MONTH
L0000280	0	0.33110E-06	390513.1	3778880.2	306.4	0.00	1.70	1.70	YES	MONTH

**MODELOPTs: RegDFAULT CONC ELEV

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0000281	0	0.33110E-06	390514.1	3778883.8	306.7	0.00	1.70	1.70	YES	MONTH
L0000282	0	0.33110E-06	390515.1	3778887.3	306.9	0.00	1.70	1.70	YES	MONTH
L0000283	0	0.33110E-06	390516.1	3778890.8	307.2	0.00	1.70	1.70	YES	MONTH
L0000284	0	0.33110E-06	390517.0	3778894.3	307.5	0.00	1.70	1.70	YES	MONTH
L0000285	0	0.33110E-06	390518.0	3778897.9	307.7	0.00	1.70	1.70	YES	MONTH
L0000286	0	0.33110E-06	390519.0	3778901.4	308.0	0.00	1.70	1.70	YES	MONTH
L0000287	0	0.33110E-06	390520.0	3778904.9	308.3	0.00	1.70	1.70	YES	MONTH
L0000288	0	0.33110E-06	390520.9	3778908.4	308.6	0.00	1.70	1.70	YES	MONTH
L0000289	0	0.33110E-06	390521.9	3778912.0	308.8	0.00	1.70	1.70	YES	MONTH
L0000290	0	0.33110E-06	390522.9	3778915.5	309.1	0.00	1.70	1.70	YES	MONTH
L0000291	0	0.33110E-06	390523.9	3778919.0	309.4	0.00	1.70	1.70	YES	MONTH
L0000292	0	0.33110E-06	390524.8	3778922.6	309.6	0.00	1.70	1.70	YES	MONTH
L0000293	0	0.33110E-06	390525.8	3778926.1	309.9	0.00	1.70	1.70	YES	MONTH
L0000294	0	0.33110E-06	390526.8	3778929.6	310.2	0.00	1.70	1.70	YES	MONTH
L0000295	0	0.33110E-06	390527.8	3778933.1	310.4	0.00	1.70	1.70	YES	MONTH
L0000296	0	0.33110E-06	390528.7	3778936.7	310.7	0.00	1.70	1.70	YES	MONTH
L0000297	0	0.33110E-06	390529.7	3778940.2	311.0	0.00	1.70	1.70	YES	MONTH
L0000298	0	0.33110E-06	390530.7	3778943.7	311.2	0.00	1.70	1.70	YES	MONTH
L0000299	0	0.33110E-06	390531.7	3778947.2	311.5	0.00	1.70	1.70	YES	MONTH
L0000300	0	0.33110E-06	390532.6	3778950.8	311.8	0.00	1.70	1.70	YES	MONTH
L0000301	0	0.33110E-06	390533.6	3778954.3	312.1	0.00	1.70	1.70	YES	MONTH
L0000302	0	0.33110E-06	390534.6	3778957.8	312.3	0.00	1.70	1.70	YES	MONTH
L0000303	0	0.33110E-06	390535.5	3778961.3	312.6	0.00	1.70	1.70	YES	MONTH
L0000304	0	0.33110E-06	390536.5	3778964.9	312.9	0.00	1.70	1.70	YES	MONTH
L0000305	0	0.33110E-06	390537.5	3778968.4	313.1	0.00	1.70	1.70	YES	MONTH
L0000306	0	0.33110E-06	390538.5	3778971.9	313.4	0.00	1.70	1.70	YES	MONTH
L0000307	0	0.33110E-06	390539.4	3778975.4	313.7	0.00	1.70	1.70	YES	MONTH
L0000308	0	0.33110E-06	390540.4	3778979.0	313.9	0.00	1.70	1.70	YES	MONTH
L0000309	0	0.33110E-06	390541.4	3778982.5	314.2	0.00	1.70	1.70	YES	MONTH
L0000310	0	0.33110E-06	390542.4	3778986.0	314.5	0.00	1.70	1.70	YES	MONTH
L0000311	0	0.33110E-06	390543.3	3778989.5	314.8	0.00	1.70	1.70	YES	MONTH
L0000312	0	0.33110E-06	390544.3	3778993.1	315.0	0.00	1.70	1.70	YES	MONTH
L0000313	0	0.33110E-06	390545.3	3778996.6	315.3	0.00	1.70	1.70	YES	MONTH
L0000314	0	0.33110E-06	390546.3	3779000.1	315.6	0.00	1.70	1.70	YES	MONTH
L0000315	0	0.33110E-06	390547.2	3779003.6	315.8	0.00	1.70	1.70	YES	MONTH
L0000316	0	0.33110E-06	390548.2	3779007.2	316.1	0.00	1.70	1.70	YES	MONTH
L0000317	0	0.33110E-06	390549.2	3779010.7	316.4	0.00	1.70	1.70	YES	MONTH
L0000318	0	0.33110E-06	390550.2	3779014.2	316.7	0.00	1.70	1.70	YES	MONTH
L0000319	0	0.33110E-06	390551.1	3779017.7	316.9	0.00	1.70	1.70	YES	MONTH
L0000320	0	0.33110E-06	390552.1	3779021.3	317.2	0.00	1.70	1.70	YES	MONTH

**MODELOPTs: RegDFAULT CONC ELEV

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0000321	0	0.33110E-06	390553.1	3779024.8	317.5	0.00	1.70	1.70	YES	MONTH
L0000322	0	0.33110E-06	390554.1	3779028.3	317.7	0.00	1.70	1.70	YES	MONTH
L0000323	0	0.33110E-06	390555.0	3779031.8	318.0	0.00	1.70	1.70	YES	MONTH
L0000324	0	0.33110E-06	390556.0	3779035.4	318.3	0.00	1.70	1.70	YES	MONTH
L0000325	0	0.33110E-06	390557.0	3779038.9	318.5	0.00	1.70	1.70	YES	MONTH
L0000326	0	0.33110E-06	390557.9	3779042.4	318.8	0.00	1.70	1.70	YES	MONTH
L0000327	0	0.33110E-06	390558.9	3779045.9	319.1	0.00	1.70	1.70	YES	MONTH
L0000328	0	0.33110E-06	390559.9	3779049.5	319.4	0.00	1.70	1.70	YES	MONTH
L0000329	0	0.33110E-06	390560.9	3779053.0	319.6	0.00	1.70	1.70	YES	MONTH
L0000330	0	0.33110E-06	390561.8	3779056.5	319.9	0.00	1.70	1.70	YES	MONTH
L0000331	0	0.33110E-06	390562.8	3779060.0	320.2	0.00	1.70	1.70	YES	MONTH
L0000332	0	0.33110E-06	390563.8	3779063.6	320.4	0.00	1.70	1.70	YES	MONTH
L0000333	0	0.33110E-06	390564.8	3779067.1	320.7	0.00	1.70	1.70	YES	MONTH
L0000334	0	0.33110E-06	390565.7	3779070.6	321.0	0.00	1.70	1.70	YES	MONTH
L0000335	0	0.33110E-06	390566.7	3779074.1	321.2	0.00	1.70	1.70	YES	MONTH
L0000336	0	0.33110E-06	390567.7	3779077.7	321.5	0.00	1.70	1.70	YES	MONTH
L0000337	0	0.33110E-06	390568.7	3779081.2	321.8	0.00	1.70	1.70	YES	MONTH
L0000338	0	0.33110E-06	390569.6	3779084.7	322.1	0.00	1.70	1.70	YES	MONTH
L0000339	0	0.33110E-06	390570.6	3779088.3	322.3	0.00	1.70	1.70	YES	MONTH
L0000340	0	0.33110E-06	390571.6	3779091.8	322.6	0.00	1.70	1.70	YES	MONTH
L0000341	0	0.33110E-06	390572.6	3779095.3	322.9	0.00	1.70	1.70	YES	MONTH
L0000342	0	0.33110E-06	390573.5	3779098.8	323.1	0.00	1.70	1.70	YES	MONTH
L0000343	0	0.33110E-06	390574.5	3779102.4	323.4	0.00	1.70	1.70	YES	MONTH
L0000344	0	0.33110E-06	390575.5	3779105.9	323.7	0.00	1.70	1.70	YES	MONTH
L0000345	0	0.33110E-06	390576.5	3779109.4	323.9	0.00	1.70	1.70	YES	MONTH
L0000346	0	0.33110E-06	390577.4	3779112.9	324.2	0.00	1.70	1.70	YES	MONTH
L0000347	0	0.33110E-06	390578.4	3779116.5	324.5	0.00	1.70	1.70	YES	MONTH
L0000348	0	0.33110E-06	390579.4	3779120.0	324.8	0.00	1.70	1.70	YES	MONTH
L0000349	0	0.33110E-06	390580.3	3779123.5	325.0	0.00	1.70	1.70	YES	MONTH
L0000350	0	0.33110E-06	390581.3	3779127.0	325.3	0.00	1.70	1.70	YES	MONTH
L0000351	0	0.33110E-06	390582.3	3779130.6	325.6	0.00	1.70	1.70	YES	MONTH
L0000352	0	0.33110E-06	390581.6	3779134.2	325.7	0.00	1.70	1.70	YES	MONTH
L0000353	0	0.33110E-06	390581.0	3779137.8	325.9	0.00	1.70	1.70	YES	MONTH
L0000354	0	0.33110E-06	390580.3	3779141.3	326.0	0.00	1.70	1.70	YES	MONTH
L0000355	0	0.33110E-06	390579.6	3779144.9	326.2	0.00	1.70	1.70	YES	MONTH
L0000356	0	0.33110E-06	390579.0	3779148.5	326.3	0.00	1.70	1.70	YES	MONTH
L0000357	0	0.33110E-06	390578.3	3779152.1	326.4	0.00	1.70	1.70	YES	MONTH
L0000358	0	0.33110E-06	390577.6	3779155.7	326.6	0.00	1.70	1.70	YES	MONTH
L0000359	0	0.33110E-06	390577.0	3779159.3	326.7	0.00	1.70	1.70	YES	MONTH
L0000360	0	0.33110E-06	390576.3	3779162.9	326.9	0.00	1.70	1.70	YES	MONTH

**MODELOPTs: RegDFAULT CONC ELEV

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0000361	0	0.33110E-06	390574.6	3779166.2	326.6	0.00	1.70	1.70	YES	MONTH
L0000362	0	0.33110E-06	390572.8	3779169.3	326.3	0.00	1.70	1.70	YES	MONTH
L0000363	0	0.33110E-06	390571.1	3779172.5	326.0	0.00	1.70	1.70	YES	MONTH
L0000364	0	0.33110E-06	390569.3	3779175.7	325.7	0.00	1.70	1.70	YES	MONTH
L0000365	0	0.33110E-06	390567.5	3779178.9	325.4	0.00	1.70	1.70	YES	MONTH
L0000366	0	0.33110E-06	390565.7	3779182.1	325.0	0.00	1.70	1.70	YES	MONTH
L0000367	0	0.33110E-06	390563.9	3779185.3	324.7	0.00	1.70	1.70	YES	MONTH
L0000368	0	0.33110E-06	390562.1	3779188.5	324.4	0.00	1.70	1.70	YES	MONTH
L0000369	0	0.33110E-06	390560.3	3779191.7	324.1	0.00	1.70	1.70	YES	MONTH
L0000370	0	0.33110E-06	390558.5	3779194.9	323.8	0.00	1.70	1.70	YES	MONTH
L0000371	0	0.33110E-06	390556.2	3779197.7	323.7	0.00	1.70	1.70	YES	MONTH
L0000372	0	0.33110E-06	390553.6	3779200.2	323.8	0.00	1.70	1.70	YES	MONTH
L0000373	0	0.33110E-06	390551.0	3779202.8	323.9	0.00	1.70	1.70	YES	MONTH
L0000374	0	0.33110E-06	390548.4	3779205.3	324.0	0.00	1.70	1.70	YES	MONTH
L0000375	0	0.33110E-06	390545.8	3779207.9	324.1	0.00	1.70	1.70	YES	MONTH
L0000376	0	0.33110E-06	390543.1	3779210.4	324.2	0.00	1.70	1.70	YES	MONTH
L0000377	0	0.33110E-06	390540.5	3779213.0	324.2	0.00	1.70	1.70	YES	MONTH
L0000378	0	0.33110E-06	390537.9	3779215.6	324.3	0.00	1.70	1.70	YES	MONTH
L0000379	0	0.33110E-06	390535.3	3779218.1	324.4	0.00	1.70	1.70	YES	MONTH
L0000380	0	0.33110E-06	390532.7	3779220.7	324.5	0.00	1.70	1.70	YES	MONTH
L0000381	0	0.33110E-06	390529.3	3779221.9	324.8	0.00	1.70	1.70	YES	MONTH
L0000382	0	0.33110E-06	390525.8	3779222.8	325.2	0.00	1.70	1.70	YES	MONTH
L0000383	0	0.33110E-06	390522.2	3779223.7	325.5	0.00	1.70	1.70	YES	MONTH
L0000384	0	0.33110E-06	390518.7	3779224.5	325.8	0.00	1.70	1.70	YES	MONTH
L0000385	0	0.33110E-06	390515.1	3779225.4	326.2	0.00	1.70	1.70	YES	MONTH
L0000386	0	0.33110E-06	390511.6	3779226.2	326.5	0.00	1.70	1.70	YES	MONTH
L0000387	0	0.33110E-06	390508.0	3779227.1	326.9	0.00	1.70	1.70	YES	MONTH
L0000388	0	0.33110E-06	390504.5	3779228.0	327.2	0.00	1.70	1.70	YES	MONTH
L0000389	0	0.33110E-06	390500.9	3779228.8	327.5	0.00	1.70	1.70	YES	MONTH
L0000390	0	0.33110E-06	390497.4	3779229.7	327.9	0.00	1.70	1.70	YES	MONTH
L0000391	0	0.33110E-06	390493.8	3779230.6	328.2	0.00	1.70	1.70	YES	MONTH
L0000392	0	0.33110E-06	390490.2	3779231.4	328.6	0.00	1.70	1.70	YES	MONTH
L0000393	0	0.33110E-06	390486.7	3779232.3	328.9	0.00	1.70	1.70	YES	MONTH
L0000394	0	0.33110E-06	390483.1	3779233.2	329.2	0.00	1.70	1.70	YES	MONTH
L0000395	0	0.33110E-06	390479.6	3779234.0	329.6	0.00	1.70	1.70	YES	MONTH
L0000396	0	0.33110E-06	390476.0	3779234.9	329.9	0.00	1.70	1.70	YES	MONTH
L0000397	0	0.33110E-06	390472.5	3779235.8	330.3	0.00	1.70	1.70	YES	MONTH
L0000398	0	0.33110E-06	390468.9	3779236.6	330.6	0.00	1.70	1.70	YES	MONTH
L0000399	0	0.33110E-06	390465.4	3779237.5	330.9	0.00	1.70	1.70	YES	MONTH
L0000400	0	0.33110E-06	390461.8	3779238.4	331.3	0.00	1.70	1.70	YES	MONTH

**MODELOPTs: RegDFAULT CONC ELEV

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0000401	0	0.33110E-06	390458.3	3779239.2	331.6	0.00	1.70	1.70	YES	MONTH
L0000402	0	0.33110E-06	390454.7	3779240.1	332.0	0.00	1.70	1.70	YES	MONTH
L0000403	0	0.33110E-06	390451.1	3779240.9	332.3	0.00	1.70	1.70	YES	MONTH
L0000404	0	0.33110E-06	390447.6	3779241.8	332.7	0.00	1.70	1.70	YES	MONTH
L0000405	0	0.33110E-06	390444.0	3779242.7	333.0	0.00	1.70	1.70	YES	MONTH
L0000406	0	0.33110E-06	390440.5	3779243.5	333.3	0.00	1.70	1.70	YES	MONTH
L0000407	0	0.33110E-06	390436.9	3779244.4	333.7	0.00	1.70	1.70	YES	MONTH
L0000408	0	0.33110E-06	390433.4	3779245.3	334.0	0.00	1.70	1.70	YES	MONTH
L0000409	0	0.33110E-06	390429.8	3779246.1	334.4	0.00	1.70	1.70	YES	MONTH
L0000410	0	0.33110E-06	390426.3	3779247.0	334.7	0.00	1.70	1.70	YES	MONTH
L0000411	0	0.33110E-06	390422.7	3779247.9	335.0	0.00	1.70	1.70	YES	MONTH
L0000412	0	0.33110E-06	390419.2	3779248.7	335.4	0.00	1.70	1.70	YES	MONTH
L0000413	0	0.33110E-06	390415.6	3779249.6	335.7	0.00	1.70	1.70	YES	MONTH
L0000414	0	0.33110E-06	390412.1	3779250.5	336.1	0.00	1.70	1.70	YES	MONTH
L0000415	0	0.33110E-06	390408.5	3779251.3	336.4	0.00	1.70	1.70	YES	MONTH
L0000416	0	0.33110E-06	390405.0	3779252.2	336.8	0.00	1.70	1.70	YES	MONTH
L0000417	0	0.33110E-06	390401.4	3779253.1	337.1	0.00	1.70	1.70	YES	MONTH
L0000418	0	0.33110E-06	390397.8	3779253.9	337.4	0.00	1.70	1.70	YES	MONTH
L0000419	0	0.33110E-06	390394.3	3779254.8	337.8	0.00	1.70	1.70	YES	MONTH
L0000420	0	0.33110E-06	390390.7	3779255.7	338.1	0.00	1.70	1.70	YES	MONTH
L0000421	0	0.33110E-06	390387.2	3779256.5	338.4	0.00	1.70	1.70	YES	MONTH
L0000422	0	0.33110E-06	390383.6	3779257.4	338.8	0.00	1.70	1.70	YES	MONTH
L0000423	0	0.33110E-06	390380.1	3779257.3	338.8	0.00	1.70	1.70	YES	MONTH
L0000424	0	0.33110E-06	390376.5	3779256.3	338.5	0.00	1.70	1.70	YES	MONTH
L0000425	0	0.33110E-06	390373.0	3779255.4	338.3	0.00	1.70	1.70	YES	MONTH
L0000426	0	0.33110E-06	390369.5	3779254.5	338.0	0.00	1.70	1.70	YES	MONTH
L0000427	0	0.33110E-06	390365.9	3779253.5	337.7	0.00	1.70	1.70	YES	MONTH
L0000428	0	0.33110E-06	390362.4	3779252.6	337.4	0.00	1.70	1.70	YES	MONTH
L0000429	0	0.33110E-06	390358.9	3779251.7	337.2	0.00	1.70	1.70	YES	MONTH
L0000430	0	0.33110E-06	390355.3	3779250.7	336.9	0.00	1.70	1.70	YES	MONTH
L0000431	0	0.33110E-06	390351.8	3779249.8	336.6	0.00	1.70	1.70	YES	MONTH
L0000432	0	0.33110E-06	390348.2	3779249.0	337.1	0.00	1.70	1.70	YES	MONTH
L0000433	0	0.33110E-06	390344.7	3779248.1	337.9	0.00	1.70	1.70	YES	MONTH
L0000434	0	0.33110E-06	390341.1	3779247.3	338.6	0.00	1.70	1.70	YES	MONTH
L0000435	0	0.33110E-06	390337.5	3779246.5	339.4	0.00	1.70	1.70	YES	MONTH
L0000436	0	0.33110E-06	390334.0	3779245.6	340.2	0.00	1.70	1.70	YES	MONTH
L0000437	0	0.33110E-06	390330.4	3779244.8	340.9	0.00	1.70	1.70	YES	MONTH
L0000438	0	0.33110E-06	390326.9	3779244.0	341.7	0.00	1.70	1.70	YES	MONTH
L0000439	0	0.33110E-06	390323.3	3779243.1	342.5	0.00	1.70	1.70	YES	MONTH
L0000440	0	0.33110E-06	390319.7	3779242.3	343.2	0.00	1.70	1.70	YES	MONTH

**MODELOPTs: RegDFAULT CONC ELEV

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0000441	0	0.33110E-06	390316.2	3779241.5	344.0	0.00	1.70	1.70	YES	MONTH
L0000442	0	0.33110E-06	390312.6	3779240.6	344.8	0.00	1.70	1.70	YES	MONTH
L0000443	0	0.33110E-06	390309.0	3779240.8	345.6	0.00	1.70	1.70	YES	MONTH
L0000444	0	0.33110E-06	390305.5	3779241.5	346.6	0.00	1.70	1.70	YES	MONTH
L0000445	0	0.33110E-06	390301.9	3779242.2	347.5	0.00	1.70	1.70	YES	MONTH
L0000446	0	0.33110E-06	390298.3	3779243.0	348.4	0.00	1.70	1.70	YES	MONTH
L0000447	0	0.33110E-06	390294.7	3779243.7	349.3	0.00	1.70	1.70	YES	MONTH
L0000448	0	0.33110E-06	390291.1	3779244.4	350.3	0.00	1.70	1.70	YES	MONTH
L0000449	0	0.33110E-06	390287.5	3779245.2	351.2	0.00	1.70	1.70	YES	MONTH
L0000450	0	0.33110E-06	390283.9	3779245.9	352.1	0.00	1.70	1.70	YES	MONTH
L0000451	0	0.33110E-06	390281.1	3779248.1	351.5	0.00	1.70	1.70	YES	MONTH
L0000452	0	0.33110E-06	390278.3	3779250.5	350.7	0.00	1.70	1.70	YES	MONTH
L0000453	0	0.33110E-06	390275.5	3779252.8	349.9	0.00	1.70	1.70	YES	MONTH
L0000454	0	0.33110E-06	390272.7	3779255.2	349.1	0.00	1.70	1.70	YES	MONTH
L0000455	0	0.33110E-06	390269.9	3779257.5	348.3	0.00	1.70	1.70	YES	MONTH
L0000456	0	0.33110E-06	390267.1	3779259.9	347.5	0.00	1.70	1.70	YES	MONTH
L0000457	0	0.33110E-06	390264.3	3779262.3	346.7	0.00	1.70	1.70	YES	MONTH
L0000458	0	0.33110E-06	390261.5	3779264.6	345.9	0.00	1.70	1.70	YES	MONTH
L0000459	0	0.33110E-06	390258.7	3779267.0	345.1	0.00	1.70	1.70	YES	MONTH
L0000460	0	0.33110E-06	390255.9	3779269.3	344.3	0.00	1.70	1.70	YES	MONTH
L0000461	0	0.33110E-06	390253.2	3779271.7	343.5	0.00	1.70	1.70	YES	MONTH
L0000462	0	0.33110E-06	390251.3	3779274.6	343.0	0.00	1.70	1.70	YES	MONTH
L0000463	0	0.33110E-06	390251.0	3779278.2	343.0	0.00	1.70	1.70	YES	MONTH
L0000464	0	0.33110E-06	390250.6	3779281.8	343.0	0.00	1.70	1.70	YES	MONTH
L0000465	0	0.33110E-06	390250.3	3779285.5	343.1	0.00	1.70	1.70	YES	MONTH
L0000466	0	0.33110E-06	390250.0	3779289.1	343.1	0.00	1.70	1.70	YES	MONTH
L0000467	0	0.33110E-06	390249.7	3779292.8	343.1	0.00	1.70	1.70	YES	MONTH
L0000468	0	0.33110E-06	390249.3	3779296.4	343.2	0.00	1.70	1.70	YES	MONTH
L0000469	0	0.33110E-06	390249.0	3779300.1	343.2	0.00	1.70	1.70	YES	MONTH
L0000470	0	0.33110E-06	390248.7	3779303.7	343.2	0.00	1.70	1.70	YES	MONTH
L0000471	0	0.33110E-06	390248.4	3779307.3	343.3	0.00	1.70	1.70	YES	MONTH
L0000472	0	0.33110E-06	390248.0	3779311.0	343.3	0.00	1.70	1.70	YES	MONTH
L0000473	0	0.33110E-06	390247.8	3779314.6	343.3	0.00	1.70	1.70	YES	MONTH
L0000474	0	0.33110E-06	390249.0	3779318.1	342.7	0.00	1.70	1.70	YES	MONTH
L0000475	0	0.33110E-06	390250.2	3779321.5	342.1	0.00	1.70	1.70	YES	MONTH
L0000476	0	0.33110E-06	390251.4	3779325.0	341.6	0.00	1.70	1.70	YES	MONTH
L0000477	0	0.33110E-06	390252.6	3779328.5	341.0	0.00	1.70	1.70	YES	MONTH
L0000478	0	0.33110E-06	390253.8	3779331.9	340.4	0.00	1.70	1.70	YES	MONTH
L0000479	0	0.33110E-06	390254.9	3779335.4	339.8	0.00	1.70	1.70	YES	MONTH
L0000480	0	0.33110E-06	390256.1	3779338.8	339.2	0.00	1.70	1.70	YES	MONTH

**MODELOPTs: RegDFAULT CONC ELEV

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
L0000481	0	0.33110E-06	390257.3	3779342.3	338.7	0.00	1.70	1.70	YES	MONTH
L0000482	0	0.33110E-06	390259.6	3779345.1	339.1	0.00	1.70	1.70	YES	MONTH
L0000483	0	0.33110E-06	390262.2	3779347.6	339.9	0.00	1.70	1.70	YES	MONTH
L0000484	0	0.33110E-06	390264.9	3779350.1	340.8	0.00	1.70	1.70	YES	MONTH
L0000485	0	0.33110E-06	390267.5	3779352.7	341.6	0.00	1.70	1.70	YES	MONTH
L0000486	0	0.33110E-06	390270.1	3779355.2	342.4	0.00	1.70	1.70	YES	MONTH
L0000487	0	0.33110E-06	390272.8	3779357.7	343.2	0.00	1.70	1.70	YES	MONTH
L0000488	0	0.33110E-06	390275.4	3779360.2	344.1	0.00	1.70	1.70	YES	MONTH
L0000489	0	0.33110E-06	390278.1	3779362.8	344.9	0.00	1.70	1.70	YES	MONTH

**MODELOPTs: RegDFAULT CONC ELEV

*** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID	SOURCE IDs
ALL	L0000001 , L0000002 , L0000003 , L0000004 , L0000005 , L0000006 , L0000007 , L0000008 ,
	L0000009 , L0000010 , L0000011 , L0000012 , L0000013 , L0000014 , L0000015 , L0000016 ,
	L0000017 , L0000018 , L0000019 , L0000020 , L0000021 , L0000022 , L0000023 , L0000024 ,
	L0000025 , L0000026 , L0000027 , L0000028 , L0000029 , L0000030 , L0000031 , L0000032 ,
	L0000033 , L0000034 , L0000035 , L0000036 , L0000037 , L0000038 , L0000039 , L0000040 ,
	L0000041 , L0000042 , L0000043 , L0000044 , L0000045 , L0000046 , L0000047 , L0000048 ,
	L0000049 , L0000050 , L0000051 , L0000052 , L0000053 , L0000054 , L0000055 , L0000056 ,
	L0000057 , L0000058 , L0000059 , L0000060 , L0000061 , L0000062 , L0000063 , L0000064 ,
	L0000065 , L0000066 , L0000067 , L0000068 , L0000069 , L0000070 , L0000071 , L0000072 ,
	L0000073 , L0000074 , L0000075 , L0000076 , L0000077 , L0000078 , L0000079 , L0000080 ,
	L0000081 , L0000082 , L0000083 , L0000084 , L0000085 , L0000086 , L0000087 , L0000088 ,
	L0000089 , L0000090 , L0000091 , L0000092 , L0000093 , L0000094 , L0000095 , L0000096 ,
	L0000097 , L0000098 , L0000099 , L0000100 , L0000101 , L0000102 , L0000103 , L0000104 ,
	L0000105 , L0000106 , L0000107 , L0000108 , L0000109 , L0000110 , L0000111 , L0000112 ,
	L0000113 , L0000114 , L0000115 , L0000116 , L0000117 , L0000118 , L0000119 , L0000120 ,
	L0000121 , L0000122 , L0000123 , L0000124 , L0000125 , L0000126 , L0000127 , L0000128 ,
	L0000129 , L0000130 , L0000131 , L0000132 , L0000133 , L0000134 , L0000135 , L0000136 ,
	L0000137 , L0000138 , L0000139 , L0000140 , L0000141 , L0000142 , L0000143 , L0000144 ,
	L0000145 , L0000146 , L0000147 , L0000148 , L0000149 , L0000150 , L0000151 , L0000152 ,
	L0000153 , L0000154 , L0000155 , L0000156 , L0000157 , L0000158 , L0000159 , L0000160 ,

**MODELOPTs: RegDFAULT CONC ELEV

*** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID SOURCE IDs

L0000161 , L0000162 , L0000163 , L0000164 , L0000165 , L0000166 , L0000167 , L0000168 ,
L0000169 , L0000170 , L0000171 , L0000172 , L0000173 , L0000174 , L0000175 , L0000176 ,
L0000177 , L0000178 , L0000179 , L0000180 , L0000181 , L0000182 , L0000183 , L0000184 ,
L0000185 , L0000186 , L0000187 , L0000188 , L0000189 , L0000190 , L0000191 , L0000192 ,
L0000193 , L0000194 , L0000195 , L0000196 , L0000197 , L0000198 , L0000199 , L0000200 ,
L0000201 , L0000202 , L0000203 , L0000204 , L0000205 , L0000206 , L0000207 , L0000208 ,
L0000209 , L0000210 , L0000211 , L0000212 , L0000213 , L0000214 , L0000215 , L0000216 ,
L0000217 , L0000218 , L0000219 , L0000220 , L0000221 , L0000222 , L0000223 , L0000224 ,
L0000225 , L0000226 , L0000227 , L0000228 , L0000229 , L0000230 , L0000231 , L0000232 ,
L0000233 , L0000234 , L0000235 , L0000236 , L0000237 , L0000238 , L0000239 , L0000240 ,
L0000241 , L0000242 , L0000243 , L0000244 , L0000245 , L0000246 , L0000247 , L0000248 ,
L0000249 , L0000250 , L0000251 , L0000252 , L0000253 , L0000254 , L0000255 , L0000256 ,
L0000257 , L0000258 , L0000259 , L0000260 , L0000261 , L0000262 , L0000263 , L0000264 ,
L0000265 , L0000266 , L0000267 , L0000268 , L0000269 , L0000270 , L0000271 , L0000272 ,
L0000273 , L0000274 , L0000275 , L0000276 , L0000277 , L0000278 , L0000279 , L0000280 ,
L0000281 , L0000282 , L0000283 , L0000284 , L0000285 , L0000286 , L0000287 , L0000288 ,
L0000289 , L0000290 , L0000291 , L0000292 , L0000293 , L0000294 , L0000295 , L0000296 ,
L0000297 , L0000298 , L0000299 , L0000300 , L0000301 , L0000302 , L0000303 , L0000304 ,
L0000305 , L0000306 , L0000307 , L0000308 , L0000309 , L0000310 , L0000311 , L0000312 ,
L0000313 , L0000314 , L0000315 , L0000316 , L0000317 , L0000318 , L0000319 , L0000320 ,

**MODELOPTs: RegDFAULT CONC ELEV

*** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID SOURCE IDs

L0000321 , L0000322 , L0000323 , L0000324 , L0000325 , L0000326 , L0000327 , L0000328 ,
L0000329 , L0000330 , L0000331 , L0000332 , L0000333 , L0000334 , L0000335 , L0000336 ,
L0000337 , L0000338 , L0000339 , L0000340 , L0000341 , L0000342 , L0000343 , L0000344 ,
L0000345 , L0000346 , L0000347 , L0000348 , L0000349 , L0000350 , L0000351 , L0000352 ,
L0000353 , L0000354 , L0000355 , L0000356 , L0000357 , L0000358 , L0000359 , L0000360 ,
L0000361 , L0000362 , L0000363 , L0000364 , L0000365 , L0000366 , L0000367 , L0000368 ,
L0000369 , L0000370 , L0000371 , L0000372 , L0000373 , L0000374 , L0000375 , L0000376 ,
L0000377 , L0000378 , L0000379 , L0000380 , L0000381 , L0000382 , L0000383 , L0000384 ,
L0000385 , L0000386 , L0000387 , L0000388 , L0000389 , L0000390 , L0000391 , L0000392 ,
L0000393 , L0000394 , L0000395 , L0000396 , L0000397 , L0000398 , L0000399 , L0000400 ,
L0000401 , L0000402 , L0000403 , L0000404 , L0000405 , L0000406 , L0000407 , L0000408 ,
L0000409 , L0000410 , L0000411 , L0000412 , L0000413 , L0000414 , L0000415 , L0000416 ,
L0000417 , L0000418 , L0000419 , L0000420 , L0000421 , L0000422 , L0000423 , L0000424 ,
L0000425 , L0000426 , L0000427 , L0000428 , L0000429 , L0000430 , L0000431 , L0000432 ,
L0000433 , L0000434 , L0000435 , L0000436 , L0000437 , L0000438 , L0000439 , L0000440 ,
L0000441 , L0000442 , L0000443 , L0000444 , L0000445 , L0000446 , L0000447 , L0000448 ,
L0000449 , L0000450 , L0000451 , L0000452 , L0000453 , L0000454 , L0000455 , L0000456 ,
L0000457 , L0000458 , L0000459 , L0000460 , L0000461 , L0000462 , L0000463 , L0000464 ,
L0000465 , L0000466 , L0000467 , L0000468 , L0000469 , L0000470 , L0000471 , L0000472 ,
L0000473 , L0000474 , L0000475 , L0000476 , L0000477 , L0000478 , L0000479 , L0000480 ,

**MODELOPTs: RegDFAULT CONC ELEV

*** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID	SOURCE IDs
	L0000481 , L0000482 , L0000483 , L0000484 , L0000485 , L0000486 , L0000487 , L0000488 , L0000489 ,

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000001 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000002 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000003 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000004 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000005 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000006 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000007 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000008 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000009 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000010 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000011 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000012 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000013 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000014 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000015 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000016 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000017 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000018 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000019 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000020 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000021 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000022 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000023 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000024 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000025 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000026 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000027 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000028 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000029 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000030 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000031 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000032 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000033 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000034 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000035 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000036 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000037 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000038 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000039 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000040 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000041 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000042 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000043 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000044 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000045 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000046 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000047 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000048 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000049 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000050 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000051 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000052 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000053 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000054 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000055 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000056 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000057 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000058 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000059 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000060 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000061 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000062 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000063 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000064 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000065 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000066 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000067 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000068 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000069 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000070 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000071 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000072 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000073 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000074 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000075 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000076 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000077 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000078 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000079 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000080 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000081 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000082 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000083 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000084 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000085 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000086 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000087 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000088 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000089 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000090 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000091 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000092 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000093 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000094 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000095 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000096 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000097 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000098 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000099 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000100 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000101 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000102 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000103 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000104 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000105 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000106 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000107 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000108 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000109 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000110 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000111 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000112 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000113 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000114 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000115 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000116 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000117 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000118 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000119 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000120 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000121 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000122 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000123 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000124 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000125 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000126 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000127 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000128 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000129 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000130 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000131 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000132 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000133 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000134 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000135 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000136 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000137 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000138 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000139 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000140 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000141 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000142 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000143 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000144 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000145 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000146 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000147 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000148 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000149 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000150 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000151 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000152 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000153 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000154 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000155 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000156 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000157 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000158 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000159 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000160 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000161 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000162 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000163 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000164 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000165 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000166 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000167 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000168 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000169 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000170 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000171 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000172 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000173 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000174 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000175 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000176 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000177 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000178 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000179 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000180 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000181 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000182 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000183 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000184 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000185 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000186 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

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* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000187 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000188 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000189 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000190 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000191 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000192 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

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* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000193 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000194 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000195 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000196 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000197 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000198 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

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* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000199 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000200 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000201 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000202 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000203 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000204 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

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* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000205 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000206 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000207 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000208 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000209 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000210 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

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	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000211 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000212 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000213 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000214 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000215 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000216 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

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* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000217 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000218 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000219 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000220 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000221 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000222 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

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	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000223 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000224 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000225 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000226 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000227 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000228 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

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	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000229 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000230 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000231 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000232 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000233 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000234 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

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* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000235 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000236 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000237 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000238 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000239 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000240 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

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* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000241 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000242 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000243 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000244 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000245 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000246 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

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* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000247 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000248 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000249 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000250 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000251 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000252 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000253 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000254 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000255 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000256 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000257 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000258 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000259 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000260 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000261 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000262 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000263 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000264 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000265 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000266 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000267 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000268 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000269 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000270 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000271 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000272 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000273 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000274 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000275 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000276 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000277 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000278 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000279 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000280 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000281 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000282 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000283 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000284 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000285 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000286 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000287 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000288 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000289 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000290 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000291 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000292 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000293 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000294 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000295 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000296 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000297 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000298 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000299 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000300 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000301 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000302 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000303 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000304 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000305 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000306 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000307 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000308 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000309 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000310 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000311 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000312 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000313 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000314 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000315 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000316 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000317 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000318 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000319 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000320 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000321 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000322 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000323 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000324 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000325 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000326 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000327 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000328 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000329 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000330 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000331 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000332 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000333 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000334 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000335 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000336 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000337 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000338 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000339 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000340 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000341 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000342 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000343 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000344 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000345 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000346 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000347 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000348 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000349 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000350 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000351 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000352 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000353 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000354 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000355 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000356 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000357 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000358 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000359 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000360 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000361 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000362 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000363 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000364 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000365 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000366 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000367 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000368 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000369 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000370 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000371 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000372 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000373 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000374 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000375 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000376 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000377 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000378 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000379 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000380 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000381 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000382 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000383 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000384 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000385 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000386 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000387 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000388 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000389 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000390 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000391 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000392 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000393 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000394 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000395 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000396 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000397 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000398 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000399 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000400 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000401 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000402 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

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* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000403 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000404 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000405 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000406 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000407 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000408 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

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* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000409 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000410 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000411 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000412 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000413 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000414 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

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* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000415 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000416 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000417 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000418 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000419 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000420 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000421 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000422 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000423 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000424 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000425 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000426 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

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* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000427 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000428 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000429 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000430 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000431 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000432 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

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* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000433 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000434 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000435 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000436 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000437 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000438 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000439 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000440 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000441 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000442 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000443 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000444 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000445 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000446 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000447 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000448 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000449 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000450 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000451 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000452 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000453 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000454 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000455 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000456 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000457 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000458 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000459 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000460 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000461 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000462 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000463 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000464 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000465 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000466 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000467 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000468 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC   ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000469 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000470 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000471 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000472 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000473 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000474 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000475 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000476 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000477 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000478 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000479 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000480 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000481 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000482 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000483 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000484 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000485 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000486 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE EMISSION RATE SCALARS WHICH VARY MONTHLY *

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SOURCE ID = L0000487 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000488 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
SOURCE ID = L0000489 ; SOURCE TYPE = VOLUME :	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

**MODELOPTs: RegDFAULT CONC ELEV

*** GRIDDED RECEPTOR NETWORK SUMMARY ***

*** NETWORK ID: UCART1 ; NETWORK TYPE: GRIDCART ***

*** X-COORDINATES OF GRID ***
(METERS)

389850.0, 389950.0, 390050.0, 390150.0, 390250.0, 390350.0, 390450.0, 390550.0, 390650.0, 390750.0,
390850.0, 390950.0, 391050.0, 391150.0, 391250.0,

*** Y-COORDINATES OF GRID ***
(METERS)

3778450.0, 3778550.0, 3778650.0, 3778750.0, 3778850.0, 3778950.0, 3779050.0, 3779150.0, 3779250.0, 3779350.0,

**MODELOPTs: RegDFAULT CONC ELEV

*** NETWORK ID: UCART1 ; NETWORK TYPE: GRIDCART ***

* ELEVATION HEIGHTS IN METERS *

Y-COORD (METERS)	X-COORD (METERS)							
	389850.00	389950.00	390050.00	390150.00	390250.00	390350.00	390450.00	390550.00
390650.00								
3779350.00	350.80	353.20	319.70	324.20	336.60	379.80	374.40	367.80
361.90								
3779250.00	309.00	333.60	298.70	307.40	344.40	340.00	345.80	332.00
351.30								
3779150.00	292.60	294.90	278.70	308.80	316.50	314.60	330.40	319.50
336.00								
3779050.00	264.00	265.30	273.20	308.50	289.00	289.00	289.00	312.20
335.50								
3778950.00	252.10	258.50	263.30	275.40	289.00	294.60	314.50	309.70
290.80								
3778850.00	249.60	258.00	249.50	264.20	266.90	271.50	294.10	304.60
291.30								
3778750.00	242.30	242.70	244.70	253.70	255.60	268.40	267.30	277.00
266.30								
3778650.00	238.00	235.40	242.50	247.50	257.20	263.60	260.20	261.30
259.00								
3778550.00	230.00	233.10	238.80	244.40	254.30	255.70	253.90	254.90
249.60								
3778450.00	226.50	230.00	240.50	244.20	251.70	249.20	246.40	243.50
245.90								

**MODELOPTs: RegDFAULT CONC ELEV

*** NETWORK ID: UCART1 ; NETWORK TYPE: GRIDCART ***

* ELEVATION HEIGHTS IN METERS *

Y-COORD (METERS)	X-COORD (METERS) 390750.00	390850.00	390950.00	391050.00	391150.00	391250.00
3779350.00	339.40	305.30	295.80	326.60	347.90	333.00
3779250.00	310.70	287.00	287.70	320.70	343.50	326.70
3779150.00	298.90	282.20	296.00	315.40	326.20	327.60
3779050.00	305.60	270.30	278.50	286.80	315.30	328.80
3778950.00	279.00	267.60	296.30	313.30	321.80	326.90
3778850.00	266.90	260.10	291.00	341.00	344.10	320.50
3778750.00	256.80	274.10	298.30	308.00	323.20	331.70
3778650.00	253.80	269.70	297.40	292.50	296.20	309.50
3778550.00	247.30	266.40	271.60	293.20	285.00	283.00
3778450.00	250.80	260.90	266.10	267.20	267.20	268.00

**MODELOPTs: RegDFAULT CONC ELEV

*** NETWORK ID: UCART1 ; NETWORK TYPE: GRIDCART ***

* HILL HEIGHT SCALES IN METERS *

Y-COORD (METERS)	X-COORD (METERS)							
	389850.00	389950.00	390050.00	390150.00	390250.00	390350.00	390450.00	390550.00
390650.00								
3779350.00	1422.00	1422.00	1422.00	1422.00	1422.00	576.00	1422.00	1422.00
1422.00								
3779250.00	1422.00	1422.00	1422.00	1422.00	1422.00	1422.00	1422.00	1422.00
1422.00								
3779150.00	1422.00	1422.00	1422.00	1422.00	1422.00	1422.00	1422.00	1422.00
1422.00								
3779050.00	1422.00	1422.00	1422.00	1422.00	1422.00	1422.00	1422.00	1422.00
1422.00								
3778950.00	1422.00	1422.00	1422.00	1422.00	1422.00	1422.00	1422.00	1422.00
1422.00								
3778850.00	1422.00	1422.00	1422.00	1422.00	1422.00	1422.00	1422.00	1422.00
1422.00								
3778750.00	1422.00	1422.00	1422.00	1422.00	1422.00	1422.00	1422.00	1422.00
1422.00								
3778650.00	1422.00	1422.00	1422.00	1422.00	1422.00	1422.00	1422.00	1422.00
1422.00								
3778550.00	1422.00	1422.00	1422.00	1422.00	1422.00	1422.00	1422.00	1422.00
1422.00								
3778450.00	1422.00	1422.00	1422.00	1422.00	1422.00	1422.00	1422.00	1422.00
1422.00								

**MODELOPTs: RegDFAULT CONC ELEV

*** NETWORK ID: UCART1 ; NETWORK TYPE: GRIDCART ***

* HILL HEIGHT SCALES IN METERS *

Y-COORD (METERS)	X-COORD (METERS) 390750.00	390850.00	390950.00	391050.00	391150.00	391250.00
3779350.00	1422.00	1422.00	1422.00	1422.00	1422.00	1422.00
3779250.00	1422.00	1422.00	1422.00	1422.00	1422.00	1422.00
3779150.00	1422.00	1422.00	1422.00	1422.00	1422.00	1422.00
3779050.00	1422.00	1422.00	1422.00	1422.00	1422.00	1422.00
3778950.00	1422.00	1422.00	1422.00	1422.00	1422.00	1422.00
3778850.00	1422.00	1422.00	1422.00	1422.00	1422.00	1422.00
3778750.00	1422.00	1422.00	1422.00	1422.00	1422.00	1422.00
3778650.00	1422.00	1422.00	1422.00	1422.00	1422.00	1422.00
3778550.00	1422.00	1422.00	1422.00	1422.00	1422.00	1422.00
3778450.00	1422.00	1422.00	1422.00	1422.00	1422.00	1422.00

**MODELOPTs: RegDFAULT CONC ELEV

*** DISCRETE CARTESIAN RECEPTORS ***
(X-COORD, Y-COORD, ZELEV, ZHILL, ZFLAG)
(METERS)

(	390707.0,	3778721.0,	259.5,	1422.0,	0.0);	(	390886.0,	3778796.0,	280.0,	1422.0,	0.0);
(	390875.0,	3778881.0,	264.7,	1422.0,	0.0);	(	390636.0,	3778559.0,	251.3,	1422.0,	0.0);

**MODELOPTs: RegDFAULT CONC ELEV

* SOURCE-RECEPTOR COMBINATIONS FOR WHICH CALCULATIONS MAY NOT BE PERFORMED *
LESS THAN 1.0 METER; WITHIN OPENPIT; OR BEYOND 80KM FOR FASTAREA/FASTALL

SOURCE ID	- - RECEPTOR LOCATION - - XR (METERS)	YR (METERS)	DISTANCE (METERS)
L0000431	390350.0	3779250.0	-1.86
L0000432	390350.0	3779250.0	-1.60

*** METEOROLOGICAL DAYS SELECTED FOR PROCESSING ***
(1=YES; 0=NO)

```
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
```

NOTE: METEOROLOGICAL DATA ACTUALLY PROCESSED WILL ALSO DEPEND ON WHAT IS INCLUDED IN THE DATA FILE.

*** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***
(METERS/SEC)

1.54, 3.09, 5.14, 8.23, 10.80,

**MODELOPTs: RegDFAULT CONC ELEV

*** UP TO THE FIRST 24 HOURS OF METEOROLOGICAL DATA ***

Surface file: ..\burk6.sfc Met Version: 12345
Profile file: ..\burk6.PFL
Surface format: FREE
Profile format: FREE
Surface station no.: 0 Upper air station no.: 3190
Name: BURBANK Name: UNKNOWN
Year: 2005 Year: 2005

First 24 hours of scalar data

YR	MO	DY	JDY	HR	H0	U*	W*	DT/DZ	ZICNV	ZIMCH	M-O LEN	Z0	BOWEN	ALBEDO	REF WS	WD	HT	REF TA	HT
05	01	01	1	01	-3.2	0.063	-9.000	-9.000	-999.	37.	7.1	0.53	1.00	1.00	0.90	285.	9.1	279.9	5.5
05	01	01	1	02	-2.6	0.063	-9.000	-9.000	-999.	37.	8.7	0.53	1.00	1.00	0.90	277.	9.1	279.9	5.5
05	01	01	1	03	-2.6	0.063	-9.000	-9.000	-999.	37.	8.7	0.53	1.00	1.00	0.90	335.	9.1	279.2	5.5
05	01	01	1	04	-2.6	0.063	-9.000	-9.000	-999.	37.	8.6	0.53	1.00	1.00	0.90	291.	9.1	278.8	5.5
05	01	01	1	05	-3.0	0.063	-9.000	-9.000	-999.	37.	7.4	0.53	1.00	1.00	0.90	334.	9.1	278.1	5.5
05	01	01	1	06	-0.5	0.028	-9.000	-9.000	-999.	11.	3.8	0.53	1.00	1.00	0.40	309.	9.1	278.8	5.5
05	01	01	1	07	-2.6	0.063	-9.000	-9.000	-999.	37.	8.6	0.53	1.00	1.00	0.90	313.	9.1	278.8	5.5
05	01	01	1	08	-0.4	0.028	-9.000	-9.000	-999.	11.	4.5	0.53	1.00	0.56	0.40	256.	9.1	279.2	5.5
05	01	01	1	09	0.1	0.128	0.022	0.005	4.	105.	-1838.7	0.53	1.00	0.33	0.90	298.	9.1	282.5	5.5
05	01	01	1	10	0.1	0.128	0.025	0.005	5.	105.	-1838.7	0.53	1.00	0.25	0.90	103.	9.1	286.4	5.5
05	01	01	1	11	0.1	0.310	0.027	0.005	7.	397.	-8888.0	0.53	1.00	0.22	2.20	136.	9.1	287.0	5.5
05	01	01	1	12	0.1	0.310	0.028	0.005	8.	397.	-8888.0	0.53	1.00	0.21	2.20	152.	9.1	287.0	5.5
05	01	01	1	13	0.1	0.254	0.029	0.005	9.	295.	-8888.0	0.53	1.00	0.21	1.80	187.	9.1	285.9	5.5
05	01	01	1	14	0.1	0.184	0.030	0.005	9.	182.	-5471.6	0.53	1.00	0.22	1.30	157.	9.1	287.0	5.5
05	01	01	1	15	0.1	0.184	0.031	0.005	10.	181.	-5471.6	0.53	1.00	0.26	1.30	192.	9.1	286.4	5.5
05	01	01	1	16	0.1	0.254	0.031	0.005	11.	294.	-8888.0	0.53	1.00	0.34	1.80	188.	9.1	285.9	5.5
05	01	01	1	17	-4.9	0.092	-9.000	-9.000	-999.	88.	13.8	0.53	1.00	0.61	1.30	200.	9.1	285.4	5.5
05	01	01	1	18	-2.6	0.063	-9.000	-9.000	-999.	37.	8.7	0.53	1.00	1.00	0.90	162.	9.1	284.9	5.5
05	01	01	1	19	-3.0	0.063	-9.000	-9.000	-999.	37.	7.5	0.53	1.00	1.00	0.90	176.	9.1	284.9	5.5
05	01	01	1	20	-0.4	0.028	-9.000	-9.000	-999.	11.	4.5	0.53	1.00	1.00	0.40	210.	9.1	284.2	5.5
05	01	01	1	21	-0.4	0.028	-9.000	-9.000	-999.	11.	4.5	0.53	1.00	1.00	0.40	236.	9.1	284.2	5.5
05	01	01	1	22	-0.4	0.028	-9.000	-9.000	-999.	11.	4.5	0.53	1.00	1.00	0.40	272.	9.1	283.8	5.5
05	01	01	1	23	-0.4	0.028	-9.000	-9.000	-999.	11.	4.5	0.53	1.00	1.00	0.40	251.	9.1	283.1	5.5
05	01	01	1	24	-0.4	0.028	-9.000	-9.000	-999.	11.	4.5	0.53	1.00	1.00	0.40	301.	9.1	282.5	5.5

First hour of profile data

YR	MO	DY	HR	HEIGHT	F	WDIR	WSPD	AMB_TMP	sigmaA	sigmaW	sigmaV
05	01	01	01	5.5	0	-999.	-99.00	279.9	99.0	-99.00	-99.00
05	01	01	01	9.1	1	285.	0.90	-999.0	99.0	-99.00	-99.00

F indicates top of profile (=1) or below (=0)

**MODELOPTs: RegDFAULT CONC ELEV

*** THE ANNUAL AVERAGE CONCENTRATION VALUES AVERAGED OVER 5 YEARS FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): L0000001 , L0000002 , L0000003 , L0000004 , L0000005 ,
L0000006 , L0000007 , L0000008 , L0000009 , L0000010 , L0000011 , L0000012 , L0000013 ,
L0000014 , L0000015 , L0000016 , L0000017 , L0000018 , L0000019 , L0000020 , L0000021 ,
L0000022 , L0000023 , L0000024 , L0000025 , L0000026 , L0000027 , L0000028 , . . . ,

*** NETWORK ID: UCART1 ; NETWORK TYPE: GRIDCART ***

** CONC OF PM_10 IN MICROGRAMS/M**3 **

Y-COORD (METERS)	X-COORD (METERS)							
	389850.00	389950.00	390050.00	390150.00	390250.00	390350.00	390450.00	390550.00	390650.00
3779350.00	0.00003	0.00004	0.00004	0.00006	0.00045	0.00009	0.00005	0.00003	0.00002
3779250.00	0.00002	0.00004	0.00004	0.00007	0.00037	0.00083	0.00051	0.00019	0.00004
3779150.00	0.00002	0.00003	0.00003	0.00006	0.00009	0.00011	0.00016	0.00031	0.00009
3779050.00	0.00002	0.00002	0.00003	0.00005	0.00005	0.00007	0.00011	0.00059	0.00014
3778950.00	0.00001	0.00002	0.00002	0.00004	0.00005	0.00007	0.00015	0.00046	0.00032
3778850.00	0.00001	0.00001	0.00002	0.00003	0.00004	0.00006	0.00013	0.00033	0.00039
3778750.00	0.00001	0.00001	0.00002	0.00002	0.00003	0.00005	0.00008	0.00014	0.00015
3778650.00	0.00001	0.00001	0.00001	0.00002	0.00002	0.00004	0.00005	0.00009	0.00016
3778550.00	0.00001	0.00001	0.00001	0.00002	0.00002	0.00003	0.00004	0.00006	0.00084
3778450.00	0.00001	0.00001	0.00001	0.00001	0.00002	0.00002	0.00003	0.00004	0.00006

**MODELOPTs: RegDFAULT CONC ELEV

*** THE ANNUAL AVERAGE CONCENTRATION VALUES AVERAGED OVER 5 YEARS FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): L0000001 , L0000002 , L0000003 , L0000004 , L0000005 ,
L0000006 , L0000007 , L0000008 , L0000009 , L0000010 , L0000011 , L0000012 , L0000013 ,
L0000014 , L0000015 , L0000016 , L0000017 , L0000018 , L0000019 , L0000020 , L0000021 ,
L0000022 , L0000023 , L0000024 , L0000025 , L0000026 , L0000027 , L0000028 , . . . ,

*** NETWORK ID: UCART1 ; NETWORK TYPE: GRIDCART ***

** CONC OF PM_10 IN MICROGRAMS/M**3 **

Y-COORD (METERS)	X-COORD (METERS) 390750.00	390850.00	390950.00	391050.00	391150.00	391250.00
3779350.00	0.00002	0.00002	0.00002	0.00001	0.00001	0.00001
3779250.00	0.00004	0.00003	0.00002	0.00001	0.00001	0.00001
3779150.00	0.00006	0.00005	0.00003	0.00002	0.00001	0.00001
3779050.00	0.00011	0.00009	0.00005	0.00002	0.00001	0.00001
3778950.00	0.00037	0.00106	0.00004	0.00002	0.00001	0.00001
3778850.00	0.00016	0.00038	0.00005	0.00001	0.00001	0.00001
3778750.00	0.00035	0.00009	0.00003	0.00002	0.00001	0.00001
3778650.00	0.00022	0.00005	0.00002	0.00002	0.00001	0.00001
3778550.00	0.00009	0.00004	0.00002	0.00001	0.00001	0.00001
3778450.00	0.00004	0.00003	0.00002	0.00002	0.00001	0.00001

**MODELOPTs: RegDFAULT CONC ELEV

*** THE ANNUAL AVERAGE CONCENTRATION VALUES AVERAGED OVER 5 YEARS FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): L0000001 , L0000002 , L0000003 , L0000004 , L0000005 ,
L0000006 , L0000007 , L0000008 , L0000009 , L0000010 , L0000011 , L0000012 , L0000013 ,
L0000014 , L0000015 , L0000016 , L0000017 , L0000018 , L0000019 , L0000020 , L0000021 ,
L0000022 , L0000023 , L0000024 , L0000025 , L0000026 , L0000027 , L0000028 , . . . ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF PM_10 IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC
390707.00	3778721.00	0.00022	390886.00	3778796.00	0.00008
390875.00	3778881.00	0.00051	390636.00	3778559.00	0.00028

**MODELOPTs: RegDFAULT CONC ELEV

*** THE SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 5 YEARS ***

** CONC OF PM_10 IN MICROGRAMS/M**3 **

GROUP ID	AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	NETWORK GRID-ID
ALL	1ST HIGHEST VALUE IS	0.00106 AT (390850.00, 3778950.00, 267.60, 1422.00, 0.00)	GC	UCART1
	2ND HIGHEST VALUE IS	0.00084 AT (390650.00, 3778550.00, 249.60, 1422.00, 0.00)	GC	UCART1
	3RD HIGHEST VALUE IS	0.00083 AT (390350.00, 3779250.00, 340.00, 1422.00, 0.00)	GC	UCART1
	4TH HIGHEST VALUE IS	0.00059 AT (390550.00, 3779050.00, 312.20, 1422.00, 0.00)	GC	UCART1
	5TH HIGHEST VALUE IS	0.00051 AT (390875.00, 3778881.00, 264.65, 1422.00, 0.00)	DC	
	6TH HIGHEST VALUE IS	0.00051 AT (390450.00, 3779250.00, 345.80, 1422.00, 0.00)	GC	UCART1
	7TH HIGHEST VALUE IS	0.00046 AT (390550.00, 3778950.00, 309.70, 1422.00, 0.00)	GC	UCART1
	8TH HIGHEST VALUE IS	0.00045 AT (390250.00, 3779350.00, 336.60, 1422.00, 0.00)	GC	UCART1
	9TH HIGHEST VALUE IS	0.00039 AT (390650.00, 3778850.00, 291.30, 1422.00, 0.00)	GC	UCART1
	10TH HIGHEST VALUE IS	0.00038 AT (390850.00, 3778850.00, 260.10, 1422.00, 0.00)	GC	UCART1

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR

**MODELOPTs: RegDFAULT CONC   ELEV

*** Message Summary : AERMOD Model Execution ***

 --------- Summary of Total Messages --------

A Total of   0 Fatal Error Message(s)
A Total of   6 Warning Message(s)
A Total of   889 Informational Message(s)

A Total of   43824 Hours Were Processed

A Total of   0 Calm Hours Identified

A Total of   889 Missing Hours Identified (2.03 Percent)

   ******** FATAL ERROR MESSAGES ********
              *** NONE ***

   ********   WARNING MESSAGES   ********
MX W420   35935 METQA:Wind Speed Out-of-Range.   KURDAT =   09020607
MX W432   35935 METQA:Friction Velocity Out-of-Range.   KURDAT =   09020607
MX W420   43325 METQA:Wind Speed Out-of-Range.   KURDAT =   09121105
MX W432   43325 METQA:Friction Velocity Out-of-Range.   KURDAT =   09121105
MX W420   43326 METQA:Wind Speed Out-of-Range.   KURDAT =   09121106
MX W432   43326 METQA:Friction Velocity Out-of-Range.   KURDAT =   09121106

   ****
   *** AERMOD Finishes Successfully ***
   ****

APPENDIX D – Biological Resources Reports

APPENDIX D 1– Biological Technical Report

BIOLOGICAL TECNHICAL REPORT FOR THE DEVIL'S GATE RESERVOIR PROJECT SITE IN THE CITY OF PASADENA, LOS ANGELES COUNTY, CALIFORNIA

Prepared for:

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LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS
Water Resources Division
Financial and Special Projects Section
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November 2010

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SECTION 1.0 – INTRODUCTION

Chambers Group, Inc. (Chambers Group) was retained by Los Angeles County Department of Public Works (LACDPW) to conduct a literature review and reconnaissance-level survey for the proposed Devil's Gate Dam and Reservoir Postfire Sediment Removal Project. All sensitive species identified with a potential for occurrence on the Project site were included in the habitat assessment. The site was also assessed for the potential to support jurisdictional waters.

The Survey Area includes the Approximate Excavation Footprint and a buffer so impacts to adjacent resources could be analyzed. The proposed project will not impact the entire Survey Area. The purpose of the biological reconnaissance survey is to document the results of the habitat assessment and sensitive species focused surveys, to help determine the potential for significant impacts.

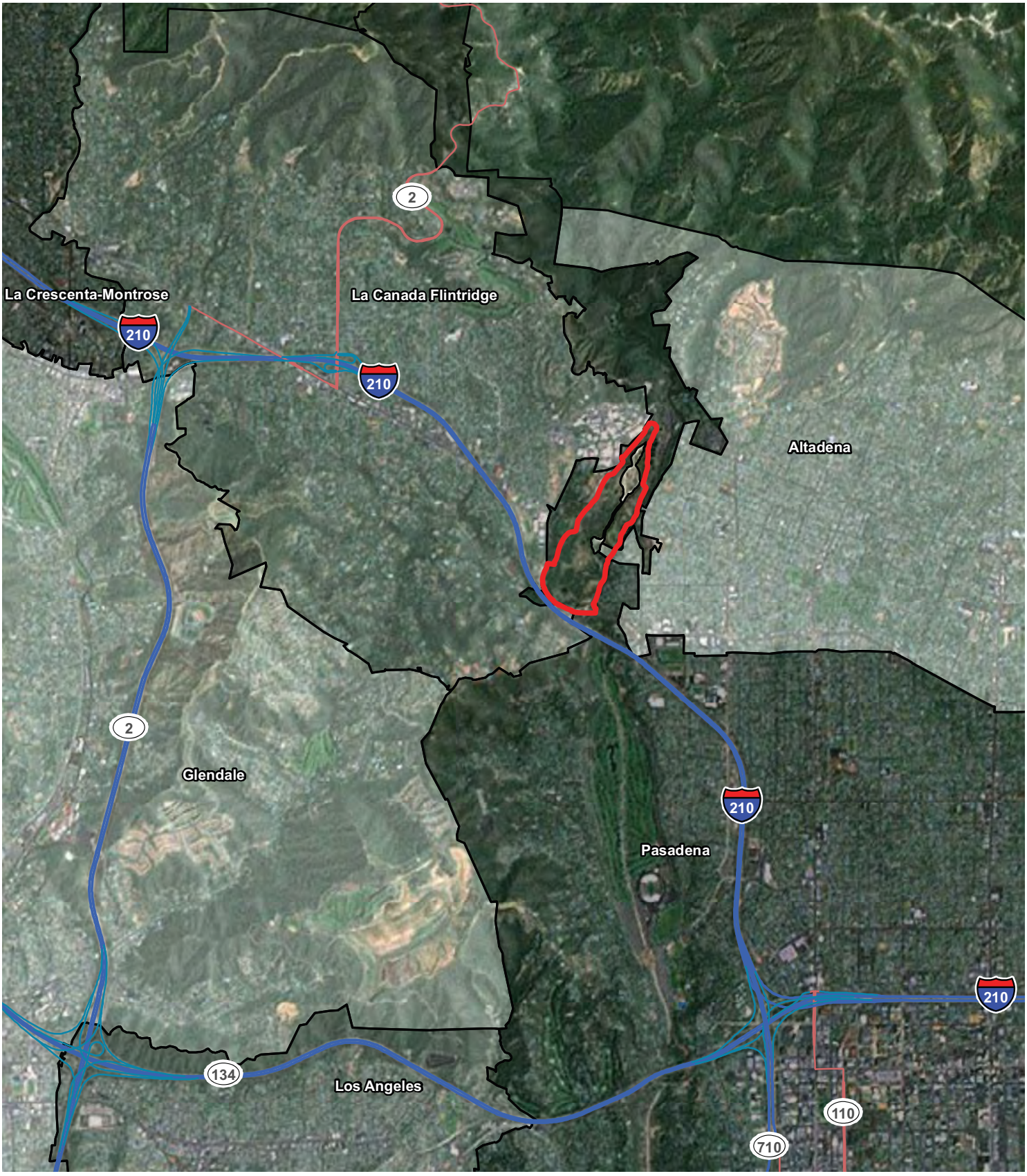
Following the biological reconnaissance-level survey, Chambers Group conducted focused surveys for eight sensitive plant species: Nevin's barberry, Plummer's mariposa lily, Parry's spineflower, slender-horned spineflower, mesa horkelia, white rabbit-tobacco, Parish's gooseberry, and Greata's aster; and one sensitive wildlife species: least Bell's vireo.

1.1. PROJECT LOCATION

Devil's Gate Dam and Reservoir is situated on the south facing slopes of the San Gabriel Mountains. The Project site is located, north of Interstate 210, west of North Arroyo Blvd., and east of Oak Grove Drive, in the City of Pasadena, Los Angeles County, California (Figure 1). The site is within the U.S. Geological Survey (USGS) *Pasadena,* California 7.5-minute topographic quadrangle in Section 7 of Township 1 north, and Range 12 west (Figure 2). The elevation range at the site is between approximately 1,000 and 1,300 feet above mean sea level (amsl). The reservoir is within the Hahamongna Watershed and is a tributary to the Arroyo Seco, which drains into the Los Angeles River.

1.2. PROJECT DESCRIPTION

The 2009 station fire was the 10th largest fire in California since 1933 and burned over 160,000 acres before containment. Approximately 68 percent of the watershed tributary to Devil's Gate Reservoir was burned, leaving vast areas of the San Gabriel Mountains denuded and sediment deposition inevitable. On average a watershed will take five years or more to recover from a fire. During this time, increased amounts of debris production are anticipated from the denuded ground surface. Sediment removal is necessary to maintain an acceptable level of flood protection to mitigate the significant risk of severe flooding in the communities downstream of the dam. LACDPW is preparing a major sediment removal project for Devil's Gate Reservoir to remove the accumulated sediment and make room for future sedimentation that will undoubtedly occur. The proposed project will remove 1,671,000 CY, of sediment debris from Devil's Gate Reservoir. This area of impact is defined as the Approximate Excavation Footprint (Figure 3). Construction is scheduled to occur as early as Summer 2011.



Legend

Survey Area

City Limit

N
W E
S

0 0.5 1 Miles

Figure 1
Project Vicinity Map

Chambers Group Inc.

Legend

Survey Area

N
W E
S

0 500 1,000 Feet

Figure 2
Project Location Map

Chambers Group Inc.

SECTION 2.0 – METHODOLOGY

2.1. LITERATURE REVIEW

Prior to performing the field surveys, existing documentation relevant to the Survey Area was reviewed. The most recent records of the California Natural Diversity Database managed by the California Department of Fish and Game (CDFG 2010) and the California Native Plant Society's Electronic Inventory of Rare and Endangered Vascular Plants of California (CNPS 2010) were reviewed for the quadrangle containing and surrounding the Survey Area (i.e. *Pasadena*, California USGS 7.5 minute quadrangles). These databases contain records of reported occurrences of federal- or state-listed as endangered or threatened species, proposed endangered or threatened species, former Federal Species of Concern (FSC), California Species of Special Concern (CSC), or otherwise sensitive species or habitat that may occur within or in the immediate vicinity of the Survey Area.

2.2. SOILS

Before conducting the surveys, soil maps for Los Angeles County were referenced online to determine the types of soil found on the site. Soils were determined in accordance with categories set forth by the U.S. Department of Agriculture (USDA) Soil Conservation Service and by referencing the USDA Natural Resources Conservation Service (NRCS) Web Soil Survey (USDA 2009).

2.3. BIOLOGICAL RECONNAISSANCE-LEVEL SURVEY

The field survey was conducted in the Survey Area in order to identify any potential for occurrence of sensitive species, vegetation communities, or habitats to support sensitive wildlife species. The survey was conducted on foot throughout the Survey Area between 0815 and 1320 hours on May 27, 2010. Photographs of the Survey Area were recorded to document existing conditions. Weather conditions during the survey included temperatures ranging from approximately 62 to 64 degrees Fahrenheit with 100 percent cloud cover and a slight drizzle in the morning. Chambers Group biologists Linette Lina and Saraiah Skidmore conducted the general reconnaissance survey.

2.3.1 Vegetation

All plant species and soil types observed onsite were noted. Plant communities in the Survey Area were identified, qualitatively described, and mapped onto an aerial photograph. Plant communities were determined in accordance with the categories set forth in Holland (1986) or Sawyer and Keeler-Wolf (1995). Plant nomenclature follows that of *The Jepson Manual: Higher Plants of California* (Hickman 1993). A comprehensive list of the plant species observed during the survey is presented in Appendix A.

2.3.2 Wildlife

All wildlife and wildlife sign observed and detected, including tracks, scat, carcasses, burrows, excavations, and vocalizations, were recorded. Additional survey time was spent in those habitats most likely to be utilized by wildlife (undisturbed native habitat, wildlife trails, etc.) or in habitats with the potential to support state- and/or federal-listed or proposed listed species. Notes were made on the general habitat types, species observed, and the conditions of the site. A list of the wildlife species observed during the site visit is included as Appendix B.

2.3.3 USACE, SWRQCB, and CDFG Preliminary Jurisdictional Assessment

Prior to beginning the field preliminary delineation, a 50-foot-to-the-inch scaled topographic map, scaled aerial photograph, and the *Pasadena* 7.5-minute USGS topographic quadrangle map were examined to determine the locations of potential areas of U.S. Army Corps of Engineers (USACE), California State Water Resources Quality Control Board (SWRQCB), and/or California Department of Fish and Game (CDFG) jurisdiction. Chambers Group biologists examined the Survey Area to identify potential USACE jurisdiction pursuant to Section 404 and 401 of the Clean Water Act and CDFG jurisdiction pursuant to Section 1602 of the State of California Fish and Game Code. Suspected jurisdictional areas were field checked for the presence of riparian vegetation, definable channels, and Ordinary High Water Marks (OHWMs). The lateral extent of a jurisdictional drainage can be measured in several ways depending on the particular situation. The outer edge of riparian vegetation is used as the line of demarcation between riparian and upland habitats and is, therefore, an identifiable boundary of the lateral extent of a jurisdictional drainage. On smaller streams or dry washes with little or no riparian habitat, the uppermost bank extents may be used to mark the jurisdictional drainage

2.4. SENSITIVE SPECIES FOCUSED SURVEYS

2.4.1 Focused Plant Surveys

Chambers Group conducted the reconnaissance-level survey in the Survey Area on May 27, 2010. Based on the literature search and reconnaissance survey, two of the sensitive plants are federal and state-listed as endangered species, and were determined to have potential for occurrence onsite. An additional six otherwise sensitive (CNPS-listed) species were also determined to have potential for occurrence.

A sensitive species is considered to potentially occur in a project area if its known geographic range includes part of the project area or an adjacent USGS 7.5-minute quadrangle and/or if the general habitat or environmental conditions (e.g., soil type, etc.) required for the species are present. The criteria for evaluating a species potential for occurrence (PFO) on a site is presented in Table 1.

Table 1
Criteria for Evaluating Sensitive Plant Species Occurrences

PFO	CRITERIA
Absent:	Species was not observed during focused surveys conducted at an appropriate time for identification of the species, or species is restricted to habitats or environmental conditions that do not occur within the site.
Low:	Historical records for this species do not exist within the immediate vicinity (approximately 5 miles) of the site, and/or habitats or environmental conditions needed to support the species are of poor quality.
Moderate:	Either a historical record exists of the species within the immediate vicinity of the site (approximately 5 miles) and marginal habitat exists on the site, or the habitat requirements or environmental conditions associated with the species occur within the site, but no historical records exist within 5 miles of the site.
High:	Both a historical record exists of the species within the site or its immediate vicinity (approximately 5 miles), and the habitat requirements and environmental conditions associated with the species occur within the site.
Present:	Species was detected within the site at the time of the survey.

Because potential for sensitive plant species to occur onsite existed, focused surveys were recommended and conducted within the Survey Area. Because the sensitive plant species with potential to occur have two different flowering periods, two separate focused plant surveys were conducted. Chambers Group botanists Rebecca Alvidrez, Nichole Cervin, Heather Clayton, Ana Hernandez, Tracy Valentovich, and Jeremy Smith conducted the first focused survey on June 28 through June 30, 2010. Heather Clayton, Kun Liu, Fern Hoffman, and Saraiah Skidmore conducted the second focused survey on August 24, 2010. The surveys consisted of walking the entire Survey Area and noting all plant species. A comprehensive list of the plant species observed during the surveys is presented in Appendix A.

To ensure the detection of rare plants, the botanists were organized into a single horizontal line and were spaced apart to form adjacent belt transects such that each botanist was surveying 15 feet on each side of their own transect, or more where visibility was high. The edge of each transect abutted the adjacent transect, leaving no gaps between each belt, for at least 100 percent coverage throughout all suitable habitats onsite. Each botanist walked in the direction of the agreed upon endpoint within the individual belt transect in a slightly meandering pattern for maximum and overlapping coverage. When suitable microhabitats were encountered or where small plants resembling sensitive species were present, the botanists would stop and carefully scan the microhabitat to positively identify each plant.

Plants of uncertain identity were collected and subsequently identified from keys, descriptions, and illustrations in Hickman ed. (1993). Plant nomenclature follows that of *The Jepson Manual* (1993).

2.4.2 Focused Least Bell's Vireo Surveys

Surveys for least Bell's vireo were performed according to modified USFWS guidelines (USFWS 2001). Constraints prevented surveys from being conducted early in the season; therefore, in order to complete all surveys during the 2010 breeding season, surveys were conducted from May through August, approximately seven days apart. All surveys were conducted during favorable weather conditions.

Chambers Group biologists Linette Lina and Mike McEntee conducted eight protocol surveys (May 27; July 7, 15, 22, and 29; August 5, 12, and 19). Surveys were conducted between sunrise and 1200 by walking suitable riparian habitats within 500 feet of the Survey Area as well as stopping in the best locations within the habitat in order to visually and audibly observe for vireos. Protocol surveys took place between sunrise and 1100. No more than 50 hectares of suitable riparian habitat were surveyed by each biologist per day. Biologists listened for the song of the male vireo as well as the whisper songs, calls, and scolds of both sexes and looked for individual vireos within the surveyed habitats. All vireos, other birds, and wildlife and their sign (e.g., tracks, scat, carcasses, feathers, burrows, nests, excavations, and vocalizations) detected during the focused surveys were recorded (Appendix B). Chambers Group biologists also recorded the locations of all sensitive species. Recorded observations generally included behaviors, pairing statuses, and nesting statuses of vireo, brown-headed cowbird presence, habitat characteristics, and other pertinent data. The USFWS guidelines require any vireos identified be observed for banded legs and any observed banding combinations be recorded.

SECTION 3.0 – RESULTS

3.1. LITERATURE REVIEW

3.1.1 Status Codes

The following information is a list of abbreviations used to help determine the significance of biological resources potentially occurring in the Survey Area.

Federal

FE = Federally listed; Endangered

FT = Federally listed; Threatened

FC = Federal Candidate for listing

State

ST = State listed; Threatened

SE = State listed; Endangered

RARE = State-listed; Rare (Listed "Rare" animals have been re-designated as Threatened, but Rare plants have retained the Rare designation.)

CSC = State Species of Special Concern

CNPS

List 1A = Plants presumed extinct in California.

List 1B = Plants rare and endangered in California and throughout their range.

List 2 = Plants rare, threatened or endangered in California but more common elsewhere in their range.

List 3 = Plants about which we need more information; a review list.

List 4 = Plants of limited distribution; a watch list.

CNPS Extensions

0.1 = Seriously endangered in California (greater than 80 percent of occurrences threatened/high degree and immediacy of threat).

0.2 = Fairly endangered in California (20-80 percent occurrences threatened).

0.3 = Not very endangered in California (less than 20 percent of occurrences threatened).

3.1.2 Plants

The literature review resulted in a list of 14 sensitive plant species that have been known to occur in the Devil's Gate area. Eight of these sensitive species were considered to have a potential to occur in the Survey Area prior to the focused plant survey, none were observed.

The following six plant species are considered **absent** from the Survey Area due to a lack of suitable habitat present or because the species occurs outside the elevation range found in the Survey Area:

- round-leaved filaree (*California macrophylla*) – CNPS List 1B.1;
- southern tarplant (*Centromadia parryi* ssp. *australis*) – CNPS List 1B.1;
- Los Angeles sunflower (*Helianthus nuttallii* ssp. *parishii*) – CNPS List 1A;
- Coulter's goldfields (*Lasthenia glabrata* ssp. *coulteri*) – CNPS List 1B.1;
- San Gabriel linanthus (*Linanthus concinnus*) – CNPS List 1B.2; and
- Orcutt's linanthus (*Linanthus orcuttii*) – CNPS List 1B.3.

Suitable habitat was present onsite for eight sensitive species; however, after the focused plant surveys in which none of these species were observed within the Survey Area, the following species are considered **absent** from the site:

- Nevin's barberry (*Berberis nevinii*) – **FE**, **SE**, CNPS List 1B.1 and
- Plummer's mariposa lily (*Calochortus plummerae*) – CNPS List 1B.2;
- Parry's spineflower (*Chorizanthe parryi* var. *parryi*) – CNPS List 1B.1;
- slender-horned spineflower (*Dodecahema leptoceras*) – **FE**, **SE**, CNPS List 1B.1;
- mesa horkelia (*Horkelia cuneata* ssp. *puberula*) – CNPS List 1B.1;
- white rabbit-tobacco (*Pseudognaphalium leucocephalum*) – CNPS List 2.2;
- Parish's gooseberry (*Ribes divaricatum* var. *parishii*) – CNPS List 1A; and
- Greata's aster (*Symphyotrichum greatae*) – CNPS List 1B.3.

3.1.3 Wildlife

After a literature review and an assessment of the various habitat types in the Survey Area, it was determined that 14 sensitive wildlife species have the potential to occur within the Survey Area or were present in the Survey Area during the survey. Factors used to determine potential for occurrence include quality of habitat, impact of surrounding residential development, and the date and location of prior CNDDB records of occurrence. The following identifies these sensitive species and their potentials to occur. Current listing status for each species is provided after their scientific names:

Due to the lack of known historical occurrences within five miles of the Survey Area, the following nine species have a **low** potential for occurrence in the Survey Area:

- pallid bat (*Antrozous pallidus*) – CSC;
- burrowing owl (*Athene cunicularia*) – CSC; and
- southwestern willow flycatcher (*Empidonax traillii extimus*) **– FE, SE;**
- western mastiff bat (*Eumops perotis californicus*) – CSC;
- western yellow bat (*Lasiurus xanthinus*) – SCS
- southern grasshopper mouse (*Onchomys torridus ramona*) – CSC;
- coast horned lizard (*Phrynosoma blainvillii*) – CSC;
- Sierra Madre yellow-legged frog (*Rana muscosa*) – CSC; and
- American badger (*Taxidea taxus*) – CSC.

Due to the presence of suitable habitat, the following species have a **moderate** potential for occurrence in the Survey Area:

- southwestern pond turtle (*Actinemys marmorata*) – CSC; and
- least Bell's vireo (*Vireo bellii pusillus*) – **FE, SE**.

Due to the presence of suitable habitat and occurrences within five miles of the Project site, the following species has a **high** potential for occurrence in the Survey Area:

- coast range newt (*Taricha torosa torosa*) – CSC.

The following two species were **present** within the Survey Area during the biological reconnaissance survey. It was determined that the yellow warbler was migrating through the site, not nesting. An expired two-striped garter snake was observed on the dirt road leading to the spillway of the dam.

- yellow warbler (*Dendroica petechia*) – CSC (nesting); and
- two-striped garter snake (*Thamnophis hammondii*).

3.2. SOILS

After review of USDA Soil Conservation Service and by referencing the USDA Natural Resources Conservation Service (NRCS) Web Soil Survey (USDA 2009), it was determined that data using this resource does not exist at this time. Soil data is important in the process of analyzing what plants may occur in the Survey Area. Most sensitive plants will only grow in specific soil types. Soil types will then help determine where to conduct focused surveys for listed plants. The following includes a description of soils identified during the reconnaissance level survey.

Many soil types were found present in the Survey Area during the biological reconnaissance survey. Sandy soils occur within the Arroyo Seco watershed. Clay soils occur in low spots, which create areas where water can pool. Silty soils occur at the spillway of Devil's Gate Dam, and sandy loam soils occur in upland communities.

3.3. BIOLOGICAL RECONNAISSANCE SURVEY

3.3.1 Vegetation

3.3.1.1 General

At the time of the survey, the Survey Area was primarily composed of riparian and upland communities (Figure 3). Southern Coast Live Oak does occur in the Survey Area and adjacent to the site. Southern Sycamore Alder Riparian Forests was not identified on the site. Representative site photographs were taken to document site conditions during the survey (Appendix C).

3.3.1.2 Vegetation Communities Descriptions

Riparian Communities

Black Willow Series

Black Willow Series, as described by Sawyer and Keeler-Wolf (1995), exists when black willow (*Salix gooddingii*) is the sole dominant shrub or tree in the canopy. This community occurs in habitats seasonally flooded and saturated with freshwater. This community occurs in floodplains along rivers and streams and on the edges of meadows. Species that usually occur with black willow include California sycamore (*Platanus racemosa*), coyote brush (*Baccharis pilularis*), Fremont cottonwood (*Populus fremontii),* Mexican elderberry (*Sambucus mexicana*), mule fat (*Baccharis salicifolia*), white alder (*Alnus rhombifolia),* and other willows (*Salix* sp.).

Black Willow Series is present in the Survey Area within the reservoir along the stream. Black willow is dominant in this community. Other native species include mule fat (*Baccharis salicifolia*), Fremont cottonwood, black cottonwood (*Populus trichocarpa),* white alder, red willow (*Salix laevigata*), and California dodder (*Cuscuta californica*). Non-native species in this community include gum tree (*Eucalyptus* sp.) and tree tobacco (*Nicotiana gluaca*).

White Alder Woodland

White Alder Woodland consists of tall, open broadleaved, winter-deciduous, streamside woodland often dominated by white alder. White alders prefer perennial streams. Species that may occur in this community include big leafed maple (*Acer macrophyllum*), mugwort (*Artemisia douglasiana*), coast live oak (*Quercus agrifolia*), California blackberry (*Rubus ursinus*), Mexican elderberry, poison oak (*Toxicodendron diversilobum*), California bay (*Umbellularia californica*), and stinging nettle (*Urtica dioica*).

A small patch of White Alder Woodland is present at the northernmost point of the Survey Area. The patch of trees is located on the east bank of the Arroyo Seco watershed. The understory consists of sand, most likely due to regular scouring from floods.

Mule Fat Scrub

Mule Fat Scrub consists of dense stands of mule fat with lesser amounts of willow species. This community type is classified as a mixed evergreen-deciduous shrubland with a continuous canopy and a sparse understory. This community typically occupies intermittent streambeds and seeps; and it occurs at elevations ranging from sea level to 4,100 feet amsl (Holland 1986; Gray and Bramlet 1992).

The Mule Fat Scrub community is present in the Survey Area. The native plant species found include mule fat and black willow. Non-native species found within this community in the Survey Area include Italian thistle (*Carduus pycnocephalus*), poison hemlock (*Conium maculatum*), and short-podded mustard *(Hirschfeldia incana*).

Riparian Herbaceous

Riparian Herbaceous vegetation is an early successional stage of willow scrub and riparian forest communities. Flooding (or other disturbance factors) often scours woody riparian vegetation away, and the site is rapidly colonized by pioneer wetland herbaceous plants (Gray and Bramlet 1992).

Sparse riparian herbaceous vegetation is present within the waterway if the Survey Area. Native plant species found in this community include mule fat, black willow, and red willow. Nonnative plant species in this community include curly dock (*Rumex crispus*), wild radish (*Raphanus sativus*), and short-podded mustard.

<u>Upland Communities</u>

Coast Live Oak Woodland

Coast Live Oak Woodland consists of evergreen trees dominated by coast live oak reaching between 30 to 80 feet in height. Shrub layer is poorly developed and can include lemonade berry (*Heteromeles arbutifolia*), gooseberry *(Ribes* sp.), and Mexican elderberry. Herbaceous layer is continuous and dominated by nonnatives such as ripgut brome (*Bromus diandrus*). This community occurs on exposed north-facing slopes below 4,000 feet amsl and in shaded ravines in the south and has been known to intergrade with Coastal Scrub, Upper Sonoran Mixed Chaparral on drier sites and Coast Live Oak Forest and Mixed Evergreen Forest on moister sites (Holland 1986).

Coast Live Oak Woodland is present in the Survey Area on the slopes east and west of the watershed. Coast live oak is the dominant species in this community. Other native species included Mexican elderberry and poison oak. Nonnative species in the understory included wild oat (*Avena fatua*), ripgut brome, foxtail chess (*Bromus madritensis*), Italian thistle, and short-podded mustard. A few scattered coast live oaks occur on the church grounds within the ornamental vegetation community.

Riversidian Alluvial Fan Sage Scrub

Riversidian Alluvial Fan Sage Scrub occurs in alluvial fans as well as in washes and is a subtype of Riversidian Coastal Scrub (Holland 1986). Three stages of alluvial fan scrub succession are described by Smith (1980) with density and species diversity varying in direct relationship to the frequency of water scouring each stage receives. Older stages of alluvial scrub are located on high benches and have not been subjected to a recent major flood event. This mature stage can be identified by the presence of larger shrubs, an increase in species diversity, and a groundcover of organic material and annual grasses. Many large shrubs over 10 feet in height are found in the mature community, including laurel (*Malosma*

laurina). The intermediate and early stages are located on lower benches closer to the active flood plain and have been subjected to relatively recent flooding events. Intermediate and early stages are progressively more open and less diverse. Medium-sized shrubs up to four feet in height can be found in intermediate stage areas, while early stage shrubs are rarely greater than two feet in height. Organic material and annual grasses are much less common in intermediate areas and are almost absent in early stages. Scale-broom (*Lepidospartum squamatum*), considered to be an indicator species of alluvial scrub communities, is present in most alluvial scrub communities.

Riversidian Alluvial Fan Sage Scrub is present on the northeast portion if the Survey Area. Plant species found in the Survey Area include scale-broom, California sagebrush (*Artemisia californica*), California buckwheat (*Eriogonum fasciculatum*), deerweed (*Lotus scoparius*), our Lord's candle (*Yucca whipplei*), and coastal prickly pear (*Opuntia littoralis*).

Other Communities

Ephemeral Stream

An ephemeral stream has flowing water for a short duration after precipitation events in a representative year. The main source of water flow in an ephemeral stream is runoff from rainfall. Ephemeral stream beds are located above the water table year-round.

Ephemeral Pond

An ephemeral pond holds water for a short duration after precipitation events in a representative year. The source of water flow in an ephemeral pond is from rainfall.

Disturbed

Disturbed areas are those areas that are either devoid of vegetation (cleared or graded), such as dirt roads, or those areas that have a high percentage of non-native weedy species (i.e., greater than 25 percent of the species cover). Disturbed areas are present along the boundaries of the work area and within the watershed. Maintenance roads exist on the east and west sides of the reservoir and pedestrian/horseback riding trails exist on the west side and within the reservoir.

Ornamental Landscaping

Ornamental Landscaping includes areas where the vegetation is dominated by nonnative horticultural plants (Gray and Bramlet 1992). Typically, the species composition consists of introduced trees, shrubs, flowers, and turf grass.

Several areas within the Survey Area have Ornamental Landscaping. Ornamental pine trees (*Pinus* spp.) are located directly west of the dam wall and in the staging area located west of the church parking lot. The church grounds are landscaped with ornamental herbs, shrubs, and trees. On the sloped areas outside of the reservoir as well as within the reservoir, ornamental gum trees (*Eucalyptus* spp.) exist in coast live oak woodland and black willow series communities.

Poison Hemlock Series

Poison Hemlock Series is a vegetation community dominated by the herbaceous weedy species poison hemlock. This biennial plant typically grows up to 10 feet in height and occurs in moist, especially

disturbed places at elevations generally less than feet 3,280 (Hickman 1993). Poison Hemlock Series is present within the watershed near the center of the Survey Area.

Peppergrass Series

Peppergrass Series is a vegetation community dominated by the herbaceous weedy species peppergrass (*Lepidium latifolium*). Peppergrass Series is present within the watershed near the center of the Survey Area.

3.3.1.3 Sensitive Plant Species

The following is a general discussion of the sensitive plants for which suitable habitat is present onsite. Although these species were not observed during the focused plant surveys and are considered absent from the Survey Area, this discussion provides a rationale for why surveys were initially required.

- Nevin's barberry (*Berberis nevinii*)

Nevin's barberry is a federally and state-listed threatened species and a CNPS List 1B.1 species. This perennial evergreen shrub flowers between March and June in chaparral, coastal scrub, cismontane woodlands, and riparian scrub in sandy/gravelly soils. This species occurs at elevations between 900 to 2,705 feet amsl. The known range of this species exists in Los Angeles, Riverside, San Bernardino, and San Diego counties in California. Suitable habitat is present onsite within the watershed and in upland coastal and alluvial fan communities.

- Plummer's mariposa lily (*Calochortus plummerae*)

Plummer's mariposa lily is a CNPS List 1B.2 species. This perennial, bulbiferous herb flowers between May and July in chaparral, cismontane woodland, coastal scrub, lower montane coniferous forest, and valley and foothill grasslands. This species occurs at elevations between 325 to 5,580 feet amsl. The known range of this species exists in Los Angeles, Orange, Riverside, San Bernardino, and Ventura counties in California. Suitable habitat is present onsite in Coastal and Alluvial Fan Sage Scrub communities in the understory of the Coast Live Oak Woodland community.

- Parry's spineflower (*Chorizanthe parryi* var. *parryi*)

Parry's spineflower is a CNPS List 1B.1 species. This annual herb flowers between April and June in chaparral, cismontane woodland, coastal scrub, and valley and foothill grasslands. This species occurs at elevations between 900 to 4,000 feet amsl. The known range of this species exists in Los Angeles, Riverside, and San Bernardino counties in California. Suitable habitat is present onsite in Coastal and Alluvial Fan Sage Scrub communities and in the understory of the Coast Live Oak Woodland community.

- slender-horned spineflower (*Dodecahema leptoceras*)

Slender-horned spineflower is a federal and state-listed endangered species and a CNPS List 1B.1 species. This annual herb flowers between April and June in chaparral, cismontane woodlands, and coastal scrub habitats. This species occurs at elevations between 655 to 2,495 feet amsl. The known range of this species exists in Los Angeles, Riverside, and San Bernardino counties in California. Suitable habitat is present onsite in Coastal and Alluvial Fan Sage Scrub communities.

- mesa horkelia (*Horkelia cuneata* ssp. *puberula*)

Mesa horkelia is a CNPSList 1B.1 species. This perennial herb flowers between February and September in chaparral, cismontane woodland, and coastal scrub communities. This species occurs at elevations between 225 to 2,660 feet amsl. The known range of this species exists in Los Angeles, Orange, Riverside, Santa Barbara, San Bernardino, San Diego, San Luis Obispo, and Ventura counties in California. Suitable habitat is present onsite in Coastal and Alluvial Fan Sage Scrub communities.

- white rabbit-tobacco (*Pseudognaphalium leucocephalum*)

White rabbit-tobacco is a CNPS List 2.2 species. This perennial herb flowers between July and December in chaparral, cismontane woodland, coastal scrub, and riparian woodland habitats. This species occurs at elevations between sea level and 6,900 feet amsl. The known range of this species exists in Los Angeles, Orange, Riverside, Santa Barbara, San Diego, San Luis Obispo, and Ventura counties in California, as well as into Arizona, Baja California, New Mexico, Sonora - Mexico, and Texas.

- Parish's gooseberry (*Ribes divaricatum* var. *parishii*)

Parish's gooseberry is a CNPS List 1A species. This perennial, deciduous shrub flowers between February and April typically in Riparian Woodland habitat. This species occurs at elevations between 210 to 985 feet amsl. The known range of this species exists in Los Angeles and San Bernardino counties in California. Suitable habitat is present onsite within the Black Willow Series of the Survey Area. No recent historical populations have been recorded within the vicinity of the site.

- Greata's aster (*Symphyotrichum greatae*)

Greata's aster is a CNPS List 1B.3 species. This perennial, rhizomatous herb flowers between June and October in broadleafed upland forest, chaparral, cismontane woodland, lower montane coniferous forest, and riparian woodland. This species occurs at elevations between 980 to 6,595 feet amsl. The known range of this species exists in Los Angeles, San Bernardino, and Ventura counties in California. Suitable habitat is present onsite in the Black Willow Series community.

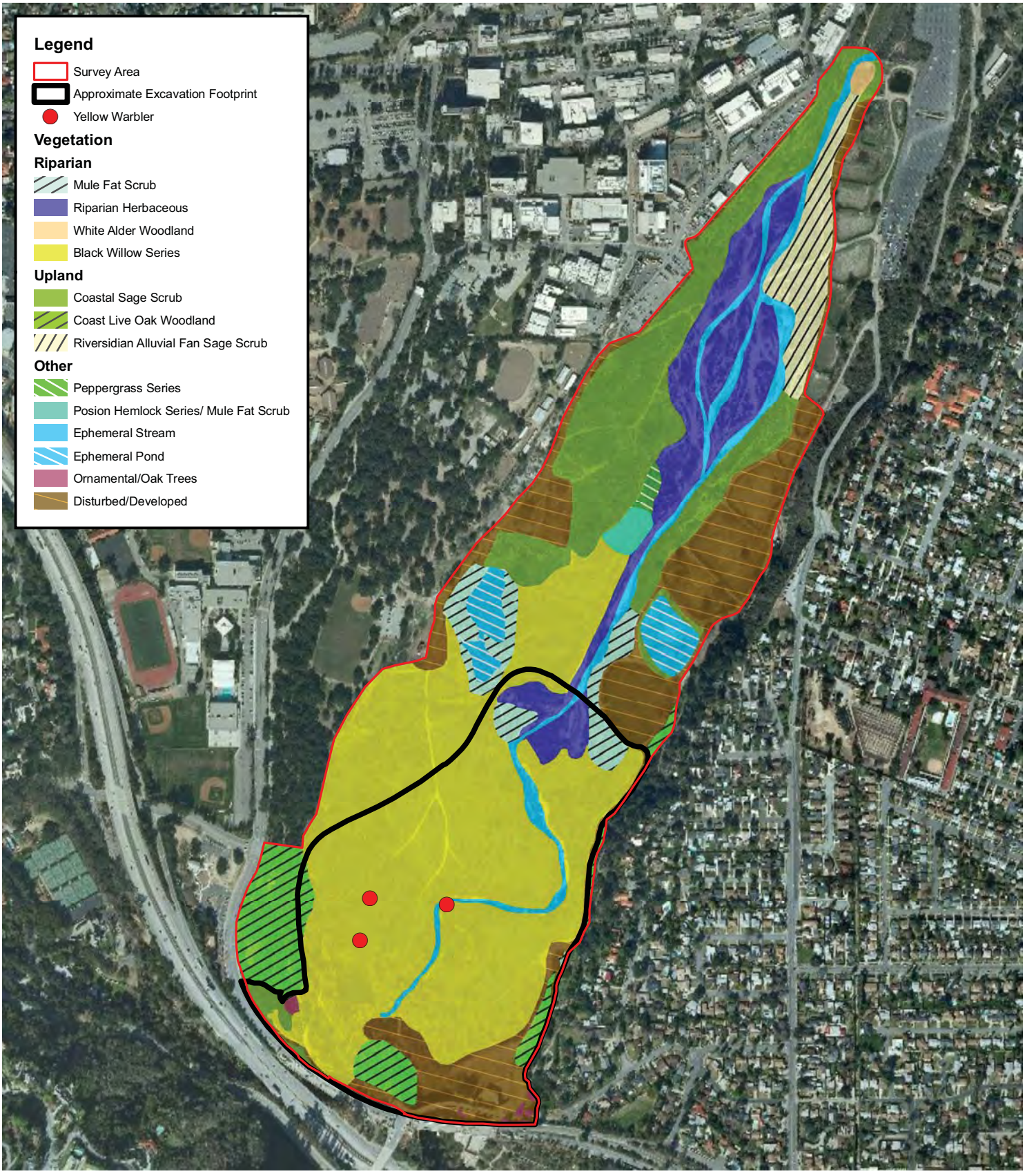


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Figure 3
Biological Resources Map

Chambers Group Inc.

3.3.2 Wildlife

3.3.2.1 General

Wildlife species observed or detected during the site survey were characteristic of the existing site conditions. A full list of the wildlife species detected within the Survey Area is included in Appendix B.

Birds

Twenty-seven bird species were observed/detected in the Survey Area during the reconnaissance level survey. Species included California quail (*Callipepla californica),* mourning dove (*Zenaida macroura*), Allen's hummingbird (*Selasphorus sasin*), acorn woodpecker (*Melanerpes formicivorus*), northern rough-winged swallow *(Stelgidopteryx serripennis*), common raven (*Corvus corax*), European starling (*Sturnus vulgaris*), common yellowthroat (*Geothlypis trichas*), black-headed grosbeak *(Pheucticus melanocephalus*), and housefinch *(Carpodacus mexicanus).*

Mammals

Eight mammal species were observed or detected in the Survey Area during the survey. Species included the Virginia opossum (Didelphis virginiana), western gray squirrel (*Sciurus griseus*), domestic dog (*Canis familiaris*), striped skunk (*Mephitis mephitis*), and bobcat (*Lynx rufus*).

3.3.2.2 Sensitive Wildlife Species

Three sensitive wildlife species have a moderate to high potential to occur in the Survey Area. One species, least Bell's vireo, is a federally- and state-listed endangered species that has a moderate potential to occur on the site. Two species, western pond turtle and coast range newt, are California species of concern and have a moderate or high potential to occur on the site. One species, yellow warbler, is a California species of concern when nesting and was present on the site during the reconnaissance survey. A two-striped garter snake was observed dead (run over by a vehicle) on the dirt road leading to the spillway.

- Least Bell's Vireo (*Vireo bellii pusillus*) - FE, SE

The least Bell's vireo (nesting) is a federally- and state-listed endangered subspecies of the Bell's vireo. The breeding range of the species extends from North Dakota to Indiana, south through Arkansas and Texas, and west to southern New Mexico, Arizona, California, and northern Mexico; however, the least Bell's vireo subspecies is restricted to coastal California and Baja California, Mexico, and a few inland populations. Its winter range extends along the Pacific coast from northern Mexico south to northern Nicaragua. It is a small, gray songbird with two faint wing bars and a faint eye ring and is whiter below. This species prefers to nest in low, dense, scrubby vegetation in early successional areas and is particularly dependent on corridors of habitat along rivers and streams. Habitats may include willow woodlands and dense mule fat, scrub oak, coastal chaparral, and mesquite patches with dense early successional understories. It builds a suspended cup nest about 0.5 to 2.0 meters above the ground and, on average, lays four eggs. It may produce two broods per season. On the breeding grounds, the least Bell's vireo feeds primarily on insects and small spiders that it gleans from twigs and leaves. The two major factors in the decline of least Bell's vireo populations are loss of habitat and nest parasitism by the brown headed-cowbird (*Molothrus ater*). Habitat loss and degradation, especially along streams and rivers due to development, agriculture, flood-control projects, logging operations, and intensive

cattle grazing practices, are the greatest threats to the continued existence of the least Bell's vireo. Overgrazing has been estimated to have reduced nesting sites by 50 percent in some areas, and it has contributed to an increase in non-native invasive plant species that do not typically support the breeding of this species.

Cowbird parasitism is also an important factor in population declines. The cowbird lays its egg in the nest of an unsuspecting vireo, and the vireo may then raise the cowbird chick as its own. The cowbird egg hatches earlier than the vireo eggs, and the chick then grows much larger in less time, eventually outcompeting the vireo chicks and causing nest failure. Fragmentation of habitat also increases cowbird parasitism by artificially creating favored habitats of cowbirds; and it isolates small, fringe vireo populations. In turn these populations are more susceptible to localized extirpations which contribute to large-scale range reductions. Domestic and feral cats are also a significant predatory force in some areas. Despite historic population losses, recent trends indicate that populations are on the rise and that the least Bell's vireo is returning to parts of its former range as well as colonizing some new areas.

Habitat for the least Bell's vireo occurs in the Survey Area, within the reservoir, in Black Willow Series and Mule Fat Scrub vegetation communities. Historic records do not exist within the *Pasadena*, California 7.5-minute topographic quadrangle, however, known occurrences do exist for this species in the San Gabriel Mountains, Los Angeles County. Therefore, this species has a moderate potential to occur on the Project site.

- Coast Range Newt (*Taricha torosa torosa*) - CSC

The coast range newt is a California Species of Concern found in terrestrial habitats such as grasslands, woodlands, and forests. Within these habitat types, this species uses pools, ponds, reservoirs, and slow moving streams as breeding sites. Its range includes most of coastal California, and it may be found up to 7,800 feet in elevation. It has a light brown dorsum, reddish-orange or yellow venter, large eyes, smooth to rough skin, and may exceed seven inches in total length. Breeding males have flattened tails, dark skin on the undersides of the feet, and smooth skin. Its diet includes invertebrates such as earthworms, slugs, sowbugs, snails, and larval insects. This species is threatened by habitat loss and alteration of hydrological systems during the breeding season.

Habitat for the coast range newt occurs seasonally within the Survey Area. The Arroyo Seco watershed is a slow moving seasonal stream. Retention basins, one holding water at the time of the survey (most likely from rain), exist on the east side of the stream, and a seasonal pond, also filled with rain water, exists on the west side of the stream. The stream, basins, and pond are all potential breeding habitat for this species. A recent historic occurrence (2003) exists for this species in the Arroyo Seco watershed less than 0.5 mile upstream of the Survey Area. Therefore, this species has a high potential to occur in the Survey Area.

- Southwestern Pond Turtle (*Clemmys marmorata pallida*) - CSC

This species is a California Species of Concern. This species occurs along the west coast of North America from Baja California up to San Francisco Bay and from sea level to 5,900 feet in elevation (California Reptiles and Amphibians 2009). It inhabits permanent or nearly permanent bodies of water in many habitat types including ponds, marshes, rivers, and streams that typically have a rocky or muddy bottom and extensive aquatic vegetation along water body margins (California Reptiles and Amphibians 2009). The southwestern pond turtle requires basking sites such as partially submerged logs, vegetation mats, or open mud banks. This species occurs in a variety of habitat types including woodland,

grassland, and open forest (California Reptiles and Amphibians 2009). Although this species is considered aquatic, some spend a lot of time on land (Bury and Germano 2008). The top of the shell is dark brown or yellow-olive and may have dark streaks (Bury and Germano 2008). Pond turtles are diurnal, but will quickly slide into water when they feel threatened. Most activity takes place from February to November. They hibernate under water in mud and will estivate during dry summers in soft mud, leaf litter, or wood rat nests (California Reptiles and Amphibians 2009). If water temperatures are right, this species may be active year-long (Bury and Germano 2008). Pond turtles mate in April and May and nest between April and August (California Reptiles and Amphibians 2009). Hatchlings emerge in early fall. Pond turtles feed on aquatic plants, invertebrates, worms, frog and salamander eggs and larvae, crayfish, carrion, and occasionally frogs and fish (California Reptiles and Amphibians 2009). Habitat destruction is the primary threat to this species. Pond turtles are found to occur in dams, although the habitat quality is low. Dams cause cooler water temperatures, fast flows below the dams, and human disturbance due to fishing in reservoirs behind the dams. Reservoirs also tend to have decreased vegetation cover, which decreases invertebrates (Bury and Germano 2008).

Habitat for the southwestern pond turtle occurs seasonally within the Survey Area. The Arroyo Seco watershed is a slow moving seasonal stream. Retention basins, one holding water at the time of the survey (most likely from rain), exist on the east side of the stream. A pond filled with rain water, containing submerged logs, exists on the west side of the stream. The stream, basins and pond are all potential breeding habitat for this species. A historic occurrence (1971, less than 0.25 mile upstream) exists for this species in the Arroyo Seco watershed less than five miles upstream of the Survey Area. Therefore, this species has a moderate potential to occur in the Survey Area.

- Yellow Warbler (*Dendroica petechia brewsteri*) - CSC

The yellow warbler (nesting) is a California Species of Concern. Its breeding range includes most of North America from northern Alaska and northern Canada to the southern U.S. and Mexico. Wintering birds occur from Mexico to Peru. Breeding habitats include wet areas, such as riparian woodlands, orchards, gardens, swamp edges, and willow thickets. Most breeding habitats generally contain medium to high-density tree and shrub species with ample early successional understories. In migration, yellow warblers may occur in other habitats, including early seral riparian habitats. Its plumage is more extensively yellow than other North American wood-warblers and it is also unique in having yellow on the inner webs of its tail feathers (except middle pair). Males show rusty streaking on the breast. Yellow warblers are almost entirely insectivorous, but they also eat a few berries. Populations are in decline in California due to habitat loss, grazing of riparian understories, and brood parasitism by the brown-headed cowbird.

The yellow warbler was observed in the Survey Area during the biological reconnaissance survey, in riparian habitat along the Arroyo Seco stream. This species is considered present within the Survey Area.

- Two-striped Garter Snake

The two-striped garter snake is a California Species of Concern. It is found in Salinas in Monterey County, south along the coast, into the Traverse Ranges in southern California, into Victorville, south to the Peninsular Ranges, and south to Baja California (California Reptiles and Amphibians 2009). The two-striped garter snake is found in or near permanent and intermittent freshwater habitats, including streams, rivers, ponds, and small lakes from sea level to around 8,000 feet. Oak woodlands, brushlands, sparse coniferous forests, and riparian forests may surround its freshwater habitat. It is recognized by its lack of a mid-dorsal stripe, and its coloration is usually olive or brownish above and dull yellow to

orange-red or salmon below. Intergrading color morphs are common. This highly aquatic snake is most active at dusk or at night, but it may also forage by day (California Reptiles and Amphibians 2009). Its diet includes tadpoles, toads, frogs, small fish, earthworms, California newt (*Taricha torosa torosa*) larvae, and aquatic eggs. The two-striped garter snake is a live-bearing species that gives birth to up to 36 young at a time. Loss of wetland habitats have contributed to a reduction in the range of this snake.

A two-striped garter snake was observed during the biological reconnaissance survey. The deceased snake was observed on the dirt road leading down to the spillway of the reservoir. This species is considered present within the Survey Area.

3.4. SENSITIVE SPECIES FOCUSED SURVEYS

3.4.1 Focused Plant Surveys

Based on the reconnaissance-level and focused plant surveys performed by Chambers Group, 246 plant species have been documented within the Survey Area (Appendix A).

The focused survey for the eight species below was negative. **No federal or state-listed as threatened or endangered or otherwise sensitive species were observed onsite.** The following species, which would have been flowering or conspicuous at the time of the focused plant survey, are therefore considered **absent** from the Survey Area:

- Nevin's barberry (*Berberis nevinii*) – **FE**, **SE**, CNPS List 1B.1;
- Plummer's mariposa lily (*Calochortus plummerae*) – CNPS List 1B.2;
- Parry's spineflower (*Chorizanthe parryi* var. *parryi*) – CNPS List 1B.1;
- slender-horned spineflower (*Dodecahema leptoceras*) – **FE**, **SE**, CNPS List 1B.1;
- mesa horkelia (*Horkelia cuneata* ssp. *puberula*) – CNPS List 1B.1; and
- white rabbit-tobacco (*Pseudognaphalium leucocephalum*) – CNPS List 2.2;
- Parish's gooseberry (*Ribes divaricatum* var. *parishii*) – CNPS List 1A; and
- Greata's aster (*Symphyotrichum greatae*) – CNPS List 1B.3.

3.4.2 Focused Least Bell's Vireo Surveys

Chambers Group biologists conducted focused presence/absence surveys for least Bell's vireo on May 27; July 7, 15, 22, and 29; and August 5, 12, and 19. Vireo surveys were performed according to modified USFWS guidelines (USFWS 2001). Constraints prevented surveys from being conducted early in the season; therefore, in order to complete all surveys during the 2010 breeding season, surveys were conducted from May through August approximately seven days apart. Least Bell's vireo was **not observed** in the Survey Area; however, since a large amount of suitable nesting habitat occurs within the Mule Fat Scrub and Black Willow Series communities in the Survey Area, this species has moderate potential to occur.

SECTION 4.0 – CONCLUSIONS AND RECOMMENDATIONS

4.1. RIPARIAN/RIVERINE AND WETLAND

Pursuant to Section 404 of the Clean Water Act, the USACE regulates the discharge of dredged and/or fill material into waters of the United States. Waters of the United States include navigable waterways and wetlands adjacent to navigable waterways, non-navigable waterways, and wetlands adjacent to non-navigable waters that are contiguous with navigable waterways.

The State of California regulates discharge of dredged and/or fill material into waters of the State pursuant to Section 401 of the Clean Water Act. The local Regional Water Quality Control Boards assert jurisdiction to all those areas defined as jurisdictional under Section 404 of the Clean Water Act, plus isolated waters. As a State agency, the State Water Resources Quality Control Board (SWRQCB) regulates all waters of the State, including isolated wetlands as defined Under the California Porter-Cologne Water Quality Control Act (Porter Cologne; Ca. Water Code, Div. 7, §13000 et seq.).

Jurisdictional authority of the CDFG over wetland areas is established under Section 1600 of the Fish and Game Code, which pertains to activities that would disrupt the natural flow or alter the channel, bed, or bank of any lake, river, or stream. The Fish and Game Code stipulates that it is unlawful to substantially divert or obstruct the natural flow or substantially change the bed, channel or bank of any river, stream, or lake without notifying the CDFG, incorporating necessary mitigation, and obtaining a Streambed Alteration Agreement.

The Devil's Gate Reservoir Project site is located within the Arroyo Seco watershed, a blue-line stream, which contains riparian vegetation and flowing water. Because sediment removal is proposed to take place, a formal delineation will be required prior to any ground disturbing activities.

4.2. SENSITIVE SPECIES

4.2.1 Sensitive Plants

Of the 14 sensitive plant species identified in the literature review, 8 species, Nevin's barberry, Plummer's mariposa lily, Parry's spineflower, slender-horned spineflower, mesa horkelia, white rabbit-tobacco, Parish's gooseberry, and Greata's aster, have suitable habitat present onsite. Two of the sensitive plants from the literature search, Nevin's barberry and slender horned spineflower, are federal and state-listed as endangered species. Agencies require focused surveys for any federal-and/or state-listed species with any kind of potential to occur onsite when the species is in bloom, to ensure it is both evident and identifiable at the time of the survey. Seven of the sensitive species have an overlapping blooming period in June. Parish's gooseberry blooms from February to April but is a shrub that can be detected outside of its blooming period. One species, white rabbit-tobacco, blooms from August to November, with uncommon flowering months in July and December.

Two focused plant surveys were conducted in the Survey Area to capture the blooming periods for all sensitive plant species with a potential to occur. The first focused plant survey was conducted from June 28 through June 30, 2010. The second focused survey was conducted on August 24, 2010. No listed or otherwise sensitive plant species were detected during either of the focused surveys conducted in the Survey Area. Therefore, the eight plant species with a potential to occur are considered **absent** from the Survey Area at this time.

4.2.2 Sensitive Wildlife

Of the 14 sensitive wildlife species identified in the literature review, 5 sensitive wildlife species were either observed in the Survey Area or have a moderate or high potential to occur in the Survey Area due to habitat onsite and/or nearby historic occurrences.

The least Bell's vireo is a federal- and state- endangered species. Because habitat for this species occurs in the Survey Area and occurrences are known in other areas of the San Gabriel Mountains, focused protocol-level least Bell's vireo surveys were conducted from May through August 2010 following modified USFWS *Least Bell's Vireo Survey Guidelines* (Jan. 19, 2001). **No least Bell's vireos were observed.**

The yellow warbler **was observed** in the Survey Area in riparian habitat during the reconnaissance survey and during subsequent least Bell's vireo surveys. Although specific breeding statuses were not obtained during the surveys, due to time constraints, this species likely migrates through the area. The yellow warbler is a California species of concern, and focused surveys will not be required for this species. Locations of observations of this species are located in the Biological Resources Map (Figure 3).

The southwestern pond turtle, coast range newt, and two-striped garter snake are California species of concern. The two-striped garter snake **was observed** within the Survey Area during the biological reconnaissance survey. The southwestern pond turtle and coast range newts were **not observed** within the Survey Area. In order to minimize impacts to these three California Species of Concern, a biological monitor should be present during construction. If special status species are observed in harms way the monitoring biologist will implement protection measures; these measures may include re-directing the species, construction exclusionary devices (e.g. fencing), or capture/relocation outside of the work area. Species relocation techniques and locations will require approval from CDFG.

In addition, ground disturbing activities should be conducted during the non-breeding season (September 1 to February 14) in order to limit impacts to nesting birds. If ground disturbing activities need to take place during breeding season (February 15 through August 31), in order to remain in compliance with the Migratory Bird Treaty Act, a pre-construction nesting bird survey(s) will be required. The last survey day should be conducted a minimum of three days prior to the start of work.

SECTION 5.0 – REFERENCES

Brown, B.T.

1993 Bell's Vireo (*Vireo bellii)*. In The Birds of North America, No. 35 (A. Poole, P. Stettenheim, and F. Gill, Eds.). Philadelphia: The Academy of Natural Sciences; Washington, DC: The American Ornithologists' Union.

Bury, B.R. and D.J. Germano

2008 *Actinemys marmorata (Baird & Girard 1852) – Western Pond Turtle, Pacific, Pond Turtle.* Conservation Biology of Freshwater Turtles and Tortoises: A Compilation Project of the IUCN/SSC Tortoise and Freshwater Turtle Specialists Group. Chelonian Research Foundation. USA. May 15, 2008.

California Department of Fish and Game (CDFG)

2010 California Natural Diversity Database (CNDDB). RareFind Version 3.1.0. Database Query for the *Pasadena*, California, USGS 7.5-minute quadrangle. Wildlife and Habitat Data Analysis Branch.

California Native Plant Society Electronic Inventory (CNPSEI)

2010 Inventory of Rare and Endangered Plants (online edition). Rare Plant Scientific Advisory Committee, California Native Plant Society, Sacramento, California. Accessed on May 2010 from http://www.cnps.org/inventory for the *Pasadena,* California*,* USGS 7.5-minute quadrangle.

Gray, J. and D. Bramlet

1992 Habitat Classification System, Natural Resources, Geographic Information System (GIS) Project. County of Orange Environmental Management Agency, Santa Ana, California.

Hickman, J.C. (ed.)

1993 *The Jepson Manual: Higher Plants of California.* University of California Press, Berkeley, California.

Holland, R.F.

1986 *Preliminary Descriptions of the Terrestrial Natural Communities of California*. Unpublished report available from the California Department of Fish and Game, Sacramento, California.

Lowther, P.E., C. Celada, N.K. Klein, C.C. Rimmer, and D.A. Spector.

1999 Yellow Warbler (*Dendroica petechia*). The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Laboratory of Ornithology. URL: http://bna.birds.cornell.edu/BNA/account/Yellow_Warbler/ accessed on July 2, 2007.

Sawyer, J.O., Jr., and T. Keeler-Wolf

1995 *A Manual of California Vegetation*. California Native Plant Society, Sacramento, California.

Smith, R.L.

1980 Alluvial Scrub Vegetation of the San Gabriel River Floodplain, California. *Madroño*, 27(3): 126-138.

Southern Pacific Pond Turtle (*Actinemys marmorata pallida*)

2009 California Reptiles and Amphibians. CaliforniaHerps.com. http://www.californiaherps.com/turtles/pages/a.m.pallida.html. Accessed May 2010.

Two-Striped Garter Snake (*Thamnophis hammondii*)

2009 California Reptiles and Amphibians. CaliforniaHerps.com. http://www.californiaherps.com/turtles/pages/a.m.pallida.html. Accessed October 2010.

U.S. Department of Agriculture (USDA)

2009 Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Official Soil Series Descriptions [Online WWW]. Available URL: "http://soils.usda.gov/technical/classification/osd/index.html" [Accessed May 2010].

U.S. Fish and Wildlife Service (USFWS)

1998 Draft Recovery Plan for the Least Bell's Vireo. U.S. Fish and Wildlife Service, Portland, Oregon. 139pp.

2001 Least Bell's vireo survey guidelines. Carlsbad Field Office, Carlsbad, California. Letter dated January 19, 2001. 3 pp.

APPENDIX A – PLANT SPECIES OBSERVED ONSITE

Comprehensive List of Plant Species Observed
In the Devil's Gate Reservoir Survey Area

Scientific Name	Common Name
FERNS AND FERN ALLIES	
PTERIDACEAE	**BRAKE FAMILY**
Pellaea andromedifolia	coffee fern
Pentagramma triangularis	goldenback fern
GYMNOSPERMS	
CUPRESSACEAE	**CYPRESS FAMILY**
Cedrus deodara	deodar cedar
Chamaecyparis sp.*	false cypress
Juniperus sp.*	juniper
PINACEAE	**PINE FAMILY**
*Pinus halepensis**	Aleppo pine
ANGIOSPERMS (DICOTYLEDONS)	
ACERACEAE	**MAPLE FAMILY**
Acer negundo var. *californicum*	California box-elder
AMARANTHACEAE	**AMARANTH FAMILY**
*Amaranthus retroflexus**	rough pigweed
ANACARDIACEAE	**SUMAC OR CASHEW FAMILY**
Malosma laurina	laurel sumac
Rhus ovata	sugar bush
Rhus trilobata	skunkbrush
Toxicodendron diversilobum	poison oak
APIACEAE	**CARROT FAMILY**
*Conium maculatum**	poison hemlock
APOCYNACEAE	**DOGBANE FAMILY**
*Vinca major**	greater periwinkle
ASCLEPIADACEAE	**MILKWEED FAMILY**
Asclepias californica	California milkweed
ASTERACEAE	**SUNFLOWER FAMILY**
Acourtia microcephala	sacapellote
*Ageratina adenophora**	eupatory
Ambrosia acanthicarpa	annual bur-sage
*Anthemis cotula**	mayweed
Artemisia californica	California sagebrush
Artemisia douglasiana	mugwort
Artemisia dracunculus	tarragon
Baccharis pilularis	coyote brush
Baccharis pilularis (cultivar)*	coyote brush
Baccharis salicifolia	mule fat
Brickellia californica	California brickellbush
*Carduus pycnocephalus**	Italian thistle
*Centaurea melitensis**	tocalote

Scientific Name	Common Name
Chaenactis artemisiaefolia	white pincushion
Chaenactis glabriuscula	yellow pincushion
Cirsium occidentale var. *californicum*	cobweb thistle
*Cirsium vulgare**	bull thistle
Conyza canadensis	horseweed
*Cotula australis**	Australian brass-buttons
Eclipta prostrate	false daisy
Eriophyllum confertiflorum	golden yarrow
*Filago gallica**	fluffweed
Gnaphalium bicolor	bicolored cudweed
Gnaphalium californicum	California everlasting
Gnaphalium canescens	felty everlasting
*Gnaphalium luteo-album**	white cudweed
Helianthus annuus	common sunflower
Heterotheca grandiflora	telegraph weed
Heterotheca villosa	hairy false golden-aster
*Lactuca serriola**	prickly lettuce
Lepidospartum squamatum	scale-broom
Malacothrix saxatilis	cliff malacothrix
Rafinesquia californica	California chicory
Senecio flaccidus	shrubby butterweed
Sonchus asper ssp. *asper**	prickly sow thistle
*Sonchus oleraceus**	common sow thistle
Stylocline gnaphaloides	everlasting nest straw
*Taraxacum officinale**	common dandelion
Tetradymia canescens	spineless horsebrush
Xanthium strumarium	cocklebur
BETULACEAE	**BIRCH FAMILY**
Alnus rhombifolia	white alder
BIGNONIACEAE	**BIGNONIA FAMILY**
*Catalpa bignonioides**	southern catalpa
BORAGINACEAE	**BORAGE FAMILY**
Cryptantha intermedia	common forget-me-not
Heliotropium curassavicum	salt heliotrope
Turricula parryi	poodle dog bush
BRASSICACEAE	**MUSTARD FAMILY**
*Capsella bursa-pastoris**	shepherd's-purse
*Coronopus didymus**	wart cress
Descurainia pinnata	western tansy-mustard
*Hirschfeldia incana**	shortpod mustard
*Lepidium latifolium**	peppergrass
Lepidium sp.	peppergrass
*Lobularia maritima**	sweet-alyssum

Scientific Name	Common Name
*Raphanus sativus**	radish
Rorippa nasturtium-aquaticum	water-cress
*Sisymbrium altissimum**	tumble mustard
*Sisymbrium irio**	London rocket
CACTACEAE	**CACTUS FAMILY**
Opuntia basilaris	beavertail cactus
*Opuntia ficus-indica**	Indian fig
Opuntia littoralis	coastal prickly pear
CAPRIFOLIACEAE	**HONEYSUCKLE FAMILY**
Sambucus mexicana	Mexican elderberry
CARYOPHYLLACEAE	**PINK FAMILY**
*Cerastium glomeratum**	mouse-ear chickweed
*Polycarpon tetraphyllum**	four-leaved allseed
*Spergularia bocconii**	Boccone's sandspurrey
*Stellaria media**	common chickweed
CHENOPODIACEAE	**GOOSEFOOT FAMILY**
*Chenopodium album**	lamb's quarters
*Chenopodium ambrosioides**	Mexican tea
*Chenopodium pumilio**	clammy goosefoot
*Salsola tragus**	Russian thistle
CONVOLVULACEAE	**MORNING-GLORY FAMILY**
Calystegia macrostegia	western bindweed
CRASSULACEAE	**STONECROP FAMILY**
Dudleya lanceolata	lance-leaved dudleya
CUCURBITACEAE	**GOURD FAMILY**
*Cucurbita pepo**	pumpkin
Marah macrocarpus	wild cucumber
CUSCUTACEAE	**DODDER FAMILY**
Cuscuta californica	California dodder
ERICACEAE	**HEATH FAMILY**
Arctostaphylos sp.	manzanita
EUPHORBIACEAE	**SPURGE FAMILY**
*Chamaesyce maculata**	spotted spurge
Eremocarpus setigerus	dove weed
*Ricinus communis**	castor-bean
FABACEAE	**LEGUME FAMILY**
*Acacia baileyana**	mimosa acacia
*Acacia longifolia**	Sydney golden wattle
*Genista monspessulana**	French broom
Lotus purshianus var. *purshianus*	Spanish clover
Lotus scoparius	deerweed
Lotus sp.	lotus
Lotus strigosus	strigose lotus

Scientific Name	Common Name
Lupinus bicolor	miniature lupine
Lupinus excubitus ssp. *austromontanus*	grape soda lupine
Lupinus hirsutissimus	stinging lupine
Lupinus sp.	lupine
Lupinus sparsiflorus	Coulter's lupine
*Medicago polymorpha**	bur clover
*Melilotus indica**	sourclover
*Spartium junceum**	Spanish broom
Trifolium sp.	clover
FAGACEAE	**OAK FAMILY**
Quercus agrifolia	coast live oak
Quercus engelmannii	Engelmann oak
GENTIANACEAE	**GENTIAN FAMILY**
Centaurium venustum	canchalagua
GERANIACEAE	**GERANIUM FAMILY**
*Erodium brachycarpum**	long-beaked filaree
*Erodium cicutarium**	red-stemmed filaree
GROSSULARIACEAE	**GOOSEBERRY FAMILY**
Ribes aureum	golden currant
HYDROPHYLLACEAE	**WATERLEAF FAMILY**
Emmenanthe penduliflora	whispering bells
Eriodictyon crassifolium	thick-leaved yerba santa
Eriodictyon trichocalyx	hairy yerba santa
Eucrypta chrysanthemifolia	common eucrypta
Phacelia brachyloba	short-lobed phacelia
Phacelia cicutaria	caterpillar phacelia
Phacelia grandiflora	large-flowered phacelia
Phacelia minor	wild canterbury-bell
Phacelia ramosissima	branching phacelia
JUGLANDACEAE	**WALNUT FAMILY**
Juglans californica	California black walnut
LAMIACEAE	**MINT FAMILY**
*Lamium amplexicaule**	henbit
*Marrubium vulgare**	horehound
Salvia apiana	white sage
Salvia columbariae	chia
Salvia mellifera	black sage
Trichostema lanatum	woolly bluecurls
LOASACEAE	**LOASA FAMILY**
Mentzelia micrantha	small-flowered stick-leaf
LYTHRACEAE	**LOOSESTRIFE FAMILY**
Lythrum californicum	California loosestrife

Scientific Name	Common Name
MALVACEAE	**MALLOW FAMILY**
*Malva parviflora**	cheeseweed
MORACEAE	**MULBERRY FAMILY**
*Ficus carica**	edible fig
MYRTACEAE	**MYRTLE FAMILY**
*Callistemon citrinus**	crimson bottlebrush
*Eucalyptus globulus**	blue gum
*Syzygium paniculatum**	magenta cherry
OLEACEAE	**OLIVE FAMILY**
Fraxinus velutina	velvet ash
*Olea europaea**	olive
ONAGRACEAE	**EVENING PRIMROSE FAMILY**
Camissonia bistorta	California suncup
Camissonia californica	California evening primrose
Camissonia confusa	San Bernardino suncup
Camissonia hirtella	suncup
Clarkia purpurea ssp. *quadrivulnera*	four spot
Epilobium ciliatum	California cottonweed
Gayophytum sp.	groundsmoke
Oenothera elata ssp. hookeri	Hooker's evening primrose
PAPAVERACEAE	**POPPY FAMILY**
Argemone munita	prickly poppy
PASSIFLORACEAE	**PASSION-FLOWER FAMILY**
*Passifloraceae caerulea**	common passion flower
PLANTAGINACEAE	**PLANTAIN FAMILY**
*Plantago indica**	Indian plantain
*Plantago lanceolata**	English plantain
PLATANACEAE	**SYCAMORE FAMILY**
Platanus racemosa	western sycamore
POLEMONIACEAE	**PHLOX FAMILY**
Allophyllum gilioides	false gilia
Eriastrum sapphirinum	sapphire eriastrum
Gilia capitata	blue field gilia
POLYGONACEAE	**BUCKWHEAT FAMILY**
Eriogonum elongatum	long-stemmed buckwheat
Eriogonum fasciculatum	California buckwheat
Eriogonum roseum	wand buckwheat
*Polygonum arenastrum**	common knotweed
Polygonum lapathifolium	willow-weed
Pterostegia drymarioides	California thread-stem
*Rumex conglomeratus**	dock
*Rumex crispus**	curly dock

Scientific Name	Common Name
PORTULACACEAE	**PURSLANE FAMILY**
*Portulaca oleracea**	common purslane
PRIMULACEAE	**PRIMROSE FAMILY**
*Anagallis arvensis**	scarlet pimpernel
RANUNCULACEAE	**BUTTERCUP FAMILY**
Clematis pauciflora	ropevine
RHAMNACEAE	**BUCKTHORN FAMILY**
Ceanothus crassifolius	hoary leaf ceanothus
Ceanothus papillosus	wart-leafed ceanothus
Rhamnus californica	California coffeeberry
Rhamnus crocea	spiny redberry
Rhamnus ilicifolia	holly-leaf redberry
ROSACEAE	**ROSE FAMILY**
Adenostoma fasciculatum	chamise
Heteromeles arbutifolia	toyon
*Prunus persica**	peach
Prunus sp.	cherry
Rosa californica	California wild rose
*Rubus discolor**	Himalayan blackberry
RUBIACEAE	**MADDER FAMILY**
Galium angustifolium	narrow-leaved bedstraw
SALICACEAE	**WILLOW FAMILY**
Populus fremontii	Fremont cottonwood
Populus balsamifera ssp. *trichocarpa*	black cottonwood
Salix gooddingii	black willow
Salix laevigata	red willow
Salix lasiolepis	arroyo willow
Salix lucida ssp. *caudata*	shining willow
SAURURACEAE	**LIZARD'S-TAIL FAMILY**
Anemopsis californica	yerba mansa
SAXIFRAGACEAE	**SAXIFRAGE FAMILY**
Boykinia rotudifolia	round-leaved boykinia
SCROPHULARIACEAE	**FIGWORT FAMILY**
Antirrhinum coulterianum	white snapdragon
*Antirrhinum multiflorum**	multiflowered snapdragon
Cordylanthus rigidus ssp. *setigerus*	bird's-beak
Keckiella cordifolia	heart leaved keckiella
Mimulus aurantiacus var. *pubescens*	orange bush monkey-flower
Mimulus brevipes	wide-throated monkey-flower
Mimulus cardinalis	scarlet monkey-flower
Mimulus floribundus	many-flowered monkey-flower
Mimulus pilosus	mimenanthe
Mimulus guttatus	common monkey-flower

Scientific Name	Common Name
Scrophularia californica	California figwort
*Verbascum thapsus**	woolly mullein
*Verbascum virgatum**	wand mullein
*Veronica anagallis-aquatica**	water speedwell
SIMAROUBACEAE	**QUASSIA FAMILY**
*Ailanthus altissima**	tree of heaven
SOLANACEAE	**NIGHTSHADE FAMILY**
*Datura wrightii**	jimson weed
*Nicotiana glauca**	tree tobacco
Nicotiana quadrivalvis	Wallace's tobacco
Solanum sp.	nightshade
Solanum douglasii	Douglas' nightshade
*Solanum rostratum**	buffalo berry
Solanum xanti	chaparral nightshade
ULMACEAE	**ELM FAMILY**
*Ulmus parvifolia**	Chinese elm
VERBENACEAE	**VERVAIN FAMILY**
*Lantana montevidensis**	trailing lantana
*Verbena tenuisecta**	fineleaf verbena
VIOLACEAE	**VIOLET FAMILY**
Viola sp.*	violet
VITACEAE	**GRAPE FAMILY**
*Tetrastigma voinierianum**	lizard vine
ZYGOPHYLLACEAE	**CALTROP FAMILY**
*Tribulus terrestris**	puncture vine
ANGIOSPERMS (MONOCOTYLEDONS)	
AGAVACEAE	**AGAVE FAMILY**
Agave desertii (ornamental)*	agave
ARECACEAE	**PALM FAMILY**
*Archontophoenix cunninghamiana**	king palm
Phoenix sp.*	date palm
*Washingtonia robusta**	Mexican fan palm
Washingtonia sp.	fan palm
CYPERACEAE	**SEDGE FAMILY**
Cyperus eragrostis	tall cyperus
*Cyperus involucratus**	umbrella-plant
JUNCACEAE	**RUSH FAMILY**
Juncus xiphioides	iris-leaved rush
LILIACEAE	**LILY FAMILY**
*Yucca elephantipes**	giant yucca
Yucca whipplei	Our Lord's candle

Scientific Name	Common Name
POACEAE	**GRASS FAMILY**
*Agrostis stolonifera**	redtop
*Arundo donax**	giant reed
*Avena barbata**	slender wild oat
Bromus carinatus	California brome
*Bromus diandrus**	ripgut grass
*Bromus hordeaceus**	soft chess
Bromus madritensis ssp. *rubens**	foxtail chess
*Cynodon dactylon**	Bermuda grass
*Digitaria sanguinalis**	hairy crabgrass
Distichlis spicata	saltgrass
*Festuca arundinacea**	tall fescue
*Hordeum murinum**	glaucous foxtail barley
Melica imperfecta	coast range melic
Paspalum sp.*	dallis grass
*Pennisetum setaceum**	fountain grass
*Piptatherum miliaceum**	smilo grass
*Poa annua**	annual bluegrass
*Polypogon monspeliensis**	annual beard grass
*Schismus barbatus**	Mediterranean schismus
*Sorghum halepense**	Johnsongrass
*Vulpia myuros**	fescue
TYPHACEAE	**CATTAIL FAMILY**
Typha domingensis	slender cattail

** Indicates non-native species.*

APPENDIX B – WILDLIFE SPECIES OBSERVED/DETECTED ONSITE

Wildlife Species Observed/Detected During the Biological Reconnaissance Survey in the Devil's Gate Survey Area

Scientific Name	Common Name
CLASS AMPHIBIA	**AMPHIBIANS**
BUFONIDAE	**True Toads**
Bufo boreas	western toad
HYLIDAE	**Treefrogs**
Hyla cadaverina	California treefrog
CLASS REPTILIA	**REPTILES**
PHRYNOSOMATIDAE	**FENCE, ZEBRA-TAILED, EARLESS, FRINGE-TOED, SPINY, TREE, SIDE-BLOTCHED, AND HORNY LIZARDS**
Uta stansburiana	Common side-blotch lizard
Sceloporus occidentalis	western fence lizard
TEIIDAE	**WHIPTAILS**
Aspidoscelis tigris	western whiptail
COLUBRIDAE	**COLUBRID SNAKES**
Thamnophis hammondii	two-striped garter snake
CLASS AVES	**BIRDS**
ANATIDAE	**DUCKS, GEESE, SWANS**
Anas platyrhynchos	mallard
ODONTOPHORIDAE	**NEW WORLD QUAIL**
Callipepla californica	California quail
ARDEIDAE	**HERONS, EGRETS**
Egretta thula	snowy egret
CARTHARTIDAE	**VULTURES**
Cathartes aura	turkey vulture
ACCIPTRIDAE	**HAWKS, EAGLES, HARRIERS**
Accipiter cooperii	Cooper's hawk
Buteo lineatus	red-shouldered hawk
Buteo jamaicensis	red-tailed hawk
FALCONIDAE	**FALCONS**
Falco sparverius	American kestrel
CHARADRIIDAE	**PLOVERS**
Charadrius vociferus	killdeer
COLUMBIDAE	**DOVES, PIGEONS**
Columba livia	rock pigeon
Zenaida macroura	mourning dove
PSITTACIDAE	**PARROTS, PARAKEETS, RELATIVES**
Amazona viridigenalis	red-crowned parrot
APODIDAE	**SWIFTS**

Scientific Name	Common Name
Aeronautes saxatalis	white-throated swift
TROCHILIDAE	**HUMMINGBIRDS**
Calypte anna	Anna's hummingbird
Selasphorus sasin	Allen's hummingbird
PICIDAE	**WOODPECKERS**
Melanerpes formicivorus	acorn woodpecker
Picoides pubescens	downy woodpecker
TYRANNIDAE	**TYRANT FLYCATCHERS**
Contopus sordidulus	western wood-pewee
Empidonax difficilis	pacific-slope flycatcher
Sayornis nigricans	black phoebe
Myiarchus cinerascens	ash-throated flycatcher
VIREONIDAE	**VIREOS**
Vireo huttoni	Hutton's vireo
HIRUNDINIDAE	**SWALLOWS**
Stelgidopteryx serripennis	northern rough-winged swallow
Hirundo rustica	barn swallow
CORVIDAE	**JAYS, CROWS, RAVENS**
Aphelocoma californica	western scrub-jay
Corvus brachyrhynchos	American crow
Corvus corax	common raven
PARIDAE	**CHICKADEES**
Baeolophus inornatus	oak titmouse
AEGITHALIDAE	**BUSHTITS**
Psaltriparus minimus	bushtit
TROGLODYTIDAE	**WRENS**
Thryomanes bewickii	Bewick's wren
Troglodytes aedon	house wren
SYLVIIDAE	**Gnatcatchers and Relatives**
Polioptila caerulea	blue-grey gnatcatcher
MIMIDAE	**MOCKINGBIRDS, THRASHERS**
Mimus polyglottos	northern mockingbird
STURNIDAE	**STARLINGS**
Sturnus vulgaris	European starling
PTILOGONATIDAE	**SILKY FLYCATCHERS**
Phainopepla nitens	phainopepla
PARULIDAE	**WOOD WARBLERS**
Vermivora celata	orange-crowned warbler
Dendroica petechia	yellow warbler
Geothlypis trichas	common yellowthroat

Scientific Name	Common Name
EMBERIZIDAE	**NEW WORLD SPARROWS, TOWHEES, REILATIVES**
Melospiza melodia	song sparrow
Pipilo crissalis	California towhee
Pipilo maculatus	spotted towhee
CARDINALIDAE	**CARDINALS, RELATIVES**
Pheucticus melanocephalus	black-headed grosbeak
ICTERIDAE	**BLACKBIRDS, GRACKLES, ORIOLES**
Agelaius phoeniceus	red-winged blackbird
Euphagus cyanocephalus	Brewer's blackbird
Molothrus ater	brown-headed cowbird
Icterus bullockii	Bullock's oriole
FRINGILLIDAE	**FINCHES**
Carduelis psaltria	lesser goldfinch
Carpodacus mexicanus	house finch
PASSERIDAE	**OLD WORLD SPARROWS**
Passer domesticus	house sparrow
ESTRILDIDAE	**WAXBILLS AND RELATIVES**
Lonchura punctulata	nutmeg mannikin
CLASS MAMMALIA	**MAMMALS**
DIDELPHIDAE	**NEW WORLD OPOSSUMS**
Didelphis virginiana	Virginia opossum
LEPORIDAE	**RABBITS, HARES**
Sylvilagus audubonii	desert cottontail
SCIURIDAE	**SQUIRRELS, CHIPMONKS, MARMOTS**
Sciurus griseus	western gray squirrel
Spermophilus beecheyi	California ground squirrel
CANIDAE	**CANINES, WOLVES, FOXES**
Canis familiaris	domestic dog
Canis latrans	coyote
Urocyon cinereoargenteus	grey fox
PROCYONIDAE	**RACCOONS**
Porocyon lotor	Raccoon
MUSTELIDAE	**WEASELS, SKUNKS, OTTERS**
Mephitis mephitis	striped skunk
FELIDAE	**FELINES**
Lynx rufus	bobcat
CERVIDAE	**DEER**
Odocoileus hemionus	mule deer
EQUIDAE	**HORSES, BURROS**
Equus caballus	horse

APPENDIX C – SITE PHOTOGRAPHS

APPENDIX C – SITE PHOTOGRAPHS

Photo 1: Photo taken looking northwest depicting the Arroyo Seco stream in the Devil's Gate Reservoir directly behind the dam wall. Scoured and Black Willow Series vegetation communities are within the reservoir along the ephemeral stream.

Photo 2: Photo depicts Riparian herbaceous community with Mulefat Scrub behind it and Oak Woodland on the slopes in the background.

Photo 3: Photo taken looking east depicting one of the many inactive retention basins within the reservoir and Survey Area. This was the only basin that contained water. The water in the basin was a result of rain water and is dry most of the year. The basin is surrounded by disturbed Upland vegetation.

Photo 4: Photo depicting disturbed areas and Coastal Sage Scrub communities. Residential areas border the reservoir on the east.

APPENDIX D 2– General Biological Resources & Presence/Absence Fish Surveys

February 13, 2013

Thomas Budinger
Water Resources Division
Los Angeles County Department of Public Works
900 South Fremont Avenue
Alhambra, CA 91803

Subject: REPORT OF FINDINGS FOR THE GENERAL BIOLOGICAL RESOURCE & PRESENCE/ABSENCE FISH SURVEYS, LOS ANGELES COUNTY, CALIFORNIA

Dear Mr. Budinger:

Chambers Group, Inc. (Chambers Group) was retained by the County of Los Angeles Department of Public Works (LACDPW) to conduct a literature review and reconnaissance-level biological surveys services. These services are in support of the Environmental Impact Report (EIR) analysis (in progress) for the Devil's Gate Dam and Reservoir Post Fire Sediment Removal Project in the City of Pasadena, Los Angeles County as requested by the LACDPW. This memo report describes potential impacts to biological resources under a proposed sluicing alternative for sediment removal. All sensitive species identified with a potential to occur on the Project site were included in the habitat assessment.

Project Background

In 2009, the Station Fire burned through more than 160,000 acres the Angeles National Forest in Los Angeles County. Approximately 68 percent of the 31.9 square mile Arroyo Seco Channel watershed tributary to the Devil's Gate Dam and Reservoir was burned during this event. Due to the denuding of this large natural tributary area, large sediment loads (in excess of 1 million cubic yards) were deposited within the reservoir area during the subsequent storm seasons.

LACDPW is currently preparing an Environmental Impact Report for a proposed sediment removal project at Devil's Gate Dam to regain flood control capacity. The potential associated impacts to biological resources downstream of the dam (Project) due to a sluicing alternative for sediment removal is analyzed in this document. The Project site for this biological report includes the Arroyo Seco Channel, which flows from Devil's Gate Dam, and the Los Angeles River where the Arroyo Seco Channel enters the river then downstream to the Pacific Ocean.

Sluicing Alternative

Sluicing activities would emulate the natural movement of sediment to downstream sections of the channel. The purpose of a sluice operation is to remove accumulated sediment from the reservoir using flowing water as the primary removal method. A FAST operation is a type of sluicing as it also uses storm runoffs to flush the sediment out of the reservoir. FASTing works effectively when sediment deposition behind the dam is minimal. A FAST operation, if performed regularly, can be used to prevent sediment accumulation in

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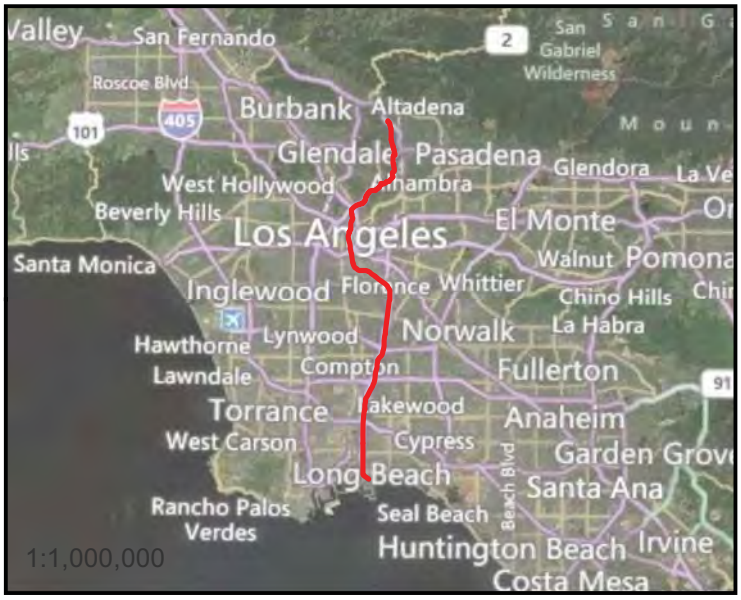
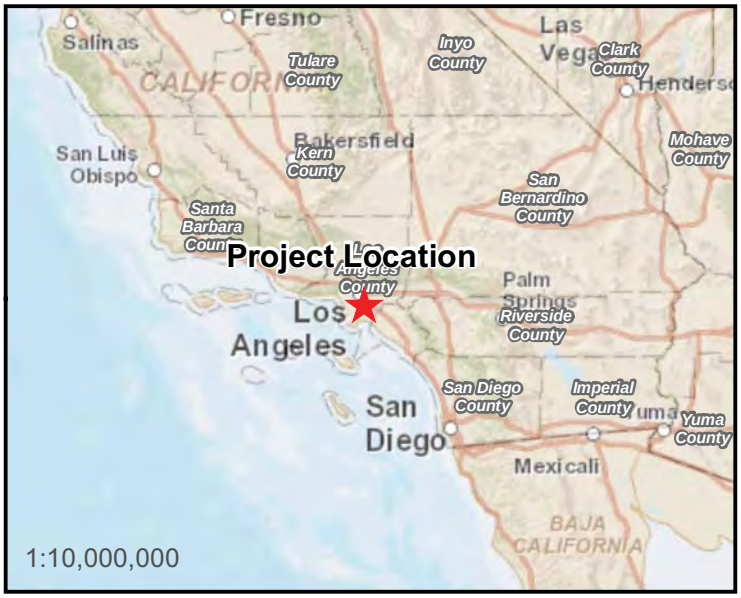
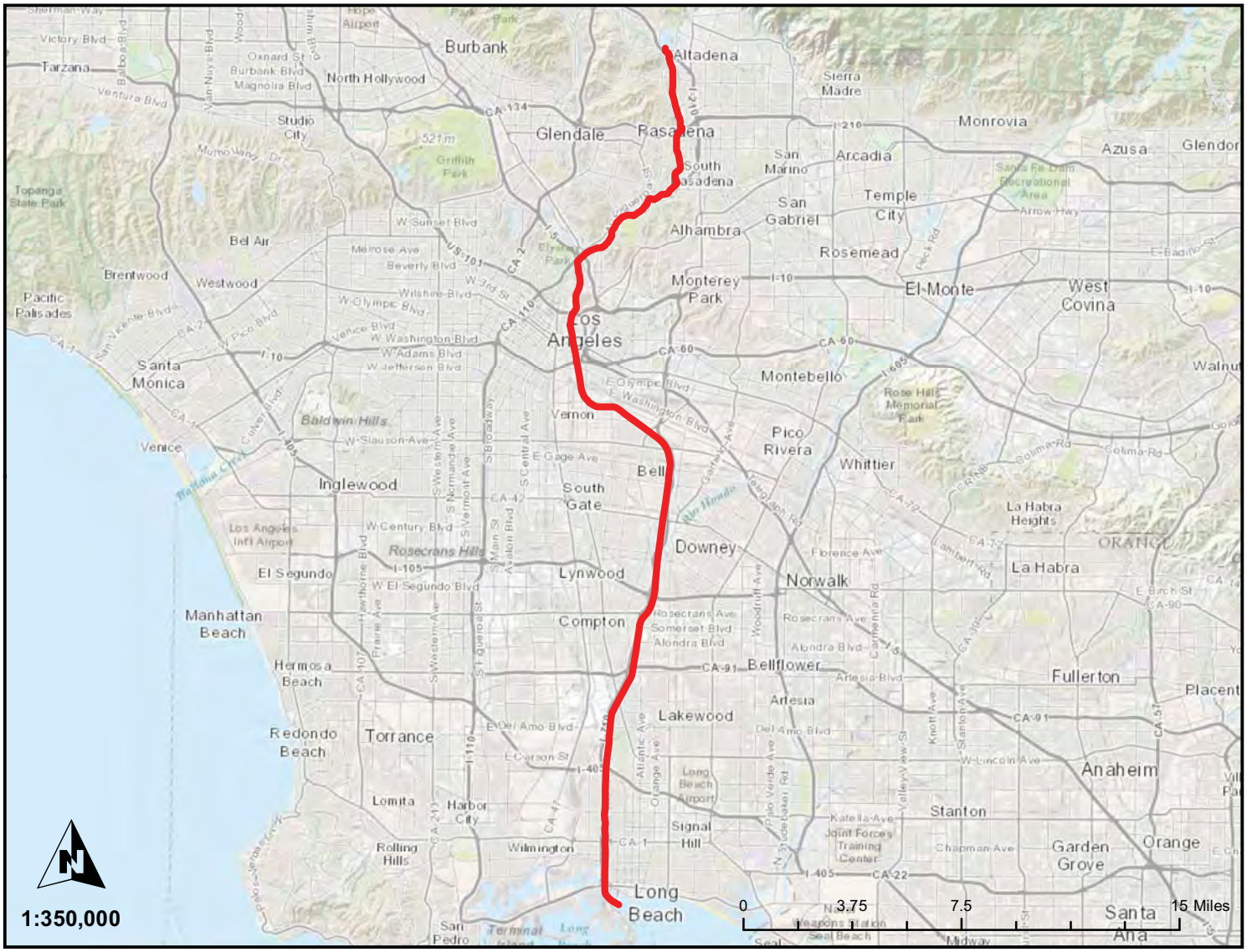
the reservoir and thus help maintain its design capacity. A sluicing operation typically removes more sediment than a FAST operation due to the use of mechanical assistance during sluicing. Sluicing at Devil's Gate Dam and Reservoir would involve allowing water to transport sediment suspended in natural flows by mechanically agitating, or pushing the sediment into the flows with the aid of bulldozers, and opening the sluice gate to allow water and sediment to be discharged downstream. The amount of sediment that will be removed through sluicing or FAST operations is limited by the amount of storm runoff or the amount of water available to store.

Arroyo Seco Channel and Los Angeles River

The Arroyo Seco Channel is a Relatively Permanent Waterway (RPW) that flows from the Devil's Gate Dam in a southwest direction for approximately 9.5 miles before it confluences with the Los Angeles River. From the confluence, the Los Angeles River a Traditionally Navigable Waterway (TNW) then flows approximately 24.5 miles to the Pacific Ocean. Flash floods are common in the Arroyo Seco Channel and Los Angeles River, which naturally moves large amounts of sediments downstream. Natural rain events in the Arroyo Seco Channel region often produce very large flows in a short time period and return to normal within a few days of the storm. According to the inflow data from 2006 and 2007 at the Devil's Gate Dam, the average natural inflow of water ranges between 0 and 5 cubic feet per second (cfs). During small rain events, the water quickly rises to 6 to 8 cfs. Large rain events took place around five times per year during this span. In these storm events, flows would rise from 2 cfs to over 300 cfs in the span of one hour; the maximum flow observed during the two-year span produced a reading of 1,353.7 cfs on February 27, 2007. The Arroyo Seco Channel is often very narrow with stream widths less than 30 feet wide. When storm events occur, the water can rise several feet in narrow sections. This was confirmed during the field surveys where debris lines and destruction of vegetation was often found five feet off the ground.







Project Boundary

Figure 1

Devil's Gate Sediment Removal Project
Site Location and Vicinity Map

Version Date: 11/28/2012

CHAMBERS GROUP

Y:\Projects\20536 Devil's Gate Dam Downstream Bio Surveys\MXD\Figure 1 Site Location and Vicinity Map.mxd

METHODOLOGY

Literature Review

Prior to conducting the field surveys, existing documentation relevant to the Project site was reviewed. The most recent records of the California Department of Fish and Game (CDFG) California Natural Diversity Database (CNDDB 2012) and the California Native Plant Society's Electronic Inventory (CNPSEI) of Rare and Endangered Vascular Plants of California (CNPSEI 2012) were reviewed for the quadrangles containing and surrounding the Project site (i.e., *Pasadena, Los Angeles, South Gate, Long Beach* California USGS 7.5 minute quadrangles). The databases contains records of reported occurrences of federal- or state-listed as endangered or threatened species, proposed endangered or threatened species, former Federal Species of Concern (FSC), California Species of Special Concern (SSC), or otherwise sensitive species or habitats that may occur within or in the vicinity of the Project site.

Biological Resource and Presence/Absence Fish

Biological resource surveys were conducted on the Project site in order to identify any potential for sensitive species to occur and identify habitats that can support special status wildlife species. Based on the type of sluicing activities proposed, potential impacts would be relegated to in-stream environments, especially to fish species. Prior to the biological surveys, a desktop analysis was performed to identify sections of the Arroyo Seco Channel and Los Angeles River with potential suitable fish habitat. The surveys were targeted to locations with suitable fish habitat for the presence or absence of fish populations. Areas that were concrete lined only and did not provide cover/shelter or foraging opportunities for fish were not visually scanned for fish in the field. However, areas that were concrete lined but had sediment deposits or scattered vegetation was surveyed for fish populations. Potential suitable habitats for sensitive wildlife species were also identified; and were located in the same areas for potential fish habitat. The field surveys also included searches for sensitive avian species, and followed recommendations set forth in the *Handbook of Field Methods for Monitoring Landbirds* (Ralph et. al 1993).

Chambers Group biologists Paul Morrissey, Heather Franklin, Leslie Levy, Corey Vane, and Ian Maunsell conducted the biological resource surveys on October 31, November 1 and 2, 2012. Chambers Group biologists surveyed from below the dam in the Arroyo Seco Channel, to the confluence with the Los Angeles River, downstream to the Pacific Ocean. During the field surveys, Chambers Group biologists confirmed the desktop analysis by walking and driving the entire river channel. Binoculars were used where access was not feasible to survey 100 percent cover of the Arroyo Seco and the potentially impacted portion of the Los Angeles River. In areas where suitable sensitive species and fish habitat were identified, the biologists walked the river course documenting stream characteristics such as riffle and run complexes, ponded areas, streambed composition, channelization, fish barriers, and vegetation in the stream as well as on the banks and surrounding area. When suitable fish habitat was present, biologists walked within the stream utilizing an aquascope, seine, and dip nets to identify the presence of fish. The results of the surveys were recorded on standardized data sheets. Photographs of the Project site were also recorded to document existing conditions. All wildlife and wildlife sign detected, including tracks, scat, carcasses, and vocalizations were recorded. A comprehensive list of wildlife species observed during the surveys was recorded and is provided in Attachment A. A list of plant species observed during the surveys is provided in Attachment B. Site photos are provided in Attachment C. Maps of the CNDDB database occurrences and the survey areas are included as Attachment D.

Sensitive Wildlife and Plant species

The following information was used to determine the potential for biological resources to occur within the Project site. Special species status rankings are outlined below. The criteria used to evaluate the potential for sensitive species to occur on the Project site are outlined in Table 1. Species occurrences resulting in the CNDDB and CNPSEI searches dating from 1960 to present was used to analyze potential for species occurrence. The records prior to 1960 do not reflect the current conditions within and near the Arroyo Seco Channel and Los Angeles River.

Special Species Status rankings

Rare Plant Rank (RPR; formally known as CNPS List)

List 1A	=	Plants presumed extinct in California.
List 1B	=	Plants rare and endangered in California and throughout their range.
List 2	=	Plants rare, threatened or endangered in California but more common elsewhere in their range.
List 3	=	Plants about which we need more information; a review list.
List 4	=	Plants of limited distribution; a watch list.

RPR Extensions

0.1	=	Seriously endangered in California (greater than 80 percent of occurrences threatened/high degree and immediacy of threat).
0.2	=	Fairly endangered in California (20-80 percent occurrences threatened).
0.3	=	Not very endangered in California (less than 20 percent of occurrences threatened).

Federal

FE	=	Federally listed; Endangered
FT	=	Federally listed; Threatened
FC	=	Federal Candidate for listing
FPT	=	Federal Proposed listing as Threatened

State

ST	=	State listed; Threatened
SE	=	State listed; Endangered
RARE	=	State-listed; Rare (Listed "Rare" animals have been re-designated as Threatened, but Rare plants have retained the Rare designation.)
SSC	=	California Species of Special Concern
WL	=	CDFG Watch List
WBWG	=	Western Bat Working Group (low, moderate, or high designated species)

Table 1: Criteria for Evaluating Sensitive Wildlife and Plant Species Potential for Occurrence (PFO)

PFO	CRITERIA
Absent:	Species is restricted to habitats or environmental conditions that do not occur within the Project site or CNDDB records indicate sightings prior to the year 1960.
Low:	Historical records for this species do not exist within the immediate vicinity of the Project site, and/or habitats or environmental conditions needed to support the species are of poor quality.
Moderate:	Either a historical record exists of the species within the immediate vicinity of the Project site (less than 1 mile) and marginal habitat exists on the Project site, or the habitat requirements or environmental conditions associated with the species occur within the Project site, but no historical records exist within 1 mile of the Project site.
High:	Both a historical record exists of the species within the Project site or its immediate vicinity (less than 1 mile), and the habitat requirements and environmental conditions associated with the species occur within the Project site. CNDDB records indicate sightings after the year of 1960.
Present:	Species was detected within the Project site at the time of the survey.

RESULTS

Literature Review

According the literature review, 10 special status plant and 10 special status wildlife species were documented to occur within 1 mile of the Project site. This list included two wildlife species that are federal- and/or state-listed endangered or threatened.

Sensitive Species

The following 10 special status plant species are considered absent from the Project site due to the lack of suitable habitat and/or CNDDB records indicate that sightings occurred prior to 1960. Several records were recorded before the land was developed and the river was channelized (channelization occurred in the 1930s). There were also records of plant species that are characterized as locally extinct according to the RPR. Suitable habitat for the following plants consist of upland habitat will not be affected by sluicing activities and therefore, will not be impacted by sluicing activities:

- Robinson's pepper-grass (*Lepidium virginicum var. robinsonii*)- RPR 1B.2
- Greata's aster (*Symphyotrichum greatae*)- RPR 1B.3

- mesa horkelia (*Horkelia cuneata* var. *puberula*)- RPR 1B.1
- round-leaved filaree (*California macrophylla*)- RPR 1B.1
- Plummer's mariposa-lily (*Calochortus plummerae*)- RPR 4.2
- Nevin's barberry (*Berberis nevinii*)- RPR 1B.1
- Parish's gooseberry (*Ribes divaricatum var. parishii*)- RPR 1A
- estuary seablite (*Suaeda esteroa*)- RPR 1B.2
- Coulter's goldfields (*Lasthenia glabrata* ssp. *Coulteri*)- RPR 1B.1
- prostrate vernal pool navarretia (*Navarretia prostrate*)- RPR 1B.1

The following five sensitive wildlife species are considered **ABSENT** from the Project site due to a lack of suitable habitat downstream of the dam and/or historical records of the species occurring prior to the year 1960:

- American badger (*Taxidea taxus*)- SSC
- Burrowing owl (*Athene cunicularia*)- SSC
- Coast horned lizard (*Phrynosoma blainvillii*)- SSC
- southwestern willow flycatcher (*Empidonax traillii extimus*)- **FE, SE**
- southern grasshopper mouse (*Onychomys torridus ramona*)- SSC

The following five special status wildlife species have a **LOW** potential to occur on the Project site due to the presence of low quality suitable habitat and/or historical records of these species occurring after the year 1960:

- **Big free-tailed bat (*Nyctinomops macrotis*) – SSC, WBWG - Mod**
  This species is rare in California. Migrants are known to occur in southern California; however, it is unlikely to breed at the Project site (CDFG 2002). This species requires rocky areas and caves in order to roost (small maternal nursery); therefore, it is unlikely this species would roost within the channel below the dam. Some potential roost habitat may exist near the Devil's Gate Reservoir and Arroyo Seco Channel area north of the 210 freeway; however, potential bat habitat will not be affected by sluicing activities.

  Records from the CNDDB have not identified big free-tailed bats in the area since 1985; therefore, big free-tailed bats have a LOW potential to forage on the Project site.

- **Hoary bat (*Lasiurus cinereus*) – WBWG - Mod**
  The hoary bat is a Western Bat Working Group (WBWG) moderate-priority species. The Western Bat Working Group is comprised of agencies, organizations and individuals interested in bat research, management and conservation from the 13 western states and provinces. This species is a special mention species, and is not considered a SSC by CDFG. The hoary bat occurs in a variety of habitats across the North American continent but has a patchy distribution in southeastern California (CDFG 2002). This species winters in coastal and southern California, but can be widespread during migration. Suitable breeding habitat includes all woodland and forest habitat with medium to large-sized trees and dense foliage. This species can be found from sea level to 13,200 feet. This solitary bat prefers to roost in dense foliage in sites that are hidden from above with few branches below and near areas with water. During migration in southern California, males are found in foothills,

deserts, and mountains; while females prefer lowlands and coastal valleys. This species prefers to rear their young in deciduous trees in forested habitats.

Although deciduous trees are abundant in portions of the Arroyo Seco Channel and Los Angeles River, the bats roosting habitat will not be affected by sluicing activities. Records from the CNDDB have not identified hoary bats in the area since 1942; therefore, hoary bats have a LOW potential to occur on the Project site.

- **Least Bell's vireo (*Vireo bellii pusillus*) - FE, SE**
  Preferred nesting habitat for least Bell's vireo is low, dense, scrubby vegetation in early successional areas and this species is particularly dependent on riparian areas. Habitats may include willow woodlands, dense mule fat, scrub oak, coastal chaparral, and mesquite patches with dense early successional understories. It builds a suspended cup nest about 0.5 to 2.0 meters above the ground and, on average, lays four eggs. It may produce two broods per season. On the breeding grounds, the least Bell's vireo feeds primarily on insects and small spiders. No suitable nesting habitat exists downstream of the dam along the Arroyo Seco Channel and Los Angeles River to the Pacific Ocean. Records from the CNDDB indicate that the species was indentified in the Devil's Gate flood basin in July of 2012. This species is not known to breed in the reservoir area and is presumed to be a migrant vireo foraging in the area; however, suitable habitat is present in the reservoir area.

  Because there is no suitable nesting habitat downstream of the dam, least Bell's vireo has a LOW potential to forage in the Arroyo Seco Channel below the dam. However, this species will not be affected by sluicing activities taking place downstream of the Devil's gate Dam.

- **Silver-haired bat (*Lasionycteris noctivagans*) – WBWG - Mod**
  The silver-haired bat is a Western Bat Working Group (WBWG) moderate-priority species. The Western Bat Working Group is comprised of agencies, organizations, and individuals interested in bat research, management, and conservation from the 13 western states and provinces. The silver-haired bat's distribution includes coast and montane forest from the Oregon border south along the coast to San Francisco Bay and along the Sierra Nevada and Great Basin region to Inyo County. It is also found in southern California from Ventura and San Bernardino counties south to Mexico and on the Channel Islands. Silver-haired bats are migratory and may be found anywhere in California during migrations. This species is primarily a forest dweller and roosts in hollow trees, snags, buildings, rock crevices, caves, and under bark. The silver-haired bat mates in autumn, starting in late August; and the young are born from May to July. This species may forage with other bat species, feeding on moths, but has been found to feed on other types of prey, such as beetles and other hard-shelled insects. It prefers to feed over streams, ponds, and open brushy areas, usually less than 20 feet above the pond or stream surface or ground. Forested areas occur near the Arroyo Seco Channel area; however, the quality of the habitat is not ideal.

  Records from the CNDDB have not identified silver-haired bats in the area since 1986 and that particular area is now developed. Therefore, silver-haired bats have a LOW potential to occur within the channel downstream of the dam. However, this species will not be affected by sluicing activities taking place downstream of the Devil's gate Dam.

- **Western mastiff bat (*Eumops perotis californicus*) – SSC, WBWG - High**
  The western mastiff bat is a permanent resident throughout its range in southern California, southern Arizona, Texas, and south to South America. With a wingspan approaching 2 feet, the western mastiff bat is the largest bat species in North America. It is also unique in that its call can be readily identified with the unaided ear. It roosts in small colonies or individually in primarily natural substrates such as cliff faces, large boulders, and exfoliating rock surfaces. It is less commonly found in artificial structures such as buildings and roof tiles. It is found in a wide variety of habitats, including desert scrub, chaparral, woodlands, floodplains, and grasslands. Reasons for observed population declines are unknown.

  Records from the CNDDB have not identified western mastiff bats in the area since 1972 and that particular area is now developed. Therefore, western mastiff bats have a LOW potential to occur downstream of the dam. However, this species will not be affected by sluicing activities taking place downstream of the Devil's gate Dam.

General Biological Resource Survey

The majority of the Arroyo Seco Channel consists of a concrete-lined channel. The sections of concrete-lined channel are a total of approximately nine miles in length. Two sections of the Arroyo Seco Channel were identified to have natural sediment bottoms, and these sections encompass a total of approximately half of a mile in length. The Los Angeles River from where the Arroyo Seco Channel enters the Los Angeles River to the Pacific Ocean also mainly consists of a concrete-lined river. The concrete-lined sections of this portion of the Los Angeles River are a total of approximately 21 miles in length. Sections of the Los Angeles River were identified as having concreted riprap and these sections included a total of approximately 4 miles in length. The majority of the concreted riprap sections were located in Long Beach from West Willow Street south to the Pacific Ocean. This section was approximately 90 percent of the total concreted riprap length. An area known as Golden Shore Marine Biological Reserve is located adjacent to the Los Angeles River immediately to the east of the main channel. This area is an intertidal and sub tidal wetland area exposed to tidal influences.

Little to no vegetation was present within the channel or riverbed in concrete-lined areas of the Arroyo Seco Channel and Los Angeles River. These areas had little to no potential for sensitive wildlife or plant species to forage and find shelter. Several bridges crossing over the Arroyo Seco Channel and Los Angeles River were identified throughout the Project site. However, the majority of these bridges were constructed of solid concrete or had exposed steel beams, and do not provide suitable bat hibernaculum. The desktop analysis and field surveys identified six areas with potential habitat for fish or other sensitive species. The majority of these areas were not concrete-lined sections of the Arroyo Seco Channel or Los Angeles River. Areas identified with the potential for sensitive species to occur (Areas 1 through 6) are described below and shown in Attachment D.

<u>Area 1</u>

Area 1 is located in the Arroyo Seco Channel just downstream of the Devil's Gate Dam in the City of Pasadena. This area starts at the downstream area below Devil's Gate Dam south to the drop spillway structure located approximately 560 feet downstream of the Interstate 210 freeway overpass near the northern portion of the Brookside Golf Course. This section of the channel consists of freshwater emergent

habitat with cattails and leads to a mature riparian woodland habitat with willows, alders, and western sycamore trees in downstream sections of this area. In the northern portion of this area to the north of the Interstate 210 freeway overpass, the streambed consists of cobble and rocky substrate and transitions to mostly sandy substrates to the south of the Interstate 210 freeway overpass. Isolated pools were identified approximately one to three feet deep, and the water present showed signs of anaerobic conditions. No macroinvertebrates were identified during the survey. There were areas within the streambed within Area 1 that were dry during the survey effort.

No sensitive wildlife or plant species were observed during surveys in Area 1. However, the riparian habitat present is suitable foraging habitat for avian species. Suitable roosting habitat for bats was present within the large native trees surrounding the channel. The Devil's Gate Dam structure, where the Arroyo Seco Channel begins below the dam, consisted of solid rock and concrete and did not have suitable roosting habitat for bats.

Area 2

Area 2 is located in the Arroyo Seco Channel just downstream of West Holly Street in the City of Pasadena. This area starts at the end of the concrete lined Arroyo Seco Channel approximately 750 feet north of the 134 freeway overpass and continues downstream to a drop spillway structure located approximately 300 feet south of the 134 freeway overpass. The northern section of Area 2 consists of riparian habitat with red willows and California white alder trees. Sandy and rocky substrates were present within the streambed and undercuts were present along the banks that could provide cover/shelter for aquatic species. Large ponds approximately five to six feet deep and 50 feet wide were found in the downstream section of this area. These ponds had a sandy bottom with little vegetation on the banks. Riffle and run complexes occurred in approximately 250 linear feet of the downstream section of this area. In addition, aquatic macroinvertebrates were present on rocks and algae was observed within the streambed that could provide food sources for foraging aquatic species. High water marks of over five feet high in this section suggest that high volume flows come through this area during storm events.

No sensitive wildlife or plant species were observed during surveys. Riparian habitat surrounding the channel is suitable foraging and nesting habitat for avian species. Suitable roosting habitat for bats was also present in the trees surrounding the channel. Several bridge structures are present throughout this area, but the bridge structures were solid concrete and did not provide suitable roosting habitat for bats.

Area 3

Area 3 consists of two restoration areas that flows north to south parallel to the Arroyo Seco Channel, and is located to the west and east of the Arroyo Seco Channel (concrete-lined). This area begins at the drop spillway structure located at the southern end of Area 2 just north of the Colorado Boulevard overpass bridge, and continues south for approximately 0.33 miles near the Pasadena Roving Archers archery range. Water enters the sites through a small gate located on both sides of the channel. The water present at these restoration sites flows back into the concrete-lined Arroyo Seco Channel. Water from the restoration site to the west of the Arroyo Seco Channel re-enters the Arroyo Seco Channel just to the northwest of the pedestrian bridge located to the west of the Pasadena Roving Archers archery range parking lot. Water from the restoration site to the east of the Arroyo Seco Channel re-enters the Arroyo Seco Channel over 300 feet south from the pedestrian bridge. The restoration area sections of the channel is comprised of slow-moving,

pooled habitat, cobble and rock substrates, with heavy silt sedimentation present. Trees line the banks of both restoration sites with an open canopy along the middle of the channel. The mature canopy included willows, California white alders, aspens, and sycamore trees. Emergent cattails were present in areas with pooled water.

No sensitive wildlife or plant species were observed during surveys. Suitable foraging and nesting habitat for avian species was present in the surround riparian habitat in both restoration sites. This habitat also provides suitable roosting habitat for bats. Nearby bridge structures were also constructed of solid concrete and do not provide suitable roosting habitat for bats.

Area 4

Area 4 is located in the City of Los Angeles. The desktop analysis identified three small areas under several street bridges traversing over the Los Angeles River as potentially having sediment or rocky substrates within the streambed. These overpass bridges were located at East 7th Street, East Olympic Boulevard, and under a railway bridge just south of East Washington Boulevard.

The Los Angeles River within Area 4 consists of a concrete-lined river with rocky and sandy substrates present under the bridges located at East 7th Street, East Olympic Boulevard, and railway just south of East Washington Boulevard. The majority of the rocky sediment was observed around the support columns of the bridges. Little to no vegetative cover was present at these locations with vegetation. The scattered emergent vegetation was located on the rocky sediment around the bridge support columns and algae covered the concrete-lined river and rocky sediment. Due to the small amount of vegetation and sediments, these areas could provide low quality foraging opportunities for common species.

No sensitive wildlife or plant species were observed during surveys. No surrounding habitat with the potential to support sensitive wildlife species was observed. The East 7th Street Bridge and East Olympic Boulevard Bridge over the Los Angeles River were solid concrete structures, and do not provide suitable roosting habitat for bats. The two railway bridges just south of East Washington Boulevard had exposed, open steel beams and were not ideal structures for roosting bats. Therefore, these railway bridges are considered to have a low potential to support bat species.

Area 5

Area 5 is located within the Los Angeles River in the Long Beach area just north of the West Willow Street overpass bridge to the West Anaheim Street overpass bridge. The area downstream of West Willow Street is comprised of a large deep pool leading into a riffle and run river system. The water at within this area was turbid and visibility was less than 1-foot. This area appeared to have an earthen basin with concreted riprap consisting of large boulders along the banks. Vegetation was present along the lower sections of the banks and included willows, cattails, and sedges. However, the vegetation lining the outer banks of the river appeared to have recently been removed for flood maintenance purposes.

No sensitive wildlife or plant species were observed during surveys. Vegetation found in this area did not appear suitable for cover; therefore the potential for sensitive riparian wildlife species to occur in this area is unlikely. The West Willow Street Bridge consisted of solid concrete and does not provide suitable roosting habitat for bats.

Area 6

Area 6 is located within the Los Angeles River in the Long Beach from the West Anaheim Street overpass to the Pacific Ocean. This area was completely turbid and visibility was less than 1-foot. Sandy sediment may be present on the river bottom and the banks consisted of concreted riprap. This section of the Los Angeles River appeared to have ocean confluent water with high salinity levels. Plants that are adapted to high saline conditions, such as pickleweed and California cord grass, were observed along the banks closer to the ocean. Several extensive patches of non-native castorbean and arundo also exist along the banks. The vegetation lining the outer banks of the river at this area also appeared to have been recently removed for flood maintenance purposes.

Several bridges crossing over the Los Angeles River were present along the river from West Willow Street south to the Pacific Ocean. These bridges were solid concrete and did not provide suitable roosting habitat for bats. Many avian shoreline species were observed in this area near the mouth of the river entering the Pacific Ocean, including a white-tailed kite (CDFG fully protected species) flying through the area. These species are not expected to be affected by sluicing events.

Wetland Preserve Adjacent to Area 6

The Golden Shore Marine Biological Reserve is located adjacent to the Los Angeles River on the eastern bank of the channel. This area was originally part of Palm Beach Park, an area created in the 1950's for a launch ramp and parking lot. This area was exposed to continual silt build up and was eventually closed in the early 1990's. In the late 1990's, 6.4 acres of intertidal and sub tidal wetland habitat was mitigation for the impact on the salt-water lagoon that was converted to Rainbow Harbor, a recreational boating area. A map of this area is included as Attachment E. Many avian species typical of coastal areas were observed including: great blue heron, black-crowned night heron, great egret, willet, marbled godwit, pied-billed grebe, eared grebe, western grebe, black-necked stilt, killdeer, and western gulls. This area is also known for fish spawning, typical of intertidal and sub tidal wetland areas.

Although this area is open to the Los Angeles River and Pacific Ocean influences, downstream flows from the Los Angeles River directly into the wetland area would be minimal. This is due to the inlet of the wetland positioned south along the east bank of the river, most likely a design feature of the mitigation site to prevent debris from entering into the wetland area. In addition, a boom is positioned along this south facing inlet. Surface flow from the Los Angeles River will primarily carry sediment past the inlet of the wetland area. However, with sediment flowing out toward the ocean and potentially being deposited on the floor, the potential for the sediment to be carried back up and into the Golden Shore Marine Biological Reserve during high tide events is likely to occur.

Intertidal and sub tidal wetland ecosystems are maintained by the macrophytes (wetland plants) that regulate the system by the accumulation of organic matter and trapping inorganic sediment. Maintenance of this system is caused by the interactions with the sea level, sediment accretion, organic production, and sediment erosion, to an equilibrium with the mean sea level. Tidal events can erode the sediments from wetland areas, reducing the areas for emergent wetland plants, food sources, and cover for aquatic and avian species. If the wetlands habitats in the Reserve are experiencing erosion, the addition of sediment could help to maintain intertidal habitats. On the contrary, if too much sediment is deposited, the sediment could elevate the floor and, if enough sediment is deposited over time, convert subtidal areas to mudflat,

mudflat to low marsh and low marsh to mid-marsh. The periodic removal of sediments from behind Devil's Gate Dam would be expected to have a minor impact, if any, on the Golden Shore Marine Biological Reserve because most of the sediments would either settle in the main channel or be washed into Outer Long Beach Harbor. The amount of sediment that would be transported back into the Reserve area would be a relatively small fraction of the total released. The periodic introduction of sediments into the Los Angeles River watershed during rainfall events over a period of 2 or 3 years would not be expected to result in any discernible change in the habitats of the Golden Shore Marine Biological Reserve.

Presence/Absence Fish Surveys

The desktop analysis and field surveys identified six areas as having a potential for fish to occur; these areas were the same areas described above in the General Biological Resource Survey results section. In general, these areas within the Arroyo Seco Channel and Los Angeles River had sediment bottoms and vegetation present that could provide foraging opportunities and cover/shelter for fish species. The majority of Arroyo Seco Channel and Los Angeles River did not have suitable fish habitat present and consisted of a concrete-lined channel or river with little to no vegetation present within the channel. Areas identified with the potential for fish to occur (Areas 1 through 6) are described below and shown in Figure 2.

Area 1

The freshwater emergent vegetation in the upstream section of this area would suitable habitat for fish species; however, the southern, downstream section had no cover present for fish and showed signs of anaerobic conditions within the water during the time of the survey. In addition, no algae or aquatic invertebrates were observed within the streambed that could provide foraging opportunities. No fish were observed in this section of the Arroyo Seco Channel.

Area 2

Sandy and rocky substrates were present within the streambed and undercuts were present along the banks that could provide cover/shelter for fish species. The macroinvertebrates and algae present on the rocks and on debris within the water could provide a source of food for fish species. Vegetation along the banks provides excellent, suitable cover for fish, and debris found within the streambed provides good suitable fish habitat. Large, deep pools found in this area may provide suitable habitat for fish including non-native bass and trout species. During the fish surveys, approximately 60 mosquito fish were identified in this section of the Arroyo Seco Channel. These fish were found near the banks where vegetative cover was present along the bank. Mosquito fish are not native fish species and are known to be used as vector control species.

Area 3

The restoration sites are parallel to and above the banks of the concrete-lined Arroyo Seco Channel. No fish were observed within either restoration areas. It appears that the drop spillway structure at the north end of both restoration areas may act as a fish movement barrier for both downstream and upstream migration. In addition, the outlet culverts entering the Arroyo Seco Channel for both restoration sites also act as a barrier for upstream migration from the Arroyo Seco Channel to the restoration areas. Although suitable fish habitat exists within the restoration areas, these barriers prevent or limit fish populations from occurring here. The Arroyo Seco Channel, parallel to and downstream of the restoration areas, is a

concrete-lined channel, and suitable fish habitat is not present within this section of the Arroyo Seco Channel.

Area 4

No fish were observed at any of the three locations within Area 4. These locations do not have appropriate riverbed composition, vegetative cover, or food sources to support native fish populations.

Area 5

Suitable fish habitat exists downstream of Willow street. This area consisted of a large deep pool leading into a riffle and run complex river system. Vegetation growing on the lower areas of the banks provides good cover for fish. No fish were observed in the water during the survey; however, non-native fish are considered to be present in this area. Hundreds of waterfowl and several species of fish eating birds, including great blue herons, brown pelicans, belted kingfisher, great egret, and several species of grebes, were observed on the riverbanks. In addition, during the survey, several anglers were lining the east bank and these anglers claimed to be fishing for carp. This area likely hosts only exotic fish species such as mosquito fish, goldfish, and sunfish species that have been introduced by local anglers. The water downstream of West Anaheim Street appears to have a brackish water influence and may support species adapted to higher saline conditions.

Area 6

Area 6, from West Anaheim Street overpass to the Pacific Ocean was completely turbid and visibility was less than 1-foot. Area 6 had deep water present with higher salinity levels (ocean influence) than upstream sections of the Los Angeles River. This area may support larger fish or species adapted to confluent freshwater and ocean water environments. Due to turbid conditions, no fish were observed during visual surveys from the outer banks; however, fish are considered present in this area. Several species of fish-eating water birds were present along the entire stretch of the river in this area. The water present expanded to the width of the channel, and boating signs were displayed in the river indicating that the water present could potentially support boat traffic. These factors, in addition to the vegetation and sediment present, does support fish populations adapted to ocean water conditions.

The Golden Shore Marine Biological Reserve will likely support fish spawning areas and foraging opportunities for fish species, typical of coastal wetlands. It is not expected that the periodic introduction of sediments from sluicing and sediment accumulation would result in a discernible loss of the subtidal and intertidal habitat used by estuarine fish. Therefore, no impact to fishes in the Golden Shore Marine Biological Reserve would be expected.

Conclusions

The majority of the Arroyo Seco Channel and Los Angeles River downstream of the Devil's Gate dam consists of a concrete-lined channel. The majority of this concrete-lined channel does not provide suitable habitat for fish or other sensitive species. Due to the flash flood nature of the Arroyo Seco Channel and Los Angeles River, large amounts of sediment are moved naturally through the system. Although the sediment within the Devil's Gate reservoir may contain clay soils which can inhibit ground water recharge, sluicing activities

would have minimal impact to groundwater and water table since the majority of the river is concrete-lined. Minimal impacts to natural areas of the stream and habitat adjacent to the Arroyo Seco Channel and Los Angeles River are also expected due to the frequent flood events that occur on an annual basis. Sediment deposited during sluicing activities would be expected to flush downstream during these storm events.

Areas 1 through 3 could provide foraging opportunities and shelter for sensitive species including bats and avian species. Maintenance activities occur in the region downstream of the dam limiting the potential for sensitive species to occur. Suitable habitat for sensitive species appeared to be absent within the majority of the Arroyo Seco Channel and the downstream section of the Los Angeles River starting where the Arroyo Seco Channel enters the river. It is not likely that sensitive plant or wildlife species are present within the Arroyo Seco Channel or Los Angeles River (Areas 1 through 5). Furthermore, since no vegetation is proposed for removal downstream of the dam during sluicing activities, impacts to sensitive species in these areas are not anticipated.

Several fish barriers exist along the Arroyo Seco Channel and Los Angeles River, preventing fish migration upstream. During flood events, fish populations may be washed downstream and the upstream movement of fish is unlikely due to a lack of continuous suitable habitat, concreted channelization of water flow, water flow controlled culverts, and drop spillway structures. Because no native fish were identified in the channel or river in Areas 1 through 3 that may serve as fish refugia, and suitable fish habitat within the Arroyo Seco Channel and Los Angeles River is of low quality with only non-native fish species likely to occur, no impacts to native fish populations are expected within the channel within Areas 1 though 5.

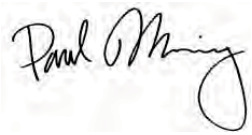
The Los Angeles River was channelized by a concrete-lined or concreted rip rap in 1938 after several floods caused major damage to cities. Based on the results of this survey, no native fish are expected to be present within the upper channel areas. Currently, only non-native fish species are expected to inhabit the river including: black bullhead catfish, bluegill, green sunfish, goldfish, largemouth bass, mosquito fish, common carp and tilapia. These fish species were introduced to the river for sport fishing and vector control purposes. Only non-native mosquito fish were observed in Area 2 during the fish surveys. No fish were observed in Areas 1, 3, or 4. Due to deep water and turbid conditions, surveys conducted from the banks were difficult in Areas 5 and 6, and no fish were observed during the visual surveys. However, several species of fish eating birds were observed in Areas 5 and 6, and these areas are likely to have non-native fish and/or native fish adapted to saline water conditions.

The Golden Shore Marine Biological Reserve is located adjacent to the Los Angeles River in Area 6 (Attachment E). Intertidal and sub tidal wetland habitat (6.4 acres) was mitigation for the impact on the salt-water lagoon that was converted to Rainbow Harbor, a recreational boating area. Although this area is open to the Los Angeles River and ocean influences, downstream flows from the Los Angeles River directly into the wetland area would be minimal due to the southward position of the inlet into the wetland area. However, with sediment flowing out toward the ocean, the potential for some of the sediment to be carried back up and into the Golden Shore Marine Biological Reserve during high tide events is likely to occur. The periodic introduction of minor amounts of sediment into the Reserve over a period of 2 to 3 years would not be expected to have significant impacts on the habitats of the area.

Sluicing activities would emulate the natural movement of sediment to downstream sections of the channel. The sediment load would be the same as a natural event; however, the duration that the sediment would be

deposited would occur in a shorter period. The ports generally maintain sediment accumulation within the port and mouth of rivers.

Sincerely,



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Attachments

Attachment A: Wildlife Species Observed List
Attachment B: Plant Species Observed List
Attachment C: Site Photographs
Attachment D: CNDDB Occurrences and Survey Areas Map
Attachment E: Golden Shore Marine Biological Reserve Map

Solving Environmental Challenges

REFERENCES

California Department of Fish and Game (CDFG)

2012 California Natural Diversity Database (CNDDB). RareFind Version 3.1.0. Database Query for the *Pasadena, Los Angeles, South Gate, Long Beach*, California, USGS 7.5-minute quadrangle. Wildlife and Habitat Data Analysis Branch. Accessed on November 5, 2012.

California Department of Fish and Game and the California Interagency Wildlife Task Group (CDFG and CITG)

2002 Big free-tailed bat (*Nyctinomops macrotis*), California Interagency Wildlife Task Group, California Wildlife Habitat Relationships System.

Hoary bat (*Lasiurus cinereus*), California Interagency Wildlife Task Group, California Wildlife Habitat Relationships System.

2005 Silver-haired bat (*Lasionycteris noctivagans*), California Interagency Wildlife Task Group, California Wildlife Habitat Relationships System.

California Native Plant Society Electronic Inventory (CNPSEI)

2012 Inventory of Rare and Endangered Plants (online edition). Rare Plant Scientific Advisory Committee, California Native Plant Society, Sacramento, California. Accessed on November 5, 2012 from http://www.cnps.org/inventory for the *Pasadena, Los Angeles, South Gate, Long Beach*, California, USGS 7.5-minute quadrangle.

Ralph, C. J., G. R. Geupel, P. Pyle, T. E. Martin, D. F. DeSante

1993 Handbook of field methods for monitoring landbirds. Gen. Tech. Rep. PSW-GTR-144-www. Albany, CA: Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture; 41 p.

Attachment A – Wildlife Species Observed List

Attachment A: Wildlife Species Observed Below the Devil's Gate Dam Along the Arroyo Seco Channel and Los Angeles River

Scientific Name	Common Name
CLASS OSTEICTHYES	**BONY FISH**
POECILIIDAE	**GUPPIES, MOLLIES, AND PLATYS**
Gambusia affinis	mosquitofish
CLASS REPTILIA	**REPTILES**
PHRYNOSOMATIDAE	**ZEBRA-TAILED, EARLESS, FRINGE-TOED, SPINY, TREE, SIDE-BLOTCHED, AND HORNY LIZARDS**
Uta stansburiana	common side-blotched lizard
CLASS AVES	**BIRDS**
PHALACROCORACIDAE	**CORMORANTS**
Phalacrocorax auritus	double-crested cormorant
ARDEIDAE	**HERONS, BITTERNS**
Ardea herodias	great blue heron
Nycticorax nycticorax	black-crowned night-heron
Ardea alba	great egret
ANATIDAE	**DUCKS, GEESE, SWANS**
Anas platyrhynchos	mallard
Anas clypeata	northern shoveler
Anas americana	American wigeon
Anas cyanoptera	cinnamon teal
Anas strepera	gadwall
Oxyura jamaicensis	ruddy duck
Branta canadensis	Canada goose
PELECANIDAE	**PELICANS**
Pelecanus occidentalis	brown pelican
SCOLOPACIDAE	**SANDPIPERS**
Limosa fedoa	marbled godwit
Catoptrophorus semipalmatus	willet
PODICIPEDIDAE	**GREBES**
Podilymbus podiceps	pied-billed grebe
Podiceps nigricollis	eared grebe
Aechmophorus occidentalis	western grebe
RALLIDAE	**RAILS**
Fulica americana	American coot
RECURVIROSTRIDAE	**STILTS & AVOCETS**
Himantopus mexicanus	black-necked stilt
LARIDAE	**SKUAS, GULLS, TERNS, SKIMMERS**
Larus occidentalis	western gull
CHARADRIIDAE	**PLOVERS**
Charadrius vociferus	killdeer

Attachment A: Wildlife Species Observed Below the Devil's Gate Dam Along the Arroyo Seco Channel and Los Angeles River

Scientific Name	Common Name
ACCIPITRIDAE	**HAWKS, KITES, EAGLES**
Accipiter cooperii	Cooper's hawk
Buteo jamaicensis	red-tailed hawk
Elanus leucurus	white-tailed kite
COLUMBIDAE	**PIGEONS & DOVES**
Columba livia	rock pigeon
Zenaida macroura	mourning dove
APODIDAE	**SWIFTS**
Aeronautes saxatalis	white-throated swift
ALCEDINIDAE	**KINGFISHERS**
Ceryle alcyon	belted kingfisher
PICIDAE	**WOODPECKERS**
Colaptes auratus	northern flicker
TYRANNIDAE	**TYRANT FLYCATCHERS**
Sayornis nigricans	black phoebe
CORVIDAE	**JAYS & CROWS**
Aphelocoma californica	western scrub-jay
Corvus brachyrhynchos	American crow
Corvus corax	common raven
AEGITHALIDAE	**BUSHTITS**
Psaltriparus minimus	bushtit
TIMALIIDAE	**BABBLERS**
Chamaea fasciata	wrentit
MIMIDAE	**MOCKINGBIRDS, THRASHERS**
Mimus polyglottos	northern mockingbird
STURNIDAE	**STARLINGS**
Sturnus vulgaris	European starling
PARULIDAE	**WOOD WARBLERS**
Dendroica coronata	yellow-rumped warbler
Geothlypis trichas	common yellowthroat
EMBERIZIDAE	**EMBERIZIDS**
Melospiza melodia	song sparrow
Pipilo crissalis	California towhee
FRINGILLIDAE	**FINCHES**
Carduelis psaltria	lesser goldfinch
Carpodacus mexicanus	house finch
ICTERIDAE	**BLACKBIRDS**
Euphagus cyanocephalus	Brewer's blackbird
PASSERIDAE	**OLD WORLD SPARROWS**

Attachment A: Wildlife Species Observed Below the Devil's Gate Dam Along the Arroyo Seco Channel and Los Angeles River

Scientific Name	Common Name
Passer domesticus	house sparrow
HIRUNDINIDAE	**SWALLOWS**
Petrochelidon pyrrhonota	cliff swallow
CLASS MAMMALIA	**MAMMALS**
SCIURIDAE	**SQUIRRELS**
Spermophilus beecheyi	California ground squirrel
MURIDAE	**MICE, RATS, and VOLES**
Neotoma fuscipes	dusky-footed woodrat
CANIDAE	**WOLVES & FOXES**
Canis familiaris	domestic dog
Canis latrans	coyote
FELIDAE	**CATS**
Lynx rufus	bobcat
PROCYONIDAE	**RACCOONS**
Procyon lotor	raccoon
MUSTELIDAE	**WEASELS, SKUNKS & OTTERS**
Mephitis mephitis	striped skunk
LEPORIDAE	**HARES & RABBITS**
Sylvilagus audubonii	desert cottontail
CERVIDAE	**DEER**
Odocoileus hemionus	mule deer

Attachment B – Plant Species Observed List

Attachment B: Plant Species Observed Below the Devil's Gate Dam Along the Arroyo Seco Channel and Los Angeles River

Scientific Name	Common Name
FERNS AND FERN ALLIES	
PTERIDACEAE	**BRAKE FAMILY**
Pentagramma triangularis	goldenback fern
ANGIOSPERMS (DICOTYLEDONS)	
ACERACEAE	**MAPLE FAMILY**
Acer negundo var. *californicum*	California box-elder
AMARANTHACEAE	**AMARANTH FAMILY**
*Amaranthus retroflexus**	rough pigweed
ANACARDIACEAE	**SUMAC OR CASHEW FAMILY**
Malosma laurina	laurel sumac
Rhus ovata	sugar bush
Rhus trilobata	skunkbrush
Toxicodendron diversilobum	poison oak
APIACEAE	**CARROT FAMILY**
*Conium maculatum**	poison hemlock
APOCYNACEAE	**DOGBANE FAMILY**
*Vinca major**	greater periwinkle
ASCLEPIADACEAE	**MILKWEED FAMILY**
Asclepias californica	California milkweed
ASTERACEAE	**SUNFLOWER FAMILY**
*Ageratina adenophora**	eupatory
*Anthemis cotula**	mayweed
Artemisia californica	California sagebrush
Artemisia douglasiana	mugwort
Artemisia dracunculus	tarragon
Baccharis pilularis	coyote brush
Baccharis salicifolia	mule fat
Brickellia californica	California brickellbush
*Carduus pycnocephalus**	Italian thistle
*Centaurea melitensis**	tocalote
Chaenactis artemisiaefolia	white pincushion
Chaenactis glabriuscula	yellow pincushion
*Cirsium vulgare**	bull thistle
Conyza canadensis	horseweed
*Cotula australis**	Australian brass-buttons
Eriophyllum confertiflorum	golden yarrow
*Filago gallica**	fluffweed
Gnaphalium californicum	California everlasting
*Gnaphalium luteo-album**	white cudweed
Lepidospartum squamatum	scale-broom
Sonchus asper ssp. *asper**	prickly sow thistle
*Sonchus oleraceus**	common sow thistle
*Taraxacum officinale**	common dandelion
Xanthium strumarium	cocklebur
BETULACEAE	**BIRCH FAMILY**

Attachment B: Plant Species Observed Below the Devil's Gate Dam Along the Arroyo Seco Channel and Los Angeles River

Scientific Name	Common Name
Alnus rhombifolia	white alder
BORAGINACEAE	**BORAGE FAMILY**
Cryptantha intermedia	common forget-me-not
BRASSICACEAE	**MUSTARD FAMILY**
*Capsella bursa-pastoris**	shepherd's-purse
*Hirschfeldia incana**	shortpod mustard
Lepidium sp.	peppergrass
Rorippa nasturtium-aquaticum	water-cress
*Sisymbrium altissimum**	tumble mustard
CAPRIFOLIACEAE	**HONEYSUCKLE FAMILY**
Sambucus mexicana	Mexican elderberry
CARYOPHYLLACEAE	**PINK FAMILY**
*Stellaria media**	common chickweed
CHENOPODIACEAE	**GOOSEFOOT FAMILY**
*Chenopodium album**	lamb's quarters
*Salsola tragus**	Russian thistle
CONVOLVULACEAE	**MORNING-GLORY FAMILY**
Calystegia macrostegia	western bindweed
CUSCUTACEAE	**DODDER FAMILY**
Cuscuta californica	California dodder
EUPHORBIACEAE	**SPURGE FAMILY**
Eremocarpus setigerus	dove weed
*Ricinus communis**	castor-bean
FABACEAE	**LEGUME FAMILY**
Lotus scoparius	deerweed
Lupinus sp.	lupine
*Spartium junceum**	Spanish broom
Trifolium sp.	clover
FAGACEAE	**OAK FAMILY**
Quercus agrifolia	coast live oak
GERANIACEAE	**GERANIUM FAMILY**
*Erodium brachycarpum**	long-beaked filaree
*Erodium cicutarium**	red-stemmed filaree
GROSSULARIACEAE	**GOOSEBERRY FAMILY**
Ribes aureum	golden currant
HYDROPHYLLACEAE	**WATERLEAF FAMILY**
Eriodictyon crassifolium	thick-leaved yerba santa
Eriodictyon trichocalyx	hairy yerba santa
Phacelia sp.	phacelia
JUGLANDACEAE	**WALNUT FAMILY**
Juglans californica	California black walnut
LAMIACEAE	**MINT FAMILY**
*Marrubium vulgare**	horehound
Salvia apiana	white sage
Salvia columbariae	chia

Attachment B: Plant Species Observed Below the Devil's Gate Dam Along the Arroyo Seco Channel and Los Angeles River

Scientific Name	Common Name
Salvia mellifera	black sage
MALVACEAE	**MALLOW FAMILY**
*Malva parviflora**	cheeseweed
MORACEAE	**MULBERRY FAMILY**
*Ficus carica**	edible fig
OLEACEAE	**OLIVE FAMILY**
Fraxinus velutina	velvet ash
ONAGRACEAE	**EVENING PRIMROSE FAMILY**
Camissonia californica	California evening primrose
Oenothera elata ssp. hookeri	Hooker's evening primrose
PASSIFLORACEAE	**PASSION-FLOWER FAMILY**
*Passifloraceae caerulea**	common passion flower
PLATANACEAE	**SYCAMORE FAMILY**
Platanus racemosa	western sycamore
POLYGONACEAE	**BUCKWHEAT FAMILY**
Eriogonum fasciculatum	California buckwheat
*Rumex conglomeratus**	dock
*Rumex crispus**	curly dock
*Non-native Species	

Attachment C – Site Photographs

ATTACHMENT C – SITE PHOTOGRAPHS

Photo 1. Photo of Area 1 below the dam. This area consisted of isolated pools with sandy substrates and areas with anaerobic conditions. The stream moves through a mature riparian corridor. Photo is facing north.

Photo 2. Photo of large pool in Area 2. Sandy and rocky substrates, undercut banks, and vegetative cover were present within the streambed that could provide cover/shelter for fish species. Photo is facing north.

Photo 3. Photo showing mosquito fish observed in Area 2. Approximately 60 mosquito fish were identified during the survey effort. No other fish species were directly observed.

Photo 4. Photo showing Area 3 in the restoration areas. This section of the stream is adjacent to the concrete lined Arroyo Seco Channel. The cement spillover that directs water into the Arroyo Seco is a fish barrier, preventing upstream migration. Photo is facing south.

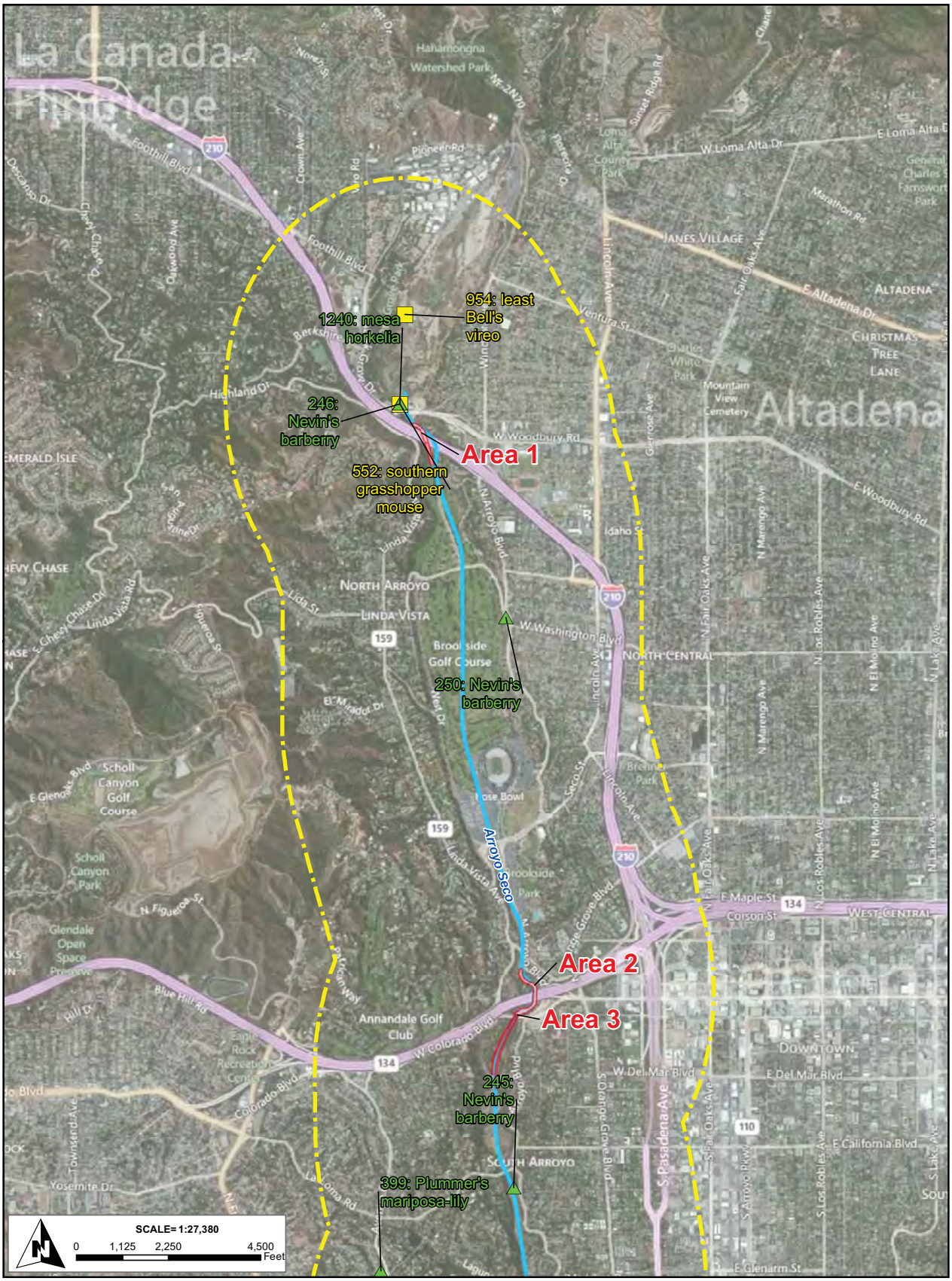
Photo 5. Photo showing Area 4, with little to no suitable shelter/cover for native fish. Photo is facing southwest.

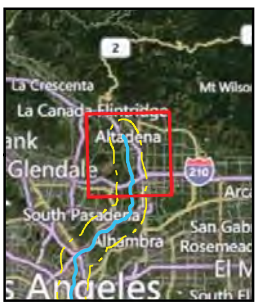
Photo 6. Photo showing Area 5. Area 5 contains suitable habitat for fish. Only non-native fish are expected to survive in this location. Photo is facing west depicting a local angler fishing for common carp.

Photo 7. Photo showing Area 6, with suitable fish habitat for species adapted to high saline content waters. Photo is facing south.

Photo 7. Photo showing an adjacent wetland area to Area 6, which opens to the ocean. This area is known as the Golden Shore Marine Reserve and is a mitigation site for the Rainbow Harbor. Photo is facing southwest.

Attachment D – CNDDB Occurrences and Survey Area Maps





Biological Survey Areas

One-Mile Project Buffer

CNDDB Plant Occurences

CNDDB Animal Occurences

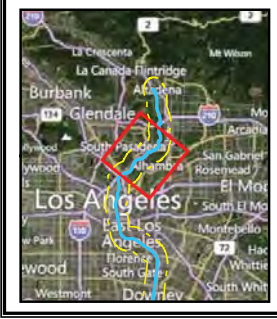
Attachment D

Devil's Gate Sediment Removal Project

CNDDB Occurences and Survey Areas

Version Date: 12/19/2012

CHAMBERS GROUP



Biological Survey Areas

One-Mile Project Buffer

CNDDB Plant Occurences

CNDDB Animal Occurences

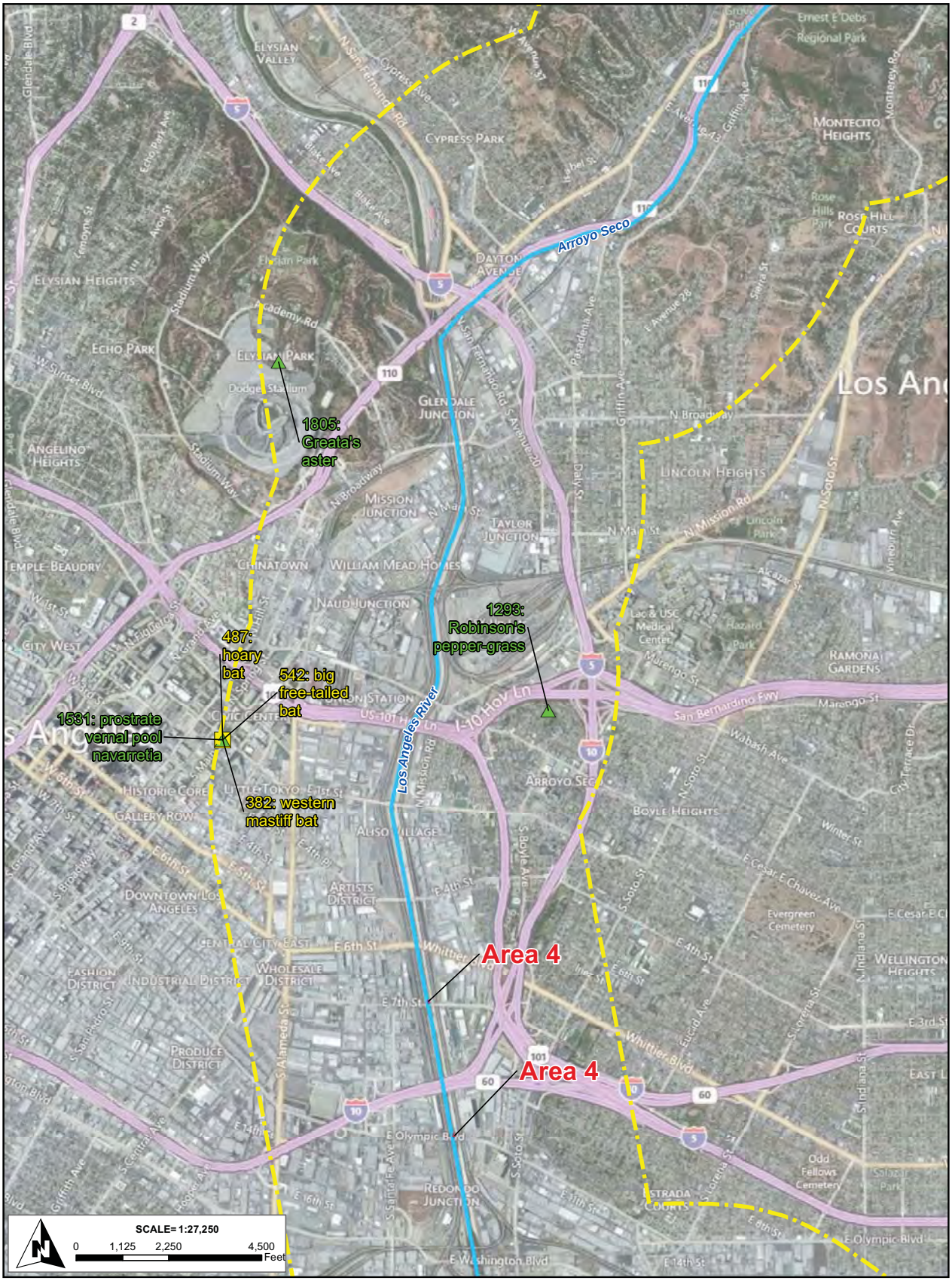
Attachment D

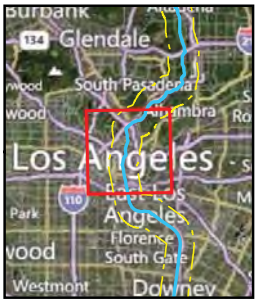
Devil's Gate Sediment Removal Project

CNDDB Occurences and Survey Areas

Version Date: 12/19/2012

CHAMBERS GROUP



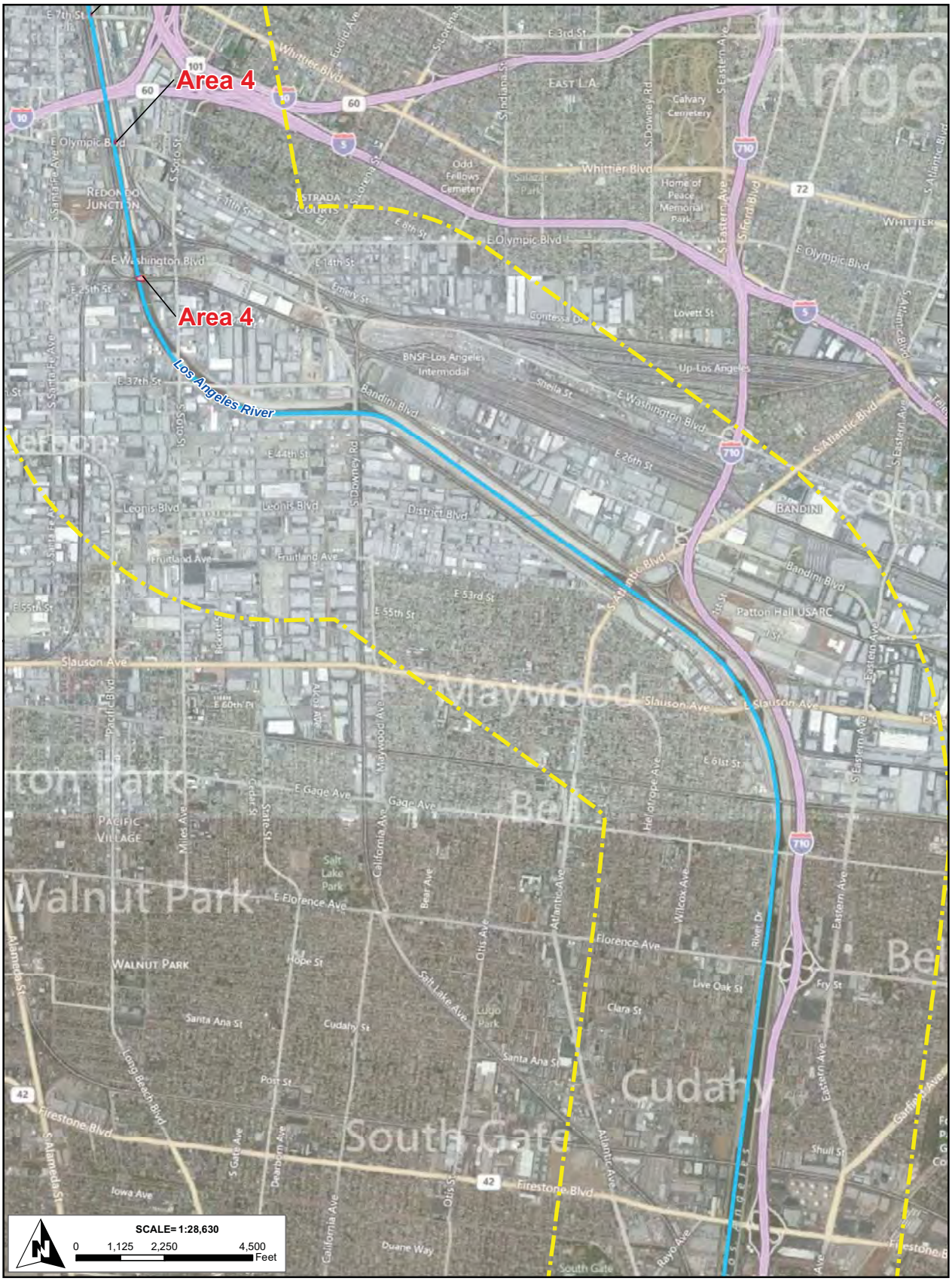


Biological Survey Areas
One-Mile Project Buffer
CNDDB Plant Occurences
CNDDB Animal Occurences

Attachment D
Devil's Gate Sediment Removal Project
CNDDB Occurences and Survey Areas

Version Date: 12/19/2012

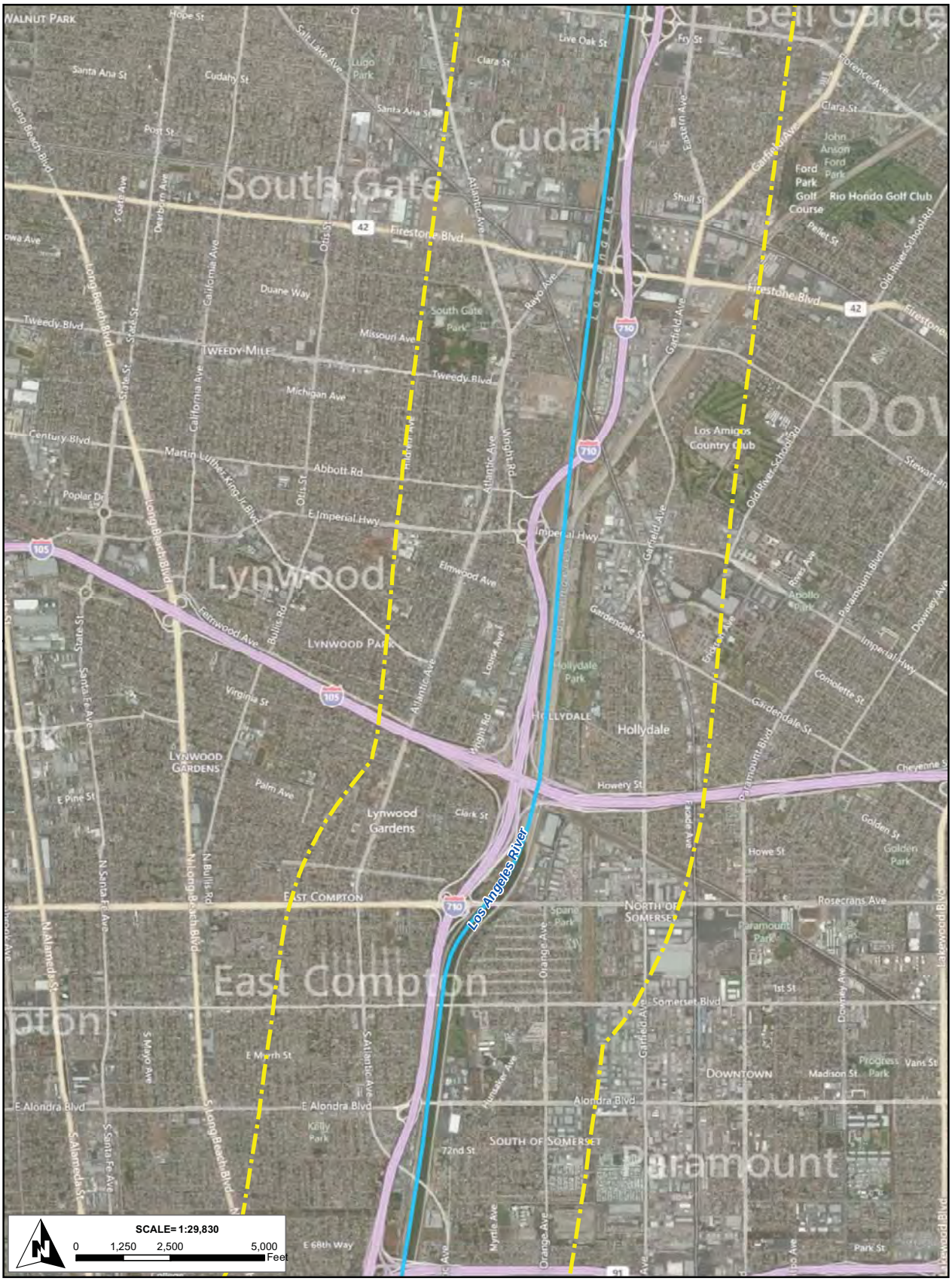
CHAMBERS GROUP



Attachment D
Devil's Gate Sediment Removal Project
CNDDB Occurences and Survey Areas

Version Date: 12/19/2012

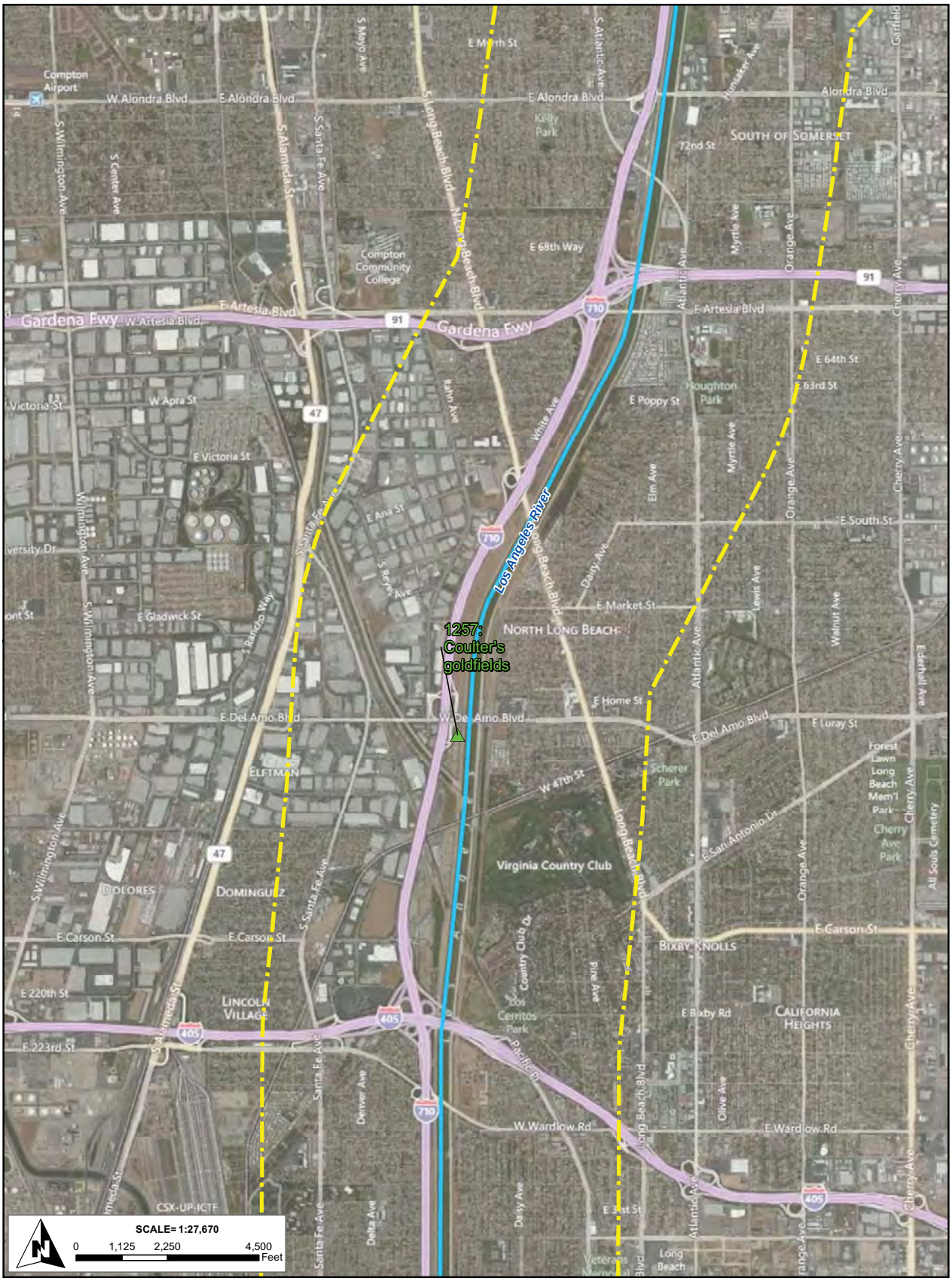
CHAMBERS GROUP

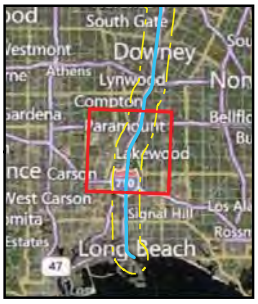


Attachment D
Devil's Gate Sediment Removal Project
CNDDB Occurences and Survey Areas

Version Date: 12/19/2012

CHAMBERS GROUP





Biological Survey Areas

One-Mile Project Buffer

CNDDB Plant Occurences

CNDDB Animal Occurences

Attachment D

Devil's Gate Sediment Removal Project

CNDDB Occurences and Survey Areas

Version Date: 12/19/2012

CHAMBERS GROUP

Attachment D
Devil's Gate Sediment Removal Project
CNDDB Occurences and Survey Areas

Version Date: 12/19/2012

CHAMBERS GROUP

Attachment E – Golden Shore Marine Biological Reserve Map

Golden Shore Marine Biological Reserve

Attachment E
Devil's Gate Sediment Removal Project
Golden Shore Marine Biological Reserve

Version Date: 11/28/2012

CHAMBERS GROUP

20535 - Y:\Projects\20536 Devil's Gate Dam Downstream Bio Surveys\MXD\Attachment E Golden Shore Marine Biological Reserve.mxd

APPENDIX D 3– Least Bell's Vireo Survey Report

October 14, 2013
(20592)

Thomas Budinger
Water Resources Division
County of Los Angeles Department of Public Works
900 South Fremont Avenue
Alhambra, CA 91803

SUBJECT: FOCUSED PROTOCOL SURVEYS FOR LEAST BELL'S VIREO AT THE DEVIL'S GATE RESERVOIR, LOS ANGELES COUNTY, CALIFORNIA

Dear Mr. Budinger:

Chambers Group, Inc. (Chambers Group) biologists conducted focused surveys for least Bell's vireo (*Vireo bellii pusillus,* LBVI) for the Devil's Gate Reservoir Sediment Removal and Management Project (Project) located in the city of Pasadena, Los Angeles County, California. The results of the surveys are presented in this letter report.

PROJECT LOCATION

The proposed Project site is located in the Devil's Gate Reservoir in the City of Pasadena, in Los Angeles County, California, on Assessor's Parcel Numbers 5823015902, 5823004900, 5823003911, 5823003910, 5823003907, 5823003909, and 5823031900. The Project site can be found in the La Cañada, San Pascual-Grafias, and San Rafael special survey areas in the California United States Geological Survey (USGS) 7.5-minute *Pasadena* topographic quadrangle (Attachment 1).

PROJECT DESCRIPTION

The proposed Project would remove sediment from the Devil's Gate Reservoir. Sediment would be removed from an approximate 124-acre excavation area within the reservoir (Attachment 2). The excavation area is a combination of bare ground, with some native and non-native vegetation. This area behind the Devil's Gate Dam is inundated seasonally, and some of the vegetation is regularly washed out by storm flows. The accumulated sediment will be removed with construction equipment including but not limited to: bulldozers, front-end loaders, scrapers, and trucks. Depending on the moisture of the sediment removed, the sediment may need to be stockpiled for drying to occur. Stockpiling of the sediment would occur on-site, within the Devil's Gate Reservoir.

LEAST BELL'S VIREO NATURAL HISTORY

The LBVI was state listed as an endangered subspecies of Bell's vireo by the California Department of Fish and Wildlife (CDFW) in 1980 and federally listed as endangered by the United States Fish and Wildlife

SANTA ANA LOS ANGELES REDLANDS PALM DESERT SAN DIEGO EL CENTRO RENO
CORPORATE OFFICE 5 Hutton Centre Drive, Suite 750 | Santa Ana, California 92707
t | 949.261.5414 f | 714.545.2255 w | www.chambersgroupinc.com

Service (USFWS) in 1986. Critical habitat for the LBVI was designated by USFWS in 1994. The LBVI subspecies is restricted to coastal and inland southern California and Baja California, Mexico. Its winter range extends along the Pacific coast from northern Mexico south to northern Nicaragua.

The LBVI is a small, gray songbird with pale yellow wash on its sides, two faint wing bars, and a faint eye ring. Preferred nesting habitat is low, dense, scrubby vegetation in early successional areas that are particularly dependent on riparian areas. Habitats may include willow woodlands and dense mule fat (*Baccharis salicifolia* subsp. *salicifolia*), scrub oak (*Quercus berberidifolia*), coastal chaparral, and mesquite (*Prosopis* sp.) patches with dense, early successional understories. The two major factors in the decline of LBVI populations are loss of habitat and nest parasitism by the brown-headed cowbird (*Molothrus ater*).

SURVEY HISTORY

A biological reconnaissance-level survey conducted by Chambers Group on May 27, 2010, determined that suitable habitat for LBVI was present within the Project site (Chambers Group 2010a). Focused surveys for LBVI were then conducted in 2010 (Chambers Group 2010b) with negative results.

In July 2012, an adult and a juvenile were observed in the proposed Project site during the week of July 15, 2012 (CDFW 2013). Because LBVI have high site fidelity, and are likely to return to the same site to breed every year, focused surveys for LBVI were conducted in 2013 to determine if they are breeding within the Project site.

METHODS

Focused surveys were conducted within habitat that was determined to be suitable for LBVI by the surveying biologist. The reconnaissance-level survey on May 27, 2010 identified vegetation communities associated with LBVI, and the vegetation community map was updated in May 2013 by Chambers Group botanists.

Eight focused LBVI surveys were conducted at least 10 days apart by Chambers Group qualified biologists Linette Lina and Corey Vane, who are familiar with the songs, whisper songs, calls, scolds, and visual identification of least Bell's vireo. The focused surveys were conducted according to USFWS guidelines (USFWS 2001).

All surveys were conducted on foot by looking and listening for LBVI in all suitable riparian habitats within the Project site (Attachment 3). Surveys were conducted during favorable weather conditions. Surveys were not conducted during excessive heat, cold, wind, rain, or other inclement weather that would be reasonably expected to reduce bird activity and consequential detection. No more than 3 linear kilometers or 50 hectares of suitable habitat were surveyed during any single survey day.

Observations of the songs, scolds, whisper calls, flight patterns, behaviors, and plumage characteristics were used in conjunction to ascertain presence/absence of LBVI. Biologists conducted the surveys from optimal stationary locations to see and hear LBVI without harming any other wildlife species in the area.

The locations of any LBVI and other sensitive species were documented and mapped (Attachment 4), and California Natural Diversity Database (CNDDB) forms were prepared (Attachment 5). If leg bands were observed, they were noted. Observations and numbers of brown-headed cowbirds also were noted and mapped (Attachment 4). All observed wildlife species were documented (Attachment 6).

Solving Environmental Challenges

RESULTS

Vegetation Communities

The Project site is a flood control basin consisting of riparian and ruderal communities plus large scoured areas created from landslides and runoff after the 2009 Station Fire. The Project site is surrounded by upland vegetation communities, developed parkland (Hahamongna Watershed Park), residential and business developments, and foothills to the northeast. Approximately 64.59 acres (26.12 hectares) of suitable habitat (riparian woodland, mule fat scrub, riparian herbaceous habitat) for LBVI were present within the Project site (Attachment 3). The riparian habitats that are suitable for LBVI are discussed below. Plant communities and associations are described with the categories set forth in *A Manual of California Vegetation* (Holland 1986; Gray and Bramlet 1992). Plant nomenclature follows that of *The Jepson Manual: Vascular Plants of California, Second Edition* (Baldwin et al. 2012).

Riparian Woodland / Black Willow Series

Black Willow Series, as described by Sawyer and Keeler-Wolf (1995), exists when black willow (*Salix gooddingii*) is the sole dominant shrub or tree in the canopy. This community occurs in habitats seasonally flooded and saturated with freshwater. This community occurs in floodplains along rivers and streams and on the edges of meadows. Species that usually occur with black willow include California sycamore (*Platanus racemosa*), coyote brush (*Baccharis pilularis*), Fremont cottonwood (*Populus fremontii*), blue elderberry (*Sambucus nigra* subsp. *caerulea*), mule fat (*Baccharis salicifolia*), white alder (*Alnus rhombifolia*), and other willows (*Salix* sp.).

In 2010, the southern half of the proposed Project site was primarily composed of the Black Willow Series. In 2013, this series is present in large and small patches throughout the proposed Project site. Black willow is dominant in this community. Other native species include mule fat, Fremont cottonwood, black cottonwood (*Populus trichocarpa),* white alder, red willow (*Salix laevigata*), and California dodder (*Cuscuta californica*). Non-native species in this community include gum tree (*Eucalyptus* sp.) and tree tobacco (*Nicotiana glauca*). Portions of this community are lacking secondary structure due to unstable sediment accumulation and subsequent scouring during storm events.

Mule Fat Scrub

Mule Fat Scrub consists of dense stands of mule fat with lesser amounts of willow species. This community type is classified as a mixed evergreen-deciduous shrubland with a continuous canopy and a sparse understory. This community typically occupies intermittent streambeds and seeps; and it occurs at elevations ranging from sea level to 4,100 feet amsl (Holland 1986; Gray and Bramlet 1992).

The Mule Fat Scrub community was present in the proposed Project site during both surveys. The native plant species found include mule fat and black willow. Non-native species found within this community in the proposed Project site include Italian thistle (*Carduus pycnocephalus*), poison hemlock (*Conium maculatum*), and short-podded mustard *(Hirschfeldia incana*).

Solving Environmental Challenges

Riparian Herbaceous

Riparian Herbaceous vegetation is an early successional stage of willow scrub and riparian forest communities. Flooding (or other disturbance factors) often scours woody riparian vegetation away, and the site is rapidly colonized by pioneer wetland herbaceous plants (Gray and Bramlet 1992).

In 2010, sparse riparian herbaceous vegetation was present in the northern half of the proposed Project site. In 2013, riparian herbaceous vegetation was found near the face of the dam. Native plant species found in this community include emergent mule fat, black willow, and red willow. Nonnative plant species in this community include curly dock (*Rumex crispus*), wild radish (*Raphanus sativus*), and short-podded mustard.

Survey Conditions

Survey conditions are presented in Table 1.

Table 1: Survey Conditions

Date	Surveyor	Time		Temperature		Wind		Cloud Cover		Precipitation	
		Start	End	Start	End	Start	End	Start	End	Start	End
04/15/13	Linette Lina	6:45 A.M.	7:30 A.M.	Canceled due to light rain and reduced visibility. Second attempt on 4/17/13.							
04/17/13	L. Lina	6:20 A.M.	11:15 A.M.	50.5	67.0	1-2	2-3	0%	0%	0	0
04/29/13	L. Lina	6:40 A.M.	11:15 A.M.	54.7	71.3	1-2	0-1	100%	0%	Foggy (visible to 600ft)	0
05/13/13	L. Lina	6:20 A.M.	11:00 A.M.	61.9	94.3	0-1	3-4	0%	0%	0	0
05/23/13	L. Lina	6:00 A.M.	1:00 P.M.	58.0	67.4	0	2-3	95%	90%	0	0
06/05/13	L. Lina	6:10 A.M.	11:45 A.M.	60.3	73.5	0	3-4	100%	0%	0	0
06/17/13	L. Lina, Corey Vane	6:20 A.M.	12:20 P.M.	55	77.7	0	1	0%	0%	0	0
06/27/13	L. Lina	6:20 A.M.	11:45 A.M.	65.0	89.1	0	4-5	0%	0%	0	0
07/09/13	L. Lina	5:55 A.M.	11:30 A.M.	62.9	92.0	0	4	0%	15%	0	0

*All temperature readings are in Fahrenheit
**All wind readings are in miles per hour

Solving Environmental Challenges

Least Bell's Vireo

One LBVI male was observed within the Project site (Attachment 4) during the April 29, May 23, June 5 and 17, 2013 surveys. No leg bands were observed. The LBVI male was extremely vocal, continuously singing throughout the mornings, and appeared to be very territorial. It did not appear to be paired, however, and no nesting behavior was observed.

The individual was mostly observed within the southwestern region of the Project site, within a disturbed patch of three- to four-year old willows within a thick understory of short-podded mustard and poison hemlock (GPS coordinates UTM NAD 83 Zone 11S 0391551 E 3783645 N). It also occupied the western border of the Project site, within more mature black willows. During the May 23, 2013 survey, however, it was observed in the southeastern region of the Project site (GPS coordinates approximately UTM NAD 83 Zone 11S 0391875 E 3783523 N). It flew to different locations within the Riparian Woodland in the southern region, singing continuously and eventually returning to the southwestern region of the Project site. The LBVI male appeared to expand its territory due to the lack of competition from other LBVI males and in order to attempt to find a LBVI female.

Shortly before the June 17, 2013 survey, recreational activities within the Project site increased dramatically due to the initiation of children's summer camps within Hahamongna Watershed Park and the flood control reservoir. Camp activities, including clearing vegetation for children's play areas within the Riparian Woodland, cutting new trails through the occupied LBVI habitat, and increasing sound disturbance within the occupied LBVI habitat, may have possibly caused it to disperse from the Project site. The LBVI was no longer observed during the June 27 or July 9, 2013 surveys.

Other Sensitive Species

Yellow Warbler

Territorial and paired yellow warblers (*Setophaga petechia*) were incidentally observed during several surveys (Attachment 4). The maximum number observed was 10 individuals, during the June 17, 2013, survey (Attachment 5).

Yellow-breasted Chat

Yellow-breasted chats (*Icteria virens*) were incidentally observed in two locations during the focused surveys (Attachments 4 and 5). One was observed in the western region of the Project site during the April 29, 2013 survey. One was observed in the southwestern region of the Project site during the June 27 and July 9, 2013 surveys. The singing yellow-breasted chat in the southwestern region is presumed to be the same individual and since it was observed later in the breeding season, is presumed to be territorial.

Brown-Headed Cowbird

Brown-headed cowbirds were observed throughout the survey area during several surveys (Attachment 4). The maximum number of brown-headed cowbirds detected during any one survey visit was 10 individuals, scattered throughout the Project site during the June 17, 2013, survey.

Solving Environmental Challenges

CONCLUSION

One territorial LBVI male was present within the Project site that did not appear to be paired or nesting during the 2013 season.

Please contact me at (949) 261-5414 ext. 7242 if you have any questions or concerns regarding these results.

Sincerely,

CHAMBERS GROUP, INC.

Linette Lina
Biologist

ENCLOSURES

Attachment 1 – Project Vicinity
Attachment 2 – Project Location
Attachment 3 – LBVI Survey Area
Attachment 4 – LBVI Survey Results Map
Attachment 5 – CNDDB Forms
Attachment 6 – Wildlife Species Observed

Solving Environmental Challenges

REFERENCES

Baldwin, B.G., D.H. Goldman, D.J. Keil, R. Patterson, T.J. Rosatti, and D.H. Wilken (editors)
2012 *The Jepson Manual: Vascular Plants of California, Second Edition*. University of California Press, Berkeley, CA.

Chambers Group, Inc.
2010a *Biological Technical Report for the Devil's Gate Reservoir Project Site in the City of Pasadena, Los Angeles County, California.* Chambers Group, Inc., Santa Ana, CA. Prepared for the County of Los Angeles Department of Public Works.

2010b *2010 Focused Least Bell's Vireo Survey Report for the Devil's Gate Reservoir Project in the City of Pasadena, Los Angeles County, CA.* Chambers Group, Inc., Santa Ana, CA. Prepared for the County of Los Angeles Department of Public Works.

California Department of Fish and Wildlife (CDFW)
2011 *Special Animals*. January 2011.

2013 California Natural Diversity Database, Rarefind 4. Biogeographic Data Branch, Sacramento, CA.

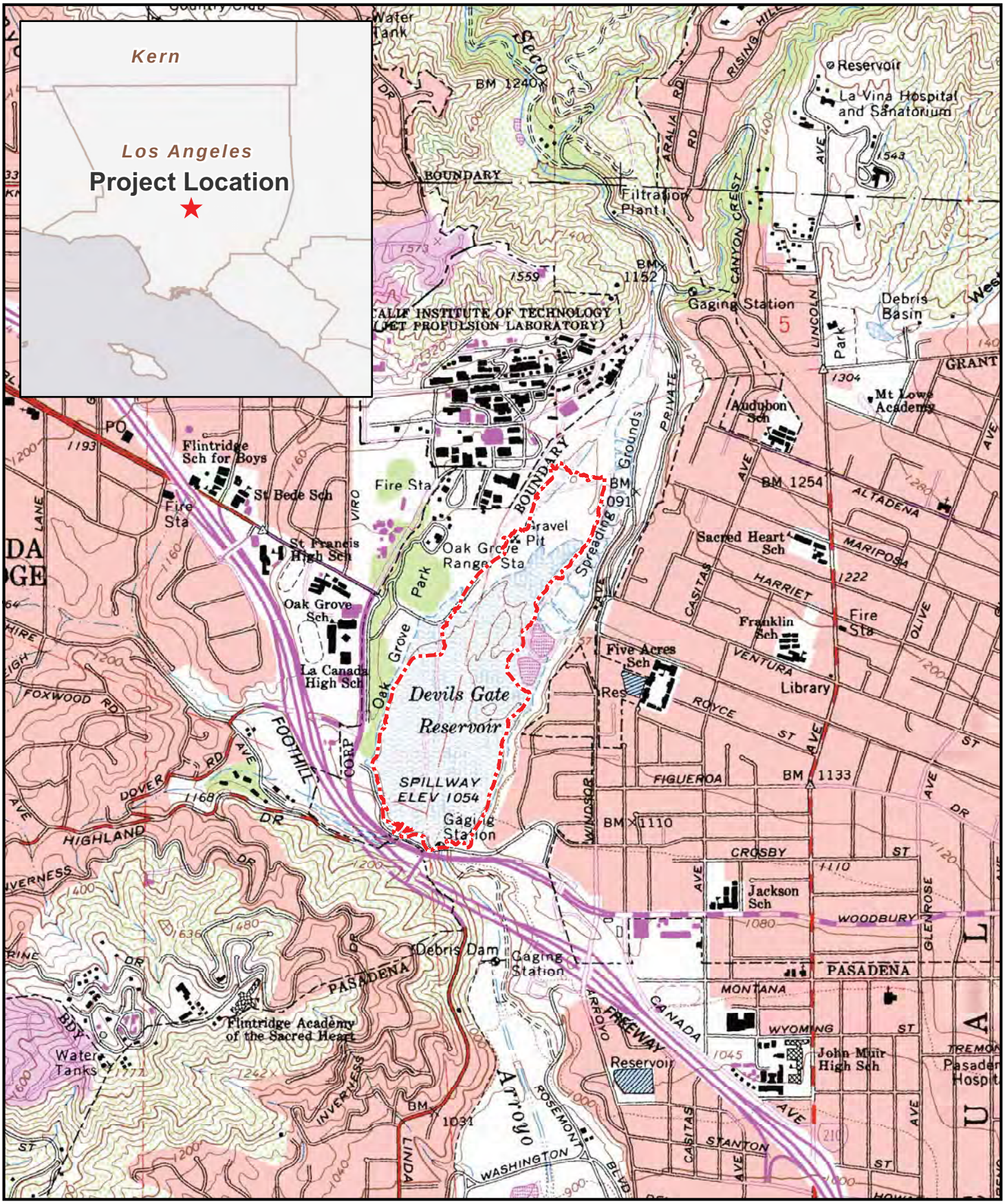
Gray, J. and D. Bramlet
1992 *Habitat Classification System, Natural Resources, Geographic Information System (GIS) Project*. County of Orange Environmental Management Agency, Santa Ana, California.

Grinnell, J. and A.H. Miller.
1944 The distribution of the birds of California. *Pacific Coast Avifauna* No. 27. 1-608

Holland, R.F.
1986 *Preliminary Descriptions of the Terrestrial Natural Communities of California*. Unpublished report available from California Department of Fish and Wildlife, Sacramento, California.

U.S. Fish and Wildlife Service (USFWS)
2001 *Least Bell's Vireo Survey Guidelines*. Carlsbad Fish and Wildlife Office.

ATTACHMENT 1 – PROJECT VICINITY



Project Area

N

0 500 1,000 2,000
Feet

Attachment 1

Devil's Gate Reservoir Sediment Removal and Management Project

Project Vicinity Map

Name: 20592 Attachment 1 Project Vicinity Map.Mxd
Print Date: 10/3/2013, Author: phuls

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ATTACHMENT 2 – PROJECT LOCATION

Attachment 2

Devil's Gate Reservoir Sediment Removal and Management Project

Project Location Map

Name: 20592 Attachment 2 Project Location Map.Mxd
Print Date: 10/3/2013, Author: stondre

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ATTACHMENT 3 – LBVI SURVEY AREA

LBVI Survey Area

Proposed Project Boundary

N

0 250 500 1,000

Feet

Attachment 3

Devil's Gate Reservoir Sediment Removal and Management Project

LBVI Survey Area Map

Name: 20592 Attachment 3 Project Survey Area Map.Mxd
Print Date: 10/10/2013, Author: stondre

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ATTACHMENT 4 – LBVI SURVEY RESULTS MAP

Project Area
Survey Area
Least Bell's Vireo Territory
Least Bell's Vireo
Yellow-breasted Chat
Yellow Warbler
Brown-headed Cowbird

N

0 250 500 1,000
Feet

Attachment 4

Devil's Gate Sediment Removal Project

LBVI Survey Results Map

Name: 20592 Attachment 4 Survey Results Map.Mxd
Print Date: 8/27/2013, Author: phuls

CHAMBERS GROUP

ATTACHMENT 5 – CNDDB FORMS

Mail to:
California Natural Diversity Database
California Dept. of Fish & Wildlife
1807 13th Street, Suite 202
Sacramento, CA 95811
Fax: (916) 324-0475 email: CNDDB@wildlife.ca.gov

Date of Field Work (mm/dd/yyyy): 07/09/2013

For Office Use Only
Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Vireo bellii pusillus*

Common Name: Least Bell's Vireo

Species Found? ☑ Yes ☐ No _____ If not, why?

Total No. Individuals 1 Subsequent Visit? ☑ yes ☐ no

Is this an existing NDDB occurrence? 348 Yes, Occ. # ☐ no ☐ unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Linette Lina
Address: 5 Hutton Centre Dr. Suite 750
Santa Ana, CA 92707
E-mail Address: llina@chambersgroupinc.com
Phone: (949) 261-5414

Plant Information

Phenology: 50 % vegetative 25 % flowering 25 % fruiting

Animal Information

1 # adults _____ # juveniles _____ # larvae _____ # egg masses _____ # unknown

☐ wintering ☑ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ other

Location Description (please attach map AND/OR fill out your choice of coordinates, below)

Devil's Gate Reservoir/Hahamongna Watershed Park, in the city of Pasadena between Altadena and La Canada Flintridge, north of I-210.

County: Los Angeles Landowner / Mgr.: County of Los Angeles
Quad Name: Pasadena Elevation: 320 m
T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ Source of Coordinates (GPS, topo. map & type): ArcGIS
T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ GPS Make & Model _____
DATUM: NAD27 ☐ NAD83 ☑ WGS84 ☐ Horizontal Accuracy _____ meters/feet
Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☑ *OR* Geographic (Latitude & Longitude) ☐
Coordinates: 0391551 E 3783645 N

Habitat Description (plants & animals) *plant communities, dominants, associates, substrates/soils, aspects/slope:*

Animal Behavior *(Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):*

Riparian Woodland dominated by Salix goodingii, Baccharis salicifolia, Conium maculatum, Hirshfeldia incana.

One territorial male observed singing continuously in same area during several survey visits. No female, nest, or young observed. No leg bands observed.

Please fill out separate form for other rare taxa seen at this site.

Site Information

Overall site/occurrence quality/viability (site + population): ☐ Excellent ☐ Good ☑ Fair ☐ Poor

Immediate AND surrounding land use: Flood control basin, recreational park, residential area, business area

Visible disturbances: Scouring from flood events, recreation

Threats: Flood control activities including sediment removal, park maintenence, recreational activities, brown-headed cowbirds

Comments: Individual was observed during focused Least Bell's Vireo surveys on 4/29, 5/23, 6/5, and 6/17 surveys.

Determination *(check one or more, and fill in blanks)*

☐ Keyed (cite reference): _____
☐ Compared with specimen housed at: _____
☐ Compared with photo / drawing in: _____
☐ By another person (name): _____
☑ Other: Known vocalizations and visual characteristics

Photographs *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☐
Habitat	☐	☐	☑
Diagnostic feature	☐	☐	☐

May we obtain duplicates at our expense? yes ☑ no ☐

Mail to:
California Natural Diversity Database
California Dept. of Fish & Wildlife
1807 13th Street, Suite 202
Sacramento, CA 95811
Fax: (916) 324-0475 email: CNDDB@wildlife.ca.gov

Date of Field Work (mm/dd/yyyy): 07/09/2013

For Office Use Only
Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Icteria virens*

Common Name: Yellow-breasted Chat

Species Found? ☑ Yes ☐ No _____ If not, why?

Total No. Individuals 1 Subsequent Visit? ☑ yes ☐ no

Is this an existing NDDB occurrence? _____ Yes, Occ. # ☐ no ☑ unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Linette Lina
Address: 5 Hutton Centre Dr. Suite 750
Santa Ana, CA 92707
E-mail Address: llina@chambersgroupinc.com
Phone: (949) 261-5414

Plant Information

Phenology: 50 % vegetative 25 % flowering 25 % fruiting

Animal Information

1 # adults _____ # juveniles _____ # larvae _____ # egg masses _____ # unknown

☐ wintering ☑ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ other

***Location Description* (please attach map AND/OR fill out your choice of coordinates, below)**

Devil's Gate Reservoir/Hahamongna Watershed Park, in the city of Pasadena between Altadena and La Canada Flintridge, north of I-210.

County: Los Angeles Landowner / Mgr.: County of Los Angeles
Quad Name: Pasadena Elevation: 320 m
T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ Source of Coordinates (GPS, topo. map & type): ArcGIS
T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ GPS Make & Model _____
DATUM: NAD27 ☐ NAD83 ☐ WGS84 ☐ Horizontal Accuracy _____ meters/feet
Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☐ ***OR*** Geographic (Latitude & Longitude) ☑
Coordinates: Latitude: 34.187331 Longitude: -118.176290

Habitat Description (plants & animals) *plant communities, dominants, associates, substrates/soils, aspects/slope:*
Animal Behavior *(Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):*
Riparian Woodland dominated by Salix goodingii, Baccharis salicifolia, Conium maculatum, Hirshfeldia incana.

One territorial male observed singing in same area over two site visits in June and July.

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☐ Good ☑ Fair ☐ Poor

Immediate AND surrounding land use: Flood control basin, recreational park, residential area, business area

Visible disturbances: Scouring from flood events, recreation

Threats: Flood control activities including sediment removal, park maintenence, recreational activities

Comments: Incidental observations during biological surveys for other species, on 6/27 and 7/09 site visits. Because of the late season dates of observation, this individual is presumed to be territorial.

Determination: *(check one or more, and fill in blanks)*
☐ Keyed (cite reference): _____
☐ Compared with specimen housed at: _____
☐ Compared with photo / drawing in: _____
☐ By another person (name): _____
☑ Other: Known vocalizations and visual characteristics

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☐
Habitat	☐	☐	☑
Diagnostic feature	☐	☐	☐

May we obtain duplicates at our expense? yes ☑ no ☐

Mail to:
California Natural Diversity Database
California Dept. of Fish & Wildlife
1807 13th Street, Suite 202
Sacramento, CA 95811
Fax: (916) 324-0475 email: CNDDB@wildlife.ca.gov

Date of Field Work (mm/dd/yyyy): 07/09/2013

For Office Use Only
Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Setophaga petechia*

Common Name: Yellow Warbler

Species Found? ☑ Yes ☐ No _____ If not, why?

Total No. Individuals 12 Subsequent Visit? ☐ yes ☐ no

Is this an existing NDDB occurrence? _____ Yes, Occ. # ☐ no ☑ unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Linette Lina
Address: 5 Hutton Centre Dr. Suite 750
Santa Ana, CA 92707
E-mail Address: llina@chambersgroupinc.com
Phone: (949) 261-5414

Plant Information

Phenology: 50 % vegetative 25 % flowering 25 % fruiting

Animal Information

12 # adults _____ # juveniles _____ # larvae _____ # egg masses _____ # unknown

☐ wintering ☑ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ other

***Location Description* (please attach map AND/OR fill out your choice of coordinates, below)**

Devil's Gate Reservoir/Hahamongna Watershed Park, in the city of Pasadena between Altadena and La Canada Flintridge, north of I-210.

County: Los Angeles Landowner / Mgr.: County of Los Angeles
Quad Name: Pasadena Elevation: 320 m
T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ Source of Coordinates (GPS, topo. map & type): ArcGIS
T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ GPS Make & Model _____
DATUM: NAD27 ☐ NAD83 ☐ WGS84 ☐ Horizontal Accuracy _____ meters/feet
Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☐ *OR* Geographic (Latitude & Longitude) ☐
Coordinates: See attached map.

Habitat Description (plants & animals) *plant communities, dominants, associates, substrates/soils, aspects/slope:*
Animal Behavior *(Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):*
Riparian Woodland dominated by Salix goodingii, Baccharis salicifolia, Conium maculatum, Hirshfeldia incana.

Territorial males observed singing and perching in roughly the same areas over several survey visits. Occasional female observed.

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☐ Good ☑ Fair ☐ Poor

Immediate AND surrounding land use: Flood control basin, recreational park, residential area, business area

Visible disturbances: Scouring from flood events, recreation

Threats: Flood control activities including sediment removal, park maintenence, recreational activities

Comments: Incidental observations during biological surveys for other species, from 4/15 through 7/09/13. No nests observed, but the species is presumed to breed in the area because of territorial behavior and residence from Spring through early Summer.

Determination: *(check one or more, and fill in blanks)*

☐ Keyed (cite reference): _____
☐ Compared with specimen housed at: _____
☐ Compared with photo / drawing in: _____
☐ By another person (name): _____
☑ Other: Known vocalizations and visual characteristics

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☐
Habitat	☐	☐	☑
Diagnostic feature	☐	☐	☐

May we obtain duplicates at our expense? yes ☑ no ☐

ATTACHMENT 6 – WILDLIFE SPECIES OBSERVED

Attachment 6:
Wildlife Species Observed

Scientific Name	Common Name
CLASS AMPHIBIA	**AMPHIBIANS**
BUFONIDAE	**TRUE TOADS**
Anaxyrus boreas halophilus	California toad
CLASS REPTILIA	**REPTILES**
PHRYNOSOMATIDAE	**ZEBRA-TAILED, EARLESS, FRINGE-TOED, SPINY, TREE, SIDE-BLOTCHED, AND HORNY LIZARDS**
Sceloporus occidentalis	western fence lizard
Uta stansburiana	side-blotched lizard
TEIIDAE	**WHIPTAIL LIZARDS**
Aspidoscelis tigris stejnegeri	coastal whiptail
COLUBRIDAE	**COLUBRID SNAKES**
Salvadora hexalepis virgultea	coast patchnose snake
CLASS AVES	**BIRDS**
ANATIDAE	**DUCKS, GEESE, SWANS**
Anas platyrhynchos	Mallard
Branta canadensis	Canada goose
ACCIPITRIDAE	**HAWKS, KITES, EAGLES**
Accipiter cooperii	Cooper's hawk
Buteo jamaicensis	red-tailed hawk
Buteo lineatus	red-shouldered hawk
ODONTOPHORIDAE	**NEW WORLD QUAIL**
Callipepla californica	California quail
CHARADRIIDAE	**PLOVERS**
Charadrius vociferus	killdeer
COLUMBIDAE	**PIGEONS & DOVES**
Columba livia	rock pigeon*
Zenaida macroura	mourning dove
APODIDAE	**SWIFTS**
Aeronautes saxatalis	white-throated swift
TROCHILIDAE	**HUMMINGBIRDS**
Calypte anna	Anna's hummingbird
Selasphorus sasin	Allen's hummingbird
ALCEDINIDAE	**KINGFISHERS**
Megaceryle alcyon	belted kingfisher
PICIDAE	**WOODPECKERS**
Melanerpes formicivorus	acorn woodpecker
Picoides nuttallii	Nuttall's woodpecker
Picoides pubescens	downy woodpecker
TYRANNIDAE	**TYRANT FLYCATCHERS**

Attachment 6:
Wildlife Species Observed

Scientific Name	Common Name
Contopus sordidulus	western wood-pewee
Empidonax difficilis	Pacific-slope flycatcher
Myiarchus cinerascens	ash-throated flycatcher
Sayornis nigricans	black phoebe
Sayornis saya	Say's phoebe
Tyrannus vociferans	Cassin's kingbird
HIRUNDINIDAE	**SWALLOWS**
Petrochelidon pyrrhonota	cliff swallow
Stelgidopteryx serripennis	northern rough-winged swallow
CORVIDAE	**JAYS & CROWS**
Aphelocoma californica	Western scrub-jay
Corvus brachyrhynchos	American crow
Corvus corax	common raven
PARIDAE	**CHICKADEES, TITMICE**
Baeolophus inornatus	oak titmouse
AEGITHALIDAE	**BUSHTITS**
Psaltriparus minimus	bushtit
TROGLODYTIDAE	**WRENS**
Thryomanes bewickii	Bewick's wren
Troglodytes aedon	house wren
SYLVIIDAE	**OLD WORLD WARBLERS**
Chamaea fasciata	wrentit
POLIOPTILIDAE	**GNATCATCHERS**
Polioptila caerulea	blue-gray gnatcatcher
MIMIDAE	**MOCKINGBIRDS, THRASHERS**
Mimus polyglottos	northern mockingbird
Toxostoma redivivum	California thrasher
STURNIDAE	**STARLINGS**
Sturnus vulgaris	European starling*
VIREONIDAE	**VIREOS**
Vireo bellii pusillus	least bell's vireo
Vireo gilvus	warbling vireo
Vireo huttoni	Hutton's vireo
PARULIDAE	**WOOD WARBLERS**
Oreothlypis celata	orange-crowned warbler
Setophaga coronata	yellow-rumped warbler
Setophaga nigrescens	black-throated gray warbler
Setophaga petechia	yellow warbler
Cardellina pusilla	Wilson's warbler

Attachment 6:
Wildlife Species Observed

Scientific Name	Common Name
Geothlypis trichas	common yellowthroat
Icteria virens	yellow-breasted chat
ICTERIDAE	**BLACKBIRDS**
Agelaius phoeniceus	red-winged blackbird
Euphagus cyanocephalus	Brewer's blackbird
Icterus bullockii	Bullock's oriole
Molothrus ater	brown-headed cowbird
EMBERIZIDAE	**EMBERIZIDS**
Melospiza melodia	song sparrow
Passerculus sandwichensis	savannah sparrow
Melozone crissalis	California towhee
Pipilo maculatus	spotted towhee
Zonotrichia leucophrys	white-crowned sparrow
CARDINALIDAE	**CARDINALS**
Piranga ludoviciana	western tanager
Pheucticus melanocephalus	black-headed grosbeak
Passerina caerulea	blue grosbeak
Passerina amoena	lazuli bunting
PSITTACIDAE	**PARROTS**
Amazona sp.	Parrot*
FRINGILLIDAE	**FINCHES**
Spinus psaltria	lesser goldfinch
Spinus tristis	American goldfinch
Carpodacus mexicanus	house finch
Carpodacus purpureus	purple finch
TURDIDAE	**THRUSHES**
Turdus migratorius	American robin
ESTRILDIDAE	**ESTRILDID FINCHES**
Lonchura punctulata	nutmeg manikin*
PTILOGONATIDAE	**SILKY-FLYCATCHERS**
Phainopepla nitens	phainopepla
CLASS MAMMALIA	**MAMMALS**
CANIDAE	**WOLVES & FOXES**
Canis latrans	coyote
LEPORIDAE	**HARES & RABBITS**
Sylvilagus audubonii	desert cottontail
SCIURIDAE	**SQUIRRELS**
Sciurus griseus	western gray squirrel
Sciurus niger	eastern fox squirrel*

Attachment 6:
Wildlife Species Observed

Scientific Name	Common Name
Spermophilus beecheyi	California ground squirrel
FELIDAE	**CATS**
Lynx rufus	bobcat

*Non-native species

APPENDIX D4– Jurisdictional Delineation Report

JURISDICTIONAL DELINEATION REPORT
DEVIL'S GATE RESERVOIR SEDIMENT REMOVAL AND MANAGEMENT PROJECT
IN THE CITY OF PASADENA, LOS ANGELES COUNTY, CALIFORNIA

Prepared for:

LOS ANGELES COUNTY FLOOD CONTROL DISTRICT
Water Resources Division
900 South Fremont Avenue
Alhambra, California 91803

Prepared by:

CHAMBERS GROUP, INC.
5 Hutton Centre Drive, Suite 750
Santa Ana, California 92707
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October 2013

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SECTION 1.0 – INTRODUCTION

1.1 PROJECT LOCATION

The Devil's Gate Reservoir Sediment Removal and Management Project (proposed project) is located in the City of Pasadena, in Los Angeles County approximately 14 miles north of downtown Los Angeles (see Figure 1, Project Vicinity Map). The City of La Cañada Flintridge and the community of Altadena are located near the proposed project site to the west and east, respectively. Lying south of the San Gabriel Mountains, the proposed project site is located in the middle portion of the Arroyo Seco watershed. The Arroyo Seco extends approximately 11 miles from the border of the Angeles National Forest to its confluence with the Los Angeles River. Approximately 20,416 acres (39.1 square miles) of both residential and undeveloped land drain into Devil's Gate Reservoir.

The proposed project site (see Figure 1) includes the Devil's Gate Dam and Reservoir and covers approximately 120 acres. The Devil's Gate Reservoir captures stormwater, sediment, and debris during storm events and retains stormwater to prevent high flow rates from overwhelming the downstream flood control channel.

The topography in the vicinity of the proposed project site is generally flat with a slight incline to the north. The San Gabriel Mountains are located to the north of the proposed project site, and are characterized by both the foothills and steep slopes associated with mountainous terrain.

1.2 PROJECT DESCRIPTION

The proposed project would remove approximately 2.9 million cubic yards of sediment from the Devil's Gate Reservoir. Sediment would be removed from the 120-acre excavation area within the reservoir. The excavation area is a combination of bare ground, with some native and non-native vegetation. This area behind the Devil's Gate Dam is inundated seasonally, and some of the vegetation is regularly washed out by storm flows. The accumulated sediment will be removed with construction equipment and will be trucked off-site to the existing facilities in Irwindale or Azusa or trucked to the west and placed in one of the existing facilities in Sun Valley.

Historically, as storm events have deposited sediment in the reservoir, native and non-native vegetation have become established in the sediment. During subsequent storm events some of the vegetation and trees have been washed out by storm flows or submerged when the reservoir level rises, or buried under sedimentation. Despite the dynamic changes to water elevation and flows in the reservoir, mature black willow trees, Riversidean alluvial fan sage scrub, mule fat scrub, and riparian vegetation have thrived in the reservoir. During storm events following the 2009 Station Fire, a large portion of the reservoir vegetation was buried in sediment; however, significant amounts of vegetation, including numerous mature willow trees, remain intact.

In order to remove the sediment from the reservoir, trees and vegetation growing within the excavation areas will need to be removed. The accumulated sediment will be excavated with construction equipment including but not limited to approximately four front loaders with 4-cubic-yard buckets, two bulldozers, one excavator, one grader, one water truck, and two tender trucks (for fuel and maintenance). Vegetation and organic debris will be separated from the sediment. Coarse material may need to be processed through sorters and crushers to be hauled offsite. Depending on the moisture

content of the sediment removed, the sediment may need to be stockpiled to allow the sediment to dry. Stockpiling of the sediment will occur onsite within Devil's Gate Reservoir.

Proposed Project Boundary

SCALE=1:100,000

0 1.25 2.5

Miles

Figure 1

Devil's Gate Reservoir Sediment Removal and Management Project

Project Vicinity and Location Map

Version Date: 10/11/2013

CHAMBERS GROUP

\\Cgi-gisdata01\gis_data\Projects\20000s\20201 - 20400\20346 Devil's Gate EIR\20346 JD Figure 1 - Site Vicinity and Location Map.mxd

SECTION 2.0 – JURISDICTIONAL CRITERIA

2.1 UNITED STATES ARMY CORPS OF ENGINEERS

Pursuant to Section 404 of the CWA, the United States Army Corps of Engineers (USACE) regulates the discharge of dredged and/or fill material into waters of the United States. The term "waters of the United States" is defined by 33 Code of Federal Regulations (CFR) Part 328 and currently includes: (1) all navigable waters (including all waters subject to the ebb and flow of the tide), (2) all interstate waters and wetlands, (3) all other waters (e.g., lakes, rivers, intermittent streams) that could affect interstate or foreign commerce, (4) all impoundments of waters mentioned above, (5) all tributaries to waters mentioned above, (6) the territorial seas, and (7) all wetlands adjacent to waters mentioned above. Waters of the United States do not include (1) waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of the Clean Water Act (CWA), and (2) prior converted cropland. Waters of the United States typically are separated into two types: (1) wetlands and (2) "other waters" (non-wetlands) of the United States.

Wetlands are defined by 33 CFR 328.3(b) as "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support … a prevalence of vegetation typically adapted for life in saturated soil conditions." In 1987, the USACE published a manual (1987 Wetland Manual) to guide its field personnel in determining jurisdictional wetland boundaries. This manual was amended in 2008 to the USACE 2008 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0) (2008 Arid West Supplement). Currently, the 1987 Wetland Manual and the 2008 Arid West Supplement provide the legally accepted methodology for identification and delineation of USACE-jurisdictional wetlands in southern California.

In the absence of wetlands, the limits of USACE jurisdiction in nontidal waters, including intermittent Relatively Permanent Water (RPW) streams, extend to the Ordinary High Water Mark (OHWM), which is defined by 33 CFR 328.3(e) as:

> *… that line on the shore established by the fluctuation of water and indicated by physical characteristics such as clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas.*

On January 9, 2001, the U.S. Supreme Court ruled (in *Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers*) (SWANCC) that USACE jurisdiction does not extend to previously regulated isolated waters, including but not limited to isolated ponds, reservoirs, and wetlands. Examples of isolated waters that are affected by this ruling include vernal pools, stock ponds, lakes (without outlets), playa lakes, and desert washes that are not tributary to navigable or interstate waters or to other jurisdictional waters.

A joint guidance by EPA and USACE was issued on June 5, 2007, to clarify circumstances where a CWA Section 404 permit would be required before conducting activities in wetlands, tributaries, and other waters. This guidance is consistent with the Supreme Court's decision in the consolidated cases *Rapanos v. United States* and *Carabell v. United States* (126 S. Ct. 2208 [2006]) (*Rapanos*), which address the jurisdiction over waters of the United States under the CWA (33 U.S.C. §1251 et seq.). This guidance was revised on December 2, 2008, based on consideration of public comments on the 2007 guidance and the agencies' experience in implementing the *Rapanos* decision. Draft guidance was circulated in April 2011

to supersede both the 2003 SWANCC guidance and 2008 Rapanos decision; however, this guidance is not finalized and lacks the force of law.

USACE will continue to assert jurisdiction over Traditionally Navigable Waters (TNWs), wetlands adjacent to TNW, non-navigable tributaries of TNW that are Relatively Permanent Waters (RPW) where the tributaries typically flow year-round or have continuous flow at least seasonally (e.g., typically three months), and wetlands that directly abut such tributaries.

USACE generally will not assert jurisdiction over swales or erosional features (e.g., gullies or small washes characterized by low volume, infrequent, or short duration flow) or non-tidal drainage ditches (including roadside ditches) that are (1) excavated wholly in and draining only uplands and (2) that do not carry a relatively permanent flow of water. USACE defines a drainage ditch as:

> *A linear excavation or depression constructed for the purpose of conveying surface runoff or groundwater from one area to another. An "upland drainage ditch" is a drainage ditch constructed entirely in uplands* (*i.e., not in waters of the United States*) *and is not a water of the United States, unless it becomes tidal or otherwise extends the ordinary high water line of existing waters of the United States.*

Furthermore, USACE generally does not consider "[a]rtificially irrigated areas which would revert to upland if the irrigation ceased" to be subject to their jurisdiction. Such irrigation ditches are linear excavations constructed for the purpose of conveying agricultural water from the adjacent fields. Therefore, such agricultural ditches are not considered to be subject to USACE jurisdiction.

USACE will use fact-specific analysis to determine whether waters have a significant nexus with (1) TNW for non-navigable tributaries that are not relatively permanent (non-RPW); (2) wetlands adjacent to non-navigable tributaries that are not relatively permanent; and (3) wetlands adjacent to, but that do not directly abut, a relatively permanent non-navigable tributary. According to USACE, *"a significant nexus analysis will assess the flow characteristics and functions of the tributary itself and the functions performed by all wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical and biological integrity of downstream traditional navigable waters,"* including consideration of hydrologic and ecologic factors. A primary component of this determination lies in establishing the connectivity or lack of connectivity of the subject drainages to a TNW.

In May 2007, USACE and EPA jointly published and authorized the use of the *Jurisdictional Determination Form Instructional Guidebook* (USACE 2007). The form and guidebook define how to determine if an area is USACE jurisdictional and if a significant nexus exists per the Rapanos decision. A nexus must have more than insubstantial and speculative effects on the downstream TNW to be considered a significant nexus. This guidebook is updated by the 2008 Arid West Supplement and the 2010 *Updated Datasheet for the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States*.

2.2 REGIONAL WATER QUALITY CONTROL BOARD

Under Porter-Cologne, the State Water Resources Control Board (SWRCB) and the local Regional Water Quality Control Boards (RWQCB) regulate the discharge of waste into waters of the State. Waters of the State are defined by Porter-Cologne as "any surface water or groundwater, including saline waters, within the boundaries of the state" (Water Code Section 13050(e)). Waters of the State broadly includes

all waters within the State's boundaries (public or private), including waters in both natural and artificial channels.

Discharges of waste include "fill, any material resulting from human activity, or any other 'discharge' that may directly or indirectly impact 'waters of the state'". Porter-Cologne reserves the right for the State to regulate activities that could affect the quantity and/or quality of surface and/or groundwaters, including isolated wetlands, within the State.

The SWRCB and RWQCBs define a wetland area (under normal circumstances) as: (1) the area has continuous or recurrent saturation of the upper substrate caused by groundwater, or shallow surface water, or both; (2) the duration of such saturation is sufficient to cause anaerobic conditions in the upper substrate; and (3) the area either lacks vegetation or the vegetation is dominated by hydrophytes. Places lacking vegetation but otherwise meeting the hydrology and substrate criteria for wetlands are defined as wetlands.

Under Section 401 of the CWA, the RWQCB is responsible for regulating, through state water quality certification, any proposed federally permitted activity which may result in a discharge to water bodies, including wetlands. Section 401 gives the RWQCB the authority to regulate waters of the United States and waters of the State, which can expand beyond the waters of the United States. Therefore, when an activity results in fill or discharge directly below the OHWM of jurisdictional Waters of the United States (federal jurisdiction), a CWA Section 401 Water Quality Certification is required from the RWQCB.

If a proposed project is not subject to CWA Section 401 certification, but involves activities that may result in a discharge to waters of the State, the proposed project may still be regulated under Porter-Cologne and may be subject to waste discharge requirements. In cases where waters apply to both CWA and Porter-Cologne, RWQCB may consolidate permitting requirements to one permit.

2.3 CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE

Pursuant to Division 2, Chapter 6, Sections 1600-1602 of the California Fish and Game Code, the California Department of Fish and Wildlife (CDFW) regulates all diversions, obstructions, or changes to the natural flow or bed, channel, or bank of any river, stream, or lake, which supports fish or wildlife. CDFW defines a "stream" (including creeks and rivers) as "a body of water that flows at least periodically or intermittently through a bed or channel having banks and supports fish or other aquatic life. This includes "watercourses having surface or subsurface flow that supports or has supported riparian vegetation" (California Code of Regulations, Title 14, Section 1.72). The jurisdiction of CDFW may include areas in or near intermittent streams, ephemeral streams, rivers, creeks, dry washes, sloughs, blue-line streams that are indicated on USGS maps, watercourses that may contain subsurface flows, or within the flood plain of a water body. CDFW's definition of "lake" includes "natural lakes or man-made reservoirs." CDFW limits of jurisdiction typically include the maximum extents of the uppermost bank-to-bank distance and/or the outermost extent of riparian vegetation dripline, whichever measurement is greater.

In a CDFW guidance of stream processes and forms in dryland watersheds (Vyverberg 2010), streams are identified as having one or more channels that may all be active or receive water only during some high flow event. Subordinate features, such as low flow channels, active channels, banks associated with secondary channels, floodplains, and stream-associated vegetation, may occur within the bounds of a single, larger channel. The water course is defined by the topography or elevations of land that confine a

stream to a definite course when its waters rise to their highest level. A water course is also defined as a stream with boundaries defined by the maximal extent or expression on the landscape even though flow may otherwise be intermittent or ephemeral.

Artificial waterways such as ditches (including roadside ditches), canals, aqueducts, irrigation ditches, and other artificially created water conveyance systems also may be under the jurisdiction of CDFW. CDFW may claim jurisdiction over these features based on the presence of habitat characteristics suitable to support aquatic life, riparian vegetation, and/or stream-dependent terrestrial wildlife. As with natural waterways, the limit of CDFW jurisdiction of artificial waterways includes the uppermost bank-to-bank distance and/or the outermost extent of riparian vegetation dripline, whichever measurement is greater.

CDFW has the responsibility to protect against a net loss of the State's wetlands. CDFW supports the wetland criteria recognized by US Fish and Wildlife Service (USFWS); one indicator of wetland conditions must exist for wetlands conditions to be considered present. The following is the USFWS-accepted definition of a wetland:

> *Wetlands are lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. For purposes of this classification, wetlands must have one or more of the following three attributes: (1) at least periodically, the lands supports hydrophytes, (2) the substrate is predominantly undrained hydric soil; and (3) the substrate is nonsoil and is saturated with water or covered by shallow water at some time during the growing season of each year (Cowardin et al. 1979).*

When considering whether an action would result in a net loss of wetlands, CDFW will extend jurisdiction to one-parameter wetland conditions where such conditions exist within the riparian vegetation that is associated with a stream or lake and does not depend on whether those features meet the three-parameter USACE methodology of wetland determination. If impacts to wetlands under the jurisdiction of CDFW are unavoidable, a mitigation plan will be implemented in coordination with CDFW to support the CDFW policy of "no net loss" of wetland habitat.

SECTION 3.0 – METHODS

3.1 JURISDICTIONAL DETERMINATION AND WETLAND DELINEATION

3.1.1 Literature Review

Prior to beginning the field delineation, high-resolution aerial photographs, USFWS National Wetlands Inventory (NWI) maps, USGS topographic maps, U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) maps, and Google Earth images were examined to determine the potential areas of USACE/RWQCB/CDFW jurisdiction on the proposed project.

As prescribed by the 1987 Wetland Manual and Arid West Supplement, all available lists of hydric soils were referenced to identify any occurrence of hydric soils listed within the proposed project. The national, state, and local hydric soils lists were used along with local soil survey maps.

3.1.2 Field Survey

Field surveys in the lower two thirds of the proposed project site were conducted on November 24, 2010 by Chambers Group biologists Paul Morrissey and Saraiah Skidmore. Additional field surveys for the upstream area of the reservoir and confirmation of the lower two thirds of the reservoir were conducted by Paul Morrissey and Carley Jennings on May 23, 2013. USACE and RWQCB potential wetland areas were evaluated based upon the presence of three parameters: hydrophytic vegetation, hydric soils, and wetland hydrology, in accordance with USACE guidelines (USACE 2008). Vegetation communities were identified to be of CDFW interest if at least one of the three wetland parameters were present.

The RWQCB jurisdiction includes all USACE jurisdictional areas, Ordinary High Water Marks (OHWMs) or High Water Marks (HWMs) in non-Relatively Permanent Waters (RPWs), isolated wetlands, and any other feature that have an effect on surface or subsurface water quality within California. The CDFW takes jurisdiction to the top of the bank on either side of the drainage or to the outer edge of all riparian vegetation, whichever measurement is greater. Vegetation communities were mapped within the survey area (proposed project boundary) and are displayed on the Vegetation Communities Map (Figure 2). Typically, for reservoir projects, the limit of jurisdiction is determined by the total capacity of the infrastructure (removal area within the reservoir), or HWM. However, Devil's Gate Reservoir does not capture and retain water to total capacity of the reservoir. For Devil's Gate Reservoir, water is typically retained up to 1020 elevation line (contour). Therefore, the 1020 contour is considered the OHWM for this study. The proposed project footprint is located up to the 1070 contour. Therefore, 1070 contour line is considered the HWM for this study. Reference photographs were taken during this survey and are included as Appendix A. Photo points were reproduced using Geographic Information System (GIS) software and displayed on the Delineation Map (Figure 3).

Regardless of whether the drainages exhibited the potential to be three-parameter wetlands (i.e., vegetation, soils, and hydrology); representative drainages were investigated and recorded onto standardized Wetland Determination Data Forms – Arid West Region data sheets (Appendix B). Features with no evidence of wetland hydrology, and which supported only upland vegetation, were evaluated for the upward limits of jurisdiction and not exclusively for wetland parameters. Recorded data included plant species with percent covers, soil profiles in dug soil pits, and evidence of hydrology. Data points and soil pits were recorded and used to delineate the wetland boundaries (Figure 3 and Figure 4).

Additional test pits were dug throughout the reservoir to identify hydric soil characteristics. All determinations and delineations were digitized for the precise mapping of jurisdictional areas. All data on jurisdictional determinations and wetland delineations were reproduced using GIS software and displayed on aerial maps for this report (Figure 3 and Figure 4).

3.1.3 Vegetation

During the wetland delineation, sample plots were established to a 30-foot radius, where feasible, that represented potential wetland areas. Plant species were identified within the sample plot, and the percent cover for each species was recorded on standard USACE wetland determination forms. The 2012 National Wetland Plant List, the California 2012 Final State Wetland Plant List (Lichvar 2012a), and the National Wetland Plant List Indicator Rating Definitions (Lichvar 2012b) were referenced to classify the plant species based on their probability to occur within a wetland.

Plant species and absolute percent covers were recorded by stratum (i.e., tree, sapling/shrub, herb, woody vine) and evaluated for dominance and prevalence according to guidelines in the 1987 Wetland Manual and Arid West Supplement. Naming conventions follow the Jepson Manual (Hickman 1993). Plants were categorized according to their probabilities to occur in wetlands versus non-wetlands in accordance with the categories in the *National List of Species that Occur in Wetlands* (Reed 1988). More specifically, the California Land Resource Region (Region 0) wetlands plant list was used, which is a regional adaptation of the *National List*. The wetland species categories are:

I. **Obligate Wetland (OBL)** – Occur almost always (estimated probability >99 %) under natural conditions in wetlands.

II. **Facultative Wetland (FACW) –** Usually occur in wetlands (estimated probability 67 % to 99 %), but occasionally found in non-wetlands.

III. **Facultative (FAC) –** Equally likely to occur in wetlands or non-wetlands (estimated probability 34 % to 66 %).

IV. **Facultative Upland (FACU) –** Usually occur in non-wetlands (estimated probability 67 % to 99 %), but occasionally found in wetlands.

V. **Obligate Upland (UPL) –** May occur in wetlands in another region, but occur almost always (estimated probability >99 %) under natural conditions in non-wetlands in southern California. All species not listed on the *National List of Species that Occur in Wetlands* (Reed 1988) are considered to be UPL.

VI. **No Indicator (NI)** – NI is recorded for those species for which insufficient information was available to determine an indicator status.

3.1.4 Soils

Before conducting the surveys, soil maps for Los Angeles County were referenced online (http://soils.usda.gov/technical/classification/osd/index.html) to determine the types of soil found on the site. Soils were determined in accordance with categories set forth by the USDA Soil Conservation

Service and by referencing the USDA NRCS Web Soil Survey (USDA 2013), and the Los Angeles County GIS (eGIS) Data Portal (Los Angeles County, 2011).

In addition to assessing the plant species, the soils present in the sample plot were also investigated. Using a spade, a soil pit was dug to a depth of 18 inches, where feasible, as prescribed by the 1987 Wetland Manual and Arid West Supplement (USACE 2008). Data was collected within each soil pit, which included the soil matrix color, soil texture, presence or absence of indicators noted in the wetland delineation manuals (Environmental Laboratory 1987; USACE 2008), and depth of soil saturation. The colors of the soil matrix and redoximorphic features (if present) were determined using the Munsell Soil Color Charts (GretagMacbeth 2009). The Munsell Soil Color Charts used to determine chroma and hue are based on wetted soils.

3.1.5 Hydrology

Consideration of the climate and flow frequency was given when observing watermarks and drift lines. Signs of hydrology were also recorded. Typical indicators of hydrology include evidence of inundation, destruction of vegetation, saturation, surface water, watermarks, drift lines, sediment deposits, water-stained leaves, and the presence or oxidation/reduction features in the soil. Climate and flow frequency were considered in observing watermarks and drift lines. For the purpose of determining hydrologic connectivity to a TNW, aerial photos, National Wetland Inventory maps, and USGS quads were referenced and were inspected on and offsite for true connectivity.

3.1.6 Mapping

Field staff collected data to submeter accuracy, when available, via Trimble GPS equipment (Trimble unit) and aerial photography. Point data was recorded for the sample plots, photo locations, and culverts. Line features were collected for drainages by walking the features with the Trimble unit. Lines were recorded on the perimeter of the wetlands and transformed to polygons on a GIS software program. Trimble unit data was downloaded and transformed utilizing ArcGIS. In areas where access to the feature was not available, lines were drawn on aerial photographs in the field and digitized in the office utilizing ArcGIS.

Vegetation Communities (Impacted Acres)

1. Riversidean Alluvial Fan Sage Scrub (1.1 acres)
2. Coastal Sage Scrub (3.1 acres)
3. Scoured (26.5 acres)
4. Ornamental Landscaping (0.4 acre)
5. Riparian Woodland (51.4 acres)
6. Ruderal (22.8 acres)
7. Mule Fat Scrub (9.3 acres)
8. Disturbed (Barren/Trails) (1.9 acres)
9. Riparian Herbaceous (1.8 acres)

SCALE= 1 inch equals 375 feet

0 187.5 375 750 Feet

Service Layer Credits: Copyright© 2013 Esri, DeLorme, NAVTEQ, TomTom
Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Proposed Project Boundary

Sediment Removal Excavation Limit

Coast Live Oak

Figure 2
Devil's Gate Reservoir Sediment Removal and Management Project
Vegetation Communities Map

Version Date: 10/18/2013

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\\Cgi-gisdata01\gis_data\Projects\20000s\20201 - 20400\20346 Devil's Gate EIR\20346 JD Figure 2 - Vegetation Communities Map.mxd

SECTION 4.0 – FINDINGS

The interactions of three parameters were examined in the field for hydrophytic characteristics and used to determine the presence or absence of a wetland for USACE/RWQCB jurisdiction and at least one of the three parameters for CDFW jurisdiction. Details on the characteristics of the soils, hydrology, and vegetation observed within the proposed project boundaries are described below.

4.1 SOILS

Referencing the USDA Natural Resources Conservation Service (NRCS) Web Soil Survey (USDA 2013), it was determined that data using this resource does not exist at this time. NRCS data for the site was found on the Los Angeles County GIS (eGIS) Data Portal (Los Angeles County 2011). The following soils were identified within the proposed project site:

I. Ramona Sandy Loam

The Ramona series is a well drained sandy loam and fine sandy loam and fine sandy loam soil formed from granitic rock. These soils are found in nearly level to moderately steep topography, on terraces and alluvial fans at elevations of 250 to 3,500 feet. Soils are generally well-drained, slow to rapid runoff, and moderately slow permeability.

II. Hanford Gravelly Sandy Loam

The Hanford series is a very deep, well drained soil that is formed in moderately coarse textured alluvium primarily from granite and other quartz bearing rock. These soils are typically found on stream bottoms, floodplains and alluvial fans and on slopes of 0 to 15 percent at elevations of 150 to 3,500 feet. Soils exhibit negligible to low runoff, and moderately rapid permeability.

Due to the inundation of soils and organic debris entering the reservoir after the Station Fire and natural flooding events, soil characteristics were also assessed in the field by digging pits, checking for soil indicators, and verifying or determining actual soil types present.

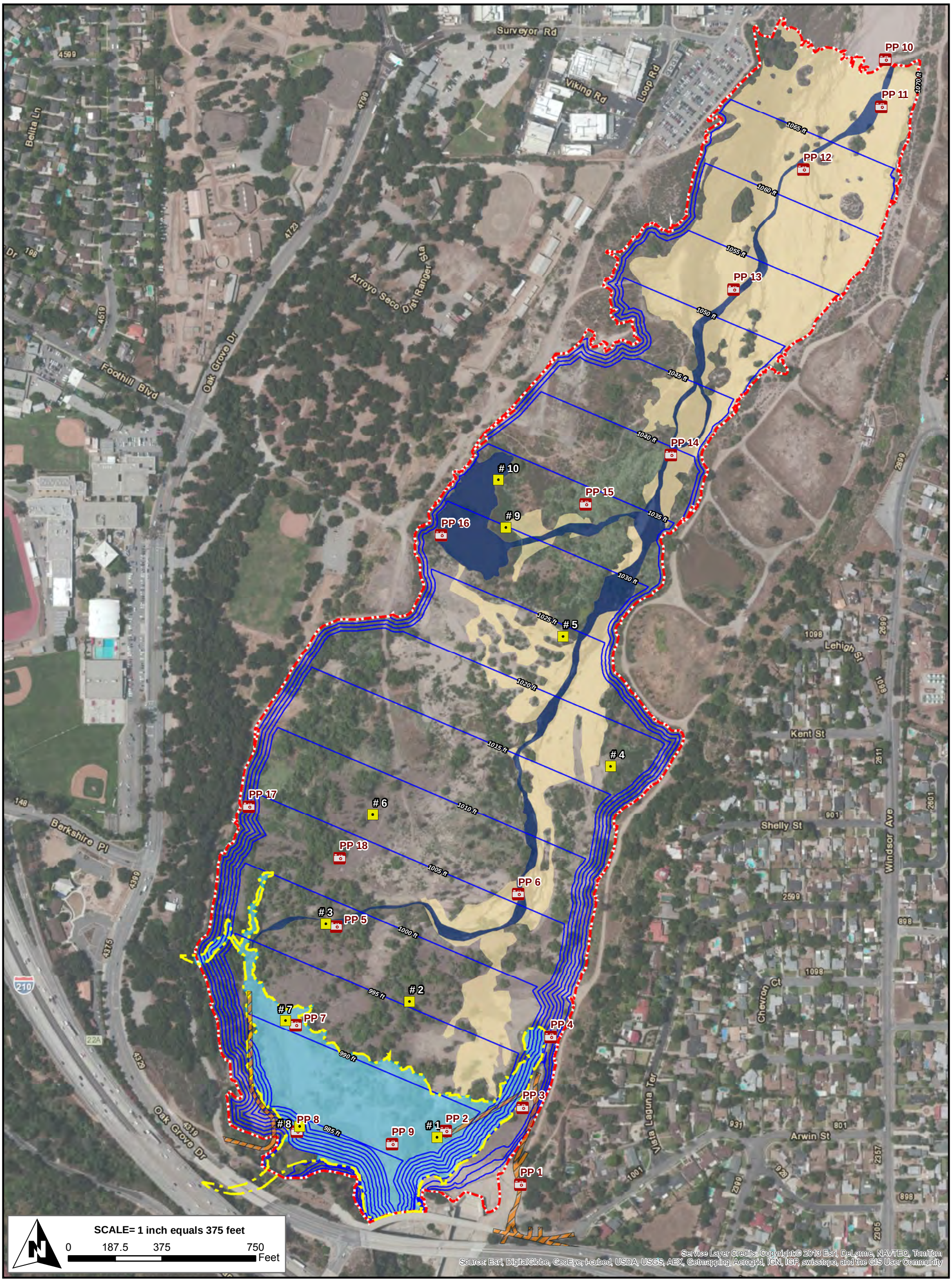
Problematic soils were found to occur within Devil's Gate Reservoir. Problematic soils include soil profiles that have angular gravel or fill (Wetland Delineation Manual, Arid West Region), such as the sediment load entering a reservoir after the fire and heavy rain events. The Devil's Gate Dam was built in 1920 and serves as a man-made structure altering natural hydrology in the area. Many human-induced wetlands do not contain hydric soils because of the relatively recent changes in soil and hydrology. Hydric soils may take several years to hundreds of years to mature under natural conditions. Fire and rainfall patterns cause debris and sediment to wash down and get trapped in the reservoir and as a result, the reservoir is continually loaded with debris and sediment build up. As a result of the 2009 Station Fire, Devil's Gate Reservoir received debris and sediment build-up at depths between 3 to 18.5 feet, depending on the area of the reservoir. Typically, sediment and debris is deposited in Devil's Gate Reservoir at a much lower rate. With new soils continuously moving into the reservoir, the upper layers of soil do not have the chance to mature. Although this system is not considered natural, the man-made changes have been left unchanged for a number of years and are considered normal circumstances.

Hydric soil indicators were observed at two formal Soil Test Pits, Pits 1 and 7, within the proposed project boundaries (Figures 3 and 4). Hydric soil indicators were faint or non-existent at the other eight

Soil Pit areas and numerous soil test pit areas. Due to the sediment build up adjacent to these pits, boundaries of these Wetland areas were undeterminable during the delineation process based on these problematic soils. Wetland boundaries were therefore identified by the OHWM (Section 4.4.3).

4.2 VEGETATION

Vegetation in the Devil's Gate Reservoir is typical of wetlands, with mature riparian trees, pockets of mule fat scrub, and emergent riparian herbaceous communities growing along scoured areas. The riparian areas consisted of Riparian Woodland, Mule Fat Scrub, Coast Live Oak Woodland, and Riparian Herbaceous. Upland vegetation communities also exist within the proposed project boundaries and include Riversidean Alluvial Fan Sage Scrub, Coastal Sage Scrub, Scoured, Ornamental Landscaping and Ruderal areas. The vegetation communities within the proposed project boundary are shown in detail in Figure 2.



Proposed Project Boundary

Access Road

Sediment Removal Excavation Limit

Inundation Line

Soil Test Pit

Photo Points

Waters

Wetland Area (11.2 acres)

Drainage (6.7 acres)

Braided Channel (28.9 acres)

Figure 3

Devil's Gate Reservoir Sediment Removal and Management Project

USACE/RWQCB Jurisdictional Areas Map

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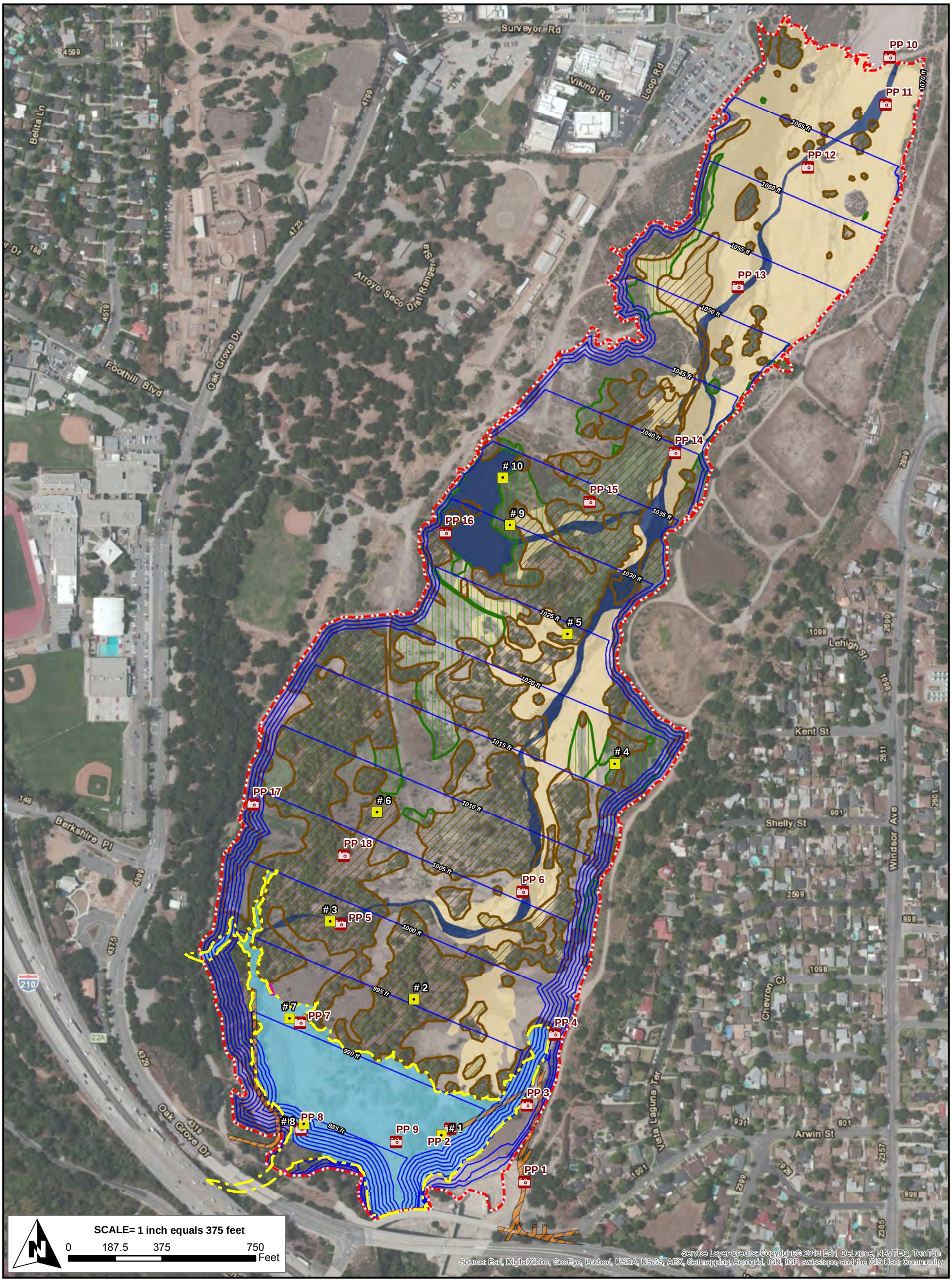
\\Cgi-gisdata01\gis_data\Projects\20000s\20201 - 20400\20346 Devil's Gate EIR\20346 JD Figure 3 - USACE_RWQCB Jurisdictional Areas Map.mxd



Proposed Project Boundary
Access Road
Sediment Removal Excavation Limit
Inundation Line
Soil Test Pit
Photo Points

Riparian Vegetation

Riparian Woodland (45 acres)
Mule Fat Scrub (9.3 acres)
Riparian Herbaceous (0.03 acre)

Waters

Wetland Area (11.2 acres)
Drainage (6.7 acres)
Braided Channel (28.9 acres)

Figure 4
Devil's Gate Reservoir Sediment Removal and Management Project
CDFW Jurisdictional Areas Map

Version Date: 10/18/2013

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\\Cgi-gisdata01\gis_data\Projects\20000s\20201 - 20400\20346 Devil's Gate EIR\20346 JD Figure 4 - CDFW Jurisdictional Areas Map.mxd

4.3 DRAINAGE FEATURES AND CONNECTIVITY

The dam and reservoir originally were developed to collect flood runoff from the drainage area upstream, store it temporarily, and release it so as not to exceed the downstream capacity. The Devil's Gate Reservoir is fed by the Arroyo Seco Watershed which begins in the San Gabriel Mountains north of Pasadena. Water flows from the watershed into the reservoir at the base of the mountains. According to the Hahamongna Watershed Master Plan (HWPMP), adopted in 2003, in addition the Arroyo Seco, 23 storm drains also enter the reservoir. Most of these storm drains divert run-off from neighborhoods and businesses into the watershed and two of these storm drains had flowing water at the time of the survey. Water entered the reservoir through a culvert on the southwest side of the site and a culvert on the southeast contained a pond with little water flow. Water from the Arroyo Seco and storm drains continues to flow to the southernmost point in the reservoir and leaves the reservoir from the outlet structures of the dam. Water flows south of the dam for approximately 8.5 river miles to the Los Angeles (LA) River in Los Angeles near the State Route (SR) 110 and Interstate 5 (I-5) freeway interchange. The LA River continues to flow south for approximately 23.5 river miles when it reaches the Pacific Ocean in Long Beach.

The total distance to the nearest TNW from Devil's Gate is the LA River at a distance of approximately 8.5 river miles. The Arroyo Seco Watershed is seasonal, flowing during the wet season after rain events. The headwaters are located at in the San Gabriel Mountains and waters terminate at LA River.

4.4 WETLAND INDICATORS

The proposed project site contained at least one of three wetland parameters within the 1020 contour. However, the proposed project site contains characteristics of hydric soil indicators at Soil Pits 1 and 7, vegetation, and hydrology that indicate the area is a wetland feature (Figures 3 and 4). Due to problematic soils in the remaining eight soil pits and numerous test pits (test pits are dug by the delineator to quickly examine soil profiles without filling out data sheets for all three parameters), the presence of wetland boundaries were undeterminable during the field delineation based on the three parameters. Therefore, the 1020 contour (OHWM) was used as the boundary of the wetland area for all three agencies (Section 4.4.3).

4.4.1 Vegetation

The vegetation present on the proposed project site is dominated by black willow (*Salix gooddingii*), in addition to cottonwood (*Populus fremontii*), western sycamore (*Platanus racemosa*), mule fat (*Baccharis salicifolia*), and slender cattail (*Typha domingensis*). Non-native species observed within soil pit study areas included: tree tobacco (*Nicotiana glauca*), eupatory (*Ageratina adenophora*), and castor bean (*Ricinus communis*).

Vegetation is considered hydrophytic if the dominance test is greater than 50 percent, if the prevalence test is less than or equal to 3.0, and/or if there are morphological adaptations in the present plant species. The dominance test was greater than 50 percent and the prevalence test was less than three for wetland vegetation at the study areas at Soil Pits 1 through 9. Hydrophytic vegetation in these areas consisted of *Baccharis salicifolia* (mulefat, FAC), *Lepidium latifolium* (peppergrass, FAC), *Rumex crispus* (curly doc, FAC), *Conium maculatum* (poison hemlock, FACW), *Cyperus eragrostis* (tall cyperus, FACW), *Typha domingensis* (slender cattail, OBL), *Plantanus racemosa* (western sycamore, FAC), *Alnus*

rhombifolia (white alder, FACW), *Salix gooddingii* (black willow, FACW), *Salix laevigata* (red willow, FACW), *Salix lasiolepis* (yellow willow, FACW), and *Juncus xiphioides* (iris-leaved rush, OBL).

The vegetation at Soil Pit 10 was dominated by exotic upland species of plants including *Hirschfeldia incana* (short-pod mustard, UPL) and *Bromus madritensis* ssp. *rubens* (foxtail chess, UPL). Although this area appears to be a man-made water retention area with constructed berms, the vegetation did not meet the dominance criteria for wetland characterization.

4.4.2 Soils

Problematic soils exist on the site as indicated in 8 of the 10 formal Soil Pits and numerous soil test pits. Sediment build up of sandy to sandy loam soils during rain events cover potentially hydric soils in the reservoir area. As a result of the 2009 Station Fire and the subsequent storm events, large amounts of sediment have entered the reservoir depositing between 3 and 18.5 feet of new sediment. During rain events, these sandy soils are transported down the Arroyo Seco and settle within the reservoir area. Scouring of vegetation was also evident, indicating that high volumes of water flow through the reservoir during natural flood events and transport the sandy soils.

However, redoximorphic features and gley soils were identified in at two formal soil pit locations (Soil Pit 1 and 7). A gleyed matrix is formed when the soils are saturated for a significant period of time. A gleyed matrix occurs when a soil layer has multiple colors and a gley mixture containing gley colors. Hydric soil indicators were present at Soil Pits 1 and 7 and included a loamy gleyed matrix beginning at a depth of three inches for Soil Pit 1 and on the surface of Soil Pit 7. For Soil Pit 1, the (wetted) soils in the upper 0 to 2 and 2 to 3 inches did not exhibit redoximorphic features with a matrix color of 10 YR 5/2 and 10 YR 3/2, respectively (GretagMacbeth 2009). The (wetted) soils in the upper 3 to 6 inches had a matrix color of Gley 3/10 Y with approximately 40 percent prominent redoximorphic features that had a color of 5 YR 4/6 (GretagMacbeth 2009). The (wetted) soils in the lower 6 to 15 inches had a matrix color of Gley 2.5/10Y. For Soil Pit 7, the (wetted) soils in the upper 0 to 18 inches had a matrix color of Gley 3/10 Y with approximately 5 percent prominent redoximorphic features that had a color of 5 YR 4/4 (GretagMacbeth 2009). Due to problematic soils in the remaining eight soil pits and numerous test pits, the presence of wetland boundaries were undeterminable during the field delineation based on the three parameters for USACE/RWQCB defined wetlands.

4.4.3 Hydrology

Several indicators of wetland hydrology were present at the time of the field delineation. Characteristics included evidence of inundation, saturation, surface water, watermarks, drift lines, sediment deposits, water-stained leaves, destruction of vegetation and the presence or oxidation/reduction features in the soil, among several others. The braided channels were highly variable within the reservoir area, in many instances flowing subsurface through the highly permeable soils and appear to lose visible connectivity. Much of the soils are sandy to sandy loam soils that do not exhibit a relatively permanent bed and bank. Instead, the flow is highly variable and many tributaries formed from single rain events were observed.

The wet season in southern California typically runs from October 15th to April 15th. Outside of the wet season, Devil's Gate Reservoir does not impound water. However, if enough water is available during the wet season, Devil's Gate Reservoir will impound water up to elevation 1020. When water within the reservoir reaches the 1020 contour, the dam's gates are opened to maintain the water level at elevation 1020. Based on this information, the OHWM for the reservoir is therefore located at the 1020 contour.

Due to the presence of problematic soils that inhibited determination of the three parameter wetland, the 1020 contour ("Inundation area" called out on Figures 3 and 4) was therefore used to delineate the boundaries of the Wetland area (Figures 3 and 4).

The quality of aquatic habitat within the reservoir is low for most wildlife species. Water is not present all year and therefore, the presence of aquatic species would only occur seasonally rather than year long. With the presence of a park nearby, hiking paths, horseback riding trails, and training rings, and domestic dogs, the aquatic areas are considered relatively disturbed. Because the site is frequently visited by the public and pets of the public, wildlife diversity is negatively impacted. Off leash dogs and outdoor cats in adjacent residential homes likely predate on native wildlife species also causing a decrease in variability. Disturbed communities also allow exotic plant species to establish and spread.

4.5 USACE JURISDICTION

The waters within the reservoir ultimately connect to the LA River and terminate in the Pacific Ocean and are therefore considered USACE jurisdictional. A significant nexus analysis was performed to determine potential USACE jurisdiction. A significant nexus was determined to exist for the proposed project based on the following facts:

- Wetlands directly abutting an ephemeral and intermittent non-RPW and is hydrologically connected approximately 8.5 river miles from the nearest TNW (LA River).
- It has the capacity to carry pollutants, nutrients, and organic carbon to the nearest TNW.
- The nutrients and organic carbon in turn support downstream foodwebs (i.e., aquatic plant and wildlife in the LA River). The nutrients and organic carbon also have the capacity to contribute to the ecology of all impoundments between the proposed project site and the Pacific Ocean.

For this reservoir, the water level is highly variable within the seasons and throughout the year. However, water is released at the 1020 contour (OHWM); therefore, the USACE identified Wetland boundary is located up to the OHWM at the 1020 contour. The total USACE jurisdiction is defined by the riparian habitat within the HWM that is indicative of the total water capacity within the proposed project.

4.6 RWQCB JURISDICTION

For this reservoir, is the water level is highly variable within the seasons and throughout the year. However, water is released at the 1020 contour (OHWM); therefore, the RWQCB identified Wetland boundary is located up to the OHWM at the 1020 contour. The total RWQCB jurisdiction is defined by the HWM that is indicative of the total water capacity within the proposed project. The reservoir has the capacity to affect surface and subsurface water quality within California and, therefore, the RWQCB has jurisdiction over riparian habitat within the reservoir up to the HWM line.

4.7 CDFW JURISDICTION

Though much of the reservoir is of low quality aquatic habitat, it does have the potential support riparian dependant birds, mammals, and aquatic species. Mature riparian vegetation [i.e., willows (*Salix* sp.) and mule-fat (*Baccharis salicifolia*)] was found present within the reservoir and within the proposed

work area, and characteristics of naturalized stream channels were present. CDFW jurisdiction applies to the top of the banks, or in this case the HWM of the proposed project. Wetland conditions were identified to be of CDFW interest since at least one of the three wetland parameters was present. Additionally, CDFW will have jurisdiction over riparian vegetation from the OHWM up to the HWM.

4.8 JURISDICTIONAL ANALYSIS

At Devil's Gate Reservoir, the OHWM of the reservoir exists up to the 1020 contour line. Sediment removal activities are proposed to the 1070 contour line. Approximately 120.4 acres are contained within the proposed work area (analyzed impact area). USACE, CDFW and RWQCB have jurisdiction of the Wetland to the OHWM, or 1020 contour. Wetland, as defined by USACE, exists within the impact area of Devil's Gate Reservoir (Figures 3 and 4). All three agencies have jurisdiction over this Wetland within the proposed work area where there will be permanent impacts. USACE, CDFW and RWQCB have jurisdiction of the riparian habitat within the proposed project boundary, up to the HWM. The wetland and riparian areas include riparian vegetation communities; Riparian Woodland, Mule Fat Scrub, and Riparian Herbaceous.

Waters were calculated using LACDPW water release data due to the fact that the amount of surface water within the reservoir is variable. The entire reservoir has the potential to contain surface waters during a high rain event year and can be completely dry during several months in years with average rainfall. The main channel was flowing at the time of the survey, bringing water into the reservoir from the Arroyo Seco watershed. Flint Wash, located on the southwest corner of the site, and a culvert on the southeast side of the site, also directed water into the reservoir at the time of the survey.

Jurisdictional acreages were calculated within the proposed project area boundary. Table 4-1 includes the jurisdictional acreages for the USACE, RWQCB, and the CDFW for waters and for vegetation impacts.

Table 1: Jurisdictional Acreage Matrix

Authority	Jurisdictional Area		Total Jurisdiction (acres)
USACE	Riparian Area outside Wetland Area	54. 33 (acres)	101.13 (acres)
	Wetland Area	11.2 (acres)	
	Drainage Impacts *Main channel* *Braided channel*	35.6 (acres) *6.7* *28.9*	
RWQCB	Riparian Area Outside Wetland Area *Mule Fat Scrub* *Riparian Herbaceous* *Riparian Woodland*	2,366,614.8 (sq. ft.) *405,108.0* *1,306.8* *1,960,200*	4,405,222.8 (sq. ft.)
	Wetland Area	487,872 (sq. ft.)	
	Drainage Impacts *Main channel* *Braided channel*	1,550,736 (sq. ft.) *291,852* *1,258,884*	
CDFW	Riparian Area Outside Wetland Area *Mule Fat Scrub* *Riparian Herbaceous* *Riparian Woodland*	54. 33 (acres) *9.3* *0.03* *45.0*	101.13 (acres)
	Wetland Area	11.2 (acres)	
	Drainage Impacts *Main channel* *Braided channel*	35.6 (acres) *6.7* *28.9*	

The USACE, RWQCB, and CDFW acreage, as defined by the HWMs and surface water within the proposed work area, amounts to approximately 11.2 acres (487,872 sq. ft.) of Wetland, 54.33 acres (2,366,614.8 sq. ft.) of riparian vegetation and 35.6 acres (1,550,736 sq. ft.) of jurisdictional drainage features (both the main channel and the braided tributaries); for a total of 101.13 acres (4,405,222.8 sq. ft.) within the proposed work area.

The proposed project area is comprised of approximately 120.4 acres. The total Wetland area (Mule Fat Scrub, Riparian Herbaceous, and Riparian Woodland) is approximately 11.2 acres. The total riparian area outside the Wetland area is 54.33 acres. The jurisdictional waters within the proposed project is 35.6 acres. The remaining acres within the proposed project boundary consist of vegetation communities not associated with wetland/riparian environments and include Disturbed (Baren/Trails), Ornamental, Coastal Sage Scrub, and scoured areas.

SECTION 5.0 – CONCLUSION

Construction activities for the proposed project will permanently impact wetland and jurisdictional waters within the proposed work area. A total of 101.13 acres (4,405,222.8 sq. ft.) of USACE/ RWQCB/CDFW jurisdiction will be impacted within the proposed work area.

5.1 FEDERAL PERMITS

The results of the jurisdictional delineation determined approximately 11.2 acres of Wetland, 54.33 acres of riparian vegetation, and 35.6 acres of jurisdictional drainage features (both the main channel and the braided tributaries) for a total of 101.13 acres of Waters of the US are anticipated to be impacted by construction activities. The USACE regulates any activity that impacts Waters of the US, including placement of fill material into or removal of fill material out of Waters of the US per Section 404 of the Clean Water Act (CWA). A Nationwide Permit (NWP) 31 (Maintenance of Existing Flood Control Facilities) may be applicable for this proposed project; the NWP program is an abbreviated permitting process compared to an Individual Permit (IP). The type of permit required (i.e., NWP versus IP) will be at the discretion of the USACE.

5.2 STATE PERMITS

As with the USACE, RWQCB has jurisdiction over Waters of the US. The results of the jurisdictional delineation determined approximately 11.2 acres (487,872 sq. ft.) of Wetland, 54.33 acres (2,366,614.8 sq. ft.) of riparian vegetation and 35.6 acres (1,550,736 sq. ft.) of jurisdictional drainage features (both the main channel and the braided tributaries); for a total of 101.13 acres (4,405,222.8 sq. ft.) within the proposed work area are anticipated to be impacted by construction activities. Under Section 401 of the CWA, the RWQCB regulates any activity that requires a federal permit for discharges to a water body. A 401 Water Quality Certification will be required from the RWQCB for this proposed project.

The results of the jurisdictional delineation determined that CDFW has jurisdiction of Wetland, riparian habitat, and surface water within the proposed project limits. The results of the jurisdictional delineation determined approximately 11.2 acres of Wetland, 54.33 acres of riparian vegetation and 35.6 acres of jurisdictional drainage features (both the main channel and the braided tributaries) for a total of 101.13 acres are anticipated to be impacted by construction activities. The CDFW regulates impacts or alterations to streambeds, including any obstruction or diversion to the natural flow of a stream, substantial change or use of material from a stream, or a deposit or disposal of any debris into a stream as part of Fish and Game Code Sections 1600-02. A Streambed Alteration Agreement (SAA) will be required from the CDFW for this proposed project.

SECTION 6.0 – REFERENCES

City of Pasadena

2003 Hahamongna Watershed Park Master Plan (HWPMP). City of Pasadena. Adopted September 29, 2003.

Cowardin et al.

1979 Classification of wetlands and deepwater habitats of the United States. Performed for U.S. Department of the Interior Fish and Wildlife Service. FWS/OBS-79/31. December 1979.

GretagMacbeth

2009 Munsell® Soil-Color Charts. Grand Rapids, Michigan.

Hickman, J. C., editor.

1993 *The Jepson Manual: Higher Plants of California*. University of California Press, Berkeley and Los Angeles.

Los Angeles County

2011 Los Angeles County GIS Data Portal (eGIS). GIS Data for Los Angeles County. http://egis3.lacounty.gov/dataportal/2011/01/27/soil-types/. Accessed June, 2013.

Lichvar, R.W.

2012a California 2012 Final State Wetland Plant List. *The National Wetland Plant List.* ERDC/CRREL TR-12-11. October. Hanover, NH: U.S. Army Corps of Engineers, Cold Regions Research and Engineering Laboratory. URL: http://rsgisias.crrel.usace.army.mil/NWPL/

2012b National Wetland Plant List Indicator Rating Definitions. ERDC/CRREL TN-12-1. July 2012. Hanover, NH: U.S. Army Corps of Engineers, Cold Regions Research and Engineering Laboratory. URL: http://rsgisias.crrel.usace.army.mil/NWPL/

Reed, Jr., P. B. et al.

1988 *National List of Plant Species That Occur in Wetlands: California (Region 0).* U.S. Fish and Wildlife Service Biological Report 88 (26.10).

U.S. Army Corps of Engineers (USACE)

1987 *U.S. Army Corps of Engineers Wetlands Delineation Manu*al, Technical Report Y-87-1, U.S. Army Engineer Waterways Experimental Station, Vicksburg, Mississippi.

2008 *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0)*, ed. J. S. Wakeley, R. W. Lichvar, and C. V. Noble. ERDC/EL TR-08-28. Vicksburg, MS: U.S. Army Engineer Research and Development Center.

U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS)

2009 Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Official Soil Series Descriptions [Online WWW]. Available URL: "http://soils.usda.gov/technical/classification/osd/index.html" [Accessed on November 22, 2010].

U.S. Geological Service (USGS)

7.5-minute topographic quadrangle map for *Pasadena*, California.

Vyverberg, K.

2010 A Review of Stream Processes and Forms in Dryland Watersheds. Prepared for California Department of Fish and Wildlife.

APPENDIX A – SITE PHOTOGRAPHS

APPENDIX A – SITE PHOTOGRAPHS

Photo 1: Photo taken from Photo Point 1 looking west depicting the spillway of the reservoir with Black Willow Series on the right and Sage Scrub and Oak Woodland at the back. The orange blockage devices are used to prevent debris from building up behind the dam.

Photo 2: Photo taken from Photo Point 2 depicting the area where Soil Pit #1 was dug. Vegetation in the area included black willow, mule fat, and cattails.

Photo 3: Photo taken from Photo Point 2 looking at soils from Soil Pit # 1. Soils at Pit #1 contained hydric soil indicators including a loamy gleyed matrix with redoximorphic features.

Photo 4: Photo taken from Photo Point 3 depicting orange rusty redoximorphic features on the surface of soils along the banks of the road (on the right). This was typical in areas throughout the reservoir.

Photo 5: Photo taken from Photo Point 4 looking west depicting a culvert that enters the reservoir on the east side directing neighborhood runoff to the reservoir. A pond existed at the opening of the culvert at the time of the survey with little running water.

Photo 6: Photo from Photo Point 5 depicting Soil Pit #3. This eroded bank gave a soil profile of 3 feet. Sediment build up was very high at this location as well as with most other soil pit locations. Due to sediment build up following rain events, top soil does not have time to mature in a reservoir like it would under natural conditions (problematic soils).

Photo 7: Photo taken from Photo Point 6 looking northeast depicting a large scoured area near the center of the site. Water flows seasonally through this area and is surrounded by Riparian Woodland.

Photo 8: Photo taken from Photo Point 7 depicting the area where Soil Pit # 7 was dug. Vegetation was dominated by mule fat and also included black willow, white alder, California sycamore, and cattails.

Photo 9: Photo taken from Photo Point 8 looking west depicting water flowing from Flint Wash which empties into the reservoir on the west side.

Photo 10: Photo taken from Photo Point 8 looking southeast depicting water flowing from Flint Wash on the west side of the reservoir to the spillway. This area is near Soil Pit #8. Vegetation in this area was dominated by black willows, cattails, and mule fat.

Photo 11: Photo taken from Photo Point 9 looking south depicting the dam wall with emergent riparian vegetation in front of the wall.

Photo 12: Photo taken from Photo Point 9, south of Soil Pit # 8, depicting water continuing to flow to spillway.

Photo 13: Photo taken from Photo Point 10 looking south depicting the scattered vegetation growing along the channel at the northern extent of the project boundary outside the wetland boundary.

Photo 14: Photo taken from Photo Point 11 looking east depicting the mostly scoured channel with patches of mule fat and dense patches of willow.

Photo 15: Photo taken from Photo Point 12 looking southwest depicting the scoured plain with scattered willows. The channel meanders from rain event to rain event and year to year throughout the northern reaches of the project site.

Photo 16: Photo taken from Photo Point 13 looking northeast depicting the braided features throughout the northern section of the project site.

Photo 17: Photo taken from Photo Point 14 looking north depicting the drainage flowing through heavy sandy deposits bordered by dense willows.

Photo 18: Photo taken from Photo Point 15 looking east depicting the dense riparian vegetation growing along the main channel.

Photo 19: Photo taken from Photo Point 16 looking northeast towards Soil Pit 10 depicting non-native grasses and dominant exotic vegetation in the foreground and native mule fat scrub in the background.

Photo 20: Photo taken from Photo Point 17 facing east depicting willow woodland in the background. Photo taken from the disturbed area to the west of wetland boundary.

Photo 21: Photo taken from Photo Point 18 looking west depicting a test soil pit with poison hemlock and willows in the background.

APPENDIX B – WETLAND DETERMINATION DATA FORMS

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Devil's Gate City/County: Pasadena Sampling Date: 11/24/10
Applicant/Owner: LACDPW State: Ca Sampling Point: 1
Investigator(s): Paul Mirrissey & Sarajah Skidmore Section, Township, Range: 415 San gabriel - Eaton
Landform (hillslope, terrace, etc.): Reservoir Local relief (concave, convex, none): concave Slope (%): 1
Subregion (LRR): C Lat: 11S 0391763 Long: UTM 3783427 Datum: Nad 83
Soil Map Unit Name: Ramona Sandy Loam NWI classification: FF/SW
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)
Are Vegetation No, Soil No, or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No ____
Are Vegetation ~~Yes~~ No, Soil ~~Yes~~ No, or Hydrology ~~Yes~~ No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	Is the Sampled Area within a Wetland? Yes X No ____ FF/SW
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks: In a maintained reservoir.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Salix goodingii - black willow	45	Yes	FACW
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 30')			
1. Baccharis salicifolia - mule fat	30	Yes	FAC
2. Typha domingensis - slender cattail	25	Yes	OBL
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 30')			
1. Gyratory - Asperatina adenophera	2	No	OBL
2. Cyperus sp.	1	No	OBL
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum 5 % Cover of Biotic Crust 0

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 1 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	28	x 1 =	28
FACW species	45	x 2 =	90
FAC species	30	x 3 =	90
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	103 (A)		208 (B)

Prevalence Index = B/A = 2.02

Hydrophytic Vegetation Indicators:
✓ Dominance Test is >50%
✓ Prevalence Index is ≤3.0[1]
__ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

SOIL

Sampling Point: 1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-1	10YR 5/2	100					Silty clay	
1-3	10YR 3/2	100					Silty clay	
3-6	Gley 3/10Y	60	(10YR3/2 mixed)					
[illegible]			→ 5YR 4/6	15	C	M	Silty clay	rust layer
6-15	Gley 2.5/10Y	100					silty clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR C)**
- ___ 1 cm Muck (A9) **(LRR D)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- X Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR C)**
- ___ 2 cm Muck (A10) **(LRR B)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No ___

Remarks:
- in a reservoir with high silt content due to fires, which may alter soil colors
- continual influx of sediment moving into the area

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- X Surface Water (A1)
- ___ High Water Table (A2)
- X Saturation (A3)
- X Water Marks (B1) **(Nonriverine)**
- X Sediment Deposits (B2) **(Nonriverine)**
- ___ Drift Deposits (B3) **(Nonriverine)**
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- X Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) **(Riverine)**
- ___ Sediment Deposits (B2) **(Riverine)**
- ___ Drift Deposits (B3) **(Riverine)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes X No ___ Depth (inches): >10"

Water Table Present? Yes X No ___ Depth (inches): >10"

Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): 12"

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
pond exists 6ft. from pit

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Devil's Gate City/County: Pasadena/LA Sampling Date: 11/24/10
Applicant/Owner: LACDPW State: Ca Sampling Point: 2
Investigator(s): Paul Morrissey Section, Township, Range: 415 San Pasqual-Grafton
Landform (hillslope, terrace, etc.): Reservoir Local relief (concave, convex, none): Concave Slope (%): 1
Subregion (LRR): C Lat: 11S 0391781 Long: Utm 3783593 Datum:
Soil Map Unit Name: Ramona Sandy Loam NWI classification: PFSW

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)
Are Vegetation No, Soil No, or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No ____
Are Vegetation No, Soil Yes, or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	Is the Sampled Area within a Wetland? Yes ✓ No ____
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes X	No ____	

Remarks: Problematic area for soils.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30')			
1. Salix goodingii – black willow	60	Yes	FACW
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 30')			
1. Castor bean - Ricinus communis	2	No	UPL
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 30')			
1. Eupatory – Ageratina adenophora	1	No	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum 60 % Cover of Biotic Crust 0

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across All Strata: 1 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 1 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	1	x 1 =	1
FACW species	60	x 2 =	120
FAC species		x 3 =	
FACU species		x 4 =	
UPL species	2	x 5 =	10
Column Totals:	64 (A)		131 (B)

Prevalence Index = B/A = 2.04

Hydrophytic Vegetation Indicators:
✓ Dominance Test is >50%
✓ Prevalence Index is ≤3.0[1]
___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

SOIL

Sampling Point: 2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-18							organic debris	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR C)**
- ___ 1 cm Muck (A9) **(LRR D)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR C)**
- ___ 2 cm Muck (A10) **(LRR B)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ____ No X

Remarks: - debris piled up & brought down from rains after fires, builds up here in reservoir & hasn't had time to mature organic material - problematic area - From this point to stream - organic debris

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) **(Nonriverine)**
- X Sediment Deposits (B2) **(Nonriverine)**
- ___ Drift Deposits (B3) **(Nonriverine)**
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- X Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) **(Riverine)**
- ___ Sediment Deposits (B2) **(Riverine)**
- ___ Drift Deposits (B3) **(Riverine)**
- X Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No X Depth (inches): >18"

Water Table Present? Yes ____ No X Depth (inches): >18"

Saturation Present? (includes capillary fringe) Yes ____ No X Depth (inches): >18"

Wetland Hydrology Present? Yes X No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Devil's Gate City/County: Pasadena/LA Sampling Date: 11/24/10
Applicant/Owner: LACDPW State: Ca Sampling Point: 3
Investigator(s): Paul Morrissey & Saraiah Skidmore Section, Township, Range: 414 La Canada
Landform (hillslope, terrace, etc.): Reservoir Local relief (concave, convex, none): Concave Slope (%): 1
Subregion (LRR): C Lat: 0391630 Long: 3783689 Datum:
Soil Map Unit Name: ~~Bomboa~~ Sandy loam NWI classification: FFSW
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)
Are Vegetation No, Soil No, or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No ____
Are Vegetation No, Soil Yes, or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ____	Is the Sampled Area within a Wetland? Yes ✓ No ____
Hydric Soil Present?	Yes ____ No X	
Wetland Hydrology Present?	Yes X No ____	

Remarks: Problematic soils –

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30')			
1. Salix goodingii – black willow	90	Yes	FACW
2.			
3.			
4.			
	90	= Total Cover	
Sapling/Shrub Stratum (Plot size: 30')			
1. Castor bean – Ricinus communis	3	No	FACU
2. Baccharis salicifolia – Mule fat	2	No	FAC
3. tree tobacco – Nicotiana glauca	3	No	FAC
4.			
5.			
	8	= Total Cover	
Herb Stratum (Plot size: 30')			
1. Mimulus sp.	1	No	~
2. rush – Juncus xiphioides	1	No	OBL
3. night shade – Solanum sp.	2	No	FAC
4. cupatory – Ageratina adenophora	1	No	UPL
5. cyperus sp.	1	No	OBL
6.			
7.			
8.			
	6	= Total Cover	
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 50 % Cover of Biotic Crust NO

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across All Strata: 1 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 1 (A/B)

Prevalence Index worksheet:

	Total % Cover of:	Multiply by:
OBL species	3	x 1 = 3
FACW species	90	x 2 = 180
FAC species	7	x 3 = 21
FACU species	3	x 4 = 12
UPL species		x 5 =
Column Totals:	103 (A)	112 (B)

Prevalence Index = B/A = 2.09

Hydrophytic Vegetation Indicators:
✓ Dominance Test is >50%
✓ Prevalence Index is ≤3.0[1]
___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

SOIL

Sampling Point: 3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-5	2.5 Y 4/2	100					silty clay loam	
5-6	10YR 4/3	100					silty clay loam	
6-7	10YR 2/1	100					silty clay loam	
7-18	2.5Y 4/2	100					silty clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR C)**
- ___ 1 cm Muck (A9) **(LRR D)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR C)**
- ___ 2 cm Muck (A10) **(LRR B)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks: in a reservoir, have a soil profile of 3ft., no hydric indicators but there is a high sediment load after rain events —lots of organic debris —problematic soils

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1) **(Nonriverine)**
- ___ Sediment Deposits (B2) **(Nonriverine)**
- ___ Drift Deposits (B3) **(Nonriverine)**
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- X Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) **(Riverine)**
- X Sediment Deposits (B2) **(Riverine)**
- X Drift Deposits (B3) **(Riverine)**
- X Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No X Depth (inches): >18"

Water Table Present? Yes _____ No X Depth (inches): >18"

Saturation Present? (includes capillary fringe) Yes _____ No X Depth (inches): >18"

Wetland Hydrology Present? Yes X No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Devil's Gate City/County: Pasadena/LA Sampling Date: 11/24/10
Applicant/Owner: LACDPW State: CA Sampling Point: 4
Investigator(s): Paul Morrissey & Sarah Skidmore Section, Township, Range: San Pascual – Bra Rey
Landform (hillslope, terrace, etc.): Reservoir Local relief (concave, convex, none): Concave Slope (%): 1
Subregion (LRR): C Lat: 11 S 3911979 Long: UTM 378 3878 Datum:
Soil Map Unit Name: Ramona Sandy Loam NWI classification: Emergent Wetland
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)
Are Vegetation No, Soil No, or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No ____
Are Vegetation No, Soil Yes, or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ____	Is the Sampled Area within a Wetland?	Yes X No ____
Hydric Soil Present?	Yes ____ No X		
Wetland Hydrology Present?	Yes X No ____		

Remarks:
– Problematic soils –

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Salix goodingii – black willow	5	Yes	FACW
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 30')			
1. Baccharis salicifolia	30	Yes	FAC
2. Poison hemlock – Conium maculatum	5	No	FACW
3. cocklebur – Xanthium strumarium	5	No	FAC
4. mustard	1	No	UPL
5.			
	= Total Cover		
Herb Stratum (Plot size: ____)			
1. Emergent herb			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum 15 % Cover of Biotic Crust No

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across All Strata: 2 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 1 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species 50	x 1 = 0
FACW species 10	x 2 = 20
FAC species 35	x 3 = 105
FACU species ____	x 4 = ____
UPL species 1	x 5 = 5
Column Totals: 46 (A)	130 (B)

Prevalence Index = B/A = 2.8

Hydrophytic Vegetation Indicators:
✓ Dominance Test is >50%
✓ Prevalence Index is ≤3.0[1]
___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

SOIL

Sampling Point: 4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-1							Organic layer	
1-18							Fine silty sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ____ No X

Remarks: QA Surrounded by a large wash area, heavy sediments formed from rain events

—problematic soils

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- X Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- X Sediment Deposits (B2) (**Riverine**)
- X Drift Deposits (B3) (**Riverine**)
- X Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No X Depth (inches): >18"

Water Table Present? Yes ____ No X Depth (inches): >18"

Saturation Present? (includes capillary fringe) Yes ____ No X Depth (inches): >18"

Wetland Hydrology Present? Yes X No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Devil's Gate City/County: Pasadena/LA Sampling Date: 11/24/10
Applicant/Owner: LACDPW State: Ca Sampling Point: 5
Investigator(s): Paul Morrissey & Sarah Skidmore Section, Township, Range:
Landform (hillslope, terrace, etc.): reservoir Local relief (concave, convex, none): concave Slope (%): 1
Subregion (LRR): C Lat: 11S 0391923 Long: UTM 3784037 Datum:
Soil Map Unit Name: ~~Tujunga~~ sandy loam NWI classification: *emergent wetland
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
Are Vegetation No, Soil No, or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No
Are Vegetation No, Soil Yes, or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No	Is the Sampled Area within a Wetland? Yes X No
Hydric Soil Present?	Yes No X	
Wetland Hydrology Present?	Yes No	

Remarks:
– Problematic Soils –

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Salix goodingii – black willow	10	Yes	FACW
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 30')			
1. Mulefat – Baccharis salicifolia	50	Yes	FAC
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum 80 % Cover of Biotic Crust

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across All Strata: 1 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 1 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species 60	x 2 = 120
FAC species 50	x 3 = 150
FACU species	x 4 =
UPL species	x 5 =
Column Totals: 60 (A)	170 (B)

Prevalence Index = B/A = 2.8

Hydrophytic Vegetation Indicators:
✓ Dominance Test is >50%
✓ Prevalence Index is ≤3.0[1]
__ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No

Remarks:

SOIL

Sampling Point: 5

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-1	2.5Y4/2	100					~~Silty~~ Sandy loam	
1-18	2.5Y5/2	100						Silt & clay streaks imbedded in fine sand

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR C)**
- ___ 1 cm Muck (A9) **(LRR D)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR C)**
- ___ 2 cm Muck (A10) **(LRR B)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ____ No X

Remarks: heavy sedimentation deposits from rain events
- problematic soils

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) **(Nonriverine)**
- ___ Sediment Deposits (B2) **(Nonriverine)**
- ___ Drift Deposits (B3) **(Nonriverine)**
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- X Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) **(Riverine)**
- X Sediment Deposits (B2) **(Riverine)**
- ___ Drift Deposits (B3) **(Riverine)**
- X Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No X Depth (inches): >18"

Water Table Present? Yes ____ No X Depth (inches): >18"

Saturation Present? (includes capillary fringe) Yes ____ No X Depth (inches): >18"

Wetland Hydrology Present? Yes X No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Devil's Gate City/County: Pasadena/LA Sampling Date: 11/24/10

Applicant/Owner: LACDPW State: Ca Sampling Point: 6

Investigator(s): Paul Morrissey & Saraiah Skidmore Section, Township, Range: 415 San Pascual – Gratial

Landform (hillslope, terrace, etc.): Reservoir Local relief (concave, convex, none): concave Slope (%): 1

Subregion (LRR): C Lat: US 0391683 Long: UTM 3783827 Datum: NAD83

Soil Map Unit Name: Ramona Sandy Loam NWI classification: * emergent wetland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation No, Soil No, or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation No, Soil Yes, or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	Is the Sampled Area within a Wetland? Yes ____ No ____
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
– Problematic soils

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Eucalyptus globulus – blue gum	10	Yes	UPL
2. Salix goodingii – black willow	1	No	FACW
3.			
4.			
	____ = Total Cover		

Sapling/Shrub Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Baccharis salicifolia – mule Fat	80	yes	FAC
2. Eriodictyon crassifolium –	10	No	UPL
3. thick leaved yerba santa			
4.			
5.			
	____ = Total Cover		

Herb Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Eupatory – Ageratina adenophora	1	Yes	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	____ = Total Cover		

Woody Vine Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum 40 % Cover of Biotic Crust ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 66.7 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	1	x 1 =	1
FACW species	1	x 2 =	2
FAC species	80	x 3 =	240
FACU species		x 4 =	
UPL species	10	x 5 =	50
Column Totals:	92 (A)		293 (B)

Prevalence Index = B/A = 3.18

Hydrophytic Vegetation Indicators:

- ✓ Dominance Test is >50%
- ✓ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

SOIL

Sampling Point: 6

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 2/1	100					silty clay loam	
2-15	2.5Y 5/2	100					sandy loam	
15-18							gravel	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR C)**
- ___ 1 cm Muck (A9) **(LRR D)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR C)**
- ___ 2 cm Muck (A10) **(LRR B)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ____ No X

Remarks:

heavy sediment deposits from rains

-Problematic soils

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) **(Nonriverine)**
- ___ Sediment Deposits (B2) **(Nonriverine)**
- ___ Drift Deposits (B3) **(Nonriverine)**
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- X Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) **(Riverine)**
- X Sediment Deposits (B2) **(Riverine)**
- X Drift Deposits (B3) **(Riverine)**
- X Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No X Depth (inches): <18"

Water Table Present? Yes ____ No X Depth (inches): <18"

Saturation Present? (includes capillary fringe) Yes ____ No X Depth (inches): <18"

Wetland Hydrology Present? Yes X No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Devil's Gate City/County: Pasadena/LA Sampling Date: 11/24/10
Applicant/Owner: LACDPW State: Ca Sampling Point: 7
Investigator(s): Paul Morrissey & Saraiah Skidmore Section, Township, Range: 414 La Canada
Landform (hillslope, terrace, etc.): Reservoir Local relief (concave, convex, none): Concave Slope (%): 1
Subregion (LRR): C Lat: 11S 0391584 Long: UTM 3783585 Datum:
Soil Map Unit Name: Pacoima Sandy loam NWI classification: FESW
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)
Are Vegetation No, Soil No, or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No ____
Are Vegetation No, Soil Yes, or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ____	Is the Sampled Area within a Wetland? Yes X No ____
Hydric Soil Present?	Yes X No ____	
Wetland Hydrology Present?	Yes X No ____	

Remarks: Problematic soils

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30')			
1. Salix goodingii - black willow	2	Yes	FACW
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 30')			
1. Mule Fat - Bacharis salicifolia	90	yes	FAC
2. Typha domingensis - Slender cattail	15	Yes No	OBL
3. Alnus rhombifolia - White Alder	10	No	FACW
4. Sycamore - Platanus racemosa	2	No	FAC
5.			
	= Total Cover		
Herb Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum ____ % Cover of Biotic Crust ____

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across All Strata: 2 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 1 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species 15	x 1 =	15
FACW species 12	x 2 =	24
FAC species 94	x 3 =	282
FACU species ____	x 4 =	____
UPL species ____	x 5 =	____
Column Totals: 121 (A)		321 (B)

Prevalence Index = B/A = 2.65

Hydrophytic Vegetation Indicators:
X Dominance Test is >50%
__ Prevalence Index is ≤3.0[1]
__ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks: NWI considers this FESW but pond area has been extended to FWEW

SOIL

Sampling Point: 7

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-18	3/10Y Grey	95	5YR4/4	5	C	PL	Silty loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR C)**
- ___ 1 cm Muck (A9) **(LRR D)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- X Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR C)**
- ___ 2 cm Muck (A10) **(LRR B)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (Inches): _____

Hydric Soil Present? Yes X No ___

Remarks: Problematic soils, darkness in color could be from sediment from fire settling in the pond, but considered Gley.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1) **(Nonriverine)**
- ___ Sediment Deposits (B2) **(Nonriverine)**
- ___ Drift Deposits (B3) **(Nonriverine)**
- ___ Surface Soil Cracks (B6)
- X Inundation Visible on Aerial Imagery (B7)
- X Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) **(Riverine)**
- ___ Sediment Deposits (B2) **(Riverine)**
- X Drift Deposits (B3) **(Riverine)**
- X Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No X Depth (Inches): >18"

Water Table Present? Yes ___ No X Depth (Inches): >18"

Saturation Present? (includes capillary fringe) Yes X No ___ Depth (Inches): @ 14"

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Devils Gate City/County: Pasadena / Sampling Date: 11/24/10

Applicant/Owner: LACDPW State: Ca Sampling Point: 8

Investigator(s): Paul Morrissey & Saraiah Skidmore Section, Township, Range: 423 San Rafael

Landform (hillslope, terrace, etc.): Reservoir Local relief (concave, convex, none): concave Slope (%): 1

Subregion (LRR): C Lat: 11 S 0391605 Long: UTM 3783437 Datum:

Soil Map Unit Name: Bahaona Sandy Loam NWI classification: FFSW

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation No, Soil No, or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation Yes, Soil Yes, or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ___	Is the Sampled Area within a Wetland? Yes ___ No ___
Hydric Soil Present?	Yes ___	No X	
Wetland Hydrology Present?	Yes X	No ___	

Remarks: – Problematic soils

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Salix goodingii – black willow	40	Yes	FACW
2.			
3.			
4.			
	___ = Total Cover		
Sapling/Shrub Stratum (Plot size: 30')			
1. Typha domingensis – slender cattail	25	Yes	OBL
2. Bacharis salicifolia – mule fat	10	Yes	FACU
3. Platanus racemosa – sycamore	1	No	FACU
4. Cottonwood – populis Freemontii	1	No	FACU
5.			
	___ = Total Cover		
Herb Stratum (Plot size: 30')			
1. Carex sp.	1	No	OBL
2. Rorippa nasturtium-aquaticum	1	No	OBL
3. Eupatory – Ageratina adenophera	1	No	OBL
4.			
5.			
6.			
7.			
8.			
	___ = Total Cover		
Woody Vine Stratum (Plot size: ___)			
1.			
2.			
	___ = Total Cover		

% Bare Ground in Herb Stratum 40 % Cover of Biotic Crust ___

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 1 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	128	x 1 = 28
FACW species	40	x 2 = 80
FAC species	12	x 3 = 36
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	80 (A)	144 (B)

Prevalence Index = B/A = 1.8

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:

SOIL

Sampling Point: 8

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6		100					Sand	
6-18	Gley 3/10Y	~100					Silt Loam	– high organic content

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR C)**
- ___ 1 cm Muck (A9) **(LRR D)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR C)**
- ___ 2 cm Muck (A10) **(LRR B)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

- Problematic
- High sediment deposits from culvert & rain events

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- X Surface Water (A1)
- ___ High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1) **(Nonriverine)**
- ___ Sediment Deposits (B2) **(Nonriverine)**
- ___ Drift Deposits (B3) **(Nonriverine)**
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- X Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) **(Riverine)**
- X Sediment Deposits (B2) **(Riverine)**
- X Drift Deposits (B3) **(Riverine)**
- X Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes X No ___ Depth (inches): 18"

Water Table Present? Yes X No ___ Depth (inches): 18"

Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): @ 7"

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Devil's Gate Reservoir City/County: LA County/Pasadena Sampling Date: 5/23/13
Applicant/Owner: LACDPW State: CA Sampling Point: 9
Investigator(s): Paul Morrissey, Carley Jennings Section, Township, Range: 5/15 San Pascual – Grafton
Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): _____ Slope (%): 0
Subregion (LRR): C Lat: 34.193 Long: -118.173 Datum: NAD 83
Soil Map Unit Name: Ramona Sandy Loam NWI classification: freshwater emergent
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)
Are Vegetation NO, Soil NO, or Hydrology NO significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____
Are Vegetation NO, Soil yes, or Hydrology NO naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No _____	**Is the Sampled Area within a Wetland?** Yes ✓ No _____
Hydric Soil Present?	Yes _____ No X	
Wetland Hydrology Present?	Yes X No _____	

Remarks: Problematic soils – soils showed hydric characteristics but did not meet the requirements for hydric soil. Not enough time to monitor.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: 30')			
1. Mulefat	35%	yes	FAC
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: 30')			
1. Bromus sp.	15%	NO	UPL
2. Hirschfeldia incana	15%	yes	UPL
3. Cynodon dactylon	15%	yes	FACW
4. Lepidium latifolium	2%	NO	FAC
5. Rumex crispus	2%	NO	FAC
6.			
7.			
8.			
	45 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum 5 % Cover of Biotic Crust _____

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 2/3 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	25	x 2 =	50
FAC species	39	x 3 =	117
FACU species	—	x 4 =	
UPL species	20	x 5 =	100
Column Totals:	84 (A)		267 (B)

Prevalence Index = B/A = 3.17

Hydrophytic Vegetation Indicators:
✓ Dominance Test is >50%
___ Prevalence Index is ≤3.0[1]
___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No _____

Remarks:

SOIL

Sampling Point: 9

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	2.5 4/2	95	10YR 5/6	5-7%	C	M	silty clay loam	
12+								

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR C)**
- ___ 1 cm Muck (A9) **(LRR D)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR C)**
- ___ 2 cm Muck (A10) **(LRR B)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ___ No ✓

Remarks:

Hydric characteristics but falls slightly short of a 3/2 requirement. However, this is a reservoir area that has an influx of sediment from inflow on a regular basis.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) **(Nonriverine)**
- ___ Sediment Deposits (B2) **(Nonriverine)**
- ___ Drift Deposits (B3) **(Nonriverine)**
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) **(Riverine)**
- ✓ Sediment Deposits (B2) **(Riverine)**
- ✓ Drift Deposits (B3) **(Riverine)**
- ✓ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): _____

Water Table Present? Yes ___ No ✓ Depth (inches): _____

Saturation Present? (Includes capillary fringe) Yes ___ No ✓ Depth (inches): _____

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

This area was developed to hold water - dug out area of basin.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Devils Gate City/County: LA county Sampling Date: 5/23/13
Applicant/Owner: LACDPW State: CA Sampling Point: 10
Investigator(s): Pimentel, Corley, Jennings Section, Township, Range: 4W La Canada
Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): concave Slope (%): 6
Subregion (LRR): C Lat: 34°18'45.43" Long: 118°12'28.65" Datum:
Soil Map Unit Name: Ramona Sandy loam NWI classification: Freshwater emergent wetland
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No (If no, explain in Remarks.)
Are Vegetation No, Soil No, or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No
Are Vegetation No, Soil Yes, or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	No ✓	Is the Sampled Area within a Wetland? Yes No ✓
Hydric Soil Present?	Yes	No ✓	
Wetland Hydrology Present?	Yes ✓	No	

Remarks: Man-made basin area with dominance of UPL vegetation and little hydric conditions in soils.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1. Mulefat	10.		FAC
2.			
3.			
4.			
5.			
	10 = Total Cover		
Herb Stratum (Plot size:)			
1. Mustard (Hirschfeldia incana)	2 %	NO	UPL
2. Low lying mustard (Lepidium sp)	12 %	NO	UPL
3. umbrella sedge (Cyperus eragrostis)	2%	NO	FACW
4. rumex crispus	5%	NO	FAC
5. Bromus sp	45%	YES	UPL
6.			
7.			
8.			
	109% = Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum 2 % Cover of Biotic Crust

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across All Strata: 2 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 50% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	2	x 2 =	4
FAC species	15	x 3 =	45
FACU species	0	x 4 =	
UPL species	59	x 5 =	295
Column Totals:	76 (A)		344 (B)

Prevalence Index = B/A = 4.52

Hydrophytic Vegetation Indicators:
___ Dominance Test is >50%
___ Prevalence Index is ≤3.0[1]
___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes No ✓

Remarks: primarily non-native grasses with few scattered hydrophytic plants, not enough hydrophytic plants to meet the vegetation requirements for a wetland.

SOIL

Sampling Point: 10

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	7.5 YR 4/1	99	10YR 4/6	1	C	M	Silty clay loam	
6-18	10YR 3/2	98	5YR 4/6	2	C	M	Silty clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR C)**
- ___ 1 cm Muck (A9) **(LRR D)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR C)**
- ___ 2 cm Muck (A10) **(LRR B)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ___ No ✓

Remarks: Minimal hydric characteristics. Soils not mature; this is a man-made basin with an influx of soil during rain events.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) **(Nonriverine)**
- X Sediment Deposits (B2) **(Nonriverine)**
- ___ Drift Deposits (B3) **(Nonriverine)**
- X Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- X Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) **(Riverine)**
- ___ Sediment Deposits (B2) **(Riverine)**
- ___ Drift Deposits (B3) **(Riverine)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): _____

Water Table Present? Yes ___ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): _____

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

APPENDIX C – JURISDICTIONAL DETERMINATION FORMS

APPROVED JURISDICTIONAL DETERMINATION FORM
U.S. Army Corps of Engineers

This form should be completed by following the instructions provided in Section IV of the JD Form Instructional Guidebook.

SECTION I: BACKGROUND INFORMATION

A. REPORT COMPLETION DATE FOR APPROVED JURISDICTIONAL DETERMINATION (JD):

B. DISTRICT OFFICE, FILE NAME, AND NUMBER:

C. PROJECT LOCATION AND BACKGROUND INFORMATION:
State: California County/parish/borough: Los Angeles City: Pasadena
Center coordinates of site (lat/long in degree decimal format): Lat. 34.187727° **N**, Long. -118.175949° **W**.
Universal Transverse Mercator: NAD 83 Decimal Degrees
Name of nearest waterbody: Arroyo Seco Wash
Name of nearest Traditional Navigable Water (TNW) into which the aquatic resource flows: Los Angeles River
Name of watershed or Hydrologic Unit Code (HUC): Arroyo Seco HUC 18070105
☒ Check if map/diagram of review area and/or potential jurisdictional areas is/are available upon request.
☐ Check if other sites (e.g., offsite mitigation sites, disposal sites, etc…) are associated with this action and are recorded on a different JD form.

D. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):
☐ Office (Desk) Determination. Date:
☐ Field Determination. Date(s):

SECTION II: SUMMARY OF FINDINGS

A. RHA SECTION 10 DETERMINATION OF JURISDICTION.

There **Appear to be no** "*navigable waters of the U.S.*" within Rivers and Harbors Act (RHA) jurisdiction (as defined by 33 CFR part 329) in the review area. [*Required*]
☐ Waters subject to the ebb and flow of the tide.
☐ Waters are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce.
Explain: .

B. CWA SECTION 404 DETERMINATION OF JURISDICTION.

There **Are** "*waters of the U.S.*" within Clean Water Act (CWA) jurisdiction (as defined by 33 CFR part 328) in the review area. [*Required*]

1. **Waters of the U.S.**
   a. **Indicate presence of waters of U.S. in review area (check all that apply):** [1]
      ☐ TNWs, including territorial seas
      ☐ Wetlands adjacent to TNWs
      ☒ Relatively permanent waters[2] (RPWs) that flow directly or indirectly into TNWs
      ☐ Non-RPWs that flow directly or indirectly into TNWs
      ☒ Wetlands directly abutting RPWs that flow directly or indirectly into TNWs
      ☐ Wetlands adjacent to but not directly abutting RPWs that flow directly or indirectly into TNWs
      ☐ Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs
      ☐ Impoundments of jurisdictional waters
      ☐ Isolated (interstate or intrastate) waters, including isolated wetlands

   b. **Identify (estimate) size of waters of the U.S. in the review area:**
      Non-wetland waters: linear feet: width (ft) and/or 45 acres.
      Wetlands: 124 acres.

   c. **Limits (boundaries) of jurisdiction** based on: **1987 Delineation Manual**
      Elevation of established OHWM (if known): .

2. **Non-regulated waters/wetlands (check if applicable):**[3]
   ☐ Potentially jurisdictional waters and/or wetlands were assessed within the review area and determined to be not jurisdictional.
   Explain: .

[1] Boxes checked below shall be supported by completing the appropriate sections in Section III below.
[2] For purposes of this form, an RPW is defined as a tributary that is not a TNW and that typically flows year-round or has continuous flow at least "seasonally" (e.g., typically 3 months).
[3] Supporting documentation is presented in Section III.F.

SECTION III: CWA ANALYSIS

A. TNWs AND WETLANDS ADJACENT TO TNWs

The agencies will assert jurisdiction over TNWs and wetlands adjacent to TNWs. If the aquatic resource is a TNW, complete Section III.A.1 and Section III.D.1. only; if the aquatic resource is a wetland adjacent to a TNW, complete Sections III.A.1 and 2 and Section III.D.1.; otherwise, see Section III.B below.

1. TNW
Identify TNW: .

Summarize rationale supporting determination: .

2. Wetland adjacent to TNW
Summarize rationale supporting conclusion that wetland is "adjacent": .

B. CHARACTERISTICS OF TRIBUTARY (THAT IS NOT A TNW) AND ITS ADJACENT WETLANDS (IF ANY):

This section summarizes information regarding characteristics of the tributary and its adjacent wetlands, if any, and it helps determine whether or not the standards for jurisdiction established under *Rapanos* have been met.

The agencies will assert jurisdiction over non-navigable tributaries of TNWs where the tributaries are "relatively permanent waters" (RPWs), i.e. tributaries that typically flow year-round or have continuous flow at least seasonally (e.g., typically 3 months). A wetland that directly abuts an RPW is also jurisdictional. If the aquatic resource is not a TNW, but has year-round (perennial) flow, skip to Section III.D.2. If the aquatic resource is a wetland directly abutting a tributary with perennial flow, skip to Section III.D.4.

A wetland that is adjacent to but that does not directly abut an RPW requires a significant nexus evaluation. Corps districts and EPA regions will include in the record any available information that documents the existence of a significant nexus between a relatively permanent tributary that is not perennial (and its adjacent wetlands if any) and a traditional navigable water, even though a significant nexus finding is not required as a matter of law.

If the waterbody[4] is not an RPW, or a wetland directly abutting an RPW, a JD will require additional data to determine if the waterbody has a significant nexus with a TNW. If the tributary has adjacent wetlands, the significant nexus evaluation must consider the tributary in combination with all of its adjacent wetlands. This significant nexus evaluation that combines, for analytical purposes, the tributary and all of its adjacent wetlands is used whether the review area identified in the JD request is the tributary, or its adjacent wetlands, or both. If the JD covers a tributary with adjacent wetlands, complete Section III.B.1 for the tributary, Section III.B.2 for any onsite wetlands, and Section III.B.3 for all wetlands adjacent to that tributary, both onsite and offsite. The determination whether a significant nexus exists is determined in Section III.C below.

1. Characteristics of non-TNWs that flow directly or indirectly into TNW

(i) General Area Conditions:
Watershed size: 47 **square miles**
Drainage area: **Pick List**
Average annual rainfall: 22.5 inches
Average annual snowfall: inches

(ii) Physical Characteristics:
(a) Relationship with TNW:
☒ Tributary flows directly into TNW.
☐ Tributary flows through **Pick List** tributaries before entering TNW.

Project waters are **5-10** river miles from TNW.
Project waters are **Pick List** river miles from RPW.
Project waters are **5-10** aerial (straight) miles from TNW.
Project waters are **Pick List** aerial (straight) miles from RPW.
Project waters cross or serve as state boundaries. Explain: .

[4] Note that the Instructional Guidebook contains additional information regarding swales, ditches, washes, and erosional features generally and in the arid West.

Identify flow route to TNW[5]: Once water leaves the Devil's Gate reservoir, water flows south for approximately 8.5 river miles where it reaches the LA River in LA near the 110 and I-5 freeway interchange. The LA River continues to flow south for approximately 23.5 river miles when it reaches the Pacific Ocean in Long Beach .
Tributary stream order, if known: .

(b) General Tributary Characteristics (check all that apply):
Tributary is: ☐ Natural
☐ Artificial (man-made). Explain: .
☒ Manipulated (man-altered). Explain: Excavation will occur within a man made reservoir. Arroyo Seco Wash is a natural stream course that has been modified (portions downstream are concrete lined) for public safety due to the development in the immediate adjacent areas.

Tributary properties with respect to top of bank (estimate):
Average width: many braided sandy channels - from 1 - 60 feet
Average depth: 0.5 to 4 feet
Average side slopes: **4:1 (or greater).**

Primary tributary substrate composition (check all that apply):
☒ Silts ☒ Sands ☐ Concrete
☐ Cobbles ☐ Gravel ☐ Muck
☐ Bedrock ☐ Vegetation. Type/% cover:
☒ Other. Explain: organic debris such as fallen and shredded trees from recent fires.

Tributary condition/stability [e.g., highly eroding, sloughing banks]. Explain: highly eroding.
Presence of run/riffle/pool complexes. Explain: slow moving wash: mainly run with little or no side pools with the exception of the ponds outside the excavation area..
Tributary geometry: **Meandering**
Tributary gradient (approximate average slope): 1-2 %

(c) Flow:
Tributary provides for: **Seasonal flow**
Estimate average number of flow events in review area/year: **6-10**
Describe flow regime: Flow would occur mainly after rain events, moving south.
Other information on duration and volume: Volume would depend on heaviness and duration of rain events.

Surface flow is: **Discrete.** Characteristics: .

Subsurface flow: **Unknown**. Explain findings: .
☐ Dye (or other) test performed: .

Tributary has (check all that apply):
☒ Bed and banks
☒ OHWM[6] (check all indicators that apply):
☒ clear, natural line impressed on the bank ☒ the presence of litter and debris
☒ changes in the character of soil ☒ destruction of terrestrial vegetation
☒ shelving ☐ the presence of wrack line
☒ vegetation matted down, bent, or absent ☐ sediment sorting
☒ leaf litter disturbed or washed away ☒ scour
☒ sediment deposition ☒ multiple observed or predicted flow events
☒ water staining ☐ abrupt change in plant community
☐ other (list):
☒ Discontinuous OHWM.[7] Explain:Some areas fan out in braided patterns with shallow waters making OHWM difficult to discern in some areas. Sandy and silty soils with heavy organic debris flow make identification difficult in some areas.

If factors other than the OHWM were used to determine lateral extent of CWA jurisdiction (check all that apply):
☐ High Tide Line indicated by: ☐ Mean High Water Mark indicated by:
☐ oil or scum line along shore objects ☐ survey to available datum;
☐ fine shell or debris deposits (foreshore) ☐ physical markings;
☐ physical markings/characteristics ☐ vegetation lines/changes in vegetation types.
☐ tidal gauges
☐ other (list):

[5] Flow route can be described by identifying, e.g., tributary a, which flows through the review area, to flow into tributary b, which then flows into TNW.
[6] A natural or man-made discontinuity in the OHWM does not necessarily sever jurisdiction (e.g., where the stream temporarily flows underground, or where the OHWM has been removed by development or agricultural practices). Where there is a break in the OHWM that is unrelated to the waterbody's flow regime (e.g., flow over a rock outcrop or through a culvert), the agencies will look for indicators of flow above and below the break.
[7] Ibid.

(iii) Chemical Characteristics:

Characterize tributary (e.g., water color is clear, discolored, oily film; water quality; general watershed characteristics, etc.).

Explain: Water color is turbid due to silty contents in flow during the survey effort.

Identify specific pollutants, if known: .

(iv) Biological Characteristics. Channel supports (check all that apply):

☒ Riparian corridor. Characteristics (type, average width): Black Willow Series (up to 1200 feet), mule fat scrub (up to 400 feet).

☒ Wetland fringe. Characteristics: freshwater emergent wetland, freshwater forested/shrub wetland.

☒ Habitat for:

☐ Federally Listed species. Explain findings: .

☐ Fish/spawn areas. Explain findings: .

☐ Other environmentally-sensitive species. Explain findings: .

☒ Aquatic/wildlife diversity. Explain findings: mainly common amphibian and avian species. Least Bell's vireo surveys were conducted with no presence durning surveys.

2. Characteristics of wetlands adjacent to non-TNW that flow directly or indirectly into TNW

(i) Physical Characteristics:

(a) General Wetland Characteristics:

Properties:

Wetland size:78.86 acres

Wetland type. Explain:The Wetland encompasses most of the reservoir and within the Excavation and Work including Mule Fat Scrub, Oak Woodland, Riparian Herbaceous, and Riparian Woodland for a total of 78.86 acres within the proposed excavation and work area and within the HWM countour (1040.5) of the reservoir. This is excluding 44.57 acres of Scoured, Coast Live Oak Woodland, Sage Scrub, Ruderal, Developed and Landscaped Communities.

Wetland quality. Explain:Although a large portion of the reservoir contains a Wetland, the quality of habitat is low for most wildlife species. Water is not present all year and therefore, the presence of aquatic species would only occur seasonally rather than year long. With the presence of a park nearby, hiking paths, and horse back riding trails and training rings, the site is disturbed. Disturbed communities allow exotic plant species to establish and spread..

Project wetlands cross or serve as state boundaries. Explain: .

(b) General Flow Relationship with Non-TNW:

Flow is: **Intermittent flow**. Explain: Flow after rain events.

Surface flow is**: Discrete**

Characteristics: .

Subsurface flow: **Unknown**. Explain findings: .

☐ Dye (or other) test performed: .

(c) Wetland Adjacency Determination with Non-TNW:

☒ Directly abutting

☐ Not directly abutting

☐ Discrete wetland hydrologic connection. Explain: .

☐ Ecological connection. Explain: .

☐ Separated by berm/barrier. Explain: .

(d) Proximity (Relationship) to TNW

Project wetlands are **5-10** river miles from TNW.

Project waters are **5-10** aerial (straight) miles from TNW.

Flow is from: **Wetland to navigable waters.**

Estimate approximate location of wetland as within the **2-year or less** floodplain.

(ii) Chemical Characteristics:

Characterize wetland system (e.g., water color is clear, brown, oil film on surface; water quality; general watershed characteristics; etc.). Explain: turbid (due to silt and debris content in the southern area) at the time of survey with the exception of flow from the southwest inlet by bridge structure into the wetland which was clear (includes residential nuissance water).

Identify specific pollutants, if known: .

(iii) Biological Characteristics. Wetland supports (check all that apply):

☒ Riparian buffer. Characteristics (type, average width):up to 1200 feet for riparian scrub, up to 400 feet for mule fat scrub communities.

☐ Vegetation type/percent cover. Explain: .

☒ Habitat for:

☐ Federally Listed species. Explain findings: .

☐ Fish/spawn areas. Explain findings: .

☐ Other environmentally-sensitive species. Explain findings: .

☐ Aquatic/wildlife diversity. Explain findings:sommonly occuring riparian species only.

3. Characteristics of all wetlands adjacent to the tributary (if any)

All wetland(s) being considered in the cumulative analysis: **1**

Approximately ( ) acres in total are being considered in the cumulative analysis.

For each wetland, specify the following:

Directly abuts? (Y/N)	Size (in acres)	Directly abuts? (Y/N)	Size (in acres)
yes			

Summarize overall biological, chemical and physical functions being performed: Although a large portion of the reservoir contains a Wetland, the quality of habitat is low for most wildlife species. Water is not present all year and therefore, the presence of aquatic species would only occur seasonally rather than year long. With the presence of a park nearby, hiking paths, and horse back riding trails and training rings, the site is disturbed. Disturbed communities allow exotic plant species to establish and spread..

C. SIGNIFICANT NEXUS DETERMINATION

A significant nexus analysis will assess the flow characteristics and functions of the tributary itself and the functions performed by any wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical, and biological integrity of a TNW. For each of the following situations, a significant nexus exists if the tributary, in combination with all of its adjacent wetlands, has more than a speculative or insubstantial effect on the chemical, physical and/or biological integrity of a TNW. Considerations when evaluating significant nexus include, but are not limited to the volume, duration, and frequency of the flow of water in the tributary and its proximity to a TNW, and the functions performed by the tributary and all its adjacent wetlands. It is not appropriate to determine significant nexus based solely on any specific threshold of distance (e.g. between a tributary and its adjacent wetland or between a tributary and the TNW). Similarly, the fact an adjacent wetland lies within or outside of a floodplain is not solely determinative of significant nexus.

Draw connections between the features documented and the effects on the TNW, as identified in the *Rapanos* Guidance and discussed in the Instructional Guidebook. Factors to consider include, for example:

- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to carry pollutants or flood waters to TNWs, or to reduce the amount of pollutants or flood waters reaching a TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), provide habitat and lifecycle support functions for fish and other species, such as feeding, nesting, spawning, or rearing young for species that are present in the TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to transfer nutrients and organic carbon that support downstream foodwebs?
- Does the tributary, in combination with its adjacent wetlands (if any), have other relationships to the physical, chemical, or biological integrity of the TNW?

Note: the above list of considerations is not inclusive and other functions observed or known to occur should be documented below:

1. **Significant nexus findings for non-RPW that has no adjacent wetlands and flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary itself, then go to Section III.D: .

2. **Significant nexus findings for non-RPW and its adjacent wetlands, where the non-RPW flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D: .

3. **Significant nexus findings for wetlands adjacent to an RPW but that do not directly abut the RPW.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D: .

D. DETERMINATIONS OF JURISDICTIONAL FINDINGS. THE SUBJECT WATERS/WETLANDS ARE (CHECK ALL THAT APPLY):

1. **TNWs and Adjacent Wetlands.** Check all that apply and provide size estimates in review area:
   - ☐ TNWs: linear feet width (ft), Or, acres.
   - ☐ Wetlands adjacent to TNWs: acres.

2. **RPWs that flow directly or indirectly into TNWs.**
   - ☐ Tributaries of TNWs where tributaries typically flow year-round are jurisdictional. Provide data and rationale indicating that tributary is perennial: .
   - ☒ Tributaries of TNW where tributaries have continuous flow "seasonally" (e.g., typically three months each year) are jurisdictional. Data supporting this conclusion is provided at Section III.B. Provide rationale indicating that tributary flows

seasonally: Based on information for the Arroyo Seco drainage (HUC 18070105) identified on http://waterdata.usgs.gov/, between 2006 and 2009, seven months out of the year on average have greater than 1 cfs, with four of those months discharging greater than 5 cfs.

Provide estimates for jurisdictional waters in the review area (check all that apply):
☐ Tributary waters: linear feet width (ft).
☐ Other non-wetland waters: acres.
Identify type(s) of waters: .

3. Non-RPWs[8] that flow directly or indirectly into TNWs.
☐ Waterbody that is not a TNW or an RPW, but flows directly or indirectly into a TNW, and it has a significant nexus with a TNW is jurisdictional. Data supporting this conclusion is provided at Section III.C.

Provide estimates for jurisdictional waters within the review area (check all that apply):
☐ Tributary waters: linear feet width (ft).
☐ Other non-wetland waters: acres.
Identify type(s) of waters: .

4. Wetlands directly abutting an RPW that flow directly or indirectly into TNWs.
☒ Wetlands directly abut RPW and thus are jurisdictional as adjacent wetlands.
☐ Wetlands directly abutting an RPW where tributaries typically flow year-round. Provide data and rationale indicating that tributary is perennial in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: .

☒ Wetlands directly abutting an RPW where tributaries typically flow "seasonally." Provide data indicating that tributary is seasonal in Section III.B and rationale in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: As identified in the figure from the 2010 Chambers Group Jurisdictional Delineation Report, wetland areas directly abut the surface waters identified within the Devil's Gate Reservoir.

Provide acreage estimates for jurisdictional wetlands in the review area: acres.

5. Wetlands adjacent to but not directly abutting an RPW that flow directly or indirectly into TNWs.
☐ Wetlands that do not directly abut an RPW, but when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisidictional. Data supporting this conclusion is provided at Section III.C.

Provide acreage estimates for jurisdictional wetlands in the review area: acres.

6. Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs.
☐ Wetlands adjacent to such waters, and have when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisdictional. Data supporting this conclusion is provided at Section III.C.

Provide estimates for jurisdictional wetlands in the review area: acres.

7. Impoundments of jurisdictional waters.[9]
As a general rule, the impoundment of a jurisdictional tributary remains jurisdictional.
☐ Demonstrate that impoundment was created from "waters of the U.S.," or
☐ Demonstrate that water meets the criteria for one of the categories presented above (1-6), or
☐ Demonstrate that water is isolated with a nexus to commerce (see E below).

E. ISOLATED [INTERSTATE OR INTRA-STATE] WATERS, INCLUDING ISOLATED WETLANDS, THE USE, DEGRADATION OR DESTRUCTION OF WHICH COULD AFFECT INTERSTATE COMMERCE, INCLUDING ANY SUCH WATERS (CHECK ALL THAT APPLY):[10]

[8] See Footnote # 3.
[9] To complete the analysis refer to the key in Section III.D.6 of the Instructional Guidebook.
[10] Prior to asserting or declining CWA jurisdiction based solely on this category, Corps Districts will elevate the action to Corps and EPA HQ for review consistent with the process described in the Corps/EPA *Memorandum Regarding CWA Act Jurisdiction Following Rapanos.*

☐ which are or could be used by interstate or foreign travelers for recreational or other purposes.
☐ from which fish or shellfish are or could be taken and sold in interstate or foreign commerce.
☐ which are or could be used for industrial purposes by industries in interstate commerce.
☐ Interstate isolated waters. Explain: .
☐ Other factors. Explain: .

Identify water body and summarize rationale supporting determination: .

Provide estimates for jurisdictional waters in the review area (check all that apply):
☐ Tributary waters: linear feet width (ft).
☐ Other non-wetland waters: acres.
Identify type(s) of waters: .
☐ Wetlands: acres.

F. NON-JURISDICTIONAL WATERS, INCLUDING WETLANDS (CHECK ALL THAT APPLY):
☐ If potential wetlands were assessed within the review area, these areas did not meet the criteria in the 1987 Corps of Engineers Wetland Delineation Manual and/or appropriate Regional Supplements.
☐ Review area included isolated waters with no substantial nexus to interstate (or foreign) commerce.
☐ Prior to the Jan 2001 Supreme Court decision in "*SWANCC*," the review area would have been regulated based solely on the "Migratory Bird Rule" (MBR).
☐ Waters do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction. Explain: .
☐ Other: (explain, if not covered above): .

Provide acreage estimates for non-jurisdictional waters in the review area, where the sole potential basis of jurisdiction is the MBR factors (i.e., presence of migratory birds, presence of endangered species, use of water for irrigated agriculture), using best professional judgment (check all that apply):
☐ Non-wetland waters (i.e., rivers, streams): linear feet width (ft).
☐ Lakes/ponds: acres.
☐ Other non-wetland waters: acres. List type of aquatic resource: .
☐ Wetlands: acres.

Provide acreage estimates for non-jurisdictional waters in the review area that do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction (check all that apply):
☐ Non-wetland waters (i.e., rivers, streams): linear feet, width (ft).
☐ Lakes/ponds: acres.
☐ Other non-wetland waters: acres. List type of aquatic resource: .
☐ Wetlands: acres.

SECTION IV: DATA SOURCES.

A. SUPPORTING DATA. Data reviewed for JD (check all that apply - checked items shall be included in case file and, where checked and requested, appropriately reference sources below):
☒ Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant: 2010 Chambers Group Jurisdictional Delineation, field survey conducted November 24, 2010.
☒ Data sheets prepared/submitted by or on behalf of the applicant/consultant.
☐ Office concurs with data sheets/delineation report.
☐ Office does not concur with data sheets/delineation report.
☐ Data sheets prepared by the Corps: .
☐ Corps navigable waters' study: .
☒ U.S. Geological Survey Hydrologic Atlas: .
☐ USGS NHD data.
☐ USGS 8 and 12 digit HUC maps.
☐ U.S. Geological Survey map(s). Cite scale & quad name: .
☒ USDA Natural Resources Conservation Service Soil Survey. Citation: .
☒ National wetlands inventory map(s). Cite name: .
☐ State/Local wetland inventory map(s): .
☐ FEMA/FIRM maps: .
☐ 100-year Floodplain Elevation is: (National Geodectic Vertical Datum of 1929)
☒ Photographs: ☐ Aerial (Name & Date): .
or ☐ Other (Name & Date): .
☐ Previous determination(s). File no. and date of response letter: .
☐ Applicable/supporting case law: .

☐ Applicable/supporting scientific literature: .
☐ Other information (please specify): .

B. ADDITIONAL COMMENTS TO SUPPORT JD: .

APPENDIX E – Cultural Resources Report

CLASS III CULTURAL RESOURCES INVENTORY
DEVIL'S GATE RESERVOIR
SEDIMENT REMOVAL AND MANAGEMENT PROJECT
PASADENA, CALIFORNIA

Prepared for:

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NOVEMBER 2011

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SECTION 1.0 – SUMMARY OF FINDINGS

Chambers Group, Inc. (Chambers Group) conducted a records search for the Devil's Gate Reservoir followed by a pedestrian survey to inspect the site for the presence of historic or archaeological resources. The records search was conducted by Marina Adame, B.A. at the South Central Coastal Information Center, California State University, Fullerton, California, on June 20, 2011. Other than the Devil's Gate Dam, which was recorded in 2009, the records search was negative for cultural resources located within the study area within a one-mile radius surrounding the Area of Potential Effect (APE). The Native American Heritage Commission was also contacted on June 24, 2011, and requested to review their Sacred Lands Inventory for the presence of sensitive or sacred sites within the project study area. The review of the Sacred Lands Inventory failed to show any sensitive or sacred sites within the study area.

Chambers Group conducted a pedestrian survey of the interior of the Devil's Gate Reservoir in June 2011. The survey was conducted at 15-meter intervals where possible until a particular area had been covered. It is estimated that 40 to 50 percent of the interior of the reservoir was covered by thick undergrowth or water and could not be surveyed at the 15-meter interval. Those areas were inspected by following equestrian, bike, or foot paths, as appropriate. No historic or prehistoric sites were observed during the pedestrian survey of the Devil's Gate Reservoir.

The inventory of the Devil's Gate Reservoir interior basin did not result in the discovery of any new cultural resources. The survey surface area consisted of accumulated sediments and debris originating farther upstream in Arroyo Seco. Geotech borings related to this project have indicated that most of the project area is filled with recently deposited sediment washed from the upstream watershed. It is not anticipated that any archaeological sites, historic or prehistoric, would exist in this context; therefore, monitoring is not recommended. However, if sediment removal activities exceed the depth of the historic flood deposits and encounter native sediments, monitoring is recommended. In the event this occurs and historic or prehistoric materials are observed, the excavation activities in proximity to the discovery should be diverted until a qualified archaeologist evaluates the discovery. In the event human remains are discovered, all work in the area must be halted until the County Coroner identifies the remains and makes recommendations regarding their appropriate treatment.

The above tasks and recommendations should be adequate to meet the undertaking requirements pursuant to Section 15064.5 of the State CEQA Guidelines, with respect to the identification and preservation of historic resources, and also in accordance with Section 106 of the National Historic Preservation Act of 1966, as amended (16 U.S.C. 470f and 470h-2), and its implementing regulations (36 CFR 800.4), as well as the 2004 Programmatic Agreement among the Federal Highway Administration, the Advisory Council on Historic Preservation, and the California State Historic Preservation Officer, regarding compliance with Section 106 of the National Historic Preservation Act (NHPA).

SECTION 2.0 – INTRODUCTION

Chambers Group conducted an archaeological survey of the Devil's Gate Reservoir for the Los Angeles County Flood Control District (LACFCD). The survey was conducted pursuant to Section 15064.5 of the State CEQA Guidelines, with respect to the identification and preservation of historic resources, and also in accordance with Section 106 of the National Historic Preservation Act of 1966, as amended (16 U.S.C. 470f and 470h-2), and its implementing regulations (36 CFR 800.4), as well as the 2004 Programmatic Agreement among the Federal Highway Administration, the Advisory Council on Historic Preservation, and the California State Historic Preservation Officer, regarding compliance with Section 106 of the National Historic Preservation Act (PA).

Table 1. Project Personnel and Qualifications

Name	Duties	Qualifications	Dates of Fieldwork
Marina Adame, B.A.	Records Search	Archaeologist, 10 years experience	NA
Tim Murphy, B.A.	Survey	Archaeologist, 3 years experience	June 25, 2011
David M. Smith, B.S.	Project Manager	Archaeologist, 24 years experience	NA
Wayne Bischoff, Ph.D	Director of Cultural Resources	Archaeologist, 18 years experience	NA

SECTION 3.0 – PROJECT LOCATION AND DESCRIPTION

3.1 LOCATION

The Devil's Gate Reservoir Sediment Removal and Management Project (Project) is located in the City of Pasadena, in Los Angeles County, approximately 14 miles north of downtown Los Angeles (see Figure 1, Project Vicinity Map). The City of La Cañada Flintridge and the community of Altadena are located near the Project site to the west and east, respectively.

The Project site is located within the Arroyo Seco watershed, south of the San Gabriel Mountains. The Arroyo Seco extends approximately 11 miles from the border of the Angeles National Forest to its confluence with the Los Angeles River. Stormwater runoff from approximately 20,416 acres (31.9 square miles) of both residential and undeveloped land drains into Devil's Gate Reservoir. Every year, large amounts of sediment, rock cobbles, and boulders are transported from the watershed by storm waters to the Project area. Removal of this fill material is the focus of the Devil's Gate Project.

The Project undertaking includes the removal of sedimentary fill and the transportation and placement of fill material at facilities already prepared and designated to accept such material. For the purposes of this Project, Waste Management Facility in Azusa, Manning Pit Sediment Placement Site in Irwindale, and Scholl Canyon Landfill were considered as facilities available to receive fill material.

3.1.1 Project Site

The proposed Project site (see Figure 2, Project Boundary Map) is interior to but does not include the Devil's Gate Dam and covers approximately 175 acres (0.27 square miles) of the reservoir lands behind the dam. The topography in the vicinity of the Project site is generally flat, with a slight incline to the north. The San Gabriel Mountains are located to the north of the Project site and are characterized by both the foothills and steep slopes associated with mountainous terrain. The proposed Project site can be accessed via Oak Grove Drive and Foothill Boulevard on the west, through the City of Pasadena's Hahamongna Watershed Park and Windsor Avenue, via La Cañada Verdugo Road on the southeast, and via Explorer Road on the northeast.

3.1.2 General Plan Designation/Zoning

The proposed Project site has a General Plan Land Use designation of Open Space and is zoned as Open Space under City of Pasadena General Plan (City of Pasadena 1994).

3.1.3 Adjacent Land Uses

The Project site is located within the reservoir behind Devil's Gate Dam. The Hahamongna Watershed Park is approximately 1,300 acres of open space extending up the Arroyo Seco Canyon from the Devil's Gate Dam. The park includes areas within and adjacent to the reservoir. The Hahamongna Watershed Park is owned and operated by the City of Pasadena and includes Oak Grove Park. Oak Grove Park contains picnic facilities, restrooms, a play field, an equestrian staging area, trails, and a disc golf course. The current leaseholders within the Hahamongna Watershed Park include the United States Forest Service (USFS), Los Angeles County Fire Camp 2, and the Rose Bowl Riders, who sublet to the Tom

Sawyer Camp. In addition, Southern California Edison, Southern California Gas Company, and Pasadena Water and Power hold easements within the Hahamongna Watershed Park. Other land uses directly adjacent to the Project area include the California Institute of Technology – Jet Propulsion Laboratory (JPL) to the northwest; La Cañada High School and Hillside School and Learning Center to the west; single-family residential areas to the south, north, and east; and the Interstate 210 Foothill Freeway to the south.

3.2 PROJECT BACKGROUND

3.2.1 LACFCD History

Since 1860, major flood events have occurred along the Arroyo Seco, which led to the development of the Los Angeles River and Arroyo Seco flood control channels. Flooding over the past century has caused loss of life and severe damage to structures and infrastructure. The most notable flooding events include:

- In 1861, severe flooding occurred along the Arroyo Seco.
- In 1884, the most destructive flood recorded in Los Angeles County occurred.
- In 1889, Arroyo Seco experienced severe flooding.
- In 1914, a devastating flood occurred in Los Angeles County, primarily the result of floodwaters originating in the San Gabriel Mountains. The flood caused over $10 million in property damage, destroyed 10 bridges and 30 homes, and claimed many lives. Peak flows in the Arroyo Seco at the USGS Gage 11098000, located approximately 2.2 miles upstream of the reservoir, were recorded at 5,800 cubic feet per second (cfs).
- In 1916, a flood recording peak flows at 3,150 cfs occurred on January 17.
- In 1938, flooding damaged the Angeles Crest Highway (SR-2). The USGS gage station recorded a maximum peak flow of 8,620 cfs on March 2.
- In 1943, a flood damaged portions of the Arroyo Seco flood control channel.

The Los Angeles County Flood Control Act was adopted in 1915 by the State Legislature after regional flooding took a toll on both lives and property. The Los Angeles County Flood Control Act established the LACFCD, tasked with controlling and conserving the flood waters of the LACFCD. The LACFCD encompasses 2,760 square miles: all of Los Angeles County except Catalina and San Clemente islands and everything north of Avenue S in Antelope Valley.

3.2.2 Hahamongna Watershed Master Plan

In 1993, the City of Pasadena established the Hahamongna Watershed Park, which includes the Devil's Gate Reservoir area. Recreational uses in the park include hiking, bicycling, horseback riding, picnicking, and disc golf.

The City of Pasadena has developed and adopted (between 2003 and 2005) three separate master plans that govern Pasadena parks along the Arroyo Seco: the Lower Arroyo Master Plan, the Central Arroyo Master Plan, and the Hahamongna Watershed Master Plan. These plans attempt to balance many competing objectives, including habitat restoration, recreational access, water supply, and other uses.

3.2.3 Devil's Gate Dam and Reservoir History

Following the floods of 1914 and 1916, the Devil's Gate Dam was built in 1920 for the purpose of water conservation and flood control. Devil's Gate Dam is the oldest dam constructed by the LACFCD and had an original storage capacity of approximately 7,423,000 cubic yards. Between 1934 and 1947, most of the Arroyo Seco downstream of the dam (approximately 450 feet south of the dam) was channelized. The Devil's Gate Dam, though over 50 years old, was not included in the present undertaking in the present undertaking as no permanent impacts to the dam were anticipated, and therefore is not addressed in this Project.

Following the 1971 Sylmar earthquake, heightened safety concerns and better understanding of seismic behavior prompted new investigations and analysis of LACFCD dams, including Devil's Gate Dam. In response to findings from these studies, in 1978 the State Department of Water Resources Division of Safety of Dams (DSOD) officially imposed an operational restriction preventing holding water at Devil's Gate Dam due to concerns with the dam's ability to withstand a major earthquake.

In 1998, the LACFCD completed a construction project that seismically rehabilitated Devil's Gate Dam. The rehabilitation project also enlarged the spillway to safely pass Probable Maximum Flood, the required level of flood protection, without overtopping the dam. After project completion, the DSOD restriction was removed, restoring the dam and reservoir to its full operational capacity, thus fulfilling its potential for water conservation. The project improvements resulted in the Devil's Gate Dam meeting current maximum credible earthquake design standards and probable maximum flood design standards.

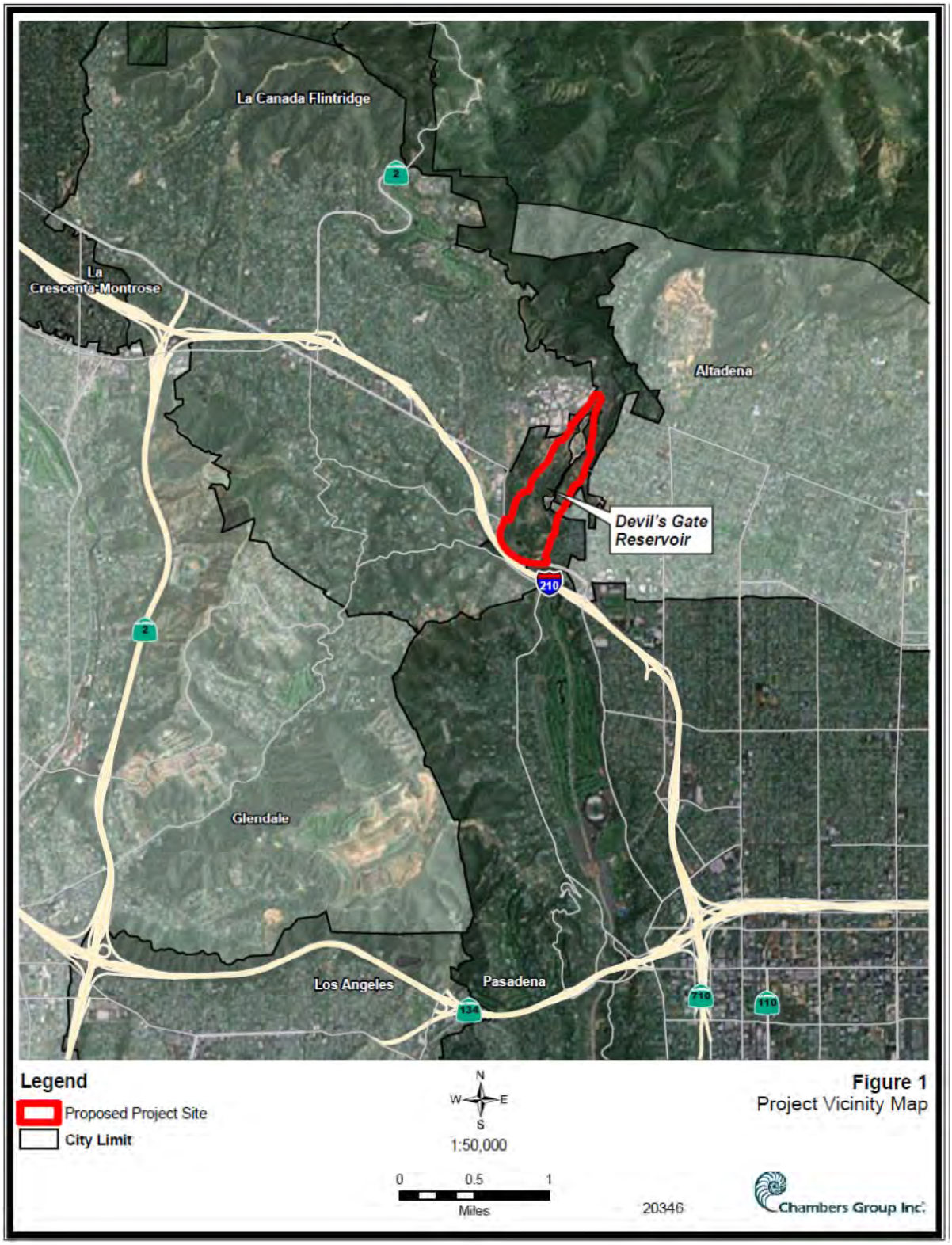


Figure 1 - Project Vicinity Map

Figure 2 - Project Boundary Map

The reservoir area behind the dam captures storm water, sediment, and debris during storm events and retains storm water to prevent high flow rates from overwhelming the downstream flood control channel. The outflow from the reservoir is controlled by three outlet corridors: a low-level gate, the outlet valve, and the outlet tunnel gates. These allow the dam to discharge up to 5,500 cfs. Controlled releases are made through the outlet valve and tunnel gates after the reservoir has impounded storm water. During major storm events that exceed the capacity of the valves and gates, the dam is designed such that the reservoir level rises until flow discharges uncontrolled thru the spillway ports (openings in the spillway structure) and then over the spillway. As mentioned above, none of the Devil's Gate Dam features are included in the project area.

3.2.4 Recent Sediment Removal

The need for a sediment removal project is determined based on the amount of sediment deposition behind the dam. Too much sediment accumulation can negatively affect the ability of the outlet works (valves, gates, and spillway) to function correctly. Excess sediment can also reduce the available reservoir capacity below what is necessary for safe flood control storage or to safely contain future sediment inflow including the Design Debris Event (DDE). The Design Debris Event is the predicted amount of sediment that will flow into the reservoir after the undeveloped portion of the tributary watershed is completely burned and a 50-year design storm event occurs after 4 years of watershed recovery. The 50-year design storm and the DDE are defined by the Los Angeles County Department of Public Works Hydrology and Sedimentation Manuals respectively. The DDE for the Devil's Gate Reservoir is approximately 2,000,000 cubic yards.

The last major reservoir sediment removal project at Devil's Gate Reservoir occurred in 1994, when 190,000 cubic yards of sediment were removed. Sediment was relocated off site via a maintenance road just west of the dam which exits onto Oak Grove Drive. Since that time, two smaller sediment removal operations have taken place, with 14,000 cubic yards being removed in 2006 and 3,800 cubic yards being removed in 2009. The volume of these sediment removal projects was limited in order to prevent impacts to vegetation growing in the accumulated sediment within the reservoir.

The 2009 Station Fire was the largest fire in recorded history of the Angeles National Forest (est. 1892) and the 10th largest fire in California since 1933. It burned over 160,000 acres, leaving vast areas of the San Gabriel Mountains denuded and susceptible to sediment flows. The fire impacted five of the LACFCD's dams and reservoirs, one of which was the Devil's Gate Dam and Reservoir. Approximately 68 percent of the watershed tributary to Devil's Gate Reservoir (approximately 100 percent of the undeveloped portion) was burned, making sediment deposition inevitable during subsequent storm events. The storms that occurred in the two wet seasons after the fire increased sediment accumulation in the reservoir by approximately 1,300,000 cubic yards, reducing the available capacity to less than one DDE. In October 2010, the California DSOD recommended the removal of sediment build-up behind the dam as well as the removal of vegetation growth.

In 2010, LACFCD initiated the planned removal of 1,670,000 cubic yards from the reservoir. This activity was found to be exempt from CEQA. In March 2011, in recognition of stakeholder and environmental concerns, the Los Angeles County Board of Supervisors directed LACFCD to complete an EIR to assess the impacts associated with removing sediment from the Project site. Since the EIR would take considerable

time to complete, LACFCD was also directed to implement interim measures to reduce downstream flood risk until the EIR is completed and a sediment removal project is implemented.

The Interim Measures Project (IMP), is currently underway to reduce downstream flood risk. The interim measures include dam modifications to keep debris from plugging the outlet works and allow for the removal of up to 25,000 cubic yards of sediment per year from the dam face until the project associated with the EIR is started. In 2011, 13,000 cubic yards were removed from the dam face and placed at Johnson Field.

3.3 PROJECT GOALS AND OBJECTIVES

The LACFCD must remove sediment that has accumulated behind the dam to restore the capacity of Devil's Gate Reservoir to minimize the level of flood risk to downstream communities along the Arroyo Seco. In its current condition, the reservoir no longer has the capacity to safely contain another major debris event; and the outlet works have a risk of becoming clogged and inoperable. The proposed Project would remove sediment from the Devil's Gate Reservoir to restore it to its current design standard, (capacity for two DDEs below the spillway elevation of 1040.5 ft) and establish a reservoir configuration more suitable for routine maintenance activities, including sediment management. This will include the removal of approximately 2.9 million cubic yards of current excess sediment in the reservoir in addition to any additional sediment received during the project sediment removal phase. The proposed Project is expected to result in a reservoir configuration and appropriate access ways to facilitate future routine periodic maintenance and sediment removal and minimize any environmental impacts associated with these future activities.

Primary Project objectives include:

- Reducing flood risk to the communities downstream of the reservoir adjacent to the Arroyo Seco by restoring reservoir capacity for flood control and future sediment inflow events;
- Supporting sustainability by establishing a reservoir configuration more suitable for routine maintenance activities, including sediment management;
- Removing sediment in front of the dam to facilitate an operational reservoir pool to reduce the possibility of plugging the outlet works with sediment or debris during subsequent storm events;
- Removing sediment placed at Johnson Field during the Devil's Gate Reservoir Interim Measures Project;
- Supporting dam safety by removing sediment accumulated in the reservoir in a timely manner to ensure the ability to empty the reservoir in the event of a dam safety concern; and
- Delivering the sediment to placement or reuse facilities that are already prepared and designated to accept such material without native vegetation and habitat removal.

3.3.1 Sediment Removal

Approximately 2.9 million cubic yards of sediment is the current excess amount of sediment in the reservoir. However, additional sediment accumulation is anticipated during the upcoming storm seasons due to the denuded surfaces of the watershed created by the 2009 Station Fire. This constitutes the construction phase of the Proposed Project. It is estimated that an average of 13,000 cubic yards of sediment will potentially be deposited in the reservoir annually after completion of the project. Proposed Project excavation activities would take place within the project's excavation limit boundaries (see Figure 3, Project Excavation Boundary). The specific excavation limits, ultimate reservoir configuration, and volume of sediment to be removed within the boundary will be determined based on locations of access roads, areas for preservation or restoration of native vegetation, and the amount and location of sediment inflow that occurs during the upcoming storm seasons. The following procedures may change as alternatives to the undertaking of the project are evaluated.

Excavation/ Reservoir Configuration

The specific excavation limits, ultimate reservoir configuration, and volume of sediment to be removed within the boundary will be determined based on locations of access roads, areas for preservation or restoration of native vegetation, and the amount and location of sediment inflow that occurs during the upcoming storm seasons. Proposed Project excavation activities would take place within the Project's excavation limit boundaries (see Figure 3, Project Excavation Boundary). As the figure shows, the basin will be excavated to a 985 foot elevation at the face of the dam, sloping up to a 1070 foot elevation at approximately 4977 feet north of the dam. This configuration will involve approximately 178 acres of the reservoir. In addition to the sediment excavated, sediment stockpiled at Johnson Field as part of the IMP will also be removed. Excavation will not involve Oak Grove Park, the area of the reservoir above the northern end of excavation limits, and the City of Pasadena's spreading grounds on the east side of the basin.

Removal Method

In the past, as storm events deposited sediment in the reservoir, native and non-native vegetation established itself in the sediment deposits. During subsequent storm events, some of the vegetation has been washed out by storm flows, buried under sedimentation, or submerged when the reservoir level rises. Despite the dynamic changes to vegetation over time, mature black willow trees, Riversidian alluvial fan sage scrub, mulefat scrub, and riparian vegetation continue to thrive within the reservoir. During storm events following the Station Fire, a large portion of the reservoir vegetation was buried in sediment; however, significant amounts of vegetation, including numerous mature willow trees remain present. In order to remove the sediment from the reservoir, vegetation growing within excavation areas will require removal. The accumulated sediment will be removed with construction equipment, including but not limited to: four front loaders with four-yard buckets, two D8 dozers, one excavator, one grader, one water truck, and two tender trucks (for fuel and maintenance). Removed vegetation and organic debris will be separated from sediment and hauled to Scholl Canyon Landfill. Coarse material may need to be processed through sorters and crushers to prepare it to be hauled offsite. Depending on the moisture content of the sediment removed, the sediment may need to be stockpiled to allow for drying. Stockpiling the sediment would occur onsite, within the Devil's Gate Reservoir.

Sediment Disposal and Reuse

Excavated sediment will be trucked offsite to sites that have already been prepared and designated to accept such material without native vegetation and habitat removal. In addition to the sediment excavated as part of the proposed Project, sediment stockpiled as part of the IMP will also be removed. Trucks will travel either to the east and will deposit the removed material at the primary disposal site locations the Waste Management Facility in Azusa or the Manning Pit Sediment Placement Site (SPS) in Irwindale, or trucked to the west and placed in one of the facilities in Sun Valley (Sheldon Pit, Cal-Mat Pit, Bradley Landfill, and Boulevard Pit). Removed vegetation and organic debris will be hauled to Scholl Canyon Landfill, located in the City of Glendale. Sediment disposal trucks are double dump trucks which have an estimated capacity of 16 to 20 cubic yards of sediment. Removal of the sediment, vegetation, and organic debris is expected to require an average of 50 truck trips in and out per hour, with an estimated maximum of 425 truck trips in and out per day during excavation. Trucks operating in the removal of all materials will access the site via the Interstate 210 Freeway and local roads. The existing reservoir access road located on the east side of the reservoir will be widened to accommodate two-way truck traffic. The existing access road is currently unpaved. The portion from below the bike path to the reservoir will remain unpaved. However, the portion of the access road from Oak Grove Drive to the West Rim Trail bike path will need to be widened and paved. Empty trucks will be staged within available space within the reservoir.

For sediment removal, trucks will utilize the maintenance road west of the reservoir to Oak Grove Drive, following it until Berkshire Place, and then merge onto the eastbound Interstate 210 Foothill Freeway. Trucks carrying sediment will continue to follow the Interstate 210 Freeway east until exiting Irwindale Avenue southbound, turning eastward onto Gladstone (Waste Management Facility), and then south onto Vincent (Manning Pit SPS). To return to the reservoir, the trucks will follow Arrow Highway eastward, turn north onto Azusa Avenue, and take the Interstate 210 Foothill Freeway westbound onramp. The access road used to access Oak Grove Drive will be widened to accommodate the truck traffic. For organic material, the trucks will follow the Interstate 210 Freeway east until the 134 Ventura Freeway west, exit Figueroa Street northbound, and then follow Scholl Canyon Road to the Scholl Canyon Landfill.

3.3.2 Project Schedule

The proposed Project is expected to occur between Spring 2015 and Winter 2020. Excavation and associated activities within the reservoir area is expected to take place during dryer months, from April to December, Monday through Saturday (except on holidays), as weather permits. The schedule may change as alternatives to the undertaking of the project are evaluated. Activities will take place between the hours of 7:00 a.m. to 7:00 p.m. on Monday through Friday and 8:00 a.m. to 5:00 p.m. on Saturday. During dry years, work could potentially start earlier and/or continue later. Removal of sediment and organic materials offsite is expected to take place between these hours, but specific hours may be further defined to avoid sensitive travel times.

SECTION 4.0 – CULTURAL HISTORY

4.1 PREHISTORY

It is generally believed that human occupation of coastal southern California dates back to at least 10,000 years before present (BP). Four cultural periods of precontact occupation of California during the Holocene Epoch (10,000 years BP to present) are discussed below: the Early Holocene Period, the Early Horizon Period, the Middle Horizon Period, and the Late Horizon Period. During the Early Holocene Period (10,000 to 8,000 years BP), hunters/gatherers utilized lacustrine and marshland settings for the varied and abundant resources found there. Milling-related artifacts are lacking during this period, but the *atlatl* (spear-thrower) and dart are common. Hunting of large and small game occurred, as well as fishing. A few scattered permanent settlements were established near large water sources, but a nomadic lifestyle was more common (Moratto 1984).

Milling-related artifacts first appear in sites dating to the Early Horizon Period (8,000 to 4,000 years BP). Hunting and gathering continue during this period, but with greater reliance on vegetal foods. Mussels and oysters were a staple. This gave way to greater consumption of shellfish in the Middle Horizon Period (4,000 to 2,000 years BP). Use of bone artifacts appears to have increased during this period, and baked-earth steaming ovens were developed. Occupation of permanent or semi-permanent villages occurred in this period, as did reoccupation of seasonal sites. During the Late Horizon Period (2,000 years BP to the time of European Contact [i.e., AD 1769]), population densities were high, and settlement in permanent villages increased (Erlandson 1994; Moratto 1984). Regional subcultures also developed, each with its own geographical territory and language or dialect. These groups, bound by shared cultural traits, maintained a high degree of interaction, including trading extensively with one another.

4.2 ETHNOGRAPHY

4.2.1 Tongva (Gabrielino)

The area in proximity to the East Fork San Gabriel Bridge was inhabited prehistorically and well into European contact times by an indigenous group known as the Gabrielino.

The term "Gabrielino" came from the group's association with Mission San Gabriel Archangel, established in 1771; however, today the group prefers to be known by their ancestral name Tongva. The Tongva were thought to be the "wealthiest, most populous, and powerful ethnic nationality in aboriginal Southern California" (Bean and Smith 1978:538), second only to their northwestern neighbors the Chumash. The Tongva occupied a large territory that included the Pacific coast from Malibu to Aliso Creek; parts of the Santa Monica and Santa Ana mountains; the Los Angeles, San Gabriel, and Santa Ana river drainages; plus the islands of Santa Barbara, Santa Catalina, and San Clemente. It is possible that the area was used by a number of groups during the sixteenth through the nineteenth centuries, although the Tongva may have been the controlling group.

The Tongva were a hunter-gatherer population exploiting local resources. They occupied numerous villages with populations ranging from 50 to 200 inhabitants. Residential structures within the villages were domed, circular, and made from thatched tule or other available wood. Tongva society was

organized by kinship groups, with each group composed of several related families, who together owned hunting and gathering territories. Settlement patterns varied according to the availability of floral and faunal resources (Bean and Smith 1978; McCawley 1996, Miller 1991).

Vegetal staples consisted of acorns, chia seeds, piñon nuts, sage, cacti, roots, and bulbs. Animals hunted included deer, antelope, coyote, rabbits, squirrels, rodents, birds, and snakes. The Tongva also fished (Bean and Smith 1978; McCawley 1996; Miller 1991).

By the late eighteenth century, Tongva population had significantly dwindled due to introduced diseases and dietary deficiencies. Tongva communities near the missions disintegrated as individuals succumbed to Spanish control, fled the region, or died. Later, many of the Tongva fell into indentured servitude to Anglo-Americans. By the early 1900s, few Tongva people had survived; and much of their culture had been lost (Bean and Smith 1978; McCawley 1996; Miller 1991). In the 1970s, a revival of the Tongva culture began which continues today with growing interest and support.

The prehistoric lands of what is currently Pasadena were inhabited by the Tongva. Tongva means "people of the earth" in the Uto-Aztecan language which they spoke (McCawley 1996). They are more widely referred to as the Gabrielino, which derives from the incorporation of their people into the Mission San Gabriel de Archangel during the eighteenth century (McCawley 1996).

The Tongva Gabrielino were semi-sedentary hunter-gatherers occupying southern California during the Late Prehistoric, between 650 to 1769 AD. They settled in small villages with 50 to 100 inhabitants, on average. Some villages were reported to have up to 200 inhabitants (Vane et al. 1996). Villages were established near dependable sources of water. From the village, small groups would leave to hunt, fish, gather food, and collect materials (Blackburn and Bean 1978).

The Tongva Gabrielino inhabited an area encompassing more than 2,500 square miles, from Topanga Canyon in the northwest, to the base of Mount Wilson to the north, as far out as current day San Bernardino vicinity in the east, and finally, the Aliso Creek in Orange County (Kroeber 1925:621). The mainland territory can be divided into four geographical regions: interior mountains and adjacent foothills, prairies flanking the interior mountains, exposed coastal strip, and sheltered coastal strip (McCawley 1996). They also occupied three Channel Islands off the coast of southern California: Santa Catalina, San Clemente, and San Nicolas. Santa Barbara Island was also frequented for quarry activities (McCawley 1996:75).

Each region and island offered a distinct variety of resources for "utilizing numerous plants and animals for food, shelter, and medicine" (McKenna 2007:11). Kroeber reports they used seed, foliage, shoots, fruits and berries, deer, rabbits, wood rats, squirrel, quail, and ducks for subsistence (Kroeber 1976). For shelter and tool-making, mountain shrubs, ash, elder, and willow were used (Kroeber 1976). For medicinal purposes, over 20 plants were used regularly (Kroeber 1976). Along the coast, resources found in wetlands and the oceans were also exploited (McKenna 2007:11).

The archaeology of Tongva Gabrielino sites is marked by bedrock mortars used for acorn processing. Manos and metates for seed grinding are also present. Also present are lithic scatters, midden, and possibly cemeteries (McKenna 2007). Temporary campsites, utilized for hunting, gathering, and collecting, are marked by fire-affected rock (Mason and Peterson 1994).

4.3 HISTORY

The three major periods of history for southern California are defined by key events documented by participants, witnesses, historians, and cartographers:

- **Mission Period** (A.D. 1769–1822, or 232–179 years ago);
- **Rancho Period** (A.D. 1822–1848, or 179–153 years ago); and
- **American Period** (A.D. 1848–Present, or since 153 years ago).

The first significant European settlement of California began during the Mission Period (1769 to 1822), with the founding of the first mission in San Diego, and lasted until 1833/34 when the Mexican secularization laws effectively opened the area to social and economic growth. The establishment of San Gabriel and San Juan Capistrano missions in 1771 and 1776, respectively, had a number of impacts on the region. The Tongva were removed from their villages and resettled around the missions. This resulted in the abandonment of some areas and the agricultural and ranching development of other portions. The mission system was dismantled after Mexican governors introduced new secularization acts between 1822 and 1833, thus freeing the Indians from mission control.

4.3.1 The Rancho Period (1821-1847)

After secularization, the dominance of the large land grant ranchos became established. In 1810, the Spanish government granted the first rancho to Jose Antonio Yorba and his nephew Juan Pablo Peralta. The Mexican government granted ranchos throughout California to Spanish and Hispanic soldiers and settlers (Castillo 1978). During this period, the entire area was almost constantly involved in political and military revolts. The tense situation ended when in 1847 California gained independence from Mexico during the "Bear Flag" revolt. One year later, the United States gained control of area as a result of the Mexican-American War.

Although under the control of the United States since 1847, the American Period did not really begin in the study area until 1851, when the Land Act required rancho dons to confirm the ownership of their lands. Many rancho dons lacked funds and legal documents to confirm land ownership. Along with legal problems related to the Land Act and new taxes imposed by the United States, many second-generation dons experienced a disastrous two-year drought (McWilliams 1973:62). The combination of these hardships resulted in many rancho families losing their lands. Railroads brought a steady influx of Euro-Americans to the area. The Euro-Americans expanded commercial and land development primarily in farming and dairying. In the twentieth century, independent businesses began to dominate the economic strategy, much as they do today.

The founding of California Mission in 1769 marks the beginning of the historic period in California (McKenna 2007). The establishment of Mission San Diego de Alcala on July 16, 1769, occurred during the Spanish period (1769-1822) of Alta California.

Locally, Mission San Gabriel Archangel was established by the Spanish in 1771 in what is now currently Montebello. Referred to as the Mission Vieja (old mission), it served the Tongva Gabrielino in the San

Gabriel Valley. The same year that is was established, it was relocated to its current location in the city of San Gabriel.

In 1822, Alta California entered into the Mexican period (1822-1848). Under the Mexican government, the missions were secularized but continued to practice granting land, reminiscent of the Spanish government. It was during this time, the Project area became Rancho San Pascual. The signing of the Treaty of Guadalupe Hildago on February 2, 1848, marked the beginning of the American period. The treaty was signed after the defeat of Mexico during the Mexican-American War. It dictated the concession of Alta California. California became a state in 1850 and was divided into 27 counties, including Los Angeles County. Rancho life continued to be the primary economy of southern California until a year of catastrophic floods in 1861-1862, followed by severe drought the following year in 1863-1864 (Cleland 1941). The land was thus further subdivided. During the 1880s, the Arroyo Seco and surrounding area became a place of leisure and recreation. By 1855, Pasadena was considered a recreational mecca. But the overuse of the area took its toll, and by the turn of the century the arroyo was in decline. During 1905, Charles Lummis founded the Arroyo Seco Foundation in an effort to protect and preserve the area from further deterioration. The foundation is still in existence today.

SECTION 5.0 – RECORDS SEARCH

5.1 SOUTH CENTRAL COASTAL INFORMATION CENTER

A cultural resources literature review and records search was conducted by Marina Adame at the South Central Coastal Information Center (SCCIC) located at California State University in Fullerton in June 2011. The SCCIC is a branch of the California Historic Resources Information System (CHRIS) established by the Office of Historic Preservation (OHP) to manage information concerning cultural resources and associated studies in California. The records search provides information on archaeological sites, historic resources, and cultural resources investigations recorded within a one-mile radius surrounding the APE. During the records search, the OHP's Historic Property Data File (HPDF), as well as a variety of publications and manuscripts are consulted. The HPDF includes the following types of properties:

- National Register of Historic Places (NRHP);
- California Historical Landmarks (CHL);
- California Points of Historical Interest (PHI);
- California Register of Historical Resources (CRHR); and
- California Historic Bridge Inventory (CHBI).

The first step of the record search was to review the USGS Pasadena Quad topographic map to find the locations of previously recorded archaeological and historical sites (Table 2).

Table 2. Technical Studies Conducted Within A One-Mile Radius

Author	Report (#LA-)	Description	Date
Crabtree	2513	Highway Construction Survey, Foothill Fwy. UCAS-082-D	1965
Blodgett	1903	Preliminary Assessment of the Prehistoric Cultural Resources of the Devil's Gate Reservoir	1987
Smith	5449	Negative Archaeological Survey Report: Route 210	2000
Sylvia	5640	Negative Archaeological Survey Report	2003
Feldman	7430	Caltrans' Historic Bridges Inventory Update: Concrete Box Girder Bridges	2003
Strauss	7455	Historic Property Survey Report for the Oak Grove Drive Bridges 53C-1829 and 53C-1851 Seismic Retrofit Project	2005
McKenna	8927	A Phase I (CEQA) and Class III (NEPA) Cultural Resources Investigation for the Sunset Overlook Trailhead Area of the Hahamongna Watershed Park in the City of Pasadena	2007

Results show that Devil's Gate Reservoir was previously surveyed as part of the 1987 Cotton/ Beland Associates study for the City of Pasadena's Department of Water and Power (Blodgett 1987). The survey yielded no prehistoric archaeological sites within the reservoir boundaries; however, the report notes the potential for buried resources (Mouriquand Blodgett 1987:2). As a result of those cultural resources studies, three historic structures have been recorded within a one-mile radius of the reservoir (Table 3).

Table 3. Historic Sites Recorded Within A One-Mile Radius

Author(s)	Primary #	Description	Date
Feldman/ Greenwood	19-187571	Oak Grove Drive Bridge	2003
Strauss/ Dolan/ Gregory	19-186859	Arroyo Seco Flood Control Channel	2003
Delu/ Ewers	19-188404	Devil's Gate Dam	2009

The Devil's Gate Dam was recorded by LSA Associates in April of 2009. In addition to the dam, a gauging station, concrete retaining walls flanking the dam to the north, and an associated flood control/ spillway feature east of the gauging station were recorded. These structures were noted during the current survey but not recorded or updated. Photographs of all dam-related features are on file at Chambers Group.

In addition, two historic landmarks within a one-mile radius of the reservoir are listed on the National Register of Historic Places (NRHP): the Jet Propulsion Laboratory's (JPL) Space Flight Operations Facility (SFOF) and the JPL's Twenty-five Foot Space Simulator (Table 4). The SFOF was built in 1963 and contains the Network Operations Control center which is utilized as a central control point for NASA's Deep Space Network (DSN). The Twenty-five Foot Space Simulator was built in 1961 for the purpose of testing aircrafts in a true space environment. Aircrafts tested within the facility included Ranger, Surveyor, Mariner, and Voyager.

Table 4. National Historic Landmarks Listed within a One-mile Radius

Category	NPS Reference No.	Description	Date Listed
Structure	85002812	Twenty-Five Foot Space Simulator	1985
Structure	85002814	Space Flight Operations Facility (SFOF)	1985

5.2 NATIVE AMERICAN HERITAGE COMMISSION

The Native American Heritage Commission (NAHC) maintains the Sacred Lands Inventory identifying lands sacred to Native Americans in California and other states. Chambers Group contacted the NAHC in June 2011 and requested a search of the Sacred Lands Inventory for any information regarding Sacred Lands or other cultural resources in the vicinity of Devil's Gate Reservoir (Appendix A). The results of the search were negative.

The NAHC also provided Chambers Group with a list of tribes affiliated with the Devil's Gate Reservoir area and recommended they be consulted regarding the Project. Chambers Group notified those tribes in August 2011 and invited comments regarding cultural resources in the area (Appendix A). One response was received from the Gabrieleno Band of Mission Indians, stating that the site is considered culturally sensitive by their Elder Committee and Tribal historians (Appendix A). Chambers Group again contacted the Gabrieleno Band of Mission Indians via phone in January 2012. Tribal representatives recommended that a Native American monitor be assigned in the event of native soils being reached and/or impacted.

SECTION 6.0 – FIELD METHODS

An archaeological survey was performed to identify archaeological or cultural resources. Chambers Group archaeologist Tim Murphy conducted a pedestrian survey of the interior of the Devil's Gate Reservoir in June 2011. The survey was conducted at 15-meter intervals where possible until a particular area had been covered. It is estimated that 30 to 40 percent of the reservoir was covered by thick undergrowth or water and could not be surveyed at the 15-meter interval (Figs.3 – 7). Those areas were inspected by following equestrian, bike, or foot paths as appropriate. No unrecorded historic or prehistoric sites were observed during the pedestrian survey of the Devil's Gate Reservoir.

SECTION 7.0 – CONCLUSION

The inventory of the Devil's Gate Reservoir interior basin did not result in the discovery of any new cultural resources. The survey surface area consisted of accumulated sediments and debris originating farther upstream in Arroyo Seco. Geotech borings related to this Project have indicated that most of the Project area is modern fill. It is not anticipated that any archaeological sites, historic or prehistoric, would exist in this context; therefore, monitoring is not recommended. However, if cleanout activities exceed the depth of the historic flood deposits and encounter native sediments, monitoring is recommended. In the event this occurs and historic or prehistoric materials are observed, the excavation activities in proximity to the discovery should be diverted until a qualified archaeologist evaluates the discovery. In the event human remains are discovered, all work in the area must be halted until the County Coroner identifies the remains and makes recommendations regarding their appropriate treatment.

The above tasks and recommendations should be adequate to meet the undertaking requirements pursuant to Section 15064.5 of the State CEQA Guidelines, with respect to the identification and preservation of historic resources, and also in accordance with Section 106 of the National Historic Preservation Act of 1966, as amended (16 U.S.C. 470f and 470h-2), and its implementing regulations (36 CFR 800.4), as well as the 2004 Programmatic Agreement among the Federal Highway Administration, the Advisory Council on Historic Preservation, and the California State Historic Preservation Officer, regarding compliance with Section 106 of the National Historic Preservation Act (PA).

Figure 3. Example of Areas Not Surveyed.

Figure 4. Typical Equestrian Pathway Used to Access Portions of the Reservoir.

Figure 5. Typical Pedestrian Path Used to Access Portions of the Reservoir.

Figure 6. One of Several Areas Under Water.

Figure 7. Recently Deposited Channel Sediments.

SECTION 8.0 – REFERENCES CITED

Bean, Lowell J. and Charles R. Smith

1978 Gabrielino. In *Handbook of North American Indians, Volume 8, California,* pp. 538-549. Edited by R.F. Heizer. William C. Sturtevant, general editor. Smithsonian Institution, Washington, D.C.

Blackburn, Thomas C. and Lowell John Bean

1978 Kitanemuk. In the *Handbook of North American Indians*, Volume 8, California. Edited by R.F. Heizer, pp. 564-569. Smithsonian Institution, Washington D.C.

Blodgett, Leslie M.

1987 Preliminary Assessment of the Prehistoric Cultural Resources of the Devil's Gate Reservoir, Pasadena, California. Manuscript L-1903 on file at the South Central Coastal Information Center, California State University, Fullerton, California.

Castillo, Edward D.

1978 The Impact of Euro-American Exploration and Settlement. In *Handbook of North American Indians, Volume 8, California,* edited by R.F. Heizer, pp. 99-127. William C. Sturtevant, general editor. Smithsonian Institution, Washington, D.C.

City of Pasadena.

1994 City of Pasadena General Plan.

Cleland, Robert G.

1941 *The Cattle on a Thousand Hills: Southern California, 1850-1870*. Huntington Library, San Marino, California

Erlandson, Jon M.

1994 Early Hunter-Gatherers of the California Coast. Plenum Press, New York.

Kroeber, A. L.

1925 *Handbook of the Indians of California.* Smithsonian, Bureau of American Ethnology Bulletin 78, Washington D.C.

Mason, R.D. and M. L. Peterson

1994 *Newport Coast Archaeological Project, Newport Coast settlement Systems: Analysis and Discussion*. Vol. 1 Report on file at the South Central Coastal Archaeological Information Center, California State University, Fullerton.

McCawley, William
1996 *The First Angelinos: the Gabrielino Indians of Los Angeles.* Malki Museum Press, Morongo Indian Reservation, Banning, California.

McKenna *et al*.
2001. *A Phase I Cultural Resources Investigation of the Parker and Johnson Property in La Cañada Flintridge Area*, *Los Angeles County*, *California*, September.

McWilliams, Carey
1973 *Southern California: An Island on the Land.* Peregrine Smith, Santa Barbara and Salt Lake City.

Miller, Bruce W.
1991 *Gabrielino*. Sand River Press, Los Osos, California.

Moratto, Michael J.
1984 *California Archaeology*. Academic Press, Inc., New York.

Robinson, Mark C., Nina M. Harris, and Carrie Chasteen
2003 Report of Cultural Resources Survey and Bridge Evaluations for Road and Bridge Maintenance at Seven Locations in the Angeles National Forest Los Angeles County, California. ARR#05-01-00817 on file at the USDA Forest Service, Angeles National Forest, Arcadia, California.

Sriro, Adam
2002 Archaeological Survey Report Jarvis 12KV Distribution Line Pole Replacement Project East Fork, Branch San Gabriel River, USDA Angeles National Forest Los Angeles County, California. Manuscript #6795 on file at the South Central Coastal Information Center. California State University, Fullerton, California.

Strong, W. D.
1929 Aboriginal society in southern California. In *Publications in American Archaeology and Ethnology 26 (1): 1-358.* University of California.

Vance, Darrell
2002 Archaeological Reconnaissance Report Short Form. East Fork & Shoemaker Roads, Angeles National Forest, Los Angeles County, California. San Gabriel River Ranger District, Angeles National Forest. FS# 05-01-01018. USDA Forest Service, Angeles National Forest, Arcadia, California. Also, manuscript #8222 on file at the South Central Coastal Information Center. California State University, Fullerton, California.

Vane, Sylvia B., William McCawley, and Harry Lawton (Editors)
1996 *The First Angelinos: The Gabrielino Indians of Los Angeles*. Malki Museum Press.

APPENDIX A

Native American Heritage Commission Request Letter

Native American Heritage Commission Response Letter

Native American Notification Letters

Native American Response Letter

Native American Heritage Commission Request Letter Update

Native American Notification Letter Update

Chambers Group, Inc.
5 Hutton Centre Drive
Suite 750
Santa Ana, California 92707
949.261.5414
714.545.2255 (fax)

June 24, 2011 (revised August 11, 2011)

Mr. Dave Singleton
Associate Governmental Program Analyst
Native American Heritage Commission
915 Capitol Mall, Room 364
Sacramento, CA 95814

Subject: **Record Search Request for the Devil's Gate Reservoir, Pasadena, CA**

Dear Mr. Singleton:

We are requesting on behalf of our client that a review of the Sacred Lands Inventory be conducted for the Devil's Gate Reservoir, Pasadena, California. The Reservoir may be found in an unsurveyed portion of the U.S. Geological Survey 7.5 Minute Pasadena, CA topographic quadrangle sheet. The reservoir is located immediately north of the 210 Freeway on the Arroyo Seco River. A copy of this quadrangle sheet identifying the location of the reservoir is attached for your use.

The Los Angeles Department of Public Works is proposing to remove excess sediments from the basin of the reservoir to ensure proper dam and reservoir function. Excavations are expected to occur entirely in sedimentation resulting from storm event in the foothills and mountains upstream from the dam.

Along with the Sacred Lands file review, please also identify any recognized Native American groups or representatives to contact for consultation regarding the proposed project.

For correspondence, please use our project number 20346. If you have any questions regarding this request, please contact me at (949) 261-5414 x7228.

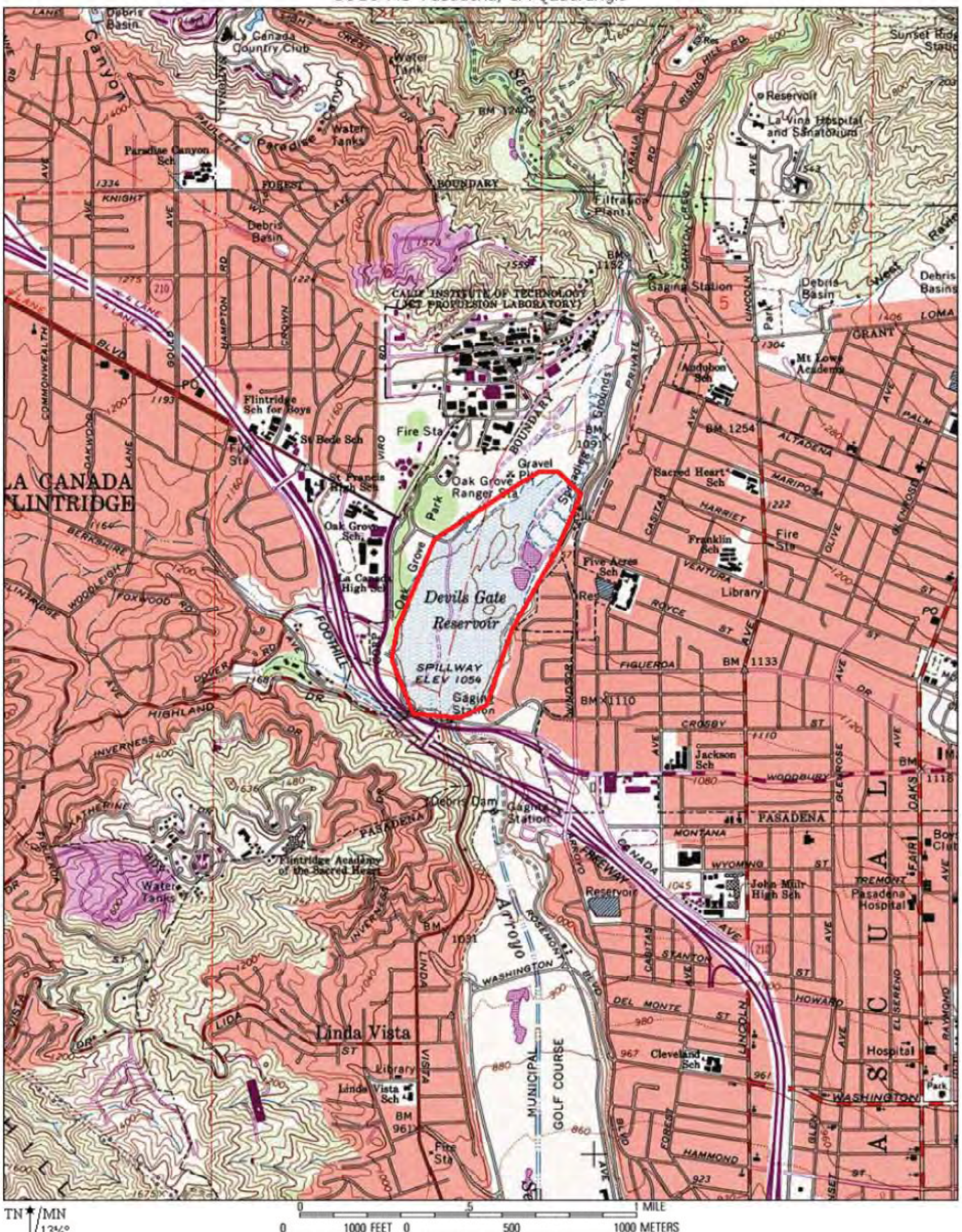
Sincerely,

CHAMBERS GROUP, INC.

David M. Smith.
Project Manager, Cultural Resources

Attachment: USGS 7.5 Pasadena, CA Topographical Map

USGS 7.5' Pasadena, CA Quadrangle



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STATE OF CALIFORNIA Edmund G. Brown, Jr., Governor

NATIVE AMERICAN HERITAGE COMMISSION
915 CAPITOL MALL, ROOM 364
SACRAMENTO, CA 95814
(916) 653-6251
Fax (916) 657-5390
Web Site www.nahc.ca.gov
ds_nahc@pacbell.net

June 28, 2011

Mr. David M. Smith, Project Manager, Cultural Resources

Chambers Group, Inc.
5 Hutton Centre Drive, Suite 750
Santa Ana, CA 92707

Sent by FAX to: 714-545-2255
No. of Pages: 4

Re: Sacred Lands File Search and Native American Contacts list for the **"Proposed Devil's Gate Reservoir Project;"** located in Pasadena; Los Angeles County, California

Dear Mr. Smith:

The Native American Heritage Commission (NAHC) conducted a Sacred Lands File search of the 'area of potential effect,' (APE) based on the USGS coordinates provided and found **Native American cultural resources were not identified** in the USGS coordinates you specified. Also, please note; the NAHC Sacred Lands Inventory is not exhaustive. Native American cultural resources may be inadvertently discovered during ground breaking activity.

The California Environmental Quality Act (CEQA – CA Public Resources Code §§ 21000-21177, amendments effective 3/18/2010) requires that any project that causes a substantial adverse change in the significance of an historical resource, that includes archaeological resources, is a 'significant effect' requiring the preparation of an Environmental Impact Report (EIR) per the CEQA Guidelines defines a significant impact on the environment as 'a substantial, or potentially substantial, adverse change in any of physical conditions within an area affected by the proposed project, including ...objects of historic or aesthetic significance." In order to comply with this provision, the lead agency is required to assess whether the project will have an adverse impact on these resources within the 'area of potential effect (APE), and if so, to mitigate that effect. CA Government Code §65040.12(e) defines "environmental justice" provisions and is applicable to the environmental review processes.

Early consultation, even during Initial Study or First Phase surveys with Native American tribes in your area is the best way to avoid unanticipated discoveries once a project is underway. Local Native Americans may have knowledge of the religious and cultural significance of the historic properties of the proposed project for the area (e.g. APE). Consultation with Native American communities is also a matter of environmental justice as defined by California Government Code §65040.12(e). We urge consultation with those tribes and interested Native Americans on the list of Native American Contacts we attach to this letter in order to see if your proposed project might impact Native American cultural resources. Lead agencies should consider avoidance as defined in §15370 of the CEQA Guidelines when significant cultural resources as defined by the CEQA Guidelines §15064.5 (b)(c)(f) may be affected by a proposed project. If so, Section 15382 of the CEQA Guidelines defines a

significant impact on the environment as "substantial," and Section 2183.2 which requires documentation, data recovery of cultural resources.

Partnering with local tribes and interested Native American consulting parties, on the NAHC list, should be conducted in compliance with the requirements of federal NEPA (42 U.S.C 4321-43351) and Section 106 4(f), Section 110 (f)(k) of federal NHPA (16 U.S.C. 470 *et seq*), 36 CFR Part 800.3 (f) (2) & .5, the President's Council on Environmental Quality (CSQ, 42 U.S.C 4371 *et seq.* and NAGPRA (25 U.S.C. 3001-3013) as appropriate. The 1992 *Secretary of the Interiors Standards for the Treatment of Historic Properties* were revised so that they could be applied to all historic resource types included in the National Register of Historic Places and including cultural landscapes. Also, federal Executive Orders Nos. 11593 (preservation of cultural environment), 13175 (coordination & consultation) and 13007 (Sacred Sites) are helpful, supportive guides for Section 106 consultation.

Also, California Public Resources Code Section 5097.98, California Government Code §27491 and Health & Safety Code Section 7050.5 provide for provisions for accidentally discovered archeological resources during construction and mandate the processes to be followed in the event of an accidental discovery of any human remains in a project location other than a 'dedicated cemetery', another important reason to have Native American Monitors on board with the project.

To be effective, consultation on specific projects must be the result of an ongoing relationship between Native American tribes and lead agencies, project proponents and their contractors, in the opinion of the NAHC. An excellent way to reinforce the relationship between a project and local tribes is to employ Native American Monitors in all phases of proposed projects including the planning phases.

Confidentiality of "historic properties of religious and cultural significance" may also be protected under Section 304 of he NHPA or at the Secretary of the Interior discretion if not eligible for listing on the National Register of Historic Places. The Secretary may also be advised by the federal Indian Religious Freedom Act (cf. 42 U.S.C., 1996) in issuing a decision on whether or not to disclose items of religious and/or cultural significance identified in or near the APE and possibility threatened by proposed project activity.

If you have any questions about this response to your request, please do not hesitate to contact me at (916) 653-6251.

Sincerely,

Dave Singleton
Program Analyst

Attachment: Native American Contact List

California Native American Contact List
Los Angeles County
June 28, 2011

LA City/County Native American Indian Comm
Ron Andrade, Director
3175 West 6th St, Rm. 403
Los Angeles , CA 90020
randrade@css.lacounty.gov
(213) 351-5324
(213) 386-3995 FAX

Gabrielino Tongva Nation
Sam Dunlap, Chairperson
P.O. Box 86908 Gabrielino Tongva
Los Angeles , CA 90086
samdunlap@earthlink.net

(909) 262-9351 - cell

Ti'At Society/Inter-Tribal Council of Pimu
Cindi M. Alvitre, Chairwoman-Manisar
3098 Mace Avenue, Aapt. D Gabrielino
Costa Mesa, , CA 92626
calvitre@yahoo.com
(714) 504-2468 Cell

Gabrielino Tongva Indians of California Tribal Council
Robert F. Dorame, Tribal Chair/Cultural Resources
P.O. Box 490 Gabrielino Tongva
Bellflower , CA 90707
gtongva@verizon.net
562-761-6417 - voice
562-761-6417- fax

Tongva Ancestral Territorial Tribal Nation
John Tommy Rosas, Tribal Admin.
Private Address Gabrielino Tongva
,
tattnlaw@gmail.com
310-570-6567

Gabrielino-Tongva Tribe
Bernie Acuna
1875 Century Pk East #1500 Gabrielino
Los Angeles , CA 90067
(760) 721-0371-work
(310) 428-7720 - cell
(310) 587-0170 - FAX
bacuna1@gabrieinotribe.org

Gabrieleno/Tongva San Gabriel Band of Mission
Anthony Morales, Chairperson
PO Box 693 Gabrielino Tongva
San Gabriel , CA 91778
GTTribalcouncil@aol.com
(626) 286-1632
(626) 286-1758 - Home
(626) 286-1262 -FAX

Shoshoneon Gabrieleno Band of Mission Indians
Andy Salas, Chairperson
PO Box 393 Gabrieleno
Covina , CA 91723
(626) 926-4131
gabrielenoindians@yahoo.com
(213) 688-0181 - FAX

This list is current only as of the date of this document.
Distribution of this list does not relieve any person of the statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources for the proposed Devil's Gate Reservoir Project; located in Pasadena; Los Angeles County, California for which a Sacred Lands File search and Native American Contacts list were requested.

California Native American Contact List
Los Angeles County
June 28, 2011

Gabrielino-Tongva Tribe
Linda Candelaria, Chairwoman
1875 Century Park East, Suite 1500
Los Angeles , CA 90067 Gabrielino
lcandelaria1@gabrielinoTribe.org
626-676-1184- cell
(310) 587-0170 - FAX
760-904-6533-home

This list is current only as of the date of this document.
Distribution of this list does not relieve any person of the statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

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Chambers Group®
Solving Environmental Challenges

August 22, 2011
(*20346*)

Ron Andrade, Director
LA City/County Native American Indian Commission
3175 West 6th St., Rm 403
Los Angeles, CA 90020
randrade@css.lacounty.gov

Subject: Request for Information Regarding Cultural Resources

Dear Ron:

Chambers Group, Inc. has been retained to provide a Phase I Cultural Resources Inventory for The Devil's Gate Reservoir, Pasadena, California.

The Reservoir may be found in an unsurveyed portion of the U.S. Geological Survey 7.5 Minute Pasadena, CA topographic quadrangle sheet. The reservoir is located immediately north of the 210 Freeway on the Arroyo Seco River.

We have contacted Mr. David Singleton of the Native American Heritage Commission and he has no record of cultural resources on the project area in the Sacred Lands File. He provided to us a list of tribes affiliated with the area and recommended we contact each person on the list for additional information regarding cultural resources in the vicinity of the project area.

If you have knowledge of sensitive resources in or near the proposed project location that could be impacted by construction activities we would appreciate any information you can provide. Also, if you have any questions or concerns regarding the proposed project, please feel free to contact me directly at (949) 261-5414.

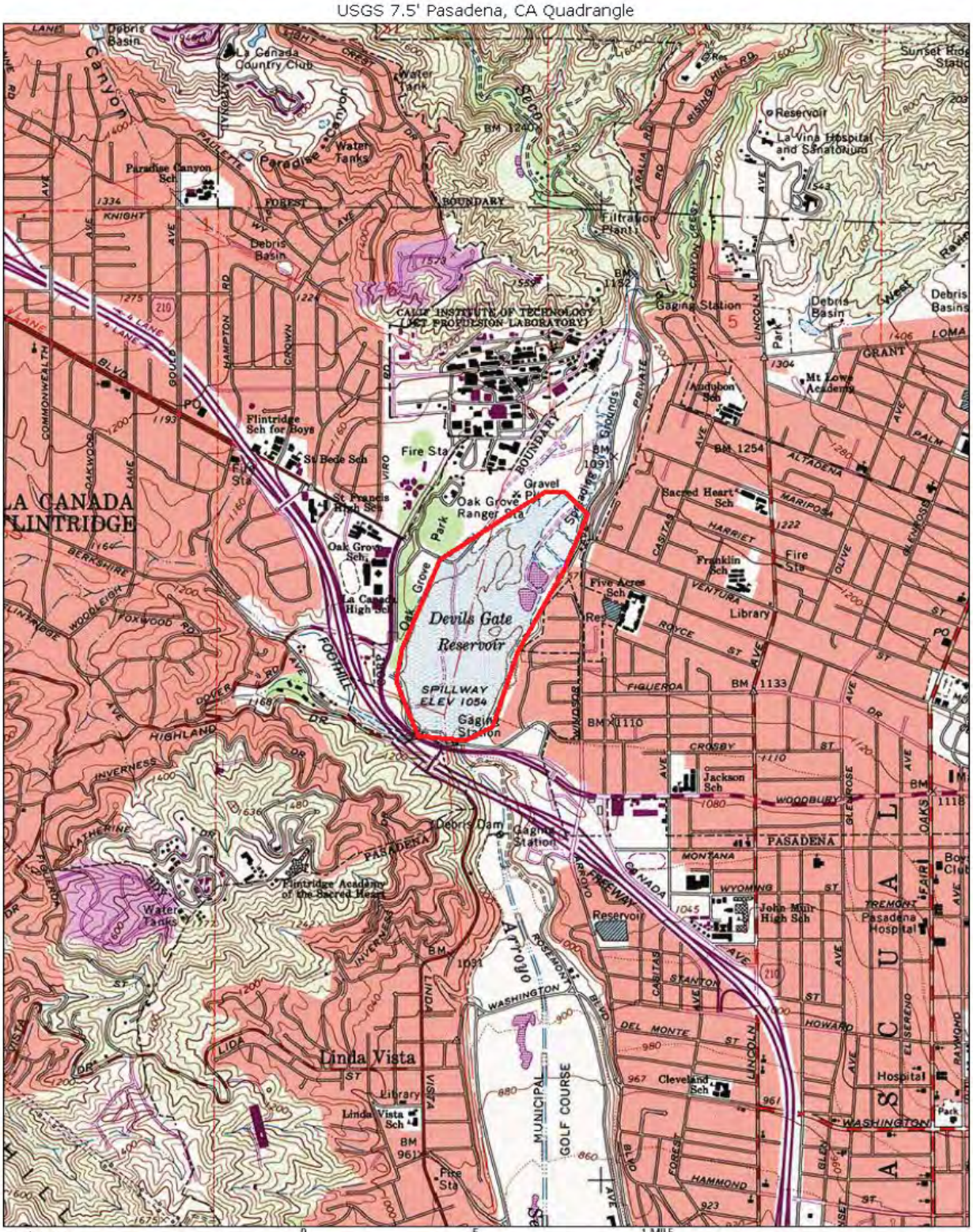
Sincerely,

CHAMBERS GROUP, INC.

David M. Smith
Project Manager, Cultural Resources

Attachments – Project Vicinity Map

USGS 7.5' Pasadena, CA Quadrangle



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Solving Environmental Challenges

August 22, 2011
(*20346*)

Sam Dunlap, Chairperson
Gabrielino Tongva Nation
PO Box 86908
Los Angeles, CA 90086
samdunlap@earthlink.net

Subject: Request for Information Regarding Cultural Resources

Dear Sam:

Chambers Group, Inc. has been retained to provide a Phase I Cultural Resources Inventory for The Devil's Gate Reservoir, Pasadena, California.

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Project Manager, Cultural Resources

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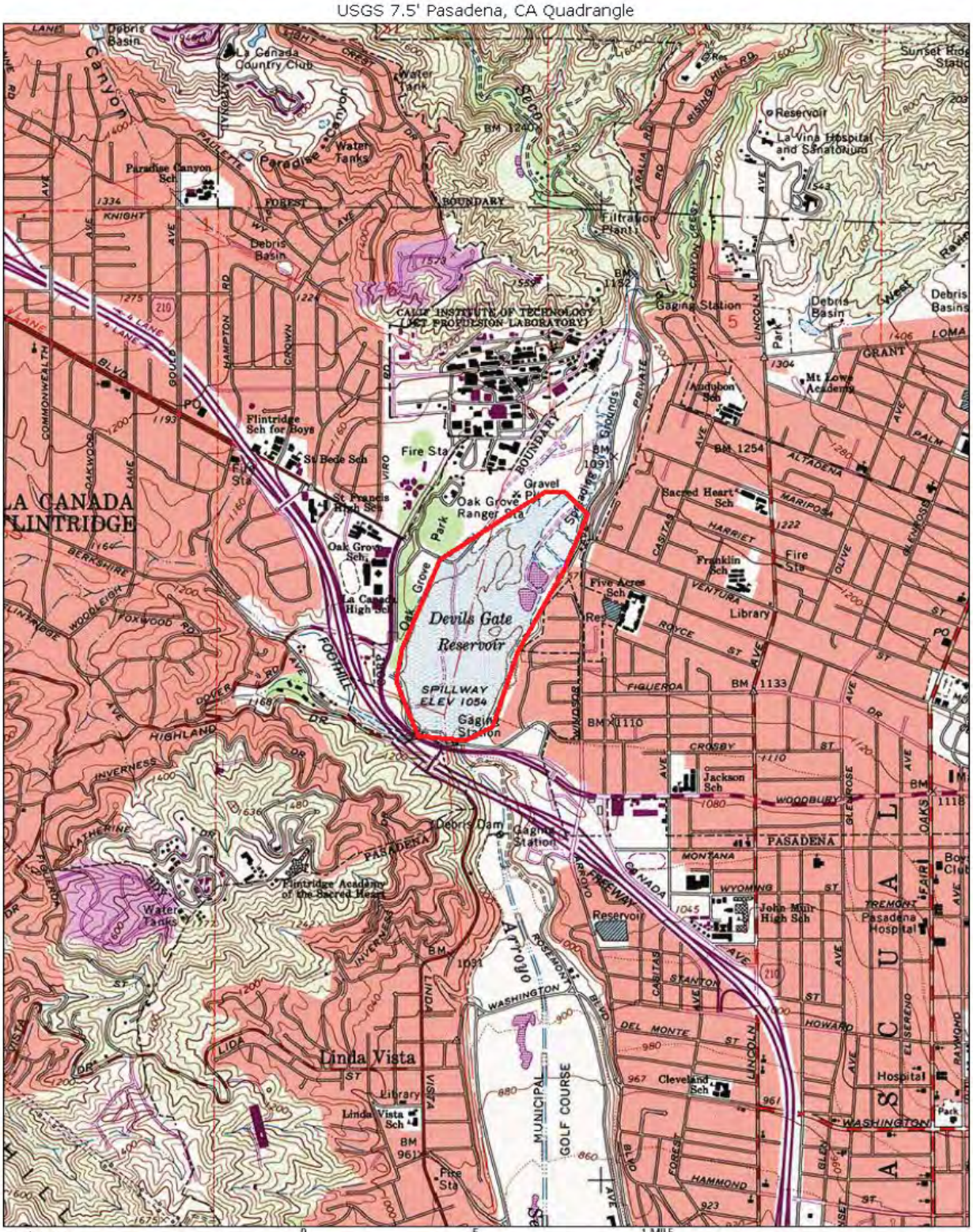

August 22, 2011
(*20346*)

Cindi Alvitre, Chairwoman
Ti'At Society/Inter-Tribal Council of Pimu
3098 Mace Ave, Apt. D
Costa Mesa, CA 92626
calvitre@yahoo.com

Subject: Request for Information Regarding Cultural Resources

Dear Cindi:

Chambers Group, Inc. has been retained to provide a Phase I Cultural Resources Inventory for The Devil's Gate Reservoir, Pasadena, California.

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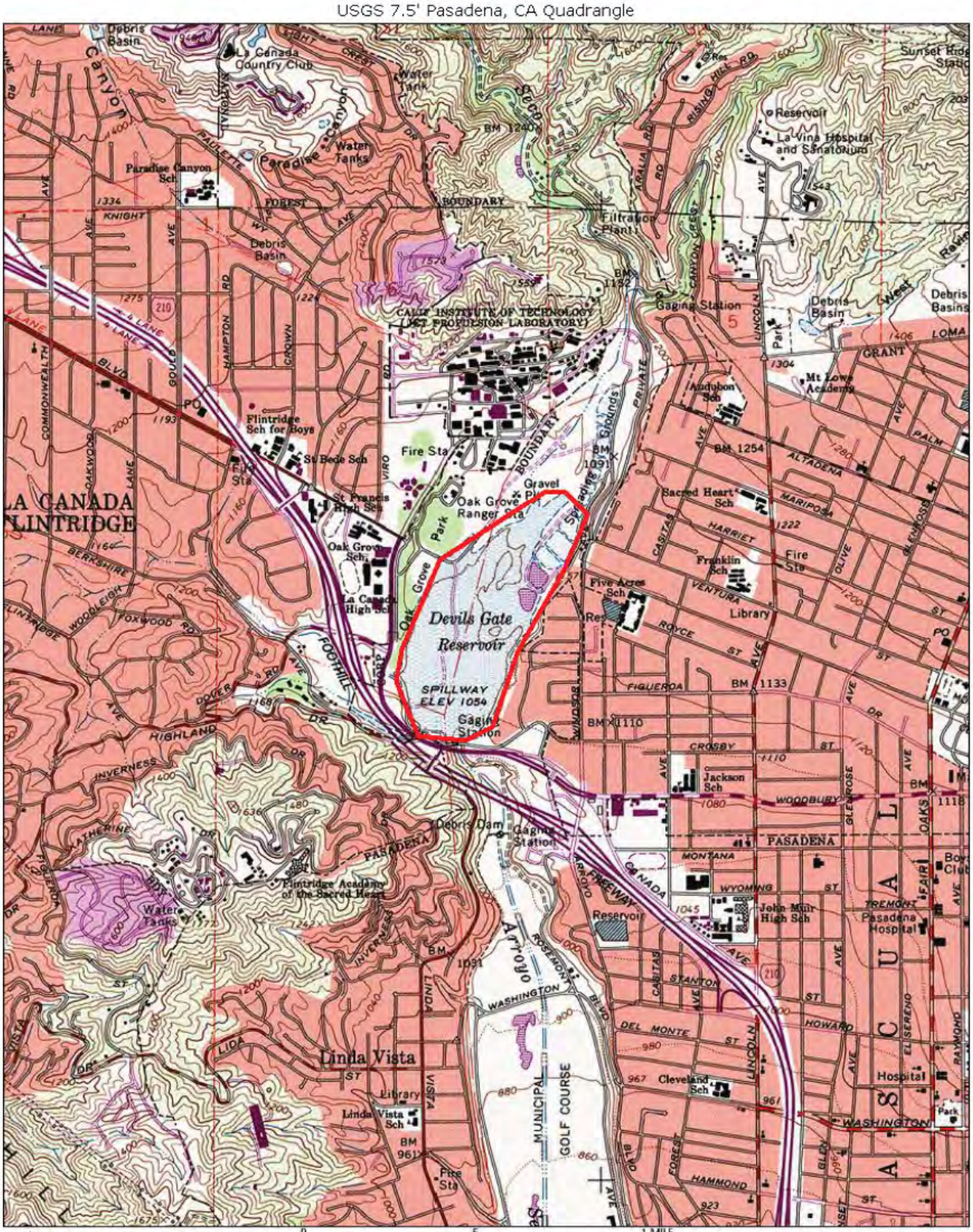

August 22, 2011
(*20346*)

Robert Dorame, Tribal Chair, Cultural Resources
Gabrielino Tongva Indians of California Tribal Council
PO Box 490
Bellflower, CA 90707
gtongva@verizon.net

Subject: Request for Information Regarding Cultural Resources

Dear Robert:

Chambers Group, Inc. has been retained to provide a Phase I Cultural Resources Inventory for The Devil's Gate Reservoir, Pasadena, California.

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Project Manager, Cultural Resources

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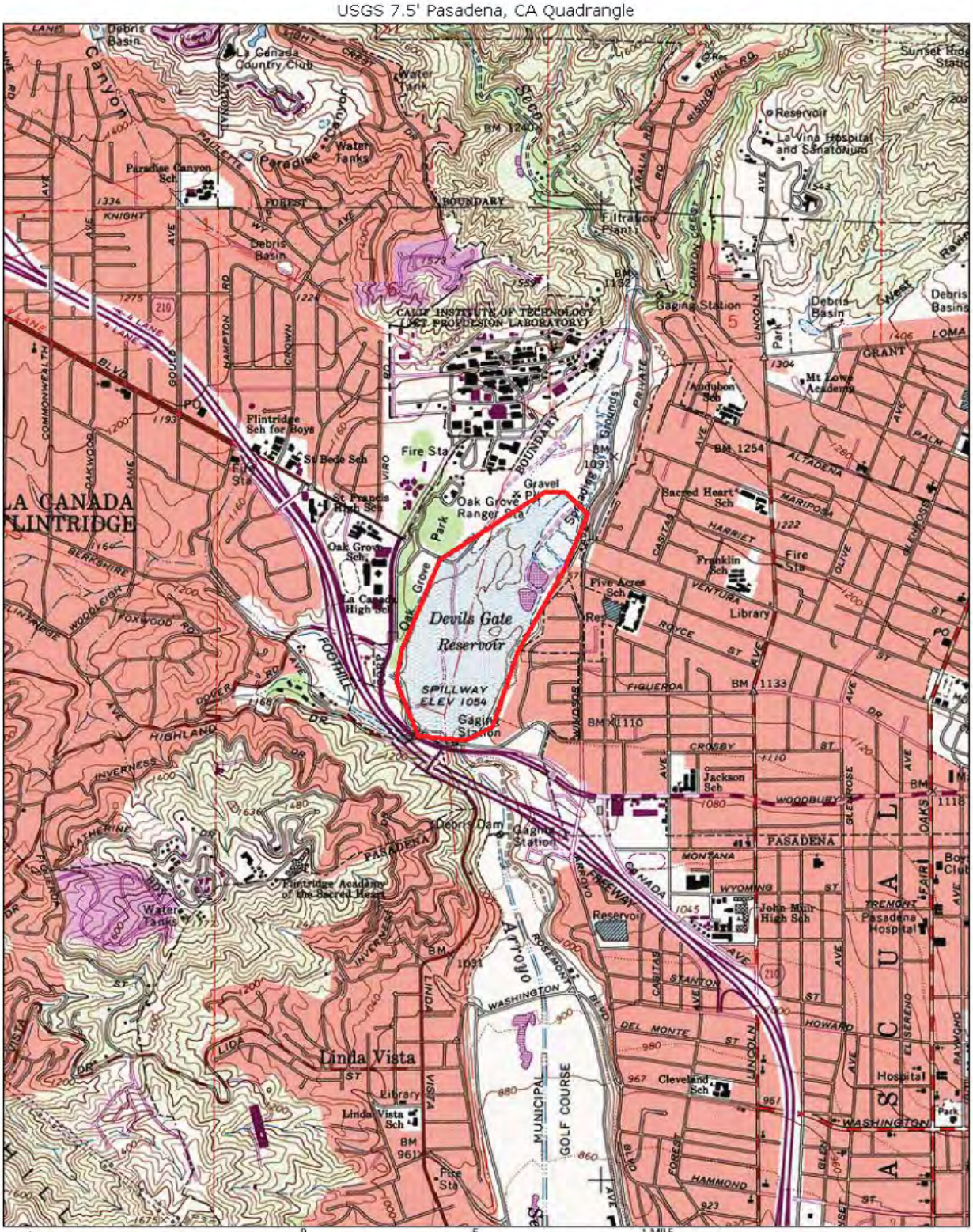

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August 22, 2011
(*20346*)

John Rosas, Tribal Admin.
Tongva Ancestral Territorial Nation
tattnlaw@gmail.com

Subject: Request for Information Regarding Cultural Resources

Dear John:

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Project Manager, Cultural Resources

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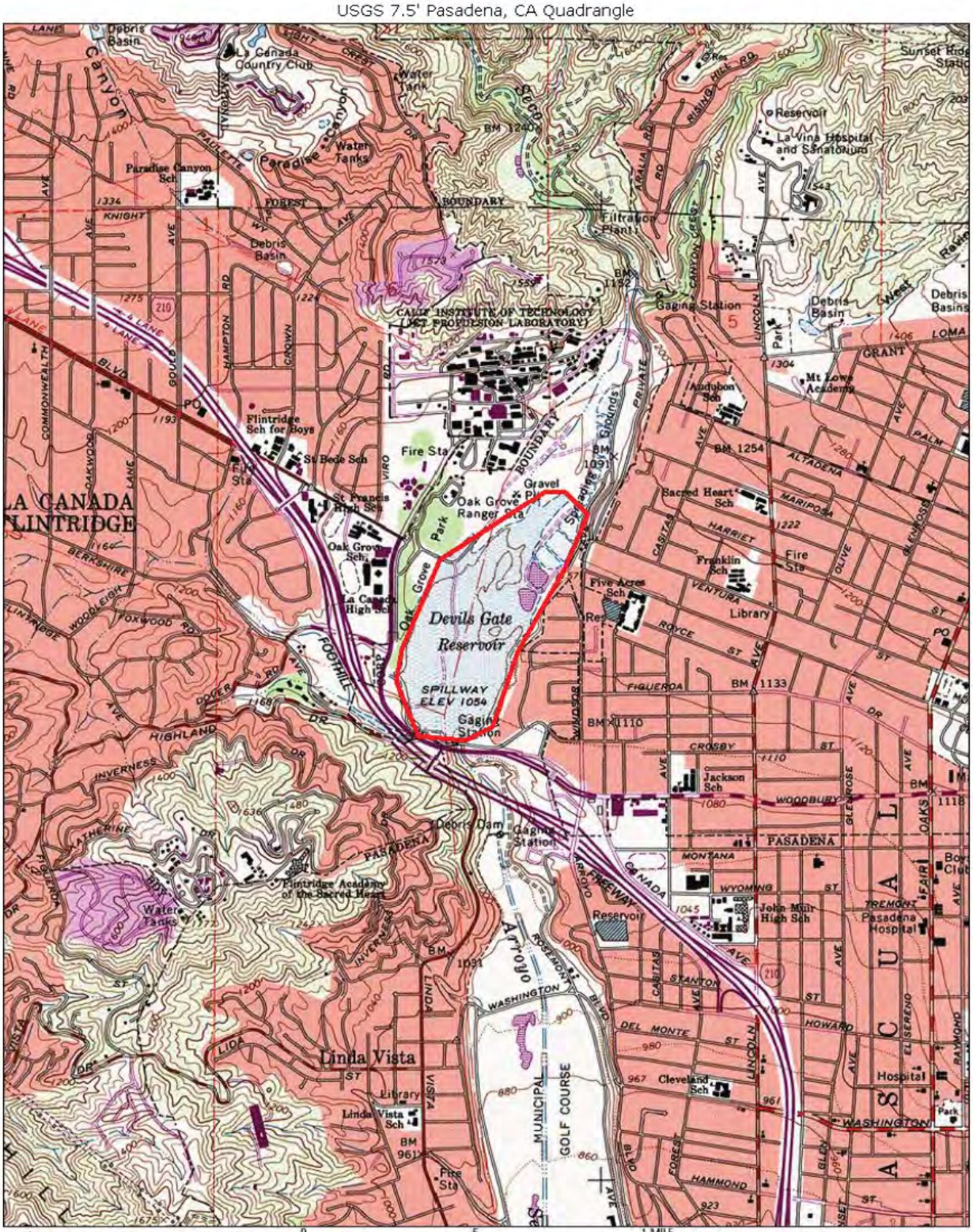

August 22, 2011
(*20346*)

Bernie Acuna
Gabrielino-Tongva Tribe
1875 Century Pk East #1500
Los Angeles, CA 90067
bacuna1@gabrielinotribe.org

Subject: Request for Information Regarding Cultural Resources

Dear Bernie:

Chambers Group, Inc. has been retained to provide a Phase I Cultural Resources Inventory for The Devil's Gate Reservoir, Pasadena, California.

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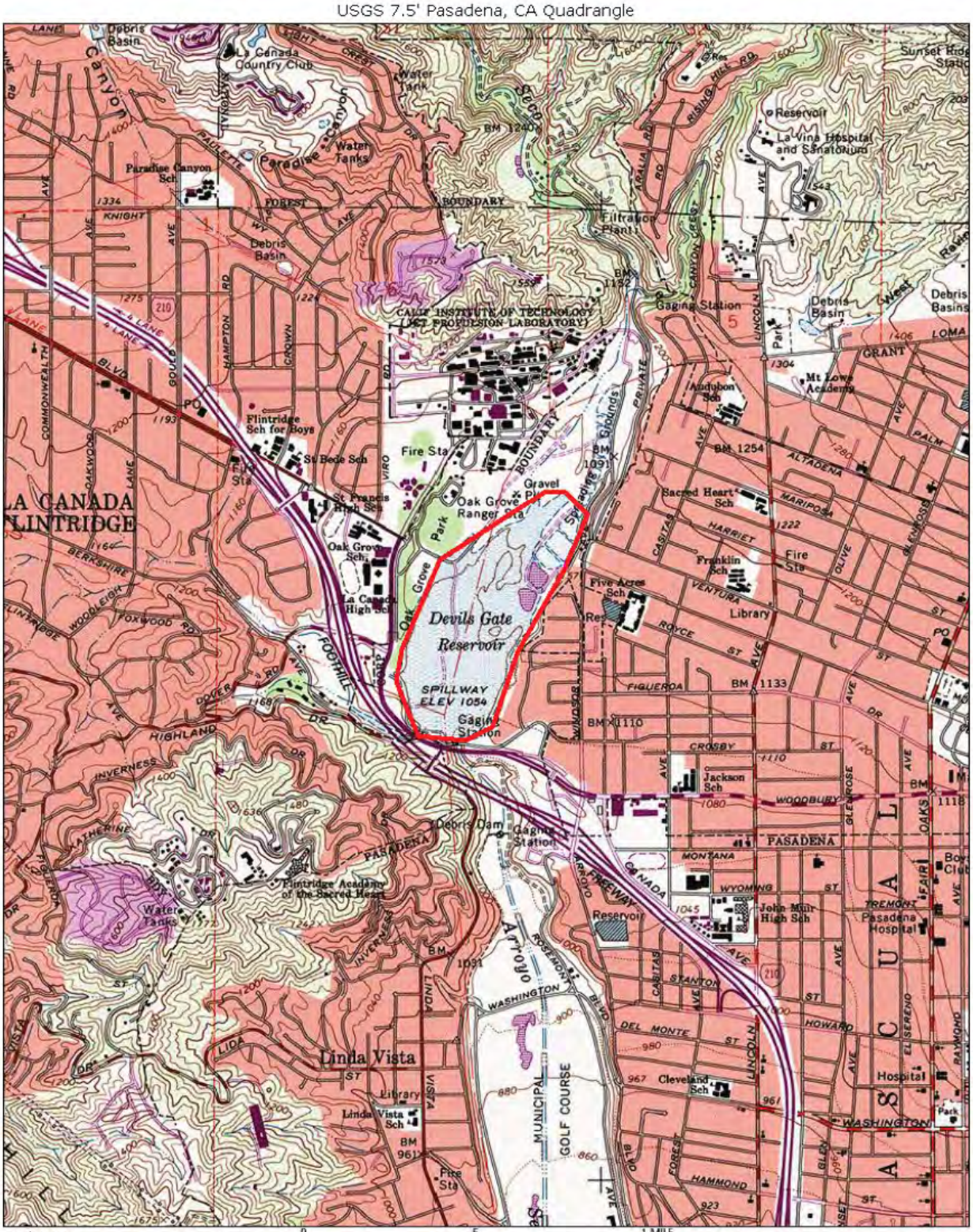

Chambers Group®
Solving Environmental Challenges

August 22, 2011
(*20346*)

Anthony Morales, Chairperson
Gabrielino/Tongva San Gabriel Band of Mission Indians
PO Box 693
San Gabriel, CA 91778
GTTribalcouncil@aol.com

Subject: Request for Information Regarding Cultural Resources

Dear Anthony:

Chambers Group, Inc. has been retained to provide a Phase I Cultural Resources Inventory for The Devil's Gate Reservoir, Pasadena, California.

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Project Manager, Cultural Resources

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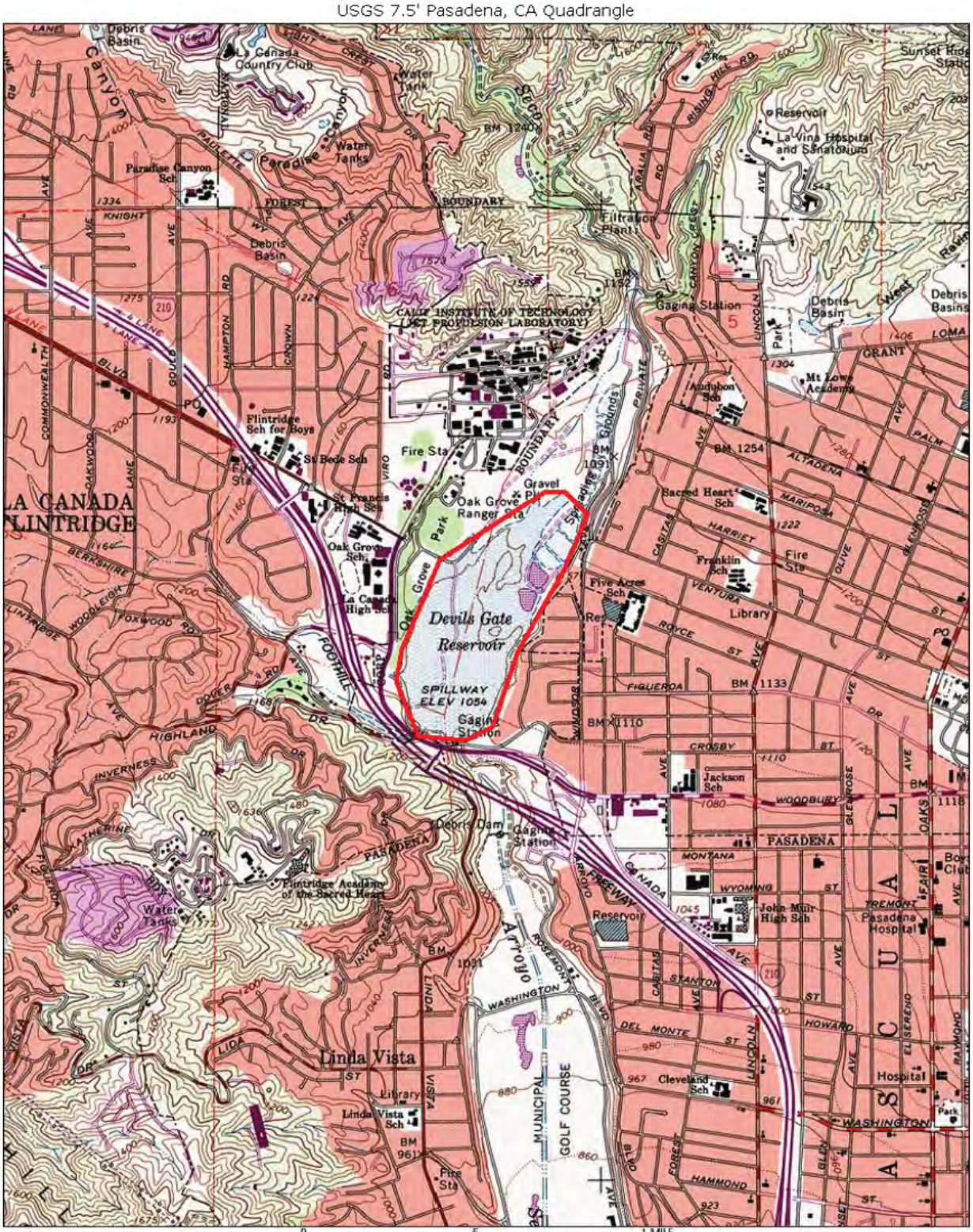

Chambers Group®
Solving Environmental Challenges

August 22, 2011
(*20346*)

Andy Salas, Chairperson
Shoshoneon Gabrieleno Band of Mission Indians
PO Box 393
Covina, CA 91723
gabrielenoindians@yahoo.com

Subject: Request for Information Regarding Cultural Resources

Dear Andy:

Chambers Group, Inc. has been retained to provide a Phase I Cultural Resources Inventory for The Devil's Gate Reservoir, Pasadena, California.

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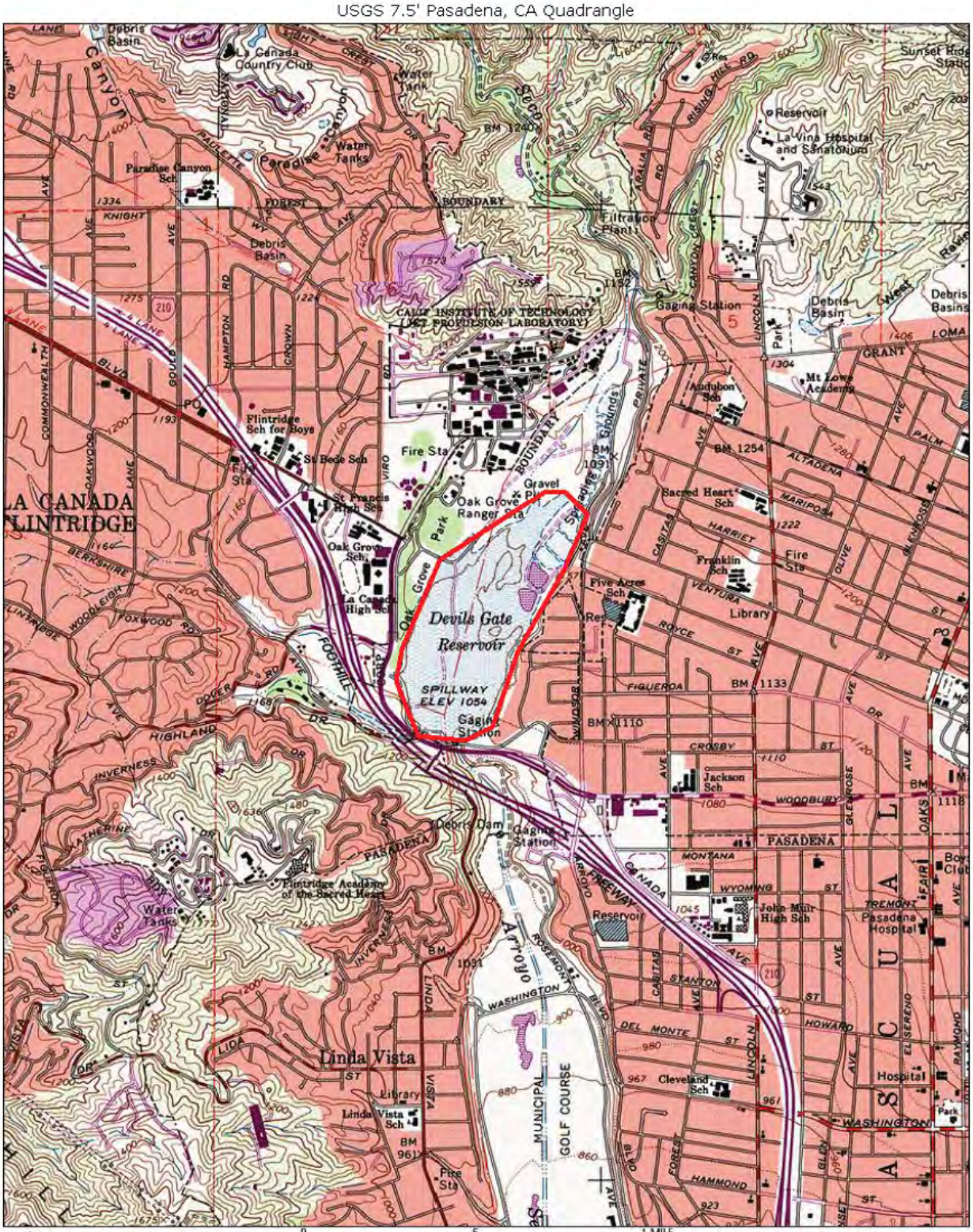
David M. Smith
Project Manager, Cultural Resources

Attachments – Project Vicinity Map

USGS 7.5' Pasadena, CA Quadrangle



Chambers Group®
Solving Environmental Challenges

August 22, 2011
(*20346*)

Linda Candelaria, Chairwoman
Gabrielino-Tongva Tribe
1875 Century Pk East #1500
Los Angeles, CA 90067
lcandelaria1@gabreielinoTribe.org

Subject: Request for Information Regarding Cultural Resources

Dear Linda:

Chambers Group, Inc. has been retained to provide a Phase I Cultural Resources Inventory for The Devil's Gate Reservoir, Pasadena, California.

The Reservoir may be found in an unsurveyed portion of the U.S. Geological Survey 7.5 Minute Pasadena, CA topographic quadrangle sheet. The reservoir is located immediately north of the 210 Freeway on the Arroyo Seco River.

We have contacted Mr. David Singleton of the Native American Heritage Commission and he has no record of cultural resources on the project area in the Sacred Lands File. He provided to us a list of tribes affiliated with the area and recommended we contact each person on the list for additional information regarding cultural resources in the vicinity of the project area.

If you have knowledge of sensitive resources in or near the proposed project location that could be impacted by construction activities we would appreciate any information you can provide. Also, if you have any questions or concerns regarding the proposed project, please feel free to contact me directly at (949) 261-5414.

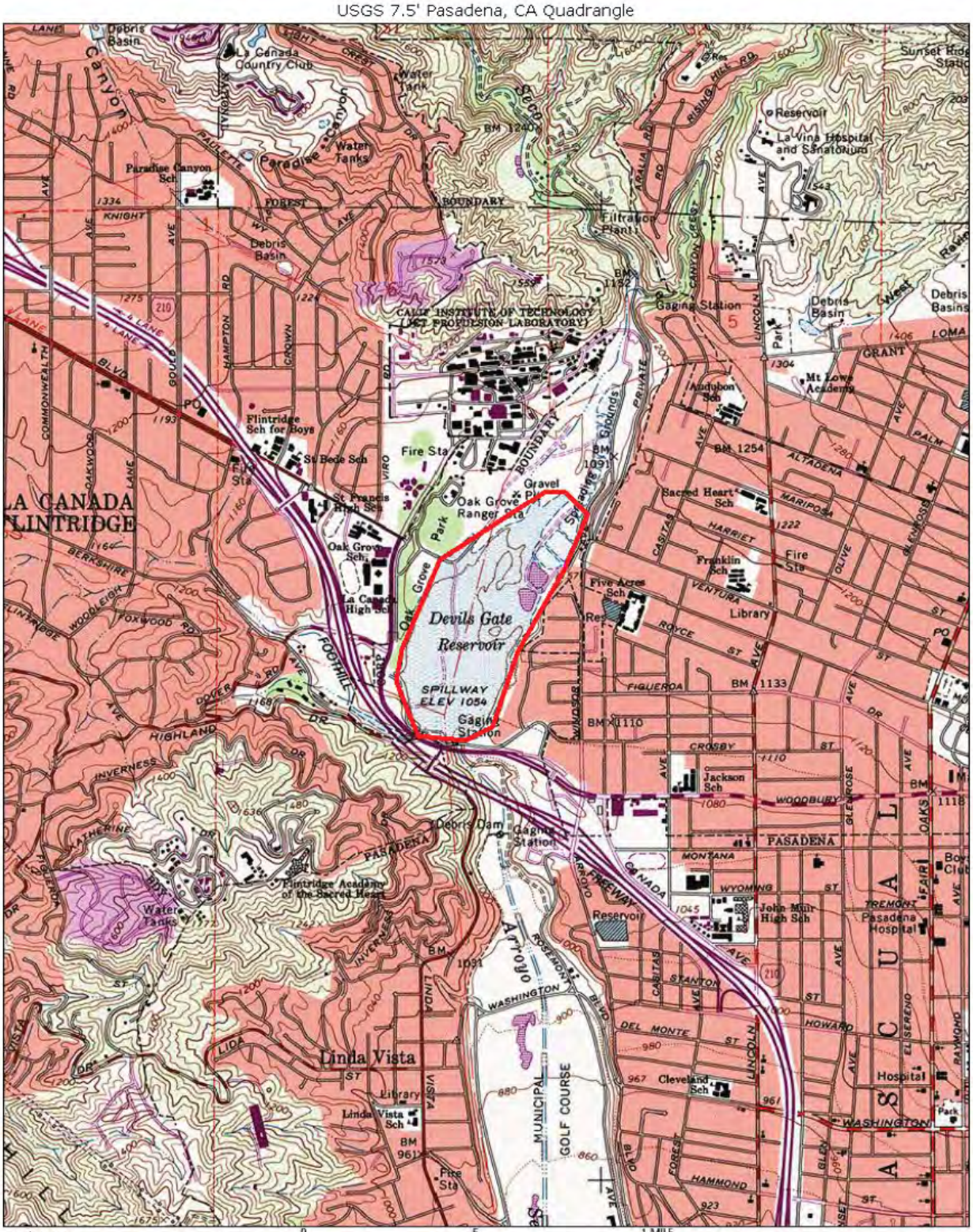
Sincerely,

CHAMBERS GROUP, INC.

David M. Smith
Project Manager, Cultural Resources

Attachments – Project Vicinity Map

USGS 7.5' Pasadena, CA Quadrangle



Andrew Salas
Chairman

Nadine Salas
Vice-Chairman

Christina Swindall-Martinez
Secretary

Albert Perez
Treasurer I

Martha Gonzalez-Lemos
Treasurer II

Albert Acuna, Jr
Chairman of the
Council of Elders

Ernest P. Salas Tautimez
Chief and Spiritual Leader

RECEIVED
AUG 30 2011

GABRIELEÑO BAND OF MISSION INDIANS
Historically known as The San Gabriel Band of Mission Indians
recognized by the State of California as the aboriginal tribe of the Los Angeles basin

Chambers Group
5 Hutton Center Dr, Suite 750
Santa Ana, CA 92707

Dear Mr. Smith,

Thank you so much for contacting us regarding the proposed Devil's Gate Reservoir project. The site in question is considered very culturally sensitive by our Elder Committee and Tribal historians. The area of Devil's Gate Reservoir and Hahamongna Watershed Park were once inhabited by Gabrieleno Indians living in the villages of Haramonknga, Hahamongna, and Povomeparngna. We also have documents from the historic Huntington Library that detail a massacre of Gabrieleno Indians in this area. In order to protect our resources, we are requesting one of our experienced & certified Native American monitors to be on site during all ground disturbances. It is interesting that your letter comes within a short amount of time of us contacting the agencies involved in the Hahamongna Watershed Park Master Plan. I have included that letter for your review as well. We assume you are affiliated?

It is odd to us that the NAHC did not state the cultural sensitivity of the site. I speaking with Mr. Singleton last week about the Hahamongna project, he confirmed to us directly that the Arroyo Seco area was in fact considered culturally sensitive by his agency. We wonder if he was not aware of the proximity of Devil's Gate Reservoir to Hahamongna Watershed Park. In either event, when the NAHC states there are "no records of sacred sites" in the subject area; they always refer the contractors back to the Native American Tribes whose tribal territory the project area is in. This is due to the fact, that the NAHC is only aware of general information on each California Native American Tribe they are not the "experts" on our Tribe. Our Elder Committee & Tribal historians are the experts and are the reason why the NAHC will always refer contractors to the local tribes. Please contact our office regarding this project to coordinate a Native American monitor to be present.

Sincerely,
Christina Swindall Martz
Christina Swindall Martinez
Gabrieleno Band of Mission Indians, secretary

July 12, 2013
Project # 20346

Mr. Dave Singleton
Associate Governmental Program Analyst
Native American Heritage Commission
915 Capitol Mall, Room 364
Sacramento, CA 95814

SUBJECT: RECORD SEARCH REQUEST FOR THE DEVIL'S GATE RESERVOIR, PASADENA, CA

Dear Mr. Singleton,

Chambers Group is requesting a review of the Sacred Lands Inventory be conducted for a study of the Devil's Gate Reservoir, Pasadena, California. A similar request was last made in June 2011, however, the project area has since been updated. This update of the project boundary includes a small portion of the reservoir not included with the previous request. The Project may be found in an un-surveyed portion of the U.S. Geological Survey 7.5 Minute Pasadena, CA topographic quadrangle sheet. The reservoir is located immediately north of the 210 Freeway on the Arroyo Seco River.

The Los Angeles Department of Public Works is proposing to remove excess sediments from the basin of the reservoir to ensure proper dam and reservoir function. Excavations are expected to occur entirely in the sedimentation resulting from storm events in the foothills and mountains upstream from the dam. Disturbances to native soils below these sediment deposits are not anticipated.

A topographic map (1:24,000 scale) identifying the updated project location is also attached for your review. Also attached is the list your office had previously provided of groups and/or representatives Chambers Group should contact regarding the project. We request that an updated list be sent, if any changes to the attached list are required.

Thank you for honoring this request. For correspondence, please use our project number 20463. If you have any questions regarding this request, please contact me at (949) 261-5414 ext.7261.

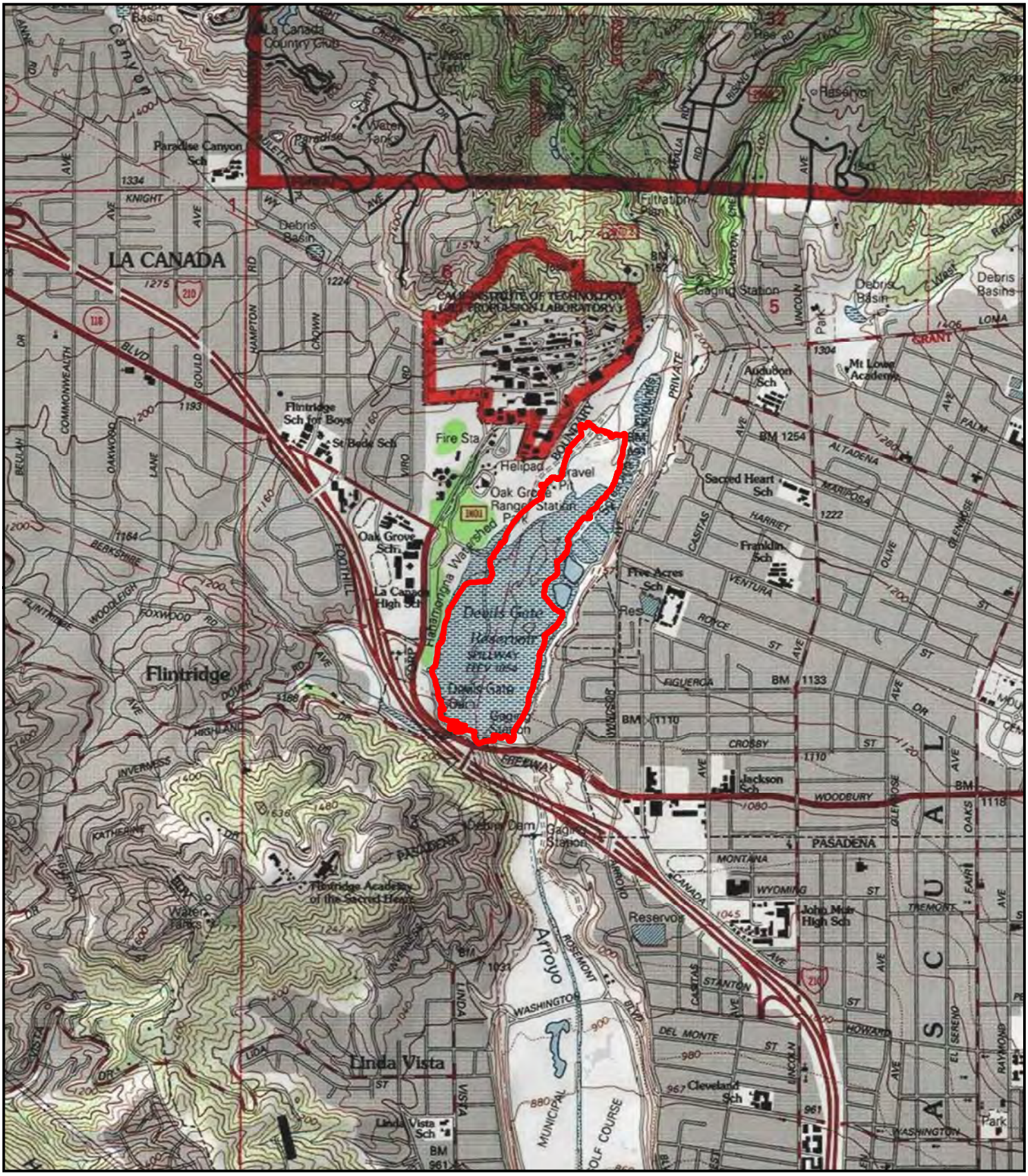
Sincerely,

Wayne Bischoff

Wayne Bischoff, PhD.
Director of Cultural Resources
CHAMBERS GROUP, INC.

Enclosure
- Topographic (1:24,000) Map
- California Native American Contact List

SANTA ANA LOS ANGELES REDLANDS SAN DIEGO EL CENTRO RENO
CORPORATE OFFICE 5 Hutton Centre Drive, Suite 750 | Santa Ana, California 92707
t | 949.261.5414 f | 714.545.2255 w | www.chambersgroupinc.com



Devil's Gate Reservoir Sediment Removal and Management Project
Project Location Map

Version Date: 7/10/2013

CHAMBERS GROUP

Sources: Copyright:© 2013 National Geographic Society, i-cubed

STATE OF CALIFORNIA Edmund G. Brown, Jr., Governor

NATIVE AMERICAN HERITAGE COMMISSION
1550 Harbor Boulevard, Suite 100
West Sacramento, CA 95691
(916) 373-3715
Fax (916) 373-5471
www.nahc.ca.gov
e-mail: ds_nahc@pacbell.net

July 18, 2013

Dr. Wayne Bischoff, Ph.D., Director of Cultural Resources
CHAMBERS GROUP, INC.
5 Hutton Centre Drive, Suite 750
Santa Ana, CA 92707

Sent by FAX to: 714-545-2255
No. of Pages: 4

Re: Request for Sacred Lands File Search and Native American Contacts list for the **"Devil's Gate Reservoir, Pasadena, CA Project;"** located Pasadena; Los Angeles County, California

Dear Dr. Bischoff:

A record search of the NAHC Sacred Lands File failed to indicate the presence of Native American traditional cultural place(s) in the project site submitted, based on the USGS coordinates submitted as part of the 'Area of Potential Effect. (APE).' However, there are Native American cultural resources in close proximity but outside the APE. Also, note that the NAHC SLF Inventory is not exhaustive; therefore, the absence of archaeological or Native American sacred places does not preclude their existence. Other data sources for Native American sacred places/sites should also be contacted. A Native American tribe of individual may be the only sources of presence of traditional cultural places or sites.

In the 1985 Appellate Court decision (170 Cal App 3rd 604; *EPIC v. Johnson*), the Court held that the NAHC has jurisdiction and special expertise, as a state agency, over affected Native American resources impacted by proposed projects, including archaeological places of religious significance to Native Americans, and to Native American burial sites.

Attached is a list of Native American tribes, individuals/organization who may have knowledge of cultural resources in or near the project area. As part of the consultation process, the NAHC recommends that local governments and project developers contact the tribal governments and individuals to determine if any cultural places might be impacted by the proposed action. If a response is not received in two weeks of notification the NAHC requests that a follow telephone call be made to ensure that the project information has been received.

If you have any questions or need additional information, please contact me at (916) 373-3715.

Sincerely,

Dave Singleton
Program Analyst

Attachment

Native American Contacts
Los Angeles County
July 18, 2013

LA City/County Native American Indian Comm
Ron Andrade, Director
3175 West 6th St, Rm. 403
Los Angeles , CA 90020
randrade@css.lacounty.gov
(213) 351-5324
(213) 386-3995 FAX

Gabrielino Tongva Nation
Sam Dunlap, Cultural Resources Director
P.O. Box 86908 Gabrielino Tongva
Los Angeles , CA 90086
samdunlap@earthlink.net

(909) 262-9351 - cell

Ti'At Society/Inter-Tribal Council of Pimu
Cindi M. Alvitre, Chairwoman-Manisar
3094 Mace Avenue, Apt. B Gabrielino
Costa Mesa, , CA 92626
calvitre@yahoo.com
(714) 504-2468 Cell

Gabrielino Tongva Indians of California Tribal Council
Robert F. Dorame, Tribal Chair/Cultural Resources
P.O. Box 490 Gabrielino Tongva
Bellflower , CA 90707
gtongva@verizon.net
562-761-6417 - voice
562-761-6417- fax

Tongva Ancestral Territorial Tribal Nation
John Tommy Rosas, Tribal Admin.
Private Address Gabrielino Tongva

tattnlaw@gmail.com
310-570-6567

Gabrielino-Tongva Tribe
Bernie Acuna, Co-Chairperson
P.O. Box 180 Gabrielino
Bonsall , CA 92003
(619) 294-6660-work
(310) 428-5690 - cell
(760) 636-0854- FAX
bacuna1@gabrielinotribe.org

Gabrieleno/Tongva San Gabriel Band of Mission
Anthony Morales, Chairperson
PO Box 693 Gabrielino Tongva
San Gabriel , CA 91778
GTTribalcouncil@aol.com
(626) 286-1632
(626) 286-1758 - Home
(626) 286-1262 -FAX

Gabrielino-Tongva Tribe
Linda Candelaria, Co-Chairperson
P.O. Box 180 Gabrielino
Bonsall , CA 92003
palmsprings9@yahoo.com
626-676-1184- cell
(760) 636-0854 - FAX

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of the statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources for the proposed Devil's Gate Reservoir Project; located in the Pasadena area; Los Angeles County, California for which a Sacred Lands File search and Native American Contacts list were requested.

Native American Contacts
Los Angeles County
July 18, 2013

Gabrieleno Band of Mission Indians
Andrew Salas, Chairperson
P.O. Box 393 Gabrielino
Covina , CA 91723
gabrielenoindians@yahoo.
(626) 926-4131

Gabrielino-Tongva Tribe
Conrad Acuna,
P.O. Box 180 Gabrielino
Bonsall , CA 92003

760-636-0854 - FAX

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of the statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources for the proposed **Devil's Gate Reservoir Project; located in the Pasadena area; Los Angeles County, California for which a Sacred Lands File search and Native American Contacts list were requested.**

MESSAGE RECORD

Project: Devil's Gate Reservoir Sediment Removal and Management Project

Date of call: 08-13-2013

Time of call: 10:15 AM

From: Robert Dormey

Affiliation: Gabrieleno Native Americans

Message:

I received a phone call from Robert Dormey with one of the Gabrieleno bands. He expressed his concerns as to Native American resources that he did not want to disclose being in the Devil's Gate footprint. He wanted to have access to the schedule for the EIR public review so he can express his concerns. His contact information is: gtongva@verizon.net and 562-761-6417.

MESSAGE RECORD

Project: Devil's Gate Reservoir Sediment Removal and Management Project

Date of email: 7-23-2013

Time of email: 1:41 PM

From: Andy Salas

Affiliation: Gabrieleno Native Americans

Message:

Dear Wayne Bischoff,PHD

This email is in response to your letter dated July 22, 2013 in regards to the above subject project #20346. The proposed project is within a very highly culturally sensitive area, the known Kizh village of "Hahamongna" is with in your proposed project site & has also been historically known to be the near the site where a great Kizh Gabrieleno Indian Massacre took place. In order to protect our resources we're requesting one of our experienced & certified Native American monitors to be on site during all ground disturbances.

In all cases, when the NAHC states there are "no records of sacred sites" in the subject area; they always refer the contractors back to the Native American Tribes whose tribal territory the project area is in. This is due to the fact, that the NAHC is only aware of general information on each California NA Tribe they are NOT the "experts" on our Tribe. Our Elder Committee & Tribal Historians are the experts and is the reason why the NAHC will always refer contractors to the local tribes.

Please contact our office regarding this project to coordinate a NA monitor to y be present.

Thank You

Sincerely,
Andy Salas

Chairman Of Gabrieleno Band Of Mission Indians/Kizh Tribe
Of the Los Angeles Basin, Orange county and the Channel islands.

MESSAGE RECORD

Project: Devil's Gate Reservoir Sediment Removal and Management Project

Date of email: 7-23-2013

Time of email: 2:53 PM

From: Unidentified (ARTZUN73)

Affiliation: Gabrieleno Native Americans

Message:

I Second This...This Is A Highly Sensastive Area....There Are Numerous Village Sites In The Immediate Area Along With The Site Of A Kizh Massacre....I Strongly Support 1 Or More Kizh/ Gabrieleno Monitors Be Present During All Phases Of Excavation (Including Hand Digging By Shovel)...Thank You

Sent from my Boost Mobile phone.

Gabrieleno

APPENDIX F – Geochemical & Geotechnical Exploration Report

FEASIBILITY-LEVEL GEOTECHNICAL AND GEOCHEMICAL EXPLORATION REPORT, DEVIL'S GATE RESERVOIR SEDIMENT REMOVAL AND MANAGEMENT PROJECT, PASADENA, CALIFORNIA

Prepared for:

Chambers Group

5 Hutton Drive, Suite 750
Santa Ana, California 92707

Project No. 603211-001

July 5, 2013

Leighton Consulting, Inc.
A LEIGHTON GROUP COMPANY

Leighton Consulting, Inc.
A LEIGHTON GROUP COMPANY

July 5, 2013

Project No. 603211-001

Chambers Group, Inc.
5 Hutton Centre Drive, Suite 750
Santa Ana, California 92707

Attention: Ms. Paula Fell

Subject: Feasibility-Level Geotechnical and Geochemical Exploration Report
Devil's Gate Reservoir Sediment Removal and Management Project
Pasadena, California

Leighton Consulting, Inc. (Leighton) is pleased to submit this feasibility-level report discussing our geotechnical and environmental assessment of soil conditions encountered at the Devil's Gate Reservoir located in Pasadena, California. The purpose of the assessment is to evaluate geologic and geotechnical conditions in, and adjacent to the Devil's Gate Reservoir Sediment Removal and Management Project area. Our assessment also included analyzing soil samples to evaluate potential contaminants of concern associated with post-fire sediments contained in the Devil's Gate Reservoir that will be removed to restore flood control capacity and reconfigure the reservoir.

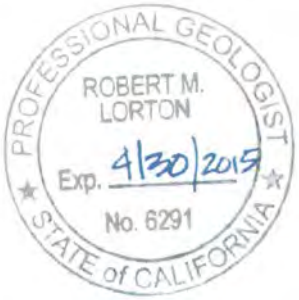
Our scope of work included a limited subsurface exploration and both geotechnical and environmental laboratory testing. The goal of our exploration was to obtain sufficient data and information to assess subsoil conditions and environmental factors that may affect the site and surrounding properties during the removal of up to 4,000,000 cubic yards of soil from the Devil's Gate Reservoir. This assessment will be used to support the preparation of an Environmental Impact Report (EIR) in accordance with the California Environmental Quality Act (CEQA).

We appreciate the opportunity to be of service to you on this project. If you have any questions or if we can be of further assistance, please call us at your convenience.

Respectfully submitted,

LEIGHTON CONSULTING, INC.

Wallace Sconiers, Jr.
Senior Staff Geologist



Robert Lorton, PG 6291
Associate Geologist

Lauren J. Doyel, PE, GE 2981
Principal Engineer

WBS/RML/LJD/lr

Distribution: (1) Addressee

Leighton

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1.0 INTRODUCTION

The Devil's Gate Reservoir Sediment Removal and Management Project is located in the City of Pasadena, in Los Angeles County approximately 14 miles north of downtown Los Angeles (see Figure 1, Site Location Map). The City of La Canada Flintridge and the community of Altadena are located near the project site to the west and east, respectively.

1.1 Site Information

Devil's Gate Dam and Reservoir was built in 1920 to provide flood protection to the Cities of Pasadena, South Pasadena, and Los Angeles and to facilitate water conservation. The City of Pasadena is the landowner of the project site, and the Los Angeles County Flood Control District (LACFCD) holds an inundation easement granting LACFCD the right to construct, reconstruct, inspect, maintain, repair and operate the dam, spillway, reservoir and other support structures for the purposes of flood protection and water conservation. The project is being undertaken in order to restore reservoir capacity to the facility to meet its intended level of flood protection for downstream communities.

1.2 Scope of Work

The purpose of this assessment is to evaluate geologic and geotechnical conditions in, and adjacent to the Devil's Gate Reservoir Sediment Removal and Management Project area. Our assessment also included analyzing soil samples to evaluate potential contaminants of concern associated with post-fire sediments contained in the Devil's Gate Reservoir that will be removed to restore flood control capacity and reconfigure the reservoir.

The goal of our exploration was to obtain sufficient data and information to assess subsoil conditions and environmental factors that may affect the site and surrounding properties during the removal of up to 4,000,000 cubic yards of soil from the Devil's Gate Reservoir. This assessment will be used to support the preparation of an Environmental Impact Report (EIR) in accordance with the California Environmental Quality Act (CEQA).

Our scope of work included a limited subsurface investigation, geotechnical and environmental laboratory testing, and a review of published literature and maps documenting the geologic features in, and adjacent to the project area. Our scope of work included the following tasks:

- Meeting with Chambers Group, Inc. and the LACFCD to develop a Work Plan and to clarify and allocate the responsibilities of the involved parties.
- Perform a subsurface investigation consisting of four hollow-stem auger borings to verify the nature and stratigraphy of the subsurface soils, and to determine the extent of fire related sediment deposited in the wash.
- Submit representative soil samples obtained from the site to a California Department of Health Services certified environmental laboratory to analyze potential contaminants of concern in the sediments.
- Conduct geotechnical laboratory testing of representative soil samples obtained from the site to assess pertinent physical/engineering properties.
- Prepare this report to present our findings, conclusions and recommendations.

2.0 FIELD EXPLORATION AND LABORATORY TESTING

2.1 Field Exploration

Our field exploration was performed on September 19th through 20th, 2011 and consisted of four hollow-stem auger borings. Nine boring locations were proposed for sampling after the initial site visit on July 3, 2011. Boring locations B-1, B-3, B-4, and B-9 were advanced to a maximum depth of 31½ feet below ground surface (bgs). Proposed boring locations B-2, B-5, B-6, B-7, and B-8 were not accessible to the drill rig and were not completed. The drilling activities were supervised, and the subsurface soil conditions were logged, by a Leighton geologist. The approximate locations of the boreholes are shown on Figure 2, Boring Location Map.

Two brass sleeves were collected with a California-Modified split-spoon sampler from each sampling interval for chemical analyses, and grab samples were collected from cuttings produced by the hollow-stem auger for geotechnical laboratory observation and testing. The depths that the samples were collected are illustrated on the Geotechnical Boring Logs that are included in Appendix B. The following sections summarize sampling procedures for analysis of both geotechnical and environmental sample sets.

2.2 Geotechnical Laboratory Testing

Representative samples of the onsite soils were classified using the following tests:

- In-situ moisture content (ASTM D2216);
- Particle size analyses (ASTM D422 and ASTM D6913); and
- Atterberg Limits (ASTM D4318).

The results of the in-situ moisture tests are shown on the Geotechnical Boring Logs in Appendix B. Results of other laboratory tests are presented in Appendix C, Geotechnical Testing Results.

2.3 Environmental Laboratory Testing

Chemical analyses were performed on selected soil samples obtained during our field exploration. The laboratory testing scheme was designed to evaluate the presence and concentrations of regulated contaminants of concern in the soil samples collected from the project area. Tests performed during this exploration include:

- Title 22 Metals by EPA Method 6010B and 7471A
- Organochlorine pesticides by EPA Method 8081
- Semi-volatile organic compounds (SVOCs) by EPA Method 8270C
- Total petroleum hydrocarbons (TPH) for Fuel Fingerprint by LUFT/FFP method
- Polychlorinated biphenyls (PCBs) by EPA Method 8082
- Volatile organic compounds (VOCs) by EPA Method 8260
- Perchlorate by EPA Method 314.0

Each environmental sample was collected using a limited access hollow-stem auger drill rig by advancing a California-Modified split spoon sampler 18-inches into the soil ahead of the auger. Once the sample was collected, the sampler was retracted from the boring, opened, and the sample sleeves were removed by Leighton personnel. Two 6-inch long brass sleeves containing the soil from the desired interval were removed from the sampler, sealed with Teflon and covered with plastic end-caps. The sample was labeled with the sample ID, the sampler's initials, date and time collected, and placed into a cooler with ice. The samples were picked up by courier and transported under Chain-of-Custody protocol to BC Laboratories, a State of California-Certified laboratory, for chemical analysis. The laboratory reports and the test results are summarized in Tables D1 through D3 presented in Appendix D.

Soil remaining from each sampling interval was placed into an empty brass sleeve for volatilized organic compound analysis using a photoionization detector (PID). The sleeve was filled approximately half-way with soil and sealed with end caps. The sample was agitated, a hole was punctured into one of the end caps, and the tip of the PID was inserted into "headspace" of the sample tube. The concentration of total VOCs were measured in parts per million (ppm); the

readings were recorded on the Geotechnical Boring Logs at the interval that the sample was collected.

3.0 GEOLOGIC SETTING

3.1 Site Geology

The project site is located in the Devil's Gate Reservoir in the City of Pasadena. The site lies within an alluvial wash bounded to the north by the San Gabriel Mountains, to the south by the San Rafael Hills, and to the west and east sides by the La Canada Valley (CDMG, 1986). The site is topographically lower than the surrounding alluvial valley on the west and east sides, and is underlain by Quaternary age alluvium derived from the San Gabriel Mountains. The alluvium consists of silts, sands and gravel deposited by the Arroyo Seco (CDMG, 1998) as shown in Figure 3, Regional Geology Map.

3.2 Local Geologic Units and Subsurface Conditions

Presented below are brief descriptions of the geologic units encountered in the exploratory borings completed during the subsurface investigation at the site. All materials encountered in the exploratory borings are consistent with local geologic conditions depicted in both the Geology of the North Half of the Pasadena Quadrangle map, by Drew P. Smith, 1986, and the Geologic Map of the Pasadena Quadrangle, by Thomas W. Dibblee, Jr., 1989. Figure 3 illustrates the distribution of geologic units at the site and surrounding areas, and more detailed descriptions of the geologic units encountered are presented on the boring logs in Appendix B.

3.2.1 Quaternary Alluvial Stream Channel Deposits: (Qg)

Quaternary-age alluvial stream channel deposits from the Arroyo Seco form the majority of the soils encountered from surface to the maximum depth explored of approximately 30 feet. Generally, the deposits consist of light to medium brown and gray well-graded sand with varying amounts of silt and gravel and silty sands. Downstream, olive gray sandy silt and silty sand with varied gravel content was encountered in shallow samples, and gray well-graded sand was encountered at depth.

3.2.2 Burn Sediments

Man-made materials including wire and plastic were observed in some samples and displayed evidence of having been burned. Burned material

was observed in samples collected from B-1, B-3, and B-9(borings). The thickness of sediments containing burned materials were approximately 3 feet thick in borings B-1 and B-3 and approximately 13½ feet thick in boring B-9. No burn sediments were observed in B-4.

The sediments containing the burned materials consist of well-graded sand with varied amounts of silt and gravel, silty sand, sandy silt with gravel, and silt and ranged in color from dark grayish brown or dark olive gray to black. Traces of organic material were also observed in some samples. The contacts between sediments containing burned material and underlying and overlying Qg were sharp and well defined.

3.3 Groundwater

The project site lies within the Raymond Basin, located between the San Fernando Valley Basin to the west and the San Gabriel Valley Basin to the east. The basin is bounded to the north and south by the San Gabriel Mountains and the Raymond Hill Fault, respectively (CDWR, 2004).

Groundwater was encountered at approximately 25¼ feet bgs in boring B-3, approximately 23 feet bgs in boring B-4, and approximately 22 feet bgs in boring B-9 following during drilling activities. Groundwater was not encountered in boring B-1.

Historical groundwater levels reported in the vicinity of the site have been reported to be approximately 20 feet bgs and are consistent with field measurements made during these drilling activities (CDMG, 1998).

4.0 GEOLOGIC-SEISMIC HAZARDS

4.1 Faulting

The site is located near the southern margin of the generally west-trending Transverse Ranges Geomorphic Province. Based on our review of the available literature, the site is not located within an Alquist-Priolo Earthquake Fault (AP) Zone. The closest active fault mapped within an AP Zone is the Raymond Hills fault which is located approximately 4.7 miles (7.5 kilometers) south of the Devil's Gate Dam.

The Tujunga Fault (AKA, Bridge Fault) transects the inlet to the reservoir at its northern boundary and is a portion of the Sierra Madre Fault Zone (Dibblee, 1989 and USGS, 1987). The Sierra Madre Fault Zone is an active system capable of producing an estimated 7.0 magnitude earthquake (SCEDC, 2011).

Other nearby faults include the south branch of the San Gabriel Fault located approximately 1.4 miles (2.1 kilometers) northeast of the inlet, and the Eagle Rock Fault located approximately 3.0 miles (4.8 kilometers) south of the Devil's Gate Dam. The regional fault map is shown in Figure 4.

Due to the nature of the project, fault rupture hazard is not considered to be a significant impact on the project.

4.2 Earthquake Ground Shaking

Seismic hazards that could affect the site include strong ground shaking resulting from an earthquake occurring along one of several major active faults in the region as mentioned above.

The site is likely to experience strong ground shaking. The magnitude of ground shaking is generally characterized by using the peak horizontal ground acceleration (pga_h). A probabilistic seismic hazard analysis was performed for the site using the United States Geological Survey (USGS) earthquake hazard program. (http://geohazards.usgs.gov/deaggint/2008/). The probabilistic seismic hazard analysis has taken into consideration the effects of the regional earthquake faults in southern California that includes the Tujunga Fault in the area. Based on the result of the deaggregation analysis, the calculated pga_h for the Maximum Considered Earthquake (MCE) was approximately 0.73g. The

design pga_h for the site can be taken as 2/3 of 0.73g (i.e., 0.48g). The magnitude and distance of the corresponding modal earthquake is 6.6 and 3.1 miles, respectively.

Due to the nature of the project, earthquake ground shaking is not considered to be a signification impact on the project.

4.3 Liquefaction

Liquefaction is the loss of soil strength or stiffness of cohesionless soil caused by the buildup of pore-water pressure during severe ground shaking. Liquefaction is associated primarily with loose (low density), saturated, fine- to medium-grained, cohesionless soils.

As shown in Figure 5, Seismic Hazard Map, the site is located in an area mapped as being susceptible to liquefaction on the Seismic Hazard Zones Map for the Pasadena Quadrangle (CDMG, 1999). Historic and measured groundwater levels indicate the site's susceptibility to liquefaction.

It is expected that the occurrence of liquefaction will be localized within recent sediment within the reservoir. Though the potential exists for liquefaction at the site, liquefaction potential will be reduced to less than significant after the sediment is removed.

4.4 Seismically-Induced Settlement

Strong ground motion during earthquakes tends to reduce the pore space between soil particles, thus causing ground settlement. This seismically-induced settlement consists of dynamic densification of non-liquefiable soils and settlement of liquefiable soil deposits. These settlements occur primarily within loose to moderately dense poorly-graded granular soils.

The occurrence of seismically-induced settlement is expected to be primarily in the recent sediment. The impact of seismically-induced settlement will be reduced to less than significant after the sediment is removed.

4.5 Lateral Spreading

Liquefaction may cause lateral spreading. For lateral spreading to occur, the liquefiable zone must be continuous, unconstrained laterally, and free to move along a gently sloping surface toward an unconfined area.

Based on the existing site conditions, liquefiable soil is present in the immediate vicinity of the reservoir. However, its impact on the proposed project is insignificant.

4.6 Flow Failure

Flow failure occurs when the liquefied soil and overlying soil layers move rapidly down a more steeply slope. Flow failure usually involves ground surface steeper than three degrees.

The occurrence of flow failure occurring at the site is also expected to be localized along the perimeter of the reservoir. However, its impact on the proposed project is insignificant.

4.7 Ground Oscillation

Ground oscillation is a phenomenon that forms ground cracks and ridges due to random vertical and lateral movements of broken blocks on non-liquefiable soils overlying liquefiable soil in response to earthquake. Ground oscillation usually occurs on relatively level ground surfaces where lateral spreading does not occur.

The occurrence of ground oscillation occurring at the site is expected to be localized. However, its impact on the proposed project is insignificant.

4.8 Seismically-Induced Landslides

The project site is not mapped as an area susceptible to seismically-induced landslides on the Seismic Hazard Zones Map for the Pasadena Quadrangle (CDMG, 1999).

4.9 Flooding

Earthquake-induced flooding can be caused by failure of dams or other water-retaining structures as a result of an earthquake. The project site itself can be identified as a potential source of downstream flooding as the result of a seismic event. The improvements completed in 1998 resulted in Devil's Gate Dam meeting current maximum credible earthquake design standards and probable maximum flood design standards.

Sediment accumulation can affect the ability of the outlet works (valves, gates and spillway) to function correctly or reduce available reservoir capacity below that necessary for flood control storage or to safely contain future sediment inflow including a Design Debris Event (DDE). The Design Debris Event is the predicted amount of sediment that will flow into the reservoir after the undeveloped portion of the tributary watershed is completely burned and a 50-year design storm event occurs after four years of watershed recovery. The 50-year design storm and the DDE are defined by the Los Angeles County Department of Public Works Hydrology and Sedimentation Manuals respectively. The DDE for the Devil's Gate Reservoir is approximately 2,000,000 cubic yards. The Interim Measures Project (IMP) is currently underway to reduce downstream flood risk.

The interim measures include dam modifications to keep debris from plugging the outlet works and allow for the removal of up to 25,000 cubic yards of sediment per year from the dam face until the project associated with the EIR is started. In 2011, 13,000 cubic yards were removed from the dam face and placed at Johnson Field, a decommissioned spreading basin located within the Devil's Gate Reservoir approximately 0.5 miles north of the Dam (LADPW, 2012).

4.10 Seiches and Tsunamis

Seiches are large waves generated in enclosed bodies of water in response to ground shaking. Tsunamis are waves generated in large bodies of water by fault displacement or major ground movement. Due to the inland location of the project site, the site is not located in an inundation or tsunami hazard area. Therefore, tsunami risks are considered to be negligible. The site itself, however, can be identified as a potential source for seiches as the result of a seismic event, however, this is not anticipated to affect the current project.

4.11 Expansive Soils

In general, the expansion potential is low for coarse-grained soils, such as sands, and high for fine-grained soils such as clay. Sediments observed in samples collected from the Devil's Gate Reservoir consist of granular materials and are not considered to have a significant potential for expansion.

4.12 Soil Erosion

Erosion includes transportation of soil materials by wind or water. Both coarse- and fine-grained soils are susceptible to erosion.

The potential for soil erosion is considerable given the nature of the proposed sediment removal at the site. Activities including the removal of vegetation, sediment, and the associated hauling and transport around and off the site can erode soil within the reservoir. Best Management Practices to control erosion should be used during project construction to control and minimize erosion.

4.13 Corrosive Soil

The corrosion potential of subsurface materials is generally characterized by pH, electrical resistivity, soluble sulfate content and chloride content. In general, the corrosion potential for concrete in direct contact with soil will be high for soils that are rich in sulfate. If the soils are rich in chloride, the corrosion potential will be high for metals. The lower the electrical resistivity of the soils, the higher the corrosion potential to buried ferrous metals.

Corrosive soil may be present at the site. Due to the nature of the project, its impact should be less than significant.

5.0 ENVIRONMENTAL HAZARD ANALYSIS ASSOCIATED WITH SITE SOILS

5.1 Summary of Environmental Laboratory Results

Low concentrations of organochlorine pesticides, petroleum hydrocarbons (diesel and hydraulic/motor oil range and aromatics), and one semi-volatile organic compound (*Bis(2-ethylhexyl)phthalate*) were detected in samples that were collected from the Devil's Gate Reservoir. Heavy metals were detected in all samples that were collected. The concentrations of analytes detected in laboratory analyses performed on samples collected from the Devil's Gate Reservoir project area are summarized in Tables D1 through D3, and copies of the laboratory reports are presented in Appendix D.

The concentration, or concentration ranges, of detected analytes are:

Organochlorine Pesticides

- 4,4'-DDE: Detected at a concentration of 0.0015 milligrams per kilogram (mg/kg) in sample B-9-5.
- 4,4'-DDT: Detected at a concentration of 0.00059 mg/kg in sample B-9-5.

TPH Fuel Fingerprint by LUFT/FFP Method

- TPH-Diesel: Detected at concentrations of 12 mg/kg and 20 mg/kg in samples B-1-25 and B-4-20, respectively.
- TPH-Hydraulic Oil/Motor Oil: Detected in seven samples at concentrations ranging from 12 mg/kg in sample B-4-15 to 39 mg/kg in sample B-4-20.

VOCs by EPA Method 8260

- Benzene: Detected in five samples at concentrations ranging from 0.0020 mg/kg in sample B-9-5 to 0.0085 mg/kg in sample B-3-5.
- Toluene: Detected in three samples at concentrations ranging from 0.0015 mg/kg in sample B-1-5 to 0.0036 mg/kg in sample B-3-5.
- 1,2,4-Trimethylbenzene: Detected at a concentration of 0.0037 mg/kg in sample B-9-5.

SVOCs by EPA Method 8270C

- Bis(2)-ethylhexyl)phthalate: Detected in five samples at concentrations ranging from 0.046 mg/kg in sample B-3-25 to 0.14 mg/kg in sample B-1-25.

Title 22 Metals by EPA Method 6010B and 7471A

- Antimony: Detected in 22 samples at concentrations ranging from 0.66 mg/kg in sample B-9-30 to 3.0 mg/kg in sample B-9-25.
- Arsenic: Detected in all samples at concentrations ranging from 1.1mg/kg in sample B-9-30 to 4.3 mg/kg in sample B-9-5.
- Barium: Detected in all samples at concentrations ranging from 24 mg/kg in sample B-3-15 to 180 mg/kg in sample B-4-25.
- Beryllium: Detected in all samples at concentrations ranging from 0.17 mg/kg in sample B-4-25 to 0.86 mg/kg in sample B-9-15.
- Cadmium: Detected in 22 samples at concentrations ranging from 0.053 mg/kg in sample B-3-25 to 0.21 mg/kg in samples B-9-5 and B-9-25.
- Chromium: Detected in all samples at concentrations ranging from 3.4 mg/kg in sample B-3-15 to 23 mg/kg in sample B-9-5.
- Cobalt: Detected in all samples at concentrations ranging from 2.1 mg/kg in sample B-3-15 to 11 mg/kg in sample B-9-5.
- Copper: Detected in all samples at concentrations ranging from 8 mg/kg in sample B-3-5 to 51 mg/kg in sample B-4-25.
- Lead: Detected in all samples at concentrations ranging from 1.8 mg/kg in sample B-4-25 to 21 mg/kg in sample B-9-5.
- Molybdenum: Detected in 15 samples at concentrations ranging from 0.26 mg/kg in sample B-3-5-D to 1.1 mg/kg in sample B-4-20.
- Nickel: Detected in all samples at concentrations ranging from 2.0 mg/kg in sample B-3-15 to 15 mg/kg in sample B-9-5.
- Silver: Detected in five samples at concentrations ranging from 0.068 mg/kg in sample B-3-5-D to 0.15 mg/kg in sample B-9-15.
- Thallium: Detected in ten samples at concentrations ranging from 0.79 mg/kg in sample B-9-20 to 2.1 mg/kg in sample B-9-5.
- Vanadium: Detected in all samples at concentrations ranging from 13 mg/kg in sample B-3-15 to 52 mg/kg in sample B-9-25.

- Zinc: Detected in all samples at concentrations ranging from 25 mg/kg in sample B-3-15 to 99 mg/kg in sample B-9-5.
- Mercury: Detected in all samples at concentrations ranging from 0.047 mg/kg in sample B-4-25 to 0.48 mg/kg in sample B-1-15.

Six soil samples, B-1-5, B-1-20, B-3-5, B-3-15, B-9-5, and B-9-25, were analyzed for perchlorate by EPA Method 314.0. Perchlorate was not detected above the laboratory reporting limit in any of these samples.

Three samples, B-1-5, B-4-20, and B-9-5, were analyzed for PCBs by EPA Method 8082. PCBs were not detected above the laboratory reporting limit in any of these samples.

5.2 Hazard Analysis

Leighton reviewed the results of laboratory analyses performed on soil samples collected from the borings at Devil's Gate Reservoir and compared the results to applilcable health screening levels issued by state and federal agencies that include: Bureau of Land Management (BLM) Human Risk Management Criteria (HRMCs); California Environmental Protection Agency (CalEPA) California Human Health Screening Levels (CHHSLs); and United States Environmental Protection Agency (EPA) Regional Screening Levels (RSLs). The concentrations of analytes were also compared to state and federal hazardous waste screening thresholds that include: Title 22 Chapter 11 of California Code of Regulations (CCR) and Part 1910 of the Code of Federal Regulations (CFR). The concentrations of analytes detected during this investigation and their corresponding regulatory thresholds are presented in Tables D1 through D3.

The health-based screening criteria that the concentrations of detected analytes were compared to included:

- BLM HRMC for Campers
- BLM HRMC for Workers
- BLM HRMC for Residents
- US EPA Region 9 RSLs for Residential Sites
- US EPA Region 9 RSLs for Industrial Sites

- CHHSLs for Residential Sites
- CHHSLs for Industrial Sites

The hazardous waste characterization based screening levels utilized during this assessment included:

- CCR Total Threshold Limit Concentrations (TTLC)
- CCR Soluble Threshold Limit Concentrations (STLC)
- CFR Toxicity Resource Conservation and Recovery Act (RCRA) Characteristic Leaching Procedure (TCLP)

The concentrations of organochlorine pesticides, petroleum hydrocarbons (diesel and hydraulic/motor oil range and aromatics), and SVOCs detected in samples that were collected from the Devil's Gate Reservoir are below regulatory thresholds.

The concentrations of heavy metals detected in soil samples collected from the site were compared the health-based and hazardous waste screening levels. Arsenic was the only heavy metal that was detected at concentrations exceeding any of the screening levels. Arsenic concentrations detected in the soil samples are consistent with California background concentrations but exceeded conservative CHHSLs and RSLs for industrial and residential sites, and the BLM HRMC for residents. The concentrations of arsenic detected in the soil samples were below the BLM HRMCs for workers of 12 mg/kg and campers of 20 mg/kg, respectively.

Arsenic concentrations detected in soil samples collected from the project area are below the California Department of Toxic Substances Control (DTSC) accepted Southern California background range of 6 mg/kg to 12.0 mg/kg (DTSC, 2005). The arsenic concentrations detected in the soil samples collected from the site are also consistent with mean background arsenic concentration of 3.5 mg/kg in California soils (Kearney, Foundation, 1996).

Since the arsenic concentrations detected are expected to be naturally occurring, consistent with background concentrations in the California, and the site will not be occupied, the appropriate screening level is considered to be the BLM HRMC for workers of 12 mg/kg. Adequate dust control should be implemented during

grading operations or other work requiring disturbance of soil to minimize dust emissions.

Based on the result of the laboratory analyses, no hazardous materials issues have been detected in soil or burn residue at the locations assessed. The sediment is not considered to be hazardous.

6.0 FINDINGS AND CONCLUSIONS

Presented below is a summary of findings and conclusions based upon the results of our evaluation of the project site:

- The site is underlain by Quaternary-aged alluvial stream channel deposits consisting of gravel, sand, and silt.
- The sediment consists of predominately granular materials with low expansion potential. The burn sediment consists of material ranging from sandy silt to silty sand with various amount of gravel.
- Groundwater was encountered at depths ranging between 22 to 25¼ feet below ground surface at the time of drilling. The historic high groundwater level at the site was reported to be approximately 20 feet below ground surface.
- The site is not included in a State of California-designated Alquist-Priolo Earthquake Fault Zone. The Sierra Madre Fault Zone, capable of producing an estimated 7.0 magnitude earthquake, includes the Tujunga Fault, which crosses the inlet of the reservoir (Dibblee, 1989 and SCEDC, 2011). Due to the nature of the project, fault rupture and earthquake ground shaking are not considered to be a significant impact on the project.
- The site is located in an area mapped as being susceptible to liquefaction on the Seismic Hazard Zones Map for the Pasadena Quadrangle (CDMG, 1999). The sediment is prone to liquefaction. Since it will be removed under this project, liquefaction hazard will be reduced to less than significant.
- The occurrence of lateral spreading and flow failures as a result of soil liquefaction are expected to be localized along the perimeter of the reservoir. The impact of lateral spreading and flow failure is considered to be less than significant on the proposed project.
- Though the potential exists for ground oscillation, it is not considered to be a significant impact on the project.
- Seismically-induced settlement, landslides, seiches, and tsunamis are not considered to be hazards for the project.

- The project site itself can be identified as a potential source of downstream flooding as a result of sediment accumulation which could affect the functionality of the outlet works.

- Corrosive soil may be present at the site. Due to the nature of the project, its impact should be less than significant.

- The potential for soil erosion is high given the nature of the proposed sediment removal at the site. Erosion control measures would reduce erosion impacts to less than significant. These measures include:

  — Work schedule; as avoid work during the rainy season to the extent possible (October through April);

  — Temporary soil stabilization; preservation of existing vegetation, mulching, hydroseeding, soil binders (if permitted), erosion control blankets, earth dikes, drainage swales, and/or slope drains; and

  — Temporary sediment control during construction through silt fencing, desilting basins, sediment traps, check dams, fiber rolls, barriers or berms, street sweeping, and/or storm drain protection.

- The onsite soils are anticipated to be readily excavated using earthmoving equipment in good working condition.

- Arsenic concentrations consistent with the average concentration range in California soils of 3.5 mg/kg and can be mitigated with adequate dust suppression including the use of water trucks to moisture condition soil during grading and excavation operations.

- All other concentrations of contaminants of concern are below risk management criteria and regulatory thresholds, and are not considered a hazard.

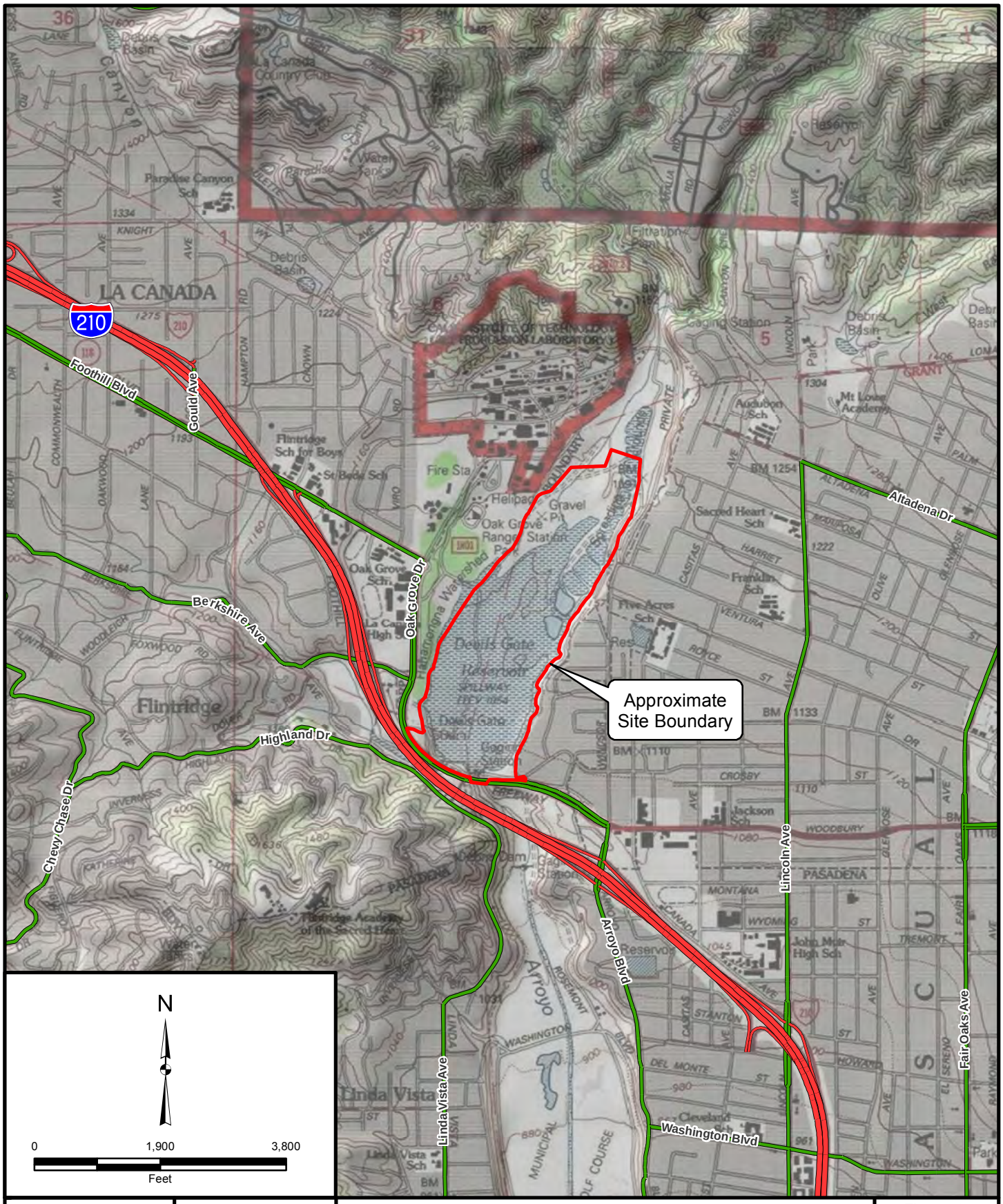
Based upon the results of our evaluation of the site soils, the proposed project is considered feasible from a geotechnical and geochemical standpoint.

7.0 LIMITATIONS

Leighton's work was performed using the degree of care and skill ordinarily exercised, under similar circumstances, by reputable geotechnical consultants practicing in this or similar localities. No other warranty, express or implied, is made as to the conclusions and professional opinions included in this report.

This report may not be used by others or for other projects without the express written consent of Chambers Group and our firm.

Any persons using this report for bidding or construction purposes should perform such independent investigations as they deem necessary to satisfy themselves as to the surface and/or subsurface conditions to be encountered and the procedures to be used in the performance of work on the subject site.



Project: 603211-001	Eng/Geol: VPI/RML
Scale: 1 " = 2,000 '	Date: October 2011

Base Map: ESRI Resource Center, 2010
Thematic Info: Leighton
Author: (cgiovando)

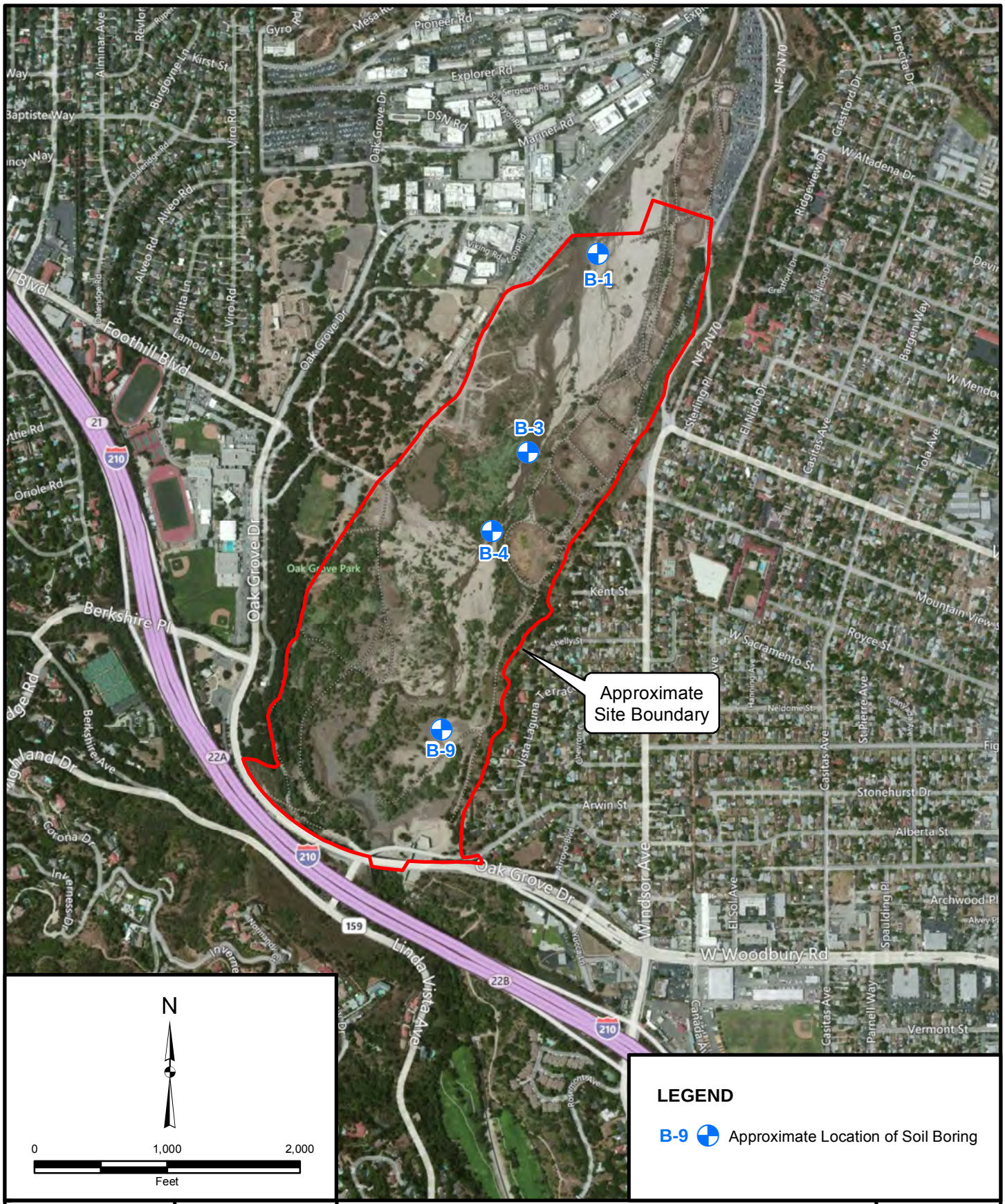
SITE LOCATION MAP

Devil's Gate Reservoir
Pasadena, California

Figure 1

Leighton

Map Saved as V:\drafting\603211\001\Maps\P603211-001_F01_SiteLocationMap_GIS_2013-01-23.mxd on 1/23/2013 3:37:05 PM



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LEGEND

B-9 Approximate Location of Soil Boring

Project: 603211-001	Eng/Geol: VPI/RML
Scale: 1 " = 1,000 '	Date: October 2011

Base Map: ESRI Resource Center, 2010
Thematic Info: Leighton
Author: (cgiovando)

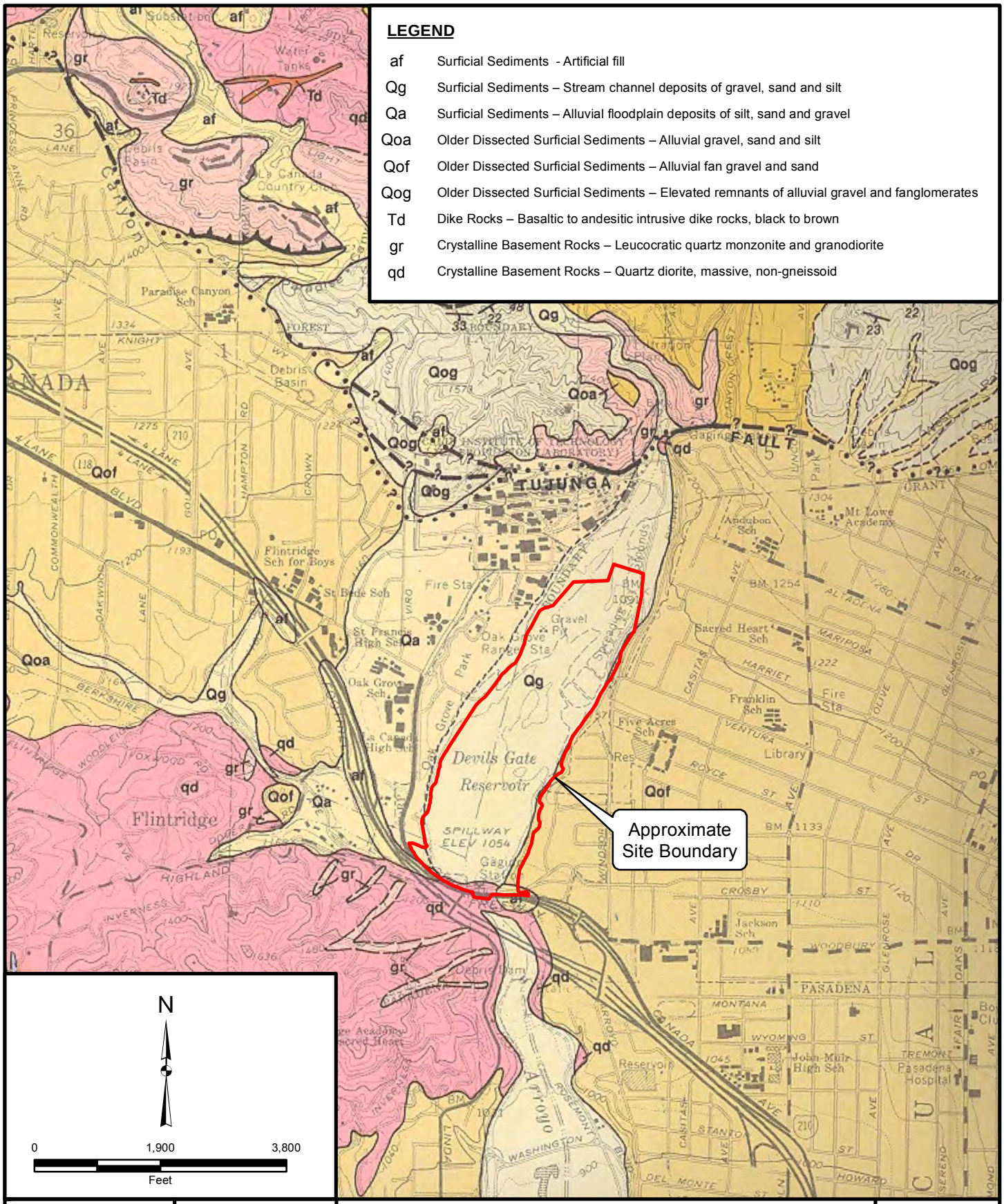
BORING LOCATION MAP

Devil's Gate Reservoir
Pasadena, California

Figure 2

Leighton

Map Saved as V:\drafting\603211\001\Maps\P603211-001_F02_BoringLocationMap_GIS_2013-01-23.mxd on 1/23/2013 3:36:43 PM



Project: 603211-001	Eng/Geol: VPI/RML
Scale: 1 " = 2,000 '	Date: October 2011

Geologic Map of the Pasadena Quadrangle, Dibblee, DF-23, 1989, Thomas W. Dibblee, Jr.

Author: (cgiovando)

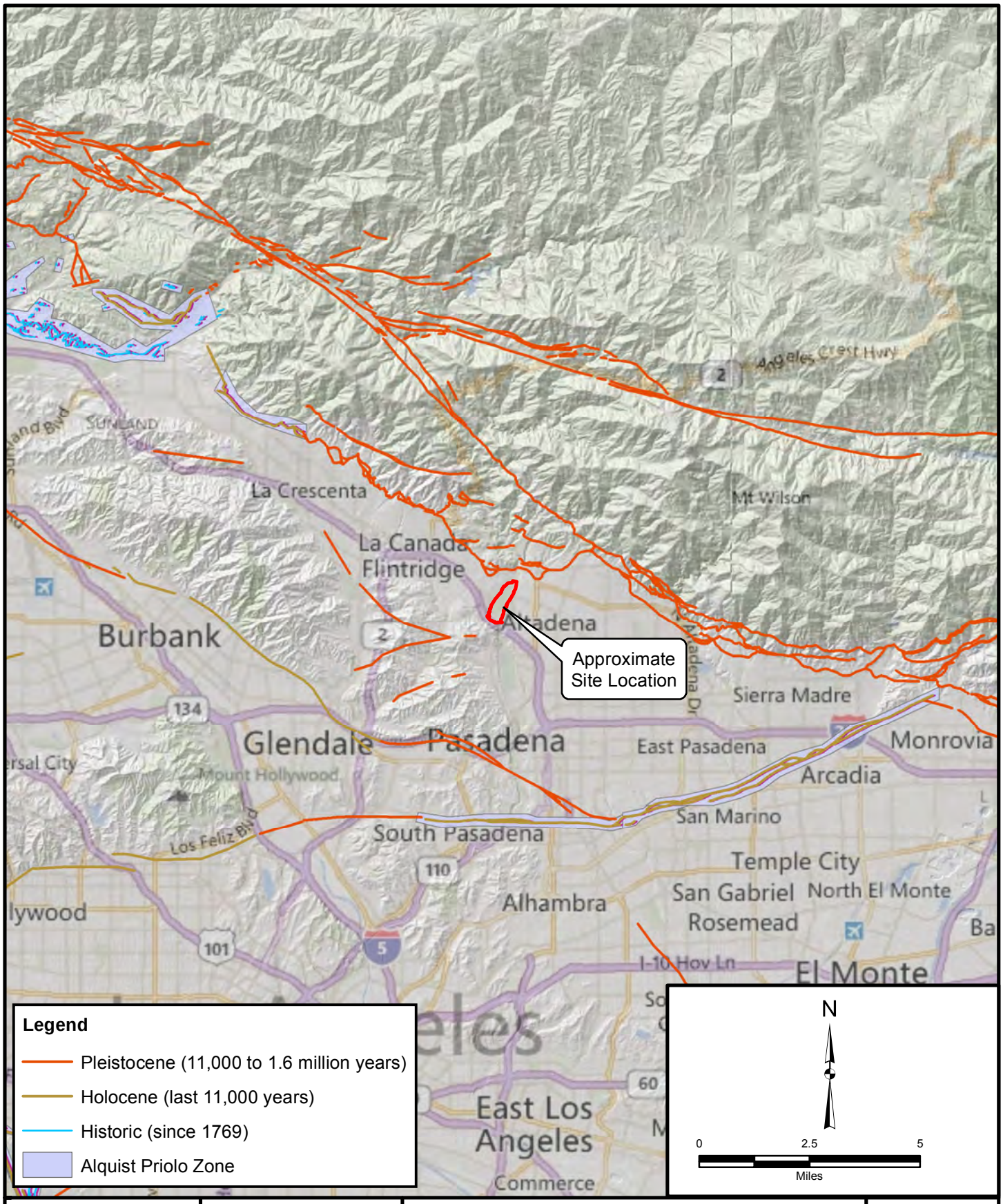
REGIONAL GEOLOGY MAP

Devil's Gate Reservoir
Pasadena, California

Figure 3

Leighton

Map Saved as V:\drafting\603211\001\Maps\P603211-001_F03_RegionalGeologyMap_GIS_2013-01-23.mxd on 1/23/2013 3:57:12 PM



Project: 603252-001	Eng/Geol: VPI/RML
Scale: 1 " = 3 miles	Date: October 2011

Base Map: Esri Resource Center, 2011

Thematic Layers Source:
Excerpted and adapted from California Geological Survey (2010)

REGIONAL FAULT MAP

Devil's Gate Reservoir
Pasadena, California

Figure 4

Leighton

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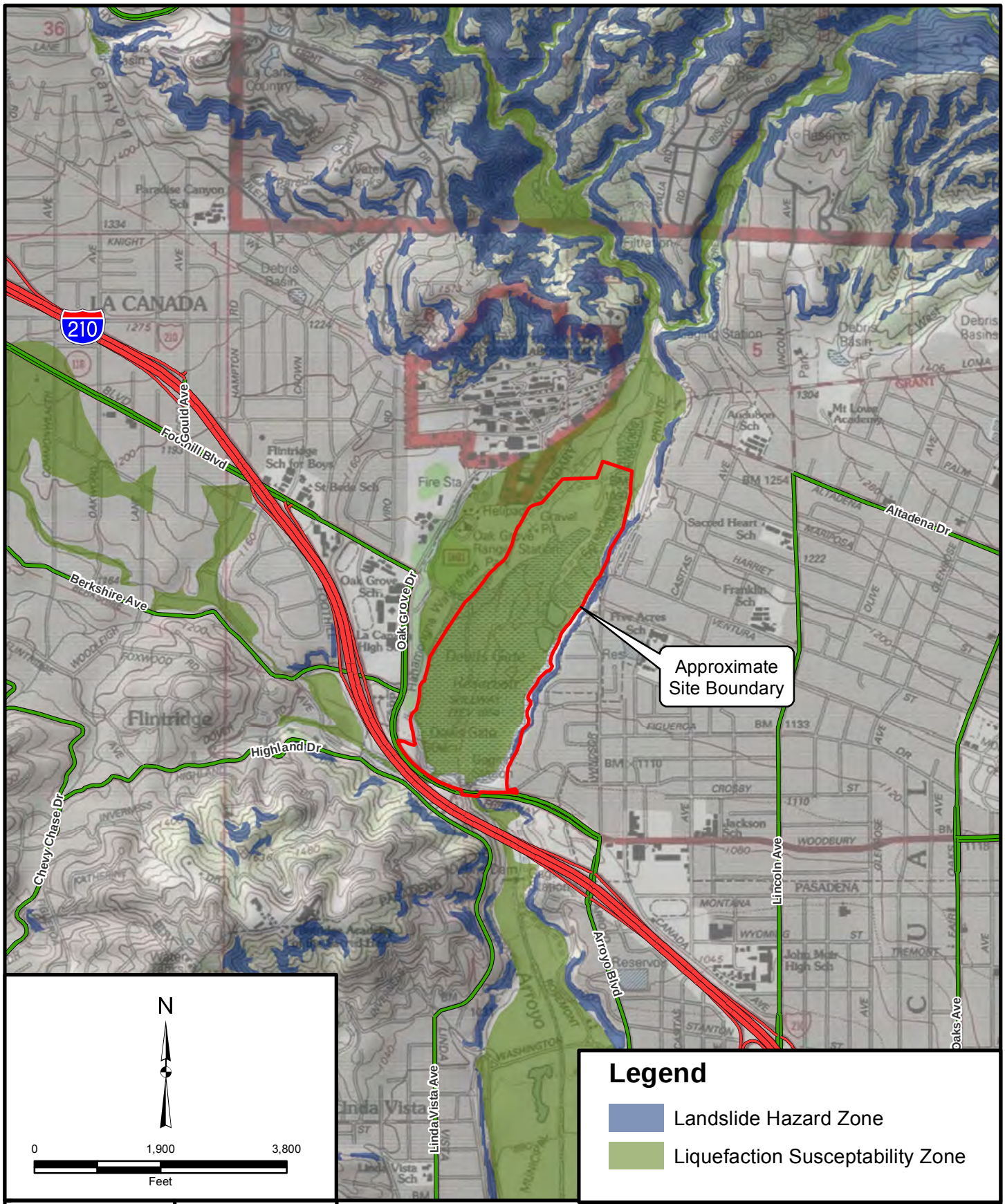

Project: 603211-001	Eng/Geol: VPI/RML
Scale: 1 " = 2,000 '	Date: October 2011

Base Map: Bing Aerial Maps from Esri Resource Center, 2011
Thematic Info: STATE OF CALIFORNIA SEISMIC HAZARD ZONES
Author: (cgiovando)

SEISMIC HAZARD MAP

Devil's Gate Reservoir
Pasadena, California

Figure 5

Leighton

Map Saved as V:\drafting\603211\001\Maps\P603211-001_F05_SeismicHazardMap_GIS_2013-01-23.mxd on 1/23/2013 3:59:54 PM

APPENDIX A

APPENDIX A

References

California Building Code (CBC), 2010, California Code of Regulations, Title 24, Part 2, Volume 2 of 2, Chapter 18 Soils and Foundations, Section 1803.5.3 Expansive Soil, page 176.

California Department of Conservation, Division of Mines and Geology (CDMG), 1986, Geology of the North Half of the Pasadena Quadrangle, Los Angeles County, California, Open-File Report 86-4 LA, dated 1986.

California Department of Conservation, Division of Mines and Geology (CDMG), 1998, Seismic Hazard Zone Report for the Pasadena 7.5-Minute Quadrangle, Los Angeles County, California, Seismic Hazard Zone Report 014, Revised 2001, June 13, 2005, June 9, and January 17, 2006.

California Department of Conservation, Division of Mines and Geology (CDMG), 1999, Seismic Hazard Zone Map, Pasadena 7.5-Minute Quadrangle, Los Angeles County, California, Scale 1:24,000.

California Department of Water Resources (CDWR), 2004, Raymond Groundwater Basin, Hydrologic Region South Coast, Bulletin 118, updated February 27, 2004.

California Geological Survey (CGS), 2002, California Geomorphic Provinces, Note 36, revised date December 2002, http://www.consrv.ca.gov/cgs/information/publications/cgs_notes/note_36/Documents/note_36.pdf.

Davis, T.L., Namson, J., and Yerkes, R.F., 1989, A Cross-Section of the Los Angeles Area: Seismically Active Fold and Thrust Belt, the 1987 Whittier Narrows Earthquake, and Earthquake Hazard: Journal of Geophysical Research, Volume 94, Number B7, pp. 9644-9664.

Dibblee, Jr., T.W., 1989, Geologic Map of the Los Angeles Quadrangle, Los Angeles County, California: Dibblee Geological Foundation Map DF-22, Santa Barbara, California, Scale 1:24,000.

DTSC, 1994, California EPA, 1994 Preliminary Endangerment Assessment Guidance Manual. Department of Toxic Substances Control, 1994

APPENDIX A (Continued)

References

DTSC, 2008, Determination of a Southern California Regional Background Arsenic Concentration in Soil, California Department of Toxic Substances Control (DTSC) March 2008, Chernoff, G., Bosan, W., and Oudiz, D.

DWR, 1961; Department of Water Resources, State of California, Planned Utilization of Ground Water Basins of the Coastal Plain of Los Angeles County, Appendix A – Ground Water Geology, Bulletin 104, June 1961.

EPA, 2009, Preliminary Remediation Goals, Region 9 PRG Table, Environmental Protection Agency Region 9, December 2009

Hart, E.W. and Bryant, W.A., Interim Revision 2007, Fault Rupture Hazard Zones in California, Alquist-Priolo Earthquake Fault Zoning Act with Index to Earthquake Fault Zones Maps: California Geological Survey, Special Publications 42, 42p.

Hauksson, E., 1990, Earthquakes, Faulting, and Stress in the Los Angeles Basin: Journal of Geophysical Research, Volume 95, Number B10, pp. 15,365-15,394.

Hauksson, E., and Jones, L.M., 1989, The 1987 Whittier Narrows Earthquake Sequence in Los Angeles, Southern California: Seismological and Tectonic Analysis: Journal of Geophysical Research, Volume 94 Number B7, pp. 9569-9589.

Hsu, E. Y., 1982, Investigation and Inventory of Slope Failures that Occurred in 1978 and 1980 in the Los Angeles 7½-Minute Quadrangle, Los Angeles County, California: California Division of Mines and Geology Open File Report 82-26 LA, 60 p.

Ishihara, K. and Yoshimine, M., 1992, “Evaluation of Settlements in Sand Deposits Following Liquefaction during Earthquakes,” Soils and Foundations, Vol. 32, No. 1, pp. 173-188.

Kearney Foundation, 1996, “Background Concentrations of Trace and Major Elements in Californial Soil, March 1996

Lamar, Donald L., California Department of Conservation, CDMG, 1970, Geology of the Elysian Park-Repetto Hills Area, Los Angeles County, California, Special Report 101, dated 1970.

APPENDIX A (Continued)

References

Los Angeles County Department of Public Works (LADPW), 2012, Devil's Gate Reservoir Sediment Removal and Management Project, updated April 19, 2012. http://ladpw.org/wrd/Removal/DevilGate/index.cfm?Project=DevilGate&site=wrd

Oskin, M., Sieh, K., Rockwell, T., Miller, G., Guptill, P., Curtis, M., McArdle, S., and Elliot, P., 2000, Active Parasitic Folds on the Elysian Park Anticline: Implications for Seismic Hazard in Central Los Angeles, California: Geological Society of America, Volume 112, Number 5, pp. 693-707.

Petersen, Mark D., Frankel, Arthur D., Harmsen, Stephen C., Mueller, Charles S., Haller, Kathleen M., Wheeler, Russell L., Wesson, Robert L., Zeng, Yuehua, Boyd, Oliver S., Perkins, David M., Luco, Nicolas, Field, Edward H., Wills, Chris J., and Rukstales, Kenneth S., 2008, Documentation for the 2008 Update of the United States National Seismic Hazard Maps: U.S. Geological Survey Open File Report 2008-1128, 61 p.

Southern California Earthquake Data Center (SCEDC), 2011, Significant Earthquakes and Faults, Sierra Madre Fault Zone, updated October 4, 2011. http://www.data.scec.org/significant/sierramadre.html

Shaw, J.H., and Suppe, J., 1996, Earthquake Hazards of Active Blind-Thrust Faults Under the Central Los Angeles Basin, California: Journal of Geophysical Research, Volume 101, Number B4, pp. 8623-8642.

United States Geological Survey (USGS) earthquake hazard program. (http://geohazards.usgs.gov/deaggint/2008/).

USGS, 1987 Recent reverse faulting in the Transverse Ranges, California, California: U.S. Geological Survey Professional Paper 1339, dated 1987.

Yerkes, R.F., McCulloh, T.H., Schoellhamer, J.E. and Vedder, J.G., 1965, Geology of the Los Angeles Basin, California -- An Introduction: U. S. Geological Survey Professional Paper 420-A, pp. 11-15, 57 p.

APPENDIX B

GEOTECHNICAL BORING LOG B-1

Project No.	603211-001	**Date Drilled**	9-19-11
Project	Devil's Gate Reservoir	**Logged By**	WBS
Drilling Co.	2R Drilling, Inc	**Hole Diameter**	8"
Drilling Method	LAR CME-75 Equivalent, 140lb (Autohammer), 30" Drop	**Ground Elevation**	*1073'
Location	Devil's Gate Reservoir, Pasadena, California	**Sampled By**	JPB

Elevation Feet	Depth Feet	Graphic Log (N / S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	0							SP	**Quaternary Stream Channel Deposits (Qg):** Poorly-graded SAND, light gray, dry, fine to medium grained sand with trace subangular gravel	
	5			B-1-5 B1					becomes brown, moist PID = 0.6 ppm	
	10			B-1-10 B2			3	SMg	SILTY SAND with GRAVEL, brown, moist, fine grained sand with non-plastic fines and some gravel PID = 1.7 ppm	M
	15			B-1-15 B3			5	SW-SM	Well-graded SAND with SILT, brown, moist, fine to coarse grained sand with non-plastic fines, trace subangular gravel PID = 0.6 ppm	M, SA
	20			B-1-20 B4			4		same as above PID = 0.4 ppm	M, SA
								SW-SM	**Burn Sediments:** Well-graded SAND with SILT and GRAVEL, black, moist, fine to coarse grained sand with non-plastic fines and subangular gravel, contains wire and plastic	
	25			B-1-25 B5			5	SM	**Quaternary Stream Channel Deposits (Qg):** SILTY SAND, moist, brown, fine-grained sand with non-plastic fines, no debris, rough drilling, POOR RECOVERY PID = 3.5 ppm	M, SA
	30								Total Depth = 26.5 ft. bgs No groundwater encountered during drilling Backfilled on 9-19-11 with cuttings *Boring elevations are approximate	

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

*** This log is a part of a report by Leighton and should not be used as a stand-alone document. ***

GEOTECHNICAL BORING LOG B-3

Project No.	603211-001	**Date Drilled**	9-19-11
Project	Devil's Gate Reservoir	**Logged By**	WBS
Drilling Co.	2R Drilling, Inc	**Hole Diameter**	8"
Drilling Method	LAR CME-75 Equivalent, 140lb (Autohammer), 30" Drop	**Ground Elevation**	*1047'
Location	Devil's Gate Reservoir, Pasadena, California	**Sampled By**	WBS

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	0							SP	**Quaternary Stream Channel Deposits (Qg):** Poorly-graded SAND, light gray, dry, fine to medium grained sand, trace subangular gravel	
	5			B-3-5 B1			2	SMg	SILTY SAND with GRAVEL, brown, moist, fine grained sand with non-plastic fines and gravel PID = 0.0 ppm	M
	10			B-3-10 B2			4	SW-SM	Well-graded SAND with SILT, gray, moist, fine to coarse grained sand with non-plastic fines, contains trace gravel PID = 0.0 ppm	M, AL, SA
									becomes more silty	
	15			B-3-15 B3			6	SM	**Burn Sediments:** SILTY SAND, brown, moist, fine grained sand with non-plastic fines, trace gravel PID = 0.1 ppm rough drilling, gravel	M, SA
								GP	**Quaternary Stream Channel Deposits (Qg):** refusal on first attempt at 18 ft., boring relocated approx. 3 feet northeast for retry	
	20			B-3-20 B4			4	SM	SILTY SAND, olive brown, moist, fine grained sand with non-plastic fines, angular to subrounded gravel encountered, drilling becomes rough PID = 0.1 ppm	M
									drilling chatter/rough drilling ends	
▽	25			B-3-25 B5			4		becomes wet, contains trace rounded gravel, POOR RECOVERY PID = 0.6 ppm	M
									Total Depth = 26.5 ft. bgs Groundwater encountered at 25.25 ft. bgs Backfilled on 9-19-11 with cuttings *Boring elevations are approximate	
	30									

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

*** This log is a part of a report by Leighton and should not be used as a stand-alone document. ***

GEOTECHNICAL BORING LOG B-4

Project No.	603211-001	**Date Drilled**	9-20-11
Project	Devil's Gate Reservoir	**Logged By**	WBS
Drilling Co.	2R Drilling, Inc	**Hole Diameter**	8"
Drilling Method	LAR CME-75 Equivalent, 140lb (Autohammer), 30" Drop	**Ground Elevation**	*1042'
Location	Devil's Gate Reservoir, Pasadena, California	**Sampled By**	WBS

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
		N S							*This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.*	
	0							SP	**Quaternary Stream Channel Deposits (Qg):** Poorly-graded SAND, light gray, dry, fine to medium grained sand with trace subangular gravel	
	5			B-4-5 B1			3	SW-SM	Well-graded SAND with SILT, brown, moist, fine to coarse grained sand with non-plastic fines PID = 0.1 ppm	M, SA
	10			B-4-10 B2			4		same as above PID = 0.0 ppm	M, SA
	15			B-4-15 B3			5	SM	SILTY SAND, pale brown, moist, fine grained sand with non-plastic fines, trace angular to subangular gravel PID = 0.0 ppm	M
									rough drilling	
	20			B-4-20 B4			4		light olive gray, POOR RECOVERY PID = 10.0 ppm rough drilling	M
	25			B-4-25 B4			3	SMg	SILTY SAND with GRAVEL, dark gray, wet, fine to medium grained sand with non-plastic fines and angular/broken gravel, POOR RECOVERY PID = 1.6 ppm	M
									Total Depth = 26.5 ft. bgs Groundwater encountered at 23 ft. bgs Backfilled on 9-20-11 with cuttings *Boring elevations are approximate	
	30									

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

*** This log is a part of a report by Leighton and should not be used as a stand-alone document. ***

GEOTECHNICAL BORING LOG B-9

Project No.	603211-001	**Date Drilled**	9-20-11
Project	Devil's Gate Reservoir	**Logged By**	WBS
Drilling Co.	2R Drilling, Inc	**Hole Diameter**	8"
Drilling Method	LAR CME-75 Equivalent, 140lb (Autohammer), 30" Drop	**Ground Elevation**	*1032'
Location	Devil's Gate Reservoir, Pasadena, California	**Sampled By**	WBS

Elevation Feet	Depth Feet	Graphic Log (N / S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	0							SP	**Quaternary Stream Channel Deposits (Qg):** Poorly graded SAND, brown, dry, fine grained sand	
	5			B-9-5 B1			6	SMg	SILTY SAND with GRAVEL, light yellowish brown, moist, fine grained sand with non-plastic fines and gravel, trace laminae and iron oxide staining PID = 0.0 ppm	M, SA
	10			B-9-10 B2			24	sML	SANDY SILT, gray, moist, non-plastic fines with fine grained sand, organic material noted PID = 0.0 ppm	M, AL, SA, H
	15			B-9-15 B3			10	sMLg	**Burn Sediments:** SANDY SILT with GRAVEL, greenish black, moist to wet, non-plastic fines with fine grained sand and gravel, trace calcium carbonate infill PID = 0.0 ppm	M
	20			B-9-20 B4			10	SM	SILTY SAND, dark olive gray, moist, fine grained sand with non-plastic fines, some iron oxide staining PID = 0.0 ppm	M
	25			B-9-25 B5			38	ML	SILT, greenish black, wet, non-plastic fines, cuttings hold water PID = 0.0 ppm	M
	30									

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

*** This log is a part of a report by Leighton and should not be used as a stand-alone document. ***

GEOTECHNICAL BORING LOG B-9

Project No.	603211-001	**Date Drilled**	9-20-11
Project	Devil's Gate Reservoir	**Logged By**	WBS
Drilling Co.	2R Drilling, Inc	**Hole Diameter**	8"
Drilling Method	LAR CME-75 Equivalent, 140lb (Autohammer), 30" Drop	**Ground Elevation**	*1032'
Location	Devil's Gate Reservoir, Pasadena, California	**Sampled By**	WBS

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	30			B-9-30				SP	**Quaternary Stream Channel Deposits (Qg):** Poorly graded SAND, gray, wet, medium to coarse grained sand PID = 0.0 ppm	
									Total Depth = 31.5 ft. bgs Groundwater encountered at 22 ft. bgs Backfilled on 9-20-11 with cuttings *Boring elevations are approximate	
	35									
	40									
	45									
	50									
	55									
	60									

The soil description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:

-200	% FINES PASSING	DS	DIRECT SHEAR	SA	SIEVE ANALYSIS
AL	ATTERBERG LIMITS	EI	EXPANSION INDEX	SE	SAND EQUIVALENT
CN	CONSOLIDATION	H	HYDROMETER	SG	SPECIFIC GRAVITY
CO	COLLAPSE	MD	MAXIMUM DENSITY	UC	UNCONFINED COMPRESSIVE STRENGTH
CR	CORROSION	PP	POCKET PENETROMETER		
CU	UNDRAINED TRIAXIAL	RV	R VALUE		

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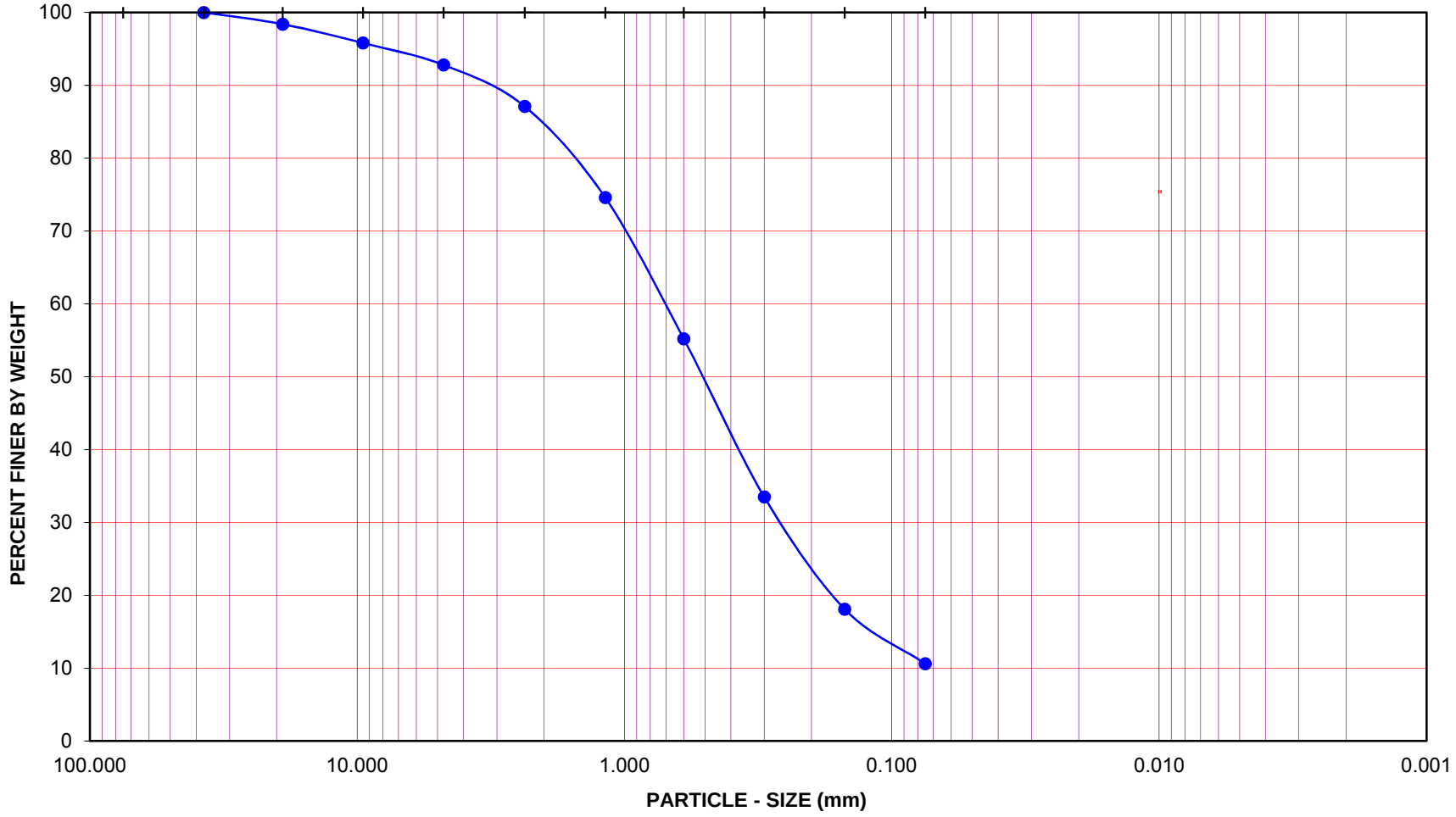
APPENDIX C

GRAVEL		SAND			FINES	
COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY

U.S. STANDARD SIEVE OPENING: 3.0" 1 1/2" 3/4" 3/8"

U.S. STANDARD SIEVE NUMBER: #4 #8 #16 #30 #50 #100 #200

HYDROMETER



Project Name: Devil's Gate

Project No.: 603211-001

Exploration No.: B-1 Sample No.: B3

Depth (feet): 15.0 Soil Type : SW-SM

Soil Identification: Olive brown well-graded sand with silt (SW-SM)

GR:SA:FI : (%) 7 : 82 : 11

Leighton

PARTICLE - SIZE DISTRIBUTION ASTM D 6913

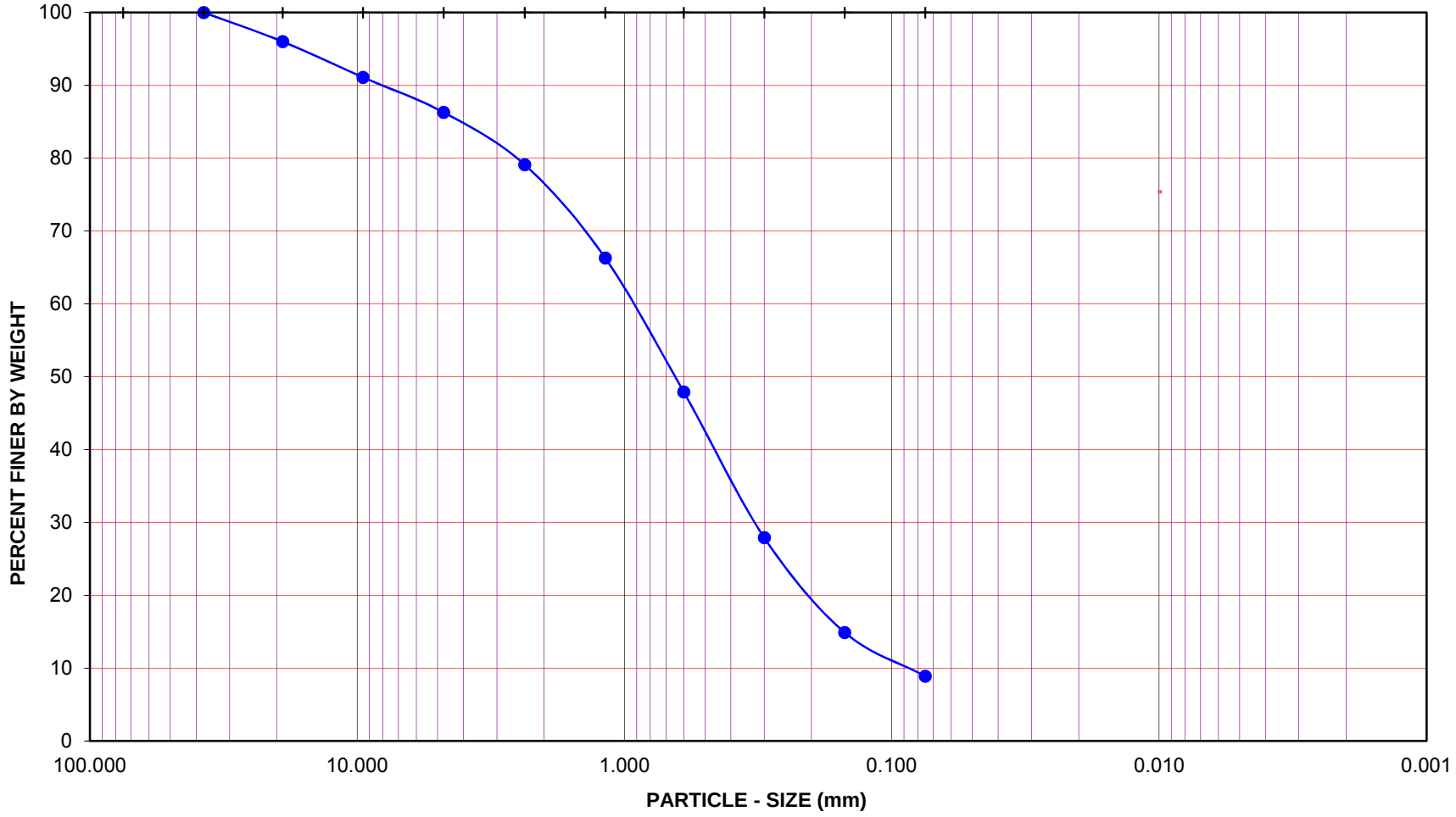
Oct-11

GRAVEL		SAND			FINES	
COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY

U.S. STANDARD SIEVE OPENING: 3.0" 1 1/2" 3/4" 3/8"

U.S. STANDARD SIEVE NUMBER: #4 #8 #16 #30 #50 #100 #200

HYDROMETER



Project Name: Devil's Gate

Project No.: 603211-001

Exploration No.: B-1 Sample No.: B4

Depth (feet): 20.0 Soil Type : SW-SM

Soil Identification: Olive gray well-graded sand with silt (SW-SM)

GR:SA:FI : (%) 14 : 77 : 9

Leighton

PARTICLE - SIZE DISTRIBUTION ASTM D 6913

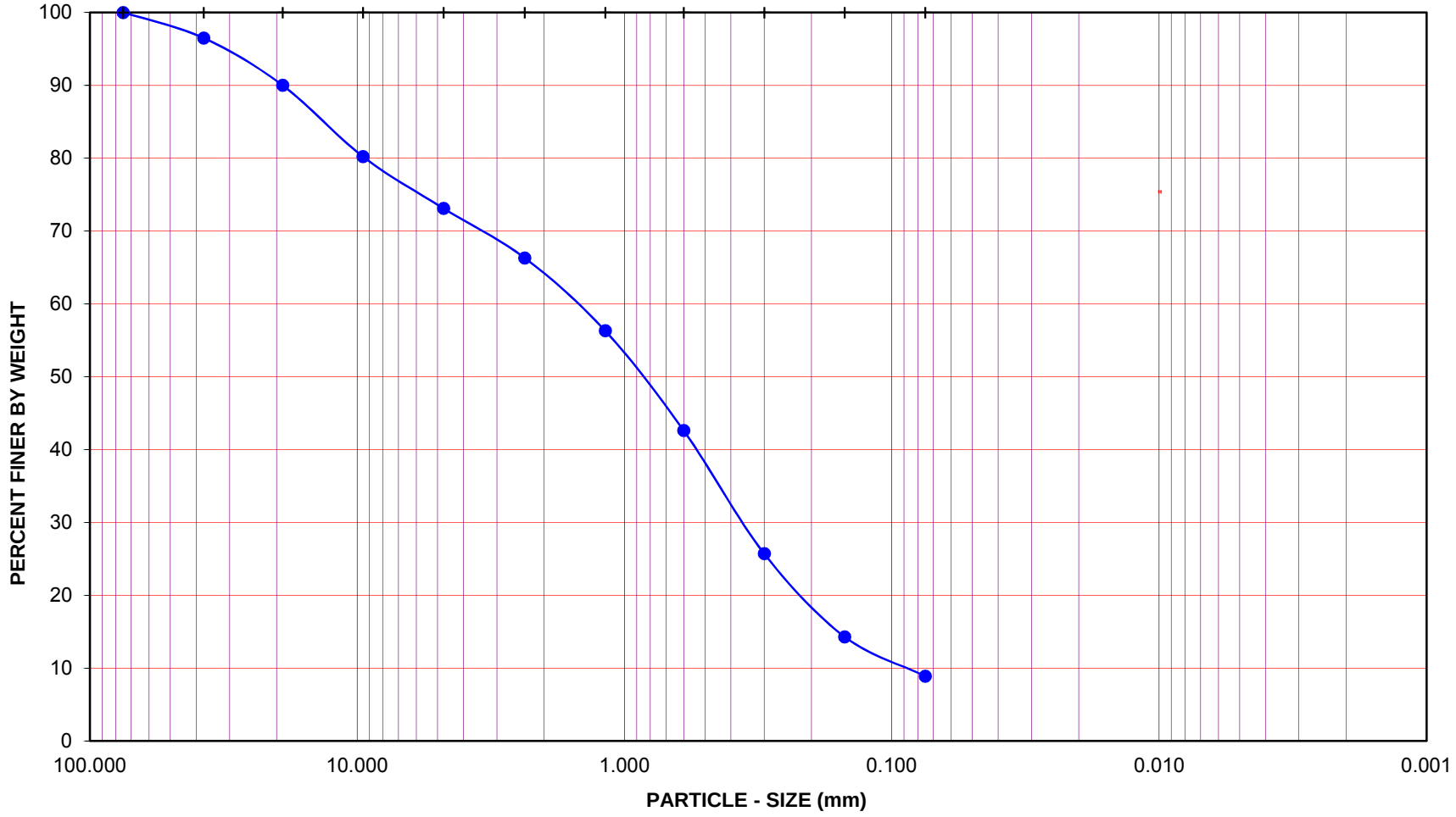
Oct-11

GRAVEL		SAND			FINES	
COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY

U.S. STANDARD SIEVE OPENING: 3.0" 1 1/2" 3/4" 3/8"

U.S. STANDARD SIEVE NUMBER: #4 #8 #16 #30 #50 #100 #200

HYDROMETER



Project Name: Devil's Gate

Project No.: 603211-001

Exploration No.: B-1 Sample No.: B5

Depth (feet): 25.0 Soil Type : (SW-SM)g

Soil Identification: Olive gray well-graded sand with silt and gravel (SW-SM)g

GR:SA:FI : (%) 27 : 64 : 9

Leighton

PARTICLE - SIZE DISTRIBUTION ASTM D 6913

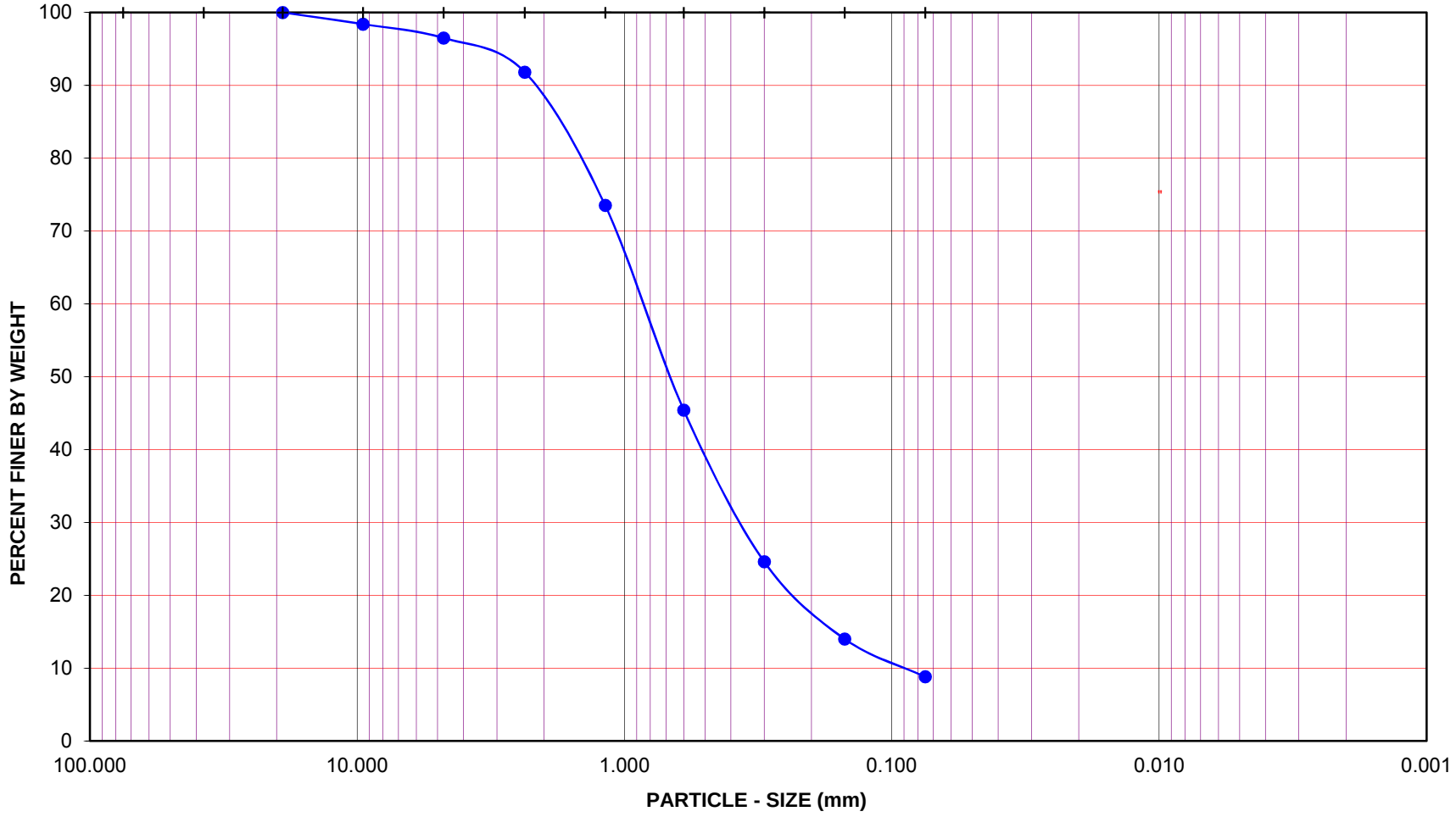
Oct-11

GRAVEL		SAND			FINES	
COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY

U.S. STANDARD SIEVE OPENING: 3.0" 1 1/2" 3/4" 3/8"

U.S. STANDARD SIEVE NUMBER: #4 #8 #16 #30 #50 #100 #200

HYDROMETER



Project Name: Devil's Gate

Project No.: 603211-001

Exploration No.: B-3 Sample No.: B2

Depth (feet): 10.0 Soil Type : SW-SM

Soil Identification: Olive gray well-graded sand with silt (SW-SM)

GR:SA:FI : (%) 4 : 87 : 9

Leighton

PARTICLE - SIZE DISTRIBUTION ASTM D 6913

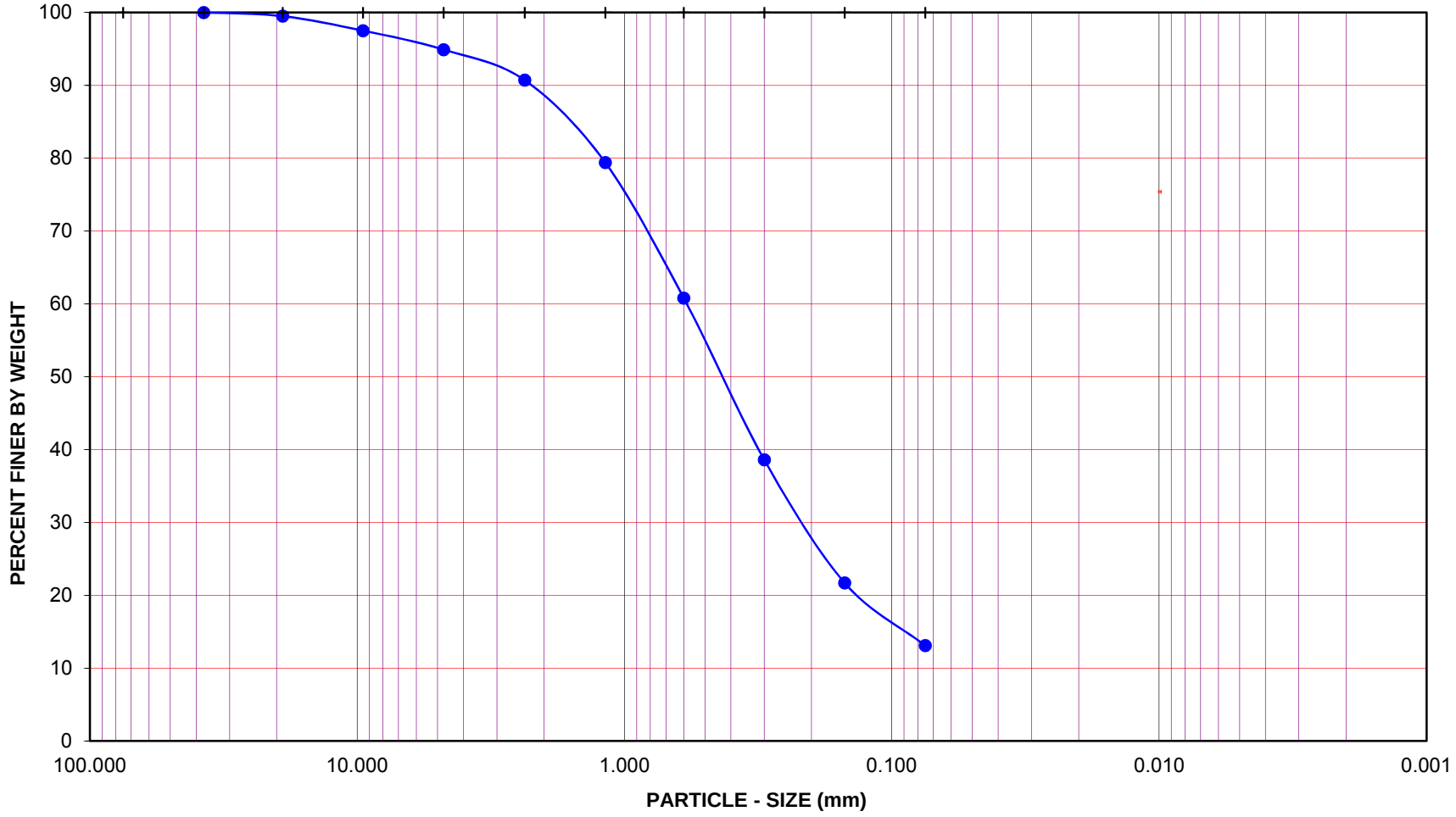
Oct-11

GRAVEL		SAND			FINES	
COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY

U.S. STANDARD SIEVE OPENING: 3.0" 1 1/2" 3/4" 3/8"

U.S. STANDARD SIEVE NUMBER: #4 #8 #16 #30 #50 #100 #200

HYDROMETER



Project Name: Devil's Gate

Project No.: 603211-001

Exploration No.: B-3 Sample No.: B3

Depth (feet): 15.0 Soil Type : SM

Soil Identification: Olive gray silty sand (SM)

GR:SA:FI : (%) 5 : 82 : 13

Leighton

PARTICLE - SIZE DISTRIBUTION ASTM D 6913

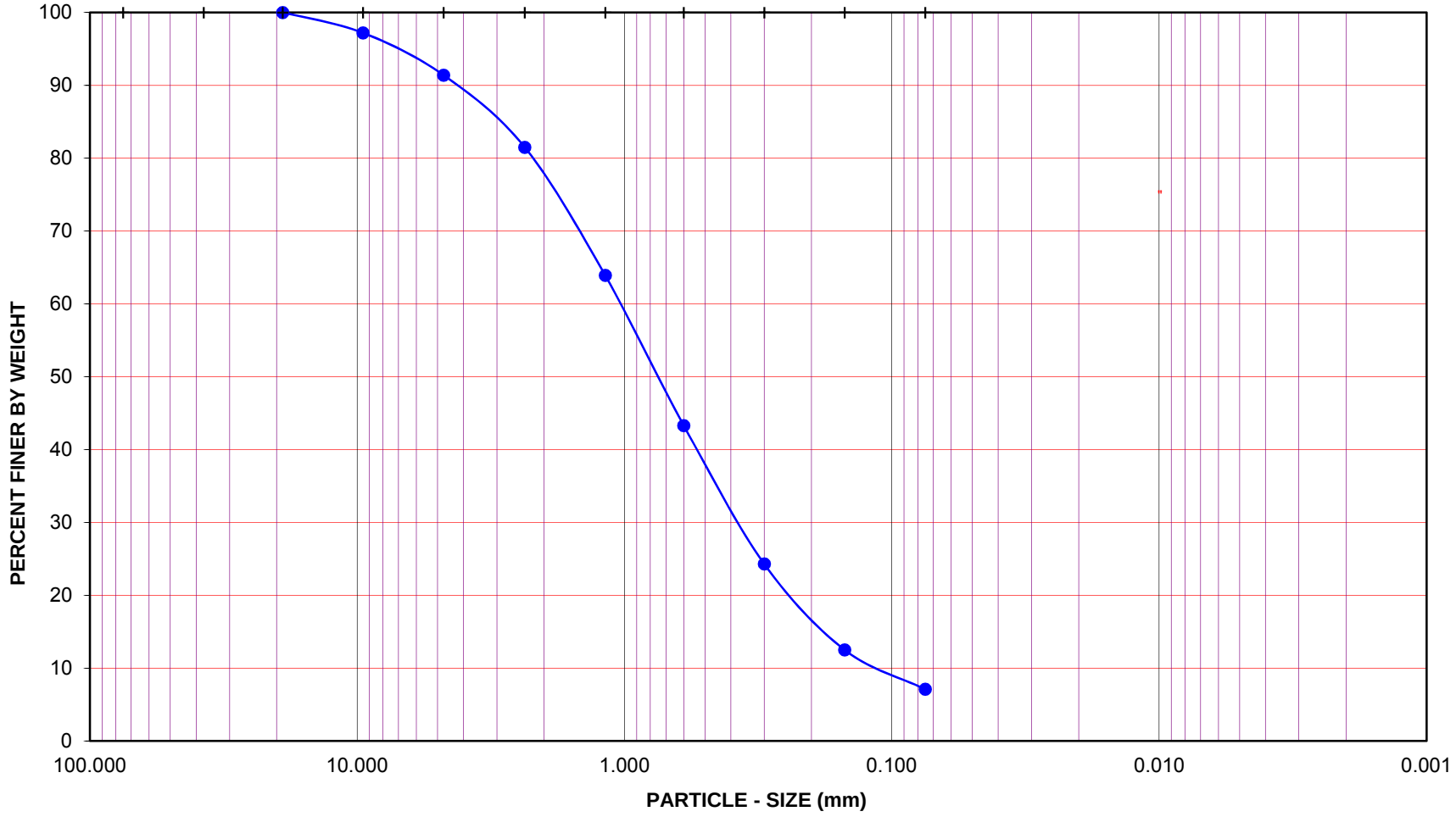
Oct-11

GRAVEL		SAND			FINES	
COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY

U.S. STANDARD SIEVE OPENING: 3.0" 1 1/2" 3/4" 3/8"

U.S. STANDARD SIEVE NUMBER: #4 #8 #16 #30 #50 #100 #200

HYDROMETER



Project Name: Devil's Gate

Project No.: 603211-001

Exploration No.: B-4 Sample No.: B1

Depth (feet): 5.0 Soil Type : SW-SM

Soil Identification: Olive brown well-graded sand with silt (SW-SM)

GR:SA:FI : (%) 9 : 84 : 7

Leighton

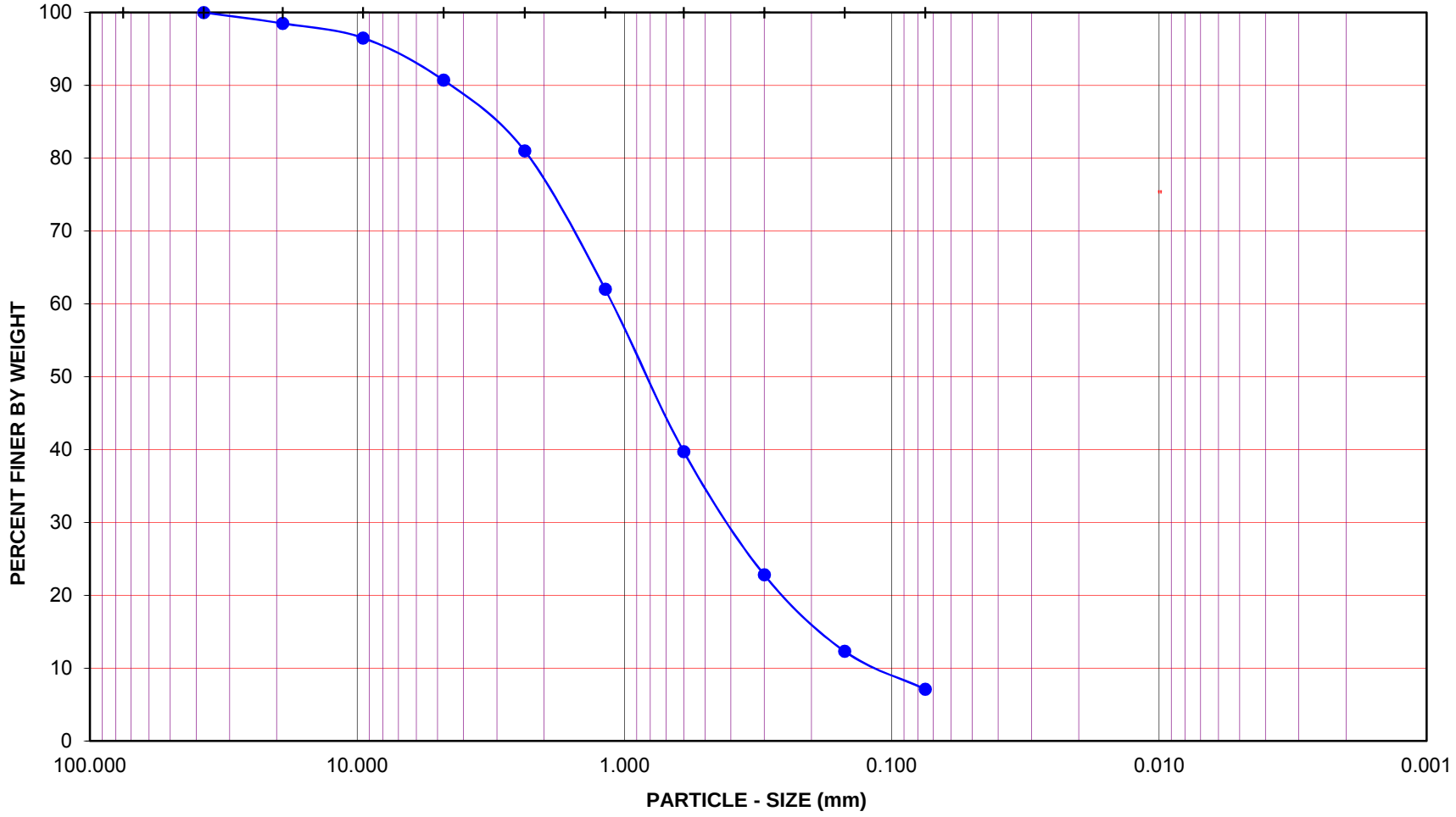
PARTICLE - SIZE DISTRIBUTION ASTM D 6913

Oct-11

GRAVEL		SAND			FINES	
COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY

U.S. STANDARD SIEVE OPENING — U.S. STANDARD SIEVE NUMBER — HYDROMETER

3.0" 1 1/2" 3/4" 3/8" #4 #8 #16 #30 #50 #100 #200



Project Name: Devil's Gate

Project No.: 603211-001

Exploration No.: B-4 Sample No.: B2

Depth (feet): 10.0 Soil Type : SW-SM

Soil Identification: Olive brown well-graded sand with silt (SW-SM)

GR:SA:FI : (%) 9 : 84 : 7

Leighton

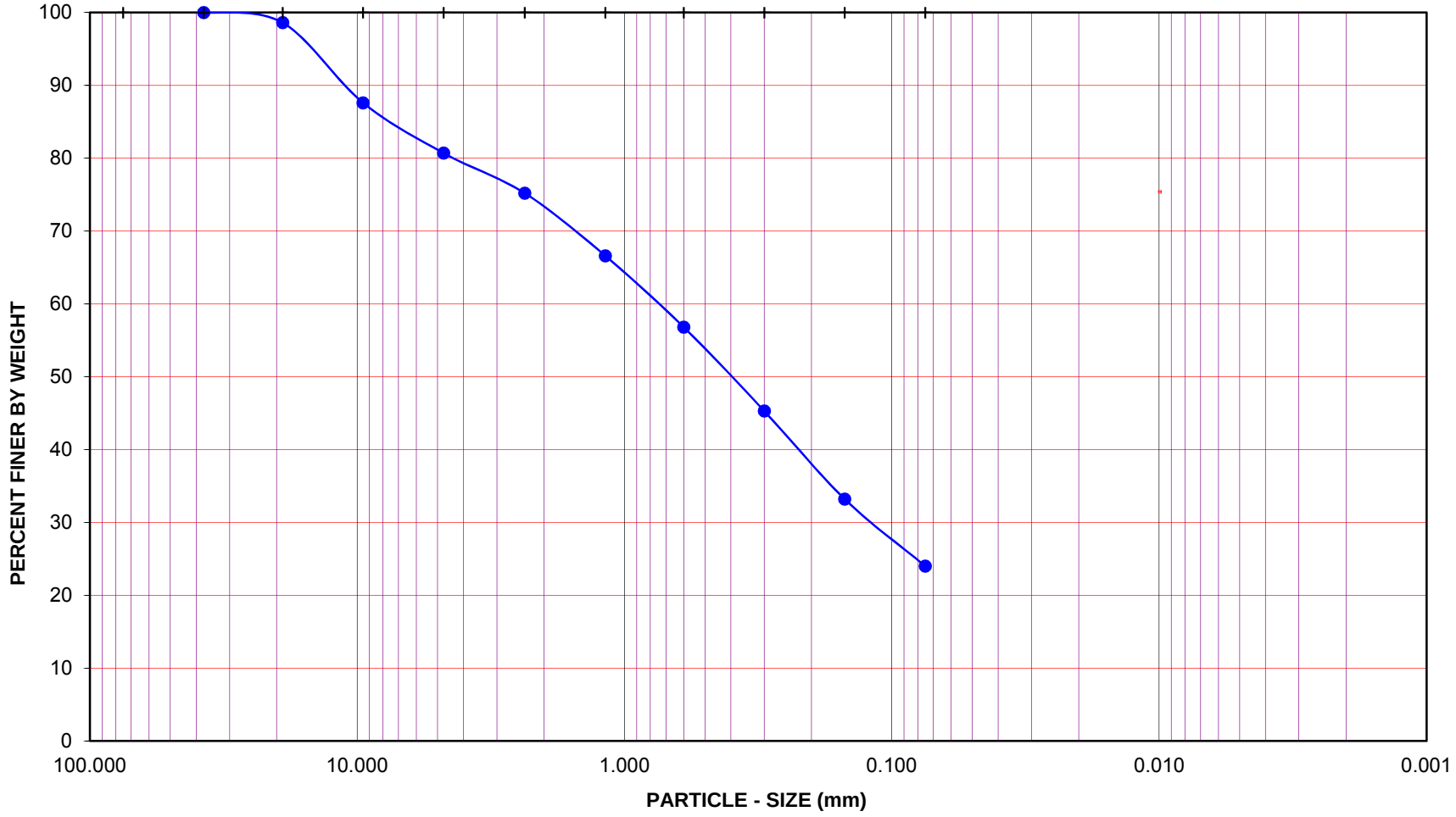
PARTICLE - SIZE DISTRIBUTION ASTM D 6913

Oct-11

GRAVEL		SAND			FINES	
COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY

U.S. STANDARD SIEVE OPENING — U.S. STANDARD SIEVE NUMBER — HYDROMETER

3.0" 1 1/2" 3/4" 3/8" #4 #8 #16 #30 #50 #100 #200



Project Name: Devil's Gate

Project No.: 603211-001

Exploration No.: B-9 Sample No.: B1

Depth (feet): 5.0 Soil Type : (SM)g

Soil Identification: Olive gray silty sand with gravel (SM)g

GR:SA:FI : (%) 19 : 57 : 24

Leighton

PARTICLE - SIZE DISTRIBUTION ASTM D 6913

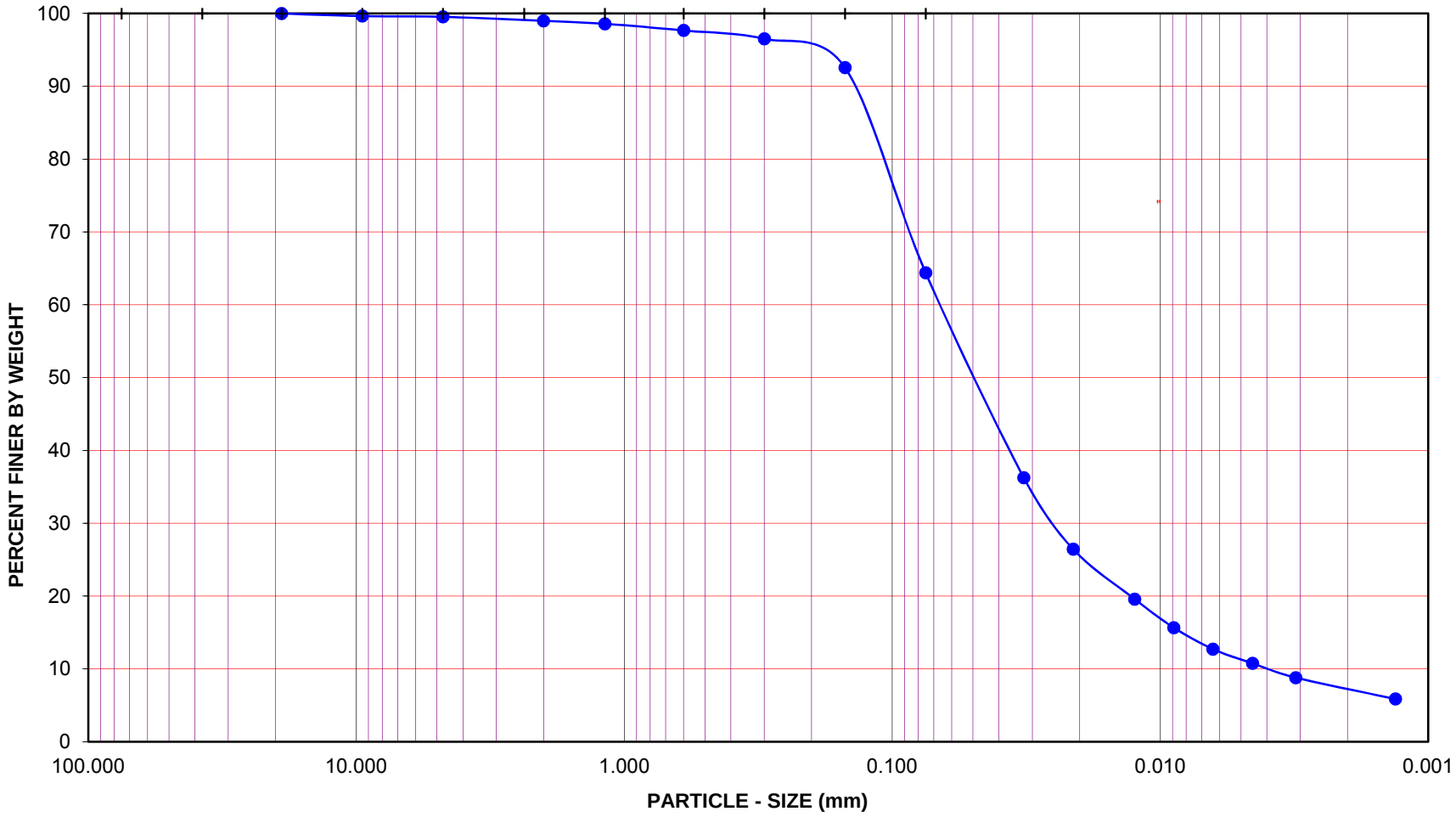
Oct-11

GRAVEL		SAND			FINES	
COARSE	FINE	CRSE	MEDIUM	FINE	SILT	CLAY

U.S. STANDARD SIEVE OPENING: 3.0" 1 1/2" 3/4" 3/8"

U.S. STANDARD SIEVE NUMBER: #4 #8 #16 #30 #50 #100 #200

HYDROMETER



Project Name: Devil's Gate

Project No.: 603211-001

Exploration No.: B-9 Sample No.: B2

Depth (feet) : 10.0 Soil Type : s(ML)

Soil Identification: Olive gray sandy silt s(ML); organic material noted

GR:SA:FI : (%) 0 : 36 : 64

Leighton

PARTICLE - SIZE DISTRIBUTION ASTM D 422

Oct-11

ATTERBERG LIMITS

ASTM D 4318

Project Name:	Devil's Gate	Tested By:	V. Juliano	Date:	10/25/11
Project No. :	603211-001	Input By:	J. Ward	Date:	10/25/11
Boring No.:	B-3	Checked By:	J. Ward		
Sample No.:	B2	Depth (ft.)	10.0		
Soil Identification:	Olive gray well-graded sand with silt (SW-SM)				

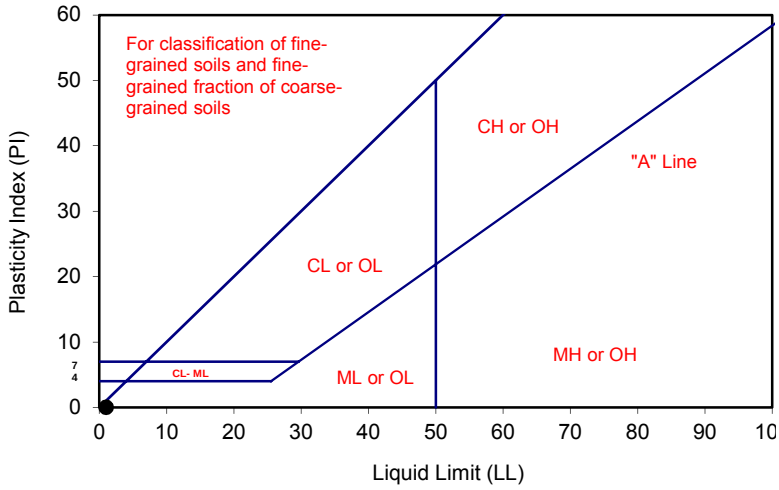
TEST	PLASTIC LIMIT		LIQUID LIMIT			
NO.	1	2	1	2	3	4
Number of Blows [N]			5			
Wet Wt. of Soil + Cont. (g)	**Cannot be rolled:**		28.89	**Cannot get more than 5 blows:**		
Dry Wt. of Soil + Cont. (g)	**NonPlastic**		26.03	**NonPlastic**		
Wt. of Container (g)			11.71			
Moisture Content (%) [Wn]			19.97			

Liquid Limit	**NP**
Plastic Limit	**NP**
Plasticity Index	**NP**
Classification	**NP**

PI at "A" - Line = 0.73(LL-20) =

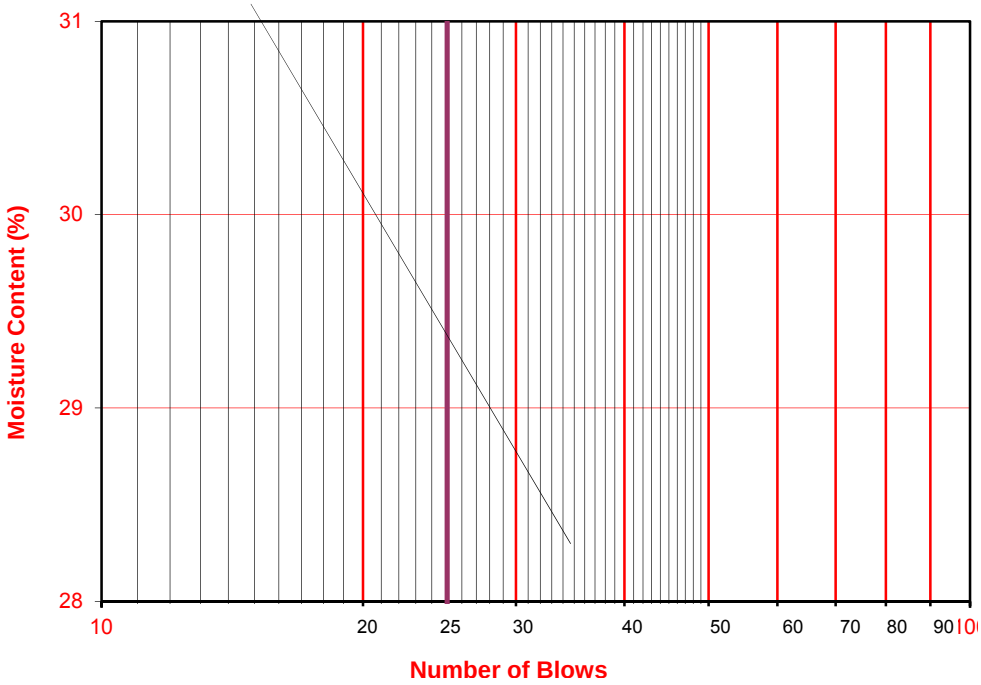
One - Point Liquid Limit Calculation

$LL = Wn(N/25)^{0.121}$



PROCEDURES USED

☐	Wet Preparation
	Multipoint - Wet
X	Dry Preparation
	Multipoint - Dry
X	Procedure A
	Multipoint Test
☐	Procedure B
	One-point Test



ATTERBERG LIMITS

ASTM D 4318

Project Name:	Devil's Gate	Tested By:	V. Juliano	Date:	10/24/11
Project No. :	603211-001	Input By:	J. Ward	Date:	10/25/11
Boring No.:	B-9	Checked By:	J. Ward		
Sample No.:	B2	Depth (ft.)	10.0		
Soil Identification:	Olive gray sandy silt s(ML); organic material noted				

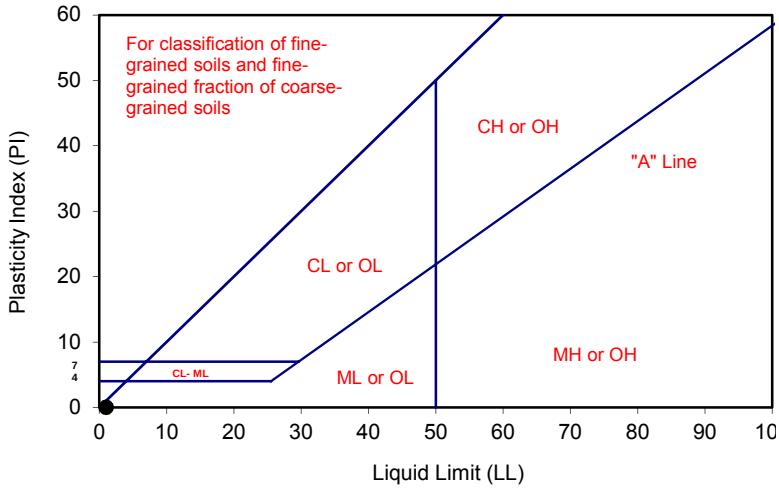
TEST	PLASTIC LIMIT		LIQUID LIMIT			
NO.	1	2	1	2	3	4
Number of Blows [N]			8			
Wet Wt. of Soil + Cont. (g)	**Cannot be rolled:**		25.01	**Cannot get more than 8 blows:**		
Dry Wt. of Soil + Cont. (g)	**NonPlastic**		22.19	**NonPlastic**		
Wt. of Container (g)			11.72			
Moisture Content (%) [Wn]			26.93			

Liquid Limit	**NP**
Plastic Limit	**NP**
Plasticity Index	**NP**
Classification	**NP**

PI at "A" - Line = 0.73(LL-20) =

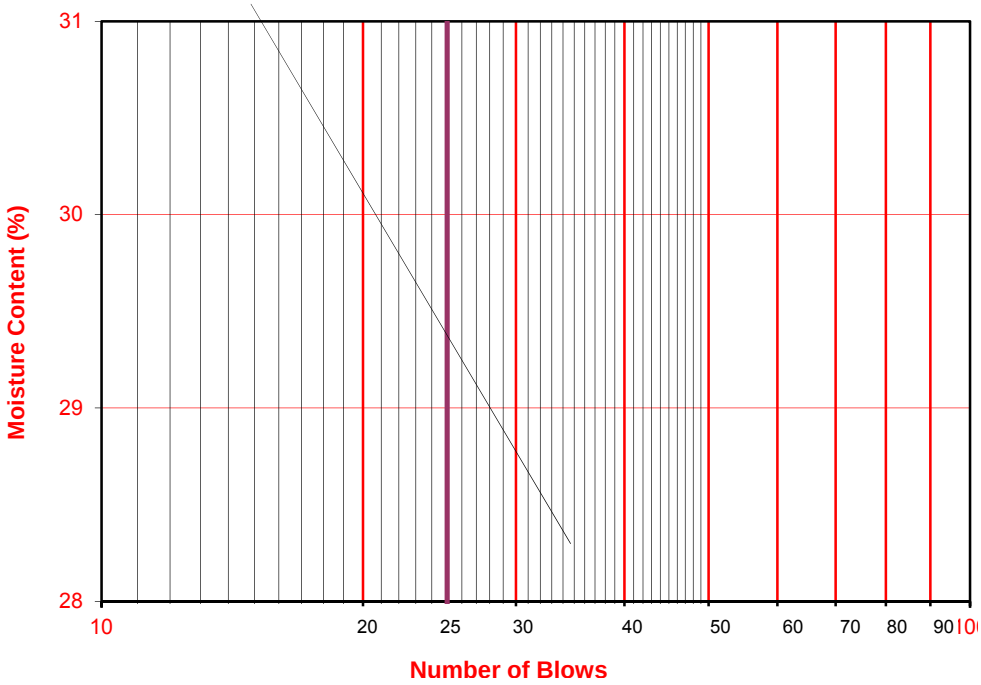
One - Point Liquid Limit Calculation

$LL = Wn(N/25)^{0.121}$



PROCEDURES USED

	Wet Preparation
	Multipoint - Wet
X	Dry Preparation
	Multipoint - Dry
X	Procedure A
	Multipoint Test
	Procedure B
	One-point Test



APPENDIX D

Table D1
Summary of Detected Metals (EPA Method 6010B/7471A)
Devil's Gate, Pasadena, California

Sample ID	Sample Date	Sample Depth (feet bgs)	Title 22/CAM 17 Metals															
			Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Molybdenum	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc	Mercury
			mg/kg																
B-1-5	09/19/11	5	1.3	2.1	52	0.29	0.092	8.2	4.4	21	3.7	0.27	4.7	ND	ND	0.91	32	54	0.087
B-1-10	09/19/11	10	1.7	2.9	49	0.32	0.12	6.0	3.9	10	4.9	ND	4.0	ND	ND	ND	24	44	0.30
B-1-15	09/19/11	15	1.7	2.4	48	0.37	0.13	8.1	4.7	15	10	0.34	5.3	ND	ND	0.86	27	57	0.48
B-1-20	09/19/11	20	1.4	1.5	49	0.26	0.12	7.1	3.6	21	8.8	ND	4.6	ND	ND	ND	21	46	0.18
B-1-25	09/19/11	25	1.2	2.7	55	0.29	0.083	9.6	3.1	19	7.8	0.95	3.4	ND	ND	ND	17	43	0.22
B-3-5	09/19/11	5	1.1	1.7	37	0.23	0.074	5.6	3.0	8	3.6	ND	3.4	ND	ND	ND	16	29	0.18
B-3-10	09/19/11	10	1.0	2.3	49	0.30	0.090	8.8	4.1	13	5.5	ND	4.9	ND	ND	ND	24	36	0.095
B-3-15	09/19/11	15	ND	1.2	24	0.19	ND	3.4	2.1	11	2.2	ND	2.0	ND	ND	ND	13	25	0.19
B-3-20	09/19/11	20	2.0	3.2	130	0.35	0.12	14	7.0	43	8.1	0.84	7.8	ND	ND	1.3	36	72	0.14
B-3-25	09/19/11	25	0.86	2.4	72	0.28	0.053	9.1	4.0	17	3.5	0.57	4.6	ND	ND	0.86	22	38	0.11
B-4-5	09/20/11	5	1.2	2.0	55	0.28	0.11	7.8	4.1	17	4.9	ND	4.7	ND	ND	ND	25	40	0.14
B-4-10	09/20/11	10	ND	2.1	39	0.21	0.065	7.4	3.6	11	3.3	0.30	4.0	ND	ND	ND	28	32	0.20
B-4-15	09/20/11	15	0.81	2.3	40	0.22	0.062	10	2.9	8.6	3.0	ND	2.7	ND	ND	ND	25	28	0.14
B-4-20	09/20/11	20	0.88	1.8	41	0.26	0.066	11	3.4	18	3.4	1.1	3.9	ND	0.069	ND	23	39	0.23
B-4-25	09/20/11	25	0.85	1.7	180	0.17	ND	10	5.8	51	1.8	0.91	5.6	ND	ND	ND	36	41	0.047
B-9-5	09/20/11	5	2.7	4.3	160	0.77	0.21	23	11	31	21	0.88	15	ND	ND	2.1	51	99	0.26
B-9-10	09/20/11	10	0.91	1.6	40	0.26	0.096	5.7	3.4	12	4.3	0.28	3.3	ND	ND	ND	20	30	0.085
B-9-15	09/20/11	15	2.6	3.8	110	0.86	0.17	18	8.5	28	9.7	0.52	12	ND	0.15	1.3	40	70	0.31
B-9-20	09/20/11	20	1.1	1.4	58	0.29	0.073	8.1	4.5	13	2.9	ND	5.0	ND	ND	0.79	24	37	0.10
B-9-25	09/20/11	25	3.0	3.7	160	0.76	0.21	21	10	30	19	0.77	14	ND	0.10	1.8	52	96	0.26
B-9-30	09/20/11	30	0.66	1.1	38	0.28	0.079	5.6	3.4	18	2.8	ND	3.7	ND	ND	ND	20	35	0.26
B-3-5-D	09/19/11	5	1.0	2.2	53	0.28	0.076	8.7	4.4	14	4.4	0.26	5.0	ND	0.068	0.94	27	40	0.29
B-4-10-D	09/20/11	10	1.1	2.0	36	0.24	0.061	6.0	3.7	16	3.6	0.27	3.6	ND	ND	ND	22	35	0.11
B-9-10-D	09/20/11	10	1.4	2.6	100	0.46	0.15	14	7.3	17	6.4	0.32	8.6	ND	0.098	1.3	38	71	0.13
BLM HRMC (Camper) (Soil mg/kg)			50	20	NL	NL	70	NL	NL	5,000	1,000	NL	2,700	700	700	NL	NL	40,000	40
BLM HRMC (Worker) (Soil mg/kg)			100	12	NL	NL	100	NL	NL	7,400	2,000	NL	4,000	1,000	1,000	NL	NL	480,000	480
BLM HRMC (Resident) (Soil mg/kg)			3	1	NL	NL	3	NL	NL	250	400	NL	135	35	35	NL	NL	2,000	2
CHHSL (Residential) mg/kg			30	0.07	5,200	150	1.7	100,000	660	3,000	150	380	1,600	380	380	5	530	23,000	18
CHHSL (Industrial) mg/kg			380	0.24	63,000	1,700	7.5	100,00	3,200	38,000	3,500	4,800	16,000	4,800	4,800	63	6,700	100,000	180
RSL (Residential) mg/kg			31	0.39	15,000	160	70	120,000	23	3,100	400*	390	1,500	390	390	0.78	390	23,000	10
RSL (Industrial) mg/kg			410	1.6	190,000	2,000	800	1,500,000	300	41,000	800	5,100	20,000	5,100	5,100	10	5,200	310,000	43
TTLC (mg/kg)			500	500	10,000	75	100	2,500	8,000	2,500	1,000	3,500	2,000	100	500	700	2,400	5,000	20
10xSTLC (mg/L)			150	50	1,000	7.5	10	5,600	800	250	50	3,500	200	10	50	70	240	2,500	2
20xTCLP (mg/L)			NL	100	2,000	NL	20	100	NL	NL	100	NL	NL	20	100	NL	NL	NL	4
Protection of Groundwater, Risk-Based SSL (mg/kg)			0.66	0.0013	300	58	NL	.00083	0.49	51	NL	3.7	48	0.95	1.6	0.026	180	680	0.033

Notes:

HRMC Human Risk Management Criteria RMC Risk Management Criteria ATV All Terrain Vehicle

Title 22/CAM 17 Metals, analyzed by EPA Method 6010B/7471A

RED* = Lead MSSL 150 mg/Kg as required by LA County

CHHSL = California Human Health Screening Levels, Cal EPA, Use of California Human Health Screening Levels (CHHSLs) in Evaluation of Contaminated Properties, January 1995

RSL = Regional Screening Level, U.S. EPA Regional Screening Levels for Chemical Contaminants at Superfund Sites dated June 2011

SSL = Site Screening Level

TTLC = Total Threshold Limit Concentration

STLC = Soluble Threshold Limit Concentration

TCLP = Toxicity Characteristic Leaching Procedure

mg/kg = Milligrams per kilogram

mg/L = Milligrams per liter

NL = Not listed

ND = Analyte not detected at or above the reporting limit

D = Duplicate sample

Table D2
Summary of Detected Organopesticides (EPA Method 8081)
Devil's Gate, Pasadena, California

Sample ID	Sample Date	Sample Depth (feet bgs)	4,4'-DDE mg/kg	4,4'-DDT mg/kg
B-1-5	09/19/11	5	ND	ND
B-1-10	09/19/11	10	ND	ND
B-1-15	09/19/11	15	ND	ND
B-1-20	09/19/11	20	ND	ND
B-1-25	09/19/11	25	ND	ND
B-3-5	09/19/11	5	ND	ND
B-3-10	09/19/11	10	ND	ND
B-3-15	09/19/11	15	ND	ND
B-3-20	09/19/11	20	ND	ND
B-3-25	09/19/11	25	ND	ND
B-4-5	09/20/11	5	ND	ND
B-4-10	09/20/11	10	ND	ND
B-4-15	09/20/11	15	ND	ND
B-4-20	09/20/11	20	ND	ND
B-4-25	09/20/11	25	ND	ND
B-9-5	09/20/11	5	**0.0015**	**0.00059**
B-9-10	09/20/11	10	ND	ND
B-9-15	09/20/11	15	ND	ND
B-9-20	09/20/11	20	ND	ND
B-9-25	09/20/11	25	ND	ND
B-9-30	09/20/11	30	ND	ND
B-3-5-D	09/19/11	5	ND	ND
B-4-10-D	09/20/11	10	ND	ND
B-9-10-D	09/20/11	10	ND	ND
CHHSL (Residential) mg/kg			**1.6**	**1.6**
CHHSL (Industrial) mg/kg			**6.3**	**6.3**
RSL (Residential) mg/kg			**1.4**	**1.7**
RSL (Industrial) mg/kg			**5.1**	**7.0**
TTLC (mg/kg)			**1**	**1**
10xSTLC (mg/L)			**1**	**1**
20xTCLP (mg/L)			**NL**	**NL**
Protection of Groundwater, Risk-Based SSL (mg/kg)			**0.047**	**0.067**

Notes:

Organopesticides, analyzed by EPA Method 8081
CHHSL = California Human Health Screening Levels, Cal EPA, January 1995
RSL = Regional Screening Level, U.S. EPA Regional Screening Levels for Chemical Contaminants at Superfund Sites dated June 2011
SSL = Site Screening Level
TTLC = Total Threshold Limit Concentration
STLC = Soluble Threshold Limit Concentration
TCLP = Toxicity Characteristic Leaching Procedure
mg/kg = Milligrams per kilogram
mg/L = Milligrams per liter
NL = Not listed
ND = Analyte not detected at or above the reporting limit
D = Duplicate sample

Table D3

Summary of Detected VOCs (EPA Method 8260), SVOCs (EPA Method 8270C) and TPH (Luft/FFP)

Devil's Gate, Pasadena, California

Sample ID	Depth (ft. bgs)	Date	TPH		VOCs			SVOCs
			Diesel (FFP)	Hydraulic Oil/Motor Oil	Benzene	Toluene	1,2,4-Trimethylbenzene	bis(2-Ethylhexyl)phthalate
			mg/kg					
B-1-5	5	9/19/2011	ND	ND	**0.0044**	**0.0015**	ND	**0.058**
B-1-10	10	9/19/2011	ND	ND	--	--	--	ND
B-1-15	15	9/19/2011	ND	ND	--	--	--	ND
B-1-20	20	9/19/2011	ND	**20**	ND	ND	ND	ND
B-1-25	25	9/19/2011	**12**	**29**	--	--	--	**0.14**
B-3-5	5	9/19/2011	ND	ND	**0.0085**	**0.0036**	ND	ND
B-3-10	10	9/19/2011	ND	ND	--	--	--	ND
B-3-15	15	9/19/2011	ND	**18**	ND	ND	ND	ND
B-3-20	20	9/19/2011	ND	**16**	--	--	--	ND
B-3-25	25	9/19/2011	ND	ND	--	--	--	**0.046**
B-4-5	5	9/20/2011	ND	ND	**0.0043**	**0.0020**	ND	ND
B-4-10	10	9/20/2011	ND	ND	--	--	--	ND
B-4-15	15	9/20/2011	ND	**12**	--	--	--	ND
B-4-20	20	9/20/2011	**20**	**39**	ND	ND	ND	**0.13**
B-4-25	25	9/20/2011	ND	ND	ND	ND	ND	**0.13**
B-9-5	5	9/20/2011	ND	**21**	**0.0020**	ND	**0.0037**	ND
B-9-10	10	9/20/2011	ND	ND	--	--	--	ND
B-9-15	15	9/20/2011	ND	ND	--	--	--	ND
B-9-20	20	9/20/2011	ND	ND	--	--	--	ND
B-9-25	25	9/20/2011	ND	ND	**0.0039**	ND	ND	ND
B-9-30	30	9/20/2011	ND	ND	--	--	--	ND
B-3-5-D	5	9/19/2011	ND	ND	--	--	--	ND
B-9-10-D	10	9/20/2011	ND	ND	--	--	--	ND
B-4-10-D	10	9/20/2011	ND	ND	--	--	--	ND
RSL (Residential, mg/kg)			**NL**	**NL**	**1.1**	**5,000**	**62**	**35**
RSL (Industrial, mg/kg)			**NL**	**NL**	**5.4**	**45,000**	**260**	**120**
CHHSL (Residential, mg/kg)			**NL**	**NL**	**3.62**	**135,000**	**NL**	**NL**
CHHSL (Industrial, mg/kg)			**NL**	**NL**	**122**	**378,000**	**NL**	**NL**
TTLC (mg/kg)			**NL**	**NL**	**NL**	**NL**	**NL**	**NL**
10xSTLC (mg/L)			**NL**	**NL**	**NL**	**NL**	**NL**	**NL**
20xTCLP (mg/L)			**NL**	**NL**	**10**	**NL**	**NL**	**NL**
Protection of Groundwater, Risk-Based SSL (mg/kg)			**NL**	**NL**	**0.00021**	**1.6**	**0.021**	**1.1**

Notes:

TPH = Total petroleum hydrocarbons, analyzed by LUFT/Fuel Fingerprint Method
VOCs = Volatile organic compounds, analyzed by EPA Method 8260B
SVOCs = Semi-volatile organic compouds, analyzed by EPA Method 8270C
FFP = Fuel Fingerprint
mg/kg = Milligrams per kilogram
mg/L = Milligrams per liter
ND = The analyte was analyzed for, but not detected. The associated numerical value is at or below the reporting limit (RL).
ft = Feet
-- = Not analyzed
RSL = Regional Screening Level, U.S. EPA Regional Screening Levels for Chemical Contaminants at Superfund Sites dated June 2011
SSL = Site Screening Level
CHHSL = California Human Health Screening Levels, Cal EPA, Use of California Human Health Screening Levels (CHHSLs) in Evaluation of Contaminated Properties, January 1995
TTLC = Total Threshold Limit Concentration
STLC = Soluble Threshold Limit Concentration
TCLP = Toxicity Characteristic Leaching Procedure
NL = Not listed
D = Duplicate sample

BC Laboratories, Inc.
Environmental Testing Laboratory Since 1949

Date of Report: 10/10/2011

Michael Crews

Gannett Fleming, Inc
1 Technology Drive, Suite F207
Irvine, CA 92618

Project:	Devils Gate
BC Work Order:	1115416
Invoice ID:	B108935

Enclosed are the results of analyses for samples received by the laboratory on 9/21/2011. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Contact Person: Tina Green
Client Services Manager

Authorized Signature

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BC Laboratories, Inc.

Chain of Custody Form

CHK BY: Con | DISTRIBUTION | SUB-OUT ☐

Page 1 of 2

Report To: Client: Leighton Consulting, Inc.		Project #: 603211-001	
Attn: Vincent Ip / Robert Lorton		Project Name: Devil's Gate	
Street Address: 2121 Wilshire Blvd., Suite 1900		Global ID #:	
City, State, Zip: LA, CA. 90017		Sampler(s): W. Scomies / P. Babcok	
Phone: 213-892-1682	Fax: 213-892-1563		
Email Address: vip@leightongroup.com		rlorton@leightongroup.com	
Work Order #: 11-15416			

Analysis Requested: Title 22 Metals; Pesticides; SVOCs; TPH EFP

Comments:
- Standard Turnaround
- Use 1 sleeve for the four analyses requested, archive the remaining sleeve for later.

Are there any tests with holding times less than or equal to 48 hours? ☐ Yes ☒ No

* Standard Turnaround = 10 work days

Sample #	Description		Date Sampled	Time Sampled	Title 22 Metals	Pesticides	SVOCs	TPH EFP	Sample Matrix	Turnaround # of work days*	Notes
B-1-5'	2 sleeves per sample	-1	9/19/11	08:50	X	X	X	X	Soil X	10	See comments
B-1-10'	↓	-2	↓	08:55	↓	↓	↓	↓	↓	↓	
B-1-15'	↓	-3	↓	09:00	↓	↓	↓	↓	↓	↓	
B-1-20'	↓	-4	↓	09:05	↓	↓	↓	↓	↓	↓	
B-1-25'	1 sleeve	-5	↓	09:20	↓	↓	↓	↓	↓	↓	
B-3-5'	1 sleeve	-6	↓	10:05	↓	↓	↓	↓	↓	↓	
B-3-10'	2 sleeves per sample	-7	↓	10:07	↓	↓	↓	↓	↓	↓	
B-3-15'	↓	-8	↓	10:10	↓	↓	↓	↓	↓	↓	
B-3-20'	↓	-9	↓	10:25	↓	↓	↓	↓	↓	↓	
B-3-25'	1 sleeve	-10	↓	10:43	↓	↓	↓	↓	↓	↓	
B-4-30'	2 sleeves per sample	-11	9/20/11	09:55	↓	↓	↓	↓	↓	↓	
B-4-5'	↓	-12	↓	08:58	↓	↓	↓	↓	↓	↓	
B-4-10'	1 sleeve	-13	↓	09:05	↓	↓	↓	↓	↓	↓	
B-4-15'	2 sleeves per sample	-14	↓	09:09	↓	↓	↓	↓	↓	↓	

Billing ☐ Same as above
Client: Leighton Consulting, Inc.
Address: 17781 Cowan
City: Irvine State: CA Zip: 92614
Attn: Accounts Payable
PO#: 603211-001

EDF Required? ☐ Yes ☐ No
Send Copy to State of CA? (EDT) ☐ Yes ☐ No

Sample Disposal: ☐ Return to Client ☐ Disposal by lab ☐ Archive: Months____

Special Reporting: ☐ QC ☐ EDF ☐ Raw Data

Relinquished By	Date	Time	Received By	Date	Time
1. Wallace Scomies	9-21-11	11:39	1. Idel Cruz	9-21-11	11:40
2. Idel Cruz	9-21-11	21:05	2. [signature]	9-21-11	21:05
3.			3.		

BC Laboratories, Inc. – 4100 Atlas Ct. – Bakersfield, CA 93308 – 661.327.4911 – Fax: 661.327.1918 – www.bclabs.com

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BC Laboratories, Inc.

Chain of Custody Form

Page 2 of 2

Report To:
Client: Leighton Consulting, Inc.
Attn: Vincent Lip / Robert Lorton
Street Address: 611 Wilshire Blvd, Suite 1404
City, State, Zip: LA, CA, 90017
Phone: 213-892-1682 Fax: 213-892-1583
Email Address: vip@leightongroup.com
Work Order #: 1115416

Project #: 60324-001
Project Name: Devil's Gate
Global ID #:
Sampler(s): W. Scoviers
P. Babcock
rlorton@leightongroup.

Analysis Requested

Comments:
- Standard Turnaround
- Use 1 sleeve for the four analyses requested, archive the remaining sleeve for later.

Are there any tests with holding times less than or equal to 48 hours? ☐ Yes ☒ No
* Standard Turnaround = 10 work days

Sample #	Description		Date Sampled	Time Sampled	Title 22 Metals	Pesticides	SVOCs	TPH	Sample Matrix: Soil	Sludge	Drinking Water	Ground Water	Waste Water	Other	Turnaround # of work days*	Notes
B-4-20	2 sleeves per sample	-15	9/20/11	09:15	X	X	X	X	X						10	See Comments
B-4-25	↓	-16		09:20												
B-4-5		-17		11:00												
B-4-10	1 sleeve	-18		11:03												
B-4-15	2 sleeves per sample	-19		11:07												
B-4-20	↓	-20		11:15												
B-4-25	1 sleeve	-21		11:40												
B-3-5-D		-22	9/19/10	10:05	X	X	X	X	X							
B-4-10-D		-23	9/20/10	09:05	X	X	X	X	X							
B-4-10-D	↓	-24	9/20/10	11:07	X	X	X	X	X							
		~~-25~~ BWT 9-22														

Billing ☐ Same as above
Client: Leighton Consulting, Inc.
Address: 17961 Cowan
City: Irvine State: CA Zip: 92614
Attn: Accounts Payable
PO#: 60324-001

EDF Required? ☐ Yes ☐ No
Send Copy to State of CA? (EDT) ☐ Yes ☐ No

Sample Disposal ☐ Return to Client ☐ Disposal by lab ☐ Archive: Months ____

Special Reporting ☐ QC ☐ EDF ☐ Raw Data

	Relinquished By	Date	Time		Received By	Date	Time
1.	Wallace Scoviers	9-21-11	11:39	1.	Idel Cruz	9-21-11	11:40
2.	Idel Cruz	9-21-11	21:05	2.	[signature]	9-21-11	2105
3.				3.			

BC Laboratories, Inc. – 4100 Atlas Ct. – Bakersfield, CA 93308 – 661.327.4911 – Fax: 661.327.1918 – www.bclabs.com

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BC LABORATORIES INC. SAMPLE RECEIPT FORM Rev. No. 12 06/24/08 Page 1 Of 4

Submission #: 11-15416

SHIPPING INFORMATION	SHIPPING CONTAINER
Federal Express ☐ UPS ☐ Hand Delivery ☐	Ice Chest ☑ None ☐
BC Lab Field Service ☑ Other ☐ (Specify)_______	Box ☐ Other ☐ (Specify)_______

Refrigerant: Ice ☑ Blue Ice ☐ None ☐ Other ☐ Comments:

Custody Seals: Ice Chest ☐ Intact? Yes ☐ No ☐ | Containers ☐ Intact? Yes ☐ No ☐ | None ☑ Comments:

All samples received? Yes ☑ No ☐ All samples containers intact? Yes ☑ No ☐ Description(s) match COC? Yes ☑ No ☐

COC Received ☑ YES ☐ NO

Emissivity: 0.94 Container: Soil Sleeve Thermometer ID: ~~199~~ 82 * new 9-21-11

Temperature: A 1.8 °C / C 2.8 °C

Date/Time 9-21-11 2057 Analyst Init JNW

SAMPLE CONTAINERS	SAMPLE NUMBERS 1	2	3	4	5	6	7	8	9	10
QT GENERAL MINERAL/ GENERAL PHYSICAL										
PT PE UNPRESERVED										
QT INORGANIC CHEMICAL METALS										
PT INORGANIC CHEMICAL METALS										
PT CYANIDE										
PT NITROGEN FORMS										
PT TOTAL SULFIDE										
2oz. NITRATE / NITRITE										
PT TOTAL ORGANIC CARBON										
PT TOX										
PT CHEMICAL OXYGEN DEMAND										
PtA PHENOLICS										
40ml VOA VIAL TRAVEL BLANK										
40ml VOA VIAL										
QT EPA 413.1, 413.2, 418.1										
PT ODOR										
RADIOLOGICAL										
BACTERIOLOGICAL										
40 ml VOA VIAL- 504										
QT EPA 508/608/8080										
QT EPA 515.1/8150										
QT EPA 525										
QT EPA 525 TRAVEL BLANK										
100ml EPA 547										
100ml EPA 531.1										
QT EPA 548										
QT EPA 549										
QT EPA 632										
QT EPA 8015M										
QT AMBER										
8 OZ. JAR										
32 OZ. JAR										
SOIL SLEEVE metal	AB	AB	AB	AB	A	A	AB	AB	AB	A
PCB VIAL										
PLASTIC BAG										
FERROUS IRON										
ENCORE										

Comments:__________

Sample Numbering Completed By: BLT Date/Time: 9-22-11 @ 1100

A = Actual / C = Corrected

[H:\DOCS\WP80\LAB_DOCS\FORMS\SAMREC2.WPD]

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Chain of Custody and Cooler Receipt Form for 1115416 Page 4 of 6

BC LABORATORIES INC. SAMPLE RECEIPT FORM Rev. No. 12 06/24/08 Page 2 Of 4

Submission #: 11-15416

SHIPPING INFORMATION
Federal Express ☐ UPS ☐ Hand Delivery ☐
BC Lab Field Service ☑ Other ☐ (Specify)_____

SHIPPING CONTAINER
Ice Chest ☑ None ☐
Box ☐ Other ☐ (Specify)_____

Refrigerant: Ice ☑ Blue Ice ☐ None ☐ Other ☐ Comments:

Custody Seals: Ice Chest ☐ (Intact? Yes ☐ No ☐) Containers ☐ (Intact? Yes ☐ No ☐) None ☑ Comments:

All samples received? Yes ☑ No ☐ All samples containers intact? Yes ☑ No ☐ Description(s) match COC? Yes ☑ No ☐

COC Received ☑ YES ☐ NO

Emissivity: 0.9 * Container: Soil Sleeve Thermometer ID: 32 * 177 9-21-11

Temperature: A 0.3 °C / C 1.3 °C

Date/Time 9-21-11 2057

Analyst Init JLW

SAMPLE CONTAINERS	SAMPLE NUMBERS									
	11	12	13	14	15	16	17	18	19	1920
QT GENERAL MINERAL/ GENERAL PHYSICAL										
PT PE UNPRESERVED										
QT INORGANIC CHEMICAL METALS										
PT INORGANIC CHEMICAL METALS										
PT CYANIDE										
PT NITROGEN FORMS										
PT TOTAL SULFIDE										
2oz. NITRATE / NITRITE										
PT TOTAL ORGANIC CARBON										
PT TOX										
PT CHEMICAL OXYGEN DEMAND										
PIA PHENOLICS										
40ml VOA VIAL TRAVEL BLANK										
40ml VOA VIAL										
QT EPA 413.1, 413.2, 418.1										
PT ODOR										
RADIOLOGICAL										
BACTERIOLOGICAL										
40 ml VOA VIAL- 504										
QT EPA 508/608/8080										
QT EPA 515.1/8150										
QT EPA 525										
QT EPA 525 TRAVEL BLANK										
100ml EPA 547										
100ml EPA 531.1										
QT EPA 548										
QT EPA 549										
QT EPA 632										
QT EPA 8015M										
QT AMBER										
8 OZ. JAR										
32 OZ. JAR										
SOIL SLEEVE Metal	AB	AB	A	AB	AB	AB	AB	A	AB	AB
PCB VIAL										
PLASTIC BAG										
FERROUS IRON										
ENCORE										

Comments:
Sample Numbering Completed By: BLT Date/Time: 9-22-11 1100
A = Actual / C = Corrected

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Chain of Custody and Cooler Receipt Form for 1115416 Page 5 of 6

BC LABORATORIES INC. SAMPLE RECEIPT FORM Rev. No. 12 06/24/08 Page 3 of 4

Submission #: 11-15416

SHIPPING INFORMATION	SHIPPING CONTAINER
Federal Express ☐ UPS ☐ Hand Delivery ☐	Ice Chest ☑ None ☐
BC Lab Field Service ☑ Other ☐ (Specify)_____	Box ☐ Other ☐ (Specify)_____

Refrigerant: Ice ☑ Blue Ice ☐ None ☐ Other ☐ Comments:

Custody Seals: Ice Chest ☐ Intact? Yes ☐ No ☐ | Containers ☐ Intact? Yes ☐ No ☐ | None ☑ Comments:

All samples received? Yes ☑ No ☐ All samples containers intact? Yes ☒ No ☐ Description(s) match COC? Yes ☑ No ☐

COC Received ☑ YES ☐ NO

Emissivity: 0.9 * Container: Soil Sleeve Thermometer ID: 82 * 127 JNW 9-21-11

Temperature: A 0.3 °C / C 1.3 °C

Date/Time 9-21-11 2057

Analyst Init JNW

SAMPLE CONTAINERS	SAMPLE NUMBERS									
	2₁	2₂	3	2₄	5	6	7	8	9	10
QT GENERAL MINERAL/ GENERAL PHYSICAL										
PT FE UNPRESERVED										
QT INORGANIC CHEMICAL METALS										
PT INORGANIC CHEMICAL METALS										
PT CYANIDE										
PT NITROGEN FORMS										
PT TOTAL SULFIDE										
Int. NITRATE / NITRITE										
PT TOTAL ORGANIC CARBON										
PT TOX										
PT CHEMICAL OXYGEN DEMAND										
P1A PHENOLICS										
40ml VOA VIAL TRAVEL BLANK										
40ml VOA VIAL	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
QT EPA 413.1, 413.2, 418.1										
PT ODOR										
RADIOLOGICAL										
BACTERIOLOGICAL										
40 ml VOA VIAL- 504										
QT EPA 508/608/8080										
QT EPA 515.1/8150										
QT EPA 525										
QT EPA 525 TRAVEL BLANK										
100ml EPA 547										
100ml EPA 531.1										
QT EPA 548										
QT EPA 549										
QT EPA 632										
QT EPA 8015M										
QT AMBER										
8 OZ. JAR										
32 OZ. JAR										
SOIL SLEEVE metal	A	A		A						
PCB VIAL										
PLASTIC BAG										
FERROUS IRON										
ENCORE										

Comments:

Sample Numbering Completed By: BLT Date/Time: 9-22-11 @ 1100

A = Actual / C = Corrected

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Chain of Custody and Cooler Receipt Form for 1115416 Page 6 of 6

BC LABORATORIES INC. SAMPLE RECEIPT FORM Rev. No. 12 06/24/08 Page 4 of 4

Submission #: 11-15416

SHIPPING INFORMATION	SHIPPING CONTAINER
Federal Express ☐ UPS ☐ Hand Delivery ☐	Ice Chest ☑ None ☐
BC Lab Field Service ☑ Other ☐ (Specify)_____	Box ☐ Other ☐ (Specify)_____

Refrigerant: Ice ☑ Blue Ice ☐ None ☐ Other ☐ Comments:

Custody Seals: Ice Chest ☐ Intact? Yes ☐ No ☐ | Containers ☐ Intact? Yes ☐ No ☐ | None ☑ Comments:

All samples received? Yes ☑ No ☐ All samples containers intact? Yes ☒ No ☐ Description(s) match COC? Yes ☒ No ☐

COC Received ☑ YES ☐ NO

Emissivity: 0.9 * Container: Soil Sleeve Thermometer ID: ~~199~~ 82 JK HOW 9-21-11

Temperature: A 1.8 °C / C 2.8 °C

Date/Time 9-21-11 2057

Analyst Init JWW

SAMPLE CONTAINERS	SAMPLE NUMBERS 1	2	2 3	4	5	6	7	8	9	10
QT GENERAL MINERAL/ GENERAL PHYSICAL										
PT PE UNPRESERVED										
QT INORGANIC CHEMICAL METALS										
PT INORGANIC CHEMICAL METALS										
PT CYANIDE										
PT NITROGEN FORMS										
PT TOTAL SULFIDE										
2oz. NITRATE / NITRITE										
PT TOTAL ORGANIC CARBON										
PT TOX										
PT CHEMICAL OXYGEN DEMAND										
PtA PHENOLICS										
40ml VOA VIAL TRAVEL BLANK										
40ml VOA VIAL										
QT EPA 413.1, 413.2, 418.1										
PT ODOR										
RADIOLOGICAL										
BACTERIOLOGICAL										
40 ml VOA VIAL- 504										
QT EPA 508/608/8080										
QT EPA 515.1/8150										
QT EPA 525										
QT EPA 525 TRAVEL BLANK										
100ml EPA 547										
100ml EPA 531.1										
QT EPA 548										
QT EPA 549										
QT EPA 632										
QT EPA 8015M										
QT AMBER										
8 OZ. JAR										
32 OZ. JAR										
SOIL SLEEVE metal			A							
PCB VIAL										
PLASTIC BAG										
FERROUS IRON										
ENCORE										

Comments:

Sample Numbering Completed By: BLT Date/Time: 9-22-11 @ 1100

A = Actual / C = Corrected

[K:\DOCS\WP0\LAB_DOCS\FORMS\SAMREC2.WP0]

Gannett Fleming, Inc
1 Technology Drive, Suite F207
Irvine, CA 92618

Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Laboratory / Client Sample Cross Reference

Laboratory	Client Sample Information			
1115416-01	**COC Number:**	---	**Receive Date:**	09/21/2011 21:05
	Project Number:	---	**Sampling Date:**	09/19/2011 08:50
	Sampling Location:	---	**Sample Depth:**	---
	Sampling Point:	B-1-5	**Lab Matrix:**	Solids
	Sampled By:	---	**Sample Type:**	Soil
1115416-02	**COC Number:**	---	**Receive Date:**	09/21/2011 21:05
	Project Number:	---	**Sampling Date:**	09/19/2011 08:55
	Sampling Location:	---	**Sample Depth:**	---
	Sampling Point:	B-1-10	**Lab Matrix:**	Solids
	Sampled By:	---	**Sample Type:**	Soil
1115416-03	**COC Number:**	---	**Receive Date:**	09/21/2011 21:05
	Project Number:	---	**Sampling Date:**	09/19/2011 09:00
	Sampling Location:	---	**Sample Depth:**	---
	Sampling Point:	B-1-15	**Lab Matrix:**	Solids
	Sampled By:	---	**Sample Type:**	Soil
1115416-04	**COC Number:**	---	**Receive Date:**	09/21/2011 21:05
	Project Number:	---	**Sampling Date:**	09/19/2011 09:05
	Sampling Location:	---	**Sample Depth:**	---
	Sampling Point:	B-1-20	**Lab Matrix:**	Solids
	Sampled By:	---	**Sample Type:**	Soil
1115416-05	**COC Number:**	---	**Receive Date:**	09/21/2011 21:05
	Project Number:	---	**Sampling Date:**	09/19/2011 09:20
	Sampling Location:	---	**Sample Depth:**	---
	Sampling Point:	B-1-25	**Lab Matrix:**	Solids
	Sampled By:	---	**Sample Type:**	Soil
1115416-06	**COC Number:**	---	**Receive Date:**	09/21/2011 21:05
	Project Number:	---	**Sampling Date:**	09/19/2011 10:05
	Sampling Location:	---	**Sample Depth:**	---
	Sampling Point:	B-3-5	**Lab Matrix:**	Solids
	Sampled By:	---	**Sample Type:**	Soil
1115416-07	**COC Number:**	---	**Receive Date:**	09/21/2011 21:05
	Project Number:	---	**Sampling Date:**	09/19/2011 10:07
	Sampling Location:	---	**Sample Depth:**	---
	Sampling Point:	B-3-10	**Lab Matrix:**	Solids
	Sampled By:	---	**Sample Type:**	Soil

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Gannett Fleming, Inc
1 Technology Drive, Suite F207
Irvine, CA 92618

Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Laboratory / Client Sample Cross Reference

Laboratory	Client Sample Information			
1115416-08	**COC Number:**	---	**Receive Date:**	09/21/2011 21:05
	Project Number:	---	**Sampling Date:**	09/19/2011 10:10
	Sampling Location:	---	**Sample Depth:**	---
	Sampling Point:	B-3-15	**Lab Matrix:**	Solids
	Sampled By:	---	**Sample Type:**	Soil
1115416-09	**COC Number:**	---	**Receive Date:**	09/21/2011 21:05
	Project Number:	---	**Sampling Date:**	09/19/2011 10:25
	Sampling Location:	---	**Sample Depth:**	---
	Sampling Point:	B-3-20	**Lab Matrix:**	Solids
	Sampled By:	---	**Sample Type:**	Soil
1115416-10	**COC Number:**	---	**Receive Date:**	09/21/2011 21:05
	Project Number:	---	**Sampling Date:**	09/19/2011 10:43
	Sampling Location:	---	**Sample Depth:**	---
	Sampling Point:	B-3-25	**Lab Matrix:**	Solids
	Sampled By:	---	**Sample Type:**	Soil
1115416-11	**COC Number:**	---	**Receive Date:**	09/21/2011 21:05
	Project Number:	---	**Sampling Date:**	09/20/2011 09:55
	Sampling Location:	---	**Sample Depth:**	---
	Sampling Point:	B-9-30	**Lab Matrix:**	Solids
	Sampled By:	---	**Sample Type:**	Soil
1115416-12	**COC Number:**	---	**Receive Date:**	09/21/2011 21:05
	Project Number:	---	**Sampling Date:**	09/20/2011 08:58
	Sampling Location:	---	**Sample Depth:**	---
	Sampling Point:	B-9-5	**Lab Matrix:**	Solids
	Sampled By:	---	**Sample Type:**	Soil
1115416-13	**COC Number:**	---	**Receive Date:**	09/21/2011 21:05
	Project Number:	---	**Sampling Date:**	09/20/2011 09:05
	Sampling Location:	---	**Sample Depth:**	---
	Sampling Point:	B-9-10	**Lab Matrix:**	Solids
	Sampled By:	---	**Sample Type:**	Soil
1115416-14	**COC Number:**	---	**Receive Date:**	09/21/2011 21:05
	Project Number:	---	**Sampling Date:**	09/20/2011 09:09
	Sampling Location:	---	**Sample Depth:**	---
	Sampling Point:	B-9-15	**Lab Matrix:**	Solids
	Sampled By:	---	**Sample Type:**	Soil

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Gannett Fleming, Inc
1 Technology Drive, Suite F207
Irvine, CA 92618

Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Laboratory / Client Sample Cross Reference

Laboratory	Client Sample Information			
1115416-15	**COC Number:**	---	**Receive Date:**	09/21/2011 21:05
	Project Number:	---	**Sampling Date:**	09/20/2011 09:15
	Sampling Location:	---	**Sample Depth:**	---
	Sampling Point:	B-9-20	**Lab Matrix:**	Solids
	Sampled By:	---	**Sample Type:**	Soil
1115416-16	**COC Number:**	---	**Receive Date:**	09/21/2011 21:05
	Project Number:	---	**Sampling Date:**	09/20/2011 09:20
	Sampling Location:	---	**Sample Depth:**	---
	Sampling Point:	B-9-25	**Lab Matrix:**	Solids
	Sampled By:	---	**Sample Type:**	Soil
1115416-17	**COC Number:**	---	**Receive Date:**	09/21/2011 21:05
	Project Number:	---	**Sampling Date:**	09/20/2011 11:00
	Sampling Location:	---	**Sample Depth:**	---
	Sampling Point:	B-4-5	**Lab Matrix:**	Solids
	Sampled By:	---	**Sample Type:**	Soil
1115416-18	**COC Number:**	---	**Receive Date:**	09/21/2011 21:05
	Project Number:	---	**Sampling Date:**	09/20/2011 11:03
	Sampling Location:	---	**Sample Depth:**	---
	Sampling Point:	B-4-10	**Lab Matrix:**	Solids
	Sampled By:	---	**Sample Type:**	Soil
1115416-19	**COC Number:**	---	**Receive Date:**	09/21/2011 21:05
	Project Number:	---	**Sampling Date:**	09/20/2011 11:07
	Sampling Location:	---	**Sample Depth:**	---
	Sampling Point:	B-4-15	**Lab Matrix:**	Solids
	Sampled By:	---	**Sample Type:**	Soil
1115416-20	**COC Number:**	---	**Receive Date:**	09/21/2011 21:05
	Project Number:	---	**Sampling Date:**	09/20/2011 11:15
	Sampling Location:	---	**Sample Depth:**	---
	Sampling Point:	B-4-20	**Lab Matrix:**	Solids
	Sampled By:	---	**Sample Type:**	Soil
1115416-21	**COC Number:**	---	**Receive Date:**	09/21/2011 21:05
	Project Number:	---	**Sampling Date:**	09/20/2011 11:40
	Sampling Location:	---	**Sample Depth:**	---
	Sampling Point:	B-4-25	**Lab Matrix:**	Solids
	Sampled By:	---	**Sample Type:**	Soil

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1 Technology Drive, Suite F207
Irvine, CA 92618

Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Laboratory / Client Sample Cross Reference

Laboratory	Client Sample Information			
1115416-22	**COC Number:**	---	**Receive Date:**	09/21/2011 21:05
	Project Number:	---	**Sampling Date:**	09/19/2011 10:05
	Sampling Location:	---	**Sample Depth:**	---
	Sampling Point:	B-3-5-D	**Lab Matrix:**	Solids
	Sampled By:	---	**Sample Type:**	Soil
1115416-23	**COC Number:**	---	**Receive Date:**	09/21/2011 21:05
	Project Number:	---	**Sampling Date:**	09/20/2011 09:05
	Sampling Location:	---	**Sample Depth:**	---
	Sampling Point:	B-9-10-D	**Lab Matrix:**	Solids
	Sampled By:	---	**Sample Type:**	Soil
1115416-24	**COC Number:**	---	**Receive Date:**	09/21/2011 21:05
	Project Number:	---	**Sampling Date:**	09/20/2011 11:03
	Sampling Location:	---	**Sample Depth:**	---
	Sampling Point:	B-4-10-D	**Lab Matrix:**	Solids
	Sampled By:	---	**Sample Type:**	Soil

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Organochlorine Pesticides (EPA Method 8081)

BCL Sample ID: 1115416-01 | **Client Sample Name:** B-1-5, 9/19/2011 8:50:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Aldrin	ND	mg/kg	0.00050	0.000026	EPA-8081	ND		1
alpha-BHC	ND	mg/kg	0.00050	0.00014	EPA-8081	ND		1
beta-BHC	ND	mg/kg	0.00050	0.00038	EPA-8081	ND		1
delta-BHC	ND	mg/kg	0.00050	0.000076	EPA-8081	ND		1
gamma-BHC (Lindane)	ND	mg/kg	0.00050	0.00025	EPA-8081	ND		1
Chlordane (Technical)	ND	mg/kg	0.050	0.015	EPA-8081	ND		1
4,4'-DDD	ND	mg/kg	0.00050	0.000063	EPA-8081	ND		1
4,4'-DDE	ND	mg/kg	0.00050	0.000045	EPA-8081	ND		1
4,4'-DDT	ND	mg/kg	0.00050	0.000031	EPA-8081	ND		1
Dieldrin	ND	mg/kg	0.00050	0.000032	EPA-8081	ND		1
Endosulfan I	ND	mg/kg	0.00050	0.000086	EPA-8081	ND		1
Endosulfan II	ND	mg/kg	0.00050	0.000066	EPA-8081	ND		1
Endosulfan sulfate	ND	mg/kg	0.00050	0.00013	EPA-8081	ND		1
Endrin	ND	mg/kg	0.00050	0.000035	EPA-8081	ND		1
Endrin aldehyde	ND	mg/kg	0.00050	0.000061	EPA-8081	ND		1
Heptachlor	ND	mg/kg	0.00050	0.00026	EPA-8081	ND		1
Heptachlor epoxide	ND	mg/kg	0.00050	0.00015	EPA-8081	ND		1
Methoxychlor	ND	mg/kg	0.00050	0.00013	EPA-8081	ND		1
Toxaphene	ND	mg/kg	0.050	0.0074	EPA-8081	ND		1
TCMX (Surrogate)	71.2	%	20 - 143 (LCL - UCL)		EPA-8081			1
Dibutyl chlorendate (Surrogate)	64.6	%	20 - 164 (LCL - UCL)		EPA-8081			1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-8081	09/28/11	10/03/11 13:12	VH1	GC-1	1.017	BUJ0048

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

PCB Analysis (EPA Method 8082)

BCL Sample ID: 1115416-01 | **Client Sample Name:** B-1-5, 9/19/2011 8:50:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
PCB-1016	ND	mg/kg	0.010	0.0027	EPA-8082	ND		1
PCB-1221	ND	mg/kg	0.010	0.0050	EPA-8082	ND		1
PCB-1232	ND	mg/kg	0.010	0.0012	EPA-8082	ND		1
PCB-1242	ND	mg/kg	0.010	0.0016	EPA-8082	ND		1
PCB-1248	ND	mg/kg	0.010	0.0012	EPA-8082	ND		1
PCB-1254	ND	mg/kg	0.010	0.00078	EPA-8082	ND		1
PCB-1260	ND	mg/kg	0.010	0.0022	EPA-8082	ND		1
Total PCB's (Summation)	ND	mg/kg	0.010	0.0050	EPA-8082	ND		1
Decachlorobiphenyl (Surrogate)	70.0	%	20 - 150 (LCL - UCL)		EPA-8082			1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-8082	09/28/11	10/03/11 13:49	VH1	GC-14	1.003	BUJ0046

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Volatile Organic Analysis (EPA Method 8260)

BCL Sample ID: 1115416-01 | **Client Sample Name:** B-1-5, 9/19/2011 8:50:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Benzene	**0.0044**	**mg/kg**	**0.0050**	**0.0013**	**EPA-8260**	ND	**J**	1
Bromobenzene	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
Bromochloromethane	ND	mg/kg	0.0050	0.00092	EPA-8260	ND		1
Bromodichloromethane	ND	mg/kg	0.0050	0.00084	EPA-8260	ND		1
Bromoform	ND	mg/kg	0.0050	0.0015	EPA-8260	ND		1
Bromomethane	ND	mg/kg	0.0050	0.0016	EPA-8260	ND		1
n-Butylbenzene	ND	mg/kg	0.0050	0.0015	EPA-8260	ND		1
sec-Butylbenzene	ND	mg/kg	0.0050	0.0012	EPA-8260	ND		1
tert-Butylbenzene	ND	mg/kg	0.0050	0.0012	EPA-8260	ND		1
Carbon tetrachloride	ND	mg/kg	0.0050	0.0011	EPA-8260	ND		1
Chlorobenzene	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
Chloroethane	ND	mg/kg	0.0050	0.0014	EPA-8260	ND		1
Chloroform	ND	mg/kg	0.0050	0.00063	EPA-8260	ND		1
Chloromethane	ND	mg/kg	0.0050	0.0014	EPA-8260	ND		1
2-Chlorotoluene	ND	mg/kg	0.0050	0.0018	EPA-8260	ND		1
4-Chlorotoluene	ND	mg/kg	0.0050	0.0014	EPA-8260	ND		1
Dibromochloromethane	ND	mg/kg	0.0050	0.00099	EPA-8260	ND		1
1,2-Dibromo-3-chloropropane	ND	mg/kg	0.0050	0.0017	EPA-8260	ND		1
1,2-Dibromoethane	ND	mg/kg	0.0050	0.0010	EPA-8260	ND		1
Dibromomethane	ND	mg/kg	0.0050	0.0018	EPA-8260	ND		1
1,2-Dichlorobenzene	ND	mg/kg	0.0050	0.00081	EPA-8260	ND		1
1,3-Dichlorobenzene	ND	mg/kg	0.0050	0.0014	EPA-8260	ND		1
1,4-Dichlorobenzene	ND	mg/kg	0.0050	0.0015	EPA-8260	ND		1
Dichlorodifluoromethane	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
1,1-Dichloroethane	ND	mg/kg	0.0050	0.0014	EPA-8260	ND		1
1,2-Dichloroethane	ND	mg/kg	0.0050	0.00085	EPA-8260	ND		1
1,1-Dichloroethene	ND	mg/kg	0.0050	0.0012	EPA-8260	ND		1
cis-1,2-Dichloroethene	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
trans-1,2-Dichloroethene	ND	mg/kg	0.0050	0.0014	EPA-8260	ND		1
1,2-Dichloropropane	ND	mg/kg	0.0050	0.00081	EPA-8260	ND		1
1,3-Dichloropropane	ND	mg/kg	0.0050	0.0011	EPA-8260	ND		1
2,2-Dichloropropane	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
1,1-Dichloropropene	ND	mg/kg	0.0050	0.0012	EPA-8260	ND		1

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Volatile Organic Analysis (EPA Method 8260)

BCL Sample ID: 1115416-01 | **Client Sample Name:** B-1-5, 9/19/2011 8:50:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
cis-1,3-Dichloropropene	ND	mg/kg	0.0050	0.0011	EPA-8260	ND		1
trans-1,3-Dichloropropene	ND	mg/kg	0.0050	0.0012	EPA-8260	ND		1
Ethylbenzene	ND	mg/kg	0.0050	0.0015	EPA-8260	ND		1
Hexachlorobutadiene	ND	mg/kg	0.0050	0.0017	EPA-8260	ND		1
Isopropylbenzene	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
p-Isopropyltoluene	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
Methylene chloride	ND	mg/kg	0.010	0.0024	EPA-8260	ND		1
Methyl t-butyl ether	ND	mg/kg	0.0050	0.00050	EPA-8260	ND		1
Naphthalene	ND	mg/kg	0.0050	0.0014	EPA-8260	ND		1
n-Propylbenzene	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
Styrene	ND	mg/kg	0.0050	0.0014	EPA-8260	ND		1
1,1,1,2-Tetrachloroethane	ND	mg/kg	0.0050	0.0011	EPA-8260	ND		1
1,1,2,2-Tetrachloroethane	ND	mg/kg	0.0050	0.0011	EPA-8260	ND		1
Tetrachloroethene	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
Toluene	**0.0015**	**mg/kg**	**0.0050**	**0.0012**	**EPA-8260**	ND	**J**	1
1,2,3-Trichlorobenzene	ND	mg/kg	0.0050	0.0021	EPA-8260	ND		1
1,2,4-Trichlorobenzene	ND	mg/kg	0.0050	0.0020	EPA-8260	ND		1
1,1,1-Trichloroethane	ND	mg/kg	0.0050	0.0011	EPA-8260	ND		1
1,1,2-Trichloroethane	ND	mg/kg	0.0050	0.00077	EPA-8260	ND		1
Trichloroethene	ND	mg/kg	0.0050	0.0011	EPA-8260	ND		1
Trichlorofluoromethane	ND	mg/kg	0.0050	0.0011	EPA-8260	ND		1
1,2,3-Trichloropropane	ND	mg/kg	0.0050	0.0016	EPA-8260	ND		1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
1,2,4-Trimethylbenzene	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
1,3,5-Trimethylbenzene	ND	mg/kg	0.0050	0.0015	EPA-8260	ND		1
Vinyl chloride	ND	mg/kg	0.0050	0.0016	EPA-8260	ND		1
Total Xylenes	ND	mg/kg	0.010	0.0034	EPA-8260	ND		1
p- & m-Xylenes	ND	mg/kg	0.0050	0.0022	EPA-8260	ND		1
o-Xylene	ND	mg/kg	0.0050	0.0012	EPA-8260	ND		1
1,2-Dichloroethane-d4 (Surrogate)	101	%	70 - 121 (LCL - UCL)		EPA-8260			1
Toluene-d8 (Surrogate)	98.2	%	81 - 117 (LCL - UCL)		EPA-8260			1
4-Bromofluorobenzene (Surrogate)	97.1	%	74 - 121 (LCL - UCL)		EPA-8260			1

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Volatile Organic Analysis (EPA Method 8260)

BCL Sample ID: 1115416-01 | **Client Sample Name:** B-1-5, 9/19/2011 8:50:00AM

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-8260	09/26/11	09/27/11 06:33	ADC	MS-V3	1	BUI1646

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

BCL Sample ID: 1115416-01 | **Client Sample Name:** B-1-5, 9/19/2011 8:50:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Acenaphthene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Acenaphthylene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Aldrin	ND	mg/kg	0.10	0.024	EPA-8270C	ND		1
Aniline	ND	mg/kg	0.20	0.053	EPA-8270C	ND		1
Anthracene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Benzidine	ND	mg/kg	3.0	0.22	EPA-8270C	ND		1
Benzo[a]anthracene	ND	mg/kg	0.10	0.012	EPA-8270C	ND		1
Benzo[b]fluoranthene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Benzo[k]fluoranthene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Benzo[a]pyrene	ND	mg/kg	0.10	0.015	EPA-8270C	ND		1
Benzo[g,h,i]perylene	ND	mg/kg	0.10	0.056	EPA-8270C	ND		1
Benzoic acid	ND	mg/kg	0.50	0.067	EPA-8270C	ND		1
Benzyl alcohol	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Benzyl butyl phthalate	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
alpha-BHC	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
beta-BHC	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
delta-BHC	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
gamma-BHC (Lindane)	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
bis(2-Chloroethoxy)methane	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
bis(2-Chloroethyl) ether	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
bis(2-Chloroisopropyl)ether	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
bis(2-Ethylhexyl)phthalate	**0.058**	**mg/kg**	**0.20**	**0.043**	**EPA-8270C**	ND	**J**	1
4-Bromophenyl phenyl ether	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
4-Chloroaniline	ND	mg/kg	0.10	0.027	EPA-8270C	ND		1
2-Chloronaphthalene	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1
4-Chlorophenyl phenyl ether	ND	mg/kg	0.10	0.015	EPA-8270C	ND		1
Chrysene	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
4,4'-DDD	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
4,4'-DDE	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
4,4'-DDT	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Dibenzo[a,h]anthracene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Dibenzofuran	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1
1,2-Dichlorobenzene	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

BCL Sample ID: 1115416-01 | **Client Sample Name:** B-1-5, 9/19/2011 8:50:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
1,3-Dichlorobenzene	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
1,4-Dichlorobenzene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
3,3-Dichlorobenzidine	ND	mg/kg	0.20	0.0067	EPA-8270C	ND		1
Dieldrin	ND	mg/kg	0.10	0.031	EPA-8270C	ND		1
Diethyl phthalate	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Dimethyl phthalate	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1
Di-n-butyl phthalate	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
2,4-Dinitrotoluene	ND	mg/kg	0.10	0.022	EPA-8270C	ND		1
2,6-Dinitrotoluene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Di-n-octyl phthalate	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
1,2-Diphenylhydrazine	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Endosulfan I	ND	mg/kg	0.20	0.020	EPA-8270C	ND		1
Endosulfan II	ND	mg/kg	0.20	0.021	EPA-8270C	ND		1
Endosulfan sulfate	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
Endrin	ND	mg/kg	0.20	0.025	EPA-8270C	ND		1
Endrin aldehyde	ND	mg/kg	0.50	0.022	EPA-8270C	ND		1
Fluoranthene	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
Fluorene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Heptachlor	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
Heptachlor epoxide	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
Hexachlorobenzene	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
Hexachlorobutadiene	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
Hexachlorocyclopentadiene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Hexachloroethane	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1
Indeno[1,2,3-cd]pyrene	ND	mg/kg	0.10	0.072	EPA-8270C	ND		1
Isophorone	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
2-Methylnaphthalene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Naphthalene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
2-Naphthylamine	ND	mg/kg	3.0	0.16	EPA-8270C	ND		1
2-Nitroaniline	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
3-Nitroaniline	ND	mg/kg	0.20	0.015	EPA-8270C	ND		1
4-Nitroaniline	ND	mg/kg	0.20	0.025	EPA-8270C	ND		1
Nitrobenzene	ND	mg/kg	0.10	0.015	EPA-8270C	ND		1

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

BCL Sample ID: 1115416-01 | **Client Sample Name:** B-1-5, 9/19/2011 8:50:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
N-Nitrosodimethylamine	ND	mg/kg	0.10	0.037	EPA-8270C	ND		1
N-Nitrosodi-N-propylamine	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
N-Nitrosodiphenylamine	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
Phenanthrene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Pyrene	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
1,2,4-Trichlorobenzene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
4-Chloro-3-methylphenol	ND	mg/kg	0.20	0.022	EPA-8270C	ND		1
2-Chlorophenol	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
2,4-Dichlorophenol	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
2,4-Dimethylphenol	ND	mg/kg	0.10	0.035	EPA-8270C	ND		1
4,6-Dinitro-2-methylphenol	ND	mg/kg	0.50	0.012	EPA-8270C	ND		1
2,4-Dinitrophenol	ND	mg/kg	0.50	0.0077	EPA-8270C	ND		1
2-Methylphenol	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
3- & 4-Methylphenol	ND	mg/kg	0.20	0.033	EPA-8270C	ND		1
2-Nitrophenol	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
4-Nitrophenol	ND	mg/kg	0.20	0.018	EPA-8270C	ND		1
Pentachlorophenol	ND	mg/kg	0.20	0.013	EPA-8270C	ND		1
Phenol	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
2,4,5-Trichlorophenol	ND	mg/kg	0.20	0.018	EPA-8270C	ND		1
2,4,6-Trichlorophenol	ND	mg/kg	0.20	0.017	EPA-8270C	ND		1
2-Fluorophenol (Surrogate)	72.7	%	28 - 144 (LCL - UCL)		EPA-8270C			1
Phenol-d5 (Surrogate)	43.3	%	36 - 136 (LCL - UCL)		EPA-8270C			1
Nitrobenzene-d5 (Surrogate)	88.3	%	31 - 135 (LCL - UCL)		EPA-8270C			1
2-Fluorobiphenyl (Surrogate)	69.8	%	20 - 140 (LCL - UCL)		EPA-8270C			1
2,4,6-Tribromophenol (Surrogate)	122	%	20 - 150 (LCL - UCL)		EPA-8270C			1
p-Terphenyl-d14 (Surrogate)	65.8	%	10 - 150 (LCL - UCL)		EPA-8270C			1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-8270C	09/28/11	10/05/11 21:55	SKC	MS-B2	0.993	BUJ0343

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Gannett Fleming, Inc
1 Technology Drive, Suite F207
Irvine, CA 92618

Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Purgeable Aromatics and Total Petroleum Hydrocarbons

BCL Sample ID: 1115416-01 | **Client Sample Name:** B-1-5, 9/19/2011 8:50:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
TPH - Light Naptha	ND	mg/kg	50	20	Luft/FFP	ND		1
TPH - Aviation Gas	ND	mg/kg	50	20	Luft/FFP	ND		1
TPH - Stoddard Solvent	ND	mg/kg	20	5.0	Luft/FFP	ND		1
TPH - Heavy Naptha	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Gasoline	ND	mg/kg	20	5.0	Luft/FFP	ND		1
TPH - Jet Fuel (JP4)	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Jet Fuel (JP5)	ND	mg/kg	10	4.6	Luft/FFP	ND		1
TPH - Jet Fuel (JP8)	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Kerosene	ND	mg/kg	10	1.4	Luft/FFP	ND		1
TPH - Diesel (FFP)	ND	mg/kg	10	1.2	Luft/FFP	ND		1
TPH - Fuel Oil #6	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Crude Oil	ND	mg/kg	20	2.8	Luft/FFP	ND		1
TPH - Hydraulic Oil / Motor Oil	ND	mg/kg	20	6.5	Luft/FFP	ND		1
TPH - WD-40	ND	mg/kg	10	5.0	Luft/FFP	ND		1
Tetracosane (Surrogate)	84.5	%	20 - 145 (LCL - UCL)		Luft/FFP			1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	Luft/FFP	09/28/11	10/07/11 09:58	MWB	GC-13	1	BUJ0256

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Total Concentrations (TTLC)

BCL Sample ID: 1115416-01 | **Client Sample Name:** B-1-5, 9/19/2011 8:50:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Antimony	**1.3**	**mg/kg**	**5.0**	**0.50**	**EPA-6010B**	ND	**J**	1
Arsenic	**2.1**	**mg/kg**	**1.0**	**0.38**	**EPA-6010B**	ND		1
Barium	**52**	**mg/kg**	**0.50**	**0.077**	**EPA-6010B**	ND		1
Beryllium	**0.29**	**mg/kg**	**0.50**	**0.050**	**EPA-6010B**	ND	**J**	1
Cadmium	**0.092**	**mg/kg**	**0.50**	**0.050**	**EPA-6010B**	ND	**J**	1
Chromium	**8.2**	**mg/kg**	**0.50**	**0.060**	**EPA-6010B**	ND		1
Cobalt	**4.4**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	ND		1
Copper	**21**	**mg/kg**	**1.0**	**0.12**	**EPA-6010B**	ND		1
Lead	**3.7**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	ND		1
Mercury	**0.087**	**mg/kg**	**0.16**	**0.024**	**EPA-7471A**	ND	**J**	2
Molybdenum	**0.27**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	ND	**J**	1
Nickel	**4.7**	**mg/kg**	**0.50**	**0.058**	**EPA-6010B**	ND		1
Selenium	ND	mg/kg	1.0	0.51	EPA-6010B	ND		1
Silver	ND	mg/kg	0.50	0.050	EPA-6010B	0.063		1
Thallium	**0.91**	**mg/kg**	**5.0**	**0.73**	**EPA-6010B**	ND	**J**	1
Vanadium	**32**	**mg/kg**	**0.50**	**0.050**	**EPA-6010B**	ND		1
Zinc	**54**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	0.38		1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-6010B	09/27/11	09/28/11 08:21	ARD	PE-OP1	1	BUI1739
2	EPA-7471A	09/26/11	09/28/11 13:02	MEV	CETAC1	0.977	BUI1659

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Organochlorine Pesticides (EPA Method 8081)

BCL Sample ID: 1115416-02 | **Client Sample Name:** B-1-10, 9/19/2011 8:55:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Aldrin	ND	mg/kg	0.00050	0.000026	EPA-8081	ND		1
alpha-BHC	ND	mg/kg	0.00050	0.00014	EPA-8081	ND		1
beta-BHC	ND	mg/kg	0.00050	0.00038	EPA-8081	ND		1
delta-BHC	ND	mg/kg	0.00050	0.000076	EPA-8081	ND		1
gamma-BHC (Lindane)	ND	mg/kg	0.00050	0.00025	EPA-8081	ND		1
Chlordane (Technical)	ND	mg/kg	0.050	0.015	EPA-8081	ND		1
4,4'-DDD	ND	mg/kg	0.00050	0.000063	EPA-8081	ND		1
4,4'-DDE	ND	mg/kg	0.00050	0.000045	EPA-8081	ND		1
4,4'-DDT	ND	mg/kg	0.00050	0.000031	EPA-8081	ND		1
Dieldrin	ND	mg/kg	0.00050	0.000032	EPA-8081	ND		1
Endosulfan I	ND	mg/kg	0.00050	0.000086	EPA-8081	ND		1
Endosulfan II	ND	mg/kg	0.00050	0.000066	EPA-8081	ND		1
Endosulfan sulfate	ND	mg/kg	0.00050	0.00013	EPA-8081	ND		1
Endrin	ND	mg/kg	0.00050	0.000035	EPA-8081	ND		1
Endrin aldehyde	ND	mg/kg	0.00050	0.000061	EPA-8081	ND		1
Heptachlor	ND	mg/kg	0.00050	0.00026	EPA-8081	ND		1
Heptachlor epoxide	ND	mg/kg	0.00050	0.00015	EPA-8081	ND		1
Methoxychlor	ND	mg/kg	0.00050	0.00013	EPA-8081	ND		1
Toxaphene	ND	mg/kg	0.050	0.0074	EPA-8081	ND		1
TCMX (Surrogate)	80.2	%	20 - 143 (LCL - UCL)		EPA-8081			1
Dibutyl chlorendate (Surrogate)	60.8	%	20 - 164 (LCL - UCL)		EPA-8081			1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-8081	09/28/11	10/03/11 13:30	VH1	GC-1	1.017	BUJ0048

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

BCL Sample ID: 1115416-02 | **Client Sample Name:** B-1-10, 9/19/2011 8:55:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Acenaphthene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Acenaphthylene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Aldrin	ND	mg/kg	0.10	0.024	EPA-8270C	ND		1
Aniline	ND	mg/kg	0.20	0.053	EPA-8270C	ND		1
Anthracene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Benzidine	ND	mg/kg	3.0	0.22	EPA-8270C	ND		1
Benzo[a]anthracene	ND	mg/kg	0.10	0.012	EPA-8270C	ND		1
Benzo[b]fluoranthene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Benzo[k]fluoranthene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Benzo[a]pyrene	ND	mg/kg	0.10	0.015	EPA-8270C	ND		1
Benzo[g,h,i]perylene	ND	mg/kg	0.10	0.056	EPA-8270C	ND		1
Benzoic acid	ND	mg/kg	0.50	0.067	EPA-8270C	ND		1
Benzyl alcohol	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Benzyl butyl phthalate	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
alpha-BHC	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
beta-BHC	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
delta-BHC	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
gamma-BHC (Lindane)	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
bis(2-Chloroethoxy)methane	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
bis(2-Chloroethyl) ether	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
bis(2-Chloroisopropyl)ether	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
bis(2-Ethylhexyl)phthalate	ND	mg/kg	0.20	0.043	EPA-8270C	ND		1
4-Bromophenyl phenyl ether	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
4-Chloroaniline	ND	mg/kg	0.10	0.027	EPA-8270C	ND		1
2-Chloronaphthalene	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1
4-Chlorophenyl phenyl ether	ND	mg/kg	0.10	0.015	EPA-8270C	ND		1
Chrysene	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
4,4'-DDD	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
4,4'-DDE	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
4,4'-DDT	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Dibenzo[a,h]anthracene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Dibenzofuran	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1
1,2-Dichlorobenzene	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

BCL Sample ID: 1115416-02 | **Client Sample Name:** B-1-10, 9/19/2011 8:55:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
1,3-Dichlorobenzene	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
1,4-Dichlorobenzene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
3,3-Dichlorobenzidine	ND	mg/kg	0.20	0.0067	EPA-8270C	ND		1
Dieldrin	ND	mg/kg	0.10	0.031	EPA-8270C	ND		1
Diethyl phthalate	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Dimethyl phthalate	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1
Di-n-butyl phthalate	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
2,4-Dinitrotoluene	ND	mg/kg	0.10	0.022	EPA-8270C	ND		1
2,6-Dinitrotoluene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Di-n-octyl phthalate	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
1,2-Diphenylhydrazine	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Endosulfan I	ND	mg/kg	0.20	0.020	EPA-8270C	ND		1
Endosulfan II	ND	mg/kg	0.20	0.021	EPA-8270C	ND		1
Endosulfan sulfate	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
Endrin	ND	mg/kg	0.20	0.025	EPA-8270C	ND		1
Endrin aldehyde	ND	mg/kg	0.50	0.022	EPA-8270C	ND		1
Fluoranthene	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
Fluorene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Heptachlor	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
Heptachlor epoxide	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
Hexachlorobenzene	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
Hexachlorobutadiene	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
Hexachlorocyclopentadiene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Hexachloroethane	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1
Indeno[1,2,3-cd]pyrene	ND	mg/kg	0.10	0.072	EPA-8270C	ND		1
Isophorone	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
2-Methylnaphthalene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Naphthalene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
2-Naphthylamine	ND	mg/kg	3.0	0.16	EPA-8270C	ND		1
2-Nitroaniline	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
3-Nitroaniline	ND	mg/kg	0.20	0.015	EPA-8270C	ND		1
4-Nitroaniline	ND	mg/kg	0.20	0.025	EPA-8270C	ND		1
Nitrobenzene	ND	mg/kg	0.10	0.015	EPA-8270C	ND		1

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

BCL Sample ID: 1115416-02 | **Client Sample Name:** B-1-10, 9/19/2011 8:55:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
N-Nitrosodimethylamine	ND	mg/kg	0.10	0.037	EPA-8270C	ND		1
N-Nitrosodi-N-propylamine	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
N-Nitrosodiphenylamine	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
Phenanthrene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Pyrene	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
1,2,4-Trichlorobenzene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
4-Chloro-3-methylphenol	ND	mg/kg	0.20	0.022	EPA-8270C	ND		1
2-Chlorophenol	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
2,4-Dichlorophenol	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
2,4-Dimethylphenol	ND	mg/kg	0.10	0.035	EPA-8270C	ND		1
4,6-Dinitro-2-methylphenol	ND	mg/kg	0.50	0.012	EPA-8270C	ND		1
2,4-Dinitrophenol	ND	mg/kg	0.50	0.0077	EPA-8270C	ND		1
2-Methylphenol	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
3- & 4-Methylphenol	ND	mg/kg	0.20	0.033	EPA-8270C	ND		1
2-Nitrophenol	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
4-Nitrophenol	ND	mg/kg	0.20	0.018	EPA-8270C	ND		1
Pentachlorophenol	ND	mg/kg	0.20	0.013	EPA-8270C	ND		1
Phenol	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
2,4,5-Trichlorophenol	ND	mg/kg	0.20	0.018	EPA-8270C	ND		1
2,4,6-Trichlorophenol	ND	mg/kg	0.20	0.017	EPA-8270C	ND		1
2-Fluorophenol (Surrogate)	70.2	%	28 - 144 (LCL - UCL)		EPA-8270C			1
Phenol-d5 (Surrogate)	39.4	%	36 - 136 (LCL - UCL)		EPA-8270C			1
Nitrobenzene-d5 (Surrogate)	83.2	%	31 - 135 (LCL - UCL)		EPA-8270C			1
2-Fluorobiphenyl (Surrogate)	78.9	%	20 - 140 (LCL - UCL)		EPA-8270C			1
2,4,6-Tribromophenol (Surrogate)	110	%	20 - 150 (LCL - UCL)		EPA-8270C			1
p-Terphenyl-d14 (Surrogate)	69.3	%	10 - 150 (LCL - UCL)		EPA-8270C			1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-8270C	09/28/11	10/05/11 23:15	SKC	MS-B2	0.974	BUJ0343

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Irvine, CA 92618

Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Purgeable Aromatics and Total Petroleum Hydrocarbons

BCL Sample ID: 1115416-02 | **Client Sample Name:** B-1-10, 9/19/2011 8:55:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
TPH - Light Naptha	ND	mg/kg	50	20	Luft/FFP	ND		1
TPH - Aviation Gas	ND	mg/kg	50	20	Luft/FFP	ND		1
TPH - Stoddard Solvent	ND	mg/kg	20	5.0	Luft/FFP	ND		1
TPH - Heavy Naptha	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Gasoline	ND	mg/kg	20	5.0	Luft/FFP	ND		1
TPH - Jet Fuel (JP4)	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Jet Fuel (JP5)	ND	mg/kg	10	4.6	Luft/FFP	ND		1
TPH - Jet Fuel (JP8)	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Kerosene	ND	mg/kg	10	1.4	Luft/FFP	ND		1
TPH - Diesel (FFP)	ND	mg/kg	10	1.2	Luft/FFP	ND		1
TPH - Fuel Oil #6	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Crude Oil	ND	mg/kg	20	2.8	Luft/FFP	ND		1
TPH - Hydraulic Oil / Motor Oil	ND	mg/kg	20	6.5	Luft/FFP	ND		1
TPH - WD-40	ND	mg/kg	10	5.0	Luft/FFP	ND		1
Tetracosane (Surrogate)	71.6	%	20 - 145 (LCL - UCL)		Luft/FFP			1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	Luft/FFP	09/28/11	10/07/11 10:21	MWB	GC-13	0.990	BUJ0256

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1 Technology Drive, Suite F207
Irvine, CA 92618

Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Total Concentrations (TTLC)

BCL Sample ID: 1115416-02 | **Client Sample Name:** B-1-10, 9/19/2011 8:55:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Antimony	**1.7**	**mg/kg**	**5.0**	**0.50**	**EPA-6010B**	ND	**J**	1
Arsenic	**2.9**	**mg/kg**	**1.0**	**0.38**	**EPA-6010B**	ND		1
Barium	**49**	**mg/kg**	**0.50**	**0.077**	**EPA-6010B**	ND		1
Beryllium	**0.32**	**mg/kg**	**0.50**	**0.050**	**EPA-6010B**	ND	**J**	1
Cadmium	**0.12**	**mg/kg**	**0.50**	**0.050**	**EPA-6010B**	ND	**J**	1
Chromium	**6.0**	**mg/kg**	**0.50**	**0.060**	**EPA-6010B**	ND		1
Cobalt	**3.9**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	ND		1
Copper	**10**	**mg/kg**	**1.0**	**0.12**	**EPA-6010B**	ND		1
Lead	**4.9**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	ND		1
Mercury	**0.30**	**mg/kg**	**0.16**	**0.024**	**EPA-7471A**	ND		2
Molybdenum	ND	mg/kg	2.5	0.25	EPA-6010B	ND		1
Nickel	**4.0**	**mg/kg**	**0.50**	**0.058**	**EPA-6010B**	ND		1
Selenium	ND	mg/kg	1.0	0.51	EPA-6010B	ND		1
Silver	ND	mg/kg	0.50	0.050	EPA-6010B	0.063		1
Thallium	ND	mg/kg	5.0	0.73	EPA-6010B	ND		1
Vanadium	**24**	**mg/kg**	**0.50**	**0.050**	**EPA-6010B**	ND		1
Zinc	**44**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	0.38		1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-6010B	09/27/11	09/28/11 08:22	ARD	PE-OP1	1	BUI1739
2	EPA-7471A	09/26/11	09/28/11 13:04	MEV	CETAC1	0.977	BUI1659

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Organochlorine Pesticides (EPA Method 8081)

BCL Sample ID: 1115416-03 | **Client Sample Name:** B-1-15, 9/19/2011 9:00:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Aldrin	ND	mg/kg	0.00050	0.000026	EPA-8081	ND		1
alpha-BHC	ND	mg/kg	0.00050	0.00014	EPA-8081	ND		1
beta-BHC	ND	mg/kg	0.00050	0.00038	EPA-8081	ND		1
delta-BHC	ND	mg/kg	0.00050	0.000076	EPA-8081	ND		1
gamma-BHC (Lindane)	ND	mg/kg	0.00050	0.00025	EPA-8081	ND		1
Chlordane (Technical)	ND	mg/kg	0.050	0.015	EPA-8081	ND		1
4,4'-DDD	ND	mg/kg	0.00050	0.000063	EPA-8081	ND		1
4,4'-DDE	ND	mg/kg	0.00050	0.000045	EPA-8081	ND		1
4,4'-DDT	ND	mg/kg	0.00050	0.000031	EPA-8081	ND		1
Dieldrin	ND	mg/kg	0.00050	0.000032	EPA-8081	ND		1
Endosulfan I	ND	mg/kg	0.00050	0.000086	EPA-8081	ND		1
Endosulfan II	ND	mg/kg	0.00050	0.000066	EPA-8081	ND		1
Endosulfan sulfate	ND	mg/kg	0.00050	0.00013	EPA-8081	ND		1
Endrin	ND	mg/kg	0.00050	0.000035	EPA-8081	ND		1
Endrin aldehyde	ND	mg/kg	0.00050	0.000061	EPA-8081	ND		1
Heptachlor	ND	mg/kg	0.00050	0.00026	EPA-8081	ND		1
Heptachlor epoxide	ND	mg/kg	0.00050	0.00015	EPA-8081	ND		1
Methoxychlor	ND	mg/kg	0.00050	0.00013	EPA-8081	ND		1
Toxaphene	ND	mg/kg	0.050	0.0074	EPA-8081	ND		1
TCMX (Surrogate)	49.7	%	20 - 143 (LCL - UCL)		EPA-8081			1
Dibutyl chlorendate (Surrogate)	42.4	%	20 - 164 (LCL - UCL)		EPA-8081			1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-8081	09/28/11	10/03/11 13:49	VH1	GC-1	1.010	BUJ0048

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

BCL Sample ID: 1115416-03 | **Client Sample Name:** B-1-15, 9/19/2011 9:00:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Acenaphthene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Acenaphthylene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Aldrin	ND	mg/kg	0.10	0.024	EPA-8270C	ND		1
Aniline	ND	mg/kg	0.20	0.053	EPA-8270C	ND		1
Anthracene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Benzidine	ND	mg/kg	3.0	0.22	EPA-8270C	ND		1
Benzo[a]anthracene	ND	mg/kg	0.10	0.012	EPA-8270C	ND		1
Benzo[b]fluoranthene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Benzo[k]fluoranthene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Benzo[a]pyrene	ND	mg/kg	0.10	0.015	EPA-8270C	ND		1
Benzo[g,h,i]perylene	ND	mg/kg	0.10	0.056	EPA-8270C	ND		1
Benzoic acid	ND	mg/kg	0.50	0.067	EPA-8270C	ND		1
Benzyl alcohol	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Benzyl butyl phthalate	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
alpha-BHC	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
beta-BHC	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
delta-BHC	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
gamma-BHC (Lindane)	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
bis(2-Chloroethoxy)methane	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
bis(2-Chloroethyl) ether	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
bis(2-Chloroisopropyl)ether	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
bis(2-Ethylhexyl)phthalate	ND	mg/kg	0.20	0.043	EPA-8270C	ND		1
4-Bromophenyl phenyl ether	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
4-Chloroaniline	ND	mg/kg	0.10	0.027	EPA-8270C	ND		1
2-Chloronaphthalene	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1
4-Chlorophenyl phenyl ether	ND	mg/kg	0.10	0.015	EPA-8270C	ND		1
Chrysene	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
4,4'-DDD	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
4,4'-DDE	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
4,4'-DDT	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Dibenzo[a,h]anthracene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Dibenzofuran	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1
1,2-Dichlorobenzene	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

BCL Sample ID: 1115416-03 | **Client Sample Name:** B-1-15, 9/19/2011 9:00:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
1,3-Dichlorobenzene	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
1,4-Dichlorobenzene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
3,3-Dichlorobenzidine	ND	mg/kg	0.20	0.0067	EPA-8270C	ND		1
Dieldrin	ND	mg/kg	0.10	0.031	EPA-8270C	ND		1
Diethyl phthalate	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Dimethyl phthalate	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1
Di-n-butyl phthalate	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
2,4-Dinitrotoluene	ND	mg/kg	0.10	0.022	EPA-8270C	ND		1
2,6-Dinitrotoluene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Di-n-octyl phthalate	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
1,2-Diphenylhydrazine	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Endosulfan I	ND	mg/kg	0.20	0.020	EPA-8270C	ND		1
Endosulfan II	ND	mg/kg	0.20	0.021	EPA-8270C	ND		1
Endosulfan sulfate	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
Endrin	ND	mg/kg	0.20	0.025	EPA-8270C	ND		1
Endrin aldehyde	ND	mg/kg	0.50	0.022	EPA-8270C	ND		1
Fluoranthene	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
Fluorene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Heptachlor	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
Heptachlor epoxide	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
Hexachlorobenzene	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
Hexachlorobutadiene	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
Hexachlorocyclopentadiene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Hexachloroethane	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1
Indeno[1,2,3-cd]pyrene	ND	mg/kg	0.10	0.072	EPA-8270C	ND		1
Isophorone	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
2-Methylnaphthalene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Naphthalene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
2-Naphthylamine	ND	mg/kg	3.0	0.16	EPA-8270C	ND		1
2-Nitroaniline	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
3-Nitroaniline	ND	mg/kg	0.20	0.015	EPA-8270C	ND		1
4-Nitroaniline	ND	mg/kg	0.20	0.025	EPA-8270C	ND		1
Nitrobenzene	ND	mg/kg	0.10	0.015	EPA-8270C	ND		1

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

BCL Sample ID: 1115416-03 | **Client Sample Name:** B-1-15, 9/19/2011 9:00:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
N-Nitrosodimethylamine	ND	mg/kg	0.10	0.037	EPA-8270C	ND		1
N-Nitrosodi-N-propylamine	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
N-Nitrosodiphenylamine	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
Phenanthrene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Pyrene	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
1,2,4-Trichlorobenzene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
4-Chloro-3-methylphenol	ND	mg/kg	0.20	0.022	EPA-8270C	ND		1
2-Chlorophenol	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
2,4-Dichlorophenol	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
2,4-Dimethylphenol	ND	mg/kg	0.10	0.035	EPA-8270C	ND		1
4,6-Dinitro-2-methylphenol	ND	mg/kg	0.50	0.012	EPA-8270C	ND		1
2,4-Dinitrophenol	ND	mg/kg	0.50	0.0077	EPA-8270C	ND		1
2-Methylphenol	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
3- & 4-Methylphenol	ND	mg/kg	0.20	0.033	EPA-8270C	ND		1
2-Nitrophenol	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
4-Nitrophenol	ND	mg/kg	0.20	0.018	EPA-8270C	ND		1
Pentachlorophenol	ND	mg/kg	0.20	0.013	EPA-8270C	ND		1
Phenol	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
2,4,5-Trichlorophenol	ND	mg/kg	0.20	0.018	EPA-8270C	ND		1
2,4,6-Trichlorophenol	ND	mg/kg	0.20	0.017	EPA-8270C	ND		1
2-Fluorophenol (Surrogate)	76.1	%	28 - 144 (LCL - UCL)		EPA-8270C			1
Phenol-d5 (Surrogate)	42.6	%	36 - 136 (LCL - UCL)		EPA-8270C			1
Nitrobenzene-d5 (Surrogate)	76.8	%	31 - 135 (LCL - UCL)		EPA-8270C			1
2-Fluorobiphenyl (Surrogate)	44.3	%	20 - 140 (LCL - UCL)		EPA-8270C			1
2,4,6-Tribromophenol (Surrogate)	98.5	%	20 - 150 (LCL - UCL)		EPA-8270C			1
p-Terphenyl-d14 (Surrogate)	58.6	%	10 - 150 (LCL - UCL)		EPA-8270C			1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-8270C	09/28/11	10/05/11 23:42	SKC	MS-B2	1.007	BUJ0343

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Purgeable Aromatics and Total Petroleum Hydrocarbons

BCL Sample ID: 1115416-03 | **Client Sample Name:** B-1-15, 9/19/2011 9:00:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
TPH - Light Naptha	ND	mg/kg	50	20	Luft/FFP	ND		1
TPH - Aviation Gas	ND	mg/kg	50	20	Luft/FFP	ND		1
TPH - Stoddard Solvent	ND	mg/kg	20	5.0	Luft/FFP	ND		1
TPH - Heavy Naptha	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Gasoline	ND	mg/kg	20	5.0	Luft/FFP	ND		1
TPH - Jet Fuel (JP4)	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Jet Fuel (JP5)	ND	mg/kg	10	4.6	Luft/FFP	ND		1
TPH - Jet Fuel (JP8)	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Kerosene	ND	mg/kg	10	1.4	Luft/FFP	ND		1
TPH - Diesel (FFP)	ND	mg/kg	10	1.2	Luft/FFP	ND		1
TPH - Fuel Oil #6	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Crude Oil	ND	mg/kg	20	2.8	Luft/FFP	ND		1
TPH - Hydraulic Oil / Motor Oil	ND	mg/kg	20	6.5	Luft/FFP	ND		1
TPH - WD-40	ND	mg/kg	10	5.0	Luft/FFP	ND		1
Tetracosane (Surrogate)	94.0	%	20 - 145 (LCL - UCL)		Luft/FFP			1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	Luft/FFP	09/28/11	10/07/11 10:44	MWB	GC-13	1.014	BUJ0256

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Total Concentrations (TTLC)

BCL Sample ID: 1115416-03 | **Client Sample Name:** B-1-15, 9/19/2011 9:00:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Antimony	**1.7**	**mg/kg**	**5.0**	**0.50**	**EPA-6010B**	ND	**J**	1
Arsenic	**2.4**	**mg/kg**	**1.0**	**0.38**	**EPA-6010B**	ND		1
Barium	**48**	**mg/kg**	**0.50**	**0.077**	**EPA-6010B**	ND		1
Beryllium	**0.37**	**mg/kg**	**0.50**	**0.050**	**EPA-6010B**	ND	**J**	1
Cadmium	**0.13**	**mg/kg**	**0.50**	**0.050**	**EPA-6010B**	ND	**J**	1
Chromium	**8.1**	**mg/kg**	**0.50**	**0.060**	**EPA-6010B**	ND		1
Cobalt	**4.7**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	ND		1
Copper	**15**	**mg/kg**	**1.0**	**0.12**	**EPA-6010B**	ND		1
Lead	**10**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	ND		1
Mercury	**0.48**	**mg/kg**	**0.16**	**0.024**	**EPA-7471A**	ND		2
Molybdenum	**0.34**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	ND	**J**	1
Nickel	**5.3**	**mg/kg**	**0.50**	**0.058**	**EPA-6010B**	ND		1
Selenium	ND	mg/kg	1.0	0.51	EPA-6010B	ND		1
Silver	ND	mg/kg	0.50	0.050	EPA-6010B	0.063		1
Thallium	**0.86**	**mg/kg**	**5.0**	**0.73**	**EPA-6010B**	ND	**J**	1
Vanadium	**27**	**mg/kg**	**0.50**	**0.050**	**EPA-6010B**	ND		1
Zinc	**57**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	0.38		1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-6010B	09/27/11	09/28/11 08:24	ARD	PE-OP1	1	BUI1739
2	EPA-7471A	09/26/11	09/28/11 13:06	MEV	CETAC1	0.977	BUI1659

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Organochlorine Pesticides (EPA Method 8081)

BCL Sample ID: 1115416-04 | **Client Sample Name:** B-1-20, 9/19/2011 9:05:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Aldrin	ND	mg/kg	0.00050	0.000026	EPA-8081	ND		1
alpha-BHC	ND	mg/kg	0.00050	0.00014	EPA-8081	ND		1
beta-BHC	ND	mg/kg	0.00050	0.00038	EPA-8081	ND		1
delta-BHC	ND	mg/kg	0.00050	0.000076	EPA-8081	ND		1
gamma-BHC (Lindane)	ND	mg/kg	0.00050	0.00025	EPA-8081	ND		1
Chlordane (Technical)	ND	mg/kg	0.050	0.015	EPA-8081	ND		1
4,4'-DDD	ND	mg/kg	0.00050	0.000063	EPA-8081	ND		1
4,4'-DDE	ND	mg/kg	0.00050	0.000045	EPA-8081	ND		1
4,4'-DDT	ND	mg/kg	0.00050	0.000031	EPA-8081	ND		1
Dieldrin	ND	mg/kg	0.00050	0.000032	EPA-8081	ND		1
Endosulfan I	ND	mg/kg	0.00050	0.000086	EPA-8081	ND		1
Endosulfan II	ND	mg/kg	0.00050	0.000066	EPA-8081	ND		1
Endosulfan sulfate	ND	mg/kg	0.00050	0.00013	EPA-8081	ND		1
Endrin	ND	mg/kg	0.00050	0.000035	EPA-8081	ND		1
Endrin aldehyde	ND	mg/kg	0.00050	0.000061	EPA-8081	ND		1
Heptachlor	ND	mg/kg	0.00050	0.00026	EPA-8081	ND		1
Heptachlor epoxide	ND	mg/kg	0.00050	0.00015	EPA-8081	ND		1
Methoxychlor	ND	mg/kg	0.00050	0.00013	EPA-8081	ND		1
Toxaphene	ND	mg/kg	0.050	0.0074	EPA-8081	ND		1
TCMX (Surrogate)	55.6	%	20 - 143 (LCL - UCL)		EPA-8081			1
Dibutyl chlorendate (Surrogate)	36.6	%	20 - 164 (LCL - UCL)		EPA-8081			1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-8081	09/28/11	10/03/11 14:07	VH1	GC-1	1.007	BUJ0048

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Volatile Organic Analysis (EPA Method 8260)

BCL Sample ID: 1115416-04 | **Client Sample Name:** B-1-20, 9/19/2011 9:05:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Benzene	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
Bromobenzene	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
Bromochloromethane	ND	mg/kg	0.0050	0.00092	EPA-8260	ND		1
Bromodichloromethane	ND	mg/kg	0.0050	0.00084	EPA-8260	ND		1
Bromoform	ND	mg/kg	0.0050	0.0015	EPA-8260	ND		1
Bromomethane	ND	mg/kg	0.0050	0.0016	EPA-8260	ND		1
n-Butylbenzene	ND	mg/kg	0.0050	0.0015	EPA-8260	ND		1
sec-Butylbenzene	ND	mg/kg	0.0050	0.0012	EPA-8260	ND		1
tert-Butylbenzene	ND	mg/kg	0.0050	0.0012	EPA-8260	ND		1
Carbon tetrachloride	ND	mg/kg	0.0050	0.0011	EPA-8260	ND		1
Chlorobenzene	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
Chloroethane	ND	mg/kg	0.0050	0.0014	EPA-8260	ND		1
Chloroform	ND	mg/kg	0.0050	0.00063	EPA-8260	ND		1
Chloromethane	ND	mg/kg	0.0050	0.0014	EPA-8260	ND		1
2-Chlorotoluene	ND	mg/kg	0.0050	0.0018	EPA-8260	ND		1
4-Chlorotoluene	ND	mg/kg	0.0050	0.0014	EPA-8260	ND		1
Dibromochloromethane	ND	mg/kg	0.0050	0.00099	EPA-8260	ND		1
1,2-Dibromo-3-chloropropane	ND	mg/kg	0.0050	0.0017	EPA-8260	ND		1
1,2-Dibromoethane	ND	mg/kg	0.0050	0.0010	EPA-8260	ND		1
Dibromomethane	ND	mg/kg	0.0050	0.0018	EPA-8260	ND		1
1,2-Dichlorobenzene	ND	mg/kg	0.0050	0.00081	EPA-8260	ND		1
1,3-Dichlorobenzene	ND	mg/kg	0.0050	0.0014	EPA-8260	ND		1
1,4-Dichlorobenzene	ND	mg/kg	0.0050	0.0015	EPA-8260	ND		1
Dichlorodifluoromethane	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
1,1-Dichloroethane	ND	mg/kg	0.0050	0.0014	EPA-8260	ND		1
1,2-Dichloroethane	ND	mg/kg	0.0050	0.00085	EPA-8260	ND		1
1,1-Dichloroethene	ND	mg/kg	0.0050	0.0012	EPA-8260	ND		1
cis-1,2-Dichloroethene	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
trans-1,2-Dichloroethene	ND	mg/kg	0.0050	0.0014	EPA-8260	ND		1
1,2-Dichloropropane	ND	mg/kg	0.0050	0.00081	EPA-8260	ND		1
1,3-Dichloropropane	ND	mg/kg	0.0050	0.0011	EPA-8260	ND		1
2,2-Dichloropropane	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
1,1-Dichloropropene	ND	mg/kg	0.0050	0.0012	EPA-8260	ND		1

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Volatile Organic Analysis (EPA Method 8260)

BCL Sample ID: 1115416-04 | **Client Sample Name:** B-1-20, 9/19/2011 9:05:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
cis-1,3-Dichloropropene	ND	mg/kg	0.0050	0.0011	EPA-8260	ND		1
trans-1,3-Dichloropropene	ND	mg/kg	0.0050	0.0012	EPA-8260	ND		1
Ethylbenzene	ND	mg/kg	0.0050	0.0015	EPA-8260	ND		1
Hexachlorobutadiene	ND	mg/kg	0.0050	0.0017	EPA-8260	ND		1
Isopropylbenzene	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
p-Isopropyltoluene	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
Methylene chloride	ND	mg/kg	0.010	0.0024	EPA-8260	ND		1
Methyl t-butyl ether	ND	mg/kg	0.0050	0.00050	EPA-8260	ND		1
Naphthalene	ND	mg/kg	0.0050	0.0014	EPA-8260	ND		1
n-Propylbenzene	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
Styrene	ND	mg/kg	0.0050	0.0014	EPA-8260	ND		1
1,1,1,2-Tetrachloroethane	ND	mg/kg	0.0050	0.0011	EPA-8260	ND		1
1,1,2,2-Tetrachloroethane	ND	mg/kg	0.0050	0.0011	EPA-8260	ND		1
Tetrachloroethene	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
Toluene	ND	mg/kg	0.0050	0.0012	EPA-8260	ND		1
1,2,3-Trichlorobenzene	ND	mg/kg	0.0050	0.0021	EPA-8260	ND		1
1,2,4-Trichlorobenzene	ND	mg/kg	0.0050	0.0020	EPA-8260	ND		1
1,1,1-Trichloroethane	ND	mg/kg	0.0050	0.0011	EPA-8260	ND		1
1,1,2-Trichloroethane	ND	mg/kg	0.0050	0.00077	EPA-8260	ND		1
Trichloroethene	ND	mg/kg	0.0050	0.0011	EPA-8260	ND		1
Trichlorofluoromethane	ND	mg/kg	0.0050	0.0011	EPA-8260	ND		1
1,2,3-Trichloropropane	ND	mg/kg	0.0050	0.0016	EPA-8260	ND		1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
1,2,4-Trimethylbenzene	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
1,3,5-Trimethylbenzene	ND	mg/kg	0.0050	0.0015	EPA-8260	ND		1
Vinyl chloride	ND	mg/kg	0.0050	0.0016	EPA-8260	ND		1
Total Xylenes	ND	mg/kg	0.010	0.0034	EPA-8260	ND		1
p- & m-Xylenes	ND	mg/kg	0.0050	0.0022	EPA-8260	ND		1
o-Xylene	ND	mg/kg	0.0050	0.0012	EPA-8260	ND		1
1,2-Dichloroethane-d4 (Surrogate)	104	%	70 - 121 (LCL - UCL)		EPA-8260			1
Toluene-d8 (Surrogate)	98.7	%	81 - 117 (LCL - UCL)		EPA-8260			1
4-Bromofluorobenzene (Surrogate)	95.3	%	74 - 121 (LCL - UCL)		EPA-8260			1

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Irvine, CA 92618

Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Volatile Organic Analysis (EPA Method 8260)

BCL Sample ID: 1115416-04 | **Client Sample Name:** B-1-20, 9/19/2011 9:05:00AM

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-8260	09/26/11	09/27/11 06:59	ADC	MS-V3	1	BUI1646

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

BCL Sample ID: 1115416-04 | **Client Sample Name:** B-1-20, 9/19/2011 9:05:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Acenaphthene	ND	mg/kg	0.50	0.090	EPA-8270C	ND	A10	1
Acenaphthylene	ND	mg/kg	0.50	0.095	EPA-8270C	ND	A10	1
Aldrin	ND	mg/kg	0.50	0.12	EPA-8270C	ND	A10	1
Aniline	ND	mg/kg	1.0	0.26	EPA-8270C	ND	A10	1
Anthracene	ND	mg/kg	0.50	0.090	EPA-8270C	ND	A10	1
Benzidine	ND	mg/kg	15	1.1	EPA-8270C	ND	A10	1
Benzo[a]anthracene	ND	mg/kg	0.50	0.060	EPA-8270C	ND	A10	1
Benzo[b]fluoranthene	ND	mg/kg	0.50	0.090	EPA-8270C	ND	A10	1
Benzo[k]fluoranthene	ND	mg/kg	0.50	0.095	EPA-8270C	ND	A10	1
Benzo[a]pyrene	ND	mg/kg	0.50	0.075	EPA-8270C	ND	A10	1
Benzo[g,h,i]perylene	ND	mg/kg	0.50	0.28	EPA-8270C	ND	A10	1
Benzoic acid	ND	mg/kg	2.5	0.34	EPA-8270C	ND	A10	1
Benzyl alcohol	ND	mg/kg	0.50	0.090	EPA-8270C	ND	A10	1
Benzyl butyl phthalate	ND	mg/kg	0.50	0.10	EPA-8270C	ND	A10	1
alpha-BHC	ND	mg/kg	0.50	0.090	EPA-8270C	ND	A10	1
beta-BHC	ND	mg/kg	0.50	0.10	EPA-8270C	ND	A10	1
delta-BHC	ND	mg/kg	0.50	0.090	EPA-8270C	ND	A10	1
gamma-BHC (Lindane)	ND	mg/kg	0.50	0.085	EPA-8270C	ND	A10	1
bis(2-Chloroethoxy)methane	ND	mg/kg	0.50	0.085	EPA-8270C	ND	A10	1
bis(2-Chloroethyl) ether	ND	mg/kg	0.50	0.080	EPA-8270C	ND	A10	1
bis(2-Chloroisopropyl)ether	ND	mg/kg	0.50	0.10	EPA-8270C	ND	A10	1
bis(2-Ethylhexyl)phthalate	ND	mg/kg	1.0	0.22	EPA-8270C	ND	A10	1
4-Bromophenyl phenyl ether	ND	mg/kg	0.50	0.085	EPA-8270C	ND	A10	1
4-Chloroaniline	ND	mg/kg	0.50	0.14	EPA-8270C	ND	A10	1
2-Chloronaphthalene	ND	mg/kg	0.50	0.10	EPA-8270C	ND	A10	1
4-Chlorophenyl phenyl ether	ND	mg/kg	0.50	0.075	EPA-8270C	ND	A10	1
Chrysene	ND	mg/kg	0.50	0.085	EPA-8270C	ND	A10	1
4,4'-DDD	ND	mg/kg	0.50	0.085	EPA-8270C	ND	A10	1
4,4'-DDE	ND	mg/kg	0.50	0.085	EPA-8270C	ND	A10	1
4,4'-DDT	ND	mg/kg	0.50	0.095	EPA-8270C	ND	A10	1
Dibenzo[a,h]anthracene	ND	mg/kg	0.50	0.095	EPA-8270C	ND	A10	1
Dibenzofuran	ND	mg/kg	0.50	0.10	EPA-8270C	ND	A10	1
1,2-Dichlorobenzene	ND	mg/kg	0.50	0.10	EPA-8270C	ND	A10	1

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

BCL Sample ID: 1115416-04 | **Client Sample Name:** B-1-20, 9/19/2011 9:05:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
1,3-Dichlorobenzene	ND	mg/kg	0.50	0.10	EPA-8270C	ND	A10	1
1,4-Dichlorobenzene	ND	mg/kg	0.50	0.095	EPA-8270C	ND	A10	1
3,3-Dichlorobenzidine	ND	mg/kg	1.0	0.034	EPA-8270C	ND	A10	1
Dieldrin	ND	mg/kg	0.50	0.16	EPA-8270C	ND	A10	1
Diethyl phthalate	ND	mg/kg	0.50	0.095	EPA-8270C	ND	A10	1
Dimethyl phthalate	ND	mg/kg	0.50	0.10	EPA-8270C	ND	A10	1
Di-n-butyl phthalate	ND	mg/kg	0.50	0.090	EPA-8270C	ND	A10	1
2,4-Dinitrotoluene	ND	mg/kg	0.50	0.11	EPA-8270C	ND	A10	1
2,6-Dinitrotoluene	ND	mg/kg	0.50	0.090	EPA-8270C	ND	A10	1
Di-n-octyl phthalate	ND	mg/kg	0.50	0.085	EPA-8270C	ND	A10	1
1,2-Diphenylhydrazine	ND	mg/kg	0.50	0.095	EPA-8270C	ND	A10	1
Endosulfan I	ND	mg/kg	1.0	0.10	EPA-8270C	ND	A10	1
Endosulfan II	ND	mg/kg	1.0	0.10	EPA-8270C	ND	A10	1
Endosulfan sulfate	ND	mg/kg	0.50	0.10	EPA-8270C	ND	A10	1
Endrin	ND	mg/kg	1.0	0.12	EPA-8270C	ND	A10	1
Endrin aldehyde	ND	mg/kg	2.5	0.11	EPA-8270C	ND	A10	1
Fluoranthene	ND	mg/kg	0.50	0.085	EPA-8270C	ND	A10	1
Fluorene	ND	mg/kg	0.50	0.095	EPA-8270C	ND	A10	1
Heptachlor	ND	mg/kg	0.50	0.10	EPA-8270C	ND	A10	1
Heptachlor epoxide	ND	mg/kg	0.50	0.085	EPA-8270C	ND	A10	1
Hexachlorobenzene	ND	mg/kg	0.50	0.080	EPA-8270C	ND	A10	1
Hexachlorobutadiene	ND	mg/kg	0.50	0.085	EPA-8270C	ND	A10	1
Hexachlorocyclopentadiene	ND	mg/kg	0.50	0.095	EPA-8270C	ND	A10	1
Hexachloroethane	ND	mg/kg	0.50	0.10	EPA-8270C	ND	A10	1
Indeno[1,2,3-cd]pyrene	ND	mg/kg	0.50	0.36	EPA-8270C	ND	A10	1
Isophorone	ND	mg/kg	0.50	0.085	EPA-8270C	ND	A10	1
2-Methylnaphthalene	ND	mg/kg	0.50	0.090	EPA-8270C	ND	A10	1
Naphthalene	ND	mg/kg	0.50	0.090	EPA-8270C	ND	A10	1
2-Naphthylamine	ND	mg/kg	15	0.80	EPA-8270C	ND	A10	1
2-Nitroaniline	ND	mg/kg	0.50	0.090	EPA-8270C	ND	A10	1
3-Nitroaniline	ND	mg/kg	1.0	0.075	EPA-8270C	ND	A10	1
4-Nitroaniline	ND	mg/kg	1.0	0.12	EPA-8270C	ND	A10	1
Nitrobenzene	ND	mg/kg	0.50	0.075	EPA-8270C	ND	A10	1

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

BCL Sample ID: 1115416-04 | **Client Sample Name:** B-1-20, 9/19/2011 9:05:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
N-Nitrosodimethylamine	ND	mg/kg	0.50	0.18	EPA-8270C	ND	A10	1
N-Nitrosodi-N-propylamine	ND	mg/kg	0.50	0.10	EPA-8270C	ND	A10	1
N-Nitrosodiphenylamine	ND	mg/kg	0.50	0.10	EPA-8270C	ND	A10	1
Phenanthrene	ND	mg/kg	0.50	0.090	EPA-8270C	ND	A10	1
Pyrene	ND	mg/kg	0.50	0.085	EPA-8270C	ND	A10	1
1,2,4-Trichlorobenzene	ND	mg/kg	0.50	0.090	EPA-8270C	ND	A10	1
4-Chloro-3-methylphenol	ND	mg/kg	1.0	0.11	EPA-8270C	ND	A10	1
2-Chlorophenol	ND	mg/kg	0.50	0.080	EPA-8270C	ND	A10	1
2,4-Dichlorophenol	ND	mg/kg	0.50	0.085	EPA-8270C	ND	A10	1
2,4-Dimethylphenol	ND	mg/kg	0.50	0.18	EPA-8270C	ND	A10	1
4,6-Dinitro-2-methylphenol	ND	mg/kg	2.5	0.060	EPA-8270C	ND	A10	1
2,4-Dinitrophenol	ND	mg/kg	2.5	0.038	EPA-8270C	ND	A10	1
2-Methylphenol	ND	mg/kg	0.50	0.085	EPA-8270C	ND	A10	1
3- & 4-Methylphenol	ND	mg/kg	1.0	0.16	EPA-8270C	ND	A10	1
2-Nitrophenol	ND	mg/kg	0.50	0.080	EPA-8270C	ND	A10	1
4-Nitrophenol	ND	mg/kg	1.0	0.090	EPA-8270C	ND	A10	1
Pentachlorophenol	ND	mg/kg	1.0	0.065	EPA-8270C	ND	A10	1
Phenol	ND	mg/kg	0.50	0.080	EPA-8270C	ND	A10	1
2,4,5-Trichlorophenol	ND	mg/kg	1.0	0.090	EPA-8270C	ND	A10	1
2,4,6-Trichlorophenol	ND	mg/kg	1.0	0.085	EPA-8270C	ND	A10	1
2-Fluorophenol (Surrogate)	70.5	%	28 - 144 (LCL - UCL)		EPA-8270C		A10	1
Phenol-d5 (Surrogate)	43.0	%	36 - 136 (LCL - UCL)		EPA-8270C		A10	1
Nitrobenzene-d5 (Surrogate)	80.8	%	31 - 135 (LCL - UCL)		EPA-8270C		A10	1
2-Fluorobiphenyl (Surrogate)	66.1	%	20 - 140 (LCL - UCL)		EPA-8270C		A10	1
2,4,6-Tribromophenol (Surrogate)	116	%	20 - 150 (LCL - UCL)		EPA-8270C		A10	1
p-Terphenyl-d14 (Surrogate)	97.6	%	10 - 150 (LCL - UCL)		EPA-8270C		A10	1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-8270C	09/28/11	10/06/11 00:08	SKC	MS-B2	5.034	BUJ0343

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1 Technology Drive, Suite F207
Irvine, CA 92618

Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Purgeable Aromatics and Total Petroleum Hydrocarbons

BCL Sample ID: 1115416-04 | **Client Sample Name:** B-1-20, 9/19/2011 9:05:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
TPH - Light Naptha	ND	mg/kg	50	20	Luft/FFP	ND		1
TPH - Aviation Gas	ND	mg/kg	50	20	Luft/FFP	ND		1
TPH - Stoddard Solvent	ND	mg/kg	20	5.0	Luft/FFP	ND		1
TPH - Heavy Naptha	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Gasoline	ND	mg/kg	20	5.0	Luft/FFP	ND		1
TPH - Jet Fuel (JP4)	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Jet Fuel (JP5)	ND	mg/kg	10	4.6	Luft/FFP	ND		1
TPH - Jet Fuel (JP8)	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Kerosene	ND	mg/kg	10	1.4	Luft/FFP	ND		1
TPH - Diesel (FFP)	ND	mg/kg	10	1.2	Luft/FFP	ND		1
TPH - Fuel Oil #6	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Crude Oil	ND	mg/kg	20	2.8	Luft/FFP	ND		1
TPH - Hydraulic Oil / Motor Oil	**20**	**mg/kg**	**20**	**6.5**	**Luft/FFP**	ND		1
TPH - WD-40	ND	mg/kg	10	5.0	Luft/FFP	ND		1
Tetracosane (Surrogate)	34.4	%	20 - 145 (LCL - UCL)		Luft/FFP			1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	Luft/FFP	09/28/11	10/07/11 11:06	MWB	GC-13	1.007	BUJ0256

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Total Concentrations (TTLC)

BCL Sample ID: 1115416-04 | **Client Sample Name:** B-1-20, 9/19/2011 9:05:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Antimony	**1.4**	**mg/kg**	**5.0**	**0.50**	**EPA-6010B**	ND	**J**	1
Arsenic	**1.5**	**mg/kg**	**1.0**	**0.38**	**EPA-6010B**	ND		1
Barium	**49**	**mg/kg**	**0.50**	**0.077**	**EPA-6010B**	ND		1
Beryllium	**0.26**	**mg/kg**	**0.50**	**0.050**	**EPA-6010B**	ND	**J**	1
Cadmium	**0.12**	**mg/kg**	**0.50**	**0.050**	**EPA-6010B**	ND	**J**	1
Chromium	**7.1**	**mg/kg**	**0.50**	**0.060**	**EPA-6010B**	ND		1
Cobalt	**3.6**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	ND		1
Copper	**21**	**mg/kg**	**1.0**	**0.12**	**EPA-6010B**	ND		1
Lead	**8.8**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	ND		1
Mercury	**0.18**	**mg/kg**	**0.16**	**0.024**	**EPA-7471A**	ND		2
Molybdenum	ND	mg/kg	2.5	0.25	EPA-6010B	ND		1
Nickel	**4.6**	**mg/kg**	**0.50**	**0.058**	**EPA-6010B**	ND		1
Selenium	ND	mg/kg	1.0	0.51	EPA-6010B	ND		1
Silver	ND	mg/kg	0.50	0.050	EPA-6010B	0.063		1
Thallium	ND	mg/kg	5.0	0.73	EPA-6010B	ND		1
Vanadium	**21**	**mg/kg**	**0.50**	**0.050**	**EPA-6010B**	ND		1
Zinc	**46**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	0.38		1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-6010B	09/27/11	09/28/11 08:25	ARD	PE-OP1	1	BUI1739
2	EPA-7471A	09/26/11	09/28/11 13:08	MEV	CETAC1	0.977	BUI1659

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Organochlorine Pesticides (EPA Method 8081)

BCL Sample ID: 1115416-05 | **Client Sample Name:** B-1-25, 9/19/2011 9:20:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Aldrin	ND	mg/kg	0.00050	0.000026	EPA-8081	ND		1
alpha-BHC	ND	mg/kg	0.00050	0.00014	EPA-8081	ND		1
beta-BHC	ND	mg/kg	0.00050	0.00038	EPA-8081	ND		1
delta-BHC	ND	mg/kg	0.00050	0.000076	EPA-8081	ND		1
gamma-BHC (Lindane)	ND	mg/kg	0.00050	0.00025	EPA-8081	ND		1
Chlordane (Technical)	ND	mg/kg	0.050	0.015	EPA-8081	ND		1
4,4'-DDD	ND	mg/kg	0.00050	0.000063	EPA-8081	ND		1
4,4'-DDE	ND	mg/kg	0.00050	0.000045	EPA-8081	ND		1
4,4'-DDT	ND	mg/kg	0.00050	0.000031	EPA-8081	ND		1
Dieldrin	ND	mg/kg	0.00050	0.000032	EPA-8081	ND		1
Endosulfan I	ND	mg/kg	0.00050	0.000086	EPA-8081	ND		1
Endosulfan II	ND	mg/kg	0.00050	0.000066	EPA-8081	ND		1
Endosulfan sulfate	ND	mg/kg	0.00050	0.00013	EPA-8081	ND		1
Endrin	ND	mg/kg	0.00050	0.000035	EPA-8081	ND		1
Endrin aldehyde	ND	mg/kg	0.00050	0.000061	EPA-8081	ND		1
Heptachlor	ND	mg/kg	0.00050	0.00026	EPA-8081	ND		1
Heptachlor epoxide	ND	mg/kg	0.00050	0.00015	EPA-8081	ND		1
Methoxychlor	ND	mg/kg	0.00050	0.00013	EPA-8081	ND		1
Toxaphene	ND	mg/kg	0.050	0.0074	EPA-8081	ND		1
TCMX (Surrogate)	85.1	%	20 - 143 (LCL - UCL)		EPA-8081			1
Dibutyl chlorendate (Surrogate)	85.6	%	20 - 164 (LCL - UCL)		EPA-8081			1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-8081	09/28/11	10/03/11 14:25	VH1	GC-1	0.997	BUJ0048

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

BCL Sample ID: 1115416-05 | **Client Sample Name:** B-1-25, 9/19/2011 9:20:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Acenaphthene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Acenaphthylene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Aldrin	ND	mg/kg	0.10	0.024	EPA-8270C	ND		1
Aniline	ND	mg/kg	0.20	0.053	EPA-8270C	ND		1
Anthracene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Benzidine	ND	mg/kg	3.0	0.22	EPA-8270C	ND		1
Benzo[a]anthracene	ND	mg/kg	0.10	0.012	EPA-8270C	ND		1
Benzo[b]fluoranthene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Benzo[k]fluoranthene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Benzo[a]pyrene	ND	mg/kg	0.10	0.015	EPA-8270C	ND		1
Benzo[g,h,i]perylene	ND	mg/kg	0.10	0.056	EPA-8270C	ND		1
Benzoic acid	ND	mg/kg	0.50	0.067	EPA-8270C	ND		1
Benzyl alcohol	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Benzyl butyl phthalate	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
alpha-BHC	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
beta-BHC	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
delta-BHC	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
gamma-BHC (Lindane)	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
bis(2-Chloroethoxy)methane	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
bis(2-Chloroethyl) ether	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
bis(2-Chloroisopropyl)ether	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
bis(2-Ethylhexyl)phthalate	**0.14**	**mg/kg**	**0.20**	**0.043**	**EPA-8270C**	ND	**J**	1
4-Bromophenyl phenyl ether	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
4-Chloroaniline	ND	mg/kg	0.10	0.027	EPA-8270C	ND		1
2-Chloronaphthalene	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1
4-Chlorophenyl phenyl ether	ND	mg/kg	0.10	0.015	EPA-8270C	ND		1
Chrysene	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
4,4'-DDD	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
4,4'-DDE	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
4,4'-DDT	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Dibenzo[a,h]anthracene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Dibenzofuran	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1
1,2-Dichlorobenzene	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

BCL Sample ID: 1115416-05 | **Client Sample Name:** B-1-25, 9/19/2011 9:20:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
1,3-Dichlorobenzene	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
1,4-Dichlorobenzene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
3,3-Dichlorobenzidine	ND	mg/kg	0.20	0.0067	EPA-8270C	ND		1
Dieldrin	ND	mg/kg	0.10	0.031	EPA-8270C	ND		1
Diethyl phthalate	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Dimethyl phthalate	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1
Di-n-butyl phthalate	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
2,4-Dinitrotoluene	ND	mg/kg	0.10	0.022	EPA-8270C	ND		1
2,6-Dinitrotoluene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Di-n-octyl phthalate	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
1,2-Diphenylhydrazine	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Endosulfan I	ND	mg/kg	0.20	0.020	EPA-8270C	ND		1
Endosulfan II	ND	mg/kg	0.20	0.021	EPA-8270C	ND		1
Endosulfan sulfate	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
Endrin	ND	mg/kg	0.20	0.025	EPA-8270C	ND		1
Endrin aldehyde	ND	mg/kg	0.50	0.022	EPA-8270C	ND		1
Fluoranthene	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
Fluorene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Heptachlor	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
Heptachlor epoxide	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
Hexachlorobenzene	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
Hexachlorobutadiene	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
Hexachlorocyclopentadiene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Hexachloroethane	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1
Indeno[1,2,3-cd]pyrene	ND	mg/kg	0.10	0.072	EPA-8270C	ND		1
Isophorone	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
2-Methylnaphthalene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Naphthalene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
2-Naphthylamine	ND	mg/kg	3.0	0.16	EPA-8270C	ND		1
2-Nitroaniline	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
3-Nitroaniline	ND	mg/kg	0.20	0.015	EPA-8270C	ND		1
4-Nitroaniline	ND	mg/kg	0.20	0.025	EPA-8270C	ND		1
Nitrobenzene	ND	mg/kg	0.10	0.015	EPA-8270C	ND		1

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

BCL Sample ID: 1115416-05 | **Client Sample Name:** B-1-25, 9/19/2011 9:20:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
N-Nitrosodimethylamine	ND	mg/kg	0.10	0.037	EPA-8270C	ND		1
N-Nitrosodi-N-propylamine	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
N-Nitrosodiphenylamine	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
Phenanthrene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Pyrene	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
1,2,4-Trichlorobenzene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
4-Chloro-3-methylphenol	ND	mg/kg	0.20	0.022	EPA-8270C	ND		1
2-Chlorophenol	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
2,4-Dichlorophenol	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
2,4-Dimethylphenol	ND	mg/kg	0.10	0.035	EPA-8270C	ND		1
4,6-Dinitro-2-methylphenol	ND	mg/kg	0.50	0.012	EPA-8270C	ND		1
2,4-Dinitrophenol	ND	mg/kg	0.50	0.0077	EPA-8270C	ND		1
2-Methylphenol	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
3- & 4-Methylphenol	ND	mg/kg	0.20	0.033	EPA-8270C	ND		1
2-Nitrophenol	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
4-Nitrophenol	ND	mg/kg	0.20	0.018	EPA-8270C	ND		1
Pentachlorophenol	ND	mg/kg	0.20	0.013	EPA-8270C	ND		1
Phenol	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
2,4,5-Trichlorophenol	ND	mg/kg	0.20	0.018	EPA-8270C	ND		1
2,4,6-Trichlorophenol	ND	mg/kg	0.20	0.017	EPA-8270C	ND		1
2-Fluorophenol (Surrogate)	74.4	%	28 - 144 (LCL - UCL)		EPA-8270C			1
Phenol-d5 (Surrogate)	42.5	%	36 - 136 (LCL - UCL)		EPA-8270C			1
Nitrobenzene-d5 (Surrogate)	88.8	%	31 - 135 (LCL - UCL)		EPA-8270C			1
2-Fluorobiphenyl (Surrogate)	86.5	%	20 - 140 (LCL - UCL)		EPA-8270C			1
2,4,6-Tribromophenol (Surrogate)	122	%	20 - 150 (LCL - UCL)		EPA-8270C			1
p-Terphenyl-d14 (Surrogate)	71.8	%	10 - 150 (LCL - UCL)		EPA-8270C			1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-8270C	09/28/11	10/06/11 00:34	SKC	MS-B2	1.007	BUJ0343

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Purgeable Aromatics and Total Petroleum Hydrocarbons

BCL Sample ID: 1115416-05 | **Client Sample Name:** B-1-25, 9/19/2011 9:20:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
TPH - Light Naptha	ND	mg/kg	50	20	Luft/FFP	ND		1
TPH - Aviation Gas	ND	mg/kg	50	20	Luft/FFP	ND		1
TPH - Stoddard Solvent	ND	mg/kg	20	5.0	Luft/FFP	ND		1
TPH - Heavy Naptha	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Gasoline	ND	mg/kg	20	5.0	Luft/FFP	ND		1
TPH - Jet Fuel (JP4)	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Jet Fuel (JP5)	ND	mg/kg	10	4.6	Luft/FFP	ND		1
TPH - Jet Fuel (JP8)	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Kerosene	ND	mg/kg	10	1.4	Luft/FFP	ND		1
TPH - Diesel (FFP)	**12**	**mg/kg**	**10**	**1.2**	**Luft/FFP**	ND	**A52**	1
TPH - Fuel Oil #6	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Crude Oil	ND	mg/kg	20	2.8	Luft/FFP	ND		1
TPH - Hydraulic Oil / Motor Oil	**29**	**mg/kg**	**20**	**6.5**	**Luft/FFP**	ND		1
TPH - WD-40	ND	mg/kg	10	5.0	Luft/FFP	ND		1
Tetracosane (Surrogate)	72.1	%	20 - 145 (LCL - UCL)		Luft/FFP			1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	Luft/FFP	09/28/11	10/07/11 11:29	MWB	GC-13	0.997	BUJ0256

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Total Concentrations (TTLC)

BCL Sample ID: 1115416-05 | **Client Sample Name:** B-1-25, 9/19/2011 9:20:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Antimony	**1.2**	**mg/kg**	**5.0**	**0.50**	**EPA-6010B**	ND	**J**	1
Arsenic	**2.7**	**mg/kg**	**1.0**	**0.38**	**EPA-6010B**	ND		1
Barium	**55**	**mg/kg**	**0.50**	**0.077**	**EPA-6010B**	ND		1
Beryllium	**0.29**	**mg/kg**	**0.50**	**0.050**	**EPA-6010B**	ND	**J**	1
Cadmium	**0.083**	**mg/kg**	**0.50**	**0.050**	**EPA-6010B**	ND	**J**	1
Chromium	**9.6**	**mg/kg**	**0.50**	**0.060**	**EPA-6010B**	ND		1
Cobalt	**3.1**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	ND		1
Copper	**19**	**mg/kg**	**1.0**	**0.12**	**EPA-6010B**	ND		1
Lead	**7.8**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	ND		1
Mercury	**0.22**	**mg/kg**	**0.16**	**0.024**	**EPA-7471A**	ND		2
Molybdenum	**0.95**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	ND	**J**	1
Nickel	**3.4**	**mg/kg**	**0.50**	**0.058**	**EPA-6010B**	ND		1
Selenium	ND	mg/kg	1.0	0.51	EPA-6010B	ND		1
Silver	ND	mg/kg	0.50	0.050	EPA-6010B	ND		1
Thallium	ND	mg/kg	5.0	0.73	EPA-6010B	ND		1
Vanadium	**17**	**mg/kg**	**0.50**	**0.050**	**EPA-6010B**	ND		1
Zinc	**43**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	0.55		1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-6010B	09/28/11	09/29/11 05:40	ARD	PE-OP1	1	BUI1866
2	EPA-7471A	09/26/11	09/28/11 13:10	MEV	CETAC1	0.977	BUI1659

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1 Technology Drive, Suite F207
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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Organochlorine Pesticides (EPA Method 8081)

BCL Sample ID: 1115416-06 | **Client Sample Name:** B-3-5, 9/19/2011 10:05:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Aldrin	ND	mg/kg	0.00050	0.000026	EPA-8081	ND		1
alpha-BHC	ND	mg/kg	0.00050	0.00014	EPA-8081	ND		1
beta-BHC	ND	mg/kg	0.00050	0.00038	EPA-8081	ND		1
delta-BHC	ND	mg/kg	0.00050	0.000076	EPA-8081	ND		1
gamma-BHC (Lindane)	ND	mg/kg	0.00050	0.00025	EPA-8081	ND		1
Chlordane (Technical)	ND	mg/kg	0.050	0.015	EPA-8081	ND		1
4,4'-DDD	ND	mg/kg	0.00050	0.000063	EPA-8081	ND		1
4,4'-DDE	ND	mg/kg	0.00050	0.000045	EPA-8081	ND		1
4,4'-DDT	ND	mg/kg	0.00050	0.000031	EPA-8081	ND		1
Dieldrin	ND	mg/kg	0.00050	0.000032	EPA-8081	ND		1
Endosulfan I	ND	mg/kg	0.00050	0.000086	EPA-8081	ND		1
Endosulfan II	ND	mg/kg	0.00050	0.000066	EPA-8081	ND		1
Endosulfan sulfate	ND	mg/kg	0.00050	0.00013	EPA-8081	ND		1
Endrin	ND	mg/kg	0.00050	0.000035	EPA-8081	ND		1
Endrin aldehyde	ND	mg/kg	0.00050	0.000061	EPA-8081	ND		1
Heptachlor	ND	mg/kg	0.00050	0.00026	EPA-8081	ND		1
Heptachlor epoxide	ND	mg/kg	0.00050	0.00015	EPA-8081	ND		1
Methoxychlor	ND	mg/kg	0.00050	0.00013	EPA-8081	ND		1
Toxaphene	ND	mg/kg	0.050	0.0074	EPA-8081	ND		1
TCMX (Surrogate)	78.6	%	20 - 143 (LCL - UCL)		EPA-8081			1
Dibutyl chlorendate (Surrogate)	75.6	%	20 - 164 (LCL - UCL)		EPA-8081			1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-8081	09/28/11	10/03/11 14:43	VH1	GC-1	1.010	BUJ0048

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Volatile Organic Analysis (EPA Method 8260)

BCL Sample ID: 1115416-06 | **Client Sample Name:** B-3-5, 9/19/2011 10:05:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Benzene	**0.0085**	**mg/kg**	**0.0050**	**0.0013**	**EPA-8260**	ND		1
Bromobenzene	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
Bromochloromethane	ND	mg/kg	0.0050	0.00092	EPA-8260	ND		1
Bromodichloromethane	ND	mg/kg	0.0050	0.00084	EPA-8260	ND		1
Bromoform	ND	mg/kg	0.0050	0.0015	EPA-8260	ND		1
Bromomethane	ND	mg/kg	0.0050	0.0016	EPA-8260	ND		1
n-Butylbenzene	ND	mg/kg	0.0050	0.0015	EPA-8260	ND		1
sec-Butylbenzene	ND	mg/kg	0.0050	0.0012	EPA-8260	ND		1
tert-Butylbenzene	ND	mg/kg	0.0050	0.0012	EPA-8260	ND		1
Carbon tetrachloride	ND	mg/kg	0.0050	0.0011	EPA-8260	ND		1
Chlorobenzene	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
Chloroethane	ND	mg/kg	0.0050	0.0014	EPA-8260	ND		1
Chloroform	ND	mg/kg	0.0050	0.00063	EPA-8260	ND		1
Chloromethane	ND	mg/kg	0.0050	0.0014	EPA-8260	ND		1
2-Chlorotoluene	ND	mg/kg	0.0050	0.0018	EPA-8260	ND		1
4-Chlorotoluene	ND	mg/kg	0.0050	0.0014	EPA-8260	ND		1
Dibromochloromethane	ND	mg/kg	0.0050	0.00099	EPA-8260	ND		1
1,2-Dibromo-3-chloropropane	ND	mg/kg	0.0050	0.0017	EPA-8260	ND		1
1,2-Dibromoethane	ND	mg/kg	0.0050	0.0010	EPA-8260	ND		1
Dibromomethane	ND	mg/kg	0.0050	0.0018	EPA-8260	ND		1
1,2-Dichlorobenzene	ND	mg/kg	0.0050	0.00081	EPA-8260	ND		1
1,3-Dichlorobenzene	ND	mg/kg	0.0050	0.0014	EPA-8260	ND		1
1,4-Dichlorobenzene	ND	mg/kg	0.0050	0.0015	EPA-8260	ND		1
Dichlorodifluoromethane	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
1,1-Dichloroethane	ND	mg/kg	0.0050	0.0014	EPA-8260	ND		1
1,2-Dichloroethane	ND	mg/kg	0.0050	0.00085	EPA-8260	ND		1
1,1-Dichloroethene	ND	mg/kg	0.0050	0.0012	EPA-8260	ND		1
cis-1,2-Dichloroethene	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
trans-1,2-Dichloroethene	ND	mg/kg	0.0050	0.0014	EPA-8260	ND		1
1,2-Dichloropropane	ND	mg/kg	0.0050	0.00081	EPA-8260	ND		1
1,3-Dichloropropane	ND	mg/kg	0.0050	0.0011	EPA-8260	ND		1
2,2-Dichloropropane	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
1,1-Dichloropropene	ND	mg/kg	0.0050	0.0012	EPA-8260	ND		1

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Volatile Organic Analysis (EPA Method 8260)

BCL Sample ID: 1115416-06 | **Client Sample Name:** B-3-5, 9/19/2011 10:05:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
cis-1,3-Dichloropropene	ND	mg/kg	0.0050	0.0011	EPA-8260	ND		1
trans-1,3-Dichloropropene	ND	mg/kg	0.0050	0.0012	EPA-8260	ND		1
Ethylbenzene	ND	mg/kg	0.0050	0.0015	EPA-8260	ND		1
Hexachlorobutadiene	ND	mg/kg	0.0050	0.0017	EPA-8260	ND		1
Isopropylbenzene	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
p-Isopropyltoluene	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
Methylene chloride	ND	mg/kg	0.010	0.0024	EPA-8260	ND		1
Methyl t-butyl ether	ND	mg/kg	0.0050	0.00050	EPA-8260	ND		1
Naphthalene	ND	mg/kg	0.0050	0.0014	EPA-8260	ND		1
n-Propylbenzene	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
Styrene	ND	mg/kg	0.0050	0.0014	EPA-8260	ND		1
1,1,1,2-Tetrachloroethane	ND	mg/kg	0.0050	0.0011	EPA-8260	ND		1
1,1,2,2-Tetrachloroethane	ND	mg/kg	0.0050	0.0011	EPA-8260	ND		1
Tetrachloroethene	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
Toluene	**0.0036**	**mg/kg**	**0.0050**	**0.0012**	**EPA-8260**	ND	**J**	1
1,2,3-Trichlorobenzene	ND	mg/kg	0.0050	0.0021	EPA-8260	ND		1
1,2,4-Trichlorobenzene	ND	mg/kg	0.0050	0.0020	EPA-8260	ND		1
1,1,1-Trichloroethane	ND	mg/kg	0.0050	0.0011	EPA-8260	ND		1
1,1,2-Trichloroethane	ND	mg/kg	0.0050	0.00077	EPA-8260	ND		1
Trichloroethene	ND	mg/kg	0.0050	0.0011	EPA-8260	ND		1
Trichlorofluoromethane	ND	mg/kg	0.0050	0.0011	EPA-8260	ND		1
1,2,3-Trichloropropane	ND	mg/kg	0.0050	0.0016	EPA-8260	ND		1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
1,2,4-Trimethylbenzene	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
1,3,5-Trimethylbenzene	ND	mg/kg	0.0050	0.0015	EPA-8260	ND		1
Vinyl chloride	ND	mg/kg	0.0050	0.0016	EPA-8260	ND		1
Total Xylenes	ND	mg/kg	0.010	0.0034	EPA-8260	ND		1
p- & m-Xylenes	ND	mg/kg	0.0050	0.0022	EPA-8260	ND		1
o-Xylene	ND	mg/kg	0.0050	0.0012	EPA-8260	ND		1
1,2-Dichloroethane-d4 (Surrogate)	101	%	70 - 121 (LCL - UCL)		EPA-8260			1
Toluene-d8 (Surrogate)	97.5	%	81 - 117 (LCL - UCL)		EPA-8260			1
4-Bromofluorobenzene (Surrogate)	96.8	%	74 - 121 (LCL - UCL)		EPA-8260			1

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Volatile Organic Analysis (EPA Method 8260)

BCL Sample ID: 1115416-06 | **Client Sample Name:** B-3-5, 9/19/2011 10:05:00AM

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-8260	09/26/11	09/27/11 07:26	ADC	MS-V3	1	BUI1646

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

BCL Sample ID: 1115416-06 | **Client Sample Name:** B-3-5, 9/19/2011 10:05:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Acenaphthene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Acenaphthylene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Aldrin	ND	mg/kg	0.10	0.024	EPA-8270C	ND		1
Aniline	ND	mg/kg	0.20	0.053	EPA-8270C	ND		1
Anthracene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Benzidine	ND	mg/kg	3.0	0.22	EPA-8270C	ND		1
Benzo[a]anthracene	ND	mg/kg	0.10	0.012	EPA-8270C	ND		1
Benzo[b]fluoranthene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Benzo[k]fluoranthene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Benzo[a]pyrene	ND	mg/kg	0.10	0.015	EPA-8270C	ND		1
Benzo[g,h,i]perylene	ND	mg/kg	0.10	0.056	EPA-8270C	ND		1
Benzoic acid	ND	mg/kg	0.50	0.067	EPA-8270C	ND		1
Benzyl alcohol	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Benzyl butyl phthalate	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
alpha-BHC	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
beta-BHC	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
delta-BHC	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
gamma-BHC (Lindane)	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
bis(2-Chloroethoxy)methane	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
bis(2-Chloroethyl) ether	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
bis(2-Chloroisopropyl)ether	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
bis(2-Ethylhexyl)phthalate	ND	mg/kg	0.20	0.043	EPA-8270C	ND		1
4-Bromophenyl phenyl ether	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
4-Chloroaniline	ND	mg/kg	0.10	0.027	EPA-8270C	ND		1
2-Chloronaphthalene	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1
4-Chlorophenyl phenyl ether	ND	mg/kg	0.10	0.015	EPA-8270C	ND		1
Chrysene	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
4,4'-DDD	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
4,4'-DDE	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
4,4'-DDT	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Dibenzo[a,h]anthracene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Dibenzofuran	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1
1,2-Dichlorobenzene	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

BCL Sample ID: 1115416-06 | **Client Sample Name:** B-3-5, 9/19/2011 10:05:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
1,3-Dichlorobenzene	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
1,4-Dichlorobenzene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
3,3-Dichlorobenzidine	ND	mg/kg	0.20	0.0067	EPA-8270C	ND		1
Dieldrin	ND	mg/kg	0.10	0.031	EPA-8270C	ND		1
Diethyl phthalate	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Dimethyl phthalate	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1
Di-n-butyl phthalate	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
2,4-Dinitrotoluene	ND	mg/kg	0.10	0.022	EPA-8270C	ND		1
2,6-Dinitrotoluene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Di-n-octyl phthalate	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
1,2-Diphenylhydrazine	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Endosulfan I	ND	mg/kg	0.20	0.020	EPA-8270C	ND		1
Endosulfan II	ND	mg/kg	0.20	0.021	EPA-8270C	ND		1
Endosulfan sulfate	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
Endrin	ND	mg/kg	0.20	0.025	EPA-8270C	ND		1
Endrin aldehyde	ND	mg/kg	0.50	0.022	EPA-8270C	ND		1
Fluoranthene	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
Fluorene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Heptachlor	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
Heptachlor epoxide	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
Hexachlorobenzene	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
Hexachlorobutadiene	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
Hexachlorocyclopentadiene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Hexachloroethane	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1
Indeno[1,2,3-cd]pyrene	ND	mg/kg	0.10	0.072	EPA-8270C	ND		1
Isophorone	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
2-Methylnaphthalene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Naphthalene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
2-Naphthylamine	ND	mg/kg	3.0	0.16	EPA-8270C	ND		1
2-Nitroaniline	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
3-Nitroaniline	ND	mg/kg	0.20	0.015	EPA-8270C	ND		1
4-Nitroaniline	ND	mg/kg	0.20	0.025	EPA-8270C	ND		1
Nitrobenzene	ND	mg/kg	0.10	0.015	EPA-8270C	ND		1

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

BCL Sample ID: 1115416-06 | **Client Sample Name:** B-3-5, 9/19/2011 10:05:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
N-Nitrosodimethylamine	ND	mg/kg	0.10	0.037	EPA-8270C	ND		1
N-Nitrosodi-N-propylamine	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
N-Nitrosodiphenylamine	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
Phenanthrene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Pyrene	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
1,2,4-Trichlorobenzene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
4-Chloro-3-methylphenol	ND	mg/kg	0.20	0.022	EPA-8270C	ND		1
2-Chlorophenol	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
2,4-Dichlorophenol	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
2,4-Dimethylphenol	ND	mg/kg	0.10	0.035	EPA-8270C	ND		1
4,6-Dinitro-2-methylphenol	ND	mg/kg	0.50	0.012	EPA-8270C	ND		1
2,4-Dinitrophenol	ND	mg/kg	0.50	0.0077	EPA-8270C	ND		1
2-Methylphenol	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
3- & 4-Methylphenol	ND	mg/kg	0.20	0.033	EPA-8270C	ND		1
2-Nitrophenol	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
4-Nitrophenol	ND	mg/kg	0.20	0.018	EPA-8270C	ND		1
Pentachlorophenol	ND	mg/kg	0.20	0.013	EPA-8270C	ND		1
Phenol	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
2,4,5-Trichlorophenol	ND	mg/kg	0.20	0.018	EPA-8270C	ND		1
2,4,6-Trichlorophenol	ND	mg/kg	0.20	0.017	EPA-8270C	ND		1
2-Fluorophenol (Surrogate)	107	%	28 - 144 (LCL - UCL)		EPA-8270C			1
Phenol-d5 (Surrogate)	50.8	%	36 - 136 (LCL - UCL)		EPA-8270C			1
Nitrobenzene-d5 (Surrogate)	104	%	31 - 135 (LCL - UCL)		EPA-8270C			1
2-Fluorobiphenyl (Surrogate)	93.2	%	20 - 140 (LCL - UCL)		EPA-8270C			1
2,4,6-Tribromophenol (Surrogate)	116	%	20 - 150 (LCL - UCL)		EPA-8270C			1
p-Terphenyl-d14 (Surrogate)	101	%	10 - 150 (LCL - UCL)		EPA-8270C			1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-8270C	09/28/11	10/07/11 16:04	SKC	MS-B1	0.987	BUJ0343

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1 Technology Drive, Suite F207
Irvine, CA 92618

Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Purgeable Aromatics and Total Petroleum Hydrocarbons

BCL Sample ID: 1115416-06 | **Client Sample Name:** B-3-5, 9/19/2011 10:05:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
TPH - Light Naptha	ND	mg/kg	50	20	Luft/FFP	ND		1
TPH - Aviation Gas	ND	mg/kg	50	20	Luft/FFP	ND		1
TPH - Stoddard Solvent	ND	mg/kg	20	5.0	Luft/FFP	ND		1
TPH - Heavy Naptha	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Gasoline	ND	mg/kg	20	5.0	Luft/FFP	ND		1
TPH - Jet Fuel (JP4)	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Jet Fuel (JP5)	ND	mg/kg	10	4.6	Luft/FFP	ND		1
TPH - Jet Fuel (JP8)	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Kerosene	ND	mg/kg	10	1.4	Luft/FFP	ND		1
TPH - Diesel (FFP)	ND	mg/kg	10	1.2	Luft/FFP	ND		1
TPH - Fuel Oil #6	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Crude Oil	ND	mg/kg	20	2.8	Luft/FFP	ND		1
TPH - Hydraulic Oil / Motor Oil	ND	mg/kg	20	6.5	Luft/FFP	ND		1
TPH - WD-40	ND	mg/kg	10	5.0	Luft/FFP	ND		1
Tetracosane (Surrogate)	82.2	%	20 - 145 (LCL - UCL)		Luft/FFP			1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	Luft/FFP	09/28/11	10/07/11 12:32	MWB	GC-13	1.010	BUJ0256

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Total Concentrations (TTLC)

BCL Sample ID: 1115416-06 | **Client Sample Name:** B-3-5, 9/19/2011 10:05:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Antimony	**1.1**	**mg/kg**	**5.0**	**0.50**	**EPA-6010B**	ND	**J**	1
Arsenic	**1.7**	**mg/kg**	**1.0**	**0.38**	**EPA-6010B**	ND		1
Barium	**37**	**mg/kg**	**0.50**	**0.077**	**EPA-6010B**	ND		1
Beryllium	**0.23**	**mg/kg**	**0.50**	**0.050**	**EPA-6010B**	ND	**J**	1
Cadmium	**0.074**	**mg/kg**	**0.50**	**0.050**	**EPA-6010B**	ND	**J**	1
Chromium	**5.6**	**mg/kg**	**0.50**	**0.060**	**EPA-6010B**	ND		1
Cobalt	**3.0**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	ND		1
Copper	**8.0**	**mg/kg**	**1.0**	**0.12**	**EPA-6010B**	ND		1
Lead	**3.6**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	ND		1
Mercury	**0.18**	**mg/kg**	**0.16**	**0.024**	**EPA-7471A**	ND		2
Molybdenum	ND	mg/kg	2.5	0.25	EPA-6010B	ND		1
Nickel	**3.4**	**mg/kg**	**0.50**	**0.058**	**EPA-6010B**	ND		1
Selenium	ND	mg/kg	1.0	0.51	EPA-6010B	ND		1
Silver	ND	mg/kg	0.50	0.050	EPA-6010B	ND		1
Thallium	ND	mg/kg	5.0	0.73	EPA-6010B	ND		1
Vanadium	**16**	**mg/kg**	**0.50**	**0.050**	**EPA-6010B**	ND		1
Zinc	**29**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	0.55		1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-6010B	09/28/11	09/29/11 05:49	ARD	PE-OP1	1	BUI1866
2	EPA-7471A	09/26/11	09/28/11 13:13	MEV	CETAC1	0.977	BUI1659

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Organochlorine Pesticides (EPA Method 8081)

BCL Sample ID: 1115416-07 | **Client Sample Name:** B-3-10, 9/19/2011 10:07:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Aldrin	ND	mg/kg	0.00050	0.000026	EPA-8081	ND		1
alpha-BHC	ND	mg/kg	0.00050	0.00014	EPA-8081	ND		1
beta-BHC	ND	mg/kg	0.00050	0.00038	EPA-8081	ND		1
delta-BHC	ND	mg/kg	0.00050	0.000076	EPA-8081	ND		1
gamma-BHC (Lindane)	ND	mg/kg	0.00050	0.00025	EPA-8081	ND		1
Chlordane (Technical)	ND	mg/kg	0.050	0.015	EPA-8081	ND		1
4,4'-DDD	ND	mg/kg	0.00050	0.000063	EPA-8081	ND		1
4,4'-DDE	ND	mg/kg	0.00050	0.000045	EPA-8081	ND		1
4,4'-DDT	ND	mg/kg	0.00050	0.000031	EPA-8081	ND		1
Dieldrin	ND	mg/kg	0.00050	0.000032	EPA-8081	ND		1
Endosulfan I	ND	mg/kg	0.00050	0.000086	EPA-8081	ND		1
Endosulfan II	ND	mg/kg	0.00050	0.000066	EPA-8081	ND		1
Endosulfan sulfate	ND	mg/kg	0.00050	0.00013	EPA-8081	ND		1
Endrin	ND	mg/kg	0.00050	0.000035	EPA-8081	ND		1
Endrin aldehyde	ND	mg/kg	0.00050	0.000061	EPA-8081	ND		1
Heptachlor	ND	mg/kg	0.00050	0.00026	EPA-8081	ND		1
Heptachlor epoxide	ND	mg/kg	0.00050	0.00015	EPA-8081	ND		1
Methoxychlor	ND	mg/kg	0.00050	0.00013	EPA-8081	ND		1
Toxaphene	ND	mg/kg	0.050	0.0074	EPA-8081	ND		1
TCMX (Surrogate)	99.1	%	20 - 143 (LCL - UCL)		EPA-8081			1
Dibutyl chlorendate (Surrogate)	86.9	%	20 - 164 (LCL - UCL)		EPA-8081			1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-8081	09/28/11	10/03/11 15:56	VH1	GC-1	1.014	BUJ0048

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

BCL Sample ID: 1115416-07 | **Client Sample Name:** B-3-10, 9/19/2011 10:07:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Acenaphthene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Acenaphthylene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Aldrin	ND	mg/kg	0.10	0.024	EPA-8270C	ND		1
Aniline	ND	mg/kg	0.20	0.053	EPA-8270C	ND		1
Anthracene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Benzidine	ND	mg/kg	3.0	0.22	EPA-8270C	ND		1
Benzo[a]anthracene	ND	mg/kg	0.10	0.012	EPA-8270C	ND		1
Benzo[b]fluoranthene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Benzo[k]fluoranthene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Benzo[a]pyrene	ND	mg/kg	0.10	0.015	EPA-8270C	ND		1
Benzo[g,h,i]perylene	ND	mg/kg	0.10	0.056	EPA-8270C	ND		1
Benzoic acid	ND	mg/kg	0.50	0.067	EPA-8270C	ND		1
Benzyl alcohol	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Benzyl butyl phthalate	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
alpha-BHC	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
beta-BHC	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
delta-BHC	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
gamma-BHC (Lindane)	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
bis(2-Chloroethoxy)methane	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
bis(2-Chloroethyl) ether	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
bis(2-Chloroisopropyl)ether	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
bis(2-Ethylhexyl)phthalate	ND	mg/kg	0.20	0.043	EPA-8270C	ND		1
4-Bromophenyl phenyl ether	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
4-Chloroaniline	ND	mg/kg	0.10	0.027	EPA-8270C	ND		1
2-Chloronaphthalene	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1
4-Chlorophenyl phenyl ether	ND	mg/kg	0.10	0.015	EPA-8270C	ND		1
Chrysene	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
4,4'-DDD	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
4,4'-DDE	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
4,4'-DDT	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Dibenzo[a,h]anthracene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Dibenzofuran	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1
1,2-Dichlorobenzene	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1

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1 Technology Drive, Suite F207
Irvine, CA 92618

Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

BCL Sample ID: 1115416-07 | **Client Sample Name:** B-3-10, 9/19/2011 10:07:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
1,3-Dichlorobenzene	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
1,4-Dichlorobenzene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
3,3-Dichlorobenzidine	ND	mg/kg	0.20	0.0067	EPA-8270C	ND		1
Dieldrin	ND	mg/kg	0.10	0.031	EPA-8270C	ND		1
Diethyl phthalate	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Dimethyl phthalate	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1
Di-n-butyl phthalate	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
2,4-Dinitrotoluene	ND	mg/kg	0.10	0.022	EPA-8270C	ND		1
2,6-Dinitrotoluene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Di-n-octyl phthalate	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
1,2-Diphenylhydrazine	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Endosulfan I	ND	mg/kg	0.20	0.020	EPA-8270C	ND		1
Endosulfan II	ND	mg/kg	0.20	0.021	EPA-8270C	ND		1
Endosulfan sulfate	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
Endrin	ND	mg/kg	0.20	0.025	EPA-8270C	ND		1
Endrin aldehyde	ND	mg/kg	0.50	0.022	EPA-8270C	ND		1
Fluoranthene	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
Fluorene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Heptachlor	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
Heptachlor epoxide	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
Hexachlorobenzene	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
Hexachlorobutadiene	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
Hexachlorocyclopentadiene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Hexachloroethane	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1
Indeno[1,2,3-cd]pyrene	ND	mg/kg	0.10	0.072	EPA-8270C	ND		1
Isophorone	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
2-Methylnaphthalene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Naphthalene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
2-Naphthylamine	ND	mg/kg	3.0	0.16	EPA-8270C	ND		1
2-Nitroaniline	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
3-Nitroaniline	ND	mg/kg	0.20	0.015	EPA-8270C	ND		1
4-Nitroaniline	ND	mg/kg	0.20	0.025	EPA-8270C	ND		1
Nitrobenzene	ND	mg/kg	0.10	0.015	EPA-8270C	ND		1

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

BCL Sample ID: 1115416-07 | **Client Sample Name:** B-3-10, 9/19/2011 10:07:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
N-Nitrosodimethylamine	ND	mg/kg	0.10	0.037	EPA-8270C	ND		1
N-Nitrosodi-N-propylamine	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
N-Nitrosodiphenylamine	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
Phenanthrene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Pyrene	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
1,2,4-Trichlorobenzene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
4-Chloro-3-methylphenol	ND	mg/kg	0.20	0.022	EPA-8270C	ND		1
2-Chlorophenol	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
2,4-Dichlorophenol	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
2,4-Dimethylphenol	ND	mg/kg	0.10	0.035	EPA-8270C	ND		1
4,6-Dinitro-2-methylphenol	ND	mg/kg	0.50	0.012	EPA-8270C	ND		1
2,4-Dinitrophenol	ND	mg/kg	0.50	0.0077	EPA-8270C	ND		1
2-Methylphenol	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
3- & 4-Methylphenol	ND	mg/kg	0.20	0.033	EPA-8270C	ND		1
2-Nitrophenol	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
4-Nitrophenol	ND	mg/kg	0.20	0.018	EPA-8270C	ND		1
Pentachlorophenol	ND	mg/kg	0.20	0.013	EPA-8270C	ND		1
Phenol	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
2,4,5-Trichlorophenol	ND	mg/kg	0.20	0.018	EPA-8270C	ND		1
2,4,6-Trichlorophenol	ND	mg/kg	0.20	0.017	EPA-8270C	ND		1
2-Fluorophenol (Surrogate)	110	%	28 - 144 (LCL - UCL)		EPA-8270C			1
Phenol-d5 (Surrogate)	53.4	%	36 - 136 (LCL - UCL)		EPA-8270C			1
Nitrobenzene-d5 (Surrogate)	106	%	31 - 135 (LCL - UCL)		EPA-8270C			1
2-Fluorobiphenyl (Surrogate)	88.4	%	20 - 140 (LCL - UCL)		EPA-8270C			1
2,4,6-Tribromophenol (Surrogate)	105	%	20 - 150 (LCL - UCL)		EPA-8270C			1
p-Terphenyl-d14 (Surrogate)	88.8	%	10 - 150 (LCL - UCL)		EPA-8270C			1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-8270C	09/28/11	10/07/11 16:31	SKC	MS-B1	1	BUJ0343

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Purgeable Aromatics and Total Petroleum Hydrocarbons

BCL Sample ID: 1115416-07 | **Client Sample Name:** B-3-10, 9/19/2011 10:07:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
TPH - Light Naptha	ND	mg/kg	50	20	Luft/FFP	ND		1
TPH - Aviation Gas	ND	mg/kg	50	20	Luft/FFP	ND		1
TPH - Stoddard Solvent	ND	mg/kg	20	5.0	Luft/FFP	ND		1
TPH - Heavy Naptha	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Gasoline	ND	mg/kg	20	5.0	Luft/FFP	ND		1
TPH - Jet Fuel (JP4)	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Jet Fuel (JP5)	ND	mg/kg	10	4.6	Luft/FFP	ND		1
TPH - Jet Fuel (JP8)	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Kerosene	ND	mg/kg	10	1.4	Luft/FFP	ND		1
TPH - Diesel (FFP)	ND	mg/kg	10	1.2	Luft/FFP	ND		1
TPH - Fuel Oil #6	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Crude Oil	ND	mg/kg	20	2.8	Luft/FFP	ND		1
TPH - Hydraulic Oil / Motor Oil	ND	mg/kg	20	6.5	Luft/FFP	ND		1
TPH - WD-40	ND	mg/kg	10	5.0	Luft/FFP	ND		1
Tetracosane (Surrogate)	118	%	20 - 145 (LCL - UCL)		Luft/FFP			1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	Luft/FFP	09/28/11	10/07/11 14:47	MWB	GC-13	1.014	BUJ0256

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Total Concentrations (TTLC)

BCL Sample ID: 1115416-07 | **Client Sample Name:** B-3-10, 9/19/2011 10:07:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Antimony	**1.0**	**mg/kg**	**5.0**	**0.50**	**EPA-6010B**	ND	**J**	1
Arsenic	**2.3**	**mg/kg**	**1.0**	**0.38**	**EPA-6010B**	ND		1
Barium	**49**	**mg/kg**	**0.50**	**0.077**	**EPA-6010B**	ND		1
Beryllium	**0.30**	**mg/kg**	**0.50**	**0.050**	**EPA-6010B**	ND	**J**	1
Cadmium	**0.090**	**mg/kg**	**0.50**	**0.050**	**EPA-6010B**	ND	**J**	1
Chromium	**8.8**	**mg/kg**	**0.50**	**0.060**	**EPA-6010B**	ND		1
Cobalt	**4.1**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	ND		1
Copper	**13**	**mg/kg**	**1.0**	**0.12**	**EPA-6010B**	ND		1
Lead	**5.5**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	ND		1
Mercury	**0.095**	**mg/kg**	**0.16**	**0.024**	**EPA-7471A**	ND	**J**	2
Molybdenum	ND	mg/kg	2.5	0.25	EPA-6010B	ND		1
Nickel	**4.9**	**mg/kg**	**0.50**	**0.058**	**EPA-6010B**	ND		1
Selenium	ND	mg/kg	1.0	0.51	EPA-6010B	ND		1
Silver	ND	mg/kg	0.50	0.050	EPA-6010B	ND		1
Thallium	ND	mg/kg	5.0	0.73	EPA-6010B	ND		1
Vanadium	**24**	**mg/kg**	**0.50**	**0.050**	**EPA-6010B**	ND		1
Zinc	**36**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	0.55		1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-6010B	09/28/11	09/29/11 05:56	ARD	PE-OP1	1	BUI1866
2	EPA-7471A	09/26/11	09/28/11 13:15	MEV	CETAC1	0.962	BUI1659

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Gannett Fleming, Inc
1 Technology Drive, Suite F207
Irvine, CA 92618

Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Organochlorine Pesticides (EPA Method 8081)

BCL Sample ID: 1115416-08 | **Client Sample Name:** B-3-15, 9/19/2011 10:10:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Aldrin	ND	mg/kg	0.00050	0.000026	EPA-8081	ND		1
alpha-BHC	ND	mg/kg	0.00050	0.00014	EPA-8081	ND		1
beta-BHC	ND	mg/kg	0.00050	0.00038	EPA-8081	ND		1
delta-BHC	ND	mg/kg	0.00050	0.000076	EPA-8081	ND		1
gamma-BHC (Lindane)	ND	mg/kg	0.00050	0.00025	EPA-8081	ND		1
Chlordane (Technical)	ND	mg/kg	0.050	0.015	EPA-8081	ND		1
4,4'-DDD	ND	mg/kg	0.00050	0.000063	EPA-8081	ND		1
4,4'-DDE	ND	mg/kg	0.00050	0.000045	EPA-8081	ND		1
4,4'-DDT	ND	mg/kg	0.00050	0.000031	EPA-8081	ND		1
Dieldrin	ND	mg/kg	0.00050	0.000032	EPA-8081	ND		1
Endosulfan I	ND	mg/kg	0.00050	0.000086	EPA-8081	ND		1
Endosulfan II	ND	mg/kg	0.00050	0.000066	EPA-8081	ND		1
Endosulfan sulfate	ND	mg/kg	0.00050	0.00013	EPA-8081	ND		1
Endrin	ND	mg/kg	0.00050	0.000035	EPA-8081	ND		1
Endrin aldehyde	ND	mg/kg	0.00050	0.000061	EPA-8081	ND		1
Heptachlor	ND	mg/kg	0.00050	0.00026	EPA-8081	ND		1
Heptachlor epoxide	ND	mg/kg	0.00050	0.00015	EPA-8081	ND		1
Methoxychlor	ND	mg/kg	0.00050	0.00013	EPA-8081	ND		1
Toxaphene	ND	mg/kg	0.050	0.0074	EPA-8081	ND		1
TCMX (Surrogate)	87.5	%	20 - 143 (LCL - UCL)		EPA-8081			1
Dibutyl chlorendate (Surrogate)	74.7	%	20 - 164 (LCL - UCL)		EPA-8081			1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-8081	09/28/11	10/03/11 16:14	VH1	GC-1	0.987	BUJ0048

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Volatile Organic Analysis (EPA Method 8260)

BCL Sample ID: 1115416-08 | **Client Sample Name:** B-3-15, 9/19/2011 10:10:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Benzene	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
Bromobenzene	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
Bromochloromethane	ND	mg/kg	0.0050	0.00092	EPA-8260	ND		1
Bromodichloromethane	ND	mg/kg	0.0050	0.00084	EPA-8260	ND		1
Bromoform	ND	mg/kg	0.0050	0.0015	EPA-8260	ND		1
Bromomethane	ND	mg/kg	0.0050	0.0016	EPA-8260	ND		1
n-Butylbenzene	ND	mg/kg	0.0050	0.0015	EPA-8260	ND		1
sec-Butylbenzene	ND	mg/kg	0.0050	0.0012	EPA-8260	ND		1
tert-Butylbenzene	ND	mg/kg	0.0050	0.0012	EPA-8260	ND		1
Carbon tetrachloride	ND	mg/kg	0.0050	0.0011	EPA-8260	ND		1
Chlorobenzene	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
Chloroethane	ND	mg/kg	0.0050	0.0014	EPA-8260	ND		1
Chloroform	ND	mg/kg	0.0050	0.00063	EPA-8260	ND		1
Chloromethane	ND	mg/kg	0.0050	0.0014	EPA-8260	ND		1
2-Chlorotoluene	ND	mg/kg	0.0050	0.0018	EPA-8260	ND		1
4-Chlorotoluene	ND	mg/kg	0.0050	0.0014	EPA-8260	ND		1
Dibromochloromethane	ND	mg/kg	0.0050	0.00099	EPA-8260	ND		1
1,2-Dibromo-3-chloropropane	ND	mg/kg	0.0050	0.0017	EPA-8260	ND		1
1,2-Dibromoethane	ND	mg/kg	0.0050	0.0010	EPA-8260	ND		1
Dibromomethane	ND	mg/kg	0.0050	0.0018	EPA-8260	ND		1
1,2-Dichlorobenzene	ND	mg/kg	0.0050	0.00081	EPA-8260	ND		1
1,3-Dichlorobenzene	ND	mg/kg	0.0050	0.0014	EPA-8260	ND		1
1,4-Dichlorobenzene	ND	mg/kg	0.0050	0.0015	EPA-8260	ND		1
Dichlorodifluoromethane	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
1,1-Dichloroethane	ND	mg/kg	0.0050	0.0014	EPA-8260	ND		1
1,2-Dichloroethane	ND	mg/kg	0.0050	0.00085	EPA-8260	ND		1
1,1-Dichloroethene	ND	mg/kg	0.0050	0.0012	EPA-8260	ND		1
cis-1,2-Dichloroethene	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
trans-1,2-Dichloroethene	ND	mg/kg	0.0050	0.0014	EPA-8260	ND		1
1,2-Dichloropropane	ND	mg/kg	0.0050	0.00081	EPA-8260	ND		1
1,3-Dichloropropane	ND	mg/kg	0.0050	0.0011	EPA-8260	ND		1
2,2-Dichloropropane	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
1,1-Dichloropropene	ND	mg/kg	0.0050	0.0012	EPA-8260	ND		1

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Volatile Organic Analysis (EPA Method 8260)

BCL Sample ID: 1115416-08 | **Client Sample Name:** B-3-15, 9/19/2011 10:10:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
cis-1,3-Dichloropropene	ND	mg/kg	0.0050	0.0011	EPA-8260	ND		1
trans-1,3-Dichloropropene	ND	mg/kg	0.0050	0.0012	EPA-8260	ND		1
Ethylbenzene	ND	mg/kg	0.0050	0.0015	EPA-8260	ND		1
Hexachlorobutadiene	ND	mg/kg	0.0050	0.0017	EPA-8260	ND		1
Isopropylbenzene	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
p-Isopropyltoluene	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
Methylene chloride	ND	mg/kg	0.010	0.0024	EPA-8260	ND		1
Methyl t-butyl ether	ND	mg/kg	0.0050	0.00050	EPA-8260	ND		1
Naphthalene	ND	mg/kg	0.0050	0.0014	EPA-8260	ND		1
n-Propylbenzene	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
Styrene	ND	mg/kg	0.0050	0.0014	EPA-8260	ND		1
1,1,1,2-Tetrachloroethane	ND	mg/kg	0.0050	0.0011	EPA-8260	ND		1
1,1,2,2-Tetrachloroethane	ND	mg/kg	0.0050	0.0011	EPA-8260	ND		1
Tetrachloroethene	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
Toluene	ND	mg/kg	0.0050	0.0012	EPA-8260	ND		1
1,2,3-Trichlorobenzene	ND	mg/kg	0.0050	0.0021	EPA-8260	ND		1
1,2,4-Trichlorobenzene	ND	mg/kg	0.0050	0.0020	EPA-8260	ND		1
1,1,1-Trichloroethane	ND	mg/kg	0.0050	0.0011	EPA-8260	ND		1
1,1,2-Trichloroethane	ND	mg/kg	0.0050	0.00077	EPA-8260	ND		1
Trichloroethene	ND	mg/kg	0.0050	0.0011	EPA-8260	ND		1
Trichlorofluoromethane	ND	mg/kg	0.0050	0.0011	EPA-8260	ND		1
1,2,3-Trichloropropane	ND	mg/kg	0.0050	0.0016	EPA-8260	ND		1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
1,2,4-Trimethylbenzene	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
1,3,5-Trimethylbenzene	ND	mg/kg	0.0050	0.0015	EPA-8260	ND		1
Vinyl chloride	ND	mg/kg	0.0050	0.0016	EPA-8260	ND		1
Total Xylenes	ND	mg/kg	0.010	0.0034	EPA-8260	ND		1
p- & m-Xylenes	ND	mg/kg	0.0050	0.0022	EPA-8260	ND		1
o-Xylene	ND	mg/kg	0.0050	0.0012	EPA-8260	ND		1
1,2-Dichloroethane-d4 (Surrogate)	103	%	70 - 121 (LCL - UCL)		EPA-8260			1
Toluene-d8 (Surrogate)	98.8	%	81 - 117 (LCL - UCL)		EPA-8260			1
4-Bromofluorobenzene (Surrogate)	98.3	%	74 - 121 (LCL - UCL)		EPA-8260			1

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Irvine, CA 92618

Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Volatile Organic Analysis (EPA Method 8260)

BCL Sample ID: 1115416-08 | **Client Sample Name:** B-3-15, 9/19/2011 10:10:00AM

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-8260	09/26/11	09/27/11 07:52	ADC	MS-V3	1	BUI1646

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

BCL Sample ID: 1115416-08 | **Client Sample Name:** B-3-15, 9/19/2011 10:10:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Acenaphthene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Acenaphthylene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Aldrin	ND	mg/kg	0.10	0.024	EPA-8270C	ND		1
Aniline	ND	mg/kg	0.20	0.053	EPA-8270C	ND		1
Anthracene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Benzidine	ND	mg/kg	3.0	0.22	EPA-8270C	ND		1
Benzo[a]anthracene	ND	mg/kg	0.10	0.012	EPA-8270C	ND		1
Benzo[b]fluoranthene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Benzo[k]fluoranthene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Benzo[a]pyrene	ND	mg/kg	0.10	0.015	EPA-8270C	ND		1
Benzo[g,h,i]perylene	ND	mg/kg	0.10	0.056	EPA-8270C	ND		1
Benzoic acid	ND	mg/kg	0.50	0.067	EPA-8270C	ND		1
Benzyl alcohol	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Benzyl butyl phthalate	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
alpha-BHC	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
beta-BHC	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
delta-BHC	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
gamma-BHC (Lindane)	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
bis(2-Chloroethoxy)methane	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
bis(2-Chloroethyl) ether	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
bis(2-Chloroisopropyl)ether	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
bis(2-Ethylhexyl)phthalate	ND	mg/kg	0.20	0.043	EPA-8270C	ND		1
4-Bromophenyl phenyl ether	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
4-Chloroaniline	ND	mg/kg	0.10	0.027	EPA-8270C	ND		1
2-Chloronaphthalene	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1
4-Chlorophenyl phenyl ether	ND	mg/kg	0.10	0.015	EPA-8270C	ND		1
Chrysene	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
4,4'-DDD	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
4,4'-DDE	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
4,4'-DDT	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Dibenzo[a,h]anthracene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Dibenzofuran	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1
1,2-Dichlorobenzene	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

BCL Sample ID: 1115416-08 | **Client Sample Name:** B-3-15, 9/19/2011 10:10:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
1,3-Dichlorobenzene	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
1,4-Dichlorobenzene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
3,3-Dichlorobenzidine	ND	mg/kg	0.20	0.0067	EPA-8270C	ND		1
Dieldrin	ND	mg/kg	0.10	0.031	EPA-8270C	ND		1
Diethyl phthalate	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Dimethyl phthalate	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1
Di-n-butyl phthalate	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
2,4-Dinitrotoluene	ND	mg/kg	0.10	0.022	EPA-8270C	ND		1
2,6-Dinitrotoluene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Di-n-octyl phthalate	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
1,2-Diphenylhydrazine	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Endosulfan I	ND	mg/kg	0.20	0.020	EPA-8270C	ND		1
Endosulfan II	ND	mg/kg	0.20	0.021	EPA-8270C	ND		1
Endosulfan sulfate	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
Endrin	ND	mg/kg	0.20	0.025	EPA-8270C	ND		1
Endrin aldehyde	ND	mg/kg	0.50	0.022	EPA-8270C	ND		1
Fluoranthene	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
Fluorene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Heptachlor	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
Heptachlor epoxide	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
Hexachlorobenzene	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
Hexachlorobutadiene	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
Hexachlorocyclopentadiene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Hexachloroethane	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1
Indeno[1,2,3-cd]pyrene	ND	mg/kg	0.10	0.072	EPA-8270C	ND		1
Isophorone	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
2-Methylnaphthalene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Naphthalene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
2-Naphthylamine	ND	mg/kg	3.0	0.16	EPA-8270C	ND		1
2-Nitroaniline	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
3-Nitroaniline	ND	mg/kg	0.20	0.015	EPA-8270C	ND		1
4-Nitroaniline	ND	mg/kg	0.20	0.025	EPA-8270C	ND		1
Nitrobenzene	ND	mg/kg	0.10	0.015	EPA-8270C	ND		1

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

BCL Sample ID: 1115416-08 | **Client Sample Name:** B-3-15, 9/19/2011 10:10:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
N-Nitrosodimethylamine	ND	mg/kg	0.10	0.037	EPA-8270C	ND		1
N-Nitrosodi-N-propylamine	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
N-Nitrosodiphenylamine	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
Phenanthrene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Pyrene	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
1,2,4-Trichlorobenzene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
4-Chloro-3-methylphenol	ND	mg/kg	0.20	0.022	EPA-8270C	ND		1
2-Chlorophenol	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
2,4-Dichlorophenol	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
2,4-Dimethylphenol	ND	mg/kg	0.10	0.035	EPA-8270C	ND		1
4,6-Dinitro-2-methylphenol	ND	mg/kg	0.50	0.012	EPA-8270C	ND		1
2,4-Dinitrophenol	ND	mg/kg	0.50	0.0077	EPA-8270C	ND		1
2-Methylphenol	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
3- & 4-Methylphenol	ND	mg/kg	0.20	0.033	EPA-8270C	ND		1
2-Nitrophenol	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
4-Nitrophenol	ND	mg/kg	0.20	0.018	EPA-8270C	ND		1
Pentachlorophenol	ND	mg/kg	0.20	0.013	EPA-8270C	ND		1
Phenol	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
2,4,5-Trichlorophenol	ND	mg/kg	0.20	0.018	EPA-8270C	ND		1
2,4,6-Trichlorophenol	ND	mg/kg	0.20	0.017	EPA-8270C	ND		1
2-Fluorophenol (Surrogate)	75.8	%	28 - 144 (LCL - UCL)		EPA-8270C			1
Phenol-d5 (Surrogate)	43.1	%	36 - 136 (LCL - UCL)		EPA-8270C			1
Nitrobenzene-d5 (Surrogate)	84.9	%	31 - 135 (LCL - UCL)		EPA-8270C			1
2-Fluorobiphenyl (Surrogate)	75.9	%	20 - 140 (LCL - UCL)		EPA-8270C			1
2,4,6-Tribromophenol (Surrogate)	94.8	%	20 - 150 (LCL - UCL)		EPA-8270C			1
p-Terphenyl-d14 (Surrogate)	90.0	%	10 - 150 (LCL - UCL)		EPA-8270C			1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-8270C	09/28/11	10/07/11 16:56	SKC	MS-B1	0.993	BUJ0343

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1 Technology Drive, Suite F207
Irvine, CA 92618

Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Purgeable Aromatics and Total Petroleum Hydrocarbons

BCL Sample ID: 1115416-08 | **Client Sample Name:** B-3-15, 9/19/2011 10:10:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
TPH - Light Naptha	ND	mg/kg	50	20	Luft/FFP	ND		1
TPH - Aviation Gas	ND	mg/kg	50	20	Luft/FFP	ND		1
TPH - Stoddard Solvent	ND	mg/kg	20	5.0	Luft/FFP	ND		1
TPH - Heavy Naptha	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Gasoline	ND	mg/kg	20	5.0	Luft/FFP	ND		1
TPH - Jet Fuel (JP4)	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Jet Fuel (JP5)	ND	mg/kg	10	4.6	Luft/FFP	ND		1
TPH - Jet Fuel (JP8)	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Kerosene	ND	mg/kg	10	1.4	Luft/FFP	ND		1
TPH - Diesel (FFP)	ND	mg/kg	10	1.2	Luft/FFP	ND		1
TPH - Fuel Oil #6	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Crude Oil	ND	mg/kg	20	2.8	Luft/FFP	ND		1
TPH - Hydraulic Oil / Motor Oil	**18**	**mg/kg**	**20**	**6.5**	**Luft/FFP**	ND	**J**	1
TPH - WD-40	ND	mg/kg	10	5.0	Luft/FFP	ND		1
Tetracosane (Surrogate)	75.1	%	20 - 145 (LCL - UCL)		Luft/FFP			1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	Luft/FFP	09/28/11	10/07/11 15:10	MWB	GC-13	1.007	BUJ0256

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Total Concentrations (TTLC)

BCL Sample ID: 1115416-08 | **Client Sample Name:** B-3-15, 9/19/2011 10:10:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Antimony	ND	mg/kg	5.0	0.50	EPA-6010B	ND		1
Arsenic	**1.2**	**mg/kg**	**1.0**	**0.38**	**EPA-6010B**	ND		1
Barium	**24**	**mg/kg**	**0.50**	**0.077**	**EPA-6010B**	ND		1
Beryllium	**0.19**	**mg/kg**	**0.50**	**0.050**	**EPA-6010B**	ND	**J**	1
Cadmium	ND	mg/kg	0.50	0.050	EPA-6010B	ND		1
Chromium	**3.4**	**mg/kg**	**0.50**	**0.060**	**EPA-6010B**	ND		1
Cobalt	**2.1**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	ND	**J**	1
Copper	**11**	**mg/kg**	**1.0**	**0.12**	**EPA-6010B**	ND		1
Lead	**2.2**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	ND	**J**	1
Mercury	**0.19**	**mg/kg**	**0.16**	**0.024**	**EPA-7471A**	ND		2
Molybdenum	ND	mg/kg	2.5	0.25	EPA-6010B	ND		1
Nickel	**2.0**	**mg/kg**	**0.50**	**0.058**	**EPA-6010B**	ND		1
Selenium	ND	mg/kg	1.0	0.51	EPA-6010B	ND		1
Silver	ND	mg/kg	0.50	0.050	EPA-6010B	ND		1
Thallium	ND	mg/kg	5.0	0.73	EPA-6010B	ND		1
Vanadium	**13**	**mg/kg**	**0.50**	**0.050**	**EPA-6010B**	ND		1
Zinc	**25**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	0.55		1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-6010B	09/28/11	09/29/11 05:58	ARD	PE-OP1	1	BUI1866
2	EPA-7471A	09/26/11	09/28/11 13:17	MEV	CETAC1	0.977	BUI1659

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Organochlorine Pesticides (EPA Method 8081)

BCL Sample ID: 1115416-09 | **Client Sample Name:** B-3-20, 9/19/2011 10:25:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Aldrin	ND	mg/kg	0.00050	0.000026	EPA-8081	ND		1
alpha-BHC	ND	mg/kg	0.00050	0.00014	EPA-8081	ND		1
beta-BHC	ND	mg/kg	0.00050	0.00038	EPA-8081	ND		1
delta-BHC	ND	mg/kg	0.00050	0.000076	EPA-8081	ND		1
gamma-BHC (Lindane)	ND	mg/kg	0.00050	0.00025	EPA-8081	ND		1
Chlordane (Technical)	ND	mg/kg	0.050	0.015	EPA-8081	ND		1
4,4'-DDD	ND	mg/kg	0.00050	0.000063	EPA-8081	ND		1
4,4'-DDE	ND	mg/kg	0.00050	0.000045	EPA-8081	ND		1
4,4'-DDT	ND	mg/kg	0.00050	0.000031	EPA-8081	ND		1
Dieldrin	ND	mg/kg	0.00050	0.000032	EPA-8081	ND		1
Endosulfan I	ND	mg/kg	0.00050	0.000086	EPA-8081	ND		1
Endosulfan II	ND	mg/kg	0.00050	0.000066	EPA-8081	ND		1
Endosulfan sulfate	ND	mg/kg	0.00050	0.00013	EPA-8081	ND		1
Endrin	ND	mg/kg	0.00050	0.000035	EPA-8081	ND		1
Endrin aldehyde	ND	mg/kg	0.00050	0.000061	EPA-8081	ND		1
Heptachlor	ND	mg/kg	0.00050	0.00026	EPA-8081	ND		1
Heptachlor epoxide	ND	mg/kg	0.00050	0.00015	EPA-8081	ND		1
Methoxychlor	ND	mg/kg	0.00050	0.00013	EPA-8081	ND		1
Toxaphene	ND	mg/kg	0.050	0.0074	EPA-8081	ND		1
TCMX (Surrogate)	56.6	%	20 - 143 (LCL - UCL)		EPA-8081			1
Dibutyl chlorendate (Surrogate)	49.1	%	20 - 164 (LCL - UCL)		EPA-8081			1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-8081	09/28/11	10/03/11 16:32	VH1	GC-1	1.014	BUJ0048

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

BCL Sample ID: 1115416-09 | **Client Sample Name:** B-3-20, 9/19/2011 10:25:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Acenaphthene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Acenaphthylene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Aldrin	ND	mg/kg	0.10	0.024	EPA-8270C	ND		1
Aniline	ND	mg/kg	0.20	0.053	EPA-8270C	ND		1
Anthracene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Benzidine	ND	mg/kg	3.0	0.22	EPA-8270C	ND		1
Benzo[a]anthracene	ND	mg/kg	0.10	0.012	EPA-8270C	ND		1
Benzo[b]fluoranthene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Benzo[k]fluoranthene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Benzo[a]pyrene	ND	mg/kg	0.10	0.015	EPA-8270C	ND		1
Benzo[g,h,i]perylene	ND	mg/kg	0.10	0.056	EPA-8270C	ND		1
Benzoic acid	ND	mg/kg	0.50	0.067	EPA-8270C	ND		1
Benzyl alcohol	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Benzyl butyl phthalate	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
alpha-BHC	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
beta-BHC	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
delta-BHC	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
gamma-BHC (Lindane)	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
bis(2-Chloroethoxy)methane	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
bis(2-Chloroethyl) ether	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
bis(2-Chloroisopropyl)ether	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
bis(2-Ethylhexyl)phthalate	ND	mg/kg	0.20	0.043	EPA-8270C	ND		1
4-Bromophenyl phenyl ether	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
4-Chloroaniline	ND	mg/kg	0.10	0.027	EPA-8270C	ND		1
2-Chloronaphthalene	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1
4-Chlorophenyl phenyl ether	ND	mg/kg	0.10	0.015	EPA-8270C	ND		1
Chrysene	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
4,4'-DDD	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
4,4'-DDE	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
4,4'-DDT	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Dibenzo[a,h]anthracene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Dibenzofuran	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1
1,2-Dichlorobenzene	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1

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1 Technology Drive, Suite F207
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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

BCL Sample ID: 1115416-09 | **Client Sample Name:** B-3-20, 9/19/2011 10:25:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
1,3-Dichlorobenzene	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
1,4-Dichlorobenzene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
3,3-Dichlorobenzidine	ND	mg/kg	0.20	0.0067	EPA-8270C	ND		1
Dieldrin	ND	mg/kg	0.10	0.031	EPA-8270C	ND		1
Diethyl phthalate	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Dimethyl phthalate	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1
Di-n-butyl phthalate	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
2,4-Dinitrotoluene	ND	mg/kg	0.10	0.022	EPA-8270C	ND		1
2,6-Dinitrotoluene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Di-n-octyl phthalate	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
1,2-Diphenylhydrazine	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Endosulfan I	ND	mg/kg	0.20	0.020	EPA-8270C	ND		1
Endosulfan II	ND	mg/kg	0.20	0.021	EPA-8270C	ND		1
Endosulfan sulfate	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
Endrin	ND	mg/kg	0.20	0.025	EPA-8270C	ND		1
Endrin aldehyde	ND	mg/kg	0.50	0.022	EPA-8270C	ND		1
Fluoranthene	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
Fluorene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Heptachlor	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
Heptachlor epoxide	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
Hexachlorobenzene	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
Hexachlorobutadiene	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
Hexachlorocyclopentadiene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Hexachloroethane	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1
Indeno[1,2,3-cd]pyrene	ND	mg/kg	0.10	0.072	EPA-8270C	ND		1
Isophorone	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
2-Methylnaphthalene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Naphthalene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
2-Naphthylamine	ND	mg/kg	3.0	0.16	EPA-8270C	ND		1
2-Nitroaniline	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
3-Nitroaniline	ND	mg/kg	0.20	0.015	EPA-8270C	ND		1
4-Nitroaniline	ND	mg/kg	0.20	0.025	EPA-8270C	ND		1
Nitrobenzene	ND	mg/kg	0.10	0.015	EPA-8270C	ND		1

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

BCL Sample ID: 1115416-09 | **Client Sample Name:** B-3-20, 9/19/2011 10:25:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
N-Nitrosodimethylamine	ND	mg/kg	0.10	0.037	EPA-8270C	ND		1
N-Nitrosodi-N-propylamine	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
N-Nitrosodiphenylamine	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
Phenanthrene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Pyrene	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
1,2,4-Trichlorobenzene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
4-Chloro-3-methylphenol	ND	mg/kg	0.20	0.022	EPA-8270C	ND		1
2-Chlorophenol	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
2,4-Dichlorophenol	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
2,4-Dimethylphenol	ND	mg/kg	0.10	0.035	EPA-8270C	ND		1
4,6-Dinitro-2-methylphenol	ND	mg/kg	0.50	0.012	EPA-8270C	ND		1
2,4-Dinitrophenol	ND	mg/kg	0.50	0.0077	EPA-8270C	ND		1
2-Methylphenol	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
3- & 4-Methylphenol	ND	mg/kg	0.20	0.033	EPA-8270C	ND		1
2-Nitrophenol	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
4-Nitrophenol	ND	mg/kg	0.20	0.018	EPA-8270C	ND		1
Pentachlorophenol	ND	mg/kg	0.20	0.013	EPA-8270C	ND		1
Phenol	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
2,4,5-Trichlorophenol	ND	mg/kg	0.20	0.018	EPA-8270C	ND		1
2,4,6-Trichlorophenol	ND	mg/kg	0.20	0.017	EPA-8270C	ND		1
2-Fluorophenol (Surrogate)	82.5	%	28 - 144 (LCL - UCL)		EPA-8270C			1
Phenol-d5 (Surrogate)	43.7	%	36 - 136 (LCL - UCL)		EPA-8270C			1
Nitrobenzene-d5 (Surrogate)	76.6	%	31 - 135 (LCL - UCL)		EPA-8270C			1
2-Fluorobiphenyl (Surrogate)	38.3	%	20 - 140 (LCL - UCL)		EPA-8270C			1
2,4,6-Tribromophenol (Surrogate)	64.3	%	20 - 150 (LCL - UCL)		EPA-8270C			1
p-Terphenyl-d14 (Surrogate)	65.9	%	10 - 150 (LCL - UCL)		EPA-8270C			1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-8270C	09/28/11	10/07/11 17:21	SKC	MS-B1	1.010	BUJ0343

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Purgeable Aromatics and Total Petroleum Hydrocarbons

BCL Sample ID: 1115416-09 | **Client Sample Name:** B-3-20, 9/19/2011 10:25:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
TPH - Light Naptha	ND	mg/kg	50	20	Luft/FFP	ND		1
TPH - Aviation Gas	ND	mg/kg	50	20	Luft/FFP	ND		1
TPH - Stoddard Solvent	ND	mg/kg	20	5.0	Luft/FFP	ND		1
TPH - Heavy Naptha	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Gasoline	ND	mg/kg	20	5.0	Luft/FFP	ND		1
TPH - Jet Fuel (JP4)	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Jet Fuel (JP5)	ND	mg/kg	10	4.6	Luft/FFP	ND		1
TPH - Jet Fuel (JP8)	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Kerosene	ND	mg/kg	10	1.4	Luft/FFP	ND		1
TPH - Diesel (FFP)	ND	mg/kg	10	1.2	Luft/FFP	ND		1
TPH - Fuel Oil #6	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Crude Oil	ND	mg/kg	20	2.8	Luft/FFP	ND		1
TPH - Hydraulic Oil / Motor Oil	**16**	**mg/kg**	**20**	**6.5**	**Luft/FFP**	ND	**J**	1
TPH - WD-40	ND	mg/kg	10	5.0	Luft/FFP	ND		1
Tetracosane (Surrogate)	71.9	%	20 - 145 (LCL - UCL)		Luft/FFP			1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	Luft/FFP	09/28/11	10/07/11 15:33	MWB	GC-13	0.984	BUJ0256

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Irvine, CA 92618

Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Total Concentrations (TTLC)

BCL Sample ID: 1115416-09 | **Client Sample Name:** B-3-20, 9/19/2011 10:25:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Antimony	**2.0**	**mg/kg**	**5.0**	**0.50**	**EPA-6010B**	ND	**J**	1
Arsenic	**3.2**	**mg/kg**	**1.0**	**0.38**	**EPA-6010B**	ND		1
Barium	**130**	**mg/kg**	**0.50**	**0.077**	**EPA-6010B**	ND		1
Beryllium	**0.35**	**mg/kg**	**0.50**	**0.050**	**EPA-6010B**	ND	**J**	1
Cadmium	**0.12**	**mg/kg**	**0.50**	**0.050**	**EPA-6010B**	ND	**J**	1
Chromium	**14**	**mg/kg**	**0.50**	**0.060**	**EPA-6010B**	ND		1
Cobalt	**7.0**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	ND		1
Copper	**43**	**mg/kg**	**1.0**	**0.12**	**EPA-6010B**	ND		1
Lead	**8.1**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	ND		1
Mercury	**0.14**	**mg/kg**	**0.16**	**0.024**	**EPA-7471A**	ND	**J**	2
Molybdenum	**0.84**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	ND	**J**	1
Nickel	**7.8**	**mg/kg**	**0.50**	**0.058**	**EPA-6010B**	ND		1
Selenium	ND	mg/kg	1.0	0.51	EPA-6010B	ND		1
Silver	ND	mg/kg	0.50	0.050	EPA-6010B	ND		1
Thallium	**1.3**	**mg/kg**	**5.0**	**0.73**	**EPA-6010B**	ND	**J**	1
Vanadium	**36**	**mg/kg**	**0.50**	**0.050**	**EPA-6010B**	ND		1
Zinc	**72**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	0.55		1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-6010B	09/28/11	09/29/11 05:59	ARD	PE-OP1	1	BUI1866
2	EPA-7471A	09/26/11	09/28/11 13:19	MEV	CETAC1	0.962	BUI1659

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Organochlorine Pesticides (EPA Method 8081)

BCL Sample ID: 1115416-10 | **Client Sample Name:** B-3-25, 9/19/2011 10:43:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Aldrin	ND	mg/kg	0.00050	0.000026	EPA-8081	ND		1
alpha-BHC	ND	mg/kg	0.00050	0.00014	EPA-8081	ND		1
beta-BHC	ND	mg/kg	0.00050	0.00038	EPA-8081	ND		1
delta-BHC	ND	mg/kg	0.00050	0.000076	EPA-8081	ND		1
gamma-BHC (Lindane)	ND	mg/kg	0.00050	0.00025	EPA-8081	ND		1
Chlordane (Technical)	ND	mg/kg	0.050	0.015	EPA-8081	ND		1
4,4'-DDD	ND	mg/kg	0.00050	0.000063	EPA-8081	ND		1
4,4'-DDE	ND	mg/kg	0.00050	0.000045	EPA-8081	ND		1
4,4'-DDT	ND	mg/kg	0.00050	0.000031	EPA-8081	ND		1
Dieldrin	ND	mg/kg	0.00050	0.000032	EPA-8081	ND		1
Endosulfan I	ND	mg/kg	0.00050	0.000086	EPA-8081	ND		1
Endosulfan II	ND	mg/kg	0.00050	0.000066	EPA-8081	ND		1
Endosulfan sulfate	ND	mg/kg	0.00050	0.00013	EPA-8081	ND		1
Endrin	ND	mg/kg	0.00050	0.000035	EPA-8081	ND		1
Endrin aldehyde	ND	mg/kg	0.00050	0.000061	EPA-8081	ND		1
Heptachlor	ND	mg/kg	0.00050	0.00026	EPA-8081	ND		1
Heptachlor epoxide	ND	mg/kg	0.00050	0.00015	EPA-8081	ND		1
Methoxychlor	ND	mg/kg	0.00050	0.00013	EPA-8081	ND		1
Toxaphene	ND	mg/kg	0.050	0.0074	EPA-8081	ND		1
TCMX (Surrogate)	59.4	%	20 - 143 (LCL - UCL)		EPA-8081			1
Dibutyl chlorendate (Surrogate)	50.8	%	20 - 164 (LCL - UCL)		EPA-8081			1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-8081	09/28/11	10/03/11 16:50	VH1	GC-1	1	BUJ0048

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

BCL Sample ID: 1115416-10 | **Client Sample Name:** B-3-25, 9/19/2011 10:43:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Acenaphthene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Acenaphthylene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Aldrin	ND	mg/kg	0.10	0.024	EPA-8270C	ND		1
Aniline	ND	mg/kg	0.20	0.053	EPA-8270C	ND		1
Anthracene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Benzidine	ND	mg/kg	3.0	0.22	EPA-8270C	ND		1
Benzo[a]anthracene	ND	mg/kg	0.10	0.012	EPA-8270C	ND		1
Benzo[b]fluoranthene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Benzo[k]fluoranthene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Benzo[a]pyrene	ND	mg/kg	0.10	0.015	EPA-8270C	ND		1
Benzo[g,h,i]perylene	ND	mg/kg	0.10	0.056	EPA-8270C	ND		1
Benzoic acid	ND	mg/kg	0.50	0.067	EPA-8270C	ND		1
Benzyl alcohol	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Benzyl butyl phthalate	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
alpha-BHC	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
beta-BHC	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
delta-BHC	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
gamma-BHC (Lindane)	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
bis(2-Chloroethoxy)methane	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
bis(2-Chloroethyl) ether	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
bis(2-Chloroisopropyl)ether	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
bis(2-Ethylhexyl)phthalate	**0.046**	**mg/kg**	**0.20**	**0.043**	**EPA-8270C**	ND	**J**	1
4-Bromophenyl phenyl ether	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
4-Chloroaniline	ND	mg/kg	0.10	0.027	EPA-8270C	ND		1
2-Chloronaphthalene	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1
4-Chlorophenyl phenyl ether	ND	mg/kg	0.10	0.015	EPA-8270C	ND		1
Chrysene	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
4,4'-DDD	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
4,4'-DDE	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
4,4'-DDT	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Dibenzo[a,h]anthracene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Dibenzofuran	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1
1,2-Dichlorobenzene	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

BCL Sample ID: 1115416-10 | **Client Sample Name:** B-3-25, 9/19/2011 10:43:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
1,3-Dichlorobenzene	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
1,4-Dichlorobenzene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
3,3-Dichlorobenzidine	ND	mg/kg	0.20	0.0067	EPA-8270C	ND		1
Dieldrin	ND	mg/kg	0.10	0.031	EPA-8270C	ND		1
Diethyl phthalate	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Dimethyl phthalate	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1
Di-n-butyl phthalate	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
2,4-Dinitrotoluene	ND	mg/kg	0.10	0.022	EPA-8270C	ND		1
2,6-Dinitrotoluene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Di-n-octyl phthalate	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
1,2-Diphenylhydrazine	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Endosulfan I	ND	mg/kg	0.20	0.020	EPA-8270C	ND		1
Endosulfan II	ND	mg/kg	0.20	0.021	EPA-8270C	ND		1
Endosulfan sulfate	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
Endrin	ND	mg/kg	0.20	0.025	EPA-8270C	ND		1
Endrin aldehyde	ND	mg/kg	0.50	0.022	EPA-8270C	ND		1
Fluoranthene	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
Fluorene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Heptachlor	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
Heptachlor epoxide	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
Hexachlorobenzene	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
Hexachlorobutadiene	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
Hexachlorocyclopentadiene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Hexachloroethane	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1
Indeno[1,2,3-cd]pyrene	ND	mg/kg	0.10	0.072	EPA-8270C	ND		1
Isophorone	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
2-Methylnaphthalene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Naphthalene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
2-Naphthylamine	ND	mg/kg	3.0	0.16	EPA-8270C	ND		1
2-Nitroaniline	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
3-Nitroaniline	ND	mg/kg	0.20	0.015	EPA-8270C	ND		1
4-Nitroaniline	ND	mg/kg	0.20	0.025	EPA-8270C	ND		1
Nitrobenzene	ND	mg/kg	0.10	0.015	EPA-8270C	ND		1

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

BCL Sample ID: 1115416-10 | **Client Sample Name:** B-3-25, 9/19/2011 10:43:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
N-Nitrosodimethylamine	ND	mg/kg	0.10	0.037	EPA-8270C	ND		1
N-Nitrosodi-N-propylamine	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
N-Nitrosodiphenylamine	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
Phenanthrene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Pyrene	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
1,2,4-Trichlorobenzene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
4-Chloro-3-methylphenol	ND	mg/kg	0.20	0.022	EPA-8270C	ND		1
2-Chlorophenol	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
2,4-Dichlorophenol	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
2,4-Dimethylphenol	ND	mg/kg	0.10	0.035	EPA-8270C	ND		1
4,6-Dinitro-2-methylphenol	ND	mg/kg	0.50	0.012	EPA-8270C	ND		1
2,4-Dinitrophenol	ND	mg/kg	0.50	0.0077	EPA-8270C	ND		1
2-Methylphenol	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
3- & 4-Methylphenol	ND	mg/kg	0.20	0.033	EPA-8270C	ND		1
2-Nitrophenol	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
4-Nitrophenol	ND	mg/kg	0.20	0.018	EPA-8270C	ND		1
Pentachlorophenol	ND	mg/kg	0.20	0.013	EPA-8270C	ND		1
Phenol	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
2,4,5-Trichlorophenol	ND	mg/kg	0.20	0.018	EPA-8270C	ND		1
2,4,6-Trichlorophenol	ND	mg/kg	0.20	0.017	EPA-8270C	ND		1
2-Fluorophenol (Surrogate)	92.7	%	28 - 144 (LCL - UCL)		EPA-8270C			1
Phenol-d5 (Surrogate)	48.4	%	36 - 136 (LCL - UCL)		EPA-8270C			1
Nitrobenzene-d5 (Surrogate)	95.2	%	31 - 135 (LCL - UCL)		EPA-8270C			1
2-Fluorobiphenyl (Surrogate)	65.9	%	20 - 140 (LCL - UCL)		EPA-8270C			1
2,4,6-Tribromophenol (Surrogate)	94.0	%	20 - 150 (LCL - UCL)		EPA-8270C			1
p-Terphenyl-d14 (Surrogate)	87.0	%	10 - 150 (LCL - UCL)		EPA-8270C			1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-8270C	09/28/11	10/07/11 17:47	SKC	MS-B1	0.997	BUJ0343

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Purgeable Aromatics and Total Petroleum Hydrocarbons

BCL Sample ID: 1115416-10 | **Client Sample Name:** B-3-25, 9/19/2011 10:43:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
TPH - Light Naptha	ND	mg/kg	50	20	Luft/FFP	ND		1
TPH - Aviation Gas	ND	mg/kg	50	20	Luft/FFP	ND		1
TPH - Stoddard Solvent	ND	mg/kg	20	5.0	Luft/FFP	ND		1
TPH - Heavy Naptha	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Gasoline	ND	mg/kg	20	5.0	Luft/FFP	ND		1
TPH - Jet Fuel (JP4)	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Jet Fuel (JP5)	ND	mg/kg	10	4.6	Luft/FFP	ND		1
TPH - Jet Fuel (JP8)	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Kerosene	ND	mg/kg	10	1.4	Luft/FFP	ND		1
TPH - Diesel (FFP)	ND	mg/kg	10	1.2	Luft/FFP	ND		1
TPH - Fuel Oil #6	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Crude Oil	ND	mg/kg	20	2.8	Luft/FFP	ND		1
TPH - Hydraulic Oil / Motor Oil	ND	mg/kg	20	6.5	Luft/FFP	ND		1
TPH - WD-40	ND	mg/kg	10	5.0	Luft/FFP	ND		1
Tetracosane (Surrogate)	59.2	%	20 - 145 (LCL - UCL)		Luft/FFP			1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	Luft/FFP	09/28/11	10/07/11 15:56	MWB	GC-13	1.017	BUJ0256

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Total Concentrations (TTLC)

BCL Sample ID: 1115416-10 | **Client Sample Name:** B-3-25, 9/19/2011 10:43:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Antimony	**0.86**	**mg/kg**	**5.0**	**0.50**	**EPA-6010B**	ND	**J**	1
Arsenic	**2.4**	**mg/kg**	**1.0**	**0.38**	**EPA-6010B**	ND		1
Barium	**72**	**mg/kg**	**0.50**	**0.077**	**EPA-6010B**	ND		1
Beryllium	**0.28**	**mg/kg**	**0.50**	**0.050**	**EPA-6010B**	ND	**J**	1
Cadmium	**0.053**	**mg/kg**	**0.50**	**0.050**	**EPA-6010B**	ND	**J**	1
Chromium	**9.1**	**mg/kg**	**0.50**	**0.060**	**EPA-6010B**	ND		1
Cobalt	**4.0**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	ND		1
Copper	**17**	**mg/kg**	**1.0**	**0.12**	**EPA-6010B**	ND		1
Lead	**3.5**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	ND		1
Mercury	**0.11**	**mg/kg**	**0.16**	**0.024**	**EPA-7471A**	ND	**J**	2
Molybdenum	**0.57**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	ND	**J**	1
Nickel	**4.6**	**mg/kg**	**0.50**	**0.058**	**EPA-6010B**	ND		1
Selenium	ND	mg/kg	1.0	0.51	EPA-6010B	ND		1
Silver	ND	mg/kg	0.50	0.050	EPA-6010B	ND		1
Thallium	**0.86**	**mg/kg**	**5.0**	**0.73**	**EPA-6010B**	ND	**J**	1
Vanadium	**22**	**mg/kg**	**0.50**	**0.050**	**EPA-6010B**	ND		1
Zinc	**38**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	0.55		1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-6010B	09/28/11	09/29/11 06:00	ARD	PE-OP1	1	BUI1866
2	EPA-7471A	09/26/11	09/28/11 13:21	MEV	CETAC1	0.962	BUI1659

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Organochlorine Pesticides (EPA Method 8081)

BCL Sample ID: 1115416-11 | **Client Sample Name:** B-9-30, 9/20/2011 9:55:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Aldrin	ND	mg/kg	0.00050	0.000026	EPA-8081	ND		1
alpha-BHC	ND	mg/kg	0.00050	0.00014	EPA-8081	ND		1
beta-BHC	ND	mg/kg	0.00050	0.00038	EPA-8081	ND		1
delta-BHC	ND	mg/kg	0.00050	0.000076	EPA-8081	ND		1
gamma-BHC (Lindane)	ND	mg/kg	0.00050	0.00025	EPA-8081	ND		1
Chlordane (Technical)	ND	mg/kg	0.050	0.015	EPA-8081	ND		1
4,4'-DDD	ND	mg/kg	0.00050	0.000063	EPA-8081	ND		1
4,4'-DDE	ND	mg/kg	0.00050	0.000045	EPA-8081	ND		1
4,4'-DDT	ND	mg/kg	0.00050	0.000031	EPA-8081	ND		1
Dieldrin	ND	mg/kg	0.00050	0.000032	EPA-8081	ND		1
Endosulfan I	ND	mg/kg	0.00050	0.000086	EPA-8081	ND		1
Endosulfan II	ND	mg/kg	0.00050	0.000066	EPA-8081	ND		1
Endosulfan sulfate	ND	mg/kg	0.00050	0.00013	EPA-8081	ND		1
Endrin	ND	mg/kg	0.00050	0.000035	EPA-8081	ND		1
Endrin aldehyde	ND	mg/kg	0.00050	0.000061	EPA-8081	ND		1
Heptachlor	ND	mg/kg	0.00050	0.00026	EPA-8081	ND		1
Heptachlor epoxide	ND	mg/kg	0.00050	0.00015	EPA-8081	ND		1
Methoxychlor	ND	mg/kg	0.00050	0.00013	EPA-8081	ND		1
Toxaphene	ND	mg/kg	0.050	0.0074	EPA-8081	ND		1
TCMX (Surrogate)	66.9	%	20 - 143 (LCL - UCL)		EPA-8081			1
Dibutyl chlorendate (Surrogate)	57.3	%	20 - 164 (LCL - UCL)		EPA-8081			1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-8081	09/28/11	10/03/11 17:08	VH1	GC-1	1.014	BUJ0048

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1 Technology Drive, Suite F207
Irvine, CA 92618

Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

BCL Sample ID: 1115416-11 | **Client Sample Name:** B-9-30, 9/20/2011 9:55:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Acenaphthene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Acenaphthylene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Aldrin	ND	mg/kg	0.10	0.024	EPA-8270C	ND		1
Aniline	ND	mg/kg	0.20	0.053	EPA-8270C	ND		1
Anthracene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Benzidine	ND	mg/kg	3.0	0.22	EPA-8270C	ND		1
Benzo[a]anthracene	ND	mg/kg	0.10	0.012	EPA-8270C	ND		1
Benzo[b]fluoranthene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Benzo[k]fluoranthene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Benzo[a]pyrene	ND	mg/kg	0.10	0.015	EPA-8270C	ND		1
Benzo[g,h,i]perylene	ND	mg/kg	0.10	0.056	EPA-8270C	ND		1
Benzoic acid	ND	mg/kg	0.50	0.067	EPA-8270C	ND		1
Benzyl alcohol	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Benzyl butyl phthalate	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
alpha-BHC	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
beta-BHC	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
delta-BHC	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
gamma-BHC (Lindane)	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
bis(2-Chloroethoxy)methane	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
bis(2-Chloroethyl) ether	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
bis(2-Chloroisopropyl)ether	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
bis(2-Ethylhexyl)phthalate	ND	mg/kg	0.20	0.043	EPA-8270C	ND		1
4-Bromophenyl phenyl ether	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
4-Chloroaniline	ND	mg/kg	0.10	0.027	EPA-8270C	ND		1
2-Chloronaphthalene	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1
4-Chlorophenyl phenyl ether	ND	mg/kg	0.10	0.015	EPA-8270C	ND		1
Chrysene	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
4,4'-DDD	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
4,4'-DDE	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
4,4'-DDT	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Dibenzo[a,h]anthracene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Dibenzofuran	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1
1,2-Dichlorobenzene	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

BCL Sample ID: 1115416-11 | **Client Sample Name:** B-9-30, 9/20/2011 9:55:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
1,3-Dichlorobenzene	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
1,4-Dichlorobenzene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
3,3-Dichlorobenzidine	ND	mg/kg	0.20	0.0067	EPA-8270C	ND		1
Dieldrin	ND	mg/kg	0.10	0.031	EPA-8270C	ND		1
Diethyl phthalate	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Dimethyl phthalate	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1
Di-n-butyl phthalate	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
2,4-Dinitrotoluene	ND	mg/kg	0.10	0.022	EPA-8270C	ND		1
2,6-Dinitrotoluene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Di-n-octyl phthalate	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
1,2-Diphenylhydrazine	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Endosulfan I	ND	mg/kg	0.20	0.020	EPA-8270C	ND		1
Endosulfan II	ND	mg/kg	0.20	0.021	EPA-8270C	ND		1
Endosulfan sulfate	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
Endrin	ND	mg/kg	0.20	0.025	EPA-8270C	ND		1
Endrin aldehyde	ND	mg/kg	0.50	0.022	EPA-8270C	ND		1
Fluoranthene	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
Fluorene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Heptachlor	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
Heptachlor epoxide	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
Hexachlorobenzene	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
Hexachlorobutadiene	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
Hexachlorocyclopentadiene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Hexachloroethane	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1
Indeno[1,2,3-cd]pyrene	ND	mg/kg	0.10	0.072	EPA-8270C	ND		1
Isophorone	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
2-Methylnaphthalene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Naphthalene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
2-Naphthylamine	ND	mg/kg	3.0	0.16	EPA-8270C	ND		1
2-Nitroaniline	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
3-Nitroaniline	ND	mg/kg	0.20	0.015	EPA-8270C	ND		1
4-Nitroaniline	ND	mg/kg	0.20	0.025	EPA-8270C	ND		1
Nitrobenzene	ND	mg/kg	0.10	0.015	EPA-8270C	ND		1

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

BCL Sample ID: 1115416-11 | **Client Sample Name:** B-9-30, 9/20/2011 9:55:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
N-Nitrosodimethylamine	ND	mg/kg	0.10	0.037	EPA-8270C	ND		1
N-Nitrosodi-N-propylamine	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
N-Nitrosodiphenylamine	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
Phenanthrene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Pyrene	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
1,2,4-Trichlorobenzene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
4-Chloro-3-methylphenol	ND	mg/kg	0.20	0.022	EPA-8270C	ND		1
2-Chlorophenol	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
2,4-Dichlorophenol	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
2,4-Dimethylphenol	ND	mg/kg	0.10	0.035	EPA-8270C	ND		1
4,6-Dinitro-2-methylphenol	ND	mg/kg	0.50	0.012	EPA-8270C	ND		1
2,4-Dinitrophenol	ND	mg/kg	0.50	0.0077	EPA-8270C	ND		1
2-Methylphenol	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
3- & 4-Methylphenol	ND	mg/kg	0.20	0.033	EPA-8270C	ND		1
2-Nitrophenol	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
4-Nitrophenol	ND	mg/kg	0.20	0.018	EPA-8270C	ND		1
Pentachlorophenol	ND	mg/kg	0.20	0.013	EPA-8270C	ND		1
Phenol	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
2,4,5-Trichlorophenol	ND	mg/kg	0.20	0.018	EPA-8270C	ND		1
2,4,6-Trichlorophenol	ND	mg/kg	0.20	0.017	EPA-8270C	ND		1
2-Fluorophenol (Surrogate)	94.6	%	28 - 144 (LCL - UCL)		EPA-8270C			1
Phenol-d5 (Surrogate)	49.0	%	36 - 136 (LCL - UCL)		EPA-8270C			1
Nitrobenzene-d5 (Surrogate)	105	%	31 - 135 (LCL - UCL)		EPA-8270C			1
2-Fluorobiphenyl (Surrogate)	71.3	%	20 - 140 (LCL - UCL)		EPA-8270C			1
2,4,6-Tribromophenol (Surrogate)	89.9	%	20 - 150 (LCL - UCL)		EPA-8270C			1
p-Terphenyl-d14 (Surrogate)	97.6	%	10 - 150 (LCL - UCL)		EPA-8270C			1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-8270C	09/28/11	10/07/11 18:12	SKC	MS-B1	1	BUJ0343

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Purgeable Aromatics and Total Petroleum Hydrocarbons

BCL Sample ID: 1115416-11 | **Client Sample Name:** B-9-30, 9/20/2011 9:55:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
TPH - Light Naptha	ND	mg/kg	50	20	Luft/FFP	ND		1
TPH - Aviation Gas	ND	mg/kg	50	20	Luft/FFP	ND		1
TPH - Stoddard Solvent	ND	mg/kg	20	5.0	Luft/FFP	ND		1
TPH - Heavy Naptha	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Gasoline	ND	mg/kg	20	5.0	Luft/FFP	ND		1
TPH - Jet Fuel (JP4)	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Jet Fuel (JP5)	ND	mg/kg	10	4.6	Luft/FFP	ND		1
TPH - Jet Fuel (JP8)	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Kerosene	ND	mg/kg	10	1.4	Luft/FFP	ND		1
TPH - Diesel (FFP)	ND	mg/kg	10	1.2	Luft/FFP	ND		1
TPH - Fuel Oil #6	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Crude Oil	ND	mg/kg	20	2.8	Luft/FFP	ND		1
TPH - Hydraulic Oil / Motor Oil	ND	mg/kg	20	6.5	Luft/FFP	ND		1
TPH - WD-40	ND	mg/kg	10	5.0	Luft/FFP	ND		1
Tetracosane (Surrogate)	75.7	%	20 - 145 (LCL - UCL)		Luft/FFP			1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	Luft/FFP	09/28/11	10/07/11 16:20	MWB	GC-13	1	BUJ0256

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Total Concentrations (TTLC)

BCL Sample ID: 1115416-11 | **Client Sample Name:** B-9-30, 9/20/2011 9:55:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Antimony	**0.66**	**mg/kg**	**5.0**	**0.50**	**EPA-6010B**	ND	**J**	1
Arsenic	**1.1**	**mg/kg**	**1.0**	**0.38**	**EPA-6010B**	ND		1
Barium	**38**	**mg/kg**	**0.50**	**0.077**	**EPA-6010B**	ND		1
Beryllium	**0.28**	**mg/kg**	**0.50**	**0.050**	**EPA-6010B**	ND	**J**	1
Cadmium	**0.079**	**mg/kg**	**0.50**	**0.050**	**EPA-6010B**	ND	**J**	1
Chromium	**5.6**	**mg/kg**	**0.50**	**0.060**	**EPA-6010B**	ND		1
Cobalt	**3.4**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	ND		1
Copper	**18**	**mg/kg**	**1.0**	**0.12**	**EPA-6010B**	ND		1
Lead	**2.8**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	ND		1
Mercury	**0.26**	**mg/kg**	**0.16**	**0.024**	**EPA-7471A**	ND		2
Molybdenum	ND	mg/kg	2.5	0.25	EPA-6010B	ND		1
Nickel	**3.7**	**mg/kg**	**0.50**	**0.058**	**EPA-6010B**	ND		1
Selenium	ND	mg/kg	1.0	0.51	EPA-6010B	ND		1
Silver	ND	mg/kg	0.50	0.050	EPA-6010B	ND		1
Thallium	ND	mg/kg	5.0	0.73	EPA-6010B	ND		1
Vanadium	**20**	**mg/kg**	**0.50**	**0.050**	**EPA-6010B**	ND		1
Zinc	**35**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	0.55		1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-6010B	09/28/11	09/29/11 06:02	ARD	PE-OP1	1	BUI1866
2	EPA-7471A	09/26/11	09/28/11 13:28	MEV	CETAC1	0.962	BUI1659

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Organochlorine Pesticides (EPA Method 8081)

BCL Sample ID: 1115416-12 | **Client Sample Name:** B-9-5, 9/20/2011 8:58:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Aldrin	ND	mg/kg	0.00050	0.000026	EPA-8081	ND		1
alpha-BHC	ND	mg/kg	0.00050	0.00014	EPA-8081	ND		1
beta-BHC	ND	mg/kg	0.00050	0.00038	EPA-8081	ND		1
delta-BHC	ND	mg/kg	0.00050	0.000076	EPA-8081	ND		1
gamma-BHC (Lindane)	ND	mg/kg	0.00050	0.00025	EPA-8081	ND		1
Chlordane (Technical)	ND	mg/kg	0.050	0.015	EPA-8081	ND		1
4,4'-DDD	ND	mg/kg	0.00050	0.000063	EPA-8081	ND		1
4,4'-DDE	**0.0015**	**mg/kg**	**0.00050**	**0.000045**	**EPA-8081**	ND		1
4,4'-DDT	**0.00059**	**mg/kg**	**0.00050**	**0.000031**	**EPA-8081**	ND		1
Dieldrin	ND	mg/kg	0.00050	0.000032	EPA-8081	ND		1
Endosulfan I	ND	mg/kg	0.00050	0.000086	EPA-8081	ND		1
Endosulfan II	ND	mg/kg	0.00050	0.000066	EPA-8081	ND		1
Endosulfan sulfate	ND	mg/kg	0.00050	0.00013	EPA-8081	ND		1
Endrin	ND	mg/kg	0.00050	0.000035	EPA-8081	ND		1
Endrin aldehyde	ND	mg/kg	0.00050	0.000061	EPA-8081	ND		1
Heptachlor	ND	mg/kg	0.00050	0.00026	EPA-8081	ND		1
Heptachlor epoxide	ND	mg/kg	0.00050	0.00015	EPA-8081	ND		1
Methoxychlor	ND	mg/kg	0.00050	0.00013	EPA-8081	ND		1
Toxaphene	ND	mg/kg	0.050	0.0074	EPA-8081	ND		1
TCMX (Surrogate)	67.0	%	20 - 143 (LCL - UCL)		EPA-8081			1
Dibutyl chlorendate (Surrogate)	55.2	%	20 - 164 (LCL - UCL)		EPA-8081			1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-8081	09/28/11	10/03/11 17:26	VH1	GC-1	0.993	BUJ0048

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

PCB Analysis (EPA Method 8082)

BCL Sample ID: 1115416-12 | **Client Sample Name:** B-9-5, 9/20/2011 8:58:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
PCB-1016	ND	mg/kg	0.010	0.0027	EPA-8082	ND		1
PCB-1221	ND	mg/kg	0.010	0.0050	EPA-8082	ND		1
PCB-1232	ND	mg/kg	0.010	0.0012	EPA-8082	ND		1
PCB-1242	ND	mg/kg	0.010	0.0016	EPA-8082	ND		1
PCB-1248	ND	mg/kg	0.010	0.0012	EPA-8082	ND		1
PCB-1254	ND	mg/kg	0.010	0.00078	EPA-8082	ND		1
PCB-1260	ND	mg/kg	0.010	0.0022	EPA-8082	ND		1
Total PCB's (Summation)	ND	mg/kg	0.010	0.0050	EPA-8082	ND		1
Decachlorobiphenyl (Surrogate)	40.0	%	20 - 150 (LCL - UCL)		EPA-8082			1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-8082	09/28/11	10/03/11 14:03	VH1	GC-14	0.997	BUJ0046

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Volatile Organic Analysis (EPA Method 8260)

BCL Sample ID: 1115416-12 | **Client Sample Name:** B-9-5, 9/20/2011 8:58:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Benzene	**0.0020**	**mg/kg**	**0.0050**	**0.0013**	**EPA-8260**	ND	**J**	1
Bromobenzene	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
Bromochloromethane	ND	mg/kg	0.0050	0.00092	EPA-8260	ND		1
Bromodichloromethane	ND	mg/kg	0.0050	0.00084	EPA-8260	ND		1
Bromoform	ND	mg/kg	0.0050	0.0015	EPA-8260	ND		1
Bromomethane	ND	mg/kg	0.0050	0.0016	EPA-8260	ND		1
n-Butylbenzene	ND	mg/kg	0.0050	0.0015	EPA-8260	ND		1
sec-Butylbenzene	ND	mg/kg	0.0050	0.0012	EPA-8260	ND		1
tert-Butylbenzene	ND	mg/kg	0.0050	0.0012	EPA-8260	ND		1
Carbon tetrachloride	ND	mg/kg	0.0050	0.0011	EPA-8260	ND		1
Chlorobenzene	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
Chloroethane	ND	mg/kg	0.0050	0.0014	EPA-8260	ND		1
Chloroform	ND	mg/kg	0.0050	0.00063	EPA-8260	ND		1
Chloromethane	ND	mg/kg	0.0050	0.0014	EPA-8260	ND		1
2-Chlorotoluene	ND	mg/kg	0.0050	0.0018	EPA-8260	ND		1
4-Chlorotoluene	ND	mg/kg	0.0050	0.0014	EPA-8260	ND		1
Dibromochloromethane	ND	mg/kg	0.0050	0.00099	EPA-8260	ND		1
1,2-Dibromo-3-chloropropane	ND	mg/kg	0.0050	0.0017	EPA-8260	ND		1
1,2-Dibromoethane	ND	mg/kg	0.0050	0.0010	EPA-8260	ND		1
Dibromomethane	ND	mg/kg	0.0050	0.0018	EPA-8260	ND		1
1,2-Dichlorobenzene	ND	mg/kg	0.0050	0.00081	EPA-8260	ND		1
1,3-Dichlorobenzene	ND	mg/kg	0.0050	0.0014	EPA-8260	ND		1
1,4-Dichlorobenzene	ND	mg/kg	0.0050	0.0015	EPA-8260	ND		1
Dichlorodifluoromethane	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
1,1-Dichloroethane	ND	mg/kg	0.0050	0.0014	EPA-8260	ND		1
1,2-Dichloroethane	ND	mg/kg	0.0050	0.00085	EPA-8260	ND		1
1,1-Dichloroethene	ND	mg/kg	0.0050	0.0012	EPA-8260	ND		1
cis-1,2-Dichloroethene	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
trans-1,2-Dichloroethene	ND	mg/kg	0.0050	0.0014	EPA-8260	ND		1
1,2-Dichloropropane	ND	mg/kg	0.0050	0.00081	EPA-8260	ND		1
1,3-Dichloropropane	ND	mg/kg	0.0050	0.0011	EPA-8260	ND		1
2,2-Dichloropropane	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
1,1-Dichloropropene	ND	mg/kg	0.0050	0.0012	EPA-8260	ND		1

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Irvine, CA 92618

Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Volatile Organic Analysis (EPA Method 8260)

BCL Sample ID: 1115416-12 | **Client Sample Name:** B-9-5, 9/20/2011 8:58:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
cis-1,3-Dichloropropene	ND	mg/kg	0.0050	0.0011	EPA-8260	ND		1
trans-1,3-Dichloropropene	ND	mg/kg	0.0050	0.0012	EPA-8260	ND		1
Ethylbenzene	ND	mg/kg	0.0050	0.0015	EPA-8260	ND		1
Hexachlorobutadiene	ND	mg/kg	0.0050	0.0017	EPA-8260	ND		1
Isopropylbenzene	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
p-Isopropyltoluene	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
Methylene chloride	ND	mg/kg	0.010	0.0024	EPA-8260	ND		1
Methyl t-butyl ether	ND	mg/kg	0.0050	0.00050	EPA-8260	ND		1
Naphthalene	ND	mg/kg	0.0050	0.0014	EPA-8260	ND		1
n-Propylbenzene	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
Styrene	ND	mg/kg	0.0050	0.0014	EPA-8260	ND		1
1,1,1,2-Tetrachloroethane	ND	mg/kg	0.0050	0.0011	EPA-8260	ND		1
1,1,2,2-Tetrachloroethane	ND	mg/kg	0.0050	0.0011	EPA-8260	ND		1
Tetrachloroethene	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
Toluene	ND	mg/kg	0.0050	0.0012	EPA-8260	ND		1
1,2,3-Trichlorobenzene	ND	mg/kg	0.0050	0.0021	EPA-8260	ND		1
1,2,4-Trichlorobenzene	ND	mg/kg	0.0050	0.0020	EPA-8260	ND		1
1,1,1-Trichloroethane	ND	mg/kg	0.0050	0.0011	EPA-8260	ND		1
1,1,2-Trichloroethane	ND	mg/kg	0.0050	0.00077	EPA-8260	ND		1
Trichloroethene	ND	mg/kg	0.0050	0.0011	EPA-8260	ND		1
Trichlorofluoromethane	ND	mg/kg	0.0050	0.0011	EPA-8260	ND		1
1,2,3-Trichloropropane	ND	mg/kg	0.0050	0.0016	EPA-8260	ND		1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
1,2,4-Trimethylbenzene	**0.0037**	**mg/kg**	**0.0050**	**0.0013**	**EPA-8260**	ND	**J**	1
1,3,5-Trimethylbenzene	ND	mg/kg	0.0050	0.0015	EPA-8260	ND		1
Vinyl chloride	ND	mg/kg	0.0050	0.0016	EPA-8260	ND		1
Total Xylenes	ND	mg/kg	0.010	0.0034	EPA-8260	ND		1
p- & m-Xylenes	ND	mg/kg	0.0050	0.0022	EPA-8260	ND		1
o-Xylene	ND	mg/kg	0.0050	0.0012	EPA-8260	ND		1
1,2-Dichloroethane-d4 (Surrogate)	103	%	70 - 121 (LCL - UCL)		EPA-8260			1
Toluene-d8 (Surrogate)	99.1	%	81 - 117 (LCL - UCL)		EPA-8260			1
4-Bromofluorobenzene (Surrogate)	92.6	%	74 - 121 (LCL - UCL)		EPA-8260			1

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1 Technology Drive, Suite F207
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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Volatile Organic Analysis (EPA Method 8260)

BCL Sample ID: 1115416-12 | **Client Sample Name:** B-9-5, 9/20/2011 8:58:00AM

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-8260	09/26/11	09/27/11 08:19	ADC	MS-V3	1	BUI1646

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

BCL Sample ID: 1115416-12 | **Client Sample Name:** B-9-5, 9/20/2011 8:58:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Acenaphthene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Acenaphthylene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Aldrin	ND	mg/kg	0.10	0.024	EPA-8270C	ND		1
Aniline	ND	mg/kg	0.20	0.053	EPA-8270C	ND		1
Anthracene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Benzidine	ND	mg/kg	3.0	0.22	EPA-8270C	ND		1
Benzo[a]anthracene	ND	mg/kg	0.10	0.012	EPA-8270C	ND		1
Benzo[b]fluoranthene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Benzo[k]fluoranthene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Benzo[a]pyrene	ND	mg/kg	0.10	0.015	EPA-8270C	ND		1
Benzo[g,h,i]perylene	ND	mg/kg	0.10	0.056	EPA-8270C	ND		1
Benzoic acid	ND	mg/kg	0.50	0.067	EPA-8270C	ND		1
Benzyl alcohol	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Benzyl butyl phthalate	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
alpha-BHC	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
beta-BHC	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
delta-BHC	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
gamma-BHC (Lindane)	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
bis(2-Chloroethoxy)methane	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
bis(2-Chloroethyl) ether	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
bis(2-Chloroisopropyl)ether	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
bis(2-Ethylhexyl)phthalate	ND	mg/kg	0.20	0.043	EPA-8270C	ND		1
4-Bromophenyl phenyl ether	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
4-Chloroaniline	ND	mg/kg	0.10	0.027	EPA-8270C	ND		1
2-Chloronaphthalene	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1
4-Chlorophenyl phenyl ether	ND	mg/kg	0.10	0.015	EPA-8270C	ND		1
Chrysene	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
4,4'-DDD	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
4,4'-DDE	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
4,4'-DDT	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Dibenzo[a,h]anthracene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Dibenzofuran	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1
1,2-Dichlorobenzene	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1

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1 Technology Drive, Suite F207
Irvine, CA 92618

Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

BCL Sample ID: 1115416-12 | **Client Sample Name:** B-9-5, 9/20/2011 8:58:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
1,3-Dichlorobenzene	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
1,4-Dichlorobenzene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
3,3-Dichlorobenzidine	ND	mg/kg	0.20	0.0067	EPA-8270C	ND		1
Dieldrin	ND	mg/kg	0.10	0.031	EPA-8270C	ND		1
Diethyl phthalate	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Dimethyl phthalate	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1
Di-n-butyl phthalate	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
2,4-Dinitrotoluene	ND	mg/kg	0.10	0.022	EPA-8270C	ND		1
2,6-Dinitrotoluene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Di-n-octyl phthalate	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
1,2-Diphenylhydrazine	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Endosulfan I	ND	mg/kg	0.20	0.020	EPA-8270C	ND		1
Endosulfan II	ND	mg/kg	0.20	0.021	EPA-8270C	ND		1
Endosulfan sulfate	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
Endrin	ND	mg/kg	0.20	0.025	EPA-8270C	ND		1
Endrin aldehyde	ND	mg/kg	0.50	0.022	EPA-8270C	ND		1
Fluoranthene	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
Fluorene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Heptachlor	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
Heptachlor epoxide	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
Hexachlorobenzene	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
Hexachlorobutadiene	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
Hexachlorocyclopentadiene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Hexachloroethane	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1
Indeno[1,2,3-cd]pyrene	ND	mg/kg	0.10	0.072	EPA-8270C	ND		1
Isophorone	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
2-Methylnaphthalene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Naphthalene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
2-Naphthylamine	ND	mg/kg	3.0	0.16	EPA-8270C	ND		1
2-Nitroaniline	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
3-Nitroaniline	ND	mg/kg	0.20	0.015	EPA-8270C	ND		1
4-Nitroaniline	ND	mg/kg	0.20	0.025	EPA-8270C	ND		1
Nitrobenzene	ND	mg/kg	0.10	0.015	EPA-8270C	ND		1

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

BCL Sample ID: 1115416-12 | **Client Sample Name:** B-9-5, 9/20/2011 8:58:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
N-Nitrosodimethylamine	ND	mg/kg	0.10	0.037	EPA-8270C	ND		1
N-Nitrosodi-N-propylamine	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
N-Nitrosodiphenylamine	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
Phenanthrene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Pyrene	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
1,2,4-Trichlorobenzene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
4-Chloro-3-methylphenol	ND	mg/kg	0.20	0.022	EPA-8270C	ND		1
2-Chlorophenol	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
2,4-Dichlorophenol	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
2,4-Dimethylphenol	ND	mg/kg	0.10	0.035	EPA-8270C	ND		1
4,6-Dinitro-2-methylphenol	ND	mg/kg	0.50	0.012	EPA-8270C	ND		1
2,4-Dinitrophenol	ND	mg/kg	0.50	0.0077	EPA-8270C	ND		1
2-Methylphenol	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
3- & 4-Methylphenol	ND	mg/kg	0.20	0.033	EPA-8270C	ND		1
2-Nitrophenol	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
4-Nitrophenol	ND	mg/kg	0.20	0.018	EPA-8270C	ND		1
Pentachlorophenol	ND	mg/kg	0.20	0.013	EPA-8270C	ND		1
Phenol	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
2,4,5-Trichlorophenol	ND	mg/kg	0.20	0.018	EPA-8270C	ND		1
2,4,6-Trichlorophenol	ND	mg/kg	0.20	0.017	EPA-8270C	ND		1
2-Fluorophenol (Surrogate)	65.9	%	28 - 144 (LCL - UCL)		EPA-8270C			1
Phenol-d5 (Surrogate)	40.3	%	36 - 136 (LCL - UCL)		EPA-8270C			1
Nitrobenzene-d5 (Surrogate)	89.6	%	31 - 135 (LCL - UCL)		EPA-8270C			1
2-Fluorobiphenyl (Surrogate)	69.2	%	20 - 140 (LCL - UCL)		EPA-8270C			1
2,4,6-Tribromophenol (Surrogate)	76.1	%	20 - 150 (LCL - UCL)		EPA-8270C			1
p-Terphenyl-d14 (Surrogate)	89.2	%	10 - 150 (LCL - UCL)		EPA-8270C			1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-8270C	09/28/11	10/07/11 18:38	SKC	MS-B1	0.984	BUJ0343

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Purgeable Aromatics and Total Petroleum Hydrocarbons

BCL Sample ID: 1115416-12 | **Client Sample Name:** B-9-5, 9/20/2011 8:58:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
TPH - Light Naptha	ND	mg/kg	50	20	Luft/FFP	ND		1
TPH - Aviation Gas	ND	mg/kg	50	20	Luft/FFP	ND		1
TPH - Stoddard Solvent	ND	mg/kg	20	5.0	Luft/FFP	ND		1
TPH - Heavy Naptha	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Gasoline	ND	mg/kg	20	5.0	Luft/FFP	ND		1
TPH - Jet Fuel (JP4)	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Jet Fuel (JP5)	ND	mg/kg	10	4.6	Luft/FFP	ND		1
TPH - Jet Fuel (JP8)	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Kerosene	ND	mg/kg	10	1.4	Luft/FFP	ND		1
TPH - Diesel (FFP)	ND	mg/kg	10	1.2	Luft/FFP	ND		1
TPH - Fuel Oil #6	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Crude Oil	ND	mg/kg	20	2.8	Luft/FFP	ND		1
TPH - Hydraulic Oil / Motor Oil	**21**	**mg/kg**	**20**	**6.5**	**Luft/FFP**	ND		1
TPH - WD-40	ND	mg/kg	10	5.0	Luft/FFP	ND		1
Tetracosane (Surrogate)	76.8	%	20 - 145 (LCL - UCL)		Luft/FFP			1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	Luft/FFP	09/28/11	10/07/11 16:43	MWB	GC-13	0.997	BUJ0256

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Total Concentrations (TTLC)

BCL Sample ID: 1115416-12 | **Client Sample Name:** B-9-5, 9/20/2011 8:58:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Antimony	**2.7**	**mg/kg**	**5.0**	**0.50**	**EPA-6010B**	ND	**J**	1
Arsenic	**4.3**	**mg/kg**	**1.0**	**0.38**	**EPA-6010B**	ND		1
Barium	**160**	**mg/kg**	**0.50**	**0.077**	**EPA-6010B**	ND		1
Beryllium	**0.77**	**mg/kg**	**0.50**	**0.050**	**EPA-6010B**	ND		1
Cadmium	**0.21**	**mg/kg**	**0.50**	**0.050**	**EPA-6010B**	ND	**J**	1
Chromium	**23**	**mg/kg**	**0.50**	**0.060**	**EPA-6010B**	ND		1
Cobalt	**11**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	ND		1
Copper	**31**	**mg/kg**	**1.0**	**0.12**	**EPA-6010B**	ND		1
Lead	**21**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	ND		1
Mercury	**0.26**	**mg/kg**	**0.16**	**0.024**	**EPA-7471A**	ND		2
Molybdenum	**0.88**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	ND	**J**	1
Nickel	**15**	**mg/kg**	**0.50**	**0.058**	**EPA-6010B**	ND		1
Selenium	ND	mg/kg	1.0	0.51	EPA-6010B	ND		1
Silver	ND	mg/kg	0.50	0.050	EPA-6010B	ND		1
Thallium	**2.1**	**mg/kg**	**5.0**	**0.73**	**EPA-6010B**	ND	**J**	1
Vanadium	**51**	**mg/kg**	**0.50**	**0.050**	**EPA-6010B**	ND		1
Zinc	**99**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	0.55		1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-6010B	09/28/11	09/29/11 06:05	ARD	PE-OP1	1	BUI1866
2	EPA-7471A	09/26/11	09/28/11 13:30	MEV	CETAC1	0.962	BUI1659

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Organochlorine Pesticides (EPA Method 8081)

BCL Sample ID: 1115416-13 | **Client Sample Name:** B-9-10, 9/20/2011 9:05:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Aldrin	ND	mg/kg	0.00050	0.000026	EPA-8081	ND		1
alpha-BHC	ND	mg/kg	0.00050	0.00014	EPA-8081	ND		1
beta-BHC	ND	mg/kg	0.00050	0.00038	EPA-8081	ND		1
delta-BHC	ND	mg/kg	0.00050	0.000076	EPA-8081	ND		1
gamma-BHC (Lindane)	ND	mg/kg	0.00050	0.00025	EPA-8081	ND		1
Chlordane (Technical)	ND	mg/kg	0.050	0.015	EPA-8081	ND		1
4,4'-DDD	ND	mg/kg	0.00050	0.000063	EPA-8081	ND		1
4,4'-DDE	ND	mg/kg	0.00050	0.000045	EPA-8081	ND		1
4,4'-DDT	ND	mg/kg	0.00050	0.000031	EPA-8081	ND		1
Dieldrin	ND	mg/kg	0.00050	0.000032	EPA-8081	ND		1
Endosulfan I	ND	mg/kg	0.00050	0.000086	EPA-8081	ND		1
Endosulfan II	ND	mg/kg	0.00050	0.000066	EPA-8081	ND		1
Endosulfan sulfate	ND	mg/kg	0.00050	0.00013	EPA-8081	ND		1
Endrin	ND	mg/kg	0.00050	0.000035	EPA-8081	ND		1
Endrin aldehyde	ND	mg/kg	0.00050	0.000061	EPA-8081	ND		1
Heptachlor	ND	mg/kg	0.00050	0.00026	EPA-8081	ND		1
Heptachlor epoxide	ND	mg/kg	0.00050	0.00015	EPA-8081	ND		1
Methoxychlor	ND	mg/kg	0.00050	0.00013	EPA-8081	ND		1
Toxaphene	ND	mg/kg	0.050	0.0074	EPA-8081	ND		1
TCMX (Surrogate)	76.7	%	20 - 143 (LCL - UCL)		EPA-8081			1
Dibutyl chlorendate (Surrogate)	86.1	%	20 - 164 (LCL - UCL)		EPA-8081			1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-8081	09/28/11	10/03/11 17:44	VH1	GC-1	1.007	BUJ0048

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Irvine, CA 92618

Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

BCL Sample ID: 1115416-13 | **Client Sample Name:** B-9-10, 9/20/2011 9:05:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Acenaphthene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Acenaphthylene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Aldrin	ND	mg/kg	0.10	0.024	EPA-8270C	ND		1
Aniline	ND	mg/kg	0.20	0.053	EPA-8270C	ND		1
Anthracene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Benzidine	ND	mg/kg	3.0	0.22	EPA-8270C	ND		1
Benzo[a]anthracene	ND	mg/kg	0.10	0.012	EPA-8270C	ND		1
Benzo[b]fluoranthene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Benzo[k]fluoranthene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Benzo[a]pyrene	ND	mg/kg	0.10	0.015	EPA-8270C	ND		1
Benzo[g,h,i]perylene	ND	mg/kg	0.10	0.056	EPA-8270C	ND		1
Benzoic acid	ND	mg/kg	0.50	0.067	EPA-8270C	ND		1
Benzyl alcohol	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Benzyl butyl phthalate	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
alpha-BHC	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
beta-BHC	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
delta-BHC	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
gamma-BHC (Lindane)	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
bis(2-Chloroethoxy)methane	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
bis(2-Chloroethyl) ether	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
bis(2-Chloroisopropyl)ether	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
bis(2-Ethylhexyl)phthalate	ND	mg/kg	0.20	0.043	EPA-8270C	ND		1
4-Bromophenyl phenyl ether	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
4-Chloroaniline	ND	mg/kg	0.10	0.027	EPA-8270C	ND		1
2-Chloronaphthalene	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1
4-Chlorophenyl phenyl ether	ND	mg/kg	0.10	0.015	EPA-8270C	ND		1
Chrysene	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
4,4'-DDD	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
4,4'-DDE	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
4,4'-DDT	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Dibenzo[a,h]anthracene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Dibenzofuran	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1
1,2-Dichlorobenzene	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

BCL Sample ID: 1115416-13 | **Client Sample Name:** B-9-10, 9/20/2011 9:05:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
1,3-Dichlorobenzene	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
1,4-Dichlorobenzene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
3,3-Dichlorobenzidine	ND	mg/kg	0.20	0.0067	EPA-8270C	ND		1
Dieldrin	ND	mg/kg	0.10	0.031	EPA-8270C	ND		1
Diethyl phthalate	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Dimethyl phthalate	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1
Di-n-butyl phthalate	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
2,4-Dinitrotoluene	ND	mg/kg	0.10	0.022	EPA-8270C	ND		1
2,6-Dinitrotoluene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Di-n-octyl phthalate	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
1,2-Diphenylhydrazine	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Endosulfan I	ND	mg/kg	0.20	0.020	EPA-8270C	ND		1
Endosulfan II	ND	mg/kg	0.20	0.021	EPA-8270C	ND		1
Endosulfan sulfate	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
Endrin	ND	mg/kg	0.20	0.025	EPA-8270C	ND		1
Endrin aldehyde	ND	mg/kg	0.50	0.022	EPA-8270C	ND		1
Fluoranthene	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
Fluorene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Heptachlor	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
Heptachlor epoxide	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
Hexachlorobenzene	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
Hexachlorobutadiene	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
Hexachlorocyclopentadiene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Hexachloroethane	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1
Indeno[1,2,3-cd]pyrene	ND	mg/kg	0.10	0.072	EPA-8270C	ND		1
Isophorone	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
2-Methylnaphthalene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Naphthalene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
2-Naphthylamine	ND	mg/kg	3.0	0.16	EPA-8270C	ND		1
2-Nitroaniline	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
3-Nitroaniline	ND	mg/kg	0.20	0.015	EPA-8270C	ND		1
4-Nitroaniline	ND	mg/kg	0.20	0.025	EPA-8270C	ND		1
Nitrobenzene	ND	mg/kg	0.10	0.015	EPA-8270C	ND		1

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

BCL Sample ID: 1115416-13 | **Client Sample Name:** B-9-10, 9/20/2011 9:05:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
N-Nitrosodimethylamine	ND	mg/kg	0.10	0.037	EPA-8270C	ND		1
N-Nitrosodi-N-propylamine	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
N-Nitrosodiphenylamine	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
Phenanthrene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Pyrene	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
1,2,4-Trichlorobenzene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
4-Chloro-3-methylphenol	ND	mg/kg	0.20	0.022	EPA-8270C	ND		1
2-Chlorophenol	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
2,4-Dichlorophenol	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
2,4-Dimethylphenol	ND	mg/kg	0.10	0.035	EPA-8270C	ND		1
4,6-Dinitro-2-methylphenol	ND	mg/kg	0.50	0.012	EPA-8270C	ND		1
2,4-Dinitrophenol	ND	mg/kg	0.50	0.0077	EPA-8270C	ND		1
2-Methylphenol	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
3- & 4-Methylphenol	ND	mg/kg	0.20	0.033	EPA-8270C	ND		1
2-Nitrophenol	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
4-Nitrophenol	ND	mg/kg	0.20	0.018	EPA-8270C	ND		1
Pentachlorophenol	ND	mg/kg	0.20	0.013	EPA-8270C	ND		1
Phenol	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
2,4,5-Trichlorophenol	ND	mg/kg	0.20	0.018	EPA-8270C	ND		1
2,4,6-Trichlorophenol	ND	mg/kg	0.20	0.017	EPA-8270C	ND		1
2-Fluorophenol (Surrogate)	88.2	%	28 - 144 (LCL - UCL)		EPA-8270C			1
Phenol-d5 (Surrogate)	47.4	%	36 - 136 (LCL - UCL)		EPA-8270C			1
Nitrobenzene-d5 (Surrogate)	96.0	%	31 - 135 (LCL - UCL)		EPA-8270C			1
2-Fluorobiphenyl (Surrogate)	83.2	%	20 - 140 (LCL - UCL)		EPA-8270C			1
2,4,6-Tribromophenol (Surrogate)	86.6	%	20 - 150 (LCL - UCL)		EPA-8270C			1
p-Terphenyl-d14 (Surrogate)	96.1	%	10 - 150 (LCL - UCL)		EPA-8270C			1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-8270C	09/28/11	10/07/11 19:05	SKC	MS-B1	1.017	BUJ0343

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Purgeable Aromatics and Total Petroleum Hydrocarbons

BCL Sample ID: 1115416-13 | **Client Sample Name:** B-9-10, 9/20/2011 9:05:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
TPH - Light Naptha	ND	mg/kg	50	20	Luft/FFP	ND		1
TPH - Aviation Gas	ND	mg/kg	50	20	Luft/FFP	ND		1
TPH - Stoddard Solvent	ND	mg/kg	20	5.0	Luft/FFP	ND		1
TPH - Heavy Naptha	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Gasoline	ND	mg/kg	20	5.0	Luft/FFP	ND		1
TPH - Jet Fuel (JP4)	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Jet Fuel (JP5)	ND	mg/kg	10	4.6	Luft/FFP	ND		1
TPH - Jet Fuel (JP8)	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Kerosene	ND	mg/kg	10	1.4	Luft/FFP	ND		1
TPH - Diesel (FFP)	ND	mg/kg	10	1.2	Luft/FFP	ND		1
TPH - Fuel Oil #6	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Crude Oil	ND	mg/kg	20	2.8	Luft/FFP	ND		1
TPH - Hydraulic Oil / Motor Oil	ND	mg/kg	20	6.5	Luft/FFP	ND		1
TPH - WD-40	ND	mg/kg	10	5.0	Luft/FFP	ND		1
Tetracosane (Surrogate)	90.0	%	20 - 145 (LCL - UCL)		Luft/FFP			1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	Luft/FFP	09/28/11	10/06/11 19:57	MWB	GC-13	1.003	BUJ0256

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Total Concentrations (TTLC)

BCL Sample ID: 1115416-13 | **Client Sample Name:** B-9-10, 9/20/2011 9:05:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Antimony	**0.91**	**mg/kg**	**5.0**	**0.50**	**EPA-6010B**	ND	**J**	1
Arsenic	**1.6**	**mg/kg**	**1.0**	**0.38**	**EPA-6010B**	ND		1
Barium	**40**	**mg/kg**	**0.50**	**0.077**	**EPA-6010B**	ND		1
Beryllium	**0.26**	**mg/kg**	**0.50**	**0.050**	**EPA-6010B**	ND	**J**	1
Cadmium	**0.096**	**mg/kg**	**0.50**	**0.050**	**EPA-6010B**	ND	**J**	1
Chromium	**5.7**	**mg/kg**	**0.50**	**0.060**	**EPA-6010B**	ND		1
Cobalt	**3.4**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	ND		1
Copper	**12**	**mg/kg**	**1.0**	**0.12**	**EPA-6010B**	ND		1
Lead	**4.3**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	ND		1
Mercury	**0.085**	**mg/kg**	**0.16**	**0.024**	**EPA-7471A**	ND	**J**	2
Molybdenum	**0.28**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	ND	**J**	1
Nickel	**3.3**	**mg/kg**	**0.50**	**0.058**	**EPA-6010B**	ND		1
Selenium	ND	mg/kg	1.0	0.51	EPA-6010B	ND		1
Silver	ND	mg/kg	0.50	0.050	EPA-6010B	ND		1
Thallium	ND	mg/kg	5.0	0.73	EPA-6010B	ND		1
Vanadium	**20**	**mg/kg**	**0.50**	**0.050**	**EPA-6010B**	ND		1
Zinc	**30**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	0.55		1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-6010B	09/28/11	09/29/11 06:04	ARD	PE-OP1	1	BUI1866
2	EPA-7471A	09/26/11	09/28/11 13:32	MEV	CETAC1	0.977	BUI1659

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Irvine, CA 92618

Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Organochlorine Pesticides (EPA Method 8081)

BCL Sample ID: 1115416-14 | **Client Sample Name:** B-9-15, 9/20/2011 9:09:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Aldrin	ND	mg/kg	0.00050	0.000026	EPA-8081	ND		1
alpha-BHC	ND	mg/kg	0.00050	0.00014	EPA-8081	ND		1
beta-BHC	ND	mg/kg	0.00050	0.00038	EPA-8081	ND		1
delta-BHC	ND	mg/kg	0.00050	0.000076	EPA-8081	ND		1
gamma-BHC (Lindane)	ND	mg/kg	0.00050	0.00025	EPA-8081	ND		1
Chlordane (Technical)	ND	mg/kg	0.050	0.015	EPA-8081	ND		1
4,4'-DDD	ND	mg/kg	0.00050	0.000063	EPA-8081	ND		1
4,4'-DDE	ND	mg/kg	0.00050	0.000045	EPA-8081	ND		1
4,4'-DDT	ND	mg/kg	0.00050	0.000031	EPA-8081	ND		1
Dieldrin	ND	mg/kg	0.00050	0.000032	EPA-8081	ND		1
Endosulfan I	ND	mg/kg	0.00050	0.000086	EPA-8081	ND		1
Endosulfan II	ND	mg/kg	0.00050	0.000066	EPA-8081	ND		1
Endosulfan sulfate	ND	mg/kg	0.00050	0.00013	EPA-8081	ND		1
Endrin	ND	mg/kg	0.00050	0.000035	EPA-8081	ND		1
Endrin aldehyde	ND	mg/kg	0.00050	0.000061	EPA-8081	ND		1
Heptachlor	ND	mg/kg	0.00050	0.00026	EPA-8081	ND		1
Heptachlor epoxide	ND	mg/kg	0.00050	0.00015	EPA-8081	ND		1
Methoxychlor	ND	mg/kg	0.00050	0.00013	EPA-8081	ND		1
Toxaphene	ND	mg/kg	0.050	0.0074	EPA-8081	ND		1
TCMX (Surrogate)	30.6	%	20 - 143 (LCL - UCL)		EPA-8081			1
Dibutyl chlorendate (Surrogate)	32.7	%	20 - 164 (LCL - UCL)		EPA-8081			1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-8081	09/28/11	10/03/11 18:03	VH1	GC-1	1.014	BUJ0048

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1 Technology Drive, Suite F207
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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

BCL Sample ID: 1115416-14 | **Client Sample Name:** B-9-15, 9/20/2011 9:09:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Acenaphthene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Acenaphthylene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Aldrin	ND	mg/kg	0.10	0.024	EPA-8270C	ND		1
Aniline	ND	mg/kg	0.20	0.053	EPA-8270C	ND		1
Anthracene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Benzidine	ND	mg/kg	3.0	0.22	EPA-8270C	ND		1
Benzo[a]anthracene	ND	mg/kg	0.10	0.012	EPA-8270C	ND		1
Benzo[b]fluoranthene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Benzo[k]fluoranthene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Benzo[a]pyrene	ND	mg/kg	0.10	0.015	EPA-8270C	ND		1
Benzo[g,h,i]perylene	ND	mg/kg	0.10	0.056	EPA-8270C	ND		1
Benzoic acid	ND	mg/kg	0.50	0.067	EPA-8270C	ND		1
Benzyl alcohol	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Benzyl butyl phthalate	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
alpha-BHC	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
beta-BHC	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
delta-BHC	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
gamma-BHC (Lindane)	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
bis(2-Chloroethoxy)methane	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
bis(2-Chloroethyl) ether	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
bis(2-Chloroisopropyl)ether	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
bis(2-Ethylhexyl)phthalate	ND	mg/kg	0.20	0.043	EPA-8270C	ND		1
4-Bromophenyl phenyl ether	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
4-Chloroaniline	ND	mg/kg	0.10	0.027	EPA-8270C	ND		1
2-Chloronaphthalene	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1
4-Chlorophenyl phenyl ether	ND	mg/kg	0.10	0.015	EPA-8270C	ND		1
Chrysene	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
4,4'-DDD	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
4,4'-DDE	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
4,4'-DDT	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Dibenzo[a,h]anthracene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Dibenzofuran	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1
1,2-Dichlorobenzene	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

BCL Sample ID: 1115416-14 | **Client Sample Name:** B-9-15, 9/20/2011 9:09:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
1,3-Dichlorobenzene	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
1,4-Dichlorobenzene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
3,3-Dichlorobenzidine	ND	mg/kg	0.20	0.0067	EPA-8270C	ND		1
Dieldrin	ND	mg/kg	0.10	0.031	EPA-8270C	ND		1
Diethyl phthalate	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Dimethyl phthalate	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1
Di-n-butyl phthalate	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
2,4-Dinitrotoluene	ND	mg/kg	0.10	0.022	EPA-8270C	ND		1
2,6-Dinitrotoluene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Di-n-octyl phthalate	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
1,2-Diphenylhydrazine	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Endosulfan I	ND	mg/kg	0.20	0.020	EPA-8270C	ND		1
Endosulfan II	ND	mg/kg	0.20	0.021	EPA-8270C	ND		1
Endosulfan sulfate	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
Endrin	ND	mg/kg	0.20	0.025	EPA-8270C	ND		1
Endrin aldehyde	ND	mg/kg	0.50	0.022	EPA-8270C	ND		1
Fluoranthene	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
Fluorene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Heptachlor	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
Heptachlor epoxide	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
Hexachlorobenzene	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
Hexachlorobutadiene	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
Hexachlorocyclopentadiene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Hexachloroethane	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1
Indeno[1,2,3-cd]pyrene	ND	mg/kg	0.10	0.072	EPA-8270C	ND		1
Isophorone	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
2-Methylnaphthalene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Naphthalene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
2-Naphthylamine	ND	mg/kg	3.0	0.16	EPA-8270C	ND		1
2-Nitroaniline	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
3-Nitroaniline	ND	mg/kg	0.20	0.015	EPA-8270C	ND		1
4-Nitroaniline	ND	mg/kg	0.20	0.025	EPA-8270C	ND		1
Nitrobenzene	ND	mg/kg	0.10	0.015	EPA-8270C	ND		1

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

BCL Sample ID: 1115416-14 | **Client Sample Name:** B-9-15, 9/20/2011 9:09:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
N-Nitrosodimethylamine	ND	mg/kg	0.10	0.037	EPA-8270C	ND		1
N-Nitrosodi-N-propylamine	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
N-Nitrosodiphenylamine	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
Phenanthrene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Pyrene	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
1,2,4-Trichlorobenzene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
4-Chloro-3-methylphenol	ND	mg/kg	0.20	0.022	EPA-8270C	ND		1
2-Chlorophenol	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
2,4-Dichlorophenol	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
2,4-Dimethylphenol	ND	mg/kg	0.10	0.035	EPA-8270C	ND		1
4,6-Dinitro-2-methylphenol	ND	mg/kg	0.50	0.012	EPA-8270C	ND		1
2,4-Dinitrophenol	ND	mg/kg	0.50	0.0077	EPA-8270C	ND		1
2-Methylphenol	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
3- & 4-Methylphenol	ND	mg/kg	0.20	0.033	EPA-8270C	ND		1
2-Nitrophenol	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
4-Nitrophenol	ND	mg/kg	0.20	0.018	EPA-8270C	ND		1
Pentachlorophenol	ND	mg/kg	0.20	0.013	EPA-8270C	ND		1
Phenol	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
2,4,5-Trichlorophenol	ND	mg/kg	0.20	0.018	EPA-8270C	ND		1
2,4,6-Trichlorophenol	ND	mg/kg	0.20	0.017	EPA-8270C	ND		1
2-Fluorophenol (Surrogate)	65.4	%	28 - 144 (LCL - UCL)		EPA-8270C			1
Phenol-d5 (Surrogate)	40.0	%	36 - 136 (LCL - UCL)		EPA-8270C			1
Nitrobenzene-d5 (Surrogate)	63.1	%	31 - 135 (LCL - UCL)		EPA-8270C			1
2-Fluorobiphenyl (Surrogate)	22.2	%	20 - 140 (LCL - UCL)		EPA-8270C			1
2,4,6-Tribromophenol (Surrogate)	46.9	%	20 - 150 (LCL - UCL)		EPA-8270C			1
p-Terphenyl-d14 (Surrogate)	74.9	%	10 - 150 (LCL - UCL)		EPA-8270C			1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-8270C	09/28/11	10/07/11 19:31	SKC	MS-B1	0.987	BUJ0343

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Purgeable Aromatics and Total Petroleum Hydrocarbons

BCL Sample ID: 1115416-14 | **Client Sample Name:** B-9-15, 9/20/2011 9:09:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
TPH - Light Naptha	ND	mg/kg	50	20	Luft/FFP	ND		1
TPH - Aviation Gas	ND	mg/kg	50	20	Luft/FFP	ND		1
TPH - Stoddard Solvent	ND	mg/kg	20	5.0	Luft/FFP	ND		1
TPH - Heavy Naptha	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Gasoline	ND	mg/kg	20	5.0	Luft/FFP	ND		1
TPH - Jet Fuel (JP4)	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Jet Fuel (JP5)	ND	mg/kg	10	4.6	Luft/FFP	ND		1
TPH - Jet Fuel (JP8)	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Kerosene	ND	mg/kg	10	1.4	Luft/FFP	ND		1
TPH - Diesel (FFP)	ND	mg/kg	10	1.2	Luft/FFP	ND		1
TPH - Fuel Oil #6	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Crude Oil	ND	mg/kg	20	2.8	Luft/FFP	ND		1
TPH - Hydraulic Oil / Motor Oil	ND	mg/kg	20	6.5	Luft/FFP	ND		1
TPH - WD-40	ND	mg/kg	10	5.0	Luft/FFP	ND		1
Tetracosane (Surrogate)	82.1	%	20 - 145 (LCL - UCL)		Luft/FFP			1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	Luft/FFP	09/28/11	10/06/11 20:20	MWB	GC-13	0.990	BUJ0256

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Total Concentrations (TTLC)

BCL Sample ID: 1115416-14 | **Client Sample Name:** B-9-15, 9/20/2011 9:09:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Antimony	**2.6**	**mg/kg**	**5.0**	**0.50**	**EPA-6010B**	ND	**J**	1
Arsenic	**3.8**	**mg/kg**	**1.0**	**0.38**	**EPA-6010B**	ND		1
Barium	**110**	**mg/kg**	**0.50**	**0.077**	**EPA-6010B**	ND		1
Beryllium	**0.86**	**mg/kg**	**0.50**	**0.050**	**EPA-6010B**	ND		1
Cadmium	**0.17**	**mg/kg**	**0.50**	**0.050**	**EPA-6010B**	ND	**J**	1
Chromium	**18**	**mg/kg**	**0.50**	**0.060**	**EPA-6010B**	ND		1
Cobalt	**8.5**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	ND		1
Copper	**28**	**mg/kg**	**1.0**	**0.12**	**EPA-6010B**	ND		1
Lead	**9.7**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	ND		1
Mercury	**0.31**	**mg/kg**	**0.16**	**0.024**	**EPA-7471A**	ND		2
Molybdenum	**0.52**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	ND	**J**	1
Nickel	**12**	**mg/kg**	**0.50**	**0.058**	**EPA-6010B**	ND		1
Selenium	ND	mg/kg	1.0	0.51	EPA-6010B	ND		1
Silver	**0.15**	**mg/kg**	**0.50**	**0.050**	**EPA-6010B**	ND	**J**	1
Thallium	**1.3**	**mg/kg**	**5.0**	**0.73**	**EPA-6010B**	ND	**J**	1
Vanadium	**40**	**mg/kg**	**0.50**	**0.050**	**EPA-6010B**	ND		1
Zinc	**70**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	0.55		1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-6010B	09/28/11	09/29/11 07:29	ARD	PE-OP1	1	BUI1866
2	EPA-7471A	09/26/11	09/28/11 13:34	MEV	CETAC1	0.962	BUI1659

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Organochlorine Pesticides (EPA Method 8081)

BCL Sample ID: 1115416-15 | **Client Sample Name:** B-9-20, 9/20/2011 9:15:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Aldrin	ND	mg/kg	0.00050	0.000026	EPA-8081	ND		1
alpha-BHC	ND	mg/kg	0.00050	0.00014	EPA-8081	ND		1
beta-BHC	ND	mg/kg	0.00050	0.00038	EPA-8081	ND		1
delta-BHC	ND	mg/kg	0.00050	0.000076	EPA-8081	ND		1
gamma-BHC (Lindane)	ND	mg/kg	0.00050	0.00025	EPA-8081	ND		1
Chlordane (Technical)	ND	mg/kg	0.050	0.015	EPA-8081	ND		1
4,4'-DDD	ND	mg/kg	0.00050	0.000063	EPA-8081	ND		1
4,4'-DDE	ND	mg/kg	0.00050	0.000045	EPA-8081	ND		1
4,4'-DDT	ND	mg/kg	0.00050	0.000031	EPA-8081	ND		1
Dieldrin	ND	mg/kg	0.00050	0.000032	EPA-8081	ND		1
Endosulfan I	ND	mg/kg	0.00050	0.000086	EPA-8081	ND		1
Endosulfan II	ND	mg/kg	0.00050	0.000066	EPA-8081	ND		1
Endosulfan sulfate	ND	mg/kg	0.00050	0.00013	EPA-8081	ND		1
Endrin	ND	mg/kg	0.00050	0.000035	EPA-8081	ND		1
Endrin aldehyde	ND	mg/kg	0.00050	0.000061	EPA-8081	ND		1
Heptachlor	ND	mg/kg	0.00050	0.00026	EPA-8081	ND		1
Heptachlor epoxide	ND	mg/kg	0.00050	0.00015	EPA-8081	ND		1
Methoxychlor	ND	mg/kg	0.00050	0.00013	EPA-8081	ND		1
Toxaphene	ND	mg/kg	0.050	0.0074	EPA-8081	ND		1
TCMX (Surrogate)	68.4	%	20 - 143 (LCL - UCL)		EPA-8081			1
Dibutyl chlorendate (Surrogate)	53.4	%	20 - 164 (LCL - UCL)		EPA-8081			1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-8081	09/28/11	10/03/11 18:21	VH1	GC-1	0.987	BUJ0048

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

BCL Sample ID: 1115416-15 | **Client Sample Name:** B-9-20, 9/20/2011 9:15:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Acenaphthene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Acenaphthylene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Aldrin	ND	mg/kg	0.10	0.024	EPA-8270C	ND		1
Aniline	ND	mg/kg	0.20	0.053	EPA-8270C	ND		1
Anthracene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Benzidine	ND	mg/kg	3.0	0.22	EPA-8270C	ND		1
Benzo[a]anthracene	ND	mg/kg	0.10	0.012	EPA-8270C	ND		1
Benzo[b]fluoranthene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Benzo[k]fluoranthene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Benzo[a]pyrene	ND	mg/kg	0.10	0.015	EPA-8270C	ND		1
Benzo[g,h,i]perylene	ND	mg/kg	0.10	0.056	EPA-8270C	ND		1
Benzoic acid	ND	mg/kg	0.50	0.067	EPA-8270C	ND		1
Benzyl alcohol	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Benzyl butyl phthalate	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
alpha-BHC	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
beta-BHC	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
delta-BHC	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
gamma-BHC (Lindane)	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
bis(2-Chloroethoxy)methane	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
bis(2-Chloroethyl) ether	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
bis(2-Chloroisopropyl)ether	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
bis(2-Ethylhexyl)phthalate	ND	mg/kg	0.20	0.043	EPA-8270C	ND		1
4-Bromophenyl phenyl ether	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
4-Chloroaniline	ND	mg/kg	0.10	0.027	EPA-8270C	ND		1
2-Chloronaphthalene	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1
4-Chlorophenyl phenyl ether	ND	mg/kg	0.10	0.015	EPA-8270C	ND		1
Chrysene	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
4,4'-DDD	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
4,4'-DDE	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
4,4'-DDT	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Dibenzo[a,h]anthracene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Dibenzofuran	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1
1,2-Dichlorobenzene	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1

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1 Technology Drive, Suite F207
Irvine, CA 92618

Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

BCL Sample ID: 1115416-15 | **Client Sample Name:** B-9-20, 9/20/2011 9:15:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
1,3-Dichlorobenzene	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
1,4-Dichlorobenzene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
3,3-Dichlorobenzidine	ND	mg/kg	0.20	0.0067	EPA-8270C	ND		1
Dieldrin	ND	mg/kg	0.10	0.031	EPA-8270C	ND		1
Diethyl phthalate	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Dimethyl phthalate	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1
Di-n-butyl phthalate	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
2,4-Dinitrotoluene	ND	mg/kg	0.10	0.022	EPA-8270C	ND		1
2,6-Dinitrotoluene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Di-n-octyl phthalate	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
1,2-Diphenylhydrazine	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Endosulfan I	ND	mg/kg	0.20	0.020	EPA-8270C	ND		1
Endosulfan II	ND	mg/kg	0.20	0.021	EPA-8270C	ND		1
Endosulfan sulfate	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
Endrin	ND	mg/kg	0.20	0.025	EPA-8270C	ND		1
Endrin aldehyde	ND	mg/kg	0.50	0.022	EPA-8270C	ND		1
Fluoranthene	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
Fluorene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Heptachlor	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
Heptachlor epoxide	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
Hexachlorobenzene	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
Hexachlorobutadiene	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
Hexachlorocyclopentadiene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Hexachloroethane	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1
Indeno[1,2,3-cd]pyrene	ND	mg/kg	0.10	0.072	EPA-8270C	ND		1
Isophorone	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
2-Methylnaphthalene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Naphthalene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
2-Naphthylamine	ND	mg/kg	3.0	0.16	EPA-8270C	ND		1
2-Nitroaniline	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
3-Nitroaniline	ND	mg/kg	0.20	0.015	EPA-8270C	ND		1
4-Nitroaniline	ND	mg/kg	0.20	0.025	EPA-8270C	ND		1
Nitrobenzene	ND	mg/kg	0.10	0.015	EPA-8270C	ND		1

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Irvine, CA 92618

Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

BCL Sample ID: 1115416-15 | **Client Sample Name:** B-9-20, 9/20/2011 9:15:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
N-Nitrosodimethylamine	ND	mg/kg	0.10	0.037	EPA-8270C	ND		1
N-Nitrosodi-N-propylamine	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
N-Nitrosodiphenylamine	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
Phenanthrene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Pyrene	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
1,2,4-Trichlorobenzene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
4-Chloro-3-methylphenol	ND	mg/kg	0.20	0.022	EPA-8270C	ND		1
2-Chlorophenol	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
2,4-Dichlorophenol	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
2,4-Dimethylphenol	ND	mg/kg	0.10	0.035	EPA-8270C	ND		1
4,6-Dinitro-2-methylphenol	ND	mg/kg	0.50	0.012	EPA-8270C	ND		1
2,4-Dinitrophenol	ND	mg/kg	0.50	0.0077	EPA-8270C	ND		1
2-Methylphenol	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
3- & 4-Methylphenol	ND	mg/kg	0.20	0.033	EPA-8270C	ND		1
2-Nitrophenol	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
4-Nitrophenol	ND	mg/kg	0.20	0.018	EPA-8270C	ND		1
Pentachlorophenol	ND	mg/kg	0.20	0.013	EPA-8270C	ND		1
Phenol	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
2,4,5-Trichlorophenol	ND	mg/kg	0.20	0.018	EPA-8270C	ND		1
2,4,6-Trichlorophenol	ND	mg/kg	0.20	0.017	EPA-8270C	ND		1
2-Fluorophenol (Surrogate)	109	%	28 - 144 (LCL - UCL)		EPA-8270C			1
Phenol-d5 (Surrogate)	55.9	%	36 - 136 (LCL - UCL)		EPA-8270C			1
Nitrobenzene-d5 (Surrogate)	107	%	31 - 135 (LCL - UCL)		EPA-8270C			1
2-Fluorobiphenyl (Surrogate)	79.3	%	20 - 140 (LCL - UCL)		EPA-8270C			1
2,4,6-Tribromophenol (Surrogate)	110	%	20 - 150 (LCL - UCL)		EPA-8270C			1
p-Terphenyl-d14 (Surrogate)	129	%	10 - 150 (LCL - UCL)		EPA-8270C			1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-8270C	09/28/11	10/07/11 19:57	SKC	MS-B1	1.007	BUJ0343

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Purgeable Aromatics and Total Petroleum Hydrocarbons

BCL Sample ID: 1115416-15 | **Client Sample Name:** B-9-20, 9/20/2011 9:15:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
TPH - Light Naptha	ND	mg/kg	50	20	Luft/FFP	ND		1
TPH - Aviation Gas	ND	mg/kg	50	20	Luft/FFP	ND		1
TPH - Stoddard Solvent	ND	mg/kg	20	5.0	Luft/FFP	ND		1
TPH - Heavy Naptha	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Gasoline	ND	mg/kg	20	5.0	Luft/FFP	ND		1
TPH - Jet Fuel (JP4)	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Jet Fuel (JP5)	ND	mg/kg	10	4.6	Luft/FFP	ND		1
TPH - Jet Fuel (JP8)	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Kerosene	ND	mg/kg	10	1.4	Luft/FFP	ND		1
TPH - Diesel (FFP)	ND	mg/kg	10	1.2	Luft/FFP	ND		1
TPH - Fuel Oil #6	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Crude Oil	ND	mg/kg	20	2.8	Luft/FFP	ND		1
TPH - Hydraulic Oil / Motor Oil	ND	mg/kg	20	6.5	Luft/FFP	ND		1
TPH - WD-40	ND	mg/kg	10	5.0	Luft/FFP	ND		1
Tetracosane (Surrogate)	75.5	%	20 - 145 (LCL - UCL)		Luft/FFP			1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	Luft/FFP	09/28/11	10/06/11 20:43	MWB	GC-13	0.984	BUJ0256

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Total Concentrations (TTLC)

BCL Sample ID: 1115416-15 | **Client Sample Name:** B-9-20, 9/20/2011 9:15:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Antimony	**1.1**	**mg/kg**	**5.0**	**0.50**	**EPA-6010B**	ND	**J**	1
Arsenic	**1.4**	**mg/kg**	**1.0**	**0.38**	**EPA-6010B**	ND		1
Barium	**58**	**mg/kg**	**0.50**	**0.077**	**EPA-6010B**	ND		1
Beryllium	**0.29**	**mg/kg**	**0.50**	**0.050**	**EPA-6010B**	ND	**J**	1
Cadmium	**0.073**	**mg/kg**	**0.50**	**0.050**	**EPA-6010B**	ND	**J**	1
Chromium	**8.1**	**mg/kg**	**0.50**	**0.060**	**EPA-6010B**	ND		1
Cobalt	**4.5**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	ND		1
Copper	**13**	**mg/kg**	**1.0**	**0.12**	**EPA-6010B**	ND		1
Lead	**2.9**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	ND		1
Mercury	**0.10**	**mg/kg**	**0.16**	**0.024**	**EPA-7471A**	ND	**J**	2
Molybdenum	ND	mg/kg	2.5	0.25	EPA-6010B	ND		1
Nickel	**5.0**	**mg/kg**	**0.50**	**0.058**	**EPA-6010B**	ND		1
Selenium	ND	mg/kg	1.0	0.51	EPA-6010B	ND		1
Silver	ND	mg/kg	0.50	0.050	EPA-6010B	ND		1
Thallium	**0.79**	**mg/kg**	**5.0**	**0.73**	**EPA-6010B**	ND	**J**	1
Vanadium	**24**	**mg/kg**	**0.50**	**0.050**	**EPA-6010B**	ND		1
Zinc	**37**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	0.55		1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-6010B	09/28/11	09/29/11 07:30	ARD	PE-OP1	1	BUI1866
2	EPA-7471A	09/26/11	09/28/11 13:36	MEV	CETAC1	0.977	BUI1659

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Organochlorine Pesticides (EPA Method 8081)

BCL Sample ID: 1115416-16 | **Client Sample Name:** B-9-25, 9/20/2011 9:20:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Aldrin	ND	mg/kg	0.00050	0.000026	EPA-8081	ND		1
alpha-BHC	ND	mg/kg	0.00050	0.00014	EPA-8081	ND		1
beta-BHC	ND	mg/kg	0.00050	0.00038	EPA-8081	ND		1
delta-BHC	ND	mg/kg	0.00050	0.000076	EPA-8081	ND		1
gamma-BHC (Lindane)	ND	mg/kg	0.00050	0.00025	EPA-8081	ND		1
Chlordane (Technical)	ND	mg/kg	0.050	0.015	EPA-8081	ND		1
4,4'-DDD	ND	mg/kg	0.00050	0.000063	EPA-8081	ND		1
4,4'-DDE	ND	mg/kg	0.00050	0.000045	EPA-8081	ND		1
4,4'-DDT	ND	mg/kg	0.00050	0.000031	EPA-8081	ND		1
Dieldrin	ND	mg/kg	0.00050	0.000032	EPA-8081	ND		1
Endosulfan I	ND	mg/kg	0.00050	0.000086	EPA-8081	ND		1
Endosulfan II	ND	mg/kg	0.00050	0.000066	EPA-8081	ND		1
Endosulfan sulfate	ND	mg/kg	0.00050	0.00013	EPA-8081	ND		1
Endrin	ND	mg/kg	0.00050	0.000035	EPA-8081	ND		1
Endrin aldehyde	ND	mg/kg	0.00050	0.000061	EPA-8081	ND		1
Heptachlor	ND	mg/kg	0.00050	0.00026	EPA-8081	ND		1
Heptachlor epoxide	ND	mg/kg	0.00050	0.00015	EPA-8081	ND		1
Methoxychlor	ND	mg/kg	0.00050	0.00013	EPA-8081	ND		1
Toxaphene	ND	mg/kg	0.050	0.0074	EPA-8081	ND		1
TCMX (Surrogate)	30.9	%	20 - 143 (LCL - UCL)		EPA-8081			1
Dibutyl chlorendate (Surrogate)	36.7	%	20 - 164 (LCL - UCL)		EPA-8081			1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-8081	09/28/11	10/03/11 18:39	VH1	GC-1	0.990	BUJ0048

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Volatile Organic Analysis (EPA Method 8260)

BCL Sample ID: 1115416-16 | **Client Sample Name:** B-9-25, 9/20/2011 9:20:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Benzene	**0.0039**	**mg/kg**	**0.0050**	**0.0013**	**EPA-8260**	ND	**J**	1
Bromobenzene	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
Bromochloromethane	ND	mg/kg	0.0050	0.00092	EPA-8260	ND		1
Bromodichloromethane	ND	mg/kg	0.0050	0.00084	EPA-8260	ND		1
Bromoform	ND	mg/kg	0.0050	0.0015	EPA-8260	ND		1
Bromomethane	ND	mg/kg	0.0050	0.0016	EPA-8260	ND		1
n-Butylbenzene	ND	mg/kg	0.0050	0.0015	EPA-8260	ND		1
sec-Butylbenzene	ND	mg/kg	0.0050	0.0012	EPA-8260	ND		1
tert-Butylbenzene	ND	mg/kg	0.0050	0.0012	EPA-8260	ND		1
Carbon tetrachloride	ND	mg/kg	0.0050	0.0011	EPA-8260	ND		1
Chlorobenzene	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
Chloroethane	ND	mg/kg	0.0050	0.0014	EPA-8260	ND		1
Chloroform	ND	mg/kg	0.0050	0.00063	EPA-8260	ND		1
Chloromethane	ND	mg/kg	0.0050	0.0014	EPA-8260	ND		1
2-Chlorotoluene	ND	mg/kg	0.0050	0.0018	EPA-8260	ND		1
4-Chlorotoluene	ND	mg/kg	0.0050	0.0014	EPA-8260	ND		1
Dibromochloromethane	ND	mg/kg	0.0050	0.00099	EPA-8260	ND		1
1,2-Dibromo-3-chloropropane	ND	mg/kg	0.0050	0.0017	EPA-8260	ND		1
1,2-Dibromoethane	ND	mg/kg	0.0050	0.0010	EPA-8260	ND		1
Dibromomethane	ND	mg/kg	0.0050	0.0018	EPA-8260	ND		1
1,2-Dichlorobenzene	ND	mg/kg	0.0050	0.00081	EPA-8260	ND		1
1,3-Dichlorobenzene	ND	mg/kg	0.0050	0.0014	EPA-8260	ND		1
1,4-Dichlorobenzene	ND	mg/kg	0.0050	0.0015	EPA-8260	ND		1
Dichlorodifluoromethane	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
1,1-Dichloroethane	ND	mg/kg	0.0050	0.0014	EPA-8260	ND		1
1,2-Dichloroethane	ND	mg/kg	0.0050	0.00085	EPA-8260	ND		1
1,1-Dichloroethene	ND	mg/kg	0.0050	0.0012	EPA-8260	ND		1
cis-1,2-Dichloroethene	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
trans-1,2-Dichloroethene	ND	mg/kg	0.0050	0.0014	EPA-8260	ND		1
1,2-Dichloropropane	ND	mg/kg	0.0050	0.00081	EPA-8260	ND		1
1,3-Dichloropropane	ND	mg/kg	0.0050	0.0011	EPA-8260	ND		1
2,2-Dichloropropane	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
1,1-Dichloropropene	ND	mg/kg	0.0050	0.0012	EPA-8260	ND		1

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Volatile Organic Analysis (EPA Method 8260)

BCL Sample ID: 1115416-16 | **Client Sample Name:** B-9-25, 9/20/2011 9:20:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
cis-1,3-Dichloropropene	ND	mg/kg	0.0050	0.0011	EPA-8260	ND		1
trans-1,3-Dichloropropene	ND	mg/kg	0.0050	0.0012	EPA-8260	ND		1
Ethylbenzene	ND	mg/kg	0.0050	0.0015	EPA-8260	ND		1
Hexachlorobutadiene	ND	mg/kg	0.0050	0.0017	EPA-8260	ND		1
Isopropylbenzene	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
p-Isopropyltoluene	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
Methylene chloride	ND	mg/kg	0.010	0.0024	EPA-8260	ND		1
Methyl t-butyl ether	ND	mg/kg	0.0050	0.00050	EPA-8260	ND		1
Naphthalene	ND	mg/kg	0.0050	0.0014	EPA-8260	ND		1
n-Propylbenzene	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
Styrene	ND	mg/kg	0.0050	0.0014	EPA-8260	ND		1
1,1,1,2-Tetrachloroethane	ND	mg/kg	0.0050	0.0011	EPA-8260	ND		1
1,1,2,2-Tetrachloroethane	ND	mg/kg	0.0050	0.0011	EPA-8260	ND		1
Tetrachloroethene	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
Toluene	ND	mg/kg	0.0050	0.0012	EPA-8260	ND		1
1,2,3-Trichlorobenzene	ND	mg/kg	0.0050	0.0021	EPA-8260	ND		1
1,2,4-Trichlorobenzene	ND	mg/kg	0.0050	0.0020	EPA-8260	ND		1
1,1,1-Trichloroethane	ND	mg/kg	0.0050	0.0011	EPA-8260	ND		1
1,1,2-Trichloroethane	ND	mg/kg	0.0050	0.00077	EPA-8260	ND		1
Trichloroethene	ND	mg/kg	0.0050	0.0011	EPA-8260	ND		1
Trichlorofluoromethane	ND	mg/kg	0.0050	0.0011	EPA-8260	ND		1
1,2,3-Trichloropropane	ND	mg/kg	0.0050	0.0016	EPA-8260	ND		1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
1,2,4-Trimethylbenzene	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
1,3,5-Trimethylbenzene	ND	mg/kg	0.0050	0.0015	EPA-8260	ND		1
Vinyl chloride	ND	mg/kg	0.0050	0.0016	EPA-8260	ND		1
Total Xylenes	ND	mg/kg	0.010	0.0034	EPA-8260	ND		1
p- & m-Xylenes	ND	mg/kg	0.0050	0.0022	EPA-8260	ND		1
o-Xylene	ND	mg/kg	0.0050	0.0012	EPA-8260	ND		1
1,2-Dichloroethane-d4 (Surrogate)	106	%	70 - 121 (LCL - UCL)		EPA-8260			1
Toluene-d8 (Surrogate)	97.3	%	81 - 117 (LCL - UCL)		EPA-8260			1
4-Bromofluorobenzene (Surrogate)	85.1	%	74 - 121 (LCL - UCL)		EPA-8260			1

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Irvine, CA 92618

Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Volatile Organic Analysis (EPA Method 8260)

BCL Sample ID: 1115416-16 | **Client Sample Name:** B-9-25, 9/20/2011 9:20:00AM

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-8260	09/26/11	09/27/11 08:45	ADC	MS-V3	1	BUI1646

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

BCL Sample ID: 1115416-16 | **Client Sample Name:** B-9-25, 9/20/2011 9:20:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Acenaphthene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Acenaphthylene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Aldrin	ND	mg/kg	0.10	0.024	EPA-8270C	ND		1
Aniline	ND	mg/kg	0.20	0.053	EPA-8270C	ND		1
Anthracene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Benzidine	ND	mg/kg	3.0	0.22	EPA-8270C	ND		1
Benzo[a]anthracene	ND	mg/kg	0.10	0.012	EPA-8270C	ND		1
Benzo[b]fluoranthene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Benzo[k]fluoranthene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Benzo[a]pyrene	ND	mg/kg	0.10	0.015	EPA-8270C	ND		1
Benzo[g,h,i]perylene	ND	mg/kg	0.10	0.056	EPA-8270C	ND		1
Benzoic acid	ND	mg/kg	0.50	0.067	EPA-8270C	ND		1
Benzyl alcohol	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Benzyl butyl phthalate	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
alpha-BHC	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
beta-BHC	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
delta-BHC	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
gamma-BHC (Lindane)	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
bis(2-Chloroethoxy)methane	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
bis(2-Chloroethyl) ether	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
bis(2-Chloroisopropyl)ether	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
bis(2-Ethylhexyl)phthalate	ND	mg/kg	0.20	0.043	EPA-8270C	ND		1
4-Bromophenyl phenyl ether	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
4-Chloroaniline	ND	mg/kg	0.10	0.027	EPA-8270C	ND		1
2-Chloronaphthalene	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1
4-Chlorophenyl phenyl ether	ND	mg/kg	0.10	0.015	EPA-8270C	ND		1
Chrysene	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
4,4'-DDD	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
4,4'-DDE	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
4,4'-DDT	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Dibenzo[a,h]anthracene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Dibenzofuran	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1
1,2-Dichlorobenzene	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

BCL Sample ID: 1115416-16 | **Client Sample Name:** B-9-25, 9/20/2011 9:20:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
1,3-Dichlorobenzene	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
1,4-Dichlorobenzene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
3,3-Dichlorobenzidine	ND	mg/kg	0.20	0.0067	EPA-8270C	ND		1
Dieldrin	ND	mg/kg	0.10	0.031	EPA-8270C	ND		1
Diethyl phthalate	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Dimethyl phthalate	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1
Di-n-butyl phthalate	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
2,4-Dinitrotoluene	ND	mg/kg	0.10	0.022	EPA-8270C	ND		1
2,6-Dinitrotoluene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Di-n-octyl phthalate	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
1,2-Diphenylhydrazine	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Endosulfan I	ND	mg/kg	0.20	0.020	EPA-8270C	ND		1
Endosulfan II	ND	mg/kg	0.20	0.021	EPA-8270C	ND		1
Endosulfan sulfate	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
Endrin	ND	mg/kg	0.20	0.025	EPA-8270C	ND		1
Endrin aldehyde	ND	mg/kg	0.50	0.022	EPA-8270C	ND		1
Fluoranthene	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
Fluorene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Heptachlor	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
Heptachlor epoxide	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
Hexachlorobenzene	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
Hexachlorobutadiene	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
Hexachlorocyclopentadiene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Hexachloroethane	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1
Indeno[1,2,3-cd]pyrene	ND	mg/kg	0.10	0.072	EPA-8270C	ND		1
Isophorone	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
2-Methylnaphthalene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Naphthalene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
2-Naphthylamine	ND	mg/kg	3.0	0.16	EPA-8270C	ND		1
2-Nitroaniline	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
3-Nitroaniline	ND	mg/kg	0.20	0.015	EPA-8270C	ND		1
4-Nitroaniline	ND	mg/kg	0.20	0.025	EPA-8270C	ND		1
Nitrobenzene	ND	mg/kg	0.10	0.015	EPA-8270C	ND		1

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

BCL Sample ID: 1115416-16 | **Client Sample Name:** B-9-25, 9/20/2011 9:20:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
N-Nitrosodimethylamine	ND	mg/kg	0.10	0.037	EPA-8270C	ND		1
N-Nitrosodi-N-propylamine	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
N-Nitrosodiphenylamine	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
Phenanthrene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Pyrene	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
1,2,4-Trichlorobenzene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
4-Chloro-3-methylphenol	ND	mg/kg	0.20	0.022	EPA-8270C	ND		1
2-Chlorophenol	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
2,4-Dichlorophenol	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
2,4-Dimethylphenol	ND	mg/kg	0.10	0.035	EPA-8270C	ND		1
4,6-Dinitro-2-methylphenol	ND	mg/kg	0.50	0.012	EPA-8270C	ND		1
2,4-Dinitrophenol	ND	mg/kg	0.50	0.0077	EPA-8270C	ND		1
2-Methylphenol	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
3- & 4-Methylphenol	ND	mg/kg	0.20	0.033	EPA-8270C	ND		1
2-Nitrophenol	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
4-Nitrophenol	ND	mg/kg	0.20	0.018	EPA-8270C	ND		1
Pentachlorophenol	ND	mg/kg	0.20	0.013	EPA-8270C	ND		1
Phenol	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
2,4,5-Trichlorophenol	ND	mg/kg	0.20	0.018	EPA-8270C	ND		1
2,4,6-Trichlorophenol	ND	mg/kg	0.20	0.017	EPA-8270C	ND		1
2-Fluorophenol (Surrogate)	61.9	%	28 - 144 (LCL - UCL)		EPA-8270C			1
Phenol-d5 (Surrogate)	37.6	%	36 - 136 (LCL - UCL)		EPA-8270C			1
Nitrobenzene-d5 (Surrogate)	53.7	%	31 - 135 (LCL - UCL)		EPA-8270C			1
2-Fluorobiphenyl (Surrogate)	13.2	%	20 - 140 (LCL - UCL)		EPA-8270C		S09	1
2,4,6-Tribromophenol (Surrogate)	27.8	%	20 - 150 (LCL - UCL)		EPA-8270C			1
p-Terphenyl-d14 (Surrogate)	52.0	%	10 - 150 (LCL - UCL)		EPA-8270C			1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-8270C	09/28/11	10/07/11 20:23	SKC	MS-B1	1.014	BUJ0343

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Purgeable Aromatics and Total Petroleum Hydrocarbons

BCL Sample ID: 1115416-16 | **Client Sample Name:** B-9-25, 9/20/2011 9:20:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
TPH - Light Naptha	ND	mg/kg	50	20	Luft/FFP	ND		1
TPH - Aviation Gas	ND	mg/kg	50	20	Luft/FFP	ND		1
TPH - Stoddard Solvent	ND	mg/kg	20	5.0	Luft/FFP	ND		1
TPH - Heavy Naptha	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Gasoline	ND	mg/kg	20	5.0	Luft/FFP	ND		1
TPH - Jet Fuel (JP4)	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Jet Fuel (JP5)	ND	mg/kg	10	4.6	Luft/FFP	ND		1
TPH - Jet Fuel (JP8)	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Kerosene	ND	mg/kg	10	1.4	Luft/FFP	ND		1
TPH - Diesel (FFP)	ND	mg/kg	10	1.2	Luft/FFP	ND		1
TPH - Fuel Oil #6	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Crude Oil	ND	mg/kg	20	2.8	Luft/FFP	ND		1
TPH - Hydraulic Oil / Motor Oil	ND	mg/kg	20	6.5	Luft/FFP	ND		1
TPH - WD-40	ND	mg/kg	10	5.0	Luft/FFP	ND		1
Tetracosane (Surrogate)	79.9	%	20 - 145 (LCL - UCL)		Luft/FFP			1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	Luft/FFP	09/28/11	10/06/11 21:06	MWB	GC-13	0.997	BUJ0256

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Total Concentrations (TTLC)

BCL Sample ID: 1115416-16 | **Client Sample Name:** B-9-25, 9/20/2011 9:20:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Antimony	**3.0**	**mg/kg**	**5.0**	**0.50**	**EPA-6010B**	ND	**J**	1
Arsenic	**3.7**	**mg/kg**	**1.0**	**0.38**	**EPA-6010B**	ND		1
Barium	**160**	**mg/kg**	**0.50**	**0.077**	**EPA-6010B**	ND		1
Beryllium	**0.76**	**mg/kg**	**0.50**	**0.050**	**EPA-6010B**	ND		1
Cadmium	**0.21**	**mg/kg**	**0.50**	**0.050**	**EPA-6010B**	ND	**J**	1
Chromium	**21**	**mg/kg**	**0.50**	**0.060**	**EPA-6010B**	ND		1
Cobalt	**10**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	ND		1
Copper	**30**	**mg/kg**	**1.0**	**0.12**	**EPA-6010B**	ND		1
Lead	**19**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	ND		1
Mercury	**0.26**	**mg/kg**	**0.16**	**0.024**	**EPA-7471A**	ND		2
Molybdenum	**0.77**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	ND	**J**	1
Nickel	**14**	**mg/kg**	**0.50**	**0.058**	**EPA-6010B**	ND		1
Selenium	ND	mg/kg	1.0	0.51	EPA-6010B	ND		1
Silver	**0.10**	**mg/kg**	**0.50**	**0.050**	**EPA-6010B**	ND	**J**	1
Thallium	**1.8**	**mg/kg**	**5.0**	**0.73**	**EPA-6010B**	ND	**J**	1
Vanadium	**52**	**mg/kg**	**0.50**	**0.050**	**EPA-6010B**	ND		1
Zinc	**96**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	0.55		1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-6010B	09/28/11	09/29/11 07:45	ARD	PE-OP1	1	BUI1866
2	EPA-7471A	09/26/11	09/28/11 13:38	MEV	CETAC1	0.977	BUI1659

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Organochlorine Pesticides (EPA Method 8081)

BCL Sample ID: 1115416-17 | **Client Sample Name:** B-4-5, 9/20/2011 11:00:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Aldrin	ND	mg/kg	0.00050	0.000026	EPA-8081	ND		1
alpha-BHC	ND	mg/kg	0.00050	0.00014	EPA-8081	ND		1
beta-BHC	ND	mg/kg	0.00050	0.00038	EPA-8081	ND		1
delta-BHC	ND	mg/kg	0.00050	0.000076	EPA-8081	ND		1
gamma-BHC (Lindane)	ND	mg/kg	0.00050	0.00025	EPA-8081	ND		1
Chlordane (Technical)	ND	mg/kg	0.050	0.015	EPA-8081	ND		1
4,4'-DDD	ND	mg/kg	0.00050	0.000063	EPA-8081	ND		1
4,4'-DDE	ND	mg/kg	0.00050	0.000045	EPA-8081	ND		1
4,4'-DDT	ND	mg/kg	0.00050	0.000031	EPA-8081	ND		1
Dieldrin	ND	mg/kg	0.00050	0.000032	EPA-8081	ND		1
Endosulfan I	ND	mg/kg	0.00050	0.000086	EPA-8081	ND		1
Endosulfan II	ND	mg/kg	0.00050	0.000066	EPA-8081	ND		1
Endosulfan sulfate	ND	mg/kg	0.00050	0.00013	EPA-8081	ND		1
Endrin	ND	mg/kg	0.00050	0.000035	EPA-8081	ND		1
Endrin aldehyde	ND	mg/kg	0.00050	0.000061	EPA-8081	ND		1
Heptachlor	ND	mg/kg	0.00050	0.00026	EPA-8081	ND		1
Heptachlor epoxide	ND	mg/kg	0.00050	0.00015	EPA-8081	ND		1
Methoxychlor	ND	mg/kg	0.00050	0.00013	EPA-8081	ND		1
Toxaphene	ND	mg/kg	0.050	0.0074	EPA-8081	ND		1
TCMX (Surrogate)	85.3	%	20 - 143 (LCL - UCL)		EPA-8081			1
Dibutyl chlorendate (Surrogate)	81.2	%	20 - 164 (LCL - UCL)		EPA-8081			1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-8081	09/28/11	10/03/11 19:53	VH1	GC-1	1.003	BUJ0048

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Volatile Organic Analysis (EPA Method 8260)

BCL Sample ID: 1115416-17 | **Client Sample Name:** B-4-5, 9/20/2011 11:00:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Benzene	**0.0043**	**mg/kg**	**0.0050**	**0.0013**	**EPA-8260**	ND	**J**	1
Bromobenzene	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
Bromochloromethane	ND	mg/kg	0.0050	0.00092	EPA-8260	ND		1
Bromodichloromethane	ND	mg/kg	0.0050	0.00084	EPA-8260	ND		1
Bromoform	ND	mg/kg	0.0050	0.0015	EPA-8260	ND		1
Bromomethane	ND	mg/kg	0.0050	0.0016	EPA-8260	ND		1
n-Butylbenzene	ND	mg/kg	0.0050	0.0015	EPA-8260	ND		1
sec-Butylbenzene	ND	mg/kg	0.0050	0.0012	EPA-8260	ND		1
tert-Butylbenzene	ND	mg/kg	0.0050	0.0012	EPA-8260	ND		1
Carbon tetrachloride	ND	mg/kg	0.0050	0.0011	EPA-8260	ND		1
Chlorobenzene	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
Chloroethane	ND	mg/kg	0.0050	0.0014	EPA-8260	ND		1
Chloroform	ND	mg/kg	0.0050	0.00063	EPA-8260	ND		1
Chloromethane	ND	mg/kg	0.0050	0.0014	EPA-8260	ND		1
2-Chlorotoluene	ND	mg/kg	0.0050	0.0018	EPA-8260	ND		1
4-Chlorotoluene	ND	mg/kg	0.0050	0.0014	EPA-8260	ND		1
Dibromochloromethane	ND	mg/kg	0.0050	0.00099	EPA-8260	ND		1
1,2-Dibromo-3-chloropropane	ND	mg/kg	0.0050	0.0017	EPA-8260	ND		1
1,2-Dibromoethane	ND	mg/kg	0.0050	0.0010	EPA-8260	ND		1
Dibromomethane	ND	mg/kg	0.0050	0.0018	EPA-8260	ND		1
1,2-Dichlorobenzene	ND	mg/kg	0.0050	0.00081	EPA-8260	ND		1
1,3-Dichlorobenzene	ND	mg/kg	0.0050	0.0014	EPA-8260	ND		1
1,4-Dichlorobenzene	ND	mg/kg	0.0050	0.0015	EPA-8260	ND		1
Dichlorodifluoromethane	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
1,1-Dichloroethane	ND	mg/kg	0.0050	0.0014	EPA-8260	ND		1
1,2-Dichloroethane	ND	mg/kg	0.0050	0.00085	EPA-8260	ND		1
1,1-Dichloroethene	ND	mg/kg	0.0050	0.0012	EPA-8260	ND		1
cis-1,2-Dichloroethene	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
trans-1,2-Dichloroethene	ND	mg/kg	0.0050	0.0014	EPA-8260	ND		1
1,2-Dichloropropane	ND	mg/kg	0.0050	0.00081	EPA-8260	ND		1
1,3-Dichloropropane	ND	mg/kg	0.0050	0.0011	EPA-8260	ND		1
2,2-Dichloropropane	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
1,1-Dichloropropene	ND	mg/kg	0.0050	0.0012	EPA-8260	ND		1

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Irvine, CA 92618

Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Volatile Organic Analysis (EPA Method 8260)

BCL Sample ID: 1115416-17 | **Client Sample Name:** B-4-5, 9/20/2011 11:00:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
cis-1,3-Dichloropropene	ND	mg/kg	0.0050	0.0011	EPA-8260	ND		1
trans-1,3-Dichloropropene	ND	mg/kg	0.0050	0.0012	EPA-8260	ND		1
Ethylbenzene	ND	mg/kg	0.0050	0.0015	EPA-8260	ND		1
Hexachlorobutadiene	ND	mg/kg	0.0050	0.0017	EPA-8260	ND		1
Isopropylbenzene	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
p-Isopropyltoluene	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
Methylene chloride	ND	mg/kg	0.010	0.0024	EPA-8260	ND		1
Methyl t-butyl ether	ND	mg/kg	0.0050	0.00050	EPA-8260	ND		1
Naphthalene	ND	mg/kg	0.0050	0.0014	EPA-8260	ND		1
n-Propylbenzene	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
Styrene	ND	mg/kg	0.0050	0.0014	EPA-8260	ND		1
1,1,1,2-Tetrachloroethane	ND	mg/kg	0.0050	0.0011	EPA-8260	ND		1
1,1,2,2-Tetrachloroethane	ND	mg/kg	0.0050	0.0011	EPA-8260	ND		1
Tetrachloroethene	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
Toluene	**0.0020**	**mg/kg**	**0.0050**	**0.0012**	**EPA-8260**	ND	**J**	1
1,2,3-Trichlorobenzene	ND	mg/kg	0.0050	0.0021	EPA-8260	ND		1
1,2,4-Trichlorobenzene	ND	mg/kg	0.0050	0.0020	EPA-8260	ND		1
1,1,1-Trichloroethane	ND	mg/kg	0.0050	0.0011	EPA-8260	ND		1
1,1,2-Trichloroethane	ND	mg/kg	0.0050	0.00077	EPA-8260	ND		1
Trichloroethene	ND	mg/kg	0.0050	0.0011	EPA-8260	ND		1
Trichlorofluoromethane	ND	mg/kg	0.0050	0.0011	EPA-8260	ND		1
1,2,3-Trichloropropane	ND	mg/kg	0.0050	0.0016	EPA-8260	ND		1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
1,2,4-Trimethylbenzene	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
1,3,5-Trimethylbenzene	ND	mg/kg	0.0050	0.0015	EPA-8260	ND		1
Vinyl chloride	ND	mg/kg	0.0050	0.0016	EPA-8260	ND		1
Total Xylenes	ND	mg/kg	0.010	0.0034	EPA-8260	ND		1
p- & m-Xylenes	ND	mg/kg	0.0050	0.0022	EPA-8260	ND		1
o-Xylene	ND	mg/kg	0.0050	0.0012	EPA-8260	ND		1
1,2-Dichloroethane-d4 (Surrogate)	109	%	70 - 121 (LCL - UCL)		EPA-8260			1
Toluene-d8 (Surrogate)	97.8	%	81 - 117 (LCL - UCL)		EPA-8260			1
4-Bromofluorobenzene (Surrogate)	91.6	%	74 - 121 (LCL - UCL)		EPA-8260			1

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Irvine, CA 92618

Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Volatile Organic Analysis (EPA Method 8260)

BCL Sample ID: 1115416-17 | **Client Sample Name:** B-4-5, 9/20/2011 11:00:00AM

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-8260	09/26/11	09/27/11 09:12	ADC	MS-V3	1	BUI1646

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

BCL Sample ID: 1115416-17 | **Client Sample Name:** B-4-5, 9/20/2011 11:00:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Acenaphthene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Acenaphthylene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Aldrin	ND	mg/kg	0.10	0.024	EPA-8270C	ND		1
Aniline	ND	mg/kg	0.20	0.053	EPA-8270C	ND		1
Anthracene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Benzidine	ND	mg/kg	3.0	0.22	EPA-8270C	ND		1
Benzo[a]anthracene	ND	mg/kg	0.10	0.012	EPA-8270C	ND		1
Benzo[b]fluoranthene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Benzo[k]fluoranthene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Benzo[a]pyrene	ND	mg/kg	0.10	0.015	EPA-8270C	ND		1
Benzo[g,h,i]perylene	ND	mg/kg	0.10	0.056	EPA-8270C	ND		1
Benzoic acid	ND	mg/kg	0.50	0.067	EPA-8270C	ND		1
Benzyl alcohol	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Benzyl butyl phthalate	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
alpha-BHC	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
beta-BHC	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
delta-BHC	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
gamma-BHC (Lindane)	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
bis(2-Chloroethoxy)methane	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
bis(2-Chloroethyl) ether	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
bis(2-Chloroisopropyl)ether	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
bis(2-Ethylhexyl)phthalate	ND	mg/kg	0.20	0.043	EPA-8270C	ND		1
4-Bromophenyl phenyl ether	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
4-Chloroaniline	ND	mg/kg	0.10	0.027	EPA-8270C	ND		1
2-Chloronaphthalene	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1
4-Chlorophenyl phenyl ether	ND	mg/kg	0.10	0.015	EPA-8270C	ND		1
Chrysene	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
4,4'-DDD	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
4,4'-DDE	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
4,4'-DDT	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Dibenzo[a,h]anthracene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Dibenzofuran	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1
1,2-Dichlorobenzene	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

BCL Sample ID: 1115416-17 | **Client Sample Name:** B-4-5, 9/20/2011 11:00:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
1,3-Dichlorobenzene	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
1,4-Dichlorobenzene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
3,3-Dichlorobenzidine	ND	mg/kg	0.20	0.0067	EPA-8270C	ND		1
Dieldrin	ND	mg/kg	0.10	0.031	EPA-8270C	ND		1
Diethyl phthalate	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Dimethyl phthalate	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1
Di-n-butyl phthalate	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
2,4-Dinitrotoluene	ND	mg/kg	0.10	0.022	EPA-8270C	ND		1
2,6-Dinitrotoluene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Di-n-octyl phthalate	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
1,2-Diphenylhydrazine	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Endosulfan I	ND	mg/kg	0.20	0.020	EPA-8270C	ND		1
Endosulfan II	ND	mg/kg	0.20	0.021	EPA-8270C	ND		1
Endosulfan sulfate	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
Endrin	ND	mg/kg	0.20	0.025	EPA-8270C	ND		1
Endrin aldehyde	ND	mg/kg	0.50	0.022	EPA-8270C	ND		1
Fluoranthene	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
Fluorene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Heptachlor	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
Heptachlor epoxide	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
Hexachlorobenzene	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
Hexachlorobutadiene	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
Hexachlorocyclopentadiene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Hexachloroethane	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1
Indeno[1,2,3-cd]pyrene	ND	mg/kg	0.10	0.072	EPA-8270C	ND		1
Isophorone	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
2-Methylnaphthalene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Naphthalene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
2-Naphthylamine	ND	mg/kg	3.0	0.16	EPA-8270C	ND		1
2-Nitroaniline	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
3-Nitroaniline	ND	mg/kg	0.20	0.015	EPA-8270C	ND		1
4-Nitroaniline	ND	mg/kg	0.20	0.025	EPA-8270C	ND		1
Nitrobenzene	ND	mg/kg	0.10	0.015	EPA-8270C	ND		1

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

BCL Sample ID: 1115416-17 | **Client Sample Name:** B-4-5, 9/20/2011 11:00:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
N-Nitrosodimethylamine	ND	mg/kg	0.10	0.037	EPA-8270C	ND		1
N-Nitrosodi-N-propylamine	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
N-Nitrosodiphenylamine	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
Phenanthrene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Pyrene	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
1,2,4-Trichlorobenzene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
4-Chloro-3-methylphenol	ND	mg/kg	0.20	0.022	EPA-8270C	ND		1
2-Chlorophenol	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
2,4-Dichlorophenol	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
2,4-Dimethylphenol	ND	mg/kg	0.10	0.035	EPA-8270C	ND		1
4,6-Dinitro-2-methylphenol	ND	mg/kg	0.50	0.012	EPA-8270C	ND		1
2,4-Dinitrophenol	ND	mg/kg	0.50	0.0077	EPA-8270C	ND		1
2-Methylphenol	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
3- & 4-Methylphenol	ND	mg/kg	0.20	0.033	EPA-8270C	ND		1
2-Nitrophenol	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
4-Nitrophenol	ND	mg/kg	0.20	0.018	EPA-8270C	ND		1
Pentachlorophenol	ND	mg/kg	0.20	0.013	EPA-8270C	ND		1
Phenol	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
2,4,5-Trichlorophenol	ND	mg/kg	0.20	0.018	EPA-8270C	ND		1
2,4,6-Trichlorophenol	ND	mg/kg	0.20	0.017	EPA-8270C	ND		1
2-Fluorophenol (Surrogate)	103	%	28 - 144 (LCL - UCL)		EPA-8270C			1
Phenol-d5 (Surrogate)	58.0	%	36 - 136 (LCL - UCL)		EPA-8270C			1
Nitrobenzene-d5 (Surrogate)	110	%	31 - 135 (LCL - UCL)		EPA-8270C			1
2-Fluorobiphenyl (Surrogate)	81.5	%	20 - 140 (LCL - UCL)		EPA-8270C			1
2,4,6-Tribromophenol (Surrogate)	105	%	20 - 150 (LCL - UCL)		EPA-8270C			1
p-Terphenyl-d14 (Surrogate)	114	%	10 - 150 (LCL - UCL)		EPA-8270C			1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-8270C	09/28/11	10/07/11 20:50	SKC	MS-B1	0.997	BUJ0343

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Purgeable Aromatics and Total Petroleum Hydrocarbons

BCL Sample ID: 1115416-17 | **Client Sample Name:** B-4-5, 9/20/2011 11:00:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
TPH - Light Naptha	ND	mg/kg	50	20	Luft/FFP	ND		1
TPH - Aviation Gas	ND	mg/kg	50	20	Luft/FFP	ND		1
TPH - Stoddard Solvent	ND	mg/kg	20	5.0	Luft/FFP	ND		1
TPH - Heavy Naptha	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Gasoline	ND	mg/kg	20	5.0	Luft/FFP	ND		1
TPH - Jet Fuel (JP4)	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Jet Fuel (JP5)	ND	mg/kg	10	4.6	Luft/FFP	ND		1
TPH - Jet Fuel (JP8)	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Kerosene	ND	mg/kg	10	1.4	Luft/FFP	ND		1
TPH - Diesel (FFP)	ND	mg/kg	10	1.2	Luft/FFP	ND		1
TPH - Fuel Oil #6	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Crude Oil	ND	mg/kg	20	2.8	Luft/FFP	ND		1
TPH - Hydraulic Oil / Motor Oil	ND	mg/kg	20	6.5	Luft/FFP	ND		1
TPH - WD-40	ND	mg/kg	10	5.0	Luft/FFP	ND		1
Tetracosane (Surrogate)	79.8	%	20 - 145 (LCL - UCL)		Luft/FFP			1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	Luft/FFP	09/28/11	10/06/11 23:23	MWB	GC-13	1.003	BUJ0256

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Total Concentrations (TTLC)

BCL Sample ID: 1115416-17 | **Client Sample Name:** B-4-5, 9/20/2011 11:00:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Antimony	**1.2**	**mg/kg**	**5.0**	**0.50**	**EPA-6010B**	ND	**J**	1
Arsenic	**2.0**	**mg/kg**	**1.0**	**0.38**	**EPA-6010B**	ND		1
Barium	**55**	**mg/kg**	**0.50**	**0.077**	**EPA-6010B**	ND		1
Beryllium	**0.28**	**mg/kg**	**0.50**	**0.050**	**EPA-6010B**	ND	**J**	1
Cadmium	**0.11**	**mg/kg**	**0.50**	**0.050**	**EPA-6010B**	ND	**J**	1
Chromium	**7.8**	**mg/kg**	**0.50**	**0.060**	**EPA-6010B**	ND		1
Cobalt	**4.1**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	ND		1
Copper	**17**	**mg/kg**	**1.0**	**0.12**	**EPA-6010B**	ND		1
Lead	**4.9**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	ND		1
Mercury	**0.14**	**mg/kg**	**0.16**	**0.024**	**EPA-7471A**	ND	**J**	2
Molybdenum	ND	mg/kg	2.5	0.25	EPA-6010B	ND		1
Nickel	**4.7**	**mg/kg**	**0.50**	**0.058**	**EPA-6010B**	ND		1
Selenium	ND	mg/kg	1.0	0.51	EPA-6010B	ND		1
Silver	ND	mg/kg	0.50	0.050	EPA-6010B	ND		1
Thallium	ND	mg/kg	5.0	0.73	EPA-6010B	ND		1
Vanadium	**25**	**mg/kg**	**0.50**	**0.050**	**EPA-6010B**	ND		1
Zinc	**40**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	0.55		1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-6010B	09/28/11	09/29/11 07:46	ARD	PE-OP1	1	BUI1866
2	EPA-7471A	09/27/11	09/30/11 10:37	MEV	CETAC1	0.992	BUI1770

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Organochlorine Pesticides (EPA Method 8081)

BCL Sample ID: 1115416-18 | **Client Sample Name:** B-4-10, 9/20/2011 11:03:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Aldrin	ND	mg/kg	0.00050	0.000026	EPA-8081	ND		1
alpha-BHC	ND	mg/kg	0.00050	0.00014	EPA-8081	ND		1
beta-BHC	ND	mg/kg	0.00050	0.00038	EPA-8081	ND		1
delta-BHC	ND	mg/kg	0.00050	0.000076	EPA-8081	ND		1
gamma-BHC (Lindane)	ND	mg/kg	0.00050	0.00025	EPA-8081	ND		1
Chlordane (Technical)	ND	mg/kg	0.050	0.015	EPA-8081	ND		1
4,4'-DDD	ND	mg/kg	0.00050	0.000063	EPA-8081	ND		1
4,4'-DDE	ND	mg/kg	0.00050	0.000045	EPA-8081	ND		1
4,4'-DDT	ND	mg/kg	0.00050	0.000031	EPA-8081	ND		1
Dieldrin	ND	mg/kg	0.00050	0.000032	EPA-8081	ND		1
Endosulfan I	ND	mg/kg	0.00050	0.000086	EPA-8081	ND		1
Endosulfan II	ND	mg/kg	0.00050	0.000066	EPA-8081	ND		1
Endosulfan sulfate	ND	mg/kg	0.00050	0.00013	EPA-8081	ND		1
Endrin	ND	mg/kg	0.00050	0.000035	EPA-8081	ND		1
Endrin aldehyde	ND	mg/kg	0.00050	0.000061	EPA-8081	ND		1
Heptachlor	ND	mg/kg	0.00050	0.00026	EPA-8081	ND		1
Heptachlor epoxide	ND	mg/kg	0.00050	0.00015	EPA-8081	ND		1
Methoxychlor	ND	mg/kg	0.00050	0.00013	EPA-8081	ND		1
Toxaphene	ND	mg/kg	0.050	0.0074	EPA-8081	ND		1
TCMX (Surrogate)	94.6	%	20 - 143 (LCL - UCL)		EPA-8081			1
Dibutyl chlorendate (Surrogate)	94.9	%	20 - 164 (LCL - UCL)		EPA-8081			1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-8081	09/28/11	10/03/11 20:11	VH1	GC-1	0.984	BUJ0048

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1 Technology Drive, Suite F207
Irvine, CA 92618

Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

BCL Sample ID: 1115416-18 | **Client Sample Name:** B-4-10, 9/20/2011 11:03:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Acenaphthene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Acenaphthylene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Aldrin	ND	mg/kg	0.10	0.024	EPA-8270C	ND		1
Aniline	ND	mg/kg	0.20	0.053	EPA-8270C	ND		1
Anthracene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Benzidine	ND	mg/kg	3.0	0.22	EPA-8270C	ND		1
Benzo[a]anthracene	ND	mg/kg	0.10	0.012	EPA-8270C	ND		1
Benzo[b]fluoranthene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Benzo[k]fluoranthene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Benzo[a]pyrene	ND	mg/kg	0.10	0.015	EPA-8270C	ND		1
Benzo[g,h,i]perylene	ND	mg/kg	0.10	0.056	EPA-8270C	ND		1
Benzoic acid	ND	mg/kg	0.50	0.067	EPA-8270C	ND		1
Benzyl alcohol	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Benzyl butyl phthalate	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
alpha-BHC	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
beta-BHC	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
delta-BHC	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
gamma-BHC (Lindane)	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
bis(2-Chloroethoxy)methane	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
bis(2-Chloroethyl) ether	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
bis(2-Chloroisopropyl)ether	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
bis(2-Ethylhexyl)phthalate	ND	mg/kg	0.20	0.043	EPA-8270C	ND		1
4-Bromophenyl phenyl ether	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
4-Chloroaniline	ND	mg/kg	0.10	0.027	EPA-8270C	ND		1
2-Chloronaphthalene	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1
4-Chlorophenyl phenyl ether	ND	mg/kg	0.10	0.015	EPA-8270C	ND		1
Chrysene	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
4,4'-DDD	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
4,4'-DDE	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
4,4'-DDT	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Dibenzo[a,h]anthracene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Dibenzofuran	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1
1,2-Dichlorobenzene	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1

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1 Technology Drive, Suite F207
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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

BCL Sample ID: 1115416-18 | **Client Sample Name:** B-4-10, 9/20/2011 11:03:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
1,3-Dichlorobenzene	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
1,4-Dichlorobenzene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
3,3-Dichlorobenzidine	ND	mg/kg	0.20	0.0067	EPA-8270C	ND		1
Dieldrin	ND	mg/kg	0.10	0.031	EPA-8270C	ND		1
Diethyl phthalate	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Dimethyl phthalate	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1
Di-n-butyl phthalate	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
2,4-Dinitrotoluene	ND	mg/kg	0.10	0.022	EPA-8270C	ND		1
2,6-Dinitrotoluene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Di-n-octyl phthalate	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
1,2-Diphenylhydrazine	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Endosulfan I	ND	mg/kg	0.20	0.020	EPA-8270C	ND		1
Endosulfan II	ND	mg/kg	0.20	0.021	EPA-8270C	ND		1
Endosulfan sulfate	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
Endrin	ND	mg/kg	0.20	0.025	EPA-8270C	ND		1
Endrin aldehyde	ND	mg/kg	0.50	0.022	EPA-8270C	ND		1
Fluoranthene	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
Fluorene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Heptachlor	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
Heptachlor epoxide	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
Hexachlorobenzene	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
Hexachlorobutadiene	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
Hexachlorocyclopentadiene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Hexachloroethane	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1
Indeno[1,2,3-cd]pyrene	ND	mg/kg	0.10	0.072	EPA-8270C	ND		1
Isophorone	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
2-Methylnaphthalene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Naphthalene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
2-Naphthylamine	ND	mg/kg	3.0	0.16	EPA-8270C	ND		1
2-Nitroaniline	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
3-Nitroaniline	ND	mg/kg	0.20	0.015	EPA-8270C	ND		1
4-Nitroaniline	ND	mg/kg	0.20	0.025	EPA-8270C	ND		1
Nitrobenzene	ND	mg/kg	0.10	0.015	EPA-8270C	ND		1

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

BCL Sample ID: 1115416-18 | **Client Sample Name:** B-4-10, 9/20/2011 11:03:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
N-Nitrosodimethylamine	ND	mg/kg	0.10	0.037	EPA-8270C	ND		1
N-Nitrosodi-N-propylamine	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
N-Nitrosodiphenylamine	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
Phenanthrene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Pyrene	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
1,2,4-Trichlorobenzene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
4-Chloro-3-methylphenol	ND	mg/kg	0.20	0.022	EPA-8270C	ND		1
2-Chlorophenol	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
2,4-Dichlorophenol	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
2,4-Dimethylphenol	ND	mg/kg	0.10	0.035	EPA-8270C	ND		1
4,6-Dinitro-2-methylphenol	ND	mg/kg	0.50	0.012	EPA-8270C	ND		1
2,4-Dinitrophenol	ND	mg/kg	0.50	0.0077	EPA-8270C	ND		1
2-Methylphenol	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
3- & 4-Methylphenol	ND	mg/kg	0.20	0.033	EPA-8270C	ND		1
2-Nitrophenol	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
4-Nitrophenol	ND	mg/kg	0.20	0.018	EPA-8270C	ND		1
Pentachlorophenol	ND	mg/kg	0.20	0.013	EPA-8270C	ND		1
Phenol	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
2,4,5-Trichlorophenol	ND	mg/kg	0.20	0.018	EPA-8270C	ND		1
2,4,6-Trichlorophenol	ND	mg/kg	0.20	0.017	EPA-8270C	ND		1
2-Fluorophenol (Surrogate)	109	%	28 - 144 (LCL - UCL)		EPA-8270C			1
Phenol-d5 (Surrogate)	55.7	%	36 - 136 (LCL - UCL)		EPA-8270C			1
Nitrobenzene-d5 (Surrogate)	118	%	31 - 135 (LCL - UCL)		EPA-8270C			1
2-Fluorobiphenyl (Surrogate)	102	%	20 - 140 (LCL - UCL)		EPA-8270C			1
2,4,6-Tribromophenol (Surrogate)	107	%	20 - 150 (LCL - UCL)		EPA-8270C			1
p-Terphenyl-d14 (Surrogate)	136	%	10 - 150 (LCL - UCL)		EPA-8270C			1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-8270C	09/28/11	10/07/11 21:16	SKC	MS-B1	1.017	BUJ0343

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Purgeable Aromatics and Total Petroleum Hydrocarbons

BCL Sample ID: 1115416-18 | **Client Sample Name:** B-4-10, 9/20/2011 11:03:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
TPH - Light Naptha	ND	mg/kg	50	20	Luft/FFP	ND		1
TPH - Aviation Gas	ND	mg/kg	50	20	Luft/FFP	ND		1
TPH - Stoddard Solvent	ND	mg/kg	20	5.0	Luft/FFP	ND		1
TPH - Heavy Naptha	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Gasoline	ND	mg/kg	20	5.0	Luft/FFP	ND		1
TPH - Jet Fuel (JP4)	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Jet Fuel (JP5)	ND	mg/kg	10	4.6	Luft/FFP	ND		1
TPH - Jet Fuel (JP8)	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Kerosene	ND	mg/kg	10	1.4	Luft/FFP	ND		1
TPH - Diesel (FFP)	ND	mg/kg	10	1.2	Luft/FFP	ND		1
TPH - Fuel Oil #6	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Crude Oil	ND	mg/kg	20	2.8	Luft/FFP	ND		1
TPH - Hydraulic Oil / Motor Oil	ND	mg/kg	20	6.5	Luft/FFP	ND		1
TPH - WD-40	ND	mg/kg	10	5.0	Luft/FFP	ND		1
Tetracosane (Surrogate)	73.4	%	20 - 145 (LCL - UCL)		Luft/FFP			1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	Luft/FFP	09/28/11	10/06/11 23:46	MWB	GC-13	1.003	BUJ0256

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Total Concentrations (TTLC)

BCL Sample ID: 1115416-18 | **Client Sample Name:** B-4-10, 9/20/2011 11:03:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Antimony	ND	mg/kg	5.0	0.50	EPA-6010B	ND		1
Arsenic	**2.1**	**mg/kg**	**1.0**	**0.38**	**EPA-6010B**	ND		1
Barium	**39**	**mg/kg**	**0.50**	**0.077**	**EPA-6010B**	ND		1
Beryllium	**0.21**	**mg/kg**	**0.50**	**0.050**	**EPA-6010B**	ND	**J**	1
Cadmium	**0.065**	**mg/kg**	**0.50**	**0.050**	**EPA-6010B**	ND	**J**	1
Chromium	**7.4**	**mg/kg**	**0.50**	**0.060**	**EPA-6010B**	ND		1
Cobalt	**3.6**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	ND		1
Copper	**11**	**mg/kg**	**1.0**	**0.12**	**EPA-6010B**	ND		1
Lead	**3.3**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	ND		1
Mercury	**0.20**	**mg/kg**	**0.16**	**0.024**	**EPA-7471A**	ND		2
Molybdenum	**0.30**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	ND	**J**	1
Nickel	**4.0**	**mg/kg**	**0.50**	**0.058**	**EPA-6010B**	ND		1
Selenium	ND	mg/kg	1.0	0.51	EPA-6010B	ND		1
Silver	ND	mg/kg	0.50	0.050	EPA-6010B	ND		1
Thallium	ND	mg/kg	5.0	0.73	EPA-6010B	ND		1
Vanadium	**28**	**mg/kg**	**0.50**	**0.050**	**EPA-6010B**	ND		1
Zinc	**32**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	0.55		1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-6010B	09/28/11	09/29/11 07:52	ARD	PE-OP1	1	BUI1866
2	EPA-7471A	09/27/11	09/30/11 10:39	MEV	CETAC1	0.992	BUI1770

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1 Technology Drive, Suite F207
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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Organochlorine Pesticides (EPA Method 8081)

BCL Sample ID: 1115416-19 | **Client Sample Name:** B-4-15, 9/20/2011 11:07:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Aldrin	ND	mg/kg	0.00050	0.000026	EPA-8081	ND		1
alpha-BHC	ND	mg/kg	0.00050	0.00014	EPA-8081	ND		1
beta-BHC	ND	mg/kg	0.00050	0.00038	EPA-8081	ND		1
delta-BHC	ND	mg/kg	0.00050	0.000076	EPA-8081	ND		1
gamma-BHC (Lindane)	ND	mg/kg	0.00050	0.00025	EPA-8081	ND		1
Chlordane (Technical)	ND	mg/kg	0.050	0.015	EPA-8081	ND		1
4,4'-DDD	ND	mg/kg	0.00050	0.000063	EPA-8081	ND		1
4,4'-DDE	ND	mg/kg	0.00050	0.000045	EPA-8081	ND		1
4,4'-DDT	ND	mg/kg	0.00050	0.000031	EPA-8081	ND		1
Dieldrin	ND	mg/kg	0.00050	0.000032	EPA-8081	ND		1
Endosulfan I	ND	mg/kg	0.00050	0.000086	EPA-8081	ND		1
Endosulfan II	ND	mg/kg	0.00050	0.000066	EPA-8081	ND		1
Endosulfan sulfate	ND	mg/kg	0.00050	0.00013	EPA-8081	ND		1
Endrin	ND	mg/kg	0.00050	0.000035	EPA-8081	ND		1
Endrin aldehyde	ND	mg/kg	0.00050	0.000061	EPA-8081	ND		1
Heptachlor	ND	mg/kg	0.00050	0.00026	EPA-8081	ND		1
Heptachlor epoxide	ND	mg/kg	0.00050	0.00015	EPA-8081	ND		1
Methoxychlor	ND	mg/kg	0.00050	0.00013	EPA-8081	ND		1
Toxaphene	ND	mg/kg	0.050	0.0074	EPA-8081	ND		1
TCMX (Surrogate)	90.0	%	20 - 143 (LCL - UCL)		EPA-8081			1
Dibutyl chlorendate (Surrogate)	88.8	%	20 - 164 (LCL - UCL)		EPA-8081			1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-8081	09/28/11	10/03/11 20:29	VH1	GC-1	1.010	BUJ0048

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

BCL Sample ID: 1115416-19 | **Client Sample Name:** B-4-15, 9/20/2011 11:07:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Acenaphthene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Acenaphthylene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Aldrin	ND	mg/kg	0.10	0.024	EPA-8270C	ND		1
Aniline	ND	mg/kg	0.20	0.053	EPA-8270C	ND		1
Anthracene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Benzidine	ND	mg/kg	3.0	0.22	EPA-8270C	ND		1
Benzo[a]anthracene	ND	mg/kg	0.10	0.012	EPA-8270C	ND		1
Benzo[b]fluoranthene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Benzo[k]fluoranthene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Benzo[a]pyrene	ND	mg/kg	0.10	0.015	EPA-8270C	ND		1
Benzo[g,h,i]perylene	ND	mg/kg	0.10	0.056	EPA-8270C	ND		1
Benzoic acid	ND	mg/kg	0.50	0.067	EPA-8270C	ND		1
Benzyl alcohol	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Benzyl butyl phthalate	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
alpha-BHC	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
beta-BHC	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
delta-BHC	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
gamma-BHC (Lindane)	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
bis(2-Chloroethoxy)methane	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
bis(2-Chloroethyl) ether	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
bis(2-Chloroisopropyl)ether	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
bis(2-Ethylhexyl)phthalate	ND	mg/kg	0.20	0.043	EPA-8270C	ND		1
4-Bromophenyl phenyl ether	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
4-Chloroaniline	ND	mg/kg	0.10	0.027	EPA-8270C	ND		1
2-Chloronaphthalene	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1
4-Chlorophenyl phenyl ether	ND	mg/kg	0.10	0.015	EPA-8270C	ND		1
Chrysene	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
4,4'-DDD	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
4,4'-DDE	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
4,4'-DDT	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Dibenzo[a,h]anthracene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Dibenzofuran	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1
1,2-Dichlorobenzene	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1

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1 Technology Drive, Suite F207
Irvine, CA 92618

Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

BCL Sample ID: 1115416-19 | **Client Sample Name:** B-4-15, 9/20/2011 11:07:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
1,3-Dichlorobenzene	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
1,4-Dichlorobenzene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
3,3-Dichlorobenzidine	ND	mg/kg	0.20	0.0067	EPA-8270C	ND		1
Dieldrin	ND	mg/kg	0.10	0.031	EPA-8270C	ND		1
Diethyl phthalate	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Dimethyl phthalate	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1
Di-n-butyl phthalate	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
2,4-Dinitrotoluene	ND	mg/kg	0.10	0.022	EPA-8270C	ND		1
2,6-Dinitrotoluene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Di-n-octyl phthalate	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
1,2-Diphenylhydrazine	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Endosulfan I	ND	mg/kg	0.20	0.020	EPA-8270C	ND		1
Endosulfan II	ND	mg/kg	0.20	0.021	EPA-8270C	ND		1
Endosulfan sulfate	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
Endrin	ND	mg/kg	0.20	0.025	EPA-8270C	ND		1
Endrin aldehyde	ND	mg/kg	0.50	0.022	EPA-8270C	ND		1
Fluoranthene	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
Fluorene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Heptachlor	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
Heptachlor epoxide	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
Hexachlorobenzene	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
Hexachlorobutadiene	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
Hexachlorocyclopentadiene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Hexachloroethane	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1
Indeno[1,2,3-cd]pyrene	ND	mg/kg	0.10	0.072	EPA-8270C	ND		1
Isophorone	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
2-Methylnaphthalene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Naphthalene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
2-Naphthylamine	ND	mg/kg	3.0	0.16	EPA-8270C	ND		1
2-Nitroaniline	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
3-Nitroaniline	ND	mg/kg	0.20	0.015	EPA-8270C	ND		1
4-Nitroaniline	ND	mg/kg	0.20	0.025	EPA-8270C	ND		1
Nitrobenzene	ND	mg/kg	0.10	0.015	EPA-8270C	ND		1

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

BCL Sample ID: 1115416-19 | **Client Sample Name:** B-4-15, 9/20/2011 11:07:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
N-Nitrosodimethylamine	ND	mg/kg	0.10	0.037	EPA-8270C	ND		1
N-Nitrosodi-N-propylamine	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
N-Nitrosodiphenylamine	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
Phenanthrene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Pyrene	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
1,2,4-Trichlorobenzene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
4-Chloro-3-methylphenol	ND	mg/kg	0.20	0.022	EPA-8270C	ND		1
2-Chlorophenol	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
2,4-Dichlorophenol	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
2,4-Dimethylphenol	ND	mg/kg	0.10	0.035	EPA-8270C	ND		1
4,6-Dinitro-2-methylphenol	ND	mg/kg	0.50	0.012	EPA-8270C	ND		1
2,4-Dinitrophenol	ND	mg/kg	0.50	0.0077	EPA-8270C	ND		1
2-Methylphenol	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
3- & 4-Methylphenol	ND	mg/kg	0.20	0.033	EPA-8270C	ND		1
2-Nitrophenol	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
4-Nitrophenol	ND	mg/kg	0.20	0.018	EPA-8270C	ND		1
Pentachlorophenol	ND	mg/kg	0.20	0.013	EPA-8270C	ND		1
Phenol	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
2,4,5-Trichlorophenol	ND	mg/kg	0.20	0.018	EPA-8270C	ND		1
2,4,6-Trichlorophenol	ND	mg/kg	0.20	0.017	EPA-8270C	ND		1
2-Fluorophenol (Surrogate)	111	%	28 - 144 (LCL - UCL)		EPA-8270C			1
Phenol-d5 (Surrogate)	56.5	%	36 - 136 (LCL - UCL)		EPA-8270C			1
Nitrobenzene-d5 (Surrogate)	120	%	31 - 135 (LCL - UCL)		EPA-8270C			1
2-Fluorobiphenyl (Surrogate)	92.6	%	20 - 140 (LCL - UCL)		EPA-8270C			1
2,4,6-Tribromophenol (Surrogate)	107	%	20 - 150 (LCL - UCL)		EPA-8270C			1
p-Terphenyl-d14 (Surrogate)	132	%	10 - 150 (LCL - UCL)		EPA-8270C			1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-8270C	09/28/11	10/07/11 21:42	SKC	MS-B1	1.010	BUJ0343

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Purgeable Aromatics and Total Petroleum Hydrocarbons

BCL Sample ID: 1115416-19 | **Client Sample Name:** B-4-15, 9/20/2011 11:07:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
TPH - Light Naptha	ND	mg/kg	50	20	Luft/FFP	ND		1
TPH - Aviation Gas	ND	mg/kg	50	20	Luft/FFP	ND		1
TPH - Stoddard Solvent	ND	mg/kg	20	5.0	Luft/FFP	ND		1
TPH - Heavy Naptha	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Gasoline	ND	mg/kg	20	5.0	Luft/FFP	ND		1
TPH - Jet Fuel (JP4)	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Jet Fuel (JP5)	ND	mg/kg	10	4.6	Luft/FFP	ND		1
TPH - Jet Fuel (JP8)	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Kerosene	ND	mg/kg	10	1.4	Luft/FFP	ND		1
TPH - Diesel (FFP)	ND	mg/kg	10	1.2	Luft/FFP	ND		1
TPH - Fuel Oil #6	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Crude Oil	ND	mg/kg	20	2.8	Luft/FFP	ND		1
TPH - Hydraulic Oil / Motor Oil	**12**	**mg/kg**	**20**	**6.5**	**Luft/FFP**	ND	**J**	1
TPH - WD-40	ND	mg/kg	10	5.0	Luft/FFP	ND		1
Tetracosane (Surrogate)	77.4	%	20 - 145 (LCL - UCL)		Luft/FFP			1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	Luft/FFP	09/28/11	10/07/11 00:09	MWB	GC-13	1.007	BUJ0256

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Total Concentrations (TTLC)

BCL Sample ID: 1115416-19 | **Client Sample Name:** B-4-15, 9/20/2011 11:07:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Antimony	**0.81**	**mg/kg**	**5.0**	**0.50**	**EPA-6010B**	ND	**J**	1
Arsenic	**2.3**	**mg/kg**	**1.0**	**0.38**	**EPA-6010B**	ND		1
Barium	**40**	**mg/kg**	**0.50**	**0.077**	**EPA-6010B**	ND		1
Beryllium	**0.22**	**mg/kg**	**0.50**	**0.050**	**EPA-6010B**	ND	**J**	1
Cadmium	**0.062**	**mg/kg**	**0.50**	**0.050**	**EPA-6010B**	ND	**J**	1
Chromium	**10**	**mg/kg**	**0.50**	**0.060**	**EPA-6010B**	ND		1
Cobalt	**2.9**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	ND		1
Copper	**8.6**	**mg/kg**	**1.0**	**0.12**	**EPA-6010B**	ND		1
Lead	**3.0**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	ND		1
Mercury	**0.14**	**mg/kg**	**0.16**	**0.024**	**EPA-7471A**	ND	**J**	2
Molybdenum	ND	mg/kg	2.5	0.25	EPA-6010B	ND		1
Nickel	**2.7**	**mg/kg**	**0.50**	**0.058**	**EPA-6010B**	ND		1
Selenium	ND	mg/kg	1.0	0.51	EPA-6010B	ND		1
Silver	ND	mg/kg	0.50	0.050	EPA-6010B	ND		1
Thallium	ND	mg/kg	5.0	0.73	EPA-6010B	ND		1
Vanadium	**25**	**mg/kg**	**0.50**	**0.050**	**EPA-6010B**	ND		1
Zinc	**28**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	0.55		1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-6010B	09/28/11	09/29/11 07:54	ARD	PE-OP1	1	BUI1866
2	EPA-7471A	09/27/11	09/30/11 10:41	MEV	CETAC1	0.977	BUI1770

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Organochlorine Pesticides (EPA Method 8081)

BCL Sample ID: 1115416-20 | **Client Sample Name:** B-4-20, 9/20/2011 11:15:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Aldrin	ND	mg/kg	0.00088	0.000046	EPA-8081	ND		1
alpha-BHC	ND	mg/kg	0.00088	0.00025	EPA-8081	ND		1
beta-BHC	ND	mg/kg	0.00088	0.00067	EPA-8081	ND		1
delta-BHC	ND	mg/kg	0.00088	0.00013	EPA-8081	ND		1
gamma-BHC (Lindane)	ND	mg/kg	0.00088	0.00044	EPA-8081	ND		1
Chlordane (Technical)	ND	mg/kg	0.088	0.026	EPA-8081	ND		1
4,4'-DDD	ND	mg/kg	0.00088	0.00011	EPA-8081	ND		1
4,4'-DDE	ND	mg/kg	0.00088	0.000079	EPA-8081	ND		1
4,4'-DDT	ND	mg/kg	0.00088	0.000055	EPA-8081	ND		1
Dieldrin	ND	mg/kg	0.00088	0.000056	EPA-8081	ND		1
Endosulfan I	ND	mg/kg	0.00088	0.00015	EPA-8081	ND		1
Endosulfan II	ND	mg/kg	0.00088	0.00012	EPA-8081	ND		1
Endosulfan sulfate	ND	mg/kg	0.00088	0.00023	EPA-8081	ND		1
Endrin	ND	mg/kg	0.00088	0.000062	EPA-8081	ND		1
Endrin aldehyde	ND	mg/kg	0.00088	0.00011	EPA-8081	ND		1
Heptachlor	ND	mg/kg	0.00088	0.00046	EPA-8081	ND		1
Heptachlor epoxide	ND	mg/kg	0.00088	0.00026	EPA-8081	ND		1
Methoxychlor	ND	mg/kg	0.00088	0.00023	EPA-8081	ND		1
Toxaphene	ND	mg/kg	0.088	0.013	EPA-8081	ND		1
TCMX (Surrogate)	95.4	%	20 - 143 (LCL - UCL)		EPA-8081			1
Dibutyl chlorendate (Surrogate)	84.5	%	20 - 164 (LCL - UCL)		EPA-8081			1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-8081	09/28/11	10/03/11 20:48	VH1	GC-1	1.765	BUJ0048

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

PCB Analysis (EPA Method 8082)

BCL Sample ID: 1115416-20 | **Client Sample Name:** B-4-20, 9/20/2011 11:15:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
PCB-1016	ND	mg/kg	0.017	0.0046	EPA-8082	ND		1
PCB-1221	ND	mg/kg	0.017	0.0084	EPA-8082	ND		1
PCB-1232	ND	mg/kg	0.017	0.0020	EPA-8082	ND		1
PCB-1242	ND	mg/kg	0.017	0.0027	EPA-8082	ND		1
PCB-1248	ND	mg/kg	0.017	0.0020	EPA-8082	ND		1
PCB-1254	ND	mg/kg	0.017	0.0013	EPA-8082	ND		1
PCB-1260	ND	mg/kg	0.017	0.0037	EPA-8082	ND		1
Total PCB's (Summation)	ND	mg/kg	0.017	0.0084	EPA-8082	ND		1
Decachlorobiphenyl (Surrogate)	100	%	20 - 150 (LCL - UCL)		EPA-8082			1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-8082	09/28/11	10/03/11 14:17	VH1	GC-14	1.685	BUJ0046

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Volatile Organic Analysis (EPA Method 8260)

BCL Sample ID: 1115416-20 | **Client Sample Name:** B-4-20, 9/20/2011 11:15:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Benzene	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
Bromobenzene	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
Bromochloromethane	ND	mg/kg	0.0050	0.00092	EPA-8260	ND		1
Bromodichloromethane	ND	mg/kg	0.0050	0.00084	EPA-8260	ND		1
Bromoform	ND	mg/kg	0.0050	0.0015	EPA-8260	ND		1
Bromomethane	ND	mg/kg	0.0050	0.0016	EPA-8260	ND		1
n-Butylbenzene	ND	mg/kg	0.0050	0.0015	EPA-8260	ND		1
sec-Butylbenzene	ND	mg/kg	0.0050	0.0012	EPA-8260	ND		1
tert-Butylbenzene	ND	mg/kg	0.0050	0.0012	EPA-8260	ND		1
Carbon tetrachloride	ND	mg/kg	0.0050	0.0011	EPA-8260	ND		1
Chlorobenzene	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
Chloroethane	ND	mg/kg	0.0050	0.0014	EPA-8260	ND		1
Chloroform	ND	mg/kg	0.0050	0.00063	EPA-8260	ND		1
Chloromethane	ND	mg/kg	0.0050	0.0014	EPA-8260	ND		1
2-Chlorotoluene	ND	mg/kg	0.0050	0.0018	EPA-8260	ND		1
4-Chlorotoluene	ND	mg/kg	0.0050	0.0014	EPA-8260	ND		1
Dibromochloromethane	ND	mg/kg	0.0050	0.00099	EPA-8260	ND		1
1,2-Dibromo-3-chloropropane	ND	mg/kg	0.0050	0.0017	EPA-8260	ND		1
1,2-Dibromoethane	ND	mg/kg	0.0050	0.0010	EPA-8260	ND		1
Dibromomethane	ND	mg/kg	0.0050	0.0018	EPA-8260	ND		1
1,2-Dichlorobenzene	ND	mg/kg	0.0050	0.00081	EPA-8260	ND		1
1,3-Dichlorobenzene	ND	mg/kg	0.0050	0.0014	EPA-8260	ND		1
1,4-Dichlorobenzene	ND	mg/kg	0.0050	0.0015	EPA-8260	ND		1
Dichlorodifluoromethane	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
1,1-Dichloroethane	ND	mg/kg	0.0050	0.0014	EPA-8260	ND		1
1,2-Dichloroethane	ND	mg/kg	0.0050	0.00085	EPA-8260	ND		1
1,1-Dichloroethene	ND	mg/kg	0.0050	0.0012	EPA-8260	ND		1
cis-1,2-Dichloroethene	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
trans-1,2-Dichloroethene	ND	mg/kg	0.0050	0.0014	EPA-8260	ND		1
1,2-Dichloropropane	ND	mg/kg	0.0050	0.00081	EPA-8260	ND		1
1,3-Dichloropropane	ND	mg/kg	0.0050	0.0011	EPA-8260	ND		1
2,2-Dichloropropane	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
1,1-Dichloropropene	ND	mg/kg	0.0050	0.0012	EPA-8260	ND		1

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Volatile Organic Analysis (EPA Method 8260)

BCL Sample ID: 1115416-20 | **Client Sample Name:** B-4-20, 9/20/2011 11:15:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
cis-1,3-Dichloropropene	ND	mg/kg	0.0050	0.0011	EPA-8260	ND		1
trans-1,3-Dichloropropene	ND	mg/kg	0.0050	0.0012	EPA-8260	ND		1
Ethylbenzene	ND	mg/kg	0.0050	0.0015	EPA-8260	ND		1
Hexachlorobutadiene	ND	mg/kg	0.0050	0.0017	EPA-8260	ND		1
Isopropylbenzene	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
p-Isopropyltoluene	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
Methylene chloride	ND	mg/kg	0.010	0.0024	EPA-8260	ND		1
Methyl t-butyl ether	ND	mg/kg	0.0050	0.00050	EPA-8260	ND		1
Naphthalene	ND	mg/kg	0.0050	0.0014	EPA-8260	ND		1
n-Propylbenzene	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
Styrene	ND	mg/kg	0.0050	0.0014	EPA-8260	ND		1
1,1,1,2-Tetrachloroethane	ND	mg/kg	0.0050	0.0011	EPA-8260	ND		1
1,1,2,2-Tetrachloroethane	ND	mg/kg	0.0050	0.0011	EPA-8260	ND		1
Tetrachloroethene	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
Toluene	ND	mg/kg	0.0050	0.0012	EPA-8260	ND		1
1,2,3-Trichlorobenzene	ND	mg/kg	0.0050	0.0021	EPA-8260	ND		1
1,2,4-Trichlorobenzene	ND	mg/kg	0.0050	0.0020	EPA-8260	ND		1
1,1,1-Trichloroethane	ND	mg/kg	0.0050	0.0011	EPA-8260	ND		1
1,1,2-Trichloroethane	ND	mg/kg	0.0050	0.00077	EPA-8260	ND		1
Trichloroethene	ND	mg/kg	0.0050	0.0011	EPA-8260	ND		1
Trichlorofluoromethane	ND	mg/kg	0.0050	0.0011	EPA-8260	ND		1
1,2,3-Trichloropropane	ND	mg/kg	0.0050	0.0016	EPA-8260	ND		1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
1,2,4-Trimethylbenzene	ND	mg/kg	0.0050	0.0013	EPA-8260	ND		1
1,3,5-Trimethylbenzene	ND	mg/kg	0.0050	0.0015	EPA-8260	ND		1
Vinyl chloride	ND	mg/kg	0.0050	0.0016	EPA-8260	ND		1
Total Xylenes	ND	mg/kg	0.010	0.0034	EPA-8260	ND		1
p- & m-Xylenes	ND	mg/kg	0.0050	0.0022	EPA-8260	ND		1
o-Xylene	ND	mg/kg	0.0050	0.0012	EPA-8260	ND		1
1,2-Dichloroethane-d4 (Surrogate)	104	%	70 - 121 (LCL - UCL)		EPA-8260			1
Toluene-d8 (Surrogate)	99.4	%	81 - 117 (LCL - UCL)		EPA-8260			1
4-Bromofluorobenzene (Surrogate)	97.7	%	74 - 121 (LCL - UCL)		EPA-8260			1

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Volatile Organic Analysis (EPA Method 8260)

BCL Sample ID: 1115416-20 | **Client Sample Name:** B-4-20, 9/20/2011 11:15:00AM

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-8260	09/26/11	09/27/11 09:38	ADC	MS-V3	1	BUI1646

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

BCL Sample ID: 1115416-20 | **Client Sample Name:** B-4-20, 9/20/2011 11:15:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Acenaphthene	ND	mg/kg	0.18	0.032	EPA-8270C	ND	A11	1
Acenaphthylene	ND	mg/kg	0.18	0.034	EPA-8270C	ND	A11	1
Aldrin	ND	mg/kg	0.18	0.042	EPA-8270C	ND	A11	1
Aniline	ND	mg/kg	0.35	0.094	EPA-8270C	ND	A11	1
Anthracene	ND	mg/kg	0.18	0.032	EPA-8270C	ND	A11	1
Benzidine	ND	mg/kg	5.3	0.39	EPA-8270C	ND	A11	1
Benzo[a]anthracene	ND	mg/kg	0.18	0.021	EPA-8270C	ND	A11	1
Benzo[b]fluoranthene	ND	mg/kg	0.18	0.032	EPA-8270C	ND	A11	1
Benzo[k]fluoranthene	ND	mg/kg	0.18	0.034	EPA-8270C	ND	A11	1
Benzo[a]pyrene	ND	mg/kg	0.18	0.026	EPA-8270C	ND	A11	1
Benzo[g,h,i]perylene	ND	mg/kg	0.18	0.099	EPA-8270C	ND	A11	1
Benzoic acid	ND	mg/kg	0.88	0.12	EPA-8270C	ND	A11	1
Benzyl alcohol	ND	mg/kg	0.18	0.032	EPA-8270C	ND	A11	1
Benzyl butyl phthalate	ND	mg/kg	0.18	0.037	EPA-8270C	ND	A11	1
alpha-BHC	ND	mg/kg	0.18	0.032	EPA-8270C	ND	A11	1
beta-BHC	ND	mg/kg	0.18	0.037	EPA-8270C	ND	A11	1
delta-BHC	ND	mg/kg	0.18	0.032	EPA-8270C	ND	A11	1
gamma-BHC (Lindane)	ND	mg/kg	0.18	0.030	EPA-8270C	ND	A11	1
bis(2-Chloroethoxy)methane	ND	mg/kg	0.18	0.030	EPA-8270C	ND	A11	1
bis(2-Chloroethyl) ether	ND	mg/kg	0.18	0.028	EPA-8270C	ND	A11	1
bis(2-Chloroisopropyl)ether	ND	mg/kg	0.18	0.037	EPA-8270C	ND	A11	1
bis(2-Ethylhexyl)phthalate	**0.13**	**mg/kg**	**0.35**	**0.076**	**EPA-8270C**	ND	**J,A11**	1
4-Bromophenyl phenyl ether	ND	mg/kg	0.18	0.030	EPA-8270C	ND	A11	1
4-Chloroaniline	ND	mg/kg	0.18	0.048	EPA-8270C	ND	A11	1
2-Chloronaphthalene	ND	mg/kg	0.18	0.035	EPA-8270C	ND	A11	1
4-Chlorophenyl phenyl ether	ND	mg/kg	0.18	0.026	EPA-8270C	ND	A11	1
Chrysene	ND	mg/kg	0.18	0.030	EPA-8270C	ND	A11	1
4,4'-DDD	ND	mg/kg	0.18	0.030	EPA-8270C	ND	A11	1
4,4'-DDE	ND	mg/kg	0.18	0.030	EPA-8270C	ND	A11	1
4,4'-DDT	ND	mg/kg	0.18	0.034	EPA-8270C	ND	A11	1
Dibenzo[a,h]anthracene	ND	mg/kg	0.18	0.034	EPA-8270C	ND	A11	1
Dibenzofuran	ND	mg/kg	0.18	0.035	EPA-8270C	ND	A11	1
1,2-Dichlorobenzene	ND	mg/kg	0.18	0.035	EPA-8270C	ND	A11	1

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

BCL Sample ID: 1115416-20 | **Client Sample Name:** B-4-20, 9/20/2011 11:15:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
1,3-Dichlorobenzene	ND	mg/kg	0.18	0.037	EPA-8270C	ND	A11	1
1,4-Dichlorobenzene	ND	mg/kg	0.18	0.034	EPA-8270C	ND	A11	1
3,3-Dichlorobenzidine	ND	mg/kg	0.35	0.012	EPA-8270C	ND	A11	1
Dieldrin	ND	mg/kg	0.18	0.055	EPA-8270C	ND	A11	1
Diethyl phthalate	ND	mg/kg	0.18	0.034	EPA-8270C	ND	A11	1
Dimethyl phthalate	ND	mg/kg	0.18	0.035	EPA-8270C	ND	A11	1
Di-n-butyl phthalate	ND	mg/kg	0.18	0.032	EPA-8270C	ND	A11	1
2,4-Dinitrotoluene	ND	mg/kg	0.18	0.039	EPA-8270C	ND	A11	1
2,6-Dinitrotoluene	ND	mg/kg	0.18	0.032	EPA-8270C	ND	A11	1
Di-n-octyl phthalate	ND	mg/kg	0.18	0.030	EPA-8270C	ND	A11	1
1,2-Diphenylhydrazine	ND	mg/kg	0.18	0.034	EPA-8270C	ND	A11	1
Endosulfan I	ND	mg/kg	0.35	0.035	EPA-8270C	ND	A11	1
Endosulfan II	ND	mg/kg	0.35	0.037	EPA-8270C	ND	A11	1
Endosulfan sulfate	ND	mg/kg	0.18	0.037	EPA-8270C	ND	A11	1
Endrin	ND	mg/kg	0.35	0.044	EPA-8270C	ND	A11	1
Endrin aldehyde	ND	mg/kg	0.88	0.039	EPA-8270C	ND	A11	1
Fluoranthene	ND	mg/kg	0.18	0.030	EPA-8270C	ND	A11	1
Fluorene	ND	mg/kg	0.18	0.034	EPA-8270C	ND	A11	1
Heptachlor	ND	mg/kg	0.18	0.037	EPA-8270C	ND	A11	1
Heptachlor epoxide	ND	mg/kg	0.18	0.030	EPA-8270C	ND	A11	1
Hexachlorobenzene	ND	mg/kg	0.18	0.028	EPA-8270C	ND	A11	1
Hexachlorobutadiene	ND	mg/kg	0.18	0.030	EPA-8270C	ND	A11	1
Hexachlorocyclopentadiene	ND	mg/kg	0.18	0.034	EPA-8270C	ND	A11	1
Hexachloroethane	ND	mg/kg	0.18	0.035	EPA-8270C	ND	A11	1
Indeno[1,2,3-cd]pyrene	ND	mg/kg	0.18	0.13	EPA-8270C	ND	A11	1
Isophorone	ND	mg/kg	0.18	0.030	EPA-8270C	ND	A11	1
2-Methylnaphthalene	ND	mg/kg	0.18	0.032	EPA-8270C	ND	A11	1
Naphthalene	ND	mg/kg	0.18	0.032	EPA-8270C	ND	A11	1
2-Naphthylamine	ND	mg/kg	5.3	0.28	EPA-8270C	ND	A11	1
2-Nitroaniline	ND	mg/kg	0.18	0.032	EPA-8270C	ND	A11	1
3-Nitroaniline	ND	mg/kg	0.35	0.026	EPA-8270C	ND	A11	1
4-Nitroaniline	ND	mg/kg	0.35	0.044	EPA-8270C	ND	A11	1
Nitrobenzene	ND	mg/kg	0.18	0.026	EPA-8270C	ND	A11	1

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1 Technology Drive, Suite F207
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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

BCL Sample ID: 1115416-20 | **Client Sample Name:** B-4-20, 9/20/2011 11:15:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
N-Nitrosodimethylamine	ND	mg/kg	0.18	0.065	EPA-8270C	ND	A11	1
N-Nitrosodi-N-propylamine	ND	mg/kg	0.18	0.037	EPA-8270C	ND	A11	1
N-Nitrosodiphenylamine	ND	mg/kg	0.18	0.037	EPA-8270C	ND	A11	1
Phenanthrene	ND	mg/kg	0.18	0.032	EPA-8270C	ND	A11	1
Pyrene	ND	mg/kg	0.18	0.030	EPA-8270C	ND	A11	1
1,2,4-Trichlorobenzene	ND	mg/kg	0.18	0.032	EPA-8270C	ND	A11	1
4-Chloro-3-methylphenol	ND	mg/kg	0.35	0.039	EPA-8270C	ND	A11	1
2-Chlorophenol	ND	mg/kg	0.18	0.028	EPA-8270C	ND	A11	1
2,4-Dichlorophenol	ND	mg/kg	0.18	0.030	EPA-8270C	ND	A11	1
2,4-Dimethylphenol	ND	mg/kg	0.18	0.062	EPA-8270C	ND	A11	1
4,6-Dinitro-2-methylphenol	ND	mg/kg	0.88	0.021	EPA-8270C	ND	A11	1
2,4-Dinitrophenol	ND	mg/kg	0.88	0.014	EPA-8270C	ND	A11	1
2-Methylphenol	ND	mg/kg	0.18	0.030	EPA-8270C	ND	A11	1
3- & 4-Methylphenol	ND	mg/kg	0.35	0.058	EPA-8270C	ND	A11	1
2-Nitrophenol	ND	mg/kg	0.18	0.028	EPA-8270C	ND	A11	1
4-Nitrophenol	ND	mg/kg	0.35	0.032	EPA-8270C	ND	A11	1
Pentachlorophenol	ND	mg/kg	0.35	0.023	EPA-8270C	ND	A11	1
Phenol	ND	mg/kg	0.18	0.028	EPA-8270C	ND	A11	1
2,4,5-Trichlorophenol	ND	mg/kg	0.35	0.032	EPA-8270C	ND	A11	1
2,4,6-Trichlorophenol	ND	mg/kg	0.35	0.030	EPA-8270C	ND	A11	1
2-Fluorophenol (Surrogate)	120	%	28 - 144 (LCL - UCL)		EPA-8270C		A11	1
Phenol-d5 (Surrogate)	58.5	%	36 - 136 (LCL - UCL)		EPA-8270C		A11	1
Nitrobenzene-d5 (Surrogate)	119	%	31 - 135 (LCL - UCL)		EPA-8270C		A11	1
2-Fluorobiphenyl (Surrogate)	92.4	%	20 - 140 (LCL - UCL)		EPA-8270C		A11	1
2,4,6-Tribromophenol (Surrogate)	114	%	20 - 150 (LCL - UCL)		EPA-8270C		A11	1
p-Terphenyl-d14 (Surrogate)	112	%	10 - 150 (LCL - UCL)		EPA-8270C		A11	1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-8270C	09/28/11	10/07/11 22:07	SKC	MS-B1	1.765	BUJ0343

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Purgeable Aromatics and Total Petroleum Hydrocarbons

BCL Sample ID: 1115416-20 | **Client Sample Name:** B-4-20, 9/20/2011 11:15:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
TPH - Light Naptha	ND	mg/kg	88	35	Luft/FFP	ND		1
TPH - Aviation Gas	ND	mg/kg	88	35	Luft/FFP	ND		1
TPH - Stoddard Solvent	ND	mg/kg	35	8.8	Luft/FFP	ND		1
TPH - Heavy Naptha	ND	mg/kg	18	8.8	Luft/FFP	ND		1
TPH - Gasoline	ND	mg/kg	35	8.8	Luft/FFP	ND		1
TPH - Jet Fuel (JP4)	ND	mg/kg	18	8.8	Luft/FFP	ND		1
TPH - Jet Fuel (JP5)	ND	mg/kg	18	8.1	Luft/FFP	ND		1
TPH - Jet Fuel (JP8)	ND	mg/kg	18	8.8	Luft/FFP	ND		1
TPH - Kerosene	ND	mg/kg	18	2.5	Luft/FFP	ND		1
TPH - Diesel (FFP)	**20**	**mg/kg**	**18**	**2.1**	**Luft/FFP**	ND	**A52**	1
TPH - Fuel Oil #6	ND	mg/kg	18	8.8	Luft/FFP	ND		1
TPH - Crude Oil	ND	mg/kg	35	4.9	Luft/FFP	ND		1
TPH - Hydraulic Oil / Motor Oil	**39**	**mg/kg**	**35**	**11**	**Luft/FFP**	ND		1
TPH - WD-40	ND	mg/kg	18	8.8	Luft/FFP	ND		1
Tetracosane (Surrogate)	70.2	%	20 - 145 (LCL - UCL)		Luft/FFP			1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	Luft/FFP	09/28/11	10/07/11 00:33	MWB	GC-13	1.765	BUJ0256

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Total Concentrations (TTLC)

BCL Sample ID: 1115416-20 | **Client Sample Name:** B-4-20, 9/20/2011 11:15:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Antimony	**0.88**	**mg/kg**	**5.0**	**0.50**	**EPA-6010B**	ND	**J**	1
Arsenic	**1.8**	**mg/kg**	**1.0**	**0.38**	**EPA-6010B**	ND		1
Barium	**41**	**mg/kg**	**0.50**	**0.077**	**EPA-6010B**	ND		1
Beryllium	**0.26**	**mg/kg**	**0.50**	**0.050**	**EPA-6010B**	ND	**J**	1
Cadmium	**0.066**	**mg/kg**	**0.50**	**0.050**	**EPA-6010B**	ND	**J**	1
Chromium	**11**	**mg/kg**	**0.50**	**0.060**	**EPA-6010B**	ND		1
Cobalt	**3.4**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	ND		1
Copper	**18**	**mg/kg**	**1.0**	**0.12**	**EPA-6010B**	ND		1
Lead	**3.4**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	ND		1
Mercury	**0.23**	**mg/kg**	**0.16**	**0.024**	**EPA-7471A**	ND		2
Molybdenum	**1.1**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	ND	**J**	1
Nickel	**3.9**	**mg/kg**	**0.50**	**0.058**	**EPA-6010B**	ND		1
Selenium	ND	mg/kg	1.0	0.51	EPA-6010B	ND		1
Silver	**0.069**	**mg/kg**	**0.50**	**0.050**	**EPA-6010B**	ND	**J**	1
Thallium	ND	mg/kg	5.0	0.73	EPA-6010B	ND		1
Vanadium	**23**	**mg/kg**	**0.50**	**0.050**	**EPA-6010B**	ND		1
Zinc	**39**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	0.55		1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-6010B	09/28/11	09/29/11 07:55	ARD	PE-OP1	1	BUI1866
2	EPA-7471A	09/27/11	09/30/11 10:43	MEV	CETAC1	0.962	BUI1770

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Organochlorine Pesticides (EPA Method 8081)

BCL Sample ID: 1115416-21 | **Client Sample Name:** B-4-25, 9/20/2011 11:40:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Aldrin	ND	mg/kg	0.00096	0.000050	EPA-8081	ND		1
alpha-BHC	ND	mg/kg	0.00096	0.00027	EPA-8081	ND		1
beta-BHC	ND	mg/kg	0.00096	0.00073	EPA-8081	ND		1
delta-BHC	ND	mg/kg	0.00096	0.00015	EPA-8081	ND		1
gamma-BHC (Lindane)	ND	mg/kg	0.00096	0.00048	EPA-8081	ND		1
Chlordane (Technical)	ND	mg/kg	0.096	0.029	EPA-8081	ND		1
4,4'-DDD	ND	mg/kg	0.00096	0.00012	EPA-8081	ND		1
4,4'-DDE	ND	mg/kg	0.00096	0.000086	EPA-8081	ND		1
4,4'-DDT	ND	mg/kg	0.00096	0.000059	EPA-8081	ND		1
Dieldrin	ND	mg/kg	0.00096	0.000061	EPA-8081	ND		1
Endosulfan I	ND	mg/kg	0.00096	0.00016	EPA-8081	ND		1
Endosulfan II	ND	mg/kg	0.00096	0.00013	EPA-8081	ND		1
Endosulfan sulfate	ND	mg/kg	0.00096	0.00025	EPA-8081	ND		1
Endrin	ND	mg/kg	0.00096	0.000067	EPA-8081	ND		1
Endrin aldehyde	ND	mg/kg	0.00096	0.00012	EPA-8081	ND		1
Heptachlor	ND	mg/kg	0.00096	0.00050	EPA-8081	ND		1
Heptachlor epoxide	ND	mg/kg	0.00096	0.00029	EPA-8081	ND		1
Methoxychlor	ND	mg/kg	0.00096	0.00025	EPA-8081	ND		1
Toxaphene	ND	mg/kg	0.096	0.014	EPA-8081	ND		1
TCMX (Surrogate)	78.9	%	20 - 143 (LCL - UCL)		EPA-8081			1
Dibutyl chlorendate (Surrogate)	78.5	%	20 - 164 (LCL - UCL)		EPA-8081			1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-8081	09/28/11	10/03/11 22:19	VH1	GC-1	1.911	BUJ0049

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Gannett Fleming, Inc
1 Technology Drive, Suite F207
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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

BCL Sample ID: 1115416-21 | **Client Sample Name:** B-4-25, 9/20/2011 11:40:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Acenaphthene	ND	mg/kg	0.19	0.035	EPA-8270C	ND	A11	1
Acenaphthylene	ND	mg/kg	0.19	0.037	EPA-8270C	ND	A11	1
Aldrin	ND	mg/kg	0.19	0.046	EPA-8270C	ND	A11	1
Aniline	ND	mg/kg	0.39	0.10	EPA-8270C	ND	A11	1
Anthracene	ND	mg/kg	0.19	0.035	EPA-8270C	ND	A11	1
Benzidine	ND	mg/kg	5.8	0.42	EPA-8270C	ND	A11	1
Benzo[a]anthracene	ND	mg/kg	0.19	0.023	EPA-8270C	ND	A11	1
Benzo[b]fluoranthene	ND	mg/kg	0.19	0.035	EPA-8270C	ND	A11	1
Benzo[k]fluoranthene	ND	mg/kg	0.19	0.037	EPA-8270C	ND	A11	1
Benzo[a]pyrene	ND	mg/kg	0.19	0.029	EPA-8270C	ND	A11	1
Benzo[g,h,i]perylene	ND	mg/kg	0.19	0.11	EPA-8270C	ND	A11	1
Benzoic acid	ND	mg/kg	0.96	0.13	EPA-8270C	ND	A11	1
Benzyl alcohol	ND	mg/kg	0.19	0.035	EPA-8270C	ND	A11	1
Benzyl butyl phthalate	ND	mg/kg	0.19	0.040	EPA-8270C	ND	A11	1
alpha-BHC	ND	mg/kg	0.19	0.035	EPA-8270C	ND	A11	1
beta-BHC	ND	mg/kg	0.19	0.040	EPA-8270C	ND	A11	1
delta-BHC	ND	mg/kg	0.19	0.035	EPA-8270C	ND	A11	1
gamma-BHC (Lindane)	ND	mg/kg	0.19	0.033	EPA-8270C	ND	A11	1
bis(2-Chloroethoxy)methane	ND	mg/kg	0.19	0.033	EPA-8270C	ND	A11	1
bis(2-Chloroethyl) ether	ND	mg/kg	0.19	0.031	EPA-8270C	ND	A11	1
bis(2-Chloroisopropyl)ether	ND	mg/kg	0.19	0.040	EPA-8270C	ND	A11	1
bis(2-Ethylhexyl)phthalate	**0.13**	**mg/kg**	**0.39**	**0.083**	**EPA-8270C**	0.10	**J,A11,M03**	1
4-Bromophenyl phenyl ether	ND	mg/kg	0.19	0.033	EPA-8270C	ND	A11	1
4-Chloroaniline	ND	mg/kg	0.19	0.052	EPA-8270C	ND	A11	1
2-Chloronaphthalene	ND	mg/kg	0.19	0.039	EPA-8270C	ND	A11	1
4-Chlorophenyl phenyl ether	ND	mg/kg	0.19	0.029	EPA-8270C	ND	A11	1
Chrysene	ND	mg/kg	0.19	0.033	EPA-8270C	ND	A11	1
4,4'-DDD	ND	mg/kg	0.19	0.033	EPA-8270C	ND	A11	1
4,4'-DDE	ND	mg/kg	0.19	0.033	EPA-8270C	ND	A11	1
4,4'-DDT	ND	mg/kg	0.19	0.037	EPA-8270C	ND	A11	1
Dibenzo[a,h]anthracene	ND	mg/kg	0.19	0.037	EPA-8270C	ND	A11	1
Dibenzofuran	ND	mg/kg	0.19	0.039	EPA-8270C	ND	A11	1
1,2-Dichlorobenzene	ND	mg/kg	0.19	0.039	EPA-8270C	ND	A11	1

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

BCL Sample ID: 1115416-21 | **Client Sample Name:** B-4-25, 9/20/2011 11:40:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
1,3-Dichlorobenzene	ND	mg/kg	0.19	0.040	EPA-8270C	ND	A11	1
1,4-Dichlorobenzene	ND	mg/kg	0.19	0.037	EPA-8270C	ND	A11	1
3,3-Dichlorobenzidine	ND	mg/kg	0.39	0.013	EPA-8270C	ND	A11	1
Dieldrin	ND	mg/kg	0.19	0.060	EPA-8270C	ND	A11	1
Diethyl phthalate	ND	mg/kg	0.19	0.037	EPA-8270C	ND	A11	1
Dimethyl phthalate	ND	mg/kg	0.19	0.039	EPA-8270C	ND	A11	1
Di-n-butyl phthalate	ND	mg/kg	0.19	0.035	EPA-8270C	ND	A11	1
2,4-Dinitrotoluene	ND	mg/kg	0.19	0.042	EPA-8270C	ND	A11	1
2,6-Dinitrotoluene	ND	mg/kg	0.19	0.035	EPA-8270C	ND	A11	1
Di-n-octyl phthalate	ND	mg/kg	0.19	0.033	EPA-8270C	ND	A11	1
1,2-Diphenylhydrazine	ND	mg/kg	0.19	0.037	EPA-8270C	ND	A11	1
Endosulfan I	ND	mg/kg	0.39	0.039	EPA-8270C	ND	A11	1
Endosulfan II	ND	mg/kg	0.39	0.040	EPA-8270C	ND	A11	1
Endosulfan sulfate	ND	mg/kg	0.19	0.040	EPA-8270C	ND	A11	1
Endrin	ND	mg/kg	0.39	0.048	EPA-8270C	ND	A11	1
Endrin aldehyde	ND	mg/kg	0.96	0.042	EPA-8270C	ND	A11	1
Fluoranthene	ND	mg/kg	0.19	0.033	EPA-8270C	ND	A11	1
Fluorene	ND	mg/kg	0.19	0.037	EPA-8270C	ND	A11	1
Heptachlor	ND	mg/kg	0.19	0.040	EPA-8270C	ND	A11	1
Heptachlor epoxide	ND	mg/kg	0.19	0.033	EPA-8270C	ND	A11	1
Hexachlorobenzene	ND	mg/kg	0.19	0.031	EPA-8270C	ND	A11	1
Hexachlorobutadiene	ND	mg/kg	0.19	0.033	EPA-8270C	ND	A11	1
Hexachlorocyclopentadiene	ND	mg/kg	0.19	0.037	EPA-8270C	ND	A11	1
Hexachloroethane	ND	mg/kg	0.19	0.039	EPA-8270C	ND	A11	1
Indeno[1,2,3-cd]pyrene	ND	mg/kg	0.19	0.14	EPA-8270C	ND	A11	1
Isophorone	ND	mg/kg	0.19	0.033	EPA-8270C	ND	A11	1
2-Methylnaphthalene	ND	mg/kg	0.19	0.035	EPA-8270C	ND	A11	1
Naphthalene	ND	mg/kg	0.19	0.035	EPA-8270C	ND	A11	1
2-Naphthylamine	ND	mg/kg	5.8	0.31	EPA-8270C	ND	A11	1
2-Nitroaniline	ND	mg/kg	0.19	0.035	EPA-8270C	ND	A11	1
3-Nitroaniline	ND	mg/kg	0.39	0.029	EPA-8270C	ND	A11	1
4-Nitroaniline	ND	mg/kg	0.39	0.048	EPA-8270C	ND	A11	1
Nitrobenzene	ND	mg/kg	0.19	0.029	EPA-8270C	ND	A11	1

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

BCL Sample ID: 1115416-21 | **Client Sample Name:** B-4-25, 9/20/2011 11:40:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
N-Nitrosodimethylamine	ND	mg/kg	0.19	0.071	EPA-8270C	ND	A11	1
N-Nitrosodi-N-propylamine	ND	mg/kg	0.19	0.040	EPA-8270C	ND	A11	1
N-Nitrosodiphenylamine	ND	mg/kg	0.19	0.040	EPA-8270C	ND	A11	1
Phenanthrene	ND	mg/kg	0.19	0.035	EPA-8270C	ND	A11	1
Pyrene	ND	mg/kg	0.19	0.033	EPA-8270C	ND	A11	1
1,2,4-Trichlorobenzene	ND	mg/kg	0.19	0.035	EPA-8270C	ND	A11	1
4-Chloro-3-methylphenol	ND	mg/kg	0.39	0.042	EPA-8270C	ND	A11	1
2-Chlorophenol	ND	mg/kg	0.19	0.031	EPA-8270C	ND	A11	1
2,4-Dichlorophenol	ND	mg/kg	0.19	0.033	EPA-8270C	ND	A11	1
2,4-Dimethylphenol	ND	mg/kg	0.19	0.068	EPA-8270C	ND	A11	1
4,6-Dinitro-2-methylphenol	ND	mg/kg	0.96	0.023	EPA-8270C	ND	A11	1
2,4-Dinitrophenol	ND	mg/kg	0.96	0.015	EPA-8270C	ND	A11	1
2-Methylphenol	ND	mg/kg	0.19	0.033	EPA-8270C	ND	A11	1
3- & 4-Methylphenol	ND	mg/kg	0.39	0.064	EPA-8270C	ND	A11	1
2-Nitrophenol	ND	mg/kg	0.19	0.031	EPA-8270C	ND	A11	1
4-Nitrophenol	ND	mg/kg	0.39	0.035	EPA-8270C	ND	A11	1
Pentachlorophenol	ND	mg/kg	0.39	0.025	EPA-8270C	ND	A11	1
Phenol	ND	mg/kg	0.19	0.031	EPA-8270C	ND	A11	1
2,4,5-Trichlorophenol	ND	mg/kg	0.39	0.035	EPA-8270C	ND	A11	1
2,4,6-Trichlorophenol	ND	mg/kg	0.39	0.033	EPA-8270C	ND	A11	1
2-Fluorophenol (Surrogate)	75.7	%	28 - 144 (LCL - UCL)		EPA-8270C		A11	1
Phenol-d5 (Surrogate)	41.3	%	36 - 136 (LCL - UCL)		EPA-8270C		A11	1
Nitrobenzene-d5 (Surrogate)	88.5	%	31 - 135 (LCL - UCL)		EPA-8270C		A11	1
2-Fluorobiphenyl (Surrogate)	86.5	%	20 - 140 (LCL - UCL)		EPA-8270C		A11	1
2,4,6-Tribromophenol (Surrogate)	130	%	20 - 150 (LCL - UCL)		EPA-8270C		A11	1
p-Terphenyl-d14 (Surrogate)	64.4	%	10 - 150 (LCL - UCL)		EPA-8270C		A11	1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-8270C	09/28/11	10/05/11 19:16	SKC	MS-B2	1.929	BUJ0149

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Purgeable Aromatics and Total Petroleum Hydrocarbons

BCL Sample ID: 1115416-21 | **Client Sample Name:** B-4-25, 9/20/2011 11:40:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
TPH - Light Naptha	ND	mg/kg	99	39	Luft/FFP	ND		1
TPH - Aviation Gas	ND	mg/kg	99	39	Luft/FFP	ND		1
TPH - Stoddard Solvent	ND	mg/kg	39	9.9	Luft/FFP	ND		1
TPH - Heavy Naptha	ND	mg/kg	20	9.9	Luft/FFP	ND		1
TPH - Gasoline	ND	mg/kg	39	9.9	Luft/FFP	ND		1
TPH - Jet Fuel (JP4)	ND	mg/kg	20	9.9	Luft/FFP	ND		1
TPH - Jet Fuel (JP5)	ND	mg/kg	20	9.1	Luft/FFP	ND		1
TPH - Jet Fuel (JP8)	ND	mg/kg	20	9.9	Luft/FFP	ND		1
TPH - Kerosene	ND	mg/kg	20	2.8	Luft/FFP	ND		1
TPH - Diesel (FFP)	ND	mg/kg	20	2.4	Luft/FFP	ND		1
TPH - Fuel Oil #6	ND	mg/kg	20	9.9	Luft/FFP	ND		1
TPH - Crude Oil	ND	mg/kg	39	5.5	Luft/FFP	ND		1
TPH - Hydraulic Oil / Motor Oil	ND	mg/kg	39	13	Luft/FFP	ND		1
TPH - WD-40	ND	mg/kg	20	9.9	Luft/FFP	ND		1
Tetracosane (Surrogate)	92.5	%	20 - 145 (LCL - UCL)		Luft/FFP			1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	Luft/FFP	09/28/11	10/07/11 02:28	MWB	GC-13	1.974	BUJ0255

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Total Concentrations (TTLC)

BCL Sample ID: 1115416-21 | **Client Sample Name:** B-4-25, 9/20/2011 11:40:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Antimony	**0.85**	**mg/kg**	**5.0**	**0.50**	**EPA-6010B**	ND	**J**	1
Arsenic	**1.7**	**mg/kg**	**1.0**	**0.38**	**EPA-6010B**	ND		1
Barium	**180**	**mg/kg**	**0.50**	**0.077**	**EPA-6010B**	0.079		1
Beryllium	**0.17**	**mg/kg**	**0.50**	**0.050**	**EPA-6010B**	ND	**J**	1
Cadmium	ND	mg/kg	0.50	0.050	EPA-6010B	ND		1
Chromium	**10**	**mg/kg**	**0.50**	**0.060**	**EPA-6010B**	ND		1
Cobalt	**5.8**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	ND		1
Copper	**51**	**mg/kg**	**1.0**	**0.12**	**EPA-6010B**	ND		1
Lead	**1.8**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	ND	**J**	1
Mercury	**0.047**	**mg/kg**	**0.16**	**0.024**	**EPA-7471A**	ND	**J**	2
Molybdenum	**0.91**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	ND	**J**	1
Nickel	**5.6**	**mg/kg**	**0.50**	**0.058**	**EPA-6010B**	0.16		1
Selenium	ND	mg/kg	1.0	0.51	EPA-6010B	ND		1
Silver	ND	mg/kg	0.50	0.050	EPA-6010B	0.090		1
Thallium	ND	mg/kg	5.0	0.73	EPA-6010B	ND		1
Vanadium	**36**	**mg/kg**	**0.50**	**0.050**	**EPA-6010B**	ND		1
Zinc	**41**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	0.49		1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-6010B	10/03/11	10/04/11 08:22	ARD	PE-OP1	1	BUJ0080
2	EPA-7471A	09/27/11	09/30/11 10:45	MEV	CETAC1	0.992	BUI1770

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Organochlorine Pesticides (EPA Method 8081)

BCL Sample ID: 1115416-22 | **Client Sample Name:** B-3-5-D, 9/19/2011 10:05:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Aldrin	ND	mg/kg	0.00050	0.000026	EPA-8081	ND		1
alpha-BHC	ND	mg/kg	0.00050	0.00014	EPA-8081	ND		1
beta-BHC	ND	mg/kg	0.00050	0.00038	EPA-8081	ND		1
delta-BHC	ND	mg/kg	0.00050	0.000076	EPA-8081	ND		1
gamma-BHC (Lindane)	ND	mg/kg	0.00050	0.00025	EPA-8081	ND		1
Chlordane (Technical)	ND	mg/kg	0.050	0.015	EPA-8081	ND		1
4,4'-DDD	ND	mg/kg	0.00050	0.000063	EPA-8081	ND		1
4,4'-DDE	ND	mg/kg	0.00050	0.000045	EPA-8081	ND		1
4,4'-DDT	ND	mg/kg	0.00050	0.000031	EPA-8081	ND		1
Dieldrin	ND	mg/kg	0.00050	0.000032	EPA-8081	ND		1
Endosulfan I	ND	mg/kg	0.00050	0.000086	EPA-8081	ND		1
Endosulfan II	ND	mg/kg	0.00050	0.000066	EPA-8081	ND		1
Endosulfan sulfate	ND	mg/kg	0.00050	0.00013	EPA-8081	ND		1
Endrin	ND	mg/kg	0.00050	0.000035	EPA-8081	ND		1
Endrin aldehyde	ND	mg/kg	0.00050	0.000061	EPA-8081	ND		1
Heptachlor	ND	mg/kg	0.00050	0.00026	EPA-8081	ND		1
Heptachlor epoxide	ND	mg/kg	0.00050	0.00015	EPA-8081	ND		1
Methoxychlor	ND	mg/kg	0.00050	0.00013	EPA-8081	ND		1
Toxaphene	ND	mg/kg	0.050	0.0074	EPA-8081	ND		1
TCMX (Surrogate)	79.3	%	20 - 143 (LCL - UCL)		EPA-8081			1
Dibutyl chlorendate (Surrogate)	76.3	%	20 - 164 (LCL - UCL)		EPA-8081			1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-8081	09/28/11	10/03/11 22:37	VH1	GC-1	1.010	BUJ0049

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

BCL Sample ID: 1115416-22 | **Client Sample Name:** B-3-5-D, 9/19/2011 10:05:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Acenaphthene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Acenaphthylene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Aldrin	ND	mg/kg	0.10	0.024	EPA-8270C	ND		1
Aniline	ND	mg/kg	0.20	0.053	EPA-8270C	ND		1
Anthracene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Benzidine	ND	mg/kg	3.0	0.22	EPA-8270C	ND		1
Benzo[a]anthracene	ND	mg/kg	0.10	0.012	EPA-8270C	ND		1
Benzo[b]fluoranthene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Benzo[k]fluoranthene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Benzo[a]pyrene	ND	mg/kg	0.10	0.015	EPA-8270C	ND		1
Benzo[g,h,i]perylene	ND	mg/kg	0.10	0.056	EPA-8270C	ND		1
Benzoic acid	ND	mg/kg	0.50	0.067	EPA-8270C	ND		1
Benzyl alcohol	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Benzyl butyl phthalate	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
alpha-BHC	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
beta-BHC	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
delta-BHC	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
gamma-BHC (Lindane)	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
bis(2-Chloroethoxy)methane	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
bis(2-Chloroethyl) ether	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
bis(2-Chloroisopropyl)ether	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
bis(2-Ethylhexyl)phthalate	ND	mg/kg	0.20	0.043	EPA-8270C	0.052	M03	1
4-Bromophenyl phenyl ether	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
4-Chloroaniline	ND	mg/kg	0.10	0.027	EPA-8270C	ND		1
2-Chloronaphthalene	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1
4-Chlorophenyl phenyl ether	ND	mg/kg	0.10	0.015	EPA-8270C	ND		1
Chrysene	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
4,4'-DDD	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
4,4'-DDE	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
4,4'-DDT	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Dibenzo[a,h]anthracene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Dibenzofuran	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1
1,2-Dichlorobenzene	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

BCL Sample ID: 1115416-22 | **Client Sample Name:** B-3-5-D, 9/19/2011 10:05:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
1,3-Dichlorobenzene	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
1,4-Dichlorobenzene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
3,3-Dichlorobenzidine	ND	mg/kg	0.20	0.0067	EPA-8270C	ND		1
Dieldrin	ND	mg/kg	0.10	0.031	EPA-8270C	ND		1
Diethyl phthalate	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Dimethyl phthalate	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1
Di-n-butyl phthalate	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
2,4-Dinitrotoluene	ND	mg/kg	0.10	0.022	EPA-8270C	ND		1
2,6-Dinitrotoluene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Di-n-octyl phthalate	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
1,2-Diphenylhydrazine	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Endosulfan I	ND	mg/kg	0.20	0.020	EPA-8270C	ND		1
Endosulfan II	ND	mg/kg	0.20	0.021	EPA-8270C	ND		1
Endosulfan sulfate	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
Endrin	ND	mg/kg	0.20	0.025	EPA-8270C	ND		1
Endrin aldehyde	ND	mg/kg	0.50	0.022	EPA-8270C	ND		1
Fluoranthene	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
Fluorene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Heptachlor	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
Heptachlor epoxide	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
Hexachlorobenzene	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
Hexachlorobutadiene	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
Hexachlorocyclopentadiene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Hexachloroethane	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1
Indeno[1,2,3-cd]pyrene	ND	mg/kg	0.10	0.072	EPA-8270C	ND		1
Isophorone	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
2-Methylnaphthalene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Naphthalene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
2-Naphthylamine	ND	mg/kg	3.0	0.16	EPA-8270C	ND		1
2-Nitroaniline	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
3-Nitroaniline	ND	mg/kg	0.20	0.015	EPA-8270C	ND		1
4-Nitroaniline	ND	mg/kg	0.20	0.025	EPA-8270C	ND		1
Nitrobenzene	ND	mg/kg	0.10	0.015	EPA-8270C	ND		1

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

BCL Sample ID: 1115416-22 | **Client Sample Name:** B-3-5-D, 9/19/2011 10:05:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
N-Nitrosodimethylamine	ND	mg/kg	0.10	0.037	EPA-8270C	ND		1
N-Nitrosodi-N-propylamine	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
N-Nitrosodiphenylamine	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
Phenanthrene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Pyrene	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
1,2,4-Trichlorobenzene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
4-Chloro-3-methylphenol	ND	mg/kg	0.20	0.022	EPA-8270C	ND		1
2-Chlorophenol	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
2,4-Dichlorophenol	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
2,4-Dimethylphenol	ND	mg/kg	0.10	0.035	EPA-8270C	ND		1
4,6-Dinitro-2-methylphenol	ND	mg/kg	0.50	0.012	EPA-8270C	ND		1
2,4-Dinitrophenol	ND	mg/kg	0.50	0.0077	EPA-8270C	ND		1
2-Methylphenol	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
3- & 4-Methylphenol	ND	mg/kg	0.20	0.033	EPA-8270C	ND		1
2-Nitrophenol	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
4-Nitrophenol	ND	mg/kg	0.20	0.018	EPA-8270C	ND		1
Pentachlorophenol	ND	mg/kg	0.20	0.013	EPA-8270C	ND		1
Phenol	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
2,4,5-Trichlorophenol	ND	mg/kg	0.20	0.018	EPA-8270C	ND		1
2,4,6-Trichlorophenol	ND	mg/kg	0.20	0.017	EPA-8270C	ND		1
2-Fluorophenol (Surrogate)	63.5	%	28 - 144 (LCL - UCL)		EPA-8270C			1
Phenol-d5 (Surrogate)	35.9	%	36 - 136 (LCL - UCL)		EPA-8270C		S09	1
Nitrobenzene-d5 (Surrogate)	76.2	%	31 - 135 (LCL - UCL)		EPA-8270C			1
2-Fluorobiphenyl (Surrogate)	79.5	%	20 - 140 (LCL - UCL)		EPA-8270C			1
2,4,6-Tribromophenol (Surrogate)	116	%	20 - 150 (LCL - UCL)		EPA-8270C			1
p-Terphenyl-d14 (Surrogate)	62.1	%	10 - 150 (LCL - UCL)		EPA-8270C			1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-8270C	09/28/11	10/05/11 19:41	SKC	MS-B2	0.990	BUJ0149

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Purgeable Aromatics and Total Petroleum Hydrocarbons

BCL Sample ID: 1115416-22 | **Client Sample Name:** B-3-5-D, 9/19/2011 10:05:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
TPH - Light Naptha	ND	mg/kg	50	20	Luft/FFP	ND		1
TPH - Aviation Gas	ND	mg/kg	50	20	Luft/FFP	ND		1
TPH - Stoddard Solvent	ND	mg/kg	20	5.0	Luft/FFP	ND		1
TPH - Heavy Naptha	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Gasoline	ND	mg/kg	20	5.0	Luft/FFP	ND		1
TPH - Jet Fuel (JP4)	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Jet Fuel (JP5)	ND	mg/kg	10	4.6	Luft/FFP	ND		1
TPH - Jet Fuel (JP8)	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Kerosene	ND	mg/kg	10	1.4	Luft/FFP	ND		1
TPH - Diesel (FFP)	ND	mg/kg	10	1.2	Luft/FFP	ND		1
TPH - Fuel Oil #6	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Crude Oil	ND	mg/kg	20	2.8	Luft/FFP	ND		1
TPH - Hydraulic Oil / Motor Oil	ND	mg/kg	20	6.5	Luft/FFP	ND		1
TPH - WD-40	ND	mg/kg	10	5.0	Luft/FFP	ND		1
Tetracosane (Surrogate)	91.5	%	20 - 145 (LCL - UCL)		Luft/FFP			1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	Luft/FFP	09/28/11	10/07/11 02:51	MWB	GC-13	1.010	BUJ0255

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Total Concentrations (TTLC)

BCL Sample ID: 1115416-22 | **Client Sample Name:** B-3-5-D, 9/19/2011 10:05:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Antimony	**1.0**	**mg/kg**	**5.0**	**0.50**	**EPA-6010B**	ND	**J**	1
Arsenic	**2.2**	**mg/kg**	**1.0**	**0.38**	**EPA-6010B**	ND		1
Barium	**53**	**mg/kg**	**0.50**	**0.077**	**EPA-6010B**	ND		1
Beryllium	**0.28**	**mg/kg**	**0.50**	**0.050**	**EPA-6010B**	ND	**J**	1
Cadmium	**0.076**	**mg/kg**	**0.50**	**0.050**	**EPA-6010B**	ND	**J**	1
Chromium	**8.7**	**mg/kg**	**0.50**	**0.060**	**EPA-6010B**	ND		1
Cobalt	**4.4**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	ND		1
Copper	**14**	**mg/kg**	**1.0**	**0.12**	**EPA-6010B**	ND		1
Lead	**4.4**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	ND		1
Mercury	**0.29**	**mg/kg**	**0.16**	**0.024**	**EPA-7471A**	ND		2
Molybdenum	**0.26**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	ND	**J**	1
Nickel	**5.0**	**mg/kg**	**0.50**	**0.058**	**EPA-6010B**	ND		1
Selenium	ND	mg/kg	1.0	0.51	EPA-6010B	ND		1
Silver	**0.068**	**mg/kg**	**0.50**	**0.050**	**EPA-6010B**	ND	**J**	1
Thallium	**0.94**	**mg/kg**	**5.0**	**0.73**	**EPA-6010B**	ND	**J**	1
Vanadium	**27**	**mg/kg**	**0.50**	**0.050**	**EPA-6010B**	ND		1
Zinc	**40**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	0.55		1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-6010B	09/28/11	09/29/11 07:56	ARD	PE-OP1	1	BUI1866
2	EPA-7471A	09/27/11	09/30/11 10:47	MEV	CETAC1	0.977	BUI1770

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Organochlorine Pesticides (EPA Method 8081)

BCL Sample ID: 1115416-23 | **Client Sample Name:** B-9-10-D, 9/20/2011 9:05:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Aldrin	ND	mg/kg	0.00050	0.000026	EPA-8081	ND		1
alpha-BHC	ND	mg/kg	0.00050	0.00014	EPA-8081	ND		1
beta-BHC	ND	mg/kg	0.00050	0.00038	EPA-8081	ND		1
delta-BHC	ND	mg/kg	0.00050	0.000076	EPA-8081	ND		1
gamma-BHC (Lindane)	ND	mg/kg	0.00050	0.00025	EPA-8081	ND		1
Chlordane (Technical)	ND	mg/kg	0.050	0.015	EPA-8081	ND		1
4,4'-DDD	ND	mg/kg	0.00050	0.000063	EPA-8081	ND		1
4,4'-DDE	ND	mg/kg	0.00050	0.000045	EPA-8081	ND		1
4,4'-DDT	ND	mg/kg	0.00050	0.000031	EPA-8081	ND	V11	1
Dieldrin	ND	mg/kg	0.00050	0.000032	EPA-8081	ND		1
Endosulfan I	ND	mg/kg	0.00050	0.000086	EPA-8081	ND		1
Endosulfan II	ND	mg/kg	0.00050	0.000066	EPA-8081	ND		1
Endosulfan sulfate	ND	mg/kg	0.00050	0.00013	EPA-8081	ND		1
Endrin	ND	mg/kg	0.00050	0.000035	EPA-8081	ND		1
Endrin aldehyde	ND	mg/kg	0.00050	0.000061	EPA-8081	ND		1
Heptachlor	ND	mg/kg	0.00050	0.00026	EPA-8081	ND		1
Heptachlor epoxide	ND	mg/kg	0.00050	0.00015	EPA-8081	ND		1
Methoxychlor	ND	mg/kg	0.00050	0.00013	EPA-8081	ND		1
Toxaphene	ND	mg/kg	0.050	0.0074	EPA-8081	ND		1
TCMX (Surrogate)	84.7	%	20 - 143 (LCL - UCL)		EPA-8081			1
Dibutyl chlorendate (Surrogate)	84.2	%	20 - 164 (LCL - UCL)		EPA-8081			1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-8081	09/28/11	10/03/11 23:49	VH1	GC-1	1.010	BUJ0049

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

BCL Sample ID: 1115416-23 | **Client Sample Name:** B-9-10-D, 9/20/2011 9:05:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Acenaphthene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Acenaphthylene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Aldrin	ND	mg/kg	0.10	0.024	EPA-8270C	ND		1
Aniline	ND	mg/kg	0.20	0.053	EPA-8270C	ND		1
Anthracene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Benzidine	ND	mg/kg	3.0	0.22	EPA-8270C	ND		1
Benzo[a]anthracene	ND	mg/kg	0.10	0.012	EPA-8270C	ND		1
Benzo[b]fluoranthene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Benzo[k]fluoranthene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Benzo[a]pyrene	ND	mg/kg	0.10	0.015	EPA-8270C	ND		1
Benzo[g,h,i]perylene	ND	mg/kg	0.10	0.056	EPA-8270C	ND		1
Benzoic acid	ND	mg/kg	0.50	0.067	EPA-8270C	ND		1
Benzyl alcohol	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Benzyl butyl phthalate	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
alpha-BHC	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
beta-BHC	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
delta-BHC	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
gamma-BHC (Lindane)	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
bis(2-Chloroethoxy)methane	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
bis(2-Chloroethyl) ether	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
bis(2-Chloroisopropyl)ether	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
bis(2-Ethylhexyl)phthalate	ND	mg/kg	0.20	0.043	EPA-8270C	0.050	M03	1
4-Bromophenyl phenyl ether	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
4-Chloroaniline	ND	mg/kg	0.10	0.027	EPA-8270C	ND		1
2-Chloronaphthalene	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1
4-Chlorophenyl phenyl ether	ND	mg/kg	0.10	0.015	EPA-8270C	ND		1
Chrysene	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
4,4'-DDD	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
4,4'-DDE	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
4,4'-DDT	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Dibenzo[a,h]anthracene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Dibenzofuran	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1
1,2-Dichlorobenzene	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

BCL Sample ID: 1115416-23 | **Client Sample Name:** B-9-10-D, 9/20/2011 9:05:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
1,3-Dichlorobenzene	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
1,4-Dichlorobenzene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
3,3-Dichlorobenzidine	ND	mg/kg	0.20	0.0067	EPA-8270C	ND		1
Dieldrin	ND	mg/kg	0.10	0.031	EPA-8270C	ND		1
Diethyl phthalate	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Dimethyl phthalate	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1
Di-n-butyl phthalate	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
2,4-Dinitrotoluene	ND	mg/kg	0.10	0.022	EPA-8270C	ND		1
2,6-Dinitrotoluene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Di-n-octyl phthalate	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
1,2-Diphenylhydrazine	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Endosulfan I	ND	mg/kg	0.20	0.020	EPA-8270C	ND		1
Endosulfan II	ND	mg/kg	0.20	0.021	EPA-8270C	ND		1
Endosulfan sulfate	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
Endrin	ND	mg/kg	0.20	0.025	EPA-8270C	ND		1
Endrin aldehyde	ND	mg/kg	0.50	0.022	EPA-8270C	ND		1
Fluoranthene	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
Fluorene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Heptachlor	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
Heptachlor epoxide	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
Hexachlorobenzene	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
Hexachlorobutadiene	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
Hexachlorocyclopentadiene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Hexachloroethane	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1
Indeno[1,2,3-cd]pyrene	ND	mg/kg	0.10	0.072	EPA-8270C	ND		1
Isophorone	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
2-Methylnaphthalene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Naphthalene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
2-Naphthylamine	ND	mg/kg	3.0	0.16	EPA-8270C	ND		1
2-Nitroaniline	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
3-Nitroaniline	ND	mg/kg	0.20	0.015	EPA-8270C	ND		1
4-Nitroaniline	ND	mg/kg	0.20	0.025	EPA-8270C	ND		1
Nitrobenzene	ND	mg/kg	0.10	0.015	EPA-8270C	ND		1

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1 Technology Drive, Suite F207
Irvine, CA 92618

Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

BCL Sample ID: 1115416-23 | **Client Sample Name:** B-9-10-D, 9/20/2011 9:05:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
N-Nitrosodimethylamine	ND	mg/kg	0.10	0.037	EPA-8270C	ND		1
N-Nitrosodi-N-propylamine	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
N-Nitrosodiphenylamine	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
Phenanthrene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Pyrene	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
1,2,4-Trichlorobenzene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
4-Chloro-3-methylphenol	ND	mg/kg	0.20	0.022	EPA-8270C	ND		1
2-Chlorophenol	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
2,4-Dichlorophenol	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
2,4-Dimethylphenol	ND	mg/kg	0.10	0.035	EPA-8270C	ND		1
4,6-Dinitro-2-methylphenol	ND	mg/kg	0.50	0.012	EPA-8270C	ND		1
2,4-Dinitrophenol	ND	mg/kg	0.50	0.0077	EPA-8270C	ND		1
2-Methylphenol	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
3- & 4-Methylphenol	ND	mg/kg	0.20	0.033	EPA-8270C	ND		1
2-Nitrophenol	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
4-Nitrophenol	ND	mg/kg	0.20	0.018	EPA-8270C	ND		1
Pentachlorophenol	ND	mg/kg	0.20	0.013	EPA-8270C	ND		1
Phenol	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
2,4,5-Trichlorophenol	ND	mg/kg	0.20	0.018	EPA-8270C	ND		1
2,4,6-Trichlorophenol	ND	mg/kg	0.20	0.017	EPA-8270C	ND		1
2-Fluorophenol (Surrogate)	69.8	%	28 - 144 (LCL - UCL)		EPA-8270C			1
Phenol-d5 (Surrogate)	39.0	%	36 - 136 (LCL - UCL)		EPA-8270C			1
Nitrobenzene-d5 (Surrogate)	88.4	%	31 - 135 (LCL - UCL)		EPA-8270C			1
2-Fluorobiphenyl (Surrogate)	83.8	%	20 - 140 (LCL - UCL)		EPA-8270C			1
2,4,6-Tribromophenol (Surrogate)	117	%	20 - 150 (LCL - UCL)		EPA-8270C			1
p-Terphenyl-d14 (Surrogate)	55.9	%	10 - 150 (LCL - UCL)		EPA-8270C			1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-8270C	09/28/11	10/05/11 18:00	SKC	MS-B2	0.954	BUJ0149

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Purgeable Aromatics and Total Petroleum Hydrocarbons

BCL Sample ID: 1115416-23 | **Client Sample Name:** B-9-10-D, 9/20/2011 9:05:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
TPH - Light Naptha	ND	mg/kg	50	20	Luft/FFP	ND		1
TPH - Aviation Gas	ND	mg/kg	50	20	Luft/FFP	ND		1
TPH - Stoddard Solvent	ND	mg/kg	20	5.0	Luft/FFP	ND		1
TPH - Heavy Naptha	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Gasoline	ND	mg/kg	20	5.0	Luft/FFP	ND		1
TPH - Jet Fuel (JP4)	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Jet Fuel (JP5)	ND	mg/kg	10	4.6	Luft/FFP	ND		1
TPH - Jet Fuel (JP8)	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Kerosene	ND	mg/kg	10	1.4	Luft/FFP	ND		1
TPH - Diesel (FFP)	ND	mg/kg	10	1.2	Luft/FFP	ND		1
TPH - Fuel Oil #6	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Crude Oil	ND	mg/kg	20	2.8	Luft/FFP	ND		1
TPH - Hydraulic Oil / Motor Oil	ND	mg/kg	20	6.5	Luft/FFP	ND		1
TPH - WD-40	ND	mg/kg	10	5.0	Luft/FFP	ND		1
Tetracosane (Surrogate)	83.6	%	20 - 145 (LCL - UCL)		Luft/FFP			1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	Luft/FFP	09/28/11	10/07/11 05:11	MWB	GC-13	1.007	BUJ0255

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Total Concentrations (TTLC)

BCL Sample ID: 1115416-23 | **Client Sample Name:** B-9-10-D, 9/20/2011 9:05:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Antimony	**1.4**	**mg/kg**	**5.0**	**0.50**	**EPA-6010B**	ND	**J**	1
Arsenic	**2.6**	**mg/kg**	**1.0**	**0.38**	**EPA-6010B**	ND		1
Barium	**100**	**mg/kg**	**0.50**	**0.077**	**EPA-6010B**	ND		1
Beryllium	**0.46**	**mg/kg**	**0.50**	**0.050**	**EPA-6010B**	ND	**J**	1
Cadmium	**0.15**	**mg/kg**	**0.50**	**0.050**	**EPA-6010B**	ND	**J**	1
Chromium	**14**	**mg/kg**	**0.50**	**0.060**	**EPA-6010B**	ND		1
Cobalt	**7.3**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	ND		1
Copper	**17**	**mg/kg**	**1.0**	**0.12**	**EPA-6010B**	ND		1
Lead	**6.4**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	ND		1
Mercury	**0.13**	**mg/kg**	**0.16**	**0.024**	**EPA-7471A**	ND	**J**	2
Molybdenum	**0.32**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	ND	**J**	1
Nickel	**8.6**	**mg/kg**	**0.50**	**0.058**	**EPA-6010B**	ND		1
Selenium	ND	mg/kg	1.0	0.51	EPA-6010B	ND		1
Silver	**0.098**	**mg/kg**	**0.50**	**0.050**	**EPA-6010B**	ND	**J**	1
Thallium	**1.3**	**mg/kg**	**5.0**	**0.73**	**EPA-6010B**	ND	**J**	1
Vanadium	**38**	**mg/kg**	**0.50**	**0.050**	**EPA-6010B**	ND		1
Zinc	**71**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	0.55		1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-6010B	09/28/11	09/29/11 07:58	ARD	PE-OP1	1	BUI1866
2	EPA-7471A	09/27/11	09/30/11 10:54	MEV	CETAC1	0.977	BUI1770

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Organochlorine Pesticides (EPA Method 8081)

BCL Sample ID: 1115416-24 | **Client Sample Name:** B-4-10-D, 9/20/2011 11:03:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Aldrin	ND	mg/kg	0.00050	0.000026	EPA-8081	ND		1
alpha-BHC	ND	mg/kg	0.00050	0.00014	EPA-8081	ND		1
beta-BHC	ND	mg/kg	0.00050	0.00038	EPA-8081	ND		1
delta-BHC	ND	mg/kg	0.00050	0.000076	EPA-8081	ND		1
gamma-BHC (Lindane)	ND	mg/kg	0.00050	0.00025	EPA-8081	ND		1
Chlordane (Technical)	ND	mg/kg	0.050	0.015	EPA-8081	ND		1
4,4'-DDD	ND	mg/kg	0.00050	0.000063	EPA-8081	ND		1
4,4'-DDE	ND	mg/kg	0.00050	0.000045	EPA-8081	ND		1
4,4'-DDT	ND	mg/kg	0.00050	0.000031	EPA-8081	ND	V11	1
Dieldrin	ND	mg/kg	0.00050	0.000032	EPA-8081	ND		1
Endosulfan I	ND	mg/kg	0.00050	0.000086	EPA-8081	ND		1
Endosulfan II	ND	mg/kg	0.00050	0.000066	EPA-8081	ND		1
Endosulfan sulfate	ND	mg/kg	0.00050	0.00013	EPA-8081	ND		1
Endrin	ND	mg/kg	0.00050	0.000035	EPA-8081	ND		1
Endrin aldehyde	ND	mg/kg	0.00050	0.000061	EPA-8081	ND		1
Heptachlor	ND	mg/kg	0.00050	0.00026	EPA-8081	ND		1
Heptachlor epoxide	ND	mg/kg	0.00050	0.00015	EPA-8081	ND		1
Methoxychlor	ND	mg/kg	0.00050	0.00013	EPA-8081	ND		1
Toxaphene	ND	mg/kg	0.050	0.0074	EPA-8081	ND		1
TCMX (Surrogate)	81.9	%	20 - 143 (LCL - UCL)		EPA-8081			1
Dibutyl chlorendate (Surrogate)	75.1	%	20 - 164 (LCL - UCL)		EPA-8081			1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-8081	09/28/11	10/04/11 00:08	VH1	GC-1	1	BUJ0049

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

BCL Sample ID: 1115416-24 | **Client Sample Name:** B-4-10-D, 9/20/2011 11:03:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Acenaphthene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Acenaphthylene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Aldrin	ND	mg/kg	0.10	0.024	EPA-8270C	ND		1
Aniline	ND	mg/kg	0.20	0.053	EPA-8270C	ND		1
Anthracene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Benzidine	ND	mg/kg	3.0	0.22	EPA-8270C	ND		1
Benzo[a]anthracene	ND	mg/kg	0.10	0.012	EPA-8270C	ND		1
Benzo[b]fluoranthene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Benzo[k]fluoranthene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Benzo[a]pyrene	ND	mg/kg	0.10	0.015	EPA-8270C	ND		1
Benzo[g,h,i]perylene	ND	mg/kg	0.10	0.056	EPA-8270C	ND		1
Benzoic acid	ND	mg/kg	0.50	0.067	EPA-8270C	ND		1
Benzyl alcohol	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Benzyl butyl phthalate	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
alpha-BHC	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
beta-BHC	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
delta-BHC	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
gamma-BHC (Lindane)	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
bis(2-Chloroethoxy)methane	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
bis(2-Chloroethyl) ether	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
bis(2-Chloroisopropyl)ether	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
bis(2-Ethylhexyl)phthalate	ND	mg/kg	0.20	0.043	EPA-8270C	0.051	M03	1
4-Bromophenyl phenyl ether	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
4-Chloroaniline	ND	mg/kg	0.10	0.027	EPA-8270C	ND		1
2-Chloronaphthalene	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1
4-Chlorophenyl phenyl ether	ND	mg/kg	0.10	0.015	EPA-8270C	ND		1
Chrysene	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
4,4'-DDD	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
4,4'-DDE	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
4,4'-DDT	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Dibenzo[a,h]anthracene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Dibenzofuran	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1
1,2-Dichlorobenzene	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

BCL Sample ID: 1115416-24 | **Client Sample Name:** B-4-10-D, 9/20/2011 11:03:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
1,3-Dichlorobenzene	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
1,4-Dichlorobenzene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
3,3-Dichlorobenzidine	ND	mg/kg	0.20	0.0067	EPA-8270C	ND		1
Dieldrin	ND	mg/kg	0.10	0.031	EPA-8270C	ND		1
Diethyl phthalate	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Dimethyl phthalate	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1
Di-n-butyl phthalate	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
2,4-Dinitrotoluene	ND	mg/kg	0.10	0.022	EPA-8270C	ND		1
2,6-Dinitrotoluene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Di-n-octyl phthalate	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
1,2-Diphenylhydrazine	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Endosulfan I	ND	mg/kg	0.20	0.020	EPA-8270C	ND		1
Endosulfan II	ND	mg/kg	0.20	0.021	EPA-8270C	ND		1
Endosulfan sulfate	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
Endrin	ND	mg/kg	0.20	0.025	EPA-8270C	ND		1
Endrin aldehyde	ND	mg/kg	0.50	0.022	EPA-8270C	ND		1
Fluoranthene	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
Fluorene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Heptachlor	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
Heptachlor epoxide	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
Hexachlorobenzene	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
Hexachlorobutadiene	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
Hexachlorocyclopentadiene	ND	mg/kg	0.10	0.019	EPA-8270C	ND		1
Hexachloroethane	ND	mg/kg	0.10	0.020	EPA-8270C	ND		1
Indeno[1,2,3-cd]pyrene	ND	mg/kg	0.10	0.072	EPA-8270C	ND		1
Isophorone	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
2-Methylnaphthalene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Naphthalene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
2-Naphthylamine	ND	mg/kg	3.0	0.16	EPA-8270C	ND		1
2-Nitroaniline	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
3-Nitroaniline	ND	mg/kg	0.20	0.015	EPA-8270C	ND		1
4-Nitroaniline	ND	mg/kg	0.20	0.025	EPA-8270C	ND		1
Nitrobenzene	ND	mg/kg	0.10	0.015	EPA-8270C	ND		1

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

BCL Sample ID: 1115416-24 | **Client Sample Name:** B-4-10-D, 9/20/2011 11:03:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
N-Nitrosodimethylamine	ND	mg/kg	0.10	0.037	EPA-8270C	ND		1
N-Nitrosodi-N-propylamine	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
N-Nitrosodiphenylamine	ND	mg/kg	0.10	0.021	EPA-8270C	ND		1
Phenanthrene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
Pyrene	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
1,2,4-Trichlorobenzene	ND	mg/kg	0.10	0.018	EPA-8270C	ND		1
4-Chloro-3-methylphenol	ND	mg/kg	0.20	0.022	EPA-8270C	ND		1
2-Chlorophenol	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
2,4-Dichlorophenol	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
2,4-Dimethylphenol	ND	mg/kg	0.10	0.035	EPA-8270C	ND		1
4,6-Dinitro-2-methylphenol	ND	mg/kg	0.50	0.012	EPA-8270C	ND		1
2,4-Dinitrophenol	ND	mg/kg	0.50	0.0077	EPA-8270C	ND		1
2-Methylphenol	ND	mg/kg	0.10	0.017	EPA-8270C	ND		1
3- & 4-Methylphenol	ND	mg/kg	0.20	0.033	EPA-8270C	ND		1
2-Nitrophenol	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
4-Nitrophenol	ND	mg/kg	0.20	0.018	EPA-8270C	ND		1
Pentachlorophenol	ND	mg/kg	0.20	0.013	EPA-8270C	ND		1
Phenol	ND	mg/kg	0.10	0.016	EPA-8270C	ND		1
2,4,5-Trichlorophenol	ND	mg/kg	0.20	0.018	EPA-8270C	ND		1
2,4,6-Trichlorophenol	ND	mg/kg	0.20	0.017	EPA-8270C	ND		1
2-Fluorophenol (Surrogate)	68.4	%	28 - 144 (LCL - UCL)		EPA-8270C			1
Phenol-d5 (Surrogate)	38.0	%	36 - 136 (LCL - UCL)		EPA-8270C			1
Nitrobenzene-d5 (Surrogate)	80.8	%	31 - 135 (LCL - UCL)		EPA-8270C			1
2-Fluorobiphenyl (Surrogate)	79.1	%	20 - 140 (LCL - UCL)		EPA-8270C			1
2,4,6-Tribromophenol (Surrogate)	121	%	20 - 150 (LCL - UCL)		EPA-8270C			1
p-Terphenyl-d14 (Surrogate)	63.6	%	10 - 150 (LCL - UCL)		EPA-8270C			1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-8270C	09/28/11	10/05/11 20:08	SKC	MS-B2	0.960	BUJ0149

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Irvine, CA 92618

Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Purgeable Aromatics and Total Petroleum Hydrocarbons

BCL Sample ID: 1115416-24 | **Client Sample Name:** B-4-10-D, 9/20/2011 11:03:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
TPH - Light Naptha	ND	mg/kg	50	20	Luft/FFP	ND		1
TPH - Aviation Gas	ND	mg/kg	50	20	Luft/FFP	ND		1
TPH - Stoddard Solvent	ND	mg/kg	20	5.0	Luft/FFP	ND		1
TPH - Heavy Naptha	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Gasoline	ND	mg/kg	20	5.0	Luft/FFP	ND		1
TPH - Jet Fuel (JP4)	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Jet Fuel (JP5)	ND	mg/kg	10	4.6	Luft/FFP	ND		1
TPH - Jet Fuel (JP8)	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Kerosene	ND	mg/kg	10	1.4	Luft/FFP	ND		1
TPH - Diesel (FFP)	ND	mg/kg	10	1.2	Luft/FFP	ND		1
TPH - Fuel Oil #6	ND	mg/kg	10	5.0	Luft/FFP	ND		1
TPH - Crude Oil	ND	mg/kg	20	2.8	Luft/FFP	ND		1
TPH - Hydraulic Oil / Motor Oil	ND	mg/kg	20	6.5	Luft/FFP	ND		1
TPH - WD-40	ND	mg/kg	10	5.0	Luft/FFP	ND		1
Tetracosane (Surrogate)	71.4	%	20 - 145 (LCL - UCL)		Luft/FFP			1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	Luft/FFP	09/28/11	10/07/11 05:34	MWB	GC-13	0.997	BUJ0255

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Total Concentrations (TTLC)

BCL Sample ID: 1115416-24 | **Client Sample Name:** B-4-10-D, 9/20/2011 11:03:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Antimony	**1.1**	**mg/kg**	**5.0**	**0.50**	**EPA-6010B**	ND	**J**	1
Arsenic	**2.0**	**mg/kg**	**1.0**	**0.38**	**EPA-6010B**	ND		1
Barium	**36**	**mg/kg**	**0.50**	**0.077**	**EPA-6010B**	ND		1
Beryllium	**0.24**	**mg/kg**	**0.50**	**0.050**	**EPA-6010B**	ND	**J**	1
Cadmium	**0.061**	**mg/kg**	**0.50**	**0.050**	**EPA-6010B**	ND	**J**	1
Chromium	**6.0**	**mg/kg**	**0.50**	**0.060**	**EPA-6010B**	ND		1
Cobalt	**3.7**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	ND		1
Copper	**16**	**mg/kg**	**1.0**	**0.12**	**EPA-6010B**	ND		1
Lead	**3.6**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	ND		1
Mercury	**0.11**	**mg/kg**	**0.16**	**0.024**	**EPA-7471A**	ND	**J**	2
Molybdenum	**0.27**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	ND	**J**	1
Nickel	**3.6**	**mg/kg**	**0.50**	**0.058**	**EPA-6010B**	ND		1
Selenium	ND	mg/kg	1.0	0.51	EPA-6010B	ND		1
Silver	ND	mg/kg	0.50	0.050	EPA-6010B	ND		1
Thallium	ND	mg/kg	5.0	0.73	EPA-6010B	ND		1
Vanadium	**22**	**mg/kg**	**0.50**	**0.050**	**EPA-6010B**	ND		1
Zinc	**35**	**mg/kg**	**2.5**	**0.25**	**EPA-6010B**	0.55		1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-6010B	09/28/11	09/29/11 08:02	ARD	PE-OP1	1	BUI1866
2	EPA-7471A	09/27/11	09/30/11 10:56	MEV	CETAC1	0.962	BUI1770

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Organochlorine Pesticides (EPA Method 8081)

Quality Control Report - Method Blank Analysis

Constituent	QC Sample ID	MB Result	Units	PQL	MDL	Lab Quals
QC Batch ID: BUJ0048						
Aldrin	BUJ0048-BLK1	ND	mg/kg	0.00050	0.000026	
alpha-BHC	BUJ0048-BLK1	ND	mg/kg	0.00050	0.00014	
beta-BHC	BUJ0048-BLK1	ND	mg/kg	0.00050	0.00038	
delta-BHC	BUJ0048-BLK1	ND	mg/kg	0.00050	0.000076	
gamma-BHC (Lindane)	BUJ0048-BLK1	ND	mg/kg	0.00050	0.00025	
Chlordane (Technical)	BUJ0048-BLK1	ND	mg/kg	0.050	0.015	
4,4'-DDD	BUJ0048-BLK1	ND	mg/kg	0.00050	0.000063	
4,4'-DDE	BUJ0048-BLK1	ND	mg/kg	0.00050	0.000045	
4,4'-DDT	BUJ0048-BLK1	ND	mg/kg	0.00050	0.000031	
Dieldrin	BUJ0048-BLK1	ND	mg/kg	0.00050	0.000032	
Endosulfan I	BUJ0048-BLK1	ND	mg/kg	0.00050	0.000086	
Endosulfan II	BUJ0048-BLK1	ND	mg/kg	0.00050	0.000066	
Endosulfan sulfate	BUJ0048-BLK1	ND	mg/kg	0.00050	0.00013	
Endrin	BUJ0048-BLK1	ND	mg/kg	0.00050	0.000035	
Endrin aldehyde	BUJ0048-BLK1	ND	mg/kg	0.00050	0.000061	
Heptachlor	BUJ0048-BLK1	ND	mg/kg	0.00050	0.00026	
Heptachlor epoxide	BUJ0048-BLK1	ND	mg/kg	0.00050	0.00015	
Methoxychlor	BUJ0048-BLK1	ND	mg/kg	0.00050	0.00013	
Toxaphene	BUJ0048-BLK1	ND	mg/kg	0.050	0.0074	
TCMX (Surrogate)	BUJ0048-BLK1	87.0	%	20 - 143 (LCL - UCL)		
Dibutyl chlorendate (Surrogate)	BUJ0048-BLK1	90.8	%	20 - 164 (LCL - UCL)		
QC Batch ID: BUJ0049						
Aldrin	BUJ0049-BLK1	ND	mg/kg	0.00050	0.000026	
alpha-BHC	BUJ0049-BLK1	ND	mg/kg	0.00050	0.00014	
beta-BHC	BUJ0049-BLK1	ND	mg/kg	0.00050	0.00038	
delta-BHC	BUJ0049-BLK1	ND	mg/kg	0.00050	0.000076	
gamma-BHC (Lindane)	BUJ0049-BLK1	ND	mg/kg	0.00050	0.00025	
Chlordane (Technical)	BUJ0049-BLK1	ND	mg/kg	0.050	0.015	
4,4'-DDD	BUJ0049-BLK1	ND	mg/kg	0.00050	0.000063	
4,4'-DDE	BUJ0049-BLK1	ND	mg/kg	0.00050	0.000045	
4,4'-DDT	BUJ0049-BLK1	ND	mg/kg	0.00050	0.000031	
Dieldrin	BUJ0049-BLK1	ND	mg/kg	0.00050	0.000032	
Endosulfan I	BUJ0049-BLK1	ND	mg/kg	0.00050	0.000086	

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Irvine, CA 92618

Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Organochlorine Pesticides (EPA Method 8081)

Quality Control Report - Method Blank Analysis

Constituent	QC Sample ID	MB Result	Units	PQL	MDL	Lab Quals
QC Batch ID: BUJ0049						
Endosulfan II	BUJ0049-BLK1	ND	mg/kg	0.00050	0.000066	
Endosulfan sulfate	BUJ0049-BLK1	ND	mg/kg	0.00050	0.00013	
Endrin	BUJ0049-BLK1	ND	mg/kg	0.00050	0.000035	
Endrin aldehyde	BUJ0049-BLK1	ND	mg/kg	0.00050	0.000061	
Heptachlor	BUJ0049-BLK1	ND	mg/kg	0.00050	0.00026	
Heptachlor epoxide	BUJ0049-BLK1	ND	mg/kg	0.00050	0.00015	
Methoxychlor	BUJ0049-BLK1	ND	mg/kg	0.00050	0.00013	
Toxaphene	BUJ0049-BLK1	ND	mg/kg	0.050	0.0074	
TCMX (Surrogate)	BUJ0049-BLK1	86.8	%	20 - 143 (LCL - UCL)		
Dibutyl chlorendate (Surrogate)	BUJ0049-BLK1	83.2	%	20 - 164 (LCL - UCL)		

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Organochlorine Pesticides (EPA Method 8081)

Quality Control Report - Laboratory Control Sample

Constituent	QC Sample ID	Type	Result	Spike Level	Units	Percent Recovery	RPD	Control Limits Percent Recovery	Control Limits RPD	Lab Quals
QC Batch ID: BUJ0048										
Aldrin	BUJ0048-BS1	LCS	0.0042777	0.0050000	mg/kg	85.6		70 - 130		
gamma-BHC (Lindane)	BUJ0048-BS1	LCS	0.0047040	0.0050000	mg/kg	94.1		40 - 140		
4,4'-DDT	BUJ0048-BS1	LCS	0.0043300	0.0050000	mg/kg	86.6		60 - 130		
Dieldrin	BUJ0048-BS1	LCS	0.0042277	0.0050000	mg/kg	84.6		70 - 130		
Endrin	BUJ0048-BS1	LCS	0.0042427	0.0050000	mg/kg	84.9		60 - 140		
Heptachlor	BUJ0048-BS1	LCS	0.0042460	0.0050000	mg/kg	84.9		70 - 130		
TCMX (Surrogate)	BUJ0048-BS1	LCS	0.010255	0.010000	mg/kg	103		20 - 143		
Dibutyl chlorendate (Surrogate)	BUJ0048-BS1	LCS	0.020945	0.025000	mg/kg	83.8		20 - 164		
QC Batch ID: BUJ0049										
Aldrin	BUJ0049-BS1	LCS	0.0043769	0.0049505	mg/kg	88.4		70 - 130		
gamma-BHC (Lindane)	BUJ0049-BS1	LCS	0.0046432	0.0049505	mg/kg	93.8		40 - 140		
4,4'-DDT	BUJ0049-BS1	LCS	0.0041776	0.0049505	mg/kg	84.4		60 - 130		
Dieldrin	BUJ0049-BS1	LCS	0.0043211	0.0049505	mg/kg	87.3		70 - 130		
Endrin	BUJ0049-BS1	LCS	0.0044185	0.0049505	mg/kg	89.3		60 - 140		
Heptachlor	BUJ0049-BS1	LCS	0.0043340	0.0049505	mg/kg	87.5		70 - 130		
TCMX (Surrogate)	BUJ0049-BS1	LCS	0.010600	0.0099010	mg/kg	107		20 - 143		
Dibutyl chlorendate (Surrogate)	BUJ0049-BS1	LCS	0.021452	0.024752	mg/kg	86.7		20 - 164		

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Organochlorine Pesticides (EPA Method 8081)

Quality Control Report - Precision & Accuracy

Constituent	Type	Source Sample ID	Source Result	Result	Spike Added	Units	RPD	Percent Recovery	Control Limits RPD	Control Limits Percent Recovery	Lab Quals
QC Batch ID: BUJ0048	Used client sample: Y - Description: B-1-15, 09/19/2011 09:00										
Aldrin	MS	1115416-03	ND	0.0040663	0.0050000	mg/kg		81.3		30 - 140	
	MSD	1115416-03	ND	0.0055064	0.0050505	mg/kg	30.1	109	30	30 - 140	
gamma-BHC (Lindane)	MS	1115416-03	ND	0.0054070	0.0050000	mg/kg		108		30 - 142	
	MSD	1115416-03	ND	0.0047771	0.0050505	mg/kg	12.4	94.6	30	30 - 142	
4,4'-DDT	MS	1115416-03	ND	0.0047843	0.0050000	mg/kg		95.7		30 - 140	
	MSD	1115416-03	ND	0.0047902	0.0050505	mg/kg	0.1	94.8	30	30 - 140	
Dieldrin	MS	1115416-03	ND	0.0043747	0.0050000	mg/kg		87.5		40 - 135	
	MSD	1115416-03	ND	0.0039694	0.0050505	mg/kg	9.7	78.6	20	40 - 135	
Endrin	MS	1115416-03	ND	0.0040683	0.0050000	mg/kg		81.4		30 - 150	
	MSD	1115416-03	ND	0.0037906	0.0050505	mg/kg	7.1	75.1	20	30 - 150	
Heptachlor	MS	1115416-03	ND	0.0045413	0.0050000	mg/kg		90.8		40 - 140	
	MSD	1115416-03	ND	0.0037697	0.0050505	mg/kg	18.6	74.6	30	40 - 140	
TCMX (Surrogate)	MS	1115416-03	ND	0.0082010	0.010000	mg/kg		82.0		20 - 143	
	MSD	1115416-03	ND	0.0077653	0.010101	mg/kg	5.5	76.9		20 - 143	
Dibutyl chlorendate (Surrogate)	MS	1115416-03	ND	0.020861	0.025000	mg/kg		83.4		20 - 164	
	MSD	1115416-03	ND	0.019579	0.025253	mg/kg	6.3	77.5		20 - 164	
QC Batch ID: BUJ0049	Used client sample: Y - Description: B-3-5-D, 09/19/2011 10:05										
Aldrin	MS	1115416-22	ND	0.0042462	0.0049180	mg/kg		86.3		30 - 140	
	MSD	1115416-22	ND	0.0043257	0.0049505	mg/kg	1.9	87.4	30	30 - 140	
gamma-BHC (Lindane)	MS	1115416-22	ND	0.0042970	0.0049180	mg/kg		87.4		30 - 142	
	MSD	1115416-22	ND	0.0044495	0.0049505	mg/kg	3.5	89.9	30	30 - 142	
4,4'-DDT	MS	1115416-22	ND	0.0040810	0.0049180	mg/kg		83.0		30 - 140	
	MSD	1115416-22	ND	0.0040399	0.0049505	mg/kg	1.0	81.6	30	30 - 140	
Dieldrin	MS	1115416-22	ND	0.0041102	0.0049180	mg/kg		83.6		40 - 135	
	MSD	1115416-22	ND	0.0042076	0.0049505	mg/kg	2.3	85.0	20	40 - 135	
Endrin	MS	1115416-22	ND	0.0042295	0.0049180	mg/kg		86.0		30 - 150	
	MSD	1115416-22	ND	0.0043079	0.0049505	mg/kg	1.8	87.0	20	30 - 150	
Heptachlor	MS	1115416-22	ND	0.0042793	0.0049180	mg/kg		87.0		40 - 140	
	MSD	1115416-22	ND	0.0042997	0.0049505	mg/kg	0.5	86.9	30	40 - 140	
TCMX (Surrogate)	MS	1115416-22	ND	0.0084384	0.0098361	mg/kg		85.8		20 - 143	
	MSD	1115416-22	ND	0.0089459	0.0099010	mg/kg	5.8	90.4		20 - 143	
Dibutyl chlorendate (Surrogate)	MS	1115416-22	ND	0.020061	0.024590	mg/kg		81.6		20 - 164	
	MSD	1115416-22	ND	0.020579	0.024752	mg/kg	2.5	83.1		20 - 164	

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

PCB Analysis (EPA Method 8082)

Quality Control Report - Method Blank Analysis

Constituent	QC Sample ID	MB Result	Units	PQL	MDL	Lab Quals
QC Batch ID: BUJ0046						
PCB-1016	BUJ0046-BLK1	ND	mg/kg	0.010	0.0027	
PCB-1221	BUJ0046-BLK1	ND	mg/kg	0.010	0.0050	
PCB-1232	BUJ0046-BLK1	ND	mg/kg	0.010	0.0012	
PCB-1242	BUJ0046-BLK1	ND	mg/kg	0.010	0.0016	
PCB-1248	BUJ0046-BLK1	ND	mg/kg	0.010	0.0012	
PCB-1254	BUJ0046-BLK1	ND	mg/kg	0.010	0.00078	
PCB-1260	BUJ0046-BLK1	ND	mg/kg	0.010	0.0022	
Total PCB's (Summation)	BUJ0046-BLK1	ND	mg/kg	0.010	0.0050	
Decachlorobiphenyl (Surrogate)	BUJ0046-BLK1	80.0	%	20 - 150 (LCL - UCL)		

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

PCB Analysis (EPA Method 8082)

Quality Control Report - Laboratory Control Sample

Constituent	QC Sample ID	Type	Result	Spike Level	Units	Percent Recovery	RPD	Control Limits Percent Recovery	Control Limits RPD	Lab Quals
QC Batch ID: BUJ0046										
PCB-1260	BUJ0046-BS1	LCS	0.074662	0.084459	mg/kg	88.4		65 - 135		
Decachlorobiphenyl (Surrogate)	BUJ0046-BS1	LCS	0.0027027	0.0033784	mg/kg	80.0		20 - 150		

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

PCB Analysis (EPA Method 8082)

Quality Control Report - Precision & Accuracy

Constituent	Type	Source Sample ID	Source Result	Result	Spike Added	Units	RPD	Percent Recovery	Control Limits RPD	Control Limits Percent Recovery	Lab Quals
QC Batch ID: BUJ0046	Used client sample: Y - Description: B-9-5, 09/20/2011 08:58										
PCB-1260	MS	1115416-12	ND	0.051864	0.084746	mg/kg		61.2		30 - 150	
	MSD	1115416-12	ND	0.052365	0.084459	mg/kg	1.0	62.0	32	30 - 150	
Decachlorobiphenyl (Surrogate)	MS	1115416-12	ND	0.0016949	0.0033898	mg/kg		50.0		20 - 150	
	MSD	1115416-12	ND	0.0016892	0.0033784	mg/kg	0.3	50.0		20 - 150	

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Volatile Organic Analysis (EPA Method 8260)

Quality Control Report - Method Blank Analysis

Constituent	QC Sample ID	MB Result	Units	PQL	MDL	Lab Quals
QC Batch ID: BUI1646						
Benzene	BUI1646-BLK1	ND	mg/kg	0.0050	0.0013	
Bromobenzene	BUI1646-BLK1	ND	mg/kg	0.0050	0.0013	
Bromochloromethane	BUI1646-BLK1	ND	mg/kg	0.0050	0.00092	
Bromodichloromethane	BUI1646-BLK1	ND	mg/kg	0.0050	0.00084	
Bromoform	BUI1646-BLK1	ND	mg/kg	0.0050	0.0015	
Bromomethane	BUI1646-BLK1	ND	mg/kg	0.0050	0.0016	
n-Butylbenzene	BUI1646-BLK1	ND	mg/kg	0.0050	0.0015	
sec-Butylbenzene	BUI1646-BLK1	ND	mg/kg	0.0050	0.0012	
tert-Butylbenzene	BUI1646-BLK1	ND	mg/kg	0.0050	0.0012	
Carbon tetrachloride	BUI1646-BLK1	ND	mg/kg	0.0050	0.0011	
Chlorobenzene	BUI1646-BLK1	ND	mg/kg	0.0050	0.0013	
Chloroethane	BUI1646-BLK1	ND	mg/kg	0.0050	0.0014	
Chloroform	BUI1646-BLK1	ND	mg/kg	0.0050	0.00063	
Chloromethane	BUI1646-BLK1	ND	mg/kg	0.0050	0.0014	
2-Chlorotoluene	BUI1646-BLK1	ND	mg/kg	0.0050	0.0018	
4-Chlorotoluene	BUI1646-BLK1	ND	mg/kg	0.0050	0.0014	
Dibromochloromethane	BUI1646-BLK1	ND	mg/kg	0.0050	0.00099	
1,2-Dibromo-3-chloropropane	BUI1646-BLK1	ND	mg/kg	0.0050	0.0017	
1,2-Dibromoethane	BUI1646-BLK1	ND	mg/kg	0.0050	0.0010	
Dibromomethane	BUI1646-BLK1	ND	mg/kg	0.0050	0.0018	
1,2-Dichlorobenzene	BUI1646-BLK1	ND	mg/kg	0.0050	0.00081	
1,3-Dichlorobenzene	BUI1646-BLK1	ND	mg/kg	0.0050	0.0014	
1,4-Dichlorobenzene	BUI1646-BLK1	ND	mg/kg	0.0050	0.0015	
Dichlorodifluoromethane	BUI1646-BLK1	ND	mg/kg	0.0050	0.0013	
1,1-Dichloroethane	BUI1646-BLK1	ND	mg/kg	0.0050	0.0014	
1,2-Dichloroethane	BUI1646-BLK1	ND	mg/kg	0.0050	0.00085	
1,1-Dichloroethene	BUI1646-BLK1	ND	mg/kg	0.0050	0.0012	
cis-1,2-Dichloroethene	BUI1646-BLK1	ND	mg/kg	0.0050	0.0013	
trans-1,2-Dichloroethene	BUI1646-BLK1	ND	mg/kg	0.0050	0.0014	
1,2-Dichloropropane	BUI1646-BLK1	ND	mg/kg	0.0050	0.00081	
1,3-Dichloropropane	BUI1646-BLK1	ND	mg/kg	0.0050	0.0011	
2,2-Dichloropropane	BUI1646-BLK1	ND	mg/kg	0.0050	0.0013	
1,1-Dichloropropene	BUI1646-BLK1	ND	mg/kg	0.0050	0.0012	
cis-1,3-Dichloropropene	BUI1646-BLK1	ND	mg/kg	0.0050	0.0011	

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Volatile Organic Analysis (EPA Method 8260)

Quality Control Report - Method Blank Analysis

Constituent	QC Sample ID	MB Result	Units	PQL	MDL	Lab Quals
QC Batch ID: BUI1646						
trans-1,3-Dichloropropene	BUI1646-BLK1	ND	mg/kg	0.0050	0.0012	
Ethylbenzene	BUI1646-BLK1	ND	mg/kg	0.0050	0.0015	
Hexachlorobutadiene	BUI1646-BLK1	ND	mg/kg	0.0050	0.0017	
Isopropylbenzene	BUI1646-BLK1	ND	mg/kg	0.0050	0.0013	
p-Isopropyltoluene	BUI1646-BLK1	ND	mg/kg	0.0050	0.0013	
Methylene chloride	BUI1646-BLK1	ND	mg/kg	0.010	0.0024	
Methyl t-butyl ether	BUI1646-BLK1	ND	mg/kg	0.0050	0.00050	
Naphthalene	BUI1646-BLK1	ND	mg/kg	0.0050	0.0014	
n-Propylbenzene	BUI1646-BLK1	ND	mg/kg	0.0050	0.0013	
Styrene	BUI1646-BLK1	ND	mg/kg	0.0050	0.0014	
1,1,1,2-Tetrachloroethane	BUI1646-BLK1	ND	mg/kg	0.0050	0.0011	
1,1,2,2-Tetrachloroethane	BUI1646-BLK1	ND	mg/kg	0.0050	0.0011	
Tetrachloroethene	BUI1646-BLK1	ND	mg/kg	0.0050	0.0013	
Toluene	BUI1646-BLK1	ND	mg/kg	0.0050	0.0012	
1,2,3-Trichlorobenzene	BUI1646-BLK1	ND	mg/kg	0.0050	0.0021	
1,2,4-Trichlorobenzene	BUI1646-BLK1	ND	mg/kg	0.0050	0.0020	
1,1,1-Trichloroethane	BUI1646-BLK1	ND	mg/kg	0.0050	0.0011	
1,1,2-Trichloroethane	BUI1646-BLK1	ND	mg/kg	0.0050	0.00077	
Trichloroethene	BUI1646-BLK1	ND	mg/kg	0.0050	0.0011	
Trichlorofluoromethane	BUI1646-BLK1	ND	mg/kg	0.0050	0.0011	
1,2,3-Trichloropropane	BUI1646-BLK1	ND	mg/kg	0.0050	0.0016	
1,1,2-Trichloro-1,2,2-trifluoroethane	BUI1646-BLK1	ND	mg/kg	0.0050	0.0013	
1,2,4-Trimethylbenzene	BUI1646-BLK1	ND	mg/kg	0.0050	0.0013	
1,3,5-Trimethylbenzene	BUI1646-BLK1	ND	mg/kg	0.0050	0.0015	
Vinyl chloride	BUI1646-BLK1	ND	mg/kg	0.0050	0.0016	
Total Xylenes	BUI1646-BLK1	ND	mg/kg	0.010	0.0034	
p- & m-Xylenes	BUI1646-BLK1	ND	mg/kg	0.0050	0.0022	
o-Xylene	BUI1646-BLK1	ND	mg/kg	0.0050	0.0012	
1,2-Dichloroethane-d4 (Surrogate)	BUI1646-BLK1	101	%	70 - 121 (LCL - UCL)		
Toluene-d8 (Surrogate)	BUI1646-BLK1	99.4	%	81 - 117 (LCL - UCL)		
4-Bromofluorobenzene (Surrogate)	BUI1646-BLK1	96.7	%	74 - 121 (LCL - UCL)		

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Volatile Organic Analysis (EPA Method 8260)

Quality Control Report - Laboratory Control Sample

Constituent	QC Sample ID	Type	Result	Spike Level	Units	Percent Recovery	RPD	Control Limits Percent Recovery	Control Limits RPD	Lab Quals
QC Batch ID: BUI1646										
Benzene	BUI1646-BS1	LCS	0.12609	0.12500	mg/kg	101		70 - 130		
Bromodichloromethane	BUI1646-BS1	LCS	0.11788	0.12500	mg/kg	94.3		70 - 130		
Chlorobenzene	BUI1646-BS1	LCS	0.11942	0.12500	mg/kg	95.5		70 - 130		
Chloroethane	BUI1646-BS1	LCS	0.13282	0.12500	mg/kg	106		70 - 130		
1,4-Dichlorobenzene	BUI1646-BS1	LCS	0.11667	0.12500	mg/kg	93.3		70 - 130		
1,1-Dichloroethane	BUI1646-BS1	LCS	0.12619	0.12500	mg/kg	101		70 - 130		
1,1-Dichloroethene	BUI1646-BS1	LCS	0.13453	0.12500	mg/kg	108		70 - 130		
Toluene	BUI1646-BS1	LCS	0.12020	0.12500	mg/kg	96.2		70 - 130		
Trichloroethene	BUI1646-BS1	LCS	0.12338	0.12500	mg/kg	98.7		70 - 130		
1,2-Dichloroethane-d4 (Surrogate)	BUI1646-BS1	LCS	0.050682	0.050000	mg/kg	101		70 - 121		
Toluene-d8 (Surrogate)	BUI1646-BS1	LCS	0.049870	0.050000	mg/kg	99.7		81 - 117		
4-Bromofluorobenzene (Surrogate)	BUI1646-BS1	LCS	0.051599	0.050000	mg/kg	103		74 - 121		

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Volatile Organic Analysis (EPA Method 8260)

Quality Control Report - Precision & Accuracy

Constituent	Type	Source Sample ID	Source Result	Result	Spike Added	Units	RPD	Percent Recovery	Control Limits RPD	Control Limits Percent Recovery	Lab Quals
QC Batch ID: BUI1646	Used client sample: N										
Benzene	MS	1115418-13	ND	0.12854	0.12500	mg/kg		103		70 - 130	
	MSD	1115418-13	ND	0.12826	0.12500	mg/kg	0.2	103	20	70 - 130	
Bromodichloromethane	MS	1115418-13	ND	0.12269	0.12500	mg/kg		98.2		70 - 130	
	MSD	1115418-13	ND	0.12328	0.12500	mg/kg	0.5	98.6	20	70 - 130	
Chlorobenzene	MS	1115418-13	ND	0.12262	0.12500	mg/kg		98.1		70 - 130	
	MSD	1115418-13	ND	0.12280	0.12500	mg/kg	0.1	98.2	20	70 - 130	
Chloroethane	MS	1115418-13	ND	0.12451	0.12500	mg/kg		99.6		70 - 130	
	MSD	1115418-13	ND	0.12879	0.12500	mg/kg	3.4	103	20	70 - 130	
1,4-Dichlorobenzene	MS	1115418-13	ND	0.12018	0.12500	mg/kg		96.1		70 - 130	
	MSD	1115418-13	ND	0.11955	0.12500	mg/kg	0.5	95.6	20	70 - 130	
1,1-Dichloroethane	MS	1115418-13	ND	0.12731	0.12500	mg/kg		102		70 - 130	
	MSD	1115418-13	ND	0.12966	0.12500	mg/kg	1.8	104	20	70 - 130	
1,1-Dichloroethene	MS	1115418-13	ND	0.12976	0.12500	mg/kg		104		70 - 130	
	MSD	1115418-13	ND	0.13054	0.12500	mg/kg	0.6	104	20	70 - 130	
Toluene	MS	1115418-13	ND	0.12610	0.12500	mg/kg		101		70 - 130	
	MSD	1115418-13	ND	0.12623	0.12500	mg/kg	0.1	101	20	70 - 130	
Trichloroethene	MS	1115418-13	ND	0.12749	0.12500	mg/kg		102		70 - 130	
	MSD	1115418-13	ND	0.12729	0.12500	mg/kg	0.2	102	20	70 - 130	
1,2-Dichloroethane-d4 (Surrogate)	MS	1115418-13	ND	0.051154	0.050000	mg/kg		102		70 - 121	
	MSD	1115418-13	ND	0.050866	0.050000	mg/kg	0.6	102		70 - 121	
Toluene-d8 (Surrogate)	MS	1115418-13	ND	0.049880	0.050000	mg/kg		99.8		81 - 117	
	MSD	1115418-13	ND	0.050415	0.050000	mg/kg	1.1	101		81 - 117	
4-Bromofluorobenzene (Surrogate)	MS	1115418-13	ND	0.051324	0.050000	mg/kg		103		74 - 121	
	MSD	1115418-13	ND	0.051337	0.050000	mg/kg	0.0	103		74 - 121	

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

Quality Control Report - Method Blank Analysis

Constituent	QC Sample ID	MB Result	Units	PQL	MDL	Lab Quals
QC Batch ID: BUJ0149						
Acenaphthene	BUJ0149-BLK1	ND	mg/kg	0.10	0.018	
Acenaphthylene	BUJ0149-BLK1	ND	mg/kg	0.10	0.019	
Aldrin	BUJ0149-BLK1	ND	mg/kg	0.10	0.024	
Aniline	BUJ0149-BLK1	ND	mg/kg	0.20	0.053	
Anthracene	BUJ0149-BLK1	ND	mg/kg	0.10	0.018	
Benzidine	BUJ0149-BLK1	ND	mg/kg	3.0	0.22	
Benzo[a]anthracene	BUJ0149-BLK1	ND	mg/kg	0.10	0.012	
Benzo[b]fluoranthene	BUJ0149-BLK1	ND	mg/kg	0.10	0.018	
Benzo[k]fluoranthene	BUJ0149-BLK1	ND	mg/kg	0.10	0.019	
Benzo[a]pyrene	BUJ0149-BLK1	ND	mg/kg	0.10	0.015	
Benzo[g,h,i]perylene	BUJ0149-BLK1	ND	mg/kg	0.10	0.056	
Benzoic acid	BUJ0149-BLK1	ND	mg/kg	0.50	0.067	
Benzyl alcohol	BUJ0149-BLK1	ND	mg/kg	0.10	0.018	
Benzyl butyl phthalate	BUJ0149-BLK1	ND	mg/kg	0.10	0.021	
alpha-BHC	BUJ0149-BLK1	ND	mg/kg	0.10	0.018	
beta-BHC	BUJ0149-BLK1	ND	mg/kg	0.10	0.021	
delta-BHC	BUJ0149-BLK1	ND	mg/kg	0.10	0.018	
gamma-BHC (Lindane)	BUJ0149-BLK1	ND	mg/kg	0.10	0.017	
bis(2-Chloroethoxy)methane	BUJ0149-BLK1	ND	mg/kg	0.10	0.017	
bis(2-Chloroethyl) ether	BUJ0149-BLK1	ND	mg/kg	0.10	0.016	
bis(2-Chloroisopropyl)ether	BUJ0149-BLK1	ND	mg/kg	0.10	0.021	
bis(2-Ethylhexyl)phthalate	BUJ0149-BLK1	0.051780	mg/kg	0.20	0.043	J,M03
4-Bromophenyl phenyl ether	BUJ0149-BLK1	ND	mg/kg	0.10	0.017	
4-Chloroaniline	BUJ0149-BLK1	ND	mg/kg	0.10	0.027	
2-Chloronaphthalene	BUJ0149-BLK1	ND	mg/kg	0.10	0.020	
4-Chlorophenyl phenyl ether	BUJ0149-BLK1	ND	mg/kg	0.10	0.015	
Chrysene	BUJ0149-BLK1	ND	mg/kg	0.10	0.017	
4,4'-DDD	BUJ0149-BLK1	ND	mg/kg	0.10	0.017	
4,4'-DDE	BUJ0149-BLK1	ND	mg/kg	0.10	0.017	
4,4'-DDT	BUJ0149-BLK1	ND	mg/kg	0.10	0.019	
Dibenzo[a,h]anthracene	BUJ0149-BLK1	ND	mg/kg	0.10	0.019	
Dibenzofuran	BUJ0149-BLK1	ND	mg/kg	0.10	0.020	
1,2-Dichlorobenzene	BUJ0149-BLK1	ND	mg/kg	0.10	0.020	
1,3-Dichlorobenzene	BUJ0149-BLK1	ND	mg/kg	0.10	0.021	

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

Quality Control Report - Method Blank Analysis

Constituent	QC Sample ID	MB Result	Units	PQL	MDL	Lab Quals
QC Batch ID: BUJ0149						
1,4-Dichlorobenzene	BUJ0149-BLK1	ND	mg/kg	0.10	0.019	
3,3-Dichlorobenzidine	BUJ0149-BLK1	ND	mg/kg	0.20	0.0067	
Dieldrin	BUJ0149-BLK1	ND	mg/kg	0.10	0.031	
Diethyl phthalate	BUJ0149-BLK1	ND	mg/kg	0.10	0.019	
Dimethyl phthalate	BUJ0149-BLK1	ND	mg/kg	0.10	0.020	
Di-n-butyl phthalate	BUJ0149-BLK1	ND	mg/kg	0.10	0.018	
2,4-Dinitrotoluene	BUJ0149-BLK1	ND	mg/kg	0.10	0.022	
2,6-Dinitrotoluene	BUJ0149-BLK1	ND	mg/kg	0.10	0.018	
Di-n-octyl phthalate	BUJ0149-BLK1	ND	mg/kg	0.10	0.017	
1,2-Diphenylhydrazine	BUJ0149-BLK1	ND	mg/kg	0.10	0.019	
Endosulfan I	BUJ0149-BLK1	ND	mg/kg	0.20	0.020	
Endosulfan II	BUJ0149-BLK1	ND	mg/kg	0.20	0.021	
Endosulfan sulfate	BUJ0149-BLK1	ND	mg/kg	0.10	0.021	
Endrin	BUJ0149-BLK1	ND	mg/kg	0.20	0.025	
Endrin aldehyde	BUJ0149-BLK1	ND	mg/kg	0.50	0.022	
Fluoranthene	BUJ0149-BLK1	ND	mg/kg	0.10	0.017	
Fluorene	BUJ0149-BLK1	ND	mg/kg	0.10	0.019	
Heptachlor	BUJ0149-BLK1	ND	mg/kg	0.10	0.021	
Heptachlor epoxide	BUJ0149-BLK1	ND	mg/kg	0.10	0.017	
Hexachlorobenzene	BUJ0149-BLK1	ND	mg/kg	0.10	0.016	
Hexachlorobutadiene	BUJ0149-BLK1	ND	mg/kg	0.10	0.017	
Hexachlorocyclopentadiene	BUJ0149-BLK1	ND	mg/kg	0.10	0.019	
Hexachloroethane	BUJ0149-BLK1	ND	mg/kg	0.10	0.020	
Indeno[1,2,3-cd]pyrene	BUJ0149-BLK1	ND	mg/kg	0.10	0.072	
Isophorone	BUJ0149-BLK1	ND	mg/kg	0.10	0.017	
2-Methylnaphthalene	BUJ0149-BLK1	ND	mg/kg	0.10	0.018	
Naphthalene	BUJ0149-BLK1	ND	mg/kg	0.10	0.018	
2-Naphthylamine	BUJ0149-BLK1	ND	mg/kg	3.0	0.16	
2-Nitroaniline	BUJ0149-BLK1	ND	mg/kg	0.10	0.018	
3-Nitroaniline	BUJ0149-BLK1	ND	mg/kg	0.20	0.015	
4-Nitroaniline	BUJ0149-BLK1	ND	mg/kg	0.20	0.025	
Nitrobenzene	BUJ0149-BLK1	ND	mg/kg	0.10	0.015	
N-Nitrosodimethylamine	BUJ0149-BLK1	ND	mg/kg	0.10	0.037	
N-Nitrosodi-N-propylamine	BUJ0149-BLK1	ND	mg/kg	0.10	0.021	

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

Quality Control Report - Method Blank Analysis

Constituent	QC Sample ID	MB Result	Units	PQL	MDL	Lab Quals
QC Batch ID: BUJ0149						
N-Nitrosodiphenylamine	BUJ0149-BLK1	ND	mg/kg	0.10	0.021	
Phenanthrene	BUJ0149-BLK1	ND	mg/kg	0.10	0.018	
Pyrene	BUJ0149-BLK1	ND	mg/kg	0.10	0.017	
1,2,4-Trichlorobenzene	BUJ0149-BLK1	ND	mg/kg	0.10	0.018	
4-Chloro-3-methylphenol	BUJ0149-BLK1	ND	mg/kg	0.20	0.022	
2-Chlorophenol	BUJ0149-BLK1	ND	mg/kg	0.10	0.016	
2,4-Dichlorophenol	BUJ0149-BLK1	ND	mg/kg	0.10	0.017	
2,4-Dimethylphenol	BUJ0149-BLK1	ND	mg/kg	0.10	0.035	
4,6-Dinitro-2-methylphenol	BUJ0149-BLK1	ND	mg/kg	0.50	0.012	
2,4-Dinitrophenol	BUJ0149-BLK1	ND	mg/kg	0.50	0.0077	
2-Methylphenol	BUJ0149-BLK1	ND	mg/kg	0.10	0.017	
3- & 4-Methylphenol	BUJ0149-BLK1	ND	mg/kg	0.20	0.033	
2-Nitrophenol	BUJ0149-BLK1	ND	mg/kg	0.10	0.016	
4-Nitrophenol	BUJ0149-BLK1	ND	mg/kg	0.20	0.018	
Pentachlorophenol	BUJ0149-BLK1	ND	mg/kg	0.20	0.013	
Phenol	BUJ0149-BLK1	ND	mg/kg	0.10	0.016	
2,4,5-Trichlorophenol	BUJ0149-BLK1	ND	mg/kg	0.20	0.018	
2,4,6-Trichlorophenol	BUJ0149-BLK1	ND	mg/kg	0.20	0.017	
2-Fluorophenol (Surrogate)	BUJ0149-BLK1	68.7	%	28 - 144 (LCL - UCL)		
Phenol-d5 (Surrogate)	BUJ0149-BLK1	38.4	%	36 - 136 (LCL - UCL)		
Nitrobenzene-d5 (Surrogate)	BUJ0149-BLK1	86.0	%	31 - 135 (LCL - UCL)		
2-Fluorobiphenyl (Surrogate)	BUJ0149-BLK1	84.7	%	20 - 140 (LCL - UCL)		
2,4,6-Tribromophenol (Surrogate)	BUJ0149-BLK1	119	%	20 - 150 (LCL - UCL)		
p-Terphenyl-d14 (Surrogate)	BUJ0149-BLK1	58.7	%	10 - 150 (LCL - UCL)		
QC Batch ID: BUJ0343						
Acenaphthene	BUJ0343-BLK1	ND	mg/kg	0.10	0.018	
Acenaphthylene	BUJ0343-BLK1	ND	mg/kg	0.10	0.019	
Aldrin	BUJ0343-BLK1	ND	mg/kg	0.10	0.024	
Aniline	BUJ0343-BLK1	ND	mg/kg	0.20	0.053	
Anthracene	BUJ0343-BLK1	ND	mg/kg	0.10	0.018	
Benzidine	BUJ0343-BLK1	ND	mg/kg	3.0	0.22	
Benzo[a]anthracene	BUJ0343-BLK1	ND	mg/kg	0.10	0.012	
Benzo[b]fluoranthene	BUJ0343-BLK1	ND	mg/kg	0.10	0.018	

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Gannett Fleming, Inc
1 Technology Drive, Suite F207
Irvine, CA 92618

Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

Quality Control Report - Method Blank Analysis

Constituent	QC Sample ID	MB Result	Units	PQL	MDL	Lab Quals
QC Batch ID: BUJ0343						
Benzo[k]fluoranthene	BUJ0343-BLK1	ND	mg/kg	0.10	0.019	
Benzo[a]pyrene	BUJ0343-BLK1	ND	mg/kg	0.10	0.015	
Benzo[g,h,i]perylene	BUJ0343-BLK1	ND	mg/kg	0.10	0.056	
Benzoic acid	BUJ0343-BLK1	ND	mg/kg	0.50	0.067	
Benzyl alcohol	BUJ0343-BLK1	ND	mg/kg	0.10	0.018	
Benzyl butyl phthalate	BUJ0343-BLK1	ND	mg/kg	0.10	0.021	
alpha-BHC	BUJ0343-BLK1	ND	mg/kg	0.10	0.018	
beta-BHC	BUJ0343-BLK1	ND	mg/kg	0.10	0.021	
delta-BHC	BUJ0343-BLK1	ND	mg/kg	0.10	0.018	
gamma-BHC (Lindane)	BUJ0343-BLK1	ND	mg/kg	0.10	0.017	
bis(2-Chloroethoxy)methane	BUJ0343-BLK1	ND	mg/kg	0.10	0.017	
bis(2-Chloroethyl) ether	BUJ0343-BLK1	ND	mg/kg	0.10	0.016	
bis(2-Chloroisopropyl)ether	BUJ0343-BLK1	ND	mg/kg	0.10	0.021	
bis(2-Ethylhexyl)phthalate	BUJ0343-BLK1	ND	mg/kg	0.20	0.043	
4-Bromophenyl phenyl ether	BUJ0343-BLK1	ND	mg/kg	0.10	0.017	
4-Chloroaniline	BUJ0343-BLK1	ND	mg/kg	0.10	0.027	
2-Chloronaphthalene	BUJ0343-BLK1	ND	mg/kg	0.10	0.020	
4-Chlorophenyl phenyl ether	BUJ0343-BLK1	ND	mg/kg	0.10	0.015	
Chrysene	BUJ0343-BLK1	ND	mg/kg	0.10	0.017	
4,4'-DDD	BUJ0343-BLK1	ND	mg/kg	0.10	0.017	
4,4'-DDE	BUJ0343-BLK1	ND	mg/kg	0.10	0.017	
4,4'-DDT	BUJ0343-BLK1	ND	mg/kg	0.10	0.019	
Dibenzo[a,h]anthracene	BUJ0343-BLK1	ND	mg/kg	0.10	0.019	
Dibenzofuran	BUJ0343-BLK1	ND	mg/kg	0.10	0.020	
1,2-Dichlorobenzene	BUJ0343-BLK1	ND	mg/kg	0.10	0.020	
1,3-Dichlorobenzene	BUJ0343-BLK1	ND	mg/kg	0.10	0.021	
1,4-Dichlorobenzene	BUJ0343-BLK1	ND	mg/kg	0.10	0.019	
3,3-Dichlorobenzidine	BUJ0343-BLK1	ND	mg/kg	0.20	0.0067	
Dieldrin	BUJ0343-BLK1	ND	mg/kg	0.10	0.031	
Diethyl phthalate	BUJ0343-BLK1	ND	mg/kg	0.10	0.019	
Dimethyl phthalate	BUJ0343-BLK1	ND	mg/kg	0.10	0.020	
Di-n-butyl phthalate	BUJ0343-BLK1	ND	mg/kg	0.10	0.018	
2,4-Dinitrotoluene	BUJ0343-BLK1	ND	mg/kg	0.10	0.022	
2,6-Dinitrotoluene	BUJ0343-BLK1	ND	mg/kg	0.10	0.018	

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

Quality Control Report - Method Blank Analysis

Constituent	QC Sample ID	MB Result	Units	PQL	MDL	Lab Quals
QC Batch ID: BUJ0343						
Di-n-octyl phthalate	BUJ0343-BLK1	ND	mg/kg	0.10	0.017	
1,2-Diphenylhydrazine	BUJ0343-BLK1	ND	mg/kg	0.10	0.019	
Endosulfan I	BUJ0343-BLK1	ND	mg/kg	0.20	0.020	
Endosulfan II	BUJ0343-BLK1	ND	mg/kg	0.20	0.021	
Endosulfan sulfate	BUJ0343-BLK1	ND	mg/kg	0.10	0.021	
Endrin	BUJ0343-BLK1	ND	mg/kg	0.20	0.025	
Endrin aldehyde	BUJ0343-BLK1	ND	mg/kg	0.50	0.022	
Fluoranthene	BUJ0343-BLK1	ND	mg/kg	0.10	0.017	
Fluorene	BUJ0343-BLK1	ND	mg/kg	0.10	0.019	
Heptachlor	BUJ0343-BLK1	ND	mg/kg	0.10	0.021	
Heptachlor epoxide	BUJ0343-BLK1	ND	mg/kg	0.10	0.017	
Hexachlorobenzene	BUJ0343-BLK1	ND	mg/kg	0.10	0.016	
Hexachlorobutadiene	BUJ0343-BLK1	ND	mg/kg	0.10	0.017	
Hexachlorocyclopentadiene	BUJ0343-BLK1	ND	mg/kg	0.10	0.019	
Hexachloroethane	BUJ0343-BLK1	ND	mg/kg	0.10	0.020	
Indeno[1,2,3-cd]pyrene	BUJ0343-BLK1	ND	mg/kg	0.10	0.072	
Isophorone	BUJ0343-BLK1	ND	mg/kg	0.10	0.017	
2-Methylnaphthalene	BUJ0343-BLK1	ND	mg/kg	0.10	0.018	
Naphthalene	BUJ0343-BLK1	ND	mg/kg	0.10	0.018	
2-Naphthylamine	BUJ0343-BLK1	ND	mg/kg	3.0	0.16	
2-Nitroaniline	BUJ0343-BLK1	ND	mg/kg	0.10	0.018	
3-Nitroaniline	BUJ0343-BLK1	ND	mg/kg	0.20	0.015	
4-Nitroaniline	BUJ0343-BLK1	ND	mg/kg	0.20	0.025	
Nitrobenzene	BUJ0343-BLK1	ND	mg/kg	0.10	0.015	
N-Nitrosodimethylamine	BUJ0343-BLK1	ND	mg/kg	0.10	0.037	
N-Nitrosodi-N-propylamine	BUJ0343-BLK1	ND	mg/kg	0.10	0.021	
N-Nitrosodiphenylamine	BUJ0343-BLK1	ND	mg/kg	0.10	0.021	
Phenanthrene	BUJ0343-BLK1	ND	mg/kg	0.10	0.018	
Pyrene	BUJ0343-BLK1	ND	mg/kg	0.10	0.017	
1,2,4-Trichlorobenzene	BUJ0343-BLK1	ND	mg/kg	0.10	0.018	
4-Chloro-3-methylphenol	BUJ0343-BLK1	ND	mg/kg	0.20	0.022	
2-Chlorophenol	BUJ0343-BLK1	ND	mg/kg	0.10	0.016	
2,4-Dichlorophenol	BUJ0343-BLK1	ND	mg/kg	0.10	0.017	
2,4-Dimethylphenol	BUJ0343-BLK1	ND	mg/kg	0.10	0.035	

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

Quality Control Report - Method Blank Analysis

Constituent	QC Sample ID	MB Result	Units	PQL	MDL	Lab Quals
QC Batch ID: BUJ0343						
4,6-Dinitro-2-methylphenol	BUJ0343-BLK1	ND	mg/kg	0.50	0.012	
2,4-Dinitrophenol	BUJ0343-BLK1	ND	mg/kg	0.50	0.0077	
2-Methylphenol	BUJ0343-BLK1	ND	mg/kg	0.10	0.017	
3- & 4-Methylphenol	BUJ0343-BLK1	ND	mg/kg	0.20	0.033	
2-Nitrophenol	BUJ0343-BLK1	ND	mg/kg	0.10	0.016	
4-Nitrophenol	BUJ0343-BLK1	ND	mg/kg	0.20	0.018	
Pentachlorophenol	BUJ0343-BLK1	ND	mg/kg	0.20	0.013	
Phenol	BUJ0343-BLK1	ND	mg/kg	0.10	0.016	
2,4,5-Trichlorophenol	BUJ0343-BLK1	ND	mg/kg	0.20	0.018	
2,4,6-Trichlorophenol	BUJ0343-BLK1	ND	mg/kg	0.20	0.017	
2-Fluorophenol (Surrogate)	BUJ0343-BLK1	72.8	%	28 - 144 (LCL - UCL)		
Phenol-d5 (Surrogate)	BUJ0343-BLK1	41.7	%	36 - 136 (LCL - UCL)		
Nitrobenzene-d5 (Surrogate)	BUJ0343-BLK1	89.8	%	31 - 135 (LCL - UCL)		
2-Fluorobiphenyl (Surrogate)	BUJ0343-BLK1	88.3	%	20 - 140 (LCL - UCL)		
2,4,6-Tribromophenol (Surrogate)	BUJ0343-BLK1	125	%	20 - 150 (LCL - UCL)		
p-Terphenyl-d14 (Surrogate)	BUJ0343-BLK1	76.8	%	10 - 150 (LCL - UCL)		

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Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

Quality Control Report - Laboratory Control Sample

Constituent	QC Sample ID	Type	Result	Spike Level	Units	Percent Recovery	RPD	Control Limits Percent Recovery	Control Limits RPD	Lab Quals
QC Batch ID: BUJ0149										
Acenaphthene	BUJ0149-BS1	LCS	1.3696	1.6611	mg/kg	82.4		40 - 156		
1,4-Dichlorobenzene	BUJ0149-BS1	LCS	1.2986	1.6611	mg/kg	78.2		35 - 153		
2,4-Dinitrotoluene	BUJ0149-BS1	LCS	1.5752	1.6611	mg/kg	94.8		30 - 150		
Hexachlorobenzene	BUJ0149-BS1	LCS	1.4684	1.6611	mg/kg	88.4		45 - 143		
Hexachlorobutadiene	BUJ0149-BS1	LCS	1.2658	1.6611	mg/kg	76.2		29 - 144		
Hexachloroethane	BUJ0149-BS1	LCS	1.3964	1.6611	mg/kg	84.1		39 - 151		
Nitrobenzene	BUJ0149-BS1	LCS	1.3141	1.6611	mg/kg	79.1		31 - 143		
N-Nitrosodi-N-propylamine	BUJ0149-BS1	LCS	1.0663	1.6611	mg/kg	64.2		45 - 135		
Pyrene	BUJ0149-BS1	LCS	1.1376	1.6611	mg/kg	68.5		40 - 150		
1,2,4-Trichlorobenzene	BUJ0149-BS1	LCS	1.4636	1.6611	mg/kg	88.1		31 - 166		
4-Chloro-3-methylphenol	BUJ0149-BS1	LCS	1.3682	1.6611	mg/kg	82.4		46 - 134		
2-Chlorophenol	BUJ0149-BS1	LCS	1.1191	1.6611	mg/kg	67.4		31 - 134		
2-Methylphenol	BUJ0149-BS1	LCS	1.2028	1.6611	mg/kg	72.4		37 - 148		
3- & 4-Methylphenol	BUJ0149-BS1	LCS	2.3039	3.3223	mg/kg	69.3		41 - 113		
4-Nitrophenol	BUJ0149-BS1	LCS	1.4479	1.6611	mg/kg	87.2		21 - 144		
Pentachlorophenol	BUJ0149-BS1	LCS	1.4007	1.6611	mg/kg	84.3		21 - 126		
Phenol	BUJ0149-BS1	LCS	2.0122	1.6611	mg/kg	121		40 - 117		
2,4,6-Trichlorophenol	BUJ0149-BS1	LCS	1.3571	1.6611	mg/kg	81.7		36 - 139		
2-Fluorophenol (Surrogate)	BUJ0149-BS1	LCS	1.8880	2.6578	mg/kg	71.0		28 - 144		
Phenol-d5 (Surrogate)	BUJ0149-BS1	LCS	1.0857	2.6578	mg/kg	40.8		36 - 136		
Nitrobenzene-d5 (Surrogate)	BUJ0149-BS1	LCS	2.3558	2.6578	mg/kg	88.6		31 - 135		
2-Fluorobiphenyl (Surrogate)	BUJ0149-BS1	LCS	2.3910	2.6578	mg/kg	90.0		20 - 140		
2,4,6-Tribromophenol (Surrogate)	BUJ0149-BS1	LCS	3.4047	2.6578	mg/kg	128		20 - 150		
p-Terphenyl-d14 (Surrogate)	BUJ0149-BS1	LCS	0.83322	1.3289	mg/kg	62.7		10 - 150		
QC Batch ID: BUJ0343										
Acenaphthene	BUJ0343-BS1	LCS	1.3673	1.6835	mg/kg	81.2		40 - 156		
1,4-Dichlorobenzene	BUJ0343-BS1	LCS	1.3036	1.6835	mg/kg	77.4		35 - 153		
2,4-Dinitrotoluene	BUJ0343-BS1	LCS	1.3953	1.6835	mg/kg	82.9		30 - 150		
Hexachlorobenzene	BUJ0343-BS1	LCS	1.3839	1.6835	mg/kg	82.2		45 - 143		
Hexachlorobutadiene	BUJ0343-BS1	LCS	1.2675	1.6835	mg/kg	75.3		29 - 144		
Hexachloroethane	BUJ0343-BS1	LCS	0.72666	1.6835	mg/kg	43.2		39 - 151		
Nitrobenzene	BUJ0343-BS1	LCS	1.3126	1.6835	mg/kg	78.0		31 - 143		
N-Nitrosodi-N-propylamine	BUJ0343-BS1	LCS	1.0700	1.6835	mg/kg	63.6		45 - 135		

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

Quality Control Report - Laboratory Control Sample

Constituent	QC Sample ID	Type	Result	Spike Level	Units	Percent Recovery	RPD	Control Limits Percent Recovery	Control Limits RPD	Lab Quals
QC Batch ID: BUJ0343										
Pyrene	BUJ0343-BS1	LCS	1.3833	1.6835	mg/kg	82.2		40 - 150		
1,2,4-Trichlorobenzene	BUJ0343-BS1	LCS	1.5319	1.6835	mg/kg	91.0		31 - 166		
4-Chloro-3-methylphenol	BUJ0343-BS1	LCS	1.3534	1.6835	mg/kg	80.4		46 - 134		
2-Chlorophenol	BUJ0343-BS1	LCS	1.0984	1.6835	mg/kg	65.2		31 - 134		
2-Methylphenol	BUJ0343-BS1	LCS	1.1880	1.6835	mg/kg	70.6		37 - 148		
3- & 4-Methylphenol	BUJ0343-BS1	LCS	2.3681	3.3670	mg/kg	70.3		41 - 113		
4-Nitrophenol	BUJ0343-BS1	LCS	1.3045	1.6835	mg/kg	77.5		21 - 144		
Pentachlorophenol	BUJ0343-BS1	LCS	1.0764	1.6835	mg/kg	63.9		21 - 126		
Phenol	BUJ0343-BS1	LCS	2.0089	1.6835	mg/kg	119		40 - 117		L21
2,4,6-Trichlorophenol	BUJ0343-BS1	LCS	1.3110	1.6835	mg/kg	77.9		36 - 139		
2-Fluorophenol (Surrogate)	BUJ0343-BS1	LCS	1.8796	2.6936	mg/kg	69.8		28 - 144		
Phenol-d5 (Surrogate)	BUJ0343-BS1	LCS	1.0712	2.6936	mg/kg	39.8		36 - 136		
Nitrobenzene-d5 (Surrogate)	BUJ0343-BS1	LCS	2.2817	2.6936	mg/kg	84.7		31 - 135		
2-Fluorobiphenyl (Surrogate)	BUJ0343-BS1	LCS	2.3043	2.6936	mg/kg	85.5		20 - 140		
2,4,6-Tribromophenol (Surrogate)	BUJ0343-BS1	LCS	3.1460	2.6936	mg/kg	117		20 - 150		
p-Terphenyl-d14 (Surrogate)	BUJ0343-BS1	LCS	0.93220	1.3468	mg/kg	69.2		10 - 150		

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

Quality Control Report - Precision & Accuracy

Constituent	Type	Source Sample ID	Source Result	Result	Spike Added	Units	RPD	Percent Recovery	Control Limits RPD	Control Limits Percent Recovery	Lab Quals
QC Batch ID: BUJ0149	Used client sample: Y - Description: B-9-10-D, 09/20/2011 09:05										
Acenaphthene	MS	1115416-23	ND	1.2653	1.6502	mg/kg		76.7		26 - 166	
	MSD	1115416-23	ND	1.3494	1.6502	mg/kg	6.4	81.8	30	26 - 166	
1,4-Dichlorobenzene	MS	1115416-23	ND	1.2014	1.6502	mg/kg		72.8		20 - 164	
	MSD	1115416-23	ND	1.3387	1.6502	mg/kg	10.8	81.1	30	20 - 164	
2,4-Dinitrotoluene	MS	1115416-23	ND	1.3814	1.6502	mg/kg		83.7		30 - 200	
	MSD	1115416-23	ND	1.4393	1.6502	mg/kg	4.1	87.2	30	30 - 200	
Hexachlorobenzene	MS	1115416-23	ND	1.2806	1.6502	mg/kg		77.6		26 - 152	
	MSD	1115416-23	ND	1.4494	1.6502	mg/kg	12.4	87.8	30	26 - 152	
Hexachlorobutadiene	MS	1115416-23	ND	1.1298	1.6502	mg/kg		68.5		20 - 140	
	MSD	1115416-23	ND	1.2486	1.6502	mg/kg	10.0	75.7	30	20 - 140	
Hexachloroethane	MS	1115416-23	ND	1.2771	1.6502	mg/kg		77.4		30 - 140	
	MSD	1115416-23	ND	1.4019	1.6502	mg/kg	9.3	85.0	30	30 - 140	
Nitrobenzene	MS	1115416-23	ND	1.1418	1.6502	mg/kg		69.2		20 - 140	
	MSD	1115416-23	ND	1.2971	1.6502	mg/kg	12.7	78.6	30	20 - 140	
N-Nitrosodi-N-propylamine	MS	1115416-23	ND	1.0228	1.6502	mg/kg		62.0		30 - 140	
	MSD	1115416-23	ND	1.1261	1.6502	mg/kg	9.6	68.2	30	30 - 140	
Pyrene	MS	1115416-23	ND	1.1547	1.6502	mg/kg		70.0		30 - 150	
	MSD	1115416-23	ND	1.2176	1.6502	mg/kg	5.3	73.8	30	30 - 150	
1,2,4-Trichlorobenzene	MS	1115416-23	ND	1.3468	1.6502	mg/kg		81.6		20 - 166	
	MSD	1115416-23	ND	1.4983	1.6502	mg/kg	10.7	90.8	30	20 - 166	
4-Chloro-3-methylphenol	MS	1115416-23	ND	1.2725	1.6502	mg/kg		77.1		37 - 137	
	MSD	1115416-23	ND	1.3675	1.6502	mg/kg	7.2	82.9	30	37 - 137	
2-Chlorophenol	MS	1115416-23	ND	1.0300	1.6502	mg/kg		62.4		27 - 140	
	MSD	1115416-23	ND	1.1654	1.6502	mg/kg	12.3	70.6	30	27 - 140	
2-Methylphenol	MS	1115416-23	ND	1.0915	1.6502	mg/kg		66.1		22 - 163	
	MSD	1115416-23	ND	1.2028	1.6502	mg/kg	9.7	72.9	30	22 - 163	
3- & 4-Methylphenol	MS	1115416-23	ND	2.1404	3.3003	mg/kg		64.9		31 - 123	
	MSD	1115416-23	ND	2.3666	3.3003	mg/kg	10.0	71.7	30	31 - 123	
4-Nitrophenol	MS	1115416-23	ND	1.4203	1.6502	mg/kg		86.1		20 - 149	
	MSD	1115416-23	ND	1.4936	1.6502	mg/kg	5.0	90.5	30	20 - 149	
Pentachlorophenol	MS	1115416-23	ND	1.3442	1.6502	mg/kg		81.5		20 - 130	
	MSD	1115416-23	ND	1.4431	1.6502	mg/kg	7.1	87.5	30	20 - 130	
Phenol	MS	1115416-23	ND	1.9017	1.6502	mg/kg		115		22 - 135	
	MSD	1115416-23	ND	2.0674	1.6502	mg/kg	8.4	125	30	22 - 135	
2,4,6-Trichlorophenol	MS	1115416-23	ND	1.2514	1.6502	mg/kg		75.8		31 - 147	
	MSD	1115416-23	ND	1.3506	1.6502	mg/kg	7.6	81.8	30	31 - 147	

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

Quality Control Report - Precision & Accuracy

Constituent	Type	Source Sample ID	Source Result	Result	Spike Added	Units	RPD	Percent Recovery	Control Limits RPD	Control Limits Percent Recovery	Lab Quals
QC Batch ID: BUJ0149	Used client sample: Y - Description: B-9-10-D, 09/20/2011 09:05										
2-Fluorophenol (Surrogate)	MS	1115416-23	ND	1.7968	2.6403	mg/kg		68.1		28 - 144	
	MSD	1115416-23	ND	1.9545	2.6403	mg/kg	8.4	74.0		28 - 144	
Phenol-d5 (Surrogate)	MS	1115416-23	ND	1.0300	2.6403	mg/kg		39.0		36 - 136	
	MSD	1115416-23	ND	1.1000	2.6403	mg/kg	6.6	41.7		36 - 136	
Nitrobenzene-d5 (Surrogate)	MS	1115416-23	ND	2.1201	2.6403	mg/kg		80.3		31 - 135	
	MSD	1115416-23	ND	2.3465	2.6403	mg/kg	10.1	88.9		31 - 135	
2-Fluorobiphenyl (Surrogate)	MS	1115416-23	ND	2.1549	2.6403	mg/kg		81.6		20 - 140	
	MSD	1115416-23	ND	2.2314	2.6403	mg/kg	3.5	84.5		20 - 140	
2,4,6-Tribromophenol (Surrogate)	MS	1115416-23	ND	3.0607	2.6403	mg/kg		116		20 - 150	
	MSD	1115416-23	ND	3.3663	2.6403	mg/kg	9.5	127		20 - 150	
p-Terphenyl-d14 (Surrogate)	MS	1115416-23	ND	0.80233	1.3201	mg/kg		60.8		10 - 150	
	MSD	1115416-23	ND	0.87780	1.3201	mg/kg	9.0	66.5		10 - 150	
QC Batch ID: BUJ0343	Used client sample: Y - Description: B-1-5, 09/19/2011 08:50										
Acenaphthene	MS	1115416-01	ND	1.3034	1.6611	mg/kg		78.5		26 - 166	
	MSD	1115416-01	ND	1.1704	1.6835	mg/kg	10.8	69.5	30	26 - 166	
1,4-Dichlorobenzene	MS	1115416-01	ND	1.2943	1.6611	mg/kg		77.9		20 - 164	
	MSD	1115416-01	ND	1.1931	1.6835	mg/kg	8.1	70.9	30	20 - 164	
2,4-Dinitrotoluene	MS	1115416-01	ND	1.3559	1.6611	mg/kg		81.6		30 - 200	
	MSD	1115416-01	ND	1.2092	1.6835	mg/kg	11.4	71.8	30	30 - 200	
Hexachlorobenzene	MS	1115416-01	ND	1.2579	1.6611	mg/kg		75.7		26 - 152	
	MSD	1115416-01	ND	1.1878	1.6835	mg/kg	5.7	70.6	30	26 - 152	
Hexachlorobutadiene	MS	1115416-01	ND	1.2096	1.6611	mg/kg		72.8		20 - 140	
	MSD	1115416-01	ND	1.0409	1.6835	mg/kg	15.0	61.8	30	20 - 140	
Hexachloroethane	MS	1115416-01	ND	0.91502	1.6611	mg/kg		55.1		30 - 140	
	MSD	1115416-01	ND	0.79477	1.6835	mg/kg	14.1	47.2	30	30 - 140	
Nitrobenzene	MS	1115416-01	ND	1.2954	1.6611	mg/kg		78.0		20 - 140	
	MSD	1115416-01	ND	1.1721	1.6835	mg/kg	10.0	69.6	30	20 - 140	
N-Nitrosodi-N-propylamine	MS	1115416-01	ND	1.1566	1.6611	mg/kg		69.6		30 - 140	
	MSD	1115416-01	ND	1.0213	1.6835	mg/kg	12.4	60.7	30	30 - 140	
Pyrene	MS	1115416-01	ND	1.2653	1.6611	mg/kg		76.2		30 - 150	
	MSD	1115416-01	ND	1.1772	1.6835	mg/kg	7.2	69.9	30	30 - 150	
1,2,4-Trichlorobenzene	MS	1115416-01	ND	1.4734	1.6611	mg/kg		88.7		20 - 166	
	MSD	1115416-01	ND	1.2914	1.6835	mg/kg	13.2	76.7	30	20 - 166	
4-Chloro-3-methylphenol	MS	1115416-01	ND	1.3618	1.6611	mg/kg		82.0		37 - 137	
	MSD	1115416-01	ND	1.2434	1.6835	mg/kg	9.1	73.9	30	37 - 137	
2-Chlorophenol	MS	1115416-01	ND	1.1749	1.6611	mg/kg		70.7		27 - 140	
	MSD	1115416-01	ND	1.1283	1.6835	mg/kg	4.0	67.0	30	27 - 140	

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Gannett Fleming, Inc
1 Technology Drive, Suite F207
Irvine, CA 92618

Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

Quality Control Report - Precision & Accuracy

Constituent	Type	Source Sample ID	Source Result	Result	Spike Added	Units	RPD	Percent Recovery	Control Limits RPD	Control Limits Percent Recovery	Lab Quals
QC Batch ID: BUJ0343	Used client sample: Y - Description: B-1-5, 09/19/2011 08:50										
2-Methylphenol	MS	1115416-01	ND	1.3497	1.6611	mg/kg		81.2		22 - 163	
	MSD	1115416-01	ND	1.2215	1.6835	mg/kg	10.0	72.6	30	22 - 163	
3- & 4-Methylphenol	MS	1115416-01	ND	2.5791	3.3223	mg/kg		77.6		31 - 123	
	MSD	1115416-01	ND	2.4374	3.3670	mg/kg	5.6	72.4	30	31 - 123	
4-Nitrophenol	MS	1115416-01	ND	1.5819	1.6611	mg/kg		95.2		20 - 149	
	MSD	1115416-01	ND	1.3834	1.6835	mg/kg	13.4	82.2	30	20 - 149	
Pentachlorophenol	MS	1115416-01	ND	1.3214	1.6611	mg/kg		79.5		20 - 130	
	MSD	1115416-01	ND	1.2125	1.6835	mg/kg	8.6	72.0	30	20 - 130	
Phenol	MS	1115416-01	ND	2.1745	1.6611	mg/kg		131		22 - 135	
	MSD	1115416-01	ND	2.0303	1.6835	mg/kg	6.9	121	30	22 - 135	
2,4,6-Trichlorophenol	MS	1115416-01	ND	1.4158	1.6611	mg/kg		85.2		31 - 147	
	MSD	1115416-01	ND	1.3436	1.6835	mg/kg	5.2	79.8	30	31 - 147	
2-Fluorophenol (Surrogate)	MS	1115416-01	ND	2.0767	2.6578	mg/kg		78.1		28 - 144	
	MSD	1115416-01	ND	1.9410	2.6936	mg/kg	6.8	72.1		28 - 144	
Phenol-d5 (Surrogate)	MS	1115416-01	ND	1.1542	2.6578	mg/kg		43.4		36 - 136	
	MSD	1115416-01	ND	1.1090	2.6936	mg/kg	4.0	41.2		36 - 136	
Nitrobenzene-d5 (Surrogate)	MS	1115416-01	ND	2.4203	2.6578	mg/kg		91.1		31 - 135	
	MSD	1115416-01	ND	2.2678	2.6936	mg/kg	6.5	84.2		31 - 135	
2-Fluorobiphenyl (Surrogate)	MS	1115416-01	ND	2.3532	2.6578	mg/kg		88.5		20 - 140	
	MSD	1115416-01	ND	2.0622	2.6936	mg/kg	13.2	76.6		20 - 140	
2,4,6-Tribromophenol (Surrogate)	MS	1115416-01	ND	3.3671	2.6578	mg/kg		127		20 - 150	
	MSD	1115416-01	ND	3.1625	2.6936	mg/kg	6.3	117		20 - 150	
p-Terphenyl-d14 (Surrogate)	MS	1115416-01	ND	0.89535	1.3289	mg/kg		67.4		10 - 150	
	MSD	1115416-01	ND	0.80970	1.3468	mg/kg	10.0	60.1		10 - 150	

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Purgeable Aromatics and Total Petroleum Hydrocarbons

Quality Control Report - Method Blank Analysis

Constituent	QC Sample ID	MB Result	Units	PQL	MDL	Lab Quals
QC Batch ID: BUJ0255						
TPH - Light Naptha	BUJ0255-BLK1	ND	mg/kg	50	20	
TPH - Aviation Gas	BUJ0255-BLK1	ND	mg/kg	50	20	
TPH - Stoddard Solvent	BUJ0255-BLK1	ND	mg/kg	20	5.0	
TPH - Heavy Naptha	BUJ0255-BLK1	ND	mg/kg	10	5.0	
TPH - Gasoline	BUJ0255-BLK1	ND	mg/kg	20	5.0	
TPH - Jet Fuel (JP4)	BUJ0255-BLK1	ND	mg/kg	10	5.0	
TPH - Jet Fuel (JP5)	BUJ0255-BLK1	ND	mg/kg	10	4.6	
TPH - Jet Fuel (JP8)	BUJ0255-BLK1	ND	mg/kg	10	5.0	
TPH - Kerosene	BUJ0255-BLK1	ND	mg/kg	10	1.4	
TPH - Diesel (FFP)	BUJ0255-BLK1	ND	mg/kg	10	1.2	
TPH - Fuel Oil #6	BUJ0255-BLK1	ND	mg/kg	10	5.0	
TPH - Crude Oil	BUJ0255-BLK1	ND	mg/kg	20	2.8	
TPH - Hydraulic Oil / Motor Oil	BUJ0255-BLK1	ND	mg/kg	20	6.5	
TPH - WD-40	BUJ0255-BLK1	ND	mg/kg	10	5.0	
Tetracosane (Surrogate)	BUJ0255-BLK1	83.5	%	20 - 145 (LCL - UCL)		
QC Batch ID: BUJ0256						
TPH - Light Naptha	BUJ0256-BLK1	ND	mg/kg	50	20	
TPH - Aviation Gas	BUJ0256-BLK1	ND	mg/kg	50	20	
TPH - Stoddard Solvent	BUJ0256-BLK1	ND	mg/kg	20	5.0	
TPH - Heavy Naptha	BUJ0256-BLK1	ND	mg/kg	10	5.0	
TPH - Gasoline	BUJ0256-BLK1	ND	mg/kg	20	5.0	
TPH - Jet Fuel (JP4)	BUJ0256-BLK1	ND	mg/kg	10	5.0	
TPH - Jet Fuel (JP5)	BUJ0256-BLK1	ND	mg/kg	10	4.6	
TPH - Jet Fuel (JP8)	BUJ0256-BLK1	ND	mg/kg	10	5.0	
TPH - Kerosene	BUJ0256-BLK1	ND	mg/kg	10	1.4	
TPH - Diesel (FFP)	BUJ0256-BLK1	ND	mg/kg	10	1.2	
TPH - Fuel Oil #6	BUJ0256-BLK1	ND	mg/kg	10	5.0	
TPH - Crude Oil	BUJ0256-BLK1	ND	mg/kg	20	2.8	
TPH - Hydraulic Oil / Motor Oil	BUJ0256-BLK1	ND	mg/kg	20	6.5	
TPH - WD-40	BUJ0256-BLK1	ND	mg/kg	10	5.0	
Tetracosane (Surrogate)	BUJ0256-BLK1	82.7	%	20 - 145 (LCL - UCL)		

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Purgeable Aromatics and Total Petroleum Hydrocarbons

Quality Control Report - Laboratory Control Sample

Constituent	QC Sample ID	Type	Result	Spike Level	Units	Percent Recovery	RPD	Control Limits Percent Recovery	Control Limits RPD	Lab Quals
QC Batch ID: BUJ0255										
TPH - Diesel (FFP)	BUJ0255-BS1	LCS	74.564	83.333	mg/kg	89.5		64 - 124		
Tetracosane (Surrogate)	BUJ0255-BS1	LCS	2.8056	3.3333	mg/kg	84.2		20 - 145		
QC Batch ID: BUJ0256										
TPH - Diesel (FFP)	BUJ0256-BS1	LCS	79.818	84.459	mg/kg	94.5		64 - 124		
Tetracosane (Surrogate)	BUJ0256-BS1	LCS	2.8853	3.3784	mg/kg	85.4		20 - 145		

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Purgeable Aromatics and Total Petroleum Hydrocarbons

Quality Control Report - Precision & Accuracy

Constituent	Type	Source Sample ID	Source Result	Result	Spike Added	Units	RPD	Percent Recovery	Control Limits RPD	Control Limits Percent Recovery	Lab Quals
QC Batch ID: BUJ0255	Used client sample: Y - Description: B-4-10-D, 09/20/2011 11:03										
TPH - Diesel (FFP)	MS	1115416-24	ND	82.795	82.508	mg/kg		100		52 - 131	
	MSD	1115416-24	ND	69.709	84.459	mg/kg	17.2	82.5	30	52 - 131	
Tetracosane (Surrogate)	MS	1115416-24	ND	2.9849	3.3003	mg/kg		90.4		20 - 145	
	MSD	1115416-24	ND	2.6728	3.3784	mg/kg	11.0	79.1		20 - 145	
QC Batch ID: BUJ0256	Used client sample: Y - Description: B-1-10, 09/19/2011 08:55										
TPH - Diesel (FFP)	MS	1115416-02	ND	88.999	83.333	mg/kg		107		52 - 131	
	MSD	1115416-02	ND	89.302	84.459	mg/kg	0.3	106	30	52 - 131	
Tetracosane (Surrogate)	MS	1115416-02	ND	3.1865	3.3333	mg/kg		95.6		20 - 145	
	MSD	1115416-02	ND	3.2389	3.3784	mg/kg	1.6	95.9		20 - 145	

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Total Concentrations (TTLC)

Quality Control Report - Method Blank Analysis

Constituent	QC Sample ID	MB Result	Units	PQL	MDL	Lab Quals
QC Batch ID: BUI1659						
Mercury	BUI1659-BLK1	ND	mg/kg	0.16	0.024	
QC Batch ID: BUI1739						
Antimony	BUI1739-BLK1	ND	mg/kg	5.0	0.50	
Arsenic	BUI1739-BLK1	ND	mg/kg	1.0	0.38	
Barium	BUI1739-BLK1	ND	mg/kg	0.50	0.077	
Beryllium	BUI1739-BLK1	ND	mg/kg	0.50	0.050	
Cadmium	BUI1739-BLK1	ND	mg/kg	0.50	0.050	
Chromium	BUI1739-BLK1	ND	mg/kg	0.50	0.060	
Cobalt	BUI1739-BLK1	ND	mg/kg	2.5	0.25	
Copper	BUI1739-BLK1	ND	mg/kg	1.0	0.12	
Lead	BUI1739-BLK1	ND	mg/kg	2.5	0.25	
Molybdenum	BUI1739-BLK1	ND	mg/kg	2.5	0.25	
Nickel	BUI1739-BLK1	ND	mg/kg	0.50	0.058	
Selenium	BUI1739-BLK1	ND	mg/kg	1.0	0.51	
Silver	BUI1739-BLK1	0.062786	mg/kg	0.50	0.050	J
Thallium	BUI1739-BLK1	ND	mg/kg	5.0	0.73	
Vanadium	BUI1739-BLK1	ND	mg/kg	0.50	0.050	
Zinc	BUI1739-BLK1	0.38473	mg/kg	2.5	0.25	J
QC Batch ID: BUI1770						
Mercury	BUI1770-BLK1	ND	mg/kg	0.16	0.024	
QC Batch ID: BUI1866						
Antimony	BUI1866-BLK1	ND	mg/kg	5.0	0.50	
Arsenic	BUI1866-BLK1	ND	mg/kg	1.0	0.38	
Barium	BUI1866-BLK1	ND	mg/kg	0.50	0.077	
Beryllium	BUI1866-BLK1	ND	mg/kg	0.50	0.050	
Cadmium	BUI1866-BLK1	ND	mg/kg	0.50	0.050	
Chromium	BUI1866-BLK1	ND	mg/kg	0.50	0.060	
Cobalt	BUI1866-BLK1	ND	mg/kg	2.5	0.25	
Copper	BUI1866-BLK1	ND	mg/kg	1.0	0.12	
Lead	BUI1866-BLK1	ND	mg/kg	2.5	0.25	
Molybdenum	BUI1866-BLK1	ND	mg/kg	2.5	0.25	
Nickel	BUI1866-BLK1	ND	mg/kg	0.50	0.058	
Selenium	BUI1866-BLK1	ND	mg/kg	1.0	0.51	

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Total Concentrations (TTLC)

Quality Control Report - Method Blank Analysis

Constituent	QC Sample ID	MB Result	Units	PQL	MDL	Lab Quals
QC Batch ID: BUI1866						
Silver	BUI1866-BLK1	ND	mg/kg	0.50	0.050	
Thallium	BUI1866-BLK1	ND	mg/kg	5.0	0.73	
Vanadium	BUI1866-BLK1	ND	mg/kg	0.50	0.050	
Zinc	BUI1866-BLK1	0.55045	mg/kg	2.5	0.25	J
QC Batch ID: BUJ0080						
Antimony	BUJ0080-BLK1	ND	mg/kg	5.0	0.50	
Arsenic	BUJ0080-BLK1	ND	mg/kg	1.0	0.38	
Barium	BUJ0080-BLK1	0.078983	mg/kg	0.50	0.077	J
Beryllium	BUJ0080-BLK1	ND	mg/kg	0.50	0.050	
Cadmium	BUJ0080-BLK1	ND	mg/kg	0.50	0.050	
Chromium	BUJ0080-BLK1	ND	mg/kg	0.50	0.060	
Cobalt	BUJ0080-BLK1	ND	mg/kg	2.5	0.25	
Copper	BUJ0080-BLK1	ND	mg/kg	1.0	0.12	
Lead	BUJ0080-BLK1	ND	mg/kg	2.5	0.25	
Molybdenum	BUJ0080-BLK1	ND	mg/kg	2.5	0.25	
Nickel	BUJ0080-BLK1	0.15872	mg/kg	0.50	0.058	J
Selenium	BUJ0080-BLK1	ND	mg/kg	1.0	0.51	
Silver	BUJ0080-BLK1	0.089621	mg/kg	0.50	0.050	J
Thallium	BUJ0080-BLK1	ND	mg/kg	5.0	0.73	
Vanadium	BUJ0080-BLK1	ND	mg/kg	0.50	0.050	
Zinc	BUJ0080-BLK1	0.49232	mg/kg	2.5	0.25	J

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Total Concentrations (TTLC)

Quality Control Report - Laboratory Control Sample

Constituent	QC Sample ID	Type	Result	Spike Level	Units	Percent Recovery	RPD	Control Limits Percent Recovery	Control Limits RPD	Lab Quals
QC Batch ID: BUI1659										
Mercury	BUI1659-BS1	LCS	0.82000	0.80000	mg/kg	102		80 - 120		
QC Batch ID: BUI1739										
Antimony	BUI1739-BS1	LCS	95.771	100.00	mg/kg	95.8		75 - 125		
Arsenic	BUI1739-BS1	LCS	10.047	10.000	mg/kg	100		75 - 125		
Barium	BUI1739-BS1	LCS	101.96	100.00	mg/kg	102		75 - 125		
Beryllium	BUI1739-BS1	LCS	10.200	10.000	mg/kg	102		75 - 125		
Cadmium	BUI1739-BS1	LCS	9.9668	10.000	mg/kg	99.7		75 - 125		
Chromium	BUI1739-BS1	LCS	100.22	100.00	mg/kg	100		75 - 125		
Cobalt	BUI1739-BS1	LCS	104.39	100.00	mg/kg	104		75 - 125		
Copper	BUI1739-BS1	LCS	101.26	100.00	mg/kg	101		75 - 125		
Lead	BUI1739-BS1	LCS	105.50	100.00	mg/kg	106		75 - 125		
Molybdenum	BUI1739-BS1	LCS	99.400	100.00	mg/kg	99.4		75 - 125		
Nickel	BUI1739-BS1	LCS	103.71	100.00	mg/kg	104		75 - 125		
Selenium	BUI1739-BS1	LCS	10.915	10.000	mg/kg	109		75 - 125		
Silver	BUI1739-BS1	LCS	10.113	10.000	mg/kg	101		75 - 125		
Thallium	BUI1739-BS1	LCS	107.01	100.00	mg/kg	107		75 - 125		
Vanadium	BUI1739-BS1	LCS	96.333	100.00	mg/kg	96.3		75 - 125		
Zinc	BUI1739-BS1	LCS	103.40	100.00	mg/kg	103		75 - 125		
QC Batch ID: BUI1770										
Mercury	BUI1770-BS1	LCS	0.82304	0.80000	mg/kg	103		80 - 120		
QC Batch ID: BUI1866										
Antimony	BUI1866-BS1	LCS	94.688	100.00	mg/kg	94.7		75 - 125		
Arsenic	BUI1866-BS1	LCS	9.5759	10.000	mg/kg	95.8		75 - 125		
Barium	BUI1866-BS1	LCS	100.94	100.00	mg/kg	101		75 - 125		
Beryllium	BUI1866-BS1	LCS	10.026	10.000	mg/kg	100		75 - 125		
Cadmium	BUI1866-BS1	LCS	9.7274	10.000	mg/kg	97.3		75 - 125		
Chromium	BUI1866-BS1	LCS	98.705	100.00	mg/kg	98.7		75 - 125		
Cobalt	BUI1866-BS1	LCS	101.59	100.00	mg/kg	102		75 - 125		
Copper	BUI1866-BS1	LCS	97.561	100.00	mg/kg	97.6		75 - 125		
Lead	BUI1866-BS1	LCS	103.66	100.00	mg/kg	104		75 - 125		
Molybdenum	BUI1866-BS1	LCS	96.312	100.00	mg/kg	96.3		75 - 125		
Nickel	BUI1866-BS1	LCS	100.82	100.00	mg/kg	101		75 - 125		
Selenium	BUI1866-BS1	LCS	10.205	10.000	mg/kg	102		75 - 125		

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Gannett Fleming, Inc
1 Technology Drive, Suite F207
Irvine, CA 92618

Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Total Concentrations (TTLC)

Quality Control Report - Laboratory Control Sample

Constituent	QC Sample ID	Type	Result	Spike Level	Units	Percent Recovery	RPD	Control Limits Percent Recovery	Control Limits RPD	Lab Quals
QC Batch ID: BUI1866										
Silver	BUI1866-BS1	LCS	9.8286	10.000	mg/kg	98.3		75 - 125		
Thallium	BUI1866-BS1	LCS	106.31	100.00	mg/kg	106		75 - 125		
Vanadium	BUI1866-BS1	LCS	94.590	100.00	mg/kg	94.6		75 - 125		
Zinc	BUI1866-BS1	LCS	101.48	100.00	mg/kg	101		75 - 125		
QC Batch ID: BUJ0080										
Antimony	BUJ0080-BS1	LCS	101.78	100.00	mg/kg	102		75 - 125		
Arsenic	BUJ0080-BS1	LCS	10.334	10.000	mg/kg	103		75 - 125		
Barium	BUJ0080-BS1	LCS	104.92	100.00	mg/kg	105		75 - 125		
Beryllium	BUJ0080-BS1	LCS	10.522	10.000	mg/kg	105		75 - 125		
Cadmium	BUJ0080-BS1	LCS	10.383	10.000	mg/kg	104		75 - 125		
Chromium	BUJ0080-BS1	LCS	102.98	100.00	mg/kg	103		75 - 125		
Cobalt	BUJ0080-BS1	LCS	108.55	100.00	mg/kg	109		75 - 125		
Copper	BUJ0080-BS1	LCS	101.90	100.00	mg/kg	102		75 - 125		
Lead	BUJ0080-BS1	LCS	109.67	100.00	mg/kg	110		75 - 125		
Molybdenum	BUJ0080-BS1	LCS	102.77	100.00	mg/kg	103		75 - 125		
Nickel	BUJ0080-BS1	LCS	108.50	100.00	mg/kg	108		75 - 125		
Selenium	BUJ0080-BS1	LCS	10.929	10.000	mg/kg	109		75 - 125		
Silver	BUJ0080-BS1	LCS	10.129	10.000	mg/kg	101		75 - 125		
Thallium	BUJ0080-BS1	LCS	110.32	100.00	mg/kg	110		75 - 125		
Vanadium	BUJ0080-BS1	LCS	103.03	100.00	mg/kg	103		75 - 125		
Zinc	BUJ0080-BS1	LCS	105.05	100.00	mg/kg	105		75 - 125		

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Irvine, CA 92618

Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Total Concentrations (TTLC)

Quality Control Report - Precision & Accuracy

Constituent	Type	Source Sample ID	Source Result	Result	Spike Added	Units	RPD	Percent Recovery	Control Limits RPD	Control Limits Percent Recovery	Lab Quals
QC Batch ID: BUI1659	Used client sample: N										
Mercury	DUP	1115365-01	ND	ND		mg/kg			20		
	MS	1115365-01	ND	0.82079	0.79365	mg/kg		103		80 - 120	
	MSD	1115365-01	ND	0.84857	0.79365	mg/kg	3.3	107	20	80 - 120	
QC Batch ID: BUI1739	Used client sample: N										
Antimony	DUP	1115404-10	1.5223	1.5117		mg/kg	0.7		20		J
	MS	1115404-10	1.5223	54.943	100.00	mg/kg		53.4		16 - 119	
	MSD	1115404-10	1.5223	51.402	100.00	mg/kg	6.7	49.9	20	16 - 119	
Arsenic	DUP	1115404-10	4.5077	4.5032		mg/kg	0.1		20		
	MS	1115404-10	4.5077	14.368	10.000	mg/kg		98.6		75 - 125	
	MSD	1115404-10	4.5077	13.385	10.000	mg/kg	7.1	88.8	20	75 - 125	
Barium	DUP	1115404-10	80.275	79.665		mg/kg	0.8		20		
	MS	1115404-10	80.275	188.44	100.00	mg/kg		108		75 - 125	
	MSD	1115404-10	80.275	177.37	100.00	mg/kg	6.0	97.1	20	75 - 125	
Beryllium	DUP	1115404-10	0.48634	0.48248		mg/kg	0.8		20		J
	MS	1115404-10	0.48634	10.633	10.000	mg/kg		101		75 - 125	
	MSD	1115404-10	0.48634	10.375	10.000	mg/kg	2.5	98.9	20	75 - 125	
Cadmium	DUP	1115404-10	0.21405	0.19283		mg/kg	10.4		20		J
	MS	1115404-10	0.21405	10.167	10.000	mg/kg		99.5		75 - 125	
	MSD	1115404-10	0.21405	9.9741	10.000	mg/kg	1.9	97.6	20	75 - 125	
Chromium	DUP	1115404-10	13.182	13.082		mg/kg	0.8		20		
	MS	1115404-10	13.182	113.26	100.00	mg/kg		100		75 - 125	
	MSD	1115404-10	13.182	108.59	100.00	mg/kg	4.2	95.4	20	75 - 125	
Cobalt	DUP	1115404-10	4.9034	4.7506		mg/kg	3.2		20		
	MS	1115404-10	4.9034	103.22	100.00	mg/kg		98.3		75 - 125	
	MSD	1115404-10	4.9034	101.02	100.00	mg/kg	2.2	96.1	20	75 - 125	
Copper	DUP	1115404-10	7.8218	7.8138		mg/kg	0.1		20		
	MS	1115404-10	7.8218	110.10	100.00	mg/kg		102		75 - 125	
	MSD	1115404-10	7.8218	107.88	100.00	mg/kg	2.0	100	20	75 - 125	
Lead	DUP	1115404-10	4.3006	4.1928		mg/kg	2.5		20		
	MS	1115404-10	4.3006	103.87	100.00	mg/kg		99.6		75 - 125	
	MSD	1115404-10	4.3006	101.97	100.00	mg/kg	1.8	97.7	20	75 - 125	
Molybdenum	DUP	1115404-10	0.50145	0.47313		mg/kg	5.8		20		J
	MS	1115404-10	0.50145	92.807	100.00	mg/kg		92.3		75 - 125	
	MSD	1115404-10	0.50145	90.853	100.00	mg/kg	2.1	90.4	20	75 - 125	
Nickel	DUP	1115404-10	14.994	14.459		mg/kg	3.6		20		
	MS	1115404-10	14.994	114.70	100.00	mg/kg		99.7		75 - 125	
	MSD	1115404-10	14.994	110.60	100.00	mg/kg	3.6	95.6	20	75 - 125	

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Gannett Fleming, Inc
1 Technology Drive, Suite F207
Irvine, CA 92618

Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Total Concentrations (TTLC)

Quality Control Report - Precision & Accuracy

Constituent	Type	Source Sample ID	Source Result	Result	Spike Added	Units	RPD	Percent Recovery	Control Limits RPD	Control Limits Percent Recovery	Lab Quals
QC Batch ID: BUI1739	Used client sample: N										
Selenium	DUP	1115404-10	ND	ND		mg/kg			20		
	MS	1115404-10	ND	11.157	10.000	mg/kg		112		75 - 125	
	MSD	1115404-10	ND	10.325	10.000	mg/kg	7.7	103	20	75 - 125	
Silver	DUP	1115404-10	ND	ND		mg/kg			20		
	MS	1115404-10	ND	9.4973	10.000	mg/kg		95.0		75 - 125	
	MSD	1115404-10	ND	9.5589	10.000	mg/kg	0.6	95.6	20	75 - 125	
Thallium	DUP	1115404-10	ND	ND		mg/kg			20		
	MS	1115404-10	ND	98.771	100.00	mg/kg		98.8		75 - 125	
	MSD	1115404-10	ND	98.241	100.00	mg/kg	0.5	98.2	20	75 - 125	
Vanadium	DUP	1115404-10	26.903	26.266		mg/kg	2.4		20		
	MS	1115404-10	26.903	124.65	100.00	mg/kg		97.7		75 - 125	
	MSD	1115404-10	26.903	116.40	100.00	mg/kg	6.8	89.5	20	75 - 125	
Zinc	DUP	1115404-10	28.369	28.049		mg/kg	1.1		20		
	MS	1115404-10	28.369	129.23	100.00	mg/kg		101		75 - 125	
	MSD	1115404-10	28.369	125.27	100.00	mg/kg	3.1	96.9	20	75 - 125	
QC Batch ID: BUI1770	Used client sample: N										
Mercury	DUP	1115470-01	0.033281	ND		mg/kg			20		
	MS	1115470-01	0.033281	0.86078	0.78125	mg/kg		106		80 - 120	
	MSD	1115470-01	0.033281	0.84891	0.78125	mg/kg	1.4	104	20	80 - 120	
QC Batch ID: BUI1866	Used client sample: Y - Description: B-1-25, 09/19/2011 09:20										
Antimony	DUP	1115416-05	1.2339	1.1405		mg/kg	7.9		20		J
	MS	1115416-05	1.2339	26.561	100.00	mg/kg		25.3		16 - 119	
	MSD	1115416-05	1.2339	28.709	100.00	mg/kg	7.8	27.5	20	16 - 119	
Arsenic	DUP	1115416-05	2.7353	2.7423		mg/kg	0.3		20		
	MS	1115416-05	2.7353	10.844	10.000	mg/kg		81.1		75 - 125	
	MSD	1115416-05	2.7353	11.290	10.000	mg/kg	4.0	85.5	20	75 - 125	
Barium	DUP	1115416-05	55.155	54.590		mg/kg	1.0		20		
	MS	1115416-05	55.155	146.19	100.00	mg/kg		91.0		75 - 125	
	MSD	1115416-05	55.155	149.94	100.00	mg/kg	2.5	94.8	20	75 - 125	
Beryllium	DUP	1115416-05	0.28568	0.28552		mg/kg	0.1		20		J
	MS	1115416-05	0.28568	9.3391	10.000	mg/kg		90.5		75 - 125	
	MSD	1115416-05	0.28568	9.8172	10.000	mg/kg	5.0	95.3	20	75 - 125	
Cadmium	DUP	1115416-05	0.082965	0.10211		mg/kg	20.7		20		J,A02
	MS	1115416-05	0.082965	9.0650	10.000	mg/kg		89.8		75 - 125	
	MSD	1115416-05	0.082965	9.3253	10.000	mg/kg	2.8	92.4	20	75 - 125	
Chromium	DUP	1115416-05	9.5817	9.5392		mg/kg	0.4		20		
	MS	1115416-05	9.5817	100.33	100.00	mg/kg		90.7		75 - 125	
	MSD	1115416-05	9.5817	102.66	100.00	mg/kg	2.3	93.1	20	75 - 125	

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Gannett Fleming, Inc
1 Technology Drive, Suite F207
Irvine, CA 92618

Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Total Concentrations (TTLC)

Quality Control Report - Precision & Accuracy

Constituent	Type	Source Sample ID	Source Result	Result	Spike Added	Units	RPD	Percent Recovery	Control Limits RPD	Control Limits Percent Recovery	Lab Quals
QC Batch ID: BUI1866	Used client sample: Y - Description: B-1-25, 09/19/2011 09:20										
Cobalt	DUP	1115416-05	3.1491	3.4110		mg/kg	8.0		20		
	MS	1115416-05	3.1491	94.523	100.00	mg/kg		91.4		75 - 125	
	MSD	1115416-05	3.1491	96.186	100.00	mg/kg	1.7	93.0	20	75 - 125	
Copper	DUP	1115416-05	19.490	19.498		mg/kg	0.0		20		
	MS	1115416-05	19.490	117.91	100.00	mg/kg		98.4		75 - 125	
	MSD	1115416-05	19.490	120.42	100.00	mg/kg	2.1	101	20	75 - 125	
Lead	DUP	1115416-05	7.7865	8.2781		mg/kg	6.1		20		
	MS	1115416-05	7.7865	96.907	100.00	mg/kg		89.1		75 - 125	
	MSD	1115416-05	7.7865	101.69	100.00	mg/kg	4.8	93.9	20	75 - 125	
Molybdenum	DUP	1115416-05	0.95259	1.0129		mg/kg	6.1		20		J
	MS	1115416-05	0.95259	86.359	100.00	mg/kg		85.4		75 - 125	
	MSD	1115416-05	0.95259	89.370	100.00	mg/kg	3.4	88.4	20	75 - 125	
Nickel	DUP	1115416-05	3.3966	3.5875		mg/kg	5.5		20		
	MS	1115416-05	3.3966	94.580	100.00	mg/kg		91.2		75 - 125	
	MSD	1115416-05	3.3966	96.092	100.00	mg/kg	1.6	92.7	20	75 - 125	
Selenium	DUP	1115416-05	ND	ND		mg/kg			20		
	MS	1115416-05	ND	8.9284	10.000	mg/kg		89.3		75 - 125	
	MSD	1115416-05	ND	9.5801	10.000	mg/kg	7.0	95.8	20	75 - 125	
Silver	DUP	1115416-05	ND	ND		mg/kg			20		
	MS	1115416-05	ND	8.6967	10.000	mg/kg		87.0		75 - 125	
	MSD	1115416-05	ND	9.1691	10.000	mg/kg	5.3	91.7	20	75 - 125	
Thallium	DUP	1115416-05	ND	ND		mg/kg			20		
	MS	1115416-05	ND	88.770	100.00	mg/kg		88.8		75 - 125	
	MSD	1115416-05	ND	95.813	100.00	mg/kg	7.6	95.8	20	75 - 125	
Vanadium	DUP	1115416-05	17.389	17.229		mg/kg	0.9		20		
	MS	1115416-05	17.389	106.47	100.00	mg/kg		89.1		75 - 125	
	MSD	1115416-05	17.389	106.29	100.00	mg/kg	0.2	88.9	20	75 - 125	
Zinc	DUP	1115416-05	42.928	43.105		mg/kg	0.4		20		
	MS	1115416-05	42.928	139.45	100.00	mg/kg		96.5		75 - 125	
	MSD	1115416-05	42.928	143.88	100.00	mg/kg	3.1	101	20	75 - 125	
QC Batch ID: BUJ0080	Used client sample: N										
Antimony	DUP	1115926-05	1.0194	1.0173		mg/kg	0.2		20		J
	MS	1115926-05	1.0194	52.823	100.00	mg/kg		51.8		16 - 119	
	MSD	1115926-05	1.0194	51.716	100.00	mg/kg	2.1	50.7	20	16 - 119	
Arsenic	DUP	1115926-05	4.2850	4.3725		mg/kg	2.0		20		
	MS	1115926-05	4.2850	14.840	10.000	mg/kg		106		75 - 125	
	MSD	1115926-05	4.2850	14.639	10.000	mg/kg	1.4	104	20	75 - 125	

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Total Concentrations (TTLC)

Quality Control Report - Precision & Accuracy

Constituent	Type	Source Sample ID	Source Result	Result	Spike Added	Units	RPD	Percent Recovery	Control Limits RPD	Control Limits Percent Recovery	Lab Quals
QC Batch ID: BUJ0080	Used client sample: N										
Barium	DUP	1115926-05	63.269	63.263		mg/kg	0.0		20		
	MS	1115926-05	63.269	159.13	100.00	mg/kg		95.9		75 - 125	
	MSD	1115926-05	63.269	163.97	100.00	mg/kg	3.0	101	20	75 - 125	
Beryllium	DUP	1115926-05	0.19304	0.19070		mg/kg	1.2		20		J
	MS	1115926-05	0.19304	10.448	10.000	mg/kg		103		75 - 125	
	MSD	1115926-05	0.19304	10.397	10.000	mg/kg	0.5	102	20	75 - 125	
Cadmium	DUP	1115926-05	0.11726	0.10367		mg/kg	12.3		20		J
	MS	1115926-05	0.11726	10.371	10.000	mg/kg		103		75 - 125	
	MSD	1115926-05	0.11726	10.292	10.000	mg/kg	0.8	102	20	75 - 125	
Chromium	DUP	1115926-05	9.4930	9.5128		mg/kg	0.2		20		
	MS	1115926-05	9.4930	109.05	100.00	mg/kg		99.6		75 - 125	
	MSD	1115926-05	9.4930	108.83	100.00	mg/kg	0.2	99.3	20	75 - 125	
Cobalt	DUP	1115926-05	3.3936	3.3584		mg/kg	1.0		20		
	MS	1115926-05	3.3936	106.04	100.00	mg/kg		103		75 - 125	
	MSD	1115926-05	3.3936	105.58	100.00	mg/kg	0.4	102	20	75 - 125	
Copper	DUP	1115926-05	8.8201	8.7386		mg/kg	0.9		20		
	MS	1115926-05	8.8201	108.42	100.00	mg/kg		99.6		75 - 125	
	MSD	1115926-05	8.8201	109.34	100.00	mg/kg	0.8	101	20	75 - 125	
Lead	DUP	1115926-05	105.78	107.47		mg/kg	1.6		20		
	MS	1115926-05	105.78	197.96	100.00	mg/kg		92.2		75 - 125	
	MSD	1115926-05	105.78	206.66	100.00	mg/kg	4.3	101	20	75 - 125	
Molybdenum	DUP	1115926-05	0.75588	0.71161		mg/kg	6.0		20		J
	MS	1115926-05	0.75588	97.958	100.00	mg/kg		97.2		75 - 125	
	MSD	1115926-05	0.75588	97.185	100.00	mg/kg	0.8	96.4	20	75 - 125	
Nickel	DUP	1115926-05	7.7843	7.9936		mg/kg	2.7		20		
	MS	1115926-05	7.7843	109.06	100.00	mg/kg		101		75 - 125	
	MSD	1115926-05	7.7843	108.17	100.00	mg/kg	0.8	100	20	75 - 125	
Selenium	DUP	1115926-05	ND	ND		mg/kg			20		
	MS	1115926-05	ND	9.9510	10.000	mg/kg		99.5		75 - 125	
	MSD	1115926-05	ND	9.8335	10.000	mg/kg	1.2	98.3	20	75 - 125	
Silver	DUP	1115926-05	ND	ND		mg/kg			20		
	MS	1115926-05	ND	9.9345	10.000	mg/kg		99.3		75 - 125	
	MSD	1115926-05	ND	9.8072	10.000	mg/kg	1.3	98.1	20	75 - 125	
Thallium	DUP	1115926-05	ND	0.75744		mg/kg			20		J
	MS	1115926-05	ND	103.51	100.00	mg/kg		104		75 - 125	
	MSD	1115926-05	ND	101.30	100.00	mg/kg	2.2	101	20	75 - 125	
Vanadium	DUP	1115926-05	22.253	22.346		mg/kg	0.4		20		
	MS	1115926-05	22.253	121.47	100.00	mg/kg		99.2		75 - 125	
	MSD	1115926-05	22.253	122.69	100.00	mg/kg	1.0	100	20	75 - 125	

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Total Concentrations (TTLC)

Quality Control Report - Precision & Accuracy

Constituent	Type	Source Sample ID	Source Result	Result	Spike Added	Units	RPD	Percent Recovery	Control Limits RPD	Control Limits Percent Recovery	Lab Quals
QC Batch ID: BUJ0080	Used client sample: N										
Zinc	DUP	1115926-05	39.264	39.297		mg/kg	0.1		20		
	MS	1115926-05	39.264	140.14	100.00	mg/kg		101		75 - 125	
	MSD	1115926-05	39.264	142.64	100.00	mg/kg	1.8	103	20	75 - 125	

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Reported: 10/10/2011 15:08
Project: Devils Gate
Project Number: 603211-001
Project Manager: Michael Crews

Notes And Definitions

J	Estimated Value (CLP Flag)
MDL	Method Detection Limit
ND	Analyte Not Detected at or above the reporting limit
PQL	Practical Quantitation Limit
RPD	Relative Percent Difference
A02	The difference between duplicate readings is less than the PQL.
A10	PQL's and MDL's were raised due to matrix interference.
A11	PQL's and/or MDL's were raised due to inadequate sample size received.
A52	Chromatogram not typical of diesel.
L21	The Laboratory Control Sample Soil (LCSS) recovery is not within laboratory established control limits.
M03	Analyte detected in the Method Blank at a level between the PQL and the MDL.
S09	The surrogate recovery on the sample for this compound was not within the control limits.
V11	The Continuing Calibration Verification (CCV) recovery is not within established control limits.

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.
All results listed in this report are for the exclusive use of the submitting party. BC Laboratories, Inc. assumes no responsibility for report alteration, separation, detachment or third party interpretation.

APPENDIX G – Greenhouse Gas Report

GREENHOUSE GAS REPORT

DEVIL'S GATE RESERVOIR SEDIMENT REMOVAL AND MANAGEMENT PROJECT

Pasadena, California
(Los Angeles County)

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Acronyms and Abbreviations

Action Plan	City of Pasadena Green City Action Plan
BAU	business as usual
CalEEMod™	California Emissions Estimator Model
CARB	California Air Resources Control Board
CCAR	California Climate Action Registry
CEQA	California Environmental Quality Act
CFC	chlorofluorocarbons
CH_4	methane
City	City of Pasadena
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalents
EMFAC2011	CARB's tool for estimating emissions from on-road vehicles
EPA	United States Environmental Protection Agency
GGR	Greenhouse Gas Report
GHG	greenhouse gas
GWP	global warming potential
IHP	International Hydrological Programme
IPCC	Intergovernmental Panel on Climate Change
LACDPW	Los Angeles County Department of Public Works
M	million
$MtCO_2e$	million tonnes of carbon dioxide equivalents
N_2O	nitrous oxide
SCAQMD	South Coast Air Quality Management District
t	abbreviation for tonne (or metric ton)
tCO_2e	tonne of carbon dioxide equivalents
TIA	Traffic Impact Analysis
tonne	metric ton (1.102 U.S. tons)
UEA	United Nations Urban Environmental Accords
UNESCO	United Nations Educational, Scientific and Cultural Organization

SECTION 1.0 – INTRODUCTION

1.1. REPORT PURPOSE

The purpose of this Greenhouse Gas Report (GGR) is an analysis of potential climate change / greenhouse gas (GHG) impacts that could occur with the sediment removal and management at the Devil's Gate Reservoir Sediment Removal and Management Project (Proposed Project). The Proposed Project consists of a comprehensive sediment removal project at Devil's Gate Reservoir that will restore flood capacity and establish a reservoir configuration more suitable for routine maintenance activities including sediment management and enhanced water conservation. The Proposed Project is being undertaken in order to restore reservoir capacity to the facility to meet its intended level of flood protection for downstream communities.

1.2. PROJECT LOCATION

The Proposed Project is located in the City of Pasadena, in Los Angeles County approximately 14 miles north of downtown Los Angeles. The City of La Cañada Flintridge and the community of Altadena are located near the Proposed Project site to the west and east, respectively. Lying south of the San Gabriel Mountains, the Proposed Project site is located in the lower portion of the Arroyo Seco watershed. The Arroyo Seco extends approximately 11 miles from the border of the Angeles National Forest to its confluence with the Los Angeles River. Approximately 20,416 acres (39.1 square miles) of both residential and undeveloped land drain into Devil's Gate Reservoir.

1.3. PROJECT PURPOSE AND NEED

The Proposed Project is designed to remove sediment that has accumulated behind the dam to restore the capacity of Devil's Gate Reservoir to minimize the level of flood risk to downstream communities along the Arroyo Seco. In its current condition, the reservoir no longer has the capacity to safely contain another major debris event and the outlet works have a risk of becoming clogged and inoperable. The Proposed Project would remove sediment from the reservoir behind Devil's Gate Dam to restore flood control capacity and establish a reservoir configuration more suitable for routine maintenance activities including sediment management.

The proposed excavation will remove approximately 2.9 million cubic yards of current excess sediment in the reservoir in addition to any sediment that accumulates prior to project commencement. The proposed configuration will involve approximately 178 acres of the reservoir. Excavated sediment will be trucked off-site to existing disposal site locations which are currently available to accept the sediment. The sediment will be trucked off-site either to the east and placed at the primary disposal site locations, the Vulcan Materials and the Waste Management facilities in Azusa or the Manning Pit Sediment Placement Site in Irwindale, or to the west and placed in one of the facilities in Sun Valley. Removed vegetation and organic debris will be hauled to Scholl Canyon Landfill, located in the City of Glendale.

SECTION 2.0 – EXISTING ENVIRONMENT

2.1. INTRODUCTION

2.1.1 Background

Constituent gases that trap heat in the Earth's atmosphere are called "greenhouse gases" (GHGs), analogous to the way a greenhouse retains heat. GHGs play a critical role in the Earth's radiation budget by trapping infrared radiation emitted from the Earth's surface, which would otherwise have escaped into space. Prominent GHGs contributing to this process include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and chlorofluorocarbons (CFCs). Without the natural heat-trapping effect of GHGs, the earth's surface would be about 34 °F cooler[1]. This is a natural phenomenon, known as the "Greenhouse Effect," is responsible for maintaining a habitable climate. However, anthropogenic emissions of these GHGs in excess of natural ambient concentrations are responsible for the enhancement of the "Greenhouse Effect", and have led to a trend of unnatural warming of the Earth's natural climate known as global warming or climate change, or more accurately Global Climate Disruption. Emissions of these gases that induce global climate disruption are attributable to human activities associated with industrial/manufacturing, utilities, transportation, residential, and agricultural sectors.

The global warming potential (GWP) is the potential of a gas or aerosol to trap heat in the atmosphere. Individual GHG compounds have varying GWP and atmospheric lifetimes. The reference gas for the GWP is CO_2; CO_2 has a GWP of one. The calculation of the CO_2 equivalent (CO_2e) is a consistent methodology for comparing GHG emissions since it normalizes various GHG emissions to a consistent metric. Methane's warming potential of 21 indicates that methane has a 21 times greater warming affect than CO_2 on a molecule per molecule basis. A CO_2e is the mass emissions of an individual GHG multiplied by its GWP. GHGs are often presented in units called tonnes (t) (i.e. metric tons) of CO_2e (tCO_2e).

2.1.1.1 GHG Emission Levels

In 2004, total worldwide GHG emissions were estimated to be 20,135 million (M) t of CO_2e ($MtCO_2e$), excluding emissions/removals from land use, land use change, and forestry. In 2004, GHG emissions in the U.S. were 7,074 $MtCO_2e$.

In 2009, total California greenhouse gas emissions were 457 $MtCO_2e$ and the net emissions were 453 $MtCO_2e$; reflecting the influence of sinks (net CO_2 flux from forestry). The transportation sector accounted for approximately 38 percent of the total emissions, while the industrial sector accounted for approximately 20 percent. Emissions from electricity generation were about 23 percent.

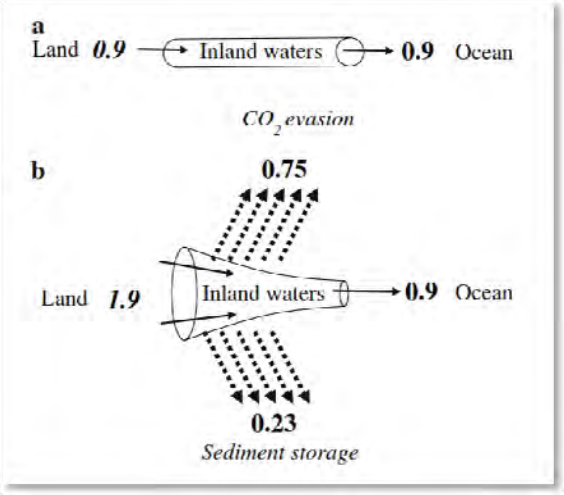
[1] Climate Action Team Report to Governor Schwarzenegger and the California Legislature. California Environmental Protection Agency, Climate Action Team. March 2006.

2.1.2 Reservoir Implications

All freshwater systems, whether they are natural or manmade, emit GHGs due to decomposing organic material. This means that lakes, rivers, estuaries, wetlands, seasonal flooded zones and reservoirs emit GHGs. They also bury some carbon in the sediments[2]. In the global description of the carbon cycle, freshwater ecosystems have traditionally been relegated to neutral pipes or gutters, explaining that water systems only transport the carbon and do not play an active role. For example, in describing the role of rivers in continental-scale geomorphology, Leopold and others (1964)[3] described rivers as ''the gutters down which flow the ruins of continents''.

However, the present science of carbon fluxes in freshwater ecosystems strongly indicates that continental hydrologic networks, spanning from river mouths to the smallest tributaries far upstream, do not act as neutral pipes or gutters, but instead are active players in the carbon cycle despite their modest size. Leopold's continental ruins do not merely flow; they are actively processed within inland waters. Scientist are now studying four different fluxes related to inland waters, gas exchange with the atmosphere, burial or storage in the sediments, export to the ocean, and importation of carbon from the land. Figure 1 depicts the two scenarios, i.e. (a) shows Leopold's "gutters" and (b) shows more current result of scientific measurements.

Figure 1 – Schematic showing inland water role[4]



Reservoirs, in particular, are collection points for material coming from the whole drainage basin area upstream. As part of the natural cycle, organic matter is flushed into these collection points from the surrounding environment. In addition, domestic sewage, industrial waste, and agricultural pollution may

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[2] J.J. Cole, et al., "Plumbing the global carbon cycle: Integrating inland waters into the terrestrial carbon budget", Ecosystems, vol. 10, p. 171-184, 2007

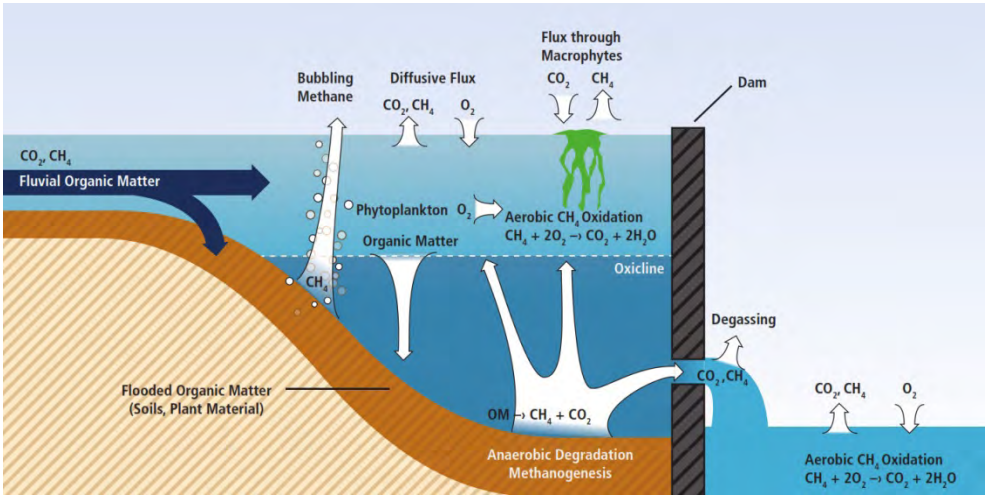
[3] Leopold LB, Wolman MG, Miller JP. 1964. Fluvial Processes in Geomorphology. Freeman.

[4] J.J. Cole, et al., *loc cit.*

also enter these systems and produce GHG emissions. The main GHGs produced in freshwater systems are CO_2 and CH_4. Warm climate reservoirs generate CH_4 when the reservoirs are stratified, in which the bottom layers are anoxic (i.e. they lack oxygen), leading to degradation of biomass through anaerobic processes. N_2O may also be of importance, particularly in reservoirs with large drawdown zones[5] or in tropical areas, but no global estimate of these emissions presently exists.

Two pathways of GHG emissions to the atmosphere are usually studied: diffusive fluxes from the surface of the reservoir and bubbling (See Figure 2). The United Nations Educational, Scientific and Cultural Organization/International Hydrological Programme (UNESCO/IHP) describes bubbling as the discharge of gaseous substances resulting from carbonation, evaporation, or fermentation from a water body[6].

Figure 2 – CO_2 and CH_4 pathways in freshwater reservoir[7]



Although the mass of methane emitted from aquatic systems is small compared to CO_2, CH_4, it has a disproportionately larger effect on climate warming, so we include it here. Because aquatic environments are frequently anoxic, some of the carbon gas efflux occurs as CH_4.

Man-made impoundments store large amounts of carbon in their sediments. Unlike the situation in lakes, carbon storage in reservoirs is mostly recent and likely short lived because dams are short lived. The first years or decades in the life of artificial impoundments are usually marked by exceptionally high rates of carbon burial due to enhanced particle trapping.

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5 The drawdown zone is defined as the area temporarily inundated depending on the reservoir level variation during operation. This zone requires special attention because emissions may be higher due to regrowth of vegetation when water levels are low, leading to their decomposition after re-flooding.

6 Greenhouse gas emissions related to freshwater reservoirs. United Nations Educational, Scientific, and Cultural Organization/International Hydrological Programme. January 2010.

7 From Guerin, F., 2006. Emissions de Gaz a Effet de Serre (CO_2 CH_4) par une Retenue de Barrage Hydroelectrique en Zone Tropicale (Petit-Saut,Guyane Francaise): Experimentation et Modelization. Thèse de doctorat de l'Université Paul Sabatier (Toulouse III). Reprinted with permission from the author.

2.1.3 Potential Environmental Effects of Climate Change

Worldwide, average annual temperatures are likely to increase by 3 °F to 7 °F by the end of the 21st century[8]. However, a global temperature increase does not directly translate to a uniform increase in temperature in all locations on the earth. Regional climate changes are dependent on multiple variables, such as topography. One region of the Earth may experience increased temperature, increased incidents of drought, and similar warming effects, whereas another region may experience a relative cooling. According to the Intergovernmental Panel on Climate Change's (IPCC) Working Group II Report[9], climate change impacts to North America may include diminishing snowpack, increasing evaporation, exacerbated shoreline erosion, exacerbated inundation from sea level rising, increased risk and frequency of wildfire, increased risk of insect outbreaks, increased experiences of heat waves, and rearrangement of ecosystems, as species and ecosystem zones shift northward and to higher elevations.

2.1.3.1 California Implications

Even though climate change is a global problem and GHGs are global pollutants, the specific potential effects of climate change on California have been studied. The California Natural Resources Agency[10] summarized the best known science on climate change impacts in seven specific sectors and provided recommendations on how to manage against those threats. Generally, research indicates that California should expect overall hotter and drier conditions with a continued reduction in winter snow (with concurrent increases in winter rains), as well as increased average temperatures, and accelerating sea-level rise. In addition to these changes, the intensity of extreme weather events is also changing. The impacts assessment indicates that extreme weather events, such as heat waves, droughts, and floods are likely to be some of the earliest climate impacts experienced. It is anticipated that temperatures in California could increase 5 °F by 2050 and 9 °F by 2100. Precipitation is expected to increase by 35 percent by 2050 and sea levels are expected to rise by 18 inches by 2050 and by 55 inches by 2100.

These changes in California's climate and ecosystems are occurring at a time when California's population is expected to increase from 34 million to 59 million by the year 2040[11]. As such, the number of people potentially affected by climate change as well as the amount of anthropogenic GHG emissions expected under a business as usual (BAU) scenario are expected to increase. Similar changes as those noted above for California would also occur in other parts of the world with regional variations in resources affected and vulnerability to adverse effects. GHG emissions in California are attributable to human activities associated with industrial/manufacturing, utilities, transportation, residential, and agricultural sectors[12] as well as natural processes.

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[8] Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories. International Panel on Climate Change. Website http://www.ipcc-nggip.iges.or.jp/gp/report.htm

[9] Climate Change 2007: Impacts, Adaptation and Vulnerability. International Panel on Climate Change. Website http://www.ipcc.ch/ipccreports/ar4-wg2.htm

[10] 2009 California Climate Adaptation Strategy, A Report to the Governor of the State of California in Response to Executive Order S-13-2008. California Natural Resources Agency. December 2009.

[11] Global Climate Change and California. Staff Final Paper. California Energy Commission. 2005.

[12] *ibid*

SECTION 3.0 – REGULATORY CONTEXT

GHGs, similar to criteria air pollutants, are regulated at the national, State, and air basin level; each agency has a different degree of control. The U.S. Environmental Protection Agency (EPA) regulates at the national level; the California Air Resources Board (CARB) regulates at the State level; and the South Coast Air Quality Management District (SCAQMD) regulates at the air basin level in the Proposed Project area.

3.1. FEDERAL CLIMATE CHANGE LEGISLATION

The federal government is taking a number of common-sense steps to address the challenge of climate change. EPA collects various types of GHG emissions data. This data helps policy makers, businesses, and EPA track GHG emissions trends and identify opportunities for reducing emissions and increasing efficiency. EPA has been collecting a national inventory of GHG emissions since 1990 and in 2009 established mandatory reporting of GHG emissions from large GHG emissions sources.

EPA is also getting GHG reductions through partnerships and initiatives; evaluating policy options, costs, and benefits; advancing the science; partnering internationally and with states, localities, and tribes; and helping communities adapt.

3.2. STATE CLIMATE CHANGE LEGISLATION

3.2.1 Executive Order S 3-05

On June 1, 2005, the Governor issued Executive Order S 3-05 which set the following GHG emission reduction targets:

- By 2010, reduce GHG emissions to 2000 levels;
- By 2020, reduce GHG emissions to 1990 levels;
- By 2050, reduce GHG emissions to 80 percent below 1990 levels.

To meet these targets, the Climate Action Team prepared a report to the Governor in 2006 that contains recommendations and strategies to help ensure the targets in Executive Order S-3-05 are met.

3.2.2 Assembly Bill 32 (AB 32)

In 2006, the California State Legislature enacted the California Global Warming Solutions Act of 2006, also known as AB 32. AB 32 focuses on reducing GHG emissions in California. GHGs, as defined under AB 32, include CO_2, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. AB 32 requires that GHGs emitted in California be reduced to 1990 levels by the year 2020. The CARB is the state agency charged with monitoring and regulating sources of emissions of GHGs that cause global warming in order to reduce emissions of GHGs. AB 32 also required that by January 1, 2008, the CARB had to determine what the statewide GHG emissions level was in 1990, and it had to approve a statewide GHG emissions limit so it may be applied to the 2020 benchmark. The CARB approved a 1990 GHG emissions level of 427 $MtCO_2e$, on December 6, 2007 in its Staff Report. Therefore, in 2020, emissions in California are required to be at or below 427 $MtCO_2e$.

Under the current BAU scenario, statewide emissions are increasing at a rate of approximately 1 percent per year as noted below. Also shown are the average reductions needed from all statewide sources (including all existing sources) to reduce GHG emissions back to 1990 levels.

- 1990: 427 $MtCO_2e$
- 2004: 480 $MtCO_2e$ (an average 11-percent reduction needed)
- 2020: 596 $MtCO_2e$ BAU (an average 28-percent reduction needed)

To achieve these goals, AB 32 mandates that CARB establish a quantified emissions cap, institute a schedule to meet the cap, implement regulations to reduce statewide GHG emissions from stationary sources, and develop tracking, reporting, and enforcement mechanisms to ensure that reductions are achieved. The following schedule outlines CARB actions mandated by AB 32:

- By January 1, 2008, CARB adopts regulations for mandatory GHG emissions reporting, defines 1990 emissions baseline for California (including emissions from imported power), and adopts it as the 2020 statewide cap.
- By January 1, 2009, CARB adopts plan to effect GHG reductions from significant sources of GHGs via regulations, market mechanisms, and other actions.
- During 2009, CARB drafts rule language to implement its plan and holds a series of public workshops on each measure (including market mechanisms).
- By January 1, 2010, early action measures take effect.
- During 2010, CARB, after workshops and public hearings, conducts series of rulemakings to adopt GHG regulations, including rules governing market mechanisms.
- By January 1, 2011, CARB completes major rulemakings for reducing GHGs, including market mechanisms. CARB may revise and adopt new rules after January 1, 2011 to achieve the 2020 goal.
- By January 1, 2012, GHG rules and market mechanisms adopted by CARB take effect and become legally enforceable.
- December 31, 2020, is the deadline for achieving the 2020 GHG emissions cap.

3.2.3 Cap-and-Trade

The AB 32 Scoping Plan identified a cap-and-trade program as one of the strategies California will employ to reduce the GHG emissions that cause climate change. CARB designed a California cap-and-trade program that is enforceable and meets the requirements of AB 32. The development of this program included a multi-year stakeholder process and consideration of potential impacts on disproportionately impacted communities. The program started on January 1, 2012, with an enforceable compliance obligation beginning with the 2013 GHG emissions. The Program includes market monitoring activities such as a Compliance Instrument Tracking System Service; quarterly allowance auctions; a Compliance Offset Program designed to give offset credits to GHG reductions or sequestered carbon that meet regulatory criteria; an Adaptive Management Plan focusing on localized air quality impacts

from the regulation and forest impacts from the U.S. Forest Protocol; and a Voluntary Renewable Electricity Program.

3.3. LOCAL CLIMATE CHANGE POLICY

The City of Pasadena (City) created a Green City Action Plan (Action Plan) in 2006[13] that launched a comprehensive environmental action plan that guides the City towards sustainability and accelerates the City's environmental commitment. The framework for the Action Plan is based on the 21 specific UEA goals to be accomplished by World Environment Day 2012. As of the 2010, the Green City Indicator Report[14] documents that 8 Goals have been achieved, 10 Goals are likely, and 3 of the 21 Goals are listed as undetermined. However, the Proposed Project does not fit into any of the existing long-term GHG Reduction strategies presented in the City's Plan.

[13] Green City Action Plan. City of Pasadena, Planning and Development Department. September 18, 2006.

[14] 2010 Green City Indicators Report. City of Pasadena Green Team.

SECTION 4.0 – BASELINE CONDITIONS

4.1. LOCAL GHG INVENTORY

In October 2009, the City of Pasadena conducted a Greenhouse Gas Emissions Inventory and Reduction Plan[15] that determined that in 2007 the total GHG emissions being produced by City residents, businesses, and municipal operations using the best available data was approximately 7.8 $MtCO_2e$. Table 1 shows the breakdown of those emissions separated into United Nations Urban Environmental Accords (UEA) categories.

Table 1 – City of Pasadena 2007 Net Total Emissions[16]

UEA Category	GHG Emissions (tCO_2e)
Energy	1,075,811
Solid Waste	1,105,498
Urban Nature	2,175
Transportation	5,610,910
TOTAL	7,794,394

Transportation sources account for approximately 72 percent of the total. These emissions do not include pass-through traffic on the freeways within the City of Pasadena and only account for vehicle trips related to Pasadena land uses as starting points and destinations.

[15] Greenhouse Gas Emissions Inventory and Reduction Plan. City of Pasadena. October 2009.

[16] ibid

SECTION 5.0 – THRESHOLDS

5.1. GREENHOUSE GAS EMISSIONS THRESHOLDS

The California Air Quality Act (CEQA) requires lead agencies to evaluate potential environmental effects based to the fullest extent possible on scientific and factual data. Significance conclusions must be based on substantial evidence, which includes facts, reasonable assumptions predicated upon facts, and expert opinion supported by facts.

To provide guidance to local lead agencies on determining significance for GHG emissions in their CEQA documents, SCAQMD Board adopted an Interim CEQA GHG Significance Threshold for Stationary Sources, Rules, and Plans[17]. The Interim Guidance uses a tiered approach to determining significance. Whereas, this Interim Guidance was developed primarily to apply to stationary source/industrial projects where the SCAQMD is the lead agency under CEQA, in absence of more directly applicable policy, the SCAQMD's Interim Guidance is often used as general guidance by local agencies to address the long-term adverse impacts associated with global climate change.

Even though this Proposed Project does not fit the typical "land-use" project, this GGR proposes the use of the "Tier 3" quantitative thresholds for residential and commercial projects as a reasonable metric. The SCAQMD proposes that if a project generates GHG emissions below 3,000 tCO_2e annually, it could be concluded that the Proposed Project's GHG contribution is not "cumulatively considerable" and is therefore less than significant under CEQA. If the Proposed Project generates GHG emissions above the threshold, the analysis must identify mitigation measures to reduce GHG emissions.

In addition, CEQA Appendix G states that a project would have potentially significant GHG emission impacts if it would:

- Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment or
- Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs.

[17] Interim CEQA GHG Significance Threshold for Stationary Sources, Rules, and Plans. South Coast Air Quality Management Board. Adopted December 5, 2008.

SECTION 6.0 – IMPACT ANALYSIS

6.1. ANALYSIS METHODOLOGY

Consistent with CEQA, indirect and direct impacts of the Proposed Project are required to be analyzed in the CEQA document for a Proposed Project. The analysis of direct GHG impacts is relatively straightforward as onsite GHG sources or directly related offsite GHG sources, such as worker commute trips, are generally readily identifiable. Indirect GHG emission sources are less obvious, but the California Climate Action Registry (CCAR) includes indirect emissions from grid-delivered electricity use and indirect emissions from imported steam, district heating or cooling and electricity from a co-generation plant. This Proposed Project does not include any indirect source.

Short-term sediment removal and long-term maintenance GHG emissions were assessed in accordance with methodologies and formulas recommended by the CCAR, EPA, CARB, and SCAQMD. Modeled emissions were compared with SCAQMD's Interim Thresholds[18] to determine potential significance. Calculations were based, in part, on information about vehicle trip generation from the Traffic Impact Analysis[19] (TIA) prepared for this project. Information on off-road equipment and project scheduling and logistics were supplied by the Los Angeles County Department of Public Works (LACDPW).

For the purposes of determining whether or not GHG emissions from affected projects are significant, project emissions will include direct, indirect, and, to the extent information are available, life cycle emissions during construction (sediment removal) and operation (maintenance). The Interim Guidance suggest that construction emissions should be amortized over the life of the project, defined as 30 years, added to the operational emissions, and compared to the applicable interim GHG significance threshold tier. The following bullet points describe the basic structure of staff's tiered GHG significance threshold proposal for stationary sources.

6.2. ANALYSIS OF IMPACTS

IMPACT 1: Would the Project generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment?

GHG emissions are generated from the exhaust of off-road equipment used to remove the sediment, including four front loaders with 4 cubic yard buckets, two D-8 dozers, an excavator, a grader, water truck, and sorters/crushers. In addition, GHG is emitted from the exhaust of the dump trucks proposed to haul approximately 4,800 cubic yards per day, which is expected to require an average of 50 truck trips in and out per hour, with an estimated maximum of 425 truck trips in and out per day during sediment removal activities. The disposal trucks will dispose of material either to the east and placed at the primary disposal site locations, the Vulcan Materials or Waste Management facilities in Azusa or the Manning Pit Sediment Placement Site in Irwindale or to the west and placed in one of the facilities in

[18] *ibid*

[19] Traffic Impact Analysis for Devil's Gate Reservoir Sediment Removal and Management Project. Hall & Foreman, Inc. March 28, 2013.

Sun Valley. Removed vegetation and organic debris will be hauled to Scholl Canyon Landfill, located in the City of Glendale. It is estimated that for approximately 3 weeks during the first year of the Proposed Project approximately 50 percent of the debris will be trucked to greenwaste facility at Scholl Canyon and the remaining will be distributed to the other sites. After the first year including maintenance activities, during the first week approximately 25 percent of the debris will be trucked to the Scholl site and the remaining will be distributed to the other sites. Proposed Project emissions were estimated using the following assumptions and methods:

- On-Road Truck Emissions: To estimate emissions from on-road sediment dump trucks, mileages between the Proposed Project site and each of the disposal sites using haul routes assumed in the TIA were measured. For the five year life of the Proposed Project it is estimated that approximately 3 percent of the trips will travel to the Scholl Canyon site, 78 percent will be delivered to the Irwindale sites, and 19 percent will go to the Sun Valley sites. During Maintenance activities, only 2 percent of the trips are assigned to Scholl Canyon, 75 percent will be delivered to the Irwindale sites, and 23 percent will go to the Sun Valley sites.

  To generate expected CO_2 emissions from exhaust, this GGR used CARB's EMFAC2011 Web Based Data Access[20] with emission rate data for Los Angeles County for the years 2015, 2017, and 2020. This GGR used "T7 single construction" as the most representative EMFAC2011 vehicle category for the sediment dump trucks. To generate expected CH_4 and N_2O emissions, factors from the Local Governments Operations Protocol[21] were applied.

- Off-Road Equipment Emissions: Off-road equipment CO_2 and CH_4 emission factors were obtained from the CalEEMod Users Guide[22].

- Employee Vehicle Emissions: To generate expected CO_2 emissions from employee vehicle exhaust, this GGR used CARB's EMFAC2011 Web Based Data Access as mentioned above in the section on on-road trucks. In order to more accurately represent the type of vehicles used by the potential employee work pool, a weighted average emission factor was generated using 69 percent of the pool using light-duty automobiles and the rest using light-duty trucks. The appropriate percentages were derived from the distribution of VMT from EMFAC2011.

Table 2 provides a summary of the GHG emission estimates for the Proposed Project. Operational emissions, defined as the on-going maintenance activities beginning in 2020, were calculated using the same methodology as before. Table 3 shows estimated emissions from ongoing maintenance activities. Details of the air quality calculations are included in Appendix A.

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20 http://www.arb.ca.gov/msei/modeling.htm#emfac2011_web_based_data

21 Local Government Operations Protocol: For the quantification and reporting of greenhouse gas emissions inventories. Version 1.1. California Air Resources Board, California Climate Action Registry, ICLEI - Local Governments for Sustainability, and The Climate Registry. May 2010

22 CalEEMod Users Guide - Appendix D, CalEEMod User's Tips (June 2011)

Table 2 – Sediment Removal GHG Emissions

Emission Source	GHG Emissions (tonnes/year)			
	CO_2	CH_4	N_2O	CO_2e
Off-Road	745.8	0.071	N/A	747.3
On-Road Trucks	4,422.6	1.681	1.546	4,937.3
Employees	46.4	0.005	0.005	48.2
Totals	**5,215**	**1.76**	**1.55**	**5,773**

Table 3 – Maintenance Activity GHG Emissions

Emission Source	GHG Emissions (tonnes/year)			
	CO_2	CH_4	N_2O	CO_2e
Off-Road	96.8	0.007	N/A	96.9
On-Road Trucks	546.1	0.208	0.191	609.7
Employees	6.5	0.001	0.001	6.7
Totals	**649**	**0.22**	**0.19**	**713**

Typical developmental projects have short-term construction and long-term operational GHG emissions, where the operational activities generate the majority of the GHG emissions. In order to assess the overall lifetime project GHG emissions, the SCAQMD developed an Interim Guidance that recommends that construction emissions should be amortized over the life of the project, defined in the Guidance as 30 years, which is then added to the operational emissions and compared to the applicable interim GHG significance threshold tier. For this Proposed Project, construction emissions are described as the sediment removal process and operational emissions are the on-going maintenance operations. Using the above annual emission rates, the Proposed Project is expected to produce 5,733 tCO_2e per year for 5 years, for a 5-year total of 28,664 tCO_2e. Amortized over 30 years the Proposed Project would produce 951 tCO_2e per year. Adding that amount to the 713 tCO_2e per year expected during maintenance would yield a Proposed Project total annual emissions of 1,669 tCO_2e, which is less than the Tier 3 threshold of 3,000 tCO_2e; therefore the Proposed Project is not "cumulatively considerable" and is therefore less than significant under CEQA.

In addition the Proposed Project may prove a positive effect on climate change. High ambient temperatures coupled with important demand for oxygen due to the degradation of substantial organic matter amounts favor the production of CO_2, the establishment of anoxic conditions, and thus the production of CH_4. If the reservoir is left as it is, the large quantity of biomass currently existing may exacerbate the condition. With the removal and disposal of most of the organic mass in the Scholl

Canyon Landfill, which uses the greenwaste primarily as "alternative daily cover" (ADC), the overall benefit to the carbon ecosystem will be positive since a Report by Kong, Huitric, Iacoboni, and Chan[23] demonstrates that since prior to using greenwaste for ADC, larger amounts of cover soil had to be imported into the landfill from offsite sources. Therefore, use of the greenwaste ADC reduced fossil fuel use for cover soil importation and so reduces GHG emissions.

Level of Significance before Mitigation

The Proposed Project would result in less than significant impacts.

Mitigation

No mitigation measures are necessary.

Level of Significance After Mitigation

No significant adverse impacts were identified and no mitigation measures are necessary.

IMPACT 2: Would the Project conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs?

AB 32 identified a 2020 target level for GHG emissions in California of 427 MMT of CO_2e, which is approximately 28.5% less than the year 2020 BAU emissions estimate of 596 MMT CO_2e. To achieve these GHG reductions, there will have to be widespread reductions of GHG emissions across California. Some of those reductions will need to come in the form of changes in vehicle emissions and mileage standards, changes in the sources of electricity, and increases in energy efficiency by existing facilities. The remainder will need to come from requiring new facility development to have lower carbon intensity than BAU conditions. Therefore, this analysis uses a threshold of significance that is in conformance with the state's goals.

On December 12, 2008, CARB adopted the AB 32 Scoping Plan, which details specific GHG emission reduction measures that target specific GHG emissions sources. Project-related GHG emissions would be reduced as a result of several AB 32 Scoping Plan measures. The Scoping Plan considers a range of actions that include direct regulations, alternative compliance mechanisms, monetary and non-monetary incentives, voluntary actions, and market based mechanisms (e.g., cap-and-trade system.

Some examples include the following:

- Mobile-source GHG emissions reduction measures
  - Pavley emissions standards (19.8% reduction)
  - Low carbon fuel standard (7.2% reduction)
  - Vehicle efficiency measures (2.8% reduction)

[23] Evaluation of Green Waste Management Impacts on GHG Emissions – Alternative Daily Cover Compared with Composting. Kong, D., Huitric, R., Iacoboni, M., and Chan, G. Los Angeles County Sanitation Districts, Solid Waste Division.

- Energy production related GHG emissions reduction measures
    - Natural gas transmission and distribution efficiency measures (7.4% reduction)
    - Natural gas extraction efficiency measures (1.6% reduction)
    - Renewables (electricity) portfolio standard (33.0% reduction)

These reductions in mobile-source and energy production GHG emissions would occur with or without development of the Proposed Project. Overall, the Proposed Project would be consistent with the AB 32 goal of reducing statewide GHG emissions to 1990 levels by year 2020. Currently, no other GHG reduction plan (i.e., SCAG, SCAQMD, or County) applies to the Proposed Project. The Proposed Project would not conflict with any applicable plan, policy, or regulation of an agency adopted for the purpose of reducing the emissions of GHGs; therefore, impacts would be less than significant.

Level of Significance before Mitigation

The Proposed Project would result in less than significant impacts.

Mitigation

No mitigation measures are necessary.

Level of Significance After Mitigation

No significant adverse impacts were identified and no mitigation measures are necessary.

Greenhouse Gas Report Appendix A

Criteria Emissions Summary

Sediment Removal — Unmitigated

Emission Source	Criteria Emissions (lbs/d)				
	ROG	CO	NO_X	PM_{10}	$PM_{2.5}$
Off-road	7.54	33.99	55.18	2.87	2.87
On-road Trucks	7.15	34.87	314.93	5.33	4.91
Employees	0.07	2.44	0.24	0.00	0.00
Fugitive	0.00	0.00	0.00	5.46	0.89
TOTALS	***14.8***	***71.3***	***370.3***	***13.7***	***8.7***
SCAQMD Daily Threshold	*75*	*550*	*100*	*150*	*55*
ON-SITE TOTALS	***7.5***	***34.0***	***55.2***	***8.3***	***3.8***
LST Threshold	*N/A*	*1,540*	*148*	*12*	*7*

Sediment Removal — Mitigated

Emission Source	Criteria Emissions (lbs/d)				
	ROG	CO	NO_X	PM_{10}	$PM_{2.5}$
Off-road	4.20	33.99	21.88	0.22	0.22
On-road Trucks	7.15	34.87	18.90	1.07	0.98
Employees	0.07	2.44	0.24	0.00	0.00
Fugitive	0.00	0.00	0.00	5.46	0.89
TOTALS	***11.4***	***71.3***	***41.0***	***6.8***	***2.1***
SCAQMD Daily Threshold	*75*	*550*	*100*	*150*	*55*
ON-SITE TOTALS	***4.2***	***34.0***	***21.9***	***5.7***	***1.1***
LST Threshold	*N/A*	*1,540*	*148*	*12*	*7*

Maintenance Activities

Emission Source	Criteria Emissions (lbs/d)				
	ROG	CO	NO_X	PM_{10}	$PM_{2.5}$
Off-road	2.86	17.29	19.26	0.98	0.98
On-road Trucks	2.17	12.16	74.62	1.13	1.04
Employees	0.02	0.76	0.07	0.00	0.00
Fugitive	0.00	0.00	0.00	3.30	0.75
TOTALS	***5.0***	***30.2***	***94.0***	***5.4***	***2.8***
SCAQMD Daily Threshold	*75*	*550*	*100*	*150*	*55*
ON-SITE TOTALS	***2.9***	***17.3***	***19.3***	***4.3***	***1.7***
LST Threshold	*N/A*	*1,540*	*148*	*12*	*7*

GHG Emissions Summary

Sediment Removal

Emission Source	Total GHG Emissions (tonnes)			
	CO_2	CH_4	N_2O	CO_2e
Off-road	745.8	0.071	N/A	747.3
On-road Trucks	4,422.6	1.681	1.546	4,937.3
Employees	46.4	0.005	0.005	48.2
TOTALS	***5,215***	***1.76***	***1.55***	***5,733***

Maintenance

Emission Source	Total GHG Emissions (tonnes)			
	CO_2	CH_4	N_2O	CO_2e
Off-road	96.8	0.007	N/A	96.9
On-road Trucks	546.1	0.208	0.191	609.7
Employees	6.5	0.001	0.001	6.7
TOTALS	***649***	***0.22***	***0.19***	***713***

Construction Amortization

Year #	CO_2e		
1	5,733		
2	5,733		
3	5,733		
4	5,733		
5	5,733		**Plus Maintenance**
Total	**28,664**		
Amortized over 30 years =		955	1,669

Mileages for Disposal Sites

Disposal Area	Haul Route #	Mileage (round trip)			
		P-H	Highway	H-D	Total
Vulcan Materials	9	1.4	31.0	1.0	33.4
Manning's Pit	2A	1.4	31.0	4.7	37.1
Waste Management Pit	3A	1.4	31.0	3.2	35.5
Average of Irwindale Sites		**1.4**	**31.0**	**3.0**	**35.3**
Scholl Canyon Landfill	4A	1.4	8.6	3.2	13.2
Greenwaste Site		**1.4**	**8.6**	**3.2**	**13.2**
Sheldon Pit	5C	1.1	24.4	10.0	35.5
Cal-Mat Pit	6C	1.1	24.4	10.1	35.7
Bradley Landfill	7C	1.1	24.4	12.8	38.3
Boulevard Pit	8C	1.1	24.4	18.8	44.3
Average of Sun Valley Sites		**1.1**	**24.4**	**12.9**	**38.5**

Distributions	SedRem	Maint
Estimated Total Truck Trips per Day =	425	200
% of trips to Scholl Canyon =	3%	2%
% of trips to Irwindale sites =	78%	75%
% of trips to Sun Valley sites =	19%	23%
Scholl Canyon Trips per Day =	11	4
Irwindale Trips per Day =	333	150
Sun Valley Trips per Day =	81	46
	425	213

P-H = Project to highway

H-D = Highway to disposal site

"Percent to Scholl" Calculations

	3	weeks	2015	5.8%
	1	week	2016+	1.9%
For first 5 years	7	weeks	SedRem	2.7%

On-Road Trucks Criteria Emissions
Unmitigated

Sediment Removal - Unmitigated

Route/Type	Round Trip (mi)	Trips per day	VMT per day	Emissions (pounds per day)				
				ROG	CO	NO_x	PM_{10}	$PM_{2.5}$
Scholl Canyon Site - Surface Streets	5	11	53	0.04	0.16	1.18	0.02	0.02
Scholl Canyon Site - Highways	8.6		99	0.04	0.21	2.04	0.04	0.03
Irwindale Sites - Surface Streets	4	333	1,445	1.01	4.46	32.45	0.47	0.43
Irwindale Sites - Highways	31		10,323	4.43	22.29	213.12	3.74	3.44
Sun Valley Sites - Surface Streets	14	81	1,135	0.79	3.50	25.47	0.37	0.34
Sun Valley Sites - Highways	24.4		1,970	0.85	4.25	40.68	0.71	0.66
Totals		***425***	***15,024***	***7.2***	***34.9***	***314.9***	***5.3***	***4.9***

Maintenance - Unmitigated

Route/Type	Round Trip (mi)	Trips per day	VMT per day	Emissions (pounds per day)				
				ROG	CO	NO_x	PM_{10}	$PM_{2.5}$
Scholl Canyon Site - Surface Streets	5	4	17	0.01	0.03	0.20	0.00	0.00
Scholl Canyon Site - Highways	8.6		33	0.01	0.05	0.31	0.01	0.01
Irwindale Sites - Surface Streets	14	150	2,108	0.93	3.41	24.15	0.23	0.21
Irwindale Sites - Highways	24.4		3,660	0.82	6.00	34.31	0.63	0.58
Sun Valley Sites - Surface Streets	4	46	200	0.09	0.32	2.29	0.02	0.02
Sun Valley Sites - Highways	31		1,426	0.32	2.34	13.37	0.24	0.23
Totals		***200***	***7,393***	***2.2***	***12.2***	***74.6***	***1.1***	***1.0***

Notes:

Trip distribution during sediment removal is 3% Scholl Canyon, 78% Irwindale SitesIrwindale, and 19% Sun Valley.

Trip distribution during maintenance is 2% Scholl Canyon, 79% Irwindale, and 19% Sun Valley.

Surface streets use vehicle speeds from 5 to 45 mph

Highway use vehicle speeds from 50 to 70 mph

On-Road Trucks Criteria Emissions
Mitigated

Sediment Removal — Mitigated

Route/Type	Round Trip (mi)	Trips per day	VMT per day	Emissions (pounds per day)				
				ROG	CO	NO_X	PM_{10}	$PM_{2.5}$
Scholl Canyon Site - Surface Streets	5	11	53	0.04	0.16	0.07	0.00	0.00
Scholl Canyon Site - Highways	8.6		99	0.04	0.21	0.12	0.01	0.01
Irwindale Sites - Surface Streets	4	333	1,445	1.01	4.46	1.95	0.09	0.09
Irwindale Sites - Highways	31		10,323	4.43	22.29	12.79	0.75	0.69
Sun Valley Sites - Surface Streets	14	81	1,135	0.79	3.50	1.53	0.07	0.07
Sun Valley Sites - Highways	24.4		1,970	0.85	4.25	2.44	0.14	0.13
Totals		***425***	***15,024***	***7.2***	***34.9***	***18.9***	***1.1***	***1.0***

Maintenance — Mitigated

Route/Type	Round Trip (mi)	Trips per day	VMT per day	Emissions (pounds per day)				
				ROG	CO	NO_X	PM_{10}	$PM_{2.5}$
Scholl Canyon Site - Surface Streets	5	4	17	0.01	0.03	0.03	0.00	0.00
Scholl Canyon Site - Highways	8.6		33	0.01	0.05	0.04	0.00	0.00
Irwindale Sites - Surface Streets	4	150	651	0.93	3.41	3.14	0.11	0.10
Irwindale Sites - Highways	31		4,650	0.82	6.00	4.46	0.30	0.28
Sun Valley Sites - Surface Streets	14	46	646	0.09	0.32	0.30	0.01	0.01
Sun Valley Sites - Highways	24.4		1,122	0.32	2.34	1.74	0.12	0.11
Totals		***200***	***5,351***	***2.2***	***12.2***	***9.7***	***0.5***	***0.5***

On-Road Trucks Total GHG Emissions

Sediment Removal

Disposal Sites	Round Trip (mi)	Trips per day	Trips per year	VMT per year
Scholl Canyon Site - Surface Streets	5	11	2,693	12,332
Scholl Canyon Site - Highways	8.6			23,156
Irwindale Sites - Surface Streets	4	333	78,136	339,111
Irwindale Sites - Highways	31			2,422,218
Sun Valley Sites - Surface Streets	14	81	18,947	266,211
Sun Valley Sites - Highways	24.4			462,317
Totals		***425***	***80,829***	***2,784,484***

Emissions (tonnes per year)

CO_2	CH_4	N_2O	CO_2e
23	0.007	0.007	25
36	0.014	0.013	40
622	0.205	0.188	685
3,764	1.462	1.345	4,212
488	0.161	0.148	538
718	0.279	0.257	804
4,423	***1.681***	***1.546***	***4,937***

Maintenance

Disposal Sites	Round Trip (mi)	Trips per day	Trips per year	VMT per year
Scholl Canyon Site - Surface Streets	5	4	248	1,134
Scholl Canyon Site - Highways	8.6			2,130
Irwindale Sites - Surface Streets	4	150	9,777	39,107
Irwindale Sites - Highways	31			303,080
Sun Valley Sites - Surface Streets	14	46	2,998	41,975
Sun Valley Sites - Highways	24.4			73,156
Totals		***200***	***10,024***	***344,318***

Emissions (tonnes per year)

CO_2	CH_4	N_2O	CO_2e
2	0.001	0.001	2
3	0.001	0.001	4
72	0.024	0.022	79
471	0.183	0.168	527
77	0.025	0.023	85
114	0.044	0.041	127
546	***0.208***	***0.191***	***610***

Notes:

	Sed	Main
Months per year =	9	3
Days per month =	26.1	21.7
Days per year =	235	65

On-Road Truck Mitigation Calculation

For T7 - single construction in Los Angeles Co

Year	Running Exhaust Emissions (grams per mile)	
	NO_X	PM_{10}
2015	9.7926	0.1547
2020	4.7230	0.0637

Conversion Factor for HHDT (Class 8B)

3.031 bhp-hr/mi

Year	Running Exhaust Emissions (grams per bhp-hr)	
	NO_X	PM_{10}
2015	3.2308	0.0511
2020	1.5582	0.0210

EPA HHDV Standard - 2007+ (g/bhp-hr)	
0.20	*0.01*

Year	% Reduction to EPA Standard	
2015	*-94%*	*-80%*
2020	*-87%*	*-52%*

Conversion Factor from *Update Heavy Duty Emission Conversion Factors for MOBILE6: Analysis of BSCFs and Calculation of Heavy-Duty Engine Conversion Factors* . USEPA, Motor Vehicle Emissions Laboratory. EPA420-P-98-015. May 1998

Employee Commute

Vehicle Activity

Activity	Days per Year	Trips per Day	Round Trip (mi)	VMT per day	VMT per Year
Sediment Removal	235	17	40	680	159,557
Maintenance	65	9	40	340	22,161

Criteria Emissions

Activity	Pounds per day				
	ROG	CO	NO_X	PM_{10}	$PM_{2.5}$
Sediment Removal	0.07	2.44	0.24	0.00	0.00
Maintenance	0.02	0.76	0.07	0.00	0.00

GHG

Activity	Total Tonnes per Year			
	CO_2	CH_4	N_2O	CO_2e
Sediment Removal	46.4	0.0046	0.0054	48.2
Maintenance	6.5	0.0006	0.0007	6.7

Notes:

Months per year =	9
Days per month =	30.4
Days per year =	274

2015 EMFAC2011 On-road Vehicle Emission Factors

Veh Type	Emission Factors (grams per mile)							
	ROG	CO	NO_X	CO_2	PM_{10}	$PM_{2.5}$	CH_4	N_2O
LDA	0.0399	1.3143	0.1167	318.1	0.0023	0.0021	0.0278	0.0294
LDT1	0.1158	3.6051	0.3508	378.3	0.0057	0.0052	0.0315	0.0433
LDT2	0.0528	1.9105	0.2243	454.7	0.0024	0.0022	0.0315	0.0433
Weighted Average - Surface Streets	*0.0488*	*1.6293*	*0.1597*	*354.3*	*0.0026*	*0.0023*	*0.0289*	*0.0337*
T7 single construction - Surface Streets	0.3170	1.3991	10.1837	1,834.9	0.1461	0.1344	0.6037	0.5554
T7 single construction - Highways	0.1945	0.9793	9.3643	1,554.1	0.1642	0.1511	0.6037	0.5554

2020 EMFAC2011 On-road Vehicle Emission Factors

Veh Type	Emission Factors (grams per mile)							
	ROG	CO	NO_X	CO_2	PM_{10}	$PM_{2.5}$	CH_4	N_2O
LDA	0.0173	0.8203	0.0755	257.1	0.0021	0.0019	0.0278	0.0294
LDT1	0.0577	2.3351	0.2331	317.0	0.0042	0.0039	0.0315	0.0433
LDT2	0.0241	1.1647	0.1285	382.7	0.0021	0.0019	0.0315	0.0433
Weighted Average - Surface Streets	*0.0220*	*1.0170*	*0.1000*	*291.1*	*0.0022*	*0.0021*	*0.0289*	*0.0337*
T7 single construction - Surface Streets	0.1993	0.7337	5.1982	1,686.1	0.0493	0.0453	0.6037	0.5554
T7 single construction - Highways	0.1015	0.7440	4.2518	1,427.6	0.0779	0.0717	0.6037	0.5554

Notes: -

Criteria and CO_2 factors come from 2013 EMFAC2011 and represent Estimated Annual Emission Rates for Los Angeles County in the South Coast Air Basin

CH_4 and N_2O factors come from Local Government Operations Protocol: For the quantification and reporting of greenhouse gas emissions inventories. Version 1.1. California Air Resources Board, California Climate Action Registry, ICLEI - Local Governments for Sustainability, and The Climate Registry. May 2010

Surface street emission factors are generated from weighted factors for vehicle speeds from 5 to 45 mph

Highway emission factors are generated from weighted factors for vehicle speeds from 50 to 70 mph

Weighted Average is 69% LDA + 8% LDT1 + 23% LDT2 based on VMT

2015 Estimated Annual Emission Rates

EMFAC 2011

EMFAC 2011 Vehicle Categories

Los Angeles County

EMPLOYEE VEHICLES

Veh_Class	Fuel	VMT per day	Running Exhaust Emissions (grams per mile)					
			ROG	CO	NO_X	CO_2	PM_{10}	$PM_{2.5}$
LDA	GAS	124,228,301	0.0399	1.3180	0.1154	318.20	0.0022	0.0020
	DSL	421,930	0.0490	0.2495	0.4813	275.97	0.0367	0.0337
LDA - Average		**124,650,231**	**0.0399**	**1.3143**	**0.1167**	**318.05**	**0.0023**	**0.0021**
LDT1	GAS	13,920,097	0.1158	3.6095	0.3503	378.39	0.0056	0.0051
	DSL	19,325	0.0948	0.4229	0.6895	294.64	0.0793	0.0729
LDT1 - Average		**13,939,422**	**0.1158**	**3.6051**	**0.3508**	**378.28**	**0.0057**	**0.0052**
LDT2	GAS	41,671,607	0.0528	1.9112	0.2241	454.73	0.0024	0.0022
	DSL	19,382	0.0632	0.3251	0.6529	294.15	0.0506	0.0465
LDT2 - Average		**41,690,989**	**0.0528**	**1.9105**	**0.2243**	**454.65**	**0.0024**	**0.0022**
Employee Weighted Average			***0.0488***	***1.6293***	***0.1597***	***354.30***	***0.0026***	***0.0023***

DIESEL TRUCKS

Veh_Class	Speed (mph)	VMT per day	Running Exhaust Emissions (grams per mile)					
			ROG	CO	NO_X	CO_2	PM_{10}	$PM_{2.5}$
T7 single construction	5	273	3.5045	6.0256	30.4992	3,919.55	0.6823	0.6277
T7 single construction	10	1,111	2.0592	4.2149	21.1424	3,237.84	0.4737	0.4358
T7 single construction	15	3,273	1.0518	2.8594	14.7722	2,658.53	0.3148	0.2896
T7 single construction	20	8,864	0.4283	1.8513	11.0830	2,097.32	0.1942	0.1787
T7 single construction	25	19,082	0.3519	1.5998	10.5006	1,956.84	0.1622	0.1493
T7 single construction	30	25,882	0.2890	1.3886	10.0244	1,836.80	0.1384	0.1273
T7 single construction	35	19,419	0.2394	1.2176	9.6540	1,737.17	0.1226	0.1128
T7 single construction	40	18,869	0.2031	1.0867	9.3942	1,657.98	0.1150	0.1058
T7 single construction	45	18,189	0.1803	0.9965	9.2244	1,599.20	0.1155	0.1063
T7 single construction - Surface Streets		**114,962**	**0.3170**	**1.3991**	**10.1837**	**1,834.92**	**0.1461**	**0.1344**
T7 single construction	50	17,465	0.1709	0.9466	9.1607	1,560.84	0.1242	0.1142
T7 single construction	55	17,232	0.1748	0.9369	9.2018	1,542.90	0.1409	0.1296
T7 single construction	60	40,396	0.1922	0.9676	9.3450	1,545.38	0.1658	0.1525
T7 single construction	65	29,825	0.2228	1.0384	9.5996	1,568.30	0.1988	0.1829
T7 single construction	70	73	0.2730	1.1037	11.0294	1,612.93	0.2421	0.2228
T7 single construction - Highways		**104,990**	**0.1945**	**0.9793**	**9.3643**	**1,554.10**	**0.1642**	**0.1511**

Notes:

- *Surface street speeds are from 5 mph to 45 mph*
- *Highway speeds are from 50 mph to 70 mph*
- *Employee average = 69% LDA + 8% LDT1 + 23% LDT2 based on VMT*

2020 Estimated Annual Emission Rates

EMFAC 2011

EMFAC 2011 Vehicle Categories
Los Angeles County

EMPLOYEE VEHICLES

Veh_Class	Fuel	VMT per day	Running Exhaust Emissions (grams per mile)					
			ROG	CO	NO_X	CO_2	PM_{10}	$PM_{2.5}$
LDA	GAS	127,356,491	0.0173	0.8226	0.0746	257.22	0.0020	0.0019
	DSL	434,476	0.0227	0.1407	0.3355	225.91	0.0162	0.0149
LDA - Average		**127,790,967**	**0.0173**	**0.8203**	**0.0755**	**257.11**	**0.0021**	**0.0019**
LDT1	GAS	14,187,931	0.0577	2.3382	0.2328	317.17	0.0042	0.0039
	DSL	20,940	0.0490	0.2398	0.4558	231.83	0.0395	0.0363
LDT1 - Average		**14,208,871**	**0.0577**	**2.3351**	**0.2331**	**317.04**	**0.0042**	**0.0039**
LDT2	GAS	43,317,321	0.0241	1.1652	0.1284	382.80	0.0021	0.0019
	DSL	20,329	0.0299	0.1759	0.4450	243.31	0.0210	0.0194
LDT2 - Average		**43,337,650**	**0.0241**	**1.1647**	**0.1285**	**382.74**	**0.0021**	**0.0019**
Employee Weighted Average			***0.0220***	***1.0170***	***0.1000***	***291.08***	***0.0022***	***0.0021***

DIESEL TRUCKS

Veh_Class	Speed (mph)	VMT per day	Running Exhaust Emissions (grams per mile)					
			ROG	CO	NO_X	CO_2	PM_{10}	$PM_{2.5}$
T7 single construction	5	422	1.9483	3.8034	15.3144	3,600.96	0.0896	0.0824
T7 single construction	10	1,387	1.1342	2.3921	11.1428	2,974.64	0.0743	0.0684
T7 single construction	15	3,732	0.5763	1.4076	8.1470	2,442.41	0.0618	0.0568
T7 single construction	20	10,499	0.2464	0.7769	6.1362	1,926.81	0.0509	0.0468
T7 single construction	25	22,096	0.2139	0.7260	5.6152	1,797.75	0.0474	0.0436
T7 single construction	30	29,986	0.1854	0.6886	5.1763	1,687.47	0.0459	0.0423
T7 single construction	35	23,319	0.1610	0.6648	4.8200	1,595.96	0.0465	0.0428
T7 single construction	40	22,600	0.1405	0.6544	4.5465	1,523.23	0.0491	0.0452
T7 single construction	45	21,535	0.1240	0.6578	4.3446	1,469.21	0.0537	0.0494
T7 single construction - Surface Streets		**135,576**	**0.1993**	**0.7337**	**5.1982**	**1,686.10**	**0.0493**	**0.0453**
T7 single construction	50	23,100	0.1115	0.6747	4.2229	1,433.95	0.0604	0.0556
T7 single construction	55	27,435	0.1031	0.7052	4.1830	1,417.46	0.0691	0.0635
T7 single construction	60	48,002	0.0986	0.7493	4.2250	1,419.74	0.0798	0.0734
T7 single construction	65	38,081	0.0981	0.8068	4.3501	1,440.80	0.0925	0.0851
T7 single construction	70	95	0.0998	0.8564	5.2530	1,484.20	0.1105	0.1016
T7 single construction - Highways		**136,714**	**0.1015**	**0.7440**	**4.2518**	**1,427.60**	**0.0779**	**0.0717**

Notes:

Surface street speeds are from 5 mph to 45 mph
Highway speeds are from 50 mph to 70 mph
Employee average = 69% LDA + 8% LDT1 + 23% LDT2 based on VMT

Sediment Removal - Off-Road

Unmitigated

Equipment Activity

Type	BHP	Load Factor	Hours/Day	Total Days/Year	Total Hours/Year
Front Loaders	87	0.36	8	235	1,877
Front Loaders	87	0.36	8	235	1,877
Front Loaders	87	0.36	8	235	1,877
Front Loaders	87	0.36	8	235	1,877
D-8 Dozer	358	0.40	8	235	1,877
D-8 Dozer	358	0.40	8	235	1,877
Excavator	157	0.38	8	235	1,877
Grader	162	0.41	8	235	1,877
Water Truck	381	0.38	8	235	1,877
Sorters/Crushers	85	0.78	2	235	469

Notes:

Months per year = 9
Days per month = 26.1
Days per year = 235

Criteria Emissions - Unmitigated

Type	Pounds per day				
	ROG	CO	NO_X	PM_{10}	$PM_{2.5}$
Front Loaders	0.44	2.18	2.78	0.23	0.23
Front Loaders	0.44	2.18	2.78	0.23	0.23
Front Loaders	0.44	2.18	2.78	0.23	0.23
Front Loaders	0.44	2.18	2.78	0.23	0.23
D-8 Dozer	1.59	6.75	12.98	0.53	0.53
D-8 Dozer	1.59	6.75	12.98	0.53	0.53
Excavator	0.56	3.54	3.95	0.21	0.21
Grader	0.70	3.93	5.12	0.28	0.28
Water Truck	1.10	3.17	7.55	0.27	0.27
Sorters/Crushers	0.23	1.13	1.47	0.13	0.13
Totals	***7.54***	***33.99***	***55.18***	***2.87***	***2.87***

GHG Emissions

Type	tonnes per year		
	CO_2	CH_4	CO_2e
Front Loaders	33.41	0.0042	33.50
Front Loaders	33.41	0.0042	33.50
Front Loaders	33.41	0.0042	33.50
Front Loaders	33.41	0.0042	33.50
D-8 Dozer	152.76	0.0151	153.08
D-8 Dozer	152.76	0.0151	153.08
Excavator	63.64	0.0054	63.76
Grader	70.86	0.0066	70.99
Water Truck	154.45	0.0098	154.65
Sorters/Crushers	17.68	0.0022	17.73
Totals	***745.80***	***0.0710***	***747.29***

Sediment Removal - Mitigated Off-Road

Equipment Activity

Type	BHP	Load Factor	Hours/Day	Total Days/Year	Total Hours/Year
Front Loaders	87	0.36	8	235	1,877
Front Loaders	87	0.36	8	235	1,877
Front Loaders	87	0.36	8	235	1,877
Front Loaders	87	0.36	8	235	1,877
D-8 Dozer	358	0.40	8	235	1,877
D-8 Dozer	358	0.40	8	235	1,877
Excavator	157	0.38	8	235	1,877
Grader	162	0.41	8	235	1,877
Water Truck	381	0.38	8	235	1,877
Sorters/Crushers	85	0.78	2	235	469

Notes:

Months per year = 9
Days per month = 26.1
Days per year = 235

Mitigated Criteria Emissions

Type	Pounds per day				
	ROG	CO	NO_X	PM_{10}	$PM_{2.5}$
Front Loaders	0.22	2.18	1.31	0.01	0.01
Front Loaders	0.22	2.18	1.31	0.01	0.01
Front Loaders	0.22	2.18	1.31	0.01	0.01
Front Loaders	0.22	2.18	1.31	0.01	0.01
D-8 Dozer	0.92	6.75	4.28	0.05	0.05
D-8 Dozer	0.92	6.75	4.28	0.05	0.05
Excavator	0.32	3.54	2.13	0.02	0.02
Grader	0.40	3.93	2.77	0.02	0.02
Water Truck	0.64	3.17	2.49	0.03	0.03
Sorters/Crushers	0.12	1.13	0.69	0.01	0.01
Totals	***4.20***	***33.99***	***21.88***	***0.22***	***0.22***

Maintenance - Off-Road

Equipment Activity

Type	BHP	Load Factor	Hours/Day	Total Days/Year	Total Hours/Year
Front Loaders	87	0.36	8	61	487
Front Loaders	87	0.36	8	61	487
D-8 Dozer	358	0.40	8	61	487
Excavator	157	0.38	8	61	487
Water Truck	381	0.38	1	61	61
Sorters/Crushers	85	0.78	8	61	487

Notes:

Months per year = 2
Days per month = 21.7
Days per year = 61

Criteria Emissions

Type	Pounds per day				
	ROG	CO	NO_X	PM_{10}	$PM_{2.5}$
Front Loaders	0.30	2.01	1.88	0.13	0.13
Front Loaders	0.30	2.01	1.88	0.13	0.13
D-8 Dozer	1.24	5.03	9.14	0.36	0.36
Excavator	0.37	3.54	2.06	0.10	0.10
Water Truck	0.10	0.36	0.50	0.02	0.02
Sorters/Crushers	0.55	4.35	3.80	0.24	0.24
Totals	***2.86***	***17.29***	***19.26***	***0.98***	***0.98***

GHG Emissions

Type	tonnes per year		
	CO_2	CH_4	CO_2e
Front Loaders	8.66	0.0007	8.68
Front Loaders	8.66	0.0007	8.68
D-8 Dozer	39.61	0.0031	39.67
Excavator	16.50	0.0009	16.52
Water Truck	5.01	0.0002	5.01
Sorters/Crushers	18.34	0.0014	18.37
Totals	***96.77***	***0.0071***	***96.92***

2015 Off-road Emission Factors

Veh Type	BHP	Load Factor	Emission Factor (g/bhp-hr)						
			ROG	CO	NO_X	PM_{10}	$PM_{2.5}$	CO_2	CH_4
Front loaders	87	0.36	0.805	3.945	5.041	0.415	0.415	568.3	0.072
D-8 dozers	358	0.40	0.628	2.672	5.138	0.211	0.211	568.3	0.056
Excavator	157	0.38	0.532	3.369	3.751	0.204	0.204	568.3	0.048
Grader	162	0.41	0.595	3.356	4.372	0.241	0.241	568.3	0.053
Water truck	381	0.38	0.431	1.241	2.956	0.105	0.105	568.3	0.036
Sorters/Crushers	85	0.78	0.797	3.859	5.040	0.430	0.430	568.3	0.071

SCAQMD Off-Road Emission Rates Table II

Percentage Reduction from Tier 2 to Tier 4

Engine Size (hp)	Percent Reduction		
	ROG	NO_X	PM_{10}
75 to 99	50%	53%	95%
100 to 174	43%	46%	93%
175 to 299	43%	68%	90%
300 to 600	42%	67%	90%

2015 Off-road Mitigated Emission Factors

Veh Type	BHP	Load Factor	Emission Factor (g/bhp-hr)						
			ROG	CO	NO_X	PM_{10}	$PM_{2.5}$	CO_2	CH_4
Front loaders	87	0.36	0.403	3.945	2.369	0.021	0.021	568.3	0.072
D-8 dozers	358	0.40	0.364	2.672	1.696	0.021	0.021	568.3	0.056
Excavator	157	0.38	0.303	3.369	2.026	0.014	0.014	568.3	0.048
Grader	162	0.41	0.339	3.356	2.361	0.017	0.017	568.3	0.053
Water truck	381	0.38	0.250	1.241	0.975	0.011	0.011	568.3	0.036
Sorters/Crushers	85	0.78	0.399	3.859	2.369	0.022	0.022	568.3	0.071

2020 Off-road Emission Factors

Veh Type	BHP	Load Factor	Emission Factor (g/bhp-hr)						
			ROG	CO	NO_X	PM_{10}	$PM_{2.5}$	CO_2	CH_4
Front loaders	87	0.36	0.542	3.636	3.404	0.228	0.228	568.3	0.048
D-8 dozers	358	0.40	0.491	1.990	3.619	0.144	0.144	568.3	0.044
Excavator	157	0.38	0.355	3.361	1.958	0.098	0.098	568.3	0.032
Water truck	381	0.38	0.310	1.136	1.561	0.057	0.057	568.3	0.028
Sorters/Crushers	85	0.78	0.473	3.722	3.249	0.206	0.206	568.3	0.042

From: CalEEMod Users Guide - Appendix D, CalEEMod User's Tips (June 2011), and 2011 Carl Moyer Program Guidelines and

Fugitive Dust - Excavation

Fugitive dust emissions from excavation are estimated using the methodology described in Section 11.9, Western Surface Coal Mining, of the EPA AP-42.

AP-42 estimates the emission factor of PM_{10} applying a scaling factor to that of PM_{15}. Similarly, the emission factor of $PM_{2.5}$ is scaled from that of total suspended particulates (TSP). The equations used to calculate the emission factors for PM_{15} and TSP and the scaling factor for those of PM_{10} and $PM_{2.5}$ are presented below:

Emission Factors (Dragline Overburden)

EF PM_{15} =	$0.0021 \times d^{0.7} \div M^{0.3}$ =	0.003 lb/hr
EF PM_{TSP} =	$0.0021 \times d^{1.1} \div M^{0.3}$ =	0.006 lb/hr

where: d = *drop height (ft)* *5* *(estimate)*

and: M = *material moisture content (%)=* *12* *(SCAQMD Handbook Table A9-9-G-1)*

EF PM_{10} =	$EF_{PM15} \times F_{PM10}$ =	0.002 lb/hr
EF $PM_{2.5}$ =	$EF_{PMTSP} \times F_{PM2.5}$ =	0.000 lb/hr

Where: EF_{PM10} = *PM_{10} scaling factor. The AP-42 default value is* *0.75*

and $EF_{PM2.5}$ = *$PM_{2.5}$ scaling factor. The AP-42 default value is* *0.017*

(Based on excavation of 7,650 yd^3 /d)

Pollutant	Emissions *(lbs/day)*	
	Unmitigated	Mitigated
PM_{10}	17.64	3.53
$PM_{2.5}$	0.76	0.15

Control Effectiveness for Rule 403 compliance

80%

Fugitive Dust - Grading

Fugitive dust emissions from excavation are estimated using the methodology described in Section 11.9, Western Surface Coal Mining, of the EPA AP-42.

AP-42 estimates the emission factor of PM_{10} applying a scaling factor to that of PM_{15}. Similarly, the emission factor of $PM_{2.5}$ is scaled from that of total suspended particulates (TSP). The equations used to calculate the emission factors for PM_{15} and TSP and the scaling factor for those of PM_{10} and $PM_{2.5}$ are presented below:

Emission Factors (Bulldozing Overburden)

EF PM_{15} =	$1.0 \times s^{1.5} \div M^{1.4}$ =	0.764	lb/hr
EF PM_{TSP} =	$5.7 \times s^{1.2} \div M^{1.3}$ =	2.939	lb/hr

where: s =	*material silt content (%)*	*8.5*	*(estimate)*
and: M =	*material moisture content (%)=*	*12*	*(SCAQMD Handbook Table A9-9-G-1)*

EF PM_{10} =	$EF_{PM15} \times F_{PM10}$ =	0.573	lb/hr
EF $PM_{2.5}$ =	$EF_{PMTSP} \times F_{PM2.5}$ =	0.309	lb/hr

Where: EF_{PM10} = PM_{10} scaling factor. The AP-42 default value is *0.75*

and $EF_{PM2.5}$ = $PM_{2.5}$ scaling factor. The AP-42 default value is *0.105*

(Based on 10 hours per day of grading)

Pollutant	Emissions *(lbs/day)*	
	Unmitigated	Mitigated
PM_{10}	5.73	1.15
$PM_{2.5}$	3.09	0.62

Control Effectiveness for Rule 403 compliance

80%

Fugitive Dust - Material Loading

Fugitive dust emissions from excavation are estimated using the methodology described in Section 13.4.2, *Aggregate Handling and Storage Piles* , of the EPA AP-42.

Emission Factor Formula

Emissions = $k \times 0.0032 \times (U \div 5)^{1.3} \div (M \div 2)^{1.4}$ lb/ton

where: k = *aerodynamic particle size multiplier* *PM $_{10}$ = 0.35* *PM $_{2.5}$ = 0.053*

U = *average wind speed (mph)* *15* *(AP-42)*

M = *material moisture content (%)* *12* *(SCAQMD Handbook Table A9-9-G-1)*

EF PM_{10} =	3.80E-04	lb-PM_{10}/ton_{mat}
EF $PM_{2.5}$ =	5.76E-05	lb-$PM_{2.5}$/ton_{mat}
or		
EF PM_{10} =	1.90E-07	lb-PM_{10}/lb_{mat}
EF $PM_{2.5}$ =	2.88E-08	lb-$PM_{2.5}$/lb_{mat}
or		
EF PM_{10} =	5.13E-04	lb-PM_{10}/yd^3_{mat}
EF $PM_{2.5}$ =	7.77E-05	lb-$PM_{2.5}$/yd^3_{mat}

(based on 2,600 lbs/yd ^{3} density for aggregate)

(Based on excavation of 7,650 yd ^{3} /d)

Pollutant	Emissions *(lbs/day)*	
	Uncontrolled	Compliance
PM_{10}	3.93	0.79
$PM_{2.5}$	0.59	0.12

Control Effectiveness for Rule 403 compliance

80%

Fugitive Dust - Summary

Uncontrolled

Category	Emissions (lb/day)	
	PM_{10}	$PM_{2.5}$
Excavation	17.64	0.76
Grading	5.73	3.09
Material Unloading/Loading	3.93	0.59
Total	***27.30***	***4.44***

Compliance

Category	Emissions (lb/day)	
	PM_{10}	$PM_{2.5}$
Excavation	3.53	0.15
Grading	1.15	0.62
Material Unloading/Loading	0.79	0.12
Total	***5.46***	***0.89***

Maintenance Fugitive Dust - Excavation

Fugitive dust emissions from excavation are estimated using the methodology described in Section 11.9, Western Surface Coal Mining, of the EPA AP-42.

AP-42 estimates the emission factor of PM_{10} applying a scaling factor to that of PM_{15}. Similarly, the emission factor of $PM_{2.5}$ is scaled from that of total suspended particulates (TSP). The equations used to calculate the emission factors for PM_{15} and TSP and the scaling factor for those of PM_{10} and $PM_{2.5}$ are presented below:

Emission Factors (Dragline Overburden)

EF PM_{15} =	$0.0021 \times d^{0.7} \div M^{0.3}$ =	0.003 lb/hr
EF PM_{TSP} =	$0.0021 \times d^{1.1} \div M^{0.3}$ =	0.006 lb/hr

where: d = *drop height (ft)* *5* *(estimate)*

and: M = *material moisture content (%)=* *12* *(SCAQMD Handbook Table A9-9-G-1)*

EF PM_{10} =	$EF_{PM15} \times F_{PM10}$ =	0.002 lb/hr
EF $PM_{2.5}$ =	$EF_{PMTSP} \times F_{PM2.5}$ =	0.000 lb/hr

Where: EF_{PM10} = *PM_{10} scaling factor. The AP-42 default value is* *0.75*

and $EF_{PM2.5}$ = *$PM_{2.5}$ scaling factor. The AP-42 default value is* *0.017*

(Based on excavation of 3,825 yd^3 /d)

Pollutant	Emissions *(lbs/day)*	
	Unmitigated	Mitigated
PM_{10}	8.82	1.76
$PM_{2.5}$	0.38	0.08

Control Effectiveness for Rule 403 compliance

80%

Maintenance Fugitive Dust - Grading

Fugitive dust emissions from excavation are estimated using the methodology described in Section 11.9, Western Surface Coal Mining, of the EPA AP-42.

AP-42 estimates the emission factor of PM_{10} applying a scaling factor to that of PM_{15}. Similarly, the emission factor of $PM_{2.5}$ is scaled from that of total suspended particulates (TSP). The equations used to calculate the emission factors for PM_{15} and TSP and the scaling factor for those of PM_{10} and $PM_{2.5}$ are presented below:

Emission Factors (Bulldozing Overburden)

EF PM_{15} =	$1.0 \times s^{1.5} \div M^{1.4}$ =	0.764	lb/hr
EF PM_{TSP} =	$5.7 \times s^{1.2} \div M^{1.3}$ =	2.939	lb/hr

where: s =	*material silt content (%)*	*8.5*	*(estimate)*
and: M =	*material moisture content (%)=*	*12*	*(SCAQMD Handbook Table A9-9-G-1)*

EF PM_{10} =	$EF_{PM15} \times F_{PM10}$ =	0.573	lb/hr
EF $PM_{2.5}$ =	$EF_{PMTSP} \times F_{PM2.5}$ =	0.309	lb/hr

Where: EF_{PM10} =	*PM_{10} scaling factor. The AP-42 default value is*	*0.75*
and $EF_{PM2.5}$ =	*$PM_{2.5}$ scaling factor. The AP-42 default value is*	*0.105*

(Based on 10 hours per day of grading)

Pollutant	Emissions *(lbs/day)*	
	Unmitigated	Mitigated
PM_{10}	5.73	1.15
$PM_{2.5}$	3.09	0.62

Control Effectiveness for Rule 403 compliance

80%

Maintenance Fugitive Dust - Material Loading

Fugitive dust emissions from excavation are estimated using the methodology described in Section 13.4.2, *Aggregate Handling and Storage Piles* , of the EPA AP-42.

Emission Factor Formula

Emissions = $k \times 0.0032 \times (U \div 5)^{1.3} \div (M \div 2)^{1.4}$ lb/ton

where: k = *aerodynamic particle size multiplier* PM_{10} = *0.35* $PM_{2.5}$ = *0.053*

U = *average wind speed (mph)* *15* *(AP-42)*

M = *material moisture content (%)* *12* *(SCAQMD Handbook Table A9-9-G-1)*

EF PM_{10} =	3.80E-04	lb-PM_{10}/ton_{mat}
EF $PM_{2.5}$ =	5.76E-05	lb-$PM_{2.5}$/ton_{mat}
or		
EF PM_{10} =	1.90E-07	lb-PM_{10}/lb_{mat}
EF $PM_{2.5}$ =	2.88E-08	lb-$PM_{2.5}$/lb_{mat}
or		
EF PM_{10} =	5.13E-04	lb-PM_{10}/yd^3_{mat}
EF $PM_{2.5}$ =	7.77E-05	lb-$PM_{2.5}$/yd^3_{mat}

(based on 2,600 lbs/yd^3 density for aggregate)

(Based on excavation of 3,825 yd^3/d)

Pollutant	Emissions *(lbs/day)*	
	Unmitigated	Mitigated
PM_{10}	1.96	0.39
$PM_{2.5}$	0.30	0.06

Control Effectiveness for Rule 403 compliance

80%

Maintenance Fugitive Dust - Summary

Unmitigated

Category	Emissions (lb/day)	
	PM_{10}	$PM_{2.5}$
Excavation	8.82	0.38
Grading	5.73	3.09
Material Unloading/Loading	1.96	0.30
Total	***16.52***	***3.76***

Mitigated

Category	Emissions (lb/day)	
	PM_{10}	$PM_{2.5}$
Excavation	1.76	0.08
Grading	1.15	0.62
Material Unloading/Loading	0.39	0.06
Total	***3.30***	***0.75***

APPENDIX H – EDR Hazardous Database Search

Devils Gate Reservoir
940 Ventura Street
LA Canada Flintridge, CA 91011

Inquiry Number: 3110824.2s
June 30, 2011

The EDR Radius Map™ Report with GeoCheck®

EDR® Environmental Data Resources Inc

440 Wheelers Farms Road
Milford, CT 06461
Toll Free: 800.352.0050
www.edrnet.com

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Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

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EXECUTIVE SUMMARY

A search of available environmental records was conducted by Environmental Data Resources, Inc (EDR). The report was designed to assist parties seeking to meet the search requirements of EPA's Standards and Practices for All Appropriate Inquiries (40 CFR Part 312), the ASTM Standard Practice for Environmental Site Assessments (E 1527-05) or custom requirements developed for the evaluation of environmental risk associated with a parcel of real estate.

TARGET PROPERTY INFORMATION

ADDRESS

940 VENTURA STREET
LA CANADA FLINTRIDGE, CA 91011

COORDINATES

Latitude (North):	34.192700 - 34° 11' 33.7''
Longitude (West):	118.172200 - 118° 10' 19.9''
Universal Tranverse Mercator:	Zone 11
UTM X (Meters):	391989.7
UTM Y (Meters):	3783948.5
Elevation:	1040 ft. above sea level

USGS TOPOGRAPHIC MAP ASSOCIATED WITH TARGET PROPERTY

Target Property Map:	34118-B2 PASADENA, CA
Most Recent Revision:	1994

AERIAL PHOTOGRAPHY IN THIS REPORT

Photo Year:	2005
Source:	USDA

TARGET PROPERTY SEARCH RESULTS

The target property was not listed in any of the databases searched by EDR.

DATABASES WITH NO MAPPED SITES

No mapped sites were found in EDR's search of available ("reasonably ascertainable ") government records either on the target property or within the search radius around the target property for the following databases:

STANDARD ENVIRONMENTAL RECORDS

Federal NPL site list

Proposed NPL---------- Proposed National Priority List Sites

EXECUTIVE SUMMARY

NPL LIENS ---------- Federal Superfund Liens

Federal Delisted NPL site list

Delisted NPL ---------- National Priority List Deletions

Federal CERCLIS list

FEDERAL FACILITY ---------- Federal Facility Site Information listing

Federal CERCLIS NFRAP site List

CERC-NFRAP ---------- CERCLIS No Further Remedial Action Planned

Federal RCRA CORRACTS facilities list

CORRACTS ---------- Corrective Action Report

Federal RCRA non-CORRACTS TSD facilities list

RCRA-TSDF ---------- RCRA - Treatment, Storage and Disposal

Federal RCRA generators list

RCRA-CESQG ---------- RCRA - Conditionally Exempt Small Quantity Generator

Federal institutional controls / engineering controls registries

US INST CONTROL ---------- Sites with Institutional Controls

Federal ERNS list

ERNS ---------- Emergency Response Notification System

State- and tribal - equivalent NPL

RESPONSE ---------- State Response Sites

State and tribal landfill and/or solid waste disposal site lists

SWF/LF ---------- Solid Waste Information System

State and tribal leaking storage tank lists

INDIAN LUST ---------- Leaking Underground Storage Tanks on Indian Land

State and tribal registered storage tank lists

UST ---------- Active UST Facilities
AST ---------- Aboveground Petroleum Storage Tank Facilities
INDIAN UST ---------- Underground Storage Tanks on Indian Land
FEMA UST ---------- Underground Storage Tank Listing

State and tribal voluntary cleanup sites

VCP ---------- Voluntary Cleanup Program Properties

INDIAN VCP ---- Voluntary Cleanup Priority Listing

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS ---- A Listing of Brownfields Sites

Local Lists of Landfill / Solid Waste Disposal Sites

ODI ---- Open Dump Inventory
DEBRIS REGION 9 ---- Torres Martinez Reservation Illegal Dump Site Locations
WMUDS/SWAT ---- Waste Management Unit Database
SWRCY ---- Recycler Database
HAULERS ---- Registered Waste Tire Haulers Listing
INDIAN ODI ---- Report on the Status of Open Dumps on Indian Lands

Local Lists of Hazardous waste / Contaminated Sites

US CDL ---- Clandestine Drug Labs
SCH ---- School Property Evaluation Program
Toxic Pits ---- Toxic Pits Cleanup Act Sites
AOCONCERN ---- San Gabriel Valley Areas of Concern
CDL ---- Clandestine Drug Labs
US HIST CDL ---- National Clandestine Laboratory Register

Local Land Records

LIENS 2 ---- CERCLA Lien Information
LUCIS ---- Land Use Control Information System
LIENS ---- Environmental Liens Listing
DEED ---- Deed Restriction Listing

Records of Emergency Release Reports

HMIRS ---- Hazardous Materials Information Reporting System
CHMIRS ---- California Hazardous Material Incident Report System
LDS ---- Land Disposal Sites Listing
MCS ---- Military Cleanup Sites Listing

Other Ascertainable Records

RCRA-NonGen ---- RCRA - Non Generators
DOT OPS ---- Incident and Accident Data
DOD ---- Department of Defense Sites
CONSENT ---- Superfund (CERCLA) Consent Decrees
UMTRA ---- Uranium Mill Tailings Sites
MINES ---- Mines Master Index File
TRIS ---- Toxic Chemical Release Inventory System
TSCA ---- Toxic Substances Control Act
FTTS ---- FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
HIST FTTS ---- FIFRA/TSCA Tracking System Administrative Case Listing
SSTS ---- Section 7 Tracking Systems

EXECUTIVE SUMMARY

ICIS	Integrated Compliance Information System
PADS	PCB Activity Database System
MLTS	Material Licensing Tracking System
RADINFO	Radiation Information Database
FINDS	Facility Index System/Facility Registry System
RAATS	RCRA Administrative Action Tracking System
CA BOND EXP. PLAN	Bond Expenditure Plan
NPDES	NPDES Permits Listing
WDS	Waste Discharge System
Notify 65	Proposition 65 Records
LA Co. Site Mitigation	Site Mitigation List
DRYCLEANERS	Cleaner Facilities
WIP	Well Investigation Program Case List
LOS ANGELES CO. HMS	HMS: Street Number List
HAZNET	Facility and Manifest Data
EMI	Emissions Inventory Data
INDIAN RESERV	Indian Reservations
SCRD DRYCLEANERS	State Coalition for Remediation of Drycleaners Listing
FINANCIAL ASSURANCE	Financial Assurance Information Listing
HWP	EnviroStor Permitted Facilities Listing
HWT	Registered Hazardous Waste Transporter Database
COAL ASH EPA	Coal Combustion Residues Surface Impoundments List
PCB TRANSFORMER	PCB Transformer Registration Database
PROC	Certified Processors Database
MWMP	Medical Waste Management Program Listing
COAL ASH DOE	Sleam-Electric Plan Operation Data

EDR PROPRIETARY RECORDS

EDR Proprietary Records

Manufactured Gas Plants	EDR Proprietary Manufactured Gas Plants
EDR Historical Auto Stations	EDR Proprietary Historic Gas Stations

SURROUNDING SITES: SEARCH RESULTS

Surrounding sites were identified in the following databases.

Elevations have been determined from the USGS Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified. Sites with an elevation equal to or higher than the target property have been differentiated below from sites with an elevation lower than the target property.
Page numbers and map identification numbers refer to the EDR Radius Map report where detailed data on individual sites can be reviewed.

Sites listed in ***bold italics*** are in multiple databases.

Unmappable (orphan) sites are not considered in the foregoing analysis.

EXECUTIVE SUMMARY

STANDARD ENVIRONMENTAL RECORDS

Federal NPL site list

NPL: Also known as Superfund, the National Priority List database is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund program. The source of this database is the U.S. EPA.

A review of the NPL list, as provided by EDR, and dated 03/31/2011 has revealed that there is 1 NPL site within approximately 1 mile of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
JET PROPULSION LABORATORY	***4800 OAK GROVE DRIVE***	***WNW 1/4 - 1/2 (0.278 mi.)***	***B12***	***48***

Federal CERCLIS list

CERCLIS: The Comprehensive Environmental Response, Compensation and Liability Information System contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). CERCLIS contains sites which are either proposed to or on the National Priorities List (NPL) and sites which are in the screening and assessment phase for possible inclusion on the NPL.

A review of the CERCLIS list, as provided by EDR, and dated 02/25/2011 has revealed that there is 1 CERCLIS site within approximately 0.5 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
JET PROPULSION LABORATORY	***4800 OAK GROVE DRIVE***	***WNW 1/4 - 1/2 (0.278 mi.)***	***B12***	***48***

Federal RCRA generators list

RCRA-LQG: RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month.

A review of the RCRA-LQG list, as provided by EDR, and dated 03/11/2011 has revealed that there is 1 RCRA-LQG site within approximately 0.25 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
EXXONMOBIL CORP 13-408	2172 YUCCA LN	ESE 1/8 - 1/4 (0.213 mi.)	8	14

RCRA-SQG: RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month.

A review of the RCRA-SQG list, as provided by EDR, and dated 03/11/2011 has revealed that there is 1 RCRA-SQG site within approximately 0.25 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
AUDUBON ELEMENTARY SCHOOL	***725 W ALTADENA DR***	***ESE 1/8 - 1/4 (0.243 mi.)***	***9***	***15***

Federal institutional controls / engineering controls registries

US ENG CONTROLS: A listing of sites with engineering controls in place.

A review of the US ENG CONTROLS list, as provided by EDR, and dated 03/16/2011 has revealed that there is 1 US ENG CONTROLS site within approximately 0.5 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
JET PROPULSION LABORATORY	***4800 OAK GROVE DRIVE***	***WNW 1/4 - 1/2 (0.278 mi.)***	***B12***	***48***

State- and tribal - equivalent CERCLIS

ENVIROSTOR: The Department of Toxic Substances Control's (DTSC's) Site Mitigation and Brownfields Reuse Program's (SMBRP's) EnviroStor database identifes sites that have known contamination or sites for which there may be reasons to investigate further. The database includes the following site types: Federal Superfund sites (National Priorities List (NPL)); State Response, including Military Facilities and State Superfund; Voluntary Cleanup; and School sites. EnviroStor provides similar information to the information that was available in CalSites, and provides additional site information, including, but not limited to, identification of formerly-contaminated properties that have been released for reuse, properties where environmental deed restrictions have been recorded to prevent inappropriate land uses, and risk characterization information that is used to assess potential impacts to public health and the environment at contaminated sites.

A review of the ENVIROSTOR list, as provided by EDR, and dated 05/10/2011 has revealed that there are 2 ENVIROSTOR sites within approximately 1 mile of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
JET PROPULSION LABORATORY Status: Active	***4800 OAK GROVE DR***	***WNW 1/4 - 1/2 (0.278 mi.)***	***B11***	***21***
CRYSTAL CLEANERS Status: Inactive - Action Required	444 FOOTHILL BLVD.	WNW 1/2 - 1 (0.853 mi.)	20	100

State and tribal leaking storage tank lists

LUST: The Leaking Underground Storage Tank Incident Reports contain an inventory of reported leaking underground storage tank incidents. The data come from the State Water Resources Control Board Leaking Underground Storage Tank Information System.

A review of the LUST list, as provided by EDR, and dated 04/29/2011 has revealed that there are 9 LUST sites within approximately 0.5 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
OAK GROVE RANGER STATION Status: Completed - Case Closed	***4600 OAK GROVE DR***	***WNW 1/8 - 1/4 (0.191 mi.)***	***3***	***8***
FLINTRIDGE RIDING CLUB Status: Completed - Case Closed	4625 OAK GROVE DR	WNW 1/8 - 1/4 (0.197 mi.)	A7	12
NASA/JET PROPULSION LABORATORI Status: Open - Site Assessment	***4800 OAK GROVE DRIVE***	***WNW 1/4 - 1/2 (0.276 mi.)***	***B10***	***17***
PACIFIC BELL Status: Completed - Case Closed	***4815 OAK GROVE AVE***	***WNW 1/4 - 1/2 (0.284 mi.)***	***B13***	***87***
CALIFORNIA HIGHWAY PATROL Status: Completed - Case Closed	2130 WINDSOR AVE.	ESE 1/4 - 1/2 (0.304 mi.)	C14	92
USDA FOREST SERVICE, OAK	***OAK GROVE DR N***	***WNW 1/4 - 1/2 (0.305 mi.)***	***15***	***93***
CALTRANS MAINTENANCE STATION Status: Open - Site Assessment	2122 NORTH WINDSOR AVEN	ESE 1/4 - 1/2 (0.308 mi.)	C16	94
SZKIBA AUTO (FORMER) Status: Completed - Case Closed	***3081 LINCOLN BLVD N***	***ESE 1/4 - 1/2 (0.432 mi.)***	***D17***	***95***
E & J ALTADENA PLAZA Status: Open - Site Assessment	575 ALTADENA DR. W	ESE 1/4 - 1/2 (0.466 mi.)	D18	98

SLIC: SLIC Region comes from the California Regional Water Quality Control Board.

A review of the SLIC list, as provided by EDR, and dated 04/29/2011 has revealed that there is 1 SLIC site within approximately 0.5 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
NASA/JET PROPULSION LABORATORI Facility Status: Open - Remediation	***4800 OAK GROVE DRIVE***	***WNW 1/4 - 1/2 (0.276 mi.)***	***B10***	***17***

ADDITIONAL ENVIRONMENTAL RECORDS

Local Lists of Hazardous waste / Contaminated Sites

HIST Cal-Sites: Formerly known as ASPIS, this database contains both known and potential hazardous substance sites. The source is the California Department of Toxic Substance Control. No longer updated by the state agency. It has been replaced by ENVIROSTOR.

A review of the HIST Cal-Sites list, as provided by EDR, and dated 08/08/2005 has revealed that there

is 1 HIST Cal-Sites site within approximately 1 mile of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
JET PROPULSION LABORATORY	***4800 OAK GROVE DR***	***WNW 1/4 - 1/2 (0.278 mi.)***	***B11***	***21***

Local Lists of Registered Storage Tanks

CA FID UST: The Facility Inventory Database contains active and inactive underground storage tank locations. The source is the State Water Resource Control Board.

A review of the CA FID UST list, as provided by EDR, and dated 10/31/1994 has revealed that there is 1 CA FID UST site within approximately 0.25 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
FLINTRIDGE RIDING CLUB	***4625 OAK GROVE DR***	***WNW 1/8 - 1/4 (0.197 mi.)***	***A5***	***11***

HIST UST: Historical UST Registered Database.

A review of the HIST UST list, as provided by EDR, and dated 10/15/1990 has revealed that there is 1 HIST UST site within approximately 0.25 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
FLINTRIDGE RIDING CLUB	***4625 OAK GROVE DR***	***WNW 1/8 - 1/4 (0.197 mi.)***	***A6***	***11***

SWEEPS UST: Statewide Environmental Evaluation and Planning System. This underground storage tank listing was updated and maintained by a company contacted by the SWRCB in the early 1990's. The listing is no longer updated or maintained. The local agency is the contact for more information on a site on the SWEEPS list.

A review of the SWEEPS UST list, as provided by EDR, and dated 06/01/1994 has revealed that there is 1 SWEEPS UST site within approximately 0.25 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
FLINTRIDGE RIDING CLUB	***4625 OAK GROVE DR***	***WNW 1/8 - 1/4 (0.197 mi.)***	***A5***	***11***

Other Ascertainable Records

FUDS: The Listing includes locations of Formerly Used Defense Sites Properties where the US Army Corps Of Engineers is actively working or will take necessary cleanup actions.

A review of the FUDS list, as provided by EDR, and dated 12/31/2009 has revealed that there is 1 FUDS site within approximately 1 mile of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
JET PROPULSION LAB		NNW 1/2 - 1 (0.693 mi.)	19	99

ROD: Record of Decision. ROD documents mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid the cleanup.

A review of the ROD list, as provided by EDR, and dated 02/25/2011 has revealed that there is 1 ROD site within approximately 1 mile of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
JET PROPULSION LABORATORY	***4800 OAK GROVE DRIVE***	***WNW 1/4 - 1/2 (0.278 mi.)***	***B12***	***48***

Cortese: The sites for the list are designated by the State Water Resource Control Board (LUST), the Integrated Waste Board (SWF/LS), and the Department of Toxic Substances Control (Cal-Sites). This listing is no longer updated by the state agency.

A review of the Cortese list, as provided by EDR, and dated 04/05/2011 has revealed that there is 1 Cortese site within approximately 0.5 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
JET PROPULSION LABORATORY	***4800 OAK GROVE DR***	***WNW 1/4 - 1/2 (0.278 mi.)***	***B11***	***21***

HIST CORTESE: The sites for the list are designated by the State Water Resource Control Board [LUST], the Integrated Waste Board [SWF/LS], and the Department of Toxic Substances Control [CALSITES].

A review of the HIST CORTESE list, as provided by EDR, and dated 04/01/2001 has revealed that there are 6 HIST CORTESE sites within approximately 0.5 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
JET PROPULSON LABORATORY	4800 OAK GROVE	0 - 1/8 (0.000 mi.)	1	8
OAK GROVE RANGER STATION	***4600 OAK GROVE DR***	***WNW 1/8 - 1/4 (0.191 mi.)***	***3***	***8***
FLINTRIDGE RIDING CLUB	***4625 OAK GROVE DR***	***WNW 1/8 - 1/4 (0.197 mi.)***	***A6***	***11***
PACIFIC BELL	***4815 OAK GROVE AVE***	***WNW 1/4 - 1/2 (0.284 mi.)***	***B13***	***87***
USDA FOREST SERVICE, OAK	***OAK GROVE DR N***	***WNW 1/4 - 1/2 (0.305 mi.)***	***15***	***93***
SZKIBA AUTO (FORMER)	***3081 LINCOLN BLVD N***	***ESE 1/4 - 1/2 (0.432 mi.)***	***D17***	***95***

EDR PROPRIETARY RECORDS

EDR Proprietary Records

EDR Historical Cleaners: EDR has searched selected national collections of business directories and has collected listings of potential dry cleaner sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include dry cleaning establishments. The categories reviewed included, but were not limited to dry cleaners, cleaners, laundry, laundromat, cleaning/laundry, wash & dry etc.

A review of the EDR Historical Cleaners list, as provided by EDR, has revealed that there are 2 EDR Historical Cleaners sites within approximately 0.25 miles of the target property.

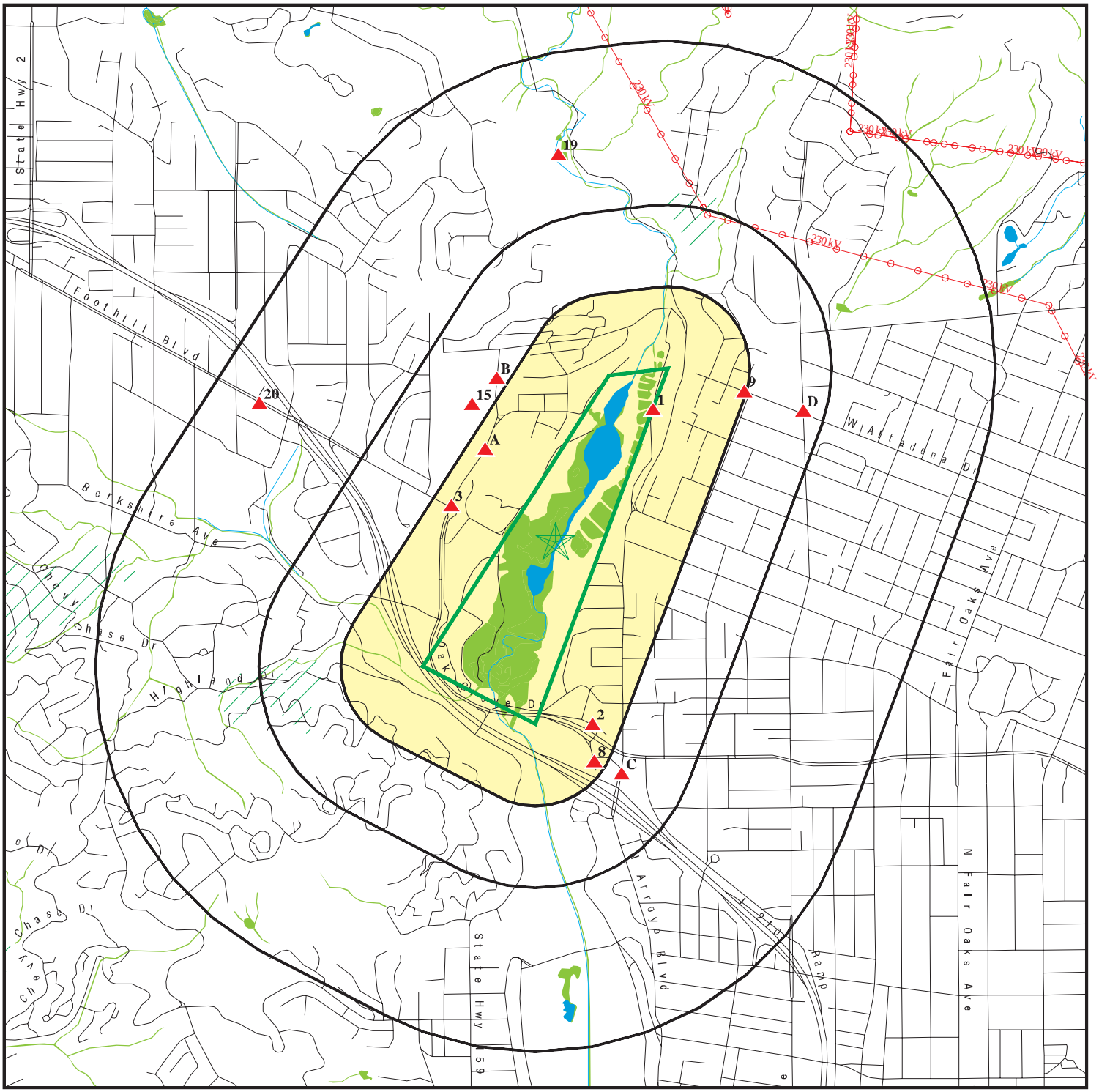
Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
FASHION DRY CLEANERS	940 YUCCA AV	ESE 1/8 - 1/4 (0.164 mi.)	2	8
FLINTRIDGE RIDING CLUB	4625 OAK GROVE DR	WNW 1/8 - 1/4 (0.197 mi.)	A4	10

EXECUTIVE SUMMARY

Due to poor or inadequate address information, the following sites were not mapped. Count: 17 records.

Site Name	Database(s)
CHILD MAINTENANCE STATIO	HIST CORTESE
NEWCOMB'S INN	HIST CORTESE
FMD BARLEY FLATS	HIST CORTESE
KRATKA RIDGE SKI AREA	HIST CORTESE
SHORT CUT STATION	CA FID UST, SWEEPS UST
KRATKA RIDGE SKI AREA	SWEEPS UST
CAMP VALCREST	SWEEPS UST
CHILAO MAINTENANCE STATION	SWEEPS UST
MOBIL OIL (F0RMER)	LUST
USDA FOREST SERVICE	LUST
USDA FOREST SERVICE, OAK GROVE	LUST
CHILAO MAINTENANCE STATION	RCRA-SQG, FINDS, LUST, HIST UST, HAZNET
FMD BARLEY FLATS	LUST
NEWCOMB'S INN	LUST
OAK FLAT	HIST UST
CHILAO RANGER STATION	HIST UST
CAMP VALCREST	HIST UST

OVERVIEW MAP - 3110824.2s



0 1/4 1/2 1 Miles

- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Manufactured Gas Plants
- National Priority List Sites
- Dept. Defense Sites
- Indian Reservations BIA
- Power transmission lines
- Oil & Gas pipelines
- 100-year flood zone
- 500-year flood zone
- National Wetland Inventory
- Areas of Concern

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME: Devils Gate Reservoir ADDRESS: 940 Ventura Street LA Canada Flintridge CA 91011 LAT/LONG: 34.1927 / 118.1722	CLIENT: Gannett Fleming, Inc. CONTACT: Joseph Lovewell INQUIRY #: 3110824.2s DATE: June 30, 2011 9:02 am

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DETAIL MAP - 3110824.2s

0 1/8 1/4 1/2 Miles

- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Manufactured Gas Plants
- Sensitive Receptors
- National Priority List Sites
- Dept. Defense Sites
- Indian Reservations BIA
- Oil & Gas pipelines
- 100-year flood zone
- 500-year flood zone
- National Wetland Inventory
- Areas of Concern

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME: Devils Gate Reservoir	CLIENT: Gannett Fleming, Inc.
ADDRESS: 940 Ventura Street LA Canada Flintridge CA 91011	CONTACT: Joseph Lovewell
LAT/LONG: 34.1927 / 118.1722	INQUIRY #: 3110824.2s DATE: June 30, 2011 9:03 am

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MAP FINDINGS SUMMARY

Database	Target Property	Search Distance (Miles)	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
STANDARD ENVIRONMENTAL RECORDS								
Federal NPL site list								
NPL		1.000	0	0	1	0	NR	1
Proposed NPL		1.000	0	0	0	0	NR	0
NPL LIENS		TP	NR	NR	NR	NR	NR	0
Federal Delisted NPL site list								
Delisted NPL		1.000	0	0	0	0	NR	0
Federal CERCLIS list								
CERCLIS		0.500	0	0	1	NR	NR	1
FEDERAL FACILITY		1.000	0	0	0	0	NR	0
Federal CERCLIS NFRAP site List								
CERC-NFRAP		0.500	0	0	0	NR	NR	0
Federal RCRA CORRACTS facilities list								
CORRACTS		1.000	0	0	0	0	NR	0
Federal RCRA non-CORRACTS TSD facilities list								
RCRA-TSDF		0.500	0	0	0	NR	NR	0
Federal RCRA generators list								
RCRA-LQG		0.250	0	1	NR	NR	NR	1
RCRA-SQG		0.250	0	1	NR	NR	NR	1
RCRA-CESQG		0.250	0	0	NR	NR	NR	0
Federal institutional controls / engineering controls registries								
US ENG CONTROLS		0.500	0	0	1	NR	NR	1
US INST CONTROL		0.500	0	0	0	NR	NR	0
Federal ERNS list								
ERNS		TP	NR	NR	NR	NR	NR	0
State- and tribal - equivalent NPL								
RESPONSE		1.000	0	0	0	0	NR	0
State- and tribal - equivalent CERCLIS								
ENVIROSTOR		1.000	0	0	1	1	NR	2
State and tribal landfill and/or solid waste disposal site lists								
SWF/LF		0.500	0	0	0	NR	NR	0
State and tribal leaking storage tank lists								
LUST		0.500	0	2	7	NR	NR	9
SLIC		0.500	0	0	1	NR	NR	1

MAP FINDINGS SUMMARY

Database	Target Property	Search Distance (Miles)	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
INDIAN LUST		0.500	0	0	0	NR	NR	0
State and tribal registered storage tank lists								
UST		0.250	0	0	NR	NR	NR	0
AST		0.250	0	0	NR	NR	NR	0
INDIAN UST		0.250	0	0	NR	NR	NR	0
FEMA UST		0.250	0	0	NR	NR	NR	0
State and tribal voluntary cleanup sites								
VCP		0.500	0	0	0	NR	NR	0
INDIAN VCP		0.500	0	0	0	NR	NR	0
ADDITIONAL ENVIRONMENTAL RECORDS								
Local Brownfield lists								
US BROWNFIELDS		0.500	0	0	0	NR	NR	0
Local Lists of Landfill / Solid Waste Disposal Sites								
ODI		0.500	0	0	0	NR	NR	0
DEBRIS REGION 9		0.500	0	0	0	NR	NR	0
WMUDS/SWAT		0.500	0	0	0	NR	NR	0
SWRCY		0.500	0	0	0	NR	NR	0
HAULERS		TP	NR	NR	NR	NR	NR	0
INDIAN ODI		0.500	0	0	0	NR	NR	0
Local Lists of Hazardous waste / Contaminated Sites								
US CDL		TP	NR	NR	NR	NR	NR	0
HIST Cal-Sites		1.000	0	0	1	0	NR	1
SCH		0.250	0	0	NR	NR	NR	0
Toxic Pits		1.000	0	0	0	0	NR	0
AOCONCERN		1.000	0	0	0	0	NR	0
CDL		TP	NR	NR	NR	NR	NR	0
US HIST CDL		TP	NR	NR	NR	NR	NR	0
Local Lists of Registered Storage Tanks								
CA FID UST		0.250	0	1	NR	NR	NR	1
HIST UST		0.250	0	1	NR	NR	NR	1
SWEEPS UST		0.250	0	1	NR	NR	NR	1
Local Land Records								
LIENS 2		TP	NR	NR	NR	NR	NR	0
LUCIS		0.500	0	0	0	NR	NR	0
LIENS		TP	NR	NR	NR	NR	NR	0
DEED		0.500	0	0	0	NR	NR	0
Records of Emergency Release Reports								
HMIRS		TP	NR	NR	NR	NR	NR	0
CHMIRS		TP	NR	NR	NR	NR	NR	0

MAP FINDINGS SUMMARY

Database	Target Property	Search Distance (Miles)	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
LDS		TP	NR	NR	NR	NR	NR	0
MCS		TP	NR	NR	NR	NR	NR	0
Other Ascertainable Records								
RCRA-NonGen		0.250	0	0	NR	NR	NR	0
DOT OPS		TP	NR	NR	NR	NR	NR	0
DOD		1.000	0	0	0	0	NR	0
FUDS		1.000	0	0	0	1	NR	1
CONSENT		1.000	0	0	0	0	NR	0
ROD		1.000	0	0	1	0	NR	1
UMTRA		0.500	0	0	0	NR	NR	0
MINES		0.250	0	0	NR	NR	NR	0
TRIS		TP	NR	NR	NR	NR	NR	0
TSCA		TP	NR	NR	NR	NR	NR	0
FTTS		TP	NR	NR	NR	NR	NR	0
HIST FTTS		TP	NR	NR	NR	NR	NR	0
SSTS		TP	NR	NR	NR	NR	NR	0
ICIS		TP	NR	NR	NR	NR	NR	0
PADS		TP	NR	NR	NR	NR	NR	0
MLTS		TP	NR	NR	NR	NR	NR	0
RADINFO		TP	NR	NR	NR	NR	NR	0
FINDS		TP	NR	NR	NR	NR	NR	0
RAATS		TP	NR	NR	NR	NR	NR	0
CA BOND EXP. PLAN		1.000	0	0	0	0	NR	0
NPDES		TP	NR	NR	NR	NR	NR	0
WDS		TP	NR	NR	NR	NR	NR	0
Cortese		0.500	0	0	1	NR	NR	1
HIST CORTESE		0.500	1	2	3	NR	NR	6
Notify 65		1.000	0	0	0	0	NR	0
LA Co. Site Mitigation		TP	NR	NR	NR	NR	NR	0
DRYCLEANERS		0.250	0	0	NR	NR	NR	0
WIP		0.250	0	0	NR	NR	NR	0
LOS ANGELES CO. HMS		TP	NR	NR	NR	NR	NR	0
HAZNET		TP	NR	NR	NR	NR	NR	0
EMI		TP	NR	NR	NR	NR	NR	0
INDIAN RESERV		1.000	0	0	0	0	NR	0
SCRD DRYCLEANERS		0.500	0	0	0	NR	NR	0
FINANCIAL ASSURANCE		TP	NR	NR	NR	NR	NR	0
HWP		1.000	0	0	0	0	NR	0
HWT		0.250	0	0	NR	NR	NR	0
COAL ASH EPA		0.500	0	0	0	NR	NR	0
PCB TRANSFORMER		TP	NR	NR	NR	NR	NR	0
PROC		0.500	0	0	0	NR	NR	0
MWMP		0.250	0	0	NR	NR	NR	0
COAL ASH DOE		TP	NR	NR	NR	NR	NR	0
EDR PROPRIETARY RECORDS								
EDR Proprietary Records								
Manufactured Gas Plants		1.000	0	0	0	0	NR	0

MAP FINDINGS SUMMARY

Database	Target Property	Search Distance (Miles)	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
EDR Historical Auto Stations		0.250	0	0	NR	NR	NR	0
EDR Historical Cleaners		0.250	0	2	NR	NR	NR	2

NOTES:

TP = Target Property

NR = Not Requested at this Search Distance

Sites may be listed in more than one database

1
< 1/8
0.000 mi.
2 ft.

JET PROPULSON LABORATORY
4800 OAK GROVE
LA CANADA, CA 91109

HIST CORTESE **S100281088**
N/A

Relative:
Higher

Actual:
1106 ft.

CORTESE:
Region: CORTESE
Facility County Code: 19
Reg By: LTNKA
Reg Id: I-11934

Region: CORTESE
Facility County Code: 19
Reg By: CALSI
Reg Id: 19970008

2
ESE
1/8-1/4
0.164 mi.
865 ft.

FASHION DRY CLEANERS
940 YUCCA AV
LANCASTER, CA

EDR Historical Cleaners **1009214088**
N/A

Relative:
Higher

Actual:
1086 ft.

EDR Historical Cleaners:
Name: FASHION DRY CLEANERS
Year: 1950
Type: LAUNDRIES

3
WNW
1/8-1/4
0.191 mi.
1009 ft.

OAK GROVE RANGER STATION
4600 OAK GROVE DR
LA CANADA-FLINTRIDGE, CA 91011

HIST CORTESE **S102434543**
LUST **N/A**

Relative:
Higher

Actual:
1087 ft.

CORTESE:
Region: CORTESE
Facility County Code: 19
Reg By: LTNKA
Reg Id: 121294-23

LUST:
Region: STATE
Global Id: T0603700208
Latitude: 34.1957542
Longitude: -118.1764028
Case Type: LUST Cleanup Site
Status: Completed - Case Closed
Status Date: 1990-12-19 00:00:00
Lead Agency: LOS ANGELES COUNTY
Case Worker: JA
Local Agency: LOS ANGELES COUNTY
RB Case Number: 121294-23
LOC Case Number: Not reported
File Location: Not reported
Potential Media Affect: Soil
Potential Contaminants of Concern: Gasoline
Site History: Not reported

OAK GROVE RANGER STATION (Continued) **S102434543**

Click here to access the California GeoTracker records for this facility:

LUST:

Global Id:	T0603700208
Contact Type:	Regional Board Caseworker
Contact Name:	YUE RONG
Organization Name:	LOS ANGELES RWQCB (REGION 4)
Address:	320 W. 4TH ST., SUITE 200
City:	Los Angeles
Email:	yrong@waterboards.ca.gov
Phone Number:	Not reported

Global Id:	T0603700208
Contact Type:	Local Agency Caseworker
Contact Name:	JOHN AWUJO
Organization Name:	LOS ANGELES COUNTY
Address:	900 S FREMONT AVE
City:	ALHAMBRA
Email:	Not reported
Phone Number:	6264583507

LUST:

Global Id:	T0603700208
Action Type:	Other
Date:	1950-01-01 00:00:00
Action:	Leak Stopped

Global Id:	T0603700208
Action Type:	Other
Date:	1950-01-01 00:00:00
Action:	Leak Reported

Global Id:	T0603700208
Action Type:	ENFORCEMENT
Date:	1990-12-19 00:00:00
Action:	Closure/No Further Action Letter

Global Id:	T0603700208
Action Type:	Other
Date:	1950-01-01 00:00:00
Action:	Leak Discovery

LUST REG 4:

Region:	4
Regional Board:	04
County:	Los Angeles
facid:	121294-23
Status:	Leak being confirmed
Substance:	Gasoline
Substance Quantity:	Not reported
Local Case No:	Not reported
Case Type:	Soil
Abatement Method Used at the Site:	Not reported
Global ID:	T0603700208
W Global ID:	Not reported

OAK GROVE RANGER STATION (Continued) **S102434543**

Staff:	UNK	
Local Agency:	19000	
Cross Street:	FOOTHILL FWY	
Enforcement Type:	Not reported	
Date Leak Discovered:	8/4/1990	
Date Leak First Reported:		9/26/1990
Date Leak Record Entered:	9/2/1993	
Date Confirmation Began:	9/26/1990	
Date Leak Stopped:	8/4/1990	
Date Case Last Changed on Database:		9/2/1993
Date the Case was Closed:		Not reported
How Leak Discovered:	Tank Closure	
How Leak Stopped:	Not reported	
Cause of Leak:	UNK	
Leak Source:	UNK	
Operator:	ROBERTS, MIKE	
Water System:	Not reported	
Well Name:	Not reported	
Approx. Dist To Production Well (ft):		2342.829495737711286102248 4757
Source of Cleanup Funding:		UNK
Preliminary Site Assessment Workplan Submitted:		Not reported
Preliminary Site Assessment Began:		Not reported
Pollution Characterization Began:		Not reported
Remediation Plan Submitted:		Not reported
Remedial Action Underway:		Not reported
Post Remedial Action Monitoring Began:		Not reported
Enforcement Action Date:		Not reported
Historical Max MTBE Date:		Not reported
Hist Max MTBE Conc in Groundwater:		Not reported
Hist Max MTBE Conc in Soil:		Not reported
Significant Interim Remedial Action Taken:		Not reported
GW Qualifier:	Not reported	
Soil Qualifier:	Not reported	
Organization:	Not reported	
Owner Contact:	Not reported	
Responsible Party:	USDA FREST SERVICE	
RP Address:	701 N SANTA ANITA AVE, ARCADIA, CA 91006	
Program:	LUST	
Lat/Long:	34.1957542 / -1	
Local Agency Staff:	Not reported	
Beneficial Use:	Not reported	
Priority:	Not reported	
Cleanup Fund Id:	Not reported	
Suspended:	Not reported	
Assigned Name:	Not reported	
Summary:	Not reported	

A4 **FLINTRIDGE RIDING CLUB** **EDR Historical Cleaners** **1009162716**
WNW **4625 OAK GROVE DR** **N/A**
1/8-1/4 **PASADENA, CA**
0.197 mi.
1038 ft. **Site 1 of 4 in cluster A**

Relative:
Higher

Actual:
1125 ft.

EDR Historical Cleaners:

Name:	FLINTRIDGE RIDING CLUB
Year:	1971
Type:	CLEANERS AND DYERS

A5
WNW
1/8-1/4
0.197 mi.
1041 ft.

FLINTRIDGE RIDING CLUB
4625 OAK GROVE DR
LA CANADA FLINTR, CA 91011

Site 2 of 4 in cluster A

CA FID UST **S101618268**
SWEEPS UST **N/A**

Relative:
Higher

Actual:
1125 ft.

CA FID UST:

Facility ID:	19009381
Regulated By:	UTNKI
Regulated ID:	00041542
Cortese Code:	Not reported
SIC Code:	Not reported
Facility Phone:	Not reported
Mail To:	Not reported
Mailing Address:	4625 OAK GROVE DR
Mailing Address 2:	Not reported
Mailing City,St,Zip:	LA CANADA FLINTR 91011
Contact:	Not reported
Contact Phone:	Not reported
DUNs Number:	Not reported
NPDES Number:	Not reported
EPA ID:	Not reported
Comments:	Not reported
Status:	Inactive

SWEEPS UST:

Status:	Not reported
Comp Number:	12267
Number:	Not reported
Board Of Equalization:	Not reported
Ref Date:	Not reported
Act Date:	Not reported
Created Date:	Not reported
Tank Status:	Not reported
Owner Tank Id:	Not reported
Swrcb Tank Id:	19-000-012267-000001
Actv Date:	Not reported
Capacity:	500
Tank Use:	M.V. FUEL
Stg:	PRODUCT
Content:	REG UNLEADED
Number Of Tanks:	1

A6
WNW
1/8-1/4
0.197 mi.
1041 ft.

FLINTRIDGE RIDING CLUB
4625 OAK GROVE DR
LA CANADA FLINTRIDGE, CA 91011

Site 3 of 4 in cluster A

HIST CORTESE **U001566503**
HIST UST **N/A**

Relative:
Higher

Actual:
1125 ft.

CORTESE:

Region:	CORTESE
Facility County Code:	19
Reg By:	LTNKA
Reg Id:	R-12267

HIST UST:

Region:	STATE
Facility ID:	00000041542
Facility Type:	Other

FLINTRIDGE RIDING CLUB (Continued) **U001566503**

Other Type: PRIVATE CLUB
Total Tanks: 0001
Contact Name: DANE WILLIAMS
Telephone: 8187901233
Owner Name: FLINTRIDGE RIDING CLUB
Owner Address: 4625 OAK GROVE DRIVE
Owner City,St,Zip: FLINTRIDGE, CA 91011

Tank Num: 001
Container Num: #1
Year Installed: Not reported
Tank Capacity: 00000500
Tank Used for: PRODUCT
Type of Fuel: REGULAR
Tank Construction: 12 gauge
Leak Detection: None

A7 **FLINTRIDGE RIDING CLUB** **LUST** **S105051393**
WNW **4625 OAK GROVE DR** **N/A**
1/8-1/4 **LA CANADA-FLINTRIDGE, CA 91011**
0.197 mi.
1041 ft. **Site 4 of 4 in cluster A**

Relative:
Higher

Actual:
1125 ft.

LUST:
Region: STATE
Global Id: T0603705109
Latitude: 34.1962542
Longitude: -118.1763128
Case Type: LUST Cleanup Site
Status: Completed - Case Closed
Status Date: 1990-12-19 00:00:00
Lead Agency: LOS ANGELES COUNTY
Case Worker: JA
Local Agency: LOS ANGELES COUNTY
RB Case Number: R-12267
LOC Case Number: Not reported
File Location: Not reported
Potential Media Affect: Soil
Potential Contaminants of Concern: Aviation
Site History: Not reported

Click here to access the California GeoTracker records for this facility:

LUST:
Global Id: T0603705109
Contact Type: Regional Board Caseworker
Contact Name: YUE RONG
Organization Name: LOS ANGELES RWQCB (REGION 4)
Address: 320 W. 4TH ST., SUITE 200
City: Los Angeles
Email: yrong@waterboards.ca.gov
Phone Number: Not reported

Global Id: T0603705109
Contact Type: Local Agency Caseworker
Contact Name: JOHN AWUJO
Organization Name: LOS ANGELES COUNTY
Address: 900 S FREMONT AVE

FLINTRIDGE RIDING CLUB (Continued) **S105051393**

City: ALHAMBRA
Email: Not reported
Phone Number: 6264583507

LUST:
Global Id: T0603705109
Action Type: Other
Date: 1950-01-01 00:00:00
Action: Leak Reported

LUST REG 4:
Region: 4
Regional Board: 04
County: Los Angeles
facid: R-12267
Status: Case Closed
Substance: 1
Substance Quantity: Not reported
Local Case No: Not reported
Case Type: Soil
Abatement Method Used at the Site: Not reported
Global ID: T0603705109
W Global ID: Not reported
Staff: UNK
Local Agency: 19000
Cross Street: LAMOUR DR
Enforcement Type: Not reported
Date Leak Discovered: Not reported
Date Leak First Reported: 12/19/1990
Date Leak Record Entered: 4/30/1996
Date Confirmation Began: Not reported
Date Leak Stopped: Not reported
Date Case Last Changed on Database: 12/19/1990
Date the Case was Closed: 12/19/1990
How Leak Discovered: Not reported
How Leak Stopped: Not reported
Cause of Leak: Not reported
Leak Source: Not reported
Operator: Not reported
Water System: Not reported
Well Name: Not reported
Approx. Dist To Production Well (ft): 2375.906783424725511074261121 2
Source of Cleanup Funding: Not reported
Preliminary Site Assessment Workplan Submitted: Not reported
Preliminary Site Assessment Began: Not reported
Pollution Characterization Began: Not reported
Remediation Plan Submitted: Not reported
Remedial Action Underway: Not reported
Post Remedial Action Monitoring Began: Not reported
Enforcement Action Date: Not reported
Historical Max MTBE Date: Not reported
Hist Max MTBE Conc in Groundwater: Not reported
Hist Max MTBE Conc in Soil: Not reported
Significant Interim Remedial Action Taken: Not reported
GW Qualifier: Not reported

FLINTRIDGE RIDING CLUB (Continued) **S105051393**

Soil Qualifier:	Not reported
Organization:	Not reported
Owner Contact:	Not reported
Responsible Party:	FLINTRIDGE RIDING CLUB
RP Address:	4625 OAK GROVE DR FLINTRIDGE CA 91011
Program:	LUST
Lat/Long:	34.1962542 / -1
Local Agency Staff:	Not reported
Beneficial Use:	Not reported
Priority:	Not reported
Cleanup Fund Id:	Not reported
Suspended:	Not reported
Assigned Name:	Not reported
Summary:	Not reported

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8 **EXXONMOBIL CORP 13-408** **RCRA-LQG** **1012176144**
ESE **2172 YUCCA LN** **CAR000200006**
1/8-1/4 **ALTADENA, CA 91001**
0.213 mi.
1122 ft.

Relative:
Higher

Actual:
1083 ft.

RCRA-LQG:

Date form received by agency:	04/23/2009
Facility name:	EXXONMOBIL CORP 13-408
Facility address:	2172 YUCCA LN ALTADENA, CA 91001
EPA ID:	CAR000200006
Mailing address:	882 S MATLACK ST STE C EMES CO JD2 ENVIRONMENTAL WEST CHESTER, CA 19382
Contact:	DONNA HYMES
Contact address:	882 S MATLACK ST STE C EMES CO JD2 ENVIRONMENTAL WEST CHESTER, CA 19382
Contact country:	US
Contact telephone:	610-430-8151
Contact email:	DHYMES@JD2ENV.COM
EPA Region:	09
Classification:	Large Quantity Generator
Description:	Handler: generates 1,000 kg or more of hazardous waste during any calendar month; or generates more than 1 kg of acutely hazardous waste during any calendar month; or generates more than 100 kg of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste during any calendar month; or generates 1 kg or less of acutely hazardous waste during any calendar month, and accumulates more than 1 kg of acutely hazardous waste at any time; or generates 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste during any calendar month, and accumulates more than 100 kg of that material at any time

Owner/Operator Summary:

Owner/operator name:	EXXONMOBIL OIL CORP
Owner/operator address:	Not reported Not reported
Owner/operator country:	Not reported
Owner/operator telephone:	Not reported

EXXONMOBIL CORP 13-408 (Continued) **1012176144**

Legal status: Private
Owner/Operator Type: Operator
Owner/Op start date: 12/01/1999
Owner/Op end date: Not reported

Owner/operator name: KENT B RILEY
Owner/operator address: 800 NEWPORT CENTER DR
NEWPORT BEACH, CA 92660
Owner/operator country: US
Owner/operator telephone: Not reported
Legal status: Private
Owner/Operator Type: Owner
Owner/Op start date: 05/18/2000
Owner/Op end date: Not reported

Handler Activities Summary:
U.S. importer of hazardous waste: No
Mixed waste (haz. and radioactive): No
Recycler of hazardous waste: No
Transporter of hazardous waste: No
Treater, storer or disposer of HW: No
Underground injection activity: No
On-site burner exemption: No
Furnace exemption: No
Used oil fuel burner: No
Used oil processor: No
User oil refiner: No
Used oil fuel marketer to burner: No
Used oil Specification marketer: No
Used oil transfer facility: No
Used oil transporter: No

Hazardous Waste Summary:
Waste code: D001
Waste name: IGNITABLE HAZARDOUS WASTES ARE THOSE WASTES WHICH HAVE A FLASHPOINT OF LESS THAN 140 DEGREES FAHRENHEIT AS DETERMINED BY A PENSKY-MARTENS CLOSED CUP FLASH POINT TESTER. ANOTHER METHOD OF DETERMINING THE FLASH POINT OF A WASTE IS TO REVIEW THE MATERIAL SAFETY DATA SHEET, WHICH CAN BE OBTAINED FROM THE MANUFACTURER OR DISTRIBUTOR OF THE MATERIAL. LACQUER THINNER IS AN EXAMPLE OF A COMMONLY USED SOLVENT WHICH WOULD BE CONSIDERED AS IGNITABLE HAZARDOUS WASTE.

Waste code: D018
Waste name: BENZENE

Violation Status: No violations found

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9 **AUDUBON ELEMENTARY SCHOOL** **RCRA-SQG** **1005441338**
ESE **725 W ALTADENA DR** **FINDS** **CAR000118067**
1/8-1/4 **ALTADENA, CA 91001**
0.243 mi.
1282 ft.

Relative:
Higher

Actual:
1243 ft.

RCRA-SQG:
Date form received by agency: 05/30/2002
Facility name: AUDUBON ELEMENTARY SCHOOL
Facility address: 725 W ALTADENA DR
ALTADENA, CA 91001

AUDUBON ELEMENTARY SCHOOL (Continued) **1005441338**

EPA ID: CAR000118067
Mailing address: 740 W WOODBURY RD
PASADENA, CA 91003
Contact: RALPH RIVERA
Contact address: 740 W WOODBURY RD
PASADENA, CA 91003
Contact country: US
Contact telephone: (626) 791-9445
Contact email: Not reported
EPA Region: 09
Classification: Small Small Quantity Generator
Description: Handler: generates more than 100 and less than 1000 kg of hazardous waste during any calendar month and accumulates less than 6000 kg of hazardous waste at any time; or generates 100 kg or less of hazardous waste during any calendar month, and accumulates more than 1000 kg of hazardous waste at any time

Owner/Operator Summary:
Owner/operator name: PASADENA UNIFIED SCHOOL DIST
Owner/operator address: 351 S HUDSON AVE
PASADENA, CA 91109
Owner/operator country: Not reported
Owner/operator telephone: (626) 568-4501
Legal status: Private
Owner/Operator Type: Owner
Owner/Op start date: Not reported
Owner/Op end date: Not reported

Handler Activities Summary:
U.S. importer of hazardous waste: No
Mixed waste (haz. and radioactive): No
Recycler of hazardous waste: No
Transporter of hazardous waste: No
Treater, storer or disposer of HW: No
Underground injection activity: No
On-site burner exemption: No
Furnace exemption: No
Used oil fuel burner: No
Used oil processor: No
User oil refiner: No
Used oil fuel marketer to burner: No
Used oil Specification marketer: No
Used oil transfer facility: No
Used oil transporter: No

Hazardous Waste Summary:
Waste code: D000
Waste name: Not Defined

Waste code: D008
Waste name: LEAD

Violation Status: No violations found

FINDS:

AUDUBON ELEMENTARY SCHOOL (Continued) **1005441338**

Registry ID: 110012538183

Environmental Interest/Information System

California Hazardous Waste Tracking System - Datamart (HWTS-DATAMART) provides California with information on hazardous waste shipments for generators, transporters, and treatment, storage, and disposal facilities.

RCRAInfo is a national information system that supports the Resource Conservation and Recovery Act (RCRA) program through the tracking of events and activities related to facilities that generate, transport, and treat, store, or dispose of hazardous waste. RCRAInfo allows RCRA program staff to track the notification, permit, compliance, and corrective action activities required under RCRA.

B10 **NASA/JET PROPULSION LABORATORIES (PASADENA)** **WDS** **S104159989**
WNW **4800 OAK GROVE DRIVE** **LUST** **N/A**
1/4-1/2 **PASADENA, CA** **CA FID UST**
0.276 mi. **SLIC**
1459 ft. **Site 1 of 4 in cluster B** **LOS ANGELES CO. HMS**

Relative:
Higher

Actual:
1150 ft.

CA WDS:

Facility ID:	4 19I001524
Facility Type:	Industrial - Facility that treats and/or disposes of liquid or semisolid wastes from any servicing, producing, manufacturing or processing operation of whatever nature, including mining, gravel washing, geothermal operations, air conditioning, ship building and repairing, oil production, storage and disposal operations, water pumping.
Facility Status:	Active - Any facility with a continuous or seasonal discharge that is under Waste Discharge Requirements.
NPDES Number:	CAS000001 The 1st 2 characters designate the state. The remaining 7 are assigned by the Regional Board
Subregion:	4
Facility Telephone:	8183542873
Facility Contact:	HENRY KOYAMATSU
Agency Name:	NASA JPL
Agency Address:	MAILSTOP171-225
Agency City,St,Zip:	PASADENA 91109
Agency Contact:	HENRY KOYAMATSU
Agency Telephone:	8183542873
Agency Type:	?
SIC Code:	0
SIC Code 2:	Not reported
Primary Waste:	Not reported
Primary Waste Type:	Not reported
Secondary Waste:	Not reported
Secondary Waste Type:	Not reported
Design Flow:	0
Baseline Flow:	0
Reclamation:	Not reported
POTW:	Not reported
Treat To Water:	Minor Threat to Water Quality. A violation of a regional board order should cause a relatively minor impairment of beneficial uses compared to a major or minor threat. Not: All nurds without a TTWQ will be considered a minor threat to water quality unless coded at a higher Level. A Zero (0) may be used to code those NURDS that are found to

NASA/JET PROPULSION LABORATORIES (PASADENA) (Continued) **S104159989**

represent no threat to water quality.
Complexity: Category C - Facilities having no waste treatment systems, such as cooling water dischargers or thosewho must comply through best management practices, facilities with passive waste treatment and disposal systems, such as septic systems with subsurface disposal, or dischargers having waste storage systems with land disposal such as dairy waste ponds.

LUST:
Region: STATE
Global Id: T0603703875
Latitude: 34.1975781
Longitude: -118.1752098
Case Type: LUST Cleanup Site
Status: Open - Site Assessment
Status Date: 1990-03-09 00:00:00
Lead Agency: DEPARTMENT OF TOXIC SUBSTANCES CONTROL
Case Worker: Not reported
Local Agency: LOS ANGELES COUNTY
RB Case Number: I-11934
LOC Case Number: I-11934
File Location: Not reported
Potential Media Affect: Soil
Potential Contaminants of Concern: Gasoline
Site History: Not reported

Click here to access the California GeoTracker records for this facility:

LUST:
Global Id: T0603703875
Contact Type: Regional Board Caseworker
Contact Name: YUE RONG
Organization Name: LOS ANGELES RWQCB (REGION 4)
Address: 320 W. 4TH ST., SUITE 200
City: Los Angeles
Email: yrong@waterboards.ca.gov
Phone Number: Not reported

Global Id: T0603703875
Contact Type: Local Agency Caseworker
Contact Name: JOHN AWUJO
Organization Name: LOS ANGELES COUNTY
Address: 900 S FREMONT AVE
City: ALHAMBRA
Email: Not reported
Phone Number: 6264583507

LUST:
Global Id: T0603703875
Action Type: Other
Date: 1950-01-01 00:00:00
Action: Leak Stopped

Global Id: T0603703875
Action Type: Other
Date: 1950-01-01 00:00:00
Action: Leak Reported

NASA/JET PROPULSION LABORATORIES (PASADENA) (Continued) **S104159989**

Global Id: T0603703875
Action Type: Other
Date: 1950-01-01 00:00:00
Action: Leak Discovery

LUST REG 4:
Region: 4
Regional Board: 04
County: Los Angeles
facid: I-11934
Status: Leak being confirmed
Substance: Gasoline
Substance Quantity: Not reported
Local Case No: Not reported
Case Type: Soil
Abatement Method Used at the Site: Not reported
Global ID: T0603703875
W Global ID: Not reported
Staff: UNK
Local Agency: 19000
Cross Street: 210 FREEWAY
Enforcement Type: Not reported
Date Leak Discovered: 6/22/1995
Date Leak First Reported: 3/9/1990
Date Leak Record Entered: 5/15/1990
Date Confirmation Began: 3/9/1990
Date Leak Stopped: 6/22/1995
Date Case Last Changed on Database: 6/22/1995
Date the Case was Closed: Not reported
How Leak Discovered: Tank Closure
How Leak Stopped: Not reported
Cause of Leak: UNK
Leak Source: UNK
Operator: KEN ADAMS
Water System: Not reported
Well Name: Not reported
Approx. Dist To Production Well (ft): 2309.7934697662164964104083198
Source of Cleanup Funding: UNK
Preliminary Site Assessment Workplan Submitted: Not reported
Preliminary Site Assessment Began: Not reported
Pollution Characterization Began: Not reported
Remediation Plan Submitted: Not reported
Remedial Action Underway: Not reported
Post Remedial Action Monitoring Began: Not reported
Enforcement Action Date: Not reported
Historical Max MTBE Date: Not reported
Hist Max MTBE Conc in Groundwater: Not reported
Hist Max MTBE Conc in Soil: Not reported
Significant Interim Remedial Action Taken: Not reported
GW Qualifier: Not reported
Soil Qualifier: Not reported
Organization: Not reported
Owner Contact: Not reported
Responsible Party: JET PROPULSION LABORATORY
RP Address: 4800 OAK GROVE DR., LA CANADA, 91109
Program: LUST

NASA/JET PROPULSION LABORATORIES (PASADENA) (Continued) **S104159989**

Lat/Long: 34.1975781 / -1
Local Agency Staff: Not reported
Beneficial Use: Not reported
Priority: Not reported
Cleanup Fund Id: Not reported
Suspended: Not reported
Assigned Name: Not reported
Summary: CONTAMINATION 202 TPH

CA FID UST:
Facility ID: 19002476
Regulated By: UTNKA
Regulated ID: 00050516
Cortese Code: Not reported
SIC Code: Not reported
Facility Phone: 8180000000
Mail To: Not reported
Mailing Address: 4800 OAK GROVE DR
Mailing Address 2: Not reported
Mailing City,St,Zip: PASADENA 91109
Contact: Not reported
Contact Phone: Not reported
DUNs Number: Not reported
NPDES Number: Not reported
EPA ID: Not reported
Comments: Not reported
Status: Active

SLIC:
Region: STATE
Facility Status: **Open - Remediation**
Status Date: 2010-03-11 00:00:00
Global Id: SL0603788964
Lead Agency: LOS ANGELES RWQCB (REGION 4)
Lead Agency Case Number: Not reported
Latitude: 34.197576
Longitude: -118.174464
Case Type: Cleanup Program Site
Case Worker: MZ
Local Agency: Not reported
RB Case Number: 117.0001
File Location: Regional Board
Potential Media Affected: Aquifer used for drinking water supply, Other Groundwater (uses other than drinking water), Soil, Soil Vapor, Surface water, Well used for drinking water supply
Potential Contaminants of Concern: Tetrachloroethylene (PCE), Trichloroethylene (TCE), Perchlorate
Site History: In the 1940's and 1950's, liquid wastes from materials used and produced at JPL (such as solvents, solid and liquid rocket propellants, cooling water chemicals, and analytical laboratory chemicals) were disposed of into seepage pits. Soil and groundwater investigations started at the site in mid-1980's. In October 1992, the site was placed on the USEPA National Priority List of sites governed by CERCLA/Sara. NASA entered into a Federal Facility Agreement (FFA) with USEPA and LARWQCB, and DTSC, and NASA was designated the lead agency responsible for carrying out the CERCLA investigation and cleanup process at JPL. Since September 2002, NASA

NASA/JET PROPULSION LABORATORIES (PASADENA) (Continued) **S104159989**

has been operating an SVE system to remove VOCs from the onsite vadose zone soils. NASA has also been conducting pump and treat of the onsite source area groundwater determined to be contaminated with VOCs and perchlorate. Since March 2005, NASA has been pumping the contaminated ground water and treating it first with liquid-phase granular activated carbon to remove VOCs, and then treating the perchlorate in the extracted groundwater using a fluidized bed reactor. The treated water is then injected back into the aquifer hydraulically upgradient of the extraction wells. Groundwater monitoring has been conducted since August 1996.

Click here to access the California GeoTracker records for this facility:

LOS ANGELES CO. HMS:
Region: LA
Facility Id: 019564-027847
Facility Status: Closed
Area: 29
Permit Number: 000531746
Permit Status: Closed
Facility Type: SS5

B11 **JET PROPULSION LABORATORY** **HIST Cal-Sites** **U003159486**
WNW **4800 OAK GROVE DR** **WDS** **N/A**
1/4-1/2 **PASADENA, CA 91109** **Cortese**
0.278 mi. **UST**
1469 ft. **Site 2 of 4 in cluster B** **HIST UST**
WIP
Relative: **HAZNET**
Higher **EMI**
ENVIROSTOR

Actual:
1150 ft.

HISTORICAL CAL-SITES:
Facility ID: 19970008
Region: 3
Region Name: GLENDALE
Branch: SA
Branch Name: SO CAL - GLENDALE
File Name: Not reported
State Senate District: 09201993
Status: AWP - ANNUAL WORKPLAN (AWP) - ACTIVE SITE
Status Name: ANNUAL WORKPLAN - ACTIVE SITE
Lead Agency: DTSC
Lead Agency: DEPT OF TOXIC SUBSTANCES CONTROL
Facility Type: NPRP
Type Name: NPL SITE, RP-FUNDED
NPL: Listed
SIC Code: 97
SIC Name: NATIONAL SECURITY/INTERNATIONAL AFFAIRS
Access: Not reported
Cortese: Not reported
Hazardous Ranking Score: Not reported
Date Site Hazard Ranked: Not reported
Groundwater Contamination: Confirmed
Staff Member Responsible for Site: MISKAROU
Supervisor Responsible for Site: Not reported
Region Water Control Board: Not reported

JET PROPULSION LABORATORY (Continued) **U003159486**

Region Water Control Board Name:	Not reported
Lat/Long Direction:	Not reported
Lat/Long (dms):	0 0 0 / 0 0 0
Lat/long Method:	Not reported
Lat/Long Description:	Not reported
State Assembly District Code:	44
State Senate District Code:	21
Facility ID:	19970008
Activity:	DISC
Activity Name:	DISCOVERY
AWP Code:	Not reported
Proposed Budget:	0
AWP Completion Date:	Not reported
Revised Due Date:	Not reported
Comments Date:	07111990
Est Person-Yrs to complete:	0
Estimated Size:	Not reported
Request to Delete Activity:	Not reported
Activity Status:	AWP
Definition of Status:	ANNUAL WORKPLAN - ACTIVE SITE
Liquids Removed (Gals):	0
Liquids Treated (Gals):	0
Action Included Capping:	Not reported
Well Decommissioned:	Not reported
Action Included Fencing:	Not reported
Removal Action Certification:	Not reported
Activity Comments:	Not reported
For Commercial Reuse:	0
For Industrial Reuse:	0
For Residential Reuse:	0
Unknown Type:	0
Facility ID:	19970008
Activity:	SS
Activity Name:	SITE SCREENING
AWP Code:	Not reported
Proposed Budget:	0
AWP Completion Date:	Not reported
Revised Due Date:	Not reported
Comments Date:	03211991
Est Person-Yrs to complete:	0
Estimated Size:	Not reported
Request to Delete Activity:	Not reported
Activity Status:	AWP
Definition of Status:	ANNUAL WORKPLAN - ACTIVE SITE
Liquids Removed (Gals):	0
Liquids Treated (Gals):	0
Action Included Capping:	Not reported
Well Decommissioned:	Not reported
Action Included Fencing:	Not reported
Removal Action Certification:	Not reported
Activity Comments:	Not reported
For Commercial Reuse:	0
For Industrial Reuse:	0
For Residential Reuse:	0
Unknown Type:	0
Facility ID:	19970008
Activity:	ORDER

JET PROPULSION LABORATORY (Continued) **U003159486**

Activity Name:	I/SE, IORSE, FFA, FFSRA, VCA, EA
AWP Code:	FFA
Proposed Budget:	0
AWP Completion Date:	Not reported
Revised Due Date:	Not reported
Comments Date:	12231992
Est Person-Yrs to complete:	0
Estimated Size:	Not reported
Request to Delete Activity:	Not reported
Activity Status:	AWP
Definition of Status:	ANNUAL WORKPLAN - ACTIVE SITE
Liquids Removed (Gals):	0
Liquids Treated (Gals):	0
Action Included Capping:	Not reported
Well Decommissioned:	Not reported
Action Included Fencing:	Not reported
Removal Action Certification:	Not reported
Activity Comments:	Not reported
For Commercial Reuse:	0
For Industrial Reuse:	0
For Residential Reuse:	0
Unknown Type:	0
Facility ID:	19970008
Activity:	ORDER
Activity Name:	I/SE, IORSE, FFA, FFSRA, VCA, EA
AWP Code:	MOU
Proposed Budget:	0
AWP Completion Date:	Not reported
Revised Due Date:	Not reported
Comments Date:	09201993
Est Person-Yrs to complete:	0
Estimated Size:	Not reported
Request to Delete Activity:	Not reported
Activity Status:	AWP
Definition of Status:	ANNUAL WORKPLAN - ACTIVE SITE
Liquids Removed (Gals):	0
Liquids Treated (Gals):	0
Action Included Capping:	Not reported
Well Decommissioned:	Not reported
Action Included Fencing:	Not reported
Removal Action Certification:	Not reported
Activity Comments:	Not reported
For Commercial Reuse:	0
For Industrial Reuse:	0
For Residential Reuse:	0
Unknown Type:	0
Facility ID:	19970008
Activity:	RIFS
Activity Name:	REMEDIAL INVESTIGATION / FEASIBILITY STUDY
AWP Code:	OU 2
Proposed Budget:	0
AWP Completion Date:	Not reported
Revised Due Date:	Not reported
Comments Date:	09072000
Est Person-Yrs to complete:	0
Estimated Size:	L
Request to Delete Activity:	Not reported

JET PROPULSION LABORATORY (Continued) **U003159486**

Activity Status:	AWP
Definition of Status:	ANNUAL WORKPLAN - ACTIVE SITE
Liquids Removed (Gals):	0
Liquids Treated (Gals):	0
Action Included Capping:	Not reported
Well Decommissioned:	Not reported
Action Included Fencing:	Not reported
Removal Action Certification:	Not reported
Activity Comments:	Not reported
For Commercial Reuse:	0
For Industrial Reuse:	0
For Residential Reuse:	0
Unknown Type:	0
Facility ID:	19970008
Activity:	RIFS
Activity Name:	REMEDIAL INVESTIGATION / FEASIBILITY STUDY
AWP Code:	OU 1
Proposed Budget:	0
AWP Completion Date:	06302005
Revised Due Date:	Not reported
Comments Date:	Not reported
Est Person-Yrs to complete:	0
Estimated Size:	L
Request to Delete Activity:	Not reported
Activity Status:	AWP
Definition of Status:	ANNUAL WORKPLAN - ACTIVE SITE
Liquids Removed (Gals):	0
Liquids Treated (Gals):	0
Action Included Capping:	Not reported
Well Decommissioned:	Not reported
Action Included Fencing:	Not reported
Removal Action Certification:	Not reported
Activity Comments:	Not reported
For Commercial Reuse:	0
For Industrial Reuse:	0
For Residential Reuse:	0
Unknown Type:	0
Facility ID:	19970008
Activity:	RIFS
Activity Name:	REMEDIAL INVESTIGATION / FEASIBILITY STUDY
AWP Code:	OU 3
Proposed Budget:	0
AWP Completion Date:	06302006
Revised Due Date:	Not reported
Comments Date:	Not reported
Est Person-Yrs to complete:	0
Estimated Size:	L
Request to Delete Activity:	Not reported
Activity Status:	AWP
Definition of Status:	ANNUAL WORKPLAN - ACTIVE SITE
Liquids Removed (Gals):	0
Liquids Treated (Gals):	0
Action Included Capping:	Not reported
Well Decommissioned:	Not reported
Action Included Fencing:	Not reported
Removal Action Certification:	Not reported
Activity Comments:	Not reported

JET PROPULSION LABORATORY (Continued) **U003159486**

For Commercial Reuse:	0
For Industrial Reuse:	0
For Residential Reuse:	0
Unknown Type:	0
Facility ID:	19970008
Activity:	DES
Activity Name:	DESIGN
AWP Code:	OU 1
Proposed Budget:	0
AWP Completion Date:	03302006
Revised Due Date:	Not reported
Comments Date:	Not reported
Est Person-Yrs to complete:	0
Estimated Size:	Not reported
Request to Delete Activity:	Not reported
Activity Status:	AWP
Definition of Status:	ANNUAL WORKPLAN - ACTIVE SITE
Liquids Removed (Gals):	0
Liquids Treated (Gals):	0
Action Included Capping:	Not reported
Well Decommissioned:	Not reported
Action Included Fencing:	Not reported
Removal Action Certification:	Not reported
Activity Comments:	Not reported
For Commercial Reuse:	0
For Industrial Reuse:	0
For Residential Reuse:	0
Unknown Type:	0
Facility ID:	19970008
Activity:	DES
Activity Name:	DESIGN
AWP Code:	OU 2
Proposed Budget:	0
AWP Completion Date:	Not reported
Revised Due Date:	Not reported
Comments Date:	11302002
Est Person-Yrs to complete:	0
Estimated Size:	Not reported
Request to Delete Activity:	Not reported
Activity Status:	AWP
Definition of Status:	ANNUAL WORKPLAN - ACTIVE SITE
Liquids Removed (Gals):	0
Liquids Treated (Gals):	0
Action Included Capping:	Not reported
Well Decommissioned:	Not reported
Action Included Fencing:	Not reported
Removal Action Certification:	Not reported
Activity Comments:	Not reported
For Commercial Reuse:	0
For Industrial Reuse:	0
For Residential Reuse:	0
Unknown Type:	0
Facility ID:	19970008
Activity:	DES
Activity Name:	DESIGN
AWP Code:	OU 3
Proposed Budget:	0

JET PROPULSION LABORATORY (Continued) **U003159486**

AWP Completion Date:	06302007
Revised Due Date:	Not reported
Comments Date:	Not reported
Est Person-Yrs to complete:	0
Estimated Size:	Not reported
Request to Delete Activity:	Not reported
Activity Status:	AWP
Definition of Status:	ANNUAL WORKPLAN - ACTIVE SITE
Liquids Removed (Gals):	0
Liquids Treated (Gals):	0
Action Included Capping:	Not reported
Well Decommissioned:	Not reported
Action Included Fencing:	Not reported
Removal Action Certification:	Not reported
Activity Comments:	Not reported
For Commercial Reuse:	0
For Industrial Reuse:	0
For Residential Reuse:	0
Unknown Type:	0
Facility ID:	19970008
Activity:	RMDL
Activity Name:	REMEDIAL ACTION (RAP REQUIRED)
AWP Code:	OU 1
Proposed Budget:	0
AWP Completion Date:	06302007
Revised Due Date:	Not reported
Comments Date:	Not reported
Est Person-Yrs to complete:	0
Estimated Size:	Not reported
Request to Delete Activity:	Not reported
Activity Status:	AWP
Definition of Status:	ANNUAL WORKPLAN - ACTIVE SITE
Liquids Removed (Gals):	0
Liquids Treated (Gals):	0
Action Included Capping:	Not reported
Well Decommissioned:	Not reported
Action Included Fencing:	Not reported
Removal Action Certification:	Not reported
Activity Comments:	Not reported
For Commercial Reuse:	0
For Industrial Reuse:	0
For Residential Reuse:	0
Unknown Type:	0
Facility ID:	19970008
Activity:	RMDL
Activity Name:	REMEDIAL ACTION (RAP REQUIRED)
AWP Code:	OU 3
Proposed Budget:	0
AWP Completion Date:	06302008
Revised Due Date:	Not reported
Comments Date:	Not reported
Est Person-Yrs to complete:	0
Estimated Size:	Not reported
Request to Delete Activity:	Not reported
Activity Status:	AWP
Definition of Status:	ANNUAL WORKPLAN - ACTIVE SITE
Liquids Removed (Gals):	0

JET PROPULSION LABORATORY (Continued) **U003159486**

Liquids Treated (Gals):	0
Action Included Capping:	Not reported
Well Decommissioned:	Not reported
Action Included Fencing:	Not reported
Removal Action Certification:	Not reported
Activity Comments:	Not reported
For Commercial Reuse:	0
For Industrial Reuse:	0
For Residential Reuse:	0
Unknown Type:	0
Facility ID:	19970008
Activity:	RMDL
Activity Name:	REMEDIAL ACTION (RAP REQUIRED)
AWP Code:	OU 2
Proposed Budget:	0
AWP Completion Date:	07302005
Revised Due Date:	Not reported
Comments Date:	Not reported
Est Person-Yrs to complete:	0
Estimated Size:	Not reported
Request to Delete Activity:	Not reported
Activity Status:	AWP
Definition of Status:	ANNUAL WORKPLAN - ACTIVE SITE
Liquids Removed (Gals):	0
Liquids Treated (Gals):	0
Action Included Capping:	Not reported
Well Decommissioned:	Not reported
Action Included Fencing:	Not reported
Removal Action Certification:	Not reported
Activity Comments:	Not reported
For Commercial Reuse:	0
For Industrial Reuse:	0
For Residential Reuse:	0
Unknown Type:	0
Facility ID:	19970008
Activity:	CERT
Activity Name:	CERTIFICATION
AWP Code:	Not reported
Proposed Budget:	0
AWP Completion Date:	12312008
Revised Due Date:	Not reported
Comments Date:	Not reported
Est Person-Yrs to complete:	0
Estimated Size:	Not reported
Request to Delete Activity:	Not reported
Activity Status:	AWP
Definition of Status:	ANNUAL WORKPLAN - ACTIVE SITE
Liquids Removed (Gals):	0
Liquids Treated (Gals):	0
Action Included Capping:	Not reported
Well Decommissioned:	Not reported
Action Included Fencing:	Not reported
Removal Action Certification:	Not reported
Activity Comments:	Not reported
For Commercial Reuse:	0
For Industrial Reuse:	0
For Residential Reuse:	0

JET PROPULSION LABORATORY (Continued) **U003159486**

Unknown Type:	0
Facility ID:	19970008
Activity:	ROD
Activity Name:	RECORD OF DECISION
AWP Code:	OU 3
Proposed Budget:	0
AWP Completion Date:	12302006
Revised Due Date:	Not reported
Comments Date:	Not reported
Est Person-Yrs to complete:	0
Estimated Size:	Not reported
Request to Delete Activity:	Not reported
Activity Status:	AWP
Definition of Status:	ANNUAL WORKPLAN - ACTIVE SITE
Liquids Removed (Gals):	0
Liquids Treated (Gals):	0
Action Included Capping:	Not reported
Well Decommissioned:	Not reported
Action Included Fencing:	Not reported
Removal Action Certification:	Not reported
Activity Comments:	Not reported
For Commercial Reuse:	0
For Industrial Reuse:	0
For Residential Reuse:	0
Unknown Type:	0
Facility ID:	19970008
Activity:	ROD
Activity Name:	RECORD OF DECISION
AWP Code:	OU 1
Proposed Budget:	0
AWP Completion Date:	12302005
Revised Due Date:	Not reported
Comments Date:	Not reported
Est Person-Yrs to complete:	0
Estimated Size:	Not reported
Request to Delete Activity:	Not reported
Activity Status:	AWP
Definition of Status:	ANNUAL WORKPLAN - ACTIVE SITE
Liquids Removed (Gals):	0
Liquids Treated (Gals):	0
Action Included Capping:	Not reported
Well Decommissioned:	Not reported
Action Included Fencing:	Not reported
Removal Action Certification:	Not reported
Activity Comments:	Not reported
For Commercial Reuse:	0
For Industrial Reuse:	0
For Residential Reuse:	0
Unknown Type:	0
Facility ID:	19970008
Activity:	ROD
Activity Name:	RECORD OF DECISION
AWP Code:	OU2
Proposed Budget:	0
AWP Completion Date:	Not reported
Revised Due Date:	Not reported
Comments Date:	09232002

JET PROPULSION LABORATORY (Continued) **U003159486**

Est Person-Yrs to complete:	0
Estimated Size:	Not reported
Request to Delete Activity:	Not reported
Activity Status:	AWP
Definition of Status:	ANNUAL WORKPLAN - ACTIVE SITE
Liquids Removed (Gals):	0
Liquids Treated (Gals):	0
Action Included Capping:	Not reported
Well Decommissioned:	Not reported
Action Included Fencing:	Not reported
Removal Action Certification:	Not reported
Activity Comments:	Not reported
For Commercial Reuse:	0
For Industrial Reuse:	0
For Residential Reuse:	0
Unknown Type:	0
Alternate Address:	4800 OAK GROVE DRIVE
Alternate City,St,Zip:	PASADENA, CA 91109
Alternate Address:	NE OF INTERSTATE 210 (FOOTHILL FREEWAY)
Alternate City,St,Zip:	PASADENA, CA 91109
Background Info:	The Jet Propulsion Labratory (JPL) is a NASA owned facility managed by the California Institute of Technology, involved in the research and development of aeronautics, space technology, and space transportation. The 176-acre site is located at the base of the southern rim of the San Gabriel Mountains about 12 miles north of Los Angeles. Up until the early 1950's, the facility used cesspools for disposal of liquid and solid wastes, domestic sewage, chemistry lab wastes, solid and liquid rocket propellants, solvents, cooling tower chemicals, sulfuric acid, freon, mercury, lead and flouride. In 1982, a preliminary hydrologic assessment of VOC's in groundwater was performed, identifying carbon tetrachloride (CCLs), trichloroethlene (TCE) and tetrachloroethylene (PCE) at concentrations above the federal MCLs. The PA/SI, performed in 1988, identified six waste disposal pits on and adjacent to JPL. These pits are suspected of being the major contributors to the contamination of the groundwater. The City of Pasadena wells located down-gradient from JPL contained concentrations of TCE, PCE, CCL4 above the MCLs. A monitoring well installed midway between JPL and the City of Pasadena wells detected the presence of VOCs. JPL then installed a groundwater treatment plant in the Arroyo Seco. In 1990, five monitoring wells were installed during an expanded site investigation (ESI) to collect data. Not reported The site was placed on the National Priorities List (NPL) in October 1991. The Federal Facilities Agreement was signed December 23, 1992. Not reported The Remedial Investigation (RI) field work, report, and health risk assessment was completed on three Operable Units (OU)s. OU-1 deals with on-site groundwater contamination; OU-2 deals with on-site soil/source contamination; and OU-3 is for the off-site groundwater contamination.
Comments Date:	07111990
Comments:	remedial investigation/feasibility study. EPA/CERCLA Site
Comments Date:	07111990
Comments:	Pending Status: EPA SITE.

JET PROPULSION LABORATORY (Continued) **U003159486**

Comments Date:	07302000
Comments:	OU-2, on-site soil - Finalized Feasibility Study Report.
Comments Date:	07302004
Comments:	OU-3 off-site gw - Installed an Ion Exchange Plant to Treat
Comments Date:	07302004
Comments:	Groundwater from Lincoln Aveune Water Company Wells: Well No.3
Comments Date:	07302004
Comments:	and Well No.5.
Comments Date:	08111989
Comments:	Preliminary Assessment done on August 11, 1989 recommends a site
Comments Date:	08111989
Comments:	inspection.
Comments Date:	08301999
Comments:	OU-1, on-site gw - Finalized Remedial Investigation Report.
Comments Date:	08301999
Comments:	OU-3, off-site gw - Finalized Remedial Investigation Report
Comments Date:	08302004
Comments:	OU-3, off-site gw - Finalized Action Memorandum for Perchlorate
Comments Date:	08302004
Comments:	Treatment for Lincoln Avenue Water Company.
Comments Date:	09201993
Comments:	A Memorandum of Agreement for NASA to reimburse the Department
Comments Date:	09201993
Comments:	for oversight of remedial activities at JPL was signed. Since
Comments Date:	09201993
Comments:	this time, the Department has continued to work on the project.
Comments Date:	09302002
Comments:	OU-2, on-site soil - Finalized the Record of Decision.
Comments Date:	10141991
Comments:	Site was listed on the NPL on this date.
Comments Date:	10302003
Comments:	OU-1, on-site gw - Final Expanded Treatability Study Work Plan
Comments Date:	10302003
Comments:	by Battelle.
Comments Date:	11301999
Comments:	OU-2, on-site soil - Finalized Remedial Investigation Report.
Comments Date:	11302004
Comments:	OU-3, off-site gw - Finalized Remedial Investigation Addendum
Comments Date:	11302004
Comments:	Workplan.
Comments Date:	12231992
Comments:	Federal Facilities Agreement reached between EPA, DTSC, NASA/JPL
Comments Date:	12231992
Comments:	and RWQCB.
Comments Date:	12301991
Comments:	OU-3, off-site gw - Installed an Air Stripping Treatment from
Comments Date:	12301991
Comments:	City of Pasadena Wells: Arroyo Well, Well 52, Ventura Well, and
Comments Date:	12301991
Comments:	Windsor Well.
Comments Date:	12301992
Comments:	OU-3, Off-site gw - Installed a Granular Activated Carbon Plant
Comments Date:	12301992
Comments:	to Treat Groundwater from Lincoln Avenue Water Company Wells:
Comments Date:	12301992
Comments:	Well No. 3 and Well No 5.
Comments Date:	12302002

JET PROPULSION LABORATORY (Continued) **U003159486**

Comments:	OU-2, on-site soil - Finalized the Remedial Design/Remedial
Comments Date:	12302002
Comments:	Action Workplan.
Comments Date:	01302005
Comments:	OU-1, on-site gw - Completed Construction the Expanded
Comments Date:	01302005
Comments:	Treatability Study system.
Comments Date:	03111991
Comments:	EPA currently preparing HRS package. EPA suspects this site may
Comments Date:	03111991
Comments:	be listed on NPL.
Comments Date:	03211991
Comments:	Groundwater contaminated with VOCs. EPA is the lead agency.
Comments Date:	03302004
Comments:	OU-1, on-site gw - Final Report on the In Situ Bioremediation
Comments Date:	03302004
Comments:	Pilot Study by ARCADIS.
Comments Date:	04241995
Comments:	The groundwater monitoring wells for OU-1 have been installed
Comments Date:	04241995
Comments:	and soil sampling and soil vapor samples have been collected for
Comments Date:	04241995
Comments:	OU-2. Results should be available within two months. The OU-3
Comments Date:	04241995
Comments:	groundwater monitoring wells are being installed to characterize
Comments Date:	04241995
Comments:	the groundwater contaminant plume off-site.
Comments Date:	04301998
Comments:	OU2, on-site Soil - Initiated Soil Vapor Extraction Pilot Study.
Comments Date:	04302001
Comments:	OU-1, on-site gw - Final Report on GAC-Fluidized Bed Reactor
Comments Date:	04302001
Comments:	Pilot Study by US Filter and Envirogen.
Comments Date:	05042005
Comments:	OU-1, on-site gw - Preparing the Feasibility Study and
Comments Date:	05042005
Comments:	Implementing the Expanded Treatability Study for Removal of VOCs
Comments Date:	05042005
Comments:	and Perchlorate from Groundwater. OU-2, on-site soil -
Comments Date:	05042005
Comments:	Operating a Full-Scale Soil Vapor Extraction Treatment system to
Comments Date:	05042005
Comments:	Clean Up Soils. OU-3, off-site gw - Preparing Engineering
Comments Date:	05042005
Comments:	Evaluation/Cost Analysis Report for Perchlorate Treatment at
Comments Date:	05042005
Comments:	City of Pasadena Wells: Arroyo Well, Well 52, Ventura Well, and
Comments Date:	05042005
Comments:	Windsor Well.
Comments Date:	06301999
Comments:	Operable Unit 1 (OU-1) on-site groundwater gw - Final Report on
Comments Date:	06301999
Comments:	Ion Exchange Pilot Study by Calgon Carbon Corporation.
Comments Date:	06302001
Comments:	OU-2, on-site soil - May-June 2001 - Finalized Proposed Plan to
Comments Date:	06302001
Comments:	Select a Remedy to Clean Up Soils and Conducted Public Meetings

JET PROPULSION LABORATORY (Continued) **U003159486**

Comments Date: 06302003
Comments: OU-1, on-site gw - Field Pilot Testing of a Dynamic Suspended
Comments Date: 06302003
Comments: Bed Reactor for Removal of Perchlorate in GW at JPL.
Comments Date: 07111990
Comments: Facility identified EPA expanded site inspection report. EPA
Comments Date: 07111990
Comments: completed expanded site inspection and will continue with a
ID Name: CALSTARS CODE
ID Value: 300318
ID Name: EPA IDENTIFICATION NUMBER
ID Value: CA9800013030
Alternate Name: NASA - JET PROPULSION LABORATORYJET PROPULSION LABORATORY (NASA)JET PROPULSION LABORATORYJPL
Special Programs Code: Not reported
Special Programs Name: Not reported

CA WDS:
Facility ID: Los Angeles River 196000430
Facility Type: Other - Does not fall into the category of Municipal/Domestic, Industrial, Agricultural or Solid Waste (Class I, II or III)
Facility Status: Active - Any facility with a continuous or seasonal discharge that is under Waste Discharge Requirements.
NPDES Number: CAG994004 The 1st 2 characters designate the state. The remaining 7 are assigned by the Regional Board
Subregion: 4
Facility Telephone: 8183542873
Facility Contact: Henry Koyamatsu
Agency Name: JET PROPULSION LABORATORY
Agency Address: Not reported
Agency City,St,Zip: 0
Agency Contact: Not reported
Agency Telephone: Not reported
Agency Type: Private
SIC Code: 3761
SIC Code 2: Not reported
Primary Waste: Miscellaneous (Includes wastes from dewatering, recreational lake overflow, swimming pool wastes, water ride wastewater, ground water seepage and other wastes of this type)
Primary Waste Type: Designated/Influent or Solid Wastes that pose a significant threat to water quality because of their high concentrations (E.G., BOD, Hardness, TRF, Chloride). 'Manageable' hazardous wastes (E.G., inorganic salts and heavy metals) are included in this category.
Secondary Waste: Not reported
Secondary Waste Type: Not reported
Design Flow: 0
Baseline Flow: 0
Reclamation: No reclamation requirements associated with this facility.
POTW: The facility is not a POTW.
Treat To Water: 0
Complexity: Not reported

Cortese:
Region: CORTESE
Envirostor Id: 19970008
Site/Facility Type: FEDERAL SUPERFUND - LISTED

JET PROPULSION LABORATORY (Continued) **U003159486**

Cleanup Status: ACTIVE
Status Date: 1993-09-20
Site Code: 300318
Latitude: 34.202807184694201
Longitude: -118.172169548056

UST:
Facility ID: 1474
Latitude: 34.15549
Longitude: -118.15449

HIST UST:
Region: STATE
Facility ID: 00000050516
Facility Type: Other
Other Type: U.S. GOVERNMENT
Total Tanks: 0019
Contact Name: B.E. FISCHER, 200-213
Telephone: 8183542539
Owner Name: NATIONAL AERONAUTICS AND SPACE
Owner Address: 4800 OAK GROVE DRIVE
Owner City,St,Zip: PASADENA, CA 91109

Tank Num: 001
Container Num: B/80
Year Installed: 1957
Tank Capacity: 00001000
Tank Used for: WASTE
Type of Fuel: Not reported
Tank Construction: 6 inches
Leak Detection: Stock Inventor

Tank Num: 002
Container Num: B/117
Year Installed: 1974
Tank Capacity: 00001000
Tank Used for: WASTE
Type of Fuel: DIESEL
Tank Construction: 6 inches
Leak Detection: Stock Inventor, None

Tank Num: 003
Container Num: B/170
Year Installed: 1962
Tank Capacity: 00000000
Tank Used for: WASTE
Type of Fuel: Not reported
Tank Construction: 6 inches
Leak Detection: Stock Inventor

Tank Num: 004
Container Num: B/177A
Year Installed: 1972
Tank Capacity: 00009940
Tank Used for: PRODUCT
Type of Fuel: REGULAR

JET PROPULSION LABORATORY (Continued) **U003159486**

Tank Construction: 1/4 inches
Leak Detection: Stock Inventor

Tank Num: 005
Container Num: B/177B
Year Installed: 1972
Tank Capacity: 00009940
Tank Used for: PRODUCT
Type of Fuel: 06
Tank Construction: 1/4 inches
Leak Detection: Stock Inventor

Tank Num: 006
Container Num: B/177C
Year Installed: 1972
Tank Capacity: 00003000
Tank Used for: WASTE
Type of Fuel: WASTE OIL
Tank Construction: Not reported
Leak Detection: Stock Inventor

Tank Num: 007
Container Num: B/183
Year Installed: Not reported
Tank Capacity: 00000000
Tank Used for: WASTE
Type of Fuel: Not reported
Tank Construction: Not reported
Leak Detection: Visual

Tank Num: 008
Container Num: B/183
Year Installed: Not reported
Tank Capacity: 00000000
Tank Used for: WASTE
Type of Fuel: Not reported
Tank Construction: Not reported
Leak Detection: Stock Inventor

Tank Num: 009
Container Num: B/183B
Year Installed: 1978
Tank Capacity: 00020000
Tank Used for: PRODUCT
Type of Fuel: Not reported
Tank Construction: 12 gauge
Leak Detection: Stock Inventor

Tank Num: 010
Container Num: B/197
Year Installed: Not reported
Tank Capacity: 00000000
Tank Used for: WASTE
Type of Fuel: Not reported
Tank Construction: 5 gauge
Leak Detection: Stock Inventor

JET PROPULSION LABORATORY (Continued) **U003159486**

Tank Num: 011
Container Num: B/231
Year Installed: 1964
Tank Capacity: 00000000
Tank Used for: WASTE
Type of Fuel: Not reported
Tank Construction: 6 inches
Leak Detection: Stock Inventor

Tank Num: 012
Container Num: B/230
Year Installed: 1978
Tank Capacity: 00015000
Tank Used for: PRODUCT
Type of Fuel: Not reported
Tank Construction: 12 gauge
Leak Detection: Stock Inventor

Tank Num: 013
Container Num: B/230A
Year Installed: Not reported
Tank Capacity: 00007000
Tank Used for: PRODUCT
Type of Fuel: DIESEL
Tank Construction: Not reported
Leak Detection: Stock Inventor

Tank Num: 014
Container Num: B/230B
Year Installed: Not reported
Tank Capacity: 00000700
Tank Used for: PRODUCT
Type of Fuel: Not reported
Tank Construction: Not reported
Leak Detection: Stock Inventor

Tank Num: 015
Container Num: B/238S
Year Installed: 1978
Tank Capacity: 00015000
Tank Used for: PRODUCT
Type of Fuel: Not reported
Tank Construction: 12 gauge
Leak Detection: Stock Inventor

Tank Num: 016
Container Num: B/238B
Year Installed: 1978
Tank Capacity: 00015000
Tank Used for: PRODUCT
Type of Fuel: Not reported
Tank Construction: 12 gauge
Leak Detection: Stock Inventor

Tank Num: 017
Container Num: B/277
Year Installed: 1978

JET PROPULSION LABORATORY (Continued) **U003159486**

Tank Capacity: 00010000
Tank Used for: PRODUCT
Type of Fuel: Not reported
Tank Construction: 12 gauge
Leak Detection: Stock Inventor

Tank Num: 018
Container Num: B/278
Year Installed: Not reported
Tank Capacity: 00005000
Tank Used for: PRODUCT
Type of Fuel: DIESEL
Tank Construction: Not reported
Leak Detection: Stock Inventor

Tank Num: 019
Container Num: TBMB/19
Year Installed: 1972
Tank Capacity: 00001000
Tank Used for: PRODUCT
Type of Fuel: REGULAR
Tank Construction: 10 gauge
Leak Detection: Visual, Stock Inventor

WIP:
Region: 4
File Number: 117.0001
File Status: Active
Staff: DYOUNG
Facility Suite: Not reported

HAZNET:
Year: 2002
Gepaid: CA9800013030
Contact: MARK ARAKI
Telephone: 8183540635
Mailing Name: Not reported
Mailing Address: 4800 OAK GROVE DR # 171-225
Mailing City,St,Zip: PASADENA, CA 911098001
Gen County: Los Angeles
TSD EPA ID: Not reported
TSD County: 99
Waste Category: Other inorganic solid waste
Disposal Method: T03
Tons: 0.08
Facility County: Not reported

Year: 2002
Gepaid: CA9800013030
Contact: MARK ARAKI
Telephone: 8183540635
Mailing Name: Not reported
Mailing Address: 4800 OAK GROVE DR # 171-225
Mailing City,St,Zip: PASADENA, CA 911098001
Gen County: Los Angeles
TSD EPA ID: Not reported

JET PROPULSION LABORATORY (Continued) **U003159486**

TSD County: 99
Waste Category: Waste oil and mixed oil
Disposal Method: T03
Tons: 1.25
Facility County: Not reported

Year: 2002
Gepaid: CA9800013030
Contact: MARK ARAKI
Telephone: 8183540635
Mailing Name: Not reported
Mailing Address: 4800 OAK GROVE DR # 171-225
Mailing City,St,Zip: PASADENA, CA 911098001
Gen County: Los Angeles
TSD EPA ID: Not reported
TSD County: 99
Waste Category: Laboratory waste chemicals
Disposal Method: T03
Tons: 0.17
Facility County: Not reported

Year: 2002
Gepaid: CA9800013030
Contact: MARK ARAKI
Telephone: 8183540635
Mailing Name: Not reported
Mailing Address: 4800 OAK GROVE DR # 171-225
Mailing City,St,Zip: PASADENA, CA 911098001
Gen County: Los Angeles
TSD EPA ID: Not reported
TSD County: 99
Waste Category: Laboratory waste chemicals
Disposal Method: Not reported
Tons: 0.00
Facility County: Not reported

Year: 2002
Gepaid: CA9800013030
Contact: MARK ARAKI
Telephone: 8183540635
Mailing Name: Not reported
Mailing Address: 4800 OAK GROVE DR # 171-225
Mailing City,St,Zip: PASADENA, CA 911098001
Gen County: Los Angeles
TSD EPA ID: Not reported
TSD County: Not reported
Waste Category: Unspecified alkaline solution
Disposal Method: T01
Tons: 0.20
Facility County: Not reported

Click this hyperlink while viewing on your computer to access
512 additional CA_HAZNET: record(s) in the EDR Site Report.

EMI:
Year: 1987
County Code: 19

JET PROPULSION LABORATORY (Continued) **U003159486**

Air Basin:	SC
Facility ID:	11887
Air District Name:	SC
SIC Code:	8731
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	20
Reactive Organic Gases Tons/Yr:	19
Carbon Monoxide Emissions Tons/Yr:	0
NOX - Oxides of Nitrogen Tons/Yr:	14
SOX - Oxides of Sulphur Tons/Yr:	0
Particulate Matter Tons/Yr:	1
Part. Matter 10 Micrometers & Smllr Tons/Yr:	1

Year:	1990
County Code:	19
Air Basin:	SC
Facility ID:	11887
Air District Name:	SC
SIC Code:	8731
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	20
Reactive Organic Gases Tons/Yr:	5
Carbon Monoxide Emissions Tons/Yr:	6
NOX - Oxides of Nitrogen Tons/Yr:	27
SOX - Oxides of Sulphur Tons/Yr:	1
Particulate Matter Tons/Yr:	2
Part. Matter 10 Micrometers & Smllr Tons/Yr:	1

Year:	1995
County Code:	19
Air Basin:	SC
Facility ID:	11887
Air District Name:	SC
SIC Code:	9661
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	30
Reactive Organic Gases Tons/Yr:	18
Carbon Monoxide Emissions Tons/Yr:	4
NOX - Oxides of Nitrogen Tons/Yr:	15
SOX - Oxides of Sulphur Tons/Yr:	1
Particulate Matter Tons/Yr:	1
Part. Matter 10 Micrometers & Smllr Tons/Yr:	1

Year:	1996
County Code:	19
Air Basin:	SC
Facility ID:	11887
Air District Name:	SC
SIC Code:	9661
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported

JET PROPULSION LABORATORY (Continued) **U003159486**

Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	16
Reactive Organic Gases Tons/Yr:	11
Carbon Monoxide Emissions Tons/Yr:	4
NOX - Oxides of Nitrogen Tons/Yr:	12
SOX - Oxides of Sulphur Tons/Yr:	0
Particulate Matter Tons/Yr:	1
Part. Matter 10 Micrometers & Smllr Tons/Yr:	1

Year:	1997
County Code:	19
Air Basin:	SC
Facility ID:	11887
Air District Name:	SC
SIC Code:	9661
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	14
Reactive Organic Gases Tons/Yr:	9
Carbon Monoxide Emissions Tons/Yr:	3
NOX - Oxides of Nitrogen Tons/Yr:	8
SOX - Oxides of Sulphur Tons/Yr:	0
Particulate Matter Tons/Yr:	1
Part. Matter 10 Micrometers & Smllr Tons/Yr:	1

Year:	1998
County Code:	19
Air Basin:	SC
Facility ID:	11887
Air District Name:	SC
SIC Code:	9661
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	13
Reactive Organic Gases Tons/Yr:	8
Carbon Monoxide Emissions Tons/Yr:	3
NOX - Oxides of Nitrogen Tons/Yr:	8
SOX - Oxides of Sulphur Tons/Yr:	0
Particulate Matter Tons/Yr:	1
Part. Matter 10 Micrometers & Smllr Tons/Yr:	1

Year:	1999
County Code:	19
Air Basin:	SC
Facility ID:	11887
Air District Name:	SC
SIC Code:	9661
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	14
Reactive Organic Gases Tons/Yr:	9
Carbon Monoxide Emissions Tons/Yr:	3
NOX - Oxides of Nitrogen Tons/Yr:	8
SOX - Oxides of Sulphur Tons/Yr:	0

JET PROPULSION LABORATORY (Continued) **U003159486**

Particulate Matter Tons/Yr:	1
Part. Matter 10 Micrometers & Smllr Tons/Yr:	1
Year:	2000
County Code:	19
Air Basin:	SC
Facility ID:	11887
Air District Name:	SC
SIC Code:	9661
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	14
Reactive Organic Gases Tons/Yr:	9
Carbon Monoxide Emissions Tons/Yr:	3
NOX - Oxides of Nitrogen Tons/Yr:	8
SOX - Oxides of Sulphur Tons/Yr:	0
Particulate Matter Tons/Yr:	1
Part. Matter 10 Micrometers & Smllr Tons/Yr:	1
Year:	2001
County Code:	19
Air Basin:	SC
Facility ID:	11887
Air District Name:	SC
SIC Code:	9661
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	4
Reactive Organic Gases Tons/Yr:	3
Carbon Monoxide Emissions Tons/Yr:	6
NOX - Oxides of Nitrogen Tons/Yr:	8
SOX - Oxides of Sulphur Tons/Yr:	0
Particulate Matter Tons/Yr:	1
Part. Matter 10 Micrometers & Smllr Tons/Yr:	1
Year:	2002
County Code:	19
Air Basin:	SC
Facility ID:	11887
Air District Name:	SC
SIC Code:	9661
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	3
Reactive Organic Gases Tons/Yr:	3
Carbon Monoxide Emissions Tons/Yr:	6
NOX - Oxides of Nitrogen Tons/Yr:	11
SOX - Oxides of Sulphur Tons/Yr:	0
Particulate Matter Tons/Yr:	1
Part. Matter 10 Micrometers & Smllr Tons/Yr:	1
Year:	2003
County Code:	19
Air Basin:	SC

JET PROPULSION LABORATORY (Continued) **U003159486**

Facility ID:	11887
Air District Name:	SC
SIC Code:	9661
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	3
Reactive Organic Gases Tons/Yr:	3
Carbon Monoxide Emissions Tons/Yr:	6
NOX - Oxides of Nitrogen Tons/Yr:	11
SOX - Oxides of Sulphur Tons/Yr:	0
Particulate Matter Tons/Yr:	1
Part. Matter 10 Micrometers & Smllr Tons/Yr:	1

Year:	2004
County Code:	19
Air Basin:	SC
Facility ID:	11887
Air District Name:	SC
SIC Code:	9661
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	3.495498996
Reactive Organic Gases Tons/Yr:	3
Carbon Monoxide Emissions Tons/Yr:	5.94547
NOX - Oxides of Nitrogen Tons/Yr:	10.5924
SOX - Oxides of Sulphur Tons/Yr:	0.097098
Particulate Matter Tons/Yr:	0.712216
Part. Matter 10 Micrometers & Smllr Tons/Yr:	0.7

Year:	2005
County Code:	19
Air Basin:	SC
Facility ID:	11887
Air District Name:	SC
SIC Code:	9661
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	1.7046828
Reactive Organic Gases Tons/Yr:	1.5146518594
Carbon Monoxide Emissions Tons/Yr:	4.81139
NOX - Oxides of Nitrogen Tons/Yr:	6.65857
SOX - Oxides of Sulphur Tons/Yr:	.048495
Particulate Matter Tons/Yr:	.46293
Part. Matter 10 Micrometers & Smllr Tons/Yr:	.46083841

Year:	2006
County Code:	19
Air Basin:	SC
Facility ID:	11887
Air District Name:	SC
SIC Code:	9661
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported

JET PROPULSION LABORATORY (Continued) **U003159486**

Total Organic Hydrocarbon Gases Tons/Yr:	1.948721441845900959
Reactive Organic Gases Tons/Yr:	1.495
Carbon Monoxide Emissions Tons/Yr:	4.574
NOX - Oxides of Nitrogen Tons/Yr:	8.02
SOX - Oxides of Sulphur Tons/Yr:	.057
Particulate Matter Tons/Yr:	.803
Part. Matter 10 Micrometers & Smllr Tons/Yr:	.7088893

Year:	2007
County Code:	19
Air Basin:	SC
Facility ID:	11887
Air District Name:	SC
SIC Code:	9661
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	4.437283444436867854
Reactive Organic Gases Tons/Yr:	3.97756493492162486
Carbon Monoxide Emissions Tons/Yr:	4.902142
NOX - Oxides of Nitrogen Tons/Yr:	7.379056692474006505
SOX - Oxides of Sulphur Tons/Yr:	.0363918
Particulate Matter Tons/Yr:	.79824107
Part. Matter 10 Micrometers & Smllr Tons/Yr:	.699190433291

Year:	2007
County Code:	19
Air Basin:	SC
Facility ID:	11887
Air District Name:	SC
SIC Code:	9661
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	1.915077826309688557
Reactive Organic Gases Tons/Yr:	1.495
Carbon Monoxide Emissions Tons/Yr:	4.574
NOX - Oxides of Nitrogen Tons/Yr:	8.02
SOX - Oxides of Sulphur Tons/Yr:	.057
Particulate Matter Tons/Yr:	.803
Part. Matter 10 Micrometers & Smllr Tons/Yr:	.7088893

ENVIROSTOR:

Site Type:	Federal Superfund
Site Type Detailed:	State Response or NPL
Acres:	176
NPL:	YES
Regulatory Agencies:	SMBRP
Lead Agency:	SMBRP
Program Manager:	MICHEL ISKAROUS
Supervisor:	Allan Plaza
Division Branch:	Cleanup Chatsworth
Facility ID:	19970008
Site Code:	300318
Assembly:	44
Senate:	21
Special Program:	Not reported

JET PROPULSION LABORATORY (Continued) **U003159486**

Status: Active
Status Date: 1993-09-20 00:00:00
Restricted Use: NO
Site Mgmt. Req.: NONE SPECIFIED
Funding: Responsible Party
Latitude: 34.2028071846942
Longitude: -118.172169548056
APN: 5817025901
Past Use: LABORATORIES- CHEMICAL, RESEARCH - AEROSPACE, RESEARCH - WEAPONS
Potential COC: 10097, 30019, 30022, 30026, 30027
Confirmed COC: 30019,30022,30026,30027,10097
Potential Description: SOIL, WELL
Alias Name: JET PROPULSION LABORATORY (NASA)
Alias Type: Alternate Name
Alias Name: JPL
Alias Type: Alternate Name
Alias Name: NASA - JET PROPULSION LABORATORY
Alias Type: Alternate Name
Alias Name: 5817025901
Alias Type: APN
Alias Name: CA9800013030
Alias Type: EPA Identification Number
Alias Name: 110002626061
Alias Type: EPA (FRS #)
Alias Name: T0603703875
Alias Type: GeoTracker Global ID
Alias Name: 300318
Alias Type: Project Code (Site Code)
Alias Name: 19970008
Alias Type: Envirostor ID Number

Completed Info:
Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Land Use Restriction Monitoring Report
Completed Date: 2010-03-25 00:00:00
Comments: DTSC reviewed the Tech memo.

Completed Area Name: OU 2
Completed Sub Area Name: Not reported
Completed Document Type: Remedial Investigation / Feasibility Study
Completed Date: 2000-09-07 00:00:00
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Site Screening
Completed Date: 1991-03-21 00:00:00
Comments: Groundwater contaminated with VOCs. EPA is the lead agency.

Completed Area Name: OU 1
Completed Sub Area Name: Not reported
Completed Document Type: Record of Decision - Interim
Completed Date: 2005-10-30 00:00:00
Comments: Part of phased approach under Superfund Cleanup Model. "Early Action" taken prior to completion of RI/FS

Completed Area Name: OU 1

JET PROPULSION LABORATORY (Continued) **U003159486**

Completed Sub Area Name: Not reported
Completed Document Type: Design/Implementation Workplan
Completed Date: 2006-12-01 00:00:00
Comments: DTSC approved the workplan.

Completed Area Name: OU 2
Completed Sub Area Name: Not reported
Completed Document Type: Design/Implementation Workplan
Completed Date: 2002-12-30 00:00:00
Comments: Finalized the Remedial Design/Remedial Action for operating a full-scale Soil Vapor Extraction Treatment system to clean up soils.

Completed Area Name: OU 2
Completed Sub Area Name: Not reported
Completed Document Type: Remedial Action Completion Report
Completed Date: 2005-03-30 00:00:00
Comments: Summary of first year operation, recommendations for future operation and optimization.

Completed Area Name: OU 2
Completed Sub Area Name: Not reported
Completed Document Type: Operations and Maintenance Report
Completed Date: 2005-09-30 00:00:00
Comments: Ongoing memoranda untill system closeout.

Completed Area Name: OU 2
Completed Sub Area Name: Not reported
Completed Document Type: Operations and Maintenance Report
Completed Date: 2006-03-30 00:00:00
Comments: Agency accepted OU-2 Tech Memo.

Completed Area Name: OU 3
Completed Sub Area Name: Not reported
Completed Document Type: Remedial Investigation Report
Completed Date: 1999-08-30 00:00:00
Comments: Finalized Remedial Investigation Report.

Completed Area Name: OU 3
Completed Sub Area Name: Not reported
Completed Document Type: Remedial Investigation Workplan
Completed Date: 2004-11-30 00:00:00
Comments: Finalized Remedial Investigation Addendum Workplan.

Completed Area Name: OU 3
Completed Sub Area Name: Not reported
Completed Document Type: Record of Decision - Interim
Completed Date: 2006-07-14 00:00:00
Comments: DTSC approved plan.

Completed Area Name: OU 3
Completed Sub Area Name: Not reported
Completed Document Type: Remedial Investigation Workplan
Completed Date: 2004-12-30 00:00:00
Comments: Woek began September 2004 foradditional multi-port well installation and isotope study.

Completed Area Name: OU 3

JET PROPULSION LABORATORY (Continued) **U003159486**

Completed Sub Area Name: Not reported
Completed Document Type: Remedial Investigation Report
Completed Date: 2006-10-30 00:00:00
Comments: DTSC completed review.

Completed Area Name: OU 3
Completed Sub Area Name: Not reported
Completed Document Type: Record of Decision
Completed Date: 2007-05-07 00:00:00
Comments: DTSC approved the response action for cleaning up off-site groundwater (OU3).

Completed Area Name: OU 1
Completed Sub Area Name: Not reported
Completed Document Type: Record of Decision
Completed Date: 2006-12-27 00:00:00
Comments: DTSC approved and signed the Interim Record of Decision for Ou-1.

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Operations and Maintenance Report
Completed Date: 2006-07-14 00:00:00
Comments: DTSC approved Report.

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Operations and Maintenance Report
Completed Date: 2006-11-30 00:00:00
Comments: DTSC completed review.

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Long Term Monitoring Report
Completed Date: 2007-01-30 00:00:00
Comments: DTSC completed review and approved the tech. memo.

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Operations and Maintenance Report
Completed Date: 2006-05-26 00:00:00
Comments: DTSC completed review and accepted the Annual groundwater monitoring report.

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Operations and Maintenance Report
Completed Date: 2006-05-19 00:00:00
Comments: DTSC completed review and accepted the monitoring report.

Completed Area Name: OU 1
Completed Sub Area Name: Not reported
Completed Document Type: Remedial Investigation Report
Completed Date: 1999-08-30 00:00:00
Comments: Final RI

Completed Area Name: OU 1
Completed Sub Area Name: Not reported

JET PROPULSION LABORATORY (Continued) **U003159486**

Completed Document Type: Pilot Study/Treatability Workplan
Completed Date: 2001-04-30 00:00:00
Comments: Final Report for pilot test.

Completed Area Name: OU 1
Completed Sub Area Name: Not reported
Completed Document Type: Treatability Study Workplan
Completed Date: 2003-08-30 00:00:00
Comments: Final expanded treatability study workplan.

Completed Area Name: OU 1
Completed Sub Area Name: Not reported
Completed Document Type: Treatability Study Report
Completed Date: 2005-01-30 00:00:00
Comments: Completed construction of the expanded treatability study system.

Completed Area Name: OU 2
Completed Sub Area Name: Not reported
Completed Document Type: Remedial Investigation / Feasibility Study
Completed Date: 2000-07-30 00:00:00
Comments: Finalized Feasaibility Study Report.

Completed Area Name: OU 2
Completed Sub Area Name: Not reported
Completed Document Type: Record of Decision
Completed Date: 2002-09-01 00:00:00
Comments: Finalized the Record of Decision (ROD).

Completed Area Name: OU 2
Completed Sub Area Name: Not reported
Completed Document Type: Remedy Constructed: Operating Properly & Successfully
Completed Date: 2002-12-30 00:00:00
Comments: Finalized the Remedial Design/Remedial Action Workplan to operate a full scale soil vapor extraction system to clean up the soils.

Completed Area Name: OU 3
Completed Sub Area Name: Not reported
Completed Document Type: Remedial Investigation Report
Completed Date: 1999-08-01 00:00:00
Comments: Finalized Remedial Investigation Report (RI).

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Monitoring Report
Completed Date: 2007-08-15 00:00:00
Comments: The report was accepted as complete.

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Long Term Monitoring Report
Completed Date: 2009-08-15 00:00:00
Comments: DTSC reviewed and accepted the report.

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Long Term Monitoring Report
Completed Date: 2009-09-30 00:00:00

JET PROPULSION LABORATORY (Continued) **U003159486**

Comments:	DTSC accepted the report
Completed Area Name:	OU 1
Completed Sub Area Name:	Not reported
Completed Document Type:	Long Term Monitoring Report
Completed Date:	2009-11-29 00:00:00
Comments:	DTSC completed review of the report.
Completed Area Name:	OU 1
Completed Sub Area Name:	Not reported
Completed Document Type:	Long Term Monitoring Report
Completed Date:	2010-03-25 00:00:00
Comments:	DTSC completed review of the report.
Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Long Term Monitoring Report
Completed Date:	2009-12-24 00:00:00
Comments:	DTSC completed review.
Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Long Term Monitoring Report
Completed Date:	2010-03-25 00:00:00
Comments:	Not reported
Completed Area Name:	OU 3
Completed Sub Area Name:	Not reported
Completed Document Type:	Long Term Monitoring Report
Completed Date:	2010-04-30 00:00:00
Comments:	DTSC reviewed and accepted the report.
Completed Area Name:	OU 3
Completed Sub Area Name:	Not reported
Completed Document Type:	Long Term Monitoring Report
Completed Date:	2010-09-15 00:00:00
Comments:	Not reported
Completed Area Name:	OU 2
Completed Sub Area Name:	Not reported
Completed Document Type:	Record of Decision
Completed Date:	2002-09-23 00:00:00
Comments:	Not reported
Completed Area Name:	OU 2
Completed Sub Area Name:	Not reported
Completed Document Type:	Design/Implementation Workplan
Completed Date:	2002-11-30 00:00:00
Comments:	Not reported
Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Consent Order
Completed Date:	1993-09-20 00:00:00
Comments:	A Memorandum of Agreement for NASA to reimburse the Department for oversight of remedial activities at JPL was signed. Since this time, the Department has continued to work on the project.

JET PROPULSION LABORATORY (Continued) **U003159486**

Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Federal Facility Agreement
Completed Date:	1992-12-23 00:00:00
Comments:	Federal Facilities Agreement reached between EPA, DTSC, NASA/JPL and RWQCB.

Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	* Discovery
Completed Date:	1990-07-11 00:00:00
Comments:	Facility identified EPA expanded site inspection report. EPA completed expanded site inspection and will continue with a remedial investigation/feasibility study. EPA/CERCLA Site Pending Status: EPA SITE.

Future Area Name:	Not reported
Future Sub Area Name:	Not reported
Future Document Type:	Not reported
Future Due Date:	Not reported
Schedule Area Name:	Not reported
Schedule Sub Area Name:	Not reported
Schedule Document Type:	Not reported
Schedule Due Date:	Not reported
Schedule Revised Date:	Not reported

B12 **JET PROPULSION LABORATORY** **NPL** **1000128791**
WNW **4800 OAK GROVE DRIVE** **CERCLIS** **CA9800013030**
1/4-1/2 **PASADENA, CA 91109** **RCRA-LQG**
0.278 mi. **US ENG CONTROLS**
1469 ft. **Site 3 of 4 in cluster B** **ROD**
FINDS
Relative: **NPDES**
Higher **MANIFEST**
SWEEPS UST
Actual: **HAZNET**
1150 ft.

NPL:

EPA ID:	CA9800013030
EPA Region:	09
Federal:	Y
Final Date:	1992-10-14 00:00:00

Site Details:

Site Name:	JET PROPULSION LABORATORY (NASA)
Site Status:	Final
Site Zip:	91109
Site City:	PASADENA
Site State:	CA
Federal Site:	Yes
Site County:	LOS ANGELES
EPA Region:	09
Date Proposed:	02/07/92
Date Deleted:	Not reported
Date Finalized:	10/14/92

JET PROPULSION LABORATORY (Continued) **1000128791**

Substance Details:

NPL Status:	Currently on the Final NPL
Substance ID:	Not reported
Substance:	Not reported
CAS #:	Not reported
Pathway:	Not reported
Scoring:	Not reported

NPL Status:	Currently on the Final NPL
Substance ID:	A038
Substance:	NICKEL AND COMPOUNDS
CAS #:	Not reported
Pathway:	NO PATHWAY INDICATED
Scoring:	1

NPL Status:	Currently on the Final NPL
Substance ID:	C113
Substance:	STYRENE
CAS #:	100-42-5
Pathway:	NO PATHWAY INDICATED
Scoring:	1

NPL Status:	Currently on the Final NPL
Substance ID:	C177
Substance:	COBALT AND COMPOUNDS
CAS #:	Not reported
Pathway:	NO PATHWAY INDICATED
Scoring:	1

NPL Status:	Currently on the Final NPL
Substance ID:	C178
Substance:	COPPER AND COMPOUNDS
CAS #:	Not reported
Pathway:	NO PATHWAY INDICATED
Scoring:	1

NPL Status:	Currently on the Final NPL
Substance ID:	C246
Substance:	VANADIUM AND COMPOUNDS
CAS #:	Not reported
Pathway:	NO PATHWAY INDICATED
Scoring:	1

NPL Status:	Currently on the Final NPL
Substance ID:	C247
Substance:	ZINC AND COMPOUNDS
CAS #:	Not reported
Pathway:	NO PATHWAY INDICATED
Scoring:	1

NPL Status:	Currently on the Final NPL
Substance ID:	C324
Substance:	CIS-1,2-DICHLOROETHYLENE
CAS #:	156-59-2
Pathway:	NO PATHWAY INDICATED
Scoring:	1

JET PROPULSION LABORATORY (Continued) **1000128791**

NPL Status: Currently on the Final NPL
Substance ID: C431
Substance: FLUORENE
CAS #: 86-73-7
Pathway: NO PATHWAY INDICATED
Scoring: 1

NPL Status: Currently on the Final NPL
Substance ID: C460
Substance: MERCURY
CAS #: 7439-97-6
Pathway: NO PATHWAY INDICATED
Scoring: 1

NPL Status: Currently on the Final NPL
Substance ID: D004
Substance: ARSENIC
CAS #: 7440-38-2
Pathway: NO PATHWAY INDICATED
Scoring: 1

NPL Status: Currently on the Final NPL
Substance ID: D005
Substance: BARIUM
CAS #: 7440-39-3
Pathway: NO PATHWAY INDICATED
Scoring: 1

NPL Status: Currently on the Final NPL
Substance ID: D006
Substance: CADMIUM (CD)
CAS #: 7440-43-9
Pathway: GROUND WATER PATHWAY
Scoring: 3

NPL Status: Currently on the Final NPL
Substance ID: D007
Substance: CHROMIUM
CAS #: 7440-47-3
Pathway: NO PATHWAY INDICATED
Scoring: 1

NPL Status: Currently on the Final NPL
Substance ID: D008
Substance: LEAD (PB)
CAS #: 7439-92-1
Pathway: NO PATHWAY INDICATED
Scoring: 1

NPL Status: Currently on the Final NPL
Substance ID: P022
Substance: CARBON DISULFIDE
CAS #: 75-15-0
Pathway: NO PATHWAY INDICATED
Scoring: 1

NPL Status: Currently on the Final NPL

JET PROPULSION LABORATORY (Continued) **1000128791**

Substance ID: U002
Substance: ACETONE
CAS #: 67-64-1
Pathway: NO PATHWAY INDICATED
Scoring: 1

NPL Status: Currently on the Final NPL
Substance ID: U037
Substance: CHLOROBENZENE
CAS #: 108-90-7
Pathway: NO PATHWAY INDICATED
Scoring: 1

NPL Status: Currently on the Final NPL
Substance ID: U044
Substance: CHLOROFORM
CAS #: 67-66-3
Pathway: NO PATHWAY INDICATED
Scoring: 1

NPL Status: Currently on the Final NPL
Substance ID: U069
Substance: DI-N-BUTYL PHTHALATE
CAS #: 84-74-2
Pathway: NO PATHWAY INDICATED
Scoring: 1

NPL Status: Currently on the Final NPL
Substance ID: U070
Substance: DICHLOROBENZENE, 1,2-
CAS #: 95-50-1
Pathway: NO PATHWAY INDICATED
Scoring: 1

NPL Status: Currently on the Final NPL
Substance ID: U072
Substance: DICHLOROBENZENE, 1,4-
CAS #: 106-46-7
Pathway: NO PATHWAY INDICATED
Scoring: 1

NPL Status: Currently on the Final NPL
Substance ID: U076
Substance: DICHLOROETHANE, 1,1-
CAS #: 75-34-3
Pathway: GROUND WATER PATHWAY
Scoring: 2

NPL Status: Currently on the Final NPL
Substance ID: U077
Substance: DICHLOROETHANE, 1,2-
CAS #: 107-06-2
Pathway: NO PATHWAY INDICATED
Scoring: 1

NPL Status: Currently on the Final NPL
Substance ID: U080

JET PROPULSION LABORATORY (Continued) **1000128791**

Substance: METHYLENE CHLORIDE
CAS #: 75-09-2
Pathway: NO PATHWAY INDICATED
Scoring: 1

NPL Status: Currently on the Final NPL
Substance ID: U159
Substance: METHYL ETHYL KETONE
CAS #: 78-93-3
Pathway: NO PATHWAY INDICATED
Scoring: 1

NPL Status: Currently on the Final NPL
Substance ID: U165
Substance: NAPHTHALENE
CAS #: 91-20-3
Pathway: NO PATHWAY INDICATED
Scoring: 1

NPL Status: Currently on the Final NPL
Substance ID: U210
Substance: TETRACHLOROETHENE
CAS #: 127-18-4
Pathway: GROUND WATER PATHWAY
Scoring: 2

NPL Status: Currently on the Final NPL
Substance ID: U211
Substance: CARBON TETRACHLORIDE
CAS #: 56-23-5
Pathway: GROUND WATER PATHWAY
Scoring: 2

NPL Status: Currently on the Final NPL
Substance ID: U211
Substance: CARBON TETRACHLORIDE
CAS #: 56-23-5
Pathway: NO PATHWAY INDICATED
Scoring: 1

NPL Status: Currently on the Final NPL
Substance ID: U220
Substance: TOLUENE
CAS #: 108-88-3
Pathway: NO PATHWAY INDICATED
Scoring: 1

NPL Status: Currently on the Final NPL
Substance ID: U228
Substance: TRICHLOROETHYLENE (TCE)
CAS #: 79-01-6
Pathway: GROUND WATER PATHWAY
Scoring: 2

NPL Status: Currently on the Final NPL
Substance ID: U239
Substance: XYLENE

JET PROPULSION LABORATORY (Continued) **1000128791**

CAS #: 1330-20-7
Pathway: NO PATHWAY INDICATED
Scoring: 1

Summary Details:

Conditions at Proposal February 7, 1992): The Jet Propulsion Laboratory JPL) covers 176 acres at 4800 Oak Grove Drive in Pasadena, Los Angeles County, California. The area is primarily residential with some light commercial operations. Itis bordered on the east by the Arroyo Seco Dry Wash, on the west by a residential neighborhood, on the north by the San Gabriel Mountains, and on the south by an equestrian club and a Los Angeles County Fire Station. Approximately 120,800 people live within 4 miles of the site. The Army developed and operated JPL between 1945 and 1957; jurisdiction was transferred to the National Aeronautics and Space Administration NASA) in 1958. The California Institute of Technology is under contract to NASA to conduct research and development at JPL in aeronautics, space technology, and space transportation. JPL s primary activities include exploration of the earth and solar system with automated spacecraft, and the design andoperation of the Global Deep Space Tracking Network. Among the sources of ha ardous substances at the site are numerous seepage pits, where liquid and solid wastes were reportedly disposed of; a settling chamber in the JPL storm drainsystem; contaminated soil excavated from part of the system; and an area where waste solvents were dumped into three holes. The general types of ha ardous substances at JPL, now and in the past, include waste solvents such as tetrachloroethene,solid rocket fuel propellants, cooling tower chemicals, sulfuric acid, Freon, mercury, and chemical laboratory wastes. In 1990, contractors for JPL detected significantly elevated levels of carbon tetrachloride, trichloroethene, tetrachloroethene, and other volatile organic compounds VOCs) in ground water both under and downgradient of the site. An estimated 68,000 people obtain drinking water from municipal wells within 4 miles of the site. Four City of Pasadena wells were shut down during 1989-90 due to VOCs attributable to JPL. The city has installed a treatment system, and the wells were returned to operation in October 1990. In addition, two Lincoln Avenue Water Co. wells were shut down in 1987 due to VOCs attributable to JPL; these wells are still closed. Status October 1992): EPA and JPL have started to negotiate a Federal Facilities Agreement under CERCLA Section 120 covering future activities at the site. The description of the site release) is based on information available at the time the site was scored. The description may change as additional information is gathered on the sources and extent of contamination. See FR 5600, February 11, 1991 or subsequent FR notices.)

Site Status Details:
NPL Status: Final
Proposed Date: 02/07/1992
Final Date: 10/14/1992
Deleted Date: Not reported

Narratives Details:
NPL Name: JET PROPULSION LABORATORY (NASA)
City: PASADENA
State: CA

CERCLIS:
Site ID: 0903438

JET PROPULSION LABORATORY (Continued) **1000128791**

EPA ID:	CA9800013030
Facility County:	LOS ANGELES
Short Name:	JET PROPULSION LABORATORY
Congressional District:	27
IFMS ID:	092U
SMSA Number:	4480
USGC Hydro Unit:	18070105
Federal Facility:	Federal Facility
DMNSN Number:	176.00000
Site Orphan Flag:	N
RCRA ID:	Not reported
USGS Quadrangle:	Not reported
Site Init By Prog:	Not reported
NFRAP Flag:	Not reported
Parent ID:	Not reported
RST Code:	Not reported
EPA Region:	09
Classification:	Not reported
Site Settings Code:	SU
NPL Status:	Currently on the Final NPL
DMNSN Unit Code:	ACRE
RBRAC Code:	Not reported
RResp Fed Agency Code:	NASA
Non NPL Status:	Not reported
Non NPL Status Date:	Not reported
Site Fips Code:	06037
CC Concurrence Date:	Not reported
CC Concurrence FY:	Not reported
Alias EPA ID:	Not reported
Site FUDS Flag:	Not reported

CERCLIS Site Contact Name(s):

Contact ID:	9271184.00000
Contact Name:	Karen Jurist
Contact Tel:	(415) 972-3219
Contact Title:	Site Assessment Manager (SAM)
Contact Email:	Not reported
Contact ID:	9270048.00000
Contact Name:	Jeff Inglis
Contact Tel:	(415) 972-3095
Contact Title:	Site Assessment Manager (SAM)
Contact Email:	Not reported
Contact ID:	9271193.00000
Contact Name:	Judy Huang
Contact Tel:	(415) 972-3681
Contact Title:	Remedial Project Manager (RPM)
Contact Email:	Not reported
Contact ID:	13002167.00000
Contact Name:	Carl Brickner
Contact Tel:	(415) 972-3814
Contact Title:	Site Assessment Manager (SAM)
Contact Email:	Not reported
Contact ID:	9270438.00000

JET PROPULSION LABORATORY (Continued) **1000128791**

Contact Name: Dawn Richmond
Contact Tel: (415) 972-3097
Contact Title: Site Assessment Manager (SAM)
Contact Email: Not reported

CERCLIS Site Alias Name(s):
Alias ID: 101
Alias Name: JET PROPULSION LABORATORY (NASA)
Alias Address: 4800 OAK GROVE DR
PASADENA, CA 91109
Alias ID: 9270295
Alias Name: JET PROPULSION LABORATORY
Alias Address: 4800 OAK GROVE DR.
PASADENA, CA 96718
Alias Comments: Not reported
Site Description: The Jet Propulsion Laboratory (JPL) is a federally-funded Research and Development Center (FFRDC) in Pasadena, California, currently operated under contract by the California Institute of Technology (Caltech) for the National Aeronautics and Space Administration (NASA). JPL's primary activities include the exploration of the earth and solar system by automated spacecraft and the design and operation of the Global Deep Space Tracking Network. Located in Los Angeles County, JPL adjoins the incorporated cities of La Canada Flintridge and Pasadena, and is bordered on the east by the unincorporated community of Altadena. A NASA owned facility, JPL encompasses approximately 176 acres of land and more than 150 buildings and other structures. Of the JPL Facility's 176 acres, approximately 156 acres are federally owned. The remaining land is leased for parking from the City of Pasadena and the Flintridge Riding Club. Development at JPL is primarily located on the southern half, in two regions, an early-developed northeastern area and a later-developed southwestern area. During historic operations at JPL, various chemicals (including chlorinated solvents, solid rocket fuel propellants, cooling tower chemicals, sulfuric acid, Freon, and mercury) and other materials were used at the JPL facility. During the 1940s and 1950s, many buildings at JPL maintained subsurface seepage pits for disposal of sanitary wastes and laboratory chemical wastes collected from drains and sinks within the buildings. The Remedial Investigation (RI) for Operable Unit 2 (OU-2) identified 40 seepage pits, five waste pits, and four discharge points at the facility that were used during historic operations. Some of the seepage pits received volatile organic compounds (VOCs) and other waste materials which are currently found in groundwater beneath and adjacent to JPL. In the late 1950s and early 1960s, a sanitary sewer system was installed at JPL to handle sewage and wastewater, and the use of seepage pits for sanitary and chemical waste disposal was discontinued. Today, laboratory chemical wastes are either recycled or sent off-facility for treatment and disposal at regulated, Resource Conservation and Recovery Act (RCRA)-permitted hazardous waste facilities. In 1980, the analyses of groundwater revealed the presence of VOCs in City of Pasadena water supply wells located southeast of JPL in the Arroyo Seco. At about the same time, VOCs were detected in two water-supply wells used by the Lincoln Avenue Water Company, located east of the Arroyo Seco. As a result, NASA initiated investigation to evaluate VOCs originating from the JPL facility. In 1988, a Preliminary Assessment/Site Inspection was completed at JPL, which indicated that further site characterization was warranted. Subsequent site investigations were conducted at JPL and VOCs were detected in on-facility groundwater at levels above drinking water standards. In 1992, JPL was placed on the National Priorities List (NPL) of sites subject to regulation under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). After being placed on the National Priorities List (NPL), the

JET PROPULSION LABORATORY (Continued) **1000128791**

nature and extent of chemicals in groundwater were investigated during the RI, which lasted from 1994 to 1998. Additional groundwater data have been obtained from a long-term groundwater monitoring program in place at the facility since August 1996, which continues to be active. Based on the data collected during the RI and long-term groundwater monitoring, two VOCs (carbon tetrachloride and trichloroethene [TCE]) and perchlorate have been detected consistently in the source area at concentrations significantly exceeding their respective state or federal maximum contaminant levels (MCLs) or California Department of Health Services (DHS) notification levels (NLs). The highest concentrations of carbon tetrachloride and perchlorate at the JPL site are located in the north-central portion of the JPL facility, which is referred to as the "source area." The source area is the location where the majority of chemicals is dissolved in the groundwater, and is defined as an 8-acre by 100-ft-thick portion of the aquifer. In the late 1990s and early 2000, NASA conducted pilot testing of several technologies to address dissolved perchlorate in source area groundwater. The technologies tested included reverse osmosis, a fluidized bed reactor (FBR), packed bed reactors, in situ bioremediation, and ion exchange. Due to the depth and extent of the chemicals in groundwater, in situ (below ground) treatment is not cost-effective at the JPL facility; therefore, groundwater must be pumped from the ground, treated aboveground, and reinjected. Based on these studies, NASA installed a demonstration treatment plant located on JPL in the source area in early 2005. The demonstration study consists of two extraction wells, two injection wells, liquid-phase granular activated carbon (LGAC) treatment to remove VOCs, and an FBR to remove perchlorate. This system has been successful in the demonstration phase. JPL comprises approximately 176 acres of land. Of these 176 acres, about 156 acres are federally owned. The remaining land is leased for parking from the City of Pasadena and the Flintridge Riding Club. Presently, more than 150 structures and buildings occupy JPL. Total usable building space is approximately 1,330,000 ft2. The main developed area of JPL is the southern half, which can be divided into two general areas ? the northeastern early-developed area and the southwestern later-developed area. Most of the northern half of JPL is not developed because of steeply sloping terrain. Currently, the northeastern early-developed part of JPL is used for project support, testing, and storage. The southwestern later-developed part is used mostly for administrative, management, laboratory, and project functions. Further development of JPL is constrained because of steeply sloping terrain to the north, the Arroyo Seco to the south and east, and residential development to the west. Located at the northern boundary of JPL is the Gould Mesa area. This area has widely separated small buildings and is used primarily for antenna testing. The distance between buildings is a result of the terrain and the need to isolate transmitting and receiving equipment. The relatively steep mountainside between Gould Mesa and the developed area at JPL is unpopulated. The primary land use in the areas surrounding JPL is residential and light commercial. Industrial areas, such as manufacturing, processing, and packaging, are limited. The closest residential properties are those located along the western fence line of JPL. The nearest off-facility buildings are the Flintridge Riding Club and Fire Camp #2, both located approximately 100 yards from the southern border of JPL. The total number of buildings within 2 miles of JPL is about 2,500, primarily residential and community (e.g., schools, day-care centers, churches). Land use at JPL is not expected to change significantly in the foreseeable future. There are no permanent surface water bodies within the boundaries of JPL. The Arroyo Seco Creek intermittently flows through the Arroyo Seco wash to the east of JPL. The entire JPL facility drains, via storm drains and surface runoff, into the Arroyo Seco. In addition, stormwater runoff from parts of La Canada Flintridge mingles with that of JPL prior to discharge to the Arroyo. Within the Arroyo Seco, a series of surface impoundments are used as surface water collection and

JET PROPULSION LABORATORY (Continued) **1000128791**

spreading basins for groundwater recharge. Groundwater beneath the Arroyo Seco is a current source of drinking water. The Raymond Basin Watershed, Monk Hill Subarea, where JPL is located, provides an important source of potable water for many communities in the area around JPL. These communities are expected to grow at a modest rate for the foreseeable future and the use of groundwater as drinking water is expected to continue. A Record of Decision addressing OU-1 was completed in February 2007.

CERCLIS Assessment History:

Action Code:	001
Action:	DISCOVERY
Date Started:	Not reported
Date Completed:	05/01/1988
Priority Level:	Not reported
Operable Unit:	SITEWIDE
Primary Responsibility:	Federal Facilities
Planning Status:	Not reported
Urgency Indicator:	Not reported
Action Anomaly:	Not reported

For detailed financial records, contact EDR for a Site Report.:

Action Code:	001
Action:	PRELIMINARY ASSESSMENT
Date Started:	Not reported
Date Completed:	09/08/1989
Priority Level:	Higher priority for further assessment
Operable Unit:	SITEWIDE
Primary Responsibility:	Federal Facilities
Planning Status:	Not reported
Urgency Indicator:	Not reported
Action Anomaly:	Not reported

For detailed financial records, contact EDR for a Site Report.:

Action Code:	001
Action:	EXPANDED SITE INSPECTION
Date Started:	Not reported
Date Completed:	04/02/1991
Priority Level:	Recommended for HRS Scoring
Operable Unit:	SITEWIDE
Primary Responsibility:	Federal Facilities
Planning Status:	Not reported
Urgency Indicator:	Not reported
Action Anomaly:	Not reported

For detailed financial records, contact EDR for a Site Report.:

Action Code:	001
Action:	PROPOSAL TO NATIONAL PRIORITIES LIST
Date Started:	Not reported
Date Completed:	02/07/1992
Priority Level:	Not reported
Operable Unit:	SITEWIDE
Primary Responsibility:	EPA Fund-Financed

JET PROPULSION LABORATORY (Continued) **1000128791**

Planning Status: Primary
Urgency Indicator: Not reported
Action Anomaly: Not reported

For detailed financial records, contact EDR for a Site Report.:

Action Code: 001
Action: HAZARD RANKING SYSTEM PACKAGE
Date Started: Not reported
Date Completed: 10/13/1992
Priority Level: Not reported
Operable Unit: SITEWIDE
Primary Responsibility: Federal Facilities
Planning Status: Primary
Urgency Indicator: Not reported
Action Anomaly: Not reported

For detailed financial records, contact EDR for a Site Report.:

Action Code: 001
Action: FINAL LISTING ON NATIONAL PRIORITIES LIST
Date Started: Not reported
Date Completed: 10/14/1992
Priority Level: Not reported
Operable Unit: SITEWIDE
Primary Responsibility: Federal Facilities
Planning Status: Primary
Urgency Indicator: Not reported
Action Anomaly: Not reported

For detailed financial records, contact EDR for a Site Report.:

Action Code: 001
Action: FEDERAL INTERAGENCY AGREEMENT
Date Started: 12/23/1992
Date Completed: 12/23/1992
Priority Level: Not reported
Operable Unit: SITEWIDE
Primary Responsibility: Federal Enforcement
Planning Status: Primary
Urgency Indicator: Not reported
Action Anomaly: Not reported

For detailed financial records, contact EDR for a Site Report.:

Action Code: 001
Action: INTERAGENCY AGREEMENT NEGOTIATIONS
Date Started: 08/04/1992
Date Completed: 12/23/1992
Priority Level: Not reported
Operable Unit: SITEWIDE
Primary Responsibility: Federal Enforcement
Planning Status: Primary
Urgency Indicator: Not reported
Action Anomaly: Not reported

JET PROPULSION LABORATORY (Continued) **1000128791**

For detailed financial records, contact EDR for a Site Report.:

Action Code: 001
Action: TREATABILITY STUDY
Date Started: 03/01/1999
Date Completed: 06/30/1999
Priority Level: Not reported
Operable Unit: ONSITE GW
Primary Responsibility: Federal Facilities
Planning Status: Not reported
Urgency Indicator: Not reported
Action Anomaly: Not reported

For detailed financial records, contact EDR for a Site Report.:

Action Code: 002
Action: FEDERAL FACILITY REMEDIAL INVESTIGATION/FEASIBILITY STUDY
Date Started: 07/07/1993
Date Completed: 09/19/2002
Priority Level: Not reported
Operable Unit: SOILS/SVE
Primary Responsibility: Federal Facilities
Planning Status: Primary
Urgency Indicator: Not reported
Action Anomaly: Not reported

For detailed financial records, contact EDR for a Site Report.:

Action Code: 002
Action: RECORD OF DECISION
Date Started: Not reported
Date Completed: 09/19/2002
Priority Level: Not reported
Operable Unit: SOILS/SVE
Primary Responsibility: Federal Facilities
Planning Status: Primary
Urgency Indicator: Not reported
Action Anomaly: Not reported

For detailed financial records, contact EDR for a Site Report.:

Action Code: 002
Action: FEDERAL FACILITY REMEDIAL DESIGN
Date Started: 11/29/2002
Date Completed: 04/28/2003
Priority Level: Not reported
Operable Unit: SOILS/SVE
Primary Responsibility: Federal Facilities
Planning Status: Primary
Urgency Indicator: Not reported
Action Anomaly: Not reported

For detailed financial records, contact EDR for a Site Report.:

Action Code: 001
Action: FEDERAL FACILITY REMEDIAL ACTION

JET PROPULSION LABORATORY (Continued) **1000128791**

Date Started:	04/28/2003
Date Completed:	01/03/2007
Priority Level:	Not reported
Operable Unit:	SOILS/SVE
Primary Responsibility:	Federal Facilities
Planning Status:	Primary
Urgency Indicator:	Not reported
Action Anomaly:	Not reported

For detailed financial records, contact EDR for a Site Report.:

Action Code:	001
Action:	FEDERAL FACILITY REMEDIAL DESIGN
Date Started:	02/08/2007
Date Completed:	02/08/2007
Priority Level:	Not reported
Operable Unit:	ONSITE GW
Primary Responsibility:	Federal Facilities
Planning Status:	Primary
Urgency Indicator:	Not reported
Action Anomaly:	Not reported

For detailed financial records, contact EDR for a Site Report.:

Action Code:	001
Action:	RECORD OF DECISION
Date Started:	Not reported
Date Completed:	02/08/2007
Priority Level:	Not reported
Operable Unit:	ONSITE GW
Primary Responsibility:	Federal Facilities
Planning Status:	Primary
Urgency Indicator:	Not reported
Action Anomaly:	Not reported

For detailed financial records, contact EDR for a Site Report.:

Action Code:	001
Action:	FEDERAL FACILITY REMEDIAL INVESTIGATION/FEASIBILITY STUDY
Date Started:	12/23/1992
Date Completed:	02/08/2007
Priority Level:	Not reported
Operable Unit:	ONSITE GW
Primary Responsibility:	Federal Facilities
Planning Status:	Primary
Urgency Indicator:	Not reported
Action Anomaly:	Not reported

For detailed financial records, contact EDR for a Site Report.:

Action Code:	002
Action:	FEDERAL FACILITY REMEDIAL ACTION
Date Started:	02/08/2007
Date Completed:	Not reported
Priority Level:	Not reported
Operable Unit:	ONSITE GW
Primary Responsibility:	Federal Facilities

JET PROPULSION LABORATORY (Continued) **1000128791**

Planning Status: Primary
Urgency Indicator: Not reported
Action Anomaly: Not reported

For detailed financial records, contact EDR for a Site Report.:

Action Code: 003
Action: RECORD OF DECISION
Date Started: Not reported
Date Completed: 06/28/2007
Priority Level: Not reported
Operable Unit: OFFSITE GW
Primary Responsibility: Federal Facilities
Planning Status: Not reported
Urgency Indicator: Not reported
Action Anomaly: Not reported

For detailed financial records, contact EDR for a Site Report.:

Action Code: 001
Action: FEDERAL FACILITY REMOVAL
Date Started: 08/23/2004
Date Completed: 06/28/2007
Priority Level: Not reported
Operable Unit: OFFSITE GW
Primary Responsibility: Federal Facilities
Planning Status: Not reported
Urgency Indicator: Not reported
Action Anomaly: Not reported

For detailed financial records, contact EDR for a Site Report.:

Action Code: 003
Action: FEDERAL FACILITY REMEDIAL DESIGN
Date Started: 06/28/2007
Date Completed: 06/28/2007
Priority Level: Not reported
Operable Unit: OFFSITE GW
Primary Responsibility: Federal Facilities
Planning Status: Not reported
Urgency Indicator: Not reported
Action Anomaly: Not reported

For detailed financial records, contact EDR for a Site Report.:

Action Code: 003
Action: FEDERAL FACILITY REMEDIAL ACTION
Date Started: 06/28/2007
Date Completed: Not reported
Priority Level: Not reported
Operable Unit: OFFSITE GW
Primary Responsibility: Federal Facilities
Planning Status: Not reported
Urgency Indicator: Not reported
Action Anomaly: Not reported

JET PROPULSION LABORATORY (Continued) **1000128791**

For detailed financial records, contact EDR for a Site Report.:

Action Code:	003
Action:	FEDERAL FACILITY REMEDIAL INVESTIGATION/FEASIBILITY STUDY
Date Started:	04/29/1994
Date Completed:	06/28/2007
Priority Level:	Not reported
Operable Unit:	OFFSITE GW
Primary Responsibility:	Federal Facilities
Planning Status:	Primary
Urgency Indicator:	Not reported
Action Anomaly:	Other Completion Anomaly

For detailed financial records, contact EDR for a Site Report.:

Federal Register Details:

Fed Register Date:	10/14/1992
Fed Register Volume:	57
Page Number:	47181
Fed Register Date:	02/07/1992
Fed Register Volume:	57
Page Number:	4824

Click this hyperlink while viewing on your computer to access
103 additional US CERCLIS Financial: record(s) in the EDR Site Report.

RCRA-LQG:

Date form received by agency:	06/10/2010
Facility name:	JET PROPULSION LABORATORY
Facility address:	4800 OAK GROVE DRIVE PASADENA, CA 91109
EPA ID:	CA9800013030
Contact:	MARK ARAKI
Contact address:	4800 OAK GROVE DRIVE PASADENA, CA 91109
Contact country:	US
Contact telephone:	(818) 354-5342
Contact email:	N.MAR.ARAKI@JPL.NASA.GOV
EPA Region:	09
Land type:	Federal
Classification:	Large Quantity Generator
Description:	Handler: generates 1,000 kg or more of hazardous waste during any calendar month; or generates more than 1 kg of acutely hazardous waste during any calendar month; or generates more than 100 kg of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste during any calendar month; or generates 1 kg or less of acutely hazardous waste during any calendar month, and accumulates more than 1 kg of acutely hazardous waste at any time; or generates 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste during any calendar month, and accumulates more than 100 kg of that material at any time

JET PROPULSION LABORATORY (Continued) **1000128791**

Owner/Operator Summary:
Owner/operator name: FEDERAL GOVERNMENT/NASA
Owner/operator address: 4800 OAK GROVE DRIVE
PASADENA, CA 91109
Owner/operator country: US
Owner/operator telephone: (818) 354-5342
Legal status: Federal
Owner/Operator Type: Owner
Owner/Op start date: 01/01/1952
Owner/Op end date: Not reported

Owner/operator name: NOT REQUIRED
Owner/operator address: NOT REQUIRED
NOT REQUIRED, ME 99999
Owner/operator country: Not reported
Owner/operator telephone: (415) 555-1212
Legal status: Federal
Owner/Operator Type: Operator
Owner/Op start date: Not reported
Owner/Op end date: Not reported

Owner/operator name: JET PROPULSION LABORATORY
Owner/operator address: Not reported
Not reported
Owner/operator country: Not reported
Owner/operator telephone: Not reported
Legal status: Private
Owner/Operator Type: Operator
Owner/Op start date: 01/01/1952
Owner/Op end date: Not reported

Handler Activities Summary:
U.S. importer of hazardous waste: No
Mixed waste (haz. and radioactive): No
Recycler of hazardous waste: No
Transporter of hazardous waste: No
Treater, storer or disposer of HW: No
Underground injection activity: No
On-site burner exemption: No
Furnace exemption: No
Used oil fuel burner: No
Used oil processor: No
User oil refiner: No
Used oil fuel marketer to burner: No
Used oil Specification marketer: No
Used oil transfer facility: No
Used oil transporter: No

Historical Generators:
Date form received by agency: 03/26/2008
Facility name: JET PROPULSION LABORATORY
Classification: Large Quantity Generator

Date form received by agency: 04/14/2006
Facility name: JET PROPULSION LABORATORY
Classification: Large Quantity Generator

JET PROPULSION LABORATORY (Continued) **1000128791**

Date form received by agency: 06/03/2005
Facility name: JET PROPULSION LABORATORY
Classification: Large Quantity Generator

Date form received by agency: 04/01/2004
Facility name: JET PROPULSION LABORATORY
Classification: Large Quantity Generator

Date form received by agency: 01/29/2004
Facility name: JET PROPULSION LABORATORY
Classification: Large Quantity Generator

Date form received by agency: 01/30/2002
Facility name: JET PROPULSION LABORATORY
Site name: USNASA JET PROPULSION LABORATORY
Classification: Large Quantity Generator

Date form received by agency: 10/12/2000
Facility name: JET PROPULSION LABORATORY
Classification: Large Quantity Generator

Date form received by agency: 04/15/1999
Facility name: JET PROPULSION LABORATORY
Classification: Large Quantity Generator

Date form received by agency: 01/14/1999
Facility name: JET PROPULSION LABORATORY
Site name: USNASA JET PROPULSION LABORATORY
Classification: Large Quantity Generator

Date form received by agency: 09/01/1996
Facility name: JET PROPULSION LABORATORY
Site name: USNASA JET PROPULSION LABORATORY
Classification: Large Quantity Generator

Date form received by agency: 03/27/1996
Facility name: JET PROPULSION LABORATORY
Classification: Large Quantity Generator

Date form received by agency: 03/29/1994
Facility name: JET PROPULSION LABORATORY
Site name: USNASA JET PROPULSION LABORATORY
Classification: Large Quantity Generator

Date form received by agency: 02/27/1992
Facility name: JET PROPULSION LABORATORY
Classification: Large Quantity Generator

Date form received by agency: 08/18/1980
Facility name: JET PROPULSION LABORATORY
Site name: USNASA JET PROPULSION LABORATORY
Classification: Large Quantity Generator

Date form received by agency: 08/18/1980
Facility name: JET PROPULSION LABORATORY
Site name: USNASA JET PROPULSION LABORATORY
Classification: Large Quantity Generator

JET PROPULSION LABORATORY (Continued) **1000128791**

Hazardous Waste Summary:

Waste code:	121
Waste name:	121
Waste code:	122
Waste name:	122
Waste code:	123
Waste name:	123
Waste code:	132
Waste name:	132
Waste code:	134
Waste name:	134
Waste code:	181
Waste name:	181
Waste code:	212
Waste name:	212
Waste code:	214
Waste name:	214
Waste code:	331
Waste name:	331
Waste code:	341
Waste name:	341
Waste code:	352
Waste name:	352
Waste code:	461
Waste name:	461
Waste code:	541
Waste name:	541
Waste code:	551
Waste name:	551
Waste code:	791
Waste name:	791
Waste code:	792
Waste name:	792
Waste code:	D001
Waste name:	IGNITABLE HAZARDOUS WASTES ARE THOSE WASTES WHICH HAVE A FLASHPOINT OF LESS THAN 140 DEGREES FAHRENHEIT AS DETERMINED BY A PENSKY-MARTENS CLOSED CUP FLASH POINT TESTER. ANOTHER METHOD OF DETERMINING THE FLASH POINT OF A WASTE IS TO REVIEW THE MATERIAL SAFETY DATA SHEET, WHICH CAN BE OBTAINED FROM THE MANUFACTURER OR DISTRIBUTOR OF THE MATERIAL. LACQUER THINNER IS AN EXAMPLE OF A COMMONLY USED SOLVENT WHICH WOULD BE CONSIDERED AS IGNITABLE HAZARDOUS WASTE.

JET PROPULSION LABORATORY (Continued) **1000128791**

Waste code:	D002
Waste name:	A WASTE WHICH HAS A PH OF LESS THAN 2 OR GREATER THAN 12.5 IS CONSIDERED TO BE A CORROSIVE HAZARDOUS WASTE. SODIUM HYDROXIDE, A CAUSTIC SOLUTION WITH A HIGH PH, IS OFTEN USED BY INDUSTRIES TO CLEAN OR DEGREASE PARTS. HYDROCHLORIC ACID, A SOLUTION WITH A LOW PH, IS USED BY MANY INDUSTRIES TO CLEAN METAL PARTS PRIOR TO PAINTING. WHEN THESE CAUSTIC OR ACID SOLUTIONS BECOME CONTAMINATED AND MUST BE DISPOSED, THE WASTE WOULD BE A CORROSIVE HAZARDOUS WASTE.
Waste code:	D003
Waste name:	A MATERIAL IS CONSIDERED TO BE A REACTIVE HAZARDOUS WASTE IF IT IS NORMALLY UNSTABLE, REACTS VIOLENTLY WITH WATER, GENERATES TOXIC GASES WHEN EXPOSED TO WATER OR CORROSIVE MATERIALS, OR IF IT IS CAPABLE OF DETONATION OR EXPLOSION WHEN EXPOSED TO HEAT OR A FLAME. ONE EXAMPLE OF SUCH WASTE WOULD BY WASTE GUNPOWDER.
Waste code:	D004
Waste name:	ARSENIC
Waste code:	D005
Waste name:	BARIUM
Waste code:	D006
Waste name:	CADMIUM
Waste code:	D007
Waste name:	CHROMIUM
Waste code:	D008
Waste name:	LEAD
Waste code:	D009
Waste name:	MERCURY
Waste code:	D010
Waste name:	SELENIUM
Waste code:	D011
Waste name:	SILVER
Waste code:	D018
Waste name:	BENZENE
Waste code:	D022
Waste name:	CHLOROFORM
Waste code:	D026
Waste name:	CRESOL
Waste code:	D035
Waste name:	METHYL ETHYL KETONE
Waste code:	D036
Waste name:	NITROBENZENE
Waste code:	D038
Waste name:	PYRIDINE

JET PROPULSION LABORATORY (Continued) **1000128791**

Waste code: F002
Waste name: THE FOLLOWING SPENT HALOGENATED SOLVENTS: TETRACHLOROETHYLENE, METHYLENE CHLORIDE, TRICHLOROETHYLENE, 1,1,1-TRICHLOROETHANE, CHLOROBENZENE, 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE, ORTHO-DICHLOROBENZENE, TRICHLOROFLUOROMETHANE, AND 1,1,2-TRICHLOROETHANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE LISTED IN F001, F004, OR F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Waste code: F003
Waste name: THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: XYLENE, ACETONE, ETHYL ACETATE, ETHYL BENZENE, ETHYL ETHER, METHYL ISOBUTYL KETONE, N-BUTYL ALCOHOL, CYCLOHEXANONE, AND METHANOL; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONLY THE ABOVE SPENT NON-HALOGENATED SOLVENTS; AND ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS, AND, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THOSE SOLVENTS LISTED IN F001, F002, F004, AND F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Waste code: F005
Waste name: THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: TOLUENE, METHYL ETHYL KETONE, CARBON DISULFIDE, ISOBUTANOL, PYRIDINE, BENZENE, 2-ETHOXYETHANOL, AND 2-NITROPROPANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F002, OR F004; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Waste code: P030
Waste name: CYANIDES (SOLUBLE CYANIDE SALTS), NOT OTHERWISE SPECIFIED

Waste code: P063
Waste name: HYDROCYANIC ACID

Waste code: P076
Waste name: NITRIC OXIDE

Waste code: P078
Waste name: NITROGEN DIOXIDE

Waste code: U080
Waste name: METHANE, DICHLORO-

Waste code: U098
Waste name: 1,1-DIMETHYLHYDRAZINE

Waste code: U123
Waste name: FORMIC ACID (C,T)

Waste code: U134
Waste name: HYDROFLUORIC ACID (C,T)

Waste code: U159

JET PROPULSION LABORATORY (Continued) **1000128791**

Waste name: 2-BUTANONE (I,T)

Biennial Reports:

Last Biennial Reporting Year: 2011

Annual Waste Handled:

Waste code: D001
Waste name: IGNITABLE HAZARDOUS WASTES ARE THOSE WASTES WHICH HAVE A FLASHPOINT OF LESS THAN 140 DEGREES FAHRENHEIT AS DETERMINED BY A PENSKY-MARTENS CLOSED CUP FLASH POINT TESTER. ANOTHER METHOD OF DETERMINING THE FLASH POINT OF A WASTE IS TO REVIEW THE MATERIAL SAFETY DATA SHEET, WHICH CAN BE OBTAINED FROM THE MANUFACTURER OR DISTRIBUTOR OF THE MATERIAL. LACQUER THINNER IS AN EXAMPLE OF A COMMONLY USED SOLVENT WHICH WOULD BE CONSIDERED AS IGNITABLE HAZARDOUS WASTE.
Amount (Lbs): 18339.6

Waste code: D002
Waste name: A WASTE WHICH HAS A PH OF LESS THAN 2 OR GREATER THAN 12.5 IS CONSIDERED TO BE A CORROSIVE HAZARDOUS WASTE. SODIUM HYDROXIDE, A CAUSTIC SOLUTION WITH A HIGH PH, IS OFTEN USED BY INDUSTRIES TO CLEAN OR DEGREASE PARTS. HYDROCHLORIC ACID, A SOLUTION WITH A LOW PH, IS USED BY MANY INDUSTRIES TO CLEAN METAL PARTS PRIOR TO PAINTING. WHEN THESE CAUSTIC OR ACID SOLUTIONS BECOME CONTAMINATED AND MUST BE DISPOSED, THE WASTE WOULD BE A CORROSIVE HAZARDOUS WASTE.
Amount (Lbs): 7747.2

Waste code: D003
Waste name: A MATERIAL IS CONSIDERED TO BE A REACTIVE HAZARDOUS WASTE IF IT IS NORMALLY UNSTABLE, REACTS VIOLENTLY WITH WATER, GENERATES TOXIC GASES WHEN EXPOSED TO WATER OR CORROSIVE MATERIALS, OR IF IT IS CAPABLE OF DETONATION OR EXPLOSION WHEN EXPOSED TO HEAT OR A FLAME. ONE EXAMPLE OF SUCH WASTE WOULD BY WASTE GUNPOWDER.
Amount (Lbs): 3569

Waste code: D004
Waste name: ARSENIC
Amount (Lbs): 5992.2

Waste code: D005
Waste name: BARIUM
Amount (Lbs): 3563

Waste code: D006
Waste name: CADMIUM
Amount (Lbs): 924

Waste code: D007
Waste name: CHROMIUM
Amount (Lbs): 9648

Waste code: D008
Waste name: LEAD
Amount (Lbs): 13963.4

Waste code: D009
Waste name: MERCURY
Amount (Lbs): 13715

JET PROPULSION LABORATORY (Continued) **1000128791**

Waste code:	D010
Waste name:	SELENIUM
Amount (Lbs):	630
Waste code:	D011
Waste name:	SILVER
Amount (Lbs):	7925.2
Waste code:	D018
Waste name:	BENZENE
Amount (Lbs):	3613.4
Waste code:	D022
Waste name:	CHLOROFORM
Amount (Lbs):	15748
Waste code:	D026
Waste name:	CRESOL
Amount (Lbs):	4273
Waste code:	D035
Waste name:	METHYL ETHYL KETONE
Amount (Lbs):	15890
Waste code:	D036
Waste name:	NITROBENZENE
Amount (Lbs):	4273
Waste code:	D038
Waste name:	PYRIDINE
Amount (Lbs):	3563
Waste code:	F002
Waste name:	THE FOLLOWING SPENT HALOGENATED SOLVENTS: TETRACHLOROETHYLENE, METHYLENE CHLORIDE, TRICHLOROETHYLENE, 1,1,1-TRICHLOROETHANE, CHLOROBENZENE, 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE, ORTHO-DICHLOROBENZENE, TRICHLOROFLUOROMETHANE, AND 1,1,2-TRICHLOROETHANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE LISTED IN F001, F004, OR F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.
Amount (Lbs):	17092
Waste code:	F003
Waste name:	THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: XYLENE, ACETONE, ETHYL ACETATE, ETHYL BENZENE, ETHYL ETHER, METHYL ISOBUTYL KETONE, N-BUTYL ALCOHOL, CYCLOHEXANONE, AND METHANOL; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONLY THE ABOVE SPENT NON-HALOGENATED SOLVENTS; AND ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS, AND, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THOSE SOLVENTS LISTED IN F001, F002, F004, AND F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.
Amount (Lbs):	15890

JET PROPULSION LABORATORY (Continued) **1000128791**

Waste code: F005
Waste name: THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: TOLUENE, METHYL ETHYL KETONE, CARBON DISULFIDE, ISOBUTANOL, PYRIDINE, BENZENE, 2-ETHOXYETHANOL, AND 2-NITROPROPANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F002, OR F004; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.
Amount (Lbs): 15748

Waste code: P030
Waste name: CYANIDES (SOLUBLE CYANIDE SALTS), NOT OTHERWISE SPECIFIED
Amount (Lbs): 3569

Waste code: P063
Waste name: HYDROCYANIC ACID
Amount (Lbs): 661

Waste code: P076
Waste name: NITRIC OXIDE
Amount (Lbs): 661

Waste code: P078
Waste name: NITROGEN DIOXIDE
Amount (Lbs): 661

Waste code: U080
Waste name: METHANE, DICHLORO-
Amount (Lbs): 142

Waste code: U098
Waste name: 1,1-DIMETHYLHYDRAZINE
Amount (Lbs): 3563

Waste code: U123
Waste name: FORMIC ACID (C,T)
Amount (Lbs): 3563

Waste code: U134
Waste name: HYDROFLUORIC ACID (C,T)
Amount (Lbs): 661

Waste code: U159
Waste name: 2-BUTANONE (I,T)
Amount (Lbs): 7912

Facility Has Received Notices of Violations:
Regulation violated: FR - 262.30-34.C
Area of violation: Generators - General
Date violation determined: 12/16/1992
Date achieved compliance: 05/14/1993
Violation lead agency: EPA
Enforcement action: WRITTEN INFORMAL
Enforcement action date: 03/15/1993
Enf. disposition status: Not reported
Enf. disp. status date: Not reported

JET PROPULSION LABORATORY (Continued) **1000128791**

Enforcement lead agency: EPA
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: FR - 262.40-43.D
Area of violation: Generators - General
Date violation determined: 12/16/1992
Date achieved compliance: 05/14/1993
Violation lead agency: EPA
Enforcement action: WRITTEN INFORMAL
Enforcement action date: 03/15/1993
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: EPA
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: FR - 262.50-60
Area of violation: Generators - General
Date violation determined: 12/16/1992
Date achieved compliance: 05/14/1993
Violation lead agency: EPA
Enforcement action: WRITTEN INFORMAL
Enforcement action date: 03/15/1993
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: EPA
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: FR - 262.50-60
Area of violation: Generators - General
Date violation determined: 02/14/1987
Date achieved compliance: 12/16/1992
Violation lead agency: EPA
Enforcement action: Not reported
Enforcement action date: 02/14/1987
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: EPA
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: FR - 262.50-60
Area of violation: Generators - General
Date violation determined: 02/14/1987
Date achieved compliance: 12/16/1992
Violation lead agency: EPA
Enforcement action: WRITTEN INFORMAL
Enforcement action date: 03/13/1987
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: EPA

JET PROPULSION LABORATORY (Continued) **1000128791**

Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Evaluation Action Summary:
Evaluation date: 03/27/2007
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 05/14/1993
Evaluation: NOT A SIGNIFICANT NON-COMPLIER
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: EPA

Evaluation date: 12/16/1992
Evaluation: SIGNIFICANT NON-COMPLIER
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: EPA

Evaluation date: 12/16/1992
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: Generators - General
Date achieved compliance: 05/14/1993
Evaluation lead agency: EPA

Evaluation date: 02/14/1987
Evaluation: NON-FINANCIAL RECORD REVIEW
Area of violation: Generators - General
Date achieved compliance: 12/16/1992
Evaluation lead agency: EPA

US ENG CONTROLS:
EPA ID: CA9800013030
Site ID: 0903438
Name: JET PROPULSION LABORATORY (NASA)
Address: 4800 OAK GROVE DR
PASADENA, CA 91109
EPA Region: 09
County: LOS ANGELES
Event Code: Not reported
Actual Date: Not reported

Action ID: 001
Action Name: RECORD OF DECISION
Action Completion date: 2/8/2007
Planned Complet. date: 8/29/2007
Operable Unit: 01
Contaminated Media : Groundwater
Engineering Control: Bioreactors

Action ID: 001
Action Name: RECORD OF DECISION
Action Completion date: 2/8/2007

JET PROPULSION LABORATORY (Continued) **1000128791**

Planned Complet. date: 8/29/2007
Operable Unit: 01
Contaminated Media : Groundwater
Engineering Control: Extraction

Action ID: 001
Action Name: RECORD OF DECISION
Action Completion date: 2/8/2007
Planned Complet. date: 8/29/2007
Operable Unit: 01
Contaminated Media : Groundwater
Engineering Control: Liquid Phase Carbon Adsorption

Action ID: 001
Action Name: RECORD OF DECISION
Action Completion date: 2/8/2007
Planned Complet. date: 8/29/2007
Operable Unit: 01
Contaminated Media : Groundwater
Engineering Control: Reinjection

Action ID: 002
Action Name: RECORD OF DECISION
Action Completion date: 9/19/2002
Planned Complet. date: 6/28/2002
Operable Unit: 02
Contaminated Media : Air
Engineering Control: Monitoring

Action ID: 002
Action Name: RECORD OF DECISION
Action Completion date: 9/19/2002
Planned Complet. date: 6/28/2002
Operable Unit: 02
Contaminated Media : Soil
Engineering Control: Soil Vapor Extraction (in-situ)

Action ID: 003
Action Name: RECORD OF DECISION
Action Completion date: 6/28/2007
Planned Complet. date: 7/31/2007
Operable Unit: 03
Contaminated Media : Groundwater
Engineering Control: Centralized waste treatment facility

Action ID: 003
Action Name: RECORD OF DECISION
Action Completion date: 6/28/2007
Planned Complet. date: 7/31/2007
Operable Unit: 03
Contaminated Media : Groundwater
Engineering Control: Ion Exchange

Action ID: 003
Action Name: RECORD OF DECISION
Action Completion date: 6/28/2007
Planned Complet. date: 7/31/2007

JET PROPULSION LABORATORY (Continued) **1000128791**

Operable Unit: 03
Contaminated Media : Groundwater
Engineering Control: Liquid Phase Carbon Adsorption

Action ID: 003
Action Name: RECORD OF DECISION
Action Completion date: 6/28/2007
Planned Complet. date: 7/31/2007
Operable Unit: 03
Contaminated Media : Groundwater
Engineering Control: Reuse as Drinking Water

ROD:

Full-text of USEPA Record of Decision(s) is available from EDR.

FINDS:

Registry ID: 110002626061

Environmental Interest/Information System

California Department of Toxic Substances Control EnviroStor System (DTSC-EnviroStor) is an online search and Geographic Information System (GIS) tool for identifying sites that have known contamination or sites for which there may be reasons to investigate further. The EnviroStor database includes the following site types: Federal Superfund sites (National Priorities List (NPL)); State Response, including Military Facilities and State Superfund; Voluntary Cleanup; and School sites.

AFS (Aerometric Information Retrieval System (AIRS) Facility Subsystem) replaces the former Compliance Data System (CDS), the National Emission Data System (NEDS), and the Storage and Retrieval of Aerometric Data (SAROAD). AIRS is the national repository for information concerning airborne pollution in the United States. AFS is used to track emissions and compliance data from industrial plants. AFS data are utilized by states to prepare State Implementation Plans to comply with regulatory programs and by EPA as an input for the estimation of total national emissions. AFS is undergoing a major redesign to support facility operating permits required under Title V of the Clean Air Act.

The NEI (National Emissions Inventory) database contains information on stationary and mobile sources that emit criteria air pollutants and their precursors, as well as hazardous air pollutants (HAPs).

California Hazardous Waste Tracking System - Datamart (HWTS-DATAMART) provides California with information on hazardous waste shipments for generators, transporters, and treatment, storage, and disposal facilities.

US EPA TRIS (Toxics Release Inventory System) contains information from facilities on the amounts of over 300 listed toxic chemicals that these facilities release directly to air, water, land, or that are transported off-site.

JET PROPULSION LABORATORY (Continued) **1000128791**

RCRAInfo is a national information system that supports the Resource Conservation and Recovery Act (RCRA) program through the tracking of events and activities related to facilities that generate, transport, and treat, store, or dispose of hazardous waste. RCRAInfo allows RCRA program staff to track the notification, permit, compliance, and corrective action activities required under RCRA.

CERCLIS (Comprehensive Environmental Response, Compensation, and Liability Information System) is the Superfund database that is used to support management in all phases of the Superfund program. The system contains information on all aspects of hazardous waste sites, including an inventory of sites, planned and actual site activities, and financial information.

ICIS (Integrated Compliance Information System) is the Integrated Compliance Information System and provides a database that, when complete, will contain integrated Enforcement and Compliance information across most of EPA's programs. The vision for ICIS is to replace EPA's independent databases that contain Enforcement data with a single repository for that information. Currently, ICIS contains all Federal Administrative and Judicial enforcement actions. This information is maintained in ICIS by EPA in the Regional offices and it Headquarters. A future release of ICIS will replace the Permit Compliance System (PCS) which supports the NPDES and will integrate that information with Federal actions already in the system. ICIS also has the capability to track other activities occurring in the Region that support Compliance and Enforcement programs. These include; Incident Tracking, Compliance Assistance, and Compliance Monitoring.

NPDES:

Npdes Number:	CAG994004
Facility Status:	Active
Agency Id:	23398
Region:	4
Regulatory Measure Id:	193446
Order No:	R4-2008-0032
Regulatory Measure Type:	Enrollee
Place Id:	234323
WDID:	4B196000430
Program Type:	NPDES
Adoption Date Of Regulatory Measure:	Not reported
Effective Date Of Regulatory Measure:	3/18/1998
Expiration Date Of Regulatory Measure:	6/5/2013
Termination Date Of Regulatory Measure:	Not reported
Discharge Name:	NASA/JPL Jet Propulsion Laboratory
Discharge Address:	4800 Oak Grove Drive
Discharge City:	Pasadena
Discharge State:	CA
Discharge Zip:	91109

Npdes Number:	CAS000002
Facility Status:	Terminated
Agency Id:	N/A
Region:	4
Regulatory Measure Id:	Not Available
Order No:	Not reported

JET PROPULSION LABORATORY (Continued) **1000128791**

Regulatory Measure Type:	Enrollee
Place Id:	Not Available
WDID:	4 19C347503
Program Type:	Construction
Adoption Date Of Regulatory Measure:	N/A
Effective Date Of Regulatory Measure:	6/13/2007 9:01:00 AM
Expiration Date Of Regulatory Measure:	Not reported
Termination Date Of Regulatory Measure:	9/21/2009
Discharge Name:	NASA Jet Propulsion Laboratory
Discharge Address:	4800 Oak Grove Dr
Discharge City:	Pasadena
Discharge State:	Ca
Discharge Zip:	91109

NY MANIFEST:

EPA ID:	CA9800013030
Country:	USA
Mailing Name:	JET PROPULSION LABORATORY
Mailing Contact:	JET PROPULSION LABORATORY
Mailing Address:	4800 OAK GROVE DR
Mailing Address 2:	Not reported
Mailing City:	PASADENA
Mailing State:	CA
Mailing Zip:	91109
Mailing Zip4:	Not reported
Mailing Country:	USA
Mailing Phone:	818-354-4710

Document ID:	NYB2816730
Manifest Status:	Completed after the designated time period for a TSDF to get a copy to the DEC
Trans1 State ID:	10219PNY
Trans2 State ID:	Not reported
Generator Ship Date:	901016
Trans1 Recv Date:	901016
Trans2 Recv Date:	Not reported
TSD Site Recv Date:	901029
Part A Recv Date:	910213
Part B Recv Date:	901113
Generator EPA ID:	CA9800013030
Trans1 EPA ID:	NYD980769947
Trans2 EPA ID:	Not reported
TSDF ID:	NYD000632372
Waste Code:	D003 - NON-LISTED REACTIVE WASTES
Quantity:	00054
Units:	P - Pounds
Number of Containers:	002
Container Type:	DM - Metal drums, barrels
Handling Method:	T Chemical, physical, or biological treatment.
Specific Gravity:	100
Year:	90

Document ID:	NYB6826329
Manifest Status:	Completed copy
Trans1 State ID:	613467FT3
Trans2 State ID:	Not reported

JET PROPULSION LABORATORY (Continued) **1000128791**

Generator Ship Date:	950807
Trans1 Recv Date:	950807
Trans2 Recv Date:	Not reported
TSD Site Recv Date:	950818
Part A Recv Date:	950906
Part B Recv Date:	950901
Generator EPA ID:	CA9800013030
Trans1 EPA ID:	CAD081157166
Trans2 EPA ID:	Not reported
TSDF ID:	NYD000632372
Waste Code:	D004 - ARSENIC 5.0 MG/L TCLP
Quantity:	00007
Units:	P - Pounds
Number of Containers:	001
Container Type:	CW - Wooden boxes
Handling Method:	B Incineration, heat recovery, burning.
Specific Gravity:	100
Year:	95

Document ID:	NYB2860830
Manifest Status:	Completed copy
Trans1 State ID:	11282PNY
Trans2 State ID:	Not reported
Generator Ship Date:	910708
Trans1 Recv Date:	910708
Trans2 Recv Date:	Not reported
TSD Site Recv Date:	910715
Part A Recv Date:	910725
Part B Recv Date:	910724
Generator EPA ID:	CA9800013030
Trans1 EPA ID:	NYD980769947
Trans2 EPA ID:	Not reported
TSDF ID:	NYD000632372
Waste Code:	D003 - NON-LISTED REACTIVE WASTES
Quantity:	00259
Units:	P - Pounds
Number of Containers:	004
Container Type:	DM - Metal drums, barrels
Handling Method:	T Chemical, physical, or biological treatment.
Specific Gravity:	100
Year:	91

Document ID:	NYB2860848
Manifest Status:	Completed copy
Trans1 State ID:	10222PNY
Trans2 State ID:	Not reported
Generator Ship Date:	920210
Trans1 Recv Date:	920210
Trans2 Recv Date:	Not reported
TSD Site Recv Date:	920225
Part A Recv Date:	920221
Part B Recv Date:	920306
Generator EPA ID:	CA9800013030
Trans1 EPA ID:	NYD980769947
Trans2 EPA ID:	Not reported

JET PROPULSION LABORATORY (Continued) **1000128791**

TSDF ID:	NYD000632372
Waste Code:	D003 - NON-LISTED REACTIVE WASTES
Quantity:	00010
Units:	P - Pounds
Number of Containers:	001
Container Type:	DM - Metal drums, barrels
Handling Method:	T Chemical, physical, or biological treatment.
Specific Gravity:	100
Year:	92

Document ID:	CAA1202980
Manifest Status:	Not reported
Trans1 State ID:	SCD987574647
Trans2 State ID:	NYD982792814
Generator Ship Date:	12/02/1998
Trans1 Recv Date:	12/02/1998
Trans2 Recv Date:	12/10/1998
TSD Site Recv Date:	12/30/1998
Part A Recv Date:	Not reported
Part B Recv Date:	Not reported
Generator EPA ID:	CA9800013030
Trans1 EPA ID:	NYD000632372
Trans2 EPA ID:	Not reported
TSDF ID:	Not reported
Waste Code:	U135 - HYDROGEN SULFIDE
Quantity:	00050
Units:	P - Pounds
Number of Containers:	001
Container Type:	DF - Fiberboard or plastic drums (glass)
Handling Method:	T Chemical, physical, or biological treatment.
Specific Gravity:	01.00
Year:	98

Document ID:	NYA7891821
Manifest Status:	Completed copy
Trans1 State ID:	000000000
Trans2 State ID:	000000000
Generator Ship Date:	890717
Trans1 Recv Date:	890717
Trans2 Recv Date:	Not reported
TSD Site Recv Date:	890801
Part A Recv Date:	890810
Part B Recv Date:	890809
Generator EPA ID:	CA9800013030
Trans1 EPA ID:	NYD980769947
Trans2 EPA ID:	Not reported
TSDF ID:	NYD000632372
Waste Code:	D003 - NON-LISTED REACTIVE WASTES
Quantity:	00085
Units:	P - Pounds
Number of Containers:	001
Container Type:	DM - Metal drums, barrels
Handling Method:	T Chemical, physical, or biological treatment.
Specific Gravity:	100
Year:	89

JET PROPULSION LABORATORY (Continued) **1000128791**

SWEEPS UST:

Status:	A
Comp Number:	11934
Number:	9
Board Of Equalization:	Not reported
Ref Date:	12-07-90
Act Date:	12-07-90
Created Date:	06-30-89
Tank Status:	A
Owner Tank Id:	Not reported
Swrcb Tank Id:	19-080-011934-000001
Actv Date:	06-30-89
Capacity:	Not reported
Tank Use:	UNKNOWN
Stg:	W
Content:	Not reported
Number Of Tanks:	22

Status:	A
Comp Number:	11934
Number:	9
Board Of Equalization:	Not reported
Ref Date:	12-07-90
Act Date:	12-07-90
Created Date:	06-30-89
Tank Status:	A
Owner Tank Id:	Not reported
Swrcb Tank Id:	19-080-011934-000002
Actv Date:	06-30-89
Capacity:	Not reported
Tank Use:	UNKNOWN
Stg:	W
Content:	Not reported
Number Of Tanks:	Not reported

Status:	A
Comp Number:	11934
Number:	9
Board Of Equalization:	Not reported
Ref Date:	12-07-90
Act Date:	12-07-90
Created Date:	06-30-89
Tank Status:	A
Owner Tank Id:	Not reported
Swrcb Tank Id:	19-080-011934-000003
Actv Date:	06-30-89
Capacity:	Not reported
Tank Use:	UNKNOWN
Stg:	W
Content:	Not reported
Number Of Tanks:	Not reported

Status:	A
Comp Number:	11934
Number:	9
Board Of Equalization:	Not reported
Ref Date:	12-07-90

JET PROPULSION LABORATORY (Continued) **1000128791**

Act Date:	12-07-90
Created Date:	06-30-89
Tank Status:	A
Owner Tank Id:	Not reported
Swrcb Tank Id:	19-080-011934-000004
Actv Date:	06-30-89
Capacity:	Not reported
Tank Use:	UNKNOWN
Stg:	W
Content:	Not reported
Number Of Tanks:	Not reported

Status:	A
Comp Number:	11934
Number:	9
Board Of Equalization:	Not reported
Ref Date:	12-07-90
Act Date:	12-07-90
Created Date:	06-30-89
Tank Status:	A
Owner Tank Id:	Not reported
Swrcb Tank Id:	19-080-011934-000005
Actv Date:	06-30-89
Capacity:	Not reported
Tank Use:	UNKNOWN
Stg:	W
Content:	Not reported
Number Of Tanks:	Not reported

Status:	A
Comp Number:	11934
Number:	9
Board Of Equalization:	Not reported
Ref Date:	12-07-90
Act Date:	12-07-90
Created Date:	06-30-89
Tank Status:	A
Owner Tank Id:	Not reported
Swrcb Tank Id:	19-080-011934-000006
Actv Date:	06-30-89
Capacity:	Not reported
Tank Use:	UNKNOWN
Stg:	W
Content:	Not reported
Number Of Tanks:	Not reported

Status:	A
Comp Number:	11934
Number:	9
Board Of Equalization:	Not reported
Ref Date:	12-07-90
Act Date:	12-07-90
Created Date:	06-30-89
Tank Status:	A
Owner Tank Id:	Not reported
Swrcb Tank Id:	19-080-011934-000007
Actv Date:	06-30-89

JET PROPULSION LABORATORY (Continued) **1000128791**

Capacity: Not reported
Tank Use: UNKNOWN
Stg: W
Content: Not reported
Number Of Tanks: Not reported

Status: A
Comp Number: 11934
Number: 9
Board Of Equalization: Not reported
Ref Date: 12-07-90
Act Date: 12-07-90
Created Date: 06-30-89
Tank Status: A
Owner Tank Id: Not reported
Swrcb Tank Id: 19-080-011934-000008
Actv Date: 06-30-89
Capacity: Not reported
Tank Use: UNKNOWN
Stg: W
Content: Not reported
Number Of Tanks: Not reported

Status: A
Comp Number: 11934
Number: 9
Board Of Equalization: Not reported
Ref Date: 12-07-90
Act Date: 12-07-90
Created Date: 06-30-89
Tank Status: A
Owner Tank Id: Not reported
Swrcb Tank Id: 19-080-011934-000009
Actv Date: 06-30-89
Capacity: Not reported
Tank Use: UNKNOWN
Stg: W
Content: Not reported
Number Of Tanks: Not reported

Status: A
Comp Number: 11934
Number: 9
Board Of Equalization: Not reported
Ref Date: 12-07-90
Act Date: 12-07-90
Created Date: 06-30-89
Tank Status: A
Owner Tank Id: Not reported
Swrcb Tank Id: 19-080-011934-000010
Actv Date: 06-30-89
Capacity: Not reported
Tank Use: UNKNOWN
Stg: W
Content: Not reported
Number Of Tanks: Not reported

JET PROPULSION LABORATORY (Continued) **1000128791**

Status:	A
Comp Number:	11934
Number:	9
Board Of Equalization:	Not reported
Ref Date:	12-07-90
Act Date:	12-07-90
Created Date:	06-30-89
Tank Status:	A
Owner Tank Id:	Not reported
Swrcb Tank Id:	19-080-011934-000011
Actv Date:	06-30-89
Capacity:	Not reported
Tank Use:	UNKNOWN
Stg:	W
Content:	Not reported
Number Of Tanks:	Not reported

Status:	A
Comp Number:	11934
Number:	9
Board Of Equalization:	Not reported
Ref Date:	12-07-90
Act Date:	12-07-90
Created Date:	06-30-89
Tank Status:	A
Owner Tank Id:	Not reported
Swrcb Tank Id:	19-080-011934-000012
Actv Date:	06-30-89
Capacity:	Not reported
Tank Use:	UNKNOWN
Stg:	W
Content:	Not reported
Number Of Tanks:	Not reported

Status:	A
Comp Number:	11934
Number:	9
Board Of Equalization:	Not reported
Ref Date:	12-07-90
Act Date:	12-07-90
Created Date:	06-30-89
Tank Status:	A
Owner Tank Id:	Not reported
Swrcb Tank Id:	19-080-011934-000013
Actv Date:	06-30-89
Capacity:	Not reported
Tank Use:	UNKNOWN
Stg:	W
Content:	Not reported
Number Of Tanks:	Not reported

Status:	A
Comp Number:	11934
Number:	9
Board Of Equalization:	Not reported
Ref Date:	12-07-90
Act Date:	12-07-90

JET PROPULSION LABORATORY (Continued) **1000128791**

Created Date: 06-30-89
Tank Status: A
Owner Tank Id: Not reported
Swrcb Tank Id: 19-080-011934-000014
Actv Date: 06-30-89
Capacity: Not reported
Tank Use: UNKNOWN
Stg: W
Content: Not reported
Number Of Tanks: Not reported

Status: A
Comp Number: 11934
Number: 9
Board Of Equalization: Not reported
Ref Date: 12-07-90
Act Date: 12-07-90
Created Date: 06-30-89
Tank Status: A
Owner Tank Id: Not reported
Swrcb Tank Id: 19-080-011934-000015
Actv Date: 06-30-89
Capacity: Not reported
Tank Use: UNKNOWN
Stg: W
Content: Not reported
Number Of Tanks: Not reported

Status: A
Comp Number: 11934
Number: 9
Board Of Equalization: Not reported
Ref Date: 12-07-90
Act Date: 12-07-90
Created Date: 06-30-89
Tank Status: A
Owner Tank Id: Not reported
Swrcb Tank Id: 19-080-011934-000016
Actv Date: 06-30-89
Capacity: Not reported
Tank Use: UNKNOWN
Stg: W
Content: Not reported
Number Of Tanks: Not reported

Status: A
Comp Number: 11934
Number: 9
Board Of Equalization: Not reported
Ref Date: 12-07-90
Act Date: 12-07-90
Created Date: 06-30-89
Tank Status: A
Owner Tank Id: Not reported
Swrcb Tank Id: 19-080-011934-000017
Actv Date: 06-30-89
Capacity: Not reported

JET PROPULSION LABORATORY (Continued) **1000128791**

Tank Use: UNKNOWN
Stg: W
Content: Not reported
Number Of Tanks: Not reported

Status: A
Comp Number: 11934
Number: 9
Board Of Equalization: Not reported
Ref Date: 12-07-90
Act Date: 12-07-90
Created Date: 06-30-89
Tank Status: A
Owner Tank Id: Not reported
Swrcb Tank Id: 19-080-011934-000018
Actv Date: 06-30-89
Capacity: Not reported
Tank Use: UNKNOWN
Stg: W
Content: Not reported
Number Of Tanks: Not reported

Status: A
Comp Number: 11934
Number: 9
Board Of Equalization: Not reported
Ref Date: 12-07-90
Act Date: 12-07-90
Created Date: 06-30-89
Tank Status: A
Owner Tank Id: Not reported
Swrcb Tank Id: 19-080-011934-000019
Actv Date: 06-30-89
Capacity: Not reported
Tank Use: UNKNOWN
Stg: W
Content: Not reported
Number Of Tanks: Not reported

Status: A
Comp Number: 11934
Number: 9
Board Of Equalization: Not reported
Ref Date: 12-07-90
Act Date: 12-07-90
Created Date: 06-30-89
Tank Status: A
Owner Tank Id: Not reported
Swrcb Tank Id: 19-080-011934-000020
Actv Date: 06-30-89
Capacity: Not reported
Tank Use: UNKNOWN
Stg: W
Content: Not reported
Number Of Tanks: Not reported

Status: A

JET PROPULSION LABORATORY (Continued) **1000128791**

Comp Number: 11934
Number: 9
Board Of Equalization: Not reported
Ref Date: 12-07-90
Act Date: 12-07-90
Created Date: 06-30-89
Tank Status: A
Owner Tank Id: Not reported
Swrcb Tank Id: 19-080-011934-000021
Actv Date: 06-30-89
Capacity: Not reported
Tank Use: UNKNOWN
Stg: W
Content: Not reported
Number Of Tanks: Not reported

Status: A
Comp Number: 11934
Number: 9
Board Of Equalization: Not reported
Ref Date: 12-07-90
Act Date: 12-07-90
Created Date: 06-30-89
Tank Status: A
Owner Tank Id: Not reported
Swrcb Tank Id: 19-080-011934-000022
Actv Date: 06-30-89
Capacity: Not reported
Tank Use: UNKNOWN
Stg: W
Content: Not reported
Number Of Tanks: Not reported

HAZNET:
Year: 2009
Gepaid: CA9800013030
Contact: MARK ARAKI
Telephone: 8183540635
Mailing Name: Not reported
Mailing Address: 4800 OAK GROVE DR # 171-225
Mailing City,St,Zip: PASADENA, CA 911098001
Gen County: Los Angeles
TSD EPA ID: CAD028409019
TSD County: Los Angeles
Waste Category: Other inorganic solid waste
Disposal Method: STORAGE, BULKING, AND/OR TRANSFER OFF SITE--NO TREATMENT/REOVERY (H010-H129) OR (H131-H135)
Tons: 0.096
Facility County: Los Angeles

Year: 2009
Gepaid: CA9800013030
Contact: MARK ARAKI
Telephone: 8183540635
Mailing Name: Not reported
Mailing Address: 4800 OAK GROVE DR # 171-225
Mailing City,St,Zip: PASADENA, CA 911098001

JET PROPULSION LABORATORY (Continued) **1000128791**

Gen County: Los Angeles
TSD EPA ID: TXD055135388
TSD County: 99
Waste Category: Not reported
Disposal Method: CHEMICAL OXIDATION
Tons: 0.0025
Facility County: Los Angeles

Year: 2009
Gepaid: CA9800013030
Contact: MARK ARAKI
Telephone: 8183540635
Mailing Name: Not reported
Mailing Address: 4800 OAK GROVE DR # 171-225
Mailing City,St,Zip: PASADENA, CA 911098001
Gen County: Los Angeles
TSD EPA ID: CAD097030993
TSD County: Los Angeles
Waste Category: Liquids with pH <= 2 with metals
Disposal Method: CHEMICAL REDUCTION WITH OR WITHOUT PRECIPITATION
Tons: 0.02085
Facility County: Los Angeles

Year: 2009
Gepaid: CA9800013030
Contact: MARK ARAKI
Telephone: 8183540635
Mailing Name: Not reported
Mailing Address: 4800 OAK GROVE DR # 171-225
Mailing City,St,Zip: PASADENA, CA 911098001
Gen County: Los Angeles
TSD EPA ID: CAD097030993
TSD County: Los Angeles
Waste Category: Other organic solids
Disposal Method: Not reported
Tons: Not reported
Facility County: Los Angeles

Year: 2009
Gepaid: CA9800013030
Contact: MARK ARAKI
Telephone: 8183540635
Mailing Name: Not reported
Mailing Address: 4800 OAK GROVE DR # 171-225
Mailing City,St,Zip: PASADENA, CA 911098001
Gen County: Los Angeles
TSD EPA ID: CAD097030993
TSD County: Los Angeles
Waste Category: Not reported
Disposal Method: STORAGE, BULKING, AND/OR TRANSFER OFF SITE--NO TREATMENT/REOVERY (H010-H129) OR (H131-H135)
Tons: 5
Facility County: Los Angeles

Click this hyperlink while viewing on your computer to access
196 additional CA_HAZNET: record(s) in the EDR Site Report.

B13
WNW
1/4-1/2
0.284 mi.
1501 ft.

Relative:
Higher

Actual:
1154 ft.

PACIFIC BELL
4815 OAK GROVE AVE
LA CANADA, CA 91011

Site 4 of 4 in cluster B

Database(s): RCRA-SQG, FINDS, HIST CORTESE, LUST, CA FID UST, SWEEPS UST, HAZNET, EMI

EDR ID Number: 1000250025
EPA ID Number: CAD980880785

RCRA-SQG:

Date form received by agency:	09/01/1996
Facility name:	PACIFIC BELL
Facility address:	4815 OAK GROVE AVE LA CANADA, CA 91011
EPA ID:	CAD980880785
Mailing address:	170 N FAIR OAKS AVE RM 103 PASADENA, CA 91103
Contact:	Not reported
Contact address:	Not reported Not reported
Contact country:	Not reported
Contact telephone:	Not reported
Contact email:	Not reported
EPA Region:	09
Classification:	Small Small Quantity Generator
Description:	Handler: generates more than 100 and less than 1000 kg of hazardous waste during any calendar month and accumulates less than 6000 kg of hazardous waste at any time; or generates 100 kg or less of hazardous waste during any calendar month, and accumulates more than 1000 kg of hazardous waste at any time

Owner/Operator Summary:

Owner/operator name:	PACIFIC TELEPHONE & TELEGRAPH CO
Owner/operator address:	NOT REQUIRED NOT REQUIRED, ME 99999
Owner/operator country:	Not reported
Owner/operator telephone:	(415) 555-1212
Legal status:	Private
Owner/Operator Type:	Owner
Owner/Op start date:	Not reported
Owner/Op end date:	Not reported

Owner/operator name:	NOT REQUIRED
Owner/operator address:	NOT REQUIRED NOT REQUIRED, ME 99999
Owner/operator country:	Not reported
Owner/operator telephone:	(415) 555-1212
Legal status:	Private
Owner/Operator Type:	Operator
Owner/Op start date:	Not reported
Owner/Op end date:	Not reported

Handler Activities Summary:

U.S. importer of hazardous waste:	No
Mixed waste (haz. and radioactive):	No
Recycler of hazardous waste:	No
Transporter of hazardous waste:	No
Treater, storer or disposer of HW:	No

PACIFIC BELL (Continued) **1000250025**

Underground injection activity: No
On-site burner exemption: No
Furnace exemption: No
Used oil fuel burner: No
Used oil processor: No
User oil refiner: No
Used oil fuel marketer to burner: No
Used oil Specification marketer: No
Used oil transfer facility: No
Used oil transporter: No

Historical Generators:
Date form received by agency: 10/12/1983
Facility name: PACIFIC BELL
Classification: Large Quantity Generator

Violation Status: No violations found

FINDS:

Registry ID: 110002672787

Environmental Interest/Information System
California Hazardous Waste Tracking System - Datamart (HWTS-DATAMART) provides California with information on hazardous waste shipments for generators, transporters, and treatment, storage, and disposal facilities.

RCRAInfo is a national information system that supports the Resource Conservation and Recovery Act (RCRA) program through the tracking of events and activities related to facilities that generate, transport, and treat, store, or dispose of hazardous waste. RCRAInfo allows RCRA program staff to track the notification, permit, compliance, and corrective action activities required under RCRA.

CORTESE:
Region: CORTESE
Facility County Code: 19
Reg By: LTNKA
Reg Id: I-10202

LUST:
Region: STATE
Global Id: T0603703589
Latitude: 34.1978741
Longitude: -118.1753698
Case Type: LUST Cleanup Site
Status: Completed - Case Closed
Status Date: 1991-06-27 00:00:00
Lead Agency: LOS ANGELES COUNTY
Case Worker: JA
Local Agency: LOS ANGELES COUNTY
RB Case Number: I-10202
LOC Case Number: Not reported
File Location: Not reported

PACIFIC BELL (Continued) **1000250025**

Potential Media Affect: Soil
Potential Contaminants of Concern: Diesel
Site History: Not reported

Click here to access the California GeoTracker records for this facility:

LUST:
Global Id: T0603703589
Contact Type: Regional Board Caseworker
Contact Name: YUE RONG
Organization Name: LOS ANGELES RWQCB (REGION 4)
Address: 320 W. 4TH ST., SUITE 200
City: Los Angeles
Email: yrong@waterboards.ca.gov
Phone Number: Not reported

Global Id: T0603703589
Contact Type: Local Agency Caseworker
Contact Name: JOHN AWUJO
Organization Name: LOS ANGELES COUNTY
Address: 900 S FREMONT AVE
City: ALHAMBRA
Email: Not reported
Phone Number: 6264583507

LUST:
Global Id: T0603703589
Action Type: Other
Date: 1950-01-01 00:00:00
Action: Leak Stopped

Global Id: T0603703589
Action Type: Other
Date: 1950-01-01 00:00:00
Action: Leak Reported

Global Id: T0603703589
Action Type: Other
Date: 1950-01-01 00:00:00
Action: Leak Discovery

LUST REG 4:
Region: 4
Regional Board: 04
County: Los Angeles
facid: I-10202
Status: Case Closed
Substance: Diesel
Substance Quantity: Not reported
Local Case No: Not reported
Case Type: Soil
Abatement Method Used at the Site: Not reported
Global ID: T0603703589
W Global ID: Not reported
Staff: UNK
Local Agency: 19000

PACIFIC BELL (Continued) **1000250025**

Cross Street:	FLORECITA WAY	
Enforcement Type:	Not reported	
Date Leak Discovered:	9/4/1990	
Date Leak First Reported:		9/5/1990
Date Leak Record Entered:	12/4/1990	
Date Confirmation Began:	Not reported	
Date Leak Stopped:	9/4/1990	
Date Case Last Changed on Database:		6/27/1991
Date the Case was Closed:		6/27/1991
How Leak Discovered:	Tank Closure	
How Leak Stopped:	Not reported	
Cause of Leak:	UNK	
Leak Source:	UNK	
Operator:	KOEHLER, E.J.	
Water System:	Not reported	
Well Name:	Not reported	
Approx. Dist To Production Well (ft):		2387.32960525338050342546404 31
Source of Cleanup Funding:		UNK
Preliminary Site Assessment Workplan Submitted:		Not reported
Preliminary Site Assessment Began:		Not reported
Pollution Characterization Began:		Not reported
Remediation Plan Submitted:		Not reported
Remedial Action Underway:		Not reported
Post Remedial Action Monitoring Began:		Not reported
Enforcement Action Date:		Not reported
Historical Max MTBE Date:		Not reported
Hist Max MTBE Conc in Groundwater:		Not reported
Hist Max MTBE Conc in Soil:		Not reported
Significant Interim Remedial Action Taken:		Not reported
GW Qualifier:	Not reported	
Soil Qualifier:	Not reported	
Organization:	Not reported	
Owner Contact:	Not reported	
Responsible Party:	PACIFIC BELL	
RP Address:	177 E. COLORADO BLVD., PASADENA, CA 91105	
Program:	LUST	
Lat/Long:	34.1978741 / -1	
Local Agency Staff:	Not reported	
Beneficial Use:	Not reported	
Priority:	Not reported	
Cleanup Fund Id:	Not reported	
Suspended:	Not reported	
Assigned Name:	Not reported	
Summary:	Not reported	

CA FID UST:

Facility ID:	19002822
Regulated By:	UTNKA
Regulated ID:	CAD980880
Cortese Code:	Not reported
SIC Code:	Not reported
Facility Phone:	8185782883
Mail To:	Not reported
Mailing Address:	2600 CAMINO RAMON
Mailing Address 2:	Not reported
Mailing City,St,Zip:	LA CANADA 91011
Contact:	Not reported

PACIFIC BELL (Continued) **1000250025**

Contact Phone: Not reported
DUNs Number: Not reported
NPDES Number: Not reported
EPA ID: Not reported
Comments: Not reported
Status: Active

SWEEPS UST:
Status: A
Comp Number: 10202
Number: 1
Board Of Equalization: 44-008754
Ref Date: 12-14-90
Act Date: 12-14-90
Created Date: 06-30-89
Tank Status: A
Owner Tank Id: 1
Swrcb Tank Id: 19-000-010202-000001
Actv Date: 12-14-90
Capacity: 5000
Tank Use: M.V. FUEL
Stg: P
Content: DIESEL
Number Of Tanks: 1

HAZNET:
Year: 2004
Gepaid: CAD980880785
Contact: SHARON BAYLE/STAFF ASSOC
Telephone: 9258675741
Mailing Name: Not reported
Mailing Address: PO BOX 5095 RM 3E000
Mailing City,St,Zip: SAN RAMON, CA 945830995
Gen County: Los Angeles
TSD EPA ID: CAT080013352
TSD County: Los Angeles
Waste Category: Waste oil and mixed oil
Disposal Method: Not reported
Tons: 0.2
Facility County: Not reported

EMI:
Year: 1990
County Code: 19
Air Basin: SC
Facility ID: 66389
Air District Name: SC
SIC Code: 4813
Air District Name: SOUTH COAST AQMD
Community Health Air Pollution Info System: Not reported
Consolidated Emission Reporting Rule: Not reported
Total Organic Hydrocarbon Gases Tons/Yr: 0
Reactive Organic Gases Tons/Yr: 0
Carbon Monoxide Emissions Tons/Yr: 0
NOX - Oxides of Nitrogen Tons/Yr: 1
SOX - Oxides of Sulphur Tons/Yr: 0

PACIFIC BELL (Continued) **1000250025**

Particulate Matter Tons/Yr: 0
Part. Matter 10 Micrometers & Smllr Tons/Yr: 0

C14 **CALIFORNIA HIGHWAY PATROL** **LUST** **S106916301**
ESE **2130 WINDSOR AVE.** **N/A**
1/4-1/2 **ALTADENA, CA 91001**
0.304 mi.
1605 ft. **Site 1 of 2 in cluster C**

Relative:
Higher

Actual:
1083 ft.

LUST:

Region:	STATE
Global Id:	T0603778155
Latitude:	34.182443
Longitude:	-118.168037
Case Type:	LUST Cleanup Site
Status:	Completed - Case Closed
Status Date:	2011-01-07 00:00:00
Lead Agency:	LOS ANGELES RWQCB (REGION 4)
Case Worker:	YL
Local Agency:	LOS ANGELES COUNTY
RB Case Number:	R-20346
LOC Case Number:	Not reported
File Location:	Regional Board
Potential Media Affect:	Soil
Potential Contaminants of Concern:	Gasoline
Site History:	Not reported

Click here to access the California GeoTracker records for this facility:

LUST:

Global Id:	T0603778155
Contact Type:	Regional Board Caseworker
Contact Name:	MARYAM TAIDY
Organization Name:	LOS ANGELES RWQCB (REGION 4)
Address:	320 W. 4TH ST., SUITE 200
City:	LOS ANGELES
Email:	mtaidy@waterboards.ca.gov
Phone Number:	2135766741

Global Id:	T0603778155
Contact Type:	Local Agency Caseworker
Contact Name:	SAM STEVENS
Organization Name:	LOS ANGELES COUNTY
Address:	900 S. FREMONT AVE.
City:	ALHAMBRA
Email:	Not reported
Phone Number:	6264583507

LUST:

Global Id:	T0603778155
Action Type:	Other
Date:	1950-01-01 00:00:00
Action:	Leak Discovery

Global Id:	T0603778155
Action Type:	ENFORCEMENT
Date:	2009-06-08 00:00:00
Action:	Staff Letter

CALIFORNIA HIGHWAY PATROL (Continued) **S106916301**

Global Id: T0603778155
Action Type: Other
Date: 1950-01-01 00:00:00
Action: Leak Reported

Global Id: T0603778155
Action Type: ENFORCEMENT
Date: 2010-06-28 00:00:00
Action: Staff Letter

Global Id: T0603778155
Action Type: RESPONSE
Date: 2009-07-08 00:00:00
Action: Other Report / Document

Global Id: T0603778155
Action Type: ENFORCEMENT
Date: 2011-01-07 00:00:00
Action: Closure/No Further Action Letter

Global Id: T0603778155
Action Type: RESPONSE
Date: 2010-09-28 00:00:00
Action: Soil and Water Investigation Workplan

15
WNW
1/4-1/2
0.305 mi.
1610 ft.

USDA FOREST SERVICE, OAK **HIST CORTESE** **S101296501**
OAK GROVE DR N **LUST** **N/A**
LA CANADA, CA 91011

Relative:
Higher

Actual:
1152 ft.

CORTESE:
Region: CORTESE
Facility County Code: 19
Reg By: LTNKA
Reg Id: 120590-24

LUST REG 4:
Region: 4
Regional Board: 04
County: Los Angeles
facid: 120590-24
Status: Remediation Plan
Substance: Gasoline
Substance Quantity: Not reported
Local Case No: Not reported
Case Type: Soil
Abatement Method Used at the Site: Not reported
Global ID: T0603700204
W Global ID: W0603700933
Staff: UNK
Local Agency: 19000
Cross Street: FOOTHILL FREEWAY
Enforcement Type: 222
Date Leak Discovered: 8/4/1990
Date Leak First Reported: 8/4/1990

USDA FOREST SERVICE, OAK (Continued) **S101296501**

Date Leak Record Entered:	12/4/1990	
Date Confirmation Began:	Not reported	
Date Leak Stopped:	8/4/1990	
Date Case Last Changed on Database:		6/30/1992
Date the Case was Closed:		Not reported
How Leak Discovered:	Tank Closure	
How Leak Stopped:	Not reported	
Cause of Leak:	UNK	
Leak Source:	UNK	
Operator:	ROBERTS, MIKE	
Water System:	PALOMAR MOUNTAIN MUTUAL WATER COMPANY	
Well Name:	Not reported	
Approx. Dist To Production Well (ft):		0
Source of Cleanup Funding:		UNK
Preliminary Site Assessment Workplan Submitted:		12/18/1989
Preliminary Site Assessment Began:		8/4/1990
Pollution Characterization Began:		Not reported
Remediation Plan Submitted:		5/20/1991
Remedial Action Underway:		Not reported
Post Remedial Action Monitoring Began:		Not reported
Enforcement Action Date:		1/1/1965
Historical Max MTBE Date:		Not reported
Hist Max MTBE Conc in Groundwater:		Not reported
Hist Max MTBE Conc in Soil:		Not reported
Significant Interim Remedial Action Taken:		Not reported
GW Qualifier:	Not reported	
Soil Qualifier:	Not reported	
Organization:	Not reported	
Owner Contact:	Not reported	
Responsible Party:	USDA FOREST SERVICE	
RP Address:	701 SANTA ANITA AVE., N., ARCADIA, 91006	
Program:	LUST	
Lat/Long:	34.2077397 / -1	
Local Agency Staff:	Not reported	
Beneficial Use:	Not reported	
Priority:	Not reported	
Cleanup Fund Id:	Not reported	
Suspended:	Not reported	
Assigned Name:	1900933-001GEN	
Summary:	Not reported	

C16 **CALTRANS MAINTENANCE STATION** **LUST** **S106875066**
ESE **2122 NORTH WINDSOR AVENUE** **N/A**
1/4-1/2 **ALTADENA, CA 91001**
0.308 mi.
1628 ft. **Site 2 of 2 in cluster C**

Relative:
Higher

Actual:
1083 ft.

LUST:

Region:	STATE
Global Id:	T0603730348
Latitude:	34.182236
Longitude:	-118.16871
Case Type:	LUST Cleanup Site
Status:	Open - Site Assessment
Status Date:	2005-01-25 00:00:00
Lead Agency:	LOS ANGELES COUNTY
Case Worker:	KBR
Local Agency:	LOS ANGELES COUNTY

CALTRANS MAINTENANCE STATION (Continued) **S106875066**

RB Case Number: Not reported
LOC Case Number: 007495-007878
File Location: Local Agency
Potential Media Affect: Under Investigation
Potential Contaminants of Concern: Diesel
Site History: Not reported

Click here to access the California GeoTracker records for this facility:

LUST:
Global Id: T0603730348
Contact Type: Regional Board Caseworker
Contact Name: YUE RONG
Organization Name: LOS ANGELES RWQCB (REGION 4)
Address: 320 W. 4TH ST., SUITE 200
City: Los Angeles
Email: yrong@waterboards.ca.gov
Phone Number: Not reported

Global Id: T0603730348
Contact Type: Local Agency Caseworker
Contact Name: KATTYA BATRES RINZE
Organization Name: LOS ANGELES COUNTY
Address: 900 SOUTH FREMONT AVE
City: ALHAMBRA
Email: gbatres@dpw.lacounty.gov
Phone Number: Not reported

LUST:
Global Id: T0603730348
Action Type: REMEDIATION
Date: 1950-01-01 00:00:00
Action: Other (Refer to Description)

Global Id: T0603730348
Action Type: Other
Date: 1950-01-01 00:00:00
Action: Leak Reported

Global Id: T0603730348
Action Type: Other
Date: 1950-01-01 00:00:00
Action: Leak Discovery

D17 **SZKIBA AUTO (FORMER)** **HIST CORTESE** **S101295533**
ESE **3081 LINCOLN BLVD N** **LUST** **N/A**
1/4-1/2 **ALTADENA, CA 91001**
0.432 mi.
2283 ft. **Site 1 of 2 in cluster D**

Relative:
Higher

Actual:
1262 ft.

CORTESE:
Region: CORTESE
Facility County Code: 19
Reg By: LTNKA
Reg Id: I-15508

SZKIBA AUTO (FORMER) (Continued) **S101295533**

LUST:

Region:	STATE
Global Id:	T0603704315
Latitude:	34.198653
Longitude:	-118.159314
Case Type:	LUST Cleanup Site
Status:	Completed - Case Closed
Status Date:	1996-10-31 00:00:00
Lead Agency:	LOS ANGELES RWQCB (REGION 4)
Case Worker:	YR
Local Agency:	LOS ANGELES COUNTY
RB Case Number:	I-15508
LOC Case Number:	Not reported
File Location:	Not reported
Potential Media Affect:	Soil
Potential Contaminants of Concern:	Gasoline
Site History:	Not reported

Click here to access the California GeoTracker records for this facility:

LUST:

Global Id:	T0603704315
Contact Type:	Regional Board Caseworker
Contact Name:	YUE RONG
Organization Name:	LOS ANGELES RWQCB (REGION 4)
Address:	320 W. 4TH ST., SUITE 200
City:	Los Angeles
Email:	yrong@waterboards.ca.gov
Phone Number:	Not reported

Global Id:	T0603704315
Contact Type:	Local Agency Caseworker
Contact Name:	JOHN AWUJO
Organization Name:	LOS ANGELES COUNTY
Address:	900 S FREMONT AVE
City:	ALHAMBRA
Email:	Not reported
Phone Number:	6264583507

LUST:

Global Id:	T0603704315
Action Type:	Other
Date:	1950-01-01 00:00:00
Action:	Leak Stopped

Global Id:	T0603704315
Action Type:	Other
Date:	1950-01-01 00:00:00
Action:	Leak Reported

Global Id:	T0603704315
Action Type:	Other
Date:	1950-01-01 00:00:00
Action:	Leak Discovery

SZKIBA AUTO (FORMER) (Continued) **S101295533**

LUST REG 4:

Region:	4	
Regional Board:	04	
County:	Los Angeles	
facid:	I-15508	
Status:	Case Closed	
Substance:	Gasoline	
Substance Quantity:	Not reported	
Local Case No:	Not reported	
Case Type:	Soil	
Abatement Method Used at the Site:		Not reported
Global ID:	T0603704315	
W Global ID:	Not reported	
Staff:	UNK	
Local Agency:	19000	
Cross Street:	ALTADENA DR	
Enforcement Type:	Not reported	
Date Leak Discovered:	3/8/1990	
Date Leak First Reported:		4/26/1990
Date Leak Record Entered:	6/18/1990	
Date Confirmation Began:	Not reported	
Date Leak Stopped:	3/8/1990	
Date Case Last Changed on Database:		6/4/1997
Date the Case was Closed:		10/31/1996
How Leak Discovered:	Tank Closure	
How Leak Stopped:	Not reported	
Cause of Leak:	UNK	
Leak Source:	UNK	
Operator:	SZKIBA'S GEORGE	
Water System:	Not reported	
Well Name:	Not reported	
Approx. Dist To Production Well (ft):		1833.771650900562456132508525 7
Source of Cleanup Funding:		UNK
Preliminary Site Assessment Workplan Submitted:		Not reported
Preliminary Site Assessment Began:		Not reported
Pollution Characterization Began:		8/3/1992
Remediation Plan Submitted:		Not reported
Remedial Action Underway:		Not reported
Post Remedial Action Monitoring Began:		Not reported
Enforcement Action Date:		Not reported
Historical Max MTBE Date:		Not reported
Hist Max MTBE Conc in Groundwater:		Not reported
Hist Max MTBE Conc in Soil:		Not reported
Significant Interim Remedial Action Taken:		Not reported
GW Qualifier:	Not reported	
Soil Qualifier:	Not reported	
Organization:	Not reported	
Owner Contact:	Not reported	
Responsible Party:	SZKIBAF AUTO	
RP Address:	2400 E ORANGE GROVE BLVD, PASADENA, CA 91104	
Program:	LUST	
Lat/Long:	34.198463 / -1	
Local Agency Staff:	Not reported	
Beneficial Use:	Not reported	
Priority:	Not reported	
Cleanup Fund Id:	Not reported	
Suspended:	Not reported	

SZKIBA AUTO (FORMER) (Continued) **S101295533**

Assigned Name: Not reported
Summary: 06/30/97 - WELL ABANDONMENT REPORT

D18 **E & J ALTADENA PLAZA** **LUST** **S108536676**
ESE **575 ALTADENA DR. W** **N/A**
1/4-1/2 **ALTADENA, CA 91001**
0.466 mi.
2462 ft. **Site 2 of 2 in cluster D**

Relative:
Higher

Actual:
1261 ft.

LUST:
Region: STATE
Global Id: T0603789937
Latitude: 34.198503
Longitude: -118.158391
Case Type: LUST Cleanup Site
Status: Open - Site Assessment
Status Date: 2007-06-07 00:00:00
Lead Agency: LOS ANGELES COUNTY
Case Worker: MRR
Local Agency: LOS ANGELES COUNTY
RB Case Number: Not reported
LOC Case Number: 030892-048810
File Location: Not reported
Potential Media Affect: Soil
Potential Contaminants of Concern: Not reported
Site History: Not reported

Click here to access the California GeoTracker records for this facility:

LUST:
Global Id: T0603789937
Contact Type: Regional Board Caseworker
Contact Name: YUE RONG
Organization Name: LOS ANGELES RWQCB (REGION 4)
Address: 320 W. 4TH ST., SUITE 200
City: Los Angeles
Email: yrong@waterboards.ca.gov
Phone Number: Not reported

Global Id: T0603789937
Contact Type: Local Agency Caseworker
Contact Name: ALBERTO GRAJEDA
Organization Name: LOS ANGELES COUNTY
Address: 900 S. FREMONT AVE.
City: ALHAMBRA
Email: algrajeda@dpw.lacounty.gov
Phone Number: Not reported

LUST:
Global Id: T0603789937
Action Type: Other
Date: 1950-01-01 00:00:00
Action: Leak Discovery

Global Id: T0603789937
Action Type: REMEDIATION
Date: 1950-01-01 00:00:00
Action: Not reported

E & J ALTADENA PLAZA (Continued) **S108536676**

Global Id:	T0603789937
Action Type:	Other
Date:	1950-01-01 00:00:00
Action:	Leak Reported

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19 NNW 1/2-1 0.693 mi. 3659 ft. **JET PROPULSION LAB** **FUDS** **1007372676 N/A**

LA CANADA/FLINTRIDGE, CA

Relative: Higher

Actual: 1221 ft.

FUDS:

Federal Facility ID:	CA9799F5467
FUDS #:	J09CA0402
INST ID:	61089
Facility Name:	JET PROPULSION LAB
City:	La Canada/Flintridge
State:	CA
EPA Region:	9
County:	LOS ANGELES
Congressional District:	26
US Army District:	Los Angeles District (SPL)
Fiscal Year:	2009
Telephone:	213-452-3920
NPL Status:	Not reported
RAB:	Not reported
CTC:	336.3
Current Owner:	STATE

FUDS Description Details:

This site consists of 150 acres in the San Gabriel Mountain foothills approximately 4 miles northwest of Pasadena. The property immediately west of the site is residential. NASA still has custody of the facility. CALTECH continues to operate the faci ility for research and testing under NASA.

FUDS History Details:

The facility was built for the Army Air Corps between 1945 and 1958 as a research facility for rocketry and jet propulsion. In 1958, custody and jurisdiction over the laboratory was transferred.

FUDS Current Program Details:

FUDS Future Program Details:

20
WNW
1/2-1
0.853 mi.
4504 ft.

CRYSTAL CLEANERS — **ENVIROSTOR** — **S105954464**
444 FOOTHILL BLVD. — **N/A**
LA CANADA, CA 91011

Relative:
Higher

Actual:
1183 ft.

ENVIROSTOR:

Site Type:	Evaluation
Site Type Detailed:	Evaluation
Acres:	0.50
NPL:	NO
Regulatory Agencies:	US EPA
Lead Agency:	NONE SPECIFIED
Program Manager:	Not reported
Supervisor:	Rita Kamat
Division Branch:	Cleanup Chatsworth
Facility ID:	19530004
Site Code:	Not reported
Assembly:	44
Senate:	21
Special Program:	Not reported
Status:	Inactive - Action Required
Status Date:	2003-06-26 00:00:00
Restricted Use:	NO
Site Mgmt. Req.:	NONE SPECIFIED
Funding:	EPA Grant
Latitude:	34.20026
Longitude:	-118.18848
APN:	NONE SPECIFIED
Past Use:	DRY CLEANING
Potential COC:	10002
Confirmed COC:	NONE SPECIFIED
Potential Description:	SOIL, SV, IA
Alias Name:	CRYSTAL CLEANERS
Alias Type:	Alternate Name
Alias Name:	CAN000905745
Alias Type:	CERCLIS ID
Alias Name:	19530004
Alias Type:	Envirostor ID Number

Completed Info:

Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Preliminary Assessment Report
Completed Date:	2003-06-26 00:00:00
Comments:	A Preliminary Assessment was conducted for this site located in La Canada. Potential contaminants of concern include PCE.
Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Site Screening
Completed Date:	2000-11-22 00:00:00
Comments:	Site Screening Completed
Future Area Name:	Not reported
Future Sub Area Name:	Not reported
Future Document Type:	Not reported
Future Due Date:	Not reported
Schedule Area Name:	Not reported
Schedule Sub Area Name:	Not reported

CRYSTAL CLEANERS (Continued) **S105954464**

Schedule Document Type: Not reported
Schedule Due Date: Not reported
Schedule Revised Date: Not reported

APPENDIX I – Noise Impact Analysis

NOISE IMPACT ANALYSIS

DEVIL'S GATE RESERVOIR SEDIMENT REMOVAL AND MANAGEMENT PROJECT

CITY OF PASADENA

LEAD AGENCY:
LOS ANGELES COUNTY FLOOD CONTROL DISTRICT

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PROJECT NO. 11057

SEPTEMBER 27, 2013

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ACRONYMS AND ABBREVIATIONS

ANSI	American National Standards Institute
Caltrans	California Department of Transportation
CEQA	California Environmental Quality Act
CNEL	Community Noise Equivalent Level
dB	Decibel
dBA	A-weighted decibels
DOT	Department of Transportation
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
EPA	Environmental Protection Agency
Hz	Hertz
L_{dn}	Day-night average noise level
L_{eq}	Equivalent sound level
L_{max}	Maximum noise level
ONAC	Federal Office of Noise Abatement and Control
OSHA	Occupational Safety and Health Administration
SEL	Single Event Level or Sound Exposure Level
STC	Sound Transmission Class
UMTA	Federal Urban Mass Transit Administration

1.0 INTRODUCTION

1.1 Purpose of Analysis and Study Objectives

This Noise Impact Analysis has been prepared to determine the offsite and onsite noise impacts associated with the proposed Devil's Gate Reservoir Sediment Removal and Management Project (proposed project). The following is provided in this report:

- A description of the study area and the proposed project;
- Information regarding the fundamentals of noise;
- Information regarding the fundamentals of vibration;
- A description of the local noise guidelines and standards;
- An evaluation of the current noise environment;
- An analysis of the potential short-term construction-related noise impacts from the proposed project; and,
- An analysis of long-term operations-related noise impacts from the proposed project.

1.2 Site Location and Study Area

The project site is located in the City of Pasadena, in Los Angeles County. The City of La Cañada Flintridge is located on the west side of the project site and the unincorporated community of Altadena is located on the east side of the project site. The project site includes the Devil's Gate Dam and Reservoir that covers approximately 175 acres. The project site is bounded by: NASA's JPL facility and park uses on the northwest side; parking for NASA JPL facility, park uses, and residential uses on the east side; Oak Grove Drive and Interstate 210 on the south side; and Oak Grove Drive and La Cañada High School on the west side of the project site. The Project Location Map is shown in Figure 1.

1.3 Proposed Project Description

The Los Angeles County Flood Control District (LACFCD) must remove sediment that has accumulated behind the dam in order to restore the flood control capacity of Devil's Gate Reservoir and minimize the level of flood risk to downstream communities along the Arroyo Seco. In its current condition, the reservoir no longer has the available capacity to safely contain another major debris event; and the outlet works have a risk of becoming clogged and inoperable. The proposed project would remove sediment from the reservoir behind Devil's Gate Dam to restore it to its current design standard, and establish a reservoir configuration more suitable for routine maintenance activities including sediment management and enhanced water conservation.

Sediment Removal Activities

There is currently approximately 2.9 million cubic yards of excess sediment in the reservoir, however additional sediment accumulation is anticipated during the upcoming storm seasons due to the denuded surfaces of the watershed created by the 2009 Station Fire. It is estimated that an

average of 13,000 cubic yards will potentially be deposited in the reservoir annually. The preferred alternative for the proposed project would remove approximately 2.9 million cubic yards of current excess sediment in the reservoir plus any additional sediment received prior to removal completion. Figure 2 shows the project excavation boundary. In addition to the sediment excavated as part of the proposed project, sediment stockpiled at Johnson Field will also be removed.

Excavated sediment will be trucked off-site to existing disposal site locations which are currently available to accept the sediment. Possible sediment disposal locations include the Waste Management Pit in Azusa, the Manning Pit in Irwindale, or one of four sites in Sun Valley that include Bradley Landfill, Boulevard Pit, Cal-Mat Pit, and Sheldon Pit. It is estimated that the eastern disposal sites (Waste Management Pit and Manning Pit) would be used 80 percent to 100 percent of the time, while the western disposal sites (Sun Valley sites) would be used 0 percent to 20 percent of the time. Vegetation and organic debris removed from the project site would be hauled to the Scholl Canyon Landfill, located in the City of Glendale.

Maintenance Activities

The proposed project is expected to result in a reservoir configuration and access to facilitate future routine periodic maintenance and sediment removal. After the initial proposed sediment removal activities, sediment will be managed through vegetation maintenance, sediment excavation/trucking off-site, and Flow-Assisted Sediment Transport (FAST). These activities will take place under one of the options described below.

Option 1 – Full Maintenance

The reservoir will be maintained with the approximate cut and elevation levels that exist at the conclusion of construction activities. The vegetation within the reservoir configuration will be mowed or removed annually. During rain events FAST will be used to naturally pass sediment through the reservoir and downstream of the dam. If proper transport does not occur, sediment removal through use of mechanical equipment would be required. Based on past storm events, it is anticipated that 13,000 cubic yards of sediment would have to be excavated and trucked off-site annually. It is anticipated that this could be accomplished over a two week period, working Monday through Friday, during the late summer or early fall following the vegetation maintenance. A moderately large storm event would result in the removal of up to 170,000 cubic yards of material and would take approximately 12 weeks of excavation and hauling activities.

Option 2 – Reduced Maintenance

The area from the dam upstream to an elevation 1,040 feet, which covers an approximately 91 acre area will be maintained, while the remainder area above 1,040 feet will be allowed to naturally re-establish vegetation. The area under 1,040 will be maintained in a similar manner as Option 1, however if sediment above the 1,040 foot elevation exceeds 1 million cubic yards, the County of Los Angeles Department of Public Works (Public Works) will initiate the CEQA process for a new large-scale sediment removal process. Figure 3 shows the extents of the reduced maintenance boundary for Option 2.

1.4 Proposed Project Schedule

Construction of the proposed project is anticipated to occur between summer 2015 and summer 2020. Excavation and associated activities within the reservoir area are expected to take place during the drier months, from April to December, Monday through Saturday (except on holidays), as weather permits. During dry years work could potentially start earlier and/or continue later. Onsite excavation activities will take place between the hours of 7:00 a.m. and 6:00 p.m. Standard Time and between 7:00 a.m. and 7:00 p.m. Daylight Savings Time, Monday through Friday and between 8:00 a.m. and 5:00 p.m. on Saturday.

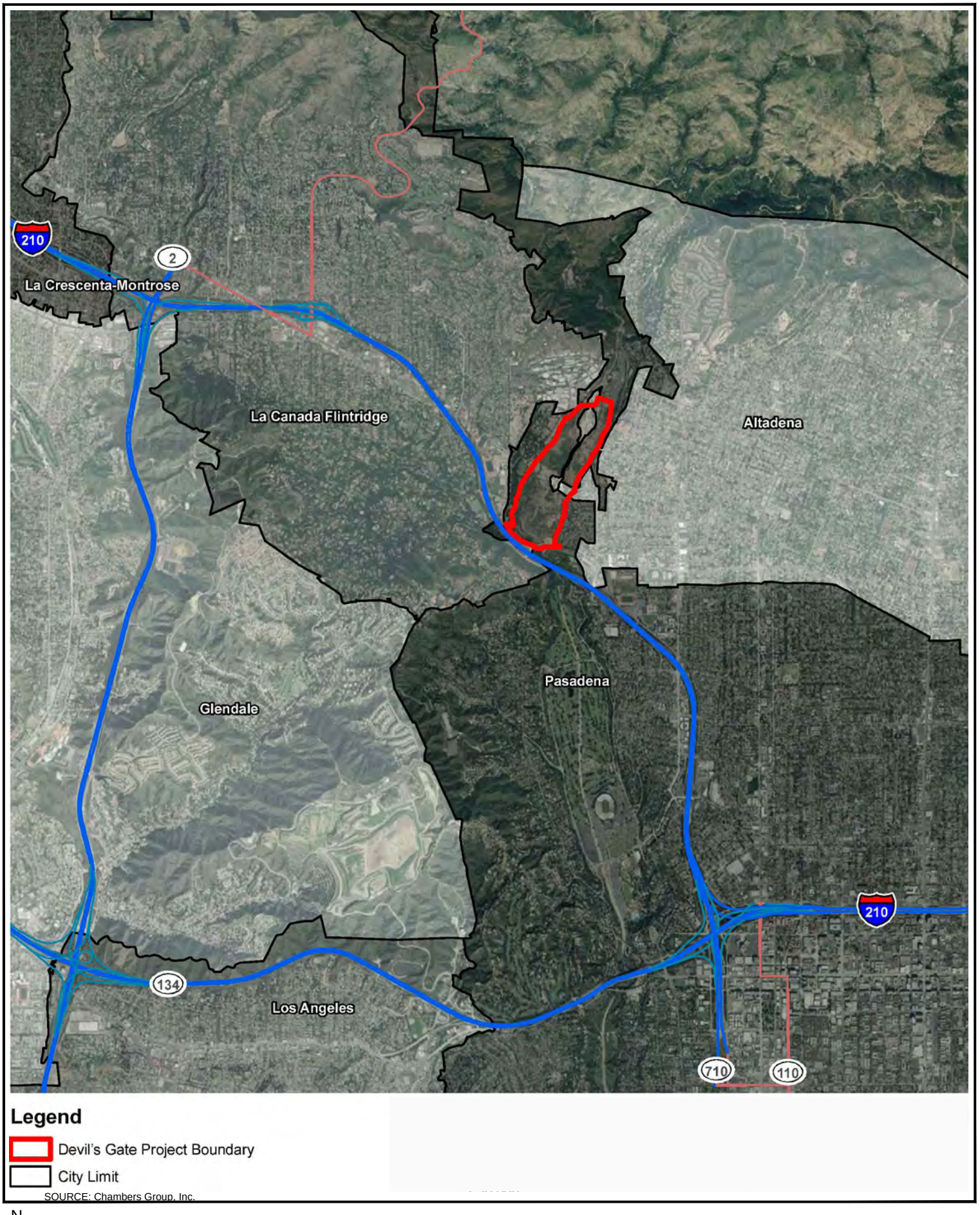

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Figure 1
Project Location Map

SOURCE: Chambers Group, Inc.

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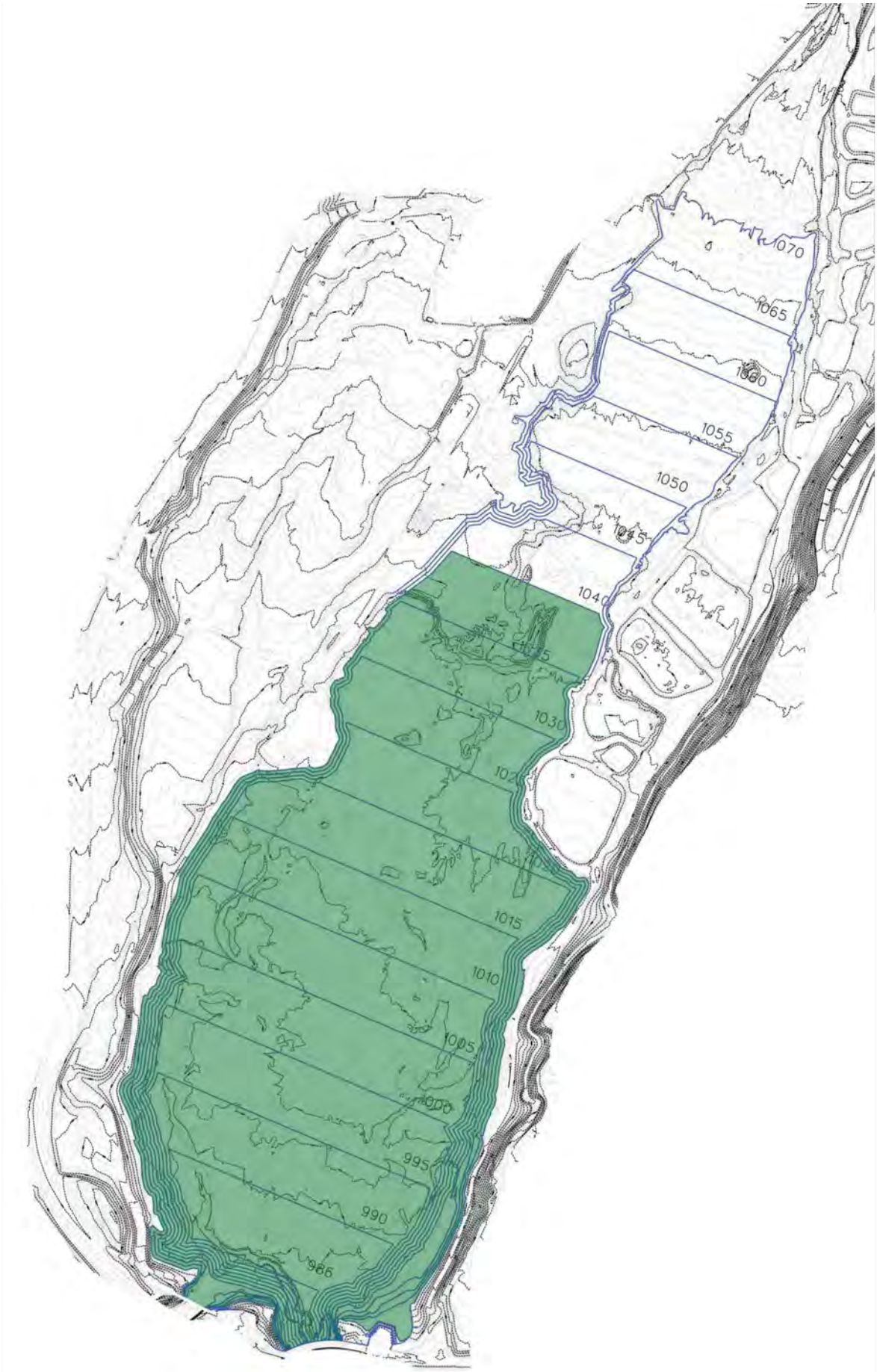
Figure 2
Proposed Project Excavation Boundary



SOURCE: Chambers Group, Inc.

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VISTA ENVIRONMENTAL

Figure 3
Proposed Project Reduced Maintenance Boundary

2.0 NOISE FUNDAMENTALS

Noise is defined as unwanted sound. Sound becomes unwanted when it interferes with normal activities, when it causes actual physical harm or when it has adverse effects on health. Sound is produced by the vibration of sound pressure waves in the air. Sound pressure levels are used to measure the intensity of sound and are described in terms of decibels. The decibel (dB) is a logarithmic unit which expresses the ratio of the sound pressure level being measured to a standard reference level. A-weighted decibels (dBA) approximate the subjective response of the human ear to a broad frequency noise source by discriminating against very low and very high frequencies of the audible spectrum. They are adjusted to reflect only those frequencies which are audible to the human ear.

2.1 Noise Descriptors

Noise Equivalent sound levels are not measured directly, but are calculated from sound pressure levels typically measured in A-weighted decibels (dBA). The equivalent sound level (Leq) represents a steady state sound level containing the same total energy as a time varying signal over a given sample period. The peak traffic hour Leq is the noise metric used by California Department of Transportation (Caltrans) for all traffic noise impact analyses.

The Day-Night Average Level (Ldn) is the weighted average of the intensity of a sound, with corrections for time of day, and averaged over 24 hours. The time of day corrections require the addition of ten decibels to sound levels at night between 10 p.m. and 7 a.m. While the Community Noise Equivalent Level (CNEL) is similar to the Ldn, except that it has another addition of 4.77 decibels to sound levels during the evening hours between 7 p.m. and 10 p.m. These additions are made to the sound levels at these time periods because during the evening and nighttime hours, when compared to daytime hours, there is a decrease in the ambient noise levels, which creates an increased sensitivity to sounds. For this reason the sound appears louder in the evening and nighttime hours and is weighted accordingly. The City of Pasadena and County of Los Angeles rely on the CNEL noise standard to assess transportation-related impacts on noise sensitive land uses.

2.2 Tone Noise

A pure tone noise is a noise produced at a single frequency and laboratory tests have shown that humans are more perceptible to changes in noise levels of a pure tone. For a noise source to contain a “pure tone,” there must be a significantly higher A-weighted sound energy in a given frequency band than in the neighboring bands, thereby causing the noise source to “stand out” against other noise sources. A pure tone occurs if the sound pressure level in the one-third octave band with the tone exceeds the average of the sound pressure levels of the two contiguous one-third octave bands by:

- 5 dB for center frequencies of 500 hertz (Hz) and above
- 8 dB for center frequencies between 160 and 400 Hz
- 15 dB for center frequencies of 125 Hz or less

2.3 Noise Propagation

From the noise source to the receiver, noise changes both in level and frequency spectrum. The most obvious is the decrease in noise as the distance from the source increases. The manner in which noise reduces with distance depends on whether the source is a point or line source as well as ground absorption, atmospheric effects and refraction, and shielding by natural and manmade features. Sound from point sources, such as air conditioning condensers, radiate uniformly outward as it travels away from the source in a spherical pattern. The noise drop-off rate associated with this geometric spreading is 6 dBA per each doubling of the distance (dBA/DD). Transportation noise sources such as roadways are typically analyzed as line sources, since at any given moment the receiver may be impacted by noise from multiple vehicles at various locations along the roadway. Because of the geometry of a line source, the noise drop-off rate associated with the geometric spreading of a line source is 3 dBA/DD.

2.4 Ground Absorption

The sound drop-off rate is highly dependent on the conditions of the land between the noise source and receiver. To account for this ground-effect attenuation (absorption), two types of site conditions are commonly used in traffic noise models, soft-site and hard-site conditions. Soft-site conditions account for the sound propagation loss over natural surfaces such as normal earth and ground vegetation. For point sources, a drop-off rate of 7.5 dBA/DD is typically observed over soft ground with landscaping, as compared with a 6.0 dBA/DD drop-off rate over hard ground such as asphalt, concrete, stone and very hard packed earth. For line sources a 4.5 dBA/DD is typically observed for soft-site conditions compared to the 3.0 dBA/DD drop-off rate for hard-site conditions. Caltrans research has shown that the use of soft-site conditions is more appropriate for the application of the Federal Highway Administration (FHWA) traffic noise prediction model used in this analysis.

3.0 GROUND-BORNE VIBRATION FUNDAMENTALS

Ground-borne vibrations consist of rapidly fluctuating motions within the ground that have an average motion of zero. The effects of ground-borne vibrations typically only cause a nuisance to people, but at extreme vibration levels damage to buildings may occur. Although ground-borne vibration can be felt outdoors, it is typically only an annoyance to people indoors where the associated effects of the shaking of a building can be notable. Ground-borne noise is an effect of ground-borne vibration and only exists indoors, since it is produced from noise radiated from the motion of the walls and floors of a room and may also consist of the rattling of windows or dishes on shelves.

3.1 Vibration Descriptors

There are several different methods that are used to quantify vibration amplitude such as the maximum instantaneous peak in the vibrations velocity, which is known as the peak particle velocity (PPV) or the root mean square (rms) amplitude of the vibration velocity. Due to the typically small amplitudes of vibrations, vibration velocity is often expressed in decibels and is denoted as (L_v) and is based on the rms velocity amplitude. A commonly used abbreviation is "VdB", which in this text, is when L_v is based on the reference quantity of 1 micro inch per second.

3.2 Vibration Perception

Typically, developed areas are continuously affected by vibration velocities of 50 VdB or lower. These continuous vibrations are not noticeable to humans whose threshold of perception is around 65 VdB. Off-site sources that may produce perceptible vibrations are usually caused by construction equipment, steel-wheeled trains, and traffic on rough roads, while smooth roads rarely produce perceptible ground-borne noise or vibration.

3.3 Vibration Propagation

The propagation of ground-borne vibration is not as simple to model as airborne noise. This is due to the fact that noise in the air travels through a relatively uniform median, while ground-borne vibrations travel through the earth which may contain significant geological differences. There are three main types of vibration propagation; surface, compression, and shear waves. Surface waves, or Rayleigh waves, travel along the ground's surface. These waves carry most of their energy along an expanding circular wave front, similar to ripples produced by throwing a rock into a pool of water. P-waves, or compression waves, are body waves that carry their energy along an expanding spherical wave front. The particle motion in these waves is longitudinal (i.e., in a "push-pull" fashion). P-waves are analogous to airborne sound waves. S-waves, or shear waves, are also body waves that carry energy along an expanding spherical wave front. However, unlike P-waves, the particle motion is transverse or "side-to-side and perpendicular to the direction of propagation."

As vibration waves propagate from a source, the vibration energy decreases in a logarithmic nature and the vibration levels typically decrease by 6 VdB per doubling of the distance from the vibration source. As stated above, this drop-off rate can vary greatly depending on the soil but

has been shown to be effective enough for screening purposes, in order to identify potential vibration impacts that may need to be studied through actual field tests.

4.0 REGULATORY SETTING

The project site is located in the City of Pasadena and is adjacent to the City of La Cañada Flintridge and the community of Altadena, which is an unincorporated area of the County of Los Angeles. Noise regulations are addressed through the efforts of various federal, state, and local government agencies. The agencies responsible for regulating noise are discussed below.

4.1 Federal Regulations

The adverse impact of noise was officially recognized by the federal government in the Noise Control Act of 1972, which serves three purposes:

- Promulgating noise emission standards for interstate commerce
- Assisting state and local abatement efforts
- Promoting noise education and research

The Federal Office of Noise Abatement and Control (ONAC) was initially tasked with implementing the Noise Control Act. However, the ONAC has since been eliminated, leaving the development of federal noise policies and programs to other federal agencies and interagency committees. For example, the Occupational Safety and Health Administration (OSHA) agency prohibits exposure of workers to excessive sound levels. The Department of Transportation (DOT) assumed a significant role in noise control through its various operating agencies. The Federal Aviation Administration (FAA) regulates noise of aircraft and airports. Surface transportation system noise is regulated by a host of agencies, including the Federal Transit Administration (FTA). Transit noise is regulated by the federal Urban Mass Transit Administration (UMTA), while freeways that are part of the interstate highway system are regulated by the Federal Highway Administration (FHWA). Finally, the federal government actively advocates that local jurisdictions use their land use regulatory authority to arrange new development in such a way that "noise sensitive" uses are either prohibited from being sited adjacent to a highway or, alternately that the developments are planned and constructed in such a manner that potential noise impacts are minimized.

Although the proposed project is not under the jurisdiction of the FTA, the FTA is the only agency that has defined what constitutes a significant noise impact from implementing a project. The FTA standards are based on extensive studies by the FTA and other governmental agencies on the human effects and reaction to noise and a summary of the FTA findings are provided below in Table A.

Since the federal government has preempted the setting of standards for noise levels that can be emitted by the transportation sources, local jurisdictions are restricted to regulating the noise generated by the transportation system through nuisance abatement ordinances and land use planning.

Table A – FTA Project Effects on Cumulative Noise Exposure

Existing Noise Exposure (dBA Leq or Ldn)	Allowable Noise Impact Exposure dBA Leq or Ldn		
	Project Only	Combined	Noise Exposure Increase
45	51	52	+7
50	53	55	+5
55	55	58	+3
60	57	62	+2
65	60	66	+1
70	64	71	+1
75	65	75	0

Source: Federal Transit Administration, 2006.

4.2 State Regulations

Noise Standards

California Department of Health Services Office of Noise Control

Established in 1973, the California Department of Health Services Office of Noise Control (ONC) was instrumental in developing regularity tools to control and abate noise for use by local agencies. One significant model is the "Land Use Compatibility for Community Noise Environments Matrix," which allows the local jurisdiction to clearly delineate compatibility of sensitive uses with various incremental levels of noise and which is shown below in Figure 4.

California Noise Insulation Standards

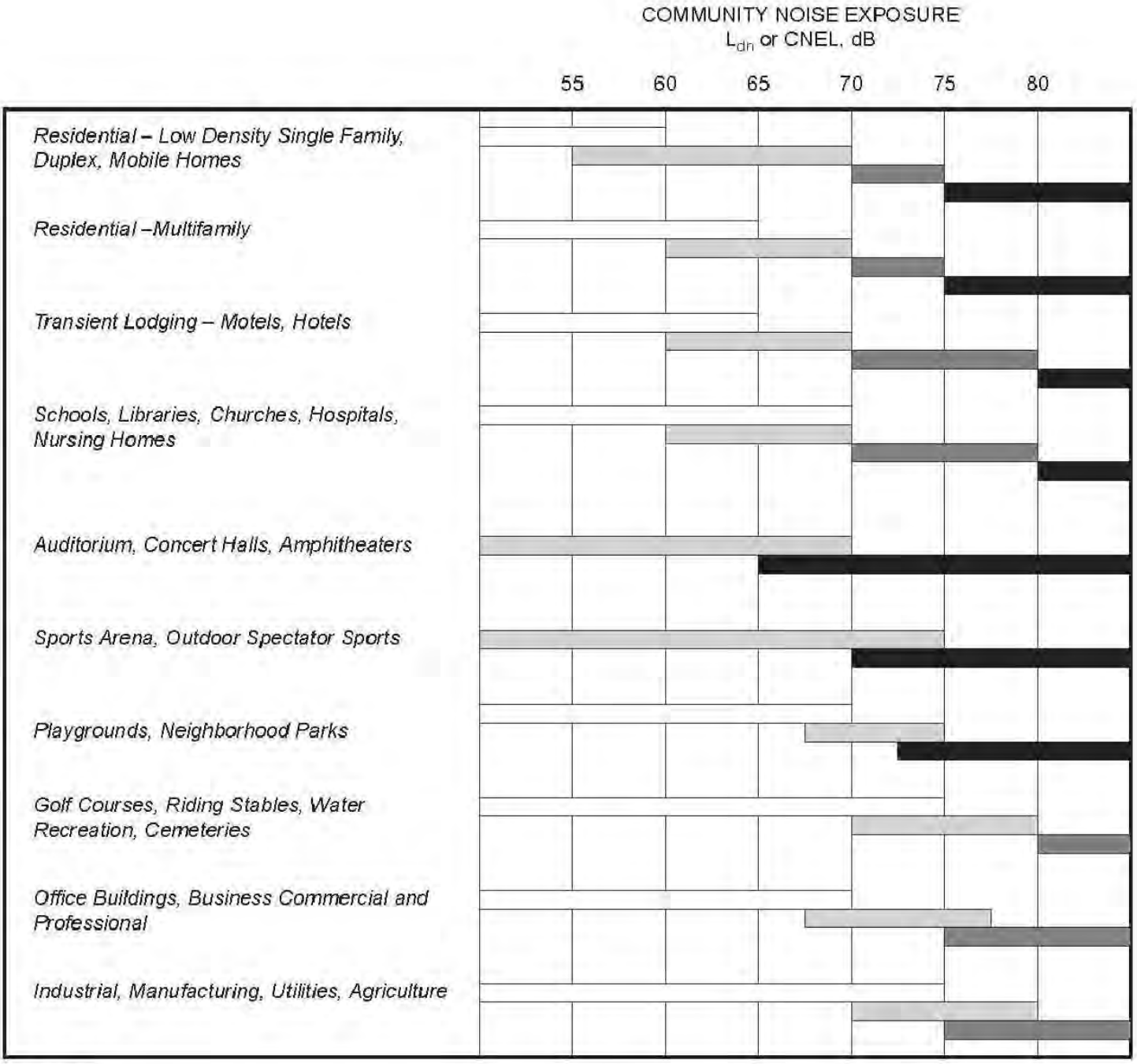
Title 24, Chapter 1, Article 4 of the California Administrative Code (California Noise Insulation Standards) requires noise insulation in new hotels, motels, apartment houses, and dwellings (other than single-family detached housing) that provides an annual average noise level of no more than 45 dBA CNEL. When such structures are located within a 60-dBA CNEL (or greater) noise contour, an acoustical analysis is required to ensure that interior levels do not exceed the 45-dBA CNEL annual threshold. In addition, Title 21, Chapter 6, Article 1 of the California Administrative Code requires that all habitable rooms, hospitals, convalescent homes, and places of worship shall have an interior CNEL of 45 dB or less due to aircraft noise.

Government Code Section 65302

Government Code Section 65302 mandates that the legislative body of each county and city in California adopt a noise element as part of its comprehensive general plan. The local noise element must recognize the land use compatibility guidelines published by the State Department of Health Services. The guidelines rank noise land use compatibility in terms of normally acceptable, conditionally acceptable, normally unacceptable, and clearly unacceptable.

4.3 Local Regulations

The project site is located in the City of Pasadena, the community of Altadena, which is an unincorporated area of Los Angeles County is located adjacent to the east side of the project site, and La Cañada Flintridge is located on the west side of the project site. The applicable policies



LEGEND:

NORMALLY ACCEPTABLE
Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction without any special noise insulation requirements.

CONDITIONALLY ACCEPTABLE
New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made. Conventional construction, but with closed windows and fresh air supply systems or air conditioning, will normally suffice.

NORMALLY UNACCEPTABLE
New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and neede noise insulation features included in the design.

CLEARLY UNACCEPTABLE
New construction or development should generally not be undertaken.

Source: California Department of Health. *Guidelines for the Preparation and Content of Noise Elements of the General Plan*. November, 1990

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Figure 4
Land Use Compatibility Matrix

related to noise and vibration from the above jurisdictions General Plans and Municipal Codes are provided below.

County of Los Angeles General Plan Noise and Vibration Policies

N 1.1 Employ effective noise abatement to achieve acceptable levels of noise as defined by the Los Angeles County Exterior Noise Standards.

N1.2 Ensure the compatibility of land uses throughout the County to minimize excessive noise levels.

N 1.3 Ensure the compatibility of land uses throughout the County to minimize excessive noise levels.

N 2.3 Mitigate exterior and interior noises to the levels listed in the table below to the extent feasible, for stationary sources:

Table B – Los Angeles County Exterior Noise Standards

Noise Zone Level	Designated Noise Zone Land Use (Receptor Property)	Time Interval	Exterior Noise (dB)
I	Noise-sensitive area, designated to ensure exceptional quiet	Anytime	45
II	Residential properties, zoned as such in the County Code Title 22	10:00 p.m. to 7:00 a.m. (nighttime) 7:00 a.m. to 10:00 p.m. (daytime)	45 50
III	Commercial properties, zoned as such in the County Code Title 22	10:00 p.m. to 7:00 a.m. (nighttime) 7:00 a.m. to 10:00 p.m. (daytime)	55 60
IV	Industrial properties, zoned as such in the County Code Title 22	Anytime	70

Source: Los Angeles County General Plan, 2007.

County of Los Angeles Municipal Code

The County of Los Angeles Municipal Code establishes the following applicable standards related to noise.

12.08.440 Construction noise.

A. Operating or causing the operation of any tools or equipment used in construction, drilling, repair, alteration or demolition work between hours of 7:00 p.m. and 7:00 a.m., or at any time on Sundays or holidays, such that the sound therefrom creates a noise disturbance across a residential or commercial real-property line, except for emergency work of public service utilities or by variance issued by the health officer is prohibited.

B. Noise Restrictions at Affected Structures. The contractor shall conduct construction activities in such a manner that the maximum noise levels at the affected buildings will not exceed those listed in the following schedule:

1. At Residential Structures.

a. Mobile Equipment. Maximum noise levels for nonscheduled, intermittent, short-term operation (less than 10 days) of mobile equipment:

Table C – Los Angeles County Mobile Equipment Construction Noise

	Single-Family Residential	Multi-Family Residential	Semi-Residential/ Commercial
Daily, except Sundays and legal holidays, 7:00 a.m. to 8:00 p.m.	75 dBA	80 dBA	85 dBA
Daily, 8:00 p.m. to 7:00 a.m. and all day Sunday and legal holidays	60 dBA	64 dBA	70 dBA

Source: Los Angeles County Municipal Code Section 12.08.440.

b. Stationary Equipment. Maximum noise level for repetitively scheduled and relatively long-term operation (10 days or more) of stationary equipment:

Table D – Los Angeles County Stationary Equipment Construction Noise

	Single-Family Residential	Multi-Family Residential	Semi-Residential/ Commercial
Daily, except Sundays and legal holidays, 7:00 a.m. to 8:00 p.m.	60 dBA	65 dBA	70 dBA
Daily, 8:00 p.m. to 7:00 a.m. and all day Sunday and legal holidays	50 dBA	55 dBA	60 dBA

Source: Los Angeles County Municipal Code Section 12.08.440.

2. At Business Structures.

a. Mobile equipment. Maximum noise levels for nonscheduled, intermittent, short-term operation of mobile equipment:

Daily, including Sunday and legal holidays, all hours: maximum of 85 dBA.

C. All mobile or stationary internal-combustion-engine powered equipment or machinery shall be equipped with suitable exhaust and air-intake silencers in proper working order.

D. In case of a conflict between this chapter and any other ordinance regulating construction activities, provisions of any specific ordinance regulating construction activities shall control.

12.08.560 Vibration.

Operating or permitting the operation of any device that creates vibration which is above the vibration perception threshold of any individual at or beyond the property boundary of the source if on private property, or at 150 feet (46 meters) from the source if on a public space or public right-of-way is prohibited. The perception threshold shall be a motion velocity of 0.01 in/sec over the range of 1 to 100 Hertz.

12.08.570 Activities exempt from chapter restrictions.

The following activities set out in this chapter shall be exempted from the provisions of this chapter:

H. Public Health and Safety Activities. All transportation, flood control, and utility company maintenance and construction operations at any time on public right-of-way, and those situations which may occur on private real property deemed necessary to serve

the best interest of the public and to protect the public's health and well being, including but not limited to street sweeping, debris and limb removal, removal of downed wires, restoring electrical service, repairing traffic signals, unplugging sewers, snow removal, house moving, vacuuming catchbasins, removal of damaged poles and vehicles, repair of water hydrants and mains, gas lines, oil lines, sewers, etc.;

City of La Cañada Flintridge General Plan Noise and Vibration Policies

NE 1.1.5 Require developers to implement noise abatement that meets Caltrans' acoustical criteria or other standards established by the City, if new developments cause increases in traffic volumes that result in roadway noise levels greater than 65 dB CNEL at sensitive receptors.

NE 2.2.2 Require new development to minimize noise impacts on adjacent uses through site and building design, setbacks, berms, landscaping, and/or other noise abatement techniques.

City of La Cañada Flintridge Municipal Code

The City of La Cañada Flintridge Municipal Code establishes the following applicable standards related to noise.

5.36.010 Construction noise prohibited when.

Except as otherwise provided in this chapter, a person may perform any construction or repair work of any kind upon any building or structure, or perform any earth excavating, filling or moving, where any of the foregoing entails the use of any air compressors; jack-hammers; power-driven drill, riveting machine; excavator, diesel-powered truck, tractor or other earth moving equipment; hand hammers on steel or iron; or any other machine, tool, device or equipment which makes loud noises exceeding a decibel level of sixty-five (65) dBA as measured from any adjacent residential property line during the following hours:

	During Standard Time:	**During Daylight Savings Time:**
Monday-Friday:	7:00 a.m. to 6:00 p.m.	7:00 a.m. to 7:00 p.m.
Saturday:	9:00 a.m. to 5:00 p.m.	9:00 a.m. to 5:00 p.m.
Sunday:	None	None
Holiday:	None	None

City of Pasadena General Plan Noise and Vibration Policies

7b The City will encourage limitations on construction activities adjacent to sensitive noise receptors as defined in Figure.

7c The City will encourage construction and landscaping activities that employ techniques to minimize noise.

7d The City will enforce noise level restrictions contained in the City of Pasadena Noise Regulations (Chapter 9.36 of the Municipal Code), except during federal, State, or local emergencies (such as power generators required for emergencies).

City of Pasadena Municipal Code

The City of Pasadena Municipal Code establishes the following applicable standards related to noise.

9.36.070 Construction projects.

A. No person shall operate any pile driver, power shovel, pneumatic hammer, derrick power hoist, forklift, cement mixer, or any other similar construction equipment within a residential district or within a radius of 500 feet therefrom at any time other than as listed below:

1. From 7:00 a.m. to 7:00 p.m. Monday through Friday;
2. From 8:00 a.m. to 5:00 p.m. on Saturday;
3. Operation of any of the listed construction is prohibited on Sundays and holidays.

B. No person shall perform any construction or repair work on buildings, structures, or projects within a residential district or within a radius of 500 feet therefrom in such a manner that a reasonable person of normal sensitiveness residing in the area is caused discomfort or annoyance at any time other than as listed below:

1. From 7:00 a.m. to 7:00 p.m. Monday through Friday;
2. From 8:00 a.m. to 5:00 p.m. on Saturday;
3. Performance of construction or repair work is prohibited on Sundays and holidays.

9.36.080 Construction equipment.

It is unlawful for any person to operate any powered construction equipment if the operation of such equipment emits noise at a level in excess of 85 dBA when measured within a radius of 100 feet from such equipment.

9.36.170 Exemptions.

A. This chapter is not intended to regulate construction or maintenance and repair activities conducted by public agencies or their contractors necessitated by emergency conditions or deemed necessary by the city to serve the best interests of the public and to protect the public health, safety and welfare. These operations may include, but are not limited to, street sweeping, debris and limb removal, removal of downed wires, restoring electrical service, repairing traffic lights, unplugging sewers, vacuuming catch basins, repairing water hydrants and mains, gas lines, oil lines, storm drains, roads, sidewalks, etc.

5.0 MODELING PARAMETERS AND ASSUMPTIONS

5.1 On-Site Construction Equipment Noise

The noise impacts from construction of the proposed project have been analyzed through use of the Federal Highway Administration's (FHWA) Roadway Construction Noise Model (RCNM). The FHWA compiled noise measurement data regarding the noise generating characteristics of several different types of construction equipment used during the Central Artery/Tunnel project in Boston. Table E below provides a list of the construction equipment measured along with the associated measured noise emissions and measured percentage of typical equipment use per day. From this acquired data the FHWA developed the RCNM, which may be used for the prediction of construction noise.

Table E – Construction Equipment Noise Emissions and Usage Factors

Equipment Description	Acoustical Use Factor[1] (percent)	Spec 721.560 Lmax at 50 feet[2] (dBA, slow[3])	Actual Measured Lmax at 50 feet[4] (dBA, slow[3])
All Other Equipment > 5 HP	50	85	--N/A--
Auger Drill Rig	20	85	84
Backhoe	40	80	78
Chain Saw	20	85	84
Compactor (ground)	20	80	83
Compressor (air)	40	80	78
Concrete Mixer Truck	40	85	79
Concrete Pump	20	82	81
Concrete Saw	20	90	90
Crane	16	85	81
Dozer	40	85	82
Drill Rig Truck	20	84	79
Drum Mixer	50	80	80
Dump Truck	40	84	76
Excavator	40	85	81
Flat Bed Truck	40	84	74
Front End Loader	40	80	79
Generator	50	82	81
Generator (<25KVA, VMS signs)	50	70	73
Gradall	40	85	83
Grader	40	85	--N/A--
Grapple (on backhoe)	40	85	87
Horizontal Boring Hydr. Jack	25	80	82
Hydra Break Ram	10	90	--N/A--
Impact Pile Driver	20	95	101
Jackhammer	20	85	89
Man Lift	20	85	75
Mounted Impact Hammer (hoe ram)	20	90	90
Pavement Scarafier	20	85	90
Paver	50	85	77
Pickup Truck	40	55	75

Table E – Construction Equipment Noise Emissions and Usage Factors

Equipment Description	Acoustical Use Factor[1] (percent)	Spec 721.560 Lmax at 50 feet[2] (dBA, slow[3])	Actual Measured Lmax at 50 feet[4] (dBA, slow[3])
Pneumatic Tools	50	85	85
Pumps	50	77	81
Refrigerator Unit	100	82	73
Rivit Buster/chipping gun	20	85	79
Rock Drill	20	85	81
Roller	20	85	80
Sand Blasting (Single Nozzle)	20	85	96
Scraper	40	85	84
Shears (on backhoe)	40	85	96
Tractor	40	84	--N/A--
Vacuum Street Sweeper	10	80	82
Vibratory Concrete Mixer	20	80	80
Vibratory Pile Driver	20	95	101
Warning Horn	5	85	83
Welder / Torch	40	73	74

Notes:
[1] Acoustical use factor is the percentage of time each piece of equipment is operational during a typical workday.
[2] Spec 721.560 is the equipment noise level utilized by the RCNM program.
[3] The "slow" response averages sound levels over 1-second increments. A "fast" response averages sound levels over 0.125-second increments.
[4] Actual Measured is the average noise level measured of each piece of equipment during the Central Artery/Tunnel project in Boston, Massachusetts primarily during the 1990s.
Source: Federal Highway Administration, 2006.

Construction noise impacts to the nearby sensitive receptors have been calculated according to the equipment noise levels and usage factors listed in Table E and through use of the RCNM and the equipment list provided in the Air Quality Analysis prepared for the proposed project. The equipment was placed at the nearest locations to the nearby sensitive receptors and each piece of equipment was placed 100 feet apart.

5.2 Off-Site Vehicular Noise

The proposed project would require the export of material from the project site through the use of trucks as well as vehicle trips from workers to the project site. In order to quantify the potential noise impacts created and received by the proposed project and compare them to the existing noise levels, the existing roadway noise environment was modeled using the FHWA Traffic Noise Prediction Model - FHWA-RD-77-108 (FHWA Model). The FHWA Model arrives at a predicted noise level through a series of adjustments to the Reference Energy Mean Emission Level (REMEL). Adjustments are then made to the reference energy mean emission level to account for the roadway active width (i.e., the distance between the center of the outermost travel lanes on each side of the roadway), the total average daily traffic (ADT) and the percentage of ADT which flows during the day, evening and night, the travel speed, the vehicle mix on the roadway, which is a percentage of the volume of automobiles, medium trucks and heavy trucks, the roadway grade, the angle of view of the observer exposed to the roadway and site conditions ("hard" or "soft" relates to the absorption of the ground, pavement or

landscaping). The following section provides a discussion of the software and modeling input parameters used in this analysis and a discussion of the resultant existing noise model.

FHWA Model Roadway Parameters

The roadway parameters used for this study are presented in Table F. Only the roadway segments that the proposed project may generate additional vehicular trips and had sensitive land uses (i.e., residential, school, parks, libraries, and hospitals) were analyzed.

The roadway classifications are based on the roadway jurisdiction's General Plan Circulation Element. The roadway speeds are based on the posted speed limits. The distance to the nearest sensitive receptor was determined by measuring the distance from the roadway centerline to the nearest residence, school, park, or hospital. Soft site conditions were used to develop noise contours and analyze noise impacts to the project site. Soft sites have an absorptive ground surface such as soft dirt, grass, or scattered bushes and trees.

Table F – FHWA Model Roadway Parameters

Roadway	Segment	General Plan Roadway Classification	Jurisdiction	Vehicle Speed (MPH)	Distance to Nearest Receptor (feet)
Site 1 – Devil's Gate Dam and Reservoir					
Berkshire Place	East of I-210 Northbound Ramps[1]	Major	La Cañada Flintridge	30	75
Oak Grove Drive	South of Berkshire Place[2]	Major	La Cañada Flintridge	35	75
Oak Grove Drive	East of Foothill Fwy Overpass[3]	Primary Arterial	Pasadena	40	85
Windsor Avenue	North of I-210 Northbound Ramps[3]	Minor Arterial	Los Angeles County	35	65
Sites 2 and 3 – Manning Pit and Waste Management Pit					
Vincent Avenue	South of Gladstone Street[3]	Secondary Arterial	Azusa	45	55
Vincent Avenue	South of Arrow Highway[3]	Secondary Arterial	Los Angeles County	45	50
Arrow Highway	East of Vincent Avenue[3]	Principal Arterial	Azusa	45	60
Arrow Highway	East of Lark Ellen Avenue[3]	Principal Arterial	Los Angeles County	45	60
Arrow Highway	East of Enid Avenue[1]	Principal Arterial	Covina	45	60
Azusa Avenue	North of Arrow Highway[3]	Principal Arterial	Azusa	45	60
Azusa Avenue	North of Gladstone Street[3]	Principal Arterial	Azusa	35	65
Site 4 – Scholl Canyon Landfill					
Scholl Canyon Road	North of SR-134 Westbound Ramps[3]	Hillside	City of Los Angeles	35	45
Figueroa Street	South of Eagle Vista Drive[4]	Secondary	City of Los Angeles	35	55

Table F – FHWA Model Roadway Parameters

Roadway	Segment	General Plan Roadway Classification	Jurisdiction	Vehicle Speed (MPH)	Distance to Nearest Receptor (feet)
Sites 5, 6, 7, and 8 – Bradley Landfill, Boulevard Pit, Cal-Mat Pit and Sheldon Pit					
Foothill Boulevard	South of I-210 Westbound Ramps[3]	Major	City of Los Angeles	45	110
Osborne Street	West of Foothill Boulevard[4]	Major	City of Los Angeles	40	60
Glen Oaks Boulevard	South of Osborne Street[3]	Major	City of Los Angeles	45	60
Glen Oaks Boulevard	South of Penrose Street[3]	Major	City of Los Angeles	45	55
Glen Oaks Boulevard	South of Sunland Boulevard[3]	Major	City of Los Angeles	45	60
Foothill Boulevard	East of Wheatland Avenue[3]	Major	City of Los Angeles	50	65
Wentworth Street	South of Foothill Boulevard[3]	Secondary	City of Los Angeles	45	60
Osborne Street	East of I-5 Northbound Ramps[3]	Major	City of Los Angeles	35	85
Laurel Canyon Boulevard	South of Osborne Street[3]	Major	City of Los Angeles	35	60
Branford Street	East of Laurel Canyon Boulevard[3]	Secondary	City of Los Angeles	35	50
Branford Street	West of Laurel Canyon Boulevard[3]	Secondary	City of Los Angeles	35	65
San Fernando Road	South of Branford Street[5]	Major	City of Los Angeles	35	190

Notes:
[1] Nearest sensitive receptor is a school.
[2] Nearest sensitive receptor is a church.
[3] Nearest sensitive receptor is residential.
[4] Nearest sensitive receptor is a park.
[5] Nearest sensitive receptor is a hospital.
Source: City of Azusa, 2004; City of Covina, 2000; City of La Cañada Flintridge, 2013; City of Los Angeles, 1999; City of Pasadena, 2004; County of Los Angeles, 2004.

FHWA Model Traffic Volumes

The average daily traffic (ADT) volumes on the study area roadways were obtained from the Devil's Gate Reservoir Sediment Removal and Management Project Traffic Impact Analysis (Traffic Impact Analysis), prepared by Hall & Foreman, Inc., March 28, 2013. Since the Traffic Impact Analysis only provided peak hour volumes, the ADT was calculated by multiplying the sum of all peak hours by 3 for Site 1 and 4 for all other sites. For Site 1, there were 4 peak hour periods provided (7 a.m. to 9 a.m., 12 p.m. to 2 p.m., 2 p.m. to 4 p.m. and 4 p.m. to 6 p.m. [8 hours total]). For all other sites there were 3 peak hour periods provided (7 a.m. to 9 a.m., 12 p.m. to 2 p.m. and 4 p.m. to 6 p.m. [6 hours total]).

The ADT volumes have been provided for the existing year, year 2030 baseline, and year 2030 with project scenarios. The ADT volumes used in this analysis are shown in Table G for Devil's Gate Dam Area (Site 1), Table H for Manning Pit (Site 2), Table I for Scholl Canyon Landfill (Site 4), Table J for Sheldon Pit (Site 5), Cal-Mat Pit (Site 6), and Bradley Landfill (Site 7), and Table K for Boulevard Pit (Site 8). The routes to Waste Management Pit (Site 3) and Vulcan Materials (Site 9) do not pass by any sensitive receptors so they have not been analyzed.

Table G – Average Daily Traffic Volumes for Site 1 – Devil's Gate Dam Area

		Average Daily Traffic Volumes								
Roadway	**Segment**	**Existing**	**Existing + Route 1A**	**Existing + Route 1B**	**Existing + Route 1C**	**Existing + Route 1D**	**Existing + Route 1E**	**Existing + Route 1F**	**Existing + Route 1G**	**Existing + Route 1H**
Berkshire Place	East of I-210 Northbound Ramps	8,000	8,442	8,000	8,221	8,221	8,442	8,000	8,221	8,221
Oak Grove Drive	South of Berkshire Place	6,000	6,442	6,000	6,221	6,221	6,442	6,000	6,221	6,221
Oak Grove Drive	East of Foothill Fwy Overpass	6,400	6,400	6,842	6,621	6,621	6,400	6,842	6,621	6,621
Windsor Avenue	North of I-210 Northbound Ramps	21,700	21,700	22,142	21,921	21,921	21,700	22,142	21,921	21,921

Source: Hall & Foreman, 2013.

Table H – Average Daily Traffic Volumes for Site 2 – Manning Pit

		Average Daily Traffic		
Roadway	**Segment**	**Existing**	**Existing + Route 2A**	**Existing + Route 2B**
Vincent Avenue	South of Gladstone Street	8,600	9,025	8,813
Vincent Avenue	South of Arrow Highway	10,600	11,025	11,025
Arrow Highway	East of Vincent Avenue	23,400	23,400	23,613
Arrow Highway	East of Lark Ellen Avenue	23,800	23,800	24,013
Arrow Highway	East of Enid Avenue	24,500	24,500	24,713
Azusa Avenue	North of Arrow Highway	20,900	20,900	21,113
Azusa Avenue	North of Gladstone Street	23,200	23,200	23,413

Notes: Route 3 to Waste Management Pit, does not pass by any sensitive receptors and therefore has not been analyzed.
Source: Hall & Foreman, 2013.

Table I – Average Daily Traffic Volumes for Site 4 – Scholl Canyon Landfill

Roadway	Segment	Average Daily Traffic		
		Existing	Existing + Route 4A	Existing + Route 4B
Scholl Canyon Road	North of SR-134 Westbound Ramps	1,000	1,425	1,425
Figueroa Street	South of Eagle Vista Drive	10,600	10,813	11,025

Source: Hall & Foreman, 2013.

Table J – Average Daily Traffic Volumes for Sites 5, 6, and 7 – Sheldon Pit, Cal-Mat Pit and Bradley Landfill

Roadway	Segment	Average Daily Traffic			
		Existing	Existing + Route 5A	Existing + Route 5B	Existing + Route 5C
Foothill Boulevard	South of I-210 Westbound Ramps	13,700	14,125	13,700	13,700
Osborne Street	West of Foothill Boulevard	14,300	14,725	14,300	14,300
Glen Oaks Boulevard	South of Osborne Street	24,300	24,725	24,300	24,300
Glen Oaks Boulevard	South of Penrose Street	15,300	15,300	15,725	15,300
Glen Oaks Boulevard	South of Sunland Boulevard	18,000	18,000	18,425	18,000
Foothill Boulevard	East of Wheatland Avenue	6,500	6,500	6,500	6,925
Wentworth Street	South of Foothill Boulevard	9,800	9,800	9,800	10,225

Source: Hall & Foreman, 2013.

Table K – Average Daily Traffic Volumes for Site 8 – Boulevard Pit

Roadway	Segment	Average Daily Traffic			
		Existing	Existing + Route 8A	Existing + Route 8B	Existing + Route 8C
Foothill Boulevard	East of Wheatland Avenue	6,500	6,500	6,500	6,925
Wentworth Street	South of Foothill Boulevard	9,800	9,800	9,800	10,225
Osborne Street	East of I-5 Northbound Ramps	30,600	30,600	31,025	30,600
Laurel Canyon Boulevard	South of Osborne Street	18,300	18,300	18,725	18,300
Branford Street	East of Laurel Canyon Boulevard	10,500	10,925	10,925	10,500
Branford Street	West of Laurel Canyon Boulevard	12,000	12,425	12,000	12,000
San Fernando Road	South of Branford Street	15,900	15,900	15,900	16,325

Notes: Route 9 to Vulcan Materials, does not pass by any sensitive receptors and therefore has not been analyzed.
Source: Hall & Foreman, 2013.

FHWA Model Vehicle Mix Assumptions

The without project vehicle mix used in the FHWA-RD-77-108 Model is shown in Table L and is based on the typical vehicle mix observed in Southern California for arterial roads. The with

project vehicle mixes were adjusted to account for the addition of 425 heavy trucks during the daytime and the calculated vehicle mixes used for each site is provided in Appendix C.

Table L – Roadway Vehicle Mix

	Traffic Flow Distributions			
Vehicle Type	**Day (7 a.m. to 7 p.m.)**	**Evening (7 p.m. to 10 p.m.)**	**Night (10 p.m. to 7 a.m.)**	**Overall**
Automobiles	69.50%	12.90%	9.60%	92.00%
Medium Trucks	1.44%	0.06%	1.50%	3.00%
Heavy Trucks	2.40%	0.10%	2.50%	5.00%

Source: Vista Environmental.

FHWA Model Source Assumptions

To assess the roadway noise generation in a uniform manner, all vehicles are analyzed at the single lane equivalent acoustic center of the roadway being analyzed. In order to determine the height above the road grade where the noise is being emitted from, each type of vehicle has been analyzed independently with autos at road grade, medium trucks at 2.3 feet above road grade, and heavy trucks at 8 feet above road grade. These elevations were determined through a noise-weighted average of the elevation of the exhaust pipe, tires, and mechanical parts in the engine, which are the primary noise emitters from a vehicle.

5.3 Vibration

Construction activity can result in varying degrees of ground vibration, depending on the equipment used on the site. Operation of construction equipment causes ground vibrations that spread through the ground and diminish in strength with distance. Buildings in the vicinity of the construction site respond to these vibrations with varying results ranging from no perceptible effects at the low levels to slight damage at the highest levels. Table M gives approximate vibration levels for particular construction activities. The data in Table M provides a reasonable estimate for a wide range of soil conditions.

Table M – Vibration Source Levels for Construction Equipment

Equipment		Peak Particle Velocity (inches/second)	Approximate Vibration Level (L_v)at 25 feet
Pile driver (impact)	Upper range	1.518	112
	typical	0.644	104
Pile driver (sonic)	Upper range	0.734	105
	typical	0.170	93
Clam shovel drop (slurry wall)		0.202	94
Hydromill	In soil	0.008	66
(slurry wall)	In rock	0.017	75
Vibratory Roller		0.210	94
Hoe Ram		0.089	87
Large bulldozer		0.089	87
Caisson drill		0.089	87
Loaded trucks		0.076	86
Jackhammer		0.035	79
Small bulldozer		0.003	58

Source: Federal Transit Administration, May 2006.

The construction-related and operational vibration impacts have been calculated through the vibration levels shown above in Table M and through typical vibration propagation rates. The equipment assumptions were based on the equipment lists provided in the Air Quality Analysis, which found that the vibration-causing equipment would be limit to bulldozers and loaded trucks.

6.0 EXISTING NOISE CONDITIONS

To determine the existing noise level environment, noise measurements have been taken in the vicinity of the project site by Chambers Group. The field survey noted that noise within the proposed project area is generally characterized by vehicular traffic on the nearby roadways. The following describes the measurement procedures, measurement locations, noise measurement results, and the modeling of the existing noise environment.

6.1 Noise Measurement Equipment

The noise measurements were taken using a Larson-Davis Model 820 Type 1 precision sound level meter programmed in "slow" mode to record noise levels in "A" weighted form. The sound level meter and microphone were mounted on a tripod five feet above the ground and were equipped with a windscreen during all measurements. The sound level meter was calibrated before and after the monitoring. The accuracy of the calibrator is maintained through a program established through the manufacturer and is traceable to the National Bureau of Standards. The unit meets the requirements of ANSI Standard S1.4-1984 and IEC Standard 942: 1988 for Class 1 equipment. All noise level measurement equipment meets American National Standards Institute (ANSI) specifications for sound level meters (S1.4-1983 identified in Chapter 19.68.020.AA).

Noise Measurement Locations

The noise monitoring locations were selected in order to obtain noise measurements of the current noise sources impacting the project site and to provide a baseline for any potential noise impacts that may be created by the proposed project. A description of the noise monitoring sites is provided below in Table D. Appendix A includes aerial photos of the noise level measurement locations.

Noise Measurement Timing and Climate

The noise measurements were recorded between 12:08 p.m. and 5:36 p.m. on June 3, 2011. During the noise measurements, the sky was sunny, the temperature varied between 79 and 89 degrees Fahrenheit and the wind varied between 0 and 10 miles per hour.

All traffic noise measurement durations were measured according to the standards stated in Section N-3320 of Caltrans Technical Noise Supplement (TeNS), which specifies that the measurements be a duration of at least 10 minutes and shall be continued past 10 minutes until the fluctuations in the displayed L_{eq} is less than 0.5 dBA.

6.2 Noise Measurement Results

The results of the short-term peak hour noise level measurements are presented in Table N. The existing noise level measurements ranged from 50.4 to 66.7 dBA Leq, with the highest noise measurement occurring at Site M1.

Table N – Existing (Ambient) Noise Level Measurements

Site No.	Description	Time of Measurement	Primary Noise Source	Noise Level (dBA Leq/Lmax)
M1	Located at La Cañada United Methodist Church at 104 Berkshire Place, in church parking lot and 25 feet from edge of Oak Grove Drive.	2:22 p.m. to 2:37 p.m.	Traffic on Oak Grove Drive and cars in parking lot.	66.7/81.0
M2	Located near a park bench across the street from La Cañada High School at 4463 Oak Grove Drive and approximately 100 feet north of the pool.	2:48 p.m. to 3:03 p.m.	Traffic on Oak Grove Drive, kids talking, and cars in parking lot.	57.9/68.8
M3	Located at the front yard of the home at 2301 Vista Laguna Terrace, Pasadena, and approximately 150 feet north of La Cañada Verdugo Road.	3:54 p.m. to 4:09 p.m.	Dogs barking, traffic on residential streets.	57.6/68.5
M4	Located on the edge of the road in front of the home at 1021 W. Shelly Street, Altadena.	4:22 p.m. to 4:37 p.m.	Kids playing, dogs barking, delivery truck and cars.	58.4/79.7
M5	Located at the Rose Bowl Riders at 4750 Oak Grove Drive, Pasadena, at the back of youth camp and adjacent to equestrian property on a dirt road.	4:53 p.m. to 5:08 p.m.	Equestrians talking and horses.	50.4/57.2
M6	Located at the western end of the southern parking lot for John Muir High School at 1905 Lincoln Avenue, Pasadena.	5:21 p.m. to 5:36 p.m.	Traffic on I-210 and Lincoln Avenue.	59.9/65.3
M7	Located at the middle of the western parking lot for Irwindale Public Library at 5050 Irwindale Ave, Irwindale.	12:08 p.m. to 12:23 p.m.	Cars and people in parking lot.	52.2/63.7

Source: Chambers Group, Inc., noise measurements taken on June 3, 2011.

The noise monitoring data printouts are included in Appendix B. According to Section N-2230 of the TeNS, the CNEL values are generally within plus or minus 2 dBA of the measured peak hour Leq dBA.

6.3 Modeled Existing Noise Levels

The noise contours of the nearby existing roadway have been calculated in order to provide a baseline of the existing traffic noise levels. The distances to the 55, 60, 65, and 70 dBA CNEL noise contours were calculated, plus the noise level at the nearest sensitive receptor to the roadway, which was determined from aerial photos of the study area. Table O shows the existing traffic noise contours and Appendix C provides the FHWA Model printouts.

The calculated existing noise contours in Table O shows that the roadway segments of Vincent Avenue from south of Gladstone Street to south of Arrow Highway; Arrow Highway from east of Vincent Avenue to east of Enid Avenue; Azusa Avenue from north of Arrow Highway to north of Gladstone Street; Figueroa Street south of Eagle Vista Drive; Foothill Boulevard south of I-210 westbound ramps; Osborne Street west of Foothill Boulevard; Glen Oaks Boulevard south of Osborne Street; Glen Oaks Boulevard south of Penrose Street; Glen Oaks Boulevard south of Sunland Boulevard; Foothill Boulevard east of Wheatland Avenue; Wentworth Street

south of Foothill Boulevard; Osborne Street east of I-5 northbound ramps; Laurel Canyon Boulevard south of Osborne Street; and Branford Street east and west of Laurel Canyon Boulevard currently exceed the County's 60 dBA CNEL residential exterior noise standard.

Table O – Existing Roadway Noise Contours

Roadway	Segment	CNEL at Nearest Receptor (dBA)[1]	Distance to Contour (feet)			
			70 dBA CNEL	65 dBA CNEL	60 dBA CNEL	55 dBA CNEL
Site 1 – Devil's Gate Dam and Reservoir						
Berkshire Place	East of I-210 Northbound Ramps	60	RW	RW	60	130
Oak Grove Drive	South of Berkshire Place	58	RW	RW	59	128
Oak Grove Drive	East of Foothill Fwy Overpass	60	RW	RW	79	170
Windsor Avenue	North of I-210 Northbound Ramps	65	RW	70	150	323
Sites 2 and 3 – Manning Pit and Waste Management Pit						
Vincent Avenue	South of Gladstone Street	65	RW	55	119	257
Vincent Avenue	South of Arrow Highway	67	RW	65	140	301
Arrow Highway	East of Vincent Avenue	69	54	115	249	535
Arrow Highway	East of Lark Ellen Avenue	69	54	117	251	542
Arrow Highway	East of Enid Avenue	69	55	119	256	552
Azusa Avenue	North of Arrow Highway	69	RW	107	230	497
Azusa Avenue	North of Gladstone Street	66	RW	73	157	338
Site 4 – Scholl Canyon Landfill						
Scholl Canyon Road	North of SR-134 Westbound Ramps	54	RW	RW	RW	38
Figueroa Street	South of Eagle Vista Drive	63	RW	RW	92	198
Sites 5, 6, 7, and 8 –Sheldon Pit, Cal-Mat Pit, Bradley Pit, and Boulevard Pit						
Foothill Boulevard	South of I-210 Westbound Ramps	62	RW	71	154	332
Osborne Street	West of Foothill Boulevard	65	RW	64	137	295
Glen Oaks Boulevard	South of Osborne Street	69	51	111	239	515
Glen Oaks Boulevard	South of Penrose Street	68	RW	83	178	385
Glen Oaks Boulevard	South of Sunland Boulevard	68	42	91	196	421
Foothill Boulevard	East of Wheatland Avenue	64	RW	55	118	254
Wentworth Street	South of Foothill Boulevard	65	RW	61	131	283
Osborne Street	East of I-5 Northbound Ramps	65	RW	81	174	375
Laurel Canyon Boulevard	South of Osborne Street	65	RW	60	129	277
Branford Street	East of Laurel Canyon Boulevard	64	RW	RW	94	202
Branford Street	West of Laurel Canyon Boulevard	63	RW	RW	97	208
San Fernando Road	South of Branford Street	56	RW	51	109	235

Notes:
[1] Distances to nearest sensitive receptor shown in Table F. The noise contours do not take into account existing noise barriers.
RW = Noise contour is located within right-of-way of roadway.
Source: FHWA Traffic Noise Prediction Model- FHWA-RD-77-108.

7.0 IMPACT ANALYSIS

7.1 CEQA Thresholds of Significance

Consistent with the California Environmental Quality Act (CEQA) and the State CEQA Guidelines, a significant impact related to noise would occur if a proposed project is determined to result in:

- Exposure of persons to or generation of noise levels in excess of standards established in the local General Plan or noise ordinance, or applicable standards of other agencies;
- Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels;
- A substantial permanent increase in ambient noise levels in the project vicinity above existing levels without the proposed project; (Refer to Notice of Preparation Initial Study Devil's Gate Reservoir Sediment Removal and Management Project, prepared by Chambers Group, September 2011, effects found not to be significant)
- A substantial temporary or periodic increase in ambient noise levels in the project vicinity above noise levels existing without the proposed project; or
- Exposure of persons residing or working in the project area to excessive noise levels from aircraft. (Refer to Notice of Preparation Initial Study Devil's Gate Reservoir Sediment Removal and Management Project, prepared by Chambers Group, September 2011, effects found not to be significant)

7.2 Generation of Noise Levels in Excess of Standards

The proposed project would not expose persons to or generate noise levels in excess of standards established in the General Plan or Noise Ordinance or applicable standards of other agencies. The following section calculates the potential noise emissions associated with the construction and operations of the proposed project and compares the noise levels to the County standards and applicable standards from other agencies.

The on-site construction equipment and off-site truck noise impacts have been analyzed separately below.

On-Site Construction Equipment Noise

Construction of the proposed project is anticipated to occur between summer 2015 and summer 2020. Excavation and associated activities within the reservoir area are expected to take place during the drier months, from April to December, Monday through Saturday (except on holidays), as weather permits. During drier rainfall years work could potentially start earlier in the year and/or continue later into the year. Excavation activities will take place between the hours of 7:00 a.m. and 6:00 p.m. Standard Time and between 7:00 a.m. and 7:00 p.m. Daylight Savings Time, Monday through Friday and between 8:00 a.m. to 5:00 p.m. on Saturday. Removal of sediment and organic materials offsite is expected to take place during these hours.

The on-site construction equipment during removal of sediment activities would require the simultaneous operation of four front end loaders, two D8 dozers, one excavator, one water truck, one sorter/crusher, and two tender trucks (for fuel and maintenance). The sediment maintenance activities would require the simultaneous operation of two front end loaders, one D8 dozer, one excavator, one water truck, one sorter/crusher, and two tender trucks (for fuel and maintenance). Since the removal of sediment activities would require a greater amount of equipment, this on-site construction equipment noise calculations have been based on the sediment removal activities equipment list. There is also anticipated to be up to three dump trucks simultaneously operating on the project site during the removal of sediment and sediment maintenance activities. Noise impacts from on-site construction equipment activities associated with the proposed project would be a function of the noise generated by construction equipment, equipment location, sensitivity of nearby land uses, and the timing and duration of the construction activities.

The nearest sensitive receptors to the proposed project are: single-family homes as near as 140 feet from excavation activities on the southeast side of the project site located in the City of Pasadena; single-family homes as near as 180 feet from excavation activities on the east side of the project site in the unincorporated area of Altadena; office buildings that are part of the JPL facility as near as 200 feet from excavation activities on the northwest side of the project site in the City of La Cañada Flintridge; park uses as near as 20 feet from excavation activities on the west side of the project site in the City of Pasadena; La Cañada High School as near as 430 feet from excavation activities on the southwest side of the project site and located in the City of La Cañada Flintridge; and La Cañada United Methodist Church as near as 500 feet from excavation activities in the City of La Cañada Flintridge.

Chapter 5.36.010 of the City of La Cañada Flintridge Municipal Code restricts construction activity that exceeds 65 dBA at any adjacent residential property line from occurring: between the hours of 6:00 p.m. and 7:00 a.m. Monday through Friday during Standard time or between 7:00 p.m. and 7:00 a.m. Monday through Friday during Daylight Savings time; between the hours of 5:00 p.m. and 7:00 a.m. on Saturday; or anytime on Sunday and holidays.

The City of Pasadena provides limitations of construction activities in Chapter 9.36.070 of their Municipal Code, however Chapter 9.36.170 exempts construction and maintenance activities by public agencies, such as the Los Angeles County Flood Control District, from the requirements of Chapter 9 in the City of Pasadena Municipal Code.

The County of Los Angeles provides limitation of construction activities in Chapter 12.08.440 of their Municipal Code, however Chapter 12.08.570 H exempts flood control maintenance and construction operations that are deemed necessary to serve the best interest of the public and to protect the public's health and well being, from the requirements of Chapter 12 of the Los Angeles County Municipal Code.

The City of Pasadena exempts public agencies from the Municipal Code noise requirements and the County of Los Angeles exempts flood control maintenance and construction projects. The City of La Cañada Flintridge exempts construction noise that occurs during the allowed times between Monday through Friday of 7:00 a.m. to 6:00 p.m. Standard Time and 7:00 a.m. to 7:00 p.m. Daylight Savings Time and on Saturday between 7:00 a.m. and 5:00 p.m.. The proposed

project's construction-related activities would only occur during the City of La Cañada Flintridge's allowable times for construction activities. Impacts would be less than significant.

Off-Site Vehicular Noise

The sediment removal activities for the proposed project would generate up to 425 daily round trips from haul trucks and up to 17 daily round trips from workers commuting to the project site. The haul trucks would export the material from the project site to one of the following sites: Manning Pit (Site 2); Waste Management Pit (Site 3); Scholl Canyon Landfill (Site 4); Bradley Landfill (Site 5); Boulevard Pit (Site 6); Cal-Mat Pit (Site 7); Sheldon Pit (Site 8); or Vulcan Materials (Site 9).

Vehicle noise is a combination of the noise produced by the engine, exhaust, and tires. The level of traffic noise depends on three primary factors (1) the volume of traffic, (2) the speed of traffic, and (3) the number of trucks in the flow of traffic. The proposed project would not alter the speed limit on any existing roadway so the proposed project's potential offsite noise impacts have been focused on the noise impacts associated with the change of volume of traffic and change of the number of trucks in the flow of traffic that would occur with development of the proposed project.

The California Department of Health has developed the noise compatibility matrix, shown above in Figure 4 on page 18, that has been adopted by most of the jurisdictions that may be impacted by the proposed project's vehicular noise and details normally acceptable noise levels for different land uses that include 60 dB CNEL for single-family homes and 70 dB CNEL for schools, libraries, churches and parks. Neither the California Department of Health nor any of the local jurisdictions provide any direction for sensitive receptors that already exceed the normally acceptable noise levels for the Without Project condition, however the (Federal Transit Administration, 2006), which assesses noise and vibration impacts from transit projects found that when the ambient noise is between 60 and 64, a noise exposure increase of 2 dB is allowed before a significant impact would occur, when the ambient noise is between 65 and 74 dB Ldn, a noise exposure increase of 1 dB is allowed before a significant impact would occur and when the ambient noise exceeds 74 dB Ldn, any increase in noise exposure would create a significant impact.

The potential offsite traffic noise impacts created by the off-site vehicle trips generated from the proposed project have been analyzed through utilization of the FHWA Model and parameters described above in Section 5.2 and The FHWA model calculation printouts are provided in Appendix E. A comparison of the without project to the with project Route 1A conditions are provided in Table P for Devil's Gate Dam Area (Site 1).

Table P – Project Traffic Noise Contributions to Route 1A Near Devil's Gate Dam

		dBA CNEL at Nearest Receptor[1]			
Roadway	Segment	Existing	Existing Plus Route 1A	Project Contribution	Threshold
Berkshire Place	East of I-210 Northbound Ramps[2]	59	60	1	70 dB
Oak Grove Drive	South of Berkshire Place[3]	59	60	1	70 dB
Oak Grove Drive	East of Foothill Fwy Overpass[4]	60	60	0	60 dB
Windsor Avenue	North of I-210 Northbound Ramps[4]	66	66	0	> +1 dB

Notes:
[1] Distance to nearest receptor shown in Table F, does not take into account existing noise barriers.
[2] Nearest sensitive receptor is La Cañada High School.
[3] Nearest sensitive receptor is La Cañada United Methodist Church.
[4] Nearest sensitive receptor is residential.
Source: FHWA Traffic Noise Prediction Model- FHWA-RD-77-108.

Table P shows that the project traffic noise contributions to Route 1A that would access Devil's Gate Dam and Reservoir area, would increase the roadway noise by up to 1 dB. The proposed project would not cause the noise level at any nearby land use to exceed the normally compatible noise standard for the with project condition that did not already exceed the standards for the without project condition. For the roadway segment of Windsor Avenue north of I-210 northbound ramps that already exceed the normally compatible residential noise standard, the noise level increase from the proposed project is within the greater than plus 1 dB noise exposure increase allowed before it is considered significant. Roadway noise impacts would be less than significant for Route 1A.

A comparison of the without project to the with project Route 1B conditions are provided in Table Q for Devil's Gate Dam Area (Site 1).

Table Q – Project Traffic Noise Contributions to Route 1B Near Devil's Gate Dam

		dBA CNEL at Nearest Receptor[1]			
Roadway	Segment	Existing	Existing Plus Route 1B	Project Contribution	Threshold
Berkshire Place	East of I-210 Northbound Ramps[2]	59	60	1	70 dB
Oak Grove Drive	South of Berkshire Place[3]	59	59	0	70 dB
Oak Grove Drive	East of Foothill Fwy Overpass[4]	60	60	0	60 dB
Windsor Avenue	North of I-210 Northbound Ramps[4]	66	66	0	> +1 dB

Notes:
[1] Distance to nearest receptor shown in Table F, does not take into account existing noise barriers.
[2] Nearest sensitive receptor is La Cañada High School.
[3] Nearest sensitive receptor is La Cañada United Methodist Church.
[4] Nearest sensitive receptor is residential.
Source: FHWA Traffic Noise Prediction Model- FHWA-RD-77-108.

Table Q shows that the project traffic noise contributions to Route 1B that would access Devil's Gate Dam and Reservoir area, would increase the roadway noise by up to 1 dB. The proposed project would not cause the noise level at any nearby land use to exceed the normally compatible noise standard for the with project condition that did not already exceed the standards for the without project condition. For the roadway segment of Windsor Avenue north of I-210 northbound ramps that already exceed the normally compatible residential noise standard, the

noise level increase from the proposed project is within the greater than plus 1 dB noise exposure increase allowed before it is considered significant. Roadway noise impacts would be less than significant for Route 1B.

A comparison of the without project to the with project Route 1C conditions are provided in Table R for Devil's Gate Dam Area (Site 1).

Table R – Project Traffic Noise Contributions to Route 1C Near Devil's Gate Dam

		dBA CNEL at Nearest Receptor[1]			
Roadway	Segment	Existing	Existing Plus Route 1C	Project Contribution	Threshold
Berkshire Place	East of I-210 Northbound Ramps[2]	59	60	1	70 dB
Oak Grove Drive	South of Berkshire Place[3]	59	59	0	70 dB
Oak Grove Drive	East of Foothill Fwy Overpass[4]	60	60	0	60 dB
Windsor Avenue	North of I-210 Northbound Ramps[4]	66	66	0	> +1 dB

Notes:
[1] Distance to nearest receptor shown in Table F, does not take into account existing noise barriers.
[2] Nearest sensitive receptor is La Cañada High School.
[3] Nearest sensitive receptor is La Cañada United Methodist Church..
[4] Nearest sensitive receptor is residential.
Source: FHWA Traffic Noise Prediction Model- FHWA-RD-77-108.

Table R shows that the project traffic noise contributions to Route 1C that would access Devil's Gate Dam and Reservoir area, would increase the roadway noise by up to 1 dB. The proposed project would not cause the noise level at any nearby land use to exceed the normally compatible noise standard for the with project condition that did not already exceed the standards for the without project condition. For the roadway segment of Windsor Avenue north of I-210 northbound ramps that already exceed the normally compatible residential noise standard, the noise level increase from the proposed project is within the greater than plus 1 dB noise exposure increase allowed before it is considered significant. Roadway noise impacts would be less than significant for Route 1C.

A comparison of the without project to the with project Route 1D conditions are provided in Table S for Devil's Gate Dam Area (Site 1).

Table S – Project Traffic Noise Contributions to Route 1D Near Devil's Gate Dam

		dBA CNEL at Nearest Receptor[1]			
Roadway	Segment	Existing	Existing Plus Route 1D	Project Contribution	Threshold
Berkshire Place	East of I-210 Northbound Ramps[2]	59	60	1	70 dB
Oak Grove Drive	South of Berkshire Place[3]	59	59	0	70 dB
Oak Grove Drive	East of Foothill Fwy Overpass[4]	60	60	0	60 dB
Windsor Avenue	North of I-210 Northbound Ramps[4]	66	66	0	> +1 dB

Notes:
[1] Distance to nearest receptor shown in Table F, does not take into account existing noise barriers.
[2] Nearest sensitive receptor is La Cañada High School.
[3] Nearest sensitive receptor is La Cañada United Methodist Church.
[4] Nearest sensitive receptor is residential.
Source: FHWA Traffic Noise Prediction Model- FHWA-RD-77-108.

Table S shows that the project traffic noise contributions to Route 1D that would access Devil's Gate Dam and Reservoir area, would increase the roadway noise by up to 1 dB. The proposed project would not cause the noise level at any nearby land use to exceed the normally compatible noise standard for the with project condition that did not already exceed the standards for the without project condition. For the roadway segment of Windsor Avenue north of I-210 northbound ramps that already exceed the normally compatible residential noise standard, the noise level increase from the proposed project is within the greater than plus 1 dB noise exposure increase allowed before it is considered significant. Roadway noise impacts would be less than significant for Route 1D.

A comparison of the without project to the with project Route 1E conditions are provided in Table T for Devil's Gate Dam Area (Site 1).

Table T – Project Traffic Noise Contributions to Route 1E Near Devil's Gate Dam

		dBA CNEL at Nearest Receptor[1]			
Roadway	Segment	Existing	Existing Plus Route 1E	Project Contribution	Threshold
Berkshire Place	East of I-210 Northbound Ramps[2]	59	60	1	70 dB
Oak Grove Drive	South of Berkshire Place[3]	59	60	1	70 dB
Oak Grove Drive	East of Foothill Fwy Overpass[4]	60	60	0	60 dB
Windsor Avenue	North of I-210 Northbound Ramps[4]	66	66	0	> +1 dB

Notes:
[1] Distance to nearest receptor shown in Table F, does not take into account existing noise barriers.
[2] Nearest sensitive receptor is La Cañada High School.
[3] Nearest sensitive receptor is La Cañada United Methodist Church.
[4] Nearest sensitive receptor is residential.
Source: FHWA Traffic Noise Prediction Model- FHWA-RD-77-108.

Table T shows that the project traffic noise contributions to Route 1E that would access Devil's Gate Dam and Reservoir area, would increase the roadway noise by up to 1 dB. The proposed project would not cause the noise level at any nearby land use to exceed the normally compatible noise standard for the with project condition that did not already exceed the standards for the without project condition. For the roadway segment of Windsor Avenue north of I-210 northbound ramps that already exceed the normally compatible residential noise standard, the noise level increase from the proposed project is within the greater than plus 1 dB noise exposure increase allowed before it is considered significant. Roadway noise impacts would be less than significant for Route 1E.

A comparison of the without project to the with project Route 1F conditions are provided in Table U for Devil's Gate Dam Area (Site 1).

Table U – Project Traffic Noise Contributions to Route 1F Near Devil's Gate Dam

		dBA CNEL at Nearest Receptor[1]			
Roadway	Segment	Existing	Existing Plus Route 1F	Project Contribution	Threshold
Berkshire Place	East of I-210 Northbound Ramps[2]	59	60	1	70 dB
Oak Grove Drive	South of Berkshire Place[3]	59	59	0	70 dB
Oak Grove Drive	East of Foothill Fwy Overpass[4]	60	60	0	60 dB
Windsor Avenue	North of I-210 Northbound Ramps[4]	66	66	0	> +1 dB

Notes:
[1] Distance to nearest receptor shown in Table F, does not take into account existing noise barriers.
[2] Nearest sensitive receptor is La Cañada High School.
[3] Nearest sensitive receptor is La Cañada United Methodist Church.
[4] Nearest sensitive receptor is residential.
Source: FHWA Traffic Noise Prediction Model- FHWA-RD-77-108.

Table U shows that the project traffic noise contributions to Route 1F that would access Devil's Gate Dam and Reservoir area, would increase the roadway noise by up to 1 dB. The proposed project would not cause the noise level at any nearby land use to exceed the normally compatible noise standard for the with project condition that did not already exceed the standards for the without project condition. For the roadway segment of Windsor Avenue north of I-210 northbound ramps that already exceed the normally compatible residential noise standard, the noise level increase from the proposed project is within the greater than plus 1 dB noise exposure increase allowed before it is considered significant. Roadway noise impacts would be less than significant for Route 1F.

A comparison of the without project to the with project Route 1G conditions are provided in Table V for Devil's Gate Dam Area (Site 1).

Table V – Project Traffic Noise Contributions to Route 1G Near Devil's Gate Dam

		dBA CNEL at Nearest Receptor[1]			
Roadway	Segment	Existing	Existing Plus Route 1G	Project Contribution	Threshold
Berkshire Place	East of I-210 Northbound Ramps[2]	59	60	1	70 dB
Oak Grove Drive	South of Berkshire Place[3]	59	59	0	70 dB
Oak Grove Drive	East of Foothill Fwy Overpass[4]	60	60	0	60 dB
Windsor Avenue	North of I-210 Northbound Ramps[4]	66	66	0	> +1 dB

Notes:
[1] Distance to nearest receptor shown in Table F, does not take into account existing noise barriers.
[2] Nearest sensitive receptor is La Cañada High School.
[3] Nearest sensitive receptor is La Cañada United Methodist Church.
[4] Nearest sensitive receptor is residential.
Source: FHWA Traffic Noise Prediction Model- FHWA-RD-77-108.

Table V shows that the project traffic noise contributions to Route 1G that would access Devil's Gate Dam and Reservoir area, would increase the roadway noise by up to 1 dB. The proposed project would not cause the noise level at any nearby land use to exceed the normally compatible noise standard for the with project condition that did not already exceed the standards for the without project condition. For the roadway segment of Windsor Avenue north of I-210 northbound ramps that already exceed the normally compatible residential noise standard, the

noise level increase from the proposed project is within the greater than plus 1 dB noise exposure increase allowed before it is considered significant. Roadway noise impacts would be less than significant for Route 1G.

A comparison of the without project to the with project Route 1H conditions are provided in Table W for Devil's Gate Dam Area (Site 1).

Table W – Project Traffic Noise Contributions to Route 1H Near Devil's Gate Dam

		dBA CNEL at Nearest Receptor[1]			
Roadway	Segment	Existing	Existing Plus Route 1H	Project Contribution	Threshold
Berkshire Place	East of I-210 Northbound Ramps[2]	59	60	1	70 dB
Oak Grove Drive	South of Berkshire Place[3]	59	59	0	70 dB
Oak Grove Drive	East of Foothill Fwy Overpass[4]	60	60	0	60 dB
Windsor Avenue	North of I-210 Northbound Ramps[4]	66	66	0	> +1 dB

Notes:
[1] Distance to nearest receptor shown in Table F, does not take into account existing noise barriers.
[2] Nearest sensitive receptor is La Cañada High School.
[3] Nearest sensitive receptor is La Cañada United Methodist Church.
[4] Nearest sensitive receptor is residential.
Source: FHWA Traffic Noise Prediction Model- FHWA-RD-77-108.

Table W shows that the project traffic noise contributions to Route 1H that would access Devil's Gate Dam and Reservoir area, would increase the roadway noise by up to 1 dB. The proposed project would not cause the noise level at any nearby land use to exceed the normally compatible noise standard for the with project condition that did not already exceed the standards for the without project condition. For the roadway segment of Windsor Avenue north of I-210 northbound ramps that already exceed the normally compatible residential noise standard, the noise level increase from the proposed project is within the greater than plus 1 dB noise exposure increase allowed before it is considered significant. Roadway noise impacts would be less than significant for Route 1H.

A comparison of the without project to the with project Route 2A conditions are provided in Table X for travel to Manning Pit (Site 2).

Table X – Project Traffic Noise Contributions to Route 2A to Manning Pit

		dBA CNEL at Nearest Receptor[1]			
Roadway	Segment	Existing	Existing Plus Route 2A	Project Contribution	Threshold
Vincent Avenue	South of Gladstone Street[3]	65	66	1	> +1 dB
Vincent Avenue	South of Arrow Highway[3]	67	67	0	> +1 dB
Arrow Highway	East of Vincent Avenue[3]	69	70	1	> +1 dB
Arrow Highway	East of Lark Ellen Avenue[3]	69	70	1	> +1 dB
Arrow Highway	East of Enid Avenue[2]	70	70	0	70 dB
Azusa Avenue	North of Arrow Highway[3]	69	69	0	> +1 dB
Azusa Avenue	North of Gladstone Street[3]	66	66	0	> +1 dB

Notes:
[1] Distance to nearest residential or school use shown in Table F, does not take into account existing noise barriers.
[2] Nearest sensitive receptor is Gladstone High School.
[3] Nearest sensitive receptor is residential.
Source: FHWA Traffic Noise Prediction Model- FHWA-RD-77-108.

Table X shows that the project traffic noise contributions to Route 2A that would travel to Manning Pit, would increase the roadway noise by up to 1 dB. The proposed project would not cause the noise level at any nearby land use to exceed the normally compatible noise standard for the with project condition that did not already exceed the standards for the without project condition. The roadway segments of: Vincent Avenue south of Gladstone Street; Vincent Avenue south of Arrow Highway; Arrow Highway east of Vincent Avenue; Arrow Highway east of Lark Ellen Avenue; Azusa Avenue north of Arrow Highway; and Azusa Avenue north of Gladstone Street, all currently exceed the normally compatible residential noise standard with noise levels that range between 65 and 69 dB CNEL, the noise level increase from the proposed project is within the greater than plus 1 dB noise exposure increase allowed before it is considered significant for these roadway segments. Roadway noise impacts would be less than significant for Route 2A.

A comparison of the without project to the with project Route 2B conditions are provided in Table Y for travel to Manning Pit (Site 2).

Table Y – Project Traffic Noise Contributions to Route 2B to Manning Pit

		dBA CNEL at Nearest Receptor[1]			
Roadway	Segment	Existing	Existing Plus Route 2B	Project Contribution	Threshold
Vincent Avenue	South of Gladstone Street[3]	65	65	0	> +1 dB
Vincent Avenue	South of Arrow Highway[3]	67	67	0	> +1 dB
Arrow Highway	East of Vincent Avenue[3]	69	70	1	> +1 dB
Arrow Highway	East of Lark Ellen Avenue[3]	69	70	1	> +1 dB
Arrow Highway	East of Enid Avenue[2]	70	70	0	70 dB
Azusa Avenue	North of Arrow Highway[3]	69	69	0	> +1 dB
Azusa Avenue	North of Gladstone Street[3]	66	66	0	> +1 dB

Notes:
[1] Distance to nearest residential or school use shown in Table F, does not take into account existing noise barriers.
[2] Nearest sensitive receptor is Gladstone High School.
[3] Nearest sensitive receptor is residential.
Source: FHWA Traffic Noise Prediction Model- FHWA-RD-77-108.

Table Y shows that the project traffic noise contributions to Route 2B that would travel to Manning Pit, would increase the roadway noise by up to 1 dB. The proposed project would not cause the noise level at any nearby land use to exceed the normally compatible noise standard for the with project condition that did not already exceed the standards for the without project condition. The roadway segments of: Vincent Avenue south of Gladstone Street; Vincent Avenue south of Arrow Highway; Arrow Highway east of Vincent Avenue; Arrow Highway east of Lark Ellen Avenue; Azusa Avenue north of Arrow Highway; and Azusa Avenue north of Gladstone Street, all currently exceed the normally compatible residential noise standard with noise levels that range between 65 and 69 dB CNEL, the noise level increase from the proposed project is within the greater than plus 1 dB noise exposure increase allowed before it is considered significant for these roadway segments. Roadway noise impacts would be less than significant for Route 2B.

Route 3 would travel from I-210 to the Waste Management Pit via Irwindale Avenue and Gladstone Street would not pass by any noise sensitive land use. Therefore no quantitative

analysis has been provided of Route 3 and roadway noise impacts would be less than significant for Route 3.

A comparison of the without project to the with project Route 4A conditions are provided in Table Z for travel to Scholl Canyon Landfill (Site 4).

Table Z – Project Traffic Noise Contributions to Route 4A to Scholl Canyon Landfill

		dBA CNEL at Nearest Receptor[1]			
Roadway	Segment	Existing	Existing Plus Route 4A	Project Contribution	Threshold
Scholl Canyon Road	North of SR-134 Westbound Ramps[2]	54	60	6	60 dB
Figueroa Street	South of Eagle Vista Drive[3]	63	64	1	70 dB

Notes:
[1] Distance to nearest receptor shown in Table F, does not take into account existing noise barriers.
[2] Nearest sensitive receptor is residential.
[3] Nearest sensitive receptor is Eagle Rock Recreation Center.
Source: FHWA Traffic Noise Prediction Model- FHWA-RD-77-108.

Table Z shows that the project traffic noise contributions to Route 4A that would travel to Scholl Canyon Landfill, would increase the roadway noise by up to 6 dB. The proposed project would not cause the noise level at any nearby land use to exceed the normally compatible noise standard for the with project condition that did not already exceed the standards for the without project condition. Roadway noise impacts would be less than significant for Route 4A.

A comparison of the without project to the with project Route 4B conditions are provided in Table AA for travel to Scholl Canyon Landfill (Site 4).

Table AA – Project Traffic Noise Contributions to Route 4B to Scholl Canyon Landfill

		dBA CNEL at Nearest Receptor[1]			
Roadway	Segment	Existing	Existing Plus Route 4B	Project Contribution	Threshold
Scholl Canyon Road	North of SR-134 Westbound Ramps[2]	54	60	6	60 dB
Figueroa Street	South of Eagle Vista Drive[3]	63	64	1	70 dB

Notes:
[1] Distance to nearest receptor shown in Table F, does not take into account existing noise barriers.
[2] Nearest sensitive receptor is residential.
[3] Nearest sensitive receptor Eagle Rock Recreation Center.
Source: FHWA Traffic Noise Prediction Model- FHWA-RD-77-108.

Table AA shows that the project traffic noise contributions to Route 4B that would travel to Scholl Canyon Landfill, would increase the roadway noise by up to 6 dB. The proposed project would not cause the noise level at any nearby land use to exceed the normally compatible noise standard for the with project condition that did not already exceed the standards for the without project condition. Roadway noise impacts would be less than significant for Route 4B.

A comparison of the without project to the with project Routes 5A, 6A, and 7A conditions are provided in Table BB for travel to Sheldon Pit (Site 5), Cal-Mat Pit (Site 6), and Bradley

Landfill (Site 7). Routes 5A, 6A, and 7A run from the Foothill Boulevard ramps on I-210 via Osborne Street and Glen Oaks Boulevard to the sites.

Table BB – Project Traffic Noise Contributions to Routes 5A, 6A, and 7A

		dBA CNEL at Nearest Receptor[1]			
Roadway	Segment	Existing	Existing Plus Route 5A	Project Contribution	Threshold
Foothill Boulevard	South of I-210 Westbound Ramps[2]	62	63	1	> +2 dB
Osborne Street	West of Foothill Boulevard[3]	65	66	1	70 dB
Glen Oaks Boulevard	South of Osborne Street[2]	69	69	0	> +1 dB

Notes:
[1] Distance to nearest receptor shown in Table F, does not take into account existing noise barriers.
[2] Nearest sensitive receptor is residential.
[3] Nearest sensitive receptor is Pacoima Youth Athletic Foundation (park use).
Source: FHWA Traffic Noise Prediction Model- FHWA-RD-77-108.

Table BB shows that the project traffic noise contributions to Routes 5A, 6A, and 7A that would travel to Sheldon Pit, Cal-Mat Pit, and Bradley Landfill, would increase the roadway noise by up to 1 dB. The proposed project would not cause the noise level at any nearby land use to exceed the normally compatible noise standard for the with project condition that did not already exceed the standards for the without project condition. The roadway segment of Foothill Boulevard south of I-210 westbound ramps currently exceeds the normally compatible residential noise standard with an existing noise level of 62 dBA CNEL, which allows for a project increase of greater than 2 dB before it is considered significant. The roadway segment of Glen Oaks Boulevard south of Osborne Street currently exceed the normally compatible residential noise standard with an existing noise level of 69 dBA CNEL, which allows for a project increase of greater than 1 dB before it is considered significant. Roadway noise impacts would be less than significant for Routes 5A, 6A, and 7A.

A comparison of the without project to the with project Route 5B, 6B, and 7B conditions are provided in Table CC for travel to Sheldon Pit (Site 5), Cal-Mat Pit (Site 6), and Bradley Landfill (Site 7). Routes 5B, 6B, and 7B run from the Glen Oaks Boulevard ramps on I-5 to the sites.

Table CC – Project Traffic Noise Contributions to Routes 5B, 6B, and 7B

		dBA CNEL at Nearest Receptor[1]			
Roadway	Segment	Existing	Existing Plus Route 5B	Project Contribution	Threshold
Glen Oaks Boulevard	South of Penrose Street[2]	68	68	0	> +1 dB
Glen Oaks Boulevard	South of Sunland Boulevard[2]	68	68	0	> +1 dB

Notes:
[1] Distance to nearest receptor shown in Table F, does not take into account existing noise barriers.
[2] Nearest sensitive receptor is residential.
Source: FHWA Traffic Noise Prediction Model- FHWA-RD-77-108.

Table CC shows that the project traffic noise contributions to Routes 5B, 6B, and 7B that would travel to Sheldon Pit, Cal-Mat Pit, and Bradley Landfill, would not create a quantitative increase in roadway noise at the nearby sensitive receptors. The proposed project would not cause the

noise level at any nearby land use to exceed the normally compatible noise standard for the with project condition that did not already exceed the standards for the without project condition. Both analyzed roadway segments currently exceeds the normally compatible residential noise standard with an existing noise level of 68 dBA CNEL, which allows for a project increase of greater than 1 dB before it is considered significant. Roadway noise impacts would be less than significant for Routes 5B, 6B, and 7B.

A comparison of the without project to the with project Routes 5C, 6C, and 7C conditions are provided in Table DD for travel to Sheldon Pit (Site 5), Cal-Mat Pit (Site 6), and Bradley Landfill (Site 7). Routes 5C, 6C, and 7C run from the Wheatland Avenue ramps on I-210 via Foothill Boulevard and Wentworth Street to the sites.

Table DD – Project Traffic Noise Contributions to Routes 5C, 6C, and 7C

		dBA CNEL at Nearest Receptor[1]			
Roadway	Segment	Existing	Existing Plus Route 5C	Project Contribution	Threshold
Foothill Boulevard	East of Wheatland Avenue[2]	64	64	0	> +1 dB
Wentworth Street	South of Foothill Boulevard[2]	65	66	1	> +1 dB

Notes:
[1] Distance to nearest receptor shown in Table F, does not take into account existing noise barriers.
[2] Nearest sensitive receptor is residential.
Source: FHWA Traffic Noise Prediction Model- FHWA-RD-77-108.

Table DD shows that the project traffic noise contributions to Routes 5C, 6C, and 7C that would travel to Sheldon Pit, Cal-Mat Pit, and Bradley Landfill, would increase the roadway noise by up to 1 dB. The proposed project would not cause the noise level at any nearby land use to exceed the normally compatible noise standard for the with project condition that did not already exceed the standards for the without project condition. The roadway segment of Foothill Boulevard east of Wheatland Avenue currently exceeds the normally compatible residential noise standard with an existing noise level of 64 dBA CNEL, which allows for a project increase of greater than 2 dB before it is considered significant. The roadway segment of Wentworth Street south of Foothill Boulevard currently exceed the normally compatible residential noise standard with an existing noise level of 65 dBA CNEL, which allows for a project increase of greater than 1 dB before it is considered significant. Roadway noise impacts would be less than significant for Routes 5C, 6C, and 7C.

A comparison of the without project to the with project Route 8A conditions are provided in Table EE for travel to Boulevard Pit (Site 8).

Table EE – Project Traffic Noise Contributions to Route 8A to Boulevard Pit

		dBA CNEL at Nearest Receptor[1]			
Roadway	Segment	Existing	Existing Plus Route 8A	Project Contribution	Threshold
Branford Street	East of Laurel Canyon Boulevard[3]	64	65	1	> +1 dB
Branford Street	West of Laurel Canyon Boulevard[3]	63	63	0	> +2 dB

Notes:
[1] Distance to nearest receptor shown in Table F, does not take into account existing noise barriers.
[2] Nearest sensitive receptor is residential.
Source: FHWA Traffic Noise Prediction Model- FHWA-RD-77-108.

Table EE shows that the project traffic noise contributions to Route 8A that would travel to Boulevard Pit, would increase the roadway noise by up to 1 dB. The proposed project would not cause the noise level at any nearby land use to exceed the normally compatible noise standard for the with project condition that did not already exceed the standards for the without project condition. Both analyzed roadway segments currently exceed the normally compatible residential noise standard with existing noise levels that range between 63 and 64 dBA CNEL, which allows for a project increase of greater than 2 dB before it is considered significant. Roadway noise impacts would be less than significant for Route 8A.

A comparison of the without project to the with project Route 8B conditions are provided in Table FF for travel to Boulevard Pit (Site 8).

Table FF – Project Traffic Noise Contributions to Route 8B to Boulevard Pit

		dBA CNEL at Nearest Receptor[1]			
Roadway	Segment	Existing	Existing Plus Route 8B	Project Contribution	Threshold
Osborne Street	East of I-5 Northbound Ramps[2]	65	65	0	> +1 dB
Laurel Canyon Boulevard	South of Osborne Street[2]	65	66	1	> +1 dB
Branford Street	East of Laurel Canyon Boulevard[2]	64	65	1	> +2 dB

Notes:
[1] Distance to nearest receptor shown in Table F, does not take into account existing noise barriers.
[2] Nearest sensitive receptor is residential.
Source: FHWA Traffic Noise Prediction Model- FHWA-RD-77-108.

Table FF shows that the project traffic noise contributions to Route 8B that would travel to Boulevard Pit, would increase the roadway noise by up to 1 dB. The proposed project would not cause the noise level at any nearby land use to exceed the normally compatible noise standard for the with project condition that did not already exceed the standards for the without project condition. The roadway segments of Osborne Street east of I-5 northbound ramps and Laurel Canyon Boulevard south of Osborne Street currently exceed the normally compatible residential noise standard with an existing noise level of 65 dBA CNEL, which allows for a project increase of greater than 1 dB before it is considered significant. The roadway segment of Branford Street east of Laurel Canyon Boulevard currently exceed the normally compatible residential noise standard with an existing noise level of 64 dBA CNEL, which allows for a project increase of greater than 2 dB before it is considered significant. Roadway noise impacts would be less than significant for Route 8B.

A comparison of the without project to the with project Route 8C conditions are provided in Table GG for travel to Boulevard Pit (Site 8).

Table GG – Project Traffic Noise Contributions to Route 8C to Boulevard Pit

		dBA CNEL at Nearest Receptor[1]			
Roadway	Segment	Existing	Existing Plus Route 8C	Project Contribution	Threshold
Foothill Boulevard	East of Wheatland Avenue[2]	64	64	0	> +1 dB
Wentworth Street	South of Foothill Boulevard[2]	65	66	1	> +1 dB
San Fernando Road	South of Branford Street[3]	57	57	0	70 dB

Notes:
[1] Distance to nearest receptor shown in Table F, does not take into account existing noise barriers.
[2] Nearest sensitive receptor is residential.
[3] Nearest sensitive receptor is Pacifica Hospital of the Valley.
Source: FHWA Traffic Noise Prediction Model- FHWA-RD-77-108.

Table GG shows that the project traffic noise contributions to Route 8C that would travel to Boulevard Pit, would increase the roadway noise by up to 1 dB. The proposed project would not cause the noise level at any nearby land use to exceed the normally compatible noise standard for the with project condition that did not already exceed the standards for the without project condition. The roadway segment of Foothill Boulevard east of Wheatland Avenue currently exceeds the normally compatible residential noise standard with an existing noise level of 64 dBA CNEL, which allows for a project increase of greater than 2 dB before it is considered significant. The roadway segment of Wentworth Street south of Foothill Boulevard currently exceed the normally compatible residential noise standard with an existing noise level of 65 dBA CNEL, which allows for a project increase of greater than 1 dB before it is considered significant. Roadway noise impacts would be less than significant for Route 8C.

Route 9 would travel from I-210 to Vulcan Materials Pit via Irwindale Avenue would not pass by any noise sensitive land use. Therefore no quantitative analysis has been provided of Route 9 and roadway noise impacts would be less than significant for Route 9.

Level of Significance Before Mitigation

Potentially significant impact.

Mitigation Measures

Mitigation Measure 1:

The project applicant shall limit construct activities for Monday through Friday to between 7:00 a.m. and 6:00 p.m. Standard Time and to between 7:00 a.m. and 7:00 p.m. Daylight Savings Time and on Saturday between 8:00 a.m. and 5:00 p.m. No construction activities shall occur on federal holidays.

Level of Significance After Mitigation

Less than significant impact.

7.3 Generation of Excessive Groundborne Vibration

The proposed project would not expose persons to or generation of excessive groundborne vibration or groundborne noise levels. The preferred alternative for the proposed project would remove approximately 2.9 million cubic yards of current excess sediment in the reservoir plus any additional sediment that accumulates prior to removal commencement. All alternatives

would require the operation of similar on-site diesel equipment and except for Alternative 4, the rest of the alternatives would require the use of haul trucks to remove sediment. The primary difference between alternatives with regard to vibration impacts is the duration of activities, however since the standards do not differentiate between vibration impacts that occur over one day or several weeks, this analysis has analyzed all alternatives together.

Chapter 12.08.560 of the County's Municipal Code restricts the operation of any device which is above the vibration perception threshold at any private property boundary or at 150 feet from the source on public property. Chapter 12.08.350 defines the "vibration perception threshold" as a motion velocity of 0.01 inch per second over the range of 1 to 100 Hertz.

The on-site construction equipment and off-site truck vibration impacts have been analyzed separately below.

On-Site Construction Equipment Vibration Impacts

The on-site construction equipment during removal of sediment and sediment maintenance activities would require the simultaneous operation of two front end loaders, one dozer, one excavator, one water truck, and one sorter/crusher. There is also anticipated to be up to three dump trucks simultaneously operating on the project site during the removal of sediment and sediment maintenance activities.

Vibration impacts primarily occur in structures, where people are sitting or laying down and are more sensitive to vibration in these positions. The nearest vibration sensitive receptors to the proposed project are: single-family homes as near as 140 feet from excavation activities on the southeast side of the project site located in the City of Pasadena; single-family homes as near as 180 feet from excavation activities on the east side of the project site in the unincorporated area of Altadena; office buildings that are part of the JPL facility as near as 200 feet from excavation activities on the northwest side of the project site in the City of La Cañada Flintridge; La Cañada High School as near as 430 feet from excavation activities on the southwest side of the project site and located in the City of La Cañada Flintridge; and La Cañada United Methodist Church as near as 500 feet from excavation activities in the City of La Cañada Flintridge.

The primary source of vibration during construction would be from the on-site operation of a bull dozer. On-site equipment vibration impacts to the nearby sensitive receptors have been calculated through use of typical vibration propagation rates and the vibration levels for a bull dozer detailed above in Section 5.3 of this report including Table M – Vibration Source Levels for Construction Equipment and the results are shown below in Table HH.

Table HH – On-Site Construction Equipment Vibration Impacts at Nearby Sensitive Receptors

Receptor Description	Receptor Jurisdiction	Distance to Receptor (feet)	Maximum Vibration Level Peak Particle Velocity inch/second
Single-Family Home	Pasadena	140	0.013
Single-Family Home	Los Angeles County	180	0.010
JPL Office	La Cañada Flintridge	200	0.009
La Cañada High School	La Cañada Flintridge	430	0.004
La Cañada Methodist Church	La Cañada Flintridge	500	0.003
	County of Los Angeles Vibration Standard		0.01

Notes: Based on vibration levels for a large bulldozer provided above in Table M and vibration propagation rates detailed in Caltrans, 2004.

Table HH above shows that vibration impacts from on-site construction equipment would range from 0.003 to 0.013 inch per second peak particle velocity. Since the Cities of Pasadena and La Cañada Flintridge do not provide vibration standards, the County of Los Angeles vibration standards have used to analyze the vibration impacts to all nearby sensitive receptors. Table HH shows that only the nearby single-family homes in the City of Pasadena would experience vibration levels that would exceed the 0.01 inch per second vibration standard. This would be considered a significant impact.

Mitigation Measure 2 is provided that would restrict the use of large bulldozers and other large equipment (greater than 200 horsepower) from operating within 180 feet of any occupied off-site structure. Equipment that is not performing any earth moving activities and is solely operating for entering or leaving the site via the access road on the southeast side of the reservoir are exempted from this requirement. Through implementation of Mitigation Measure 2, the on-site construction equipment vibration impacts to nearby sensitive receptors would be reduced to less than significant.

Off-Site Truck Operations Vibration Impacts

The sediment removal activities for the proposed project would generate up to 425 daily round trips from haul trucks. The haul trucks would export the material from the project site to one of the following sites: Manning Pit (Site 2); Waste Management Pit (Site 3); Scholl Canyon Landfill (Site 4); Bradley Landfill (Site 5); Boulevard Pit (Site 6); Cal-Mat Pit (Site 7); Sheldon Pit (Site 8); or Vulcan Materials (Site 9).

Although, there is a lot of data available on the vibration levels created by construction equipment and trucks operating on dirt roads at construction sites as detailed above in Table M, there is relatively little quantitative data on vibration impacts from trucks operating on paved roads, which produce much lower vibration levels due to their smoother surfaces and compacted road bases than dirt roads. However, the City of Concord, California did a comprehensive survey of the vibration impacts from the City's major roadways and freeways and found that the roadways create vibration levels up to 64 VdB at 20 feet or 0.003 inch per second peak particle velocity. According to Table F above, the nearest sensitive receptors to the roadways would be single-family homes as close as 50 feet to the roadways travelled by the project trucks. Based on

typical vibration propagation rates, the vibration level at the nearest homes would be 0.001 inch per second peak particle velocity, which is within the County of Los Angeles 0.01 inch per second vibration standard. Impacts would be less than significant.

Level of Significance Before Mitigation

Potentially significant impact.

Mitigation Measures

Mitigation Measure 2:

The project applicant shall restrict the operation of any off-road construction equipment that is powered by a greater than 200 horse power engine from operating within 180 feet of any occupied off-site structure. Equipment that is not performing any earth moving activities and is solely operating for entering or leaving the site via the access road on the southeast side of the reservoir are exempted from this requirement.

Level of Significance After Mitigation

Less than significant impact.

7.4 Temporary Noise Level Increase

The proposed project would not create a substantial temporary or periodic increase in ambient noise levels in the project vicinity above noise levels existing without the proposed project. For this analysis, both the sediment removal activities and operational maintenance activities have been considered as temporary activities, since they would only occur for limited durations of time. The preferred alternative for the proposed project would remove approximately 2.9 million cubic yards of current excess sediment in the reservoir plus any additional sediment received prior to removal commencement. The construction activities associated with the removal of the sediment may create temporary on-site noise impacts from the operation of construction equipment as well off-site noise impacts from the use of haul trucks to export material offsite.

On-Site Construction Equipment Noise

In order to determine if the proposed on-site construction activities would create a significant substantial temporary noise increase, the OSHA agency limits for noise exposure have been utilized. The use of a significance threshold using an OSHA standard is considered conservative. The OSHA standard limits noise exposure of workers to 90 dB or less over 8 continuous hours and this standard has been utilized to analyze the construction noise impacts to the sensitive receptors located at the nearby off-site residences.

Construction noise impacts to the nearby sensitive receptors have been calculated through use of the RCNM and the parameters and assumptions detailed in Section 5.1 of this report including Table E – Construction Equipment Noise Emissions and Usage Factors. The results are shown below in Table II and the RCNM printouts are provided in Appendix D.

Table II – On-Site Construction Equipment Noise Levels at Nearby Sensitive Receptors

Receptor Description	Receptor Jurisdiction	Distance to Receptor (feet)	Construction Noise Levels[1]	
			dBA Leq	dBA L_{max}
Single-Family Home	Pasadena	140	71	73
Single-Family Home	Los Angeles County	180	70	71
JPL Office	La Cañada Flintridge	200	69	70
Watershed Park	Pasadena	20	86	90
La Cañada High School	La Cañada Flintridge	430	64	63
La Cañada Methodist Church	La Cañada Flintridge	500	63	62

Notes:
[1] Lmax is based on the maximum noise from the loudest piece of equipment and the Leq is the average noise from all equipment. Since there are 14 pieces of equipment being modeled the average noise level may exceed the maximum noise level for one piece of equipment.
Source: RCNM, Federal Highway Administration, 2006

Table II above shows that construction noise impacts would range from 62 dBA Leq to 86 dBA Leq at the nearby receptors, with the highest noise levels occurring at the portion of Watershed Park that is adjacent to the west side of the reservoir. Table II shows that the noise levels from on-site of construction activities would be within the 90 dB threshold detailed above. Therefore, a less than significant temporary construction noise impact would occur from development of the proposed project.

Off-Site Vehicular Noise

The sediment removal activities for the proposed project would generate up to 425 daily round trips from haul trucks and up to 17 daily round trips from workers commuting to the project site. The haul trucks would export the material from the project site to one of the following sites: Manning Pit (Site 2); Waste Management Pit (Site 3); Scholl Canyon Landfill (Site 4); Sheldon Pit (Site 5); Cal-Mat Pit (Site 6); Bradley Landfill (Site 7); Boulevard Pit (Site 8); or Vulcan Materials (Site 9). The analysis above in Section 7.2 found that the off-site vehicular trips would not create an exceedance of the normally acceptable noise standards for nearby sensitive land uses for locations that do not already exceed the standards for the without project conditions. The analysis above in Section 7.2 also found that for the locations that currently exceed the normally acceptable noise standard, the project noise contribution to these roadway segments would be within the Federal Transit Administration's allowable noise exposure increase levels. Therefore, the temporary noise level increase created from off-site vehicular noise impacts would result in a less than significant impact.

Level of Significance Before Mitigation

Less than significant impact.

Mitigation Measures

No mitigation is necessary.

Level of Significance After Mitigation

Less than significant impact.

8.0 REFERENCES

California Department of Transportation (Caltrans), *Technical Noise Supplement,* November 2009.

California Department of Transportation, *Transportation- and Construction-Induced Vibration Guidance Manual*, June, 2004

Chambers Group, *Notice of Preparation Initial Study Devil's Gate Reservoir and Management Project,* September 2011.

City of La Cañada Flintridge, *City of La Cañada Flintridge General Plan 2030*, January 2013.

City of La Cañada Flintridge, *Chapter 5.36.010 of the Municipal Code*, 1991.

City of Pasadena, *City of Pasadena Revised Noise Element of the General Plan,* December 2002.

City of Pasadena, *Pasadena, California Code of Ordinances Chapter 9.36 – Noise Restrictions,* 2008.

County of Los Angeles, *Los Angeles County Draft Preliminary General Plan 2007.*

County of Los Angeles, *County of Los Angeles Municipal Code Chapter 12.08 Noise Control*, 1978.

Hall & Foreman, Inc., *Devil's Gate Reservoir Sediment Removal and Management Project Traffic Impact Analysis*, September, 2013.

Federal Transit Administration, *Transit Noise and Vibration Impact Assessment*, May 2006.

U.S. Department of Transportation, *FHWA Roadway Construction Noise Model User's Guide*, January, 2006.

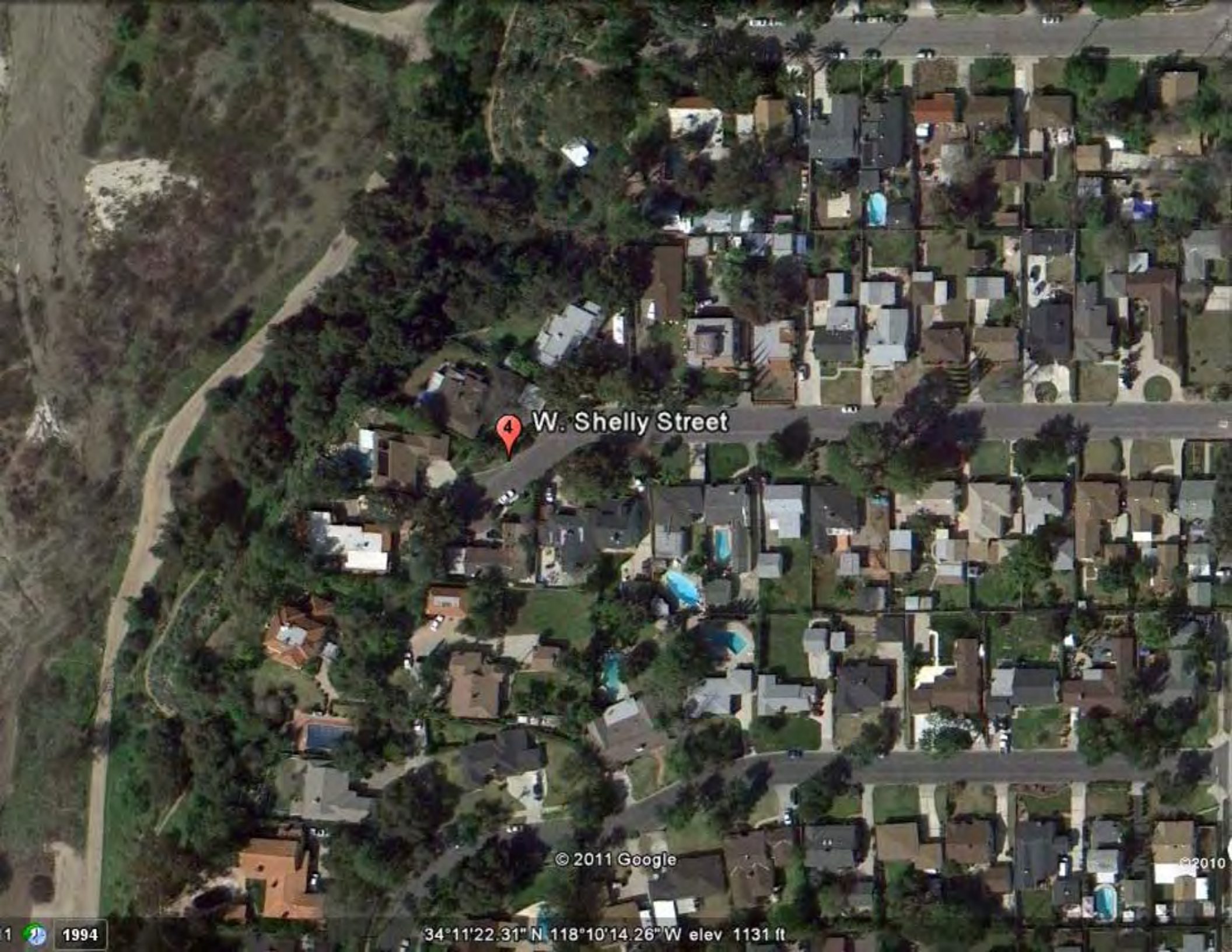
APPENDIX A

Aerial Photos of Noise Measurement Locations

1
La Canada United Metho
© 2011 Google
©2010
1994
34°11'19.80" N 118°10'46.10" W elev 1079 ft

2
La Canada High School
© 2011 Google
©2010
1994
34°11'31.51" N 118°10'42.13" W elev 1096 ft

Vista Laguna Te
Chevron Ct
N Windsor Ave
3
Residential - Vista Laguna Terrace
La Canada Verdugo Rd
Arroyo Blvd
Alberta St
Oak Grove Dr
W Woodbury Rd
© 2011 Google
©2010
Archwood Pl
1994
34°11'10.30" N 118°10'16.52" W elev 1104 ft


4
W. Shelly Street
© 2011 Google
©2010
1994
34°11'22.31" N 118°10'14.26" W elev 1131 ft

5
Rose Bowl Riders
Oak Grove Dr
© 2011 Google
©2010
1994
34°11'44.71" N 118°10'30.76" W elev 1079 ft

6
John Muir High School
© 2011 Google
©2010
1994
34°10'37.24" N 118°09'40.28" W elev 1038 ft

A
Irwindale Public
7
Irwindale Public Library
© 2011 Google
©2010
1995
34°06'14.26" N 117°56'00.49" W elev 461 ft

APPENDIX B

Noise Monitoring Data Printouts

Noise Measurement Field Data	Chambers Group, Inc.

Project Name: Devil's Gate

Project #:

Receiver Name: La Cañada United Methodist

Technician: Chris Pylant

Date: 6/3/11

Address: 104 Berkshire Pl. La Cañada-Flintridge, CA 91011

Site Description: In church parking lot, 25' from edge of Oak Grove Dr.

Temperature: 81°

Wind: light (3-5 mph)

Weather: sunny

Settings: (SLOW) FAST

Terrain: Sloped to E & W, church site is flat. Fwy is approx. 20' higher Project site is approx. 40' lower

Primary Source: Traffic Noise from 210 Freeway.

Secondary Sources: Traffic noise from Oak Grove Dr., Car doors opening & closing in church parking lot

1	Start: 2:22 PM	End: 2:37 PM	Leq: 66.7	Lmax: 81.0	Other:		
2	Start:	End:	Leq:	Lmax:	Other:		
3	Start:	End:	Leq:	Lmax:	Other:		
4	Start:	End:	Leq:	Lmax:	Other:		

Additional Notes/Sketch

Lmax was passing motorcycle.

This receptor is also representative of Hillside School because of their proximity.

Noise Measurement Field Data	Chambers Group, Inc.

Project Name: Devil's Gate

Project #:

Receiver Name: La Cañada H.S.

Technician: Chris Pylant

Date: 6/3/11

Address: 4463 Oak Grove Dr. La Cañada, CA 91011

Site Description: Park Bench across street from school, 100' N of pool

Temperature: 81°

Wind: light (3-5mph)

Weather: sunny

Settings: (SLOW) FAST

Terrain: hilly, project site is approx. 40-50' lower.

Primary Source: Traffic on Oak Grove Dr., kids talking, parking lot noise

Secondary Sources: Traffic noise from 210 freeway

1	Start: 2:48PM	End: 3:03 PM	Leq: 57.9	Lmax: 68.8	Other:		
2	Start:	End:	Leq:	Lmax:	Other:		
3	Start:	End:	Leq:	Lmax:	Other:		
4	Start:	End:	Leq:	Lmax:	Other:		

Additional Notes/Sketch

Noise Measurement Field Data

Chambers Group, Inc.

Project Name: Devil's Gate

Project #:

Receiver Name: Residential - Vista Laguna Terr.

Technician: Chris Pylant

Date: 6/3/11

Address: 2301 Vista Laguna Terrace Pasadena, CA 91001

Site Description: 150' N of intersection w/ La Cañada Verdugo Rd. @ outside edge of sidewalk

Temperature: 81°

Wind: light (3-5mph)

Weather: sunny

Settings: (SLOW) FAST

Terrain: gently sloping project site is approx. 60-70' lower

Primary Source: Traffic on 210 Freeway

Secondary Sources: dogs barking, cars passing on residential streets

1	Start: 3:54 PM	End: 4:09 PM	Leq: 57.6	Lmax: 68.5	Other:		
2	Start:	End:	Leq:	Lmax:	Other:		
3	Start:	End:	Leq:	Lmax:	Other:		
4	Start:	End:	Leq:	Lmax:	Other:		

Additional Notes/Sketch

Helicopter at 4:08 to 4:09 PM

Noise Measurement Field Data	Chambers Group, Inc.

Project Name: Devil's Gate

Project #:

Receiver Name: W. End of Shelley St.

Technician: Chris Pylant

Date: 6/3/11

Address: 1021 W. Shelly St. Altadena, CA 91001

Site Description: @ edge of road

Temperature: 80°

Wind: light (3-5 mph)

Weather: sunny

Settings: (SLOW) FAST

Terrain: flat, project site approx. 80-90' lower

Primary Source: kids playing, dog barking

Secondary Sources: UPS truck/delivery, cars leaving/arriving

1	Start:	4:22 PM	End:	4:37PM	Leq:	58.4	Lmax:	79.7	Other:
2	Start:		End:		Leq:		Lmax:		Other:
3	Start:		End:		Leq:		Lmax:		Other:
4	Start:		End:		Leq:		Lmax:		Other:

Additional Notes/Sketch

UPS truck + dog barking at 4:27 & 4:31 PM

Dogs barking at 4:36-8 PM

Noise Measurement Field Data	Chambers Group, Inc.

Project Name: Devil's Gate

Project #:

Receiver Name: Rose Bowl Riders

Technician: Chris Pylant

Date: 6/3/11

Address: Lower Hahamonga Watershed Park 4750 Oak Grove Dr. Pasadena, CA

Site Description: Back of youth camp, adjacent to equestrian property, on dirt road

Temperature: 80°

Wind: light (3-5 mph)

Weather: sunny

Settings: (SLOW) FAST

Terrain: generally flat, Oak Grove Dr. is about 50' higher, project site 10-20' lower.

Primary Source: Faint traffic on Oak Grove Dr.

Secondary Sources: people talking (equestrians) as they passed by

1	Start:	4:53 PM	End:	5:08 PM	Leq:	50.4	Lmax:	57.2	Other:
2	Start:		End:		Leq:		Lmax:		Other:
3	Start:		End:		Leq:		Lmax:		Other:
4	Start:		End:		Leq:		Lmax:		Other:

Additional Notes/Sketch

Noise Measurement Field Data

Chambers Group, Inc.

Project Name: Devil's Gate

Project #:

Receiver Name: John Muir High School

Technician: Chris Rylant

Date: 6/3/11

Address: 1905 Lincoln Ave. Pasadena, CA 91103

Site Description: Western end of South parking lot (edge of last space)

Temperature: 79°

Wind: light (0-3 mph)

Weather: sunny

Settings: (SLOW) FAST

Terrain: flat

Primary Source: Traffic on Lincoln Ave.

Secondary Sources: Traffic on 210 Freeway

1	Start: 5:21 PM	End: 5:36 PM	Leq: 59.9	Lmax: 65.3	Other:	
2	Start:	End:	Leq:	Lmax:	Other:	
3	Start:	End:	Leq:	Lmax:	Other:	
4	Start:	End:	Leq:	Lmax:	Other:	

Additional Notes/Sketch

Noise Measurement Field Data

Chambers Group, Inc.

Project Name: Devil's Gate

Project #:

Receiver Name: Irwindale Public Library

Technician: Chris Pylant

Date: 6/3/11

Address: 5050 Irwindale Ave. Irwindale, CA 91706

Site Description: Middle of western edge of parking lot

Temperature: 89°

Wind: mild (5-10mph)

Weather: sunny

Settings: SLOW FAST

Terrain: flat

Primary Source: Traffic on Irwindale Ave.

Secondary Sources: Parking lot noise including: people talking, car doors, cars starting

1	Start: 12:08 PM	End: 12:23 PM	Leq: 52.2	Lmax: 63.7	Other:	
2	Start:	End:	Leq:	Lmax:	Other:	
3	Start:	End:	Leq:	Lmax:	Other:	
4	Start:	End:	Leq:	Lmax:	Other:	

Additional Notes/Sketch

APPENDIX C

FHWA Model Existing Traffic Noise Contour Calculations

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: EXISTING CONDITIONS SITE 1

Project: Devil's Gate Reservoir
Site Conditions: Soft

	Vehicle Mix 1 (Arterials)				Vehicle Mix 2 (Arterial With Project)				Vehicle Mix 3 (SR-210)			
Vehicle Type	Day	Evening	Night	Daily	Day	Evening	Night	Daily	Day	Evenin	Night	Daily
Automobiles	69.50%	12.90%	9.60%	92.00%	64.86%	11.99%	8.92%	85.77%	63.28%	12.97%	15.17%	91.42%
Medium Trucks	1.44%	0.06%	1.50%	3.00%	1.34%	0.06%	1.39%	2.79%	1.50%	0.27%	0.76%	2.53%
Heavy Trucks	2.40%	0.10%	2.50%	5.00%	9.20%	0.09%	2.32%	11.62%	3.31%	0.32%	2.42%	6.05%

Road Name: Berkshire Place **Segment: East of I-210 Northbound Ramps**

Average Daily Traffic: 8000 Vehicles Vehicle Speed: 30 MPH Vehicle Mix: 1 Roadway Classification: Major

	NOISE PARAMETERS AT 75 FEET FROM CENTERLINE (Equiv. Lane Dist: 71.39 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	62.51	-1.41	-2.42	-1.20	57.48	55.11	53.82	47.76	56.19	56.82	70 dBA:	**12**	**13**
Medium Trucks	73.11	-16.27	-2.42	-1.20	53.22	34.01	26.23	35.44	41.59	41.62	65 dBA:	**26**	**28**
Heavy Trucks	80.26	-14.06	-2.42	-1.20	62.58	45.59	37.81	47.02	53.17	53.21	60 dBA:	**56**	**59**
				Total:	**64.12**	**55.60**	**53.93**	**50.55**	**58.05**	**58.48**	55 dBA:	**120**	**128**

Road Name: Oak Grove Drive **Segment: South of Berkshire Place**

Average Daily Traffic: 6000 Vehicles Vehicle Speed: 35 MPH Vehicle Mix: 1 Roadway Classification: Major

	NOISE PARAMETERS AT 75 FEET FROM CENTERLINE (Equiv. Lane Dist: 71.39 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	65.11	-3.33	-2.42	-1.20	58.16	55.79	54.49	48.44	56.87	57.50	70 dBA:	**12**	**13**
Medium Trucks	74.83	-18.19	-2.42	-1.20	53.01	33.80	26.02	35.23	41.38	41.42	65 dBA:	**26**	**28**
Heavy Trucks	80.05	-15.97	-2.42	-1.20	60.45	43.46	35.68	44.89	51.04	51.07	60 dBA:	**55**	**59**
				Total:	**62.93**	**56.06**	**54.56**	**50.17**	**57.98**	**58.48**	55 dBA:	**118**	**128**

Road Name: Oak Grove Drive **Segment: East of Foothill Fwy Overpass**

Average Daily Traffic: 6400 Vehicles Vehicle Speed: 40 MPH Vehicle Mix: 1 Roadway Classification: Primary Arterial

	NOISE PARAMETERS AT 85 FEET FROM CENTERLINE (Equiv. Lane Dist: 79.53 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	67.36	-3.63	-3.13	-1.20	59.41	57.03	55.74	49.69	58.12	58.75	70 dBA:	**16**	**17**
Medium Trucks	76.31	-18.49	-3.13	-1.20	53.49	34.28	26.50	35.71	41.87	41.90	65 dBA:	**34**	**37**
Heavy Trucks	81.16	-16.27	-3.13	-1.20	60.56	43.57	35.79	45.00	51.15	51.18	60 dBA:	**73**	**79**
				Total:	**63.49**	**57.25**	**55.79**	**51.08**	**59.00**	**59.53**	55 dBA:	**157**	**170**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: EXISTING CONDITIONS SITE 1

Project: Devil's Gate Reservoir
Site Conditions: Soft

Road Name: Windsor Avenue **Segment: North of I-210 Northbound Ramps**

Average Daily Traffic: 21700 Vehicles | Vehicle Speed: 35 MPH | Vehicle Mix: 1 | Roadway Classification: Minor Arterial

	NOISE PARAMETERS AT 65 FEET FROM CENTERLINE (Equiv. Lane Dist: 57.66 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	65.11	2.26	-1.03	-1.20	65.13	62.76	61.47	55.41	63.85	64.48	70 dBA:	**30**	**32**
Medium Trucks	74.83	-12.61	-1.03	-1.20	59.99	40.78	33.00	42.20	48.36	48.39	65 dBA:	**64**	**70**
Heavy Trucks	80.05	-10.39	-1.03	-1.20	67.42	50.43	42.65	51.86	58.01	58.05	60 dBA:	**139**	**150**
				Total:	**69.90**	**63.03**	**61.53**	**57.14**	**64.95**	**65.45**	55 dBA:	**299**	**323**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: EXISTING CONDITIONS SITES 2 AND 3

Project: Devil's Gate Reservoir
Site Conditions: Soft

	Vehicle Mix 1 (Arterials)				Vehicle Mix 2 (Arterial With Project)				Vehicle Mix 3 (I-210)			
Vehicle Type	Day	Evening	Night	Daily	Day	Evening	Night	Daily	Day	Evenin	Night	Daily
Automobiles	69.50%	12.90%	9.60%	92.00%	66.07%	12.26%	9.13%	87.45%	64.42%	13.20%	15.44%	93.07%
Medium Trucks	1.44%	0.06%	1.50%	3.00%	1.37%	0.06%	1.43%	2.85%	1.24%	0.22%	0.63%	2.09%
Heavy Trucks	2.40%	0.10%	2.50%	5.00%	7.34%	0.10%	2.38%	9.81%	2.65%	0.25%	1.94%	4.84%

Road Name: Vincent Avenue **Segment: South of Gladstone Street**

Average Daily Traffic: 8600 Vehicles Vehicle Speed: 45 MPH Vehicle Mix: 1 Roadway Classification: Secondary Arterial

	NOISE PARAMETERS AT 55 FEET FROM CENTERLINE (Equiv. Lane Dist: 50.83 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	69.34	-2.85	-0.21	-1.20	65.08	62.71	61.41	55.36	63.79	64.42	70 dBA:	**24**	**26**
Medium Trucks	77.62	-17.72	-0.21	-1.20	58.49	39.28	31.50	40.71	46.86	46.90	65 dBA:	**51**	**55**
Heavy Trucks	82.14	-15.50	-0.21	-1.20	65.23	48.24	40.46	49.66	55.82	55.85	60 dBA:	**110**	**119**
				Total:	**68.61**	**62.88**	**61.45**	**56.51**	**64.51**	**65.05**	55 dBA:	**237**	**257**

Road Name: Vincent Avenue **Segment: South of Arrow Highway**

Average Daily Traffic: 10600 Vehicles Vehicle Speed: 45 MPH Vehicle Mix: 1 Roadway Classification: Secondary Arterial

	NOISE PARAMETERS AT 50 FEET FROM CENTERLINE (Equiv. Lane Dist: 45.38 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	69.34	-1.95	0.53	-1.20	66.73	64.35	63.06	57.01	65.44	66.07	70 dBA:	**28**	**30**
Medium Trucks	77.62	-16.81	0.53	-1.20	60.14	40.93	33.15	42.36	48.51	48.54	65 dBA:	**60**	**65**
Heavy Trucks	82.14	-14.59	0.53	-1.20	66.88	49.89	42.10	51.31	57.47	57.50	60 dBA:	**129**	**140**
				Total:	**70.26**	**64.53**	**63.10**	**58.16**	**66.16**	**66.70**	55 dBA:	**277**	**301**

Road Name: Arrow Highway **Segment: East of Vincent Avenue**

Average Daily Traffic: 23400 Vehicles Vehicle Speed: 45 MPH Vehicle Mix: 1 Roadway Classification: Principal Arterial

	NOISE PARAMETERS AT 60 FEET FROM CENTERLINE (Equiv. Lane Dist: 51.96 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	69.34	1.49	-0.35	-1.20	69.28	66.91	65.62	59.56	67.99	68.63	70 dBA:	**49**	**54**
Medium Trucks	77.62	-13.37	-0.35	-1.20	62.69	43.49	35.70	44.91	51.07	51.10	65 dBA:	**106**	**115**
Heavy Trucks	82.14	-11.16	-0.35	-1.20	69.43	52.44	44.66	53.87	60.02	60.06	60 dBA:	**229**	**249**
				Total:	**72.81**	**67.08**	**65.66**	**60.72**	**68.71**	**69.26**	55 dBA:	**492**	**535**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: EXISTING CONDITIONS SITES 2 AND 3

Project: Devil's Gate Reservoir
Site Conditions: Soft

Road Name: Arrow Highway **Segment: East of Lark Ellen Avenue**
Average Daily Traffic: 23800 Vehicles Vehicle Speed: 45 MPH Vehicle Mix: 1 Roadway Classification: Principal Arterial

	NOISE PARAMETERS AT 60 FEET FROM CENTERLINE (Equiv. Lane Dist: 51.96 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	69.34	1.57	-0.35	-1.20	69.36	66.98	65.69	59.64	68.07	68.70	70 dBA:	**50**	**54**
Medium Trucks	77.62	-13.30	-0.35	-1.20	62.77	43.56	35.78	44.99	51.14	51.17	65 dBA:	**107**	**117**
Heavy Trucks	82.14	-11.08	-0.35	-1.20	69.51	52.52	44.73	53.94	60.10	60.13	60 dBA:	**231**	**251**
				Total:	**72.89**	**67.16**	**65.73**	**60.79**	**68.79**	**69.33**	55 dBA:	**498**	**542**

Road Name: Arrow Highway **Segment: East of Enid Avenue**
Average Daily Traffic: 24500 Vehicles Vehicle Speed: 45 MPH Vehicle Mix: 1 Roadway Classification: Principal Arterial

	NOISE PARAMETERS AT 60 FEET FROM CENTERLINE (Equiv. Lane Dist: 51.96 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	69.34	1.69	-0.35	-1.20	69.48	67.11	65.82	59.76	68.19	68.83	70 dBA:	**51**	**55**
Medium Trucks	77.62	-13.17	-0.35	-1.20	62.89	43.69	35.90	45.11	51.27	51.30	65 dBA:	**109**	**119**
Heavy Trucks	82.14	-10.96	-0.35	-1.20	69.63	52.64	44.86	54.07	60.22	60.26	60 dBA:	**236**	**256**
				Total:	**73.01**	**67.28**	**65.86**	**60.91**	**68.91**	**69.46**	55 dBA:	**508**	**552**

Road Name: Azusa Avenue **Segment: North of Arrow Highway**
Average Daily Traffic: 20900 Vehicles Vehicle Speed: 45 MPH Vehicle Mix: 1 Roadway Classification: Principal Arterial

	NOISE PARAMETERS AT 60 FEET FROM CENTERLINE (Equiv. Lane Dist: 51.96 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	69.34	1.00	-0.35	-1.20	68.79	66.42	65.13	59.07	67.50	68.14	70 dBA:	**46**	**50**
Medium Trucks	77.62	-13.86	-0.35	-1.20	62.20	43.00	35.21	44.42	50.58	50.61	65 dBA:	**98**	**107**
Heavy Trucks	82.14	-11.65	-0.35	-1.20	68.94	51.95	44.17	53.38	59.53	59.57	60 dBA:	**212**	**230**
				Total:	**72.32**	**66.59**	**65.17**	**60.22**	**68.22**	**68.77**	55 dBA:	**457**	**497**

Road Name: Azusa Avenue **Segment: North of Gladstone Street**
Average Daily Traffic: 23200 Vehicles Vehicle Speed: 35 MPH Vehicle Mix: 1 Roadway Classification: Principal Arterial

	NOISE PARAMETERS AT 65 FEET FROM CENTERLINE (Equiv. Lane Dist: 57.66 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	65.11	2.55	-1.03	-1.20	65.42	63.05	61.76	55.70	64.14	64.77	70 dBA:	**31**	**34**
Medium Trucks	74.83	-12.32	-1.03	-1.20	60.28	41.07	33.29	42.49	48.65	48.68	65 dBA:	**67**	**73**
Heavy Trucks	80.05	-10.10	-1.03	-1.20	67.71	50.72	42.94	52.15	58.30	58.34	60 dBA:	**145**	**157**
				Total:	**70.19**	**63.33**	**61.82**	**57.43**	**65.24**	**65.74**	55 dBA:	**313**	**338**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: EXISTING CONDITIONS SITE 4

Project: Devil's Gate Reservoir
Site Conditions: Soft

	Vehicle Mix 1 (Arterials)				Vehicle Mix 2 (Scholl Cyn With Project)				Vehicle Mix 3 (Figueroa W-Project)			
Vehicle Type	Day	Evening	Night	Daily	Day	Evening	Night	Daily	Day	Evenin	Night	Daily
Automobiles	69.50%	12.90%	9.60%	92.00%	39.96%	7.42%	5.52%	52.90%	67.90%	12.60%	9.38%	89.88%
Medium Trucks	1.44%	0.06%	1.50%	3.00%	0.83%	0.03%	0.86%	1.73%	1.41%	0.06%	1.47%	2.93%
Heavy Trucks	2.40%	0.10%	2.50%	5.00%	44.90%	0.06%	0.44%	45.40%	6.41%	0.10%	2.48%	8.99%

Road Name: Scholl Canyon Road **Segment: North of SR-134 Westbound Ramps**

Average Daily Traffic: 1000 Vehicles Vehicle Speed: 35 MPH Vehicle Mix: 1 Roadway Classification: Hillside

	NOISE PARAMETERS AT 45 FEET FROM CENTERLINE (Equiv. Lane Dist: 44.09 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	65.11	-11.11	0.72	-1.20	53.52	51.15	49.85	43.80	52.23	52.86	70 dBA:	**3**	**4**
Medium Trucks	74.83	-25.97	0.72	-1.20	48.37	29.16	21.38	30.59	36.74	36.78	65 dBA:	**8**	**8**
Heavy Trucks	80.05	-23.76	0.72	-1.20	55.81	38.82	31.03	40.24	46.40	46.43	60 dBA:	**16**	**17**
				Total:	**58.29**	**51.42**	**49.92**	**45.53**	**53.33**	**53.84**	55 dBA:	**35**	**38**

Road Name: Figueroa Street **Segment: South of Eagle Vista Drive**

Average Daily Traffic: 10600 Vehicles Vehicle Speed: 35 MPH Vehicle Mix: 1 Roadway Classification: Secondary

	NOISE PARAMETERS AT 55 FEET FROM CENTERLINE (Equiv. Lane Dist: 49.49 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	65.11	-0.86	-0.04	-1.20	63.02	60.65	59.35	53.30	61.73	62.36	70 dBA:	**18**	**20**
Medium Trucks	74.83	-15.72	-0.04	-1.20	57.87	38.66	30.88	40.09	46.24	46.28	65 dBA:	**39**	**43**
Heavy Trucks	80.05	-13.50	-0.04	-1.20	65.31	48.32	40.54	49.74	55.90	55.93	60 dBA:	**85**	**92**
				Total:	**67.79**	**60.92**	**59.42**	**55.03**	**62.83**	**63.34**	55 dBA:	**183**	**198**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: EXISTING CONDITIONS SITES 5, 6, 7, AND 8 **Project: Devil's Gate Reservoir**

Site Conditions: Soft

	Vehicle Mix 1 (Arterials)				Vehicle Mix 2 (Foothill Blvd W-Project)				Vehicle Mix 3 (Wentworth W-Project)			
Vehicle Type	Day	Evening	Night	Daily	Day	Evening	Night	Daily	Day	Evenin	Night	Daily
Automobiles	69.50%	12.90%	9.60%	92.00%	64.96%	12.06%	8.97%	85.98%	66.68%	12.38%	9.21%	88.27%
Medium Trucks	1.44%	0.06%	1.50%	3.00%	1.35%	0.06%	1.40%	2.80%	1.38%	0.06%	1.44%	2.88%
Heavy Trucks	2.40%	0.10%	2.50%	5.00%	8.94%	0.09%	2.34%	11.37%	6.74%	0.10%	2.40%	9.23%

Road Name: Foothill Boulevard **Segment: South of I-210 Westbound Ramps**

Average Daily Traffic: 13700 Vehicles Vehicle Speed: 45 MPH Vehicle Mix: 1 Roadway Classification: Major

	NOISE PARAMETERS AT 110 FEET FROM CENTERLINE (Equiv. Lane Dist: 107.57 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	69.34	-0.83	-5.09	-1.20	62.22	59.85	58.55	52.50	60.93	61.56	70 dBA:	**31**	**33**
Medium Trucks	77.62	-15.70	-5.09	-1.20	55.63	36.42	28.64	37.85	44.00	44.04	65 dBA:	**66**	**71**
Heavy Trucks	82.14	-13.48	-5.09	-1.20	62.37	45.38	37.60	46.80	52.96	52.99	60 dBA:	**142**	**154**
				Total:	**65.75**	**60.02**	**58.59**	**53.65**	**61.65**	**62.19**	55 dBA:	**305**	**332**

Road Name: Osborne Street **Segment: West of Foothill Boulevard**

Average Daily Traffic: 14300 Vehicles Vehicle Speed: 40 MPH Vehicle Mix: 1 Roadway Classification: Major

	NOISE PARAMETERS AT 60 FEET FROM CENTERLINE (Equiv. Lane Dist: 55.42 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	67.36	-0.13	-0.77	-1.20	65.25	62.88	61.59	55.53	63.96	64.59	70 dBA:	**27**	**29**
Medium Trucks	76.31	-15.00	-0.77	-1.20	59.34	40.13	32.35	41.56	47.71	47.74	65 dBA:	**59**	**64**
Heavy Trucks	81.16	-12.78	-0.77	-1.20	66.40	49.41	41.63	50.84	56.99	57.03	60 dBA:	**126**	**137**
				Total:	**69.33**	**63.09**	**61.64**	**56.93**	**64.84**	**65.37**	55 dBA:	**272**	**295**

Road Name: Glen Oaks Boulevard **Segment: South of Osborne Street**

Average Daily Traffic: 24300 Vehicles Vehicle Speed: 45 MPH Vehicle Mix: 1 Roadway Classification: Major

	NOISE PARAMETERS AT 60 FEET FROM CENTERLINE (Equiv. Lane Dist: 55.42 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	69.34	1.66	-0.77	-1.20	69.03	66.66	65.36	59.31	67.74	68.37	70 dBA:	**47**	**51**
Medium Trucks	77.62	-13.21	-0.77	-1.20	62.44	43.23	35.45	44.66	50.81	50.85	65 dBA:	**102**	**111**
Heavy Trucks	82.14	-10.99	-0.77	-1.20	69.18	52.19	44.41	53.61	59.77	59.80	60 dBA:	**220**	**239**
				Total:	**72.56**	**66.83**	**65.40**	**60.46**	**68.46**	**69.00**	55 dBA:	**474**	**515**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: EXISTING CONDITIONS SITES 5, 6, 7, AND 8 **Project: Devil's Gate Reservoir**
Site Conditions: Soft

Road Name: Glen Oaks Boulevard **Segment: South of Penrose Street**
Average Daily Traffic: 15300 Vehicles Vehicle Speed: 45 MPH Vehicle Mix: 1 Roadway Classification: Major

	NOISE PARAMETERS AT 55 FEET FROM CENTERLINE (Equiv. Lane Dist: 49.96 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	69.34	-0.35	-0.10	-1.20	67.69	65.32	64.03	57.97	66.41	67.04	70 dBA:	**35**	**38**
Medium Trucks	77.62	-15.22	-0.10	-1.20	61.10	41.90	34.11	43.32	49.48	49.51	65 dBA:	**76**	**83**
Heavy Trucks	82.14	-13.00	-0.10	-1.20	67.84	50.85	43.07	52.28	58.43	58.47	60 dBA:	**164**	**178**
				Total:	**71.22**	**65.49**	**64.07**	**59.13**	**67.12**	**67.67**	55 dBA:	**354**	**385**

Road Name: Glen Oaks Boulevard **Segment: South of Sunland Boulevard**
Average Daily Traffic: 18000 Vehicles Vehicle Speed: 45 MPH Vehicle Mix: 1 Roadway Classification: Major

	NOISE PARAMETERS AT 60 FEET FROM CENTERLINE (Equiv. Lane Dist: 55.42 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	69.34	0.35	-0.77	-1.20	67.72	65.35	64.06	58.00	66.44	67.07	70 dBA:	**39**	**42**
Medium Trucks	77.62	-14.51	-0.77	-1.20	61.14	41.93	34.15	43.35	49.51	49.54	65 dBA:	**84**	**91**
Heavy Trucks	82.14	-12.30	-0.77	-1.20	67.87	50.88	43.10	52.31	58.46	58.50	60 dBA:	**180**	**196**
				Total:	**71.25**	**65.52**	**64.10**	**59.16**	**67.15**	**67.70**	55 dBA:	**388**	**421**

Road Name: Foothill Boulevard **Segment: East of Wheatland Avenue**
Average Daily Traffic: 6500 Vehicles Vehicle Speed: 50 MPH Vehicle Mix: 1 Roadway Classification: Major

	NOISE PARAMETERS AT 65 FEET FROM CENTERLINE (Equiv. Lane Dist: 60.79 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	71.12	-4.53	-1.38	-1.20	64.02	61.64	60.35	54.30	62.73	63.36	70 dBA:	**23**	**25**
Medium Trucks	78.79	-19.39	-1.38	-1.20	56.82	37.61	29.83	39.04	45.19	45.23	65 dBA:	**50**	**55**
Heavy Trucks	83.02	-17.18	-1.38	-1.20	63.27	46.28	38.50	47.70	53.86	53.89	60 dBA:	**108**	**118**
				Total:	**67.10**	**61.78**	**60.38**	**55.26**	**63.32**	**63.88**	55 dBA:	**233**	**254**

Road Name: Wentworth Street **Segment: South of Foothill Boulevard**
Average Daily Traffic: 9800 Vehicles Vehicle Speed: 45 MPH Vehicle Mix: 1 Roadway Classification: Secondary

	NOISE PARAMETERS AT 60 FEET FROM CENTERLINE (Equiv. Lane Dist: 54.99 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	69.34	-2.29	-0.72	-1.20	65.13	62.76	61.47	55.41	63.85	64.48	70 dBA:	**26**	**28**
Medium Trucks	77.62	-17.15	-0.72	-1.20	58.54	39.34	31.56	40.76	46.92	46.95	65 dBA:	**56**	**61**
Heavy Trucks	82.14	-14.94	-0.72	-1.20	65.28	48.29	40.51	49.72	55.87	55.91	60 dBA:	**121**	**131**
				Total:	**68.66**	**62.93**	**61.51**	**56.57**	**64.56**	**65.11**	55 dBA:	**260**	**283**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: EXISTING CONDITIONS SITES 5, 6, 7, AND 8 **Project: Devil's Gate Reservoir**
Site Conditions: Soft

Road Name: Osborne Street **Segment: East of I-5 Northbound Ramps**
Average Daily Traffic: 30600 Vehicles Vehicle Speed: 35 MPH Vehicle Mix: 1 Roadway Classification: Major

	NOISE PARAMETERS AT 85 FEET FROM CENTERLINE (Equiv. Lane Dist: 81.83 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	65.11	3.75	-3.31	-1.20	64.35	61.97	60.68	54.63	63.06	63.69	70 dBA:	**35**	**37**
Medium Trucks	74.83	-11.12	-3.31	-1.20	59.20	39.99	32.21	41.42	47.57	47.60	65 dBA:	**75**	**81**
Heavy Trucks	80.05	-8.90	-3.31	-1.20	66.63	49.64	41.86	51.07	57.23	57.26	60 dBA:	**161**	**174**
				Total:	**69.12**	**62.25**	**60.74**	**56.36**	**64.16**	**64.67**	55 dBA:	**347**	**375**

Road Name: Laurel Canyon Boulevard **Segment: South of Osborne Street**
Average Daily Traffic: 18300 Vehicles Vehicle Speed: 35 MPH Vehicle Mix: 1 Roadway Classification: Major

	NOISE PARAMETERS AT 60 FEET FROM CENTERLINE (Equiv. Lane Dist: 55.42 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	65.11	1.52	-0.77	-1.20	64.65	62.28	60.99	54.93	63.36	64.00	70 dBA:	**26**	**28**
Medium Trucks	74.83	-13.35	-0.77	-1.20	59.50	40.30	32.51	41.72	47.88	47.91	65 dBA:	**55**	**60**
Heavy Trucks	80.05	-11.13	-0.77	-1.20	66.94	49.95	42.17	51.38	57.53	57.57	60 dBA:	**119**	**129**
				Total:	**69.42**	**62.55**	**61.05**	**56.66**	**64.47**	**64.97**	55 dBA:	**257**	**277**

Road Name: Branford Street **Segment: East of Laurel Canyon Boulevard**
Average Daily Traffic: 10500 Vehicles Vehicle Speed: 35 MPH Vehicle Mix: 1 Roadway Classification: Secondary

	NOISE PARAMETERS AT 50 FEET FROM CENTERLINE (Equiv. Lane Dist: 43.86 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	65.11	-0.90	0.75	-1.20	63.76	61.39	60.10	54.04	62.47	63.11	70 dBA:	**19**	**20**
Medium Trucks	74.83	-15.76	0.75	-1.20	58.61	39.41	31.63	40.83	46.99	47.02	65 dBA:	**40**	**43**
Heavy Trucks	80.05	-13.54	0.75	-1.20	66.05	49.06	41.28	50.49	56.64	56.68	60 dBA:	**87**	**94**
				Total:	**68.53**	**61.66**	**60.16**	**55.77**	**63.58**	**64.08**	55 dBA:	**187**	**202**

Road Name: Branford Street **Segment: West of Laurel Canyon Boulevard**
Average Daily Traffic: 12000 Vehicles Vehicle Speed: 35 MPH Vehicle Mix: 1 Roadway Classification: Secondary

	NOISE PARAMETERS AT 65 FEET FROM CENTERLINE (Equiv. Lane Dist: 60.41 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	65.11	-0.32	-1.34	-1.20	62.26	59.89	58.59	52.54	60.97	61.60	70 dBA:	**19**	**21**
Medium Trucks	74.83	-15.18	-1.34	-1.20	57.11	37.90	30.12	39.33	45.48	45.52	65 dBA:	**41**	**45**
Heavy Trucks	80.05	-12.96	-1.34	-1.20	64.55	47.56	39.78	48.98	55.14	55.17	60 dBA:	**89**	**97**
				Total:	**67.03**	**60.16**	**58.66**	**54.27**	**62.07**	**62.58**	55 dBA:	**193**	**208**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: EXISTING CONDITIONS SITES 5, 6, 7, AND 8 **Project: Devil's Gate Reservoir**

Site Conditions: Soft

Road Name: San Fernando Road **Segment: South of Branford Street**

Average Daily Traffic: 15900 Vehicles Vehicle Speed: 35 MPH Vehicle Mix: 1 Roadway Classification: Major

	NOISE PARAMETERS AT 190 FEET FROM CENTERLINE (Equiv. Lane Dist: 188.6 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	65.11	0.91	-8.75	-1.20	56.06	53.69	52.40	46.34	54.78	55.41	70 dBA:	**22**	**23**
Medium Trucks	74.83	-13.96	-8.75	-1.20	50.92	31.71	23.93	33.13	39.29	39.32	65 dBA:	**47**	**51**
Heavy Trucks	80.05	-11.74	-8.75	-1.20	58.35	41.36	33.58	42.79	48.94	48.98	60 dBA:	**101**	**109**
				Total:	**60.83**	**53.96**	**52.46**	**48.07**	**55.88**	**56.38**	55 dBA:	**217**	**235**

APPENDIX D

RCNM Model On-Site Construction Equipment Noise Calculations

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 7/1/2013
Case Description: Devil's Gate Dam and Reservoir

		Baselines (dBA)		**---- Receptor #1 ----**
Description	Land Use	Daytime	Evening	Night
SFH in Pasadena	Residential	57.6	57.6	57.6

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Dozer	No	40		81.7	140	0
Dozer	No	40		81.7	240	0
Excavator	No	40		80.7	340	0
Grader	No	40	85		440	0
Front End Loader	No	40		79.1	540	0
Front End Loader	No	40		79.1	640	0
Front End Loader	No	40		79.1	740	0
Front End Loader	No	40		79.1	840	0
Concrete Batch Plant	No	15	83		940	0
Dump Truck	No	40		76.5	1040	0
Dump Truck	No	40		76.5	1140	0
Dump Truck	No	40		76.5	1240	0
Flat Bed Truck	No	40		74.3	1340	0
Pickup Truck	No	40		75	1440	0

		Calculated (dBA)		Results	Noise Limits (dBA)		
				Day		Evening	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq
Dozer		72.7	68.7	N/A	N/A	N/A	N/A
Dozer		68	64.1	N/A	N/A	N/A	N/A
Excavator		64	60	N/A	N/A	N/A	N/A
Grader		66.1	62.1	N/A	N/A	N/A	N/A
Front End Loader		58	55	N/A	N/A	N/A	N/A
Front End Loader		57	53	N/A	N/A	N/A	N/A
Front End Loader		55.7	51.7	N/A	N/A	N/A	N/A
Front End Loader		54.6	50.6	N/A	N/A	N/A	N/A
Concrete Batch Plant		57.5	49.3	N/A	N/A	N/A	N/A
Dump Truck		50.1	46.1	N/A	N/A	N/A	N/A
Dump Truck		49.3	45.3	N/A	N/A	N/A	N/A
Dump Truck		48.6	44.6	N/A	N/A	N/A	N/A
Flat Bed Truck		45.7	41.7	N/A	N/A	N/A	N/A
Pickup Truck		45.8	41.8	N/A	N/A	N/A	N/A
	Total	**73**	**71**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
SFH in LA County	Residential	58.4	58.4	58.4

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Dozer	No	40		81.7	180	0
Dozer	No	40		81.7	280	0
Excavator	No	40		80.7	380	0
Grader	No	40	85		480	0
Front End Loader	No	40		79.1	580	0
Front End Loader	No	40		79.1	680	0
Front End Loader	No	40		79.1	780	0
Front End Loader	No	40		79.1	880	0
Concrete Batch Plant	No	15	83		980	0
Dump Truck	No	40		76.5	1080	0
Dump Truck	No	40		76.5	1180	0
Dump Truck	No	40		76.5	1280	0
Flat Bed Truck	No	40		74.3	1380	0
Pickup Truck	No	40		75	1480	0

Equipment	Calculated (dBA) *Lmax	Leq	Results Day Lmax	Noise Limits (dBA) Leq	Evening Lmax	Leq
Dozer	70.5	66.6	N/A	N/A	N/A	N/A
Dozer	66.7	62.7	N/A	N/A	N/A	N/A
Excavator	63.1	59.1	N/A	N/A	N/A	N/A
Grader	65.4	61.4	N/A	N/A	N/A	N/A
Front End Loader	57.8	53.8	N/A	N/A	N/A	N/A
Front End Loader	56.4	52.5	N/A	N/A	N/A	N/A
Front End Loader	55.2	51.3	N/A	N/A	N/A	N/A
Front End Loader	54.2	50.2	N/A	N/A	N/A	N/A
Concrete Batch Plant	57.2	48.9	N/A	N/A	N/A	N/A
Dump Truck	49.8	45.8	N/A	N/A	N/A	N/A
Dump Truck	49.0	45.0	N/A	N/A	N/A	N/A
Dump Truck	48.3	44.3	N/A	N/A	N/A	N/A
Flat Bed Truck	45.4	41.5	N/A	N/A	N/A	N/A
Pickup Truck	45.6	41.6	N/A	N/A	N/A	N/A
Total	**71**	**70**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #3 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
JPL Office in LCF	Commercial	58.0	58.0	58

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Dozer	No	40		81.7	200	0
Dozer	No	40		81.7	300	0
Excavator	No	40		80.7	400	0
Grader	No	40	85		500	0
Front End Loader	No	40		79.1	600	0
Front End Loader	No	40		79.1	700	0
Front End Loader	No	40		79.1	800	0
Front End Loader	No	40		79.1	900	0
Concrete Batch Plant	No	15	83		1000	0
Dump Truck	No	40		76.5	1100	0
Dump Truck	No	40		76.5	1200	0
Dump Truck	No	40		76.5	1300	0
Flat Bed Truck	No	40		74.3	1400	0
Pickup Truck	No	40		75	1500	0

Equipment	Calculated (dBA) *Lmax	Leq	Results Noise Limits (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq
Dozer	69.6	65.6	N/A	N/A	N/A	N/A
Dozer	66.1	62.1	N/A	N/A	N/A	N/A
Excavator	62.6	58.7	N/A	N/A	N/A	N/A
Grader	65.0	61.0	N/A	N/A	N/A	N/A
Front End Loader	57.5	53.5	N/A	N/A	N/A	N/A
Front End Loader	56.2	52.2	N/A	N/A	N/A	N/A
Front End Loader	55.0	51.0	N/A	N/A	N/A	N/A
Front End Loader	54.0	50.0	N/A	N/A	N/A	N/A
Concrete Batch Plant	57.0	48.7	N/A	N/A	N/A	N/A
Dump Truck	49.6	45.6	N/A	N/A	N/A	N/A
Dump Truck	48.8	44.9	N/A	N/A	N/A	N/A
Dump Truck	48.2	44.2	N/A	N/A	N/A	N/A
Flat Bed Truck	45.3	41.3	N/A	N/A	N/A	N/A
Pickup Truck	45.5	41.5	N/A	N/A	N/A	N/A
Total	**70**	**69**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #4 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Park in LCF	Commercial	50	50	50.4

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Dozer	No	40		81.7	20	0
Dozer	No	40		81.7	120	0
Excavator	No	40		80.7	220	0
Grader	No	40	85		320	0
Front End Loader	No	40		79.1	420	0
Front End Loader	No	40		79.1	520	0
Front End Loader	No	40		79.1	620	0
Front End Loader	No	40		79.1	720	0
Concrete Batch Plant	No	15	83		820	0
Dump Truck	No	40		76.5	920	0
Dump Truck	No	40		76.5	1020	0
Dump Truck	No	40		76.5	1120	0
Flat Bed Truck	No	40		74.3	1220	0
Pickup Truck	No	40		75	1320	0

Equipment	Calculated (dBA) *Lmax	Leq	Results Day Lmax	Noise Limits (dBA) Day Leq	Evening Lmax	Evening Leq
Dozer	89.6	85.6	N/A	N/A	N/A	N/A
Dozer	74.1	70.1	N/A	N/A	N/A	N/A
Excavator	67.8	63.9	N/A	N/A	N/A	N/A
Grader	68.9	64.9	N/A	N/A	N/A	N/A
Front End Loader	60.6	56.6	N/A	N/A	N/A	N/A
Front End Loader	58.8	54.8	N/A	N/A	N/A	N/A
Front End Loader	57.2	53.3	N/A	N/A	N/A	N/A
Front End Loader	55.9	52.0	N/A	N/A	N/A	N/A
Concrete Batch Plant	58.7	50.5	N/A	N/A	N/A	N/A
Dump Truck	51.2	47.2	N/A	N/A	N/A	N/A
Dump Truck	50.3	46.3	N/A	N/A	N/A	N/A
Dump Truck	49.4	45.5	N/A	N/A	N/A	N/A
Flat Bed Truck	46.5	42.5	N/A	N/A	N/A	N/A
Pickup Truck	46.6	42.6	N/A	N/A	N/A	N/A
Total	**90**	**86**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #5 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
High School in LCF	Commercial	58	58	57.9

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Dozer	No	40		81.7	430	0
Dozer	No	40		81.7	530	0
Excavator	No	40		80.7	630	0
Grader	No	40	85		730	0
Front End Loader	No	40		79.1	830	0
Front End Loader	No	40		79.1	930	0
Front End Loader	No	40		79.1	1030	0
Front End Loader	No	40		79.1	1130	0
Concrete Batch Plant	No	15	83		1230	0
Dump Truck	No	40		76.5	1330	0
Dump Truck	No	40		76.5	1430	0
Dump Truck	No	40		76.5	1530	0
Flat Bed Truck	No	40		74.3	1630	0
Pickup Truck	No	40		75	1730	0

Equipment	Calculated (dBA) *Lmax	Leq	Results Noise Limits (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq
Dozer	63.0	59.0	N/A	N/A	N/A	N/A
Dozer	61.2	57.2	N/A	N/A	N/A	N/A
Excavator	58.7	54.7	N/A	N/A	N/A	N/A
Grader	61.7	57.7	N/A	N/A	N/A	N/A
Front End Loader	54.7	50.7	N/A	N/A	N/A	N/A
Front End Loader	53.7	49.7	N/A	N/A	N/A	N/A
Front End Loader	52.8	48.9	N/A	N/A	N/A	N/A
Front End Loader	52.0	48.0	N/A	N/A	N/A	N/A
Concrete Batch Plant	55.2	46.9	N/A	N/A	N/A	N/A
Dump Truck	48.0	44.0	N/A	N/A	N/A	N/A
Dump Truck	47.3	43.3	N/A	N/A	N/A	N/A
Dump Truck	46.7	42.8	N/A	N/A	N/A	N/A
Flat Bed Truck	44.0	40.0	N/A	N/A	N/A	N/A
Pickup Truck	44.2	40.2	N/A	N/A	N/A	N/A
Total	**63**	**64**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #6 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Church in LCF	Commercial	67	67	66.7

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Dozer	No	40		81.7	500	0
Dozer	No	40		81.7	600	0
Excavator	No	40		80.7	700	0
Grader	No	40	85		800	0
Front End Loader	No	40		79.1	900	0
Front End Loader	No	40		79.1	1000	0
Front End Loader	No	40		79.1	1100	0
Front End Loader	No	40		79.1	1200	0
Concrete Batch Plant	No	15	83		1300	0
Dump Truck	No	40		76.5	1400	0
Dump Truck	No	40		76.5	1500	0
Dump Truck	No	40		76.5	1600	0
Flat Bed Truck	No	40		74.3	1700	0
Pickup Truck	No	40		75	1800	0

Equipment	Calculated (dBA) *Lmax	Leq	Results Noise Limits (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq
Dozer	61.7	57.7	N/A	N/A	N/A	N/A
Dozer	60.1	56.1	N/A	N/A	N/A	N/A
Excavator	57.8	53.8	N/A	N/A	N/A	N/A
Grader	60.9	56.9	N/A	N/A	N/A	N/A
Front End Loader	54.0	50.0	N/A	N/A	N/A	N/A
Front End Loader	53.1	49.1	N/A	N/A	N/A	N/A
Front End Loader	52.3	48.3	N/A	N/A	N/A	N/A
Front End Loader	51.5	47.5	N/A	N/A	N/A	N/A
Concrete Batch Plant	54.7	46.5	N/A	N/A	N/A	N/A
Dump Truck	47.5	43.5	N/A	N/A	N/A	N/A
Dump Truck	46.9	42.9	N/A	N/A	N/A	N/A
Dump Truck	46.3	42.4	N/A	N/A	N/A	N/A
Flat Bed Truck	43.6	39.6	N/A	N/A	N/A	N/A
Pickup Truck	43.9	39.9	N/A	N/A	N/A	N/A
Total	**62**	**63**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

APPENDIX E

FHWA Model Existing With Project Traffic Noise Contour Calculations

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: EXISTING WITH ROUTE 1A PROJECT CONDITIONS **Project: Devil's Gate Reservoir**

Site Conditions: Soft

	Vehicle Mix 1 (Arterials)				Vehicle Mix 2 (Arterial With Project)				Vehicle Mix 3 (SR-210)			
Vehicle Type	Day	Evening	Night	Daily	Day	Evening	Night	Daily	Day	Evenin	Night	Daily
Automobiles	69.50%	12.90%	9.60%	92.00%	64.86%	11.99%	8.92%	85.77%	63.28%	12.97%	15.17%	91.42%
Medium Trucks	1.44%	0.06%	1.50%	3.00%	1.34%	0.06%	1.39%	2.79%	1.50%	0.27%	0.76%	2.53%
Heavy Trucks	2.40%	0.10%	2.50%	5.00%	9.20%	0.09%	2.32%	11.62%	3.31%	0.32%	2.42%	6.05%

Road Name: Berkshire Place **Segment: East of I-210 Northbound Ramps**

Average Daily Traffic: 8442 Vehicles Vehicle Speed: 30 MPH Vehicle Mix: 2 Roadway Classification: Major

	NOISE PARAMETERS AT 75 FEET FROM CENTERLINE (Equiv. Lane Dist: 71.39 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	62.51	-1.48	-2.42	-1.20	57.41	54.74	53.43	47.37	55.81	56.44	70 dBA:	**16**	**17**
Medium Trucks	73.11	-16.36	-2.42	-1.20	53.13	33.60	25.82	35.03	41.18	41.22	65 dBA:	**35**	**36**
Heavy Trucks	80.26	-10.16	-2.42	-1.20	66.48	55.32	41.39	50.59	57.80	57.82	60 dBA:	**75**	**78**
				Total:	**67.16**	**58.07**	**53.70**	**52.37**	**59.98**	**60.25**	55 dBA:	**161**	**168**

Road Name: Oak Grove Drive **Segment: South of Berkshire Place**

Average Daily Traffic: 6442 Vehicles Vehicle Speed: 35 MPH Vehicle Mix: 2 Roadway Classification: Major

	NOISE PARAMETERS AT 75 FEET FROM CENTERLINE (Equiv. Lane Dist: 71.39 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	65.11	-3.32	-2.42	-1.20	58.16	55.49	54.18	48.13	56.56	57.19	70 dBA:	**14**	**15**
Medium Trucks	74.83	-18.20	-2.42	-1.20	53.00	33.47	25.69	34.90	41.06	41.09	65 dBA:	**31**	**33**
Heavy Trucks	80.05	-12.01	-2.42	-1.20	64.42	53.26	39.33	48.54	55.74	55.76	60 dBA:	**67**	**71**
				Total:	**65.59**	**57.55**	**54.33**	**51.44**	**59.25**	**59.61**	55 dBA:	**144**	**152**

Road Name: Oak Grove Drive **Segment: East of Foothill Fwy Overpass**

Average Daily Traffic: 6400 Vehicles Vehicle Speed: 40 MPH Vehicle Mix: 2 Roadway Classification: Primary Arterial

	NOISE PARAMETERS AT 85 FEET FROM CENTERLINE (Equiv. Lane Dist: 79.53 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	67.36	-3.93	-3.13	-1.20	59.10	56.43	55.12	49.06	57.50	58.13	70 dBA:	**17**	**19**
Medium Trucks	76.31	-18.81	-3.13	-1.20	53.17	33.65	25.87	35.07	41.23	41.26	65 dBA:	**38**	**40**
Heavy Trucks	81.16	-12.61	-3.13	-1.20	64.22	53.07	39.13	48.34	55.54	55.57	60 dBA:	**81**	**86**
				Total:	**65.64**	**58.09**	**55.23**	**51.82**	**59.70**	**60.10**	55 dBA:	**175**	**186**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: EXISTING WITH ROUTE 1A PROJECT CONDITIONS **Project: Devil's Gate Reservoir**

Site Conditions: Soft

Road Name: Windsor Avenue **Segment: North of I-210 Northbound Ramps**

Average Daily Traffic: 21700 Vehicles Vehicle Speed: 35 MPH Vehicle Mix: 2 Roadway Classification: Minor Arterial

	NOISE PARAMETERS AT 65 FEET FROM CENTERLINE (Equiv. Lane Dist: 57.66 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	65.11	1.95	-1.03	-1.20	64.83	62.16	60.84	54.79	63.23	63.86	70 dBA:	**35**	**37**
Medium Trucks	74.83	-12.93	-1.03	-1.20	59.67	40.14	32.36	41.57	47.72	47.75	65 dBA:	**75**	**79**
Heavy Trucks	80.05	-6.73	-1.03	-1.20	71.08	59.93	45.99	55.20	62.40	62.43	60 dBA:	**161**	**170**
				Total:	**72.25**	**64.21**	**60.99**	**58.11**	**65.91**	**66.27**	55 dBA:	**347**	**367**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: EXISTING WITH PROJECT ROUTE 1B CONDITIONS

Project: Devil's Gate Reservoir
Site Conditions: Soft

	Vehicle Mix 1 (Arterials)				Vehicle Mix 2 (Arterial With Project)				Vehicle Mix 3 (SR-210)			
Vehicle Type	Day	Evening	Night	Daily	Day	Evening	Night	Daily	Day	Evenin	Night	Daily
Automobiles	69.50%	12.90%	9.60%	92.00%	64.86%	11.99%	8.92%	85.77%	63.28%	12.97%	15.17%	91.42%
Medium Trucks	1.44%	0.06%	1.50%	3.00%	1.34%	0.06%	1.39%	2.79%	1.50%	0.27%	0.76%	2.53%
Heavy Trucks	2.40%	0.10%	2.50%	5.00%	9.20%	0.09%	2.32%	11.62%	3.31%	0.32%	2.42%	6.05%

Road Name: Berkshire Place **Segment: East of I-210 Northbound Ramps**

Average Daily Traffic: 8000 Vehicles Vehicle Speed: 30 MPH Vehicle Mix: 2 Roadway Classification: Major

	NOISE PARAMETERS AT 75 FEET FROM CENTERLINE (Equiv. Lane Dist: 71.39 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	62.51	-1.71	-2.42	-1.20	57.18	54.50	53.19	47.14	55.58	56.21	70 dBA:	**16**	**16**
Medium Trucks	73.11	-16.59	-2.42	-1.20	52.90	33.37	25.59	34.80	40.95	40.99	65 dBA:	**34**	**35**
Heavy Trucks	80.26	-10.40	-2.42	-1.20	66.24	55.09	41.15	50.36	57.56	57.59	60 dBA:	**72**	**75**
				Total:	**66.93**	**57.83**	**53.46**	**52.13**	**59.75**	**60.02**	55 dBA:	**155**	**162**

Road Name: Oak Grove Drive **Segment: South of Berkshire Place**

Average Daily Traffic: 6000 Vehicles Vehicle Speed: 35 MPH Vehicle Mix: 2 Roadway Classification: Major

	NOISE PARAMETERS AT 75 FEET FROM CENTERLINE (Equiv. Lane Dist: 71.39 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	65.11	-3.63	-2.42	-1.20	57.86	55.18	53.87	47.82	56.26	56.89	70 dBA:	**14**	**15**
Medium Trucks	74.83	-18.51	-2.42	-1.20	52.69	33.17	25.38	34.59	40.75	40.78	65 dBA:	**30**	**31**
Heavy Trucks	80.05	-12.31	-2.42	-1.20	64.11	52.96	39.02	48.23	55.43	55.46	60 dBA:	**64**	**67**
				Total:	**65.28**	**57.24**	**54.02**	**51.13**	**58.94**	**59.30**	55 dBA:	**137**	**145**

Road Name: Oak Grove Drive **Segment: East of Foothill Fwy Overpass**

Average Daily Traffic: 6842 Vehicles Vehicle Speed: 40 MPH Vehicle Mix: 2 Roadway Classification: Primary Arterial

	NOISE PARAMETERS AT 85 FEET FROM CENTERLINE (Equiv. Lane Dist: 79.53 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	67.36	-3.64	-3.13	-1.20	59.39	56.72	55.41	49.35	57.79	58.42	70 dBA:	**18**	**19**
Medium Trucks	76.31	-18.52	-3.13	-1.20	53.46	33.94	26.16	35.36	41.52	41.55	65 dBA:	**39**	**42**
Heavy Trucks	81.16	-12.32	-3.13	-1.20	64.51	53.36	39.42	48.63	55.83	55.86	60 dBA:	**85**	**90**
				Total:	**65.93**	**58.38**	**55.52**	**52.11**	**59.99**	**60.39**	55 dBA:	**183**	**195**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: EXISTING WITH PROJECT ROUTE 1B CONDITIONS

Project: Devil's Gate Reservoir
Site Conditions: Soft

Road Name: Windsor Avenue **Segment: North of I-210 Northbound Ramps**

Average Daily Traffic: 22142 Vehicles | Vehicle Speed: 35 MPH | Vehicle Mix: 2 | Roadway Classification: Minor Arterial

	NOISE PARAMETERS AT 65 FEET FROM CENTERLINE (Equiv. Lane Dist: 57.66 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	65.11	2.04	-1.03	-1.20	64.92	62.24	60.93	54.88	63.32	63.95	70 dBA:	**35**	**37**
Medium Trucks	74.83	-12.84	-1.03	-1.20	59.75	40.23	32.45	41.65	47.81	47.84	65 dBA:	**76**	**80**
Heavy Trucks	80.05	-6.64	-1.03	-1.20	71.17	60.02	46.08	55.29	62.49	62.52	60 dBA:	**163**	**173**
				Total:	**72.34**	**64.30**	**61.08**	**58.20**	**66.00**	**66.36**	55 dBA:	**352**	**372**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: EXISTING WITH PROJECT ROUTE 1C CONDITIONS

Project: Devil's Gate Reservoir
Site Conditions: Soft

	Vehicle Mix 1 (Arterials)				Vehicle Mix 2 (Arterial With Project)				Vehicle Mix 3 (SR-210)			
Vehicle Type	Day	Evening	Night	Daily	Day	Evening	Night	Daily	Day	Evenin	Night	Daily
Automobiles	69.50%	12.90%	9.60%	92.00%	64.86%	11.99%	8.92%	85.77%	63.28%	12.97%	15.17%	91.42%
Medium Trucks	1.44%	0.06%	1.50%	3.00%	1.34%	0.06%	1.39%	2.79%	1.50%	0.27%	0.76%	2.53%
Heavy Trucks	9.00%	0.10%	2.50%	5.00%	9.20%	0.09%	2.32%	11.62%	3.31%	0.32%	2.42%	6.05%

Road Name: Berkshire Place **Segment: East of I-210 Northbound Ramps**

Average Daily Traffic: 8221 Vehicles Vehicle Speed: 30 MPH Vehicle Mix: 2 Roadway Classification: Major

	NOISE PARAMETERS AT 75 FEET FROM CENTERLINE (Equiv. Lane Dist: 71.39 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	62.51	-1.59	-2.42	-1.20	57.30	54.62	53.31	47.26	55.70	56.33	70 dBA:	**16**	**16**
Medium Trucks	73.11	-16.48	-2.42	-1.20	53.02	33.49	25.71	34.92	41.07	41.10	65 dBA:	**34**	**36**
Heavy Trucks	80.26	-10.28	-2.42	-1.20	66.36	55.21	41.27	50.48	57.68	57.71	60 dBA:	**73**	**77**
				Total:	**67.04**	**57.95**	**53.58**	**52.25**	**59.87**	**60.14**	55 dBA:	**158**	**165**

Road Name: Oak Grove Drive **Segment: South of Berkshire Place**

Average Daily Traffic: 6221 Vehicles Vehicle Speed: 35 MPH Vehicle Mix: 2 Roadway Classification: Major

	NOISE PARAMETERS AT 75 FEET FROM CENTERLINE (Equiv. Lane Dist: 71.39 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	65.11	-3.47	-2.42	-1.20	58.01	55.34	54.03	47.97	56.41	57.04	70 dBA:	**14**	**15**
Medium Trucks	74.83	-18.36	-2.42	-1.20	52.85	33.32	25.54	34.75	40.90	40.94	65 dBA:	**30**	**32**
Heavy Trucks	80.05	-12.16	-2.42	-1.20	64.27	53.11	39.18	48.38	55.59	55.61	60 dBA:	**65**	**69**
				Total:	**65.44**	**57.40**	**54.17**	**51.29**	**59.10**	**59.46**	55 dBA:	**141**	**149**

Road Name: Oak Grove Drive **Segment: East of Foothill Fwy Overpass**

Average Daily Traffic: 6621 Vehicles Vehicle Speed: 40 MPH Vehicle Mix: 2 Roadway Classification: Primary Arterial

	NOISE PARAMETERS AT 85 FEET FROM CENTERLINE (Equiv. Lane Dist: 79.53 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	67.36	-3.78	-3.13	-1.20	59.25	56.58	55.27	49.21	57.65	58.28	70 dBA:	**18**	**19**
Medium Trucks	76.31	-18.66	-3.13	-1.20	53.32	33.79	26.01	35.22	41.37	41.41	65 dBA:	**39**	**41**
Heavy Trucks	81.16	-12.47	-3.13	-1.20	64.37	53.21	39.28	48.48	55.69	55.71	60 dBA:	**83**	**88**
				Total:	**65.79**	**58.24**	**55.38**	**51.97**	**59.85**	**60.25**	55 dBA:	**179**	**190**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: EXISTING WITH PROJECT ROUTE 1C CONDITIONS

Project: Devil's Gate Reservoir
Site Conditions: Soft

Road Name: Windsor Avenue **Segment: North of I-210 Northbound Ramps**

Average Daily Traffic: 21921 Vehicles | Vehicle Speed: 35 MPH | Vehicle Mix: 2 | Roadway Classification: Minor Arterial

	NOISE PARAMETERS AT 65 FEET FROM CENTERLINE (Equiv. Lane Dist: 57.66 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	65.11	2.00	-1.03	-1.20	64.87	62.20	60.89	54.83	63.27	63.90	70 dBA:	**35**	**37**
Medium Trucks	74.83	-12.89	-1.03	-1.20	59.71	40.18	32.40	41.61	47.76	47.80	65 dBA:	**75**	**80**
Heavy Trucks	80.05	-6.69	-1.03	-1.20	71.13	59.97	46.04	55.24	62.45	62.47	60 dBA:	**162**	**171**
				Total:	**72.30**	**64.26**	**61.03**	**58.15**	**65.96**	**66.32**	55 dBA:	**349**	**369**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: EXISTING WITH PROJECT ROUTE 1D CONDITIONS

Project: Devil's Gate Reservoir
Site Conditions: Soft

	Vehicle Mix 1 (Arterials)				Vehicle Mix 2 (Arterial With Project)				Vehicle Mix 3 (SR-210)			
Vehicle Type	Day	Evening	Night	Daily	Day	Evening	Night	Daily	Day	Evenin	Night	Daily
Automobiles	69.50%	12.90%	9.60%	92.00%	64.86%	11.99%	8.92%	85.77%	63.28%	12.97%	15.17%	91.42%
Medium Trucks	1.44%	0.06%	1.50%	3.00%	1.34%	0.06%	1.39%	2.79%	1.50%	0.27%	0.76%	2.53%
Heavy Trucks	2.40%	0.10%	2.50%	5.00%	9.20%	0.09%	2.32%	11.62%	3.31%	0.32%	2.42%	6.05%

Road Name: Berkshire Place **Segment: East of I-210 Northbound Ramps**

Average Daily Traffic: 8221 Vehicles Vehicle Speed: 30 MPH Vehicle Mix: 2 Roadway Classification: Major

	NOISE PARAMETERS AT 75 FEET FROM CENTERLINE (Equiv. Lane Dist: 71.39 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	62.51	-1.59	-2.42	-1.20	57.30	54.62	53.31	47.26	55.70	56.33	70 dBA:	**16**	**16**
Medium Trucks	73.11	-16.48	-2.42	-1.20	53.02	33.49	25.71	34.92	41.07	41.10	65 dBA:	**34**	**36**
Heavy Trucks	80.26	-10.28	-2.42	-1.20	66.36	55.21	41.27	50.48	57.68	57.71	60 dBA:	**73**	**77**
				Total:	**67.04**	**57.95**	**53.58**	**52.25**	**59.87**	**60.14**	55 dBA:	**158**	**165**

Road Name: Oak Grove Drive **Segment: South of Berkshire Place**

Average Daily Traffic: 6221 Vehicles Vehicle Speed: 35 MPH Vehicle Mix: 2 Roadway Classification: Major

	NOISE PARAMETERS AT 75 FEET FROM CENTERLINE (Equiv. Lane Dist: 71.39 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	65.11	-3.47	-2.42	-1.20	58.01	55.34	54.03	47.97	56.41	57.04	70 dBA:	**14**	**15**
Medium Trucks	74.83	-18.36	-2.42	-1.20	52.85	33.32	25.54	34.75	40.90	40.94	65 dBA:	**30**	**32**
Heavy Trucks	80.05	-12.16	-2.42	-1.20	64.27	53.11	39.18	48.38	55.59	55.61	60 dBA:	**65**	**69**
				Total:	**65.44**	**57.40**	**54.17**	**51.29**	**59.10**	**59.46**	55 dBA:	**141**	**149**

Road Name: Oak Grove Drive **Segment: East of Foothill Fwy Overpass**

Average Daily Traffic: 6621 Vehicles Vehicle Speed: 40 MPH Vehicle Mix: 2 Roadway Classification: Primary Arterial

	NOISE PARAMETERS AT 85 FEET FROM CENTERLINE (Equiv. Lane Dist: 79.53 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	67.36	-3.78	-3.13	-1.20	59.25	56.58	55.27	49.21	57.65	58.28	70 dBA:	**18**	**19**
Medium Trucks	76.31	-18.66	-3.13	-1.20	53.32	33.79	26.01	35.22	41.37	41.41	65 dBA:	**39**	**41**
Heavy Trucks	81.16	-12.47	-3.13	-1.20	64.37	53.21	39.28	48.48	55.69	55.71	60 dBA:	**83**	**88**
				Total:	**65.79**	**58.24**	**55.38**	**51.97**	**59.85**	**60.25**	55 dBA:	**179**	**190**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: EXISTING WITH PROJECT ROUTE 1D CONDITIONS

Project: Devil's Gate Reservoir
Site Conditions: Soft

Road Name: Windsor Avenue **Segment: North of I-210 Northbound Ramps**

Average Daily Traffic: 21921 Vehicles Vehicle Speed: 35 MPH Vehicle Mix: 2 Roadway Classification: Minor Arterial

	NOISE PARAMETERS AT 65 FEET FROM CENTERLINE (Equiv. Lane Dist: 57.66 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	65.11	2.00	-1.03	-1.20	64.87	62.20	60.89	54.83	63.27	63.90	70 dBA:	**35**	**37**
Medium Trucks	74.83	-12.89	-1.03	-1.20	59.71	40.18	32.40	41.61	47.76	47.80	65 dBA:	**75**	**80**
Heavy Trucks	80.05	-6.69	-1.03	-1.20	71.13	59.97	46.04	55.24	62.45	62.47	60 dBA:	**162**	**171**
				Total:	**72.30**	**64.26**	**61.03**	**58.15**	**65.96**	**66.32**	55 dBA:	**349**	**369**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: EXISTING WITH PROJECT ROUTE 1E CONDITIONS

Project: Devil's Gate Reservoir
Site Conditions: Soft

	Vehicle Mix 1 (Arterials)				Vehicle Mix 2 (Arterial With Project)				Vehicle Mix 3 (SR-210)			
Vehicle Type	Day	Evening	Night	Daily	Day	Evening	Night	Daily	Day	Evenin	Night	Daily
Automobiles	69.50%	12.90%	9.60%	92.00%	64.86%	11.99%	8.92%	85.77%	63.28%	12.97%	15.17%	91.42%
Medium Trucks	1.44%	0.06%	1.50%	3.00%	1.34%	0.06%	1.39%	2.79%	1.50%	0.27%	0.76%	2.53%
Heavy Trucks	2.40%	0.10%	2.50%	5.00%	9.20%	0.09%	2.32%	11.62%	3.31%	0.32%	2.42%	6.05%

Road Name: Berkshire Place **Segment: East of I-210 Northbound Ramps**

Average Daily Traffic: 8442 Vehicles Vehicle Speed: 30 MPH Vehicle Mix: 2 Roadway Classification: Major

	NOISE PARAMETERS AT 75 FEET FROM CENTERLINE (Equiv. Lane Dist: 71.39 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	62.51	-1.48	-2.42	-1.20	57.41	54.74	53.43	47.37	55.81	56.44	70 dBA:	**16**	**17**
Medium Trucks	73.11	-16.36	-2.42	-1.20	53.13	33.60	25.82	35.03	41.18	41.22	65 dBA:	**35**	**36**
Heavy Trucks	80.26	-10.16	-2.42	-1.20	66.48	55.32	41.39	50.59	57.80	57.82	60 dBA:	**75**	**78**
				Total:	**67.16**	**58.07**	**53.70**	**52.37**	**59.98**	**60.25**	55 dBA:	**161**	**168**

Road Name: Oak Grove Drive **Segment: South of Berkshire Place**

Average Daily Traffic: 6442 Vehicles Vehicle Speed: 35 MPH Vehicle Mix: 2 Roadway Classification: Major

	NOISE PARAMETERS AT 75 FEET FROM CENTERLINE (Equiv. Lane Dist: 71.39 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	65.11	-3.32	-2.42	-1.20	58.16	55.49	54.18	48.13	56.56	57.19	70 dBA:	**14**	**15**
Medium Trucks	74.83	-18.20	-2.42	-1.20	53.00	33.47	25.69	34.90	41.06	41.09	65 dBA:	**31**	**33**
Heavy Trucks	80.05	-12.01	-2.42	-1.20	64.42	53.26	39.33	48.54	55.74	55.76	60 dBA:	**67**	**71**
				Total:	**65.59**	**57.55**	**54.33**	**51.44**	**59.25**	**59.61**	55 dBA:	**144**	**152**

Road Name: Oak Grove Drive **Segment: East of Foothill Fwy Overpass**

Average Daily Traffic: 6400 Vehicles Vehicle Speed: 40 MPH Vehicle Mix: 2 Roadway Classification: Primary Arterial

	NOISE PARAMETERS AT 85 FEET FROM CENTERLINE (Equiv. Lane Dist: 79.53 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	67.36	-3.93	-3.13	-1.20	59.10	56.43	55.12	49.06	57.50	58.13	70 dBA:	**17**	**19**
Medium Trucks	76.31	-18.81	-3.13	-1.20	53.17	33.65	25.87	35.07	41.23	41.26	65 dBA:	**38**	**40**
Heavy Trucks	81.16	-12.61	-3.13	-1.20	64.22	53.07	39.13	48.34	55.54	55.57	60 dBA:	**81**	**86**
				Total:	**65.64**	**58.09**	**55.23**	**51.82**	**59.70**	**60.10**	55 dBA:	**175**	**186**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: EXISTING WITH PROJECT ROUTE 1E CONDITIONS

Project: Devil's Gate Reservoir
Site Conditions: Soft

Road Name: Windsor Avenue **Segment: North of I-210 Northbound Ramps**

Average Daily Traffic: 21700 Vehicles | Vehicle Speed: 35 MPH | Vehicle Mix: 2 | Roadway Classification: Minor Arterial

	NOISE PARAMETERS AT 65 FEET FROM CENTERLINE (Equiv. Lane Dist: 57.66 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	65.11	1.95	-1.03	-1.20	64.83	62.16	60.84	54.79	63.23	63.86	70 dBA:	**35**	**37**
Medium Trucks	74.83	-12.93	-1.03	-1.20	59.67	40.14	32.36	41.57	47.72	47.75	65 dBA:	**75**	**79**
Heavy Trucks	80.05	-6.73	-1.03	-1.20	71.08	59.93	45.99	55.20	62.40	62.43	60 dBA:	**161**	**170**
				Total:	**72.25**	**64.21**	**60.99**	**58.11**	**65.91**	**66.27**	55 dBA:	**347**	**367**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: EXISTING WITH PROJECT ROUTE 1F CONDITIONS

Project: Devil's Gate Reservoir
Site Conditions: Soft

	Vehicle Mix 1 (Arterials)				Vehicle Mix 2 (Arterial With Project)				Vehicle Mix 3 (SR-210)			
Vehicle Type	Day	Evening	Night	Daily	Day	Evening	Night	Daily	Day	Evenin	Night	Daily
Automobiles	69.50%	12.90%	9.60%	92.00%	64.86%	11.99%	8.92%	85.77%	63.28%	12.97%	15.17%	91.42%
Medium Trucks	1.44%	0.06%	1.50%	3.00%	1.34%	0.06%	1.39%	2.79%	1.50%	0.27%	0.76%	2.53%
Heavy Trucks	9.00%	0.10%	2.50%	5.00%	9.20%	0.09%	2.32%	11.62%	3.31%	0.32%	2.42%	6.05%

Road Name: Berkshire Place **Segment: East of I-210 Northbound Ramps**

Average Daily Traffic: 8000 Vehicles Vehicle Speed: 30 MPH Vehicle Mix: 2 Roadway Classification: Major

	NOISE PARAMETERS AT 75 FEET FROM CENTERLINE (Equiv. Lane Dist: 71.39 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	62.51	-1.71	-2.42	-1.20	57.18	54.50	53.19	47.14	55.58	56.21	70 dBA:	**16**	**16**
Medium Trucks	73.11	-16.59	-2.42	-1.20	52.90	33.37	25.59	34.80	40.95	40.99	65 dBA:	**34**	**35**
Heavy Trucks	80.26	-10.40	-2.42	-1.20	66.24	55.09	41.15	50.36	57.56	57.59	60 dBA:	**72**	**75**
				Total:	**66.93**	**57.83**	**53.46**	**52.13**	**59.75**	**60.02**	55 dBA:	**155**	**162**

Road Name: Oak Grove Drive **Segment: South of Berkshire Place**

Average Daily Traffic: 6000 Vehicles Vehicle Speed: 35 MPH Vehicle Mix: 2 Roadway Classification: Major

	NOISE PARAMETERS AT 75 FEET FROM CENTERLINE (Equiv. Lane Dist: 71.39 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	65.11	-3.63	-2.42	-1.20	57.86	55.18	53.87	47.82	56.26	56.89	70 dBA:	**14**	**15**
Medium Trucks	74.83	-18.51	-2.42	-1.20	52.69	33.17	25.38	34.59	40.75	40.78	65 dBA:	**30**	**31**
Heavy Trucks	80.05	-12.31	-2.42	-1.20	64.11	52.96	39.02	48.23	55.43	55.46	60 dBA:	**64**	**67**
				Total:	**65.28**	**57.24**	**54.02**	**51.13**	**58.94**	**59.30**	55 dBA:	**137**	**145**

Road Name: Oak Grove Drive **Segment: East of Foothill Fwy Overpass**

Average Daily Traffic: 6842 Vehicles Vehicle Speed: 40 MPH Vehicle Mix: 2 Roadway Classification: Primary Arterial

	NOISE PARAMETERS AT 85 FEET FROM CENTERLINE (Equiv. Lane Dist: 79.53 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	67.36	-3.64	-3.13	-1.20	59.39	56.72	55.41	49.35	57.79	58.42	70 dBA:	**18**	**19**
Medium Trucks	76.31	-18.52	-3.13	-1.20	53.46	33.94	26.16	35.36	41.52	41.55	65 dBA:	**39**	**42**
Heavy Trucks	81.16	-12.32	-3.13	-1.20	64.51	53.36	39.42	48.63	55.83	55.86	60 dBA:	**85**	**90**
				Total:	**65.93**	**58.38**	**55.52**	**52.11**	**59.99**	**60.39**	55 dBA:	**183**	**195**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: EXISTING WITH PROJECT ROUTE 1F CONDITIONS

Project: Devil's Gate Reservoir
Site Conditions: Soft

Road Name: Windsor Avenue **Segment: North of I-210 Northbound Ramps**

Average Daily Traffic: 22142 Vehicles | Vehicle Speed: 35 MPH | Vehicle Mix: 2 | Roadway Classification: Minor Arterial

	NOISE PARAMETERS AT 65 FEET FROM CENTERLINE (Equiv. Lane Dist: 57.66 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	65.11	2.04	-1.03	-1.20	64.92	62.24	60.93	54.88	63.32	63.95	70 dBA:	**35**	**37**
Medium Trucks	74.83	-12.84	-1.03	-1.20	59.75	40.23	32.45	41.65	47.81	47.84	65 dBA:	**76**	**80**
Heavy Trucks	80.05	-6.64	-1.03	-1.20	71.17	60.02	46.08	55.29	62.49	62.52	60 dBA:	**163**	**173**
				Total:	**72.34**	**64.30**	**61.08**	**58.20**	**66.00**	**66.36**	55 dBA:	**352**	**372**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: EXISTING WITH PROJECT ROUTE 1G CONDITIONS

Project: Devil's Gate Reservoir
Site Conditions: Soft

	Vehicle Mix 1 (Arterials)				Vehicle Mix 2 (Arterial With Project)				Vehicle Mix 3 (SR-210)			
Vehicle Type	Day	Evening	Night	Daily	Day	Evening	Night	Daily	Day	Evenin	Night	Daily
Automobiles	69.50%	12.90%	9.60%	92.00%	64.86%	11.99%	8.92%	85.77%	63.28%	12.97%	15.17%	91.42%
Medium Trucks	1.44%	0.06%	1.50%	3.00%	1.34%	0.06%	1.39%	2.79%	1.50%	0.27%	0.76%	2.53%
Heavy Trucks	2.40%	0.10%	2.50%	5.00%	9.20%	0.09%	2.32%	11.62%	3.31%	0.32%	2.42%	6.05%

Road Name: Berkshire Place **Segment: East of I-210 Northbound Ramps**

Average Daily Traffic: 8221 Vehicles Vehicle Speed: 30 MPH Vehicle Mix: 2 Roadway Classification: Major

	NOISE PARAMETERS AT 75 FEET FROM CENTERLINE (Equiv. Lane Dist: 71.39 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	62.51	-1.59	-2.42	-1.20	57.30	54.62	53.31	47.26	55.70	56.33	70 dBA:	**16**	**16**
Medium Trucks	73.11	-16.48	-2.42	-1.20	53.02	33.49	25.71	34.92	41.07	41.10	65 dBA:	**34**	**36**
Heavy Trucks	80.26	-10.28	-2.42	-1.20	66.36	55.21	41.27	50.48	57.68	57.71	60 dBA:	**73**	**77**
				Total:	**67.04**	**57.95**	**53.58**	**52.25**	**59.87**	**60.14**	55 dBA:	**158**	**165**

Road Name: Oak Grove Drive **Segment: South of Berkshire Place**

Average Daily Traffic: 6221 Vehicles Vehicle Speed: 35 MPH Vehicle Mix: 2 Roadway Classification: Major

	NOISE PARAMETERS AT 75 FEET FROM CENTERLINE (Equiv. Lane Dist: 71.39 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	65.11	-3.47	-2.42	-1.20	58.01	55.34	54.03	47.97	56.41	57.04	70 dBA:	**14**	**15**
Medium Trucks	74.83	-18.36	-2.42	-1.20	52.85	33.32	25.54	34.75	40.90	40.94	65 dBA:	**30**	**32**
Heavy Trucks	80.05	-12.16	-2.42	-1.20	64.27	53.11	39.18	48.38	55.59	55.61	60 dBA:	**65**	**69**
				Total:	**65.44**	**57.40**	**54.17**	**51.29**	**59.10**	**59.46**	55 dBA:	**141**	**149**

Road Name: Oak Grove Drive **Segment: East of Foothill Fwy Overpass**

Average Daily Traffic: 6621 Vehicles Vehicle Speed: 40 MPH Vehicle Mix: 2 Roadway Classification: Primary Arterial

	NOISE PARAMETERS AT 85 FEET FROM CENTERLINE (Equiv. Lane Dist: 79.53 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	67.36	-3.78	-3.13	-1.20	59.25	56.58	55.27	49.21	57.65	58.28	70 dBA:	**18**	**19**
Medium Trucks	76.31	-18.66	-3.13	-1.20	53.32	33.79	26.01	35.22	41.37	41.41	65 dBA:	**39**	**41**
Heavy Trucks	81.16	-12.47	-3.13	-1.20	64.37	53.21	39.28	48.48	55.69	55.71	60 dBA:	**83**	**88**
				Total:	**65.79**	**58.24**	**55.38**	**51.97**	**59.85**	**60.25**	55 dBA:	**179**	**190**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: EXISTING WITH PROJECT ROUTE 1G CONDITIONS

Project: Devil's Gate Reservoir
Site Conditions: Soft

Road Name: Windsor Avenue **Segment: North of I-210 Northbound Ramps**

Average Daily Traffic: 21921 Vehicles | Vehicle Speed: 35 MPH | Vehicle Mix: 2 | Roadway Classification: Minor Arterial

	NOISE PARAMETERS AT 65 FEET FROM CENTERLINE (Equiv. Lane Dist: 57.66 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	65.11	2.00	-1.03	-1.20	64.87	62.20	60.89	54.83	63.27	63.90	70 dBA:	**35**	**37**
Medium Trucks	74.83	-12.89	-1.03	-1.20	59.71	40.18	32.40	41.61	47.76	47.80	65 dBA:	**75**	**80**
Heavy Trucks	80.05	-6.69	-1.03	-1.20	71.13	59.97	46.04	55.24	62.45	62.47	60 dBA:	**162**	**171**
				Total:	**72.30**	**64.26**	**61.03**	**58.15**	**65.96**	**66.32**	55 dBA:	**349**	**369**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: EXISTING WITH PROJECT ROUTE 1H CONDITIONS

Project: Devil's Gate Reservoir
Site Conditions: Soft

	Vehicle Mix 1 (Arterials)				Vehicle Mix 2 (Arterial With Project)				Vehicle Mix 3 (SR-210)			
Vehicle Type	Day	Evening	Night	Daily	Day	Evening	Night	Daily	Day	Evenin	Night	Daily
Automobiles	69.50%	12.90%	9.60%	92.00%	64.86%	11.99%	8.92%	85.77%	63.28%	12.97%	15.17%	91.42%
Medium Trucks	1.44%	0.06%	1.50%	3.00%	1.34%	0.06%	1.39%	2.79%	1.50%	0.27%	0.76%	2.53%
Heavy Trucks	2.40%	0.10%	2.50%	5.00%	9.20%	0.09%	2.32%	11.62%	3.31%	0.32%	2.42%	6.05%

Road Name: Berkshire Place **Segment: East of I-210 Northbound Ramps**

Average Daily Traffic: 8221 Vehicles Vehicle Speed: 30 MPH Vehicle Mix: 2 Roadway Classification: Major

	NOISE PARAMETERS AT 75 FEET FROM CENTERLINE (Equiv. Lane Dist: 71.39 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	62.51	-1.59	-2.42	-1.20	57.30	54.62	53.31	47.26	55.70	56.33	70 dBA:	**16**	**16**
Medium Trucks	73.11	-16.48	-2.42	-1.20	53.02	33.49	25.71	34.92	41.07	41.10	65 dBA:	**34**	**36**
Heavy Trucks	80.26	-10.28	-2.42	-1.20	66.36	55.21	41.27	50.48	57.68	57.71	60 dBA:	**73**	**77**
				Total:	**67.04**	**57.95**	**53.58**	**52.25**	**59.87**	**60.14**	55 dBA:	**158**	**165**

Road Name: Oak Grove Drive **Segment: South of Berkshire Place**

Average Daily Traffic: 6221 Vehicles Vehicle Speed: 35 MPH Vehicle Mix: 2 Roadway Classification: Major

	NOISE PARAMETERS AT 75 FEET FROM CENTERLINE (Equiv. Lane Dist: 71.39 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	65.11	-3.47	-2.42	-1.20	58.01	55.34	54.03	47.97	56.41	57.04	70 dBA:	**14**	**15**
Medium Trucks	74.83	-18.36	-2.42	-1.20	52.85	33.32	25.54	34.75	40.90	40.94	65 dBA:	**30**	**32**
Heavy Trucks	80.05	-12.16	-2.42	-1.20	64.27	53.11	39.18	48.38	55.59	55.61	60 dBA:	**65**	**69**
				Total:	**65.44**	**57.40**	**54.17**	**51.29**	**59.10**	**59.46**	55 dBA:	**141**	**149**

Road Name: Oak Grove Drive **Segment: East of Foothill Fwy Overpass**

Average Daily Traffic: 6621 Vehicles Vehicle Speed: 40 MPH Vehicle Mix: 2 Roadway Classification: Primary Arterial

	NOISE PARAMETERS AT 85 FEET FROM CENTERLINE (Equiv. Lane Dist: 79.53 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	67.36	-3.78	-3.13	-1.20	59.25	56.58	55.27	49.21	57.65	58.28	70 dBA:	**18**	**19**
Medium Trucks	76.31	-18.66	-3.13	-1.20	53.32	33.79	26.01	35.22	41.37	41.41	65 dBA:	**39**	**41**
Heavy Trucks	81.16	-12.47	-3.13	-1.20	64.37	53.21	39.28	48.48	55.69	55.71	60 dBA:	**83**	**88**
				Total:	**65.79**	**58.24**	**55.38**	**51.97**	**59.85**	**60.25**	55 dBA:	**179**	**190**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: EXISTING WITH PROJECT ROUTE 1H CONDITIONS

Project: Devil's Gate Reservoir
Site Conditions: Soft

Road Name: Windsor Avenue **Segment: North of I-210 Northbound Ramps**

Average Daily Traffic: 21921 Vehicles Vehicle Speed: 35 MPH Vehicle Mix: 2 Roadway Classification: Minor Arterial

	NOISE PARAMETERS AT 65 FEET FROM CENTERLINE (Equiv. Lane Dist: 57.66 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	65.11	2.00	-1.03	-1.20	64.87	62.20	60.89	54.83	63.27	63.90	70 dBA:	**35**	**37**
Medium Trucks	74.83	-12.89	-1.03	-1.20	59.71	40.18	32.40	41.61	47.76	47.80	65 dBA:	**75**	**80**
Heavy Trucks	80.05	-6.69	-1.03	-1.20	71.13	59.97	46.04	55.24	62.45	62.47	60 dBA:	**162**	**171**
				Total:	**72.30**	**64.26**	**61.03**	**58.15**	**65.96**	**66.32**	55 dBA:	**349**	**369**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: EXISTING WITH PROJECT ROUTE 2A CONDITIONS **Project: Devil's Gate Reservoir**

Site Conditions: Soft

	Vehicle Mix 1 (Arterials)				Vehicle Mix 2 (Arterial With Project)				Vehicle Mix 3 (I-210)			
Vehicle Type	Day	Evening	Night	Daily	Day	Evening	Night	Daily	Day	Evenin	Night	Daily
Automobiles	69.50%	12.90%	9.60%	92.00%	66.07%	12.26%	9.13%	87.45%	64.42%	13.20%	15.44%	93.07%
Medium Trucks	1.44%	0.06%	1.50%	3.00%	1.37%	0.06%	1.43%	2.85%	1.24%	0.22%	0.63%	2.09%
Heavy Trucks	2.40%	0.10%	2.50%	5.00%	7.34%	0.10%	2.38%	9.81%	2.65%	0.25%	1.94%	4.84%

Road Name: Vincent Avenue **Segment: South of Gladstone Street**

Average Daily Traffic: 9025 Vehicles Vehicle Speed: 45 MPH Vehicle Mix: 2 Roadway Classification: Secondary Arterial

	NOISE PARAMETERS AT 55 FEET FROM CENTERLINE (Equiv. Lane Dist: 50.83 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	69.34	-2.87	-0.21	-1.20	65.07	62.48	61.18	55.13	63.56	64.19	70 dBA:	**26**	**28**
Medium Trucks	77.62	-17.73	-0.21	-1.20	58.48	39.05	31.27	40.48	46.63	46.67	65 dBA:	**56**	**60**
Heavy Trucks	82.14	-12.36	-0.21	-1.20	68.37	56.23	43.37	52.58	59.51	59.53	60 dBA:	**120**	**128**
				Total:	**70.33**	**63.42**	**61.26**	**57.14**	**65.06**	**65.53**	55 dBA:	**258**	**277**

Road Name: Vincent Avenue **Segment: South of Arrow Highway**

Average Daily Traffic: 11025 Vehicles Vehicle Speed: 45 MPH Vehicle Mix: 2 Roadway Classification: Secondary Arterial

	NOISE PARAMETERS AT 50 FEET FROM CENTERLINE (Equiv. Lane Dist: 45.38 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	69.34	-2.00	0.53	-1.20	66.68	64.09	62.79	56.74	65.17	65.80	70 dBA:	**30**	**32**
Medium Trucks	77.62	-16.86	0.53	-1.20	60.09	40.66	32.88	42.09	48.24	48.27	65 dBA:	**65**	**69**
Heavy Trucks	82.14	-11.50	0.53	-1.20	69.97	57.84	44.98	54.19	61.11	61.14	60 dBA:	**139**	**150**
				Total:	**71.94**	**65.03**	**62.87**	**58.75**	**66.67**	**67.14**	55 dBA:	**300**	**322**

Road Name: Arrow Highway **Segment: East of Vincent Avenue**

Average Daily Traffic: 23400 Vehicles Vehicle Speed: 45 MPH Vehicle Mix: 2 Roadway Classification: Principal Arterial

	NOISE PARAMETERS AT 60 FEET FROM CENTERLINE (Equiv. Lane Dist: 51.96 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	69.34	1.27	-0.35	-1.20	69.06	66.47	65.18	59.12	67.55	68.19	70 dBA:	**52**	**56**
Medium Trucks	77.62	-13.59	-0.35	-1.20	62.47	43.05	35.26	44.47	50.63	50.66	65 dBA:	**112**	**120**
Heavy Trucks	82.14	-8.23	-0.35	-1.20	72.36	60.23	47.37	56.58	63.50	63.53	60 dBA:	**241**	**259**
				Total:	**74.32**	**67.41**	**65.25**	**61.14**	**69.06**	**69.52**	55 dBA:	**519**	**557**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: EXISTING WITH PROJECT ROUTE 2A CONDITIONS

Project: Devil's Gate Reservoir
Site Conditions: Soft

Road Name: Arrow Highway **Segment: East of Lark Ellen Avenue**
Average Daily Traffic: 23800 Vehicles Vehicle Speed: 45 MPH Vehicle Mix: 2 Roadway Classification: Principal Arterial

	NOISE PARAMETERS AT 60 FEET FROM CENTERLINE (Equiv. Lane Dist: 51.96 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	69.34	1.35	-0.35	-1.20	69.14	66.54	65.25	59.20	67.63	68.26	70 dBA:	**53**	**56**
Medium Trucks	77.62	-13.52	-0.35	-1.20	62.55	43.12	35.34	44.55	50.70	50.73	65 dBA:	**113**	**121**
Heavy Trucks	82.14	-8.15	-0.35	-1.20	72.43	60.30	47.44	56.65	63.57	63.60	60 dBA:	**244**	**262**
				Total:	**74.39**	**67.49**	**65.33**	**61.21**	**69.13**	**69.59**	55 dBA:	**525**	**564**

Road Name: Arrow Highway **Segment: East of Enid Avenue**
Average Daily Traffic: 24500 Vehicles Vehicle Speed: 45 MPH Vehicle Mix: 2 Roadway Classification: Principal Arterial

	NOISE PARAMETERS AT 60 FEET FROM CENTERLINE (Equiv. Lane Dist: 51.96 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	69.34	1.47	-0.35	-1.20	69.26	66.67	65.38	59.32	67.75	68.39	70 dBA:	**54**	**57**
Medium Trucks	77.62	-13.39	-0.35	-1.20	62.67	43.25	35.46	44.67	50.83	50.86	65 dBA:	**115**	**124**
Heavy Trucks	82.14	-8.03	-0.35	-1.20	72.56	60.43	47.57	56.78	63.70	63.73	60 dBA:	**248**	**267**
				Total:	**74.52**	**67.61**	**65.45**	**61.34**	**69.26**	**69.72**	55 dBA:	**535**	**575**

Road Name: Azusa Avenue **Segment: North of Arrow Highway**
Average Daily Traffic: 20900 Vehicles Vehicle Speed: 45 MPH Vehicle Mix: 2 Roadway Classification: Principal Arterial

	NOISE PARAMETERS AT 60 FEET FROM CENTERLINE (Equiv. Lane Dist: 51.96 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	69.34	0.78	-0.35	-1.20	68.57	65.98	64.69	58.63	67.06	67.69	70 dBA:	**48**	**52**
Medium Trucks	77.62	-14.08	-0.35	-1.20	61.98	42.55	34.77	43.98	50.14	50.17	65 dBA:	**104**	**111**
Heavy Trucks	82.14	-8.72	-0.35	-1.20	71.87	59.74	46.88	56.09	63.01	63.04	60 dBA:	**223**	**240**
				Total:	**73.83**	**66.92**	**64.76**	**60.65**	**68.57**	**69.03**	55 dBA:	**482**	**517**

Road Name: Azusa Avenue **Segment: North of Gladstone Street**
Average Daily Traffic: 23200 Vehicles Vehicle Speed: 35 MPH Vehicle Mix: 2 Roadway Classification: Principal Arterial

	NOISE PARAMETERS AT 65 FEET FROM CENTERLINE (Equiv. Lane Dist: 57.66 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	65.11	2.33	-1.03	-1.20	65.20	62.61	61.32	55.26	63.70	64.33	70 dBA:	**35**	**37**
Medium Trucks	74.83	-12.54	-1.03	-1.20	60.06	40.63	32.85	42.05	48.21	48.24	65 dBA:	**75**	**80**
Heavy Trucks	80.05	-7.17	-1.03	-1.20	70.64	58.51	45.65	54.86	61.78	61.81	60 dBA:	**161**	**172**
				Total:	**72.02**	**64.06**	**61.44**	**58.18**	**65.93**	**66.33**	55 dBA:	**348**	**370**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: EXISTING WITH PROJECT ROUTE 2B CONDITIONS

Project: Devil's Gate Reservoir
Site Conditions: Soft

	Vehicle Mix 1 (Arterials)				Vehicle Mix 2 (Arterial With Project)				Vehicle Mix 3 (I-210)			
Vehicle Type	Day	Evening	Night	Daily	Day	Evening	Night	Daily	Day	Evenin	Night	Daily
Automobiles	69.50%	12.90%	9.60%	92.00%	66.07%	12.26%	9.13%	87.45%	64.42%	13.20%	15.44%	93.07%
Medium Trucks	1.44%	0.06%	1.50%	3.00%	1.37%	0.06%	1.43%	2.85%	1.24%	0.22%	0.63%	2.09%
Heavy Trucks	2.40%	0.10%	2.50%	5.00%	7.34%	0.10%	2.38%	9.81%	2.65%	0.25%	1.94%	4.84%

Road Name: Vincent Avenue **Segment: South of Gladstone Street**

Average Daily Traffic: 8813 Vehicles Vehicle Speed: 45 MPH Vehicle Mix: 2 Roadway Classification: Secondary Arterial

	NOISE PARAMETERS AT 55 FEET FROM CENTERLINE (Equiv. Lane Dist: 50.83 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	69.34	-2.97	-0.21	-1.20	64.96	62.37	61.08	55.03	63.46	64.09	70 dBA:	**25**	**27**
Medium Trucks	77.62	-17.84	-0.21	-1.20	58.38	38.95	31.17	40.37	46.53	46.56	65 dBA:	**55**	**59**
Heavy Trucks	82.14	-12.47	-0.21	-1.20	68.26	56.13	43.27	52.48	59.40	59.43	60 dBA:	**118**	**126**
				Total:	**70.22**	**63.31**	**61.16**	**57.04**	**64.96**	**65.42**	55 dBA:	**254**	**272**

Road Name: Vincent Avenue **Segment: South of Arrow Highway**

Average Daily Traffic: 11025 Vehicles Vehicle Speed: 45 MPH Vehicle Mix: 2 Roadway Classification: Secondary Arterial

	NOISE PARAMETERS AT 50 FEET FROM CENTERLINE (Equiv. Lane Dist: 45.38 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	69.34	-2.00	0.53	-1.20	66.68	64.09	62.79	56.74	65.17	65.80	70 dBA:	**30**	**32**
Medium Trucks	77.62	-16.86	0.53	-1.20	60.09	40.66	32.88	42.09	48.24	48.27	65 dBA:	**65**	**69**
Heavy Trucks	82.14	-11.50	0.53	-1.20	69.97	57.84	44.98	54.19	61.11	61.14	60 dBA:	**139**	**150**
				Total:	**71.94**	**65.03**	**62.87**	**58.75**	**66.67**	**67.14**	55 dBA:	**300**	**322**

Road Name: Arrow Highway **Segment: East of Vincent Avenue**

Average Daily Traffic: 23613 Vehicles Vehicle Speed: 45 MPH Vehicle Mix: 2 Roadway Classification: Principal Arterial

	NOISE PARAMETERS AT 60 FEET FROM CENTERLINE (Equiv. Lane Dist: 51.96 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	69.34	1.31	-0.35	-1.20	69.10	66.51	65.22	59.16	67.59	68.22	70 dBA:	**52**	**56**
Medium Trucks	77.62	-13.55	-0.35	-1.20	62.51	43.08	35.30	44.51	50.67	50.70	65 dBA:	**113**	**121**
Heavy Trucks	82.14	-8.19	-0.35	-1.20	72.40	60.27	47.41	56.62	63.54	63.57	60 dBA:	**242**	**260**
				Total:	**74.36**	**67.45**	**65.29**	**61.18**	**69.10**	**69.56**	55 dBA:	**522**	**561**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: EXISTING WITH PROJECT ROUTE 2B CONDITIONS

Project: Devil's Gate Reservoir
Site Conditions: Soft

Road Name: Arrow Highway **Segment: East of Lark Ellen Avenue**
Average Daily Traffic: 24013 Vehicles Vehicle Speed: 45 MPH Vehicle Mix: 2 Roadway Classification: Principal Arterial

	NOISE PARAMETERS AT 60 FEET FROM CENTERLINE (Equiv. Lane Dist: 51.96 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	69.34	1.38	-0.35	-1.20	69.18	66.58	65.29	59.24	67.67	68.30	70 dBA:	**53**	**57**
Medium Trucks	77.62	-13.48	-0.35	-1.20	62.59	43.16	35.38	44.58	50.74	50.77	65 dBA:	**114**	**122**
Heavy Trucks	82.14	-8.11	-0.35	-1.20	72.47	60.34	47.48	56.69	63.61	63.64	60 dBA:	**245**	**263**
				Total:	**74.43**	**67.52**	**65.37**	**61.25**	**69.17**	**69.63**	55 dBA:	**528**	**567**

Road Name: Arrow Highway **Segment: East of Enid Avenue**
Average Daily Traffic: 24713 Vehicles Vehicle Speed: 45 MPH Vehicle Mix: 2 Roadway Classification: Principal Arterial

	NOISE PARAMETERS AT 60 FEET FROM CENTERLINE (Equiv. Lane Dist: 51.96 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	69.34	1.51	-0.35	-1.20	69.30	66.71	65.41	59.36	67.79	68.42	70 dBA:	**54**	**58**
Medium Trucks	77.62	-13.36	-0.35	-1.20	62.71	43.28	35.50	44.71	50.86	50.90	65 dBA:	**116**	**125**
Heavy Trucks	82.14	-7.99	-0.35	-1.20	72.60	60.46	47.61	56.81	63.74	63.77	60 dBA:	**250**	**268**
				Total:	**74.56**	**67.65**	**65.49**	**61.38**	**69.29**	**69.76**	55 dBA:	**538**	**578**

Road Name: Azusa Avenue **Segment: North of Arrow Highway**
Average Daily Traffic: 21113 Vehicles Vehicle Speed: 45 MPH Vehicle Mix: 2 Roadway Classification: Principal Arterial

	NOISE PARAMETERS AT 60 FEET FROM CENTERLINE (Equiv. Lane Dist: 51.96 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	69.34	0.83	-0.35	-1.20	68.62	66.02	64.73	58.68	67.11	67.74	70 dBA:	**48**	**52**
Medium Trucks	77.62	-14.04	-0.35	-1.20	62.03	42.60	34.82	44.03	50.18	50.21	65 dBA:	**104**	**112**
Heavy Trucks	82.14	-8.67	-0.35	-1.20	71.91	59.78	46.92	56.13	63.05	63.08	60 dBA:	**225**	**242**
				Total:	**73.87**	**66.97**	**64.81**	**60.69**	**68.61**	**69.07**	55 dBA:	**485**	**520**

Road Name: Azusa Avenue **Segment: North of Gladstone Street**
Average Daily Traffic: 23413 Vehicles Vehicle Speed: 35 MPH Vehicle Mix: 2 Roadway Classification: Principal Arterial

	NOISE PARAMETERS AT 65 FEET FROM CENTERLINE (Equiv. Lane Dist: 57.66 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	65.11	2.37	-1.03	-1.20	65.24	62.65	61.36	55.30	63.74	64.37	70 dBA:	**35**	**37**
Medium Trucks	74.83	-12.50	-1.03	-1.20	60.10	40.67	32.89	42.09	48.25	48.28	65 dBA:	**75**	**80**
Heavy Trucks	80.05	-7.13	-1.03	-1.20	70.68	58.55	45.69	54.90	61.82	61.85	60 dBA:	**162**	**173**
				Total:	**72.06**	**64.10**	**61.48**	**58.22**	**65.97**	**66.37**	55 dBA:	**350**	**372**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: EXISTING WITH PROJECT ROUTE 4A CONDITIONS **Project: Devil's Gate Reservoir**

Site Conditions: Soft

	Vehicle Mix 1 (Arterials)				Vehicle Mix 2 (Scholl Cyn With Project)				Vehicle Mix 3 (Figueroa W-Project)			
Vehicle Type	Day	Evening	Night	Daily	Day	Evening	Night	Daily	Day	Evenin	Night	Daily
Automobiles	69.50%	12.90%	9.60%	92.00%	39.96%	7.42%	5.52%	52.90%	67.90%	12.60%	9.38%	89.88%
Medium Trucks	1.44%	0.06%	1.50%	3.00%	0.83%	0.03%	0.86%	1.73%	1.41%	0.06%	1.47%	2.93%
Heavy Trucks	2.40%	0.10%	2.50%	5.00%	44.90%	0.06%	0.44%	45.40%	6.41%	0.10%	2.48%	8.99%

Road Name: Scholl Canyon Road **Segment: North of SR-134 Westbound Ramps**

Average Daily Traffic: 1425 Vehicles Vehicle Speed: 35 MPH Vehicle Mix: 2 Roadway Classification: Hillside

	NOISE PARAMETERS AT 45 FEET FROM CENTERLINE (Equiv. Lane Dist: 44.09 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	65.11	-11.97	0.72	-1.20	52.65	47.88	46.58	40.53	48.96	49.59	70 dBA:	**10**	**10**
Medium Trucks	74.83	-26.84	0.72	-1.20	47.50	25.89	18.11	27.32	33.47	33.51	65 dBA:	**22**	**22**
Heavy Trucks	80.05	-12.64	0.72	-1.20	66.92	62.65	39.75	43.79	60.05	60.06	60 dBA:	**48**	**48**
				Total:	**67.13**	**62.80**	**47.41**	**45.54**	**60.39**	**60.45**	55 dBA:	**103**	**104**

Road Name: Figueroa Street **Segment: South of Eagle Vista Drive**

Average Daily Traffic: 10813 Vehicles Vehicle Speed: 35 MPH Vehicle Mix: 3 Roadway Classification: Secondary

	NOISE PARAMETERS AT 55 FEET FROM CENTERLINE (Equiv. Lane Dist: 49.49 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	65.11	-0.87	-0.04	-1.20	63.00	60.53	59.24	53.18	61.61	62.24	70 dBA:	**21**	**22**
Medium Trucks	74.83	-15.74	-0.04	-1.20	57.85	38.55	30.76	39.97	46.13	46.16	65 dBA:	**45**	**47**
Heavy Trucks	80.05	-10.87	-0.04	-1.20	67.94	55.22	43.07	52.35	59.10	59.13	60 dBA:	**96**	**102**
				Total:	**69.46**	**61.67**	**59.35**	**55.91**	**63.62**	**64.04**	55 dBA:	**207**	**220**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: EXISTING WITH PROJECT ROUTE 4B CONDITIONS **Project: Devil's Gate Reservoir**

Site Conditions: Soft

	Vehicle Mix 1 (Arterials)				Vehicle Mix 2 (Scholl Cyn With Project)				Vehicle Mix 3 (Figueroa W-Project)			
Vehicle Type	Day	Evening	Night	Daily	Day	Evening	Night	Daily	Day	Evenin	Night	Daily
Automobiles	69.50%	12.90%	9.60%	92.00%	39.96%	7.42%	5.52%	52.90%	67.90%	12.60%	9.38%	89.88%
Medium Trucks	1.44%	0.06%	1.50%	3.00%	0.83%	0.03%	0.86%	1.73%	1.41%	0.06%	1.47%	2.93%
Heavy Trucks	2.40%	0.10%	2.50%	5.00%	44.90%	0.06%	0.44%	45.40%	6.41%	0.10%	2.48%	8.99%

Road Name: Scholl Canyon Road **Segment: North of SR-134 Westbound Ramps**

Average Daily Traffic: 1425 Vehicles Vehicle Speed: 35 MPH Vehicle Mix: 2 Roadway Classification: Hillside

	NOISE PARAMETERS AT 45 FEET FROM CENTERLINE (Equiv. Lane Dist: 44.09 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	65.11	-11.97	0.72	-1.20	52.65	47.88	46.58	40.53	48.96	49.59	70 dBA:	**10**	**10**
Medium Trucks	74.83	-26.84	0.72	-1.20	47.50	25.89	18.11	27.32	33.47	33.51	65 dBA:	**22**	**22**
Heavy Trucks	80.05	-12.64	0.72	-1.20	66.92	62.65	39.75	43.79	60.05	60.06	60 dBA:	**48**	**48**
				Total:	**67.13**	**62.80**	**47.41**	**45.54**	**60.39**	**60.45**	55 dBA:	**103**	**104**

Road Name: Figueroa Street **Segment: South of Eagle Vista Drive**

Average Daily Traffic: 11025 Vehicles Vehicle Speed: 35 MPH Vehicle Mix: 3 Roadway Classification: Secondary

	NOISE PARAMETERS AT 55 FEET FROM CENTERLINE (Equiv. Lane Dist: 49.49 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	65.11	-0.79	-0.04	-1.20	63.09	60.61	59.32	53.27	61.70	62.33	70 dBA:	**21**	**22**
Medium Trucks	74.83	-15.65	-0.04	-1.20	57.94	38.63	30.85	40.06	46.21	46.24	65 dBA:	**45**	**48**
Heavy Trucks	80.05	-10.78	-0.04	-1.20	68.02	55.30	43.15	52.43	59.18	59.21	60 dBA:	**97**	**104**
				Total:	**69.54**	**61.76**	**59.43**	**55.99**	**63.71**	**64.13**	55 dBA:	**209**	**223**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: EXISTING WITH PROJECT ROUTE 5A CONDITIONS **Project: Devil's Gate Reservoir**

Site Conditions: Soft

	Vehicle Mix 1 (Arterials)				Vehicle Mix 2 (Foothill Blvd W-Project)				Vehicle Mix 3 (Wentworth W-Project)			
Vehicle Type	Day	Evening	Night	Daily	Day	Evening	Night	Daily	Day	Evenin	Night	Daily
Automobiles	69.50%	12.90%	9.60%	92.00%	64.96%	12.06%	8.97%	85.98%	66.68%	12.38%	9.21%	88.27%
Medium Trucks	1.44%	0.06%	1.50%	3.00%	1.35%	0.06%	1.40%	2.80%	1.38%	0.06%	1.44%	2.88%
Heavy Trucks	2.40%	0.10%	2.50%	5.00%	8.94%	0.09%	2.34%	11.37%	6.74%	0.10%	2.40%	9.23%

Road Name: Foothill Boulevard **Segment: South of I-210 Westbound Ramps**

Average Daily Traffic: 14125 Vehicles Vehicle Speed: 45 MPH Vehicle Mix: 3 Roadway Classification: Major

	NOISE PARAMETERS AT 110 FEET FROM CENTERLINE (Equiv. Lane Dist: 107.57 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	69.34	-0.88	-5.09	-1.20	62.17	59.62	58.33	52.27	60.70	61.33	70 dBA:	**33**	**35**
Medium Trucks	77.62	-15.75	-5.09	-1.20	55.58	36.19	28.41	37.62	43.78	43.81	65 dBA:	**70**	**76**
Heavy Trucks	82.14	-10.68	-5.09	-1.20	65.16	52.66	40.21	49.42	56.25	56.28	60 dBA:	**152**	**163**
				Total:	**67.24**	**60.43**	**58.40**	**54.18**	**62.10**	**62.57**	55 dBA:	**327**	**352**

Road Name: Osborne Street **Segment: West of Foothill Boulevard**

Average Daily Traffic: 14725 Vehicles Vehicle Speed: 40 MPH Vehicle Mix: 3 Roadway Classification: Major

	NOISE PARAMETERS AT 60 FEET FROM CENTERLINE (Equiv. Lane Dist: 55.42 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	67.36	-0.19	-0.77	-1.20	65.20	62.65	61.35	55.30	63.73	64.36	70 dBA:	**30**	**32**
Medium Trucks	76.31	-15.05	-0.77	-1.20	59.29	39.90	32.12	41.32	47.48	47.51	65 dBA:	**64**	**69**
Heavy Trucks	81.16	-9.99	-0.77	-1.20	69.19	56.69	44.24	53.45	60.28	60.31	60 dBA:	**138**	**148**
				Total:	**70.96**	**63.65**	**61.44**	**57.59**	**65.42**	**65.87**	55 dBA:	**297**	**318**

Road Name: Glen Oaks Boulevard **Segment: South of Osborne Street**

Average Daily Traffic: 24725 Vehicles Vehicle Speed: 45 MPH Vehicle Mix: 3 Roadway Classification: Major

	NOISE PARAMETERS AT 60 FEET FROM CENTERLINE (Equiv. Lane Dist: 55.42 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	69.34	1.55	-0.77	-1.20	68.92	66.37	65.08	59.02	67.46	68.09	70 dBA:	**50**	**54**
Medium Trucks	77.62	-13.31	-0.77	-1.20	62.33	42.95	35.16	44.37	50.53	50.56	65 dBA:	**108**	**117**
Heavy Trucks	82.14	-8.25	-0.77	-1.20	71.91	59.41	46.96	56.17	63.00	63.03	60 dBA:	**233**	**251**
				Total:	**73.99**	**67.18**	**65.15**	**60.94**	**68.85**	**69.32**	55 dBA:	**503**	**541**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: EXISTING WITH PROJECT ROUTE 5B CONDITIONS **Project: Devil's Gate Reservoir**

Site Conditions: Soft

	Vehicle Mix 1 (Arterials)				Vehicle Mix 2 (Foothill Blvd W-Project)				Vehicle Mix 3 (Wentworth W-Project)			
Vehicle Type	Day	Evening	Night	Daily	Day	Evening	Night	Daily	Day	Evenin	Night	Daily
Automobiles	69.50%	12.90%	9.60%	92.00%	64.96%	12.06%	8.97%	85.98%	66.68%	12.38%	9.21%	88.27%
Medium Trucks	1.44%	0.06%	1.50%	3.00%	1.35%	0.06%	1.40%	2.80%	1.38%	0.06%	1.44%	2.88%
Heavy Trucks	2.40%	0.10%	2.50%	5.00%	8.94%	0.09%	2.34%	11.37%	6.74%	0.10%	2.40%	9.23%

Road Name: Glen Oaks Boulevard **Segment: South of Penrose Street**

Average Daily Traffic: 15725 Vehicles Vehicle Speed: 45 MPH Vehicle Mix: 3 Roadway Classification: Major

	NOISE PARAMETERS AT 55 FEET FROM CENTERLINE (Equiv. Lane Dist: 49.96 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	69.34	-0.41	-0.10	-1.20	67.63	65.08	63.79	57.73	66.17	66.80	70 dBA:	**38**	**41**
Medium Trucks	77.62	-15.28	-0.10	-1.20	61.04	41.66	33.87	43.08	49.24	49.27	65 dBA:	**81**	**88**
Heavy Trucks	82.14	-10.22	-0.10	-1.20	70.62	58.12	45.67	54.88	61.71	61.74	60 dBA:	**176**	**189**
				Total:	**72.70**	**65.89**	**63.86**	**59.64**	**67.56**	**68.03**	55 dBA:	**378**	**407**

Road Name: Glen Oaks Boulevard **Segment: South of Sunland Boulevard**

Average Daily Traffic: 18425 Vehicles Vehicle Speed: 45 MPH Vehicle Mix: 3 Roadway Classification: Major

	NOISE PARAMETERS AT 60 FEET FROM CENTERLINE (Equiv. Lane Dist: 55.42 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	69.34	0.27	-0.77	-1.20	67.65	65.09	63.80	57.75	66.18	66.81	70 dBA:	**41**	**44**
Medium Trucks	77.62	-14.59	-0.77	-1.20	61.06	41.67	33.89	43.10	49.25	49.28	65 dBA:	**89**	**96**
Heavy Trucks	82.14	-9.53	-0.77	-1.20	70.64	58.13	45.69	54.89	61.72	61.75	60 dBA:	**192**	**206**
				Total:	**72.71**	**65.91**	**63.87**	**59.66**	**67.57**	**68.05**	55 dBA:	**413**	**445**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: EXISTING WITH PROJECT ROUTE 5C CONDITIONS

Project: Devil's Gate Reservoir
Site Conditions: Soft

	Vehicle Mix 1 (Arterials)				Vehicle Mix 2 (Foothill Blvd W-Project)				Vehicle Mix 3 (Wentworth W-Project)			
Vehicle Type	Day	Evening	Night	Daily	Day	Evening	Night	Daily	Day	Evening	Night	Daily
Automobiles	69.50%	12.90%	9.60%	92.00%	64.96%	12.06%	8.97%	85.98%	66.68%	12.38%	9.21%	88.27%
Medium Trucks	1.44%	0.06%	1.50%	3.00%	1.35%	0.06%	1.40%	2.80%	1.38%	0.06%	1.44%	2.88%
Heavy Trucks	9.00%	0.10%	2.50%	5.00%	8.94%	0.09%	2.34%	11.37%	6.74%	0.10%	2.40%	9.23%

Road Name: Foothill Boulevard **Segment: East of Wheatland Avenue**

Average Daily Traffic: 6925 Vehicles Vehicle Speed: 50 MPH Vehicle Mix: 2 Roadway Classification: Major

	NOISE PARAMETERS AT 65 FEET FROM CENTERLINE (Equiv. Lane Dist: 60.79 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	71.12	-4.55	-1.38	-1.20	64.00	61.33	60.04	53.98	62.41	63.05	70 dBA:	**26**	**27**
Medium Trucks	78.79	-19.41	-1.38	-1.20	56.80	37.30	29.52	38.73	44.88	44.92	65 dBA:	**55**	**59**
Heavy Trucks	83.02	-13.33	-1.38	-1.20	67.11	55.83	42.04	51.25	58.41	58.44	60 dBA:	**119**	**127**
				Total:	**69.10**	**62.42**	**60.11**	**55.92**	**63.92**	**64.39**	55 dBA:	**256**	**275**

Road Name: Wentworth Street **Segment: South of Foothill Boulevard**

Average Daily Traffic: 10225 Vehicles Vehicle Speed: 45 MPH Vehicle Mix: 3 Roadway Classification: Secondary

	NOISE PARAMETERS AT 60 FEET FROM CENTERLINE (Equiv. Lane Dist: 54.99 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	69.34	-2.28	-0.72	-1.20	65.14	62.59	61.29	55.24	63.67	64.30	70 dBA:	**28**	**30**
Medium Trucks	77.62	-17.15	-0.72	-1.20	58.55	39.16	31.38	40.59	46.74	46.78	65 dBA:	**61**	**65**
Heavy Trucks	82.14	-12.09	-0.72	-1.20	68.13	55.62	43.18	52.39	59.22	59.25	60 dBA:	**131**	**140**
				Total:	**70.20**	**63.40**	**61.36**	**57.15**	**65.07**	**65.54**	55 dBA:	**281**	**303**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: EXISTING WITH PROJECT ROUTE 6A CONDITIONS **Project: Devil's Gate Reservoir**

Site Conditions: Soft

	Vehicle Mix 1 (Arterials)				Vehicle Mix 2 (Foothill Blvd W-Project)				Vehicle Mix 3 (Wentworth W-Project)			
Vehicle Type	Day	Evening	Night	Daily	Day	Evening	Night	Daily	Day	Evenin	Night	Daily
Automobiles	69.50%	12.90%	9.60%	92.00%	64.96%	12.06%	8.97%	85.98%	66.68%	12.38%	9.21%	88.27%
Medium Trucks	1.44%	0.06%	1.50%	3.00%	1.35%	0.06%	1.40%	2.80%	1.38%	0.06%	1.44%	2.88%
Heavy Trucks	2.40%	0.10%	2.50%	5.00%	8.94%	0.09%	2.34%	11.37%	6.74%	0.10%	2.40%	9.23%

Road Name: Foothill Boulevard **Segment: South of I-210 Westbound Ramps**

Average Daily Traffic: 14125 Vehicles Vehicle Speed: 45 MPH Vehicle Mix: 3 Roadway Classification: Major

	NOISE PARAMETERS AT 110 FEET FROM CENTERLINE (Equiv. Lane Dist: 107.57 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	69.34	-0.88	-5.09	-1.20	62.17	59.62	58.33	52.27	60.70	61.33	70 dBA:	**33**	**35**
Medium Trucks	77.62	-15.75	-5.09	-1.20	55.58	36.19	28.41	37.62	43.78	43.81	65 dBA:	**70**	**76**
Heavy Trucks	82.14	-10.68	-5.09	-1.20	65.16	52.66	40.21	49.42	56.25	56.28	60 dBA:	**152**	**163**
				Total:	**67.24**	**60.43**	**58.40**	**54.18**	**62.10**	**62.57**	55 dBA:	**327**	**352**

Road Name: Osborne Street **Segment: West of Foothill Boulevard**

Average Daily Traffic: 14725 Vehicles Vehicle Speed: 40 MPH Vehicle Mix: 3 Roadway Classification: Major

	NOISE PARAMETERS AT 60 FEET FROM CENTERLINE (Equiv. Lane Dist: 55.42 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	67.36	-0.19	-0.77	-1.20	65.20	62.65	61.35	55.30	63.73	64.36	70 dBA:	**30**	**32**
Medium Trucks	76.31	-15.05	-0.77	-1.20	59.29	39.90	32.12	41.32	47.48	47.51	65 dBA:	**64**	**69**
Heavy Trucks	81.16	-9.99	-0.77	-1.20	69.19	56.69	44.24	53.45	60.28	60.31	60 dBA:	**138**	**148**
				Total:	**70.96**	**63.65**	**61.44**	**57.59**	**65.42**	**65.87**	55 dBA:	**297**	**318**

Road Name: Glen Oaks Boulevard **Segment: South of Osborne Street**

Average Daily Traffic: 24725 Vehicles Vehicle Speed: 45 MPH Vehicle Mix: 3 Roadway Classification: Major

	NOISE PARAMETERS AT 60 FEET FROM CENTERLINE (Equiv. Lane Dist: 55.42 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	69.34	1.55	-0.77	-1.20	68.92	66.37	65.08	59.02	67.46	68.09	70 dBA:	**50**	**54**
Medium Trucks	77.62	-13.31	-0.77	-1.20	62.33	42.95	35.16	44.37	50.53	50.56	65 dBA:	**108**	**117**
Heavy Trucks	82.14	-8.25	-0.77	-1.20	71.91	59.41	46.96	56.17	63.00	63.03	60 dBA:	**233**	**251**
				Total:	**73.99**	**67.18**	**65.15**	**60.94**	**68.85**	**69.32**	55 dBA:	**503**	**541**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: EXISTING WITH PROJECT ROUTE 6B CONDITIONS **Project: Devil's Gate Reservoir**

Site Conditions: Soft

	Vehicle Mix 1 (Arterials)				Vehicle Mix 2 (Foothill Blvd W-Project)				Vehicle Mix 3 (Wentworth W-Project)			
Vehicle Type	Day	Evening	Night	Daily	Day	Evening	Night	Daily	Day	Evenin	Night	Daily
Automobiles	69.50%	12.90%	9.60%	92.00%	64.96%	12.06%	8.97%	85.98%	66.68%	12.38%	9.21%	88.27%
Medium Trucks	1.44%	0.06%	1.50%	3.00%	1.35%	0.06%	1.40%	2.80%	1.38%	0.06%	1.44%	2.88%
Heavy Trucks	2.40%	0.10%	2.50%	5.00%	8.94%	0.09%	2.34%	11.37%	6.74%	0.10%	2.40%	9.23%

Road Name: Glen Oaks Boulevard **Segment: South of Penrose Street**

Average Daily Traffic: 15725 Vehicles Vehicle Speed: 45 MPH Vehicle Mix: 3 Roadway Classification: Major

	NOISE PARAMETERS AT 55 FEET FROM CENTERLINE (Equiv. Lane Dist: 49.96 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	69.34	-0.41	-0.10	-1.20	67.63	65.08	63.79	57.73	66.17	66.80	70 dBA:	**38**	**41**
Medium Trucks	77.62	-15.28	-0.10	-1.20	61.04	41.66	33.87	43.08	49.24	49.27	65 dBA:	**81**	**88**
Heavy Trucks	82.14	-10.22	-0.10	-1.20	70.62	58.12	45.67	54.88	61.71	61.74	60 dBA:	**176**	**189**
				Total:	**72.70**	**65.89**	**63.86**	**59.64**	**67.56**	**68.03**	55 dBA:	**378**	**407**

Road Name: Glen Oaks Boulevard **Segment: South of Sunland Boulevard**

Average Daily Traffic: 18425 Vehicles Vehicle Speed: 45 MPH Vehicle Mix: 3 Roadway Classification: Major

	NOISE PARAMETERS AT 60 FEET FROM CENTERLINE (Equiv. Lane Dist: 55.42 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	69.34	0.27	-0.77	-1.20	67.65	65.09	63.80	57.75	66.18	66.81	70 dBA:	**41**	**44**
Medium Trucks	77.62	-14.59	-0.77	-1.20	61.06	41.67	33.89	43.10	49.25	49.28	65 dBA:	**89**	**96**
Heavy Trucks	82.14	-9.53	-0.77	-1.20	70.64	58.13	45.69	54.89	61.72	61.75	60 dBA:	**192**	**206**
				Total:	**72.71**	**65.91**	**63.87**	**59.66**	**67.57**	**68.05**	55 dBA:	**413**	**445**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: EXISTING WITH PROJECT ROUTE 6C CONDITIONS

Project: Devil's Gate Reservoir
Site Conditions: Soft

	Vehicle Mix 1 (Arterials)				Vehicle Mix 2 (Foothill Blvd W-Project)				Vehicle Mix 3 (Wentworth W-Project)			
Vehicle Type	Day	Evening	Night	Daily	Day	Evening	Night	Daily	Day	Evening	Night	Daily
Automobiles	69.50%	12.90%	9.60%	92.00%	64.96%	12.06%	8.97%	85.98%	66.68%	12.38%	9.21%	88.27%
Medium Trucks	1.44%	0.06%	1.50%	3.00%	1.35%	0.06%	1.40%	2.80%	1.38%	0.06%	1.44%	2.88%
Heavy Trucks	9.00%	0.10%	2.50%	5.00%	8.94%	0.09%	2.34%	11.37%	6.74%	0.10%	2.40%	9.23%

Road Name: Foothill Boulevard **Segment: East of Wheatland Avenue**

Average Daily Traffic: 6925 Vehicles Vehicle Speed: 50 MPH Vehicle Mix: 2 Roadway Classification: Major

	NOISE PARAMETERS AT 65 FEET FROM CENTERLINE (Equiv. Lane Dist: 60.79 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	71.12	-4.55	-1.38	-1.20	64.00	61.33	60.04	53.98	62.41	63.05	70 dBA:	**26**	**27**
Medium Trucks	78.79	-19.41	-1.38	-1.20	56.80	37.30	29.52	38.73	44.88	44.92	65 dBA:	**55**	**59**
Heavy Trucks	83.02	-13.33	-1.38	-1.20	67.11	55.83	42.04	51.25	58.41	58.44	60 dBA:	**119**	**127**
				Total:	**69.10**	**62.42**	**60.11**	**55.92**	**63.92**	**64.39**	55 dBA:	**256**	**275**

Road Name: Wentworth Street **Segment: South of Foothill Boulevard**

Average Daily Traffic: 10225 Vehicles Vehicle Speed: 45 MPH Vehicle Mix: 3 Roadway Classification: Secondary

	NOISE PARAMETERS AT 60 FEET FROM CENTERLINE (Equiv. Lane Dist: 54.99 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	69.34	-2.28	-0.72	-1.20	65.14	62.59	61.29	55.24	63.67	64.30	70 dBA:	**28**	**30**
Medium Trucks	77.62	-17.15	-0.72	-1.20	58.55	39.16	31.38	40.59	46.74	46.78	65 dBA:	**61**	**65**
Heavy Trucks	82.14	-12.09	-0.72	-1.20	68.13	55.62	43.18	52.39	59.22	59.25	60 dBA:	**131**	**140**
				Total:	**70.20**	**63.40**	**61.36**	**57.15**	**65.07**	**65.54**	55 dBA:	**281**	**303**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: EXISTING WITH PROJECT ROUTE 7A CONDITIONS **Project: Devil's Gate Reservoir**

Site Conditions: Soft

	Vehicle Mix 1 (Arterials)				Vehicle Mix 2 (Foothill Blvd W-Project)				Vehicle Mix 3 (Wentworth W-Project)			
Vehicle Type	Day	Evening	Night	Daily	Day	Evening	Night	Daily	Day	Evenin	Night	Daily
Automobiles	69.50%	12.90%	9.60%	92.00%	64.96%	12.06%	8.97%	85.98%	66.68%	12.38%	9.21%	88.27%
Medium Trucks	1.44%	0.06%	1.50%	3.00%	1.35%	0.06%	1.40%	2.80%	1.38%	0.06%	1.44%	2.88%
Heavy Trucks	2.40%	0.10%	2.50%	5.00%	8.94%	0.09%	2.34%	11.37%	6.74%	0.10%	2.40%	9.23%

Road Name: Foothill Boulevard **Segment: South of I-210 Westbound Ramps**

Average Daily Traffic: 14125 Vehicles Vehicle Speed: 45 MPH Vehicle Mix: 3 Roadway Classification: Major

	NOISE PARAMETERS AT 110 FEET FROM CENTERLINE (Equiv. Lane Dist: 107.57 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	69.34	-0.88	-5.09	-1.20	62.17	59.62	58.33	52.27	60.70	61.33	70 dBA:	**33**	**35**
Medium Trucks	77.62	-15.75	-5.09	-1.20	55.58	36.19	28.41	37.62	43.78	43.81	65 dBA:	**70**	**76**
Heavy Trucks	82.14	-10.68	-5.09	-1.20	65.16	52.66	40.21	49.42	56.25	56.28	60 dBA:	**152**	**163**
				Total:	**67.24**	**60.43**	**58.40**	**54.18**	**62.10**	**62.57**	55 dBA:	**327**	**352**

Road Name: Osborne Street **Segment: West of Foothill Boulevard**

Average Daily Traffic: 14725 Vehicles Vehicle Speed: 40 MPH Vehicle Mix: 3 Roadway Classification: Major

	NOISE PARAMETERS AT 60 FEET FROM CENTERLINE (Equiv. Lane Dist: 55.42 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	67.36	-0.19	-0.77	-1.20	65.20	62.65	61.35	55.30	63.73	64.36	70 dBA:	**30**	**32**
Medium Trucks	76.31	-15.05	-0.77	-1.20	59.29	39.90	32.12	41.32	47.48	47.51	65 dBA:	**64**	**69**
Heavy Trucks	81.16	-9.99	-0.77	-1.20	69.19	56.69	44.24	53.45	60.28	60.31	60 dBA:	**138**	**148**
				Total:	**70.96**	**63.65**	**61.44**	**57.59**	**65.42**	**65.87**	55 dBA:	**297**	**318**

Road Name: Glen Oaks Boulevard **Segment: South of Osborne Street**

Average Daily Traffic: 24725 Vehicles Vehicle Speed: 45 MPH Vehicle Mix: 3 Roadway Classification: Major

	NOISE PARAMETERS AT 60 FEET FROM CENTERLINE (Equiv. Lane Dist: 55.42 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	69.34	1.55	-0.77	-1.20	68.92	66.37	65.08	59.02	67.46	68.09	70 dBA:	**50**	**54**
Medium Trucks	77.62	-13.31	-0.77	-1.20	62.33	42.95	35.16	44.37	50.53	50.56	65 dBA:	**108**	**117**
Heavy Trucks	82.14	-8.25	-0.77	-1.20	71.91	59.41	46.96	56.17	63.00	63.03	60 dBA:	**233**	**251**
				Total:	**73.99**	**67.18**	**65.15**	**60.94**	**68.85**	**69.32**	55 dBA:	**503**	**541**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: EXISTING WITH PROJECT ROUTE 7B CONDITIONS **Project: Devil's Gate Reservoir**

Site Conditions: Soft

	Vehicle Mix 1 (Arterials)				Vehicle Mix 2 (Foothill Blvd W-Project)				Vehicle Mix 3 (Wentworth W-Project)			
Vehicle Type	Day	Evening	Night	Daily	Day	Evening	Night	Daily	Day	Evenin	Night	Daily
Automobiles	69.50%	12.90%	9.60%	92.00%	64.96%	12.06%	8.97%	85.98%	66.68%	12.38%	9.21%	88.27%
Medium Trucks	1.44%	0.06%	1.50%	3.00%	1.35%	0.06%	1.40%	2.80%	1.38%	0.06%	1.44%	2.88%
Heavy Trucks	2.40%	0.10%	2.50%	5.00%	8.94%	0.09%	2.34%	11.37%	6.74%	0.10%	2.40%	9.23%

Road Name: Glen Oaks Boulevard **Segment: South of Penrose Street**

Average Daily Traffic: 15725 Vehicles Vehicle Speed: 45 MPH Vehicle Mix: 3 Roadway Classification: Major

	NOISE PARAMETERS AT 55 FEET FROM CENTERLINE (Equiv. Lane Dist: 49.96 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	69.34	-0.41	-0.10	-1.20	67.63	65.08	63.79	57.73	66.17	66.80	70 dBA:	**38**	**41**
Medium Trucks	77.62	-15.28	-0.10	-1.20	61.04	41.66	33.87	43.08	49.24	49.27	65 dBA:	**81**	**88**
Heavy Trucks	82.14	-10.22	-0.10	-1.20	70.62	58.12	45.67	54.88	61.71	61.74	60 dBA:	**176**	**189**
				Total:	**72.70**	**65.89**	**63.86**	**59.64**	**67.56**	**68.03**	55 dBA:	**378**	**407**

Road Name: Glen Oaks Boulevard **Segment: South of Sunland Boulevard**

Average Daily Traffic: 18425 Vehicles Vehicle Speed: 45 MPH Vehicle Mix: 3 Roadway Classification: Major

	NOISE PARAMETERS AT 60 FEET FROM CENTERLINE (Equiv. Lane Dist: 55.42 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	69.34	0.27	-0.77	-1.20	67.65	65.09	63.80	57.75	66.18	66.81	70 dBA:	**41**	**44**
Medium Trucks	77.62	-14.59	-0.77	-1.20	61.06	41.67	33.89	43.10	49.25	49.28	65 dBA:	**89**	**96**
Heavy Trucks	82.14	-9.53	-0.77	-1.20	70.64	58.13	45.69	54.89	61.72	61.75	60 dBA:	**192**	**206**
				Total:	**72.71**	**65.91**	**63.87**	**59.66**	**67.57**	**68.05**	55 dBA:	**413**	**445**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: EXISTING WITH PROJECT ROUTE 7C CONDITIONS

Project: Devil's Gate Reservoir
Site Conditions: Soft

	Vehicle Mix 1 (Arterials)				Vehicle Mix 2 (Foothill Blvd W-Project)				Vehicle Mix 3 (Wentworth W-Project)			
Vehicle Type	Day	Evening	Night	Daily	Day	Evening	Night	Daily	Day	Evening	Night	Daily
Automobiles	69.50%	12.90%	9.60%	92.00%	64.96%	12.06%	8.97%	85.98%	66.68%	12.38%	9.21%	88.27%
Medium Trucks	1.44%	0.06%	1.50%	3.00%	1.35%	0.06%	1.40%	2.80%	1.38%	0.06%	1.44%	2.88%
Heavy Trucks	9.00%	0.10%	2.50%	5.00%	8.94%	0.09%	2.34%	11.37%	6.74%	0.10%	2.40%	9.23%

Road Name: Foothill Boulevard **Segment: East of Wheatland Avenue**

Average Daily Traffic: 6925 Vehicles Vehicle Speed: 50 MPH Vehicle Mix: 2 Roadway Classification: Major

	NOISE PARAMETERS AT 65 FEET FROM CENTERLINE (Equiv. Lane Dist: 60.79 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	71.12	-4.55	-1.38	-1.20	64.00	61.33	60.04	53.98	62.41	63.05	70 dBA:	**26**	**27**
Medium Trucks	78.79	-19.41	-1.38	-1.20	56.80	37.30	29.52	38.73	44.88	44.92	65 dBA:	**55**	**59**
Heavy Trucks	83.02	-13.33	-1.38	-1.20	67.11	55.83	42.04	51.25	58.41	58.44	60 dBA:	**119**	**127**
				Total:	**69.10**	**62.42**	**60.11**	**55.92**	**63.92**	**64.39**	55 dBA:	**256**	**275**

Road Name: Wentworth Street **Segment: South of Foothill Boulevard**

Average Daily Traffic: 10225 Vehicles Vehicle Speed: 45 MPH Vehicle Mix: 3 Roadway Classification: Secondary

	NOISE PARAMETERS AT 60 FEET FROM CENTERLINE (Equiv. Lane Dist: 54.99 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	69.34	-2.28	-0.72	-1.20	65.14	62.59	61.29	55.24	63.67	64.30	70 dBA:	**28**	**30**
Medium Trucks	77.62	-17.15	-0.72	-1.20	58.55	39.16	31.38	40.59	46.74	46.78	65 dBA:	**61**	**65**
Heavy Trucks	82.14	-12.09	-0.72	-1.20	68.13	55.62	43.18	52.39	59.22	59.25	60 dBA:	**131**	**140**
				Total:	**70.20**	**63.40**	**61.36**	**57.15**	**65.07**	**65.54**	55 dBA:	**281**	**303**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: EXISTING WITH PROJECT ROUTE 8A CONDITIONS

Project: Devil's Gate Reservoir
Site Conditions: Soft

	Vehicle Mix 1 (Arterials)				Vehicle Mix 2 (Foothill Blvd W-Project)				Vehicle Mix 3 (Wentworth W-Project)			
Vehicle Type	Day	Evening	Night	Daily	Day	Evening	Night	Daily	Day	Evening	Night	Daily
Automobiles	69.50%	12.90%	9.60%	92.00%	64.96%	12.06%	8.97%	85.98%	66.68%	12.38%	9.21%	88.27%
Medium Trucks	1.44%	0.06%	1.50%	3.00%	1.35%	0.06%	1.40%	2.80%	1.38%	0.06%	1.44%	2.88%
Heavy Trucks	2.40%	0.10%	2.50%	5.00%	8.94%	0.09%	2.34%	11.37%	6.74%	0.10%	2.40%	9.23%

Road Name: Branford Street **Segment: East of Laurel Canyon Boulevard**

Average Daily Traffic: 10925 Vehicles | Vehicle Speed: 35 MPH | Vehicle Mix: 3 | Roadway Classification: Secondary

	NOISE PARAMETERS AT 50 FEET FROM CENTERLINE (Equiv. Lane Dist: 43.86 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	65.11	-0.90	0.75	-1.20	63.76	61.20	59.91	53.86	62.29	62.92	70 dBA:	**21**	**22**
Medium Trucks	74.83	-15.77	0.75	-1.20	58.61	39.22	31.44	40.65	46.80	46.83	65 dBA:	**45**	**48**
Heavy Trucks	80.05	-10.71	0.75	-1.20	68.89	56.38	43.94	53.14	59.97	60.00	60 dBA:	**98**	**104**
				Total:	**70.35**	**62.46**	**60.03**	**56.64**	**64.37**	**64.78**	55 dBA:	**211**	**224**

Road Name: Branford Street **Segment: West of Laurel Canyon Boulevard**

Average Daily Traffic: 12425 Vehicles | Vehicle Speed: 35 MPH | Vehicle Mix: 3 | Roadway Classification: Secondary

	NOISE PARAMETERS AT 65 FEET FROM CENTERLINE (Equiv. Lane Dist: 60.41 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	65.11	-0.34	-1.34	-1.20	62.23	59.68	58.38	52.33	60.76	61.39	70 dBA:	**22**	**23**
Medium Trucks	74.83	-15.21	-1.34	-1.20	57.08	37.69	29.91	39.12	45.27	45.31	65 dBA:	**47**	**50**
Heavy Trucks	80.05	-10.15	-1.34	-1.20	67.36	54.85	42.41	51.62	58.45	58.48	60 dBA:	**101**	**107**
				Total:	**68.82**	**60.93**	**58.50**	**55.11**	**62.84**	**63.26**	55 dBA:	**217**	**231**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: EXISTING WITH PROJECT ROUTE 8B CONDITIONS

Project: Devil's Gate Reservoir
Site Conditions: Soft

	Vehicle Mix 1 (Arterials)				Vehicle Mix 2 (Foothill Blvd W-Project)				Vehicle Mix 3 (Wentworth W-Project)			
Vehicle Type	Day	Evening	Night	Daily	Day	Evening	Night	Daily	Day	Evening	Night	Daily
Automobiles	69.50%	12.90%	9.60%	92.00%	64.96%	12.06%	8.97%	85.98%	66.68%	12.38%	9.21%	88.27%
Medium Trucks	1.44%	0.06%	1.50%	3.00%	1.35%	0.06%	1.40%	2.80%	1.38%	0.06%	1.44%	2.88%
Heavy Trucks	2.40%	0.10%	2.50%	5.00%	8.94%	0.09%	2.34%	11.37%	6.74%	0.10%	2.40%	9.23%

Road Name: Osborne Street **Segment: East of I-5 Northbound Ramps**

Average Daily Traffic: 31025 Vehicles Vehicle Speed: 35 MPH Vehicle Mix: 3 Roadway Classification: Major

	NOISE PARAMETERS AT 85 FEET FROM CENTERLINE (Equiv. Lane Dist: 81.83 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	65.11	3.63	-3.31	-1.20	64.23	61.67	60.38	54.33	62.76	63.39	70 dBA:	**38**	**41**
Medium Trucks	74.83	-11.24	-3.31	-1.20	59.08	39.69	31.91	41.12	47.27	47.31	65 dBA:	**83**	**88**
Heavy Trucks	80.05	-6.18	-3.31	-1.20	69.36	56.85	44.41	53.61	60.44	60.47	60 dBA:	**179**	**190**
				Total:	**70.82**	**62.93**	**60.50**	**57.11**	**64.84**	**65.25**	55 dBA:	**385**	**410**

Road Name: Laurel Canyon Boulevard **Segment: South of Osborne Street**

Average Daily Traffic: 18725 Vehicles Vehicle Speed: 35 MPH Vehicle Mix: 3 Roadway Classification: Major

	NOISE PARAMETERS AT 60 FEET FROM CENTERLINE (Equiv. Lane Dist: 55.42 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	65.11	1.44	-0.77	-1.20	64.57	62.02	60.73	54.67	63.10	63.74	70 dBA:	**29**	**31**
Medium Trucks	74.83	-13.43	-0.77	-1.20	59.42	40.04	32.25	41.46	47.62	47.65	65 dBA:	**62**	**66**
Heavy Trucks	80.05	-8.37	-0.77	-1.20	69.70	57.20	44.75	53.96	60.79	60.82	60 dBA:	**133**	**142**
				Total:	**71.17**	**63.28**	**60.84**	**57.45**	**65.19**	**65.60**	55 dBA:	**287**	**305**

Road Name: Branford Street **Segment: East of Laurel Canyon Boulevard**

Average Daily Traffic: 10925 Vehicles Vehicle Speed: 35 MPH Vehicle Mix: 3 Roadway Classification: Secondary

	NOISE PARAMETERS AT 50 FEET FROM CENTERLINE (Equiv. Lane Dist: 43.86 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	65.11	-0.90	0.75	-1.20	63.76	61.20	59.91	53.86	62.29	62.92	70 dBA:	**21**	**22**
Medium Trucks	74.83	-15.77	0.75	-1.20	58.61	39.22	31.44	40.65	46.80	46.83	65 dBA:	**45**	**48**
Heavy Trucks	80.05	-10.71	0.75	-1.20	68.89	56.38	43.94	53.14	59.97	60.00	60 dBA:	**98**	**104**
				Total:	**70.35**	**62.46**	**60.03**	**56.64**	**64.37**	**64.78**	55 dBA:	**211**	**224**

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: EXISTING WITH PROJECT ROUTE 8C CONDITIONS

Project: Devil's Gate Reservoir
Site Conditions: Soft

	Vehicle Mix 1 (Arterials)				Vehicle Mix 2 (Foothill Blvd W-Project)				Vehicle Mix 3 (Wentworth W-Project)			
Vehicle Type	Day	Evening	Night	Daily	Day	Evening	Night	Daily	Day	Evening	Night	Daily
Automobiles	69.50%	12.90%	9.60%	92.00%	64.96%	12.06%	8.97%	85.98%	66.68%	12.38%	9.21%	88.27%
Medium Trucks	1.44%	0.06%	1.50%	3.00%	1.35%	0.06%	1.40%	2.80%	1.38%	0.06%	1.44%	2.88%
Heavy Trucks	9.00%	0.10%	2.50%	5.00%	8.94%	0.09%	2.34%	11.37%	6.74%	0.10%	2.40%	9.23%

Road Name: Foothill Boulevard **Segment: East of Wheatland Avenue**
Average Daily Traffic: 6925 Vehicles Vehicle Speed: 50 MPH Vehicle Mix: 2 Roadway Classification: Major

	NOISE PARAMETERS AT 65 FEET FROM CENTERLINE (Equiv. Lane Dist: 60.79 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	71.12	-4.55	-1.38	-1.20	64.00	61.33	60.04	53.98	62.41	63.05	70 dBA:	**26**	**27**
Medium Trucks	78.79	-19.41	-1.38	-1.20	56.80	37.30	29.52	38.73	44.88	44.92	65 dBA:	**55**	**59**
Heavy Trucks	83.02	-13.33	-1.38	-1.20	67.11	55.83	42.04	51.25	58.41	58.44	60 dBA:	**119**	**127**
				Total:	**69.10**	**62.42**	**60.11**	**55.92**	**63.92**	**64.39**	55 dBA:	**256**	**275**

Road Name: Wentworth Street **Segment: South of Foothill Boulevard**
Average Daily Traffic: 10225 Vehicles Vehicle Speed: 45 MPH Vehicle Mix: 3 Roadway Classification: Secondary

	NOISE PARAMETERS AT 60 FEET FROM CENTERLINE (Equiv. Lane Dist: 54.99 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	69.34	-2.28	-0.72	-1.20	65.14	62.59	61.29	55.24	63.67	64.30	70 dBA:	**28**	**30**
Medium Trucks	77.62	-17.15	-0.72	-1.20	58.55	39.16	31.38	40.59	46.74	46.78	65 dBA:	**61**	**65**
Heavy Trucks	82.14	-12.09	-0.72	-1.20	68.13	55.62	43.18	52.39	59.22	59.25	60 dBA:	**131**	**140**
				Total:	**70.20**	**63.40**	**61.36**	**57.15**	**65.07**	**65.54**	55 dBA:	**281**	**303**

Road Name: San Fernando Road **Segment: South of Branford Street**
Average Daily Traffic: 16325 Vehicles Vehicle Speed: 35 MPH Vehicle Mix: 3 Roadway Classification: Major

	NOISE PARAMETERS AT 190 FEET FROM CENTERLINE (Equiv. Lane Dist: 188.6 ft)										**Centerline Distance to**		
	Noise Adjustments				**Unmitigated Noise Levels**						**Noise Contour (in feet)**		
Vehicle Type	REMEL	Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		Ldn	CNEL
Automobiles	65.11	0.84	-8.75	-1.20	56.00	53.45	52.15	46.10	54.53	55.16	70 dBA:	**24**	**26**
Medium Trucks	74.83	-14.03	-8.75	-1.20	50.85	31.46	23.68	32.89	39.04	39.08	65 dBA:	**52**	**56**
Heavy Trucks	80.05	-8.96	-8.75	-1.20	61.13	48.62	36.18	45.39	52.22	52.24	60 dBA:	**113**	**120**
				Total:	**62.59**	**54.70**	**52.27**	**48.88**	**56.61**	**57.02**	55 dBA:	**243**	**259**

APPENDIX J – Traffic Report

Hall & Foreman, Inc.
Engineering • Surveying • Planning • Landscape Architecture

TRAFFIC IMPACT ANALYSIS

Devil's Gate Reservoir Sediment Removal and Management Project

Los Angeles County, California

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UPDATED
DRAFT REPORT
October 18, 2013

Hall & Foreman, Inc.
Engineering ▪ Planning ▪ Surveying

October 18, 2013 Job No. VV.110264.0000

Paula Fell
Senior Environmental Planner
Chambers Group, Inc.
5 Hutton Centre Drive, Suite 750
Santa Ana, CA 92707

RE: TRAFFIC IMPACT ANALYSIS – DEVIL'S GATE RESERVOIR SEDIMENT REMOVAL AND MANAGEMENT PROJECT – LOS ANGELES COUNTY, CALIFORNIA

Dear Ms. Fell;

Hall & Foreman Inc. is pleased to submit this Traffic Impact Analysis report for the haul route alternatives for the Devil's Gate Reservoir Sediment Removal and Management Project. Devil's Gate Dam and Reservoir is located to the north east of the I-210 Freeway in the City of Pasadena. Devil's Gate Dam and Reservoir serves as a critical component of the Los Angeles County Flood Control District since it provides flood protection to the Cities of Pasadena, South Pasadena, and Los Angeles. The sediment removal is proposed to be taken to eight potential disposal sites that have been identified by the County of Los Angeles.

The report examines the traffic impacts specifically along the project haul routes. The report also addresses the impacts of ambient growth within the area to assure that cumulative traffic mitigations can be addressed.

We are pleased to have been of assistance to you in processing and obtaining approval for the project. If you have any questions or comments, please feel free to contact me at 760-524-9115.

Respectfully submitted,

Hall & Foreman Inc.

REGISTERED PROFESSIONAL ENGINEER
ROBERT KILPATRICK
No. 1573
TRAFFIC
STATE OF CALIFORNIA

Robert A. Kilpatrick, P.E., T.E.
Project Director/Associate

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1. INTRODUCTION

Project Description

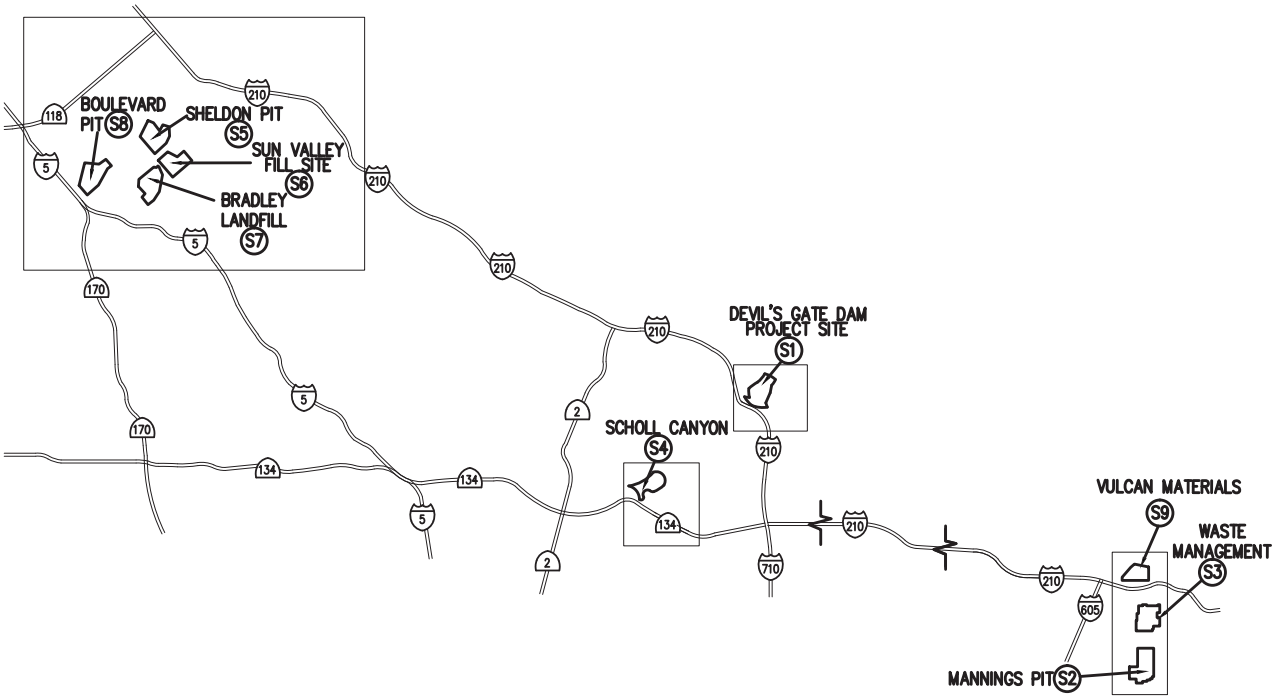
The County of Los Angeles has proposed a sediment removal project for the Devil's Gate Dam and Reservoir which is located to the northeast of the I-210 Freeway in the City of Pasadena, as illustrated in *Figure 1-1.* The project site is surrounded by residential communities to the south, and east of the site. Devil's Gate Dam and Reservoir serves as a critical component of the Los Angeles County Flood Control District since it provides flood protection to the Cities of Pasadena, South Pasadena, and Los Angeles. The sediment removal is proposed to be taken to seven potential disposal sites that have been identified by the County of Los Angeles.

The Devil's Gate Dam and Reservoir site is located to the northeast of the I-210 Freeway on Oak Grove Drive between Berkshire Place and the Foothill Freeway Overpass. Access to the project site will be obtained from Oak Grove Drive. The sediment and organic materials removed from the dam is proposed to be transported to eight potential disposal sites within the county of Los Angeles. The sediment is proposed to be transported to potentially seven (7) disposal sites and one (1) green waste disposal site, as illustrated in *Figure 1-2.* The seven proposed disposal sites are the Manning's Pit, Waste Management, Vulcan Materials - Irwindale Site, Sheldon Pit, Sun Valley Fill Site, Bradley Landfill, and the Boulevard Pit. The Waste Management, Manning's Pit, and Vulcan Materials - Irwindale Site are to the east of the dam site in the cities of Azusa and Irwindale. The Sheldon Pit, Sun Valley Fill Site, Bradley Landfill, and the Boulevard Pit are to the northwest of the dam site in the City of Los Angeles, as illustrated in *Figure 1-3*. The proposed green waste disposal site is the Scholl Canyon Landfill, southwest of the dam in the Eagle Rock area within the City of Los Angeles.

The On-site excavation hours is proposed to occur between the hours of 7 AM to 6 PM Standard Time, 7 AM to 7 PM Daylight Savings Time, and Saturday 8 AM to 5 PM. The operational period is divided into three peak hour periods. The AM peak period consists of the hours 7 AM to 10 AM. The MIDDAY peak period consists of the hours 10 AM to 4 PM. The PM peak period consists of the hours 4 PM to 6 PM Standard Time, 4 PM to 7 PM Daylight Savings Time.

The proposed Haul Trucks are Double Dump Trucks estimated to haul 18 cubic yards of sediment. The trucks are anticipated to haul approximately 7.65 thousand cubic yards per day. A proposed 50 trucks per hour will be removing up to 4 million cubic yards of sediment and organic materials during the sediment removal phase of the project.

This traffic study analyzed the existing conditions, the existing conditions with project trips (existing + project conditions), and the Year 2014 project conditions for the identified study intersections, freeway segments, and ramps. Twenty-six (26) haul routes are proposed for the transportation of the removed sediment to the proposed disposal sites. Along the 26 haul routes 52 intersections were identified for analysis. Twenty-eight (28) freeway segments along the I-210 Freeway, SR-134 Freeway, SR-2 Freeway, I-5 Freeway, and SR-118 freeway and fifty-four (54) on and off-ramps within those freeway segments were also identified for analysis. The sediment removal project phase is expected to generate 50 truck trips per hour with destinations to the potential seven disposal sites. It is estimated that a total of 17 and 425 average daily trips for autos and trucks will travel to and from the project site, respectively. Truck trip distributions were based on the existing capacity of the haul routes and intersections along the haul routes.



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DEVIL'S GATE PROJECT MAP

DEVIL'S GATE DAM & RESERVOIR

FIGURE 1-1

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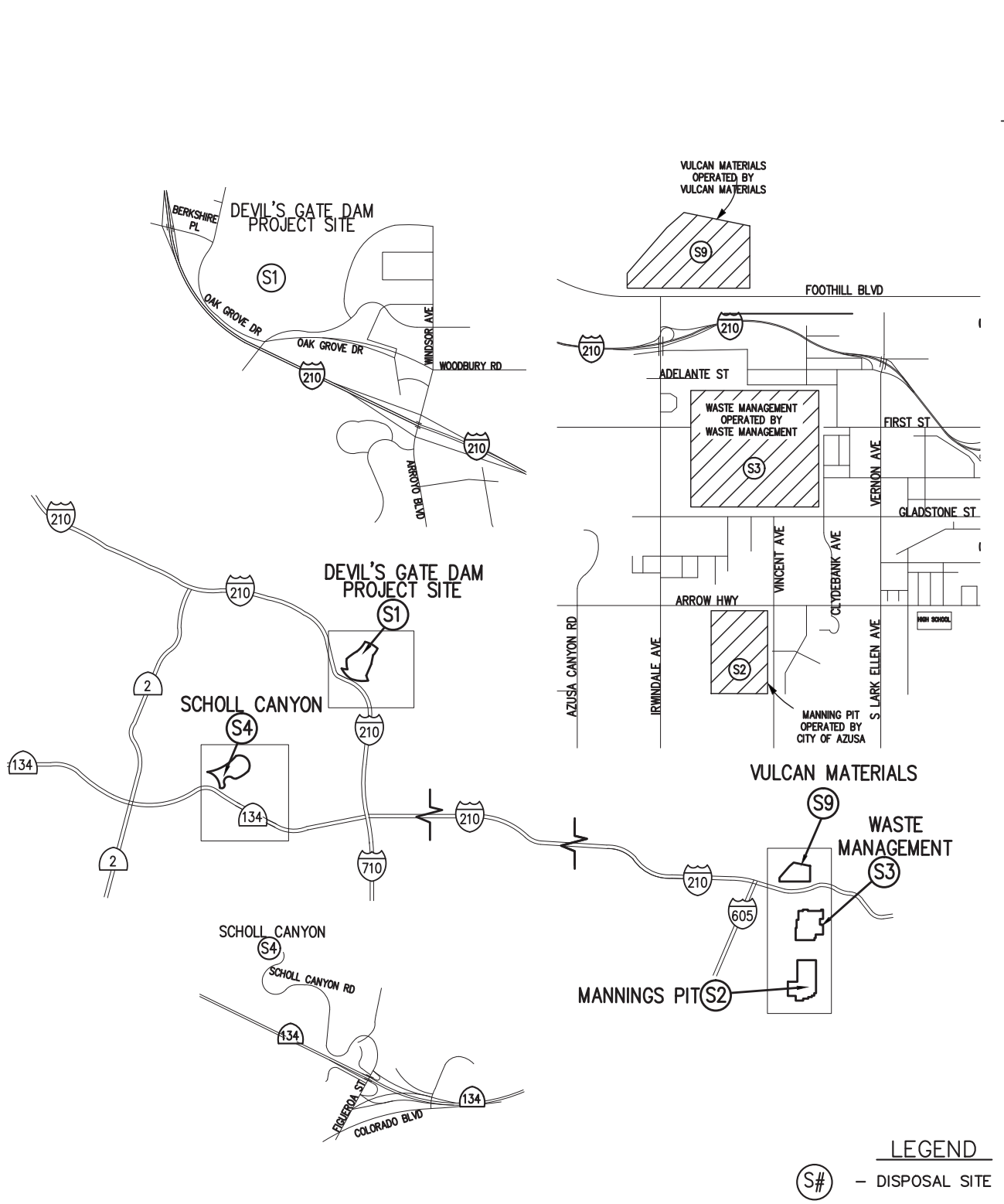

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DEVIL'S GATE, SCHOLL CANYON. WASTE MANAGEMENT, MANNINGS PIT, VULCAN MATERIALS

DEVIL'S GATE DAM & RESERVOIR

FIGURE 1-2

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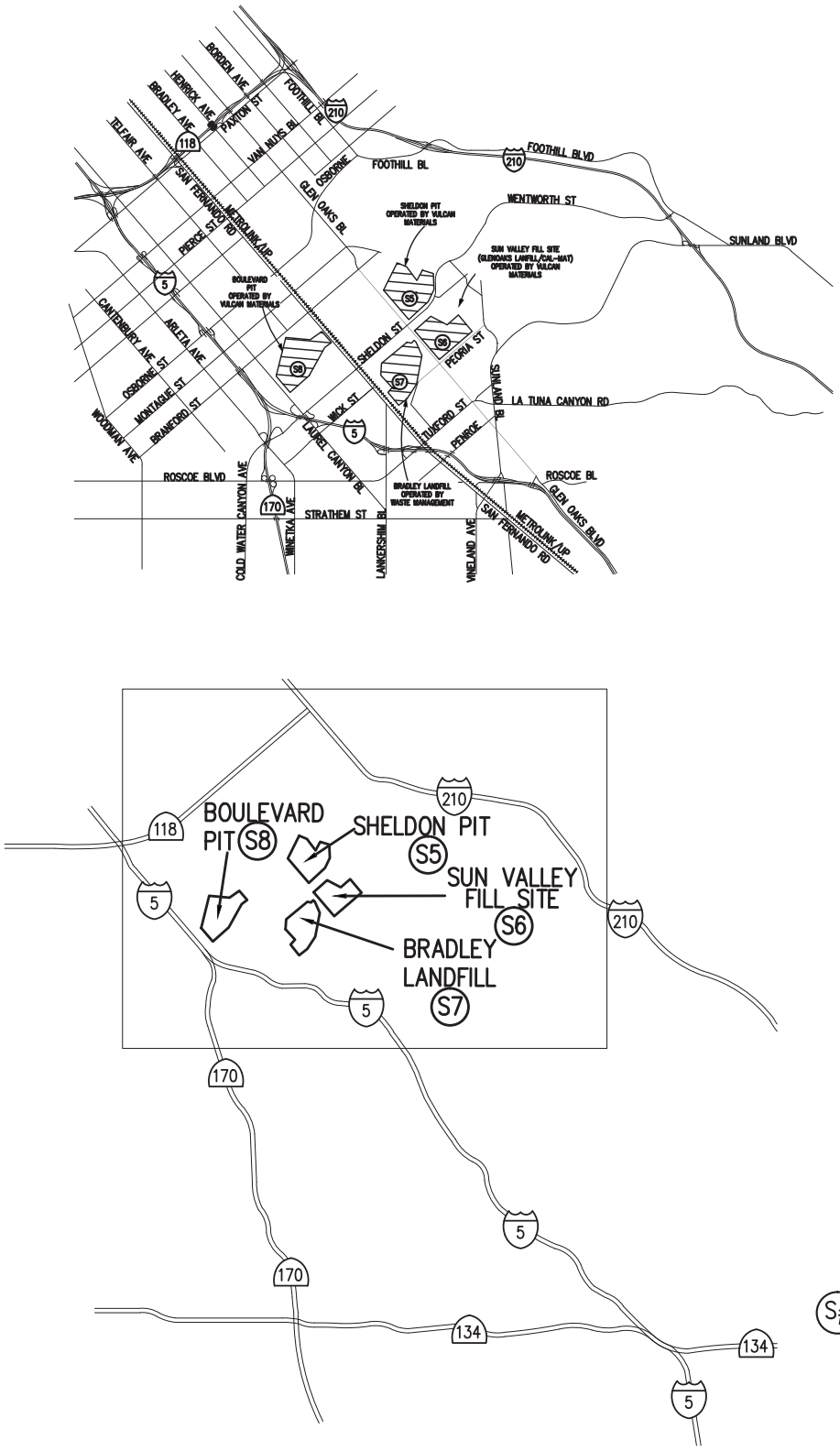

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SHELDON PIT, SUN VALLEY FILL SITE, BRADLEY LANDFILL, AND BOULEVARD PIT SITES

DEVIL'S GATE DAM & RESERVOIR

FIGURE 1-3

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The Preferred Haul Routes

The preferred Haul Route to the east is the Haul Route 1D. The Haul Routes that utilize the Haul Route 1D are the Manning's Pit (Site 2), Waste Management (Site 3), Vulcan Materials - Irwindale Site (Site 9), and Scholl Canyon Landfill (Site 4). The Manning's Pit preferred Haul Route is Haul Route 2A. The Waste Management preferred Haul Route is Haul Route 3. The Vulcan Materials - Irwindale Site preferred Haul Route is Haul Route 9. The Scholl Canyon Landfill preferred Haul Route is Haul Route 4A.

The preferred Haul Route to the west is the Haul Route 1H. The Haul Routes that utilize the Haul Route 1H are the Sheldon Pit (Site 5), Sun Valley Fill Site (Site 6), Bradley Landfill (Site 7), and Boulevard Pit (Site 8). The Sheldon Pit preferred Haul Route is Haul Route 5A. The Sun Valley Fill Site preferred Haul Route is Haul Route 6A. The Bradley Landfill preferred Haul Route is Haul Route 7A. The Boulevard Pit preferred Haul Route is Haul Route 8C.

Devil's Gate Dam Area (Site 1): Haul Route 1D

Haul Route 1D is the preferred route to Manning's Pit (Site 2), Waste Management (Site 3), Vulcan Materials - Irwindale Site (Site 9), and Scholl Canyon Landfill (Site 4), disposal sites east of Devil's Gate Dam and Reservoir.

Preferred East Route – Devil's Gate Dam and Reservoir (Haul Route 1D) - Year 2014

Route1D		AM				MID-DAY (12-2 PM)				MID-DAY (2-4 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
1	Berkshire Place and I-210 Freeway Eastbound Ramps (3)	F	51.4	-	-	B	10.8	-	-	C	23.7	-	-	D	31.6	-	-
2	Berkshire Place and I-210 Freeway Westbound Ramps (3)	A	9.5	-	-	A	4.9	-	-	A	7.2	-	-	A	3.8	-	-
3	Oak Grove Drive and Berkshire Place	B	19.2	0.93	B	A	5.6	0.29	A	A	8.4	0.57	B	A	8	0.57	B
4	Oak Grove Drive and Foothill Freeway Overpass (3)	C	19.2	-	-	A	9.6	-	-	A	9.5	-	-	B	11.3	-	-
5	Windsor Ave and Oak Grove Drive/Woodbury Rd	C	34.7	0.94	D	B	14.3	0.54	A	B	17.1	0.58	A	C	24.9	0.76	C
6	Windsor Ave/Arroyo Blvd and I-210 Freeway Westbound Ramps	B	10.4	0.66	B	A	6	0.31	A	A	7.3	0.41	A	A	8.2	0.45	B

(*) F*- ICU LOS Exceeds LOS F

Source: **Hall & Foreman Inc**

	Route 1D AM Peak Hour	Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project		Year 2014 with Project and potential impact reduction measures		Difference with vs. without potential impact reduction measures
	Intersection # / Name	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact
1	Berkshire Place and I-210 Freeway Eastbound Ramps (3)	-	D	-	E	YES	-	F	-	-	N/A
2	Berkshire Place and I-210 Freeway Westbound Ramps (3)	-	A	-	A	NO	-	A	-	-	N/A
3	Oak Grove Drive and Berkshire Place	0.50	A	0.67	A	NO	0.93	B	-	-	N/A
4	Oak Grove Drive and Foothill Freeway Overpass (3)	-	B	-	C	NO	-	C	-	-	N/A
5	Windsor Ave and Oak Grove Drive/Woodbury Rd	0.87	C	0.86	C	NO	0.94	C	-	-	N/A
6	Windsor Ave/Arroyo Blvd and I-210 Freeway Westbound Ramps	0.53	A	0.57	A	NO	0.66	B	-	-	N/A

The Haul Route 1D is anticipated to continue to operate at an LOS D or better for all utilized intersections during the MID-DAY and PM peak periods without the need for potential impact reduction measures. The Devil's Gate Dam and Reservoir driveway does not require potential impact reduction measures.

Berkshire Place (EW) and I-210 Freeway Eastbound Ramps (NS): The Intersection is anticipated to operate at an unacceptable LOS during the AM peak period. The optional measures of this intersection are beyond of the scope of the project. The Haul Route, therefore, is anticipated to continue to operate at an unacceptable LOS during the AM peak period.

Manning's Pit (Site 2): Haul Route 2A

Haul Route 2A is the preferred route for Manning's Pit, east of Devil's Gate Dam and Reservoir.

Preferred Route – Manning's Pit (Haul Route 2A) - Year 2014

	Route 2A	AM				MID-DAY				PM			
	Intersection # / Name	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
8	Irwindale Ave and I-210 Freeway Westbound Ramps	A	7.1	0.56	A	A	7.4	0.53	A	A	7.3	0.56	A
9	Irwindale Ave and I-210 Freeway Eastbound Ramps	C	27.9	0.93	C	C	22.0	0.79	C	C	26.9	0.91	D
10	Irwindale Ave and First Street	B	10.6	0.63	B	B	14.2	0.65	B	C	23.2	0.86	C
11	Irwindale Ave and Gladstone Street	C	29.9	0.92	D	B	16.0	0.72	B	C	30.2	0.95	D
12	Vincent Ave and Gladstone Street	B	14.3	0.80	C	A	8.9	0.45	A	B	14.4	0.72	C
13	Vincent Ave and Arrow Hwy	B	17.6	0.90	D	A	9.8	0.45	A	B	15.4	0.93	D

(*) F*- ICU LOS Exceeds LOS F

Source: **Hall & Foreman Inc**

Route 2A AM Peak Hour		Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project		Year 2014 with Project and potential impact reduction measures		Difference with vs. without potential impact reduction measures
Intersection # / Name		HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact
8	Irwindale Ave and I-210 Freeway Westbound Ramps	0.48	A	0.5	A	NO	0.56	A	-	-	N/A
9	Irwindale Ave and I-210 Freeway Eastbound Ramps	0.84	C	0.85	C	NO	0.93	C	-	-	N/A
10	Irwindale Ave and First Street	0.6	B	0.64	B	NO	0.63	B	-	-	N/A
11	Irwindale Ave and Gladstone Street	0.81	C	0.87	C	NO	0.92	C	-	-	N/A
12	Vincent Ave and Gladstone Street	0.61	B	0.72	B	NO	0.8	B	-	-	N/A
13	Vincent Ave and Arrow Hwy	0.77	B	0.8	B	NO	0.9	B	-	-	N/A

The Haul Route 2A is anticipated to continue to operate at an LOS C or better for all utilized intersections during the AM, MID-DAY, and PM peak periods without the need for potential impact reduction measures.

An optional measure is to provide applicable construction signing at the Manning's Pit driveway.

Waste Management (Site 3): Haul Route 3

Haul Route 3 is the preferred route for Waste Management, east of Devil's Gate Dam and Reservoir.

Preferred Route – Waste Management (Haul Route 3) - Year 2014

Route 3		AM				MID-DAY				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
8	Irwindale Ave and I-210 Freeway Westbound Ramps	A	7.1	0.56	A	A	7.4	0.53	A	A	7.3	0.56	A
9	Irwindale Ave and I-210 Freeway Eastbound Ramps	C	27.9	0.93	C	C	22.0	0.79	C	C	26.9	0.91	D
10	Irwindale Ave and First Street	B	10.6	0.63	B	B	14.2	0.65	B	C	23.2	0.86	C
11	Irwindale Ave and Gladstone Street	C	29.9	0.92	D	B	16.0	0.72	B	C	30.2	0.95	D
12	Vincent Ave and Gladstone Street	B	11.7	0.68	B	A	8.7	0.31	A	B	11.0	0.57	B

(*) F*- ICU LOS Exceeds LOS F

Source: **Hall & Foreman Inc**

The Haul Route 3 is anticipated to continue to operate at an LOS C or better for all utilized intersections during the AM, MID-DAY, and PM peak periods without the need for potential impact reduction measures. The Waste Management driveway is at the signalized study intersection of Vincent Avenue and Gladstone Street that does not require potential impact reduction measures.

Route 3 AM Peak Hour		Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project		Year 2014 with Project and potential impact reduction measures		Difference with vs. without potential impact reduction measures
Intersection # / Name		HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact
8	Irwindale Ave and I-210 Freeway Westbound Ramps	0.48	A	0.5	A	NO	0.56	A	-	-	N/A
9	Irwindale Ave and I-210 Freeway Eastbound Ramps	0.84	C	0.85	C	NO	0.93	C	-	-	N/A
10	Irwindale Ave and First Street	0.6	B	0.64	B	NO	0.63	B	-	-	N/A
11	Irwindale Ave and Gladstone Street	0.81	C	0.87	C	NO	0.92	C	-	-	N/A
12	Vincent Ave and Gladstone Street	0.61	B	0.65	B	NO	0.68	B	-	-	N/A

Vulcan Material (Site 9): Haul Route 9

Haul Route 9 is the preferred route for Vulcan Material – Irwindale Site, east of Devil's Gate Dam and Reservoir.

Preferred Route – Vulcan Material (Haul Route 9) - Year 2014

Route 9		AM				MID-DAY				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
8	Irwindale Ave and I-210 Freeway Westbound Ramps	A	7.2	0.57	A	A	7.5	0.54	A	A	7.5	0.58	A
9	Irwindale Ave and I-210 Freeway Eastbound Ramps	C	27.9	0.90	C	C	22.5	0.80	C	C	26.6	0.88	D
53	Irwindale Ave and Foothill Boulevard	C	30.0	0.87	C	D	46.8	1.01	D	E	77.1	1.09	F*

(*) F*- ICU LOS Exceeds LOS F

Source: **Hall & Foreman Inc**

Route 9 PM Peak Hour		Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project		Year 2014 with Project and potential impact reduction measures		Difference with vs. without potential impact reduction measures
Intersection # / Name		HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact
8	Irwindale Ave and I-210 Freeway Westbound Ramps	0.50	A	0.52	A	NO	0.58	A	-	-	N/A
9	Irwindale Ave and I-210 Freeway Eastbound Ramps	0.83	C	0.84	C	NO	0.88	C	-	-	N/A
53	Irwindale Ave and Foothill Boulevard	0.94	D	1.05	D	NO	1.09	E	-	-	N/A

The Haul Route 9 is anticipated to continue to operate at an LOS D or better for all utilized intersections during the AM, and MID-DAY peak periods without the need for potential impact reduction measures.

Irwindale Avenue (NS) and Foothill Boulevard (EW) (Vulcan Materials driveway): The Intersection is anticipated to operate at an unacceptable LOS during the PM peak hour. The optional measures of this intersection are beyond of the scope of the project. The Haul Route, therefore, is anticipated to continue to operate at an unacceptable LOS during the PM peak period.

Scholl Canyon Landfill Haul (Site 4): Route 4A

Haul Route 4A is the Scholl Canyon Landfill preferred route, east of Devil's Gate Dam and Reservoir.

Preferred Route – Scholl Canyon Landfill (Haul Route 4A) - Year 2014

Route 4A		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
21	Figueroa St/Scholl Canyon Road and SR-134 Freeway Westbound Ramps	E	41.2	-	-	B	14.4	-	-	E	49.9	-	-
	With potential impact reduction measures (Lane Modification)	C	15.3	-	-	B	11.0	-	-	C	15.7	-	-
22	Figueroa St and Eagle Vista Drive	B	14.2	-	-	B	12.8	-	-	C	22.9	-	-
23	Figueroa St and SR-134 Freeway Eastbound Ramps	A	9.2	0.66	B	A	6.4	0.44	A	A	8.6	0.63	B

(*) F*- ICU LOS Exceeds LOS F

Source: **Hall & Foreman Inc**

Route 4A AM Peak Hour		Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project		Year 2014 with Project and potential impact reduction measures		Difference with vs. without potential impact reduction measures
Intersection # / Name		HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact
21	Figueroa St/Scholl Canyon Road and SR-134 Freeway Westbound Ramps	-	D	-	E	YES	-	E	-	C	NO
22	Figueroa St and Eagle Vista Drive	-	B	-	B	NO	-	B	-	-	N/A
23	Figueroa St and SR-134 Freeway Eastbound Ramps	0.5	A	0.57	A	NO	0.66	A	-	-	N/A

Route 4A PM Peak Hour		Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project		Year 2014 with Project and potential impact reduction measures		Difference with vs. without potential impact reduction measures
Intersection # / Name		HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact
21	Figueroa St/Scholl Canyon Road and SR-134 Freeway Westbound Ramps	-	D	-	D	NO	-	E	-	C	NO
22	Figueroa St and Eagle Vista Drive	-	C	-	C	NO	-	C	-	-	N/A
23	Figueroa St and SR-134 Freeway Eastbound Ramps	0.46	A	0.55	A	NO	0.63	A	-	-	N/A

The Haul Route 4A utilized intersections are anticipated to continue to operate at an LOS B or better during the MID-DAY peak period without the need for potential impact reduction measures. The following potential impact reduction measures will improve the utilized intersections to an acceptable LOS during the AM and PM peak periods:

1. Figueroa St/Scholl Canyon Road (NS) and SR-134 Freeway Westbound Ramps (EW): Restripe the westbound right turn lane to a shared left-right turn lane and the northbound through lane to a shared through-right turn lane. The northbound direction will include a shared through-right turn lane and a right turn lane. The southbound direction will include a shared through-left turn lane and a through turn lane. The westbound direction will include a left turn lane and a shared left-right turn lane. This optional measure requires the approval of the City of Los Angeles and Caltrans.

Devil's Gate Dam Area (Site 1): Haul Route 1H

Haul Route 1H is the preferred route for disposal sites Sheldon Pit (Site 5), Sun Valley Fill Site (Site 6), Bradley Landfill (Site 7), and Boulevard Pit (Site 8), east of Devil's Gate Dam and Reservoir.

Preferred East Route – Devil's Gate Dam and Reservoir (Haul Route 1H) - Year 2014

Route1H		AM				MID-DAY (12-2 PM)				MID-DAY (2-4 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
2	Berkshire Place and I-210 Freeway Westbound Ramps (3)	B	10.4	-	-	A	4.6	-	-	A	6.6	-	-	A	3.5	-	-
3	Oak Grove Drive and Berkshire Place	B	19.2	0.93	B	A	5.6	0.29	A	A	8.4	0.57	B	A	8	0.57	B
4	Oak Grove Drive and Foothill Freeway Overpass (3)	C	19.2	-	-	A	9.6	-	-	A	9.5	-	-	B	11.3	-	-
5	Windsor Ave and Oak Grove Drive/Woodbury Rd	C	34.7	0.94	D	B	14.3	0.54	A	B	17.1	0.58	A	C	24.9	0.76	C
6	Windsor Ave/Arroyo Blvd and I-210 Freeway Westbound Ramps	A	9.7	0.61	B	A	5.7	0.37	A	A	6.4	0.37	A	A	7.8	0.44	B
7	Windsor Ave/Arroyo Blvd and I-210 Freeway Eastbound Ramps	C	28.6	0.57	A	B	16.1	0.39	A	B	17.4	0.42	A	C	26.8	0.63	A

(*) F*- ICU LOS Exceeds LOS F

Source: **Hall & Foreman Inc**

	Route 1H AM Peak Hour	Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project		Year 2014 with Project and potential impact reduction measures		Difference with vs. without potential impact reduction measures
	Intersection # / Name	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact
2	Berkshire Place and I-210 Freeway Westbound Ramps (3)	-	A	-	A	NO	-	B	-	-	N/A
3	Oak Grove Drive and Berkshire Place	0.50	A	0.67	A	NO	0.93	B	-	-	N/A
4	Oak Grove Drive and Foothill Freeway Overpass (3)	-	B	-	C	NO	-	C	-	-	N/A
5	Windsor Ave and Oak Grove Drive/Woodbury Rd	0.87	C	0.86	C	NO	0.94	C	-	-	N/A
6	Windsor Ave/Arroyo Blvd and I-210 Freeway Westbound Ramps	0.53	A	0.55	A	NO	0.61	A	-	-	N/A
7	Windsor Ave/Arroyo Blvd and I-210 Freeway Eastbound Ramps	0.49	C	0.53	C	NO	0.57	C	-	-	N/A

The Haul Route 1H is anticipated to continue to operate at an LOS C or better for all utilized intersections throughout the day without the need for potential impact reduction measures. The Devil's Gate Dam and Reservoir entrance and access to Oak Grove Drive Oak Grove Drive for Route 1H to access the Devil's Gate Dam and Reservoir does not require potential impact reduction measures.

Sheldon Pit (Site 5): Haul Route 5A

Haul Route 5A is the preferred route for Sheldon Pit, west of Devil's Gate Dam and Reservoir.

Preferred Route – Sheldon Pit (Haul Route 5A) – Year 2014

	Route 5A	AM				MID-DAY (12-2 PM)				PM			
	Intersection # / Name	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
24	Foothill Blvd and I-210 Westbound Ramps	A	5.8	0.30	A	A	5.9	0.31	A	A	8.5	0.56	A
25	Foothill Blvd and I-210 Eastbound Ramps	A	6.4	0.32	A	A	6.7	0.33	A	A	7.9	0.44	A
26	Foothill Blvd and Osborne Street	C	20.7	0.78	D	B	10.8	0.56	A	C	21.1	0.88	D
27	Glenoaks Blvd and Osborne Street	F	105.7	1.15	F	D	35.4	0.88	C	E	55.4	0.95	E
28	Glenoaks Blvd and Montague Street	B	10.5	0.79	B	A	9.5	0.41	A	A	10.0	0.62	C
29	Glenoaks Blvd and Branford Street	B	17.9	0.80	C	B	16.5	0.65	B	C	21.9	0.91	D
30	Glenoaks Blvd and Sheldon Street	B	14.2	0.86	E	A	8.1	0.56	B	C	21.8	1.10	D

(*) F*- ICU LOS Exceeds LOS F

Source: **Hall & Foreman Inc**

Route 5A AM Peak Hour		Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project		Year 2014 with Project and potential impact reduction measures		Difference with vs. without potential impact reduction measures
Intersection # / Name		HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact
24	Foothill Blvd and I-210 Westbound Ramps	0.51	A	0.57	A	NO	0.30	A	-	-	N/A
25	Foothill Blvd and I-210 Eastbound Ramps	0.60	A	0.63	A	NO	0.32	A	-	-	N/A
26	Foothill Blvd and Osborne Street	0.89	B	1.16	D	NO	0.78	C	-	-	N/A
27	Glenoaks Blvd and Osborne Street	0.99	E	1.13	F	YES	1.15	F	-	-	YES
28	Glenoaks Blvd and Montague Street	0.69	A	0.72	A	NO	0.79	B	-	-	N/A
29	Glenoaks Blvd and Branford Street	0.77	B	0.81	B	NO	0.80	B	-	-	N/A
30	Glenoaks Blvd and Sheldon Street	0.75	B	0.78	B	NO	0.86	B	-	-	N/A

Route 5A PM Peak Hour		Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project		Year 2014 with Project and potential impact reduction measures		Difference with vs. without potential impact reduction measures
Intersection # / Name		HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact
24	Foothill Blvd and I-210 Westbound Ramps	0.46	A	0.50	A	NO	0.56	A	-	-	N/A
25	Foothill Blvd and I-210 Eastbound Ramps	0.39	A	0.41	A	NO	0.44	A	-	-	N/A
26	Foothill Blvd and Osborne Street	0.73	B	0.91	B	NO	0.88	C	-	-	N/A
27	Glenoaks Blvd and Osborne Street	0.90	D	0.90	D	NO	0.95	E	-	-	YES
28	Glenoaks Blvd and Montague Street	0.55	A	0.58	A	NO	0.62	A	-	-	N/A
29	Glenoaks Blvd and Branford Street	0.76	C	0.80	C	NO	0.91	C	-	-	N/A
30	Glenoaks Blvd and Sheldon Street	0.75	B	0.95	B	NO	1.10	C	-	-	N/A

The Haul Route 5A utilized intersections are anticipated to continue to operate at an LOS D or better during the MID-DAY peak period without the need for potential impact reduction measures.

Glenoaks Blvd (NS) and Osborne Street (EW): The Intersection is anticipated to operate at an unacceptable LOS during the AM and PM peak hours. The optional measures for this intersection are beyond of the scope of the project. The Haul Route, therefore, is anticipated to continue to operate at an unacceptable LOS during the AM and PM peak periods.

An optional measure is to provide applicable construction signing at the Sheldon Pit driveway.

Sun Valley Fill Site (Glenoaks Landfill/Cal-Mat) (Site 6): Haul Route 6A

Haul Route 6A is the preferred route for Sun Valley Fill Site, west of Devil's Gate Dam and Reservoir.

Preferred Route – Sun Valley Fill Site (Haul Route 6A) – Year 2014

Route 6A		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
24	Foothill Blvd and I-210 Westbound Ramps	A	5.8	0.30	A	A	5.9	0.31	A	A	8.5	0.56	A
25	Foothill Blvd and I-210 Eastbound Ramps	A	6.4	0.32	A	A	6.7	0.33	A	A	7.9	0.44	A
26	Foothill Blvd and Osborne Street	C	20.7	0.78	D	B	10.8	0.56	A	C	21.1	0.88	D
27	Glenoaks Blvd and Osborne Street	F	105.7	1.15	F	D	35.4	0.88	C	E	55.4	0.95	E
28	Glenoaks Blvd and Montague Street	B	10.5	0.79	B	A	9.5	0.41	A	A	10.0	0.62	C
29	Glenoaks Blvd and Branford Street	B	17.9	0.80	C	B	16.5	0.65	B	C	21.9	0.91	D
30	Glenoaks Blvd and Sheldon Street	B	14.2	0.86	E	A	8.1	0.56	B	C	21.8	1.10	D

(*) F*- ICU LOS Exceeds LOS F

Source: **Hall & Foreman Inc**

Route 6A AM Peak Hour		Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project		Year 2014 with Project and potential impact reduction measures		Difference with vs. without potential impact reduction measures
Intersection # / Name		HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact
24	Foothill Blvd and I-210 Westbound Ramps	0.51	A	0.57	A	NO	0.30	A	-	-	N/A
25	Foothill Blvd and I-210 Eastbound Ramps	0.60	A	0.63	A	NO	0.32	A	-	-	N/A
26	Foothill Blvd and Osborne Street	0.89	B	1.16	D	NO	0.78	C	-	-	N/A
27	Glenoaks Blvd and Osborne Street	0.99	E	1.13	F	YES	1.15	F	-	-	YES
28	Glenoaks Blvd and Montague Street	0.69	A	0.72	A	NO	0.79	B	-	-	N/A
29	Glenoaks Blvd and Branford Street	0.77	B	0.81	B	NO	0.80	B	-	-	N/A
30	Glenoaks Blvd and Sheldon Street	0.75	B	0.78	B	NO	0.86	B	-	-	N/A

Route 6A PM Peak Hour		Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project		Year 2014 with Project and potential impact reduction measures		Difference with vs. without potential impact reduction measures
Intersection # / Name		HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact
24	Foothill Blvd and I-210 Westbound Ramps	0.46	A	0.50	A	NO	0.56	A	-	-	N/A
25	Foothill Blvd and I-210 Eastbound Ramps	0.39	A	0.41	A	NO	0.44	A	-	-	N/A
26	Foothill Blvd and Osborne Street	0.73	B	0.91	B	NO	0.88	C	-	-	N/A
27	Glenoaks Blvd and Osborne Street	0.90	D	0.90	D	NO	0.95	E	-	-	YES
28	Glenoaks Blvd and Montague Street	0.55	A	0.58	A	NO	0.62	A	-	-	N/A
29	Glenoaks Blvd and Branford Street	0.76	C	0.80	C	NO	0.91	C	-	-	N/A
30	Glenoaks Blvd and Sheldon Street	0.75	B	0.95	B	NO	1.10	C	-	-	N/A

The Haul Route 6A utilized intersections are anticipated to continue to operate at an LOS D or better during the MID-DAY peak period without the need for potential impact reduction measures. The Sun Valley Fill Site driveway does not require potential impact reduction measures.

Glenoaks Blvd (NS) and Osborne Street (EW): The Intersection is anticipated to operate at an unacceptable LOS during the AM and PM peak hours. The optional measures for this intersection are beyond of the scope of the project. The Haul Route, therefore, is anticipated to continue to operate at an unacceptable LOS during the AM and PM peak periods.

Bradley Landfill (Site 7): Haul Route 7A

Haul Route 7A is the Bradley Landfill preferred route, west of Devil's Gate Dam and Reservoir.

Preferred Route – Bradley Landfill (Haul Route 7A) – Year 2014

Route 7A		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
24	Foothill Blvd and I-210 Westbound Ramps	A	5.8	0.30	A	A	5.9	0.31	A	A	8.5	0.56	A
25	Foothill Blvd and I-210 Eastbound Ramps	A	6.4	0.32	A	A	6.7	0.33	A	A	7.9	0.44	A
26	Foothill Blvd and Osborne Street	C	20.7	0.78	D	B	10.8	0.56	A	C	21.1	0.88	D
27	Glenoaks Blvd and Osborne Street	F	105.7	1.15	F	D	35.4	0.88	C	E	55.4	0.95	E
28	Glenoaks Blvd and Montague Street	B	10.5	0.79	B	A	9.5	0.41	A	A	10.0	0.62	C
29	Glenoaks Blvd and Branford Street	B	17.9	0.80	C	B	16.5	0.65	B	C	21.9	0.91	D
30	Glenoaks Blvd and Sheldon Street	B	16.0	0.89	E	A	7.7	0.52	A	B	14.7	0.86	D
31	Glenoaks Blvd and Peoria Street	A	6.2	0.64	A	A	5.4	0.42	A	A	6.4	0.56	A

(*) F*- ICU LOS Exceeds LOS F

Source: **Hall & Foreman Inc**

Route 7A AM Peak Hour		Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project		Year 2014 with Project and potential impact reduction measures		Difference with vs. without potential impact reduction measures
Intersection # / Name		HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact
24	Foothill Blvd and I-210 Westbound Ramps	0.51	A	0.57	A	NO	0.30	A	-	-	N/A
25	Foothill Blvd and I-210 Eastbound Ramps	0.60	A	0.63	A	NO	0.32	A	-	-	N/A
26	Foothill Blvd and Osborne Street	0.89	B	1.16	D	NO	0.78	C	-	-	N/A
27	Glenoaks Blvd and Osborne Street	0.99	E	1.13	F	YES	1.15	F	-	-	YES
28	Glenoaks Blvd and Montague Street	0.69	A	0.72	A	NO	0.79	B	-	-	N/A
29	Glenoaks Blvd and Branford Street	0.77	B	0.81	B	NO	0.80	B	-	-	N/A
30	Glenoaks Blvd and Sheldon Street	0.75	B	0.79	B	NO	0.89	B	-	-	N/A
31	Glenoaks Blvd and Peoria Street	0.54	B	0.61	A	NO	0.64	A	-	-	N/A

Route 7A PM Peak Hour		Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project		Year 2014 with Project and potential impact reduction measures		Difference with vs. without potential impact reduction measures
Intersection # / Name		HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact
24	Foothill Blvd and I-210 Westbound Ramps	0.46	A	0.50	A	NO	0.56	A	-	-	N/A
25	Foothill Blvd and I-210 Eastbound Ramps	0.39	A	0.41	A	NO	0.44	A	-	-	N/A
26	Foothill Blvd and Osborne Street	0.73	B	0.91	B	NO	0.88	C	-	-	N/A
27	Glenoaks Blvd and Osborne Street	0.90	D	0.90	D	NO	0.95	E	-	-	YES
28	Glenoaks Blvd and Montague Street	0.55	A	0.58	A	NO	0.62	A	-	-	N/A
29	Glenoaks Blvd and Branford Street	0.76	C	0.80	C	NO	0.91	C	-	-	N/A
30	Glenoaks Blvd and Sheldon Street	0.75	B	0.78	B	NO	0.86	B	-	-	N/A
31	Glenoaks Blvd and Peoria Street	0.52	B	0.55	A	NO	0.56	A	-	-	N/A

The Haul Route 7A utilized intersections are anticipated to continue to operate at an LOS D or better during the MID-DAY peak period without the need for potential impact reduction measures. The Bradley Landfill driveway does not require potential impact reduction measures.

Glenoaks Blvd (NS) and Osborne Street (EW): The Intersection is anticipated to operate at an unacceptable LOS during the AM and PM peak hours. The optional measures for this intersection are beyond of the scope of the project. The Haul Route, therefore, is anticipated to continue to operate at an unacceptable LOS during the AM and PM peak periods.

Boulevard Pit (Site 8): Haul Route 8C

Haul Route 8C is the Boulevard Pit preferred route west of Devil's Gate Dam and Reservoir.

Preferred Route – Boulevard Pit (Haul Route 8C) – Year 2014

Route 8C		AM				MID-DAY				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
30	Glen Oaks Blvd and Sheldon Street	B	14.7	0.87	D	A	7.6	0.50	A	B	13.7	0.86	D
31	Glen Oaks Blvd and Peoria Street	A	6.6	0.59	A	A	9.0	0.39	A	B	16.9	0.53	A
32	Glen Oaks Blvd and Tuxford Street	D	40.1	1.10	E	A	8.9	0.63	B	B	11.1	0.81	C
44	Wheatland Ave and I-210 Freeway Eastbound Ramp	A	0	-	-	A	0	-	-	A	0	-	-
45	Wheatland Ave and I-210 Freeway Westbound Ramp	B	11.1	-	-	A	8.8	-	-	B	10.2	-	-
46	Wheatland Ave and Foothill Blvd	B	11.3	0.46	A	B	10.6	0.39	A	B	10	0.47	A
47	Wentworth Street and Foothill Blvd	C	28.4	0.88	A	B	10.4	0.45	A	A	9.7	0.48	A
48	Tuxford Street and San Fernando Road	D	40.1	0.80	C	C	34.7	0.80	B	C	34.8	0.75	C
49	Lankershim Blvd and San Fernando Road	A	8.6	0.57	A	A	7.8	0.47	A	A	9.6	0.55	A
50	Sheldon Street and San Fernando Road	C	34.8	0.80	C	C	24.3	0.54	A	E	58.1	1.03	E
51	Branford Street and San Fernando Road	D	38.0	0.89	B	C	30.7	0.51	A	F	84.0	0.99	D

(*) F*- ICU LOS Exceeds LOS F

Source: **Hall & Foreman Inc**

Route 8C PM Peak Hour		Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project		Year 2014 with Project and potential impact reduction measures		Difference with vs. without potential impact reduction measures
Intersection # / Name		HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact
30	Glen Oaks Blvd and Sheldon Street	0.75	B	0.75	B	NO	0.86	B	-	-	N/A
31	Glen Oaks Blvd and Peoria Street	0.52	B	0.54	B	NO	0.53	B	-	-	N/A
32	Glen Oaks Blvd and Tuxford Street	0.54	A	0.65	A	NO	0.81	B	-	-	N/A
44	Wheatland Ave and I-210 Freeway Eastbound Ramp	-	A	-	A	NO	-	A	-	-	N/A
45	Wheatland Ave and I-210 Freeway Westbound Ramp	-	A	-	A	NO	-	B	-	-	N/A
46	Wheatland Ave and Foothill Blvd	0.27	A	0.43	B	NO	0.47	B	-	-	N/A
47	Wentworth Street and Foothill Blvd	0.42	A	0.43	A	NO	0.48	A	-	-	N/A
48	Tuxford Street and San Fernando Road	0.73	C	0.71	D	NO	0.75	C	-	-	N/A
49	Lankershim Blvd and San Fernando Road	0.46	A	0.51	A	NO	0.55	A	-	-	N/A
50	Sheldon Street and San Fernando Road	0.94	D	0.94	D	NO	1.03	E	-	-	N/A
51	Branford Street and San Fernando Road	0.92	E	0.95	E	NO	0.99	F	-	-	N/A

The Haul Route is anticipated to continue to operate at an LOS D or better for all utilized intersections during the AM and MID-DAY peak periods without the need for potential impact reduction measures.

An optional measure is to provide applicable construction signing at the Boulevard Pit driveway.

Sheldon Street (EW) and San Fernando Road (NS): The Intersection is anticipated to operate at an unacceptable LOS during the PM peak hour. The optional measures for this intersection are beyond of the scope of the project. The Haul Route, therefore, is anticipated to continue to operate at an unacceptable LOS during the PM peak period.

Branford Street (EW) and San Fernando Road (NS): The Intersection is anticipated to operate at an unacceptable LOS during the PM peak hour. The optional measures for this intersection are beyond of the scope of the project. The Haul Route, therefore, is anticipated to continue to operate at an unacceptable LOS during the PM peak period.

The Alternate Haul Routes

The Alternate Haul Route to the east is the Haul Route 1B. The Haul Routes that utilize the Haul Route 1B to and from Devil's Gate Dam and Reservoir are the Manning's Pit (Site 2), Waste Management (Site 3), and Vulcan Materials - Irwindale Site (Site 9). The Manning's Pit alternate Haul Route is Haul Route 2B. The Waste Management alternate Haul Route is Haul Route 3. The Vulcan Materials - Irwindale Site alternate Haul Route is Haul Route 9.

The Alternate Haul Route to the west is the Haul Route 1F. The Haul Routes that utilize the Haul Route 1F to and from Devil's Gate Dam and Reservoir are the Scholl Canyon Landfill (Site 4), Sheldon Pit (Site 5), Sun Valley Fill Site (Site 6), Bradley Landfill (Site 7), and Boulevard Pit (Site 8). The Scholl Canyon Landfill alternate Haul Route is Haul Route 4B.The Sheldon Pit alternate Haul Route is Haul Route 5C. The Sun Valley Fill Site alternate Haul Route is Haul Route 6C. The Bradley Landfill alternate Haul Route is Haul Route 7C. The Boulevard Pit alternate Haul Route is Haul Route 8B.

Devil's Gate Dam Area (Site 1): Haul Route 1B

Haul Route 1B is an alternative route to the disposal sites Manning's Pit (Site 2), Waste Management (Site 3), Vulcan Materials - Irwindale Site (Site 9), and Scholl Canyon Landfill (Site 4), east of Devil's Gate Dam and Reservoir.

Alternative East Route – Devil's Gate Dam and Reservoir (Haul Route 1B)

Route1B		AM				MID-DAY (12-2 PM)				MID-DAY (2-4 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
4	Oak Grove Drive and Foothill Freeway Overpass (3)	C	21.0	-	-	A	9.9	-	-	A	9.8	-	-	B	12.0	-	-
5	Windsor Ave and Oak Grove Drive/Woodbury Rd	C	34.6	0.94	D	B	14.4	0.59	A	B	17.1	0.58	A	C	24.7	0.76	C
6	Windsor Ave/Arroyo Blvd and I-210 Freeway Westbound Ramps	B	10.8	0.68	B	A	6.8	0.37	A	A	6.9	0.37	A	A	8.3	0.48	B
7	Windsor Ave/Arroyo Blvd and I-210 Freeway Eastbound Ramps	C	23.7	0.39	A	C	30.9	0.42	A	C	28.4	0.42	A	C	28.5	0.62	A

(*) F*- ICU LOS Exceeds LOS F

Source: **Hall & Foreman Inc**

Route 1B AM Peak Hour		Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project		Year 2014 with Project and potential impact reduction measures		Difference with vs. without potential impact reduction measures
Intersection # / Name		HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact
4	Oak Grove Drive and Foothill Freeway Overpass (3)	-	B	-	C	NO	-	C	-	-	N/A
5	Windsor Ave and Oak Grove Drive/Woodbury Rd	0.87	C	0.86	C	NO	0.94	C	-	-	N/A
6	Windsor Ave/Arroyo Blvd and I-210 Freeway Westbound Ramps	0.53	A	0.60	A	NO	0.68	B	-	-	N/A
7	Windsor Ave/Arroyo Blvd and I-210 Freeway Eastbound Ramps	0.49	C	0.53	C	NO	0.39	C	-	-	N/A

The use of Haul Route 1B requires that the median along the frontage of the Devils Gate Dam and Reservoir be restriped to a Two Way Left Turn Lane (TWLTL). This requires the approval of the City of Pasadena. The Haul Route 1B is anticipated to continue to operate at an LOS C or better for all utilized intersections throughout the day.

An optional measure is to provide applicable construction signing at the Devil's Gate Dam and Reservoir driveway.

Manning's Pit (Site 2): Haul Route 2B

The Haul Route 2B is the alternate route for Manning's Pit, east of Devil's Gate Dam and Reservoir.

Preferred Route – Manning's Pit (Haul Route 2B) - Year 2014

Route 2B		AM				MID-DAY				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
9	Irwindale Ave and I-210 Freeway Eastbound Ramps	C	27.9	0.93	C	C	22.2	0.79	C	C	26.9	0.91	D
10	Irwindale Ave and First Street	B	13.8	0.65	B	B	18.5	0.65	B	D	50.3	0.93	C
11	Irwindale Ave and Gladstone Street	C	31.9	0.91	D	B	15.2	0.67	B	C	27.6	0.95	D
12	Vincent Ave and Gladstone Street	B	12.6	0.74	B	A	8.7	0.38	A	B	14.2	0.72	C
13	Vincent Ave and Arrow Hwy	B	17.5	0.90	D	A	9.8	0.45	A	B	15.4	0.93	D
14	Arrow Hwy and Lark Ellen Ave	E	61.5	0.97	D	D	40.3	0.72	B	E	55.4	0.94	E
15	Arrow Hwy and Enid Ave	D	55.0	1.35	E	B	12.8	0.50	A	B	14.4	0.70	C
16	Azusa Ave and Arrow Hwy	E	63.8	1.15	D	E	55.4	0.96	D	E	58.4	1.04	E
17	Azusa Ave and Gladstone Street	E	61.5	1.01	D	D	38.3	0.91	C	D	38.0	0.87	D
18	Azusa Ave and I-210 Freeway Eastbound Ramps	B	12.1	0.71	A	B	11.7	0.75	A	B	10.3	0.65	A
19	Azusa Ave and First Street	D	46.2	0.87	D	B	16.3	0.57	A	B	18.9	0.69	B
20	First Street and Alameda Street/I-210 Freeway Westbound Ramps	E	69.2	1.40	E	B	11.6	0.63	B	B	17.1	0.87	C

(*) F*- ICU LOS Exceeds LOS F

Source: **Hall & Foreman Inc**

Route 2B AM Peak Hour		Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project		Year 2014 with Project and potential impact reduction measures		Difference with vs. without potential impact reduction measures
Intersection # / Name		HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact
9	Irwindale Ave and I-210 Freeway Eastbound Ramps	0.84	C	0.85	C	NO	0.93	C	-	-	N/A
10	Irwindale Ave and First Street	0.60	B	0.64	B	NO	0.65	B	-	-	N/A
11	Irwindale Ave and Gladstone Street	0.81	C	0.88	C	NO	0.91	C	-	-	N/A
12	Vincent Ave and Gladstone Street	0.61	B	0.63	B	NO	0.74	B	-	-	N/A
13	Vincent Ave and Arrow Hwy	0.77	B	0.80	B	NO	0.90	B	-	-	N/A
14	Arrow Hwy and Lark Ellen Ave	0.88	D	0.88	D	NO	0.97	E	-	-	N/A
15	Arrow Hwy and Enid Ave	1.00	C	1.08	C	NO	1.35	D	-	-	N/A
16	Azusa Ave and Arrow Hwy	0.95	D	1.04	D	NO	1.15	E	-	-	N/A
17	Azusa Ave and Gladstone Street	0.89	D	0.93	D	NO	1.01	E	-	-	N/A
18	Azusa Ave and I-210 Freeway Eastbound Ramps	0.63	A	0.64	B	NO	0.71	B	-	-	N/A
19	Azusa Ave and First Street	0.82	C	0.84	D	NO	0.87	D	-	-	N/A
20	First Street and Alameda Street/I-210 Freeway Westbound Ramps	1.13	D	1.19	D	NO	1.40	E	-	-	N/A

Route 2B MIDDAY Peak Hour		Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project		Year 2014 with Project and potential impact reduction measures		Difference with vs. without potential impact reduction measures
Intersection # / Name		HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact
9	Irwindale Ave and I-210 Freeway Eastbound Ramps	0.71	B	0.72	B	NO	0.79	C	-	-	N/A
10	Irwindale Ave and First Street	0.60	B	0.60	B	NO	0.65	B	-	-	N/A
11	Irwindale Ave and Gladstone Street	0.51	B	0.57	B	NO	0.67	B	-	-	N/A
12	Vincent Ave and Gladstone Street	0.30	A	0.31	A	NO	0.38	A	-	-	N/A
13	Vincent Ave and Arrow Hwy	0.36	A	0.40	A	NO	0.45	A	-	-	N/A
14	Arrow Hwy and Lark Ellen Ave	0.62	C	0.67	C	NO	0.72	D	-	-	N/A
15	Arrow Hwy and Enid Ave	0.43	B	0.48	B	NO	0.50	B	-	-	N/A
16	Azusa Ave and Arrow Hwy	0.91	D	0.95	D	NO	0.96	E	-	-	YES
17	Azusa Ave and Gladstone Street	0.75	C	0.79	C	NO	0.91	D	-	-	N/A
18	Azusa Ave and I-210 Freeway Eastbound Ramps	0.63	A	0.67	A	NO	0.75	B	-	-	N/A
19	Azusa Ave and First Street	0.53	B	0.53	B	NO	0.57	B	-	-	N/A
20	First Street and Alameda Street/I-210 Freeway Westbound Ramps	0.54	B	0.56	B	NO	0.63	B	-	-	N/A

Route 2B PM Peak Hour		Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project		Year 2014 with Project and potential impact reduction measures		Difference with vs. without potential impact reduction measures
Intersection # / Name		HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact
9	Irwindale Ave and I-210 Freeway Eastbound Ramps	0.83	C	0.84	C	NO	0.91	C	-	-	N/A
10	Irwindale Ave and First Street	0.69	B	0.69	C	NO	0.93	D	-	-	N/A
11	Irwindale Ave and Gladstone Street	0.84	B	0.88	C	NO	0.95	C	-	-	N/A
12	Vincent Ave and Gladstone Street	0.57	B	0.60	B	NO	0.72	B	-	-	N/A
13	Vincent Ave and Arrow Hwy	0.73	B	0.77	B	NO	0.93	B	-	-	N/A
14	Arrow Hwy and Lark Ellen Ave	0.79	D	0.82	D	NO	0.94	E	-	-	N/A
15	Arrow Hwy and Enid Ave	0.64	B	0.68	B	NO	0.70	B	-	-	N/A
16	Azusa Ave and Arrow Hwy	0.94	D	0.96	D	NO	1.04	E	-	-	N/A
17	Azusa Ave and Gladstone Street	0.77	C	0.85	C	NO	0.87	D	-	-	N/A
18	Azusa Ave and I-210 Freeway Eastbound Ramps	0.58	A	0.59	A	NO	0.65	B	-	-	N/A
19	Azusa Ave and First Street	0.64	B	0.64	B	NO	0.69	B	-	-	N/A
20	First Street and Alameda Street/I-210 Freeway Westbound Ramps	0.78	B	0.82	B	NO	0.87	B	-	-	N/A

The Haul Route is anticipated to operate at an unacceptable LOS at Arrow Hwy and Lark Ellen Ave, Azusa Ave and Arrow Hwy, Azusa Ave and Gladstone Street, and First Street and Alameda Street/I-210 Freeway Westbound Ramps during the AM, MID-DAY, and PM peak periods.

Arrow Hwy (EW) and Lark Ellen Ave (NS): The Intersection is anticipated to operate at an unacceptable LOS during the AM and PM peak hours. The optional measures of this intersection are beyond of the scope of the project. The Haul Route is, therefore, anticipated to continue to operate at an unacceptable LOS during the AM and PM peak periods.

Azusa Ave (NS) and Arrow Hwy (EW): The Intersection is anticipated to operate at an unacceptable LOS throughout the day. The optional measures of this intersection are beyond of the scope of the project. The Haul Route is, therefore, anticipated to continue to operate at an unacceptable LOS throughout the day.

Azusa Ave (NS) and Gladstone Street (EW): The Intersection is anticipated to operate at an unacceptable LOS during the AM peak hour. The optional measures of this intersection are beyond of the scope of the project. The Haul Route is, therefore, anticipated to continue to operate at an unacceptable LOS during the AM peak period.

First Street (EW) and Alameda Street/I-210 Freeway Westbound Ramps (NS): The Intersection is anticipated to operate at an unacceptable LOS during the AM peak hour. The optional measures of this intersection are beyond of the scope of the project. The Haul Route is, therefore, anticipated to continue to operate at an unacceptable LOS during the AM peak period.

An optional measure is to provide applicable construction signing at the Manning's Pit driveway.

Waste Management (Site 3): Haul Route 3

The Waste Management is provided with a single route as such does not have an alternate route other than Haul Route 3. The Haul Route 3 is the preferred route for Waste Management, east of Devil's Gate Dam and Reservoir.

Preferred Route – Waste Management (Haul Route 3) - Year 2014

Route 3		AM				MID-DAY				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
8	Irwindale Ave and I-210 Freeway Westbound Ramps	A	7.1	0.56	A	A	7.4	0.53	A	A	7.3	0.56	A
9	Irwindale Ave and I-210 Freeway Eastbound Ramps	C	27.9	0.93	C	C	22.0	0.79	C	C	26.9	0.91	D
10	Irwindale Ave and First Street	B	10.6	0.63	B	B	14.2	0.65	B	C	23.2	0.86	C
11	Irwindale Ave and Gladstone Street	C	29.9	0.92	D	B	16.0	0.72	B	C	30.2	0.95	D
12	Vincent Ave and Gladstone Street	B	11.7	0.68	B	A	8.7	0.31	A	B	11.0	0.57	B

(*) F*- ICU LOS Exceeds LOS F

Source: **Hall & Foreman Inc**

Route 3 AM Peak Hour		Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project		Year 2014 with Project and potential impact reduction measures		Difference with vs. without potential impact reduction measures
Intersection # / Name		HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact
8	Irwindale Ave and I-210 Freeway Westbound Ramps	0.48	A	0.5	A	NO	0.56	A	-	-	N/A
9	Irwindale Ave and I-210 Freeway Eastbound Ramps	0.84	C	0.85	C	NO	0.93	C	-	-	N/A
10	Irwindale Ave and First Street	0.6	B	0.64	B	NO	0.63	B	-	-	N/A
11	Irwindale Ave and Gladstone Street	0.81	C	0.87	C	NO	0.92	C	-	-	N/A
12	Vincent Ave and Gladstone Street	0.61	B	0.65	B	NO	0.68	B	-	-	N/A

The Haul Route 3 is anticipated to continue to operate at an LOS C or better for all utilized intersections during the AM, MID-DAY, and PM peak periods without the need for potential impact reduction measures. The Waste Management driveway is at the signalized study intersection of Vincent Avenue and Gladstone Street that does not require potential impact reduction measures.

Vulcan Material (Site 9): Haul Route 9

The Vulcan Material – Irwindale Site is provided with a single route as such does not have an alternate route other than Haul Route 9. Haul Route 9 is the preferred route for Vulcan Material – Irwindale Site, east of Devil's Gate Dam and Reservoir.

Preferred Route – Vulcan Material (Haul Route 9) - Year 2014

Route 9		AM				MID-DAY				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
8	Irwindale Ave and I-210 Freeway Westbound Ramps	A	7.2	0.57	A	A	7.5	0.54	A	A	7.5	0.58	A
9	Irwindale Ave and I-210 Freeway Eastbound Ramps	C	27.9	0.90	C	C	22.5	0.80	C	C	26.6	0.88	D
53	Irwindale Ave and Foothill Boulevard	C	30.0	0.87	C	D	46.8	1.01	D	E	77.1	1.09	F*

(*) F*- ICU LOS Exceeds LOS F

Source: **Hall & Foreman Inc**

Route 9 PM Peak Hour		Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project		Year 2014 with Project and potential impact reduction measures		Difference with vs. without potential impact reduction measures
Intersection # / Name		HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact
8	Irwindale Ave and I-210 Freeway Westbound Ramps	0.50	A	0.52	A	NO	0.58	A	-	-	N/A
9	Irwindale Ave and I-210 Freeway Eastbound Ramps	0.83	C	0.84	C	NO	0.88	C	-	-	N/A
53	Irwindale Ave and Foothill Boulevard	0.94	D	1.05	D	NO	1.09	E	-	-	N/A

The Haul Route 9 is anticipated to continue to operate at an LOS D or better for all utilized intersections during the AM, and MID-DAY peak periods without the need for potential impact reduction measures.

Irwindale Avenue (NS) and Foothill Boulevard (EW) (Vulcan Materials driveway): The Intersection is anticipated to operate at an unacceptable LOS during the PM peak hour. The optional measures of this intersection are beyond of the scope of the project. The Haul Route, therefore, is anticipated to continue to operate at an unacceptable LOS during the PM peak period.

Devil's Gate Dam Area (Site 1): Haul Route 1F

Haul Route 1F is the alternate route for disposal sites Sheldon Pit (Site 5), Sun Valley Fill Site (Site 6), Bradley Landfill (Site 7), and Boulevard Pit (Site 8), east of Devil's Gate Dam and Reservoir.

Alternative Route – Devil's Gate Dam and Reservoir (Haul Route 1F) – Year 2014

Route1F		AM				MID-DAY (12-2 PM)				MID-DAY (2-4 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
4	Oak Grove Drive and Foothill Freeway Overpass (3)	C	21	-	-	A	9.9	-	-	A	9.8	-	-	B	12	-	-
5	Windsor Ave and Oak Grove Drive/Woodbury Rd	C	34.6	0.94	D	B	14.4	0.59	A	B	17.1	0.58	A	C	24.7	0.76	C
6	Windsor Ave/Arroyo Blvd and I-210 Freeway Westbound Ramps	A	9.9	0.62	B	A	5.5	0.31	A	A	5.6	0.27	A	A	7.9	0.47	B
7	Windsor Ave/Arroyo Blvd and I-210 Freeway Eastbound Ramps	C	28.6	0.57	A	B	16.1	0.39	A	B	17.4	0.42	A	C	26.8	0.63	A

(*) F*- ICU LOS Exceeds LOS F

Source: **Hall & Foreman Inc**

Route 1F AM Peak Hour		Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project		Year 2014 with Project and potential impact reduction measures		Difference with vs. without Potential impact reduction measures
Intersection # / Name		HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact
4	Oak Grove Drive and Foothill Freeway Overpass (3)	-	B	-	C	NO	-	C	-	-	N/A
5	Windsor Ave and Oak Grove Drive/Woodbury Rd	0.87	C	0.86	C	NO	0.94	C	-	-	N/A
6	Windsor Ave/Arroyo Blvd and I-210 Freeway Westbound Ramps	0.53	A	0.56	A	NO	0.62	A	-	-	N/A
7	Windsor Ave/Arroyo Blvd and I-210 Freeway Eastbound Ramps	0.49	C	0.53	C	NO	0.57	C	-	-	N/A

The use of Haul Route 1F requires that the median along the frontage of the Devils Gate Dam and Reservoir be restriped to a Two Way Left Turn Lane (TWLTL). This requires the approval of the City of Pasadena. The Haul Route 1F is anticipated to continue to operate at an LOS C or better for all utilized intersections throughout the day.

An optional measure is to provide applicable construction signing at the Devil's Gate Dam and Reservoir driveway.

Scholl Canyon Landfill Haul (Site 4): Route 4B

Haul Route 4B is the Scholl Canyon Landfill alternate route, west of Devil's Gate Dam and Reservoir.

Preferred Route – Scholl Canyon Landfill (Haul Route 4B) - Year 2014

Route 4B		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
21	Figueroa St/Scholl Canyon Road and SR-134 Freeway Westbound Ramps	E	41.3	-	-	B	14.3	-	-	F	53.8	-	-
	With potential impact reduction measures (Lane Modification)	C	17.6	-	-	B	12.9	-	-	D	28.3	-	-
22	Figueroa St and Eagle Vista Drive	B	14.2	-	-	B	12.8	-	-	C	22.9	-	-
23	Figueroa St and SR-134 Freeway Eastbound Ramps	A	8.1	0.54	B	A	7.1	0.37	A	A	8	0.55	B

(*) F*- ICU LOS Exceeds LOS F

Source: **Hall & Foreman Inc**

Route 4B AM Peak Hour		Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project		Year 2014 with Project and potential impact reduction measures		Difference with vs. without potential impact reduction measures
Intersection # / Name		HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact
21	Figueroa St/Scholl Canyon Road and SR-134 Freeway Westbound Ramps	-	D	-	D	NO	-	E	-	C	N/A
22	Figueroa St and Eagle Vista Drive	-	B	-	B	NO	-	B	-	-	N/A
23	Figueroa St and SR-134 Freeway Eastbound Ramps	0.50	A	0.52	A	NO	0.54	A	-	-	N/A

Route 4B PM Peak Hour		Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project		Year 2014 with Project and potential impact reduction measures		Difference with vs. without potential impact reduction measures
Intersection # / Name		HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact
21	Figueroa St/Scholl Canyon Road and SR-134 Freeway Westbound Ramps	-	D	-	E	YES	-	F	-	D	NO
22	Figueroa St and Eagle Vista Drive	-	C	-	C	NO	-	C	-	-	N/A
23	Figueroa St and SR-134 Freeway Eastbound Ramps	0.46	A	0.48	A	NO	0.55	A	-	-	N/A

The Haul Route 4B utilized intersections are anticipated to continue to operate at an LOS B or better during the MID-DAY peak period without the need for potential impact reduction measures. The following potential impact reduction measures will improve the utilized intersections to an acceptable LOS during the AM and PM peak periods:

1. Figueroa St/Scholl Canyon Road (NS) and SR-134 Freeway Westbound Ramps (EW): Restripe the westbound right turn lane to a shared left-right turn lane and the northbound through lane to a shared through-right turn lane. The northbound direction will include a shared through-right turn lane and a right turn lane. The southbound direction will include a shared through-left turn lane and a through turn lane. The westbound direction will include a left turn lane and a shared left-right turn lane. This optional measure requires the approval of the City of Los Angeles and Caltrans.

Sheldon Pit (Site 5): Haul Route 5C

Haul Route 5C is the alternate route for Sheldon Pit, west of Devil's Gate Dam and Reservoir.

Preferred Route – Sheldon Pit (Haul Route 5C) – Year 2014

Route 5C		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
44	Wheatland Ave and I- 210 Freeway Eastbound Ramps	A	0.0	-	-	A	0.0	-	-	A	0.0	-	-
45	Wheatland Ave and I-210 Freeway Westbound Ramps	B	11.1	-	-	A	8.8	-	-	B	10.2	-	-
46	Wheatland Ave and Foothill Blvd	B	11.3	0.46	A	B	10.6	0.39	A	B	10.0	0.47	A
47	Wentworth Street and Foothill Blvd	C	28.4	0.88	A	B	10.4	0.45	A	A	9.7	0.48	A

(*) F*- ICU LOS Exceeds LOS F

Source: **Hall & Foreman Inc**

Route 5C AM Peak Hour		Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project		Year 2014 with Project and Potential impact reduction measures		Difference with vs. without Potential impact reduction measures
Intersection # / Name		HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact
44	Wheatland Ave and I-210 Freeway Eastbound Ramp	-	A	-	A	NO	-	A	-	-	N/A
45	Wheatland Ave and I-210 Freeway Westbound Ramp	-	A	-	B	NO	-	B	-	-	N/A
46	Wheatland Ave and Foothill Blvd	0.25	A	0.42	B	NO	0.46	B	-	-	N/A
47	Wentworth Street and Foothill Blvd	0.69	B	0.78	B	NO	0.88	C	-	-	N/A

The Haul Route 5C utilized intersections are anticipated to continue to operate at an LOS C or better throughout the day.

An optional measure is to provide applicable construction signing at the Sheldon Pit driveway.

Sun Valley Fill Site (Glenoaks Landfill/Cal-Mat) (Site 6): Haul Route 6C

Haul Route 6C is the alternate route for Sun Valley Fill Site, west of Devil's Gate Dam and Reservoir.

Preferred Route – Sun Valley Fill Site (Haul Route 6C) – Year 2014

Route 6C		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
30	Glenoaks Blvd and Sheldon Street	B	17.4	0.92	E	A	8.0	0.54	A	B	15.9	0.89	D
44	Wheatland Ave and I-210 Freeway Eastbound Ramps	A	0	-	-	A	0	-	-	A	0	-	-
45	Wheatland Ave and I-210 Freeway Westbound Ramps	B	11.1	-	-	A	8.8	-	-	B	10.2	-	-
46	Wheatland Ave and Foothill Blvd	B	11.3	0.46	A	B	10.6	0.39	A	B	10	0.47	A
47	Wentworth Street and Foothill Blvd	C	28.4	0.88	A	B	10.4	0.45	A	A	9.7	0.48	A

(*) F*- ICU LOS Exceeds LOS F

Source: **Hall & Foreman Inc**

Route 6C AM Peak Hour		Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project		Year 2014 with Project and Potential impact reduction measures		Difference with vs. without Potential impact reduction measures
Intersection # / Name		HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact
30	Glen Oaks Blvd and Sheldon Street	0.75	B	0.75	B	NO	0.92	B	-	-	N/A
44	Wheatland Ave and I-210 Freeway Eastbound Ramp	-	A	-	A	NO	-	A	-	-	N/A
45	Wheatland Ave and I-210 Freeway Westbound Ramp	-	A	-	B	NO	-	B	-	-	N/A
46	Wheatland Ave and Foothill Blvd	0.25	A	0.42	B	NO	0.46	B	-	-	N/A
47	Wentworth Street and Foothill Blvd	0.69	B	0.78	B	NO	0.88	C	-	-	N/A

The Haul Route 6C utilized intersections are anticipated to continue to operate at an LOS D or better throughout the day. The Sun Valley Fill Site driveway does not require potential impact reduction measures.

Bradley Landfill (Site 7): Haul Route 7C

Haul Route 7C is the Bradley Landfill alternate route, west of Devil's Gate Dam and Reservoir.

Preferred Route – Bradley Landfill (Haul Route 7C) – Year 2014

Route 7C		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
30	Glenoaks Blvd and Sheldon Street	B	14.7	0.87	D	A	7.6	0.50	A	B	13.7	0.86	D
31	Glenoaks Blvd and Peoria Street	A	6.2	0.64	A	A	5.4	0.42	A	A	6.4	0.56	A
44	Wheatland Ave and I- 210 Freeway Eastbound Ramps	A	0	-	-	A	0	-	-	A	0	-	-
45	Wheatland Ave and I-210 Freeway Westbound Ramps	B	11.1	-	-	A	8.8	-	-	B	10.2	-	-
46	Wheatland Ave and Foothill Blvd	B	11.3	0.46	A	B	10.6	0.39	A	B	10	0.47	A
47	Wentworth Street and Foothill Blvd	C	28.4	0.88	A	B	10.4	0.45	A	A	9.7	0.48	A

(*) F*- ICU LOS Exceeds LOS F

Source: **Hall & Foreman Inc**

Route 7C AM Peak Hour		Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project		Year 2014 with Project and Potential impact reduction measures		Difference with vs. without Potential impact reduction measures
Intersection # / Name		HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact
30	Glen Oaks Blvd and Sheldon Street	0.75	B	0.78	B	NO	0.87	B	-	-	N/A
31	Glen Oaks Blvd and Peoria Street	0.54	B	0.61	A	NO	0.64	A	-	-	N/A
44	Wheatland Ave and I-210 Freeway Eastbound Ramp	-	A	-	A	NO	-	A	-	-	N/A
45	Wheatland Ave and I-210 Freeway Westbound Ramp	-	A	-	B	NO	-	B	-	-	N/A
46	Wheatland Ave and Foothill Blvd	0.25	A	0.42	B	NO	0.46	B	-	-	N/A
47	Wentworth Street and Foothill Blvd	0.69	B	0.78	B	NO	0.88	C	-	-	N/A

The Haul Route 7C utilized intersections are anticipated to continue to operate at an LOS D or better throughout the day. The Bradley Landfill driveway does not require potential impact reduction measures.

Boulevard Pit (Site 8): Haul Route 8B

Haul Route 8B is the Boulevard Pit alternate route west of Devil's Gate Dam and Reservoir.

Preferred Route – Boulevard Pit (Haul Route 8B) – Year 2014

Route 8B		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
40	Branford Street and Laurel Canyon Blvd	C	21.9	1.00	D	B	11.0	0.54	C	D	37.2	1.21	F*
41	Osborne Street and I-5 Freeway Southbound Ramps	B	13.7	0.83	D	C	20.9	0.93	B	D	37.0	1.00	E
42	Osborne Street and I-5 Freeway Northbound Ramps	B	14.7	0.75	B	B	12.1	0.70	B	B	19.3	0.89	D
43	Osborne Street and Laurel Canyon Blvd	D	42.3	0.98	E	C	25.2	0.80	D	E	66.3	1.03	F

(*) F*- ICU LOS Exceeds LOS F

Source: **Hall & Foreman Inc**

Route 8C PM Peak Hour		Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project		Year 2014 with Project and Potential impact reduction measures		Difference with vs. without Potential impact reduction measures
Intersection # / Name		HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact
40	Branford Street and Laurel Canyon Blvd	0.76	B	1.06	C	NO	1.21	D	-	-	N/A
41	Osborne Street and I-5 Freeway Southbound Ramps	0.91	C	0.91	C	NO	1.00	D	-	-	N/A
42	Osborne Street and I-5 Freeway Northbound Ramps	0.83	C	0.83	B	NO	0.89	B	-	-	N/A
43	Osborne Street and Laurel Canyon Blvd	1.01	D	0.98	D	NO	1.03	E	-	-	N/A

The Haul Route is anticipated to continue to operate at an LOS D or better for all utilized intersections during the AM and MID-DAY peak periods without the need for potential impact reduction measures.

An optional measure is to provide applicable construction signing at the Boulevard Pit driveway.

Osborne Street (EW) and Laurel Canyon Blvd (NS): The Intersection is anticipated to operate at an unacceptable LOS during the PM peak hour. The optional measures for this intersection are beyond of the scope of the project. The Haul Route is, therefore, anticipated to continue to operate at an unacceptable LOS during the PM peak period.

2. CAPACITY ANALYSIS METHODOLOGY

Level of Service Analysis Criteria for Local Intersections:

The proposed haul routes for the Devil's Gate Reservoir Sediment Removal and Management Project will require the expected truck trips to travel through the Cities of Pasadena, La Cañada Flintridge, Los Angeles, Azusa, Irwindale, and unincorporated areas in the County of Los Angeles. In order to maintain adequate traffic flow it is important to meet the lowest acceptable service level at each intersection along the truck haul routes. In order to verify the intersection capacity analysis impacts, present Level-of-Service (LOS) were conducted for the signalized and un-signalized study intersections. Based on the existing intersection geometrics and traffic volumes during the AM, Mid-day, and PM peak hours, the intersection capacity analyses for the signalized and un-signalized intersections were conducted using Trafficware Ltd Synchro version 8 which implements the methods of the 2010 Highway Capacity Manual (HCM) and 2003 Intersection Capacity Utilization (ICU) methods.

It is important to note that each city/jurisdiction has different criteria and thresholds to identify the lowest acceptable service levels. Each jurisdiction along the truck haul routes follows either the ICU, CMA, or HCM methodologies for signalized intersections. Synchro analysis was used to conduct the intersection capacity analyses for the signalized and un-signalized intersections since Synchro can provide the LOS per the HCM and ICU methodologies. To further understand the concepts and differences between the methodologies, used by the local jurisdictions, each methodology is described below.

Critical Movement Analysis (CMA)

The Critical Movement Analysis (CMA) methodology is a method developed by the Transportation Research Board (TRB) Circular 212. Under the CMA methodology the Level-of-Service (LOS) is determined by dividing the volume of vehicles that pass through the facility over the capacity of that facility. This ratio is known as the volume-to-capacity (V/C) ratio. A V/C ratio value of 1.00 or greater indicates that an intersection is at or exceeding capacity. The V/C ratio value is based upon volumes by lane, signal phasing, and approach lane configurations. The LOS values range from LOS A to LOS F where a LOS A indicates excellent operating conditions and a LOS F represents congested conditions with excessive vehicle delay. The threshold table for signalized intersections per the CMA methodology is shown below.

TABLE 2-1
Critical Movement Analysis (CMA) - LOS and V/C Threshold

Level of Service (LOS)	Volume/Capacity Ratio (V/C)	Definition
A	0.000 - 0.600	EXCELLENT. No vehicle waits longer than one red light and no approach phase is fully used.
B	0.601 - 0.700	VERY GOOD. An occasional approach phase is fully utilized; many drivers begin to feel somewhat restricted within groups of vehicles.
C	0.701 – 0.800	GOOD. Occasionally, drivers may have to wait through more than one red light; backups may develop behind turning vehicles.
D	0.801 – 0.900	FAIR. Delays may be substantial during portions of the rush hours, but enough lower volume periods occur to permit clearing of developing lines, preventing excessive backups.
E	0.901 – 1.00	POOR. Represents the most vehicles that intersection approaches can accommodate; may be long lines of waiting vehicles through several signal cycles.
F	Greater than 1.000	FAILURE. Backups from nearby intersections or on cross streets may restrict or prevent movement of vehicles out of the intersection approaches. Tremendous delays with continuously increasing queue lengths.

Source: **TRB**

Intersection Capacity Utilization (ICU)

The Intersection Capacity Utilization (ICU) traffic analysis methodology is a method that is similar to the Critical Movement Analysis (CMA) methodology. Like the CMA method the ICU method uses volume-to-capacity (V/C) ratios to determine a LOS for an intersection. However, the ICU method compares the V/C ratios of conflicting turn movements at an intersection, sums these critical conflicting V/C ratios for each intersection approach, and determines the overall ICU. The resulting ICU is expressed in terms of LOS, where LOS A represents free-flow activity and LOS F represents overcapacity operation. The ICU thresholds are similar to the thresholds of the CMA methodology but can vary by local jurisdictions.

HCM Methodology

The Highway Capacity Manual (HCM) traffic analysis methodology is a method developed by the Transportation Research Board (TRB). Under the HCM methodology the LOS of an intersection is determined based on the delay of vehicles at the intersections. For signalized intersections the HCM measures the LOS based on control delay. Control delay is a portion of the total delay attributed to a signalized intersection and consists of initial acceleration delay, queue move-up time, stopped delay, and final acceleration delay. The HCM bases its delay on an adjusted flow using a mean control delay for the highest 15 minute period within the hour. The LOS for signalized intersections ranges from LOS A, which indicates excellent operating conditions and a LOS F, which represents congested conditions with excessive vehicle delay. The threshold table for signalized intersections per the HCM 2010 methodology is shown below.

TABLE 2-2
HCM 2010 - LOS Criteria for Signalized Intersections

LOS	Control Delay per Vehicle (s/veh)
A	≤ 10
B	> 10-20
C	> 20-35
D	> 35-55
E	> 55-80
F	> 80

Source: **HCM 2010 Exhibit 18-1**

For un-signalized intersections the HCM measures the LOS based on the computed or measured control delay for Two Way Stop Controlled intersections (TWSC) and control delay for All Way Stop Controlled (AWSC) intersections. For a TWSC the LOS is computed for each movement and the most critical LOS is the one that describes the effectiveness of that intersection, which is typically the stop controlled left turn movement from the minor street. The threshold table for TWSC intersections per the HCM 2010 methodology is shown below.

TABLE 2-3
HCM 2010 - LOS Criteria for TWSC Intersections

LOS	Control Delay per Vehicle (s/veh)
A	0-10
B	> 10-15
C	> 15-25
D	> 25-35
E	> 35-50
F	> 50

Source: **HCM 2010 Exhibit 19-1**

For an AWSC intersection the LOS defines the whole intersection. The threshold table for AWSC intersections per the HCM 2010 methodology is shown below.

TABLE 2-4
HCM 2010 - LOS Criteria for AWSC Intersections

LOS	Control Delay per Vehicle (s/veh)
A	0-10
B	> 10-15
C	> 15-25
D	> 25-35
E	> 35-50
F	> 50

Source: **HCM 2010 Exhibit 20-2**

Level of Service Analysis Criteria for Freeways and Ramps:

The proposed haul routes for the Devil's Gate Reservoir Sediment Removal and Management Project will require the expected truck trips to travel through the I-210, I-5, SR-2, SR-134, and SR-118 freeways from which 28 freeway segments and 54 ramps were identified for analysis. The LOS analysis done on the freeway and ramps will be per Caltrans requirements, which consists of the use of the HCM 2010 methodologies. To determine the LOS per the HCM 2010 methodology, Highway Capacity (HCS) 2010 software, which is developed by McTrans, was used for the freeway mainline analysis, ramp analysis, and weaving analysis.

Freeway Mainline HCM Methodology:

The freeway mainline LOS analysis was done with existing mainline volumes provided by Caltrans for each segment identified for analysis. The HCM methodology for determining the LOS of a basic freeway segment consists of inputting the existing geometric data, free flow speed (FFS), base free flow speed (BFFS), and mainline volumes to specific formulas described in Chapter 23 of the HCM. The procedure consists of adjusting the BFFS and mainline volume based on the existing conditions of the freeway. After the adjustments are made a speed-flow curve is used to determine the average passenger car speed in order to compute the density of the freeway segment to determine the LOS of that segment.

To determine the mainline LOS the mainline volumes and required criteria are inputted into the HCS 2010 software which calculates the freeway segment density value using the HCM methodology. The resulting density value is then matched to the corresponding LOS value as presented in Table 2-5 shown below. Caltrans District 7 has established that the densities in a freeway mainline should not exceed 35.0 pc/mi/ln which corresponds to a LOS D. Caltrans has determined that freeway segments that operate below LOS D should be identified and improved to an acceptable LOS.

TABLE 2-5
Caltrans Freeway Mainline HCM LOS Criteria

LOS	Basic Freeway Segment Density (pc/mi/ln)
A	0 - 11.0
B	11.0 - 18.0
C	18.0 - 26.0
D	26.0 - 35.0
E	35.0 - 45.0
F	> 45.0

Source: **HCM 2000, Exhibit 23-2**

Ramp HCM Methodology:

The freeway ramp LOS analysis was conducted with existing ramp volumes counted by Newport Traffic Studies. The HCM methodology for determining the LOS of a freeway ramps consists of inputting the existing geometric data, ramp free flow speed, and the existing ramp volumes to specific formulas described in Chapter 25 of the HCM. The volume (demand) is adjusted and then a demand flow rate is computed for a merging (entering) maneuver in an on-ramp or a diverging (exiting) maneuver in an off-ramp. Capacity is then computed and compared to the adjusted flow. After this the density for the ramp can be computed and the LOS of the ramp can be determined.

To determine the freeway ramp LOS a ramp merge and diverge analysis was carried out through the use of the freeway-to-arterial interchanges analysis in the HCS software. According to Chapter 13 of the HCM, the merge and diverge ramp areas focus on an influential area of 1,500 feet, which includes the acceleration or deceleration lane and adjacent freeway lanes. The HCM methodology has three major steps that need to be followed.

The first step is the determination of traffic entering the freeway lanes immediately upstream of the merge area for a merging maneuver or at the beginning of a deceleration lane of the diverge area for a diverging maneuver. The second step is to determine the capacity for the corresponding segment. The final step is the determination of the density of flow within the influence area and the LOS based on that density value.

The HCS software computes a density value for a freeway ramp using the same HCM procedure. That density value can then be matched to the corresponding LOS values as presented in Table 2-6 shown below. Caltrans District 7 has established that the densities in a freeway ramp should not exceed 35.0 pc/mi/ln which corresponds to a LOS D. Caltrans has determined that freeway ramps that operate below LOS D should be identified and improved to an acceptable LOS.

TABLE 2-6
Caltrans Freeway Ramp HCM LOS Criteria

LOS	Freeway Ramp Density (pc/mi/ln)
A	≤ 10.0
B	> 10.0 and ≤ 20.0
C	> 20.0 and ≤ 28.0
D	> 28.0 and ≤ 35.0
E	> 35.0
F	Exceeds Capacity

Source: **HCM 2000, Exhibit 25-4**

Freeway Weaving HCM Methodology:

Freeway weaving is defined as the crossing of two streams of traffic traveling in the same direction along a significant length of highway without the aid of traffic control devices. Freeway weaving can become complicated when on and off-ramps are spaced close together, spaced less than 2,500 feet apart and do not allow proper merging or diverging maneuvers. Weaving maneuvers can adversely affect the traffic on the mainline which is why freeway weaving is being analyzed in this study.

The freeway weaving LOS analysis was done with existing freeway volumes provided by Caltrans. The HCM methodology for determining the LOS of a weaving segment consists of inputting the existing geometric data, the free flow speed of the before and after weaving segments, and the weaving and non-weaving volumes into to specific formulas described in Chapter 24 of the HCM. To determine the freeway weaving LOS the HCS software was used. The HCS software computes a density for the weaving area based on the parameters inputted into the software. The density value can then be matched to the corresponding LOS values as presented in Table 2-7 shown below.

TABLE 2-7
Caltrans Freeway Weaving HCM LOS Criteria

LOS	Freeway Weaving Segment Density (pc/mi/ln)
A	≤ 10.0
B	> 10.0 and ≤ 20.0
C	> 20.0 and ≤ 28.0
D	> 28.0 and ≤ 35.0
E	> 35.0 and ≤ 43.0
F	> 43.0

Source: **HCM 2000, Exhibit 24-2**

3. EXISTING CONDITIONS

Land-Use Description & Haul Routes

The Project site and proposed disposal sites are located in areas surrounded by residential neighborhoods and industrial and office buildings. The descriptions of the sites are as follows.

Devil's Gate Dam (Site 1)
Land uses to the south, and east of the dam consist of residential housing. A local high school is located just north of the dam on Oak Grove Drive. Oak Grove Drive is the main road fronting the project site and provides access to the I-210 through Berkshire Place and Windsor Avenue.

Manning's Pit (Site 2)
Land uses around the Manning's Pit consist of industrial and office buildings to the north of the site. Residential housing surrounds the disposal site to the south, west, and east. Vincent Avenue is the main street fronting the project. The site is operated by the City of Azusa.

Waste Management (Site 3)
Land uses to the north, south, and west of the site consist of industrial and office buildings and residential housing to the east of the site. Gladstone Street is the main street fronting the project. The site is operated by Waste Management.

Vulcan Materials - Irwindale Site (Site 9)
Land uses to the north, south, and east of the site consist of industrial and office buildings and vacant land to the west of the site. Foothill Boulevard is the main street fronting the site. The site is operated by Vulcan Materials.

Scholl Canyon Landfill (Site 4)
Land uses around the Scholl Canyon Landfill consist of residential housing to the west of the site and vacant mountainous terrain to the north, south, and east of the site. Scholl Canyon Road is the main road fronting the project site. The site is operated by Los Angeles County.

Sheldon Pit (Site 5)
Land uses to the north, south, and west of the site consist of industrial and office buildings and residential housing to the east of the site. The Sun Valley Fill Site is located just south across Sheldon Street. Glenoaks Blvd is the major road fronting the project site to the west and allows access to the I-5 Freeway. Access to the Sheldon Pit is provided through Sheldon Street. The site is operated by the Vulcan Materials. The Hours of Operation are between 6AM to 8PM Monday to Saturday.

Sun Valley Fill Site (Glenoaks Landfill/Cal-Mat) (Site 6)
Land uses to the north, south, and west of the site consist of industrial and office buildings and residential housing to the east of the site. The Sheldon Pit is located just north across Sheldon Street. Glenoaks Blvd is the major road fronting the project site to the west and allows access to the I-5 Freeway. Access to the Sheldon Pit is provided through Sheldon Street. The site is operated by the Vulcan Materials. The Hours of Operation are between 6AM to 8PM Monday to Saturday.

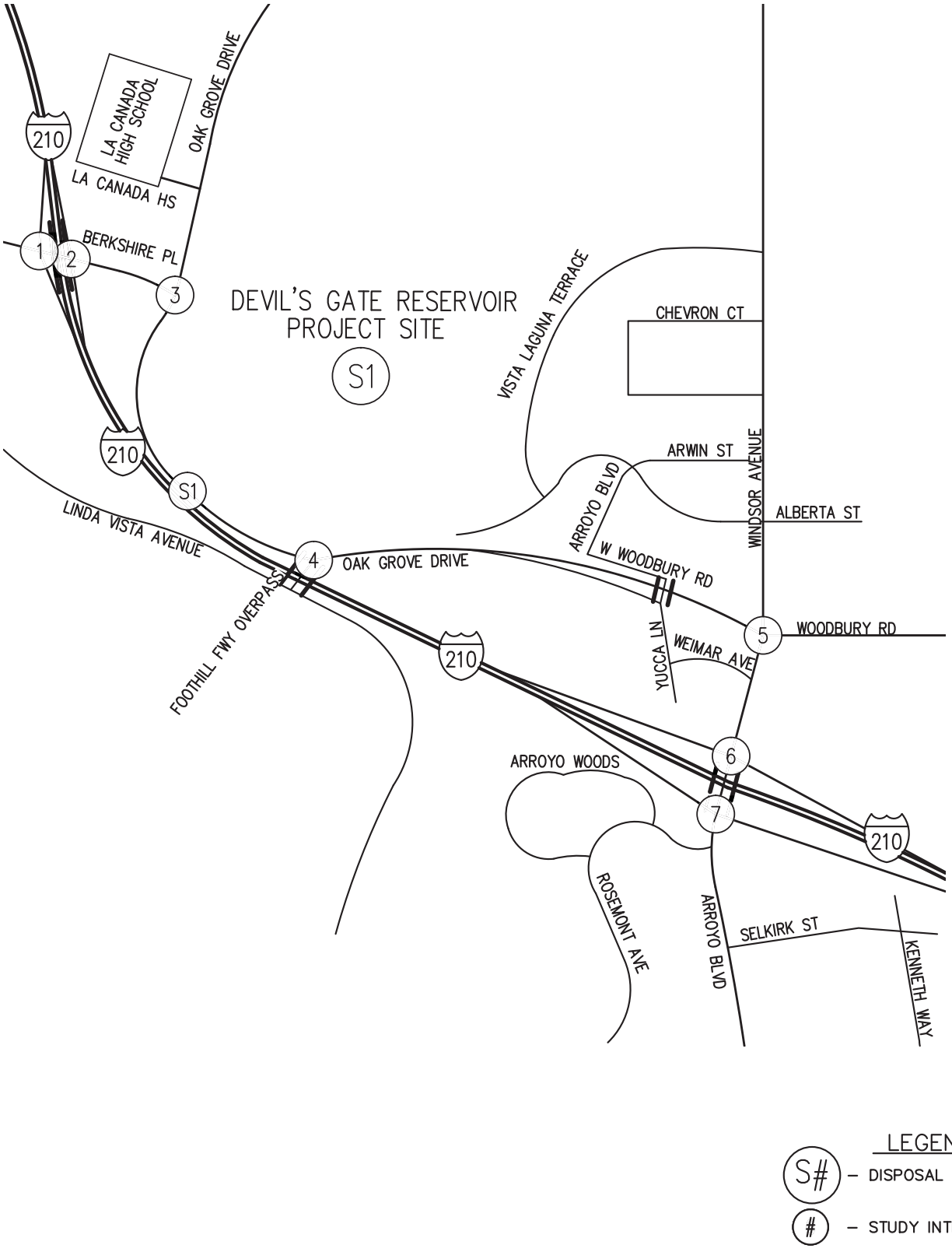
Bradley Landfill (Site 7)
Land uses to the north and south of the site consist of industrial and office buildings and residential housing to the west and east. The Sheldon Pit and Sun Valley Fill Site are located just to the east across Glenn Oaks Blvd. Access to the Bradley Landfill is found through Peoria Street. Glenoaks Blvd is the major road fronting the project site to the east and allows access to the I-5 Freeway. The site is operated by the Waste Management.

Boulevard Pit (Site 8)
Land uses to the north, south, and west of the site consist of residential housing and Industrial and office buildings to the east. The Bradley Landfill is located to the southeast of the disposal site. Access to the Boulevard Pit is found through Branford Street. Branford Street is the major road fronting the project site to the east and allows access to the I-5 Freeway. The site is operated by the Vulcan Materials. The Hours of Operation are between 6AM to 8PM Monday to Saturday.

As identified, the sediment removed may be transported to the disposal sites through twenty-six (26) proposed haul routes. The proposed haul routes are outlined below:

Devil's Gate Dam & Reservoir Area

1.	Haul Route 1A	-Exit the WB I-210 Freeway at Berkshire Place. -Turn right onto EB Berkshire Place and then right onto SB Oak Grove Drive. -Enter and exit the project site on Oak Grove Drive. -Turn right onto NB Oak Grove Drive and then left onto WB Berkshire Place. -Enter the EB I-210 Freeway at Berkshire Place.
2.	Haul Route 1B	-Exit the WB I-210 Freeway at Windsor Avenue/Arroyo Blvd. -Turn right onto EB Windsor Ave and then left onto NB Oak Grove Drive. -Enter and exit the project site on Oak Grove Drive. -Turn left onto SB Oak Grove Drive and then right onto WB Windsor Ave. -Enter the EB I-210 Freeway at Windsor Avenue/Arroyo Blvd.
3.	Haul Route 1C	-Exit the WB I-210 Freeway at Berkshire Place. -Turn right onto EB Berkshire Place and then right onto SB Oak Grove Drive. -Enter and exit the project site on Oak Grove Drive. -Turn left onto SB Oak Grove Drive and then right onto WB Windsor Ave. -Enter the EB I-210 Freeway at Windsor Avenue/Arroyo Blvd.
4.	Haul Route 1D	-Exit the WB I-210 Freeway at Windsor Avenue/Arroyo Blvd. -Turn right onto EB Windsor Ave and then left onto NB Oak Grove Drive. -Enter and exit the project site on Oak Grove Drive. -Turn right onto NB Oak Grove Drive and then left onto WB Berkshire Place. -Enter the EB I-210 Freeway at Berkshire Place.
5.	Haul Route 1E	-Exit the EB I-210 Freeway at Berkshire Place. -Turn left onto EB Berkshire Place and then right onto SB Oak Grove Drive. -Enter and exit the project site on Oak Grove Drive. -Turn right onto NB Oak Grove Drive and then left onto WB Berkshire Place. -Enter the WB I-210 Freeway at Berkshire Place.
6.	Haul Route 1F	-Exit the EB I-210 Freeway at Windsor Avenue/Arroyo Blvd. -Turn left onto EB Windsor Ave and then left onto NB Oak Grove Drive. -Enter and exit the project site on Oak Grove Drive. -Turn left onto SB Oak Grove Drive and then right onto WB Windsor Ave. -Enter the WB I-210 Freeway at Windsor Avenue/Arroyo Blvd.
7.	Haul Route 1G	-Exit the EB I-210 Freeway at Berkshire Place. -Turn left onto EB Berkshire Place and then right onto SB Oak Grove Drive. -Enter and exit the project site on Oak Grove Drive. -Turn left onto SB Oak Grove Drive and then right onto WB Windsor Ave. -Enter the WB I-210 Freeway at Windsor Avenue/Arroyo Blvd.
8.	Haul Route 1H	-Exit the EB I-210 Freeway at Windsor Avenue/Arroyo Blvd. -Turn left onto EB Windsor Ave and then left onto NB Oak Grove Drive. -Enter and exit the project site on Oak Grove Drive. -Turn right onto NB Oak Grove Drive and then left onto WB Berkshire Place. -Enter the WB I-210 Freeway at Berkshire Place.



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DEVIL'S GATE RESERVOIR VICINITY MAP

DEVIL'S GATE DAM & RESERVOIR

FIGURE 3-1-1

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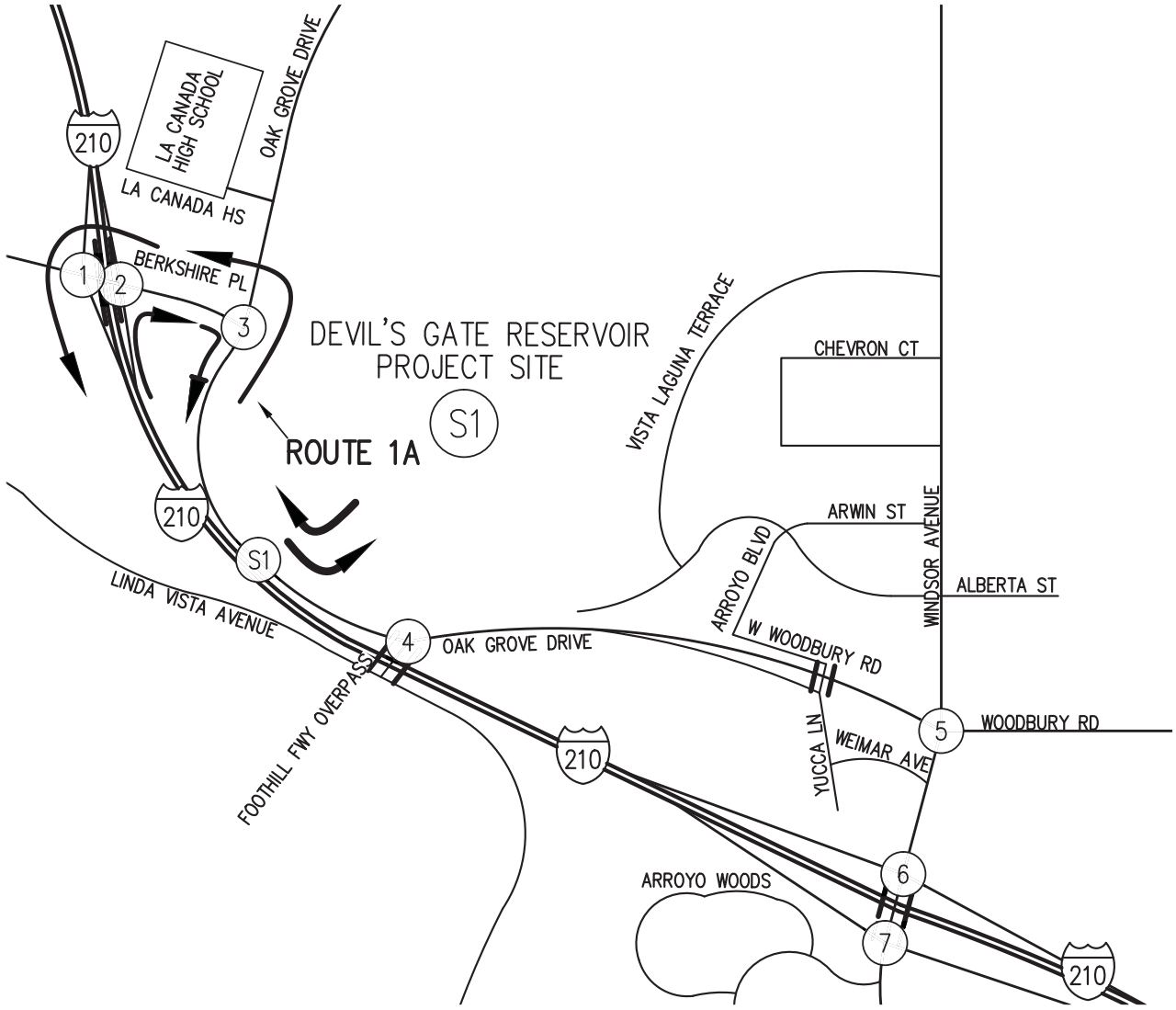

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HAUL ROUTE 1A

DEVIL'S GATE DAM & RESERVOIR

FIGURE
3-1-2

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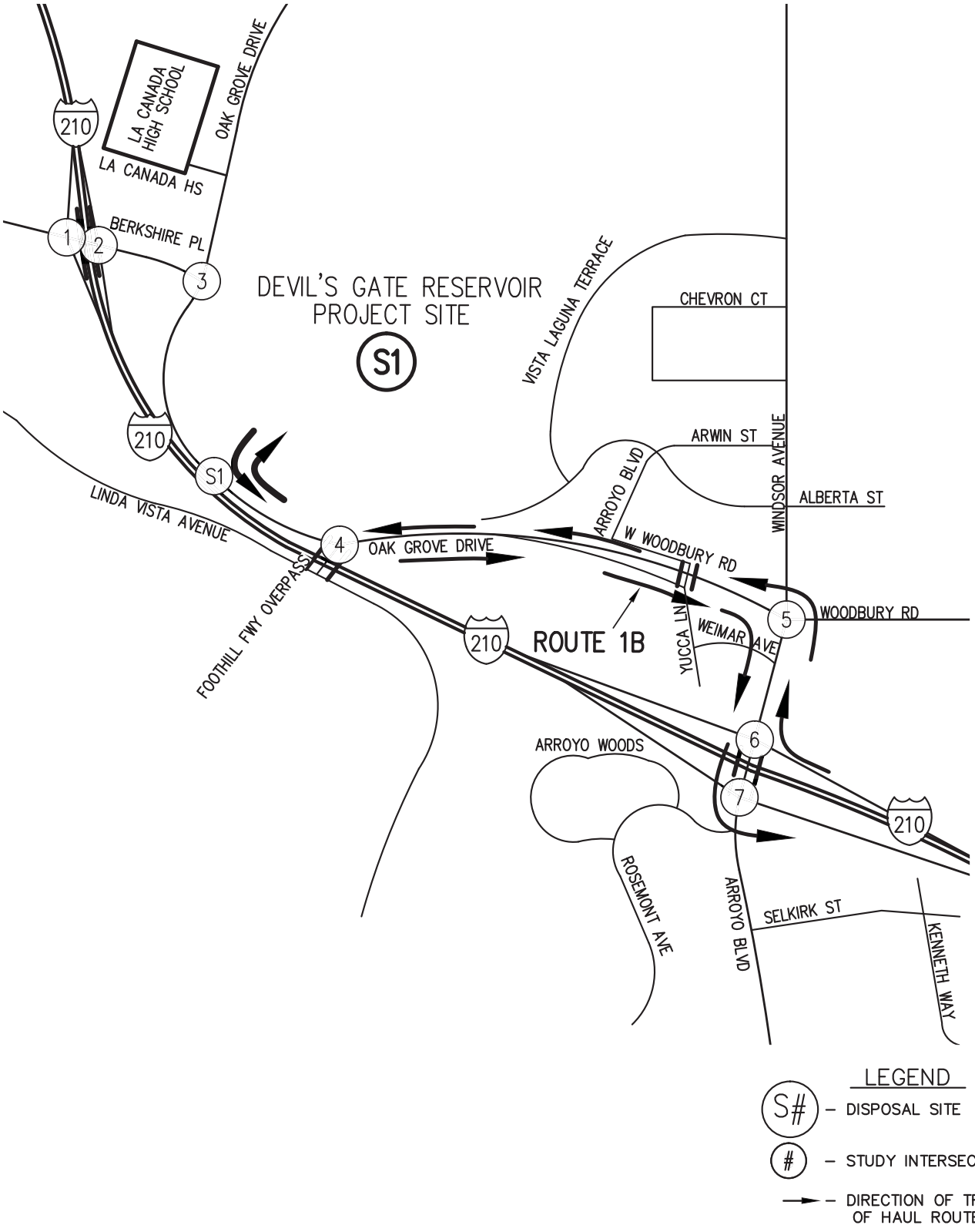

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HAUL ROUTE 1B

DEVIL'S GATE DAM & RESERVOIR

FIGURE
3-1-3

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 3\Ch. 3 Section 1\FIG 3-1-3.dwg
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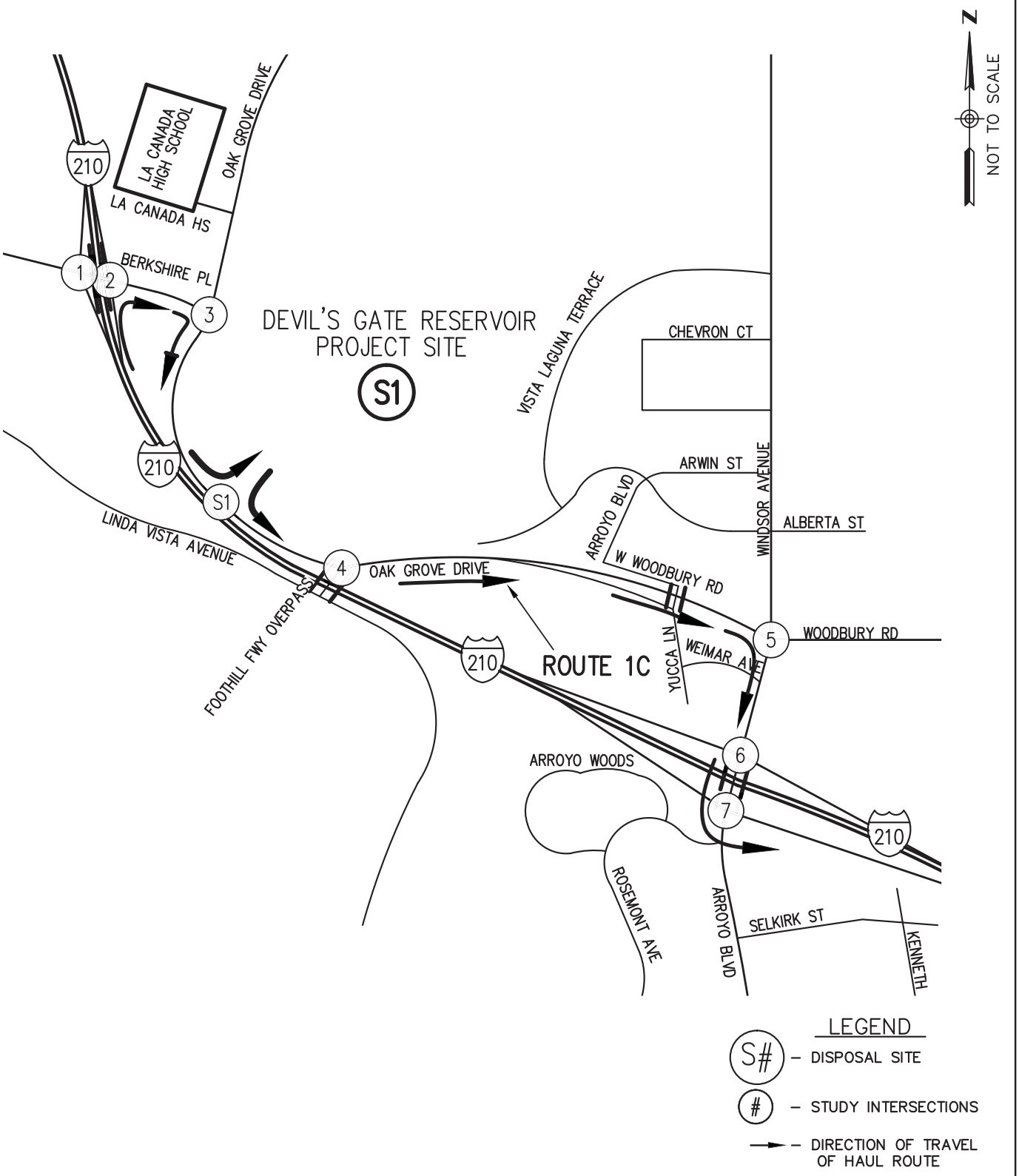

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HAUL ROUTE 1C

DEVIL'S GATE DAM & RESERVOIR

FIGURE
3-1-4

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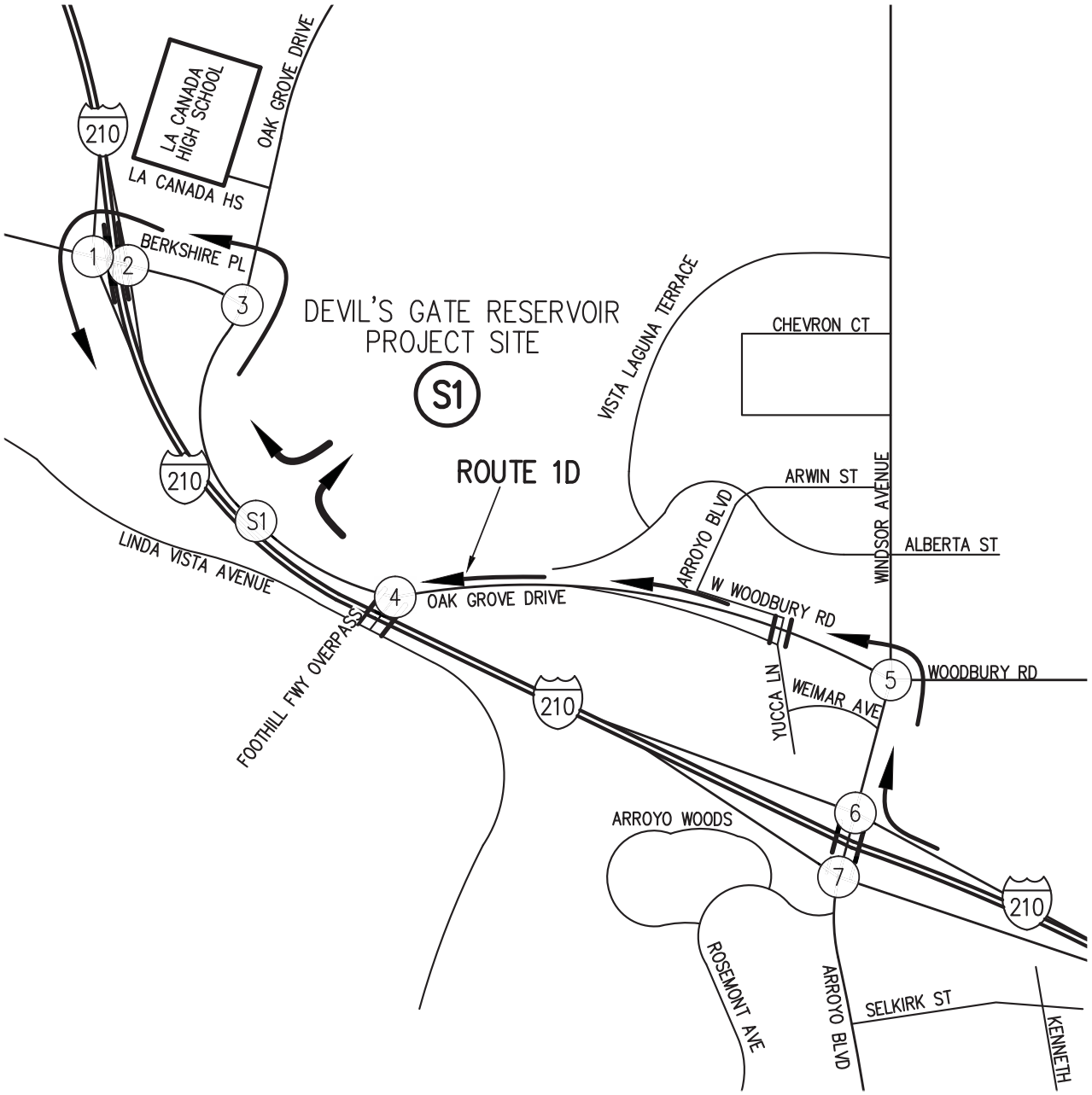

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HAUL ROUTE 1D

DEVIL'S GATE DAM & RESERVOIR

FIGURE
3-1-5

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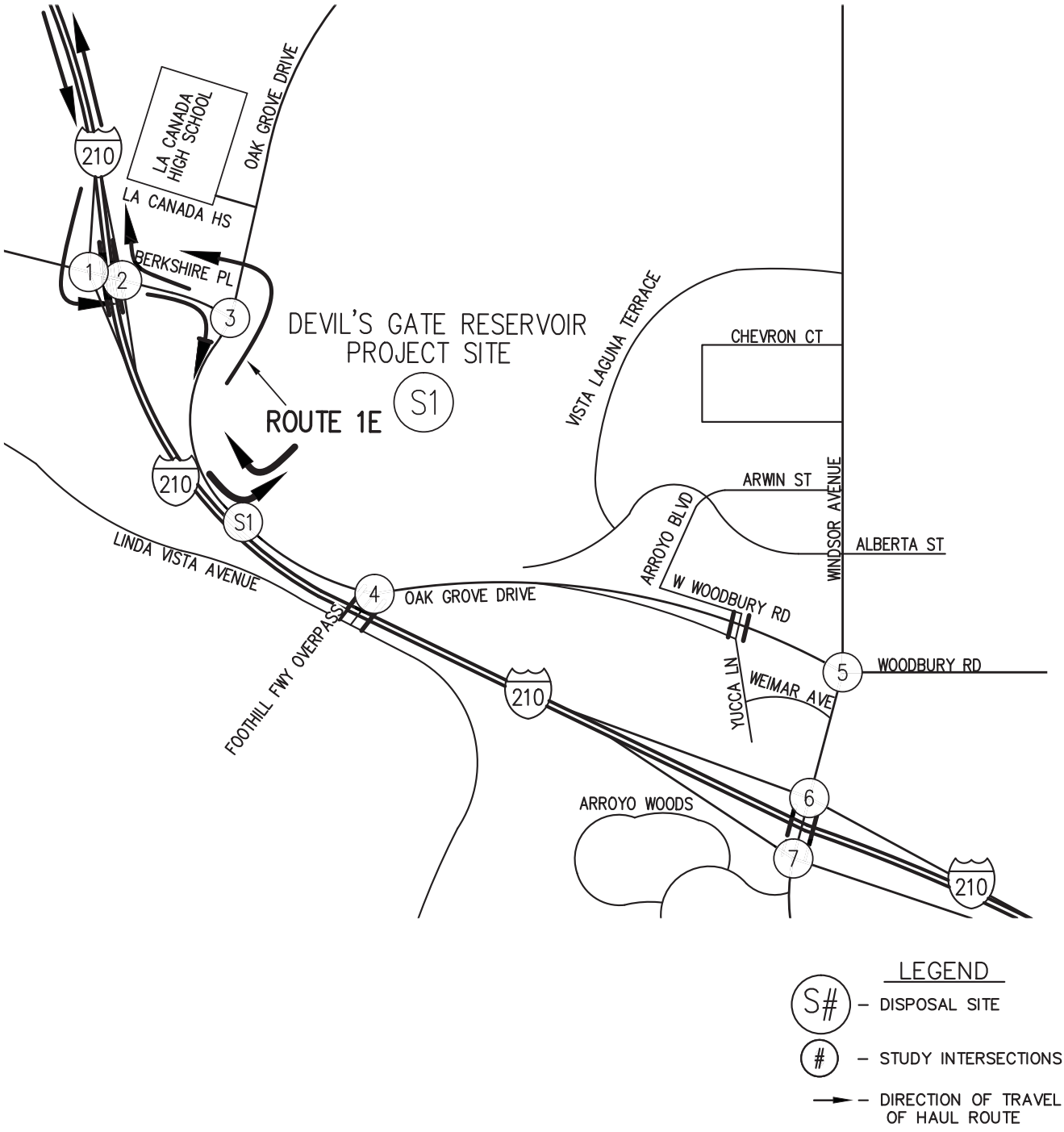

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HAUL ROUTE 1E

DEVIL'S GATE DAM & RESERVOIR

FIGURE
3-1-6

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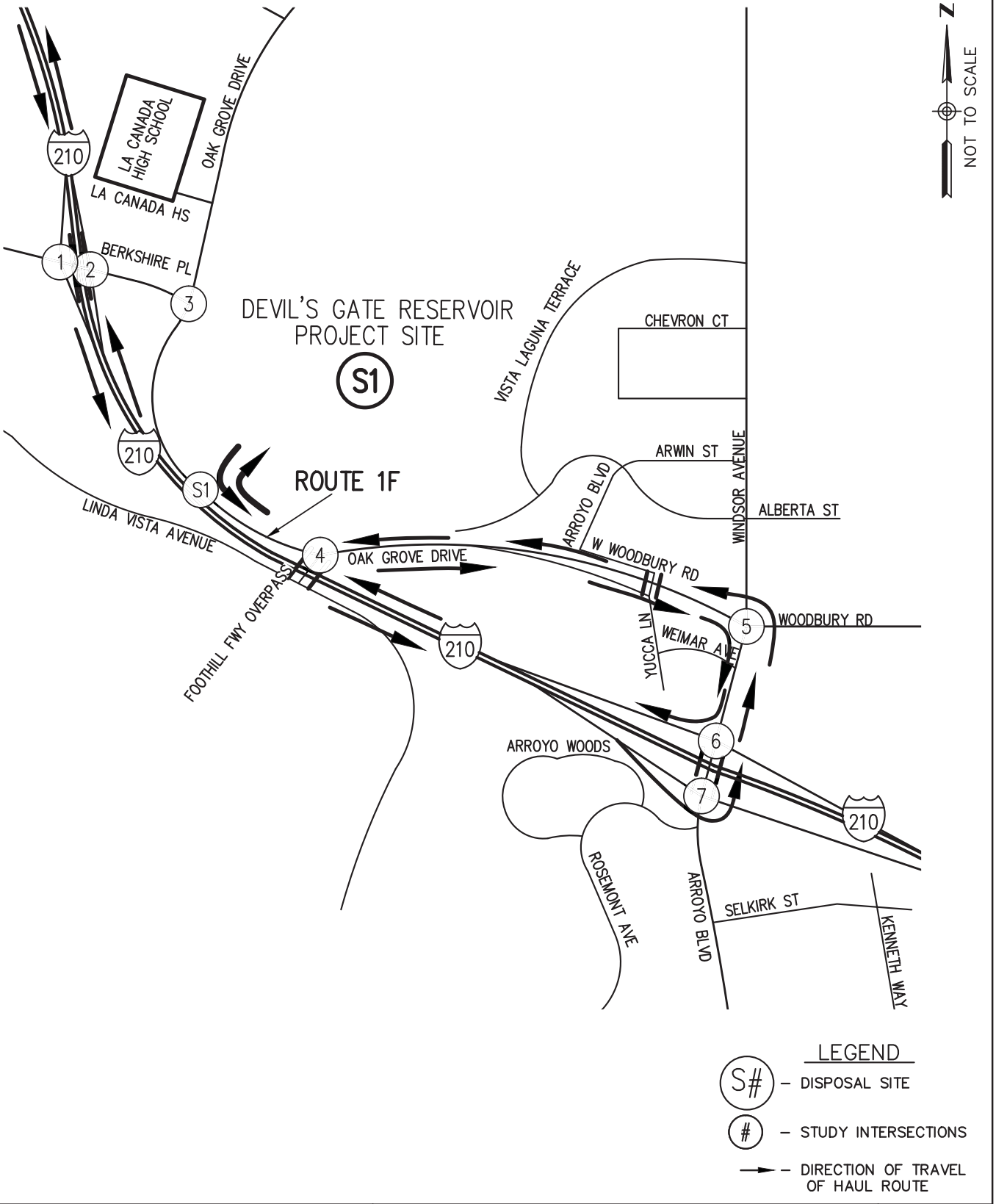

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HAUL ROUTE 1F

DEVIL'S GATE DAM & RESERVOIR

FIGURE
3-1-7

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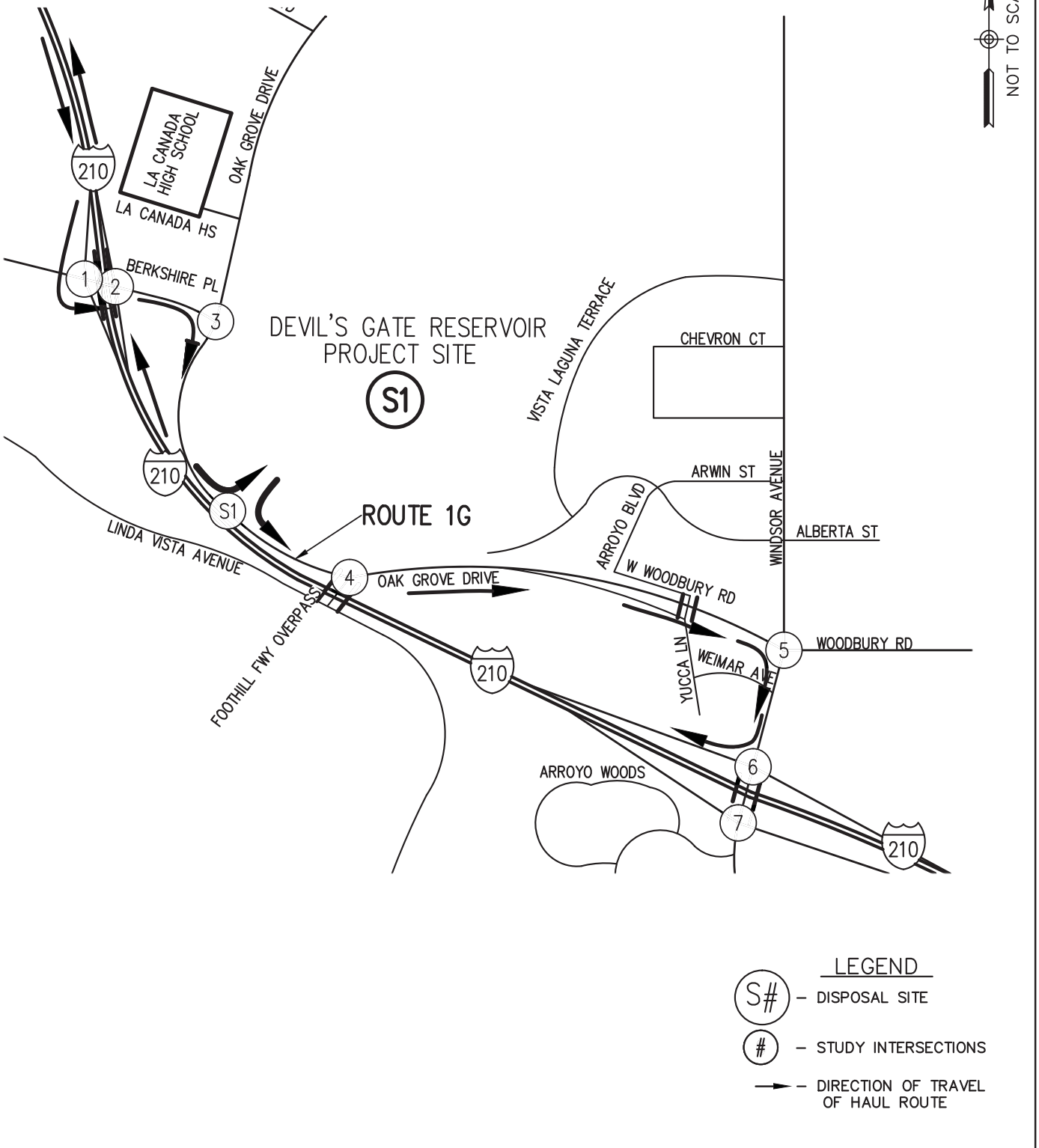

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HAUL ROUTE 1G

DEVIL'S GATE DAM & RESERVOIR

FIGURE
3-1-8

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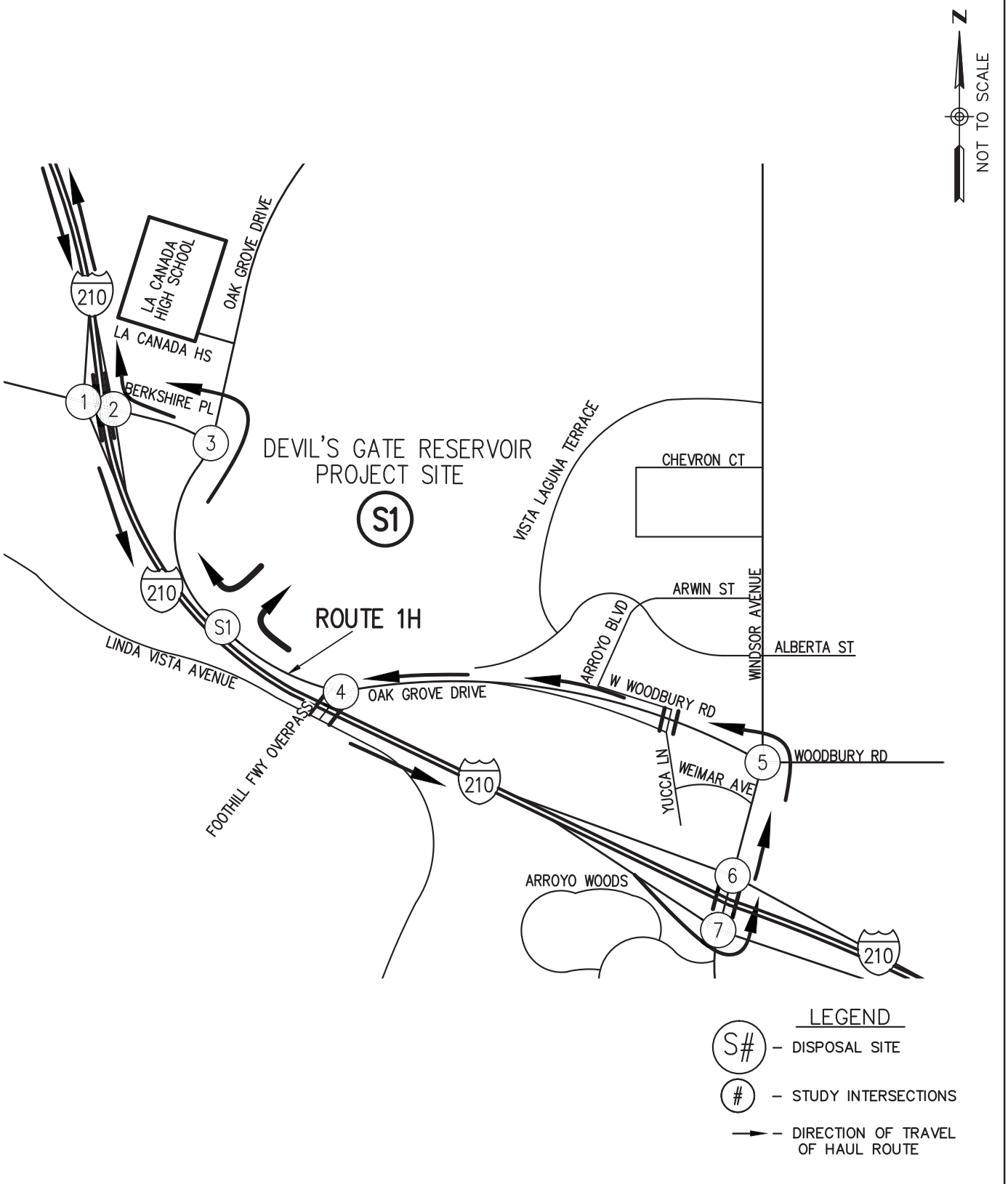

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HAUL ROUTE 1H

DEVIL'S GATE DAM & RESERVOIR

FIGURE

3-1-9

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 3\Ch. 3 Section 1\FIG 3-1-9.dwg
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Manning's Pit Area

9.	Haul Route 2A	-Exit the EB I-210 Freeway at Irwindale Avenue. -Turn right onto SB Irwindale Ave. -Turn left onto EB Gladstone Street and then right onto SB Vincent Avenue. -Enter and exit the disposal site on Vincent Avenue. -Turn left onto NB Vincent Ave and then left onto WB Gladstone Street. -Turn right onto NB Irwindale Ave. -Enter the WB I-210 Freeway at Irwindale Avenue.
10.	Haul Route 2B	-Exit the EB I-210 Freeway at Irwindale Ave. -Turn right onto SB Irwindale Ave. -Turn left onto EB Gladstone Street and then right onto SB Vincent Avenue. -Enter and exit the disposal site on Vincent Avenue. -Turn left onto NB Vincent Ave. -Turn right onto EB Arrow Hwy then left onto NB Azusa Avenue. -Turn right onto EB First Street. -Enter the WB I-210 Freeway at First Street.

Waste Management Area

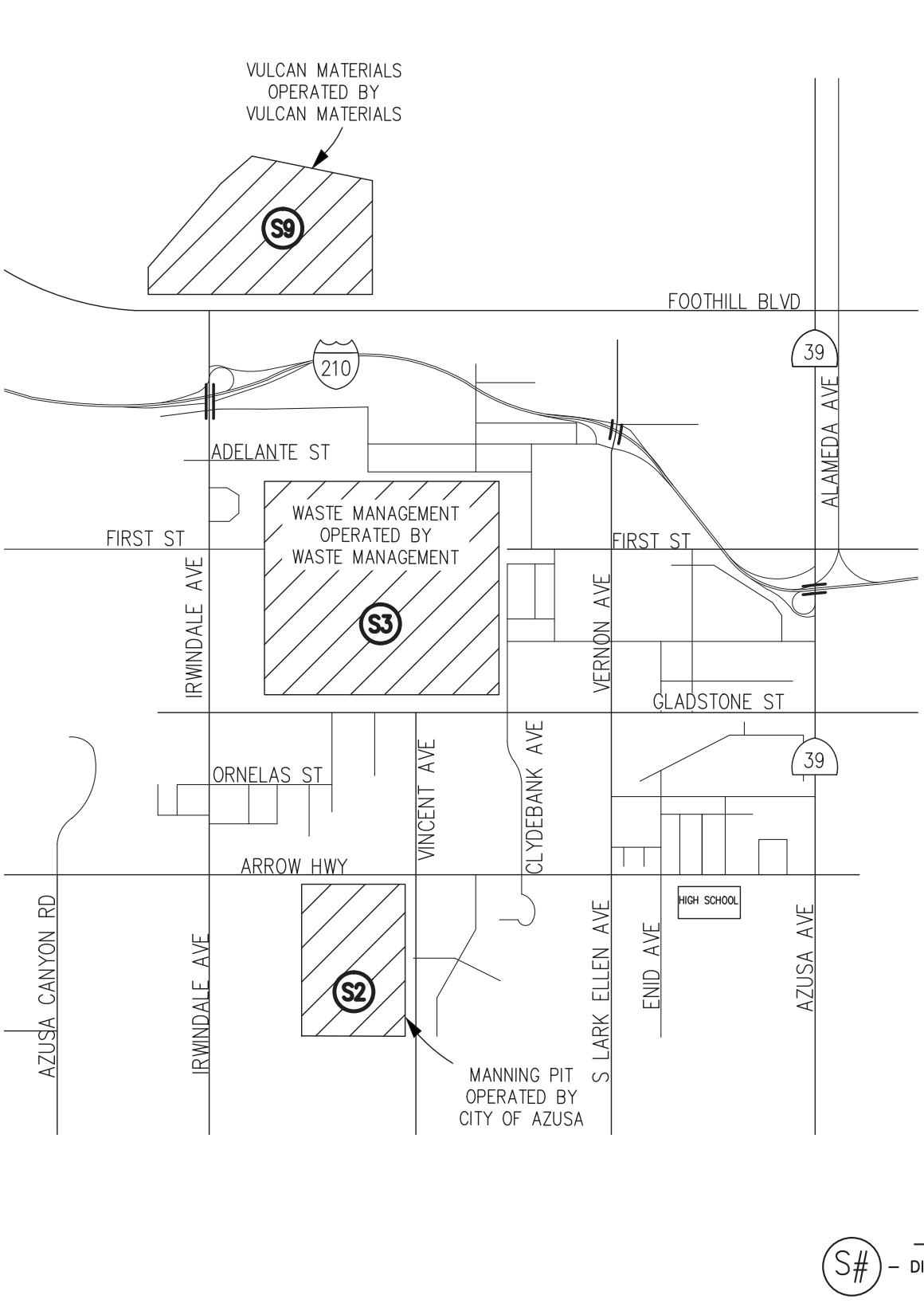
11.	Haul Route 3	-Exit the EB I-210 Freeway at Irwindale Avenue. -Turn right onto SB Irwindale Ave. -Turn left onto EB Gladstone Street. -Enter and exit the disposal site on Gladstone Street. -Turn right onto WB Gladstone Street. -Turn right onto NB Irwindale Ave. -Enter the WB I-210 Freeway at Irwindale Avenue.

Vulcan Materials - Irwindale Site Area

26.	Haul Route 9	-Exit the EB I-210 Freeway at Irwindale Avenue. -Turn left onto NB Irwindale Ave. -Enter and exit the disposal site at the intersection of Irwindale Ave and Foothill Blvd. -Enter the WB I-210 Freeway at Irwindale Avenue.

Scholl Canyon Landfill Area

12.	Haul Route 4A	-Exit the WB SR-134 Freeway at Figueroa Street. -Turn right onto NB Scholl Canyon Rd. -Enter and exit the disposal site on Scholl Canyon Road. -Turn right onto SB Scholl Canyon Rd. -Enter the EB SR-134 Freeway at Figueroa Street.
13.	Haul Route 4B	-Exit the EB SR-134 Freeway at Figueroa Street. -Turn right onto NB Figueroa Street. -Enter and exit the disposal site on Scholl Canyon Road. -Turn right onto SB Scholl Canyon Rd. -Enter the WB SR-134 Freeway at Figueroa Street.



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WASTE MANAGEMENT PIT, MANNING PIT, AND VULCAN MATERIALS PIT VICINITY MAP

DEVIL'S GATE DAM & RESERVOIR

FIGURE
3-2-1

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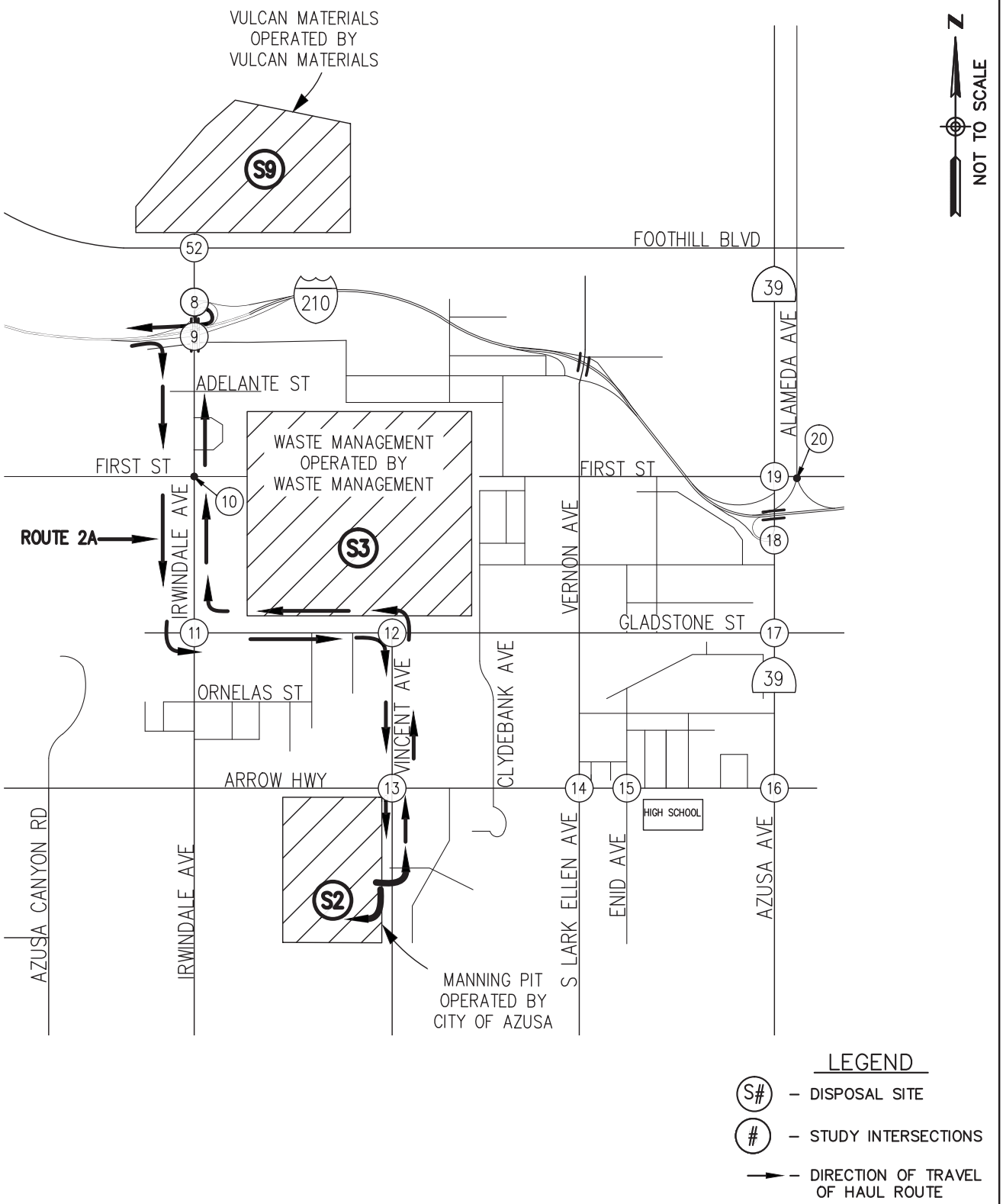

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HAUL ROUTE 2A

DEVIL'S GATE DAM & RESERVOIR

FIGURE
3-2-2

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 3\Ch. 3 Section 2\FIG 3-2-2.dwg
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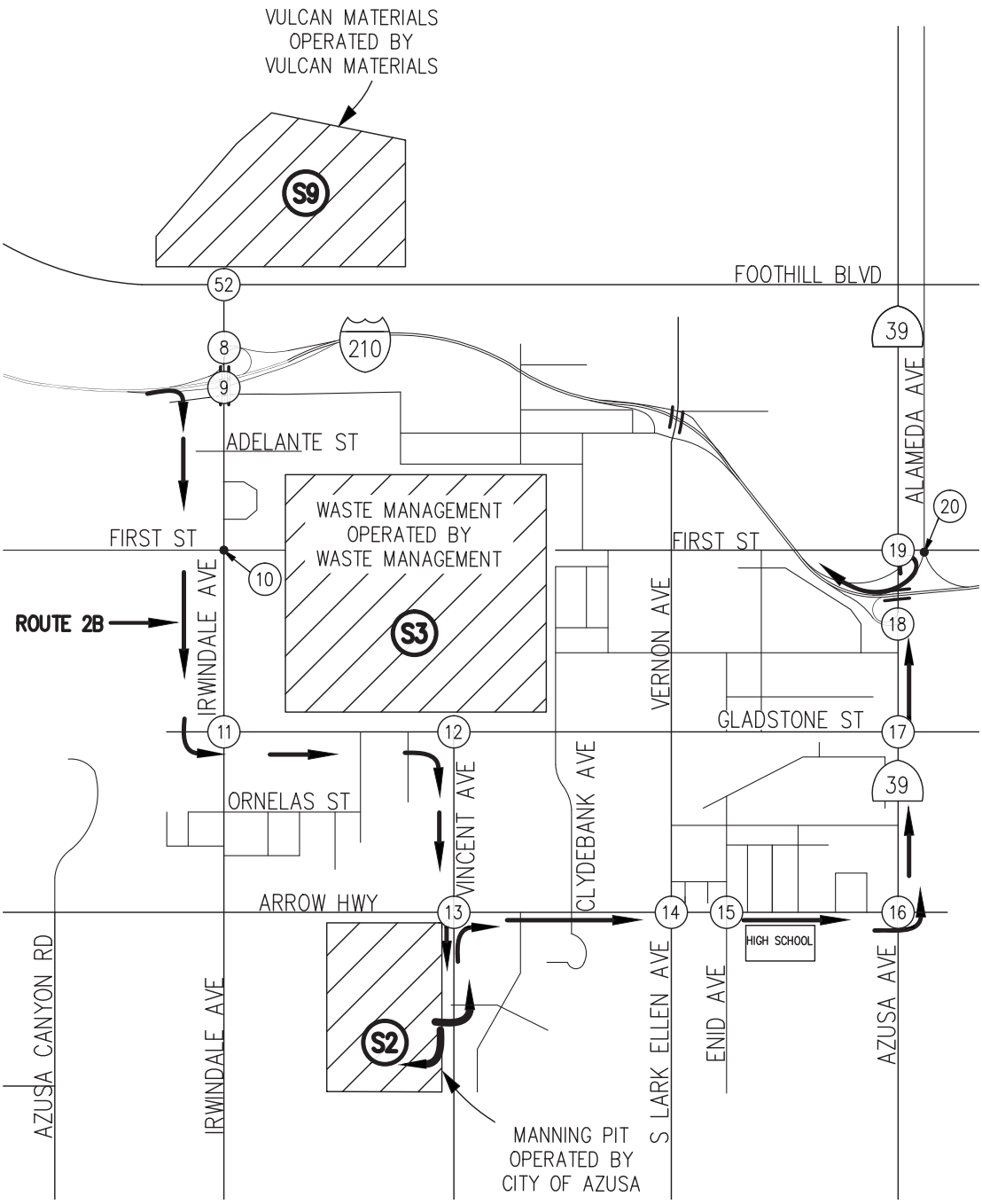

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HAUL ROUTE 2B

DEVIL'S GATE DAM & RESERVOIR

FIGURE
3-2-3

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 3\Ch. 3 Section 2\FIG 3-2-3.dwg
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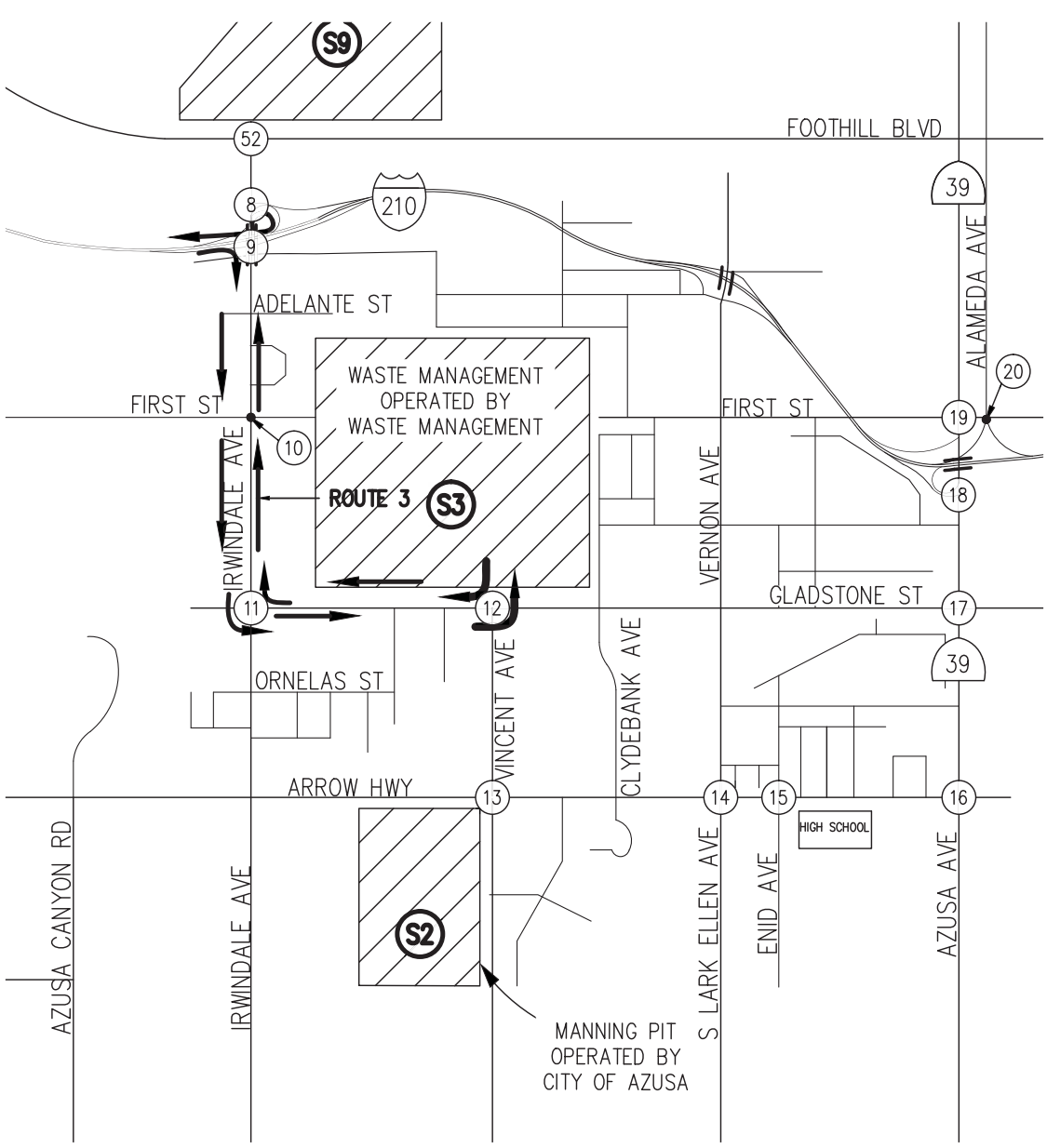

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HAUL ROUTE 3

DEVIL'S GATE DAM & RESERVOIR

FIGURE
3-2-4

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 3\Ch. 3 Section 2\FIG 3-2-4.dwg
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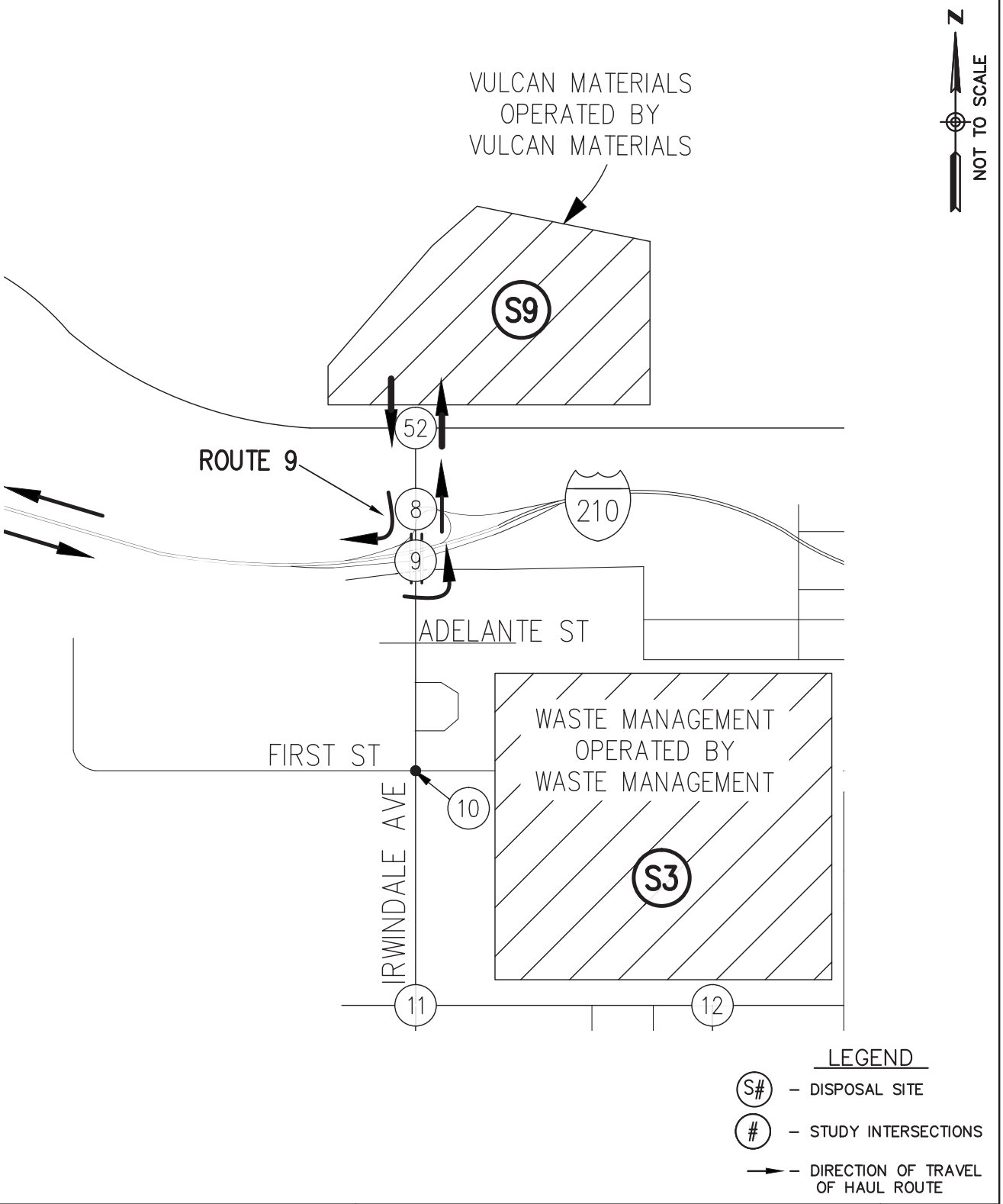

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HAUL ROUTE 9

DEVIL'S GATE DAM & RESERVOIR

FIGURE
3-2-5

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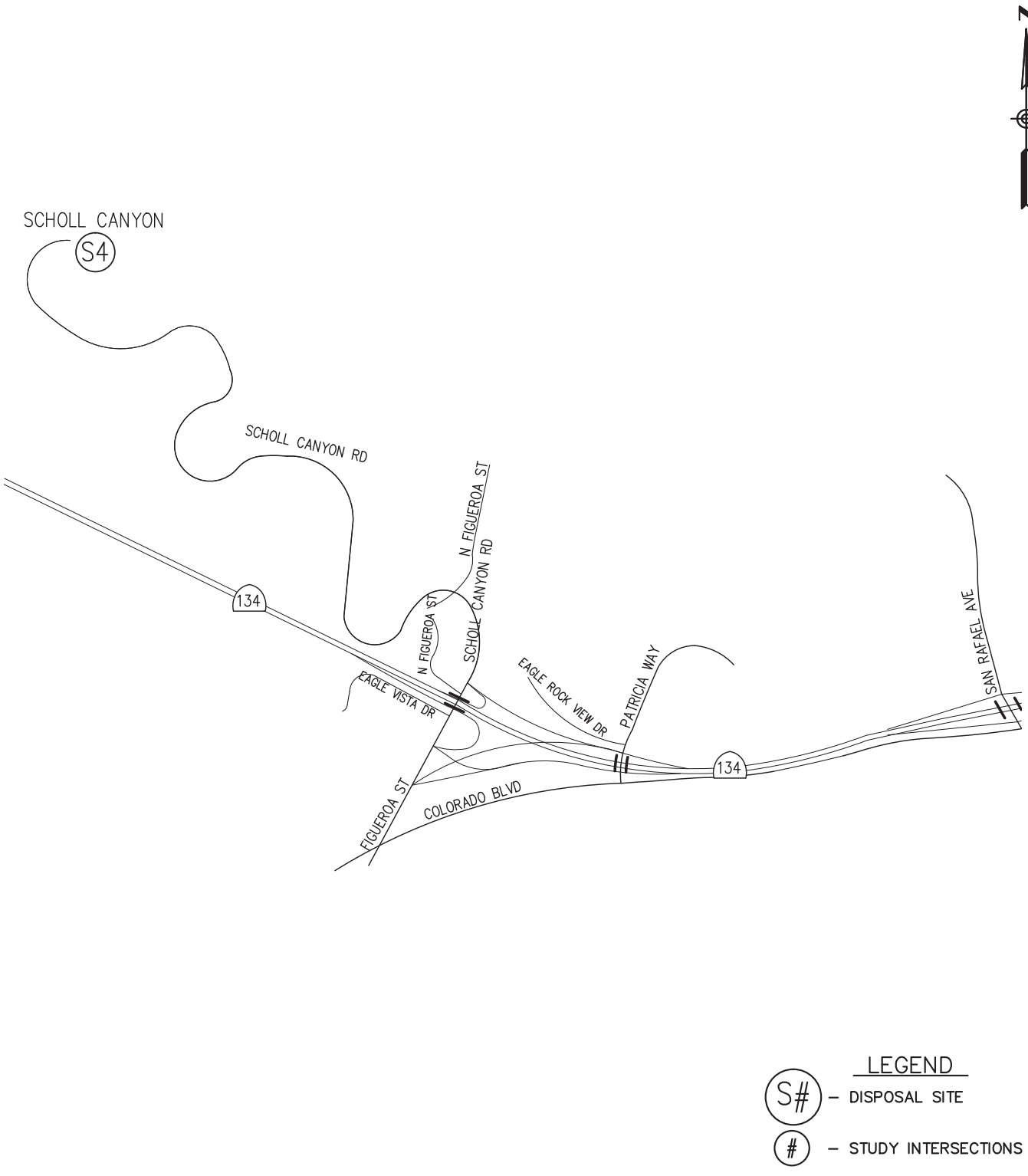

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SCHOLL CANYON PIT VICINITY MAP

DEVIL'S GATE DAM & RESERVOIR

FIGURE 3-3-1

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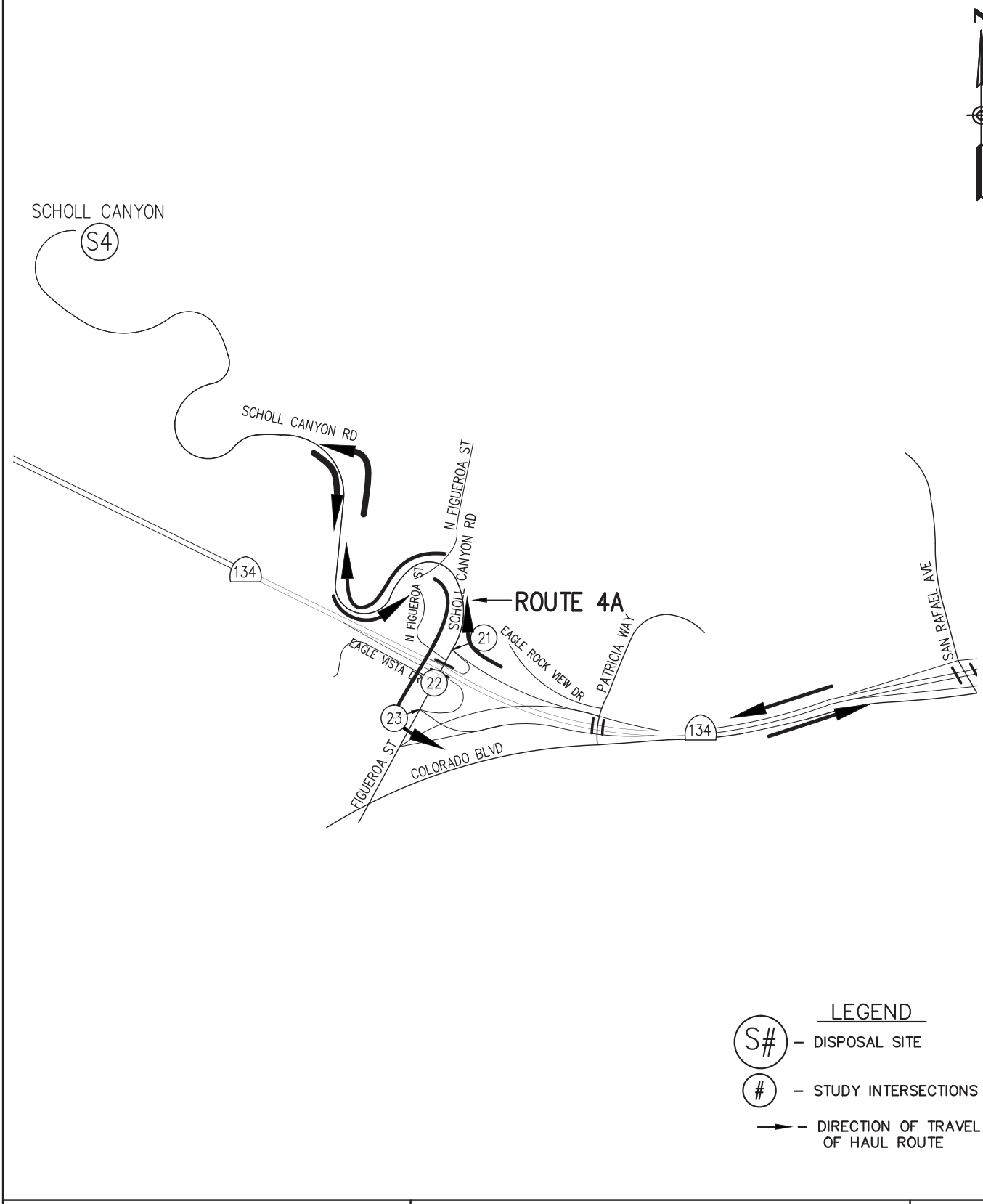

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HAUL ROUTE 4A

DEVIL'S GATE DAM & RESERVOIR

FIGURE
3-3-2

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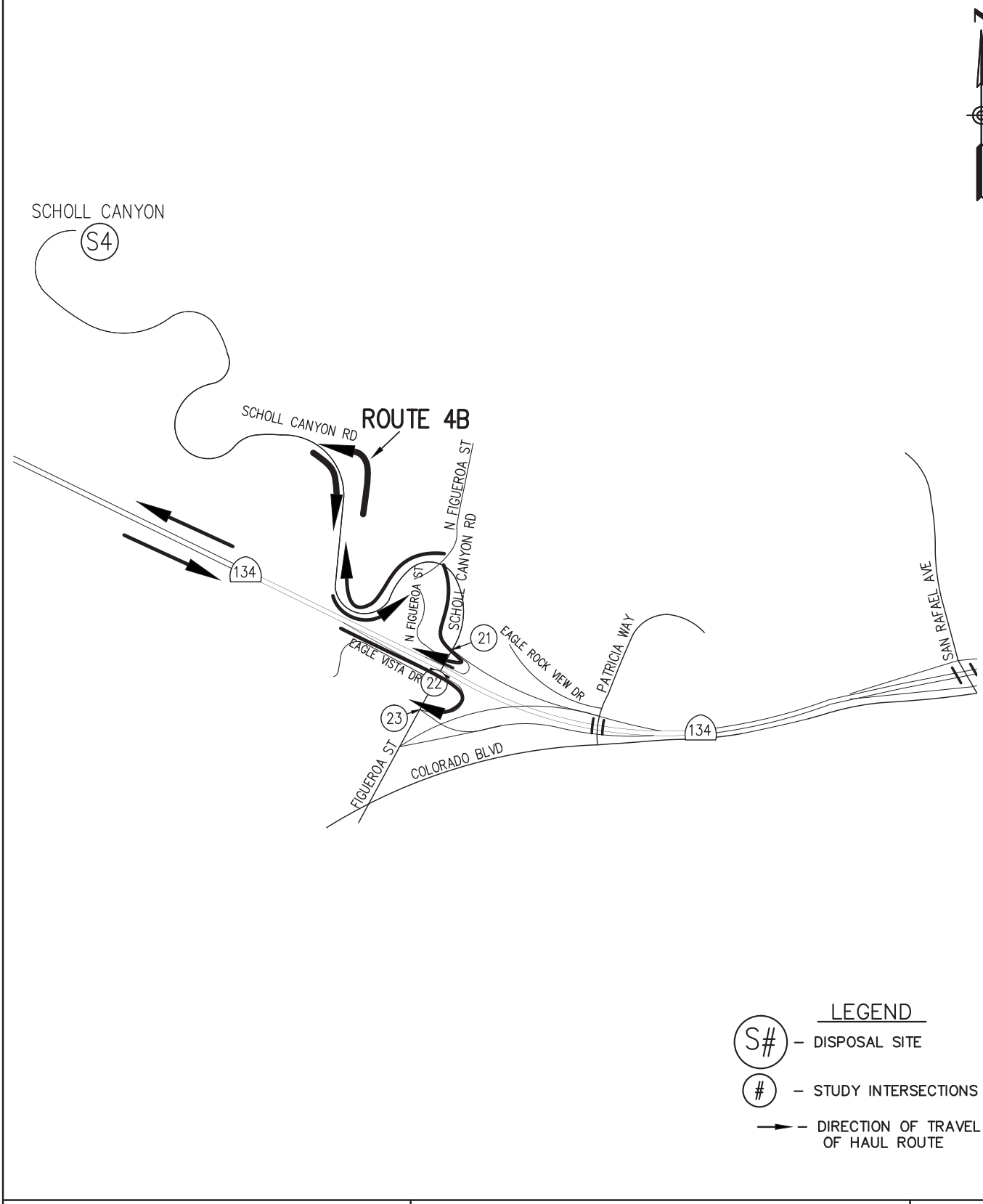

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HAUL ROUTE 4B

DEVIL'S GATE DAM & RESERVOIR

FIGURE
3-3-3

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 3\Ch. 3 Section 3\FIG 3-3-3.dwg
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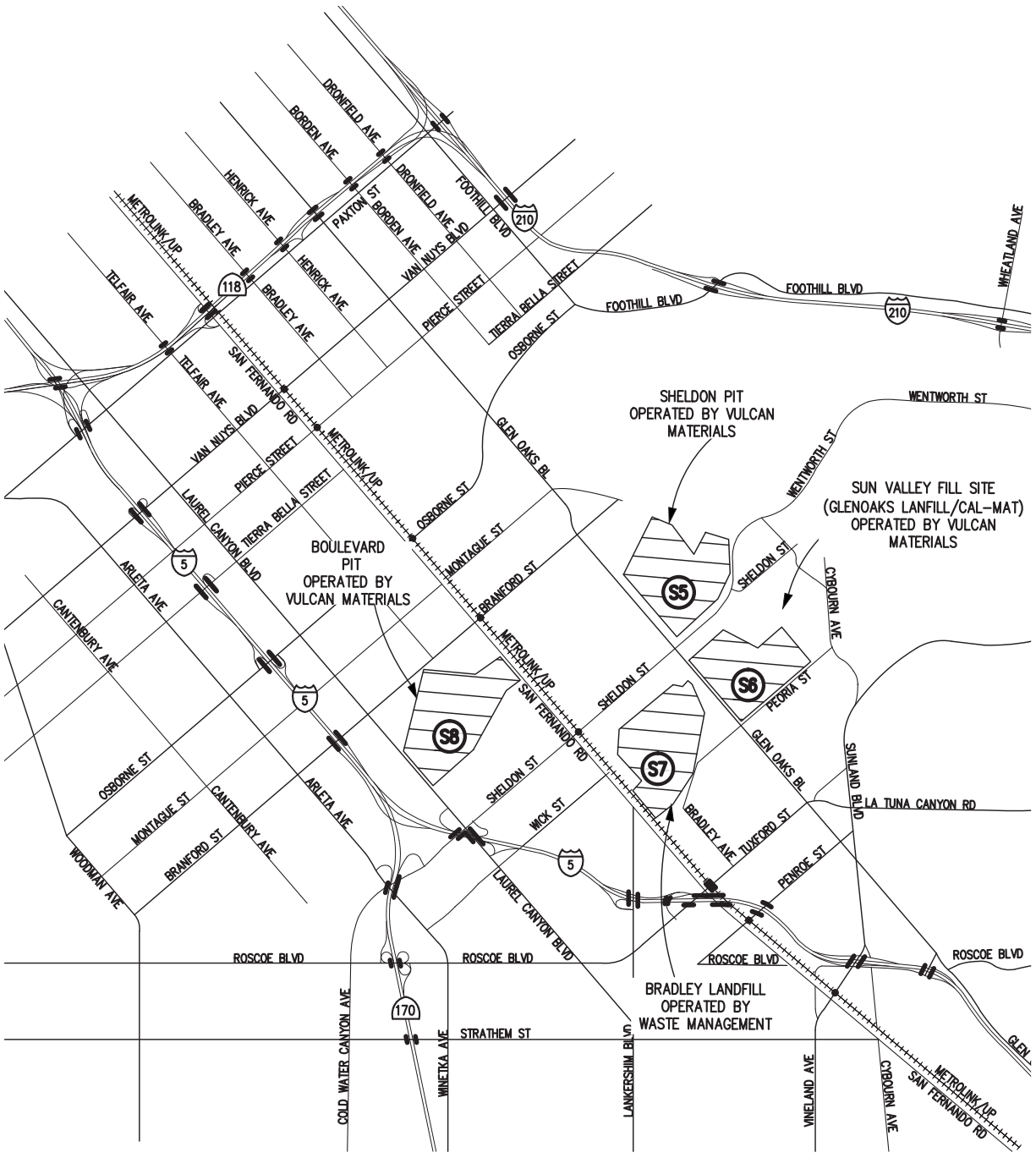
Sheldon Pit Area

14.	Haul Route 5A	-Exit the WB I-210 Freeway at the Osborne Street/Foothill Blvd interchange. -Turn left onto WB Foothill Blvd and then left onto WB Osborne Street. -Turn left onto SB Glenoaks Blvd. -Turn left onto EB Sheldon Street. -Enter and exit the disposal site on Sheldon Street. -Turn right onto WB Sheldon Street. -Turn right onto NB Glenoaks Blvd. -Turn right onto EB Osborne Street and then right onto EB Foothill Blvd. -Enter the EB I-210 Freeway at the Osborne Street/Foothill Blvd interchange.
15.	Haul Route 5B	-Exit the NB I-5 Freeway at the Glenoaks Blvd/Roscoe Blvd interchange. -Turn right onto EB Roscoe Blvd. -Turn left onto NB Glenoaks Blvd. -Turn right onto EB Sheldon Street. -Enter and exit the disposal site on Sheldon Street. -Turn right onto WB Sheldon Street. -Turn left onto SB Glenoaks Blvd. -Turn right onto WB Roscoe Blvd. -Enter the SB I-5 Fwy at the Glenoaks Blvd/Roscoe Blvd interchange.
16.	Haul Route 5C	-Exit the WB I-210 Fwy at the Wheatland Ave interchange. -Turn right onto NB Wheatland Ave. -Turn right onto EB Foothill Blvd. -Turn right onto WB Wentworth Street. -Enter and exit the disposal site on Sheldon Street. -Turn left onto EB Sheldon Street. -Turn left onto WB Foothill Blvd. -Turn left onto SB Wheatland Ave. -Enter the EB I-210 Fwy at the Wheatland Ave interchange.



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BOULEVARD, BRADLEY, SUN VALLEY, SHELDON PITS VICINITY MAP

DEVIL'S GATE DAM & RESERVOIR

FIGURE
3-4-1

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 3\Ch. 3 Section 4\FIG 3-4-1.dwg
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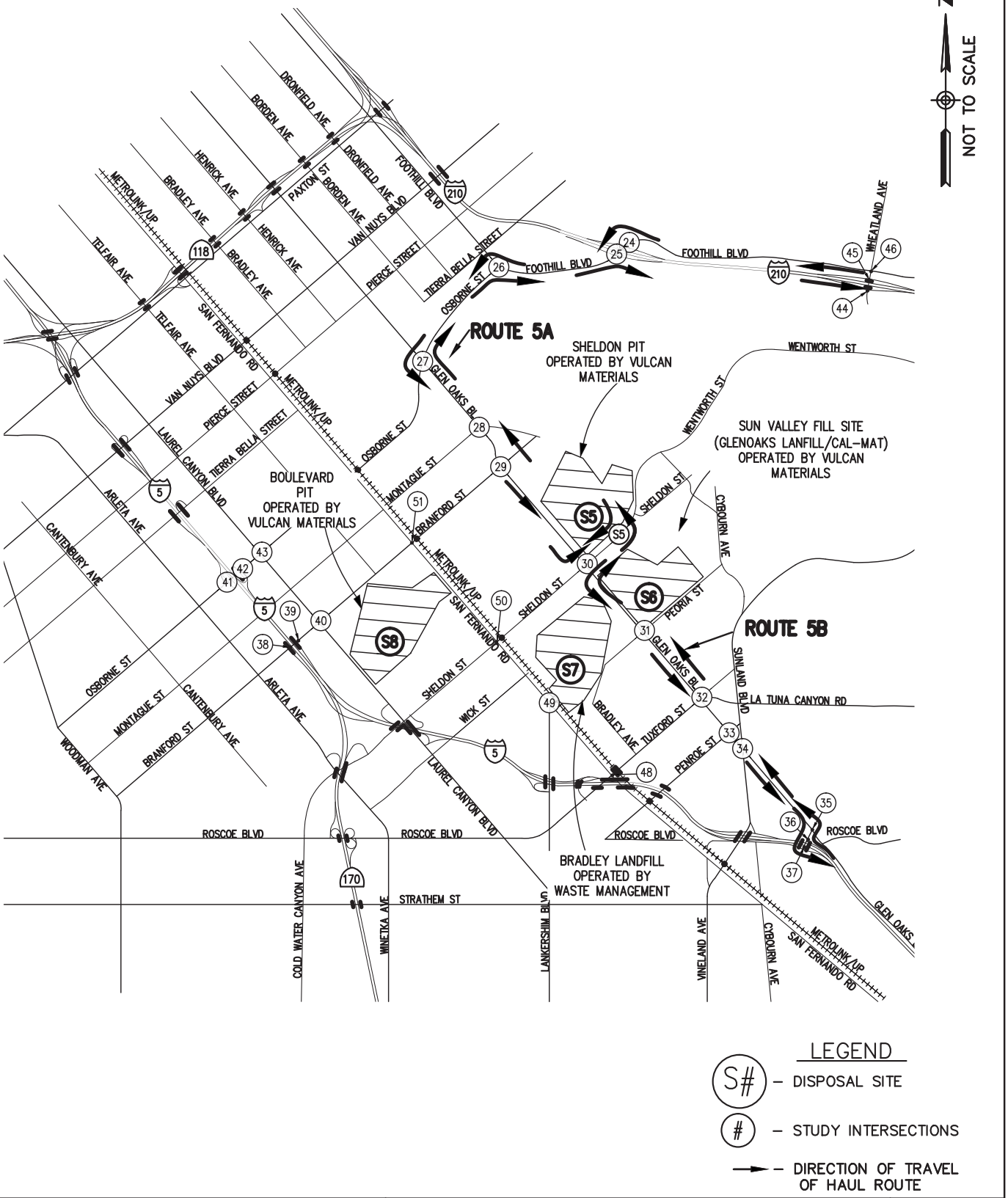

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HAUL ROUTE 5A/5B

DEVIL'S GATE DAM & RESERVOIR

FIGURE
3-4-2

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 3\Ch. 3 Section 4\FIG 3-4-2.dwg
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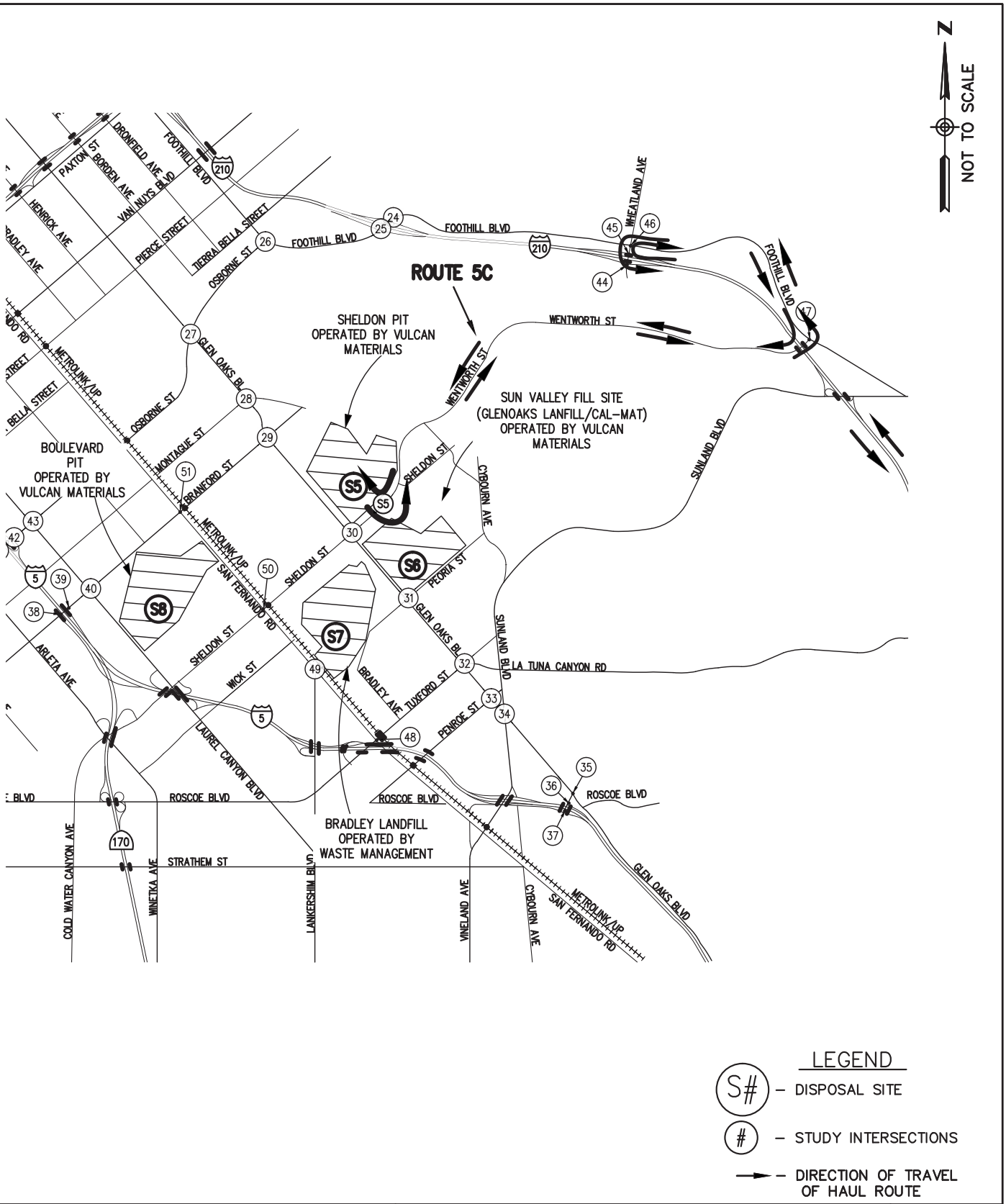

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HAUL ROUTE 5C

DEVIL'S GATE DAM & RESERVOIR

FIGURE
3-4-3

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 3\Ch. 3 Section 4\FIG 3-4-3.dwg
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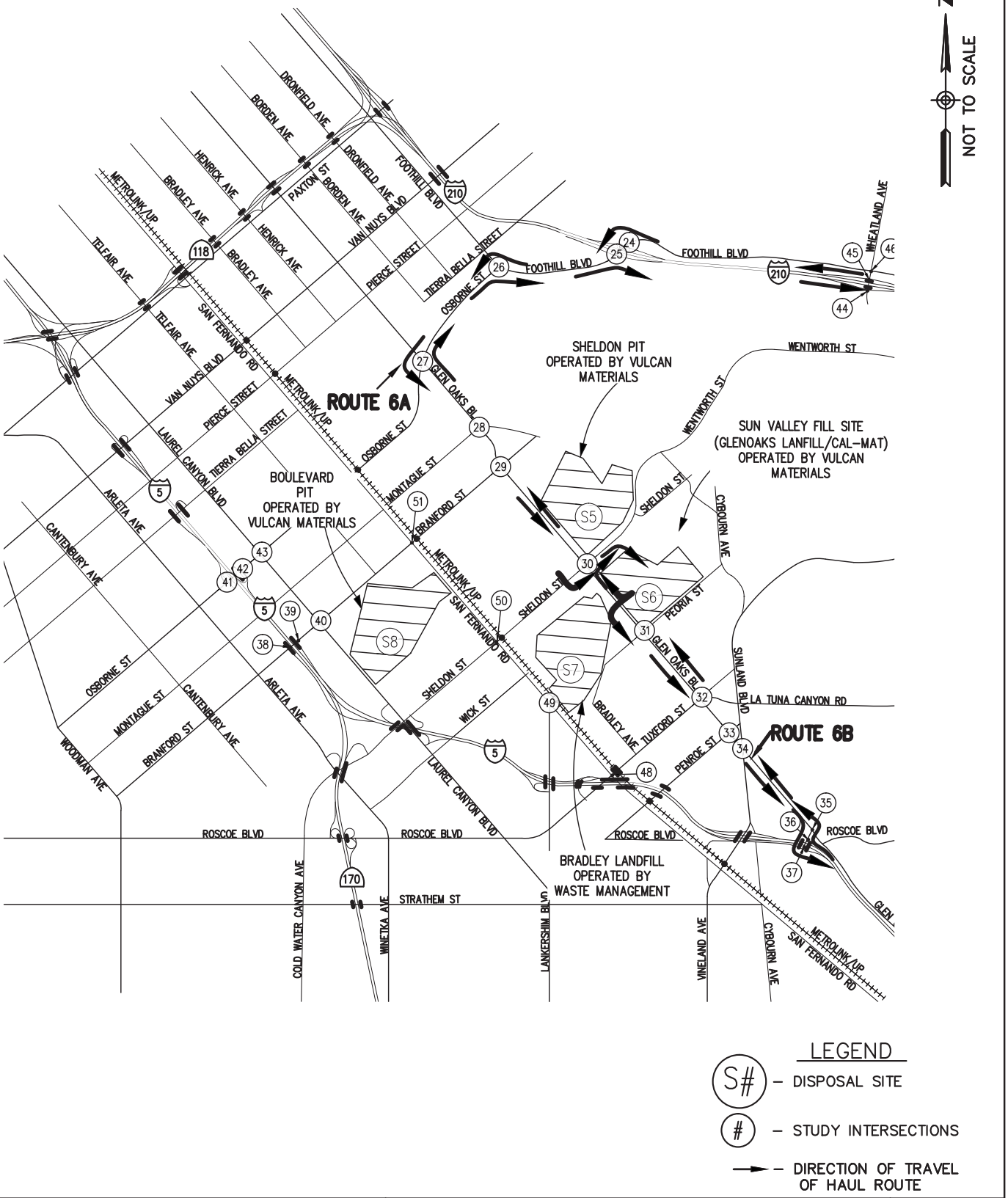
Sun Valley Fill Site (Glenoaks Landfill/Cal-Mat) Area

17.	Haul Route 6A	-Exit the WB I-210 Fwy at the Osborne Street/Foothill Blvd interchange. -Turn left onto WB Foothill Blvd and then left onto WB Osborne Street. -Turn left onto SB Glenoaks Blvd. -Turn left onto EB Sheldon Street. -Enter the disposal site on Sheldon Street. -Exit the disposal site on Glenoaks Blvd. -Turn right onto NB Glenoaks Blvd. -Turn right onto EB Osborne Street and then right onto EB Foothill Blvd. -Enter the EB I-210 Fwy at the Osborne Street/Foothill Blvd interchange.
18.	Haul Route 6B	-Exit the NB I-5 Fwy at the Glenoaks Blvd/Roscoe Blvd interchange. -Turn right onto EB Roscoe Blvd. -Turn left onto NB Glenoaks Blvd. -Turn right onto EB Sheldon Street. -Enter the disposal site on Sheldon Street. -Exit the disposal site on Glenoaks Blvd. -Turn left onto SB Glenoaks Blvd -Turn right onto WB Roscoe Blvd. -Enter the SB I-5 Fwy at the Glenoaks Blvd/Roscoe Blvd interchange.
19.	Haul Route 6C	-Exit the WB I-210 Fwy at the Wheatland Ave interchange. -Turn right onto NB Wheatland Ave. -Turn right onto EB Foothill Blvd. -Turn right onto WB Wentworth Street. -Enter the disposal site on Sheldon Street. -Exit the disposal site on Glenoaks Blvd. -Turn right onto NB Glenoaks Blvd -Turn right onto EB Sheldon Street. -Turn left onto WB Foothill Blvd. -Turn left onto SB Wheatland Ave. -Enter the EB I-210 Fwy at the Wheatland Ave interchange



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HAUL ROUTE 6A/6B

DEVIL'S GATE DAM & RESERVOIR

FIGURE
3-4-4

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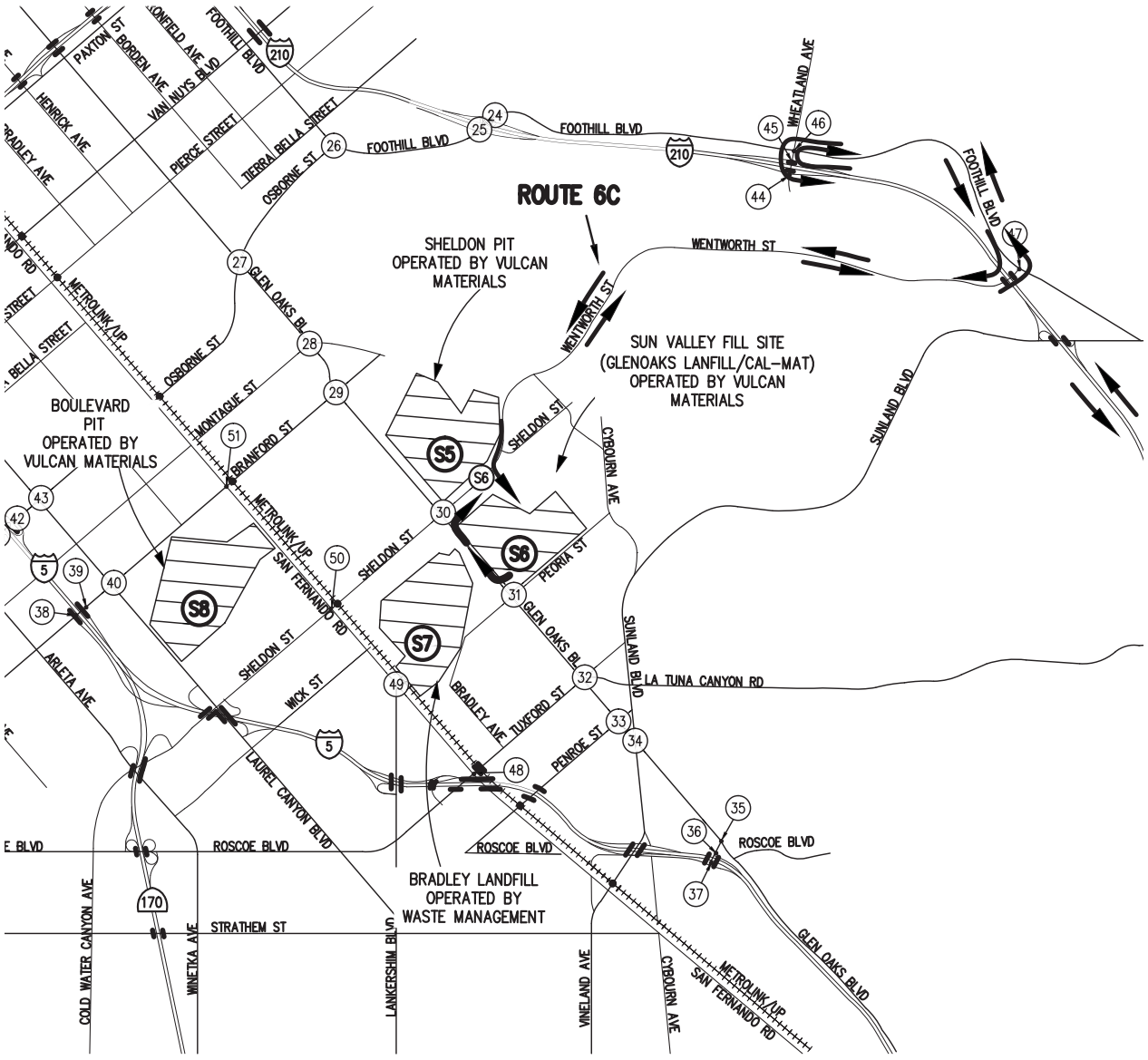

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HAUL ROUTE 6C

DEVIL'S GATE DAM & RESERVOIR

FIGURE
3-4-5

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 3\Ch. 3 Section 4\FIG 3-4-5.dwg
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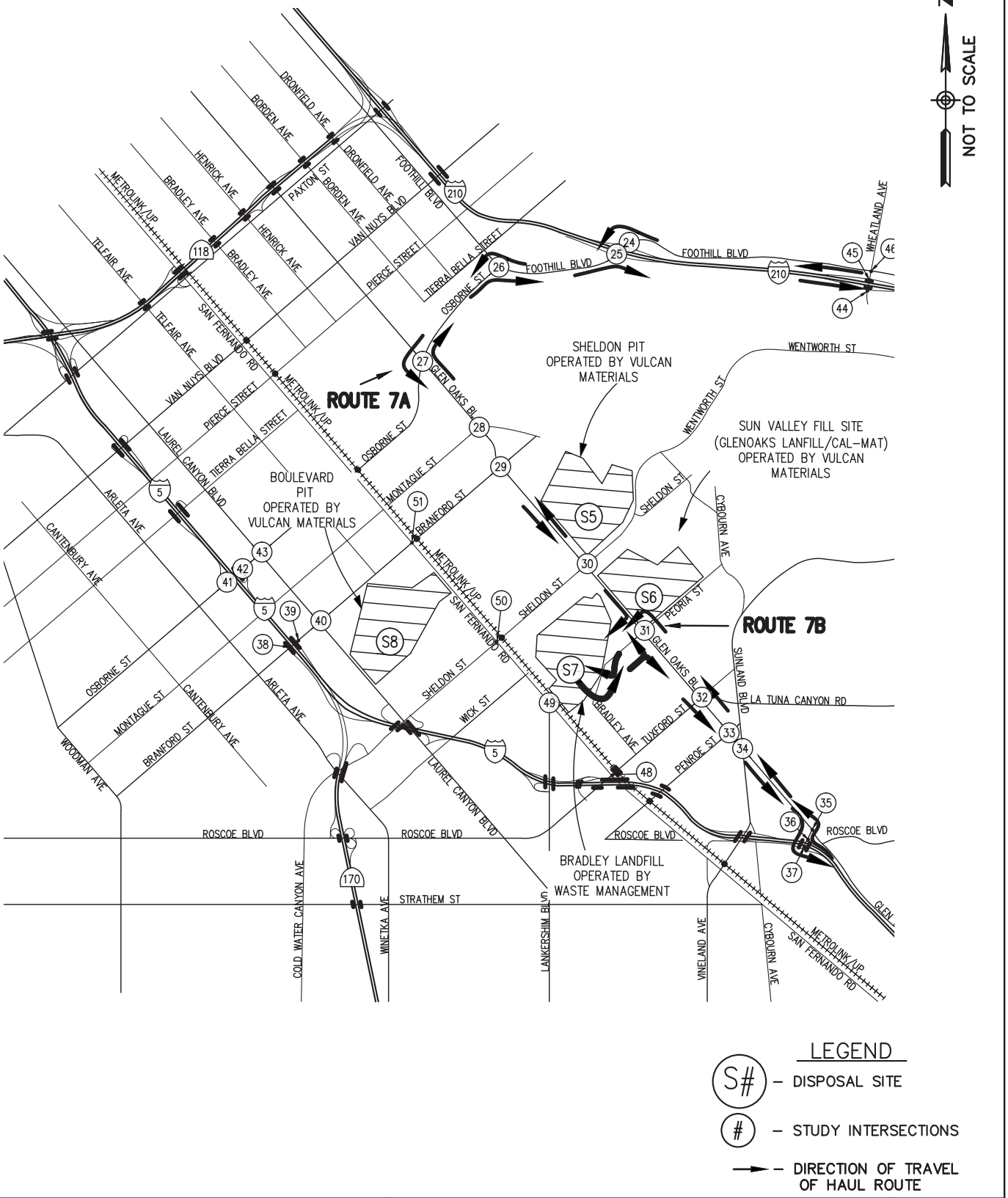
Bradley Landfill Area

20.	Haul Route 7A	-Exit the WB I-210 Fwy at the Osborne Street/Foothill Blvd interchange. -Turn left onto WB Foothill Blvd and then left onto WB Osborne Street. -Turn left onto SB Glenoaks Blvd. -Turn right onto WB Peoria Street. -Enter and exit the disposal site on Peoria Street. -Turn left onto EB Peoria Street. -Turn left onto NB Glenoaks Blvd. -Turn right onto EB Osborne Street and then right onto EB Foothill Blvd. -Enter the EB I-210 Fwy at the Osborne Street/Foothill Blvd interchange.
21.	Haul Route 7B	-Exit the NB I-5 Fwy at the Glenoaks Blvd/Roscoe Blvd interchange. -Turn right onto EB Roscoe Blvd. -Turn left onto NB Glenoaks Blvd. -Turn left onto WB Peoria Street. -Enter and exit the disposal site on Peoria Street. -Turn left onto EB Peoria Street. -Turn right onto SB Glenoaks Blvd. -Turn right onto WB Roscoe Blvd. -Enter the SB I-5 Fwy at the Glenoaks Blvd/Roscoe Blvd interchange.
22.	Haul Route 7C	-Exit the WB I-210 Fwy at the Wheatland Ave interchange. -Turn right onto NB Wheatland Ave. -Turn right onto EB Foothill Blvd. -Turn right onto WB Wentworth Street. -Turn left onto SB Glenoaks Blvd. -Turn right onto WB Peoria Street. -Enter and exit the disposal site on Peoria Street. -Turn left onto EB Peoria Street. -Turn left onto NB Glenoaks Blvd. -Turn right onto EB Sheldon Street. -Turn left onto WB Foothill Blvd. -Turn left onto SB Wheatland Ave. -Enter the EB I-210 Fwy at the Wheatland Ave interchange



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HAUL ROUTE 7A/7B

DEVIL'S GATE DAM & RESERVOIR

FIGURE
3-4-6

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 3\Ch. 3 Section 4\FIG 3-4-6.dwg
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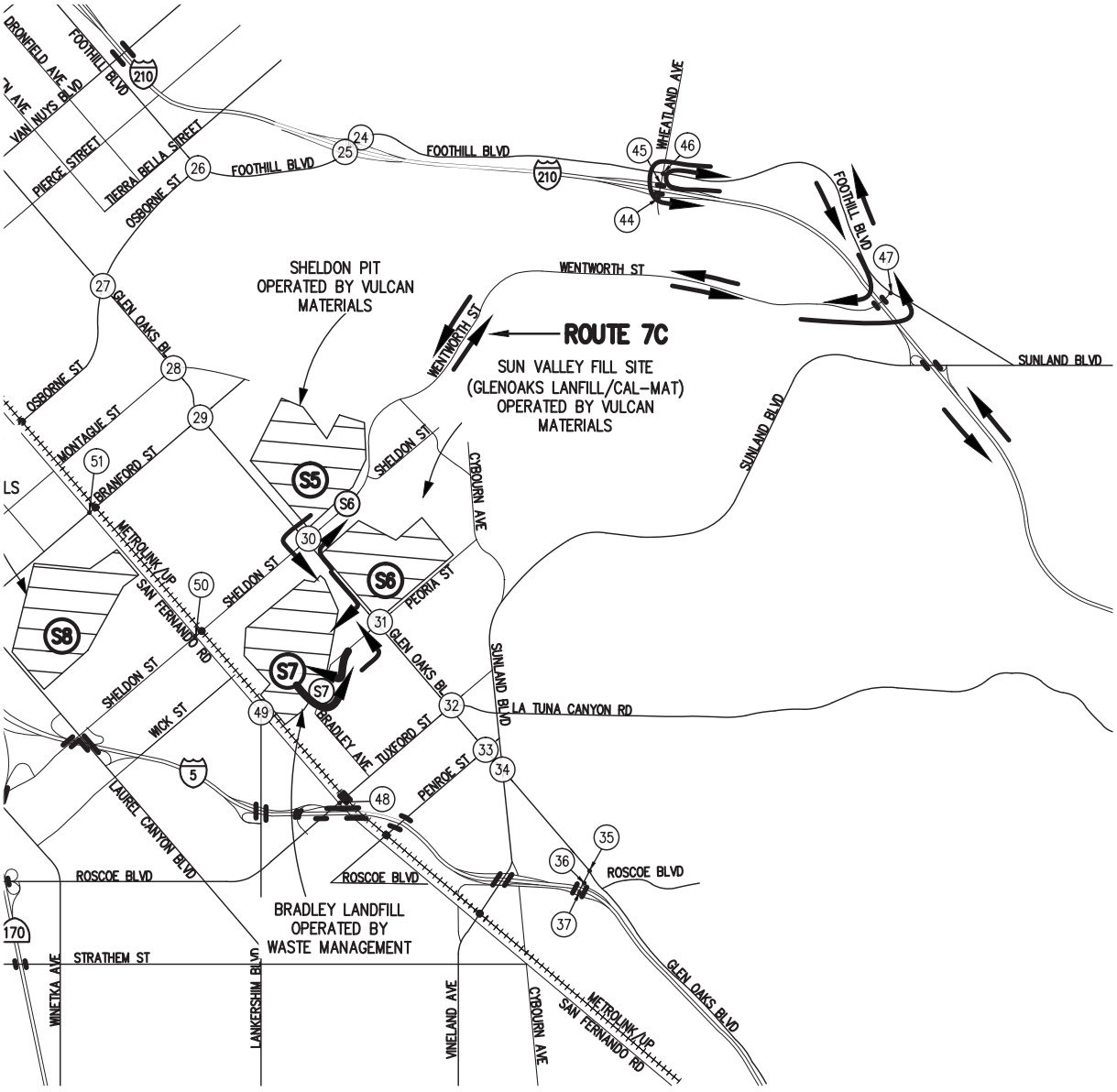

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HAUL ROUTE 7C

DEVIL'S GATE DAM & RESERVOIR

FIGURE
3-4-7

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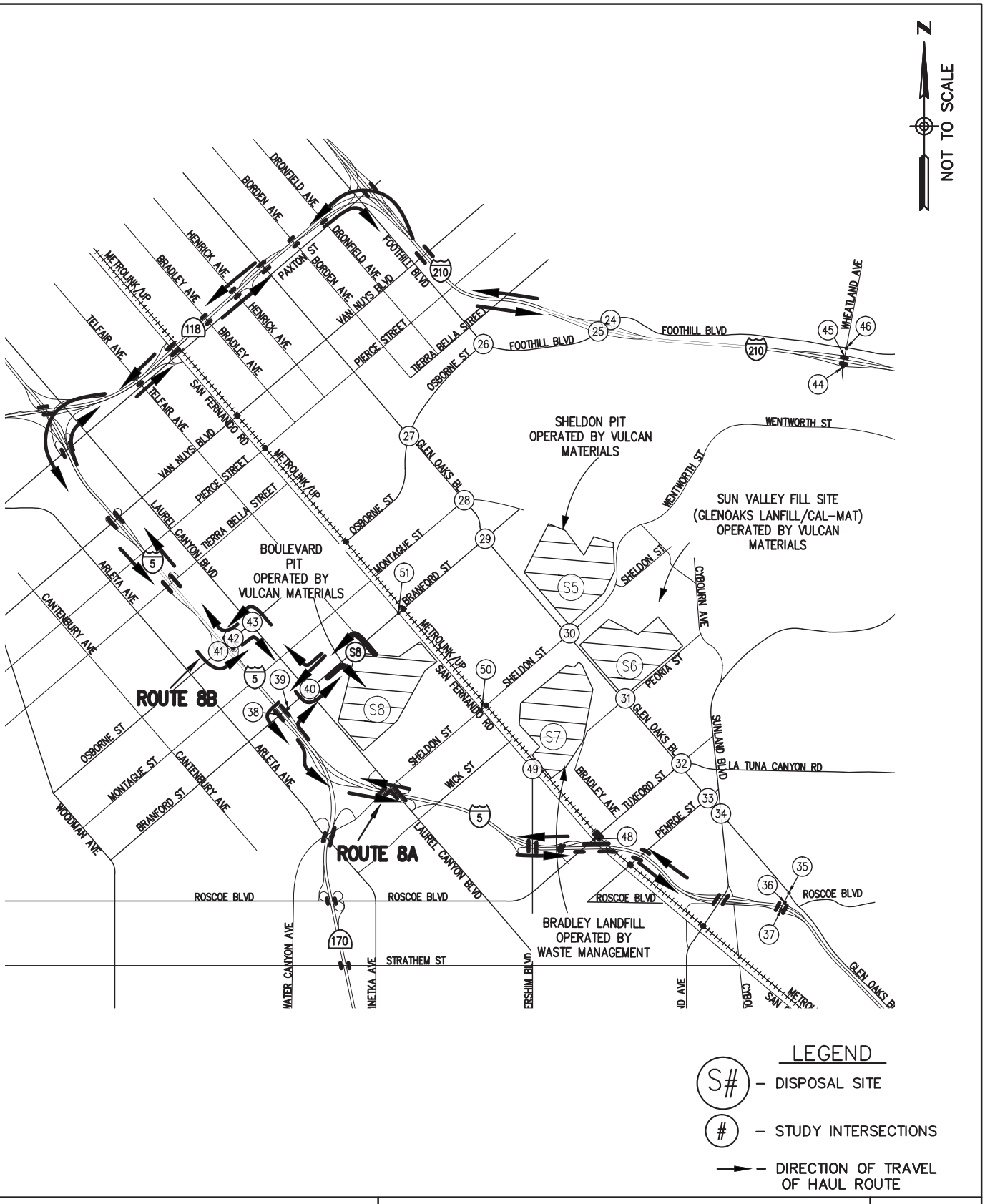
Boulevard Pit Area

23.	Haul Route 8A	-Exit the NB I-5 Fwy at Branford Street. -Turn right onto EB Branford Street. -Enter and exit the disposal site on Branford Street. -Turn left onto WB Branford Street. -Enter the SB I-5 Fwy at Branford Street.
24.	Haul Route 8B	-Exit the SB I-5 Fwy at Osborne Street. -Turn left onto EB Osborne Street. -Turn right onto SB Laurel Canyon Blvd. -Turn left onto EB Branford Street. -Enter and exit the disposal site on Branford Street. -Turn left onto WB Branford Street. -Turn right onto NB Laurel Canyon Blvd. -Turn left onto WB Osborne Street. -Enter the NB I-5 Fwy at Osborne Street.
25.	Haul Route 8C	-Exit the WB I-210 Fwy at the Wheatland Ave interchange. -Turn right onto NB Wheatland Ave then right onto EB Foothill Blvd. -Turn right onto Wentworth Street. -Turn left onto Glenoaks Blvd. -Turn right onto Tuxford Street then right onto San Fernando Road. -Turn left onto Branford Street. -Enter and exit the disposal site on Branford Street. -Turn right onto EB Branford Street. -Turn right onto San Fernando Rd then left on to Tuxford Street. -Turn left onto NB Glenoaks Blvd. -Turn right onto EB Sheldon Street. -Turn left onto WB Foothill Blvd then left onto SB Wheatland Ave. -Enter the EB I-210 Fwy at the Wheatland Ave interchange



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HAUL ROUTE 8A/8B

DEVIL'S GATE DAM & RESERVOIR

FIGURE
3-4-8

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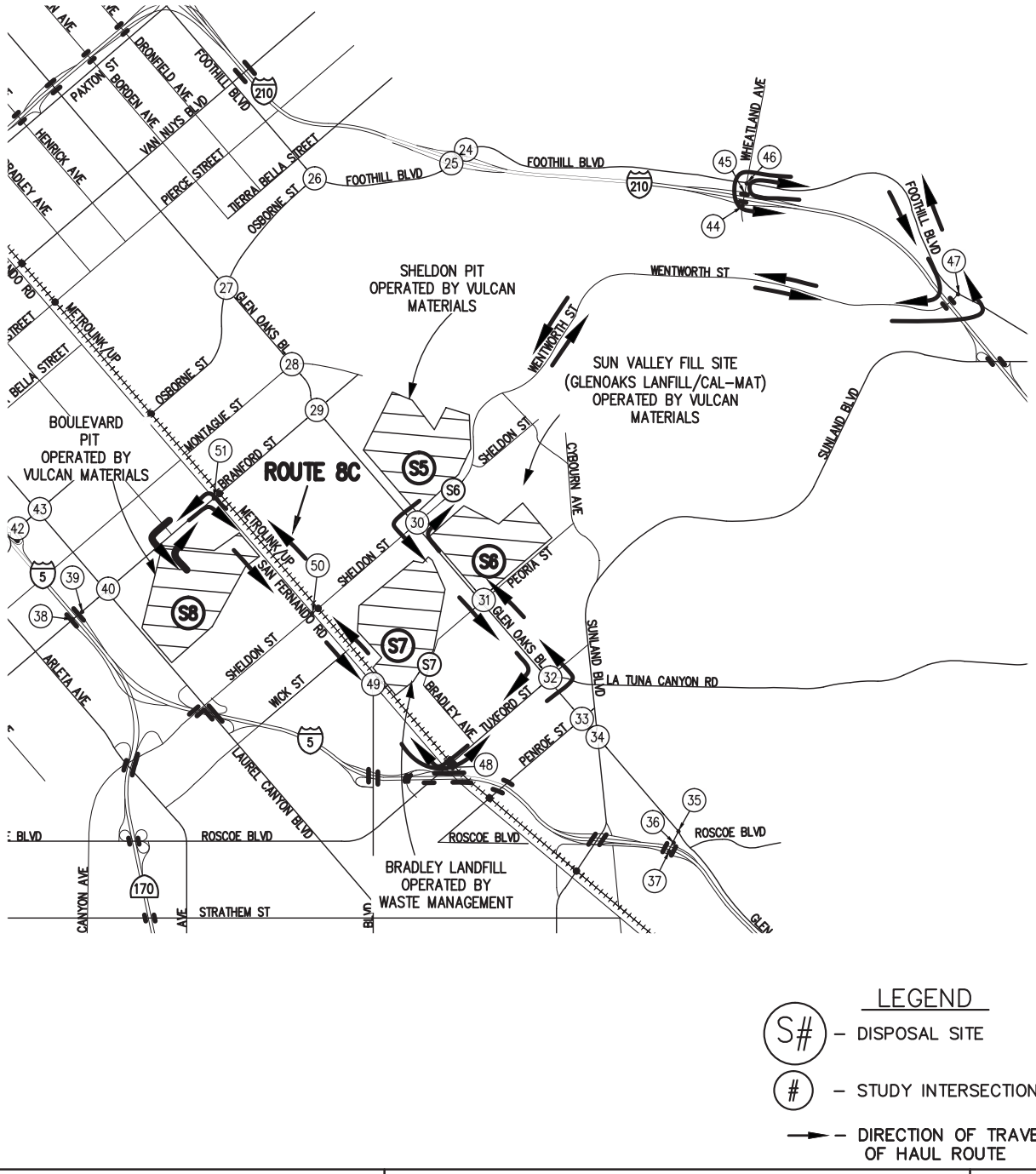

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HAUL ROUTE 8C

DEVIL'S GATE DAM & RESERVOIR

FIGURE
3-4-9

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The proposed haul routes consist of the following roadways:

Local and Major Roadways:

Devil's Gate Dam Area (Site 1)

Oak Grove Drive is a north-south four-lane arterial road with a striped median to the north of the Foothill Freeway Overpass and a raised median to the south. The roadway provides two travel lanes in each direction and a bike lane in each direction. Oak Grove Drive provides direct access to the project site and freeway access from the project site through the intersections of Berkshire Place and Windsor Avenue. On-street parking is not permitted along Oak Grove Drive. Pavement conditions range from fair to poor conditions.

Berkshire Place is a west-east four-lane collector road with two travel lanes in each direction, a bike lane in each direction, and a striped two way left turn lane median. The road provides access to the I-210 Freeway to the residential neighborhoods to the north and west of the project site. On-street parking is not permitted along Berkshire Place. Pavement conditions range from good to fair conditions.

Windsor Avenue is a north-south four lane arterial road with two travel lanes in each direction, one bike lane on the southbound side, and a striped two way left turn lane median. Windsor Avenue provides regional access within the City of Pasadena and access to the I-210 Freeway. On-street parking is not permitted along the west side and some street parking is allowed on the east side of the roadway. Pavement conditions range from good to fair conditions.

Waste Management (Site 2), Manning's Pit (Site 3), and Vulcan Material (Site 9)

Foothill Boulevard is an east-west four lane arterial road with two travel lanes in each direction, and a striped or raised median. Foothill Boulevard (Route 66) generally follows the alignment of the I-210 freeway. Pavement conditions range from good to fair conditions.

Irwindale Avenue is a north-south four lane arterial road with two travel lanes in each direction that has a raised median to the north of First Street and a striped two way left turn lane median between First Street and Gladstone Street. Irwindale Ave provides regional access within the City of Azusa and Irwindale and local access to the I-210 Freeway and I-10 Freeway. On-street parking is generally permitted on both sides of the roadway between First Street and Gladstone Street. Pavement conditions range from good to fair conditions.

Gladstone Street is a west-east four lane collector street with two travel lanes in each direction and a striped two way left turn lane median. Gladstone Street provides regional access within the City of Azusa and access to the I-210 Freeway. On-street parking is permitted along some segments of the roadway, but these areas are not adjacent. Pavement conditions range from good to fair conditions.

Vincent Avenue is a north-south four lane collector road with two travel lanes in each direction and a striped two way left turn lane median along certain sections of the roadway. Vincent Ave provides regional access within the City of Azusa and Irwindale. On-street parking is generally permitted along the west side of the roadway and prohibited on the east side. Pavement conditions range from fair to poor conditions.

Arrow Highway is a west-east four lane arterial highway with two travel lanes in each direction and a striped two way left turn lane median. Arrow Highway serves as an alternative to the I-210 Freeway by providing access from the San Bernardino, Rancho Cucamonga, and San Dimas areas to the City of Azusa, Covina, and Irwindale. It also provides regional access within the City of Azusa, Covina, and Irwindale as well as access to the I-605 and SR-57 Freeways. On-street parking is generally permitted along both sides of the roadway. Pavement conditions range from good to fair conditions.

Azusa Avenue (SR-39) is a north-south divided four lane arterial highway with two travel lanes in each direction and a raised median. Azusa Avenue (SR-39) provides access from the City of Azusa and Covina to Orange County. It also provides regional access to the I-210 Freeway and I-10 Freeway. On-street parking is generally permitted along some segments of the roadway. Pavement conditions range from good to fair conditions.

First Street is a west-east four lane collector road with two travel lanes in each direction with a striped median. It provides regional access within the City of Azusa and access to the westbound I-210 Freeway. On-street parking is generally prohibited along both sides of the roadway. Pavement conditions range from good to fair conditions.

Scholl Canyon Landfill Area (Site 4)

Figueroa Street is a north-south four lane arterial road with two travel lanes in each direction and a striped median. It provides access from the City of Los Angeles to the Eagle Rock area. It also provides regional access to the SR-134 Freeway. On-street parking is generally permitted along the west side of the roadway and prohibited on the east side. Pavement conditions range from fair to poor conditions.

Scholl Canyon Road is a west-east two lane collector road with one travel lane in each direction and a striped median. Scholl Canyon Road provides access to the Scholl Canyon Landfill. On-street parking is generally permitted along both sides of the roadway. Pavement conditions are poor.

Boulevard, Bradley, Sun Valley Fill Site & Sheldon Pits/Landfill (Sites 5-8)

Foothill Blvd is a north-south four lane arterial road with two travel lanes in each direction, a striped bike lane in each direction, and a striped two way left turn lane median. It provides access from La Cañada Flintridge area to the San Fernando Valley area. It also provides regional access to the I-210 Freeway. On-street parking is generally prohibited along both sides of the roadway. Pavement conditions range from good to fair conditions.

Osborne Street is a west-east four lane collector road with two travel lanes in each direction and a striped two way left turn lane median. Osborne Street provides local access to the I-210 Freeway and I-5 Freeway. On-street parking is generally permitted along both sides of the roadway. Pavement conditions range from good to fair conditions.

Branford Street is a west-east collector road with four lanes in some sections and three lanes in other sections and a striped two way left turn lane median. Branford Street provides access to the I-5 Freeway. Pavement conditions range from good to fair conditions.

Glenoaks Blvd is a north-south four lane arterial road with two travel lanes in each direction, a striped bike lane in each direction, and a striped two way left turn lane median. It provides access from the City of San Fernando to the City of Los Angeles and Burbank. It also provides regional access to the SR-118 and I-5 Freeways. On-street parking is generally permitted along both sides of the roadway. Pavement conditions range from fair to poor conditions.

Sheldon Street is west-east four lane arterial road with two travel lanes in each direction, a striped bike lane in each direction, and a two way left turn lane. Sheldon Street provides local access to the I-5 Freeway and the Sun Valley Fill Site and Sheldon Pits. On-street parking is generally prohibited along both sides of the roadway. Pavement conditions range from good to fair conditions.

Laurel Canyon Blvd is a north-south four lane arterial road with two travel lanes in each direction and a striped two way left turn lane median. It provides access from the City of San Fernando to the City of Los Angeles. It also provides regional access to the SR-118 and I-5 Freeways. On-street parking is generally permitted along both sides of the roadway. Pavement conditions range from good to fair conditions.

San Fernando Road is a north-south four lane arterial road with two travel lanes in each direction and a striped two way left turn lane median. It provides access from the City of San Fernando to the City of Los Angeles and Burbank. It also provides regional access to the SR-118 and I-5 Freeways. On-street parking is generally permitted along the west side of the roadway and prohibited on the east side of the roadway. Pavement conditions range from good to fair conditions.

Wheatland Avenue is north-south two lane collector road with one travel lane in each direction and a striped median. Wheatland Avenue provides the Sunland community access to the I-210 Freeway. On-street parking is generally allowed along both sides of the roadway. Pavement conditions range from fair to poor conditions.

Wentworth Street is west-east four lane arterial road with two travel lanes in each direction, a striped bike lane in each direction, and a two way left turn lane. Wentworth Street provides local access to the Sunland area. On-street parking is generally prohibited along both sides of the roadway. Pavement conditions range from good to fair conditions.

Tuxford Street is west-east four lane collector road with two travel lanes in each direction and a two way left turn lane. Tuxford Street provides local access to the I-5 Freeway. On-street parking is generally allowed along both sides of the roadway. Pavement conditions range from good to fair conditions.

Peoria Street is west-east two lane local road with one travel lanes in each direction. Peoria Street provides access Bradley Landfill. On-street parking is generally allowed along the both sides of the roadway. Pavement conditions range from fair to poor conditions.

Existing Intersections

Based on our review of the proposed truck trips and distribution of the truck trips, we recommended that fifty-two (52) intersections in the study area be analyzed:

1.) Berkshire Place and I-210 Freeway Eastbound Ramps (La Cañada Flintridge/Caltrans)
2.) Berkshire Place and I-210 Freeway Westbound Ramps (La Cañada Flintridge/Caltrans)
3.) Oak Grove Drive and Berkshire Place (Pasadena)
4.) Oak Grove Drive and Foothill Freeway Overpass (La Cañada Flintridge)
5.) Windsor Ave and Oak Grove Drive/Woodbury Rd (Altadena/Los Angeles County)
6.) Windsor Ave/Arroyo Blvd and I-210 Freeway Westbound Ramps (Los Angeles County /Caltrans)
7.) Windsor Ave/Arroyo Blvd and I-210 Freeway Eastbound Ramps (Pasadena/Caltrans)
8.) Irwindale Ave and I-210 Freeway Westbound Ramps (Caltrans, Irwindale)
9.) Irwindale Ave and I-210 Freeway Eastbound Ramps (Caltrans, Irwindale)
10.) Irwindale Ave and First Street (Irwindale/Azusa)
11.) Irwindale Ave and Gladstone Street (Irwindale/Azusa)
12.) Vincent Ave and Gladstone Street (Azusa)
13.) Vincent Ave and Arrow Hwy (Irwindale/Azusa/Los Angeles County)
14.) Arrow Hwy and Lark Ellen Ave (County of Los Angeles)
15.) Arrow Hwy and Enid Ave (County of Los Angeles)
16.) Azusa Ave and Arrow Hwy (Azusa/Covina/Los Angeles County)
17.) Azusa Ave and Gladstone Street (Azusa/Los Angeles County)
18.) Azusa Ave and I-210 Freeway Eastbound Ramps (Caltrans/ Azusa)
19.) Azusa Ave and First Street (Azusa)
20.) First Street and Alameda Street/I-210 Freeway Westbound Ramps (Caltrans, Azusa)
21.) Figueroa St/Scholl Canyon Road and SR-134 Freeway Westbound Ramps (City of Los Angeles, Caltrans)
22.) Figueroa St and Eagle Vista Drive (City of Los Angeles)
23.) Figueroa St and SR-134 Freeway Eastbound Ramps (City of Los Angeles, Caltrans)
24.) Foothill Blvd and I-210 Westbound Ramps (City of Los Angeles, Caltrans)
25.) Foothill Blvd and I-210 Eastbound Ramps (City of Los Angeles, Caltrans)
26.) Foothill Blvd and Osborne Street (City of Los Angeles)
27.) Glenoaks Blvd and Osborne Street (City of Los Angeles)
28.) Glenoaks Blvd and Montague Street (City of Los Angeles)
29.) Glenoaks Blvd and Branford Street (City of Los Angeles)
30.) Glenoaks Blvd and Sheldon Street (City of Los Angeles)
31.) Glenoaks Blvd and Peoria Street (City of Los Angeles)
32.) Glenoaks Blvd and Tuxford Street (City of Los Angeles)
33.) Glenoaks Blvd and Penroe Street (City of Los Angeles)
34.) Glenoaks Blvd and Sunland Blvd (City of Los Angeles)
35.) Glenoaks Blvd and Roscoe Blvd (City of Los Angeles)
36.) Roscoe Blvd and I-5 Freeway Northbound Ramps (City of Los Angeles/Caltrans)
37.) Roscoe Blvd and I-5 Freeway Southbound Ramps (City of Los Angeles/Caltrans)
38.) Branford Street and I-5 Freeway Southbound Ramps (City of Los Angeles/Caltrans)
39.) Branford Street and I-5 Freeway Northbound Ramps (City of Los Angeles/Caltrans)
40.) Branford Street and Laurel Canyon Blvd (City of Los Angeles)
41.) Osborne Street and I-5 Freeway Southbound Ramps (City of Los Angeles/Caltrans)
42.) Osborne Street and I-5 Freeway Northbound Ramps (City of Los Angeles/Caltrans)

43.) Osborne Street and Laurel Canyon Blvd (City of Los Angeles)
44.) Wheatland Ave and I-210 Freeway Eastbound Ramps (City of Los Angeles/Caltrans)
45.) Wheatland Ave and I-210 Freeway Westbound Ramps (City of Los Angeles/Caltrans)
46.) Wheatland Ave and Foothill Blvd (City of Los Angeles)
47.) Wentworth Street and Foothill Blvd (City of Los Angeles)
48.) Tuxford Street and San Fernando Road (City of Los Angeles)
49.) Lankershim Blvd and San Fernando Road (City of Los Angeles)
50.) Sheldon Street and San Fernando Road (City of Los Angeles)
51.) Branford Street and San Fernando Road (City of Los Angeles)
52.) Irwindale Avenue and Foothill Boulevard (City of Irwindale)

Freeway Facilities

Interstate 210 Freeway provides regional access within the study area and runs west to east to the east of the SR-134 Freeway interchange and runs north to south to the north of the SR-134 Freeway interchange. To the east of the SR-134 Freeway interchange the I-210 Freeway is an eight-lane freeway with four lanes in each direction and one car pool lane in each direction. To the north of the SR-134 Freeway interchange the I-210 Freeway becomes an eight-lane freeway with four lanes in each direction. This freeway is an interstate facility that provides travel between the San Bernardino, Rancho Cucamonga, and San Dimas areas to the Pasadena and San Fernando areas.

Interstate 5 Freeway provides regional access within the study area and runs north to south connecting Southern California to Northern California. The I-5 Freeway is an eight-lane freeway with four lanes in each direction. This freeway is an interstate facility that provides travel between Los Angeles to Orange and San Diego County and between Los Angeles to Bakersfield, Sacramento, and San Francisco.

State Route 134 Freeway provides regional access within the study area and runs west to east from the I-210 Freeway interchange to the US-101 and SR-170 Freeway interchange in Hollywood. The SR-134 Freeway is an eight-lane freeway with four lanes in each direction and one car pool lane in each direction. This freeway is a state facility that provides travel between the Ventura, Hollywood, and Burbank areas to the Pasadena, San Dimas, and San Bernardino areas.

State Route 2 Freeway provides regional access within the study area and runs north to south from south of the I-5 Freeway interchange in Los Angeles to the I-210 Freeway interchange in La Cañada Flintridge. The SR-2 Freeway is an eight-lane freeway with four lanes in each direction. This freeway is a state facility that provides travel between the La Cañada Flintridge and Glendale areas to the Los Angeles and Hollywood areas.

State Route 118 Freeway provides regional access within the study area and runs north to south from south of the I-5 Freeway interchange to the I-210 Freeway interchange within Los Angeles. The SR-118 Freeway is an eight-lane freeway with four lanes in each direction. This freeway is a state facility that provides travel with Los Angeles.

Existing Freeway and Ramps System

The proposed haul routes must utilize freeway segments along the I-210 Freeway, SR-134 Freeway, SR-2 Freeway, I-5 Freeway, and SR-118 freeway as well as several on and off-ramps. An increase in truck traffic along the freeway and ramps can impact the LOS of the freeway and ramps adversely. In order to ensure adequate freeway and ramp operations this study has identified 28 freeway segments and 54 on and off-ramps for analysis. The 28 freeway segments identified for analysis consist of the following:

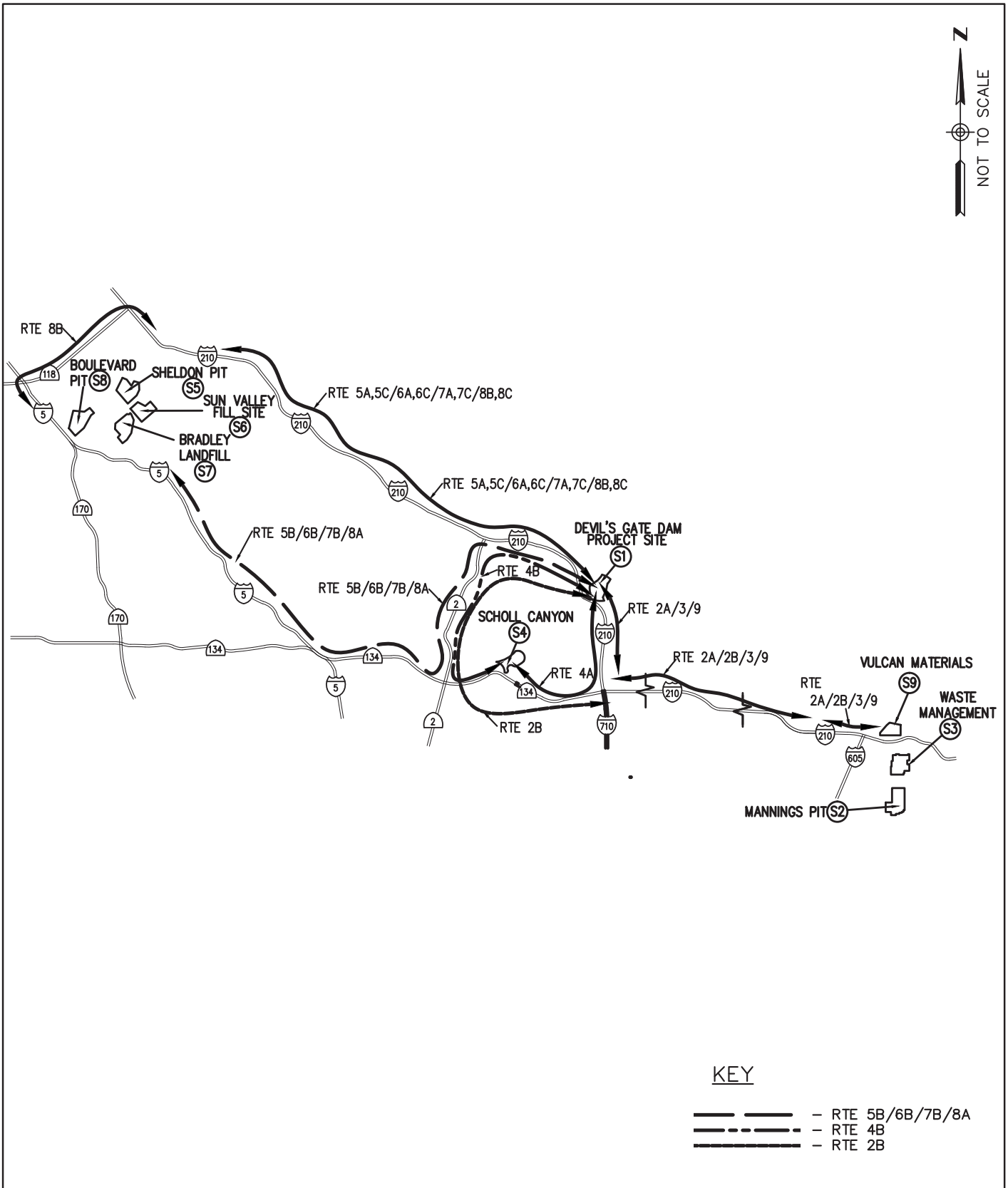
1.) I-210 Freeway between Windsor Ave/Arroyo Blvd and Berkshire Place.
2.) I-210 Freeway between Lincoln Ave and Windsor Ave/Arroyo Blvd.
3.) I-210 Freeway between the SR-134 Freeway and Mountain Street.
4.) SR-134 Freeway between San Rafael Ave and Figueroa Street.
5.) SR-134 Freeway between the I-210 Freeway and San Rafael Ave.
6.) I-210 Freeway between the SR-134 Freeway and Lake Ave.
7.) I-210 Freeway between the I-605 Freeway and Irwindale Ave.
8.) I-210 Freeway between Irwindale Ave and Azusa Ave.
9.) I-210 Freeway between Berkshire Place and Foothill Blvd.
10.) I-210 Freeway between Angeles Crest Hwy and the SR-2 Freeway (Glendale Freeway)
11.) SR-2 Freeway between the I-210 Freeway and Mountain Street.
12.) SR-2 Freeway between Mountain Street and the SR-134 Freeway.
13.) SR-134 Freeway between the SR-2 Freeway and Figueroa Street.
14.) SR-134 Freeway between the SR-2 Freeway and Glendale Ave.
15.) SR-134 Freeway between the Pacific Ave and Concord Street.
16.) SR-134 Freeway between Concord Street and the I-5 Freeway.
17.) I-5 Freeway between the SR-134 Freeway and Western Ave.
18.) I-5 Freeway between North Hollywood Way and Roscoe Blvd/Glenoaks Blvd.
19.) I-5 Freeway between Sheldon Street/Laurel Canyon Blvd and the SR-170 Freeway.
20.) I-5 Freeway between the SR-170 Freeway and Branford Street.
21.) I-210 Freeway between the SR-2 Freeway and Montrose Ave.
22.) I-210 Freeway between Sunland Blvd and Wheatland Ave
23.) I-210 Freeway between Wheatland Ave and Foothill Blvd/Osborne Street.
24.) I-210 Freeway between Foothill Blvd/Osborne Street and the SR-118 Freeway.
25.) SR-118 Freeway between the I-210 Freeway and Glenoaks Blvd.
26.) SR-118 Freeway between San Fernando Rd and the I-5 Freeway.
27.) I-5 Freeway between the SR-118 Freeway and Van Nuys Blvd.
28.) I-5 Freeway between Tierra Bella Street and Osborne Street.

The 54 on and off-ramps on-ramps and off-ramps identified for analysis consists of the following:

1.) Berkshire Place and the Eastbound I-210 Freeway Off-ramp. *(Diverge Point)*
2.) Berkshire Place and the Westbound I-210 Freeway On-ramp.*(Merge Point)*
3.) Berkshire Place and the Eastbound I-210 Freeway On-ramp. *(Merge Point)*
4.) Berkshire Place and the Westbound I-210 Freeway Off-ramp. *(Diverge Point)*
5.) Windsor Ave/Arroyo Blvd and the Eastbound I-210 Freeway Off-ramp. *(Diverge Point)*
6.) Windsor Ave/Arroyo Blvd and the Westbound I-210 Freeway On-Ramp. *(Merge Point)*
7.) Windsor Ave/Arroyo Blvd and the Eastbound I-210 Freeway On-Ramp. *(Merge Point)*
8.) Windsor Ave/Arroyo Blvd and the Westbound I-210 Freeway Off-ramp. *(Diverge Point)*

9.) Southbound I-210 Freeway Transition Ramp to the Westbound SR-134 Freeway mainline and Eastbound I-210 Freeway mainline. *(Diverge Point)*
10.) Westbound I-210 Freeway and Eastbound SR-134 Freeway Transition Ramp to the Northbound I-210 Freeway mainline. *(Merge Point)*
11.) Southbound I-210 Freeway Transition Ramp to the Westbound SR-134 Freeway mainline. *(Merge Point)*
12.) Eastbound SR-134 Freeway Transition Ramp to the Northbound I-210 Freeway mainline. *(Diverge Point)*
13.) Figueroa St/Scholl Canyon Road and the Westbound SR-134 Freeway Off-ramp. *(Diverge Point)*
14.) Figueroa St and the Eastbound SR-134 Freeway Eastbound On-ramp. *(Merge Point)*
15.) Southbound I-210 Freeway Transition Ramp to the Eastbound I-210 Freeway mainline. *(Merge Point)*
16.) Westbound I-210 Freeway Transition Ramp to the Northbound I-210 Freeway mainline. *(Diverge Point)*
17.) Irwindale Ave and the Eastbound I-210 Freeway Off-ramp. *(Diverge Point)*
18.) Irwindale Ave and the Westbound loop I-210 Freeway On-ramp. *(Merge Point)*
19.) First Street/Alameda Street and the Westbound I-210 Freeway On-ramp. *(Merge Point)*
20.) Westbound I-210 Freeway Transition Ramp to the Southbound SR-2 Freeway mainline. *(Diverge Point)*
21.) Northbound SR-2 Freeway Transition Ramp to the Eastbound I-210 Freeway mainline. *(Merge Point)*
22.) Westbound I-210 Freeway Transition Ramp to the Southbound SR-2 Freeway mainline. *(Merge Point)*
23.) Northbound SR-2 Freeway Transition Ramp to the Eastbound I-210 Freeway mainline. *(Diverge Point)*
24.) Southbound SR-2 Freeway Transition Ramp to the Eastbound SR-134 Freeway mainline. *(Diverge Point)*
25.) Westbound and Eastbound SR-134 Freeway Transition Ramp to the Northbound SR-2 Freeway mainline. *(Merge Point)*
26.) Southbound SR-2 Freeway Transition Ramp to the Eastbound SR-134 Freeway mainline. *(Merge Point)*
27.) Westbound SR-134 Freeway Transition Ramp to the Northbound SR-2 Freeway mainline. *(Diverge Point)*
28.) Figueroa Street and the Eastbound SR-134 Freeway Off-ramp. *(Diverge Point)*
29.) Figueroa Street and the Westbound SR-134 Freeway On-ramp. *(Merge Point)*
30.) Southbound SR-2 Freeway Transition Ramp to the Westbound SR-134 Freeway mainline. *(Merge Point)*
31.) Eastbound SR-134 Freeway Transition Ramp to the Northbound SR-2 Freeway mainline. *(Diverge Point)*
32.) Westbound SR-134 Freeway Transition Ramp to the Northbound I-5 Freeway mainline. *(Diverge Point)*
33.) Southbound I-5 Freeway Transition Ramp to the Eastbound SR-134 Freeway mainline. *(Merge Point)*
34.) Westbound SR-134 Freeway Transition Ramp to the Northbound I-5 Freeway mainline. *(Merge Point)*
35.) Southbound I-5 Freeway Transition Ramp to the Eastbound SR-134 Freeway mainline. *(Diverge Point)*

36.) Roscoe Blvd/Glenoaks Blvd and the Northbound I-5 Freeway mainline Off-ramp. *(Diverge Point)*
37.) Roscoe Blvd/Glenoaks Blvd and the Southbound I-5 Freeway mainline On-ramp. *(Merge Point)*
38.) Branford Street and the Southbound I-5 Freeway mainline On-ramp. *(Merge Point)*
39.) Branford Street and the Northbound I-5 Freeway mainline Off-ramp. *(Diverge Point)*
40.) Wheatland Ave and the Westbound I-210 Freeway mainline Off-ramp. *(Diverge Point)*
41.) Wheatland Avenue and the Eastbound I-210 Freeway mainline On-ramp. *(Merge Point)*
42.) Foothill Blvd/Osborne Street and the Westbound I-210 Freeway mainline Off-ramp. *(Diverge Point)*
43.) Foothill Blvd/Osborne Street and the Eastbound I-210 Freeway mainline On-ramp. *(Merge Point)*
44.) Westbound I-210 Freeway Transition Ramp to the Westbound SR-118 Freeway mainline. *(Diverge Point)*
45.) Eastbound SR-118 Freeway Transition Ramp to the Eastbound I-210 Freeway mainline. *(Merge Point)*
46.) Westbound I-210 Freeway Transition Ramp to the Westbound SR-118 Freeway mainline. *(Merge Point)*
47.) Eastbound SR-118 Freeway Transition Ramp to the Eastbound I-210 Freeway mainline. *(Diverge Point)*
48.) Westbound SR-118 Freeway Transition Ramp to the Southbound I-5 Freeway mainline. *(Diverge Point)*
49.) Northbound I-5 Freeway Transition Ramp to the Eastbound SR-118 Freeway mainline. *(Merge Point)*
50.) Westbound SR-118 Freeway Transition Ramp to the Southbound I-5 Freeway mainline. *(Merge Point)*
51.) Northbound I-5 Freeway Transition Ramp to the Eastbound SR-118 Freeway mainline *(Diverge Point)*
52.) Osborne Street and the Southbound I-5 Freeway mainline Off-ramp. *(Diverge Point)*
53.) Osborne Street and the Northbound I-5 Freeway mainline On-ramp. *(Merge Point)*
54.) Irwindale Ave and the Westbound I-210 Freeway On-ramp. *(Merge Point)*



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FREEWAY SYSTEM

DEVIL'S GATE DAM & RESERVOIR

FIGURE
3-5-1

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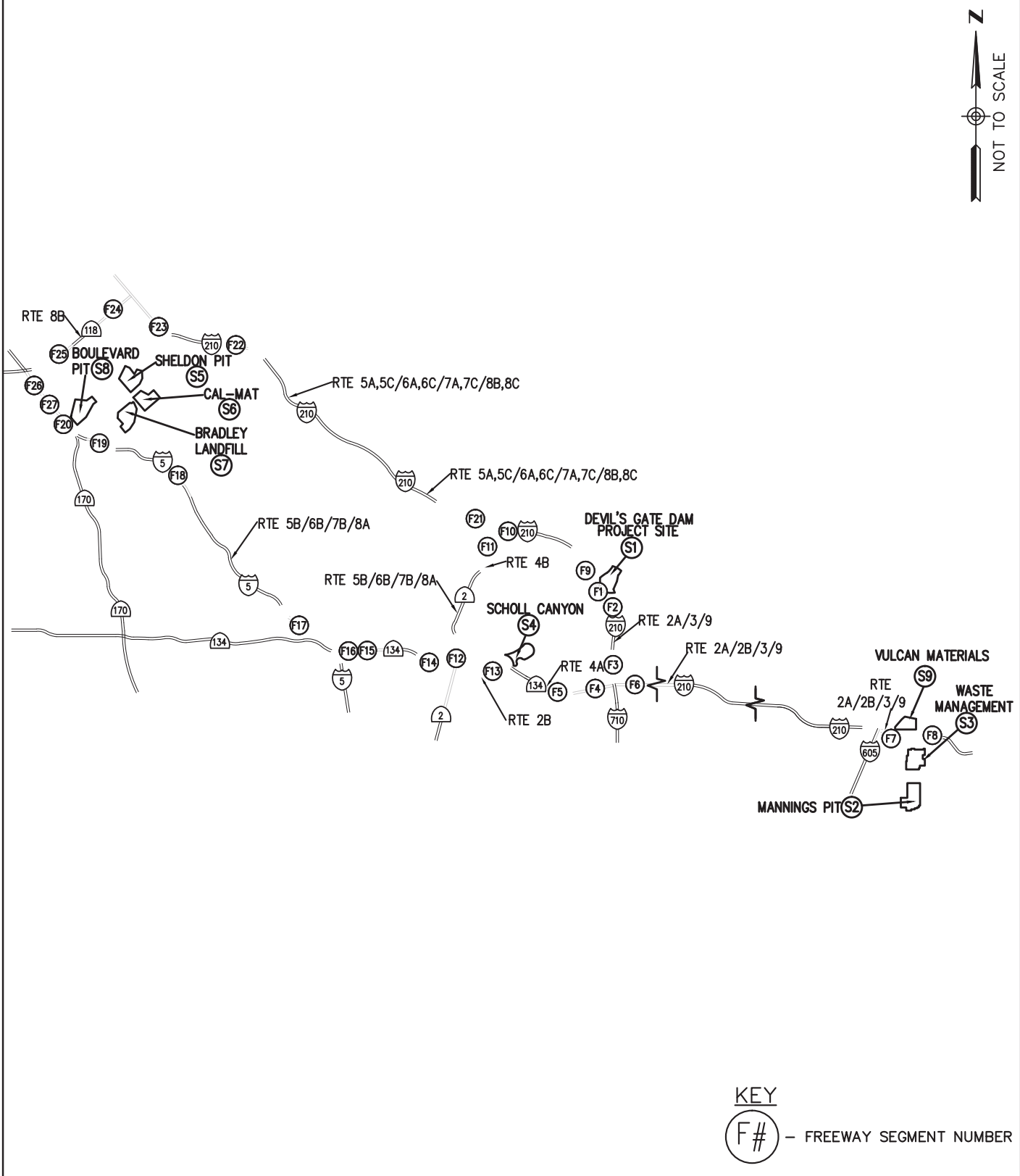

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LOCATION OF FREEWAY SEGMENTS

DEVIL'S GATE DAM & RESERVOIR

FIGURE 3-5-2

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FREEWAY SEGMENTS 1, 2, AND 9

DEVIL'S GATE DAM & RESERVOIR

FIGURE 3-5-3

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 3\Ch. 3 Section 5\FIG 3-5-3.dwg
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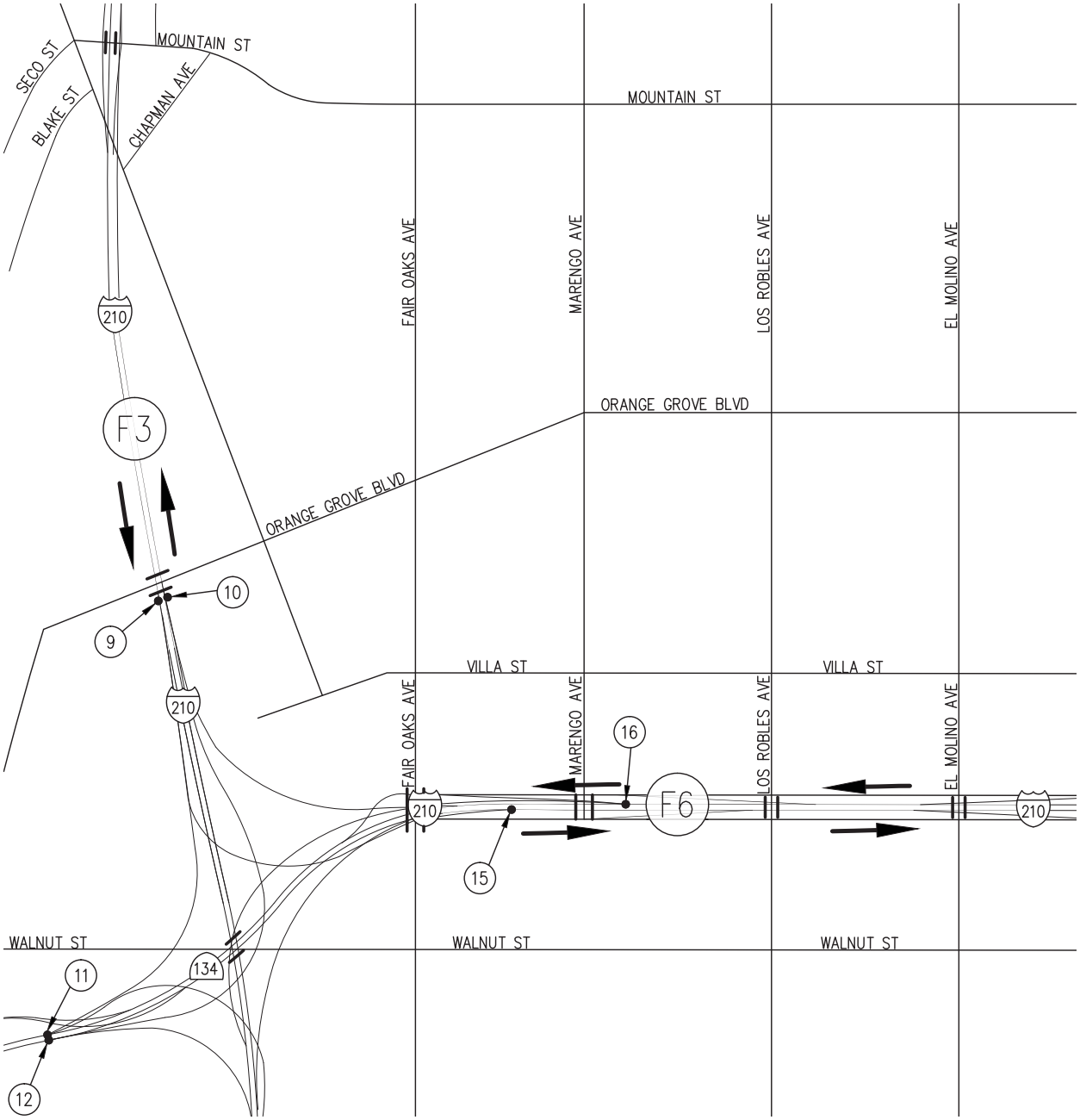

KEY

F# – FREEWAY SEGMENT NUMBER

– RAMPS WITH ENTERING OR EXITING TRUCKS TO BE ANALYZED

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FREEWAY SEGMENTS 3 AND 6

DEVIL'S GATE DAM & RESERVOIR

FIGURE 3-5-4

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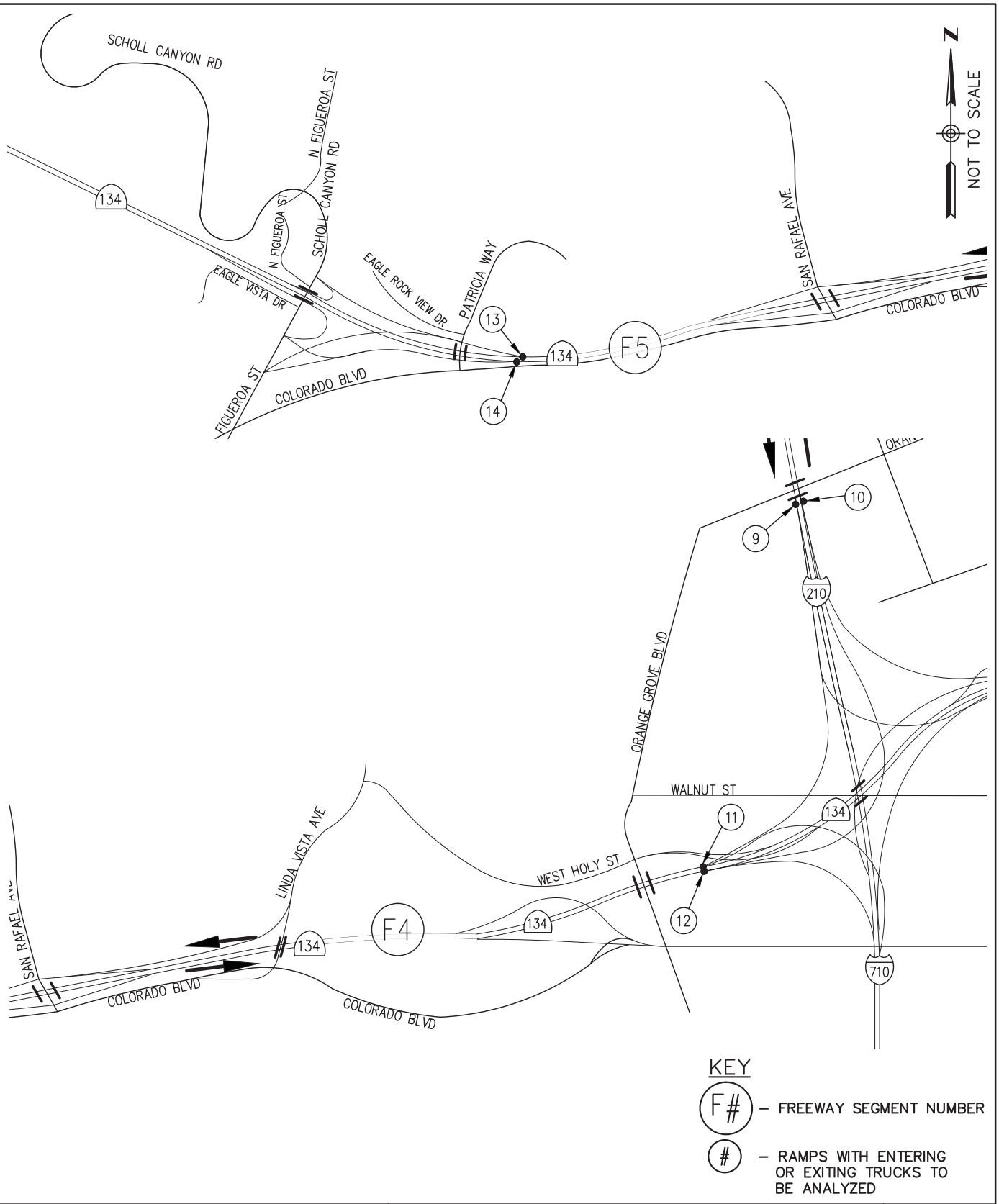

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FREEWAY SEGMENTS 4 AND 5

DEVIL'S GATE DAM & RESERVOIR

FIGURE 3-5-5

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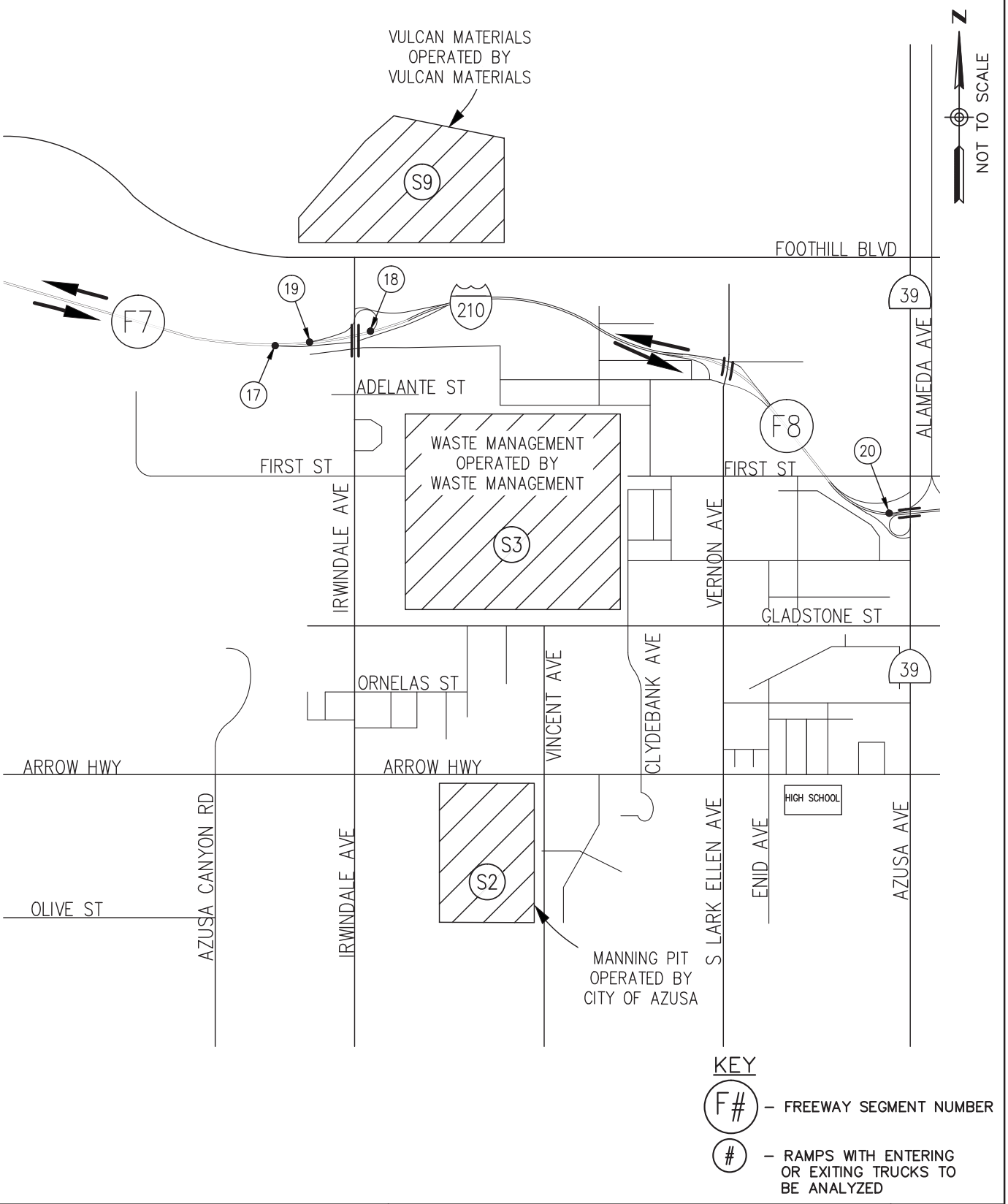

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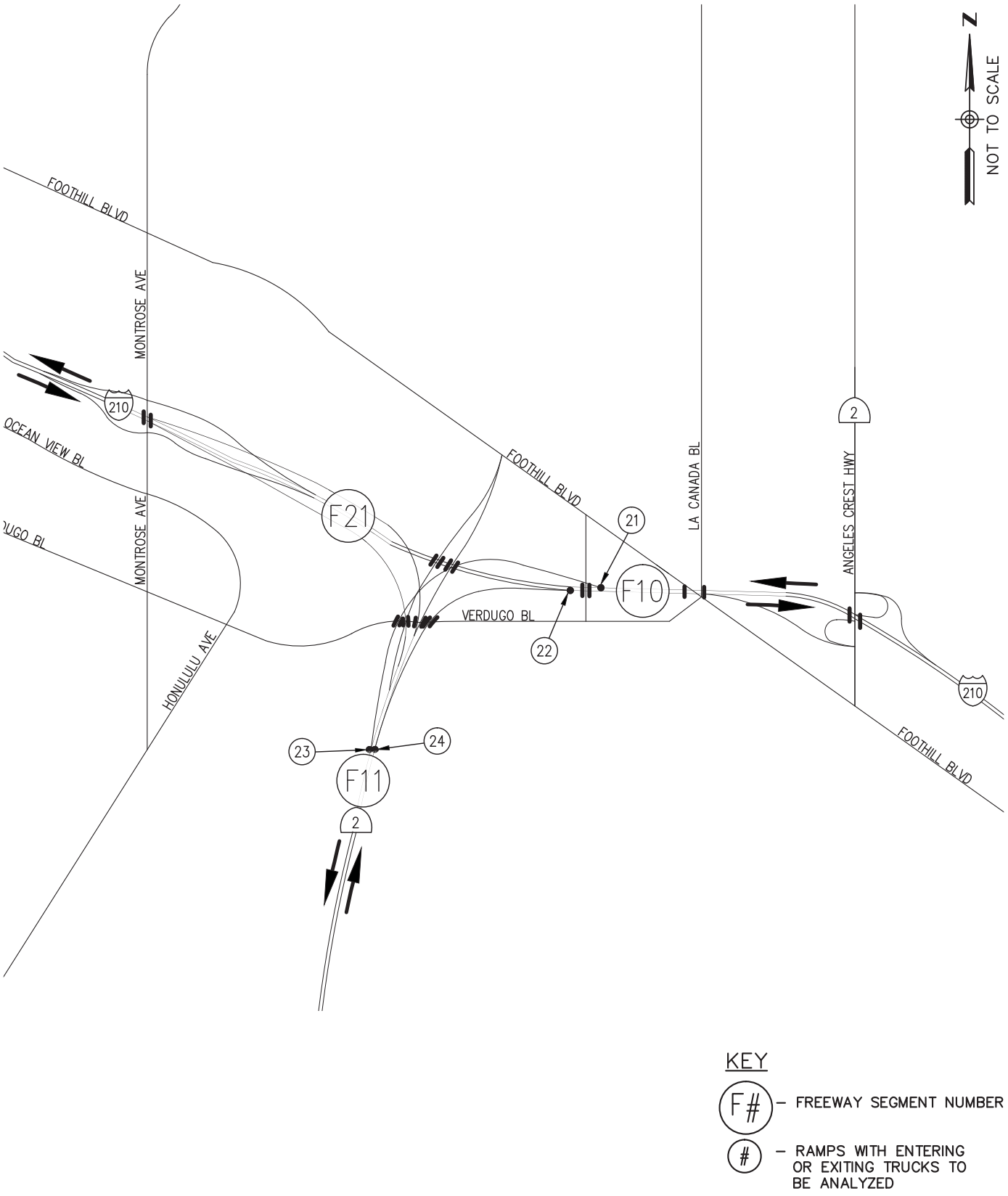
FREEWAY SEGMENTS 7, AND 8

DEVIL'S GATE DAM & RESERVOIR

FIGURE
3-5-6

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 3\Ch. 3 Section 5\FIG 3-5-6.dwg
Last Opened: Oct 03, 2013 - 12:03pm by: TMunoz



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FREEWAY SEGMENTS 10, 11, AND 21

DEVIL'S GATE DAM & RESERVOIR

FIGURE
3-5-7

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 3\Ch. 3 Section 5\FIG 3-5-7.dwg
Last Opened: Oct 03, 2013 - 12:03pm by: TMunoz

KEY

F# – FREEWAY SEGMENT NUMBER

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FREEWAY SEGMENTS 12 AND 14

DEVIL'S GATE DAM & RESERVOIR

FIGURE 3-5-8

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 3\Ch. 3 Section 5\FIG 3-5-8.dwg
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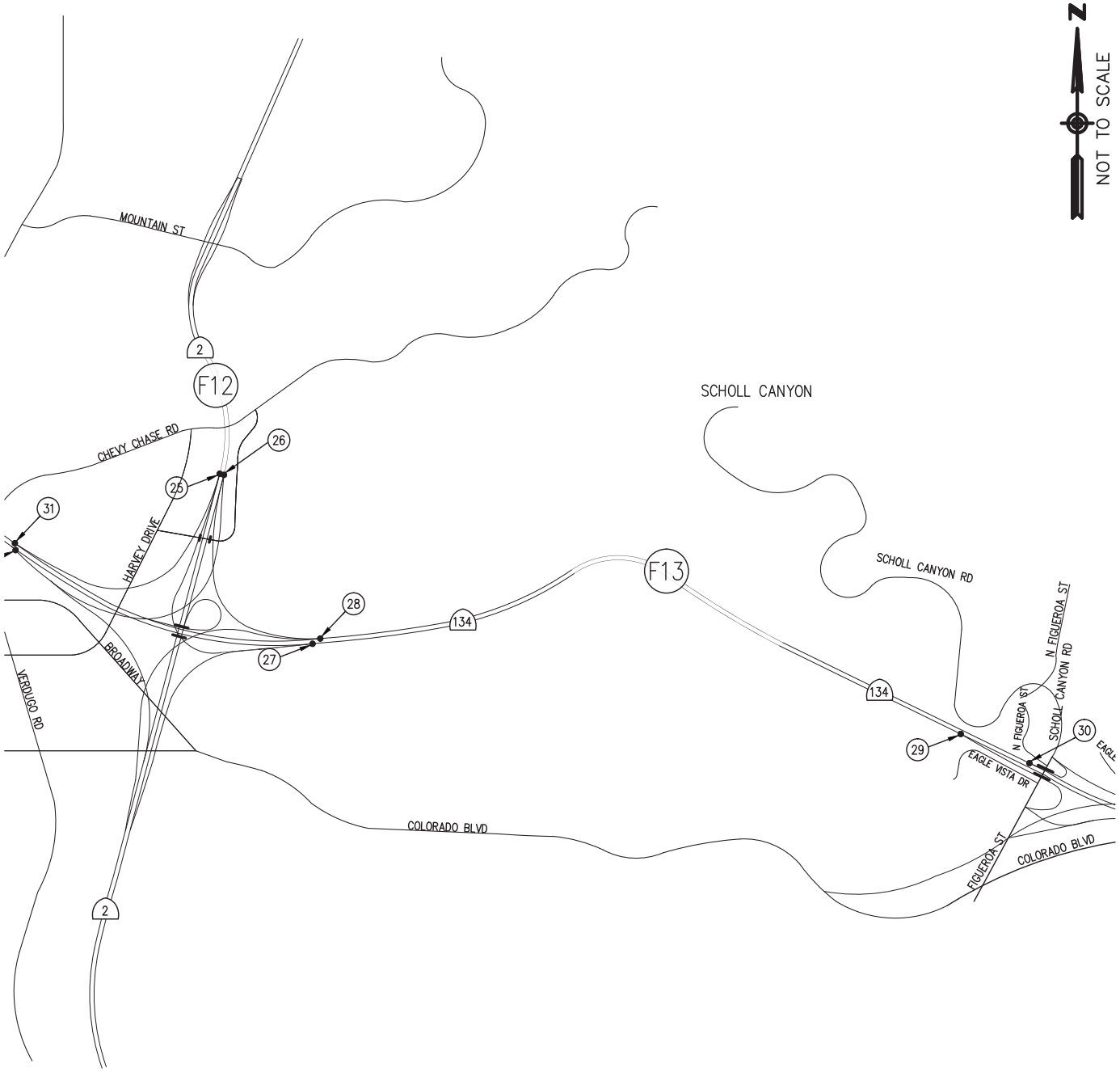

KEY

F# – FREEWAY SEGMENT NUMBER

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FREEWAY SEGMENTS 12 AND 13

DEVIL'S GATE DAM & RESERVOIR

FIGURE 3-5-9

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 3\Ch. 3 Section 5\FIG 3-5-9.dwg
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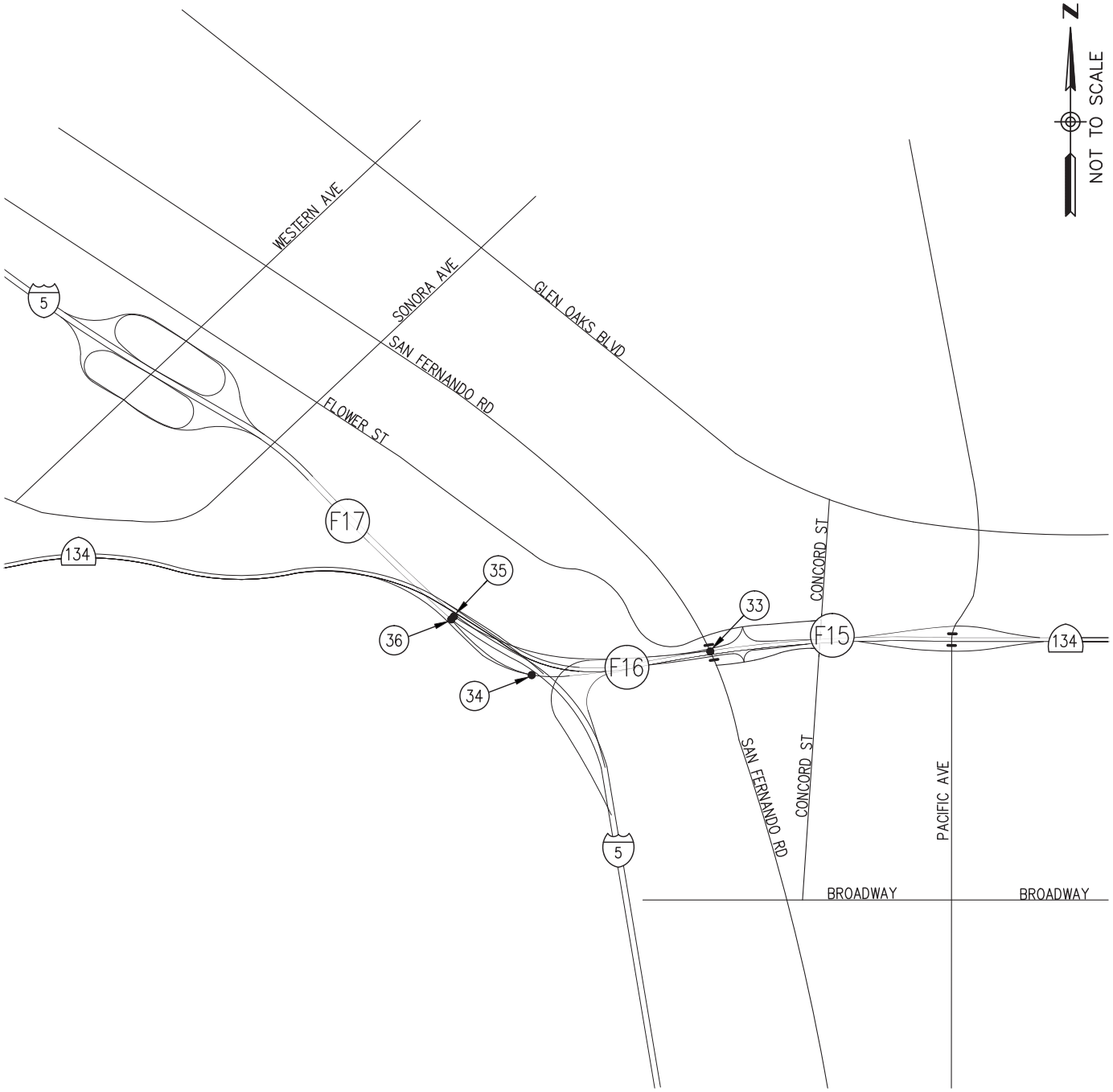

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FREEWAY SEGMENTS 15, 16, AND 17

DEVIL'S GATE DAM & RESERVOIR

FIGURE
3-5-10

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 3\Ch. 3 Section 5\FIG 3-5-10.dwg
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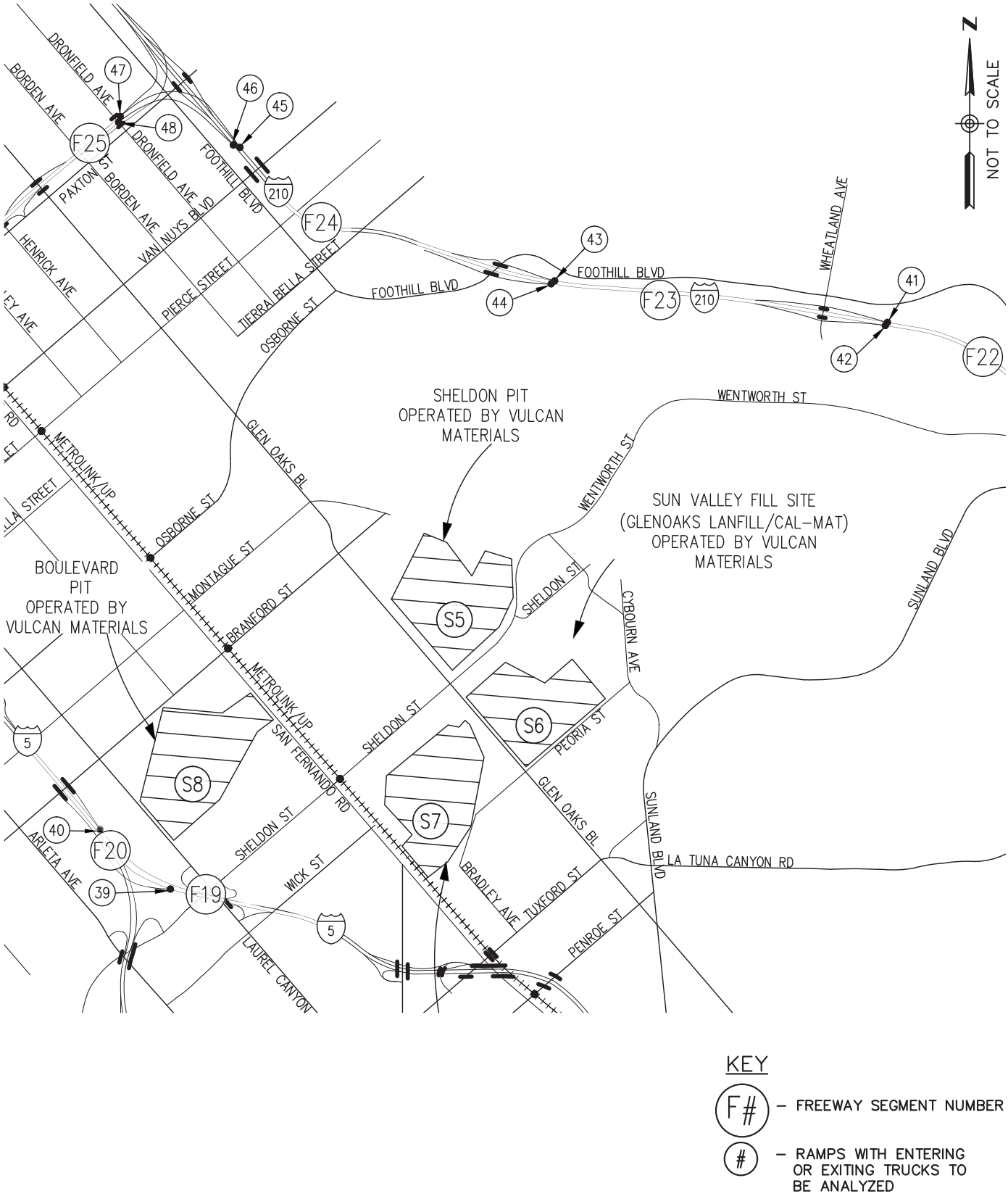

KEY

F# – FREEWAY SEGMENT NUMBER

(#) – RAMPS WITH ENTERING OR EXITING TRUCKS TO BE ANALYZED

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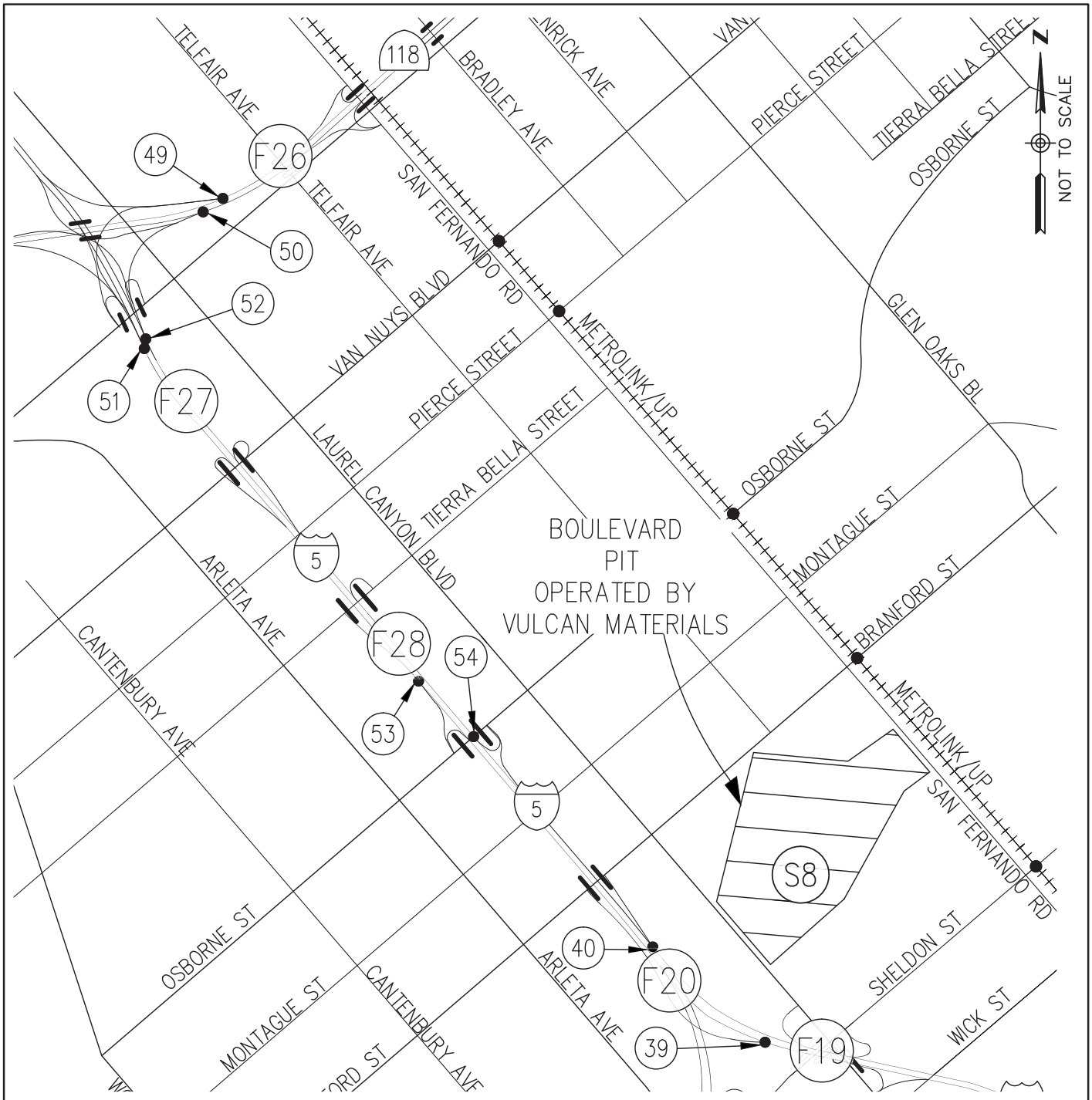
FREEWAY SEGMENTS 19, 20, 22, 23, 24, AND 25

DEVIL'S GATE DAM & RESERVOIR

FIGURE 3-5-11

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 3\Ch. 3 Section 5\FIG 3-5-11.dwg
Last Opened: Oct 03, 2013 - 12:03pm by: TMunoz



KEY

F# – FREEWAY SEGMENT NUMBER

(#) – RAMPS WITH ENTERING OR EXITING TRUCKS TO BE ANALYZED

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FREEWAY SEGMENTS 19, 20, 26, 27, AND 28

DEVIL'S GATE DAM & RESERVOIR

FIGURE 3-5-12

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 3\Ch. 3 Section 5\FIG 3-5-12.dwg
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Existing Traffic Analysis

Capacity analyses for the existing conditions were conducted utilizing the methods discussed in Chapter 2 for the twenty-five (25) proposed haul routes. Within those 25 haul routes 51 intersections, 28 freeway segments, and 53 on and off-ramps were analyzed.

Existing Intersection Level of Service
The intersection LOS is presented in Chapter 3 of Appendix A in the Tables 3-1-1 through 3-4-12, Sites 1 through Site 9. The LOS of both the HCM and ICU methods are presented. The capacity analysis worksheets are provided in Appendix B.

Existing Freeway Mainline HCM Analysis
The freeway mainline LOS is presented in Chapter 3 of Appendix A in the Table 3-5-1. The capacity analysis worksheets are provided in Appendix C.

Existing Freeway Ramp HCM Analysis
The freeway ramp LOS is presented in Chapter 3 of Appendix A in the Table 3-5-2. The capacity analysis worksheets are provided in Appendix D.

Existing plus Project Traffic Analysis

Capacity analyses for the existing plus project were conducted utilizing the methods discussed in Chapter 2 for the twenty-five (25) proposed haul routes.

Existing plus Project Intersection Level of Service
The intersection LOS is presented in Chapter 4 of Appendix A in the Tables 4-1-1 through 4-4-12. The capacity analysis worksheets are provided in Appendix B.

Existing plus Project Freeway Mainline HCM Analysis
The freeway mainline LOS is presented in Chapter 4 of Appendix A in the Table 4-5-1. The capacity analysis worksheets are provided in Appendix C.

Existing plus Project Freeway Ramp HCM Analysis
The freeway ramp LOS is presented in Chapter 4 of Appendix A in the Table 4-5-2. The capacity analysis worksheets are provided in Appendix D.

4. PROJECT CONDITIONS - YEAR 2014

Project Trip Generation

The sediment removal process is expected to generate 50 truck trips per hour. The expected increase of truck trips can result in an increase of traffic delay at the intersections along the truck haul routes. The intersections along the haul routes were analyzed to determine the impact the truck trips will have on the intersection operations. Employee trips to the site are also taken into account and are estimated.

Table 4 summarizes the estimated trucks trip generation for the project site during the AM and PM peak periods. It is recommended that *Table 4* be used as the trip generation for this project.

Table 4
Project Trip Generation
Traffic Scope – Devil's Gate Dam & Reservoir

			A.M. Peak Hour			Mid-Day Peak Hour			P.M. Peak Hour		
	Use	Daily	In	Out	Total	In	Out	Total	In	Out	Total
1	**Employees**										
		17	2	2	4	2	2	4	2	2	4
2	**Trucks**										
	Truck Trips	425	50	50	100	50	50	100	50	50	100
	PCE Adjustment		125	150	275	125	150	275	125	150	275
	Total	442	52	52	104	52	52	104	52	52	104
	Total Adjusted (w PCE)		127	152	279	127	152	279	127	152	279

Project Trip Growth

The Devil's Gate Dam and Reservoir Area included the cumulative projects in the cities of La Cañada Flintridge, Pasadena, Pacoima, and peak road. The NASA Jet Propulsion Laboratory (JPL) On-Site Parking Structure project was included for the study area within the City of La Cañada Flintridge. The Rose Bowl National Football League (NFL) Stadium designation project was included for the study area within the City of Pasadena.

The Manning's Pit and Waste Management deposit sites included cumulative projects in the cities of Azusa and Irwindale. The cumulative projects included for the study area within the cities of Azusa and Irwindale include the Azusa Material Recovery Facility and Waste Transfer Station project and the Gold Line Station project.

For the project conditions at the Year 2014, vehicular growth is expected to occur. An annual increase factor of 4.5% totaling 9% for 2 years is incorporated to the report to account for any construction improvements and cumulative projects expected to occur in the surrounding area up to Project Year 2014. The cumulative projects included in the growth factor are specific to deposit site. The report accounts for this growth and incorporated into the calculations. This helps to identify major problematic areas of improvements.

Project Traffic Analysis

Capacity analyses for the project conditions were conducted for the twenty-six (26) proposed haul routes. Within those 26 haul routes 52 intersections, 28 freeway segments, and 54 on and off-ramps were analyzed. The resulting LOS for the project conditions Year 2014 of each haul route analyzed are presented in Tables 4-1-1 thru 4-4-3. The intersection capacity analysis worksheets are provided in Appendix B. The freeway mainline capacity analysis worksheets are provided in Appendix C. The freeway ramp capacity analysis worksheets are provided in Appendix D.

TABLE 4-1-1: Haul Route 1A-Route 1H Year 2014: AM Peak Hour

	Intersections							Freeway Segments						Ramps								Route Total
	1	2	3	4	5	6	7	1	2	3	4	9		1	2	3	4	5	6	7	8	
	Berkshire Place & I-210 Freeway Eastbound Ramps	Berkshire Place & I-210 Freeway Westbound Ramps	Oak Grove Drive and Berkshire Place	Oak Grove Drive and Foothill Freeway Overpass	Windsor Ave and Oak Grove Drive/Woodbury Rd	Windsor Ave/Arroyo Blvd and I-210 Freeway Westbound Ramps	Windsor Ave/Arroyo Blvd and I-210 Freeway Eastbound Ramps	1	2	3	4	17	18	Berkshire Place and the Eastbound I-210 Freeway Off-ramp. *(Diverge Point)*	Berkshire Place and the Westbound I-210 Freeway On-ramp.*(Merge Point)*	Berkshire Place and the Westbound I-210 Freeway Off-ramp. *(Diverge Point)*	Berkshire Place and the Eastbound I-210 Freeway On-ramp. *(Merge Point)*	Windsor Ave/Arroyo Blvd and the Eastbound I-210 Freeway Off-ramp. *(Diverge Point)*	Windsor Ave/Arroyo Blvd and the Westbound I-210 Freeway On-Ramp. *(Merge Point)*	Windsor Ave/Arroyo Blvd and the Eastbound I-210 Freeway On-Ramp. *(Merge Point)*	Windsor Ave/Arroyo Blvd and the Westbound I-210 Freeway Off-ramp. *(Diverge Point)*	
Route 1A	x	x	x					x	x							x	x					
HCM LOS	F	B	C					B	C							C	C					
HCM Delay	51.4	13.1	26.6					13.3	21.4							27.7	23.7					217
HCM V/C	-	-	0.97																			
ICU LOS	-	-	B																			
Length (ft)	360	640	1,110					3,800	4,030							960	1,120					13,770
Grade (%)								1.5	-1.5													
Route 1B				x	x	x	x			x	x									x	x	
HCM LOS				C	C	B	C			B	C									B	B	
HCM Delay				21.0	34.6	10.8	23.7			15.7	23.8									19.1	11.1	226
HCM V/C				-	0.94	0.68	0.39															
ICU LOS				-	D	B	A															
Length (ft)				940	2,300	520	340			2,550	2,540									1,270	1,335	15,555
Grade (%)										1.7	-1.7											
Route 1C		x	x	x	x	x	x	x			x					x				x		
HCM LOS		B	B	C	C	B	C	B			C					C				B		
HCM Delay		13.1	10.9	18.1	29	10.2	23.7	13.3			23.8					27.7				19.1		189
HCM V/C		-	0.68	-	0.95	0.65	0.39															
ICU LOS		-	A	-	D	B	A															
Length (ft)		640	1,110	940	2,300	520	340	3,800			2,540					960				1,270		14,420
Grade (%)								1.5			-1.7											
Route 1D	x	x	x	x	x	x			x	x							x				x	
HCM LOS	F	A	B	C	C	B			C	B							C				B	
HCM Delay	51.4	9.5	19.2	19.2	34.7	10.4			21.4	15.7							23.7				11.1	216
HCM V/C	-	-	0.93	-	0.94	0.66																
ICU LOS	-	-	B	-	D	B																
Length (ft)	360	640	1,110	940	2,300	520			4,030	2,550							1,120				1,335	14,905
Grade (%)									-1.5	1.7												
Route 1E	x	x	x									x	x	x	x							
HCM LOS	E	B	C									B	C	C	B							
HCM Delay	48.2	11.0	26.6									15.3	24.4	20.3	14.9							198
HCM V/C	-	-	0.97																			
ICU LOS	-	-	B																			
Length (ft)	360	640	1,110									2,250	1,680	1,500	960							10,250
Grade (%)												1.8	-1.8									
Route 1F				x	x	x	x	x	x									x	x			
HCM LOS				C	C	A	C	B	C									D	C			
HCM Delay				21	34.6	9.9	28.6	13.3	21.4									23.7	33.4			251
HCM V/C				-	0.94	0.62	0.57															
ICU LOS				-	D	B	A															
Length (ft)				940	2,300	520	340	3,650	3,930									1,140	2,000			18,580
Grade (%)								1.5	-1.5													
Route 1G	x	x	x	x	x	x		x					x	x					x			
HCM LOS	E	A	B	C	C	A		B					C	C					C			
HCM Delay	48.2	4.7	10.9	18.1	29	9.6		13.3					24.4	20.3					33.4			212
HCM V/C	-	-	0.68	-	0.95	0.61																
ICU LOS	-	-	A	-	D	B																
Length (ft)	360	640	1,110	940	2,300	520		3,650					1680	1500					2,000			14,700
Grade (%)								1.5					-1.8									
Route 1H		x	x	x	x	x	x		x			x			x			x				
HCM LOS		B	B	C	C	A	C		C			B			B			D				
HCM Delay		10.4	19.2	19.2	34.7	9.7	28.6		21.4			15			14.9			23.7				197
HCM V/C		-	0.93	-	0.94	0.61	0.57															
ICU LOS		-	B	-	D	B	A															
Length (ft)		640	1,110	940	2,300	520	340		3,930			2,250			960			1,140				14,130
Grade (%)									-1.5			1.8										

TABLE 4-1-2: Haul Route 1A-Route 1H Year 2014: MID-DAY (12-2) Peak Hour

	Intersections							Freeway Segments						Ramps								Route Total
	1	2	3	4	5	6	7	1	2	1	2	9		1	2	3	4	5	6	7	8	
	Berkshire Place & I-210 Freeway Eastbound Ramps	Berkshire Place & I-210 Freeway Westbound Ramps	Oak Grove Drive and Berkshire Place	Oak Grove Drive and Foothill Freeway Overpass	Windsor Ave and Oak Grove Drive/Woodbury Rd	Windsor Ave/Arroyo Blvd and I-210 Freeway Westbound Ramps	Windsor Ave/Arroyo Blvd and I-210 Freeway Eastbound Ramps	1	2	3	4	17	18	Berkshire Place and the Eastbound I-210 Freeway Off-ramp. *(Diverge Point)*	Berkshire Place and the Westbound I-210 Freeway On-ramp.*(Merge Point)*	Berkshire Place and the Westbound I-210 Freeway Off-ramp. *(Diverge Point)*	Berkshire Place and the Eastbound I-210 Freeway On-ramp. *(Merge Point)*	Windsor Ave/Arroyo Blvd and the Eastbound I-210 Freeway Off-ramp. *(Diverge Point)*	Windsor Ave/Arroyo Blvd and the Westbound I-210 Freeway On-Ramp. *(Merge Point)*	Windsor Ave/Arroyo Blvd and the Eastbound I-210 Freeway On-Ramp. *(Merge Point)*	Windsor Ave/Arroyo Blvd and the Westbound I-210 Freeway Off-ramp. *(Diverge Point)*	
Route 1A	x	x	x					x	x							x	x					
HCM LOS	B	A	A					A	B							C	C					
HCM Delay	10.8	7.0	6.2					9.9	14.9							20.6	22.7					105
HCM V/C	-	-	0.30																			
ICU LOS	-	-	A																			
Length (ft)	360	640	1,110					3,800	4,030							960	1,120					13,770
Grade (%)								1.5	-1.5													
Route 1B				x	x	x	x			x	x									x	x	
HCM LOS				A	B	A	C			B	B									B	A	
HCM Delay				9.9	14.4	6.8	30.9			15.5	14.5									11.8	5.2	140
HCM V/C				-	0.59	0.37	0.42															
ICU LOS				-	A	A	A															
Length (ft)				940	2,300	520	340			2,550	2,540									1,270	1,335	15,555
Grade (%)										1.7	-1.7											
Route 1C		x	x	x	x	x	x	x			x					x				x		
HCM LOS		A	A	A	B	A	C	A			B					C				B		
HCM Delay		6.9	6.1	9.4	14.5	5.7	30.9	9.9			14.5					20.6				11.8		130
HCM V/C		-	0.22	-	0.53	0.33	0.42															
ICU LOS		-	A	-	A	A	A															
Length (ft)		640	1,110	940	2,300	520	340	3,800			2,540					960				1,270		14,420
Grade (%)								1.5			-1.7											
Route 1D	x	x	x	x	x	x			x	x							x				x	
HCM LOS	B	A	A	A	B	A			B	B							C				A	
HCM Delay	10.8	4.9	5.6	9.6	14.3	6			14.9	15.5							22.7				5.2	110
HCM V/C	-	-	0.29	-	0.54	0.31																
ICU LOS	-	-	A	-	A	A																
Length (ft)	360	640	1,110	940	2,300	520			4,030	2,550							1,120				1,335	14,905
Grade (%)									-1.5	1.7												
Route 1E	x	x	x									x	x	x	x							
HCM LOS	B	A	A									B	B	B	B							
HCM Delay	10.6	4.7	6.2									15.5	14.6	10.5	14.7							88
HCM V/C	-	-	0.30																			
ICU LOS	-	-	A																			
Length (ft)	360	640	1,110									2,250	1,680	1,500	960							10,250
Grade (%)												1.8	-1.8									
Route 1F				x	x	x	x	x	x									x	x			
HCM LOS				A	B	A	B	A	B									C	B			
HCM Delay				9.9	14.4	5.5	16.1	9.9	14.9									23.1	18.2			142
HCM V/C				-	0.59	0.31	0.39															
ICU LOS				-	A	A	A															
Length (ft)				940	2,300	520	340	3,650	3,930									1,140	2,000			18,580
Grade (%)								1.5	-1.5													
Route 1G	x	x	x	x	x	x		x					x	x					x			
HCM LOS	B	A	A	A	B	A		A					B	B					B			
HCM Delay	10.6	6.9	6.1	9.4	14.5	5.6		9.9					14.6	10.5					18.2			106
HCM V/C	-	-	0.22	-	0.53	0.31																
ICU LOS	-	-	A	-	A	A																
Length (ft)	360	640	1,110	940	2,300	520		3,650					1680	1500					2,000			14,700
Grade (%)								1.5					-1.8									
Route 1H		x	x	x	x	x	x		x			x			x			x					
HCM LOS		A	A	A	B	A	B		B			B			B			C					
HCM Delay		4.6	5.6	9.6	14.3	5.7	16.1		14.9			15.5			14.7			23.1					124
HCM V/C		-	0.29	-	0.54	0.37	0.39															
ICU LOS		-	A	-	A	A	A															
Length (ft)		640	1,110	940	2,300	520	340		3,930			2,250			960			1,140					14,130
Grade (%)									-1.5			1.8											

TABLE 4-1-3: Haul Route 1A-Route 1H Year 2014: MID-DAY (2-4) Peak Hour

	Intersections						
	1	2	3	4	5	6	7
	Berkshire Place & I-210 Freeway Eastbound Ramps	Berkshire Place & I-210 Freeway Westbound Ramps	Oak Grove Drive and Berkshire Place	Oak Grove Drive and Foothill Freeway Overpass	Windsor Ave and Oak Grove Drive/Woodbury Rd	Windsor Ave/Arroyo Blvd and I-210 Freeway Westbound Ramps	Windsor Ave/Arroyo Blvd and I-210 Freeway Eastbound Ramps
Route 1A	x	x	x				
HCM LOS	C	A	A				
HCM Delay	23.7	9.3	7.1				
HCM V/C	-	-	0.49				
ICU LOS	-	-	A				
Length (ft)	360	640	1,110				
Grade (%)							
Route 1B				x	x	x	x
HCM LOS				A	B	A	C
HCM Delay				9.8	17.1	6.9	28.4
HCM V/C				-	0.58	0.37	0.42
ICU LOS				-	A	A	A
Length (ft)				940	2,300	520	340
Grade (%)							
Route 1C		x	x	x	x	x	x
HCM LOS		A	A	A	B	A	C
HCM Delay		8.4	8.4	9.6	17.3	6.4	28.4
HCM V/C		-	0.59	-	0.55	0.4	0.42
ICU LOS		-	A	-	A	A	A
Length (ft)		640	1,110	940	2,300	520	340
Grade (%)							
Route 1D	x	x	x	x	x	x	
HCM LOS	C	A	A	A	B	A	
HCM Delay	23.7	7.2	8.4	9.5	17.1	7.3	
HCM V/C	-	-	0.57	-	0.58	0.41	
ICU LOS	-	-	B	-	A	A	
Length (ft)	360	640	1,110	940	2,300	520	
Grade (%)							
Route 1E	x	x	x				
HCM LOS	C	A	A				
HCM Delay	18.9	6.9	7.1				
HCM V/C	-	-	0.49				
ICU LOS	-	-	A				
Length (ft)	360	640	1,110				
Grade (%)							
Route 1F				x	x	x	x
HCM LOS				A	B	A	B
HCM Delay				9.8	17.1	5.6	17.4
HCM V/C				-	0.58	0.27	0.42
ICU LOS				-	A	A	A
Length (ft)				940	2,300	520	340
Grade (%)							
Route 1G	x	x	x	x	x	x	
HCM LOS	C	A	A	A	B	A	
HCM Delay	18.9	6.9	8.4	9.6	17.3	6.3	
HCM V/C	-	-	0.59	-	0.55	0.37	
ICU LOS	-	-	A	-	A	A	
Length (ft)	360	640	1,110	940	2,300	520	
Grade (%)							
Route 1H		x	x	x	x	x	x
HCM LOS		A	A	A	B	A	B
HCM Delay		6.6	8.4	9.5	17.1	6.4	17.4
HCM V/C		-	0.57	-	0.58	0.37	0.42
ICU LOS		-	B	-	A	A	A
Length (ft)		640	1,110	940	2,300	520	340
Grade (%)							

TABLE 4-1-4: Haul Route 1A-Route 1H Year 2014: PM Peak Hour

	Intersections							Freeway Segments						Ramps								Route Total
	1	2	3	4	5	6	7	1	2	3	4	9		1	2	3	4	5	6	7	8	
	Berkshire Place & I-210 Freeway Eastbound Ramps	Berkshire Place & I-210 Freeway Westbound Ramps	Oak Grove Drive and Berkshire Place	Oak Grove Drive and Foothill Freeway Overpass	Windsor Ave and Oak Grove Drive/Woodbury Rd	Windsor Ave/Arroyo Blvd and I-210 Freeway Westbound Ramps	Windsor Ave/Arroyo Blvd and I-210 Freeway Eastbound Ramps	1	2	3	4	17	18	Berkshire Place and the Eastbound I-210 Freeway Off-ramp. *(Diverge Point)*	Berkshire Place and the Westbound I-210 Freeway On-ramp.*(Merge Point)*	Berkshire Place and the Westbound I-210 Freeway Off-ramp. *(Diverge Point)*	Berkshire Place and the Eastbound I-210 Freeway On-ramp. *(Merge Point)*	Windsor Ave/Arroyo Blvd and the Eastbound I-210 Freeway Off-ramp. *(Diverge Point)*	Windsor Ave/Arroyo Blvd and the Westbound I-210 Freeway On-Ramp. *(Merge Point)*	Windsor Ave/Arroyo Blvd and the Eastbound I-210 Freeway On-Ramp. *(Merge Point)*	Windsor Ave/Arroyo Blvd and the Westbound I-210 Freeway Off-ramp. *(Diverge Point)*	
Route 1A	x	x	x					x	x							x	x					
HCM LOS	D	A	A					B	C							C	D					
HCM Delay	31.6	5.6	8.4					16.4	18.1							25.2	31.9					151
HCM V/C	-	-	0.57																			
ICU LOS	-	-	B																			
Length (ft)	360	640	1,110					3,800	4,030							960	1,120					13,770
Grade (%)								1.5	-1.5													
Route 1B				x	x	x	x			x	x									x	x	
HCM LOS				B	C	A	C			C	B									B	B	
HCM Delay				12.0	24.7	8.3	28.5			24.8	17.5									14.2	13.3	188
HCM V/C				-	0.76	0.48	0.62															
ICU LOS				-	C	B	A															
Length (ft)				940	2,300	520	340			2,550	2,540									1,270	1,335	15,555
Grade (%)										1.7	-1.7											
Route 1C		x	x	x	x	x	x	x			x					x				x		
HCM LOS		A	A	B	C	A	C	B			B					C				B		
HCM Delay		5.7	7.1	11.5	24.9	7.6	28.5	16.4			17.5					25.2				14.2		159
HCM V/C		-	0.54	-	0.69	0.45	0.62															
ICU LOS		-	B	-	C	B	A															
Length (ft)		640	1,110	940	2,300	520	340	3,800			2,540					960				1,270		14,420
Grade (%)								1.5			-1.7											
Route 1D	x	x	x	x	x	x			x	x							x				x	
HCM LOS	D	A	A	B	C	A			C	C							D				B	
HCM Delay	31.6	3.8	8	11.3	24.9	8.2			18.1	24.8							31.9				13.3	176
HCM V/C	-	-	0.57	-	0.76	0.45																
ICU LOS	-	-	B	-	C	B																
Length (ft)	360	640	1,110	940	2,300	520			4,030	2,550							1,120				1,335	14,905
Grade (%)									-1.5	1.7												
Route 1E	x	x	x									x	x	x	x							
HCM LOS	C	A	A									C	B	B	C							
HCM Delay	21.8	3.7	8.4									25.4	17.2	14.4	24.1							127
HCM V/C	-	-	0.57																			
ICU LOS	-	-	B																			
Length (ft)	360	640	1,110									2,250	1,680	1,500	960							10,250
Grade (%)												1.8	-1.8									
Route 1F				x	x	x	x	x	x									x	x			
HCM LOS				B	C	A	C	B	C									C	C			
HCM Delay				12	24.7	7.9	26.8	16.4	18.1									28	25.6			204
HCM V/C				-	0.76	0.47	0.63															
ICU LOS				-	C	B	A															
Length (ft)				940	2,300	520	340	3,650	3,930									1,140	2,000			18,580
Grade (%)								1.5	-1.5													
Route 1G	x	x	x	x	x	x		x					x	x					x			
HCM LOS	C	A	A	B	C	A		B					B	B					C			
HCM Delay	21.8	3.7	7.1	11.5	24.9	7.6		16.4					17.2	14.4					25.6			150
HCM V/C	-	-	0.54	-	0.69	0.45																
ICU LOS	-	-	B	-	C	B																
Length (ft)	360	640	1,110	940	2,300	520		3,650					1680	1500					2,000			14,700
Grade (%)								1.5					-1.8									
Route 1H		x	x	x	x	x	x		x			x			x			x				
HCM LOS		A	A	B	C	A	C		C			C			C			C				
HCM Delay		3.5	8	11.3	24.9	7.8	26.8		18.1			25.4			24.1			28				178
HCM V/C		-	0.57	-	0.76	0.44	0.63															
ICU LOS		-	B	-	C	B	A															
Length (ft)		640	1,110	940	2,300	520	340		3,930			2,250			960			1,140				14,130
Grade (%)									-1.5			1.8										

TABLE 4-2-1: Haul Routes 2A,2B,3,9 Year 2014: AM Peak Hour

	Intersections														Freeway Segments																
	8	9	10	11	12	13	14	15	16	17	18	19	20	52	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		
	Irwindale Ave and I-210 Freeway Westbound Ramps	Irwindale Ave and I-210 Freeway Eastbound Ramps	Irwindale Ave and First Street	Irwindale Ave and Gladstone Street	Vincent Ave and Gladstone Street	Vincent Ave and Arrow Hwy	Arrow Hwy and Lark Ellen Ave	Arrow Hwy and Enid Ave	Azusa Ave and Arrow Hwy	Azusa Ave and Gladstone Street	Azusa Ave and I-210 Freeway Eastbound Ramps	Azusa Ave and First Street	First Street and Alameda Street/I-210 Freeway Westbound Ramps	Irwindale Ave and Foothill Blvd.	I-210 WB between Windsor Ave/Arroyo Blvd and Berkshire Place	I-210 EB between Windsor Ave/Arroyo Blvd and Berkshire Place	I-210 WB Freeway between Lincoln Ave and Windsor Ave/Arroyo	I-210 EB Freeway between Lincoln Ave and Windsor Ave/Arroyo	I-210 WB between the SR-134 Fwy and Mountain Street.	I-210 EB between the SR-134 Fwy and Mountain Street.	SR-134 WB between San Rafael Ave and Figueroa Street	SR-134 EB between San Rafael Ave and Figueroa Street	SR-134 WB between the I-210 Fwy and San Rafael Ave.	SR-134 EB between the I-210 Fwy and San Rafael Ave.	I-210 WB between the SR-134 Fwy and Lake Ave.	I-210 EB between the SR-134 Fwy and Lake Ave.	I-210 WB between the I-605 Fwy and Irwindale Avenue.	I-210 EB between the I-605 Fwy and Irwindale Avenue.	I-210 WB between Irwindale Avenue and Azusa Avenue.		
Route 2A	x	x	x	x	x	x											x	x	x	x					x	x	x	x			
HCM LOS	A	C	B	C	B	B											B	C	B	C					E	E	C	B			
HCM Delay	7.1	27.9	10.6	29.9	14.3	17.6											15.7	23.8	15	23.3					39.8	36.3	23.9	17.5			
HCM V/C	0.56	0.93	0.63	0.92	0.80	0.90																									
ICU LOS	A	C	B	D	C	D																									
Length (ft)	420	2,840	2,650	2,660	2,670	370											3,800	3,800	4,600	4,600					7,200	7,200	7,800	6,540			
Grade (%)																	0.4	-0.4	1.3	-1.3					-0.5	0.5	-0.7	0.7			
Route 2B		x	x	x	x	x	x	x	x	x	x	x	x		x						x	x	x	x	x	x	x	x	x		
HCM LOS		C	B	C	B	B	E	D	E	E	B	D	E		B						D	C	D	C	E	E	C	B	C		
HCM Delay		27.9	13.8	31.9	12.6	17.5	61.5	55.0	63.8	61.5	12.1	46.2	69.2		13.3						28.3	18.9	26.9	24.8	39.8	36.3	23.9	17.5	22.2		
HCM V/C		0.93	0.65	0.91	0.74	0.90	0.97	1.35	1.15	1.01	0.71	0.87	1.40																		
ICU LOS		C	B	D	B	D	D	E	D	D	A	D	E																		
Length (ft)		2,840	2,650	2,660	2,670	370	3000	730	2030	2750	1900	800	350		5030						4800	4800	5200	5200	7,200	7,200	7,800	6,540	9100		
Grade (%)															1.5						0.2	-0.2	-0.4	0.4	-0.5	0.5	-0.7	0.7	0		
Route 3	x	x	x	x	x												x	x	x	x					x	x	x	x			
HCM LOS	A	C	B	C	B												B	C	B	C					E	E	C	B			
HCM Delay	7.1	27.9	10.6	29.9	11.7												15.7	23.8	15	23.3					39.8	36.3	23.9	17.5			
HCM V/C	0.56	0.93	0.63	0.92	0.68																										
ICU LOS	A	C	B	D	B																										
Length (ft)	420	2,840	2,650	2,660	2,670												3,800	3,800	4,600	4,600					7,200	7,200	7,800	6,540			
Grade (%)																	0.4	-0.4	1.3	-1.3					-0.5	0.5	-0.7	0.7			
Route 9	x	x												x			x	x	x	x					x	x	x	x			
HCM LOS	A	C												C			B	C	B	C					E	E	C	B			
HCM Delay	7.2	27.9												30			15.7	23.8	15	23.3					39.8	36.3	23.9	17.5			
HCM V/C	0.57	0.9												0.87																	
ICU LOS	A	C												C																	
Length (ft)	420	2840												900			3,800	3,800	4,600	0					7,200	7,200	7,800	6,540			
Grade (%)																	0.4	-0.4	1.3	0.0					-0.5	0.5	-0.7	0.7			

	Freeway Segments											Ramps																		
	9			10		11			12			13																			
	17	18	19	20	21	22	23	24	25	26		9	10	15	16	17	18	19	20	21	22	23	24	25	26	27	28			
	I-210 WB between Berkshire Place and Foothill Blvd.	I-210 EB between Berkshire Place and Foothill Blvd.	I-210 WB between Angeles Crest Hwy (SR-2 Hwy) and the SR-2 Fwy (Glendale Fwy)	I-210 EB between Angeles Crest Hwy (SR-2 Hwy) and the SR-2 Fwy (Glendale Fwy)	SR-2 NB between the I-210 Fwy and Mountain Street.	SR-2 SB between the I-210 Fwy and Mountain St.	SR-2 NB between Mountain St and the SR-134 Fwy.	SR-2 SB between Mountain St and the SR-134 Fwy.	SR-134 WB between the SR-2 Fwy and Figueroa St.	SR-134 EB between the SR-2 Fwy and Figueroa St.		Southbound I-210 Freeway Transition Ramp to the Westbound SR-134 Freeway mainline and Westbound I-210 Freeway and Eastbound SR-134 Freeway Transition Ramp to the Northbound	Southbound I-210 Freeway Transition Ramp to the Eastbound I-210 Freeway mainline. (Merge Point)	Westbound I-210 Freeway Transition Ramp to the Northbound I-210 Freeway mainline. (Diverge Point)	Irwindale Ave and the Eastbound I-210 Freeway Off-ramp. *(Diverge Point)*	Irwindale Ave and the Westbound I-210 Freeway Loop On-ramp. *(Merge Point)*	Irwindale Ave and the Westbound I-210 Freeway Slip On-ramp. *(Merge Point)*	First Street/Alameda Street and the Westbound I-210 Freeway On-ramp. *(Merge Point)*	Westbound I-210 Freeway Transition Ramp to the Southbound SR-2 Freeway mainline. (Diverge Point)	Northbound SR-2 Freeway Transition Ramp to the Eastbound I-210 Freeway mainline. (Merge Point)	Westbound I-210 Freeway Transition Ramp to the Southbound SR-2 Freeway mainline. (Merge Point)	Northbound SR-2 Freeway Transition Ramp to the Eastbound I-210 Freeway mainline. (Diverge Point)	Southbound SR-2 Freeway Transition Ramp to the Eastbound SR-134 Freeway mainline. (Merge Point)	Westbound and Eastbound SR-134 Freeway Transition Ramp to the Northbound SR-2 Freeway mainline. *(Merge Point)*	Southbound SR-2 Freeway Transition Ramp to the Eastbound SR-134 Freeway mainline. (Merge Point)	Westbound SR-134 Freeway Transition Ramp to the Northbound SR-2 Freeway mainline. (Diverge Point)	**Route Total**
Route 2A												x	x	x	x	x	x													
HCM LOS												N/D*	N/D*	N/D*	N/D*	A	C													
HCM Delay												N/D*	N/D*	N/D*	N/D*	0.6	20.5													424.1
HCM V/C																														
ICU LOS																														
Length (ft)																1450	740													70530
Grade (%)																														
Route 2B	x	x	x	x	x	x	x	x	x	x						x			x	x	x	x	x	x	x	x	x			
HCM LOS	B	C	B	N/D*	A	D	N/D*	D	C	C						A			C	A	C	A	B	N/D*	N/D*	N/D*	C			
HCM Delay	15.3	24.4	13.8	N/D*	8.6	27.3	N/D*	30.6	20.4	20.3						0.6			23.9	11	24.3	5.6	18.9	N/D*	N/D*	N/D*	26.7			997
HCM V/C																														
ICU LOS																														
Length (ft)	3200	3200	5300		15500	15500		6600	13000	13000						1450			1150	5700	4000	5700	4000				5000			187,920
Grade (%)	2.3	2.3	0.4		2.7	-2.7		-4	0.4	-0.4																				
Route 3												x	x	x	x	x	x													
HCM LOS												N/D*	N/D*	N/D*	N/D*	A	C													
HCM Delay												N/D*	N/D*	N/D*	N/D*	0.6	20.5													356
HCM V/C																														
ICU LOS																														
Length (ft)																1450	740													66,950
Grade (%)																														
Route 9												x	x	x	x	x		x												
HCM LOS												N/D*	N/D*	N/D*	N/D*	A		C												
HCM Delay												N/D*	N/D*	N/D*	N/D*	0.6		22.6												314
HCM V/C																														
ICU LOS																														
Length (ft)																1450		1300												48,750
Grade (%)																														

N/D*: No Data available from Caltrans

TABLE 4-2-2: Haul Routes 2A,2B,3,9 Year 2014: MID-DAY Peak Hour

	Intersections														Freeway Segments																	
	8	9	10	11	12	13	14	15	16	17	18	19	20	52	1		2		3		4		5				6		7		8	
	Irwindale Ave and I-210 Freeway Westbound Ramps	Irwindale Ave and I-210 Freeway Eastbound Ramps	Irwindale Ave and First Street	Irwindale Ave and Gladstone Street	Vincent Ave and Gladstone Street	Vincent Ave and Arrow Hwy	Arrow Hwy and Lark Ellen Ave	Arrow Hwy and Enid Ave	Azusa Ave and Arrow Hwy	Azusa Ave and Gladstone Street	Azusa Ave and I-210 Freeway Eastbound Ramps	Azusa Ave and First Street	First Street and Alameda Street/I-210 Freeway Westbound Ramps	Irwindale Ave and Foothill Blvd.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
															I-210 WB between Windsor Ave/Arroyo Blvd and Berkshire Place	I-210 EB between Windsor Ave/Arroyo Blvd and Berkshire Place	I-210 WB Freeway between Lincoln Ave and Windsor Ave/Arroyo Blvd.	I-210 EB Freeway between Lincoln Ave and Windsor Ave/Arroyo Blvd.	I-210 WB between the SR-134 Fwy and Mountain Street.	I-210 EB between the SR-134 Fwy and Mountain Street.	SR-134 WB between San Rafael Ave and Figueroa Street	SR-134 EB between San Rafael Ave and Figueroa Street	SR-134 WB between the I-210 Fwy and San Rafael Ave.	SR-134 EB between the I-210 Fwy and San Rafael Ave.	I-210 WB between the SR-134 Fwy and Lake Ave.	I-210 EB between the SR-134 Fwy and Lake Ave.	I-210 WB between the I-605 Fwy and Irwindale Avenue.	I-210 EB between the I-605 Fwy and Irwindale Avenue.	I-210 WB between Irwindale Avenue and Azusa Avenue.	I-210 EB between Irwindale Avenue and Azusa Avenue.
Route 2A	x	x	x	x	x	x											x	x	x	x					x	x	x	x		
HCM LOS	A	C	B	B	A	A											B	B	B	B					E	E	C	B		
HCM Delay	7.4	22.0	14.2	16.0	8.9	9.8											15.5	14.5	12.8	14.4					39.8	36.3	23.9	17.5		
HCM V/C	0.53	0.79	0.65	0.72	0.45	0.45																								
ICU LOS	A	C	B	B	A	A																								
Length (ft)	420	2,840	2,650	2,660	2,670	370											3,800	3,800	4,600	4,600					7,200	7,200	7,800	6,540		
Grade (%)																	0.4	-0.4	1.3	-1.3					-0.5	0.5	-0.7	0.7		
Route 2B		x	x	x	x	x	x	x	x	x	x	x	x		x						x	x	x	x	x	x	x	x	x	
HCM LOS		C	B	B	A	A	D	B	E	D	B	B	B		A						C	B	B	C	D	E	C	B	C	
HCM Delay		22.2	18.5	15.2	8.7	9.8	40.3	12.8	55.4	38.3	11.7	16.3	11.6		9.9						18.1	17.6	17.2	21.4	26.3	38.1	22.8	16.6	21.8	
HCM V/C		0.79	0.65	0.67	0.38	0.45	0.72	0.50	0.96	0.91	0.75	0.57	0.63																	
ICU LOS		C	B	B	A	A	B	A	D	C	A	A	B																	
Length (ft)		2,840	2,650	2,660	2,670	370	3000	730	2030	2750	1900	800	350		5030						4800	4800	5200	5200	7,200	7,200	7,800	6,540	9100	
Grade (%)															1.5						0.2	-0.2	-0.4	0.4	-0.5	0.5	-0.7	0.7	0	
Route 3	x	x	x	x	x												x	x	x	x					x	x	x	x		
HCM LOS	A	C	B	B	A												B	B	B	B					D	E	C	B		
HCM Delay	7.4	22.0	14.2	16.0	8.7												15.5	14.5	12.8	14.4					26.3	38.1	22.8	16.6		
HCM V/C	0.53	0.79	0.65	0.72	0.31																									
ICU LOS	A	C	B	B	A																									
Length (ft)	420	2,840	2,650	2,660	2,670												3,800	3,800	4,600	4,600					7,200	7,200	7,800	6,540		
Grade (%)																	0.4	-0.4	1.3	-1.3					-0.5	0.5	-0.7	0.7		
Route 9	x	x												x			x	x	x	x					x	x	x	x		
HCM LOS	A	C												D			B	C	B	C					E	E	C	B		
HCM Delay	7.5	22.5												46.8			15.7	23.8	15	23.3					39.8	36.3	23.9	17.5		
HCM V/C	0.54	0.8												1.01																
ICU LOS	A	C												D																
Length (ft)	420	2840												900			3,800	3,800	4,600	4,600					7,200	7,200	7,800	6,540		
Grade (%)																	0.4	-0.4	1.3	-1.3					-0.5	0.5	-0.7	0.7		

	Freeway Segments										Ramps															
	9		10		11		12		13																	
	17	18	19	20	21	22	23	24	25	26	9	10	15	16	17	18	18	19	20	21	22	23	24	25	26	27	
	I-210 WB between Berkshire Place and Foothill Blvd.	I-210 EB between Berkshire Place and Foothill Blvd.	I-210 WB between Angeles Crest Hwy (SR-2 Hwy) and the SR-2 Fwy (Glendale Fwy)	I-210 EB between Angeles Crest Hwy (SR-2 Hwy) and the SR-2 Fwy (Glendale Fwy)	SR-2 NB between the I-210 Fwy and Mountain Street.	SR-2 SB between the I-210 Fwy and Mountain St	SR-2 NB between Mountain St and the SR-134 Fwy.	SR-2 SB between Mountain St and the SR-134 Fwy.	SR-134 WB between the SR-2 Fwy and Figueroa St.	SR-134 EB between the SR-2 Fwy and Figueroa St.	Southbound I-210 Freeway Transition Ramp to the Westbound SR-134 Freeway mainline and Westbound I-210 Freeway and Eastbound SR-134 Freeway Transition Ramp to the Northbound	Southbound I-210 Freeway Transition Ramp to the Eastbound I-210 Freeway mainline. (Merge Point)	Westbound I-210 Freeway Transition Ramp to the Northbound I-210 Freeway mainline. (Diverge Point)	Irwindale Ave and the Eastbound I-210 Freeway Off-ramp. *(Diverge Point)*	Irwindale Ave and the Westbound I-210 Freeway On-ramp. *(Merge Point)*	First Street/Alameda Street and the Westbound I-210 Freeway On-ramp. *(Merge Point)*	First Street/Alameda Street and the Westbound I-210 Freeway On-ramp. *(Merge Point)*	Westbound I-210 Freeway Transition Ramp to the Southbound SR-2 Freeway mainline. (Diverge Point)	Northbound SR-2 Freeway Transition Ramp to the Eastbound I-210 Freeway mainline. (Merge Point)	Westbound I-210 Freeway Transition Ramp to the Southbound SR-2 Freeway mainline. (Merge Point)	Northbound SR-2 Freeway Transition Ramp to the Eastbound I-210 Freeway mainline. (Diverge Point)	Southbound SR-2 Freeway Transition Ramp to the Eastbound SR-134 Freeway mainline. (Diverge Point)	Westbound and Eastbound SR-134 Freeway Transition Ramp to the Northbound SR-2 Freeway mainline. *(Merge Point)*	Southbound SR-2 Freeway Transition Ramp to the Eastbound SR-134 Freeway mainline. (Merge Point)	Westbound SR-134 Freeway Transition Ramp to the Northbound SR-2 Freeway mainline. (Diverge Point)	**Route Total**
Route 2A											x	x	x	x	x	x											
HCM LOS											N/D*	N/D*	N/D*	N/D*	A	C											
HCM Delay											N/D*	N/D*	N/D*	N/D*	0.8	23.2											343.3
HCM V/C																											
ICU LOS																											
Length (ft)															1,450	740											70530
Grade (%)																											
Route 2B	x	x	x	x	x	x	x	x	x	x					x			x	x	x	x	x	x	x	x	x	
HCM LOS	B	B	B	N/D*	B	A	N/D*	A	B	C					A			B	A	C	A	B	N/D*	N/D*	N/D*	C	
HCM Delay	15.5	14.6	13.6	N/D*	17.1	8.7	N/D*	10.6	15.9	21.2					0.8			19.4	18.7	22.8	1.2	14.7	N/D*	N/D*	N/D*	22.4	688
HCM V/C																											
ICU LOS																											
Length (ft)	3200	3200	5300		15500	15500		6600	13000	13000					1450			1150	5700	4000	5700	4000				5,000	187,920
Grade (%)	2.3	2.3	0.4		2.7	-2.7		-4	0.4	-0.4																	
Route 3											x	x	x	x	x	x											
HCM LOS											N/D*	N/D*	N/D*	N/D*	A	C											
HCM Delay											N/D*	N/D*	N/D*	N/D*	0.8	23.2											288
HCM V/C																											
ICU LOS																											
Length (ft)															1,450	740											66,950
Grade (%)																											
Route 9											x	x	x	x	x		x										
HCM LOS											N/D*	N/D*	N/D*	N/D*	A		C										
HCM Delay											N/D*	N/D*	N/D*	N/D*	0.8		20.4										340
HCM V/C																											
ICU LOS																											
Length (ft)															1450		1300										53,350
Grade (%)																											

N/D*: No Data available from Caltrans

TABLE 4-2-3: Haul Routes 2A,2B,3,9 Year 2014: PM Peak Hour

	Intersections														Freeway Segments																
	8	9	10	11	12	13	14	15	16	17	18	19	20	52	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	Irwindale Ave and I-210 Freeway Westbound Ramps	Irwindale Ave and I-210 Freeway Eastbound Ramps	Irwindale Ave and First Street	Irwindale Ave and Gladstone Street	Vincent Ave and Gladstone Street	Vincent Ave and Arrow Hwy	Arrow Hwy and Lark Ellen Ave	Arrow Hwy and Enid Ave	Azusa Ave and Arrow Hwy	Azusa Ave and Gladstone Street	Azusa Ave and I-210 Freeway Eastbound Ramps	Azusa Ave and First Street	First Street and Alameda Street/I-210 Freeway Westbound Ramps	Irwindale Ave and Foothill Blvd.	I-210 WB between Windsor Ave/Arroyo Blvd and Berkshire Place	I-210 EB between Windsor Ave/Arroyo Blvd and Berkshire Place	I-210 WB Freeway between Lincoln Ave and Windsor Ave/Arroyo Blvd.	I-210 EB Freeway between Lincoln Ave and Windsor Ave/Arroyo	I-210 WB between the SR-134 Fwy and Mountain Street.	I-210 EB between the SR-134 Fwy and Mountain Street.	SR-134 WB between San Rafael Ave and Figueroa Street	SR-134 EB between San Rafael Ave and Figueroa Street	SR-134 WB between the I-210 Fwy and San Rafael Ave.	SR-134 EB between the I-210 Fwy and San Rafael Ave.	I-210 WB between the SR-134 Fwy and Lake Ave.	I-210 EB between the SR-134 Fwy and Lake Ave.	I-210 WB between the I-605 Fwy and Irwindale Avenue.	I-210 EB between the I-605 Fwy and Irwindale Avenue.	I-210 WB between Irwindale Avenue and Azusa Avenue.	I-210 EB between Irwindale Avenue and Azusa Avenue.
Route 2A	x	x	x	x	x	x											x	x	x	x					x	x	x	x		
HCM LOS	A	C	C	C	B	B											C	B	C	B					D	E	D	C		
HCM Delay	7.3	26.9	23.2	30.2	14.4	15.4											24.8	17.5	18.2	16.6					33	41.1	26.4	18		
HCM V/C	0.56	0.91	0.86	0.95	0.72	0.93																								
ICU LOS	A	D	C	D	C	D																								
Length (ft)	420	2,840	2,650	2,660	2,670	370											3,800	3,800	4,600	4,600					7,200	7,200	7,800	6,540		
Grade (%)																	0.4	-0.4	1.3	-1.3					-0.5	0.5	-0.7	0.7		
Route 2B		x	x	x	x	x	x	x	x	x	x	x	x		x						x	x	x	x	x	x	x	x	x	
HCM LOS		C	D	C	B	B	E	B	E	D	B	B	B		B						C	C	C	D	D	E	D	C	D	
HCM Delay		26.9	50.3	27.6	14.2	15.4	55.4	14.4	58.4	38.0	10.3	18.9	17.1		16.4						25.4	21.8	25	28.2	33	41.1	26.4	18	31.3	
HCM V/C		0.91	0.93	0.95	0.72	0.93	0.94	0.70	1.04	0.87	0.65	0.69	0.87																	
ICU LOS		D	C	D	C	D	E	C	E	D	A	B	C																	
Length (ft)		2,840	2,650	2,660	2,670	370	3000	730	2030	2750	1900	800	350		5030						4800	4800	5200	5200	7,200	7,200	7,800	6,540	9100	
Grade (%)															1.5						0.2	-0.2	-0.4	0.4	-0.5	0.5	-0.7	0.7	0	
Route 3	x	x	x	x	x												x	x	x	x					x	x	x	x		
HCM LOS	A	C	C	C	B												C	B	C	B					D	E	D	C		
HCM Delay	7.3	26.9	23.2	30.2	11.0												24.8	17.5	18.2	16.6					33	41.1	26.4	18		
HCM V/C	0.56	0.91	0.86	0.95	0.57																									
ICU LOS	A	D	C	D	B																									
Length (ft)	420	2,840	2,650	2,660	2,670												3,800	3,800	4,600	4,600					7,200	7,200	7,800	6,540		
Grade (%)																	0.4	-0.4	1.3	-1.3					-0.5	0.5	-0.7	0.7		
Route 9	x	x												x			x	x	x	x					x	x	x	x		
HCM LOS	A	C												E			B	C	B	C					E	E	C	B		
HCM Delay	7.5	26.6												77.1			15.7	23.8	15	23.3					39.8	36.3	23.9	17.5		
HCM V/C	0.58	0.88												1.09																
ICU LOS	A	D												F*																
Length (ft)	420	2840												900			3,800	3,800	4,600	4,600					7,200	7,200	7,800	6,540		
Grade (%)																	0.4	-0.4	1.3	-1.3					-0.5	0.5	-0.7	0.7		

	Freeway Segments										Ramps																	**Route Total**
	9		10		11		12		13		9	10	15	16	17	18	18	19	20	21	22	23	24	25	26	27		
	17	18	19	20	21	22	23	24	25	26																		
	I-210 WB between Berkshire Place and Foothill Blvd.	I-210 EB between Berkshire Place and Foothill Blvd.	I-210 WB between Angeles Crest Hwy (SR-2 Hwy) and the SR-2 Fwy (Glendale Fwy)	I-210 EB between Angeles Crest Hwy (SR-2 Hwy) and the SR-2 Fwy (Glendale Fwy)	SR-2 NB between the I-210 Fwy and Mountain Street.	SR-2 SB between the I-210 Fwy and Mountain St	SR-2 NB between Mountain St and the SR-134 Fwy.	SR-2 SB between Mountain St and the SR-134 Fwy.	SR-134 WB between the SR-2 Fwy and Figueroa St.	SR-134 EB between the SR-2 Fwy and Figueroa St.	Southbound I-210 Freeway Transition Ramp to the Westbound SR-134 Freeway mainline and	Westbound I-210 Freeway and Eastbound SR-134 Freeway Transition Ramp to the Northbound	Southbound I-210 Freeway Transition Ramp to the Eastbound I-210 Freeway mainline. (Merge Point)	Westbound I-210 Freeway Transition Ramp to the Northbound I-210 Freeway mainline. (Diverge Point)	Irwindale Ave and the Eastbound I-210 Freeway Off-ramp. *(Diverge Point)*	Irwindale Ave and the Westbound I-210 Freeway On-ramp. *(Merge Point)*	First Street/Alameda Street and the Westbound I-210 Freeway On-ramp. *(Merge Point)*	First Street/Alameda Street and the Westbound I-210 Freeway On-ramp. *(Merge Point)*	Westbound I-210 Freeway Transition Ramp to the Southbound SR-2 Freeway	Northbound SR-2 Freeway Transition Ramp to the Eastbound I-210 Freeway mainline. (Merge Point)	Southbound SR-2 Freeway Transition Ramp to the Eastbound SR-134 Freeway mainline. (Diverge Point)	Northbound SR-2 Freeway Transition Ramp to the Eastbound I-210 Freeway mainline. (Diverge Point)	Westbound I-210 Freeway Transition Ramp to the Southbound SR-2 Freeway mainline. (Merge Point)	Northbound SR-2 Freeway Transition Ramp to the Eastbound I-210 Freeway mainline. (Diverge Point)	Southbound SR-2 Freeway Transition Ramp to the Eastbound SR-134 Freeway mainline. (Diverge Point)	Westbound and Eastbound SR-134 Freeway Transition Ramp to the Northbound SR-2 Freeway mainline. *(Merge Point)*	Southbound SR-2 Freeway Transition Ramp to the Eastbound SR-134 Freeway mainline. (Merge Point)	Westbound SR-134 Freeway Transition Ramp to the Northbound SR-2 Freeway mainline. (Diverge Point)	
Route 2A											x	x	x	x	x	x												
HCM LOS											N/D*	N/D*	N/D*	N/D*	A	C												
HCM Delay											N/D*	N/D*	N/D*	N/D*	0.8	23.2												446.1
HCM V/C																												
ICU LOS																												
Length (ft)															1,450	740												70530
Grade (%)																												
Route 2B	x	x	x	x	x	x	x	x	x	x					x			x	x	x	x	x	x	x	x	x		
HCM LOS	B	B	B	N/D*	B	A	N/D*	A	B	C					A			B	A	C	A	B	N/D*	N/D*	N/D*	C		
HCM Delay	15.5	14.6	13.6	N/D*	17.1	8.7	N/D*	10.6	15.9	21.2					0.8			19.4	18.7	22.8	1.2	14.7	N/D*	N/D*	N/D*	22.4	881	
HCM V/C																												
ICU LOS																												
Length (ft)	3200	3200	5300		15500	15500		6600	13000	13000					1450			1150	5700	4000	5700	4000				5,000	187,920	
Grade (%)	2.3	2.3	0.4		2.7	-2.7		-4	0.4	-0.4																		
Route 3											x	x	x	x	x	x												
HCM LOS											N/D*	N/D*	N/D*	N/D*	A	C												
HCM Delay											N/D*	N/D*	N/D*	N/D*	0.8	23.2												382
HCM V/C																												
ICU LOS																												
Length (ft)															1,450	740												66,950
Grade (%)																												
Route 9											x	x	x	x	x		x											
HCM LOS											N/D*	N/D*	N/D*	N/D*	A		C											
HCM Delay											N/D*	N/D*	N/D*	N/D*	2		22.7											0
HCM V/C																												
ICU LOS																												
Length (ft)															1450		1300											0
Grade (%)																												

N/D*: No Data available from Caltrans

TABLE 4-3-1: Haul Route 4A-Route 4B Year 2014: AM Peak Hour

	Intersections			Freeway segment																				
	1			2		3		4				5			9		10		11			12			13
	21	22	23	1	2	3	4	5	6	7	8	9	10	17	18	19	20	21	22	23	24	25	26
	Figueroa St/Scholl Canyon Rd and SR-134 Freeway Westbound Ramps	Figueroa St and Eagle Vista Dr	Figueroa St and SR-134 Freeway Eastbound Ramps	I-210 WB between Windsor Ave/Arroyo Blvd and Berkshire Pl	I-210 EB between Windsor Ave/Arroyo Blvd and Berkshire Pl	I-210 WB Freeway between Lincoln Ave and Windsor Ave/Arroyo Blvd.	I-210 EB Freeway between Lincoln Ave and Windsor Ave/Arroyo Blvd.	I-210 WB between the SR-134 Fwy and Mountain St.	I-210 EB between the SR-134 Fwy and Mountain St.	SR-134 WB between San Rafael Ave and Figueroa St	SR-134 EB between San Rafael Ave and Figueroa St	SR-134 WB between the I-210 Fwy and San Rafael Ave.	SR-134 EB between the I-210 Fwy and San Rafael Ave.	I-210 WB between Berkshire Pl and Foothill Blvd.	I-210 EB between Berkshire Pl and Foothill Blvd.	I-210 WB between Angeles Crest Hwy (SR-2 Hwy) and the SR-2 Fwy (Glendale Fwy)	I-210 EB between Angeles Crest Hwy (SR-2 Hwy) and the SR-2 Fwy (Glendale Fwy)	SR-2 NB between the I-210 Fwy and Mountain St.	SR-2 SB between the I-210 Fwy and Mountain St	SR-2 NB between Mountain St and the SR-134 Fwy.	SR-2 SB between Mountain St and the SR-134 Fwy.	SR-134 WB between the SR-2 Fwy and Figueroa St.	SR-134 EB between the SR-2 Fwy and Figueroa St.
Route 4A	x	x	x			x	x	x	x	x	x	x	x											
HCM LOS	E	B	A			B	C	B	C	D	C	D	C											
HCM Delay	41.2	14.2	9.2			15.7	23.8	15	23.3	28.3	18.9	26.9	24.8											
HCM V/C	-	-	0.66																					
ICU LOS	-	-	B																					
Length (ft)	9,700	600	300			3,800	3,800	4,600	4,600	2,900	3,500	5,200	5,200											
Grade (%)						0.4	-0.4	1.3	-1.3	0.2	-0.2	-0.4	0.4											
Route 4B	x	x	x	x										x	x	x	x	x	x	x	x	x	x	x
HCM LOS	E	B	A	B										B	C	B	N/D*	A	D	N/D*	D	C	C	
HCM Delay	41.3	14.2	8.1	13.3										15.3	24.4	13.8	N/D*	8.6	27.3	N/D*	30.6	20.4	20.3	
HCM V/C	-	-	0.54																					
ICU LOS	-	-	B																					
Length (ft)	9700	600	300	4900										3200	3200	5300		15500	15500		6600	13000	13000	
Grade (%)				1.3										2.3	2.3	0.4		2.7	-2.7		-4	0.4	-0.4	

	Ramps														
	11	12	13	14	20	21	22	23	24	25	26	27	28	29	
	Southbound I-210 Freeway Transition Ramp to the Westbound SR-134 Freeway mainline. *(Merge Point)*	Eastbound SR-134 Freeway Transition Ramp to the Northbound I-210 Freeway mainline. *(Diverge Point)*	Figueroa St/Scholl Canyon Road and the Westbound SR-134 Freeway Off-ramp. (Diverge Point)	Figueroa St and the Eastbound SR-134 Freeway Eastbound On-ramp. (Merge Point)	Westbound I-210 Freeway Transition Ramp to the Southbound SR-2 Freeway mainline. (Diverge Point)	Northbound SR-2 Freeway Transition Ramp to the Eastbound I-210 Freeway mainline. (Merge Point)	Westbound I-210 Freeway Transition Ramp to the Southbound SR-2 Freeway mainline. (Merge Point)	Northbound SR-2 Freeway Transition Ramp to the Eastbound I-210 Freeway mainline. (Diverge Point)	Southbound SR-2 Freeway Transition Ramp to the Eastbound SR-134 Freeway mainline. (Diverge Point)	Westbound and Eastbound SR-134 Freeway Transition Ramp to the Northbound SR-2 Freeway mainline. *(Merge Point)*	Southbound SR-2 Freeway Transition Ramp to the Eastbound SR-134 Freeway mainline. (Merge Point)	Westbound SR-134 Freeway Transition Ramp to the Northbound SR-2 Freeway mainline. (Diverge Point)	Figueroa Street and the Eastbound SR-134 Freeway Off-ramp. (Diverge Point)	Figueroa Street and the Westbound SR-134 Freeway On-ramp. (Merge Point)	**Route Total**
Route 4A	x	x	x	x											
HCM LOS	N/D*	N/D*	N/D*	D											
HCM Delay	N/D*	N/D*	N/D*	301											568
HCM V/C															
ICU LOS															
Length (ft)				1,430											51,530
Grade (%)															
Route 4B					x	x	x	x	x	x	x	x	x	x	
HCM LOS					A	C	A	B	N/D*	N/D*	N/D*	C	D	N/D*	
HCM Delay					11	24.3	5.6	18.9	N/D*	N/D*	N/D*	26.7	28.7	N/D*	381
HCM V/C															
ICU LOS															
Length (ft)					5700	4000	5700	4000				5,000	1300		121,300
Grade (%)															

N/D*: No Data available from Caltrans

TABLE 4-3-2: Haul Route 4A-Route 4B Year 2014: MID-DAY Peak Hour

	Intersections			Freeway segment																				
				1		2		3		4		5		9		10		11		12			13	
	21	22	23	1	2	3	4	5	6	7	8	9	10	17	18	19	20	21	22	23	24	25	26
	Figueroa St/Scholl Canyon Rd and SR-134 Freeway Westbound Ramps	Figueroa St and Eagle Vista Dr	Figueroa St and SR-134 Freeway Eastbound Ramps	I-210 WB between Windsor Ave/Arroyo Blvd and Berkshire Pl	I-210 EB between Windsor Ave/Arroyo Blvd and Berkshire Pl	I-210 WB Freeway between Lincoln Ave and Windsor Ave/Arroyo Blvd.	I-210 EB Freeway between Lincoln Ave and Windsor Ave/Arroyo Blvd.	I-210 WB between the SR-134 Fwy and Mountain St.	I-210 EB between the SR-134 Fwy and Mountain St.	SR-134 WB between San Rafael Ave and Figueroa St	SR-134 EB between San Rafael Ave and Figueroa St	SR-134 WB between the I-210 Fwy and San Rafael Ave.	SR-134 EB between the I-210 Fwy and San Rafael Ave.	I-210 WB between Berkshire Pl and Foothill Blvd.	I-210 EB between Berkshire Pl and Foothill Blvd.	I-210 WB between Angeles Crest Hwy (SR-2 Hwy) and the SR-2 Fwy (Glendale Fwy)	I-210 EB between Angeles Crest Hwy (SR-2 Hwy) and the SR-2 Fwy (Glendale Fwy)	SR-2 NB between the I-210 Fwy and Mountain St.	SR-2 SB between the I-210 Fwy and Mountain St	SR-2 NB between Mountain St and the SR-134 Fwy.	SR-2 SB between Mountain St and the SR-134 Fwy.	SR-134 WB between the SR-2 Fwy and Figueroa St.	SR-134 EB between the SR-2 Fwy and Figueroa St.
Route 4A	x	x	x			x	x	x	x	x	x	x	x											
HCM LOS	B	B	A			B	B	B	B	C	B	B	C											
HCM Delay	14.4	12.8	6.4			15.5	14.5	12.8	14.4	18.1	17.6	17.2	21.4											
HCM V/C	-	-	0.44																					
ICU LOS	-	-	A																					
Length (ft)	9,700	600	300			3,800	3,800	4,600	4,600	2,900	3,500	5,200	5,200											
Grade (%)						0.4	-0.4	1.3	-1.3	0.2	-0.2	-0.4	0.4											
Route 4B	x	x	x	x										x	x	x	x	x	x	x	x	x	x	x
HCM LOS	B	B	A	A										B	B	B	N/D*	B	A	N/D*	A	B	C	
HCM Delay	14.3	12.8	7.1	9.9										15.5	14.6	13.6	N/D*	17.1	8.7	N/D*	8.7	15.9	21.2	
HCM V/C	-	-	0.37																					
ICU LOS	-	-	A																					
Length (ft)	9700	600	300	4900										3200	3200	5300		15500	15500		6600	13000	13000	
Grade (%)				1.3										2.3	2.3	0.4		2.7	-2.7		-4	0.4	-0.4	

	Ramps														
	11	12	13	14	20	21	22	23	24	25	26	27	28	29	
	Southbound I-210 Freeway Transition Ramp to the Westbound SR-134 Freeway mainline. *(Merge Point)*	Eastbound SR-134 Freeway Transition Ramp to the Northbound I-210 Freeway mainline. *(Diverge Point)*	Figueroa St/Scholl Canyon Road and the Westbound SR-134 Freeway Off-ramp. (Diverge Point)	Figueroa St and the Eastbound SR-134 Freeway Eastbound On-ramp. (Merge Point)	Westbound I-210 Freeway Transition Ramp to the Southbound SR-2 Freeway mainline. (Diverge Point)	Northbound SR-2 Freeway Transition Ramp to the Eastbound I-210 Freeway mainline. (Merge Point)	Westbound I-210 Freeway Transition Ramp to the Southbound SR-2 Freeway mainline. (Merge Point)	Northbound SR-2 Freeway Transition Ramp to the Eastbound I-210 Freeway mainline. (Diverge Point)	Southbound SR-2 Freeway Transition Ramp to the Eastbound SR-134 Freeway mainline. (Diverge Point)	Westbound and Eastbound SR-134 Freeway Transition Ramp to the Northbound SR-2 Freeway mainline. *(Merge Point)*	Southbound SR-2 Freeway Transition Ramp to the Eastbound SR-134 Freeway mainline. (Merge Point)	Westbound SR-134 Freeway Transition Ramp to the Northbound SR-2 Freeway mainline. (Diverge Point)	Figueroa Street and the Eastbound SR-134 Freeway Off-ramp. (Diverge Point)	Figueroa Street and the Westbound SR-134 Freeway On-ramp. (Merge Point)	**Route Total**
Route 4A	x	x	x	x											
HCM LOS	N/D*	N/D*	N/D*	D											
HCM Delay	N/D*	N/D*	N/D*	28.7											193
HCM V/C															
ICU LOS															
Length (ft)				1,430											51,530
Grade (%)															
Route 4B					x	x	x	x	x	x	x	x	x	x	
HCM LOS					A	C	A	B	N/D*	N/D*	N/D*	C	D	N/D*	
HCM Delay					18.7	22.8	1.2	14.7	N/D*	N/D*	N/D*	22.4	28.3	N/D*	272
HCM V/C															
ICU LOS															
Length (ft)					5700	4000	5700	4000				5,000	1300		121,300
Grade (%)															

N/D*: No Data available from Caltrans

TABLE 4-3-3: Haul Route 4A-Route 4B Year 2014: PM Peak Hour

	Intersections			Freeway segment																				
				1		2		3		4		5		9		10		11		12			13	
	21	22	23	1	2	3	4	5	6	7	8	9	10	17	18	19	20	21	22	23	24	25	26
	Figueroa St/Scholl Canyon Rd and SR-134 Freeway Westbound Ramps	Figueroa St and Eagle Vista Dr	Figueroa St and SR-134 Freeway Eastbound Ramps	I-210 WB between Windsor Ave/Arroyo Blvd and Berkshire Pl	I-210 EB between Windsor Ave/Arroyo Blvd and Berkshire Pl	I-210 WB Freeway between Lincoln Ave and Windsor Ave/Arroyo Blvd.	I-210 EB Freeway between Lincoln Ave and Windsor Ave/Arroyo Blvd.	I-210 WB between the SR-134 Fwy and Mountain St.	I-210 EB between the SR-134 Fwy and Mountain St.	SR-134 WB between San Rafael Ave and Figueroa St	SR-134 EB between San Rafael Ave and Figueroa St	SR-134 WB between the I-210 Fwy and San Rafael Ave.	SR-134 EB between the I-210 Fwy and San Rafael Ave.	I-210 WB between Berkshire Pl and Foothill Blvd.	I-210 EB between Berkshire Pl and Foothill Blvd.	I-210 WB between Angeles Crest Hwy (SR-2 Hwy) and the SR-2 Fwy (Glendale Fwy)	I-210 EB between Angeles Crest Hwy (SR-2 Hwy) and the SR-2 Fwy (Glendale Fwy)	SR-2 NB between the I-210 Fwy and Mountain St.	SR-2 SB between the I-210 Fwy and Mountain St	SR-2 NB between Mountain St and the SR-134 Fwy.	SR-2 SB between Mountain St and the SR-134 Fwy.	SR-134 WB between the SR-2 Fwy and Figueroa St.	SR-134 EB between the SR-2 Fwy and Figueroa St.
Route 4A	x	x	x			x	x	x	x	x	x	x	x											
HCM LOS	E	C	A			C	B	C	B	C	C	C	D											
HCM Delay	49.9	22.9	8.6			24.8	17.5	18.2	16.6	25.4	21.8	25	28.2											
HCM V/C	-	-	0.63																					
ICU LOS	-	-	B																					
Length (ft)	9,700	600	300			3,800	3,800	4,600	4,600	2,900	3,500	5,200	5,200											
Grade (%)						0.4	-0.4	1.3	-1.3	0.2	-0.2	-0.4	0.4											
Route 4B	x	x	x	x										x	x	x	x	x	x	x	x	x	x	x
HCM LOS	F	C	A	B										C	B	C	N/D*	C	B	N/D*	B	C	C	
HCM Delay	53.8	22.9	8	16.4										25.4	17.2	23.2	N/D*	18.6	11.5	N/D*	11.5	20.5	24.1	
HCM V/C	-	-	0.55																					
ICU LOS	-	-	B																					
Length (ft)	9700	600	300	4900										3200	3200	5300		15500	15500		6600	13000	13000	
Grade (%)				1.3										2.3	2.3	0.4		2.7	-2.7		-4	0.4	-0.4	

	Ramps														Route Total
	11	12	13	14	20	21	22	23	24	25	26	27	28	29	
	Southbound I-210 Freeway Transition Ramp to the Westbound SR-134 Freeway mainline. *(Merge Point)*	Eastbound SR-134 Freeway Transition Ramp to the Northbound I-210 Freeway mainline. *(Diverge Point)*	Figueroa St/Scholl Canyon Road and the Westbound SR-134 Freeway Off-ramp. (Diverge Point)	Figueroa St and the Eastbound SR-134 Freeway Eastbound On-ramp. (Merge Point)	Westbound I-210 Freeway Transition Ramp to the Southbound SR-2 Freeway mainline. (Diverge Point)	Northbound SR-2 Freeway Transition Ramp to the Eastbound I-210 Freeway mainline. (Merge Point)	Westbound I-210 Freeway Transition Ramp to the Southbound SR-2 Freeway mainline. (Merge Point)	Northbound SR-2 Freeway Transition Ramp to the Eastbound I-210 Freeway mainline. (Diverge Point)	Southbound SR-2 Freeway Transition Ramp to the Eastbound SR-134 Freeway mainline. (Diverge Point)	Westbound and Eastbound SR-134 Freeway Transition Ramp to the Northbound SR-2 Freeway mainline. *(Merge Point)*	Southbound SR-2 Freeway Transition Ramp to the Eastbound SR-134 Freeway mainline. (Merge Point)	Westbound SR-134 Freeway Transition Ramp to the Northbound SR-2 Freeway mainline. (Diverge Point)	Figueroa Street and the Eastbound SR-134 Freeway Off-ramp. (Diverge Point)	Figueroa Street and the Westbound SR-134 Freeway On-ramp. (Merge Point)	
Route 4A	x	x	x	x											
HCM LOS	N/D*	N/D*	N/D*	D											
HCM Delay	N/D*	N/D*	N/D*	32.5											317
HCM V/C															
ICU LOS															
Length (ft)				1,430											51,530
Grade (%)															
Route 4B					x	x	x	x	x	x	x	x	x	x	
HCM LOS					A	C	A	B	N/D*	N/D*	N/D*	C	D	N/D*	
HCM Delay					18.7	22.8	1.2	14.7	N/D*	N/D*	N/D*	22.4	28.3	N/D*	410
HCM V/C															
ICU LOS															
Length (ft)					5700	4000	5700	4000				5,000	1300		121,300
Grade (%)															

N/D*: No Data available from Caltrans

TABLE 4-4-1: Haul Route 5A-Route 8C Year 2014: AM Peak Hour

	Intersection																															
	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51				
	Foothill Blvd and I-210 Westbound Ramps	Foothill Blvd and I-210 Eastbound Ramps	Foothill Blvd and Osborne Street	Glenoaks Blvd and Osborne Street	Glenoaks Blvd and Montague Street	Glenoaks Blvd and Branford Street	Glenoaks Blvd and Sheldon Street	Glenoaks Blvd and Peoria Street	Glenoaks Blvd and Tuxford Street	Glenoaks Blvd and Penrose Street	Glenoaks Blvd and Sunland Blvd	Glenoaks Blvd and Roscoe Blvd	Roscoe Blvd and I-5 Freeway Northbound Ramps	Roscoe Blvd and I-5 Freeway Southbound Ramps	Branford Street and I-5 Freeway Southbound Ramps	Branford Street and I-5 Freeway Northbound Ramps	Branford Street and Laurel Canyon Blvd	Osborne Street and I-5 Freeway Southbound Ramps	Osborne Street and I-5 Freeway Northbound Ramps	Osborne Street and Laurel Canyon Blvd	Wheatland Ave and I-210 Freeway Eastbound RampS	Wheatland Ave and I-210 Freeway Westbound Ramps	Wheatland Ave and Foothill Blvd	Wentworth Street and Foothill Blvd	Tuxford Street and San Fernando Road	Lankershim Blvd and San Fernando Road	Sheldon Street and San Fernando Road	Branford Street and San Fernando Road				
Route 5A	x	x	x	x	x	x	x																									
HCM LOS	A	A	C	F	B	B	B																									
HCM Delay	5.8	6.4	20.7	105.7	10.5	17.9	14.2																									
HCM V/C	0.30	0.32	0.78	1.15	0.79	0.80	0.86																									
ICU LOS	A	A	D	F	B	C	E																									
Length (ft)	400	3900	4200	2850	1480	4330	720																									
Grade (%)																																
Route 5B							x	x	x	x	x	x	x	x																		
HCM LOS							B	A	B	A	C	A	B	A																		
HCM Delay							13.5	6.6	15.7	6.6	22.9	6.7	12.0	0.0																		
HCM V/C							0.85	0.59	0.89	0.58	0.88	0.41	-	-																		
ICU LOS							D	A	D	A	C	A	-	-																		
Length (ft)							720	2900	2900	1440	800	3520	230	290																		
Grade (%)																																
Route 5C																					x	x	x	x								
HCM LOS																					A	B	B	C								
HCM Delay																					0.0	11.1	11.3	28.4								
HCM V/C																					-	-	0.46	0.88								
ICU LOS																					-	-	A	A								
Length (ft)																					320	280	8000	12500								
Grade (%)																																
Route 6A	x	x	x	x	x	x	x																									
HCM LOS	A	A	C	F	B	B	B																									
HCM Delay	5.8	6.4	20.7	105.7	10.5	17.9	14.2																									
HCM V/C	0.30	0.32	0.78	1.15	0.79	0.80	0.86																									
ICU LOS	A	A	D	F	B	C	E																									
Length (ft)	400	3900	4200	2850	1480	4330	1050																									
Grade (%)																																
Route 6B							x	x	x	x	x	x	x	x																		
HCM LOS							B	A	B	A	C	A	B	A																		
HCM Delay							13.3	6.6	15.7	6.6	22.9	6.7	12.0	0.0																		
HCM V/C							0.85	0.59	0.89	0.58	0.88	0.41	-	-																		
ICU LOS							D	A	D	A	C	A	-	-																		
Length (ft)							1050	2900	2900	1440	800	3520	230	290																		
Grade (%)																																
Route 6C							x														x	x	x	x								
HCM LOS							B														A	B	B	C								
HCM Delay							17.4														0	11.1	11.3	28.4								
HCM V/C							0.92														-	-	0.46	0.88								
ICU LOS							E														-	-	A	A								
Length (ft)							2080														320	280	8000	18900								
Grade (%)																																
Route 7A	x	x	x	x	x	x	x	x																								
HCM LOS	A	A	C	F	B	B	B	A																								
HCM Delay	5.8	6.4	20.7	105.7	10.5	17.9	16.0	6.2																								
HCM V/C	0.30	0.32	0.78	1.15	0.79	0.80	0.89	0.64																								
ICU LOS	A	A	D	F	B	C	E	A																								
Length (ft)	400	3900	4200	2850	1480	4330	1050	2100																								
Grade (%)																																
Route 7B								x	x	x	x	x	x	x																		
HCM LOS								A	B	A	C	A	B	A																		
HCM Delay								6.0	15.7	6.6	22.9	6.7	12.0	0.0																		
HCM V/C								0.76	0.89	0.58	0.88	0.41	-	-																		
ICU LOS								B	D	A	C	A	-	-																		
Length (ft)								2100	2900	1440	800	3520	230	290																		
Grade (%)																																
Route 7C							x	x													x	x	x	x								
HCM LOS							B	A													A	B	B	C								
HCM Delay							14.7	6.2													0	11.1	11.3	28.4								
HCM V/C							0.87	0.64													-	-	0.46	0.88								
ICU LOS							D	A													-	-	A	A								
Length (ft)							2900	2100													320	280	8000	12500								
Grade (%)																																
Route 8A															x	x	x															
HCM LOS															N/D*	N/D*	B															
HCM Delay															N/D*	N/D*	11.2															
HCM V/C															-	-	0.62															
ICU LOS															-	-	C															
Length (ft)																	2,480															
Grade (%)																																
Route 8B																	x	x	x	x												
HCM LOS																	C	B	B	D												
HCM Delay																	21.9	13.7	14.7	42.3												
HCM V/C																	1.00	0.83	0.75	0.98												
ICU LOS																	D	D	B	E												
Length (ft)																	2,400	510	1,030	2,900												
Grade (%)																																
Route 8C							x	x	x												x	x	x	x	x	x	x	x				
HCM LOS							B	A	D												A	B	B	C	D	A	C	D				
HCM Delay							14.7	6.6	40.1												0	11.1	11.3	28.4	40.1	8.6	34.8	38.0				
HCM V/C							0.87	0.59	1.10												-	-	0.46	0.88	0.80	0.57	0.80	0.89				
ICU LOS							D	A	E												-	-	A	A	C	A	C	B				
Length (ft)							2,900	2,900	3,900												320	280	8,000	19,500	3,060	2,800	4,320	1,130				
Grade (%)																																

- Value exceeds maximum calculated delay. N/D*: No Data available from Caltrans

-CONTINUED- TABLE 4-4-1: Haul Route 5A-Route 8C Year 2014: AM Peak Hour

Freeway Segments	1		2		9		10		11		12		14		15		16		17		18		19		20		21		22		23		24		25		26		27		28	
	1	2	3	4	17	18	19	20	21	22	23	24	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56
	I-210 WB between Windsor Ave/Arroyo Blvd and Berkshire Pl	I-210 EB between Windsor Ave/Arroyo Blvd and Berkshire Pl	I-210 WB Freeway between Lincoln Ave and Windsor Ave	I-210 EB Freeway between Lincoln Ave and Windsor Ave	I-210 WB between Berkshire Pl and Foothill Blvd.	I-210 EB between Berkshire Pl and Foothill Blvd.	I-210 WB between Angeles Crest Hwy and the SR-2 Fwy	I-210 EB between Angeles Crest Hwy and the SR-2 Fwy	SR-2 NB between the I-210 Fwy and Mountain St.	SR-2 SB between the I-210 Fwy and Mountain St	SR-2 NB between Mountain St and the SR-134 Fwy.	SR-2 SB between Mountain St and the SR-134 Fwy.	SR-134 WB between the SR-2 Fwy and Glendale Ave.	SR-134 EB between the SR-2 Fwy and Glendale Ave.	SR-134 WB between the Pacific Ave and Concord St.	SR-134 EB between the Pacific Ave and Concord St.	SR-134 WB between San Fernando St and the I-5 Fwy.	SR-134 EB between San Fernando St and the I-5 Fwy.	I-5 SB between the SR-134 Fwy and Western Ave.	I-5 NB between the SR-134 Fwy and Western Ave.	I-5 NB between North Hollywood Way and Roscoe Blvd.	I-5 SB between North Hollywood Way and Roscoe Blvd.	I-5 SB between Sheldon St and the SR-170 Fwy.	I-5 NB between Sheldon St and the SR-170 Fwy.	I-5 SB between the SR-170 Fwy and Branford St.	I-5 NB between the SR-170 Fwy and Branford St.	I-210 Fwy between the SR-2 Fwy and Montrose Ave.	I-210EB between the SR-2 Fwy and Montrose Ave.	I-210 WB between Wheatland Ave and Sunland Blvd.	I-210 EB between Wheatland Ave and Sunland Blvd.	I-210 WB between Wheatland Blvd and Foothill Blvd.	I-210 EB between Wheatland Blvd and Foothill Blvd.	I-210 WB between Foothill Blvd and the SR-118 Fwy.	I-210 EB between Foothill Blvd and the SR-118 Fwy.	SR-118 WB between the I-210 Fwy and Glenoaks Blvd.	SR-118 EB between the I-210 Fwy and Glenoaks Blvd.	SR-118 WB between San Fernando Rd and the I-5 Fwy.	SR-118 EB between San Fernando Rd and the I-210 Fwy.	I-5 NB between the SR-118 Fwy and Van Nuys Blvd.	I-5 SB between the SR-118 Fwy and Van Nuys Blvd.	I-5 NB between Tierra Bella Street and Osborne Street.	I-5 SB between Tierra Bella Street and Osborne Street.
Route 5A	x	x			x	x	x	x																			x	x	x	x												
HCM LOS	B	C			B	C	B	N/D*																			N/D*	N/D*	N/D*	C												
HCM Delay	13.3	21.4			15.3	24.4	13.8	N/D*																			N/D*	N/D*	N/D*	19.1												
HCM V/C																																										
ICU LOS																																										
Length (ft)	4,900	4,030			3200	3200	2500																							8800												
Grade (%)	1.3	-1.5			2.3	2.3	0.4																							2.3												
Route 5B	x	x			x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x																				
HCM LOS	B	C			B	C	B	N/D*	A	D	N/D*	D	N/D*	C	D	E	D	N/D*	D	N/D*	C	D																				
HCM Delay	13.3	21.4			15.3	24.4	13.8	N/D*	8.6	27.3	N/D*	30.6	N/D*	22.2	32	36.8	29.8	N/D*	30.1	N/D*	23	27.1																				
HCM V/C																																										
ICU LOS																																										
Length (ft)	4,900	4,030			3200	3200	2500		13400	13400		3450		5900	2100	2100	2300		5700		3650	3650																				
Grade (%)	1.3	-1.5			2.3	2.3	0.4		2.7	-2.7		-4		0.7	-1.4	1.4	-1.2		-1		0.5	-0.5																				
Route 5C	x	x			x	x	x	x																			x	x	x	x												
HCM LOS	B	C			B	C	B	N/D*																			N/D*	N/D*	N/D*	C												
HCM Delay	13.3	21.4			15.3	24.4	13.8	N/D*																			N/D*	N/D*	N/D*	19.1												
HCM V/C																																										
ICU LOS																																										
Length (ft)	4,900	4,030			3200	3200	2500																							8800												
Grade (%)	1.3	-1.5			2.3	2.3	0.4																							2.3												
Route 6A	x	x			x	x	x	x																			x	x	x	x												
HCM LOS	B	C			B	C	B	N/D*																			N/D*	N/D*	N/D*	C												
HCM Delay																																										
HCM V/C																																										
ICU LOS	13.3	21.4			15.3	24.4	13.8	N/D*																			N/D*	N/D*	N/D*	19.1												
Length (ft)	4,900	4,030			3200	3200	2500																							8800												
Grade (%)	1.3	-1.5			2.3	2.3	0.4																							2.3												
Route 6B	x	x			x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x																				
HCM LOS	B	C			B	C	B	N/D*	A	D	N/D*	D	N/D*	C	D	E	D	N/D*	D	N/D*	C	D																				
HCM Delay	13.3	21.4			15.3	24.4	13.8	N/D*	8.6	27.3	N/D*	30.6	N/D*	22.2	32	36.8	29.8	N/D*	30.1	N/D*	23	27.1																				
HCM V/C																																										
ICU LOS																																										
Length (ft)	4,900	4,030			3200	3200	2500		13400	13400		3450		5900	2100	2100	2300		5700		3650	3650																				
Grade (%)	1.3	-1.5			2.3	2.3	0.4		2.7	-2.7		-4		0.7	-1.4	1.4	-1.2		-1		0.5	-0.5																				
Route 6C	x	x			x	x	x	x																			x	x	x	x												
HCM LOS	B	C			B	C	B	N/D*																			N/D*	N/D*	N/D*	C												
HCM Delay	13.3	21.4			15.3	24.4	13.8	N/D*																			N/D*	N/D*	N/D*	19.1												
HCM V/C																																										
ICU LOS																																										
Length (ft)	4,900	4,030			3200	3200	2500																							8800												
Grade (%)	1.3	-1.5			2.3	2.3	0.4																							2.3												
Route 7A	x	x			x	x	x	x																			x	x	x	x												
HCM LOS	B	C			B	C	B	N/D*																			N/D*	N/D*	N/D*	C												
HCM Delay	13.3	21.4			15.3	24.4	13.8	N/D*																			N/D*	N/D*	N/D*	19.1												
HCM V/C																																										
ICU LOS																																										
Length (ft)	4,900	4,030			3200	3200	2500																							8800												
Grade (%)	1.3	-1.5			2.3	2.3	0.4																							2.3												
Route 7B	x	x			x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x																				
HCM LOS	B	C			B	C	B	N/D*	A	D	N/D*	D	N/D*	C	D	E	D	N/D*	D	N/D*	C	D																				
HCM Delay	13.3	21.4			15.3	24.4	13.8	N/D*	8.6	27.3	N/D*	30.6	N/D*	22.2	32	36.8	29.8	N/D*	30.1	N/D*	23	27.1																				
HCM V/C																																										
ICU LOS																																										
Length (ft)	4,900	4,030			3200	3200	2500		13400	13400		3450		5900	2100	2100	2300		5700		3650	3650																				
Grade (%)	1.3	-1.5			2.3	2.3	0.4		2.7	-2.7		-4		0.7	-1.4	1.4	-1.2		-1		0.5	-0.5																				
Route 7C	x	x			x	x	x	x																			x	x	x	x												
HCM LOS	B	C			B	C	B	N/D*																			N/D*	N/D*	N/D*	C												
HCM Delay	13.3	21.4			15.3	24.4	13.8	N/D*																			N/D*	N/D*	N/D*	19.1												
HCM V/C																																										
ICU LOS																																										
Length (ft)	4,900	4,030			3200	3200	2500																							8800												
Grade (%)	1.3	-1.5			2.3	2.3	0.4																							2.3												
Route 8A	x	x			x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x																
HCM LOS	B	C			B	C	B	N/D*	A	D	N/D*	D	N/D*	C	D	E	D	N/D*	D	N/D*	C	D	N/D*	C	F	N/D*																
HCM Delay	13.3	21.4			15.3	24.4	13.8	N/D*	8.6	27.3	N/D*	30.6	N/D*	22.2	32	36.8	29.8	N/D*	30.1	N/D*	23	27.1	N/D*	21	-	N/D*																
HCM V/C																																										
ICU LOS																																										
Length (ft)	4,900	4,030			3200	3200	2500		13400	13400		3450		5900	2100	2100	2300		5700		3650	3650		1800																		
Grade (%)	1.3	-1.5			2.3	2.3	0.4		2.7	-2.7		-4		0.7	-1.4	1.4	-1.2		-1		0.5	-0.5		2.5																		
Route 8B	x	x			x	x	x	x																			x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
HCM LOS	B	C			B	C	B	N/D*																			N/D*	N/D*	N/D*	C	B	C	B	N/D*	N/D*	N/D*	F	N/D*	E	D	F	N/D*
HCM Delay	13.3	21.4			15.3	24.4	13.8	N/D*																			N/D*	N/D*	N/D*	19.1	16.2	18.2	16.7	N/D*	N/D*	N/D*	51.3	N/D*	42.4	27.2	47	N/D*
HCM V/C																																										
ICU LOS																																										
Length (ft)	4,900	4,030			3200	3200	2500																							8800	8400	8400	9700				5100		4500	4500	1650	
Grade (%)	1.3	-1.5			2.3	2.3	0.4																							2.3	-0.4	-0.4	-0.8				1.5		0.2	-0.2	1	
Route 8C	x	x			x	x	x	x																			x	x	x	x												
HCM LOS	B	C			B	C	B	N/D*																			N/D*	N/D*	N/D*	C												
HCM Delay	13.3	21.4			15.3	24.4	13.8	N/D*																			N/D*	N/D*	N/D*	19.1												
HCM V/C																																										
ICU LOS																																										
Length (ft)	4,900	4,030			3200	3200	2500																							8800												
Grade (%)	1.3	-1.5			2.3	2.3	0.4																							2.3												

- Value exceeds maximum calculated delay. N/D*: No Data available from Caltrans

-CONTINUED- TABLE 4-4-1: Haul Route 5A-Route 8C Year 2014: AM Peak Hour

	Ramps																													
	21 Westbound I-210 Freeway Transition Ramp to the Southbound SR-2 Freeway mainline. (Diverge Point)	22 Northbound SR-2 Freeway Transition Ramp to the Eastbound I-210 Freeway mainline. (Merge Point)	23 Westbound I-210 Freeway Transition Ramp to the Southbound SR-2 Freeway mainline. (Merge Point)	24 Northbound SR-2 Freeway Transition Ramp to the Eastbound I-210 Freeway mainline. (Diverge Point)	26 Westbound and Eastbound SR-134 Freeway Transition Ramp to the Northbound SR-2 Freeway mainline. *(Merge Point)*	31 Southbound SR-2 Freeway Transition Ramp to the Westbound SR-134 Freeway mainline. *(Merge Point)*	32 Eastbound SR-134 Freeway Transition Ramp to the Northbound SR-2 Freeway mainline. *(Diverge Point)*	33 Westbound SR-134 Freeway Transition Ramp to the Northbound I-5 Freeway mainline. *(Diverge Point)*	34 Southbound I-5 Freeway Transition Ramp to the Eastbound SR-134 Freeway mainline. *(Merge Point)*	35 Westbound SR-134 Freeway Transition Ramp to the Northbound I-5 Freeway mainline. *(Merge Point)*	36 Southbound I-5 Freeway Transition Ramp to the Eastbound SR-134 Freeway mainline. *(Diverge Point)*	37 Roscoe Blvd/Glenoaks Blvd and the Northbound I-5 Freeway mainline Off-ramp. (Diverge Point)	38 Roscoe Blvd/Glenoaks Blvd and the Southbound I-5 Freeway mainline On-ramp. *(Merge Point)*	39 Branford Street and the Southbound I-5 Freeway mainline On-ramp. *(Merge Point)*	40 Branford Street and the Northbound I-5 Freeway mainline Off-ramp. *(Diverge Point)*	41 Wheatland Ave and the Westbound I-210 Freeway mainline Off-ramp. (Diverge Point)	42 Wheatland Avenue and the Eastbound I-210 Freeway mainline On-ramp. Merge Point)	43 Foothill Blvd/Osborne Street and the Westbound I-210 Freeway mainline Off-ramp. (Diverge Point)	44 Foothill Blvd/Osborne Street and the Eastbound I-210 Freeway mainline On-ramp. (Merge Point)	45 Westbound I-210 Freeway Transition Ramp to the Westbound SR-118 Freeway mainline. *(Diverge Point)*	46 Eastbound SR-118 Freeway Transition Ramp to the Eastbound I-210 Freeway mainline. (Merge Point)	47 Westbound I-210 Freeway Transition Ramp to the Westbound SR-118 Freeway mainline. *(Merge Point)*	48 Eastbound SR-118 Freeway Transition Ramp to the Eastbound I-210 Freeway mainline. (Diverge Point)	49 Westbound SR-118 Freeway Transition Ramp to the Southbound I-5 Freeway mainline. (Diverge Point)	50 Northbound I-5 Freeway Transition Ramp to the Eastbound SR-118 Freeway mainline. (Merge Point)	51 Westbound SR-118 Freeway Transition Ramp to the Southbound I-5 Freeway mainline. (Merge Point)	52 Northbound I-5 Freeway Transition Ramp to the Eastbound SR-118 Freeway mainline. (Diverge Point)	53 Osborne Street and the Southbound I-5 Freeway mainline Off-ramp. *(Diverge Point)*	54 Osborne Street and the Northbound I-5 Freeway mainline On-ramp. *(Merge Point)*	**Route Total**
Route 5A																		x	x											
HCM LOS																		D	C											
HCM Delay																		34.8	20.7											519
HCM V/C																														
ICU LOS																														
Length (ft)																		1050	885											63,925
Grade (%)																														
Route 5B	x	x	x	x	x	x	x	x	x	x	x	x	x																	
HCM LOS	A	C	A	B	N/D*	N/D*	C	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*																	
HCM Delay	11	24.3	5.6	18.9	N/D*	N/D*	23.8	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*																	595
HCM V/C																														
ICU LOS																														
Length (ft)	5700	4000	5700	4000			5600																							123,560
Grade (%)																														
Route 5C																x	x													
HCM LOS																D	C													
HCM Delay																32.4	25.5													267
HCM V/C																														
ICU LOS																														
Length (ft)																1300	1060													70,870
Grade (%)																														
Route 6A																		x	x											
HCM LOS																		D	C											
HCM Delay																		34.8	20.7											412
HCM V/C																														
ICU LOS																														
Length (ft)																		1050	885											64,585
Grade (%)																														
Route 6B	x	x	x	x	x	x	x	x	x	x	x	x	x																	
HCM LOS	A	C	A	B	N/D*	N/D*	C	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*																	
HCM Delay	11	24.3	5.6	18.9	N/D*	N/D*	23.8	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*																	595
HCM V/C																														
ICU LOS																														
Length (ft)	5700	4000	5700	4000			5600																							124,220
Grade (%)																														
Route 6C																x	x													
HCM LOS																D	C													
HCM Delay																32.4	25.5													238
HCM V/C																														
ICU LOS																														
Length (ft)																1300	1060													83,670
Grade (%)																														
Route 7A																		x	x											
HCM LOS																		D	C											
HCM Delay																		34.8	20.7											541
HCM V/C																														
ICU LOS																														
Length (ft)																		1050	885											69,185
Grade (%)																														
Route 7B	x	x	x	x	x	x	x	x	x	x	x	x	x																	
HCM LOS	A	C	A	B	N/D*	N/D*	C	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*																	
HCM Delay	11	24.3	5.6	18.9	N/D*	N/D*	23.8	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*																	22,999
HCM V/C																														
ICU LOS																														
Length (ft)	5700	4000	5700	4000			5600																							98,480
Grade (%)																														
Route 7C																x	x													
HCM LOS																D	C													
HCM Delay																32.4	25.5													52,045
HCM V/C																														
ICU LOS																														
Length (ft)																1300	1060													28,990
Grade (%)																														
Route 8A	x	x	x	x	x	x	x	x	x	x	x			x	x															
HCM LOS	A	C	A	B	N/D*	N/D*	C	N/D*	N/D*	N/D*	N/D*			N/D*	N/D*															
HCM Delay	11	24.3	5.6	18.9	N/D*	N/D*	23.8	N/D*	N/D*	N/D*	N/D*			N/D*	N/D*															2,916
HCM V/C																														
ICU LOS																														
Length (ft)	5700	4000	5700	4000			5600																							97,080
Grade (%)																														
Route 8B																				x	x	x	x	x	x	x	x	x	x	
HCM LOS																				N/D*	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*	C	D	
HCM Delay																				N/D*	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*	24.4	34.9	13,556
HCM V/C																														
ICU LOS																														
Length (ft)																												770	830	70,480
Grade (%)																														
Route 8C																x	x													
HCM LOS																D	C													
HCM Delay																32.4	25.5													98,065
HCM V/C																														
ICU LOS																														
Length (ft)																1300	1060													28,990
Grade (%)																														

N/D*: No Data available from Caltrans

TABLE 4-4-2: Haul Route 5A-Route 8C Year 2014: MID-DAY Peak Hour

	Intersection																															
	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51				
	Foothill Blvd and I-210 Westbound Ramps	Foothill Blvd and I-210 Eastbound Ramps	Foothill Blvd and Osborne Street	Glenoaks Blvd and Osborne Street	Glenoaks Blvd and Montague Street	Glenoaks Blvd and Branford Street	Glenoaks Blvd and Sheldon Street	Glenoaks Blvd and Peoria Street	Glenoaks Blvd and Tuxford Street	Glenoaks Blvd and Penrose Street	Glenoaks Blvd and Sunland Blvd	Glenoaks Blvd and Roscoe Blvd	Roscoe Blvd and I-5 Freeway Northbound Ramps	Roscoe Blvd and I-5 Freeway Southbound Ramps	Branford Street and I-5 Freeway Southbound Ramps	Branford Street and I-5 Freeway Northbound Ramps	Branford Street and Laurel Canyon Blvd	Osborne Street and I-5 Freeway Southbound Ramps	Osborne Street and I-5 Freeway Northbound Ramps	Osborne Street and Laurel Canyon Blvd	Wheatland Ave and I-210 Freeway Eastbound RampS	Wheatland Ave and I-210 Freeway Westbound Ramps	Wheatland Ave and Foothill Blvd	Wentworth Street and Foothill Blvd	Tuxford Street and San Fernando Road	Lankershim Blvd and San Fernando Road	Sheldon Street and San Fernando Road	Branford Street and San Fernando Road				
Route 5A	x	x	x	x	x	x	x																									
HCM LOS	A	A	B	D	A	B	A																									
HCM Delay	5.9	6.7	10.8	35.4	9.5	16.5	8.1																									
HCM V/C	0.31	0.33	0.56	0.88	0.41	0.65	0.56																									
ICU LOS	A	A	A	C	A	B	B																									
Length (ft)	400	3900	4200	2850	1480	4330	720																									
Grade (%)																																
Route 5B							x	x	x	x	x	x	x	x																		
HCM LOS							A	A	A	A	B	A	B	A																		
HCM Delay							7.5	9.0	7.8	6.0	16.3	7.1	11.8	0.0																		
HCM V/C							0.48	0.39	0.49	0.36	0.67	0.42	-	-																		
ICU LOS							A	A	A	A	B	A	-	-																		
Length (ft)							720	2900	2900	1440	800	3520	230	290																		
Grade (%)																																
Route 5C																					x	x	x	x								
HCM LOS																					A	A	B	B								
HCM Delay																					0.0	8.8	10.6	10.4								
HCM V/C																					-	-	0.39	0.45								
ICU LOS																					-	-	A	A								
Length (ft)																					320	280	8000	12500								
Grade (%)																																
Route 6A	x	x	x	x	x	x	x																									
HCM LOS	A	A	B	D	A	B	A																									
HCM Delay	5.9	6.7	10.8	35.4	9.5	16.5	8.1																									
HCM V/C	0.31	0.33	0.56	0.88	0.41	0.65	0.56																									
ICU LOS	A	A	A	C	A	B	B																									
Length (ft)	400	3900	4200	2850	1480	4330	1050																									
Grade (%)																																
Route 6B							x	x	x	x	x	x	x	x																		
HCM LOS							A	A	A	A	B	A	B	A																		
HCM Delay							7.4	9.0	7.8	6.0	16.3	7.1	11.8	0.0																		
HCM V/C							0.48	0.39	0.49	0.36	0.67	0.42	-	-																		
ICU LOS							A	A	A	A	B	A	-	-																		
Length (ft)							1050	2900	2900	1440	800	3520	230	290																		
Grade (%)																																
Route 6C							x														x	x	x	x								
HCM LOS							A														A	A	B	B								
HCM Delay							8.0														0	8.8	10.6	10.4								
HCM V/C							0.54														-	-	0.39	0.45								
ICU LOS							A														-	-	A	A								
Length (ft)							2080														320	280	8000	18900								
Grade (%)																																
Route 7A	x	x	x	x	x	x	x	x																								
HCM LOS	A	A	B	D	A	B	A	A																								
HCM Delay	5.9	6.7	10.8	35.4	9.5	16.5	7.7	5.4																								
HCM V/C	0.31	0.33	0.56	0.88	0.41	0.65	0.52	0.42																								
ICU LOS	A	A	A	C	A	B	A	A																								
Length (ft)	400	3900	4200	2850	1480	4330	1050	2100																								
Grade (%)																																
Route 7B								x	x	x	x	x	x	x																		
HCM LOS								A	A	A	B	A	B	A																		
HCM Delay								4.4	7.8	6.0	16.3	7.1	11.8	0.0																		
HCM V/C								0.33	0.49	0.36	0.67	0.42	-	-																		
ICU LOS								A	A	A	B	A	-	-																		
Length (ft)								2100	2900	1440	800	3520	230	290																		
Grade (%)																																
Route 7C							x	x													x	x	x	x								
HCM LOS							A	A													A	A	B	B								
HCM Delay							7.6	5.4													0	8.8	10.6	10.4								
HCM V/C							0.50	0.42													-	-	0.39	0.45								
ICU LOS							A	A													-	-	A	A								
Length (ft)							2900	2100													320	280	8000	12500								
Grade (%)																																
Route 8A															x	x	x															
HCM LOS															N/D*	N/D*	B															
HCM Delay															N/D*	N/D*	10.1															
HCM V/C															-	-	0.45															
ICU LOS															-	-	B															
Length (ft)																	2,400															
Grade (%)																																
Route 8B																	x	x	x	x												
HCM LOS																	B	C	B	C												
HCM Delay																	11.0	20.9	12.1	25.2												
HCM V/C																	0.54	0.93	0.70	0.80												
ICU LOS																	C	B	B	D												
Length (ft)																	2,400	510	1,030	2,900												
Grade (%)																																
Route 8C							x	x	x												x	x	x	x	x	x	x	x				
HCM LOS							A	A	A												A	A	B	B	C	A	C	C				
HCM Delay							7.6	9.0	8.9												0	8.8	10.6	10.4	34.7	7.8	24.3	30.7				
HCM V/C							0.50	0.39	0.63												-	-	0.39	0.45	0.80	0.47	0.54	0.51				
ICU LOS							A	A	B												-	-	A	A	B	A	A	A				
Length (ft)							2,900	2,900	3,900												320	280	8,000	19,500	3,060	2,800	4,320	1,130				
Grade (%)																																

- Value exceeds maximum calculated delay. N/D*: No Data available from Caltrans

-CONTINUED- TABLE 4-4-2: Haul Route 5A-Route 8C Year 2014: MID-DAY Peak Hour

Freeway Segments (columns 1–36)

	1		2		9		10		11		12		14		15		16		17		18	
	1 I-210 WB between Windsor Ave/Arroyo Blvd and Berkshire Pl	2 I-210 EB between Windsor Ave/Arroyo Blvd and Berkshire Pl	3 I-210 WB Freeway between Lincoln Ave and Windsor Ave	4 I-210 EB Freeway between Lincoln Ave and Windsor Ave	17 I-210 WB between Berkshire Pl and Foothill Blvd.	18 I-210 EB between Berkshire Pl and Foothill Blvd.	19 I-210 WB between Angeles Crest Hwy and the SR-2 Fwy	20 I-210 EB between Angeles Crest Hwy and the SR-2 Fwy	21 SR-2 NB between the I-210 Fwy and Mountain St.	22 SR-2 SB between the I-210 Fwy and Mountain St	23 SR-2 NB between Mountain St and the SR-134 Fwy.	24 SR-2 SB between Mountain St and the SR-134 Fwy.	27 SR-134 WB between the SR-2 Fwy and Glendale Ave.	28 SR-134 EB between the SR-2 Fwy and Glendale Ave.	29 SR-134 WB between the Pacific Ave and Concord St.	30 SR-134 EB between the Pacific Ave and Concord St.	31 SR-134 WB between San Fernando St and the I-5 Fwy.	32 SR-134 EB between San Fernando St and the I-5 Fwy.	33 I-5 SB between the SR-134 Fwy and Western Ave.	34 I-5 NB between the SR-134 Fwy and Western Ave.	35 I-5 NB between North Hollywood Way and Roscoe Blvd.	36 I-5 SB between North Hollywood Way and Roscoe Blvd.
Route 5A	x				x	x	x	x														
HCM LOS	A				B	B	B	N/D*														
HCM Delay	9.9				15.5	14.6	13.6	N/D*														
HCM V/C																						
ICU LOS																						
Length (ft)	4,900				3200	3200	2500															
Grade (%)	1.3				2.3	2.3	0.4															
Route 5B	x				x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
HCM LOS	A				B	B	B	N/D*	B	A	N/D*	A	N/D*	C	C	D	C	N/D*	E	N/D*	D	C
HCM Delay	9.9				15.5	14.6	13.6	N/D*	17.1	8.7	N/D*	10.6	N/D*	25.4	20.4	34.7	21.2	N/D*	36.7	N/D*	26.2	21
HCM V/C																						
ICU LOS																						
Length (ft)	4,900				3200	3200	2500		13400	13400		3450		5900	2100	2100	2300		5700		3650	3650
Grade (%)	1.3				2.3	2.3	0.4		2.7	-2.7		-4		0.7	-1.4	1.4	-1.2		-1		0.5	-0.5
Route 5C	x				x	x	x	x														
HCM LOS	A				B	B	B	N/D*														
HCM Delay	9.9				15.5	14.6	13.6	N/D*														
HCM V/C																						
ICU LOS																						
Length (ft)	4,900				3200	3200	2500															
Grade (%)	1.3				2.3	2.3	0.4															
Route 6A	x				x	x	x	x														
HCM LOS	A				B	B	B	N/D*														
HCM Delay	9.9				15.5	14.6	13.6	N/D*														
HCM V/C																						
ICU LOS																						
Length (ft)	4,900				3200	3200	2500															
Grade (%)	1.3				2.3	2.3	0.4															
Route 6B	x				x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
HCM LOS	A				B	B	B	N/D*	B	A	N/D*	A	N/D*	C	C	D	C	N/D*	E	N/D*	D	C
HCM Delay	9.9				15.5	14.6	13.6	N/D*	17.1	8.7	N/D*	10.6	N/D*	25.4	20.4	34.7	21.2	N/D*	36.7	N/D*	26.2	21
HCM V/C																						
ICU LOS																						
Length (ft)	4,900				3200	3200	2500		13400	13400		3450		5900	2100	2100	2300		5700		3650	3650
Grade (%)	1.3				2.3	2.3	0.4		2.7	-2.7		-4		0.7	-1.4	1.4	-1.2		-1		0.5	-0.5
Route 6C	x				x	x	x	x														
HCM LOS	A				B	B	B	N/D*														
HCM Delay	9.9				15.5	14.6	13.6	N/D*														
HCM V/C																						
ICU LOS																						
Length (ft)	4,900				3200	3200	2500															
Grade (%)	1.3				2.3	2.3	0.4															
Route 7A	x				x	x	x	x														
HCM LOS	A				B	B	B	N/D*														
HCM Delay	9.9				15.5	14.6	13.6	N/D*														
HCM V/C																						
ICU LOS																						
Length (ft)	4,900				3200	3200	2500															
Grade (%)	1.3				2.3	2.3	0.4															
Route 7B	x				x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
HCM LOS	A				B	B	B	N/D*	B	A	N/D*	A	N/D*	C	C	D	C	N/D*	E	N/D*	D	C
HCM Delay	9.9				15.5	14.6	13.6	N/D*	17.1	8.7	N/D*	10.6	N/D*	25.4	20.4	34.7	21.2	N/D*	36.7	N/D*	26.2	21
HCM V/C																						
ICU LOS																						
Length (ft)	4,900				3200	3200	2500		13400	13400		3450		5900	2100	2100	2300		5700		3650	3650
Grade (%)	1.3				2.3	2.3	0.4		2.7	-2.7		-4		0.7	-1.4	1.4	-1.2		-1		0.5	-0.5
Route 7C	x				x	x	x	x														
HCM LOS	A				B	B	B	N/D*														
HCM Delay	9.9				15.5	14.6	13.6	N/D*														
HCM V/C																						
ICU LOS																						
Length (ft)	4,900				3200	3200	2500															
Grade (%)	1.3				2.3	2.3	0.4															
Route 8A	x				x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
HCM LOS	A				B	B	B	N/D*	B	A	N/D*	A	N/D*	C	C	D	C	N/D*	E	N/D*	D	C
HCM Delay	9.9				15.5	14.6	13.6	N/D*	17.1	8.7	N/D*	10.6	N/D*	25.4	20.4	34.7	21.2	N/D*	36.7	N/D*	26.2	21
HCM V/C																						
ICU LOS																						
Length (ft)	4,900				3200	3200	2500		13400	13400		3450		5900	2100	2100	2300		5700		3650	3650
Grade (%)	1.3				2.3	2.3	0.4		2.7	-2.7		-4		0.7	-1.4	1.4	-1.2		-1		0.5	-0.5
Route 8B	x				x	x	x	x														
HCM LOS	A				B	B	B	N/D*														
HCM Delay	9.9				15.5	14.6	13.6	N/D*														
HCM V/C																						
ICU LOS																						
Length (ft)	4,900				3200	3200	2500															
Grade (%)	1.3				2.3	2.3	0.4															
Route 8C	x				x	x	x	x														
HCM LOS	A				B	B	B	N/D*														
HCM Delay	9.9				15.5	14.6	13.6	N/D*														
HCM V/C																						
ICU LOS																						
Length (ft)	4,900				3200	3200	2500															
Grade (%)	1.3				2.3	2.3	0.4															

Freeway Segments (columns 37–56)

	19		20		21		22		23		24		25		26		27		28	
	37 I-5 SB between Sheldon St and the SR-170 Fwy.	38 I-5 NB between Sheldon St and the SR-170 Fwy.	39 I-5 SB between the SR-170 Fwy and Branford St.	40 I-5 NB between the SR-170 Fwy and Branford St.	41 I-210 Fwy between the SR-2 Fwy and Montrose Ave.	42 I-210EB between the SR-2 Fwy and Montrose Ave.	43 I-210 WB between Wheatland Ave and Sunland Blvd.	44 I-210 EB between Wheatland Ave and Sunland Blvd.	45 I-210 WB between Wheatland Blvd and Foothill Blvd.	46 I-210 EB between Wheatland Blvd and Foothill Blvd.	47 I-210 WB between Foothill Blvd and the SR-118 Fwy.	48 I-210 EB between Foothill Blvd and the SR-118 Fwy.	49 SR-118 WB between the I-210 Fwy and Glenoaks Blvd.	50 SR-118 EB between the I-210 Fwy and Glenoaks Blvd.	51 SR-118 WB between San Fernando Rd and the I-5 Fwy.	52 SR-118 EB between San Fernando Rd and the I-210 Fwy.	53 I-5 NB between the SR-118 Fwy and Van Nuys Blvd.	54 I-5 SB between the SR-118 Fwy and Van Nuys Blvd.	55 I-5 NB between Tierra Bella Street and Osborne Street.	56 I-5 SB between Tierra Bella Street and Osborne Street.
Route 5A					x	x	x	x												
HCM LOS					N/D*	N/D*	N/D*	B												
HCM Delay					N/D*	N/D*	N/D*	11.2												
HCM V/C																				
ICU LOS																				
Length (ft)								8800												
Grade (%)								2.3												
Route 5B																				
HCM LOS																				
HCM Delay																				
HCM V/C																				
ICU LOS																				
Length (ft)																				
Grade (%)																				
Route 5C					x	x	x	x												
HCM LOS					N/D*	N/D*	N/D*	B												
HCM Delay					N/D*	N/D*	N/D*	11.2												
HCM V/C																				
ICU LOS																				
Length (ft)								8800												
Grade (%)								2.3												
Route 6A					x	x	x	x												
HCM LOS					N/D*	N/D*	N/D*	B												
HCM Delay					N/D*	N/D*	N/D*	11.2												
HCM V/C																				
ICU LOS																				
Length (ft)								8800												
Grade (%)								2.3												
Route 6B																				
HCM LOS																				
HCM Delay																				
HCM V/C																				
ICU LOS																				
Length (ft)																				
Grade (%)																				
Route 6C					x	x	x	x												
HCM LOS					N/D*	N/D*	N/D*	B												
HCM Delay					N/D*	N/D*	N/D*	11.2												
HCM V/C																				
ICU LOS																				
Length (ft)								8800												
Grade (%)								2.3												
Route 7A					x	x	x	x												
HCM LOS					N/D*	N/D*	N/D*	B												
HCM Delay					N/D*	N/D*	N/D*	11.2												
HCM V/C																				
ICU LOS																				
Length (ft)								8800												
Grade (%)								2.3												
Route 7B																				
HCM LOS																				
HCM Delay																				
HCM V/C																				
ICU LOS																				
Length (ft)																				
Grade (%)																				
Route 7C					x	x	x	x												
HCM LOS					N/D*	N/D*	N/D*	B												
HCM Delay					N/D*	N/D*	N/D*	11.2												
HCM V/C																				
ICU LOS																				
Length (ft)								8800												
Grade (%)								2.3												
Route 8A	x	x	x	x																
HCM LOS	N/D*	C	F	N/D*																
HCM Delay	N/D*	23.5	-	N/D*																
HCM V/C																				
ICU LOS																				
Length (ft)		1800																		
Grade (%)		2.5																		
Route 8B					x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
HCM LOS					N/D*	N/D*	N/D*	B	B	B	B	N/D*	N/D*	N/D*	C	N/D*	F	C	F	N/D*
HCM Delay					N/D*	N/D*	N/D*	11.2	14.2	14.1	13.7	N/D*	N/D*	N/D*	19.9	N/D*	47.5	19.8	53.4	N/D*
HCM V/C																				
ICU LOS																				
Length (ft)								8800	8400	8400	9700				5100		4500	4500	1650	
Grade (%)								2.3	-0.4	-0.4	-0.8				1.5		0.2	-0.2	1	
Route 8C					x	x	x	x												
HCM LOS					N/D*	N/D*	N/D*	B												
HCM Delay					N/D*	N/D*	N/D*	11.2												
HCM V/C																				
ICU LOS																				
Length (ft)								8800												
Grade (%)								2.3												

\- Value exceeds maximum calculated delay. N/D*: No Data available from Caltrans

-CONTINUED- TABLE 4-4-2: Haul Route 5A-Route 8C Year 2014: MID-DAY Peak Hour

	Ramps																																
	21 Westbound I-210 Freeway Transition Ramp to the Southbound SR-2 Freeway mainline. (Diverge Point)	22 Northbound SR-2 Freeway Transition Ramp to the Eastbound I-210 Freeway mainline. (Merge Point)	23 Westbound I-210 Freeway Transition Ramp to the Southbound SR-2 Freeway mainline. (Merge Point)	24 Northbound SR-2 Freeway Transition Ramp to the Eastbound I-210 Freeway mainline. (Diverge Point)	26 Westbound and Eastbound SR-134 Freeway Transition Ramp to the Northbound SR-2 Freeway mainline. *(Merge Point)*	31 Southbound SR-2 Freeway Transition Ramp to the Westbound SR-134 Freeway mainline. *(Merge Point)*	32 Eastbound SR-134 Freeway Transition Ramp to the Northbound SR-2 Freeway mainline. *(Diverge Point)*	33 Westbound SR-134 Freeway Transition Ramp to the Northbound I-5 Freeway mainline. *(Diverge Point)*	34 Southbound I-5 Freeway Transition Ramp to the Eastbound SR-134 Freeway mainline. *(Merge Point)*	35 Westbound SR-134 Freeway Transition Ramp to the Northbound I-5 Freeway mainline. *(Merge Point)*	36 Southbound I-5 Freeway Transition Ramp to the Eastbound SR-134 Freeway mainline. *(Diverge Point)*	37 Roscoe Blvd/Glenoaks Blvd and the Northbound I-5 Freeway mainline Off ramp. (Diverge Point)	38 Roscoe Blvd/Glenoaks Blvd and the Southbound I-5 Freeway mainline On-ramp. *(Merge Point)*	39 Branford Street and the Southbound I-5 Freeway mainline On-ramp. *(Merge Point)*	40 Branford Street and the Northbound I-5 Freeway mainline Off-ramp. *(Diverge Point)*	41 Wheatland Ave and the Westbound I-210 Freeway mainline Off-ramp. (Diverge Point)	42 Wheatland Avenue and the Eastbound I-210 Freeway mainline On-ramp. Merge Point)	43 Foothill Blvd/Osborne Street and the Westbound I-210 Freeway mainline Off-ramp. (Diverge Point)	44 Foothill Blvd/Osborne Street and the Eastbound I-210 Freeway mainline On-ramp. (Merge Point)	45 Westbound I-210 Freeway Transition Ramp to the Westbound SR-118 Freeway mainline. *(Diverge Point)*	46 Eastbound SR-118 Freeway Transition Ramp to the Eastbound I-210 Freeway mainline. (Merge Point)	47 Westbound I-210 Freeway Transition Ramp to the Westbound SR-118 Freeway mainline. *(Merge Point)*	48 Eastbound SR-118 Freeway Transition Ramp to the Eastbound I-210 Freeway mainline. (Diverge Point)	49 Westbound SR-118 Freeway Transition Ramp to the Southbound I-5 Freeway mainline. (Diverge Point)	50 Northbound I-5 Freeway Transition Ramp to the Eastbound SR-118 Freeway mainline. (Merge Point)	51 Westbound SR-118 Freeway Transition Ramp to the Southbound I-5 Freeway mainline. (Merge Point)	52 Northbound I-5 Freeway Transition Ramp to the Eastbound SR-118 Freeway mainline. (Diverge Point)	53 Osborne Street and the Southbound I-5 Freeway mainline Off-ramp. *(Diverge Point)*	54 Osborne Street and the Northbound I-5 Freeway mainline On-ramp. *(Merge Point)*	**Route Total**
Route 5A																				x	x												
HCM LOS																				C	B												
HCM Delay																				21	16.8												283
HCM V/C																																	
ICU LOS																																	
Length (ft)																				1050	885												59,895
Grade (%)																																	
Route 5B	x	x	x	x	x	x	x	x	x	x	x	x	x																				
HCM LOS	A	C	A	B	N/D*	N/D*	B	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*																				
HCM Delay	18.7	22.8	1.2	14.7	N/D*	N/D*	14.9	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*																				467
HCM V/C																																	
ICU LOS																																	
Length (ft)	5700	4000	5700	4000			5600																										119,530
Grade (%)																																	
Route 5C																				x	x												
HCM LOS																				C	C												
HCM Delay																				20.9	20.1												165
HCM V/C																																	
ICU LOS																																	
Length (ft)																				1300	1060												66,840
Grade (%)																																	
Route 6A																				x	x												
HCM LOS																				C	B												
HCM Delay																				21	16.8												283
HCM V/C																																	
ICU LOS																																	
Length (ft)																				1050	885												60,555
Grade (%)																																	
Route 6B	x	x	x	x	x	x	x	x	x	x	x	x	x																				
HCM LOS	A	C	A	B	N/D*	N/D*	B	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*																				
HCM Delay	18.7	22.8	1.2	14.7	N/D*	N/D*	14.9	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*																				467
HCM V/C																																	
ICU LOS																																	
Length (ft)	5700	4000	5700	4000			5600																										120,190
Grade (%)																																	
Route 6C																				x	x												
HCM LOS																				C	C												
HCM Delay																				20.9	20.1												155
HCM V/C																																	
ICU LOS																																	
Length (ft)																				1300	1060												79,640
Grade (%)																																	
Route 7A																				x	x												
HCM LOS																				C	B												
HCM Delay																				21	16.8												298
HCM V/C																																	
ICU LOS																																	
Length (ft)																				1050	885												65,155
Grade (%)																																	
Route 7B	x	x	x	x	x	x	x	x	x	x	x	x	x																				
HCM LOS	A	C	A	B	N/D*	N/D*	B	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*																				
HCM Delay	18.7	22.8	1.2	14.7	N/D*	N/D*	14.9	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*																				22,908
HCM V/C																																	
ICU LOS																																	
Length (ft)	5700	4000	5700	4000			5600																										94,450
Grade (%)																																	
Route 7C																				x	x												
HCM LOS																				C	C												
HCM Delay																				20.9	20.1												51,986
HCM V/C																																	
ICU LOS																																	
Length (ft)																				1300	1060												24,960
Grade (%)																																	
Route 8A	x	x	x	x	x	x	x	x	x	x	x			x	x																		
HCM LOS	A	C	A	B	N/D*	N/D*	B	N/D*	N/D*	N/D*	N/D*			N/D*	N/D*																		
HCM Delay	18.7	22.8	1.2	14.7	N/D*	N/D*	14.9	N/D*	N/D*	N/D*	N/D*			N/D*	N/D*																		2,757
HCM V/C																																	
ICU LOS																																	
Length (ft)	5700	4000	5700	4000			5600																										93,050
Grade (%)																																	
Route 8B																						x	x	x	x	x	x	x	x	x	x		
HCM LOS																						N/D*	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*	B	D		
HCM Delay																						N/D*	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*	19.1	34.8		13,471
HCM V/C																																	
ICU LOS																																	
Length (ft)																														770	830		66,450
Grade (%)																																	
Route 8C																				x	x												
HCM LOS																				C	C												
HCM Delay																				20.9	20.1												98,006
HCM V/C																																	
ICU LOS																																	
Length (ft)																				1300	1060												24,960
Grade (%)																																	

- Value exceeds maximum calculated delay.

N/D*: No Data available from Caltrans

TABLE 4-4-3: Haul Route 5A-Route 8C Year 2014: PM Peak Hour

	Intersection																													
	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51		
	Foothill Blvd and I-210 Westbound Ramps	Foothill Blvd and I-210 Eastbound Ramps	Foothill Blvd and Osborne Street	Glenoaks Blvd and Osborne Street	Glenoaks Blvd and Montague Street	Glenoaks Blvd and Branford Street	Glenoaks Blvd and Sheldon Street	Glenoaks Blvd and Peoria Street	Glenoaks Blvd and Tuxford Street	Glenoaks Blvd and Penrose Street	Glenoaks Blvd and Sunland Blvd	Glenoaks Blvd and Roscoe Blvd	Roscoe Blvd and I-5 Freeway Northbound Ramps	Roscoe Blvd and I-5 Freeway Southbound Ramps	Branford Street and I-5 Freeway Southbound Ramps	Branford Street and I-5 Freeway Northbound Ramps	Branford Street and Laurel Canyon Blvd	Osborne Street and I-5 Freeway Southbound Ramps	Osborne Street and I-5 Freeway Northbound Ramps	Osborne Street and Laurel Canyon Blvd	Wheatland Ave and I-210 Freeway Eastbound Ramps5	Wheatland Ave and I-210 Freeway Westbound Ramps	Wheatland Ave and Foothill Blvd	Wentworth Street and Foothill Blvd	Tuxford Street and San Fernando Road	Lankershim Blvd and San Fernando Road	Sheldon Street and San Fernando Road	Branford Street and San Fernando Road		
Route 5A	x	x	x	x	x	x	x																							
HCM LOS	A	A	C	E	A	C	C																							
HCM Delay	8.5	7.9	21.1	55.4	10.0	21.9	21.8																							
HCM V/C	0.56	0.44	0.88	0.95	0.62	0.91	1.10																							
ICU LOS	A	A	D	E	C	D	D																							
Length (ft)	400	3900	4200	2850	1480	4330	720																							
Grade (%)																														
Route 5B							x	x	x	x	x	x	x	x																
HCM LOS							B	B	A	B	C	B	C	A																
HCM Delay							13.6	16.9	10.2	11.3	27.4	10.6	26.3	0.0																
HCM V/C							0.86	0.53	0.67	0.70	0.92	0.65	-	-																
ICU LOS							D	A	C	B	D	A	-	-																
Length (ft)							720	2900	2900	1440	800	3520	230	290																
Grade (%)																														
Route 5C																					x	x	x	x						
HCM LOS																					A	B	B	A						
HCM Delay																					0.0	10.2	10.0	9.7						
HCM V/C																					-	-	0.47	0.48						
ICU LOS																					-	-	A	A						
Length (ft)																					320	280	8000	12500						
Grade (%)																														
Route 6A	x	x	x	x	x	x	x																							
HCM LOS	A	A	C	E	A	C	C																							
HCM Delay	8.5	7.9	21.1	55.4	10.0	21.9	21.8																							
HCM V/C	0.56	0.44	0.88	0.95	0.62	0.91	1.10																							
ICU LOS	A	A	D	E	C	D	D																							
Length (ft)	400	3900	4200	2850	1480	4330	1050																							
Grade (%)																														
Route 6B							x	x	x	x	x	x	x	x																
HCM LOS							B	B	A	B	C	B	C	A																
HCM Delay							13.7	16.9	10.2	11.3	27.4	10.6	26.3	0.0																
HCM V/C							0.86	0.53	0.67	0.7	0.92	0.65	-	-																
ICU LOS							D	A	C	B	D	A	-	-																
Length (ft)							1050	2900	2900	1440	800	3520	230	290																
Grade (%)																														
Route 6C							x														x	x	x	x						
HCM LOS							B														A	B	B	A						
HCM Delay							15.9														0	10.2	10	9.7						
HCM V/C							0.89														-	-	0.47	0.48						
ICU LOS							D														-	-	A	A						
Length (ft)							2080														320	280	8000	18900						
Grade (%)																														
Route 7A	x	x	x	x	x	x	x	x																						
HCM LOS	A	A	C	E	A	C	B	A																						
HCM Delay	8.5	7.9	21.1	55.4	10.0	21.9	14.7	6.4																						
HCM V/C	0.56	0.44	0.88	0.95	0.62	0.91	0.86	0.56																						
ICU LOS	A	A	D	E	C	D	D	A																						
Length (ft)	400	3900	4200	2850	1480	4330	1050	2100																						
Grade (%)																														
Route 7B								x	x	x	x	x	x	x																
HCM LOS								A	A	B	C	B	C	A																
HCM Delay								5.3	10.2	11.3	27.4	10.6	26.3	0.0																
HCM V/C								0.48	0.67	0.7	0.92	0.65	-	-																
ICU LOS								A	C	B	D	A	-	-																
Length (ft)								2100	2900	1440	800	3520	230	290																
Grade (%)																														
Route 7C							x	x													x	x	x	x						
HCM LOS							B	A													A	B	B	A						
HCM Delay							13.7	6.4													0	10.2	10	9.7						
HCM V/C							0.86	0.56													-	-	0.47	0.48						
ICU LOS							D	A													-	-	A	A						
Length (ft)							2900	2100													320	280	8000	12500						
Grade (%)																														
Route 8A															x	x	x													
HCM LOS															N/D*	N/D*	B													
HCM Delay															N/D*	N/D*	17.6													
HCM V/C															-	-	0.88													
ICU LOS															-	-	E													
Length (ft)																	2,480													
Grade (%)																														
Route 8B																	x	x	x	x										
HCM LOS																	D	D	B	E										
HCM Delay																	37.2	37.0	19.3	66.3										
HCM V/C																	1.21	1.00	0.89	1.03										
ICU LOS																	F*	E	D	F										
Length (ft)																	2,400	510	1,030	2,900										
Grade (%)																														
Route 8C							x	x	x												x	x	x	x	x	x	x	x		
HCM LOS							B	B	B												A	B	B	A	C	A	E	F		
HCM Delay							13.7	16.9	11.1												0	10.2	10	9.7	34.8	9.6	58.1	84.0		
HCM V/C							0.86	0.53	0.81												-	-	0.47	0.48	0.75	0.55	1.03	0.99		
ICU LOS							D	A	C												-	-	A	A	C	A	E	D		
Length (ft)							2,900	2,900	3,900												320	280	8,000	19,500	3,060	2,800	4,320	1,130		
Grade (%)																														

- Value exceeds maximum calculated delay. N/D*: No Data available from Caltrans

-CONTINUED- TABLE 4-4-3: Haul Route 5A-Route 8C Year 2014: PM Peak Hour

Freeway Segments (segments 1–36)

	1		2		9		10		11		12		14		15		16		17		18	
	1	2	3	4	17	18	19	20	21	22	23	24	27	28	29	30	31	32	33	34	35	36
	I-210 WB between Windsor Ave/Arroyo Blvd and Berkshire Pl	I-210 EB between Windsor Ave/Arroyo Blvd and Berkshire Pl	I-210 WB Freeway between Lincoln Ave and Windsor Ave	I-210 EB Freeway between Lincoln Ave and Windsor Ave	I-210 WB between Berkshire Pl and Foothill Blvd.	I-210 EB between Berkshire Pl and Foothill Blvd.	I-210 WB between Angeles Crest Hwy and the SR-2 Fwy	I-210 EB between Angeles Crest Hwy and the SR-2 Fwy	SR-2 NB between the I-210 Fwy and Mountain St.	SR-2 SB between the I-210 Fwy and Mountain St	SR-2 NB between Mountain St and the SR-134 Fwy.	SR-2 SB between Mountain St and the SR-134 Fwy.	SR-134 WB between the SR-2 Fwy and Glendale Ave.	SR-134 EB between the SR-2 Fwy and Glendale Ave.	SR-134 WB between the Pacific Ave and Concord St.	SR-134 EB between the Pacific Ave and Concord St.	SR-134 WB between San Fernando St and the I-5 Fwy.	SR-134 EB between San Fernando St and the I-5 Fwy.	I-5 SB between the SR-134 Fwy and Western Ave.	I-5 NB between the SR-134 Fwy and Western Ave.	I-5 NB between North Hollywood Way and Roscoe Blvd.	I-5 SB between North Hollywood Way and Roscoe Blvd.
Route 5A	x				x	x	x	x														
HCM LOS	B				C	B	C	N/D*														
HCM Delay	16.4				25.4	17.2	23.2	N/D*														
HCM V/C																						
ICU LOS																						
Length (ft)	4,900				3200	3200	2500															
Grade (%)	1.3				2.3	2.3	0.4															
Route 5B	x				x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
HCM LOS	B				C	B	C	N/D*	C	B	N/D*	B	N/D*	D	C	E	F	N/D*	E	N/D*	D	C
HCM Delay	16.4				25.4	17.2	23.2	N/D*	18.6	11.5	N/D*	13.2	N/D*	32.7	22.1	39.7	52.7	N/D*	35.3	N/D*	29.6	19.3
HCM V/C																						
ICU LOS																						
Length (ft)	4,900				3200	3200	2500		13400	13400		3450		5900	2100	2100	2300		5700		3650	3650
Grade (%)	1.3				2.3	2.3	0.4		2.7	-2.7		-4		0.7	-1.4	1.4	-1.2		-1		0.5	-0.5
Route 5C	x				x	x	x	x														
HCM LOS	B				C	B	C	N/D*														
HCM Delay	16.4				25.4	17.2	23.2	N/D*														
HCM V/C																						
ICU LOS																						
Length (ft)	4,900				3200	3200	2500															
Grade (%)	1.3				2.3	2.3	0.4															
Route 6A	x				x	x	x	x														
HCM LOS	B				C	B	C	N/D*														
HCM Delay	16.4				25.4	17.2	23.2	N/D*														
HCM V/C																						
ICU LOS																						
Length (ft)	4,900				3200	3200	2500															
Grade (%)	1.3				2.3	2.3	0.4															
Route 6B	x				x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
HCM LOS	B				C	B	C	N/D*	C	B	N/D*	B	N/D*	D	C	E	F	N/D*	E	N/D*	D	C
HCM Delay	16.4				25.4	17.2	23.2	N/D*	18.6	11.5	N/D*	13.2	N/D*	32.7	22.1	39.7	52.7	N/D*	35.3	N/D*	29.6	19.3
HCM V/C																						
ICU LOS																						
Length (ft)	4,900				3200	3200	2500		13400	13400		3450		5900	2100	2100	2300		5700		3650	3650
Grade (%)	1.3				2.3	2.3	0.4		2.7	-2.7		-4		0.7	-1.4	1.4	-1.2		-1		0.5	-0.5
Route 6C	x				x	x	x	x														
HCM LOS	B				C	B	C	N/D*														
HCM Delay	16.4				25.4	17.2	23.2	N/D*														
HCM V/C																						
ICU LOS																						
Length (ft)	4,900				3200	3200	2500															
Grade (%)	1.3				2.3	2.3	0.4															
Route 7A	x				x	x	x	x														
HCM LOS	B				C	B	C	N/D*														
HCM Delay	16.4				25.4	17.2	23.2	N/D*														
HCM V/C																						
ICU LOS																						
Length (ft)	4,900				3200	3200	2500															
Grade (%)	1.3				2.3	2.3	0.4															
Route 7B	x				x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
HCM LOS	B				C	B	C	N/D*	C	B	N/D*	B	N/D*	D	C	E	F	N/D*	E	N/D*	D	C
HCM Delay	16.4				25.4	17.2	23.2	N/D*	18.6	11.5	N/D*	13.2	N/D*	32.7	22.1	39.7	52.7	N/D*	35.3	N/D*	29.6	19.3
HCM V/C																						
ICU LOS																						
Length (ft)	4,900				3200	3200	2500		13400	13400		3450		5900	2100	2100	2300		5700		3650	3650
Grade (%)	1.3				2.3	2.3	0.4		2.7	-2.7		-4		0.7	-1.4	1.4	-1.2		-1		0.5	-0.5
Route 7C	x				x	x	x	x														
HCM LOS	B				C	B	C	N/D*														
HCM Delay	16.4				25.4	17.2	23.2	N/D*														
HCM V/C																						
ICU LOS																						
Length (ft)	4,900				3200	3200	2500															
Grade (%)	1.3				2.3	2.3	0.4															
Route 8A	x				x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
HCM LOS	B				C	B	C	N/D*	C	B	N/D*	B	N/D*	D	C	E	F	N/D*	E	N/D*	D	C
HCM Delay	16.4				25.4	17.2	23.2	N/D*	18.6	11.5	N/D*	13.2	N/D*	32.7	22.1	39.7	52.7	N/D*	35.3	N/D*	29.6	19.3
HCM V/C																						
ICU LOS																						
Length (ft)	4,900				3200	3200	2500		13400	13400		3450		5900	2100	2100	2300		5700		3650	3650
Grade (%)	1.3				2.3	2.3	0.4		2.7	-2.7		-4		0.7	-1.4	1.4	-1.2		-1		0.5	-0.5
Route 8B	x				x	x	x	x														
HCM LOS	B				C	B	C	N/D*														
HCM Delay	16.4				25.4	17.2	23.2	N/D*														
HCM V/C																						
ICU LOS																						
Length (ft)	4,900				3200	3200	2500															
Grade (%)	1.3				2.3	2.3	0.4															
Route 8C	x				x	x	x	x														
HCM LOS	B				C	B	C	N/D*														
HCM Delay	16.4				25.4	17.2	23.2	N/D*														
HCM V/C																						
ICU LOS																						
Length (ft)	4,900				3200	3200	2500															
Grade (%)	1.3				2.3	2.3	0.4															

Freeway Segments (segments 37–56)

	19		20		21		22		23		24		25		26		27		28	
	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56
	I-5 SB between Sheldon St and the SR-170 Fwy.	I-5 NB between Sheldon St and the SR-170 Fwy.	I-5 SB between the SR-170 Fwy and Branford St.	I-5 NB between the SR-170 Fwy and Branford St.	I-210 Fwy between the SR-2 Fwy and Montrose Ave.	I-210EB between the SR-2 Fwy and Montrose Ave.	I-210 WB between Wheatland Ave and Sunland Blvd.	I-210 EB between Wheatland Ave and Sunland Blvd.	I-210 WB between Wheatland Blvd and Foothill Blvd.	I-210 EB between Wheatland Blvd and Foothill Blvd.	I-210 WB between Foothill Blvd and the SR-118 Fwy.	I-210 EB between Foothill Blvd and the SR-118 Fwy.	SR-118 WB between the I-210 Fwy and Glenoaks Blvd.	SR-118 EB between the I-210 Fwy and Glenoaks Blvd.	SR-118 WB between San Fernando Rd and the I-5 Fwy.	SR-118 EB between San Fernando Rd and the I-210 Fwy.	I-5 NB between the SR-118 Fwy and Van Nuys Blvd.	I-5 SB between the SR-118 Fwy and Van Nuys Blvd.	I-5 NB between Tierra Bella Street and Osborne Street.	I-5 SB between Tierra Bella Street and Osborne Street.
Route 5A					x	x	x	x												
HCM LOS					N/D*	N/D*	N/D*	B												
HCM Delay					N/D*	N/D*	N/D*	15.5												
HCM V/C																				
ICU LOS																				
Length (ft)								8800												
Grade (%)								2.3												
Route 5B																				
HCM LOS																				
HCM Delay																				
HCM V/C																				
ICU LOS																				
Length (ft)																				
Grade (%)																				
Route 5C					x	x	x	x												
HCM LOS					N/D*	N/D*	N/D*	B												
HCM Delay					N/D*	N/D*	N/D*	15.5												
HCM V/C																				
ICU LOS																				
Length (ft)								8800												
Grade (%)								2.3												
Route 6A					x	x	x	x												
HCM LOS					N/D*	N/D*	N/D*	B												
HCM Delay					N/D*	N/D*	N/D*	15.5												
HCM V/C																				
ICU LOS																				
Length (ft)								8800												
Grade (%)								2.3												
Route 6B																				
HCM LOS																				
HCM Delay																				
HCM V/C																				
ICU LOS																				
Length (ft)																				
Grade (%)																				
Route 6C					x	x	x	x												
HCM LOS					N/D*	N/D*	N/D*	B												
HCM Delay					N/D*	N/D*	N/D*	15.5												
HCM V/C																				
ICU LOS																				
Length (ft)								8800												
Grade (%)								2.3												
Route 7A					x	x	x	x												
HCM LOS					N/D*	N/D*	N/D*	B												
HCM Delay					N/D*	N/D*	N/D*	15.5												
HCM V/C																				
ICU LOS																				
Length (ft)								8800												
Grade (%)								2.3												
Route 7B																				
HCM LOS																				
HCM Delay																				
HCM V/C																				
ICU LOS																				
Length (ft)																				
Grade (%)																				
Route 7C					x	x	x	x												
HCM LOS					N/D*	N/D*	N/D*	B												
HCM Delay					N/D*	N/D*	N/D*	15.5												
HCM V/C																				
ICU LOS																				
Length (ft)								8800												
Grade (%)								2.3												
Route 8A	x	x	x	x																
HCM LOS	N/D*	C	F	N/D*																
HCM Delay	N/D*	19.3	-	N/D*																
HCM V/C																				
ICU LOS																				
Length (ft)		1800																		
Grade (%)		2.5																		
Route 8B					x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
HCM LOS					N/D*	N/D*	N/D*	B	D	C	C	N/D*	N/D*	N/D*	E	N/D*	F	C	F	N/D*
HCM Delay					N/D*	N/D*	N/D*	15.5	30.5	20.8	25	N/D*	N/D*	N/D*	41.4	N/D*	50	22.3	54.2	N/D*
HCM V/C																				
ICU LOS																				
Length (ft)								8800	8400	8400	9700				5100		4500	4500	1650	
Grade (%)								2.3	-0.4	-0.4	-0.8				1.5		0.2	-0.2	1	
Route 8C					x	x	x	x												
HCM LOS					N/D*	N/D*	N/D*	B												
HCM Delay					N/D*	N/D*	N/D*	15.5												
HCM V/C																				
ICU LOS																				
Length (ft)								8800												
Grade (%)								2.3												

- Value exceeds maximum calculated delay. N/D*: No Data available from Caltrans

-CONTINUED- TABLE 4-4-3: Haul Route 5A-Route 8C Year 2014: PM Peak Hour

	Ramps																																		
	21	22	23	24	26	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	Route Total
	Westbound I-210 Freeway Transition Ramp to the Southbound SR-2 Freeway mainline. (Diverge Point)	Northbound SR-2 Freeway Transition Ramp to the Eastbound I-210 Freeway mainline. (Merge Point)	Westbound I-210 Freeway Transition Ramp to the Southbound SR-2 Freeway mainline. (Merge Point)	Northbound SR-2 Freeway Transition Ramp to the Eastbound I-210 Freeway mainline. (Diverge Point)	Westbound and Eastbound SR-134 Freeway Transition Ramp to the Northbound SR-2 Freeway mainline. *(Merge Point)*	Southbound SR-2 Freeway Transition Ramp to the Westbound SR-134 Freeway mainline. *(Merge Point)*	Eastbound SR-134 Freeway Transition Ramp to the Northbound SR-2 Freeway mainline. *(Diverge Point)*	Westbound SR-134 Freeway Transition Ramp to the Northbound I-5 Freeway mainline. *(Diverge Point)*	Southbound I-5 Freeway Transition Ramp to the Eastbound SR-134 Freeway mainline. *(Merge Point)*	Westbound SR-134 Freeway Transition Ramp to the Northbound I-5 Freeway mainline. *(Merge Point)*	Southbound I-5 Freeway Transition Ramp to the Eastbound SR-134 Freeway mainline. *(Diverge Point)*	Roscoe Blvd/Glenoaks Blvd and the Northbound I-5 Freeway mainline Off-ramp. (Diverge Point)	Roscoe Blvd/Glenoaks Blvd and the Southbound I-5 Freeway mainline On-ramp. *(Merge Point)*	Branford Street and the Southbound I-5 Freeway mainline On-ramp. *(Merge Point)*	Branford Street and the Northbound I-5 Freeway mainline Off-ramp. *(Diverge Point)*	Wheatland Ave and the Westbound I-210 Freeway mainline Off-ramp. (Diverge Point)	Wheatland Avenue and the Eastbound I-210 Freeway mainline On-ramp. Merge Point)	Foothill Blvd/Osborne Street and the Westbound I-210 Freeway mainline Off-ramp. (Diverge Point)	Foothill Blvd/Osborne Street and the Eastbound I-210 Freeway mainline On-ramp. (Merge Point)	Westbound I-210 Freeway Transition Ramp to the Westbound SR-118 Freeway mainline. *(Diverge Point)*	Eastbound SR-118 Freeway Transition Ramp to the Eastbound I-210 Freeway mainline. (Merge Point)	Westbound I-210 Freeway Transition Ramp to the Westbound SR-118 Freeway mainline. *(Merge Point)*	Eastbound SR-118 Freeway Transition Ramp to the Eastbound I-210 Freeway mainline. (Diverge Point)	Westbound SR-118 Freeway Transition Ramp to the Southbound I-5 Freeway mainline. (Diverge Point)	Northbound I-5 Freeway Transition Ramp to the Eastbound SR-118 Freeway mainline. (Merge Point)	Westbound SR-118 Freeway Transition Ramp to the Southbound I-5 Freeway mainline. (Merge Point)	Northbound I-5 Freeway Transition Ramp to the Eastbound SR-118 Freeway mainline. (Diverge Point)	Osborne Street and the Southbound I-5 Freeway mainline Off-ramp. *(Diverge Point)*	Osborne Street and the Northbound I-5 Freeway mainline On-ramp. *(Merge Point)*	
Route 5A																		x	x											
HCM LOS																		D	C											
HCM Delay																		34.8	20.7											438
HCM V/C																														
ICU LOS																														
Length (ft)																		1050	885											59,895
Grade (%)																														
Route 5B	x	x	x	x	x	x	x	x	x	x	x	x	x																	
HCM LOS	A	C	A	B	N/D*	N/D*	C	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*																	
HCM Delay	11	24.3	5.6	18.9	N/D*	N/D*	23.8	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*																	647
HCM V/C																														
ICU LOS																														
Length (ft)	5700	4000	5700	4000			5600																							119,530
Grade (%)																														
Route 5C																x	x													
HCM LOS																D	C													
HCM Delay																32.4	25.5													215
HCM V/C																														
ICU LOS																														
Length (ft)																1300	1060													66,840
Grade (%)																														
Route 6A																		x	x											
HCM LOS																		D	C											
HCM Delay																		34.8	20.7											438
HCM V/C																														
ICU LOS																														
Length (ft)																		1050	885											60,555
Grade (%)																														
Route 6B	x	x	x	x	x	x	x	x	x	x	x	x	x	x																
HCM LOS	A	C	A	B	N/D*	N/D*	C	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*																	
HCM Delay	11	24.3	5.6	18.9	N/D*	N/D*	23.8	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*																	647
HCM V/C																														
ICU LOS																														
Length (ft)	5700	4000	5700	4000			5600																							120,190
Grade (%)																														
Route 6C																x	x													
HCM LOS																D	C													
HCM Delay																32.4	25.5													206
HCM V/C																														
ICU LOS																														
Length (ft)																1300	1060													79,640
Grade (%)																														
Route 7A																		x	x											
HCM LOS																		D	C											
HCM Delay																		34.8	20.7											445
HCM V/C																														
ICU LOS																														
Length (ft)																		1050	885											65,155
Grade (%)																														
Route 7B	x	x	x	x	x	x	x	x	x	x	x	x	x																	
HCM LOS	A	C	A	B	N/D*	N/D*	C	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*																	
HCM Delay	11	24.3	5.6	18.9	N/D*	N/D*	23.8	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*																	23,001
HCM V/C																														
ICU LOS																														
Length (ft)	5700	4000	5700	4000			5600																							94,450
Grade (%)																														
Route 7C																x	x													
HCM LOS																D	C													
HCM Delay																32.4	25.5													52,036
HCM V/C																														
ICU LOS																														
Length (ft)																1300	1060													2,360
Grade (%)																														
Route 8A	x	x	x	x	x	x	x	x	x	x	x			x	x															
HCM LOS	A	C	A	B	N/D*	N/D*	C	N/D*	N/D*	N/D*	N/D*			N/D*	N/D*															
HCM Delay	11	24.3	5.6	18.9	N/D*	N/D*	23.8	N/D*	N/D*	N/D*	N/D*			N/D*	N/D*															2,564
HCM V/C																														
ICU LOS	5700	4000	5700	4000			5600																							
Length (ft)																														0
Grade (%)																														
Route 8B																				x	x	x	x	x	x	x	x	x	x	
HCM LOS																				N/D*	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*	C	D	
HCM Delay																				N/D*	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*	24.4	34.9	13,229
HCM V/C																														
ICU LOS																														
Length (ft)																												770	830	1,600
Grade (%)																														
Route 8C																x	x													
HCM LOS																D	C													
HCM Delay																32.4	25.5													97,958
HCM V/C																														
ICU LOS																														
Length (ft)																1300	1060													2,360
Grade (%)																														

- Value exceeds maximum calculated delay.

N/D*: No Data available from Caltrans

5. PROJECT IMPACTS, SUMMARY, AND MITIGATIONS AND POTENTIAL IMPACT REDUCTION MEASURES

This study has examined and identified regional impacts related to the Devil's Gate Reservoir Sediment Removal and Management Project, and identified traffic impacts due to the expected increase of truck traffic generated along proposed routes. Route recommendations considered access and traffic mitigation in the impacted intersections, freeway segments, and ramps.

The Devil's Gate Dam and Reservoir site is located to the north east of the I-210 Freeway on Oak Grove Drive between Berkshire Place and the Foothill Freeway Overpass. Access to the project site will be obtained from Oak Grove Drive. Due to the project site vicinity to residential communities north, south, and east of the site further attention to route designation was required. The sediment and organic materials removed from the dam is proposed to be transported to eight disposal sites within the county of Los Angeles.

Twenty-six (26) haul routes were proposed and evaluated for the transportation of the sediment and organic materials to the proposed disposal sites. Along the 26 haul routes 52 intersections were identified for analysis. Twenty-eight (28) freeway segments along the I-210 Freeway, I-5 Freeway, SR-2 Freeway, and SR-134 Freeway and fifty-four (54) on and off-ramps within those freeway segments were also identified for analysis.

The hours of operation are 7 AM to 7 PM Monday through Friday and 8 AM to 5 PM on Saturday. The operational period is divided into three peak hour periods. The AM peak period consists of the hours 7 AM to 10 AM. The MIDDAY peak period consists of the hours 10 AM to 4 PM. The PM peak period consists of the hours 4 PM to 7 PM. Removal of sediment and organic materials off-site is expected to take place between these hours.

The proposed Haul Trucks are Double Dump Trucks estimated to haul 18 cubic yards of sediment. The trucks are anticipated to haul approximately 7.65 thousand cubic yards per day. During the sediment removal phase of the project approximately up to 4 million cubic yards of sediment and organic materials will be removed by 50 trucks per hour.

This traffic study analyzed the existing conditions, the existing conditions with project trips (existing + project conditions), and the Year 2014 project conditions for the identified study intersections, freeway segments, and ramps. Based on the results of the traffic analysis recommendations to maintain acceptable operating conditions at the intersections, freeway segments, and ramps were made.

Analysis, Scope, and Methodology

This traffic study report consists of the following analysis, scope, and methodologies listed below:

- Peak hour Synchro Intersection analysis of the existing, existing plus project, and year 2014 project conditions of the study intersections per the Highway Capacity Manual (HCM) methodology.
- Peak hour HCM Freeway analysis of the existing conditions, existing plus project conditions, and year 2014 project conditions for the freeway segments and ramps in the study areas.
- Peak hour HCM Merge and Diverge analysis of the existing conditions, existing plus project conditions, and year 2014 project conditions for the study areas.

5.1 Intersection Impacts

This traffic study analyzed 52 intersections in order to determine the optimal truck haul routes which would provide the least traffic impacts. From the traffic analysis it was determined that the increase in truck trips does not significantly impact the study intersections.

This study verified that most of the intersections associated with the twenty six routes are expected to continue to operate at an acceptable level of service (LOS) D or better during the Mid-day peak hour. There are some intersections that would require traffic mitigations or impact reduction measures as a result of route and peak hour selection. The intersections with unacceptable LOS E or lower are provided here identifying the condition when the intersection fails to meet an acceptable level of service.

Existing Conditions

Prior to the initiation of the Devil's Gate Reservoir Sediment Removal and Management Project two existing condition intersections are at an unacceptable LOS E. These intersections are as follows:

Intersection Impacts – Existing Plus Project

	INTERSECTIONS	HAUL ROUTE	PEAK HOUR	LOS(1)
27.	Glenoaks Blvd and Osborne Street	5A/6A/7A	AM	E
51.	Branford Street and San Fernando Road	8C	PM	E

(1) LOS–Level of Service
Source: **Hall & Foreman, Inc**

Existing Plus Project

The project conditions will impact two additional intersections. These intersections are Berkshire Place and I-210 Freeway Eastbound Ramps and Figueroa St and SR-134 WB Ramps. Intersections identified during existing conditions are anticipated to continue to operate at LOS E or lower. These intersections are provided below:

Intersection Impacts – Existing Plus Project

	INTERSECTIONS	HAUL ROUTE	PEAK HOUR	LOS(1)
1.	Berkshire Place and I-210 Freeway Eastbound Ramps	1A/1D/1E/1G	AM	E
21.	Figueroa St and SR-134 WB Ramps	4A/4B	AM/PM	E
27.	Glenoaks Blvd and Osborne Street	5A/6A/7A	AM	F
51.	Branford Street and San Fernando Road	8C	PM	E

(1) LOS–Level of Service
Source: **Hall & Foreman, Inc**

Project Year 2014

The Year 2014 project conditions will impact 6 additional intersections. The level of service issues are anticipated to occur predominately during the AM and PM peak hours. The exception to this is in route 2B for Site 2, Manning's Pit at the intersection of Arrow Hwy and Azusa Ave is anticipated operate and an unacceptable LOS E throughout the day. Intersections identified during existing conditions and project conditions are anticipated to continue to operate at LOS E or lower. These intersections are expected to be minimally impacted by the project. Two intersections are anticipated to be noticeably impacted. The intersection of Berkshire Place and I-210 Freeway Eastbound Ramps of Routes 1A and 1D is anticipated to lower to an LOS F during the AM peak hour. Also the intersection of Figueroa Street and SR-134 Westbound Ramps of route 4B is anticipated to lower to an LOS F during the PM peak hour. These intersections are provided below:

Intersection Impacts – Project Year 2014

	INTERSECTIONS	HAUL ROUTE	PEAK HOUR	LOS(1)
1.	Berkshire Place and I-210 Freeway Eastbound Ramps	1A/1D	AM	F
1.	Berkshire Place and I-210 Freeway Eastbound Ramps	1E/1G	AM	E
14.	Arrow Hwy and Lark Ellen Ave	2B	AM and PM	E
16.	Azusa Ave and Arrow Hwy	2B	AM, Mid-day, PM	E
17.	Azusa Ave and Gladstone St	2B	AM	E
20.	First St and Alameda St/I-210 Fwy WB Ramps	2B	AM	E
21.	Figueroa St and SR-134 WB Ramps	4A	AM/PM	E
21.	Figueroa St and SR-134 WB Ramps	4B	AM/PM	E/F
27.	Glenoaks Blvd and Osborne Street	5A/6A/7A	AM/PM	F/E
43.	Osborne Street and Laurel Canyon Blvd	8B	PM	E
50.	Sheldon Street and San Fernando Road	8C	PM	E
51.	Branford Street and San Fernando Road	8C	PM	F
52	Irwindale Avenue and Foothill Boulevard	9	PM	E

(1) LOS–Level of Service
Source: **Hall & Foreman, Inc**

5.2 Freeway Impacts

This traffic study analyzed 28 freeway segments to determine the mainline Level-of-Service (LOS). From the traffic analysis it was determined that the increase in truck trips do not cause any major traffic impacts at the identified freeway segments.

Existing Conditions and Existing Plus Project

Prior to the initiation of the Devil's Gate Reservoir Sediment Removal and Management Project five existing condition freeway segments are at an unacceptable LOS E, predominately during the AM and PM peak hours. The inclusion of the project provides no additional unacceptable freeway segments, as presented in the Appendix A: Existing Plus Project Freeway Segment Table. The freeway segments operating at an unacceptable LOS are as follows:

Freeway Segment Impacts – Existing Conditions

	Freeway Segment	Haul Route	Peak Hour	LOS
31	WB SR-134 between San Fernando Rd and the I-5 Fwy	5B, 6B, 7B, 8A	PM	E
39	SB I-5 between SR-170 and Branford St	8A	AM, PM	F
39	SB I-5 between SR-170 and Branford St	8A	Mid-day	E
51	WB SR-118 between San Fernando Rd and the I-210 Fwy	8B	AM	E
53	NB I-5 between the SR-118 and Van Nuys Blvd	8B	Mid-day, PM	E
55	NB I-5 between Tierra Bella St and Osborne St	8B	AM, Mid-day, PM	E

(1) LOS–Level of Service
Source: **Hall & Foreman, Inc**

Project Year 2014

Anticipated impact the freeway segments for Year 2014 are WB I-210 between the SR-134 Fwy and Lake Ave, EB I-210 between the SR-134 Fwy and Lake Ave, EB SR-134 between the Pacific Ave and Concord St, and SB I-5 between the SR-134 Fwy and Western Ave. Freeway segments identified in existing conditions are anticipated to continue to operate at LOS E or lower. Year 2014 freeway segments with an anticipated LOS E or lower are as follows:

Freeway Segment Impacts – Project Year 2014

	Freeway Segment	Haul Route	Peak Hour	LOS
11	WB I-210 between the SR-134 Fwy and Lake Ave	2A, 2B, 3, 9	AM	E
12	EB I-210 between the SR-134 Fwy and Lake Ave	2A, 2B, 3, 9	AM, Mid-day, PM	E
30	EB SR-134 between the Pacific Ave and Concord St	5B, 6B, 7B, 8A	AM, PM	E
31	WB SR-134 between San Fernando Rd and the I-5 Fwy	5B, 6B, 7B, 8A	PM	F
33	SB I-5 between the SR-134 Fwy and Western Ave	5B, 6B, 7B, 8A	Mid-day, PM	E
39	SB I-5 between SR-170 and Branford St	8A	AM, Mid-day, PM	F
51	WB SR-118 between San Fernando Rd and the I-210 Fwy	8B	AM/PM	F/E
53	NB I-5 between the SR-118 and Van Nuys Blvd	8B	AM	E
53	NB I-5 between the SR-118 and Van Nuys Blvd	8B	Mid-day, PM	F
55	NB I-5 between Tierra Bella St and Osborne St	8B	AM, Mid-day, PM	F

(1) LOS–Level of Service
Source: **Hall & Foreman, Inc**

5.3 Ramp Impacts

This traffic study analyzed 54 on and off-ramps to determine the Level-of-Service (LOS) of the utilized ramps with the study area. From the traffic analysis it was determined that the increase in truck trips does not cause any major traffic impacts to the identified ramps. The LOS of the ramps remained acceptable when the expected increase in truck trips were applied to the ramps being studied.

Existing Conditions and Existing Plus Project

Prior to the initiation of the Devil's Gate Reservoir Sediment Removal and Management Project one ramp is at an unacceptable LOS E during existing condition. The inclusion of the project does not noticeably impact the ramps, as presented in the Appendix A: Existing Plus Project Freeway Ramp Table. The project condition provides no additional unacceptable ramps. The ramp operating at an unacceptable LOS is as follows:

Freeway Ramp Impacts – Existing Conditions

	RAMP	HAUL ROUTE	PEAK HOUR	LOS (1)
52	Osborne St and the SB I-5 Fwy mainline off-ramp	8B	AM	F

(1) LOS–Level of Service
Source: **Hall & Foreman, Inc**

Project Year 2014

The Year 2014 project conditions will negatively impact one additional ramp. The ramp identified during existing conditions is anticipated to continue to operate at LOS F. The ramps anticipated to operate at an unacceptable level are provided below:

Freeway Ramp Impacts – Project Year 2014

	RAMP	HAUL ROUTE	PEAK HOUR	LOS (1)
22	WB I-210 Fwy Transition Ramp to the SB SR-2 Fwy mainline	5B, 6B, 7B, 8A	AM	F
52	Osborne St and the SB I-5 Fwy mainline off-ramp	8B	AM	F

(1) LOS–Level of Service
Source: **Hall & Foreman, Inc**

5.4 Route Summary and Mitigations/Potential Impact Reduction Measures

An index of the routes was developed and provided in the Summary Tables. These tables outline the Level of Service (LOS), delay, volume to capacity ratio (V/C), segment lengths, and grade of the utilized freeway segments. The optimal time of operation for the Trucks varies by Haul Route. During the AM, MID-DAY, and PM peak periods most of the routes, currently and through the life of the project, are anticipated to operate at an acceptable LOS.

The Haul Trucks are estimated to haul 18 cubic yards of sediment and organic materials. Utilizing the proposed haul route hours of operation and 50 trucks per hour an approximate thousand cubic yards of sediment and organic materials will be removed from the dam per day.

5.4.1 Devil's Gate Dam Area

The reservoir requires two preferred routes. A route will accommodate trucks outbound to the deposit sites south and east of the reservoir, Manning's Pit (Site 2), Waste Management (Site 3), Vulcan Materials - Irwindale Site (Site 9), Scholl Canyon Landfill (Site 4). The other route will accommodate trucks outbound to the deposit sites west of the reservoir, Sheldon Pit (Site 5), Sun Valley Fill Site (Site 6), Bradley Landfill (Site 7), and Boulevard Pit (Site 8).

Devil's Gate Dam Area (Site 1): Haul Route 1A

Haul Route 1A is an optional route to the disposal sites south and east of Devil's Gate Dam and Reservoir. The sites east of Devil's Gate Dam and Reservoir are Manning's Pit (Site 2), Waste Management (Site 3), and Vulcan Materials - Irwindale Site (Site 9). The site south of Devil's Gate Dam and Reservoir is Scholl Canyon Landfill (Site 4). The use of Haul Route 1A requires that the median along the frontage of the Devils Gate Dam and Reservoir be restriped to a Two Way Left Turn Lane (TWLTL). This requires the approval of the City of Pasadena.

AM Mitigations and Potential Impact Reduction Measures

An optional measure is to provide applicable construction signing at the Devil's Gate Dam and Reservoir driveway.

Berkshire Place (EW) and I-210 Freeway Eastbound Ramps (NS): The Intersection is anticipated to operate at an unacceptable LOS during the AM peak period. The optional measures of this intersection are beyond of the scope of the project. The Haul Route is, therefore, anticipated to continue to operate at an unacceptable LOS during the AM peak period.

MID-DAY and PM Mitigations and Potential Impact Reduction Measures

The Haul Route 1A is anticipated to continue to operate at an LOS D or better for all utilized intersections during the MID-DAY and PM peak periods.

An optional measure is to provide applicable construction signing at the Devil's Gate Dam and Reservoir driveway.

Devil's Gate Dam Area (Site 1): Haul Route 1B

Haul Route 1B is the alternative route to the disposal sites south and east of Devil's Gate Dam and Reservoir. These sites are Manning's Pit (Site 2), Waste Management (Site 3), Vulcan Materials - Irwindale Site (Site 9), and Scholl Canyon Landfill (Site 4).

AM, MID-DAY and PM Mitigations and Potential Impact Reduction Measures

The Haul Route 1B is anticipated to continue to operate at an LOS C or better for all utilized intersections throughout the day.

An optional measure is to provide applicable construction signing at the Devil's Gate Dam and Reservoir driveway.

Devil's Gate Dam Area (Site 1): Haul Route 1C

Haul Route 1C is an optional route for disposal sites south and east of Devil's Gate Dam and Reservoir. These sites are Manning's Pit (Site 2), Waste Management (Site 3), Vulcan Materials - Irwindale Site (Site 9), and Scholl Canyon Landfill (Site 4). The use of Haul Route 1C requires that the median along the frontage of the Devils Gate Dam and Reservoir be restriped to a Two Way Left Turn Lane (TWLTL). This requires the approval of the City of Pasadena.

AM, MID-DAY and PM Mitigations and Potential Impact Reduction Measures

The Haul Route 1C is anticipated to continue to operate at an LOS C or better for all utilized intersections throughout the day.

An optional measure is to provide applicable construction signing at the Devil's Gate Dam and Reservoir driveway.

Devil's Gate Dam Area (Site 1): Haul Route 1D

Haul Route 1D is the preferred route for disposal sites south and east of Devil's Gate Dam and Reservoir. These sites are Manning's Pit (Site 2), Waste Management (Site 3), Vulcan Materials - Irwindale Site (Site 9), and Scholl Canyon Landfill (Site 4).

AM Mitigations and Potential Impact Reduction Measures

Berkshire Place (EW) and I-210 Freeway Eastbound Ramps (NS): The Intersection is anticipated to operate at an unacceptable LOS during the AM peak period. The optional measures of this intersection are beyond of the scope of the project. The Haul Route is, therefore, anticipated to continue to operate at an unacceptable LOS during the AM peak period.

MID-DAY and PM Mitigations and Potential Impact Reduction Measures

The Haul Route 1D is anticipated to continue to operate at an LOS D or better for all utilized intersections during the MID-DAY and PM peak periods without the need for potential impact reduction measures. The Devil's Gate Dam and Reservoir driveway does not require potential impact reduction measures.

Devil's Gate Dam Area (Site 1): Haul Route 1E

Haul Route 1E is an optional route for disposal sites west of Devil's Gate Dam and Reservoir. These sites are Sheldon Pit (Site 5), Sun Valley Fill Site (Site 6), Bradley Landfill (Site 7), and Boulevard Pit (Site 8). The use of Haul Route 1E requires that the median along the frontage of the Devils Gate Dam and Reservoir be restriped to a Two Way Left Turn Lane (TWLTL). This requires the approval of the City of Pasadena.

AM Mitigations and Potential Impact Reduction Measures

An optional measure is to provide applicable construction signing at the Devil's Gate Dam and Reservoir driveway.

Berkshire Place (EW) and I-210 Freeway Eastbound Ramps (NS): The Intersection is anticipated to operate at an unacceptable LOS during the AM peak period. The optional measures of this intersection are beyond of the scope of the project.

MID-DAY and PM Mitigations and Potential Impact Reduction Measures

The Haul Route 1E is anticipated to continue to operate at an LOS D or better for all utilized intersections during the MID-DAY and PM peak periods.

An optional measure is to provide applicable construction signing at the Devil's Gate Dam and Reservoir driveway.

Devil's Gate Dam Area (Site 1): Haul Route 1F

Haul Route 1F is an alternative route for disposal sites east of Devil's Gate Dam and Reservoir. These sites are Sheldon Pit (Site 5), Sun Valley Fill Site (Site 6), Bradley Landfill (Site 7), and Boulevard Pit (Site 8). The use of Haul Route 1F requires that the median along the frontage of the Devils Gate Dam and Reservoir be restriped to a Two Way Left Turn Lane (TWLTL). This requires the approval of the City of Pasadena.

AM, MID-DAY and PM Mitigations and Potential Impact Reduction Measures

The Haul Route 1F is anticipated to continue to operate at an LOS C or better for all utilized intersections throughout the day.

An optional measure is to provide applicable construction signing at the Devil's Gate Dam and Reservoir driveway.

Devil's Gate Dam Area (Site 1): Haul Route 1G

Haul Route 1G is an optional route to the disposal sites east of Devil's Gate Dam and Reservoir. These sites are Sheldon Pit (Site 5), Sun Valley Fill Site (Site 6), Bradley Landfill (Site 7), and Boulevard Pit (Site 8). The use of Haul Route 1G requires that the median along the frontage of the Devils Gate Dam and Reservoir be restriped to a Two Way Left Turn Lane (TWLTL). This requires the approval of the City of Pasadena.

AM Mitigations and Potential Impact Reduction Measures

An optional measure is to provide applicable construction signing at the Devil's Gate Dam and Reservoir driveway.

Berkshire Place (EW) and I-210 Freeway Eastbound Ramps (NS): The Intersection is anticipated to operate at an unacceptable LOS during the AM peak period. The optional measures of this intersection are beyond of the scope of the project.

MID-DAY and PM Mitigations and Potential Impact Reduction Measures

The Haul Route 1G is anticipated to continue to operate at an LOS C or better for all utilized intersections during the MID-DAY and PM peak periods.

An optional measure is to provide applicable construction signing at the Devil's Gate Dam and Reservoir driveway.

Devil's Gate Dam Area (Site 1): Haul Route 1H

Haul Route 1H is the preferred route for disposal sites east of Devil's Gate Dam and Reservoir. These sites are Sheldon Pit (Site 5), Sun Valley Fill Site (Site 6), Bradley Landfill (Site 7), and Boulevard Pit (Site 8).

AM, MID-DAY and PM Mitigations and Potential Impact Reduction Measures

The Haul Route 1H is anticipated to continue to operate at an LOS C or better for all utilized intersections throughout the day without the need for potential impact reduction measures. The Devil's Gate Dam and Reservoir entrance and access to Oak Grove Drive Oak Grove Drive for Route 1H to access the Devil's Gate Dam and Reservoir does not require potential impact reduction measures.

5.4.2 Waste Management, Manning's Pit, and Vulcan Materials - Irwindale Site Area

The Manning's Pit (Site 2), Waste Management (Site 3), and Vulcan Material (Site 9) are the disposal sites east of Devil's Gate Dam and Reservoir.

Manning's Pit (Site 2): Haul Route 2A

Haul Route 2A is the preferred route for Manning's Pit, east of Devil's Gate Dam and Reservoir.

AM, MID-DAY and PM Mitigations and Potential Impact Reduction Measures

The Haul Route 2A is anticipated to continue to operate at an LOS C or better for all utilized intersections during the AM, MID-DAY, and PM peak periods:

An optional measure is to provide applicable construction signing at the Manning's Pit driveway.

Manning's Pit (Site 2): Haul Route 2B

Haul Route 2B is the alternate route for Manning's Pit, a disposal site east of Devil's Gate Dam and Reservoir.

AM, MID-DAY, and PM Mitigations and Potential Impact Reduction Measures

The Haul Route is anticipated to operate at an unacceptable LOS at Arrow Hwy and Lark Ellen Ave, Azusa Ave and Arrow Hwy, Azusa Ave and Gladstone Street, and First Street and Alameda Street/I-210 Freeway Westbound Ramps during the AM and PM peak periods.

The Haul Route is anticipated to operate at an unacceptable LOS at Arrow Hwy and Lark Ellen Ave, Azusa Ave and Arrow Hwy, Azusa Ave and Gladstone Street, and First Street and Alameda Street/I-210 Freeway Westbound Ramps during the AM and PM peak periods.

Arrow Hwy (EW) and Lark Ellen Ave (NS): The Intersection is anticipated to operate at an unacceptable LOS during the AM and PM peak hours. The optional measures of this intersection are beyond of the scope of the project. The Haul Route is, therefore, anticipated to continue to operate at an unacceptable LOS during the AM and PM peak periods.

Azusa Ave (NS) and Arrow Hwy (EW): The Intersection is anticipated to operate at an unacceptable LOS throughout the day. The optional measures of this intersection are beyond of the scope of the project. The Haul Route is, therefore, anticipated to continue to operate at an unacceptable LOS throughout the day.

Azusa Ave (NS) and Gladstone Street (EW): The Intersection is anticipated to operate at an unacceptable LOS during the AM peak hour. The optional measures of this intersection are beyond of the scope of the project. The Haul Route is, therefore, anticipated to continue to operate at an unacceptable LOS during the AM peak period.

First Street (EW) and Alameda Street/I-210 Freeway Westbound Ramps (NS): The Intersection is anticipated to operate at an unacceptable LOS during the AM peak hour. The optional measures of this intersection are beyond of the scope of the project. The Haul Route is, therefore, anticipated to continue to operate at an unacceptable LOS during the AM peak period.

An optional measure is to provide applicable construction signing at the Manning's Pit driveway.

Waste Management (Site 3): Haul Route 3

Haul Route 3 is the preferred route for Waste Management, east of Devil's Gate Dam and Reservoir.

AM, MID-DAY and PM Mitigations and Potential Impact Reduction Measures

The Haul Route 3 is anticipated to continue to operate at an LOS C or better for all utilized intersections during the AM, MID-DAY, and PM peak periods without the need for potential impact reduction measures. The Waste Management driveway is at the signalized study intersection of Vincent Avenue and Gladstone Street that does not require potential impact reduction measures.

Vulcan Materials (Site 9): Haul Route 9

Haul Route 9 is the preferred route for Vulcan Material – Irwindale Site, east of Devil's Gate Dam and Reservoir.

AM and MID-DAY Mitigations and Potential Impact Reduction Measures

The Haul Route 9 is anticipated to continue to operate at an LOS D or better for all utilized intersections during the AM, and MID-DAY peak periods without the need for potential impact reduction measures. The Vulcan Materials driveway is at the signalized study intersection of Irwindale Avenue and Foothill Boulevard that does not require potential impact reduction measures.

PM Mitigations and Potential Impact Reduction Measures

Irwindale Avenue (NS) and Foothill Boulevard (EW) (Vulcan Materials driveway): The Intersection is anticipated to operate at an unacceptable LOS during the PM peak hour. The optional measures of this intersection are beyond of the scope of the project. The Haul Route is, therefore, anticipated to continue to operate at an unacceptable LOS during the PM peak period.

5.4.3 Scholl Canyon Landfill (Site 4)

The Scholl Canyon Landfill (Site 4) is the green waste disposal site east of Devil's Gate Dam and Reservoir.

Scholl Canyon Landfill Haul (Site 4): Route 4A

Haul Route 4A is the Scholl Canyon Landfill preferred route, east of Devil's Gate Dam and Reservoir.

MID-DAY Mitigations and Potential Impact Reduction Measures

The Haul Route 4A utilized intersections are anticipated to continue to operate at an LOS B or better during the MID-DAY peak period without the need for potential impact reduction measures. The Scholl Canyon Landfill driveway does not require potential impact reduction measures during the MID-DAY peak period.

AM and PM Mitigations and Potential Impact Reduction Measures

The Haul Route is anticipated to continue to operate at an acceptable LOS for all utilized intersections during the AM and PM peak periods with the following potential impact reduction measures will improve the utilized intersections to an acceptable LOS during the AM and PM peak periods:

1. Figueroa St/Scholl Canyon Road (NS) and SR-134 Freeway Westbound Ramps (EW): Restripe the westbound right turn lane to a shared left-right turn lane and the northbound through lane to a shared through-right turn lane. The northbound direction will include a shared through-right turn lane and a right turn lane. The southbound direction will include a shared through-left turn lane and a through turn lane. The westbound direction will include a left turn lane and a shared left-right turn lane. This optional measure requires the approval of the City of Los Angeles and Caltrans.

Scholl Canyon Landfill Haul (Site 4): Haul Route 4B

Haul Route 4B is an optional route for the green waste disposal site Scholl Canyon Landfill, east of Devil's Gate Dam and Reservoir. The Scholl Canyon Landfill driveway does not require potential impact reduction measures.

MID-DAY Mitigations and Potential Impact Reduction Measures

The Haul Route utilized intersections are anticipated to continue to operate at an LOS B or better during the MID-DAY peak period without the need for potential impact reduction measures.

AM and PM Mitigations and Potential Impact Reduction Measures

The Haul Route is anticipated to continue to operate at an acceptable LOS for all utilized intersections during the AM and PM peak periods with the following potential impact reduction measures will improve the utilized intersections to an acceptable LOS during the AM and PM peak periods:

1. Figueroa St/Scholl Canyon Road (NS) and SR-134 Freeway Westbound Ramps (EW): Restripe the westbound right turn lane to a shared left-right turn lane and the northbound through lane to a shared through-right turn lane. The northbound direction will include a shared through-right turn lane and a right turn lane. The southbound direction will include a shared through-left turn lane and a through turn lane. The westbound direction will include a left turn lane and a shared left-right turn lane. This optional measure requires the approval of the City of Los Angeles and Caltrans.

5.4.4 Sheldon Pit (Site 5), Sun Valley Fill Site (Site 6), Bradley Landfill (Site 7), and Boulevard Pit (Site 8)

The Sheldon Pit (Site 5), Sun Valley Fill Site (Site 6), Bradley Landfill (Site 7), and Boulevard Pit (Site 8) are the disposal site west of Devil's Gate Dam and Reservoir.
Sheldon Pit (Site 5): Haul Route 5A

Haul Route 5A is the preferred route for Sheldon Pit, west of Devil's Gate Dam and Reservoir.

MID-DAY Mitigations and Potential Impact Reduction Measures

The Haul Route is anticipated to continue to operate at an LOS D or better for all utilized intersections during the MID-DAY peak period
An optional measure is to provide applicable construction signing at the Sheldon Pit driveway.

AM and PM Mitigations and Potential Impact Reduction Measures

An optional measure is to provide applicable construction signing at the Sheldon Pit driveway.

Glenoaks Blvd (NS) and Osborne Street (EW): The Intersection is anticipated to operate at an unacceptable LOS during the AM and PM peak hours. The optional measures for this intersection are beyond of the scope of the project. The Haul Route is, therefore, anticipated to continue to operate at an unacceptable LOS during the AM and PM peak periods.

Sheldon Pit (Site 5): Haul Route 5B

Haul Route 5B is an optional route for Sheldon Pit, a disposal site west of Devil's Gate Dam and Reservoir.

AM, MID-DAY and PM Mitigations and Potential Impact Reduction Measures

The Haul Route 5B is anticipated to continue to operate at an LOS C or better for all utilized intersections during the AM, MID-DAY, and PM peak periods.

An optional measure is to provide applicable construction signing at the Sheldon Pit driveway.

Sheldon Pit (Site 5): Haul Route 5C

Haul Route 5C is the alternate route for Sheldon Pit, a disposal site west of Devil's Gate Dam and Reservoir.

AM, MID-DAY and PM Mitigations and Potential Impact Reduction Measures

The Haul Route 5C utilized intersections are anticipated to continue to operate at an LOS C or better throughout the day:

An optional measure is to provide applicable construction signing at the Sheldon Pit driveway.

Sun Valley Fill Site (Glenoaks Landfill/Cal-Mat) (Site 6): Haul Route 6A

Haul Route 6A is the preferred route for Sun Valley Fill Site, west of Devil's Gate Dam and Reservoir.

MID-DAY Mitigations and Potential Impact Reduction Measures

The Haul Route 6A utilized intersections are anticipated to continue to operate at an LOS D or better during the MID-DAY peak period without the need for potential impact reduction measures. The Sun Valley Fill Site driveway does not require potential impact reduction measures.

AM and PM Mitigations and Potential Impact Reduction Measures

The Sun Valley Fill Site driveway does not require potential impact reduction measures during the AM and PM peak periods.

Glenoaks Blvd (NS) and Osborne Street (EW): The Intersection is anticipated to operate at an unacceptable LOS during the AM and PM peak hours. The optional measures for this intersection are beyond of the scope of the project. The Haul Route is, therefore, anticipated to continue to operate at an unacceptable LOS during the AM and PM peak periods.

Sun Valley Fill Site (Glenoaks Landfill/Cal-Mat) (Site 6): Haul Route 6B

Haul Route 6B is an optional route for Sun Valley Fill Site, a disposal site west of Devil's Gate Dam and Reservoir. The Sun Valley Fill Site driveway does not require potential impact reduction measures.

MID-DAY Mitigation and Potential Impact Reduction Measures

The Haul Route 6B utilized intersections are anticipated to continue to operate at an acceptable LOS during the MID-DAY peak period without the need for potential impact reduction measures.

AM, MID-DAY and PM Mitigations and Potential Impact Reduction Measures

Glenoaks Blvd (NS) and Osborne Street (EW): The Intersection is anticipated to operate at an unacceptable LOS during the AM and PM peak hours. The optional measures for this intersection are beyond of the scope of the project.

Sun Valley Fill Site (Glenoaks Landfill/Cal-Mat) (Site 6): Haul Route 6C

Haul Route 6C is the alternate route for Sun Valley Fill Site, a disposal site west of Devil's Gate Dam and Reservoir. The Sun Valley Fill Site driveway does not require potential impact reduction measures.

AM, MID-DAY and PM Mitigations and Potential Impact Reduction Measures

The Haul Route 6C utilized intersections are anticipated to continue to operate at an LOS D or better throughout the day without the need for potential impact reduction measures.

Bradley Landfill (Site 7): Haul Route 7A

Haul Route 7A is the Bradley Landfill is the preferred route, west of Devil's Gate Dam and Reservoir. The Bradley Landfill driveway does not require potential impact reduction measures.

MID-DAY Mitigations and Potential Impact Reduction Measures

The Haul Route 7A utilized intersections are anticipated to continue to operate at an LOS D or better during the MID-DAY peak period without the need for potential impact reduction measures.

AM and PM Mitigations and Potential Impact Reduction Measures

Glenoaks Blvd (NS) and Osborne Street (EW): The Intersection is anticipated to operate at an unacceptable LOS during the AM and PM peak hours. The optional measures for this intersection are beyond of the scope of the project. The Haul Route is, therefore, anticipated to continue to operate at an unacceptable LOS during the AM and PM peak periods.

Bradley Landfill (Site 7): Haul Route 7B

Haul Route 7B is an optional route for Bradley Landfill, a disposal site west of Devil's Gate Dam and Reservoir. The Bradley Landfill driveway does not require mitigation.

AM, MID-DAY and PM Mitigations and Potential Impact Reduction Measures

The Haul Route 7B is anticipated to continue to operate at an LOS C or better throughout the day without the need for potential impact reduction measures.

Bradley Landfill (Site 7): Haul Route 7C

Haul Route 7C is the alternate route for Bradley Landfill, a disposal site west of Devil's Gate Dam and Reservoir. The Bradley Landfill driveway does not require potential impact reduction measures.

AM, MID-DAY and PM Mitigations and Potential Impact Reduction Measures

The Haul Route 7C utilized intersections are anticipated to continue to operate at an LOS D or better throughout the day without the need for potential impact reduction measures.

Boulevard Pit (Site 8): Haul Route 8A

Haul Route 8A is an optional route for a disposal site west of Devil's Gate Dam and Reservoir.

AM, MID-DAY and PM Mitigations and Potential Impact Reduction Measures

The Haul Route 8A is anticipated to continue to operate at an acceptable LOS for all utilized intersections throughout the day.

An optional measure is to provide applicable construction signing at the Boulevard Pit driveway.

Boulevard Pit (Site 8): Haul Route 8B

Haul Route 8B is an alternative route for a disposal site west of Devil's Gate Dam and Reservoir.

AM and MID-DAY Mitigations and Potential Impact Reduction Measures

The Haul Route 8B is anticipated to continue to operate at an acceptable LOS during the AM and MID-DAY peak periods

An optional measure is to provide applicable construction signing at the Boulevard Pit driveway.

PM Mitigations and Potential Impact Reduction Measures

Osborne Street (EW) and Laurel Canyon Blvd (NS): The Intersection is anticipated to operate at an unacceptable LOS during the PM peak hour. The optional measures for this intersection are beyond of the scope of the project. The Haul Route is, therefore, anticipated to continue to operate at an unacceptable LOS during the PM peak period.

An optional measure is to provide applicable construction signing at the Boulevard Pit driveway.

Boulevard Pit (Site 8): Haul Route 8C

Haul Route 8C is the Boulevard Pit preferred route west of Devil's Gate Dam and Reservoir.

AM and MID-DAY Mitigations and Potential Impact Reduction Measures

The Haul Route is anticipated to continue to operate at an LOS D or better for all utilized intersections during the AM and MID-DAY peak periods

An optional measure is to provide applicable construction signing at the Boulevard Pit driveway.

PM Mitigations and Potential Impact Reduction Measures

An optional measure is to provide applicable construction signing at the Boulevard Pit driveway.

Sheldon Street (EW) and San Fernando Road (NS): The Intersection is anticipated to operate at an unacceptable LOS during the PM peak hour. The optional measures for this intersection are beyond of the scope of the project. The Haul Route is, therefore, anticipated to continue to operate at an unacceptable LOS during the PM peak period.

Branford Street (EW) and San Fernando Road (NS): The Intersection is anticipated to operate at an unacceptable LOS during the PM peak hour. The optional measures for this intersection are beyond of the scope of the project. The Haul Route is, therefore, anticipated to continue to operate at an unacceptable LOS during the PM peak period.

Hall & Foreman, Inc.
Engineering • Surveying • Planning • Landscape Architecture

APPENDIX A: TECHNICAL REPORT

Devil's Gate Reservoir Sediment Removal and Management Project

Los Angeles County, California

TRAFFIC IMPACT ANALYSIS

TUSTIN
17782 East 17th Street
Suite 200
Tustin, CA 92780
714.665.4500
Fax: 714.665.4501

SANTA CLARITA
25152 Springfield Court
Suite350
Santa Clarita, CA 91355-1096
661.284.7400
Fax 661.284.7401

TEMECULA
Three Better World Circle
Suite 200
Temecula, CA 92590-3745
951.294.9300
Fax: 951.294-9301

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October 17, 2013

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Executive Summary

Project Description

This traffic study has been prepared to examine and identify impacts related to the Devil's Gate Reservoir Sediment Removal and Management Project. This report identifies traffic impacts due to the expected increase of truck traffic generated by the sediment removal project and presents recommendations for access and traffic mitigation in the impacted intersections, freeway segments, and ramps.

Devil's Gate Dam and Reservoir is located to the northeast of the I-210 Freeway on Oak Grove Drive between Berkshire Place and the Foothill Freeway Overpass. Access to the project site is proposed to be obtained from Oak Grove Drive. The project site is surrounded by residential communities to the south, and east of the site. The debris removed from the dam is proposed to be transported to eight potential disposal sites located within the county of Los Angeles. The sediment is proposed to be transported to seven dirt waste disposal sites and the eighth being a green waste disposal site. The seven proposed dirt waste disposal sites are Waste Management, Manning's Pit, Vulcan Materials - Irwindale Site, Sheldon Pit, Sun Valley Fill Site, Bradley Landfill, and the Boulevard Pit. The proposed green waste disposal site is the Scholl Canyon Landfill, located southwest of the dam in the Eagle Rock area within the City of Los Angeles. The sediment removal project is expected to generate 50 truck trips per hour with destinations to the potential eight disposal sites. It is estimated that a total of 17 and 425 average daily trips for autos and trucks will travel to and from the project site, respectively. The proposed Haul Trucks are the Double dumps estimated to haul 18 cubic yards of sediment. The trucks are anticipated to haul approximately 7.65 thousand cubic yards per day. A proposed 50 trucks per hour will be removing up to 4 million cubic yards of sediment and organic materials during the sediment removal phase of the project.

The On-site excavation hours is proposed to occur between the hours of 7 AM to 6 PM Standard Time, 7 AM to 7 PM Daylight Savings Time, and Saturday 8 AM to 5 PM. The operational period is divided into three peak hour periods. The AM peak period consists of the hours 7 AM to 10 AM. The MIDDAY peak period consists of the hours 10 AM to 4 PM. The PM peak period consists of the hours 4 PM to 6 PM Standard Time, 4 PM to 7 PM Daylight Savings Time.

The sediment removal project consists of 26 proposed haul routes. Within those 26 haul routes 52 intersections were evaluated. Truck trip distributions were made based on the existing capacity of the haul routes and intersections along the haul routes. This traffic study also identified 28 freeway segments along the I-210 Freeway, SR-134 Freeway, SR-2 Freeway, I-5 Freeway, and SR-118 freeway and 54 on and off-ramps within those freeway segments for analysis.

This traffic study analyzed the existing conditions, the existing conditions with project trips (existing + project conditions), and the year 2014 project conditions for the identified study intersections, freeway segments, and ramps. Based on the results of the traffic analysis, recommendations were made to maintain acceptable operating conditions at the intersections, freeway segments, and ramps.

Analysis, Scope, and Methodology

This traffic study report consists of the following analysis, scope, and methodologies:

- Peak hour Synchro Intersection analysis of the existing, existing plus project, and year 2014 project conditions of the study intersections per the Highway Capacity Manual (HCM) methodology.

- Peak hour HCM Freeway Segment analysis of the existing conditions, existing plus project conditions, and year 2014 project conditions for the freeway segments and ramps in the study areas.

- Peak hour HCM Freeway Ramp and Weaving analysis of the existing conditions, existing plus project conditions, and year 2014 project conditions for the study areas.

Intersection Impacts

This traffic study analyzed 52 intersections in order to determine the best truck haul routes that will provide the least traffic impacts. From the traffic analysis it was determined that the increase in truck trips do not significantly impact most of the study intersections.

Freeway and Ramp Impacts

This traffic study analyzed 28 freeway segments to determine the mainline Level-of-Service (LOS) as well as 54 on and off-ramps. It was determined that the increase in truck trips do not significantly impact the identified freeway segments and ramps.

Recommendations

The Routes selected provided the least traffic impacts and maintained acceptable operating conditions at the intersections, freeway segments, and ramps. The recommended hours of operation will vary by disposal site to accommodate the anticipated 50 trips per hour totaling to 425 average daily trips while minimally impacting the existing roadway network.

- *Devils Gate Dam (Site 1):* The preferred route for sites 2, 3, 9, and 4 is 1D. The alternative route for sites 2, 3, 9, and 4 is 1B. The preferred route for sites 5, 6, 7, and 8 is 1H. The alternate route for sites 5, 6, 7, and 8 is 1F. Anticipated all intersections, most freeway segment and all ramps will operate at an acceptable LOS.

- *Manning's Pit (Site 2):* The preferred route for site 2 is route 2A. The site Anticipated all intersections, most freeway segment and all ramps will operate at an acceptable LOS. The alternative route for Manning's Pit is Haul Route 2B.

- *Waste Management (Site 3):* The preferred route for site 3 is route 3A. Anticipated all intersections, most freeway segment and all ramps will operate at an acceptable LOS. The Waste Management does not have an alternative route with lower impacts other than Haul Route 3.

- *Vulcan Materials - Irwindale Site (Site 9):* The preferred route for site 9 is route 9. Anticipated all intersections, most freeway segment and all ramps will operate at an acceptable LOS. The Vulcan Material – Irwindale Site does not have an alternative route with lower impacts other than Haul Route 9.

- *Scholl Canyon Landfill (Site 4):* The preferred route for site 4 is route 4A. Anticipated all intersections, most freeway segment and all ramps will operate at an acceptable LOS. The alternative route for Scholl Canyon Landfill is Haul Route 4B.

- *Sheldon Pit (Site 5):* The preferred route for site 5 is route 5A. Anticipated intersection, freeway segments, and ramps will operate at an LOS D or better. The alternative route for Sheldon Pit Haul Route 5C.

- *Sun Valley Fill Site (Site 6):* The preferred route for site 6 is route. Anticipated intersection, freeway segments, and ramps will operate at an LOS D or better. The alternative route for Sun Valley Fill Site Haul Route 6C.

- *Bradley Landfill (Site 7):* The preferred route for site 7 is route 7A. Anticipated intersection, freeway segment and ramp LOS D or better. The alternative route for Bradley Landfill Haul Route 7C.

- *Boulevard Pit (Site 8):* The preferred route for site 8 is route 8C. Anticipated intersection, freeway segments, and ramps will operate at an LOS D or better. The alternative route for Boulevard Pit is Haul Route 8B.

1. INTRODUCTION

Project Description

The County of Los Angeles has proposed a sediment removal project for the Devil's Gate Dam and Reservoir which is located to the north east of the I-210 Freeway in the City of Pasadena, as illustrated in *Figure 1-1.* The project site is surrounded by residential communities to the south, and east of the site. Devil's Gate Dam and Reservoir serves as a critical component of the Los Angeles County Flood Control District since it provides flood protection to the Cities of Pasadena, South Pasadena, and Los Angeles. The sediment removal is proposed to be taken to seven potential disposal sites that have been identified by the County of Los Angeles.

As presented, the Devil's Gate Dam and Reservoir site is located to the northeast of the I-210 Freeway on Oak Grove Drive between Berkshire Place and the Foothill Freeway Overpass. Access to the project site is proposed to be obtained from Oak Grove Drive. The sediment removed from the dam is proposed to be transported to eight disposal sites located within the county of Los Angeles. The sediment is proposed to be transported to seven dirt waste disposal sites and the eighth being a green waste disposal site. The seven dirt waste disposal sites are Waste Management, Manning's Pit, Vulcan Materials - Irwindale Site, Sheldon Pit, Sun Valley Fill Site, Bradley Landfill, and the Boulevard Pit. The Waste Management, Manning's Pit, and Vulcan Material are located to the east of the dam site in the cities of Azusa and Irwindale, as illustrated in *Figure 1-2*. The green waste disposal site is the Scholl Canyon Landfill, located southwest of the dam in the Eagle Rock area within the City of Los Angeles, as illustrated in *Figure 1-2*. The Sheldon Pit, Sun Valley Fill Site, Bradley Landfill, and the Boulevard Pit are located to the northwest of the dam site in the City of Los Angeles, as illustrated in *Figure 1-3*.

The trucks are anticipated to haul approximately 7.65 thousand cubic yards per day. A proposed 50 trucks per hour will be removing up to 4 million cubic yards of sediment and organic materials during the sediment removal phase of the project.

The sediment removal project consists of 26 proposed haul routes for the transportation of the removed sediment to the disposal sites. Along those 26 haul routes 52 intersections were identified for analysis. Twenty-eight (28) freeway segments along the I-210 Freeway, SR-134 Freeway, SR-2 Freeway, I-5 Freeway, and SR-118 freeway and fifty-four (54) on and off-ramps within those freeway segments were also identified for analysis. The sediment removal project is expected to generate 50 truck trips per hour with destinations to the potential seven disposal sites. It is estimated that a total of 17 and 425 average daily trips for autos and trucks will travel to and from the project site, respectively. Truck trip distributions were based on the existing capacity of the haul routes and intersections along the haul routes.

Traffic Study Objectives

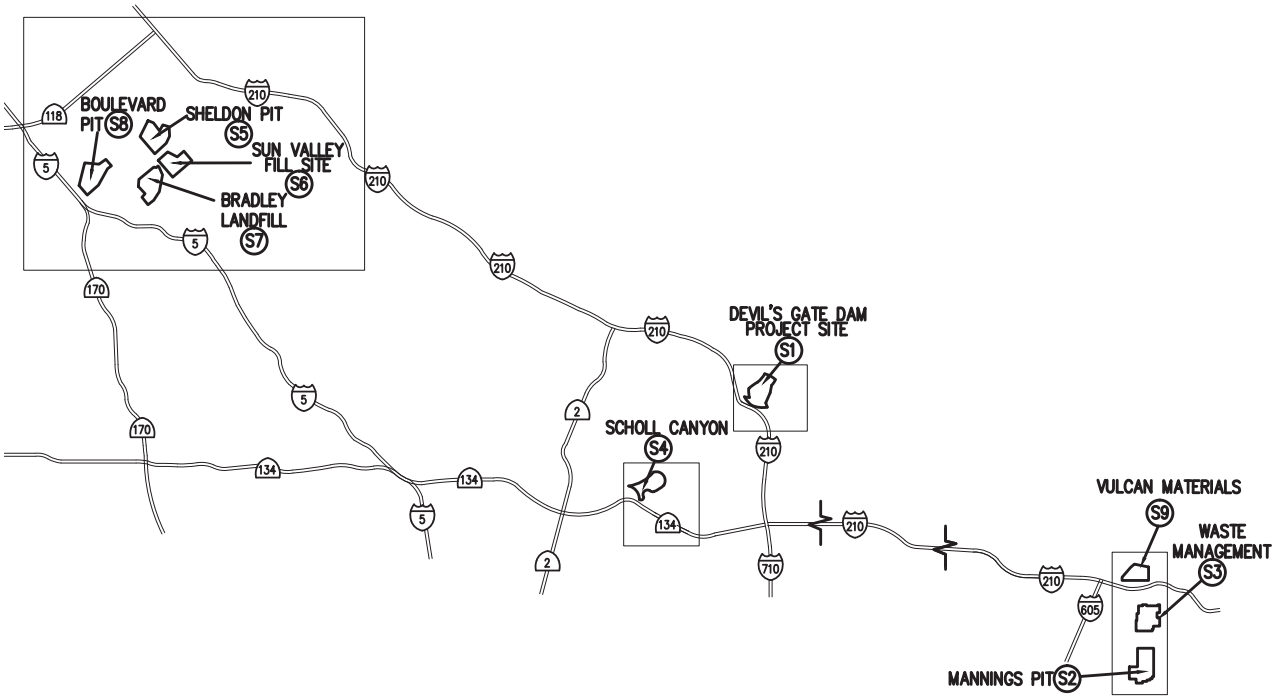
This traffic study has been prepared to examine and identify impacts related to the Devil's Gate Reservoir Sediment Removal and Management Project. This report identifies traffic impacts due to the expected increase of truck trips generated by the sediment removal project and presents recommendations for access and traffic mitigation in the impacted intersections, freeway segments, and ramps.

The traffic analysis along the 26 proposed haul routes consists of peak hour intersection capacity analysis, peak hour freeway mainline HCM 2010 analysis, peak hour ramp HCM 2010 capacity analysis, and peak hour freeway HCM 2010 weaving analysis. This study also addresses the impacts of ambient growth within the area since the sediment removal project is expected to last more than one year. Recommendations to maintain acceptable operating conditions at the intersections, freeway segments, and on and off-ramps were made based on the results of the analysis.

Report Organization

This report analyzes the existing conditions, existing plus project conditions, and project conditions. The report is organized as follows:

- Chapter 1: Introduction
- Chapter 2: Capacity Analysis Methodology
- Chapter 3: Existing Conditions
- Chapter 4: Existing + Plus Project Conditions
- Chapter 5: Year 2014 Project Conditions
- Chapter 6: Project Impacts, Mitigation and Summary



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DEVIL'S GATE PROJECT MAP

DEVIL'S GATE DAM & RESERVOIR

FIGURE 1-1

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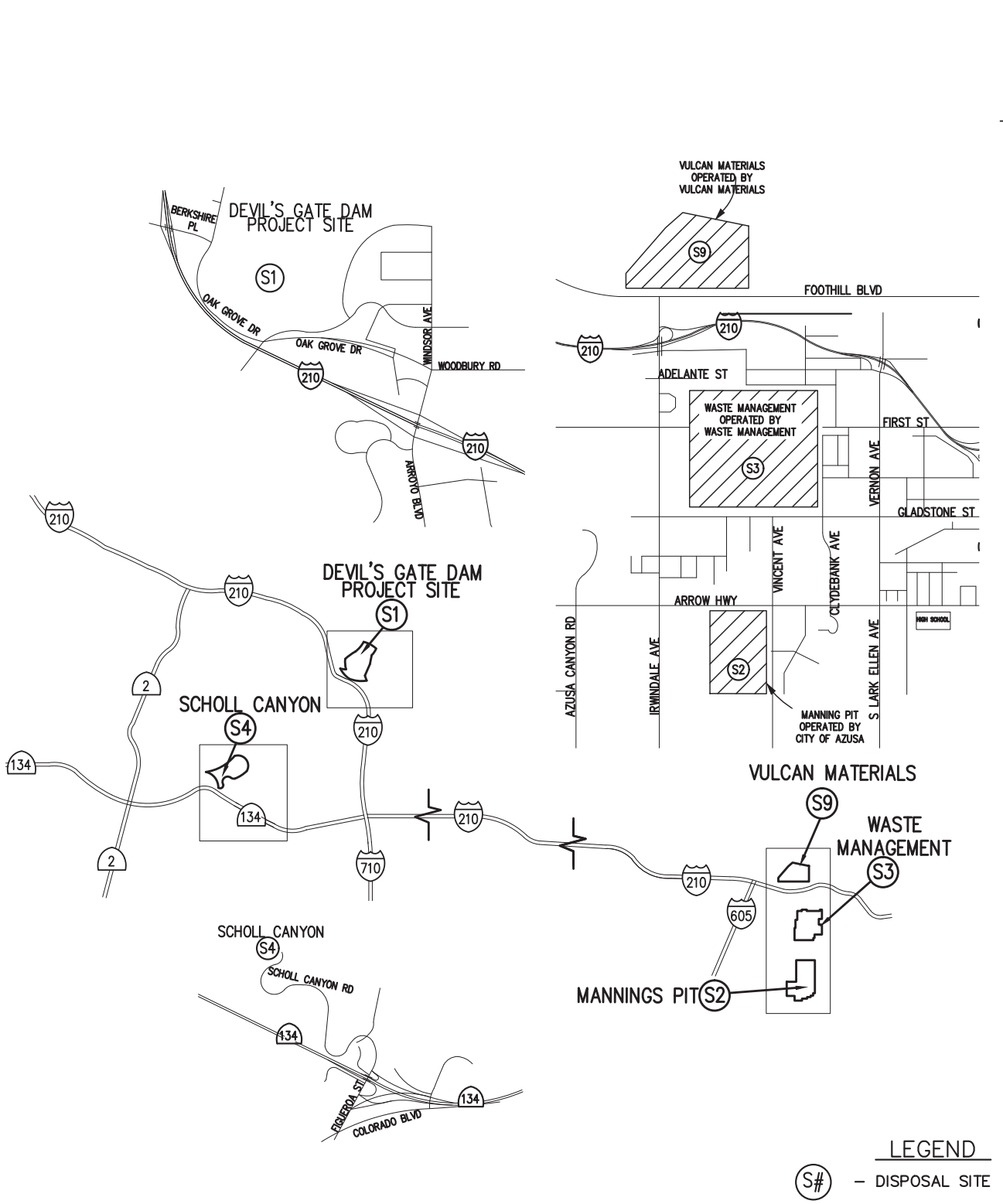

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DEVIL'S GATE, SCHOLL CANYON. WASTE MANAGEMENT, MANNINGS PIT, VULCAN MATERIALS

DEVIL'S GATE DAM & RESERVOIR

FIGURE
1-2

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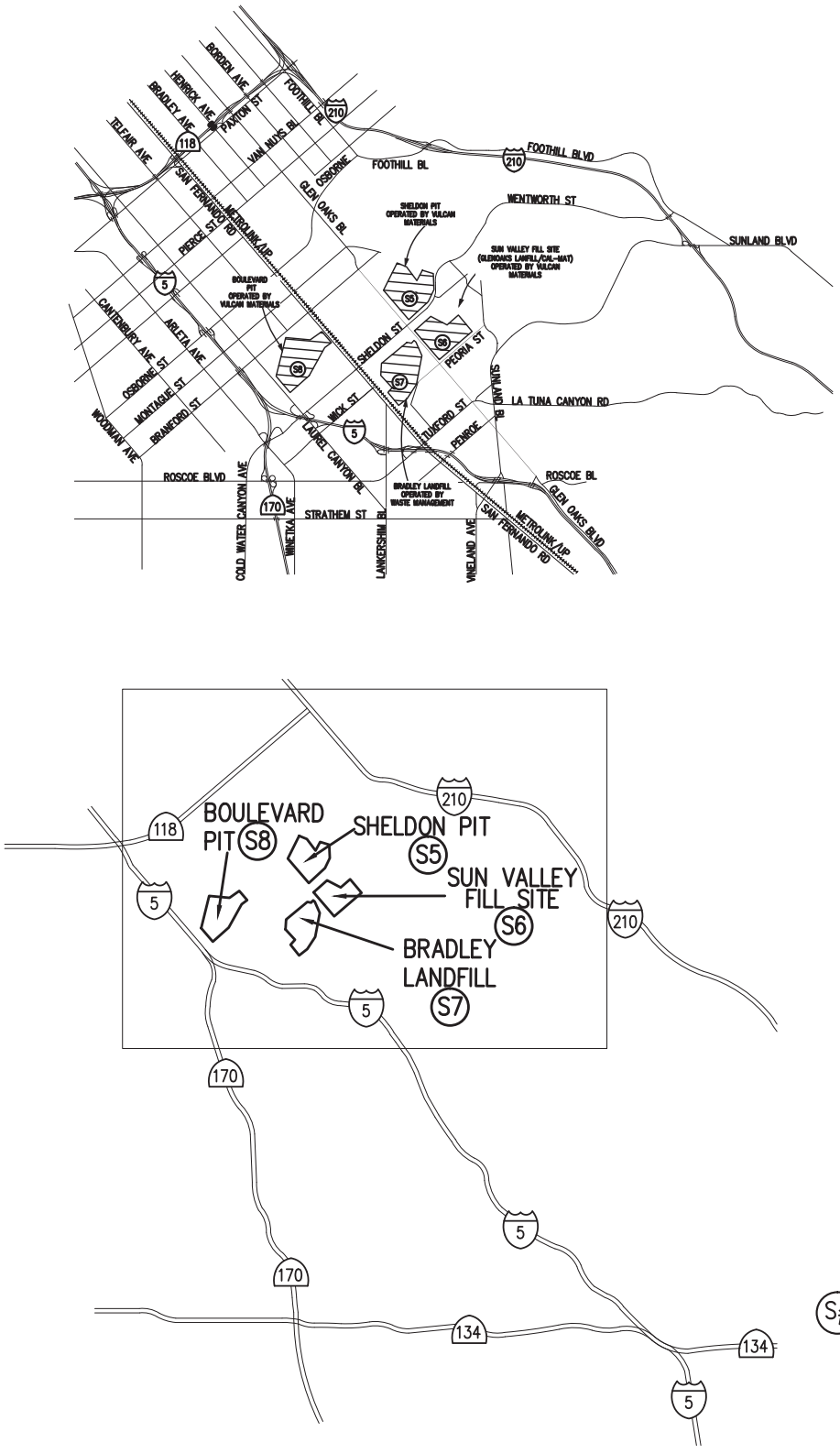

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SHELDON PIT, SUN VALLEY FILL SITE, BRADLEY LANDFILL, AND BOULEVARD PIT SITES

DEVIL'S GATE DAM & RESERVOIR

FIGURE 1-3

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2. CAPACITY ANALYSIS METHODOLOGY

Level of Service Analysis Criteria For Local Intersections:

The proposed haul routes for the Devil's Gate Reservoir Sediment Removal and Management Project will require the expected truck trips to travel through the Cities of Pasadena, La Cañada Flintridge, Los Angeles, Azusa, Irwindale, and unincorporated areas in the County of Los Angeles. In order to maintain adequate traffic flow it is important to meet the lowest acceptable service level at each intersection along the truck haul routes. In order to verify the intersection capacity analysis impacts, present Level-of-Service (LOS) were conducted for the signalized and un-signalized study intersections. Based on the existing intersection geometrics and traffic volumes during the AM, Mid-day, and PM peak hours, the intersection capacity analyses for the signalized and un-signalized intersections were conducted using Trafficware Ltd Synchro version 8 which implements the methods of the 2010 Highway Capacity Manual (HCM) and 2003 Intersection Capacity Utilization (ICU) methods.

It is important to note that each city/jurisdiction has different criteria and thresholds to identify the lowest acceptable service levels. All jurisdictions along the truck haul routes either follow the ICU, CMA, or HCM methodologies for signalized intersections. In order to be consistent a Synchro analysis was done since Synchro can provide the LOS per the HCM and ICU methodologies. To further understand the concepts and differences between the methodologies each methodology used by the local jurisdictions is described below.

Critical Movement Analysis (CMA)

The Critical Movement Analysis (CMA) methodology is a method developed by the Transportation Research Board (TRB) Circular 212. Under the CMA methodology the Level-of-Service (LOS) is determined by dividing the volume of vehicles that pass through the facility over the capacity of that facility. This ratio is known as the volume-to-capacity (V/C) ratio. A V/C ratio value of 1.00 or greater indicates that an intersection is at or exceeding capacity. The V/C ratio value is based upon volumes by lane, signal phasing, and approach lane configurations. The LOS values range from LOS A to LOS F where a LOS A indicates excellent operating conditions and a LOS F represents congested conditions with excessive vehicle delay. The threshold table for signalized intersections per the CMA methodology is shown below.

Table 2-1
Critical Movement Analysis (CMA) - LOS and V/C Threshold

Level of Service (LOS)	Volume/Capacity Ratio (V/C)	Definition
A	0.000 - 0.600	EXCELLENT. No vehicle waits longer than one red light and no approach phase is fully used.
B	0.601 - 0.700	VERY GOOD. An occasional approach phase is fully utilized; many drivers begin to feel somewhat restricted within groups of vehicles.
C	0.701 – 0.800	GOOD. Occasionally, drivers may have to wait through more than one red light; backups may develop behind turning vehicles.
D	0.801 – 0.900	FAIR. Delays may be substantial during portions of the rush hours, but enough lower volume periods occur to permit clearing of developing lines, preventing excessive backups.
E	0.901 – 1.00	POOR. Represents the most vehicles that intersection approaches can accommodate; may be long lines of waiting vehicles through several signal cycles.
F	Greater than 1.000	FAILURE. Backups from nearby intersections or on cross streets may restrict or prevent movement of vehicles out of the intersection approaches. Tremendous delays with continuously increasing queue lengths.

Source: **TRB**

Intersection Capacity Utilization (ICU)

The Intersection Capacity Utilization (ICU) traffic analysis methodology is a method that is similar to the Critical Movement Analysis (CMA) methodology. Like the CMA method the ICU method uses volume-to-capacity (V/C) ratios to determine a LOS for an intersection. However, the ICU method compares the V/C ratios of conflicting turn movements at an intersection, sums these critical conflicting V/C ratios for each intersection approach, and determines the overall ICU. The resulting ICU is expressed in terms of LOS, where LOS A represents free-flow activity and LOS F represents overcapacity operation. The ICU thresholds are similar to the thresholds of the CMA methodology but can vary by local jurisdictions.

HCM Methodology

The Highway Capacity Manual (HCM) traffic analysis methodology is a method developed by the Transportation Research Board (TRB). Under the HCM methodology the LOS of an intersection is determined based on the delay of vehicles at the intersections. For signalized intersections the HCM measures the LOS based on control delay. Control delay is a portion of the total delay attributed to a signalized intersection and consists of initial acceleration delay, queue move-up time, stopped delay, and final acceleration delay. The HCM bases its delay on an adjusted flow using a mean control delay for the highest 15 minute period within the hour. The LOS for signalized intersections ranges from LOS A, which indicates excellent operating conditions and a LOS F, which represents congested conditions with excessive vehicle delay. The threshold table for signalized intersections per the HCM 2010 methodology is shown below.

Table 2-2
HCM 2010 - LOS Criteria for Signalized Intersections

LOS	Control Delay per Vehicle (s/veh)
A	≤ 10
B	> 10-20
C	> 20-35
D	> 35-55
E	> 55-80
F	> 80

Source: **HCM 2010 Exhibit 18-1**

For un-signalized intersections the HCM measures the LOS based on the computed or measured control delay for Two Way Stop Controlled intersections (TWSC) and control delay for All Way Stop Controlled (AWSC) intersections. For a TWSC the LOS is computed for each movement and the most critical LOS is the one that describes the effectiveness of that intersection, which is typically the stop controlled left turn movement from the minor street. The threshold table for TWSC intersections per the HCM 2010 methodology is shown below.

Table 2-3
HCM 2010 - LOS Criteria for TWSC Intersections

LOS	Control Delay per Vehicle (s/veh)
A	0-10
B	> 10-15
C	> 15-25
D	> 25-35
E	> 35-50
F	> 50

Source: **HCM 2010 Exhibit 19-1**

For an AWSC intersection the LOS defines the whole intersection. The threshold table for AWSC intersections per the HCM 2010 methodology is shown below.

Table 2-4
HCM 2010 - LOS Criteria for AWSC Intersections

LOS	Control Delay per Vehicle (s/veh)
A	0-10
B	> 10-15
C	> 15-25
D	> 25-35
E	> 35-50
F	> 50

Source: **HCM 2010 Exhibit 20-2**

Level of Service Analysis Criteria for Freeways and Ramps:

The proposed haul routes for the Devil's Gate Reservoir Sediment Removal and Management Project will require the expected truck trips to travel through the I-210, I-5, SR-2, and SR-134 freeways from which 28 freeway segments and 54 ramps were identified for analysis. The LOS analysis done on the freeway and ramps will be per Caltrans requirements, which consists of the use of the HCM 2010 methodologies. To determine the LOS per the HCM 2010 methodology, Highway Capacity (HCS) 2010 software, which is developed by McTrans, was used for the freeway mainline analysis, ramp analysis, and weaving analysis.

Freeway Mainline HCM Analysis:

The freeway mainline LOS analysis was done with existing mainline volumes provided by Caltrans for each segment identified for analysis. The HCM methodology for determining the LOS of a basic freeway segment consists of inputting the existing geometric data, free flow speed (FFS), base free flow speed (BFFS), and mainline volumes to specific formulas described in Chapter 23 of the HCM. The procedure consists of adjusting the BFFS and mainline volume based on the existing conditions of the freeway. After the adjustments are made a speed-flow curve is used to determine the average passenger car speed in order to compute the density of the freeway segment to determine the LOS of that segment.

To determine the mainline LOS the mainline volumes and required criteria are inputted into the HCS 2010 software which calculates the freeway segment density value using the HCM methodology. The resulting density value is then matched to the corresponding LOS value as presented in *Table 2-5* shown below. Caltrans District 7 has established that the densities in a freeway mainline should not exceed 35.0 pc/mi/ln which corresponds to a LOS D. Caltrans has determined that freeway segments that operate below LOS D should be identified and improved to an acceptable LOS.

Table 2-5
Caltrans Freeway Mainline HCM LOS Criteria

LOS	Basic Freeway Segment Density (pc/mi/ln)
A	0 - 11.0
B	11.0 - 18.0
C	18.0 - 26.0
D	26.0 - 35.0
E	35.0 - 45.0
F	> 45.0

Source: **HCM 2000, Exhibit 23-2**

Ramp HCM Analysis

The freeway ramp LOS analysis was conducted with existing ramp volumes counted by Newport Traffic Studies. The HCM methodology for determining the LOS of a freeway ramps consists of inputting the existing geometric data, ramp free flow speed, and the existing ramp volumes to specific formulas described in Chapter 25 of the HCM. The volume (demand) is adjusted and then a demand flow rate is computed for a merging maneuver in an on-ramp or a diverging maneuver in an off-ramp. Capacity is then computed and compared to the adjusted flow. After this the density for the ramp can be computed and the LOS of the ramp can be determined.

To determine the freeway ramp LOS a ramp merge and diverge analysis was carried out through the use of the freeway-to-arterial interchanges analysis in the HCS software. According to HCM methodology, the merge and diverge ramp areas focus on an influential area of 1,500 feet, which includes the acceleration or deceleration lane and adjacent freeway lanes. The HCM methodology has three major steps that need to be followed. The first step is the determination of traffic entering the freeway lanes immediately upstream of the merge area for a merging maneuver or at the beginning of a deceleration lane of the diverge area for a diverging maneuver. The second step is to determine the capacity for the corresponding segment. The final step is the determination of the density of flow within the influence area and the LOS based on that density value.

The HCS software computes a density value for a freeway ramp using the same HCM procedure. That density value can then be matched to the corresponding LOS values as presented in *Table 2-6* shown below. Caltrans District 7 has established that the densities in a freeway ramp should not exceed 35.0 pc/mi/ln which corresponds to a LOS D. Caltrans has determined that freeway ramps that operate below LOS D should be identified and improved to an acceptable LOS.

Table 2-6
Caltrans Freeway Ramp HCM LOS Criteria

LOS	Freeway Ramp Density (pc/mi/ln)
A	≤ 10.0
B	> 10.0 and ≤ 20.0
C	> 20.0 and ≤ 28.0
D	> 28.0 and ≤ 35.0
E	> 35.0
F	Exceeds Capacity

Source: **HCM 2000, Exhibit 25-4**

Freeway Weaving HCM Analysis:

Freeway weaving is defined as the crossing of two streams of traffic traveling in the same direction along a significant length of highway without the aid of traffic control devices. Freeway weaving can become complicated when on and off-ramps are spaced close together and do not allow proper merging or diverging maneuvers. Weaving maneuvers can adversely affect the traffic on the mainline which is why freeway weaving is being analyzed in this study.

The freeway weaving LOS analysis was done with existing freeway volumes provided by Caltrans. The HCM methodology for determining the LOS of a freeway ramps consists of inputting the existing geometric data, the free flow speed of the before and after weaving segments, and the weaving and non-weaving volumes into specific formulas described in Chapter 24 of the HCM. To determine the freeway weaving LOS the HCS software was used. The HCS software computes a density for the weaving area based on the parameters inputted into the software. The density value can then be matched to the corresponding LOS values as presented in *Table 2-7* shown below.

Table 2-7
Caltrans Freeway Weaving HCM LOS Criteria

LOS	Freeway Weaving Segment Density (pc/mi/ln)
A	≤ 10.0
B	> 10.0 and ≤ 20.0
C	> 20.0 and ≤ 28.0
D	> 28.0 and ≤ 35.0
E	> 35.0 and ≤ 43.0
F	> 43.0

Source: **HCM 2000, Exhibit 24-2**

3. EXISTING CONDITIONS

Land-Use Description & Haul Routes

The Project site and proposed disposal sites are located in areas surrounded by residential neighborhoods and industrial and office buildings. The descriptions of the sites are as follows.

Devils Gate Dam (Site 1)
Land uses to the south, and east of the dam consist of residential housing. A local high school is located just north of the dam on Oak Grove Drive. Oak Grove Drive is the main road fronting the project site and provides access to the I-210 through Berkshire Place and Windsor Avenue.

Manning's Pit (Site 2)
Land uses around the Manning's Pit consist of industrial and office buildings to the north of the site. Residential housing surrounds the disposal site to the south, west, and east. Vincent Avenue is the main street fronting the project. The site is operated by the City of Azusa.

Waste Management (Site 3)
Land uses to the north, south, and west of the site consist of industrial and office buildings and residential housing to the east of the site. Gladstone Street is the main street fronting the project. The site is operated by Waste Management.

Vulcan Materials - Irwindale Site (Site 9)
Land uses to the north, south, and east of the site consist of industrial and office buildings and vacant land to the west of the site. Foothill Boulevard is the main street fronting the site. The site is operated by Vulcan Materials.

Scholl Canyon Landfill (Site 4)
Land uses around the Scholl Canyon Landfill consist of residential housing to the west of the site and vacant mountainous terrain to the north, south, and east of the site. Scholl Canyon Road is the main road fronting the project site. The site is operated by Los Angeles County.

Sheldon Pit (Site 5)
Land uses to the north, south, and west of the site consist of industrial and office buildings and residential housing to the east of the site. The Sun Valley Fill Site is located just south across Sheldon Street. Glenoaks Blvd is the major road fronting the project site to the west and allows access to the I-5 Freeway. Access to the Sheldon Pit is provided through Sheldon Street. The site is operated by the Vulcan Materials. The Hours of Operation are between 6AM to 8PM Monday to Saturday.

Sun Valley Fill Site (Glenoaks Landfill/Cal-Mat) (Site 6)
Land uses to the north, south, and west of the site consist of industrial and office buildings and residential housing to the east of the site. The Sheldon Pit is located just north across Sheldon Street. Glenoaks Blvd is the major road fronting the project site to the west and allows access to the I-5 Freeway. Access to the Sheldon Pit is provided through Sheldon Street. The site is operated by the Vulcan Materials. The Hours of Operation are between 6AM to 8PM Monday to Saturday.

Bradley Landfill (Site 7)
Land uses to the north and south of the site consist of industrial and office buildings and residential housing to the west and east. The Sheldon Pit and Sun Valley Fill Site are located just to the east across Glenn Oaks Blvd. Access to the Bradley Landfill is found through Peoria Street. Glenoaks Blvd is the major road fronting the project site to the east and allows access to the I-5 Freeway. The site is operated by the Waste Management.

Boulevard Pit (Site 8)
Land uses to the north, south, and west of the site consist of residential housing and Industrial and office buildings to the east. The Bradley Landfill is located to the southeast of the disposal site. Access to the Boulevard Pit is found through Branford Street. Branford Street is the major road fronting the project site to the east and allows access to the I-5 Freeway. The site is operated by the Vulcan Materials. The Hours of Operation are between 6AM to 8PM Monday to Saturday.

As identified, the sediment removed may be transported to the disposal sites through twenty-six (26) proposed haul routes. The proposed haul routes are outlined below:

Devil's Gate Dam & Reservoir Area

1.	Haul Route 1A	-Exit the WB I-210 Freeway at Berkshire Place. -Turn right onto EB Berkshire Place and then right onto SB Oak Grove Drive. -Enter and exit the project site on Oak Grove Drive. -Turn right onto NB Oak Grove Drive and then left onto WB Berkshire Place. -Enter the EB I-210 Freeway at Berkshire Place.
2.	Haul Route 1B	-Exit the WB I-210 Freeway at Windsor Avenue/Arroyo Blvd. -Turn right onto EB Windsor Ave and then left onto NB Oak Grove Drive. -Enter and exit the project site on Oak Grove Drive. -Turn left onto SB Oak Grove Drive and then right onto WB Windsor Ave. -Enter the EB I-210 Freeway at Windsor Avenue/Arroyo Blvd.
3.	Haul Route 1C	-Exit the WB I-210 Freeway at Berkshire Place. -Turn right onto EB Berkshire Place and then right onto SB Oak Grove Drive. -Enter and exit the project site on Oak Grove Drive. -Turn left onto SB Oak Grove Drive and then right onto WB Windsor Ave. -Enter the EB I-210 Freeway at Windsor Avenue/Arroyo Blvd.
4.	Haul Route 1D	-Exit the WB I-210 Freeway at Windsor Avenue/Arroyo Blvd. -Turn right onto EB Windsor Ave and then left onto NB Oak Grove Drive. -Enter and exit the project site on Oak Grove Drive. -Turn right onto NB Oak Grove Drive and then left onto WB Berkshire Place. -Enter the EB I-210 Freeway at Berkshire Place.
5.	Haul Route 1E	-Exit the EB I-210 Freeway at Berkshire Place. -Turn left onto EB Berkshire Place and then right onto SB Oak Grove Drive. -Enter and exit the project site on Oak Grove Drive. -Turn right onto NB Oak Grove Drive and then left onto WB Berkshire Place. -Enter the WB I-210 Freeway at Berkshire Place.
6.	Haul Route 1F	-Exit the EB I-210 Freeway at Windsor Avenue/Arroyo Blvd. -Turn left onto EB Windsor Ave and then left onto NB Oak Grove Drive. -Enter and exit the project site on Oak Grove Drive. -Turn left onto SB Oak Grove Drive and then right onto WB Windsor Ave. -Enter the WB I-210 Freeway at Windsor Avenue/Arroyo Blvd.
7.	Haul Route 1G	-Exit the EB I-210 Freeway at Berkshire Place. -Turn left onto EB Berkshire Place and then right onto SB Oak Grove Drive. -Enter and exit the project site on Oak Grove Drive. -Turn left onto SB Oak Grove Drive and then right onto WB Windsor Ave. -Enter the WB I-210 Freeway at Windsor Avenue/Arroyo Blvd.
8.	Haul Route 1H	-Exit the EB I-210 Freeway at Windsor Avenue/Arroyo Blvd. -Turn left onto EB Windsor Ave and then left onto NB Oak Grove Drive. -Enter and exit the project site on Oak Grove Drive. -Turn right onto NB Oak Grove Drive and then left onto WB Berkshire Place. -Enter the WB I-210 Freeway at Berkshire Place.

Manning's Pit Area

9.	Haul Route 2A	-Exit the EB I-210 Freeway at Irwindale Avenue. -Turn right onto SB Irwindale Ave. -Turn left onto EB Gladstone Street and then right onto SB Vincent Avenue. -Enter and exit the disposal sites on Vincent Avenue. -Turn left onto NB Vincent Ave and then left onto WB Gladstone Street. -Turn right onto NB Irwindale Ave. -Enter the WB I-210 Freeway at Irwindale Avenue.
10.	Haul Route 2B	-Exit the EB I-210 Freeway at Irwindale Ave. -Turn right onto SB Irwindale Ave. -Turn left onto EB Gladstone Street and then right onto SB Vincent Avenue. -Enter and exit the disposal site on Vincent Avenue. -Turn left onto NB Vincent Ave. -Turn right onto EB Arrow Hwy then left onto NB Azusa Avenue. -Turn right onto EB First Street. -Enter the WB I-210 Freeway at First Street.

Waste Management Area

11.	Haul Route 3	-Exit the EB I-210 Freeway at Irwindale Avenue. -Turn right onto SB Irwindale Ave. -Turn left onto EB Gladstone Street. -Enter and exit the disposal site on Gladstone Street. -Turn right onto WB Gladstone Street. -Turn right onto NB Irwindale Ave. -Enter the WB I-210 Freeway at Irwindale Avenue.

Vulcan Materials - Irwindale Site Area

26.	Haul Route 9	-Exit the EB I-210 Freeway at Irwindale Avenue. -Turn left onto NB Irwindale Ave. -Enter and exit the disposal site at the intersection of Irwindale Ave and Foothill Blvd. -Enter the WB I-210 Freeway at Irwindale Avenue.

Scholl Canyon Landfill Area

12.	Haul Route 4A	-Exit the WB SR-134 Freeway at Figueroa Street. -Turn right onto NB Scholl Canyon Rd. -Enter and exit the disposal site on Scholl Canyon Road. -Turn right onto SB Scholl Canyon Rd. -Enter the EB SR-134 Freeway at Figueroa Street.
13.	Haul Route 4B	-Exit the EB SR-134 Freeway at Figueroa Street. -Turn right onto NB Figueroa Street. -Enter and exit the disposal site on Scholl Canyon Road. -Turn right onto SB Scholl Canyon Rd. -Enter the WB SR-134 Freeway at Figueroa Street.

Sheldon Pit Area

14.	Haul Route 5A	-Exit the WB I-210 Freeway at the Osborne Street/Foothill Blvd interchange. -Turn left onto WB Foothill Blvd and then left onto WB Osborne Street. -Turn left onto SB Glenoaks Blvd. -Turn left onto EB Sheldon Street. -Enter and exit the disposal site on Sheldon Street. -Turn right onto WB Sheldon Street. -Turn right onto NB Glenoaks Blvd. -Turn right onto EB Osborne Street and then right onto EB Foothill Blvd. -Enter the EB I-210 Freeway at the Osborne Street/Foothill Blvd interchange.
15.	Haul Route 5B	-Exit the NB I-5 Freeway at the Glenoaks Blvd/Roscoe Blvd interchange. -Turn right onto EB Roscoe Blvd. -Turn left onto NB Glenoaks Blvd. -Turn right onto EB Sheldon Street. -Enter and exit the disposal site on Sheldon Street. -Turn right onto WB Sheldon Street. -Turn left onto SB Glenoaks Blvd. -Turn right onto WB Roscoe Blvd. -Enter the SB I-5 Fwy at the Glenoaks Blvd/Roscoe Blvd interchange.
16.	Haul Route 5C	-Exit the WB I-210 Fwy at the Wheatland Ave interchange. -Turn right onto NB Wheatland Ave. -Turn right onto EB Foothill Blvd. -Turn right onto WB Wentworth Street. -Enter and exit the disposal site on Sheldon Street. -Turn left onto EB Sheldon Street. -Turn left onto WB Foothill Blvd. -Turn left onto SB Wheatland Ave. -Enter the EB I-210 Fwy at the Wheatland Ave interchange.

Sun Valley Fill Site (Glenoaks Landfill/Cal-Mat) Area

17.	Haul Route 6A	-Exit the WB I-210 Fwy at the Osborne Street/Foothill Blvd interchange. -Turn left onto WB Foothill Blvd and then left onto WB Osborne Street. -Turn left onto SB Glenoaks Blvd. -Turn left onto EB Sheldon Street. -Enter the disposal site on Sheldon Street. -Exit the dump site on Glenoaks Blvd. -Turn right onto NB Glenoaks Blvd. -Turn right onto EB Osborne Street and then right onto EB Foothill Blvd. -Enter the EB I-210 Fwy at the Osborne Street/Foothill Blvd interchange.
18.	Haul Route 6B	-Exit the NB I-5 Fwy at the Glenoaks Blvd/Roscoe Blvd interchange. -Turn right onto EB Roscoe Blvd. -Turn left onto NB Glenoaks Blvd. -Turn right onto EB Sheldon Street. -Enter the disposal site on Sheldon Street. -Exit the dump site on Glenoaks Blvd. -Turn left onto SB Glenoaks Blvd -Turn right onto WB Roscoe Blvd. -Enter the SB I-5 Fwy at the Glenoaks Blvd/Roscoe Blvd interchange.
19.	Haul Route 6C	-Exit the WB I-210 Fwy at the Wheatland Ave interchange. -Turn right onto NB Wheatland Ave. -Turn right onto EB Foothill Blvd. -Turn right onto WB Wentworth Street. -Enter the disposal site on Sheldon Street. -Exit the dump site on Glenoaks Blvd. -Turn right onto NB Glenoaks Blvd -Turn right onto EB Sheldon Street. -Turn left onto WB Foothill Blvd. -Turn left onto SB Wheatland Ave. -Enter the EB I-210 Fwy at the Wheatland Ave interchange.

Bradley Landfill Area

20.	Haul Route 7A	-Exit the WB I-210 Fwy at the Osborne Street/Foothill Blvd interchange. -Turn left onto WB Foothill Blvd and then left onto WB Osborne Street. -Turn left onto SB Glenoaks Blvd. -Turn right onto WB Peoria Street. -Enter and exit the disposal site on Peoria Street. -Turn left onto EB Peoria Street. -Turn left onto NB Glenoaks Blvd. -Turn right onto EB Osborne Street and then right onto EB Foothill Blvd. -Enter the EB I-210 Fwy at the Osborne Street/Foothill Blvd interchange.
21.	Haul Route 7B	-Exit the NB I-5 Fwy at the Glenoaks Blvd/Roscoe Blvd interchange. -Turn right onto EB Roscoe Blvd. -Turn left onto NB Glenoaks Blvd. -Turn left onto WB Peoria Street. -Enter and exit the disposal site on Peoria Street. -Turn left onto EB Peoria Street. -Turn right onto SB Glenoaks Blvd. -Turn right onto WB Roscoe Blvd. -Enter the SB I-5 Fwy at the Glenoaks Blvd/Roscoe Blvd interchange.
22.	Haul Route 7C	-Exit the WB I-210 Fwy at the Wheatland Ave interchange. -Turn right onto NB Wheatland Ave. -Turn right onto EB Foothill Blvd. -Turn right onto WB Wentworth Street. -Turn left onto SB Glenoaks Blvd. -Turn right onto WB Peoria Street. -Enter and exit the disposal site on Peoria Street. -Turn left onto EB Peoria Street. -Turn left onto NB Glenoaks Blvd. -Turn right onto EB Sheldon Street. -Turn left onto WB Foothill Blvd. -Turn left onto SB Wheatland Ave. -Enter the EB I-210 Fwy at the Wheatland Ave interchange.

Boulevard Pit Area

23.	Haul Route 8A	-Exit the NB I-5 Fwy at Branford Street. -Turn right onto EB Branford Street. -Enter and exit the disposal site on Branford Street. -Turn left onto WB Branford Street. -Enter the SB I-5 Fwy at Branford Street.
24.	Haul Route 8B	-Exit the SB I-5 Fwy at Osborne Street. -Turn left onto EB Osborne Street. -Turn right onto SB Laurel Canyon Blvd. -Turn left onto EB Branford Street. -Enter and exit the disposal site on Branford Street. -Turn left onto WB Branford Street. -Turn right onto NB Laurel Canyon Blvd. -Turn left onto WB Osborne Street. -Enter the NB I-5 Fwy at Osborne Street.
25.	Haul Route 8C	-Exit the WB I-210 Fwy at the Wheatland Ave interchange. -Turn right onto NB Wheatland Ave then right onto EB Foothill Blvd. -Turn right onto Wentworth Street. -Turn left onto Glenoaks Blvd. -Turn right onto Tuxford Street then right onto San Fernando Road. -Turn left onto Branford Street. -Enter and exit the disposal site on Branford Street. -Turn right onto EB Branford Street. -Turn right onto San Fernando Rd then left on to Tuxford Street. -Turn left onto NB Glenoaks Blvd. -Turn right onto EB Sheldon Street. -Turn left onto WB Foothill Blvd then left onto SB Wheatland Ave. -Enter the EB I-210 Fwy at the Wheatland Ave interchange

The haul routes listed above consist of the following roadways:

Local and Major Roadways:

Devils Gate Dam Area (Site 1)

Oak Grove Drive is a north-south four-lane arterial road with a striped median to the north of the Foothill Freeway Overpass and a raised median to the south. The roadway provides two travel lanes in each direction and a bike lane in each direction. Oak Grove Drive provides direct access to the project site and freeway access from the project site through the intersections of Berkshire Place and Windsor Avenue. On-street parking is not permitted along Oak Grove Drive. Pavement conditions range from fair to poor conditions.

Berkshire Place is a west-east four-lane collector road with two travel lanes in each direction, a bike lane in each direction, and a striped two way left turn lane median. The road provides access to the I-210 Freeway to the residential neighborhoods to the north and west of the project site. On-street parking is not permitted along Berkshire Place. Pavement conditions range from good to fair conditions.

Windsor Avenue is a north-south four lane arterial road with two travel lanes in each direction, one bike lane on the southbound side, and a striped two way left turn lane median. Windsor Avenue provides regional access within the City of Pasadena and access to the I-210 Freeway. On-street parking is not permitted along the west side and some street parking is allowed on the east side of the roadway. Pavement conditions range from good to fair conditions.

Waste Management (Site 2), Manning's Pit (Site 3), and Vulcan Material (Site 9) Area

Foothill Boulevard is an east-west four lane arterial road with two travel lanes in each direction, and a striped or raised median. Foothill Boulevard (Route 66) generally follows the alignment of the I-210 freeway. Pavement conditions range from good to fair conditions.

Irwindale Avenue is a north-south four lane arterial road with two travel lanes in each direction that has a raised median to the north of First Street and a striped two way left turn lane median between First Street and Gladstone Street. Irwindale Ave provides regional access within the City of Azusa and Irwindale and local access to the I-210 Freeway and I-10 Freeway. On-street parking is generally permitted on both sides of the roadway between First Street and Gladstone Street. Pavement conditions range from good to fair conditions.

Gladstone Street is a west-east four lane collector street with two travel lanes in each direction and a striped two way left turn lane median. Gladstone Street provides regional access within the City of Azusa and access to the I-210 Freeway. On-street parking is permitted along some segments of the roadway, but these areas are not adjacent. Pavement conditions range from good to fair conditions.

Vincent Avenue is a north-south four lane collector road with two travel lanes in each direction and a striped two way left turn lane median along certain sections of the roadway. Vincent Ave provides regional access within the City of Azusa and Irwindale. On-street parking is generally permitted along the west side of the roadway and prohibited on the east side. Pavement conditions range from fair to poor conditions.

Arrow Highway is a west-east four lane arterial highway with two travel lanes in each direction and a striped two way left turn lane median. Arrow Highway serves as an alternative to the I-210 Freeway by providing access from the San Bernardino, Rancho Cucamonga, and San Dimas areas to the City of Azusa, Covina, and Irwindale. It also provides regional access within the City of Azusa, Covina, and Irwindale as well as access to the I-605 and SR-57 Freeways. On-street parking is generally permitted along both sides of the roadway. Pavement conditions range from good to fair conditions.

Azusa Avenue (SR-39) is a north-south divided four lane arterial highway with two travel lanes in each direction and a raised median. Azusa Avenue (SR-39) provides access from the City of Azusa and Covina to Orange County. It also provides regional access to the I-210 Freeway and I-10 Freeway. On-street parking is generally permitted along some segments of the roadway. Pavement conditions range from good to fair conditions.

First Street is a west-east four lane collector road with two travel lanes in each direction with a striped median. It provides regional access within the City of Azusa and access to the westbound I-210 Freeway. On-street parking is generally prohibited along both sides of the roadway. Pavement conditions range from good to fair conditions.

Scholl Canyon Landfill Area (Site 4)

Figueroa Street is a north-south four lane arterial road with two travel lanes in each direction and a striped median. It provides access from the City of Los Angeles to the Eagle Rock area. It also provides regional access to the SR-134 Freeway. On-street parking is generally permitted along the west side of the roadway and prohibited on the east side. Pavement conditions range from fair to poor conditions.

Scholl Canyon Road is a west-east two lane collector road with one travel lane in each direction and a striped median. Scholl Canyon Road provides access to the Scholl Canyon Landfill. On-street parking is generally permitted along both sides of the roadway. Pavement conditions are poor.

Sheldon Pit (Site 5), Sun Valley Fill Site (Site 6), Bradley Landfill (Site 7), and Boulevard Pit (Sites 8)

Foothill Blvd is a north-south four lane arterial road with two travel lanes in each direction, a striped bike lane in each direction, and a striped two way left turn lane median. It provides access from La Cañada Flintridge area to the San Fernando Valley area. It also provides regional access to the I-210 Freeway. On-street parking is generally prohibited along both sides of the roadway. Pavement conditions range from good to fair conditions.

Osborne Street is a west-east four lane collector road with two travel lanes in each direction and a striped two way left turn lane median. Osborne Street provides local access to the I-210 Freeway and I-5 Freeway. On-street parking is generally permitted along both sides of the roadway. Pavement conditions range from good to fair conditions.

Branford Street is a west-east collector road with four lanes in some sections and three lanes in other sections and a striped two way left turn lane median. Branford Street provides access to the I-5 Freeway. Pavement conditions range from good to fair conditions.

Glenoaks Blvd is a north-south four lane arterial road with two travel lanes in each direction, a striped bike lane in each direction, and a striped two way left turn lane median. It provides access from the City of San Fernando to the City of Los Angeles and Burbank. It also provides regional access to the SR-118 and I-5 Freeways. On-street parking is generally permitted along both sides of the roadway. Pavement conditions range from fair to poor conditions.

Sheldon Street is west-east four lane arterial road with two travel lanes in each direction, a striped bike lane in each direction, and a two way left turn lane. Sheldon Street provides local access to the I-5 Freeway and the Sun Valley and Sheldon Pits. On-street parking is generally prohibited along both sides of the roadway. Pavement conditions range from good to fair conditions.

Laurel Canyon Blvd is a north-south four lane arterial road with two travel lanes in each direction and a striped two way left turn lane median. It provides access from the City of San Fernando to the City of Los Angeles. It also provides regional access to the SR-118 and I-5 Freeways. On-street parking is generally permitted along both sides of the roadway. Pavement conditions range from good to fair conditions.

San Fernando Road is a north-south four lane arterial road with two travel lanes in each direction and a striped two way left turn lane median. It provides access from the City of San Fernando to the City of Los Angeles and Burbank. It also provides regional access to the SR-118 and I-5 Freeways. On-street parking is generally permitted along the west side of the roadway and prohibited on the east side of the roadway. Pavement conditions range from good to fair conditions.

Wheatland Avenue is north-south two lane collector road with one travel lane in each direction and a striped median. Wheatland Avenue provides the Sunland community access to the I-210 Freeway. On-street parking is generally allowed along both sides of the roadway. Pavement conditions range from fair to poor conditions.

Wentworth Street is west-east four lane arterial road with two travel lanes in each direction, a striped bike lane in each direction, and a two way left turn lane. Wentworth Street provides local access to the Sunland area. On-street parking is generally prohibited along both sides of the roadway. Pavement conditions range from good to fair conditions.

Tuxford Street is west-east four lane collector road with two travel lanes in each direction and a two way left turn lane. Tuxford Street provides local access to the I-5 Freeway. On-street parking is generally allowed along both sides of the roadway. Pavement conditions range from good to fair conditions.

Peoria Street is west-east two lane local road with one travel lanes in each direction. Peoria Street provides access Bradley Landfill. On-street parking is generally allowed along the both sides of the roadway. Pavement conditions range from fair to poor conditions.

Existing Intersections

Based on our review of the proposed truck trips and distribution of the truck trips, we recommended that fifty-two (52) intersections in the study area be analyzed:

1.) Berkshire Place and I-210 Freeway Eastbound Ramps (La Cañada Flintridge/Caltrans)
2.) Berkshire Place and I-210 Freeway Westbound Ramps (La Cañada Flintridge/Caltrans)
3.) Oak Grove Drive and Berkshire Place (Pasadena)
4.) Oak Grove Drive and Foothill Freeway Overpass (La Cañada Flintridge)
5.) Windsor Ave and Oak Grove Drive/Woodbury Rd (Altadena/Los Angeles County)
6.) Windsor Ave/Arroyo Blvd and I-210 Freeway Westbound Ramps (Los Angeles County /Caltrans)
7.) Windsor Ave/Arroyo Blvd and I-210 Freeway Eastbound Ramps (Pasadena/Caltrans)
8.) Irwindale Ave and I-210 Freeway Westbound Ramps (Caltrans, Irwindale)
9.) Irwindale Ave and I-210 Freeway Eastbound Ramps (Caltrans, Irwindale)
10.) Irwindale Ave and First Street (Irwindale/Azusa)
11.) Irwindale Ave and Gladstone Street (Irwindale/Azusa)
12.) Vincent Ave and Gladstone Street (Azusa)
13.) Vincent Ave and Arrow Hwy (Irwindale/Azusa/Los Angeles County)
14.) Arrow Hwy and Lark Ellen Ave (County of Los Angeles)
15.) Arrow Hwy and Enid Ave (County of Los Angeles)
16.) Azusa Ave and Arrow Hwy (Azusa/Covina/Los Angeles County)
17.) Azusa Ave and Gladstone Street (Azusa/Los Angeles County)

18.) Azusa Ave and I-210 Freeway Eastbound Ramps (Caltrans/ Azusa)
19.) Azusa Ave and First Street (Azusa)
20.) First Street and Alameda Street/I-210 Freeway Westbound Ramps (Caltrans, Azusa)
21.) Figueroa St/Scholl Canyon Road and SR-134 Freeway Westbound Ramps (City of Los Angeles, Caltrans)
22.) Figueroa St and Eagle Vista Drive (City of Los Angeles)
23.) Figueroa St and SR-134 Freeway Eastbound Ramps (City of Los Angeles, Caltrans)
24.) Foothill Blvd and I-210 Westbound Ramps (City of Los Angeles, Caltrans)
25.) Foothill Blvd and I-210 Eastbound Ramps (City of Los Angeles, Caltrans)
26.) Foothill Blvd and Osborne Street (City of Los Angeles)
27.) Glenoaks Blvd and Osborne Street (City of Los Angeles)
28.) Glenoaks Blvd and Montague Street (City of Los Angeles)
29.) Glenoaks Blvd and Branford Street (City of Los Angeles)
30.) Glenoaks Blvd and Sheldon Street (City of Los Angeles)
31.) Glenoaks Blvd and Peoria Street (City of Los Angeles)
32.) Glenoaks Blvd and Tuxford Street (City of Los Angeles)
33.) Glenoaks Blvd and Penroe Street (City of Los Angeles)
34.) Glenoaks Blvd and Sunland Blvd (City of Los Angeles)
35.) Glenoaks Blvd and Roscoe Blvd (City of Los Angeles)
36.) Roscoe Blvd and I-5 Freeway Northbound Ramps (City of Los Angeles/Caltrans)
37.) Roscoe Blvd and I-5 Freeway Southbound Ramps (City of Los Angeles/Caltrans)
38.) Branford Street and I-5 Freeway Southbound Ramps (City of Los Angeles/Caltrans)
39.) Branford Street and I-5 Freeway Northbound Ramps (City of Los Angeles/Caltrans)
40.) Branford Street and Laurel Canyon Blvd (City of Los Angeles)
41.) Osborne Street and I-5 Freeway Southbound Ramps (City of Los Angeles/Caltrans)
42.) Osborne Street and I-5 Freeway Northbound Ramps (City of Los Angeles/Caltrans)
43.) Osborne Street and Laurel Canyon Blvd (City of Los Angeles)
44.) Wheatland Ave and I-210 Freeway Eastbound Ramps (City of Los Angeles/Caltrans)
45.) Wheatland Ave and I-210 Freeway Westbound Ramps (City of Los Angeles/Caltrans)
46.) Wheatland Ave and Foothill Blvd (City of Los Angeles)
47.) Wentworth Street and Foothill Blvd (City of Los Angeles)
48.) Tuxford Street and San Fernando Road (City of Los Angeles)
49.) Lankershim Blvd and San Fernando Road (City of Los Angeles)
50.) Sheldon Street and San Fernando Road (City of Los Angeles)
51.) Branford Street and San Fernando Road (City of Los Angeles)
52.) Irwindale Avenue and Foothill Boulevard (City of Irwindale)

Freeway Facilities

Interstate 210 Freeway provides regional access within the study area and runs west to east to the east of the SR-134 Freeway interchange and runs north to south to the north of the SR-134 Freeway interchange. To the east of the SR-134 Freeway interchange the I-210 Freeway is an eight-lane freeway with four lanes in each direction and one car pool lane in each direction. To the north of the SR-134 Freeway interchange the I-210 Freeway becomes an eight-lane freeway with four lanes in each direction. This freeway is an interstate facility that provides travel between the San Bernardino, Rancho Cucamonga, and San Dimas areas to the Pasadena and San Fernando areas.

Interstate 5 Freeway provides regional access within the study area and runs north to south connecting Southern California to Northern California. The I-5 Freeway is an eight-lane freeway with four lanes in each direction. This freeway is an interstate facility that provides travel between Los Angeles to Orange and San Diego County and between Los Angeles to Bakersfield, Sacramento, and San Francisco.

State Route 134 Freeway provides regional access within the study area and runs west to east from the I-210 Freeway interchange to the US-101 and SR-170 Freeway interchange in Hollywood. The SR-134 Freeway is an eight-lane freeway with four lanes in each direction and one car pool lane in each direction. This freeway is a state facility that provides travel between the Ventura, Hollywood, and Burbank areas to the Pasadena, San Dimas, and San Bernardino areas.

State Route 2 Freeway provides regional access within the study area and runs north to south from south of the I-5 Freeway interchange in Los Angeles to the I-210 Freeway interchange in La Cañada Flintridge. The SR-2 Freeway is an eight-lane freeway with four lanes in each direction. This freeway is a state facility that provides travel between the La Cañada Flintridge and Glendale areas to the Los Angeles and Hollywood areas.

Existing Freeway and Ramps System

The proposed haul routes must utilize segments of the I-210 and SR-134 freeways as well as several on and off-ramps. An increase in truck traffic along the freeway and ramps can impact the LOS of the freeway and ramps adversely. In order to ensure adequate freeway and ramp operations this study has identified 28 freeway segments and 54 on and off-ramps for analysis. The 28 freeway segments identified for analysis consist of the following:

1.) I-210 Freeway between Windsor Ave/Arroyo Blvd and Berkshire Place.
2.) I-210 Freeway between Lincoln Ave and Windsor Ave/Arroyo Blvd.
3.) I-210 Freeway between the SR-134 Freeway and Mountain Street.
4.) SR-134 Freeway between San Rafael Ave and Figueroa Street.
5.) SR-134 Freeway between the I-210 Freeway and San Rafael Ave.
6.) I-210 Freeway between the SR-134 Freeway and Lake Ave.
7.) I-210 Freeway between the I-605 Freeway and Irwindale Ave.
8.) I-210 Freeway between Irwindale Ave and Azusa Ave.
9.) I-210 Freeway between Berkshire Place and Foothill Blvd.
10.) I-210 Freeway between Angeles Crest Hwy and the SR-2 Freeway (Glendale Freeway)
11.) SR-2 Freeway between the I-210 Freeway and Mountain Street.
12.) SR-2 Freeway between Mountain Street and the SR-134 Freeway.
13.) SR-134 Freeway between the SR-2 Freeway and Figueroa Street.
14.) SR-134 Freeway between the SR-2 Freeway and Glendale Ave.
15.) SR-134 Freeway between the Pacific Ave and Concord Street.
16.) SR-134 Freeway between Concord Street and the I-5 Freeway.
17.) I-5 Freeway between the SR-134 Freeway and Western Ave.
18.) I-5 Freeway between North Hollywood Way and Roscoe Blvd/Glenoaks Blvd.
19.) I-5 Freeway between Sheldon Street/Laurel Canyon Blvd and the SR-170 Freeway.
20.) I-5 Freeway between the SR-170 Freeway and Branford Street.
21.) I-210 Freeway between the SR-2 Freeway and Montrose Ave.
22.) I-210 Freeway between Sunland Blvd and Wheatland Ave
23.) I-210 Freeway between Wheatland Ave and Foothill Blvd/Osborne Street.

24.) I-210 Freeway between Foothill Blvd/Osborne Street and the SR-118 Freeway.
25.) SR-118 Freeway between the I-210 Freeway and Glenoaks Blvd.
26.) SR-118 Freeway between San Fernando Rd and the I-5 Freeway.
27.) I-5 Freeway between the SR-118 Freeway and Van Nuys Blvd.
28.) I-5 Freeway between Tierra Bella Street and Osborne Street.

The 54 on and off-ramps on-ramps and off-ramps identified for analysis consists of the following:

1.) Berkshire Place and the Eastbound I-210 Freeway Off-ramp. *(Diverge Point)*
2.) Berkshire Place and the Westbound I-210 Freeway On-ramp.*(Merge Point)*
3.) Berkshire Place and the Eastbound I-210 Freeway On-ramp. *(Merge Point)*
4.) Berkshire Place and the Westbound I-210 Freeway Off-ramp. *(Diverge Point)*
5.) Windsor Ave/Arroyo Blvd and the Eastbound I-210 Freeway Off-ramp. *(Diverge Point)*
6.) Windsor Ave/Arroyo Blvd and the Westbound I-210 Freeway On-Ramp. *(Merge Point)*
7.) Windsor Ave/Arroyo Blvd and the Eastbound I-210 Freeway On-Ramp. *(Merge Point)*
8.) Windsor Ave/Arroyo Blvd and the Westbound I-210 Freeway Off-ramp. *(Diverge Point)*
9.) Southbound I-210 Freeway Transition Ramp to the Westbound SR-134 Freeway mainline and Eastbound I-210 Freeway mainline. *(Diverge Point)*
10.) Westbound I-210 Freeway and Eastbound SR-134 Freeway Transition Ramp to the Northbound I-210 Freeway mainline. *(Merge Point)*
11.) Southbound I-210 Freeway Transition Ramp to the Westbound SR-134 Freeway mainline. *(Merge Point)*
12.) Eastbound SR-134 Freeway Transition Ramp to the Northbound I-210 Freeway mainline. *(Diverge Point)*
13.) Figueroa St/Scholl Canyon Road and the Westbound SR-134 Freeway Off-ramp. *(Diverge Point)*
14.) Figueroa St and the Eastbound SR-134 Freeway Eastbound On-ramp. *(Merge Point)*
15.) Southbound I-210 Freeway Transition Ramp to the Eastbound I-210 Freeway mainline. *(Merge Point)*
16.) Westbound I-210 Freeway Transition Ramp to the Northbound I-210 Freeway mainline. *(Diverge Point)*
17.) Irwindale Ave and the Eastbound I-210 Freeway Off-ramp. *(Diverge Point)*
18.) Irwindale Ave and the Westbound loop I-210 Freeway On-ramp. *(Merge Point)*
19.) Irwindale Ave and the Westbound slip I-210 Freeway On-ramp. *(Merge Point)*
20.) First Street/Alameda Street and the Westbound I-210 Freeway On-ramp. *(Merge Point)*
21.) Westbound I-210 Freeway Transition Ramp to the Southbound SR-2 Freeway mainline. *(Diverge Point)*
22.) Northbound SR-2 Freeway Transition Ramp to the Eastbound I-210 Freeway mainline. *(Merge Point)*
23.) Westbound I-210 Freeway Transition Ramp to the Southbound SR-2 Freeway mainline. *(Merge Point)*
24.) Northbound SR-2 Freeway Transition Ramp to the Eastbound I-210 Freeway mainline. *(Diverge Point)*
25.) Southbound SR-2 Freeway Transition Ramp to the Eastbound SR-134 Freeway mainline. *(Diverge Point)*
26.) Westbound and Eastbound SR-134 Freeway Transition Ramp to the Northbound SR-2 Freeway mainline. *(Merge Point)*
27.) Southbound SR-2 Freeway Transition Ramp to the Eastbound SR-134 Freeway mainline. *(Merge Point)*

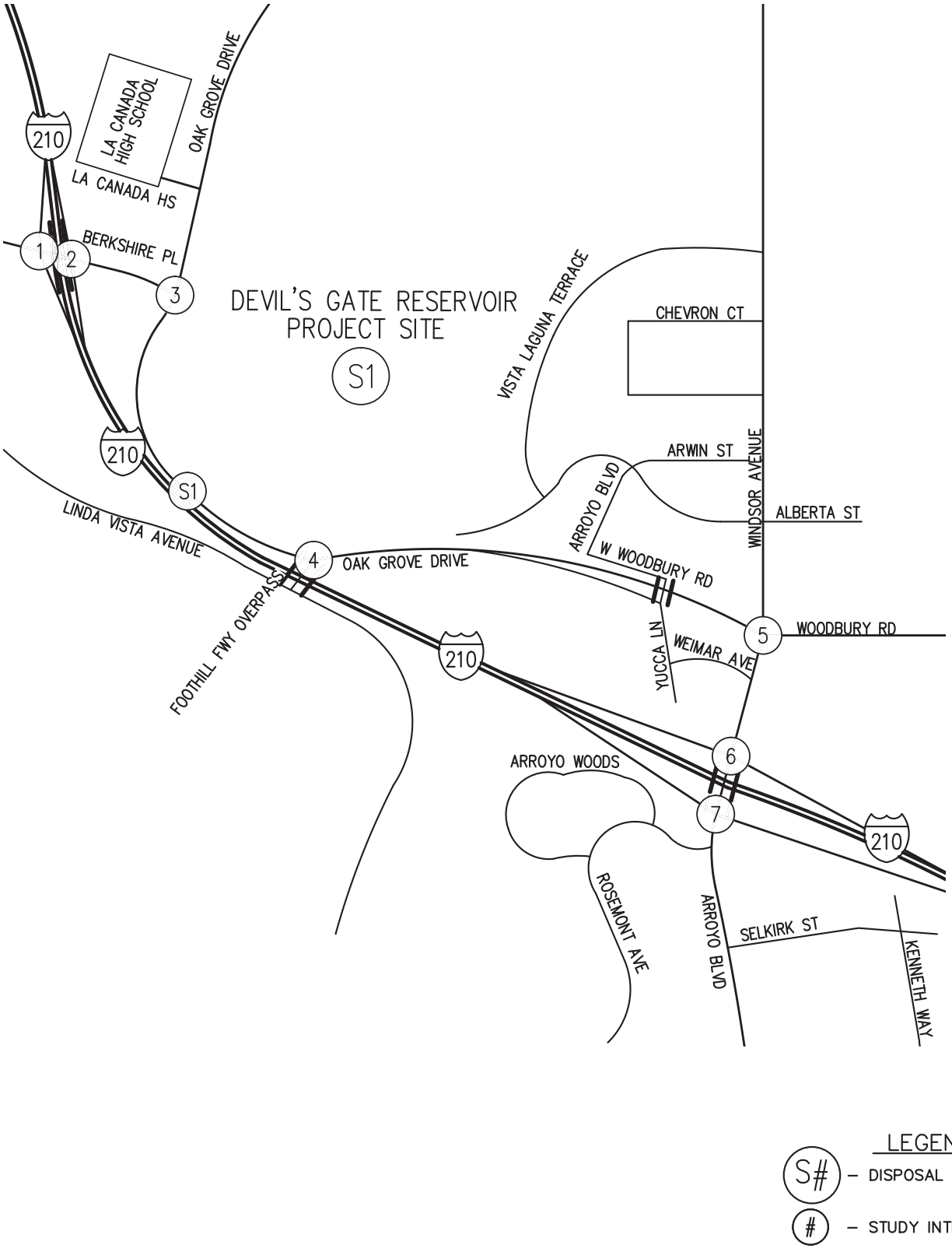
28.) Westbound SR-134 Freeway Transition Ramp to the Northbound SR-2 Freeway mainline. *(Diverge Point)*
29.) Figueroa Street and the Eastbound SR-134 Freeway Off-ramp. *(Diverge Point)*
30.) Figueroa Street and the Westbound SR-134 Freeway On-ramp. *(Merge Point)*
31.) Southbound SR-2 Freeway Transition Ramp to the Westbound SR-134 Freeway mainline. *(Merge Point)*
32.) Eastbound SR-134 Freeway Transition Ramp to the Northbound SR-2 Freeway mainline. *(Diverge Point)*
33.) Westbound SR-134 Freeway Transition Ramp to the Northbound I-5 Freeway mainline. *(Diverge Point)*
34.) Southbound I-5 Freeway Transition Ramp to the Eastbound SR-134 Freeway mainline. *(Merge Point)*
35.) Westbound SR-134 Freeway Transition Ramp to the Northbound I-5 Freeway mainline. *(Merge Point)*
36.) Southbound I-5 Freeway Transition Ramp to the Eastbound SR-134 Freeway mainline. *(Diverge Point)*
37.) Roscoe Blvd/Glenoaks Blvd and the Northbound I-5 Freeway mainline Off-ramp. *(Diverge Point)*
38.) Roscoe Blvd/Glenoaks Blvd and the Southbound I-5 Freeway mainline On-ramp. *(Merge Point)*
39.) Branford Street and the Southbound I-5 Freeway mainline On-ramp. *(Merge Point)*
40.) Branford Street and the Northbound I-5 Freeway mainline Off-ramp. *(Diverge Point)*
41.) Wheatland Ave and the Westbound I-210 Freeway mainline Off-ramp. *(Diverge Point)*
42.) Wheatland Avenue and the Eastbound I-210 Freeway mainline On-ramp. *(Merge Point)*
43.) Foothill Blvd/Osborne Street and the Westbound I-210 Freeway mainline Off-ramp. *(Diverge Point)*
44.) Foothill Blvd/Osborne Street and the Eastbound I-210 Freeway mainline On-ramp. *(Merge Point)*
45.) Westbound I-210 Freeway Transition Ramp to the Westbound SR-118 Freeway mainline. *(Diverge Point)*
46.) Eastbound SR-118 Freeway Transition Ramp to the Eastbound I-210 Freeway mainline. *(Merge Point)*
47.) Westbound I-210 Freeway Transition Ramp to the Westbound SR-118 Freeway mainline. *(Merge Point)*
48.) Eastbound SR-118 Freeway Transition Ramp to the Eastbound I-210 Freeway mainline. *(Diverge Point)*
49.) Westbound SR-118 Freeway Transition Ramp to the Southbound I-5 Freeway mainline. *(Diverge Point)*
50.) Northbound I-5 Freeway Transition Ramp to the Eastbound SR-118 Freeway mainline. *(Merge Point)*
51.) Westbound SR-118 Freeway Transition Ramp to the Southbound I-5 Freeway mainline. *(Merge Point)*
52.) Northbound I-5 Freeway Transition Ramp to the Eastbound SR-118 Freeway mainline *(Diverge Point)*
53.) Osborne Street and the Southbound I-5 Freeway mainline Off-ramp. *(Diverge Point)*
54.) Osborne Street and the Northbound I-5 Freeway mainline On-ramp. *(Merge Point)*

Existing Intersection Level of Service

Intersection capacity analyses were conducted for the fifty-two (52) existing study intersections utilizing the methods as discussed previously. The resulting LOS for the existing conditions of each intersection analyzed is presented in *Table 3-1-1* through *Table 3-4-12*, Sites 1 through Site 9. The LOS of both the HCM and ICU methods are presented.

Section 1: Devil's Gate Dam and Reservoir (Site 1)

The Devil's Gate Dam and Reservoir site consists of eight (8) proposed Haul Routes labeled 1A-1H. These routes will provide access from the Devil's Gate Dam and Reservoir to the proposed Disposal Sites. The Devil's Gate Dam and Reservoir site is illustrated in *Figure 3-1-1*, providing study intersections utilized. Proposed Haul Routes 1A through 1H are is illustrated in *Figure 3-1-2 through Figure 3-1-9.* The previously outlined intersection utilization is provided in the Route figures, outlining the Haul Truck turn movements for individual proposed routes. Existing AM (7-9), MID-DAY (12-2), MID-DAY (2-4), and PM (4-6) turn movement volumes, for proposed Haul Routes 1A through 1H, are provided in *Figure 3-1-10.* The existing geometrics are illustrated in *Figure 3-1-11.*



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DEVIL'S GATE RESERVOIR VICINITY MAP

DEVIL'S GATE DAM & RESERVOIR

FIGURE 3-1-1

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 3\Ch. 3 Section 1\FIG 3-1-1.dwg
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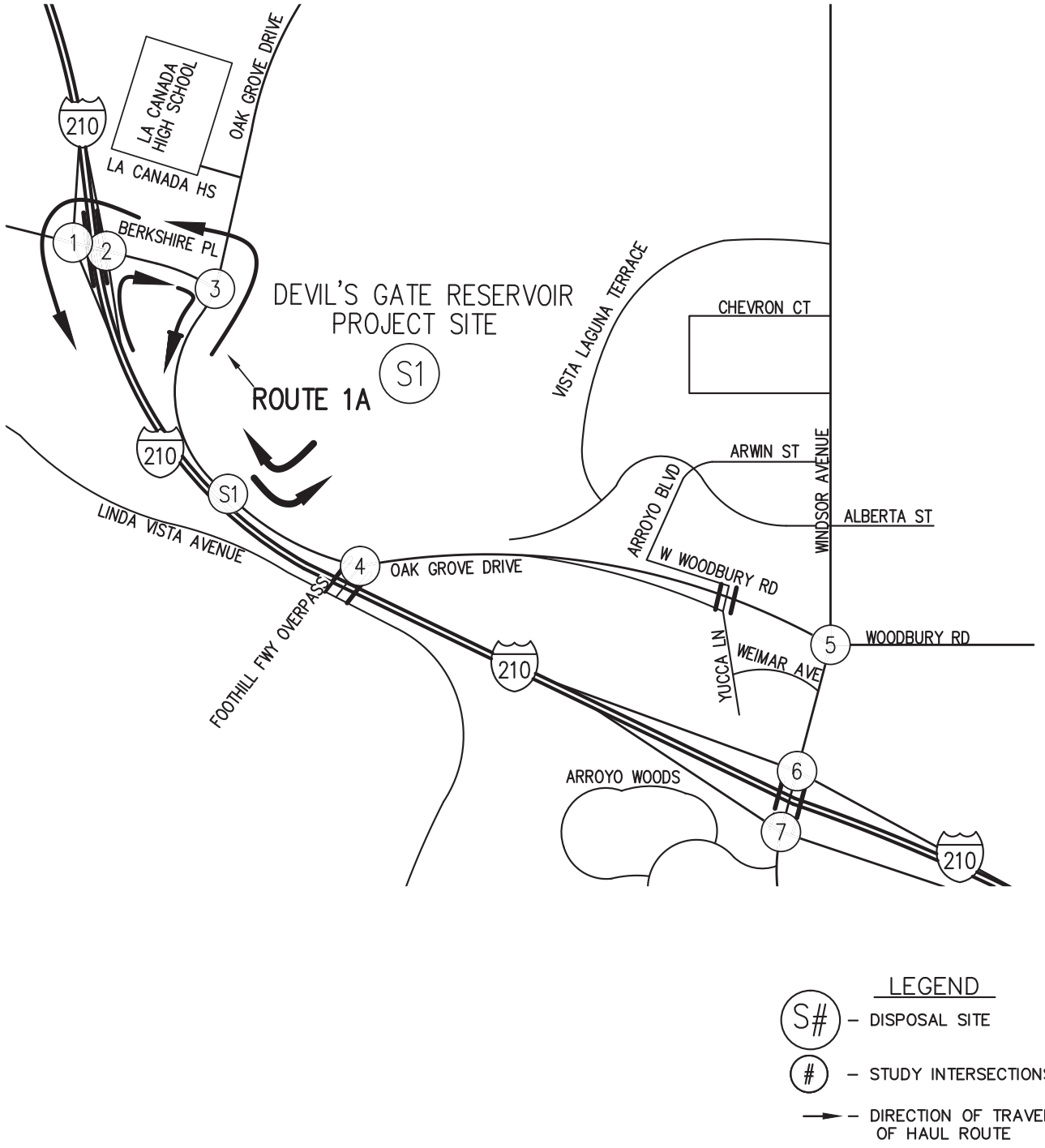

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HAUL ROUTE 1A

DEVIL'S GATE DAM & RESERVOIR

FIGURE
3-1-2

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 3\Ch. 3 Section 1\FIG 3-1-2.dwg
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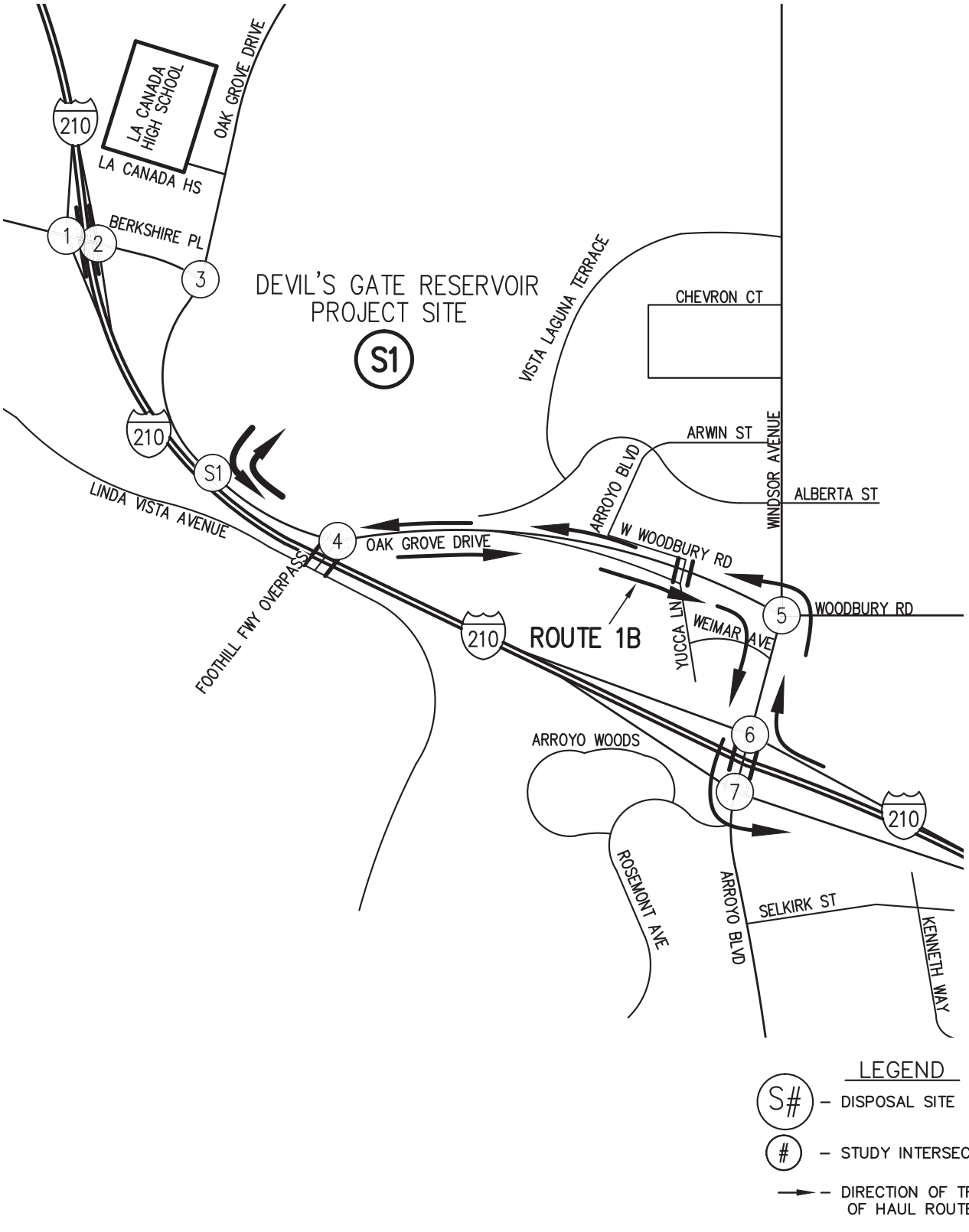

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HAUL ROUTE 1B

DEVIL'S GATE DAM & RESERVOIR

FIGURE
3-1-3

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 3\Ch. 3 Section 1\FIG 3-1-3.dwg
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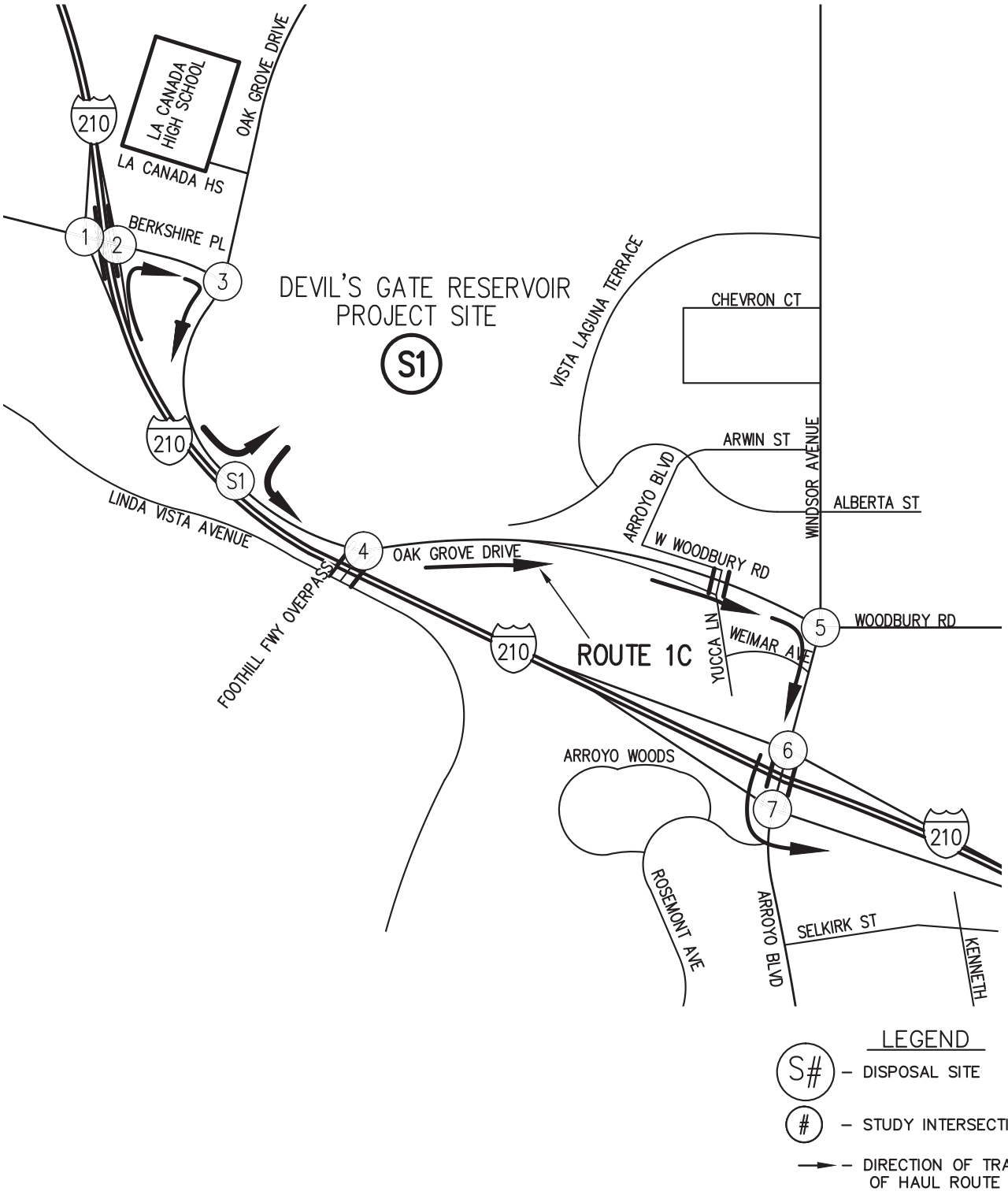

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HAUL ROUTE 1C

DEVIL'S GATE DAM & RESERVOIR

FIGURE
3-1-4

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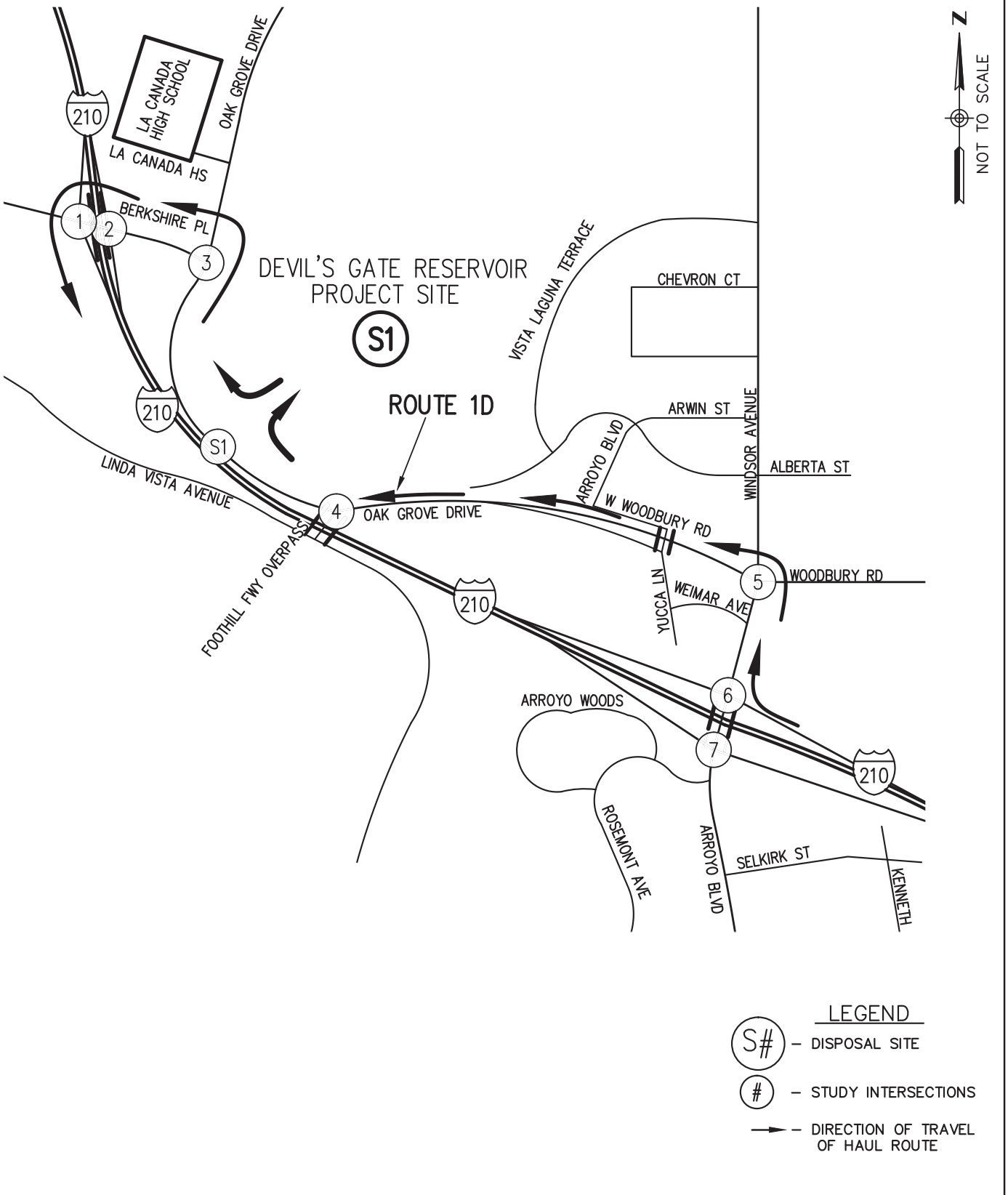

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HAUL ROUTE 1D

DEVIL'S GATE DAM & RESERVOIR

FIGURE
3-1-5

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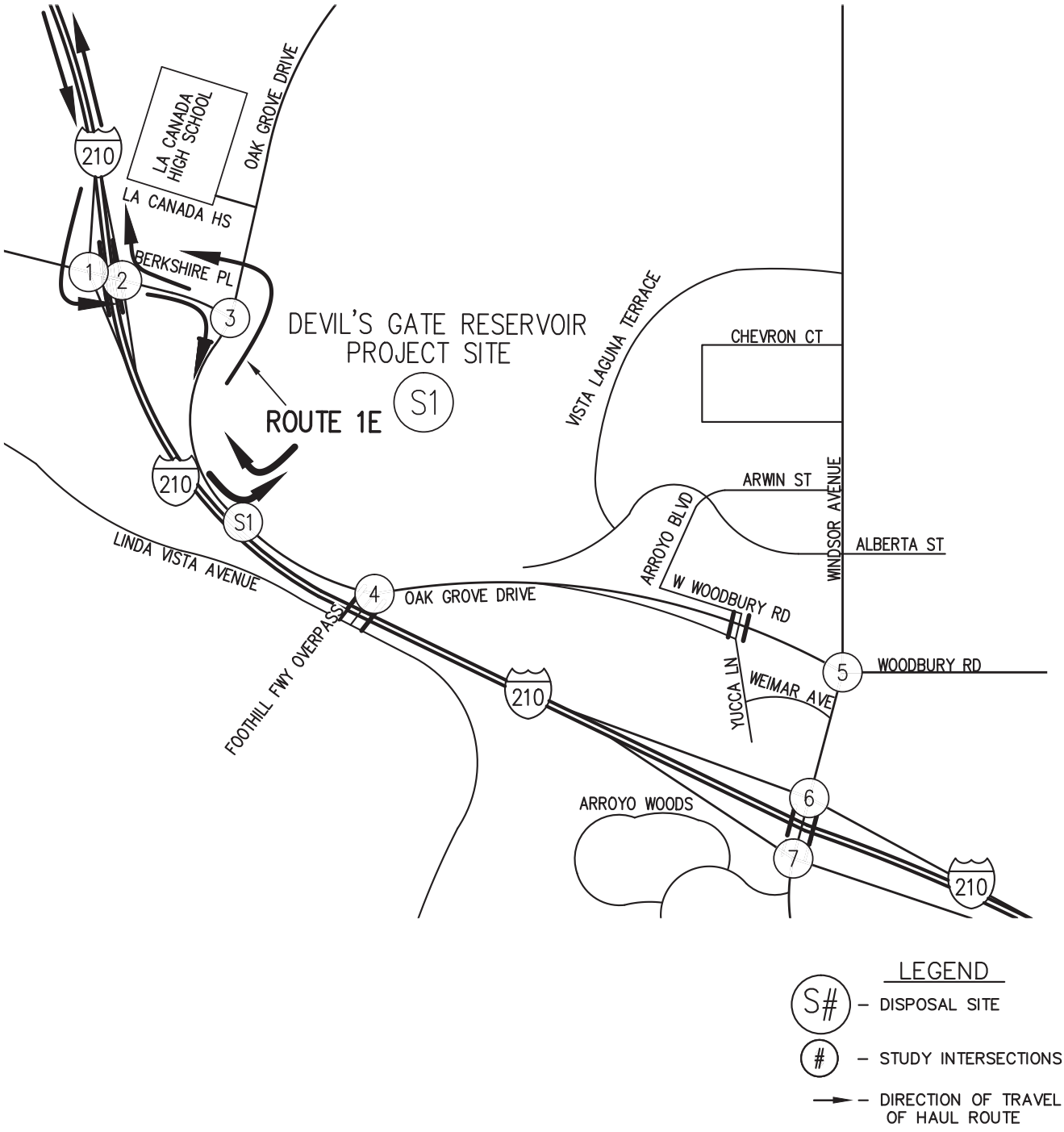

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HAUL ROUTE 1E

DEVIL'S GATE DAM & RESERVOIR

FIGURE
3-1-6

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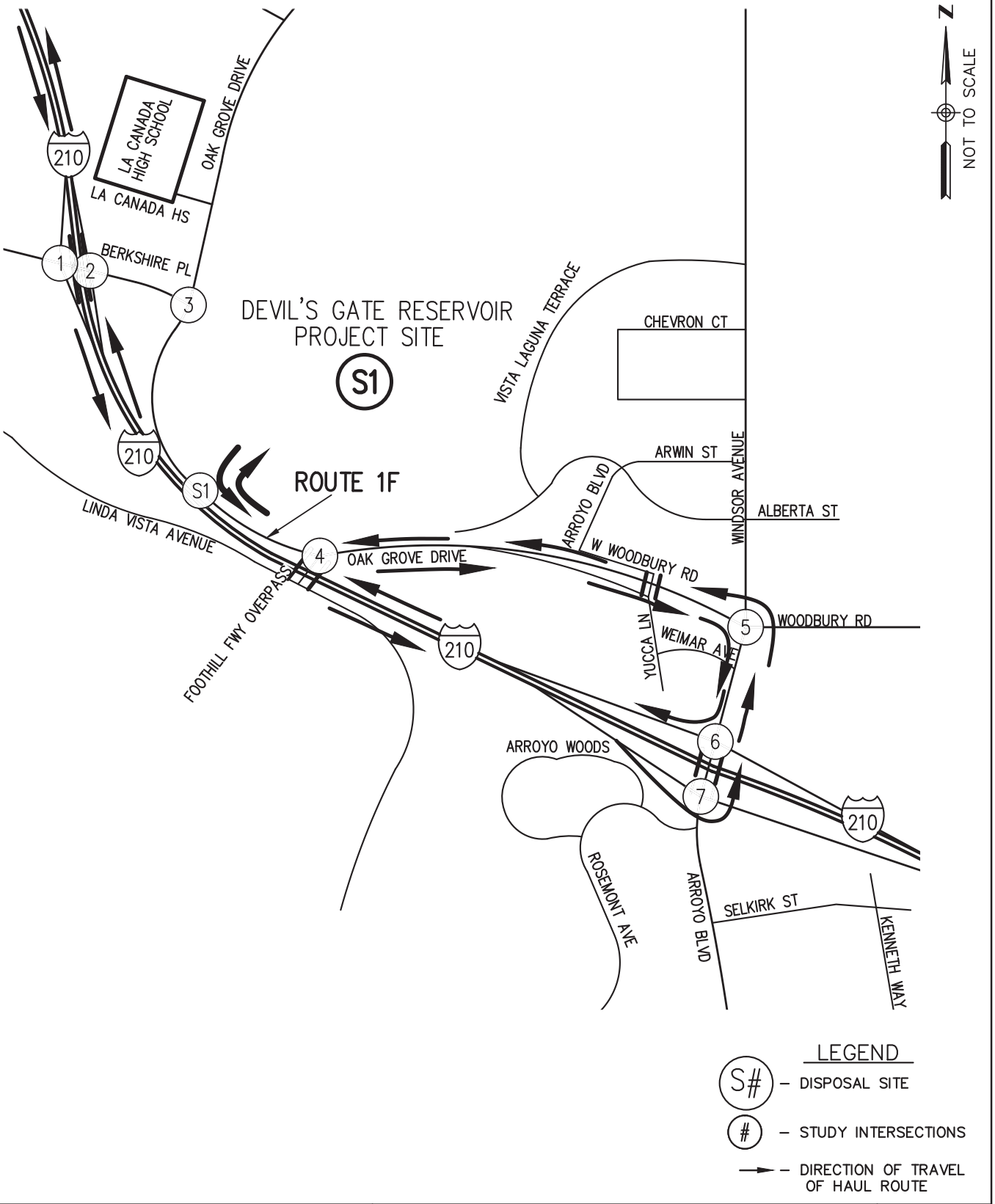

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HAUL ROUTE 1F

DEVIL'S GATE DAM & RESERVOIR

FIGURE
3-1-7

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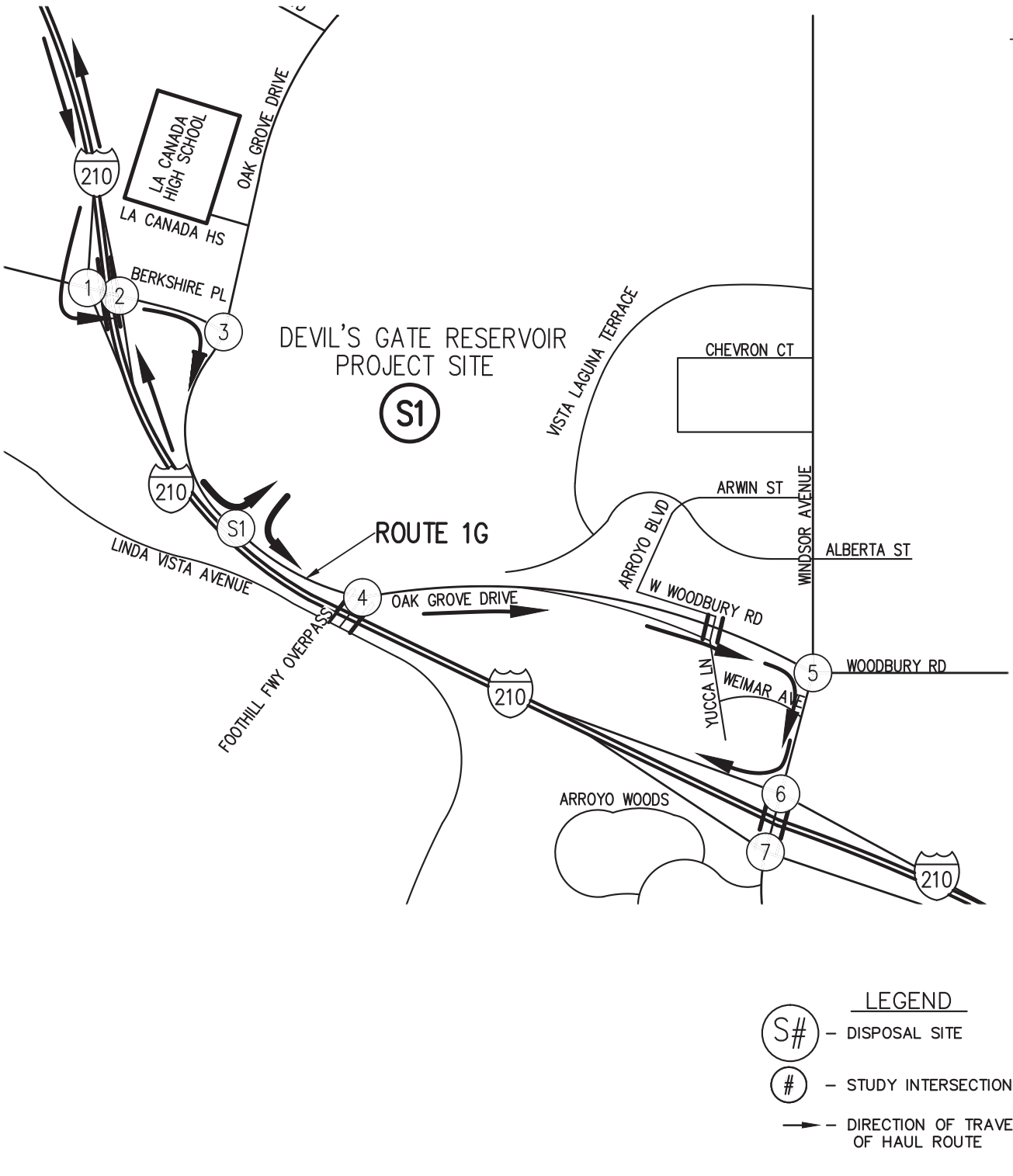

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HAUL ROUTE 1G

DEVIL'S GATE DAM & RESERVOIR

FIGURE
3-1-8

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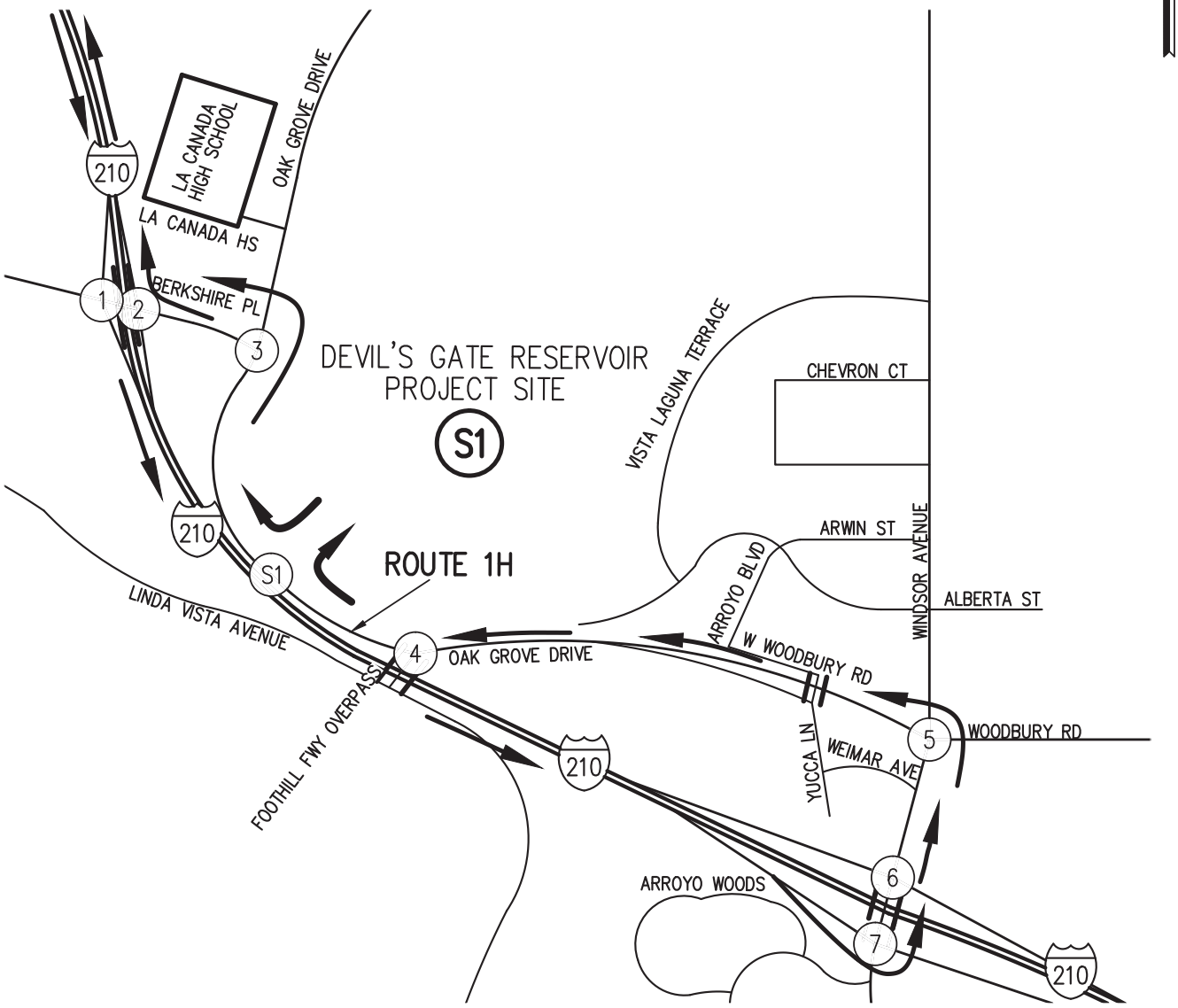

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HAUL ROUTE 1H

DEVIL'S GATE DAM & RESERVOIR

FIGURE
3-1-9

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N/S STREET	1	E/W STREET
I-210 FWY EB RAMPS		BERKSHIRE PLACE
	85 5 325	
	45 5 105	
	60 5 205	
	90 5 165	
0 0 0 0		0 0 0 0
250 100 125 80	TS	120 110 165 160
125 55 80 70		140 80 205 335
	0 0 0	
	0 0 0	
	0 0 0	
	0 0 0	

N/S STREET	2	E/W STREET
I-210 FWY WB RAMPS		BERKSHIRE PLACE
	0 0 0	
	0 0 0	
	0 0 0	
	0 0 0	
95 50 50 65		255 170 170 410
285 175 175 180	TS	190 110 110 405
0 0 0 0		0 0 0 0
	60 5 275	
	55 5 70	
	65 5 115	
	95 5 80	

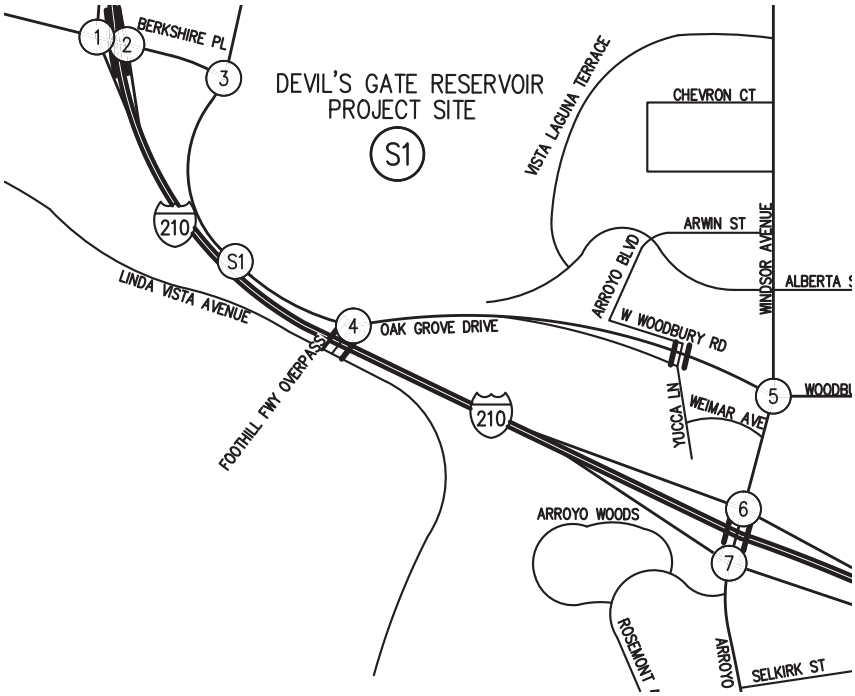
N/S STREET	3	E/W STREET
OAK GROVE DRIVE		BERKSHIRE PLACE
	360 70 0	
	215 100 0	
	745 140 0	
	750 245 0	
510 150 330 185		0 0 0 0
0 0 0 0	TS	0 0 0 0
70 60 45 85		0 0 0 0
	140 450 0	
	65 135 0	
	75 95 0	
	65 150 0	

N/S STREET	4	E/W STREET
FOOTHILL FWY OVERPASS		OAK GROVE DRIVE
	0 0 0	
	0 0 0	
	0 0 0	
	0 0 0	
0 0 0 0		0 0 0 0
115 105 140 265		465 170 125 130
50 65 60 80		180 60 40 60
	125 0 95	
	55 0 60	
	60 0 65	
	70 0 60	

N/S STREET	5	E/W STREET
WINDSOR AVE		OAK GROVE DRIVE
	35 590 55	
	10 300 40	
	20 340 40	
	5 525 60	
20 25 20 40		45 35 30 50
105 140 140 240	TS	425 160 110 155
40 15 30 25		555 300 350 440
	70 605 455	
	30 290 365	
	20 355 435	
	25 495 570	

N/S STREET	6	E/W STREET
WINDSOR AVE		I-210 FWY WB RAMPS
	530 585 0	
	280 370 0	
	275 435 0	
	445 550 0	
0 0 0 0		570 275 335 405
0 0 0 0	TS	5 5 5 5
0 0 0 0		5 20 20 25
	40 555 0	
	45 420 0	
	45 500 0	
	100 690 0	

N/S STREET	7	E/W STREET
WINDSOR AVE		I-210 FWY EB RAMPS
	0 190 415	
	0 100 295	
	0 160 280	
	0 165 415	
550 320 370 595		0 0 0 0
5 5 5 5	TS	0 0 0 0
105 55 50 105		0 0 0 0
	0 130 20	
	0 145 15	
	0 160 15	
	0 195 15	



LEGEND

N/S STREET	#	E/W STREET
	7AM-9AM	
	12PM-2PM	
	2PM-4PM	
	4PM-6PM	
7AM - 9AM | 12 PM - 2 PM | 2PM - 4PM | 4PM - 6PM	TS	7AM - 9AM | 12 PM - 2 PM | 2PM - 4PM | 4PM - 6PM
	7AM-9AM	
	12PM-2PM	
	2PM-4PM	
	4PM-6PM	

LEGEND

S# – DISPOSAL SITE

– STUDY INTERSECTIONS

NOT TO SCALE

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DEVILS GATE RESERVOIR AREA EXISTING VOLUMES

DEVIL'S GATE DAM & RESERVOIR

FIGURE 3-1-10

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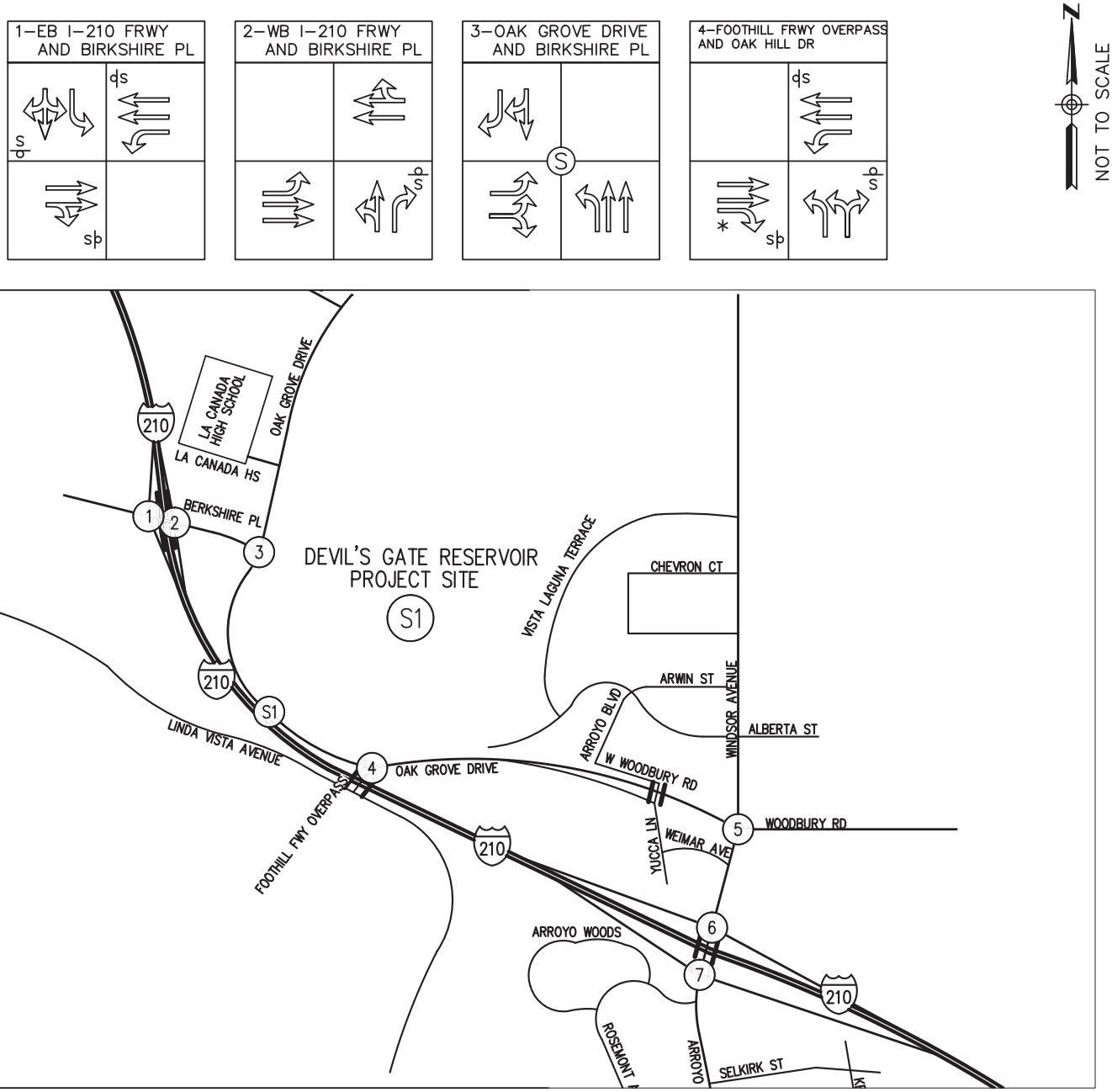

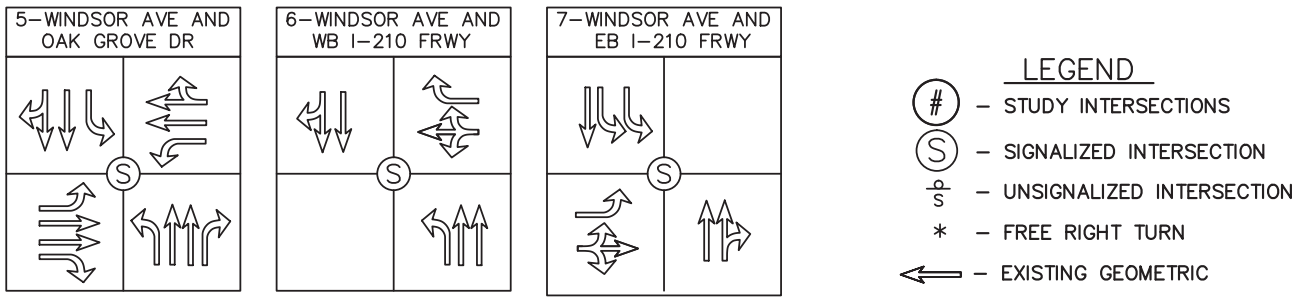

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DEVILS GATE RESERVOIR AREA EXISTING GEOMETRICS

DEVIL'S GATE DAM & RESERVOIR

FIGURE 3–1–11

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Table 3-1-1
Intersection Capacity Analysis – Existing Conditions (Route 1A)

Route1A		AM				MID-DAY (12-2 PM)				MID-DAY (2-4 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
1	Berkshire Place and I-210 Freeway Eastbound Ramps (3)	D	27.9	-	-	A	9.5	-	-	B	14.6	-	-	C	16.3	-	-
2	Berkshire Place and I-210 Freeway Westbound Ramps (3)	A	9.7	-	-	A	4.5	-	-	A	6.3	-	-	A	3.6	-	-
3	Oak Grove Drive and Berkshire Place	A	8.3	0.50	A	A	5.4	0.18	A	A	7.2	0.45	A	A	6.2	0.49	A

Table 3-1-2
Intersection Capacity Analysis – Existing Conditions (Route 1B)

Route1B		AM				MID-DAY (12-2 PM)				MID-DAY (2-4 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
4	Oak Grove Drive and Foothill Freeway Overpass (3)	B	14.8	-	-	A	8.9	-	-	A	8.8	-	-	B	10.2	-	-
5	Windsor Ave and Oak Grove Drive/Woodbury Rd	C	26.5	0.87	C	B	12.8	0.49	A	B	13.9	0.50	A	B	19.7	0.66	B
6	Windsor Ave/Arroyo Blvd and I-210 Freeway Westbound Ramps	A	8.4	0.53	A	A	5.5	0.27	A	A	5.9	0.31	A	A	6.9	0.37	A
7	Windsor Ave/Arroyo Blvd and I-210 Freeway Eastbound Ramps	C	20.8	0.49	A	B	15.5	0.34	A	B	14.9	0.35	A	C	20.9	0.53	A

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
(5) ICU – Intersection Capacity Utilization

Source: **Hall & Foreman, Inc.**

Table 3-1-3
Intersection Capacity Analysis – Existing Conditions (Route 1C)

Route1C		AM				MID-DAY (12-2 PM)				MID-DAY (2-4 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
2	Berkshire Place and I-210 Freeway Westbound Ramps (3)	A	8.8	-	-	A	4.5	-	-	A	6	-	-	A	3.6	-	-
3	Oak Grove Drive and Berkshire Place	A	8.3	0.5	A	A	5.4	0.18	A	A	7.2	0.45	A	A	6.2	0.49	A
4	Oak Grove Drive and Foothill Freeway Overpass (3)	B	14.8	-	-	A	8.9	-	-	A	8.8	-	-	B	10.2	-	-
5	Windsor Ave and Oak Grove Drive/Woodbury Rd	C	26.5	0.87	C	B	12.8	0.49	A	B	13.9	0.5	A	B	19.7	0.66	B
6	Windsor Ave/Arroyo Blvd and I-210 Freeway Westbound Ramps	A	8.4	0.53	A	A	5.5	0.27	A	A	5.9	0.31	A	A	6.9	0.37	A
7	Windsor Ave/Arroyo Blvd and I-210 Freeway Eastbound Ramps	C	20.8	0.49	A	B	15.5	0.34	A	B	14.9	0.35	A	C	20.9	0.53	A

Table 3-1-4
Intersection Capacity Analysis – Existing Conditions (Route 1D)

Route1D		AM				MID-DAY (12-2 PM)				MID-DAY (2-4 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
1	Berkshire Place and I-210 Freeway Eastbound Ramps (3)	D	27.9	-	-	A	9.5	-	-	B	14.6	-	-	C	16.3	-	-
2	Berkshire Place and I-210 Freeway Westbound Ramps (3)	A	9.7	-	-	A	4.5	-	-	A	6.3	-	-	A	1.9	-	-
3	Oak Grove Drive and Berkshire Place	A	8.3	0.50	A	A	5.4	0.18	A	A	7.2	0.45	A	A	6.2	0.49	A
4	Oak Grove Drive and Foothill Freeway Overpass (3)	B	14.8	-	-	A	8.9	-	-	A	8.8	-	-	B	10.2	-	-
5	Windsor Ave and Oak Grove Drive/Woodbury Rd	C	26.5	0.87	C	B	12.8	0.49	A	B	13.9	0.5	A	B	19.7	0.66	B
6	Windsor Ave/Arroyo Blvd and I-210 Freeway Westbound Ramps	A	8.4	0.53	A	A	5.5	0.27	A	A	5.9	0.31	A	A	6.9	0.37	A

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
(5) ICU – Intersection Capacity Utilization

Source: **Hall & Foreman, Inc.**

Table 3-1-5
Intersection Capacity Analysis – Existing Conditions (Route 1E)

Route1E		AM				MID-DAY (12-2 PM)				MID-DAY (2-4 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
1	Berkshire Place and I-210 Freeway Eastbound Ramps (3)	D	27.9	-	-	A	9.5	-	-	B	14.6	-	-	C	16.3	-	-
2	Berkshire Place and I-210 Freeway Westbound Ramps	A	9.7	-	-	A	4.5	-	-	A	6.3	-	-	A	3.6	-	-
3	Oak Grove Drive and Berkshire Place (3)	A	8.3	0.50	A	A	5.4	0.18	A	A	7.2	0.45	A	A	6.2	0.49	A

Table 3-1-6
Intersection Capacity Analysis – Existing Conditions (Route 1F)

Route1F		AM				MID-DAY (12-2 PM)				MID-DAY (2-4 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
4	Oak Grove Drive and Foothill Freeway Overpass (3)	B	14.8	-	-	A	8.9	-	-	A	8.8	-	-	B	10.2	-	-
5	Windsor Ave and Oak Grove Drive/Woodbury Rd	C	26.5	0.87	C	B	12.8	0.49	A	B	13.9	0.5	A	B	19.7	0.66	B
6	Windsor Ave/Arroyo Blvd and I-210 Freeway Westbound Ramps	A	8.4	0.53	A	A	5.5	0.27	A	A	5.9	0.31	A	A	6.9	0.37	A
7	Windsor Ave/Arroyo Blvd and I-210 Freeway Eastbound Ramps	C	20.8	0.49	A	B	15.5	0.34	A	B	14.9	0.35	A	C	20.9	0.53	A

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
(5) ICU – Intersection Capacity Utilization

Source: **Hall & Foreman, Inc.**

Table 3-1-7
Intersection Capacity Analysis – Existing Conditions (Route 1G)

Route1G		AM				MID-DAY (12-2 PM)				MID-DAY (2-4 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
1	Berkshire Place and I-210 Freeway Eastbound Ramps (3)	D	27.9	-	-	A	9.5	-	-	B	14.6	-	-	C	16.3	-	-
2	Berkshire Place and I-210 Freeway Westbound Ramps (3)	A	9.7	-	-	A	4.5	-	-	A	6.3	-	-	A	3.6	-	-
3	Oak Grove Drive and Berkshire Place	A	8.3	0.50	A	A	5.4	0.18	A	A	7.2	0.45	A	A	6.2	0.49	A
4	Oak Grove Drive and Foothill Freeway Overpass (3)	B	14.8	-	-	A	8.9	-	-	A	8.8	-	-	B	10.2	-	-
5	Windsor Ave and Oak Grove Drive/Woodbury Rd	C	26.5	0.87	C	B	12.8	0.49	A	B	13.9	0.50	A	B	19.7	0.66	B
6	Windsor Ave/Arroyo Blvd and I-210 Freeway Westbound Ramps	A	8.4	0.53	A	A	5.5	0.27	A	A	5.9	0.31	A	A	6.9	0.37	A

Table 3-1-8
Intersection Capacity Analysis – Existing Conditions (Route 1H)

Route1H		AM				MID-DAY (12-2 PM)				MID-DAY (2-4 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
2	Berkshire Place and I-210 Freeway Westbound Ramps (3)	A	9.7	-	-	A	4.5	-	-	A	6.3	-	-	A	3.6	-	-
3	Oak Grove Drive and Berkshire Place	A	8.3	0.50	A	A	5.4	0.18	A	A	7.2	0.45	A	A	6.2	0.49	A
4	Oak Grove Drive and Foothill Freeway Overpass (3)	B	14.8	-	-	A	8.9	-	-	A	8.8	-	-	B	10.2	-	-
5	Windsor Ave and Oak Grove Drive/Woodbury Rd	C	26.5	0.87	C	B	12.8	0.49	A	B	13.9	0.5	A	B	19.7	0.66	B
6	Windsor Ave/Arroyo Blvd and I-210 Freeway Westbound Ramps	A	8.4	0.53	A	A	5.5	0.27	A	A	5.9	0.31	A	A	6.9	0.37	A
7	Windsor Ave/Arroyo Blvd and I-210 Freeway Eastbound Ramps	C	20.8	0.49	A	B	15.5	0.34	A	B	14.9	0.35	A	C	20.9	0.53	A

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
(5)V/C-HCM Volume to Capacity Ratio

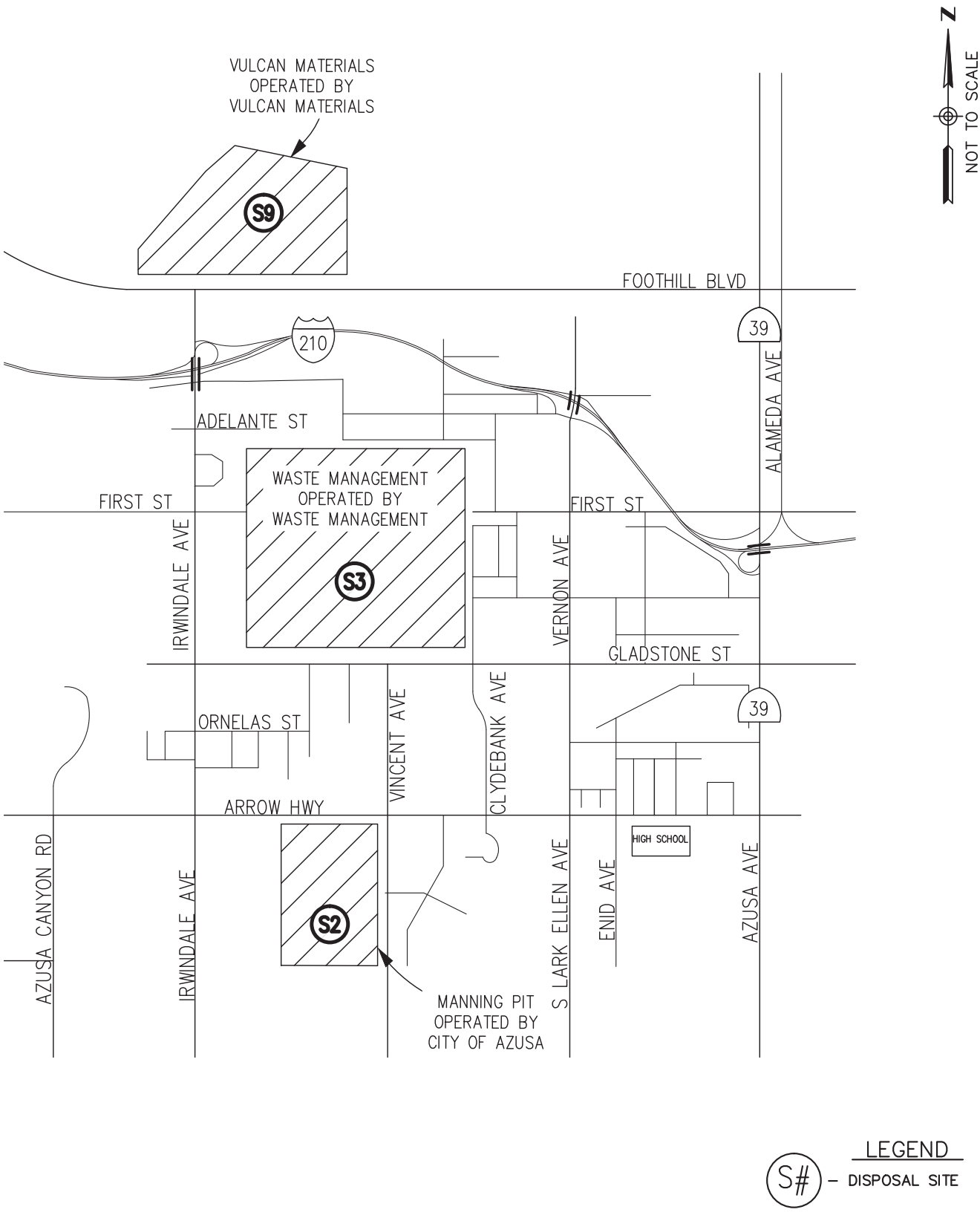
Source: **Hall & Foreman, Inc.**

Devil's Gate Dam and Reservoir (Site 1) Analysis

As presented in *Table 3-1-1* thru *Table 3-1-8*, under the existing conditions for Site 1 (Routes 1A - 1H) all intersections are operating at an acceptable HCM LOS of D or better for the AM, Mid-day (12-2 PM), Mid-day (2-4 PM), and PM peak hours. Since all intersections operate with an acceptable HCM LOS no mitigation is required to improve the HCM LOS under existing conditions.

Section 2: Manning's Pit (Site 2), Waste Management (Site 3), and Vulcan Materials - Irwindale Site (Site 9)

The Manning's Pit consists of two (2) proposed Haul Routes labeled 2A-2B. The Waste Management consists of a proposed Haul Route labeled 3. The Vulcan Materials - Irwindale Site consists of a proposed Haul Route labeled 9. The Manning's Pit, Waste Management, and Vulcan Materials - Irwindale Site are illustrated in *Figure 3-2-1*. Proposed Haul Routes 2A, 2B, 3, and 9 are illustrated in *Figure 3-2-2 through Figure 3-2-5*, providing study intersections utilized. The previously outlined intersection utilization is provided in the Route figures, outlining the Haul Truck turn movements for individual proposed routes. Existing AM (7-9), MID-DAY (12-2), and PM (4-6) turn movement volumes, for proposed Haul Routes 2A, 2B, 3, and 9, are provided in *Figure 3-2-6A and Figure 3-2-6B.* The existing geometrics are illustrated in *Figure 3-2-7.*



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WASTE MANAGEMENT PIT, MANNING PIT, AND VULCAN MATERIALS PIT VICINITY MAP

DEVIL'S GATE DAM & RESERVOIR

FIGURE 3-2-1

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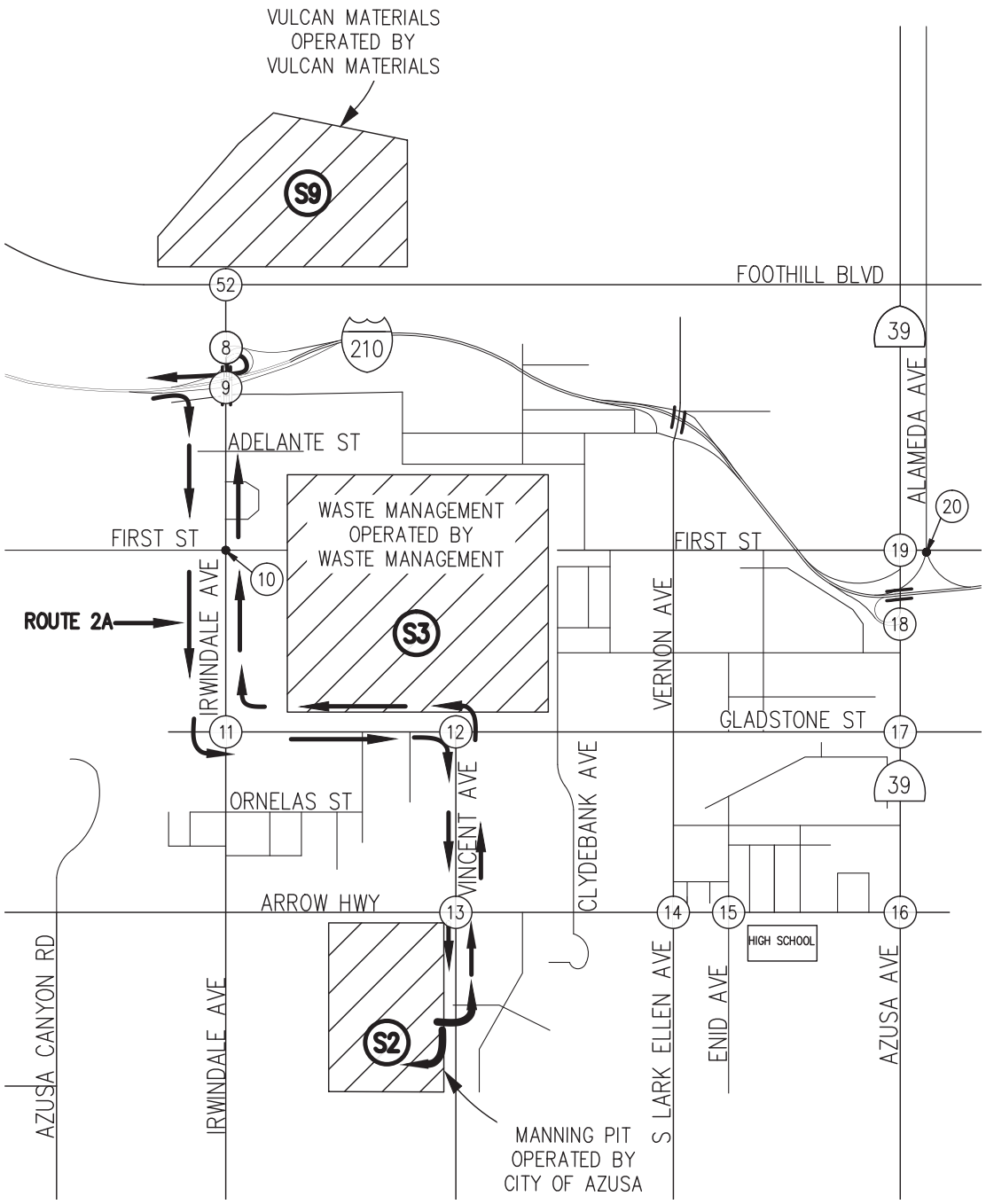

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HAUL ROUTE 2A

DEVIL'S GATE DAM & RESERVOIR

FIGURE
3-2-2

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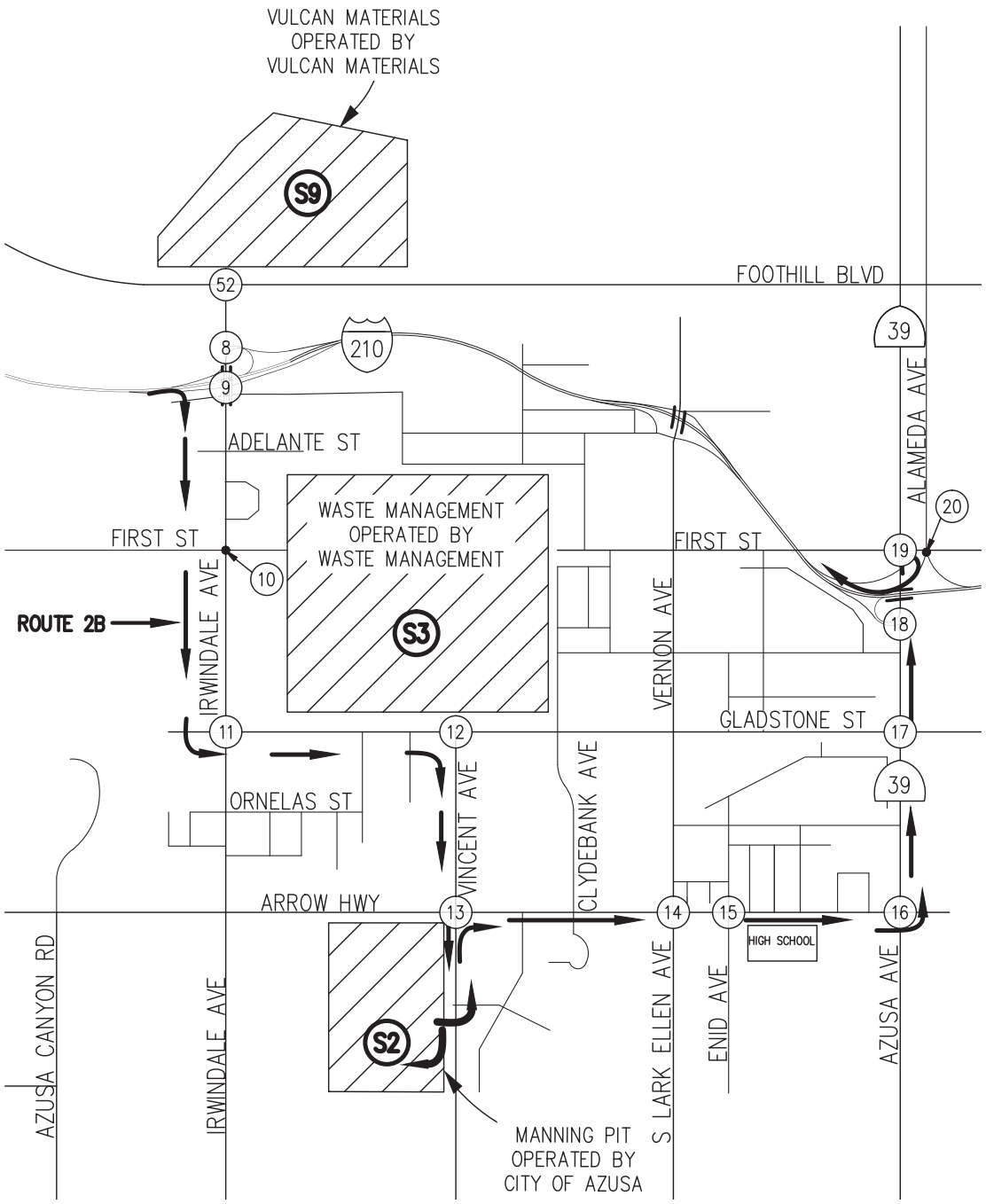

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HAUL ROUTE 2B

DEVIL'S GATE DAM & RESERVOIR

FIGURE
3-2-3

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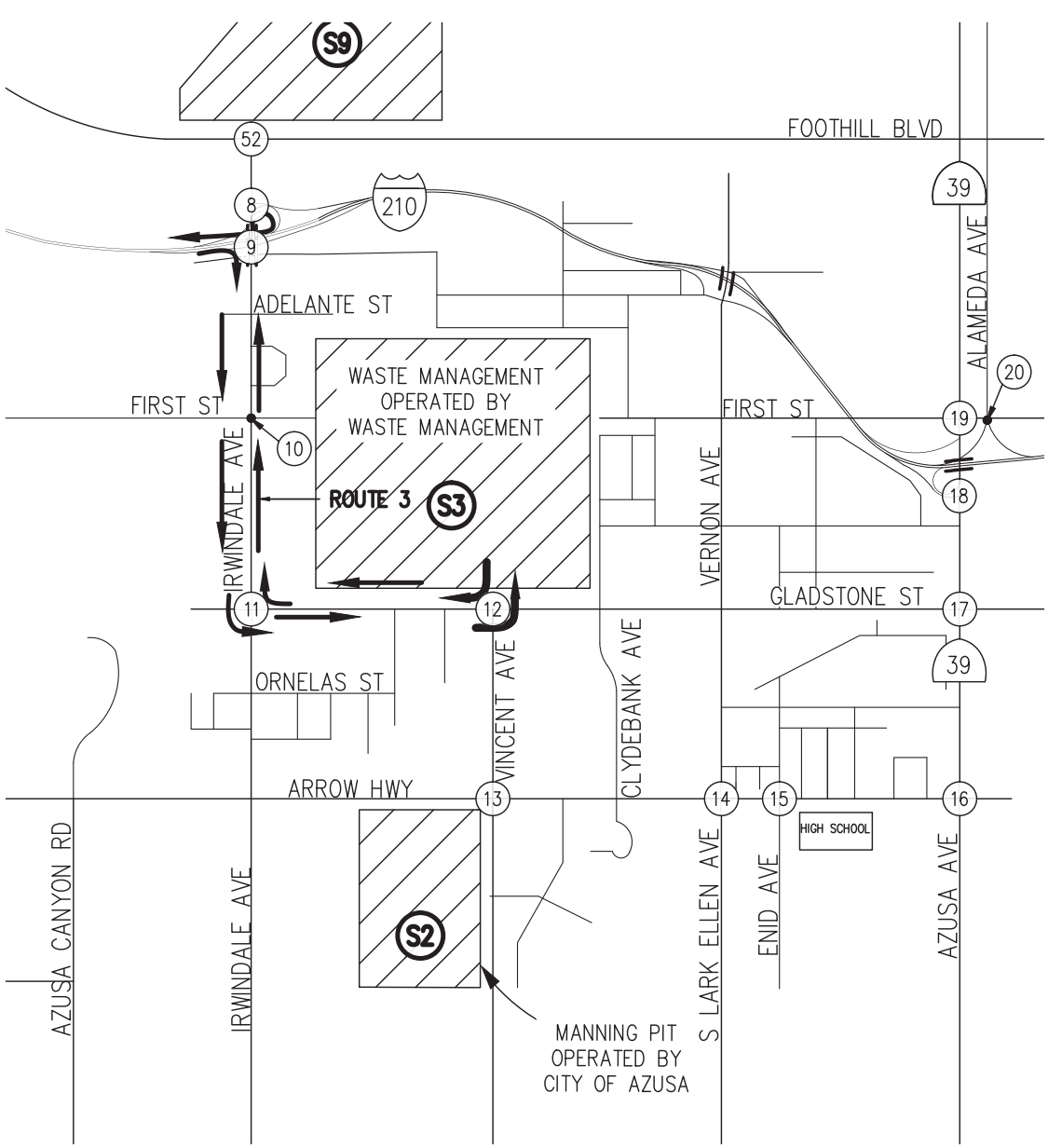

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HAUL ROUTE 3

DEVIL'S GATE DAM & RESERVOIR

FIGURE
3-2-4

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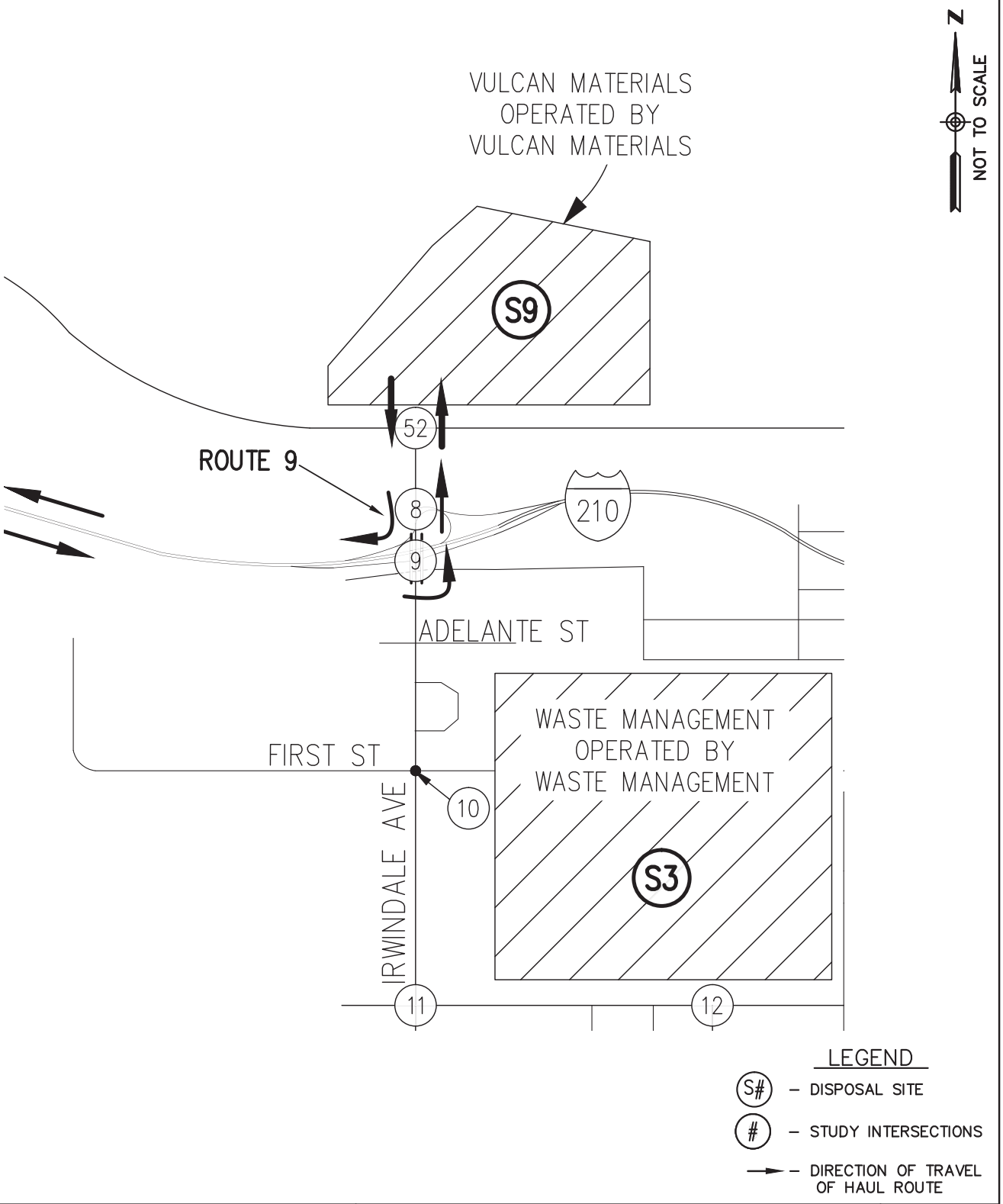

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HAUL ROUTE 9

DEVIL'S GATE DAM & RESERVOIR

FIGURE
3-2-5

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N/S STREET				8	E/W STREET				
IRWINDALE AVE					I-210 FWY WB RAMPS				
				610	470	0			
				545	595	0			
				475	895	0			
0	0	0					100	110	145
0	0	0		TS			0	0	0
0	0	0					175	255	145
				0	845	585			
				0	865	420			
				0	755	475			

N/S STREET				9	E/W STREET				
IRWINDALE AVE					I-210 FWY EB RAMPS				
				0	545	175			
				0	670	200			
				0	740	300			
470	590	375					0	0	0
5	5	5		TS			0	0	0
645	365	385					0	0	0
				0	895	195			
				0	690	240			
				0	960	385			

N/S STREET				10	E/W STREET				
IRWINDALE AVE					FIRST STREET				
				125	1055	5			
				170	750	20			
				40	970	15			
80	135	190					10	15	15
5	10	5		TS			5	5	5
20	95	35					5	15	15
				45	1000	5			
				90	975	25			
				30	1305	15			

N/S STREET				11	E/W STREET				
IRWINDALE AVE					GLADSTONE STREET				
				5	780	185			
				5	750	165			
				5	700	310			
5	5	5					580	200	175
10	25	70		TS			65	20	10
10	35	30					495	130	130
				10	515	55			
				15	770	90			
				10	1170	330			

N/S STREET				12	E/W STREET				
VINCENT AVE					GLADSTONE STREET				
				20	15	5			
				10	5	10			
				5	5	5			
15	10	5					5	5	5
105	170	585		TS			760	195	240
115	105	150					250	115	150
				310	10	165			
				140	5	170			
				90	5	355			

N/S STREET				13	E/W STREET				
VINCENT AVE					ARROW HWY				
				70	265	30			
				60	155	25			
				55	205	45			
55	80	135					90	45	75
530	655	1395		TS			1215	575	525
80	90	210					120	100	110
				170	315	85			
				75	175	115			
				40	235	105			

N/S STREET				14	E/W STREET				
LARK ELLEN AVE					ARROW HWY				
				70	330	110			
				25	210	70			
				55	330	100			
75	75	115					30	30	35
515	675	1345		TS			1205	540	595
90	60	115					115	110	85
				165	330	170			
				65	190	110			
				75	325	115			

N/S STREET				15	E/W STREET				
ENID AVE					ARROW HWY				
				60	145	30			
				25	20	25			
				30	35	25			
15	25	85					20	25	30
640	810	1425		TS			1300	635	630
110	20	60					170	45	50
				95	110	155			
				25	20	55			
				35	40	55			

N/S STREET				16	E/W STREET				
AZUSA AVE					ARROW HWY				
				205	490	95			
				100	760	125			
				85	635	260			
150	145	215					105	115	95
510	495	1130		TS			895	395	460
80	120	135					70	190	125
				225	520	45			
				200	670	135			
				160	465	230			

LEGEND

EXISTING VOLUMES

N/S STREET				#	E/W STREET				
					7AM-9AM				
					12PM-2PM				
					4PM-6PM				
7AM - 9AM	12 PM - 2 PM	4PM - 6PM					7AM - 9AM	12 PM - 2 PM	4PM - 6PM
				TS					
					7AM-9AM				
					12PM-2PM				
					4PM-6PM				

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WASTE MANAGEMENT, MANNINGS PIT, AND VULCAN MATERIALS AREA EXISTING VOLUMES

DEVIL'S GATE DAM & RESERVOIR

FIGURE 3-2-6A

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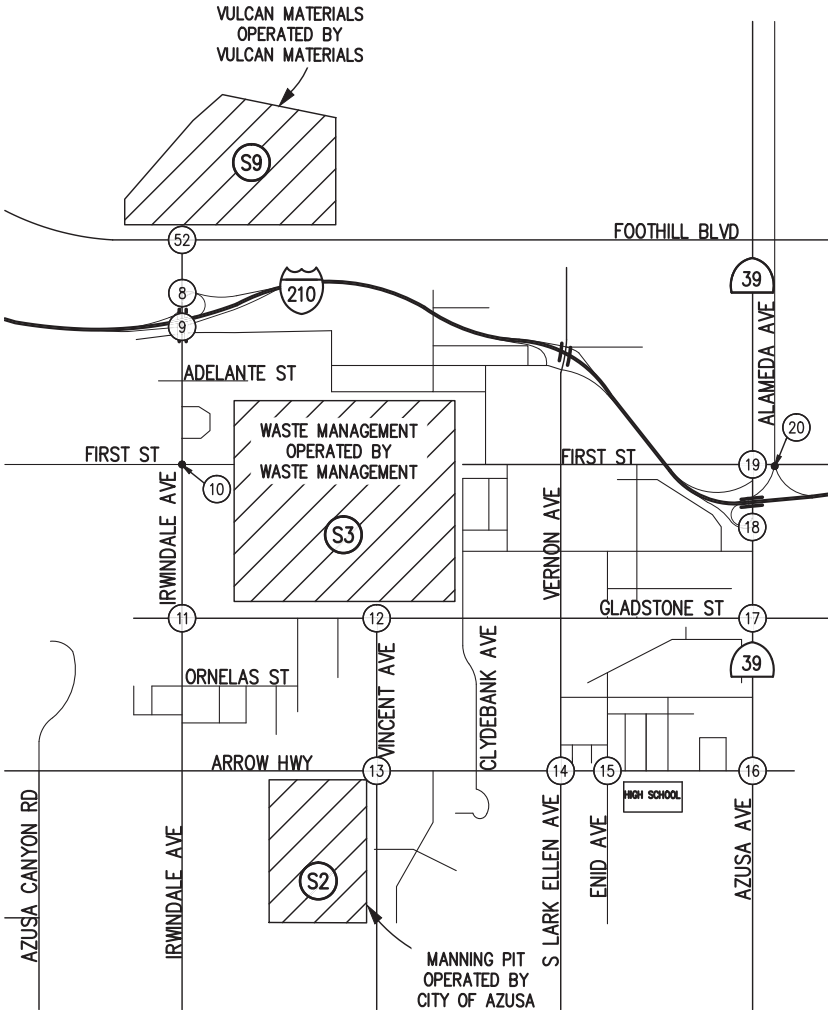
N/S STREET				17		E/W STREET				
AZUSA AVE						GLADSTONE STREET				
				120	630	160				
				115	765	175				
				65	825	180				
145	150	180	↱	↰	↑	↱	↰	60	85	55
160	195	670	←	TS			→	825	180	255
25	35	55	↰	↰	↑	↱	↱	155	200	130
				110	660	40				
				100	740	95				
				55	685	75				

N/S STREET				18		E/W STREET				
AZUSA AVE						I-210 FWY EB RAMPS				
				210	740	0				
				170	720	0				
				190	800	0				
250	280	225	↱	↰	↑	↱	↰	0	0	0
0	0	0	←	TS			→	0	0	0
235	260	215	↰	↰	↑	↱	↱	0	0	0
				0	660	195				
				0	815	215				
				0	640	245				

N/S STREET				19		E/W STREET				
AZUSA AVE						FIRST STREET				
				170	365	160				
				10	645	80				
				20	800	120				
120	45	90	↱	↰	↑	↱	↰	320	155	220
305	85	185	←	TS			→	500	130	205
125	30	35	↰	↰	↑	↱	↱	485	270	255
				160	375	375				
				70	655	325				
				50	430	330				

N/S STREET				20		E/W STREET				
ALAMEDA ST/WB I-210 FWY						FIRST STREET				
				80	35	45				
				65	25	30				
				65	35	50				
15	25	20	↱	↰	↑	↱	↰	40	25	35
320	210	395	←	TS			→	640	220	240
420	215	215	↰	↰	↑	↱	↱	410	120	150
				310	50	15				
				350	55	45				
				445	75	70				



NOT TO SCALE

LEGEND

EXISTING VOLUMES

N/S STREET				#		E/W STREET				
				7AM-9AM						
				12PM-2PM						
				4PM-6PM						
7AM - 9AM	12 PM - 2 PM	4PM - 6PM	↱	↰	↑	↱	↰	7AM - 9AM	12 PM - 2 PM	4PM - 6PM
			←	TS			→			
			↰	↰	↑	↱	↱			
				7AM-9AM						
				12PM-2PM						
				4PM-6PM						

LEGEND

S# – DISPOSAL SITE

– STUDY INTERSECTIONS

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WASTE MANAGEMENT, MANNINGS PIT, AND VULCAN MATERIALS AREA EXISTING VOLUMES

DEVIL'S GATE DAM & RESERVOIR

FIGURE 3-2-6B

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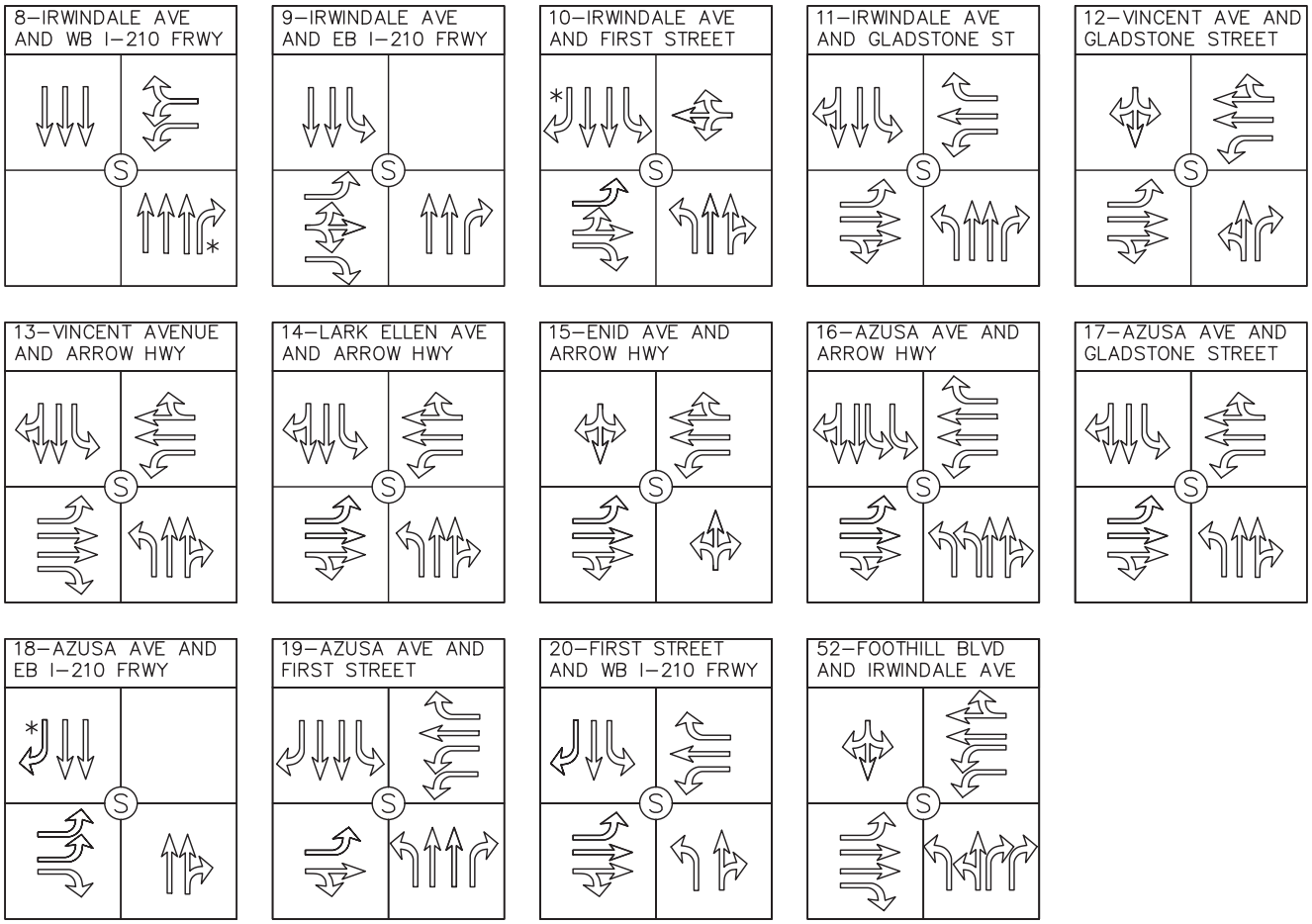

LEGEND

- (S) – SIGNALIZED INTERSECTION
- S – UNSIGNALIZED INTERSECTION
- * – FREE RIGHT TURN
- ⇐ – EXISTING GEOMETRIC

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WASTE MANAGEMENT, MANNINGS PIT, AND VULCAN MATERIALS AREA EXISTING GEOMETRICS

DEVIL'S GATE DAM & RESERVOIR

FIGURE 3–2–7

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Table 3-2-1
Intersection Capacity Analysis – Existing Conditions (Route 2A)

Route2A		AM				MID-DAY				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
8	Irwindale Ave and I-210 Freeway Westbound Ramps	A	6.3	0.48	A	A	6.7	0.46	A	A	6.4	0.50	A
9	Irwindale Ave and I-210 Freeway Eastbound Ramps	C	21.6	0.84	C	B	18.2	0.71	B	C	21.0	0.83	C
10	Irwindale Ave and First Street	B	12.0	0.60	A	B	16.8	0.60	B	B	19.8	0.69	B
11	Irwindale Ave and Gladstone Street	C	30.3	0.81	C	B	11.0	0.51	A	B	18.8	0.84	D
12	Vincent Ave and Gladstone Street	B	10.8	0.61	B	A	8.6	0.30	A	B	11.2	0.57	B
13	Vincent Ave and Arrow Hwy	B	13.8	0.77	C	A	9.2	0.36	A	B	12.2	0.73	C

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: Hall & Foreman, Inc.

Table 3-2-2
Intersection Capacity Analysis – Existing Conditions (Route 2B)

Route2B		AM				MID-DAY				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
9	Irwindale Ave and I-210 Freeway Eastbound Ramps	C	21.6	0.84	C	B	18.2	0.71	B	C	21.0	0.83	C
10	Irwindale Ave and First Street	B	12.0	0.60	A	B	16.8	0.60	B	B	19.8	0.69	B
11	Irwindale Ave and Gladstone Street	C	30.3	0.81	C	B	11.0	0.51	A	B	18.8	0.84	D
12	Vincent Ave and Gladstone Street	B	10.8	0.61	B	A	8.6	0.30	A	B	11.2	0.57	B
13	Vincent Ave and Arrow Hwy	B	13.8	0.77	C	A	9.2	0.36	A	B	12.2	0.73	C
14	Arrow Hwy and Lark Ellen Ave	D	45.9	0.88	C	C	30.1	0.62	A	D	35.2	0.79	D
15	Arrow Hwy and Enid Ave	C	26.9	1.00	D	B	11.0	0.43	A	B	11.7	0.64	C
16	Azusa Ave and Arrow Hwy	D	37.2	0.95	D	D	36.6	0.91	C	D	42.6	0.94	E
17	Azusa Ave and Gladstone Street	D	43.4	0.89	D	C	30.8	0.75	B	C	31.2	0.77	C
18	Azusa Ave and I-210 Freeway Eastbound Ramps	A	9.8	0.63	A	A	9.5	0.63	A	A	8.6	0.58	A
19	Azusa Ave and First Street	C	32.9	0.82	C	B	16.6	0.53	A	B	17.5	0.64	B
20	First Street and Alameda Street/I-210 Freeway Westbound Ramps	D	42.2	1.13	D	B	10.5	0.54	B	B	14.4	0.78	C

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
(5)V/C-HCM Volume to Capacity Ratio
Source: **Hall & Foreman, Inc.**

Manning's Pit (Site 2) Analysis

As presented in *Tables 3-2-1* and *3-2-2*, under the existing conditions all intersections are operating at an acceptable HCM LOS of D or better throughout the day, thus mitigation is not required.

Table 3-2-3
Intersection Capacity Analysis – Existing Conditions (Route 3)

Route 3		AM				MID-DAY				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
8	Irwindale Ave and I-210 Freeway Westbound Ramps	A	6.3	0.48	A	A	6.7	0.46	A	A	6.4	0.50	A
9	Irwindale Ave and I-210 Freeway Eastbound Ramps	C	21.6	0.84	C	B	18.2	0.71	B	C	21.0	0.83	C
10	Irwindale Ave and First Street	B	12.0	0.60	A	B	16.8	0.60	B	B	19.8	0.69	B
11	Irwindale Ave and Gladstone Street	C	30.3	0.81	C	B	11.0	0.51	A	B	18.8	0.84	D
12	Vincent Ave and Gladstone Street	B	10.8	0.61	B	A	8.6	0.30	A	B	11.2	0.57	B

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc.**

Waste Management (Site 3) Analysis

As presented in *Table 3-2-3*, under the existing conditions all intersections are operating at an acceptable HCM LOS of C or better throughout the day, thus mitigation is not required.

Table 3-2-4
Intersection Capacity Analysis – Existing Conditions (Route 9)

Route 9		AM				MID-DAY				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
8	Irwindale Ave and I-210 Freeway Westbound Ramps	A	6.3	0.48	A	A	6.7	0.46	A	A	6.4	0.50	A
9	Irwindale Ave and I-210 Freeway Eastbound Ramps	C	21.6	0.84	C	B	18.2	0.71	B	C	21.0	0.83	C
52	Irwindale Ave and Foothill Boulevard	C	21.7	0.79	B	C	28.5	0.79	C	D	45.5	0.94	F

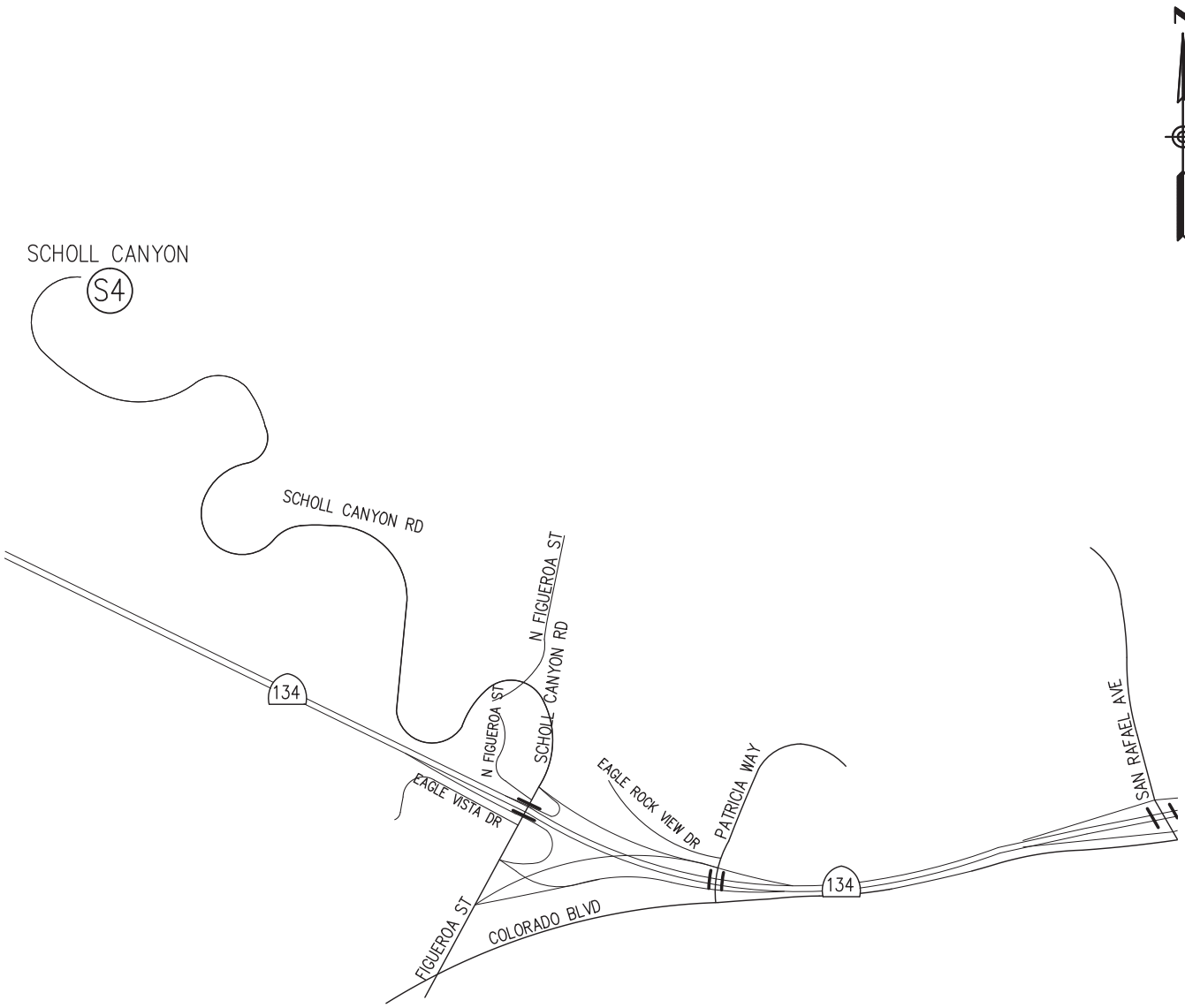
(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: Hall & Foreman, Inc.

Vulcan Material (Site 9) Analysis

As presented in *Table 3-2-4*, under the existing conditions all intersections are operating at an acceptable HCM LOS of D or better throughout the day, thus mitigation is not required.

Section 3: Scholl Canyon Landfill (Site 4)

The Scholl Canyon Landfill consists of two (2) proposed Haul Routes labeled 4A-4B. The Scholl Canyon Landfill is illustrated in *Figure 3-3-1*. Proposed Haul Routes 4A and 4B are illustrated in *Figure 3-3-2 and Figure 3-3-3 respectively.* The previously outlined intersection utilization is provided in the Route figures, outlining the Haul Truck turn movements for individual proposed routes. Existing AM (7-9), MID-DAY (12-2), and PM (4-6) turn movement volumes, for proposed Haul Routes 4A and 4B, are provided in *Figure 3-3-4.* The existing geometrics are illustrated in *Figure 3-3-5.*



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SCHOLL CANYON PIT VICINITY MAP

DEVIL'S GATE DAM & RESERVOIR

FIGURE 3-3-1

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 3\Ch. 3 Section 3\FIG 3-3-1.dwg
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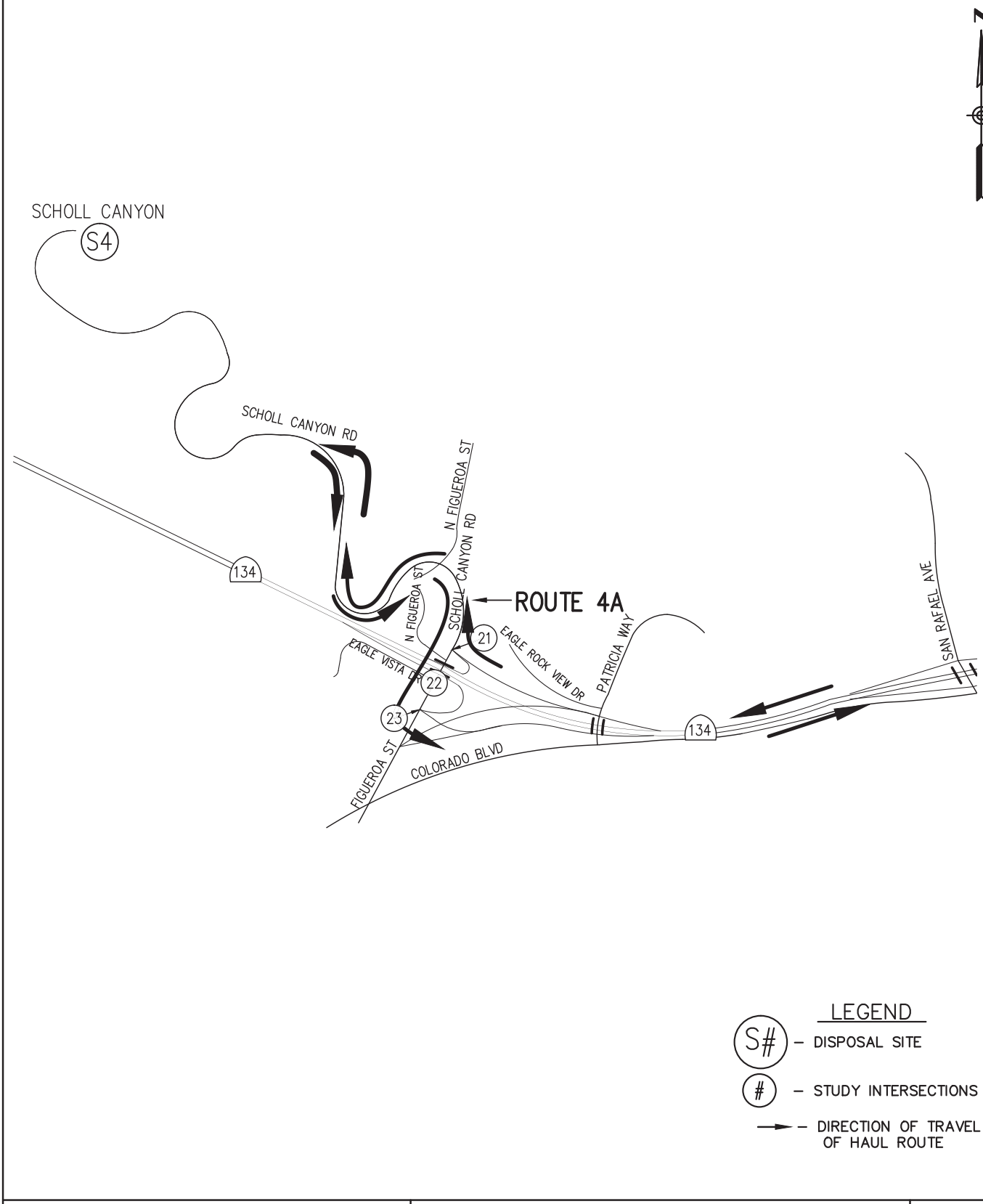

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HAUL ROUTE 4A

DEVIL'S GATE DAM & RESERVOIR

FIGURE
3-3-2

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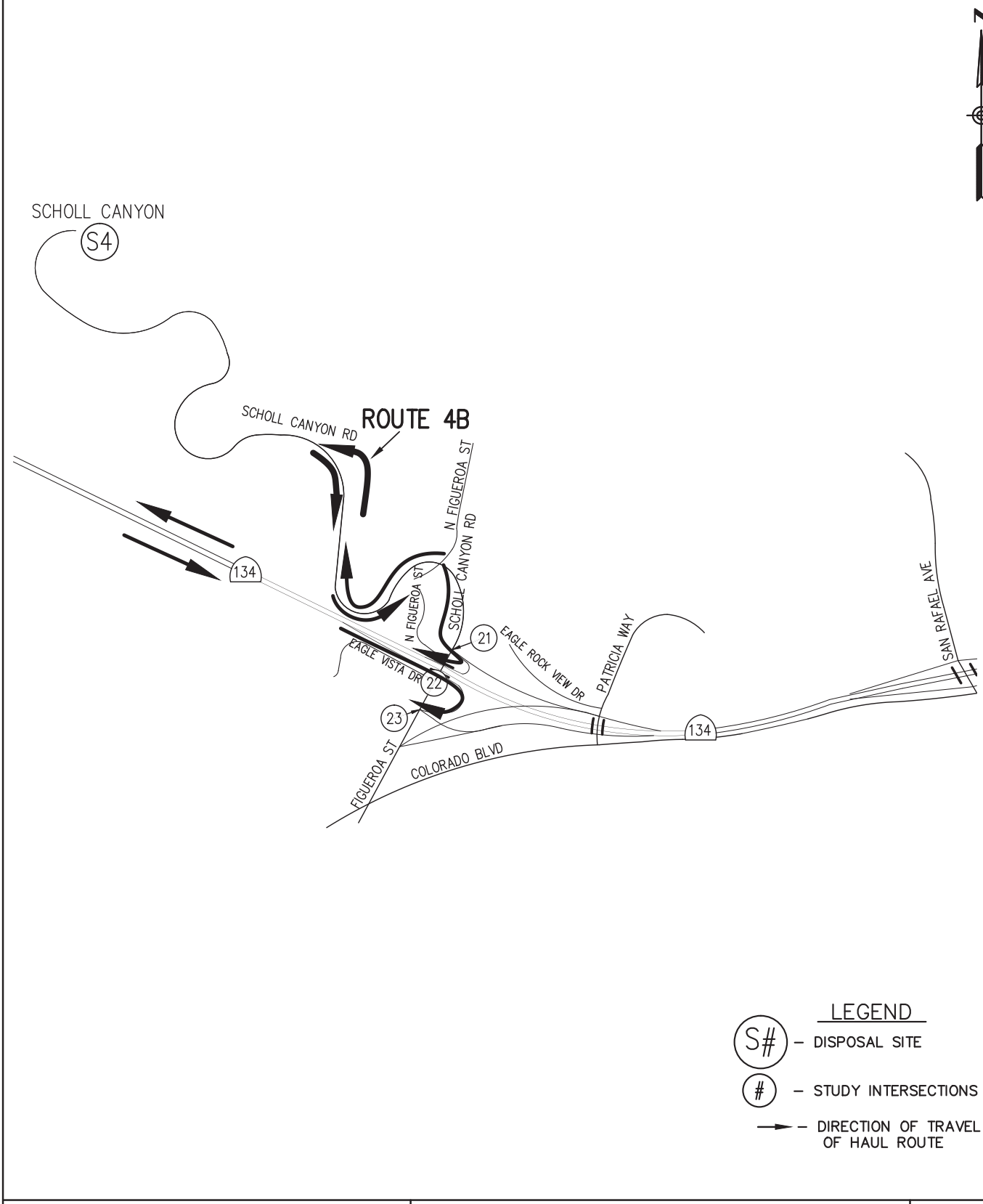

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HAUL ROUTE 4B

DEVIL'S GATE DAM & RESERVOIR

FIGURE
3-3-3

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 3\Ch. 3 Section 3\FIG 3-3-3.dwg
Last Opened: Oct 04, 2013 – 9:28am by: TMunoz

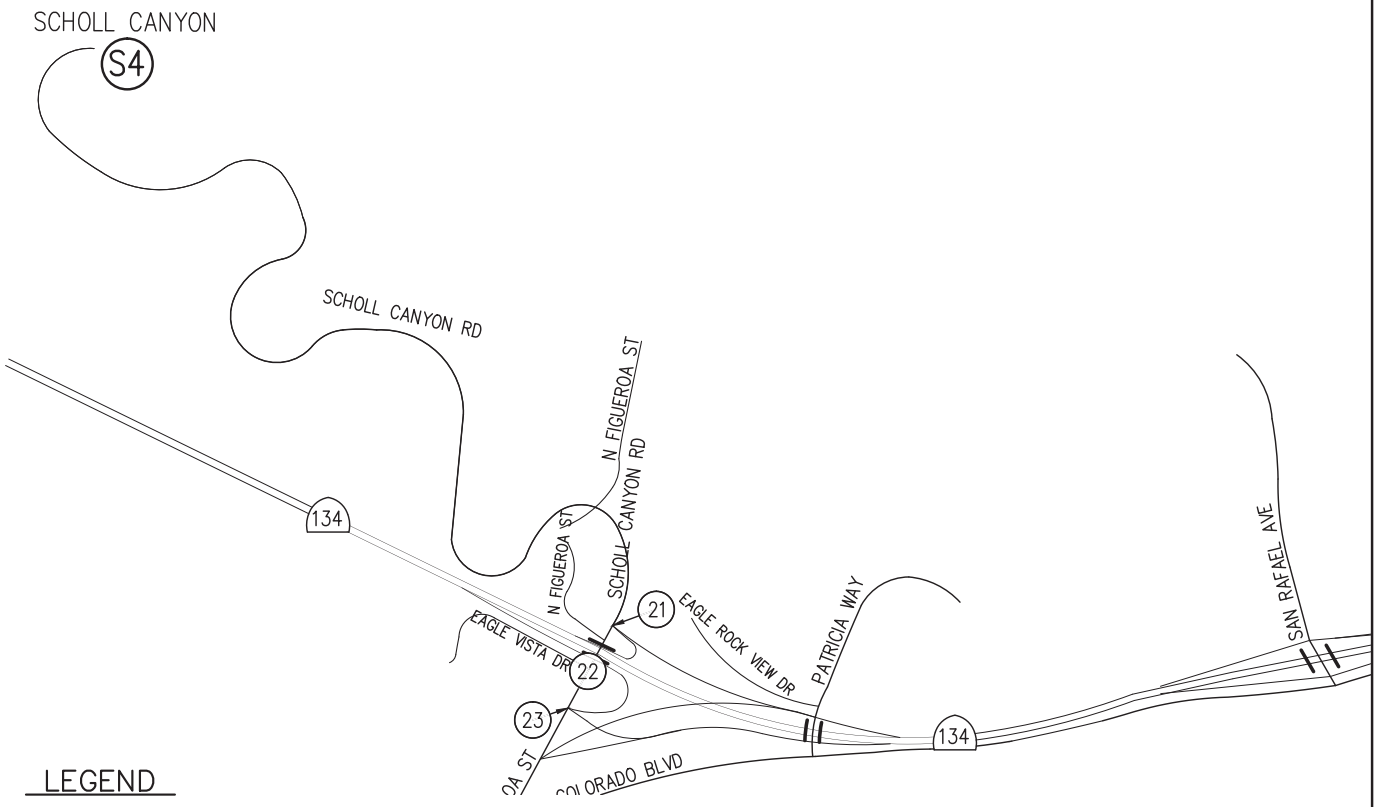
N/S STREET				21		E/W STREET					
SCHOLL CANYON RD						WB 134 FWY					
				0	10	5					
				0	45	15					
				0	35	15					
0	0	0						15	35	10	
0	0	0						0	0	0	
0	0	0						210	260	430	
				0	20	635					
				0	35	310					
				0	10	460					

N/S STREET				22		E/W STREET					
FIGUEROA ST						EAGLE VISTA DRIVE					
				10	220	0					
				15	275	0					
				25	435	0					
45	30	40						0	0	0	
0	0	0						0	0	0	
60	50	70						0	0	0	
				25	625	0					
				40	325	0					
				105	430	0					

N/S STREET				23		E/W STREET					
FIGUEROA ST						EB 134 FWY					
				0	210	50					
				0	280	65					
				0	445	55					
0	0	0						40	75	55	
0	0	0		TS				0	0	0	
0	0	0						365	235	455	
				0	615	285					
				0	260	225					
				0	480	265					

N

NOT TO SCALE



LEGEND

EXISTING VOLUMES

N/S STREET				S#		E/W STREET					
				7AM-9AM							
				12PM-2PM							
				4PM-6PM							
7AM - 9AM	12 PM - 2 PM	4PM - 6PM						7AM - 9AM	12 PM - 2 PM	4PM - 6PM	
				TS							
				7AM-9AM							
				12PM-2PM							
				4PM-6PM							

LEGEND

S# – DISPOSAL SITE

– STUDY INTERSECTIONS

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SCHOLL CANYON AREA EXISTING VOLUMES

DEVIL'S GATE DAM & RESERVOIR

FIGURE 3-3-4

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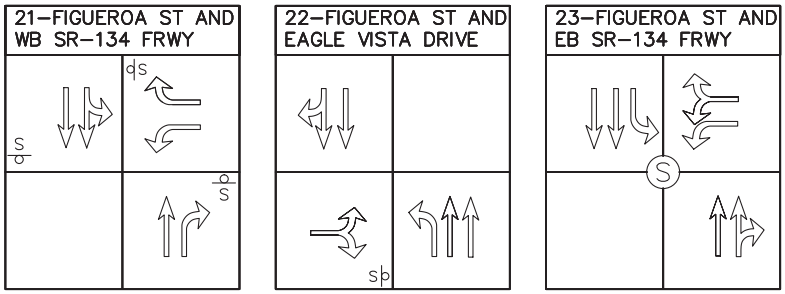

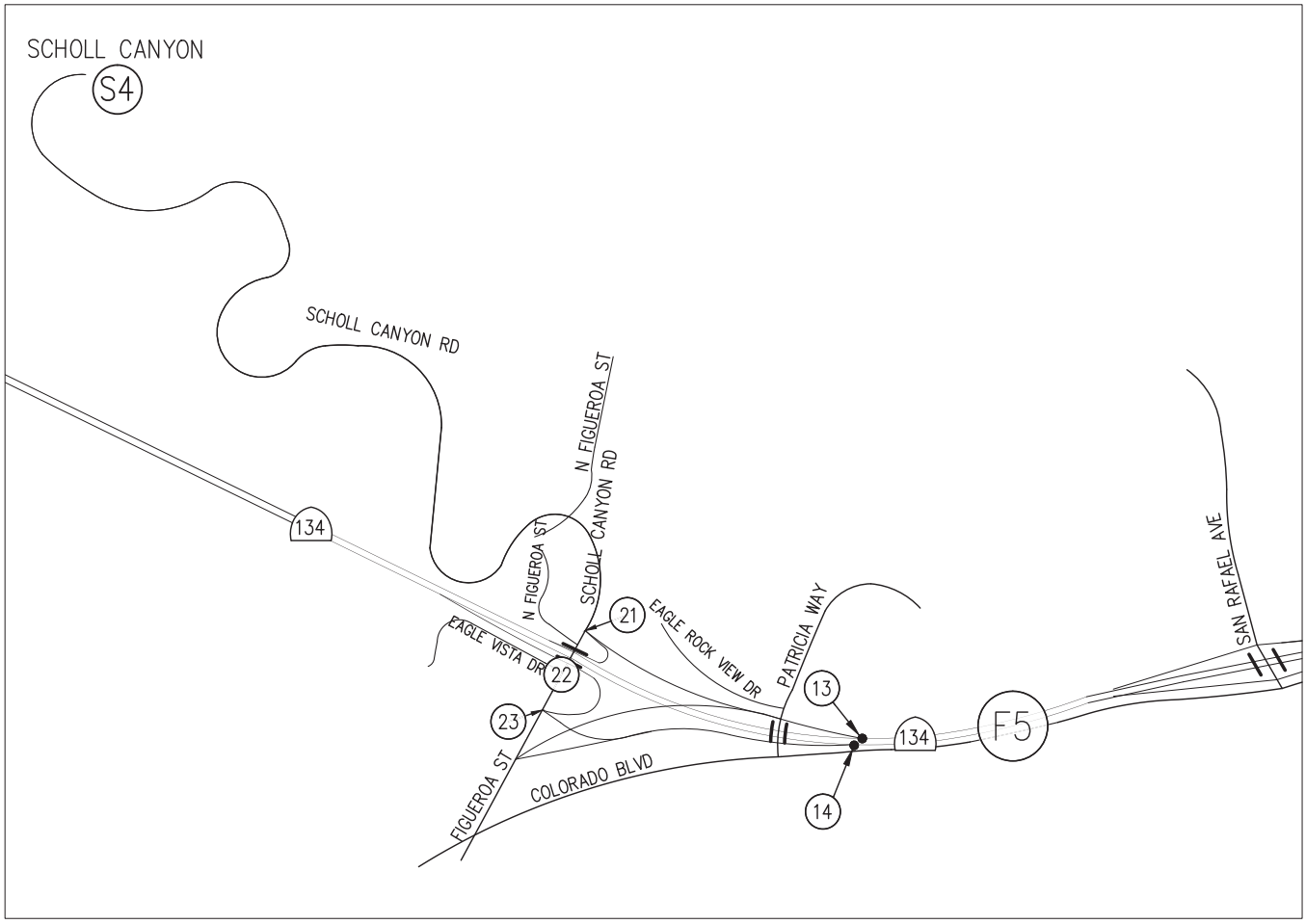

LEGEND

(#) – STUDY INTERSECTIONS

(S) – SIGNALIZED INTERSECTION

p/s – UNSIGNALIZED INTERSECTION

* – FREE RIGHT TURN

⇐ – EXISTING GEOMETRIC

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SCHOLL CANYON AREA EXISTING GEOMETRICS

DEVIL'S GATE DAM & RESERVOIR

FIGURE 3–3–5

Drawing Name: V:\110264\Eng\110264–000\Exhibit\02 Traffic Study\Route Figures\Chapter 3\Ch. 3 Section 3\FIG 3–3–5.dwg
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Table 3-3-1
Intersection Capacity Analysis – Existing Conditions (Route 4A)

Route 4A		AM				MID-DAY				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
21	Figueroa St/Scholl Canyon Road and SR-134 Freeway Westbound Ramps	D	30.8	-	-	B	12.3	-	-	D	31.4	-	-
22	Figueroa St and Eagle Vista Drive	B	12.6	-	-	B	11.5	-	-	C	17.6	-	-
23	Figueroa St and SR-134 Freeway Eastbound Ramps	A	7.1	0.5	A	A	6.4	0.27	A	A	7.1	0.46	A

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc.**

Table 3-3-2
Intersection Capacity Analysis – Existing Conditions (Route 4B)

Route 4B		AM				MID-DAY				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
21	Figueroa St/Scholl Canyon Road and SR-134 Freeway Westbound Ramps	D	30.8	-	-	B	12.3	-	-	D	31.4	-	-
22	Figueroa St and Eagle Vista Drive	B	12.6	-	-	B	11.5	-	-	C	17.6	-	-
23	Figueroa St and SR-134 Freeway Eastbound Ramps	A	7.1	0.5	A	A	6.4	0.27	A	A	7.1	0.46	A

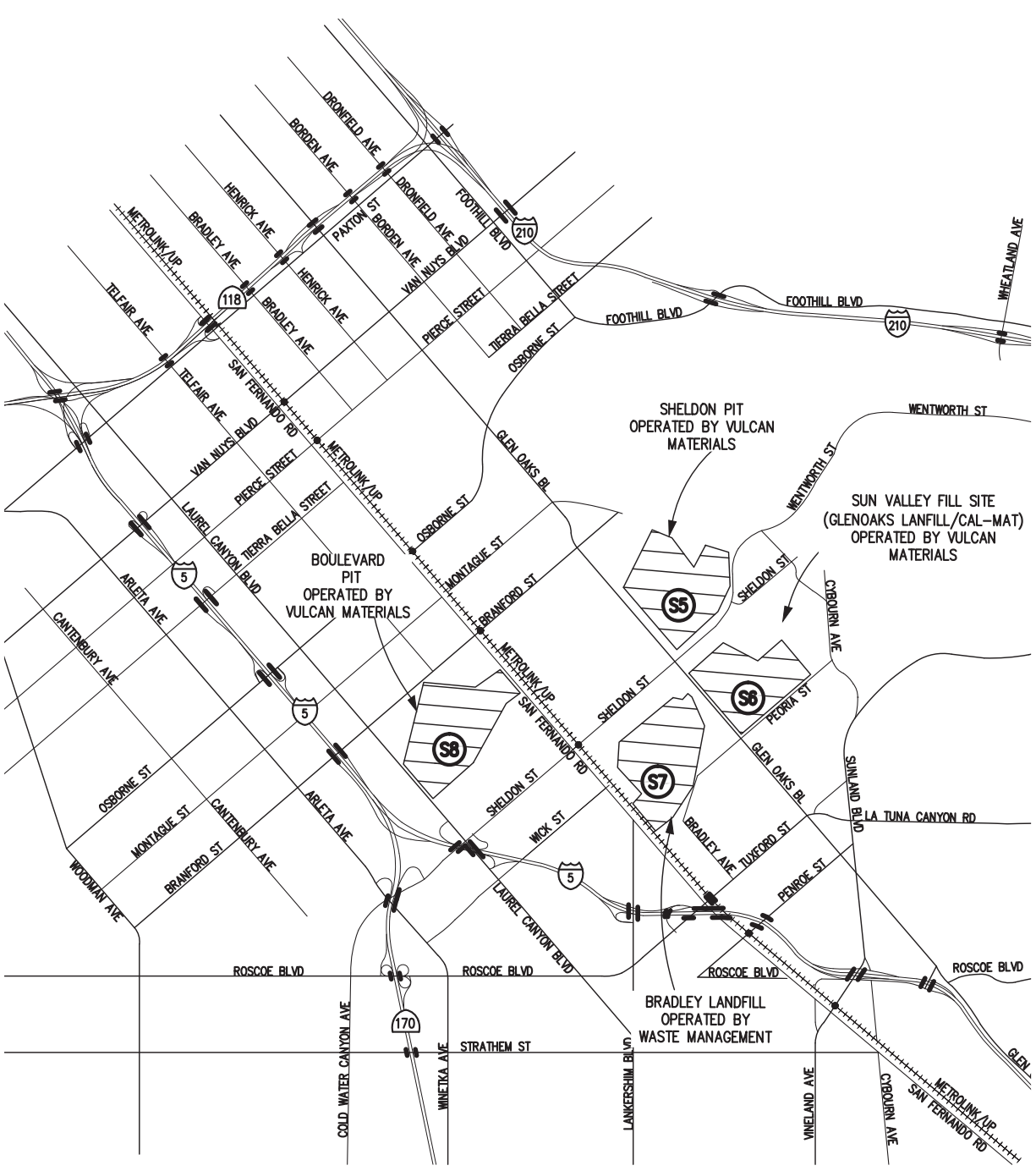
(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc.**

Scholl Canyon Landfill (Site 4) Analysis

As presented in *Table 3-3-1* and *Table 3-3-2*, under the existing conditions for Site 4 (Route 4A-4B) the study intersections are operating at an acceptable HCM LOS D or better, for the AM, Mid-day and PM peak hours. All intersections are operating with an acceptable HCM LOS and thus mitigation is not required to improve the HCM LOS under existing conditions.

Section 4: Sheldon Pit (Site 5), Sun Valley Fill Site (Site 6), Bradley Landfill (Site 7), and Boulevard Pit (Site 8)

The Bradley Landfill, Boulevard Pit, Sun Valley Fill Site, and Sheldon Pit each consists of three (2) proposed Haul Routes labeled 5A-8C. The Bradley Landfill, Boulevard Pit, Sun Valley Fill Site, and Sheldon Pit are illustrated in *Figure 3-4-1*. Proposed Haul Routes 5A through 8C are illustrated in *Figure 3-4-2 and Figure 3-4-9.* The previously outlined intersection utilization is provided in the Route figures, outlining the Haul Truck turn movements for individual proposed routes. Existing AM (7-9), MID-DAY (12-2), and PM (4-6) turn movement volumes, for proposed Haul Routes 5A through 8C, are provided in *Figure 3-4-10A* through *Figure 3-4-10D.* The existing geometrics are illustrated in *Figure 3-4-11A* and *Figure 3-4-11B.*



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BOULEVARD, BRADLEY, SUN VALLEY, SHELDON PITS VICINITY MAP

DEVIL'S GATE DAM & RESERVOIR

FIGURE
3-4-1

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 3\Ch. 3 Section 4\FIG 3-4-1.dwg
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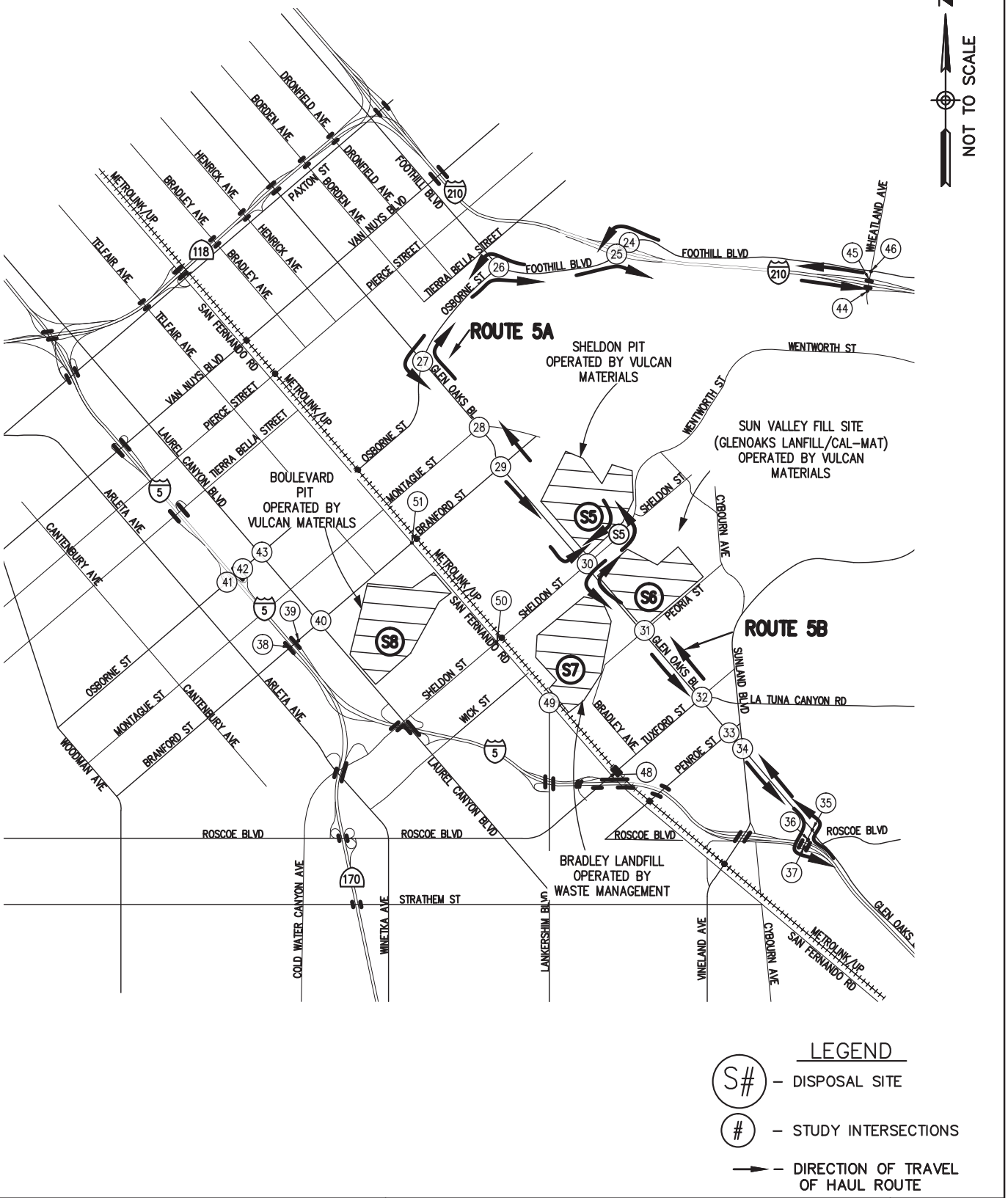

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HAUL ROUTE 5A/5B

DEVIL'S GATE DAM & RESERVOIR

FIGURE
3-4-2

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 3\Ch. 3 Section 4\FIG 3-4-2.dwg
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LEGEND

S# – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

→ – DIRECTION OF TRAVEL OF HAUL ROUTE

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HAUL ROUTE 5C

DEVIL'S GATE DAM & RESERVOIR

FIGURE
3-4-3

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 3\Ch. 3 Section 4\FIG 3-4-3.dwg
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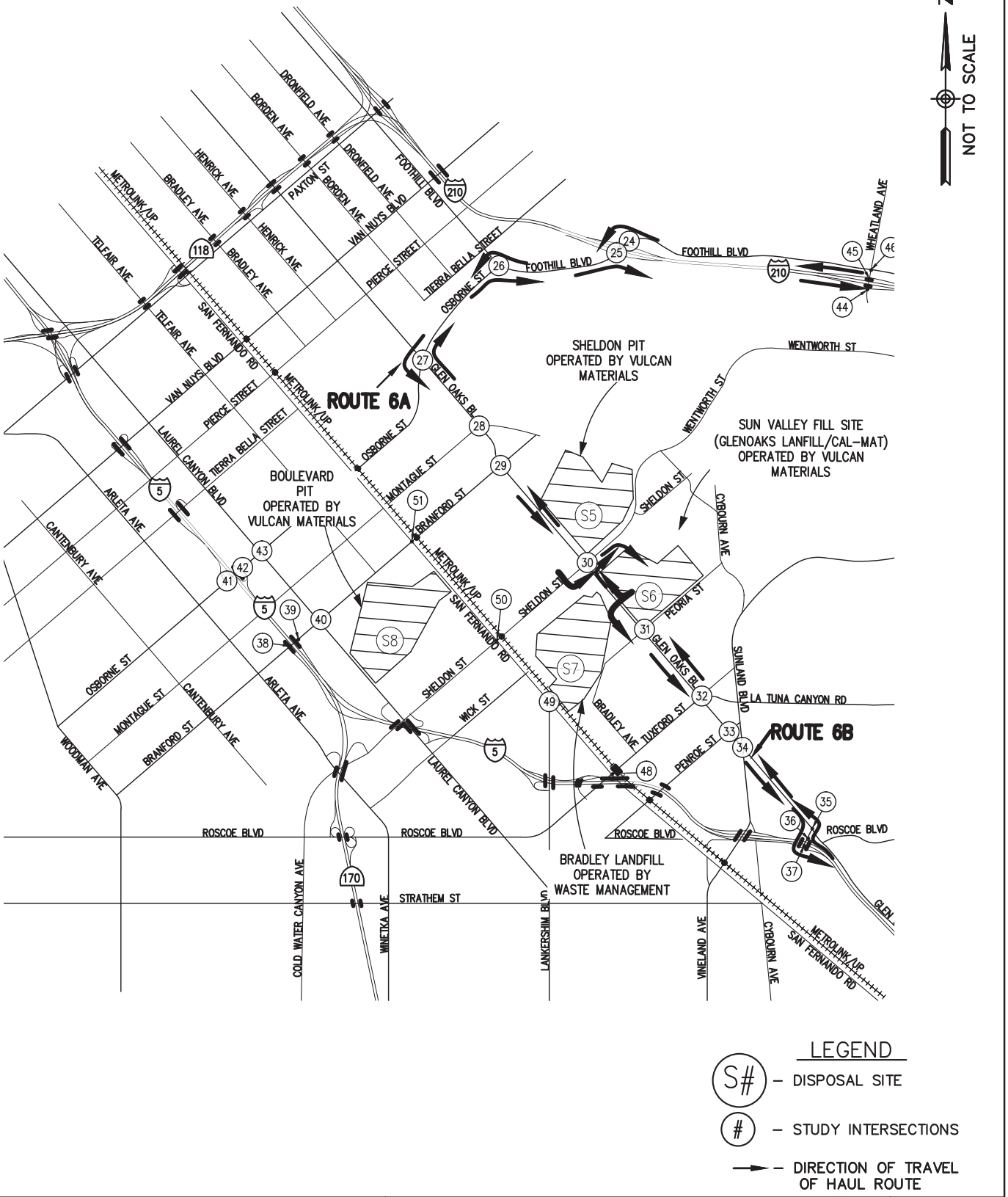

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HAUL ROUTE 6A/6B

DEVIL'S GATE DAM & RESERVOIR

FIGURE
3-4-4

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 3\Ch. 3 Section 4\FIG 3-4-4.dwg
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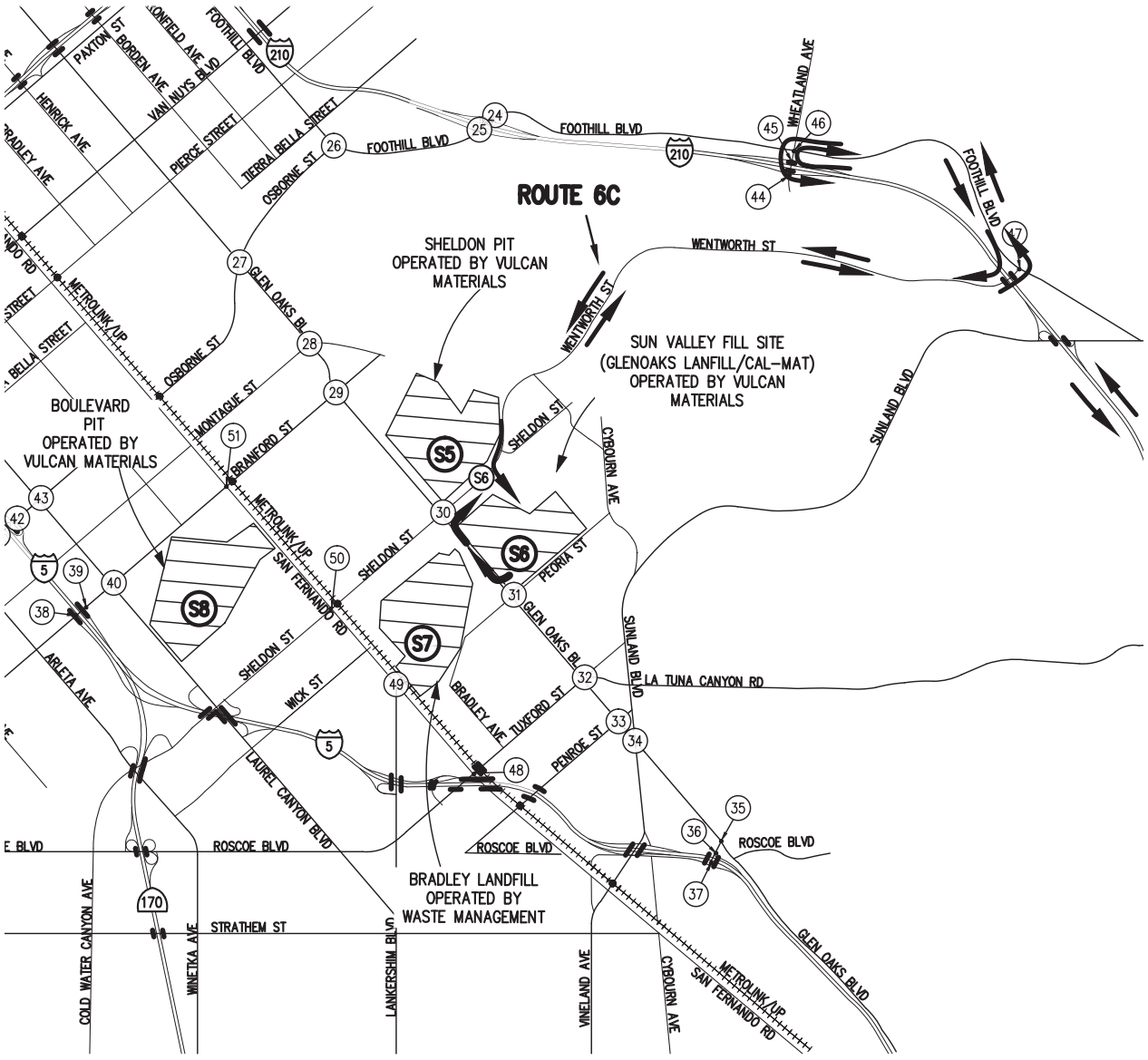

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HAUL ROUTE 6C

DEVIL'S GATE DAM & RESERVOIR

FIGURE
3-4-5

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 3\Ch. 3 Section 4\FIG 3-4-5.dwg
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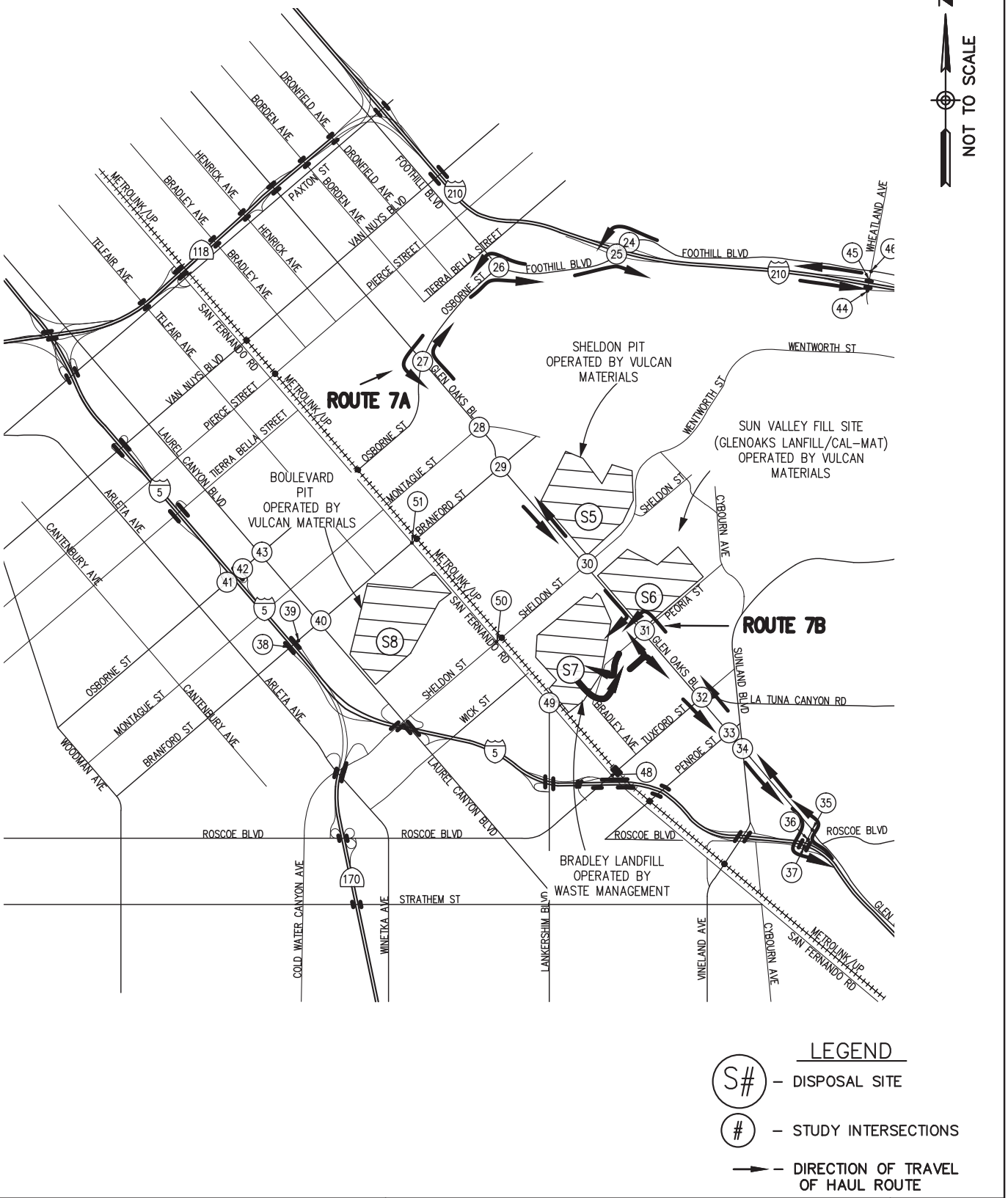

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HAUL ROUTE 7A/7B

DEVIL'S GATE DAM & RESERVOIR

FIGURE
3-4-6

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 3\Ch. 3 Section 4\FIG 3-4-6.dwg
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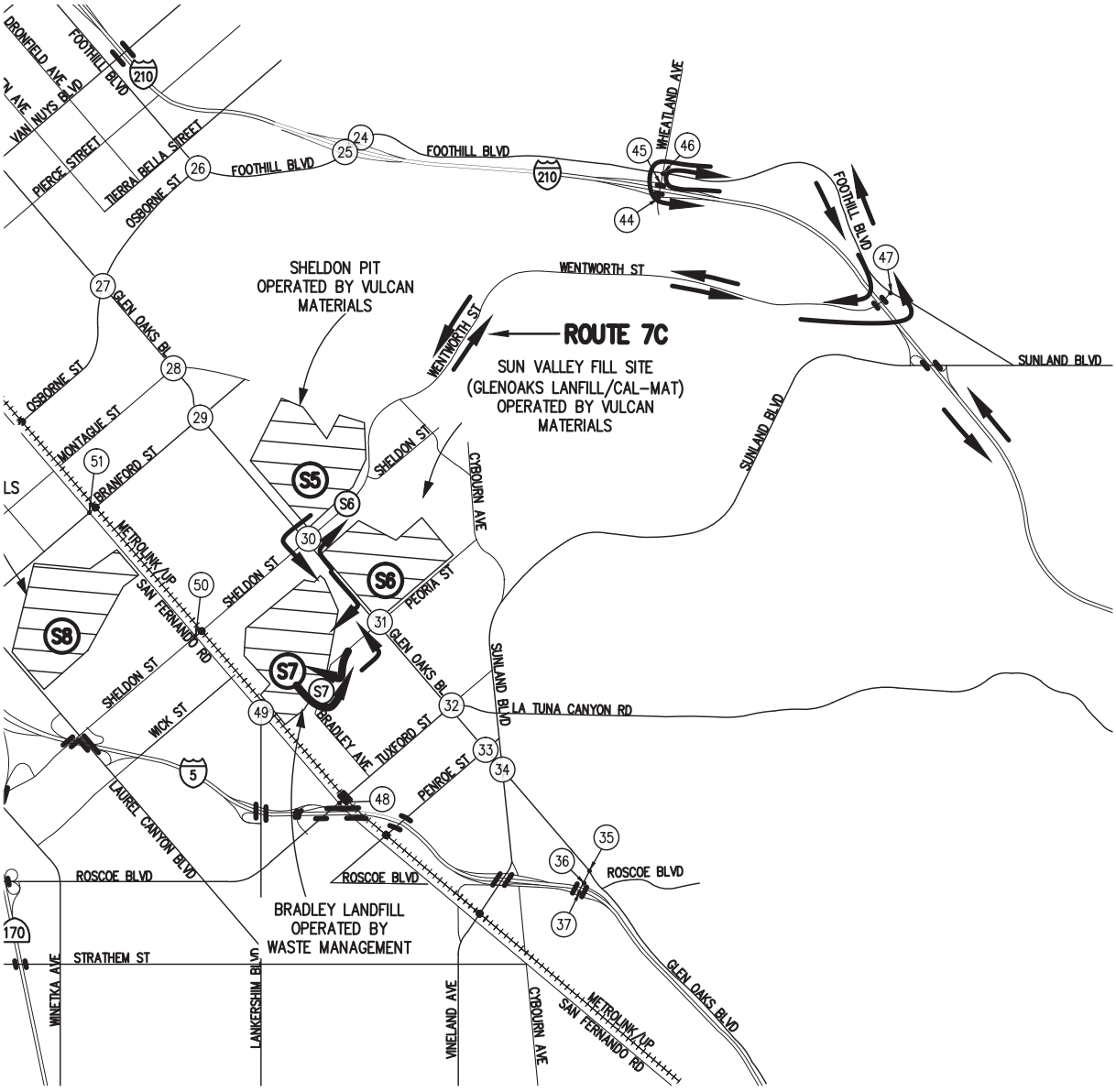

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HAUL ROUTE 7C

DEVIL'S GATE DAM & RESERVOIR

FIGURE
3-4-7

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 3\Ch. 3 Section 4\FIG 3-4-7.dwg
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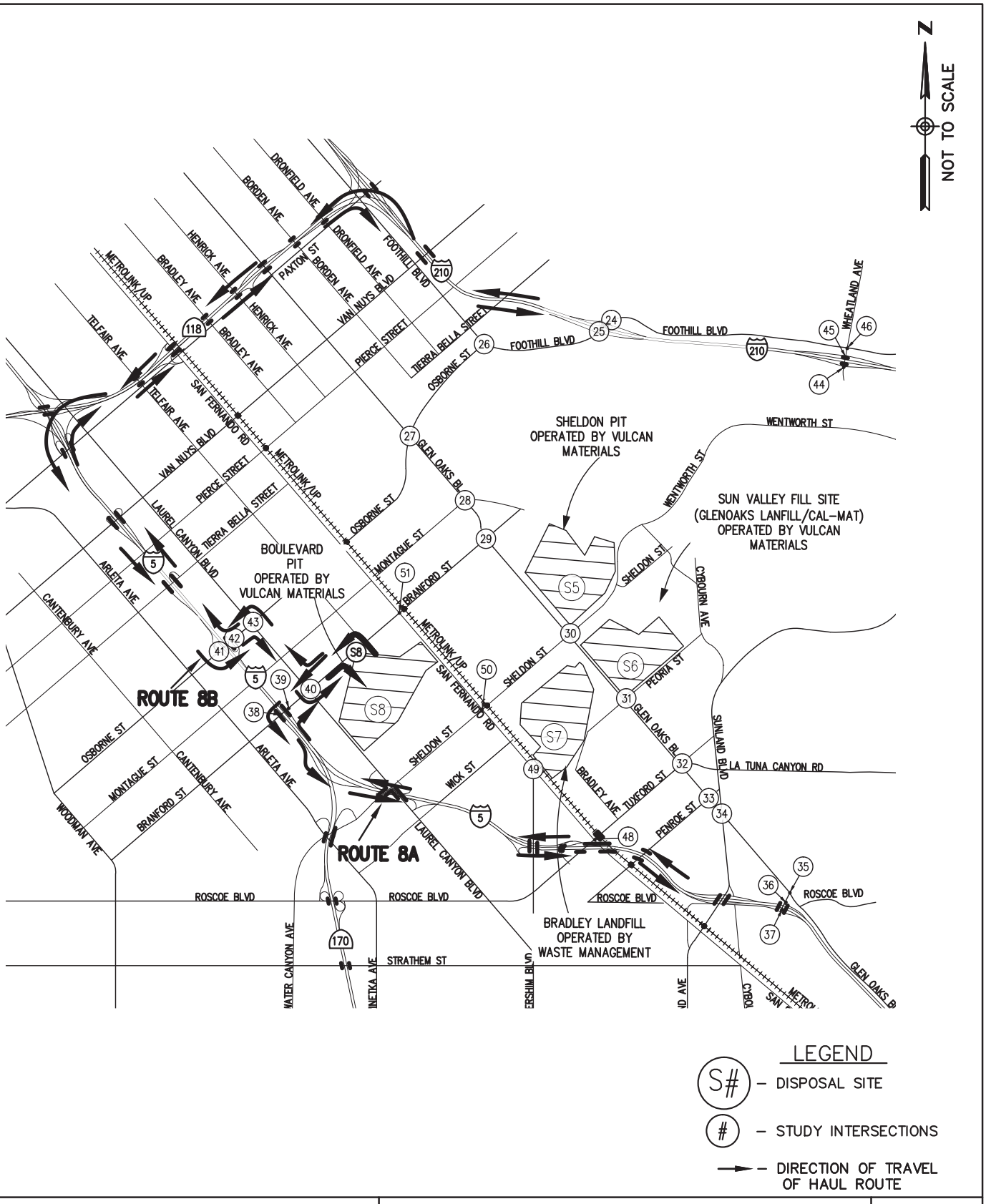

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HAUL ROUTE 8A/8B

DEVIL'S GATE DAM & RESERVOIR

FIGURE
3-4-8

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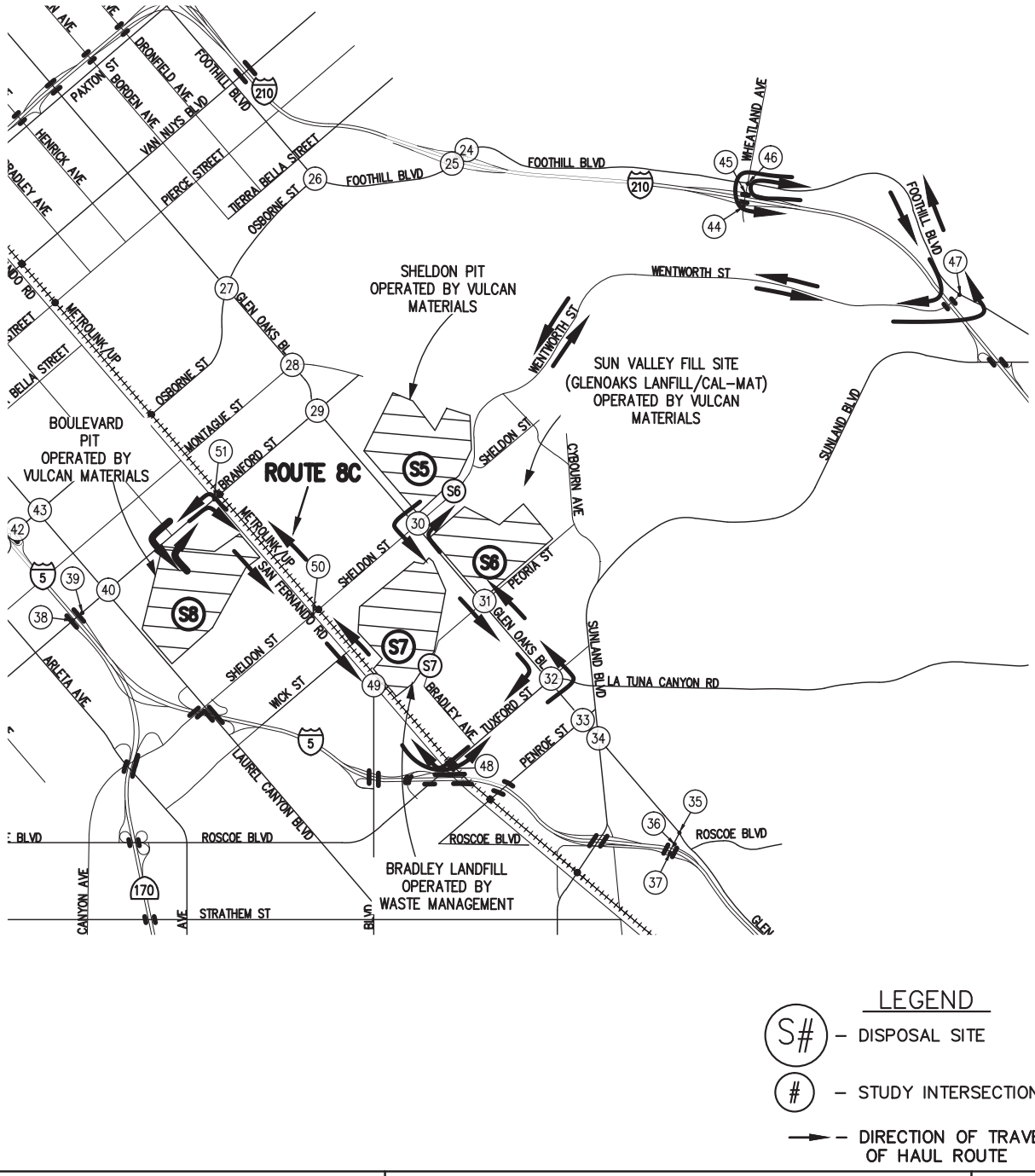

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HAUL ROUTE 8C

DEVIL'S GATE DAM & RESERVOIR

FIGURE
3-4-9

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 3\Ch. 3 Section 4\FIG 3-4-9.dwg
Last Opened: Oct 04, 2013 - 9:46am by: TMunoz

N/S STREET				24			E/W STREET			
FOOTHILL BLVD							WB I-210 FWY RAMPS			
				490	390	0				
				205	255	0				
				225	260	0				
0	0	0	⌟	⌐	↑	⌙	⌞	60	35	65
0	0	0	←	TS			→	0	0	0
0	0	0	⌜	⌐	↑	⌙	⌜	170	115	255
				130	570	0				
				105	445	0				
				210	510	0				

N/S STREET				25			E/W STREET			
FOOTHILL BLVD							EB I-210 FWY RAMPS			
				0	355	195				
				0	305	75				
				0	460	55				
355	260	335	⌟	⌐	↑	⌙	⌞	0	0	0
0	0	0	←	TS			→	0	0	0
100	40	80	⌜	⌐	↑	⌙	⌜	0	0	0
				0	350	290				
				0	265	160				
				0	390	240				

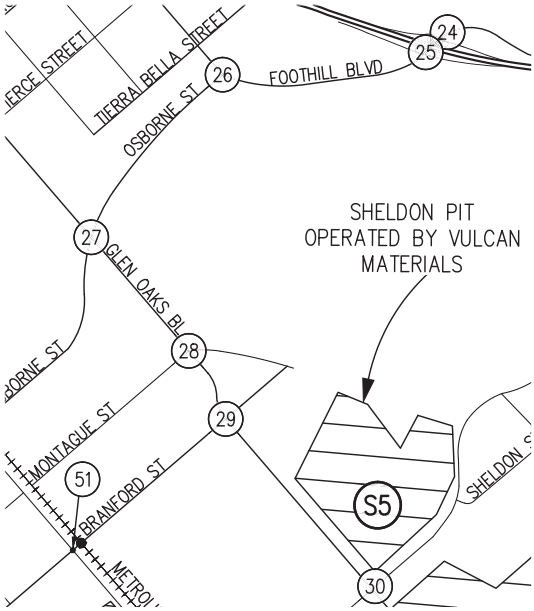
N/S STREET				26			E/W STREET			
OSBORNE STREET							FOOTHILL BLVD			
				5	5	5				
				15	5	5				
				15	5	5				
5	20	15	⌟	⌐	↑	⌙	⌞	5	5	5
320	225	315	←	TS			→	245	200	305
520	25	265	⌜	⌐	↑	⌙	⌜	260	165	205
				335	10	250				
				230	5	210				
				680	5	395				

N/S STREET				27			E/W STREET			
GLEN OAKS BLVD							OSBORNE STREET			
				170	1070	45				
				130	425	80				
				205	575	135				
300	170	240	⌟	⌐	↑	⌙	⌞	70	70	100
535	425	690	←	TS			→	630	500	535
70	90	90	⌜	⌐	↑	⌙	⌜	425	175	255
				50	520	135				
				80	635	150				
				120	875	340				

N/S STREET				28			E/W STREET			
GLEN OAKS BLVD							MONTAGUE STREET			
				55	####	15				
				35	525	35				
				25	855	15				
10	40	55	⌟	⌐	↑	⌙	⌞	10	30	30
5	5	5	←	TS			→	5	5	5
30	45	60	⌜	⌐	↑	⌙	⌜	5	35	10
				55	640	5				
				60	560	15				
				50	1180	15				

N/S STREET				29			E/W STREET			
GLEN OAKS BLVD							BRANFORD STREET			
				175	1360	15				
				80	520	70				
				80	740	115				
130	150	220	⌟	⌐	↑	⌙	⌞	10	85	100
15	85	110	←	TS			→	5	90	190
95	90	155	⌜	⌐	↑	⌙	⌜	10	70	90
				95	595	10				
				90	565	70				
				115	945	105				

N/S STREET				30			E/W STREET			
GLEN OAKS BLVD							SHELDON STREET			
				160	1235	85				
				95	490	50				
				145	730	90				
115	130	300	⌟	⌐	↑	⌙	⌞	40	50	60
405	240	325	←	TS			→	595	285	325
45	80	65	⌜	⌐	↑	⌙	⌜	90	45	40
				80	480	45				
				80	535	50				
				120	820	70				



LEGEND

N/S STREET				S#			E/W STREET			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM	⌟	⌐	↑	⌙	⌞	7AM - 9AM	2PM - 4PM	4PM - 6PM
			←	TS			→			
			⌜	⌐	↑	⌙	⌜			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

S# – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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BOULEVARD PIT, SUN VALLEY FILL, SHELDON PIT, AND BRADLEY PIT EXISTING VOLUMES

DEVIL'S GATE DAM & RESERVOIR

FIGURE 3-4-10A

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 3\Ch. 3 Section 4\FIG 3-4-10A.dwg
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N/S STREET				31			E/W STREET			
GLEN OAKS BLVD							PEORIA STREET			
				40	1250	30				
				15	530	10				
				15	745	35				
15	25	40						10	15	55
5	5	10		TS				5	5	5
5	30	20						15	20	30
				15	525	25				
				25	525	15				
				25	975	25				

N/S STREET				32			E/W STREET			
GLEN OAKS BLVD							TUXFORD STREET			
				125	1015	90				
				100	355	90				
				90	590	130				
115	110	140						75	45	80
470	390	505		TS				565	425	345
45	60	95						30	25	60
				95	395	20				
				110	435	30				
				120	800	60				

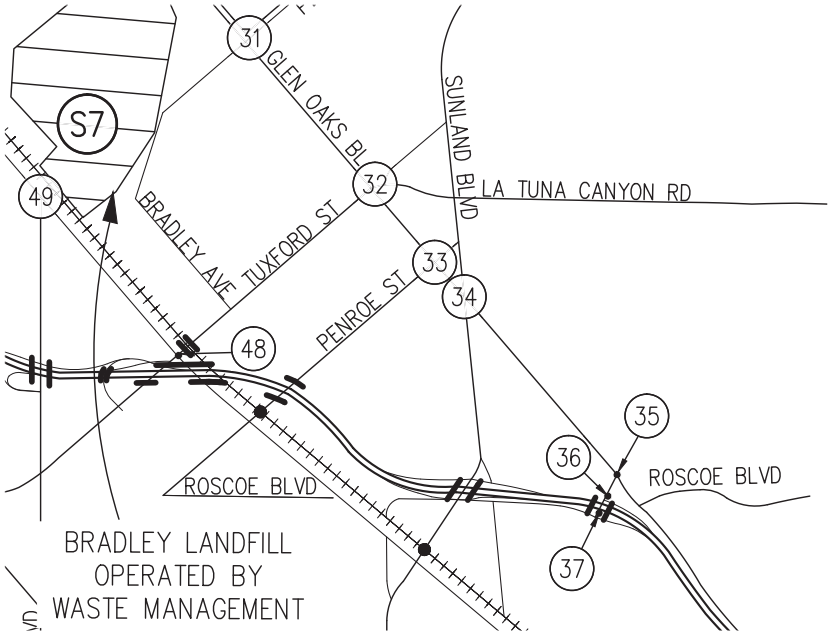
N/S STREET				33			E/W STREET			
GLEN OAKS BLVD							PENROSE STREET			
				95	920	35				
				35	440	25				
				110	520	45				
120	90	185						35	35	75
125	130	200		TS				70	85	140
20	50	55						5	20	45
				25	365	5				
				45	465	25				
				75	700	40				

N/S STREET				34			E/W STREET			
GLEN OAKS BLVD							SUNLAND BLVD			
				205	640	10				
				170	305	35				
				50	510	50				
70	165	165						20	15	5
670	430	650		TS				750	355	395
30	20	55						205	320	360
				10	310	80				
				25	350	245				
				20	640	385				

N/S STREET				35			E/W STREET			
GLEN OAKS BLVD							ROSCOE BLVD			
				420	520	0				
				305	355	0				
				420	530	0				
175	240	545						0	0	0
0	0	0		TS				0	0	0
75	90	120						0	0	0
				70	275	0				
				75	370	0				
				65	540	0				

N/S STREET				36			E/W STREET			
NB I-5 FREEWAY RAMPS							ROSCOE BLVD			
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
90	120	110		TS				490	375	490
0	0	0						0	0	0
				70	0	215				
				60	0	235				
				65	0	565				

N/S STREET				37			E/W STREET			
SB I-5 FREEWAY RAMPS							ROSCOE BLVD			
				0	35	90				
				0	40	120				
				0	30	110				
0	0	0						25	45	100
0	0	0		TS				0	0	0
0	0	0						565	330	375
				0	0	0				
				0	0	0				
				0	0	0				



LEGEND

N/S STREET				S#			E/W STREET			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

S# – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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BOULEVARD PIT, SUN VALLEY FILL, SHELDON PIT, AND BRADLEY PIT EXISTING VOLUMES

DEVIL'S GATE DAM & RESERVOIR

FIGURE 3-4-10B

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N/S STREET				38			E/W STREET			
SB I-5 FREEWAY RAMPS							BRANFORD STREET			
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

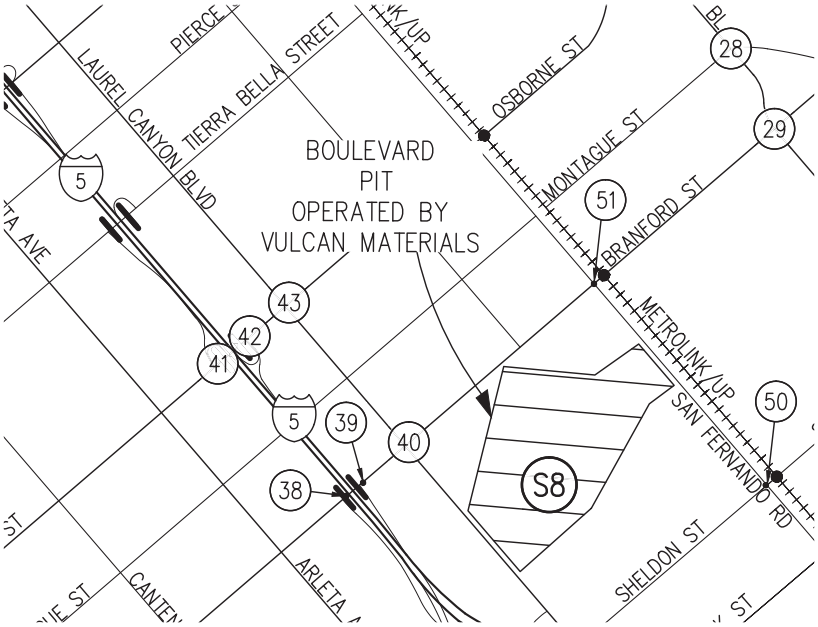
N/S STREET				39			E/W STREET			
NB I-5 FREEWAY RAMPS							BRANFORD STREET			
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET				40			E/W STREET			
LAUREL CANYON BLVD							BRANFORD STREET			
				150	365	130				
				95	585	65				
				135	445	60				
150	115	190						110	85	125
145	170	380		TS				205	160	365
65	210	185						85	90	100
				90	585	140				
				85	460	85				
				115	1120	120				

N/S STREET				41			E/W STREET			
SB I-5 FREEWAY RAMPS							OSBORNE STREET			
				190	20	145				
				360	20	380				
				610	20	455				
0	0	0						515	220	225
795	595	895		TS				1155	910	1220
685	165	275						60	35	35
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET				42			E/W STREET			
NB I-5 FREEWAY RAMPS							OSBORNE STREET			
				5	0	5				
				5	0	5				
				5	0	0				
5	5	5						25	15	30
955	955	1340		TS				1500	820	1075
0	0	0						0	0	0
				230	0	180				
				305	0	220				
				410	0	205				

N/S STREET				43			E/W STREET			
LAUREL CANYON BLVD							OSBORNE STREET			
				50	335	110				
				90	515	75				
				75	460	75				
120	90	95						170	110	110
840	995	1315		TS				1375	690	850
80	80	65						110	80	120
				85	605	105				
				80	460	90				
				160	1130	120				



LEGEND

N/S STREET				S#			E/W STREET			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM
				TS						
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

S# – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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BOULEVARD PIT, SUN VALLEY FILL, SHELDON PIT, AND BRADLEY PIT EXISTING VOLUMES

DEVIL'S GATE DAM & RESERVOIR

FIGURE 3-4-10C

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N/S STREET	44	E/W STREET
WHEATLAND AVE		EB I-210 FWY RAMPS

			0	0	120					
			0	0	60					
			0	0	85					
105	75	100					0	0	0	
5	5	5		TS			0	0	0	
0	0	0					0	0	0	
			0	0	0					
			0	0	0					
			0	0	0					

N/S STREET	45	E/W STREET
WHEATLAND AVE		WB I-210 FWY RAMPS

			65	110	0					
			55	60	0					
			105	80	0					
0	0	0					100	40	120	
0	0	0		TS			0	5	0	
0	0	0					5	5	5	
			5	100	0					
			5	55	0					
			5	95	0					

N/S STREET	46	E/W STREET
WHEATLAND AVE		FOOTHILL BLVD

			5	15	15					
			15	20	5					
			5	20	10					
5	10	0					5	20	15	
195	135	170		TS			220	130	215	
90	35	80					80	65	95	
			70	10	110					
			40	25	50					
			90	25	100					

N/S STREET	47	E/W STREET
WENTWORTH STREET		FOOTHILL BLVD

			0	0	0					
			0	0	0					
			0	0	0					
0	0	0					0	0	0	
200	165	200		TS			175	155	295	
165	95	125					440	215	215	
			100	0	225					
			100	0	185					
			160	0	420					

N/S STREET	48	E/W STREET
SAN FERNANDO ROAD		TUXFORD STREET

			70	325	125					
			70	220	60					
			40	275	90					
65	80	30					105	100	130	
515	380	570		TS			650	355	430	
110	185	145					115	175	80	
			250	210	60					
			315	185	135					
			330	580	65					

N/S STREET	49	E/W STREET
SAN FERNANDO ROAD		LANKERSHIM BLVD

			470	445	0					
			280	305	0					
			360	310	0					
225	275	550					0	0	0	
0	0	0		TS			0	0	0	
35	60	55					0	0	0	
			50	260	0					
			55	285	0					
			80	620	0					

N/S STREET	50	E/W STREET
SAN FERNANDO ROAD		SHELDON STREET

			85	610	65					
			45	335	65					
			30	595	75					
60	60	125					55	55	100	
355	320	560		TS			635	320	405	
75	40	65					220	125	165	
			35	290	80					
			50	375	95					
			115	975	160					

N/S STREET	51	E/W STREET
SAN FERNANDO ROAD		BRANFORD STREET

			70	635	40					
			55	330	65					
			115	530	100					
35	35	90					20	45	105	
300	180	385		TS			145	150	285	
105	45	105					55	70	125	
			50	240	90					
			50	345	70					
			170	820	130					

LEGEND

N/S STREET	S#	E/W STREET

			7AM-9AM							
			2PM-4PM							
			4PM-6PM							
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS			7AM - 9AM	2PM - 4PM	4PM - 6PM	
			7AM-9AM							
			2PM-4PM							
			4PM-6PM							

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BOULEVARD PIT, SUN VALLEY FILL, SHELDON PIT, BRADLEY PIT EXISTING VOLUMES

DEVIL'S GATE DAM & RESERVOIR

FIGURE 3-4-10D

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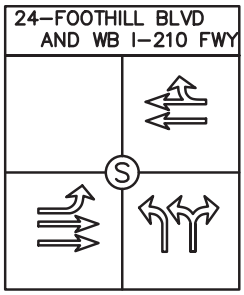

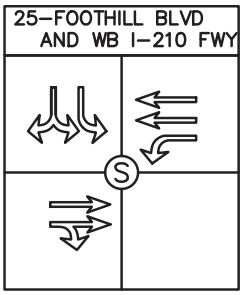

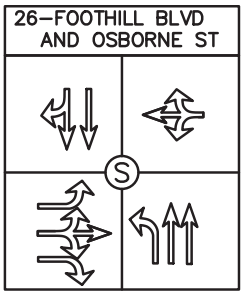

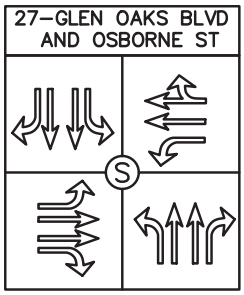

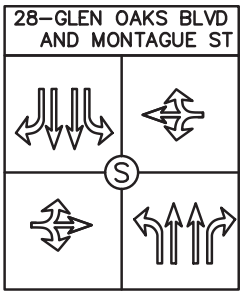

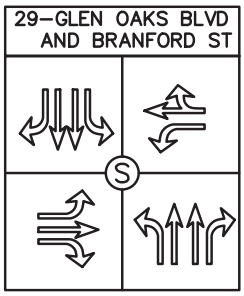

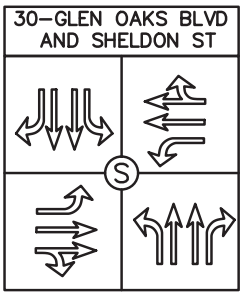

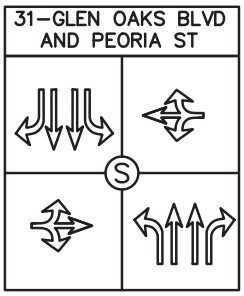

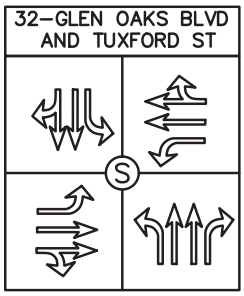

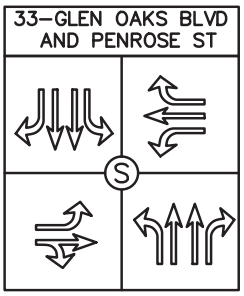

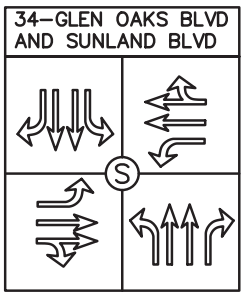

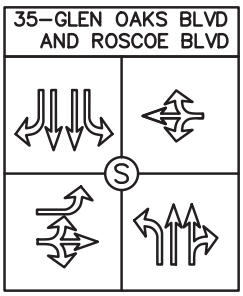

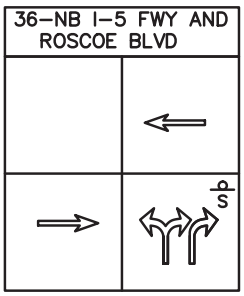

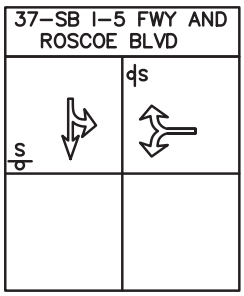

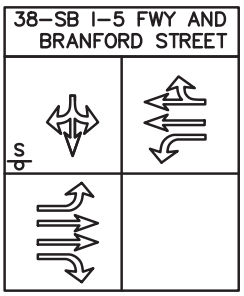

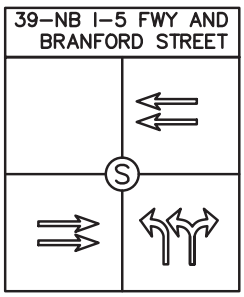

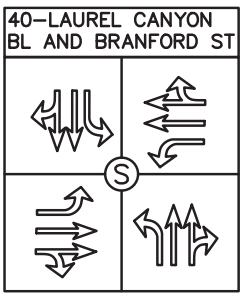

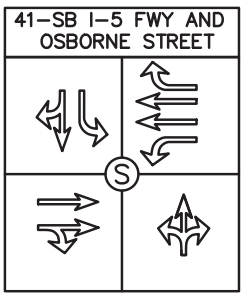

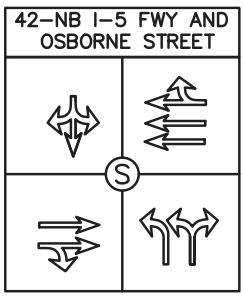

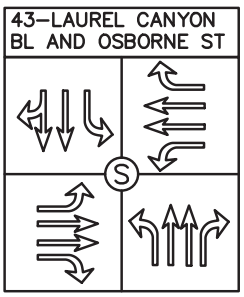

LEGEND

(#) – STUDY INTERSECTIONS

(S) – SIGNALIZED INTERSECTION

p/s – UNSIGNALIZED INTERSECTION

* – FREE RIGHT TURN

⟸ – EXISTING GEOMETRIC

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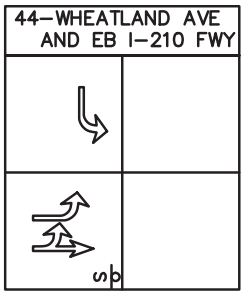
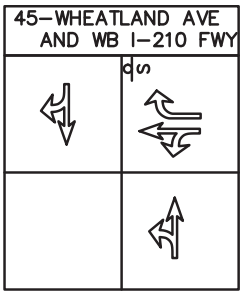
BOULEVARD PIT, SUN VALLEY FILL, SHELDON PIT, AND BRADLEY PIT EXISTING GEOMETRICS

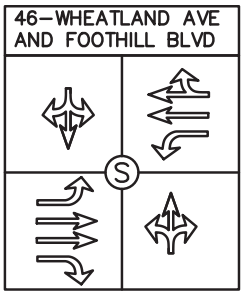
DEVIL'S GATE DAM & RESERVOIR

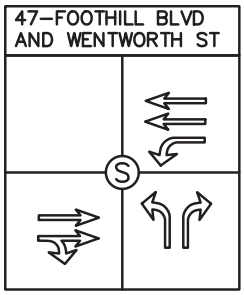
FIGURE 3–4–11A

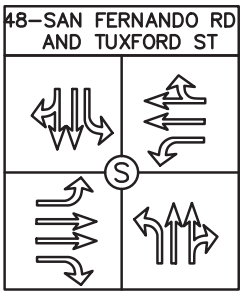
Drawing Name: V:\110264\Eng\110264–000\Exhibit\02 Traffic Study\Route Figures\Chapter 3\Ch. 3 Section 4\FIG 3–4–11A.dwg
Last Opened: Oct 04, 2013 – 9:47am by: TMunoz

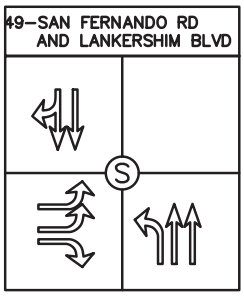


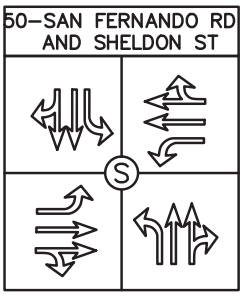


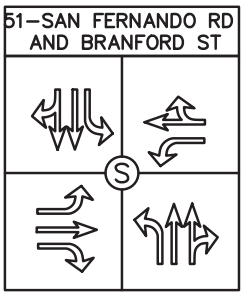












LEGEND

(#) – STUDY INTERSECTIONS

(S) – SIGNALIZED INTERSECTION

p/s – UNSIGNALIZED INTERSECTION

* – FREE RIGHT TURN

⟸ – EXISTING GEOMETRIC

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BOULEVARD PIT, SUN VALLEY FILL, SHELDON PIT, AND BRADLEY PIT EXISTING GEOMETRICS

DEVIL'S GATE DAM & RESERVOIR

FIGURE 3–4–11B

Drawing Name: V:\110264\Eng\110264–000\Exhibit\02 Traffic Study\Route Figures\Chapter 3\Ch. 3 Section 4\FIG 3–4–11B.dwg
Last Opened: Oct 04, 2013 – 9:47am by: TMunoz

Table 3-4-1
Intersection Capacity Analysis – Existing Conditions (Route 5A)

Route 5A		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
24	Foothill Blvd and I-210 Westbound Ramps	A	6.7	0.51	A	A	4.5	0.24	A	A	6.9	0.46	A
25	Foothill Blvd and I-210 Eastbound Ramps	A	9.7	0.60	A	A	6.5	0.28	A	A	7.1	0.39	A
26	Foothill Blvd and Osborne Street	B	19.3	0.89	C	A	8.2	0.42	A	B	13.2	0.73	C
27	Glenoaks Blvd and Osborne Street	E	74.4	0.99	E	C	31.3	0.74	B	D	40.7	0.90	D
28	Glenoaks Blvd and Montague Street	A	8.7	0.69	B	B	14.6	0.34	A	A	9.5	0.55	B
29	Glenoaks Blvd and Branford Street	B	14.6	0.77	C	B	12.0	0.58	A	C	21.9	0.76	D
30	Glenoaks Blvd and Sheldon Street	B	11.2	0.75	D	A	7.2	0.44	A	B	11.2	0.75	C

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc.**

Table 3-4-2
Intersection Capacity Analysis – Existing Conditions (Route 5B)

Route 5B		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
30	Glenoaks Blvd and Sheldon Street	B	11.7	0.75	D	A	7.2	0.44	A	B	11.2	0.75	C
31	Glenoaks Blvd and Peoria Street	B	10.3	0.54	A	B	11.4	0.34	A	B	13.4	0.52	A
32	Glenoaks Blvd and Tuxford Street	B	12.0	0.77	D	A	7.2	0.42	A	A	8.7	0.54	B
33	Glenoaks Blvd and Penrose Street	A	6.2	0.52	A	A	5.8	0.32	A	A	9.0	0.63	A
34	Glenoaks Blvd and Sunland Blvd	C	25.1	0.83	B	B	14.8	0.60	B	C	22.6	0.83	D
35	Glenoaks Blvd and Roscoe Blvd	A	6.1	0.36	A	A	6.6	0.36	A	A	9.1	0.58	A
36	Roscoe Blvd and I-5 Freeway Northbound Ramps	B	11.1	-	-	B	11.0	-	-	C	17.7	-	-
37	Roscoe Blvd and I-5 Freeway Southbound Ramps	A	0.0	-	-	A	0.0	-	-	A	0.0	-	-

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc.**

Table 3-4-3
Intersection Capacity Analysis – Existing Conditions (Route 5C)

Route 5C		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
44	Wheatland Ave and I-210 Freeway Eastbound Ramps	A	0.0	-	-	A	0.0	-	-	A	0.0	-	-
45	Wheatland Ave and I-210 Freeway Westbound Ramps	A	9.2	-	-	A	6.6	-	-	A	9.0	-	-
46	Wheatland Ave and Foothill Blvd	A	9.6	0.25	A	A	9.3	0.19	A	A	9.4	0.27	A
47	Wentworth Street and Foothill Blvd	B	17.6	0.69	A	B	12.1	0.35	A	A	9.0	0.42	A

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc.**

Sheldon Pit (Site 5) Analysis

As presented in *Table 3-4-1* thru *Table 3-4-3*, under the existing conditions for Site 5 (Route 5A-5C) most of the study intersections are operating at an acceptable HCM LOS C or better, for the AM, Mid-day and PM peak hours. The Intersection of Glenoaks Blvd and Osborne Street included in Haul Route 5A, currently operates at a HCM LOS E during the AM peak hour. Under existing conditions, mitigation is recommended for Glenoaks Blvd and Osborne Street to improve the intersection to an acceptable level-of-service. All other intersections are operating with an acceptable HCM LOS and thus mitigation is not required under existing conditions for those intersections.

Table 3-4-4
Intersection Capacity Analysis – Existing Conditions (Route 6A)

Route 6A		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
24	Foothill Blvd and I-210 Westbound Ramps	A	6.7	0.51	A	A	4.5	0.24	A	A	6.9	0.46	A
25	Foothill Blvd and I-210 Eastbound Ramps	A	9.7	0.60	A	A	6.5	0.28	A	A	7.1	0.39	A
26	Foothill Blvd and Osborne Street	B	19.3	0.89	C	A	8.2	0.42	A	B	13.2	0.73	C
27	Glenoaks Blvd and Osborne Street	E	74.4	0.99	E	C	31.3	0.74	B	D	40.7	0.90	D
28	Glenoaks Blvd and Montague Street	A	8.7	0.69	B	B	14.6	0.34	A	A	9.5	0.55	B
29	Glenoaks Blvd and Branford Street	B	14.6	0.77	C	B	12.0	0.58	A	C	21.9	0.76	D
30	Glenoaks Blvd and Sheldon Street	B	11.2	0.75	D	A	7.2	0.44	A	B	11.2	0.75	C

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc**

Table 3-4-5
Intersection Capacity Analysis – Existing Conditions (Route 6B)

Route 6B		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
30	Glenoaks Blvd and Sheldon Street	B	11.2	0.75	D	A	7.2	0.44	A	B	11.2	0.75	C
31	Glenoaks Blvd and Peoria Street	B	10.3	0.54	A	B	11.4	0.34	A	B	13.4	0.52	A
32	Glenoaks Blvd and Tuxford Street	B	12.0	0.77	D	A	7.2	0.42	A	A	8.7	0.54	B
33	Glenoaks Blvd and Penrose Street	A	6.2	0.52	A	A	5.8	0.32	A	A	9.0	0.63	A
34	Glenoaks Blvd and Sunland Blvd	C	25.1	0.83	B	B	14.8	0.60	B	C	22.6	0.83	D
35	Glenoaks Blvd and Roscoe Blvd	A	6.1	0.36	A	A	6.6	0.36	A	A	9.1	0.58	A
36	Roscoe Blvd and I-5 Freeway Northbound Ramps	B	11.1	-	-	B	11.0	-	-	C	17.7	-	-
37	Roscoe Blvd and I-5 Freeway Southbound Ramps	A	0.0	-	-	A	0.0	-	-	A	0.0	-	-

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc.**

Table 3-4-6
Intersection Capacity Analysis – Existing Conditions (Route 6C)

Route 6C		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
30	Glenoaks Blvd and Sheldon Street	B	11.2	0.75	D	A	7.2	0.44	A	B	11.2	0.75	C
44	Wheatland Ave and I-210 Freeway Eastbound Ramps	A	0	-	-	A	0	-	-	A	0	-	-
45	Wheatland Ave and I-210 Freeway Westbound Ramps	A	9.2	-	-	A	6.6	-	-	A	9	-	-
46	Wheatland Ave and Foothill Blvd	A	9.6	0.25	A	A	9.3	0.19	A	A	9.4	0.27	A
47	Wentworth Street and Foothill Blvd	B	17.6	0.69	A	B	12.1	0.35	A	A	9	0.42	A

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc.**

Sun Valley Fill Site (Site 6) Analysis

As presented in *Table 3-4-4* thru *Table 3-4-6*, under the existing conditions for Site 6 (Route 6A-6C) most of the study intersections are operating at an acceptable HCM LOS C or better, for the AM, Mid-day and PM peak hours. The Intersection of Glenoaks Blvd and Osborne Street included in Haul Route 6A, currently operates at a HCM LOS E during the AM peak hour. Under existing conditions, mitigation is recommended for Glenoaks Blvd and Osborne Street to improve the intersection to an acceptable level-of-service. All other intersections are operating with an acceptable HCM LOS and thus mitigation is not required under existing conditions for those intersections.

Table 3-4-7
Intersection Capacity Analysis – Existing Conditions (Route 7A)

Route 7A		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
24	Foothill Blvd and I-210 Westbound Ramps	A	6.7	0.51	A	A	4.5	0.24	A	A	6.9	0.46	A
25	Foothill Blvd and I-210 Eastbound Ramps	A	9.7	0.60	A	A	6.5	0.28	A	A	7.1	0.39	A
26	Foothill Blvd and Osborne Street	B	19.3	0.89	C	A	8.2	0.42	A	B	13.2	0.73	C
27	Glenoaks Blvd and Osborne Street	E	74.4	0.99	E	C	31.3	0.74	B	D	40.7	0.90	D
28	Glenoaks Blvd and Montague Street	A	8.7	0.69	B	B	14.6	0.34	A	A	9.5	0.55	B
29	Glenoaks Blvd and Branford Street	B	14.6	0.77	C	B	12.0	0.58	A	C	21.9	0.76	D
30	Glenoaks Blvd and Sheldon Street	B	11.2	0.75	D	A	7.2	0.44	A	B	11.2	0.75	C
31	Glenoaks Blvd and Peoria Street	B	10.3	0.54	A	B	11.4	0.34	A	B	13.4	0.52	A

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc.**

Table 3-4-8
Intersection Capacity Analysis – Existing Conditions (Route 7B)

Route 7B		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
31	Glenoaks Blvd and Peoria Street	B	10.3	0.54	A	B	11.4	0.34	A	B	13.4	0.52	A
32	Glenoaks Blvd and Tuxford Street	B	12.0	0.77	D	A	7.2	0.42	A	A	8.7	0.54	B
33	Glenoaks Blvd and Penrose Street	A	6.2	0.52	A	A	5.8	0.32	A	A	9.0	0.63	A
34	Glenoaks Blvd and Sunland Blvd	C	25.1	0.83	B	B	14.8	0.60	B	C	22.6	0.83	D
35	Glenoaks Blvd and Roscoe Blvd	A	6.1	0.36	A	A	6.6	0.36	A	A	9.1	0.58	A
36	Roscoe Blvd and I-5 Freeway Northbound Ramps	B	11.1	-	-	B	11.0	-	-	C	17.7	-	-
37	Roscoe Blvd and I-5 Freeway Southbound Ramps	A	0.0	-	-	A	0.0	-	-	A	0.0	-	-

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc.**

Table 3-4-9
Intersection Capacity Analysis – Existing Conditions (Route 7C)

Route 7C		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
30	Glenoaks Blvd and Sheldon Street	B	11.2	0.75	D	A	7.2	0.44	A	B	11.2	0.75	C
31	Glenoaks Blvd and Peoria Street	B	10.3	0.54	A	B	11.4	0.34	A	B	13.4	0.52	A
44	Wheatland Ave and I-210 Freeway Eastbound Ramps	A	0	-	-	A	0	-	-	A	0	-	-
45	Wheatland Ave and I-210 Freeway Westbound Ramps	A	9.2	-	-	A	6.6	-	-	A	9	-	-
46	Wheatland Ave and Foothill Blvd	A	9.6	0.25	A	A	9.3	0.19	A	A	9.4	0.27	A
47	Wentworth Street and Foothill Blvd	B	17.6	0.69	A	B	12.1	0.35	A	A	9	0.42	A

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc.**

Bradley Landfill (Site 7) Analysis

As presented in *Table 3-4-7* thru *Table 3-4-9*, under the existing conditions for Site 7 (Route 7A-7C) all intersections are operating at an acceptable HCM LOS C or better, for the AM, Mid-day and PM peak hours. The Intersection of Glenoaks Blvd and Osborne Street included in Haul Route 7A, currently operates at a HCM LOS E during the AM peak hour. Under existing conditions, mitigation is recommended for Glenoaks Blvd and Osborne Street to improve the intersection to an acceptable level-of-service. All other intersections are operating with an acceptable HCM LOS and thus mitigation is not required under existing conditions for those intersections.

Table 3-4-10
Intersection Capacity Analysis – Existing Conditions (Route 8A)

Route 8A		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
38	Branford Street and I-5 Freeway Southbound Ramps	-	-	-	-	-	-	-	-	-	-	-	-
39	Branford Street and I-5 Freeway Northbound Ramps	-	-	-	-	-	-	-	-	-	-	-	-
40	Branford Street and Laurel Canyon Blvd	B	10.2	0.51	B	A	9.5	0.98	A	B	13.4	0.76	D

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc.**

Table 3-4-11
Intersection Capacity Analysis – Existing Conditions (Route 8B)

Route 8B		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
40	Branford Street and Laurel Canyon Blvd	B	10.2	0.51	B	A	9.5	0.98	A	B	13.4	0.76	D
41	Osborne Street and I-5 Freeway Southbound Ramps	B	11.2	0.66	C	B	12.7	0.76	B	C	23.5	0.91	D
42	Osborne Street and I-5 Freeway Northbound Ramps	B	13.3	0.69	A	B	10.8	0.62	A	C	14.6	0.83	C
43	Osborne Street and Laurel Canyon Blvd	C	30.9	0.90	D	C	20.4	0.70	C	D	44.9	1.01	F

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc.**

Table 3-4-12
Intersection Capacity Analysis – Existing Conditions (Route 8C)

Route 8C		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
30	Glen Oaks Blvd and Sheldon Street	B	11.2	0.75	D	A	7.2	0.44	A	B	11.2	0.75	C
31	Glen Oaks Blvd and Peoria Street	B	10.3	0.54	A	B	11.4	0.34	A	B	13.4	0.52	A
32	Glen Oaks Blvd and Tuxford Street	B	12.0	0.77	D	A	7.2	0.42	A	A	8.7	0.54	B
44	Wheatland Ave and I-210 Freeway Eastbound Ramp	A	0	-	-	A	0	-	-	A	0	-	-
45	Wheatland Ave and I-210 Freeway Westbound Ramp	A	9.2	-	-	A	6.6	-	-	A	9	-	-
46	Wheatland Ave and Foothill Blvd	A	9.6	0.25	A	A	9.3	0.19	A	A	9.4	0.27	A
47	Wentworth Street and Foothill Blvd	B	17.6	0.69	A	B	12.1	0.35	A	A	9	0.42	A
48	Tuxford Street and San Fernando Road	C	30.0	0.67	B	C	34.0	0.69	B	C	33.2	0.73	B
49	Lankershim Blvd and San Fernando Road	A	6.6	0.46	A	A	6.8	0.36	A	A	8.5	0.46	A
50	Sheldon Street and San Fernando Road	C	30.9	0.74	B	C	23.7	0.46	A	D	40.5	0.94	D
51	Branford Street and San Fernando Road	C	26.3	0.81	B	C	20.3	0.44	A	E	62.7	0.92	C

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc.**

Boulevard Pit (Site 8) Analysis

As presented in *Table 3-4-10* thru *Table 3-4-12*, under the existing conditions for Site 8 (Routes 8A-8C) all intersections are operating at an acceptable HCM LOS of D or better for the AM, Mid-day, and PM peak hours with the exception of intersection of Branford Street and San Fernando Road. The Intersection of Branford Street and San Fernando Road is included in Haul Route 8C and is operating at a HCM LOS E during the PM peak hour. Under existing conditions, mitigation is recommended at Branford Street and San Fernando Road to improve the intersection to an acceptable level-of-service. All other intersections are operating with an acceptable HCM LOS and thus mitigation is not required under existing conditions for those intersections.

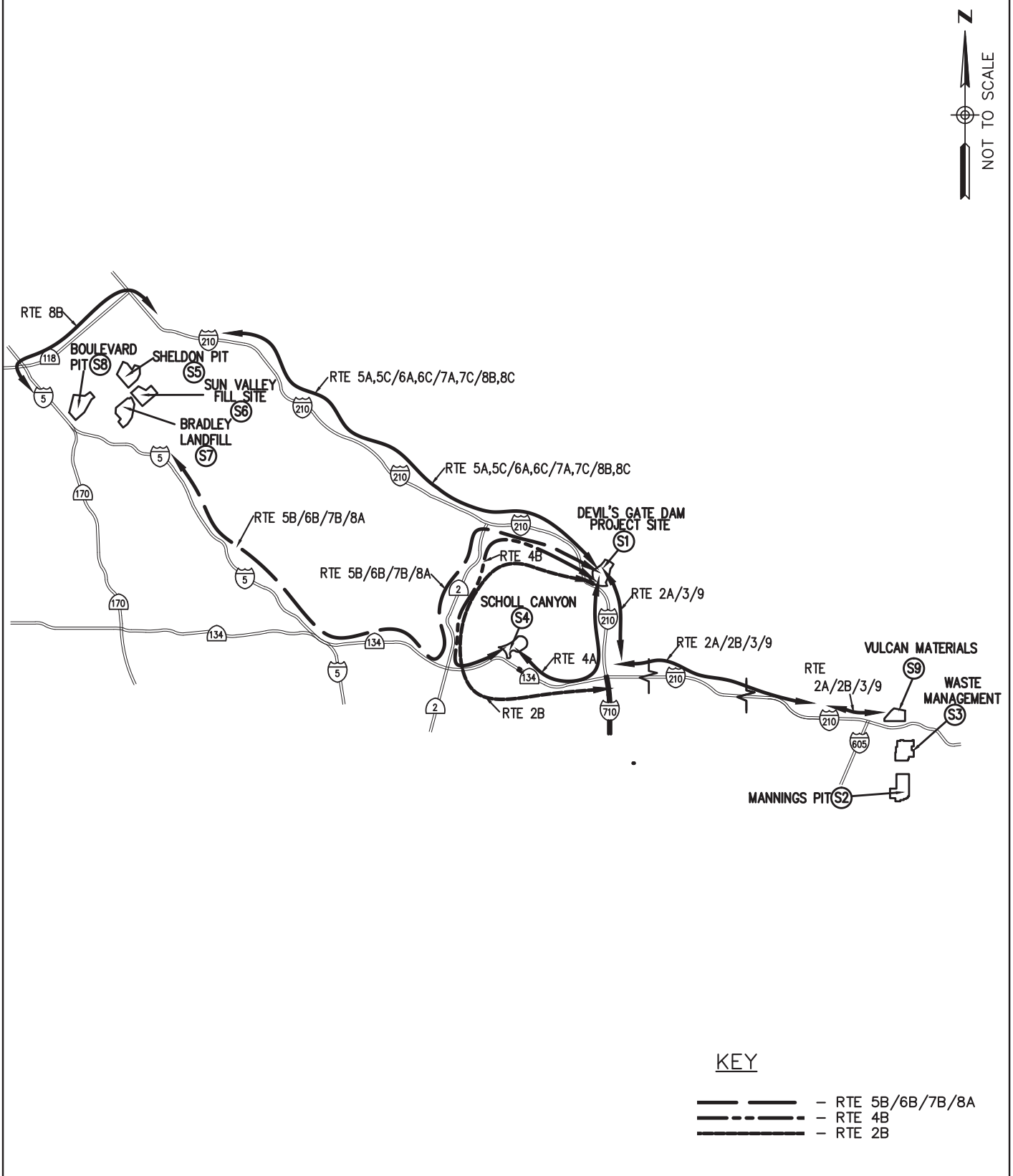
Existing Intersection Capacity Analysis

In Summary, most of the intersections associated with the twenty five routes are operating at an acceptable level of service with the exception of two intersections that mitigation is recommended to improve the level of service, during the AM or PM peak hours, prior to the introduction of the project trips. The Intersections include Glenoaks Blvd and Osborne Street (Haul Routes 5A, 6A, 7A) with an AM peak hour LOS E, and Branford Street and San Fernando Road (Haul Route 8C) with a PM peak hour LOS E.

Section E: (Caltrans)

The proposed haul routes for the Devil's Gate Reservoir Sediment Removal and Management Project will require the expected truck trips to travel through the I-210, I-5, SR-2, and SR-134 freeways from which 28 freeway segments and 54 ramps were identified for analysis. The HCM LOS analysis done on the freeway and ramps will be per Caltrans requirements, which consists of the use of the HCM 2010 methodologies. To determine the HCM LOS per the HCM 2010 methodology, Highway Capacity (HCS) 2010 software, which is developed by McTrans, was used for the freeway mainline analysis, ramp analysis, and weaving analysis.

The freeway system proposed to be utilized by the haul routes is illustrated in *Figure 3-5-1*, providing study haul route utilization. The 28 freeway segments identified for analysis are illustrated in *Figure 3-5-2*. *Figure 3-5-3* through *Figure 3-5-12* provide the identified 28 freeway segments and 53 ramps by segment. Existing AM (7-9), MID-DAY (12-2), and PM (4-6) freeway segment volumes are provided in *Figure 3-5-13* and *Figure 3-5-14.* Existing AM (7-9), MID-DAY (12-2), and PM (4-6) ramp volumes are provided in *Figure 3-5-15* and *Figure 3-5-16.*



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FREEWAY SYSTEM

DEVIL'S GATE DAM & RESERVOIR

FIGURE
3-5-1

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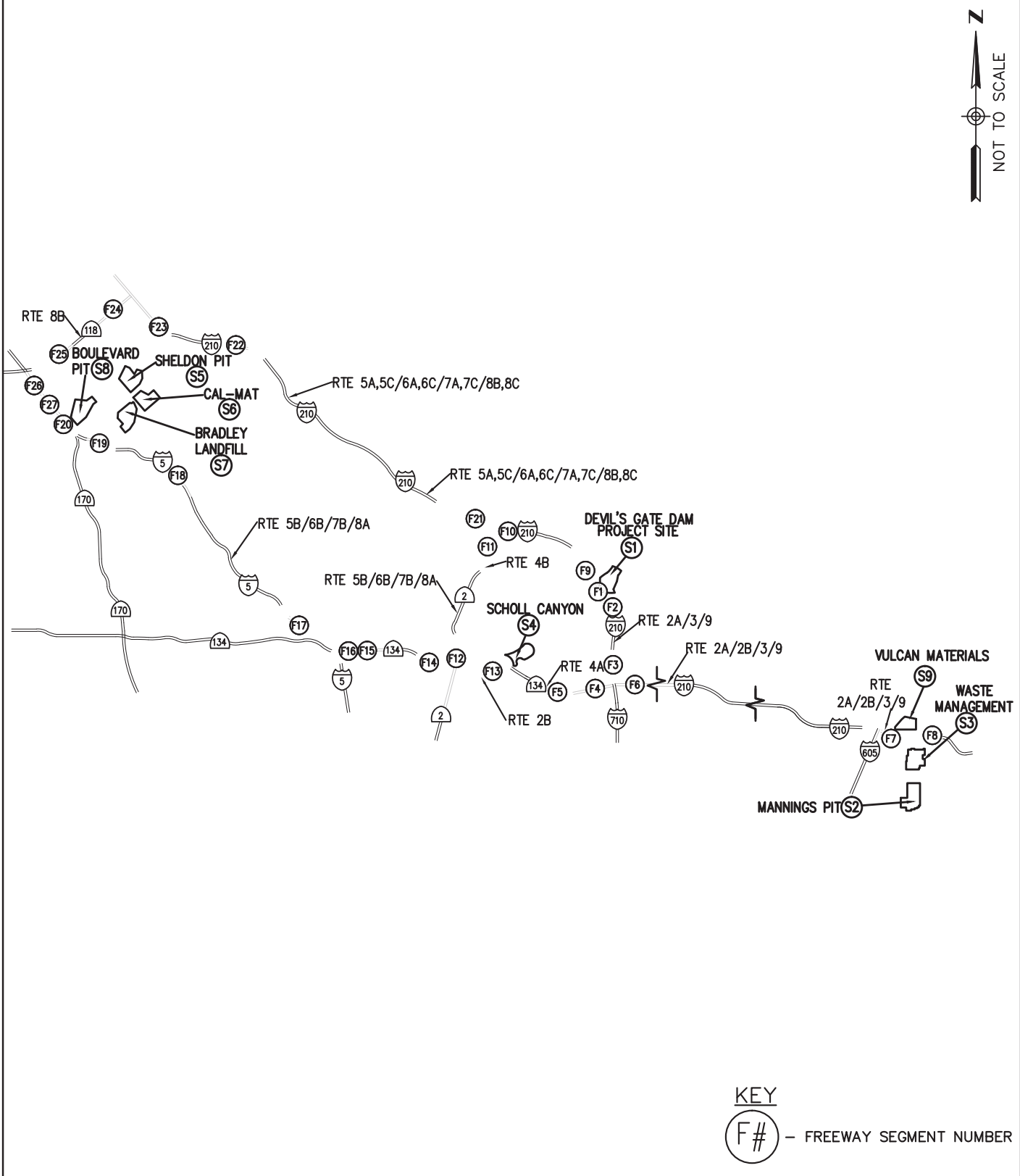

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LOCATION OF FREEWAY SEGMENTS

DEVIL'S GATE DAM & RESERVOIR

FIGURE 3-5-2

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 3\Ch. 3 Section 5\FIG 3-5-2.dwg
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FREEWAY SEGMENTS 1, 2, AND 9

DEVIL'S GATE DAM & RESERVOIR

FIGURE 3-5-3

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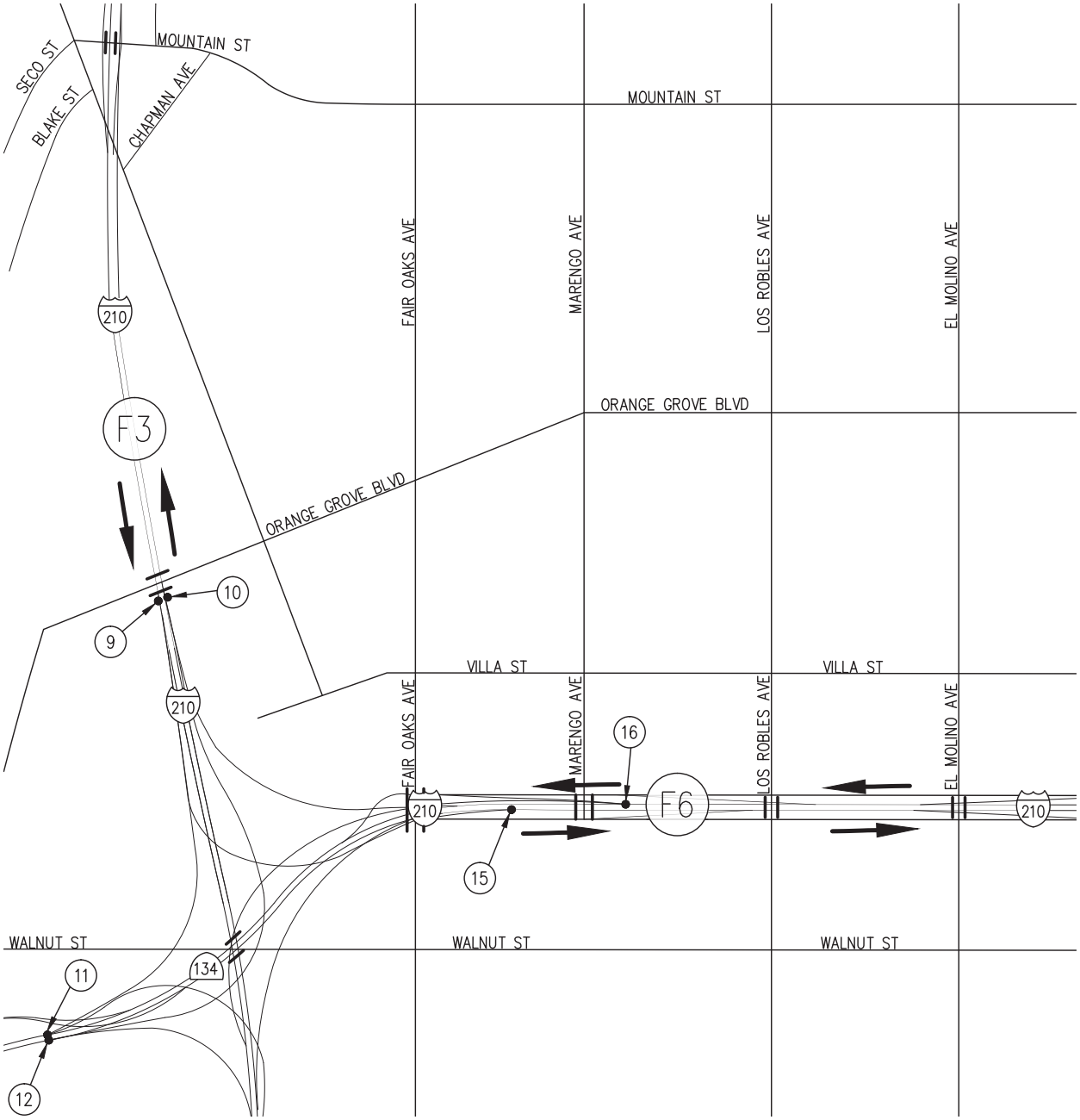

KEY

F# – FREEWAY SEGMENT NUMBER

– RAMPS WITH ENTERING OR EXITING TRUCKS TO BE ANALYZED

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FREEWAY SEGMENTS 3 AND 6

DEVIL'S GATE DAM & RESERVOIR

FIGURE 3-5-4

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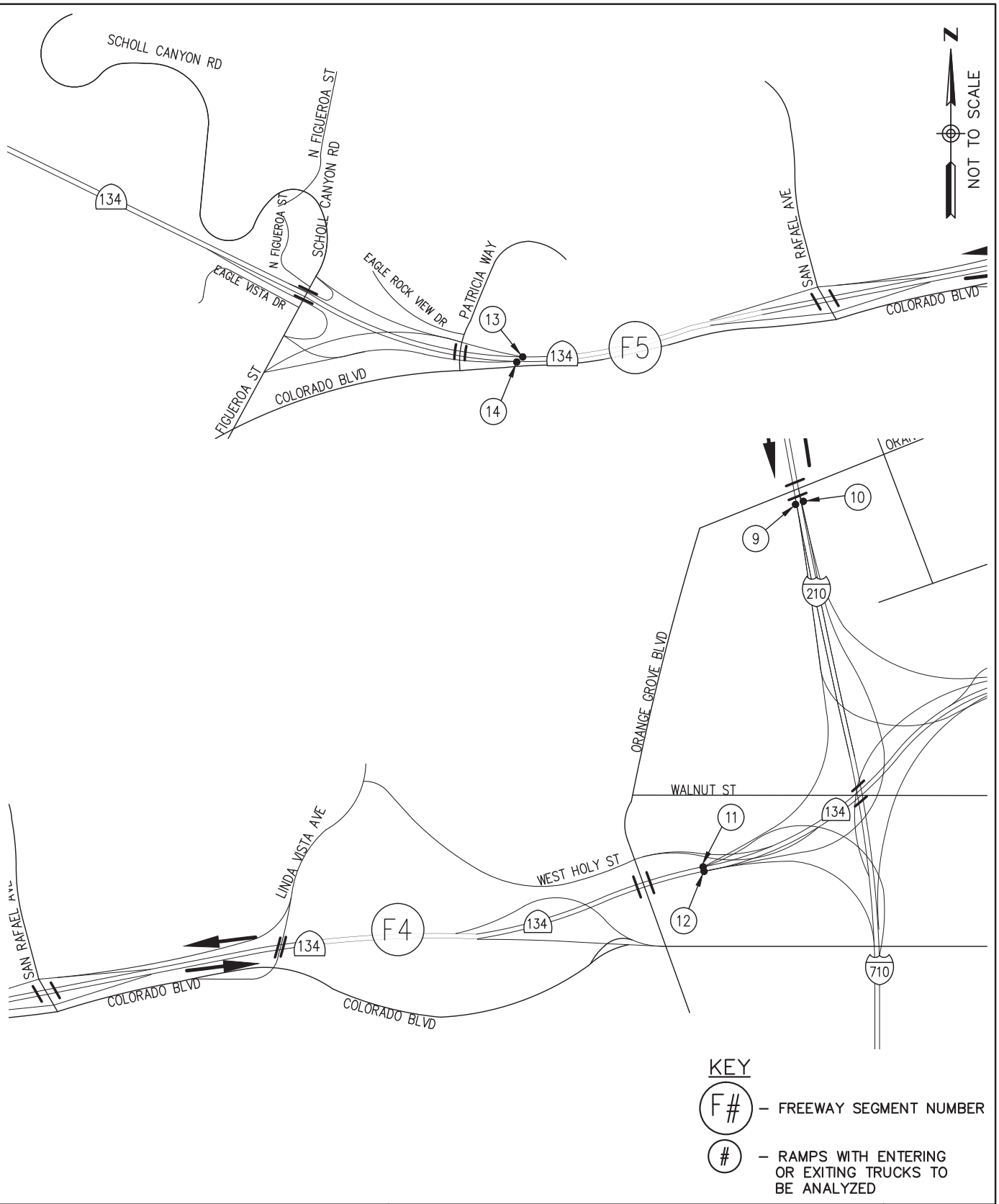

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FREEWAY SEGMENTS 4 AND 5

DEVIL'S GATE DAM & RESERVOIR

FIGURE 3-5-5

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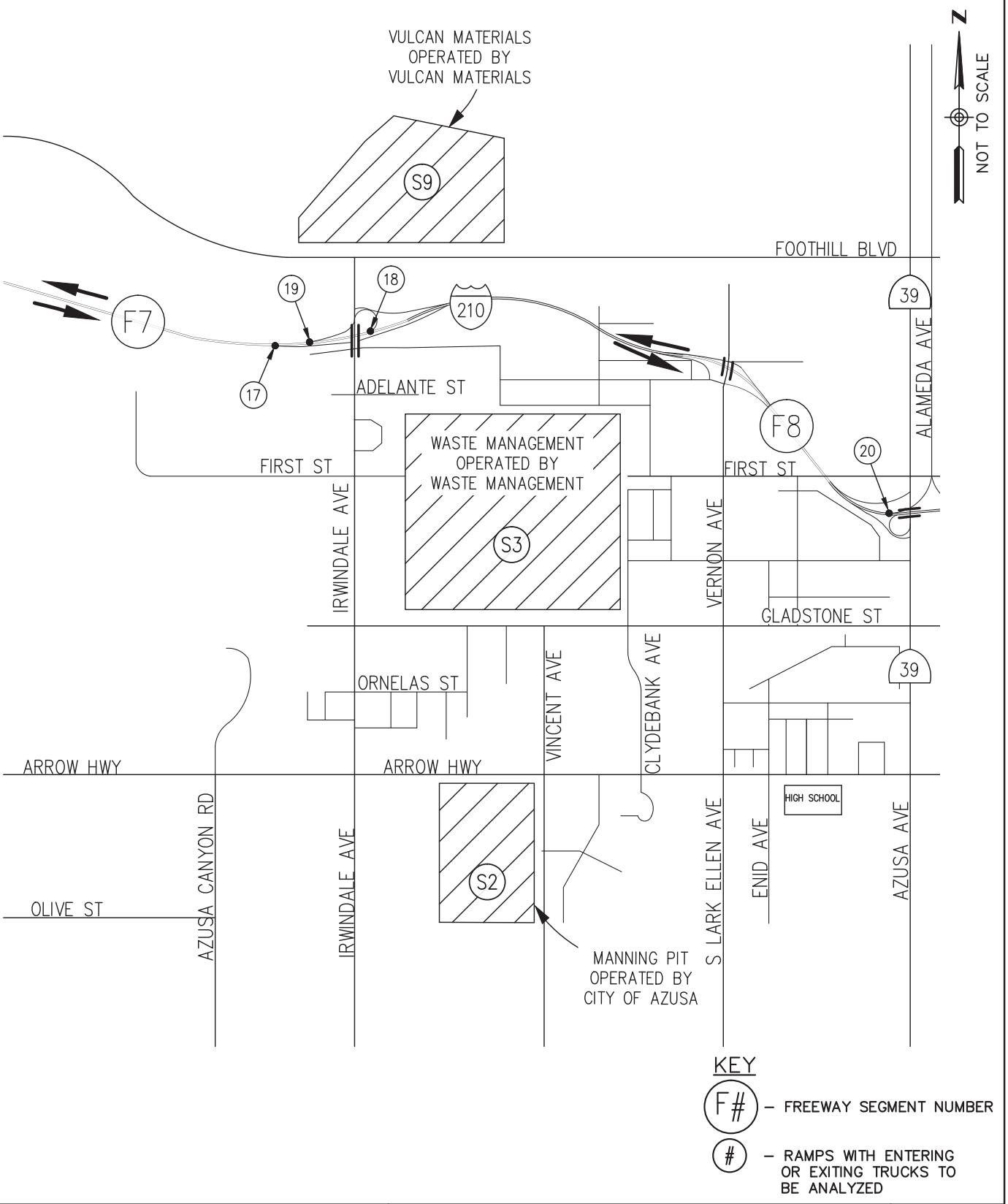

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FREEWAY SEGMENTS 7, AND 8

DEVIL'S GATE DAM & RESERVOIR

FIGURE
3-5-6

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 3\Ch. 3 Section 5\FIG 3-5-6.dwg
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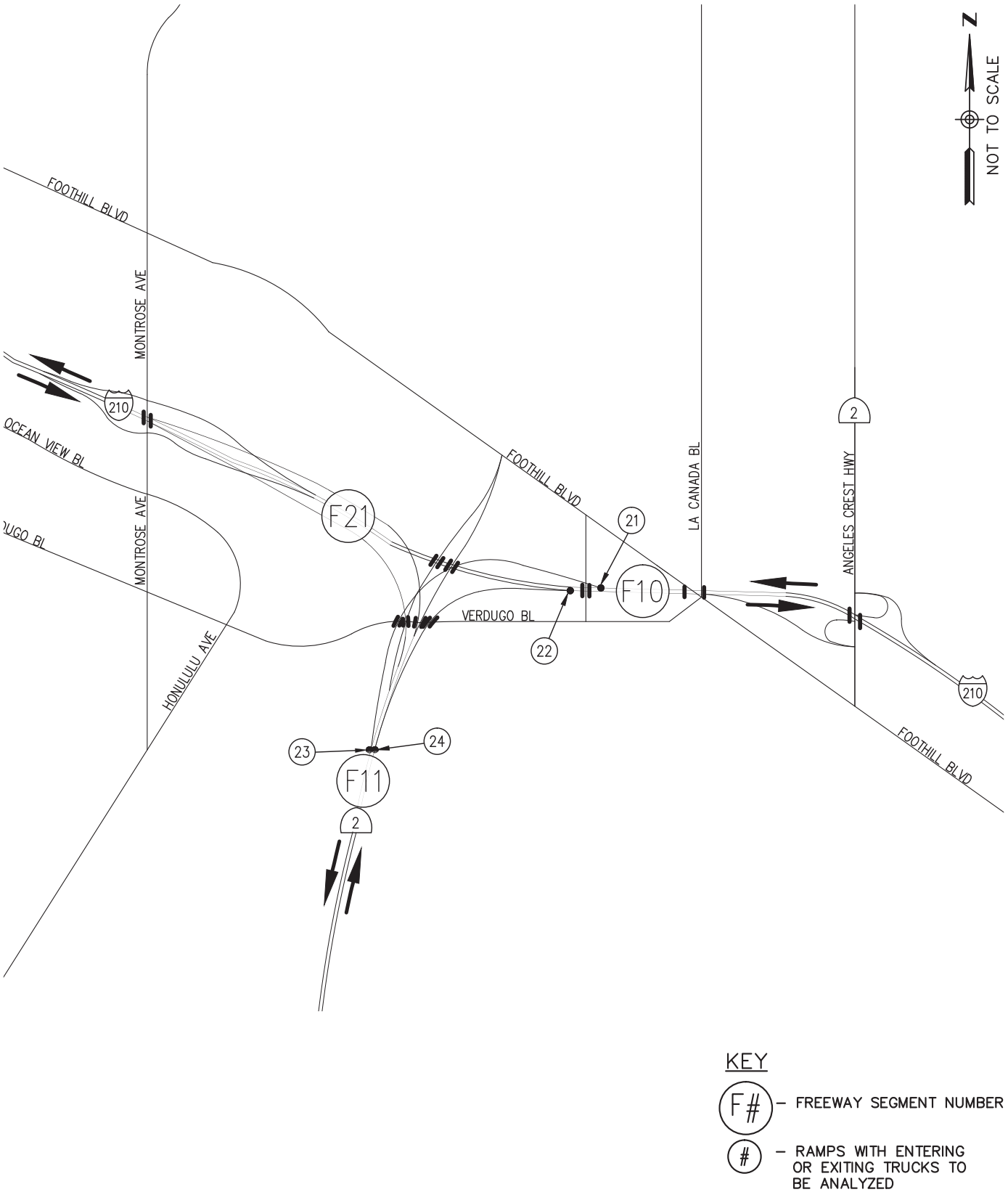

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FREEWAY SEGMENTS 10, 11, AND 21

DEVIL'S GATE DAM & RESERVOIR

FIGURE 3-5-7

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FREEWAY SEGMENTS 12 AND 14

DEVIL'S GATE DAM & RESERVOIR

FIGURE 3-5-8

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 3\Ch. 3 Section 5\FIG 3-5-8.dwg
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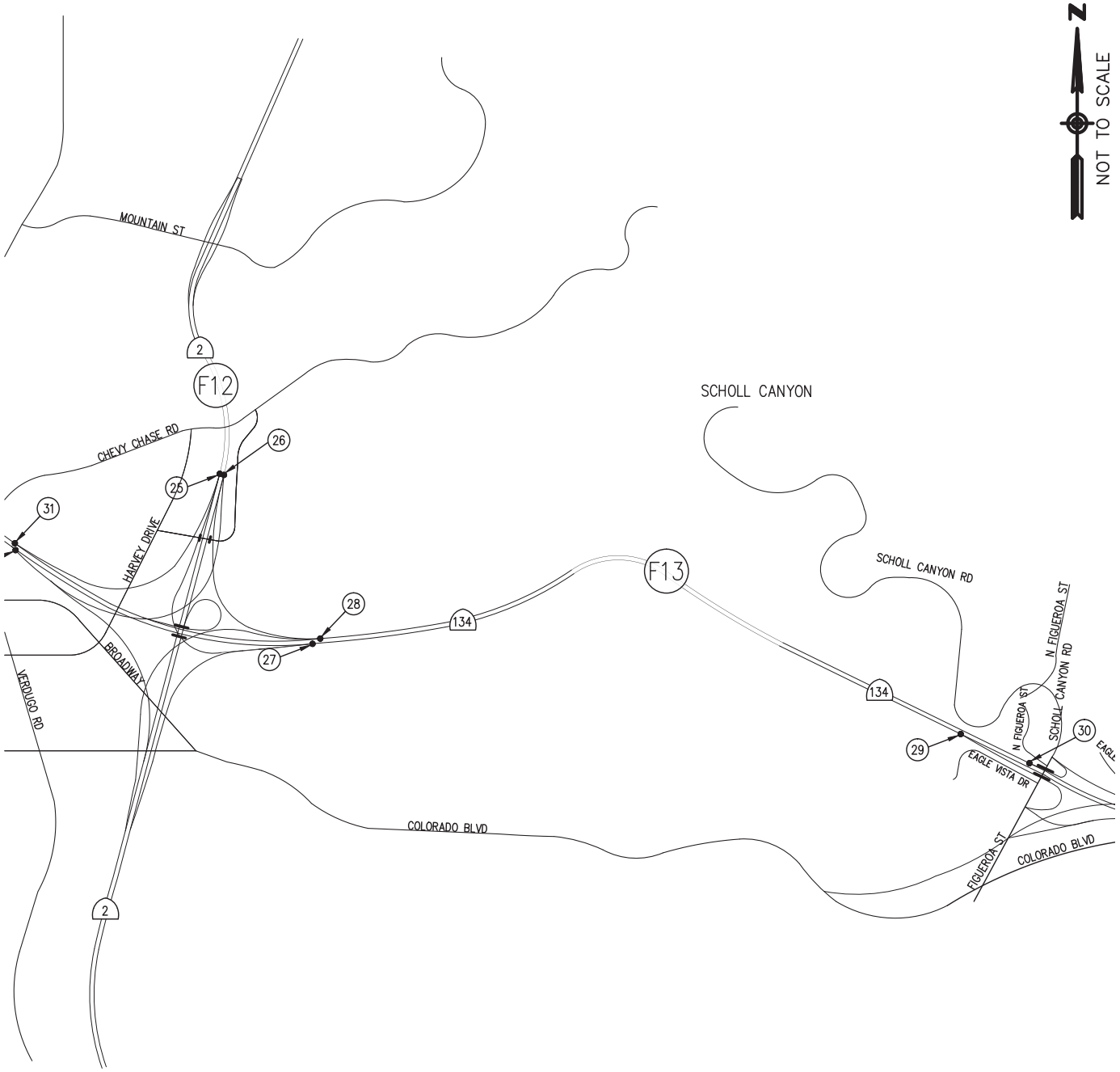

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FREEWAY SEGMENTS 12 AND 13

DEVIL'S GATE DAM & RESERVOIR

FIGURE 3-5-9

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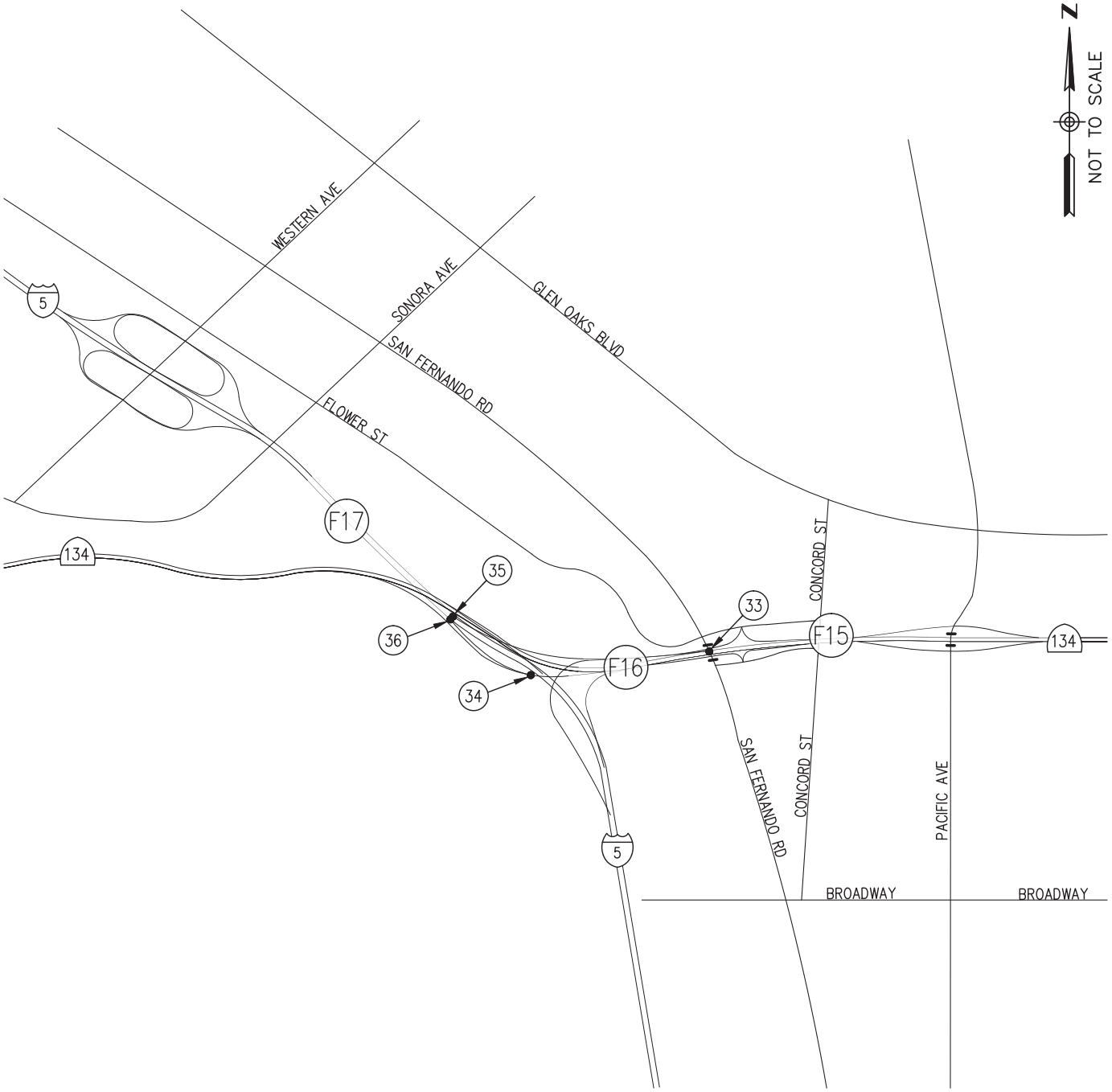

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FREEWAY SEGMENTS 15, 16, AND 17

DEVIL'S GATE DAM & RESERVOIR

FIGURE 3-5-10

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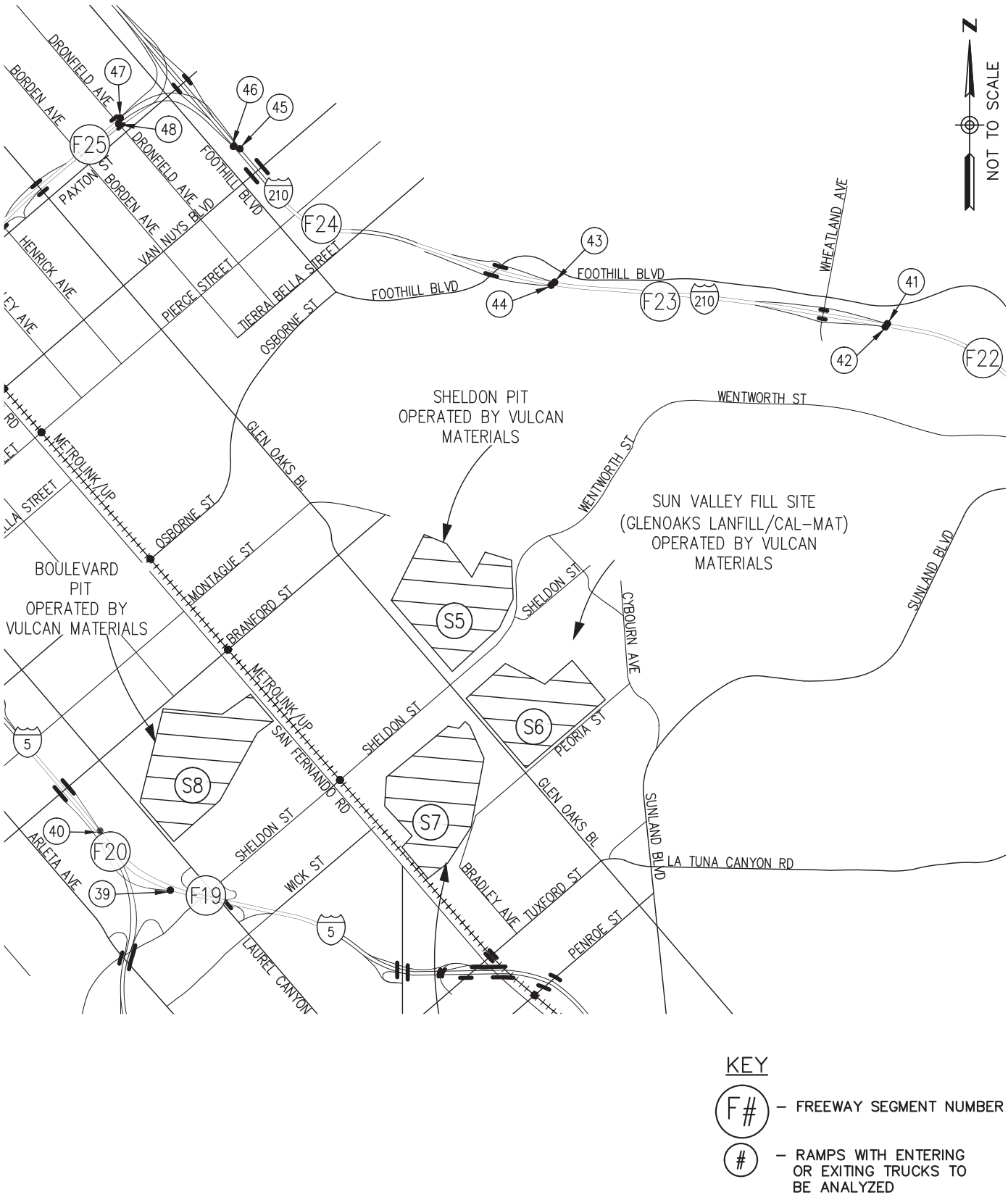

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FREEWAY SEGMENTS 19, 20, 22, 23, 24, AND 25

DEVIL'S GATE DAM & RESERVOIR

FIGURE
3-5-11

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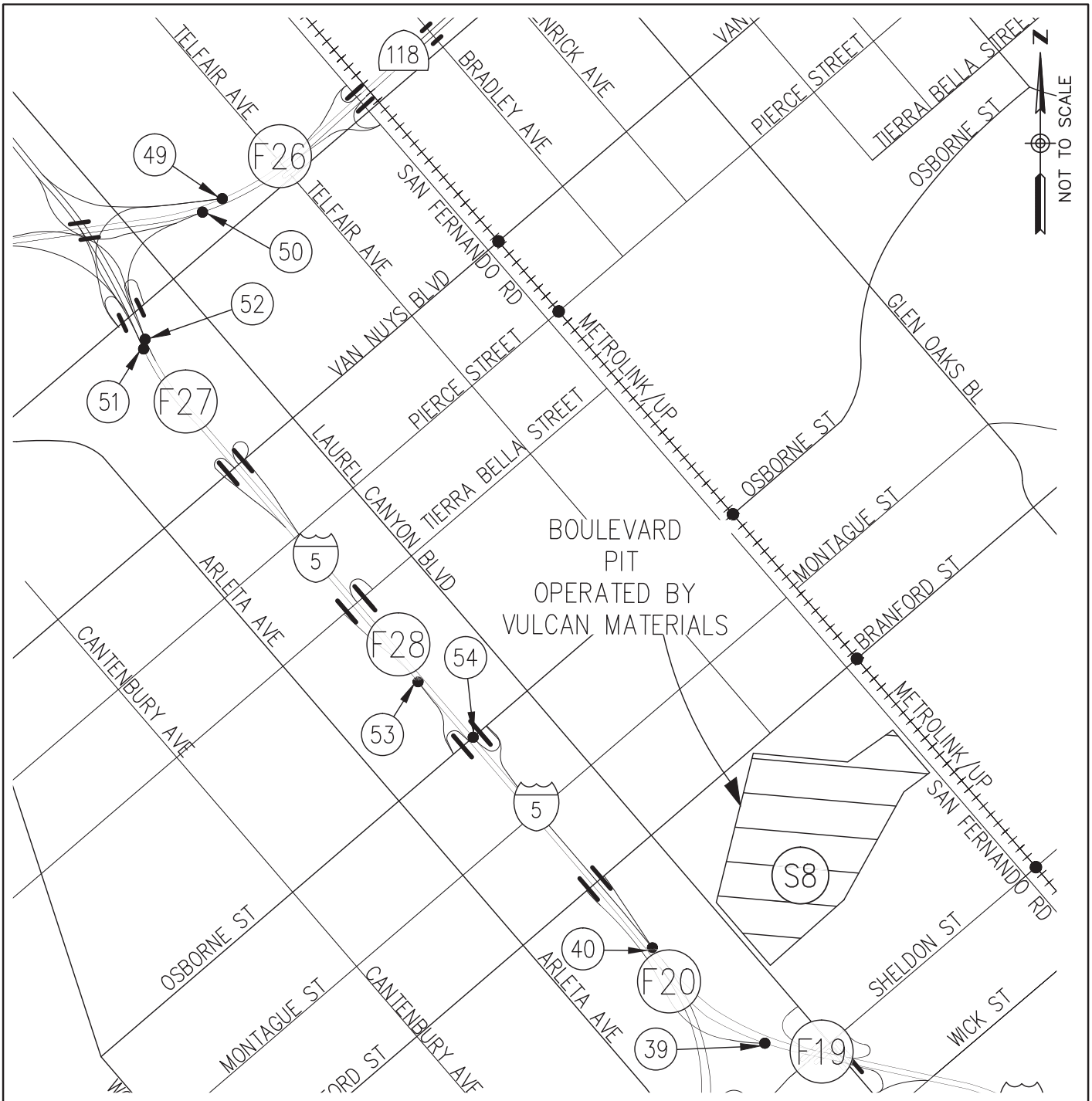

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FREEWAY SEGMENTS 19, 20, 26, 27, AND 28

DEVIL'S GATE DAM & RESERVOIR

FIGURE 3-5-12

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S1–EB I–210 FWY		S1–WB I–210 FWY	
SEGMENT BETWEEN BERKSHIRE PLACE AND WINDSOR AVE.		SEGMENT BETWEEN WINDSOR AVE AND BERKSHIRE PLACE .	
AM	5570→	AM	←3365
MID–DAY	3510→	MID–DAY	←2460
PM	4335→	PM	←4060

S2–EB I–210 FWY		S2–WB I–210 FWY	
SEGMENT BETWEEN WINDSOR AVE AND LINCOLN AVE.		SEGMENT BETWEEN LINCOLN AVE AND WINDSOR AVE.	
AM	5715→	AM	←3780
MID–DAY	3650→	MID–DAY	←3635
PM	4400→	PM	←5610

S3–EB I–210 FWY		S3–WB I–210 FWY	
SEGMENT BETWEEN MOUNTAIN ST AND SR–134/1–210 FWY INTERCHANGE.		SEGMENT BETWEEN SR–134/1–210 FWY INTERCHANGE AND MOUNTAIN ST.	
AM	5520→	AM	←4775
MID–DAY	3495→	MID–DAY	←3905
PM	4100→	PM	←5615

S4–EB SR–134 FWY		S4–WB SR–134 FWY	
SEGMENT BETWEEN FIGUEROA ST AND SAN RAFAEL AVE.		SEGMENT BETWEEN SAN RAFAEL AVE AND FIGUEROA ST.	
AM	5970→	AM	←7980
MID–DAY	5610→	MID–DAY	←5610
PM	6725→	PM	←7375

S5–EB SR–134 FWY		S5–WB SR–134 FWY	
SEGMENT BETWEEN SAN RAFAEL AVE AND SR–134/I–210 FWY INTERCHANGE.		SEGMENT BETWEEN SR–134/I–210 FWY INTERCHANGE AND SAN RAFAEL AVENUE.	
AM	7415→	AM	←7470*
MID–DAY	6630→	MID–DAY	←5215*
PM	8085→	PM	←7100*

S6–EB I–210 FWY		S6–WB I–210 FWY	
SEGMENT BETWEEN WB SR–134/EB I–210 FWY INTERCHANGE AND LAKE AVE.		SEGMENT BETWEEN LAKE AVE AND EB SR–134/WB I–210 FWY INTERCHANGE.	
AM	5115→	AM	←9710
MID–DAY	4140→	MID–DAY	←7420
PM	4325→	PM	←8400

S7–EB I–210 FWY		S7–WB I–210 FWY	
SEGMENT BETWEEN I–605 FREEWAY AND IRWINDALE AVE.		SEGMENT BETWEEN IRWINDALE AVE AND I–605 FREEWAY.	
AM	5515→	AM	←7070
MID–DAY	5200→	MID–DAY	←6825
PM	5615→	PM	←7520

S8–EB I–210 FWY		S8–WB I–210 FWY	
SEGMENT BETWEEN IRWINDALE AVE AND AZUSA AVE.		SEGMENT BETWEEN AZUSA AVE AND IRWINDALE AVE.	
AM	6225→	AM	←6715
MID–DAY	6660→	MID–DAY	←6630
PM	6265→	PM	←8500

S9–EB I–210 FWY		S9–WB I–210 FWY	
SEGMENT BETWEEN FOOTHILL BLVD AND BERKSHIRE PLACE.		SEGMENT BETWEEN BERKSHIRE PLACE AND FOOTHILL BLVD	
AM	5570*→	AM	←3705
MID–DAY	3560*→	MID–DAY	←3645
PM	4175*→	PM	←5765

S10–EB I–210 FWY		S10–WB I–210 FWY	
SEGMENT BETWEEN SR–2 FWY AND ANGELES CREST HWY.		SEGMENT BETWEEN ANGELES CREST HWY AND SR–2 FWY.	
AM	N/D→	AM	←3450
MID–DAY	N/D→	MID–DAY	←3305
PM	N/D→	PM	←5495

S11–NB SR–2 FWY		S11–SB SR–2 FWY	
SEGMENT BETWEEN MOUNTAIN ST AND I–210/SR–2 FWY INTERCHANGE.		SEGMENT BETWEEN I–210/SR–2 FWY INTERCHANGE AND MOUNTAIN ST.	
AM	2590→	AM	←6015
MID–DAY	5200→	MID–DAY	←2095
PM	5610→	PM	←2790

S12–NB SR–2 FWY		S12–SB SR–2 FWY	
SEGMENT BETWEEN SR–134/SR–2 FWY INTERCHANGE AND MOUNTAIN ST.		SEGMENT BETWEEN MOUNTAIN ST AND SR–134/SR–2 FWY INTERCHANGE.	
AM	N/D→	AM	←6475
MID–DAY	N/D→	MID–DAY	←2580
PM	N/D→	PM	←3235

S13–EB SR–134 FWY		S13–WB SR–134 FWY	
SEGMENT BETWEEN SR–2 FWY AND FIGUEROA ST.		SEGMENT BETWEEN FIGUEROA ST AND SR–2 FWY.	
AM	6030*→	AM	←6300
MID–DAY	6245*→	MID–DAY	←5040
PM	6905*→	PM	←6325

LEGEND

X%→ EXISTING VOLUMES
N/D→ NO DATA AVAILABLE
*→ CALCULATED VOLUME

S14–EB SR–134 FWY		S14–WB SR–134 FWY	
SEGMENT BETWEEN GLENDALE AVE AND SR–2 FWY.		SEGMENT BETWEEN SR–2 FWY AND GLENDALE AVE.	
AM	6490→	AM	←N/D
MID–DAY	7175→	MID–DAY	←N/D
PM	8430→	PM	←N/D

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EXISTING VOLUMES ON FREEWAY SEGMENTS 1–14

DEVIL'S GATE DAM & RESERVOIR

FIGURE 3–5–13

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S15–EB SR–134 FWY		S15–WB SR–134 FWY	
SEGMENT BETWEEN SAN FERNANDO ST AND PACIFIC AVE.		SEGMENT BETWEEN PACIFIC AVE AND SAN FERNANDO ST.	
AM	7185→	AM	←8330
MID–DAY	6960→	MID–DAY	←6055
PM	7455→	PM	←6470

S16–EB SR–134 FWY		S16–WB SR–134 FWY	
SEGMENT BETWEEN SR–134/I–5 FWY INTERCHANGE AND SAN FERNANDO ST.		SEGMENT BETWEEN SAN FERNANDO ST. AND SR–134/I–5 FWY INTERCHANGE.	
AM	N/D→	AM	←6370
MID–DAY	N/D→	MID–DAY	←5000
PM	N/D→	PM	←8385

S17–SB I–5 FWY		S17–NB I–5 FWY	
SEGMENT BETWEEN WESTERN AVE AND I–5/SR–134 FWY INTERCHANGE.		SEGMENT BETWEEN I–5/SR–134 FWY INTERCHANGE AND WESTERN AVE.	
AM	6450→	AM	←N/D
MID–DAY	7095→	MID–DAY	←N/D
PM	6995→	PM	←N/D

S18–SB I–5 FWY		S18–NB I–5 FWY	
SEGMENT BETWEEN ROSCOE BLVD/GLEN OAKS BLVD AND N. HOLLYWOOD WAY.		SEGMENT BETWEEN N. HOLLYWOOD WAY AND ROSCOE BLVD/GLEN OAKS BLVD.	
AM	5990→	AM	←5490
MID–DAY	4960→	MID–DAY	←6030
PM	4625→	PM	←6570

S19–SB I–5 FWY		S19–NB I–5 FWY	
SEGMENT BETWEEN I–5/SR–170 FWY INTERCHANGE AND SHELDON ST.		SEGMENT BETWEEN SHELDON ST AND I–5/SR–170 FWY INTERCHANGE.	
AM	N/D→	AM	←4950
MID–DAY	N/D→	MID–DAY	←5445
PM	N/D→	PM	←4755

S20–SB I–5 FWY		S20–NB I–5 FWY	
SEGMENT BETWEEN BRANFORD ST. AND I–5/SR–170 FWY INTERCHANGE		SEGMENT BETWEEN I–5/SR–170 FWY INTERCHANGE AND BRANFORD ST.	
AM	12595→	AM	←N/D
MID–DAY	8420→	MID–DAY	←N/D
PM	9245→	PM	←N/D

S21–EB I–210 FWY		S21–WB I–210 FWY	
SEGMENT BETWEEN MONTROSE AVE AND EB–210/SR–2 FWY INTERCHANGE.		SEGMENT BETWEEN EB–210/SR–2 FWY INTERCHANGE AND MONTROSE AVE.	
AM	N/D→	AM	←N/D
MID–DAY	N/D→	MID–DAY	←N/D
PM	N/D→	PM	←N/D

S22–EB I–210 FWY		S22–WB I–210 FWY	
SEGMENT BETWEEN WHEATLAND AVE AND SUNLAND AVE.		SEGMENT BETWEEN SUNLAND AVE AVE WHEATLAND AVE.	
AM	4735→	AM	←N/D
MID–DAY	2670→	MID–DAY	←N/D
PM	3650→	PM	←N/D

S23–EB I–210 FWY		S23–WB I–210 FWY	
SEGMENT BETWEEN FOOTHILL BLVD AND WHEATLAND AVE.		SEGMENT BETWEEN WHEATLAND AVE AND FOOTHILL BLVD.	
AM	4405→	AM	←4080
MID–DAY	3430→	MID–DAY	←3480
PM	4850→	PM	←6690

S24–EB I–210 FWY		S24–WB I–210 FWY	
SEGMENT BETWEEN SR–118/I–210 FWY INTERCHANGE AND FOOTHILL BLVD		SEGMENT BETWEEN FOOTHILL BLVD AND SR–118/I–210 FWY INTERCHANGE.	
AM	N/D→	AM	←4030
MID–DAY	N/D→	MID–DAY	←3330
PM	N/D→	PM	←5640

S25–EB SR–118 FWY		S25–WB SR–118 FWY	
SEGMENT BETWEEN GLEN OAKS BLVD AND SR–118/I–210 FWY INTERCHANGE.		SEGMENT BETWEEN SR–118/I–210 FWY INTERCHANGE AND GLEN OAKS BLVD.	
AM	N/D→	AM	←N/D
MID–DAY	N/D→	MID–DAY	←N/D
PM	N/D→	PM	←N/D

S26–EB SR–118 FWY		S26–WB SR–118 FWY	
SEGMENT BETWEEN SR–118/I–5 FWY INTERCHANGE AND SAN FERNANDO RD.		SEGMENT BETWEEN SAN FERNANDO RD AND SR–118/I–5 FWY INTERCHANGE.	
AM	N/D→	AM	←6215
MID–DAY	N/D→	MID–DAY	←3550
PM	N/D→	PM	←5690

S27–SB I–5 FWY		S27–NB I–5 FWY	
SEGMENT BETWEEN I–5/ SR–118 FWY INTERCHANGE AND VAN NUYS BLVD.		SEGMENT BETWEEN VAN NUYS BLVD AND I–5/ SR–118 FWY INTERCHANGE.	
AM	9070→	AM	←7985
MID–DAY	7105→	MID–DAY	←8340
PM	7810→	PM	←8505

LEGEND

X%→ EXISTING VOLUMES
N/D→ NO DATA AVAILABLE
*→ CALCULATED VOLUME

S28–SB I–5 FWY		S28–NB I–5 FWY	
SEGMENT BETWEEN VAN NUYS BLVD AND OSBORNE ST.		SEGMENT BETWEEN OSBORNE ST AND VAN NUYS BLVD.	
AM	7985→	AM	←10985
MID–DAY	8340→	MID–DAY	←7600
PM	8505→	PM	←8435

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EXISTING VOLUMES ON FREEWAY SEGMENTS 15–28

DEVIL'S GATE DAM & RESERVOIR

FIGURE 3–5–14

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R1–EB 210 FREEWAY	
DIVERGE POINT	
BERKSHIRE PLACE OFF–RAMP	
AM	415►
MID–DAY	155►
PM	260►

R2–WB 210 FREEWAY	
MERGE POINT	
BERKSHIRE PLACE ON–RAMP	
AM	◄350
MID–DAY	◄220
PM	◄475

R3–EB 210 FREEWAY	
MERGE POINT	
BERKSHIRE PLACE ON–RAMP	
AM	265►
MID–DAY	135►
PM	405►

R4–WB 210 FREEWAY	
DIVERGE POINT	
BERKSHIRE PLACE OFF–RAMP	
AM	◄340
MID–DAY	◄130
PM	◄180

R5–EB 210 FREEWAY	
DIVERGE POINT	
WINDSOR AVENUE OFF–RAMP	
AM	660►
MID–DAY	380►
PM	705►

R6–WB 210 FREEWAY	
MERGE POINT	
WINDSOR AVENUE ON–RAMP	
AM	◄575
MID–DAY	◄330
PM	◄550

R7–EB 210 FREEWAY	
MERGE POINT	
WINDSOR AVENUE ON–RAMP	
AM	435►
MID–DAY	310►
PM	430►

R8–WB 210 FREEWAY	
DIVERGE POINT	
WINDSOR AVENUE OFF–RAMP	
AM	◄580
MID–DAY	◄200
PM	◄435

R9–EB 210 FREEWAY	
DIVERGE POINT	
EB I–210 FREEWAY AND WB SR–134 FREEWAY TRANSITION/OFF–RAMP	
AM	N/D►
MID–DAY	N/D►
PM	N/D►

R10–WB 210 FREEWAY	
MERGE POINT	
WB I–210 FREEWAY AND EB SR–134 FREEWAY TRANSITION/ ON–RAMP	
AM	◄N/D
MID–DAY	◄N/D
PM	◄N/D

R11–WB 134 FREEWAY	
MERGE POINT	
WB I–210 FREEWAY TRANSITION/ ON–RAMP	
AM	◄N/D
MID–DAY	◄N/D
PM	◄N/D

R12–EB 134 FREEWAY	
DIVERGE POINT	
EB I–210 FREEWAY TRANSITION/ OFF–RAMP	
AM	N/D►
MID–DAY	N/D►
PM	N/D►

R13–WB 134 FREEWAY	
DIVERGE POINT	
FIGUEROA ST/ SCHOLL CANYON RD OFF–RAMP	
AM	◄N/D
MID–DAY	◄N/D
PM	◄N/D

R14–EB 210 FREEWAY	
MERGE POINT	
FIGUEROA ST/ SCHOLL CANYON RD ON–RAMP	
AM	335►
MID–DAY	290►
PM	320►

R15–EB 210 FREEWAY	
MERGE POINT	
EB I–210 FREEWAY TRANSITION/ ON–RAMP	
AM	N/D►
MID–DAY	N/D►
PM	N/D►

R16–WB 210 FREEWAY	
DIVERGE POINT	
WB I–210 FREEWAY TRANSITION/ OFF–RAMP	
AM	◄N/D
MID–DAY	◄N/D
PM	◄N/D

R17–EB 210 FREEWAY	
DIVERGE POINT	
IRWINDALE AVENUE OFF–RAMP	
AM	1120►
MID–DAY	960►
PM	765►

R18–WB 210 FREEWAY	
MERGE POINT	
IRWINDALE AVENUE ON–RAMP	
AM	◄585
MID–DAY	◄420
PM	◄475

R19–WB 210 FREEWAY	
MERGE POINT	
IRWINDALE AVENUE SLIP ON–RAMP	
AM	◄610
MID–DAY	◄545
PM	◄475

R20–WB 210 FREEWAY	
MERGE POINT	
AZUSA AVENUE/FIRST STREET ON–RAMP	
AM	◄865
MID–DAY	◄360
PM	◄400

R21–WB 210 FREEWAY	
DIVERGE POINT	
SB SR–2 FREEWAY TRANSITION/ OFF–RAMP	
AM	◄1485
MID–DAY	◄660
PM	◄870

R22–EB 210 FREEWAY	
MERGE POINT	
NB SR–2 FREEWAY TRANSITION/ ON–RAMP	
AM	525►
MID–DAY	560►
PM	785►

R23–SB 2 FREEWAY	
MERGE POINT	
WB I–210 FREEWAY TRANSITION/ ON–RAMP	
AM	◄1485
MID–DAY	◄660
PM	◄870

R24–NB 2 FREEWAY	
DIVERGE POINT	
EB I–210 FREEWAY TRANSITION/ OFF–RAMP	
AM	525►
MID–DAY	560►
PM	785►

R25–SB 2 FREEWAY	
DIVERGE POINT	
EB SR–134 FREEWAY TRANSITION/ OFF–RAMP	
AM	N/D►
MID–DAY	N/D►
PM	N/D►

R26–NB 2 FREEWAY	
MERGE POINT	
WB AND EB SR–134 FREEWAY TRANSITION/ ON–RAMP	
AM	◄1220
MID–DAY	◄1610
PM	◄2370

R27–EB 134 FREEWAY	
MERGE POINT	
SB SR–2 FREEWAY TRANSITION/ ON–RAMP	
AM	N/D►
MID–DAY	N/D►
PM	N/D►

R28–WB 134 FREEWAY	
DIVERGE POINT	
NB SR–2 FREEWAY TRANSITION/ OFF–RAMP	
AM	◄1070
MID–DAY	◄740
PM	◄1180

R29–EB 134 FREEWAY	
DIVERGE POINT	
FIGUEROA ST/SCHOLL CANYON RD OFF–RAMP	
AM	405►
MID–DAY	310►
PM	510►

LEGEND

XXX► EXISTING VOLUMES
N/D► NO DATA AVAILABLE
*► CALCULATED VOLUME

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EXISTING VOLUMES RAMPS 1–29

DEVIL'S GATE DAM & RESERVOIR

FIGURE 3–5–15

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R30–WB 134 FREEWAY	
MERGE POINT	
FIGUEROA ST/SCHOLL CANYON RD ON–RAMP	
AM	◄ N/D
MID–DAY	◄ N/D
PM	◄ N/D

R31–WB 134 FREEWAY	
MERGE POINT	
SB SR–2 FREEWAY TRANSITION/ON–RAMP	
AM	◄ N/D
MID–DAY	◄ N/D
PM	◄ N/D

R32–EB 134 FREEWAY	
DIVERGE POINT	
NB SR–2 FREEWAY TRANSITION/ OFF–RAMP	
AM	2000 ►
MID–DAY	2260 ►
PM	3180 ►

R33–WB 134 FREEWAY	
DIVERGE POINT	
NB I–5 FREEWAY TRANSITION/ OFF–RAMP	
AM	◄ 2880
MID–DAY	◄ 2625
PM	◄ 2755

R34–EB 134 FREEWAY	
MERGE POINT	
SB I–5 FREEWAY TRANSITION/ ON–RAMP	
AM	2870 ►
MID–DAY	2630 ►
PM	2985 ►

R35–NB 5 FREEWAY	
MERGE POINT	
WB SR–134 FREEWAY TRANSITION/ ON–RAMP	
AM	◄ 2900
MID–DAY	◄ 2490
PM	◄ 2755

R36–SB 5 FREEWAY	
DIVERGE POINT	
EB SR–134 FREEWAY TRANSITION/ OFF–RAMP	
AM	N/D ►
MID–DAY	N/D ►
PM	N/D ►

R37–NB 5 FREEWAY	
DIVERGE POINT	
ROSCOE BLVD/GLEN OAKS BLVD OFF–RAMP	
AM	◄ 285
MID–DAY	◄ 295
PM	◄ 630

R38–SB 5 FREEWAY	
MERGE POINT	
ROSCOE BLVD/GLEN OAKS BLVD ON–RAMP	
AM	600 ►
MID–DAY	370 ►
PM	405 ►

R39–SB 5 FREEWAY	
MERGE POINT	
BRANFORD STREET ON–RAMP	
AM	N/D ►
MID–DAY	N/D ►
PM	N/D ►

R40–NB 5 FREEWAY	
DIVERGE POINT	
BRANFORD STREET OFF–RAMP	
AM	◄ N/D
MID–DAY	◄ N/D
PM	◄ N/D

R41–WB 210 FREEWAY	
DIVERGE POINT	
WHEATLAND AVE OFF–RAMP	
AM	◄ 70
MID–DAY	◄ 65
PM	◄ 110

R42–EB 210 FREEWAY	
MERGE POINT	
WHEATLAND AVE ON–RAMP	
AM	125 ►
MID–DAY	65 ►
PM	90 ►

R43–WB 210 FREEWAY	
DIVERGE POINT	
FOOTHILL BLVD/ OSBORNE STREET OFF–RAMP	
AM	◄ 230
MID–DAY	◄ 150
PM	◄ 320

R44–EB 210 FREEWAY	
MERGE POINT	
FOOTHILL BLVD/ OSBORNE STREET ON–RAMP	
AM	485 ►
MID–DAY	235 ►
PM	295 ►

R45–WB 210 FREEWAY	
DIVERGE POINT	
WB SR–118 FREEWAY TRANSITION/ OFF–RAMP	
AM	◄ N/D
MID–DAY	◄ N/D
PM	◄ N/D

R46–EB 210 FREEWAY	
MERGE POINT	
EB SR–118 FREEWAY TRANSITION/ ON–RAMP	
AM	N/D ►
MID–DAY	N/D ►
PM	N/D ►

R47–WB 118 FREEWAY	
MERGE POINT	
WB I–210 FREEWAY TRANSITION/ ON–RAMP	
AM	◄ N/D
MID–DAY	◄ N/D
PM	◄ N/D

R48–EB 118 FREEWAY	
DIVERGE POINT	
EB I–210 FREEWAY TRANSITION/ OFF–RAMP	
AM	N/D ►
MID–DAY	N/D ►
PM	N/D ►

R49–WB 118 FREEWAY	
DIVERGE POINT	
SB 1–5 FREEWAY TRANSITION/ OFF–RAMP	
AM	◄ N/D
MID–DAY	◄ N/D
PM	◄ N/D

R50–EB 118 FREEWAY	
MERGE POINT	
NB I–5 FREEWAY TRANSITION/ON–RAMP	
AM	N/D ►
MID–DAY	N/D ►
PM	N/D ►

R51–SB 5 FREEWAY	
MERGE POINT	
WB SR–118 FREEWAY TRANSITION/ON–RAMP	
AM	N/D ►
MID–DAY	N/D ►
PM	N/D ►

R52–NB 5 FREEWAY	
DIVERGE POINT	
EB SR–118 FREEWAY TRANSITION/ OFF–RAMP	
AM	◄ N/D
MID–DAY	◄ N/D
PM	◄ N/D

R53–SB 5 FREEWAY	
MERGE POINT	
OSBORNE STREET ON–RAMP	
AM	355 ►
MID–DAY	760 ►
PM	1085 ►

R54–NB 5 FREEWAY	
DIVERGE POINT	
OSBORNE STREET OFF–RAMP	
AM	◄ 410
MID–DAY	◄ 525
PM	◄ 615

LEGEND

XXX ► EXISTING VOLUMES
N/D ► NO DATA AVAILABLE
* ► CALCULATED VOLUME

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EXISTING VOLUMES RAMPS 30–54

DEVIL'S GATE DAM & RESERVOIR

FIGURE 3–5–16

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Existing Freeway Mainline HCM Analysis

Freeway mainline capacity analyses were conducted for the 28 freeway segments identified utilizing the methods as discussed in section 2 and the existing geometrics for the freeway Mainlines. *Table 3-5-1* presents the resulting HCM LOS of the freeway segments analyzed.

Table 3-5-1
Freeway Mainline Capacity Analysis – Existing Conditions
Traffic Impact Analysis

	Segment/Freeway Name	AM		MID-DAY		PM	
		Density	LOS	Density	LOS	Density	LOS
1	I-210 WB between Windsor Ave/Arroyo Blvd and Berkshire Place	11.9	B	8.9	A	14.6	B
2	I-210 EB between Windsor Ave/Arroyo Blvd and Berkshire Place	21.1	C	12.7	B	16.2	B
3	I-210 WB between Lincoln Avenue and Windsor Ave/Arroyo Blvd.	13.4	B	14.0	B	21.8	C
4	I-210 EB between Lincoln Avenue and Windsor Ave/Arroyo Blvd.	21.0	C	13.0	B	15.7	B
5	I-210 WB between the SR-134 Fwy and Mountain Street.	13.5	B	11.6	B	16.4	B
6	I-210 EB between the SR-134 Fwy and Mountain Street.	20.6	C	12.9	B	14.9	B
7	SR-134 WB between San Rafael Ave and Figueroa Street	24.5	C	16.2	B	21.7	C
8	SR-134 EB between San Rafael Ave and Figueroa Street	16.9	B	15.8	B	19.4	C
9	SR-134 WB between the I-210 Fwy and San Rafael Ave.	N/D*	N/D*	15.4	B	22.0	C
10	SR-134 EB between the I-210 Fwy and San Rafael Ave.	21.8	C	19.1	C	19.4	C
11	I-210 WB between the SR-134 Fwy and Lake Ave.	33.4	D	23.0	C	28.2	D
12	I-210 EB between the SR-134 Fwy and Lake Ave.	30.5	D	31.8	D	34.0	D
13	I-210 WB between the I-605 Fwy and Irwindale Avenue.	21.2	C	20.2	C	23.1	C
14	I-210 EB between the I-605 Fwy and Irwindale Avenue.	15.7	B	14.9	B	16.2	B
15	I-210 WB between Irwindale Avenue and Azusa Avenue.	19.8	C	19.5	C	27.1	D
16	I-210 EB between Irwindale Avenue and Azusa Avenue.	18.1	C	19.6	C	18.6	C
17	I-210 WB between Berkshire Place and Foothill Blvd.	13.7	B	13.9	B	22.3	C
18	I-210 EB between Berkshire Place and Foothill Blvd.	21.4	C	13.1	B	15.4	B
19	I-210 WB between Angeles Crest Hwy (SR-2 Hwy) and the SR-2 Fwy (Glendale Fwy)	12.4	B	12.2	B	20.5	C
20	I-210 EB between Angeles Crest Hwy (SR-2 Hwy) and the SR-2 Fwy (Glendale Fwy)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
21	SR-2 NB between the I-210 Fwy and Mountain Street.	7.6	A	15.4	B	16.7	B
22	SR-2 SB between the I-210 Fwy and Mountain Street.	23.7	C	7.7	A	10.3	A
23	SR-2 NB between Mountain Street and the SR-134 Fwy.	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
24	SR-2 SB between Mountain Street and the SR-134 Fwy.	23.3	D	9.5	A	11.9	B

Table 3-5-1 -Continued-
Freeway Mainline Capacity Analysis – Existing Conditions
Traffic Impact Analysis

	Segment/Freeway Name	AM		MID-DAY		PM	
		Density	LOS	Density	LOS	Density	LOS
25	SR-134 WB between the SR-2 Fwy and Figueroa Street.	18.2	C	14.3	B	18.3	C
26	SR-134 EB between the SR-2 Fwy and Figueroa Street.	18.1	C	18.8	C	21.2	C
27	SR-134 WB between the SR-2 Fwy and Glendale Avenue.	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
28	SR-134 EB between the SR-2 Fwy and Glendale Avenue.	19.7	C	22.3	C	28.0	D
29	SR-134 WB between San Fernando Street and Pacific Ave.	27.4	D	18.1	C	19.6	C
30	SR-134 EB between San Fernando Street and Pacific Ave.	30.9	D	29.3	D	32.9	D
31	SR-134 WB between San Fernando Street and the I-5 Freeway.	25.7	C	18.8	C	41.5	E
32	SR-134 EB between San Fernando Street and the I-5 Freeway.	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
33	I-5 SB between the SR-134 Fwy and Western Avenue.	25.9	C	30.7	D	30.0	D
34	I-5 NB between the SR-134 Fwy and Western Avenue.	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
35	I-5 NB between North Hollywood Way and Roscoe Blvd/Glenoaks Blvd.	20.3	C	22.9	C	25.5	C
36	I-5 SB between North Hollywood Way and Roscoe Blvd/Glenoaks Blvd.	23.6	C	18.7	C	17.2	B
37	I-5 SB between Sheldon Street/Laurel Canyon Blvd and the SR-170 Fwy	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
38	I-5 NB between Sheldon Street/Laurel Canyon Blvd and the SR-170 Fwy.	18.6	C	20.7	C	17.2	B
39	I-5 SB between the SR-170 Fwy and Branford Street.	256.1	F	39.8	E	48.3	F
40	I-5 NB between the SR-170 Fwy and Branford Street.	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
41	I-210WB between the SR-2 Fwy and Montrose Avenue.	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
42	I-210EB between the SR-2 Fwy and Montrose Avenue.	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
43	I-210 WB between Wheatland Ave and Sunland Blvd.	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
44	I-210 EB between Wheatland Ave and Sunland Blvd.	17.0	B	10.0	A	13.2	B
45	I-210 WB between Wheatland Ave and Foothill Blvd/Osborne Street.	14.6	B	12.8	B	26.2	D
46	I-210 EB between Wheatland Ave and Foothill Blvd/Osborne Street.	16.3	B	12.7	B	18.5	C
47	I-210 WB between Foothill Blvd/Osborne Street and the SR-118 Fwy.	15.0	B	12.3	B	21.9	C
48	I-210 EB between Foothill Blvd/Osborne Street and the SR-118 Fwy.	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
49	SR-118WB between the I-210 Fwy and Glenoaks Blvd.	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
50	SR-118EB between the I-210 Fwy and Glenoaks Blvd.	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*

Table 3-5-1 -Continued-
Freeway Mainline Capacity Analysis – Existing Conditions
Traffic Impact Analysis

Segment/Freeway Name		AM		MID-DAY		PM	
		Density	LOS	Density	LOS	Density	LOS
51	SR-118 WB between San Fernando Rd and the I-210 Fwy.	40.5	E	17.7	B	34.0	D
52	SR-118 EB between San Fernando Rd and the I-210 Fwy.	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
53	I-5 NB between the SR-118 Fwy and Van Nuys Blvd.	34.8	D	38.2	E	39.8	E
54	I-5 SB between the SR-118 Fwy and Van Nuys Blvd.	23.9	C	17.7	B	19.7	C
55	I-5 NB between Tierra Bella Street and Osborne Street.	38.2	E	42.3	E	42.9	E
56	I-5 SB between Tierra Bella Street and Osborne Street.	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*

(1) Density – Highway Capacity Manual (pc/mi/ln)
(2) HCM LOS - Highway Capacity Manual Level of Service
(*) N/D*- No Available Data from Caltrans
Source: **Hall & Foreman Inc**

As presented in *Table 3-5-1*, under the existing conditions most of the identified freeway segments are operating at an acceptable HCM LOS during the AM, Mid-day, and PM peak hours. The following five segments are operating at an unacceptable HCM LOS. The freeway segment SR-134 Westbound between San Fernando road and the I-5 Freeway (Haul Routes 5B, 6B, 7B, 8A) with an HCM LOS E for the PM peak hour. The freeway segment I-5 Southbound between SR-170 and Branford (Haul Route 8A) with an HCM LOS F for the AM and PM peak hours and HCM LOS E for the MIDDAY peak hour. The freeway segment SR-118 Westbound Freeway between San Fernando road and the I-210 Freeway (Haul Route 8B) with an HCM LOS E for the AM peak hours. The freeway segment I-5 Northbound between the SR-118 Westbound Freeway and Van Nuys Blvd (Haul Route 8B) with an HCM LOS E MID-DAY and P.M. peak hours. The freeway segment I-5 Northbound between Tierra Bella Street and Osborne Street (Haul Route 8B) with an HCM LOS E AM, MID-DAY and P.M. peak hours. Mitigation is recommended to improve the HCM LOS for these five freeway segments.

Existing Freeway Ramp HCM Analysis

A freeway ramp analysis was conducted for the 54 on and off-ramps identified utilizing the methods as discussed previously and using the existing geometrics. The resulting HCM LOS for the existing conditions of each ramp analyzed is presented in *Table 3-5-2*.

Table 3-5-2
Freeway Ramp Analysis – Existing Conditions
Traffic Impact Analysis

Intersection # / Routes / Name			AM		MID-DAY		PM	
			Density	LOS	Density	LOS	Density	LOS
1	1E, 1G	Berkshire Place and the Eastbound I-210 Freeway Off-ramp. (Diverge Point)	17.3	B	8.4	A	11.9	B
2	1E, 1H	Berkshire Place and the Westbound I-210 Freeway On-ramp.(Merge Point)	12.8	B	12.6	B	21.2	C
3	1A, 1C	Berkshire Place and the Eastbound I-210 Freeway On-ramp. (Merge Point)	25.1	C	18.6	B	22.9	C
4	1A, 1D	Berkshire Place and the Westbound I-210 Freeway Off-ramp. (Diverge Point)	21.4	C	20.5	C	29.0	D
5	1F, 1H	Windsor Ave/Arroyo Blvd and the Eastbound I-210 Freeway Off-ramp. (Diverge Point)	30.0	D	20.8	C	25.4	C
6	1F, 1G	Windsor Ave/Arroyo Blvd and the Westbound I-210 Freeway On-Ramp. (Merge Point)	21.0	C	16.3	B	23.2	C
7	1B, 1C	Windsor Ave/Arroyo Blvd and the Eastbound I-210 Freeway On-Ramp. (Merge Point)	16.4	B	9.7	A	12.0	B
8	1B, 1D	Windsor Ave/Arroyo Blvd and the Westbound I-210 Freeway Off-ramp. (Diverge Point)	8.9	A	3.5	A	11.0	B
9	4A	Southbound I-210 Fwy Transition Ramp to the Westbound SR-134 Fwy mainline and Eastbound I-210 Fwy mainline. (Diverge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
10	2A, 2B,3	Westbound I-210 Fwy and Eastbound SR-134 Fwy Transition Ramp to the Westbound I-210 Fwy mainline. (Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
11	2B	Westbound I-210 Fwy Transition Ramp to the Westbound SR-134 Fwy mainline. (Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
12	2B	Eastbound SR-134 Fwy Transition Ramp to the Eastbound I-210 Fwy mainline. (Diverge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
13	4A	Figueroa St/Scholl Canyon Road and the Westbound SR-134 Freeway Off-ramp. (Diverge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
14	4A	Figueroa St and the Eastbound SR-134 Freeway Eastbound On-ramp. (Merge Point)	22.7	C	21.6	C	23.6	C
15	2A, 3	Eastbound I-210 Fwy Transition Ramp to the Eastbound I-210 Fwy mainline.(Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
16	2A, 3	Westbound I-210 Fwy Transition Ramp to the Westbound I-210 Fwy mainline. (Diverge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
17	2A, 2B, 3,9	Irwindale Ave and the Eastbound I-210 Freeway Off-ramp. (Diverge Point)	2.2	A	-3.1	A	-2.8	A
18	2A,3	Irwindale Ave and the Westbound loop I-210 Freeway On-ramp. (Merge Point)	17.8	B	16.2	B	18.0	B
19	9	Irwindale Ave and the Westbound slip I-210 Freeway On-ramp. (Merge Point)	19.4	B	17.9	B	19.0	B
20	2B	First Street/Azusa Avenue and the Westbound I-210 Freeway On-ramp. (Merge Point)	21.4	C	17.3	B	22.1	C

Table 3-5-2 -Continued-
Freeway Ramp Analysis – Existing Conditions
Traffic Impact Analysis

Intersection # / Routes / Name			AM		MID-DAY		PM	
			Density	LOS	Density	LOS	Density	LOS
21	2B, 4B,5B, 6B, 7B, 8A	Westbound I-210 Fwy Transition Ramp to the Southbound SR-2 Fwy mainline. (Diverge Point)	14.8	A	20.6	A	13.2	A
22	2B, 4B,5B, 6B, 7B, 8A	Northbound SR-2 Fwy Transition Ramp to the Eastbound I-210 Fwy mainline. (Merge Point)	22.1	C	21.1	C	22.4	C
23	2B, 4B,5B, 6B, 7B, 8A	Westbound I-210 Fwy Transition Ramp to the Southbound SR-2 Fwy mainline. (Merge Point)	21.0	C	-0.9	A	3.2	A
24	2B, 4B,5B, 6B, 7B, 8A	Northbound SR-2 Fwy Transition Ramp to the Eastbound I-210 Fwy mainline. (Diverge Point)	18.2	B	12.4	B	16.2	B
25	2B, 4B	Southbound SR-2 Fwy Transition Ramp to the Eastbound SR-134 Fwy mainline. (Diverge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
26	2B, 4B,5B, 6B, 7B, 8A	Westbound and Eastbound SR-134 Fwy Transition Ramp to the Northbound SR-2 Fwy mainline. (Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
27	2B, 4B	Southbound SR-2 Fwy Transition Ramp to the Eastbound SR-134 Fwy mainline. (Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
28	2B,4B	Westbound SR-134 Fwy Transition Ramp to the Northbound SR-2 Fwy mainline. (Diverge Point)	25.0	C	20.5	C	25.8	C
29	4B	Figueroa Street and the Eastbound SR-134 Fwy Off-ramp. (Diverge Point)	27.4	C	25.7	C	29.2	D
30	4B	Figueroa Street and the Westbound SR-134 Fwy On-ramp. (Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
31	5B, 6B, 7B,8A	Southbound SR-2 Fwy Transition Ramp to the Westbound SR-134 Fwy mainline. (Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
32	5B, 6B, 7B,8A	Eastbound SR-134 Fwy Transition Ramp to the Northbound SR-2 Fwy mainline. (Diverge Point)	9.0	A	11.5	B	19.7	B
33	5B, 6B, 7B,8A	Westbound SR-134 Fwy Transition Ramp to the Northbound I-5 Fwy mainline. (Diverge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
34	5B,6B, 7B,8A	Southbound I-5 Fwy Transition Ramp to the Eastbound SR-134 Fwy mainline. (Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
35	5B,6B, 7B,8A	Westbound SR-134 Fwy Transition Ramp to the Northbound I-5 Fwy mainline. (Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
36	5B, 6B, 7B, 8A	Southbound I-5 Fwy Transition Ramp to the Eastbound SR-134 Fwy mainline. (Diverge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
37	5B, 6B, 7B	Roscoe Blvd/Glenoaks Blvd and the Northbound I-5 Fwy mainline Off-ramp. (Diverge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
38	5B, 6B, 7B	Roscoe Blvd/Glenoaks Blvd and the Southbound I-5 Fwy mainline On-ramp. (Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
39	8A	Branford Street and the Southbound I-5 Fwy mainline On-ramp. (Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*

Table 3-5-2 -Continued-
Freeway Ramp Analysis – Existing Conditions
Traffic Impact Analysis

Intersection # / Routes / Name			AM		MID-DAY		PM	
			Density	LOS	Density	LOS	Density	LOS
40	8A	Branford Street and the Northbound I-5 Fwy mainline Off-ramp. (Diverge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
41	5C,6C, 7C,8C	Wheatland Avenue and the Westbound I-210 Fwy mainline Off-Ramp. (Diverge Point)	21.0	C	19.0	B	31.6	D
42	5C,6C, 7C, 8C	Wheatland Avenue and the Eastbound I-210 Fwy mainline On-Ramp. (Merge Point)	22.8	C	15.2	B	18.8	B
43	5A, 6A, 7A	Foothill Blvd/Osborne Street and the Westbound I-210 Fwy mainline Off-ramp. (Diverge Point)	23.0	C	18.1	B	23.1	C
44	5A, 6A, 7A	Foothill Blvd/Osborne Street and the Eastbound I-210 Fwy mainline On-ramp. (Merge Point)	22.2	C	18.9	B	29.4	D
45	8B	Westbound I-210 Fwy Transition Ramp to the Westbound SR-118 Fwy mainline. (Diverge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
46	8B	Eastbound SR-118 Fwy Transition Ramp to the Eastbound I-210 Fwy mainline. (Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
47	8B	Westbound I-210 Fwy Transition Ramp to the Westbound SR-118 Fwy mainline. (Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
48	8B	Eastbound SR-118 Fwy Transition Ramp to the -Eastbound I-210 Fwy mainline. (Diverge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
49	8B	Westbound SR-118 Fwy Transition Ramp to the Southbound I-5 Fwy mainline. (Diverge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
50	8B	Northbound I-5 Fwy Transition Ramp to the Eastbound SR-118 Fwy mainline. (Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
51	8B	Westbound SR-118 Fwy Transition Ramp to the Southbound I-5 Fwy mainline. (Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
52	8B	Northbound I-5 Fwy Transition Ramp to the Eastbound SR-118 Fwy mainline (Diverge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
53	8B	Osborne Street and the Southbound I-5 Fwy mainline On-ramp. (Merge Point)	24.4	F	15.9	B	20.2	C
54	8B	Osborne Street and the Northbound I-5 Fwy mainline Off-ramp. (Diverge Point)	29.3	D	31.6	D	31.7	D

(1) Density – Highway Capacity Manual (pc/mi/ln)
(2) LOS - Highway Capacity Manual Level of Service
(N/D*)- No Data

Source: **Hall & Foreman Inc**

As presented in *Table 3-5-2*, under the existing conditions most of the freeway ramps are operating at an acceptable HCM LOS of D or better throughout the day, with the exception of the Southbound I-5 Freeway on-ramp at Osborne Street. The Southbound I-5 Freeway on-ramp at Osborne Street (Haul Route 8B) is currently operating at HCM LOS F during the AM peak hour. Mitigations are recommended for the ramp under the existing conditions.

4. EXISTING PLUS PROJECT CONDITIONS

Project Trip Generation

The sediment removal process is expected to generate 50 truck trips per hour. The expected increase of truck trips can result in an increase of traffic delay at the intersections along the truck haul routes. The intersections along the haul routes were analyzed to determine the impact the truck trips will have on the intersection operations. Employee trips to the site are also taken into account and are estimated. As presented in *Table 4-1*, the site is broken down to employee trips, truck trips. It is estimated that a total of 17 and 425 average non adjusted daily trips, for Autos and Trucks will travel to and from the project site, respectively.

Table 4-1 summarizes the estimated trucks trip generation for the project site during the AM and PM peak periods. It is recommended that *Table 4-1* be used as the trip generation for this project.

Table 4-1
Project Trip Generation
Traffic Scope – Devil's Gate Dam & Reservoir

			A.M. Peak Hour			Mid-Day Peak Hour			P.M. Peak Hour		
	Use	Daily	In	Out	Total	In	Out	Total	In	Out	Total
1	**Employees**										
		17	2	2	4	2	2	4	2	2	4
2	**Trucks**										
	Truck Trips	425	50	50	100	50	50	100	50	50	100
	PCE Adjustment		125	150	275	125	150	275	125	150	275
	Total	442	52	52	104	52	52	104	52	52	104
	Total Adjusted (w PCE)		127	152	279	127	152	279	127	152	279

Project Trip Distribution

The trucks trips will be distributed based on the capacity that the proposed haul routes have. The haul routes with the most capacity will have more truck trips assigned to it. It is anticipated that the majority of the truck trips will be to and from the dam site to the disposal sites in the City of Los Angeles. It is expected that the disposal sites in the City of Los Angeles will be assigned most of the truck trips due to the closer proximity to the dam site and more haul route options. It should also be noted that the Employees will only affect Site 1 of the project as the remainder of the travel will be the Truck Trips.

Project Traffic Analysis

Intersection capacity analyses for the existing plus project conditions were conducted for the 52 study intersections utilizing the methods as discussed in section 2 and using the existing intersection geometrics. The resulting HCM LOS for the existing plus project conditions of each intersection analyzed are presented in *Table 4-1-1* thru *Table 4-4-12*. The LOS of both the HCM and ICU methods are presented.

Section 1: Devil's Gate Dam and Reservoir (Site 1)

Haul Route 1A

The Haul Route 1A project trips, truck percentages and passenger car equivalent (PCE) project trips are illustrated in *Figure 4-1-1A* through *Figure 4-1-1C.* The existing plus project AM (7-9), MID-DAY (12-2), MID-DAY (2-4), PM (4-6) turn movement volumes, are provided in *Figure 4-1-1D.* For comparison the (PCE) existing plus project turn movement volumes are provided in *Figure 4-1-1E.*

Haul Route 1B

The Haul Route 1B project trips, truck percentages and passenger car equivalent (PCE) project trips are illustrated in *Figure 4-1-2A* through *Figure 4-1-2C.* The existing plus project AM (7-9), MID-DAY (12-2), MID-DAY (2-4), PM (4-6) turn movement volumes, are provided in *Figure 4-1-2D.* For comparison the (PCE) existing plus project turn movement volumes are provided in *Figure 4-1-2E.*

N/S STREET	1	E/W STREET
I-210 FWY EB RAMPS		BERKSHIRE PLACE

				0	0	0						
				0	0	0						
				0	0	0						
				0	0	0						
0	0	0	0					0	0	0	0	
0	0	0	0		TS			0	0	0	0	
0	0	0	0					55	55	55	55	
				0	0	0						
				0	0	0						
				0	0	0						
				0	0	0						

N/S STREET	2	E/W STREET
I-210 FWY WB RAMPS		BERKSHIRE PLACE

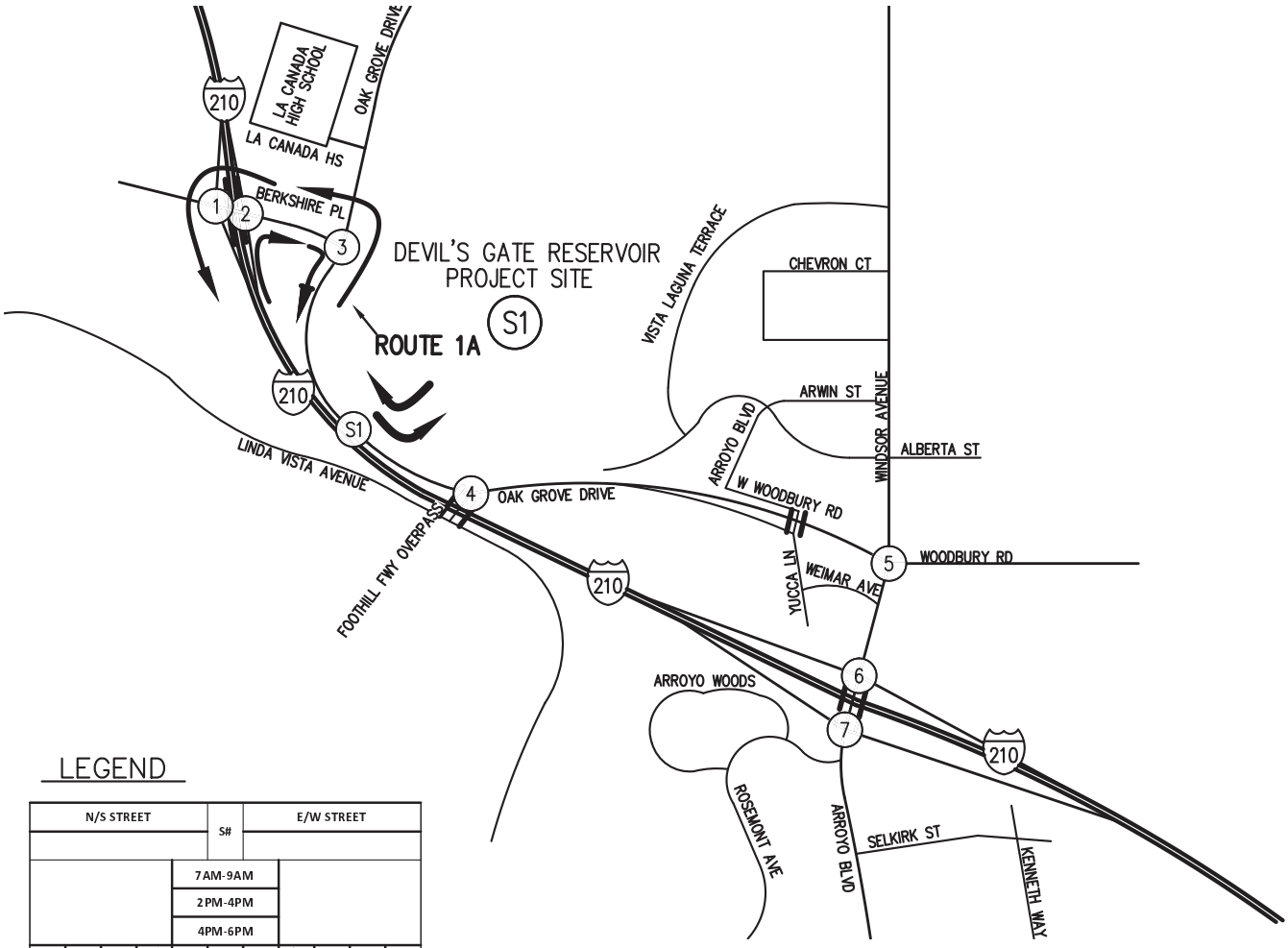
				0	0	0						
				0	0	0						
				0	0	0						
				0	0	0						
0	0	0	0					0	0	0	0	
0	0	0	0		TS			55	55	55	55	
0	0	0	0					0	0	0	0	
				0	0	55						
				0	0	55						
				0	0	55						
				0	0	55						

N/S STREET	3	E/W STREET
OAK GROVE DRIVE		BERKSHIRE PLACE

					0	0	0					
					0	0	0					
					0	0	0					
					0	0	0					
0	0	0	0					0	0	0	0	
0	0	0	0		TS			0	0	0	0	
55	55	55	55					0	0	0	0	
					55	0	0					
					55	0	0					
					55	0	0					
					55	0	0					

N

NOT TO SCALE



LEGEND

N/S STREET	S#	E/W STREET

				7AM-9AM								
				2PM-4PM								
				4PM-6PM								
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM		
				TS								
				7AM-9AM								
				2PM-4PM								
				4PM-6PM								

LEGEND

S# – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 1A PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE

4-1-1A

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 1\FIG 4-1-1A.dwg
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N/S STREET	1	E/W STREET
I-210 FWY EB RAMPS		BERKSHIRE PLACE

					5%	5%	5%								
					5%	0%	5%								
					5%	0%	5%								
					5%	5%	5%								
0%	0%	0%	0%						0%	0%	0%	0%			
5%	5%	5%	5%		TS				5%	5%	5%	5%			
5%	5%	5%	5%						30%	42%	22%	17%			
					0%	0%	0%								
					0%	0%	0%								
					0%	0%	0%								
					0%	0%	0%								

N/S STREET	2	E/W STREET
I-210 FWY WB RAMPS		BERKSHIRE PLACE

					0%	0%	0%								
					0%	0%	0%								
					0%	0%	0%								
					0%	0%	0%								
5%	5%	5%	5%						5%	5%	5%	5%			
5%	5%	5%	5%		TS				25%	5%	5%	5%			
0%	0%	0%	0%						0%	0%	0%	0%			
					5%	5%	20%								
					5%	5%	5%								
					5%	5%	5%								
					5%	5%	5%								

N/S STREET	3	E/W STREET
OAK GROVE DRIVE		BERKSHIRE PLACE

					5%	10%	0%								
					5%	10%	0%								
					5%	10%	0%								
					5%	10%	0%								
0%	5%	5%	5%						0%	0%	0%	0%			
0%	0%	0%	0%		TS				0%	0%	0%	0%			
42%	5%	5%	37%						0%	0%	0%	0%			
					30%	5%	0%								
					5%	5%	0%								
					5%	5%	0%								
					43%	5%	0%								

N

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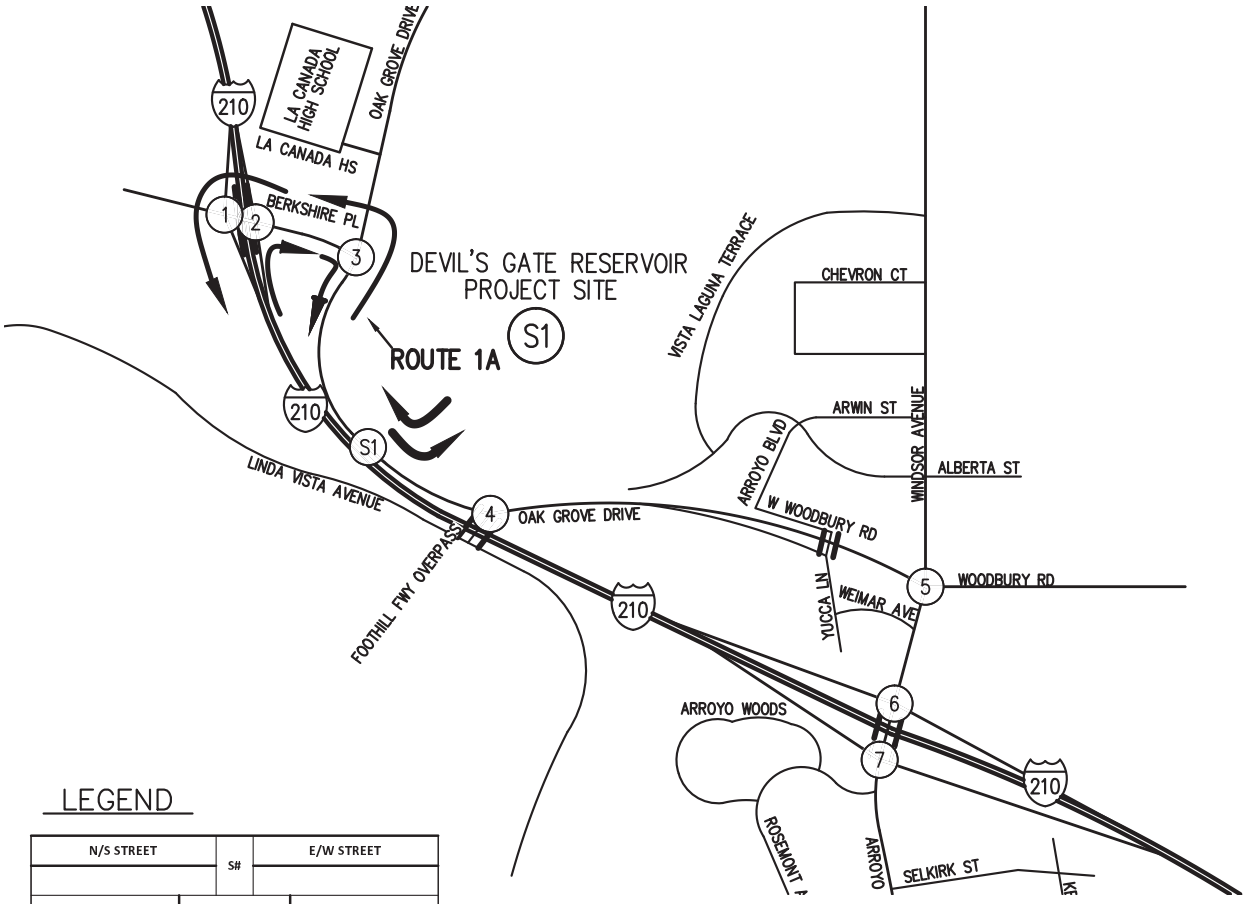

LEGEND

N/S STREET	S#	E/W STREET

					7AM-9AM										
					2PM-4PM										
					4PM-6PM										
7AM - 9AM	2PM - 4PM	4PM - 6PM							7AM - 9AM	2PM - 4PM	4PM - 6PM				
					TS										
					7AM-9AM										
					2PM-4PM										
					4PM-6PM										

LEGEND

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ROUTE 1A TRUCK PERCENTAGES

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-1-1B

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N/S STREET	1	E/W STREET
I-210 FWY EB RAMPS		BERKSHIRE PLACE

				0	0	0					
				0	0	0					
				0	0	0					
				0	0	0					
0	0	0	0					0	0	0	0
0	0	0	0		TS			0	0	0	0
0	0	0	0					165	165	165	165
				0	0	0					
				0	0	0					
				0	0	0					
				0	0	0					

N/S STREET	2	E/W STREET
I-210 FWY WB RAMPS		BERKSHIRE PLACE

				0	0	0					
				0	0	0					
				0	0	0					
				0	0	0					
0	0	0	0					0	0	0	0
0	0	0	0		TS			165	165	165	165
0	0	0	0					0	0	0	0
				0	0	140					
				0	0	140					
				0	0	140					
				0	0	140					

N/S STREET	3	E/W STREET
OAK GROVE DRIVE		BERKSHIRE PLACE

				0	0	0					
				0	0	0					
				0	0	0					
				0	0	0					
0	0	0	0					0	0	0	0
0	0	0	0		TS			0	0	0	0
140	140	140	140					0	0	0	0
				165	0	0					
				165	0	0					
				165	0	0					
				165	0	0					

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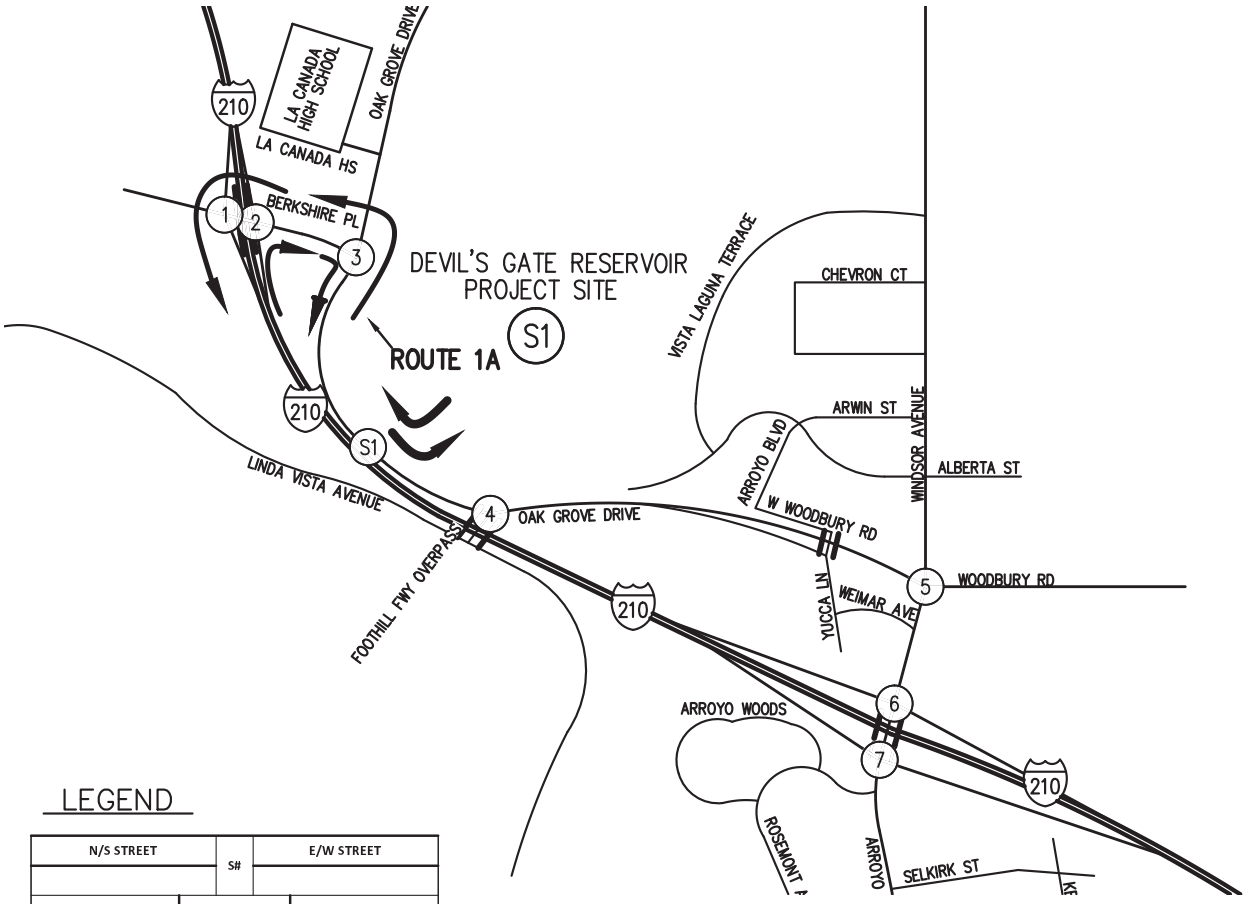

LEGEND

N/S STREET	S#	E/W STREET

				7AM-9AM							
				2PM-4PM							
				4PM-6PM							
7AM - 9AM	2PM - 4PM	4PM - 6PM					7AM - 9AM	2PM - 4PM	4PM - 6PM		
				TS							
				7AM-9AM							
				2PM-4PM							
				4PM-6PM							

LEGEND

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ROUTE 1A
PCE PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-1-1C

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 1\FIG 4-1-1C.dwg
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N/S STREET				1	E/W STREET			
I-210 FWY EB RAMPS					BERKSHIRE PLACE			
				85	5	325		
				45	5	105		
				60	5	205		
				90	5	165		
0	0	0	0				0	0	0	0
250	100	125	80		TS		120	110	165	160
125	55	80	70				195	135	260	390
				0	0	0				
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET				2	E/W STREET			
I-210 FWY WB RAMPS					BERKSHIRE PLACE			
				0	0	0		
				0	0	0		
				0	0	0		
				0	0	0		
95	50	50	65				255	170	170	410
285	175	175	180		TS		245	165	165	460
0	0	0	0				0	0	0	0
				60	5	330		
				55	5	125		
				65	5	170		
				95	5	135		

N/S STREET				3	E/W STREET			
OAK GROVE DRIVE					BERKSHIRE PLACE			
				360	70	0		
				215	100	0		
				745	140	0		
				750	245	0		
510	150	330	185				0	0	0	0
0	0	0	0		TS		0	0	0	0
125	115	100	140				0	0	0	0
				195	450	0		
				120	135	0		
				130	95	0		
				120	150	0		

N

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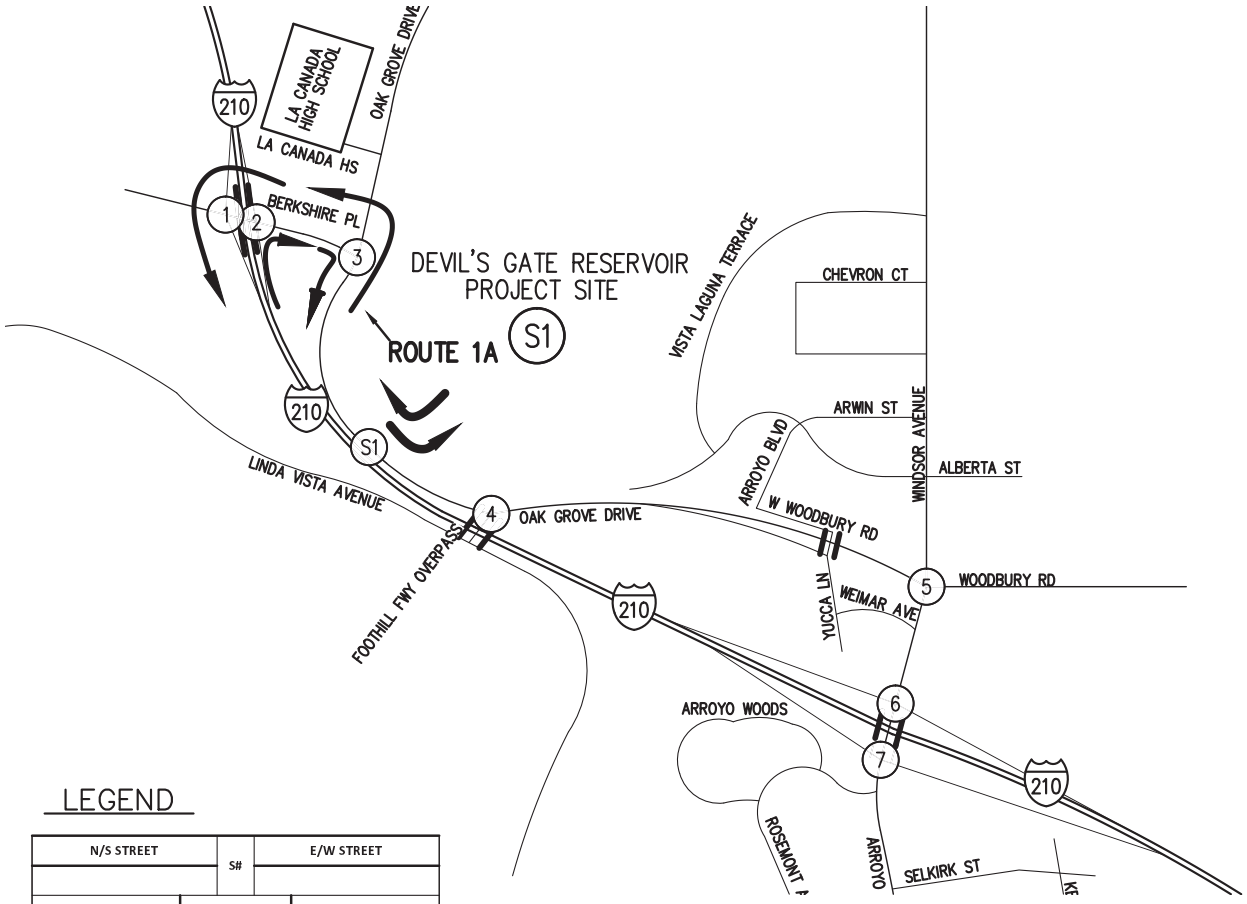

LEGEND

N/S STREET				S#	E/W STREET			
				7AM-9AM				
				2PM-4PM				
				4PM-6PM				
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS		7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM				
				2PM-4PM				
				4PM-6PM				

LEGEND

S# – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 1A
EXISTING + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-1-1D

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Last Opened: Oct 04, 2013 - 10:14am by: TMunoz

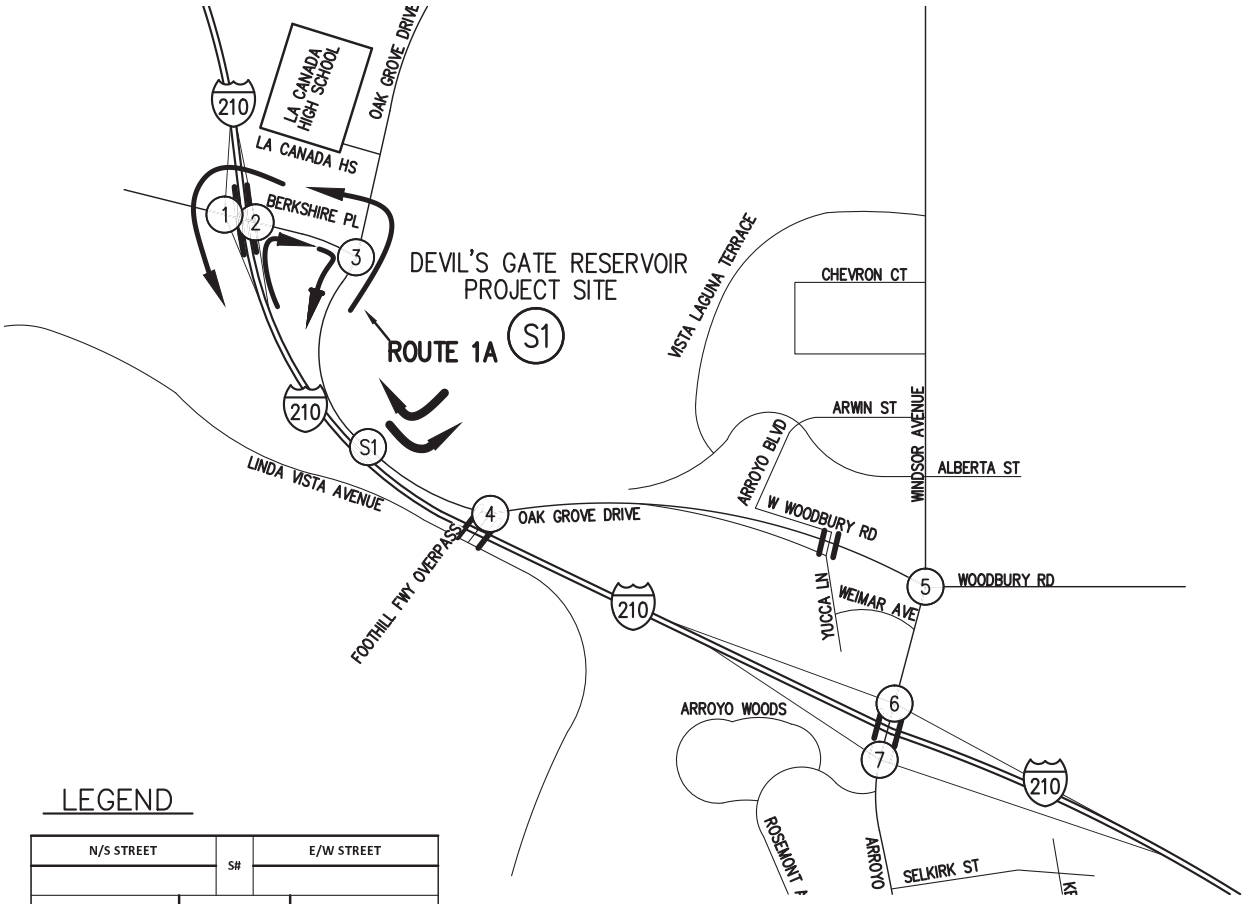
N/S STREET				1	E/W STREET			
I-210 FWY EB RAMPS					BERKSHIRE PLACE			
				90	5	335		
				50	5	115		
				70	5	235		
				90	5	165		
0	0	0	0				0	0	0	0
250	105	145	85		TS		125	115	190	160
130	60	90	70				310	255	400	500
				0	0	0				
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET				2	E/W STREET			
I-210 FWY WB RAMPS					BERKSHIRE PLACE			
				0	0	0		
				0	0	0		
				0	0	0		
				0	0	0		
95	55	75	65				270	170	580	410
295	185	315	180		TS		365	285	500	575
0	0	0	0				0	0	0	0
				60	5	425				
				60	5	210				
				75	0	275				
				95	5	225				

N/S STREET				3	E/W STREET			
OAK GROVE DRIVE					BERKSHIRE PLACE			
				365	85	0		
				225	115	0		
				855	180	0		
				755	250	0		
520	160	380	200				0	0	0	0
0	0	0	0		TS		0	0	0	0
210	205	190	225				0	0	0	0
				310	455	0				
				230	140	0				
				250	110	0				
				230	160	0				

N

NOT TO SCALE



LEGEND

N/S STREET				S#	E/W STREET			
				7AM-9AM				
				2PM-4PM				
				4PM-6PM				
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS		7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM				
				2PM-4PM				
				4PM-6PM				

LEGEND

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ROUTE 1A
PCE EXISTING + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-1-1E

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 1\FIG 4-1-1E.dwg
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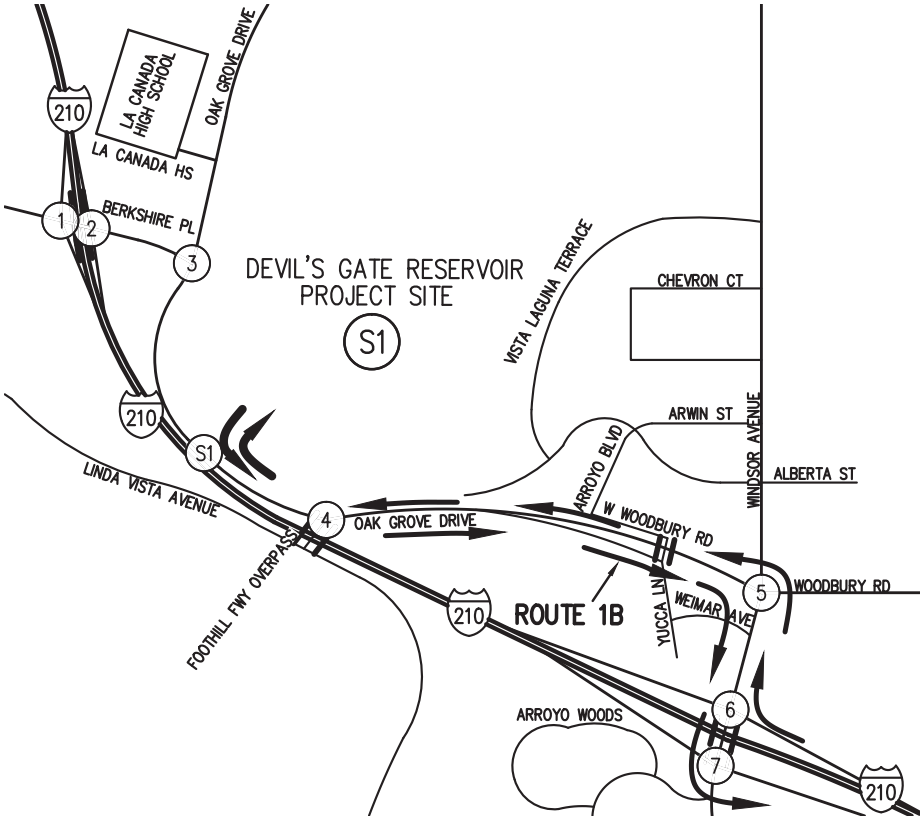
N/S STREET	4	E/W STREET
FOOTHILL FWY OVERPASS		OAK GROVE DRIVE

N/S STREET	5	E/W STREET
WINDSOR AVE		OAK GROVE DRIVE

N/S STREET	6	E/W STREET
WINDSOR AVE		I-210 FWY WB RAMPS

N/S STREET	7	E/W STREET
WINDSOR AVE		I-210 FWY EB RAMPS



NOT TO SCALE

LEGEND

N/S STREET	S#	E/W STREET

7AM-9AM
2PM-4PM
4PM-6PM

7AM - 9AM | 2PM - 4PM | 4PM - 6PM | TS | 7AM - 9AM | 2PM - 4PM | 4PM - 6PM

7AM-9AM
2PM-4PM
4PM-6PM

LEGEND

S# – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 1B PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-1-2A

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Last Opened: Oct 04, 2013 - 10:14am by: TMunoz

N/S STREET	4	E/W STREET
FOOTHILL FWY OVERPASS		OAK GROVE DRIVE

					0%	0%	0%					
					0%	0%	0%					
					0%	0%	0%					
					0%	0%	0%					
0%	0%	0%	0%						0%	0%	0%	0%
5%	10%	5%	5%		TS				5%	5%	5%	5%
5%	5%	5%	5%						5%	5%	5%	5%
					5%	0%	5%					
					5%	0%	5%					
					5%	0%	5%					
					5%	0%	5%					

N/S STREET	5	E/W STREET
WINDSOR AVE		OAK GROVE DRIVE

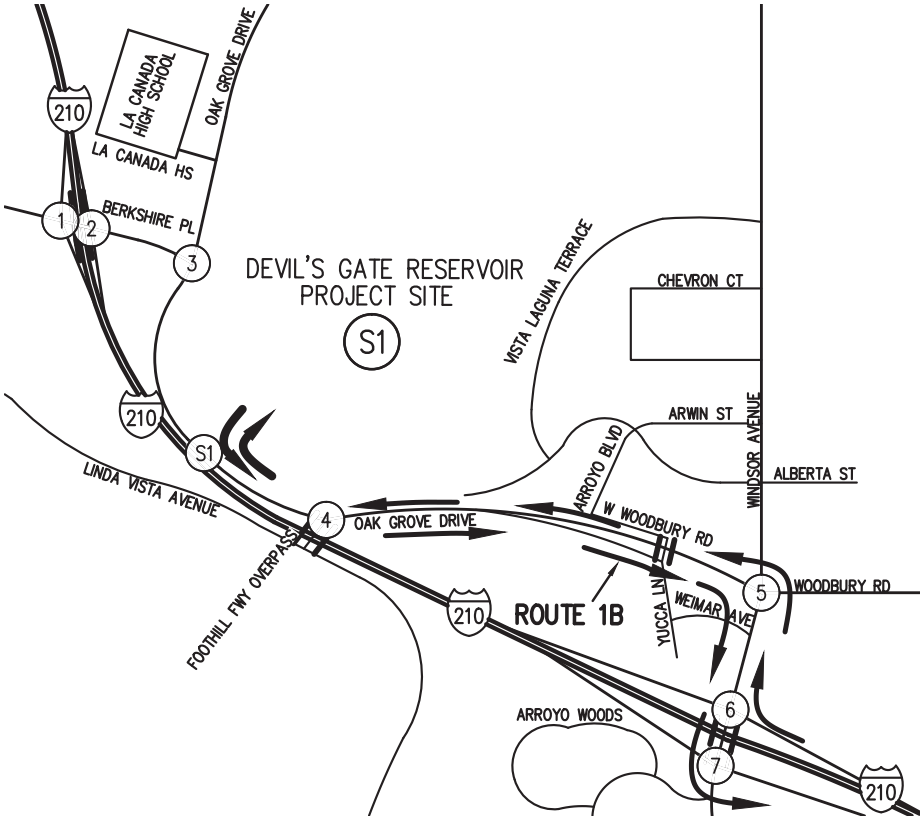
					5%	5%	5%					
					10%	5%	5%					
					10%	5%	5%					
					5%	5%	5%					
5%	5%	5%	5%						10%	15%	15%	5%
5%	5%	5%	5%		TS				5%	5%	5%	5%
5%	5%	5%	5%						5%	5%	5%	5%
					5%	5%	5%					
					5%	5%	5%					
					5%	5%	5%					
					5%	5%	5%					

N/S STREET	6	E/W STREET
WINDSOR AVE		I-210 FWY WB RAMPS

					5%	5%	0%					
					5%	5%	0%					
					5%	5%	0%					
					5%	5%	0%					
0%	0%	0%	0%						5%	5%	5%	5%
0%	0%	0%	0%		TS				5%	5%	5%	5%
0%	0%	0%	0%						5%	5%	5%	5%
					5%	5%	0%					
					5%	5%	0%					
					5%	5%	0%					
					5%	5%	0%					

N/S STREET	7	E/W STREET
WINDSOR AVE		I-210 FWY EB RAMPS

					0%	5%	5%					
					0%	5%	5%					
					0%	5%	5%					
					0%	5%	5%					
5%	5%	5%	5%						0%	0%	0%	0%
5%	5%	5%	5%		TS				0%	0%	0%	0%
5%	5%	5%	5%						0%	0%	0%	0%
					0%	5%	5%					
					0%	5%	5%					
					0%	5%	5%					
					0%	5%	5%					



NOT TO SCALE

LEGEND

N/S STREET	S#	E/W STREET

					7AM-9AM							
					2PM-4PM							
					4PM-6PM							
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM		
					TS							
					7AM-9AM							
					2PM-4PM							
					4PM-6PM							

LEGEND

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ROUTE 1B
TRUCK PERCENTAGES

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-1-2B

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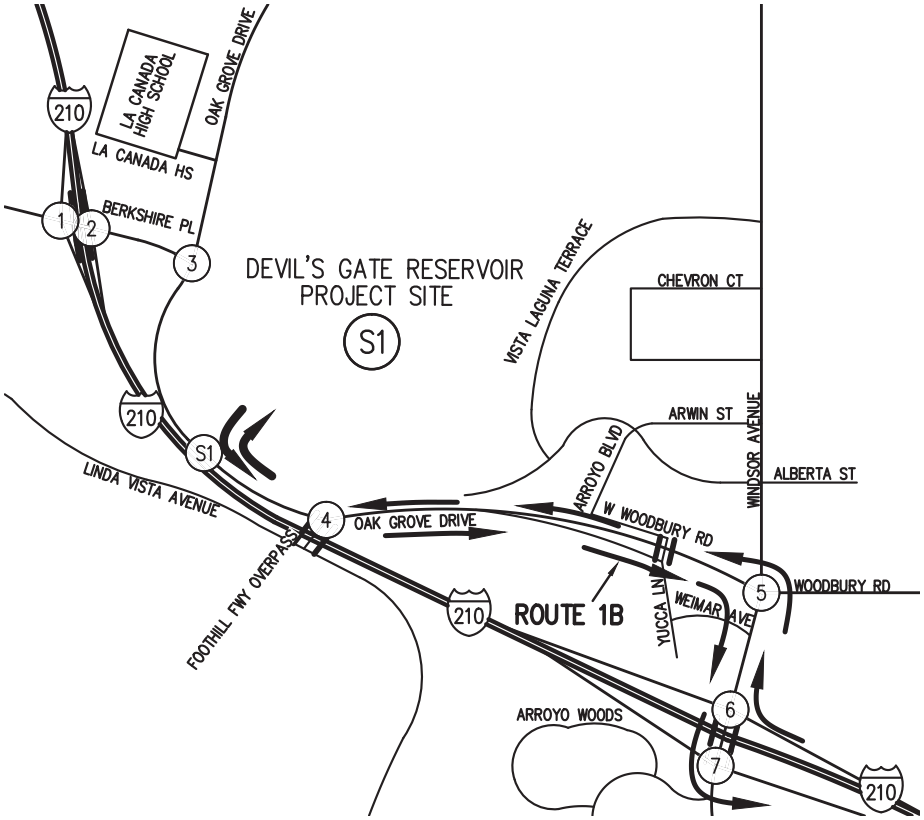
N/S STREET	4	E/W STREET
FOOTHILL FWY OVERPASS		OAK GROVE DRIVE

N/S STREET	5	E/W STREET
WINDSOR AVE		OAK GROVE DRIVE

N/S STREET	6	E/W STREET
WINDSOR AVE		I-210 FWY WB RAMPS

N/S STREET	7	E/W STREET
WINDSOR AVE		I-210 FWY EB RAMPS



N

NOT TO SCALE

LEGEND

N/S STREET	S#	E/W STREET
	7AM-9AM	
	2PM-4PM	
	4PM-6PM	
7AM - 9AM, 2PM - 4PM, 4PM - 6PM	TS	7AM - 9AM, 2PM - 4PM, 4PM - 6PM
	7AM-9AM	
	2PM-4PM	
	4PM-6PM	

LEGEND

S# – DISPOSAL SITE

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ROUTE 1B
PCE PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-1-2C

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 1\FIG 4-1-2C.dwg
Last Opened: Oct 04, 2013 - 10:14am by: TMunoz

N/S STREET	4	E/W STREET
FOOTHILL FWY OVERPASS		OAK GROVE DRIVE

					0	0	0					
					0	0	0					
					0	0	0					
					0	0	0					
0	0	0	0						0	0	0	0
170	160	195	320						520	225	180	185
50	65	60	80						180	60	40	60
					125	0	95					
					55	0	60					
					60	0	65					
					70	0	60					

N/S STREET	5	E/W STREET
WINDSOR AVE		OAK GROVE DRIVE

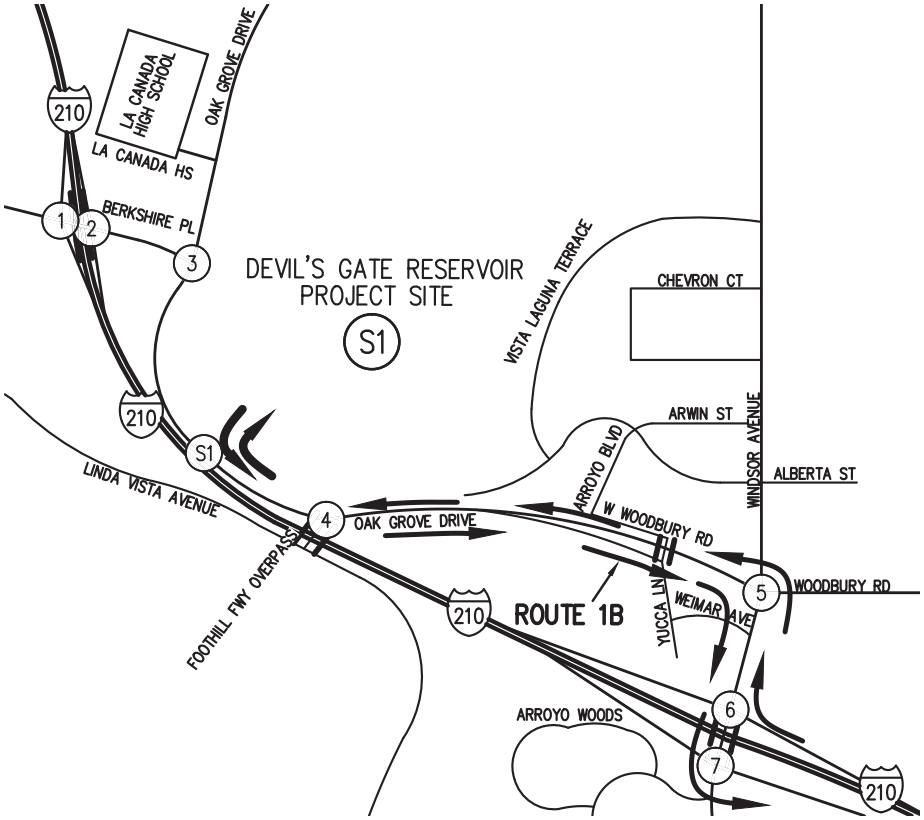
					35	590	55					
					10	300	40					
					20	340	40					
					5	525	60					
20	25	20	40						45	35	30	50
105	140	140	240						425	160	110	155
95	70	85	80						555	300	350	440
					125	605	455					
					85	290	365					
					75	355	435					
					80	495	570					

N/S STREET	6	E/W STREET
WINDSOR AVE		I-210 FWY WB RAMPS

					530	640	0					
					280	425	0					
					275	490	0					
					445	605	0					
0	0	0	0						625	330	390	460
0	0	0	0						5	5	5	5
0	0	0	0						5	20	20	25
					40	555	0					
					45	420	0					
					45	500	0					
					100	690	0					

N/S STREET	7	E/W STREET
WINDSOR AVE		I-210 FWY EB RAMPS

					0	190	470					
					0	100	350					
					0	160	335					
					0	165	470					
550	320	370	595						0	0	0	0
5	5	5	5						0	0	0	0
105	55	50	105						0	0	0	0
					0	130	20					
					0	145	15					
					0	160	15					
					0	195	15					



LEGEND

N/S STREET	S#	E/W STREET

					7AM-9AM							
					2PM-4PM							
					4PM-6PM							
7AM - 9AM	2PM - 4PM	4PM - 6PM							7AM - 9AM	2PM - 4PM	4PM - 6PM	
					TS							
					7AM-9AM							
					2PM-4PM							
					4PM-6PM							

LEGEND

S# – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 1B
EXISTING + PROJECT TRAFFIC

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-1-2D

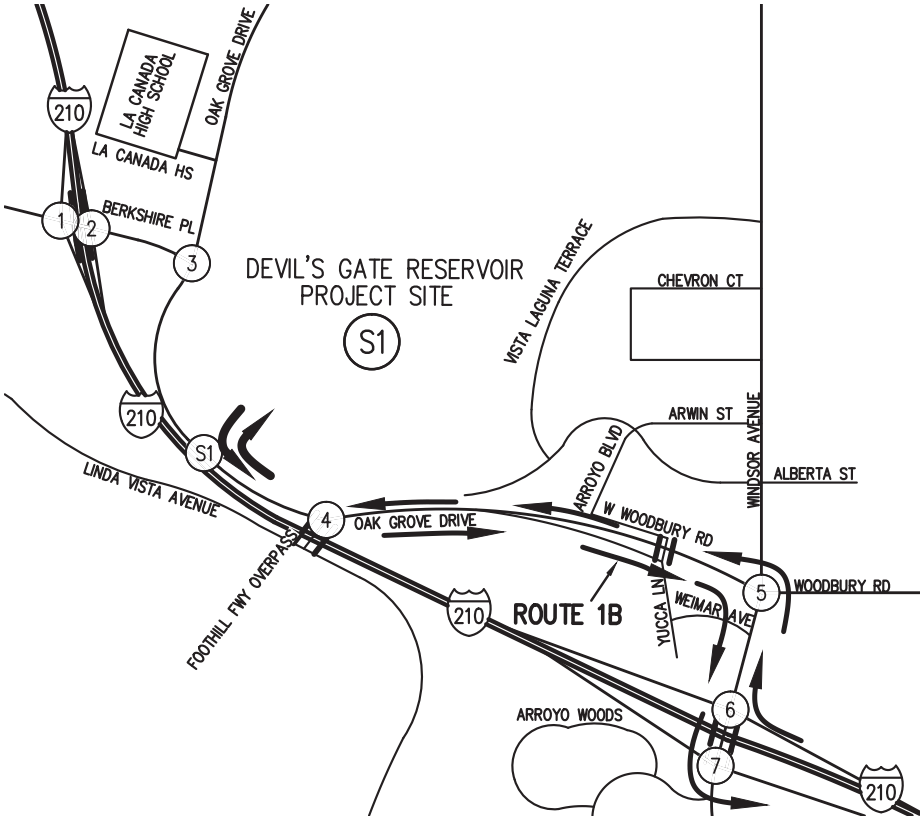
Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 1\FIG 4-1-2D.dwg
Last Opened: Oct 04, 2013 - 10:14am by: TMunoz

N/S STREET				4				E/W STREET			
FOOTHILL FWY OVERPASS								OAK GROVE DRIVE			
				0	0	0					
				0	0	0					
				0	0	0					
				0	0	0					
0	0	0	0					0	0	0	0
300	290	325	435		TS			620	325	285	280
55	65	70	80					190	65	45	60
				130	0	100					
				60	0	65					
				70	0	75					
				70	0	60					

N/S STREET				5				E/W STREET			
WINDSOR AVE								OAK GROVE DRIVE			
				35	600	55					
				15	310	40					
				25	390	40					
				0	525	60					
20	25	20	40					55	45	45	50
115	150	160	250		TS			440	165	125	175
210	180	200	190					575	330	405	445
				215	610	495					
				170	305	380					
				165	410	500					
				165	495	575					

N/S STREET				6				E/W STREET			
WINDSOR AVE								I-210 FWY WB RAMPS			
				535	760	0					
				300	545	0					
				315	665	0					
				455	715	0					
0	0	0	0					720	420	525	550
0	0	0	0		TS			0	0	5	5
0	0	0	0					5	20	20	25
				40	580	0					
				45	425	0					
				50	575	0					
				100	690	0					

N/S STREET				7				E/W STREET			
WINDSOR AVE								I-210 FWY EB RAMPS			
				0	200	585					
				0	105	465					
				0	185	485					
				0	165	580					
550	320	370	595					0	0	0	0
5	5	5	5		TS			0	0	0	0
105	55	50	105					0	0	0	0
				0	130	20					
				0	150	20					
				0	185	15					
				0	195	15					



LEGEND

N/S STREET				S#				E/W STREET			
				7AM-9AM							
				2PM-4PM							
				4PM-6PM							
7AM - 9AM	2PM - 4PM	4PM - 6PM			TS			7AM - 9AM	2PM - 4PM	4PM - 6PM	
				7AM-9AM							
				2PM-4PM							
				4PM-6PM							

LEGEND

S# – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 1B
PCE EXISTING + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-1-2E

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Table 4-1-1
Intersection Capacity Analysis – Existing + Project Conditions (Route 1A)
Traffic Impact Analysis - Site 1

Route1A		AM				MID-DAY (12-2 PM)				MID-DAY (2-4 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
1	Berkshire Place and I-210 Freeway Eastbound Ramps (3)	E	35.5	-	-	B	10.4	-	-	C	18.7	-	-	C	23.2	-	-
2	Berkshire Place and I-210 Freeway Westbound Ramps (3)	B	11.8	-	-	A	6.8	-	-	A	8.8	-	-	A	5.5	-	-
3	Oak Grove Drive and Berkshire Place	B	10.4	0.71	A	A	6.0	0.27	A	A	9.4	0.67	A	A	7.1	0.49	A

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
(5)V/C-HCM Volume to Capacity Ratio

Source: **Hall & Foreman, Inc.**

Table 4-1-2
Intersection Capacity Analysis – Existing + Project Conditions (Route 1B)
Traffic Impact Analysis - Site 1

Route1B		AM				MID-DAY (12-2 PM)				MID-DAY (2-4 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
4	Oak Grove Drive and Foothill Freeway Overpass (3)	C	17.5	-	-	A	9.6	-	-	A	9.5	-	-	B	11.4	-	-
5	Windsor Ave and Oak Grove Drive/Woodbury Rd	C	28.4	0.86	C	B	13.5	0.53	A	B	15.0	0.52	A	B	18.9	0.74	B
6	Windsor Ave/Arroyo Blvd and I-210 Freeway Westbound Ramps	A	9.5	0.60	A	A	5.9	0.31	A	A	6.8	0.37	A	A	7.5	0.41	B
7	Windsor Ave/Arroyo Blvd and I-210 Freeway Eastbound Ramps	C	24.9	0.53	A	C	23.7	0.39	A	C	21.6	0.39	A	C	23.6	0.57	A

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
(5)V/C-HCM Volume to Capacity Ratio

Source: **Hall & Foreman, Inc.**

Haul Routes 1A and 1B Analysis

As presented in *Table 4-1-1* and *Table 4-1-2*, under the existing plus project conditions for Site 1 (Routes 1A-1B) most of the study intersections are anticipated to continue to operate at acceptable HCM LOS of C or better for the AM, Mid-day (12-2 PM), Mid-day (2-4 PM), and PM peak hours. The intersection of Berkshire Place and I-210 Freeway Eastbound Ramps is anticipated to operate at HCM LOS E during the AM peak period, mitigation is recommended.

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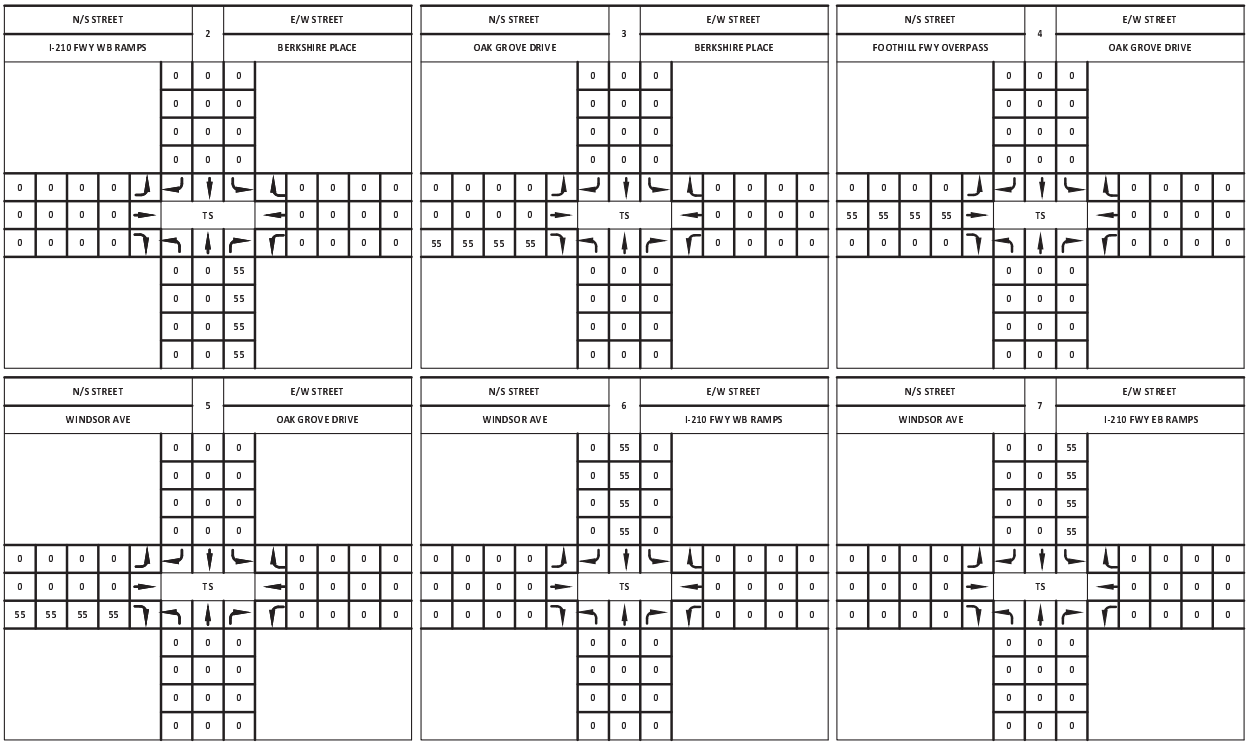
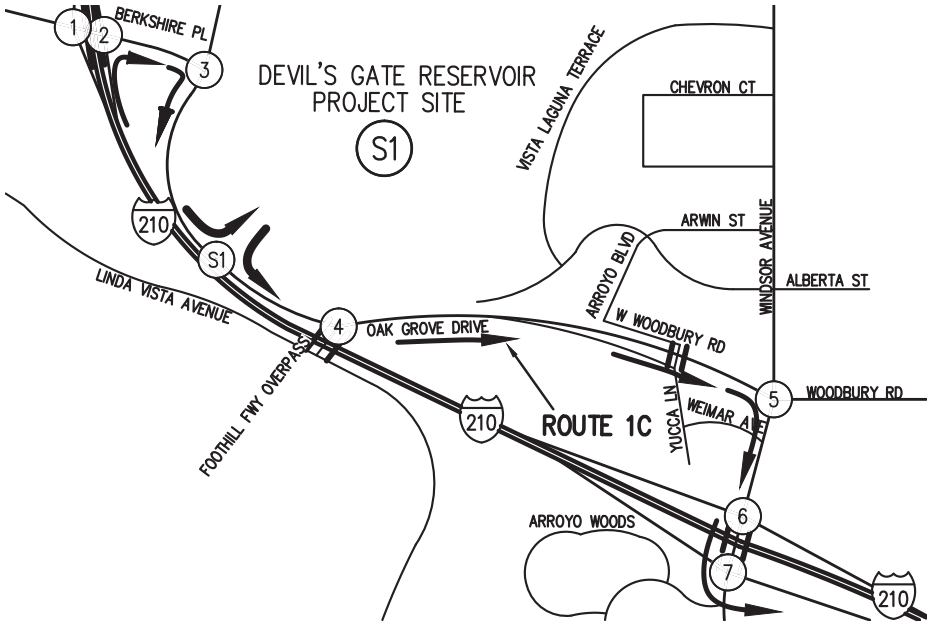
Haul Route 1C

The Haul Route 1C project trips, truck percentages and passenger car equivalent (PCE) project trips are illustrated in *Figure 4-1-3A* through *Figure 4-1-3C.* The existing plus project AM (7-9), MID-DAY (12-2), MID-DAY (2-4), PM (4-6) turn movement volumes, are provided in *Figure 4-1-3D.* For comparison the (PCE) existing plus project turn movement volumes are provided in *Figure 4-1-3E.*





LEGEND

N/S STREET	S#	E/W STREET
	7AM-9AM	
	2PM-4PM	
	4PM-6PM	
7AM - 9AM, 2PM - 4PM, 4PM - 6PM	TS	7AM - 9AM, 2PM - 4PM, 4PM - 6PM
	7AM-9AM	
	2PM-4PM	
	4PM-6PM	

LEGEND

S# – DISPOSAL SITE

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ROUTE 1C PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-1-3A

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 1\FIG 4-1-3A.dwg
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N/S STREET	2	E/W STREET
I-210 FWY WB RAMPS		BERKSHIRE PLACE

				0%	0%	0%						
				0%	0%	0%						
				0%	0%	0%						
				0%	0%	0%						
5%	5%	5%	5%					5%	5%	5%	5%	
5%	5%	5%	5%		TS			25%	5%	5%	5%	
0%	0%	0%	0%					0%	0%	0%	0%	
				5%	5%	20%						
				5%	5%	5%						
				5%	5%	5%						
				5%	5%	5%						

N/S STREET	3	E/W STREET
OAK GROVE DRIVE		BERKSHIRE PLACE

				5%	10%	0%						
				5%	10%	0%						
				5%	10%	0%						
				5%	5%	0%						
5%	5%	5%	5%					0%	0%	0%	0%	
0%	0%	0%	0%		TS			0%	0%	0%	0%	
42%	5%	5%	37%					0%	0%	0%	0%	
				5%	5%	0%						
				5%	5%	0%						
				5%	5%	0%						
				0%	5%	0%						

N/S STREET	4	E/W STREET
FOOTHILL FWY OVERPASS		OAK GROVE DRIVE

				0%	0%	0%						
				0%	0%	0%						
				0%	0%	0%						
				0%	0%	0%						
0%	0%	0%	0%					0%	0%	0%	0%	
5%	10%	5%	5%		TS			5%	5%	5%	5%	
5%	5%	5%	5%					5%	5%	5%	5%	
				5%	0%	5%						
				5%	0%	5%						
				5%	0%	5%						
				5%	0%	5%						

N/S STREET	5	E/W STREET
WINDSOR AVE		OAK GROVE DRIVE

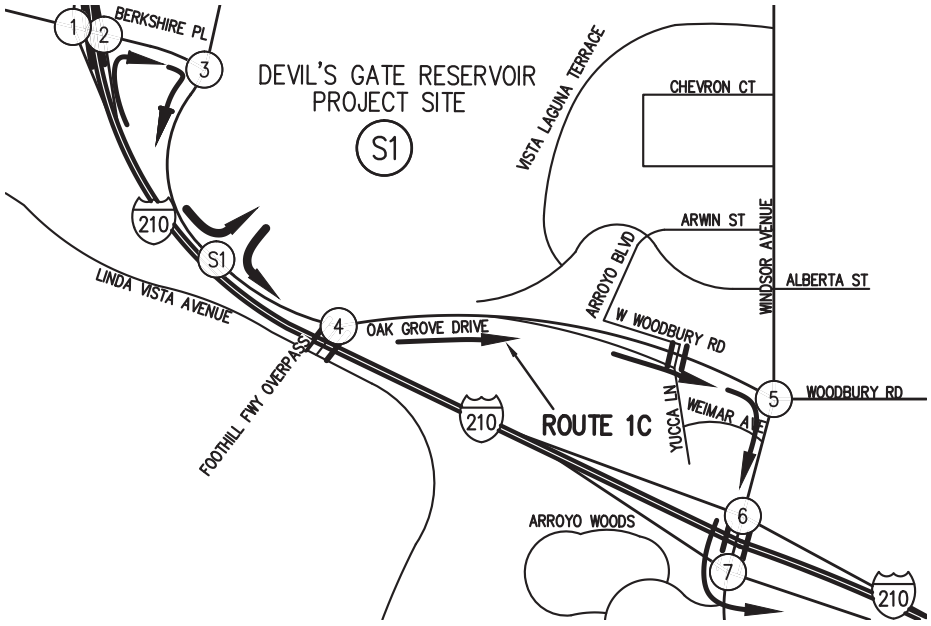
				5%	5%	5%						
				10%	5%	5%						
				10%	5%	5%						
				5%	5%	5%						
5%	5%	5%	5%					10%	15%	15%	5%	
5%	5%	5%	5%		TS			5%	5%	5%	5%	
5%	5%	5%	5%					5%	5%	5%	5%	
				5%	5%	5%						
				5%	5%	5%						
				5%	5%	5%						
				5%	5%	5%						

N/S STREET	6	E/W STREET
WINDSOR AVE		I-210 FWY WB RAMPS

				5%	5%	0%						
				5%	5%	0%						
				5%	5%	0%						
				5%	5%	0%						
0%	0%	0%	0%					5%	5%	5%	5%	
0%	0%	0%	0%		TS			5%	5%	5%	5%	
0%	0%	0%	0%					5%	5%	5%	5%	
				5%	5%	0%						
				5%	5%	0%						
				5%	5%	0%						
				5%	5%	0%						

N/S STREET	7	E/W STREET
WINDSOR AVE		I-210 FWY EB RAMPS

				0%	5%	5%						
				0%	5%	5%						
				0%	5%	5%						
				0%	5%	5%						
5%	5%	5%	5%					0%	0%	0%	0%	
5%	5%	5%	5%		TS			0%	0%	0%	0%	
5%	5%	5%	5%					0%	0%	0%	0%	
				0%	5%	5%						
				0%	5%	5%						
				0%	5%	5%						
				0%	5%	5%						



LEGEND

N/S STREET	S#	E/W STREET
	7AM-9AM	
	2PM-4PM	
	4PM-6PM	

7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM		
				TS								

	7AM-9AM	
	2PM-4PM	
	4PM-6PM	

LEGEND

S# – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 1C
TRUCK PERCENTAGES

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-1-3B

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 1\FIG 4-1-3B.dwg
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N/S STREET	2	E/W STREET
I-210 FWY WB RAMPS		BERKSHIRE PLACE

			0	0	0						
			0	0	0						
			0	0	0						
			0	0	0						
0	0	0	0					0	0	0	0
0	0	0	0		TS			0	0	0	0
0	0	0	0					0	0	0	0
			0	0	140						
			0	0	140						
			0	0	140						
			0	0	140						

N/S STREET	3	E/W STREET
OAK GROVE DRIVE		BERKSHIRE PLACE

			0	0	0						
			0	0	0						
			0	0	0						
			0	0	0						
0	0	0	0					0	0	0	0
0	0	0	0		TS			0	0	0	0
140	140	140	140					0	0	0	0
			0	0	0						
			0	0	0						
			0	0	0						
			0	0	0						

N/S STREET	4	E/W STREET
FOOTHILL FWY OVERPASS		OAK GROVE DRIVE

			0	0	0						
			0	0	0						
			0	0	0						
			0	0	0						
0	0	0	0					0	0	0	0
165	165	165	165		TS			0	0	0	0
0	0	0	0					0	0	0	0
			0	0	0						
			0	0	0						
			0	0	0						
			0	0	0						

N/S STREET	5	E/W STREET
WINDSOR AVE		OAK GROVE DRIVE

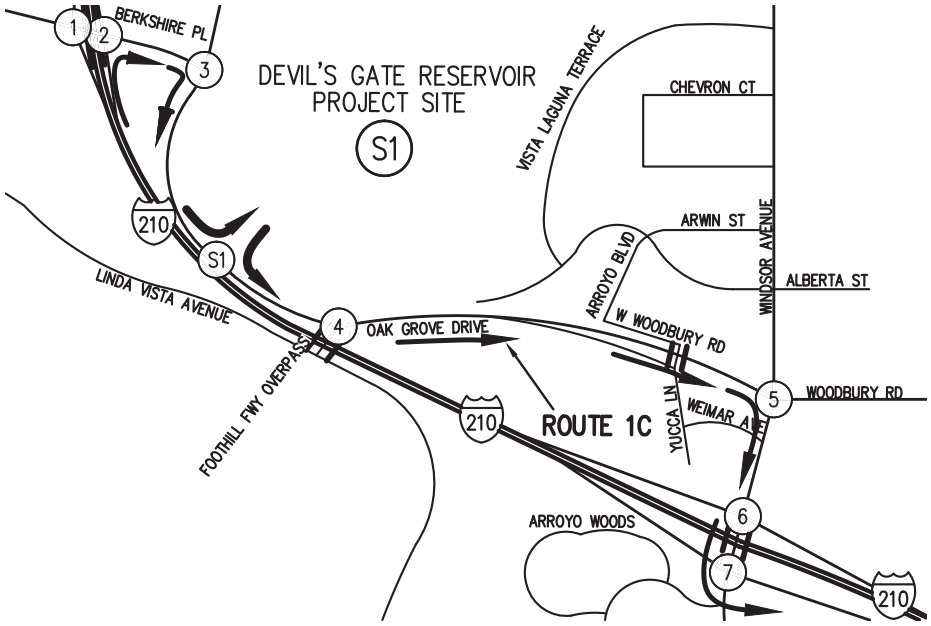
			0	0	0						
			0	0	0						
			0	0	0						
			0	0	0						
0	0	0	0					0	0	0	0
0	0	0	0		TS			0	0	0	0
165	165	165	165					0	0	0	0
			0	0	0						
			0	0	0						
			0	0	0						
			0	0	0						

N/S STREET	6	E/W STREET
WINDSOR AVE		I-210 FWY WB RAMPS

			0	165	0						
			0	165	0						
			0	165	0						
			0	165	0						
0	0	0	0					0	0	0	0
0	0	0	0		TS			0	0	0	0
0	0	0	0					0	0	0	0
			0	0	0						
			0	0	0						
			0	0	0						
			0	0	0						

N/S STREET	7	E/W STREET
WINDSOR AVE		I-210 FWY EB RAMPS

			0	0	165						
			0	0	165						
			0	0	165						
			0	0	165						
0	0	0	0					0	0	0	0
0	0	0	0		TS			0	0	0	0
0	0	0	0					0	0	0	0
			0	0	0						
			0	0	0						
			0	0	0						
			0	0	0						



LEGEND

N/S STREET	S#	E/W STREET

			7AM-9AM								
			2PM-4PM								
			4PM-6PM								
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM	
				TS							
			7AM-9AM								
			2PM-4PM								
			4PM-6PM								

LEGEND

S# – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 1C
PCE PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-1-3C

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 1\FIG 4-1-3C.dwg
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N/S STREET	2	E/W STREET
I-210 FWY WB RAMPS		BERKSHIRE PLACE

				0	0	0					
				0	0	0					
				0	0	0					
				0	0	0					
95	50	50	65					255	170	170	410
285	175	175	180		TS			190	110	110	405
0	0	0	0					0	0	0	0
				60	5	330					
				55	5	125					
				65	5	170					
				95	5	135					

N/S STREET	3	E/W STREET
OAK GROVE DRIVE		BERKSHIRE PLACE

				360	70	0					
				215	100	0					
				745	140	0					
				750	245	0					
510	150	330	185					0	0	0	0
0	0	0	0		TS			0	0	0	0
125	115	100	140					0	0	0	0
				140	450	0					
				65	135	0					
				75	95	0					
				65	150	0					

N/S STREET	4	E/W STREET
FOOTHILL FWY OVERPASS		OAK GROVE DRIVE

				0	0	0					
				0	0	0					
				0	0	0					
				0	0	0					
0	0	0	0					0	0	0	0
170	160	195	320					465	170	125	130
50	65	60	80					180	60	40	60
				125	0	95					
				55	0	60					
				60	0	65					
				70	0	60					

N/S STREET	5	E/W STREET
WINDSOR AVE		OAK GROVE DRIVE

				35	590	55					
				10	300	40					
				20	340	40					
				5	525	60					
20	25	20	40					45	35	30	50
105	140	140	240		TS			425	160	110	155
95	70	85	80					555	300	350	440
				70	605	455					
				30	290	365					
				20	355	435					
				25	495	570					

N/S STREET	6	E/W STREET
WINDSOR AVE		I-210 FWY WB RAMPS

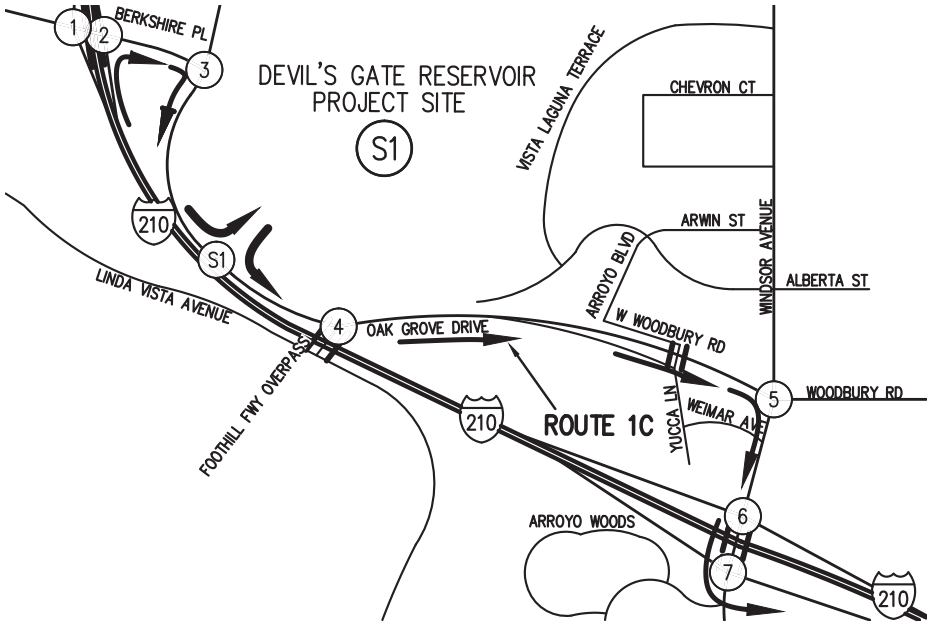
				530	640	0					
				280	425	0					
				275	490	0					
				445	605	0					
0	0	0	0					570	275	335	405
0	0	0	0		TS			5	5	5	5
0	0	0	0					5	20	20	25
				40	555	0					
				45	420	0					
				45	500	0					
				100	690	0					

N/S STREET	7	E/W STREET
WINDSOR AVE		I-210 FWY EB RAMPS

				0	190	470					
				0	100	350					
				0	160	335					
				0	165	470					
550	320	370	595					0	0	0	0
5	5	5	5		TS			0	0	0	0
105	55	50	105					0	0	0	0
				0	130	20					
				0	145	15					
				0	160	15					
				0	195	15					

N

NOT TO SCALE



LEGEND

N/S STREET	S#	E/W STREET

				7AM-9AM							
				2PM-4PM							
				4PM-6PM							
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM	
				TS							
				7AM-9AM							
				2PM-4PM							
				4PM-6PM							

LEGEND

S# – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 1C
EXISTING + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-1-3D

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 1\FIG 4-1-3D.dwg
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N/S STREET	2	E/W STREET
I-210 FWY WB RAMPS		BERKSHIRE PLACE
	0 0 0	
	0 0 0	
	0 0 0	
	0 0 0	
95 55 75 65		270 170 580 410
295 185 315 180	TS	200 120 335 410
0 0 0 0		0 0 0 0
	60 5 425	
	60 5 210	
	75 5 275	
	95 5 225	

N/S STREET	3	E/W STREET
OAK GROVE DRIVE		BERKSHIRE PLACE
	365 85 0	
	225 115 0	
	855 180 0	
	755 250 0	
520 160 380 200		0 0 0 0
0 0 0 0	TS	0 0 0 0
210 205 190 225		0 0 0 0
	145 455 0	
	65 140 0	
	85 110 0	
	65 160 0	

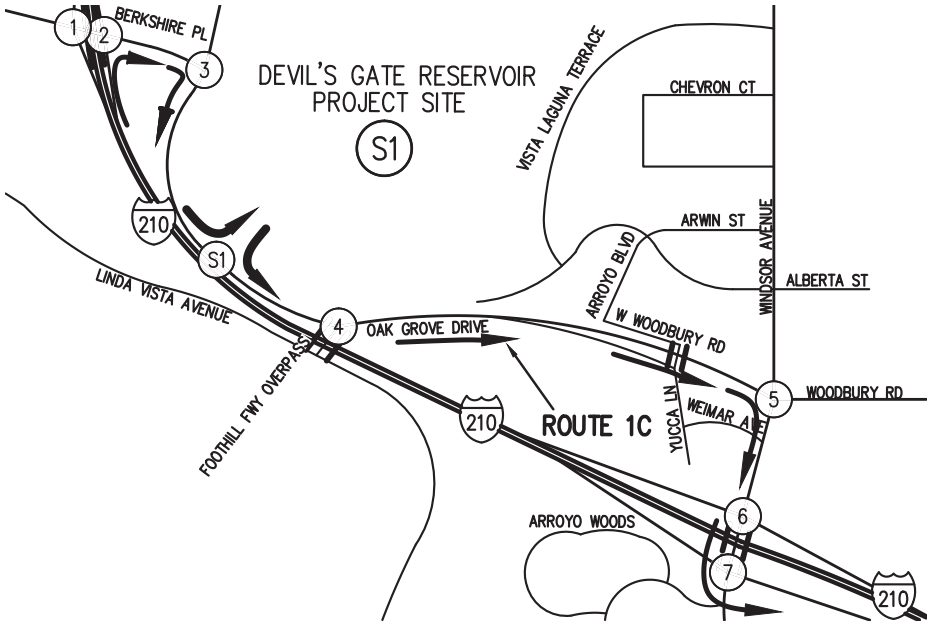
N/S STREET	4	E/W STREET
FOOTHILL FWY OVERPASS		OAK GROVE DRIVE
	0 0 0	
	0 0 0	
	0 0 0	
	0 0 0	
0 0 0 0		0 0 0 0
300 290 325 435		480 185 145 140
55 65 70 80		190 65 45 60
	130 0 100	
	60 0 65	
	70 0 75	
	70 0 60	

N/S STREET	4	E/W STREET
FOOTHILL FWY OVERPASS		OAK GROVE DRIVE
	0 0 0	
	0 0 0	
	0 0 0	
	0 0 0	
0 0 0 0		0 0 0 0
300 290 325 435		480 185 145 140
55 65 70 80		190 65 45 60
	130 0 100	
	60 0 65	
	70 0 75	
	70 0 60	

N/S STREET	6	E/W STREET
WINDSOR AVE		I-210 FWY WB RAMPS
	535 760 0	
	300 545 0	
	315 665 0	
	455 715 0	
0 0 0 0		580 280 385 410
0 0 0 0	TS	5 5 5 5
0 0 0 0		5 20 20 25
	40 580 0	
	45 425 0	
	50 575 0	
	100 690 0	

N/S STREET	7	E/W STREET
WINDSOR AVE		I-210 FWY EB RAMPS
	0 200 585	
	0 105 465	
	0 185 485	
	0 165 580	
550 320 370 595		0 0 0 0
5 5 5 5	TS	0 0 0 0
105 55 50 105		0 0 0 0
	0 130 20	
	0 150 20	
	0 185 15	
	0 195 15	

NOT TO SCALE



LEGEND

N/S STREET	S#	E/W STREET
	7AM-9AM	
	2PM-4PM	
	4PM-6PM	
7AM - 9AM / 2PM - 4PM / 4PM - 6PM	TS	7AM - 9AM / 2PM - 4PM / 4PM - 6PM
	7AM-9AM	
	2PM-4PM	
	4PM-6PM	

LEGEND

S# – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 1C
PCE EXISTING + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-1-3E

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 1\FIG 4-1-3E.dwg
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Table 4-1-3
Intersection Capacity Analysis – Existing + Project Conditions (Route 1C)
Traffic Impact Analysis - Site 1

Route1C		AM				MID-DAY (12-2 PM)				MID-DAY (2-4 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
2	Berkshire Place and I-210 Freeway Westbound Ramps (3)	B	11.8	-	-	A	6.8	-	-	A	8	-	-	A	5.7	-	-
3	Oak Grove Drive and Berkshire Place	B	10	0.6	A	A	5.9	0.2	A	A	7.7	0.52	A	A	6.6	0.49	A
4	Oak Grove Drive and Foothill Freeway Overpass (3)	C	15.8	-	-	A	9.2	-	-	A	9.2	-	-	B	10.9	-	-
5	Windsor Ave and Oak Grove Drive/Woodbury Rd	C	23.9	0.84	C	B	16.9	0.48	A	B	16.8	0.55	A	B	13.2	0.59	B
6	Windsor Ave/Arroyo Blvd and I-210 Freeway Westbound Ramps	A	8.7	0.57	A	A	5.5	0.31	A	A	6	0.35	A	A	7	0.41	B
7	Windsor Ave/Arroyo Blvd and I-210 Freeway Eastbound Ramps	C	24.9	0.53	A	C	23.7	0.39	A	C	21.6	0.39	A	C	23.6	0.57	A

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
(5)V/C-HCM Volume to Capacity Ratio

Source: **Hall & Foreman, Inc.**

Haul Route 1C Analysis

As presented in *Table 4-1-3*, under the existing plus project conditions for Site 1 (Routes 1C) all intersections are anticipated to continue to operate at acceptable HCM LOS of C or better for the AM, Mid-day (12-2 PM), Mid-day (2-4 PM), and PM peak hours.

Haul Route 1D

The Haul Route 1D project trips, truck percentages and passenger car equivalent (PCE) project trips are illustrated in *Figure 4-1-4A* through *Figure 4-1-4C.* The existing plus project AM (7-9), MID-DAY (12-2), MID-DAY (2-4), PM (4-6) turn movement volumes, are provided in *Figure 4-1-4D.* For comparison the (PCE) existing plus project turn movement volumes are provided in *Figure 4-1-4E.*

N/S STREET	1	E/W STREET
I-210 FWY EB RAMPS		BERKSHIRE PLACE

N/S STREET	2	E/W STREET
I-210 FWY WB RAMPS		BERKSHIRE PLACE

N/S STREET	3	E/W STREET
OAK GROVE DRIVE		BERKSHIRE PLACE

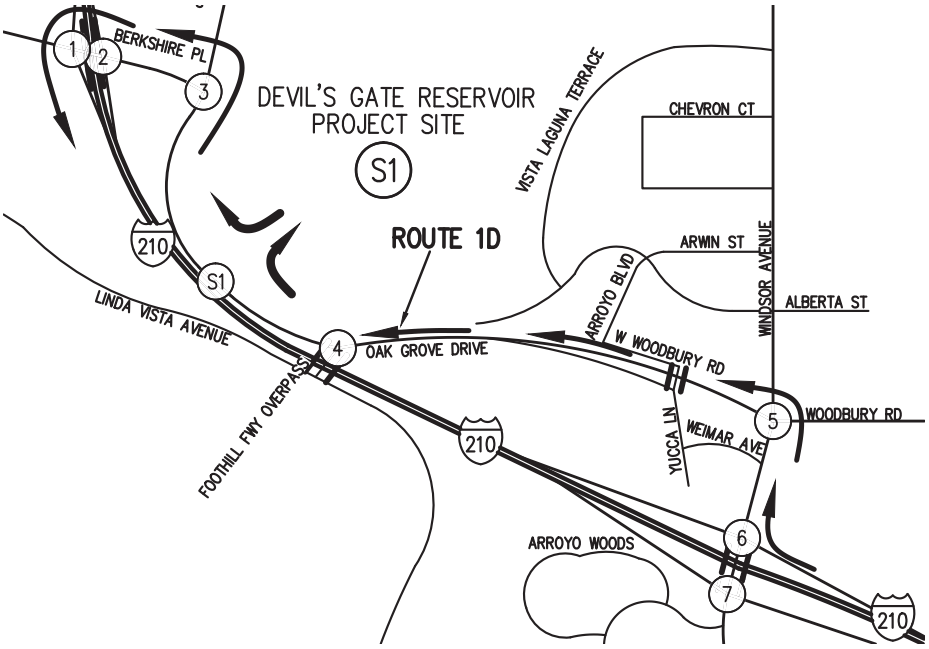
N/S STREET	4	E/W STREET
FOOTHILL FWY OVERPASS		OAK GROVE DRIVE

N/S STREET	5	E/W STREET
WINDSOR AVE		OAK GROVE DRIVE

N/S STREET	6	E/W STREET
WINDSOR AVE		I-210 FWY WB RAMPS

N

NOT TO SCALE



LEGEND

N/S STREET	S#	E/W STREET
	7AM-9AM	
	2PM-4PM	
	4PM-6PM	
7AM - 9AM, 2PM - 4PM, 4PM - 6PM	TS	7AM - 9AM, 2PM - 4PM, 4PM - 6PM
	7AM-9AM	
	2PM-4PM	
	4PM-6PM	

LEGEND

S# – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 1D
PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-1-4A

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 1\FIG 4-1-4A.dwg
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N/S STREET	1	E/W STREET
I-210 FWY EB RAMPS		BERKSHIRE PLACE

				5%	5%	5%						
				5%	5%	5%						
				5%	5%	5%						
				5%	5%	5%						
0%	0%	0%	0%					0%	0%	0%	0%	
5%	5%	5%	5%		TS			5%	5%	5%	5%	
5%	5%	5%	5%					30%	42%	22%	17%	
				0%	0%	0%						
				0%	0%	0%						
				0%	0%	0%						
				0%	0%	0%						

N/S STREET	2	E/W STREET
I-210 FWY WB RAMPS		BERKSHIRE PLACE

				0%	0%	0%						
				0%	0%	0%						
				0%	0%	0%						
				0%	0%	0%						
5%	5%	5%	5%					5%	5%	5%	5%	
5%	5%	5%	5%		TS			25%	5%	5%	5%	
0%	0%	0%	0%					0%	0%	0%	0%	
				5%	5%	5%						
				5%	5%	5%						
				5%	5%	5%						
				5%	5%	5%						

N/S STREET	3	E/W STREET
OAK GROVE DRIVE		BERKSHIRE PLACE

				5%	10%	0%						
				5%	10%	0%						
				5%	10%	0%						
				5%	5%	0%						
5%	5%	5%	5%					0%	0%	0%	0%	
0%	0%	0%	0%		TS			0%	0%	0%	0%	
5%	5%	5%	5%					0%	0%	0%	0%	
				30%	5%	0%						
				5%	5%	0%						
				5%	5%	0%						
				43%	5%	0%						

N/S STREET	4	E/W STREET
FOOTHILL FWY OVERPASS		OAK GROVE DRIVE

				0%	0%	0%						
				0%	0%	0%						
				0%	0%	0%						
				0%	0%	0%						
0%	0%	0%	0%					0%	0%	0%	0%	
5%	10%	10%	5%		TS			5%	5%	5%	5%	
5%	5%	5%	5%					5%	5%	5%	5%	
				5%	0%	5%						
				5%	0%	5%						
				5%	0%	5%						
				5%	0%	5%						

N/S STREET	5	E/W STREET
WINDSOR AVE		OAK GROVE DRIVE

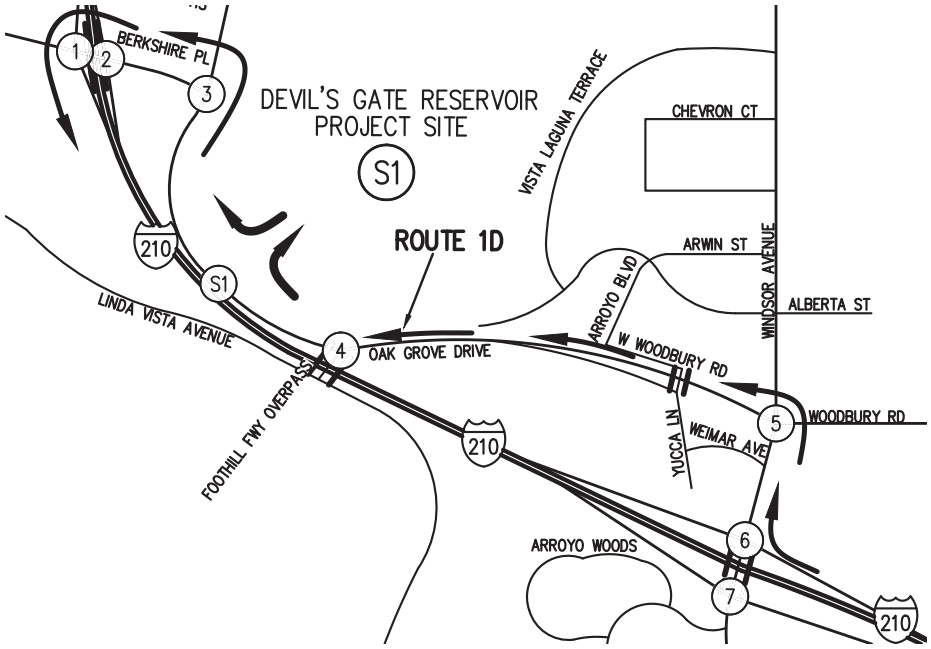
				5%	5%	5%						
				10%	5%	5%						
				10%	5%	5%						
				5%	5%	5%						
5%	5%	5%	5%					10%	15%	15%	5%	
5%	5%	5%	5%		TS			5%	5%	5%	5%	
5%	5%	5%	5%					5%	5%	5%	5%	
				5%	5%	5%						
				5%	5%	5%						
				5%	5%	5%						
				5%	5%	5%						

N/S STREET	6	E/W STREET
WINDSOR AVE		I-210 FWY WB RAMPS

				5%	5%	0%						
				5%	5%	0%						
				5%	5%	0%						
				5%	5%	0%						
0%	0%	0%	0%					5%	5%	5%	5%	
0%	0%	0%	0%		TS			5%	5%	5%	5%	
0%	0%	0%	0%					5%	5%	5%	5%	
				5%	5%	0%						
				5%	5%	0%						
				5%	5%	0%						
				5%	5%	0%						

N

NOT TO SCALE



LEGEND

N/S STREET	S#	E/W STREET

				7AM-9AM								
				2PM-4PM								
				4PM-6PM								
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM		
				TS								
				7AM-9AM								
				2PM-4PM								
				4PM-6PM								

LEGEND

S# – DISPOSAL SITE

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ROUTE 1D
TRUCK PERCENTAGES

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-1-4B

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N/S STREET	1	E/W STREET
I-210 FWY EB RAMPS		BERKSHIRE PLACE

				0	0	0					
				0	0	0					
				0	0	0					
				0	0	0					
0	0	0	0					0	0	0	0
0	0	0	0		TS			0	0	0	0
0	0	0	0					165	165	165	165
				0	0	0					
				0	0	0					
				0	0	0					
				0	0	0					

N/S STREET	2	E/W STREET
I-210 FWY WB RAMPS		BERKSHIRE PLACE

				0	0	0					
				0	0	0					
				0	0	0					
				0	0	0					
0	0	0	0					0	0	0	0
0	0	0	0		TS			165	165	165	165
0	0	0	0					0	0	0	0
				0	0	0					
				0	0	0					
				0	0	0					
				0	0	0					

N/S STREET	3	E/W STREET
OAK GROVE DRIVE		BERKSHIRE PLACE

				0	0	0					
				0	0	0					
				0	0	0					
				0	0	0					
0	0	0	0					0	0	0	0
0	0	0	0		TS			0	0	0	0
0	0	0	0					0	0	0	0
				165	0	0					
				165	0	0					
				165	0	0					
				165	0	0					

N/S STREET	4	E/W STREET
FOOTHILL FWY OVERPASS		OAK GROVE DRIVE

				0	0	0					
				0	0	0					
				0	0	0					
				0	0	0					
0	0	0	0					0	0	0	0
0	0	0	0		TS			140	140	140	140
0	0	0	0					0	0	0	0
				0	0	0					
				0	0	0					
				0	0	0					
				0	0	0					

N/S STREET	5	E/W STREET
WINDSOR AVE		OAK GROVE DRIVE

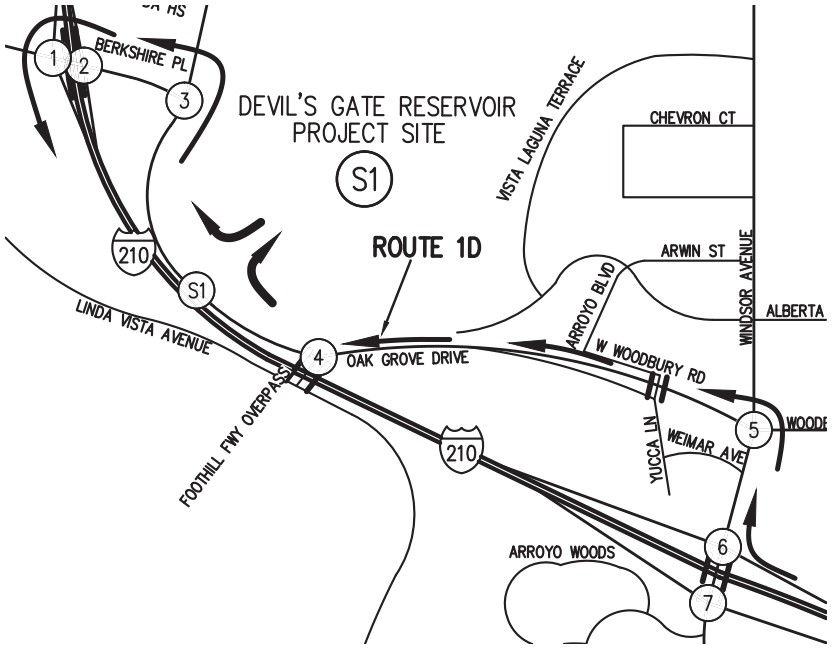
				0	0	0					
				0	0	0					
				0	0	0					
				0	0	0					
0	0	0	0					0	0	0	0
0	0	0	0		TS			0	0	0	0
0	0	0	0					0	0	0	0
				140	0	0					
				140	0	0					
				140	0	0					
				140	0	0					

N/S STREET	6	E/W STREET
WINDSOR AVE		I-210 FWY WB RAMPS

				0	0	0					
				0	0	0					
				0	0	0					
				0	0	0					
0	0	0	0					140	140	140	140
0	0	0	0		TS			0	0	0	0
0	0	0	0					0	0	0	0
				0	0	0					
				0	0	0					
				0	0	0					
				0	0	0					

N

NOT TO SCALE



LEGEND

N/S STREET	S#	E/W STREET

				7AM-9AM							
				2PM-4PM							
				4PM-6PM							
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM	
				TS							
				7AM-9AM							
				2PM-4PM							
				4PM-6PM							

LEGEND

S# – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 1D
PCE PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-1-4C

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N/S STREET	1	E/W STREET
I-210 FWY EB RAMPS		BERKSHIRE PLACE
	85 5 325	
	45 5 105	
	60 5 205	
	90 5 165	
0 0 0 0		0 0 0 0
250 100 125 80	TS	120 110 165 160
125 55 80 70		195 135 260 390
	0 0 0	
	0 0 0	
	0 0 0	
	0 0 0	

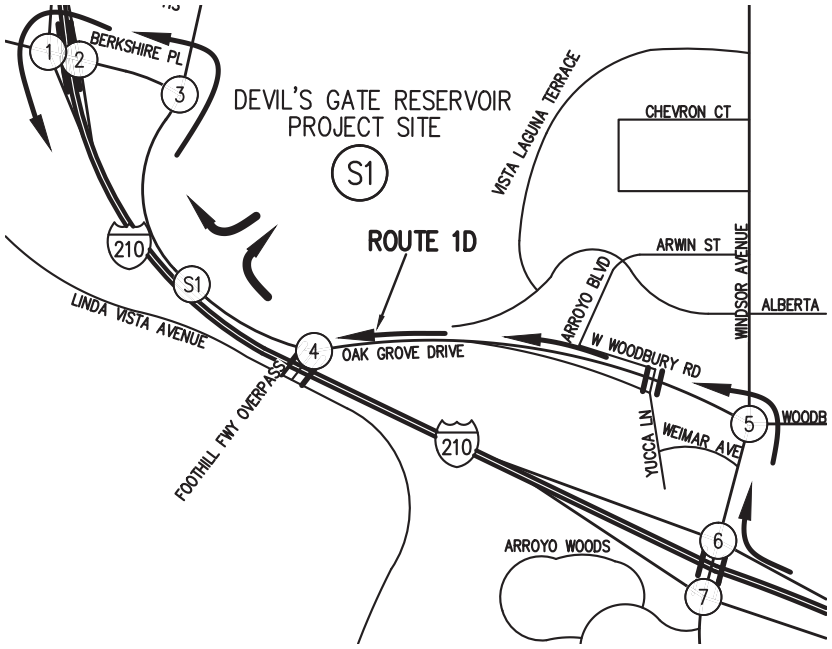
N/S STREET	2	E/W STREET
I-210 FWY WB RAMPS		BERKSHIRE PLACE
	0 0 0	
	0 0 0	
	0 0 0	
	0 0 0	
95 50 50 65		255 170 170 410
285 175 175 180	TS	245 165 165 460
0 0 0 0		0 0 0 0
	60 5 275	
	55 5 70	
	65 5 115	
	95 5 80	

N/S STREET	3	E/W STREET
OAK GROVE DRIVE		BERKSHIRE PLACE
	360 70 0	
	215 100 0	
	745 140 0	
	750 245 0	
510 150 330 185		0 0 0 0
0 0 0 0	TS	0 0 0 0
70 60 45 85		0 0 0 0
	195 450 0	
	120 135 0	
	130 95 0	
	120 150 0	

N/S STREET	4	E/W STREET
FOOTHILL FWY OVERPASS		OAK GROVE DRIVE
	0 0 0	
	0 0 0	
	0 0 0	
	0 0 0	
0 0 0 0		0 0 0 0
115 105 140 265	TS	520 225 180 185
50 65 60 80		180 60 40 60
	125 0 95	
	55 0 60	
	60 0 65	
	70 0 60	

N/S STREET	5	E/W STREET
WINDSOR AVE		OAK GROVE DRIVE
	35 590 55	
	10 300 40	
	20 340 40	
	5 525 60	
20 25 40 40		45 35 30 50
105 140 240 240	TS	425 160 110 155
40 15 25 25		555 300 350 440
	125 605 455	
	85 290 365	
	75 355 435	
	80 495 570	

N/S STREET	6	E/W STREET
WINDSOR AVE		I-210 FWY WB RAMPS
	530 585 0	
	280 370 0	
	275 435 0	
	445 550 0	
0 0 0 0		625 330 390 460
0 0 0 0	TS	5 5 5 5
0 0 0 0		5 20 20 25
	40 555 0	
	45 420 0	
	45 500 0	
	100 690 0	



LEGEND

N/S STREET	S#	E/W STREET
	7AM-9AM	
	2PM-4PM	
	4PM-6PM	
7AM - 9AM / 2PM - 4PM / 4PM - 6PM	TS	7AM - 9AM / 2PM - 4PM / 4PM - 6PM
	7AM-9AM	
	2PM-4PM	
	4PM-6PM	

LEGEND

S# – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 1D
EXISTING + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-1-4D

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N/S STREET	1	E/W STREET
I-210 FWY EB RAMPS		BERKSHIRE PLACE
	90 5 335	
	50 5 115	
	70 5 235	
	90 5 165	
0 0 0 0		0 0 0 0
250 105 145 85	TS	125 115 190 160
130 60 90 70		310 255 400 500
	0 0 0	
	0 0 0	
	0 0 0	
	0 0 0	

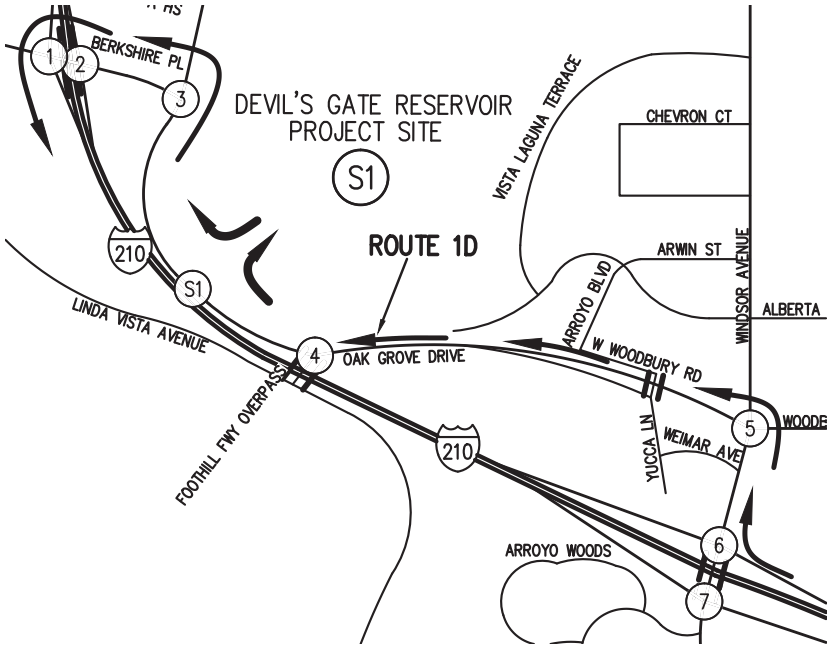
N/S STREET	2	E/W STREET
I-210 FWY WB RAMPS		BERKSHIRE PLACE
	0 0 0	
	0 0 0	
	0 0 0	
	0 0 0	
95 55 65 65		270 170 580 410
295 185 180 180	TS	365 285 500 575
0 0 0 0		0 0 0 0
	60 5 285	
	60 5 70	
	75 0 135	
	95 5 85	

N/S STREET	3	E/W STREET
OAK GROVE DRIVE		BERKSHIRE PLACE
	365 85 0	
	225 115 0	
	855 180 0	
	755 250 0	
520 160 380 200		0 0 0 0
0 0 0 0	TS	0 0 0 0
70 65 50 85		0 0 0 0
	310 455 0	
	230 140 0	
	250 110 0	
	230 160 0	

N/S STREET	4	E/W STREET
FOOTHILL FWY OVERPASS		OAK GROVE DRIVE
	0 0 0	
	0 0 0	
	0 0 0	
	0 0 0	
0 0 0 0		0 0 0 0
135 125 270 270		620 325 285 280
55 65 80 80	TS	190 65 45 60
	130 0 100	
	60 0 65	
	70 0 75	
	70 0 60	

N/S STREET	5	E/W STREET
WINDSOR AVE		OAK GROVE DRIVE
	35 600 55	
	15 310 40	
	25 390 40	
	5 525 60	
20 25 40 40		55 45 45 50
115 150 250 250	TS	440 165 125 175
45 15 25 25		575 330 405 445
	215 610 495	
	170 305 380	
	165 410 500	
	165 495 575	

N/S STREET	6	E/W STREET
WINDSOR AVE		I-210 FWY WB RAMPS
	535 595 0	
	300 380 0	
	315 500 0	
	455 550 0	
0 0 0 0		720 420 525 550
0 0 0 0	TS	5 5 5 5
0 0 0 0		5 20 20 25
	40 580 0	
	45 425 0	
	50 575 0	
	100 690 0	



LEGEND

N/S STREET	S#	E/W STREET
	7AM-9AM	
	2PM-4PM	
	4PM-6PM	
7AM - 9AM / 2PM - 4PM / 4PM - 6PM	TS	7AM - 9AM / 2PM - 4PM / 4PM - 6PM
	7AM-9AM	
	2PM-4PM	
	4PM-6PM	

LEGEND

S# – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 1D
PCE EXISTING + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-1-4E

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Table 4-1-4
Intersection Capacity Analysis – Existing + Project Conditions (Route 1D)
Traffic Impact Analysis - Site 1

Route1D		AM				MID-DAY (12-2 PM)				MID-DAY (2-4 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
1	Berkshire Place and I-210 Freeway Eastbound Ramps (3)	E	35.5	-	-	B	10.4	-	-	C	18.7	-	-	C	23.2	-	-
2	Berkshire Place and I-210 Freeway Westbound Ramps (3)	A	9.7	-	-	A	5.1	-	-	A	6.3	-	-	A	3.6	-	-
3	Oak Grove Drive and Berkshire Place	A	9.6	0.67	A	A	5.4	0.25	A	A	8.8	0.57	A	A	6.8	0.49	A
4	Oak Grove Drive and Foothill Freeway Overpass (3)	C	16.3	-	-	A	9.3	-	-	A	9.2	-	-	B	10.7	-	-
5	Windsor Ave and Oak Grove Drive/Woodbury Rd	C	28.4	0.86	C	B	13.6	0.49	A	B	14.9	0.53	A	B	19	0.74	B
6	Windsor Ave/Arroyo Blvd and I-210 Freeway Westbound Ramps	A	9	0.57	A	A	5.9	0.28	A	A	6.7	0.33	A	A	7.6	0.39	B

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
(5)V/C-HCM Volume to Capacity Ratio

Source: **Hall & Foreman, Inc.**

Haul Route 1D Analysis

As presented in *Table 4-1-4*, under the existing plus project conditions for Site 1 (Routes 1D) most of the study intersections are anticipated to continue to operate at acceptable HCM LOS of D or better for the AM, Mid-day (12-2 PM), Mid-day (2-4 PM), and PM peak hours. The intersection of Berkshire Place and I-210 Freeway Eastbound Ramps is anticipated to operate at HCM LOS E during the AM peak period, mitigation is recommended.

Haul Route 1E

The Haul Route 1E project trips, truck percentages and passenger car equivalent (PCE) project trips are illustrated in *Figure 4-1-5A* through *Figure 4-1-5C.* The existing plus project AM (7-9), MID-DAY (12-2), MID-DAY (2-4), PM (4-6) turn movement volumes, are provided in *Figure 4-1-5D.* For comparison the (PCE) existing plus project turn movement volumes are provided in *Figure 4-1-5E.*

Haul Route 1F

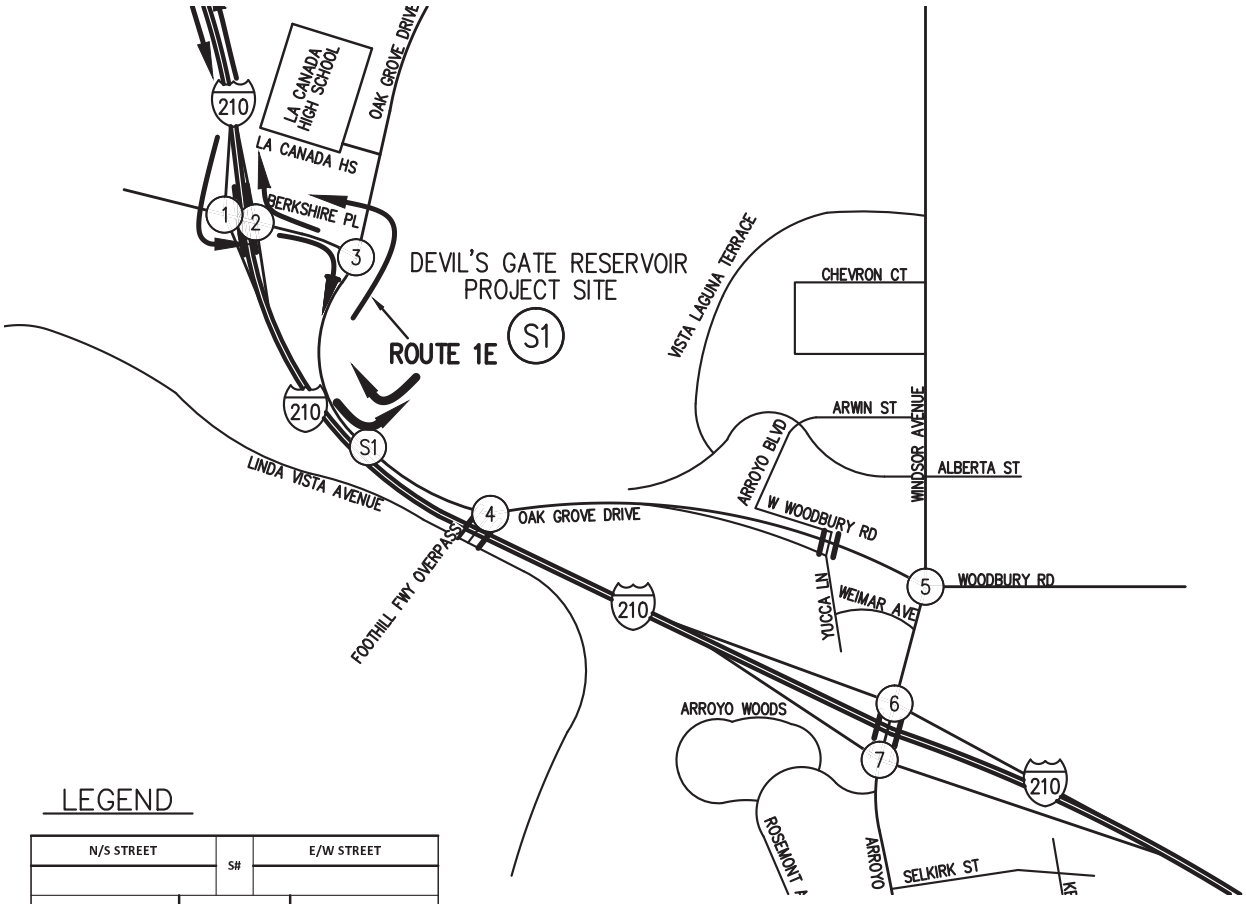
The Haul Route 1F project trips, truck percentages and passenger car equivalent (PCE) project trips are illustrated in *Figure 4-1-6A* through *Figure 4-1-6C.* The existing plus project AM (7-9), MID-DAY (12-2), MID-DAY (2-4), PM (4-6) turn movement volumes, are provided in *Figure 4-1-6D.* For comparison the (PCE) existing plus project turn movement volumes are provided in *Figure 4-1-6E.*

N/S STREET	1	E/W STREET
I-210 FWY EB RAMPS		BERKSHIRE PLACE

N/S STREET	2	E/W STREET
I-210 FWY WB RAMPS		BERKSHIRE PLACE

N/S STREET	3	E/W STREET
OAK GROVE DRIVE		BERKSHIRE PLACE

NOT TO SCALE



LEGEND

N/S STREET	S#	E/W STREET
	7AM-9AM	
	2PM-4PM	
	4PM-6PM	
7AM - 9AM / 2PM - 4PM / 4PM - 6PM	TS	7AM - 9AM / 2PM - 4PM / 4PM - 6PM
	7AM-9AM	
	2PM-4PM	
	4PM-6PM	

LEGEND

S# – DISPOSAL SITE

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ROUTE 1E PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-1-5A

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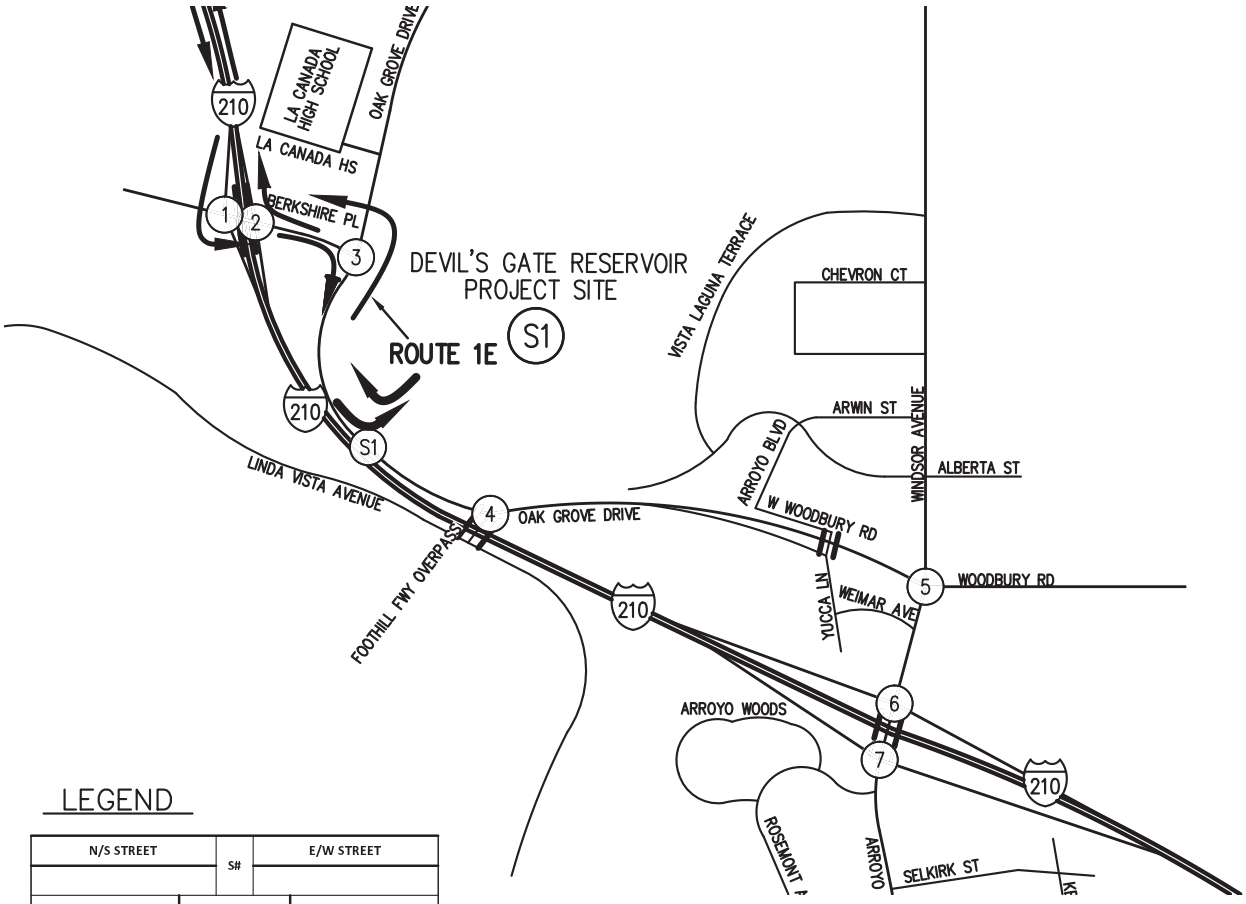
N/S STREET					1				E/W STREET			
I-210 FWY EB RAMPS									BERKSHIRE PLACE			
				5%	5%	18%						
				5%	5%	36%						
				5%	5%	23%						
				5%	5%	23%						
0%	0%	0%	0%						0%	0%	0%	0%
5%	5%	5%	5%		TR				5%	5%	5%	5%
5%	5%	5%	5%						5%	5%	5%	5%
				0%	0%	0%						
				0%	0%	0%						
				0%	0%	0%						
				0%	0%	0%						

N/S STREET					2				E/W STREET			
I-210 FWY WB RAMPS									BERKSHIRE PLACE			
				0%	0%	0%						
				0%	0%	0%						
				0%	0%	0%						
				0%	0%	0%						
5%	5%	5%	5%						21%	5%	5%	5%
19%	5%	5%	5%		TS				5%	5%	5%	5%
0%	0%	0%	0%						0%	0%	0%	0%
				5%	5%	5%						
				5%	5%	5%						
				5%	5%	5%						
				5%	5%	5%						

N/S STREET					3				E/W STREET			
OAK GROVE DRIVE									BERKSHIRE PLACE			
				5%	10%	0%						
				5%	10%	0%						
				5%	10%	0%						
				5%	10%	0%						
5%	5%	5%	5%						0%	0%	0%	0%
0%	0%	0%	0%		TS				0%	0%	0%	0%
42%	5%	5%	37%						0%	0%	0%	0%
				30%	5%	0%						
				5%	5%	0%						
				5%	5%	0%						
				43%	5%	0%						

N

NOT TO SCALE



LEGEND

N/S STREET					S#				E/W STREET			
					7AM-9AM							
					2PM-4PM							
					4PM-6PM							
7AM - 9AM	2PM - 4PM	4PM - 6PM			TS				7AM - 9AM	2PM - 4PM	4PM - 6PM	
					7AM-9AM							
					2PM-4PM							
					4PM-6PM							

LEGEND

S# – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 1E
TRUCK PERCENTAGES

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-1-5B

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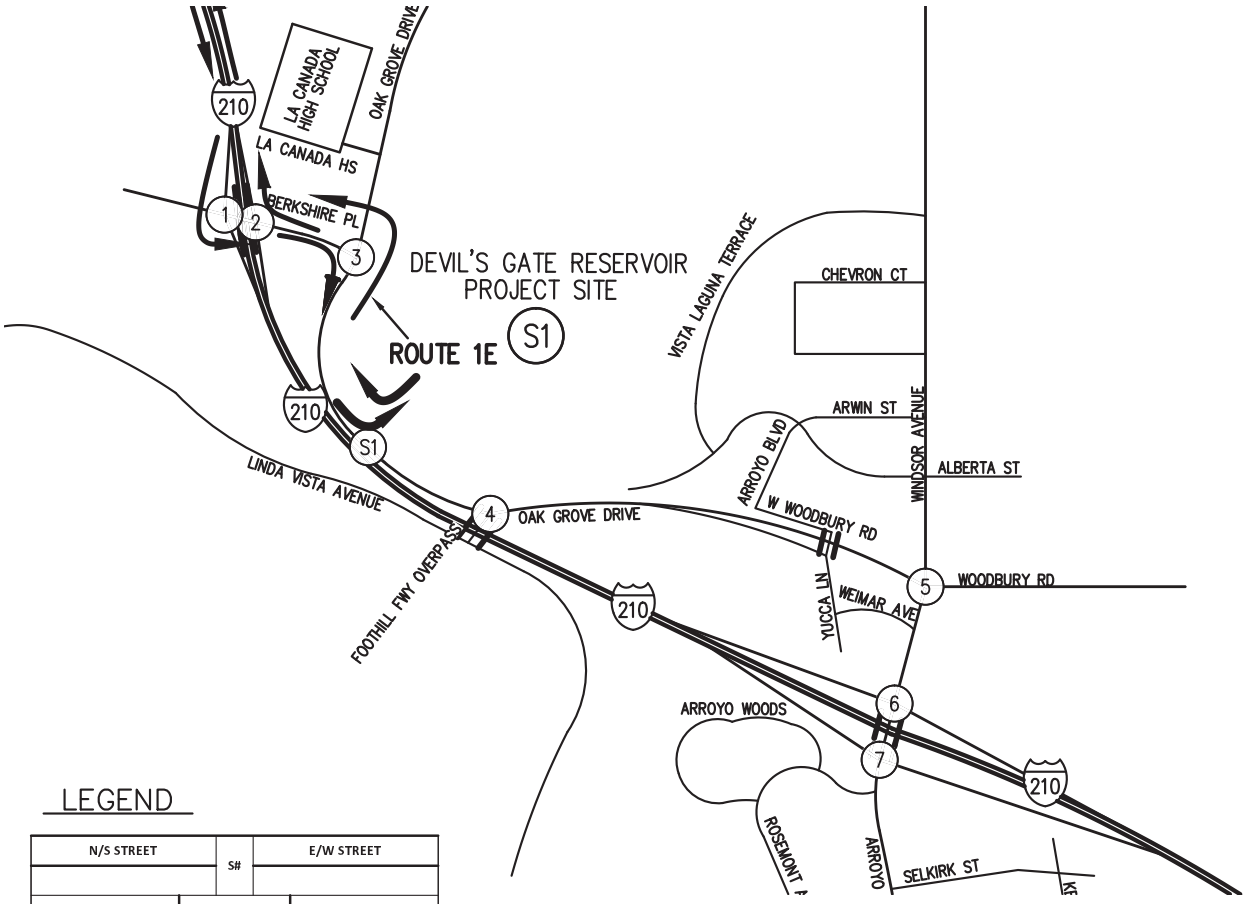
Last Opened: Oct 04, 2013 - 10:24am by: TMunoz

N/S STREET	1	E/W STREET
I-210 FWY EB RAMPS		BERKSHIRE PLACE

N/S STREET	2	E/W STREET
I-210 FWY WB RAMPS		BERKSHIRE PLACE

N/S STREET	3	E/W STREET
OAK GROVE DRIVE		BERKSHIRE PLACE

NOT TO SCALE



LEGEND

N/S STREET	S#	E/W STREET
	7AM-9AM	
	2PM-4PM	
	4PM-6PM	
7AM - 9AM, 2PM - 4PM, 4PM - 6PM	TS	7AM - 9AM, 2PM - 4PM, 4PM - 6PM
	7AM-9AM	
	2PM-4PM	
	4PM-6PM	

LEGEND

S# – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 1E
PCE PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-1-5C

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 1\FIG 4-1-5C.dwg
Last Opened: Oct 04, 2013 - 10:24am by: TMunoz

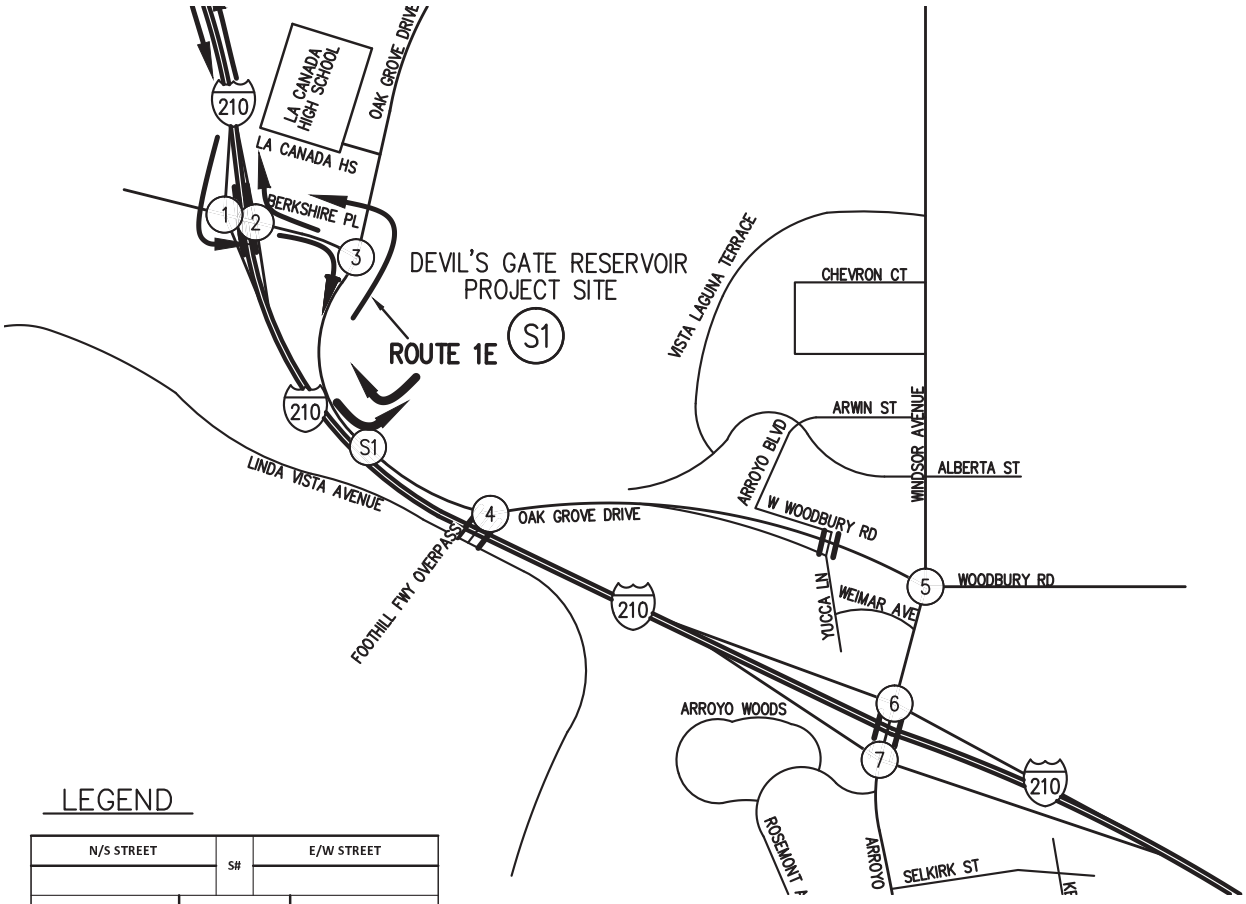
N/S STREET	1	E/W STREET
I-210 FWY EB RAMPS		BERKSHIRE PLACE
	85 5 380	
	45 5 160	
	60 5 205	
	90 5 220	
0 0 0 0		0 0 0 0
250 100 125 80	TS	120 110 165 160
125 55 80 70		140 80 260 335
	0 0 0	
	0 0 0	
	0 0 0	
	0 0 0	

N/S STREET	2	E/W STREET
I-210 FWY WB RAMPS		BERKSHIRE PLACE
	0 0 0	
	0 0 0	
	0 0 0	
	0 0 0	
95 50 50 65		310 225 225 465
340 230 230 235	TS	190 110 110 405
0 0 0 0		0 0 0 0
	60 5 275	
	55 5 70	
	65 5 115	
	95 5 80	

N/S STREET	3	E/W STREET
OAK GROVE DRIVE		BERKSHIRE PLACE
	360 70 0	
	215 100 0	
	745 140 0	
	750 245 0	
510 150 330 185		0 0 0 0
0 0 0 0	TS	0 0 0 0
125 115 100 140		0 0 0 0
	195 450 0	
	120 135 0	
	130 95 0	
	120 150 0	

N

NOT TO SCALE



LEGEND

N/S STREET	S#	E/W STREET
	7AM-9AM	
	2PM-4PM	
	4PM-6PM	
7AM - 9AM, 2PM - 4PM, 4PM - 6PM	TS	7AM - 9AM, 2PM - 4PM, 4PM - 6PM
	7AM-9AM	
	2PM-4PM	
	4PM-6PM	

LEGEND

S# – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 1E
EXISTING + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-1-5D

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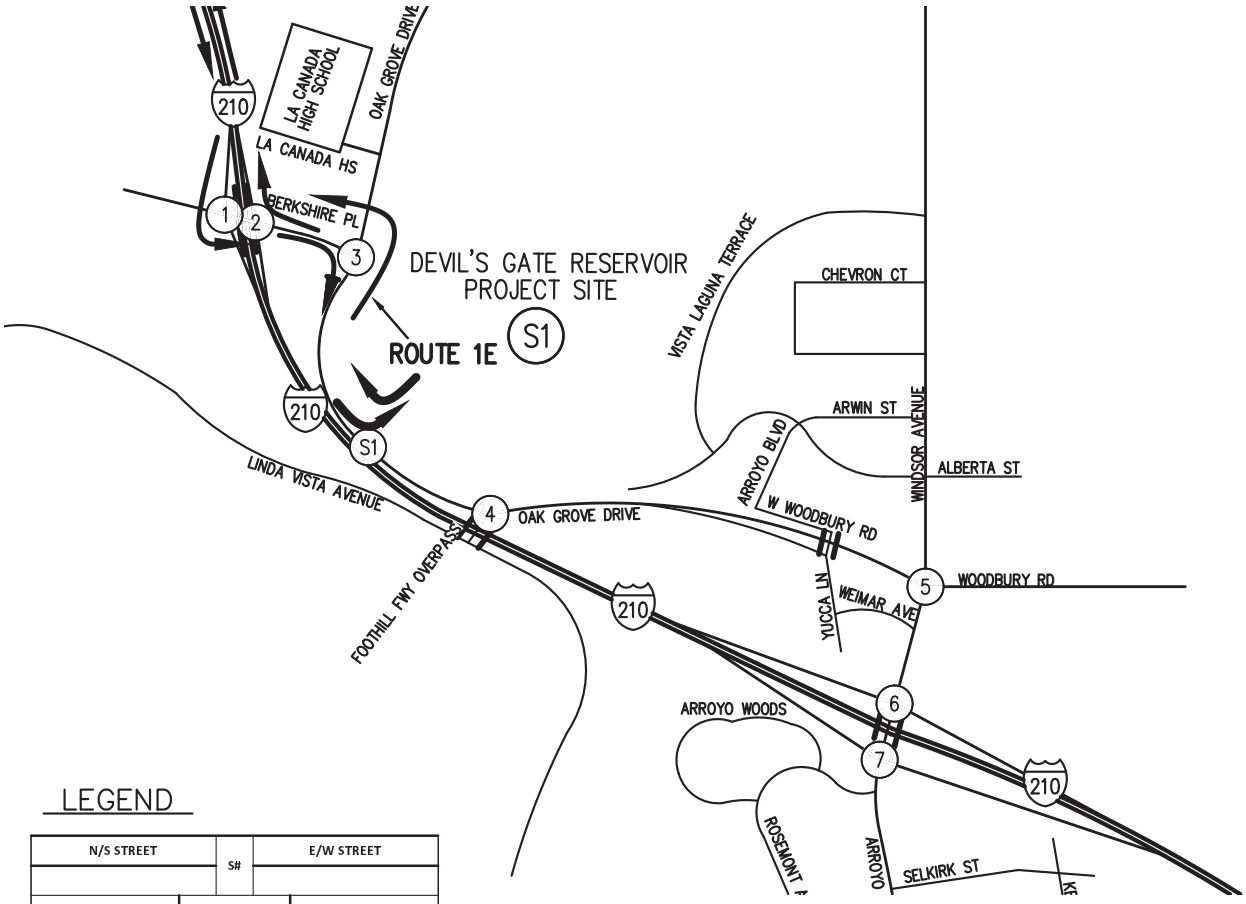
N/S STREET				1	E/W STREET			
I-210 FWY EB RAMPS					BERKSHIRE PLACE			
				90	5	475		
				50	5	255		
				70	5	235		
				90	5	305		
0	0	0	0				0	0	0	0
250	105	145	85		TS		125	115	190	160
130	60	90	70				145	90	400	335
				0	0	0		
				0	0	0		
				0	0	0		
				0	0	0		

N/S STREET				2	E/W STREET			
I-210 FWY WB RAMPS					BERKSHIRE PLACE			
				0	0	0		
				0	0	0		
				0	0	0		
				0	0	0		
95	55	75	65				435	335	745	575
435	325	455	320		TS		200	120	335	410
0	0	0	0				0	0	0	0
				60	5	285		
				60	5	70		
				75	5	135		
				95	5	85		

N/S STREET				3	E/W STREET			
OAK GROVE DRIVE					BERKSHIRE PLACE			
				365	85	0		
				225	115	0		
				855	180	0		
				755	250	0		
520	160	380	200				0	0	0	0
0	0	0	0		TS		0	0	0	0
210	205	190	225				0	0	0	0
				310	455	0		
				230	140	0		
				250	110	0		
				230	160	0		

N

NOT TO SCALE



LEGEND

N/S STREET				S#	E/W STREET			
				7AM-9AM				
				2PM-4PM				
				4PM-6PM				
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS		7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM				
				2PM-4PM				
				4PM-6PM				

LEGEND

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ROUTE 1E
PCE EXISTING + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-1-5E

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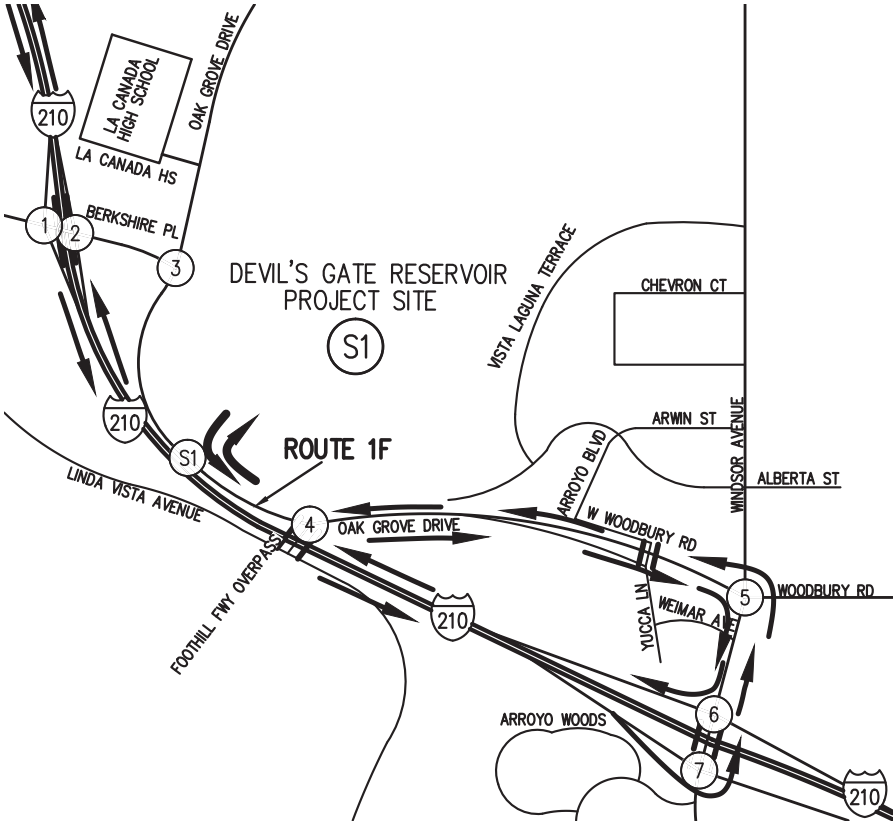
N/S STREET	4	E/W STREET
FOOTHILL FWY OVERPASS		OAK GROVE DRIVE

N/S STREET	5	E/W STREET
WINDSOR AVE		OAK GROVE DRIVE

N/S STREET	6	E/W STREET
WINDSOR AVE		I-210 FWY WB RAMPS

N/S STREET	7	E/W STREET
WINDSOR AVE		I-210 FWY EB RAMPS



LEGEND

N/S STREET	S#	E/W STREET
	7AM-9AM	
	2PM-4PM	
	4PM-6PM	
7AM - 9AM / 2PM - 4PM / 4PM - 6PM	TS	7AM - 9AM / 2PM - 4PM / 4PM - 6PM
	7AM-9AM	
	2PM-4PM	
	4PM-6PM	

LEGEND

S# – DISPOSAL SITE

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ROUTE 1F PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-1-6A

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N/S STREET	4	E/W STREET
FOOTHILL FWY OVERPASS		OAK GROVE DRIVE

				0%	0%	0%						
				0%	0%	0%						
				0%	0%	0%						
				0%	0%	0%						
0%	0%	0%	0%					0%	0%	0%	0%	
5%	10%	5%	5%	←	TS		→	5%	5%	5%	5%	
5%	5%	5%	5%					5%	5%	5%	5%	
				5%	0%	5%						
				5%	0%	5%						
				5%	0%	5%						
				5%	0%	5%						

N/S STREET	5	E/W STREET
WINDSOR AVE		OAK GROVE DRIVE

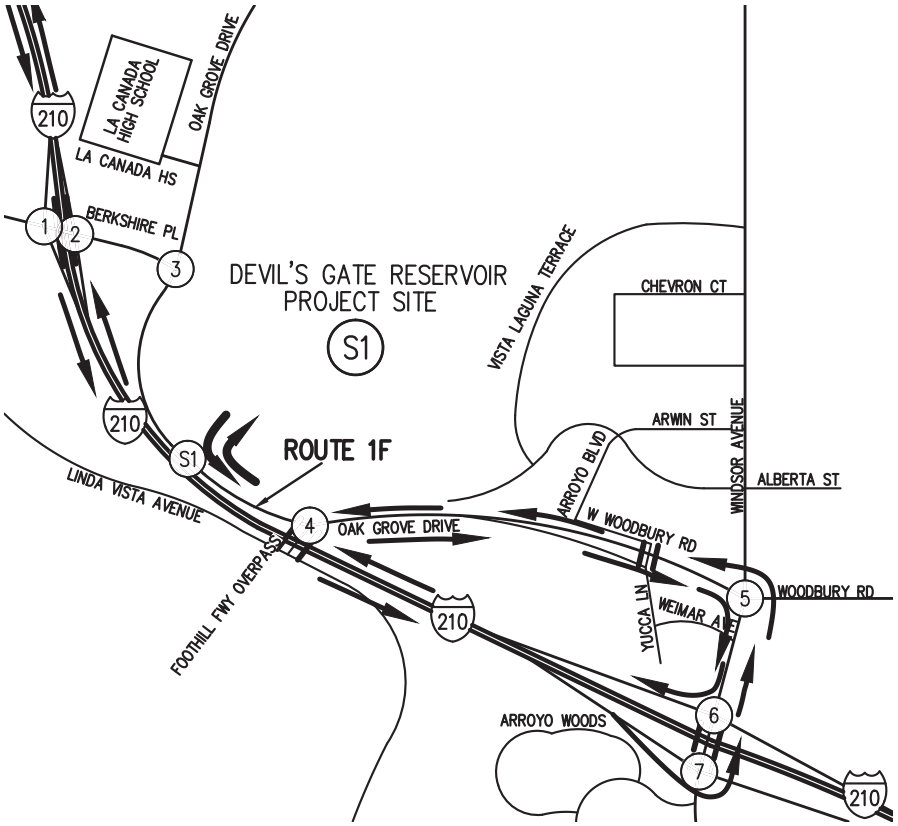
				5%	5%	5%						
				10%	5%	5%						
				10%	5%	5%						
				5%	5%	5%						
5%	5%	5%	5%					10%	15%	15%	5%	
5%	5%	5%	5%	←	TS		→	5%	5%	5%	5%	
5%	5%	5%	5%					5%	5%	5%	5%	
				5%	5%	5%						
				5%	5%	5%						
				5%	5%	5%						
				5%	5%	5%						

N/S STREET	6	E/W STREET
WINDSOR AVE		I-210 FWY WB RAMPS

				5%	5%	0%						
				5%	5%	0%						
				5%	5%	0%						
				5%	5%	0%						
0%	0%	0%	0%					5%	5%	5%	5%	
0%	0%	0%	0%	←	TS		→	5%	5%	5%	5%	
0%	0%	0%	0%					5%	5%	5%	5%	
				5%	5%	0%						
				5%	5%	0%						
				5%	5%	0%						
				5%	5%	0%						

N/S STREET	7	E/W STREET
WINDSOR AVE		I-210 FWY EB RAMPS

				0%	5%	5%						
				0%	5%	5%						
				0%	5%	5%						
				0%	5%	5%						
5%	5%	12%	5%					0%	0%	0%	0%	
5%	5%	5%	5%	←	TS		→	0%	0%	0%	0%	
5%	5%	5%	5%					0%	0%	0%	0%	
				0%	5%	5%						
				0%	5%	5%						
				0%	5%	5%						
				0%	5%	5%						



LEGEND

N/S STREET	S#	E/W STREET

				7AM-9AM								
				2PM-4PM								
				4PM-6PM								
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM		
			←	TS		→						
				7AM-9AM								
				2PM-4PM								
				4PM-6PM								

LEGEND

S# – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 1F TRUCK PERCENTAGES

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-1-6B

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N/S STREET	4	E/W STREET
FOOTHILL FWY OVERPASS		OAK GROVE DRIVE

				0	0	0					
				0	0	0					
				0	0	0					
				0	0	0					
0	0	0	0					0	0	0	0
165	165	165	165		TS			140	140	140	140
0	0	0	0					0	0	0	0
				0	0	0					
				0	0	0					
				0	0	0					
				0	0	0					

N/S STREET	5	E/W STREET
WINDSOR AVE		OAK GROVE DRIVE

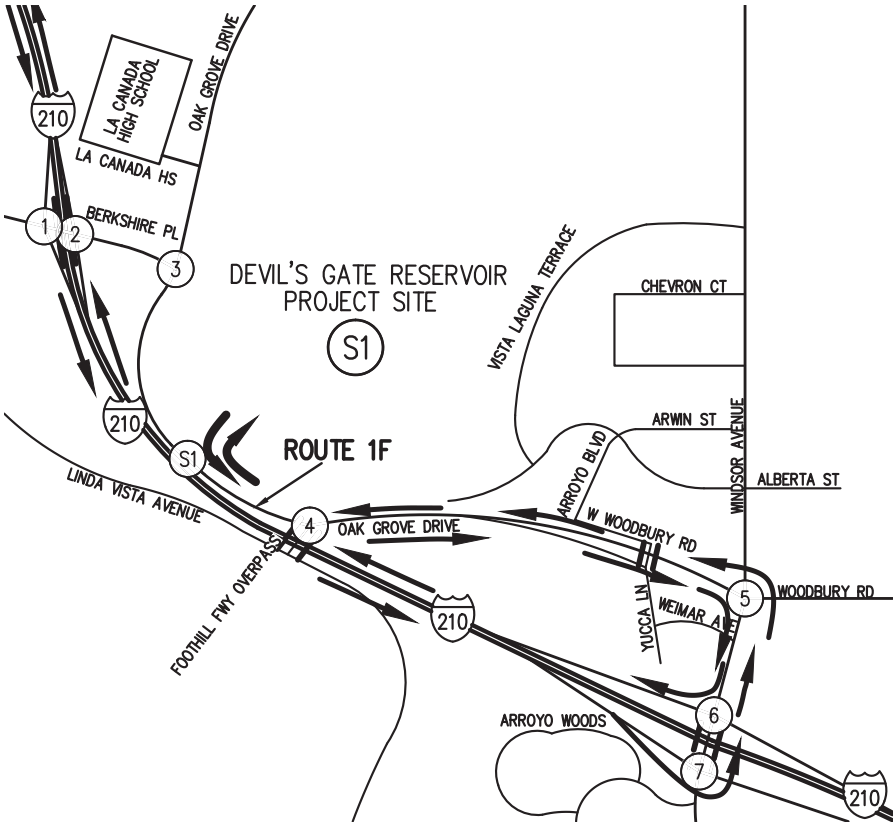
				0	0	0					
				0	0	0					
				0	0	0					
				0	0	0					
0	0	0	0					0	0	0	0
0	0	0	0		TS			0	0	0	0
165	165	165	165					0	0	0	0
				140	0	0					
				140	0	0					
				140	0	0					
				140	0	0					

N/S STREET	6	E/W STREET
WINDSOR AVE		I-210 FWY WB RAMPS

				165	0	0					
				165	0	0					
				165	0	0					
				165	0	0					
0	0	0	0					0	0	0	0
0	0	0	0		TS			0	0	0	0
0	0	0	0					0	0	0	0
				0	140	0					
				0	140	0					
				0	140	0					
				0	140	0					

N/S STREET	7	E/W STREET
WINDSOR AVE		I-210 FWY EB RAMPS

				0	0	0					
				0	0	0					
				0	0	0					
				0	0	0					
140	140	140	140					0	0	0	0
0	0	0	0		TS			0	0	0	0
0	0	0	0					0	0	0	0
				0	0	0					
				0	0	0					
				0	0	0					
				0	0	0					



LEGEND

N/S STREET	S#	E/W STREET

				7AM-9AM							
				2PM-4PM							
				4PM-6PM							
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM	
				TS							
				7AM-9AM							
				2PM-4PM							
				4PM-6PM							

LEGEND

S# – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

N

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ROUTE 1F
PCE PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-1-6C

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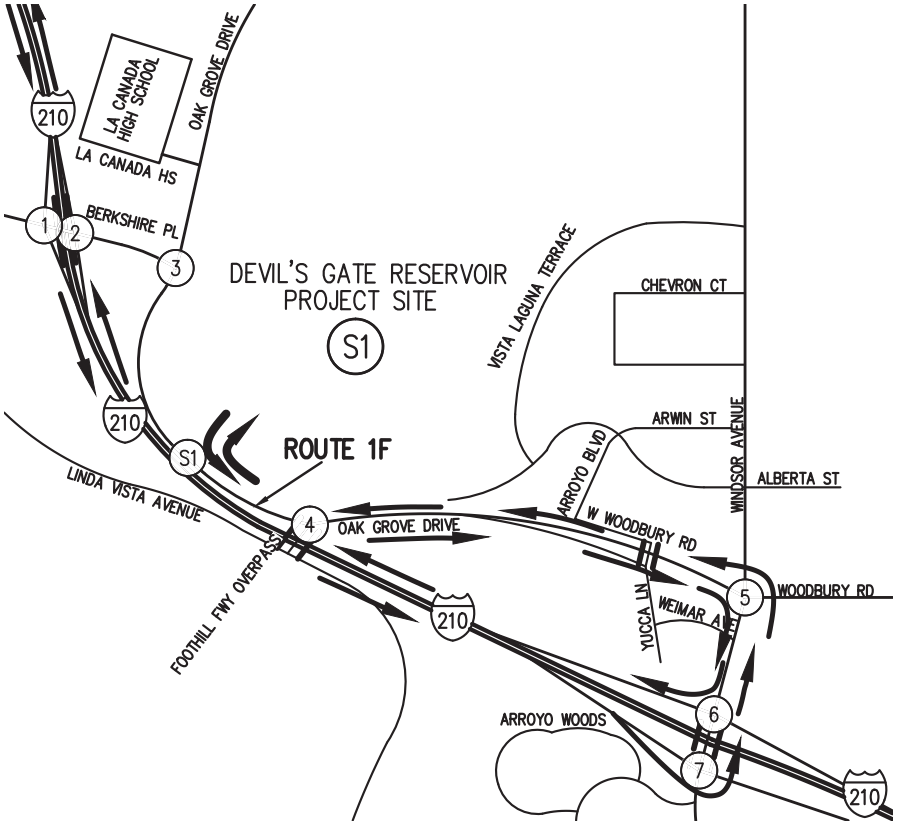
Last Opened: Oct 04, 2013 - 10:24am by: TMunoz

N/S STREET				4				E/W STREET			
FOOTHILL FWY OVERPASS								OAK GROVE DRIVE			
				0	0	0					
				0	0	0					
				0	0	0					
				0	0	0					
0	0	0	0					0	0	0	0
170	160	195	320					520	225	180	185
50	65	60	80					180	60	40	60
				125	0	95					
				55	0	60					
				60	0	65					
				70	0	60					

N/S STREET				5				E/W STREET			
WINDSOR AVE								OAK GROVE DRIVE			
				35	590	55					
				10	300	40					
				20	340	40					
				5	525	60					
20	25	20	40					45	35	30	50
105	140	140	240					425	160	110	155
95	70	85	80					555	300	350	440
				125	605	455					
				85	290	365					
				75	355	435					
				80	495	570					

N/S STREET				6				E/W STREET			
WINDSOR AVE								I-210 FWY WB RAMPS			
				585	585	0					
				335	370	0					
				330	435	0					
				500	550	0					
0	0	0	0					570	275	335	405
0	0	0	0					5	5	5	5
0	0	0	0					5	20	20	25
				40	610	0					
				45	475	0					
				45	555	0					
				100	745	0					

N/S STREET				7				E/W STREET			
WINDSOR AVE								I-210 FWY EB RAMPS			
				0	190	415					
				0	100	295					
				0	160	280					
				0	165	415					
605	375	425	650					0	0	0	0
5	5	5	5					0	0	0	0
105	55	50	105					0	0	0	0
				0	130	20					
				0	145	15					
				0	160	15					
				0	195	15					



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LEGEND

N/S STREET				S#				E/W STREET			
				7AM-9AM							
				2PM-4PM							
				4PM-6PM							
7AM - 9AM	2PM - 4PM	4PM - 6PM			TS			7AM - 9AM	2PM - 4PM	4PM - 6PM	
				7AM-9AM							
				2PM-4PM							
				4PM-6PM							

LEGEND

S# – DISPOSAL SITE

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ROUTE 1F EXISTING + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-1-6D

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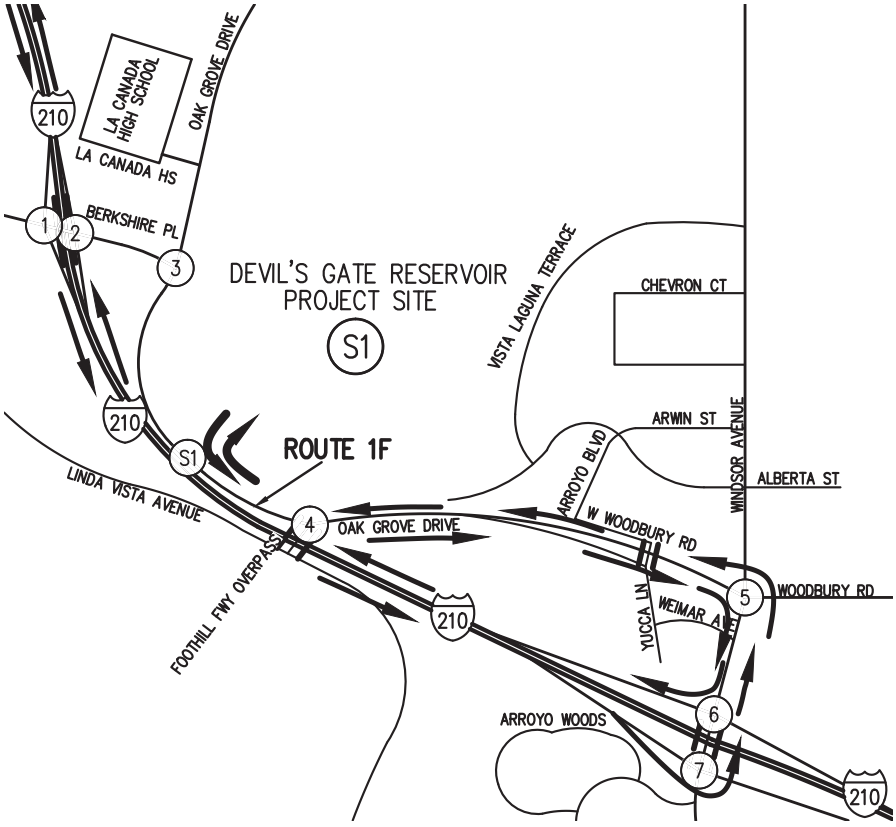
N/S STREET				4				E/W STREET			
FOOTHILL FWY OVERPASS								OAK GROVE DRIVE			
				0	0	0					
				0	0	0					
				0	0	0					
				0	0	0					
0	0	0	0					0	0	0	0
300	290	325	435					620	325	285	280
55	65	70	80					190	65	45	60
				130	0	100					
				60	0	65					
				70	0	75					
				70	0	60					

N/S STREET				5				E/W STREET			
WINDSOR AVE								OAK GROVE DRIVE			
				35	600	55					
				15	310	40					
				25	390	40					
				5	525	60					
20	25	20	40					55	45	45	50
115	150	160	250					440	165	125	175
210	180	200	190					575	330	405	445
				215	610	495					
				170	305	380					
				165	410	500					
				165	495	575					

N/S STREET				6				E/W STREET			
WINDSOR AVE								I-210 FWY WB RAMPS			
				700	595	0					
				465	380	0					
				480	500	0					
				620	550	0					
0	0	0	0					580	280	385	410
0	0	0	0					5	5	5	5
0	0	0	0					5	20	20	25
				40	720	0					
				45	565	0					
				50	715	0					
				100	830	0					

N/S STREET				7				E/W STREET			
WINDSOR AVE								I-210 FWY EB RAMPS			
				0	200	420					
				0	105	300					
				0	185	320					
				0	165	415					
690	460	510	735					0	0	0	0
5	5	5	5					0	0	0	0
105	55	50	105					0	0	0	0
				0	130	20					
				0	150	20					
				0	185	15					
				0	195	15					



NOT TO SCALE

LEGEND

N/S STREET				S#				E/W STREET			
				7AM-9AM							
				2PM-4PM							
				4PM-6PM							
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM	
				TS							
				7AM-9AM							
				2PM-4PM							
				4PM-6PM							

LEGEND

S# – DISPOSAL SITE

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ROUTE 1F
PCE EXISTING + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-1-6E

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Table 4-1-5
Intersection Capacity Analysis – Existing + Project Conditions (Route 1E)
Traffic Impact Analysis - Site 1

Route1E		AM				MID-DAY (12-2 PM)				MID-DAY (2-4 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
1	Berkshire Place and I-210 Freeway Eastbound Ramps (3)	E	37.0	-	-	B	10.2	-	-	C	16.3	-	-	C	17.9	-	-
2	Berkshire Place and I-210 Freeway Westbound Ramps	B	10.2	-	-	A	4.6	-	-	A	7.2	-	-	A	4.4	-	-
3	Oak Grove Drive and Berkshire Place (3)	B	10.4	0.71	A	A	6.0	0.27	A	A	9.4	0.67	A	A	7.1	0.49	A

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
(5)V/C-HCM Volume to Capacity Ratio

Source: **Hall & Foreman, Inc.**

Table 4-1-6
Intersection Capacity Analysis – Existing + Project Conditions (Route 1F)
Traffic Impact Analysis - Site 1

Route1F		AM				MID-DAY (12-2 PM)				MID-DAY (2-4 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
4	Oak Grove Drive and Foothill Freeway Overpass (3)	C	17.5	-	-	A	9.6	-	-	A	9.5	-	-	B	11.4	-	-
5	Windsor Ave and Oak Grove Drive/Woodbury Rd	C	28.4	0.86	C	B	13.5	0.53	A	B	15	0.52	A	B	18.9	0.74	B
6	Windsor Ave/Arroyo Blvd and I-210 Freeway Westbound Ramps	A	8.8	0.56	A	A	5.5	0.28	A	A	6	0.34	A	A	7.1	0.4	B
7	Windsor Ave/Arroyo Blvd and I-210 Freeway Eastbound Ramps	C	24.5	0.53	A	B	16.5	0.39	A	B	16.1	0.39	A	C	23.9	0.57	A

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
(5)V/C-HCM Volume to Capacity Ratio

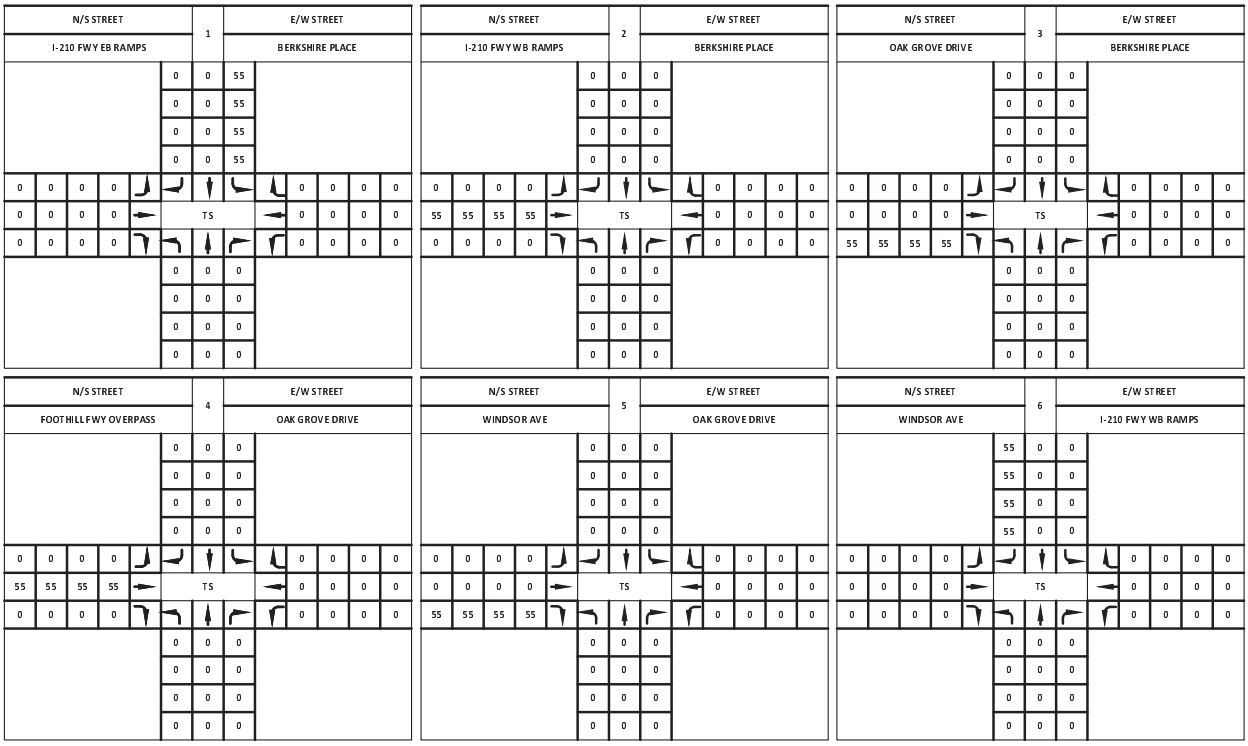
Source: **Hall & Foreman, Inc.**

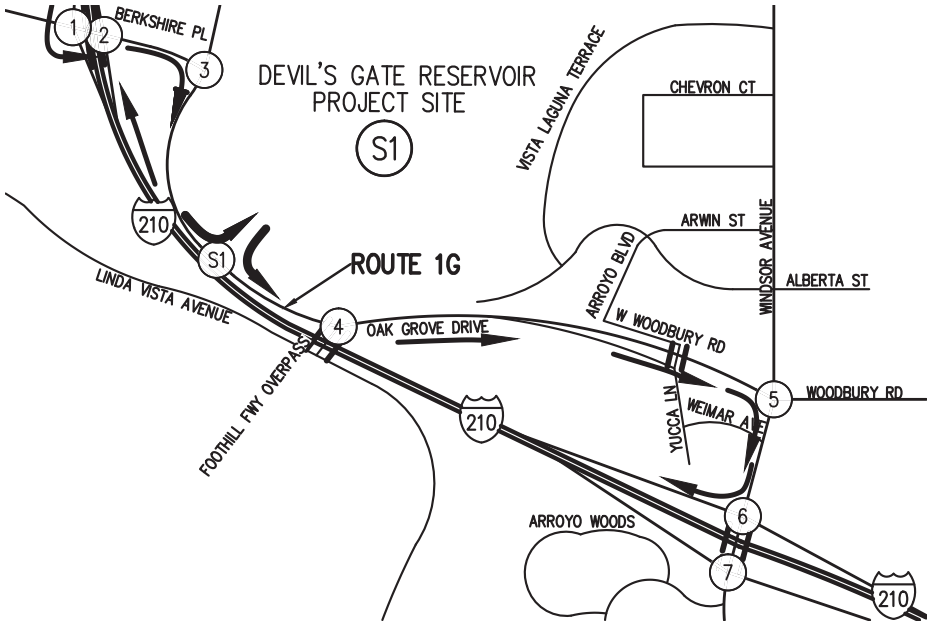
Haul Routes 1E and 1F Analysis

As presented in *Table 4-1-5* and *Table 4-1-6*, under the existing plus project conditions for Site 1 (Routes 1E-1F) most of the study intersections are anticipated to continue to operate at acceptable HCM LOS of C or better for the AM, Mid-day (12-2 PM), Mid-day (2-4 PM), and PM peak hours. The intersection of Berkshire Place and I-210 Freeway Eastbound Ramps is anticipated to operate at HCM LOS E during the AM peak period, mitigation is recommended.

Haul Route 1G

The Haul Route 1G project trips, truck percentages and passenger car equivalent (PCE) project trips are illustrated in *Figure 4-1-7A* through *Figure 4-1-7C.* The existing plus project AM (7-9), MID-DAY (12-2), MID-DAY (2-4), PM (4-6) turn movement volumes, are provided in *Figure 4-1-7D.* For comparison the (PCE) existing plus project turn movement volumes are provided in *Figure 4-1-7E.*





LEGEND

N/S STREET	S#	E/W STREET
	7AM-9AM	
	2PM-4PM	
	4PM-6PM	
7AM - 9AM, 2PM - 4PM, 4PM - 6PM	TS	7AM - 9AM, 2PM - 4PM, 4PM - 6PM
	7AM-9AM	
	2PM-4PM	
	4PM-6PM	

LEGEND

S# – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 1G PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-1-7A

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N/S STREET	1	E/W STREET
I-210 FWY EB RAMPS		BERKSHIRE PLACE

				5%	5%	18%					
				5%	5%	36%					
				5%	5%	23%					
				5%	5%	23%					
0%	0%	0%	0%					0%	0%	0%	0%
5%	5%	5%	5%		TR			5%	5%	5%	5%
5%	5%	5%	5%					5%	5%	5%	5%
				0%	0%	0%					
				0%	0%	0%					
				0%	0%	0%					
				0%	0%	0%					

N/S STREET	2	E/W STREET
I-210 FWY WB RAMPS		BERKSHIRE PLACE

				0%	0%	0%					
				0%	0%	0%					
				0%	0%	0%					
				0%	0%	0%					
5%	5%	5%	5%					5%	5%	5%	5%
19%	5%	20%	5%		TS			5%	5%	5%	5%
0%	0%	0%	0%					0%	0%	0%	0%
				5%	5%	5%					
				5%	5%	5%					
				5%	5%	5%					
				5%	5%	5%					

N/S STREET	3	E/W STREET
OAK GROVE DRIVE		BERKSHIRE PLACE

				5%	10%	0%					
				5%	10%	0%					
				5%	10%	0%					
				5%	5%	0%					
5%	5%	5%	5%					0%	0%	0%	0%
0%	0%	0%	0%		TS			0%	0%	0%	0%
42%	5%	5%	37%					0%	0%	0%	0%
				5%	5%	0%					
				5%	5%	0%					
				5%	5%	0%					
				5%	5%	0%					

N/S STREET	4	E/W STREET
FOOTHILL FWY OVERPASS		OAK GROVE DRIVE

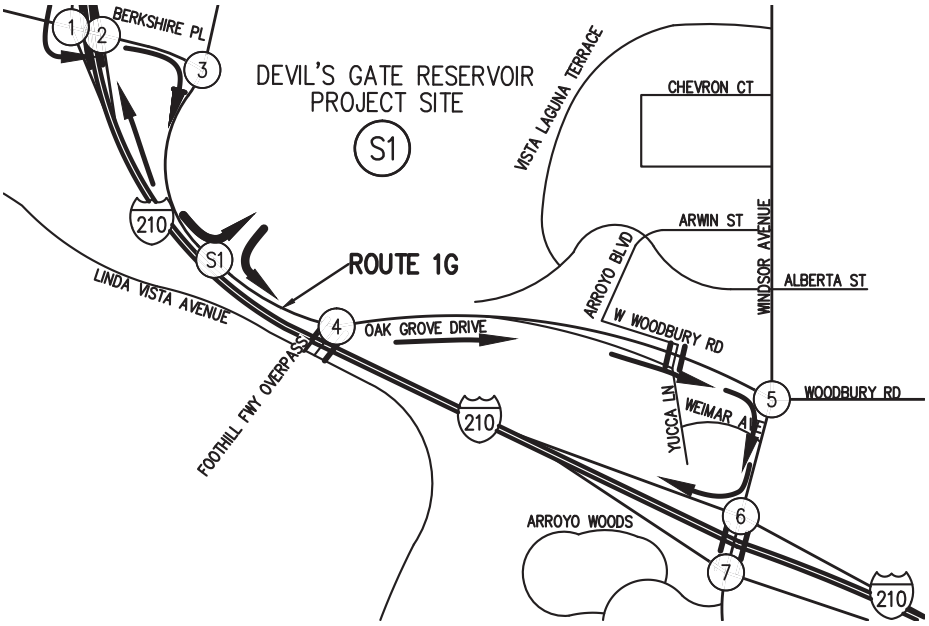
				0%	0%	0%					
				0%	0%	0%					
				0%	0%	0%					
				0%	0%	0%					
0%	0%	0%	0%					0%	0%	0%	0%
5%	10%	5%	5%		TS			5%	5%	5%	5%
5%	5%	5%	5%					5%	5%	5%	5%
				5%	0%	5%					
				5%	0%	5%					
				5%	0%	5%					
				5%	0%	5%					

N/S STREET	5	E/W STREET
WINDSOR AVE		OAK GROVE DRIVE

				5%	5%	5%					
				10%	5%	5%					
				10%	5%	5%					
				5%	5%	5%					
5%	5%	5%	5%					10%	15%	15%	5%
5%	5%	5%	5%		TS			5%	5%	5%	5%
5%	5%	5%	5%					5%	5%	5%	5%
				5%	5%	5%					
				5%	5%	5%					
				5%	5%	5%					
				5%	5%	5%					

N/S STREET	6	E/W STREET
WINDSOR AVE		I-210 FWY WB RAMPS

				5%	5%	0%					
				5%	5%	0%					
				5%	5%	0%					
				5%	5%	0%					
0%	0%	0%	0%					5%	5%	5%	5%
0%	0%	0%	0%		TS			5%	5%	5%	5%
0%	0%	0%	0%					5%	5%	5%	5%
				5%	5%	0%					
				5%	5%	0%					
				5%	5%	0%					
				5%	5%	0%					



LEGEND

N/S STREET	S#	E/W STREET

				7AM-9AM							
				2PM-4PM							
				4PM-6PM							
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM	
				TS							
				7AM-9AM							
				2PM-4PM							
				4PM-6PM							

LEGEND

S# – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 1G
TRUCK PERCENTAGES

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-1-7B

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N/S STREET	1	E/W STREET
I-210 FWY EB RAMPS		BERKSHIRE PLACE

N/S STREET	2	E/W STREET
I-210 FWY WB RAMPS		BERKSHIRE PLACE

N/S STREET	3	E/W STREET
OAK GROVE DRIVE		BERKSHIRE PLACE

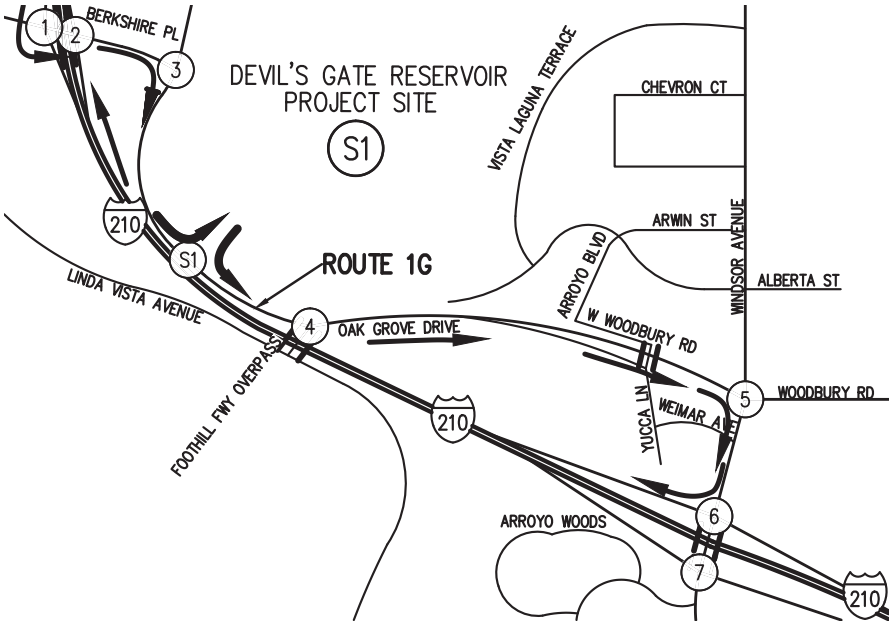
N/S STREET	4	E/W STREET
FOOTHILL FWY OVERPASS		OAK GROVE DRIVE

N/S STREET	5	E/W STREET
WINDSOR AVE		OAK GROVE DRIVE

N/S STREET	6	E/W STREET
WINDSOR AVE		I-210 FWY WB RAMPS

N

NOT TO SCALE



LEGEND

N/S STREET	S#	E/W STREET
		7AM-9AM
		2PM-4PM
		4PM-6PM
7AM - 9AM, 2PM - 4PM, 4PM - 6PM	TS	7AM - 9AM, 2PM - 4PM, 4PM - 6PM
		7AM-9AM
		2PM-4PM
		4PM-6PM

LEGEND

S# – DISPOSAL SITE

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ROUTE 1G
PCE PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE

4-1-7C

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 1\FIG 4-1-7C.dwg
Last Opened: Oct 04, 2013 - 10:27am by: TMunoz

N/S STREET				1			E/W STREET			
I-210 FWY EB RAMPS							BERKSHIRE PLACE			
				85	5	380				
				45	5	160				
				60	5	205				
				90	5	220				
0	0	0	0					0	0	0	0
250	100	125	80		TS			120	110	165	160
125	55	80	70					140	80	260	335
				0	0	0				
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET				2			E/W STREET			
I-210 FWY WB RAMPS							BERKSHIRE PLACE			
				0	0	0				
				0	0	0				
				0	0	0				
				0	0	0				
95	50	50	65					255	170	225	410
340	230	230	235		TS			190	110	110	405
0	0	0	0					0	0	0	0
				60	5	275				
				55	5	70				
				65	5	115				
				95	5	80				

N/S STREET				3			E/W STREET			
OAK GROVE DRIVE							BERKSHIRE PLACE			
				360	70	0				
				215	100	0				
				745	140	0				
				750	245	0				
510	150	330	185					0	0	0	0
0	0	0	0		TS			0	0	0	0
125	115	100	140					0	0	0	0
				140	450	0				
				65	135	0				
				75	95	0				
				65	150	0				

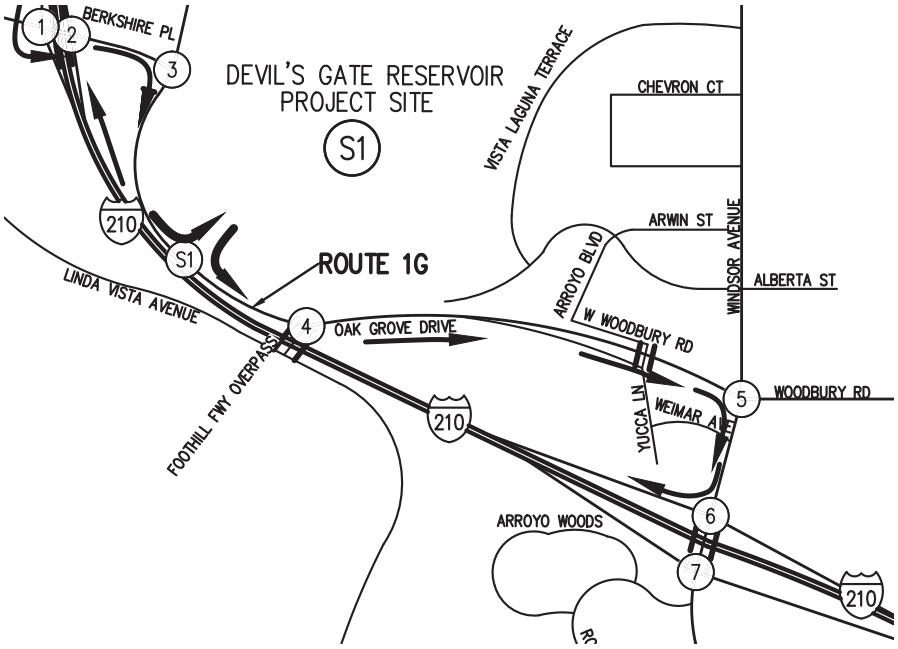
N/S STREET				4			E/W STREET			
FOOTHILL FWY OVERPASS							OAK GROVE DRIVE			
				0	0	0				
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0	0					0	0	0	0
170	160	195	320					465	170	125	130
50	65	60	80					180	60	40	60
				125	0	95				
				55	0	60				
				60	0	65				
				70	0	60				

N/S STREET				5			E/W STREET			
WINDSOR AVE							OAK GROVE DRIVE			
				35	590	55				
				10	300	40				
				20	340	40				
				5	525	60				
20	25	20	40					45	35	30	50
105	140	140	240		TS			425	160	110	155
95	70	85	80					555	300	350	440
				70	605	455				
				30	290	365				
				20	355	435				
				25	495	570				

N/S STREET				6			E/W STREET			
WINDSOR AVE							I-210 FWY WB RAMPS			
				585	585	0				
				335	370	0				
				330	435	0				
				500	550	0				
0	0	0	0					570	275	335	405
0	0	0	0		TS			5	5	5	5
0	0	0	0					5	20	20	25
				40	555	0				
				45	420	0				
				45	500	0				
				100	500	0				

N

NOT TO SCALE



LEGEND

N/S STREET				S#			E/W STREET			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM			TS			7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

S# – DISPOSAL SITE

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ROUTE 1G
EXISTING + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-1-7D

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 1\FIG 4-1-7D.dwg
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N/S STREET	1	E/W STREET
I-210 FWY EB RAMPS		BERKSHIRE PLACE
	90 5 475	
	50 5 255	
	70 5 235	
	90 5 305	
0 0 0 0		0 0 0 0
250 105 145 85	TS	125 115 190 160
130 60 90 70		145 90 400 335
	0 0 0	
	0 0 0	
	0 0 0	
	0 0 0	

N/S STREET	2	E/W STREET
I-210 FWY WB RAMPS		BERKSHIRE PLACE
	0 0 0	
	0 0 0	
	0 0 0	
	0 0 0	
95 55 75 65		270 170 745 410
435 325 455 320	TS	200 120 335 410
0 0 0 0		0 0 0 0
	60 5 285	
	60 5 70	
	75 5 135	
	95 5 85	

N/S STREET	3	E/W STREET
OAK GROVE DRIVE		BERKSHIRE PLACE
	365 85 0	
	225 115 0	
	855 180 0	
	755 250 0	
520 160 380 200		0 0 0 0
0 0 0 0	TS	0 0 0 0
210 205 190 225		0 0 0 0
	145 455 0	
	65 140 0	
	85 110 0	
	65 160 0	

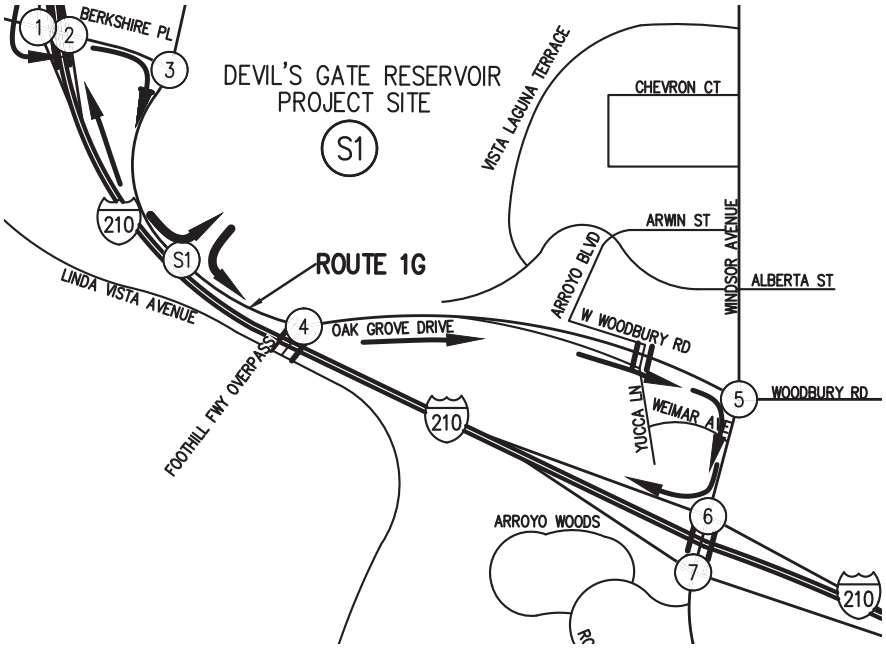
N/S STREET	4	E/W STREET
FOOTHILL FWY OVERPASS		OAK GROVE DRIVE
	0 0 0	
	0 0 0	
	0 0 0	
	0 0 0	
0 0 0 0		0 0 0 0
300 290 325 435		480 185 145 140
55 65 70 80		190 65 45 60
	130 0 100	
	60 0 65	
	70 0 75	
	70 0 60	

N/S STREET	5	E/W STREET
WINDSOR AVE		OAK GROVE DRIVE
	35 600 55	
	15 310 40	
	25 390 40	
	5 525 60	
20 25 20 40		55 45 45 50
115 150 160 250	TS	440 165 125 175
210 180 200 190		575 330 405 445
	75 610 495	
	30 305 380	
	25 410 500	
	25 495 575	

N/S STREET	6	E/W STREET
WINDSOR AVE		I-210 FWY WB RAMPS
	700 595 0	
	465 380 0	
	480 500 0	
	620 550 0	
0 0 0 0		580 280 385 410
0 0 0 0	TS	5 5 5 5
0 0 0 0		5 20 20 25
	40 580 0	
	45 425 0	
	50 575 0	
	100 690 0	

N

NOT TO SCALE



LEGEND

N/S STREET	S#	E/W STREET
	7AM-9AM	
	2PM-4PM	
	4PM-6PM	
7AM - 9AM / 2PM - 4PM / 4PM - 6PM	TS	7AM - 9AM / 2PM - 4PM / 4PM - 6PM
	7AM-9AM	
	2PM-4PM	
	4PM-6PM	

LEGEND

S# – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 1G
PCE EXISTING + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-1-7E

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Last Opened: Oct 04, 2013 - 10:27am by: TMunoz

Table 4-1-7
Intersection Capacity Analysis – Existing + Project Conditions (Route 1G)
Traffic Impact Analysis - Site 1

Route1G		AM				MID-DAY (12-2 PM)				MID-DAY (2-4 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
1	Berkshire Place and I-210 Freeway Eastbound Ramps (3)	E	37	-	-	B	10.2	-	-	C	16.3	-	-	C	17.9	-	-
2	Berkshire Place and I-210 Freeway Westbound Ramps (3)	B	10.2	-	-	A	4.6	-	-	A	6.7	-	-	A	3.7	-	-
3	Oak Grove Drive and Berkshire Place	B	10	0.60	A	A	5.9	0.20	A	A	7.7	0.52	A	A	6.6	0.49	A
4	Oak Grove Drive and Foothill Freeway Overpass (3)	C	15.8	-	-	A	9.2	-	-	A	9.2	-	-	B	10.9	-	-
5	Windsor Ave and Oak Grove Drive/Woodbury Rd	C	23.9	0.84	C	B	16.9	0.48	A	B	16.8	0.55	A	B	13.2	0.59	B
6	Windsor Ave/Arroyo Blvd and I-210 Freeway Westbound Ramps	A	8.6	0.56	A	A	5.5	0.30	A	A	5.9	0.34	A	A	7	0.40	B

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
(5)V/C-HCM Volume to Capacity Ratio

Source: **Hall & Foreman, Inc.**

Haul Route 1G Analysis

As presented in *Table 4-1-7*, under the existing plus project conditions for Site 1 (Routes 1G) most of the study intersections are anticipated to continue to operate at acceptable HCM LOS of C or better for the AM, Mid-day (12-2 PM), Mid-day (2-4 PM), and PM peak hours. The intersection of Berkshire Place and I-210 Freeway Eastbound Ramps is anticipated to operate at HCM LOS E during the AM peak period, mitigation is recommended.

Haul Route 1H

The Haul Route 1H project trips, truck percentages and passenger car equivalent (PCE) project trips are illustrated in *Figure 4-1-8A* through *Figure 4-1-8C.* The existing plus project AM (7-9), MID-DAY (12-2), MID-DAY (2-4), PM (4-6) turn movement volumes, are provided in *Figure 4-1-8D.* For comparison the (PCE) existing plus project turn movement volumes are provided in *Figure 4-1-8E.*

N/S STREET	2	E/W STREET
I-210 FWY WB RAMPS		BERKSHIRE PLACE

N/S STREET	3	E/W STREET
OAK GROVE DRIVE		BERKSHIRE PLACE

N/S STREET	4	E/W STREET
FOOTHILL FWY OVERPASS		OAK GROVE DRIVE

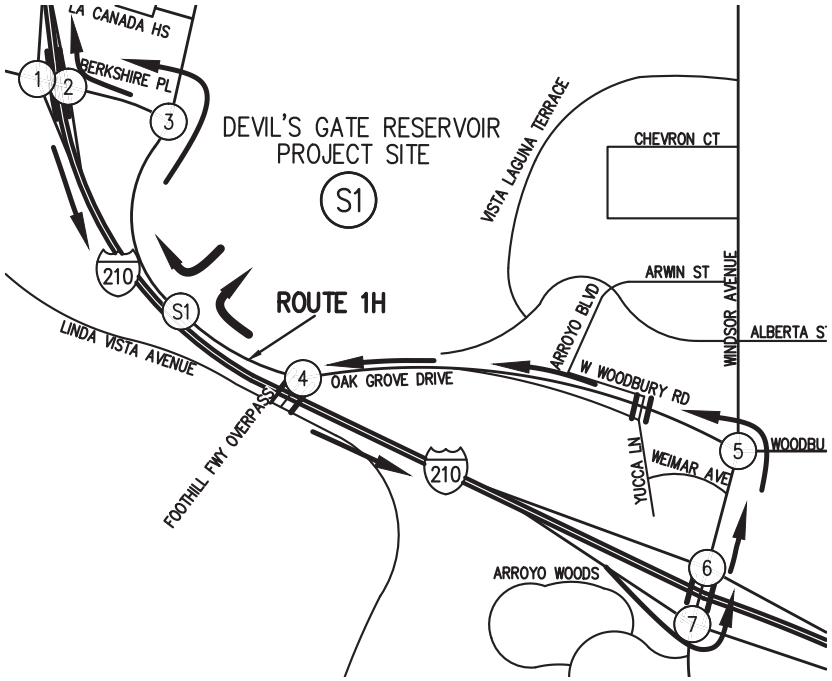
N/S STREET	5	E/W STREET
WINDSOR AVE		OAK GROVE DRIVE

N/S STREET	6	E/W STREET
WINDSOR AVE		I-210 FWY WB RAMPS

N/S STREET	7	E/W STREET
WINDSOR AVE		I-210 FWY EB RAMPS

N

NOT TO SCALE



LEGEND

N/S STREET	S#	E/W STREET
	7AM-9AM	
	2PM-4PM	
	4PM-6PM	
7AM - 9AM, 2PM - 4PM, 4PM - 6PM	TS	7AM - 9AM, 2PM - 4PM, 4PM - 6PM
	7AM-9AM	
	2PM-4PM	
	4PM-6PM	

LEGEND

S# – DISPOSAL SITE

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ROUTE 1H PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE

4-1-8A

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N/S STREET	2	E/W STREET
I-210 FWY WB RAMPS		BERKSHIRE PLACE

				0%	0%	0%						
				0%	0%	0%						
				0%	0%	0%						
				0%	0%	0%						
5%	5%	5%	5%					21%	5%	14%	5%	
5%	5%	5%	5%	←	TS		→	5%	5%	5%	5%	
0%	0%	0%	0%					0%	0%	0%	0%	
				5%	5%	5%						
				5%	5%	5%						
				5%	5%	5%						
				5%	5%	5%						

N/S STREET	3	E/W STREET
OAK GROVE DRIVE		BERKSHIRE PLACE

				5%	10%	0%						
				5%	10%	0%						
				5%	10%	0%						
				5%	5%	0%						
5%	5%	5%	5%					0%	0%	0%	0%	
0%	0%	0%	0%	←	TS		→	0%	0%	0%	0%	
5%	5%	5%	5%					0%	0%	0%	0%	
				30%	5%	0%						
				5%	5%	0%						
				5%	5%	0%						
				43%	5%	0%						

N/S STREET	4	E/W STREET
FOOTHILL FWY OVERPASS		OAK GROVE DRIVE

				0%	0%	0%						
				0%	0%	0%						
				0%	0%	0%						
				0%	0%	0%						
0%	0%	0%	0%					0%	0%	0%	0%	
5%	10%	10%	5%	←	TS		→	5%	5%	5%	5%	
5%	5%	5%	5%					5%	5%	5%	5%	
				5%	0%	5%						
				5%	0%	5%						
				5%	0%	5%						
				5%	0%	5%						

N/S STREET	5	E/W STREET
WINDSOR AVE		OAK GROVE DRIVE

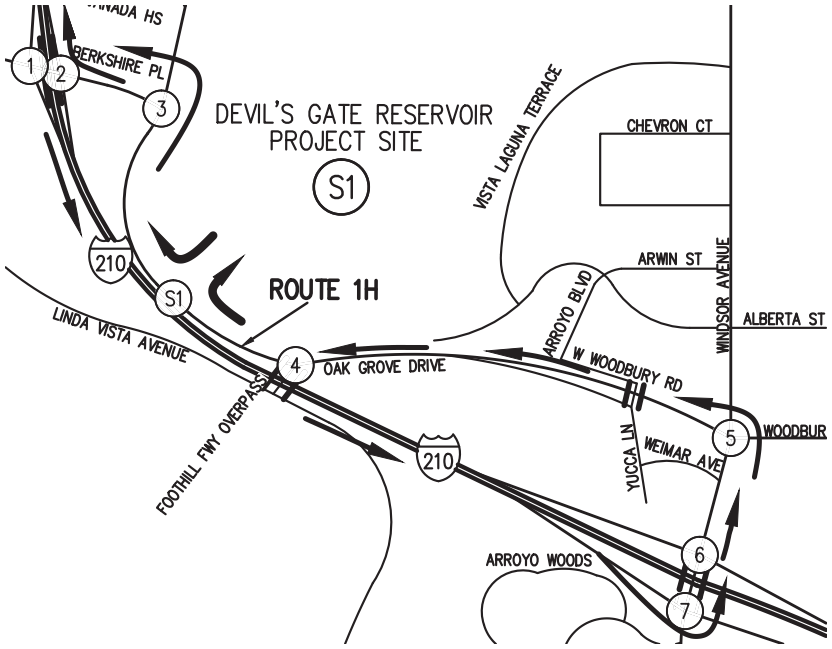
				5%	5%	5%						
				10%	5%	5%						
				10%	5%	5%						
				5%	5%	5%						
5%	5%	5%	5%					10%	15%	15%	5%	
5%	5%	5%	5%	←	TS		→	5%	5%	5%	5%	
5%	5%	5%	5%					5%	5%	5%	5%	
				5%	5%	5%						
				5%	5%	5%						
				5%	5%	5%						
				5%	5%	5%						

N/S STREET	6	E/W STREET
WINDSOR AVE		I-210 FWY WB RAMPS

				5%	5%	0%						
				5%	5%	0%						
				5%	5%	0%						
				5%	5%	0%						
0%	0%	0%	0%					5%	5%	5%	5%	
0%	0%	0%	0%	←	TS		→	5%	5%	5%	5%	
0%	0%	0%	0%					5%	5%	5%	5%	
				5%	5%	0%						
				5%	5%	0%						
				5%	5%	0%						
				5%	5%	0%						

N/S STREET	7	E/W STREET
WINDSOR AVE		I-210 FWY EB RAMPS

				0%	5%	5%						
				0%	5%	5%						
				0%	5%	5%						
				0%	5%	5%						
5%	5%	12%	5%					0%	0%	0%	0%	
5%	5%	5%	5%	←	TS		→	0%	0%	0%	0%	
5%	5%	5%	5%					0%	0%	0%	0%	
				0%	5%	5%						
				0%	5%	5%						
				0%	5%	5%						
				0%	5%	5%						



LEGEND

N/S STREET	S#	E/W STREET

				7AM-9AM								
				2PM-4PM								
				4PM-6PM								
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM		
			←	TS		→						
				7AM-9AM								
				2PM-4PM								
				4PM-6PM								

LEGEND

S# – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 1H
TRUCK PERCENTAGES

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-1-8B

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 1\FIG 4-1-8B.dwg
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N/S STREET	2	E/W STREET
I-210 FWY WB RAMPS		BERKSHIRE PLACE

N/S STREET	3	E/W STREET
OAK GROVE DRIVE		BERKSHIRE PLACE

N/S STREET	4	E/W STREET
FOOTHILL FWY OVERPASS		OAK GROVE DRIVE

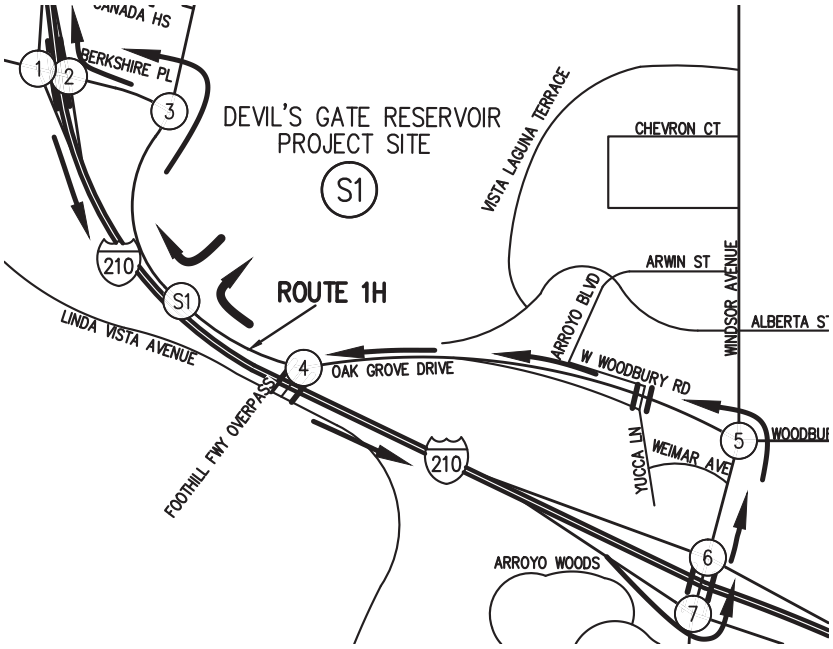
N/S STREET	5	E/W STREET
WINDSOR AVE		OAK GROVE DRIVE

N/S STREET	6	E/W STREET
WINDSOR AVE		I-210 FWY WB RAMPS

N/S STREET	7	E/W STREET
WINDSOR AVE		I-210 FWY EB RAMPS

N

NOT TO SCALE



LEGEND

N/S STREET	S#	E/W STREET
	7AM-9AM	
	2PM-4PM	
	4PM-6PM	
7AM - 9AM, 2PM - 4PM, 4PM - 6PM	TS	7AM - 9AM, 2PM - 4PM, 4PM - 6PM
	7AM-9AM	
	2PM-4PM	
	4PM-6PM	

LEGEND

S# – DISPOSAL SITE

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ROUTE 1H
PCE PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-1-8C

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 1\FIG 4-1-8C.dwg
Last Opened: Oct 04, 2013 - 10:40am by: TMunoz

N/S STREET	2	E/W STREET
I-210 FWY WB RAMPS		BERKSHIRE PLACE

				0	0	0					
				0	0	0					
				0	0	0					
				0	0	0					
95	50	50	65					310	225	225	465
285	175	175	180		TS			190	110	110	405
0	0	0	0					0	0	0	0
				60	5	275					
				55	5	70					
				65	5	115					
				95	5	80					

N/S STREET	3	E/W STREET
OAK GROVE DRIVE		BERKSHIRE PLACE

				360	70	0					
				215	100	0					
				745	140	0					
				750	245	0					
510	150	330	185					0	0	0	0
0	0	0	0		TS			0	0	0	0
70	60	45	85					0	0	0	0
				195	450	0					
				120	135	0					
				130	95	0					
				120	150	0					

N/S STREET	4	E/W STREET
FOOTHILL FWY OVERPASS		OAK GROVE DRIVE

				0	0	0					
				0	0	0					
				0	0	0					
				0	0	0					
0	0	0	0					0	0	0	0
115	105	140	265					520	225	180	185
50	65	60	80					180	60	40	60
				125	0	95					
				55	0	60					
				60	0	65					
				70	0	60					

N/S STREET	5	E/W STREET
WINDSOR AVE		OAK GROVE DRIVE

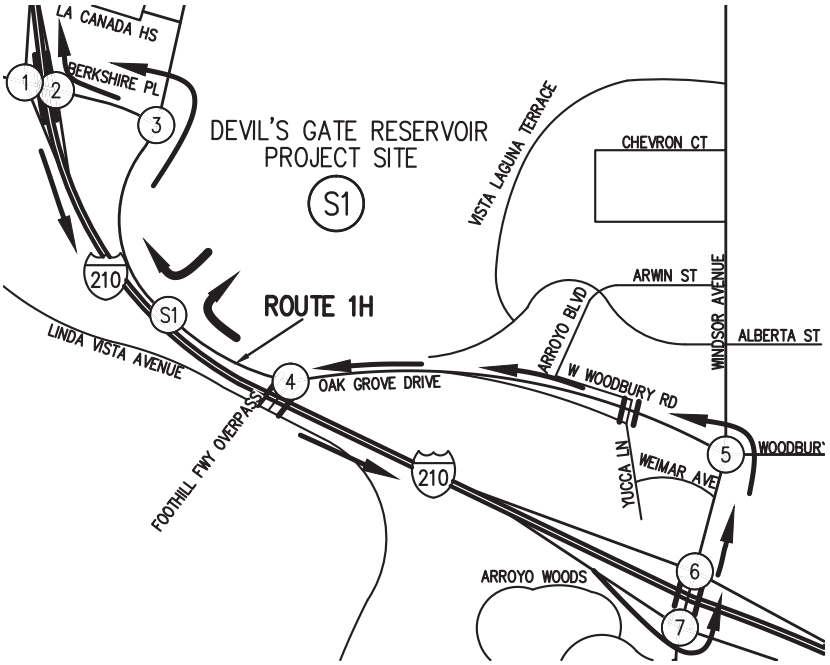
				35	590	55					
				10	300	40					
				20	340	40					
				5	525	60					
20	25	40	40					45	35	30	50
105	140	240	240		TS			425	160	110	155
40	15	25	25					555	300	350	440
				125	605	455					
				85	290	365					
				75	355	435					
				80	495	570					

N/S STREET	6	E/W STREET
WINDSOR AVE		I-210 FWY WB RAMPS

				530	585	0					
				280	370	0					
				275	435	0					
				445	550	0					
0	0	0	0					570	275	335	405
0	0	0	0		TS			5	5	5	5
0	0	0	0					5	20	20	25
				40	610	0					
				45	475	0					
				45	555	0					
				100	745	0					

N/S STREET	7	E/W STREET
WINDSOR AVE		I-210 FWY EB RAMPS

				0	190	415					
				0	100	295					
				0	160	280					
				0	165	415					
605	375	425	650					0	0	0	0
5	5	5	5		TS			0	0	0	0
105	55	50	105					0	0	0	0
				0	130	20					
				0	145	15					
				0	160	15					
				0	195	15					



LEGEND

N/S STREET	S#	E/W STREET

				7AM-9AM							
				2PM-4PM							
				4PM-6PM							
7AM - 9AM	2PM - 4PM	4PM - 6PM			TS			7AM - 9AM	2PM - 4PM	4PM - 6PM	
				7AM-9AM							
				2PM-4PM							
				4PM-6PM							

LEGEND

S# – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

N

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ROUTE 1H
EXISTING + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-1-8D

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 1\FIG 4-1-8D.dwg
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N/S STREET				2	E/W STREET			
I-210 FWY WB RAMPS					BERKSHIRE PLACE			
				0 0 0				
				0 0 0				
				0 0 0				
				0 0 0				
95	55	75	65				435	335	745	575
295	185	315	180		TS		200	120	335	410
0	0	0	0				0	0	0	0
				60 5 285				
				60 5 70				
				75 5 135				
				95 5 85				

N/S STREET				3	E/W STREET			
OAK GROVE DRIVE					BERKSHIRE PLACE			
				365 85 0				
				225 115 0				
				855 180 0				
				755 250 0				
520	160	380	200				0	0	0	0
0	0	0	0		TS		0	0	0	0
70	65	50	85				0	0	0	0
				310 455 0				
				230 140 0				
				250 110 0				
				230 160 0				

N/S STREET				4	E/W STREET			
FOOTHILL FWY OVERPASS					OAK GROVE DRIVE			
				0 0 0				
				0 0 0				
				0 0 0				
				0 0 0				
0	0	0	0				0	0	0	0
135	125	270	270				620	325	285	280
55	65	80	80				190	65	45	60
				130 0 100				
				60 0 65				
				70 0 75				
				70 0 60				

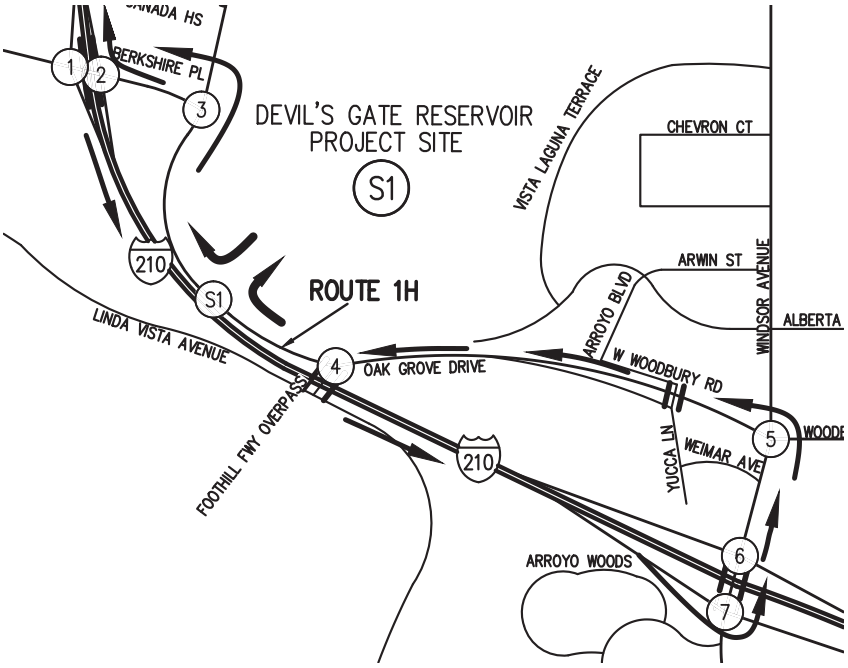
N/S STREET				5	E/W STREET			
WINDSOR AVE					OAK GROVE DRIVE			
				35 600 55				
				15 310 40				
				25 390 40				
				5 525 60				
20	25	40	40				55	45	45	50
115	150	250	250		TS		440	165	125	175
45	15	25	25				575	330	405	445
				215 610 495				
				170 305 380				
				165 410 500				
				165 495 575				

N/S STREET				6	E/W STREET			
WINDSOR AVE					I-210 FWY WB RAMPS			
				535 595 0				
				300 380 0				
				315 500 0				
				455 550 0				
0	0	0	0				580	280	385	410
0	0	0	0		TS		5	5	5	5
0	0	0	0				5	20	20	25
				40 720 0				
				45 565 0				
				50 715 0				
				100 830 0				

N/S STREET				7	E/W STREET			
WINDSOR AVE					I-210 FWY EB RAMPS			
				0 200 420				
				0 105 300				
				0 185 320				
				0 165 415				
690	460	510	735				0	0	0	0
5	5	5	5		TS		0	0	0	0
105	55	50	105				0	0	0	0
				0 130 20				
				0 150 20				
				0 185 15				
				0 195 15				

N

NOT TO SCALE



LEGEND

N/S STREET				S#	E/W STREET			
				7AM-9AM				
				2PM-4PM				
				4PM-6PM				
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS		7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM				
				2PM-4PM				
				4PM-6PM				

LEGEND

S# – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 1H
PCE EXISTING + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-1-8E

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 1\FIG 4-1-8E.dwg
Last Opened: Oct 04, 2013 - 10:40am by: TMunoz

Table 4-1-8
Intersection Capacity Analysis – Existing + Project Conditions (Route 1H)
Traffic Impact Analysis - Site 1

Route1H		AM				MID-DAY (12-2 PM)				MID-DAY (2-4 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
2	Berkshire Place and I-210 Freeway Westbound Ramps (3)	A	9.7	-	-	A	4.5	-	-	A	6	-	-	A	3.6	-	-
3	Oak Grove Drive and Berkshire Place	A	9.6	0.67	A	A	5.4	0.25	A	A	8.8	0.57	A	A	6.8	0.49	A
4	Oak Grove Drive and Foothill Freeway Overpass (3)	C	16.3	-	-	A	9.3	-	-	A	9.2	-	-	B	10.7	-	-
5	Windsor Ave and Oak Grove Drive/Woodbury Rd	C	28.4	0.86	C	B	13.6	0.49	A	B	14.9	0.53	A	B	19	0.74	B
6	Windsor Ave/Arroyo Blvd and I-210 Freeway Westbound Ramps	A	8.7	0.55	A	A	5.5	0.27	A	A	6	0.32	A	A	7.1	0.38	A
7	Windsor Ave/Arroyo Blvd and I-210 Freeway Eastbound Ramps	C	24.5	0.53	A	B	16.5	0.39	A	B	16.1	0.39	A	C	23.9	0.57	A

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
(5)V/C-HCM Volume to Capacity Ratio

Source: **Hall & Foreman, Inc.**

Haul Route 1H Analysis

As presented in *Table 4-1-8*, under the existing plus project conditions for Site 1 (Routes 1H) all intersections are anticipated to continue to operate at acceptable HCM LOS of C or better for the AM, Mid-day (12-2 PM), Mid-day (2-4 PM), and PM peak hours. Since all intersections operate with an acceptable HCM LOS mitigation is not required under existing plus project conditions.

Section 2: Manning's Pit (Site 2), Waste Management (Site 3), and Vulcan Materials - Irwindale Site (Site 9)

Haul Route 2A

The Haul Route 2A project trips, truck percentages and passenger car equivalent (PCE) project trips are illustrated in *Figure 4-2-1A* through *Figure 4-2-1C.* The existing plus project AM (7-9), MID-DAY (12-2), PM (4-6) turn movement volumes, are provided in *Figure 4-2-1D.* For comparison the (PCE) existing plus project turn movement volumes are provided in *Figure 4-2-1E.*

N/S STREET	8	E/W STREET
IRWINDALE AVE		I-210 FWY WB RAMPS

			0	0	0					
			0	0	0					
			0	0	0					
0	0	0					0	0	0	
0	0	0		TS			0	0	0	
0	0	0					0	0	0	
			0	0	50					
			0	0	50					
			0	0	50					

N/S STREET	9	E/W STREET
IRWINDALE AVE		I-210 FWY EB RAMPS

			0	0	0					
			0	0	0					
			0	0	0					
0	0	0					0	0	0	
0	0	0		TS			0	0	0	
50	50	50					0	0	0	
			0	50	0					
			0	50	0					
			0	50	0					

N/S STREET	10	E/W STREET
IRWINDALE AVE		FIRST STREET

			0	50	0					
			0	50	0					
			0	50	0					
0	0	0					0	0	0	
0	0	0		TS			0	0	0	
0	0	0					0	0	0	
			0	50	0					
			0	50	0					
			0	50	0					

N/S STREET	11	E/W STREET
IRWINDALE AVE		GLADSTONE STREET

			0	0	50					
			0	0	50					
			0	0	50					
0	0	0					50	50	50	
0	0	0		TS			0	0	0	
0	0	0					0	0	0	
			0	0	0					
			0	0	0					
			0	0	0					

N/S STREET	12	E/W STREET
VINCENT AVE		GLADSTONE STREET

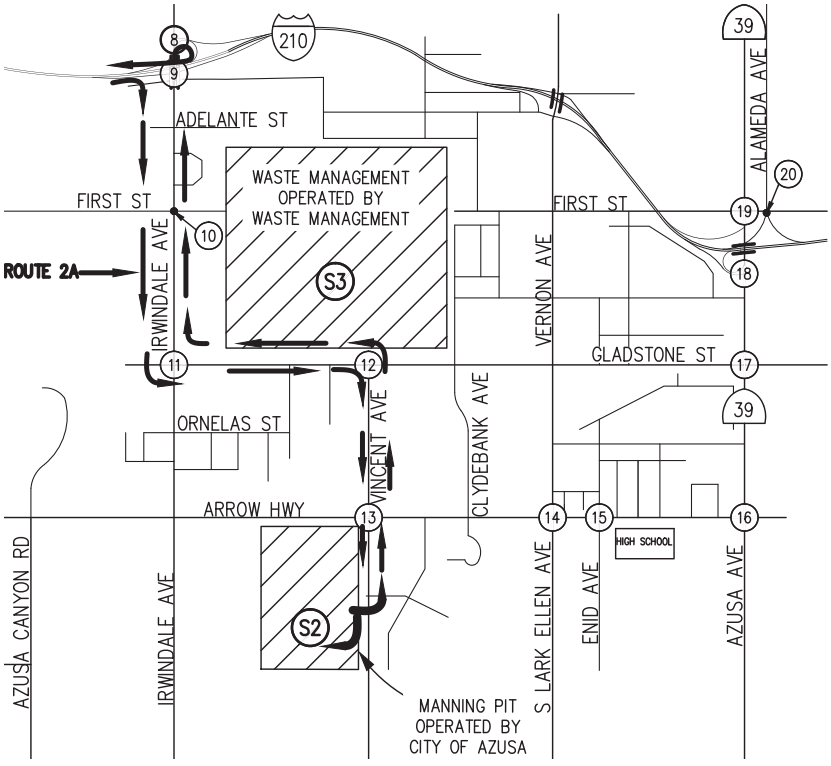
			0	0	0					
			0	0	0					
			0	0	0					
0	0	0					0	0	0	
0	0	0		TS			0	0	0	
50	50	50					0	0	0	
			50	0	0					
			50	0	0					
			50	0	0					

N/S STREET	13	E/W STREET
VINCENT AVE		ARROW HWY

			0	50	0					
			0	50	0					
			0	50	0					
0	0	0					0	0	0	
0	0	0		TS			0	0	0	
0	0	0					0	0	0	
			0	50	0					
			0	50	0					
			0	50	0					

N

NOT TO SCALE



LEGEND

N/S STREET	S#	E/W STREET
	7AM-9AM	
	2PM-4PM	
	4PM-6PM	

7AM - 9AM	2PM - 4PM	4PM - 6PM		TS			7AM - 9AM	2PM - 4PM	4PM - 6PM	

	7AM-9AM	
	2PM-4PM	
	4PM-6PM	

LEGEND

S# – DISPOSAL SITE

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ROUTE 2A PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE

4-2-1A

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 2\FIG 4-2-1A.dwg
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N/S STREET			8			E/W STREET			
IRWINDALE AVE						I-210 FWY WB RAMPS			
			10%	10%	0%				
			5%	5%	0%				
			5%	5%	0%				
0%	0%	0%					10%	5%	5%
0%	0%	0%		TS			0%	0%	0%
0%	0%	0%					5%	10%	5%
			0%	10%	10%				
			0%	10%	10%				
			0%	10%	5%				

N/S STREET			9			E/W STREET			
IRWINDALE AVE						I-210 FWY EB RAMPS			
			0%	10%	10%				
			0%	10%	5%				
			0%	5%	5%				
10%	10%	5%					0%	0%	0%
5%	5%	5%		TS			0%	0%	0%
5%	10%	5%					0%	0%	0%
			0%	5%	5%				
			0%	5%	10%				
			0%	5%	5%				

N/S STREET			10			E/W STREET			
IRWINDALE AVE						FIRST STREET			
			20%	10%	25%				
			35%	15%	5%				
			40%	5%	10%				
40%	30%	10%					10%	20%	15%
5%	5%	5%		TS			5%	5%	5%
35%	20%	15%					5%	5%	5%
			5%	10%	40%				
			15%	10%	5%				
			5%	5%	40%				

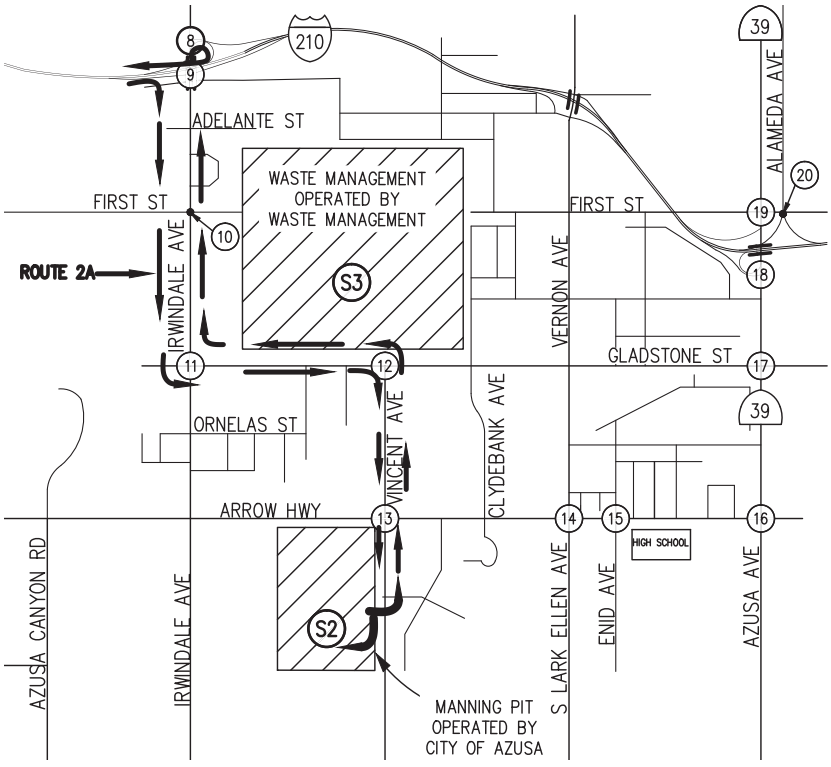
N/S STREET			11			E/W STREET			
IRWINDALE AVE						GLADSTONE STREET			
			5%	5%	25%				
			5%	10%	30%				
			30%	5%	10%				
5%	5%	5%					10%	20%	5%
35%	20%	5%		TS			5%	10%	10%
25%	5%	5%					5%	5%	5%
			20%	10%	10%				
			5%	10%	5%				
			40%	5%	10%				

N/S STREET			12			E/W STREET			
VINCENT AVE						GLADSTONE STREET			
			70%	15%	5%				
			65%	5%	20%				
			35%	5%	5%				
75%	70%	5%					5%	5%	5%
5%	5%	5%		TS			5%	5%	5%
25%	49%	33%					5%	5%	5%
			5%	90%	5%				
			37%	100%	5%				
			56%	5%	5%				

N/S STREET			13			E/W STREET			
VINCENT AVE						ARROW HWY			
			10%	10%	5%				
			5%	20%	5%				
			5%	5%	5%				
5%	5%	5%					5%	5%	5%
5%	5%	5%		TS			5%	5%	5%
5%	10%	5%					5%	5%	5%
			5%	5%	5%				
			10%	15%	5%				
			5%	5%	5%				

N

NOT TO SCALE



LEGEND

N/S STREET			S#			E/W STREET			
			7AM-9AM						
			2PM-4PM						
			4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS		7AM - 9AM	2PM - 4PM	4PM - 6PM	
			7AM-9AM						
			2PM-4PM						
			4PM-6PM						

LEGEND

(S#) – DISPOSAL SITE

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ROUTE 2A
TRUCK PERCENTAGES

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-2-1B

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N/S STREET	8	E/W STREET
IRWINDALE AVE		I-210 FWY WB RAMPS

			0	0	0					
			0	0	0					
			0	0	0					
0	0	0					0	0	0	
0	0	0		TS			0	0	0	
0	0	0					0	0	0	
			0	0	150					
			0	0	150					
			0	0	150					

N/S STREET	9	E/W STREET
IRWINDALE AVE		I-210 FWY EB RAMPS

			0	0	0					
			0	0	0					
			0	0	0					
0	0	0					0	0	0	
0	0	0		TS			0	0	0	
150	150	150					0	0	0	
			0	150	0					
			0	150	0					
			0	150	0					

N/S STREET	10	E/W STREET
IRWINDALE AVE		FIRST STREET

			0	150	0					
			0	150	0					
			0	150	0					
0	0	0					0	0	0	
0	0	0		TS			0	0	0	
0	0	0					0	0	0	
			0	150	0					
			0	150	0					
			0	150	0					

N/S STREET	11	E/W STREET
IRWINDALE AVE		GLADSTONE STREET

			0	0	150					
			0	0	150					
			0	0	150					
0	0	0					150	150	150	
0	0	0		TS			0	0	0	
0	0	0					0	0	0	
			0	0	0					
			0	0	0					
			0	0	0					

N/S STREET	12	E/W STREET
VINCENT AVE		GLADSTONE STREET

			0	0	0					
			0	0	0					
			0	0	0					
0	0	0					0	0	0	
0	0	0		TS			0	0	0	
150	150	150					0	0	0	
			150	0	0					
			150	0	0					
			150	0	0					

N/S STREET	13	E/W STREET
VINCENT AVE		ARROW HWY

			0	150	0					
			0	150	0					
			0	150	0					
0	0	0					0	0	0	
0	0	0		TS			0	0	0	
0	0	0					0	0	0	
			0	150	0					
			0	150	0					
			0	150	0					

N

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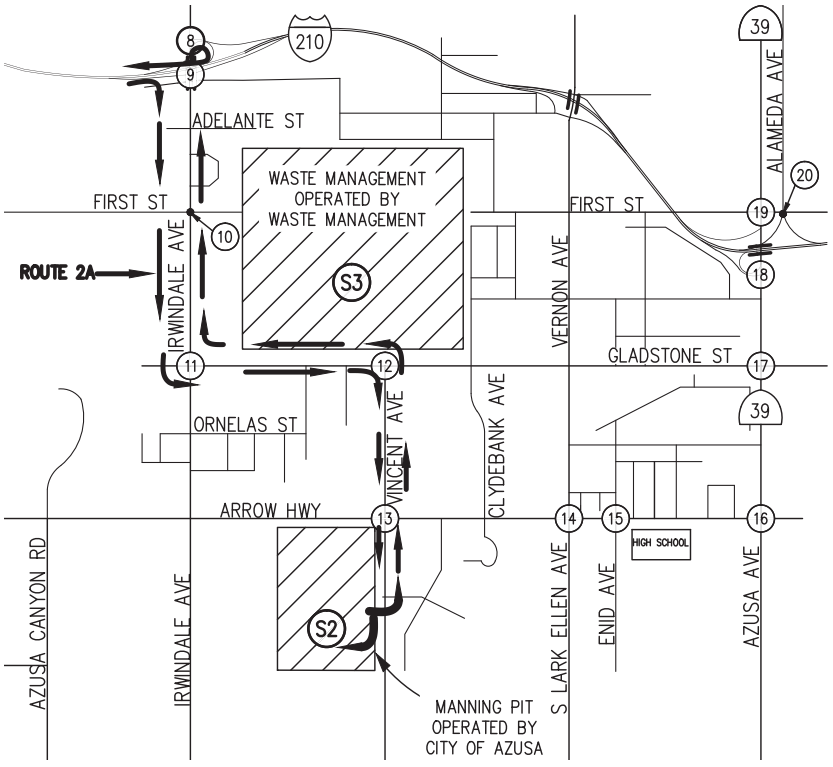

LEGEND

N/S STREET	S#	E/W STREET
	7AM-9AM	
	2PM-4PM	
	4PM-6PM	

7AM - 9AM	2PM - 4PM	4PM - 6PM					7AM - 9AM	2PM - 4PM	4PM - 6PM	
				TS						
			7AM-9AM							
			2PM-4PM							
			4PM-6PM							

LEGEND

S# – DISPOSAL SITE

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ROUTE 2A
PCE PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE

4-2-1C

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N/S STREET			8			E/W STREET		
IRWINDALE AVE						I-210 FWY WB RAMPS		
			610	470	0			
			545	595	0			
			475	895	0			
0	0	0					100	110	145
0	0	0		TS			0	0	0
0	0	0					175	255	145
			0	845	635			
			0	865	470			
			0	755	525			

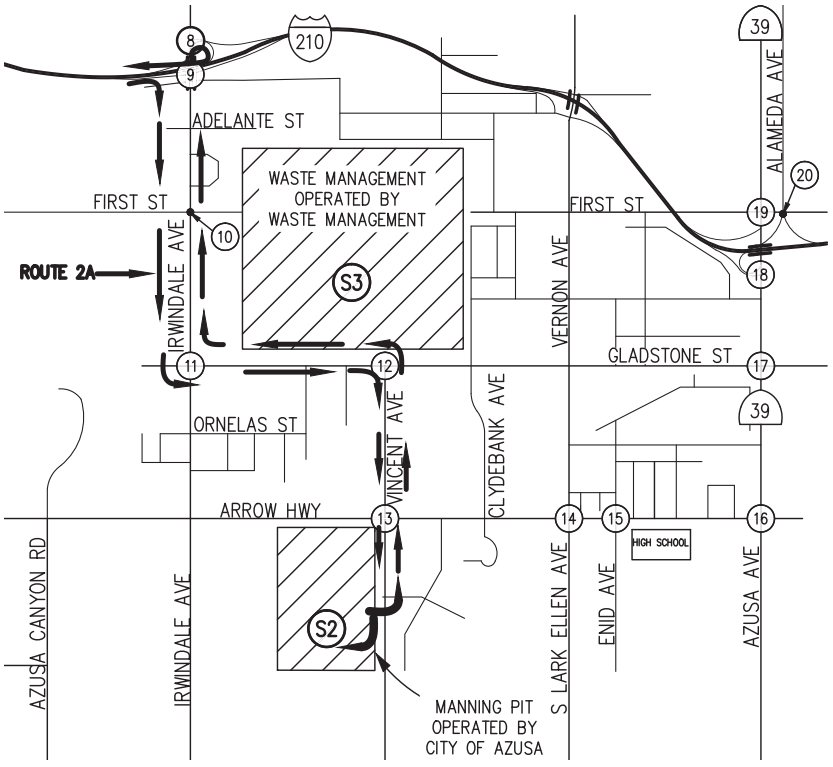
N/S STREET			9			E/W STREET		
IRWINDALE AVE						I-210 FWY EB RAMPS		
			0	545	175			
			0	670	200			
			0	740	300			
470	590	375					0	0	0
5	5	5		TS			0	0	0
695	415	435					0	0	0
			0	945	195			
			0	740	240			
			0	1010	385			

N/S STREET			10			E/W STREET		
IRWINDALE AVE						FIRST STREET		
			125	1105	5			
			170	800	20			
			40	1020	15			
80	135	190					10	15	15
5	10	5		TS			5	5	5
20	95	35					5	15	15
			45	1050	5			
			90	1025	25			
			30	1355	15			

N/S STREET			11			E/W STREET		
IRWINDALE AVE						GLADSTONE STREET		
			5	780	235			
			5	750	215			
			5	700	360			
5	5	5					630	250	225
10	25	70		TS			65	20	10
10	35	30					495	130	130
			10	515	55			
			15	770	90			
			10	1170	330			

N/S STREET			12			E/W STREET		
VINCENT AVE						GLADSTONE STREET		
			20	15	5			
			10	5	10			
			5	5	5			
15	10	5					5	5	5
105	170	585		TS			760	195	240
165	155	200					250	115	150
			360	10	165			
			190	5	170			
			140	5	355			

N/S STREET			13			E/W STREET		
VINCENT AVE						ARROW HWY		
			70	315	30			
			60	205	25			
			55	255	45			
55	80	135					90	45	75
530	655	1395		TS			1215	575	525
80	90	210					120	100	110
			170	365	85			
			75	225	115			
			40	285	105			



LEGEND

N/S STREET			S#			E/W STREET		
			7AM-9AM					
			2PM-4PM					
			4PM-6PM					
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS		7AM - 9AM	2PM - 4PM	4PM - 6PM
			7AM-9AM					
			2PM-4PM					
			4PM-6PM					

LEGEND

S# – DISPOSAL SITE

– STUDY INTERSECTIONS

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ROUTE 2A
EXISTING + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-2-1D

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N/S STREET				8		E/W STREET				
IRWINDALE AVE						I-210 FWY WB RAMPS				
				725	550	0				
				620	645	0				
				495	910	0				
0	0	0						125	120	155
0	0	0		TS				0	0	0
0	0	0						195	315	165
				0	975	830				
				0	950	670				
				0	780	660				

N/S STREET				9		E/W STREET				
IRWINDALE AVE						I-210 FWY EB RAMPS				
				0	660	220				
				0	810	210				
				0	780	315				
540	695	385						0	0	0
5	5	5		TS				0	0	0
890	595	540						0	0	0
				0	1115	215				
				0	925	290				
				0	1135	395				

N/S STREET				10		E/W STREET				
IRWINDALE AVE						FIRST STREET				
				170	1365	5				
				280	1090	25				
				75	1225	20				
140	225	235						10	20	20
5	10	5		TS				5	5	5
30	130	45						5	15	15
				50	1360	10				
				120	1330	25				
				35	1540	25				

N/S STREET				11		E/W STREET				
IRWINDALE AVE						GLADSTONE STREET				
				5	850	435				
				5	875	415				
				10	785	510				
5	5	5						850	440	345
15	35	70		TS				70	25	10
20	35	35						535	145	145
				15	595	65				
				20	890	100				
				15	1250	405				

N/S STREET				12		E/W STREET				
VINCENT AVE						GLADSTONE STREET				
				50	20	5				
				20	5	15				
				5	5	5				
35	25	5						5	5	5
115	180	585		TS				765	205	245
325	300	335						255	115	150
				465	20	190				
				330	5	175				
				240	5	360				

N/S STREET				13		E/W STREET				
VINCENT AVE						ARROW HWY				
				85	460	30				
				65	355	25				
				55	355	45				
60	90	135						90	45	75
540	670	1405		TS				1235	585	530
85	105	210						125	100	110
				175	500	85				
				95	380	115				
				40	395	110				

N

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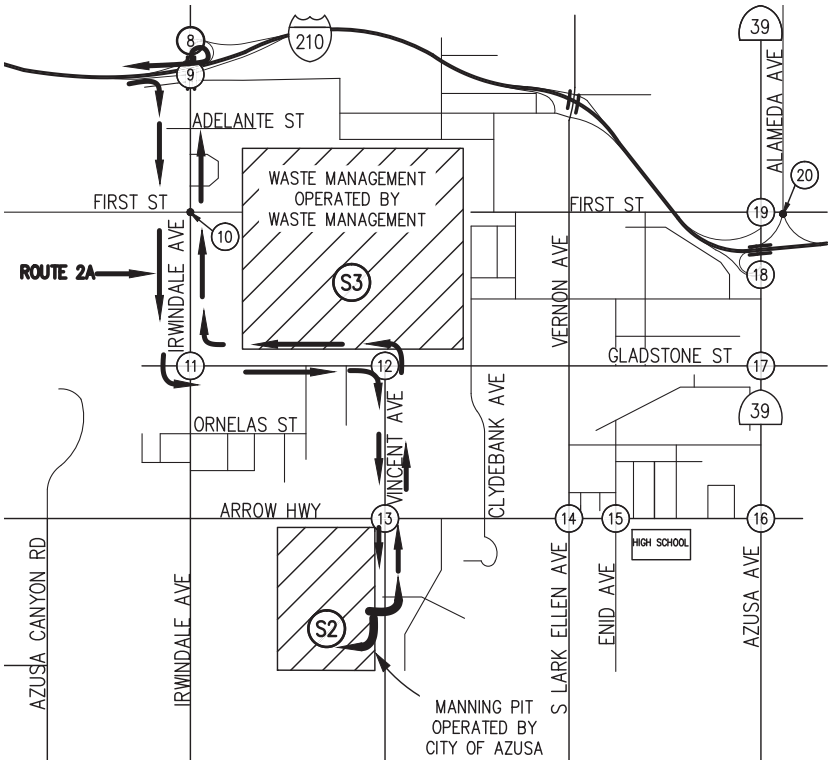

LEGEND

N/S STREET				S#		E/W STREET				
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

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ROUTE 2A
PCE EXISTING + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-2-1E

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Table 4-2-1
Intersection Capacity Analysis – Existing + Project Conditions (Route 2A)
Traffic Impact Analysis - Site 2

Route2A		AM				MID-DAY				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
8	Irwindale Ave and I-210 Freeway Westbound Ramps	A	6.5	0.50	A	A	6.8	0.48	A	A	6.5	0.50	A
9	Irwindale Ave and I-210 Freeway Eastbound Ramps	C	22.3	0.85	C	B	19.0	0.72	B	C	21.5	0.84	C
10	Irwindale Ave and First Street	B	12.6	0.64	A	B	17.4	0.63	B	D	39.1	0.88	B
11	Irwindale Ave and Gladstone Street	C	29.4	0.87	C	B	12.7	0.60	B	C	21.7	0.87	D
12	Vincent Ave and Gladstone Street	B	12.4	0.72	B	A	8.8	0.41	A	B	12.0	0.60	B
13	Vincent Ave and Arrow Hwy	B	14.4	0.80	D	A	9.2	0.40	A	B	12.7	0.77	C

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
(5)V/C-HCM Volume to Capacity Ratio

Source: **Hall & Foreman, Inc.**

Haul Route 2A Analysis

As presented in *Table 4-2-1*, under the existing plus project conditions for Site 2 (Routes 2A) all intersections are anticipated to continue to operating at acceptable HCM LOS of D or better for the AM, Mid-day and PM peak hours. Since all intersections operate with an acceptable HCM LOS mitigation is not required under existing plus project conditions.

Haul Route 2B

The Haul Route 2B project trips, truck percentages and passenger car equivalent (PCE) project trips are illustrated in *Figure 4-2-2A* through *Figure 4-2-2F*. The existing plus project AM (7-9), MID-DAY (12-2), PM (4-6) turn movement volumes, are provided in *Figure 4-2-2G* and *Figure 4-2-2H.* For comparison the (PCE) existing plus project turn movement volumes are provided in *Figure 4-2-2I* and *Figure 4-2-2J.*

N/S STREET	9	E/W STREET
IRWINDALE AVE		I-210 FWY EB RAMPS

				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
50	50	50						0	0	0
				0	50	0				
				0	50	0				
				0	50	0				

N/S STREET	10	E/W STREET
IRWINDALE AVE		FIRST STREET

				0	50	0				
				0	50	0				
				0	50	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	50	0				
				0	50	0				
				0	50	0				

N/S STREET	11	E/W STREET
IRWINDALE AVE		GLADSTONE STREET

				0	0	50				
				0	0	50				
				0	0	50				
0	0	0						50	50	50
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET	12	E/W STREET
VINCENT AVE		GLADSTONE STREET

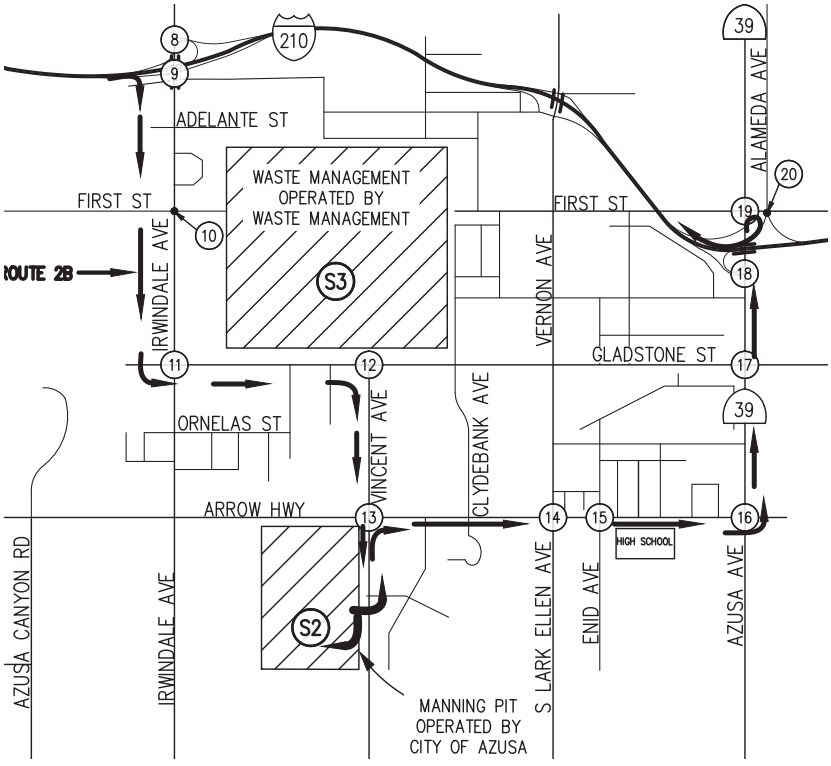
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
50	50	50						0	0	0
				50	0	0				
				50	0	0				
				50	0	0				

N/S STREET	13	E/W STREET
VINCENT AVE		ARROW HWY

				0	50	0				
				0	50	0				
				0	50	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	50	0				
				0	50	0				
				0	50	0				

N/S STREET	14	E/W STREET
LARK ELLEN AVE		ARROW HWY

				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
50	50	50		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				



LEGEND

N/S STREET	S#	E/W STREET

				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS			7AM - 9AM	2PM - 4PM	4PM - 6PM	
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 2B PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-2-2A

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N/S STREET	15	E/W STREET
ENID AVE		ARROW HWY

			0	0	0					
			0	0	0					
			0	0	0					
0	0	0					0	0	0	
50	50	50		TS			0	0	0	
0	0	0					0	0	0	
			0	0	0					
			0	0	0					
			0	0	0					

N/S STREET	16	E/W STREET
AZUSA AVE		ARROW HWY

			0	0	0					
			0	0	0					
			0	0	0					
50	50	50					0	0	0	
0	0	0		TS			0	0	0	
0	0	0					0	0	0	
			0	0	0					
			0	0	0					
			0	0	0					

N/S STREET	17	E/W STREET
AZUSA AVE		GLADSTONE STREET

			0	0	0					
			0	0	0					
			0	0	0					
0	0	0					0	0	0	
0	0	0		TS			0	0	0	
0	0	0					0	0	0	
			0	50	0					
			0	50	0					
			0	50	0					

N/S STREET	18	E/W STREET
AZUSA AVE		I-210 FWY EB RAMPS

			0	0	0					
			0	0	0					
			0	0	0					
0	0	0					0	0	0	
0	0	0		TS			0	0	0	
0	0	0					0	0	0	
			0	50	0					
			0	50	0					
			0	50	0					

N/S STREET	19	E/W STREET
AZUSA AVE		FIRST STREET

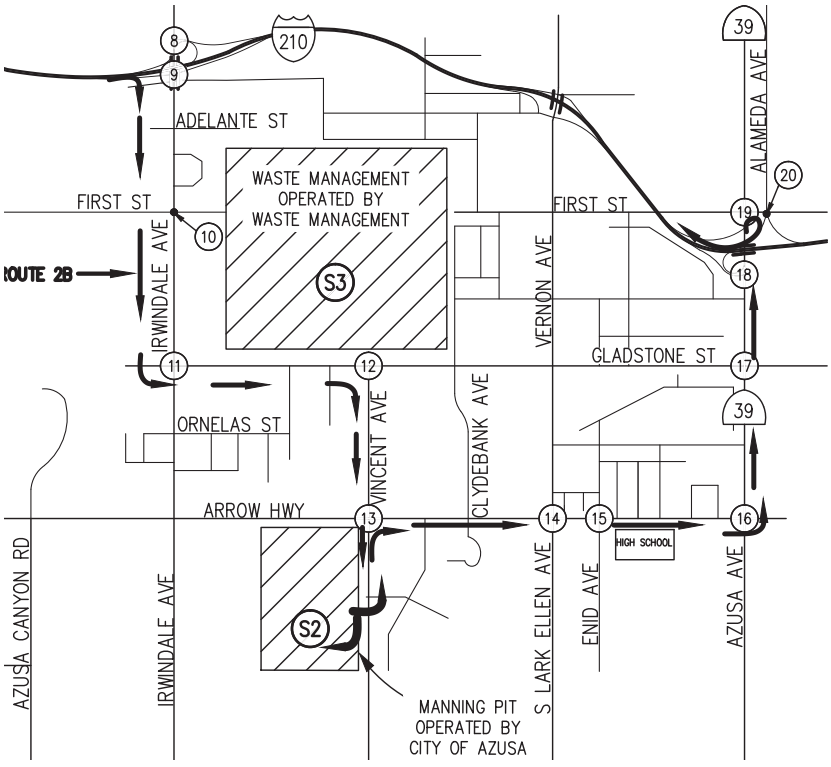
			0	0	0					
			0	0	0					
			0	0	0					
0	0	0					0	0	0	
0	0	0		TS			0	0	0	
0	0	0					0	0	0	
			0	0	50					
			0	0	50					
			0	0	50					

N/S STREET	20	E/W STREET
ALAMEDA ST/WB I-210 FWY		FIRST STREET

			0	0	0					
			0	0	0					
			0	0	0					
0	0	0					0	0	0	
0	0	0		TS			0	0	0	
50	50	50					0	0	0	
			0	0	0					
			0	0	0					
			0	0	0					

N

NOT TO SCALE



LEGEND

N/S STREET	S#	E/W STREET

			7AM-9AM							
			2PM-4PM							
			4PM-6PM							
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS			7AM - 9AM	2PM - 4PM	4PM - 6PM	
			7AM-9AM							
			2PM-4PM							
			4PM-6PM							

LEGEND

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ROUTE 2B PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-2-2B

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N/S STREET			9			E/W STREET		
IRWINDALE AVE						I-210 FWY EB RAMPS		
			0%	10%	10%			
			0%	10%	5%			
			0%	5%	5%			
10%	10%	5%					0%	0%	0%
5%	5%	5%		TS			0%	0%	0%
5%	10%	5%					0%	0%	0%
			0%	5%	5%			
			0%	5%	10%			
			0%	5%	5%			

N/S STREET			10			E/W STREET		
IRWINDALE AVE						FIRST STREET		
			20%	10%	25%			
			35%	15%	5%			
			40%	5%	10%			
40%	30%	10%					10%	20%	15%
5%	5%	5%		TS			5%	5%	5%
35%	20%	15%					5%	5%	5%
			5%	10%	40%			
			15%	10%	5%			
			5%	5%	40%			

N/S STREET			11			E/W STREET		
IRWINDALE AVE						GLADSTONE STREET		
			5%	5%	25%			
			5%	10%	30%			
			30%	5%	10%			
5%	5%	5%					10%	20%	5%
35%	20%	5%		TS			5%	10%	10%
25%	5%	5%					5%	5%	5%
			20%	10%	10%			
			5%	10%	5%			
			40%	5%	10%			

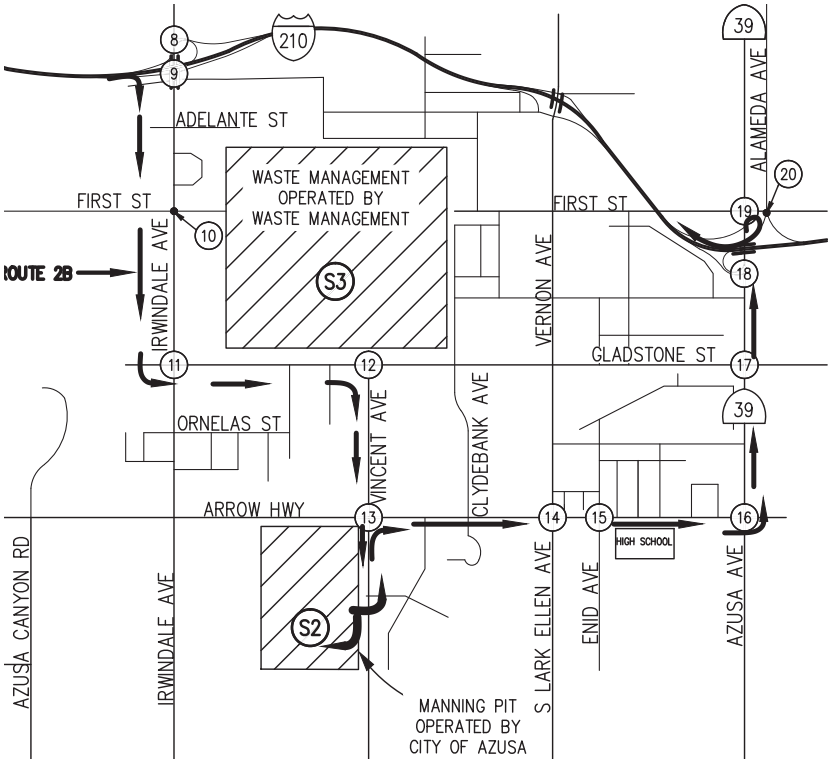
N/S STREET			12			E/W STREET		
VINCENT AVE						GLADSTONE STREET		
			70%	15%	5%			
			65%	5%	20%			
			35%	5%	5%			
75%	70%	5%					5%	5%	5%
5%	5%	5%		TS			5%	5%	5%
25%	49%	33%					5%	5%	5%
			5%	90%	5%			
			37%	100%	5%			
			56%	5%	5%			

N/S STREET			13			E/W STREET		
VINCENT AVE						ARROW HWY		
			10%	10%	5%			
			5%	20%	5%			
			5%	5%	5%			
5%	5%	5%					5%	5%	5%
5%	5%	5%		TS			5%	5%	5%
5%	10%	5%					5%	5%	5%
			5%	5%	5%			
			10%	15%	5%			
			5%	5%	5%			

N/S STREET			14			E/W STREET		
LARK ELLEN AVE						ARROW HWY		
			5%	5%	5%			
			15%	5%	5%			
			5%	5%	5%			
5%	10%	5%					5%	5%	5%
5%	5%	5%		TS			5%	5%	5%
5%	5%	5%					5%	5%	5%
			5%	5%	5%			
			5%	5%	5%			
			5%	5%	5%			

N

NOT TO SCALE



LEGEND

N/S STREET			S#			E/W STREET		
			7AM-9AM					
			2PM-4PM					
			4PM-6PM					
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS		7AM - 9AM	2PM - 4PM	4PM - 6PM
			7AM-9AM					
			2PM-4PM					
			4PM-6PM					

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 2B TRUCK PERCENTAGE

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-2-2C

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 2\FIG 4-2-2C.dwg
Last Opened: Oct 04, 2013 - 10:47am by: TMunoz

N/S STREET				15			E/W STREET			
ENID AVE							ARROW HWY			
			5%	5%	5%					
			5%	5%	5%					
			5%	5%	5%					
5%	5%	5%						5%	5%	5%
5%	5%	5%		TS				5%	5%	5%
5%	5%	5%						5%	5%	5%
			5%	5%	5%					
			5%	5%	5%					
			5%	5%	5%					

N/S STREET				16			E/W STREET			
AZUSA AVE							ARROW HWY			
			5%	5%	5%					
			5%	5%	5%					
			5%	5%	5%					
5%	5%	5%						5%	5%	5%
10%	5%	5%		TS				5%	5%	5%
5%	5%	5%						5%	10%	5%
			5%	5%	5%					
			5%	5%	5%					
			5%	5%	5%					

N/S STREET				17			E/W STREET			
AZUSA AVE							GLADSTONE STREET			
			5%	5%	5%					
			5%	5%	5%					
			5%	5%	5%					
10%	10%	5%						5%	5%	5%
5%	5%	5%		TS				5%	5%	5%
10%	10%	5%						5%	5%	5%
			5%	5%	5%					
			5%	5%	5%					
			5%	5%	5%					

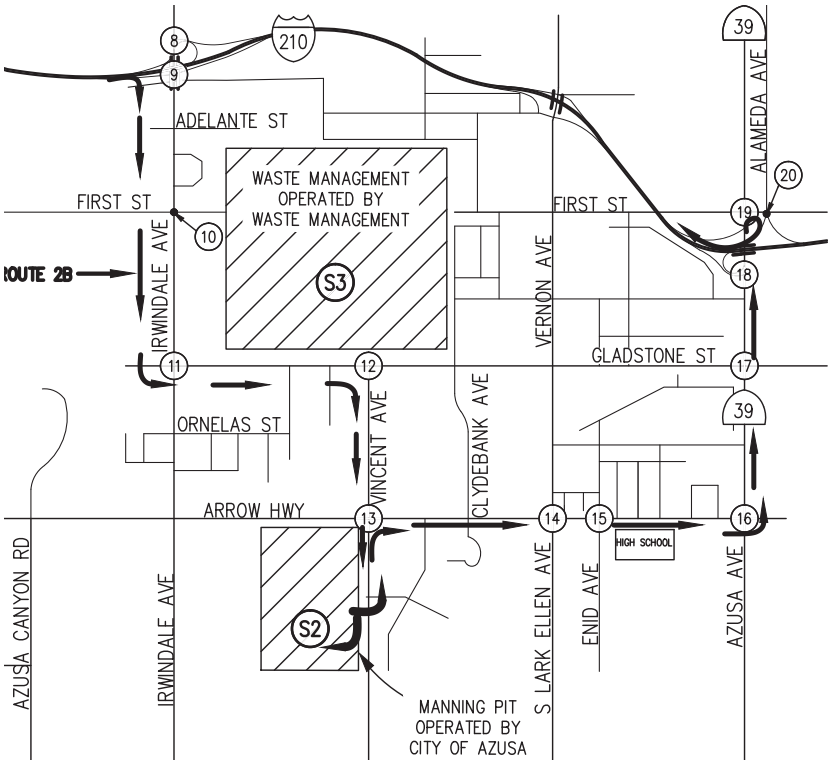
N/S STREET				18			E/W STREET			
AZUSA AVE							I-210 FWY EB RAMPS			
			10%	5%	0%					
			10%	5%	0%					
			5%	5%	0%					
5%	5%	5%						0%	0%	0%
0%	0%	0%		TS				0%	0%	0%
5%	5%	5%						0%	0%	0%
			0%	5%	10%					
			0%	5%	5%					
			0%	5%	5%					

N/S STREET				19			E/W STREET			
AZUSA AVE							FIRST STREET			
			10%	15%	5%					
			10%	5%	5%					
			5%	5%	5%					
5%	5%	5%						5%	5%	5%
5%	5%	5%		TS				5%	5%	5%
5%	15%	5%						5%	5%	5%
			5%	5%	5%					
			5%	5%	5%					
			5%	5%	5%					

N/S STREET				20			E/W STREET			
ALAMEDA ST/WB I-210 FWY							FIRST STREET			
			5%	5%	5%					
			5%	5%	5%					
			5%	5%	5%					
5%	5%	5%						5%	30%	5%
5%	5%	5%		TS				5%	5%	5%
5%	5%	5%						5%	5%	5%
			5%	5%	5%					
			10%	5%	5%					
			5%	5%	5%					

N

NOT TO SCALE



LEGEND

N/S STREET				S#			E/W STREET			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS			7AM - 9AM	2PM - 4PM	4PM - 6PM	
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 2B
TRUCK PERCENTAGES

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-2-2D

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 2\FIG 4-2-2D.dwg
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N/S STREET	9	E/W STREET
IRWINDALE AVE		I-210 FWY EB RAMPS

			0	0	0					
			0	0	0					
			0	0	0					
0	0	0					0	0	0	
0	0	0		TS			0	0	0	
150	150	150					0	0	0	
			0	0	0					
			0	0	0					
			0	0	0					

N/S STREET	10	E/W STREET
IRWINDALE AVE		FIRST STREET

			0	150	0					
			0	150	0					
			0	150	0					
0	0	0					0	0	0	
0	0	0		TS			0	0	0	
0	0	0					0	0	0	
			0	0	0					
			0	0	0					
			0	0	0					

N/S STREET	11	E/W STREET
IRWINDALE AVE		GLADSTONE STREET

			0	0	150					
			0	0	150					
			0	0	150					
0	0	0					0	0	0	
0	0	0		TS			0	0	0	
0	0	0					0	0	0	
			0	0	0					
			0	0	0					
			0	0	0					

N/S STREET	12	E/W STREET
VINCENT AVE		GLADSTONE STREET

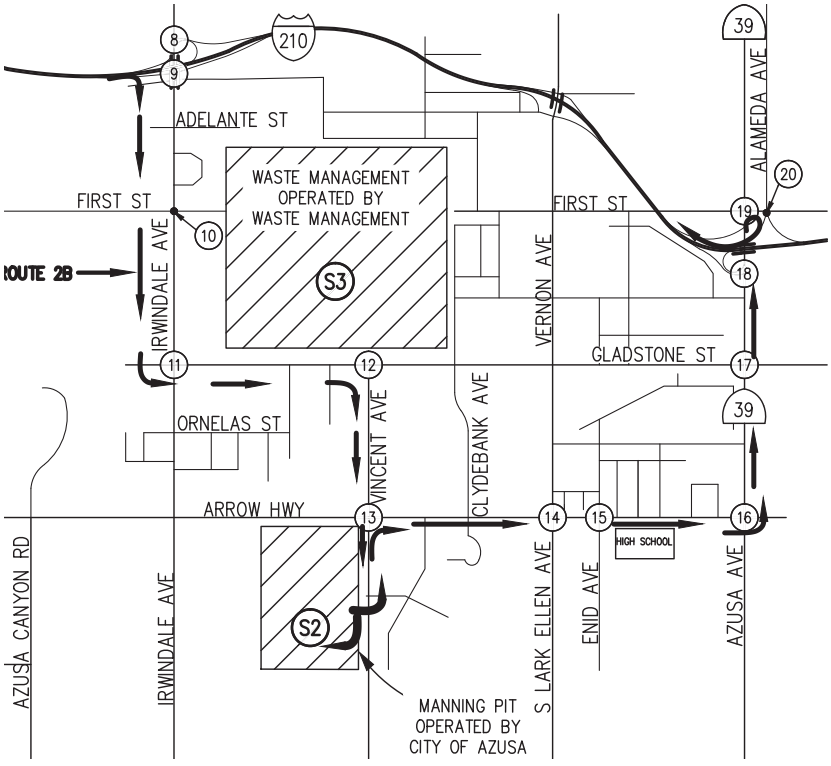
			0	0	0					
			150	0	0					
			150	0	0					
150	150	150					0	0	0	
0	0	0		TS			0	0	0	
0	0	0					0	0	0	
			0	0	0					
			0	0	0					
			0	0	0					

N/S STREET	13	E/W STREET
VINCENT AVE		ARROW HWY

			0	150	0					
			0	150	0					
			0	150	0					
0	0	0					0	0	0	
0	0	0		TS			0	0	0	
0	0	0					0	0	0	
			0	0	150					
			0	0	150					
			0	0	150					

N/S STREET	14	E/W STREET
LARK ELLEN AVE		ARROW HWY

			0	0	0					
			0	0	0					
			0	0	0					
0	0	0					0	0	0	
150	150	150		TS			0	0	0	
0	0	0					0	0	0	
			0	0	0					
			0	0	0					
			0	0	0					



LEGEND

N/S STREET	S#	E/W STREET

			7AM-9AM							
			2PM-4PM							
			4PM-6PM							
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS			7AM - 9AM	2PM - 4PM	4PM - 6PM	
			7AM-9AM							
			2PM-4PM							
			4PM-6PM							

LEGEND

S# – DISPOSAL SITE

– STUDY INTERSECTIONS

N

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ROUTE 2B
PCE PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-2-2E

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 2\FIG 4-2-2E.dwg
Last Opened: Oct 04, 2013 - 10:47am by: TMunoz

N/S STREET	15	E/W STREET
ENID AVE		ARROW HWY

				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
150	150	150		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET	16	E/W STREET
AZUSA AVE		ARROW HWY

				0	0	0				
				0	0	0				
				0	0	0				
150	150	150						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET	17	E/W STREET
AZUSA AVE		GLADSTONE STREET

				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	150	0				
				0	150	0				
				0	150	0				

N/S STREET	18	E/W STREET
AZUSA AVE		I-210 FWY EB RAMPS

				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	150	0				
				0	150	0				
				0	150	0				

N/S STREET	19	E/W STREET
AZUSA AVE		FIRST STREET

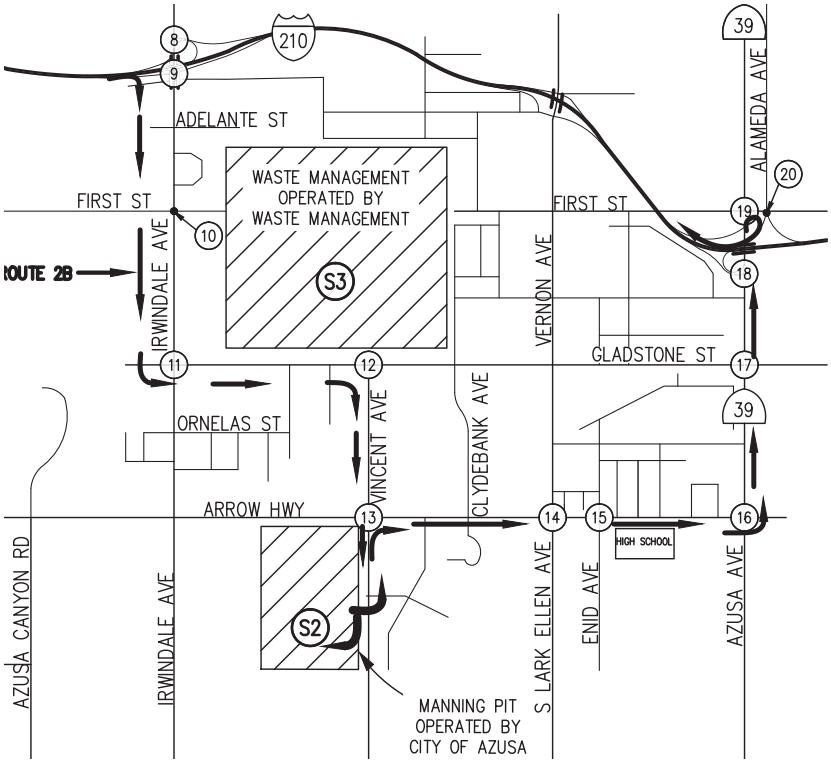
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	150				
				0	0	150				
				0	0	150				

N/S STREET	20	E/W STREET
ALAMEDA ST/WB I-210 FWY		FIRST STREET

				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
150	150	150						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N

NOT TO SCALE



LEGEND

N/S STREET	S#	E/W STREET

				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM
				TS						
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

S# – DISPOSAL SITE

– STUDY INTERSECTIONS

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ROUTE 2B PCE PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-2-2F

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 2\FIG 4-2-2F.dwg
Last Opened: Oct 04, 2013 - 10:47am by: TMunoz

N/S STREET				9			E/W STREET			
IRWINDALE AVE							I-210 FWY EB RAMPS			
				0	545	175				
				0	670	200				
				0	740	300				
470	590	375						0	0	0
5	5	5		TS				0	0	0
695	415	435						0	0	0
				0	945	195				
				0	740	240				
				0	1010	385				

N/S STREET				10			E/W STREET			
IRWINDALE AVE							FIRST STREET			
				125	1105	5				
				170	800	20				
				40	1020	15				
80	135	190						10	15	15
5	10	5		TS				5	5	5
20	95	35						5	15	15
				45	1050	5				
				90	1025	25				
				30	1355	15				

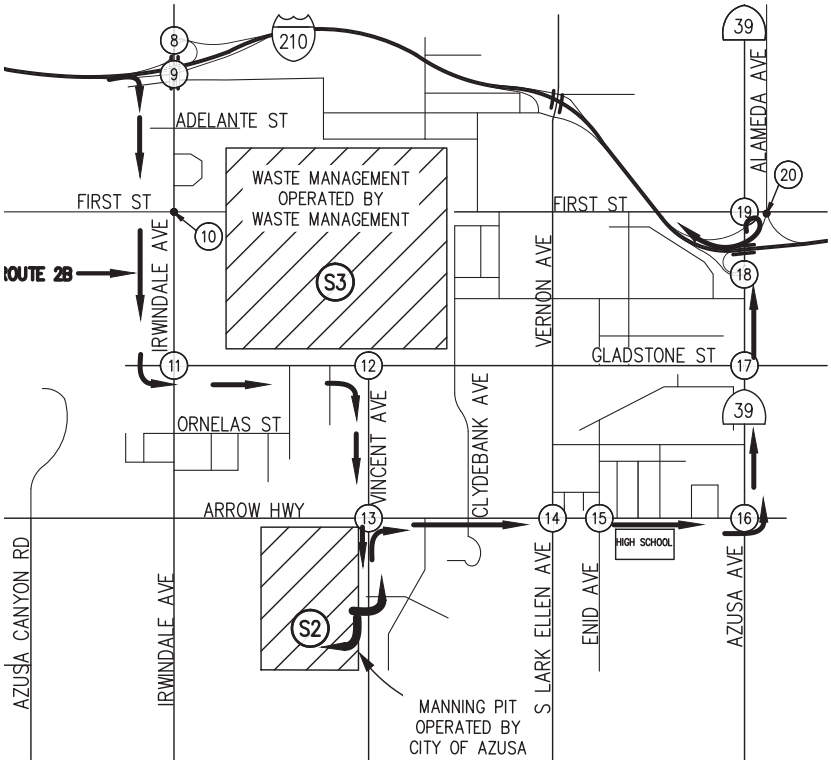
N/S STREET				11			E/W STREET			
IRWINDALE AVE							GLADSTONE STREET			
				5	780	235				
				5	750	215				
				5	700	360				
5	5	5						630	250	225
10	25	70		TS				65	20	10
10	35	30						495	130	130
				10	515	55				
				15	770	90				
				10	1170	330				

N/S STREET				12			E/W STREET			
VINCENT AVE							GLADSTONE STREET			
				20	15	5				
				10	5	10				
				5	5	5				
15	10	5						5	5	5
105	170	585		TS				760	195	240
165	155	200						250	115	150
				360	10	165				
				190	5	170				
				140	5	355				

N/S STREET				13			E/W STREET			
VINCENT AVE							ARROW HWY			
				70	315	30				
				60	205	25				
				55	255	45				
55	80	135						90	45	75
530	655	1395		TS				1215	575	525
80	90	210						120	100	110
				170	365	85				
				75	225	115				
				40	285	105				

N/S STREET				14			E/W STREET			
LARK ELLEN AVE							ARROW HWY			
				70	330	110				
				25	210	70				
				55	330	100				
75	75	115						30	30	35
565	725	1395		TS				1205	540	595
90	60	115						115	110	85
				165	330	170				
				65	190	110				
				75	325	115				

NOT TO SCALE



LEGEND

N/S STREET				S#			E/W STREET			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 2B
EXISTING + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-2-2G

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 2\FIG 4-2-2G.dwg
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N/S STREET				15			E/W STREET			
ENID AVE							ARROW HWY			
			60	145	30					
			25	20	25					
			30	35	25					
15	25	85					20	25	30	
690	860	1475		TS			1300	635	630	
110	20	60					170	45	50	
			95	110	155					
			25	20	55					
			35	40	55					

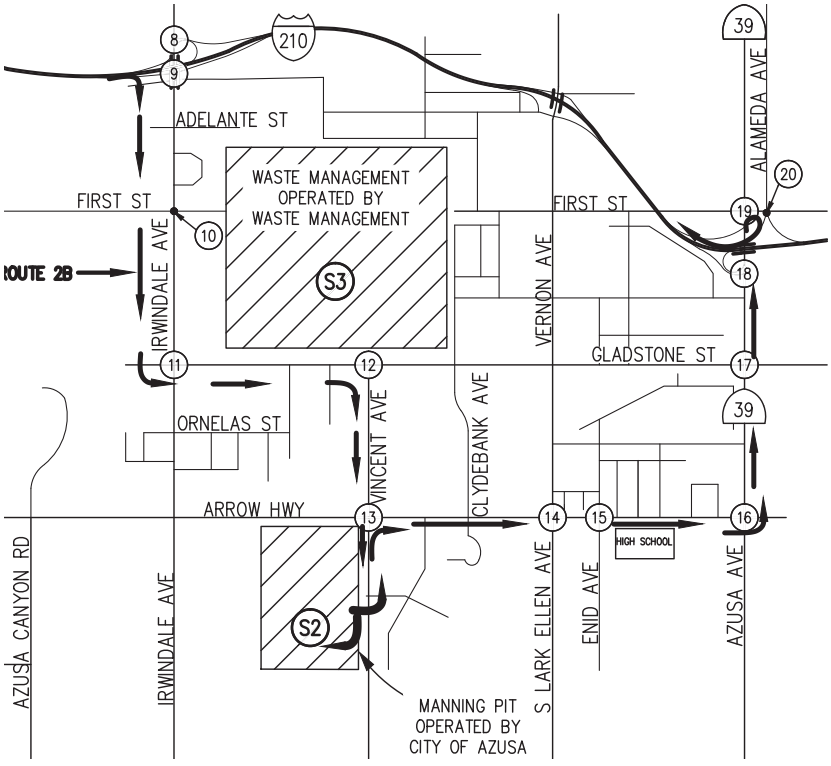
N/S STREET				16			E/W STREET			
AZUSA AVE							ARROW HWY			
			205	490	95					
			100	760	125					
			85	635	260					
200	195	265					105	115	95	
510	495	1130		TS			895	395	460	
80	120	135					70	190	125	
			225	520	45					
			200	670	135					
			160	465	230					

N/S STREET				17			E/W STREET			
AZUSA AVE							GLADSTONE STREET			
			120	630	160					
			115	765	175					
			65	825	180					
145	150	180					60	85	55	
160	195	670		TS			825	180	255	
25	35	55					155	200	130	
			110	710	40					
			100	790	95					
			55	735	75					

N/S STREET				18			E/W STREET			
AZUSA AVE							I-210 FWY EB RAMPS			
			210	740	0					
			170	720	0					
			190	800	0					
250	280	225					0	0	0	
0	0	0		TS			0	0	0	
235	260	215					0	0	0	
			0	710	195					
			0	865	215					
			0	690	245					

N/S STREET				19			E/W STREET			
AZUSA AVE							FIRST STREET			
			170	365	160					
			10	645	80					
			20	800	120					
120	45	90					320	155	220	
305	85	185		TS			500	130	205	
125	30	35					485	270	255	
			160	375	425					
			70	655	375					
			50	430	380					

N/S STREET				20			E/W STREET			
ALAMEDA ST/WB I-210 FWY							FIRST STREET			
			80	35	45					
			65	25	30					
			65	35	50					
15	25	20					40	25	35	
320	210	395		TS			640	220	240	
470	265	265					410	120	150	
			310	50	15					
			350	55	45					
			445	75	70					



LEGEND

N/S STREET				S#			E/W STREET			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS			7AM - 9AM	2PM - 4PM	4PM - 6PM	
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 2B
EXISTING + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-2-2H

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 2\FIG 4-2-2H.dwg
Last Opened: Oct 04, 2013 - 10:47am by: TMunoz

N/S STREET			9			E/W STREET			
IRWINDALE AVE						I-210 FWY EB RAMPS			
			0	660	220				
			0	810	210				
			0	780	315				
540	695	385					0	0	0
5	5	5		TS			0	0	0
890	595	540					0	0	0
			0	965	215				
			0	775	290				
			0	985	395				

N/S STREET			10			E/W STREET			
IRWINDALE AVE						FIRST STREET			
			170	1365	5				
			280	1090	25				
			75	1225	20				
140	225	235					10	20	20
5	10	5		TS			5	5	5
30	130	45					5	15	15
			50	1210	10				
			120	1180	25				
			35	1390	25				

N/S STREET			11			E/W STREET			
IRWINDALE AVE						GLADSTONE STREET			
			5	850	435				
			5	875	415				
			10	785	510				
5	5	5					700	290	195
15	35	70		TS			70	25	10
20	35	35					535	145	145
			15	595	65				
			20	890	100				
			15	1250	405				

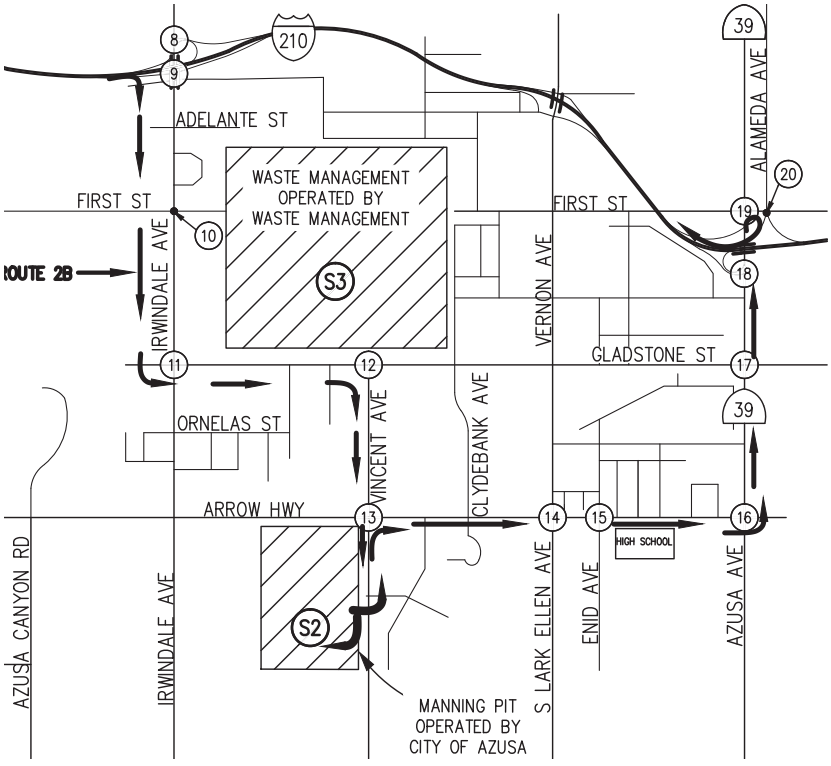
N/S STREET			12			E/W STREET			
VINCENT AVE						GLADSTONE STREET			
			50	20	5				
			20	5	15				
			5	5	5				
35	25	5					5	5	5
115	180	585		TS			765	205	245
325	300	335					255	115	150
			315	20	190				
			180	5	175				
			90	5	360				

N/S STREET			13			E/W STREET			
VINCENT AVE						ARROW HWY			
			85	460	30				
			65	355	25				
			55	355	45				
60	90	135					90	45	75
540	670	1405		TS			1235	585	530
85	105	210					125	100	110
			175	350	235				
			95	230	265				
			40	245	260				

N/S STREET			14			E/W STREET			
LARK ELLEN AVE						ARROW HWY			
			75	340	115				
			30	220	75				
			55	330	100				
80	85	120					30	30	35
730	910	1535		TS			1295	615	610
100	65	115					115	110	85
			170	345	175				
			70	215	110				
			80	325	115				

N

NOT TO SCALE



LEGEND

N/S STREET			S#			E/W STREET			
			7AM-9AM						
			2PM-4PM						
			4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS		7AM - 9AM	2PM - 4PM	4PM - 6PM	
			7AM-9AM						
			2PM-4PM						
			4PM-6PM						

LEGEND

S# – DISPOSAL SITE

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ROUTE 2B
PCE EXISTING + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-2-21

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N/S STREET				15			E/W STREET		
ENID AVE							ARROW HWY		
				60	145	30			
				25	20	25			
				35	35	25			
15	30	85					20	30	35
875	1075	1620		TS			1385	695	645
110	20	60					175	45	50
				95	115	160			
				25	20	55			
				35	40	55			

N/S STREET				16			E/W STREET		
AZUSA AVE							ARROW HWY		
				215	520	95			
				100	785	130			
				85	655	270			
305	305	370					110	120	95
595	520	1145		TS			940	420	475
80	130	140					70	230	130
				240	555	45			
				210	700	145			
				160	475	235			

N/S STREET				17			E/W STREET		
AZUSA AVE							GLADSTONE STREET		
				135	695	180			
				125	825	185			
				75	855	190			
180	180	195					65	90	55
180	225	695		TS			850	205	265
30	45	55					160	210	130
				120	850	45			
				110	940	100			
				60	860	80			

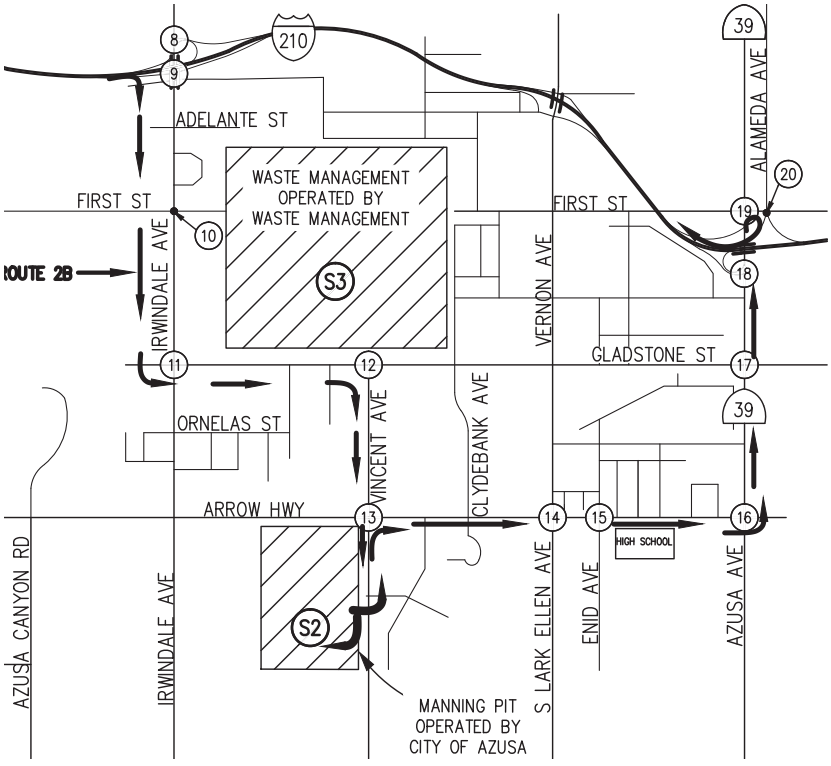
N/S STREET				18			E/W STREET		
AZUSA AVE							I-210 FWY EB RAMPS		
				240	815	0			
				205	780	0			
				205	845	0			
265	310	245					0	0	0
0	0	0		TS			0	0	0
255	280	245					0	0	0
				0	890	225			
				0	1020	240			
				0	825	270			

N/S STREET				19			E/W STREET		
AZUSA AVE							FIRST STREET		
				210	475	175			
				10	735	80			
				20	825	125			
120	45	95					330	170	225
305	95	190		TS			505	135	215
125	40	35					505	295	270
				165	425	555			
				70	710	495			
				50	455	490			

N/S STREET				20			E/W STREET		
ALAMEDA ST/WB I-210 FWY							FIRST STREET		
				80	40	45			
				65	25	30			
				65	40	50			
15	25	20					40	35	35
345	215	405		TS			665	230	245
590	385	375					425	125	155
				350	55	15			
				415	60	45			
				475	75	70			

N

NOT TO SCALE



LEGEND

N/S STREET				S#			E/W STREET		
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS			7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					

LEGEND

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ROUTE 2B
PCE EXISTING + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-2-2J

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Table 4-2-2
Intersection Capacity Analysis – Existing + Project Conditions (Route 2B)
Traffic Impact Analysis - Site 2

Route2B		AM				MID-DAY				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
9	Irwindale Ave and I-210 Freeway Eastbound Ramps	C	22.3	0.85	C	B	19.0	0.72	B	C	21.5	0.84	C
10	Irwindale Ave and First Street	B	12.4	0.64	A	B	17.1	0.60	B	C	20.1	0.69	B
11	Irwindale Ave and Gladstone Street	C	28.0	0.88	C	B	12.0	0.57	B	C	21.4	0.88	D
12	Vincent Ave and Gladstone Street	B	10.9	0.63	B	A	8.6	0.31	A	B	11.8	0.60	B
13	Vincent Ave and Arrow Hwy	B	14.3	0.80	D	A	9.2	0.40	A	B	12.7	0.77	C
14	Arrow Hwy and Lark Ellen Ave	D	46.0	0.88	C	C	33.5	0.67	A	D	39.7	0.82	D
15	Arrow Hwy and Enid Ave	C	29.0	1.08	D	B	12.1	0.48	A	B	13.2	0.68	C
16	Azusa Ave and Arrow Hwy	D	52.2	1.04	D	D	42.0	0.95	C	D	43.7	0.96	E
17	Azusa Ave and Gladstone Street	D	46.8	0.93	D	C	32.0	0.79	B	C	32.0	0.85	C
18	Azusa Ave and I-210 Freeway Eastbound Ramps	B	10.1	0.64	A	A	10.0	0.67	A	A	9.0	0.59	A
19	Azusa Ave and First Street	D	38.1	0.84	C	B	16.6	0.53	A	B	17.6	0.64	B
20	First Street and Alameda Street/I-210 Freeway Westbound Ramps	D	46.8	1.19	D	B	10.8	0.56	B	B	15.7	0.82	C

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
(5)V/C-HCM Volume to Capacity Ratio

Source: **Hall & Foreman, Inc.**

Haul Route 2B Analysis

As presented in *Table 4-2-2*, under the existing plus project conditions for Site 2 (Routes 2B) all intersections are anticipated to continue to operating at acceptable HCM LOS of D or better for the AM, Mid-day and PM peak hours. Since all intersections operate with an acceptable HCM LOS mitigation is not required under existing plus project conditions.

Haul Route 3

The Haul Route 3 project trips, truck percentages and passenger car equivalent (PCE) project trips are illustrated in *Figure 4-2-3A* through *Figure 4-2-3C.* The existing plus project AM (7-9), MID-DAY (12-2), PM (4-6) turn movement volumes, are provided in *Figure 4-2-3D.* For comparison the (PCE) existing plus project turn movement volumes are provided in *Figure 4-2-3E.*

Haul Route 9

The Haul Route 9 project trips, truck percentages and passenger car equivalent (PCE) project trips are illustrated in *Figure 4-2-4A* through *Figure 4-2-4C.* The existing plus project AM (7-9), MID-DAY (12-2), PM (4-6) turn movement volumes, are provided in *Figure 4-2-4D.* For comparison the (PCE) existing plus project turn movement volumes are provided in *Figure 4-2-4E.*

N/S STREET	8	E/W STREET
IRWINDALE AVE		I-210 FWY WB RAMPS

N/S STREET	9	E/W STREET
IRWINDALE AVE		I-210 FWY EB RAMPS

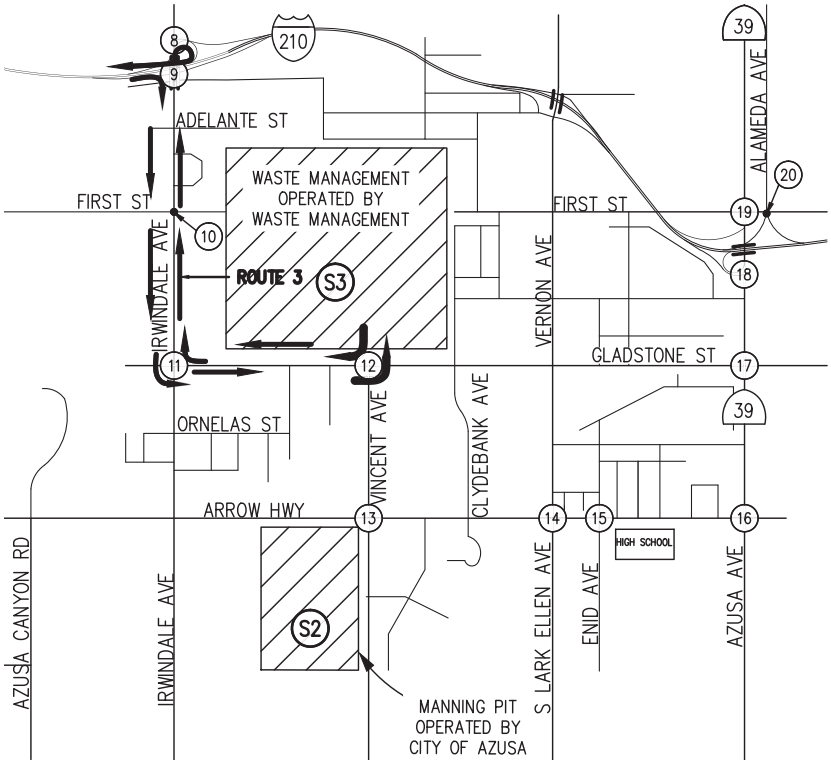
N/S STREET	10	E/W STREET
IRWINDALE AVE		FIRST STREET

N/S STREET	11	E/W STREET
IRWINDALE AVE		GLADSTONE STREET

N/S STREET	12	E/W STREET
VINCENT AVE		GLADSTONE STREET

N

NOT TO SCALE



LEGEND

N/S STREET	S#	E/W STREET
	7AM-9AM	
	2PM-4PM	
	4PM-6PM	
7AM - 9AM, 2PM - 4PM, 4PM - 6PM	TS	7AM - 9AM, 2PM - 4PM, 4PM - 6PM
	7AM-9AM	
	2PM-4PM	
	4PM-6PM	

LEGEND

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ROUTE 3 PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-2-3A

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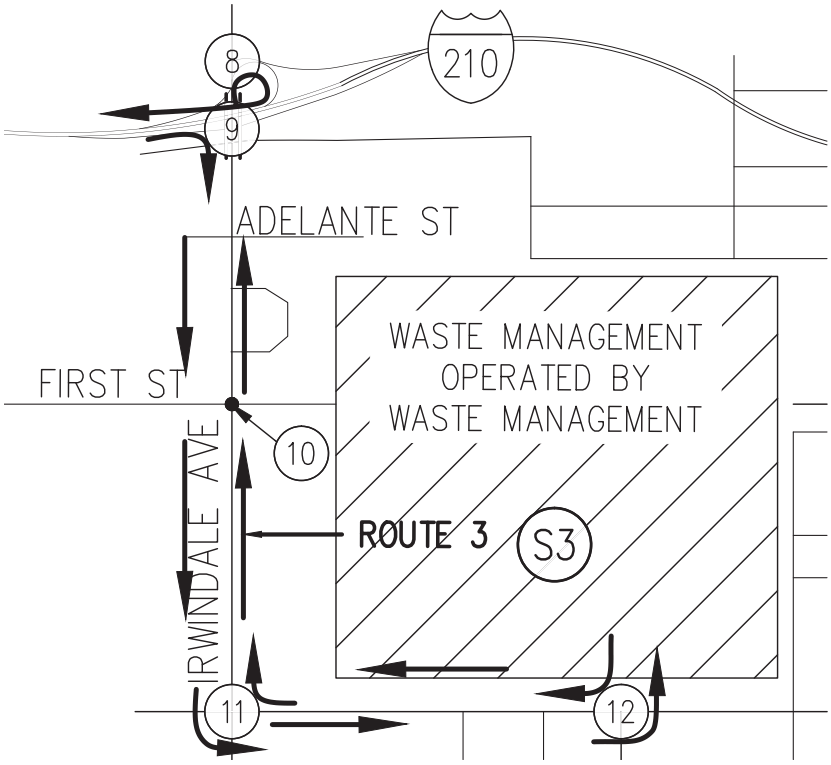
N/S STREET				8			E/W STREET			
IRWINDALE AVE							I-210 FWY WB RAMPS			
				10%	10%	0%				
				5%	5%	0%				
				5%	5%	0%				
0%	0%	0%						10%	5%	5%
0%	0%	0%		TS				0%	0%	0%
0%	0%	0%						5%	10%	5%
				0%	10%	10%				
				0%	10%	10%				
				0%	10%	5%				

N/S STREET				9			E/W STREET			
IRWINDALE AVE							I-210 FWY EB RAMPS			
				0%	10%	10%				
				0%	10%	5%				
				0%	5%	5%				
10%	10%	5%						0%	0%	0%
5%	5%	5%		TS				0%	0%	0%
5%	10%	5%						0%	0%	0%
				0%	5%	5%				
				0%	5%	10%				
				0%	5%	5%				

N/S STREET				10			E/W STREET			
IRWINDALE AVE							FIRST STREET			
				20%	10%	25%				
				35%	15%	5%				
				40%	5%	10%				
40%	30%	10%						10%	20%	15%
5%	5%	5%		TS				5%	5%	5%
35%	20%	15%						5%	5%	5%
				5%	10%	40%				
				15%	10%	5%				
				5%	5%	40%				

N/S STREET				11			E/W STREET			
IRWINDALE AVE							GLADSTONE STREET			
				5%	5%	25%				
				5%	10%	30%				
				30%	5%	10%				
5%	5%	5%						10%	20%	5%
35%	20%	5%		TS				5%	10%	10%
25%	5%	5%						5%	5%	5%
				20%	10%	10%				
				5%	10%	5%				
				40%	5%	10%				

N/S STREET				12			E/W STREET			
VINCENT AVE							GLADSTONE STREET			
				70%	15%	5%				
				94%	5%	20%				
				94%	5%	5%				
75%	95%	100%						5%	5%	5%
5%	5%	5%		TS				5%	5%	5%
25%	25%	10%						5%	5%	5%
				5%	90%	5%				
				15%	100%	5%				
				5%	5%	5%				



LEGEND

N/S STREET				S#			E/W STREET			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

N

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ROUTE 3 TRUCK PERCENTAGES

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-2-3B

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N/S STREET	8	E/W STREET
IRWINDALE AVE		I-210 FWY WB RAMPS

			0	0	0					
			0	0	0					
			0	0	0					
0	0	0					0	0	0	
0	0	0		TS			0	0	0	
0	0	0					0	0	0	
			0	0	150					
			0	0	150					
			0	0	150					

N/S STREET	9	E/W STREET
IRWINDALE AVE		I-210 FWY EB RAMPS

			0	0	0					
			0	0	0					
			0	0	0					
0	0	0					0	0	0	
0	0	0		TS			0	0	0	
150	150	150					0	0	0	
			0	150	0					
			0	150	0					
			0	150	0					

N/S STREET	10	E/W STREET
IRWINDALE AVE		FIRST STREET

			0	150	0					
			0	150	0					
			0	150	0					
0	0	0					0	0	0	
0	0	0		TS			0	0	0	
0	0	0					0	0	0	
			0	150	0					
			0	150	0					
			0	150	0					

N/S STREET	11	E/W STREET
IRWINDALE AVE		GLADSTONE STREET

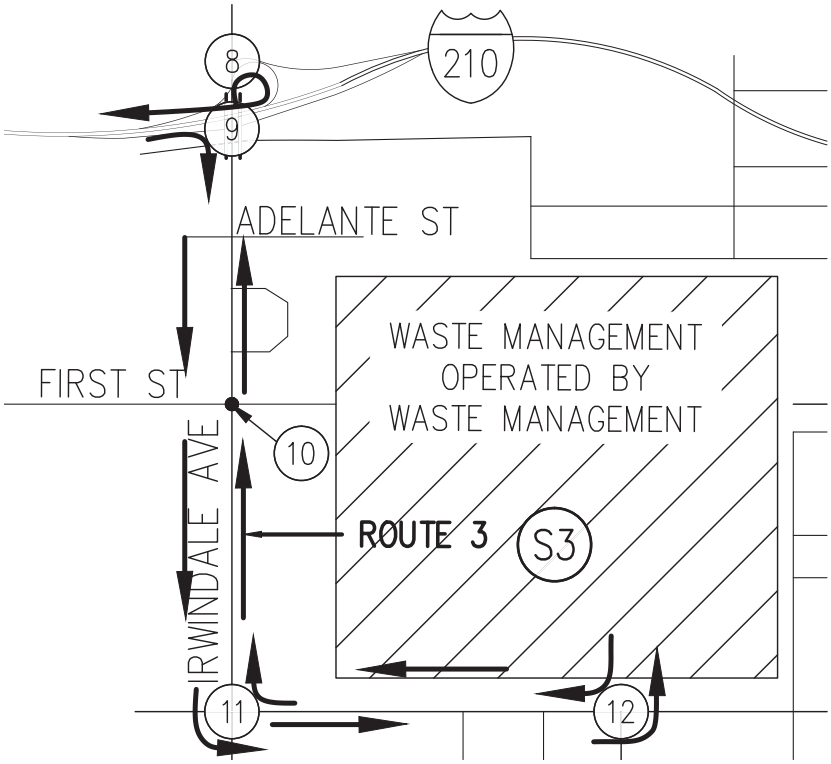
			0	0	150					
			0	0	150					
			0	0	150					
0	0	0					150	150	150	
0	0	0		TS			0	0	0	
0	0	0					0	0	0	
			0	0	0					
			0	0	0					
			0	0	0					

N/S STREET	12	E/W STREET
VINCENT AVE		GLADSTONE STREET

			150	0	0					
			150	0	0					
			150	0	0					
150	150	150					0	0	0	
0	0	0		TS			0	0	0	
0	0	0					0	0	0	
			0	0	0					
			0	0	0					
			0	0	0					

N

NOT TO SCALE



LEGEND

N/S STREET	S#	E/W STREET
	7AM-9AM	
	2PM-4PM	
	4PM-6PM	

7AM - 9AM	2PM - 4PM	4PM - 6PM					7AM - 9AM	2PM - 4PM	4PM - 6PM
				TS					

	7AM-9AM	
	2PM-4PM	
	4PM-6PM	

LEGEND

(S#) – DISPOSAL SITE

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ROUTE 3
PCE PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-2-3C

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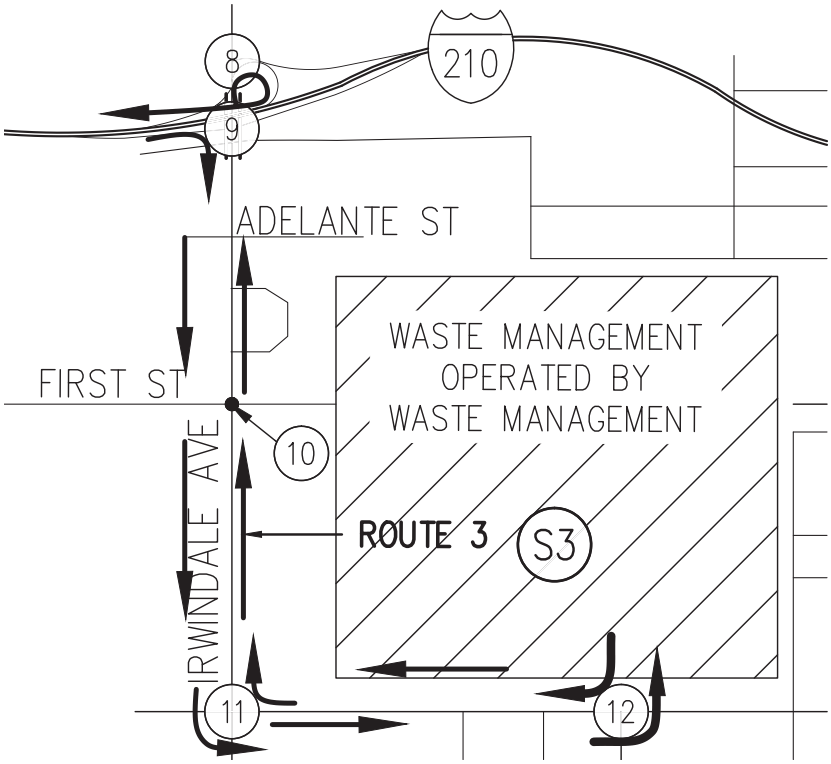
N/S STREET				8	E/W STREET						
IRWINDALE AVE					I-210 FWY WB RAMPS						
				610	470	0					
				545	595	0					
				475	895	0					
0	0	0						100	110	145	
0	0	0		TS				0	0	0	
0	0	0						175	255	145	
				0	845	635					
				0	865	470					
				0	755	525					

N/S STREET				9	E/W STREET						
IRWINDALE AVE					I-210 FWY EB RAMPS						
				0	545	175					
				0	670	200					
				0	740	300					
470	590	375						0	0	0	
5	5	5		TS				0	0	0	
695	415	435						0	0	0	
				0	945	195					
				0	740	240					
				0	1010	385					

N/S STREET				10	E/W STREET						
IRWINDALE AVE					FIRST STREET						
				125	1105	5					
				170	800	20					
				40	1020	15					
80	135	190						10	15	15	
5	10	5		TS				5	5	5	
20	95	35						5	15	15	
				45	1050	5					
				90	1025	25					
				30	1355	15					

N/S STREET				11	E/W STREET						
IRWINDALE AVE					GLADSTONE STREET						
				5	780	235					
				5	750	215					
				5	700	360					
5	5	5						630	250	225	
10	25	70		TS				65	20	10	
10	35	30						495	130	130	
				10	515	55					
				15	770	90					
				10	1170	330					

N/S STREET				12	E/W STREET						
VINCENT AVE					GLADSTONE STREET						
				20	15	5					
				60	5	10					
				55	5	5					
65	60	55						5	5	5	
105	170	585		TS				760	195	240	
115	105	150						250	115	150	
				310	10	165					
				140	5	170					
				90	5	355					



LEGEND

N/S STREET				S#	E/W STREET						
				7AM-9AM							
				2PM-4PM							
				4PM-6PM							
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM	
				7AM-9AM							
				2PM-4PM							
				4PM-6PM							

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

N

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ROUTE 3
EXISTING + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-2-3D

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N/S STREET				8	E/W STREET					
IRWINDALE AVE					I-210 FWY WB RAMPS					
				725	550	0				
				620	645	0				
				495	910	0				
0	0	0						125	120	155
0	0	0		TS				0	0	0
0	0	0						195	315	165
				0	975	830				
				0	950	670				
				0	780	660				

N/S STREET				9	E/W STREET					
IRWINDALE AVE					I-210 FWY EB RAMPS					
				0	660	220				
				0	810	210				
				0	780	315				
540	695	385						0	0	0
5	5	5		TS				0	0	0
890	595	540						0	0	0
				0	1115	215				
				0	925	290				
				0	1135	395				

N/S STREET				10	E/W STREET					
IRWINDALE AVE					FIRST STREET					
				170	1365	5				
				280	1090	25				
				75	1225	20				
140	225	235						10	20	20
5	10	5		TS				5	5	5
30	130	45						5	15	15
				50	1360	10				
				120	1330	25				
				35	1540	25				

N/S STREET				11	E/W STREET					
IRWINDALE AVE					GLADSTONE STREET					
				5	850	435				
				5	875	415				
				10	785	510				
5	5	5						850	440	345
15	35	70		TS				70	25	10
20	35	35						535	145	145
				15	595	65				
				20	890	100				
				15	1250	405				

N/S STREET				12	E/W STREET					
VINCENT AVE					GLADSTONE STREET					
				200	20	5				
				170	5	15				
				155	5	5				
185	175	155						5	5	5
115	180	585		TS				765	205	245
175	150	185						255	115	150
				315	20	190				
				180	5	175				
				90	5	360				

N

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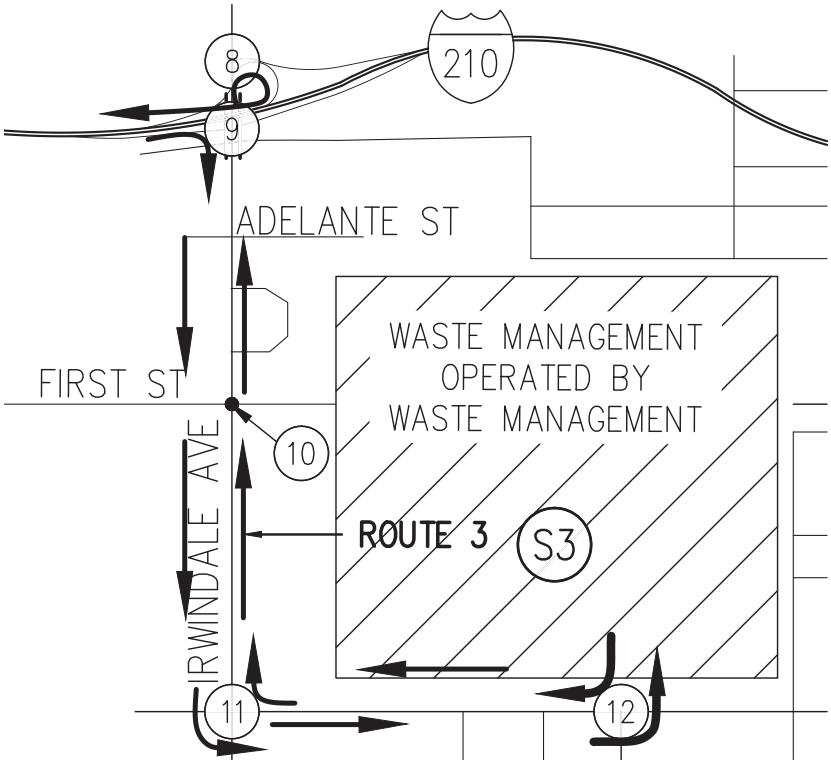

LEGEND

N/S STREET				S#	E/W STREET					
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 3
PCE EXISTING + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-2-3E

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 2\FIG 4-2-3E.dwg
Last Opened: Oct 04, 2013 - 10:54am by: TMunoz

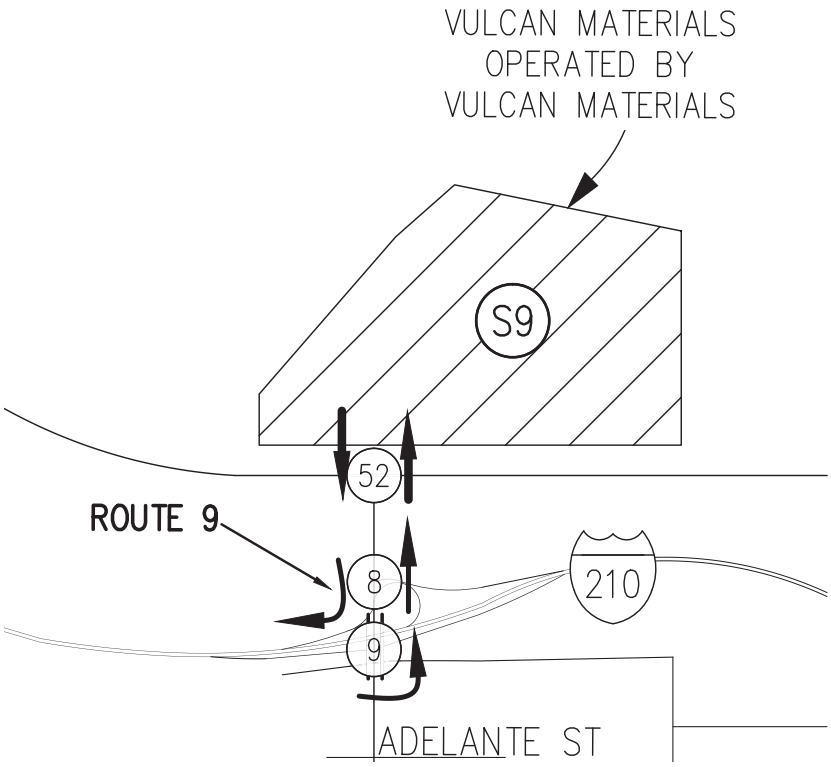
N/S STREET				8	E/W STREET					
IRWINDALE AVE					I-210 FWY WB RAMPS					
			50	0	0					
			50	0	0					
			50	0	0					
0	0	0					0	0	0	
0	0	0		TS			0	0	0	
0	0	0					0	0	0	
			0	50	0					
			0	50	0					
			0	50	0					

N/S STREET				9	E/W STREET					
IRWINDALE AVE					I-210 FWY EB RAMPS					
			0	0	0					
			0	0	0					
			0	0	0					
50	50	50					0	0	0	
0	0	0		TS			0	0	0	
0	0	0					0	0	0	
			0	0	0					
			0	0	0					
			0	0	0					

N/S STREET				52	E/W STREET					
IRWINDALE AVE					FOOTHILL BOULEVARD					
			0	50	0					
			0	50	0					
			0	50	0					
0	0	0					0	0	0	
0	0	0		TS			0	0	0	
0	0	0					0	0	0	
			0	50	0					
			0	50	0					
			0	50	0					

N

NOT TO SCALE



LEGEND

N/S STREET				S#	E/W STREET					
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM					7AM - 9AM	2PM - 4PM	4PM - 6PM	
				TS						
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

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ROUTE 9 PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE

4-2-4A

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 2\FIG 4-2-4A.dwg
Last Opened: Oct 04, 2013 - 10:54am by: TMunoz

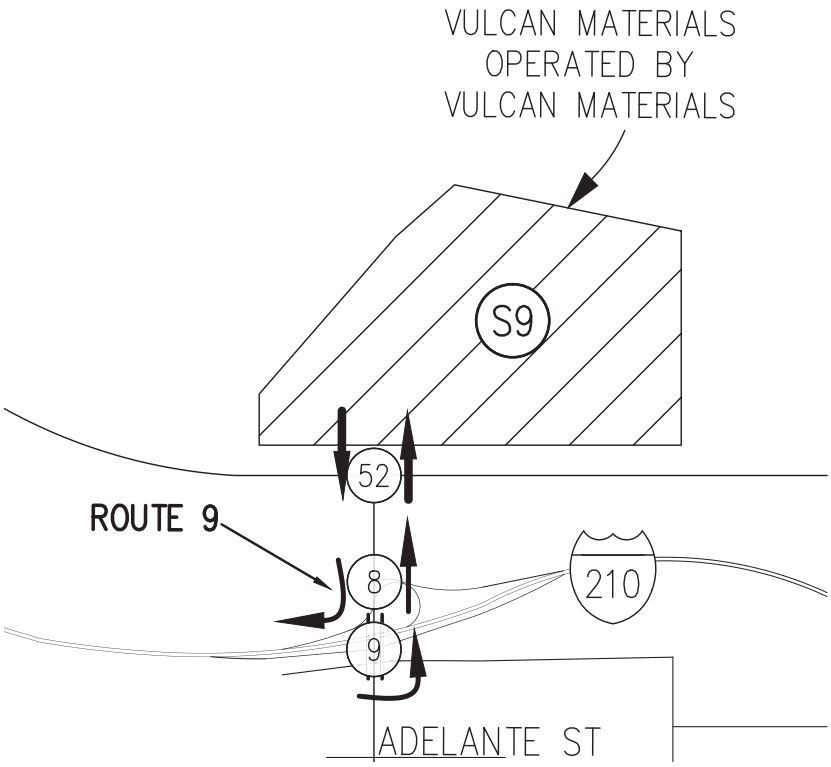
N/S STREET				8	E/W STREET					
IRWINDALE AVE					I-210 FWY WB RAMPS					
			10%	10%	0%					
			5%	5%	0%					
			5%	5%	0%					
0%	0%	0%					10%	5%	5%	
0%	0%	0%		TS			0%	0%	0%	
0%	0%	0%					5%	10%	5%	
			0%	10%	10%					
			0%	5%	10%					
			0%	5%	5%					

N/S STREET				9	E/W STREET					
IRWINDALE AVE					I-210 FWY EB RAMPS					
			0%	10%	10%					
			0%	10%	5%					
			0%	5%	5%					
10%	10%	5%					0%	0%	0%	
5%	5%	5%		TS			0%	0%	0%	
5%	10%	5%					0%	0%	0%	
			0%	5%	5%					
			0%	5%	10%					
			0%	5%	5%					

N/S STREET				52	E/W STREET					
IRWINDALE AVE					FOOTHILL BOULEVARD					
			5%	5%	5%					
			5%	5%	5%					
			5%	5%	5%					
5%	5%	5%					5%	5%	5%	
5%	5%	5%		TS			5%	5%	5%	
5%	5%	5%					5%	5%	5%	
			5%	5%	5%					
			5%	5%	5%					
			5%	5%	5%					

N

NOT TO SCALE



LEGEND

N/S STREET				S#	E/W STREET					
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS			7AM - 9AM	2PM - 4PM	4PM - 6PM	
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

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ROUTE 9 TRUCK PERCENTAGES

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-2-4B

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Last Opened: Oct 04, 2013 - 10:54am by: TMunoz

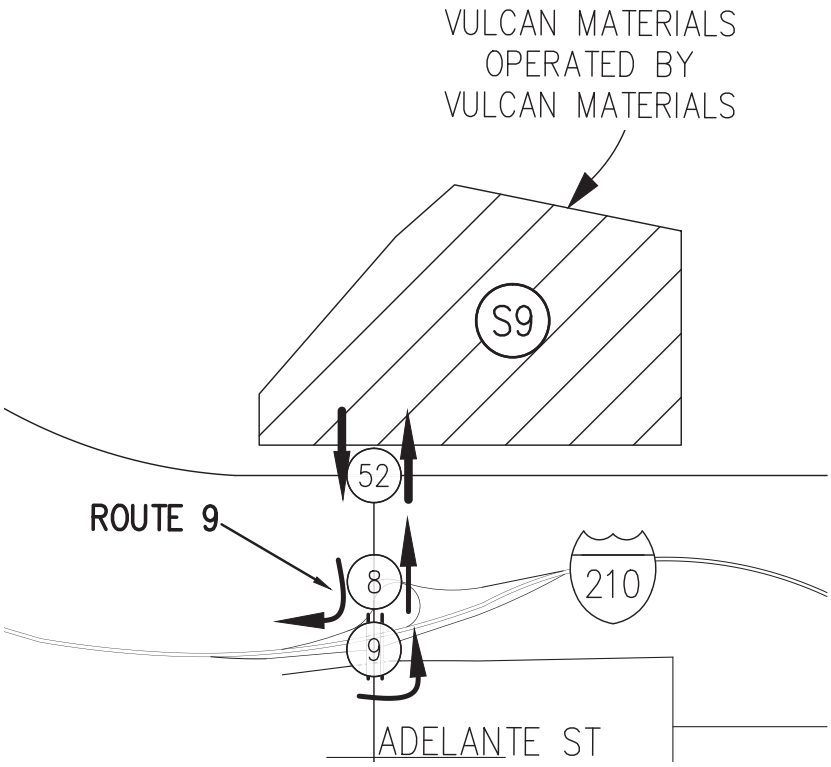
N/S STREET				8	E/W STREET					
IRWINDALE AVE					I-210 FWY WB RAMPS					
			150	0	0					
			150	0	0					
			150	0	0					
0	0	0					0	0	0	
0	0	0		TS			0	0	0	
0	0	0					0	0	0	
			0	150	0					
			0	150	0					
			0	150	0					

N/S STREET				9	E/W STREET					
IRWINDALE AVE					I-210 FWY EB RAMPS					
			0	0	0					
			0	0	0					
			0	0	0					
150	150	150					0	0	0	
0	0	0		TS			0	0	0	
0	0	0					0	0	0	
			0	0	0					
			0	0	0					
			0	0	0					

N/S STREET				52	E/W STREET					
IRWINDALE AVE					FOOTHILL BOULEVARD					
			0	150	0					
			0	150	0					
			0	150	0					
0	0	0					0	0	0	
0	0	0		TS			0	0	0	
0	0	0					0	0	0	
			0	150	0					
			0	150	0					
			0	150	0					

N

NOT TO SCALE



LEGEND

N/S STREET				S#	E/W STREET					
			7AM-9AM							
			2PM-4PM							
			4PM-6PM							
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS			7AM - 9AM	2PM - 4PM	4PM - 6PM	
			7AM-9AM							
			2PM-4PM							
			4PM-6PM							

LEGEND

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(#) – STUDY INTERSECTIONS

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ROUTE 9
PCE PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE

4-2-4C

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 2\FIG 4-2-4C.dwg
Last Opened: Oct 04, 2013 - 10:54am by: TMunoz

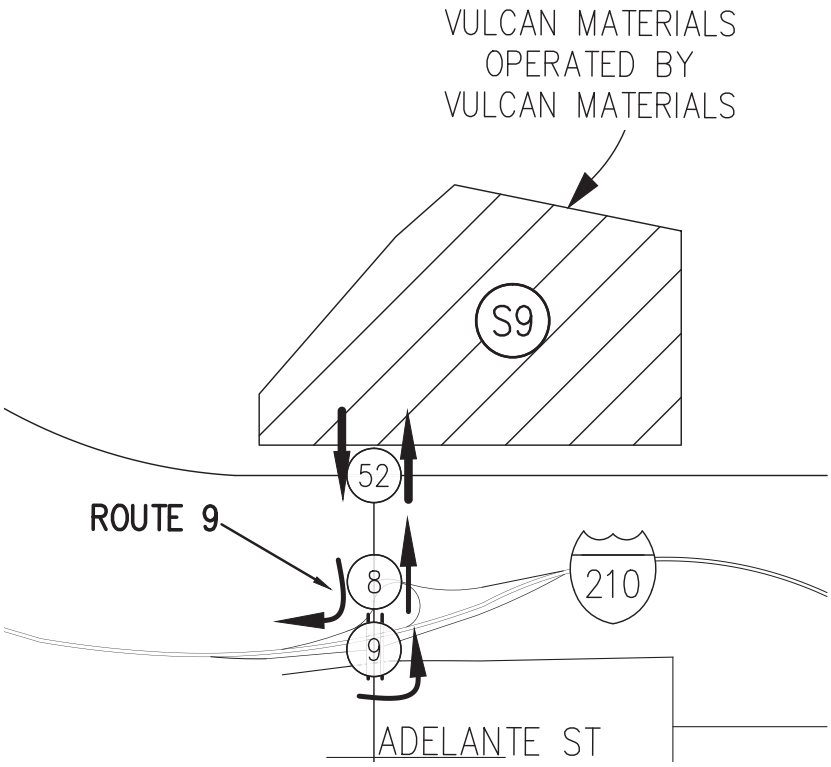
N/S STREET				8	E/W STREET					
IRWINDALE AVE					I-210 FWY WB RAMPS					
			660	100	0					
			595	110	0					
			525	145	0					
0	0	0					100	110	145	
0	0	0		TS			0	0	0	
0	0	0					175	255	145	
			0	895	585					
			0	915	420					
			0	805	475					

N/S STREET				9	E/W STREET					
IRWINDALE AVE					I-210 FWY EB RAMPS					
			0	545	175					
			0	670	200					
			0	740	300					
520	640	425					0	0	0	
5	5	5		TS			0	0	0	
645	365	385					0	0	0	
			0	895	195					
			0	690	240					
			0	960	385					

N/S STREET				52	E/W STREET					
IRWINDALE AVE					FOOTHILL BOULEVARD					
			5	55	5					
			5	55	5					
			5	55	5					
5	5	5					5	5	5	
5	5	5		TS			5	5	5	
5	5	5					5	5	5	
			5	55	5					
			5	55	5					
			5	55	5					

N

NOT TO SCALE



LEGEND

N/S STREET				S#	E/W STREET					
			7AM-9AM							
			2PM-4PM							
			4PM-6PM							
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS			7AM - 9AM	2PM - 4PM	4PM - 6PM	
			7AM-9AM							
			2PM-4PM							
			4PM-6PM							

LEGEND

(S#) – DISPOSAL SITE

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ROUTE 9 EXISTING + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-2-4D

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Last Opened: Oct 04, 2013 - 10:54am by: TMunoz

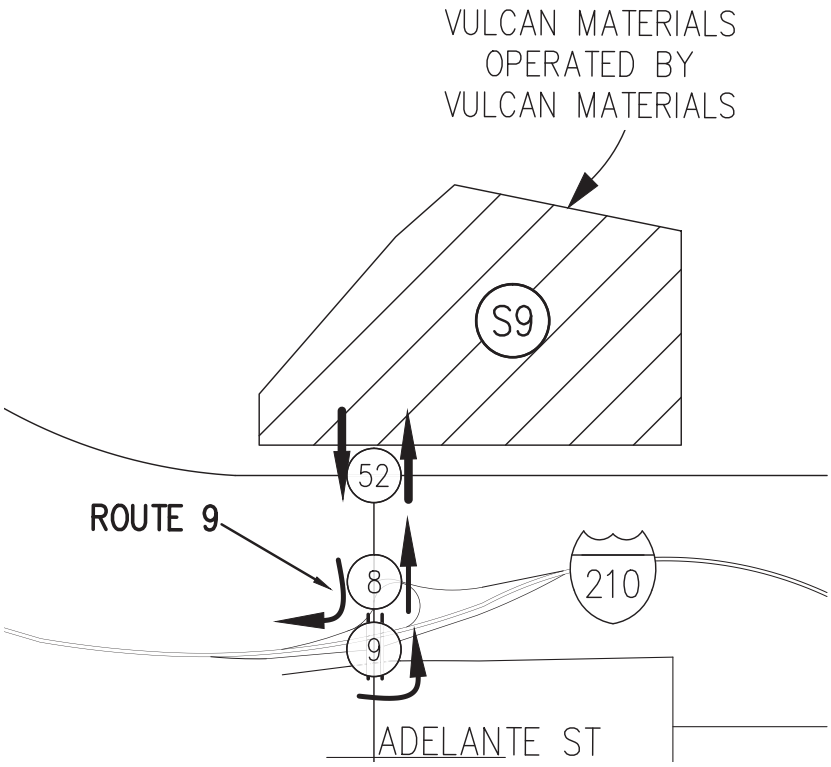
N/S STREET				8	E/W STREET				
IRWINDALE AVE					I-210 FWY WB RAMPS				
			875	550	0				
			770	645	0				
			645	910	0				
0	0	0					125	120	155
0	0	0		TS			0	0	0
0	0	0					195	315	165
			0	1125	680				
			0	1100	520				
			0	930	510				

N/S STREET				9	E/W STREET				
IRWINDALE AVE					I-210 FWY EB RAMPS				
			0	660	220				
			0	810	210				
			0	780	315				
690	845	535					0	0	0
5	5	5		TS			0	0	0
740	445	390					0	0	0
			0	965	215				
			0	775	290				
			0	985	395				

N/S STREET				52	E/W STREET				
IRWINDALE AVE					FOOTHILL BOULEVARD				
			5	155	5				
			5	155	5				
			5	155	5				
5	5	5					5	5	5
5	5	5		TS			5	5	5
5	5	5					5	5	5
			5	155	5				
			5	155	5				
			5	155	5				

N

NOT TO SCALE



LEGEND

N/S STREET				S#	E/W STREET				
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS		7AM - 9AM	2PM - 4PM	4PM - 6PM	
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 9
PCE EXISTING + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-2-4E

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Table 4-2-3
Intersection Capacity Analysis – Existing + Project Conditions (Route 3)
Traffic Impact Analysis - Site 3

Route 3		AM				MID-DAY				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
8	Irwindale Ave and I-210 Freeway Westbound Ramps	A	6.5	0.50	A	A	6.8	0.48	A	A	6.5	0.50	A
9	Irwindale Ave and I-210 Freeway Eastbound Ramps	C	22.3	0.85	C	B	19.0	0.72	B	C	21.5	0.84	C
10	Irwindale Ave and First Street	B	12.6	0.64	A	B	17.4	0.63	B	D	39.1	0.88	B
11	Irwindale Ave and Gladstone Street	C	29.4	0.87	C	B	12.7	0.60	B	C	21.7	0.87	D
12	Vincent Ave and Gladstone Street	B	11.4	0.65	B	A	8.7	0.31	A	B	11.0	0.57	B

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc.**

Haul Route 3 Analysis

As presented in *Table 4-2-3*, under the existing conditions for Site 3 (Route 3) all intersections are anticipated to operating at an acceptable HCM LOS of D or better for the AM, Mid-day and PM peak hours. Since all intersections operate with an acceptable HCM LOS mitigation is not required under existing plus project conditions.

Table 4-2-4
Intersection Capacity Analysis – Existing + Project Conditions (Route 9)
Traffic Impact Analysis - Site 9

Route 9		AM				MID-DAY				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
8	Irwindale Ave and I-210 Freeway Westbound Ramps	A	6.6	0.51	A	A	6.6	0.48	A	A	6.7	0.52	A
9	Irwindale Ave and I-210 Freeway Eastbound Ramps	C	22.8	0.85	C	B	18.4	0.73	B	C	21.9	0.84	C
53	Irwindale Ave and Foothill Boulevard	C	25.2	0.81	C	D	35.3	0.87	C	D	53.0	1.05	F

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: Hall & Foreman, Inc.

Haul Route 9 Analysis

As presented in *Table 4-2-4*, under the existing conditions for Site 9 (Route 9) all intersections are anticipated to operating at an acceptable HCM LOS of D or better for the AM, Mid-day and PM peak hours. Since all intersections operate with an acceptable HCM LOS mitigation is not required under existing plus project conditions.

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Section 3: Scholl Canyon Landfill (Site 4)

Haul Route 4A

The Haul Route 4A project trips, truck percentages and passenger car equivalent (PCE) project trips are illustrated in *Figure 4-3-1A* through *Figure 4-3-1C.* The existing plus project AM (7-9), MID-DAY (12-2), PM (4-6) turn movement volumes, are provided in *Figure 4-3-1D.* For comparison the (PCE) existing plus project turn movement volumes are provided in *Figure 4-3-1E.*

Haul Route 4B

The Haul Route 4B project trips, truck percentages and passenger car equivalent (PCE) project trips are illustrated in *Figure 4-3-2A* through *Figure 4-3-2C.* The existing plus project AM (7-9), MID-DAY (12-2), PM (4-6) turn movement volumes, are provided in *Figure 4-3-2D.* For comparison the (PCE) existing plus project turn movement volumes are provided in *Figure 4-3-2E.*

N/S STREET	21	E/W STREET
SCHOLL CANYON RD		WB 134 FWY

			0	50	0					
			0	50	0					
			0	50	0					
0	0	0					50	50	50	
0	0	0					0	0	0	
0	0	0					0	0	0	
			0	0	0					
			0	0	0					
			0	0	0					

N/S STREET	22	E/W STREET
FIGUEROA ST		EAGLE VISTA DRIVE

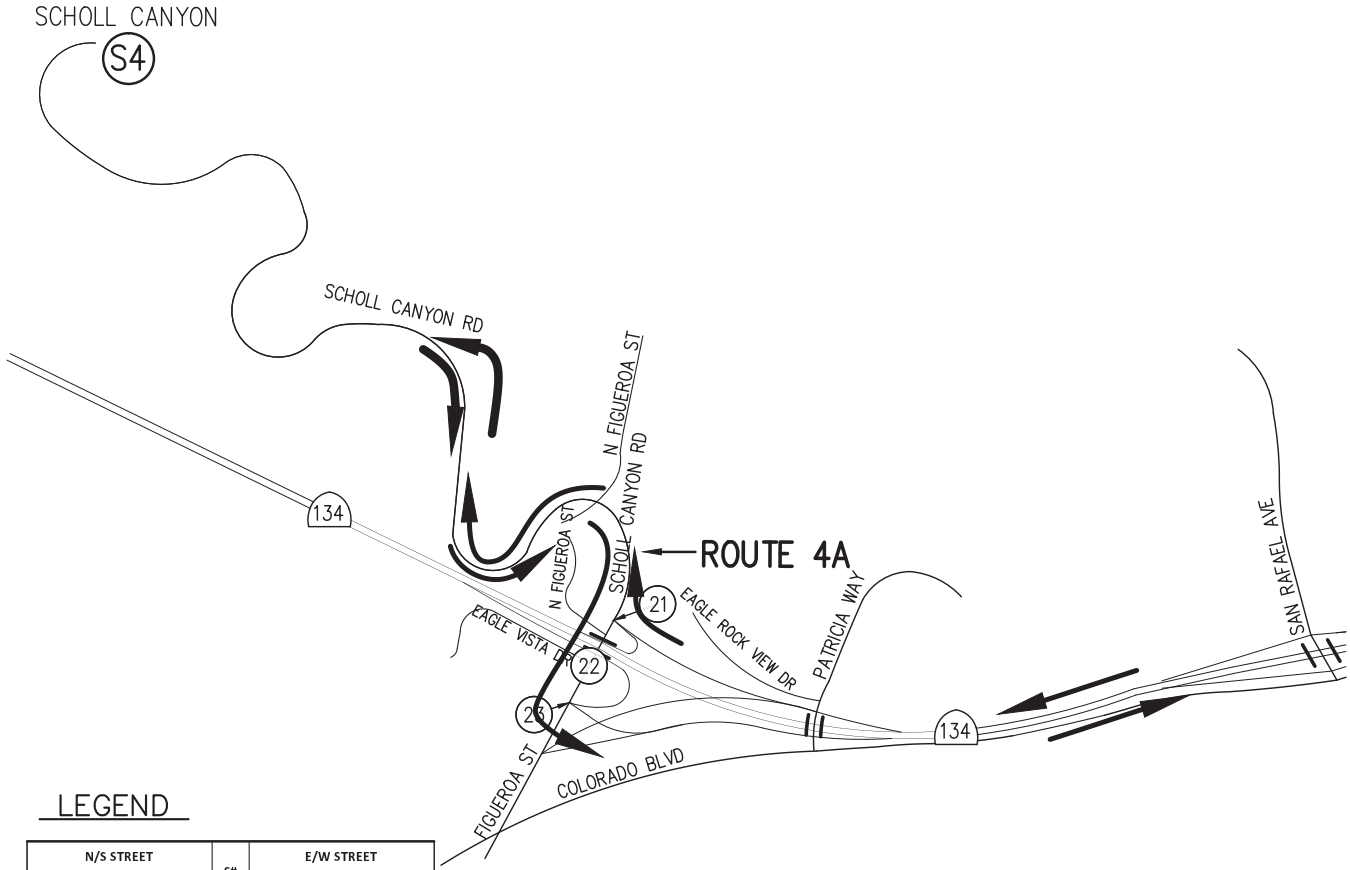
			0	50	0					
			0	50	0					
			0	50	0					
0	0	0					0	0	0	
0	0	0					0	0	0	
0	0	0					0	0	0	
			0	0	0					
			0	0	0					
			0	0	0					

N/S STREET	23	E/W STREET
FIGUEROA ST		EB 134 FWY

			0	0	50					
			0	0	50					
			0	0	50					
0	0	0					0	0	0	
0	0	0		TS			0	0	0	
0	0	0					0	0	0	
			0	0	0					
			0	0	0					
			0	0	0					

N

NOT TO SCALE



LEGEND

N/S STREET	S#	E/W STREET

			7AM-9AM							
			2PM-4PM							
			4PM-6PM							
7AM - 9AM	2PM - 4PM	4PM - 6PM					7AM - 9AM	2PM - 4PM	4PM - 6PM	
				TS						
			7AM-9AM							
			2PM-4PM							
			4PM-6PM							

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 4A PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-3-1A

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 3\FIG 4-3-1A.dwg
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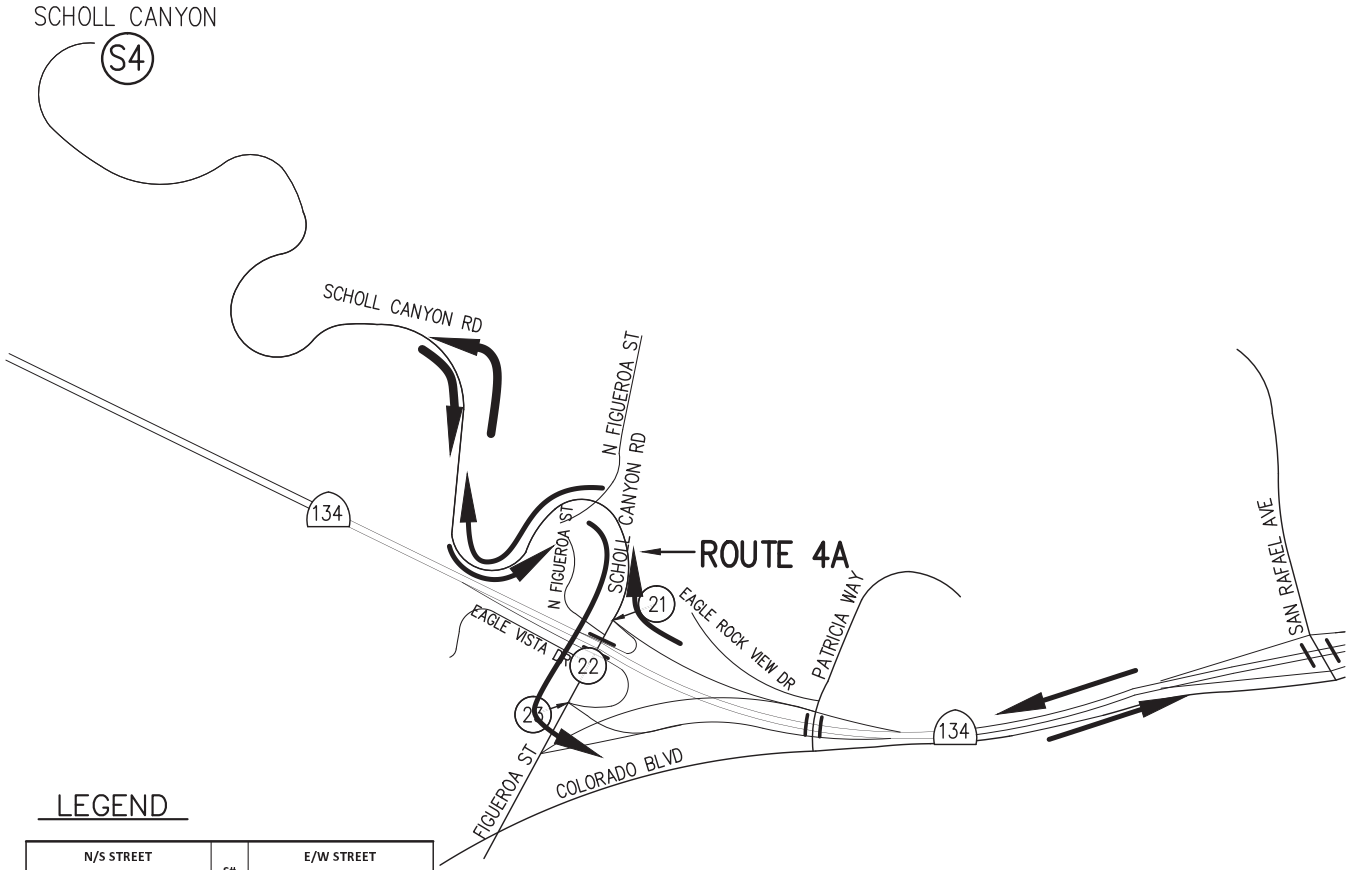
N/S STREET				21		E/W STREET				
SCHOLL CANYON RD						WB 134 FWY				
				0%	65%	60%				
				0%	60%	70%				
				0%	30%	25%				
0%	0%	0%						80%	65%	30%
0%	0%	0%						0%	0%	0%
0%	0%	0%						5%	5%	5%
				0%	35%	5%				
				0%	65%	5%				
				0%	5%	5%				

N/S STREET				22		E/W STREET				
FIGUEROA ST						EAGLE VISTA DRIVE				
				5%	5%	0%				
				5%	10%	0%				
				5%	5%	0%				
5%	5%	5%						0%	0%	0%
0%	0%	0%						0%	0%	0%
5%	5%	5%						0%	0%	0%
				30%	5%	0%				
				5%	10%	0%				
				5%	5%	0%				

N/S STREET				23		E/W STREET				
FIGUEROA ST						EB 134 FWY				
				0%	5%	5%				
				0%	5%	35%				
				0%	5%	15%				
0%	0%	0%						10%	25%	5%
0%	0%	0%		TS				0%	0%	0%
0%	0%	0%						5%	5%	5%
				0%	5%	5%				
				0%	5%	5%				
				0%	5%	5%				

N

NOT TO SCALE



LEGEND

N/S STREET				S#		E/W STREET				
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 4A TRUCK PERCENTAGE

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-3-1B

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 3\FIG 4-3-1B.dwg
Last Opened: Oct 04, 2013 - 11:03am by: TMunoz

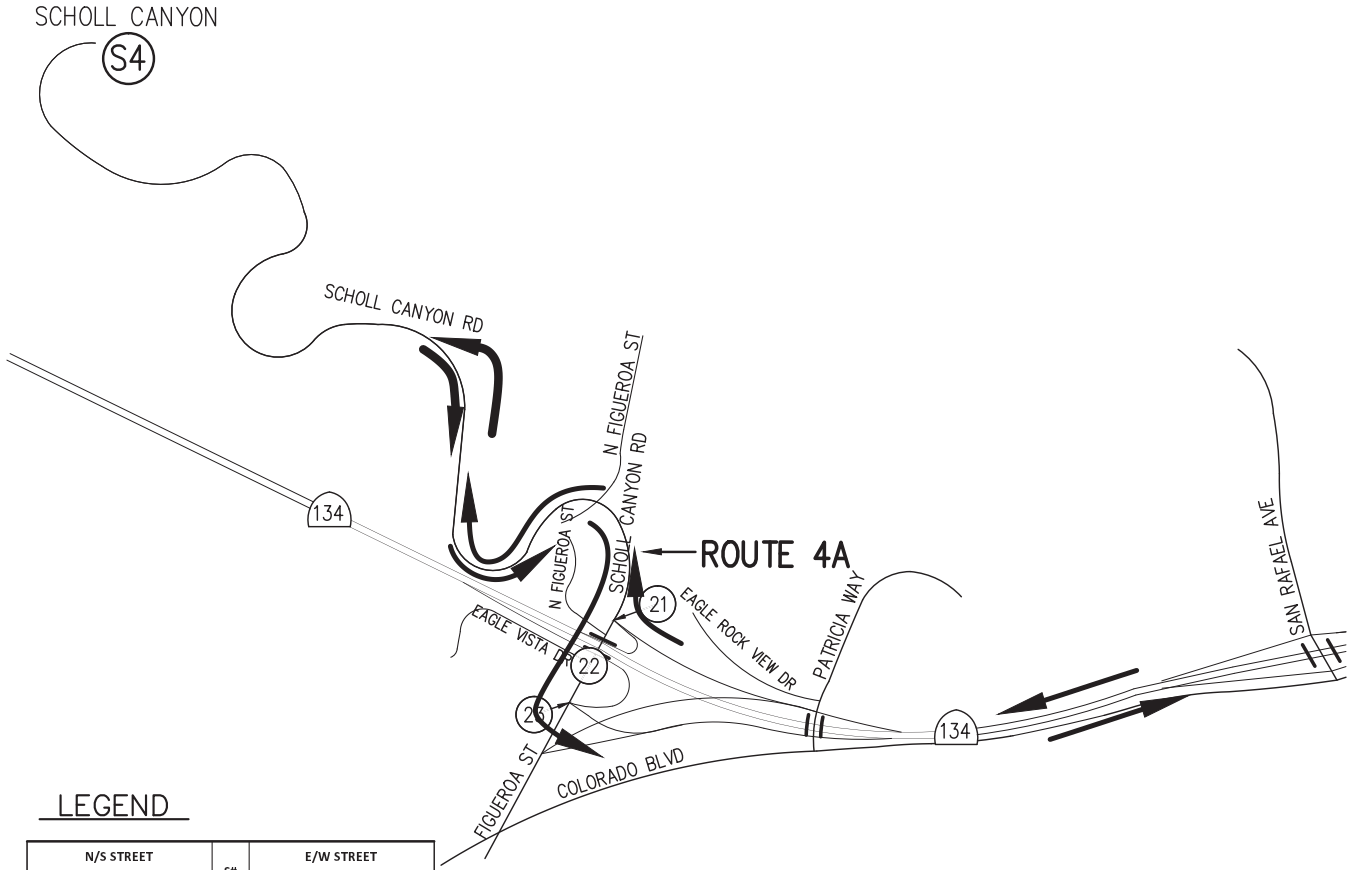
N/S STREET				21		E/W STREET				
SCHOLL CANYON RD						WB 134 FWY				
			0	170	10					
			0	245	40					
			0	210	20					
0	0	0					185	235	165	
0	0	0					0	0	0	
0	0	0					235	270	435	
			0	40	645					
			0	80	325					
			0	10	470					

N/S STREET				22		E/W STREET				
FIGUEROA ST						EAGLE VISTA DRIVE				
			10	380	0					
			20	485	0					
			25	610	0					
50	30	40					0	0	0	
0	0	0					0	0	0	
60	50	70					0	0	0	
			40	665	0					
			40	390	0					
			105	440	0					

N/S STREET				23		E/W STREET				
FIGUEROA ST						EB 134 FWY				
			0	220	200					
			0	290	260					
			0	450	225					
0	0	0					50	110	60	
0	0	0		TS			0	0	0	
0	0	0					380	255	455	
			0	650	290					
			0	270	235					
			0	490	275					

N

NOT TO SCALE



LEGEND

N/S STREET				S#		E/W STREET			
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					
7AM - 9AM	2PM - 4PM	4PM - 6PM					7AM - 9AM	2PM - 4PM	4PM - 6PM
				TS					
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 4A
PCE PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-3-1C

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 3\FIG 4-3-1C.dwg
Last Opened: Oct 04, 2013 - 11:03am by: TMunoz

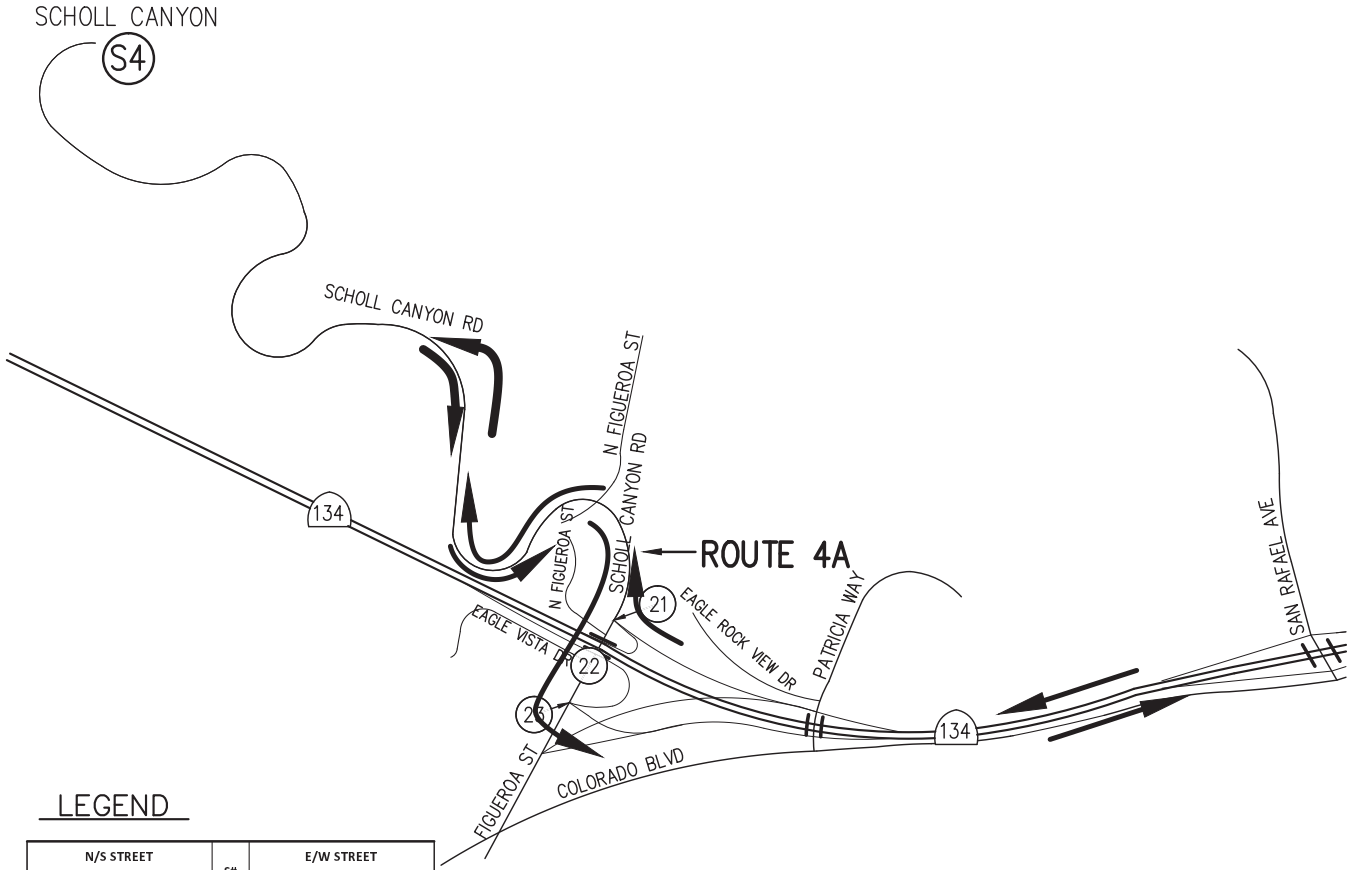
N/S STREET				21	E/W STREET						
SCHOLL CANYON RD					WB 134 FWY						
			0	60	5						
			0	95	15						
			0	85	15						
0	0	0					65	85	60		
0	0	0					0	0	0		
0	0	0					210	260	430		
			0	20	635						
			0	35	310						
			0	10	460						

N/S STREET				22	E/W STREET						
FIGUEROA ST					EAGLE VISTA DRIVE						
			10	270	0						
			15	325	0						
			25	485	0						
45	30	40					0	0	0		
0	0	0					0	0	0		
60	50	70					0	0	0		
			25	625	0						
			40	325	0						
			105	430	0						

N/S STREET				23	E/W STREET						
FIGUEROA ST					EB 134 FWY						
			0	210	100						
			0	280	115						
			0	445	105						
0	0	0					40	75	55		
0	0	0		TS			0	0	0		
0	0	0					365	235	455		
			0	615	285						
			0	260	225						
			0	480	265						

N

NOT TO SCALE



LEGEND

N/S STREET				S#	E/W STREET						
				7AM-9AM							
				2PM-4PM							
				4PM-6PM							
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS			7AM - 9AM	2PM - 4PM	4PM - 6PM		
				7AM-9AM							
				2PM-4PM							
				4PM-6PM							

LEGEND

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ROUTE 4A
EXISTING + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-3-1D

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N/S STREET				21		E/W STREET			
SCHOLL CANYON RD						WB 134 FWY			
			0	150	0				
			0	150	0				
			0	150	0				
0	0	0					150	150	150
0	0	0					0	0	0
0	0	0					0	0	0
			0	0	0				
			0	0	0				
			0	0	0				

N/S STREET				22		E/W STREET			
FIGUEROA ST						EAGLE VISTA DRIVE			
			0	150	0				
			0	150	0				
			0	150	0				
0	0	0					0	0	0
0	0	0					0	0	0
0	0	0					0	0	0
			0	0	0				
			0	0	0				
			0	0	0				

N/S STREET				23		E/W STREET			
FIGUEROA ST						EB 134 FWY			
			0	0	150				
			0	0	150				
			0	0	150				
0	0	0					0	0	0
0	0	0		TS			0	0	0
0	0	0					0	0	0
			0	0	0				
			0	0	0				
			0	0	0				

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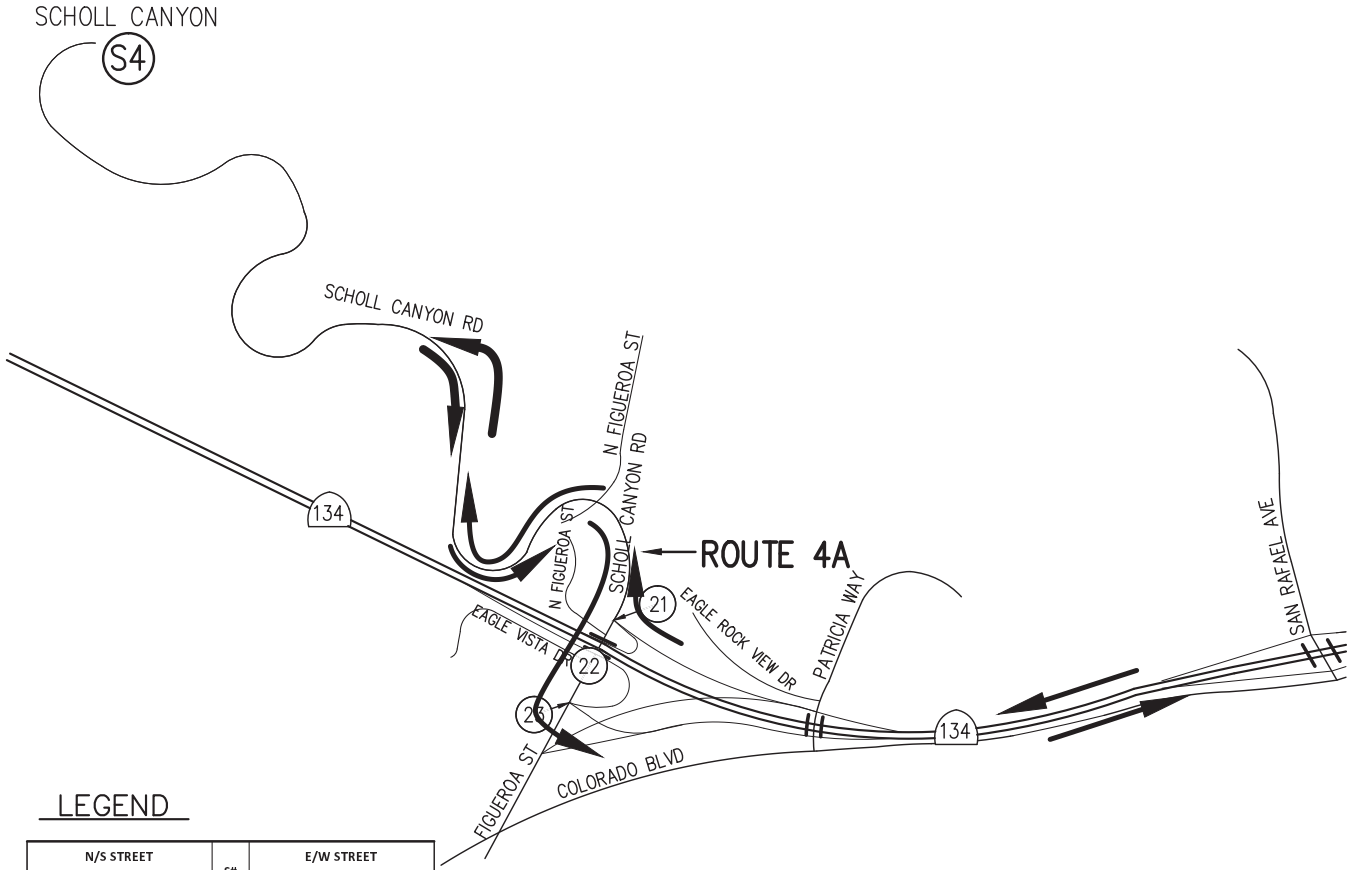
NOT TO SCALE



LEGEND

N/S STREET				S#		E/W STREET			
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					
7AM - 9AM	2PM - 4PM	4PM - 6PM					7AM - 9AM	2PM - 4PM	4PM - 6PM
				TS					
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 4A
PCE EXISTING + PROJECT TRIPS
DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-3-1E

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 3\FIG 4-3-1E.dwg
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N/S STREET				21			E/W STREET			
SCHOLL CANYON RD							WB 134 FWY			
			0	0	50					
			0	0	50					
			0	0	50					
0	0	0					0	0	0	
0	0	0					0	0	0	
0	0	0					0	0	0	
			0	50	0					
			0	50	0					
			0	50	0					

N/S STREET				22			E/W STREET			
FIGUEROA ST							EAGLE VISTA DRIVE			
			0	0	0					
			0	0	0					
			0	0	0					
0	0	0					0	0	0	
0	0	0					0	0	0	
0	0	0					0	0	0	
			0	50	0					
			0	50	0					
			0	50	0					

N/S STREET				23			E/W STREET			
FIGUEROA ST							EB 134 FWY			
			0	0	0					
			0	0	0					
			0	0	0					
0	0	0					50	50	50	
0	0	0		TS			0	0	0	
0	0	0					0	0	0	
			0	0	0					
			0	0	0					
			0	0	0					

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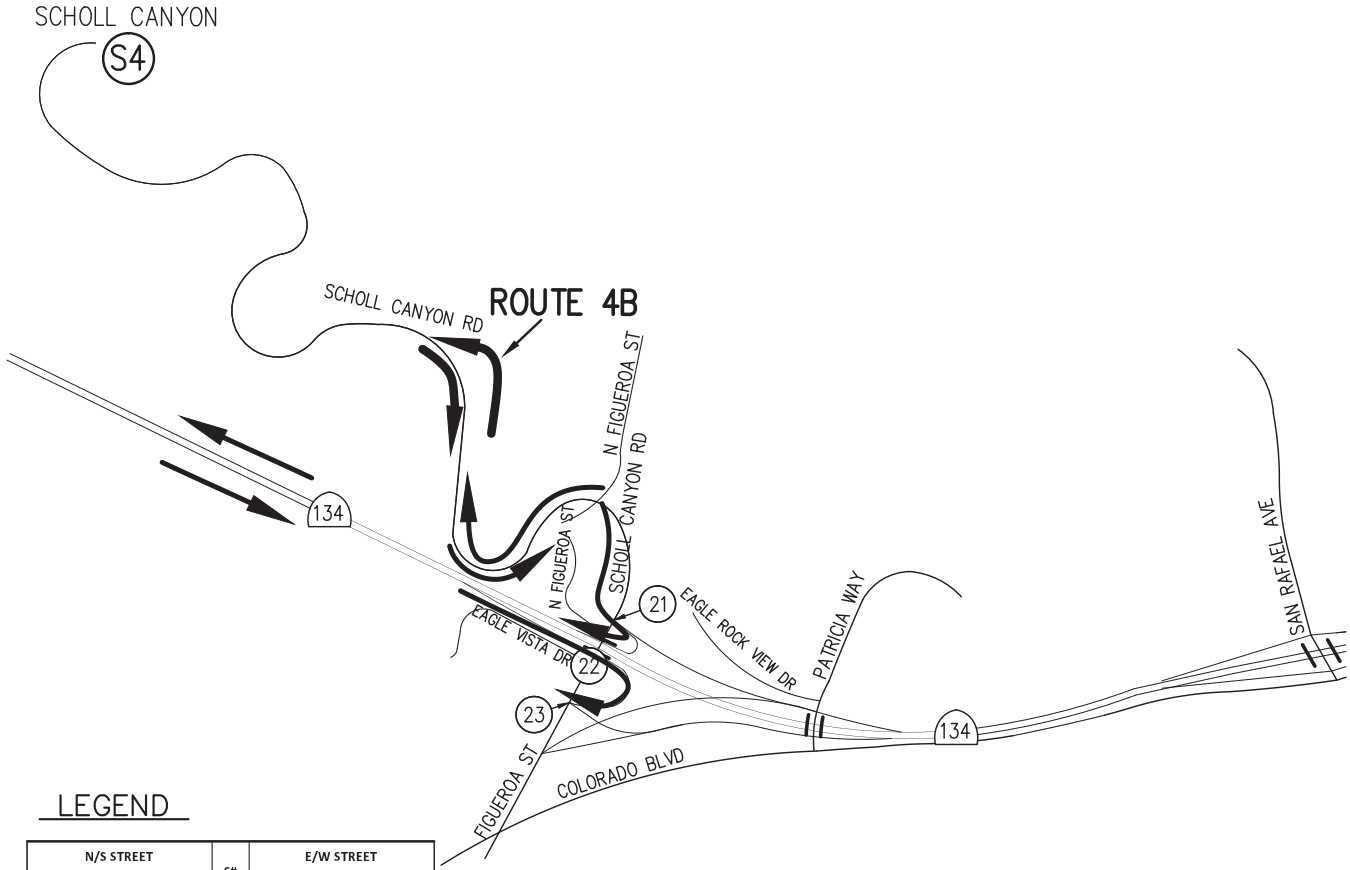
NOT TO SCALE



LEGEND

N/S STREET				S#			E/W STREET			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM					7AM - 9AM	2PM - 4PM	4PM - 6PM	
				TS						
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

(S#) – DISPOSAL SITE

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ROUTE 4B PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-3-2A

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SCHOLL CANYON RD					WB 134 FWY				
			0%	65%	60%				
			0%	60%	70%				
			0%	30%	25%				
0%	0%	0%					80%	65%	30%
0%	0%	0%					0%	0%	0%
0%	0%	0%					5%	5%	5%
			0%	35%	5%				
			0%	65%	5%				
			0%	5%	5%				

N/S STREET				22	E/W STREET				
FIGUEROA ST					EAGLE VISTA DRIVE				
			5%	5%	0%				
			5%	10%	0%				
			5%	5%	0%				
5%	5%	5%					0%	0%	0%
0%	0%	0%					0%	0%	0%
5%	5%	5%					0%	0%	0%
			30%	5%	0%				
			5%	10%	0%				
			5%	5%	0%				

N/S STREET				23	E/W STREET				
FIGUEROA ST					EB 134 FWY				
			0%	5%	5%				
			0%	5%	35%				
			0%	5%	15%				
0%	0%	0%					10%	25%	5%
0%	0%	0%		TS			0%	0%	0%
0%	0%	0%					5%	5%	5%
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			0%	5%	5%				

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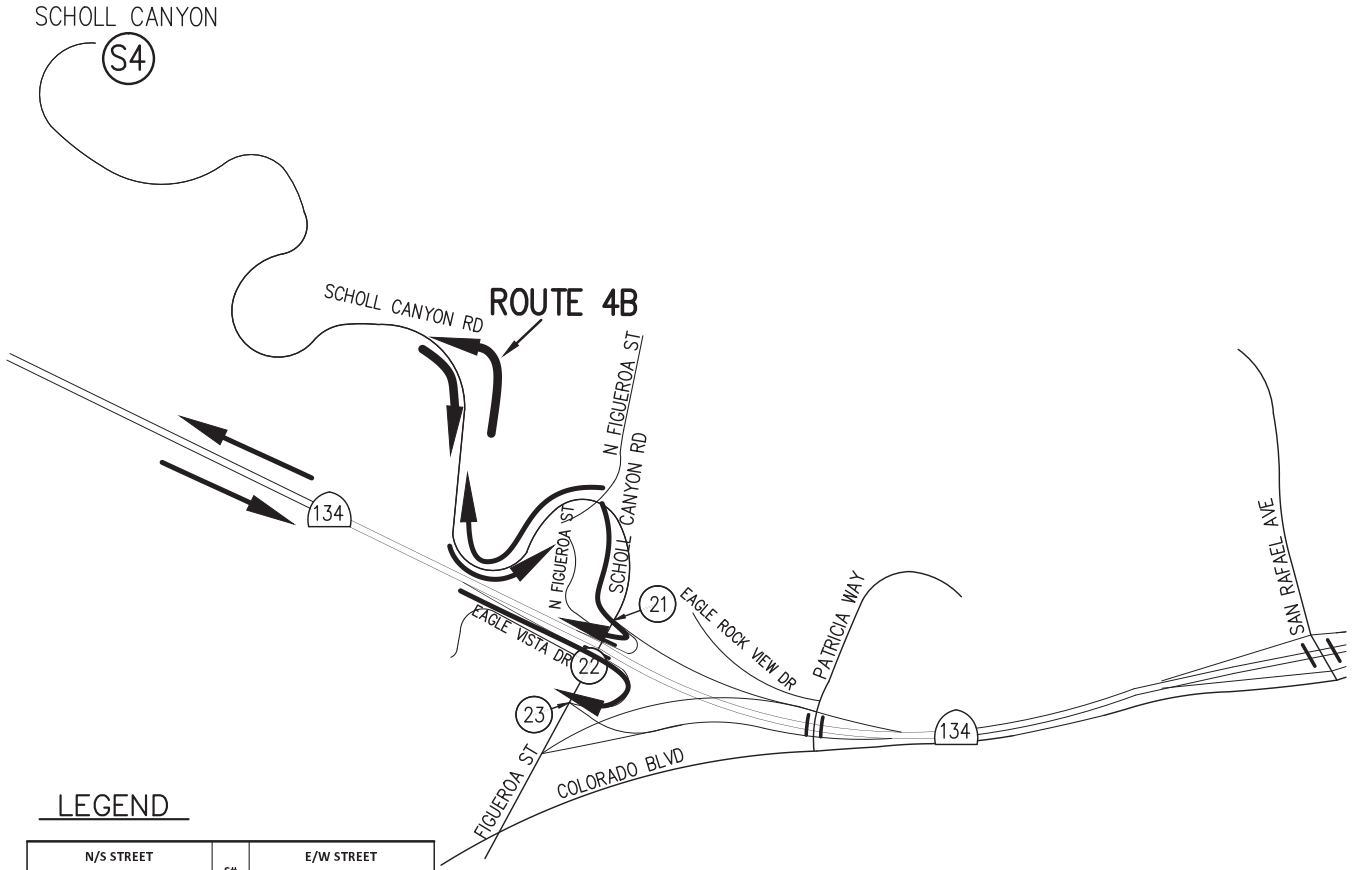

LEGEND

N/S STREET				S#	E/W STREET				
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS		7AM - 9AM	2PM - 4PM	4PM - 6PM	
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					

LEGEND

(S#) – DISPOSAL SITE

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ROUTE 4B
TRUCK PERCENTAGES

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-3-2B

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 3\FIG 4-3-2B.dwg
Last Opened: Oct 04, 2013 - 11:04am by: TMunoz

N/S STREET				21		E/W STREET			
SCHOLL CANYON RD						WB 134 FWY			
			0	0	150				
			0	0	150				
			0	0	150				
0	0	0					0	0	0
0	0	0					0	0	0
0	0	0					0	0	0
			0	150	0				
			0	150	0				
			0	150	0				

N/S STREET				22		E/W STREET			
FIGUEROA ST						EAGLE VISTA DRIVE			
			0	0	0				
			0	0	0				
			0	0	0				
0	0	0					0	0	0
0	0	0					0	0	0
0	0	0					0	0	0
			0	150	0				
			0	150	0				
			0	150	0				

N/S STREET				23		E/W STREET			
FIGUEROA ST						EB 134 FWY			
			0	0	0				
			0	0	0				
			0	0	0				
0	0	0					150	150	150
0	0	0		TS			0	0	0
0	0	0					0	0	0
			0	0	0				
			0	0	0				
			0	0	0				

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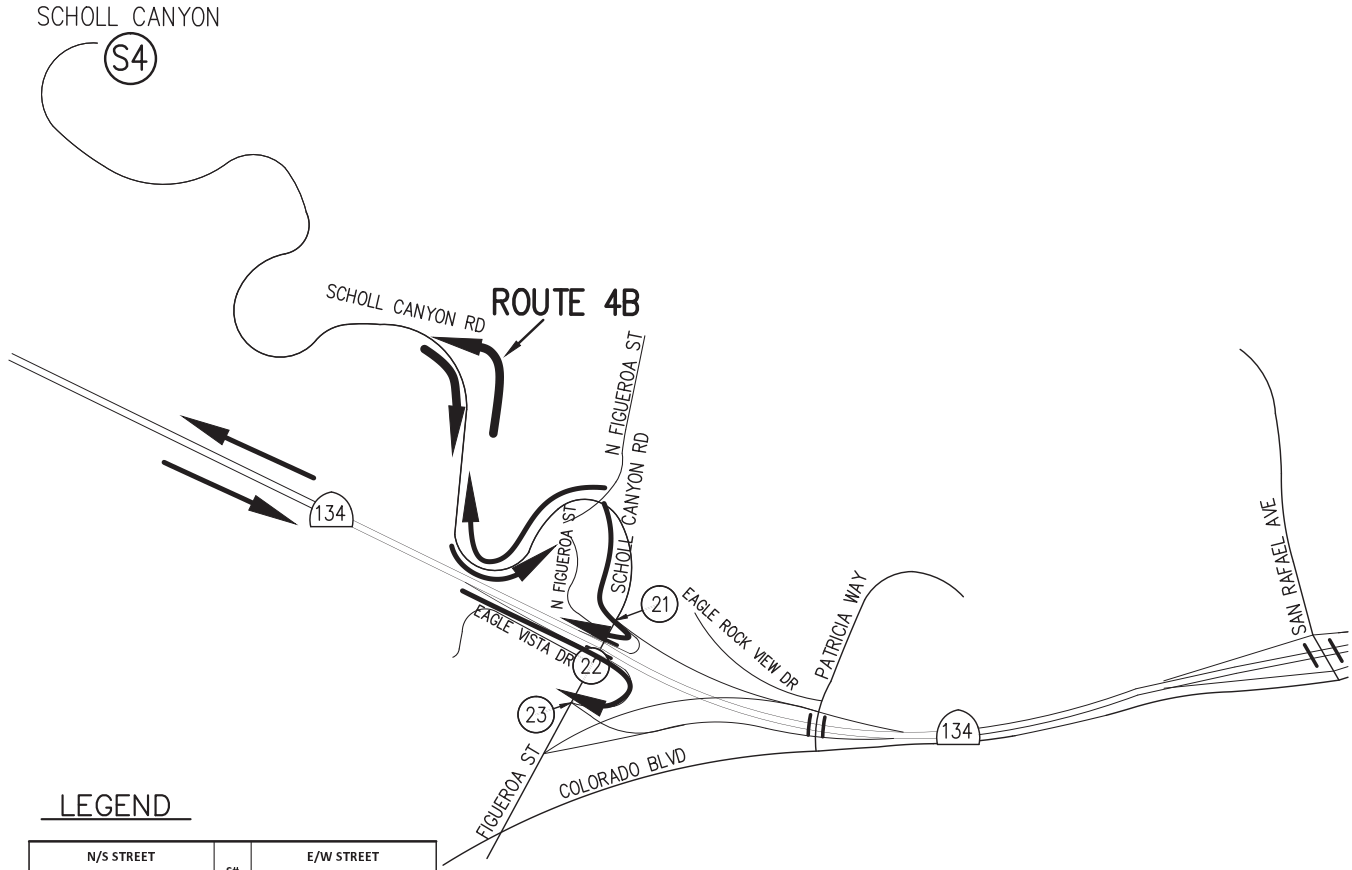

LEGEND

N/S STREET				S#		E/W STREET			
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					
7AM - 9AM	2PM - 4PM	4PM - 6PM					7AM - 9AM	2PM - 4PM	4PM - 6PM
				TS					
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 4B
PCE PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-3-2C

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 3\FIG 4-3-2C.dwg
Last Opened: Oct 04, 2013 - 11:04am by: TMunoz

N/S STREET				21		E/W STREET				
SCHOLL CANYON RD						WB 134 FWY				
			0	10	55					
			0	45	65					
			0	35	65					
0	0	0					15	35	10	
0	0	0					0	0	0	
0	0	0					210	260	430	
			0	70	635					
			0	85	310					
			0	60	460					

N/S STREET				22		E/W STREET				
FIGUEROA ST						EAGLE VISTA DRIVE				
			10	220	0					
			15	275	0					
			25	435	0					
45	30	40					0	0	0	
0	0	0					0	0	0	
60	50	70					0	0	0	
			25	675	0					
			40	375	0					
			105	480	0					

N/S STREET				23		E/W STREET				
FIGUEROA ST						EB 134 FWY				
			0	210	50					
			0	280	65					
			0	445	55					
0	0	0					90	125	105	
0	0	0		TS			0	0	0	
0	0	0					365	235	455	
			0	615	285					
			0	260	225					
			0	480	265					

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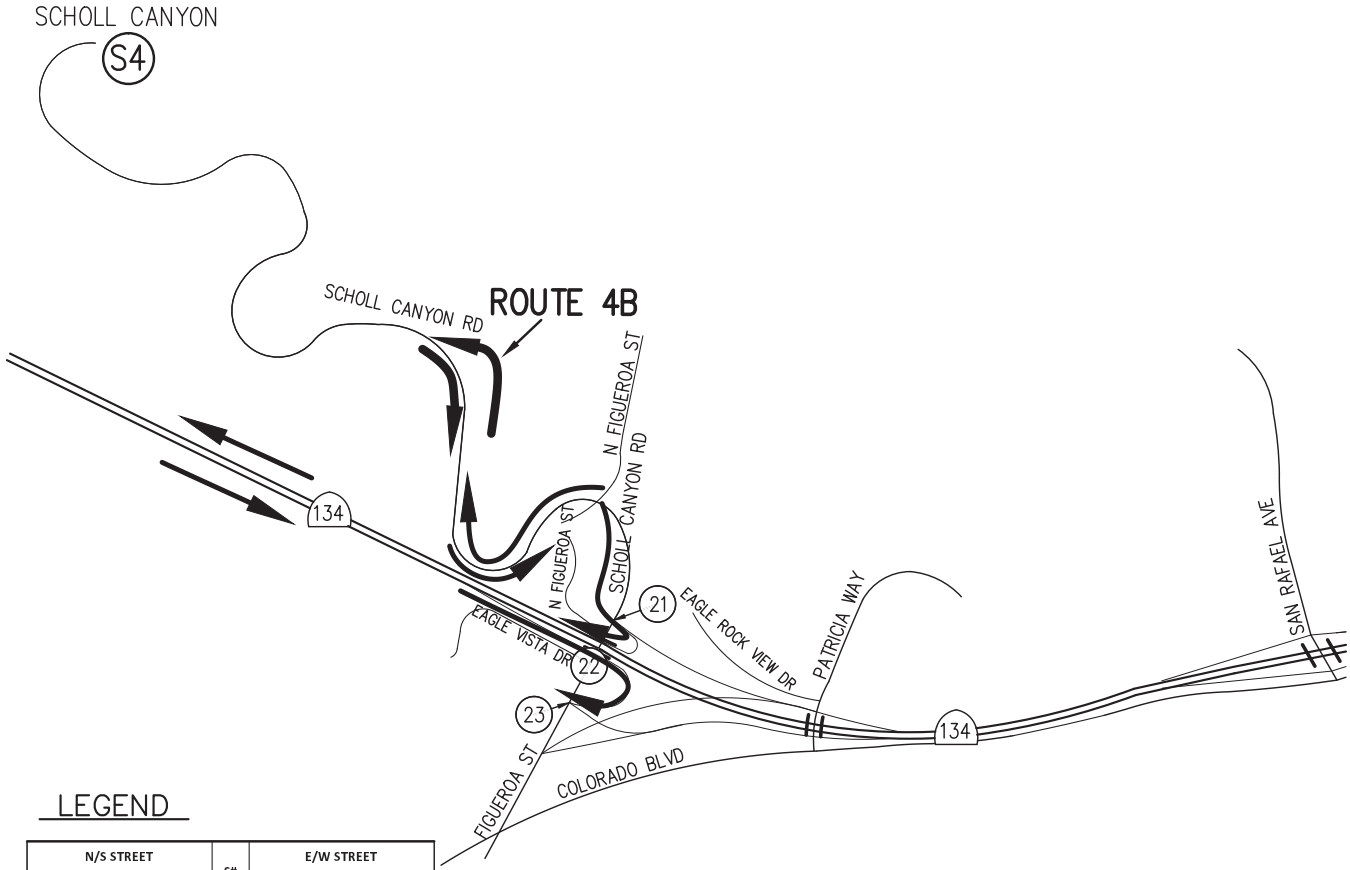
NOT TO SCALE



LEGEND

N/S STREET				S#		E/W STREET				
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM					7AM - 9AM	2PM - 4PM	4PM - 6PM	
				TS						
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 4B
EXISTING + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-3-2D

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 3\FIG 4-3-2D.dwg
Last Opened: Oct 04, 2013 - 11:04am by: TMunoz

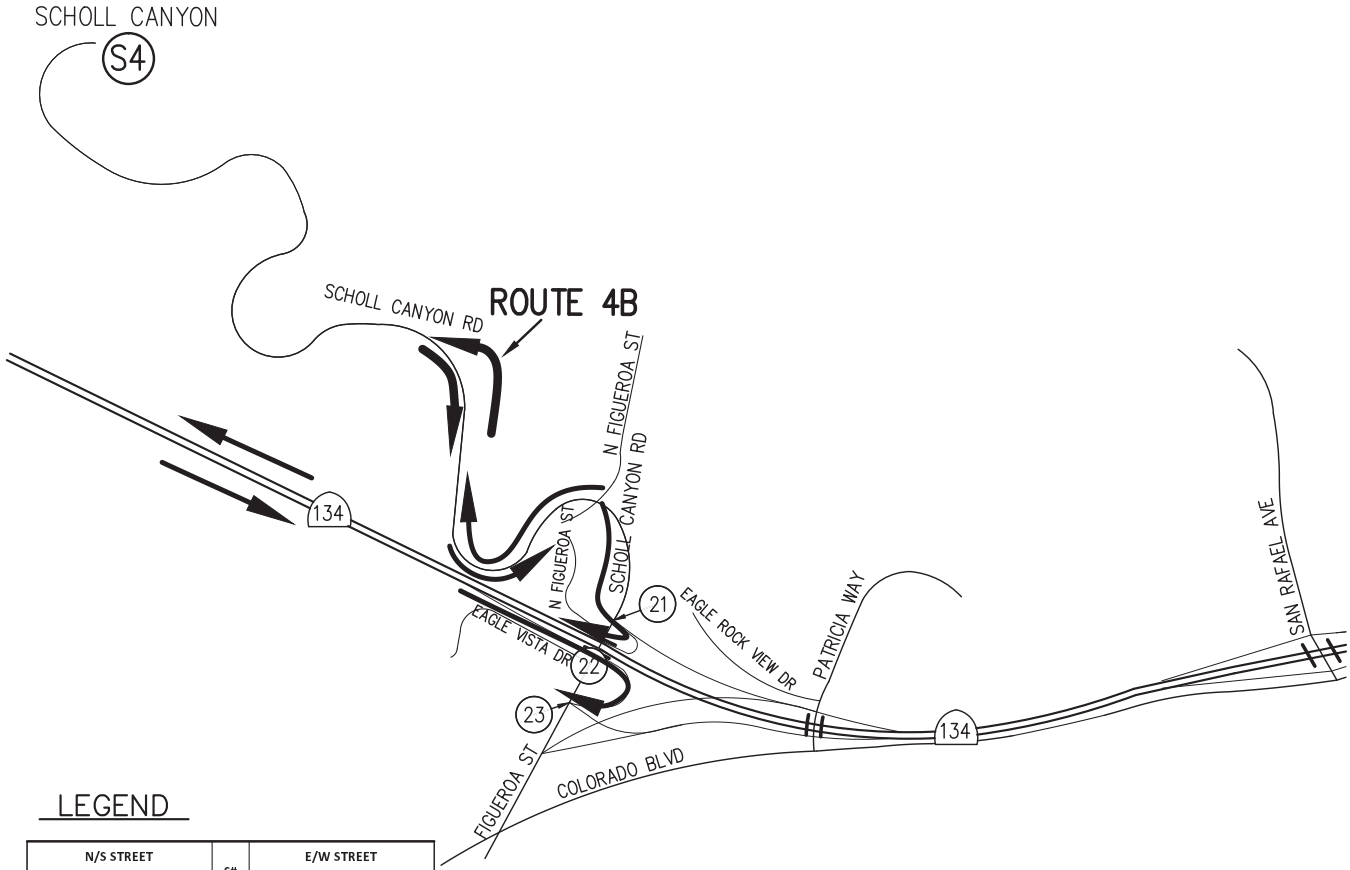
N/S STREET				21	E/W STREET					
SCHOLL CANYON RD					WB 134 FWY					
			0	20	160					
			0	95	190					
			0	60	170					
0	0	0					35	85	15	
0	0	0					0	0	0	
0	0	0					235	270	435	
			0	190	645					
			0	230	325					
			0	160	470					

N/S STREET				22	E/W STREET					
FIGUEROA ST					EAGLE VISTA DRIVE					
			10	230	0					
			20	335	0					
			25	460	0					
50	30	40					0	0	0	
0	0	0					0	0	0	
60	50	70					0	0	0	
			40	815	0					
			40	540	0					
			105	590	0					

N/S STREET				23	E/W STREET					
FIGUEROA ST					EB 134 FWY					
			0	220	50					
			0	290	110					
			0	450	75					
0	0	0					200	260	210	
0	0	0	TS				0	0	0	
0	0	0					380	255	455	
			0	650	290					
			0	270	235					
			0	490	275					

N

NOT TO SCALE



LEGEND

N/S STREET				S#	E/W STREET					
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS			7AM - 9AM	2PM - 4PM	4PM - 6PM	
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 4B
PCE EXISTING + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-3-2E

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Table 4-3-1
Intersection Capacity Analysis – Existing + Project Conditions (Route 4A)
Traffic Impact Analysis - Site 4

Route 4A		AM				MID-DAY				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
21	Figueroa St/Scholl Canyon Road and SR-134 Freeway Westbound Ramps	E	36.2	-	-	B	12.9	-	-	D	34	-	-
22	Figueroa St and Eagle Vista Drive	B	13.2	-	-	B	12	-	-	C	19	-	-
23	Figueroa St and SR-134 Freeway Eastbound Ramps	A	8	0.57	A	A	6.2	0.42	A	A	7.8	0.55	A

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc.**

Table 4-3-2
Intersection Capacity Analysis – Existing + Project Conditions (Route 4B)
Traffic Impact Analysis - Site 4

Route 4B		AM				MID-DAY				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
21	Figueroa St/Scholl Canyon Road and SR-134 Freeway Westbound Ramps	D	32.2	-	-	B	13.2	-	-	E	35.4	-	-
22	Figueroa St and Eagle Vista Drive	B	12.9	-	-	B	11.7	-	-	C	18.1	-	-
23	Figueroa St and SR-134 Freeway Eastbound Ramps	A	7.4	0.52	A	A	6.1	0.31	A	A	7.4	0.48	A

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc.**

Haul Routes 4A and 4B Analysis

As presented in *Table 4-3-1* and *Table 4-3-2*, under existing plus project conditions for Site 4 (Route 4A-4B) most intersections are expected to operate at an acceptable HCM LOS C or better, for the AM, Mid-day and PM peak hours. The Intersection of Figueroa Street and SR-134 Westbound Ramps is anticipated to operate at HCM LOS E for Haul Route 4A during the AM peak hour and for Haul Route 4B E during the PM peak hour. Mitigation is recommended for Figueroa Street and SR-134 Westbound Ramps.

Section 4: Sheldon Pit (Site 5), Sun Valley Fill Site (Site 6), Bradley Landfill (Site 7), and Boulevard Pit (Site 8)

Haul Route 5A

The Haul Route 5A project trips, truck percentages and passenger car equivalent (PCE) project trips are illustrated in *Figure 4-4-1A* through *Figure 4-4-1C.* The existing plus project AM (7-9), MID-DAY (12-2), PM (4-6) turn movement volumes, are provided in *Figure 4-4-1D.* For comparison the (PCE) existing plus project turn movement volumes are provided in *Figure 4-4-1E.*

N/S STREET				24			E/W STREET			
FOOTHILL BLVD							WB I-210 FWY RAMPS			
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						50	50	50
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET				25			E/W STREET			
FOOTHILL BLVD							EB I-210 FWY RAMPS			
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	50				
				0	0	50				
				0	0	50				

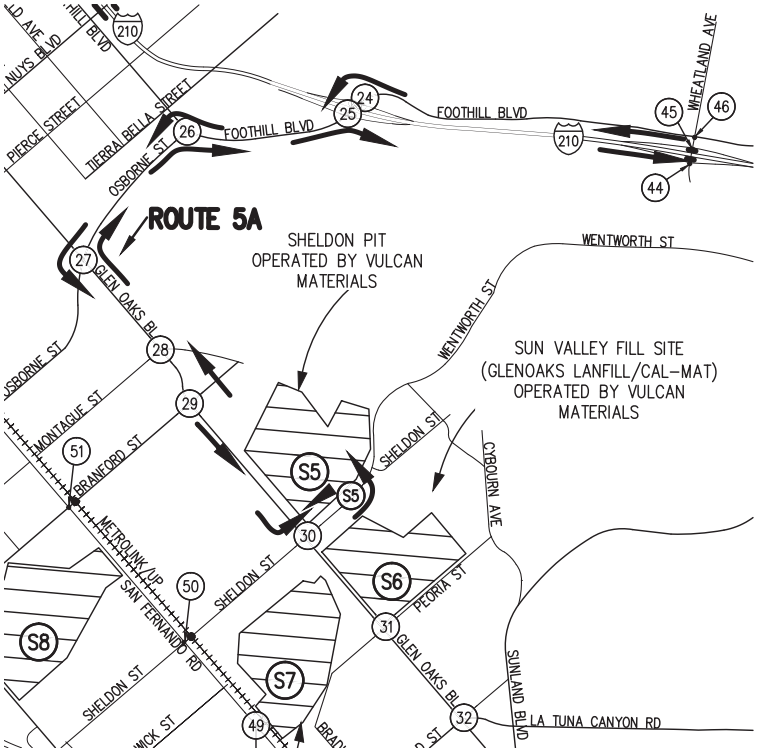
N/S STREET				26			E/W STREET			
OSBORNE STREET							FOOTHILL BLVD			
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						50	50	50
				0	0	50				
				0	0	50				
				0	0	50				

N/S STREET				27			E/W STREET			
GLEN OAKS BLVD							OSBORNE STREET			
				0	0	0				
				0	0	0				
				0	0	0				
50	50	50						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	50				
				0	0	50				
				0	0	50				

N/S STREET				28			E/W STREET			
GLEN OAKS BLVD							MONTAGUE STREET			
				0	50	0				
				0	50	0				
				0	50	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	50	0				
				0	50	0				
				0	50	0				

N/S STREET				29			E/W STREET			
GLEN OAKS BLVD							BRANFORD STREET			
				0	50	0				
				0	50	0				
				0	50	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	50	0				
				0	50	0				
				0	50	0				

N/S STREET				30			E/W STREET			
GLEN OAKS BLVD							SHELDON STREET			
				0	0	50				
				0	0	50				
				0	0	50				
0	0	0						50	50	50
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				



LEGEND

N/S STREET				S#			E/W STREET			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

(S#) – DISPOSAL SITE

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ROUTE 5A PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-4-1A

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N/S STREET				24		E/W STREET				
FOOTHILL BLVD						WB I-210 FWY RAMPS				
				5%	5%	0%				
				5%	5%	0%				
				5%	5%	0%				
0%	0%	0%						5%	10%	5%
0%	0%	0%		TS				0%	0%	0%
0%	0%	0%						5%	10%	5%
				5%	5%	0%				
				5%	5%	0%				
				5%	5%	0%				

N/S STREET				25		E/W STREET				
FOOTHILL BLVD						EB I-210 FWY RAMPS				
				0%	5%	5%				
				0%	5%	5%				
				0%	5%	5%				
5%	5%	5%						0%	0%	0%
0%	0%	0%		TS				0%	0%	0%
5%	20%	5%						0%	0%	0%
				0%	5%	5%				
				0%	5%	10%				
				0%	5%	5%				

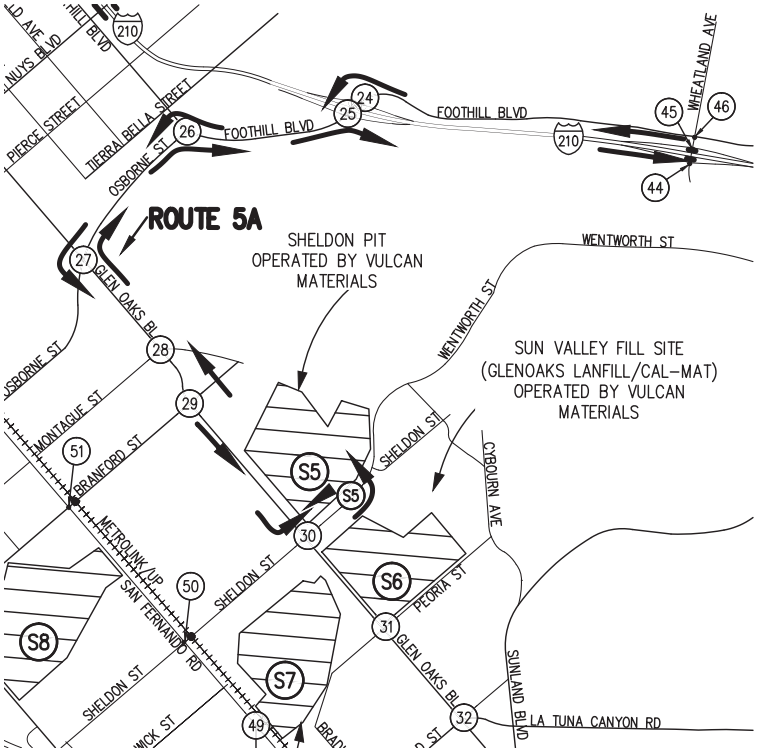
N/S STREET				26		E/W STREET				
OSBORNE STREET						FOOTHILL BLVD				
				5%	5%	5%				
				5%	5%	5%				
				5%	5%	5%				
5%	5%	5%						5%	5%	5%
5%	10%	5%		TS				5%	10%	5%
5%	5%	5%						5%	15%	5%
				5%	5%	5%				
				10%	5%	10%				
				5%	5%	5%				

N/S STREET				27		E/W STREET				
GLEN OAKS BLVD						OSBORNE STREET				
				10%	5%	20%				
				5%	10%	5%				
				5%	10%	5%				
5%	5%	5%						15%	10%	5%
5%	10%	5%		TS				5%	5%	5%
20%	10%	15%						10%	10%	10%
				45%	15%	20%				
				10%	10%	20%				
				5%	5%	5%				

N/S STREET				28		E/W STREET				
GLEN OAKS BLVD						MONTAGUE STREET				
				15%	10%	5%				
				15%	10%	5%				
				15%	5%	5%				
30%	30%	10%						5%	5%	5%
5%	5%	5%		TS				5%	5%	5%
20%	20%	5%						5%	5%	5%
				5%	10%	15%				
				5%	10%	15%				
				25%	5%	5%				

N/S STREET				29		E/W STREET				
GLEN OAKS BLVD						BRANFORD STREET				
				5%	5%	45%				
				5%	5%	15%				
				15%	10%	5%				
5%	5%	5%						35%	5%	5%
10%	5%	5%		TS				50%	5%	5%
10%	5%	5%						40%	10%	10%
				5%	10%	50%				
				10%	10%	10%				
				5%	5%	5%				

N/S STREET				30		E/W STREET				
GLEN OAKS BLVD						SHELDON STREET				
				10%	5%	30%				
				15%	5%	5%				
				5%	5%	5%				
5%	5%	5%						5%	10%	5%
5%	25%	5%		TS				5%	15%	5%
5%	25%	5%						5%	10%	20%
				10%	5%	10%				
				20%	5%	25%				
				10%	5%	10%				



LEGEND

N/S STREET				S#		E/W STREET				
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

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ROUTE 5A TRUCK PERCENTAGES

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-4-1B

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N/S STREET				24			E/W STREET			
FOOTHILL BLVD							WB I-210 FWY RAMPS			
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						150	150	150
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET				25			E/W STREET			
FOOTHILL BLVD							EB I-210 FWY RAMPS			
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	150				
				0	0	150				
				0	0	150				

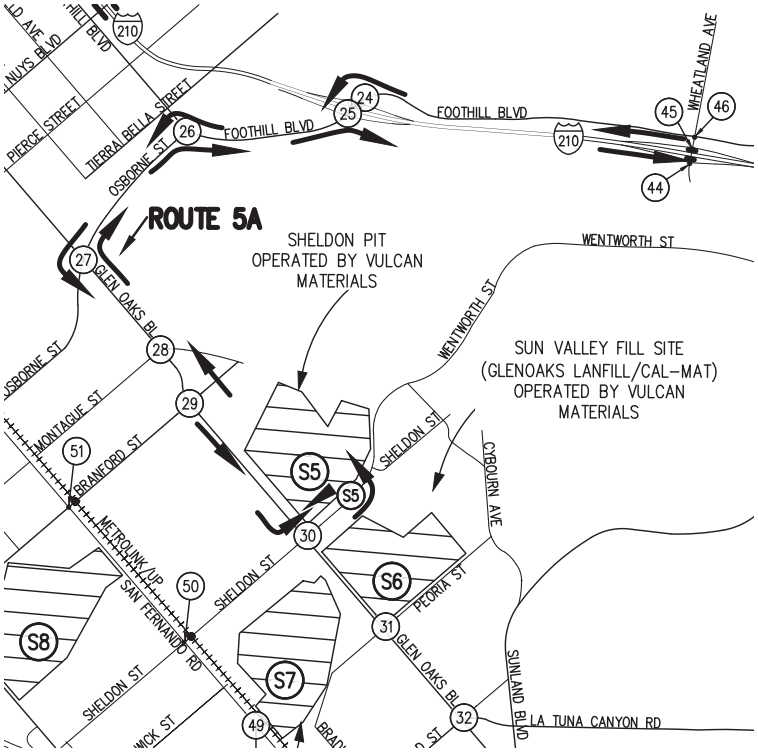
N/S STREET				26			E/W STREET			
OSBORNE STREET							FOOTHILL BLVD			
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						150	150	150
				0	0	150				
				0	0	150				
				0	0	150				

N/S STREET				27			E/W STREET			
GLEN OAKS BLVD							OSBORNE STREET			
				0	0	0				
				0	0	0				
				0	0	0				
150	150	150						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	150				
				0	0	150				
				0	0	150				

N/S STREET				28			E/W STREET			
GLEN OAKS BLVD							MONTAGUE STREET			
				0	150	0				
				0	150	0				
				0	150	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	150	0				
				0	150	0				
				0	150	0				

N/S STREET				29			E/W STREET			
GLEN OAKS BLVD							BRANFORD STREET			
				0	150	0				
				0	150	0				
				0	150	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	150	0				
				0	150	0				
				0	150	0				

N/S STREET				30			E/W STREET			
GLEN OAKS BLVD							SHELDON STREET			
				0	0	150				
				0	0	150				
				0	0	150				
0	0	0						150	150	150
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				



LEGEND

N/S STREET				S#			E/W STREET			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 5A
PCE PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-4-1C

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N/S STREET				24			E/W STREET								
FOOTHILL BLVD							WB I-210 FWY RAMPS								
				490	390	0									
				205	255	0									
				225	260	0									
0	0	0						60	35	65					
0	0	0		TS				0	0	0					
0	0	0						220	165	305					
				130	570	0									
				105	445	0									
				210	510	0									

N/S STREET				25			E/W STREET								
FOOTHILL BLVD							EB I-210 FWY RAMPS								
				0	355	195									
				0	305	75									
				0	460	55									
355	260	335						0	0	0					
0	0	0		TS				0	0	0					
100	40	80						0	0	0					
				0	350	340									
				0	265	210									
				0	390	290									

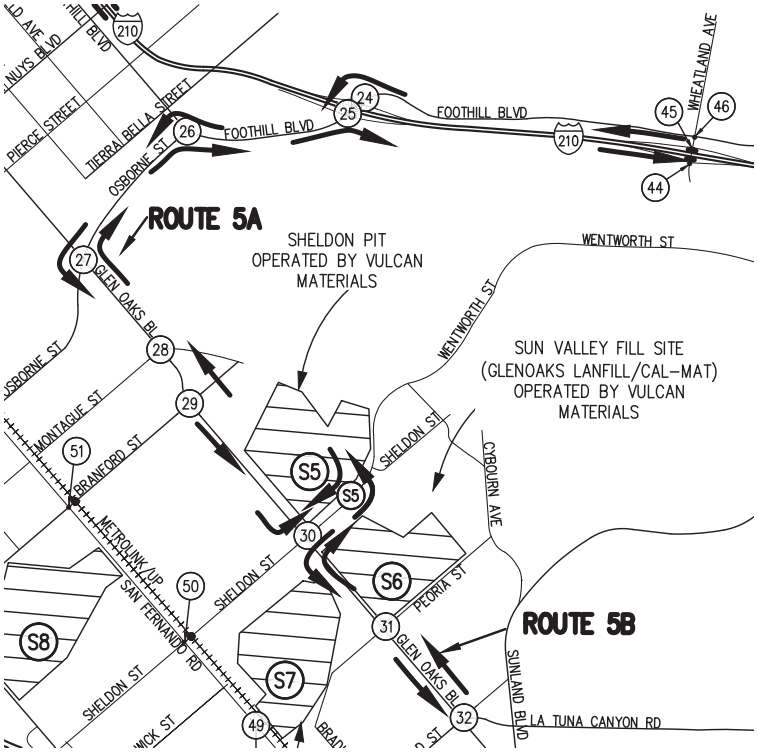
N/S STREET				26			E/W STREET								
OSBORNE STREET							FOOTHILL BLVD								
				5	5	5									
				15	5	5									
				15	5	5									
5	20	15						5	5	5					
320	225	315		TS				245	200	305					
520	25	265						310	215	255					
				335	10	300									
				230	5	260									
				680	5	445									

N/S STREET				27			E/W STREET								
GLEN OAKS BLVD							OSBORNE STREET								
				170	1070	45									
				130	425	80									
				205	575	135									
350	220	290						70	70	100					
535	425	690		TS				630	500	535					
70	90	90						425	175	255					
				50	520	185									
				80	635	200									
				120	875	390									

N/S STREET				28			E/W STREET								
GLEN OAKS BLVD							MONTAGUE STREET								
				55	1625	15									
				35	575	35									
				25	905	15									
10	40	55						10	30	30					
5	5	5		TS				5	5	5					
30	45	60						5	35	10					
				55	690	5									
				60	610	15									
				50	1230	15									

N/S STREET				29			E/W STREET								
GLEN OAKS BLVD							BRANFORD STREET								
				175	1410	15									
				80	570	70									
				80	790	115									
130	150	220						10	85	100					
15	85	110		TS				5	90	190					
95	90	155						10	70	90					
				95	645	10									
				90	615	70									
				115	995	105									

N/S STREET				30			E/W STREET								
GLEN OAKS BLVD							SHELDON STREET								
				160	1235	135									
				95	490	100									
				145	730	140									
115	130	325						90	100	110					
405	240	355		TS				595	285	325					
45	80	65						90	45	40					
				80	480	45									
				80	535	50									
				120	820	70									



LEGEND

N/S STREET				S#			E/W STREET								
				7AM-9AM											
				2PM-4PM											
				4PM-6PM											
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM					
				TS											
				7AM-9AM											
				2PM-4PM											
				4PM-6PM											

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 5A
EXISTING + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-4-1D

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N/S STREET				24	E/W STREET					
FOOTHILL BLVD					WB I-210 FWY RAMPS					
			505	410	0					
			215	290	0					
			230	275	0					
0	0	0					60	40	65	
0	0	0		TS			0	0	0	
0	0	0					325	290	430	
			140	595	0					
			110	480	0					
			220	530	0					

N/S STREET				25	E/W STREET					
FOOTHILL BLVD					EB I-210 FWY RAMPS					
			0	385	200					
			0	335	75					
			0	475	55					
365	270	345					0	0	0	
0	0	0		TS			0	0	0	
115	55	90					0	0	0	
			0	380	465					
			0	295	340					
			0	415	400					

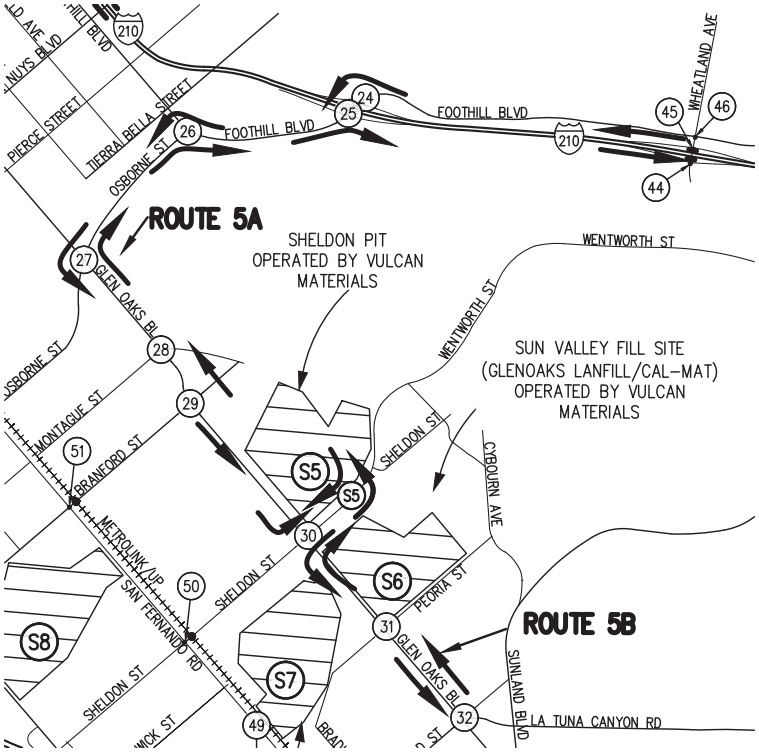
N/S STREET				26	E/W STREET					
OSBORNE STREET					FOOTHILL BLVD					
			5	5	5					
			15	5	5					
			15	5	5					
5	20	15					5	5	5	
350	265	330		TS			250	235	345	
560	25	295					425	360	375	
			355	10	415					
			265	5	400					
			735	5	570					

N/S STREET				27	E/W STREET					
GLEN OAKS BLVD					OSBORNE STREET					
			200	1215	65					
			140	520	80					
			205	575	135					
465	340	390					90	80	100	
600	490	690		TS			695	545	535	
95	105	90					490	210	255	
			90	655	340					
			100	735	365					
			120	875	490					

N/S STREET				28	E/W STREET					
GLEN OAKS BLVD					MONTAGUE STREET					
			70	1785	20					
			50	765	40					
			30	1110	20					
45	65	65					10	30	30	
5	5	5		TS			5	5	5	
50	65	65					5	40	10	
			65	890	10					
			65	815	15					
			70	1395	15					

N/S STREET				29	E/W STREET					
GLEN OAKS BLVD					BRANFORD STREET					
			195	1605	25					
			80	750	90					
			105	1000	120					
130	155	225					15	95	105	
15	85	110		TS			5	90	195	
115	100	170					20	85	105	
			105	865	25					
			105	820	80					
			125	1160	110					

N/S STREET				30	E/W STREET					
GLEN OAKS BLVD					SHELDON STREET					
			200	1355	285					
			125	555	210					
			155	785	250					
130	150	330					200	210	215	
430	370	335		TS			660	370	350	
50	120	75					105	50	50	
			100	520	50					
			110	605	70					
			140	905	80					



LEGEND

N/S STREET				S#	E/W STREET					
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS			7AM - 9AM	2PM - 4PM	4PM - 6PM	
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

S# – DISPOSAL SITE

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ROUTE 5A
PCE EXISTING + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-4-1E

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Table 4-4-1
Intersection Capacity Analysis – Existing + Project Conditions (Route 5A)
Traffic Impact Analysis - Site 5

Route 5A		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
24	Foothill Blvd and I-210 Westbound Ramps	A	8.4	0.57	A	A	5.6	0.29	A	A	8.0	0.50	A
25	Foothill Blvd and I-210 Eastbound Ramps	A	9.9	0.63	A	A	6.5	0.31	A	A	7.2	0.41	A
26	Foothill Blvd and Osborne Street	D	37.9	1.16	C	A	9.2	0.57	A	B	19.3	0.91	C
27	Glenoaks Blvd and Osborne Street	F	82.9	1.13	E	C	32.7	0.78	B	D	44.9	0.90	D
28	Glenoaks Blvd and Montague Street	A	9.1	0.72	B	B	13.0	0.38	A	A	9.5	0.58	B
29	Glenoaks Blvd and Branford Street	B	15.1	0.81	C	B	18.4	0.57	A	C	23.6	0.80	D
30	Glenoaks Blvd and Sheldon Street	B	12.4	0.78	D	A	7.4	0.49	A	B	16.8	0.95	C

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc.**

Haul Route 5A Analysis

As presented in *Table 4-4-1*, under existing plus project conditions for Site 5 (Route 5A) most study intersections are expected to operate at an acceptable HCM LOS D or better, for the AM, Mid-day and PM peak hours. The Intersection of Glenoaks Blvd and Osborne Street will continue to operate at HCM LOS F during the AM peak period. As identified under existing conditions, mitigation of the intersection of Glenoaks Blvd and Osborne Street is recommended to improve the intersection to an acceptable level-of-service.

Haul Route 5B

The Haul Route 5B project trips, truck percentages and passenger car equivalent (PCE) project trips are illustrated in *Figure 4-4-2A* through *Figure 4-4-2C.* The existing plus project AM (7-9), MID-DAY (12-2), PM (4-6) turn movement volumes, are provided in *Figure 4-4-2D.* For comparison the (PCE) existing plus project turn movement volumes are provided in *Figure 4-4-2E.*

Haul Route 5C

The Haul Route 5C project trips, truck percentages and passenger car equivalent (PCE) project trips are illustrated in *Figure 4-4-3A* through *Figure 4-4-3C.* The existing plus project AM (7-9), MID-DAY (12-2), PM (4-6) turn movement volumes, are provided in *Figure 4-4-3D.* For comparison the (PCE) existing plus project turn movement volumes are provided in *Figure 4-4-3E.*

N/S STREET	30	E/W STREET
GLEN OAKS BLVD		SHELDON STREET

			0	0	0					
			0	0	0					
			0	0	0					
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						50	50	50
			0	0	50					
			0	0	50					
			0	0	50					

N/S STREET	31	E/W STREET
GLEN OAKS BLVD		PEORIA STREET

			0	50	0					
			0	50	0					
			0	50	0					
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
			0	50	0					
			0	50	0					
			0	50	0					

N/S STREET	32	E/W STREET
GLEN OAKS BLVD		TUXFORD STREET

			0	50	0					
			0	50	0					
			0	50	0					
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
			0	50	0					
			0	50	0					
			0	50	0					

N/S STREET	33	E/W STREET
GLEN OAKS BLVD		PENROSE STREET

			0	50	0					
			0	50	0					
			0	50	0					
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
			0	50	0					
			0	50	0					
			0	50	0					

N/S STREET	34	E/W STREET
GLEN OAKS BLVD		SUNLAND BLVD

			0	50	0					
			0	50	0					
			0	50	0					
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
			0	50	0					
			0	50	0					
			0	50	0					

N/S STREET	35	E/W STREET
GLEN OAKS BLVD		ROSCOE BLVD

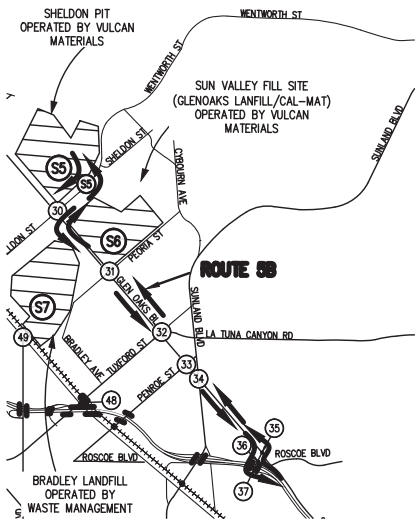
			50	0	0					
			50	0	0					
			50	0	0					
50	50	50						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
			0	0	0					
			0	0	0					
			0	0	0					

N/S STREET	36	E/W STREET
NB I-5 FREEWAY RAMPS		ROSCOE BLVD

			0	0	0					
			0	0	0					
			0	0	0					
0	0	0						0	0	0
0	0	0		TS				50	50	50
0	0	0						0	0	0
			0	0	50					
			0	0	50					
			0	0	50					

N/S STREET	37	E/W STREET
SB I-5 FREEWAY RAMPS		ROSCOE BLVD

			0	0	0					
			0	0	0					
			0	0	0					
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						50	50	50
			0	0	0					
			0	0	0					
			0	0	0					



LEGEND

N/S STREET	S#	E/W STREET

				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS			7AM - 9AM	2PM - 4PM	4PM - 6PM	
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 5B PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-4-2A

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N/S STREET				30			E/W STREET			
GLEN OAKS BLVD							SHELDON STREET			
				10%	5%	30%				
				15%	5%	5%				
				5%	5%	5%				
5%	5%	5%						5%	10%	5%
5%	25%	5%		TS				5%	15%	5%
5%	25%	5%						5%	10%	20%
				10%	5%	10%				
				20%	5%	25%				
				10%	5%	10%				

N/S STREET				31			E/W STREET			
GLEN OAKS BLVD							PEORIA STREET			
				20%	5%	45%				
				45%	15%	40%				
				45%	5%	50%				
40%	40%	20%						20%	5%	20%
80%	60%	40%		TS				20%	20%	5%
40%	45%	45%						20%	30%	55%
				45%	10%	65%				
				15%	15%	45%				
				45%	5%	50%				

N/S STREET				32			E/W STREET			
GLEN OAKS BLVD							TUXFORD STREET			
				40%	9%	5%				
				45%	25%	10%				
				10%	12%	5%				
25%	45%	25%						10%	10%	5%
5%	5%	5%		TS				5%	5%	5%
15%	15%	10%						5%	5%	5%
				15%	20%	20%				
				15%	19%	5%				
				10%	15%	5%				

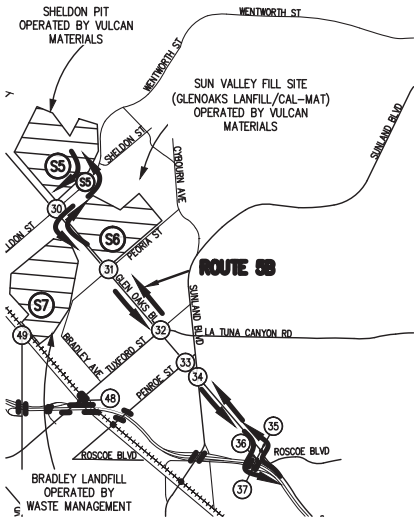
N/S STREET				33			E/W STREET			
GLEN OAKS BLVD							PENROSE STREET			
				5%	10%	15%				
				10%	19%	10%				
				5%	18%	0%				
5%	10%	5%						10%	5%	5%
5%	5%	5%		TS				5%	5%	10%
25%	5%	10%						0%	10%	5%
				0%	21%	0%				
				0%	14%	5%				
				0%	16%	0%				

N/S STREET				34			E/W STREET			
GLEN OAKS BLVD							SUNLAND BLVD			
				5%	12%	35%				
				15%	23%	5%				
				10%	13%	10%				
15%	5%	10%						5%	0%	0%
5%	5%	5%		TS				5%	5%	5%
0%	5%	0%						5%	5%	5%
				35%	23%	5%				
				10%	21%	5%				
				0%	12%	5%				

N/S STREET				35			E/W STREET			
GLEN OAKS BLVD							ROSCOE BLVD			
				15%	5%	0%				
				18%	10%	0%				
				15%	5%	0%				
26%	21%	13%						0%	0%	0%
0%	0%	0%		TS				0%	0%	0%
10%	20%	10%						0%	0%	0%
				10%	5%	0%				
				10%	5%	0%				
				10%	5%	0%				

N/S STREET				36			E/W STREET			
NB I-5 FREEWAY RAMPS							ROSCOE BLVD			
				0%	0%	0%				
				0%	0%	0%				
				0%	0%	0%				
0%	0%	0%						0%	0%	0%
10%	10%	15%		TS				14%	16%	14%
0%	0%	0%						0%	0%	0%
				15%	0%	23%				
				20%	0%	22%				
				20%	0%	13%				

N/S STREET				37			E/W STREET			
SB I-5 FREEWAY RAMPS							ROSCOE BLVD			
				0%	5%	5%				
				0%	0%	0%				
				0%	0%	0%				
0%	0%	0%						15%	5%	5%
0%	0%	0%		TS				0%	0%	0%
0%	0%	0%						13%	18%	16%
				0%	0%	0%				
				0%	0%	0%				
				0%	0%	0%				



LEGEND

N/S STREET				S#			E/W STREET			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

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ROUTE 5B TRUCK PERCENTAGES

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-4-2B

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N/S STREET	30	E/W STREET
GLEN OAKS BLVD		SHELDON STREET

			0	0	0					
			0	0	0					
			0	0	0					
0	0	0					0	0	0	
0	0	0		TS			0	0	0	
0	0	0					150	150	150	
			0	0	150					
			0	0	150					
			0	0	150					

N/S STREET	31	E/W STREET
GLEN OAKS BLVD		PEORIA STREET

			0	150	0					
			0	150	0					
			0	150	0					
0	0	0					0	0	0	
0	0	0		TS			0	0	0	
0	0	0					0	0	0	
			0	150	0					
			0	150	0					
			0	150	0					

N/S STREET	32	E/W STREET
GLEN OAKS BLVD		TUXFORD STREET

			0	150	0					
			0	150	0					
			0	150	0					
0	0	0					0	0	0	
0	0	0		TS			0	0	0	
0	0	0					0	0	0	
			0	150	0					
			0	150	0					
			0	150	0					

N/S STREET	33	E/W STREET
GLEN OAKS BLVD		PENROSE STREET

			0	150	0					
			0	150	0					
			0	150	0					
0	0	0					0	0	0	
0	0	0		TS			0	0	0	
0	0	0					0	0	0	
			0	150	0					
			0	150	0					
			0	150	0					

N/S STREET	34	E/W STREET
GLEN OAKS BLVD		SUNLAND BLVD

			0	150	0					
			0	150	0					
			0	150	0					
0	0	0					0	0	0	
0	0	0		TS			0	0	0	
0	0	0					0	0	0	
			0	150	0					
			0	150	0					
			0	150	0					

N/S STREET	35	E/W STREET
GLEN OAKS BLVD		ROSCOE BLVD

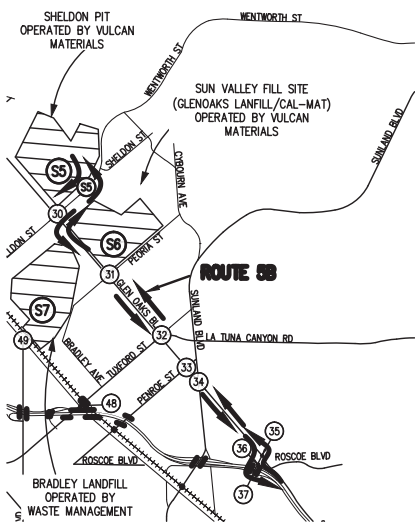
			150	0	0					
			150	0	0					
			150	0	0					
150	150	150					0	0	0	
0	0	0		TS			0	0	0	
0	0	0					0	0	0	
			0	0	0					
			0	0	0					
			0	0	0					

N/S STREET	36	E/W STREET
NB I-5 FREEWAY RAMPS		ROSCOE BLVD

			0	0	0					
			0	0	0					
			0	0	0					
0	0	0					0	0	0	
0	0	0		TS			150	150	150	
0	0	0					0	0	0	
			0	0	150					
			0	0	150					
			0	0	150					

N/S STREET	37	E/W STREET
SB I-5 FREEWAY RAMPS		ROSCOE BLVD

			0	0	0					
			0	0	0					
			0	0	0					
0	0	0					0	0	0	
0	0	0		TS			0	0	0	
0	0	0					150	150	150	
			0	0	0					
			0	0	0					
			0	0	0					



LEGEND

N/S STREET	S#	E/W STREET

				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS			7AM - 9AM	2PM - 4PM	4PM - 6PM	
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 5B
PCE PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-4-2C

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N/S STREET				30			E/W STREET			
GLEN OAKS BLVD							SHELDON STREET			
				175	1345	90				
				105	535	55				
				160	795	100				
125	140	325						45	55	65
440	260	355		TS				650	310	355
50	85	70						155	105	100
				85	525	105				
				85	585	110				
				130	895	130				

N/S STREET				31			E/W STREET			
GLEN OAKS BLVD							PEORIA STREET			
				40	1300	30				
				15	580	10				
				15	795	35				
15	25	40						10	15	55
5	5	10		TS				5	5	5
5	30	20						15	20	30
				15	575	25				
				25	575	15				
				25	1025	25				

N/S STREET				32			E/W STREET			
GLEN OAKS BLVD							TUXFORD STREET			
				125	1065	90				
				100	405	90				
				90	640	130				
115	110	140						75	45	80
470	390	505		TS				565	425	345
45	60	95						30	25	60
				95	445	20				
				110	485	30				
				120	850	60				

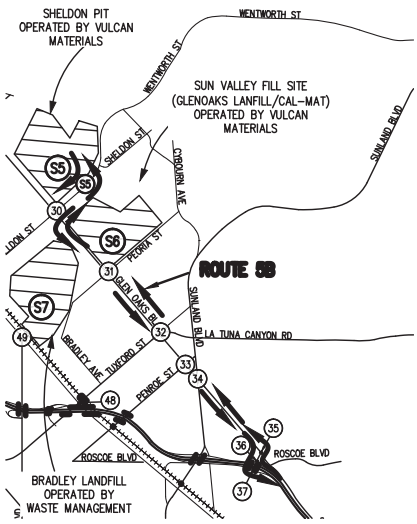
N/S STREET				33			E/W STREET			
GLEN OAKS BLVD							PENROSE STREET			
				95	970	35				
				35	490	25				
				110	570	45				
120	90	185						35	35	75
125	130	200		TS				70	85	140
20	50	55						5	20	45
				25	415	5				
				45	515	25				
				75	750	40				

N/S STREET				34			E/W STREET			
GLEN OAKS BLVD							SUNLAND BLVD			
				205	690	10				
				170	355	35				
				50	560	50				
70	165	165						20	15	5
670	430	650		TS				750	355	395
30	20	55						205	320	360
				10	360	80				
				25	400	245				
				20	690	385				

N/S STREET				35			E/W STREET			
GLEN OAKS BLVD							ROSCOE BLVD			
				470	520	0				
				355	355	0				
				470	530	0				
225	290	595						0	0	0
0	0	0		TS				0	0	0
75	90	120						0	0	0
				70	275	0				
				75	370	0				
				65	540	0				

N/S STREET				36			E/W STREET			
NB I-5 FREEWAY RAMPS							ROSCOE BLVD			
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
90	120	110		TS				540	425	540
0	0	0						0	0	0
				70	0	265				
				60	0	285				
				65	0	615				

N/S STREET				37			E/W STREET			
SB I-5 FREEWAY RAMPS							ROSCOE BLVD			
				0	35	90				
				0	40	120				
				0	30	110				
0	0	0						25	45	100
0	0	0		TS				0	0	0
0	0	0						615	380	425
				0	0	0				
				0	0	0				
				0	0	0				



LEGEND

N/S STREET				S#			E/W STREET			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

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ROUTE 5B
PROJECT TRIPS – YEAR 2014

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-4-2D

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N/S STREET				30			E/W STREET			
GLEN OAKS BLVD							SHELDON STREET			
				200	1355	135				
				125	555	60				
				155	785	100				
130	150	330						50	60	65
430	370	335		TS				660	370	350
50	120	75						255	200	200
				100	520	200				
				110	605	220				
				140	905	230				

N/S STREET				31			E/W STREET			
GLEN OAKS BLVD							PEORIA STREET			
				55	1535	55				
				30	855	20				
				30	980	65				
25	45	55						15	15	75
10	10	20		TS				10	5	5
5	60	40						20	30	65
				30	760	60				
				35	810	30				
				45	1260	50				

N/S STREET				32			E/W STREET			
GLEN OAKS BLVD							TUXFORD STREET			
				220	1270	100				
				195	605	105				
				105	795	145				
175	200	210						90	55	90
510	445	540		TS				615	450	375
55	80	120						30	30	60
				120	620	30				
				140	680	30				
				145	1095	65				

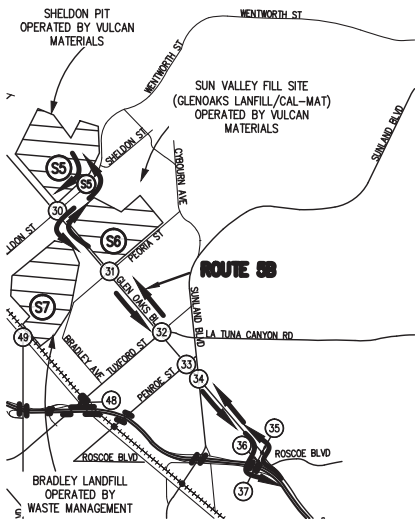
N/S STREET				33			E/W STREET			
GLEN OAKS BLVD							PENROSE STREET			
				100	1160	45				
				40	660	30				
				115	795	45				
135	110	210						45	40	85
130	135	215		TS				75	90	160
30	55	65						5	25	50
				25	585	5				
				45	675	25				
				75	960	40				

N/S STREET				34			E/W STREET			
GLEN OAKS BLVD							SUNLAND BLVD			
				235	855	20				
				230	520	40				
				60	695	60				
85	190	200						25	15	5
720	470	670		TS				790	400	405
30	20	55						220	340	370
				20	510	85				
				25	555	260				
				20	865	415				

N/S STREET				35			E/W STREET			
GLEN OAKS BLVD							ROSCOE BLVD			
				585	560	0				
				490	415	0				
				585	575	0				
340	400	705						0	0	0
0	0	0		TS				0	0	0
90	125	145						0	0	0
				85	305	0				
				95	410	0				
				80	580	0				

N/S STREET				36			E/W STREET			
NB I-5 FREEWAY RAMPS							ROSCOE BLVD			
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
100	140	135		TS				660	550	655
0	0	0						0	0	0
				90	0	380				
				85	0	395				
				90	0	725				

N/S STREET				37			E/W STREET			
SB I-5 FREEWAY RAMPS							ROSCOE BLVD			
				0	40	100				
				0	40	120				
				0	30	110				
0	0	0						35	50	100
0	0	0		TS				0	0	0
0	0	0						735	505	550
				0	0	0				
				0	0	0				
				0	0	0				



LEGEND

N/S STREET				S#	E/W STREET
				7AM-9AM	
				2PM-4PM	
				4PM-6PM	
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS	7AM - 9AM / 2PM - 4PM / 4PM - 6PM
				7AM-9AM	
				2PM-4PM	
				4PM-6PM	

LEGEND

S# – DISPOSAL SITE

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ROUTE 5B
PCE EXISTING + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-4-2E

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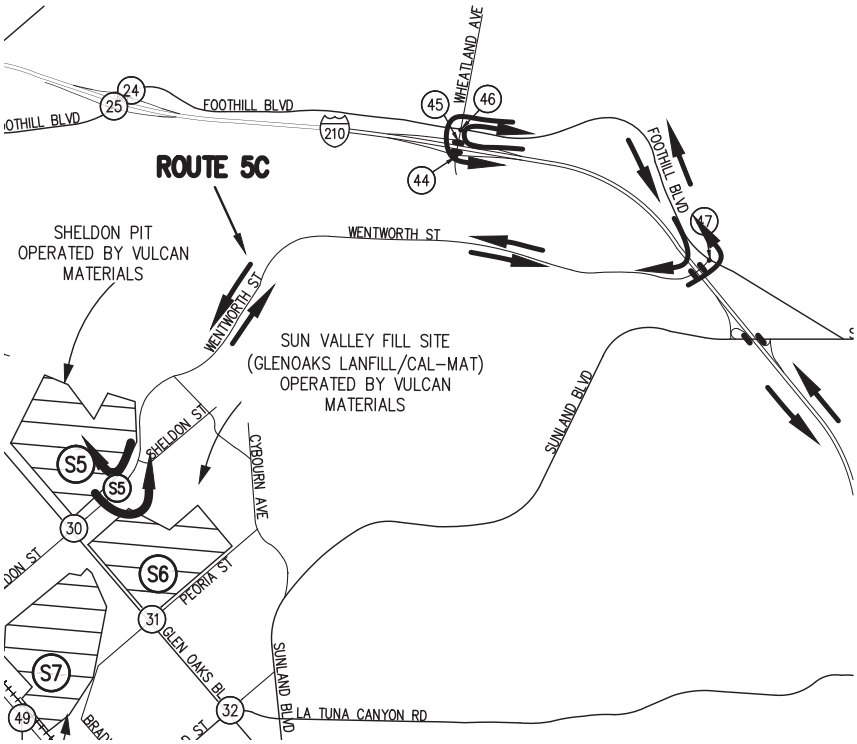
N/S STREET				44			E/W STREET			
WHEATLAND AVE							EB I-210 FWY RAMPS			
			0	0	50					
			0	0	50					
			0	0	50					
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
			0	0	0					
			0	0	0					
			0	0	0					

N/S STREET				45			E/W STREET			
WHEATLAND AVE							WB I-210 FWY RAMPS			
			0	50	0					
			0	50	0					
			0	50	0					
0	0	0						50	50	50
0	0	0		TS				0	0	0
0	0	0						0	0	0
			0	0	0					
			0	0	0					
			0	0	0					

N/S STREET				46			E/W STREET			
WHEATLAND AVE							FOOTHILL BLVD			
			0	0	0					
			0	0	0					
			0	0	0					
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						50	50	50
			0	0	50					
			0	0	50					
			0	0	50					

N/S STREET				47			E/W STREET			
WENTWORTH STREET							FOOTHILL BLVD			
			0	0	0					
			0	0	0					
			0	0	0					
0	0	0						0	0	0
0	0	0		TS				0	0	0
50	50	50						0	0	0
			50	0	0					
			50	0	0					
			50	0	0					



LEGEND

N/S STREET				S#			E/W STREET			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS			7AM - 9AM	2PM - 4PM	4PM - 6PM	
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

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ROUTE 5C PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-4-3A

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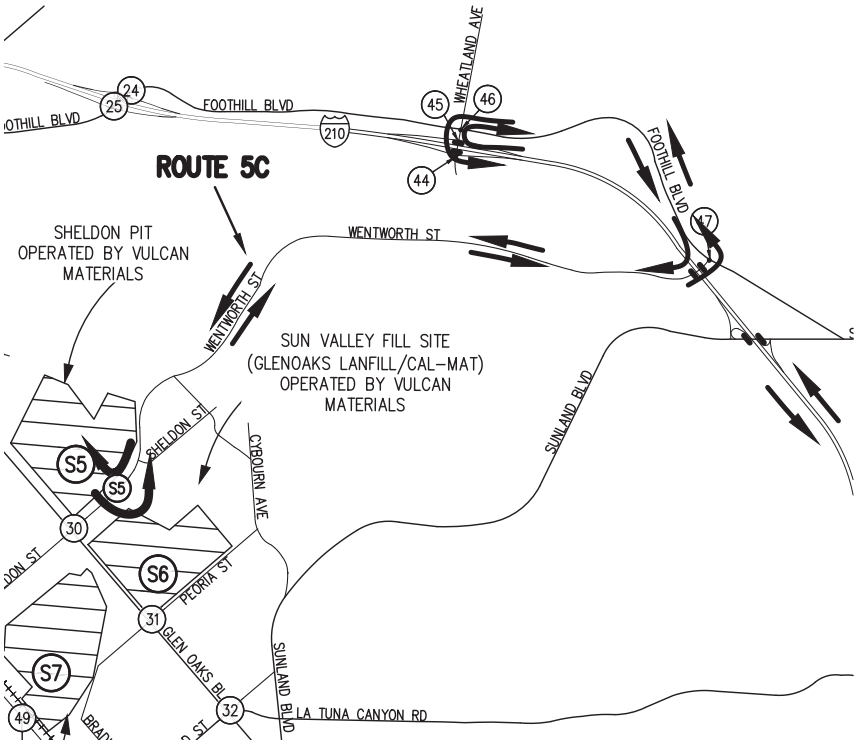
N/S STREET				44			E/W STREET			
WHEATLAND AVE							EB I-210 FWY RAMPS			
				0%	0%	33%				
				0%	0%	45%				
				0%	0%	40%				
5%	5%	5%						0%	0%	0%
15%	15%	100%		TS				0%	0%	0%
0%	0%	0%						0%	0%	0%
				0%	0%	0%				
				0%	0%	0%				
				0%	0%	0%				

N/S STREET				45			E/W STREET			
WHEATLAND AVE							WB I-210 FWY RAMPS			
				5%	35%	0%				
				5%	48%	0%				
				5%	38%	0%				
0%	0%	0%						37%	56%	29%
0%	0%	0%		TS				0%	0%	0%
0%	0%	0%						50%	5%	5%
				20%	5%	0%				
				5%	10%	0%				
				20%	5%	0%				

N/S STREET				46			E/W STREET			
WHEATLAND AVE							FOOTHILL BLVD			
				5%	5%	20%				
				5%	5%	5%				
				5%	5%	5%				
30%	5%	5%						5%	5%	5%
5%	5%	5%		TS				5%	5%	5%
5%	5%	5%						42%	49%	34%
				5%	5%	35%				
				5%	5%	58%				
				5%	5%	33%				

N/S STREET				47			E/W STREET			
WENTWORTH STREET							FOOTHILL BLVD			
				0%	0%	0%				
				0%	0%	0%				
				0%	0%	0%				
0%	0%	0%						0%	0%	0%
5%	5%	5%		TS				5%	5%	5%
34%	55%	43%						5%	5%	5%
				53%	0%	5%				
				53%	0%	5%				
				35%	0%	5%				



NOT TO SCALE

LEGEND

N/S STREET				S#			E/W STREET			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS			7AM - 9AM	2PM - 4PM	4PM - 6PM	
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

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ROUTE 5C
TRUCK PERCENTAGES
DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-4-3B

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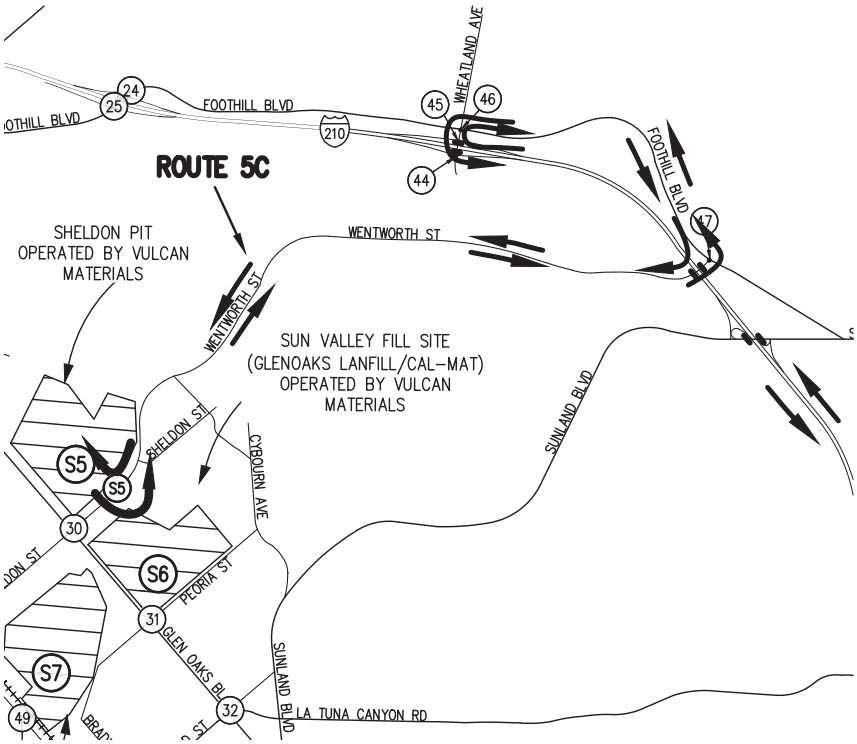
N/S STREET				44		E/W STREET			
WHEATLAND AVE						EB I-210 FWY RAMPS			
			0	0	150				
			0	0	150				
			0	0	150				
0	0	0					0	0	0
0	0	0		TS			0	0	0
0	0	0					0	0	0
			0	0	0				
			0	0	0				
			0	0	0				

N/S STREET				45		E/W STREET			
WHEATLAND AVE						WB I-210 FWY RAMPS			
			0	150	0				
			0	150	0				
			0	150	0				
0	0	0					150	150	150
0	0	0		TS			0	0	0
0	0	0					0	0	0
			0	0	0				
			0	0	0				
			0	0	0				

N/S STREET				46		E/W STREET			
WHEATLAND AVE						FOOTHILL BLVD			
			0	0	0				
			0	0	0				
			0	0	0				
0	0	0					0	0	0
0	0	0		TS			0	0	0
0	0	0					150	150	150
			0	0	150				
			0	0	150				
			0	0	150				

N/S STREET				47		E/W STREET			
WENTWORTH STREET						FOOTHILL BLVD			
			0	0	0				
			0	0	0				
			0	0	0				
0	0	0					0	0	0
0	0	0		TS			0	0	0
150	150	150					0	0	0
			150	0	0				
			150	0	0				
			150	0	0				



LEGEND

N/S STREET				S#		E/W STREET			
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS			7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					

LEGEND

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ROUTE 5C
PCE PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-4-3C

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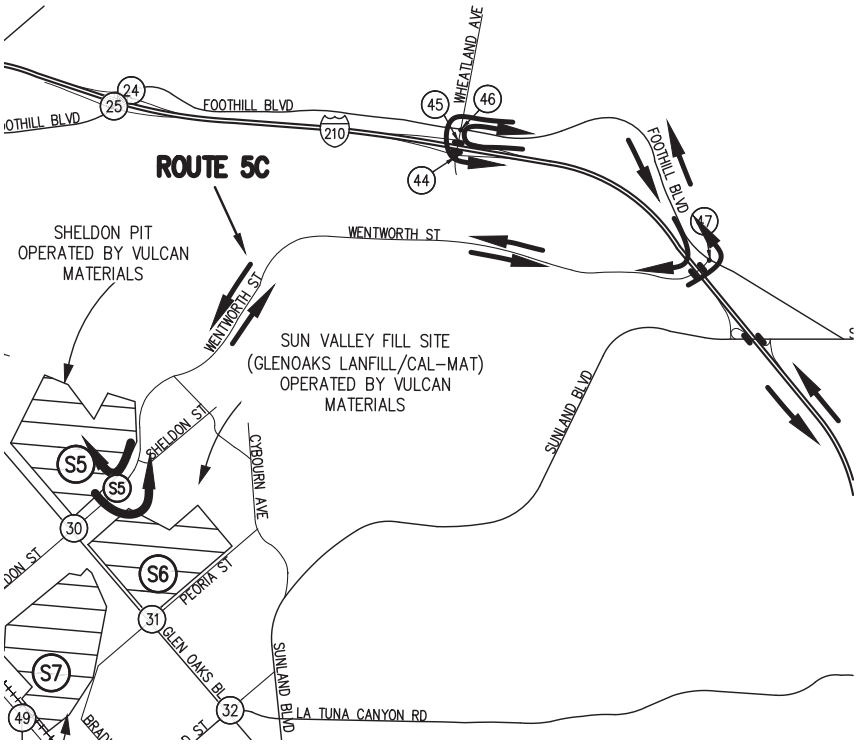
N/S STREET				44			E/W STREET			
WHEATLAND AVE							EB I-210 FWY RAMPS			
				0	0	170				
				0	0	110				
				0	0	135				
105	75	100						0	0	0
5	5	5		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET				45			E/W STREET			
WHEATLAND AVE							WB I-210 FWY RAMPS			
				65	160	0				
				55	110	0				
				105	130	0				
0	0	0						150	90	170
0	0	0		TS				5	5	5
0	0	0						5	5	5
				5	100	0				
				5	55	0				
				5	95	0				

N/S STREET				46			E/W STREET			
WHEATLAND AVE							FOOTHILL BLVD			
				10	20	20				
				20	25	10				
				10	25	15				
10	15	10						10	25	20
215	145	185		TS				240	140	235
100	40	85						140	125	160
				75	15	175				
				45	30	110				
				100	30	165				

N/S STREET				47			E/W STREET			
WENTWORTH STREET							FOOTHILL BLVD			
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
200	165	200		TS				175	155	295
165	95	125						440	215	215
				100	0	225				
				100	0	185				
				160	0	420				



LEGEND

N/S STREET				S#			E/W STREET			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 5C
EXISITNG + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-4-3D

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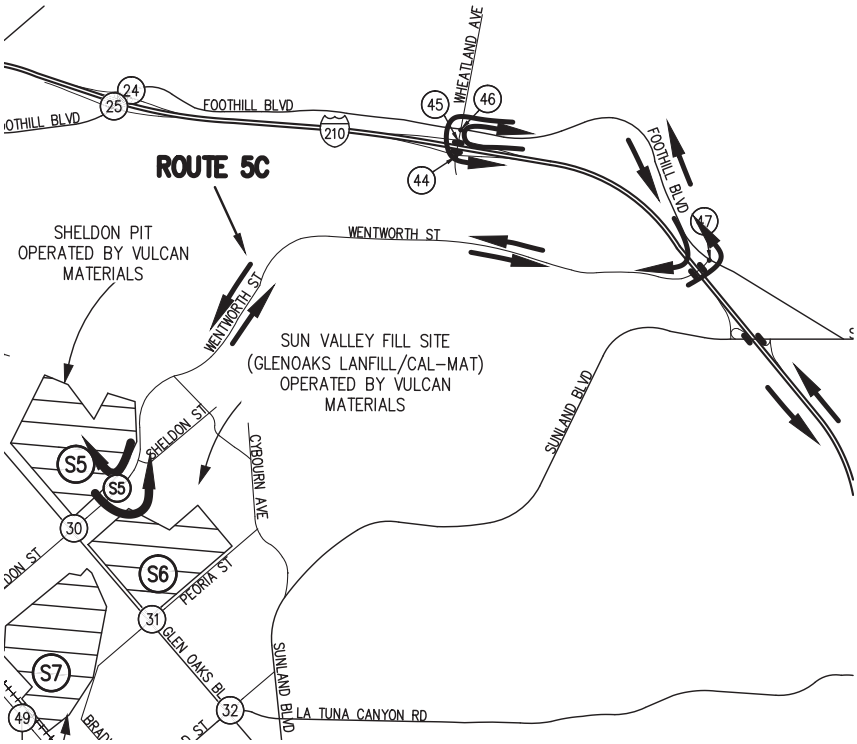
N/S STREET				44		E/W STREET			
WHEATLAND AVE						EB I-210 FWY RAMPS			
			0	0	275				
			0	0	210				
			0	0	240				
115	85	100					0	0	0
10	10	5		TS			0	0	0
0	0	0					0	0	0
			0	0	0				
			0	0	0				
			0	0	0				

N/S STREET				45		E/W STREET			
WHEATLAND AVE						WB I-210 FWY RAMPS			
			75	265	0				
			60	215	0				
			105	230	0				
0	0	0					260	190	270
0	0	0		TS			5	5	5
0	0	0					5	5	5
			5	105	0				
			5	65	0				
			5	100	0				

N/S STREET				46		E/W STREET			
WHEATLAND AVE						FOOTHILL BLVD			
			5	15	20				
			15	20	5				
			5	20	10				
10	10	5					5	20	15
215	150	175		TS			245	145	230
90	40	80					240	230	245
			80	10	265				
			40	25	210				
			90	25	250				

N/S STREET				47		E/W STREET			
WENTWORTH STREET						FOOTHILL BLVD			
			0	0	0				
			0	0	0				
			0	0	0				
0	0	0					0	0	0
205	175	200		TS			185	165	300
270	200	230					450	225	240
			205	0	240				
			205	0	190				
			265	0	425				



LEGEND

N/S STREET				S#		E/W STREET			
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS			7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					

LEGEND

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(#) – STUDY INTERSECTIONS

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ROUTE 5C
PCE EXISITNG + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-4-3E

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Table 4-4-2
Intersection Capacity Analysis – Existing + Project Conditions (Route 5B)
Traffic Impact Analysis - Site 5

Route 5B		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
30	Glenoaks Blvd and Sheldon Street	A	7.3	0.45	A	B	11.1	0.75	C	B	13.5	0.85	D
31	Glenoaks Blvd and Peoria Street	B	10.5	0.57	A	A	9.3	0.39	A	B	15.5	0.54	A
32	Glenoaks Blvd and Tuxford Street	B	12.9	0.81	D	A	7.5	0.46	A	A	9.1	0.57	C
33	Glenoaks Blvd and Penrose Street	A	6.4	0.55	A	A	5.9	0.36	A	A	9.5	0.67	B
34	Glenoaks Blvd and Sunland Blvd	C	20.5	0.83	B	B	15.4	0.63	B	C	24.6	0.86	D
35	Glenoaks Blvd and Roscoe Blvd	A	6.8	0.42	A	A	7.1	0.42	A	B	10.3	0.61	A
36	Roscoe Blvd and I-5 Freeway Northbound Ramps	B	11.8	-	-	B	11.7	-	-	C	22.0	-	-
37	Roscoe Blvd and I-5 Freeway Southbound Ramps	A	0.0	-	-	A	0.0	-	-	A	0.0	-	-

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc.**

Table 4-4-3
Intersection Capacity Analysis – Existing + Project Conditions (Route 5C)
Traffic Impact Analysis - Site 5

Route 5C		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
44	Wheatland Ave and I-210 Freeway Eastbound Ramps	A	0.0	-	-	A	0.0	-	-	A	0.0	-	-
45	Wheatland Ave and I-210 Freeway Westbound Ramps	B	10.7	-	-	A	9.0	-	-	A	9.1	-	-
46	Wheatland Ave and Foothill Blvd	B	10.6	0.42	A	B	10.3	0.36	A	B	10.5	0.43	A
47	Wentworth Street and Foothill Blvd	B	19.4	0.78	A	B	12.4	0.40	A	A	9.2	0.43	A

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc.**

Haul Routes 5B & 5C Analysis

As presented in *Table 4-4-2* and *Table 4-4-3*, under existing plus project conditions for Site 5 (Route 5B-5C) all intersections are expected to operate at an acceptable HCM LOS C or better, for the AM, Mid-day and PM peak hour. Since all intersections operate with an acceptable HCM LOS mitigation is not required under existing plus project conditions.

Haul Route 6A

The Haul Route 6A project trips, truck percentages and passenger car equivalent (PCE) project trips are illustrated in *Figure 4-4-4A* through *Figure 4-4-4C.* The existing plus project AM (7-9), MID-DAY (12-2), PM (4-6) turn movement volumes, are provided in *Figure 4-4-4D.* For comparison the (PCE) existing plus project turn movement volumes are provided in *Figure 4-4-4E.*

N/S STREET			24	E/W STREET		
FOOTHILL BLVD				WB I-210 FWY RAMPS		
			0 0 0			
			0 0 0			
			0 0 0			
0 0 0					0 0 0	
0 0 0		TS			0 0 0	
0 0 0					50 50 50	
			0 0 0			
			0 0 0			
			0 0 0			

N/S STREET			25	E/W STREET		
FOOTHILL BLVD				EB I-210 FWY RAMPS		
			0 0 0			
			0 0 0			
			0 0 0			
0 0 0					0 0 0	
0 0 0		TS			0 0 0	
0 0 0					0 0 0	
			0 0 50			
			0 0 50			
			0 0 50			

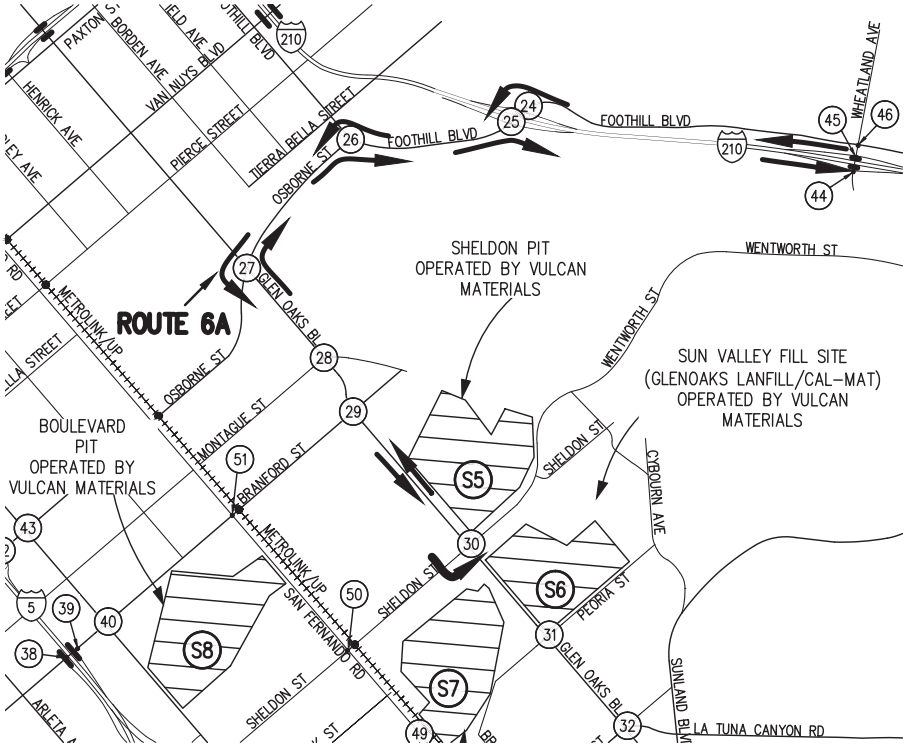
N/S STREET			26	E/W STREET		
OSBORNE STREET				FOOTHILL BLVD		
			0 0 0			
			0 0 0			
			0 0 0			
0 0 0					0 0 0	
0 0 0		TS			0 0 0	
0 0 0					50 50 50	
			0 0 50			
			0 0 50			
			0 0 50			

N/S STREET			27	E/W STREET		
GLEN OAKS BLVD				OSBORNE STREET		
			0 0 0			
			0 0 0			
			0 0 0			
50 50 50					0 0 0	
0 0 0		TS			0 0 0	
0 0 0					0 0 0	
			0 0 50			
			0 0 50			
			0 0 50			

N/S STREET			28	E/W STREET		
GLEN OAKS BLVD				MONTAGUE STREET		
			0 50 0			
			0 50 0			
			0 50 0			
0 0 0					0 0 0	
0 0 0		TS			0 0 0	
0 0 0					0 0 0	
			0 50 0			
			0 50 0			
			0 50 0			

N/S STREET			29	E/W STREET		
GLEN OAKS BLVD				BRANFORD STREET		
			0 50 0			
			0 50 0			
			0 50 0			
0 0 0					0 0 0	
0 0 0		TS			0 0 0	
0 0 0					0 0 0	
			0 50 0			
			0 50 0			
			0 50 0			

N/S STREET			30	E/W STREET		
GLEN OAKS BLVD				SHELDON STREET		
			0 0 50			
			0 0 50			
			0 0 50			
0 0 0					50 50 50	
0 0 0		TS			0 0 0	
0 0 0					0 0 0	
			0 0 0			
			0 0 0			
			0 0 0			



LEGEND

N/S STREET			S#	E/W STREET		
			7AM-9AM			
			2PM-4PM			
			4PM-6PM			
7AM - 9AM	2PM - 4PM	4PM - 6PM	TS	7AM - 9AM	2PM - 4PM	4PM - 6PM
			7AM-9AM			
			2PM-4PM			
			4PM-6PM			

LEGEND

S# – DISPOSAL SITE

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ROUTE 6A PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-4-4A

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N/S STREET				24			E/W STREET			
FOOTHILL BLVD							WB I-210 FWY RAMPS			
				5%	5%	0%				
				5%	5%	0%				
				5%	5%	0%				
0%	0%	0%						5%	10%	5%
0%	0%	0%		TS				0%	0%	0%
0%	0%	0%						5%	10%	5%
				5%	5%	0%				
				5%	5%	0%				
				5%	5%	0%				

N/S STREET				25			E/W STREET			
FOOTHILL BLVD							EB I-210 FWY RAMPS			
				0%	5%	5%				
				0%	5%	5%				
				0%	5%	5%				
5%	5%	5%						0%	0%	0%
0%	0%	0%		TS				0%	0%	0%
5%	20%	5%						0%	0%	0%
				0%	5%	5%				
				0%	5%	10%				
				0%	5%	5%				

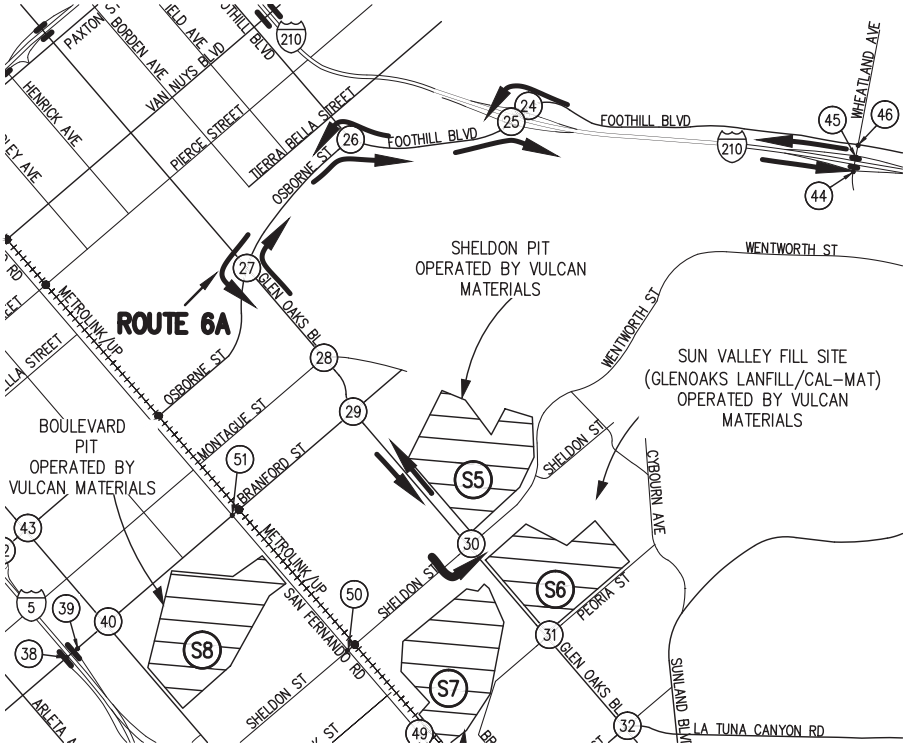
N/S STREET				26			E/W STREET			
OSBORNE STREET							FOOTHILL BLVD			
				5%	5%	5%				
				5%	5%	5%				
				5%	5%	5%				
5%	5%	5%						5%	5%	5%
5%	10%	5%		TS				5%	10%	5%
5%	5%	5%						5%	15%	5%
				5%	5%	5%				
				10%	5%	10%				
				5%	5%	5%				

N/S STREET				27			E/W STREET			
GLEN OAKS BLVD							OSBORNE STREET			
				10%	5%	20%				
				5%	10%	5%				
				5%	10%	5%				
5%	5%	5%						15%	10%	5%
5%	10%	5%		TS				5%	5%	5%
20%	10%	15%						10%	10%	10%
				45%	15%	20%				
				10%	10%	20%				
				5%	5%	5%				

N/S STREET				28			E/W STREET			
GLEN OAKS BLVD							MONTAGUE STREET			
				15%	10%	5%				
				15%	10%	5%				
				15%	5%	5%				
30%	30%	10%						5%	5%	5%
5%	5%	5%		TS				5%	5%	5%
20%	20%	5%						5%	5%	5%
				5%	10%	15%				
				5%	10%	15%				
				25%	5%	5%				

N/S STREET				29			E/W STREET			
GLEN OAKS BLVD							BRANFORD STREET			
				5%	5%	45%				
				5%	5%	15%				
				15%	10%	5%				
5%	5%	5%						35%	5%	5%
10%	5%	5%		TS				50%	5%	5%
10%	5%	5%						40%	10%	10%
				5%	10%	50%				
				10%	10%	10%				
				5%	5%	5%				

N/S STREET				30			E/W STREET			
GLEN OAKS BLVD							SHELDON STREET			
				10%	5%	30%				
				15%	5%	5%				
				5%	5%	5%				
5%	5%	5%						5%	10%	5%
5%	25%	5%		TS				5%	15%	5%
5%	25%	5%						5%	10%	20%
				10%	5%	10%				
				20%	5%	25%				
				10%	5%	10%				



LEGEND

N/S STREET				S#			E/W STREET			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 6A
TRUCK PERCENTAGES

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-4-4B

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N/S STREET			24	E/W STREET		
FOOTHILL BLVD				WB I-210 FWY RAMPS		
			0 0 0			
			0 0 0			
			0 0 0			
0 0 0					0 0 0	
0 0 0			TS		0 0 0	
0 0 0					150 150 150	
			0 0 0			
			0 0 0			
			0 0 0			

N/S STREET			25	E/W STREET		
FOOTHILL BLVD				EB I-210 FWY RAMPS		
			0 0 0			
			0 0 0			
			0 0 0			
0 0 0					0 0 0	
0 0 0			TS		0 0 0	
0 0 0					0 0 0	
			0 0 150			
			0 0 150			
			0 0 150			

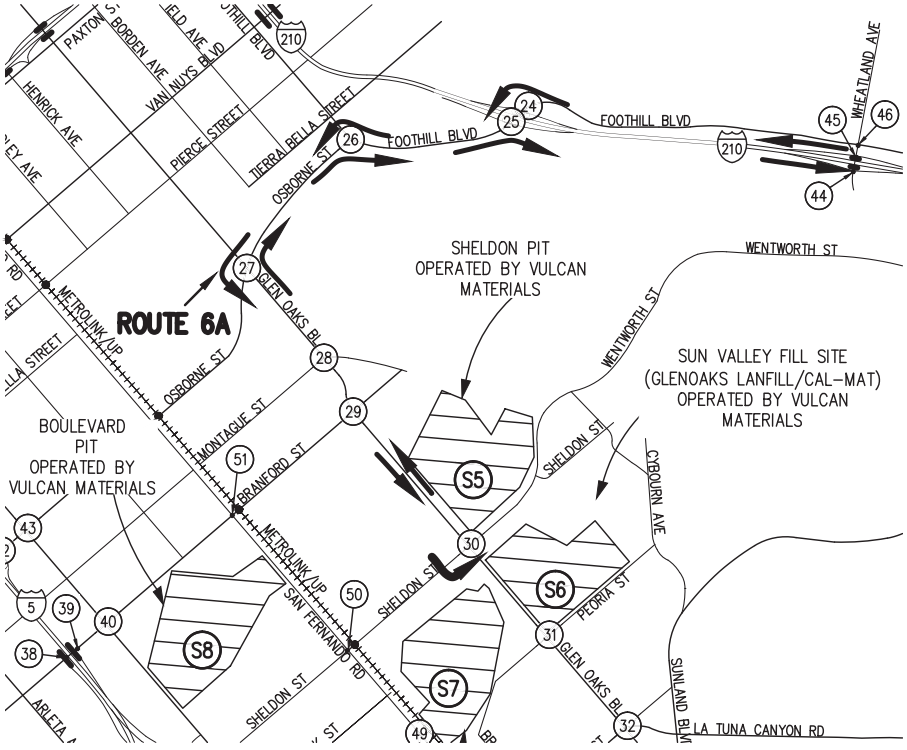
N/S STREET			26	E/W STREET		
OSBORNE STREET				FOOTHILL BLVD		
			0 0 0			
			0 0 0			
			0 0 0			
0 0 0					0 0 0	
0 0 0			TS		0 0 0	
0 0 0					150 150 150	
			0 0 150			
			0 0 150			
			0 0 150			

N/S STREET			27	E/W STREET		
GLEN OAKS BLVD				OSBORNE STREET		
			0 0 0			
			0 0 0			
			0 0 0			
150 150 150					0 0 0	
0 0 0			TS		0 0 0	
0 0 0					0 0 0	
			0 0 150			
			0 0 150			
			0 0 150			

N/S STREET			28	E/W STREET		
GLEN OAKS BLVD				MONTAGUE STREET		
			0 150 0			
			0 150 0			
			0 150 0			
0 0 0					0 0 0	
0 0 0			TS		0 0 0	
0 0 0					0 0 0	
			0 150 0			
			0 150 0			
			0 150 0			

N/S STREET			29	E/W STREET		
GLEN OAKS BLVD				BRANFORD STREET		
			0 150 0			
			0 150 0			
			0 150 0			
0 0 0					0 0 0	
0 0 0			TS		0 0 0	
0 0 0					0 0 0	
			0 150 0			
			0 150 0			
			0 150 0			

N/S STREET			30	E/W STREET		
GLEN OAKS BLVD				SHELDON STREET		
			0 0 150			
			0 0 150			
			0 0 150			
0 0 0					150 150 150	
0 0 0			TS		0 0 0	
0 0 0					0 0 0	
			0 0 0			
			0 0 0			
			0 0 0			



LEGEND

N/S STREET			S#	E/W STREET		
			7AM-9AM			
			2PM-4PM			
			4PM-6PM			
7AM - 9AM	2PM - 4PM	4PM - 6PM	TS	7AM - 9AM	2PM - 4PM	4PM - 6PM
			7AM-9AM			
			2PM-4PM			
			4PM-6PM			

LEGEND

S# – DISPOSAL SITE

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ROUTE 6A
PCE PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-4-4C

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Last Opened: Oct 04, 2013 - 11:26am by: TMunoz

N/S STREET				24	E/W STREET					
FOOTHILL BLVD					WB I-210 FWY RAMPS					
			490	390	0					
			205	255	0					
			225	260	0					
0	0	0					60	35	65	
0	0	0		TS			0	0	0	
0	0	0					220	165	305	
			130	570	0					
			105	445	0					
			210	510	0					

N/S STREET				25	E/W STREET					
FOOTHILL BLVD					EB I-210 FWY RAMPS					
			0	355	195					
			0	305	75					
			0	460	55					
355	260	335					0	0	0	
0	0	0		TS			0	0	0	
100	40	80					0	0	0	
			0	350	340					
			0	265	210					
			0	390	290					

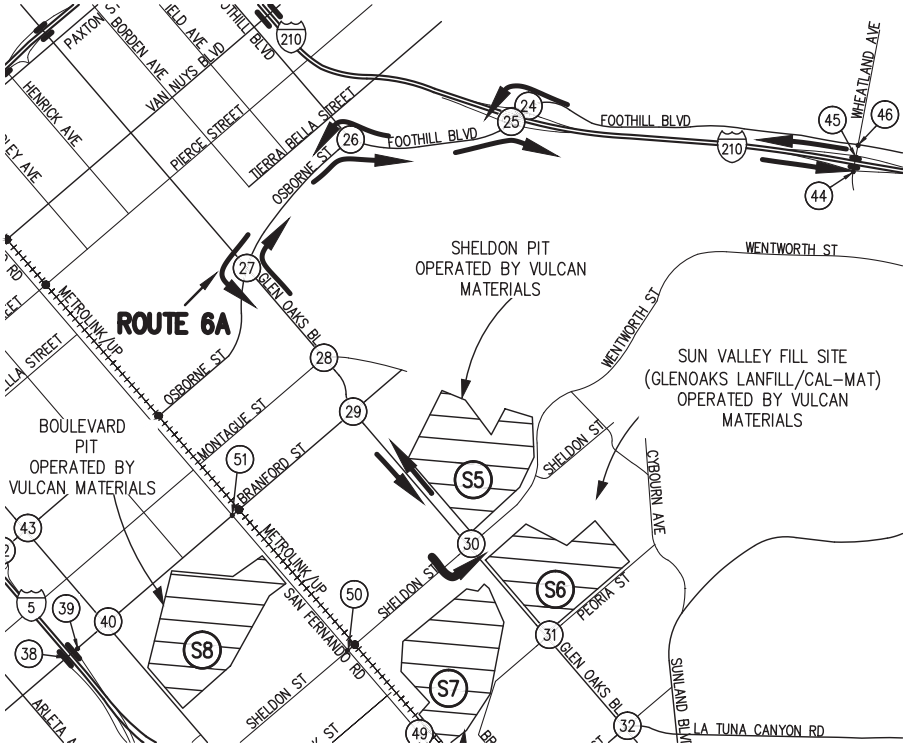
N/S STREET				26	E/W STREET					
OSBORNE STREET					FOOTHILL BLVD					
			5	5	5					
			15	5	5					
			15	5	5					
5	20	15					5	5	5	
320	225	315		TS			245	200	305	
520	25	265					310	215	255	
			335	10	300					
			230	5	260					
			680	5	445					

N/S STREET				27	E/W STREET					
GLEN OAKS BLVD					OSBORNE STREET					
			170	1070	45					
			130	425	80					
			205	575	135					
350	220	290					70	70	100	
535	425	690		TS			630	500	535	
70	90	90					425	175	255	
			50	520	185					
			80	635	200					
			120	875	390					

N/S STREET				28	E/W STREET					
GLEN OAKS BLVD					MONTAGUE STREET					
			55	1625	15					
			35	575	35					
			25	905	15					
10	40	55					10	30	30	
5	5	5		TS			5	5	5	
30	45	60					5	35	10	
			55	690	5					
			60	610	15					
			50	1230	15					

N/S STREET				29	E/W STREET					
GLEN OAKS BLVD					BRANFORD STREET					
			175	1410	15					
			80	570	70					
			80	790	115					
130	150	220					10	85	100	
15	85	110		TS			5	90	190	
95	90	155					10	70	90	
			95	645	10					
			90	615	70					
			115	995	105					

N/S STREET				30	E/W STREET					
GLEN OAKS BLVD					SHELDON STREET					
			160	1235	135					
			95	490	100					
			145	730	140					
115	130	300					90	100	110	
405	240	325		TS			595	285	325	
45	80	65					90	45	40	
			80	480	45					
			80	535	50					
			120	820	70					



LEGEND

N/S STREET				S#	E/W STREET					
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS			7AM - 9AM	2PM - 4PM	4PM - 6PM	
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

S# – DISPOSAL SITE

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ROUTE 6A
EXISTING + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-4-4D

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 4\FIG 4-4-4D.dwg
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N/S STREET				24			E/W STREET			
FOOTHILL BLVD							WB I-210 FWY RAMPS			
				505	410	0				
				215	290	0				
				230	275	0				
0	0	0						60	40	65
0	0	0		TS				0	0	0
0	0	0						325	290	430
				140	595	0				
				110	480	0				
				220	530	0				

N/S STREET				25			E/W STREET			
FOOTHILL BLVD							EB I-210 FWY RAMPS			
				0	385	200				
				0	335	75				
				0	475	55				
365	270	345						0	0	0
0	0	0		TS				0	0	0
115	55	90						0	0	0
				0	380	465				
				0	295	340				
				0	415	400				

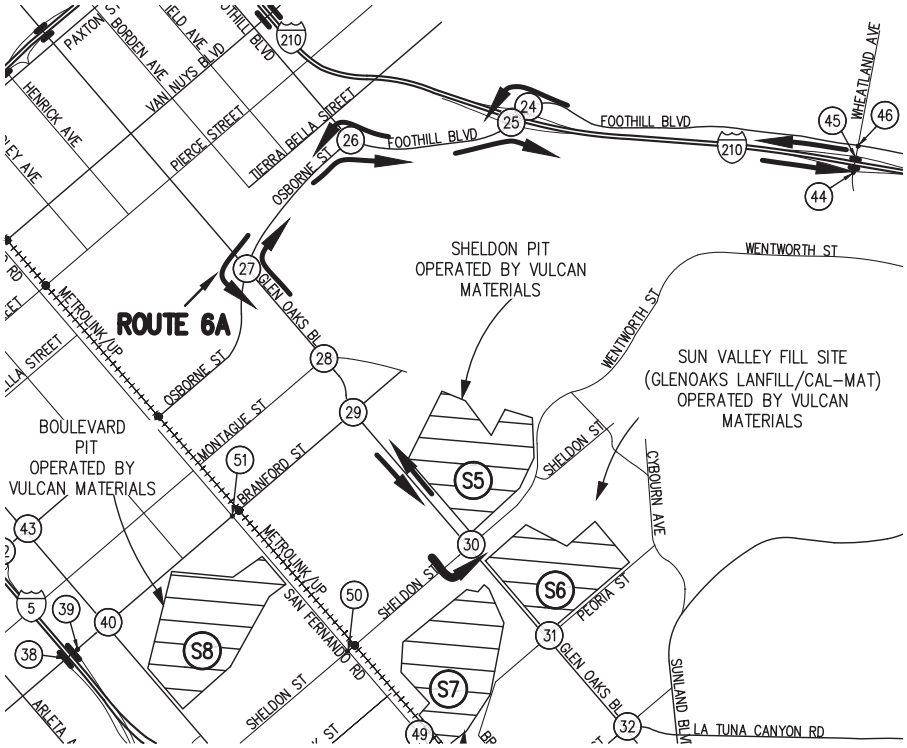
N/S STREET				26			E/W STREET			
OSBORNE STREET							FOOTHILL BLVD			
				5	5	5				
				15	5	5				
				15	5	5				
5	20	15						5	5	5
350	265	330		TS				250	235	345
560	25	295						425	360	375
				355	10	415				
				265	5	400				
				735	5	570				

N/S STREET				27			E/W STREET			
GLEN OAKS BLVD							OSBORNE STREET			
				200	1215	65				
				140	520	80				
				205	575	135				
465	340	390						90	80	100
600	490	690		TS				695	545	535
95	105	90						490	210	255
				90	655	340				
				100	735	365				
				120	875	490				

N/S STREET				28			E/W STREET			
GLEN OAKS BLVD							MONTAGUE STREET			
				70	1785	20				
				50	765	40				
				30	1110	20				
45	65	65						10	30	30
5	5	5		TS				5	5	5
50	65	65						5	40	10
				65	890	10				
				65	815	15				
				70	1395	15				

N/S STREET				29			E/W STREET			
GLEN OAKS BLVD							BRANFORD STREET			
				195	1605	25				
				80	750	90				
				105	1000	120				
130	155	225						15	95	105
15	85	110		TS				5	90	195
115	100	170						20	85	105
				105	865	25				
				105	820	80				
				125	1160	110				

N/S STREET				30			E/W STREET			
GLEN OAKS BLVD							SHELDON STREET			
				200	1355	285				
				125	555	210				
				155	785	250				
130	150	330						200	210	215
430	370	335		TS				660	370	350
50	120	75						105	50	50
				100	520	50				
				110	605	70				
				140	905	80				



LEGEND

N/S STREET				S#	E/W STREET
				7AM-9AM	
				2PM-4PM	
				4PM-6PM	
7AM - 9AM	2PM - 4PM	4PM - 6PM	TS		7AM - 9AM / 2PM - 4PM / 4PM - 6PM
				7AM-9AM	
				2PM-4PM	
				4PM-6PM	

LEGEND

S# – DISPOSAL SITE

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ROUTE 6A
PCE EXISTING + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-4-4E

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Table 4-4-4
Intersection Capacity Analysis – Existing + Project Conditions (Route 6A)
Traffic Impact Analysis - Site 6

Route 6A		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
24	Foothill Blvd and I-210 Westbound Ramps	A	8.4	0.57	A	A	5.6	0.29	A	A	8.0	0.50	A
25	Foothill Blvd and I-210 Eastbound Ramps	A	9.9	0.63	A	A	6.5	0.31	A	A	7.2	0.41	A
26	Foothill Blvd and Osborne Street	D	37.9	1.16	C	A	9.2	0.57	A	B	19.3	0.91	C
27	Glenoaks Blvd and Osborne Street	F	82.9	1.13	E	C	32.7	0.78	B	D	44.9	0.90	D
28	Glenoaks Blvd and Montague Street	A	9.1	0.72	B	B	13.0	0.38	A	A	9.5	0.58	B
29	Glenoaks Blvd and Branford Street	B	15.1	0.81	C	B	18.4	0.57	A	C	23.6	0.80	D
30	Glenoaks Blvd and Sheldon Street	B	12.4	0.78	D	A	7.4	0.49	A	B	16.8	0.95	C

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc.**

Haul Route 6A Analysis

As presented in *Table 4-4-4*, under the existing plus project conditions for Site 6 (Route 6A) most study intersections are expected to operate at an acceptable HCM LOS D or better, for the AM, Mid-day and PM peak hours. The Intersection of Glenoaks Blvd and Osborne Street will continue to operate at HCM LOS F during the AM peak period. As identified under existing conditions, mitigation of the intersection of Glenoaks Blvd and Osborne Street is recommended to improve the intersection to an acceptable level-of-service.

Haul Route 6B

The Haul Route 6B project trips, truck percentages and passenger car equivalent (PCE) project trips are illustrated in *Figure 4-4-5A* through *Figure 4-4-5C.* The existing plus project AM (7-9), MID-DAY (12-2), PM (4-6) turn movement volumes, are provided in *Figure 4-4-5D.* For comparison the (PCE) existing plus project turn movement volumes are provided in *Figure 4-4-5E.*

Haul Route 6C

The Haul Route 6C project trips, truck percentages and passenger car equivalent (PCE) project trips are illustrated in *Figure 4-4-6A* through *Figure 4-4-6C.* The existing plus project AM (7-9), MID-DAY (12-2), PM (4-6) turn movement volumes, are provided in *Figure 4-4-6D.* For comparison the (PCE) existing plus project turn movement volumes are provided in *Figure 4-4-6E.*

N/S STREET	30	E/W STREET
GLEN OAKS BLVD		SHELDON STREET

			0	0	0					
			0	0	0					
			0	0	0					
0	0	0					0	0	0	
0	0	0		TS			0	0	0	
0	0	0					0	0	0	
			0	0	50					
			0	0	50					
			0	0	50					

N/S STREET	31	E/W STREET
GLEN OAKS BLVD		PEORIA STREET

			0	50	0					
			0	50	0					
			0	50	0					
0	0	0					0	0	0	
0	0	0		TS			0	0	0	
0	0	0					0	0	0	
			0	50	0					
			0	50	0					
			0	50	0					

N/S STREET	32	E/W STREET
GLEN OAKS BLVD		TUXFORD STREET

			0	50	0					
			0	50	0					
			0	50	0					
0	0	0					0	0	0	
0	0	0		TS			0	0	0	
0	0	0					0	0	0	
			0	50	0					
			0	50	0					
			0	50	0					

N/S STREET	33	E/W STREET
GLEN OAKS BLVD		PENROSE STREET

			0	50	0					
			0	50	0					
			0	50	0					
0	0	0					0	0	0	
0	0	0		TS			0	0	0	
0	0	0					0	0	0	
			0	50	0					
			0	50	0					
			0	50	0					

N/S STREET	34	E/W STREET
GLEN OAKS BLVD		SUNLAND BLVD

			0	50	0					
			0	50	0					
			0	50	0					
0	0	0					0	0	0	
0	0	0		TS			0	0	0	
0	0	0					0	0	0	
			0	50	0					
			0	50	0					
			0	50	0					

N/S STREET	35	E/W STREET
GLEN OAKS BLVD		ROSCOE BLVD

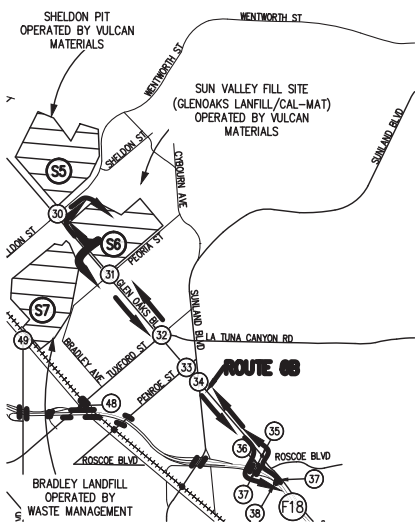
			50	0	0					
			50	0	0					
			50	0	0					
50	50	50					0	0	0	
0	0	0		TS			0	0	0	
0	0	0					0	0	0	
			0	0	0					
			0	0	0					
			0	0	0					

N/S STREET	36	E/W STREET
NB I-5 FREEWAY RAMPS		ROSCOE BLVD

			0	0	0					
			0	0	0					
			0	0	0					
0	0	0					0	0	0	
0	0	0		TS			50	50	50	
0	0	0					0	0	0	
			0	0	50					
			0	0	50					
			0	0	50					

N/S STREET	37	E/W STREET
SB I-5 FREEWAY RAMPS		ROSCOE BLVD

			0	0	0					
			0	0	0					
			0	0	0					
0	0	0					0	0	0	
0	0	0		TS			0	0	0	
0	0	0					50	50	50	
			0	0	0					
			0	0	0					
			0	0	0					



LEGEND

N/S STREET	S#	E/W STREET

				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS			7AM - 9AM	2PM - 4PM	4PM - 6PM	
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 6B PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-4-5A

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 4\FIG 4-4-5A.dwg
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N/S STREET				30			E/W STREET			
GLEN OAKS BLVD							SHELDON STREET			
				10%	5%	30%				
				15%	5%	5%				
				5%	5%	5%				
5%	5%	5%						5%	10%	5%
5%	25%	5%		TS				5%	15%	5%
5%	25%	5%						5%	10%	20%
				10%	5%	10%				
				20%	5%	25%				
				10%	5%	10%				

N/S STREET				31			E/W STREET			
GLEN OAKS BLVD							PEORIA STREET			
				20%	5%	45%				
				45%	15%	40%				
				45%	5%	50%				
40%	40%	20%						20%	5%	20%
80%	60%	40%		TS				20%	20%	5%
40%	45%	45%						20%	30%	55%
				45%	10%	65%				
				15%	15%	45%				
				45%	5%	50%				

N/S STREET				32			E/W STREET			
GLEN OAKS BLVD							TUXFORD STREET			
				40%	9%	5%				
				45%	25%	10%				
				10%	12%	5%				
25%	45%	25%						10%	10%	5%
5%	5%	5%		TS				5%	5%	5%
15%	15%	10%						5%	5%	5%
				15%	20%	20%				
				15%	19%	5%				
				10%	15%	5%				

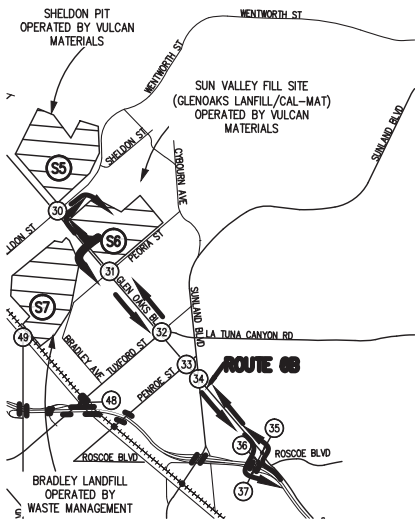
N/S STREET				33			E/W STREET			
GLEN OAKS BLVD							PENROSE STREET			
				5%	10%	15%				
				10%	19%	10%				
				5%	18%	0%				
5%	10%	5%						10%	5%	5%
5%	5%	5%		TS				5%	5%	10%
25%	5%	10%						0%	10%	5%
				0%	21%	0%				
				0%	14%	5%				
				0%	16%	0%				

N/S STREET				34			E/W STREET			
GLEN OAKS BLVD							SUNLAND BLVD			
				5%	12%	35%				
				15%	23%	5%				
				10%	13%	10%				
15%	5%	10%						5%	0%	0%
5%	5%	5%		TS				5%	5%	5%
0%	5%	0%						5%	5%	5%
				35%	23%	5%				
				10%	21%	5%				
				0%	12%	5%				

N/S STREET				35			E/W STREET			
GLEN OAKS BLVD							ROSCOE BLVD			
				15%	5%	0%				
				18%	10%	0%				
				15%	5%	0%				
26%	21%	13%						0%	0%	0%
0%	0%	0%		TS				0%	0%	0%
10%	20%	10%						0%	0%	0%
				10%	5%	0%				
				10%	5%	0%				
				10%	5%	0%				

N/S STREET				36			E/W STREET			
NB I-5 FREEWAY RAMPS							ROSCOE BLVD			
				0%	0%	0%				
				0%	0%	0%				
				0%	0%	0%				
0%	0%	0%						0%	0%	0%
10%	10%	15%		TS				14%	16%	14%
0%	0%	0%						0%	0%	0%
				15%	0%	23%				
				20%	0%	22%				
				20%	0%	13%				

N/S STREET				37			E/W STREET			
SB I-5 FREEWAY RAMPS							ROSCOE BLVD			
				0%	5%	5%				
				0%	0%	0%				
				0%	0%	0%				
0%	0%	0%						15%	5%	5%
0%	0%	0%		TS				0%	0%	0%
0%	0%	0%						13%	18%	16%
				0%	0%	0%				
				0%	0%	0%				
				0%	0%	0%				



LEGEND

N/S STREET				S#			E/W STREET			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 6B TRUCK PERCENTAGES

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-4-5B

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N/S STREET	30	E/W STREET
GLEN OAKS BLVD		SHELDON STREET

			0	0	0					
			0	0	0					
			0	0	0					
0	0	0					0	0	0	
0	0	0		TS			0	0	0	
0	0	0					0	0	0	
			0	0	150					
			0	0	150					
			0	0	150					

N/S STREET	31	E/W STREET
GLEN OAKS BLVD		PEORIA STREET

			0	150	0					
			0	150	0					
			0	150	0					
0	0	0					0	0	0	
0	0	0		TS			0	0	0	
0	0	0					0	0	0	
			0	150	0					
			0	150	0					
			0	150	0					

N/S STREET	32	E/W STREET
GLEN OAKS BLVD		TUXFORD STREET

			0	150	0					
			0	150	0					
			0	150	0					
0	0	0					0	0	0	
0	0	0		TS			0	0	0	
0	0	0					0	0	0	
			0	150	0					
			0	150	0					
			0	150	0					

N/S STREET	33	E/W STREET
GLEN OAKS BLVD		PENROSE STREET

			0	150	0					
			0	150	0					
			0	150	0					
0	0	0					0	0	0	
0	0	0		TS			0	0	0	
0	0	0					0	0	0	
			0	150	0					
			0	150	0					
			0	150	0					

N/S STREET	34	E/W STREET
GLEN OAKS BLVD		SUNLAND BLVD

			0	150	0					
			0	150	0					
			0	150	0					
0	0	0					0	0	0	
0	0	0		TS			0	0	0	
0	0	0					0	0	0	
			0	150	0					
			0	150	0					
			0	150	0					

N/S STREET	35	E/W STREET
GLEN OAKS BLVD		ROSCOE BLVD

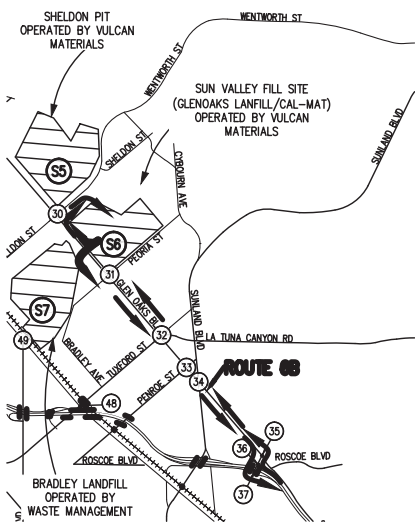
			150	0	0					
			150	0	0					
			150	0	0					
150	150	150					0	0	0	
0	0	0		TS			0	0	0	
0	0	0					0	0	0	
			0	0	0					
			0	0	0					
			0	0	0					

N/S STREET	36	E/W STREET
NB I-5 FREEWAY RAMPS		ROSCOE BLVD

			0	0	0					
			0	0	0					
			0	0	0					
0	0	0					0	0	0	
0	0	0		TS			150	150	150	
0	0	0					0	0	0	
			0	0	150					
			0	0	150					
			0	0	150					

N/S STREET	37	E/W STREET
SB I-5 FREEWAY RAMPS		ROSCOE BLVD

			0	0	0					
			0	0	0					
			0	0	0					
0	0	0					0	0	0	
0	0	0		TS			0	0	0	
0	0	0					150	150	150	
			0	0	0					
			0	0	0					
			0	0	0					



LEGEND

N/S STREET	S#	E/W STREET

			7AM-9AM							
			2PM-4PM							
			4PM-6PM							
7AM - 9AM	2PM - 4PM	4PM - 6PM					7AM - 9AM	2PM - 4PM	4PM - 6PM	
				TS						
			7AM-9AM							
			2PM-4PM							
			4PM-6PM							

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 6B
PCE PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-4-5C

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 4\FIG 4-4-5C.dwg
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N/S STREET				30			E/W STREET		
GLEN OAKS BLVD							SHELDON STREET		
				160	1235	85			
				95	490	50			
				145	730	90			
115	130	300						40	50	60
405	240	325		TS				595	285	325
45	80	65						90	45	40
				80	480	95			
				80	535	100			
				120	820	50			

N/S STREET				31			E/W STREET		
GLEN OAKS BLVD							PEORIA STREET		
				40	1300	30			
				15	580	10			
				15	795	35			
15	25	40						10	15	55
5	5	10		TS				5	5	5
5	30	20						15	20	30
				15	575	25			
				25	575	15			
				25	1025	25			

N/S STREET				32			E/W STREET		
GLEN OAKS BLVD							TUXFORD STREET		
				125	1065	90			
				100	405	90			
				90	640	130			
115	110	140						75	45	80
470	390	505		TS				565	425	345
45	60	95						30	25	60
				95	445	20			
				110	485	30			
				120	850	60			

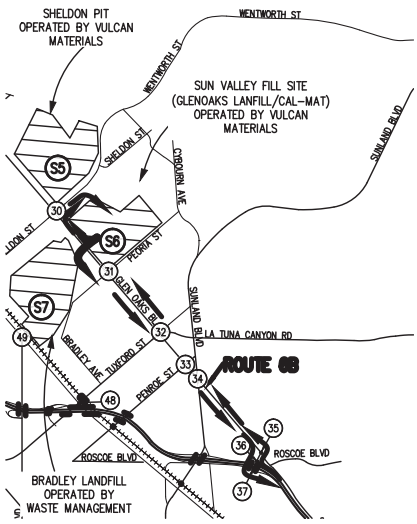
N/S STREET				33			E/W STREET		
GLEN OAKS BLVD							PENROSE STREET		
				95	970	35			
				35	490	25			
				110	570	45			
120	90	185						35	35	75
125	130	200		TS				70	85	140
20	50	55						5	20	45
				25	415	5			
				45	515	25			
				75	750	40			

N/S STREET				34			E/W STREET		
GLEN OAKS BLVD							SUNLAND BLVD		
				205	690	10			
				170	355	35			
				50	560	50			
70	165	165						20	15	5
670	430	650		TS				750	355	395
30	20	55						205	320	360
				10	360	80			
				25	400	245			
				20	690	385			

N/S STREET				35			E/W STREET		
GLEN OAKS BLVD							ROSCOE BLVD		
				470	520	0			
				355	355	0			
				470	530	0			
225	290	595						0	0	0
0	0	0		TS				0	0	0
75	90	120						0	0	0
				70	275	0			
				75	370	0			
				65	540	0			

N/S STREET				36			E/W STREET		
NB I-5 FREEWAY RAMPS							ROSCOE BLVD		
				0	0	0			
				0	0	0			
				0	0	0			
0	0	0						0	0	0
90	120	110		TS				540	425	540
0	0	0						0	0	0
				70	0	265			
				60	0	285			
				65	0	615			

N/S STREET				37			E/W STREET		
SB I-5 FREEWAY RAMPS							ROSCOE BLVD		
				0	35	90			
				0	40	120			
				0	30	110			
0	0	0						25	45	100
0	0	0		TS				0	0	0
0	0	0						615	380	425
				0	0	0			
				0	0	0			
				0	0	0			



LEGEND

N/S STREET				S#	E/W STREET
				7AM-9AM	
				2PM-4PM	
				4PM-6PM	
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS	7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM	
				2PM-4PM	
				4PM-6PM	

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 6B
EXISTING + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-4-5D

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 4\FIG 4-4-5D.dwg
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N/S STREET				30			E/W STREET			
GLEN OAKS BLVD							SHELDON STREET			
				200	1355	135				
				125	555	60				
				155	785	100				
130	150	330						50	60	65
430	370	335		TS				660	370	350
50	120	75						105	50	50
				100	520	200				
				110	605	220				
				140	905	230				

N/S STREET				31			E/W STREET			
GLEN OAKS BLVD							PEORIA STREET			
				55	1535	55				
				30	855	20				
				30	980	65				
25	45	55						15	15	75
10	10	20		TS				10	5	5
5	60	40						20	30	65
				30	760	60				
				35	810	30				
				45	1260	50				

N/S STREET				32			E/W STREET			
GLEN OAKS BLVD							TUXFORD STREET			
				220	1270	100				
				195	605	105				
				105	795	145				
175	200	210						90	55	90
510	445	540		TS				615	450	375
55	80	120						30	30	60
				120	620	30				
				140	680	30				
				145	1095	65				

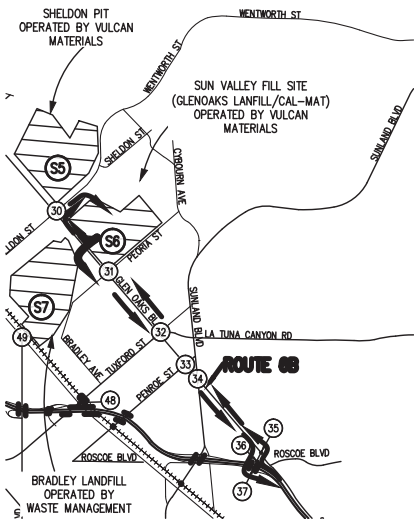
N/S STREET				33			E/W STREET			
GLEN OAKS BLVD							PENROSE STREET			
				100	1160	45				
				40	660	30				
				115	795	45				
135	110	210						45	40	85
130	135	215		TS				75	90	160
30	55	65						5	25	50
				25	585	5				
				45	675	25				
				75	960	40				

N/S STREET				34			E/W STREET			
GLEN OAKS BLVD							SUNLAND BLVD			
				235	855	20				
				230	520	40				
				60	695	60				
85	190	200						25	15	5
720	470	670		TS				790	400	405
30	20	55						220	340	370
				20	510	85				
				25	555	260				
				20	865	415				

N/S STREET				35			E/W STREET			
GLEN OAKS BLVD							ROSCOE BLVD			
				585	560	0				
				490	415	0				
				585	575	0				
340	400	705						0	0	0
0	0	0		TS				0	0	0
90	125	145						0	0	0
				85	305	0				
				95	410	0				
				80	580	0				

N/S STREET				36			E/W STREET			
NB I-5 FREEWAY RAMPS							ROSCOE BLVD			
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
100	140	135		TS				660	550	655
0	0	0						0	0	0
				90	0	380				
				85	0	395				
				90	0	725				

N/S STREET				37			E/W STREET			
SB I-5 FREEWAY RAMPS							ROSCOE BLVD			
				0	40	100				
				0	40	120				
				0	30	110				
0	0	0						35	50	100
0	0	0		TS				0	0	0
0	0	0						735	505	550
				0	0	0				
				0	0	0				
				0	0	0				



LEGEND

N/S STREET				S#	E/W STREET
				7AM-9AM	
				2PM-4PM	
				4PM-6PM	
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS	7AM - 9AM / 2PM - 4PM / 4PM - 6PM
				7AM-9AM	
				2PM-4PM	
				4PM-6PM	

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 6B
PCE EXISTING + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-4-5E

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 4\FIG 4-4-5E.dwg
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N/S STREET	44	E/W STREET
WHEATLAND AVE		EB I-210 FWY RAMPS

			0	0	50					
			0	0	50					
			0	0	50					
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
			0	0	0					
			0	0	0					
			0	0	0					

N/S STREET	45	E/W STREET
WHEATLAND AVE		WB I-210 FWY RAMPS

			0	50	0					
			0	50	0					
			0	50	0					
0	0	0						50	50	50
0	0	0		TS				0	0	0
0	0	0						0	0	0
			0	0	0					
			0	0	0					
			0	0	0					

N/S STREET	46	E/W STREET
WHEATLAND AVE		FOOTHILL BLVD

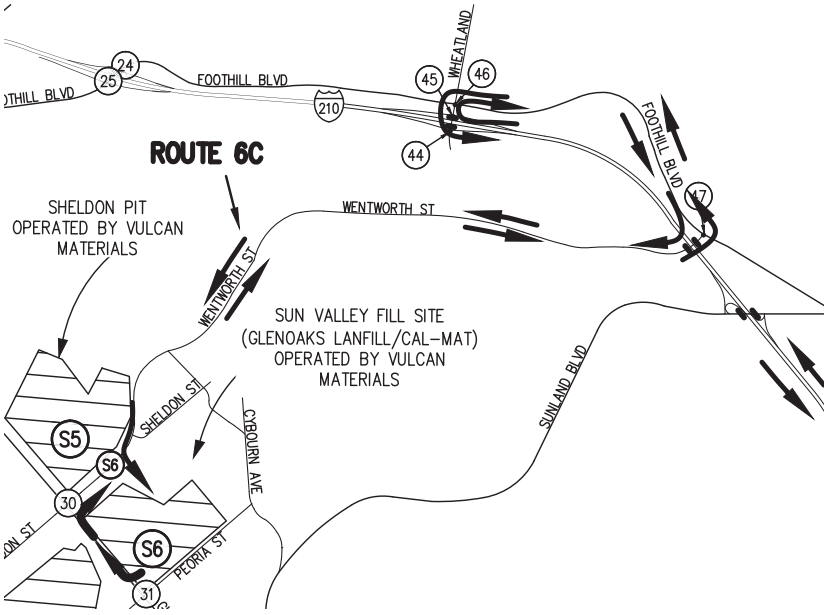
			0	0	0					
			0	0	0					
			0	0	0					
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						50	50	50
			0	0	50					
			0	0	50					
			0	0	50					

N/S STREET	47	E/W STREET
WENTWORTH STREET		FOOTHILL BLVD

			0	0	0					
			0	0	0					
			0	0	0					
0	0	0						0	0	0
0	0	0		TS				0	0	0
50	50	50						0	0	0
			50	0	0					
			50	0	0					
			50	0	0					

N/S STREET	30	E/W STREET
GLEN OAKS BLVD		SHELDON STREET

			0	0	0					
			0	0	0					
			0	0	0					
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
			0	0	50					
			0	0	50					
			0	0	50					



LEGEND

N/S STREET	S#	E/W STREET

			7AM-9AM							
			2PM-4PM							
			4PM-6PM							
7AM - 9AM	2PM - 4PM	4PM - 6PM					7AM - 9AM	2PM - 4PM	4PM - 6PM	
				TS						
			7AM-9AM							
			2PM-4PM							
			4PM-6PM							

LEGEND

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ROUTE 6C PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-4-6A

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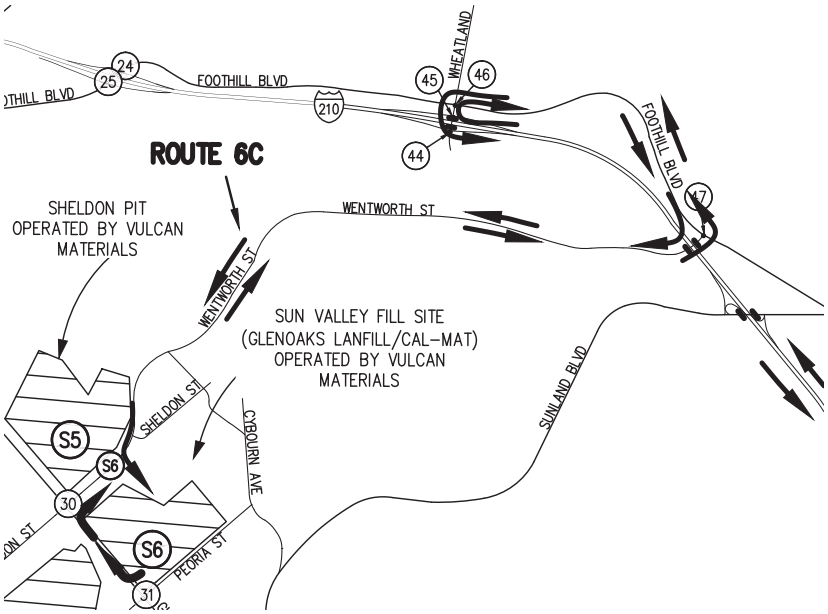
N/S STREET				44			E/W STREET			
WHEATLAND AVE							EB I-210 FWY RAMPS			
				0%	0%	33%				
				0%	0%	45%				
				0%	0%	40%				
5%	5%	5%						0%	0%	0%
15%	15%	100%		TS				0%	0%	0%
0%	0%	0%						0%	0%	0%
				0%	0%	0%				
				0%	0%	0%				
				0%	0%	0%				

N/S STREET				45			E/W STREET			
WHEATLAND AVE							WB I-210 FWY RAMPS			
				5%	35%	0%				
				5%	48%	0%				
				5%	38%	0%				
0%	0%	0%						37%	56%	29%
0%	0%	0%		TS				0%	0%	0%
0%	0%	0%						50%	5%	5%
				20%	5%	0%				
				5%	10%	0%				
				20%	5%	0%				

N/S STREET				46			E/W STREET			
WHEATLAND AVE							FOOTHILL BLVD			
				5%	5%	20%				
				5%	5%	5%				
				5%	5%	5%				
30%	5%	5%						5%	5%	5%
5%	5%	5%		TS				5%	5%	5%
5%	5%	5%						42%	49%	34%
				5%	5%	35%				
				5%	5%	58%				
				5%	5%	33%				

N/S STREET				47			E/W STREET			
WENTWORTH STREET							FOOTHILL BLVD			
				0%	0%	0%				
				0%	0%	0%				
				0%	0%	0%				
0%	0%	0%						0%	0%	0%
5%	5%	5%		TS				5%	5%	5%
34%	55%	43%						5%	5%	5%
				53%	0%	5%				
				53%	0%	5%				
				35%	0%	5%				

N/S STREET				30			E/W STREET			
GLEN OAKS BLVD							SHELDON STREET			
				10%	5%	30%				
				15%	5%	5%				
				5%	5%	5%				
5%	5%	5%						5%	10%	5%
5%	25%	5%		TS				5%	15%	5%
5%	25%	5%						5%	10%	20%
				10%	5%	10%				
				20%	5%	25%				
				10%	5%	10%				



LEGEND

N/S STREET				S#			E/W STREET			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS			7AM - 9AM	2PM - 4PM	4PM - 6PM	
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

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ROUTE 6C
TRUCK PERCENTAGES

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-4-6B

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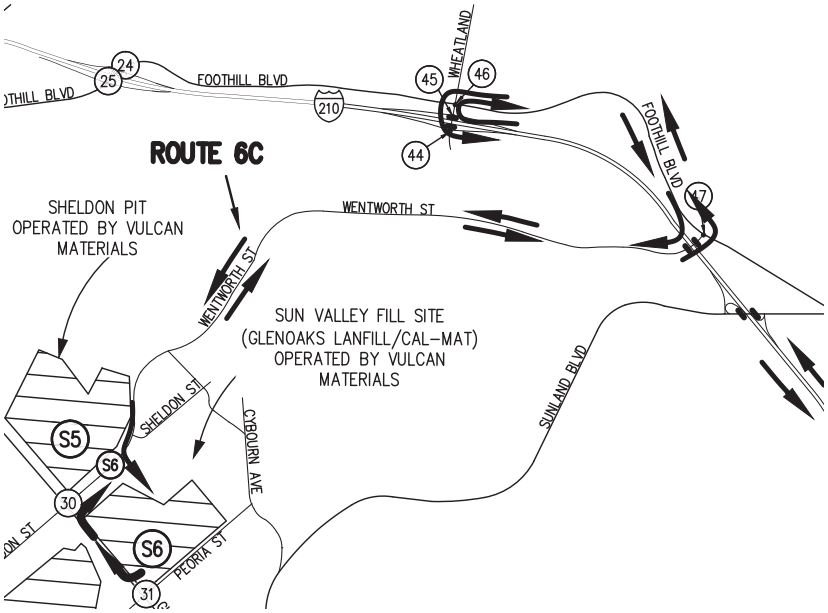
N/S STREET				44		E/W STREET			
WHEATLAND AVE						EB I-210 FWY RAMPS			
			0	0	150				
			0	0	150				
			0	0	150				
0	0	0					0	0	0
0	0	0		TS			0	0	0
0	0	0					0	0	0
			0	0	0				
			0	0	0				
			0	0	0				

N/S STREET				45		E/W STREET			
WHEATLAND AVE						WB I-210 FWY RAMPS			
			0	150	0				
			0	150	0				
			0	150	0				
0	0	0					150	150	150
0	0	0		TS			0	0	0
0	0	0					0	0	0
			0	0	0				
			0	0	0				
			0	0	0				

N/S STREET				46		E/W STREET			
WHEATLAND AVE						FOOTHILL BLVD			
			0	0	0				
			0	0	0				
			0	0	0				
0	0	0					0	0	0
0	0	0		TS			0	0	0
0	0	0					150	150	150
			0	0	150				
			0	0	150				
			0	0	150				

N/S STREET				47		E/W STREET			
WENTWORTH STREET						FOOTHILL BLVD			
			0	0	0				
			0	0	0				
			0	0	0				
0	0	0					0	0	0
0	0	0		TS			0	0	0
150	150	150					0	0	0
			150	0	0				
			150	0	0				
			150	0	0				

N/S STREET				30		E/W STREET			
GLEN OAKS BLVD						SHELDON STREET			
			0	0	0				
			0	0	0				
			0	0	0				
0	0	0					0	0	0
0	0	0		TS			0	0	0
0	0	0					0	0	0
			0	0	150				
			0	0	150				
			0	0	150				



LEGEND

N/S STREET				S#		E/W STREET			
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS			7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					

LEGEND

(S#) – DISPOSAL SITE

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ROUTE 6C
PCE PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-4-6C

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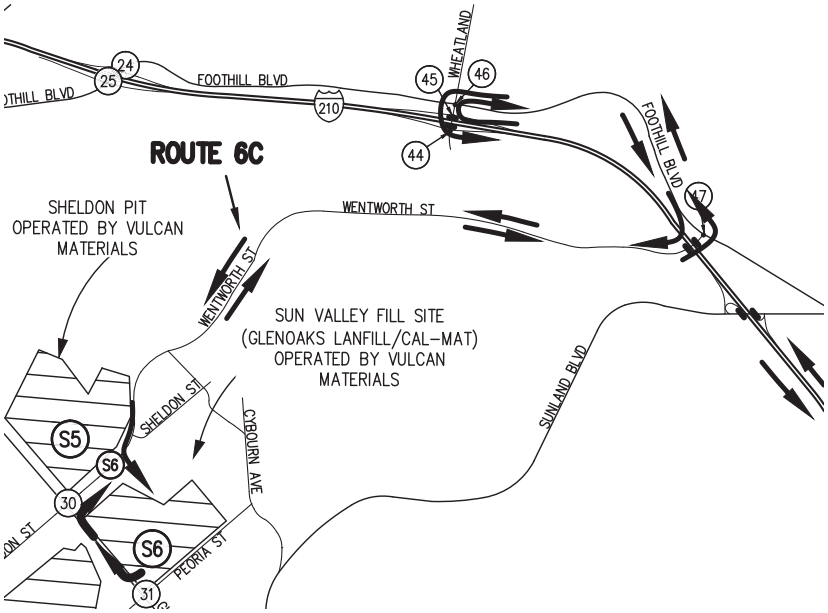
N/S STREET				44			E/W STREET			
WHEATLAND AVE							EB I-210 FWY RAMPS			
				0	0	170				
				0	0	110				
				0	0	135				
105	75	100						0	0	0
5	5	5		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET				45			E/W STREET			
WHEATLAND AVE							WB I-210 FWY RAMPS			
				65	160	0				
				55	110	0				
				105	130	0				
0	0	0						150	90	170
0	0	0		TS				5	5	5
0	0	0						5	5	5
				5	100	0				
				5	55	0				
				5	95	0				

N/S STREET				46			E/W STREET			
WHEATLAND AVE							FOOTHILL BLVD			
				5	15	15				
				15	20	5				
				5	20	10				
5	10	5						5	20	15
195	135	170		TS				220	130	215
90	35	80						130	115	145
				70	10	160				
				40	25	100				
				90	25	150				

N/S STREET				47			E/W STREET			
WENTWORTH STREET							FOOTHILL BLVD			
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
200	165	200		TS				175	155	295
165	95	125						440	215	215
				100	0	225				
				100	0	185				
				160	0	420				

N/S STREET				30			E/W STREET			
GLEN OAKS BLVD							SHELDON STREET			
				160	1235	85				
				95	490	50				
				145	730	90				
115	130	300						40	50	60
405	240	325		TS				595	285	325
45	80	65						90	45	40
				80	480	95				
				80	535	100				
				120	820	120				



LEGEND

N/S STREET				S#			E/W STREET			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 6C
EXISITNG + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-4-6D

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 4\FIG 4-4-6D.dwg
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N/S STREET				44		E/W STREET			
WHEATLAND AVE						EB I-210 FWY RAMPS			
				0	0	275			
				0	0	210			
				0	0	240			
115	85	100						0	0	0
10	10	5		TS				0	0	0
0	0	0						0	0	0
				0	0	0			
				0	0	0			
				0	0	0			

N/S STREET				45		E/W STREET			
WHEATLAND AVE						WB I-210 FWY RAMPS			
				75	265	0			
				60	215	0			
				105	230	0			
0	0	0						260	190	270
0	0	0		TS				5	5	5
0	0	0						5	5	5
				5	105	0			
				5	65	0			
				5	100	0			

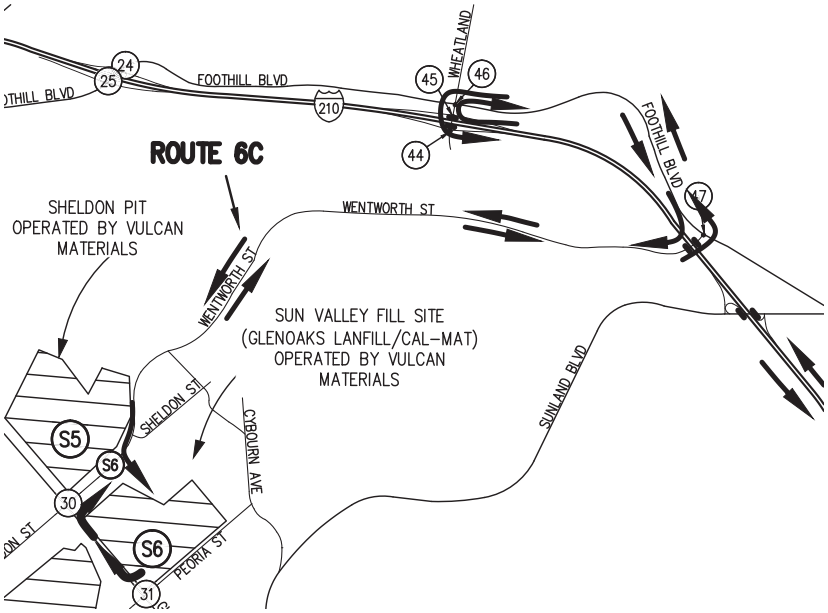
N/S STREET				46		E/W STREET			
WHEATLAND AVE						FOOTHILL BLVD			
				5	15	20			
				15	20	5			
				5	20	10			
10	10	5						5	20	15
215	150	175		TS				245	145	230
90	40	80						240	230	245
				80	10	265			
				40	25	210			
				90	25	250			

N/S STREET				47		E/W STREET			
WENTWORTH STREET						FOOTHILL BLVD			
				0	0	0			
				0	0	0			
				0	0	0			
0	0	0						0	0	0
205	175	200		TS				185	165	300
270	200	230						450	225	240
				205	0	240			
				205	0	190			
				265	0	425			

N/S STREET				30		E/W STREET			
GLEN OAKS BLVD						SHELDON STREET			
				200	1355	135			
				125	555	60			
				155	785	100			
130	150	330						50	60	65
430	370	335		TS				660	370	350
50	120	75						105	50	50
				100	520	200			
				110	605	220			
				140	905	230			

N

NOT TO SCALE



LEGEND

N/S STREET				S#		E/W STREET			
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					

LEGEND

(S#) – DISPOSAL SITE

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ROUTE 6C
PCE EXISITNG + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-4-6E

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Table 4-4-5
Intersection Capacity Analysis – Existing + Project Conditions (Route 6B)
Traffic Impact Analysis - Site 6

Route 6B		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
30	Glenoaks Blvd and Sheldon Street	B	11.1	0.75	D	A	7.2	0.44	A	B	11.1	0.75	C
31	Glenoaks Blvd and Peoria Street	B	10.5	0.57	A	A	9.3	0.39	A	B	15.5	0.54	A
32	Glenoaks Blvd and Tuxford Street	B	12.9	0.81	D	A	7.5	0.46	A	A	9.1	0.57	C
33	Glenoaks Blvd and Penrose Street	A	6.4	0.55	A	A	5.9	0.36	A	A	9.5	0.67	B
34	Glenoaks Blvd and Sunland Blvd	C	20.5	0.83	B	B	15.4	0.63	B	C	24.6	0.86	D
35	Glenoaks Blvd and Roscoe Blvd	A	6.8	0.42	A	A	7.1	0.42	A	B	10.3	0.61	A
36	Roscoe Blvd and I-5 Freeway Northbound Ramps	B	11.8	-	-	B	11.7	-	-	C	22.0	-	-
37	Roscoe Blvd and I-5 Freeway Southbound Ramps	A	0.0	-	-	A	0.0	-	-	A	0.0	-	-

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc.**

Table 4-4-6
Intersection Capacity Analysis – Existing + Project Conditions (Route 6C)
Traffic Impact Analysis - Site 6

Route 6C		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
30	Glenoaks Blvd and Sheldon Street	B	11.1	0.75	D	A	7.2	0.44	A	B	11.1	0.75	C
44	Wheatland Ave and I-210 Freeway Eastbound Ramps	A	0	-	-	A	0	-	-	A	0	-	-
45	Wheatland Ave and I-210 Freeway Westbound Ramps	B	10.7	-	-	A	9	-	-	A	9.1	-	-
46	Wheatland Ave and Foothill Blvd	B	10.6	0.42	A	B	10.3	0.36	A	B	10.5	0.43	A
47	Wentworth Street and Foothill Blvd	B	19.4	0.78	A	B	12.4	0.4	A	A	9.2	0.43	A

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc.**

Haul Routes 6B & 6C Analysis

As presented in *Tables 4-4-5 & 4-4-6* , under the existing plus project conditions for Site 6 (Routes 6B & 6C) all intersections are expected to continue to operate at an acceptable HCM LOS C or better, for the AM, Mid-day and PM peak hours.

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Haul Route 7A

The Haul Route 7A project trips, truck percentages and passenger car equivalent (PCE) project trips are illustrated in *Figure 4-4-7A* through *Figure 4-4-7C.* The existing plus project AM (7-9), MID-DAY (12-2), PM (4-6) turn movement volumes, are provided in *Figure 4-4-7D.* For comparison the (PCE) existing plus project turn movement volumes are provided in *Figure 4-4-7E.*

N/S STREET	24	E/W STREET
FOOTHILL BLVD		WB I-210 FWY RAMPS

			0	0	0					
			0	0	0					
			0	0	0					
0	0	0					0	0	0	
0	0	0		TS			0	0	0	
0	0	0					50	50	50	
			0	0	0					
			0	0	0					
			0	0	0					

N/S STREET	25	E/W STREET
FOOTHILL BLVD		EB I-210 FWY RAMPS

			0	0	0					
			0	0	0					
			0	0	0					
0	0	0					0	0	0	
0	0	0		TS			0	0	0	
0	0	0					0	0	0	
			0	0	50					
			0	0	50					
			0	0	50					

N/S STREET	26	E/W STREET
OSBORNE STREET		FOOTHILL BLVD

			0	0	0					
			0	0	0					
			0	0	0					
0	0	0					0	0	0	
0	0	0		TS			0	0	0	
0	0	0					50	50	50	
			0	0	50					
			0	0	50					
			0	0	50					

N/S STREET	27	E/W STREET
GLEN OAKS BLVD		OSBORNE STREET

			0	0	0					
			0	0	0					
			0	0	0					
50	50	50					0	0	0	
0	0	0		TS			0	0	0	
0	0	0					0	0	0	
			0	0	50					
			0	0	50					
			0	0	50					

N/S STREET	28	E/W STREET
GLEN OAKS BLVD		MONTAGUE STREET

			0	50	0					
			0	50	0					
			0	50	0					
0	0	0					0	0	0	
0	0	0		TS			0	0	0	
0	0	0					0	0	0	
			0	50	0					
			0	50	0					
			0	50	0					

N/S STREET	29	E/W STREET
GLEN OAKS BLVD		BRANFORD STREET

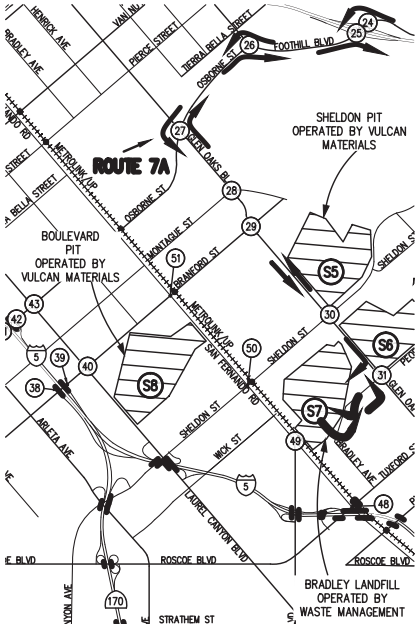
			0	50	0					
			0	50	0					
			0	50	0					
0	0	0					0	0	0	
0	0	0		TS			0	0	0	
0	0	0					0	0	0	
			0	50	0					
			0	50	0					
			0	50	0					

N/S STREET	30	E/W STREET
GLEN OAKS BLVD		SHELDON STREET

			0	50	0					
			0	50	0					
			0	50	0					
0	0	0					0	0	0	
0	0	0		TS			0	0	0	
0	0	0					0	0	0	
			0	50	0					
			0	50	0					
			0	50	0					

N/S STREET	31	E/W STREET
GLEN OAKS BLVD		PEORIA STREET

			50	0	0					
			50	0	0					
			50	0	0					
50	50	50					0	0	0	
0	0	0		TS			0	0	0	
0	0	0					0	0	0	
			0	0	0					
			0	0	0					
			0	0	0					



LEGEND

N/S STREET	S#	E/W STREET

				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS			7AM - 9AM	2PM - 4PM	4PM - 6PM	
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 7A PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-4-7A

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 4\FIG 4-4-7A.dwg
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N/S STREET				24	E/W STREET						
FOOTHILL BLVD					WB I-210 FWY RAMPS						
				5%	5%	0%					
				5%	5%	0%					
				5%	5%	0%					
0%	0%	0%	↰	↑	↱	↰	5%	10%	5%		
0%	0%	0%	→	TS		←	0%	0%	0%		
0%	0%	0%	↲	↑	↳	↲	5%	10%	5%		
				5%	5%	0%					
				5%	5%	0%					
				5%	5%	0%					

N/S STREET				25	E/W STREET						
FOOTHILL BLVD					EB I-210 FWY RAMPS						
				0%	5%	5%					
				0%	5%	5%					
				0%	5%	5%					
5%	5%	5%	↰	↑	↱	↰	0%	0%	0%		
0%	0%	0%	→	TS		←	0%	0%	0%		
5%	20%	5%	↲	↑	↳	↲	0%	0%	0%		
				0%	5%	5%					
				0%	5%	10%					
				0%	5%	5%					

N/S STREET				26	E/W STREET						
OSBORNE STREET					FOOTHILL BLVD						
				5%	5%	5%					
				5%	5%	5%					
				5%	5%	5%					
5%	5%	5%	↰	↑	↱	↰	5%	5%	5%		
5%	10%	5%	→	TS		←	5%	10%	5%		
5%	5%	5%	↲	↑	↳	↲	5%	15%	5%		
				5%	5%	5%					
				10%	5%	10%					
				5%	5%	5%					

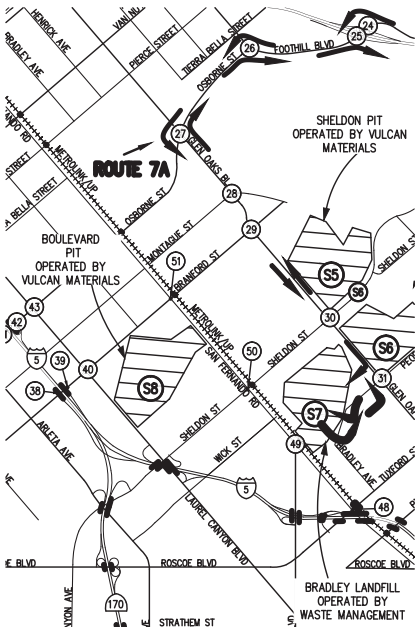
N/S STREET				27	E/W STREET						
GLEN OAKS BLVD					OSBORNE STREET						
				10%	5%	20%					
				5%	10%	5%					
				5%	10%	5%					
5%	5%	5%	↰	↑	↱	↰	15%	10%	5%		
5%	10%	5%	→	TS		←	5%	5%	5%		
20%	10%	15%	↲	↑	↳	↲	10%	10%	10%		
				45%	15%	20%					
				10%	10%	20%					
				5%	5%	5%					

N/S STREET				28	E/W STREET						
GLEN OAKS BLVD					MONTAGUE STREET						
				15%	10%	5%					
				15%	10%	5%					
				15%	5%	5%					
30%	30%	10%	↰	↑	↱	↰	5%	5%	5%		
5%	5%	5%	→	TS		←	5%	5%	5%		
20%	20%	5%	↲	↑	↳	↲	5%	5%	5%		
				5%	10%	15%					
				5%	10%	15%					
				25%	5%	5%					

N/S STREET				29	E/W STREET						
GLEN OAKS BLVD					BRANFORD STREET						
				5%	5%	45%					
				5%	5%	15%					
				15%	10%	5%					
5%	5%	5%	↰	↑	↱	↰	35%	5%	5%		
10%	5%	5%	→	TS		←	50%	5%	5%		
10%	5%	5%	↲	↑	↳	↲	40%	10%	10%		
				5%	10%	50%					
				10%	10%	10%					
				5%	5%	5%					

N/S STREET				30	E/W STREET						
GLEN OAKS BLVD					SHELDON STREET						
				10%	5%	30%					
				15%	5%	5%					
				5%	5%	5%					
5%	5%	5%	↰	↑	↱	↰	5%	10%	5%		
5%	25%	5%	→	TS		←	5%	15%	5%		
5%	25%	5%	↲	↑	↳	↲	5%	10%	20%		
				10%	5%	10%					
				20%	5%	25%					
				10%	5%	10%					

N/S STREET				31	E/W STREET						
GLEN OAKS BLVD					PEORIA STREET						
				20%	5%	45%					
				45%	15%	40%					
				45%	5%	50%					
40%	40%	20%	↰	↑	↱	↰	20%	5%	20%		
80%	60%	40%	→	TS		←	20%	20%	5%		
40%	45%	45%	↲	↑	↳	↲	20%	30%	55%		
				45%	10%	65%					
				15%	15%	45%					
				45%	5%	50%					



LEGEND

N/S STREET				S#	E/W STREET						
				7AM-9AM							
				2PM-4PM							
				4PM-6PM							
7AM - 9AM	2PM - 4PM	4PM - 6PM	↰	↑	↱	↰	7AM - 9AM	2PM - 4PM	4PM - 6PM		
			→	TS		←					
			↲	↑	↳	↲					
				7AM-9AM							
				2PM-4PM							
				4PM-6PM							

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 7A TRUCK PERCENTAGES

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-4-7B

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N/S STREET				24	E/W STREET					
FOOTHILL BLVD					WB I-210 FWY RAMPS					
			0	0	0					
			0	0	0					
			0	0	0					
0	0	0					0	0	0	
0	0	0		TS			0	0	0	
0	0	0					150	150	150	
			0	0	0					
			0	0	0					
			0	0	0					

N/S STREET				25	E/W STREET					
FOOTHILL BLVD					EB I-210 FWY RAMPS					
			0	0	0					
			0	0	0					
			0	0	0					
0	0	0					0	0	0	
0	0	0		TS			0	0	0	
0	0	0					0	0	0	
			0	0	150					
			0	0	150					
			0	0	150					

N/S STREET				26	E/W STREET					
OSBORNE STREET					FOOTHILL BLVD					
			0	0	0					
			0	0	0					
			0	0	0					
0	0	0					0	0	0	
0	0	0		TS			0	0	0	
0	0	0					150	150	150	
			0	0	150					
			0	0	150					
			0	0	150					

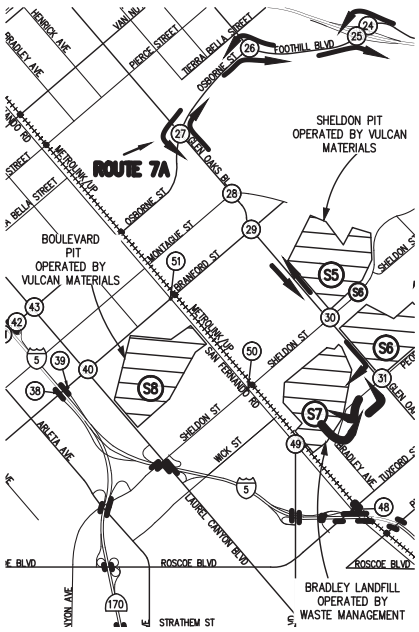
N/S STREET				27	E/W STREET					
GLEN OAKS BLVD					OSBORNE STREET					
			0	0	0					
			0	0	0					
			0	0	0					
150	150	150					0	0	0	
0	0	0		TS			0	0	0	
0	0	0					0	0	0	
			0	0	150					
			0	0	150					
			0	0	150					

N/S STREET				28	E/W STREET					
GLEN OAKS BLVD					MONTAGUE STREET					
			0	150	0					
			0	150	0					
			0	150	0					
0	0	0					0	0	0	
0	0	0		TS			0	0	0	
0	0	0					0	0	0	
			0	150	0					
			0	150	0					
			0	150	0					

N/S STREET				29	E/W STREET					
GLEN OAKS BLVD					BRANFORD STREET					
			0	150	0					
			0	150	0					
			0	150	0					
0	0	0					0	0	0	
0	0	0		TS			0	0	0	
0	0	0					0	0	0	
			0	150	0					
			0	150	0					
			0	150	0					

N/S STREET				30	E/W STREET					
GLEN OAKS BLVD					SHELDON STREET					
			0	150	0					
			0	150	0					
			0	150	0					
0	0	0					0	0	0	
0	0	0		TS			0	0	0	
0	0	0					0	0	0	
			0	150	0					
			0	150	0					
			0	150	0					

N/S STREET				31	E/W STREET					
GLEN OAKS BLVD					PEORIA STREET					
			150	0	0					
			150	0	0					
			150	0	0					
150	150	150					0	0	0	
0	0	0		TS			0	0	0	
0	0	0					0	0	0	
			0	0	0					
			0	0	0					
			0	0	0					



LEGEND

N/S STREET				S#	E/W STREET					
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS			7AM - 9AM	2PM - 4PM	4PM - 6PM	
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 7A
PCE PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-4-7C

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N/S STREET				24	E/W STREET					
FOOTHILL BLVD					WB I-210 FWY RAMPS					
				490	390	0				
				205	255	0				
				225	260	0				
0	0	0						60	35	65
0	0	0		TS				0	0	0
0	0	0						220	165	305
				130	570	0				
				105	445	0				
				210	510	0				

N/S STREET				25	E/W STREET					
FOOTHILL BLVD					EB I-210 FWY RAMPS					
				0	355	195				
				0	305	75				
				0	460	55				
355	260	335						0	0	0
0	0	0		TS				0	0	0
100	40	80						0	0	0
				0	350	340				
				0	265	210				
				0	390	290				

N/S STREET				26	E/W STREET					
OSBORNE STREET					FOOTHILL BLVD					
				5	5	5				
				15	5	5				
				15	5	5				
5	20	15						5	5	5
320	225	315		TS				245	200	305
520	25	265						310	215	255
				335	10	300				
				230	5	260				
				680	5	445				

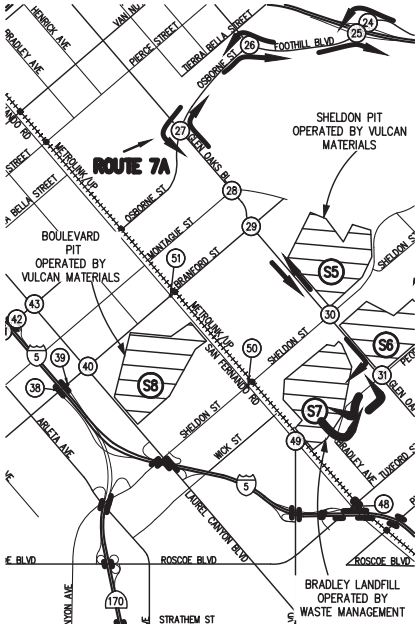
N/S STREET				27	E/W STREET					
GLEN OAKS BLVD					OSBORNE STREET					
				170	1070	45				
				130	425	80				
				205	575	135				
350	220	290						70	70	100
535	425	690		TS				630	500	535
70	90	90						425	175	255
				50	520	185				
				80	635	200				
				120	875	390				

N/S STREET				28	E/W STREET					
GLEN OAKS BLVD					MONTAGUE STREET					
				55	1625	15				
				35	575	35				
				25	905	15				
10	40	55						10	30	30
5	5	5		TS				5	5	5
30	45	60						5	35	10
				55	690	5				
				60	610	15				
				50	1230	15				

N/S STREET				29	E/W STREET					
GLEN OAKS BLVD					BRANFORD STREET					
				175	1410	15				
				80	570	70				
				80	790	115				
130	150	220						10	85	100
15	85	110		TS				5	90	190
95	90	155						10	70	90
				95	645	10				
				90	615	70				
				115	995	105				

N/S STREET				30	E/W STREET					
GLEN OAKS BLVD					SHELDON STREET					
				160	1285	85				
				95	540	50				
				145	780	90				
125	140	325						40	50	60
440	260	355		TS				595	285	325
50	85	70						90	45	40
				80	530	45				
				80	585	50				
				120	870	70				

N/S STREET				31	E/W STREET					
GLEN OAKS BLVD					PEORIA STREET					
				90	1250	30				
				65	530	10				
				65	745	35				
65	75	90						10	15	55
5	5	10		TS				5	5	5
5	30	20						15	20	30
				15	525	25				
				25	525	15				
				25	975	25				



LEGEND

N/S STREET				S#	E/W STREET					
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM
				TS						
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 7A
EXISTING + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-4-7D

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N/S STREET				24		E/W STREET				
FOOTHILL BLVD						WB I-210 FWY RAMPS				
				505	410	0				
				215	290	0				
				230	275	0				
0	0	0						60	40	65
0	0	0		TS				0	0	0
0	0	0						325	290	430
				140	595	0				
				110	480	0				
				220	530	0				

N/S STREET				25		E/W STREET				
FOOTHILL BLVD						EB I-210 FWY RAMPS				
				0	385	200				
				0	335	75				
				0	475	55				
365	270	345						0	0	0
0	0	0		TS				0	0	0
115	55	90						0	0	0
				0	380	465				
				0	295	340				
				0	415	400				

N/S STREET				26		E/W STREET				
OSBORNE STREET						FOOTHILL BLVD				
				5	5	5				
				15	5	5				
				15	5	5				
5	20	15						5	5	5
350	265	330		TS				250	235	345
560	25	295						425	360	375
				355	10	415				
				265	5	400				
				735	5	570				

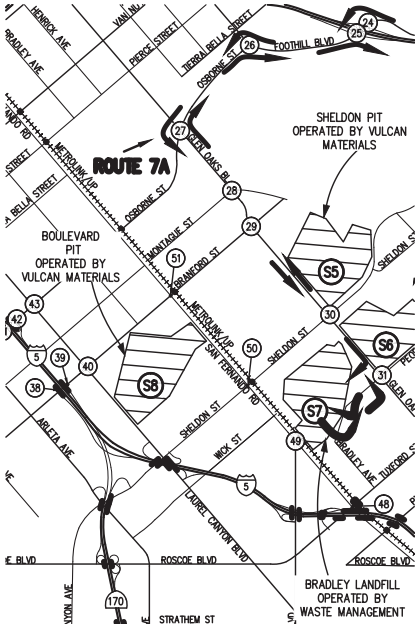
N/S STREET				27		E/W STREET				
GLEN OAKS BLVD						OSBORNE STREET				
				200	1215	65				
				140	520	80				
				205	575	135				
465	340	390						90	80	100
600	490	690		TS				695	545	535
95	105	90						490	210	255
				90	655	340				
				100	735	365				
				120	875	490				

N/S STREET				28		E/W STREET				
GLEN OAKS BLVD						MONTAGUE STREET				
				70	1785	20				
				50	765	40				
				30	1110	20				
45	65	65						10	30	30
5	5	5		TS				5	5	5
50	65	65						5	40	10
				65	890	10				
				65	815	15				
				70	1395	15				

N/S STREET				29		E/W STREET				
GLEN OAKS BLVD						BRANFORD STREET				
				195	1605	25				
				80	750	90				
				105	1000	120				
130	155	225						15	95	105
15	85	110		TS				5	90	195
115	100	170						20	85	105
				105	865	25				
				105	820	80				
				125	1160	110				

N/S STREET				30		E/W STREET				
GLEN OAKS BLVD						SHELDON STREET				
				200	1505	135				
				125	705	60				
				155	935	100				
130	150	330						50	60	65
430	370	335		TS				660	370	350
50	120	75						105	50	50
				100	670	50				
				110	755	70				
				140	1055	80				

N/S STREET				31		E/W STREET				
GLEN OAKS BLVD						PEORIA STREET				
				205	1385	55				
				180	705	20				
				180	830	65				
175	195	205						15	15	75
10	10	20		TS				10	5	5
5	60	40						20	30	65
				30	610	60				
				35	660	30				
				45	1110	50				



LEGEND

N/S STREET				S#		E/W STREET				
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM
				TS						
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 7A
PCE EXISTING + PROJECT TRIPS
DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-4-7E

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Table 4-4-7
Intersection Capacity Analysis – Existing + Project Conditions (Route 7A)
Traffic Impact Analysis - Site 7

Route 7A		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
24	Foothill Blvd and I-210 Westbound Ramps	A	8.4	0.57	A	A	5.6	0.29	A	A	8.0	0.50	A
25	Foothill Blvd and I-210 Eastbound Ramps	A	9.9	0.63	A	A	6.5	0.31	A	A	7.2	0.41	A
26	Foothill Blvd and Osborne Street	D	37.9	1.16	C	A	9.2	0.57	A	B	19.3	0.91	C
27	Glenoaks Blvd and Osborne Street	F	82.9	1.13	E	C	32.7	0.78	B	D	44.9	0.90	D
28	Glenoaks Blvd and Montague Street	A	9.1	0.72	B	B	13.0	0.38	A	A	9.5	0.58	B
29	Glenoaks Blvd and Branford Street	B	15.1	0.81	C	B	18.4	0.57	A	C	23.6	0.80	D
30	Glenoaks Blvd and Sheldon Street	B	12.4	0.79	D	A	7.4	0.48	A	B	11.9	0.78	C
31	Glenoaks Blvd and Peoria Street	A	5.2	0.61	A	A	5.2	0.39	A	A	5.9	0.55	A

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc.**

Haul Route 7A Analysis

As presented in *Table 4-4-7*, under the existing plus project conditions for Site 7 (Route 7A) most study intersections are expected to operate at an acceptable HCM LOS D or better, for the AM, Mid-day and PM peak hours. The Intersection of Glenoaks Blvd and Osborne Street will continue to operate at HCM LOS F during the AM peak period. As identified under existing conditions, mitigation of the intersection of Glenoaks Blvd and Osborne Street is recommended to improve the intersection to an acceptable level-of-service.

Haul Route 7B

The Haul Route 7B project trips, truck percentages and passenger car equivalent (PCE) project trips are illustrated in *Figure 4-4-8A* through *Figure 4-4-8C.* The existing plus project AM (7-9), MID-DAY (12-2), PM (4-6) turn movement volumes, are provided in *Figure 4-4-8D.* For comparison the (PCE) existing plus project turn movement volumes are provided in *Figure 4-4-8E.*

Haul Route 7C

The Haul Route 7C project trips, truck percentages and passenger car equivalent (PCE) project trips are illustrated in *Figure 4-4-9A* through *Figure 4-4-9C.* The existing plus project AM (7-9), MID-DAY (12-2), PM (4-6) turn movement volumes, are provided in *Figure 4-4-9D.* For comparison the (PCE) existing plus project turn movement volumes are provided in *Figure 4-4-9E.*

N/S STREET	31	E/W STREET
GLEN OAKS BLVD		PEORIA STREET

				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
50	50	50						0	0	0
				50	0	0				
				50	0	0				
				50	0	0				

N/S STREET	32	E/W STREET
GLEN OAKS BLVD		TUXFORD STREET

				0	50	0				
				0	50	0				
				0	50	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	50	0				
				0	50	0				
				0	50	0				

N/S STREET	33	E/W STREET
GLEN OAKS BLVD		PENROSE STREET

				0	50	0				
				0	50	0				
				0	50	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	50	0				
				0	50	0				
				0	50	0				

N/S STREET	34	E/W STREET
GLEN OAKS BLVD		SUNLAND BLVD

				0	50	0				
				0	50	0				
				0	50	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	50	0				
				0	50	0				
				0	50	0				

N/S STREET	35	E/W STREET
GLEN OAKS BLVD		ROSCOE BLVD

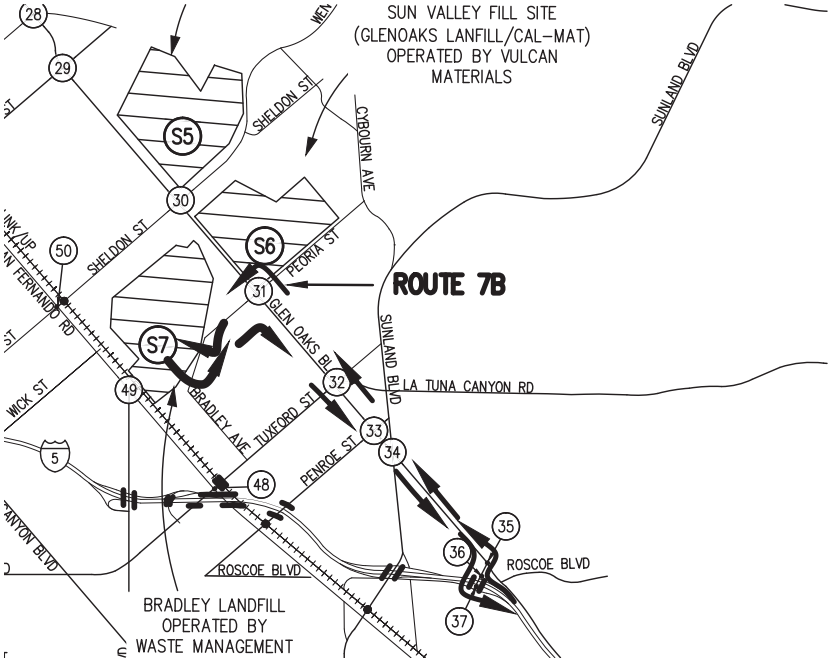
				50	0	0				
				50	0	0				
				50	0	0				
50	50	50						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET	36	E/W STREET
NB I-5 FREEWAY RAMPS		ROSCOE BLVD

				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				50	50	50
0	0	0						0	0	0
				0	0	50				
				0	0	50				
				0	0	50				

N/S STREET	37	E/W STREET
SB I-5 FREEWAY RAMPS		ROSCOE BLVD

				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						50	50	50
				0	0	0				
				0	0	0				
				0	0	0				



LEGEND

N/S STREET	S#	E/W STREET

				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM
				TS						
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

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ROUTE 7B PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE

4-4-8A

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N/S STREET				31			E/W STREET		
GLEN OAKS BLVD							PEORIA STREET		
				20%	5%	45%			
				45%	15%	40%			
				45%	5%	50%			
40%	40%	20%						20%	5%	20%
80%	60%	40%		TS				20%	20%	5%
40%	45%	45%						20%	30%	55%
				45%	10%	65%			
				15%	15%	45%			
				45%	5%	50%			

N/S STREET				32			E/W STREET		
GLEN OAKS BLVD							TUXFORD STREET		
				40%	9%	5%			
				45%	25%	10%			
				10%	12%	5%			
25%	45%	25%						10%	10%	5%
5%	5%	5%		TS				5%	5%	5%
15%	15%	10%						5%	5%	5%
				15%	20%	20%			
				15%	19%	5%			
				10%	15%	5%			

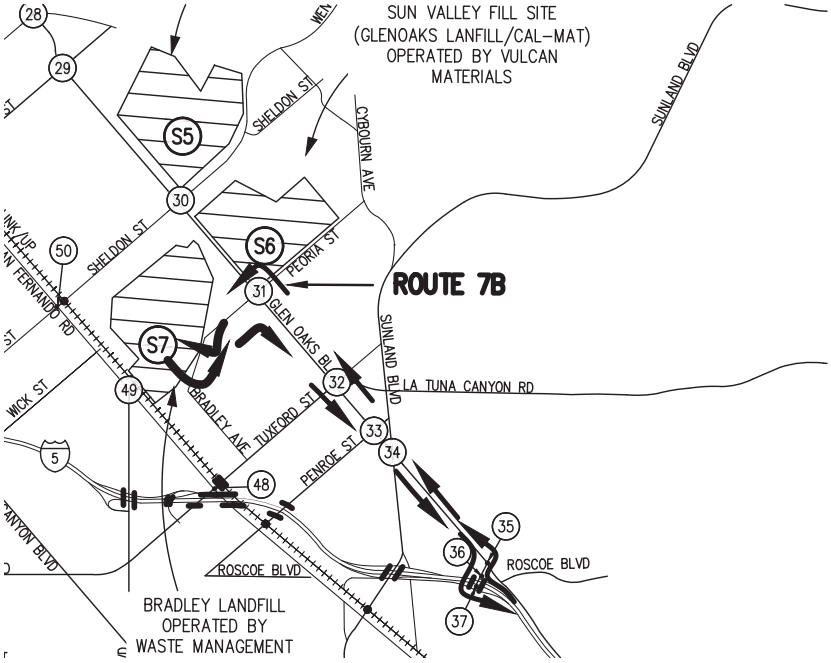
N/S STREET				33			E/W STREET		
GLEN OAKS BLVD							PENROSE STREET		
				5%	10%	15%			
				10%	19%	10%			
				5%	18%	5%			
5%	10%	5%						10%	5%	5%
5%	5%	5%		TS				5%	5%	10%
25%	5%	10%						5%	10%	5%
				5%	21%	5%			
				5%	14%	5%			
				5%	16%	5%			

N/S STREET				34			E/W STREET		
GLEN OAKS BLVD							SUNLAND BLVD		
				5%	12%	35%			
				15%	23%	5%			
				10%	13%	10%			
15%	5%	10%						5%	5%	5%
5%	5%	5%		TS				5%	5%	5%
5%	5%	5%						5%	5%	5%
				35%	23%	5%			
				10%	21%	5%			
				5%	12%	5%			

N/S STREET				35			E/W STREET		
GLEN OAKS BLVD							ROSCOE BLVD		
				15%	5%	0%			
				18%	10%	0%			
				15%	5%	0%			
26%	21%	13%						0%	0%	0%
0%	0%	0%		TS				0%	0%	0%
10%	20%	10%						0%	0%	0%
				10%	5%	0%			
				10%	5%	0%			
				10%	5%	0%			

N/S STREET				36			E/W STREET		
NB I-5 FREEWAY RAMPS							ROSCOE BLVD		
				0%	0%	0%			
				0%	0%	0%			
				0%	0%	0%			
0%	0%	0%						0%	0%	0%
10%	10%	15%		TS				14%	16%	14%
0%	0%	0%						0%	0%	0%
				15%	0%	23%			
				20%	0%	22%			
				20%	0%	13%			

N/S STREET				37			E/W STREET		
SB I-5 FREEWAY RAMPS							ROSCOE BLVD		
				0%	5%	5%			
				0%	5%	5%			
				0%	5%	5%			
0%	0%	0%						15%	5%	5%
0%	0%	0%		TS				0%	0%	0%
0%	0%	0%						13%	18%	16%
				0%	0%	0%			
				0%	0%	0%			
				0%	0%	0%			



LEGEND

N/S STREET				S#			E/W STREET		
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					

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ROUTE 7B
TRUCK PERCENTAGES

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-4-8B

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N/S STREET	31	E/W STREET
GLEN OAKS BLVD		PEORIA STREET

				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
150	150	150						0	0	0
				150	0	0				
				150	0	0				
				150	0	0				

N/S STREET	22	E/W STREET
FIGUEROA ST		EAGLE VISTA DRIVE

				0	150	0				
				0	150	0				
				0	150	0				
0	0	0						0	0	0
0	0	0						0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET	33	E/W STREET
GLEN OAKS BLVD		PENROSE STREET

				0	150	0				
				0	150	0				
				0	150	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	150	0				
				0	150	0				
				0	150	0				

N/S STREET	34	E/W STREET
GLEN OAKS BLVD		SUNLAND BLVD

				0	150	0				
				0	150	0				
				0	150	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	150	0				
				0	150	0				
				0	150	0				

N/S STREET	35	E/W STREET
GLEN OAKS BLVD		ROSCOE BLVD

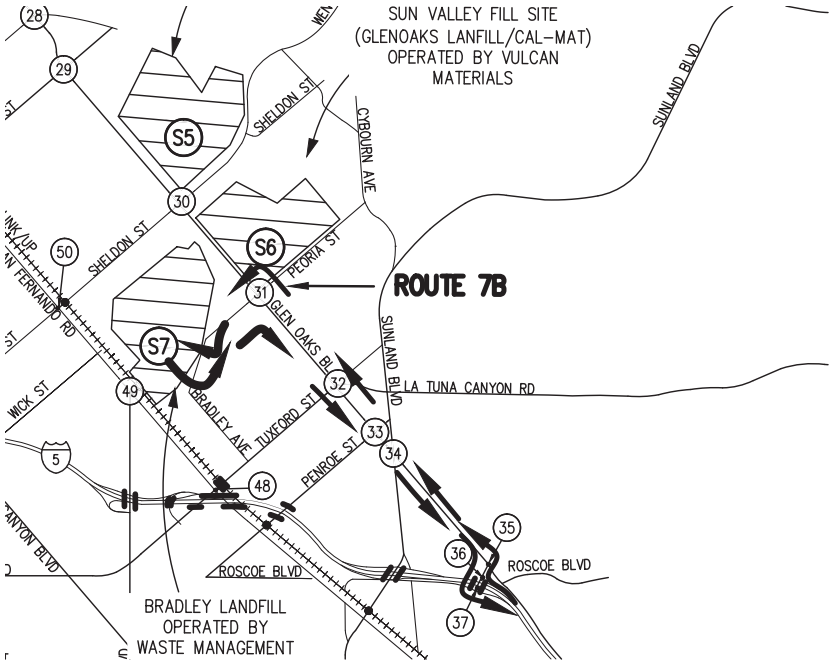
				150	0	0				
				150	0	0				
				150	0	0				
150	150	150						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET	36	E/W STREET
NB I-5 FREEWAY RAMPS		ROSCOE BLVD

				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				150	150	150
0	0	0						0	0	0
				0	0	150				
				0	0	150				
				0	0	150				

N/S STREET	27	E/W STREET
GLEN OAKS BLVD		OSBORNE STREET

				0	0	0				
				0	0	0				
				0	0	0				
150	150	150						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	150				
				0	0	150				
				0	0	150				



LEGEND

N/S STREET	S#	E/W STREET

				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM					7AM - 9AM	2PM - 4PM	4PM - 6PM	
				TS						
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

(S#) – DISPOSAL SITE

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ROUTE 7B
PCE PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-4-8C

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N/S STREET				31			E/W STREET			
GLEN OAKS BLVD							PEORIA STREET			
				40	1250	30				
				15	530	10				
				15	745	35				
15	25	40						10	15	55
5	5	10		TS				5	5	5
55	80	70						15	20	30
				65	525	25				
				75	525	15				
				75	975	25				

N/S STREET				32			E/W STREET			
GLEN OAKS BLVD							TUXFORD STREET			
				125	1065	90				
				100	405	90				
				90	640	130				
115	110	140						75	45	80
470	390	505		TS				565	425	345
45	60	95						30	25	60
				95	445	20				
				110	485	30				
				120	850	60				

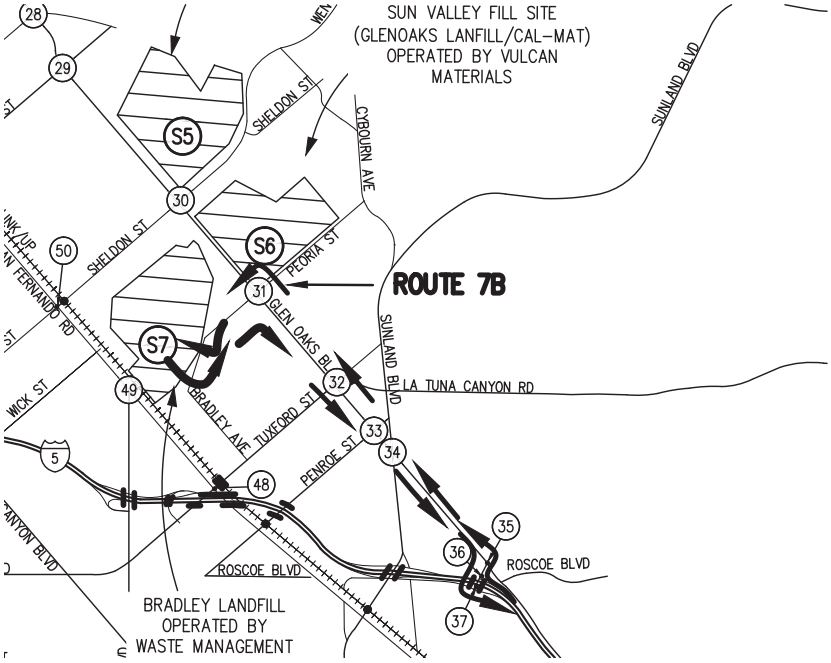
N/S STREET				33			E/W STREET			
GLEN OAKS BLVD							PENROSE STREET			
				95	970	35				
				35	490	25				
				110	570	45				
120	90	185						35	35	75
125	130	200		TS				70	85	140
20	50	55						5	20	45
				25	415	5				
				45	515	25				
				75	750	40				

N/S STREET				34			E/W STREET			
GLEN OAKS BLVD							SUNLAND BLVD			
				205	690	10				
				170	355	35				
				50	560	50				
70	165	165						20	15	5
670	430	650		TS				750	355	395
30	20	55						205	320	360
				10	360	80				
				25	400	245				
				20	690	385				

N/S STREET				35			E/W STREET			
GLEN OAKS BLVD							ROSCOE BLVD			
				470	520	0				
				355	355	0				
				470	530	0				
225	290	595						0	0	0
0	0	0		TS				0	0	0
75	90	120						0	0	0
				70	275	0				
				75	370	0				
				65	540	0				

N/S STREET				36			E/W STREET			
NB I-5 FREEWAY RAMPS							ROSCOE BLVD			
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
90	120	110		TS				540	425	540
0	0	0						0	0	0
				70	0	265				
				60	0	285				
				65	0	615				

N/S STREET				37			E/W STREET			
SB I-5 FREEWAY RAMPS							ROSCOE BLVD			
				0	35	90				
				0	40	120				
				0	30	110				
0	0	0						25	45	100
0	0	0		TS				0	0	0
0	0	0						615	380	425
				0	0	0				
				0	0	0				
				0	0	0				



LEGEND

N/S STREET				S#			E/W STREET			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

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ROUTE 7B
EXISTING + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-4-8D

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N/S STREET				31		E/W STREET			
GLEN OAKS BLVD						PEORIA STREET			
				55	1385	55			
				30	705	20			
				30	830	65			
25	45	55						15	15	75
10	10	20		TS				10	5	5
155	210	190						20	30	65
				180	610	60			
				185	660	30			
				195	1110	50			

N/S STREET				32		E/W STREET			
GLEN OAKS BLVD						TUXFORD STREET			
				220	1270	100			
				195	605	105			
				105	795	145			
175	200	210						90	55	90
510	445	540		TS				615	450	375
55	80	120						30	30	60
				120	620	30			
				140	680	30			
				145	1095	65			

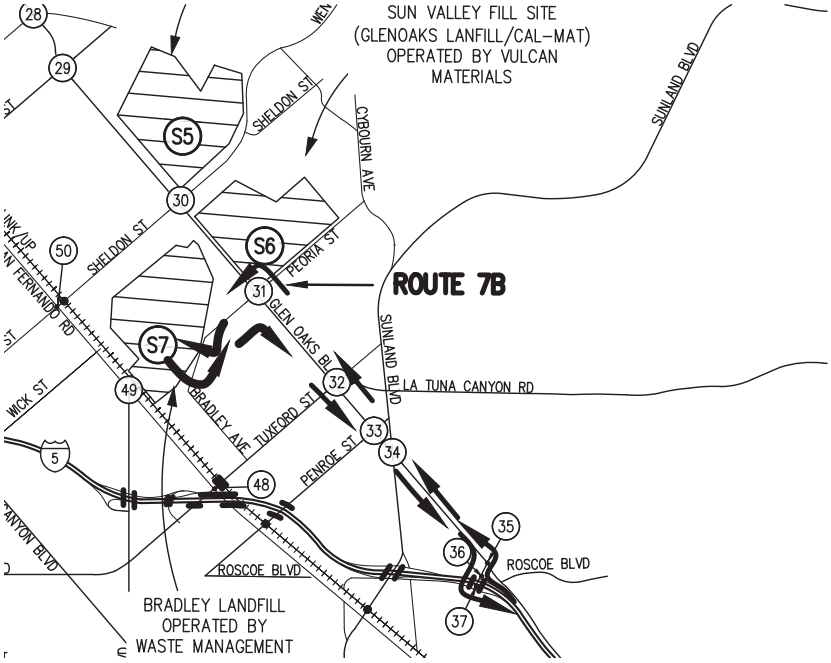
N/S STREET				33		E/W STREET			
GLEN OAKS BLVD						PENROSE STREET			
				100	1160	45			
				40	660	30			
				115	795	45			
135	110	210						45	40	85
130	135	215		TS				75	90	160
30	55	65						5	25	50
				25	585	5			
				45	675	25			
				75	960	40			

N/S STREET				34		E/W STREET			
GLEN OAKS BLVD						SUNLAND BLVD			
				235	855	20			
				230	520	40			
				60	695	60			
85	190	200						25	15	5
720	470	670		TS				790	400	405
30	20	55						220	340	370
				20	510	85			
				25	555	260			
				20	865	415			

N/S STREET				35		E/W STREET			
GLEN OAKS BLVD						ROSCOE BLVD			
				585	560	0			
				490	415	0			
				585	575	0			
340	400	705						0	0	0
0	0	0		TS				0	0	0
90	125	145						0	0	0
				85	305	0			
				95	410	0			
				80	580	0			

N/S STREET				36		E/W STREET			
NB I-5 FREEWAY RAMPS						ROSCOE BLVD			
				0	0	0			
				0	0	0			
				0	0	0			
0	0	0						0	0	0
100	140	135		TS				660	550	655
0	0	0						0	0	0
				90	0	380			
				85	0	395			
				90	0	725			

N/S STREET				37		E/W STREET			
SB I-5 FREEWAY RAMPS						ROSCOE BLVD			
				0	40	100			
				0	40	120			
				0	30	110			
0	0	0						35	50	100
0	0	0		TS				0	0	0
0	0	0						735	505	550
				0	0	0			
				0	0	0			
				0	0	0			



LEGEND

N/S STREET				S#		E/W STREET			
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 7B
PCE EXISTING + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-4-8E

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N/S STREET	44	E/W STREET
WHEATLAND AVE		EB I-210 FWY RAMPS

			0	0	50					
			0	0	50					
			0	0	50					
0	0	0					0	0	0	
0	0	0		TS			0	0	0	
0	0	0					0	0	0	
			0	0	0					
			0	0	0					
			0	0	0					

N/S STREET	45	E/W STREET
WHEATLAND AVE		WB I-210 FWY RAMPS

			0	50	0					
			0	50	0					
			0	50	0					
0	0	0					50	50	50	
0	0	0		TS			0	0	0	
0	0	0					0	0	0	
			0	0	0					
			0	0	0					
			0	0	0					

N/S STREET	46	E/W STREET
WHEATLAND AVE		FOOTHILL BLVD

			0	0	0					
			0	0	0					
			0	0	0					
0	0	0					0	0	0	
0	0	0		TS			0	0	0	
0	0	0					50	50	50	
			0	0	50					
			0	0	50					
			0	0	50					

N/S STREET	47	E/W STREET
WENTWORTH STREET		FOOTHILL BLVD

			0	0	0					
			0	0	0					
			0	0	0					
0	0	0					0	0	0	
0	0	0		TS			0	0	0	
50	50	50					0	0	0	
			50	0	0					
			50	0	0					
			50	0	0					

N/S STREET	30	E/W STREET
GLEN OAKS BLVD		SHELDON STREET

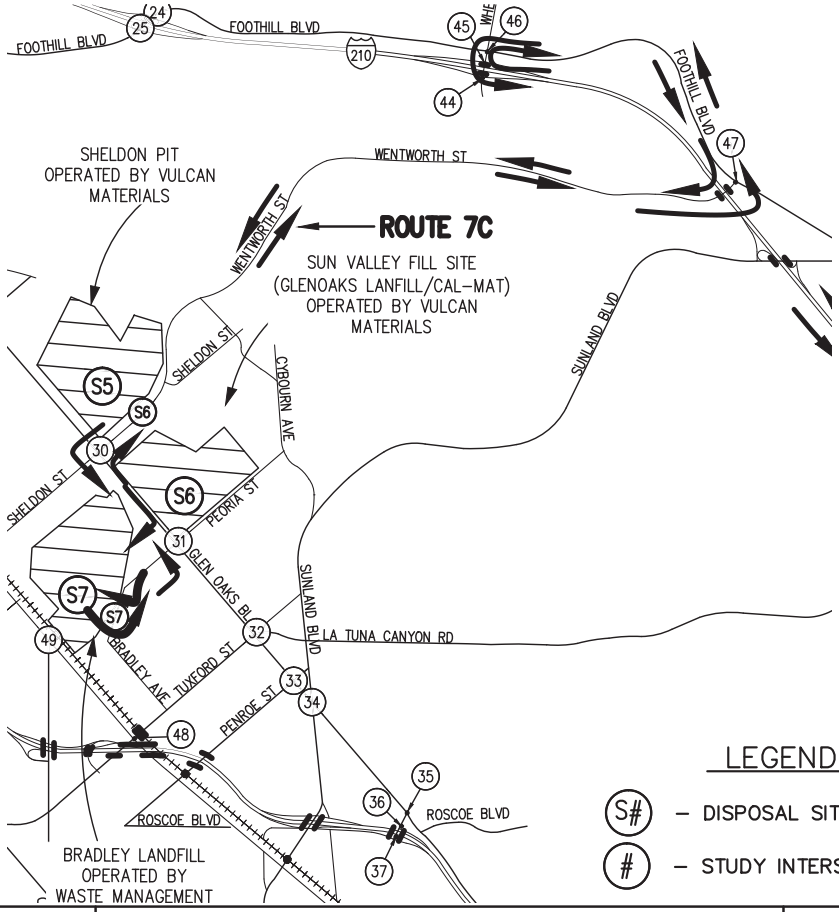
			0	0	0					
			0	0	0					
			0	0	0					
0	0	0					0	0	0	
0	0	0		TS			0	0	0	
0	0	0					50	50	50	
			0	0	50					
			0	0	50					
			0	0	50					

N/S STREET	31	E/W STREET
GLEN OAKS BLVD		PEORIA STREET

			50	0	0					
			50	0	0					
			50	0	0					
50	50	50					0	0	0	
0	0	0		TS			0	0	0	
0	0	0					0	0	0	
			0	0	0					
			0	0	0					
			0	0	0					

N

NOT TO SCALE



LEGEND

N/S STREET	S#	E/W STREET

			7AM-9AM							
			2PM-4PM							
			4PM-6PM							
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS			7AM - 9AM	2PM - 4PM	4PM - 6PM	
			7AM-9AM							
			2PM-4PM							
			4PM-6PM							

LEGEND

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ROUTE 7C PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-4-9A

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N/S STREET				44			E/W STREET			
WHEATLAND AVE							EB I-210 FWY RAMPS			
				0%	0%	33%				
				0%	0%	45%				
				0%	0%	40%				
5%	5%	5%						0%	0%	0%
15%	15%	100%		TS				0%	0%	0%
0%	0%	0%						0%	0%	0%
				0%	0%	0%				
				0%	0%	0%				
				0%	0%	0%				

N/S STREET				45			E/W STREET			
WHEATLAND AVE							WB I-210 FWY RAMPS			
				5%	35%	0%				
				5%	48%	0%				
				5%	38%	0%				
0%	0%	0%						37%	56%	29%
0%	0%	0%		TS				0%	0%	0%
0%	0%	0%						50%	5%	5%
				20%	5%	0%				
				5%	10%	0%				
				20%	5%	0%				

N/S STREET				46			E/W STREET			
WHEATLAND AVE							FOOTHILL BLVD			
				5%	5%	20%				
				5%	5%	5%				
				5%	5%	5%				
30%	5%	5%						5%	5%	5%
5%	5%	5%		TS				5%	5%	5%
5%	5%	5%						42%	49%	34%
				5%	5%	35%				
				5%	5%	58%				
				5%	5%	33%				

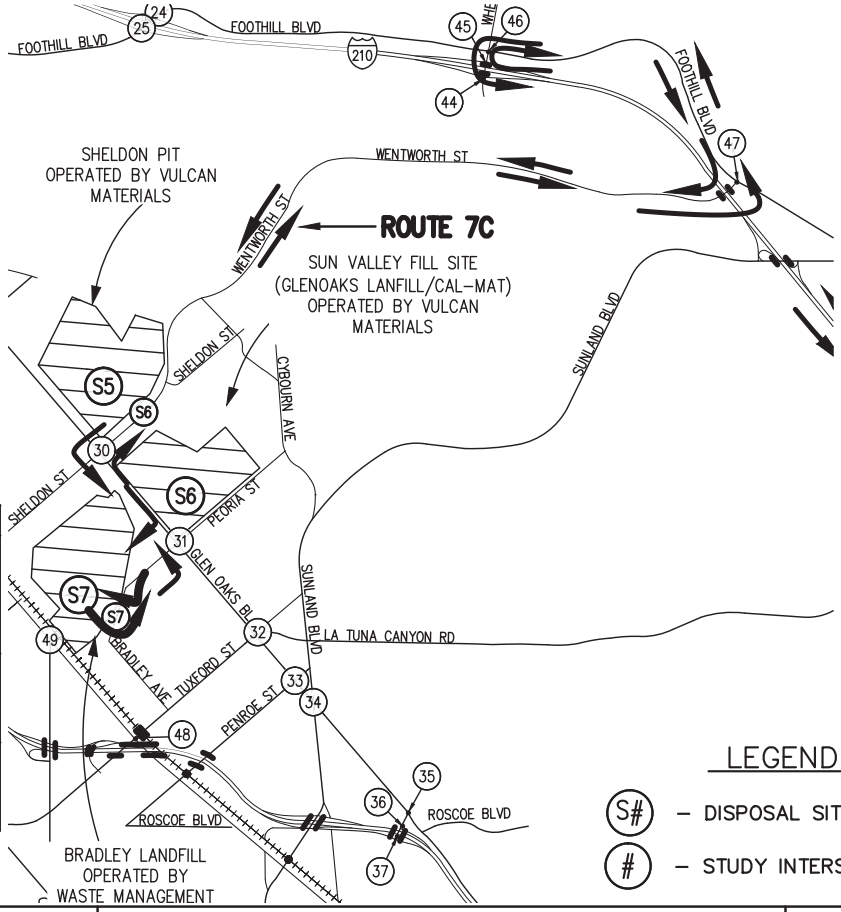
N/S STREET				47			E/W STREET			
WENTWORTH STREET							FOOTHILL BLVD			
				0%	0%	0%				
				0%	0%	0%				
				0%	0%	0%				
0%	0%	0%						0%	0%	0%
5%	5%	5%		TS				5%	5%	5%
34%	55%	43%						5%	5%	5%
				53%	0%	5%				
				53%	0%	5%				
				35%	0%	5%				

N/S STREET				30			E/W STREET			
GLEN OAKS BLVD							SHELDON STREET			
				10%	5%	30%				
				15%	5%	5%				
				5%	5%	5%				
5%	5%	5%						5%	10%	5%
5%	25%	5%		TS				5%	15%	5%
5%	25%	5%						5%	10%	20%
				10%	5%	10%				
				20%	5%	25%				
				10%	5%	10%				

N/S STREET				31			E/W STREET			
GLEN OAKS BLVD							PEORIA STREET			
				20%	5%	45%				
				45%	15%	40%				
				45%	5%	50%				
40%	40%	20%						20%	5%	20%
80%	60%	40%		TS				20%	20%	5%
40%	45%	45%						20%	30%	55%
				45%	10%	65%				
				15%	15%	45%				
				45%	5%	50%				

N

NOT TO SCALE



LEGEND

N/S STREET				S#			E/W STREET			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

S# – DISPOSAL SITE

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ROUTE 7C TRUCK PERCENTAGES

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-4-9B

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N/S STREET	44	E/W STREET
WHEATLAND AVE		EB I-210 FWY RAMPS

			0	0	150					
			0	0	150					
			0	0	150					
0	0	0					0	0	0	
0	0	0		TS			0	0	0	
0	0	0					0	0	0	
			0	0	0					
			0	0	0					
			0	0	0					

N/S STREET	45	E/W STREET
WHEATLAND AVE		WB I-210 FWY RAMPS

			0	150	0					
			0	150	0					
			0	150	0					
0	0	0					150	150	150	
0	0	0		TS			0	0	0	
0	0	0					0	0	0	
			0	0	0					
			0	0	0					
			0	0	0					

N/S STREET	46	E/W STREET
WHEATLAND AVE		FOOTHILL BLVD

			0	0	0					
			0	0	0					
			0	0	0					
0	0	0					0	0	0	
0	0	0		TS			0	0	0	
0	0	0					150	150	150	
			0	0	150					
			0	0	150					
			0	0	150					

N/S STREET	47	E/W STREET
WENTWORTH STREET		FOOTHILL BLVD

			0	0	0					
			0	0	0					
			0	0	0					
0	0	0					0	0	0	
0	0	0		TS			0	0	0	
150	150	150					0	0	0	
			150	0	0					
			150	0	0					
			150	0	0					

N/S STREET	30	E/W STREET
GLEN OAKS BLVD		SHELDON STREET

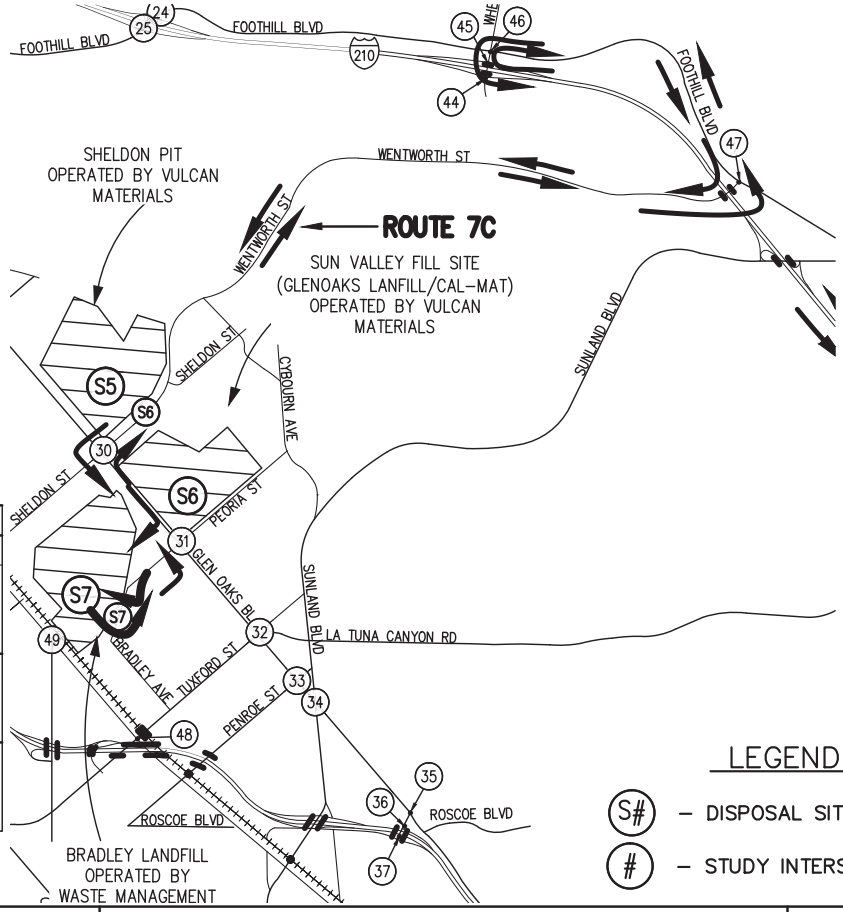
			0	0	0					
			0	0	0					
			0	0	0					
0	0	0					0	0	0	
0	0	0		TS			0	0	0	
0	0	0					150	150	150	
			0	0	150					
			0	0	150					
			0	0	150					

N/S STREET	31	E/W STREET
GLEN OAKS BLVD		PEORIA STREET

			150	0	0					
			150	0	0					
			150	0	0					
150	150	150					0	0	0	
0	0	0		TS			0	0	0	
0	0	0					0	0	0	
			0	0	0					
			0	0	0					
			0	0	0					

N

NOT TO SCALE



LEGEND

N/S STREET	S#	E/W STREET

			7AM-9AM							
			2PM-4PM							
			4PM-6PM							
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS			7AM - 9AM	2PM - 4PM	4PM - 6PM	
			7AM-9AM							
			2PM-4PM							
			4PM-6PM							

LEGEND

(S#) – DISPOSAL SITE

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ROUTE 7C
PCE PROJECT TRIPS
DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-4-9C

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 4\FIG 4-4-9C.dwg
Last Opened: Oct 04, 2013 – 11:58am by: TMunoz

N/S STREET				44			E/W STREET			
WHEATLAND AVE							EB I-210 FWY RAMPS			
				0	0	170				
				0	0	110				
				0	0	135				
105	75	100						0	0	0
5	5	5		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET				45			E/W STREET			
WHEATLAND AVE							WB I-210 FWY RAMPS			
				65	160	0				
				55	110	0				
				105	130	0				
0	0	0						150	90	170
0	0	0		TS				5	5	5
0	0	0						5	5	5
				5	100	0				
				5	55	0				
				5	95	0				

N/S STREET				46			E/W STREET			
WHEATLAND AVE							FOOTHILL BLVD			
				5	15	15				
				15	20	5				
				5	20	10				
5	10	5						5	20	15
195	135	170		TS				220	130	215
90	35	80						130	115	145
				70	10	160				
				40	25	100				
				90	25	150				

N/S STREET				47			E/W STREET			
WENTWORTH STREET							FOOTHILL BLVD			
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
200	165	200		TS				175	155	295
165	95	125						440	215	215
				100	0	225				
				100	0	185				
				160	0	420				

N/S STREET				30			E/W STREET			
GLEN OAKS BLVD							SHELDON STREET			
				160	1235	85				
				95	490	50				
				145	730	90				
115	130	300						40	50	60
405	240	325		TS				595	285	325
45	80	65						140	95	90
				80	480	95				
				80	535	100				
				120	820	120				

N/S STREET				31			E/W STREET			
GLEN OAKS BLVD							PEORIA STREET			
				90	1250	30				
				65	530	10				
				65	745	35				
65	75	90						10	15	55
5	5	10		TS				5	5	5
5	30	20						15	20	30
				15	525	25				
				25	525	15				
				25	975	25				

N

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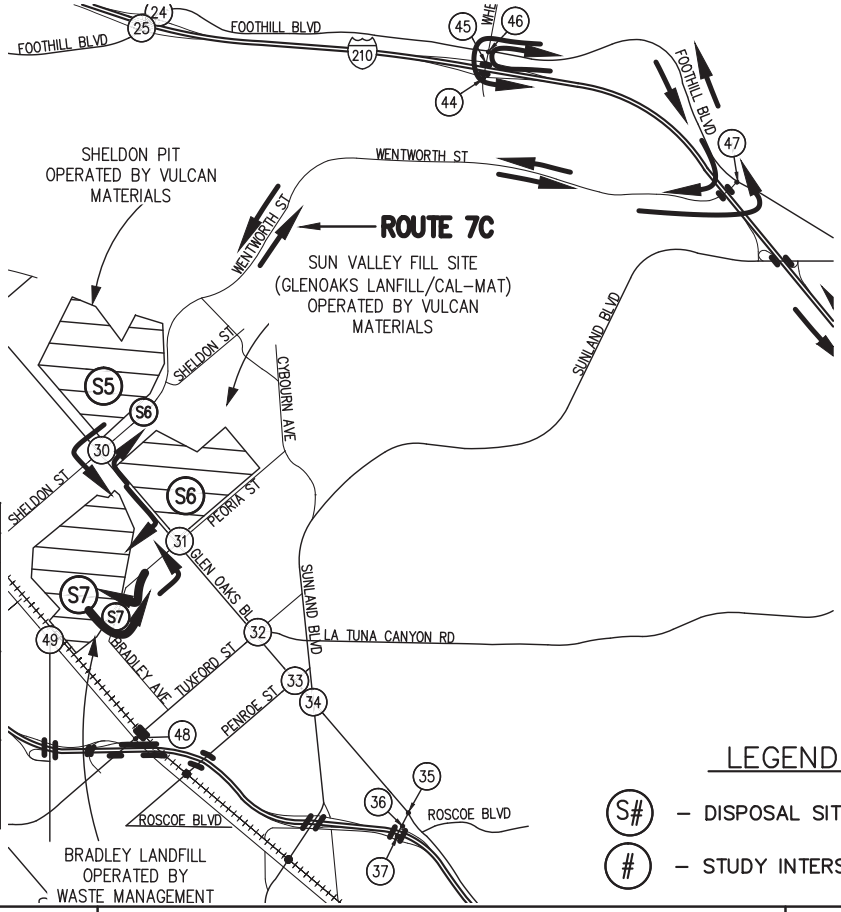

LEGEND

N/S STREET				S#			E/W STREET			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

S# – DISPOSAL SITE

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ROUTE 7C
EXISTING + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-4-9D

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 4\FIG 4-4-9D.dwg
Last Opened: Oct 04, 2013 - 11:58am by: TMunoz

N/S STREET				44			E/W STREET			
WHEATLAND AVE							EB I-210 FWY RAMPS			
				0	0	275				
				0	0	210				
				0	0	240				
115	85	100						0	0	0
10	10	5		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET				45			E/W STREET			
WHEATLAND AVE							WB I-210 FWY RAMPS			
				75	265	0				
				60	215	0				
				105	230	0				
0	0	0						260	190	270
0	0	0		TS				5	5	5
0	0	0						5	5	5
				5	105	0				
				5	65	0				
				5	100	0				

N/S STREET				46			E/W STREET			
WHEATLAND AVE							FOOTHILL BLVD			
				10	20	25				
				20	25	10				
				10	25	15				
15	15	10						10	25	20
235	165	190		TS				265	160	250
100	45	85						260	250	265
				85	15	290				
				45	30	230				
				100	30	275				

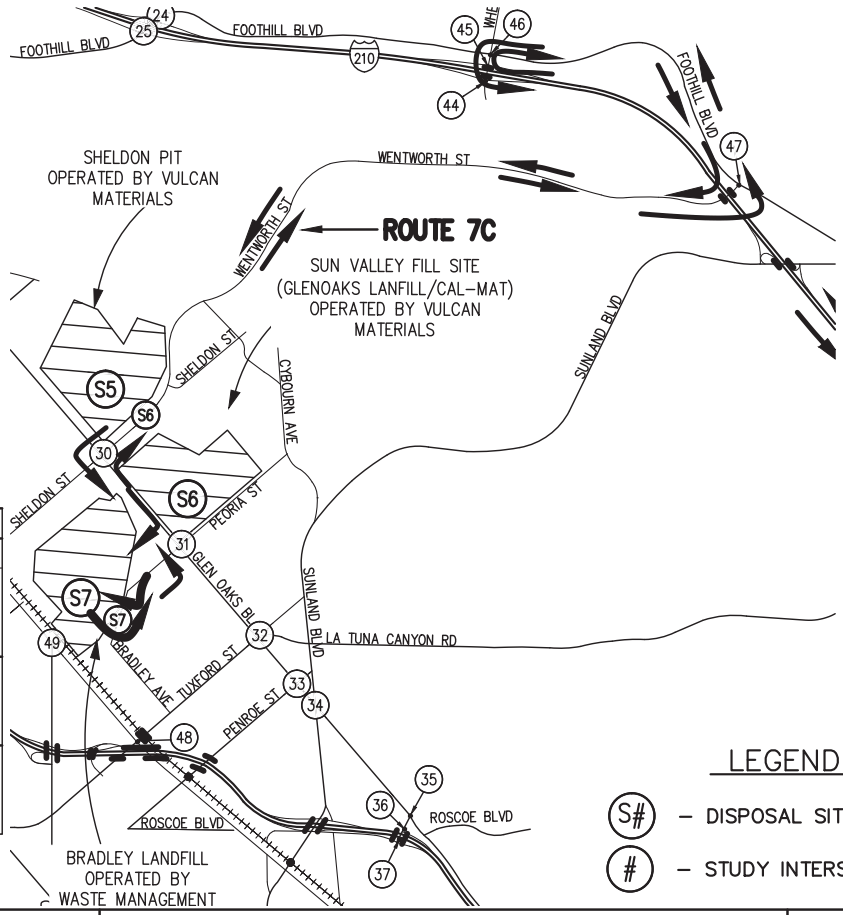
N/S STREET				47			E/W STREET			
WENTWORTH STREET							FOOTHILL BLVD			
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
225	190	220		TS				200	180	325
295	220	250						490	245	260
				225	0	260				
				225	0	205				
				290	0	465				

N/S STREET				30			E/W STREET			
GLEN OAKS BLVD							SHELDON STREET			
				200	1355	135				
				125	555	60				
				155	785	100				
130	150	330						50	60	65
430	370	335		TS				660	370	350
50	120	75						255	200	200
				100	520	200				
				110	605	220				
				140	905	230				

N/S STREET				31			E/W STREET			
GLEN OAKS BLVD							PEORIA STREET			
				205	1385	55				
				180	705	20				
				180	830	65				
175	195	205						15	15	75
10	10	20		TS				10	5	5
5	60	40						20	30	65
				30	610	60				
				35	660	30				
				45	1110	50				

N

NOT TO SCALE



LEGEND

N/S STREET				S#			E/W STREET			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

S# – DISPOSAL SITE

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ROUTE 7C

PCE EXISTING + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-4-9E

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 4\FIG 4-4-9E.dwg
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Table 4-4-8
Intersection Capacity Analysis – Existing + Project Conditions (Route 7B)
Traffic Impact Analysis - Site 7

Route 7B		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
31	Glenoaks Blvd and Peoria Street	A	4.1	0.51	A	A	4.4	0.31	A	A	4.9	0.48	A
32	Glenoaks Blvd and Tuxford Street	B	12.9	0.81	D	A	7.5	0.46	A	A	9.1	0.57	C
33	Glenoaks Blvd and Penrose Street	A	6.4	0.55	A	A	5.9	0.36	A	A	9.5	0.67	B
34	Glenoaks Blvd and Sunland Blvd	C	20.5	0.83	B	B	15.4	0.63	B	C	24.6	0.86	D
35	Glenoaks Blvd and Roscoe Blvd	A	6.8	0.42	A	A	7.1	0.42	A	B	10.3	0.61	A
36	Roscoe Blvd and I-5 Freeway Northbound Ramps	B	11.8	-	-	B	11.7	-	-	C	22.0	-	-
37	Roscoe Blvd and I-5 Freeway Southbound Ramps	A	0.0	-	-	A	0.0	-	-	A	0.0	-	-

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc.**

Table 4-4-9
Intersection Capacity Analysis – Existing + Project Conditions (Route 7C)
Traffic Impact Analysis - Site 7

Route 7C		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
30	Glenoaks Blvd and Sheldon Street	B	11.7	0.78	D	A	7.3	0.45	A	B	11.1	0.75	D
31	Glenoaks Blvd and Peoria Street	A	5.2	0.61	A	A	5.2	0.39	A	A	5.9	0.55	A
44	Wheatland Ave and I-210 Freeway Eastbound Ramps	A	0	-	-	A	0	-	-	A	0	-	-
45	Wheatland Ave and I-210 Freeway Westbound Ramps	B	10.7	-	-	A	9	-	-	A	9.1	-	-
46	Wheatland Ave and Foothill Blvd	B	10.6	0.42	A	B	10.3	0.36	A	B	10.5	0.43	A
47	Wentworth Street and Foothill Blvd	B	19.4	0.78	A	B	12.4	0.4	A	A	9.2	0.43	A

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc.**

Haul Routes 7B & 7C Analysis

As presented in *Tables 4-4-8 and 4-4-9*, under the existing plus project conditions for Site 7 (Routes 7B & 7C) all intersections are expected to continue to operate at an acceptable HCM LOS C or better, for the AM, Mid-day and PM peak hours.

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Haul Route 8A

The Haul Route 8A project trips, truck percentages and passenger car equivalent (PCE) project trips are illustrated in *Figure 4-4-10A* through *Figure 4-4-10C.* The existing plus project AM (7-9), MID-DAY (12-2), PM (4-6) turn movement volumes, are provided in *Figure 4-4-10D.* For comparison the (PCE) existing plus project turn movement volumes are provided in *Figure 4-4-10E.*

Haul Route 8B

The Haul Route 8B project trips, truck percentages and passenger car equivalent (PCE) project trips are illustrated in *Figure 4-4-11A* through *Figure 4-4-11C.* The existing plus project AM (7-9), MID-DAY (12-2), PM (4-6) turn movement volumes, are provided in *Figure 4-4-11D.* For comparison the (PCE) existing plus project turn movement volumes are provided in *Figure 4-4-11E.*

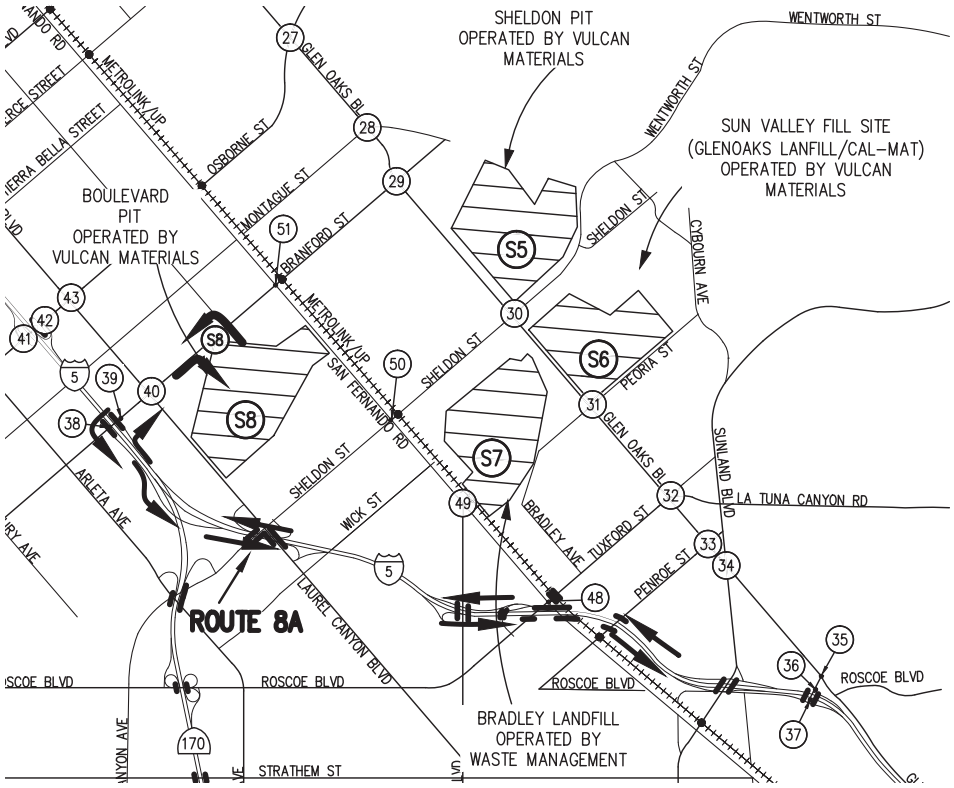
N/S STREET				38			E/W STREET			
SB I-5 FREEWAY RAMPS							BRANFORD STREET			
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET				39			E/W STREET			
NB I-5 FREEWAY RAMPS							BRANFORD STREET			
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET				40			E/W STREET			
LAUREL CANYON BLVD							BRANFORD STREET			
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
50	50	50		TS				50	50	50
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N

NOT TO SCALE



LEGEND

N/S STREET				S#			E/W STREET			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS			7AM - 9AM	2PM - 4PM	4PM - 6PM	
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 8A PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-4-10A

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 4\FIG 4-4-10A.dwg
Last Opened: Oct 04, 2013 - 12:01pm by: TMunoz

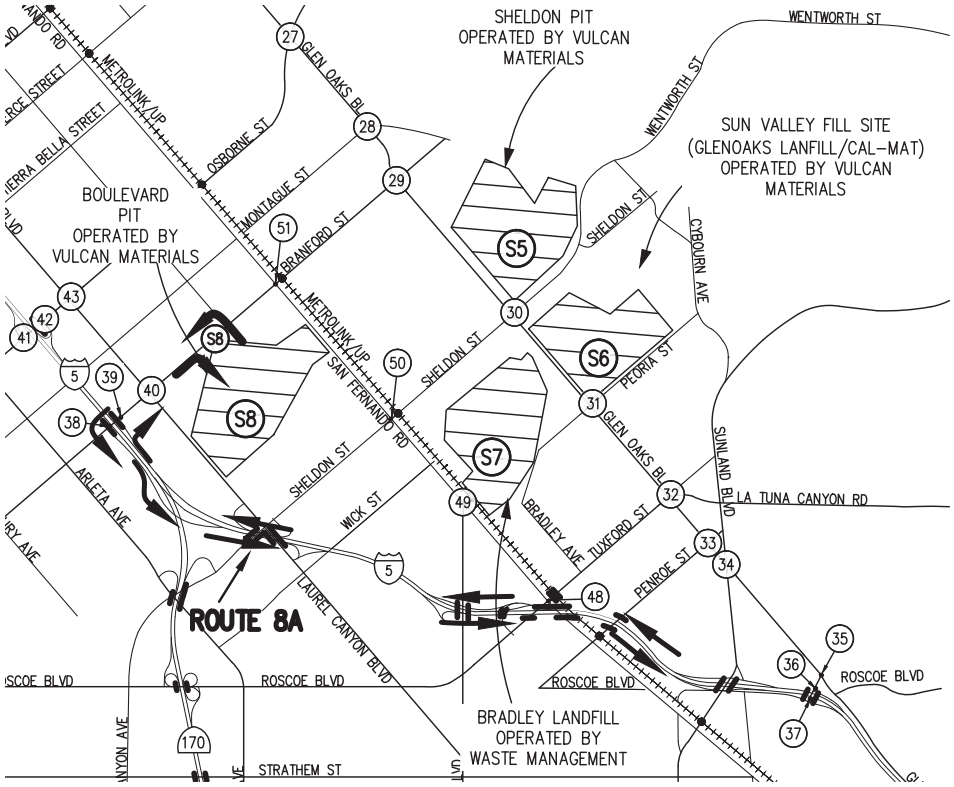
N/S STREET				38	E/W STREET			
SB I-5 FREEWAY RAMPS					BRANFORD STREET			
				0 0 0				
				0 0 0				
				0 0 0				
0	0	0					0	0	0
0	0	0		TS			0	0	0
0	0	0					0	0	0
				0 0 0				
				0 0 0				
				0 0 0				

N/S STREET				39	E/W STREET			
NB I-5 FREEWAY RAMPS					BRANFORD STREET			
				0 0 0				
				0 0 0				
				0 0 0				
0	0	0					0	0	0
0	0	0		TS			0	0	0
0	0	0					0	0	0
				0 0 0				
				0 0 0				
				0 0 0				

N/S STREET				40	E/W STREET			
LAUREL CANYON BLVD					BRANFORD STREET			
				5% 5% 5%				
				5% 5% 5%				
				5% 5% 5%				
5%	5%	5%					5%	5%	5%
37%	34%	20%		TS			28%	35%	21%
10%	5%	5%					5%	5%	5%
				5% 5% 5%				
				5% 5% 5%				
				5% 5% 5%				

N

NOT TO SCALE



LEGEND

N/S STREET				S#	E/W STREET			
				7AM-9AM				
				2PM-4PM				
				4PM-6PM				
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS		7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM				
				2PM-4PM				
				4PM-6PM				

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 8A
TRUCK PERCENTAGES
DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-4-10B

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 4\FIG 4-4-10B.dwg
Last Opened: Oct 04, 2013 - 12:01pm by: TMunoz

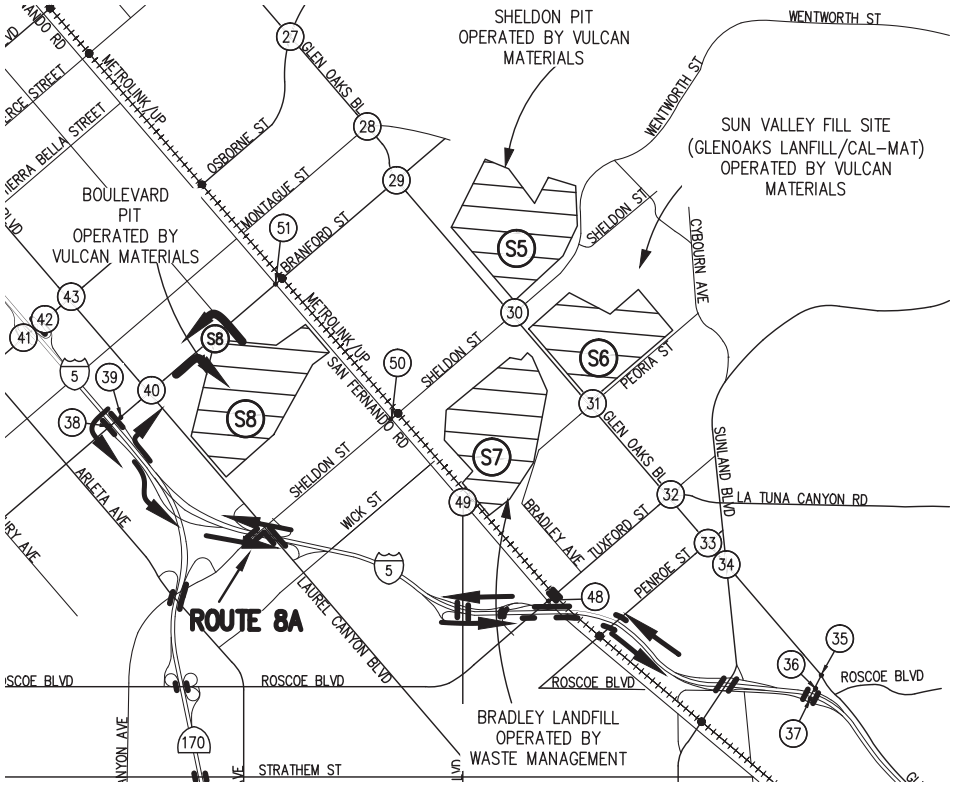
N/S STREET				38			E/W STREET			
SB I-5 FREEWAY RAMPS							BRANFORD STREET			
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET				39			E/W STREET			
NB I-5 FREEWAY RAMPS							BRANFORD STREET			
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET				40			E/W STREET			
LAUREL CANYON BLVD							BRANFORD STREET			
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
150	150	150		TS				150	150	150
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N

NOT TO SCALE



LEGEND

N/S STREET				S#			E/W STREET			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

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ROUTE 8A
PCE PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-4-10C

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 4\FIG 4-4-10C.dwg
Last Opened: Oct 04, 2013 - 12:01pm by: TMunoz

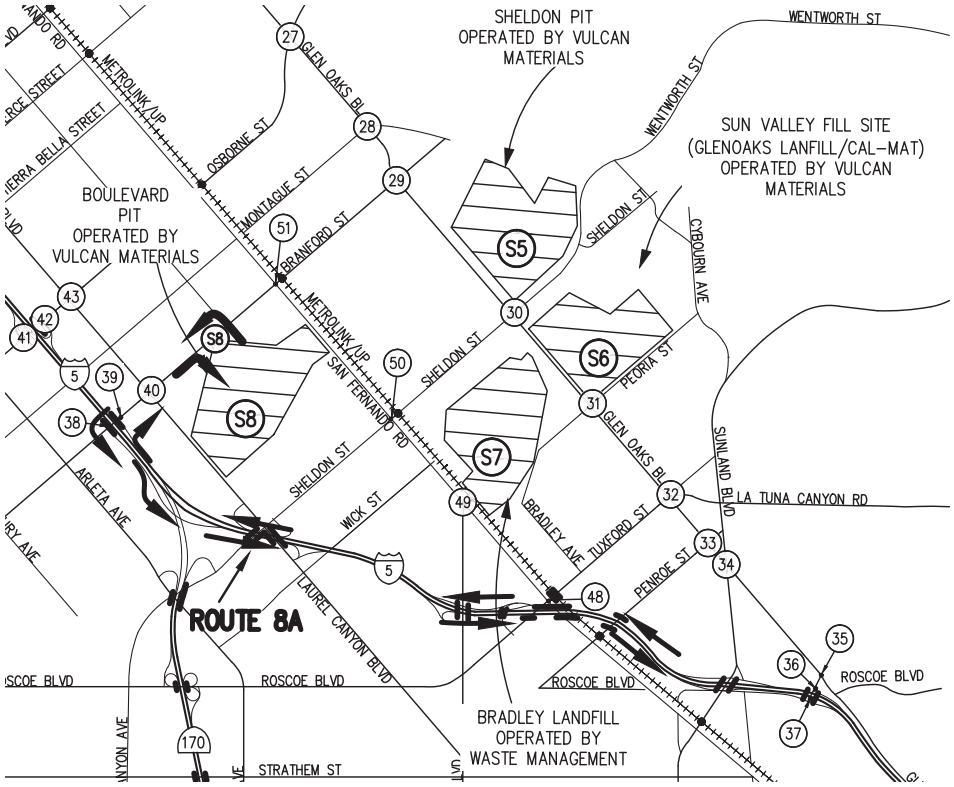
N/S STREET				38			E/W STREET			
SB I-5 FREEWAY RAMPS							BRANFORD STREET			
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET				39			E/W STREET			
NB I-5 FREEWAY RAMPS							BRANFORD STREET			
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET				40			E/W STREET			
LAUREL CANYON BLVD							BRANFORD STREET			
				150	365	130				
				95	585	65				
				135	445	60				
150	115	190						110	85	125
195	220	430		TS				255	210	415
65	210	185						85	90	100
				90	585	140				
				85	460	85				
				115	1120	120				

N

NOT TO SCALE



LEGEND

N/S STREET				S#			E/W STREET			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

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ROUTE 8A
EXISTING + PROJECT TRIPS
DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-4-10D

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 4\FIG 4-4-10D.dwg
Last Opened: Oct 04, 2013 - 12:01pm by: TMunoz

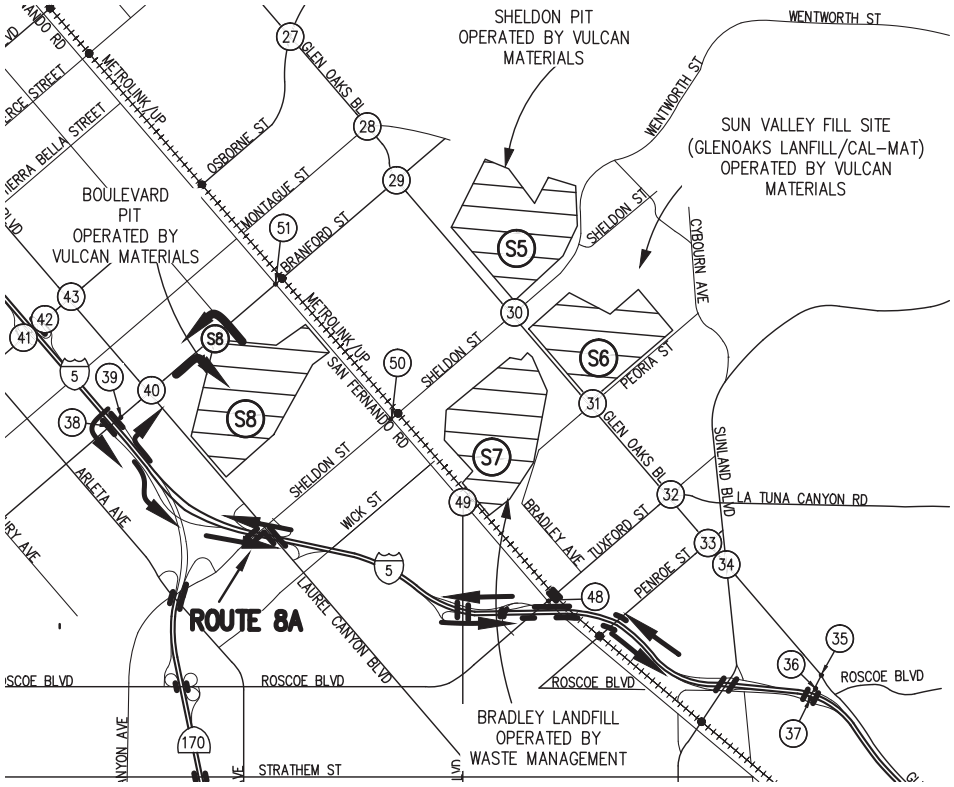
N/S STREET				38			E/W STREET			
SB I-5 FREEWAY RAMPS							BRANFORD STREET			
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET				39			E/W STREET			
NB I-5 FREEWAY RAMPS							BRANFORD STREET			
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET				40			E/W STREET			
LAUREL CANYON BLVD							BRANFORD STREET			
				150	380	135				
				95	605	65				
				140	460	65				
155	125	195						120	100	130
330	375	600		TS				395	365	580
80	220	195						95	95	105
				90	595	145				
				85	475	95				
				120	1140	130				

N

NOT TO SCALE



LEGEND

N/S STREET				S#			E/W STREET			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM
				TS						
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

(S#) – DISPOSAL SITE

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ROUTE 8A
PCE EXISTING + PROJECT TRIPS
DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-4-10E

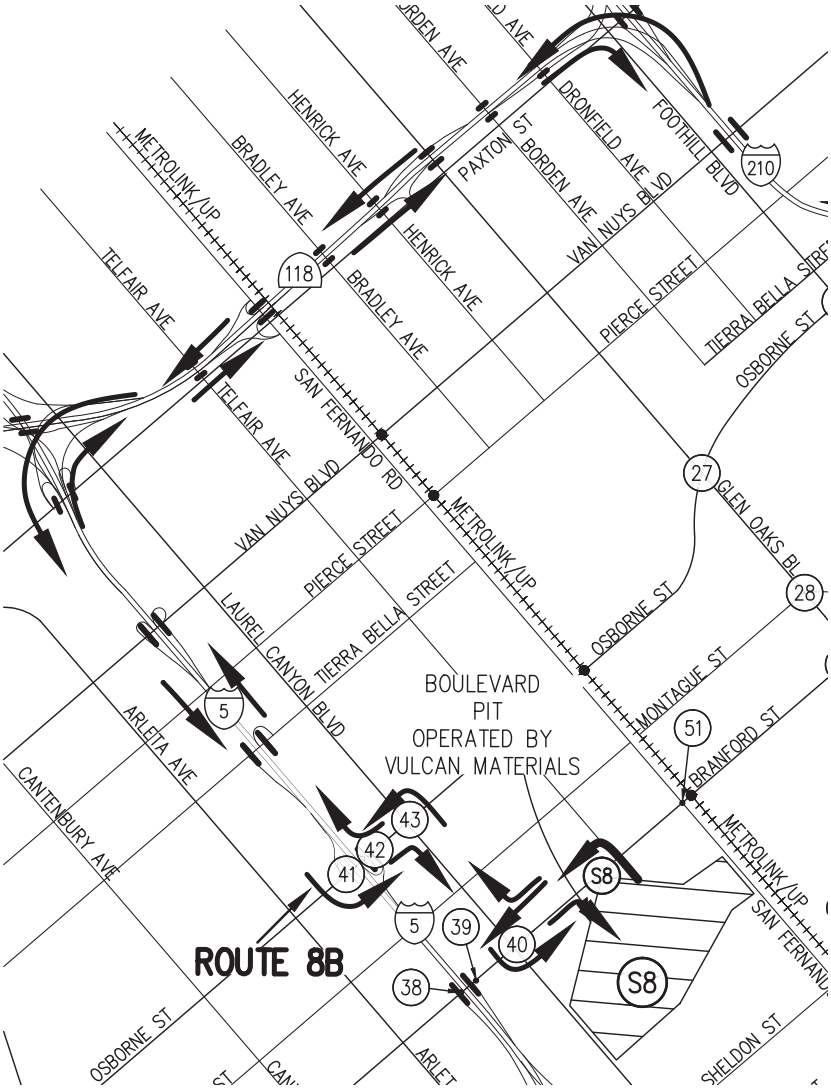
Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 4\FIG 4-4-10E.dwg
Last Opened: Oct 04, 2013 - 12:01pm by: TMunoz

N/S STREET				40			E/W STREET			
LAUREL CANYON BLVD							BRANFORD STREET			
				0	0	50				
				0	0	50				
				0	0	50				
0	0	0						50	50	50
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET				41			E/W STREET			
SB I-5 FREEWAY RAMPS							OSBORNE STREET			
				0	0	50				
				0	0	50				
				0	0	50				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET				42			E/W STREET			
NB I-5 FREEWAY RAMPS							OSBORNE STREET			
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						50	50	50
50	50	50		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET				43			E/W STREET			
LAUREL CANYON BLVD							OSBORNE STREET			
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
50	50	50						0	0	0
				50	0	0				
				50	0	0				
				50	0	0				



N

NOT TO SCALE

LEGEND

N/S STREET				S#			E/W STREET			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

(S#) – DISPOSAL SITE

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ROUTE 8B PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-4-11A

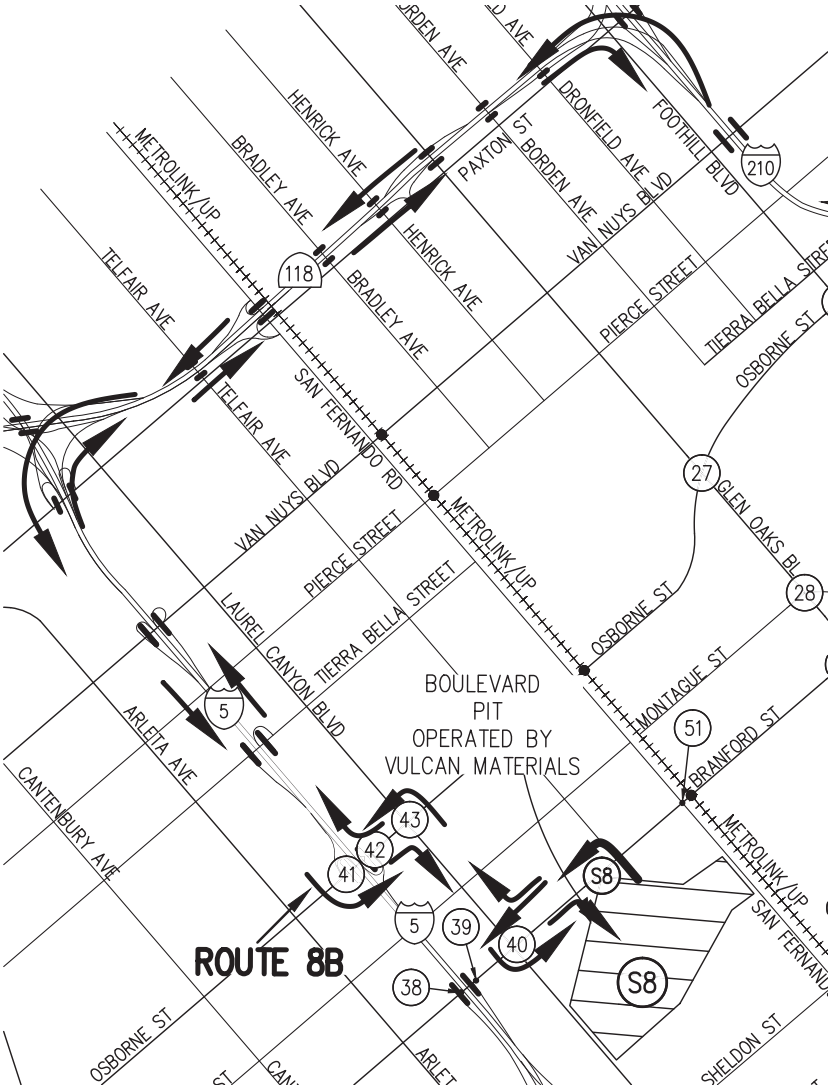
Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 4\FIG 4-4-11A.dwg
Last Opened: Oct 04, 2013 - 12:01pm by: TMunoz

N/S STREET			40			E/W STREET			
LAUREL CANYON BLVD						BRANFORD STREET			
			5%	5%	31%				
			5%	5%	43%				
			5%	5%	48%				
5%	5%	5%					35%	40%	32%
15%	15%	10%		TS			10%	15%	10%
10%	5%	5%					5%	5%	5%
			5%	5%	5%				
			5%	5%	5%				
			5%	5%	5%				

N/S STREET			41			E/W STREET			
SB I-5 FREEWAY RAMPS						OSBORNE STREET			
			10%	5%	41%				
			5%	5%	16%				
			5%	5%	14%				
0%	0%	0%					5%	5%	5%
5%	5%	5%		TS			5%	5%	5%
5%	5%	5%					5%	5%	5%
			0%	0%	0%				
			0%	0%	0%				
			0%	0%	0%				

N/S STREET			42			E/W STREET			
NB I-5 FREEWAY RAMPS						OSBORNE STREET			
			5%	0%	5%				
			5%	0%	5%				
			5%	0%	5%				
5%	5%	5%					67%	77%	63%
10%	10%	5%		TS			5%	5%	5%
0%	0%	0%					0%	0%	0%
			10%	0%	10%				
			5%	0%	5%				
			5%	0%	5%				

N/S STREET			43			E/W STREET			
LAUREL CANYON BLVD						OSBORNE STREET			
			10%	5%	5%				
			5%	5%	5%				
			5%	5%	5%				
5%	5%	5%					5%	5%	5%
5%	5%	5%		TS			5%	5%	5%
45%	42%	52%					5%	10%	5%
			40%	5%	5%				
			42%	5%	5%				
			36%	5%	5%				



LEGEND

N/S STREET			S#			E/W STREET			
			7AM-9AM						
			2PM-4PM						
			4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS		7AM - 9AM	2PM - 4PM	4PM - 6PM	
			7AM-9AM						
			2PM-4PM						
			4PM-6PM						

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 8B
TRUCK PERCENTAGES
DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-4-11B

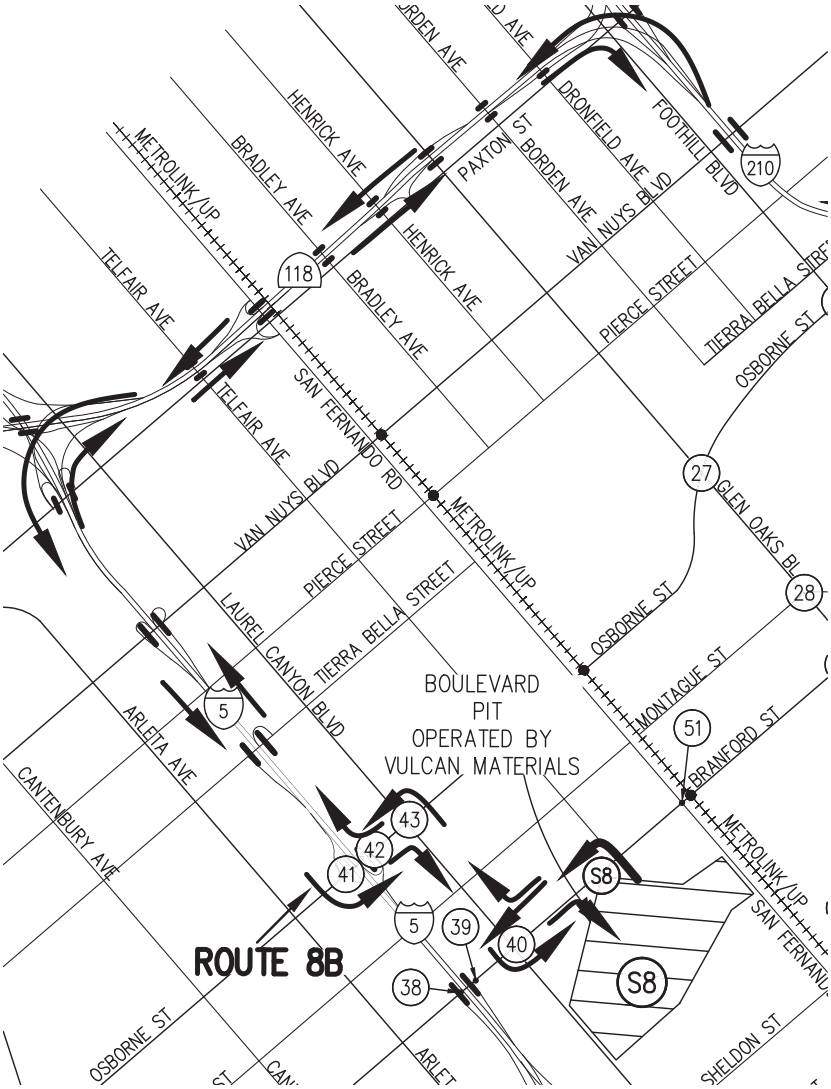
Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 4\FIG 4-4-11B.dwg
Last Opened: Oct 04, 2013 - 12:02pm by: TMunoz

N/S STREET				40			E/W STREET			
LAUREL CANYON BLVD							BRANFORD STREET			
				0	0	150				
				0	0	150				
				0	0	150				
0	0	0						150	150	150
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET				41			E/W STREET			
SB I-5 FREEWAY RAMPS							OSBORNE STREET			
				0	0	150				
				0	0	150				
				0	0	150				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET				42			E/W STREET			
NB I-5 FREEWAY RAMPS							OSBORNE STREET			
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						150	150	150
150	150	150		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET				43			E/W STREET			
LAUREL CANYON BLVD							OSBORNE STREET			
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
150	150	150						0	0	0
				150	0	0				
				150	0	0				
				150	0	0				



LEGEND

N/S STREET				S#	E/W STREET
				7AM-9AM	
				2PM-4PM	
				4PM-6PM	
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS	7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM	
				2PM-4PM	
				4PM-6PM	

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 8B
PCE PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-4-11C

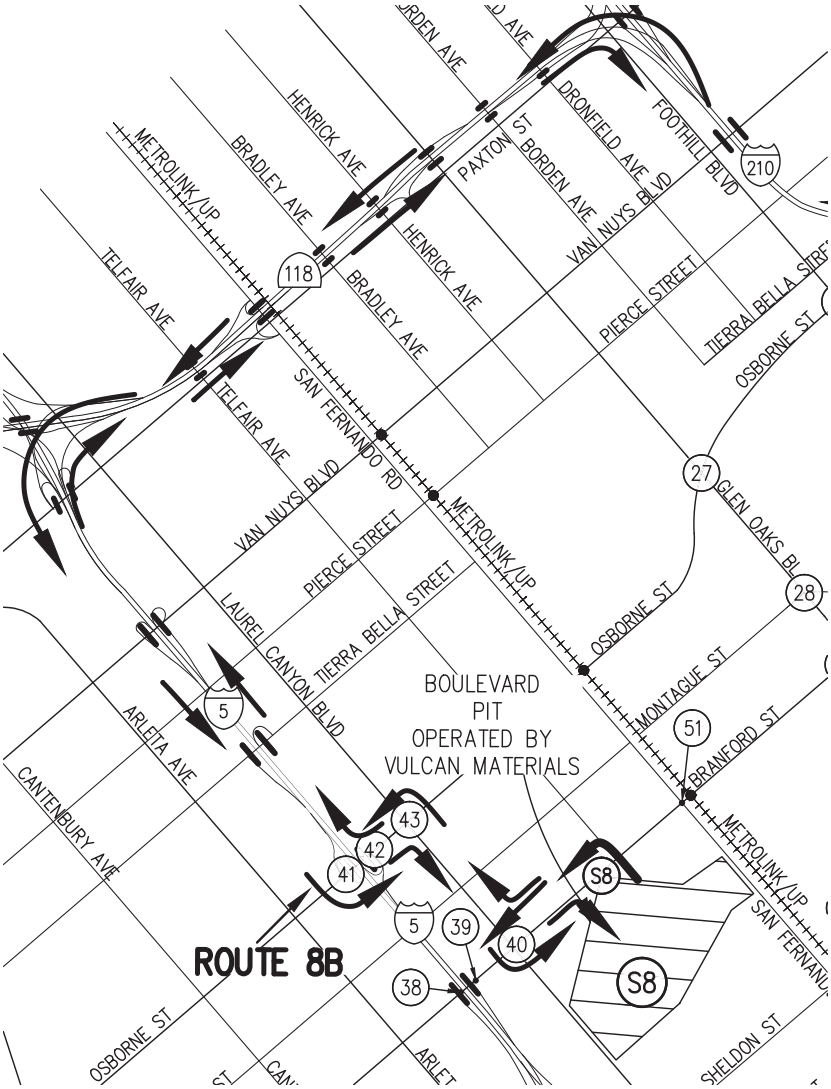
Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 4\FIG 4-4-11C.dwg
Last Opened: Oct 04, 2013 - 12:02pm by: TMunoz

N/S STREET				40		E/W STREET				
LAUREL CANYON BLVD						BRANFORD STREET				
				150	365	180				
				95	585	115				
				135	445	110				
150	115	190						160	135	175
145	170	380		TS				205	160	365
65	210	185						85	90	100
				90	585	140				
				85	460	85				
				115	1120	120				

N/S STREET				41		E/W STREET				
SB I-5 FREEWAY RAMPS						OSBORNE STREET				
				190	20	195				
				360	20	430				
				610	20	505				
0	0	0						515	220	225
795	595	895		TS				1155	910	1220
685	165	275						60	35	35
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET				42		E/W STREET				
NB I-5 FREEWAY RAMPS						OSBORNE STREET				
				5	0	5				
				5	0	5				
				5	0	5				
5	5	5						75	65	80
1005	1005	1390		TS				1500	820	1075
0	0	0						0	0	0
				230	0	180				
				305	0	220				
				410	0	205				

N/S STREET				43		E/W STREET				
LAUREL CANYON BLVD						OSBORNE STREET				
				50	335	110				
				90	515	75				
				75	460	75				
120	90	95						170	110	110
840	995	1315		TS				1375	690	850
130	130	115						110	80	120
				135	605	105				
				130	460	90				
				210	1130	120				



NOT TO SCALE

LEGEND

N/S STREET				S#		E/W STREET				
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

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ROUTE 8B
EXISTING + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-4-11D

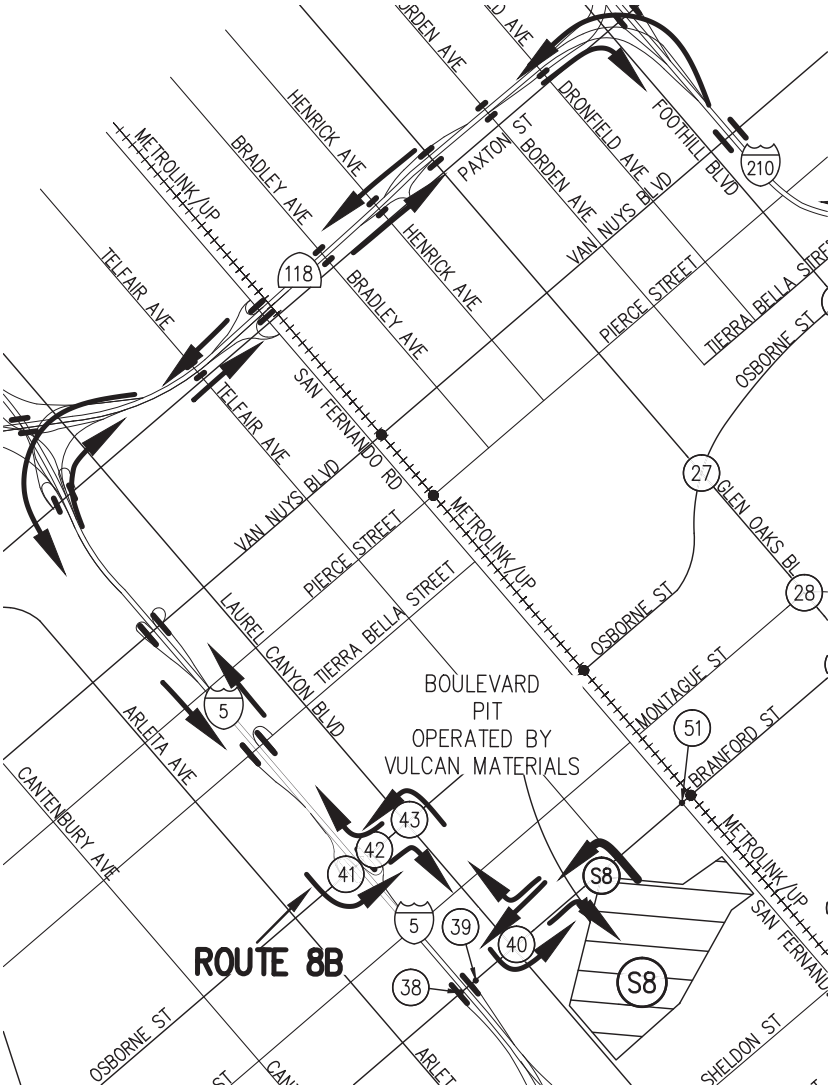
Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 4\FIG 4-4-11D.dwg
Last Opened: Oct 04, 2013 - 12:02pm by: TMunoz

N/S STREET				40		E/W STREET			
LAUREL CANYON BLVD						BRANFORD STREET			
				150	380	285			
				95	605	215			
				140	460	215			
155	125	195					270	250	280
180	225	450		TS			245	215	430
80	220	195					95	95	105
				90	595	145			
				85	475	95			
				120	1140	130			

N/S STREET				41		E/W STREET			
SB I-5 FREEWAY RAMPS						OSBORNE STREET			
				235	20	350			
				400	20	585			
				620	20	630			
0	0	0					560	250	235
870	645	950		TS			1220	930	1280
685	165	275					60	35	35
				0	0	0			
				0	0	0			
				0	0	0			

N/S STREET				42		E/W STREET			
NB I-5 FREEWAY RAMPS						OSBORNE STREET			
				5	0	5			
				5	0	5			
				5	0	5			
5	5	5					175	165	180
1085	1165	1550		TS			1490	880	1160
0	0	0					0	0	0
				240	0	195			
				315	0	245			
				425	0	215			

N/S STREET				43		E/W STREET			
LAUREL CANYON BLVD						OSBORNE STREET			
				60	345	115			
				100	520	85			
				80	465	85			
125	95	100					180	110	120
900	1055	1375		TS			1425	735	925
250	240	235					120	100	130
				240	620	115			
				230	470	100			
				310	1135	130			



LEGEND

N/S STREET				S#		E/W STREET			
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS			7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					

LEGEND

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ROUTE 8B
PCE EXISTING + PROJECT TRIPS
DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-4-11E

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Last Opened: Oct 04, 2013 - 12:02pm by: TMunoz

Table 4-4-10
Intersection Capacity Analysis – Existing + Project Conditions (Route 8A)
Traffic Impact Analysis - Site 8

Route 8A		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
38	Branford Street and I-5 Freeway Southbound Ramps	-	-	-	-	-	-	-	-	-	-	-	-
39	Branford Street and I-5 Freeway Northbound Ramps	-	-	-	-	-	-	-	-	-	-	-	-
40	Branford Street and Laurel Canyon Blvd	B	10.4	0.52	B	A	9.6	0.40	B	B	14.1	0.80	D

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc.**

Table 4-4-11
Intersection Capacity Analysis – Existing + Project Conditions (Route 8B)
Traffic Impact Analysis - Site 8

Route 8B		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
40	Branford Street and Laurel Canyon Blvd	B	15.4	0.81	C	B	10.3	0.47	B	C	25.8	1.06	F
41	Osborne Street and I-5 Freeway Southbound Ramps	B	12.0	0.75	C	B	16.3	0.85	B	C	25.3	0.91	D
42	Osborne Street and I-5 Freeway Northbound Ramps	B	13.6	0.70	A	B	11.7	0.66	A	B	15.6	0.83	C
43	Osborne Street and Laurel Canyon Blvd	C	31.8	0.88	D	C	20.9	0.73	C	D	45.8	0.98	F

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc.**

As presented in *Table 4-4-10* and *Table 4-4-11*, under the existing plus project conditions for Site 8 (Routes 8A-8B) all intersections are expected to operate at an acceptable HCM LOS of C or better for the AM, Mid-day, and PM peak hours.

Haul Route 8C

The Haul Route 8C project trips, truck percentages and passenger car equivalent (PCE) project trips are illustrated in *Figure 4-4-12A* through *Figure 4-4-12F*. The existing plus project AM (7-9), MID-DAY (12-2), PM (4-6) turn movement volumes, are provided in *Figure 4-4-12G* and *Figure 4-4-12H.* For comparison the (PCE) existing plus project turn movement volumes are provided in *Figure 4-4-12I* and *Figure 4-4-12J.*

N/S STREET	44	E/W STREET
WHEATLAND AVE		EB I-210 FWY RAMPS

			0	0	50					
			0	0	50					
			0	0	50					
0	0	0					0	0	0	
0	0	0		TS			0	0	0	
0	0	0					0	0	0	
			0	0	0					
			0	0	0					
			0	0	0					

N/S STREET	45	E/W STREET
WHEATLAND AVE		WB I-210 FWY RAMPS

			0	50	0					
			0	50	0					
			0	50	0					
0	0	0					50	50	50	
0	0	0		TS			0	0	0	
0	0	0					0	0	0	
			0	0	0					
			0	0	0					
			0	0	0					

N/S STREET	46	E/W STREET
WHEATLAND AVE		FOOTHILL BLVD

			0	0	0					
			0	0	0					
			0	0	0					
0	0	0					0	0	0	
0	0	0		TS			0	0	0	
0	0	0					50	50	50	
			0	0	50					
			0	0	50					
			0	0	50					

N/S STREET	47	E/W STREET
WENTWORTH STREET		FOOTHILL BLVD

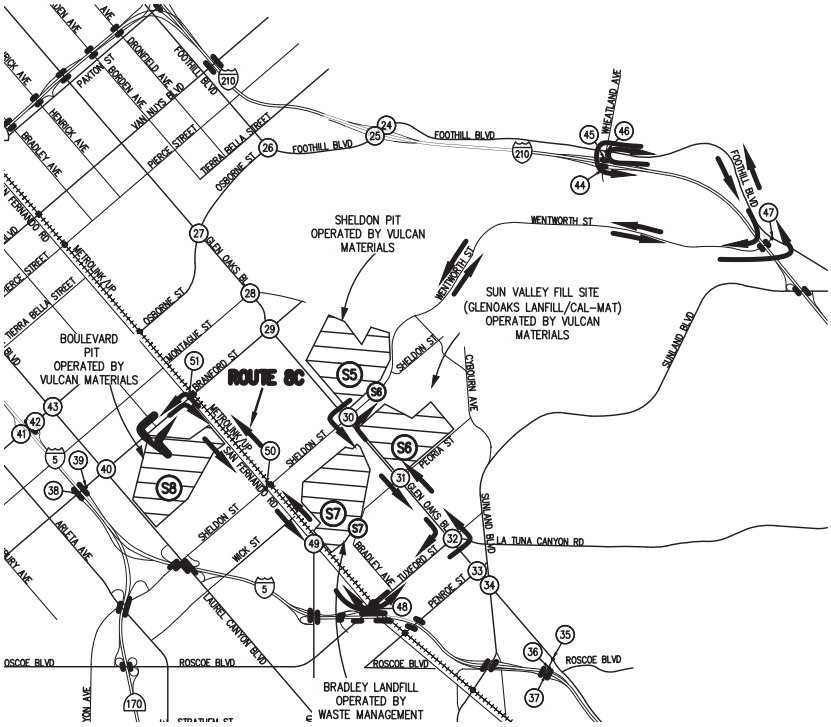
			0	0	0					
			0	0	0					
			0	0	0					
0	0	0					0	0	0	
0	0	0		TS			0	0	0	
50	50	50					0	0	0	
			50	0	0					
			50	0	0					
			50	0	0					

N/S STREET	30	E/W STREET
GLEN OAKS BLVD		SHELDON STREET

			0	0	0					
			0	0	0					
			0	0	0					
0	0	0					0	0	0	
0	0	0		TS			0	0	0	
0	0	0					50	50	50	
			0	0	50					
			0	0	50					
			0	0	50					

N/S STREET	31	E/W STREET
GLEN OAKS BLVD		PEORIA STREET

			0	50	0					
			0	50	0					
			0	50	0					
0	0	0					0	0	0	
0	0	0		TS			0	0	0	
0	0	0					0	0	0	
			0	50	0					
			0	50	0					
			0	50	0					



LEGEND

N/S STREET	S#	E/W STREET

			7AM-9AM							
			2PM-4PM							
			4PM-6PM							
7AM - 9AM	2PM - 4PM	4PM - 6PM					7AM - 9AM	2PM - 4PM	4PM - 6PM	
				TS						
			7AM-9AM							
			2PM-4PM							
			4PM-6PM							

LEGEND

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ROUTE 8C PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-4-12A

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Last Opened: Oct 04, 2013 - 12:03pm by: TMunoz

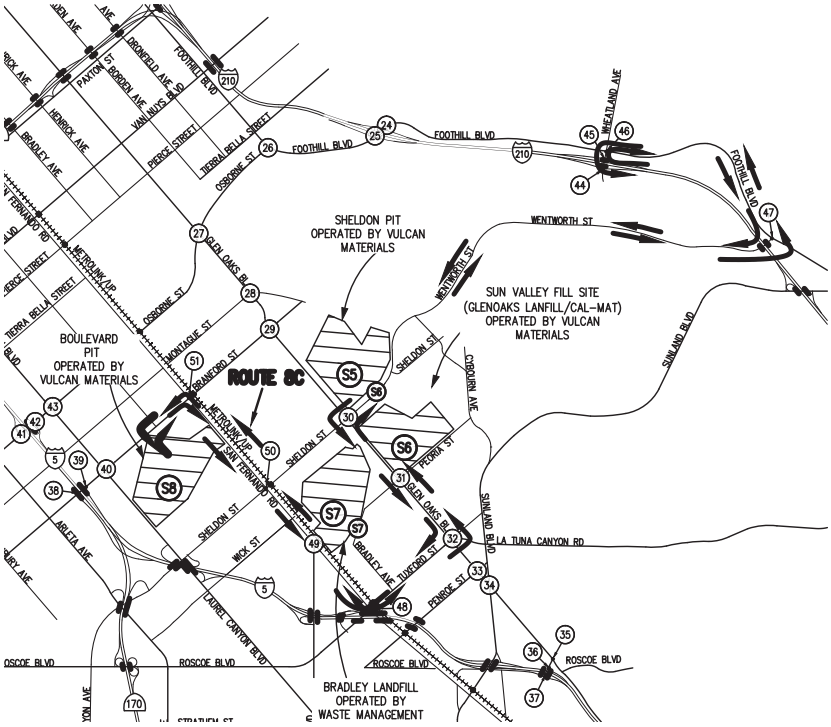
N/S STREET				32			E/W STREET			
GLEN OAKS BLVD							TUXFORD STREET			
				50	0	0				
				50	0	0				
				50	0	0				
50	50	50						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET				48			E/W STREET			
SAN FERNANDO ROAD							TUXFORD STREET			
				0	0	50				
				0	0	50				
				0	0	50				
0	0	0						50	50	50
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET				49			E/W STREET			
SAN FERNANDO ROAD							LANKERSHIM BLVD			
				0	50	0				
				0	50	0				
				0	50	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	50	0				
				0	50	0				
				0	50	0				

N/S STREET				50			E/W STREET			
SAN FERNANDO ROAD							SHELDON STREET			
				0	50	0				
				0	50	0				
				0	50	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	50	0				
				0	50	0				
				0	50	0				

N/S STREET				51			E/W STREET			
SAN FERNANDO ROAD							BRANFORD STREET			
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
50	50	50						0	0	0
				50	0	0				
				50	0	0				
				50	0	0				



LEGEND

N/S STREET				S#			E/W STREET			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 8C PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-4-12B

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 4\FIG 4-4-12B.dwg
Last Opened: Oct 04, 2013 - 12:04pm by: TMunoz

N/S STREET				44			E/W STREET			
WHEATLAND AVE							EB I-210 FWY RAMPS			
				0%	0%	33%				
				0%	0%	45%				
				0%	0%	40%				
5%	5%	5%						0%	0%	0%
15%	15%	100%		TS				0%	0%	0%
0%	0%	0%						0%	0%	0%
				0%	0%	0%				
				0%	0%	0%				
				0%	0%	0%				

N/S STREET				45			E/W STREET			
WHEATLAND AVE							WB I-210 FWY RAMPS			
				5%	35%	0%				
				5%	48%	0%				
				5%	38%	0%				
0%	0%	0%						37%	56%	29%
0%	0%	0%		TS				0%	0%	0%
0%	0%	0%						50%	5%	5%
				20%	5%	0%				
				5%	10%	0%				
				20%	5%	0%				

N/S STREET				46			E/W STREET			
WHEATLAND AVE							FOOTHILL BLVD			
				5%	5%	20%				
				5%	5%	5%				
				5%	5%	5%				
30%	5%	5%						5%	5%	5%
5%	5%	5%		TS				5%	5%	5%
5%	5%	5%						42%	49%	34%
				5%	5%	35%				
				5%	5%	58%				
				5%	5%	33%				

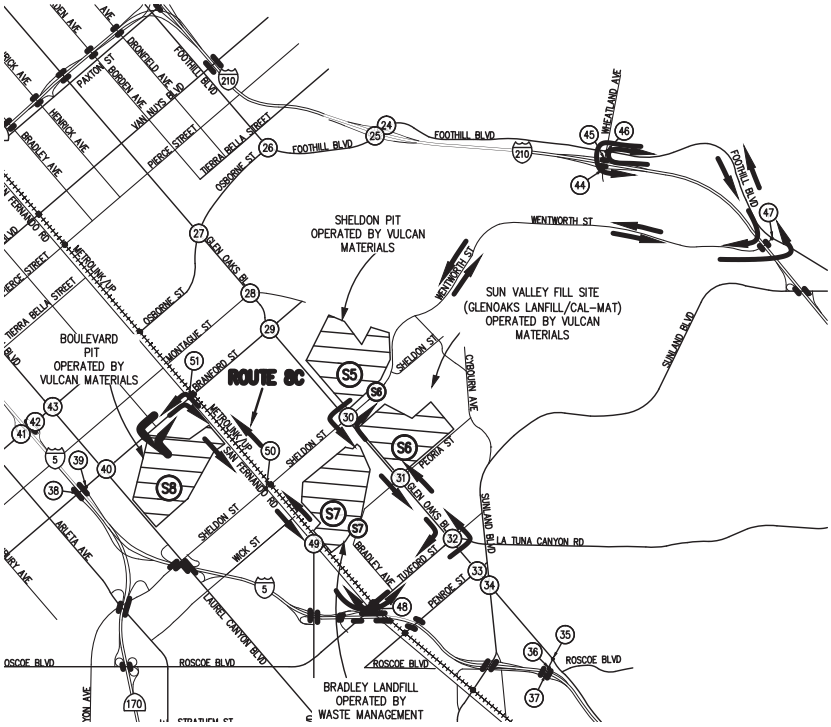
N/S STREET				47			E/W STREET			
WENTWORTH STREET							FOOTHILL BLVD			
				0%	0%	0%				
				0%	0%	0%				
				0%	0%	0%				
0%	0%	0%						0%	0%	0%
5%	5%	5%		TS				5%	5%	5%
34%	55%	43%						5%	5%	5%
				53%	0%	5%				
				53%	0%	5%				
				35%	0%	5%				

N/S STREET				30			E/W STREET			
GLEN OAKS BLVD							SHELDON STREET			
				10%	5%	30%				
				15%	5%	5%				
				5%	5%	5%				
5%	5%	5%						5%	10%	5%
5%	25%	5%		TS				5%	15%	5%
5%	25%	5%						5%	10%	20%
				10%	5%	10%				
				20%	5%	25%				
				10%	5%	10%				

N/S STREET				31			E/W STREET			
GLEN OAKS BLVD							PEORIA STREET			
				20%	5%	45%				
				45%	15%	40%				
				45%	5%	50%				
40%	40%	20%						20%	5%	20%
80%	60%	40%		TS				20%	20%	5%
40%	45%	45%						20%	30%	55%
				45%	10%	65%				
				15%	15%	45%				
				45%	5%	50%				

N

NOT TO SCALE



LEGEND

N/S STREET				S#			E/W STREET			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

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ROUTE 8C
TRUCK PERCENTAGES

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-4-12C

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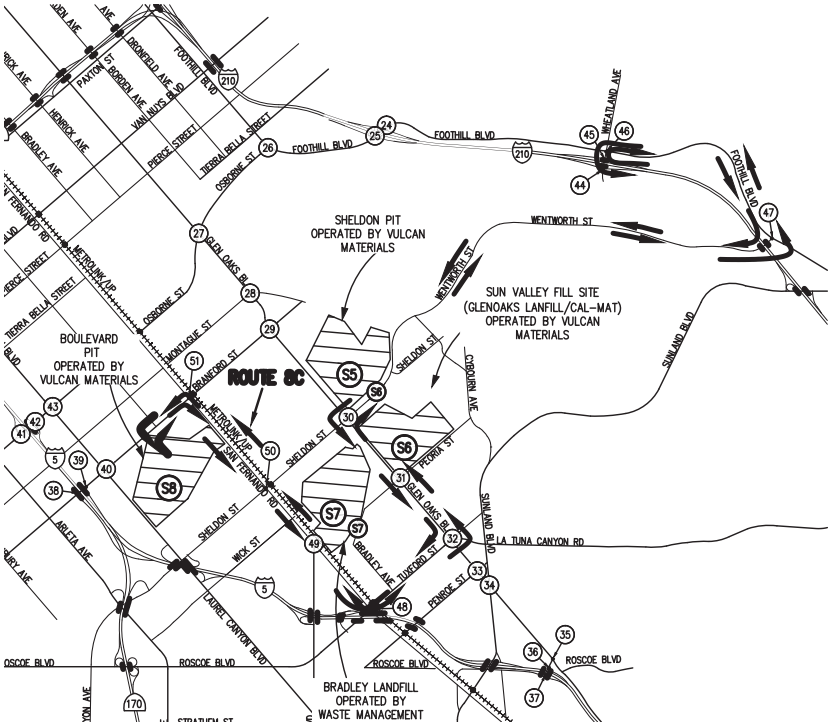
N/S STREET				32			E/W STREET			
GLEN OAKS BLVD							TUXFORD STREET			
				57%	5%	5%				
				63%	15%	10%				
				42%	5%	5%				
48%	62%	45%						10%	10%	5%
5%	5%	5%		TS				5%	5%	5%
15%	15%	10%						5%	5%	5%
				15%	10%	20%				
				15%	10%	5%				
				10%	10%	5%				

N/S STREET				48			E/W STREET			
SAN FERNANDO ROAD							TUXFORD STREET			
				10%	20%	43%				
				10%	35%	54%				
				5%	5%	39%				
5%	15%	10%						39%	37%	35%
15%	15%	10%		TS				20%	40%	10%
5%	5%	5%						5%	5%	5%
				10%	30%	5%				
				5%	30%	10%				
				5%	5%	10%				

N/S STREET				49			E/W STREET			
SAN FERNANDO ROAD							LANKERSHIM BLVD			
				15%	24%	0%				
				10%	27%	0%				
				5%	23%	0%				
15%	10%	5%						0%	0%	0%
0%	0%	0%		TS				0%	0%	0%
20%	25%	15%						0%	0%	0%
				15%	29%	0%				
				25%	28%	0%				
				15%	12%	0%				

N/S STREET				50			E/W STREET			
SAN FERNANDO ROAD							SHELDON STREET			
				30%	12%	15%				
				5%	22%	5%				
				45%	12%	25%				
15%	5%	15%						15%	5%	25%
5%	5%	5%		TS				5%	15%	5%
20%	5%	20%						10%	5%	15%
				30%	23%	25%				
				15%	16%	5%				
				5%	10%	10%				

N/S STREET				51			E/W STREET			
SAN FERNANDO ROAD							BRANFORD STREET			
				5%	5%	10%				
				5%	5%	5%				
				5%	10%	10%				
5%	10%	15%						5%	15%	5%
5%	10%	15%		TS				5%	15%	15%
39%	62%	36%						20%	10%	10%
				60%	5%	15%				
				58%	10%	25%				
				27%	5%	5%				



LEGEND

N/S STREET				S#			E/W STREET			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

(S#) – DISPOSAL SITE

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ROUTE 8C
TRUCK PERCENTAGES
DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-4-12D

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Last Opened: Oct 04, 2013 - 12:04pm by: TMunoz

N/S STREET				44		E/W STREET			
WHEATLAND AVE						EB I-210 FWY RAMPS			
			0	0	150				
			0	0	150				
			0	0	150				
0	0	0					0	0	0
0	0	0		TS			0	0	0
0	0	0					0	0	0
			0	0	0				
			0	0	0				
			0	0	0				

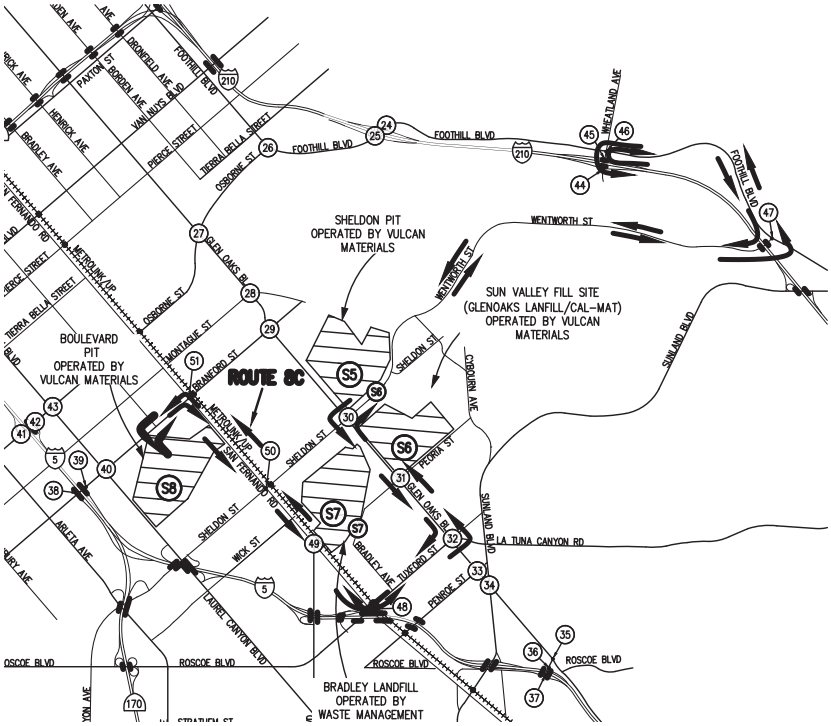
N/S STREET				45		E/W STREET			
WHEATLAND AVE						WB I-210 FWY RAMPS			
			0	150	0				
			0	150	0				
			0	150	0				
0	0	0					150	150	150
0	0	0		TS			0	0	0
0	0	0					0	0	0
			0	0	0				
			0	0	0				
			0	0	0				

N/S STREET				46		E/W STREET			
WHEATLAND AVE						FOOTHILL BLVD			
			0	0	0				
			0	0	0				
			0	0	0				
0	0	0					0	0	0
0	0	0		TS			0	0	0
0	0	0					150	150	150
			0	0	150				
			0	0	150				
			0	0	150				

N/S STREET				47		E/W STREET			
WENTWORTH STREET						FOOTHILL BLVD			
			0	0	0				
			0	0	0				
			0	0	0				
0	0	0					0	0	0
0	0	0		TS			0	0	0
150	150	150					0	0	0
			150	0	0				
			150	0	0				
			150	0	0				

N/S STREET				30		E/W STREET			
GLEN OAKS BLVD						SHELDON STREET			
			0	0	0				
			0	0	0				
			0	0	0				
0	0	0					0	0	0
0	0	0		TS			0	0	0
0	0	0					150	150	150
			0	0	150				
			0	0	150				
			0	0	150				

N/S STREET				31		E/W STREET			
GLEN OAKS BLVD						PEORIA STREET			
			0	150	0				
			0	150	0				
			0	150	0				
0	0	0					0	0	0
0	0	0		TS			0	0	0
0	0	0					0	0	0
			0	150	0				
			0	150	0				
			0	150	0				



LEGEND

N/S STREET				S#		E/W STREET			
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS			7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					

LEGEND

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ROUTE 8C
PCE PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-4-12E

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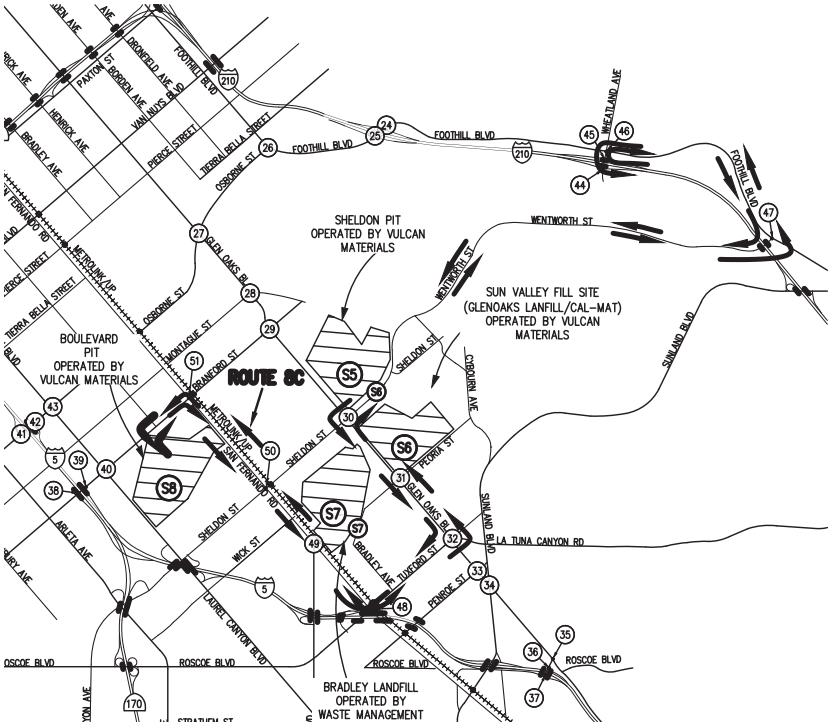
N/S STREET				32			E/W STREET			
GLEN OAKS BLVD							TUXFORD STREET			
				150	0	0				
				150	0	0				
				150	0	0				
150	150	150						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET				48			E/W STREET			
SAN FERNANDO ROAD							TUXFORD STREET			
				0	0	150				
				0	0	150				
				0	0	150				
0	0	0						150	150	150
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET				49			E/W STREET			
SAN FERNANDO ROAD							LANKERSHIM BLVD			
				0	150	0				
				0	150	0				
				0	150	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	150	0				
				0	150	0				
				0	150	0				

N/S STREET				50			E/W STREET			
SAN FERNANDO ROAD							SHELDON STREET			
				0	150	0				
				0	150	0				
				0	150	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	150	0				
				0	150	0				
				0	150	0				

N/S STREET				51			E/W STREET			
SAN FERNANDO ROAD							BRANFORD STREET			
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
150	150	150						0	0	0
				150	0	0				
				150	0	0				
				150	0	0				



LEGEND

N/S STREET				S#			E/W STREET			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

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DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-4-12F

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N/S STREET				44			E/W STREET			
WHEATLAND AVE							EB I-210 FWY RAMPS			
				0	0	170				
				0	0	110				
				0	0	135				
105	75	100						0	0	0
5	5	5		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET				45			E/W STREET			
WHEATLAND AVE							WB I-210 FWY RAMPS			
				65	160	0				
				55	110	0				
				105	130	0				
0	0	0						150	90	170
0	0	0		TS				5	5	5
0	0	0						5	5	5
				5	100	0				
				5	55	0				
				5	95	0				

N/S STREET				46			E/W STREET			
WHEATLAND AVE							FOOTHILL BLVD			
				5	15	15				
				15	20	5				
				5	20	10				
5	10	5						5	20	15
195	135	170		TS				220	130	215
90	35	80						130	115	145
				70	10	160				
				40	25	100				
				90	25	150				

N/S STREET				47			E/W STREET			
WENTWORTH STREET							FOOTHILL BLVD			
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
200	165	200		TS				175	155	295
165	95	125						440	215	215
				100	0	225				
				100	0	185				
				160	0	420				

N/S STREET				30			E/W STREET			
GLEN OAKS BLVD							SHELDON STREET			
				160	1235	85				
				95	490	50				
				145	730	90				
115	130	300						40	50	60
405	240	325		TS				595	285	325
45	80	65						140	95	90
				80	480	95				
				80	535	100				
				120	820	120				

N/S STREET				31			E/W STREET			
GLEN OAKS BLVD							PEORIA STREET			
				40	1300	30				
				15	580	10				
				15	795	35				
15	25	40						10	15	55
5	5	10		TS				5	5	5
5	30	20						15	20	30
				15	575	25				
				25	575	15				
				25	1025	25				

N

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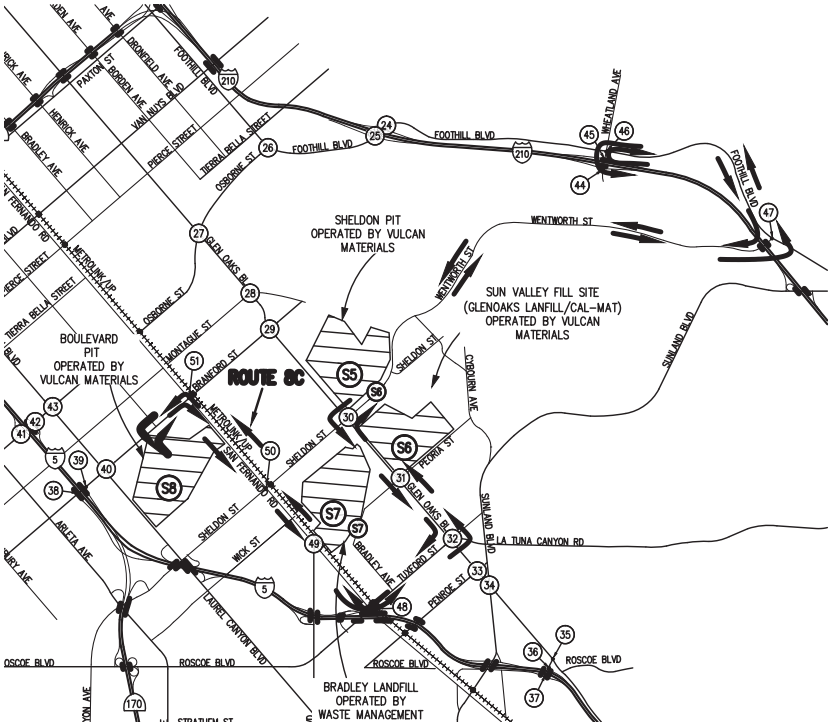

LEGEND

N/S STREET				S#			E/W STREET			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

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ROUTE 8C
EXISTING + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-4-12G

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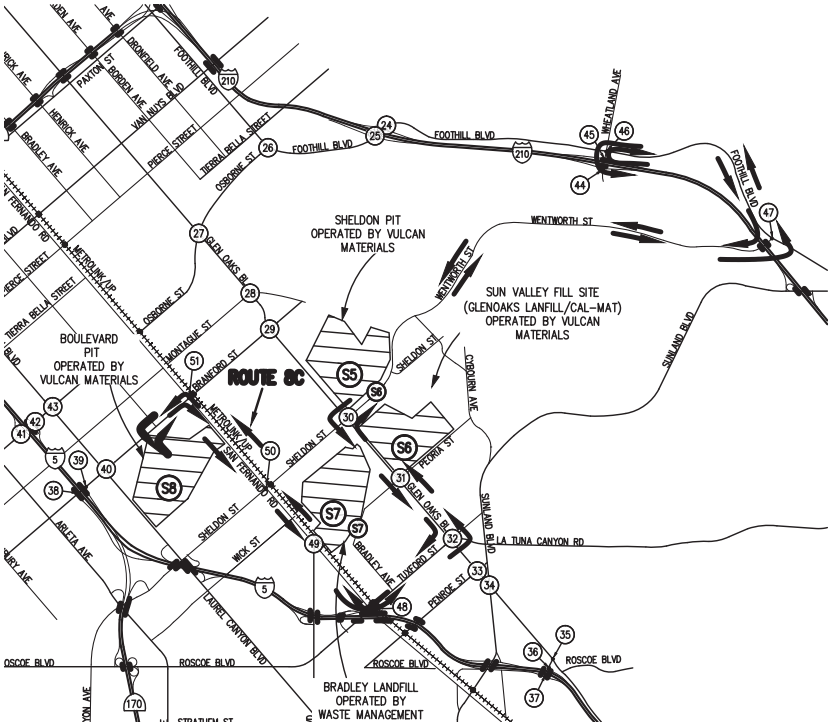
N/S STREET				32		E/W STREET				
GLEN OAKS BLVD						TUXFORD STREET				
				175	1015	90				
				150	355	90				
				140	590	130				
165	160	190						75	45	80
470	390	505		TS				565	425	345
45	60	95						30	25	60
				95	395	20				
				110	435	30				
				120	800	60				

N/S STREET				48		E/W STREET				
SAN FERNANDO ROAD						TUXFORD STREET				
				70	325	175				
				70	220	110				
				40	275	140				
65	80	30						155	150	180
515	380	570		TS				650	355	430
110	185	145						115	175	80
				250	210	60				
				315	185	135				
				330	580	65				

N/S STREET				49		E/W STREET				
SAN FERNANDO ROAD						LANKERSHIM BLVD				
				470	495	0				
				280	355	0				
				360	360	0				
225	275	550						0	0	0
0	0	0		TS				0	0	0
35	60	55						0	0	0
				50	310	0				
				55	335	0				
				80	670	0				

N/S STREET				50		E/W STREET				
SAN FERNANDO ROAD						SHELDON STREET				
				85	660	65				
				45	385	65				
				30	645	75				
60	60	125						55	55	100
355	320	560		TS				635	320	405
75	40	65						220	125	165
				35	340	80				
				50	425	95				
				115	1025	160				

N/S STREET				51		E/W STREET				
SAN FERNANDO ROAD						BRANFORD STREET				
				70	635	40				
				55	330	65				
				115	530	100				
35	35	90						20	45	105
300	180	385		TS				145	150	285
155	95	155						55	70	125
				100	240	90				
				100	345	70				
				220	820	130				



LEGEND

N/S STREET				S#		E/W STREET				
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

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ROUTE 8C
EXISTING + PROJECT TRIPS
DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-4-12H

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N/S STREET				44		E/W STREET			
WHEATLAND AVE						EB I-210 FWY RAMPS			
			0	0	275				
			0	0	210				
			0	0	240				
115	85	100					0	0	0
10	10	5		TS			0	0	0
0	0	0					0	0	0
			0	0	0				
			0	0	0				
			0	0	0				

N/S STREET				45		E/W STREET			
WHEATLAND AVE						WB I-210 FWY RAMPS			
			75	265	0				
			60	215	0				
			105	230	0				
0	0	0					260	190	270
0	0	0		TS			5	5	5
0	0	0					5	5	5
			5	105	0				
			5	65	0				
			5	100	0				

N/S STREET				46		E/W STREET			
WHEATLAND AVE						FOOTHILL BLVD			
			5	15	20				
			15	20	5				
			5	20	10				
10	10	5					5	20	15
215	150	175		TS			245	145	230
90	40	80					240	230	245
			80	10	265				
			40	25	210				
			90	25	250				

N/S STREET				47		E/W STREET			
WENTWORTH STREET						FOOTHILL BLVD			
			0	0	0				
			0	0	0				
			0	0	0				
0	0	0					0	0	0
205	175	200		TS			185	165	300
270	200	230					450	225	240
			205	0	240				
			205	0	190				
			265	0	425				

N/S STREET				30		E/W STREET			
GLEN OAKS BLVD						SHELDON STREET			
			200	1355	135				
			125	555	60				
			155	785	100				
130	150	330					50	60	65
430	370	335		TS			660	370	350
50	120	75					255	200	200
			100	520	200				
			110	605	220				
			140	905	230				

N/S STREET				31		E/W STREET			
GLEN OAKS BLVD						PEORIA STREET			
			205	1385	55				
			180	705	20				
			180	830	65				
175	195	205					15	15	75
10	10	20		TS			10	5	5
5	60	40					20	30	65
			30	610	60				
			35	660	30				
			45	1110	50				

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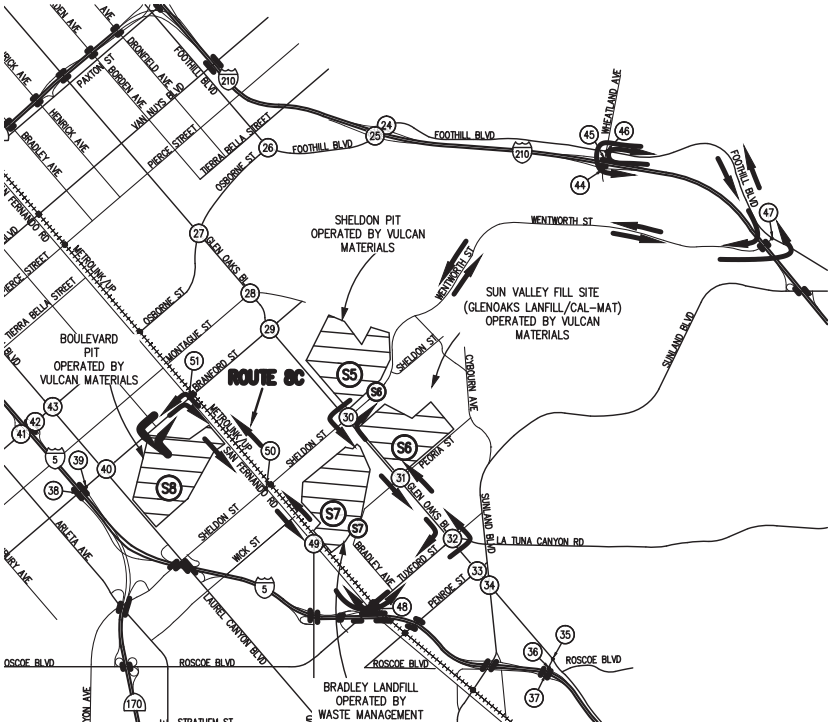

LEGEND

N/S STREET				S#		E/W STREET			
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS			7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					

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FIGURE 4-4-12I

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N/S STREET				32		E/W STREET				
GLEN OAKS BLVD						TUXFORD STREET				
				370	1120	100				
				345	455	105				
				230	561	122				
325	350	257						90	55	77
510	445	487		TS				615	450	332
55	80	86						30	30	56
				120	470	30				
				140	530	30				
				106	725	55				

N/S STREET				48		E/W STREET				
SAN FERNANDO ROAD						TUXFORD STREET				
				85	445	320				
				85	360	230				
				40	315	285				
70	105	35						270	260	315
650	510	680		TS				910	660	520
125	205	160						125	200	90
				315	340	65				
				340	305	160				
				350	655	75				

N/S STREET				49		E/W STREET				
SAN FERNANDO ROAD						LANKERSHIM BLVD				
				625	725	0				
				330	545	0				
				400	515	0				
295	335	625						0	0	0
0	0	0		TS				0	0	0
45	90	70						0	0	0
				65	480	0				
				80	515	0				
				105	860	0				

N/S STREET				50		E/W STREET				
SAN FERNANDO ROAD						SHELDON STREET				
				135	805	85				
				45	550	65				
				30	745	75				
75	60	125						70	55	100
380	365	560		TS				670	405	405
100	40	65						255	135	165
				60	490	120				
				60	570	95				
				115	1125	160				

N/S STREET				51		E/W STREET				
SAN FERNANDO ROAD						BRANFORD STREET				
				75	715	50				
				65	370	70				
				120	620	120				
40	45	120						20	55	105
330	220	490		TS				165	190	380
275	215	260						80	80	150
				220	275	115				
				215	415	105				
				335	920	140				

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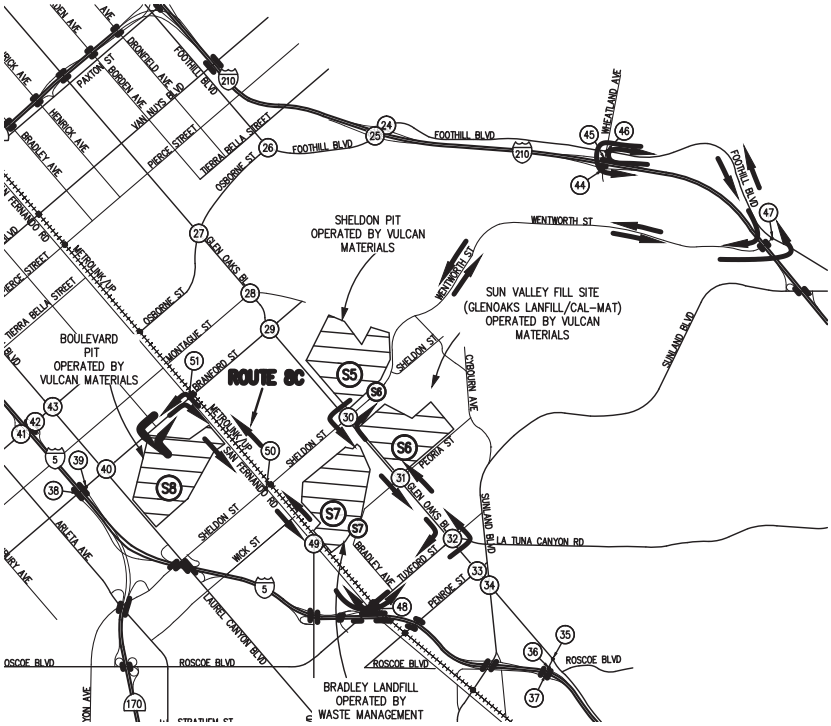

LEGEND

N/S STREET				S#		E/W STREET				
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

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FIGURE 4-4-12J

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Table 4-4-12
Intersection Capacity Analysis – Existing + Project Conditions (Route 8C)
Traffic Impact Analysis - Site 8

Route 8C		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
30	Glen Oaks Blvd and Sheldon Street	B	11.7	0.78	D	A	7.3	0.45	A	B	11.1	0.75	D
31	Glen Oaks Blvd and Peoria Street	B	10.5	0.57	A	A	9.3	0.39	A	B	15.5	0.54	A
32	Glen Oaks Blvd and Tuxford Street	C	20.2	0.96	D	A	8.1	0.57	A	A	9.8	0.65	C
44	Wheatland Ave and I-210 Freeway Eastbound Ramp	A	0	-	-	A	0	-	-	A	0	-	-
45	Wheatland Ave and I-210 Freeway Westbound Ramp	B	10.7	-	-	A	9	-	-	A	9.1	-	-
46	Wheatland Ave and Foothill Blvd	B	10.6	0.42	A	B	10.3	0.36	A	B	10.5	0.43	A
47	Wentworth Street and Foothill Blvd	B	19.4	0.78	A	B	12.4	0.4	A	A	9.2	0.43	A
48	Tuxford Street and San Fernando Road	D	41.5	0.76	C	C	34.2	0.72	B	D	35.5	0.71	B
49	Lankershim Blvd and San Fernando Road	A	8.0	0.52	A	A	7.5	0.43	A	A	9.1	0.51	A
50	Sheldon Street and San Fernando Road	C	31.5	0.75	B	C	23.7	0.50	A	D	46.0	0.94	D
51	Branford Street and San Fernando Road	C	31.8	0.85	B	C	26.9	0.46	A	E	68.9	0.95	C

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc.**

Haul Route 8C Analysis

As presented in *Table 4-4-12*, under the existing plus project conditions for Site 8 (Routes 8C) most study intersections are expected to operate at an acceptable HCM LOS of D or better for the AM, Mid-day, and PM peak hours. As identified earlier the intersection of Branford Street and San Fernando Road is anticipated to operate at a HCM LOS E during the PM peak hours and will require mitigation to improve to acceptable HCM LOS.

Existing + Project Intersection Capacity Analysis

In Summary, most of the intersections associated with the twenty five routes are expected to operate at an acceptable level of service with the exception of intersections noted for existing conditions and two additional intersections that will require traffic mitigation. The intersections include Berkshire Place and I-210 Freeway Eastbound Ramps anticipated (Route 1A,1D, 1E,1G) AM peak period HCM LOS E and Figueroa Street and SR-134 Westbound Ramps anticipated (Route 4A) AM peak hour and Haul (Route 4B) PM peak hour HCM LOS E. As previously identified the intersections Glenoaks Blvd and Osborne Street (Haul Routes 5A, 6A, 7A) with an AM peak hour HCM LOS E and Branford Street and San Fernando Road (Haul Route 8C) with a PM peak hour HCM LOS E are anticipated to continue to operate at HCM LOS E or lower.

Section 5: (Caltrans)

Existing plus project AM (7-9), MID-DAY (12-2), and PM (4-6) freeway segment volumes are provided in *Figure 4-5-1* and *Figure 4-5-2.* Existing plus project AM (7-9), MID-DAY (12-2), and PM (4-6) ramp volumes are provided in *Figure 4-5-3* and *Figure 4-5-4.*

S1–EB I–210 FWY		S1–WB I–210 FWY	
SEGMENT BETWEEN BERKSHIRE PLACE AND WINDSOR AVE.		SEGMENT BETWEEN WINDSOR AVE AND BERKSHIRE PLACE .	
AM	5620→	AM	←3415
MID–DAY	3560→	MID–DAY	←2510
PM	4385→	PM	←4110

S2–EB I–210 FWY		S2–WB I–210 FWY	
SEGMENT BETWEEN WINDSOR AVE AND LINCOLN AVE.		SEGMENT BETWEEN LINCOLN AVE AND WINDSOR AVE.	
AM	5715→	AM	←3830
MID–DAY	3650→	MID–DAY	←3685
PM	4400→	PM	←5660

S3–EB I–210 FWY		S3–WB I–210 FWY	
SEGMENT BETWEEN MOUNTAIN ST AND SR–134/1–210 FWY INTERCHANGE.		SEGMENT BETWEEN SR–134/1–210 FWY INTERCHANGE AND MOUNTAIN ST.	
AM	5570→	AM	←4825
MID–DAY	3545→	MID–DAY	←3955
PM	4150→	PM	←5665

S4–EB SR–134 FWY		S4–WB SR–134 FWY	
SEGMENT BETWEEN FIGUEROA ST AND SAN RAFAEL AVE.		SEGMENT BETWEEN SAN RAFAEL AVE AND FIGUEROA ST.	
AM	6020→	AM	←8030
MID–DAY	5660→	MID–DAY	←5655
PM	6775→	PM	←7425

S5–EB SR–134 FWY		S5–WB SR–134 FWY	
SEGMENT BETWEEN SAN RAFAEL AVE AND SR–134/I–210 FWY INTERCHANGE.		SEGMENT BETWEEN SR–134/I–210 FWY INTERCHANGE AND SAN RAFAEL AVENUE.	
AM	7465→	AM	←7520*
MID–DAY	6680→	MID–DAY	←5265*
PM	8135→	PM	←7150*

S6–EB I–210 FWY		S6–WB I–210 FWY	
SEGMENT BETWEEN WB SR–134/EB I–210 FWY INTERCHANGE AND LAKE AVE.		SEGMENT BETWEEN LAKE AVE AND EB SR–134/WB I–210 FWY INTERCHANGE.	
AM	5165→	AM	←9760
MID–DAY	4190→	MID–DAY	←7470
PM	4375→	PM	←8450

S7–EB I–210 FWY		S7–WB I–210 FWY	
SEGMENT BETWEEN I–605 FREEWAY AND IRWINDALE AVE.		SEGMENT BETWEEN IRWINDALE AVE AND I–605 FREEWAY.	
AM	5565→	AM	←7120
MID–DAY	5250→	MID–DAY	←6875
PM	5665→	PM	←7570

S8–EB I–210 FWY		S8–WB I–210 FWY	
SEGMENT BETWEEN IRWINDALE AVE AND AZUSA AVE.		SEGMENT BETWEEN AZUSA AVE AND IRWINDALE AVE.	
AM	6275→	AM	←6765
MID–DAY	6710→	MID–DAY	←6680
PM	6315→	PM	←8550

S9–EB I–210 FWY		S9–WB I–210 FWY	
SEGMENT BETWEEN FOOTHILL BLVD AND BERKSHIRE PLACE.		SEGMENT BETWEEN BERKSHIRE PLACE AND FOOTHILL BLVD	
AM	5620*→	AM	←3755
MID–DAY	3610*→	MID–DAY	←3695
PM	4225*→	PM	←5815

S10–EB I–210 FWY		S10–WB I–210 FWY	
SEGMENT BETWEEN SR–2 FWY AND ANGELES CREST HWY.		SEGMENT BETWEEN ANGELES CREST HWY AND SR–2 FWY.	
AM	N/D→	AM	←3500
MID–DAY	N/D→	MID–DAY	←3355
PM	N/D→	PM	←5545

S11–NB SR–2 FWY		S11–SB SR–2 FWY	
SEGMENT BETWEEN MOUNTAIN ST AND I–210/SR–2 FWY INTERCHANGE.		SEGMENT BETWEEN I–210/SR–2 FWY INTERCHANGE AND MOUNTAIN ST.	
AM	2640→	AM	←6065
MID–DAY	5250→	MID–DAY	←2145
PM	5660→	PM	←2840

S12–NB SR–2 FWY		S12–SB SR–2 FWY	
SEGMENT BETWEEN SR–134/SR–2 FWY INTERCHANGE AND MOUNTAIN ST.		SEGMENT BETWEEN MOUNTAIN ST AND SR–134/SR–2 FWY INTERCHANGE.	
AM	N/D→	AM	←6525
MID–DAY	N/D→	MID–DAY	←2630
PM	N/D→	PM	←3285

S13–EB SR–134 FWY		S13–WB SR–134 FWY	
SEGMENT BETWEEN SR–2 FWY AND FIGUEROA ST.		SEGMENT BETWEEN FIGUEROA ST AND SR–2 FWY.	
AM	6080*→	AM	←6350
MID–DAY	6295*→	MID–DAY	←5085
PM	6955*→	PM	←6375

LEGEND

X%→ EXISTING VOLUMES
N/D→ NO DATA AVAILABLE
*→ CALCULATED VOLUME

S14–EB SR–134 FWY		S14–WB SR–134 FWY	
SEGMENT BETWEEN GLENDALE AVE AND SR–2 FWY.		SEGMENT BETWEEN SR–2 FWY AND GLENDALE AVE.	
AM	6540→	AM	←N/D
MID–DAY	7225→	MID–DAY	←N/D
PM	8485→	PM	←N/D

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EXISTING + PROJECT TRIPS FREEWAY SEGMENTS 1–14

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4–5–1

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S15–EB SR–134 FWY		S15–WB SR–134 FWY	
SEGMENT BETWEEN SAN FERNANDO ST AND PACIFIC AVE.		SEGMENT BETWEEN PACIFIC AVE AND SAN FERNANDO ST.	
AM	7235→	AM	←7880
MID–DAY	7010→	MID–DAY	←7635
PM	7505→	PM	←8175

S16–EB SR–134 FWY		S16–WB SR–134 FWY	
SEGMENT BETWEEN SR–134/I–5 FWY INTERCHANGE AND SAN FERNANDO ST.		SEGMENT BETWEEN SAN FERNANDO ST. AND SR–134/I–5 FWY INTERCHANGE.	
AM	N/D→	AM	←6420
MID–DAY	N/D→	MID–DAY	←5050
PM	N/D→	PM	←8435

S17–SB I–5 FWY		S17–NB I–5 FWY	
SEGMENT BETWEEN WESTERN AVE AND I–5/SR–134 FWY INTERCHANGE.		SEGMENT BETWEEN I–5/SR–134 FWY INTERCHANGE AND WESTERN AVE.	
AM	6500→	AM	←N/D
MID–DAY	7145→	MID–DAY	←N/D
PM	7045→	PM	←N/D

S18–SB I–5 FWY		S18–NB I–5 FWY	
SEGMENT BETWEEN ROSCOE BLVD/GLEN OAKS BLVD AND N. HOLLYWOOD WAY.		SEGMENT BETWEEN N. HOLLYWOOD WAY AND ROSCOE BLVD/GLEN OAKS BLVD.	
AM	6040→	AM	←5540
MID–DAY	5010→	MID–DAY	←6080
PM	4675→	PM	←6620

S19–SB I–5 FWY		S19–NB I–5 FWY	
SEGMENT BETWEEN I–5/SR–170 FWY INTERCHANGE AND SHELDON ST.		SEGMENT BETWEEN SHELDON ST AND I–5/SR–170 FWY INTERCHANGE.	
AM	N/D→	AM	←5000
MID–DAY	N/D→	MID–DAY	←5495
PM	N/D→	PM	←4805

S20–SB I–5 FWY		S20–NB I–5 FWY	
SEGMENT BETWEEN BRANFORD ST. AND I–5/SR–170 FWY INTERCHANGE		SEGMENT BETWEEN I–5/SR–170 FWY INTERCHANGE AND BRANFORD ST.	
AM	12645→	AM	←N/D
MID–DAY	8470→	MID–DAY	←N/D
PM	9295→	PM	←N/D

S21–EB I–210 FWY		S21–WB I–210 FWY	
SEGMENT BETWEEN MONTROSE AVE AND EB–210/SR–2 FWY INTERCHANGE.		SEGMENT BETWEEN EB–210/SR–2 FWY INTERCHANGE AND MONTROSE AVE.	
AM	N/D→	AM	←N/D
MID–DAY	N/D→	MID–DAY	←N/D
PM	N/D→	PM	←N/D

S22–EB I–210 FWY		S22–WB I–210 FWY	
SEGMENT BETWEEN WHEATLAND AVE AND SUNLAND AVE.		SEGMENT BETWEEN SUNLAND AVE AVE WHEATLAND AVE.	
AM	4785→	AM	←N/D
MID–DAY	2720→	MID–DAY	←N/D
PM	3700→	PM	←N/D

S23–EB I–210 FWY		S23–WB I–210 FWY	
SEGMENT BETWEEN FOOTHILL BLVD AND WHEATLAND AVE.		SEGMENT BETWEEN WHEATLAND AVE AND FOOTHILL BLVD.	
AM	4455→	AM	←4130
MID–DAY	3480→	MID–DAY	←3530
PM	4900→	PM	←6740

S24–EB I–210 FWY		S24–WB I–210 FWY	
SEGMENT BETWEEN SR–118/I–210 FWY INTERCHANGE AND FOOTHILL BLVD		SEGMENT BETWEEN FOOTHILL BLVD AND SR–118/I–210 FWY INTERCHANGE.	
AM	N/D→	AM	←4080
MID–DAY	N/D→	MID–DAY	←3380
PM	N/D→	PM	←5690

S25–EB SR–118 FWY		S25–WB SR–118 FWY	
SEGMENT BETWEEN GLEN OAKS BLVD AND SR–118/I–210 FWY INTERCHANGE.		SEGMENT BETWEEN SR–118/I–210 FWY INTERCHANGE AND GLEN OAKS BLVD.	
AM	N/D→	AM	←N/D
MID–DAY	N/D→	MID–DAY	←N/D
PM	N/D→	PM	←N/D

S26–EB SR–118 FWY		S26–WB SR–118 FWY	
SEGMENT BETWEEN SR–118/I–5 FWY INTERCHANGE AND SAN FERNANDO RD.		SEGMENT BETWEEN SAN FERNANDO RD AND SR–118/I–5 FWY INTERCHANGE.	
AM	N/D→	AM	←6265
MID–DAY	N/D→	MID–DAY	←3600
PM	N/D→	PM	←5740

S27–SB I–5 FWY		S27–NB I–5 FWY	
SEGMENT BETWEEN I–5/ SR–118 FWY INTERCHANGE AND VAN NUYS BLVD.		SEGMENT BETWEEN VAN NUYS BLVD AND I–5/ SR–118 FWY INTERCHANGE.	
AM	9120→	AM	←8035
MID–DAY	7155→	MID–DAY	←8390
PM	7860→	PM	←8555

LEGEND

X%→ EXISTING VOLUMES
N/D→ NO DATA AVAILABLE
*→ CALCULATED VOLUME

S28–SB I–5 FWY		S28–NB I–5 FWY	
SEGMENT BETWEEN VAN NUYS BLVD AND OSBORNE ST.		SEGMENT BETWEEN OSBORNE ST AND VAN NUYS BLVD.	
AM	N/D→	AM	←N/D
MID–DAY	N/D→	MID–DAY	←N/D
PM	N/D→	PM	←N/D

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EXISTING + PROJECT TRIPS FREEWAY SEGMENTS 15–28

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4–5–2

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R1–EB 210 FREEWAY	
DIVERGE POINT	
BERKSHIRE PLACE OFF–RAMP	
AM	465→
MID–DAY	205→
PM	310→

R2–WB 210 FREEWAY	
MERGE POINT	
BERKSHIRE PLACE ON–RAMP	
AM	←400
MID–DAY	←270
PM	←525

R3–EB 210 FREEWAY	
MERGE POINT	
BERKSHIRE PLACE ON–RAMP	
AM	315→
MID–DAY	185→
PM	455→

R4–WB 210 FREEWAY	
DIVERGE POINT	
BERKSHIRE PLACE OFF–RAMP	
AM	←390
MID–DAY	←180
PM	←230

R5–EB 210 FREEWAY	
DIVERGE POINT	
WINDSOR AVENUE OFF–RAMP	
AM	710→
MID–DAY	430→
PM	755→

R6–WB 210 FREEWAY	
MERGE POINT	
WINDSOR AVENUE ON–RAMP	
AM	←625
MID–DAY	←380
PM	←600

R7–EB 210 FREEWAY	
MERGE POINT	
WINDSOR AVENUE ON–RAMP	
AM	485→
MID–DAY	360→
PM	490→

R8–WB 210 FREEWAY	
DIVERGE POINT	
WINDSOR AVENUE OFF–RAMP	
AM	←630
MID–DAY	←250
PM	←485

R9–EB 210 FREEWAY	
DIVERGE POINT	
EB I–210 FREEWAY AND WB SR–134 FREEWAY TRANSITION/OFF–RAMP	
AM	N/D→
MID–DAY	N/D→
PM	N/D→

R10–WB 210 FREEWAY	
MERGE POINT	
WB I–210 FREEWAY AND EB SR–134 FREEWAY TRANSITION/ ON–RAMP	
AM	←N/D
MID–DAY	←N/D
PM	←N/D

R11–WB 134 FREEWAY	
MERGE POINT	
WB I–210 FREEWAY TRANSITION/ ON–RAMP	
AM	←N/D
MID–DAY	←N/D
PM	←N/D

R12–EB 134 FREEWAY	
DIVERGE POINT	
EB I–210 FREEWAY TRANSITION/ OFF–RAMP	
AM	N/D→
MID–DAY	N/D→
PM	N/D→

R13–WB 134 FREEWAY	
DIVERGE POINT	
FIGUEROA ST/ SCHOLL CANYON RD OFF–RAMP	
AM	←N/D
MID–DAY	←N/D
PM	←N/D

R14–EB 210 FREEWAY	
MERGE POINT	
FIGUEROA ST/ SCHOLL CANYON RD ON–RAMP	
AM	385→
MID–DAY	340→
PM	370→

R15–EB 210 FREEWAY	
MERGE POINT	
EB I–210 FREEWAY TRANSITION/ ON–RAMP	
AM	N/D→
MID–DAY	N/D→
PM	N/D→

R16–WB 210 FREEWAY	
DIVERGE POINT	
WB I–210 FREEWAY TRANSITION/ OFF–RAMP	
AM	←N/D
MID–DAY	←N/D
PM	←N/D

R17–EB 210 FREEWAY	
DIVERGE POINT	
IRWINDALE AVENUE OFF–RAMP	
AM	1170→
MID–DAY	1010→
PM	815→

R18–WB 210 FREEWAY	
MERGE POINT	
IRWINDALE AVENUE ON–RAMP	
AM	←635
MID–DAY	←470
PM	←525

R19–WB 210 FREEWAY	
MERGE POINT	
IRWINDALE AVENUE SLIP ON–RAMP	
AM	←660
MID–DAY	←595
PM	←525

R20–WB 210 FREEWAY	
MERGE POINT	
AZUSA AVENUE/FIRST STREET ON–RAMP	
AM	←915
MID–DAY	←410
PM	←450

R21–WB 210 FREEWAY	
DIVERGE POINT	
SB SR–2 FREEWAY TRANSITION/ OFF–RAMP	
AM	←1535
MID–DAY	←710
PM	←870

R22–EB 210 FREEWAY	
MERGE POINT	
NB SR–2 FREEWAY TRANSITION/ ON–RAMP	
AM	575→
MID–DAY	610→
PM	835→

R23–SB 2 FREEWAY	
MERGE POINT	
WB I–210 FREEWAY TRANSITION/ ON–RAMP	
AM	←1535
MID–DAY	←710
PM	←920

R24–NB 2 FREEWAY	
DIVERGE POINT	
EB I–210 FREEWAY TRANSITION/ OFF–RAMP	
AM	575→
MID–DAY	610→
PM	835→

R25–SB 2 FREEWAY	
DIVERGE POINT	
EB SR–134 FREEWAY TRANSITION/ OFF–RAMP	
AM	N/D→
MID–DAY	N/D→
PM	N/D→

R26–NB 2 FREEWAY	
MERGE POINT	
WB AND EB SR–134 FREEWAY TRANSITION/ ON–RAMP	
AM	←1270
MID–DAY	←1660
PM	←2420

R27–EB 134 FREEWAY	
MERGE POINT	
SB SR–2 FREEWAY TRANSITION/ ON–RAMP	
AM	N/D→
MID–DAY	N/D→
PM	N/D→

R28–WB 134 FREEWAY	
DIVERGE POINT	
NB SR–2 FREEWAY TRANSITION/ OFF–RAMP	
AM	←1120
MID–DAY	←790
PM	←1230

R29–EB 134 FREEWAY	
DIVERGE POINT	
FIGUEROA ST/SCHOLL CANYON RD OFF–RAMP	
AM	445→
MID–DAY	360→
PM	560→

LEGEND

XXX→ EXISTING VOLUMES
N/D→ NO DATA AVAILABLE
*→ CALCULATED VOLUME

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EXISTING + PROJECT TRIPS RAMPS 1–29

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4–5–3

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R30–WB 134 FREEWAY	
MERGE POINT	
FIGUEROA ST/SCHOLL CANYON RD ON–RAMP	
AM	◄ N/D
MID–DAY	◄ N/D
PM	◄ N/D

R31–WB 134 FREEWAY	
MERGE POINT	
SB SR–2 FREEWAY TRANSITION/ON–RAMP	
AM	◄ N/D
MID–DAY	◄ N/D
PM	◄ N/D

R32–EB 134 FREEWAY	
DIVERGE POINT	
NB SR–2 FREEWAY TRANSITION/ OFF–RAMP	
AM	2050 ►
MID–DAY	2310 ►
PM	3230 ►

R33–WB 134 FREEWAY	
DIVERGE POINT	
NB I–5 FREEWAY TRANSITION/ OFF–RAMP	
AM	◄ 2930
MID–DAY	◄ 2675
PM	◄ 2805

R34–EB 134 FREEWAY	
MERGE POINT	
SB I–5 FREEWAY TRANSITION/ ON–RAMP	
AM	2920 ►
MID–DAY	2680 ►
PM	3035 ►

R35–NB 5 FREEWAY	
MERGE POINT	
WB SR–134 FREEWAY TRANSITION/ ON–RAMP	
AM	◄ 2950
MID–DAY	◄ 2540
PM	◄ 2805

R36–SB 5 FREEWAY	
DIVERGE POINT	
EB SR–134 FREEWAY TRANSITION/ OFF–RAMP	
AM	N/D ►
MID–DAY	N/D ►
PM	N/D ►

R37–NB 5 FREEWAY	
DIVERGE POINT	
ROSCOE BLVD/GLEN OAKS BLVD OFF–RAMP	
AM	◄ 335
MID–DAY	◄ 345
PM	◄ 680

R38–SB 5 FREEWAY	
MERGE POINT	
ROSCOE BLVD/GLEN OAKS BLVD ON–RAMP	
AM	650 ►
MID–DAY	420 ►
PM	455 ►

R39–SB 5 FREEWAY	
MERGE POINT	
BRANFORD STREET ON–RAMP	
AM	N/D ►
MID–DAY	N/D ►
PM	N/D ►

R40–NB 5 FREEWAY	
DIVERGE POINT	
BRANFORD STREET OFF–RAMP	
AM	◄ N/D
MID–DAY	◄ N/D
PM	◄ N/D

R41–WB 210 FREEWAY	
DIVERGE POINT	
WHEATLAND AVE OFF–RAMP	
AM	◄ 120
MID–DAY	◄ 115
PM	◄ 160

R42–EB 210 FREEWAY	
MERGE POINT	
WHEATLAND AVE ON–RAMP	
AM	175 ►
MID–DAY	115 ►
PM	140 ►

R43–WB 210 FREEWAY	
DIVERGE POINT	
FOOTHILL BLVD/ OSBORNE STREET OFF–RAMP	
AM	◄ 280
MID–DAY	◄ 200
PM	◄ 320

R44–EB 210 FREEWAY	
MERGE POINT	
FOOTHILL BLVD/ OSBORNE STREET ON–RAMP	
AM	535 ►
MID–DAY	285 ►
PM	345 ►

R45–WB 210 FREEWAY	
DIVERGE POINT	
WB SR–118 FREEWAY TRANSITION/ OFF–RAMP	
AM	◄ N/D
MID–DAY	◄ N/D
PM	◄ N/D

R46–EB 210 FREEWAY	
MERGE POINT	
EB SR–118 FREEWAY TRANSITION/ ON–RAMP	
AM	N/D ►
MID–DAY	N/D ►
PM	N/D ►

R47–WB 118 FREEWAY	
MERGE POINT	
WB I–210 FREEWAY TRANSITION/ ON–RAMP	
AM	◄ N/D
MID–DAY	◄ N/D
PM	◄ N/D

R48–EB 118 FREEWAY	
DIVERGE POINT	
EB I–210 FREEWAY TRANSITION/ OFF–RAMP	
AM	N/D ►
MID–DAY	N/D ►
PM	N/D ►

R49–WB 118 FREEWAY	
DIVERGE POINT	
SB 1–5 FREEWAY TRANSITION/ OFF–RAMP	
AM	◄ N/D
MID–DAY	◄ N/D
PM	◄ N/D

R50–EB 118 FREEWAY	
MERGE POINT	
NB I–5 FREEWAY TRANSITION/ON–RAMP	
AM	N/D ►
MID–DAY	N/D ►
PM	N/D ►

R51–SB 5 FREEWAY	
MERGE POINT	
WB SR–118 FREEWAY TRANSITION/ON–RAMP	
AM	N/D ►
MID–DAY	N/D ►
PM	N/D ►

R52–NB 5 FREEWAY	
DIVERGE POINT	
EB SR–118 FREEWAY TRANSITION/ OFF–RAMP	
AM	◄ N/D
MID–DAY	◄ N/D
PM	◄ N/D

R53–SB 5 FREEWAY	
MERGE POINT	
OSBORNE STREET ON–RAMP	
AM	405 ►
MID–DAY	810 ►
PM	1135 ►

R54–NB 5 FREEWAY	
DIVERGE POINT	
OSBORNE STREET OFF–RAMP	
AM	◄ 460
MID–DAY	◄ 575
PM	◄ 665

LEGEND

XXX► EXISTING VOLUMES
N/D► NO DATA AVAILABLE
*► CALCULATED VOLUME

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EXISTING + PROJECT TRIPS RAMPS 30–54

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4–5–4

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Existing + Project Freeway Mainline HCM Analysis

Freeway mainline capacity analyses were conducted for the 28 freeway segments identified utilizing the methods as discussed previously and using the existing geometrics. The resulting LOS for the existing plus project conditions of each freeway segment analyzed is presented in *Table 4-5-1*.

Table 4-5-1
Freeway Mainline Capacity Analysis – Existing + Project Conditions
Traffic Impact Analysis

	Segment/Freeway Name	AM		MID-DAY		PM	
		Density	LOS	Density	LOS	Density	LOS
1	I-210 WB between Windsor Ave/Arroyo Blvd and Berkshire Place	12.2	B	9.1	A	14.7	B
2	I-210 EB between Windsor Ave/Arroyo Blvd and Berkshire Place	21.4	C	13.7	B	16.5	B
3	I-210 WB between Lincoln Avenue and Windsor Ave/Arroyo Blvd.	14.3	B	14.2	B	22.1	C
4	I-210 EB between Lincoln Avenue and Windsor Ave/Arroyo Blvd.	21.3	C	13.3	B	15.9	B
5	I-210 WB between the SR-134 Fwy and Mountain Street.	13.7	B	11.8	B	16.6	B
6	I-210 EB between the SR-134 Fwy and Mountain Street.	20.9	C	12.8	B	15.2	B
7	SR-134 WB between San Rafael Ave and Figueroa Street	24.9	C	16.5	B	22.6	C
8	SR-134 EB between San Rafael Ave and Figueroa Street	17.2	B	16.1	B	19.7	C
9	SR-134 WB between the I-210 Fwy and San Rafael Ave.	23.8	C	15.7	B	22.3	C
10	SR-134 EB between the I-210 Fwy and San Rafael Ave.	17.2	B	19.3	C	24.9	C
11	I-210 WB between the SR-134 Fwy and Lake Ave.	33.7	D	23.3	C	28.7	D
12	I-210 EB between the SR-134 Fwy and Lake Ave.	31.1	D	32.4	D	34.6	D
13	I-210 WB between the I-605 Fwy and Irwindale Avenue.	21.4	C	20.5	C	23.4	C
14	I-210 EB between the I-605 Fwy and Irwindale Avenue.	15.9	B	15.1	B	16.4	B
15	I-210 WB between Irwindale Avenue and Azusa Avenue.	20.0	C	19.7	C	27.3	D
16	I-210 EB between Irwindale Avenue and Azusa Avenue.	18.4	C	19.9	C	18.8	C
17	I-210 WB between Berkshire Place and Foothill Blvd.	14.0	B	14.2	B	22.7	C
18	I-210 EB between Berkshire Place and Foothill Blvd.	21.8	C	13.4	B	15.7	B
19	I-210 WB between Angeles Crest Hwy (SR-2 Hwy) and the SR-2 Fwy (Glendale Fwy)	12.7	B	12.5	B	20.8	C
20	I-210 EB between Angeles Crest Hwy (SR-2 Hwy) and the SR-2 Fwy (Glendale Fwy)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
21	SR-2 NB between the I-210 Fwy and Mountain Street.	7.9	A	15.6	B	16.9	B
22	SR-2 SB between the I-210 Fwy and Mountain Street.	24.1	C	8.0	A	10.6	A
23	SR-2 NB between Mountain Street and the SR-134 Fwy.	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
24	SR-2 SB between Mountain Street and the SR-134 Fwy.	26.8	D	9.8	A	12.2	B

Table 4-5-1 -Continued-
Freeway Mainline Capacity Analysis – Existing + Project Conditions
Traffic Impact Analysis

	Segment/Freeway Name	AM		MID-DAY		PM	
		Density	LOS	Density	LOS	Density	LOS
25	SR-134 WB between the SR-2 Fwy and Figueroa Street.	18.4	C	14.5	B	18.5	C
26	SR-134 EB between the SR-2 Fwy and Figueroa Street.	18.3	C	19.1	C	21.4	C
27	SR-134 WB between the SR-2 Fwy and Glendale Avenue.	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
28	SR-134 EB between the SR-2 Fwy and Glendale Avenue.	20.0	C	22.6	C	28.4	D
29	SR-134 WB between San Fernando Street and Pacific Ave.	27.9	D	18.4	C	19.9	C
30	SR-134 EB between San Fernando Street and Pacific Ave.	31.5	D	29.9	D	33.6	D
31	SR-134 WB between San Fernando Street and the I-5 Freeway.	26.1	D	19.2	C	42.5	E
32	SR-134 EB between San Fernando Street and the I-5 Freeway.	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
33	I-5 SB between the SR-134 Fwy and Western Avenue.	26.4	D	30.7	D	30.4	D
34	I-5 NB between the SR-134 Fwy and Western Avenue.	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
35	I-5 NB between North Hollywood Way and Roscoe Blvd/Glenoaks Blvd.	20.7	C	23.3	C	26.0+	D
36	I-5 SB between North Hollywood Way and Roscoe Blvd/Glenoaks Blvd.	24.0	C	19.0	C	17.5	B
37	I-5 SB between Sheldon Street/Laurel Canyon Blvd and the SR-170 Fwy	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
38	I-5 NB between Sheldon Street/Laurel Canyon Blvd and the SR-170 Fwy.	18.9	C	21.2	C	17.5	B
39	I-5 SB between the SR-170 Fwy and Branford Street.	272.4	F	40.3	E	49.6	F
40	I-5 NB between the SR-170 Fwy and Branford Street.	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
41	I-210WB between the SR-2 Fwy and Montrose Avenue.	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
42	I-210EB between the SR-2 Fwy and Montrose Avenue.	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
43	I-210 WB between Wheatland Ave and Sunland Blvd.	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
44	I-210 EB between Wheatland Ave and Sunland Blvd.	17.3	B	10.3	A	14.2	B
45	I-210 WB between Wheatland Ave and Foothill Blvd/Osborne Street.	14.8	B	13.1	B	26.7	C
46	I-210 EB between Wheatland Ave and Foothill Blvd/Osborne Street.	16.5	B	12.9	B	18.8	C
47	I-210 WB between Foothill Blvd/Osborne Street and the SR-118 Fwy.	15.2	B	12.6	B	22.3	C
48	I-210 EB between Foothill Blvd/Osborne Street and the SR-118 Fwy.	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
49	SR-118WB between the I-210 Fwy and Glenoaks Blvd.	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
50	SR-118EB between the I-210 Fwy and Glenoaks Blvd.	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*

Table 4-5-1 -Continued-
Freeway Mainline Capacity Analysis – Existing + Project Conditions
Traffic Impact Analysis

Segment/Freeway Name		AM		MID-DAY		PM	
		Density	LOS	Density	LOS	Density	LOS
51	SR-118 WB between San Fernando Rd and the I-210 Fwy.	40.5	E	17.7	B	34.0	D
52	SR-118 EB between San Fernando Rd and the I-210 Fwy.	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
53	I-5 NB between the SR-118 Fwy and Van Nuys Blvd.	35.5	E	39.1	E	40.7	E
54	I-5 SB between the SR-118 Fwy and Van Nuys Blvd.	24.0	C	17.9	B	20.0	C
55	I-5 NB between Tierra Bella Street and Osborne Street.	38.7	E	42.9	E	43.5	E
56	I-5 SB between Tierra Bella Street and Osborne Street.	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*

(1) Density – (pc/mi/ln)
(2) HCM LOS - Highway Capacity Manual Level of Service
(*) N/D*- No Available Data from Caltrans

Source: **Hall & Foreman Inc**

As presented in *Table 4-5-1*, under existing plus project conditions most of the 28 freeway segments are expected to operate at an acceptable HCM LOS of D or better for the AM, Mid-day, and PM peak hours. Freeway segments identified in existing conditions are estimated to continue to operate at a level-of-service E or lower. The freeway segment SR-134 Westbound between San Fernando road and the I-5 Freeway (Haul Routes 5B, 6B, 7B, 8A) with an HCM LOS E for the PM peak hour. The freeway segment I-5 Southbound between SR-170 and Branford Street (Haul Route 8A) with an HCM LOS F for the AM and PM peak hours and HCM LOS E for the MIDDAY peak hour. The freeway segment SR-118 Westbound Freeway between San Fernando road and the I-210 Freeway (Haul Route 8B) with an HCM LOS E for the AM peak hours. The freeway segment I-5 Northbound between the SR-118 Westbound Freeway and Van Nuys Blvd (Haul Route 8B) with an HCM LOS E MID-DAY and P.M. peak hours. The freeway segment I-5 Northbound between Tierra Bella Street and Osborne Street (Haul Route 8B) with an HCM LOS E AM, MID-DAY and P.M. peak hours. Mitigation is recommended under existing conditions to improve the HCM LOS for these five freeway segments.

Existing + Project Freeway Ramp HCM Analysis

Freeway ramp analyses was conducted for the 54 on and off-ramps identified utilizing the methods as discussed previously and using the existing geometrics The resulting HCM LOS for the existing conditions of each ramp analyzed is presented in *Table 4-5-2*.

Table 4-5-2
Freeway Ramp Analysis – Existing + Project Conditions
Traffic Impact Analysis

Intersection # / Routes / Name			AM		MID-DAY		PM	
			Density	LOS	Density	LOS	Density	LOS
1	1E, 1G	Berkshire Place and the Eastbound I-210 Freeway Off-ramp. (Diverge Point)	18.0	B	9.0	A	12.6	B
2	1E, 1H	Berkshire Place and the Westbound I-210 Freeway On-ramp.(Merge Point)	13.6	B	13.4	B	22.0	C
3	1A, 1C	Berkshire Place and the Eastbound I-210 Freeway On-ramp. (Merge Point)	25.9	C	19.4	B	23.7	C
4	1A, 1D	Berkshire Place and the Westbound I-210 Freeway Off-ramp. (Diverge Point)	22.1	C	21.2	C	31.9	D
5	1F, 1H	Windsor Ave/Arroyo Blvd and the Eastbound I-210 Freeway Off-ramp. (Diverge Point)	31.0	D	21.5	C	26.1	C
6	1F, 1G	Windsor Ave/Arroyo Blvd and the Westbound I-210 Freeway On-Ramp. (Merge Point)	21.9	C	17.2	B	24.0	C
7	1B, 1C	Windsor Ave/Arroyo Blvd and the Eastbound I-210 Freeway On-Ramp. (Merge Point)	17.3	B	10.5	B	12.8	B
8	1B, 1D	Windsor Ave/Arroyo Blvd and the Westbound I-210 Freeway Off-ramp. (Diverge Point)	9.6	A	4.2	A	11.6	B
9	4A	Southbound I-210 Fwy Transition Ramp to the Westbound SR-134 Fwy mainline and Eastbound I-210 Fwy mainline. (Diverge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
10	2A, 2B,3	Westbound I-210 Fwy and Eastbound SR-134 Fwy Transition Ramp to the Westbound I-210 Fwy mainline. (Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
11	2B	Westbound I-210 Fwy Transition Ramp to the Westbound SR-134 Fwy mainline. (Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
12	2B	Eastbound SR-134 Fwy Transition Ramp to the Eastbound I-210 Fwy mainline. (Diverge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
13	4A	Figueroa St/Scholl Canyon Road and the Westbound SR-134 Freeway Off-ramp. (Diverge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
14	4A	Figueroa St and the Eastbound SR-134 Freeway Eastbound On-ramp. (Merge Point)	23.4	C	22.4	C	24.5	C
15	2A, 3	Eastbound I-210 Fwy Transition Ramp to the Eastbound I-210 Fwy mainline.(Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
16	2A, 3	Westbound I-210 Fwy Transition Ramp to the Westbound I-210 Fwy mainline. (Diverge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
17	2A, 2B, 3,9	Irwindale Ave and the Eastbound I-210 Freeway Off-ramp. (Diverge Point)	1.6	A	2.6	A	2.5	A
18	2A,3	Irwindale Ave and the Westbound loop I-210 Freeway On-ramp. (Merge Point)	18.5	B	17.0	B	18.8	B
19	9	Irwindale Ave and the Westbound slip I-210 Freeway On-ramp. (Merge Point)	20.2	C	18.6	B	19.9	B
20	2B	First Street/Azusa Avenue and the Westbound I-210 Freeway On-ramp. (Merge Point)	22.2	C	18.0	B	22.8	C

Table 4-5-2 -Continued-
Freeway Ramp Analysis – Existing + Project Conditions
Traffic Impact Analysis

Intersection # / Routes / Name			AM		MID-DAY		PM	
			Density	LOS	Density	LOS	Density	LOS
21	2B, 4B,5B, 6B, 7B, 8A	Westbound I-210 Fwy Transition Ramp to the Southbound SR-2 Fwy mainline. (Diverge Point)	14.1	A	19.9	A	12.9	A
22	2B, 4B,5B, 6B, 7B, 8A	Northbound SR-2 Fwy Transition Ramp to the Eastbound I-210 Fwy mainline. (Merge Point)	22.3	C	21.3	C	22.6	C
23	2B, 4B,5B, 6B, 7B, 8A	Westbound I-210 Fwy Transition Ramp to the Southbound SR-2 Fwy mainline. (Merge Point)	22.0	C	0.0	A	4.1	A
24	2B, 4B,5B, 6B, 7B, 8A	Northbound SR-2 Fwy Transition Ramp to the Eastbound I-210 Fwy mainline. (Diverge Point)	19.0	B	13.2	B	17.0	B
25	2B, 4B	Southbound SR-2 Fwy Transition Ramp to the Eastbound SR-134 Fwy mainline. (Diverge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
26	2B, 4B,5B, 6B, 7B, 8A	Westbound and Eastbound SR-134 Fwy Transition Ramp to the Northbound SR-2 Fwy mainline. (Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
27	2B, 4B	Southbound SR-2 Fwy Transition Ramp to the Eastbound SR-134 Fwy mainline. (Merge Point)	N/D*	N/D*		N/D*	N/D*	N/D*
28	2B,4B	Westbound SR-134 Fwy Transition Ramp to the Northbound SR-2 Fwy mainline. (Diverge Point)	24.9	C	21.0	C	26.1	C
29	4B	Figueroa Street and the Eastbound SR-134 Fwy Off-ramp. (Diverge Point)	28.0+	D	26.3	C	29.8	D
30	4B	Figueroa Street and the Westbound SR-134 Fwy On-ramp. (Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
31	5B, 6B, 7B,8A	Southbound SR-2 Fwy Transition Ramp to the Westbound SR-134 Fwy mainline. (Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
32	5B, 6B, 7B,8A	Eastbound SR-134 Fwy Transition Ramp to the Northbound SR-2 Fwy mainline. (Diverge Point)	9.7	A	12.2	B	20.4	C
33	5B, 6B, 7B,8A	Westbound SR-134 Fwy Transition Ramp to the Northbound I-5 Fwy mainline. (Diverge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
34	5B,6B, 7B,8A	Southbound I-5 Fwy Transition Ramp to the Eastbound SR-134 Fwy mainline. (Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
35	5B,6B, 7B,8A	Westbound SR-134 Fwy Transition Ramp to the Northbound I-5 Fwy mainline. (Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
36	5B, 6B, 7B, 8A	Southbound I-5 Fwy Transition Ramp to the Eastbound SR-134 Fwy mainline. (Diverge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
37	5B, 6B, 7B	Roscoe Blvd/Glenoaks Blvd and the Northbound I-5 Fwy mainline Off-ramp. (Diverge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
38	5B, 6B, 7B	Roscoe Blvd/Glenoaks Blvd and the Southbound I-5 Fwy mainline On-ramp. (Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
39	8A	Branford Street and the Southbound I-5 Fwy mainline On-ramp. (Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*

Table 4-5-2 -Continued-
Freeway Ramp Analysis – Existing + Project Conditions
Traffic Impact Analysis

Intersection # / Routes / Name			AM		MID-DAY		PM	
			Density	LOS	Density	LOS	Density	LOS
40	8A	Branford Street and the Northbound I-5 Fwy mainline Off-ramp. (Diverge Point)	22.9	C	19.6	B	30.1	D
41	5C,6C, 7C,8C	Wheatland Avenue and the Westbound I-210 Fwy mainline Off-Ramp. (Diverge Point)	23.8	C	18.9	B	23.9	C
42	5C,6C, 7C, 8C	Wheatland Avenue and the Eastbound I-210 Fwy mainline On-Ramp. (Merge Point)	21.6	C	19.7	B	32.3	D
43	5A, 6A, 7A	Foothill Blvd/Osborne Street and the Westbound I-210 Fwy mainline Off-ramp. (Diverge Point)	23.5	C	19.5	B	24.4	C
44	5A, 6A, 7A	Foothill Blvd/Osborne Street and the Eastbound I-210 Fwy mainline On-ramp. (Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
45	8B	Westbound I-210 Fwy Transition Ramp to the Westbound SR-118 Fwy mainline. (Diverge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
46	8B	Eastbound SR-118 Fwy Transition Ramp to the Eastbound I-210 Fwy mainline. (Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
47	8B	Westbound I-210 Fwy Transition Ramp to the Westbound SR-118 Fwy mainline. (Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
48	8B	Eastbound SR-118 Fwy Transition Ramp to the -Eastbound I-210 Fwy mainline. (Diverge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
49	8B	Westbound SR-118 Fwy Transition Ramp to the Southbound I-5 Fwy mainline. (Diverge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
50	8B	Northbound I-5 Fwy Transition Ramp to the Eastbound SR-118 Fwy mainline. (Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
51	8B	Westbound SR-118 Fwy Transition Ramp to the Southbound I-5 Fwy mainline. (Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
52	8B	Northbound I-5 Fwy Transition Ramp to the Eastbound SR-118 Fwy mainline (Diverge Point)	25.1	F	16.7	B	21.1	C
53	8B	Osborne Street and the Southbound I-5 Fwy mainline On-ramp. (Merge Point)	29.9	D	32.3	D	32.4	D
54	8B	Osborne Street and the Northbound I-5 Fwy mainline Off-ramp. (Diverge Point)	22.9	C	19.6	B	30.1	D

(1) Density – (pc/mi/ln)
(2) HCM LOS - Highway Capacity Manual Level of Service
(*) N/D*- No Available Data from Caltrans

Source: **Hall & Foreman Inc**

As presented in *Table 4-5-2*, under the existing plus project conditions most of the freeway ramps are expected to operate at an acceptable HCM LOS of D or better throughout the day, with the exception of the Southbound I-5 Freeway on-ramp at Osborne Street. The Southbound I-5 Freeway on-ramp at Osborne Street (Haul Route 8B) is anticipated to operate at an HCM LOS F during the AM peak hour. Mitigation is recommended under existing conditions to improve the HCM LOS for the ramp.

5. PROJECT CONDITIONS - YEAR 2014

Project Trip Growth

The Devils Gate Dam and Reservoir Area included the cumulative projects in the cities of La Cañada Flintridge and Pasadena. The NASA Jet Propulsion Laboratory (JPL) On-Site Parking Structure project was included for the study area within the City of La Cañada Flintridge. The Rose Bowl National Football League (NFL) Stadium designation project was included for the study area within the City of Pasadena.

The Manning's Pit and Waste Management deposit sites included cumulative projects in the cities of Azusa and Irwindale. The cumulative projects included for the study area within the cities of Azusa and Irwindale include the Azusa Material Recovery Facility and Waste Transfer Station project and the Gold Line Station project.

For the project conditions at the Year 2014, vehicular growth is expected to occur. An annual increase factor of 4.5% totaling 9% for 2 years is incorporated to the report to account for any construction improvements and cumulative projects expected to occur in the surrounding area up to project year. The cumulative projects included in the growth factor are specific to disposal site. The report accounts for this growth and incorporated into the calculations. This helps to identify significant impacts specific to the project.

Project Traffic Analysis

Intersection capacity analyses for the project conditions were conducted for the 52 study intersections utilizing the methods as discussed in section 2 and using the existing intersection geometrics. The resulting HCM LOS for the project conditions Year 2014 of each intersection analyzed are presented in *Table 5-1-1* thru *Table 5-4-12*. The LOS of both the HCM and ICU methods are presented.

Section 1: Devil's Gate Dam and Reservoir (Site 1)

Haul Route 1A

The Year 2014 AM (7-9), MID-DAY (12-2), MID-DAY (2-4), PM (4-6) turn movement volumes, are provided in *Figure 5-1-1A.* For comparison the (PCE) Year 2014 turn movement volumes are provided in *Figure 5-1-1B.*

Haul Route 1B

The Year 2014 AM (7-9), MID-DAY (12-2), MID-DAY (2-4), PM (4-6) turn movement volumes, are provided in *Figure 5-1-2A.* For comparison the (PCE) Year 2014 turn movement volumes are provided in *Figure 5-1-2B.*

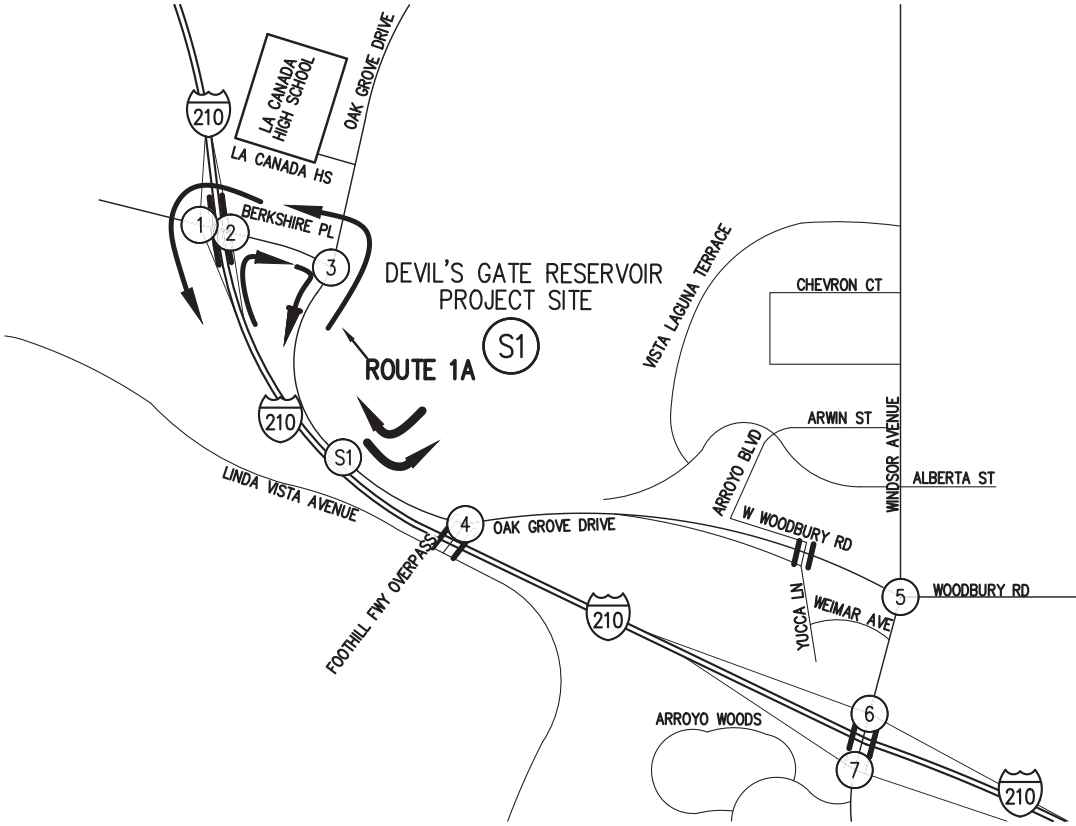
N/S STREET				1	E/W STREET			
I-210 FWY EB RAMPS					BERKSHIRE PLACE			
				90	10	355		
				50	10	115		
				65	10	225		
				100	10	180		
0	0	0	0				0	0	0	0
275	110	135	85		TS		130	120	180	175
135	60	85	75				215	145	285	425
				0	0	0				
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET				2	E/W STREET			
I-210 FWY WB RAMPS					BERKSHIRE PLACE			
				0	0	0		
				0	0	0		
				0	0	0		
				0	0	0		
105	55	55	70				280	185	185	445
310	190	190	195		TS		265	180	180	500
0	0	0	0				0	0	0	0
				65	10	360				
				60	10	135				
				70	10	185				
				105	10	145				

N/S STREET				3	E/W STREET			
OAK GROVE DRIVE					BERKSHIRE PLACE			
				390	75	0		
				235	110	0		
				810	155	0		
				820	265	0		
555	165	360	200				0	0	0	0
0	0	0	0		TS		0	0	0	0
135	125	110	155				0	0	0	0
				215	490	0				
				130	145	0				
				140	105	0				
				130	165	0				

N

NOT TO SCALE



LEGEND

N/S STREET				S#	E/W STREET			
				7AM-9AM				
				2PM-4PM				
				4PM-6PM				
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS		7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM				
				2PM-4PM				
				4PM-6PM				

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 1A
PROJECT TRIPS – YEAR 2014

DEVIL'S GATE DAM & RESERVOIR

FIGURE 5-1-1A

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 5\Ch. 5 Section 1\FIG 5-1-1A.dwg
Last Opened: Oct 04, 2013 – 12:15pm by: TMunoz

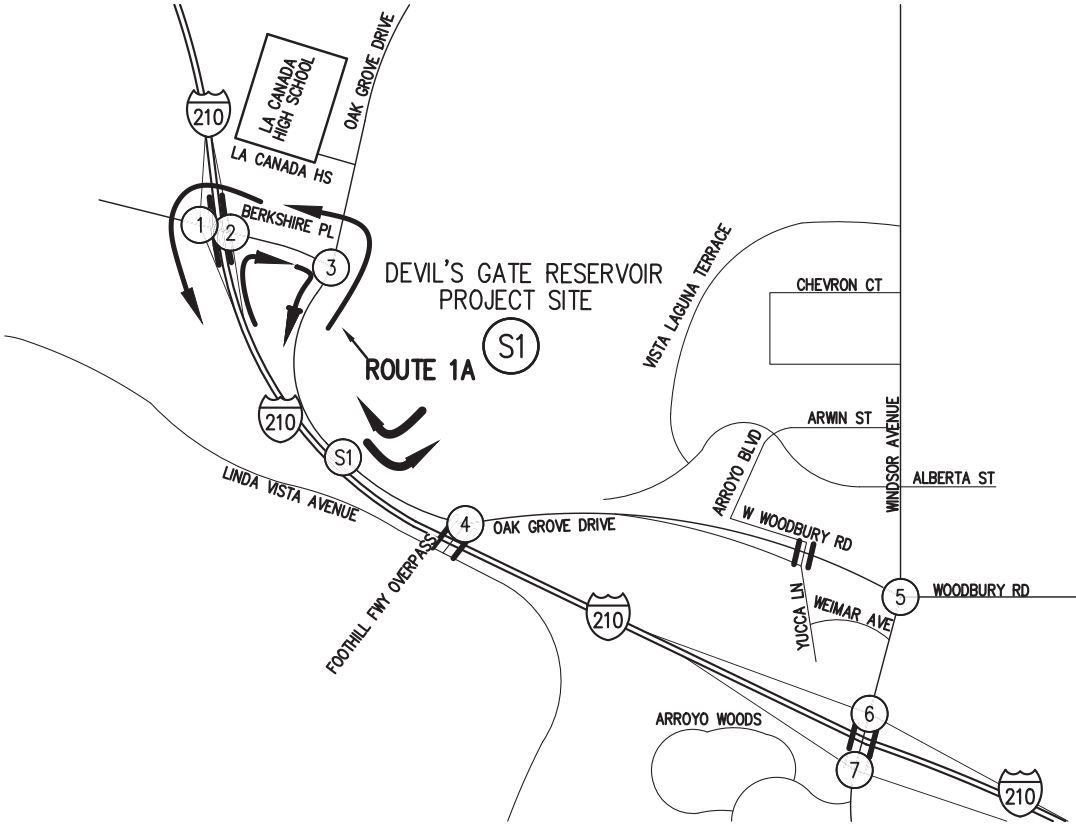
N/S STREET				1			E/W STREET				
I-210 FWY EB RAMPS							BERKSHIRE PLACE				
				100	10	365					
				55	10	125					
				75	10	255					
				100	10	180					
0	0	0	0					0	0	0	0
275	115	160	90		TS			135	125	205	175
140	65	100	75					340	280	435	545
				0	0	0					
				0	0	0					
				0	0	0					
				0	0	0					

N/S STREET				2			E/W STREET				
I-210 FWY WB RAMPS							BERKSHIRE PLACE				
				0	0	0					
				0	0	0					
				0	0	0					
				0	0	0					
105	60	80	70					295	185	630	445
320	200	345	195		TS			400	310	545	625
0	0	0	0					0	0	0	0
				65	10	465					
				65	10	230					
				80	10	300					
				105	10	245					

N/S STREET				3			E/W STREET				
OAK GROVE DRIVE							BERKSHIRE PLACE				
				400	90	0					
				245	125	0					
				930	195	0					
				825	275	0					
565	175	415	220					0	0	0	0
0	0	0	0		TS			0	0	0	0
230	225	205	245					0	0	0	0
				340	495	0					
				250	155	0					
				275	120	0					
				250	175	0					

N

NOT TO SCALE



LEGEND

N/S STREET				S#				E/W STREET			
				7AM-9AM							
				2PM-4PM							
				4PM-6PM							
7AM - 9AM	2PM - 4PM	4PM - 6PM			TS			7AM - 9AM	2PM - 4PM	4PM - 6PM	
				7AM-9AM							
				2PM-4PM							
				4PM-6PM							

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 1A
PCE PROJECT TRIPS – YEAR 2014
DEVIL'S GATE DAM & RESERVOIR

FIGURE 5-1-1B

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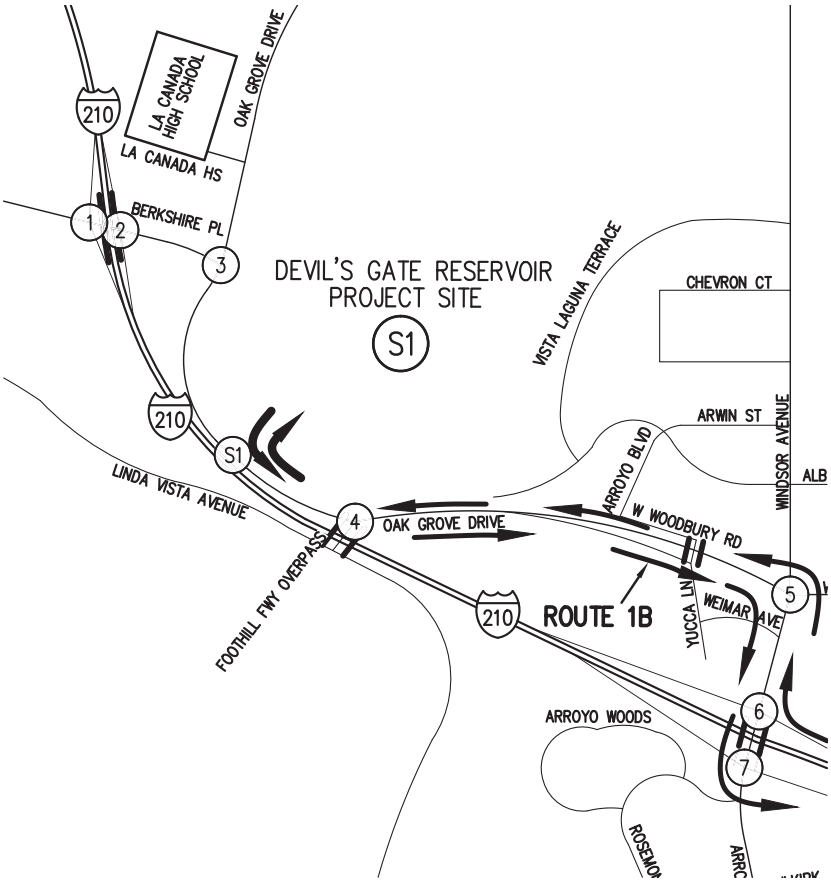
N/S STREET				4				E/W STREET			
FOOTHILL FWY OVERPASS								OAK GROVE DRIVE			
				0	0	0					
				0	0	0					
				0	0	0					
				0	0	0					
0	0	0	0					0	0	0	0
185	175	215	350		TS			565	245	195	200
55	70	65	85					195	65	45	65
				135	0	105					
				60	0	65					
				65	0	70					
				75	0	65					

N/S STREET				5				E/W STREET			
WINDSOR AVE								OAK GROVE DRIVE			
				40	645	60					
				15	325	45					
				25	370	45					
				10	570	65					
25	30	25	45					50	40	35	55
115	155	155	260		TS			465	175	120	170
105	75	90	85					605	325	380	480
				135	660	495					
				90	315	400					
				80	385	475					
				85	540	620					

N/S STREET				6				E/W STREET			
WINDSOR AVE								I-210 FWY WB RAMPS			
				580	700	0					
				305	465	0					
				300	535	0					
				485	660	0					
0	0	0	0					680	360	425	500
0	0	0	0		TS			10	10	10	10
0	0	0	0					10	25	25	30
				45	605	0					
				50	460	0					
				50	545	0					
				110	750	0					

N/S STREET				7				E/W STREET			
WINDSOR AVE								I-210 FWY EB RAMPS			
				0	205	510					
				0	110	380					
				0	175	365					
				0	180	510					
600	350	405	650					0	0	0	0
10	10	10	10		TS			0	0	0	0
115	60	55	115					0	0	0	0
				0	140	25					
				0	160	20					
				0	175	20					
				0	215	20					



LEGEND

N/S STREET				S#				E/W STREET			
				7AM-9AM							
				2PM-4PM							
				4PM-6PM							
7AM - 9AM	2PM - 4PM	4PM - 6PM			TS			7AM - 9AM	2PM - 4PM	4PM - 6PM	
				7AM-9AM							
				2PM-4PM							
				4PM-6PM							

LEGEND

(S#) – DISPOSAL SITE

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ROUTE 1B
PROJECT TRIPS – YEAR 2014
DEVIL'S GATE DAM & RESERVOIR

FIGURE 5-5-2A

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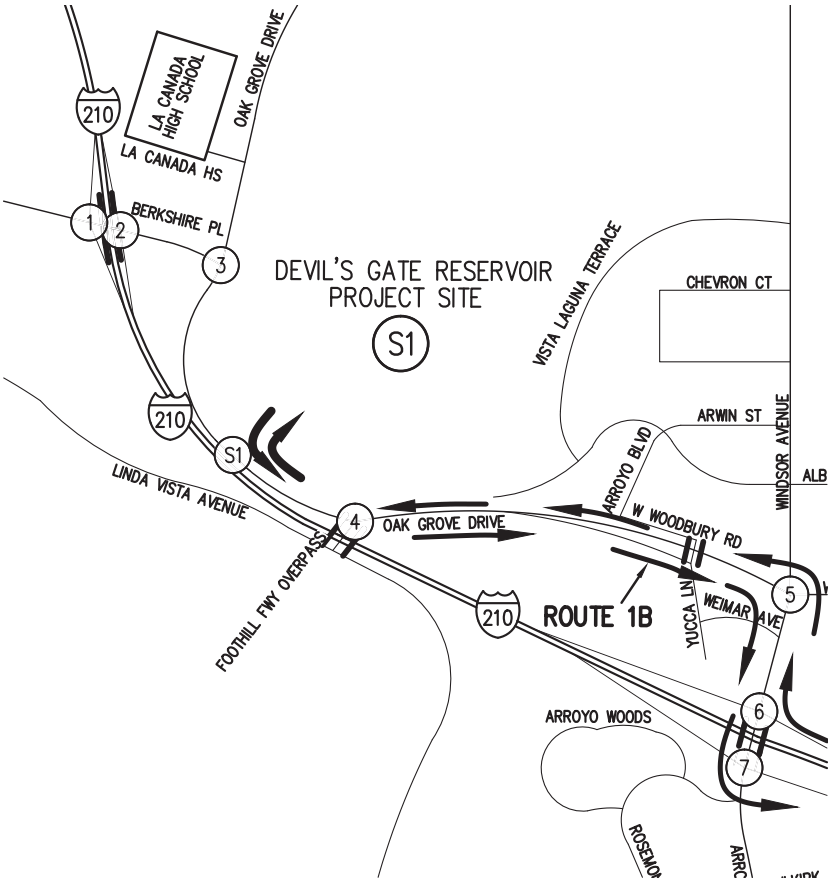
N/S STREET				4				E/W STREET			
FOOTHILL FWY OVERPASS								OAK GROVE DRIVE			
				0	0	0					
				0	0	0					
				0	0	0					
				0	0	0					
0	0	0	0					0	0	0	0
325	315	355	475		TS			675	355	310	305
60	70	75	85					205	70	50	65
				140	0	110					
				65	0	70					
				75	0	80					
				75	0	65					

N/S STREET				5				E/W STREET			
WINDSOR AVE								OAK GROVE DRIVE			
				40	655	60					
				20	340	45					
				30	425	45					
				10	570	65					
25	30	25	45					60	50	50	55
125	165	175	275		TS			480	180	135	190
230	195	220	205					625	360	440	485
				235	665	540					
				185	330	415					
				180	445	545					
				180	540	625					

N/S STREET				6				E/W STREET			
WINDSOR AVE								I-210 FWY WB RAMPS			
				585	830	0					
				325	595	0					
				345	725	0					
				495	780	0					
0	0	0	0					785	460	570	600
0	0	0	0		TS			10	10	10	10
0	0	0	0					10	25	25	30
				45	630	0					
				50	465	0					
				55	625	0					
				110	750	0					

N/S STREET				7				E/W STREET			
WINDSOR AVE								I-210 FWY EB RAMPS			
				0	220	640					
				0	115	505					
				0	200	530					
				0	180	630					
600	350	405	650					0	0	0	0
10	10	10	10		TS			0	0	0	0
115	60	55	115					0	0	0	0
				0	140	25					
				0	165	25					
				0	200	20					
				0	215	20					



LEGEND

N/S STREET				S#				E/W STREET			
				7AM-9AM							
				2PM-4PM							
				4PM-6PM							
7AM - 9AM	2PM - 4PM	4PM - 6PM			TS			7AM - 9AM	2PM - 4PM	4PM - 6PM	
				7AM-9AM							
				2PM-4PM							
				4PM-6PM							

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 1B
PCE PROJECT TRIPS – YEAR 2014

DEVIL'S GATE DAM & RESERVOIR

FIGURE 5-1-2B

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Table 5-1-1
Intersection Capacity Analysis – Year 2014 Conditions (Route 1A)
Traffic Impact Analysis - Site 1

Route1A		AM				MID-DAY (12-2 PM)				MID-DAY (2-4 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
1	Berkshire Place and I-210 Freeway Eastbound Ramps (3)	F	51.4	-	-	B	10.8	-	-	C	23.7	-	-	D	31.6	-	-
2	Berkshire Place and I-210 Freeway Westbound Ramps (3)	B	13.1	-	-	A	7.0	-	-	A	9.3	-	-	A	5.6	-	-
3	Oak Grove Drive and Berkshire Place	C	26.6	0.97	B	A	6.2	0.30	A	A	7.1	0.49	A	A	8.4	0.57	B

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
(5)V/C-HCM Volume to Capacity Ratio

Source: **Hall & Foreman, Inc.**

Table 5-1-2
Intersection Capacity Analysis – Year 2014 Conditions (Route 1B)
Traffic Impact Analysis - Site 1

Route1B		AM				MID-DAY (12-2 PM)				MID-DAY (2-4 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
4	Oak Grove Drive and Foothill Freeway Overpass (3)	C	21.0	-	-	A	9.9	-	-	A	9.8	-	-	B	12.0	-	-
5	Windsor Ave and Oak Grove Drive/Woodbury Rd	C	34.6	0.94	D	B	14.4	0.59	A	B	17.1	0.58	A	C	24.7	0.76	C
6	Windsor Ave/Arroyo Blvd and I-210 Freeway Westbound Ramps	B	10.8	0.68	B	A	6.8	0.37	A	A	6.9	0.37	A	A	8.3	0.48	B
7	Windsor Ave/Arroyo Blvd and I-210 Freeway Eastbound Ramps	C	23.7	0.39	A	C	30.9	0.42	A	C	28.4	0.42	A	C	28.5	0.62	A

1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
(5)V/C-HCM Volume to Capacity Ratio

Source: **Hall & Foreman, Inc.**

Haul Routes 1A & 1B Analysis

As presented in *Table 5-1-1* through *Table 5-1-2*, under the project conditions Year 2014 for Site 1 (Routes 1A & 1B) most intersections are expected to operate at an acceptable HCM LOS of D or better for the AM, Mid-day, and PM peak hours. Mitigation is recommended for the intersection of Berkshire Place and I-210 Freeway Westbound Ramps AM peak hour anticipated HCM LOS F (Route 1A).

Haul Route 1C

The Year 2014 AM (7-9), MID-DAY (12-2), MID-DAY (2-4), PM (4-6) turn movement volumes, are provided in *Figure 5-1-3A.* For comparison the (PCE) Year 2014 turn movement volumes are provided in *Figure 5-1-3B.*

N/S STREET	2	E/W STREET
I-210 FWY WB RAMPS		BERKSHIRE PLACE
	0 0 0	
	0 0 0	
	0 0 0	
	0 0 0	
105 55 55 70		280 185 185 445
310 190 190 195	TS	205 120 120 440
0 0 0 0		0 0 0 0
	65 10 360	
	60 10 135	
	70 10 185	
	105 10 145	

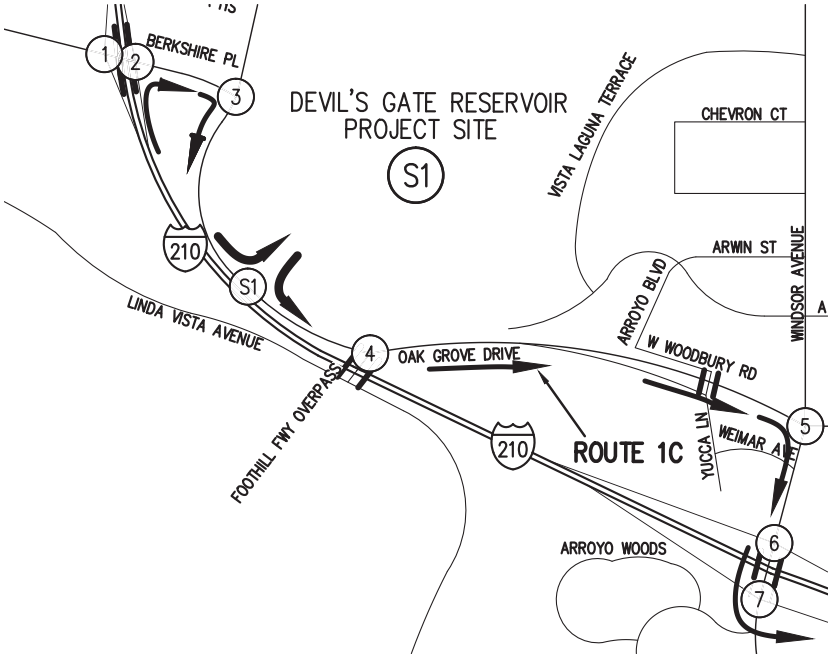
N/S STREET	3	E/W STREET
OAK GROVE DRIVE		BERKSHIRE PLACE
	390 75 0	
	235 110 0	
	810 155 0	
	820 265 0	
510 165 360 200		0 0 0 0
0 0 0 0	TS	0 0 0 0
125 125 110 155		0 0 0 0
	155 490 0	
	70 145 0	
	80 105 0	
	70 165 0	

N/S STREET	4	E/W STREET
FOOTHILL FWY OVERPASS		OAK GROVE DRIVE
	0 0 0	
	0 0 0	
	0 0 0	
	0 0 0	
0 0 0 0		0 0 0 0
185 175 215 350	TS	505 185 135 140
55 70 65 85		195 65 45 65
	135 0 105	
	60 0 65	
	65 0 70	
	75 0 65	

N/S STREET	5	E/W STREET
WINDSOR AVE		OAK GROVE DRIVE
	40 645 60	
	15 325 45	
	25 370 45	
	10 570 65	
25 30 25 45		50 40 35 55
115 155 155 260	TS	465 175 120 170
105 75 90 85		605 325 380 480
	75 660 495	
	35 315 400	
	25 385 475	
	30 540 620	

N/S STREET	6	E/W STREET
WINDSOR AVE		I-210 FWY WB RAMPS
	580 700 0	
	305 465 0	
	300 535 0	
	485 660 0	
0 0 0 0		620 300 365 440
0 0 0 0	TS	10 10 10 10
0 0 0 0		10 25 25 30
	45 605 0	
	50 460 0	
	50 545 0	
	110 750 0	

N/S STREET	7	E/W STREET
WINDSOR AVE		I-210 FWY EB RAMPS
	0 205 510	
	0 110 380	
	0 175 365	
	0 180 510	
600 350 405 650		0 0 0 0
10 10 10 10	TS	0 0 0 0
115 60 55 115		0 0 0 0
	0 140 25	
	0 160 20	
	0 175 20	
	0 215 20	



LEGEND

N/S STREET	S#	E/W STREET
	7AM-9AM	
	2PM-4PM	
	4PM-6PM	
7AM - 9AM / 2PM - 4PM / 4PM - 6PM	TS	7AM - 9AM / 2PM - 4PM / 4PM - 6PM
	7AM-9AM	
	2PM-4PM	
	4PM-6PM	

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 1C
PROJECT TRIPS – YEAR 2014
DEVIL'S GATE DAM & RESERVOIR

FIGURE 5-1-3A

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N/S STREET				2	E/W STREET			
I-210 FWY WB RAMPS					BERKSHIRE PLACE			
				0	0	0		
				0	0	0		
				0	0	0		
				0	0	0		
105	60	80	70				295	185	630	445
320	200	345	195	TS			220	130	365	445
0	0	0	0				0	0	0	0
				65	10	465		
				65	10	230		
				80	10	300		
				105	10	245		

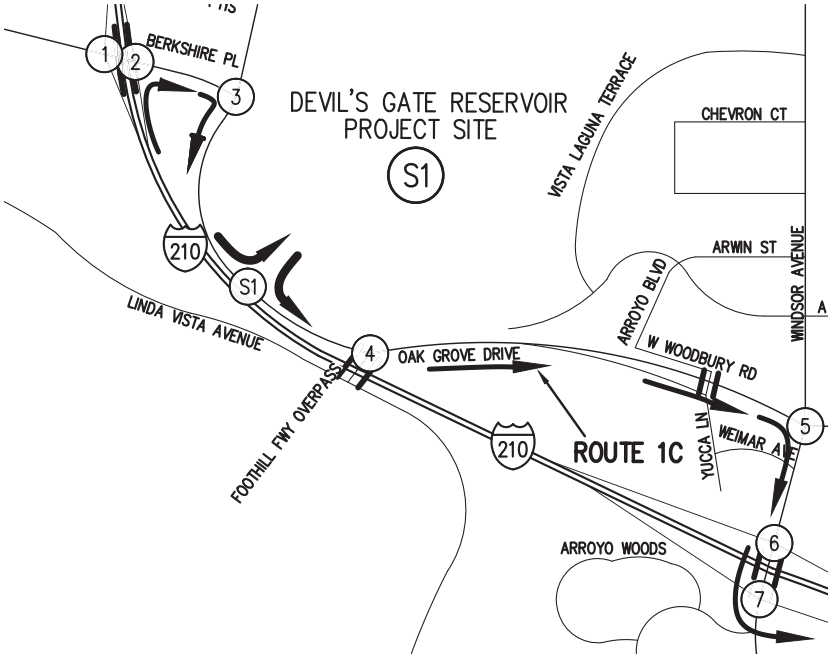
N/S STREET				3	E/W STREET			
OAK GROVE DRIVE					BERKSHIRE PLACE			
				400	90	0		
				245	125	0		
				930	195	0		
				825	275	0		
565	175	415	220				0	0	0	0
0	0	0	0	TS			0	0	0	0
230	225	205	245				0	0	0	0
				160	495	0		
				70	155	0		
				90	120	0		
				70	175	0		

N/S STREET				4	E/W STREET			
FOOTHILL FWY OVERPASS					OAK GROVE DRIVE			
				0	0	0		
				0	0	0		
				0	0	0		
				0	0	0		
0	0	0	0				0	0	0	0
325	315	355	475	TS			525	200	160	155
60	70	75	85				205	70	50	65
				140	0	110		
				65	0	70		
				75	0	80		
				75	0	65		

N/S STREET				5	E/W STREET			
WINDSOR AVE					OAK GROVE DRIVE			
				40	655	60		
				20	340	45		
				30	425	45		
				10	570	65		
25	30	25	45				60	50	50	55
125	165	175	275	TS			480	180	135	190
230	195	220	205				625	360	440	485
				80	665	540		
				35	330	415		
				30	445	545		
				30	540	625		

N/S STREET				6	E/W STREET			
WINDSOR AVE					I-210 FWY WB RAMPS			
				585	830	0		
				325	595	0		
				345	725	0		
				495	780	0		
0	0	0	0				630	305	420	445
0	0	0	0	TS			10	10	10	10
0	0	0	0				10	25	25	30
				45	630	0		
				50	465	0		
				55	625	0		
				110	750	0		

N/S STREET				7	E/W STREET			
WINDSOR AVE					I-210 FWY EB RAMPS			
				0	220	640		
				0	115	505		
				0	200	530		
				0	180	630		
600	350	405	650				0	0	0	0
10	10	10	10	TS			0	0	0	0
115	60	55	115				0	0	0	0
				0	140	25		
				0	165	25		
				0	200	20		
				0	215	20		



LEGEND

N/S STREET				S#	E/W STREET			
				7AM-9AM				
				2PM-4PM				
				4PM-6PM				
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS		7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM				
				2PM-4PM				
				4PM-6PM				

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

N

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ROUTE 1C
PCE PROJECT TRIPS – YEAR 2014
DEVIL'S GATE DAM & RESERVOIR

FIGURE 5-1-3B

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Table 5-1-3
Intersection Capacity Analysis – Year 2014 Conditions (Route 1C)
Traffic Impact Analysis - Site 1

Route1C		AM				MID-DAY (12-2 PM)				MID-DAY (2-4 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
2	Berkshire Place and I-210 Freeway Westbound Ramps (3)	B	13.1	-	-	A	6.9	-	-	A	8.4	-	-	A	5.7	-	-
3	Oak Grove Drive and Berkshire Place	B	10.9	0.68	A	A	6.1	0.22	A	A	8.4	0.59	A	A	7.1	0.54	B
4	Oak Grove Drive and Foothill Freeway Overpass (3)	C	18.1	-	-	A	9.4	-	-	A	9.6	-	-	B	11.5	-	-
5	Windsor Ave and Oak Grove Drive/Woodbury Rd	C	29	0.95	D	B	14.5	0.53	A	B	17.3	0.55	A	C	24.9	0.69	C
6	Windsor Ave/Arroyo Blvd and I-210 Freeway Westbound Ramps	B	10.2	0.65	B	A	5.7	0.33	A	A	6.4	0.4	A	A	7.6	0.45	B
7	Windsor Ave/Arroyo Blvd and I-210 Freeway Eastbound Ramps	C	23.7	0.39	A	C	30.9	0.42	A	C	28.4	0.42	A	C	28.5	0.62	A

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
(5)V/C-HCM Volume to Capacity Ratio

Source: **Hall & Foreman, Inc.**

Haul Route 1C Analysis

As presented in *Table 5-1-3*, under the project conditions Year 2014 for Site 1 (Routes 1C) all intersections are anticipated to operate at an HCM LOS C or better.

Haul Route 1D

The Year 2014 AM (7-9), MID-DAY (12-2), MID-DAY (2-4), PM (4-6) turn movement volumes, are provided in *Figure 5-1-5A.* For comparison the (PCE) Year 2014 turn movement volumes are provided in *Figure 5-1-5B.*

Haul Route 1E

The Year 2014 AM (7-9), MID-DAY (12-2), MID-DAY (2-4), PM (4-6) turn movement volumes, are provided in *Figure 5-1-5A.* For comparison the (PCE) Year 2014 turn movement volumes are provided in *Figure 5-1-5B.*

N/S STREET	1	E/W STREET
I-210 FWY EB RAMPS		BERKSHIRE PLACE
	90 10 355	
	50 10 115	
	65 10 225	
	100 10 180	
0 0 0 0		0 0 0 0
275 110 135 85	TS	130 120 180 175
135 60 85 75		215 145 285 425
	0 0 0	
	0 0 0	
	0 0 0	
	0 0 0	

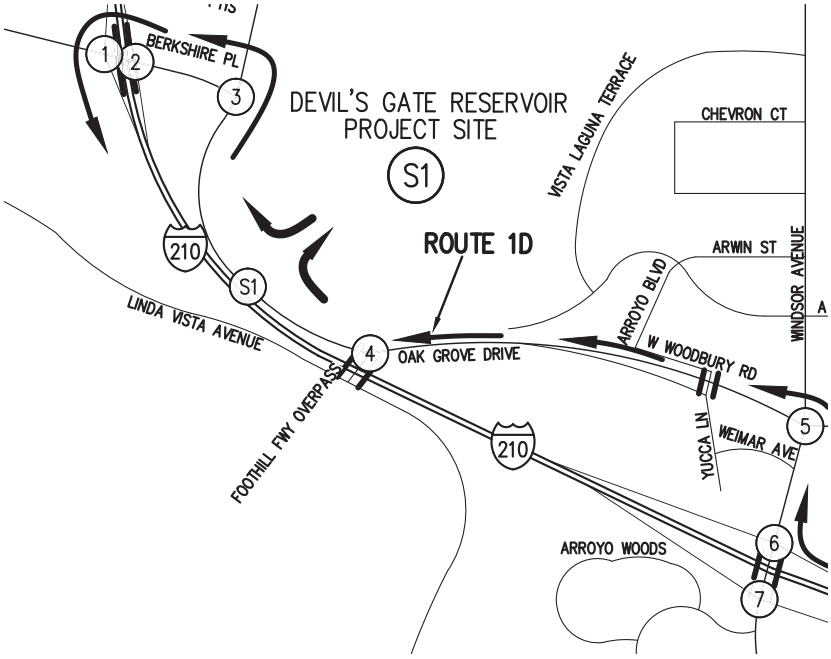
N/S STREET	2	E/W STREET
I-210 FWY WB RAMPS		BERKSHIRE PLACE
	0 0 0	
	0 0 0	
	0 0 0	
	0 0 0	
105 55 70 70		280 185 185 445
310 190 195 195	TS	265 180 180 500
0 0 0 0		0 0 0 0
	65 10 300	
	60 10 75	
	70 10 125	
	105 10 85	

N/S STREET	3	E/W STREET
OAK GROVE DRIVE		BERKSHIRE PLACE
	390 75 0	
	235 110 0	
	810 155 0	
	820 265 0	
555 165 360 200		0 0 0 0
0 0 0 0	TS	0 0 0 0
75 65 50 90		0 0 0 0
	215 490 0	
	130 145 0	
	140 105 0	
	130 165 0	

N/S STREET	4	E/W STREET
FOOTHILL FWY OVERPASS		OAK GROVE DRIVE
	0 0 0	
	0 0 0	
	0 0 0	
	0 0 0	
0 0 0 0		0 0 0 0
125 115 290 290	TS	565 245 195 200
55 70 85 85		195 65 45 65
	135 0 105	
	60 0 65	
	65 0 70	
	75 0 65	

N/S STREET	5	E/W STREET
WINDSOR AVE		OAK GROVE DRIVE
	40 645 60	
	15 325 45	
	25 370 45	
	10 570 65	
25 30 45 45		50 40 35 55
115 155 260 260	TS	465 175 120 170
45 20 30 30		605 325 380 480
	135 660 495	
	90 315 400	
	80 385 475	
	85 540 620	

N/S STREET	6	E/W STREET
WINDSOR AVE		I-210 FWY WB RAMPS
	580 640 0	
	305 405 0	
	300 475 0	
	485 600 0	
0 0 0 0		680 360 425 500
0 0 0 0	TS	10 10 10 10
0 0 0 0		10 25 25 30
	45 605 0	
	50 460 0	
	50 545 0	
	110 750 0	



LEGEND

N/S STREET	S#	E/W STREET
	7AM-9AM	
	2PM-4PM	
	4PM-6PM	
7AM - 9AM / 2PM - 4PM / 4PM - 6PM	TS	7AM - 9AM / 2PM - 4PM / 4PM - 6PM
	7AM-9AM	
	2PM-4PM	
	4PM-6PM	

LEGEND

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(#) – STUDY INTERSECTIONS

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ROUTE 1D
PROJECT TRIPS – YEAR 2014

DEVIL'S GATE DAM & RESERVOIR

FIGURE 5-1-4A

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N/S STREET				1	E/W STREET			
I-210 FWY EB RAMPS					BERKSHIRE PLACE			
				100	10	365		
				55	10	125		
				75	10	255		
				100	10	180		
0	0	0	0				0	0	0	0
275	115	160	90		TS		135	125	205	175
140	65	100	75				340	280	435	545
				0	0	0				
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET				2	E/W STREET			
I-210 FWY WB RAMPS					BERKSHIRE PLACE			
				0	0	0		
				0	0	0		
				0	0	0		
				0	0	0		
105	60	70	70				295	185	630	445
320	200	195	195		TS		400	310	545	625
0	0	0	0				0	0	0	0
				65	10	310				
				65	10	75				
				80	10	145				
				105	10	90				

N/S STREET				3	E/W STREET			
OAK GROVE DRIVE					BERKSHIRE PLACE			
				400	90	0		
				245	125	0		
				930	195	0		
				825	275	0		
565	175	415	220				0	0	0	0
0	0	0	0		TS		0	0	0	0
75	70	55	90				0	0	0	0
				340	495	0				
				250	155	0				
				275	120	0				
				250	175	0				

N/S STREET				4	E/W STREET			
FOOTHILL FWY OVERPASS					OAK GROVE DRIVE			
				0	0	0		
				0	0	0		
				0	0	0		
				0	0	0		
0	0	0	0				0	0	0	0
145	135	295	295		TS		675	355	310	305
60	70	85	85				205	70	50	65
				140	0	110				
				65	0	70				
				75	0	80				
				75	0	65				

N/S STREET				5	E/W STREET			
WINDSOR AVE					OAK GROVE DRIVE			
				40	655	60		
				20	340	45		
				30	425	45		
				10	570	65		
25	30	25	45				60	50	50	55
125	165	175	275		TS		480	180	135	190
50	20	40	30				625	360	440	485
				235	665	540				
				185	330	415				
				180	445	545				
				180	540	625				

N/S STREET				6	E/W STREET			
WINDSOR AVE					I-210 FWY WB RAMPS			
				585	650	0		
				325	415	0		
				345	545	0		
				495	600	0		
0	0	0	0				785	460	570	600
0	0	0	0		TS		10	10	10	10
0	0	0	0				10	25	25	30
				45	630	0				
				50	465	0				
				55	625	0				
				110	750	0				

N

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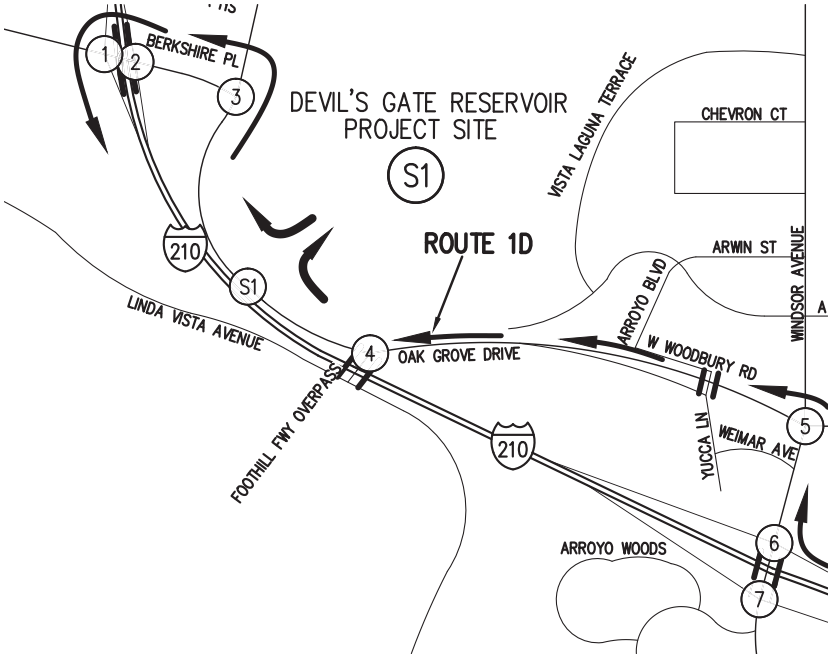

LEGEND

N/S STREET				S#	E/W STREET			
				7AM-9AM				
				2PM-4PM				
				4PM-6PM				
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS		7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM				
				2PM-4PM				
				4PM-6PM				

LEGEND

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ROUTE 1D
PCE PROJECT TRIPS – YEAR 2014
DEVIL'S GATE DAM & RESERVOIR

FIGURE
5-1-4B

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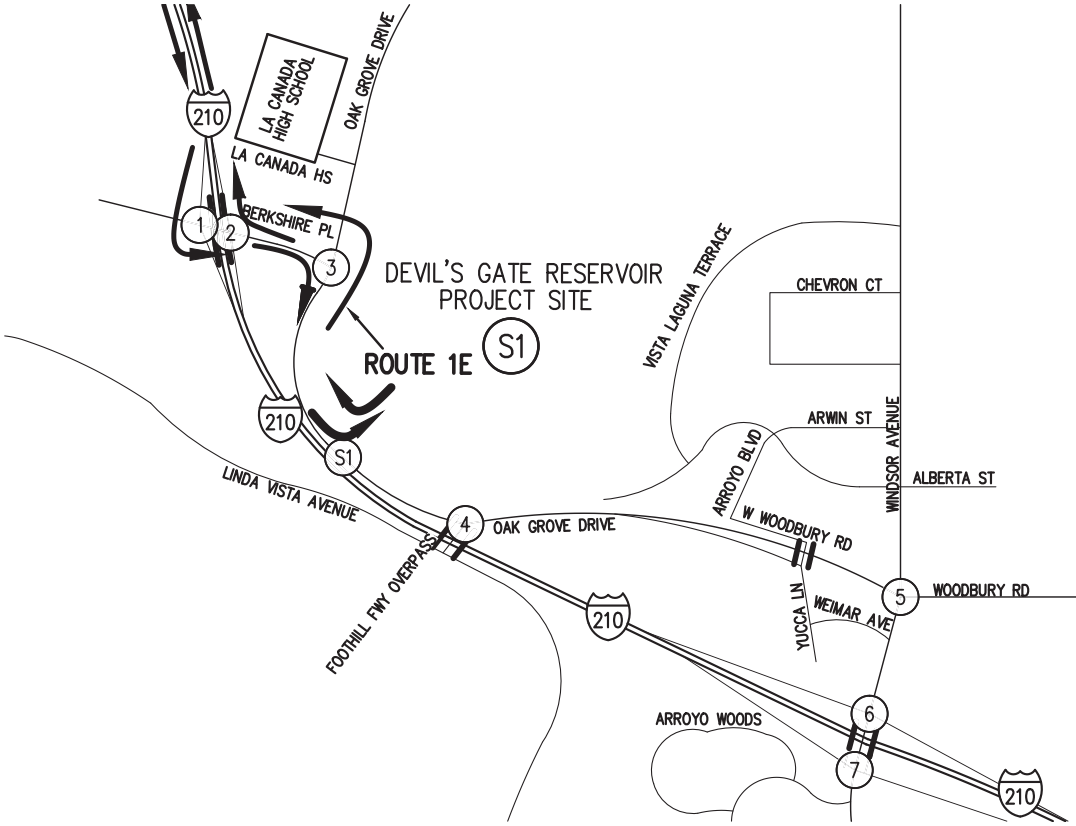
N/S STREET				1	E/W STREET			
I-210 FWY EB RAMPS					BERKSHIRE PLACE			
				90 10 415				
				50 10 175				
				65 10 225				
				100 10 240				
0	0	0	0		0	0	0	0
275	110	135	85	TS	130	120	180	175
135	60	85	75		155	85	285	365
				0 0 0				
				0 0 0				
				0 0 0				
				0 0 0				

N/S STREET				2	E/W STREET			
I-210 FWY WB RAMPS					BERKSHIRE PLACE			
				0 0 0				
				0 0 0				
				0 0 0				
				0 0 0				
105	55	55	70		340	245	245	505
370	250	250	255	TS	205	120	120	440
0	0	0	0		0	0	0	0
				65 10 300				
				60 10 75				
				70 10 125				
				105 10 85				

N/S STREET				3	E/W STREET			
OAK GROVE DRIVE					BERKSHIRE PLACE			
				390 75 0				
				235 110 0				
				810 155 0				
				820 265 0				
555	165	360	200		0	0	0	0
0	0	0	0	TS	0	0	0	0
135	125	110	155		0	0	0	0
				215 490 0				
				130 145 0				
				140 105 0				
				130 165 0				

N

NOT TO SCALE



LEGEND

N/S STREET				S#	E/W STREET			
				7AM-9AM				
				2PM-4PM				
				4PM-6PM				
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS		7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM				
				2PM-4PM				
				4PM-6PM				

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ROUTE 1E
PROJECT TRIPS – YEAR 2014
DEVIL'S GATE DAM & RESERVOIR

FIGURE
5-1-5A

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N/S STREET				1			E/W STREET			
I-210 FWY EB RAMPS							BERKSHIRE PLACE			
				100	10	520				
				55	10	280				
				75	10	255				
				100	10	330				
0	0	0	0					0	0	0	0
275	115	160	90		TS			135	125	205	175
140	65	100	75					160	100	435	365
				0	0	0				
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET				2			E/W STREET			
I-210 FWY WB RAMPS							BERKSHIRE PLACE			
				0	0	0				
				0	0	0				
				0	0	0				
				0	0	0				
105	60	80	70					475	365	810	625
475	355	495	350		TS			220	130	365	445
0	0	0	0					0	0	0	0
				65	10	310				
				65	10	75				
				80	10	145				
				105	10	90				

N/S STREET				3			E/W STREET			
OAK GROVE DRIVE							BERKSHIRE PLACE			
				400	90	0				
				245	125	0				
				930	195	0				
				825	275	0				
565	175	415	220					0	0	0	0
0	0	0	0		TS			0	0	0	0
230	225	205	245					0	0	0	0
				340	495	0				
				250	155	0				
				275	120	0				
				250	175	0				

N

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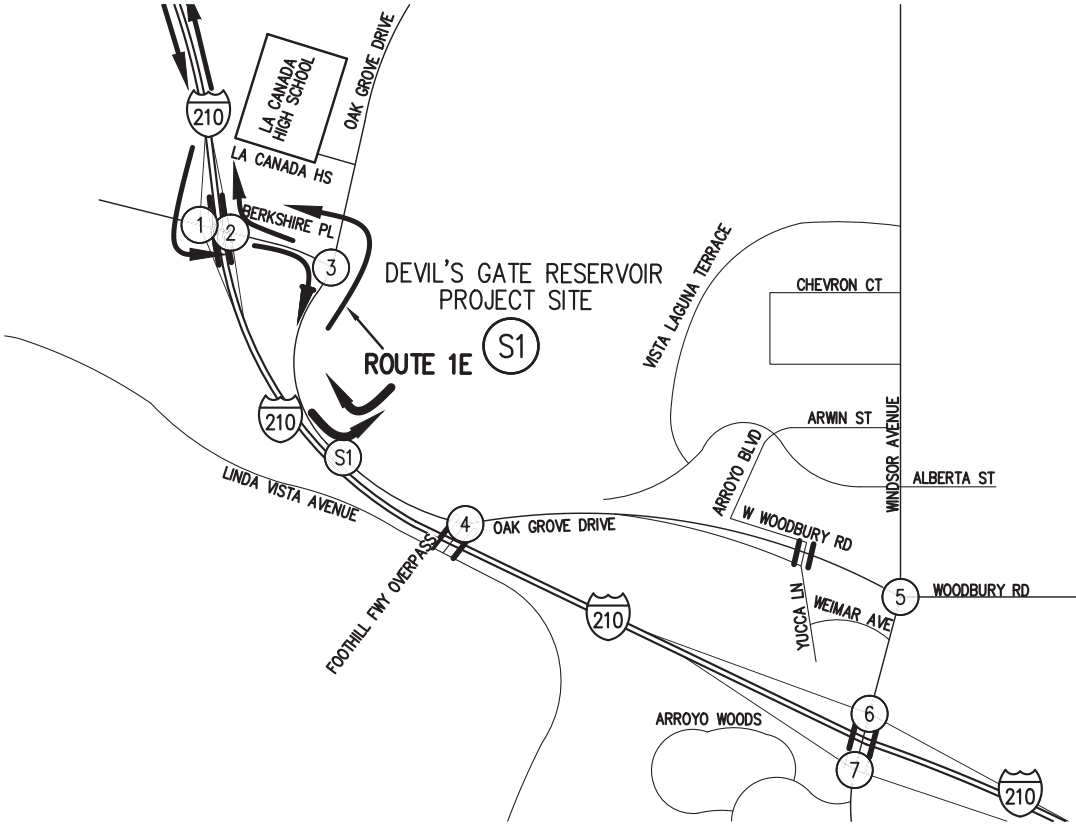

LEGEND

N/S STREET				S#	E/W STREET
				7AM-9AM	
				2PM-4PM	
				4PM-6PM	
7AM - 9AM	2PM - 4PM	4PM - 6PM	TS		7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM	
				2PM-4PM	
				4PM-6PM	

LEGEND

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ROUTE 1E
PCE PROJECT TRIPS – YEAR 2014
DEVIL'S GATE DAM & RESERVOIR

FIGURE 5-1-5B

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Table 5-1-4
Intersection Capacity Analysis – Year 2014 Conditions (Route 1D)
Traffic Impact Analysis - Site 1

Route1D		AM				MID-DAY (12-2 PM)				MID-DAY (2-4 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
1	Berkshire Place and I-210 Freeway Eastbound Ramps (3)	F	51.4	-	-	B	10.8	-	-	C	23.7	-	-	D	31.6	-	-
2	Berkshire Place and I-210 Freeway Westbound Ramps (3)	A	9.5	-	-	A	4.9	-	-	A	7.2	-	-	A	3.8	-	-
3	Oak Grove Drive and Berkshire Place	B	19.2	0.93	B	A	5.6	0.29	A	A	8.4	0.57	B	A	8	0.57	B
4	Oak Grove Drive and Foothill Freeway Overpass (3)	C	19.2	-	-	A	9.6	-	-	A	9.5	-	-	B	11.3	-	-
5	Windsor Ave and Oak Grove Drive/Woodbury Rd	C	34.7	0.94	D	B	14.3	0.54	A	B	17.1	0.58	A	C	24.9	0.76	C
6	Windsor Ave/Arroyo Blvd and I-210 Freeway Westbound Ramps	B	10.4	0.66	B	A	6	0.31	A	A	7.3	0.41	A	A	8.2	0.45	B

Table 5-1-5
Intersection Capacity Analysis – Year 2014 Conditions (Route 1E)
Traffic Impact Analysis - Site 1

Route1E		AM				MID-DAY (12-2 PM)				MID-DAY (2-4 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
1	Berkshire Place and I-210 Freeway Eastbound Ramps (3)	E	48.2	-	-	B	10.6	-	-	C	18.9	-	-	C	21.8	-	-
2	Berkshire Place and I-210 Freeway Westbound Ramps	B	11.0	-	-	A	4.7	-	-	A	6.9	-	-	A	3.7	-	-
3	Oak Grove Drive and Berkshire Place (3)	C	26.6	0.97	B	A	6.2	0.30	A	A	7.1	0.49	A	A	8.4	0.57	B

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
(5)V/C-HCM Volume to Capacity Ratio

Source: **Hall & Foreman, Inc.**

Haul Routes 1D & 1E Analysis

As presented in *Table 5-1-4* and *Table 5-1-5*, under the project conditions Year 2014 for Site 1 (Routes 1D & 1E) most intersections are expected to operate at an acceptable HCM LOS of C or better. Mitigation is recommended for the intersection of Berkshire Place and I-210 Freeway Westbound Ramps AM peak hour anticipated HCM LOS F (Route 1D) and HCM LOS E (Route 1E).

Haul Route 1F

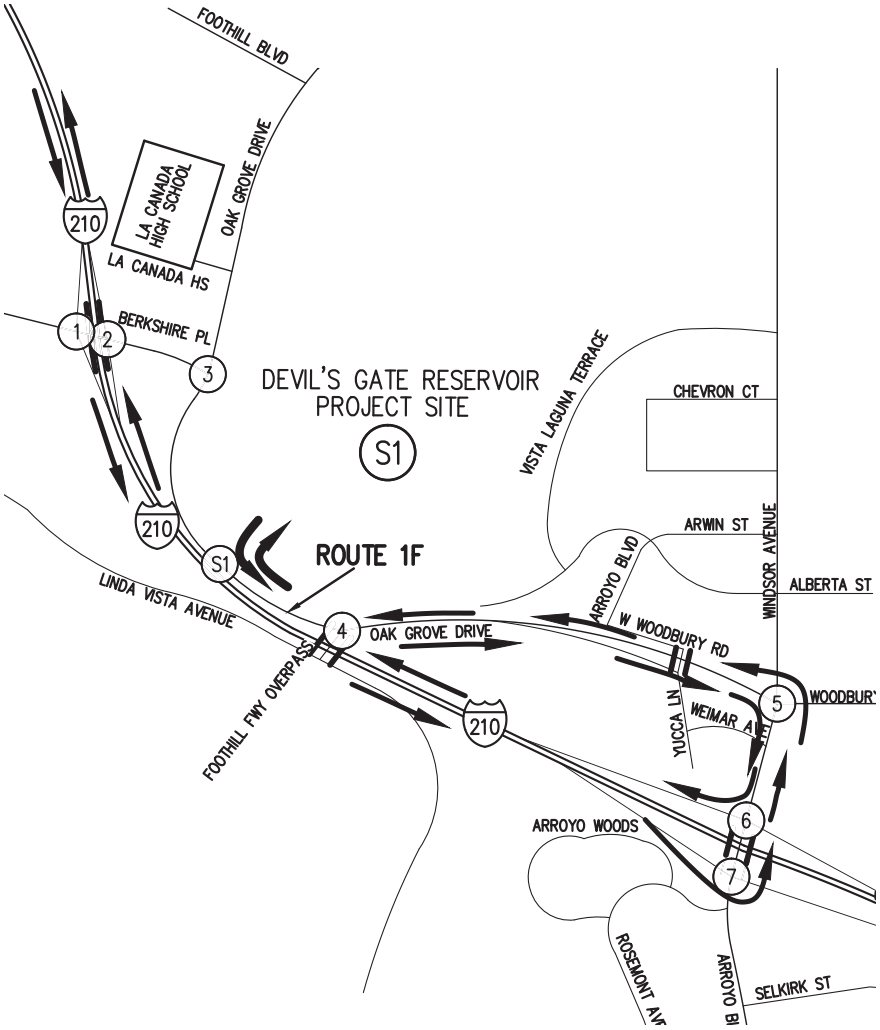
The Year 2014 AM (7-9), MID-DAY (12-2), MID-DAY (2-4), PM (4-6) turn movement volumes, are provided in *Figure 5-1-6A.* For comparison the (PCE) Year 2014 turn movement volumes are provided in *Figure 5-1-6B.*

N/S STREET				4	E/W STREET			
FOOTHILL FWY OVERPASS					OAK GROVE DRIVE			
				0 0 0				
				0 0 0				
				0 0 0				
				0 0 0				
0	0	0	0			0	0	0	0
185	175	215	350	TS		565	245	195	200
55	70	65	85			195	65	45	65
				135 0 105				
				60 0 65				
				65 0 70				
				75 0 65				

N/S STREET				5	E/W STREET			
WINDSOR AVE					OAK GROVE DRIVE			
				40 645 60				
				15 325 45				
				25 370 45				
				10 570 65				
25	30	25	45			50	40	35	55
115	155	155	260	TS		465	175	120	170
105	75	90	85			605	325	380	480
				135 660 495				
				90 315 400				
				80 385 475				
				85 540 620				

N/S STREET				6	E/W STREET			
WINDSOR AVE					I-210 FWY WB RAMPS			
				640 640 0				
				365 405 0				
				360 475 0				
				545 600 0				
0	0	0	0			620	300	365	440
0	0	0	0	TS		10	10	10	10
0	0	0	0			10	25	25	30
				45 665 0				
				50 520 0				
				50 605 0				
				110 810 0				

N/S STREET				7	E/W STREET			
WINDSOR AVE					I-210 FWY EB RAMPS			
				0 205 450				
				0 110 320				
				0 175 305				
				0 180 450				
660	410	465	710			0	0	0	0
10	10	10	10	TS		0	0	0	0
115	60	55	115			0	0	0	0
				0 140 25				
				0 160 20				
				0 175 20				
				0 215 20				



LEGEND

N/S STREET				S#	E/W STREET			
				7AM-9AM				
				2PM-4PM				
				4PM-6PM				
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS		7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM				
				2PM-4PM				
				4PM-6PM				

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ROUTE 1F
PROJECT TRIPS – YEAR 2014
DEVIL'S GATE DAM & RESERVOIR

FIGURE 5-1-6A

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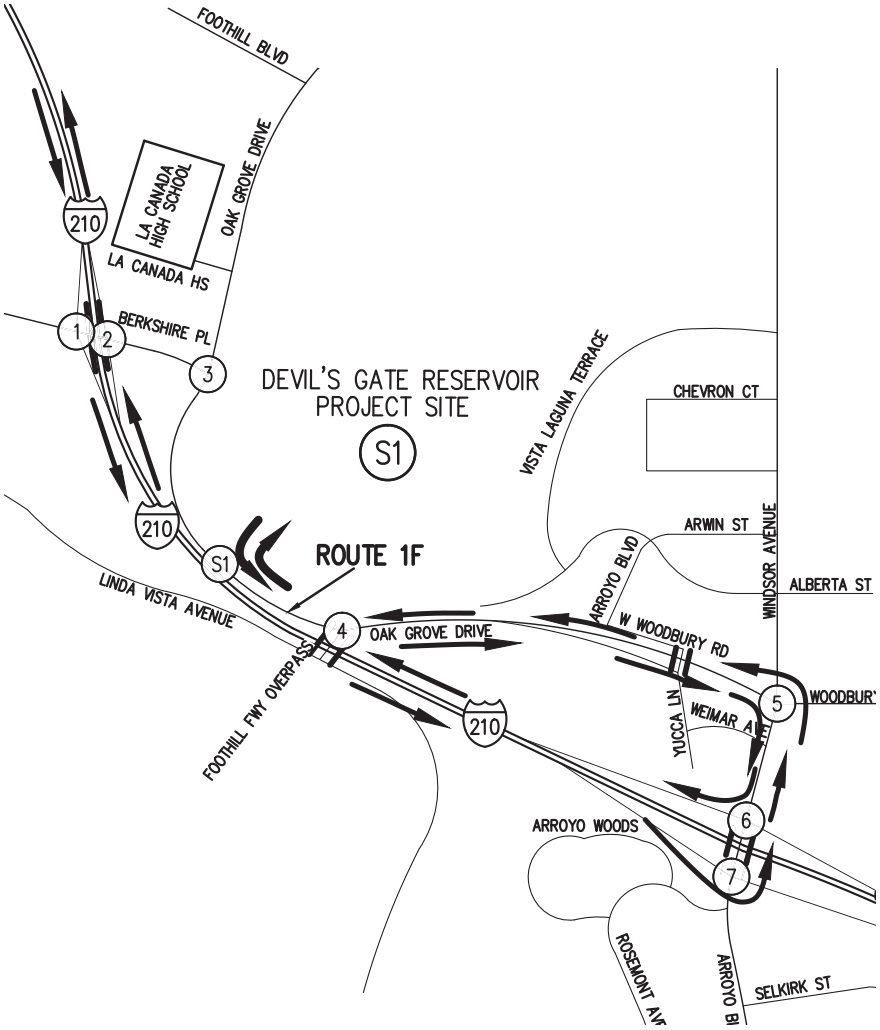
N/S STREET				4				E/W STREET			
FOOTHILL FWY OVERPASS								OAK GROVE DRIVE			
				0	0	0					
				0	0	0					
				0	0	0					
				0	0	0					
0	0	0	0					0	0	0	0
325	315	355	475		TS			675	355	310	305
60	70	75	85					205	70	50	65
				140	0	110					
				65	0	70					
				75	0	80					
				75	0	65					

N/S STREET				5				E/W STREET			
WINDSOR AVE								OAK GROVE DRIVE			
				40	655	60					
				20	340	45					
				30	425	45					
				10	570	65					
25	30	25	45					60	50	50	55
125	165	175	275		TS			480	180	135	190
230	195	220	205					625	360	440	485
				235	665	540					
				185	330	415					
				180	445	545					
				180	540	625					

N/S STREET				6				E/W STREET			
WINDSOR AVE								I-210 FWY WB RAMPS			
				765	650	0					
				505	415	0					
				525	545	0					
				675	600	0					
0	0	0	0					630	305	420	445
0	0	0	0		TS			10	10	10	10
0	0	0	0					10	25	25	30
				45	785	0					
				50	615	0					
				55	780	0					
				110	905	0					

N/S STREET				7				E/W STREET			
WINDSOR AVE								I-210 FWY EB RAMPS			
				0	220	460					
				0	115	325					
				0	200	350					
				0	180	450					
750	500	555	800					0	0	0	0
10	10	10	10		TS			0	0	0	0
115	60	55	115					0	0	0	0
				0	140	25					
				0	165	25					
				0	200	20					
				0	215	20					



LEGEND

N/S STREET				S#				E/W STREET			
				7AM-9AM							
				2PM-4PM							
				4PM-6PM							
7AM - 9AM	2PM - 4PM	4PM - 6PM			TS			7AM - 9AM	2PM - 4PM	4PM - 6PM	
				7AM-9AM							
				2PM-4PM							
				4PM-6PM							

LEGEND

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ROUTE 1F
PCE PROJECT TRIPS – YEAR 2014
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FIGURE 5-1-6B

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Table 5-1-6
Intersection Capacity Analysis – Year 2014 Conditions (Route 1F)
Traffic Impact Analysis - Site 1

Route1F		AM				MID-DAY (12-2 PM)				MID-DAY (2-4 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
4	Oak Grove Drive and Foothill Freeway Overpass (3)	C	21	-	-	A	9.9	-	-	A	9.8	-	-	B	12	-	-
5	Windsor Ave and Oak Grove Drive/Woodbury Rd	C	34.6	0.94	D	B	14.4	0.59	A	B	17.1	0.58	A	C	24.7	0.76	C
6	Windsor Ave/Arroyo Blvd and I-210 Freeway Westbound Ramps	A	9.9	0.62	B	A	5.5	0.31	A	A	5.6	0.27	A	A	7.9	0.47	B
7	Windsor Ave/Arroyo Blvd and I-210 Freeway Eastbound Ramps	C	28.6	0.57	A	B	16.1	0.39	A	B	17.4	0.42	A	C	26.8	0.63	A

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
(5)V/C-HCM Volume to Capacity Ratio

Source: **Hall & Foreman, Inc.**

Haul Route 1F Analysis

As presented in *Table 5-1-6*, under the project conditions Year 2014 for Site 1 (Routes 1F) all intersections are anticipated to operate at an HCM LOS C or better.

Haul Route 1G

The Year 2014 AM (7-9), MID-DAY (12-2), MID-DAY (2-4), PM (4-6) turn movement volumes, are provided in *Figure 5-1-7A.* For comparison the (PCE) Year 2014 turn movement volumes are provided in *Figure 5-1-7B.*

N/S STREET	1	E/W STREET
I-210 FWY EB RAMPS		BERKSHIRE PLACE

				90	10	415					
				50	10	175					
				65	10	225					
				100	10	240					
0	0	0	0					0	0	0	0
275	110	135	85		TS			130	120	180	175
135	60	85	75					155	85	285	365
				0	0	0					
				0	0	0					
				0	0	0					
				0	0	0					

N/S STREET	2	E/W STREET
I-210 FWY WB RAMPS		BERKSHIRE PLACE

				0	0	0					
				0	0	0					
				0	0	0					
				0	0	0					
105	55	55	70					280	185	245	445
370	250	250	255		TS			205	120	120	440
0	0	0	0					0	0	0	0
				65	10	300					
				60	10	75					
				70	10	125					
				105	10	85					

N/S STREET	3	E/W STREET
OAK GROVE DRIVE		BERKSHIRE PLACE

				390	75	0					
				235	110	0					
				810	155	0					
				820	265	0					
510	165	360	200					0	0	0	0
0	0	0	0		TS			0	0	0	0
125	125	110	155					0	0	0	0
				155	490	0					
				70	145	0					
				80	105	0					
				70	165	0					

N/S STREET	4	E/W STREET
FOOTHILL FWY OVERPASS		OAK GROVE DRIVE

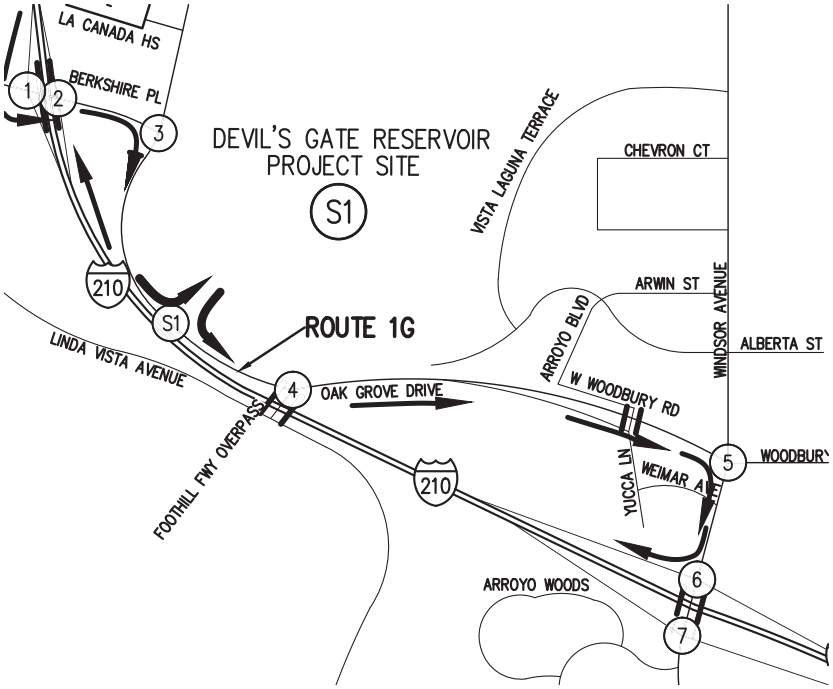
				0	0	0					
				0	0	0					
				0	0	0					
				0	0	0					
0	0	0	0					0	0	0	0
185	175	215	350		TS			505	185	135	140
55	70	65	85					195	65	45	65
				135	0	105					
				60	0	65					
				65	0	70					
				75	0	65					

N/S STREET	5	E/W STREET
WINDSOR AVE		OAK GROVE DRIVE

				40	645	60					
				15	325	45					
				25	370	45					
				10	570	65					
25	30	25	45					50	40	35	55
115	155	155	260		TS			465	175	120	170
105	75	90	85					605	325	380	480
				75	660	495					
				35	315	400					
				25	385	475					
				30	540	620					

N/S STREET	6	E/W STREET
WINDSOR AVE		I-210 FWY WB RAMPS

				640	640	0					
				365	405	0					
				360	475	0					
				545	600	0					
0	0	0	0					620	300	365	440
0	0	0	0		TS			10	10	10	10
0	0	0	0					10	25	25	30
				45	605	0					
				50	460	0					
				50	545	0					
				110	750	0					



LEGEND

N/S STREET	S#	E/W STREET

				7AM-9AM							
				2PM-4PM							
				4PM-6PM							
7AM - 9AM	2PM - 4PM	4PM - 6PM			TS			7AM - 9AM	2PM - 4PM	4PM - 6PM	
				7AM-9AM							
				2PM-4PM							
				4PM-6PM							

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 1G
PROJECT TRIPS – YEAR 2014
DEVIL'S GATE DAM & RESERVOIR

FIGURE
5-1-7A

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N/S STREET				1			E/W STREET				
I-210 FWY EB RAMPS							BERKSHIRE PLACE				
				100	10	520					
				55	10	280					
				75	10	255					
				100	10	330					
0	0	0	0					0	0	0	0
275	115	160	90		TS			135	125	205	175
140	65	100	75					160	100	435	365
				0	0	0					
				0	0	0					
				0	0	0					
				0	0	0					

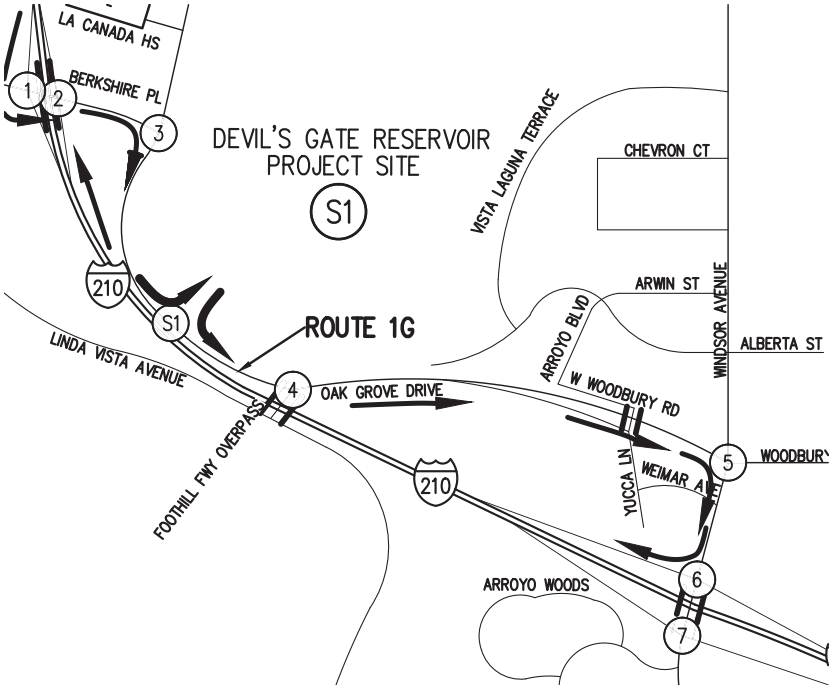
N/S STREET				2			E/W STREET				
I-210 FWY WB RAMPS							BERKSHIRE PLACE				
				0	0	0					
				0	0	0					
				0	0	0					
				0	0	0					
105	60	80	70					295	185	810	445
475	355	495	350		TS			220	130	365	445
0	0	0	0					0	0	0	0
				65	10	310					
				65	10	75					
				80	10	145					
				105	10	90					

N/S STREET				3			E/W STREET				
OAK GROVE DRIVE							BERKSHIRE PLACE				
				400	90	0					
				245	125	0					
				930	195	0					
				825	275	0					
565	175	415	220					0	0	0	0
0	0	0	0		TS			0	0	0	0
230	225	205	245					0	0	0	0
				160	495	0					
				70	155	0					
				90	120	0					
				70	175	0					

N/S STREET				4			E/W STREET				
FOOTHILL FWY OVERPASS							OAK GROVE DRIVE				
				0	0	0					
				0	0	0					
				0	0	0					
				0	0	0					
0	0	0	0					0	0	0	0
325	315	355	475		TS			525	200	160	155
60	70	75	85					205	70	50	65
				140	0	110					
				65	0	70					
				75	0	80					
				75	0	65					

N/S STREET				5			E/W STREET				
WINDSOR AVE							OAK GROVE DRIVE				
				40	655	60					
				20	340	45					
				30	425	45					
				10	570	65					
25	30	25	45					60	50	50	55
125	165	175	275		TS			480	180	135	190
230	195	220	205					625	360	440	485
				80	665	540					
				35	330	415					
				30	445	545					
				30	540	625					

N/S STREET				6			E/W STREET				
WINDSOR AVE							I-210 FWY WB RAMPS				
				765	650	0					
				505	415	0					
				525	545	0					
				675	600	0					
0	0	0	0					630	305	420	445
0	0	0	0		TS			10	10	10	10
0	0	0	0					10	25	25	30
				45	630	0					
				50	465	0					
				55	625	0					
				110	750	0					



LEGEND

N/S STREET				S#			E/W STREET				
				7AM-9AM							
				2PM-4PM							
				4PM-6PM							
7AM - 9AM	2PM - 4PM	4PM - 6PM			TS			7AM - 9AM	2PM - 4PM	4PM - 6PM	
				7AM-9AM							
				2PM-4PM							
				4PM-6PM							

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 1G
PCE PROJECT TRIPS – YEAR 2014
DEVIL'S GATE DAM & RESERVOIR

FIGURE 5-1-7B

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Table 5-1-7
Intersection Capacity Analysis – Year 2014 Conditions (Route 1G)
Traffic Impact Analysis - Site 1

Route1G		AM				MID-DAY (12-2 PM)				MID-DAY (2-4 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
1	Berkshire Place and I-210 Freeway Eastbound Ramps (3)	E	48.2	-	-	B	10.6	-	-	C	18.9	-	-	C	21.8	-	-
2	Berkshire Place and I-210 Freeway Westbound Ramps (3)	A	4.7	-	-	A	6.9	-	-	A	6.9	-	-	A	3.7	-	-
3	Oak Grove Drive and Berkshire Place	B	10.9	0.68	A	A	6.1	0.22	A	A	8.4	0.59	A	A	7.1	0.54	B
4	Oak Grove Drive and Foothill Freeway Overpass (3)	C	18.1	-	-	A	9.4	-	-	A	9.6	-	-	B	11.5	-	-
5	Windsor Ave and Oak Grove Drive/Woodbury Rd	C	29	0.95	D	B	14.5	0.53	A	B	17.3	0.55	A	C	24.9	0.69	C
6	Windsor Ave/Arroyo Blvd and I-210 Freeway Westbound Ramps	A	9.6	0.61	B	A	5.6	0.31	A	A	6.3	0.37	A	A	7.6	0.45	B

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
(5)V/C-HCM Volume to Capacity Ratio

Source: **Hall & Foreman, Inc.**

Haul Route 1G Analysis

As presented in *Table 5-1-7*, under the project conditions Year 2014 for Site 1 (Routes 1G) most intersections are expected to operate at an acceptable HCM LOS of C or better for the AM, Mid-day, and PM peak hours. Mitigation is recommended for the intersection of Berkshire Place and I-210 Freeway Westbound Ramps AM peak hour anticipated HCM LOS E (Route 1G).

Haul Route 1H

The Year 2014 AM (7-9), MID-DAY (12-2), MID-DAY (2-4), PM (4-6) turn movement volumes, are provided in *Figure 5-1-8.* For comparison the (PCE) Year 2014 turn movement volumes are provided in *Figure 5-1-8B.*

N/S STREET	2	E/W STREET
I-210 FWY WB RAMPS		BERKSHIRE PLACE
	0 0 0	
	0 0 0	
	0 0 0	
	0 0 0	
105 55 55 70		340 245 245 505
310 190 190 195	TS	205 120 120 440
0 0 0 0		0 0 0 0
	65 10 300	
	60 10 75	
	70 10 125	
	105 10 85	

N/S STREET	3	E/W STREET
OAK GROVE DRIVE		BERKSHIRE PLACE
	390 75 0	
	235 110 0	
	810 155 0	
	820 265 0	
555 165 360 200		0 0 0 0
0 0 0 0	TS	0 0 0 0
75 65 50 90		0 0 0 0
	215 490 0	
	130 145 0	
	140 105 0	
	130 165 0	

N/S STREET	4	E/W STREET
FOOTHILL FWY OVERPASS		OAK GROVE DRIVE
	0 0 0	
	0 0 0	
	0 0 0	
	0 0 0	
0 0 0 0		0 0 0 0
125 115 290 290	TS	565 245 195 200
55 70 85 85		195 65 45 65
	135 0 105	
	60 0 65	
	65 0 70	
	75 0 65	

N/S STREET	5	E/W STREET
WINDSOR AVE		OAK GROVE DRIVE
	40 645 60	
	15 325 45	
	25 370 45	
	10 570 65	
25 30 45 45		50 40 35 55
115 155 260 260	TS	465 175 120 170
45 20 30 30		605 325 380 480
	135 660 495	
	90 315 400	
	80 385 475	
	85 540 620	

N/S STREET	6	E/W STREET
WINDSOR AVE		I-210 FWY WB RAMPS
	580 640 0	
	305 405 0	
	300 475 0	
	485 600 0	
0 0 0 0		620 300 365 440
0 0 0 0	TS	10 10 10 10
0 0 0 0		10 25 25 30
	45 665 0	
	50 520 0	
	50 605 0	
	110 810 0	

N/S STREET	7	E/W STREET
WINDSOR AVE		I-210 FWY EB RAMPS
	0 205 450	
	0 110 320	
	0 175 305	
	0 180 450	
660 410 465 710		0 0 0 0
10 10 10 10	TS	0 0 0 0
115 60 55 115		0 0 0 0
	0 140 25	
	0 160 20	
	0 175 20	
	0 215 20	

N

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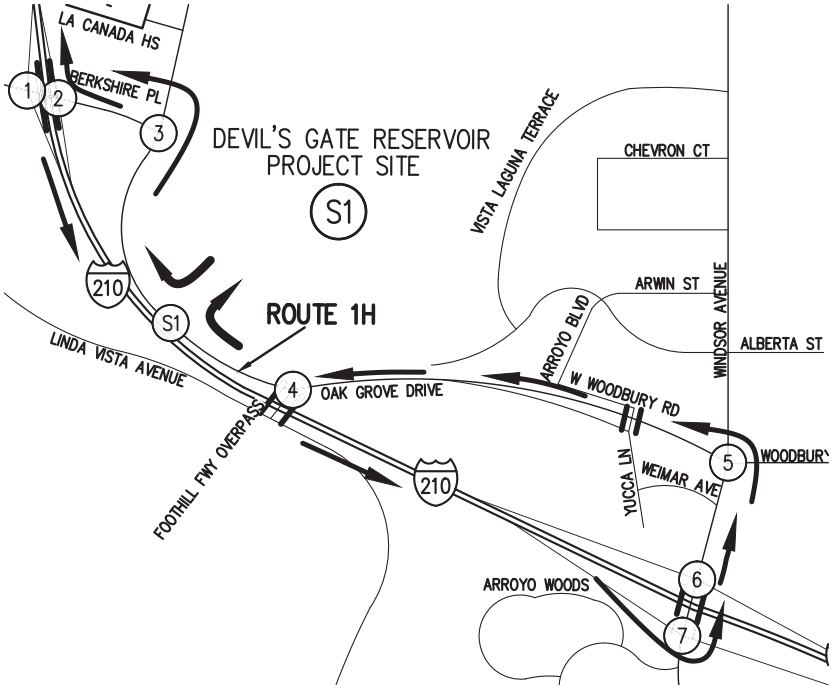

LEGEND

N/S STREET	S#	E/W STREET
	7AM-9AM	
	2PM-4PM	
	4PM-6PM	
7AM - 9AM | 2PM - 4PM | 4PM - 6PM	TS	7AM - 9AM | 2PM - 4PM | 4PM - 6PM
	7AM-9AM	
	2PM-4PM	
	4PM-6PM	

LEGEND

(S#) – DISPOSAL SITE

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ROUTE 1H
PROJECT TRIPS – YEAR 2014
DEVIL'S GATE DAM & RESERVOIR

FIGURE
5-1-8A

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N/S STREET				2				E/W STREET			
I-210 FWY WB RAMPS								BERKSHIRE PLACE			
				0	0	0					
				0	0	0					
				0	0	0					
				0	0	0					
105	60	80	70					475	365	810	625
320	200	345	195		TS			220	130	365	445
0	0	0	0					0	0	0	0
				65	10	310					
				65	10	75					
				80	10	145					
				105	10	90					

N/S STREET				3				E/W STREET			
OAK GROVE DRIVE								BERKSHIRE PLACE			
				400	90	0					
				245	125	0					
				930	195	0					
				825	275	0					
565	175	415	220					0	0	0	0
0	0	0	0		TS			0	0	0	0
75	70	55	90					0	0	0	0
				340	495	0					
				250	155	0					
				275	120	0					
				250	175	0					

N/S STREET				4				E/W STREET			
FOOTHILL FWY OVERPASS								OAK GROVE DRIVE			
				0	0	0					
				0	0	0					
				0	0	0					
				0	0	0					
0	0	0	0					0	0	0	0
145	135	295	295		TS			675	355	310	305
60	70	85	85					205	70	50	65
				140	0	110					
				65	0	70					
				75	0	80					
				75	0	65					

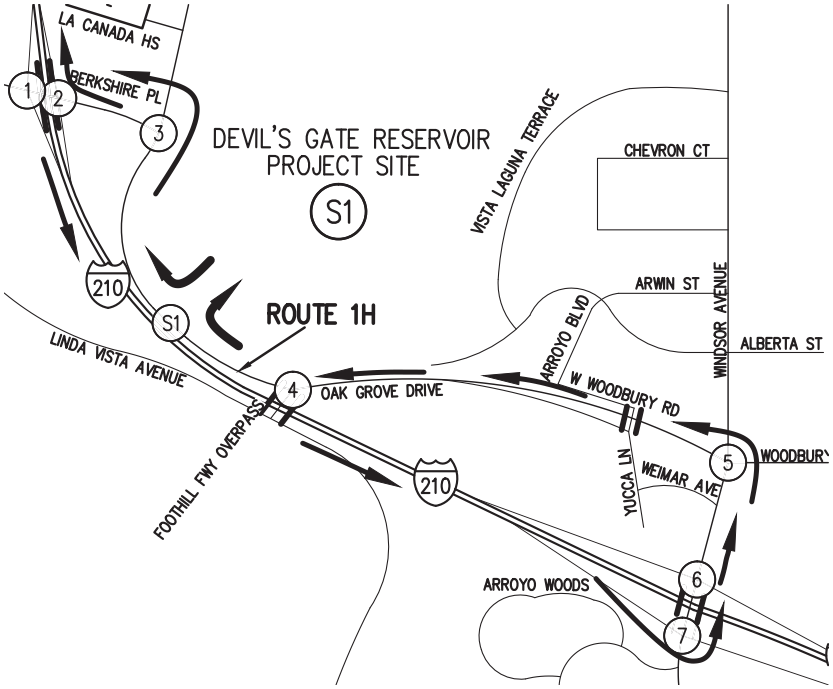
N/S STREET				5				E/W STREET			
WINDSOR AVE								OAK GROVE DRIVE			
				40	655	60					
				20	340	45					
				30	425	45					
				10	570	65					
25	30	25	45					60	50	50	55
125	165	175	275		TS			480	180	135	190
50	20	40	30					625	360	440	485
				235	665	540					
				185	330	415					
				180	445	545					
				180	540	625					

N/S STREET				6				E/W STREET			
WINDSOR AVE								I-210 FWY WB RAMPS			
				585	650	0					
				325	415	0					
				345	545	0					
				495	600	0					
0	0	0	0					630	305	420	445
0	0	0	0		TS			10	10	10	10
0	0	0	0					10	25	25	30
				45	785	0					
				50	615	0					
				55	780	0					
				110	905	0					

N/S STREET				7				E/W STREET			
WINDSOR AVE								I-210 FWY EB RAMPS			
				0	220	460					
				0	115	325					
				0	200	350					
				0	180	450					
750	500	555	800					0	0	0	0
10	10	10	10		TS			0	0	0	0
115	60	55	115					0	0	0	0
				0	140	25					
				0	165	25					
				0	200	20					
				0	215	20					

N

NOT TO SCALE



LEGEND

N/S STREET				S#				E/W STREET			
				7AM-9AM							
				2PM-4PM							
				4PM-6PM							
7AM - 9AM	2PM - 4PM	4PM - 6PM			TS			7AM - 9AM	2PM - 4PM	4PM - 6PM	
				7AM-9AM							
				2PM-4PM							
				4PM-6PM							

LEGEND

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ROUTE 1H
PCE PROJECT TRIPS – YEAR 2014
DEVIL'S GATE DAM & RESERVOIR

FIGURE
5-1-8B

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Table 5-1-8
Intersection Capacity Analysis – Year 2014 Conditions (Route 1H)
Traffic Impact Analysis - Site 1

Route1H		AM				MID-DAY (12-2 PM)				MID-DAY (2-4 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
2	Berkshire Place and I-210 Freeway Westbound Ramps (3)	B	10.4	-	-	A	4.6	-	-	A	6.6	-	-	A	3.5	-	-
3	Oak Grove Drive and Berkshire Place	B	19.2	0.93	B	A	5.6	0.29	A	A	8.4	0.57	B	A	8	0.57	B
4	Oak Grove Drive and Foothill Freeway Overpass (3)	C	19.2	-	-	A	9.6	-	-	A	9.5	-	-	B	11.3	-	-
5	Windsor Ave and Oak Grove Drive/Woodbury Rd	C	34.7	0.94	D	B	14.3	0.54	A	B	17.1	0.58	A	C	24.9	0.76	C
6	Windsor Ave/Arroyo Blvd and I-210 Freeway Westbound Ramps	A	9.7	0.61	B	A	5.7	0.37	A	A	6.4	0.37	A	A	7.8	0.44	B
7	Windsor Ave/Arroyo Blvd and I-210 Freeway Eastbound Ramps	C	28.6	0.57	A	B	16.1	0.39	A	B	17.4	0.42	A	C	26.8	0.63	A

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
(5)V/C-HCM Volume to Capacity Ratio

Source: **Hall & Foreman, Inc.**

Haul Route 1H Analysis

As presented in *Table 5-1-8*, under the project conditions Year 2014 for Site 1 (Routes 1H) all intersections are anticipated to operate at an HCM LOS C or better.

Section 2: Manning's Pit (Site 2), Waste Management (Site 3), and Vulcan Materials - Irwindale Site (Site 9)

Haul Route 2A

The Year 2014 AM (7-9), MID-DAY (12-2), PM (4-6) turn movement volumes, are provided in *Figure 5-2-1A*. For comparison the (PCE) Year 2014 turn movement volumes are provided in *Figure 5-2-1B.*

N/S STREET				8			E/W STREET			
IRWINDALE AVE							I-210 FWY WB RAMPS			
				665	510	0				
				595	650	0				
				520	975	0				
0	0	0						110	120	160
0	0	0		TS				0	0	0
0	0	0						190	280	160
				0	920	690				
				0	945	510				
				0	825	570				

N/S STREET				9			E/W STREET			
IRWINDALE AVE							I-210 FWY EB RAMPS			
				0	595	190				
				0	730	220				
				0	805	325				
510	645	410						0	0	0
10	10	10		TS				0	0	0
760	450	475						0	0	0
				0	1030	215				
				0	805	260				
				0	1100	420				

N/S STREET				10			E/W STREET			
IRWINDALE AVE							FIRST STREET			
				135	1205	10				
				185	870	25				
				45	1110	20				
85	145	205						15	20	20
10	15	10		TS				10	10	10
25	105	40						10	20	20
				50	1145	10				
				100	1115	30				
				35	1475	20				

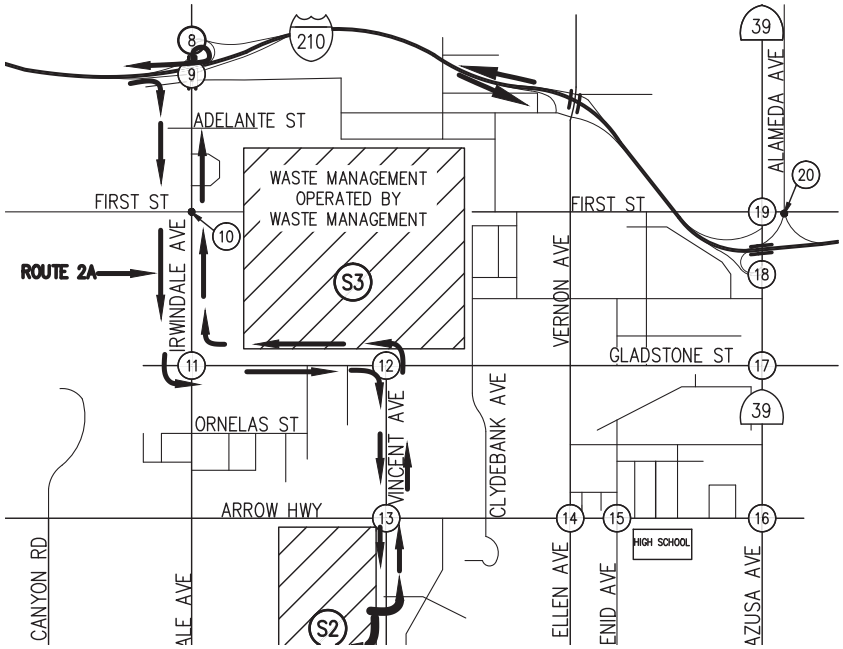
N/S STREET				11			E/W STREET			
IRWINDALE AVE							GLADSTONE STREET			
				10	850	255				
				10	820	235				
				10	765	390				
10	10	10						685	275	245
15	30	75		TS				70	25	15
15	40	35						540	140	140
				15	560	60				
				20	840	100				
				15	1275	360				

N/S STREET				12			E/W STREET			
VINCENT AVE							GLADSTONE STREET			
				25	20	10				
				15	10	15				
				10	10	10				
20	15	10						10	10	10
115	185	640		TS				830	215	260
180	170	220						275	125	165
				390	15	180				
				205	10	185				
				155	10	385				

N/S STREET				13			E/W STREET			
VINCENT AVE							ARROW HWY			
				75	345	35				
				65	225	30				
				60	280	50				
60	85	145						100	50	80
580	715	1520		TS				1325	625	570
85	100	230						130	110	120
				185	365	90				
				80	225	125				
				45	285	115				

N

NOT TO SCALE



LEGEND

N/S STREET				S#			E/W STREET			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

S# – DISPOSAL SITE

– STUDY INTERSECTIONS

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ROUTE 2A
PROJECT TRIPS – YEAR 2014

DEVIL'S GATE DAM & RESERVOIR

FIGURE
5-2-1A

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 5\Ch. 5 Section 2\FIG 5-2-1A.dwg
Last Opened: Oct 04, 2013 – 1:03pm by: TMunoz

N/S STREET				8	E/W STREET					
IRWINDALE AVE					I-210 FWY WB RAMPS					
			790	600	0					
			675	705	0					
			540	990	0					
0	0	0					135	130	170	
0	0	0		TS			0	0	0	
0	0	0					215	345	180	
			0	1065	905					
			0	1035	730					
			0	850	720					

N/S STREET				9	E/W STREET					
IRWINDALE AVE					I-210 FWY EB RAMPS					
			0	720	240					
			0	885	230					
			0	850	345					
590	760	420					0	0	0	
10	10	10		TS			0	0	0	
970	650	590					0	0	0	
			0	1215	235					
			0	1010	315					
			0	1235	430					

N/S STREET				10	E/W STREET					
IRWINDALE AVE					FIRST STREET					
			185	1490	10					
			305	1190	30					
			80	1335	25					
155	245	255					15	25	25	
10	15	10		TS			10	10	10	
35	140	50					10	20	20	
			55	1480	15					
			130	1450	30					
			40	1680	30					

N/S STREET				11	E/W STREET					
IRWINDALE AVE					GLADSTONE STREET					
			10	925	475					
			10	955	450					
			15	855	555					
10	10	10					925	480	375	
20	40	75		TS			75	30	15	
25	40	40					585	160	160	
			20	650	70					
			25	970	110					
			20	1365	440					

N/S STREET				12	E/W STREET					
VINCENT AVE					GLADSTONE STREET					
			55	25	10					
			25	10	20					
			10	10	10					
40	30	10					10	10	10	
125	195	640		TS			835	225	265	
355	325	365					280	125	165	
			505	25	205					
			360	10	190					
			260	10	390					

N/S STREET				13	E/W STREET					
VINCENT AVE					ARROW HWY					
			90	500	35					
			70	385	30					
			60	385	50					
65	100	145					100	50	80	
590	730	1530		TS			1345	640	580	
90	115	230					135	110	120	
			190	500	90					
			105	380	125					
			45	395	120					

N

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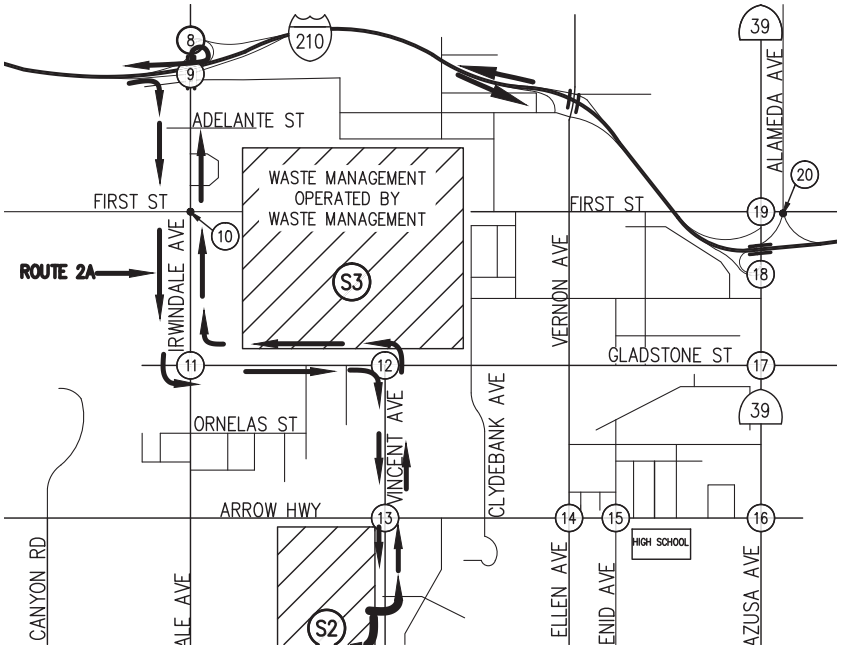

LEGEND

N/S STREET				S#	E/W STREET					
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS			7AM - 9AM	2PM - 4PM	4PM - 6PM	
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

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ROUTE 2A
PCE PROJECT TRIPS – YEAR 2014
DEVIL'S GATE DAM & RESERVOIR

FIGURE 5-2-1B

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Table 5-2-1
Intersection Capacity Analysis – Year 2014 Conditions (Route 2A)
Traffic Impact Analysis - Site 2

Route2A		AM				MID-DAY				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
8	Irwindale Ave and I-210 Freeway Westbound Ramps	A	7.1	0.56	A	A	7.4	0.53	A	A	7.3	0.56	A
9	Irwindale Ave and I-210 Freeway Eastbound Ramps	C	27.9	0.93	C	C	22.0	0.79	C	C	26.9	0.91	D
10	Irwindale Ave and First Street	B	10.6	0.63	B	B	14.2	0.65	B	C	23.2	0.86	C
11	Irwindale Ave and Gladstone Street	C	29.9	0.92	D	B	16.0	0.72	B	C	30.2	0.95	D
12	Vincent Ave and Gladstone Street	B	14.3	0.80	C	A	8.9	0.45	A	B	14.4	0.72	C
13	Vincent Ave and Arrow Hwy	B	17.6	0.90	D	A	9.8	0.45	A	B	15.4	0.93	D

1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
(5)V/C-HCM Volume to Capacity Ratio

Source: **Hall & Foreman, Inc.**

As presented in *Table 5-2-1*, under the project conditions year 2014 for Site 2 (Route 2A) all of the intersections are anticipated to operate at an acceptable HCM LOS C or better.

Haul Route 2B

The Year 2014 AM (7-9), MID-DAY (12-2), PM (4-6) turn movement volumes, are provided in *Figure 5-2-2A*. For comparison the (PCE) Year 2014 turn movement volumes are provided in *Figure 5-2-2C.*

N/S STREET				9			E/W STREET			
IRWINDALE AVE							I-210 FWY EB RAMPS			
				0	595	190				
				0	730	220				
				0	805	325				
510	645	410						0	0	0
10	10	10		TS				0	0	0
760	450	475						0	0	0
				0	975	215				
				0	750	260				
				0	1045	420				

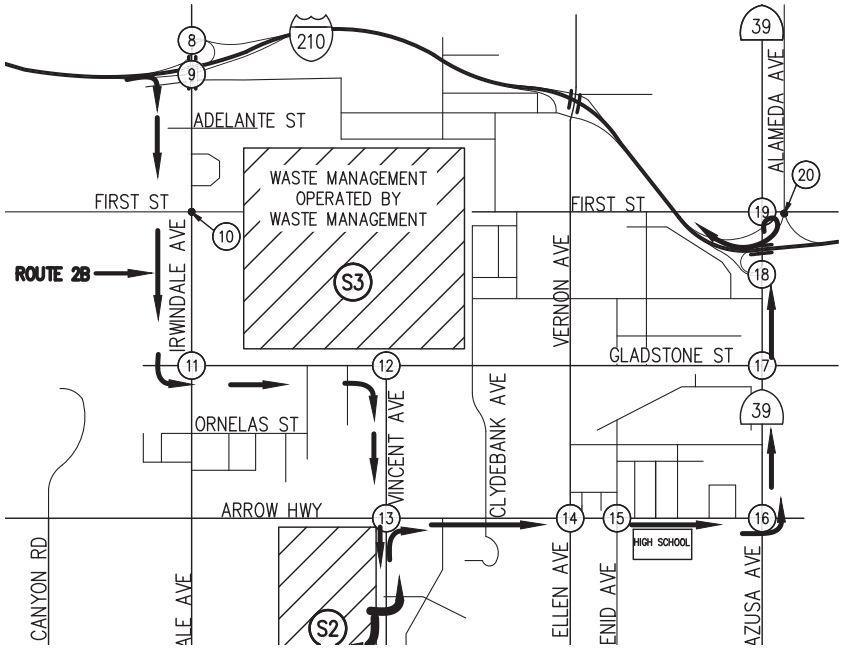
N/S STREET				10			E/W STREET			
IRWINDALE AVE							FIRST STREET			
				135	1205	10				
				185	870	20				
				45	1110	20				
85	145	205						15	20	20
10	15	10		TS				10	10	10
25	105	40						10	20	20
				50	1090	10				
				100	1065	25				
				35	1420	20				

N/S STREET				11			E/W STREET			
IRWINDALE AVE							GLADSTONE STREET			
				10	850	255				
				10	820	235				
				10	765	390				
10	10	10						630	220	190
15	30	75		TS				70	25	15
15	40	35						540	140	140
				15	560	60				
				20	840	100				
				15	1275	360				

N/S STREET				12			E/W STREET			
VINCENT AVE							GLADSTONE STREET			
				25	20	10				
				65	10	15				
				10	10	10				
20	15	10						10	10	10
115	185	640		TS				830	215	260
180	170	220						275	125	165
				340	15	180				
				155	10	185				
				100	10	385				

N/S STREET				13			E/W STREET			
VINCENT AVE							ARROW HWY			
				75	345	35				
				65	225	30				
				60	280	50				
60	85	145						100	50	80
580	715	1520		TS				1325	625	570
85	100	230						130	110	120
				185	345	145				
				80	190	180				
				45	255	170				

N/S STREET				14			E/W STREET			
LARK ELLEN AVE							ARROW HWY			
				75	360	120				
				30	230	75				
				60	360	110				
80	80	125						35	35	40
615	790	1520		TS				1315	590	650
100	65	125						125	120	90
				180	360	185				
				70	205	120				
				80	355	125				



LEGEND

N/S STREET				S#			E/W STREET			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

S# – DISPOSAL SITE

– STUDY INTERSECTIONS

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ROUTE 2B
PROJECT TRIPS – YEAR 2014
DEVIL'S GATE DAM & RESERVOIR

FIGURE 5-2-2A

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N/S STREET				15			E/W STREET			
ENID AVE							ARROW HWY			
				65	160	35				
				30	25	30				
				35	40	30				
20	30	90						25	30	35
750	935	1610		TS				1415	690	685
120	25	65						185	50	55
				105	120	170				
				30	25	60				
				40	45	60				

N/S STREET				16			E/W STREET			
AZUSA AVE							ARROW HWY			
				225	535	105				
				110	830	135				
				90	690	285				
220	215	290						115	125	105
555	540	1230		TS				975	430	500
85	130	145						75	205	135
				245	565	50				
				220	730	145				
				175	505	250				

N/S STREET				17			E/W STREET			
AZUSA AVE							GLADSTONE STREET			
				130	685	175				
				125	835	190				
				70	900	195				
160	165	195						65	90	60
175	215	730		TS				900	195	280
30	40	60						170	220	140
				120	775	45				
				110	860	105				
				60	800	80				

N/S STREET				18			E/W STREET			
AZUSA AVE							I-210 FWY EB RAMPS			
				230	805	0				
				185	785	0				
				205	870	0				
275	305	245						0	0	0
0	0	0		TS				0	0	0
255	285	235						0	0	0
				0	775	215				
				0	945	235				
				0	750	265				

N/S STREET				19			E/W STREET			
AZUSA AVE							FIRST STREET			
				185	400	175				
				15	705	85				
				25	870	130				
130	50	100						350	170	240
330	90	200		TS				545	140	225
135	35	40						530	295	280
				175	410	465				
				75	715	410				
				55	470	415				

N/S STREET				20			E/W STREET			
ALAMEDA ST/WB I-210 FWY							FIRST STREET			
				85	40	50				
				70	30	35				
				70	40	55				
20	30	25						45	30	40
350	230	430		TS				700	240	260
510	290	290						445	130	165
				340	55	20				
				380	60	50				
				485	80	75				

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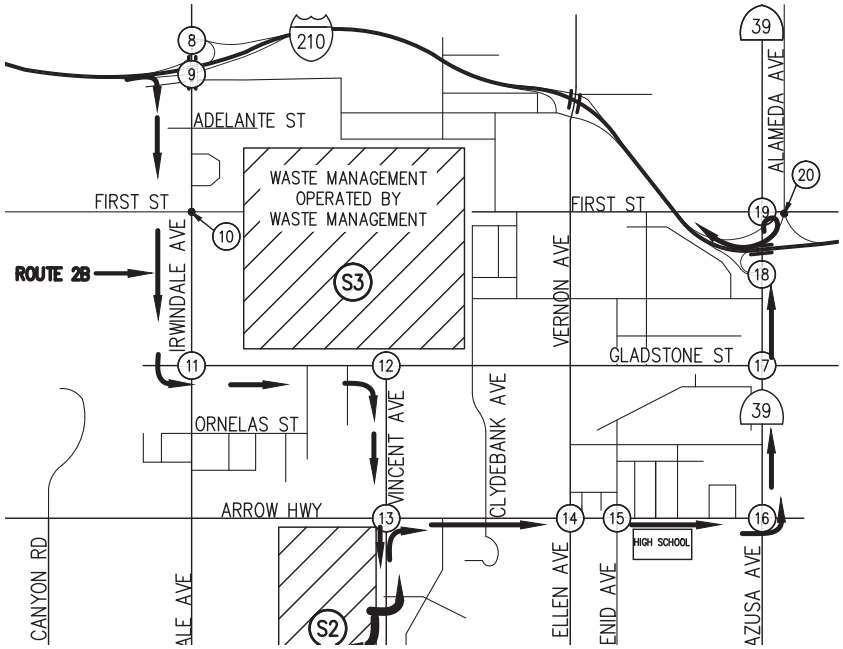

LEGEND

N/S STREET				S#			E/W STREET			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

S# – DISPOSAL SITE

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ROUTE 2B
PROJECT TRIPS – YEAR 2014

DEVIL'S GATE DAM & RESERVOIR

FIGURE 5-2-2B

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Last Opened: Oct 04, 2013 – 1:05pm by: TMunoz

N/S STREET			9			E/W STREET				
IRWINDALE AVE						I-210 FWY EB RAMPS				
			0	720	240					
			0	885	230					
			0	850	345					
590	760	420					0	0	0	
10	10	10		TS			0	0	0	
970	650	590					0	0	0	
			0	1050	235					
			0	845	315					
			0	1075	430					

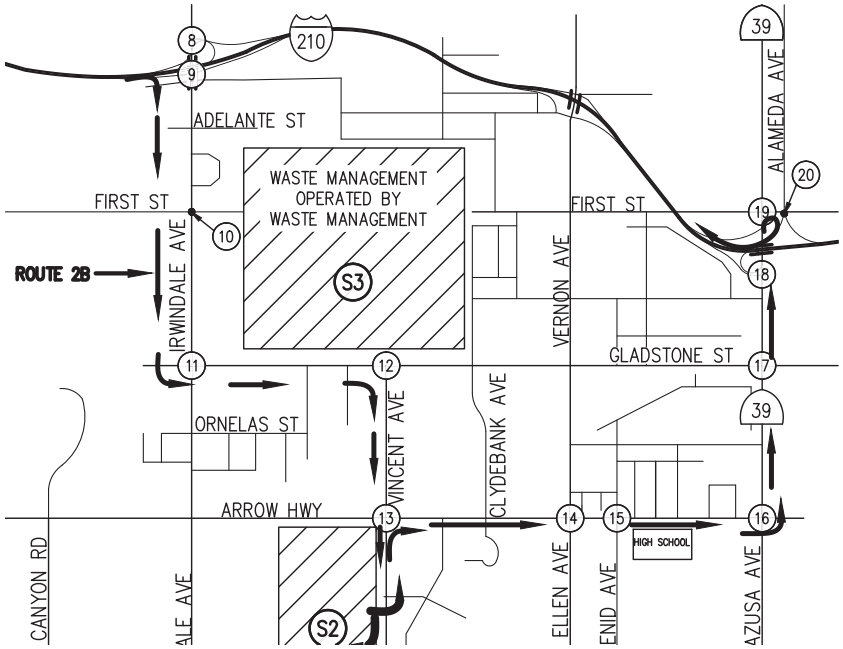
N/S STREET			10			E/W STREET				
IRWINDALE AVE						FIRST STREET				
			185	1490	10					
			305	1190	25					
			80	1335	25					
155	245	255					15	25	25	
10	15	10		TS			10	10	10	
35	140	50					10	20	20	
			55	1320	15					
			130	1285	25					
			40	1515	30					

N/S STREET			11			E/W STREET				
IRWINDALE AVE						GLADSTONE STREET				
			10	925	475					
			10	955	450					
			15	855	555					
10	10	10					765	315	215	
20	40	75		TS			75	30	15	
25	40	40					585	160	160	
			20	650	70					
			25	970	110					
			20	1365	440					

N/S STREET			12			E/W STREET				
VINCENT AVE						GLADSTONE STREET				
			55	25	10					
			25	10	20					
			10	10	10					
40	30	10					10	10	10	
125	195	640		TS			835	225	265	
355	325	365					280	125	165	
			345	25	205					
			195	10	190					
			100	10	390					

N/S STREET			13			E/W STREET				
VINCENT AVE						ARROW HWY				
			90	500	35					
			70	385	30					
			60	385	50					
65	100	145					100	50	80	
590	730	1530		TS			1345	640	580	
90	115	230					135	110	120	
			190	380	255					
			105	250	290					
			45	265	285					

N/S STREET			14			E/W STREET				
LARK ELLEN AVE						ARROW HWY				
			80	370	125					
			35	240	80					
			60	360	110					
85	90	130					35	35	40	
795	990	1675		TS			1410	670	665	
110	70	125					125	120	90	
			185	375	190					
			75	235	120					
			85	355	125					



LEGEND

N/S STREET			S#			E/W STREET				
			7AM-9AM							
			2PM-4PM							
			4PM-6PM							
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS			7AM - 9AM	2PM - 4PM	4PM - 6PM	
			7AM-9AM							
			2PM-4PM							
			4PM-6PM							

LEGEND

(S#) – DISPOSAL SITE

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ROUTE 2B
PCE PROJECT TRIPS – YEAR 2014
DEVIL'S GATE DAM & RESERVOIR

FIGURE 5-2-2C

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N/S STREET				15			E/W STREET		
ENID AVE							ARROW HWY		
			65	160	35				
			30	25	30				
			40	40	30				
20	35	90	↱	↑	↰	↰	25	35	40
955	1170	1765	→	TS		←	1510	760	705
120	25	65	↳	↑	↱	↱	190	50	55
			105	125	175				
			30	25	60				
			40	45	60				

N/S STREET				16			E/W STREET		
AZUSA AVE							ARROW HWY		
			235	565	105				
			110	855	140				
			90	715	295				
330	330	405	↱	↑	↰	↰	120	130	105
650	565	1250	→	TS		←	1025	460	520
85	140	155	↳	↑	↱	↱	75	250	140
			260	605	50				
			230	765	160				
			175	520	255				

N/S STREET				17			E/W STREET		
AZUSA AVE							GLADSTONE STREET		
			145	760	195				
			135	900	200				
			80	930	205				
195	195	215	↱	↑	↰	↰	70	100	60
195	245	760	→	TS		←	925	225	290
35	50	60	↳	↑	↱	↱	175	230	140
			130	925	50				
			120	1025	110				
			65	935	85				

N/S STREET				18			E/W STREET		
AZUSA AVE							I-210 FWY EB RAMPS		
			260	890	0				
			225	850	0				
			225	920	0				
290	340	265	↱	↑	↰	↰	0	0	0
0	0	0	→	TS		←	0	0	0
280	305	265	↳	↑	↱	↱	0	0	0
			0	970	245				
			0	1110	260				
			0	900	295				

N/S STREET				19			E/W STREET		
AZUSA AVE							FIRST STREET		
			230	520	190				
			15	800	85				
			25	900	135				
130	50	105	↱	↑	↰	↰	360	185	245
330	105	205	→	TS		←	550	145	235
135	45	40	↳	↑	↱	↱	550	320	295
			180	465	605				
			75	775	540				
			55	495	535				

N/S STREET				20			E/W STREET		
ALAMEDA ST/WB I-210 FWY							FIRST STREET		
			85	45	50				
			70	30	35				
			70	45	55				
20	30	25	↱	↑	↰	↰	45	40	40
375	235	440	→	TS		←	725	250	265
645	420	410	↳	↑	↱	↱	465	135	170
			380	60	20				
			450	65	50				
			520	80	75				

N

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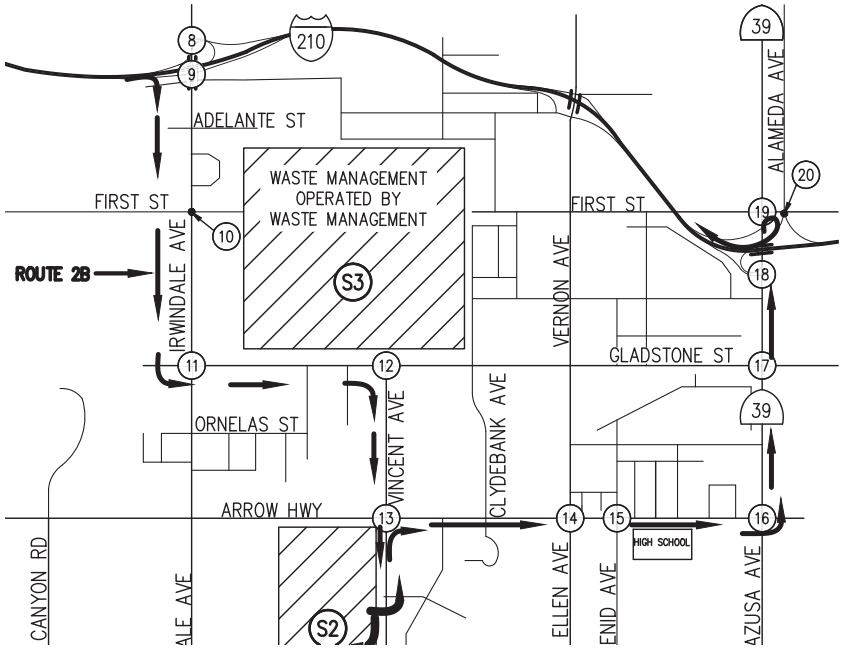

LEGEND

N/S STREET				S#			E/W STREET		
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					
7AM - 9AM	2PM - 4PM	4PM - 6PM	↱	↑	↰	↰	7AM - 9AM	2PM - 4PM	4PM - 6PM
			→	TS		←			
			↳	↑	↱	↱			
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					

LEGEND

(S#) – DISPOSAL SITE

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ROUTE 2B
PCE PROJECT TRIPS – YEAR 2014
DEVIL'S GATE DAM & RESERVOIR

FIGURE 5-2-2D

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Table 5-2-2
Intersection Capacity Analysis – Year 2014 Conditions (Route 2B)
Traffic Impact Analysis - Site 2

Route2B		AM				MID-DAY				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
9	Irwindale Ave and I-210 Freeway Eastbound Ramps	C	27.9	0.93	C	C	22.2	0.79	C	C	26.9	0.91	D
10	Irwindale Ave and First Street	B	13.8	0.65	B	B	18.5	0.65	B	D	50.3	0.93	C
11	Irwindale Ave and Gladstone Street	C	31.9	0.91	D	B	15.2	0.67	B	C	27.6	0.95	D
12	Vincent Ave and Gladstone Street	B	12.6	0.74	B	A	8.7	0.38	A	B	14.2	0.72	C
13	Vincent Ave and Arrow Hwy	B	17.5	0.90	D	A	9.8	0.45	A	B	15.4	0.93	D
14	Arrow Hwy and Lark Ellen Ave	E	61.5	0.97	D	D	40.3	0.72	B	E	55.4	0.94	E
15	Arrow Hwy and Enid Ave	D	55.0	1.35	E	B	12.8	0.50	A	B	14.4	0.70	C
16	Azusa Ave and Arrow Hwy	E	63.8	1.15	D	E	55.4	0.96	D	E	58.4	1.04	E
17	Azusa Ave and Gladstone Street	E	61.5	1.01	D	D	38.3	0.91	C	D	38.0	0.87	D
18	Azusa Ave and I-210 Freeway Eastbound Ramps	B	12.1	0.71	A	B	11.7	0.75	A	B	10.3	0.65	A
19	Azusa Ave and First Street	D	46.2	0.87	D	B	16.3	0.57	A	B	18.9	0.69	B
20	First Street and Alameda Street/I-210 Freeway Westbound Ramps	E	69.2	1.40	E	B	11.6	0.63	B	B	17.1	0.87	C

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
(5)V/C-HCM Volume to Capacity Ratio

Source: **Hall & Foreman, Inc.**

Haul Route 2B Analysis

As presented in *Table 5-2-2*, under the project conditions year 2014 for Site 2 (Route 2B) most of the intersections are anticipated to operate at an acceptable HCM LOS D or better. Route 2B will have negative impacts on intersections Arrow Hwy and Lark Ellen Ave anticipated AM and PM peak hours HCM LOS E, Azusa Ave and Arrow Hwy anticipated AM, Mid-day, and PM peak hours HCM LOS E, Azusa Ave and Gladstone Street anticipated AM peak hour HCM LOS E, First Street and Alameda Street/I-210 Freeway Westbound Ramps AM peak hour HCM LOS E. Mitigations are recommended to improve the HCM LOS at these four intersections.

Haul Route 3

The Year 2014 AM (7-9), MID-DAY (12-2), PM (4-6) turn movement volumes, are provided in *Figure 5-2-3A*. For comparison the (PCE) Year 2014 turn movement volumes are provided in *Figure 5-2-3B.*

Haul Route 9

The Year 2014 AM (7-9), MID-DAY (12-2), PM (4-6) turn movement volumes, are provided in *Figure 5-2-4A*. For comparison the (PCE) Year 2014 turn movement volumes are provided in *Figure 5-2-4B.*

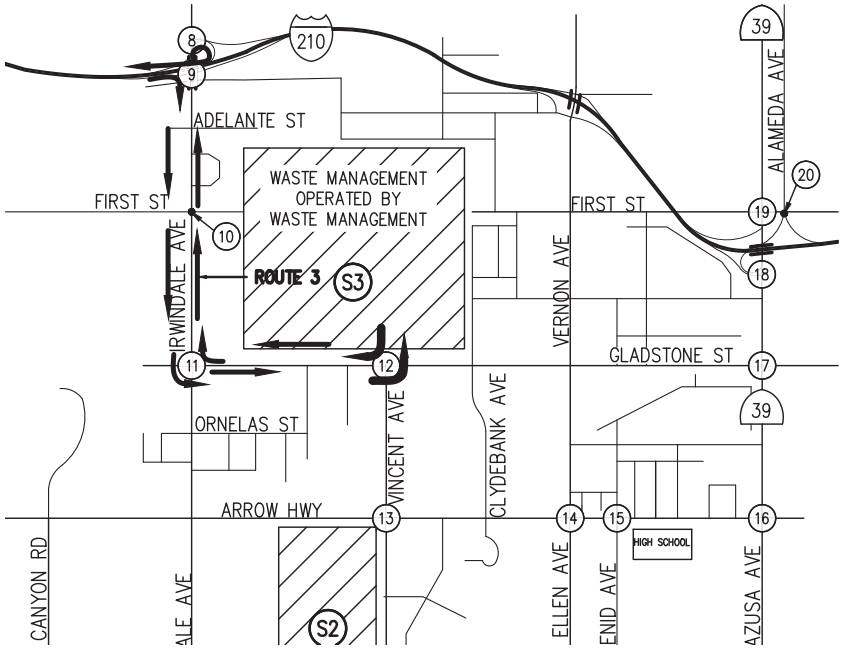
N/S STREET				8			E/W STREET					
IRWINDALE AVE							I-210 FWY WB RAMPS					
				665	510	0						
				595	650	0						
				520	975	0						
0	0	0						110	120	160		
0	0	0		TS				0	0	0		
0	0	0						190	280	160		
				0	920	690						
				0	945	510						
				0	825	570						

N/S STREET				9			E/W STREET					
IRWINDALE AVE							I-210 FWY EB RAMPS					
				0	595	190						
				0	730	220						
				0	805	325						
510	645	410						0	0	0		
10	10	10		TS				0	0	0		
760	450	475						0	0	0		
				0	1030	215						
				0	805	260						
				0	1100	420						

N/S STREET				10			E/W STREET					
IRWINDALE AVE							FIRST STREET					
				125	1105	5						
				170	800	20						
				40	1020	15						
80	135	190						10	15	15		
5	10	5		TS				5	5	5		
20	95	35						5	15	15		
				45	1050	5						
				90	1025	25						
				30	1355	15						

N/S STREET				11			E/W STREET					
IRWINDALE AVE							GLADSTONE STREET					
				10	850	255						
				10	820	235						
				10	765	390						
10	10	10						685	275	245		
15	30	75		TS				70	25	15		
15	40	35						540	140	140		
				15	560	60						
				20	840	100						
				15	1275	360						

N/S STREET				12			E/W STREET					
VINCENT AVE							GLADSTONE STREET					
				25	20	10						
				65	10	15						
				60	10	10						
70	65	60						10	10	10		
115	185	640		TS				830	215	260		
125	115	165						275	125	165		
				340	15	180						
				155	10	185						
				100	10	385						



LEGEND

N/S STREET				S#			E/W STREET					
				7AM-9AM								
				2PM-4PM								
				4PM-6PM								
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM		
				7AM-9AM								
				2PM-4PM								
				4PM-6PM								

LEGEND

S# – DISPOSAL SITE

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ROUTE 3
PROJECT TRIPS – YEAR 2014

DEVIL'S GATE DAM & RESERVOIR

FIGURE 5-2-3A

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N/S STREET				8	E/W STREET				
IRWINDALE AVE					I-210 FWY WB RAMPS				
			790	600	0				
			675	705	0				
			540	990	0				
0	0	0					135	130	170
0	0	0		TS			0	0	0
0	0	0					215	345	180
			0	1065	905				
			0	1035	730				
			0	850	720				

N/S STREET				9	E/W STREET				
IRWINDALE AVE					I-210 FWY EB RAMPS				
			0	720	240				
			0	885	230				
			0	850	345				
590	760	420					0	0	0
10	10	10		TS			0	0	0
970	650	590					0	0	0
			0	1215	235				
			0	1010	315				
			0	1235	430				

N/S STREET				10	E/W STREET				
IRWINDALE AVE					FIRST STREET				
			185	1490	10				
			305	1190	30				
			80	1335	25				
155	245	255					15	25	25
10	15	10		TS			10	10	10
35	140	50					10	20	20
			55	1480	15				
			130	1450	30				
			40	1680	30				

N/S STREET				11	E/W STREET				
IRWINDALE AVE					GLADSTONE STREET				
			10	925	475				
			10	955	450				
			15	855	555				
10	10	10					925	480	375
20	40	75		TS			75	30	15
25	40	40					585	160	160
			20	650	70				
			25	970	110				
			20	1365	440				

N/S STREET				12	E/W STREET				
VINCENT AVE					GLADSTONE STREET				
			220	25	10				
			185	10	20				
			170	10	10				
200	190	170					10	10	10
125	195	640		TS			835	225	265
190	165	200					280	125	165
			345	25	205				
			195	10	190				
			100	10	390				

N

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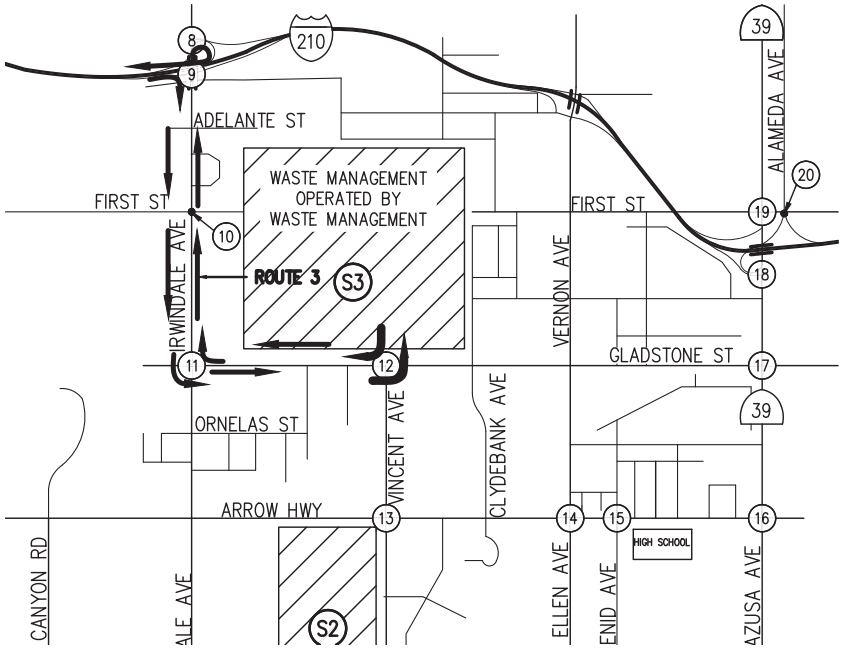

LEGEND

N/S STREET				S#	E/W STREET				
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					
7AM - 9AM	2PM - 4PM	4PM - 6PM					7AM - 9AM	2PM - 4PM	4PM - 6PM
				TS					
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					

LEGEND

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ROUTE 3
PCE PROJECT TRIPS – YEAR 2014
DEVIL'S GATE DAM & RESERVOIR

FIGURE 5-2-3B

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Last Opened: Oct 04, 2013 – 1:13pm by: TMunoz

N/S STREET				8	E/W STREET					
IRWINDALE AVE					I-210 FWY WB RAMPS					
				720	110	0				
				650	120	0				
				570	160	0				
0	0	0						110	120	160
0	0	0		TS				0	0	0
0	0	0						190	280	160
				0	975	640				
				0	995	460				
				0	875	520				

N/S STREET				9	E/W STREET					
IRWINDALE AVE					I-210 FWY EB RAMPS					
				0	595	190				
				0	730	220				
				0	805	325				
565	700	465						0	0	0
10	10	10		TS				0	0	0
705	400	420						0	0	0
				0	975	215				
				0	750	260				
				0	1045	420				

N/S STREET				52	E/W STREET					
IRWINDALE AVE					FOOTHILL BOULEVARD					
				10	60	10				
				10	60	10				
				10	60	10				
10	10	10						10	10	10
10	10	10		TS				10	10	10
10	10	10						10	10	10
				10	60	10				
				10	60	10				
				10	60	10				

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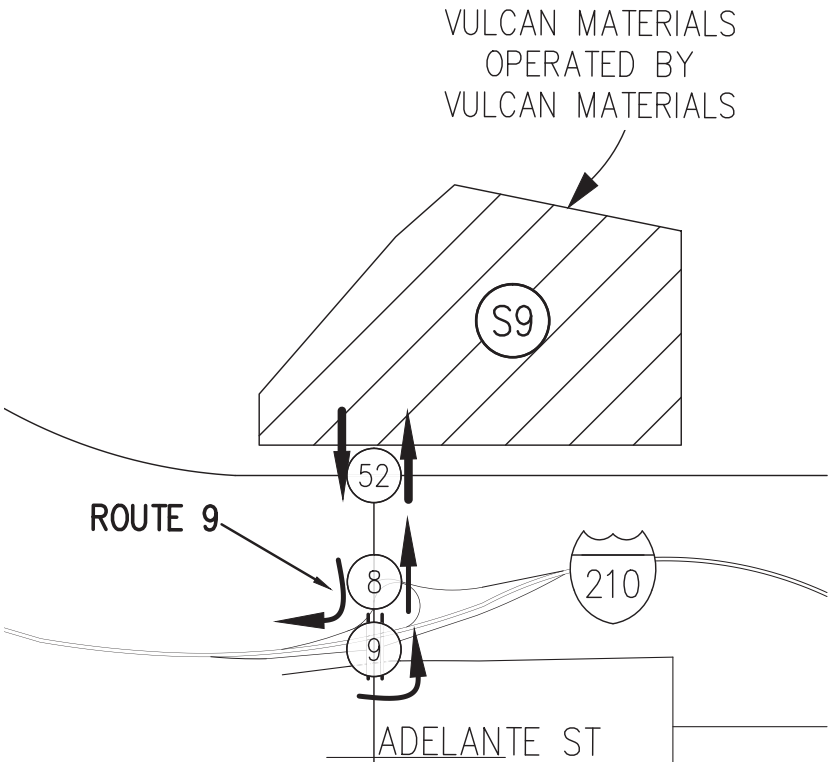

LEGEND

N/S STREET				S#	E/W STREET					
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

(S#) – DISPOSAL SITE

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ROUTE 9
PROJECT TRIPS – YEAR 2014

DEVIL'S GATE DAM & RESERVOIR

FIGURE
5-2-4A

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Last Opened: Oct 04, 2013 – 1:14pm by: TMunoz

N/S STREET				8	E/W STREET				
IRWINDALE AVE					I-210 FWY WB RAMPS				
			955	600	0				
			840	705	0				
			705	990	0				
0	0	0					135	130	170
0	0	0		TS			0	0	0
0	0	0					215	345	180
			0	1225	740				
			0	1200	565				
			0	1015	555				

N/S STREET				9	E/W STREET				
IRWINDALE AVE					I-210 FWY EB RAMPS				
			0	720	240				
			0	885	230				
			0	850	345				
750	920	585					0	0	0
10	10	10		TS			0	0	0
805	485	425					0	0	0
			0	1050	235				
			0	845	315				
			0	1075	430				

N/S STREET				52	E/W STREET				
IRWINDALE AVE					FOOTHILL BOULEVARD				
			10	170	10				
			10	170	10				
			10	170	10				
10	10	10					10	10	10
10	10	10		TS			10	10	10
10	10	10					10	10	10
			10	170	10				
			10	170	10				
			10	170	10				

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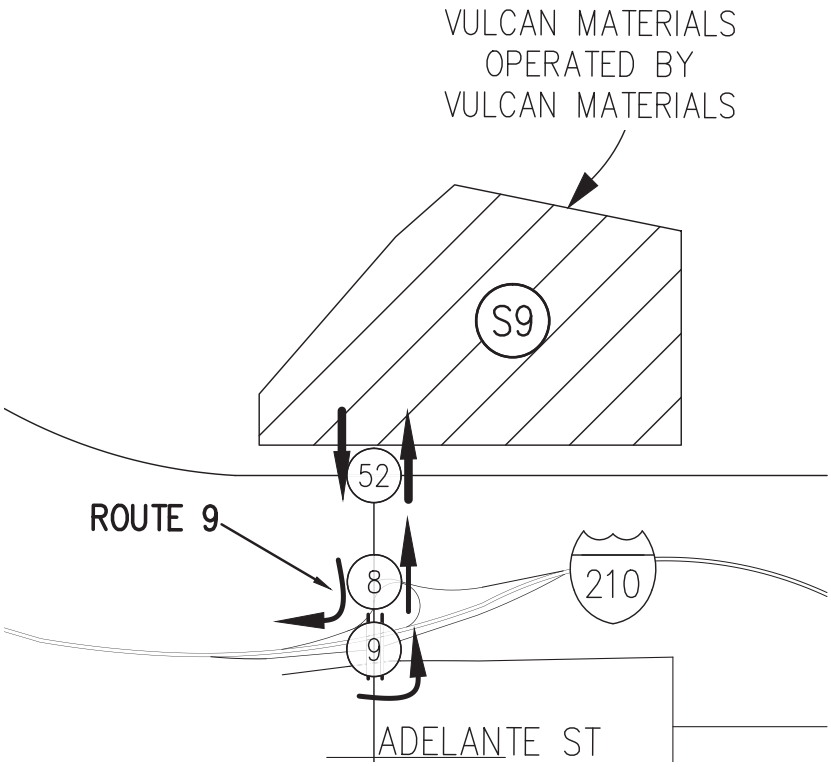

LEGEND

N/S STREET				S#	E/W STREET				
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS		7AM - 9AM	2PM - 4PM	4PM - 6PM	
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 9
PCE PROJECT TRIPS – YEAR 2014

DEVIL'S GATE DAM & RESERVOIR

FIGURE 5-2-4B

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Table 5-2-3
Intersection Capacity Analysis – Year 2014 Conditions (Route 3)
Traffic Impact Analysis - Site 3

Route 3		AM				MID-DAY				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
8	Irwindale Ave and I-210 Freeway Westbound Ramps	A	7.1	0.56	A	A	7.4	0.53	A	A	7.3	0.56	A
9	Irwindale Ave and I-210 Freeway Eastbound Ramps	C	27.9	0.93	C	C	22.0	0.79	C	C	26.9	0.91	D
10	Irwindale Ave and First Street	B	10.6	0.63	B	B	14.2	0.65	B	C	23.2	0.86	C
11	Irwindale Ave and Gladstone Street	C	29.9	0.92	D	B	16.0	0.72	B	C	30.2	0.95	D
12	Vincent Ave and Gladstone Street	B	11.7	0.68	B	A	8.7	0.31	A	B	11.0	0.57	B

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc.**

Haul Routes 3 Analysis

As presented in *Table 5-2-3*, under the project conditions Year 2014 for Site 3 (Route 3) all of the intersections are anticipated to operate at an acceptable HCM LOS C or better.

Table 5-2-4
Intersection Capacity Analysis – Year 2014 Conditions (Route 9)
Traffic Impact Analysis - Site 9

Route 9		AM				MID-DAY				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
8	Irwindale Ave and I-210 Freeway Westbound Ramps	A	7.2	0.57	A	A	7.5	0.54	A	A	7.5	0.58	A
9	Irwindale Ave and I-210 Freeway Eastbound Ramps	C	27.9	0.90	C	C	22.5	0.80	C	C	26.6	0.88	D
53	Irwindale Ave and Foothill Boulevard	C	30.0	0.87	C	D	46.8	1.01	D	E	77.1	1.09	F*

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc.**

Haul Routes 9 Analysis

As presented in *Table 5-2-4*, under the project conditions Year 2014 for Site 9 (Route 9) most of the intersections are anticipated to operate at an acceptable HCM LOS C or better. The intersection of Irwindale Ave and Foothill Boulevard is anticipated to operate at an unacceptable HCM LOS E during the PM peak period.

Section 3: Scholl Canyon Landfill (Site 4)

Haul Route 4A

The Year 2014 AM (7-9), MID-DAY (12-2), PM (4-6) turn movement volumes, are provided in *Figure 5-3-1A*. For comparison the (PCE) Year 2014 turn movement volumes are provided in *Figure 5-3-1B*.

Haul Route 4B

The Year 2014 AM (7-9), MID-DAY (12-2), PM (4-6) turn movement volumes, are provided in *Figure 5-3-2A*. For comparison the (PCE) Year 2014 turn movement volumes are provided in *Figure 5-3-2B*.

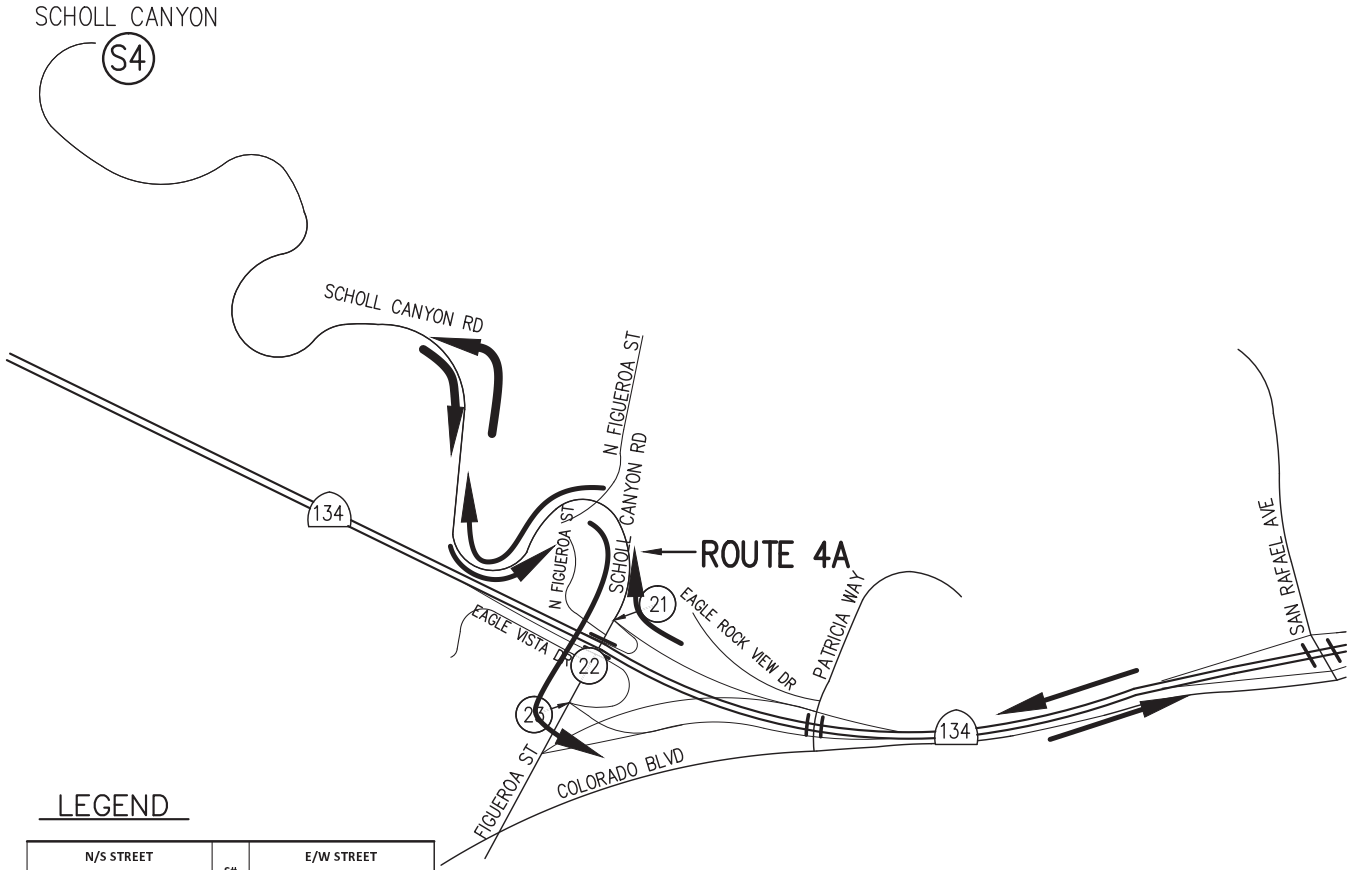
N/S STREET				21		E/W STREET					
SCHOLL CANYON RD						WB 134 FWY					
			0	65	10						
			0	105	20						
			0	90	20						
0	0	0					70	90	65		
0	0	0					0	0	0		
0	0	0					230	285	470		
			0	25	690						
			0	40	340						
			0	15	500						

N/S STREET				22		E/W STREET					
FIGUEROA ST						EAGLE VISTA DRIVE					
			15	295	0						
			20	355	0						
			30	530	0						
50	35	45					0	0	0		
0	0	0					0	0	0		
65	55	75					0	0	0		
			30	680	0						
			45	355	0						
			115	470	0						

N/S STREET				23		E/W STREET					
FIGUEROA ST						EB 134 FWY					
			0	230	110						
			0	305	125						
			0	485	115						
0	0	0					45	80	60		
0	0	0		TS			0	0	0		
0	0	0					400	255	495		
			0	670	310						
			0	285	245						
			0	525	290						

N

NOT TO SCALE



LEGEND

N/S STREET				S#		E/W STREET					
				7AM-9AM							
				2PM-4PM							
				4PM-6PM							
7AM - 9AM	2PM - 4PM	4PM - 6PM					7AM - 9AM	2PM - 4PM	4PM - 6PM		
				TS							
				7AM-9AM							
				2PM-4PM							
				4PM-6PM							

LEGEND

S# – DISPOSAL SITE

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ROUTE 4A
PROJECT TRIPS – YEAR 2014

DEVIL'S GATE DAM & RESERVOIR

FIGURE 5-3-1A

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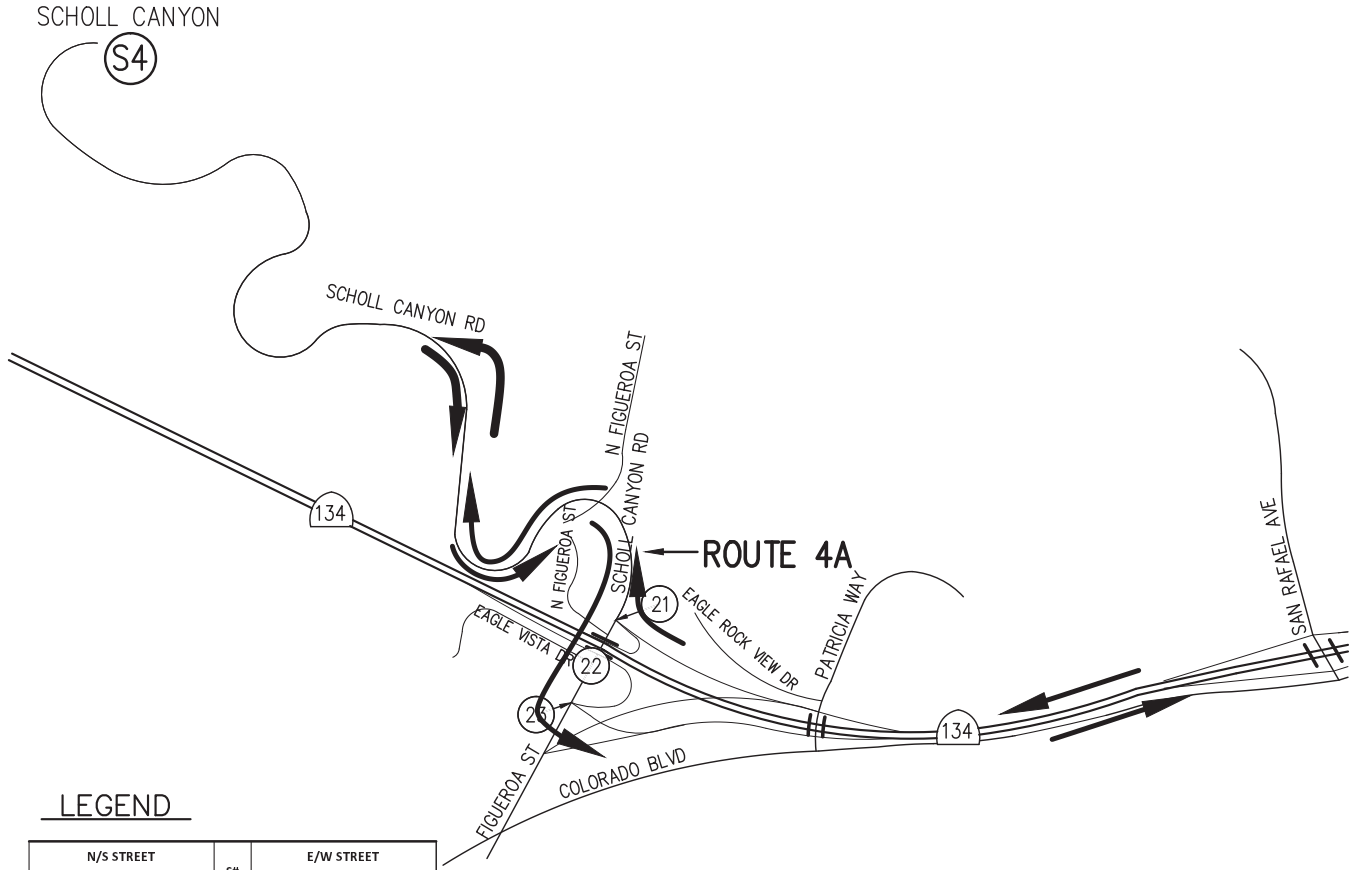
N/S STREET				21		E/W STREET						
SCHOLL CANYON RD						WB 134 FWY						
				0	185	15						
				0	265	45						
				0	230	25						
0	0	0						200	255	180		
0	0	0						0	0	0		
0	0	0						255	295	475		
				0	45	705						
				0	85	355						
				0	15	510						

N/S STREET				22		E/W STREET						
FIGUEROA ST						EAGLE VISTA DRIVE						
				15	415	0						
				25	530	0						
				30	665	0						
55	35	45						0	0	0		
0	0	0						0	0	0		
65	55	75						0	0	0		
				45	725	0						
				45	425	0						
				115	480	0						

N/S STREET				23		E/W STREET						
FIGUEROA ST						EB 134 FWY						
				0	240	220						
				0	315	285						
				0	490	245						
0	0	0						55	120	65		
0	0	0		TS				0	0	0		
0	0	0						415	280	495		
				0	710	315						
				0	295	255						
				0	535	300						

N

NOT TO SCALE



LEGEND

N/S STREET				S#		E/W STREET						
				7AM-9AM								
				2PM-4PM								
				4PM-6PM								
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM		
				TS								
				7AM-9AM								
				2PM-4PM								
				4PM-6PM								

LEGEND

(S#) – DISPOSAL SITE

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ROUTE 4A
PCE PROJECT TRIPS – YEAR 2014

DEVIL'S GATE DAM & RESERVOIR

FIGURE 5-3-1B

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 5\Ch. 5 Section 3\FIG 5-3-1B.dwg
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N/S STREET				21		E/W STREET				
SCHOLL CANYON RD						WB 134 FWY				
			0	15	60					
			0	50	70					
			0	40	70					
0	0	0					20	40	15	
0	0	0					0	0	0	
0	0	0					230	285	470	
			0	75	690					
			0	90	340					
			0	65	500					

N/S STREET				22		E/W STREET				
FIGUEROA ST						EAGLE VISTA DRIVE				
			15	240	0					
			20	300	0					
			30	475	0					
50	35	45					0	0	0	
0	0	0					0	0	0	
65	55	75					0	0	0	
			30	735	0					
			45	410	0					
			115	525	0					

N/S STREET				23		E/W STREET				
FIGUEROA ST						EB 134 FWY				
			0	230	55					
			0	305	70					
			0	485	60					
0	0	0					100	135	115	
0	0	0		TS			0	0	0	
0	0	0					400	255	495	
			0	670	310					
			0	285	245					
			0	525	290					

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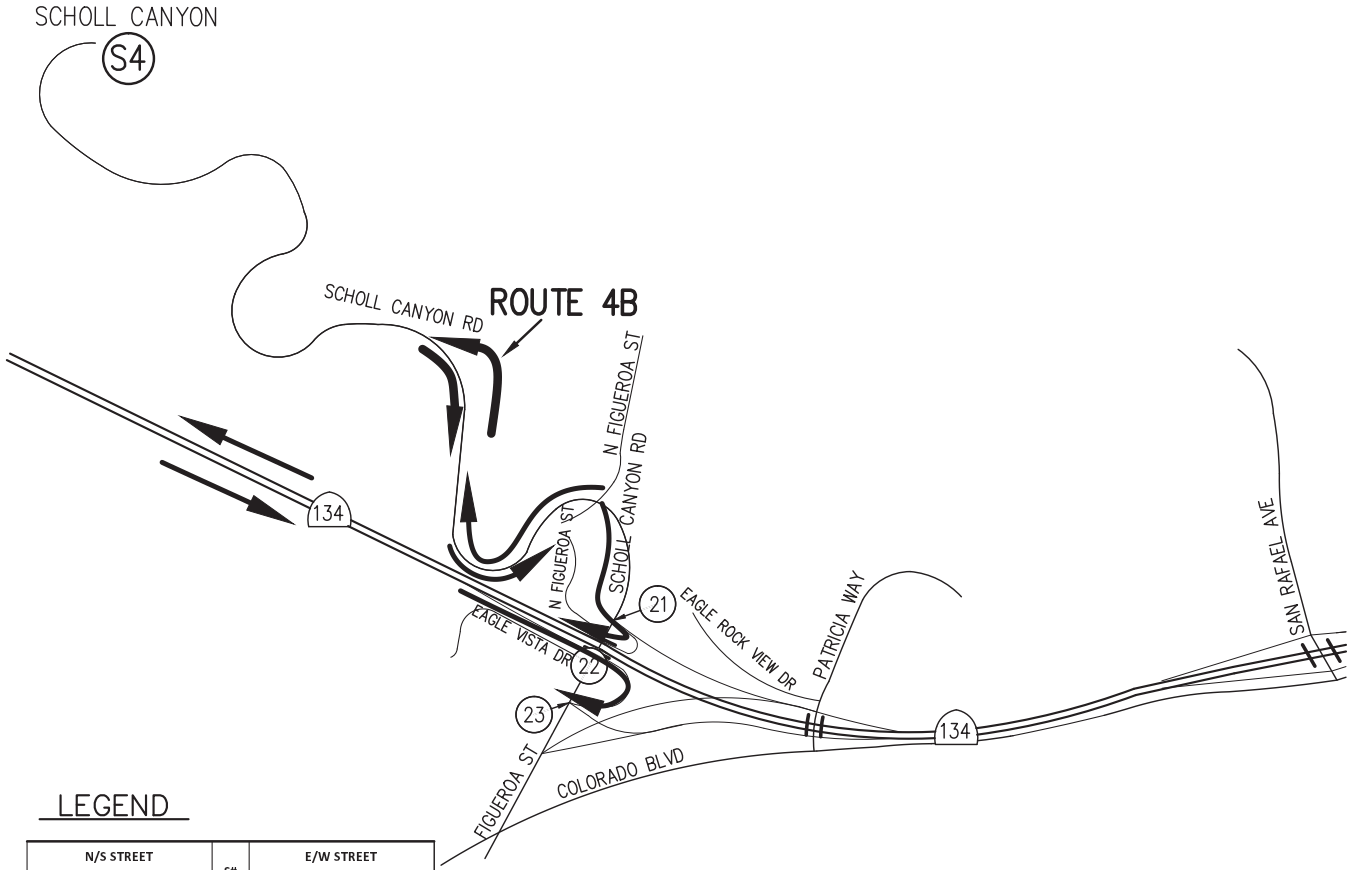
NOT TO SCALE



LEGEND

N/S STREET				S#		E/W STREET				
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS			7AM - 9AM	2PM - 4PM	4PM - 6PM	
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

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ROUTE 4B
PROJECT TRIPS – YEAR 2014

DEVIL'S GATE DAM & RESERVOIR

FIGURE
5-3-2A

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N/S STREET				21		E/W STREET					
SCHOLL CANYON RD						WB 134 FWY					
				0	25	175					
				0	105	205					
				0	65	185					
0	0	0						40	90	20	
0	0	0						0	0	0	
0	0	0						255	295	475	
				0	205	705					
				0	250	355					
				0	175	510					

N/S STREET				22		E/W STREET					
FIGUEROA ST						EAGLE VISTA DRIVE					
				15	250	0					
				25	365	0					
				30	500	0					
55	35	45						0	0	0	
0	0	0						0	0	0	
65	55	75						0	0	0	
				45	890	0					
				45	590	0					
				115	645	0					

N/S STREET				23		E/W STREET					
FIGUEROA ST						EB 134 FWY					
				0	240	55					
				0	315	120					
				0	490	80					
0	0	0						220	285	230	
0	0	0		TS				0	0	0	
0	0	0						415	280	495	
				0	710	315					
				0	295	255					
				0	535	300					

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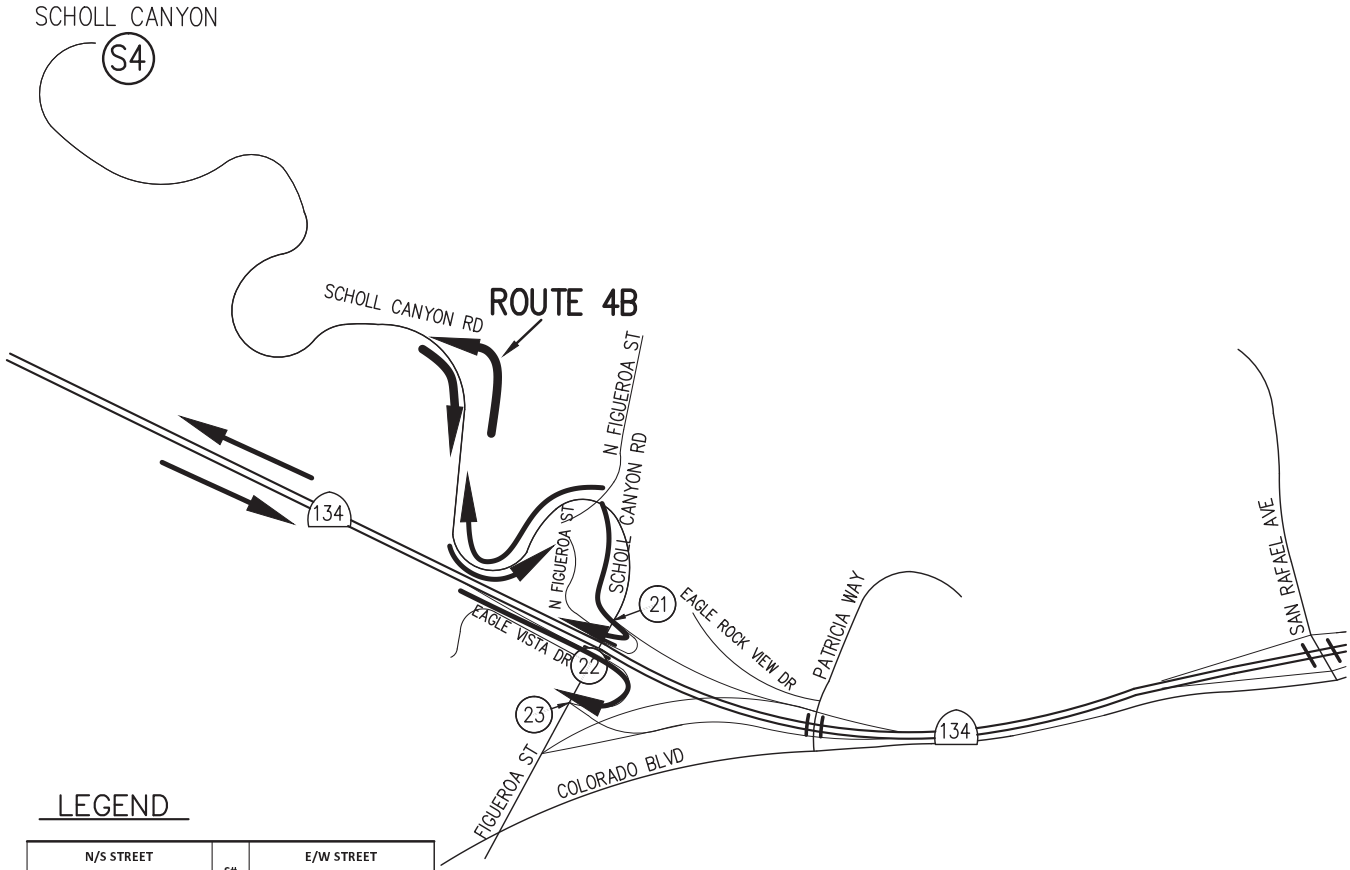

LEGEND

N/S STREET				S#		E/W STREET					
				7AM-9AM							
				2PM-4PM							
				4PM-6PM							
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM	
				TS							
				7AM-9AM							
				2PM-4PM							
				4PM-6PM							

LEGEND

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ROUTE 4B
PCE PROJECT TRIPS – YEAR 2014

DEVIL'S GATE DAM & RESERVOIR

FIGURE 5-3-2B

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Table 5-3-1
Intersection Capacity Analysis – Year 2014 Conditions (Route 4A)
Traffic Impact Analysis - Site 4

Route 4A		AM				MID-DAY				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
21	Figueroa St/Scholl Canyon Road and SR-134 Freeway Westbound Ramps	E	41.2	-	-	B	14.4	-	-	E	49.9	-	-
22	Figueroa St and Eagle Vista Drive	B	14.2	-	-	B	12.8	-	-	C	22.9	-	-
23	Figueroa St and SR-134 Freeway Eastbound Ramps	A	9.2	0.66	B	A	6.4	0.44	A	A	8.6	0.63	B

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc.**

Table 5-3-2
Intersection Capacity Analysis – Year 2014 Conditions (Route 4B)
Traffic Impact Analysis - Site 4

Route 4B		AM				MID-DAY				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
21	Figueroa St/Scholl Canyon Road and SR-134 Freeway Westbound Ramps	E	41.3	-	-	B	14.3	-	-	F	53.8	-	-
22	Figueroa St and Eagle Vista Drive	B	14.2	-	-	B	12.8	-	-	C	22.9	-	-
23	Figueroa St and SR-134 Freeway Eastbound Ramps	A	8.1	0.54	B	A	7.1	0.37	A	A	8	0.55	B

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc.**

Haul Routes 4A & 4C Analysis

As presented in *Table 5-3-1* and *Table 5-3-2*, under project conditions Year 2014 for Site 4 (Route 4A-4B) most of the study intersections are expected to operate at an acceptable HCM LOS C or better, for the AM, Mid-day and PM peak hours. The Intersection of Figueroa Street and SR-134 Freeway Westbound and Figureoa Street (Routes 4A) anticipated AM and PM peak hour HCM LOS E and (Routes 4B) anticipated AM peak hour HCM LOS E and PM peak hour HCM LOS F; mitigations are recommended under existing plus project conditions.

Section 4: Sheldon Pit (Site 5), Sun Valley Fill Site (Site 6), Bradley Landfill (Site 7), and Boulevard Pit (Site 8)

Haul Route 5A

The Year 2014 AM (7-9), MID-DAY (12-2), PM (4-6) turn movement volumes, are provided in *Figure 5-5-1A*. For comparison the (PCE) Year 2014 turn movement volumes are provided in *Figure 5-5-1B.*

Haul Route 5B

The Year 2014 AM (7-9), MID-DAY (12-2), PM (4-6) turn movement volumes, are provided in *Figure 5-5-2A*. For comparison the (PCE) Year 2014 turn movement volumes are provided in *Figure 5-5-2B.*

N/S STREET				24			E/W STREET		
FOOTHILL BLVD							WBI-210 FWY RAMPS		
			535	425	0				
			225	280	0				
			245	285	0				
0	0	0					65	40	70
0	0	0		TS			0	0	0
0	0	0					240	180	330
			140	620	0				
			115	485	0				
			230	555	0				

N/S STREET				25			E/W STREET		
FOOTHILL BLVD							EB I-210 FWY RAMPS		
			0	385	215				
			0	330	80				
			0	500	60				
385	285	365					0	0	0
0	0	0		TS			0	0	0
110	45	85					0	0	0
			0	380	370				
			0	290	230				
			0	425	315				

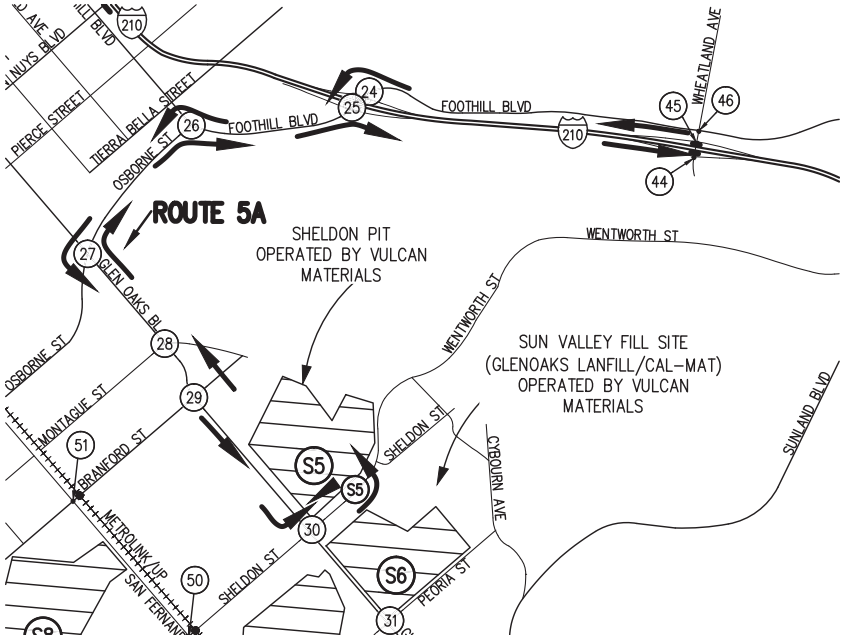
N/S STREET				26			E/W STREET		
OSBORNE STREET							FOOTHILL BLVD		
			10	10	10				
			20	10	10				
			20	10	10				
10	25	20					10	10	10
350	245	345		TS			265	220	330
565	30	290					340	235	280
			365	15	325				
			250	10	285				
			740	10	485				

N/S STREET				27			E/W STREET		
GLEN OAKS BLVD							OSBORNE STREET		
			185	1165	50				
			140	465	85				
			225	625	145				
380	240	315					75	75	110
585	465	750		TS			685	545	585
75	100	100					465	190	280
			55	565	200				
			85	690	220				
			130	955	425				

N/S STREET				28			E/W STREET		
GLEN OAKS BLVD							MONTAGUE STREET		
			60	1770	20				
			40	625	40				
			30	985	20				
15	45	60					15	35	35
10	10	10		TS			10	10	10
35	50	65					10	40	15
			60	750	10				
			65	665	20				
			55	1340	20				

N/S STREET				29			E/W STREET		
GLEN OAKS BLVD							BRANFORD STREET		
			190	1535	20				
			85	620	75				
			85	860	125				
135	165	240					10	90	110
25	90	120		TS			10	100	205
100	100	170					15	75	100
			105	705	15				
			100	670	75				
			125	1085	115				

N/S STREET				30			E/W STREET		
GLEN OAKS BLVD							SHELDON STREET		
			175	1345	145				
			105	535	110				
			160	795	155				
125	140	325					100	110	120
440	260	355		TS			650	310	355
50	85	70					100	50	45
			85	525	50				
			85	585	55				
			130	895	75				



LEGEND

N/S STREET				S#			E/W STREET		
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS			7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					

LEGEND

S# – DISPOSAL SITE

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ROUTE 5A
PROJECT TRIPS – YEAR 2014

DEVIL'S GATE DAM & RESERVOIR

FIGURE 5-4-1A

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 5\Ch. 5 Section 4\FIG 5-4-1A.dwg
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N/S STREET				24			E/W STREET		
FOOTHILL BLVD							WBI-210 FWY RAMPS		
				550	445	0			
				235	315	0			
				250	300	0			
0	0	0					65	45	70
0	0	0		TS			0	0	0
0	0	0					355	315	470
				155	650	0			
				120	525	0			
				240	580	0			

N/S STREET				25			E/W STREET		
FOOTHILL BLVD							EBI-210 FWY RAMPS		
				0	420	220			
				0	365	80			
				0	520	60			
400	295	375					0	0	0
0	0	0		TS			0	0	0
125	60	100					0	0	0
				0	415	505			
				0	320	370			
				0	450	435			

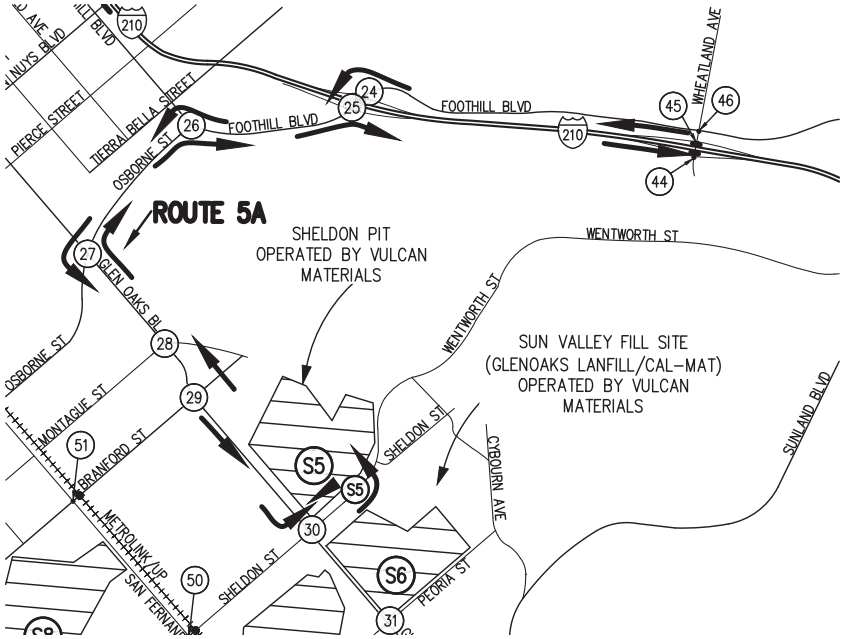
N/S STREET				26			E/W STREET		
OSBORNE STREET							FOOTHILL BLVD		
				10	10	10			
				20	10	10			
				20	10	10			
10	25	20					10	10	10
380	290	360		TS			275	255	375
610	30	320					465	390	410
				385	15	450			
				290	10	435			
				800	10	620			

N/S STREET				27			E/W STREET		
GLEN OAKS BLVD							OSBORNE STREET		
				220	1325	70			
				155	565	85			
				225	625	145			
505	370	425					100	85	110
655	535	750		TS			760	595	585
105	115	100					535	230	280
				100	715	370			
				110	800	400			
				130	955	535			

N/S STREET				28			E/W STREET		
GLEN OAKS BLVD							MONTAGUE STREET		
				75	1945	25			
				55	835	45			
				35	1210	25			
50	70	70					15	35	35
10	10	10		TS			10	10	10
55	70	70					10	45	15
				70	970	15			
				70	890	20			
				75	1520	20			

N/S STREET				29			E/W STREET		
GLEN OAKS BLVD							BRANFORD STREET		
				215	1750	30			
				85	820	100			
				115	1090	130			
135	170	245					15	105	115
25	90	120		TS			10	100	215
120	110	185					25	90	115
				115	945	30			
				115	895	85			
				135	1265	120			

N/S STREET				30			E/W STREET		
GLEN OAKS BLVD							SHELDON STREET		
				280	1875	395			
				170	770	290			
				215	1085	350			
180	210	455					280	290	300
595	515	465		TS			915	515	485
70	165	100					145	70	70
				140	720	70			
				150	840	95			
				195	1250	110			



LEGEND

N/S STREET				S#			E/W STREET		
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS			7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					

LEGEND

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ROUTE 5A
PCE PROJECT TRIPS – YEAR 2014
DEVIL'S GATE DAM & RESERVOIR

FIGURE
5-4-1B

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N/S STREET				30			E/W STREET			
GLEN OAKS BLVD							SHELDON STREET			
				175	1345	90				
				105	535	55				
				160	795	100				
125	140	325						45	55	65
440	260	355		TS				650	310	355
50	85	70						155	105	100
				85	525	105				
				85	585	110				
				130	895	130				

N/S STREET				31			E/W STREET			
GLEN OAKS BLVD							PEORIA STREET			
				45	1415	35				
				20	630	15				
				20	865	40				
20	30	45						15	20	60
10	10	15		TS				10	10	10
10	35	25						20	25	35
				20	625	30				
				30	625	20				
				30	1115	30				

N/S STREET				32			E/W STREET			
GLEN OAKS BLVD							TUXFORD STREET			
				135	1160	100				
				110	440	100				
				100	700	140				
125	120	155						80	50	85
510	425	550		TS				615	465	375
50	65	105						35	30	65
				105	485	20				
				120	530	35				
				130	925	65				

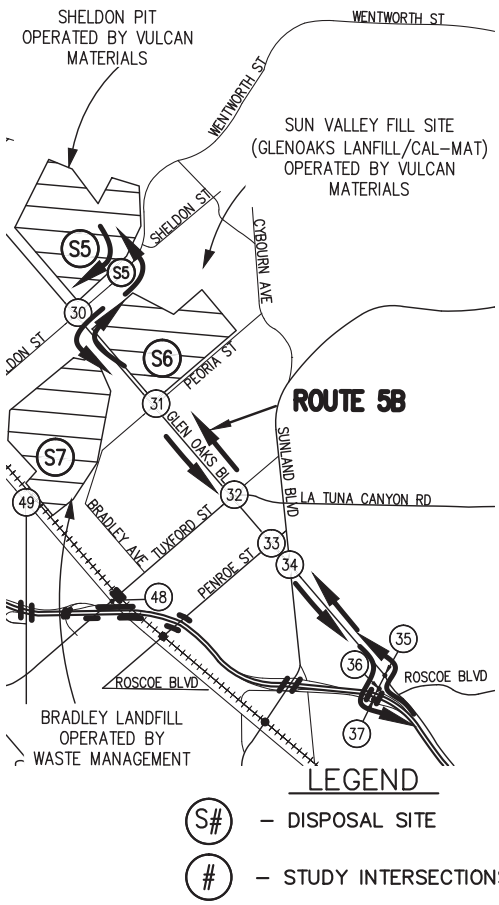
N/S STREET				33			E/W STREET			
GLEN OAKS BLVD							PENROSE STREET			
				105	1055	40				
				40	535	30				
				120	620	50				
130	100	200						40	40	80
135	140	220		TS				75	90	155
25	55	60						10	25	50
				30	450	10				
				50	560	30				
				80	820	45				

N/S STREET				34			E/W STREET			
GLEN OAKS BLVD							SUNLAND BLVD			
				225	750	15				
				185	385	40				
				55	610	55				
75	180	180						25	20	10
730	470	710		TS				820	385	430
35	25	60						225	350	390
				15	390	85				
				30	435	265				
				25	750	420				

N/S STREET				35			E/W STREET			
GLEN OAKS BLVD							ROSCOE BLVD			
				510	565	0				
				385	385	0				
				510	580	0				
245	315	650						0	0	0
0	0	0		TS				0	0	0
80	100	130						0	0	0
				75	300	0				
				80	405	0				
				70	590	0				

N/S STREET				36			E/W STREET			
NB I-5 FREEWAY RAMPS							ROSCOE BLVD			
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
100	130	120		TS				590	465	590
0	0	0						0	0	0
				75	0	290				
				65	0	310				
				70	0	670				

N/S STREET				37			E/W STREET			
SB I-5 FREEWAY RAMPS							ROSCOE BLVD			
				0	40	100				
				0	45	130				
				0	35	120				
0	0	0						30	50	110
0	0	0		TS				0	0	0
0	0	0						670	415	465
				0	0	0				
				0	0	0				
				0	0	0				



LEGEND

N/S STREET				S#			E/W STREET			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 5B
PROJECT TRIPS – YEAR 2014
DEVIL'S GATE DAM & RESERVOIR

FIGURE
5-4-2A

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N/S STREET	30	E/W STREET
GLEN OAKS BLVD		SHELDON STREET
	220 1475 145	
	135 605 65	
	170 855 110	
140 165 360		55 65 70
470 405 365	TS	720 405 380
55 130 80		280 220 220
	110 565 220	
	120 660 240	
	155 985 250	

N/S STREET	31	E/W STREET
GLEN OAKS BLVD		PEORIA STREET
	60 1675 60	
	35 930 25	
	35 1070 70	
30 50 60		20 20 80
15 15 25	TS	15 10 10
10 65 45		25 35 70
	35 830 65	
	40 885 35	
	50 1375 55	

N/S STREET	32	E/W STREET
GLEN OAKS BLVD		TUXFORD STREET
	240 1385 110	
	215 660 115	
	115 865 160	
190 220 230		100 60 100
555 485 590	TS	670 490 410
60 85 130		35 35 65
	130 675 35	
	155 740 35	
	160 1195 70	

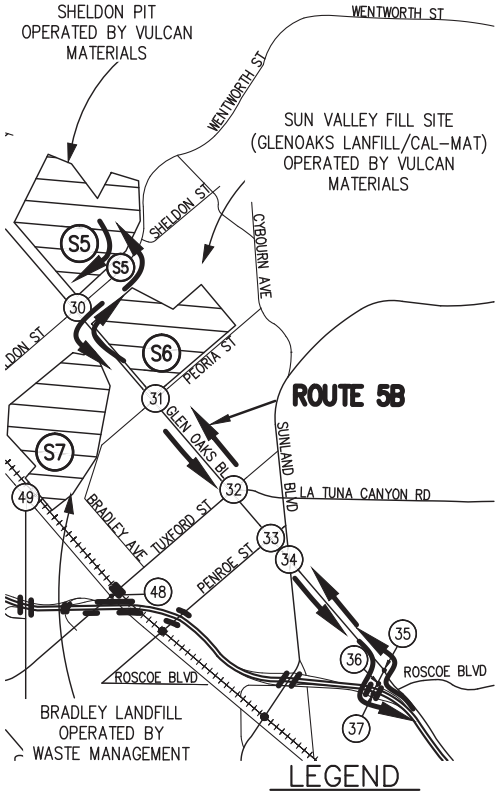
N/S STREET	33	E/W STREET
GLEN OAKS BLVD		PENROSE STREET
	110 1265 50	
	45 720 35	
	125 865 50	
145 120 230		50 45 90
140 145 235	TS	80 100 175
35 60 70		10 30 55
	30 640 10	
	50 735 30	
	80 1045 45	

N/S STREET	34	E/W STREET
GLEN OAKS BLVD		SUNLAND BLVD
	255 930 25	
	250 565 45	
	65 760 65	
90 205 220		30 20 10
785 510 730	TS	860 435 440
35 25 60		240 370 405
	25 555 90	
	30 605 285	
	25 945 450	

N/S STREET	35	E/W STREET
GLEN OAKS BLVD		ROSCOE BLVD
	640 610 0	
	535 450 0	
	640 625 0	
370 435 770		0 0 0
0 0 0	TS	0 0 0
100 135 160		0 0 0
	90 330 0	
	105 445 0	
	85 630 0	

N/S STREET	36	E/W STREET
NB I-5 FREEWAY RAMPS		ROSCOE BLVD
	0 0 0	
	0 0 0	
	0 0 0	
0 0 0		0 0 0
110 155 145	TS	720 600 715
0 0 0		0 0 0
	100 0 415	
	90 0 430	
	100 0 790	

N/S STREET	37	E/W STREET
SB I-5 FREEWAY RAMPS		ROSCOE BLVD
	0 45 110	
	0 45 130	
	0 35 120	
0 0 0		40 55 110
0 0 0	TS	0 0 0
0 0 0		800 550 600
	0 0 0	
	0 0 0	
	0 0 0	



LEGEND

N/S STREET	S#	E/W STREET
	7AM-9AM	
	2PM-4PM	
	4PM-6PM	
7AM - 9AM / 2PM - 4PM / 4PM - 6PM	TS	7AM - 9AM / 2PM - 4PM / 4PM - 6PM
	7AM-9AM	
	2PM-4PM	
	4PM-6PM	

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 5B
PCE PROJECT TRIPS – YEAR 2014
DEVIL'S GATE DAM & RESERVOIR

FIGURE 5-4-2B

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Table 5-4-1
Intersection Capacity Analysis – Year 2014 Conditions (Route 5A)
Traffic Impact Analysis - Site 5

Route 5A		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
24	Foothill Blvd and I-210 Westbound Ramps	A	5.8	0.30	A	A	5.9	0.31	A	A	8.5	0.56	A
25	Foothill Blvd and I-210 Eastbound Ramps	A	6.4	0.32	A	A	6.7	0.33	A	A	7.9	0.44	A
26	Foothill Blvd and Osborne Street	C	20.7	0.78	D	B	10.8	0.56	A	C	21.1	0.88	D
27	Glenoaks Blvd and Osborne Street	F	105.7	1.15	F	D	35.4	0.88	C	E	55.4	0.95	E
28	Glenoaks Blvd and Montague Street	B	10.5	0.79	B	A	9.5	0.41	A	A	10.0	0.62	C
29	Glenoaks Blvd and Branford Street	B	17.9	0.80	C	B	16.5	0.65	B	C	21.9	0.91	D
30	Glenoaks Blvd and Sheldon Street	B	14.2	0.86	E	A	8.1	0.56	B	C	21.8	1.10	D

Table 5-4-1
Intersection Capacity Analysis – Year 2014 Conditions (Route 5B)
Traffic Impact Analysis - Site 5

Route 5B		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
30	Glenoaks Blvd and Sheldon Street	B	13.5	0.85	D	A	7.5	0.48	A	B	13.6	0.86	D
31	Glenoaks Blvd and Peoria Street	A	6.6	0.59	A	A	9.0	0.39	A	B	16.9	0.53	A
32	Glenoaks Blvd and Tuxford Street	B	15.7	0.89	D	A	7.8	0.49	A	A	10.2	0.67	C
33	Glenoaks Blvd and Penrose Street	A	6.6	0.58	A	A	6.0	0.36	A	B	11.3	0.70	B
34	Glenoaks Blvd and Sunland Blvd	C	22.9	0.88	C	B	16.3	0.67	B	C	27.4	0.92	D
35	Glenoaks Blvd and Roscoe Blvd	A	6.7	0.41	A	A	7.1	0.42	A	B	10.6	0.65	A
36	Roscoe Blvd and I-5 Freeway Northbound Ramps	B	12.0	-	-	B	11.8	-	-	C	26.3	-	-
37	Roscoe Blvd and I-5 Freeway Southbound Ramps	A	0.0	-	-	A	0.0	-	-	A	0.0	-	-

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc.**

Haul Routes 5A & 5B Analysis

As presented in *Table 5-4-1*, under project conditions Year 2014 for Site 5 (Routes 5A & 5B) most intersections are expected to operate at an acceptable HCM LOS of C or better for the AM, Mid-day, and PM peak hours. The intersection of Glenoaks Blvd and Osborne Street is anticipated to operate at HCM LOS F during the AM peak hour and HCM LOS E during the PM peak hour, mitigations are recommended under existing conditions.

Haul Route 5C

The Year 2014 AM (7-9), MID-DAY (12-2), PM (4-6) turn movement volumes, are provided in *Figure 5-5-3A*. For comparison the (PCE) Year 2014 turn movement volumes are provided in *Figure 5-5-3B.*

Haul Route 6A

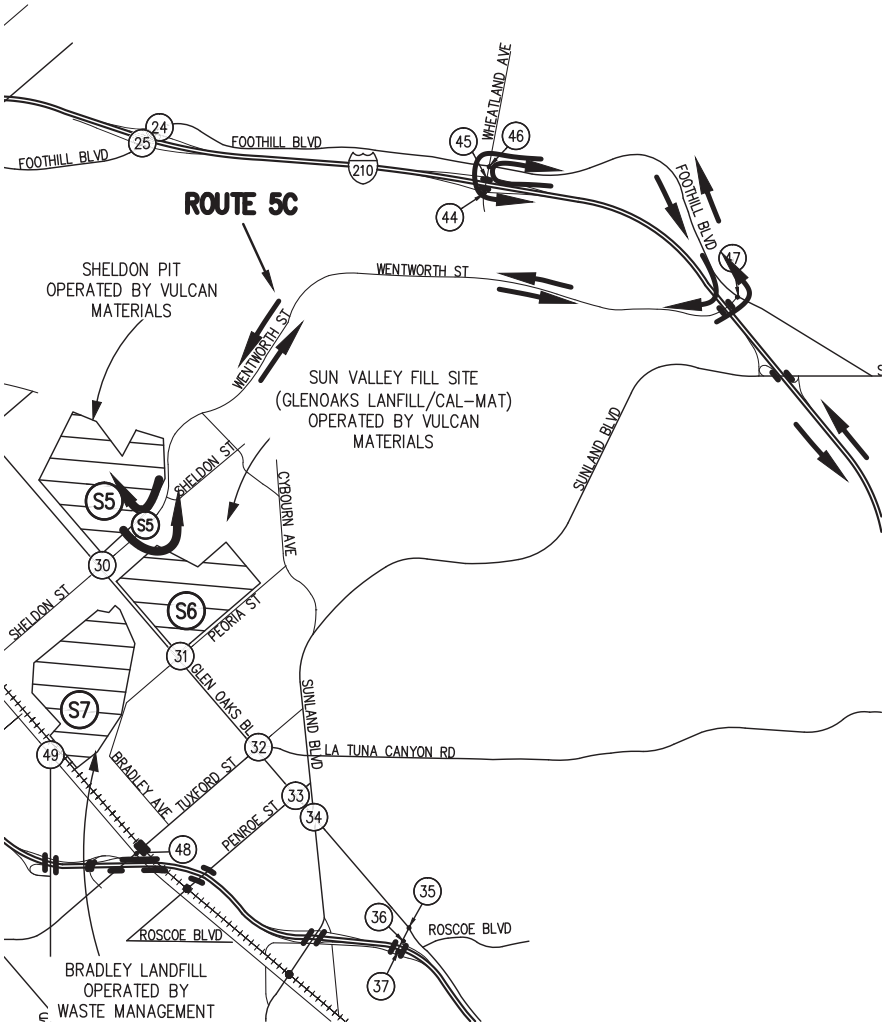
The Year 2014 AM (7-9), MID-DAY (12-2), PM (4-6) turn movement volumes, are provided in *Figure 5-5-5A*. For comparison the (PCE) Year 2014 turn movement volumes are provided in *Figure 5-5-5B.*

N/S STREET				44			E/W STREET			
WHEATLAND AVE							EB I-210 FWY RAMPS			
				0	0	185				
				0	0	120				
				0	0	145				
115	80	110	⌟	⌝	↑	⌜	⌞	0	0	0
10	10	10	←	TS			→	0	0	0
0	0	0	⌝	⌝	↑	⌜	⌜	0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET				45			E/W STREET			
WHEATLAND AVE							WB I-210 FWY RAMPS			
				70	175	0				
				60	120	0				
				115	140	0				
0	0	0	⌟	⌝	↑	⌜	⌞	165	100	185
0	0	0	←	TS			→	10	10	10
0	0	0	⌝	⌝	↑	⌜	⌜	10	10	10
				10	110	0				
				10	60	0				
				10	105	0				

N/S STREET				46			E/W STREET			
WHEATLAND AVE							FOOTHILL BLVD			
				10	20	20				
				20	25	10				
				10	25	15				
10	15	10	⌟	⌝	↑	⌜	⌞	10	25	20
215	145	185	←	TS			→	240	140	235
100	40	85	⌝	⌝	↑	⌜	⌜	140	125	160
				75	15	175				
				45	30	110				
				100	30	165				

N/S STREET				47			E/W STREET			
WENTWORTH STREET							FOOTHILL BLVD			
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0	⌟	⌝	↑	⌜	⌞	0	0	0
220	180	220	←	TS			→	190	170	320
180	105	135	⌝	⌝	↑	⌜	⌜	480	235	235
				110	0	245				
				110	0	200				
				175	0	460				



LEGEND

N/S STREET				S#	E/W STREET
				7AM-9AM	
				2PM-4PM	
				4PM-6PM	
7AM - 9AM	2PM - 4PM	4PM - 6PM	⌟	⌝ ↑ ⌜	⌞ 7AM - 9AM / 2PM - 4PM / 4PM - 6PM
			←	TS	→
			⌝	⌝ ↑ ⌜	⌜
				7AM-9AM	
				2PM-4PM	
				4PM-6PM	

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 5C
PROJECT TRIPS – YEAR 2014
DEVIL'S GATE DAM & RESERVOIR

FIGURE 5-4-3A

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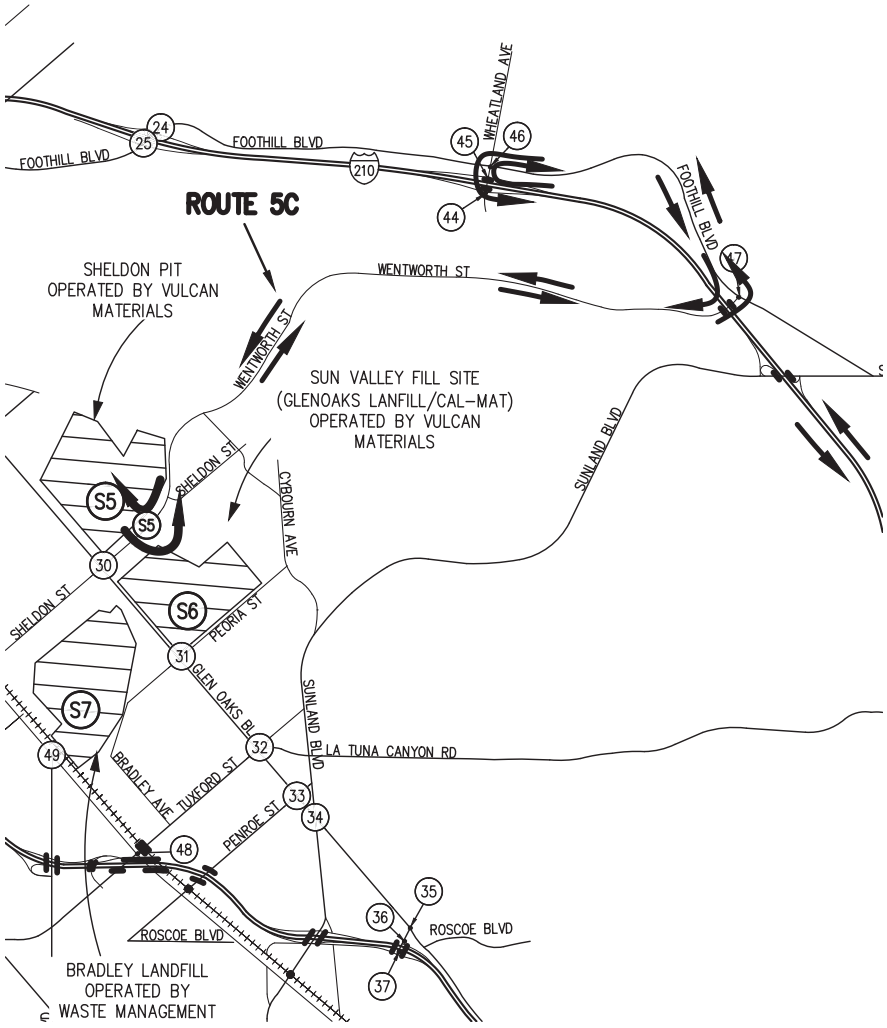
N/S STREET				44		E/W STREET			
WHEATLAND AVE						EB I-210 FWY RAMPS			
			0	0	300				
			0	0	230				
			0	0	260				
125	90	110					0	0	0
15	15	10		TS			0	0	0
0	0	0					0	0	0
			0	0	0				
			0	0	0				
			0	0	0				

N/S STREET				45		E/W STREET			
WHEATLAND AVE						WB I-210 FWY RAMPS			
			80	290	0				
			65	235	0				
			115	250	0				
0	0	0					285	205	295
0	0	0		TS			10	10	10
0	0	0					10	10	10
			10	115	0				
			10	70	0				
			10	110	0				

N/S STREET				46		E/W STREET			
WHEATLAND AVE						FOOTHILL BLVD			
			10	20	25				
			20	25	10				
			10	25	15				
15	15	10					10	25	20
235	165	190		TS			265	160	250
100	45	85					260	250	265
			85	15	290				
			45	30	230				
			100	30	275				

N/S STREET				47		E/W STREET			
WENTWORTH STREET						FOOTHILL BLVD			
			0	0	0				
			0	0	0				
			0	0	0				
0	0	0					0	0	0
225	190	220		TS			200	180	325
295	220	250					490	245	260
			225	0	260				
			225	0	205				
			290	0	465				



LEGEND

N/S STREET				S#		E/W STREET			
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS		7AM - 9AM	2PM - 4PM	4PM - 6PM	
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 5C
PCE PROJECT TRIPS – YEAR 2014

DEVIL'S GATE DAM & RESERVOIR

FIGURE 5-4-3B

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N/S STREET				24	E/W STREET						
FOOTHILL BLVD					WBI-210 FWY RAMPS						
			535	425	0						
			225	280	0						
			245	285	0						
0	0	0						65	40	70	
0	0	0		TS				0	0	0	
0	0	0						240	180	330	
			140	620	0						
			115	485	0						
			230	555	0						

N/S STREET				25	E/W STREET						
FOOTHILL BLVD					EB I-210 FWY RAMPS						
			0	385	215						
			0	330	80						
			0	500	60						
385	285	365						0	0	0	
0	0	0		TS				0	0	0	
110	45	85						0	0	0	
			0	380	370						
			0	290	230						
			0	425	315						

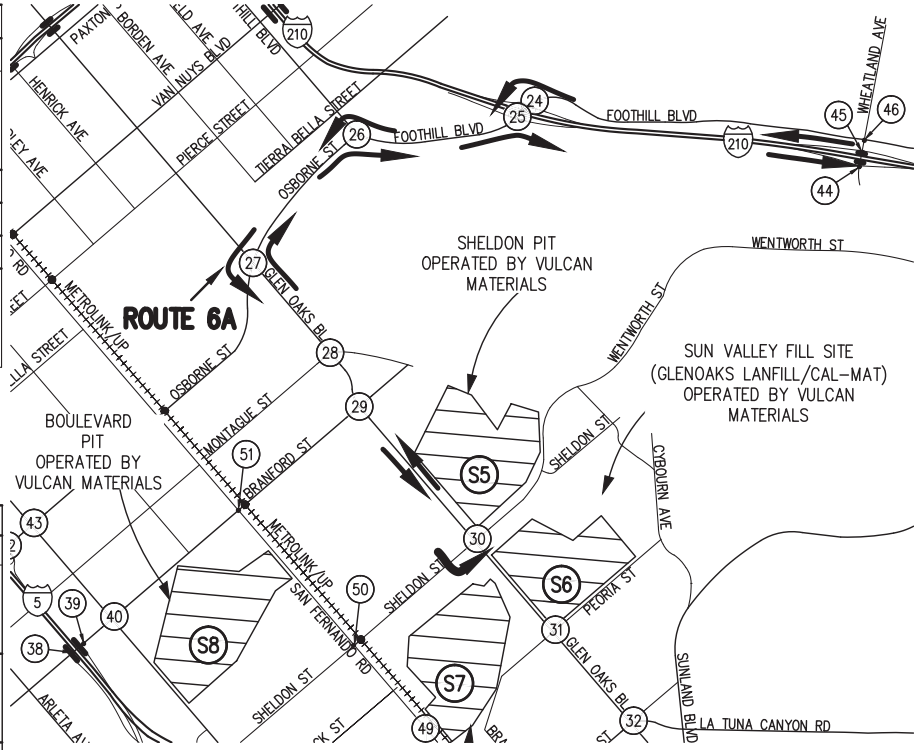
N/S STREET				26	E/W STREET						
OSBORNE STREET					FOOTHILL BLVD						
			10	10	10						
			20	10	10						
			20	10	10						
10	25	20						10	10	10	
350	245	345		TS				265	220	330	
565	30	290						340	235	280	
			365	15	325						
			250	10	285						
			740	10	485						

N/S STREET				27	E/W STREET						
GLEN OAKS BLVD					OSBORNE STREET						
			185	1165	50						
			140	465	85						
			225	625	145						
380	240	315						75	75	110	
585	465	750		TS				685	545	585	
75	100	100						465	190	280	
			55	565	200						
			85	690	220						
			130	955	425						

N/S STREET				28	E/W STREET						
GLEN OAKS BLVD					MONTAGUE STREET						
			60	1770	20						
			40	625	40						
			30	985	20						
15	45	60						15	35	35	
10	10	10		TS				10	10	10	
35	50	65						10	40	15	
			60	750	10						
			65	665	20						
			55	1340	20						

N/S STREET				29	E/W STREET						
GLEN OAKS BLVD					BRANFORD STREET						
			190	1535	20						
			85	620	75						
			85	860	125						
135	165	240						10	90	110	
25	90	120		TS				10	100	205	
100	100	170						15	75	100	
			105	705	15						
			100	670	75						
			125	1085	115						

N/S STREET				30	E/W STREET						
GLEN OAKS BLVD					SHELDON STREET						
			175	1345	145						
			105	535	110						
			160	795	155						
125	140	325						100	110	120	
440	260	355		TS				650	310	355	
50	85	70						100	50	45	
			85	525	50						
			85	585	55						
			130	895	75						



LEGEND

N/S STREET				S#	E/W STREET						
				7AM-9AM							
				2PM-4PM							
				4PM-6PM							
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM	
				7AM-9AM							
				2PM-4PM							
				4PM-6PM							

LEGEND

S# – DISPOSAL SITE

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ROUTE 6A
PROJECT TRIPS – YEAR 2014

DEVIL'S GATE DAM & RESERVOIR

FIGURE
5-4-4A

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 5\Ch. 5 Section 4\FIG 5-4-4A.dwg
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N/S STREET				24		E/W STREET			
FOOTHILL BLVD						WB I-210 FWY RAMPS			
				550	445	0			
				235	315	0			
				250	300	0			
0	0	0					65	45	70
0	0	0		TS			0	0	0
0	0	0					355	315	470
				155	650	0			
				120	525	0			
				240	580	0			

N/S STREET				25		E/W STREET			
FOOTHILL BLVD						EB I-210 FWY RAMPS			
				0	420	220			
				0	365	80			
				0	520	60			
400	295	375					0	0	0
0	0	0		TS			0	0	0
125	60	100					0	0	0
				0	415	505			
				0	320	370			
				0	450	435			

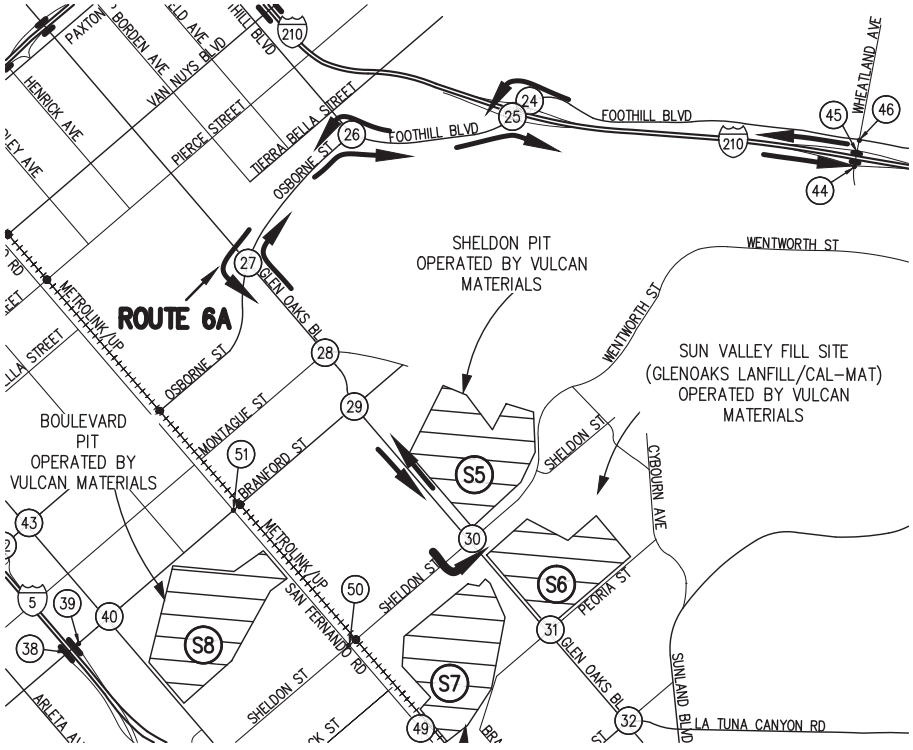
N/S STREET				26		E/W STREET			
OSBORNE STREET						FOOTHILL BLVD			
				10	10	10			
				20	10	10			
				20	10	10			
10	25	20					10	10	10
380	290	360		TS			275	255	375
610	30	320					465	390	410
				385	15	450			
				290	10	435			
				800	10	620			

N/S STREET				27		E/W STREET			
GLEN OAKS BLVD						OSBORNE STREET			
				220	1325	70			
				155	565	85			
				225	625	145			
505	370	425					100	85	110
655	535	750		TS			760	595	585
105	115	100					535	230	280
				100	715	370			
				110	800	400			
				130	955	535			

N/S STREET				28		E/W STREET			
GLEN OAKS BLVD						MONTAGUE STREET			
				75	1945	25			
				55	835	45			
				35	1210	25			
50	70	70					15	35	35
10	10	10		TS			10	10	10
55	70	70					10	45	15
				70	970	15			
				70	890	20			
				75	1520	20			

N/S STREET				29		E/W STREET			
GLEN OAKS BLVD						BRANFORD STREET			
				215	1750	30			
				85	820	100			
				115	1090	130			
135	170	245					15	105	115
25	90	120		TS			10	100	215
120	110	185					25	90	115
				115	945	30			
				115	895	85			
				135	1265	120			

N/S STREET				30		E/W STREET			
GLEN OAKS BLVD						SHELDON STREET			
				220	1475	310			
				135	605	230			
				170	855	275			
140	165	360					220	230	235
470	405	365		TS			720	405	380
55	130	80					115	55	55
				110	565	55			
				120	660	75			
				155	985	85			



LEGEND

N/S STREET				S#		E/W STREET			
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS			7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					

LEGEND

S# – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 6A
PCE PROJECT TRIPS – YEAR 2014

DEVIL'S GATE DAM & RESERVOIR

FIGURE 5-4-4B

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Table 5-4-3
Intersection Capacity Analysis – Year 2014 Conditions (Route 5C)
Traffic Impact Analysis - Site 5

Route 5C		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
44	Wheatland Ave and I-210 Freeway Eastbound Ramps	A	0.0	-	-	A	0.0	-	-	A	0.0	-	-
45	Wheatland Ave and I-210 Freeway Westbound Ramps	B	11.1	-	-	A	8.8	-	-	B	10.2	-	-
46	Wheatland Ave and Foothill Blvd	B	11.3	0.46	A	B	10.6	0.39	A	B	10.0	0.47	A
47	Wentworth Street and Foothill Blvd	C	28.4	0.88	A	B	10.4	0.45	A	A	9.7	0.48	A

Haul Route 5C Analysis

As presented in *Table 5-4-3*, project conditions Year 2014 for Site 5 (Route 5C) all intersections are anticipated to continue operating at an acceptable HCM LOS C or better throughout the day.

Table 5-4-4
Intersection Capacity Analysis – Year 2014 Conditions (Route 6A)
Traffic Impact Analysis - Site 6

Route 6A		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
24	Foothill Blvd and I-210 Westbound Ramps	A	5.8	0.30	A	A	5.9	0.31	A	A	8.5	0.56	A
25	Foothill Blvd and I-210 Eastbound Ramps	A	6.4	0.32	A	A	6.7	0.33	A	A	7.9	0.44	A
26	Foothill Blvd and Osborne Street	C	20.7	0.78	D	B	10.8	0.56	A	C	21.1	0.88	D
27	Glenoaks Blvd and Osborne Street	F	105.7	1.15	F	D	35.4	0.88	C	E	55.4	0.95	E
28	Glenoaks Blvd and Montague Street	B	10.5	0.79	B	A	9.5	0.41	A	A	10.0	0.62	C
29	Glenoaks Blvd and Branford Street	B	17.9	0.80	C	B	16.5	0.65	B	C	21.9	0.91	D
30	Glenoaks Blvd and Sheldon Street	B	14.2	0.86	E	A	8.1	0.56	B	C	21.8	1.10	D

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc.**

Haul Route 6A Analysis

As presented in *Table 5-4-4*, under the project conditions Year 2014 for Site 6 (Route 6A) most intersections are expected to operate at an acceptable HCM LOS of C or better for the AM, Mid-day, and PM peak hours. The intersection of Glenoaks Blvd and Osborne Street is anticipated to operate at HCM LOS F during the AM peak hour and HCM LOS E during the PM peak hour, mitigations are recommended under existing conditions.

Haul Route 6B

The Year 2014 AM (7-9), MID-DAY (12-2), PM (4-6) turn movement volumes, are provided in *Figure 5-5-5A*. For comparison the (PCE) Year 2014 turn movement volumes are provided in *Figure 5-5-5B.*

Haul Route 6C

The Year 2014 AM (7-9), MID-DAY (12-2), PM (4-6) turn movement volumes, are provided in *Figure 5-5-6A*. For comparison the (PCE) Year 2014 turn movement volumes are provided in *Figure 5-5-6B.*

N/S STREET				30		E/W STREET			
GLEN OAKS BLVD						SHELDON STREET			
				175	1345	90			
				105	535	55			
				160	795	100			
125	140	325	⌟	⌜	↑	⌞	⌞	45	55	0
440	260	355	→	TS			→	650	310	355
50	85	70	⌝	⌜	↑	⌞	⌜	100	50	45
				85	525	105			
				85	585	110			
				130	895	130			

N/S STREET				31		E/W STREET			
GLEN OAKS BLVD						PEORIA STREET			
				45	1415	35			
				20	630	15			
				20	865	40			
20	30	45	⌟	⌜	↑	⌞	⌞	15	20	60
10	10	15	→	TS			→	10	10	10
10	35	25	⌝	⌜	↑	⌞	⌜	20	25	35
				20	625	30			
				30	625	20			
				30	1115	30			

N/S STREET				32		E/W STREET			
GLEN OAKS BLVD						TUXFORD STREET			
				135	1160	100			
				110	440	100			
				100	700	140			
125	120	155	⌟	⌜	↑	⌞	⌞	80	50	85
510	425	550	→	TS			→	615	465	375
50	65	105	⌝	⌜	↑	⌞	⌜	35	30	65
				105	485	20			
				120	530	35			
				130	925	65			

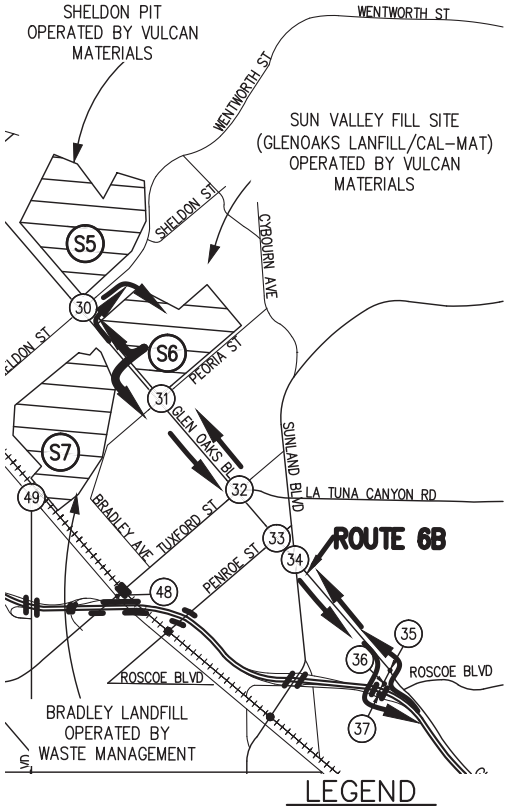
N/S STREET				33		E/W STREET			
GLEN OAKS BLVD						PENROSE STREET			
				105	1055	40			
				40	535	30			
				120	620	50			
130	100	200	⌟	⌜	↑	⌞	⌞	40	40	80
135	140	220	→	TS			→	75	90	155
25	55	60	⌝	⌜	↑	⌞	⌜	10	25	50
				30	450	10			
				50	560	30			
				80	820	45			

N/S STREET				34		E/W STREET			
GLEN OAKS BLVD						SUNLAND BLVD			
				225	750	15			
				185	385	40			
				55	610	55			
75	180	180	⌟	⌜	↑	⌞	⌞	25	20	10
730	470	710	→	TS			→	820	385	430
35	25	60	⌝	⌜	↑	⌞	⌜	225	350	390
				15	390	85			
				30	435	265			
				25	750	420			

N/S STREET				35		E/W STREET			
GLEN OAKS BLVD						ROSCOE BLVD			
				510	565	0			
				385	385	0			
				510	580	0			
245	315	650	⌟	⌜	↑	⌞	⌞	0	0	0
0	0	0	→	TS			→	0	0	0
80	100	130	⌝	⌜	↑	⌞	⌜	0	0	0
				75	300	0			
				80	405	0			
				70	590	0			

N/S STREET				36		E/W STREET			
NB I-5 FREEWAY RAMPS						ROSCOE BLVD			
				0	0	0			
				0	0	0			
				0	0	0			
0	0	0	⌟	⌜	↑	⌞	⌞	0	0	0
100	130	120	→	TS			→	590	465	590
0	0	0	⌝	⌜	↑	⌞	⌜	0	0	0
				75	0	290			
				65	0	310			
				70	0	670			

N/S STREET				37		E/W STREET			
SB I-5 FREEWAY RAMPS						ROSCOE BLVD			
				0	40	100			
				0	45	130			
				0	35	120			
0	0	0	⌟	⌜	↑	⌞	⌞	30	50	110
0	0	0	→	TS			→	0	0	0
0	0	0	⌝	⌜	↑	⌞	⌜	670	415	465
				0	0	0			
				0	0	0			
				0	0	0			



N

NOT TO SCALE

LEGEND

N/S STREET				S#		E/W STREET			
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					
7AM - 9AM	2PM - 4PM	4PM - 6PM	⌟	⌜	↑	⌞	⌞	7AM - 9AM	2PM - 4PM	4PM - 6PM
			→	TS			→			
			⌝	⌜	↑	⌞	⌜			
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

Hall & Foreman, Inc.
Engineering • Surveying • Planning
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Phn. 760-524-9100 Fax. 760-524-9101

ROUTE 6B
PROJECT TRIPS – YEAR 2014

DEVIL'S GATE DAM & RESERVOIR

FIGURE 5-4-5A

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N/S STREET				30	E/W STREET					
GLEN OAKS BLVD					SHELDON STREET					
				220	1475	145				
				135	605	65				
				170	855	110				
140	165	360	⌟	↱	↑	↰	↰	55	65	70
470	405	365	←	TS			→	720	405	380
55	130	80	↰	↰	↑	↱	↱	115	55	55
				110	565	220				
				120	660	240				
				155	985	250				

N/S STREET				31	E/W STREET					
GLEN OAKS BLVD					PEORIA STREET					
				60	1675	60				
				35	930	25				
				35	1070	70				
30	50	60	⌟	↱	↑	↰	↰	20	20	80
15	15	25	←	TS			→	15	10	10
10	65	45	↰	↰	↑	↱	↱	25	35	70
				35	830	65				
				40	885	35				
				50	1375	55				

N/S STREET				32	E/W STREET					
GLEN OAKS BLVD					TUXFORD STREET					
				240	1385	110				
				215	660	115				
				115	865	160				
190	220	230	⌟	↱	↑	↰	↰	100	60	100
555	485	590	←	TS			→	670	490	410
60	85	130	↰	↰	↑	↱	↱	35	35	65
				130	675	35				
				155	740	35				
				160	1195	70				

N/S STREET				33	E/W STREET					
GLEN OAKS BLVD					PENROSE STREET					
				110	1265	50				
				45	720	35				
				125	865	50				
145	120	230	⌟	↱	↑	↰	↰	50	45	90
140	145	235	←	TS			→	80	100	175
35	60	70	↰	↰	↑	↱	↱	10	30	55
				30	640	10				
				50	735	30				
				80	1045	45				

N/S STREET				34	E/W STREET					
GLEN OAKS BLVD					SUNLAND BLVD					
				255	930	25				
				250	565	45				
				65	760	65				
90	205	220	⌟	↱	↑	↰	↰	30	20	10
785	510	730	←	TS			→	860	435	440
35	25	60	↰	↰	↑	↱	↱	240	370	405
				25	555	90				
				30	605	285				
				25	945	450				

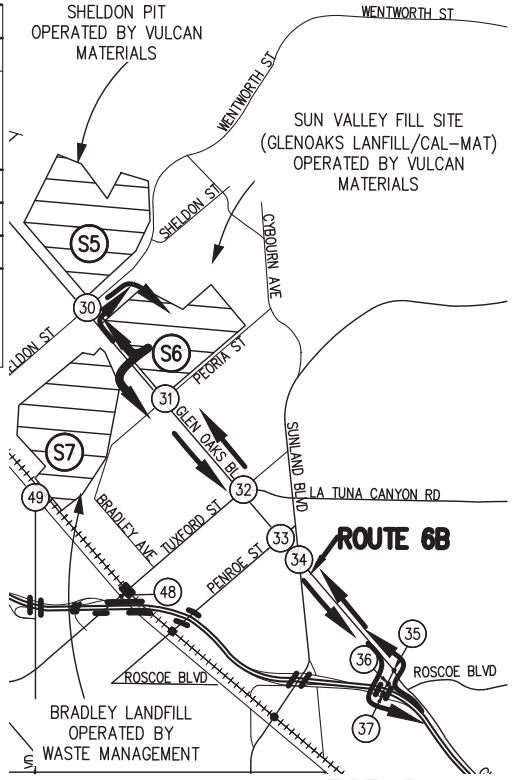
N/S STREET				35	E/W STREET					
GLEN OAKS BLVD					ROSCOE BLVD					
				640	610	0				
				535	450	0				
				640	625	0				
370	435	770	⌟	↱	↑	↰	↰	0	0	0
0	0	0	←	TS			→	0	0	0
100	135	160	↰	↰	↑	↱	↱	0	0	0
				90	330	0				
				105	445	0				
				85	630	0				

N/S STREET				36	E/W STREET					
NB I-5 FREEWAY RAMPS					ROSCOE BLVD					
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0	⌟	↱	↑	↰	↰	0	0	0
110	155	145	←	TS			→	720	600	715
0	0	0	↰	↰	↑	↱	↱	0	0	0
				100	0	415				
				90	0	430				
				100	0	790				

N/S STREET				37	E/W STREET					
SB I-5 FREEWAY RAMPS					ROSCOE BLVD					
				0	45	110				
				0	45	130				
				0	35	120				
0	0	0	⌟	↱	↑	↰	↰	40	55	110
0	0	0	←	TS			→	0	0	0
0	0	0	↰	↰	↑	↱	↱	800	550	600
				0	0	0				
				0	0	0				
				0	0	0				

N

NOT TO SCALE



LEGEND

N/S STREET				S#	E/W STREET					
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM	⌟	↱	↑	↰	↰	7AM - 9AM	2PM - 4PM	4PM - 6PM
			←	TS			→			
			↰	↰	↑	↱	↱			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

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ROUTE 6B
PCE PROJECT TRIPS – YEAR 2014

DEVIL'S GATE DAM & RESERVOIR

FIGURE 5-4-5B

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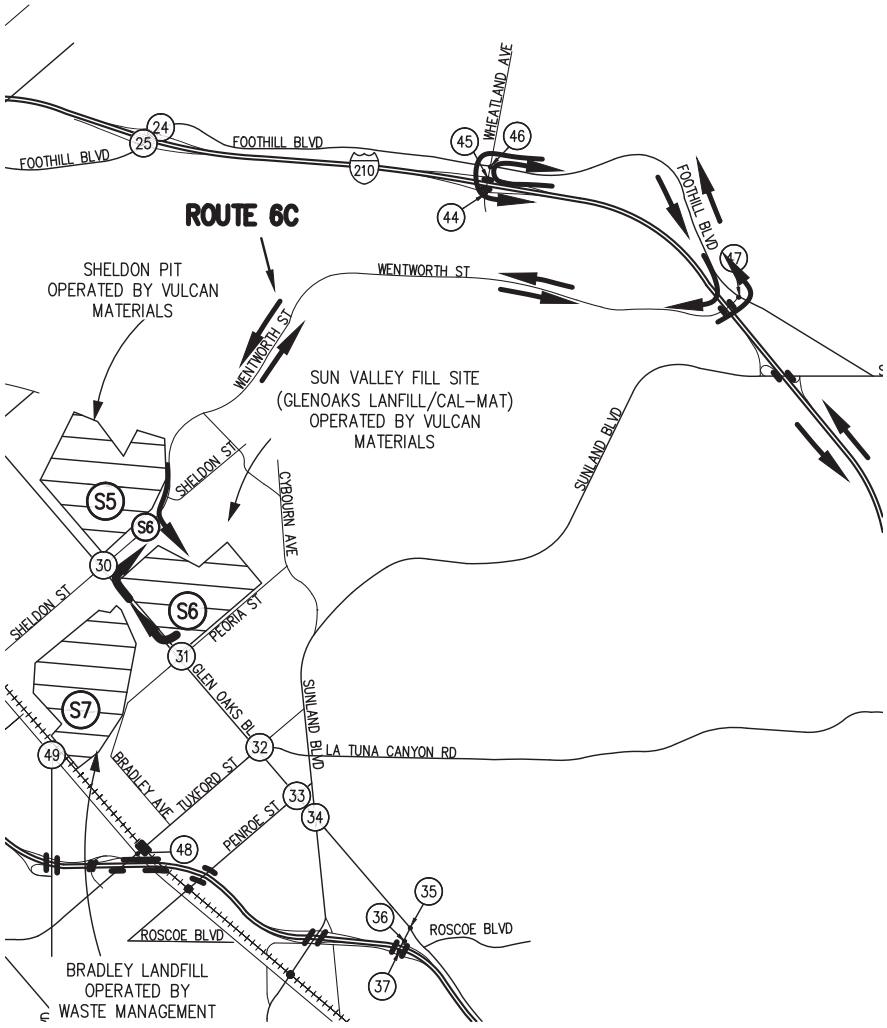
N/S STREET				44			E/W STREET			
WHEATLAND AVE							EB I-210 FWY RAMPS			
				0	0	185				
				0	0	120				
				0	0	145				
115	80	110						0	0	0
10	10	10		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET				45			E/W STREET			
WHEATLAND AVE							WB I-210 FWY RAMPS			
				70	175	0				
				60	120	0				
				115	140	0				
0	0	0						165	100	185
0	0	0		TS				10	10	10
0	0	0						10	10	10
				10	110	0				
				10	60	0				
				10	105	0				

N/S STREET				46			E/W STREET			
WHEATLAND AVE							FOOTHILL BLVD			
				10	20	20				
				20	25	10				
				10	25	15				
10	15	10						10	25	20
215	145	185		TS				240	140	235
100	40	85						140	125	160
				75	15	175				
				45	30	110				
				100	30	165				

N/S STREET				47			E/W STREET			
WENTWORTH STREET							FOOTHILL BLVD			
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
220	180	220		TS				190	170	320
180	105	135						480	235	235
				110	0	245				
				110	0	200				
				175	0	460				



LEGEND

N/S STREET				S#			E/W STREET			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 6C
PROJECT TRIPS – YEAR 2014
DEVIL'S GATE DAM & RESERVOIR

FIGURE 5-4-6A

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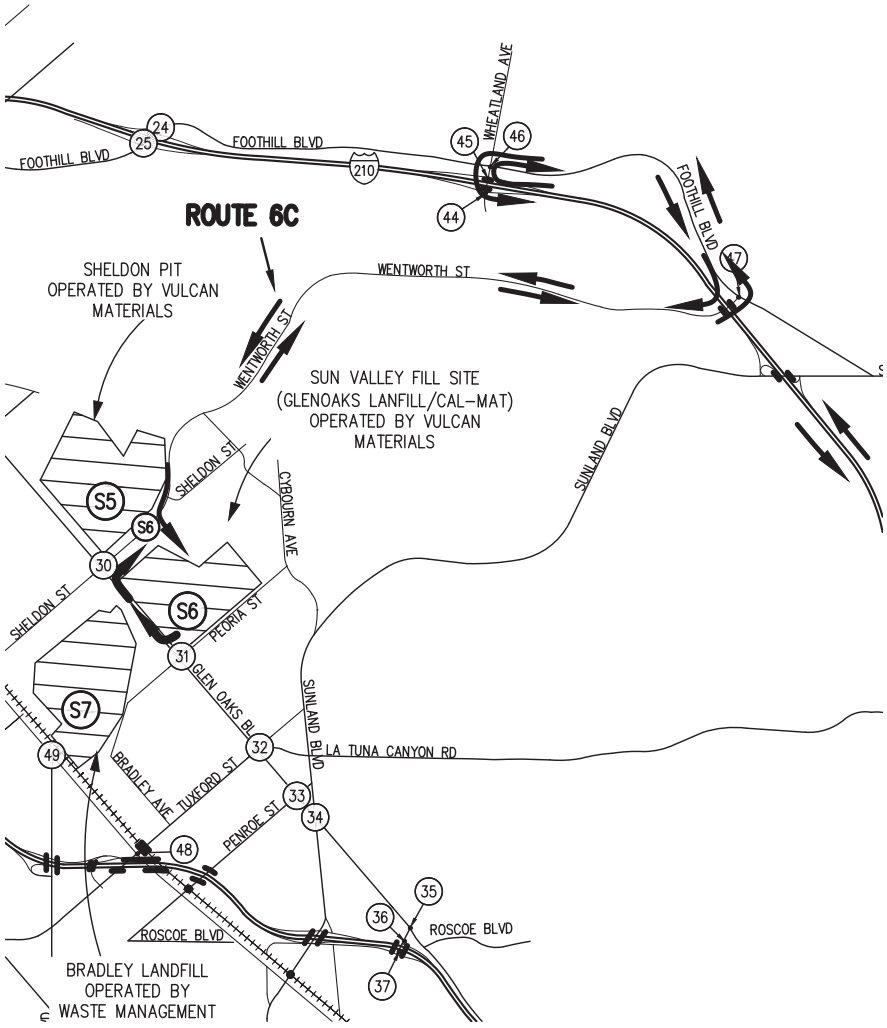
N/S STREET				44		E/W STREET				
WHEATLAND AVE						EB I-210 FWY RAMPS				
				0	0	300				
				0	0	230				
				0	0	260				
125	90	110						0	0	0
15	15	10		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET				45		E/W STREET				
WHEATLAND AVE						WB I-210 FWY RAMPS				
				80	290	0				
				65	235	0				
				115	250	0				
0	0	0						285	205	295
0	0	0		TS				10	10	10
0	0	0						10	10	10
				10	115	0				
				10	70	0				
				10	110	0				

N/S STREET				46		E/W STREET				
WHEATLAND AVE						FOOTHILL BLVD				
				10	20	25				
				20	25	10				
				10	25	15				
15	15	10						10	25	20
235	165	190		TS				265	160	250
100	45	85						260	250	265
				85	15	290				
				45	30	230				
				100	30	275				

N/S STREET				47		E/W STREET				
WENTWORTH STREET						FOOTHILL BLVD				
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
225	190	220		TS				200	180	325
295	220	250						490	245	260
				225	0	260				
				225	0	205				
				290	0	465				



LEGEND

N/S STREET				S#		E/W STREET				
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 6C
PCE PROJECT TRIPS – YEAR 2014
DEVIL'S GATE DAM & RESERVOIR

FIGURE 5-4-3B

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Table 5-4-5
Intersection Capacity Analysis – Year 2014 Conditions (Route 6B)
Traffic Impact Analysis - Site 6

Route 6B		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
30	Glenoaks Blvd and Sheldon Street	B	13.3	0.85	D	A	7.4	0.48	A	B	13.7	0.86	D
31	Glenoaks Blvd and Peoria Street	A	6.6	0.59	A	A	9.0	0.39	A	B	16.9	0.53	A
32	Glenoaks Blvd and Tuxford Street	B	15.7	0.89	D	A	7.8	0.49	A	A	10.2	0.67	C
33	Glenoaks Blvd and Penrose Street	A	6.6	0.58	A	A	6.0	0.36	A	B	11.3	0.70	B
34	Glenoaks Blvd and Sunland Blvd	C	22.9	0.88	C	B	16.3	0.67	B	C	27.4	0.92	D
35	Glenoaks Blvd and Roscoe Blvd	A	6.7	0.41	A	A	7.1	0.42	A	B	10.6	0.65	A
36	Roscoe Blvd and I-5 Freeway Northbound Ramps	B	12.0	-	-	B	11.8	-	-	C	26.3	-	-
37	Roscoe Blvd and I-5 Freeway Southbound Ramps	A	0.0	-	-	A	0.0	-	-	A	0.0	-	-

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc.**

Table 5-4-6
Intersection Capacity Analysis – Year 2014 Conditions (Route 6C)
Traffic Impact Analysis - Site 6

Route 6C		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
30	Glenoaks Blvd and Sheldon Street	B	17.4	0.92	E	A	8.0	0.54	A	B	15.9	0.89	D
44	Wheatland Ave and I-210 Freeway Eastbound Ramps	A	0	-	-	A	0	-	-	A	0	-	-
45	Wheatland Ave and I-210 Freeway Westbound Ramps	B	11.1	-	-	A	8.8	-	-	B	10.2	-	-
46	Wheatland Ave and Foothill Blvd	B	11.3	0.46	A	B	10.6	0.39	A	B	10	0.47	A
47	Wentworth Street and Foothill Blvd	C	28.4	0.88	A	B	10.4	0.45	A	A	9.7	0.48	A

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc.**

Haul Routes 6B & 6C Analysis

As presented in *Tables 5-4-5* and *5-4-6*, under the project conditions Year 2014 for Site 6 (Routes 6B & 6C) all intersections are anticipated to continue operating at an acceptable HCM LOS C or better, for the AM, Mid-day and PM peak hours.

Haul Route 7A

The Year 2014 AM (7-9), MID-DAY (12-2), PM (4-6) turn movement volumes, are provided in *Figure 5-5-7A*. For comparison the (PCE) Year 2014 turn movement volumes are provided in *Figure 5-5-7B.*

Haul Route 7B

The Year 2014 AM (7-9), MID-DAY (12-2), PM (4-6) turn movement volumes, are provided in *Figure 5-5-8A*. For comparison the (PCE) Year 2014 turn movement volumes are provided in *Figure 5-5-8B.*

N/S STREET				24	E/W STREET				
FOOTHILL BLVD					WB I-210 FWY RAMPS				
			535	425	0				
			225	280	0				
			245	285	0				
0	0	0					65	40	70
0	0	0		TS			0	0	0
0	0	0					240	180	330
			140	620	0				
			115	485	0				
			230	555	0				

N/S STREET				25	E/W STREET				
FOOTHILL BLVD					EB I-210 FWY RAMPS				
			0	385	215				
			0	330	80				
			0	500	60				
385	285	365					0	0	0
0	0	0		TS			0	0	0
110	45	85					0	0	0
			0	380	370				
			0	290	230				
			0	425	315				

N/S STREET				26	E/W STREET				
OSBORNE STREET					FOOTHILL BLVD				
			10	10	10				
			20	10	10				
			20	10	10				
10	25	20					10	10	10
350	245	345		TS			265	220	330
565	30	290					340	235	280
			365	15	325				
			250	10	285				
			740	10	485				

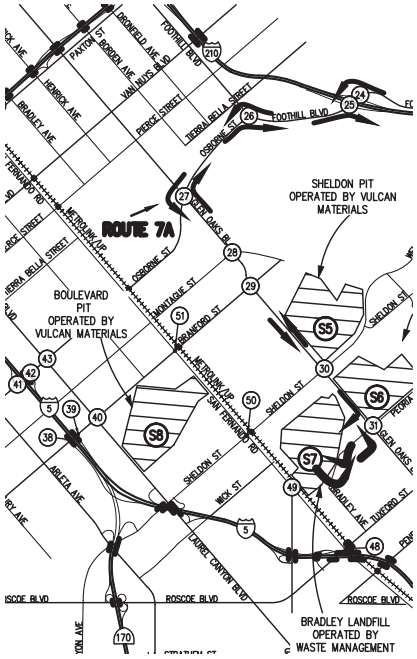
N/S STREET				27	E/W STREET				
GLEN OAKS BLVD					OSBORNE STREET				
			185	1165	50				
			140	465	85				
			225	625	145				
380	240	315					75	75	110
585	465	750		TS			685	545	585
75	100	100					465	190	280
			55	565	200				
			85	690	220				
			130	955	425				

N/S STREET				28	E/W STREET				
GLEN OAKS BLVD					MONTAGUE STREET				
			60	1770	20				
			40	625	40				
			30	985	20				
15	45	60					15	35	35
10	10	10		TS			10	10	10
35	50	65					10	40	15
			60	750	10				
			65	665	20				
			55	1340	20				

N/S STREET				29	E/W STREET				
GLEN OAKS BLVD					BRANFORD STREET				
			190	1535	20				
			85	620	75				
			85	860	125				
135	165	240					10	90	110
25	90	120		TS			10	100	205
100	100	170					15	75	100
			105	705	15				
			100	670	75				
			125	1085	115				

N/S STREET				30	E/W STREET				
GLEN OAKS BLVD					SHELDON STREET				
			175	1400	90				
			105	590	55				
			160	850	100				
125	140	325					45	55	65
440	260	355		TS			650	310	355
50	85	70					100	50	45
			85	580	50				
			85	640	55				
			130	950	75				

N/S STREET				31	E/W STREET				
GLEN OAKS BLVD					PEORIA STREET				
			100	1365	35				
			70	580	15				
			70	810	40				
70	80	100					15	20	60
10	10	15		TS			10	10	10
10	35	25					20	25	35
			20	570	30				
			30	570	20				
			30	1065	30				



LEGEND

N/S STREET				S#	E/W STREET				
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS			7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					

LEGEND

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ROUTE 7A
PROJECT TRIPS – YEAR 2014
DEVIL'S GATE DAM & RESERVOIR

FIGURE 5-4-7A

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N/S STREET				24	E/W STREET					
FOOTHILL BLVD					WB I-210 FWY RAMPS					
			550	445	0					
			235	315	0					
			250	300	0					
0	0	0					65	45	70	
0	0	0		TS			0	0	0	
0	0	0					355	315	470	
			155	650	0					
			120	525	0					
			240	580	0					

N/S STREET				25	E/W STREET					
FOOTHILL BLVD					EB I-210 FWY RAMPS					
			0	420	220					
			0	365	80					
			0	520	60					
400	295	375					0	0	0	
0	0	0		TS			0	0	0	
125	60	100					0	0	0	
			0	415	505					
			0	320	370					
			0	450	435					

N/S STREET				26	E/W STREET					
OSBORNE STREET					FOOTHILL BLVD					
			10	10	10					
			20	10	10					
			20	10	10					
10	25	20					10	10	10	
380	290	360		TS			275	255	375	
610	30	320					465	390	410	
			385	15	450					
			290	10	435					
			800	10	620					

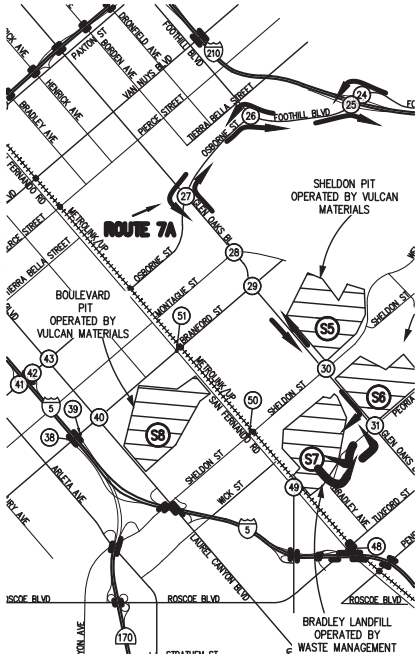
N/S STREET				27	E/W STREET					
GLEN OAKS BLVD					OSBORNE STREET					
			220	1325	70					
			155	565	85					
			225	625	145					
505	370	425					100	85	110	
655	535	750		TS			760	595	585	
105	115	100					535	230	280	
			100	715	370					
			110	800	400					
			130	955	535					

N/S STREET				28	E/W STREET					
GLEN OAKS BLVD					MONTAGUE STREET					
			75	1945	25					
			55	835	45					
			35	1210	25					
50	70	70					15	35	35	
10	10	10		TS			10	10	10	
55	70	70					10	45	15	
			70	970	15					
			70	890	20					
			75	1520	20					

N/S STREET				29	E/W STREET					
GLEN OAKS BLVD					BRANFORD STREET					
			215	1750	30					
			85	820	100					
			115	1090	130					
135	170	245					15	105	115	
25	90	120		TS			10	100	215	
120	110	185					25	90	115	
			115	945	30					
			115	895	85					
			135	1265	120					

N/S STREET				30	E/W STREET					
GLEN OAKS BLVD					SHELDON STREET					
			220	1640	145					
			135	770	65					
			170	1020	110					
140	165	360					55	65	70	
470	405	365		TS			720	405	380	
55	130	80					115	55	55	
			110	730	55					
			120	825	75					
			155	1150	85					

N/S STREET				31	E/W STREET					
GLEN OAKS BLVD					PEORIA STREET					
			225	1510	60					
			195	770	25					
			195	905	70					
190	215	225					20	20	80	
15	15	25		TS			15	10	10	
10	65	45					25	35	70	
			35	665	65					
			40	720	35					
			50	1210	55					



LEGEND

N/S STREET				S#	E/W STREET					
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM					7AM - 9AM	2PM - 4PM	4PM - 6PM	
				TS						
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

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ROUTE 7A
PCE PROJECT TRIPS – YEAR 2014

DEVIL'S GATE DAM & RESERVOIR

FIGURE 5-4-7B

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N/S STREET				31		E/W STREET			
GLEN OAKS BLVD						PEORIA STREET			
				100	1365	35			
				70	580	15			
				70	810	40			
70	80	100	⌟	⌟	↑	⌞	⌞	15	20	60
10	10	15	←	TS			→	10	10	10
10	35	25	⌝	⌝	↑	⌜	⌜	20	25	35
				20	570	30			
				30	570	20			
				30	1065	30			

N/S STREET				32		E/W STREET			
GLEN OAKS BLVD						TUXFORD STREET			
				135	1160	100			
				110	440	100			
				100	700	140			
125	120	155	⌟	⌟	↑	⌞	⌞	80	50	85
510	425	550	←	TS			→	615	465	375
50	65	105	⌝	⌝	↑	⌜	⌜	35	30	65
				105	485	20			
				120	530	35			
				130	925	65			

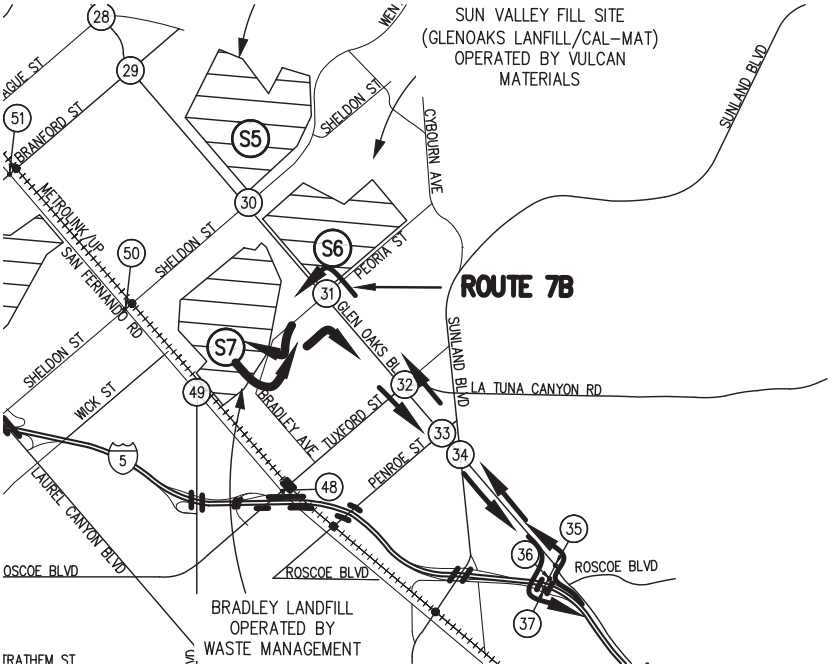
N/S STREET				33		E/W STREET			
GLEN OAKS BLVD						PENROSE STREET			
				105	1055	40			
				40	535	30			
				120	620	50			
130	100	200	⌟	⌟	↑	⌞	⌞	40	40	80
135	140	220	←	TS			→	75	90	155
25	55	60	⌝	⌝	↑	⌜	⌜	10	25	50
				30	450	10			
				50	560	30			
				80	820	45			

N/S STREET				34		E/W STREET			
GLEN OAKS BLVD						SUNLAND BLVD			
				225	750	15			
				185	385	40			
				55	610	55			
75	180	180	⌟	⌟	↑	⌞	⌞	25	20	10
730	470	710	←	TS			→	820	385	430
35	25	60	⌝	⌝	↑	⌜	⌜	225	350	390
				15	390	85			
				30	435	265			
				25	750	420			

N/S STREET				35		E/W STREET			
GLEN OAKS BLVD						ROSCOE BLVD			
				510	565	0			
				385	385	0			
				510	580	0			
245	315	650	⌟	⌟	↑	⌞	⌞	0	0	0
0	0	0	←	TS			→	0	0	0
80	100	130	⌝	⌝	↑	⌜	⌜	0	0	0
				75	300	0			
				80	405	0			
				70	590	0			

N/S STREET				36		E/W STREET			
NB I-5 FREEWAY RAMPS						ROSCOE BLVD			
				0	0	0			
				0	0	0			
				0	0	0			
0	0	0	⌟	⌟	↑	⌞	⌞	0	0	0
100	130	120	←	TS			→	590	465	590
0	0	0	⌝	⌝	↑	⌜	⌜	0	0	0
				75	0	290			
				65	0	310			
				70	0	670			

N/S STREET				37		E/W STREET			
SB I-5 FREEWAY RAMPS						ROSCOE BLVD			
				0	40	100			
				0	45	130			
				0	35	120			
0	0	0	⌟	⌟	↑	⌞	⌞	30	50	110
0	0	0	←	TS			→	0	0	0
0	0	0	⌝	⌝	↑	⌜	⌜	670	415	465
				0	0	0			
				0	0	0			
				0	0	0			



LEGEND

N/S STREET				S#	E/W STREET				
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					
7AM - 9AM	2PM - 4PM	4PM - 6PM	⌟	⌟	↑	⌞	⌞	7AM - 9AM	2PM - 4PM	4PM - 6PM
			←	TS			→			
			⌝	⌝	↑	⌜	⌜			
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					

LEGEND

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ROUTE 7B
PROJECT TRIPS – YEAR 2014
DEVIL'S GATE DAM & RESERVOIR

FIGURE
5-4-8A

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N/S STREET			31			E/W STREET			
GLEN OAKS BLVD						PEORIA STREET			
				60	1510	60			
				35	770	25			
				35	905	70			
30	50	60					20	20	80
15	15	25		TS			15	10	10
170	230	205					25	35	70
				195	665	65			
				200	720	35			
				215	1210	55			

N/S STREET			32			E/W STREET			
GLEN OAKS BLVD						TUXFORD STREET			
				240	1385	110			
				215	660	115			
				115	865	160			
190	220	230					100	60	100
555	485	590		TS			670	490	410
60	85	130					35	35	65
				130	675	35			
				155	740	35			
				160	1195	70			

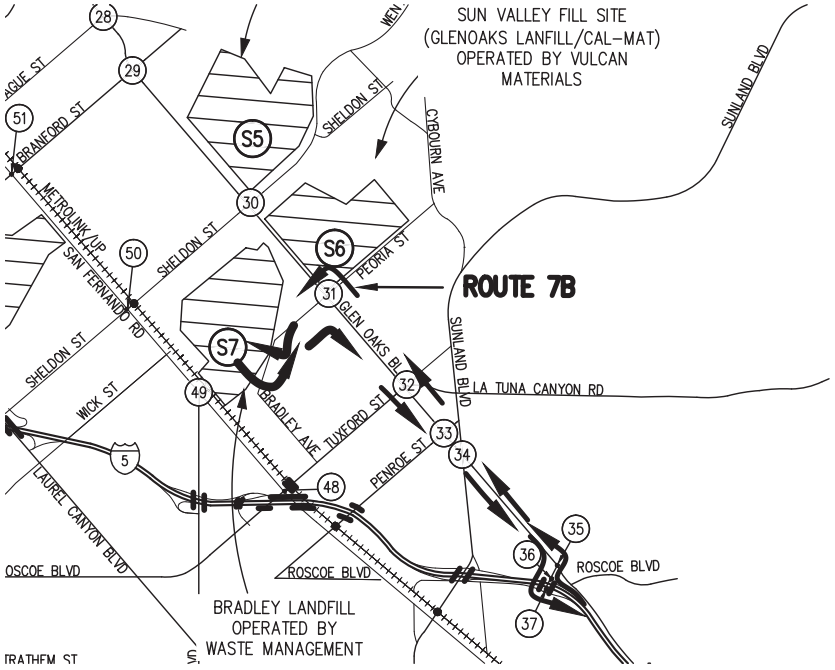
N/S STREET			33			E/W STREET			
GLEN OAKS BLVD						PENROSE STREET			
				110	1265	50			
				45	720	35			
				125	865	50			
145	120	230					50	45	90
140	145	235		TS			80	100	175
35	60	70					10	30	55
				30	640	10			
				50	735	30			
				80	1045	45			

N/S STREET			34			E/W STREET			
GLEN OAKS BLVD						SUNLAND BLVD			
				255	930	25			
				250	565	45			
				65	760	65			
90	205	220					30	20	10
785	510	730		TS			860	435	440
35	25	60					240	370	405
				25	555	90			
				30	605	285			
				25	945	450			

N/S STREET			35			E/W STREET			
GLEN OAKS BLVD						ROSCOE BLVD			
				640	610	0			
				535	450	0			
				640	625	0			
370	435	770					0	0	0
0	0	0		TS			0	0	0
100	135	160					0	0	0
				90	330	0			
				105	445	0			
				85	630	0			

N/S STREET			36			E/W STREET			
NB I-5 FREEWAY RAMPS						ROSCOE BLVD			
				0	0	0			
				0	0	0			
				0	0	0			
0	0	0					0	0	0
110	155	145		TS			720	600	715
0	0	0					0	0	0
				100	0	415			
				90	0	430			
				100	0	790			

N/S STREET			37			E/W STREET			
SB I-5 FREEWAY RAMPS						ROSCOE BLVD			
				0	45	110			
				0	45	130			
				0	35	120			
0	0	0					40	55	110
0	0	0		TS			0	0	0
0	0	0					800	550	600
				0	0	0			
				0	0	0			
				0	0	0			



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N/S STREET			S#			E/W STREET			
			7AM-9AM						
			2PM-4PM						
			4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS		7AM - 9AM	2PM - 4PM	4PM - 6PM	
			7AM-9AM						
			2PM-4PM						
			4PM-6PM						

LEGEND

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ROUTE 7B
PCE PROJECT TRIPS – YEAR 2014

DEVIL'S GATE DAM & RESERVOIR

FIGURE 5-4-8B

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Table 5-4-7
Intersection Capacity Analysis – Year 2014 Conditions (Route 7A)
Traffic Impact Analysis - Site 7

Route 7A		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
24	Foothill Blvd and I-210 Westbound Ramps	A	5.8	0.30	A	A	5.9	0.31	A	A	8.5	0.56	A
25	Foothill Blvd and I-210 Eastbound Ramps	A	6.4	0.32	A	A	6.7	0.33	A	A	7.9	0.44	A
26	Foothill Blvd and Osborne Street	C	20.7	0.78	D	B	10.8	0.56	A	C	21.1	0.88	D
27	Glenoaks Blvd and Osborne Street	F	105.7	1.15	F	D	35.4	0.88	C	E	55.4	0.95	E
28	Glenoaks Blvd and Montague Street	B	10.5	0.79	B	A	9.5	0.41	A	A	10.0	0.62	C
29	Glenoaks Blvd and Branford Street	B	17.9	0.80	C	B	16.5	0.65	B	C	21.9	0.91	D
30	Glenoaks Blvd and Sheldon Street	B	16.0	0.89	E	A	7.7	0.52	A	B	14.7	0.86	D
31	Glenoaks Blvd and Peoria Street	A	6.2	0.64	A	A	5.4	0.42	A	A	6.4	0.56	A

Table 5-4-8
Intersection Capacity Analysis – Year 2014 Conditions (Route 7B)
Traffic Impact Analysis - Site 7

Route 7B		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
31	Glenoaks Blvd and Peoria Street	A	6.0	0.76	B	A	4.4	0.33	A	A	5.3	0.48	A
32	Glenoaks Blvd and Tuxford Street	B	15.7	0.89	D	A	7.8	0.49	A	A	10.2	0.67	C
33	Glenoaks Blvd and Penrose Street	A	6.6	0.58	A	A	6.0	0.36	A	B	11.3	0.70	B
34	Glenoaks Blvd and Sunland Blvd	C	22.9	0.88	C	B	16.3	0.67	B	C	27.4	0.92	D
35	Glenoaks Blvd and Roscoe Blvd	A	6.7	0.41	A	A	7.1	0.42	A	B	10.6	0.65	A
36	Roscoe Blvd and I-5 Freeway Northbound Ramps	B	12.0	-	-	B	11.8	-	-	C	26.3	-	-
37	Roscoe Blvd and I-5 Freeway Southbound Ramps	A	0.0	-	-	A	0.0	-	-	A	0.0	-	-

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc.**

Haul Routes 7A & 7B Analysis

As presented in *Tables 5-4-7* and *5-4-8*, under the project conditions Year 2014 for Site 7 (Routes 7A & 7B) most intersections are expected to operate at an acceptable HCM LOS of C or better for the AM, Mid-day, and PM peak hours. The intersection of Glenoaks Blvd and Osborne Street is anticipated to operate at HCM LOS F during the AM peak hour and HCM LOS E during the PM peak hour, mitigations are recommended under existing conditions.

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Haul Route 7C

The Year 2014 AM (7-9), MID-DAY (12-2), PM (4-6) turn movement volumes, are provided in *Figure 5-5-9A*. For comparison the (PCE) Year 2014 turn movement volumes are provided in *Figure 5-5-9B.*

N/S STREET				44		E/W STREET			
WHEATLAND AVE						EB I-210 FWY RAMPS			
			0	0	185				
			0	0	120				
			0	0	145				
115	80	110					0	0	0
10	10	10		TS			0	0	0
0	0	0					0	0	0
			0	0	0				
			0	0	0				
			0	0	0				

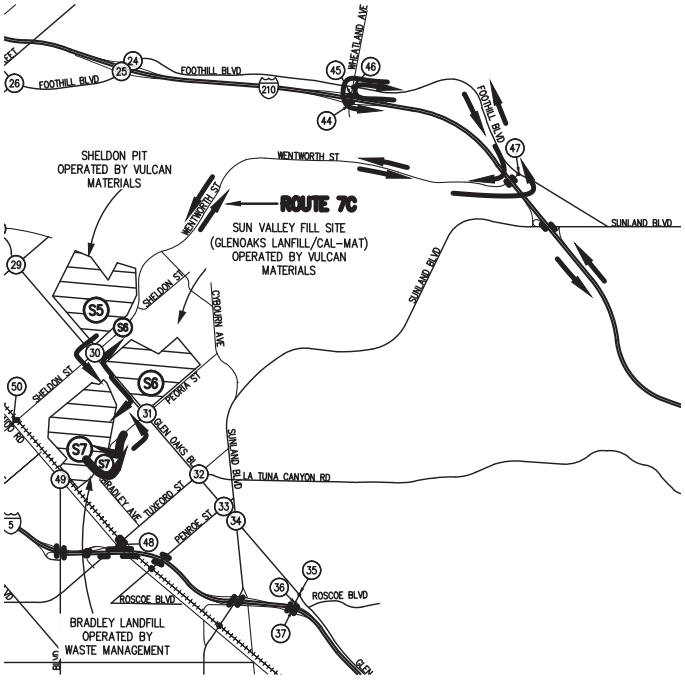
N/S STREET				45		E/W STREET			
WHEATLAND AVE						WB I-210 FWY RAMPS			
			70	175	0				
			60	120	0				
			115	140	0				
0	0	0					165	100	185
0	0	0		TS			10	10	10
0	0	0					10	10	10
			10	110	0				
			10	60	0				
			10	105	0				

N/S STREET				46		E/W STREET			
WHEATLAND AVE						FOOTHILL BLVD			
			10	20	20				
			20	25	10				
			10	25	15				
10	15	10					10	25	20
215	145	185		TS			240	140	235
100	40	85					140	125	160
			75	15	175				
			45	30	110				
			100	30	165				

N/S STREET				47		E/W STREET			
WENTWORTH STREET						FOOTHILL BLVD			
			0	0	0				
			0	0	0				
			0	0	0				
0	0	0					0	0	0
220	180	220		TS			190	170	320
180	105	135					480	235	235
			110	0	245				
			110	0	200				
			175	0	460				

N/S STREET				30		E/W STREET			
GLEN OAKS BLVD						SHELDON STREET			
			175	1345	90				
			105	535	55				
			160	795	100				
125	140	325					45	55	65
440	260	355		TS			650	310	355
50	85	70					155	105	100
			85	525	105				
			85	585	110				
			130	895	130				

N/S STREET				31		E/W STREET			
GLEN OAKS BLVD						PEORIA STREET			
			100	1365	35				
			70	580	15				
			70	810	40				
70	80	100					15	20	60
10	10	15		TS			10	10	10
10	35	25					20	25	35
			20	570	30				
			30	570	20				
			30	1065	30				



LEGEND

N/S STREET				S#		E/W STREET			
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS			7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 7C
PROJECT TRIPS – YEAR 2014

DEVIL'S GATE DAM & RESERVOIR

FIGURE 5-4-9A

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N/S STREET				44		E/W STREET			
WHEATLAND AVE						EB I-210 FWY RAMPS			
			0	0	300				
			0	0	230				
			0	0	260				
125	90	110					0	0	0
15	15	10		TS			0	0	0
0	0	0					0	0	0
			0	0	0				
			0	0	0				
			0	0	0				

N/S STREET				45		E/W STREET			
WHEATLAND AVE						WB I-210 FWY RAMPS			
			80	290	0				
			65	235	0				
			115	250	0				
0	0	0					285	205	295
0	0	0		TS			10	10	10
0	0	0					10	10	10
			10	115	0				
			10	70	0				
			10	110	0				

N/S STREET				46		E/W STREET			
WHEATLAND AVE						FOOTHILL BLVD			
			10	20	25				
			20	25	10				
			10	25	15				
15	15	10					10	25	20
235	165	190		TS			265	160	250
100	45	85					260	250	265
			85	15	290				
			45	30	230				
			100	30	275				

N/S STREET				47		E/W STREET			
WENTWORTH STREET						FOOTHILL BLVD			
			0	0	0				
			0	0	0				
			0	0	0				
0	0	0					0	0	0
225	190	220		TS			200	180	325
295	220	250					490	245	260
			225	0	260				
			225	0	205				
			290	0	465				

N/S STREET				30		E/W STREET			
GLEN OAKS BLVD						SHELDON STREET			
			220	1475	145				
			135	605	65				
			170	855	110				
140	165	360					55	65	70
470	405	365		TS			720	405	380
55	130	80					280	220	220
			110	565	220				
			120	660	240				
			155	985	250				

N/S STREET				31		E/W STREET			
GLEN OAKS BLVD						PEORIA STREET			
			225	1510	60				
			195	770	25				
			195	905	70				
190	215	225					20	20	80
15	15	25		TS			15	10	10
10	65	45					25	35	70
			35	665	65				
			40	720	35				
			50	1210	55				

N

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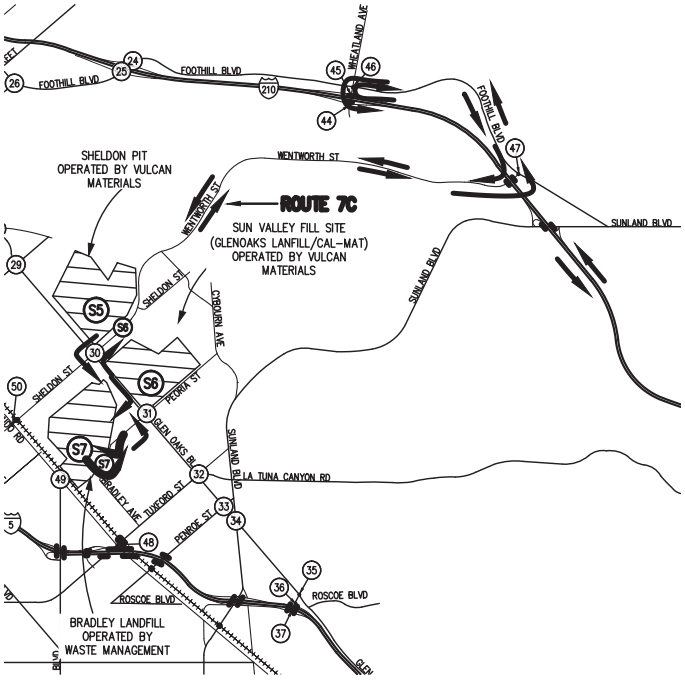

LEGEND

N/S STREET				S#		E/W STREET			
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS			7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					

LEGEND

(S#) – DISPOSAL SITE

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ROUTE 7C
PCE PROJECT TRIPS – YEAR 2014

DEVIL'S GATE DAM & RESERVOIR

FIGURE 5-4-9B

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Table 5-4-9
Intersection Capacity Analysis – Year 2014 Conditions (Route 7C)
Traffic Impact Analysis - Site 7

Route 7C		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
30	Glenoaks Blvd and Sheldon Street	B	14.7	0.87	D	A	7.6	0.50	A	B	13.7	0.86	D
31	Glenoaks Blvd and Peoria Street	A	6.2	0.64	A	A	5.4	0.42	A	A	6.4	0.56	A
44	Wheatland Ave and I-210 Freeway Eastbound Ramps	A	0	-	-	A	0	-	-	A	0	-	-
45	Wheatland Ave and I-210 Freeway Westbound Ramps	B	11.1	-	-	A	8.8	-	-	B	10.2	-	-
46	Wheatland Ave and Foothill Blvd	B	11.3	0.46	A	B	10.6	0.39	A	B	10	0.47	A
47	Wentworth Street and Foothill Blvd	C	28.4	0.88	A	B	10.4	0.45	A	A	9.7	0.48	A

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc.**

Haul Route 7C Analysis

As presented in *Table 5-4-9*, under the project conditions Year 2014 for Site 7 (Route 7C) all intersections are expected to operate at an acceptable HCM LOS C or better, for the AM, Mid-day and PM peak hours.

Haul Route 8A

The Year 2014 AM (7-9), MID-DAY (12-2), PM (4-6) turn movement volumes, are provided in *Figure 5-5-10A.* For comparison the (PCE) Year 2014 turn movement volumes are provided in *Figure 5-5-10B.*

Haul Route 8B

The Year 2014 AM (7-9), MID-DAY (12-2), PM (4-6) turn movement volumes, are provided in *Figure 5-5-11A.* For comparison the (PCE) Year 2014 turn movement volumes are provided in *Figure 5-5-11B.*

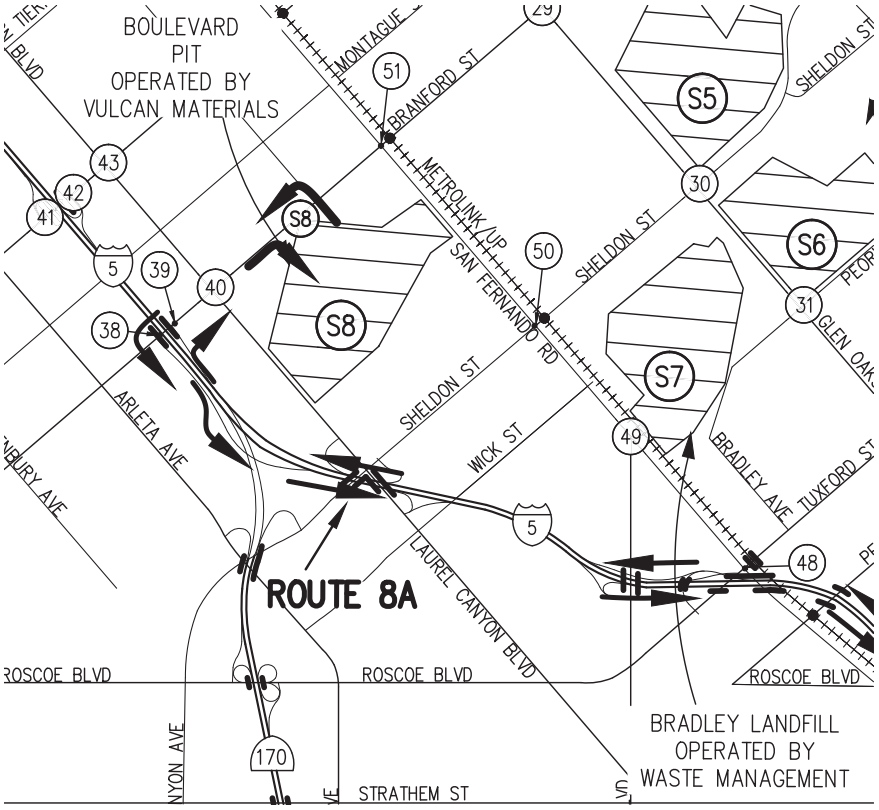
N/S STREET				38			E/W STREET			
SB I-5 FREEWAY RAMPS							BRANFORD STREET			
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET				39			E/W STREET			
NB I-5 FREEWAY RAMPS							BRANFORD STREET			
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET				40			E/W STREET			
LAUREL CANYON BLVD							BRANFORD STREET			
				165	400	140				
				105	640	70				
				145	485	65				
165	125	205						120	90	135
215	240	470		TS				280	230	450
70	230	200						90	100	110
				100	585	155				
				90	460	90				
				125	1120	130				

N

NOT TO SCALE



LEGEND

N/S STREET				S#			E/W STREET			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

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ROUTE 8A
PROJECT TRIPS – YEAR 2014
DEVIL'S GATE DAM & RESERVOIR

FIGURE
5-4-10A

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Last Opened: Oct 04, 2013 – 1:43pm by: TMunoz

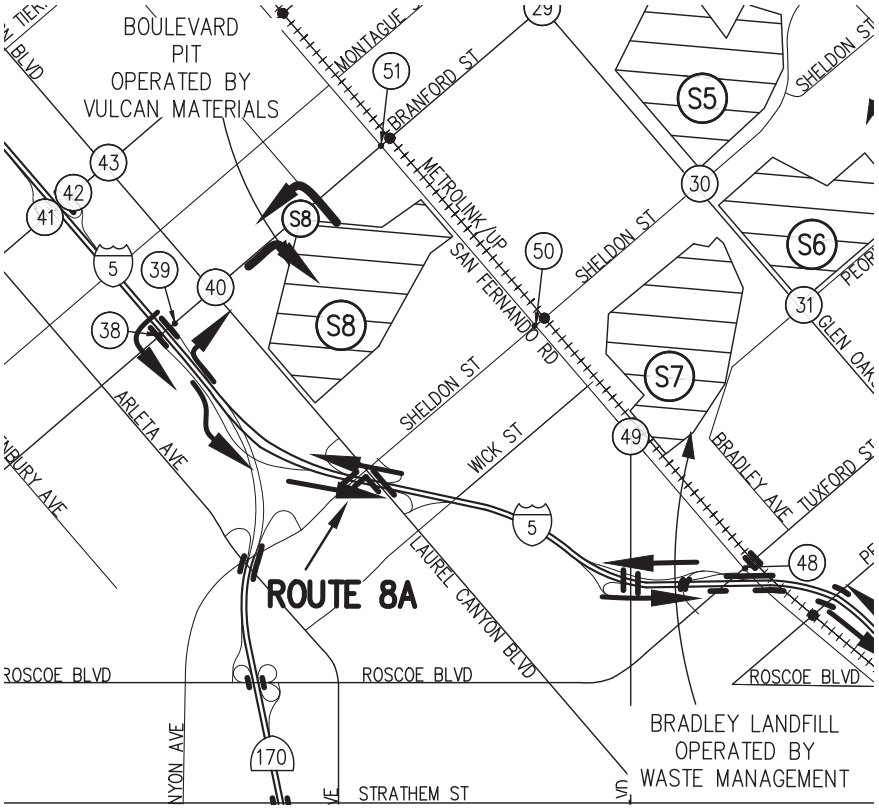
N/S STREET				38			E/W STREET			
SB I-5 FREEWAY RAMPS							BRANFORD STREET			
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET				38			E/W STREET			
SB I-5 FREEWAY RAMPS							BRANFORD STREET			
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET				40			E/W STREET			
LAUREL CANYON BLVD							BRANFORD STREET			
				165	415	145				
				105	660	70				
				155	500	70				
170	135	215						130	110	140
360	410	655		TS				430	400	630
85	240	215						105	105	115
				100	595	160				
				90	475	105				
				130	1140	140				

N

NOT TO SCALE



LEGEND

N/S STREET				S#			E/W STREET			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM
				TS						
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

(S#) – DISPOSAL SITE

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ROUTE 8A
PCE PROJECT TRIPS – YEAR 2014

DEVIL'S GATE DAM & RESERVOIR

FIGURE 5-4-10B

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Last Opened: Oct 04, 2013 – 1:43pm by: TMunoz

N/S STREET				40			E/W STREET			
LAUREL CANYON BLVD							BRANFORD STREET			
				165	400	195				
				105	640	125				
				145	485	120				
165	125	205						175	145	190
160	185	415		TS				225	175	400
70	230	200						90	100	110
				100	640	155				
				90	500	90				
				125	1220	130				

N/S STREET				41			E/W STREET			
SB I-5 FREEWAY RAMPS							OSBORNE STREET			
				205	25	215				
				390	25	470				
				665	25	550				
0	0	0						560	240	245
865	650	975		TS				1260	990	1330
745	180	300						65	40	40
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET				42			E/W STREET			
NB I-5 FREEWAY RAMPS							OSBORNE STREET			
				10	0	10				
				10	0	10				
				10	0	10				
10	10	10						80	70	85
1095	1095	1515		TS				1635	895	1170
0	0	0						0	0	0
				250	0	195				
				330	0	240				
				445	0	225				

N/S STREET				43			E/W STREET			
LAUREL CANYON BLVD							OSBORNE STREET			
				55	365	120				
				100	560	80				
				80	500	80				
130	100	105						185	120	120
915	1085	1435		TS				1500	750	925
140	140	125						120	85	130
				145	605	115				
				140	460	100				
				230	1130	130				

N

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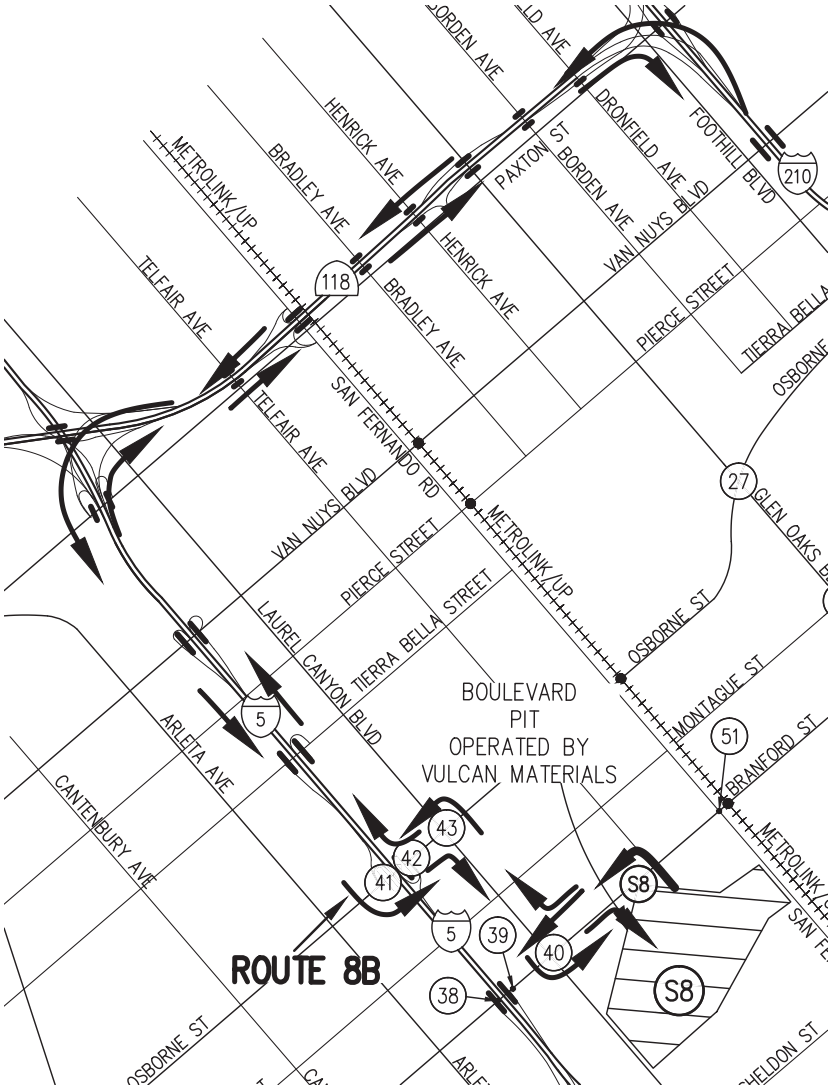

LEGEND

N/S STREET				S#	E/W STREET
				7AM-9AM	
				2PM-4PM	
				4PM-6PM	
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS	7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM	
				2PM-4PM	
				4PM-6PM	

LEGEND

(S#) – DISPOSAL SITE

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ROUTE 8B
PROJECT TRIPS – YEAR 2014
DEVIL'S GATE DAM & RESERVOIR

FIGURE
5-4-11A

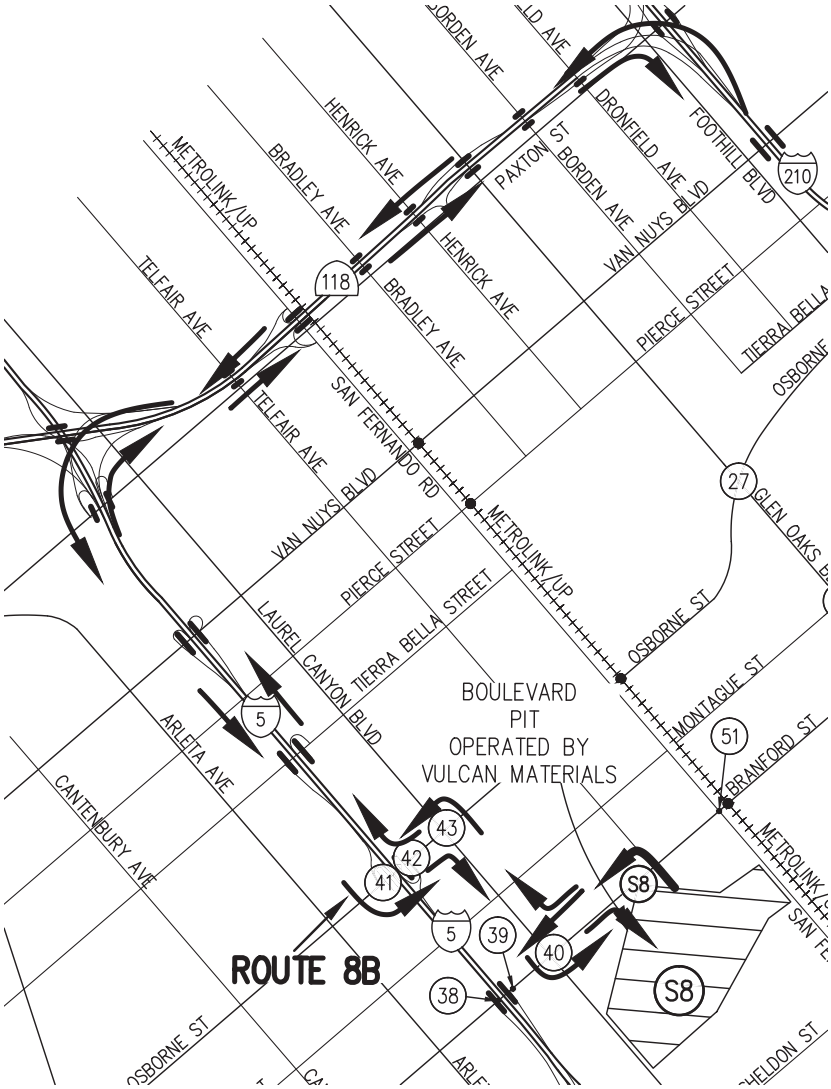
Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 5\Ch. 5 Section 4\FIG 5-4-11A.dwg
Last Opened: Oct 04, 2013 – 1:43pm by: TMunoz

N/S STREET				40			E/W STREET		
LAUREL CANYON BLVD							BRANFORD STREET		
				165	415	310			
				105	660	235			
				155	500	235			
170	135	215						295	275	305
195	245	490		TS				265	235	470
85	240	215						105	105	115
				100	650	160			
				90	520	105			
				130	1245	140			

N/S STREET				41			E/W STREET		
SB I-5 FREEWAY RAMPS							OSBORNE STREET		
				255	25	380			
				435	25	640			
				675	25	685			
0	0	0						610	275	255
950	705	1035		TS				1330	1015	1395
745	180	300						65	40	40
				0	0	0			
				0	0	0			
				0	0	0			

N/S STREET				42			E/W STREET		
NB I-5 FREEWAY RAMPS							OSBORNE STREET		
				10	0	10			
				10	0	10			
				10	0	10			
10	10	10						190	180	195
1185	1270	1690		TS				1625	960	1265
0	0	0						0	0	0
				260	0	215			
				345	0	265			
				465	0	235			

N/S STREET				43			E/W STREET		
LAUREL CANYON BLVD							OSBORNE STREET		
				65	375	125			
				110	565	90			
				85	505	90			
135	105	110						195	120	130
980	1150	1500		TS				1555	800	1010
275	260	255						130	110	140
				260	620	125			
				250	470	110			
				340	1135	140			



NOT TO SCALE

LEGEND

N/S STREET				S#	E/W STREET
				7AM-9AM	
				2PM-4PM	
				4PM-6PM	
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS	7AM - 9AM / 2PM - 4PM / 4PM - 6PM
				7AM-9AM	
				2PM-4PM	
				4PM-6PM	

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 8B
PCE PROJECT TRIPS – YEAR 2014

DEVIL'S GATE DAM & RESERVOIR

FIGURE 5-4-11B

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Table 5-4-10
Intersection Capacity Analysis – Year 2014 Conditions (Route 8A)
Traffic Impact Analysis - Site 8

Route 8A		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
38	Branford Street and I-5 Freeway Southbound Ramps	-	-	-	-	-	-	-	-	-	-	-	-
39	Branford Street and I-5 Freeway Northbound Ramps	-	-	-	-	-	-	-	-	-	-	-	-
40	Branford Street and Laurel Canyon Blvd	B	11.2	0.62	C	B	10.1	0.45	B	B	17.6	0.88	E

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc.**

Table 5-4-11
Intersection Capacity Analysis – Year 2014 Conditions (Route 8**B**)
Traffic Impact Analysis - Site 8

Route 8B		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
40	Branford Street and Laurel Canyon Blvd	C	21.9	1.00	D	B	11.0	0.54	C	D	37.2	1.21	F*
41	Osborne Street and I-5 Freeway Southbound Ramps	B	13.7	0.83	D	C	20.9	0.93	B	D	37.0	1.00	E
42	Osborne Street and I-5 Freeway Northbound Ramps	B	14.7	0.75	B	B	12.1	0.70	B	B	19.3	0.89	D
43	Osborne Street and Laurel Canyon Blvd	D	42.3	0.98	E	C	25.2	0.80	D	E	66.3	1.03	F

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc.**

Haul Routes 8A & 8B Analysis

As presented in *Table 5-4-10* and *Table 5-4-11*, under the project conditions Year 2014 for Site 8 (Routes 8A-8B) most of the study intersections are expected to operate at an acceptable HCM LOS D or better, for the AM, Mid-day and PM peak hours. The intersection requiring mitigations includes Osborne Street and Laurel Canyon Blvd (Route 8B) anticipated PM peak hour HCM LOS E. Mitigations for the intersection of Osborne Street and Laurel Canyon Blvd is recommended under project conditions.

Haul Route 8C

The Year 2014 AM (7-9), MID-DAY (12-2), PM (4-6) turn movement volumes, are provided in *Figure 5-5-12A* and *Figure 5-5-12B.* For comparison the (PCE) Year 2014 turn movement volumes are provided in *Figure 5-5-12C* and *Figure 5-5-12D*.

N/S STREET				44		E/W STREET			
WHEATLAND AVE						EB I-210 FWY RAMPS			
				0	0	185			
				0	0	120			
				0	0	145			
115	80	110	⌟	⌜	↑	⌝	⌞	0	0	0
10	10	10	→	TS			←	0	0	0
0	0	0	⌝	⌜	↑	⌝	⌜	0	0	0
				0	0	0			
				0	0	0			
				0	0	0			

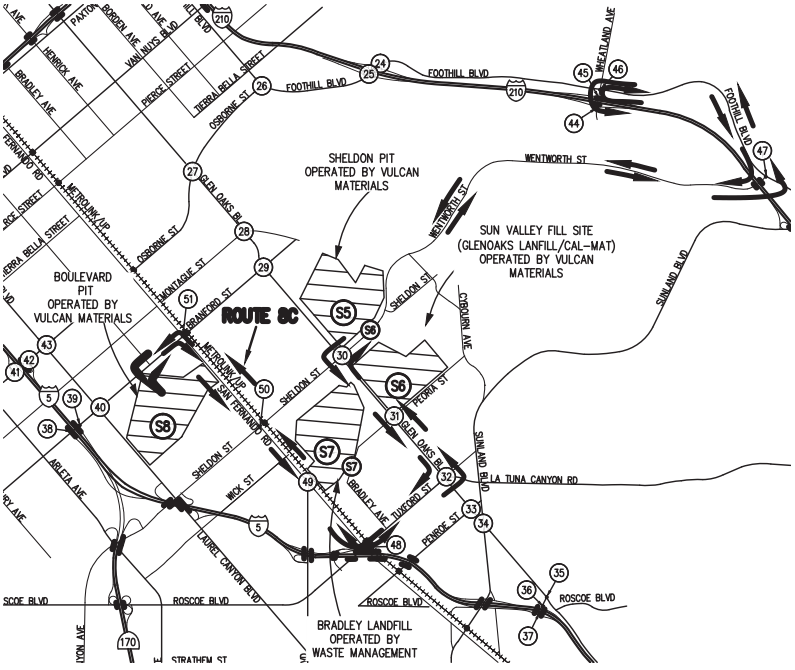
N/S STREET				45		E/W STREET			
WHEATLAND AVE						WB I-210 FWY RAMPS			
				70	175	0			
				60	120	0			
				115	140	0			
0	0	0	⌟	⌜	↑	⌝	⌞	165	100	185
0	0	0	→	TS			←	10	10	10
0	0	0	⌝	⌜	↑	⌝	⌜	10	10	10
				10	110	0			
				10	60	0			
				10	105	0			

N/S STREET				46		E/W STREET			
WHEATLAND AVE						FOOTHILL BLVD			
				10	20	20			
				20	25	10			
				10	25	15			
10	15	10	⌟	⌜	↑	⌝	⌞	10	25	20
215	145	185	→	TS			←	240	140	235
100	40	85	⌝	⌜	↑	⌝	⌜	140	125	160
				75	15	175			
				45	30	110			
				100	30	165			

N/S STREET				47		E/W STREET			
WENTWORTH STREET						FOOTHILL BLVD			
				0	0	0			
				0	0	0			
				0	0	0			
0	0	0	⌟	⌜	↑	⌝	⌞	0	0	0
220	180	220	→	TS			←	190	170	320
180	105	135	⌝	⌜	↑	⌝	⌜	480	235	235
				110	0	245			
				110	0	200			
				175	0	460			

N/S STREET				30		E/W STREET			
GLEN OAKS BLVD						SHELDON STREET			
				175	1345	90			
				105	535	55			
				160	795	100			
125	140	325	⌟	⌜	↑	⌝	⌞	45	55	65
440	260	355	→	TS			←	650	310	355
50	85	70	⌝	⌜	↑	⌝	⌜	155	105	100
				85	525	105			
				85	585	110			
				130	895	130			

N/S STREET				31		E/W STREET			
GLEN OAKS BLVD						PEORIA STREET			
				45	1415	35			
				20	630	15			
				20	865	40			
20	30	45	⌟	⌜	↑	⌝	⌞	15	20	60
10	10	15	→	TS			←	10	10	10
10	35	25	⌝	⌜	↑	⌝	⌜	20	25	35
				20	625	30			
				30	625	20			
				30	1115	30			



LEGEND

N/S STREET				S#		E/W STREET			
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					
7AM - 9AM	2PM - 4PM	4PM - 6PM	→	TS			←	7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					

LEGEND

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ROUTE 8C
PROJECT TRIPS – YEAR 2014

DEVIL'S GATE DAM & RESERVOIR

FIGURE 5-4-12A

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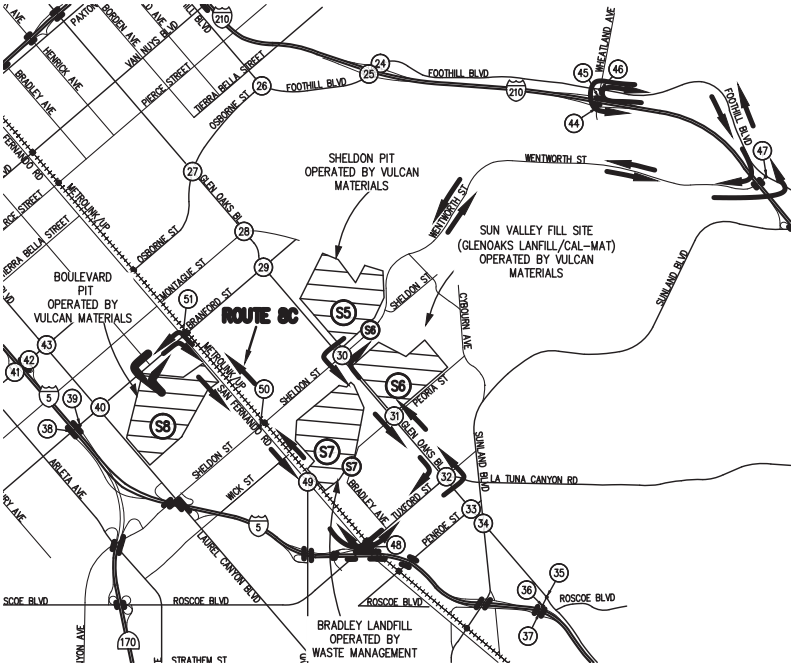
N/S STREET				32		E/W STREET			
GLEN OAKS BLVD						TUXFORD STREET			
				190	1105	100			
				165	385	100			
				155	645	140			
180	175	205					80	50	85
510	425	550		TS			615	465	375
50	65	105					35	30	65
				105	430	25			
				120	475	35			
				130	870	65			

N/S STREET				48		E/W STREET			
SAN FERNANDO ROAD						TUXFORD STREET			
				75	355	190			
				75	240	120			
				45	300	155			
70	85	35					170	165	195
560	415	620		TS			710	385	470
120	200	160					125	190	85
				275	210	65			
				345	185	145			
				360	580	70			

N/S STREET				49		E/W STREET			
SAN FERNANDO ROAD						LANKERSHIM BLVD			
				510	540	0			
				305	385	0			
				390	390	0			
245	300	600					0	0	0
0	0	0		TS			0	0	0
40	65	60					0	0	0
				55	310	0			
				60	335	0			
				85	670	0			

N/S STREET				50		E/W STREET			
SAN FERNANDO ROAD						SHELDON STREET			
				90	720	70			
				50	420	70			
				35	705	80			
65	65	135					60	60	110
385	350	610		TS			690	350	440
80	45	70					240	135	180
				40	340	85			
				55	425	105			
				125	1025	175			

N/S STREET				51		E/W STREET			
SAN FERNANDO ROAD						BRANFORD STREET			
				75	690	45			
				60	360	70			
				125	580	110			
40	40	100					25	50	115
325	195	420		TS			160	165	310
170	105	170					60	75	135
				110	240	100			
				110	345	75			
				240	820	140			



LEGEND

N/S STREET				S#	E/W STREET				
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS		7AM - 9AM	2PM - 4PM	4PM - 6PM	
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					

LEGEND

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ROUTE 8C
PROJECT TRIPS – YEAR 2014

DEVIL'S GATE DAM & RESERVOIR

FIGURE 5-4-12B

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N/S STREET				44		E/W STREET			
WHEATLAND AVE						EB I-210 FWY RAMPS			
			0	0	300				
			0	0	230				
			0	0	260				
125	90	110					0	0	0
15	15	10		TS			0	0	0
0	0	0					0	0	0
			0	0	0				
			0	0	0				
			0	0	0				

N/S STREET				45		E/W STREET			
WHEATLAND AVE						WB I-210 FWY RAMPS			
			80	290	0				
			65	235	0				
			115	250	0				
0	0	0					285	205	295
0	0	0		TS			10	10	10
0	0	0					10	10	10
			10	115	0				
			10	70	0				
			10	110	0				

N/S STREET				46		E/W STREET			
WHEATLAND AVE						FOOTHILL BLVD			
			10	20	25				
			20	25	10				
			10	25	15				
15	15	10					10	25	20
235	165	190		TS			265	160	250
100	45	85					260	250	265
			85	15	290				
			45	30	230				
			100	30	275				

N/S STREET				47		E/W STREET			
WENTWORTH STREET						FOOTHILL BLVD			
			0	0	0				
			0	0	0				
			0	0	0				
0	0	0					0	0	0
225	190	220		TS			200	180	325
295	220	250					490	245	260
			225	0	260				
			225	0	205				
			290	0	465				

N/S STREET				30		E/W STREET			
GLEN OAKS BLVD						SHELDON STREET			
			220	1475	145				
			135	605	65				
			170	855	110				
140	165	360					55	65	70
470	405	365		TS			720	405	380
55	130	80					280	220	220
			110	565	220				
			120	660	240				
			155	985	250				

N/S STREET				31		E/W STREET			
GLEN OAKS BLVD						PEORIA STREET			
			60	1675	60				
			35	930	25				
			35	1070	70				
30	50	60					20	20	80
15	15	25		TS			15	10	10
10	65	45					25	35	70
			35	830	65				
			40	885	35				
			50	1375	55				

N

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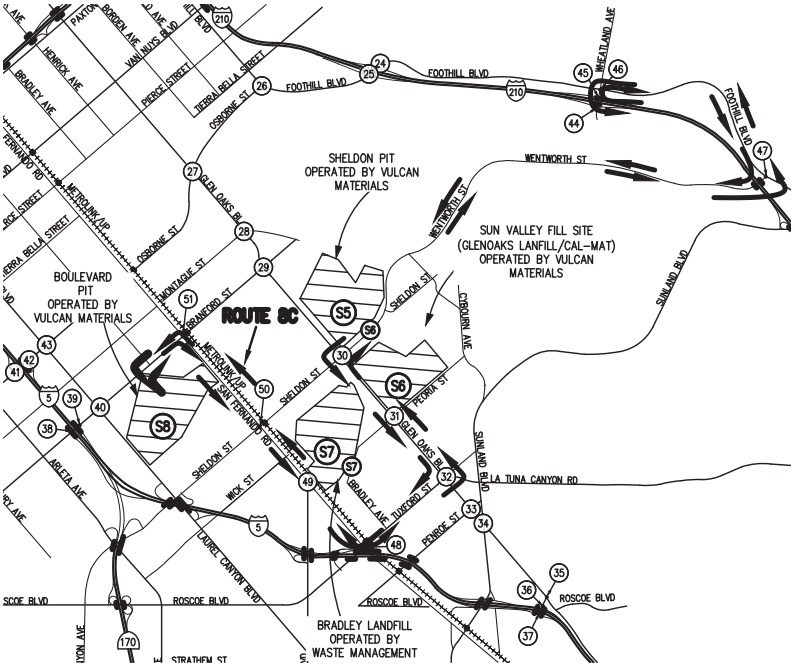

LEGEND

N/S STREET				S#		E/W STREET			
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS			7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					

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PCE PROJECT TRIPS – YEAR 2014

FIGURE 5-4-12C

DEVIL'S GATE DAM & RESERVOIR

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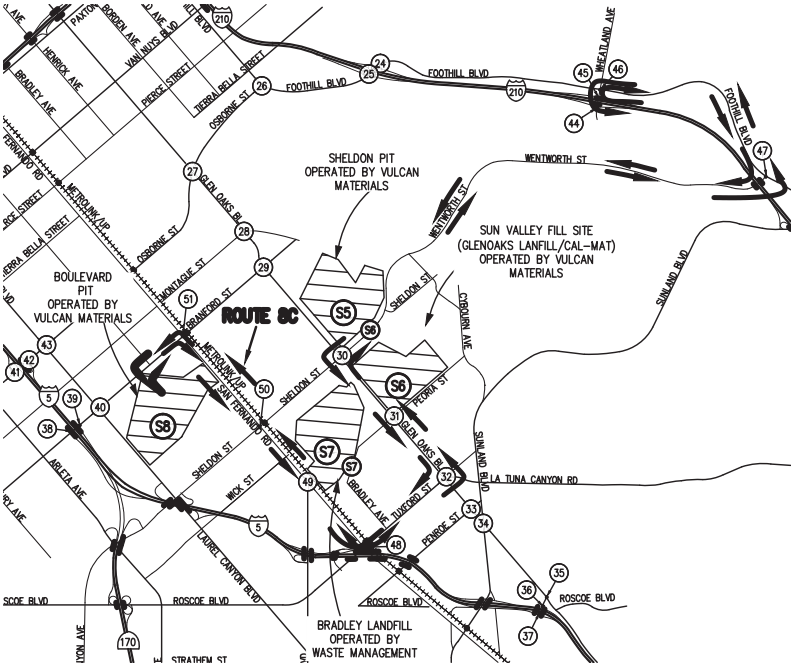
N/S STREET				32			E/W STREET			
GLEN OAKS BLVD							TUXFORD STREET			
				405	1220	110				
				375	495	115				
				250	611	132				
355	380	282						100	60	82
555	485	532		TS				670	490	362
60	85	91						35	35	61
				130	510	35				
				155	580	35				
				116	790	60				

N/S STREET				48			E/W STREET			
SAN FERNANDO ROAD							TUXFORD STREET			
				90	485	350				
				90	390	250				
				45	345	310				
75	115	40						295	285	345
710	555	740		TS				990	720	565
135	225	175						135	220	100
				345	340	70				
				370	305	175				
				380	655	80				

N/S STREET				49			E/W STREET			
SAN FERNANDO ROAD							LANKERSHIM BLVD			
				680	790	0				
				360	595	0				
				435	560	0				
320	365	680						0	0	0
0	0	0		TS				0	0	0
50	100	75						0	0	0
				70	480	0				
				85	515	0				
				115	860	0				

N/S STREET				50			E/W STREET			
SAN FERNANDO ROAD							SHELDON STREET			
				145	875	90				
				50	600	70				
				35	810	80				
80	65	135						75	60	110
415	400	610		TS				730	440	440
110	45	70						280	145	180
				65	490	130				
				65	570	105				
				125	1125	175				

N/S STREET				51			E/W STREET			
SAN FERNANDO ROAD							BRANFORD STREET			
				80	780	55				
				70	405	75				
				130	675	130				
45	50	130						25	60	115
360	240	535		TS				180	205	415
300	235	285						85	85	165
				240	275	125				
				235	415	115				
				365	920	155				



LEGEND

N/S STREET				S#			E/W STREET			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

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ROUTE 8C
PCE PROJECT TRIPS – YEAR 2014

DEVIL'S GATE DAM & RESERVOIR

FIGURE 5-4-12D

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Table 5-4-12
Intersection Capacity Analysis – Year 2014 Conditions (Route 8C)
Traffic Impact Analysis - Site 8

Route 8C		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
30	Glen Oaks Blvd and Sheldon Street	B	14.7	0.87	D	A	7.6	0.50	A	B	13.7	0.86	D
31	Glen Oaks Blvd and Peoria Street	A	6.6	0.59	A	A	9.0	0.39	A	B	16.9	0.53	A
32	Glen Oaks Blvd and Tuxford Street	D	40.1	1.10	E	A	8.9	0.63	B	B	11.1	0.81	C
44	Wheatland Ave and I-210 Freeway Eastbound Ramp	A	0	-	-	A	0	-	-	A	0	-	-
45	Wheatland Ave and I-210 Freeway Westbound Ramp	B	11.1	-	-	A	8.8	-	-	B	10.2	-	-
46	Wheatland Ave and Foothill Blvd	B	11.3	0.46	A	B	10.6	0.39	A	B	10	0.47	A
47	Wentworth Street and Foothill Blvd	C	28.4	0.88	A	B	10.4	0.45	A	A	9.7	0.48	A
48	Tuxford Street and San Fernando Road	D	40.1	0.80	C	C	34.7	0.80	B	C	34.8	0.75	C
49	Lankershim Blvd and San Fernando Road	A	8.6	0.57	A	A	7.8	0.47	A	A	9.6	0.55	A
50	Sheldon Street and San Fernando Road	C	34.8	0.80	C	C	24.3	0.54	A	E	58.1	1.03	E
51	Branford Street and San Fernando Road	D	38.0	0.89	B	C	30.7	0.51	A	F	84.0	0.99	D

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc.**

Haul Route 8C Analysis

As presented in *Table 5-4-12*, under the project conditions Year 2014 for Site 8 (Route 8C) most intersections are operating at an acceptable HCM LOS of D or better for the AM, Mid-day, and PM peak hours. Mitigation is recommended for Sheldon Street and San Fernando Road under project conditions and Branford Street and San Fernando Road under existing conditions.

In Summary, most of the intersections are expected to operate at an acceptable HCM LOS. Mitigation is required for intersection Berkshire Place and I-210 Freeway Westbound Ramps (Routes 1A, 1D) AM HCM LOS F (Routes 1E, 1G) AM peak hour HCM LOS E, Arrow Hwy and Lark Ellen Ave (Route 2B) anticipated AM and PM peak hours HCM LOS E, Azusa Ave and Arrow Hwy (Route 2B) anticipated AM, Mid-day, and PM peak hours HCM LOS E, Azusa Ave and Gladstone Street(Route 2B) anticipated AM peak hour HCM LOS E, First Street and Alameda Street/I-210 Freeway Westbound Ramps (Route 2B) anticipated AM peak hour HCM LOS E, Figueroa Street and SR-134 Freeway Westbound and Figureoa Street (Routes 4A) anticipated AM and PM peak hour HCM LOS E and (Routes 4B) anticipated AM peak hour HCM LOS E and PM peak hour HCM LOS F, Glenoaks Blvd and Osborne Street (Route 5A, 6A, 7A) anticipated AM peak hour HCM LOS F, Osborne Street and Laurel Canyon (Route 8B) anticipated PM peak hours HCM LOS E, Sheldon Street and San Fernando Road (Route 8C) with an anticipated PM peak hour HCM LOS E, and Branford Street and San Fernando Road (Route 8C) with an anticipated PM peak hour HCM LOS F. Improvements implemented during existing conditions and project conditions will mitigate issues increased by additional traffic.

Section 5: (Caltrans)

The Year 2014 AM (7-9), MID-DAY (12-2), and PM (4-6) freeway segment volumes are provided in *Figure 5-5-1* and *Figure 5-5-2*. Year 2014 AM (7-9), MID-DAY (12-2), and PM (4-6) ramp volumes are provided in *Figure 5-5-3* and *Figure 5-5-5*.

S1–EB I–210 FWY		S1–WB I–210 FWY	
SEGMENT BETWEEN BERKSHIRE PLACE AND WINDSOR AVE.		SEGMENT BETWEEN WINDSOR AVE AND BERKSHIRE PLACE.	
AM	6120→	AM	←3415
MID–DAY	3875→	MID–DAY	←2510
PM	4775→	PM	←4110

S2–EB I–210 FWY		S2–WB I–210 FWY	
SEGMENT BETWEEN WINDSOR AVE AND LINCOLN AVE.		SEGMENT BETWEEN LINCOLN AVE AND WINDSOR AVE.	
AM	6280→	AM	←4170
MID–DAY	4030→	MID–DAY	←4010
PM	4845→	PM	←6165

S3–EB I–210 FWY		S3–WB I–210 FWY	
SEGMENT BETWEEN MOUNTAIN ST AND SR–134/1–210 FWY INTERCHANGE.		SEGMENT BETWEEN SR–134/1–210 FWY INTERCHANGE AND MOUNTAIN ST.	
AM	6065→	AM	←5255
MID–DAY	3860→	MID–DAY	←4305
PM	4520→	PM	←6170

S4–EB SR–134 FWY		S4–WB SR–134 FWY	
SEGMENT BETWEEN FIGUEROA ST AND SAN RAFAEL AVE.		SEGMENT BETWEEN SAN RAFAEL AVE AND FIGUEROA ST.	
AM	6555→	AM	←8750
MID–DAY	6165→	MID–DAY	←6160
PM	7380→	PM	←8090

S5–EB SR–134 FWY		S5–WB SR–134 FWY	
SEGMENT BETWEEN SAN RAFAEL AVE AND SR–134/I–210 FWY INTERCHANGE.		SEGMENT BETWEEN SR–134/I–210 FWY INTERCHANGE AND SAN RAFAEL AVENUE.	
AM	8130→	AM	←8190*
MID–DAY	7275→	MID–DAY	←5735*
PM	8865→	PM	←7790*

S6–EB I–210 FWY		S6–WB I–210 FWY	
SEGMENT BETWEEN WB SR–134/EB I–210 FWY INTERCHANGE AND LAKE AVE.		SEGMENT BETWEEN LAKE AVE AND EB SR–134/WB I–210 FWY INTERCHANGE.	
AM	5625→	AM	←10635
MID–DAY	4565→	MID–DAY	←8140
PM	4765→	PM	←9205

S7–EB I–210 FWY		S7–WB I–210 FWY	
SEGMENT BETWEEN I–605 FREEWAY AND IRWINDALE AVE.		SEGMENT BETWEEN IRWINDALE AVE AND I–605 FREEWAY.	
AM	6060→	AM	←7755
MID–DAY	5720→	MID–DAY	←7490
PM	6170→	PM	←8245

S8–EB I–210 FWY		S8–WB I–210 FWY	
SEGMENT BETWEEN IRWINDALE AVE AND AZUSA AVE.		SEGMENT BETWEEN AZUSA AVE AND IRWINDALE AVE.	
AM	6835→	AM	←6765
MID–DAY	7310→	MID–DAY	←6680
PM	6880→	PM	←8550

S9–EB I–210 FWY		S9–WB I–210 FWY	
SEGMENT BETWEEN FOOTHILL BLVD AND BERKSHIRE PLACE.		SEGMENT BETWEEN BERKSHIRE PLACE AND FOOTHILL BLVD	
AM	6120*→	AM	←4090
MID–DAY	3930*→	MID–DAY	←4025
PM	4600*→	PM	←6335

S10–EB I–210 FWY		S10–WB I–210 FWY	
SEGMENT BETWEEN SR–2 FWY AND ANGELES CREST HWY.		SEGMENT BETWEEN ANGELES CREST HWY AND SR–2 FWY.	
AM	N/D→	AM	←3810
MID–DAY	N/D→	MID–DAY	←3650
PM	N/D→	PM	←6040

S11–NB SR–2 FWY		S11–SB SR–2 FWY	
SEGMENT BETWEEN MOUNTAIN ST AND I–210/SR–2 FWY INTERCHANGE.		SEGMENT BETWEEN I–210/SR–2 FWY INTERCHANGE AND MOUNTAIN ST.	
AM	2875→	AM	←6605
MID–DAY	5720→	MID–DAY	←2335
PM	6165→	PM	←3090

S12–NB SR–2 FWY		S12–SB SR–2 FWY	
SEGMENT BETWEEN SR–134/SR–2 FWY INTERCHANGE AND MOUNTAIN ST.		SEGMENT BETWEEN MOUNTAIN ST AND SR–134/SR–2 FWY INTERCHANGE.	
AM	N/D→	AM	←7110
MID–DAY	N/D→	MID–DAY	←2860
PM	N/D→	PM	←3575

S13–EB SR–134 FWY		S13–WB SR–134 FWY	
SEGMENT BETWEEN SR–2 FWY AND FIGUEROA ST.		SEGMENT BETWEEN FIGUEROA ST AND SR–2 FWY.	
AM	6625*→	AM	←6915
MID–DAY	6855*→	MID–DAY	←5540
PM	7575*→	PM	←6945

LEGEND

X%→ EXISTING VOLUMES
N/D→ NO DATA AVAILABLE
*→ CALCULATED VOLUME

S14–EB SR–134 FWY		S14–WB SR–134 FWY	
SEGMENT BETWEEN GLENDALE AVE AND SR–2 FWY.		SEGMENT BETWEEN SR–2 FWY AND GLENDALE AVE.	
AM	7125→	AM	←N/D
MID–DAY	7870→	MID–DAY	←N/D
PM	9245→	PM	←N/D

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PROJECT YEAR 2014 TRIPS FREEWAY SEGMENTS 1–14

DEVIL'S GATE DAM & RESERVOIR

FIGURE 5–5–1

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S15–EB SR–134 FWY		S15–WB SR–134 FWY	
SEGMENT BETWEEN SAN FERNANDO ST AND PACIFIC AVE.		SEGMENT BETWEEN PACIFIC AVE AND SAN FERNANDO ST.	
AM	7880→	AM	←9130
MID–DAY	7635→	MID–DAY	←6650
PM	8175→	PM	←7100

S16–EB SR–134 FWY		S16–WB SR–134 FWY	
SEGMENT BETWEEN SR–134/I–5 FWY INTERCHANGE AND SAN FERNANDO ST.		SEGMENT BETWEEN SAN FERNANDO ST. AND SR–134/I–5 FWY INTERCHANGE.	
AM	N/D→	AM	←6995
MID–DAY	N/D→	MID–DAY	←5500
PM	N/D→	PM	←9190

S17–SB I–5 FWY		S17–NB I–5 FWY	
SEGMENT BETWEEN WESTERN AVE AND I–5/SR–134 FWY INTERCHANGE.		SEGMENT BETWEEN I–5/SR–134 FWY INTERCHANGE AND WESTERN AVE.	
AM	7080→	AM	←N/D
MID–DAY	7785→	MID–DAY	←N/D
PM	7675→	PM	←N/D

S18–SB I–5 FWY		S18–NB I–5 FWY	
SEGMENT BETWEEN ROSCOE BLVD/GLEN OAKS BLVD AND N. HOLLYWOOD WAY.		SEGMENT BETWEEN N. HOLLYWOOD WAY AND ROSCOE BLVD/GLEN OAKS BLVD.	
AM	6580→	AM	←6035
MID–DAY	5455→	MID–DAY	←6625
PM	5090→	PM	←7210

S19–SB I–5 FWY		S19–NB I–5 FWY	
SEGMENT BETWEEN I–5/SR–170 FWY INTERCHANGE AND SHELDON ST.		SEGMENT BETWEEN SHELDON ST AND I–5/SR–170 FWY INTERCHANGE.	
AM	N/D→	AM	←5445
MID–DAY	N/D→	MID–DAY	←5985
PM	N/D→	PM	←5235

S20–SB I–5 FWY		S20–NB I–5 FWY	
SEGMENT BETWEEN BRANFORD ST. AND I–5/SR–170 FWY INTERCHANGE		SEGMENT BETWEEN I–5/SR–170 FWY INTERCHANGE AND BRANFORD ST.	
AM	13780→	AM	←N/D
MID–DAY	9230→	MID–DAY	←N/D
PM	10125→	PM	←N/D

S21–EB I–210 FWY		S21–WB I–210 FWY	
SEGMENT BETWEEN MONTROSE AVE AND EB–210/SR–2 FWY INTERCHANGE.		SEGMENT BETWEEN EB–210/SR–2 FWY INTERCHANGE AND MONTROSE AVE.	
AM	N/D→	AM	←N/D
MID–DAY	N/D→	MID–DAY	←N/D
PM	N/D→	PM	←N/D

S22–EB I–210 FWY		S22–WB I–210 FWY	
SEGMENT BETWEEN WHEATLAND AVE AND SUNLAND AVE.		SEGMENT BETWEEN SUNLAND AVE AVE WHEATLAND AVE.	
AM	5210→	AM	←N/D
MID–DAY	2960→	MID–DAY	←N/D
PM	4030→	PM	←N/D

S23–EB I–210 FWY		S23–WB I–210 FWY	
SEGMENT BETWEEN FOOTHILL BLVD AND WHEATLAND AVE.		SEGMENT BETWEEN WHEATLAND AVE AND FOOTHILL BLVD.	
AM	4850→	AM	←4495
MID–DAY	3790→	MID–DAY	←3845
PM	5335→	PM	←7340

S24–EB I–210 FWY		S24–WB I–210 FWY	
SEGMENT BETWEEN SR–118/I–210 FWY INTERCHANGE AND FOOTHILL BLVD		SEGMENT BETWEEN FOOTHILL BLVD AND SR–118/I–210 FWY INTERCHANGE.	
AM	N/D→	AM	←4445
MID–DAY	N/D→	MID–DAY	←3680
PM	N/D→	PM	←6200

S25–EB SR–118 FWY		S25–WB SR–118 FWY	
SEGMENT BETWEEN GLEN OAKS BLVD AND SR–118/I–210 FWY INTERCHANGE.		SEGMENT BETWEEN SR–118/I–210 FWY INTERCHANGE AND GLEN OAKS BLVD.	
AM	N/D→	AM	←N/D
MID–DAY	N/D→	MID–DAY	←N/D
PM	N/D→	PM	←N/D

S26–EB SR–118 FWY		S26–WB SR–118 FWY	
SEGMENT BETWEEN SR–118/I–5 FWY INTERCHANGE AND SAN FERNANDO RD.		SEGMENT BETWEEN SAN FERNANDO RD AND SR–118/I–5 FWY INTERCHANGE.	
AM	N/D→	AM	←6825
MID–DAY	N/D→	MID–DAY	←3920
PM	N/D→	PM	←6250

S27–SB I–5 FWY		S27–NB I–5 FWY	
SEGMENT BETWEEN I–5/ SR–118 FWY INTERCHANGE AND VAN NUYS BLVD.		SEGMENT BETWEEN VAN NUYS BLVD AND I–5/ SR–118 FWY INTERCHANGE.	
AM	9935→	AM	←8755
MID–DAY	7795→	MID–DAY	←9140
PM	8565→	PM	←9320

LEGEND

X%→ EXISTING VOLUMES
N/D→ NO DATA AVAILABLE
*→ CALCULATED VOLUME

S28–SB I–5 FWY		S28–NB I–5 FWY	
SEGMENT BETWEEN VAN NUYS BLVD AND OSBORNE ST.		SEGMENT BETWEEN OSBORNE ST AND VAN NUYS BLVD.	
AM	N/D→	AM	←N/D
MID–DAY	N/D→	MID–DAY	←N/D
PM	N/D→	PM	←N/D

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PROJECT YEAR 2014 TRIPS FREEWAY SEGMENTS 15–28

DEVIL'S GATE DAM & RESERVOIR

FIGURE 5–5–2

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R1–EB 210 FREEWAY	
DIVERGE POINT	
BERKSHIRE PLACE OFF–RAMP	
AM	500→
MID–DAY	220→
PM	335→

R2–WB 210 FREEWAY	
MERGE POINT	
BERKSHIRE PLACE ON–RAMP	
AM	←430
MID–DAY	←290
PM	←570

R3–EB 210 FREEWAY	
MERGE POINT	
BERKSHIRE PLACE ON–RAMP	
AM	340→
MID–DAY	195→
PM	490→

R4–WB 210 FREEWAY	
DIVERGE POINT	
BERKSHIRE PLACE OFF–RAMP	
AM	←420
MID–DAY	←190
PM	←245

R5–EB 210 FREEWAY	
DIVERGE POINT	
WINDSOR AVENUE OFF–RAMP	
AM	770→
MID–DAY	465→
PM	820→

R6–WB 210 FREEWAY	
MERGE POINT	
WINDSOR AVENUE ON–RAMP	
AM	←675
MID–DAY	←410
PM	←650

R7–EB 210 FREEWAY	
MERGE POINT	
WINDSOR AVENUE ON–RAMP	
AM	525→
MID–DAY	390→
PM	520→

R8–WB 210 FREEWAY	
DIVERGE POINT	
WINDSOR AVENUE OFF–RAMP	
AM	←680
MID–DAY	←270
PM	←525

R9–EB 210 FREEWAY	
DIVERGE POINT	
EB I–210 FREEWAY AND WB SR–134 FREEWAY TRANSITION/OFF–RAMP	
AM	N/D→
MID–DAY	N/D→
PM	N/D→

R10–WB 210 FREEWAY	
MERGE POINT	
WB I–210 FREEWAY AND EB SR–134 FREEWAY TRANSITION/ ON–RAMP	
AM	←N/D
MID–DAY	←N/D
PM	←N/D

R11–WB 134 FREEWAY	
MERGE POINT	
WB I–210 FREEWAY TRANSITION/ ON–RAMP	
AM	←N/D
MID–DAY	←N/D
PM	←N/D

R12–EB 134 FREEWAY	
DIVERGE POINT	
EB I–210 FREEWAY TRANSITION/ OFF–RAMP	
AM	N/D→
MID–DAY	N/D→
PM	N/D→

R13–WB 134 FREEWAY	
DIVERGE POINT	
FIGUEROA ST/ SCHOLL CANYON RD OFF–RAMP	
AM	←N/D
MID–DAY	←N/D
PM	←N/D

R14–EB 210 FREEWAY	
MERGE POINT	
FIGUEROA ST/ SCHOLL CANYON RD ON–RAMP	
AM	415→
MID–DAY	365→
PM	400→

R15–EB 210 FREEWAY	
MERGE POINT	
EB I–210 FREEWAY TRANSITION/ ON–RAMP	
AM	N/D→
MID–DAY	N/D→
PM	N/D→

R16–WB 210 FREEWAY	
DIVERGE POINT	
WB I–210 FREEWAY TRANSITION/ OFF–RAMP	
AM	←N/D
MID–DAY	←N/D
PM	←N/D

R17–EB 210 FREEWAY	
DIVERGE POINT	
IRWINDALE AVENUE OFF–RAMP	
AM	1270→
MID–DAY	1095→
PM	885→

R18–WB 210 FREEWAY	
MERGE POINT	
IRWINDALE AVENUE ON–RAMP	
AM	←690
MID–DAY	←510
PM	←570

R19–WB 210 FREEWAY	
MERGE POINT	
IRWINDALE AVENUE SLIP ON–RAMP	
AM	← 715
MID–DAY	←645
PM	←570

R20–WB 210 FREEWAY	
MERGE POINT	
AZUSA AVENUE/FIRST STREET ON–RAMP	
AM	←995
MID–DAY	←440
PM	←485

R21–WB 210 FREEWAY	
DIVERGE POINT	
SB SR–2 FREEWAY TRANSITION/ OFF–RAMP	
AM	←1670
MID–DAY	←770
PM	←1000

R22–EB 210 FREEWAY	
MERGE POINT	
NB SR–2 FREEWAY TRANSITION/ ON–RAMP	
AM	620→
MID–DAY	660→
PM	905→

R23–SB 2 FREEWAY	
MERGE POINT	
WB I–210 FREEWAY TRANSITION/ ON–RAMP	
AM	←1670
MID–DAY	←770
PM	←1000

R24–NB 2 FREEWAY	
DIVERGE POINT	
EB I–210 FREEWAY TRANSITION/ OFF–RAMP	
AM	620→
MID–DAY	660→
PM	905→

R25–SB 2 FREEWAY	
DIVERGE POINT	
EB SR–134 FREEWAY TRANSITION/ OFF–RAMP	
AM	N/D→
MID–DAY	N/D→
PM	N/D→

R26–NB 2 FREEWAY	
MERGE POINT	
WB AND EB SR–134 FREEWAY TRANSITION/ ON–RAMP	
AM	←2230
MID–DAY	←2515
PM	←3515

R27–EB 134 FREEWAY	
MERGE POINT	
SB SR–2 FREEWAY TRANSITION/ ON–RAMP	
AM	N/D→
MID–DAY	N/D→
PM	N/D→

R28–WB 134 FREEWAY	
DIVERGE POINT	
NB SR–2 FREEWAY TRANSITION/ OFF–RAMP	
AM	←1215
MID–DAY	←855
PM	←1335

R29–EB 134 FREEWAY	
DIVERGE POINT	
FIGUEROA ST/SCHOLL CANYON RD OFF–RAMP	
AM	490→
MID–DAY	390→
PM	605→

LEGEND

XXX→ EXISTING VOLUMES
N/D→ NO DATA AVAILABLE
*→ CALCULATED VOLUME

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PROJECT YEAR 2014 TRIPS
RAMPS 1–29
DEVIL'S GATE DAM & RESERVOIR

FIGURE
5–5–3

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R30–WB 134 FREEWAY	
MERGE POINT	
FIGUEROA ST/SCHOLL CANYON RD ON–RAMP	
AM	N/D→
MID–DAY	N/D→
PM	N/D→

R31–WB 134 FREEWAY	
MERGE POINT	
SB SR–2 FREEWAY TRANSITION/ON–RAMP	
AM	N/D→
MID–DAY	N/D→
PM	N/D→

R32–EB 134 FREEWAY	
DIVERGE POINT	
NB SR–2 FREEWAY TRANSITION/ OFF–RAMP	
AM	2230→
MID–DAY	2515→
PM	3515→

R33–WB 134 FREEWAY	
DIVERGE POINT	
NB I–5 FREEWAY TRANSITION/ OFF–RAMP	
AM	←3190
MID–DAY	←2910
PM	←3055

R34–EB 134 FREEWAY	
MERGE POINT	
SB I–5 FREEWAY TRANSITION/ ON–RAMP	
AM	3180→
MID–DAY	2915→
PM	3305→

R35–NB 5 FREEWAY	
MERGE POINT	
WB SR–134 FREEWAY TRANSITION/ ON–RAMP	
AM	←3210
MID–DAY	←2765
PM	←3055

R36–SB 5 FREEWAY	
DIVERGE POINT	
EB SR–134 FREEWAY TRANSITION/ OFF–RAMP	
AM	N/D→
MID–DAY	N/D→
PM	N/D→

R37–NB 5 FREEWAY	
DIVERGE POINT	
ROSCOE BLVD/GLEN OAKS BLVD OFF–RAMP	
AM	←360
MID–DAY	←370
PM	←630

R38–SB 5 FREEWAY	
MERGE POINT	
ROSCOE BLVD/GLEN OAKS BLVD ON–RAMP	
AM	705→
MID–DAY	455→
PM	490→

R39–SB 5 FREEWAY	
MERGE POINT	
BRANFORD STREET ON–RAMP	
AM	N/D→
MID–DAY	N/D→
PM	N/D→

R40–NB 5 FREEWAY	
DIVERGE POINT	
BRANFORD STREET OFF–RAMP	
AM	←N/D
MID–DAY	←N/D
PM	←N/D

R41–WB 210 FREEWAY	
DIVERGE POINT	
WHEATLAND AVE OFF–RAMP	
AM	←125
MID–DAY	←120
PM	←170

R42–EB 210 FREEWAY	
MERGE POINT	
WHEATLAND AVE ON–RAMP	
AM	185→
MID–DAY	120→
PM	150→

R43–WB 210 FREEWAY	
DIVERGE POINT	
FOOTHILL BLVD/ OSBORNE STREET OFF–RAMP	
AM	←300
MID–DAY	←215
PM	←400

R44–EB 210 FREEWAY	
MERGE POINT	
FOOTHILL BLVD/ OSBORNE STREET ON–RAMP	
AM	580→
MID–DAY	305→
PM	370→

R45–WB 210 FREEWAY	
DIVERGE POINT	
WB SR–118 FREEWAY TRANSITION/ OFF–RAMP	
AM	←N/D
MID–DAY	←N/D
PM	←N/D

R46–EB 210 FREEWAY	
MERGE POINT	
EB SR–118 FREEWAY TRANSITION/ ON–RAMP	
AM	N/D→
MID–DAY	N/D→
PM	N/D→

R47–WB 118 FREEWAY	
MERGE POINT	
WB I–210 FREEWAY TRANSITION/ ON–RAMP	
AM	←N/D
MID–DAY	←N/D
PM	←N/D

R48–EB 118 FREEWAY	
DIVERGE POINT	
EB I–210 FREEWAY TRANSITION/ OFF–RAMP	
AM	N/D→
MID–DAY	N/D→
PM	N/D→

R49–WB 118 FREEWAY	
DIVERGE POINT	
SB 1–5 FREEWAY TRANSITION/ OFF–RAMP	
AM	←N/D
MID–DAY	←N/D
PM	←N/D

R50–EB 118 FREEWAY	
MERGE POINT	
NB I–5 FREEWAY TRANSITION/ON–RAMP	
AM	N/D→
MID–DAY	N/D→
PM	N/D→

R51–SB 5 FREEWAY	
MERGE POINT	
WB SR–118 FREEWAY TRANSITION/ON–RAMP	
AM	N/D→
MID–DAY	N/D→
PM	N/D→

R52–NB 5 FREEWAY	
DIVERGE POINT	
EB SR–118 FREEWAY TRANSITION/ OFF–RAMP	
AM	←N/D
MID–DAY	←N/D
PM	←N/D

R53–SB 5 FREEWAY	
MERGE POINT	
OSBORNE STREET ON–RAMP	
AM	435→
MID–DAY	880→
PM	1235→

R54–NB 5 FREEWAY	
DIVERGE POINT	
OSBORNE STREET OFF–RAMP	
AM	←495
MID–DAY	←620
PM	←720

LEGEND

XXX→ EXISTING VOLUMES
N/D→ NO DATA AVAILABLE
*→ CALCULATED VOLUME

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PROJECT YEAR 2014 TRIPS RAMPS 30–54

DEVIL'S GATE DAM & RESERVOIR

FIGURE 5–5–4

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Year 2014 Freeway Mainline HCM Analysis

Freeway mainline capacity analyses were conducted for the 28 freeway segments identified utilizing the methods as discussed previously and using the existing geometrics. The resulting HCM LOS for the existing conditions of each freeway segment analyzed is presented in *Table 5-5-1*.

Table 5-5-1
Freeway Mainline Capacity Analysis – Year 2014 Conditions
Traffic Impact Analysis

Segment/Freeway Name		AM		MID-DAY		PM	
		Density	LOS	Density	LOS	Density	LOS
1	I-210 WB between Windsor Ave/Arroyo Blvd and Berkshire Place	13.3	B	9.9	A	16.4	B
2	I-210 EB between Windsor Ave/Arroyo Blvd and Berkshire Place	21.4	C	14.9	B	18.1	C
3	I-210 WB between Lincoln Avenue and Windsor Ave/Arroyo Blvd.	15.7	B	15.5	B	24.8	C
4	I-210 EB between Lincoln Avenue and Windsor Ave/Arroyo Blvd.	23.8	C	14.5	B	17.5	B
5	I-210 WB between the SR-134 Fwy and Mountain Street.	15.0	B	12.8	B	18.2	C
6	I-210 EB between the SR-134 Fwy and Mountain Street.	23.3	C	14.4	B	16.6	B
7	SR-134 WB between San Rafael Ave and Figueroa Street	28.3	D	18.1	C	25.4	C
8	SR-134 EB between San Rafael Ave and Figueroa Street	18.9	C	17.6	B	21.8	C
9	SR-134 WB between the I-210 Fwy and San Rafael Ave.	26.9	D	17.2	B	25.0	C
10	SR-134 EB between the I-210 Fwy and San Rafael Ave.	24.8	C	21.4	C	28.2	D
11	I-210 WB between the SR-134 Fwy and Lake Ave.	39.8	E	26.3	D	33.0	D
12	I-210 EB between the SR-134 Fwy and Lake Ave.	36.3	E	38.1	E	41.1	E
13	I-210 WB between the I-605 Fwy and Irwindale Avenue.	23.9	C	22.8	C	26.4	D
14	I-210 EB between the I-605 Fwy and Irwindale Avenue.	17.5	B	16.6	B	18.0+	C
15	I-210 WB between Irwindale Avenue and Azusa Avenue.	22.2	C	21.8	C	31.3	D
16	I-210 EB between Irwindale Avenue and Azusa Avenue.	20.3	C	22.1	C	20.9	C
17	I-210 WB between Berkshire Place and Foothill Blvd.	15.3	B	15.5	B	25.4	C
18	I-210 EB between Berkshire Place and Foothill Blvd.	24.4	C	14.6	B	17.2	B
19	I-210 WB between Angeles Crest Hwy (SR-2 Hwy) and the SR-2 Fwy (Glendale Fwy)	13.8	B	13.6	B	23.2	C
20	I-210 EB between Angeles Crest Hwy (SR-2 Hwy) and the SR-2 Fwy (Glendale Fwy)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
21	SR-2 NB between the I-210 Fwy and Mountain Street.	8.6	A	17.1	B	18.6	C
22	SR-2 SB between the I-210 Fwy and Mountain Street.	27.3	D	8.7	A	11.5	B
23	SR-2 NB between Mountain Street and the SR-134 Fwy.	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
24	SR-2 SB between Mountain Street and the SR-134 Fwy.	30.6	D	10.6	A	13.2	B

Table 5-5-1 -Continued-
Freeway Mainline Capacity Analysis – Year 2014 Conditions
Traffic Impact Analysis

	Segment/Freeway Name	AM		MID-DAY		PM	
		Density	LOS	Density	LOS	Density	LOS
25	SR-134 WB between the SR-2 Fwy and Figueroa Street.	20.4	C	15.9	B	20.5	C
26	SR-134 EB between the SR-2 Fwy and Figueroa Street.	20.3	C	21.2	C	24.1	C
27	SR-134 WB between the SR-2 Fwy and Glendale Avenue.	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
28	SR-134 EB between the SR-2 Fwy and Glendale Avenue.	22.2	C	25.4	C	32.7	D
29	SR-134 WB between San Fernando Street and Pacific Ave.	32.0	D	20.4	C	22.1	C
30	SR-134 EB between San Fernando Street and Pacific Ave.	36.8	E	34.7	D	39.7	E
31	SR-134 WB between San Fernando Street and the I-5 Freeway.	29.8	D	21.2	C	52.7	F
32	SR-134 EB between San Fernando Street and the I-5 Freeway.	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
33	I-5 SB between the SR-134 Fwy and Western Avenue.	30.1	D	36.7	E	35.3	E
34	I-5 NB between the SR-134 Fwy and Western Avenue.	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
35	I-5 NB between North Hollywood Way and Roscoe Blvd/Glenoaks Blvd.	23.0	C	26.2	D	29.6	D
36	I-5 SB between North Hollywood Way and Roscoe Blvd/Glenoaks Blvd.	27.1	D	21.0	C	19.3	C
37	I-5 SB between Sheldon Street/Laurel Canyon Blvd and the SR-170 Fwy	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
38	I-5 NB between Sheldon Street/Laurel Canyon Blvd and the SR-170 Fwy.	21.0	C	23.5	C	19.3	C
39	I-5 SB between the SR-170 Fwy and Branford Street.	-	F	49.4	F	64.2	F
40	I-5 NB between the SR-170 Fwy and Branford Street.	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
41	I-210WB between the SR-2 Fwy and Montrose Avenue.	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
42	I-210EB between the SR-2 Fwy and Montrose Avenue.	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
43	I-210 WB between Wheatland Ave and Sunland Blvd.	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
44	I-210 EB between Wheatland Ave and Sunland Blvd.	19.1	C	11.2	B	15.5	B
45	I-210 WB between Wheatland Ave and Foothill Blvd/Osborne Street.	16.2	B	14.2	B	30.5	D
46	I-210 EB between Wheatland Ave and Foothill Blvd/Osborne Street.	18.2	C	14.1	B	20.8	C
47	I-210 WB between Foothill Blvd/Osborne Street and the SR-118 Fwy.	16.7	B	13.7	B	25.0	C
48	I-210 EB between Foothill Blvd/Osborne Street and the SR-118 Fwy.	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
49	SR-118WB between the I-210 Fwy and Glenoaks Blvd.	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
50	SR-118EB between the I-210 Fwy and Glenoaks Blvd.	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*

Table 5-5-1 -Continued-
Freeway Mainline Capacity Analysis – Year 2014 Conditions
Traffic Impact Analysis

	Segment/Freeway Name	AM		MID-DAY		PM	
		Density	LOS	Density	LOS	Density	LOS
51	SR-118 WB between San Fernando Rd and the I-210 Fwy.	51.3	F	19.9	C	41.4	E
52	SR-118 EB between San Fernando Rd and the I-210 Fwy.	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
53	I-5 NB between the SR-118 Fwy and Van Nuys Blvd.	42.4	E	47.5	F	50.0	F
54	I-5 SB between the SR-118 Fwy and Van Nuys Blvd.	27.2	D	19.8	C	22.3	C
55	I-5 NB between Tierra Bella Street and Osborne Street.	47.0	F	53.4	F	54.2	F
56	I-5 SB between Tierra Bella Street and Osborne Street.	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*

(1) Density – (pc/mi/ln)
(2) HCM LOS - Highway Capacity Manual Level of Service
(N/D*)- No Data
Source: **Hall & Foreman Inc**

As presented in *Table 5-5-1*, under project conditions some of the freeway segments are expected to continue to operate and acceptable HCM LOS during the AM, MID-DAY, and PM peak hours. Mitigation is recommended for I-210 WB between the SR-134 Fwy and Lake Ave (Haul Routes 2A, 2B, 3, 4A, 4C) anticipated AM peak hour HCM LOS E, I-210 EB between the SR-134 Fwy and Lake Ave (Haul Routes 2A, 2B, 3, 4A, 4C) anticipated AM, MID-DAY, and PM peak hours HCM LOS E, SR-134 EB between San Fernando Street and Pacific Ave (Haul Routes 5B, 6B, 7B, 8A) anticipated AM and PM peak hours HCM LOS E, and I-5 SB between the SR-134 Fwy and Western Avenue anticipated MID-DAY and PM peak hours HCM LOS E.
As identified in existing conditions the following segments are anticipated to continue to operating at a level-of-service E or lower. The identified segments were SR-134 Westbound between San Fernando road and the I-5 Freeway (Haul Routes 5B, 6B, 7B, and 8A) anticipated AM, MID-DAY, and PM peak hours HCM LOS E, I-5 Southbound between SR-170 and Branford (Haul Route 8A) anticipated AM, MID-DAY, and PM peak hours HCM LOS E, SR-118 Westbound Freeway between San Fernando road and the I-210 Freeway (Haul Route 8B) anticipated AM peak hour HCM LOS F and anticipated PM peak hour HCM LOS E, I-5 Northbound between the SR-118 Westbound Freeway and Van Nuys Blvd (Haul Route 8B) anticipated AM peak hour HCM LOS E and anticipated MID-DAY and PM peak hours HCM LOS F, and lastly I-5 Northbound between Tierra Bella Street and Osborne Street (Haul Route 8B) anticipated AM, MID-DAY and PM peak hours HCM LOS F. Mitigation will be required to improve the HCM LOS for these freeway segments. Per CalTrans criteria these segments will need to be identified for roadway improvements to obtain acceptable HCM LOS.

Year 2014 Freeway Ramp HCM Analysis

Freeway ramp analyses was conducted for the 54 on and off-ramps identified utilizing the methods as discussed previously and using the existing geometrics The resulting LOS for the existing conditions of each ramp analyzed is presented in *Table 5-5-2*.

Table 5-5-2
Freeway Ramp Analysis – Year 2014 Conditions
Traffic Impact Analysis

Intersection # / Routes / Name			AM		MID-DAY		PM	
			Density	LOS	Density	LOS	Density	LOS
1	1E, 1G	Berkshire Place and the Eastbound I-210 Freeway Off-ramp. (Diverge Point)	20.3	C	10.5	B	14.4	B
2	1E, 1H	Berkshire Place and the Westbound I-210 Freeway On-ramp.(Merge Point)	14.9	B	14.7	B	24.1	C
3	1A, 1C	Berkshire Place and the Eastbound I-210 Freeway On-ramp. (Merge Point)	27.7	C	20.6	C	25.2	C
4	1A, 1D	Berkshire Place and the Westbound I-210 Freeway Off-ramp. (Diverge Point)	23.7	C	22.7	C	31.9	D
5	1F, 1H	Windsor Ave/Arroyo Blvd and the Eastbound I-210 Freeway Off-ramp. (Diverge Point)	33.4	D	23.1	C	28.0-	C
6	1F, 1G	Windsor Ave/Arroyo Blvd and the Westbound I-210 Freeway On-Ramp. (Merge Point)	23.3	C	18.2	B	25.6	C
7	1B, 1C	Windsor Ave/Arroyo Blvd and the Eastbound I-210 Freeway On-Ramp. (Merge Point)	19.1	B	11.8	B	14.2	B
8	1B, 1D	Windsor Ave/Arroyo Blvd and the Westbound I-210 Freeway Off-ramp. (Diverge Point)	11.1	B	5.2	A	13.3	B
9	4A	Southbound I-210 Fwy Transition Ramp to the Westbound SR-134 Fwy mainline and Eastbound I-210 Fwy mainline. (Diverge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
10	2A, 2B,3	Westbound I-210 Fwy and Eastbound SR-134 Fwy Transition Ramp to the Westbound I-210 Fwy mainline. (Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
11	2B	Westbound I-210 Fwy Transition Ramp to the Westbound SR-134 Fwy mainline. (Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
12	2B	Eastbound SR-134 Fwy Transition Ramp to the Eastbound I-210 Fwy mainline. (Diverge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
13	4A	Figueroa St/Scholl Canyon Road and the Westbound SR-134 Freeway Off-ramp. (Diverge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
14	4A	Figueroa St and the Eastbound SR-134 Freeway Eastbound On-ramp. (Merge Point)	30.1	D	28.7	D	32.5	D
15	2A, 3	Eastbound I-210 Fwy Transition Ramp to the Eastbound I-210 Fwy mainline.(Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
16	2A, 3	Westbound I-210 Fwy Transition Ramp to the Westbound I-210 Fwy mainline. (Diverge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
17	2A, 2B, 3,9	Irwindale Ave and the Eastbound I-210 Freeway Off-ramp. (Diverge Point)	0.6	A	0.8	A	2.0	A
18	2A,3	Irwindale Ave and the Westbound loop I-210 Freeway On-ramp. (Merge Point)	20.5	C	18.6	B	21.0	C
19	9	Irwindale Ave and the Westbound slip I-210 Freeway On-ramp. (Merge Point)	22.6	C	20.4	C	22.7	C
20	2B	First Street/Azusa Avenue and the Westbound I-210 Freeway On-ramp. (Merge Point)	23.9	C	19.4	B	25.6	C

Table 5-5-2 -Continued-
Freeway Ramp Analysis – Year 2014 Conditions
Traffic Impact Analysis

Intersection # / Routes / Name			AM		MID-DAY		PM	
			Density	LOS	Density	LOS	Density	LOS
21	2B, 4B,5B, 6B, 7B, 8A	Westbound I-210 Fwy Transition Ramp to the Southbound SR-2 Fwy mainline. (Diverge Point)	12.3	A	18.7	A	11.0	A
22	2B, 4B,5B, 6B, 7B, 8A	Northbound SR-2 Fwy Transition Ramp to the Eastbound I-210 Fwy mainline. (Merge Point)	23.9	C	22.8	C	24.3	C
23	2B, 4B,5B, 6B, 7B, 8A	Westbound I-210 Fwy Transition Ramp to the Southbound SR-2 Fwy mainline. (Merge Point)	25.1	F	1.2	A	5.6	A
24	2B, 4B,5B, 6B, 7B, 8A	Northbound SR-2 Fwy Transition Ramp to the Eastbound I-210 Fwy mainline. (Diverge Point)	21.0	C	14.7	B	18.9	B
25	2B, 4B	Southbound SR-2 Fwy Transition Ramp to the Eastbound SR-134 Fwy mainline. (Diverge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
26	2B, 4B,5B, 6B, 7B, 8A	Westbound and Eastbound SR-134 Fwy Transition Ramp to the Northbound SR-2 Fwy mainline. (Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
27	2B, 4B	Southbound SR-2 Fwy Transition Ramp to the Eastbound SR-134 Fwy mainline. (Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
28	2B,4B	Westbound SR-134 Fwy Transition Ramp to the Northbound SR-2 Fwy mainline. (Diverge Point)	26.7	C	22.4	C	28.0+	D
29	4B	Figueroa Street and the Eastbound SR-134 Fwy Off-ramp. (Diverge Point)	28.7	D	28.3	D	32.1	D
30	4B	Figueroa Street and the Westbound SR-134 Fwy On-ramp. (Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
31	5B, 6B, 7B,8A	Southbound SR-2 Fwy Transition Ramp to the Westbound SR-134 Fwy mainline. (Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
32	5B, 6B, 7B,8A	Eastbound SR-134 Fwy Transition Ramp to the Northbound SR-2 Fwy mainline. (Diverge Point)	12.1	B	14.9	B	23.8	C
33	5B, 6B, 7B,8A	Westbound SR-134 Fwy Transition Ramp to the Northbound I-5 Fwy mainline. (Diverge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
34	5B,6B, 7B,8A	Southbound I-5 Fwy Transition Ramp to the Eastbound SR-134 Fwy mainline. (Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
35	5B,6B, 7B,8A	Westbound SR-134 Fwy Transition Ramp to the Northbound I-5 Fwy mainline. (Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
36	5B, 6B, 7B, 8A	Southbound I-5 Fwy Transition Ramp to the Eastbound SR-134 Fwy mainline. (Diverge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
37	5B, 6B, 7B	Roscoe Blvd/Glenoaks Blvd and the Northbound I-5 Fwy mainline Off-ramp. (Diverge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
38	5B, 6B, 7B	Roscoe Blvd/Glenoaks Blvd and the Southbound I-5 Fwy mainline On-ramp. (Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
39	8A	Branford Street and the Southbound I-5 Fwy mainline On-ramp. (Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*

Table 5-5-2 -Continued-
Freeway Ramp Analysis – Year 2014 Conditions
Traffic Impact Analysis

Intersection # / Routes / Name			AM		MID-DAY		PM	
			Density	LOS	Density	LOS	Density	LOS
40	8A	Branford Street and the Northbound I-5 Fwy mainline Off-ramp. (Diverge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
41	5C, 6C, 7C, 8C	Wheatland Avenue and the Westbound I-210 Fwy mainline Off-Ramp. (Diverge Point)	24.5	C	20.9	C	32.4	D
42	5C, 6C, 7C, 8C	Wheatland Avenue and the Eastbound I-210 Fwy mainline On-Ramp. (Merge Point)	25.4	C	20.1	C	25.5	C
43	5A, 6A, 7A	Foothill Blvd/Osborne Street and the Westbound I-210 Fwy mainline Off-ramp. (Diverge Point)	23.1	C	21.0	C	34.8	D
44	5A, 6A, 7A	Foothill Blvd/Osborne Street and the Eastbound I-210 Fwy mainline On-ramp. (Merge Point)	25.1	C	16.8	B	20.7	C
45	8B	Westbound I-210 Fwy Transition Ramp to the Westbound SR-118 Fwy mainline. (Diverge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
46	8B	Eastbound SR-118 Fwy Transition Ramp to the Eastbound I-210 Fwy mainline. (Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
47	8B	Westbound I-210 Fwy Transition Ramp to the Westbound SR-118 Fwy mainline. (Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
48	8B	Eastbound SR-118 Fwy Transition Ramp to the -Eastbound I-210 Fwy mainline. (Diverge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
49	8B	Westbound SR-118 Fwy Transition Ramp to the Southbound I-5 Fwy mainline. (Diverge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
50	8B	Northbound I-5 Fwy Transition Ramp to the Eastbound SR-118 Fwy mainline. (Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
51	8B	Westbound SR-118 Fwy Transition Ramp to the Southbound I-5 Fwy mainline. (Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
52	8B	Northbound I-5 Fwy Transition Ramp to the Eastbound SR-118 Fwy mainline (Diverge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
53	8B	Osborne Street and the Southbound I-5 Fwy mainline On-ramp. (Merge Point)	28.7	F	19.1	B	24.4	C
54	8B	Osborne Street and the Northbound I-5 Fwy mainline Off-ramp. (Diverge Point)	32.1	D	34.8	D	34.9	D

(1) Density – Highway Capacity Manual (pc/mi/ln)
(2) LOS - Highway Capacity Manual Level of Service
(N/D*)- No Data

Source: **Hall & Foreman Inc**

As presented in *Table 5-5-2*, under the project conditions year 2014 most ramps are anticipated to continue to operate at an acceptable HCM LOS throughout the day. Mitigation will be required for the Westbound I-210 Fwy Transition Ramp to the Southbound SR-2 Fwy mainline (Routes 4B, 5B, 6B, 7B, 8A) anticipated AM peak hour HCM LOS F, and as previously noted the section of Osborne Street and the Southbound I-5 Freeway (Haul Route 8B) anticipated AM peak hour HCM LOS F.

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6. PROJECT IMPACTS, MITIGATION, AND SUMMARY

This study has examined and identified regional impacts related to the Devil's Gate Reservoir Sediment Removal and Management Project, and identified traffic impacts due to the expected increase of truck traffic generated along proposed routes. Route recommendations considered access and traffic mitigation in the impacted intersections, freeway segments, and ramps.

The Devil's Gate Dam and Reservoir site is located to the north east of the I-210 Freeway on Oak Grove Drive between Berkshire Place and the Foothill Freeway Overpass. Access to the project site will be obtained from Oak Grove Drive. Due to the project site vicinity to residential communities north, south, and east of the site further attention to route designation was required. The sediment and organic materials removed from the dam is proposed to be transported to eight disposal sites within the county of Los Angeles.

Twenty-six (26) haul routes were proposed and evaluated for the transportation of the sediment and organic materials to the proposed disposal sites. Along the 26 haul routes 51 intersections were identified for analysis. Twenty-eight (28) freeway segments along the I-210 Freeway, I-5 Freeway, SR-2 Freeway, and SR-134 Freeway and fifty-four (54) on and off-ramps within those freeway segments were also identified for analysis.

The hours of operation are 7 AM to 7 PM Monday through Friday and 8 AM to 5 PM on Saturday. The operational period is divided into three peak hour periods. The AM peak period consists of the hours 7 AM to 10 AM. The MIDDAY peak period consists of the hours 10 AM to 4 PM. The PM peak period consists of the hours 4 PM to 7 PM. Removal of sediment and organic materials off-site is expected to take place between these hours.

The proposed Haul Trucks are Double Dump Trucks estimated to haul 18 cubic yards of sediment. The trucks are anticipated to haul approximately 10.8 thousand cubic yards per day. During the life of the project approximately 4 million cubic yards of sediment and organic materials will be removed by 50 trucks per hour.

This traffic study analyzed the existing conditions, the existing conditions with project trips (existing + project conditions), and the year 2014 project conditions for the identified study intersections, freeway segments, and ramps. Based on the results of the traffic analysis recommendations to maintain acceptable operating conditions at the intersections, freeway segments, and ramps were made.

Analysis, Scope, and Methodology

This traffic study report consists of the following analysis, scope, and methodologies listed below:

- Peak hour Synchro analysis of the existing, existing plus project, and year 2014 project conditions of the study intersections per the Highway Capacity Manual (HCM) methodology.

- Peak hour HCM analysis of the existing conditions, existing plus project conditions, and year 2014 project conditions for the freeway segments and ramps in the study areas.

- Peak hour HCM weaving analysis of the existing conditions, existing plus project conditions, and year 2014 project conditions for the study areas.

6.1 Intersection Impacts

This traffic study analyzed 52 intersections in order to determine the optimal truck haul routes which would provide the least traffic impacts. From the traffic analysis it was determined that the increase in truck trips does not significantly impact the study intersections.

This study verified that most of the intersections associated with the twenty five routes are expected to continue to operate at an acceptable level of service (LOS) D or better during the AM, Mid-day, and PM peak periods. There are some intersections that would require traffic mitigations as a result of route and peak hour selection. The intersections with unacceptable LOS E or lower are provided here identifying the condition when the intersection operates at an unacceptable level of service.

Existing Conditions

Prior to the initiation of the Devil's Gate Reservoir Sediment Removal and Management Project two existing condition intersections are at an unacceptable LOS E. These intersections are as follows:

Intersection Impacts – Existing Plus Project

	INTERSECTIONS	HAUL ROUTE	PEAK HOUR	LOS(1)
27.	Glenoaks Blvd and Osborne Street	5A/6A/7A	AM	E
51.	Branford Street and San Fernando Road	8C	PM	E

(1) LOS–Level of Service
Source: **Hall & Foreman, Inc**

Existing Plus Project

The project conditions will impact two additional intersections. These intersections are Berkshire Place and I-210 Freeway Eastbound Ramps and Figueroa St and SR-134 WB Ramps. Intersections identified during existing conditions are anticipated to continue to operate at LOS E or lower. These intersections are provided below:

Intersection Impacts – Existing Plus Project

	INTERSECTIONS	HAUL ROUTE	PEAK HOUR	LOS(1)
1.	Berkshire Place and I-210 Freeway Eastbound Ramps	1A/1D/1E/1G	AM	E
21.	Figueroa St and SR-134 WB Ramps	4A/4B	AM/PM	E
27.	Glenoaks Blvd and Osborne Street	5A/6A/7A	AM	F
51.	Branford Street and San Fernando Road	8C	PM	E

(1) LOS–Level of Service
Source: **Hall & Foreman, Inc**

Project Year 2014

The Year 2014 project conditions will impact 6 additional intersections. The level of service issues are anticipated to occur predominately during the AM and PM peak hours. The exception to this is in route 2B for Site 2, Manning's pit at the intersection of Arrow Hwy and Azusa Ave is anticipated operate and an unacceptable LOS E throughout the day. Intersections identified during existing conditions and project conditions are anticipated to continue to operate at LOS E or lower. These intersections are expected to be minimally impacted by the project. Two intersections are anticipated to be noticeably impacted. The intersection of Berkshire Place and I-210 Freeway Eastbound Ramps of Routes 1A and 1D is anticipated to lower to an LOS F during the AM peak hour. Also the intersection of Figueroa Street and SR-134 Westbound Ramps of route 4B is anticipated to lower to an LOS F during the PM peak hour. These intersections are provided below:

Intersection Impacts – Project Year 2014

	INTERSECTIONS	HAUL ROUTE	PEAK HOUR	LOS(1)
1.	Berkshire Place and I-210 Freeway Eastbound Ramps	1A/1D	AM	F
1.	Berkshire Place and I-210 Freeway Eastbound Ramps	1E/1G	AM	E
14.	Arrow Hwy and Lark Ellen Ave	2B	AM and PM	E
16.	Azusa Ave and Arrow Hwy	2B	AM, Mid-day, PM	E
17.	Azusa Ave and Gladstone St	2B	AM	E
20.	First St and Alameda St/I-210 Fwy WB Ramps	2B	AM	E
21.	Figueroa St and SR-134 WB Ramps	4A	AM/PM	E
21.	Figueroa St and SR-134 WB Ramps	4B	AM/PM	E/F
27.	Glenoaks Blvd and Osborne Street	5A/6A/7A	AM/PM	F/E
43.	Osborne Street and Laurel Canyon Blvd	8B	PM	E
50.	Sheldon Street and San Fernando Road	8C	PM	E
51.	Branford Street and San Fernando Road	8C	PM	F

(1) LOS–Level of Service
Source: **Hall & Foreman, Inc**

6.2 Freeway Impacts

This traffic study analyzed 28 freeway segments to determine the mainline Level-of-Service (LOS). From the traffic analysis it was determined that the increase in truck trips do not cause any major traffic impacts at the identified freeway segments.

Existing Conditions and Existing Plus Project

Prior to the initiation of the Devil's Gate Reservoir Sediment Removal and Management Project five existing condition freeway segments are at an unacceptable LOS E. The freeway segments are at an unacceptable LOS E predominately during the AM and PM peak hours. The inclusion of the project provides no additional unacceptable freeway segments. These freeway segments are as follows:

Freeway Segment Impacts – Existing Conditions

	FREEWAY SEGMENT	HAUL ROUTE	PEAK HOUR	LOS(1)
31	WB SR-134 between San Fernando Rd and the I-5 Fwy	5B, 6B, 7B, 8A	PM	E
39	SB I-5 between SR-170 and Branford St	8A	AM, PM	F
39	SB I-5 between SR-170 and Branford St	8A	Mid-day	E
51	WB SR-118 between San Fernando Rd and the I-210 Fwy	8B	AM	E
53	NB I-5 between the SR-118 and Van Nuys Blvd	8B	Mid-day, PM	E
55	NB I-5 between Tierra Bella St and Osborne St	8B	AM, Mid-day, PM	E

(1) LOS–Level of Service
Source: **Hall & Foreman, Inc**

Project Year 2014

Anticipated impact the freeway segments for Year 2014 are WB I-210 between the SR-134 Fwy and Lake Ave, EB I-210 between the SR-134 Fwy and Lake Ave, EB SR-134 between the Pacific Ave and Concord St, and SB I-5 between the SR-134 Fwy and Western Ave. Freeway segments identified in existing conditions are anticipated to continue to operate at LOS E or lower. Year 2014 freeway segments with an anticipated LOS E or lower are as follows:

Freeway Segment Impacts – Project Year 2014

	FREEWAY SEGMENT	HAUL ROUTE	PEAK HOUR	LOS(1)
11	WB I-210 between the SR-134 Fwy and Lake Ave	2A, 2B, 3	AM	E
12	EB I-210 between the SR-134 Fwy and Lake Ave	2A, 2B, 3	AM, Mid-day, PM	E
30	EB SR-134 between the Pacific Ave and Concord St	5B, 6B, 7B, 8A	AM, PM	E
31	WB SR-134 between San Fernando Rd and the I-5 Fwy	5B, 6B, 7B, 8A	PM	F
33	SB I-5 between the SR-134 Fwy and Western Ave	5B, 6B, 7B, 8A	Mid-day, PM	E
39	SB I-5 between SR-170 and Branford St	8A	AM, Mid-day, PM	F
51	WB SR-118 between San Fernando Rd and the I-210 Fwy	8B	AM/PM	F/E
53	NB I-5 between the SR-118 and Van Nuys Blvd	8B	AM	E
53	NB I-5 between the SR-118 and Van Nuys Blvd	8B	Mid-day, PM	F
55	NB I-5 between Tierra Bella St and Osborne St	8B	AM, Mid-day, PM	F

(1) LOS–Level of Service
Source: **Hall & Foreman, Inc**

6.3 Ramp Impacts

This traffic study analyzed 54 on and off-ramps to determine the Level-of-Service (LOS) of the utilized ramps with the study area. From the traffic analysis it was determined that the increase in truck trips does not cause any major traffic impacts to the identified ramps. The LOS of the ramps remained acceptable when the expected increase in truck trips were applied to the ramps being studied.

Existing Conditions and Existing Plus Project

Prior to the initiation of the Devil's Gate Reservoir Sediment Removal and Management Project one ramp is at an unacceptable LOS E during existing condition. The inclusion of the project does not noticeably impact the ramps. The project condition provides no additional unacceptable ramps. The ramp is as follows:

Freeway Ramp Impacts – Existing Conditions

	RAMP	HAUL ROUTE	PEAK HOUR	LOS (1)
52	Osborne St and the SB I-5 Fwy mainline off-ramp	8B	AM	F

(1) LOS–Level of Service
Source: **Hall & Foreman, Inc**

Project Year 2014

The Year 2014 project conditions will negatively impact one additional ramp. The ramp identified during existing conditions is anticipated to continue to operate at LOS F. The ramps anticipated to operate at an unacceptable level are provided below:

Freeway Ramp Impacts – Project Year 2014

	RAMP	HAUL ROUTE	PEAK HOUR	LOS (1)
22	WB I-210 Fwy Transition Ramp to the SB SR-2 Fwy mainline	5B, 6B, 7B, 8A	AM	F
52	Osborne St and the SB I-5 Fwy mainline off-ramp	8B	AM	F

(1) LOS–Level of Service
Source: **Hall & Foreman, Inc**

6.4 Route Summary and Mitigations/Potential Impact Reduction Measures

The Preferred and Alternative Routes include the intersections, freeway segments, and freeway ramps operating and anticipated to continue to operate at an acceptable LOS providing the shortest distance, least traffic impacts, and shortest delay time while maintaining acceptable operating conditions.

The Haul Trucks are estimated to haul 18 cubic yards of sediment and organic materials. Utilizing the proposed haul route hours of operation and 50 trucks per hour an approximate thousand cubic yards of sediment and organic materials will be removed from the dam per day.

6.4.1 Devil's Gate Dam Area

The reservoir requires two preferred routes. A route will accommodate trucks outbound to the deposit sites south and east of the reservoir, Manning's Pit (Site 2), Waste Management (Site 3), Vulcan Materials - Irwindale Site (Site 9), Scholl Canyon Landfill (Site 4). The other route will accommodate trucks outbound to the deposit sites west of the reservoir, Sheldon Pit (Site 5), Sun Valley Fill Site (Site 6), Bradley Landfill (Site 7), and Boulevard Pit (Site 8).

Devil's Gate Dam Area (Site 1): Haul Route 1A

Haul Route 1A is an optional route to the disposal sites south and east of Devil's Gate Dam and Reservoir. The sites east of Devil's Gate Dam and Reservoir are Manning's Pit (Site 2), Waste Management (Site 3), and Vulcan Materials - Irwindale Site (Site 9). The site south of Devil's Gate Dam and Reservoir is Scholl Canyon Landfill (Site 4). The use of Haul Route 1A requires that the median along the frontage of the Devils Gate Dam and Reservoir be restriped to a Two Way Left Turn Lane (TWLTL). This requires the approval of the City of Pasadena.

AM Mitigations and Potential Impact Reduction Measures

An optional measure is to provide applicable construction signing at the Devil's Gate Dam and Reservoir driveway.

Berkshire Place (EW) and I-210 Freeway Eastbound Ramps (NS): The Intersection is anticipated to operate at an unacceptable LOS during the AM peak period. The optional measures of this intersection are beyond of the scope of the project. The Haul Route is, therefore, anticipated to continue to operate at an unacceptable LOS during the AM peak period.

MID-DAY and PM Mitigations and Potential Impact Reduction Measures

The Haul Route 1A is anticipated to continue to operate at an LOS D or better for all utilized intersections during the MID-DAY and PM peak periods.

An optional measure is to provide applicable construction signing at the Devil's Gate Dam and Reservoir driveway.

Devil's Gate Dam Area (Site 1): Haul Route 1B

Haul Route 1B is the alternative route to the disposal sites south and east of Devil's Gate Dam and Reservoir. These sites are Manning's Pit (Site 2), Waste Management (Site 3), Vulcan Materials - Irwindale Site (Site 9), and Scholl Canyon Landfill (Site 4).

AM, MID-DAY and PM Mitigations and Potential Impact Reduction Measures

The Haul Route 1B is anticipated to continue to operate at an LOS C or better for all utilized intersections throughout the day.

An optional measure is to provide applicable construction signing at the Devil's Gate Dam and Reservoir driveway.

Devil's Gate Dam Area (Site 1): Haul Route 1C

Haul Route 1C is an optional route for disposal sites south and east of Devil's Gate Dam and Reservoir. These sites are Manning's Pit (Site 2), Waste Management (Site 3), Vulcan Materials - Irwindale Site (Site 9), and Scholl Canyon Landfill (Site 4). The use of Haul Route 1C requires that the median along the frontage of the Devils Gate Dam and Reservoir be restriped to a Two Way Left Turn Lane (TWLTL). This requires the approval of the City of Pasadena.

AM, MID-DAY and PM Mitigations and Potential Impact Reduction Measures

The Haul Route 1C is anticipated to continue to operate at an LOS C or better for all utilized intersections throughout the day.

An optional measure is to provide applicable construction signing at the Devil's Gate Dam and Reservoir driveway.

Devil's Gate Dam Area (Site 1): Haul Route 1D

Haul Route 1D is the preferred route for disposal sites south and east of Devil's Gate Dam and Reservoir. These sites are Manning's Pit (Site 2), Waste Management (Site 3), Vulcan Materials - Irwindale Site (Site 9), and Scholl Canyon Landfill (Site 4).

AM Mitigations and Potential Impact Reduction Measures

Berkshire Place (EW) and I-210 Freeway Eastbound Ramps (NS): The Intersection is anticipated to operate at an unacceptable LOS during the AM peak period. The optional measures of this intersection are beyond of the scope of the project. The Haul Route is, therefore, anticipated to continue to operate at an unacceptable LOS during the AM peak period.

MID-DAY and PM Mitigations and Potential Impact Reduction Measures

The Haul Route 1D is anticipated to continue to operate at an LOS D or better for all utilized intersections during the MID-DAY and PM peak periods without the need for potential impact reduction measures. The Devil's Gate Dam and Reservoir driveway does not require potential impact reduction measures.

Devil's Gate Dam Area (Site 1): Haul Route 1E

Haul Route 1E is an optional route for disposal sites west of Devil's Gate Dam and Reservoir. These sites are Sheldon Pit (Site 5), Sun Valley Fill Site (Site 6), Bradley Landfill (Site 7), and Boulevard Pit (Site 8). The use of Haul Route 1E requires that the median along the frontage of the Devils Gate Dam and Reservoir be restriped to a Two Way Left Turn Lane (TWLTL). This requires the approval of the City of Pasadena.

AM Mitigations and Potential Impact Reduction Measures

An optional measure is to provide applicable construction signing at the Devil's Gate Dam and Reservoir driveway.

Berkshire Place (EW) and I-210 Freeway Eastbound Ramps (NS): The Intersection is anticipated to operate at an unacceptable LOS during the AM peak period. The optional measures of this intersection are beyond of the scope of the project.

MID-DAY and PM Mitigations and Potential Impact Reduction Measures

The Haul Route 1E is anticipated to continue to operate at an LOS D or better for all utilized intersections during the MID-DAY and PM peak periods.

An optional measure is to provide applicable construction signing at the Devil's Gate Dam and Reservoir driveway.

Devil's Gate Dam Area (Site 1): Haul Route 1F

Haul Route 1F is an alternative route for disposal sites east of Devil's Gate Dam and Reservoir. These sites are Sheldon Pit (Site 5), Sun Valley Fill Site (Site 6), Bradley Landfill (Site 7), and Boulevard Pit (Site 8). The use of Haul Route 1F requires that the median along the frontage of the Devils Gate Dam and Reservoir be restriped to a Two Way Left Turn Lane (TWLTL). This requires the approval of the City of Pasadena.

AM, MID-DAY and PM Mitigations and Potential Impact Reduction Measures

The Haul Route 1F is anticipated to continue to operate at an LOS C or better for all utilized intersections throughout the day.

An optional measure is to provide applicable construction signing at the Devil's Gate Dam and Reservoir driveway.

Devil's Gate Dam Area (Site 1): Haul Route 1G

Haul Route 1G is an optional route to the disposal sites east of Devil's Gate Dam and Reservoir. These sites are Sheldon Pit (Site 5), Sun Valley Fill Site (Site 6), Bradley Landfill (Site 7), and Boulevard Pit (Site 8). The use of Haul Route 1G requires that the median along the frontage of the Devils Gate Dam and Reservoir be restriped to a Two Way Left Turn Lane (TWLTL). This requires the approval of the City of Pasadena.

AM Mitigations and Potential Impact Reduction Measures

An optional measure is to provide applicable construction signing at the Devil's Gate Dam and Reservoir driveway.

Berkshire Place (EW) and I-210 Freeway Eastbound Ramps (NS): The Intersection is anticipated to operate at an unacceptable LOS during the AM peak period. The optional measures of this intersection are beyond of the scope of the project.

MID-DAY and PM Mitigations and Potential Impact Reduction Measures

The Haul Route 1G is anticipated to continue to operate at an LOS C or better for all utilized intersections during the MID-DAY and PM peak periods.

An optional measure is to provide applicable construction signing at the Devil's Gate Dam and Reservoir driveway.

Devil's Gate Dam Area (Site 1): Haul Route 1H

Haul Route 1H is the preferred route for disposal sites east of Devil's Gate Dam and Reservoir. These sites are Sheldon Pit (Site 5), Sun Valley Fill Site (Site 6), Bradley Landfill (Site 7), and Boulevard Pit (Site 8).

AM, MID-DAY and PM Mitigations and Potential Impact Reduction Measures

The Haul Route 1H is anticipated to continue to operate at an LOS C or better for all utilized intersections throughout the day without the need for potential impact reduction measures. The Devil's Gate Dam and Reservoir entrance and access to Oak Grove Drive Oak Grove Drive for Route 1H to access the Devil's Gate Dam and Reservoir does not require potential impact reduction measures.

6.4.2 Waste Management, Manning's Pit, and Vulcan Materials - Irwindale Site Area

The Manning's Pit (Site 2), Waste Management (Site 3), and Vulcan Material (Site 9) are the disposal sites east of Devil's Gate Dam and Reservoir.

Manning's Pit (Site 2): Haul Route 2A

Haul Route 2A is the preferred route for Manning's Pit, east of Devil's Gate Dam and Reservoir.

AM, MID-DAY and PM Mitigations and Potential Impact Reduction Measures

The Haul Route 2A is anticipated to continue to operate at an LOS C or better for all utilized intersections during the AM, MID-DAY, and PM peak periods:

An optional measure is to provide applicable construction signing at the Manning's Pit driveway.

Manning's Pit (Site 2): Haul Route 2B

Haul Route 2B is the alternate route for Manning's Pit, a disposal site east of Devil's Gate Dam and Reservoir.

AM, MID-DAY, and PM Mitigations and Potential Impact Reduction Measures

The Haul Route is anticipated to operate at an unacceptable LOS at Arrow Hwy and Lark Ellen Ave, Azusa Ave and Arrow Hwy, Azusa Ave and Gladstone Street, and First Street and Alameda Street/I-210 Freeway Westbound Ramps during the AM and PM peak periods.

The Haul Route is anticipated to operate at an unacceptable LOS at Arrow Hwy and Lark Ellen Ave, Azusa Ave and Arrow Hwy, Azusa Ave and Gladstone Street, and First Street and Alameda Street/I-210 Freeway Westbound Ramps during the AM and PM peak periods.

Arrow Hwy (EW) and Lark Ellen Ave (NS): The Intersection is anticipated to operate at an unacceptable LOS during the AM and PM peak hours. The optional measures of this intersection are beyond of the scope of the project. The Haul Route is, therefore, anticipated to continue to operate at an unacceptable LOS during the AM and PM peak periods.

Azusa Ave (NS) and Arrow Hwy (EW): The Intersection is anticipated to operate at an unacceptable LOS throughout the day. The optional measures of this intersection are beyond of the scope of the project. The Haul Route is, therefore, anticipated to continue to operate at an unacceptable LOS throughout the day.

Azusa Ave (NS) and Gladstone Street (EW): The Intersection is anticipated to operate at an unacceptable LOS during the AM peak hour. The optional measures of this intersection are beyond of the scope of the project. The Haul Route is, therefore, anticipated to continue to operate at an unacceptable LOS during the AM peak period.

First Street (EW) and Alameda Street/I-210 Freeway Westbound Ramps (NS): The Intersection is anticipated to operate at an unacceptable LOS during the AM peak hour. The optional measures of this intersection are beyond of the scope of the project. The Haul Route is, therefore, anticipated to continue to operate at an unacceptable LOS during the AM peak period.

An optional measure is to provide applicable construction signing at the Manning's Pit driveway.

Waste Management (Site 3): Haul Route 3

Haul Route 3 is the preferred route for Waste Management, east of Devil's Gate Dam and Reservoir.

AM, MID-DAY and PM Mitigations and Potential Impact Reduction Measures

The Haul Route 3 is anticipated to continue to operate at an LOS C or better for all utilized intersections during the AM, MID-DAY, and PM peak periods without the need for potential impact reduction measures. The Waste Management driveway is at the signalized study intersection of Vincent Avenue and Gladstone Street that does not require potential impact reduction measures.

Vulcan Materials (Site 9): Haul Route 9

Haul Route 9 is the preferred route for Vulcan Material – Irwindale Site, east of Devil's Gate Dam and Reservoir.

AM and MID-DAY Mitigations and Potential Impact Reduction Measures

The Haul Route 9 is anticipated to continue to operate at an LOS D or better for all utilized intersections during the AM, and MID-DAY peak periods without the need for potential impact reduction measures. The Vulcan Materials driveway is at the signalized study intersection of Irwindale Avenue and Foothill Boulevard that does not require potential impact reduction measures.

PM Mitigations and Potential Impact Reduction Measures

Irwindale Avenue (NS) and Foothill Boulevard (EW) (Vulcan Materials driveway): The Intersection is anticipated to operate at an unacceptable LOS during the PM peak hour. The optional measures of this intersection are beyond of the scope of the project. The Haul Route is, therefore, anticipated to continue to operate at an unacceptable LOS during the PM peak period.

6.4.3 Scholl Canyon Landfill (Site 4)

The Scholl Canyon Landfill (Site 4) is the green waste disposal site east of Devil's Gate Dam and Reservoir.

Scholl Canyon Landfill Haul (Site 4): Route 4A

Haul Route 4A is the Scholl Canyon Landfill preferred route, east of Devil's Gate Dam and Reservoir.

MID-DAY Mitigations and Potential Impact Reduction Measures

The Haul Route 4A utilized intersections are anticipated to continue to operate at an LOS B or better during the MID-DAY peak period without the need for potential impact reduction measures. The Scholl Canyon Landfill driveway does not require potential impact reduction measures during the MID-DAY peak period.

AM and PM Mitigations and Potential Impact Reduction Measures

The Haul Route is anticipated to continue to operate at an acceptable LOS for all utilized intersections during the AM and PM peak periods with the following potential impact reduction measures will improve the utilized intersections to an acceptable LOS during the AM and PM peak periods:

1. Figueroa St/Scholl Canyon Road (NS) and SR-134 Freeway Westbound Ramps (EW): Restripe the westbound right turn lane to a shared left-right turn lane and the northbound through lane to a shared through-right turn lane. The northbound direction will include a shared through-right turn lane and a right turn lane. The southbound direction will include a shared through-left turn lane and a through turn lane. The westbound direction will include a left turn lane and a shared left-right turn lane. This optional measure requires the approval of the City of Los Angeles and Caltrans.

Scholl Canyon Landfill Haul (Site 4): Haul Route 4B

Haul Route 4B is an optional route for the green waste disposal site Scholl Canyon Landfill, east of Devil's Gate Dam and Reservoir. The Scholl Canyon Landfill driveway does not require potential impact reduction measures.

MID-DAY Mitigations and Potential Impact Reduction Measures

The Haul Route utilized intersections are anticipated to continue to operate at an LOS B or better during the MID-DAY peak period without the need for potential impact reduction measures.

AM and PM Mitigations and Potential Impact Reduction Measures

The Haul Route is anticipated to continue to operate at an acceptable LOS for all utilized intersections during the AM and PM peak periods with the following potential impact reduction measures will improve the utilized intersections to an acceptable LOS during the AM and PM peak periods:

1. Figueroa St/Scholl Canyon Road (NS) and SR-134 Freeway Westbound Ramps (EW): Restripe the westbound right turn lane to a shared left-right turn lane and the northbound through lane to a shared through-right turn lane. The northbound direction will include a shared through-right turn lane and a right turn lane. The southbound direction will include a shared through-left turn lane and a through turn lane. The westbound direction will include a left turn lane and a shared left-right turn lane. This optional measure requires the approval of the City of Los Angeles and Caltrans.

6.4.4 Sheldon Pit (Site 5), Sun Valley Fill Site (Site 6), Bradley Landfill (Site 7), and Boulevard Pit (Site 8)

The Sheldon Pit (Site 5), Sun Valley Fill Site (Site 6), Bradley Landfill (Site 7), and Boulevard Pit (Site 8) are the disposal site west of Devil's Gate Dam and Reservoir.
Sheldon Pit (Site 5): Haul Route 5A

Haul Route 5A is the preferred route for Sheldon Pit, west of Devil's Gate Dam and Reservoir.

MID-DAY Mitigations and Potential Impact Reduction Measures

The Haul Route is anticipated to continue to operate at an LOS D or better for all utilized intersections during the MID-DAY peak period
An optional measure is to provide applicable construction signing at the Sheldon Pit driveway.

AM and PM Mitigations and Potential Impact Reduction Measures

An optional measure is to provide applicable construction signing at the Sheldon Pit driveway.

Glenoaks Blvd (NS) and Osborne Street (EW): The Intersection is anticipated to operate at an unacceptable LOS during the AM and PM peak hours. The optional measures for this intersection are beyond of the scope of the project. The Haul Route is, therefore, anticipated to continue to operate at an unacceptable LOS during the AM and PM peak periods.

Sheldon Pit (Site 5): Haul Route 5B

Haul Route 5B is an optional route for Sheldon Pit, a disposal site west of Devil's Gate Dam and Reservoir.

AM, MID-DAY and PM Mitigations and Potential Impact Reduction Measures

The Haul Route 5B is anticipated to continue to operate at an LOS C or better for all utilized intersections during the AM, MID-DAY, and PM peak periods.

An optional measure is to provide applicable construction signing at the Sheldon Pit driveway.

Sheldon Pit (Site 5): Haul Route 5C

Haul Route 5C is the alternate route for Sheldon Pit, a disposal site west of Devil's Gate Dam and Reservoir.

AM, MID-DAY and PM Mitigations and Potential Impact Reduction Measures

The Haul Route 5C utilized intersections are anticipated to continue to operate at an LOS C or better throughout the day:

An optional measure is to provide applicable construction signing at the Sheldon Pit driveway.

Sun Valley Fill Site (Glenoaks Landfill/Cal-Mat) (Site 6): Haul Route 6A

Haul Route 6A is the preferred route for Sun Valley Fill Site, west of Devil's Gate Dam and Reservoir.

MID-DAY Mitigations and Potential Impact Reduction Measures

The Haul Route 6A utilized intersections are anticipated to continue to operate at an LOS D or better during the MID-DAY peak period without the need for potential impact reduction measures. The Sun Valley Fill Site driveway does not require potential impact reduction measures.

AM and PM Mitigations and Potential Impact Reduction Measures

The Sun Valley Fill Site driveway does not require potential impact reduction measures during the AM and PM peak periods.

Glenoaks Blvd (NS) and Osborne Street (EW): The Intersection is anticipated to operate at an unacceptable LOS during the AM and PM peak hours. The optional measures for this intersection are beyond of the scope of the project. The Haul Route is, therefore, anticipated to continue to operate at an unacceptable LOS during the AM and PM peak periods.

Sun Valley Fill Site (Glenoaks Landfill/Cal-Mat) (Site 6): Haul Route 6B

Haul Route 6B is an optional route for Sun Valley Fill Site, a disposal site west of Devil's Gate Dam and Reservoir. The Sun Valley Fill Site driveway does not require potential impact reduction measures.

MID-DAY Mitigation and Potential Impact Reduction Measures

The Haul Route 6B utilized intersections are anticipated to continue to operate at an acceptable LOS during the MID-DAY peak period without the need for potential impact reduction measures.

AM, MID-DAY and PM Mitigations and Potential Impact Reduction Measures

Glenoaks Blvd (NS) and Osborne Street (EW): The Intersection is anticipated to operate at an unacceptable LOS during the AM and PM peak hours. The optional measures for this intersection are beyond of the scope of the project.

Sun Valley Fill Site (Glenoaks Landfill/Cal-Mat) (Site 6): Haul Route 6C

Haul Route 6C is the alternate route for Sun Valley Fill Site, a disposal site west of Devil's Gate Dam and Reservoir. The Sun Valley Fill Site driveway does not require potential impact reduction measures.

AM, MID-DAY and PM Mitigations and Potential Impact Reduction Measures

The Haul Route 6C utilized intersections are anticipated to continue to operate at an LOS D or better throughout the day without the need for potential impact reduction measures.

Bradley Landfill (Site 7): Haul Route 7A

Haul Route 7A is the Bradley Landfill is the preferred route, west of Devil's Gate Dam and Reservoir. The Bradley Landfill driveway does not require potential impact reduction measures.

MID-DAY Mitigations and Potential Impact Reduction Measures

The Haul Route 7A utilized intersections are anticipated to continue to operate at an LOS D or better during the MID-DAY peak period without the need for potential impact reduction measures.

AM and PM Mitigations and Potential Impact Reduction Measures

Glenoaks Blvd (NS) and Osborne Street (EW): The Intersection is anticipated to operate at an unacceptable LOS during the AM and PM peak hours. The optional measures for this intersection are beyond of the scope of the project. The Haul Route is, therefore, anticipated to continue to operate at an unacceptable LOS during the AM and PM peak periods.

Bradley Landfill (Site 7): Haul Route 7B

Haul Route 7B is an optional route for Bradley Landfill, a disposal site west of Devil's Gate Dam and Reservoir. The Bradley Landfill driveway does not require mitigation.

AM, MID-DAY and PM Mitigations and Potential Impact Reduction Measures

The Haul Route 7B is anticipated to continue to operate at an LOS C or better throughout the day without the need for potential impact reduction measures.

Bradley Landfill (Site 7): Haul Route 7C

Haul Route 7C is the alternate route for Bradley Landfill, a disposal site west of Devil's Gate Dam and Reservoir. The Bradley Landfill driveway does not require potential impact reduction measures.

AM, MID-DAY and PM Mitigations and Potential Impact Reduction Measures

The Haul Route 7C utilized intersections are anticipated to continue to operate at an LOS D or better throughout the day without the need for potential impact reduction measures.

Boulevard Pit (Site 8): Haul Route 8A

Haul Route 8A is an optional route for a disposal site west of Devil's Gate Dam and Reservoir.

AM, MID-DAY and PM Mitigations and Potential Impact Reduction Measures

The Haul Route 8A is anticipated to continue to operate at an acceptable LOS for all utilized intersections throughout the day.

An optional measure is to provide applicable construction signing at the Boulevard Pit driveway.

Boulevard Pit (Site 8): Haul Route 8B

Haul Route 8B is an alternative route for a disposal site west of Devil's Gate Dam and Reservoir.

AM and MID-DAY Mitigations and Potential Impact Reduction Measures

The Haul Route 8B is anticipated to continue to operate at an acceptable LOS during the AM and MID-DAY peak periods

An optional measure is to provide applicable construction signing at the Boulevard Pit driveway.

PM Mitigations and Potential Impact Reduction Measures

Osborne Street (EW) and Laurel Canyon Blvd (NS): The Intersection is anticipated to operate at an unacceptable LOS during the PM peak hour. The optional measures for this intersection are beyond of the scope of the project. The Haul Route is, therefore, anticipated to continue to operate at an unacceptable LOS during the PM peak period.

An optional measure is to provide applicable construction signing at the Boulevard Pit driveway.

Boulevard Pit (Site 8): Haul Route 8C

Haul Route 8C is the Boulevard Pit preferred route west of Devil's Gate Dam and Reservoir.

AM and MID-DAY Mitigations and Potential Impact Reduction Measures

The Haul Route is anticipated to continue to operate at an LOS D or better for all utilized intersections during the AM and MID-DAY peak periods

An optional measure is to provide applicable construction signing at the Boulevard Pit driveway.

PM Mitigations and Potential Impact Reduction Measures

An optional measure is to provide applicable construction signing at the Boulevard Pit driveway.

Sheldon Street (EW) and San Fernando Road (NS): The Intersection is anticipated to operate at an unacceptable LOS during the PM peak hour. The optional measures for this intersection are beyond of the scope of the project. The Haul Route is, therefore, anticipated to continue to operate at an unacceptable LOS during the PM peak period.

Branford Street (EW) and San Fernando Road (NS): The Intersection is anticipated to operate at an unacceptable LOS during the PM peak hour. The optional measures for this intersection are beyond of the scope of the project. The Haul Route is, therefore, anticipated to continue to operate at an unacceptable LOS during the PM peak period.

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APPENDIX B: INTERSECTION CAPACITY ANALYSIS WORKSHEETS

Devil's Gate Reservoir Sediment Removal and Management Project

Los Angeles County, California

TRAFFIC IMPACT ANALYSIS

TUSTIN

SANTA CLARITA

TEMECULA

VICTORVILLE

www.hfinc.com

Prepared by:

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September 12, 2013

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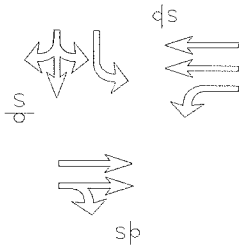
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	JV	9-Sep-13	VV.110264.0000	1 OF 8

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY EB RAMPS
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 1
ROUTE 1A, 1D

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BERKSHIRE PLACE						
EB LEFT	0	0%	**0**	0	0	0
EB THRU	250	0%	**0**	250	25	275
EB RIGHT	125	5%	**0**	125	10	135
WB LEFT	140	30%	**55**	195	20	215
WB THRU	120	5%	**0**	120	10	130
WB RIGHT	0	0%	**0**	0	0	0
I-210 FWY EB RAMPS						
NB LEFT	0	0%	**0**	0	0	0
NB THRU	0	0%	**0**	0	0	0
NB RIGHT	0	0%	**0**	0	0	0
SB LEFT	325	5%	**0**	325	30	355
SB THRU	5	0%	**0**	5	5	10
SB RIGHT	85	5%	**0**	85	5	90
TOTALS	**1050**		**55**	**1105**	**105**	**1210**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	2 OF 8

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY EB RAMPS
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 1
ROUTE 1E, 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BERKSHIRE PLACE						
EB LEFT	0	0%	**0**	0	0	0
EB THRU	250	0%	**0**	250	25	275
EB RIGHT	125	5%	**0**	125	10	135
WB LEFT	140	5%	**0**	140	15	155
WB THRU	120	5%	**0**	120	10	130
WB RIGHT	0	0%	**0**	0	0	0
I-210 FWY EB RAMPS						
NB LEFT	0	0%	**0**	0	0	0
NB THRU	0	0%	**0**	0	0	0
NB RIGHT	0	0%	**0**	0	0	0
SB LEFT	325	18%	**55**	380	35	415
SB THRU	5	0%	**0**	5	5	10
SB RIGHT	85	5%	**0**	85	5	90
TOTALS	**1050**		**55**	**1105**	**105**	**1210**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	3 OF 8

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY EB RAMPS
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 1
ROUTE 1A, 1D

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BERKSHIRE PLACE						
EB LEFT	0	0%	**0**	0	0	0
EB THRU	100	5%	**0**	100	10	110
EB RIGHT	55	5%	**0**	55	5	60
WB LEFT	80	42%	**55**	135	10	145
WB THRU	110	5%	**0**	110	10	120
WB RIGHT	0	0%	**0**	0	0	0
I-210 FWY EB RAMPS						
NB LEFT	0	0%	**0**	0	0	0
NB THRU	0	0%	**0**	0	0	0
NB RIGHT	0	0%	**0**	0	0	0
SB LEFT	105	5%	**0**	105	10	115
SB THRU	5	0%	**0**	5	5	10
SB RIGHT	45	5%	**0**	45	5	50
TOTALS	**500**		**55**	**555**	**55**	**610**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	4 OF 8

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY EB RAMPS
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 1
ROUTE 1E, 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	
SCENERIO #							
BERKSHIRE PLACE							
EB LEFT	0	0%	**0**	0	0	0	
EB THRU	100	5%	**0**	100	10	110	#
EB RIGHT	55	5%	**0**	55	5	60	#
WB LEFT	80	5%	**0**	80	5	85	#
WB THRU	110	5%	**0**	110	10	120	#
WB RIGHT	0	0%	**0**	0	0	0	
I-210 FWY EB RAMPS							
NB LEFT	0	0%	**0**	0	0	0	
NB THRU	0	0%	**0**	0	0	0	
NB RIGHT	0	0%	**0**	0	0	0	
SB LEFT	105	36%	**55**	160	15	175	#
SB THRU	5	0%	**0**	5	5	10	ↄ
SB RIGHT	45	5%	**0**	45	5	50	#
TOTALS	**500**		**55**	**555**	**55**	**610**	

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	5 OF 8

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY EB RAMPS
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 1
ROUTE 1A, 1D

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	
SCENERIO #							
BERKSHIRE PLACE							
EB LEFT	0	0%	**0**	0	0	0	
EB THRU	125	5%	**0**	125	10	135	#
EB RIGHT	80	5%	**0**	80	5	85	#
WB LEFT	205	22%	**55**	260	25	285	#
WB THRU	165	5%	**0**	165	15	180	#
WB RIGHT	0	0%	**0**	0	0	0	
I-210 FWY EB RAMPS							
NB LEFT	0	0%	**0**	0	0	0	
NB THRU	0	0%	**0**	0	0	0	
NB RIGHT	0	0%	**0**	0	0	0	
SB LEFT	205	5%	**0**	205	20	225	#
SB THRU	5	0%	**0**	5	5	10	#
SB RIGHT	60	5%	**0**	60	5	65	
TOTALS	**845**		**55**	**900**	**85**	**985**	

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	6 OF 8

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY EB RAMPS
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 1
ROUTE 1E, 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	
SCENERIO #							
BERKSHIRE PLACE							
EB LEFT	0	0%	**0**	0	0	0	
EB THRU	125	5%	**0**	125	10	135	#
EB RIGHT	80	5%	**0**	80	5	85	#
WB LEFT	205	5%	**0**	205	20	225	#
WB THRU	165	5%	**0**	165	15	180	#
WB RIGHT	0	0%	**0**	0	0	0	
I-210 FWY EB RAMPS							
NB LEFT	0	0%	**0**	0	0	0	
NB THRU	0	0%	**0**	0	0	0	
NB RIGHT	0	0%	**0**	0	0	0	
SB LEFT	205	23%	**55**	260	25	285	#
SB THRU	5	0%	**0**	5	5	10	#
SB RIGHT	60	5%	**0**	60	5	65	
TOTALS	**845**		**55**	**900**	**85**	**985**	

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	7 OF 8

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY EB RAMPS
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 1
ROUTE 1A, 1D

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BERKSHIRE PLACE						
EB LEFT	0	0%		0	0	0
EB THRU	80	5%		80	5	85
EB RIGHT	70	0%		70	5	75
WB LEFT	335	17%	**55**	390	35	425
WB THRU	160	0%		160	15	175
WB RIGHT	0	0%		0	0	0
I-210 FWY EB RAMPS						
NB LEFT	0	0%		0	0	0
NB THRU	0	0%		0	0	0
NB RIGHT	0	0%		0	0	0
SB LEFT	165	0%		165	15	180
SB THRU	5	0%		5	5	10
SB RIGHT	90	0%		90	10	100
TOTALS	**905**		**55**	**960**	**90**	**1050**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	8 OF 8

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY EB RAMPS
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 1
ROUTE 1E, 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BERKSHIRE PLACE						
EB LEFT	0	0%	**0**	0	0	0
EB THRU	80	5%	**0**	80	5	85
EB RIGHT	70	0%	**0**	70	5	75
WB LEFT	335	5%	**0**	335	30	365
WB THRU	160	0%	**0**	160	15	175
WB RIGHT	0	0%	**0**	0	0	0
I-210 FWY EB RAMPS						
NB LEFT	0	0%	**0**	0	0	0
NB THRU	0	0%	**0**	0	0	0
NB RIGHT	0	0%	**0**	0	0	0
SB LEFT	165	23%	**55**	220	20	240
SB THRU	5	0%	**0**	5	5	10
SB RIGHT	90	0%	**0**	90	10	100
TOTALS	**905**		**55**	**960**	**90**	**1050**

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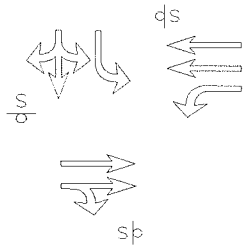
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	1 OF 8

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY EB RAMPS
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
1
ROUTE
1A, 1D

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	PCE EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BERKSHIRE PLACE								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	250	0	0	250	**0**	250	25	275
EB RIGHT	126	1	3	130	**0**	130	10	140
WB LEFT	134	4	12	145	**165**	310	30	340
WB THRU	115	3	9	125	**0**	125	10	135
WB RIGHT	0	0	0	0	**0**	0	0	0
I-210 FWY EB RAMPS								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	324	3	9	335	**0**	335	30	365
SB THRU	4	0	0	5	**0**	5	5	10
SB RIGHT	82	3	9	90	**0**	90	10	100
TOTALS	**1035**				**165**	**1245**	**120**	**1365**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	2 OF 8

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY EB RAMPS
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
1
ROUTE
1E, 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BERKSHIRE PLACE								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	250	0	0	250	**0**	250	25	275
EB RIGHT	126	1	3	130	**0**	130	10	140
WB LEFT	134	4	12	145	**0**	145	15	160
WB THRU	115	3	9	125	**0**	125	10	135
WB RIGHT	0	0	0	0	**0**	0	0	0
I-210 FWY EB RAMPS								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	324	3	9	335	**140**	475	45	520
SB THRU	4	0	0	5	**0**	5	5	10
SB RIGHT	82	3	9	90	**0**	90	10	100
TOTALS	**1035**				**140**	**1220**	**120**	**1340**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	3 OF 8

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY EB RAMPS
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 1
ROUTE 1A, 1D

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	ROUNDED PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BERKSHIRE PLACE								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	98	3	9	105	**0**	105	10	115
EB RIGHT	56	1	3	60	**0**	60	5	65
WB LEFT	79	3	9	90	**165**	255	25	280
WB THRU	107	2	6	115	**0**	115	10	125
WB RIGHT	0	0	0	0	**0**	0	0	0
I-210 FWY EB RAMPS								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	104	3	9	115	**0**	115	10	125
SB THRU	1	0	0	5	**0**	5	5	10
SB RIGHT	41	3	9	50	**0**	50	5	55
TOTALS	**486**				**165**	**705**	**70**	**775**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	4 OF 8

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY EB RAMPS
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 1
ROUTE 1E, 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BERKSHIRE PLACE								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	98	3	9	105	**0**	105	10	115
EB RIGHT	56	1	3	60	**0**	60	5	65
WB LEFT	79	3	9	90	**0**	90	10	100
WB THRU	107	2	6	115	**0**	115	10	125
WB RIGHT	0	0	0	0	**0**	0	0	0
I-210 FWY EB RAMPS								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	104	3	9	115	**140**	255	25	280
SB THRU	1	0	0	5	**0**	5	5	10
SB RIGHT	41	3	9	50	**0**	50	5	55
TOTALS	**486**					**680**	**70**	**750**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	5 OF 8

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY EB RAMPS
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 1
ROUTE 1A, 1D

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BERKSHIRE PLACE								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	125	6	19	145	**0**	145	15	160
EB RIGHT	80	4	12	90	**0**	90	10	100
WB LEFT	205	10	31	235	**165**	400	35	435
WB THRU	165	8	25	190	**0**	190	15	205
WB RIGHT	0	0	0	0	**0**	0	0	0
I-210 FWY EB RAMPS								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	205	10	31	235	**0**	235	20	255
SB THRU	5	0	1	5	**0**	5	5	10
SB RIGHT	60	3	9	70	**0**	70	5	75
TOTALS	**845**				**165**	**1135**	**105**	**1240**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	6 OF 8

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY EB RAMPS
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 1
ROUTE 1E, 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BERKSHIRE PLACE								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	125	6	19	145	**0**	145	15	160
EB RIGHT	80	4	12	90	**0**	90	10	100
WB LEFT	205	10	31	235	**0**	235	20	255
WB THRU	165	8	25	190	**0**	190	15	205
WB RIGHT	0	0	0	0	**0**	0	0	0
I-210 FWY EB RAMPS								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	205	10	31	235	**140**	236	20	256
SB THRU	5	0	1	5	**0**	6	5	11
SB RIGHT	60	3	9	70	**0**	69	5	74
TOTALS	**845**				**140**	**971**	**90**	**1061**

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TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	7 OF 8

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY EB RAMPS
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 1
ROUTE 1A, 1D

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BERKSHIRE PLACE								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	78	3	9	85	**0**	85	5	90
EB RIGHT	70	0	0	70	**0**	70	5	75
WB LEFT	333	1	3	335	**165**	500	45	545
WB THRU	160	0	0	160	**0**	160	15	175
WB RIGHT	0	0	0	0	**0**	0	0	0
I-210 FWY EB RAMPS								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	163	0	0	165	**0**	165	15	180
SB THRU	1	0	0	5	**0**	5	5	10
SB RIGHT	89	0	0	90	**0**	90	10	100
TOTALS	**894**				**165**	**1075**	**100**	**1175**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	8 OF 8

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY EB RAMPS
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 1
ROUTE 1E, 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BERKSHIRE PLACE								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	78	3	9	85	**0**	85	5	90
EB RIGHT	70	0	0	70	**0**	70	5	75
WB LEFT	333	1	3	335	**0**	335	30	365
WB THRU	160	0	0	160	**0**	160	15	175
WB RIGHT	0	0	0	0	**0**	0	0	0
I-210 FWY EB RAMPS								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	163	0	0	165	**140**	305	25	330
SB THRU	1	0	0	5	**0**	5	5	10
SB RIGHT	89	0	0	90	**0**	90	10	100
TOTALS	**894**				**140**	**1050**	**95**	**1145**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: BIRKSHIRE
EAST-WEST STREET: I-210 EB RAMPS
JURISDICTION: PASADENA

DATE: 05-31-11

PEAK HOUR: 07:30AM

Birkshire Place (WB)

NORTH LEG

TOTAL: 256

TT = 5

TT% = $\frac{5}{256}$ = 1.95 % ≈ 2%

	Rt	Thru	Lt	
		118 (120)	138 (140)	Total
		39	65	1st
		42	34	2nd
		21	15	3rd
		16	24	4th

EAST LEG TOTAL: 0

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
327 (325)	102	76	75	74	Lt
4 (5)	1	0	2	1	Thru
85	15	25	11	34	Rt

WEST LEG TOTAL: 416

EB 210 Fwy

TT = 6

TT = $\frac{6}{416}$ = 1.44% ≈ 1%

PEAK HOUR FACTORS

NORTH LEG = 0.62
SOUTH LEG = 0.49
EAST LEG =
WEST LEG = 0.88

ALL LEGS = 0.63

TT = 1

TT% = $\frac{1}{377}$ = 0.27% ≈ 1%

TOTAL: 377

	Lt	Thru	Rt
1st		137	55
2nd		86	38
3rd		16	16
4th		11	18
Total		250	127 (125)

SOUTH LEG

Birkshire Place (EB)

HOUR TOTAL: 1,049

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: BIRKSHIRE

EAST-WEST STREET: I-210 EB RAMPS

TIME: 07:00AM-08:00AM DATE: 05-31-11

NORTH LEG

	119	137	Total
	23	18	1st
	15	20	2nd
	39	65	3rd
	42	34	4th
Rt	Thru	Lt	

Rt					
Thru					
Lt					
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
220	14	28	102	76	Lt
4	0	3	1	0	Thru
63	11	12	15	25	Rt

	Lt	Thru	Rt
1st		34	24
2nd		54	26
3rd		137	55
4th		86	38
Total		311	143

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: BIRKSHIRE

EAST-WEST STREET: I-210 EB RAMPS

TIME: 08:00AM-09:00AM DATE: 05-31-11

NORTH LEG

	71	99	Total
	21	15	1st
	16	24	2nd
	19	34	3rd
	15	26	4th
Rt	Thru	Lt	

Rt					
Thru					
Lt					
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
278	75	74	69	60	Lt
3	2	1	0	0	Thru
76	11	34	15	16	Rt

	Lt	Thru	Rt
1st		16	16
2nd		11	18
3rd		14	22
4th		10	20
Total		51	76

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : BIRKSHIRE PASADENA

EAST-WEST STREET : I-210 EB RAMPS 05-31-11

BEGINNING TIME : 07:00AM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
					WB NORTH LEG							
0	20	17	0	3	0	0	0	0	0	0	1	41
0	15	20	0	0	0	0	0	0	0	0	0	35
0	37	65	0	2	0	0	0	0	0	0	0	104
0	41	32	0	1	2	0	0	0	0	0	0	76
0	21	14	0	0	0	0	0	1	0	0	0	36
0	16	23	0	0	1	0	0	0	0	0	0	40
0	18	34	0	1	0	0	0	0	0	0	0	53
0	14	25	0	1	1	0	0	0	0	0	0	41
						TT=4+1+0=5						256
0	182	230	0	8	4	0	0	1	0	0	1	426
					EB SOUTH LEG							
24	33	0	0	1	0	0	0	0	0	0	0	58
26	54	0	0	0	0	0	0	0	0	0	0	80
54	137	0	1	0	0	0	0	0	0	0	0	192
38	86	0	0	0	0	0	0	0	0	0	0	124
16	16	0	0	0	0	0	0	0	0	0	0	32
18	11	0	0	0	0	0	0	0	0	0	0	29
22	14	0	0	0	0	0	0	0	0	0	0	36
20	10	0	0	0	0	0	0	0	0	0	0	30
						TT=1+0+0=1						377
218	361	0	1	1	0	0	0	0	0	0	0	581
					EAST LEG							
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
					SB WEST LEG							
10	0	14	1	0	0	0	0	0	0	0	0	25
12	3	27	0	0	1	0	0	0	0	0	0	43
15	1	100	0	0	1	0	0	1	0	0	0	118
24	0	76	0	0	0	0	0	0	1	0	0	101
10	2	74	1	0	1	0	0	0	0	0	0	88
33	1	74	1	0	0	0	0	0	0	0	0	109
14	0	69	0	0	0	1	0	0	0	0	1	84
16	0	58	0	0	2	0	0	0	0	0	0	76
						TT=4+1+1=6						416
134	7	492	3	0	5	1	0	1	1	0	0	644

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: BIRKSHIRE
EAST-WEST STREET: I-210 EB RAMPS
JURISDICTION: PASADENA

DATE: 05-31-11

PEAK HOUR: 01:00PM

Birkshire Place (WB)
NORTH LEG

TOTAL: 191

TT = 5
TT% = 5/191 = 2.62%
≈ 3%

	109 (110)	82 (80)	Total
	25	10	1st
	22	23	2nd
	28	24	3rd
	34	25	4th
	Rt	Thru	Lt

EAST LEG TOTAL: 0

Rt					
Thru					
Lt					
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
107 (105)	24	27	27	29	Lt
5 1	1	0	0	0	Thru
45 44	16	12	7	9	Rt

WEST LEG TOTAL: 152
EB 210 Fwy

TT = 6
TT = 6/152 = 3.95%
≈ 4%

PEAK HOUR FACTORS

NORTH LEG = 0.81
SOUTH LEG = 0.67
EAST LEG =
WEST LEG = 0.93

ALL LEGS = 0.80

TT = 4
TT% = 4/158 = 2.53%
≈ 3%

	Lt	Thru	Rt	
1st		10	13	
2nd		19	13	
3rd		30	14	
4th		42	17	
Total		101 (100)	57 (55)	TOTAL: 158

SOUTH LEG
Birkshire Place (EB)

HOUR TOTAL: 501

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: BIRKSHIRE

EAST-WEST STREET: I-210 EB RAMPS

TIME: 12:00PM-01:00PM DATE: 05-31-11

NORTH LEG

	96	63	Total
	28	24	1st
	22	15	2nd
	28	14	3rd
	18	10	4th
	Rt	Thru	Lt

Rt					
Thru					
Lt					
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
152	27	44	46	35	Lt
5	1	1	1	2	Thru
43	9	16	5	13	Rt

	Lt	Thru	Rt
1st		26	7
2nd		14	12
3rd		29	12
4th		16	20
Total		85	51

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: BIRKSHIRE

EAST-WEST STREET: I-210 EB RAMPS

TIME: 01:00PM-02:00PM DATE: 05-31-11

NORTH LEG

	109	82	Total
	25	10	1st
	22	23	2nd
	28	24	3rd
	34	25	4th

Rt Thru Lt

Rt					
Thru					
Lt					
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
107	24	27	27	29	Lt
1	1	0	0	0	Thru
44	16	12	7	9	Rt

	Lt	Thru	Rt
1st		10	13
2nd		19	13
3rd		30	14
4th		42	17
Total		101	57

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : BIRKSHIRE PASADENA

EAST-WEST STREET : I-210 EB RAMPS 05-31-11

BEGINNING TIME : 12:00PM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
					WB NORTH LEG							
0	27	24	0	1	0	0	0	0	0	0	0	52
0	21	14	0	1	0	0	0	0	0	0	1	37
0	27	13	0	1	1	0	0	0	0	0	0	42
0	17	9	0	1	1	0	0	0	0	0	0	28
0	25	10	0	0	0	0	0	0	0	0	0	35
0	21	21	0	1	2	0	0	0	0	0	0	45
0	28	24	0	0	0	0	0	0	0	0	0	52
0	33	24	0	1	0	0	0	0	0	0	1	59
				4			0			1		191
						TT=4+0+1=5						
0	199	139	0	6	4	0	0	0	0	0	2	350
					EB SOUTH LEG							
7	24	0	0	2	0	0	0	0	0	0	0	33
12	14	0	0	0	0	0	0	0	0	0	0	26
12	27	0	0	2	0	0	0	0	0	0	0	41
20	16	0	0	0	0	0	0	0	0	0	0	36
13	9	0	0	0	0	0	1	0	0	0	0	23
13	18	0	0	0	0	0	1	0	0	0	0	32
13	29	0	1	0	0	0	1	0	0	0	0	44
17	42	0	0	0	0	0	0	0	0	0	0	59
				1			3			0		158
						TT=1+3+0=4						
107	179	0	1	4	0	0	3	0	0	0	0	294
					EAST LEG							
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
					SB WEST LEG							
8	1	26	0	0	1	1	0	0	0	0	0	37
16	1	44	0	0	0	0	0	0	0	0	0	61
5	1	46	0	0	0	0	0	0	0	0	0	52
13	2	33	0	0	2	0	0	0	0	0	0	50
16	1	23	0	0	1	0	0	0	0	0	0	41
9	0	26	1	0	1	2	0	0	0	0	0	39
7	0	27	0	0	0	0	0	0	0	0	0	34
9	0	28	0	0	1	0	0	0	0	0	0	38
				4		TT=4+2+0=6		2				152
83	6	253	1	0	6	3	0	0	0	0	0	352

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: BERKSHIRE
EAST-WEST STREET: I-210 EB RAMPS
JURISDICTION: LA CANADA

DATE: 04-10-12

PEAK HOUR: 02:45PM

NORTH LEG (SB)

TOTAL: 370

	167	203	Total
	33	24	1st
	67	57	2nd
	32	66	3rd
	35	56	4th
Rt	Thru	Lt	

EAST LEG TOTAL: 0

Rt					
Thru					
Lt					
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
205	79	65	39	22	Lt
					Thru
62	11	26	17	8	Rt

WEST LEG TOTAL: 267
(EB)

PEAK HOUR FACTORS

NORTH LEG = 0.75
SOUTH LEG = 0.66
EAST LEG =
WEST LEG = 0.73

ALL LEGS = 0.72

	Lt	Thru	Rt
1st		34	23
2nd		51	28
3rd		25	16
4th		17	14
Total		127	81

TOTAL: 208

SOUTH LEG (NB)

HOUR TOTAL: 845

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: BERKSHIRE

EAST-WEST STREET: I-210 EB RAMPS

TIME: 02:00PM-03:00PM DATE: 04-10-12

NORTH LEG

	92	95	Total
	24	22	1st
	16	25	2nd
	19	24	3rd
	33	24	4th
Rt	Thru	Lt	

Rt					
Thru					
Lt					
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
151	32	30	10	79	Lt
					Thru
24	8	5	0	11	Rt

	Lt	Thru	Rt
1st		27	9
2nd		20	11
3rd		30	3
4th		34	23
Total		111	46

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: BERKSHIRE

EAST-WEST STREET: I-210 EB RAMPS

TIME: 03:00PM-04:00PM DATE: 04-10-12

NORTH LEG

	157	221	Total
	67	57	1st
	32	66	2nd
	35	56	3rd
	23	42	4th
	Rt	Thru	Lt

Rt					
Thru					
Lt					
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
162	65	39	22	36	Lt
					Thru
63	26	17	8	12	Rt

	Lt	Thru	Rt
1st		51	28
2nd		25	16
3rd		17	14
4th		25	12
Total		118	70

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: BIRKSHIRE
EAST-WEST STREET: I-210 EB RAMPS
JURISDICTION: PASADENA

DATE: 05-31-11

PEAK HOUR: 05:00PM

NORTH LEG

TOTAL: 495

TT = 1

TT% = $\frac{1}{495}$ = 0.2 %
≈ 1%

	161 (160)	334 (335)	Total
	45	100	1st
	39	87	2nd
	40	95	3rd
	37	52	4th
Rt	Thru	Lt	

EAST LEG TOTAL: 0

Rt					
Thru					
Lt					
	1st	2nd	3rd	4th	Total

WEST LEG TOTAL: 253

EB 210 Fwy

TT = 0

TT% = $\frac{0}{253}$ = 0 %
≈ 1%

Total	1st	2nd	3rd	4th	
163 (165)	32	37	56	38	Lt
1 (S)	0	0	0	1	Thru
89 (90)	24	24	24	17	Rt

SOUTH LEG

TOTAL: 151

TT = 3

TT% = $\frac{3}{151}$ = 1.99 %
≈ 2%

	Lt	Thru	Rt
1st		13	12
2nd		11	11
3rd		27	19
4th		30	28
Total		81 (80)	70

PEAK HOUR FACTORS

NORTH LEG = 0.85
SOUTH LEG = 0.65
EAST LEG =
WEST LEG = 0.79

ALL LEGS = 0.86

HOUR TOTAL: 899

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: BIRKSHIRE

EAST-WEST STREET: I-210 EB RAMPS

TIME: 04:00PM-05:00PM DATE: 05-31-11

NORTH LEG

	108	240	Total
	20	69	1st
	31	56	2nd
	33	63	3rd
	24	52	4th
Rt	Thru	Lt	

Rt					
Thru					
Lt					
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
100	26	21	28	25	Lt
0	0	0	0	0	Thru
56	6	14	12	24	Rt

	Lt	Thru	Rt
1st		21	18
2nd		15	20
3rd		22	22
4th		21	24
Total		79	84

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: BIRKSHIRE

EAST-WEST STREET: I-210 EB RAMPS

TIME: 05:00PM-06:00PM DATE: 05-31-11

NORTH LEG

	161	334	Total
	45	100	1st
	39	87	2nd
	40	95	3rd
	37	52	4th
Rt	Thru	Lt	

Rt					
Thru					
Lt					
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
163	32	37	56	38	Lt
1	0	0	0	1	Thru
89	24	24	24	17	Rt

	Lt	Thru	Rt
1st		13	12
2nd		11	11
3rd		27	19
4th		30	28
Total		81	70

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : BIRKSHIRE PASADENA

EAST-WEST STREET : I-210 EB RAMPS 05-31-11

BEGINNING TIME : 04:00PM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
					WB NORTH LEG							
0	20	68	0	0	1	0	0	0	0	0	0	89
0	31	56	0	0	0	0	0	0	0	0	0	87
0	33	62	0	0	1	0	0	0	0	0	0	96
0	24	52	0	0	0	0	0	0	0	0	0	76
0	45	100	0	0	0	0	0	0	0	0	0	145
0	39	87	0	0	0	0	0	0	0	0	0	126
0	40	94	0	0	1	0	0	0	0	0	0	135
0	37	52	0	0	0	0	0	0	0	0	0	89
					1			0			0	
						TT=1+0+0=1						
0	269	571	0	0	3	0	0	0	0	0	0	843
					EB SOUTH LEG							
18	20	0	0	0	0	0	1	0	0	0	0	39
19	14	0	1	1	0	0	0	0	0	0	0	35
22	22	0	0	0	0	0	0	0	0	0	0	44
24	21	0	0	0	0	0	0	0	0	0	0	45
12	12	0	0	1	0	0	0	0	0	0	0	25
11	9	0	0	1	0	0	1	0	0	0	0	22
19	27	0	0	0	0	0	0	0	0	0	0	46
28	30	0	0	0	0	0	0	0	0	0	0	58
				2			1			0		
						TT=2+1+0=3						
153	155	0	1	3	0	0	2	0	0	0	0	314
					EAST LEG							
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
					SB WEST LEG							
6	0	26	0	0	0	0	0	0	0	0	0	32
14	0	20	0	0	0	0	0	1	0	0	0	35
12	0	28	0	0	0	0	0	0	0	0	0	40
24	0	25	0	0	0	0	0	0	0	0	0	49
24	0	32	0	0	0	0	0	0	0	0	0	56
24	0	37	0	0	0	0	0	0	0	0	0	61
24	0	56	0	0	0	0	0	0	0	0	0	80
17	1	38	0	0	0	0	0	0	0	0	0	56
					0			0			0	
						TT=0+0+0=0						
145	1	262	0	0	0	0	0	1	0	0	0	409

Prepared by Newport Traffic Studies

Intersection	
Intersection Delay (sec/veh)	27.9
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	0	250	125	140	120	0	0	0	0	325	5	85
Peak Hour Factor	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63
Heavy Vehicles(%)	0	0	5	5	5	0	0	0	0	5	0	5
Movement Flow Rate	0	397	198	222	190	0	0	0	0	516	8	135
Number of Lanes	0	2	0	1	2	0	0	0	0	1	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	3	2	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	3
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	2
HCM Control Delay	27.1	19.2	34.1
HCM LOS	D	C	D

Lane	EBLn1	EBLn2	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Volume Left (%)	0%	0%	100%	0%	0%	100%	56%
Volume Thru (%)	100%	40%	0%	100%	100%	0%	2%
Volume Right (%)	0%	60%	0%	0%	0%	0%	42%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	167	208	140	60	60	211	204
Left Turning Volume	167	83	0	60	60	0	5
Through Volume	0	125	0	0	0	0	85
Right Turning Volume	0	0	140	0	0	211	114
Lane Flow Rate	265	331	222	95	95	335	323
Geometry Group	8	8	8	8	8	8	8
Degree of Utilization, X	0.612	0.734	0.57	0.231	0.228	0.806	0.723
Departure Headway, Hd	8.333	7.986	9.233	8.717	8.629	8.656	8.047
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	434	453	391	411	415	419	450
Service Time	6.096	5.749	6.999	6.483	6.395	6.417	5.808
HCM Lane V/C Ratio	0.611	0.731	0.568	0.231	0.229	0.8	0.718
HCM Control Delay	23.5	29.9	23.6	14.1	13.9	38.9	29.2
HCM Lane LOS	C	D	C	B	B	E	D
HCM 95th Percentile Queue	4.7	8.2	4	0.9	0.9	12.2	7.8

Intersection	
Intersection Delay (sec/veh)	9.5
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	0	100	55	80	110	0	0	0	0	105	5	45
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Heavy Vehicles(%)	0	5	5	5	5	0	0	0	0	5	0	5
Movement Flow Rate	0	125	69	100	138	0	0	0	0	131	6	56
Number of Lanes	0	2	0	1	2	0	0	0	0	1	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	3	2	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	3
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	2
HCM Control Delay	9.2	9.4	9.8
HCM LOS	A	A	A

Lane	EBLn1	EBLn2	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Volume Left (%)	0%	0%	100%	0%	0%	100%	34%
Volume Thru (%)	100%	38%	0%	100%	100%	0%	7%
Volume Right (%)	0%	62%	0%	0%	0%	0%	60%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	67	88	80	55	55	80	75
Left Turning Volume	67	33	0	55	55	0	5
Through Volume	0	55	0	0	0	0	45
Right Turning Volume	0	0	80	0	0	80	25
Lane Flow Rate	83	110	100	69	69	100	94
Geometry Group	8	8	8	8	8	8	8
Degree of Utilization, X	0.132	0.161	0.169	0.107	0.105	0.173	0.141
Departure Headway, Hd	5.705	5.265	6.092	5.588	5.503	6.255	5.417
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	623	676	585	637	646	570	656
Service Time	3.484	3.044	3.87	3.366	3.281	4.037	3.199
HCM Lane V/C Ratio	0.133	0.163	0.171	0.108	0.107	0.175	0.143
HCM Control Delay	9.4	9.1	10.1	9	8.9	10.4	9.1
HCM Lane LOS	A	A	B	A	A	B	A
HCM 95th Percentile Queue	0.5	0.6	0.6	0.4	0.4	0.6	0.5

Intersection	
Intersection Delay (sec/veh)	14.6
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	0	125	80	205	165	0	0	0	0	205	5	60
Peak Hour Factor	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72
Heavy Vehicles(%)	0	5	5	5	5	0	0	0	0	5	0	5
Movement Flow Rate	0	174	111	285	229	0	0	0	0	285	7	83
Number of Lanes	0	2	0	1	2	0	0	0	0	1	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	3	2	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	3
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	2
HCM Control Delay	12.6	15.8	14.5
HCM LOS	B	C	B

Lane	EBLn1	EBLn2	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Volume Left (%)	0%	0%	100%	0%	0%	100%	51%
Volume Thru (%)	100%	34%	0%	100%	100%	0%	4%
Volume Right (%)	0%	66%	0%	0%	0%	0%	45%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	83	122	205	82	82	137	133
Left Turning Volume	83	42	0	82	82	0	5
Through Volume	0	80	0	0	0	0	60
Right Turning Volume	0	0	205	0	0	137	68
Lane Flow Rate	116	169	285	115	115	191	184
Geometry Group	8	8	8	8	8	8	8
Degree of Utilization, X	0.234	0.32	0.573	0.214	0.212	0.402	0.355
Departure Headway, Hd	7.278	6.807	7.246	6.737	6.651	7.58	6.928
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	490	524	495	529	536	473	516
Service Time	5.072	4.601	5.028	4.519	4.433	5.366	4.713
HCM Lane V/C Ratio	0.237	0.323	0.576	0.217	0.215	0.404	0.357
HCM Control Delay	12.3	12.8	19.4	11.4	11.2	15.4	13.5
HCM Lane LOS	B	B	C	B	B	C	B
HCM 95th Percentile Queue	0.9	1.4	4	0.8	0.8	2	1.7

Intersection	
Intersection Delay (sec/veh)	16.3
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	0	80	70	335	160	0	0	0	0	165	5	90
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles(%)	0	5	0	5	0	0	0	0	0	0	0	0
Movement Flow Rate	0	93	81	390	186	0	0	0	0	192	6	105
Number of Lanes	0	2	0	1	2	0	0	0	0	1	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	3	2	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	3
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	2
HCM Control Delay	10.9	20	12.4
HCM LOS	B	C	B

Lane	EBLn1	EBLn2	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Volume Left (%)	0%	0%	100%	0%	0%	100%	24%
Volume Thru (%)	100%	28%	0%	100%	100%	0%	4%
Volume Right (%)	0%	72%	0%	0%	0%	0%	72%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	53	97	335	80	80	135	125
Left Turning Volume	53	27	0	80	80	0	5
Through Volume	0	70	0	0	0	0	90
Right Turning Volume	0	0	335	0	0	135	30
Lane Flow Rate	62	112	390	93	93	157	145
Geometry Group	8	8	8	8	8	8	8
Degree of Utilization, X	0.122	0.202	0.72	0.157	0.157	0.318	0.257
Departure Headway, Hd	7.064	6.46	6.656	6.064	6.064	7.271	6.38
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	506	553	541	591	591	494	561
Service Time	4.83	4.227	4.403	3.811	3.811	5.032	4.14
HCM Lane V/C Ratio	0.123	0.203	0.721	0.157	0.157	0.318	0.258
HCM Control Delay	10.8	10.9	24.8	9.9	9.9	13.4	11.4
HCM Lane LOS	B	B	C	A	A	B	B
HCM 95th Percentile Queue	0.4	0.8	7.7	0.6	0.6	1.4	1

Intersection	
Intersection Delay (sec/veh)	35.5
Intersection LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	0	250	125	195	120	0	0	0	0	325	5	85
Peak Hour Factor	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63
Heavy Vehicles(%)	0	0	5	30	5	0	0	0	0	5	0	5
Movement Flow Rate	0	397	198	310	190	0	0	0	0	516	8	135
Number of Lanes	0	2	0	1	2	0	0	0	0	1	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	3	2	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	3
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	2
HCM Control Delay	30.9	35.2	40
HCM LOS	D	E	E

Lane	EBLn1	EBLn2	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Volume Left (%)	0%	0%	100%	0%	0%	100%	56%
Volume Thru (%)	100%	40%	0%	100%	100%	0%	2%
Volume Right (%)	0%	60%	0%	0%	0%	0%	42%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	167	208	195	60	60	211	204
Left Turning Volume	167	83	0	60	60	0	5
Through Volume	0	125	0	0	0	0	85
Right Turning Volume	0	0	195	0	0	211	114
Lane Flow Rate	265	331	310	95	95	335	323
Geometry Group	8	8	8	8	8	8	8
Degree of Utilization, X	0.644	0.773	0.844	0.234	0.232	0.847	0.762
Departure Headway, Hd	8.766	8.418	9.817	8.86	8.773	9.092	8.481
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	410	430	368	404	409	399	427
Service Time	6.546	6.197	7.597	6.64	6.552	6.87	6.258
HCM Lane V/C Ratio	0.646	0.77	0.842	0.235	0.232	0.84	0.756
HCM Control Delay	26.2	34.7	48.1	14.3	14.2	45.9	33.9
HCM Lane LOS	D	D	E	B	B	E	D
HCM 95th Percentile Queue	5.4	10.1	15.7	0.9	0.9	16	9.5

Intersection	
Intersection Delay (sec/veh)	10.4
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	0	100	55	135	110	0	0	0	0	105	5	45
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Heavy Vehicles(%)	0	5	5	42	5	0	0	0	0	5	0	5
Movement Flow Rate	0	125	69	169	138	0	0	0	0	131	6	56
Number of Lanes	0	2	0	1	2	0	0	0	0	1	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	3	2	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	3
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	2
HCM Control Delay	9.5	11.1	10.2
HCM LOS	A	B	B

Lane	EBLn1	EBLn2	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Volume Left (%)	0%	0%	100%	0%	0%	100%	34%
Volume Thru (%)	100%	38%	0%	100%	100%	0%	7%
Volume Right (%)	0%	62%	0%	0%	0%	0%	60%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	67	88	135	55	55	80	75
Left Turning Volume	67	33	0	55	55	0	5
Through Volume	0	55	0	0	0	0	45
Right Turning Volume	0	0	135	0	0	80	25
Lane Flow Rate	83	110	169	69	69	100	94
Geometry Group	8	8	8	8	8	8	8
Degree of Utilization, X	0.139	0.171	0.321	0.109	0.107	0.183	0.151
Departure Headway, Hd	6.012	5.572	6.849	5.711	5.625	6.605	5.766
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	597	645	527	630	639	545	623
Service Time	3.735	3.295	4.568	3.429	3.344	4.328	3.489
HCM Lane V/C Ratio	0.139	0.171	0.321	0.11	0.108	0.183	0.151
HCM Control Delay	9.7	9.4	12.8	9.1	9	10.8	9.5
HCM Lane LOS	A	A	B	A	A	B	A
HCM 95th Percentile Queue	0.5	0.6	1.4	0.4	0.4	0.7	0.5

Intersection	
Intersection Delay (sec/veh)	18.7
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	0	125	80	260	165	0	0	0	0	205	5	60
Peak Hour Factor	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72
Heavy Vehicles(%)	0	5	5	22	5	0	0	0	0	5	0	5
Movement Flow Rate	0	174	111	361	229	0	0	0	0	285	7	83
Number of Lanes	0	2	0	1	2	0	0	0	0	1	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	3	2	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	3
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	2
HCM Control Delay	13.3	23.5	15.4
HCM LOS	B	C	C

Lane	EBLn1	EBLn2	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Volume Left (%)	0%	0%	100%	0%	0%	100%	51%
Volume Thru (%)	100%	34%	0%	100%	100%	0%	4%
Volume Right (%)	0%	66%	0%	0%	0%	0%	45%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	83	122	260	82	82	137	133
Left Turning Volume	83	42	0	82	82	0	5
Through Volume	0	80	0	0	0	0	60
Right Turning Volume	0	0	260	0	0	137	68
Lane Flow Rate	116	169	361	115	115	191	184
Geometry Group	8	8	8	8	8	8	8
Degree of Utilization, X	0.246	0.337	0.763	0.217	0.214	0.422	0.374
Departure Headway, Hd	7.661	7.189	7.724	6.921	6.834	7.971	7.317
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	471	502	473	521	528	454	494
Service Time	5.378	4.906	5.424	4.621	4.534	5.682	5.028
HCM Lane V/C Ratio	0.246	0.337	0.763	0.221	0.218	0.421	0.372
HCM Control Delay	12.9	13.5	31.2	11.5	11.4	16.4	14.3
HCM Lane LOS	B	B	D	B	B	C	B
HCM 95th Percentile Queue	1	1.5	9.5	0.8	0.8	2.2	1.8

Intersection	
Intersection Delay (sec/veh)	23.2
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	0	80	70	390	160	0	0	0	0	165	5	90
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles(%)	0	5	0	17	0	0	0	0	0	0	0	0
Movement Flow Rate	0	93	81	453	186	0	0	0	0	192	6	105
Number of Lanes	0	2	0	1	2	0	0	0	0	1	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	3	2	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	3
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	2
HCM Control Delay	11.2	31.4	12.9
HCM LOS	B	D	B

Lane	EBLn1	EBLn2	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Volume Left (%)	0%	0%	100%	0%	0%	100%	24%
Volume Thru (%)	100%	28%	0%	100%	100%	0%	4%
Volume Right (%)	0%	72%	0%	0%	0%	0%	72%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	53	97	390	80	80	135	125
Left Turning Volume	53	27	0	80	80	0	5
Through Volume	0	70	0	0	0	0	90
Right Turning Volume	0	0	390	0	0	135	30
Lane Flow Rate	62	112	453	93	93	157	145
Geometry Group	8	8	8	8	8	8	8
Degree of Utilization, X	0.125	0.209	0.87	0.158	0.158	0.328	0.267
Departure Headway, Hd	7.281	6.678	6.905	6.107	6.107	7.511	6.619
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	490	534	526	586	586	477	541
Service Time	5.063	4.459	4.659	3.86	3.86	5.284	4.391
HCM Lane V/C Ratio	0.127	0.21	0.861	0.159	0.159	0.329	0.268
HCM Control Delay	11.1	11.2	40.2	10	10	13.9	11.8
HCM Lane LOS	B	B	E	A	A	B	B
HCM 95th Percentile Queue	0.4	0.8	19.3	0.6	0.6	1.5	1.1

Intersection	
Intersection Delay (sec/veh)	51.4
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	0	275	135	215	130	0	0	0	0	355	5	85
Peak Hour Factor	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63
Heavy Vehicles(%)	0	0	5	30	5	0	0	0	0	5	0	5
Movement Flow Rate	0	437	214	341	206	0	0	0	0	563	8	135
Number of Lanes	0	2	0	1	2	0	0	0	0	1	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	3	2	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	3
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	2
HCM Control Delay	44.7	51.5	57.4
HCM LOS	E	F	F

Lane	EBLn1	EBLn2	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Volume Left (%)	0%	0%	100%	0%	0%	100%	59%
Volume Thru (%)	100%	40%	0%	100%	100%	0%	2%
Volume Right (%)	0%	60%	0%	0%	0%	0%	39%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	183	227	215	65	65	227	218
Left Turning Volume	183	92	0	65	65	0	5
Through Volume	0	135	0	0	0	0	85
Right Turning Volume	0	0	215	0	0	227	128
Lane Flow Rate	291	360	341	103	103	361	346
Geometry Group	8	8	8	8	8	8	8
Degree of Utilization, X	0.751	0.894	0.968	0.265	0.263	0.954	0.859
Departure Headway, Hd	9.292	8.946	10.325	9.366	9.278	9.64	9.06
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	393	407	355	386	390	379	401
Service Time	6.992	6.646	8.025	7.066	6.978	7.34	6.76
HCM Lane V/C Ratio	0.74	0.885	0.961	0.267	0.264	0.953	0.863
HCM Control Delay	35.2	52.4	73.3	15.4	15.3	67.1	47.2
HCM Lane LOS	E	F	F	C	C	F	E
HCM 95th Percentile Queue	8.9	23.6	54.8	1.1	1.1	45.9	17.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	275	135	215	130	0	0	0	0	355	5	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0					4.0	4.0	
Lane Util. Factor		0.95		1.00	0.95					0.95	0.95	
Frt		0.95		1.00	1.00					1.00	0.94	
Flt Protected		1.00		0.95	1.00					0.95	0.97	
Satd. Flow (prot)		3376		1388	3438					1633	1574	
Flt Permitted		1.00		0.23	1.00					0.95	0.97	
Satd. Flow (perm)		3376		336	3438					1633	1574	
Peak-hour factor, PHF	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63
Adj. Flow (vph)	0	437	214	341	206	0	0	0	0	563	8	135
RTOR Reduction (vph)	0	113	0	0	0	0	0	0	0	0	42	0
Lane Group Flow (vph)	0	538	0	341	206	0	0	0	0	360	304	0
Heavy Vehicles (%)	0%	0%	5%	30%	5%	0%	0%	0%	0%	5%	0%	5%
Turn Type		NA		pm+pt	NA					Perm	NA	
Protected Phases		4		3	8						6	
Permitted Phases				8						6		
Actuated Green, G (s)		13.4		28.3	28.3					14.5	14.5	
Effective Green, g (s)		13.4		28.3	28.3					14.5	14.5	
Actuated g/C Ratio		0.26		0.56	0.56					0.29	0.29	
Clearance Time (s)		4.0		4.0	4.0					4.0	4.0	
Vehicle Extension (s)		3.0		3.0	3.0					3.0	3.0	
Lane Grp Cap (vph)		891		413	1915					466	449	
v/s Ratio Prot		0.16		c0.18	0.06							
v/s Ratio Perm				c0.28						c0.22	0.19	
v/c Ratio		0.60		0.83	0.11					0.77	0.68	
Uniform Delay, d1		16.4		8.3	5.3					16.6	16.1	
Progression Factor		1.00		1.00	1.00					1.00	1.00	
Incremental Delay, d2		1.2		12.7	0.0					7.8	4.0	
Delay (s)		17.5		20.9	5.3					24.4	20.1	
Level of Service		B		C	A					C	C	
Approach Delay (s)		17.5			15.1			0.0			22.3	
Approach LOS		B			B			A			C	

Intersection Summary			
HCM Average Control Delay	18.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	50.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	46.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Intersection Delay (sec/veh)	10.8
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	0	110	60	145	120	0	0	0	0	115	5	50
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Heavy Vehicles(%)	0	5	5	42	5	0	0	0	0	5	0	5
Movement Flow Rate	0	138	75	181	150	0	0	0	0	144	6	62
Number of Lanes	0	2	0	1	2	0	0	0	0	1	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	3	2	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	3
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	2
HCM Control Delay	9.9	11.6	10.5
HCM LOS	A	B	B

Lane	EBLn1	EBLn2	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Volume Left (%)	0%	0%	100%	0%	0%	100%	33%
Volume Thru (%)	100%	38%	0%	100%	100%	0%	6%
Volume Right (%)	0%	62%	0%	0%	0%	0%	61%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	73	97	145	60	60	87	83
Left Turning Volume	73	37	0	60	60	0	5
Through Volume	0	60	0	0	0	0	50
Right Turning Volume	0	0	145	0	0	87	28
Lane Flow Rate	92	121	181	75	75	109	103
Geometry Group	8	8	8	8	8	8	8
Degree of Utilization, X	0.157	0.192	0.351	0.122	0.12	0.205	0.169
Departure Headway, Hd	6.157	5.718	6.978	5.838	5.752	6.749	5.905
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	583	628	517	615	625	533	608
Service Time	3.886	3.447	4.701	3.562	3.476	4.479	3.634
HCM Lane V/C Ratio	0.158	0.193	0.35	0.122	0.12	0.205	0.169
HCM Control Delay	10	9.8	13.4	9.4	9.3	11.2	9.8
HCM Lane LOS	A	A	B	A	A	B	A
HCM 95th Percentile Queue	0.6	0.7	1.6	0.4	0.4	0.8	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	110	60	145	120	0	0	0	0	115	5	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0					4.0	4.0	
Lane Util. Factor		0.95		1.00	0.95					0.95	0.95	
Frt		0.95		1.00	1.00					1.00	0.91	
Flt Protected		1.00		0.95	1.00					0.95	0.98	
Satd. Flow (prot)		3257		1271	3438					1633	1542	
Flt Permitted		1.00		0.42	1.00					0.95	0.98	
Satd. Flow (perm)		3257		563	3438					1633	1542	
Peak-hour factor, PHF	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Adj. Flow (vph)	0	138	75	181	150	0	0	0	0	144	6	62
RTOR Reduction (vph)	0	63	0	0	0	0	0	0	0	0	41	0
Lane Group Flow (vph)	0	150	0	181	150	0	0	0	0	109	62	0
Heavy Vehicles (%)	0%	5%	5%	42%	5%	0%	0%	0%	0%	5%	0%	5%
Turn Type		NA		pm+pt	NA					Perm	NA	
Protected Phases		4		3	8						6	
Permitted Phases				8						6		
Actuated Green, G (s)		5.5		14.1	14.1					11.4	11.4	
Effective Green, g (s)		5.5		14.1	14.1					11.4	11.4	
Actuated g/C Ratio		0.16		0.42	0.42					0.34	0.34	
Clearance Time (s)		4.0		4.0	4.0					4.0	4.0	
Vehicle Extension (s)		3.0		3.0	3.0					3.0	3.0	
Lane Grp Cap (vph)		535		334	1447					556	525	
v/s Ratio Prot		0.05		c0.07	0.04							
v/s Ratio Perm				c0.15						c0.07	0.04	
v/c Ratio		0.28		0.54	0.10					0.20	0.12	
Uniform Delay, d1		12.3		6.8	5.9					7.8	7.6	
Progression Factor		1.00		1.00	1.00					1.00	1.00	
Incremental Delay, d2		0.3		1.8	0.0					0.2	0.1	
Delay (s)		12.6		8.6	5.9					8.0	7.7	
Level of Service		B		A	A					A	A	
Approach Delay (s)		12.6			7.4			0.0			7.8	
Approach LOS		B			A			A			A	

Intersection Summary			
HCM Average Control Delay	9.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	33.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	27.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Intersection Delay (sec/veh)	23.7
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	0	135	85	285	180	0	0	0	0	225	5	65
Peak Hour Factor	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72
Heavy Vehicles(%)	0	5	5	22	5	0	0	0	0	5	0	5
Movement Flow Rate	0	188	118	396	250	0	0	0	0	312	7	90
Number of Lanes	0	2	0	1	2	0	0	0	0	1	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	3	2	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	3
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	2
HCM Control Delay	14.4	32.3	17.1
HCM LOS	B	D	C

Lane	EBLn1	EBLn2	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Volume Left (%)	0%	0%	100%	0%	0%	100%	51%
Volume Thru (%)	100%	35%	0%	100%	100%	0%	3%
Volume Right (%)	0%	65%	0%	0%	0%	0%	45%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	90	130	285	90	90	151	144
Left Turning Volume	90	45	0	90	90	0	5
Through Volume	0	85	0	0	0	0	65
Right Turning Volume	0	0	285	0	0	151	74
Lane Flow Rate	125	181	396	125	125	209	200
Geometry Group	8	8	8	8	8	8	8
Degree of Utilization, X	0.278	0.378	0.874	0.248	0.245	0.48	0.423
Departure Headway, Hd	8.002	7.531	7.95	7.145	7.059	8.254	7.602
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	449	478	455	504	509	438	475
Service Time	5.746	5.275	5.687	4.882	4.795	5.994	5.342
HCM Lane V/C Ratio	0.278	0.379	0.87	0.248	0.246	0.477	0.421
HCM Control Delay	13.8	14.8	45.1	12.2	12.1	18.4	15.8
HCM Lane LOS	B	B	E	B	B	C	C
HCM 95th Percentile Queue	1.2	1.8	19.9	1	1	2.8	2.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	135	85	285	180	0	0	0	0	225	5	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0					4.0	4.0	
Lane Util. Factor		0.95		1.00	0.95					0.95	0.95	
Frpb, ped/bikes		0.94		1.00	1.00					1.00	1.00	
Flpb, ped/bikes		1.00		1.00	1.00					1.00	1.00	
Frt		0.94		1.00	1.00					1.00	0.93	
Flt Protected		1.00		0.95	1.00					0.95	0.97	
Satd. Flow (prot)		3042		1480	3438					1633	1565	
Flt Permitted		1.00		0.39	1.00					0.95	0.97	
Satd. Flow (perm)		3042		605	3438					1633	1565	
Peak-hour factor, PHF	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72
Adj. Flow (vph)	0	188	118	396	250	0	0	0	0	312	7	90
RTOR Reduction (vph)	0	94	0	0	0	0	0	0	0	0	50	0
Lane Group Flow (vph)	0	212	0	396	250	0	0	0	0	209	150	0
Confl. Peds. (#/hr)			110									
Confl. Bikes (#/hr)			60									
Heavy Vehicles (%)	0%	5%	5%	22%	5%	0%	0%	0%	0%	5%	0%	5%
Turn Type		NA		pm+pt	NA					Perm	NA	
Protected Phases		4		3	8						6	
Permitted Phases				8						6		
Actuated Green, G (s)		8.8		25.0	25.0					11.0	11.0	
Effective Green, g (s)		8.8		25.0	25.0					11.0	11.0	
Actuated g/C Ratio		0.20		0.57	0.57					0.25	0.25	
Clearance Time (s)		4.0		4.0	4.0					4.0	4.0	
Vehicle Extension (s)		3.0		3.0	3.0					3.0	3.0	
Lane Grp Cap (vph)		608		586	1953					408	391	
v/s Ratio Prot		0.07		c0.19	0.07							
v/s Ratio Perm				c0.20						c0.13	0.10	
v/c Ratio		0.35		0.68	0.13					0.51	0.38	
Uniform Delay, d1		15.1		5.9	4.4					14.2	13.7	
Progression Factor		1.00		1.00	1.00					1.00	1.00	
Incremental Delay, d2		0.3		3.1	0.0					1.1	0.6	
Delay (s)		15.5		9.0	4.5					15.3	14.3	
Level of Service		B		A	A					B	B	
Approach Delay (s)		15.5			7.3			0.0			14.8	
Approach LOS		B			A			A			B	

Intersection Summary			
HCM Average Control Delay	11.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	44.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	47.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Intersection Delay (sec/veh)	31.6
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	0	85	75	425	175	0	0	0	0	180	5	100
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles(%)	0	5	0	17	0	0	0	0	0	0	0	0
Movement Flow Rate	0	99	87	494	203	0	0	0	0	209	6	116
Number of Lanes	0	2	0	1	2	0	0	0	0	1	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	3	2	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	3
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	2
HCM Control Delay	11.8	45.4	13.8
HCM LOS	B	E	B

Lane	EBLn1	EBLn2	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Volume Left (%)	0%	0%	100%	0%	0%	100%	24%
Volume Thru (%)	100%	27%	0%	100%	100%	0%	4%
Volume Right (%)	0%	73%	0%	0%	0%	0%	73%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	57	103	425	87	87	148	137
Left Turning Volume	57	28	0	87	87	0	5
Through Volume	0	75	0	0	0	0	100
Right Turning Volume	0	0	425	0	0	148	32
Lane Flow Rate	66	120	494	102	102	172	160
Geometry Group	8	8	8	8	8	8	8
Degree of Utilization, X	0.14	0.236	0.972	0.178	0.178	0.369	0.304
Departure Headway, Hd	7.667	7.059	7.081	6.281	6.281	7.738	6.84
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	470	512	509	568	568	462	521
Service Time	5.367	4.759	4.854	4.053	4.053	5.535	4.636
HCM Lane V/C Ratio	0.14	0.234	0.971	0.18	0.18	0.372	0.307
HCM Control Delay	11.6	11.9	59.8	10.4	10.4	15	12.6
HCM Lane LOS	B	B	F	B	B	B	B
HCM 95th Percentile Queue	0.5	0.9	64.6	0.6	0.6	1.8	1.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	85	75	425	175	0	0	0	0	180	5	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0					4.0	4.0	
Lane Util. Factor		0.95	1.00	1.00	0.95					0.95	0.95	
Frt		1.00	0.85	1.00	1.00					1.00	0.89	
Flt Protected		1.00	1.00	0.95	1.00					0.95	0.99	
Satd. Flow (prot)		3438	1615	1543	3610					1715	1590	
Flt Permitted		1.00	1.00	0.44	1.00					0.95	0.99	
Satd. Flow (perm)		3438	1615	714	3610					1715	1590	
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	0	99	87	494	203	0	0	0	0	209	6	116
RTOR Reduction (vph)	0	0	76	0	0	0	0	0	0	0	88	0
Lane Group Flow (vph)	0	99	11	494	203	0	0	0	0	171	72	0
Heavy Vehicles (%)	0%	5%	0%	17%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type		NA	Perm	pm+pt	NA					Perm	NA	
Protected Phases		4		3	8						6	
Permitted Phases			4	8						6		
Actuated Green, G (s)		5.1	5.1	22.3	22.3					9.8	9.8	
Effective Green, g (s)		5.1	5.1	22.3	22.3					9.8	9.8	
Actuated g/C Ratio		0.13	0.13	0.56	0.56					0.24	0.24	
Clearance Time (s)		4.0	4.0	4.0	4.0					4.0	4.0	
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0	3.0	
Lane Grp Cap (vph)		437	205	670	2008					419	389	
v/s Ratio Prot		0.03		c0.24	0.06							
v/s Ratio Perm			0.01	c0.17						c0.10	0.05	
v/c Ratio		0.23	0.05	0.74	0.10					0.41	0.19	
Uniform Delay, d1		15.7	15.4	6.1	4.2					12.7	12.0	
Progression Factor		1.00	1.00	1.00	1.00					1.00	1.00	
Incremental Delay, d2		0.3	0.1	4.2	0.0					0.7	0.2	
Delay (s)		16.0	15.5	10.4	4.2					13.4	12.2	
Level of Service		B	B	B	A					B	B	
Approach Delay (s)		15.8			8.6			0.0			12.8	
Approach LOS		B			A			A			B	

Intersection Summary			
HCM Average Control Delay	10.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	40.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	46.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Intersection Delay (sec/veh)	37
Intersection LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	0	250	125	140	120	0	0	0	0	380	5	85
Peak Hour Factor	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63
Heavy Vehicles(%)	0	0	5	5	5	0	0	0	0	18	0	5
Movement Flow Rate	0	397	198	222	190	0	0	0	0	603	8	135
Number of Lanes	0	2	0	1	2	0	0	0	0	1	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	3	2	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	3
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	2
HCM Control Delay	29.6	20.3	52.1
HCM LOS	D	C	F

Lane	EBLn1	EBLn2	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Volume Left (%)	0%	0%	100%	0%	0%	100%	61%
Volume Thru (%)	100%	40%	0%	100%	100%	0%	2%
Volume Right (%)	0%	60%	0%	0%	0%	0%	37%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	167	208	140	60	60	239	231
Left Turning Volume	167	83	0	60	60	0	5
Through Volume	0	125	0	0	0	0	85
Right Turning Volume	0	0	140	0	0	239	141
Lane Flow Rate	265	331	222	95	95	380	366
Geometry Group	8	8	8	8	8	8	8
Degree of Utilization, X	0.634	0.761	0.589	0.239	0.236	0.947	0.834
Departure Headway, Hd	8.633	8.285	9.535	9.017	8.929	8.975	8.201
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	418	437	378	398	402	403	439
Service Time	6.399	6.051	7.303	6.786	6.698	6.74	5.966
HCM Lane V/C Ratio	0.634	0.757	0.587	0.239	0.236	0.943	0.834
HCM Control Delay	25.3	33.1	25.2	14.6	14.5	63	40.7
HCM Lane LOS	D	D	D	B	B	F	E
HCM 95th Percentile Queue	5.2	9.4	4.3	0.9	0.9	42.3	14.7

Intersection	
Intersection Delay (sec/veh)	10.2
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	0	100	55	80	110	0	0	0	0	160	5	45
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Heavy Vehicles(%)	0	5	5	5	5	0	0	0	0	36	0	5
Movement Flow Rate	0	125	69	100	138	0	0	0	0	200	6	56
Number of Lanes	0	2	0	1	2	0	0	0	0	1	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	3	2	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	3
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	2
HCM Control Delay	9.6	9.9	11
HCM LOS	A	A	B

Lane	EBLn1	EBLn2	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Volume Left (%)	0%	0%	100%	0%	0%	100%	51%
Volume Thru (%)	100%	38%	0%	100%	100%	0%	5%
Volume Right (%)	0%	62%	0%	0%	0%	0%	44%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	67	88	80	55	55	107	103
Left Turning Volume	67	33	0	55	55	0	5
Through Volume	0	55	0	0	0	0	45
Right Turning Volume	0	0	80	0	0	107	53
Lane Flow Rate	83	110	100	69	69	134	128
Geometry Group	8	8	8	8	8	8	8
Degree of Utilization, X	0.141	0.173	0.179	0.114	0.112	0.258	0.205
Departure Headway, Hd	6.081	5.64	6.46	5.955	5.869	6.92	5.756
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	591	637	557	603	612	521	626
Service Time	3.806	3.365	4.185	3.68	3.594	4.64	3.476
HCM Lane V/C Ratio	0.14	0.173	0.18	0.114	0.113	0.257	0.204
HCM Control Delay	9.8	9.5	10.6	9.4	9.3	12	10
HCM Lane LOS	A	A	B	A	A	B	A
HCM 95th Percentile Queue	0.5	0.6	0.7	0.4	0.4	1	0.8

Intersection	
Intersection Delay (sec/veh)	16.3
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	0	125	80	205	165	0	0	0	0	260	5	60
Peak Hour Factor	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72
Heavy Vehicles(%)	0	5	5	5	5	0	0	0	0	23	0	5
Movement Flow Rate	0	174	111	285	229	0	0	0	0	361	7	83
Number of Lanes	0	2	0	1	2	0	0	0	0	1	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	3	2	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	3
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	2
HCM Control Delay	13.4	17	17.2
HCM LOS	B	C	C

Lane	EBLn1	EBLn2	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Volume Left (%)	0%	0%	100%	0%	0%	100%	59%
Volume Thru (%)	100%	34%	0%	100%	100%	0%	3%
Volume Right (%)	0%	66%	0%	0%	0%	0%	38%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	83	122	205	82	82	166	159
Left Turning Volume	83	42	0	82	82	0	5
Through Volume	0	80	0	0	0	0	60
Right Turning Volume	0	0	205	0	0	166	94
Lane Flow Rate	116	169	285	115	115	231	220
Geometry Group	8	8	8	8	8	8	8
Degree of Utilization, X	0.249	0.341	0.598	0.224	0.222	0.512	0.435
Departure Headway, Hd	7.732	7.259	7.673	7.163	7.076	8.085	7.216
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	468	498	473	504	511	448	502
Service Time	5.432	4.959	5.373	4.863	4.776	5.785	4.916
HCM Lane V/C Ratio	0.248	0.339	0.603	0.228	0.225	0.516	0.438
HCM Control Delay	13	13.7	21.1	11.9	11.8	19	15.4
HCM Lane LOS	B	B	C	B	B	C	C
HCM 95th Percentile Queue	1	1.6	4.4	0.9	0.9	3.1	2.3

Intersection	
Intersection Delay (sec/veh)	17.9
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	0	80	70	335	160	0	0	0	0	220	5	90
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles(%)	0	5	0	5	0	0	0	0	0	23	0	0
Movement Flow Rate	0	93	81	390	186	0	0	0	0	256	6	105
Number of Lanes	0	2	0	1	2	0	0	0	0	1	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	3	2	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	3
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	2
HCM Control Delay	11.3	22.1	14.3
HCM LOS	B	C	B

Lane	EBLn1	EBLn2	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Volume Left (%)	0%	0%	100%	0%	0%	100%	38%
Volume Thru (%)	100%	28%	0%	100%	100%	0%	3%
Volume Right (%)	0%	72%	0%	0%	0%	0%	59%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	53	97	335	80	80	163	152
Left Turning Volume	53	27	0	80	80	0	5
Through Volume	0	70	0	0	0	0	90
Right Turning Volume	0	0	335	0	0	163	57
Lane Flow Rate	62	112	390	93	93	189	177
Geometry Group	8	8	8	8	8	8	8
Degree of Utilization, X	0.127	0.211	0.75	0.164	0.164	0.407	0.325
Departure Headway, Hd	7.375	6.769	6.931	6.337	6.337	7.736	6.613
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	484	527	522	564	564	464	542
Service Time	5.16	4.554	4.692	4.098	4.098	5.507	4.383
HCM Lane V/C Ratio	0.128	0.213	0.747	0.165	0.165	0.407	0.327
HCM Control Delay	11.2	11.4	27.8	10.3	10.3	15.8	12.6
HCM Lane LOS	B	B	D	B	B	C	B
HCM 95th Percentile Queue	0.4	0.8	8.9	0.6	0.6	2.1	1.4

Intersection	
Intersection Delay (sec/veh)	48.2
Intersection LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	0	275	135	155	130	0	0	0	0	415	5	95
Peak Hour Factor	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63
Heavy Vehicles(%)	0	0	5	5	5	0	0	0	0	18	0	5
Movement Flow Rate	0	437	214	246	206	0	0	0	0	659	8	151
Number of Lanes	0	2	0	1	2	0	0	0	0	1	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	3	2	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	3
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	2
HCM Control Delay	37.5	23	70.6
HCM LOS	E	C	F

Lane	EBLn1	EBLn2	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Volume Left (%)	0%	0%	100%	0%	0%	100%	61%
Volume Thru (%)	100%	40%	0%	100%	100%	0%	2%
Volume Right (%)	0%	60%	0%	0%	0%	0%	37%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	183	227	155	65	65	261	254
Left Turning Volume	183	92	0	65	65	0	5
Through Volume	0	135	0	0	0	0	95
Right Turning Volume	0	0	155	0	0	261	154
Lane Flow Rate	291	360	246	103	103	415	402
Geometry Group	8	8	8	8	8	8	8
Degree of Utilization, X	0.713	0.847	0.664	0.264	0.261	1	0.96
Departure Headway, Hd	8.819	8.474	9.721	9.203	9.115	9.371	8.588
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	413	432	374	392	395	390	427
Service Time	6.489	6.159	7.423	6.923	6.839	7.071	6.288
HCM Lane V/C Ratio	0.705	0.833	0.658	0.263	0.261	1.064	0.941
HCM Control Delay	30.5	43.1	29.7	15.2	15	77	63.9
HCM Lane LOS	D	E	D	C	B	F	F
HCM 95th Percentile Queue	7.4	16.1	5.9	1.1	1.1	93	51.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	275	135	155	130	0	0	0	0	415	5	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0					4.0	4.0	
Lane Util. Factor		0.95			0.95					0.95	0.95	
Frt		0.95			1.00					1.00	0.94	
Flt Protected		1.00			0.97					0.95	0.97	
Satd. Flow (prot)		3376			3347					1453	1466	
Flt Permitted		1.00			0.62					0.95	0.97	
Satd. Flow (perm)		3376			2130					1453	1466	
Peak-hour factor, PHF	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63
Adj. Flow (vph)	0	437	214	246	206	0	0	0	0	659	8	151
RTOR Reduction (vph)	0	96	0	0	0	0	0	0	0	0	38	0
Lane Group Flow (vph)	0	555	0	0	452	0	0	0	0	415	365	0
Heavy Vehicles (%)	0%	0%	5%	5%	5%	0%	0%	0%	0%	18%	0%	5%
Turn Type		NA		pm+pt	NA					Perm	NA	
Protected Phases		4		3	8						6	
Permitted Phases				8						6		
Actuated Green, G (s)		14.9			14.9					17.4	17.4	
Effective Green, g (s)		14.9			14.9					17.4	17.4	
Actuated g/C Ratio		0.37			0.37					0.43	0.43	
Clearance Time (s)		4.0			4.0					4.0	4.0	
Vehicle Extension (s)		3.0			3.0					3.0	3.0	
Lane Grp Cap (vph)		1248			788					627	633	
v/s Ratio Prot		0.16										
v/s Ratio Perm					c0.21					c0.29	0.25	
v/c Ratio		0.44			1.06dl					0.66	0.58	
Uniform Delay, d1		9.6			10.2					9.1	8.7	
Progression Factor		1.00			1.00					1.00	1.00	
Incremental Delay, d2		0.3			1.0					2.6	1.3	
Delay (s)		9.8			11.2					11.7	9.9	
Level of Service		A			B					B	A	
Approach Delay (s)		9.8			11.2			0.0			10.9	
Approach LOS		A			B			A			B	

Intersection Summary			
HCM Average Control Delay	10.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	40.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	45.0%	ICU Level of Service	A
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
c Critical Lane Group

Intersection	
Intersection Delay (sec/veh)	10.6
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	0	110	60	85	120	0	0	0	0	175	5	50
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Heavy Vehicles(%)	0	5	5	5	5	0	0	0	0	36	0	5
Movement Flow Rate	0	138	75	106	150	0	0	0	0	219	6	62
Number of Lanes	0	2	0	1	2	0	0	0	0	1	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	3	2	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	3
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	2
HCM Control Delay	10	10.2	11.5
HCM LOS	A	B	B

Lane	EBLn1	EBLn2	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Volume Left (%)	0%	0%	100%	0%	0%	100%	51%
Volume Thru (%)	100%	38%	0%	100%	100%	0%	4%
Volume Right (%)	0%	62%	0%	0%	0%	0%	44%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	73	97	85	60	60	117	113
Left Turning Volume	73	37	0	60	60	0	5
Through Volume	0	60	0	0	0	0	50
Right Turning Volume	0	0	85	0	0	117	58
Lane Flow Rate	92	121	106	75	75	147	141
Geometry Group	8	8	8	8	8	8	8
Degree of Utilization, X	0.159	0.194	0.195	0.127	0.125	0.287	0.23
Departure Headway, Hd	6.232	5.791	6.61	6.104	6.018	7.046	5.877
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	577	620	544	588	596	512	612
Service Time	3.962	3.522	4.339	3.833	3.747	4.774	3.605
HCM Lane V/C Ratio	0.159	0.195	0.195	0.128	0.126	0.287	0.23
HCM Control Delay	10.1	9.9	10.9	9.7	9.6	12.6	10.4
HCM Lane LOS	B	A	B	A	A	B	B
HCM 95th Percentile Queue	0.6	0.7	0.7	0.4	0.4	1.2	0.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	110	60	85	120	0	0	0	0	175	5	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0					4.0	4.0	
Lane Util. Factor		0.95		1.00	0.95					0.95	0.95	
Frt		0.95		1.00	1.00					1.00	0.93	
Flt Protected		1.00		0.95	1.00					0.95	0.97	
Satd. Flow (prot)		3257		1719	3438					1261	1361	
Flt Permitted		1.00		0.41	1.00					0.95	0.97	
Satd. Flow (perm)		3257		746	3438					1261	1361	
Peak-hour factor, PHF	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Adj. Flow (vph)	0	138	75	106	150	0	0	0	0	219	6	62
RTOR Reduction (vph)	0	62	0	0	0	0	0	0	0	0	38	0
Lane Group Flow (vph)	0	151	0	106	150	0	0	0	0	147	102	0
Heavy Vehicles (%)	0%	5%	5%	5%	5%	0%	0%	0%	0%	36%	0%	5%
Turn Type		NA		pm+pt	NA					Perm	NA	
Protected Phases		4		3	8						6	
Permitted Phases				8						6		
Actuated Green, G (s)		5.7		11.8	11.8					12.9	12.9	
Effective Green, g (s)		5.7		11.8	11.8					12.9	12.9	
Actuated g/C Ratio		0.17		0.36	0.36					0.39	0.39	
Clearance Time (s)		4.0		4.0	4.0					4.0	4.0	
Vehicle Extension (s)		3.0		3.0	3.0					3.0	3.0	
Lane Grp Cap (vph)		568		332	1241					497	537	
v/s Ratio Prot		0.05		c0.02	0.04							
v/s Ratio Perm				c0.09						c0.12	0.08	
v/c Ratio		0.27		0.32	0.12					0.30	0.19	
Uniform Delay, d1		11.7		7.4	7.0					6.8	6.5	
Progression Factor		1.00		1.00	1.00					1.00	1.00	
Incremental Delay, d2		0.3		0.6	0.0					0.3	0.2	
Delay (s)		11.9		7.9	7.0					7.1	6.7	
Level of Service		B		A	A					A	A	
Approach Delay (s)		11.9			7.4			0.0			6.9	
Approach LOS		B			A			A			A	

Intersection Summary			
HCM Average Control Delay	8.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.30		
Actuated Cycle Length (s)	32.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	26.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Intersection Delay (sec/veh)	18.9
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	0	135	85	225	180	0	0	0	0	285	5	65
Peak Hour Factor	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72
Heavy Vehicles(%)	0	5	5	5	5	0	0	0	0	23	0	5
Movement Flow Rate	0	188	118	312	250	0	0	0	0	396	7	90
Number of Lanes	0	2	0	1	2	0	0	0	0	1	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	3	2	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	3
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	2
HCM Control Delay	14.6	20.3	19.9
HCM LOS	B	C	C

Lane	EBLn1	EBLn2	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Volume Left (%)	0%	0%	100%	0%	0%	100%	59%
Volume Thru (%)	100%	35%	0%	100%	100%	0%	3%
Volume Right (%)	0%	65%	0%	0%	0%	0%	38%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	90	130	225	90	90	182	173
Left Turning Volume	90	45	0	90	90	0	5
Through Volume	0	85	0	0	0	0	65
Right Turning Volume	0	0	225	0	0	182	103
Lane Flow Rate	125	181	312	125	125	253	240
Geometry Group	8	8	8	8	8	8	8
Degree of Utilization, X	0.28	0.381	0.688	0.257	0.254	0.587	0.498
Departure Headway, Hd	8.075	7.603	7.927	7.415	7.328	8.339	7.472
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	445	473	456	485	490	433	482
Service Time	5.819	5.346	5.664	5.153	5.066	6.078	5.21
HCM Lane V/C Ratio	0.281	0.383	0.684	0.258	0.255	0.584	0.498
HCM Control Delay	13.9	15	26.5	12.7	12.6	22.3	17.4
HCM Lane LOS	B	B	D	B	B	C	C
HCM 95th Percentile Queue	1.2	1.8	6.6	1	1	4.3	3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	135	85	225	180	0	0	0	0	285	5	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0					4.0	4.0	
Lane Util. Factor		0.95		1.00	0.95					0.95	0.95	
Frt		0.94		1.00	1.00					1.00	0.94	
Flt Protected		1.00		0.95	1.00					0.95	0.97	
Satd. Flow (prot)		3239		1719	3438					1394	1431	
Flt Permitted		1.00		0.38	1.00					0.95	0.97	
Satd. Flow (perm)		3239		682	3438					1394	1431	
Peak-hour factor, PHF	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72
Adj. Flow (vph)	0	188	118	312	250	0	0	0	0	396	7	90
RTOR Reduction (vph)	0	93	0	0	0	0	0	0	0	0	44	0
Lane Group Flow (vph)	0	213	0	312	250	0	0	0	0	253	196	0
Heavy Vehicles (%)	0%	5%	5%	5%	5%	0%	0%	0%	0%	23%	0%	5%
Turn Type		NA		pm+pt	NA					Perm	NA	
Protected Phases		4		3	8						6	
Permitted Phases				8						6		
Actuated Green, G (s)		8.0		18.1	18.1					12.0	12.0	
Effective Green, g (s)		8.0		18.1	18.1					12.0	12.0	
Actuated g/C Ratio		0.21		0.48	0.48					0.31	0.31	
Clearance Time (s)		4.0		4.0	4.0					4.0	4.0	
Vehicle Extension (s)		3.0		3.0	3.0					3.0	3.0	
Lane Grp Cap (vph)		680		490	1633					439	451	
v/s Ratio Prot		0.07		c0.10	0.07							
v/s Ratio Perm				c0.20						c0.18	0.14	
v/c Ratio		0.31		0.64	0.15					0.58	0.43	
Uniform Delay, d1		12.7		6.7	5.7					10.9	10.4	
Progression Factor		1.00		1.00	1.00					1.00	1.00	
Incremental Delay, d2		0.3		2.7	0.0					1.8	0.7	
Delay (s)		13.0		9.4	5.7					12.8	11.0	
Level of Service		B		A	A					B	B	
Approach Delay (s)		13.0			7.8			0.0			11.9	
Approach LOS		B			A			A			B	

Intersection Summary			
HCM Average Control Delay	10.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	38.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	38.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Intersection Delay (sec/veh)	21.8
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	0	85	75	365	175	0	0	0	0	240	5	100
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles(%)	0	5	0	5	0	0	0	0	0	23	0	0
Movement Flow Rate	0	99	87	424	203	0	0	0	0	279	6	116
Number of Lanes	0	2	0	1	2	0	0	0	0	1	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	3	2	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	3
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	2
HCM Control Delay	12	28.7	15.5
HCM LOS	B	D	C

Lane	EBLn1	EBLn2	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Volume Left (%)	0%	0%	100%	0%	0%	100%	37%
Volume Thru (%)	100%	27%	0%	100%	100%	0%	3%
Volume Right (%)	0%	73%	0%	0%	0%	0%	60%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	57	103	365	87	87	178	167
Left Turning Volume	57	28	0	87	87	0	5
Through Volume	0	75	0	0	0	0	100
Right Turning Volume	0	0	365	0	0	178	62
Lane Flow Rate	66	120	424	102	102	207	195
Geometry Group	8	8	8	8	8	8	8
Degree of Utilization, X	0.142	0.239	0.84	0.184	0.184	0.456	0.369
Departure Headway, Hd	7.768	7.159	7.122	6.527	6.527	7.953	6.822
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	465	505	505	546	546	450	524
Service Time	5.468	4.859	4.904	4.309	4.309	5.747	4.616
HCM Lane V/C Ratio	0.142	0.238	0.84	0.187	0.187	0.46	0.372
HCM Control Delay	11.7	12.1	37.3	10.8	10.8	17.3	13.6
HCM Lane LOS	B	B	E	B	B	C	B
HCM 95th Percentile Queue	0.5	0.9	15.4	0.7	0.7	2.5	1.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	85	75	365	175	0	0	0	0	240	5	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0					4.0	4.0	
Lane Util. Factor		0.95		1.00	0.95					0.95	0.95	
Frt		0.93		1.00	1.00					1.00	0.91	
Flt Protected		1.00		0.95	1.00					0.95	0.98	
Satd. Flow (prot)		3270		1719	3610					1394	1486	
Flt Permitted		1.00		0.43	1.00					0.95	0.98	
Satd. Flow (perm)		3270		787	3610					1394	1486	
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	0	99	87	424	203	0	0	0	0	279	6	116
RTOR Reduction (vph)	0	75	0	0	0	0	0	0	0	0	82	0
Lane Group Flow (vph)	0	111	0	424	203	0	0	0	0	206	113	0
Heavy Vehicles (%)	0%	5%	0%	5%	0%	0%	0%	0%	0%	23%	0%	0%
Turn Type		NA		pm+pt	NA					Perm	NA	
Protected Phases		4		3	8						6	
Permitted Phases				8						6		
Actuated Green, G (s)		5.2		19.5	19.5					11.2	11.2	
Effective Green, g (s)		5.2		19.5	19.5					11.2	11.2	
Actuated g/C Ratio		0.13		0.50	0.50					0.29	0.29	
Clearance Time (s)		4.0		4.0	4.0					4.0	4.0	
Vehicle Extension (s)		3.0		3.0	3.0					3.0	3.0	
Lane Grp Cap (vph)		439		645	1819					403	430	
v/s Ratio Prot		0.03		c0.18	0.06							
v/s Ratio Perm				c0.16						c0.15	0.08	
v/c Ratio		0.25		0.66	0.11					0.51	0.26	
Uniform Delay, d1		15.0		6.6	5.0					11.5	10.6	
Progression Factor		1.00		1.00	1.00					1.00	1.00	
Incremental Delay, d2		0.3		2.4	0.0					1.1	0.3	
Delay (s)		15.3		9.0	5.1					12.6	10.9	
Level of Service		B		A	A					B	B	
Approach Delay (s)		15.3			7.8			0.0			11.8	
Approach LOS		B			A			A			B	

Intersection Summary			
HCM Average Control Delay	10.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	38.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	44.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

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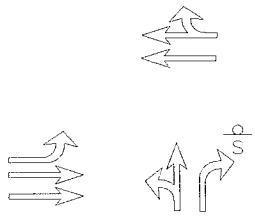
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	1 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1A

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						

BERKSHIRE PLACE

EB LEFT	95	0%	**0**	95	10	105
EB THRU	285	5%	**0**	285	25	310
EB RIGHT	0	0%	**0**	0	0	0
WB LEFT	0	0%	**0**	0	0	0
WB THRU	190	25%	**55**	245	20	265
WB RIGHT	255	5%	**0**	255	25	280

I-210 FWY WB RAMPS

NB LEFT	60	5%	**0**	60	5	65
NB THRU	5	5%	**0**	5	5	10
NB RIGHT	275	20%	**55**	330	30	360
SB LEFT	0	0%	**0**	0	0	0
SB THRU	0	0%	**0**	0	0	0
SB RIGHT	0	0%	**0**	0	0	0
TOTALS	**1165**		**110**	**1275**	**120**	**1395**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	2 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BERKSHIRE PLACE						
EB LEFT	95	0%	**0**	95	10	105
EB THRU	285	5%	**0**	285	25	310
EB RIGHT	0	0%	**0**	0	0	0
WB LEFT	0	0%	**0**	0	0	0
WB THRU	190	5%	**0**	190	15	205
WB RIGHT	255	5%	**0**	255	25	280
I-210 FWY WB RAMPS						
NB LEFT	60	5%	**0**	60	5	65
NB THRU	5	5%	**0**	5	5	10
NB RIGHT	275	20%	**55**	330	30	360
SB LEFT	0	0%	**0**	0	0	0
SB THRU	0	0%	**0**	0	0	0
SB RIGHT	0	0%	**0**	0	0	0
TOTALS	**1165**		**55**	**1220**	**115**	**1335**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	3 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1D

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BERKSHIRE PLACE						
EB LEFT	95	0%	**0**	95	10	105
EB THRU	285	5%	**0**	285	25	310
EB RIGHT	0	0%	**0**	0	0	0
WB LEFT	0	0%	**0**	0	0	0
WB THRU	190	25%	**55**	245	20	265
WB RIGHT	255	5%	**0**	255	25	280
I-210 FWY WB RAMPS						
NB LEFT	60	5%	**0**	60	5	65
NB THRU	5	5%	**0**	5	5	10
NB RIGHT	275	5%	**0**	275	25	300
SB LEFT	0	0%	**0**	0	0	0
SB THRU	0	0%	**0**	0	0	0
SB RIGHT	0	0%	**0**	0	0	0
TOTALS	**1165**		**55**	**1220**	**115**	**1335**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	4 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1E

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BERKSHIRE PLACE						
EB LEFT	95	0%		95	10	105
EB THRU	285	19%	**55**	340	30	370
EB RIGHT	0	0%		0	0	0
WB LEFT	0	0%		0	0	0
WB THRU	190	5%		190	15	205
WB RIGHT	255	21%	**55**	310	30	340
I-210 FWY WB RAMPS						
NB LEFT	60	5%		60	5	65
NB THRU	5	5%		5	5	10
NB RIGHT	275	5%		275	25	300
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**1165**		**110**	**1275**	**120**	**1395**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	5 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BERKSHIRE PLACE						
EB LEFT	95	0%		95	10	105
EB THRU	285	19%	**55**	340	30	370
EB RIGHT	0	0%		0	0	0
WB LEFT	0	0%		0	0	0
WB THRU	190	5%		190	15	205
WB RIGHT	255	5%		255	25	280
I-210 FWY WB RAMPS						
NB LEFT	60	5%		60	5	65
NB THRU	5	5%		5	5	10
NB RIGHT	275	5%		275	25	300
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**1165**		**55**	**1220**	**115**	**1335**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	6 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BERKSHIRE PLACE						
EB LEFT	95	0%		95	10	105
EB THRU	285	5%		285	25	310
EB RIGHT	0	0%		0	0	0
WB LEFT	0	0%		0	0	0
WB THRU	190	5%		190	15	205
WB RIGHT	255	21%	**55**	310	30	340
I-210 FWY WB RAMPS						
NB LEFT	60	5%		60	5	65
NB THRU	5	5%		5	5	10
NB RIGHT	275	5%		275	25	300
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**1165**		**55**	**1220**	**115**	**1335**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	7 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						

BERKSHIRE PLACE

EB LEFT	50	5%		50	5	55
EB THRU	175	5%		175	15	190
EB RIGHT	0	0%		0	0	0
WB LEFT	0	0%		0	0	0
WB THRU	110	5%	**55**	165	15	180
WB RIGHT	170	5%		170	15	185

I-210 FWY WB RAMPS

NB LEFT	55	5%		55	5	60
NB THRU	5	5%		5	5	10
NB RIGHT	70	5%	**55**	125	10	135
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**635**		**110**	**745**	**70**	**815**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	8 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BERKSHIRE PLACE						
EB LEFT	50	5%		50	5	55
EB THRU	175	5%		175	15	190
EB RIGHT	0	0%		0	0	0
WB LEFT	0	0%		0	0	0
WB THRU	110	5%		110	10	120
WB RIGHT	170	5%		170	15	185
I-210 FWY WB RAMPS						
NB LEFT	55	5%		55	5	60
NB THRU	5	5%		5	5	10
NB RIGHT	70	5%	55	125	10	135
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**635**		**55**	**690**	**65**	**755**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	9 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1D

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BERKSHIRE PLACE						
EB LEFT	50	5%		50	5	55
EB THRU	175	5%		175	15	190
EB RIGHT	0	0%		0	0	0
WB LEFT	0	0%		0	0	0
WB THRU	110	5%	**55**	165	15	180
WB RIGHT	170	5%		170	15	185
I-210 FWY WB RAMPS						
NB LEFT	55	5%		55	5	60
NB THRU	5	5%		5	5	10
NB RIGHT	70	5%		70	5	75
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**635**		**55**	**690**	**65**	**755**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	10 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1E

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BERKSHIRE PLACE						
EB LEFT	50	5%		50	5	55
EB THRU	175	5%	**55**	230	20	250
EB RIGHT	0	0%		0	0	0
WB LEFT	0	0%		0	0	0
WB THRU	110	5%		110	10	120
WB RIGHT	170	5%	**55**	225	20	245
I-210 FWY WB RAMPS						
NB LEFT	55	5%		55	5	60
NB THRU	5	5%		5	5	10
NB RIGHT	70	5%		70	5	75
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**635**		**110**	**745**	**70**	**815**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	11 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BERKSHIRE PLACE						
EB LEFT	50	5%		50	5	55
EB THRU	175	5%	**55**	230	20	250
EB RIGHT	0	0%		0	0	0
WB LEFT	0	0%		0	0	0
WB THRU	110	5%		110	10	120
WB RIGHT	170	5%		170	15	185
I-210 FWY WB RAMPS						
NB LEFT	55	5%		55	5	60
NB THRU	5	5%		5	5	10
NB RIGHT	70	5%		70	5	75
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**635**		**55**	**690**	**65**	**755**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	12 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						

BERKSHIRE PLACE

EB LEFT	50	5%		50	5	55
EB THRU	175	5%		175	15	190
EB RIGHT	0	0%		0	0	0
WB LEFT	0	0%		0	0	0
WB THRU	110	5%		110	10	120
WB RIGHT	170	5%	**55**	225	20	245

I-210 FWY WB RAMPS

NB LEFT	55	5%		55	5	60
NB THRU	5	5%		5	5	10
NB RIGHT	70	5%		70	5	75
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**635**		**55**	**690**	**65**	**755**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	13 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BERKSHIRE PLACE						
EB LEFT	50	5%		50	5	55
EB THRU	175	5%		175	15	190
EB RIGHT	0	0%		0	0	0
WB LEFT	0	0%		0	0	0
WB THRU	110	5%	**55**	165	15	180
WB RIGHT	170	5%		170	15	185
I-210 FWY WB RAMPS						
NB LEFT	65	5%		65	5	70
NB THRU	5	5%		5	5	10
NB RIGHT	115	5%	**55**	170	15	185
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**690**		**110**	**800**	**75**	**875**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	14 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BERKSHIRE PLACE						
EB LEFT	50	5%		50	5	55
EB THRU	175	5%		175	15	190
EB RIGHT	0	0%		0	0	0
WB LEFT	0	0%		0	0	0
WB THRU	110	5%		110	10	120
WB RIGHT	170	5%		170	15	185
I-210 FWY WB RAMPS						
NB LEFT	65	5%		65	5	70
NB THRU	5	5%		5	5	10
NB RIGHT	115	5%	**55**	170	15	185
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**690**		**55**	**745**	**70**	**815**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	15 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1D

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BERKSHIRE PLACE						
EB LEFT	50	5%		50	5	55
EB THRU	175	5%		175	15	190
EB RIGHT	0	0%		0	0	0
WB LEFT	0	0%		0	0	0
WB THRU	110	5%	**55**	165	15	180
WB RIGHT	170	5%		170	15	185
I-210 FWY WB RAMPS						
NB LEFT	65	5%		65	5	70
NB THRU	5	5%		5	5	10
NB RIGHT	115	5%		115	10	125
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**690**		**55**	**745**	**70**	**815**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	16 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1E

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BERKSHIRE PLACE						
EB LEFT	50	5%		50	5	55
EB THRU	175	5%	**55**	230	20	250
EB RIGHT	0	0%		0	0	0
WB LEFT	0	0%		0	0	0
WB THRU	110	5%		110	10	120
WB RIGHT	170	5%	**55**	225	20	245
I-210 FWY WB RAMPS						
NB LEFT	65	5%		65	5	70
NB THRU	5	5%		5	5	10
NB RIGHT	115	5%		115	10	125
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**690**		**110**	**800**	**75**	**875**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	17 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BERKSHIRE PLACE						
EB LEFT	50	5%		50	5	55
EB THRU	175	20%	**55**	230	20	250
EB RIGHT	0	0%		0	0	0
WB LEFT	0	0%		0	0	0
WB THRU	110	5%		110	10	120
WB RIGHT	170	5%		170	15	185
I-210 FWY WB RAMPS						
NB LEFT	65	5%		65	5	70
NB THRU	5	5%		5	5	10
NB RIGHT	115	0%		115	10	125
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**690**		**55**	**745**	**70**	**815**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	18 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BERKSHIRE PLACE						
EB LEFT	50	5%		50	5	55
EB THRU	175	5%		175	15	190
EB RIGHT	0	0%		0	0	0
WB LEFT	0	0%		0	0	0
WB THRU	110	5%		110	10	120
WB RIGHT	170	14%	**55**	225	20	245
I-210 FWY WB RAMPS						
NB LEFT	65	5%		65	5	70
NB THRU	5	5%		5	5	10
NB RIGHT	115	0%		115	10	125
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**690**		**55**	**745**	**70**	**815**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	19 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BERKSHIRE PLACE						
EB LEFT	65	5%		65	5	70
EB THRU	180	5%		180	15	195
EB RIGHT	0	0%		0	0	0
WB LEFT	0	0%		0	0	0
WB THRU	405	5%	**55**	460	40	500
WB RIGHT	410	5%		410	35	445
I-210 FWY WB RAMPS						
NB LEFT	95	5%		95	10	105
NB THRU	5	5%		5	5	10
NB RIGHT	80	5%	**55**	135	10	145
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**1240**		**110**	**1350**	**120**	**1470**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	20 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BERKSHIRE PLACE						
EB LEFT	65	5%		65	5	70
EB THRU	180	5%		180	15	195
EB RIGHT	0	0%		0	0	0
WB LEFT	0	0%		0	0	0
WB THRU	405	5%		405	35	440
WB RIGHT	410	5%		410	35	445
I-210 FWY WB RAMPS						
NB LEFT	95	5%		95	10	105
NB THRU	5	5%		5	5	10
NB RIGHT	80	5%	55	135	10	145
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**1240**		**55**	**1295**	**115**	**1410**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	21 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1D

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BERKSHIRE PLACE						
EB LEFT	65	5%		65	5	70
EB THRU	180	5%		180	15	195
EB RIGHT	0	0%		0	0	0
WB LEFT	0	0%		0	0	0
WB THRU	405	5%	**55**	460	40	500
WB RIGHT	410	5%		410	35	445
I-210 FWY WB RAMPS						
NB LEFT	95	5%		95	10	105
NB THRU	5	5%		5	5	10
NB RIGHT	80	5%		80	5	85
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**1240**		**55**	**1295**	**115**	**1410**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	22 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1E

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BERKSHIRE PLACE						
EB LEFT	65	5%		65	5	70
EB THRU	180	5%	**55**	235	20	255
EB RIGHT	0	0%		0	0	0
WB LEFT	0	0%		0	0	0
WB THRU	405	5%		405	35	440
WB RIGHT	410	5%	**55**	465	40	505
I-210 FWY WB RAMPS						
NB LEFT	95	5%		95	10	105
NB THRU	5	5%		5	5	10
NB RIGHT	80	5%		80	5	85
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**1240**		**110**	**1350**	**120**	**1470**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	23 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BERKSHIRE PLACE						
EB LEFT	65	5%		65	5	70
EB THRU	180	5%	**55**	235	20	255
EB RIGHT	0	0%		0	0	0
WB LEFT	0	0%		0	0	0
WB THRU	405	5%		405	35	440
WB RIGHT	410	5%		410	35	445
I-210 FWY WB RAMPS						
NB LEFT	95	5%		95	10	105
NB THRU	5	5%		5	5	10
NB RIGHT	80	5%		80	5	85
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**1240**		**55**	**1295**	**115**	**1410**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	24 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BERKSHIRE PLACE						
EB LEFT	65	5%		65	5	70
EB THRU	180	5%		180	15	195
EB RIGHT	0	0%		0	0	0
WB LEFT	0	0%		0	0	0
WB THRU	405	5%		405	35	440
WB RIGHT	410	5%	**55**	465	40	505
I-210 FWY WB RAMPS						
NB LEFT	95	5%		95	10	105
NB THRU	5	5%		5	5	10
NB RIGHT	80	5%		80	5	85
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**1240**		**55**	**1295**	**115**	**1410**

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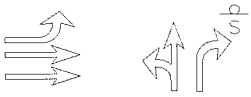
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	1 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1A

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								

BERKSHIRE PLACE

EB LEFT	96	0	0	95	**0**	95	10	105
EB THRU	284	3	9	295	**0**	295	25	320
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	188	4	12	200	**165**	365	35	400
WB RIGHT	251	6	18	270	**0**	270	25	295

I-210 FWY WB RAMPS

NB LEFT	61	0	0	60	**0**	60	5	65
NB THRU	2	0	0	5	**0**	5	5	10
NB RIGHT	273	4	12	285	**140**	425	40	465
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**1155**				**305**	**1515**	**145**	**1660**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	2 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BERKSHIRE PLACE								
EB LEFT	96	0	0	95	**0**	95	10	105
EB THRU	284	3	9	295	**0**	295	25	320
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	188	4	12	200	**0**	200	20	220
WB RIGHT	251	6	18	270	**0**	270	25	295
I-210 FWY WB RAMPS								
NB LEFT	61	0	0	60	**0**	60	5	65
NB THRU	2	0	0	5	**0**	5	5	10
NB RIGHT	273	4	12	285	**140**	425	40	465
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**1155**				**140**	**1350**	**130**	**1480**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	3 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1D

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BERKSHIRE PLACE								
EB LEFT	96	0	0	95	**0**	95	10	105
EB THRU	284	3	9	295	**0**	295	25	320
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	188	4	12	200	**165**	365	35	400
WB RIGHT	251	6	18	270	**0**	270	25	295
I-210 FWY WB RAMPS								
NB LEFT	61	0	0	60	**0**	60	5	65
NB THRU	2	0	0	5	**0**	5	5	10
NB RIGHT	273	4	12	285	**0**	285	25	310
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**1155**				**165**	**1375**	**130**	**1505**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	4 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1E

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BERKSHIRE PLACE								
EB LEFT	96	0	0	95	**0**	95	10	105
EB THRU	284	3	9	295	**140**	435	40	475
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	188	4	12	200	**0**	200	20	220
WB RIGHT	251	6	18	270	**165**	435	40	475
I-210 FWY WB RAMPS								
NB LEFT	61	0	0	60	**0**	60	5	65
NB THRU	2	0	0	5	**0**	5	5	10
NB RIGHT	273	4	12	285	**0**	285	25	310
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**1155**				**305**	**1515**	**145**	**1660**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	5 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BERKSHIRE PLACE								
EB LEFT	96	0	0	95	**0**	95	10	105
EB THRU	284	3	9	295	**140**	435	40	475
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	188	4	12	200	**0**	200	20	220
WB RIGHT	251	6	18	270	**0**	270	25	295
I-210 FWY WB RAMPS								
NB LEFT	61	0	0	60	**0**	60	5	65
NB THRU	2	0	0	5	**0**	5	5	10
NB RIGHT	273	4	12	285	**0**	285	25	310
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**1155**				**140**	**1350**	**130**	**1480**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	6 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BERKSHIRE PLACE								
EB LEFT	96	0	0	95	**0**	95	10	105
EB THRU	284	3	9	295	**0**	295	25	320
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	188	4	12	200	**0**	200	20	220
WB RIGHT	251	6	18	270	**165**	435	40	475
I-210 FWY WB RAMPS								
NB LEFT	61	0	0	60	**0**	60	5	65
NB THRU	2	0	0	5	**0**	5	5	10
NB RIGHT	273	4	12	285	**0**	285	25	310
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**1155**				**165**	**1375**	**130**	**1505**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	7 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BERKSHIRE PLACE								
EB LEFT	45	3	9	55	**0**	55	5	60
EB THRU	173	4	12	185	**0**	185	15	200
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	103	5	15	120	**165**	285	25	310
WB RIGHT	166	2	6	170	**0**	170	15	185
I-210 FWY WB RAMPS								
NB LEFT	52	3	9	60	**0**	60	5	65
NB THRU	5	0	0	5	**0**	5	5	10
NB RIGHT	70	0	0	70	**140**	210	20	230
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**614**				**305**	**970**	**90**	**1060**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	8 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BERKSHIRE PLACE								
EB LEFT	45	3	9	55	**0**	55	5	60
EB THRU	173	4	12	185	**0**	185	15	200
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	103	5	15	120	**0**	120	10	130
WB RIGHT	166	2	6	170	**0**	170	15	185
I-210 FWY WB RAMPS								
NB LEFT	52	3	9	60	**0**	60	5	65
NB THRU	5	0	0	5	**0**	5	5	10
NB RIGHT	70	0	0	70	**140**	210	20	230
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**614**				**140**	**805**	**75**	**880**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	9 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1D

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BERKSHIRE PLACE								
EB LEFT	45	3	9	55	**0**	55	5	60
EB THRU	173	4	12	185	**0**	185	15	200
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	103	5	15	120	**165**	285	25	310
WB RIGHT	166	2	6	170	**0**	170	15	185
I-210 FWY WB RAMPS								
NB LEFT	52	3	9	60	**0**	60	5	65
NB THRU	5	0	0	5	**0**	5	5	10
NB RIGHT	70	0	0	70	**0**	70	5	75
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**614**				**165**	**830**	**75**	**905**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	10 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1E

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BERKSHIRE PLACE								
EB LEFT	45	3	9	55	**0**	55	5	60
EB THRU	173	4	12	185	**140**	325	30	355
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	103	5	15	120	**0**	120	10	130
WB RIGHT	166	2	6	170	**165**	335	30	365
I-210 FWY WB RAMPS								
NB LEFT	52	3	9	60	**0**	60	5	65
NB THRU	5	0	0	5	**0**	5	5	10
NB RIGHT	70	0	0	70	**0**	70	5	75
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**614**				**305**	**970**	**90**	**1060**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	11 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BERKSHIRE PLACE								
EB LEFT	45	3	9	55	**0**	55	5	60
EB THRU	173	4	12	185	**140**	325	30	355
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	103	5	15	120	**0**	120	10	130
WB RIGHT	166	2	6	170	**0**	170	15	185
I-210 FWY WB RAMPS								
NB LEFT	52	3	9	60	**0**	60	5	65
NB THRU	5	0	0	5	**0**	5	5	10
NB RIGHT	70	0	0	70	**0**	70	5	75
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**614**				**140**	**805**	**75**	**880**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	12 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BERKSHIRE PLACE								
EB LEFT	45	3	9	55	**0**	55	5	60
EB THRU	173	4	12	185	**0**	185	15	200
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	103	5	15	120	**0**	120	10	130
WB RIGHT	166	2	6	170	**165**	335	30	365
I-210 FWY WB RAMPS								
NB LEFT	52	3	9	60	**0**	60	5	65
NB THRU	5	0	0	5	**0**	5	5	10
NB RIGHT	70	0	0	70	**0**	70	5	75
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**614**				**165**	**830**	**75**	**905**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	13 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BERKSHIRE PLACE								
EB LEFT	65	3	9	75	**0**	75	5	80
EB THRU	275	14	42	315	**0**	315	30	345
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	290	15	45	335	**165**	500	45	545
WB RIGHT	505	25	75	580	**0**	580	50	630
I-210 FWY WB RAMPS								
NB LEFT	65	3	9	75	**0**	75	5	80
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	115	6	18	135	**140**	275	25	300
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**1315**				**305**	**1820**	**160**	**1980**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	14 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BERKSHIRE PLACE								
EB LEFT	65	3	9	75	0	75	5	80
EB THRU	275	14	42	315	0	315	30	345
EB RIGHT	0	0	0	0	0	0	0	0
WB LEFT	0	0	0	0	0	0	0	0
WB THRU	290	15	45	335	0	335	30	365
WB RIGHT	505	25	75	580	0	580	50	630
I-210 FWY WB RAMPS								
NB LEFT	65	3	9	75	0	75	5	80
NB THRU	0	0	0	0	0	0	0	0
NB RIGHT	115	6	18	135	140	275	25	300
SB LEFT	0	0	0	0	0	0	0	0
SB THRU	0	0	0	0	0	0	0	0
SB RIGHT	0	0	0	0	0	0	0	0
TOTALS	**1315**				**140**	**1655**	**145**	**1800**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	15 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1D

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BERKSHIRE PLACE								
EB LEFT	65	3	9	75	**0**	75	5	80
EB THRU	275	14	42	315	**0**	315	30	345
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	290	15	45	335	**165**	500	45	545
WB RIGHT	505	25	75	580	**0**	580	50	630
I-210 FWY WB RAMPS								
NB LEFT	65	3	9	75	**0**	75	5	80
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	115	6	18	135	**0**	135	10	145
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**1315**				**165**	**1680**	**145**	**1825**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	16 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1E

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BERKSHIRE PLACE								
EB LEFT	65	3	9	75	**0**	75	5	80
EB THRU	275	14	42	315	**140**	455	40	495
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	290	15	45	335	**0**	335	30	365
WB RIGHT	505	25	75	580	**165**	745	65	810
I-210 FWY WB RAMPS								
NB LEFT	65	3	9	75	**0**	75	5	80
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	115	6	18	135	**0**	135	10	145
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**1315**				**305**	**1820**	**155**	**1975**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	17 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BERKSHIRE PLACE								
EB LEFT	65	3	9	75	**0**	75	5	80
EB THRU	275	14	42	315	**140**	455	40	495
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	290	15	45	335	**0**	335	30	365
WB RIGHT	505	25	75	580	**0**	580	50	630
I-210 FWY WB RAMPS								
NB LEFT	65	3	9	75	**0**	75	5	80
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	115	6	18	135	**0**	135	10	145
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**1315**				**140**	**1655**	**140**	**1795**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	18 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BERKSHIRE PLACE								
EB LEFT	65	3	9	75	**0**	75	5	80
EB THRU	275	14	42	315	**0**	315	30	345
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	290	15	45	335	**0**	335	30	365
WB RIGHT	505	25	75	580	**165**	745	65	810
I-210 FWY WB RAMPS								
NB LEFT	65	3	9	75	**0**	75	5	80
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	115	6	18	135	**0**	135	10	145
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**1315**				**165**	**1680**	**145**	**1825**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	19 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BERKSHIRE PLACE								
EB LEFT	61	2	6	65	**0**	65	5	70
EB THRU	178	0	0	180	**0**	180	15	195
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	400	3	9	410	**165**	575	50	625
WB RIGHT	407	1	3	410	**0**	410	35	445
I-210 FWY WB RAMPS								
NB LEFT	94	0	0	95	**0**	95	10	105
NB THRU	1	0	0	5	**0**	5	5	10
NB RIGHT	80	2	6	85	**140**	225	20	245
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**1221**				**305**	**1555**	**140**	**1695**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	20 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								

BERKSHIRE PLACE

EB LEFT	61	2	6	65	**0**	65	5	70
EB THRU	178	0	0	180	**0**	180	15	195
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	400	3	9	410	**0**	410	35	445
WB RIGHT	407	1	3	410	**0**	410	35	445

I-210 FWY WB RAMPS

NB LEFT	94	0	0	95	**0**	95	10	105
NB THRU	1	0	0	5	**0**	5	5	10
NB RIGHT	80	2	6	85	**140**	225	20	245
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**1221**				**140**	**1390**	**125**	**1515**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	21 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1D

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BERKSHIRE PLACE								
EB LEFT	61	2	6	65	**0**	65	5	70
EB THRU	178	0	0	180	**0**	180	15	195
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	400	3	9	410	**165**	575	50	625
WB RIGHT	407	1	3	410	**0**	410	35	445
I-210 FWY WB RAMPS								
NB LEFT	94	0	0	95	**0**	95	10	105
NB THRU	1	0	0	5	**0**	5	5	10
NB RIGHT	80	2	6	85	**0**	85	5	90
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**1221**				**165**	**1415**	**125**	**1540**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	22 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1E

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BERKSHIRE PLACE								
EB LEFT	61	2	6	65	**0**	65	5	70
EB THRU	178	0	0	180	**140**	320	30	350
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	400	3	9	410	**0**	410	35	445
WB RIGHT	407	1	3	410	**165**	575	50	625
I-210 FWY WB RAMPS								
NB LEFT	94	0	0	95	**0**	95	10	105
NB THRU	1	0	0	5	**0**	5	5	10
NB RIGHT	80	2	6	85	**0**	85	5	90
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**1221**				**305**	**1555**	**140**	**1695**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	23 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BERKSHIRE PLACE								
EB LEFT	61	2	6	65	**0**	65	5	70
EB THRU	178	0	0	180	**140**	320	30	350
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	400	3	9	410	**0**	410	35	445
WB RIGHT	407	1	3	410	**0**	410	35	445
I-210 FWY WB RAMPS								
NB LEFT	94	0	0	95	**0**	95	10	105
NB THRU	1	0	0	5	**0**	5	5	10
NB RIGHT	80	2	6	85	**0**	85	5	90
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**1221**				**140**	**1390**	**125**	**1515**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	24 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BERKSHIRE PLACE								
EB LEFT	61	2	6	65	**0**	65	5	70
EB THRU	178	0	0	180	**0**	180	15	195
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	400	3	9	410	**0**	410	35	445
WB RIGHT	407	1	3	410	**165**	575	50	625
I-210 FWY WB RAMPS								
NB LEFT	94	0	0	95	**0**	95	10	105
NB THRU	1	0	0	5	**0**	5	5	10
NB RIGHT	80	2	6	85	**0**	85	5	90
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**1221**				**165**	**1415**	**125**	**1540**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: BIRKSHIRE
EAST-WEST STREET: I-210 WB RAMPS
JURISDICTION: PASADENA

DATE: 05-31-11

PEAK HOUR: 07:30AM

Birkshire Place (WB)
NORTH LEG

TOTAL: 449

TT = 10
TT% = 10/449 = 2.2% ≈ 2%

Rt	Thru	Lt	
257 (255)	192 (190)		Total
39	84		1st
114	58		2nd
48	21		3rd
56	29		4th

TT = 4
TT% = 4/340 = 1.2% ≈ 1%

WB 210 Fwy
EAST LEG TOTAL: 340

	1st	2nd	3rd	4th	Total
Rt	66	67	76	68	277 (295)
Thru	1	0	1	0	2 (5)
Lt	11	16	22	12	61 (60)

Total	1st	2nd	3rd	4th	
					Lt
					Thru
					Rt

WEST LEG TOTAL: 0

PEAK HOUR FACTORS

NORTH LEG = 0.65
SOUTH LEG = 0.78
EAST LEG = 0.86
WEST LEG =

ALL LEGS = 0.82

TT = 3
TT% = 3/383 = 0.78% ≈ 1%

	Lt	Thru	Rt
1st	25	98	
2nd	30	72	
3rd	27	55	
4th	14	62	
Total	96 (95)	287 (285)	

TOTAL: 383

SOUTH LEG
Birkshire Place (EB)

HOUR TOTAL: 1,172

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: BIRKSHIRE

EAST-WEST STREET: I-210 WB RAMPS

TIME: 07:00AM-08:00AM DATE: 05-31-11

NORTH LEG

Rt	Thru	Lt	
293	197		Total
51	28		1st
89	27		2nd
39	84		3rd
114	58		4th

	1st	2nd	3rd	4th	Total
Rt	60	55	66	67	248
Thru	1	0	1	0	2
Lt	8	14	11	16	49

Total	1st	2nd	3rd	4th	
					Lt
					Thru
					Rt

	Lt	Thru	Rt
1st	9	42	
2nd	14	41	
3rd	25	98	
4th	30	72	
Total	78	253	

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: BIRKSHIRE

EAST-WEST STREET: I-210 WB RAMPS

TIME: 08:00AM-09:00AM DATE: 05-31-11

NORTH LEG

Rt	Thru	Lt	
188	99		Total
48	21		1st
56	29		2nd
44	26		3rd
40	23		4th

	1st	2nd	3rd	4th	Total
Rt	76	68	55	49	248
Thru	1	0	0	0	1
Lt	22	12	20	16	70

Total	1st	2nd	3rd	4th	
					Lt
					Thru
					Rt

	Lt	Thru	Rt
1st	27	55	
2nd	14	62	
3rd	21	63	
4th	18	56	
Total	80	236	

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : BIRKSHIRE PASADENA

EAST-WEST STREET : I-210 WB RAMPS 05-31-11

BEGINNING TIME : 07:00AM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
					WB NORTH LEG							
51	28	0	0	0	0	0	0	0	0	0	0	79
89	25	0	0	2	0	0	0	0	0	0	0	116
38	84	0	1	0	0	0	0	0	0	0	0	123
113	57	0	1	1	0	0	0	0	0	0	0	172
46	19	0	2	2	0	0	0	0	0	0	0	69
54	28	0	2	1	0	0	0	0	0	0	0	85
44	25	0	0	1	0	0	0	0	0	0	0	70
40	22	0	0	1	0	0	0	0	0	0	0	63
				10			0			0		449
						TT=10+0+0=10						
475	288	0	6	8	0	0	0	0	0	0	0	777
					EB SOUTH LEG							
0	40	8	0	1	1	0	0	0	0	1	0	51
0	41	14	0	0	0	0	0	0	0	0	0	55
0	96	25	0	2	0	0	0	0	0	0	0	123
0	72	30	0	0	0	0	0	0	0	0	0	102
0	54	27	0	1	0	0	0	0	0	0	0	82
0	62	14	0	0	0	0	0	0	0	0	0	76
0	63	21	0	0	0	0	0	0	0	0	0	84
0	54	18	0	2	0	0	0	0	0	0	0	74
				3			0			0		383
						TT=3+0+0=3						
0	482	157	0	6	1	0	0	0	0	1	0	647
					NB EAST LEG							
60	1	6	0	0	2	0	0	0	0	0	0	69
55	0	14	0	0	0	0	0	0	0	0	0	69
65	1	11	1	0	0	0	0	0	0	0	0	78
64	0	16	3	0	0	0	0	0	0	0	0	83
76	1	22	0	0	0	0	0	0	0	0	0	99
68	0	12	0	0	0	0	0	0	0	0	0	80
55	0	20	0	0	0	0	0	0	0	0	0	75
49	0	16	0	0	0	0	0	0	0	0	0	65
				4			0			0		340
						TT=4+0+0=4						
492	3	117	4	0	2	0	0	0	0	0	0	618
					WEST LEG							
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: BIRKSHIRE
EAST-WEST STREET: I-210 WB RAMPS
JURISDICTION: PASADENA

DATE: 05-31-11

PEAK HOUR: 12:00PM

Birkshire Place (WB)
NORTH LEG

TOTAL: 276

Rt	Thru	Lt	
168 (170)	108 (110)		Total
73	44		1st
33	29		2nd
34	22		3rd
28	13		4th

TT = 7
TT% = 7/276 = 2.54% ≈ 3%

TT = 3
TT% = 3/130 = 2.3% ≈ 2%

WB 210 Fwy
EAST LEG TOTAL: 130

	1st	2nd	3rd	4th	Total
Rt	15	20	15	20	70
Thru	3	1	1	0	5
Lt	18	14	13	10	55

Total	1st	2nd	3rd	4th	
					Lt
					Thru
					Rt

WEST LEG TOTAL: 0

PEAK HOUR FACTORS

NORTH LEG = 0.59
SOUTH LEG = 0.85
EAST LEG = 0.90
WEST LEG =

ALL LEGS = 0.79

	Lt	Thru	Rt
1st	10	37	
2nd	12	54	
3rd	15	48	
4th	11	38	
Total	48 (50)	177 (175)	

TT = 7
TT% = 7/225 = 3.1% ≈ 3%

TOTAL: 225

SOUTH LEG
Birkshire Place (EB)

HOUR TOTAL: 631

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: BIRKSHIRE

EAST-WEST STREET: I-210 WB RAMPS

TIME: 12:00PM-01:00PM DATE: 05-31-11

NORTH LEG

Rt	Thru	Lt	
168	108		Total
73	44		1st
33	29		2nd
34	22		3rd
28	13		4th

	1st	2nd	3rd	4th	Total
Rt	15	20	15	20	70
Thru	3	1	1	0	5
Lt	18	14	13	10	55

Total	1st	2nd	3rd	4th	
					Lt
					Thru
					Rt

	Lt	Thru	Rt
1st	10	37	
2nd	12	54	
3rd	15	48	
4th	11	38	
Total	48	177	

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: BIRKSHIRE

EAST-WEST STREET: I-210 WB RAMPS

TIME: 01:00PM-02:00PM DATE: 05-31-11

NORTH LEG

Rt	Thru	Lt	
106	172		Total
12	29		1st
11	36		2nd
44	55		3rd
39	52		4th

	1st	2nd	3rd	4th	Total
Rt	18	23	19	15	75
Thru	0	0	0	1	1
Lt	20	15	14	10	59

Total	1st	2nd	3rd	4th	
					Lt
					Thru
					Rt

	Lt	Thru	Rt
1st	11	25	
2nd	9	28	
3rd	12	31	
4th	17	40	
Total	49	124	

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : BIRKSHIRE PASADENA

EAST-WEST STREET : I-210 WB RAMPS 05-31-11

BEGINNING TIME : 12:00PM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
					WB NORTH LEG							
73	43	0	0	1	0	0	0	0	0	0	0	117
32	27	0	1	1	0	0	0	0	0	1	0	62
34	21	0	0	1	0	0	0	0	0	0	0	56
27	12	0	1	1	0	0	0	0	0	0	0	41
11	28	0	1	1 6	0	0	0 0	0	0	0 1	0	276 41
9	35	0	2	1	0	0	0	0	0	0	0	47
43	54	0	0	0	0	1	1	0	0	0	0	99
38	51	0	1	1	0	0	0	0	0	0	0	91
						TT=6+0+1=7						
267	271	0	6	7	0	1	1	0	0	1	0	554
					EB SOUTH LEG							
0	35	10	0	2	0	0	0	0	0	0	0	47
0	54	12	0	0	0	0	0	0	0	0	0	66
0	48	14	0	0	1	0	0	0	0	0	0	63
0	36	9	0	2	1	0	0	1	0	0	0	49
0	24	11	0	1 6	0	0	0 1	0	0	0 0	0	225 36
0	26	9	0	1	0	0	1	0	0	0	0	37
0	31	12	0	0	0	0	0	0	0	0	0	43
0	39	17	0	1	0	0	0	0	0	0	0	57
						TT=6+1+0=7						
0	293	94	0	7	2	0	1	1	0	0	0	398
					NB EAST LEG							
15	3	18	0	0	0	0	0	0	0	0	0	36
20	1	13	0	0	1	0	0	0	0	0	0	35
15	1	12	0	0	1	0	0	0	0	0	0	29
20	0	9	0	0	1	0	0	0	0	0	0	30
17	0	20	1	0 3	0	0	0 0	0	0	0 0	0	130 38
23	0	14	0	0	1	0	0	0	0	0	0	38
19	0	14	0	0	0	0	0	0	0	0	0	33
13	1	10	2	0	0	0	0	0	0	0	0	26
						TT=3+0+0=3						
142	6	110	3	0	4	0	0	0	0	0	0	265
					WEST LEG							
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: BERKSHIRE
EAST-WEST STREET: I-210 WB RAMPS
JURISDICTION: LA CANADA

DATE: 04-10-12

PEAK HOUR: 02:45PM

NORTH LEG (SB) NB

TOTAL: 797

Rt	Thru	Lt	
506	291		Total
74	35		1st
232	105		2nd
113	73		3rd
87	78		4th

EB (WB)

EAST LEG TOTAL: 178

	1st	2nd	3rd	4th	Total
Rt	36	25	33	19	113
Thru					
Lt	10	16	17	22	65

SB (EB)

Total	1st	2nd	3rd	4th	
					Lt
					Thru
					Rt

WEST LEG TOTAL: 0

PEAK HOUR FACTORS

NORTH LEG = 0.59
SOUTH LEG = 0.75
EAST LEG = 0.89
WEST LEG =

ALL LEGS = 0.69

	Lt	Thru	Rt	
1st	10	103		
2nd	16	81		
3rd	16	61		
4th	21	29		
Total	63	274		TOTAL: 337

SOUTH LEG (NB) SB

HOUR TOTAL: 1,312

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: BERKSHIRE

EAST-WEST STREET: I-210 WB RAMPS

TIME: 02:00PM-03:00PM DATE: 04-10-12

NORTH LEG

Rt	Thru	Lt	
231	137		Total
75	31		1st
39	30		2nd
43	41		3rd
74	35		4th

	1st	2nd	3rd	4th	Total
Rt	18	11	16	36	81
Thru					
Lt	11	12	18	10	51

Total	1st	2nd	3rd	4th	
					Lt
					Thru
					Rt

	Lt	Thru	Rt
1st	11	37	
2nd	11	25	
3rd	11	60	
4th	10	103	
Total	43	225	

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: BERKSHIRE

EAST-WEST STREET: I-210 WB RAMPS

TIME: 03:00PM-04:00PM DATE: 04-10-12

NORTH LEG

Rt	Thru	Lt	
509	313		Total
232	105		1st
113	73		2nd
87	78		3rd
77	57		4th

	1st	2nd	3rd	4th	Total
Rt	25	33	19	14	91
Thru					
Lt	16	17	22	18	73

Total	1st	2nd	3rd	4th	
					Lt
					Thru
					Rt

	Lt	Thru	Rt
1st	16	81	
2nd	16	61	
3rd	21	29	
4th	14	39	
Total	67	210	

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: BIRKSHIRE
EAST-WEST STREET: I-210 WB RAMPS
JURISDICTION: PASADENA

DATE: 05-31-11

PEAK HOUR: 05:00PM

Birkshire Place (NB)
NORTH LEG

TOTAL: 811

	Rt	Thru	Lt	Total
1st	129	110		
2nd	98	103		
3rd	93	117		
4th	88	73		
Total	408 (410)	403 (405)		

TT = 4
TT% = 4/811 = 0.5% ≈ 1%

TT = 2
TT% = 2/177 = 1.1% ≈ 1%

WB 210 Fwy
EAST LEG TOTAL: 177

	1st	2nd	3rd	4th	Total
Rt	16	13	29	24	82 (80)
Thru	0	1	0	0	1 (5)
Lt	27	28	24	15	94 (95)

	Total	1st	2nd	3rd	4th
Lt					
Thru					
Rt					

WEST LEG TOTAL: 0

PEAK HOUR FACTORS

NORTH LEG = 0.85
SOUTH LEG = 0.70
EAST LEG = 0.83
WEST LEG =

ALL LEGS = 0.88

	Lt	Thru	Rt
1st	11	37	
2nd	12	37	
3rd	23	63	
4th	17	41	
Total	63 (65)	178 (180)	

TT = 2
TT% = 2/241 = 0.8% ≈ 1%

TOTAL: 241

SOUTH LEG
Birkshire Place (EB)

HOUR TOTAL: 1,229

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: BIRKSHIRE

EAST-WEST STREET: I-210 WB RAMPS

TIME: 04:00PM-05:00PM DATE: 05-31-11

NORTH LEG

Rt	Thru	Lt	
385	259		Total
98	70		1st
93	61		2nd
103	66		3rd
91	62		4th

	1st	2nd	3rd	4th	Total
Rt	20	13	9	13	55
Thru	0	0	0	1	1
Lt	14	24	26	22	86

Total	1st	2nd	3rd	4th	
					Lt
					Thru
					Rt

	Lt	Thru	Rt
1st	16	29	
2nd	12	24	
3rd	11	37	
4th	12	32	
Total	51	122	

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: BIRKSHIRE

EAST-WEST STREET: I-210 WB RAMPS

TIME: 05:00PM-06:00PM DATE: 05-31-11

NORTH LEG

Rt	Thru	Lt	
408	403		Total
129	110		1st
98	103		2nd
93	117		3rd
88	73		4th

	1st	2nd	3rd	4th	Total
Rt	16	13	29	24	82
Thru	0	1	0	0	1
Lt	27	28	24	15	94

Total	1st	2nd	3rd	4th	
					Lt
					Thru
					Rt

	Lt	Thru	Rt
1st	11	37	
2nd	12	37	
3rd	23	63	
4th	17	41	
Total	63	178	

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : BIRKSHIRE — PASADENA

EAST-WEST STREET : I-210 WB RAMPS — 05-31-11

BEGINNING TIME : 04:00PM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
					WB NORTH LEG							
98	69	0	0	0	0	0	1	0	0	0	0	168
91	58	0	2	3	0	0	0	0	0	0	0	154
101	64	0	1	2	0	1	0	0	0	0	0	169
91	62	0	0	0	0	0	0	0	0	0	0	153
129	109	0	0	1	0	0	0	0	0	0	0	239
98	102	0	0	1	0	0	0	0	0	0	0	201
93	116	0	0	1	0	0	0	0	0	0	0	210
87	73	0	1	0	0	0	0	0	0	0	0	161
				4				0			0	811
						TT = 4+0+0 = 4						
788	653	0	4	8	0	1	1	0	0	0	0	1455
					EB SOUTH LEG							
0	29	16	0	0	0	0	0	0	0	0	0	45
0	24	12	0	0	0	0	0	0	0	0	0	36
0	35	11	0	1	0	0	1	0	0	0	0	48
0	32	12	0	0	0	0	0	0	0	0	0	44
0	37	11	0	0	0	0	0	0	0	0	0	48
0	37	12	0	0	0	0	0	0	0	0	0	49
0	63	21	0	0	1	0	0	1	0	0	0	86
0	41	17	0	0	0	0	0	0	0	0	0	58
				1				1			0	241
						TT = 1+1+0 = 2						
0	298	112	0	1	1	0	1	1	0	0	0	414
					NB EAST LEG							
19	0	14	1	0	0	0	0	0	0	0	0	34
13	0	24	0	0	0	0	0	0	0	0	0	37
8	0	26	1	0	0	0	0	0	0	0	0	35
12	1	22	1	0	0	0	0	0	0	0	0	36
16	0	27	0	0	0	0	0	0	0	0	0	43
13	1	28	0	0	0	0	0	0	0	0	0	42
28	0	24	1	0	0	0	0	0	0	0	0	53
23	0	15	0	0	0	0	0	0	1	0	0	39
				1				0			1	177
						TT = 1+0+1 = 2						
132	2	180	4	0	0	0	0	0	1	0	0	319
					WEST LEG							
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0

Prepared by Newport Traffic Studies

Intersection	
Intersection Delay (sec/veh):	3.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	95	285	0	0	190	255	60	5	275	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles(%)	0	5	0	0	5	5	0	0	5	0	0	0
Movement Flow Rate	116	348	0	0	232	311	73	6	335	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1			Major 2			Minor 1			Lane
Conflicting Flow Rate - All	543	0	-	-	0	0	695	1122	174	Capacity (vph)
Stage 1	0	0	-	-	0	0	579	579	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	116	543	0	HCM Lane VC Ratio
Follow-up Headway	2.2	-	-	-	0	0	3.5	4	3.35	HCM Lane LOS
Pot Capacity-1 Maneuver	1036	-	-	-	-	-	333	208	HCM 95th Percentile Queue (veh)	
Stage 1	-	-	-	-	-	-	473	504	-	
Stage 2	-	-	-	-	-	-	882	523	-	
Mov Capacity-1 Maneuver	1036	-	-	-	-	-	-	184.7	830	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	184.7	-	
Stage 1	-	-	-	-	-	-	473	447.6	-	
Stage 2	-	-	-	-	-	-	882	# 0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	2.2	0	9.676
HCM LOS	A	A	A

Intersection	
Intersection Delay (sec/veh):	1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	50	175	0	0	110	170	55	5	70	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Heavy Vehicles(%)	5	5	0	0	5	5	5	0	0	0	0	0
Movement Flow Rate	63	222	0	0	139	215	70	6	89	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1				Major 2		Minor 1			Lane
Conflicting Flow Rate - All	354	0	-	-	0	0	418	702	111	Capacity (vph)
Stage 1	0	0	-	-	0	0	348	348	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	70	354	0	HCM Lane VC Ratio
Follow-up Headway	2.25	-	-	-	0	0	3.55	4	3.3	HCM Lane LOS
Pot Capacity-1 Maneuver	1181	-	-	-	-	-	512	365	HCM 95th Percentile Queue (veh)	
Stage 1	-	-	-	-	-	-	633	638	-	
Stage 2	-	-	-	-	-	-	923	634	-	
Mov Capacity-1 Maneuver	1181	-	-	-	-	-	-	345.3	925	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	345.3	-	
Stage 1	-	-	-	-	-	-	633	603.5	-	
Stage 2	-	-	-	-	-	-	923	# 0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	1.8	0	4.546
HCM LOS	A	A	A

Intersection	
Intersection Delay (sec/veh):	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	65	275	0	0	290	505	65	0	115	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69
Heavy Vehicles(%)	5	5	0	0	5	5	5	0	0	0	0	0
Movement Flow Rate	94	399	0	0	420	732	94	0	167	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1				Major 2		Minor 1			Lane
Conflicting Flow Rate - All	1152	0	-	-	0	0	797	1739	199	Capacity (vph)
Stage 1	0	0	-	-	0	0	587	587	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	210	1152	0	HCM Lane VC Ratio
Follow-up Headway	2.25	-	-	-	0	0	3.55	4	3.3	HCM Lane LOS
Pot Capacity-1 Maneuver	585	-	-	-	-	-	272	88	817	95th Percentile Queue (veh)
Stage 1	-	-	-	-	-	-	455	500	-	
Stage 2	-	-	-	-	-	-	764	275	-	
Mov Capacity-1 Maneuver	585	-	-	-	-	-	-	73.8	817	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	73.8	-	
Stage 1	-	-	-	-	-	-	455	419.5	-	
Stage 2	-	-	-	-	-	-	764	0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	2.4	0	6.347
HCM LOS	A	A	A

Intersection	
Intersection Delay (sec/veh):	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	65	180	0	0	405	410	95	5	80	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles(%)	5	0	0	0	5	5	0	0	5	0	0	0
Movement Flow Rate	74	205	0	0	460	466	108	6	91	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1				Major 2		Minor 1			Lane
Conflicting Flow Rate - All	926	0	-	-	0	0	582	1278	102	Capacity (vph)
Stage 1	0	0	-	-	0	0	352	352	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	230	926	0	HCM Lane VC Ratio
Follow-up Headway	2.25	-	-	-	0	0	3.5	4	3.35	HCM Lane LOS
Pot Capacity-1 Maneuver	715	-	-	-	-	-	401	168	HCM 95th Percentile Queue (veh)	
Stage 1	-	-	-	-	-	-	643	635	-	
Stage 2	-	-	-	-	-	-	758	350	-	
Mov Capacity-1 Maneuver	715	-	-	-	-	-	-	150.7	923	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	150.7	-	
Stage 1	-	-	-	-	-	-	643	569.6	-	
Stage 2	-	-	-	-	-	-	758	# 0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	2.8	0	3.578
HCM LOS	A	A	A

Intersection	
Intersection Delay (sec/veh):	4.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	95	285	0	0	245	255	60	5	330	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles(%)	0	5	0	0	25	5	0	0	20	0	0	0
Movement Flow Rate	116	348	0	0	299	311	73	6	402	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1				Major 2		Minor 1			Lane
Conflicting Flow Rate - All	610	0	-	-	0	0	728	1189	174	Capacity (vph)
Stage 1	0	0	-	-	0	0	579	579	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	149	610	0	HCM Lane VC Ratio
Follow-up Headway	2.2	-	-	-	0	0	3.5	4	3.5	HCM Lane LOS
Pot Capacity-1 Maneuver	978	-	-	-	-	-	315	190	HCM 95th Percentile Queue (veh)	
Stage 1	-	-	-	-	-	-	473	504	-	
Stage 2	-	-	-	-	-	-	844	488	-	
Mov Capacity-1 Maneuver	978	-	-	-	-	-	-	167.6	786	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	167.6	-	
Stage 1	-	-	-	-	-	-	473	444.5	-	
Stage 2	-	-	-	-	-	-	844	# 0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	2.3	0	11.782
HCM LOS	A	A	B

Intersection	
Intersection Delay (sec/veh):	2.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	50	175	0	0	165	170	55	5	125	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Heavy Vehicles(%)	5	5	0	0	35	5	5	0	42	0	0	0
Movement Flow Rate	63	222	0	0	209	215	70	6	158	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1			Major 2			Minor 1			Lane
Conflicting Flow Rate - All	424	0	-	-	0	0	452	772	111	Capacity (vph)
Stage 1	0	0	-	-	0	0	348	348	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	104	424	0	HCM Lane VC Ratio
Follow-up Headway	2.25	-	-	-	0	0	3.55	4	3.72	HCM Lane LOS
Pot Capacity-1 Maneuver	1110	-	-	-	-	-	484	333	HCM 95th Percentile Queue (veh)	
Stage 1	-	-	-	-	-	-	633	638	-	
Stage 2	-	-	-	-	-	-	882	590	-	
Mov Capacity-1 Maneuver	1110	-	-	-	-	-	-	314	805	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	314	-	
Stage 1	-	-	-	-	-	-	633	601.6	-	
Stage 2	-	-	-	-	-	-	882	# 0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	1.9	0	6.838
HCM LOS	A	A	A

Intersection	
Intersection Delay (sec/veh):	2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	65	275	0	0	345	505	65	0	170	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69
Heavy Vehicles(%)	5	5	0	0	19	5	5	0	30	0	0	0
Movement Flow Rate	94	399	0	0	500	732	94	0	246	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1			Major 2			Minor 1			Lane
Conflicting Flow Rate - All	1232	0	-	-	0	0	837	1819	199	Capacity (vph)
Stage 1	0	0	-	-	0	0	587	587	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	250	1232	0	HCM Lane VC Ratio
Follow-up Headway	2.25	-	-	-	0	0	3.55	4	3.6	HCM Lane LOS
Pot Capacity-1 Maneuver	545	-	-	-	-	-	254	79	HCM 95th Percentile Queue (veh)	
Stage 1	-	-	-	-	-	-	455	500	-	
Stage 2	-	-	-	-	-	-	724	252	-	
Mov Capacity-1 Maneuver	545	-	-	-	-	-	-	65.3	728	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	65.3	-	
Stage 1	-	-	-	-	-	-	455	413.5	-	
Stage 2	-	-	-	-	-	-	724	0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	2.5	0	8.766
HCM LOS	A	A	A

Intersection	
Intersection Delay (sec/veh):	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	65	180	0	0	460	410	95	5	135	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles(%)	5	0	0	0	15	5	0	0	42	0	0	0
Movement Flow Rate	74	205	0	0	523	466	108	6	153	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1				Major 2		Minor 1			Lane
Conflicting Flow Rate - All	989	0	-	-	0	0	613	1341	102	Capacity (vph)
Stage 1	0	0	-	-	0	0	352	352	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	261	989	0	HCM Lane VC Ratio
Follow-up Headway	2.25	-	-	-	0	0	3.5	4	3.72	HCM Lane LOS
Pot Capacity-1 Maneuver	677	-	-	-	-	-	381	154	HC[illegible]95th Percentile Queue (veh)
Stage 1	-	-	-	-	-	-	643	635	-	
Stage 2	-	-	-	-	-	-	727	327	-	
Mov Capacity-1 Maneuver	677	-	-	-	-	-	-	137.2	822	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	137.2	-	
Stage 1	-	-	-	-	-	-	643	565.8	-	
Stage 2	-	-	-	-	-	-	727	# 0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	2.9	0	5.549
HCM LOS	A	A	A

Intersection	
Intersection Delay (sec/veh):	4.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	105	310	0	0	265	280	65	5	360	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles(%)	0	5	0	0	25	5	0	0	20	0	0	0
Movement Flow Rate	128	378	0	0	323	341	79	6	439	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1				Major 2		Minor 1			Lane
Conflicting Flow Rate - All	665	0	-	-	0	0	796	1299	189	Capacity (vph)
Stage 1	0	0	-	-	0	0	634	634	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	162	665	0	HCM Lane VC Ratio
Follow-up Headway	2.2	-	-	-	0	0	3.5	4	3.5	HCM Lane LOS
Pot Capacity-1 Maneuver	935	-	-	-	-	-	281	163	HCM 95th Percentile Queue (veh)	
Stage 1	-	-	-	-	-	-	439	476	-	
Stage 2	-	-	-	-	-	-	830	461	-	
Mov Capacity-1 Maneuver	935	-	-	-	-	-	-	140.7	767	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	140.7	-	
Stage 1	-	-	-	-	-	-	439	410.8	-	
Stage 2	-	-	-	-	-	-	830	# 0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	2.4	0	13.065
HCM LOS	A	A	B

Intersection	
Intersection Delay (sec/veh):	2.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	55	190	0	0	180	185	60	5	135	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Heavy Vehicles(%)	5	5	0	0	35	5	5	0	42	0	0	0
Movement Flow Rate	70	241	0	0	228	234	76	6	171	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1				Major 2		Minor 1			Lane
Conflicting Flow Rate - All	462	0	-	-	0	0	494	842	120	Capacity (vph)
Stage 1	0	0	-	-	0	0	380	380	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	114	462	0	HCM Lane VC Ratio
Follow-up Headway	2.25	-	-	-	0	0	3.55	4	3.72	HCM Lane LOS
Pot Capacity-1 Maneuver	1074	-	-	-	-	-	451	303	HCM 95th Percentile Queue (veh)	
Stage 1	-	-	-	-	-	-	606	617	-	
Stage 2	-	-	-	-	-	-	870	568	-	
Mov Capacity-1 Maneuver	1074	-	-	-	-	-	-	283.3	795	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	283.3	-	
Stage 1	-	-	-	-	-	-	606	576.9	-	
Stage 2	-	-	-	-	-	-	870	# 0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	1.9	0	6.965
HCM LOS	A	A	A

Intersection	
Intersection Delay (sec/veh):	2.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	70	300	0	0	375	550	70	0	185	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69
Heavy Vehicles(%)	5	5	0	0	19	5	5	0	30	0	0	0
Movement Flow Rate	101	435	0	0	543	797	101	0	268	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1				Major 2		Minor 1			Lane
Conflicting Flow Rate - All	1341	0	-	-	0	0	910	1979	217	Capacity (vph)
Stage 1	0	0	-	-	0	0	638	638	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	272	1341	0	HCM Lane VC Ratio
Follow-up Headway	2.25	-	-	-	0	0	3.55	4	3.6	HCM Lane LOS
Pot Capacity-1 Maneuver	495	-	-	-	-	-	225	62	HCM 95th Percentile Queue (veh)	
Stage 1	-	-	-	-	-	-	424	474	-	
Stage 2	-	-	-	-	-	-	702	223	-	
Mov Capacity-1 Maneuver	495	-	-	-	-	-	-	49.3	708	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	49.3	-	
Stage 1	-	-	-	-	-	-	424	376.8	-	
Stage 2	-	-	-	-	-	-	702	0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	2.7	0	9.302
HCM LOS	A	A	A

Intersection	
Intersection Delay (sec/veh):	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	70	195	0	0	500	445	105	5	145	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles(%)	5	0	0	0	15	5	0	0	42	0	0	0
Movement Flow Rate	80	222	0	0	568	506	119	6	165	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1			Major 2			Minor 1			Lane
Conflicting Flow Rate - All	1074	0	-	-	0	0	665	1455	111	Capacity (vph)
Stage 1	0	0	-	-	0	0	381	381	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	284	1074	0	HCM Lane VC Ratio
Follow-up Headway	2.25	-	-	-	0	0	3.5	4	3.72	HCM Lane LOS
Pot Capacity-1 Maneuver	628	-	-	-	-	-	349	131	HCM 95th Percentile Queue (veh)	
Stage 1	-	-	-	-	-	-	619	617	-	
Stage 2	-	-	-	-	-	-	705	299	-	
Mov Capacity-1 Maneuver	628	-	-	-	-	-	-	114.4	805	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	114.4	-	
Stage 1	-	-	-	-	-	-	619	538.6	-	
Stage 2	-	-	-	-	-	-	705	# 0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	3.1	0	5.596
HCM LOS	A	A	A

Intersection	
Intersection Delay (sec/veh):	4.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	95	285	0	0	190	255	60	5	330	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles(%)	0	5	0	0	5	5	0	0	20	0	0	0
Movement Flow Rate	116	348	0	0	232	311	73	6	402	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1			Major 2			Minor 1			Lane
Conflicting Flow Rate - All	543	0	-	-	0	0	695	1122	174	Capacity (vph)
Stage 1	0	0	-	-	0	0	579	579	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	116	543	0	HCM Lane VC Ratio
Follow-up Headway	2.2	-	-	-	0	0	3.5	4	3.5	HCM Lane LOS
Pot Capacity-1 Maneuver	1036	-	-	-	-	-	333	208	HCM 95th	Percentile Queue (veh)
Stage 1	-	-	-	-	-	-	473	504	-	
Stage 2	-	-	-	-	-	-	882	523	-	
Mov Capacity-1 Maneuver	1036	-	-	-	-	-	-	184.7	786	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	184.7	-	
Stage 1	-	-	-	-	-	-	473	447.6	-	
Stage 2	-	-	-	-	-	-	882	# 0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	2.2	0	11.782
HCM LOS	A	A	B

Intersection	
Intersection Delay (sec/veh):	2.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	50	175	0	0	110	170	55	5	125	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles(%)	5	5	0	0	5	5	5	0	42	0	0	0
Movement Flow Rate	61	213	0	0	134	207	67	6	152	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1				Major 2		Minor 1			Lane
Conflicting Flow Rate - All	341	0	-	-	0	0	402	676	107	Capacity (vph)
Stage 1	0	0	-	-	0	0	335	335	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	67	341	0	HCM Lane VC Ratio
Follow-up Headway	2.25	-	-	-	0	0	3.55	4	3.72	HCM Lane LOS
Pot Capacity-1 Maneuver	1194	-	-	-	-	-	526	378	HCM 95th Percentile Queue (veh)	
Stage 1	-	-	-	-	-	-	644	646	-	
Stage 2	-	-	-	-	-	-	927	642	-	
Mov Capacity-1 Maneuver	1194	-	-	-	-	-	-	358.7	809	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	358.7	-	
Stage 1	-	-	-	-	-	-	644	613.1	-	
Stage 2	-	-	-	-	-	-	927	# 0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	1.8	0	6.77
HCM LOS	A	A	A

Intersection	
Intersection Delay (sec/veh):	1.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	65	275	0	0	290	505	65	0	170	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles(%)	5	5	0	0	5	5	5	0	30	0	0	0
Movement Flow Rate	79	335	0	0	354	616	79	0	207	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1				Major 2		Minor 1			Lane
Conflicting Flow Rate - All	970	0	-	-	0	0	671	1464	168	Capacity (vph)
Stage 1	0	0	-	-	0	0	494	494	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	177	970	0	HCM Lane VC Ratio
Follow-up Headway	2.25	-	-	-	0	0	3.55	4	3.6	HCM Lane LOS
Pot Capacity-1 Maneuver	688	-	-	-	-	-	336	130	HCM 95th Percentile Queue (veh)	
Stage 1	-	-	-	-	-	-	518	550	-	
Stage 2	-	-	-	-	-	-	799	334	-	
Mov Capacity-1 Maneuver	688	-	-	-	-	-	-	115.1	766	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	115.1	-	
Stage 1	-	-	-	-	-	-	518	486.8	-	
Stage 2	-	-	-	-	-	-	799	0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	2.1	0	7.97
HCM LOS	A	A	A

Intersection	
Intersection Delay (sec/veh):	1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	65	180	0	0	405	410	95	5	135	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles(%)	5	0	0	0	5	5	0	0	42	0	0	0
Movement Flow Rate	79	220	0	0	494	500	116	6	165	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1				Major 2		Minor 1			Lane
Conflicting Flow Rate - All	994	0	-	-	0	0	625	1372	110	Capacity (vph)
Stage 1	0	0	-	-	0	0	378	378	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	247	994	0	HCM Lane VC Ratio
Follow-up Headway	2.25	-	-	-	0	0	3.5	4	3.72	HCM Lane LOS
Pot Capacity-1 Maneuver	674	-	-	-	-	-	373	147	HCM 95th Percentile Queue (veh)	
Stage 1	-	-	-	-	-	-	621	619	-	
Stage 2	-	-	-	-	-	-	741	326	-	
Mov Capacity-1 Maneuver	674	-	-	-	-	-	-	129.7	806	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	129.7	-	
Stage 1	-	-	-	-	-	-	621	546	-	
Stage 2	-	-	-	-	-	-	741	# 0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	2.9	0	5.664
HCM LOS	A	A	A

Intersection	
Intersection Delay (sec/veh):	4.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	105	310	0	0	205	280	65	5	360	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles(%)	0	5	0	0	5	5	0	0	20	0	0	0
Movement Flow Rate	128	378	0	0	250	341	79	6	439	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1				Major 2		Minor 1			Lane
Conflicting Flow Rate - All	591	0	-	-	0	0	759	1225	189	Capacity (vph)
Stage 1	0	0	-	-	0	0	634	634	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	125	591	0	HCM Lane VC Ratio
Follow-up Headway	2.2	-	-	-	0	0	3.5	4	3.5	HCM Lane LOS
Pot Capacity-1 Maneuver	995	-	-	-	-	-	299	180	HCM 95th Percentile Queue (veh)	
Stage 1	-	-	-	-	-	-	439	476	-	
Stage 2	-	-	-	-	-	-	872	498	-	
Mov Capacity-1 Maneuver	995	-	-	-	-	-	-	156.8	767	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	156.8	-	
Stage 1	-	-	-	-	-	-	439	414.6	-	
Stage 2	-	-	-	-	-	-	872	# 0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	2.3	0	13.065
HCM LOS	A	A	B

Intersection	
Intersection Delay (sec/veh):	2.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	55	190	0	0	120	185	60	5	135	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles(%)	5	5	0	0	5	5	5	0	42	0	0	0
Movement Flow Rate	67	232	0	0	146	226	73	6	165	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1				Major 2		Minor 1			Lane
Conflicting Flow Rate - All	372	0	-	-	0	0	439	738	116	Capacity (vph)
Stage 1	0	0	-	-	0	0	366	366	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	73	372	0	HCM Lane VC Ratio
Follow-up Headway	2.25	-	-	-	0	0	3.55	4	3.72	HCM Lane LOS
Pot Capacity-1 Maneuver	1164	-	-	-	-	-	495	348	HCM 800	95th Percentile Queue (veh)
Stage 1	-	-	-	-	-	-	618	626	-	
Stage 2	-	-	-	-	-	-	919	622	-	
Mov Capacity-1 Maneuver	1164	-	-	-	-	-	-	327.8	800	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	327.8	-	
Stage 1	-	-	-	-	-	-	618	589.7	-	
Stage 2	-	-	-	-	-	-	919	# 0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	1.9	0	6.898
HCM LOS	A	A	A

Intersection	
Intersection Delay (sec/veh):	2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	70	300	0	0	315	550	70	0	185	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles(%)	5	5	0	0	5	5	5	0	30	0	0	0
Movement Flow Rate	85	366	0	0	384	671	85	0	226	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1				Major 2		Minor 1			Lane
Conflicting Flow Rate - All	1055	0	-	-	0	0	729	1592	183	Capacity (vph)
Stage 1	0	0	-	-	0	0	537	537	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	192	1055	0	HCM Lane VC Ratio
Follow-up Headway	2.25	-	-	-	0	0	3.55	4	3.6	HCM Lane LOS
Pot Capacity-1 Maneuver	638	-	-	-	-	-	305	108	HCM 95th Percentile Queue (veh)	
Stage 1	-	-	-	-	-	-	488	526	-	
Stage 2	-	-	-	-	-	-	783	305	-	
Mov Capacity-1 Maneuver	638	-	-	-	-	-	-	93.5	748	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	93.5	-	
Stage 1	-	-	-	-	-	-	488	455.5	-	
Stage 2	-	-	-	-	-	-	783	0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	2.2	0	8.359
HCM LOS	A	A	A

Intersection	
Intersection Delay (sec/veh):	1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	70	195	0	0	440	445	105	5	145	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles(%)	5	0	0	0	5	5	0	0	42	0	0	0
Movement Flow Rate	85	238	0	0	537	543	128	6	177	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1				Major 2		Minor 1			Lane
Conflicting Flow Rate - All	1079	0	-	-	0	0	677	1488	119	Capacity (vph)
Stage 1	0	0	-	-	0	0	409	409	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	268	1079	0	HCM Lane VC Ratio
Follow-up Headway	2.25	-	-	-	0	0	3.5	4	3.72	HCM Lane LOS
Pot Capacity-1 Maneuver	625	-	-	-	-	-	343	125	HCM 95th Percentile Queue (veh)	
Stage 1	-	-	-	-	-	-	596	600	-	
Stage 2	-	-	-	-	-	-	720	297	-	
Mov Capacity-1 Maneuver	625	-	-	-	-	-	-	107.9	796	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	107.9	-	
Stage 1	-	-	-	-	-	-	596	517.8	-	
Stage 2	-	-	-	-	-	-	720	# 0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	3.1	0	5.71
HCM LOS	A	A	A

Intersection	
Intersection Delay (sec/veh):	3.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	95	285	0	0	245	255	60	5	275	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles(%)	0	5	0	0	25	5	0	0	5	0	0	0
Movement Flow Rate	116	348	0	0	299	311	73	6	335	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1				Major 2		Minor 1			Lane
Conflicting Flow Rate - All	610	0	-	-	0	0	728	1189	174	Capacity (vph)
Stage 1	0	0	-	-	0	0	579	579	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	149	610	0	HCM Lane VC Ratio
Follow-up Headway	2.2	-	-	-	0	0	3.5	4	3.35	HCM Lane LOS
Pot Capacity-1 Maneuver	978	-	-	-	-	-	315	190	[illegible]	95th Percentile Queue (veh)
Stage 1	-	-	-	-	-	-	473	504	-	
Stage 2	-	-	-	-	-	-	844	488	-	
Mov Capacity-1 Maneuver	978	-	-	-	-	-	-	167.6	830	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	167.6	-	
Stage 1	-	-	-	-	-	-	473	444.5	-	
Stage 2	-	-	-	-	-	-	844	# 0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	2.3	0	9.676
HCM LOS	A	A	A

Intersection	
Intersection Delay (sec/veh):	1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	50	175	0	0	165	170	55	5	70	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Heavy Vehicles(%)	5	5	0	0	35	5	5	0	0	0	0	0
Movement Flow Rate	63	222	0	0	209	215	70	6	89	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1				Major 2		Minor 1			Lane
Conflicting Flow Rate - All	424	0	-	-	0	0	452	772	111	Capacity (vph)
Stage 1	0	0	-	-	0	0	348	348	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	104	424	0	HCM Lane VC Ratio
Follow-up Headway	2.25	-	-	-	0	0	3.55	4	3.3	HCM Lane LOS
Pot Capacity-1 Maneuver	1110	-	-	-	-	-	484	333	HCM 95th Percentile Queue (veh)	
Stage 1	-	-	-	-	-	-	633	638	-	
Stage 2	-	-	-	-	-	-	882	590	-	
Mov Capacity-1 Maneuver	1110	-	-	-	-	-	-	314	925	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	314	-	
Stage 1	-	-	-	-	-	-	633	601.6	-	
Stage 2	-	-	-	-	-	-	882	# 0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	1.9	0	5.06
HCM LOS	A	A	A

Intersection	
Intersection Delay (sec/veh):	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	65	275	0	0	345	505	65	0	115	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69
Heavy Vehicles(%)	5	5	0	0	19	5	5	0	0	0	0	0
Movement Flow Rate	94	399	0	0	500	732	94	0	167	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1			Major 2			Minor 1			Lane
Conflicting Flow Rate - All	1232	0	-	-	0	0	837	1819	199	Capacity (vph)
Stage 1	0	0	-	-	0	0	587	587	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	250	1232	0	HCM Lane VC Ratio
Follow-up Headway	2.25	-	-	-	0	0	3.55	4	3.3	HCM Lane LOS
Pot Capacity-1 Maneuver	545	-	-	-	-	-	254	79	HCM 95th Percentile Queue (veh)	
Stage 1	-	-	-	-	-	-	455	500	-	
Stage 2	-	-	-	-	-	-	724	252	-	
Mov Capacity-1 Maneuver	545	-	-	-	-	-	-	65.3	817	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	65.3	-	
Stage 1	-	-	-	-	-	-	455	413.5	-	
Stage 2	-	-	-	-	-	-	724	0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	2.5	0	6.347
HCM LOS	A	A	A

Intersection	
Intersection Delay (sec/veh):	1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	65	180	0	0	460	410	95	5	80	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles(%)	5	0	0	0	15	5	0	0	5	0	0	0
Movement Flow Rate	74	205	0	0	523	466	108	6	91	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1				Major 2		Minor 1			Lane
Conflicting Flow Rate - All	989	0	-	-	0	0	613	1341	102	Capacity (vph)
Stage 1	0	0	-	-	0	0	352	352	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	261	989	0	HCM Lane VC Ratio
Follow-up Headway	2.25	-	-	-	0	0	3.5	4	3.35	HCM Lane LOS
Pot Capacity-1 Maneuver	677	-	-	-	-	-	381	154	HCM 95th Percentile Queue (veh)	
Stage 1	-	-	-	-	-	-	643	635	-	
Stage 2	-	-	-	-	-	-	727	327	-	
Mov Capacity-1 Maneuver	677	-	-	-	-	-	-	137.2	923	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	137.2	-	
Stage 1	-	-	-	-	-	-	643	565.8	-	
Stage 2	-	-	-	-	-	-	727	# 0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	2.9	0	3.578
HCM LOS	A	A	A

Intersection	
Intersection Delay (sec/veh):	3.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	105	310	0	0	265	280	65	5	300	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles(%)	0	5	0	0	25	5	0	0	20	0	0	0
Movement Flow Rate	128	378	0	0	323	341	79	6	366	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1				Major 2		Minor 1			Lane
Conflicting Flow Rate - All	665	0	-	-	0	0	796	1299	189	Capacity (vph)
Stage 1	0	0	-	-	0	0	634	634	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	162	665	0	HCM Lane VC Ratio
Follow-up Headway	2.2	-	-	-	0	0	3.5	4	3.5	HCM Lane LOS
Pot Capacity-1 Maneuver	935	-	-	-	-	-	281	163	HCM 95th Percentile Queue (veh)	
Stage 1	-	-	-	-	-	-	439	476	-	
Stage 2	-	-	-	-	-	-	830	461	-	
Mov Capacity-1 Maneuver	935	-	-	-	-	-	-	140.7	767	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	140.7	-	
Stage 1	-	-	-	-	-	-	439	410.8	-	
Stage 2	-	-	-	-	-	-	830	# 0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	2.4	0	9.507
HCM LOS	A	A	A

Intersection	
Intersection Delay (sec/veh):	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	55	190	0	0	180	185	60	5	75	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Heavy Vehicles(%)	5	5	0	0	35	5	5	0	42	0	0	0
Movement Flow Rate	70	241	0	0	228	234	76	6	95	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1				Major 2		Minor 1			Lane
Conflicting Flow Rate - All	462	0	-	-	0	0	494	842	120	Capacity (vph)
Stage 1	0	0	-	-	0	0	380	380	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	114	462	0	HCM Lane VC Ratio
Follow-up Headway	2.25	-	-	-	0	0	3.55	4	3.72	HCM Lane LOS
Pot Capacity-1 Maneuver	1074	-	-	-	-	-	451	303	HCM 95th Percentile Queue (veh)	
Stage 1	-	-	-	-	-	-	606	617	-	
Stage 2	-	-	-	-	-	-	870	568	-	
Mov Capacity-1 Maneuver	1074	-	-	-	-	-	-	283.3	795	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	283.3	-	
Stage 1	-	-	-	-	-	-	606	576.9	-	
Stage 2	-	-	-	-	-	-	870	# 0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	1.9	0	4.946
HCM LOS	A	A	A

Intersection	
Intersection Delay (sec/veh):	1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	70	300	0	0	375	550	70	0	125	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69
Heavy Vehicles(%)	5	5	0	0	19	5	5	0	30	0	0	0
Movement Flow Rate	101	435	0	0	543	797	101	0	181	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1				Major 2		Minor 1			Lane
Conflicting Flow Rate - All	1341	0	-	-	0	0	910	1979	217	Capacity (vph)
Stage 1	0	0	-	-	0	0	638	638	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	272	1341	0	HCM Lane VC Ratio
Follow-up Headway	2.25	-	-	-	0	0	3.55	4	3.6	HCM Lane LOS
Pot Capacity-1 Maneuver	495	-	-	-	-	-	225	62	HCM 95th Percentile Queue (veh)	
Stage 1	-	-	-	-	-	-	424	474	-	
Stage 2	-	-	-	-	-	-	702	223	-	
Mov Capacity-1 Maneuver	495	-	-	-	-	-	-	49.3	708	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	49.3	-	
Stage 1	-	-	-	-	-	-	424	376.8	-	
Stage 2	-	-	-	-	-	-	702	0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	2.7	0	7.205
HCM LOS	A	A	A

Intersection	
Intersection Delay (sec/veh):	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	70	195	0	0	500	445	105	5	85	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles(%)	5	0	0	0	15	5	0	0	42	0	0	0
Movement Flow Rate	80	222	0	0	568	506	119	6	97	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1			Major 2			Minor 1			Lane
Conflicting Flow Rate - All	1074	0	-	-	0	0	665	1455	111	Capacity (vph)
Stage 1	0	0	-	-	0	0	381	381	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	284	1074	0	HCM Lane VC Ratio
Follow-up Headway	2.25	-	-	-	0	0	3.5	4	3.72	HCM Lane LOS
Pot Capacity-1 Maneuver	628	-	-	-	-	-	349	131	HCM 95th Percentile Queue (veh)	
Stage 1	-	-	-	-	-	-	619	617	-	
Stage 2	-	-	-	-	-	-	705	299	-	
Mov Capacity-1 Maneuver	628	-	-	-	-	-	-	114.4	805	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	114.4	-	
Stage 1	-	-	-	-	-	-	619	538.6	-	
Stage 2	-	-	-	-	-	-	705	# 0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	3.1	0	3.838
HCM LOS	A	A	A

Intersection	
Intersection Delay (sec/veh):	3.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	95	340	0	0	190	310	60	5	275	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles(%)	0	19	0	0	5	21	0	0	5	0	0	0
Movement Flow Rate	116	415	0	0	232	378	73	6	335	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1				Major 2		Minor 1			Lane
Conflicting Flow Rate - All	610	0	-	-	0	0	762	1256	207	Capacity (vph)
Stage 1	0	0	-	-	0	0	646	646	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	116	610	0	HCM Lane VC Ratio
Follow-up Headway	2.2	-	-	-	0	0	3.5	4	3.35	HCM Lane LOS
Pot Capacity-1 Maneuver	978	-	-	-	-	-	298	173	HCM 95th Percentile Queue (veh)	
Stage 1	-	-	-	-	-	-	431	470	-	
Stage 2	-	-	-	-	-	-	882	488	-	
Mov Capacity-1 Maneuver	978	-	-	-	-	-	-	152.6	789	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	152.6	-	
Stage 1	-	-	-	-	-	-	431	414.5	-	
Stage 2	-	-	-	-	-	-	882	# 0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	2	0	10.243
HCM LOS	A	A	B

Intersection	
Intersection Delay (sec/veh):	1.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	50	230	0	0	110	225	55	5	70	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Heavy Vehicles(%)	5	26	0	0	5	27	5	0	0	0	0	0
Movement Flow Rate	63	291	0	0	139	285	70	6	89	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1			Major 2			Minor 1			Lane
Conflicting Flow Rate - All	424	0	-	-	0	0	488	842	146	Capacity (vph)
Stage 1	0	0	-	-	0	0	5.74[illegible]8865990[illegible]335E-311			HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	1.36[illegible]6183[illegible]025E-321			HCM Lane VC Ratio
Follow-up Headway	2.25	-	-	-	0	0	3.55	4	3.3	HCM Lane LOS
Pot Capacity-1 Maneuver	1110	-	-	-	-	-	456	303	[illegible]	HCM 95th Percentile Queue (veh)
Stage 1	-	-	-	-	-	-	575	594	-	
Stage 2	-	-	-	-	-	-	923	590	-	
Mov Capacity-1 Maneuver	1110	-	-	-	-	-	-	285.7	880	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	285.7	-	
Stage 1	-	-	-	-	-	-	575	560.1	-	
Stage 2	-	-	-	-	-	-	923	# 0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	1.5	0	4.654
HCM LOS	A	A	A

Intersection	
Intersection Delay (sec/veh):	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	65	330	0	0	290	560	65	0	115	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69
Heavy Vehicles(%)	5	20	0	0	5	14	5	0	0	0	0	0
Movement Flow Rate	94	478	0	0	420	812	94	0	167	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1				Major 2		Minor 1			Lane
Conflicting Flow Rate - All	1232	0	-	-	0	0	877	1899	239	Capacity (vph)
Stage 1	0	0	-	-	0	0	667	667	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	210	1232	0	HCM Lane VC Ratio
Follow-up Headway	2.25	-	-	-	0	0	3.55	4	3.3	HCM Lane LOS
Pot Capacity-1 Maneuver	545	-	-	-	-	-	238	70	769	95th Percentile Queue (veh)
Stage 1	-	-	-	-	-	-	407	460	-	
Stage 2	-	-	-	-	-	-	764	252	-	
Mov Capacity-1 Maneuver	545	-	-	-	-	-	-	57.9	769	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	57.9	-	
Stage 1	-	-	-	-	-	-	407	380.4	-	
Stage 2	-	-	-	-	-	-	764	0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	2.1	0	7.207
HCM LOS	A	A	A

Intersection	
Intersection Delay (sec/veh):	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	65	235	0	0	405	465	95	5	80	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles(%)	5	22	0	0	5	15	0	0	5	0	0	0
Movement Flow Rate	74	267	0	0	460	528	108	6	91	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1				Major 2		Minor 1			Lane
Conflicting Flow Rate - All	989	0	-	-	0	0	645	1404	134	Capacity (vph)
Stage 1	0	0	-	-	0	0	415	415	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	230	989	0	HCM Lane VC Ratio
Follow-up Headway	2.25	-	-	-	0	0	3.5	4	3.35	HCM Lane LOS
Pot Capacity-1 Maneuver	677	-	-	-	-	-	361	141	[illegible]	95th Percentile Queue (veh)
Stage 1	-	-	-	-	-	-	591	596	-	
Stage 2	-	-	-	-	-	-	758	327	-	
Mov Capacity-1 Maneuver	677	-	-	-	-	-	-	125.6	878	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	125.6	-	
Stage 1	-	-	-	-	-	-	591	531	-	
Stage 2	-	-	-	-	-	-	758	# 0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	2.4	0	4.374
HCM LOS	A	A	A

Intersection	
Intersection Delay (sec/veh):	3.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	105	370	0	0	205	340	65	5	300	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles(%)	0	19	0	0	5	21	0	0	5	0	0	0
Movement Flow Rate	128	451	0	0	250	415	79	6	366	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1				Major 2		Minor 1			Lane
Conflicting Flow Rate - All	665	0	-	-	0	0	832	1372	226	Capacity (vph)
Stage 1	0	0	-	-	0	0	707	707	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	125	665	0	HCM Lane VC Ratio
Follow-up Headway	2.2	-	-	-	0	0	3.5	4	3.35	HCM Lane LOS
Pot Capacity-1 Maneuver	935	-	-	-	-	-	265	147	HCM 769	95th Percentile Queue (veh)
Stage 1	-	-	-	-	-	-	397	441	-	
Stage 2	-	-	-	-	-	-	872	461	-	
Mov Capacity-1 Maneuver	935	-	-	-	-	-	-	126.9	769	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	126.9	-	
Stage 1	-	-	-	-	-	-	397	380.6	-	
Stage 2	-	-	-	-	-	-	872	# 0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	2.1	0	11.081
HCM LOS	A	A	B

Intersection	
Intersection Delay (sec/veh):	1.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	55	250	0	0	120	245	60	5	75	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Heavy Vehicles(%)	5	26	0	0	5	27	5	0	0	0	0	0
Movement Flow Rate	70	316	0	0	152	310	76	6	95	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1				Major 2		Minor 1			Lane
Conflicting Flow Rate - All	462	0	-	-	0	0	532	918	158	Capacity (vph)
Stage 1	0	0	-	-	0	0	456	456	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	76	462	0	HCM Lane VC Ratio
Follow-up Headway	2.25	-	-	-	0	0	3.55	4	3.3	HCM Lane LOS
Pot Capacity-1 Maneuver	1074	-	-	-	-	-	424	274	HCM 95th Percentile Queue (veh)	
Stage 1	-	-	-	-	-	-	546	572	-	
Stage 2	-	-	-	-	-	-	916	568	-	
Mov Capacity-1 Maneuver	1074	-	-	-	-	-	-	256.2	865	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	256.2	-	
Stage 1	-	-	-	-	-	-	546	534.8	-	
Stage 2	-	-	-	-	-	-	916	# 0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	1.5	0	4.732
HCM LOS	A	A	A

Intersection	
Intersection Delay (sec/veh):	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	70	360	0	0	315	610	70	0	125	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69
Heavy Vehicles(%)	5	20	0	0	5	14	5	0	0	0	0	0
Movement Flow Rate	101	522	0	0	457	884	101	0	181	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1				Major 2		Minor 1			Lane
Conflicting Flow Rate - All	1341	0	-	-	0	0	953	2066	261	Capacity (vph)
Stage 1	0	0	-	-	0	0	725	725	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	228	1341	0	HCM Lane VC Ratio
Follow-up Headway	2.25	-	-	-	0	0	3.55	4	3.3	HCM Lane LOS
Pot Capacity-1 Maneuver	495	-	-	-	-	-	209	55	HCM 95th Percentile Queue (veh)	
Stage 1	-	-	-	-	-	-	376	433	-	
Stage 2	-	-	-	-	-	-	745	223	-	
Mov Capacity-1 Maneuver	495	-	-	-	-	-	-	43.7	745	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	43.7	-	
Stage 1	-	-	-	-	-	-	376	344.2	-	
Stage 2	-	-	-	-	-	-	745	0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	2.3	0	6.949
HCM LOS	A	A	A

Intersection	
Intersection Delay (sec/veh):	1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	70	255	0	0	440	505	105	5	85	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles(%)	5	22	0	0	5	15	0	0	5	0	0	0
Movement Flow Rate	80	290	0	0	500	574	119	6	97	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1				Major 2		Minor 1			Lane
Conflicting Flow Rate - All	1074	0	-	-	0	0	699	1523	145	Capacity (vph)
Stage 1	0	0	-	-	0	0	449	449	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	250	1074	0	HCM Lane VC Ratio
Follow-up Headway	2.25	-	-	-	0	0	3.5	4	3.35	HCM Lane LOS
Pot Capacity-1 Maneuver	628	-	-	-	-	-	330	119	HCM 95th Percentile Queue (veh)	
Stage 1	-	-	-	-	-	-	564	576	-	
Stage 2	-	-	-	-	-	-	738	299	-	
Mov Capacity-1 Maneuver	628	-	-	-	-	-	-	103.9	866	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	103.9	-	
Stage 1	-	-	-	-	-	-	564	502.8	-	
Stage 2	-	-	-	-	-	-	738	# 0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	2.5	0	3.664
HCM LOS	A	A	A

Intersection	
Intersection Delay (sec/veh):	3.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	95	340	0	0	190	255	60	5	275	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles(%)	0	19	0	0	5	5	0	0	5	0	0	0
Movement Flow Rate	116	415	0	0	232	311	73	6	335	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1				Major 2		Minor 1			Lane
Conflicting Flow Rate - All	543	0	-	-	0	0	762	1189	207	Capacity (vph)
Stage 1	0	0	-	-	0	0	646	646	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	116	543	0	HCM Lane VC Ratio
Follow-up Headway	2.2	-	-	-	0	0	3.5	4	3.35	HCM Lane LOS
Pot Capacity-1 Maneuver	1036	-	-	-	-	-	298	190	HCM 95th Percentile Queue (veh)	
Stage 1	-	-	-	-	-	-	431	470	-	
Stage 2	-	-	-	-	-	-	882	523	-	
Mov Capacity-1 Maneuver	1036	-	-	-	-	-	-	168.7	789	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	168.7	-	
Stage 1	-	-	-	-	-	-	431	417.4	-	
Stage 2	-	-	-	-	-	-	882	# 0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	1.9	0	10.243
HCM LOS	A	A	B

Intersection	
Intersection Delay (sec/veh):	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	50	230	0	0	110	170	55	5	70	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Heavy Vehicles(%)	5	26	0	0	5	5	5	0	0	0	0	0
Movement Flow Rate	63	291	0	0	139	215	70	6	89	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1				Major 2		Minor 1			Lane
Conflicting Flow Rate - All	354	0	-	-	0	0	488	772	146	Capacity (vph)
Stage 1	0	0	-	-	0	0	418	418	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	70	354	0	HCM Lane VC Ratio
Follow-up Headway	2.25	-	-	-	0	0	3.55	4	3.3	HCM Lane LOS
Pot Capacity-1 Maneuver	1181	-	-	-	-	-	456	333	HCM 95th Percentile Queue (veh)	
Stage 1	-	-	-	-	-	-	575	594	-	
Stage 2	-	-	-	-	-	-	923	634	-	
Mov Capacity-1 Maneuver	1181	-	-	-	-	-	-	315	880	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	315	-	
Stage 1	-	-	-	-	-	-	575	561.9	-	
Stage 2	-	-	-	-	-	-	923	# 0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	1.5	0	4.654
HCM LOS	A	A	A

Intersection	
Intersection Delay (sec/veh):	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	65	330	0	0	290	505	65	0	115	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69
Heavy Vehicles(%)	5	20	0	0	5	5	5	0	0	0	0	0
Movement Flow Rate	94	478	0	0	420	732	94	0	167	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1				Major 2		Minor 1			Lane
Conflicting Flow Rate - All	1152	0	-	-	0	0	877	1819	239	Capacity (vph)
Stage 1	0	0	-	-	0	0	667	667	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	210	1152	0	HCM Lane VC Ratio
Follow-up Headway	2.25	-	-	-	0	0	3.55	4	3.3	HCM Lane LOS
Pot Capacity-1 Maneuver	585	-	-	-	-	-	238	79	HCM 95th Percentile Queue (veh)	
Stage 1	-	-	-	-	-	-	407	460	-	
Stage 2	-	-	-	-	-	-	764	275	-	
Mov Capacity-1 Maneuver	585	-	-	-	-	-	-	66.3	769	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	66.3	-	
Stage 1	-	-	-	-	-	-	407	385.9	-	
Stage 2	-	-	-	-	-	-	764	0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	2	0	6.667
HCM LOS	A	A	A

Intersection	
Intersection Delay (sec/veh):	1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	65	235	0	0	405	410	95	5	80	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles(%)	5	22	0	0	5	5	0	0	5	0	0	0
Movement Flow Rate	74	267	0	0	460	466	108	6	91	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1				Major 2		Minor 1			Lane
Conflicting Flow Rate - All	926	0	-	-	0	0	645	1341	134	Capacity (vph)
Stage 1	0	0	-	-	0	0	415	415	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	230	926	0	HCM Lane VC Ratio
Follow-up Headway	2.25	-	-	-	0	0	3.5	4	3.35	HCM Lane LOS
Pot Capacity-1 Maneuver	715	-	-	-	-	-	361	154	HCM 95th Percentile Queue (veh)	
Stage 1	-	-	-	-	-	-	591	596	-	
Stage 2	-	-	-	-	-	-	758	350	-	
Mov Capacity-1 Maneuver	715	-	-	-	-	-	-	138.1	878	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	138.1	-	
Stage 1	-	-	-	-	-	-	591	534.6	-	
Stage 2	-	-	-	-	-	-	758	# 0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	2.3	0	3.711
HCM LOS	A	A	A

Intersection	
Intersection Delay (sec/veh):	1.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	55	250	0	0	120	245	60	5	75	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Heavy Vehicles(%)	5	26	0	0	5	27	5	0	0	0	0	0
Movement Flow Rate	70	316	0	0	152	310	76	6	95	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1				Major 2		Minor 1			Lane
Conflicting Flow Rate - All	462	0	-	-	0	0	532	918	158	Capacity (vph)
Stage 1	0	0	-	-	0	0	456	456	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	76	462	0	HCM Lane VC Ratio
Follow-up Headway	2.25	-	-	-	0	0	3.55	4	3.3	HCM Lane LOS
Pot Capacity-1 Maneuver	1074	-	-	-	-	-	424	274	HCM 95th Percentile Queue (veh)	
Stage 1	-	-	-	-	-	-	546	572	-	
Stage 2	-	-	-	-	-	-	916	568	-	
Mov Capacity-1 Maneuver	1074	-	-	-	-	-	-	256.2	865	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	256.2	-	
Stage 1	-	-	-	-	-	-	546	534.8	-	
Stage 2	-	-	-	-	-	-	916	# 0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	1.5	0	4.732
HCM LOS	A	A	A

Intersection	
Intersection Delay (sec/veh):	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	70	360	0	0	315	610	70	0	125	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69
Heavy Vehicles(%)	5	20	0	0	5	14	5	0	0	0	0	0
Movement Flow Rate	101	522	0	0	457	884	101	0	181	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1				Major 2		Minor 1			Lane
Conflicting Flow Rate - All	1341	0	-	-	0	0	953	2066	261	Capacity (vph)
Stage 1	0	0	-	-	0	0	725	725	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	228	1341	0	HCM Lane VC Ratio
Follow-up Headway	2.25	-	-	-	0	0	3.55	4	3.3	HCM Lane LOS
Pot Capacity-1 Maneuver	495	-	-	-	-	-	209	55	HCM 95th Percentile Queue (veh)	
Stage 1	-	-	-	-	-	-	376	433	-	
Stage 2	-	-	-	-	-	-	745	223	-	
Mov Capacity-1 Maneuver	495	-	-	-	-	-	-	43.7	745	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	43.7	-	
Stage 1	-	-	-	-	-	-	376	344.2	-	
Stage 2	-	-	-	-	-	-	745	0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	2.3	0	6.949
HCM LOS	A	A	A

Intersection	
Intersection Delay (sec/veh):	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	70	360	0	0	315	550	70	0	125	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69
Heavy Vehicles(%)	5	20	0	0	5	14	5	0	0	0	0	0
Movement Flow Rate	101	522	0	0	457	797	101	0	181	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1				Major 2		Minor 1			Lane
Conflicting Flow Rate - All	1254	0	-	-	0	0	953	1979	261	Capacity (vph)
Stage 1	0	0	-	-	0	0	725	725	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	228	1254	0	HCM Lane VC Ratio
Follow-up Headway	2.25	-	-	-	0	0	3.55	4	3.3	HCM Lane LOS
Pot Capacity-1 Maneuver	534	-	-	-	-	-	209	62	HCM 95th Percentile Queue (veh)	
Stage 1	-	-	-	-	-	-	376	433	-	
Stage 2	-	-	-	-	-	-	745	246	-	
Mov Capacity-1 Maneuver	534	-	-	-	-	-	-	50.2	745	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	50.2	-	
Stage 1	-	-	-	-	-	-	376	350.7	-	
Stage 2	-	-	-	-	-	-	745	0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	2.2	0	6.949
HCM LOS	A	A	A

Intersection	
Intersection Delay (sec/veh):	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	70	255	0	0	440	445	105	5	85	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles(%)	5	22	0	0	5	15	0	0	5	0	0	0
Movement Flow Rate	80	290	0	0	500	506	119	6	97	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1				Major 2		Minor 1			Lane
Conflicting Flow Rate - All	1006	0	-	-	0	0	699	1455	145	Capacity (vph)
Stage 1	0	0	-	-	0	0	449	449	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	250	1006	0	HCM Lane VC Ratio
Follow-up Headway	2.25	-	-	-	0	0	3.5	4	3.35	HCM Lane LOS
Pot Capacity-1 Maneuver	666	-	-	-	-	-	330	131	[illegible]	95th Percentile Queue (veh)
Stage 1	-	-	-	-	-	-	564	576	-	
Stage 2	-	-	-	-	-	-	738	321	-	
Mov Capacity-1 Maneuver	666	-	-	-	-	-	-	115.4	866	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	115.4	-	
Stage 1	-	-	-	-	-	-	564	507.5	-	
Stage 2	-	-	-	-	-	-	738	# 0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	2.4	0	3.664
HCM LOS	A	A	A

Intersection	
Intersection Delay (sec/veh):	3.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	95	285	0	0	190	310	60	5	275	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles(%)	0	5	0	0	5	21	0	0	5	0	0	0
Movement Flow Rate	116	348	0	0	232	378	73	6	335	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1				Major 2		Minor 1			Lane
Conflicting Flow Rate - All	610	0	-	-	0	0	695	1189	174	Capacity (vph)
Stage 1	0	0	-	-	0	0	579	579	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	116	610	0	HCM Lane VC Ratio
Follow-up Headway	2.2	-	-	-	0	0	3.5	4	3.35	HCM Lane LOS
Pot Capacity-1 Maneuver	978	-	-	-	-	-	333	190	[illegible]	95th Percentile Queue (veh)
Stage 1	-	-	-	-	-	-	473	504	-	
Stage 2	-	-	-	-	-	-	882	488	-	
Mov Capacity-1 Maneuver	978	-	-	-	-	-	-	167.6	830	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	167.6	-	
Stage 1	-	-	-	-	-	-	473	444.5	-	
Stage 2	-	-	-	-	-	-	882	# 0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	2.3	0	9.676
HCM LOS	A	A	A

Intersection	
Intersection Delay (sec/veh):	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	50	175	0	0	110	225	55	5	70	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Heavy Vehicles(%)	5	5	0	0	5	27	5	0	0	0	0	0
Movement Flow Rate	63	222	0	0	139	285	70	6	89	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1				Major 2		Minor 1			Lane
Conflicting Flow Rate - All	424	0	-	-	0	0	418	772	111	Capacity (vph)
Stage 1	0	0	-	-	0	0	348	348	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	70	424	0	HCM Lane VC Ratio
Follow-up Headway	2.25	-	-	-	0	0	3.55	4	3.3	HCM Lane LOS
Pot Capacity-1 Maneuver	1110	-	-	-	-	-	512	333	HCM 95th Percentile Queue (veh)	
Stage 1	-	-	-	-	-	-	633	638	-	
Stage 2	-	-	-	-	-	-	923	590	-	
Mov Capacity-1 Maneuver	1110	-	-	-	-	-	-	314	925	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	314	-	
Stage 1	-	-	-	-	-	-	633	601.6	-	
Stage 2	-	-	-	-	-	-	923	# 0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	1.9	0	4.546
HCM LOS	A	A	A

Intersection	
Intersection Delay (sec/veh):	1.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	65	275	0	0	290	560	65	0	115	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69
Heavy Vehicles(%)	5	5	0	0	5	14	5	0	0	0	0	0
Movement Flow Rate	94	399	0	0	420	812	94	0	167	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1			Major 2			Minor 1			Lane
Conflicting Flow Rate - All	1232	0	-	-	0	0	797	1819	199	Capacity (vph)
Stage 1	0	0	-	-	0	0	3.2[illegible]	[illegible]	[illegible]E-319	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	6.5[illegible]	[illegible]	[illegible]E-310	HCM Lane VC Ratio
Follow-up Headway	2.25	-	-	-	0	0	3.55	4	3.3	HCM Lane LOS
Pot Capacity-1 Maneuver	545	-	-	-	-	-	272	79	[illegible]	95th Percentile Queue (veh)
Stage 1	-	-	-	-	-	-	455	500	-	
Stage 2	-	-	-	-	-	-	764	252	-	
Mov Capacity-1 Maneuver	545	-	-	-	-	-	-	65.3	817	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	65.3	-	
Stage 1	-	-	-	-	-	-	455	413.5	-	
Stage 2	-	-	-	-	-	-	764	0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	2.5	0	5.964
HCM LOS	A	A	A

Intersection	
Intersection Delay (sec/veh):	1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	65	180	0	0	405	465	95	5	80	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles(%)	5	0	0	0	5	15	0	0	5	0	0	0
Movement Flow Rate	74	205	0	0	460	528	108	6	91	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1				Major 2		Minor 1			Lane
Conflicting Flow Rate - All	989	0	-	-	0	0	582	1341	102	Capacity (vph)
Stage 1	0	0	-	-	0	0	352	352	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	230	989	0	HCM Lane VC Ratio
Follow-up Headway	2.25	-	-	-	0	0	3.5	4	3.35	HCM Lane LOS
Pot Capacity-1 Maneuver	677	-	-	-	-	-	401	154	HCM 95th Percentile Queue (veh)	
Stage 1	-	-	-	-	-	-	643	635	-	
Stage 2	-	-	-	-	-	-	758	327	-	
Mov Capacity-1 Maneuver	677	-	-	-	-	-	-	137.2	923	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	137.2	-	
Stage 1	-	-	-	-	-	-	643	565.8	-	
Stage 2	-	-	-	-	-	-	758	# 0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	2.9	0	3.578
HCM LOS	A	A	A

Intersection	
Intersection Delay (sec/veh):	3.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	105	310	0	0	205	340	65	5	300	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles(%)	0	19	0	0	5	21	0	0	5	0	0	0
Movement Flow Rate	128	378	0	0	250	415	79	6	366	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1				Major 2		Minor 1			Lane
Conflicting Flow Rate - All	665	0	-	-	0	0	759	1299	189	Capacity (vph)
Stage 1	0	0	-	-	0	0	634	634	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	125	665	0	HCM Lane VC Ratio
Follow-up Headway	2.2	-	-	-	0	0	3.5	4	3.35	HCM Lane LOS
Pot Capacity-1 Maneuver	935	-	-	-	-	-	299	163	HCM 95th Percentile Queue (veh)	
Stage 1	-	-	-	-	-	-	439	476	-	
Stage 2	-	-	-	-	-	-	872	461	-	
Mov Capacity-1 Maneuver	935	-	-	-	-	-	-	140.7	811	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	140.7	-	
Stage 1	-	-	-	-	-	-	439	410.8	-	
Stage 2	-	-	-	-	-	-	872	# 0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	2.4	0	10.351
HCM LOS	A	A	B

Intersection	
Intersection Delay (sec/veh):	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	55	190	0	0	120	245	60	5	75	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Heavy Vehicles(%)	5	26	0	0	5	27	5	0	0	0	0	0
Movement Flow Rate	70	241	0	0	152	310	76	6	95	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1				Major 2		Minor 1			Lane
Conflicting Flow Rate - All	462	0	-	-	0	0	456	842	120	Capacity (vph)
Stage 1	0	0	-	-	0	0	380	380	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	76	462	0	HCM Lane VC Ratio
Follow-up Headway	2.25	-	-	-	0	0	3.55	4	3.3	HCM Lane LOS
Pot Capacity-1 Maneuver	1074	-	-	-	-	-	481	303	HCM 95th Percentile Queue (veh)	
Stage 1	-	-	-	-	-	-	606	617	-	
Stage 2	-	-	-	-	-	-	916	568	-	
Mov Capacity-1 Maneuver	1074	-	-	-	-	-	-	283.3	915	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	283.3	-	
Stage 1	-	-	-	-	-	-	606	576.9	-	
Stage 2	-	-	-	-	-	-	916	# 0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	1.9	0	4.571
HCM LOS	A	A	A

Intersection	
Intersection Delay (sec/veh):	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	70	300	0	0	315	610	70	0	125	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69
Heavy Vehicles(%)	5	20	0	0	5	14	5	0	0	0	0	0
Movement Flow Rate	101	435	0	0	457	884	101	0	181	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1				Major 2		Minor 1			Lane
Conflicting Flow Rate - All	1341	0	-	-	0	0	866	1979	217	Capacity (vph)
Stage 1	0	0	-	-	0	0	638	638	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	228	1341	0	HCM Lane VC Ratio
Follow-up Headway	2.25	-	-	-	0	0	3.55	4	3.3	HCM Lane LOS
Pot Capacity-1 Maneuver	495	-	-	-	-	-	242	62	793	95th Percentile Queue (veh)
Stage 1	-	-	-	-	-	-	424	474	-	
Stage 2	-	-	-	-	-	-	745	223	-	
Mov Capacity-1 Maneuver	495	-	-	-	-	-	-	49.3	793	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	49.3	-	
Stage 1	-	-	-	-	-	-	424	376.8	-	
Stage 2	-	-	-	-	-	-	745	0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	2.7	0	6.628
HCM LOS	A	A	A

Intersection	
Intersection Delay (sec/veh):	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	70	195	0	0	440	505	105	5	85	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles(%)	5	22	0	0	5	15	0	0	5	0	0	0
Movement Flow Rate	80	222	0	0	500	574	119	6	97	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1				Major 2		Minor 1			Lane
Conflicting Flow Rate - All	1074	0	-	-	0	0	631	1455	111	Capacity (vph)
Stage 1	0	0	-	-	0	0	381	381	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	250	1074	0	HCM Lane VC Ratio
Follow-up Headway	2.25	-	-	-	0	0	3.5	4	3.35	HCM Lane LOS
Pot Capacity-1 Maneuver	628	-	-	-	-	-	370	131	HCM 95th Percentile Queue (veh)	
Stage 1	-	-	-	-	-	-	619	617	-	
Stage 2	-	-	-	-	-	-	738	299	-	
Mov Capacity-1 Maneuver	628	-	-	-	-	-	-	114.4	914	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	114.4	-	
Stage 1	-	-	-	-	-	-	619	538.6	-	
Stage 2	-	-	-	-	-	-	738	# 0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	3.1	0	3.533
HCM LOS	A	A	A

Hall & Foreman, Inc.

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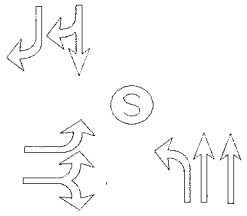
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	JV	9-Sep-13	VV.110264.0000	1 OF 12

E/W STREET : BERKSHIRE PLACE
N/S STREET : OAK GROVE DRIVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 3
ROUTE 1A, 1E

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BERKSHIRE PLACE						
EB LEFT	510	5%		510	45	555
EB THRU	0	0%		0	0	0
EB RIGHT	70	42%	**55**	125	10	135
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
OAK GROVE DRIVE						
NB LEFT	140	30%	**55**	195	20	215
NB THRU	450	5%		450	40	490
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	70	10%		70	5	75
SB RIGHT	360	5%		360	30	390
TOTALS	**1600**		**110**	**1710**	**150**	**1860**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	2 OF 12

E/W STREET : BERKSHIRE PLACE
N/S STREET : OAK GROVE DRIVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 3
ROUTE 1C, 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BERKSHIRE PLACE						
EB LEFT	510	5%		510	45	510
EB THRU	0	0%		0	0	10
EB RIGHT	70	42%	**55**	125	10	125
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
OAK GROVE DRIVE						
NB LEFT	140	5%		140	15	155
NB THRU	450	5%		450	40	490
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	70	10%		70	5	75
SB RIGHT	360	5%		360	30	390
TOTALS	**1600**		**55**	**1655**	**145**	**1755**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	3 OF 12

E/W STREET : BERKSHIRE PLACE
N/S STREET : OAK GROVE DRIVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 3
ROUTE 1D, 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BERKSHIRE PLACE						
EB LEFT	510	5%		510	45	555
EB THRU	0	0%		0	0	0
EB RIGHT	70	0%		70	5	75
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
OAK GROVE DRIVE						
NB LEFT	140	30%	**55**	195	20	215
NB THRU	450	5%		450	40	490
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	70	10%		70	5	75
SB RIGHT	360	5%		360	30	390
TOTALS	**1600**		**55**	**1655**	**145**	**1800**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	4 OF 12

E/W STREET : BERKSHIRE PLACE
N/S STREET : OAK GROVE DRIVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 3
ROUTE 1A, 1E

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BERKSHIRE PLACE						
EB LEFT	150	5%		150	15	165
EB THRU	0	0%		0	0	0
EB RIGHT	60	5%	**55**	115	10	125
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
OAK GROVE DRIVE						
NB LEFT	65	5%	**55**	120	10	130
NB THRU	135	5%		135	10	145
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	100	10%		100	10	110
SB RIGHT	215	5%		215	20	235
TOTALS	**725**		**110**	**835**	**75**	**910**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	5 OF 12

E/W STREET : BERKSHIRE PLACE
N/S STREET : OAK GROVE DRIVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
3
ROUTE
1C, 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BERKSHIRE PLACE						
EB LEFT	150	5%		150	15	165
EB THRU	0	0%		0	0	0
EB RIGHT	60	5%	**55**	115	10	125
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
OAK GROVE DRIVE						
NB LEFT	65	5%		65	5	70
NB THRU	135	5%		135	10	145
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	100	10%		100	10	110
SB RIGHT	215	5%		215	20	235
TOTALS	**725**		**55**	**780**	**70**	**850**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	6 OF 12

E/W STREET : BERKSHIRE PLACE
N/S STREET : OAK GROVE DRIVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 3
ROUTE 1D, 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BERKSHIRE PLACE						
EB LEFT	150	5%		150	15	165
EB THRU	0	0%		0	0	0
EB RIGHT	60	5%		60	5	65
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
OAK GROVE DRIVE						
NB LEFT	65	5%	**55**	120	10	130
NB THRU	135	5%		135	10	145
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	100	10%		100	10	110
SB RIGHT	215	5%		215	20	235
TOTALS	**725**		**55**	**780**	**70**	**850**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	7 OF 12

E/W STREET : BERKSHIRE PLACE
N/S STREET : OAK GROVE DRIVE
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 3
ROUTE 1A, 1E

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BERKSHIRE PLACE						
EB LEFT	330	5%		330	30	360
EB THRU	0	0%		0	0	0
EB RIGHT	45	5%	**55**	100	10	110
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
OAK GROVE DRIVE						
NB LEFT	75	5%	**55**	130	10	140
NB THRU	95	5%		95	10	105
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	140	10%		140	15	155
SB RIGHT	745	5%		745	65	810
TOTALS	**1430**		**110**	**1540**	**140**	**1680**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	8 OF 12

E/W STREET : BERKSHIRE PLACE
N/S STREET : OAK GROVE DRIVE
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 3
ROUTE 1C, 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BERKSHIRE PLACE						
EB LEFT	330	5%		330	30	360
EB THRU	0	0%		0	0	0
EB RIGHT	45	5%	**55**	100	10	110
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
OAK GROVE DRIVE						
NB LEFT	75	5%		75	5	80
NB THRU	95	5%		95	10	105
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	140	10%		140	15	155
SB RIGHT	745	5%		745	65	810
TOTALS	**1430**		**55**	**1485**	**135**	**1620**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	9 OF 12

E/W STREET : BERKSHIRE PLACE
N/S STREET : OAK GROVE DRIVE
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 3
ROUTE 1D, 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BERKSHIRE PLACE						
EB LEFT	330	5%		330	30	360
EB THRU	0	0%		0	0	0
EB RIGHT	45	5%		45	5	50
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
OAK GROVE DRIVE						
NB LEFT	75	5%	**55**	130	10	140
NB THRU	95	5%		95	10	105
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	140	10%		140	15	155
SB RIGHT	745	5%		745	65	810
TOTALS	**1430**		**55**	**1485**	**135**	**1620**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	10 OF 12

E/W STREET : BERKSHIRE PLACE
N/S STREET : OAK GROVE DRIVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 3
ROUTE 1A, 1E

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BERKSHIRE PLACE						
EB LEFT	185	5%		185	15	200
EB THRU	0	0%		0	0	0
EB RIGHT	85	37%	**55**	140	15	155
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
OAK GROVE DRIVE						
NB LEFT	65	43%	**55**	120	10	130
NB THRU	150	5%		150	15	165
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	245	5%		245	20	265
SB RIGHT	750	5%		750	70	820
TOTALS	**1480**		**110**	**1590**	**145**	**1735**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	11 OF 12

E/W STREET : BERKSHIRE PLACE
N/S STREET : OAK GROVE DRIVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 3
ROUTE 1C, 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BERKSHIRE PLACE						
EB LEFT	185	5%		185	15	200
EB THRU	0	0%		0	0	0
EB RIGHT	85	37%	**55**	140	15	155
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
OAK GROVE DRIVE						
NB LEFT	65	0%		65	5	70
NB THRU	150	5%		150	15	165
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	245	5%		245	20	265
SB RIGHT	750	5%		750	70	820
TOTALS	**1480**		**55**	**1535**	**140**	**1675**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	12 OF 12

E/W STREET : BERKSHIRE PLACE
N/S STREET : OAK GROVE DRIVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 3
ROUTE 1D, 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BERKSHIRE PLACE						
EB LEFT	185	5%		185	15	200
EB THRU	0	0%		0	0	0
EB RIGHT	85	0%		85	5	90
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
OAK GROVE DRIVE						
NB LEFT	65	43%	**55**	120	10	130
NB THRU	150	5%		150	15	165
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	245	5%		245	20	265
SB RIGHT	750	5%		750	70	820
TOTALS	**1480**		**55**	**1535**	**135**	**1670**

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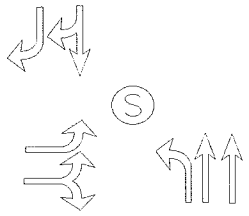
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	1 OF 12

E/W STREET : BERKSHIRE PLACE
N/S STREET : OAK GROVE DRIVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 3
ROUTE 1A, 1E

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BERKSHIRE PLACE								
EB LEFT	503	5	15	520	**0**	520	45	565
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	70	0	0	70	**140**	210	20	230
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
OAK GROVE DRIVE								
NB LEFT	139	2	6	145	**165**	310	30	340
NB THRU	448	2	6	455	**0**	455	40	495
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	65	6	18	85	**0**	85	5	90
SB RIGHT	355	4	12	365	**0**	365	35	400
TOTALS	**1580**				**305**	**1945**	**175**	**2120**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	2 OF 12

E/W STREET : BERKSHIRE PLACE
N/S STREET : OAK GROVE DRIVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 3
ROUTE 1C, 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BERKSHIRE PLACE								
EB LEFT	503	5	15	520	**0**	520	45	520
EB THRU	0	0	0	0	**0**	0	0	20
EB RIGHT	70	0	0	70	**140**	210	20	210
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
OAK GROVE DRIVE								
NB LEFT	139	2	6	145	**0**	145	15	160
NB THRU	448	2	6	455	**0**	455	40	495
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	65	6	18	85	**0**	85	5	90
SB RIGHT	355	4	12	365	**0**	365	35	400
TOTALS	**1580**				**140**	**1780**	**160**	**1895**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	3 OF 12

E/W STREET : BERKSHIRE PLACE
N/S STREET : OAK GROVE DRIVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 3
ROUTE 1D, 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BERKSHIRE PLACE								
EB LEFT	503	5	15	520	**0**	520	45	565
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	70	0	0	70	**0**	70	5	75
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
OAK GROVE DRIVE								
NB LEFT	139	2	6	145	**165**	310	30	340
NB THRU	448	2	6	455	**0**	455	40	495
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	65	6	18	85	**0**	85	5	90
SB RIGHT	355	4	12	365	**0**	365	35	400
TOTALS	**1580**				**165**	**1805**	**160**	**1965**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	4 OF 12

E/W STREET : BERKSHIRE PLACE
N/S STREET : OAK GROVE DRIVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 3
ROUTE 1A, 1E

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BERKSHIRE PLACE								
EB LEFT	148	4	12	160	**0**	160	15	175
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	57	3	9	65	**140**	205	20	225
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
OAK GROVE DRIVE								
NB LEFT	67	0	0	65	**165**	230	20	250
NB THRU	130	3	9	140	**0**	140	15	155
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	92	8	24	115	**0**	115	10	125
SB RIGHT	208	6	18	225	**0**	225	20	245
TOTALS	**702**				**305**	**1075**	**100**	**1175**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	5 OF 12

E/W STREET : BERKSHIRE PLACE
N/S STREET : OAK GROVE DRIVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
3
ROUTE
1C, 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BERKSHIRE PLACE								
EB LEFT	148	4	12	160	**0**	160	15	175
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	57	3	9	65	**140**	205	20	225
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
OAK GROVE DRIVE								
NB LEFT	67	0	0	65	**0**	65	5	70
NB THRU	130	3	9	140	**0**	140	15	155
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	92	8	24	115	**0**	115	10	125
SB RIGHT	208	6	18	225	**0**	225	20	245
TOTALS	**702**				**140**	**910**	**85**	**995**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	6 OF 12

E/W STREET : BERKSHIRE PLACE
N/S STREET : OAK GROVE DRIVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 3
ROUTE 1D, 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BERKSHIRE PLACE								
EB LEFT	148	4	12	160	**0**	160	15	175
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	57	3	9	65	**0**	65	5	70
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
OAK GROVE DRIVE								
NB LEFT	67	0	0	65	**165**	230	20	250
NB THRU	130	3	9	140	**0**	140	15	155
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	92	8	24	115	**0**	115	10	125
SB RIGHT	208	6	18	225	**0**	225	20	245
TOTALS	**702**				**165**	**935**	**85**	**1020**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	7 OF 12

E/W STREET : BERKSHIRE PLACE
N/S STREET : OAK GROVE DRIVE
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 3
ROUTE 1A, 1E

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BERKSHIRE PLACE								
EB LEFT	330	17	50	380	**0**	380	35	415
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	45	2	6	50	**140**	190	15	205
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
OAK GROVE DRIVE								
NB LEFT	75	4	12	85	**165**	250	25	275
NB THRU	95	5	14	110	**0**	110	10	120
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	140	14	42	180	**0**	180	15	195
SB RIGHT	745	37	111	855	**0**	855	75	930
TOTALS	**1430**				**305**	**1965**	**175**	**2140**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	8 OF 12

E/W STREET : BERKSHIRE PLACE
N/S STREET : OAK GROVE DRIVE
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 3
ROUTE 1C, 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BERKSHIRE PLACE								
EB LEFT	330	17	50	380	**0**	380	35	415
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	45	2	6	50	**140**	190	15	205
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
OAK GROVE DRIVE								
NB LEFT	75	4	12	85	**0**	85	5	90
NB THRU	95	5	14	110	**0**	110	10	120
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	140	14	42	180	**0**	180	15	195
SB RIGHT	745	37	111	855	**0**	855	75	930
TOTALS	**1430**				**140**	**1800**	**155**	**1955**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	9 OF 12

E/W STREET : BERKSHIRE PLACE
N/S STREET : OAK GROVE DRIVE
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 3
ROUTE 1D, 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BERKSHIRE PLACE								
EB LEFT	330	17	50	380	**0**	380	35	415
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	45	2	6	50	**0**	50	5	55
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
OAK GROVE DRIVE								
NB LEFT	75	4	12	85	**165**	250	25	275
NB THRU	95	5	14	110	**0**	110	10	120
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	140	14	42	180	**0**	180	15	195
SB RIGHT	745	37	111	855	**0**	855	75	930
TOTALS	**1430**				**165**	**1825**	**165**	**1990**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	10 OF 12

E/W STREET : BERKSHIRE PLACE
N/S STREET : OAK GROVE DRIVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 3
ROUTE 1A, 1E

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BERKSHIRE PLACE								
EB LEFT	180	6	18	200	**0**	200	20	220
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	84	0	0	85	**140**	225	20	245
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
OAK GROVE DRIVE								
NB LEFT	66	0	0	65	**165**	230	20	250
NB THRU	145	5	15	160	**0**	160	15	175
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	241	3	9	250	**0**	250	25	275
SB RIGHT	748	3	9	755	**0**	755	70	825
TOTALS	**1464**				**305**	**1820**	**170**	**1990**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	11 OF 12

E/W STREET : BERKSHIRE PLACE
N/S STREET : OAK GROVE DRIVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 3
ROUTE 1C, 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BERKSHIRE PLACE								
EB LEFT	180	6	18	200	**0**	200	20	220
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	84	0	0	85	**140**	225	20	245
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
OAK GROVE DRIVE								
NB LEFT	66	0	0	65	**0**	65	5	70
NB THRU	145	5	15	160	**0**	160	15	175
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	241	3	9	250	**0**	250	25	275
SB RIGHT	748	3	9	755	**0**	755	70	825
TOTALS	**1464**				**140**	**1655**	**155**	**1810**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	12 OF 12

E/W STREET : BERKSHIRE PLACE
N/S STREET : OAK GROVE DRIVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 3
ROUTE 1D, 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BERKSHIRE PLACE								
EB LEFT	180	6	18	200	**0**	200	20	220
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	84	0	0	85	**0**	85	5	90
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
OAK GROVE DRIVE								
NB LEFT	66	0	0	65	**165**	230	20	250
NB THRU	145	5	15	160	**0**	160	15	175
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	241	3	9	250	**0**	250	25	275
SB RIGHT	748	3	9	755	**0**	755	70	825
TOTALS	**1464**				**165**	**1680**	**155**	**1835**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: OAK GROVE
EAST-WEST STREET: BIRKSHIRE
JURISDICTION: PASADENA

DATE: 05-26-11

PEAK HOUR: 07:15AM

NORTH LEG

TOTAL: 0

	Rt	Thru	Lt
Total			
1st			
2nd			
3rd			
4th			

TT = 3

TT% = $\frac{3}{591}$ = 0.5% ≈ 1%

Oak Grove (NB)

EAST LEG TOTAL: 591

	1st	2nd	3rd	4th	Total
Rt					
Thru	74	196	136	44	450
Lt	20	24	61	36	141 ≈ 140

N/S ↔

E/W ↕

WEST LEG TOTAL: 430

Oak Grove (SB)

	Total	1st	2nd	3rd	4th
Lt					
Thru	71 ≈ 70	21	19	12	19
Rt	359 ≈ 360	93	98	111	57

TT = 10

TT% = $\frac{10}{430}$ = 2.3% ≈ 2%

SOUTH LEG

Birkshire (EB)

	Lt	Thru	Rt
1st	82		13
2nd	121		16
3rd	178		20
4th	127		21
Total	508 ≈ 510		70

TOTAL: 578

TT = 5

TT% = $\frac{5}{578}$ = 0.87% ≈ 1%

PEAK HOUR FACTORS

NORTH LEG =
SOUTH LEG = 0.73
EAST LEG = 0.67
WEST LEG = 0.87

ALL LEGS = 0.77

HOUR TOTAL: 1,599

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: OAK GROVE

EAST-WEST STREET: BIRKSHIRE

TIME: 07:00AM-08:00AM DATE: 05-26-11

NORTH LEG

			Total
			1st
			2nd
			3rd
			4th
Rt	Thru	Lt	

Rt					
Thru	25	74	196	136	431
Lt	11	20	24	61	116
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
					Lt
60	8	21	19	12	Thru
370	68	93	98	111	Rt

	Lt	Thru	Rt
1st	71		11
2nd	82		13
3rd	121		16
4th	178		20
Total	452		60

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: OAK GROVE

EAST-WEST STREET: BIRKSHIRE

TIME: 08:00AM-09:00AM DATE: 05-26-11

NORTH LEG

			Total
			1st
			2nd
			3rd
			4th
Rt	Thru	Lt	

	1st	2nd	3rd	4th	Total
Rt					
Thru	44	57	40	60	201
Lt	36	30	11	20	97

Total	1st	2nd	3rd	4th	
					Lt
85	19	20	25	21	Thru
160	57	48	37	18	Rt

	Lt	Thru	Rt
1st	127		21
2nd	124		3
3rd	88		19
4th	82		17
Total	421		60

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : OAK GROVE PASADENA

EAST-WEST STREET : BIRKSHIRE 05-26-11

BEGINNING TIME : 07:00AM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
					W NORTH LEG							
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
					E SOUTH LEG (Birkshire)							
11	0	69	0	0	0	0	0	0	0	0	2	82
13	0	81	0	0	1	0	0	0	0	0	0	95
16	0	121	0	0	0	0	0	0	0	0	0	137
20	0	176	0	0	1	0	0	1	0	0	0	198
21	0	125	0	0	2	0	0	0	0	0	0	148
3	0	123	0	0	4 1	0	0	1 0	0	0	0 0	578 127
19	0	87	0	0	1	0	0	0	0	0	0	107
17	0	81	0	0	1	0	0	0	0	0	0	99
							TT = 4+1+0 = 5					
120	0	863	0	0	7	0	0	1	0	0	2	993
					N EAST LEG (Oak Grove)							
0	23	11	0	2	0	0	0	0	0	0	0	36
0	74	19	0	0	0	0	0	1	0	0	0	94
0	196	24	0	0	0	0	0	0	0	0	0	220
0	135	60	0	1	1	0	0	0	0	0	0	197
0	43	36	0	1	0	0	0	0	0	0	0	80
0	55	30	0	2	3 0	0	0	0 0	0	0	0 0	591 87
0	39	11	0	1	0	0	0	0	0	0	0	51
0	60	20	0	0	0	0	0	0	0	0	0	80
							TT = 3+0+0 = 3					
0	625	211	0	7	1	0	0	1	0	0	0	845
					S WEST LEG (Oak Grove)							
67	8	0	1	0	0	0	0	0	0	0	0	76
92	19	0	1	2	0	0	0	0	0	0	0	114
98	18	0	0	1	0	0	0	0	0	0	0	117
109	10	0	2	2	0	0	0	0	0	0	0	123
56	18	0	0	1	0	1	0	0	0	0	0	76
45	20	0	3	0	9 0	0	0	1 0	0	0	0 0	430 68
36	24	0	1	1	0	0	0	0	0	0	0	62
17	19	0	1	2	0	0	0	0	0	0	0	39
							TT = 9+1+0 = 10					
520	136	0	9	9	0	1	0	0	0	0	0	675

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: OAK GROVE
EAST-WEST STREET: BIRKSHIRE
JURISDICTION: PASADENA

DATE: 05-26-11

PEAK HOUR: 12:00PM

NORTH LEG

TOTAL: 0

Rt	Thru	Lt	Total
			1st
			2nd
			3rd
			4th

TT = 3
TT% = 3/200 = 1.5% ≈ 2%

Oak Grove (NB)

EAST LEG TOTAL: 200

	1st	2nd	3rd	4th	Total
Rt					
Thru	37	32	31	33	133 ≈135
Lt	17	10	33	7	67 ≈65

Total	1st	2nd	3rd	4th	
					Lt
100	34	26	14	26	Thru
215	55	66	47	47	Rt

N — S
E | W

WEST LEG TOTAL: 315
Oak Grove (SB)

TT = 15
TT% = 15/315 = 4.8% ≈ 5%

PEAK HOUR FACTORS

NORTH LEG =
SOUTH LEG = 0.75
EAST LEG = 0.78
WEST LEG = 0.86

ALL LEGS = 0.98

	Lt	Thru	Rt
1st	20		11
2nd	33		18
3rd	44		15
4th	55		16
Total	152 ≈150		60

TT = 7
TT% = 7/212 = 3.3% ≈ 3%

TOTAL: 212

SOUTH LEG
Birkshire (EB)

HOUR TOTAL: 727

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: OAK GROVE

EAST-WEST STREET: BIRKSHIRE

TIME: 12:00PM-01:00PM DATE: 05-26-11

NORTH LEG

			Total
			1st
			2nd
			3rd
			4th
Rt	Thru	Lt	

Rt					
Thru	37	32	31	33	133
Lt	17	10	33	7	67
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
					Lt
100	34	26	14	26	Thru
215	55	66	47	47	Rt

	Lt	Thru	Rt
1st	20		11
2nd	33		18
3rd	44		15
4th	55		16
Total	152		60

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: OAK GROVE

EAST-WEST STREET: BIRKSHIRE

TIME: 01:00PM-02:00PM DATE: 05-26-11

NORTH LEG

			Total
			1st
			2nd
			3rd
			4th
Rt	Thru	Lt	

Rt					
Thru	23	51	41	31	146
Lt	14	12	12	12	50
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
					Lt
98	25	24	19	30	Thru
153	44	39	34	36	Rt

	Lt	Thru	Rt
1st	29		5
2nd	27		15
3rd	27		22
4th	21		15
Total	104		57

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : OAK GROVE PASADENA

EAST-WEST STREET : BIRKSHIRE 05-26-11

BEGINNING TIME : 12:00PM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
					NORTH LEG							
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
					E SOUTH LEG							
10	0	18	1	0	0	0	0	1	0	0	1	31
18	0	33	0	0	0	0	0	0	0	0	0	51
15	0	42	0	0	2	0	0	0	0	0	0	59
14	0	55	1	0	0	0	0	0	1	0	0	71
5	0	25	0	0	4 2	0	0	1 2	0	0	2 0	212 34
15	0	26	0	0	0	0	0	0	0	0	1	42
22	0	27	0	0	0	0	0	0	0	0	0	49
14	0	20	0	0	0	0	0	0	1	0	1	36
						TT = 4+1+2 = 7						
113	0	246	2	0	4	0	0	3	2	0	3	373
					N EAST LEG							
0	35	17	0	2	0	0	0	0	0	0	0	54
0	31	10	0	1	0	0	0	0	0	0	0	42
0	31	33	0	0	0	0	0	0	0	0	0	64
0	33	7	0	0	0	0	0	0	0	0	0	40
0	21	14	0	2	3 0	0	0	0 0	0	0	0 0	200 37
0	50	12	0	1	0	0	0	0	0	0	0	63
0	39	12	0	2	0	0	0	0	0	0	0	53
0	30	12	0	0	0	0	1	0	0	0	0	43
						TT = 3+0+0 = 3						
0	270	117	0	8	0	0	1	0	0	0	0	396
					S WEST LEG							
55	32	0	0	2	0	0	0	0	0	0	0	89
63	26	0	3	0	0	0	0	0	0	0	0	92
43	12	0	3	2	0	0	0	0	1	0	0	61
47	22	0	0	4	0	0	0	0	0	0	0	73
41	23	0	1	2 14	0	1	0 0	0	1	0	1 0	69
36	24	0	1	0	0	1	0	0	1	0	0	63
34	18	0	0	1	0	0	0	0	0	0	0	53
36	29	0	0	1	0	0	0	0	0	0	0	66
						TT = 14+0+1 = 15						
355	186	0	8	12	0	2	0	0	3	0	0	566

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: BERKSHIRE
EAST-WEST STREET: OAK GROVE
JURISDICTION: LA CANADA

DATE: 04-10-12

PEAK HOUR: 02:45PM

NORTH LEG

TOTAL: 0

Rt	Thru	Lt	
			Total
			1st
			2nd
			3rd
			4th

(NB)

EAST LEG TOTAL: 171

Rt					
Thru	25	20	27	22	94
Lt	23	18	25	11	77
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
					Lt
142	18	45	48	31	Thru
744	98	259	258	129	Rt

WEST LEG TOTAL: 886

(SB)

PEAK HOUR FACTORS

NORTH LEG =
SOUTH LEG = 0.72
EAST LEG = 0.82
WEST LEG = 0.72

ALL LEGS = 0.80

	Lt	Thru	Rt
1st	113		17
2nd	99		9
3rd	68		12
4th	49		8
Total	329		46

TOTAL: 375

SOUTH LEG (EB)

HOUR TOTAL: 1,432

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: BERKSHIRE

EAST-WEST STREET: OAK GROVE

TIME: 02:00PM-03:00PM DATE: 04-10-12

NORTH LEG

			Total
			1st
			2nd
			3rd
			4th
Rt	Thru	Lt	

	1st	2nd	3rd	4th	Total
Rt					
Thru	18	31	17	25	91
Lt	19	18	23	23	83

Total	1st	2nd	3rd	4th	
					Lt
82	27	18	19	18	Thru
285	67	63	57	98	Rt

	Lt	Thru	Rt
1st	43		9
2nd	34		12
3rd	66		22
4th	113		17
Total	256		60

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: BERKSHIRE

EAST-WEST STREET: OAK GROVE

TIME: 03:00PM-04:00PM DATE: 04-10-12

NORTH LEG

			Total
			1st
			2nd
			3rd
			4th
Rt	Thru	Lt	

	1st	2nd	3rd	4th	Total
Rt					
Thru	20	27	22	32	101
Lt	18	25	11	20	74

Total	1st	2nd	3rd	4th	
					Lt
153	45	48	31	29	Thru
746	259	258	129	100	Rt

	Lt	Thru	Rt
1st	99		9
2nd	68		12
3rd	49		8
4th	45		7
Total	261		36

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: OAK GROVE
EAST-WEST STREET: BIRKSHIRE
JURISDICTION: PASADENA

DATE: 05-26-11

PEAK HOUR: 05:00PM

NORTH LEG

TOTAL: 0

Total			
1st			
2nd			
3rd			
4th			
	Rt	Thru	Lt

TT = 5

TT% = $\frac{5}{216}$ = 2.3% ≈ 2%

Oak Grove (NB)

EAST LEG TOTAL: 216

	1st	2nd	3rd	4th	Total
Rt					
Thru	27	23	47	53	150
Lt	11	14	21	20	66 (65)

WEST LEG TOTAL: 995

	1st	2nd	3rd	4th	Total
Lt					
Thru	58	66	72	48	244 (245)
Rt	218	177	199	157	751 (750)

Oak Grove (SB)

TT = 6

TT% = $\frac{6}{995}$ = 0.6% ≈ 1%

SOUTH LEG

Birkshire (EB)

	Lt	Thru	Rt	TOTAL: 270
1st	55		15	
2nd	36		18	
3rd	42		29	
4th	53		22	
Total	186 (185)		84 (85)	

PEAK HOUR FACTORS

NORTH LEG =
SOUTH LEG = 0.90
EAST LEG = 0.74
WEST LEG = 0.90

ALL LEGS = 0.90

TT = 6

TT% = $\frac{6}{270}$ = 2.2% ≈ 2%

HOUR TOTAL: 1,481

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: OAK GROVE

EAST-WEST STREET: BIRKSHIRE

TIME: 04:00PM-05:00PM DATE: 05-26-11

NORTH LEG

			Total
			1st
			2nd
			3rd
			4th
Rt	Thru	Lt	

Rt					
Thru	31	41	32	36	140
Lt	12	15	14	14	55
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
					Lt
231	64	62	55	50	Thru
588	132	130	164	162	Rt

	Lt	Thru	Rt
1st	26		15
2nd	25		21
3rd	35		15
4th	34		20
Total	120		71

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: OAK GROVE

EAST-WEST STREET: BIRKSHIRE

TIME: 05:00PM-06:00PM DATE: 05-26-11

NORTH LEG

			Total
			1st
			2nd
			3rd
			4th
Rt	Thru	Lt	

Rt					
Thru	27	23	47	53	150
Lt	11	14	21	20	66
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
					Lt
244	58	66	72	48	Thru
751	218	177	199	157	Rt

	Lt	Thru	Rt
1st	55		15
2nd	36		18
3rd	42		29
4th	53		22
Total	186		84

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : OAK GROVE PASADENA

EAST-WEST STREET : BIRKSHIRE 05-26-11

BEGINNING TIME : 04:00PM

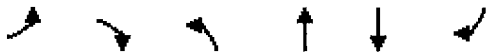
AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
					NORTH LEG							
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
					E SOUTH LEG							
15	0	26	0	0	0	0	0	0	0	0	0	41
21	0	25	0	0	0	0	0	0	0	0	0	46
15	0	34	0	0	1	0	0	0	0	0	0	50
20	0	34	0	0	0	0	0	0	0	0	0	54
15	0	52	0	0	2	0	0	1	0	0	0	70
18	0	34	0	0	0	0	0	0	0	0	2	54
29	0	41	0	0	1	0	0	0	0	0	0	71
22	0	53	0	0	0	0	0	0	0	0	0	75
				3		TT = 3+1+2		1	TT = 6		2	270
155	0	299	0	0	4	0	0	1	0	0	2	461
					N EAST LEG							
0	30	12	0	1	0	0	0	0	0	0	0	43
0	39	15	0	2	0	0	0	0	0	0	0	56
0	31	14	0	1	0	0	0	0	0	0	0	46
0	33	14	0	3	0	0	0	0	0	0	0	50
0	25	11	0	2	0	0	0	0	0	0	0	38
0	23	14	0	0	0	0	0	0	0	0	0	37
0	45	21	0	2	0	0	0	0	0	0	0	68
0	52	20	0	1	0	0	0	0	0	0	0	73
				5		TT = 5+0+0 = 5						216
0	278	121	0	12	0	0	0	0	0	0	0	411
					S WEST LEG							
131	63	0	1	1	0	0	0	0	0	0	0	196
128	60	0	2	2	0	0	0	0	0	0	0	192
163	52	0	1	3	0	0	0	0	0	0	0	219
162	48	0	0	2	0	0	0	0	0	0	0	212
217	56	0	1	2	0	0	0	0	0	0	0	276
176	66	0	1	0	0	0	0	0	0	0	0	243
199	72	0	0	0	0	0	0	0	0	0	0	271
156	47	0	0	1	0	0	0	0	1	0	0	205
				5		TT = 5+0+1 = 6					1	995
1332	464	0	6	11	0	0	0	0	1	0	0	1814

Prepared by Newport Traffic Studies

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	510	70	140	450	70	360
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.97		1.00	0.95	0.95	0.95
Frt	0.98		1.00	1.00	0.90	0.85
Flt Protected	0.96		0.95	1.00	1.00	1.00
Satd. Flow (prot)	3321		1719	3438	1520	1461
Flt Permitted	0.96		0.56	1.00	1.00	1.00
Satd. Flow (perm)	3321		1020	3438	1520	1461
Peak-hour factor, PHF	0.77	0.77	0.77	0.77	0.77	0.77
Adj. Flow (vph)	662	91	182	584	91	468
RTOR Reduction (vph)	30	0	0	0	112	0
Lane Group Flow (vph)	723	0	182	584	176	271
Heavy Vehicles (%)	5%	0%	5%	5%	10%	5%
Turn Type	NA		Perm	NA	NA	pm+ov
Protected Phases	4			2	6	4
Permitted Phases			2			6
Actuated Green, G (s)	13.4		16.1	16.1	16.1	29.5
Effective Green, g (s)	13.4		16.1	16.1	16.1	29.5
Actuated g/C Ratio	0.36		0.43	0.43	0.43	0.79
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1187		438	1476	653	1461
v/s Ratio Prot	c0.22			0.17	0.12	0.07
v/s Ratio Perm			c0.18			0.12
v/c Ratio	0.61		0.42	0.40	0.27	0.19
Uniform Delay, d1	9.9		7.4	7.4	6.9	1.0
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.9		2.9	0.8	1.0	0.1
Delay (s)	10.8		10.3	8.2	7.9	1.1
Level of Service	B		B	A	A	A
Approach Delay (s)	10.8			8.7	4.6	
Approach LOS	B			A	A	

Intersection Summary			
HCM Average Control Delay	8.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	37.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	45.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	150	60	65	135	100	215
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.97		1.00	0.95	0.95	0.95
Frt	0.96		1.00	1.00	0.94	0.85
Flt Protected	0.97		0.95	1.00	1.00	1.00
Satd. Flow (prot)	3244		1805	3438	1572	1461
Flt Permitted	0.97		0.65	1.00	1.00	1.00
Satd. Flow (perm)	3244		1227	3438	1572	1461
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	153	61	66	138	102	219
RTOR Reduction (vph)	50	0	0	0	28	0
Lane Group Flow (vph)	164	0	66	138	140	153
Heavy Vehicles (%)	5%	5%	0%	5%	10%	5%
Turn Type	NA		Perm	NA	NA	pm+ov
Protected Phases	4			2	6	4
Permitted Phases			2			6
Actuated Green, G (s)	5.9		19.0	19.0	19.0	24.9
Effective Green, g (s)	5.9		19.0	19.0	19.0	24.9
Actuated g/C Ratio	0.18		0.58	0.58	0.58	0.76
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	582		709	1985	908	1461
v/s Ratio Prot	c0.05			0.04	c0.09	0.02
v/s Ratio Perm			0.05			0.09
v/c Ratio	0.28		0.09	0.07	0.15	0.10
Uniform Delay, d1	11.7		3.1	3.1	3.2	1.1
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3		0.3	0.1	0.4	0.0
Delay (s)	11.9		3.4	3.1	3.6	1.1
Level of Service	B		A	A	A	A
Approach Delay (s)	11.9			3.2	2.4	
Approach LOS	B			A	A	

Intersection Summary			
HCM Average Control Delay	5.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.18		
Actuated Cycle Length (s)	32.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	29.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	330	45	75	95	140	745
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.97		1.00	0.95	0.95	0.95
Frt	0.98		1.00	1.00	0.90	0.85
Flt Protected	0.96		0.95	1.00	1.00	1.00
Satd. Flow (prot)	3302		1805	3438	1519	1461
Flt Permitted	0.96		0.32	1.00	1.00	1.00
Satd. Flow (perm)	3302		606	3438	1519	1461
Peak-hour factor, PHF	0.80	0.80	0.80	0.80	0.80	0.80
Adj. Flow (vph)	412	56	94	119	175	931
RTOR Reduction (vph)	27	0	0	0	162	0
Lane Group Flow (vph)	441	0	94	119	404	540
Heavy Vehicles (%)	5%	5%	0%	5%	10%	5%
Turn Type	NA		Perm	NA	NA	pm+ov
Protected Phases	4			2	6	4
Permitted Phases			2			6
Actuated Green, G (s)	11.8		21.1	21.1	21.1	32.9
Effective Green, g (s)	11.8		21.1	21.1	21.1	32.9
Actuated g/C Ratio	0.29		0.52	0.52	0.52	0.80
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	953		313	1774	784	1461
v/s Ratio Prot	0.13			0.03	c0.27	c0.11
v/s Ratio Perm			0.16			0.26
v/c Ratio	0.46		0.30	0.07	0.52	0.37
Uniform Delay, d1	11.9		5.7	5.0	6.5	1.1
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4		2.4	0.1	2.4	0.2
Delay (s)	12.3		8.1	5.0	8.9	1.3
Level of Service	B		A	A	A	A
Approach Delay (s)	12.3			6.4	5.2	
Approach LOS	B			A	A	

Intersection Summary			
HCM Average Control Delay	7.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	40.9	Sum of lost time (s)	4.0
Intersection Capacity Utilization	47.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	185	85	65	150	245	750
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.97		1.00	0.95	0.95	0.95
Frt	0.95		1.00	1.00	0.92	0.85
Flt Protected	0.97		0.95	1.00	1.00	1.00
Satd. Flow (prot)	3283		1805	3438	1584	1461
Flt Permitted	0.97		0.34	1.00	1.00	1.00
Satd. Flow (perm)	3283		649	3438	1584	1461
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	206	94	72	167	272	833
RTOR Reduction (vph)	72	0	0	0	74	0
Lane Group Flow (vph)	228	0	72	167	498	533
Heavy Vehicles (%)	5%	0%	0%	5%	5%	5%
Turn Type	NA		Perm	NA	NA	pm+ov
Protected Phases	4			2	6	4
Permitted Phases			2			6
Actuated Green, G (s)	9.1		21.1	21.1	21.1	30.2
Effective Green, g (s)	9.1		21.1	21.1	21.1	30.2
Actuated g/C Ratio	0.24		0.55	0.55	0.55	0.79
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	782		358	1899	875	1461
v/s Ratio Prot	0.07			0.05	c0.31	c0.09
v/s Ratio Perm			0.11			0.28
v/c Ratio	0.29		0.20	0.09	0.57	0.36
Uniform Delay, d1	11.9		4.3	4.0	5.6	1.2
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2		1.3	0.1	2.7	0.2
Delay (s)	12.1		5.6	4.1	8.3	1.3
Level of Service	B		A	A	A	A
Approach Delay (s)	12.1			4.6	4.9	
Approach LOS	B			A	A	

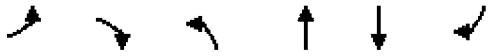
Intersection Summary			
HCM Average Control Delay	6.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	38.2	Sum of lost time (s)	4.0
Intersection Capacity Utilization	49.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	510	125	195	450	70	360
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.97		1.00	0.95	0.95	0.95
Frt	0.97		1.00	1.00	0.90	0.85
Flt Protected	0.96		0.95	1.00	1.00	1.00
Satd. Flow (prot)	3063		1388	3438	1520	1461
Flt Permitted	0.96		0.56	1.00	1.00	1.00
Satd. Flow (perm)	3063		817	3438	1520	1461
Peak-hour factor, PHF	0.77	0.77	0.77	0.77	0.77	0.77
Adj. Flow (vph)	662	162	253	584	91	468
RTOR Reduction (vph)	58	0	0	0	114	0
Lane Group Flow (vph)	766	0	253	584	174	271
Heavy Vehicles (%)	5%	42%	30%	5%	10%	5%
Turn Type	NA		Perm	NA	NA	pm+ov
Protected Phases	4			2	6	4
Permitted Phases			2			6
Actuated Green, G (s)	14.0		16.1	16.1	16.1	30.1
Effective Green, g (s)	14.0		16.1	16.1	16.1	30.1
Actuated g/C Ratio	0.37		0.42	0.42	0.42	0.79
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1126		345	1453	642	1461
v/s Ratio Prot	c0.25			0.17	0.11	0.07
v/s Ratio Perm			c0.31			0.12
v/c Ratio	0.68		0.73	0.40	0.27	0.19
Uniform Delay, d1	10.2		9.2	7.7	7.2	1.0
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	1.7		13.0	0.8	1.0	0.1
Delay (s)	11.9		22.2	8.5	8.2	1.0
Level of Service	B		C	A	A	A
Approach Delay (s)	11.9			12.6	4.7	
Approach LOS	B			B	A	

Intersection Summary			
HCM Average Control Delay	10.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	38.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	50.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	150	115	120	135	100	215
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.97		1.00	0.95	0.95	0.95
Frt	0.94		1.00	1.00	0.94	0.85
Flt Protected	0.97		0.95	1.00	1.00	1.00
Satd. Flow (prot)	2711		1262	3438	1572	1461
Flt Permitted	0.97		0.65	1.00	1.00	1.00
Satd. Flow (perm)	2711		858	3438	1572	1461
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	153	117	122	138	102	219
RTOR Reduction (vph)	94	0	0	0	29	0
Lane Group Flow (vph)	176	0	122	138	139	153
Heavy Vehicles (%)	5%	48%	43%	5%	10%	5%
Turn Type	NA		Perm	NA	NA	pm+ov
Protected Phases	4			2	6	4
Permitted Phases			2			6
Actuated Green, G (s)	6.5		18.8	18.8	18.8	25.3
Effective Green, g (s)	6.5		18.8	18.8	18.8	25.3
Actuated g/C Ratio	0.20		0.56	0.56	0.56	0.76
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	529		484	1941	887	1461
v/s Ratio Prot	c0.06			0.04	0.09	0.02
v/s Ratio Perm			c0.14			0.08
v/c Ratio	0.33		0.25	0.07	0.16	0.10
Uniform Delay, d1	11.5		3.7	3.3	3.5	1.0
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4		1.2	0.1	0.4	0.0
Delay (s)	11.9		4.9	3.4	3.8	1.1
Level of Service	B		A	A	A	A
Approach Delay (s)	11.9			4.1	2.5	
Approach LOS	B			A	A	

Intersection Summary			
HCM Average Control Delay	6.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.27		
Actuated Cycle Length (s)	33.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	34.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	330	100	130	95	140	745
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.97		1.00	0.95	0.95	0.95
Frt	0.97		1.00	1.00	0.90	0.85
Flt Protected	0.96		0.95	1.00	1.00	1.00
Satd. Flow (prot)	2937		1289	3438	1519	1461
Flt Permitted	0.96		0.31	1.00	1.00	1.00
Satd. Flow (perm)	2937		424	3438	1519	1461
Peak-hour factor, PHF	0.80	0.80	0.80	0.80	0.80	0.80
Adj. Flow (vph)	412	125	162	119	175	931
RTOR Reduction (vph)	72	0	0	0	165	0
Lane Group Flow (vph)	465	0	162	119	401	540
Heavy Vehicles (%)	5%	55%	40%	5%	10%	5%
Turn Type	NA		Perm	NA	NA	pm+ov
Protected Phases	4			2	6	4
Permitted Phases			2			6
Actuated Green, G (s)	12.4		21.1	21.1	21.1	33.5
Effective Green, g (s)	12.4		21.1	21.1	21.1	33.5
Actuated g/C Ratio	0.30		0.51	0.51	0.51	0.81
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	878		216	1748	772	1461
v/s Ratio Prot	c0.16			0.03	0.26	0.11
v/s Ratio Perm			c0.38			0.26
v/c Ratio	0.53		0.75	0.07	0.52	0.37
Uniform Delay, d1	12.1		8.1	5.2	6.8	1.1
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.6		21.1	0.1	2.5	0.2
Delay (s)	12.7		29.2	5.3	9.3	1.3
Level of Service	B		C	A	A	A
Approach Delay (s)	12.7			19.0	5.4	
Approach LOS	B			B	A	

Intersection Summary			
HCM Average Control Delay	9.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	41.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	52.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	185	140	120	150	245	750
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.97		1.00	0.95	0.95	0.95
Frt	0.94		1.00	1.00	0.92	0.85
Flt Protected	0.97		0.95	1.00	1.00	1.00
Satd. Flow (prot)	2822		1262	3438	1584	1461
Flt Permitted	0.97		0.34	1.00	1.00	1.00
Satd. Flow (perm)	2822		449	3438	1584	1461
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	206	156	133	167	272	833
RTOR Reduction (vph)	118	0	0	0	75	0
Lane Group Flow (vph)	244	0	133	167	497	533
Heavy Vehicles (%)	5%	37%	43%	5%	5%	5%
Turn Type	NA		Perm	NA	NA	pm+ov
Protected Phases	4			2	6	4
Permitted Phases			2			6
Actuated Green, G (s)	9.5		21.1	21.1	21.1	30.6
Effective Green, g (s)	9.5		21.1	21.1	21.1	30.6
Actuated g/C Ratio	0.25		0.55	0.55	0.55	0.79
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	695		245	1879	866	1461
v/s Ratio Prot	0.09			0.05	c0.31	c0.09
v/s Ratio Perm			0.30			0.27
v/c Ratio	0.35		0.54	0.09	0.57	0.36
Uniform Delay, d1	12.0		5.6	4.2	5.8	1.2
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3		8.4	0.1	2.8	0.2
Delay (s)	12.3		14.0	4.3	8.5	1.3
Level of Service	B		B	A	A	A
Approach Delay (s)	12.3			8.6	5.1	
Approach LOS	B			A	A	

Intersection Summary			
HCM Average Control Delay	7.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	38.6	Sum of lost time (s)	4.0
Intersection Capacity Utilization	54.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	870	135	215	490	75	390
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.97		1.00	0.95	0.95	0.95
Frt	0.98		1.00	1.00	0.90	0.85
Flt Protected	0.96		0.95	1.00	1.00	1.00
Satd. Flow (prot)	3148		1388	3438	1519	1461
Flt Permitted	0.96		0.52	1.00	1.00	1.00
Satd. Flow (perm)	3148		756	3438	1519	1461
Peak-hour factor, PHF	0.77	0.77	0.77	0.77	0.77	0.77
Adj. Flow (vph)	1130	175	279	636	97	506
RTOR Reduction (vph)	32	0	0	0	128	0
Lane Group Flow (vph)	1273	0	279	636	182	293
Heavy Vehicles (%)	5%	42%	30%	5%	10%	5%
Turn Type	NA		Perm	NA	NA	pm+ov
Protected Phases	4			2	6	4
Permitted Phases			2			6
Actuated Green, G (s)	16.0		16.0	16.0	16.0	32.0
Effective Green, g (s)	16.0		16.0	16.0	16.0	32.0
Actuated g/C Ratio	0.40		0.40	0.40	0.40	0.80
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1259		302	1375	608	1461
v/s Ratio Prot	c0.40			0.18	0.12	0.08
v/s Ratio Perm			c0.37			0.12
v/c Ratio	1.01		0.92	0.46	0.30	0.20
Uniform Delay, d1	12.0		11.4	8.8	8.2	1.0
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	28.2		35.5	1.1	1.3	0.1
Delay (s)	40.2		46.9	10.0	9.4	1.0
Level of Service	D		D	A	A	A
Approach Delay (s)	40.2			21.2	5.4	
Approach LOS	D			C	A	

Intersection Summary			
HCM Average Control Delay	26.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	40.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	62.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	165	125	130	145	110	235
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.97		1.00	0.95	0.95	0.95
Frt	0.94		1.00	1.00	0.94	0.85
Flt Protected	0.97		0.95	1.00	1.00	1.00
Satd. Flow (prot)	2712		1262	3438	1573	1461
Flt Permitted	0.97		0.64	1.00	1.00	1.00
Satd. Flow (perm)	2712		845	3438	1573	1461
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	168	128	133	148	112	240
RTOR Reduction (vph)	99	0	0	0	33	0
Lane Group Flow (vph)	197	0	133	148	151	168
Heavy Vehicles (%)	5%	48%	43%	5%	10%	5%
Turn Type	NA		Perm	NA	NA	pm+ov
Protected Phases	4			2	6	4
Permitted Phases			2			6
Actuated Green, G (s)	7.9		18.6	18.6	18.6	26.5
Effective Green, g (s)	7.9		18.6	18.6	18.6	26.5
Actuated g/C Ratio	0.23		0.54	0.54	0.54	0.77
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	621		456	1854	848	1461
v/s Ratio Prot	c0.07			0.04	0.10	0.03
v/s Ratio Perm			c0.16			0.09
v/c Ratio	0.32		0.29	0.08	0.18	0.11
Uniform Delay, d1	11.1		4.3	3.8	4.1	1.0
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3		1.6	0.1	0.5	0.0
Delay (s)	11.4		6.0	3.9	4.5	1.1
Level of Service	B		A	A	A	A
Approach Delay (s)	11.4			4.9	2.9	
Approach LOS	B			A	A	

Intersection Summary			
HCM Average Control Delay	6.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.30		
Actuated Cycle Length (s)	34.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	36.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	185	140	120	150	245	750
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.97		1.00	0.95	0.95	0.95
Frt	0.94		1.00	1.00	0.92	0.85
Flt Protected	0.97		0.95	1.00	1.00	1.00
Satd. Flow (prot)	2822		1262	3438	1584	1461
Flt Permitted	0.97		0.34	1.00	1.00	1.00
Satd. Flow (perm)	2822		449	3438	1584	1461
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	206	156	133	167	272	833
RTOR Reduction (vph)	118	0	0	0	75	0
Lane Group Flow (vph)	244	0	133	167	497	533
Heavy Vehicles (%)	5%	37%	43%	5%	5%	5%
Turn Type	NA		Perm	NA	NA	pm+ov
Protected Phases	4			2	6	4
Permitted Phases			2			6
Actuated Green, G (s)	9.5		21.1	21.1	21.1	30.6
Effective Green, g (s)	9.5		21.1	21.1	21.1	30.6
Actuated g/C Ratio	0.25		0.55	0.55	0.55	0.79
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	695		245	1879	866	1461
v/s Ratio Prot	0.09			0.05	c0.31	c0.09
v/s Ratio Perm			0.30			0.27
v/c Ratio	0.35		0.54	0.09	0.57	0.36
Uniform Delay, d1	12.0		5.6	4.2	5.8	1.2
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3		8.4	0.1	2.8	0.2
Delay (s)	12.3		14.0	4.3	8.5	1.3
Level of Service	B		B	A	A	A
Approach Delay (s)	12.3			8.6	5.1	
Approach LOS	B			A	A	

Intersection Summary			
HCM Average Control Delay	7.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	38.6	Sum of lost time (s)	4.0
Intersection Capacity Utilization	54.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	200	155	130	165	265	820
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.97		1.00	0.95	0.95	0.95
Frt	0.93		1.00	1.00	0.92	0.85
Flt Protected	0.97		0.95	1.00	1.00	1.00
Satd. Flow (prot)	2816		1262	3438	1583	1461
Flt Permitted	0.97		0.29	1.00	1.00	1.00
Satd. Flow (perm)	2816		387	3438	1583	1461
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	222	172	144	183	294	911
RTOR Reduction (vph)	128	0	0	0	77	0
Lane Group Flow (vph)	266	0	144	183	545	583
Heavy Vehicles (%)	5%	37%	43%	5%	5%	5%
Turn Type	NA		Perm	NA	NA	pm+ov
Protected Phases	4			2	6	4
Permitted Phases			2			6
Actuated Green, G (s)	10.1		21.1	21.1	21.1	31.2
Effective Green, g (s)	10.1		21.1	21.1	21.1	31.2
Actuated g/C Ratio	0.26		0.54	0.54	0.54	0.80
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	726		208	1851	852	1461
v/s Ratio Prot	0.09			0.05	0.34	c0.10
v/s Ratio Perm			c0.37			0.30
v/c Ratio	0.37		0.69	0.10	0.64	0.40
Uniform Delay, d1	11.9		6.7	4.4	6.4	1.2
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3		17.3	0.1	3.7	0.2
Delay (s)	12.2		24.0	4.5	10.0	1.4
Level of Service	B		C	A	B	A
Approach Delay (s)	12.2			13.1	5.8	
Approach LOS	B			B	A	

Intersection Summary			
HCM Average Control Delay	8.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	39.2	Sum of lost time (s)	4.0
Intersection Capacity Utilization	58.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	510	125	140	450	70	360
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.97		1.00	0.95	0.95	0.95
Frt	0.97		1.00	1.00	0.90	0.85
Flt Protected	0.96		0.95	1.00	1.00	1.00
Satd. Flow (prot)	3063		1388	3438	1520	1461
Flt Permitted	0.96		0.54	1.00	1.00	1.00
Satd. Flow (perm)	3063		796	3438	1520	1461
Peak-hour factor, PHF	0.77	0.77	0.77	0.77	0.77	0.77
Adj. Flow (vph)	662	162	182	584	91	468
RTOR Reduction (vph)	55	0	0	0	118	0
Lane Group Flow (vph)	769	0	182	584	170	271
Heavy Vehicles (%)	5%	42%	30%	5%	10%	5%
Turn Type	NA		Perm	NA	NA	pm+ov
Protected Phases	4			2	6	4
Permitted Phases			2			6
Actuated Green, G (s)	16.0		16.0	16.0	16.0	32.0
Effective Green, g (s)	16.0		16.0	16.0	16.0	32.0
Actuated g/C Ratio	0.40		0.40	0.40	0.40	0.80
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	1225		318	1375	608	1461
v/s Ratio Prot	c0.25			0.17	0.11	0.07
v/s Ratio Perm			c0.23			0.11
v/c Ratio	0.63		0.57	0.42	0.28	0.19
Uniform Delay, d1	9.6		9.3	8.7	8.1	0.9
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	2.4		7.3	1.0	1.1	0.3
Delay (s)	12.1		16.6	9.6	9.2	1.2
Level of Service	B		B	A	A	A
Approach Delay (s)	12.1			11.3	5.4	
Approach LOS	B			B	A	

Intersection Summary			
HCM Average Control Delay	10.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	40.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	47.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	150	115	65	135	100	215
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.97		1.00	0.95	0.95	0.95
Frt	0.94		1.00	1.00	0.94	0.85
Flt Protected	0.97		0.95	1.00	1.00	1.00
Satd. Flow (prot)	2711		1805	3438	1572	1461
Flt Permitted	0.97		0.65	1.00	1.00	1.00
Satd. Flow (perm)	2711		1227	3438	1572	1461
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	153	117	66	138	102	219
RTOR Reduction (vph)	94	0	0	0	29	0
Lane Group Flow (vph)	176	0	66	138	139	153
Heavy Vehicles (%)	5%	48%	0%	5%	10%	5%
Turn Type	NA		Perm	NA	NA	pm+ov
Protected Phases	4			2	6	4
Permitted Phases			2			6
Actuated Green, G (s)	6.5		18.8	18.8	18.8	25.3
Effective Green, g (s)	6.5		18.8	18.8	18.8	25.3
Actuated g/C Ratio	0.20		0.56	0.56	0.56	0.76
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	529		693	1941	887	1461
v/s Ratio Prot	c0.06			0.04	c0.09	0.02
v/s Ratio Perm			0.05			0.08
v/c Ratio	0.33		0.10	0.07	0.16	0.10
Uniform Delay, d1	11.5		3.3	3.3	3.5	1.0
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4		0.3	0.1	0.4	0.0
Delay (s)	11.9		3.6	3.4	3.8	1.1
Level of Service	B		A	A	A	A
Approach Delay (s)	11.9			3.4	2.5	
Approach LOS	B			A	A	

Intersection Summary			
HCM Average Control Delay	5.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.20		
Actuated Cycle Length (s)	33.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	31.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	330	100	75	95	140	745
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.97		1.00	0.95	0.95	0.95
Frt	0.97		1.00	1.00	0.90	0.85
Flt Protected	0.96		0.95	1.00	1.00	1.00
Satd. Flow (prot)	2937		1805	3438	1519	1461
Flt Permitted	0.96		0.31	1.00	1.00	1.00
Satd. Flow (perm)	2937		594	3438	1519	1461
Peak-hour factor, PHF	0.80	0.80	0.80	0.80	0.80	0.80
Adj. Flow (vph)	412	125	94	119	175	931
RTOR Reduction (vph)	72	0	0	0	165	0
Lane Group Flow (vph)	465	0	94	119	401	540
Heavy Vehicles (%)	5%	55%	0%	5%	10%	5%
Turn Type	NA		Perm	NA	NA	pm+ov
Protected Phases	4			2	6	4
Permitted Phases			2			6
Actuated Green, G (s)	12.4		21.1	21.1	21.1	33.5
Effective Green, g (s)	12.4		21.1	21.1	21.1	33.5
Actuated g/C Ratio	0.30		0.51	0.51	0.51	0.81
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	878		302	1748	772	1461
v/s Ratio Prot	c0.16			0.03	c0.26	0.11
v/s Ratio Perm			0.16			0.26
v/c Ratio	0.53		0.31	0.07	0.52	0.37
Uniform Delay, d1	12.1		6.0	5.2	6.8	1.1
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.6		2.7	0.1	2.5	0.2
Delay (s)	12.7		8.6	5.3	9.3	1.3
Level of Service	B		A	A	A	A
Approach Delay (s)	12.7			6.8	5.4	
Approach LOS	B			A	A	

Intersection Summary			
HCM Average Control Delay	7.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	41.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	49.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	185	140	65	150	245	750
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.97		1.00	0.95	0.95	0.95
Frt	0.94		1.00	1.00	0.92	0.85
Flt Protected	0.97		0.95	1.00	1.00	1.00
Satd. Flow (prot)	2822		1805	3438	1584	1461
Flt Permitted	0.97		0.34	1.00	1.00	1.00
Satd. Flow (perm)	2822		641	3438	1584	1461
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	206	156	72	167	272	833
RTOR Reduction (vph)	118	0	0	0	75	0
Lane Group Flow (vph)	244	0	72	167	497	533
Heavy Vehicles (%)	5%	37%	0%	5%	5%	5%
Turn Type	NA		Perm	NA	NA	pm+ov
Protected Phases	4			2	6	4
Permitted Phases			2			6
Actuated Green, G (s)	9.5		21.1	21.1	21.1	30.6
Effective Green, g (s)	9.5		21.1	21.1	21.1	30.6
Actuated g/C Ratio	0.25		0.55	0.55	0.55	0.79
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	695		350	1879	866	1461
v/s Ratio Prot	0.09			0.05	c0.31	c0.09
v/s Ratio Perm			0.11			0.27
v/c Ratio	0.35		0.21	0.09	0.57	0.36
Uniform Delay, d1	12.0		4.5	4.2	5.8	1.2
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3		1.3	0.1	2.8	0.2
Delay (s)	12.3		5.8	4.3	8.5	1.3
Level of Service	B		A	A	A	A
Approach Delay (s)	12.3			4.7	5.1	
Approach LOS	B			A	A	

Intersection Summary			
HCM Average Control Delay	6.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	38.6	Sum of lost time (s)	4.0
Intersection Capacity Utilization	51.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	555	135	155	490	75	390
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.97		1.00	0.95	0.95	0.95
Frt	0.97		1.00	1.00	0.90	0.85
Flt Protected	0.96		0.95	1.00	1.00	1.00
Satd. Flow (prot)	3065		1388	3438	1519	1461
Flt Permitted	0.96		0.52	1.00	1.00	1.00
Satd. Flow (perm)	3065		756	3438	1519	1461
Peak-hour factor, PHF	0.77	0.77	0.77	0.77	0.77	0.77
Adj. Flow (vph)	721	175	201	636	97	506
RTOR Reduction (vph)	55	0	0	0	128	0
Lane Group Flow (vph)	841	0	201	636	182	293
Heavy Vehicles (%)	5%	42%	30%	5%	10%	5%
Turn Type	NA		Perm	NA	NA	pm+ov
Protected Phases	4			2	6	4
Permitted Phases			2			6
Actuated Green, G (s)	16.0		16.0	16.0	16.0	32.0
Effective Green, g (s)	16.0		16.0	16.0	16.0	32.0
Actuated g/C Ratio	0.40		0.40	0.40	0.40	0.80
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	1226		302	1375	608	1461
v/s Ratio Prot	c0.27			0.18	0.12	0.08
v/s Ratio Perm			c0.27			0.12
v/c Ratio	0.69		0.67	0.46	0.30	0.20
Uniform Delay, d1	9.9		9.8	8.8	8.2	1.0
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	3.1		11.1	1.1	1.3	0.3
Delay (s)	13.1		20.9	10.0	9.4	1.3
Level of Service	B		C	A	A	A
Approach Delay (s)	13.1			12.6	5.5	
Approach LOS	B			B	A	

Intersection Summary			
HCM Average Control Delay	10.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	40.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	50.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	165	125	70	145	110	235
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.97		1.00	0.95	0.95	0.95
Frt	0.94		1.00	1.00	0.94	0.85
Flt Protected	0.97		0.95	1.00	1.00	1.00
Satd. Flow (prot)	2712		1805	3438	1573	1461
Flt Permitted	0.97		0.64	1.00	1.00	1.00
Satd. Flow (perm)	2712		1208	3438	1573	1461
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	168	128	71	148	112	240
RTOR Reduction (vph)	99	0	0	0	33	0
Lane Group Flow (vph)	197	0	71	148	151	168
Heavy Vehicles (%)	5%	48%	0%	5%	10%	5%
Turn Type	NA		Perm	NA	NA	pm+ov
Protected Phases	4			2	6	4
Permitted Phases			2			6
Actuated Green, G (s)	7.9		18.6	18.6	18.6	26.5
Effective Green, g (s)	7.9		18.6	18.6	18.6	26.5
Actuated g/C Ratio	0.23		0.54	0.54	0.54	0.77
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	621		651	1854	848	1461
v/s Ratio Prot	c0.07			0.04	c0.10	0.03
v/s Ratio Perm			0.06			0.09
v/c Ratio	0.32		0.11	0.08	0.18	0.11
Uniform Delay, d1	11.1		3.9	3.8	4.1	1.0
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3		0.3	0.1	0.5	0.0
Delay (s)	11.4		4.2	3.9	4.5	1.1
Level of Service	B		A	A	A	A
Approach Delay (s)	11.4			4.0	2.9	
Approach LOS	B			A	A	

Intersection Summary			
HCM Average Control Delay	6.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.22		
Actuated Cycle Length (s)	34.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	33.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	360	110	80	105	155	810
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.97		1.00	0.95	0.95	0.95
Frt	0.96		1.00	1.00	0.90	0.85
Flt Protected	0.96		0.95	1.00	1.00	1.00
Satd. Flow (prot)	2934		1805	3438	1519	1461
Flt Permitted	0.96		0.26	1.00	1.00	1.00
Satd. Flow (perm)	2934		500	3438	1519	1461
Peak-hour factor, PHF	0.80	0.80	0.80	0.80	0.80	0.80
Adj. Flow (vph)	450	138	100	131	194	1012
RTOR Reduction (vph)	72	0	0	0	163	0
Lane Group Flow (vph)	516	0	100	131	456	587
Heavy Vehicles (%)	5%	55%	0%	5%	10%	5%
Turn Type	NA		Perm	NA	NA	pm+ov
Protected Phases	4			2	6	4
Permitted Phases			2			6
Actuated Green, G (s)	12.8		21.1	21.1	21.1	33.9
Effective Green, g (s)	12.8		21.1	21.1	21.1	33.9
Actuated g/C Ratio	0.31		0.50	0.50	0.50	0.81
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	896		252	1731	765	1461
v/s Ratio Prot	c0.18			0.04	c0.30	0.12
v/s Ratio Perm			0.20			0.28
v/c Ratio	0.58		0.40	0.08	0.60	0.40
Uniform Delay, d1	12.3		6.5	5.4	7.4	1.1
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.9		4.6	0.1	3.4	0.2
Delay (s)	13.2		11.1	5.5	10.8	1.3
Level of Service	B		B	A	B	A
Approach Delay (s)	13.2			7.9	6.2	
Approach LOS	B			A	A	

Intersection Summary			
HCM Average Control Delay	8.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	41.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	52.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	200	155	70	165	265	820
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.97		1.00	0.95	0.95	0.95
Frt	0.93		1.00	1.00	0.92	0.85
Flt Protected	0.97		0.95	1.00	1.00	1.00
Satd. Flow (prot)	2816		1805	3438	1583	1461
Flt Permitted	0.97		0.29	1.00	1.00	1.00
Satd. Flow (perm)	2816		553	3438	1583	1461
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	222	172	78	183	294	911
RTOR Reduction (vph)	128	0	0	0	77	0
Lane Group Flow (vph)	266	0	78	183	545	583
Heavy Vehicles (%)	5%	37%	0%	5%	5%	5%
Turn Type	NA		Perm	NA	NA	pm+ov
Protected Phases	4			2	6	4
Permitted Phases			2			6
Actuated Green, G (s)	10.1		21.1	21.1	21.1	31.2
Effective Green, g (s)	10.1		21.1	21.1	21.1	31.2
Actuated g/C Ratio	0.26		0.54	0.54	0.54	0.80
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	726		298	1851	852	1461
v/s Ratio Prot	0.09			0.05	c0.34	c0.10
v/s Ratio Perm			0.14			0.30
v/c Ratio	0.37		0.26	0.10	0.64	0.40
Uniform Delay, d1	11.9		4.9	4.4	6.4	1.2
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3		2.1	0.1	3.7	0.2
Delay (s)	12.2		7.0	4.5	10.0	1.4
Level of Service	B		A	A	B	A
Approach Delay (s)	12.2			5.3	5.8	
Approach LOS	B			A	A	

Intersection Summary			
HCM Average Control Delay	7.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	39.2	Sum of lost time (s)	4.0
Intersection Capacity Utilization	55.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	510	70	195	450	70	360
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.97		1.00	0.95	0.95	0.95
Frt	0.98		1.00	1.00	0.90	0.85
Flt Protected	0.96		0.95	1.00	1.00	1.00
Satd. Flow (prot)	3321		1388	3438	1520	1461
Flt Permitted	0.96		0.56	1.00	1.00	1.00
Satd. Flow (perm)	3321		823	3438	1520	1461
Peak-hour factor, PHF	0.77	0.77	0.77	0.77	0.77	0.77
Adj. Flow (vph)	662	91	253	584	91	468
RTOR Reduction (vph)	30	0	0	0	112	0
Lane Group Flow (vph)	723	0	253	584	176	271
Heavy Vehicles (%)	5%	0%	30%	5%	10%	5%
Turn Type	NA		Perm	NA	NA	pm+ov
Protected Phases	4			2	6	4
Permitted Phases			2			6
Actuated Green, G (s)	13.4		16.1	16.1	16.1	29.5
Effective Green, g (s)	13.4		16.1	16.1	16.1	29.5
Actuated g/C Ratio	0.36		0.43	0.43	0.43	0.79
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1187		353	1476	653	1461
v/s Ratio Prot	c0.22			0.17	0.12	0.07
v/s Ratio Perm			c0.31			0.12
v/c Ratio	0.61		0.72	0.40	0.27	0.19
Uniform Delay, d1	9.9		8.8	7.4	6.9	1.0
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.9		11.8	0.8	1.0	0.1
Delay (s)	10.8		20.6	8.2	7.9	1.1
Level of Service	B		C	A	A	A
Approach Delay (s)	10.8			11.9	4.6	
Approach LOS	B			B	A	

Intersection Summary			
HCM Average Control Delay	9.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	37.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	48.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	150	60	120	135	100	215
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.97		1.00	0.95	0.95	0.95
Frt	0.96		1.00	1.00	0.94	0.85
Flt Protected	0.97		0.95	1.00	1.00	1.00
Satd. Flow (prot)	3244		1262	3438	1572	1461
Flt Permitted	0.97		0.65	1.00	1.00	1.00
Satd. Flow (perm)	3244		858	3438	1572	1461
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	153	61	122	138	102	219
RTOR Reduction (vph)	50	0	0	0	28	0
Lane Group Flow (vph)	164	0	122	138	140	153
Heavy Vehicles (%)	5%	5%	43%	5%	10%	5%
Turn Type	NA		Perm	NA	NA	pm+ov
Protected Phases	4			2	6	4
Permitted Phases			2			6
Actuated Green, G (s)	5.9		19.0	19.0	19.0	24.9
Effective Green, g (s)	5.9		19.0	19.0	19.0	24.9
Actuated g/C Ratio	0.18		0.58	0.58	0.58	0.76
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	582		496	1985	908	1461
v/s Ratio Prot	c0.05			0.04	0.09	0.02
v/s Ratio Perm			c0.14			0.09
v/c Ratio	0.28		0.25	0.07	0.15	0.10
Uniform Delay, d1	11.7		3.4	3.1	3.2	1.1
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3		1.2	0.1	0.4	0.0
Delay (s)	11.9		4.6	3.1	3.6	1.1
Level of Service	B		A	A	A	A
Approach Delay (s)	11.9			3.8	2.4	
Approach LOS	B			A	A	

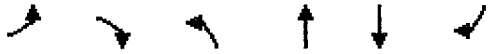
Intersection Summary			
HCM Average Control Delay	5.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.25		
Actuated Cycle Length (s)	32.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	32.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	330	45	130	95	140	745
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.97		1.00	0.95	0.95	0.95
Frt	0.98		1.00	1.00	0.90	0.85
Flt Protected	0.96		0.95	1.00	1.00	1.00
Satd. Flow (prot)	3302		1289	3438	1519	1461
Flt Permitted	0.96		0.32	1.00	1.00	1.00
Satd. Flow (perm)	3302		433	3438	1519	1461
Peak-hour factor, PHF	0.80	0.80	0.80	0.80	0.80	0.80
Adj. Flow (vph)	412	56	162	119	175	931
RTOR Reduction (vph)	27	0	0	0	162	0
Lane Group Flow (vph)	441	0	162	119	404	540
Heavy Vehicles (%)	5%	5%	40%	5%	10%	5%
Turn Type	NA		Perm	NA	NA	pm+ov
Protected Phases	4			2	6	4
Permitted Phases			2			6
Actuated Green, G (s)	11.8		21.1	21.1	21.1	32.9
Effective Green, g (s)	11.8		21.1	21.1	21.1	32.9
Actuated g/C Ratio	0.29		0.52	0.52	0.52	0.80
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	953		223	1774	784	1461
v/s Ratio Prot	0.13			0.03	0.27	c0.11
v/s Ratio Perm			c0.37			0.26
v/c Ratio	0.46		0.73	0.07	0.52	0.37
Uniform Delay, d1	11.9		7.7	5.0	6.5	1.1
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4		18.6	0.1	2.4	0.2
Delay (s)	12.3		26.3	5.0	8.9	1.3
Level of Service	B		C	A	A	A
Approach Delay (s)	12.3			17.3	5.2	
Approach LOS	B			B	A	

Intersection Summary			
HCM Average Control Delay	8.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	40.9	Sum of lost time (s)	4.0
Intersection Capacity Utilization	50.6%	ICU Level of Service	A
Analysis Period (min)	15		

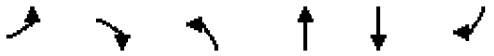
c Critical Lane Group



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	185	85	120	150	245	750
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.97		1.00	0.95	0.95	0.95
Frt	0.95		1.00	1.00	0.92	0.85
Flt Protected	0.97		0.95	1.00	1.00	1.00
Satd. Flow (prot)	3283		1262	3438	1584	1461
Flt Permitted	0.97		0.34	1.00	1.00	1.00
Satd. Flow (perm)	3283		454	3438	1584	1461
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	206	94	133	167	272	833
RTOR Reduction (vph)	72	0	0	0	74	0
Lane Group Flow (vph)	228	0	133	167	498	533
Heavy Vehicles (%)	5%	0%	43%	5%	5%	5%
Turn Type	NA		Perm	NA	NA	pm+ov
Protected Phases	4			2	6	4
Permitted Phases			2			6
Actuated Green, G (s)	9.1		21.1	21.1	21.1	30.2
Effective Green, g (s)	9.1		21.1	21.1	21.1	30.2
Actuated g/C Ratio	0.24		0.55	0.55	0.55	0.79
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	782		251	1899	875	1461
v/s Ratio Prot	0.07			0.05	c0.31	c0.09
v/s Ratio Perm			0.29			0.28
v/c Ratio	0.29		0.53	0.09	0.57	0.36
Uniform Delay, d1	11.9		5.4	4.0	5.6	1.2
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2		7.8	0.1	2.7	0.2
Delay (s)	12.1		13.2	4.1	8.3	1.3
Level of Service	B		B	A	A	A
Approach Delay (s)	12.1			8.1	4.9	
Approach LOS	B			A	A	

Intersection Summary			
HCM Average Control Delay	6.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	38.2	Sum of lost time (s)	4.0
Intersection Capacity Utilization	52.8%	ICU Level of Service	A
Analysis Period (min)	15		

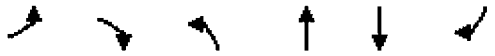
c Critical Lane Group



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	870	75	215	490	75	390
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.97		1.00	0.95	0.95	0.95
Frt	0.99		1.00	1.00	0.90	0.85
Flt Protected	0.96		0.95	1.00	1.00	1.00
Satd. Flow (prot)	3226		1388	3438	1519	1461
Flt Permitted	0.96		0.52	1.00	1.00	1.00
Satd. Flow (perm)	3226		756	3438	1519	1461
Peak-hour factor, PHF	0.77	0.77	0.77	0.77	0.77	0.77
Adj. Flow (vph)	1130	97	279	636	97	506
RTOR Reduction (vph)	16	0	0	0	128	0
Lane Group Flow (vph)	1211	0	279	636	182	293
Heavy Vehicles (%)	5%	42%	30%	5%	10%	5%
Turn Type	NA		Perm	NA	NA	pm+ov
Protected Phases	4			2	6	4
Permitted Phases			2			6
Actuated Green, G (s)	16.0		16.0	16.0	16.0	32.0
Effective Green, g (s)	16.0		16.0	16.0	16.0	32.0
Actuated g/C Ratio	0.40		0.40	0.40	0.40	0.80
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1290		302	1375	608	1461
v/s Ratio Prot	c0.38			0.18	0.12	0.08
v/s Ratio Perm			c0.37			0.12
v/c Ratio	0.94		0.92	0.46	0.30	0.20
Uniform Delay, d1	11.5		11.4	8.8	8.2	1.0
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	12.9		35.5	1.1	1.3	0.1
Delay (s)	24.4		46.9	10.0	9.4	1.0
Level of Service	C		D	A	A	A
Approach Delay (s)	24.4			21.2	5.4	
Approach LOS	C			C	A	

Intersection Summary			
HCM Average Control Delay	19.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	40.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	61.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	165	65	130	145	110	235
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.97		1.00	0.95	0.95	0.95
Frt	0.96		1.00	1.00	0.94	0.85
Flt Protected	0.97		0.95	1.00	1.00	1.00
Satd. Flow (prot)	2909		1262	3438	1573	1461
Flt Permitted	0.97		0.64	1.00	1.00	1.00
Satd. Flow (perm)	2909		845	3438	1573	1461
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	168	66	133	148	112	240
RTOR Reduction (vph)	53	0	0	0	31	0
Lane Group Flow (vph)	181	0	133	148	153	168
Heavy Vehicles (%)	5%	48%	43%	5%	10%	5%
Turn Type	NA		Perm	NA	NA	pm+ov
Protected Phases	4			2	6	4
Permitted Phases			2			6
Actuated Green, G (s)	6.4		18.8	18.8	18.8	25.2
Effective Green, g (s)	6.4		18.8	18.8	18.8	25.2
Actuated g/C Ratio	0.19		0.57	0.57	0.57	0.76
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	561		478	1947	891	1461
v/s Ratio Prot	c0.06			0.04	0.10	0.02
v/s Ratio Perm			c0.16			0.09
v/c Ratio	0.32		0.28	0.08	0.17	0.11
Uniform Delay, d1	11.5		3.7	3.3	3.5	1.1
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3		1.4	0.1	0.4	0.0
Delay (s)	11.9		5.2	3.3	3.9	1.1
Level of Service	B		A	A	A	A
Approach Delay (s)	11.9			4.2	2.5	
Approach LOS	B			A	A	

Intersection Summary			
HCM Average Control Delay	5.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.29		
Actuated Cycle Length (s)	33.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	34.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	200	155	130	165	265	820
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.97		1.00	0.95	0.95	0.95
Frt	0.93		1.00	1.00	0.92	0.85
Flt Protected	0.97		0.95	1.00	1.00	1.00
Satd. Flow (prot)	2816		1262	3438	1583	1461
Flt Permitted	0.97		0.29	1.00	1.00	1.00
Satd. Flow (perm)	2816		387	3438	1583	1461
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	222	172	144	183	294	911
RTOR Reduction (vph)	128	0	0	0	77	0
Lane Group Flow (vph)	266	0	144	183	545	583
Heavy Vehicles (%)	5%	37%	43%	5%	5%	5%
Turn Type	NA		Perm	NA	NA	pm+ov
Protected Phases	4			2	6	4
Permitted Phases			2			6
Actuated Green, G (s)	10.1		21.1	21.1	21.1	31.2
Effective Green, g (s)	10.1		21.1	21.1	21.1	31.2
Actuated g/C Ratio	0.26		0.54	0.54	0.54	0.80
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	726		208	1851	852	1461
v/s Ratio Prot	0.09			0.05	0.34	c0.10
v/s Ratio Perm			c0.37			0.30
v/c Ratio	0.37		0.69	0.10	0.64	0.40
Uniform Delay, d1	11.9		6.7	4.4	6.4	1.2
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3		17.3	0.1	3.7	0.2
Delay (s)	12.2		24.0	4.5	10.0	1.4
Level of Service	B		C	A	B	A
Approach Delay (s)	12.2			13.1	5.8	
Approach LOS	B			B	A	

Intersection Summary			
HCM Average Control Delay	8.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	39.2	Sum of lost time (s)	4.0
Intersection Capacity Utilization	58.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	200	95	130	165	265	820
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.97		1.00	0.95	0.95	0.95
Frt	0.95		1.00	1.00	0.92	0.85
Flt Protected	0.97		0.95	1.00	1.00	1.00
Satd. Flow (prot)	2941		1262	3438	1583	1461
Flt Permitted	0.97		0.30	1.00	1.00	1.00
Satd. Flow (perm)	2941		393	3438	1583	1461
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	222	106	144	183	294	911
RTOR Reduction (vph)	80	0	0	0	76	0
Lane Group Flow (vph)	249	0	144	183	546	583
Heavy Vehicles (%)	5%	37%	43%	5%	5%	5%
Turn Type	NA		Perm	NA	NA	pm+ov
Protected Phases	4			2	6	4
Permitted Phases			2			6
Actuated Green, G (s)	9.7		21.1	21.1	21.1	30.8
Effective Green, g (s)	9.7		21.1	21.1	21.1	30.8
Actuated g/C Ratio	0.25		0.54	0.54	0.54	0.79
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	735		214	1870	861	1461
v/s Ratio Prot	0.08			0.05	0.34	c0.10
v/s Ratio Perm			c0.37			0.30
v/c Ratio	0.34		0.67	0.10	0.63	0.40
Uniform Delay, d1	11.9		6.4	4.3	6.2	1.2
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3		15.6	0.1	3.5	0.2
Delay (s)	12.2		22.0	4.4	9.7	1.4
Level of Service	B		C	A	A	A
Approach Delay (s)	12.2			12.1	5.7	
Approach LOS	B			B	A	

Intersection Summary			
HCM Average Control Delay	8.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	38.8	Sum of lost time (s)	4.0
Intersection Capacity Utilization	56.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

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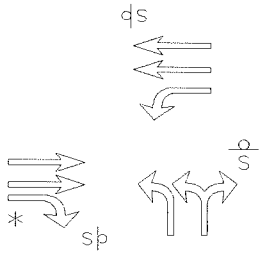
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	1 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : FOOTHILL FWY OVERPASS
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 4
ROUTE 1B, 1F

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						

OAK GROVE DRIVE

EB LEFT	0	0%		0	0	0
EB THRU	115	5%	**55**	170	15	185
EB RIGHT	50	5%		50	5	55
WB LEFT	180	5%		180	15	195
WB THRU	465	5%	**55**	520	45	565
WB RIGHT	0	0%		0	0	0

FOOTHILL FWY OVERPASS

NB LEFT	125	5%		125	10	135
NB THRU	0	0%		0	0	0
NB RIGHT	95	5%		95	10	105
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**1030**		**110**	**1140**	**100**	**1240**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	2 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : FOOTHILL FWY OVERPASS
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 4
ROUTE 1C, 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
OAK GROVE DRIVE						
EB LEFT	0	0%		0	0	0
EB THRU	115	5%	**55**	170	15	185
EB RIGHT	50	5%		50	5	55
WB LEFT	180	5%		180	15	195
WB THRU	465	5%		465	40	505
WB RIGHT	0	0%		0	0	0
FOOTHILL FWY OVERPASS						
NB LEFT	125	5%		125	10	135
NB THRU	0	0%		0	0	0
NB RIGHT	95	5%		95	10	105
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**1030**		**55**	**1085**	**95**	**1180**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	3 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : FOOTHILL FWY OVERPASS
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 4
ROUTE 1D, 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
OAK GROVE DRIVE						
EB LEFT	0	0%		0	0	0
EB THRU	115	5%		115	10	125
EB RIGHT	50	5%		50	5	55
WB LEFT	180	5%		180	15	195
WB THRU	465	5%	**55**	520	45	565
WB RIGHT	0	0%		0	0	0
FOOTHILL FWY OVERPASS						
NB LEFT	125	5%		125	10	135
NB THRU	0	0%		0	0	0
NB RIGHT	95	5%		95	10	105
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**1030**		**55**	**1085**	**95**	**1180**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	4 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : FOOTHILL FWY OVERPASS
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 4
ROUTE 1B, 1F

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
OAK GROVE DRIVE						
EB LEFT	0	0%		0	0	0
EB THRU	105	10%	**55**	160	15	175
EB RIGHT	65	5%		65	5	70
WB LEFT	60	5%		60	5	65
WB THRU	170	5%	**55**	225	20	245
WB RIGHT	0	0%		0	0	0
FOOTHILL FWY OVERPASS						
NB LEFT	55	5%		55	5	60
NB THRU	0	0%		0	0	0
NB RIGHT	60	5%		60	5	65
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**515**		**110**	**625**	**55**	**680**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	5 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : FOOTHILL FWY OVERPASS
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 4
ROUTE 1C, 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
OAK GROVE DRIVE						
EB LEFT	0	0%		0	0	0
EB THRU	105	10%	**55**	160	15	175
EB RIGHT	65	5%		65	5	70
WB LEFT	60	5%		60	5	65
WB THRU	170	5%		170	15	185
WB RIGHT	0	0%		0	0	0
FOOTHILL FWY OVERPASS						
NB LEFT	55	5%		55	5	60
NB THRU	0	0%		0	0	0
NB RIGHT	60	5%		60	5	65
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**515**		**55**	**570**	**50**	**620**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	6 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : FOOTHILL FWY OVERPASS
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 4
ROUTE 1D, 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
OAK GROVE DRIVE						
EB LEFT	0	0%		0	0	0
EB THRU	105	10%		105	10	115
EB RIGHT	65	5%		65	5	70
WB LEFT	60	5%		60	5	65
WB THRU	170	5%	**55**	225	20	245
WB RIGHT	0	0%		0	0	0
FOOTHILL FWY OVERPASS						
NB LEFT	55	5%		55	5	60
NB THRU	0	0%		0	0	0
NB RIGHT	60	5%		60	5	65
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**515**		**55**	**570**	**50**	**620**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	7 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : FOOTHILL FWY OVERPASS
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 4
ROUTE 1B, 1F

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
OAK GROVE DRIVE						
EB LEFT	0	0%		0	0	0
EB THRU	140	5%	**55**	195	20	215
EB RIGHT	60	5%		60	5	65
WB LEFT	40	5%		40	5	45
WB THRU	125	5%	**55**	180	15	195
WB RIGHT	0	0%		0	0	0
FOOTHILL FWY OVERPASS						
NB LEFT	60	5%		60	5	65
NB THRU	0	0%		0	0	0
NB RIGHT	65	5%		65	5	70
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**490**		**110**	**600**	**55**	**655**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	8 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : FOOTHILL FWY OVERPASS
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 4
ROUTE 1C, 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
OAK GROVE DRIVE						
EB LEFT	0	0%		0	0	0
EB THRU	140	5%	**55**	195	20	215
EB RIGHT	60	5%		60	5	65
WB LEFT	40	5%		40	5	45
WB THRU	125	5%		125	10	135
WB RIGHT	0	0%		0	0	0
FOOTHILL FWY OVERPASS						
NB LEFT	60	5%		60	5	65
NB THRU	0	0%		0	0	0
NB RIGHT	65	5%		65	5	70
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**490**		**55**	**545**	**50**	**595**

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TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	9 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : FOOTHILL FWY OVERPASS
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 4
ROUTE 1D, 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
OAK GROVE DRIVE						
EB LEFT	0	0%		0	0	0
EB THRU	140	10%		140	15	155
EB RIGHT	60	5%		60	5	65
WB LEFT	40	5%		40	5	45
WB THRU	125	5%	**55**	180	15	195
WB RIGHT	0	0%		0	0	0
FOOTHILL FWY OVERPASS						
NB LEFT	60	5%		60	5	65
NB THRU	0	0%		0	0	0
NB RIGHT	65	5%		65	5	70
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**490**		**55**	**545**	**50**	**595**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	10 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : FOOTHILL FWY OVERPASS
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 4
ROUTE 1B, 1F

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
OAK GROVE DRIVE						
EB LEFT	0	0%		0	0	0
EB THRU	265	5%	**55**	320	30	350
EB RIGHT	80	5%		80	5	85
WB LEFT	60	5%		60	5	65
WB THRU	130	5%	**55**	185	15	200
WB RIGHT	0	0%		0	0	0
FOOTHILL FWY OVERPASS						
NB LEFT	70	5%		70	5	75
NB THRU	0	0%		0	0	0
NB RIGHT	60	5%		60	5	65
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**665**		**110**	**775**	**65**	**840**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	11 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : FOOTHILL FWY OVERPASS
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 4
ROUTE 1C, 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
OAK GROVE DRIVE						
EB LEFT	0	0%		0	0	0
EB THRU	265	5%	**55**	320	30	350
EB RIGHT	80	5%		80	5	85
WB LEFT	60	5%		60	5	65
WB THRU	130	5%		130	10	140
WB RIGHT	0	0%		0	0	0
FOOTHILL FWY OVERPASS						
NB LEFT	70	5%		70	5	75
NB THRU	0	0%		0	0	0
NB RIGHT	60	5%		60	5	65
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**665**		**55**	**720**	**60**	**780**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	12 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : FOOTHILL FWY OVERPASS
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 4
ROUTE 1D, 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
OAK GROVE DRIVE						
EB LEFT	0	0%		0	0	0
EB THRU	265	5%		265	25	290
EB RIGHT	80	5%		80	5	85
WB LEFT	60	5%		60	5	65
WB THRU	130	5%	**55**	185	15	200
WB RIGHT	0	0%		0	0	0
FOOTHILL FWY OVERPASS						
NB LEFT	70	5%		70	5	75
NB THRU	0	0%		0	0	0
NB RIGHT	60	5%		60	5	65
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**665**		**55**	**720**	**60**	**780**

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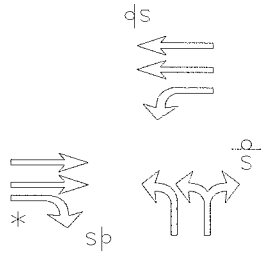
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	1 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : FOOTHILL FWY OVERPASS
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 4
ROUTE 1B, 1F

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
OAK GROVE DRIVE								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	109	8	24	135	**165**	300	25	325
EB RIGHT	50	1	3	55	**0**	55	5	60
WB LEFT	179	3	9	190	**0**	190	15	205
WB THRU	457	7	21	480	**140**	620	55	675
WB RIGHT	0	0	0	0	**0**	0	0	0
FOOTHILL FWY OVERPASS								
NB LEFT	122	2	6	130	**0**	130	10	140
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	95	2	6	100	**0**	100	10	110
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**1012**				**305**	**1395**	**120**	**1515**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	2 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : FOOTHILL FWY OVERPASS
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 4
ROUTE 1C, 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
OAK GROVE DRIVE								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	109	8	24	135	**165**	300	25	325
EB RIGHT	50	1	3	55	**0**	55	5	60
WB LEFT	179	3	9	190	**0**	190	15	205
WB THRU	457	7	21	480	**0**	480	45	525
WB RIGHT	0	0	0	0	**0**	0	0	0
FOOTHILL FWY OVERPASS								
NB LEFT	122	2	6	130	**0**	130	10	140
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	95	2	6	100	**0**	100	10	110
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**1012**				**165**	**1255**	**110**	**1365**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	3 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : FOOTHILL FWY OVERPASS
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 4
ROUTE 1D, 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
OAK GROVE DRIVE								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	109	8	24	135	**0**	135	10	145
EB RIGHT	50	1	3	55	**0**	55	5	60
WB LEFT	179	3	9	190	**0**	190	15	205
WB THRU	457	7	21	480	**140**	620	55	675
WB RIGHT	0	0	0	0	**0**	0	0	0
FOOTHILL FWY OVERPASS								
NB LEFT	122	2	6	130	**0**	130	10	140
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	95	2	6	100	**0**	100	10	110
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**1012**				**140**	**1230**	**105**	**1335**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	4 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : FOOTHILL FWY OVERPASS
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 4
ROUTE 1B, 1F

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
OAK GROVE DRIVE								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	96	10	30	125	**165**	290	25	315
EB RIGHT	64	1	3	65	**0**	65	5	70
WB LEFT	60	1	3	65	**0**	65	5	70
WB THRU	162	8	24	185	**140**	325	30	355
WB RIGHT	0	0	0	0	**0**	0	0	0
FOOTHILL FWY OVERPASS								
NB LEFT	53	2	6	60	**0**	60	5	65
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	60	1	3	65	**0**	65	5	70
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**495**				**305**	**870**	**75**	**945**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	5 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : FOOTHILL FWY OVERPASS
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 4
ROUTE 1C, 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
OAK GROVE DRIVE								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	96	10	30	125	**165**	290	25	315
EB RIGHT	64	1	3	65	**0**	65	5	70
WB LEFT	60	1	3	65	**0**	65	5	70
WB THRU	162	8	24	185	**0**	185	15	200
WB RIGHT	0	0	0	0	**0**	0	0	0
FOOTHILL FWY OVERPASS								
NB LEFT	53	2	6	60	**0**	60	5	65
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	60	1	3	65	**0**	65	5	70
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**495**				**165**	**730**	**60**	**790**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	6 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : FOOTHILL FWY OVERPASS
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 4
ROUTE 1D, 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
OAK GROVE DRIVE								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	96	10	30	125	**0**	125	10	135
EB RIGHT	64	1	3	65	**0**	65	5	70
WB LEFT	60	1	3	65	**0**	65	5	70
WB THRU	162	8	24	185	**140**	325	30	355
WB RIGHT	0	0	0	0	**0**	0	0	0
FOOTHILL FWY OVERPASS								
NB LEFT	53	2	6	60	**0**	60	5	65
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	60	1	3	65	**0**	65	5	70
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**495**				**140**	**705**	**60**	**765**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	7 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : FOOTHILL FWY OVERPASS
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 4
ROUTE 1B, 1F

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
OAK GROVE DRIVE								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	140	7	21	160	**165**	325	30	355
EB RIGHT	60	3	9	70	**0**	70	5	75
WB LEFT	40	2	6	45	**0**	45	5	50
WB THRU	125	6	19	145	**140**	285	25	310
WB RIGHT	0	0	0	0	**0**	0	0	0
FOOTHILL FWY OVERPASS								
NB LEFT	60	3	9	70	**0**	70	5	75
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	65	3	10	75	**0**	75	5	80
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**490**				**305**	**870**	**75**	**945**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	8 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : FOOTHILL FWY OVERPASS
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 4
ROUTE 1C, 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
OAK GROVE DRIVE								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	140	7	21	160	**165**	325	30	355
EB RIGHT	60	3	9	70	**0**	70	5	75
WB LEFT	40	2	6	45	**0**	45	5	50
WB THRU	125	6	19	145	**0**	145	15	160
WB RIGHT	0	0	0	0	**0**	0	0	0
FOOTHILL FWY OVERPASS								
NB LEFT	60	3	9	70	**0**	70	5	75
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	65	3	10	75	**0**	75	5	80
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**490**				**165**	**730**	**65**	**795**

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TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	9 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : FOOTHILL FWY OVERPASS
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 4
ROUTE 1D, 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
OAK GROVE DRIVE								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	140	7	21	160	**0**	160	15	175
EB RIGHT	60	3	9	70	**0**	70	5	75
WB LEFT	40	2	6	45	**0**	45	5	50
WB THRU	125	6	19	145	**140**	285	25	310
WB RIGHT	0	0	0	0	**0**	0	0	0
FOOTHILL FWY OVERPASS								
NB LEFT	60	3	9	70	**0**	70	5	75
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	65	3	10	75	**0**	75	5	80
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**490**				**140**	**705**	**60**	**765**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	10 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : FOOTHILL FWY OVERPASS
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 4
ROUTE 1B, 1F

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
OAK GROVE DRIVE								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	259	4	12	270	**165**	435	40	475
EB RIGHT	82	0	0	80	**0**	80	5	85
WB LEFT	59	0	0	60	**0**	60	5	65
WB THRU	123	5	15	140	**140**	280	25	305
WB RIGHT	0	0	0	0	**0**	0	0	0
FOOTHILL FWY OVERPASS								
NB LEFT	69	0	0	70	**0**	70	5	75
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	59	0	0	60	**0**	60	5	65
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	0	0	0	0
TOTALS	**651**				**305**	**985**	**85**	**1070**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	11 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : FOOTHILL FWY OVERPASS
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 4
ROUTE 1C, 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
OAK GROVE DRIVE								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	259	4	12	270	**165**	435	40	475
EB RIGHT	82	0	0	80	**0**	80	5	85
WB LEFT	59	0	0	60	**0**	60	5	65
WB THRU	123	5	15	140	**0**	140	15	155
WB RIGHT	0	0	0	0	**0**	0	0	0
FOOTHILL FWY OVERPASS								
NB LEFT	69	0	0	70	**0**	70	5	75
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	59	0	0	60	**0**	60	5	65
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**651**				**165**	**845**	**75**	**920**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	12 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : FOOTHILL FWY OVERPASS
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 4
ROUTE 1D, 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
OAK GROVE DRIVE								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	259	4	12	270	**0**	270	25	295
EB RIGHT	82	0	0	80	**0**	80	5	85
WB LEFT	59	0	0	60	**0**	60	5	65
WB THRU	123	5	15	140	**140**	280	25	305
WB RIGHT	0	0	0	0	**0**	0	0	0
FOOTHILL FWY OVERPASS								
NB LEFT	69	0	0	70	**0**	70	5	75
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	59	0	0	60	**0**	60	5	65
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**651**				**140**	**820**	**70**	**890**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: FOOTHILL OVERCROSS
EAST-WEST STREET: OAK GROVE
JURISDICTION: PASADENA
DATE: 06-02-11

PEAK HOUR: 07:15AM

NORTH LEG SB

TOTAL: 0

Rt	Thru	Lt	
			Total
			1st
			2nd
			3rd
			4th

TT = 10
TT% = 10/646 = 1.55% ≈ 2%

Oak Grove (~~NB~~) WB

EAST LEG TOTAL: 646

	1st	2nd	3rd	4th	Total
Rt					
Thru	76	162	168	58	464 (463)
Lt	37	68	41	36	182 (180)

WEST LEG TOTAL: 168

Oak Grove (~~WB~~) EB

Total	1st	2nd	3rd	4th	
					Lt
117 (115)	21	24	38	34	Thru
51 (50)	5	16	18	12	Rt

TT = 9
TT% = 9/168 = 5.36% ≈ 5%

SOUTH LEG

Foothill fwy Overpass (~~EB~~) NB

	Lt	Thru	Rt
1st	17		19
2nd	54		21
3rd	31		41
4th	22		16
Total	124 (125)		97 (95)

TT = 4
TT% = 4/221 = 1.81% ≈ 2%

TOTAL: 221

PEAK HOUR FACTORS

NORTH LEG =
SOUTH LEG = 0.74
EAST LEG = 0.70
WEST LEG = 0.75

ALL LEGS = 0.75

HOUR TOTAL: 1,035

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: FOOTHILL OVERCROSS

EAST-WEST STREET: OAK GROVE

TIME: 07:00AM-08:00AM DATE: 06-02-11

NORTH LEG

Rt	Thru	Lt	
			Total
			1st
			2nd
			3rd
			4th

	1st	2nd	3rd	4th	Total
Rt					
Thru	29	76	162	168	435
Lt	22	37	68	41	168

Total	1st	2nd	3rd	4th	
					Lt
97	14	21	24	38	Thru
45	6	5	16	18	Rt

	Lt	Thru	Rt
1st	11		4
2nd	17		19
3rd	54		21
4th	31		41
Total	113		85

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: FOOTHILL OVERCROSS

EAST-WEST STREET: OAK GROVE

TIME: 08:00AM-09:00AM DATE: 06-02-11

NORTH LEG

			Total
			1st
			2nd
			3rd
			4th
Rt	Thru	Lt	

Rt					
Thru	58	55	45	46	204
Lt	36	43	20	27	126
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
					Lt
116	34	24	29	29	Thru
54	12	12	15	15	Rt

	Lt	Thru	Rt
1st	22		16
2nd	9		14
3rd	14		13
4th	17		11
Total	62		54

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : FOOTHILL OVERCROSS PASADENA

EAST-WEST STREET : OAK GROVE 06-02-11

BEGINNING TIME : 07:00AM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
					NORTH LEG							
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
					EB SOUTH LEG							
4	0	11	0	0	0	0	0	0	0	0	0	15
19	0	16	0	0	1	0	0	0	0	0	0	36
21	0	54	0	0	0	0	0	0	0	0	0	75
40	0	30	0	0	1	0	0	0	1	0	0	72
15	0	22	1	0	0	0	0	0	0	0	0	38
14	0	9	0	0	3 0	0	0	0 0	0	0	0	23
13	0	13	0	0	1	0	0	0	0	0	1 0	27
11	0	17	0	0	0	0	0	0	0	0	0	28
						TT=3+0+1=4						
137	0	172	1	0	3	0	0	0	1	0	0	314
					NB EAST LEG							
0	29	19	0	0	3	0	0	0	0	0	0	51
0	73	37	0	3	0	0	0	0	0	0	0	113
0	161	65	0	1	2	0	0	0	0	0	1	230
0	166	41	0	2	0	0	0	0	0	0	0	209
0	57	36	0	1	0	0	0	0	0	0	0	94
0	54	43	0	1	9 0	0	0	0 0	0	0	1 0	98
0	45	20	0	0	0	0	0	0	0	0	1 0	65
0	44	27	0	2	0	0	0	0	0	0	0	73
						TT=9+0+1=10						
0	629	288	0	10	5	0	0	0	0	0	1	933
					SB WEST LEG							
6	14	0	0	0	0	0	0	0	0	0	0	20
5	19	0	0	2	0	0	0	0	0	0	0	26
15	23	0	1	1	0	0	0	0	0	0	0	40
18	35	0	0	3	0	0	0	0	0	0	0	56
12	32	0	0	2	0	0	0	0	0	0	0	46
12	23	0	0	1	9 0	0	0	0 0	0	0	0 0	36
15	27	0	0	2	0	0	0	0	0	0	0	44
15	28	0	0	1	0	0	0	0	0	0	0	44
						TT=9+0+0=9						
98	201	0	1	12	0	0	0	0	0	0	0	312

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: FOOTHILL OVERCROSS
EAST-WEST STREET: OAK GROVE DATE: 06-02-11
JURISDICTION: PASADENA

PEAK HOUR: 12:30PM

NORTH LEG

TOTAL: 0

	Rt	Thru	Lt	Total
1st				
2nd				
3rd				
4th				

TT = 9

TT% = $\frac{9}{231}$ = 3.90% ≈ 4%

Oak Grove (NB)

EAST LEG TOTAL: 231

	1st	2nd	3rd	4th	Total
Rt					
Thru	47	39	39	45	170
Lt	10	19	15	17	60 61

WEST LEG

	1st	2nd	3rd	4th	Total
Lt					
Thru	38	11	38	19	106 105
Rt	21	14	15	15	65

WEST LEG TOTAL: 171

Oak Grove (SB)

TT = 11

TT% = $\frac{11}{171}$ = 6.43% ≈ 6%

SOUTH LEG

	Lt	Thru	Rt	Total
1st	10		11	
2nd	12		13	
3rd	18		20	
4th	15		17	
Total	55		60 61	

Foothill Fwy Overpass (EB)

TT = 3

TT% = $\frac{3}{116}$ = 2.59% ≈ 3%

TOTAL: 116

PEAK HOUR FACTORS

NORTH LEG =
SOUTH LEG = 0.76
EAST LEG = 0.93
WEST LEG = 0.72

ALL LEGS = 0.89

HOUR TOTAL: 518

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: FOOTHILL OVERCROSS

EAST-WEST STREET: OAK GROVE

TIME: 12:00PM-01:00PM DATE: 06-02-11

NORTH LEG

			Total
			1st
			2nd
			3rd
			4th
Rt	Thru	Lt	

Rt					
Thru	35	50	47	39	171
Lt	12	22	10	19	63
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
					Lt
98	26	23	38	11	Thru
64	19	10	21	14	Rt

	Lt	Thru	Rt
1st	9		16
2nd	10		9
3rd	10		11
4th	12		13
Total	41		49

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: FOOTHILL OVERCROSS

EAST-WEST STREET: OAK GROVE

TIME: 01:00PM-02:00PM DATE: 06-02-11

NORTH LEG

			Total
			1st
			2nd
			3rd
			4th
Rt	Thru	Lt	

Rt					
Thru	39	45	31	29	144
Lt	15	17	15	23	70
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
					Lt
91	38	19	20	14	Thru
60	15	15	10	20	Rt

	Lt	Thru	Rt
1st	18		20
2nd	15		17
3rd	11		14
4th	21		15
Total	65		66

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : FOOTHILL OVERCROSS PASADENA

EAST-WEST STREET : OAK GROVE 06-02-11

BEGINNING TIME : 12:00PM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
					NORTH LEG							
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
					EB SOUTH LEG							
16	0	9	0	0	0	0	0	0	0	0	0	25
9	0	10	0	0	0	0	0	0	0	0	0	19
11	0	10	0	0	0	0	0	0	0	0	0	21
13	0	10	0	0	2	0	0	0	0	0	0	25
20	0	18	0	0	0	0	0	0	0	0	0	38
16	0	15	1	0	0	0	0	0	0	0	0	32
12	0	11	2	0	3 0	0	0	0 0	0	0	0 0	25
15	0	21	0	0	0	0	0	0	0	0	0	36
						TT = 3+0+0 = 3						
112	0	104	3	0	2	0	0	0	0	0	0	221
					NB EAST LEG							
0	34	12	0	1	0	0	0	0	0	0	0	47
0	49	22	0	1	0	0	0	0	0	0	0	72
0	44	9	0	1	0	0	1	1	0	1	0	57
0	38	19	0	0	0	0	1	0	0	0	0	58
0	36	15	0	1	0	0	2	0	0	0	0	54
0	44	17	0	1	0	0	0	0	0	0	0	62
0	28	15	0	3 3	0	0	0 5	0	0	0 1	0	46
0	28	23	0	1	0	0	0	0	0	0	0	52
						TT = 3+5+1 = 9						
0	301	132	0	9	0	0	4	1	0	1	0	448
					SB WEST LEG							
19	23	0	0	3	0	0	0	0	0	0	0	45
10	21	0	0	1	0	0	0	0	0	1	0	33
21	34	0	0	1	0	0	1	0	0	2	0	59
14	10	0	0	1	0	0	0	0	0	0	0	25
14	37	0	0	1	0	1	0	0	0	0	0	53
15	15	0	0	3	0	0	1	0	0	0	0	34
10	19	0	0	1 6	0	0	0 3	0	0	0 2	0	30
20	12	0	0	1	0	0	1	0	0	0	0	34
						TT = 6+3+2 = 11						
123	171	0	0	12	0	1	3	0	0	3	0	313

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: OAK GROVE
EAST-WEST STREET: FOOTHILL OVERPASS DATE: 04-12-12
JURISDICTION: LA CANADA

PEAK HOUR: 02:45PM

NORTH LEG

TOTAL: 0

			Total
			1st
			2nd
			3rd
			4th
Rt	Thru	Lt	

EAST LEG (NB) TOTAL: 169

	1st	2nd	3rd	4th	Total
Rt					
Thru	39	33	23	32	127
Lt	8	11	11	12	42

WEST LEG (SB) TOTAL: 200

Total	1st	2nd	3rd	4th	
					Lt
142	30	33	34	45	Thru
58	21	14	12	11	Rt

SOUTH LEG (EB) TOTAL: 125

	Lt	Thru	Rt
1st	17		14
2nd	16		18
3rd	11		17
4th	15		17
Total	59		66

PEAK HOUR FACTORS

NORTH LEG =
SOUTH LEG = 0.92
EAST LEG = 0.90
WEST LEG = 0.89

ALL LEGS = 0.94

HOUR TOTAL: 494

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: OAK GROVE

EAST-WEST STREET: FOOTHILL OVERPASS

TIME: 02:00PM-03:00PM DATE: 04-12-12

NORTH LEG

			Total
			1st
			2nd
			3rd
			4th
Rt	Thru	Lt	

Rt					
Thru	22	26	30	39	117
Lt	7	12	9	8	36
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
					Lt
98	18	24	26	30	Thru
56	10	10	15	21	Rt

	Lt	Thru	Rt
1st	12		4
2nd	15		11
3rd	13		6
4th	17		14
Total	57		35

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: OAK GROVE

EAST-WEST STREET: FOOTHILL OVERPASS

TIME: 03:00PM-04:00PM DATE: 04-12-12

NORTH LEG

			Total
			1st
			2nd
			3rd
			4th
Rt	Thru	Lt	

Rt					
Thru	33	23	32	34	122
Lt	11	11	12	7	41
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
					Lt
156	33	34	45	44	Thru
52	14	12	11	15	Rt

	Lt	Thru	Rt
1st	16		18
2nd	11		17
3rd	15		17
4th	14		12
Total	56		64

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: FOOTHILL OVERCROSS
EAST-WEST STREET: OAK GROVE DATE: 06-02-11
JURISDICTION: PASADENA

PEAK HOUR: 05:00PM

NORTH LEG

TOTAL: 0

			Total
			1st
			2nd
			3rd
			4th
Rt	Thru	Lt	

TT = 5
TT% = 5/187 = 2.67% ≈ 3%

Oak Grove NB
EAST LEG TOTAL: 187

Rt					
Thru	28	31	39	30	128 (130)
Lt	12	14	18	15	59 (60)
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
					Lt
263 (265)	71	58	71	63	Thru
82 (80)	21	24	16	21	Rt

WEST LEG TOTAL: 345
Oak Grove (SB)

TT = 4
TT% = 4/345 = 1.16% ≈ 1%

	Lt	Thru	Rt
1st	14		13
2nd	18		12
3rd	22		19
4th	15		15
Total	69 (70)		59 (60)

SOUTH LEG
Foothill Fwy overpass (EB)

TT = 0
TT% = 0/128 = 0% ≈ 1%

TOTAL: 128

PEAK HOUR FACTORS

NORTH LEG =
SOUTH LEG = 0.78
EAST LEG = 0.82
WEST LEG = 0.94

ALL LEGS = 0.89

HOUR TOTAL: 660

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: FOOTHILL OVERCROSS

EAST-WEST STREET: OAK GROVE

TIME: 04:00PM-05:00PM DATE: 06-02-11

NORTH LEG

			Total
			1st
			2nd
			3rd
			4th
Rt	Thru	Lt	

Rt					
Thru	26	29	36	31	122
Lt	7	16	15	12	50
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
					Lt
222	48	58	53	63	Thru
49	18	8	13	10	Rt

	Lt	Thru	Rt
1st	16		21
2nd	9		14
3rd	11		14
4th	16		12
Total	52		61

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: FOOTHILL OVERCROSS

EAST-WEST STREET: OAK GROVE

TIME: 05:00PM-06:00PM DATE: 06-02-11

NORTH LEG

			Total
			1st
			2nd
			3rd
			4th
Rt	Thru	Lt	

Rt					
Thru	28	31	39	30	128
Lt	12	14	18	15	59
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
					Lt
263	71	58	71	63	Thru
82	21	24	16	21	Rt

	Lt	Thru	Rt
1st	14		13
2nd	18		12
3rd	22		19
4th	15		15
Total	69		59

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : FOOTHILL OVERCROSS PASADENA

EAST-WEST STREET : OAK GROVE 06-02-11

BEGINNING TIME : 04:00PM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
					NORTH LEG							
0	0	0	0	0	0	0	0	0				0
0	0	0	0	0	0	0	0	0				0
0	0	0	0	0	0	0	0	0				0
0	0	0	0	0	0	0	0	0				0
0	0	0	0	0	0	0	0	0				0
0	0	0	0	0	0	0	0	0				0
0	0	0	0	0	0	0	0	0				0
0	0	0	0	0	0	0	0	0				0
0	0	0	0	0	0	0	0	0	0	0	0	0
					EB SOUTH LEG							
21	0	16	0	0	0	0	0	0				37
14	0	8	0	0	1	0	0	0				23
14	0	11	0	0	0	0	0	0				25
12	0	15	0	0	1	0	0	0				28
13	0	14	0	0	0	0	0	0				27
12	0	18	0	0	0	0	0	0				30
19	0	22	0	0	0	0	0	0				41
15	0	15	0	0 (0)	0	0	0 (0)	0				30
				TT=0+0=0								
120	0	119	0	0	2	0	0	0	0	0	0	241
					NB EAST LEG							
0	24	7	0	2	0	0	0	0				33
0	28	16	0	1	0	0	0	0				45
0	35	15	0	1	0	0	0	0				51
0	29	12	0	2	0	0	0	0				43
0	26	12	0	2	0	0	0	0				40
0	31	14	0	0	0	0	0	0				45
0	38	18	0	1	0	0	0	0				57
0	28	15	0	2 (5)	0	0	0 (0)	0				45
				TT=5+0=5								
0	239	109	0	11	0	0	0	0	0	0	0	359
					SB WEST LEG							
18	46	0	0	2	0	0	0	0				66
8	56	0	0	2	0	0	0	0				66
12	53	0	1	0	0	0	0	0				66
9	61	0	1	2	0	0	0	0				73
21	70	0	0	1	0	0	0	0				92
24	56	0	0	2	0	0	0	0				82
16	71	0	0	0	0	0	0	0				87
21	62	0	0	1 (4)	0	0	0 (0)	0				84
						TT=4+0=4						
129	475	0	2	10	0	0	0	0	0	0	0	616

Prepared by Newport Traffic Studies

Intersection	
Intersection Delay (sec/veh)	14.8
Intersection LOS	B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Volume (vph)	115	50	180	465	125	95
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75
Heavy Vehicles(%)	5	5	5	5	5	5
Movement Flow Rate	153	67	240	620	167	127
Number of Lanes	2	1	1	2	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	3	3	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	3
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	3
HCM Control Delay	11.4	16.1	13.6
HCM LOS	B	C	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3
Volume Left (%)	100%	30%	0%	0%	0%	100%	0%	0%
Volume Thru (%)	0%	0%	100%	100%	0%	0%	100%	100%
Volume Right (%)	0%	70%	0%	0%	100%	0%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	83	137	57	57	50	180	232	232
Left Turning Volume	0	0	57	57	0	0	232	232
Through Volume	0	95	0	0	50	0	0	0
Right Turning Volume	83	42	0	0	0	180	0	0
Lane Flow Rate	111	182	77	77	67	240	310	310
Geometry Group	8	8	8	8	8	8	8	8
Degree of Utilization, X	0.244	0.358	0.161	0.161	0.125	0.457	0.547	0.539
Departure Headway, Hd	7.898	7.064	7.546	7.546	6.745	6.859	6.351	6.265
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	452	507	472	472	527	523	564	574
Service Time	5.682	4.847	5.342	5.342	4.54	4.627	4.119	4.033
HCM Lane V/C Ratio	0.246	0.359	0.163	0.163	0.127	0.459	0.55	0.54
HCM Control Delay	13.2	13.8	11.8	11.8	10.5	15.3	16.6	16.2
HCM Lane LOS	B	B	B	B	B	C	C	C
HCM 95th Percentile Queue	1	1.7	0.6	0.6	0.4	2.5	3.6	3.5

Intersection	
Intersection Delay (sec/veh)	8.9
Intersection LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Volume (vph)	105	65	60	170	55	60
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles(%)	10	5	5	5	5	5
Movement Flow Rate	118	73	67	191	62	67
Number of Lanes	2	1	1	2	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	3	3	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	3
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	3
HCM Control Delay	8.5	9	9.1
HCM LOS	A	A	A

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3
Volume Left (%)	100%	23%	0%	0%	0%	100%	0%	0%
Volume Thru (%)	0%	0%	100%	100%	0%	0%	100%	100%
Volume Right (%)	0%	77%	0%	0%	100%	0%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	37	78	52	52	65	60	85	85
Left Turning Volume	0	0	52	52	0	0	85	85
Through Volume	0	60	0	0	65	0	0	0
Right Turning Volume	37	18	0	0	0	60	0	0
Lane Flow Rate	41	88	59	59	73	67	96	96
Geometry Group	8	8	8	8	8	8	8	8
Degree of Utilization, X	0.071	0.13	0.092	0.09	0.096	0.11	0.142	0.14
Departure Headway, Hd	6.223	5.306	5.599	5.513	4.724	5.863	5.36	5.275
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	573	672	638	648	754	609	667	677
Service Time	3.983	3.067	3.354	3.268	2.479	3.617	3.115	3.029
HCM Lane V/C Ratio	0.072	0.131	0.092	0.091	0.097	0.11	0.144	0.142
HCM Control Delay	9.5	8.9	8.9	8.8	8	9.3	9	8.9
HCM Lane LOS	A	A	A	A	A	A	A	A
HCM 95th Percentile Queue	0.2	0.4	0.3	0.3	0.3	0.4	0.5	0.5

Intersection	
Intersection Delay (sec/veh)	8.8
Intersection LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Volume (vph)	140	60	40	125	60	65
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles(%)	10	5	5	5	5	5
Movement Flow Rate	157	67	45	140	67	73
Number of Lanes	2	1	1	2	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	3	3	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	3
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	3
HCM Control Delay	8.6	8.9	9
HCM LOS	A	A	A

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3
Volume Left (%)	100%	24%	0%	0%	0%	100%	0%	0%
Volume Thru (%)	0%	0%	100%	100%	0%	0%	100%	100%
Volume Right (%)	0%	76%	0%	0%	100%	0%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	40	85	70	70	60	40	62	62
Left Turning Volume	0	0	70	70	0	0	62	62
Through Volume	0	65	0	0	60	0	0	0
Right Turning Volume	40	20	0	0	0	40	0	0
Lane Flow Rate	45	96	79	79	67	45	70	70
Geometry Group	8	8	8	8	8	8	8	8
Degree of Utilization, X	0.076	0.138	0.12	0.118	0.086	0.074	0.106	0.105
Departure Headway, Hd	6.127	5.212	5.488	5.402	4.613	5.954	5.452	5.366
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	583	685	651	661	773	600	655	666
Service Time	3.885	2.97	3.237	3.152	2.362	3.708	3.205	3.119
HCM Lane V/C Ratio	0.077	0.14	0.121	0.12	0.087	0.075	0.107	0.105
HCM Control Delay	9.4	8.8	9	8.9	7.8	9.2	8.9	8.8
HCM Lane LOS	A	A	A	A	A	A	A	A
HCM 95th Percentile Queue	0.2	0.5	0.4	0.4	0.3	0.2	0.4	0.4

Intersection	
Intersection Delay (sec/veh)	10.2
Intersection LOS	B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Volume (vph)	265	80	60	130	70	60
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75
Heavy Vehicles(%)	5	0	0	5	0	0
Movement Flow Rate	353	107	80	173	93	80
Number of Lanes	2	1	1	2	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	3	3	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	3
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	3
HCM Control Delay	10.3	10.1	10.3
HCM LOS	B	B	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3
Volume Left (%)	100%	28%	0%	0%	0%	100%	0%	0%
Volume Thru (%)	0%	0%	100%	100%	0%	0%	100%	100%
Volume Right (%)	0%	72%	0%	0%	100%	0%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	47	83	132	132	80	60	65	65
Left Turning Volume	0	0	132	132	0	0	65	65
Through Volume	0	60	0	0	80	0	0	0
Right Turning Volume	47	23	0	0	0	60	0	0
Lane Flow Rate	62	111	177	177	107	80	87	87
Geometry Group	8	8	8	8	8	8	8	8
Degree of Utilization, X	0.119	0.186	0.286	0.281	0.149	0.146	0.148	0.146
Departure Headway, Hd	6.903	6.04	5.82	5.735	5.029	6.581	6.162	6.076
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	520	594	618	627	715	546	582	591
Service Time	4.635	3.772	3.544	3.458	2.752	4.31	3.891	3.805
HCM Lane V/C Ratio	0.119	0.187	0.286	0.282	0.15	0.147	0.149	0.147
HCM Control Delay	10.6	10.2	10.9	10.7	8.6	10.4	10	9.8
HCM Lane LOS	B	B	B	B	A	B	A	A
HCM 95th Percentile Queue	0.4	0.7	1.2	1.2	0.5	0.5	0.5	0.5

Intersection	
Intersection Delay (sec/veh)	17.5
Intersection LOS	C

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Volume (vph)	170	50	180	520	125	95
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75
Heavy Vehicles(%)	34	5	5	14	5	5
Movement Flow Rate	227	67	240	693	167	127
Number of Lanes	2	1	1	2	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	3	3	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	3
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	3
HCM Control Delay	13.1	19.7	14.8
HCM LOS	B	C	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3
Volume Left (%)	100%	30%	0%	0%	0%	100%	0%	0%
Volume Thru (%)	0%	0%	100%	100%	0%	0%	100%	100%
Volume Right (%)	0%	70%	0%	0%	100%	0%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	83	137	85	85	50	180	260	260
Left Turning Volume	0	0	85	85	0	0	260	260
Through Volume	0	95	0	0	50	0	0	0
Right Turning Volume	83	42	0	0	0	180	0	0
Lane Flow Rate	111	182	113	113	67	240	347	347
Geometry Group	8	8	8	8	8	8	8	8
Degree of Utilization, X	0.262	0.387	0.265	0.249	0.132	0.476	0.654	0.631
Departure Headway, Hd	8.479	7.641	8.424	7.92	7.117	7.268	6.914	6.672
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	426	474	428	456	505	499	527	544
Service Time	6.195	5.356	6.143	5.639	4.836	4.968	4.614	4.372
HCM Lane V/C Ratio	0.261	0.384	0.264	0.248	0.133	0.481	0.658	0.638
HCM Control Delay	14.2	15.1	14.2	13.3	10.9	16.4	21.7	20.1
HCM Lane LOS	B	C	B	B	B	C	C	C
HCM 95th Percentile Queue	1.1	1.9	1.1	1	0.5	2.7	5.6	5.1

Intersection	
Intersection Delay (sec/veh)	9.6
Intersection LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Volume (vph)	160	65	60	225	55	60
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles(%)	39	5	5	27	5	5
Movement Flow Rate	180	73	67	253	62	67
Number of Lanes	2	1	1	2	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	3	3	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	3
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	3
HCM Control Delay	9.3	9.8	9.6
HCM LOS	A	A	A

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3
Volume Left (%)	100%	23%	0%	0%	0%	100%	0%	0%
Volume Thru (%)	0%	0%	100%	100%	0%	0%	100%	100%
Volume Right (%)	0%	77%	0%	0%	100%	0%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	37	78	80	80	65	60	112	112
Left Turning Volume	0	0	80	80	0	0	112	112
Through Volume	0	60	0	0	65	0	0	0
Right Turning Volume	37	18	0	0	0	60	0	0
Lane Flow Rate	41	88	90	90	73	67	126	126
Geometry Group	8	8	8	8	8	8	8	8
Degree of Utilization, X	0.075	0.138	0.156	0.141	0.099	0.113	0.207	0.191
Departure Headway, Hd	6.562	5.645	6.248	5.666	4.877	6.022	5.895	5.434
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	541	628	570	627	727	591	604	655
Service Time	4.359	3.441	4.03	3.449	2.659	3.802	3.675	3.213
HCM Lane V/C Ratio	0.076	0.14	0.158	0.144	0.1	0.113	0.209	0.192
HCM Control Delay	9.9	9.4	10.2	9.4	8.2	9.6	10.2	9.5
HCM Lane LOS	A	A	B	A	A	A	B	A
HCM 95th Percentile Queue	0.2	0.5	0.6	0.5	0.3	0.4	0.8	0.7

Intersection	
Intersection Delay (sec/veh)	9.5
Intersection LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Volume (vph)	195	60	40	180	60	65
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles(%)	34	5	5	32	5	5
Movement Flow Rate	219	67	45	202	67	73
Number of Lanes	2	1	1	2	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	3	3	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	3
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	3
HCM Control Delay	9.4	9.6	9.5
HCM LOS	A	A	A

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3
Volume Left (%)	100%	24%	0%	0%	0%	100%	0%	0%
Volume Thru (%)	0%	0%	100%	100%	0%	0%	100%	100%
Volume Right (%)	0%	76%	0%	0%	100%	0%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	40	85	97	97	60	40	90	90
Left Turning Volume	0	0	97	97	0	0	90	90
Through Volume	0	65	0	0	60	0	0	0
Right Turning Volume	40	20	0	0	0	40	0	0
Lane Flow Rate	45	96	110	110	67	45	101	101
Geometry Group	8	8	8	8	8	8	8	8
Degree of Utilization, X	0.081	0.148	0.184	0.169	0.089	0.076	0.171	0.155
Departure Headway, Hd	6.476	5.56	6.057	5.562	4.772	6.113	6.072	5.525
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	549	639	588	640	743	582	587	643
Service Time	4.266	3.35	3.838	3.341	2.551	3.897	3.856	3.308
HCM Lane V/C Ratio	0.082	0.15	0.187	0.172	0.09	0.077	0.172	0.157
HCM Control Delay	9.8	9.3	10.2	9.5	8	9.4	10.1	9.3
HCM Lane LOS	A	A	B	A	A	A	B	A
HCM 95th Percentile Queue	0.3	0.5	0.7	0.6	0.3	0.2	0.6	0.6

Intersection	
Intersection Delay (sec/veh)	11.4
Intersection LOS	B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Volume (vph)	320	80	60	185	70	60
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75
Heavy Vehicles(%)	20	0	0	31	0	0
Movement Flow Rate	427	107	80	247	93	80
Number of Lanes	2	1	1	2	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	3	3	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	3
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	3
HCM Control Delay	11.7	11.1	11
HCM LOS	B	B	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3
Volume Left (%)	100%	28%	0%	0%	0%	100%	0%	0%
Volume Thru (%)	0%	0%	100%	100%	0%	0%	100%	100%
Volume Right (%)	0%	72%	0%	0%	100%	0%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	47	83	160	160	80	60	92	92
Left Turning Volume	0	0	160	160	0	0	92	92
Through Volume	0	60	0	0	80	0	0	0
Right Turning Volume	47	23	0	0	0	60	0	0
Lane Flow Rate	62	111	213	213	107	80	123	123
Geometry Group	8	8	8	8	8	8	8	8
Degree of Utilization, X	0.127	0.2	0.374	0.354	0.156	0.151	0.234	0.216
Departure Headway, Hd	7.343	6.478	6.313	5.97	5.263	6.809	6.837	6.304
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	488	553	570	602	681	526	525	569
Service Time	5.095	4.23	4.052	3.708	3.001	4.554	4.581	4.048
HCM Lane V/C Ratio	0.127	0.201	0.374	0.354	0.157	0.152	0.234	0.216
HCM Control Delay	11.2	10.9	12.8	12	9	10.8	11.7	10.8
HCM Lane LOS	B	B	B	B	A	B	B	B
HCM 95th Percentile Queue	0.4	0.7	1.8	1.6	0.6	0.5	0.9	0.8

Intersection	
Intersection Delay (sec/veh)	21
Intersection LOS	C

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Volume (vph)	185	55	195	565	135	105
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75
Heavy Vehicles(%)	34	5	5	14	5	5
Movement Flow Rate	247	73	260	753	180	140
Number of Lanes	2	1	1	2	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	3	3	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	3
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	3
HCM Control Delay	14.1	24.7	16.3
HCM LOS	B	C	C

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3
Volume Left (%)	100%	30%	0%	0%	0%	100%	0%	0%
Volume Thru (%)	0%	0%	100%	100%	0%	0%	100%	100%
Volume Right (%)	0%	70%	0%	0%	100%	0%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	90	150	92	92	55	195	282	282
Left Turning Volume	0	0	92	92	0	0	282	282
Through Volume	0	105	0	0	55	0	0	0
Right Turning Volume	90	45	0	0	0	195	0	0
Lane Flow Rate	120	200	123	123	73	260	377	377
Geometry Group	8	8	8	8	8	8	8	8
Degree of Utilization, X	0.294	0.443	0.301	0.284	0.152	0.541	0.747	0.721
Departure Headway, Hd	8.817	7.971	8.79	8.284	7.479	7.493	7.138	6.895
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	408	452	408	433	479	481	508	524
Service Time	6.567	5.722	6.546	6.04	5.235	5.234	4.879	4.636
HCM Lane V/C Ratio	0.294	0.442	0.301	0.284	0.152	0.541	0.742	0.719
HCM Control Delay	15.2	16.9	15.3	14.3	11.6	18.8	28.1	25.5
HCM Lane LOS	C	C	C	B	B	C	D	D
HCM 95th Percentile Queue	1.2	2.4	1.3	1.2	0.5	3.5	8.8	7.7

Intersection	
Intersection Delay (sec/veh)	9.9
Intersection LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Volume (vph)	175	70	65	245	60	65
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles(%)	39	5	5	27	5	5
Movement Flow Rate	197	79	73	275	67	73
Number of Lanes	2	1	1	2	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	3	3	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	3
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	3
HCM Control Delay	9.6	10.1	9.8
HCM LOS	A	B	A

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3
Volume Left (%)	100%	24%	0%	0%	0%	100%	0%	0%
Volume Thru (%)	0%	0%	100%	100%	0%	0%	100%	100%
Volume Right (%)	0%	76%	0%	0%	100%	0%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	40	85	87	87	70	65	122	122
Left Turning Volume	0	0	87	87	0	0	122	122
Through Volume	0	65	0	0	70	0	0	0
Right Turning Volume	40	20	0	0	0	65	0	0
Lane Flow Rate	45	96	98	98	79	73	138	138
Geometry Group	8	8	8	8	8	8	8	8
Degree of Utilization, X	0.085	0.156	0.176	0.157	0.109	0.124	0.229	0.211
Departure Headway, Hd	6.804	5.887	6.448	5.874	5.083	6.221	6.094	5.632
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	529	612	559	614	709	580	593	641
Service Time	4.508	3.592	4.157	3.574	2.783	3.921	3.794	3.332
HCM Lane V/C Ratio	0.085	0.157	0.175	0.16	0.111	0.126	0.233	0.215
HCM Control Delay	10.1	9.7	10.5	9.7	8.4	9.8	10.6	9.8
HCM Lane LOS	B	A	B	A	A	A	B	A
HCM 95th Percentile Queue	0.3	0.6	0.6	0.6	0.4	0.4	0.9	0.8

Intersection	
Intersection Delay (sec/veh)	9.8
Intersection LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Volume (vph)	215	65	45	195	65	70
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles(%)	34	5	5	32	5	5
Movement Flow Rate	242	73	51	219	73	79
Number of Lanes	2	1	1	2	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	3	3	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	3
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	3
HCM Control Delay	9.7	9.9	9.8
HCM LOS	A	A	A

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3
Volume Left (%)	100%	24%	0%	0%	0%	100%	0%	0%
Volume Thru (%)	0%	0%	100%	100%	0%	0%	100%	100%
Volume Right (%)	0%	76%	0%	0%	100%	0%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	43	92	107	107	65	45	97	97
Left Turning Volume	0	0	107	107	0	0	97	97
Through Volume	0	70	0	0	65	0	0	0
Right Turning Volume	43	22	0	0	0	45	0	0
Lane Flow Rate	49	103	121	121	73	51	110	110
Geometry Group	8	8	8	8	8	8	8	8
Degree of Utilization, X	0.091	0.166	0.206	0.19	0.099	0.087	0.188	0.171
Departure Headway, Hd	6.714	5.8	6.254	5.757	4.966	6.324	6.283	5.735
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	537	622	577	627	726	570	575	629
Service Time	4.414	3.5	3.954	3.457	2.666	4.024	3.983	3.435
HCM Lane V/C Ratio	0.091	0.166	0.21	0.193	0.101	0.089	0.191	0.175
HCM Control Delay	10.1	9.7	10.6	9.8	8.2	9.6	10.4	9.6
HCM Lane LOS	B	A	B	A	A	A	B	A
HCM 95th Percentile Queue	0.3	0.6	0.8	0.7	0.3	0.3	0.7	0.6

Intersection	
Intersection Delay (sec/veh)	12
Intersection LOS	B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Volume (vph)	350	85	65	200	75	65
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75
Heavy Vehicles(%)	20	0	0	31	0	0
Movement Flow Rate	467	113	87	267	100	87
Number of Lanes	2	1	1	2	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	3	3	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	3
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	3
HCM Control Delay	12.5	11.6	11.4
HCM LOS	B	B	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3
Volume Left (%)	100%	28%	0%	0%	0%	100%	0%	0%
Volume Thru (%)	0%	0%	100%	100%	0%	0%	100%	100%
Volume Right (%)	0%	72%	0%	0%	100%	0%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	50	90	175	175	85	65	100	100
Left Turning Volume	0	0	175	175	0	0	100	100
Through Volume	0	65	0	0	85	0	0	0
Right Turning Volume	50	25	0	0	0	65	0	0
Lane Flow Rate	67	120	233	233	113	87	133	133
Geometry Group	8	8	8	8	8	8	8	8
Degree of Utilization, X	0.14	0.223	0.418	0.396	0.17	0.168	0.26	0.24
Departure Headway, Hd	7.552	6.683	6.456	6.113	5.405	6.985	7.012	6.479
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	474	535	558	588	662	513	512	553
Service Time	5.314	4.445	4.206	3.862	3.154	4.739	4.767	4.233
HCM Lane V/C Ratio	0.141	0.224	0.418	0.396	0.171	0.17	0.26	0.241
HCM Control Delay	11.5	11.4	13.8	12.8	9.3	11.2	12.2	11.3
HCM Lane LOS	B	B	B	B	A	B	B	B
HCM 95th Percentile Queue	0.5	0.9	2.2	2	0.6	0.6	1.1	0.9

Intersection	
Intersection Delay (sec/veh)	15.8
Intersection LOS	C

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Volume (vph)	170	50	180	465	125	95
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75
Heavy Vehicles(%)	34	5	5	5	5	5
Movement Flow Rate	227	67	240	620	167	127
Number of Lanes	2	1	1	2	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	3	3	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	3
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	3
HCM Control Delay	12.7	17.3	14.4
HCM LOS	B	C	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3
Volume Left (%)	100%	30%	0%	0%	0%	100%	0%	0%
Volume Thru (%)	0%	0%	100%	100%	0%	0%	100%	100%
Volume Right (%)	0%	70%	0%	0%	100%	0%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	83	137	85	85	50	180	232	232
Left Turning Volume	0	0	85	85	0	0	232	232
Through Volume	0	95	0	0	50	0	0	0
Right Turning Volume	83	42	0	0	0	180	0	0
Lane Flow Rate	111	182	113	113	67	240	310	310
Geometry Group	8	8	8	8	8	8	8	8
Degree of Utilization, X	0.256	0.378	0.26	0.244	0.129	0.474	0.569	0.561
Departure Headway, Hd	8.305	7.467	8.25	7.746	6.944	7.225	6.716	6.629
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	434	485	437	466	519	502	539	549
Service Time	6.021	5.183	5.965	5.461	4.658	4.925	4.416	4.329
HCM Lane V/C Ratio	0.256	0.375	0.259	0.242	0.129	0.478	0.575	0.565
HCM Control Delay	13.9	14.7	13.8	12.9	10.7	16.3	17.9	17.5
HCM Lane LOS	B	B	B	B	B	C	C	C
HCM 95th Percentile Queue	1	1.8	1.1	1	0.4	2.7	4	3.8

Intersection	
Intersection Delay (sec/veh)	9.2
Intersection LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Volume (vph)	160	65	60	170	55	60
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles(%)	39	5	5	5	5	5
Movement Flow Rate	180	73	67	191	62	67
Number of Lanes	2	1	1	2	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	3	3	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	3
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	3
HCM Control Delay	9.1	9.2	9.3
HCM LOS	A	A	A

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3
Volume Left (%)	100%	23%	0%	0%	0%	100%	0%	0%
Volume Thru (%)	0%	0%	100%	100%	0%	0%	100%	100%
Volume Right (%)	0%	77%	0%	0%	100%	0%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	37	78	80	80	65	60	85	85
Left Turning Volume	0	0	80	80	0	0	85	85
Through Volume	0	60	0	0	65	0	0	0
Right Turning Volume	37	18	0	0	0	60	0	0
Lane Flow Rate	41	88	90	90	73	67	96	96
Geometry Group	8	8	8	8	8	8	8	8
Degree of Utilization, X	0.073	0.134	0.153	0.138	0.096	0.112	0.146	0.144
Departure Headway, Hd	6.397	5.48	6.108	5.526	4.737	6.007	5.504	5.419
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	557	649	584	644	751	593	648	657
Service Time	4.176	3.259	3.875	3.294	2.504	3.777	3.274	3.189
HCM Lane V/C Ratio	0.074	0.136	0.154	0.14	0.097	0.113	0.148	0.146
HCM Control Delay	9.7	9.1	10	9.2	8	9.5	9.2	9.1
HCM Lane LOS	A	A	A	A	A	A	A	A
HCM 95th Percentile Queue	0.2	0.5	0.5	0.5	0.3	0.4	0.5	0.5

Intersection	
Intersection Delay (sec/veh)	9.2
Intersection LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Volume (vph)	195	60	40	125	60	65
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles(%)	34	5	5	5	5	5
Movement Flow Rate	219	67	45	140	67	73
Number of Lanes	2	1	1	2	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	3	3	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	3
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	3
HCM Control Delay	9.2	9.1	9.3
HCM LOS	A	A	A

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3
Volume Left (%)	100%	24%	0%	0%	0%	100%	0%	0%
Volume Thru (%)	0%	0%	100%	100%	0%	0%	100%	100%
Volume Right (%)	0%	76%	0%	0%	100%	0%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	40	85	97	97	60	40	62	62
Left Turning Volume	0	0	97	97	0	0	62	62
Through Volume	0	65	0	0	60	0	0	0
Right Turning Volume	40	20	0	0	0	40	0	0
Lane Flow Rate	45	96	110	110	67	45	70	70
Geometry Group	8	8	8	8	8	8	8	8
Degree of Utilization, X	0.079	0.143	0.18	0.165	0.087	0.076	0.109	0.107
Departure Headway, Hd	6.3	5.384	5.91	5.414	4.625	6.097	5.594	5.509
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	566	661	605	658	769	584	636	646
Service Time	4.072	3.157	3.674	3.178	2.388	3.869	3.366	3.28
HCM Lane V/C Ratio	0.08	0.145	0.182	0.167	0.087	0.077	0.11	0.108
HCM Control Delay	9.6	9.1	10	9.3	7.8	9.4	9.1	8.9
HCM Lane LOS	A	A	A	A	A	A	A	A
HCM 95th Percentile Queue	0.3	0.5	0.7	0.6	0.3	0.2	0.4	0.4

Intersection	
Intersection Delay (sec/veh)	10.9
Intersection LOS	B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Volume (vph)	320	80	60	130	70	60
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75
Heavy Vehicles(%)	20	0	0	5	0	0
Movement Flow Rate	427	107	80	173	93	80
Number of Lanes	2	1	1	2	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	3	3	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	3
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	3
HCM Control Delay	11.3	10.3	10.6
HCM LOS	B	B	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3
Volume Left (%)	100%	28%	0%	0%	0%	100%	0%	0%
Volume Thru (%)	0%	0%	100%	100%	0%	0%	100%	100%
Volume Right (%)	0%	72%	0%	0%	100%	0%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	47	83	160	160	80	60	65	65
Left Turning Volume	0	0	160	160	0	0	65	65
Through Volume	0	60	0	0	80	0	0	0
Right Turning Volume	47	23	0	0	0	60	0	0
Lane Flow Rate	62	111	213	213	107	80	87	87
Geometry Group	8	8	8	8	8	8	8	8
Degree of Utilization, X	0.123	0.193	0.362	0.342	0.15	0.15	0.153	0.151
Departure Headway, Hd	7.103	6.24	6.111	5.768	5.062	6.759	6.34	6.254
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	505	574	589	623	708	531	566	574
Service Time	4.844	3.981	3.842	3.499	2.792	4.497	4.078	3.992
HCM Lane V/C Ratio	0.123	0.193	0.362	0.342	0.151	0.151	0.154	0.152
HCM Control Delay	10.8	10.5	12.3	11.5	8.7	10.7	10.2	10.1
HCM Lane LOS	B	B	B	B	A	B	B	B
HCM 95th Percentile Queue	0.4	0.7	1.7	1.6	0.5	0.5	0.5	0.5

Intersection	
Intersection Delay (sec/veh)	18.1
Intersection LOS	C

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Volume (vph)	185	55	195	505	135	105
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75
Heavy Vehicles(%)	34	5	5	5	5	5
Movement Flow Rate	247	73	260	673	180	140
Number of Lanes	2	1	1	2	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	3	3	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	3
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	3
HCM Control Delay	13.7	20.5	15.7
HCM LOS	B	C	C

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3
Volume Left (%)	100%	30%	0%	0%	0%	100%	0%	0%
Volume Thru (%)	0%	0%	100%	100%	0%	0%	100%	100%
Volume Right (%)	0%	70%	0%	0%	100%	0%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	90	150	92	92	55	195	252	252
Left Turning Volume	0	0	92	92	0	0	252	252
Through Volume	0	105	0	0	55	0	0	0
Right Turning Volume	90	45	0	0	0	195	0	0
Lane Flow Rate	120	200	123	123	73	260	337	337
Geometry Group	8	8	8	8	8	8	8	8
Degree of Utilization, X	0.287	0.432	0.294	0.277	0.148	0.538	0.648	0.64
Departure Headway, Hd	8.621	7.776	8.591	8.085	7.281	7.444	6.934	6.847
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	418	464	418	444	492	486	522	529
Service Time	6.365	5.52	6.338	5.833	5.028	5.181	4.67	4.584
HCM Lane V/C Ratio	0.287	0.431	0.294	0.277	0.148	0.535	0.646	0.637
HCM Control Delay	14.8	16.3	14.9	13.9	11.3	18.6	21.6	21
HCM Lane LOS	B	C	B	B	B	C	C	C
HCM 95th Percentile Queue	1.2	2.3	1.2	1.1	0.5	3.5	5.5	5.3

Intersection	
Intersection Delay (sec/veh)	9.4
Intersection LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Volume (vph)	175	70	65	185	60	65
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles(%)	39	5	5	5	5	5
Movement Flow Rate	197	79	73	208	67	73
Number of Lanes	2	1	1	2	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	3	3	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	3
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	3
HCM Control Delay	9.3	9.5	9.6
HCM LOS	A	A	A

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3
Volume Left (%)	100%	24%	0%	0%	0%	100%	0%	0%
Volume Thru (%)	0%	0%	100%	100%	0%	0%	100%	100%
Volume Right (%)	0%	76%	0%	0%	100%	0%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	40	85	87	87	70	65	92	92
Left Turning Volume	0	0	87	87	0	0	92	92
Through Volume	0	65	0	0	70	0	0	0
Right Turning Volume	40	20	0	0	0	65	0	0
Lane Flow Rate	45	96	98	98	79	73	104	104
Geometry Group	8	8	8	8	8	8	8	8
Degree of Utilization, X	0.081	0.148	0.169	0.153	0.105	0.124	0.161	0.159
Departure Headway, Hd	6.511	5.595	6.197	5.616	4.826	6.097	5.594	5.508
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	546	634	575	633	735	584	636	645
Service Time	4.304	3.388	3.977	3.395	2.605	3.876	3.373	3.288
HCM Lane V/C Ratio	0.082	0.151	0.17	0.155	0.107	0.125	0.164	0.161
HCM Control Delay	9.9	9.4	10.2	9.4	8.2	9.7	9.5	9.3
HCM Lane LOS	A	A	B	A	A	A	A	A
HCM 95th Percentile Queue	0.3	0.5	0.6	0.5	0.4	0.4	0.6	0.6

Intersection	
Intersection Delay (sec/veh)	9.4
Intersection LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Volume (vph)	215	65	45	135	65	70
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles(%)	34	5	5	5	5	5
Movement Flow Rate	242	73	51	152	73	79
Number of Lanes	2	1	1	2	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	3	3	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	3
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	3
HCM Control Delay	9.5	9.3	9.5
HCM LOS	A	A	A

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3
Volume Left (%)	100%	24%	0%	0%	0%	100%	0%	0%
Volume Thru (%)	0%	0%	100%	100%	0%	0%	100%	100%
Volume Right (%)	0%	76%	0%	0%	100%	0%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	43	92	107	107	65	45	67	67
Left Turning Volume	0	0	107	107	0	0	67	67
Through Volume	0	70	0	0	65	0	0	0
Right Turning Volume	43	22	0	0	0	45	0	0
Lane Flow Rate	49	103	121	121	73	51	76	76
Geometry Group	8	8	8	8	8	8	8	8
Degree of Utilization, X	0.087	0.157	0.201	0.184	0.095	0.087	0.12	0.118
Departure Headway, Hd	6.414	5.5	5.99	5.494	4.704	6.196	5.692	5.607
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	555	646	595	649	754	574	625	634
Service Time	4.2	3.286	3.765	3.268	2.478	3.978	3.474	3.389
HCM Lane V/C Ratio	0.088	0.159	0.203	0.186	0.097	0.089	0.122	0.12
HCM Control Delay	9.8	9.3	10.3	9.5	8	9.6	9.3	9.1
HCM Lane LOS	A	A	B	A	A	A	A	A
HCM 95th Percentile Queue	0.3	0.6	0.8	0.7	0.3	0.3	0.4	0.4

Intersection	
Intersection Delay (sec/veh)	11.5
Intersection LOS	B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Volume (vph)	350	85	65	140	75	65
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75
Heavy Vehicles(%)	20	0	0	5	0	0
Movement Flow Rate	467	113	87	187	100	87
Number of Lanes	2	1	1	2	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	3	3	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	3
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	3
HCM Control Delay	12	10.7	11
HCM LOS	B	B	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3
Volume Left (%)	100%	28%	0%	0%	0%	100%	0%	0%
Volume Thru (%)	0%	0%	100%	100%	0%	0%	100%	100%
Volume Right (%)	0%	72%	0%	0%	100%	0%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	50	90	175	175	85	65	70	70
Left Turning Volume	0	0	175	175	0	0	70	70
Through Volume	0	65	0	0	85	0	0	0
Right Turning Volume	50	25	0	0	0	65	0	0
Lane Flow Rate	67	120	233	233	113	87	93	93
Geometry Group	8	8	8	8	8	8	8	8
Degree of Utilization, X	0.135	0.214	0.404	0.382	0.163	0.167	0.169	0.166
Departure Headway, Hd	7.286	6.419	6.232	5.889	5.182	6.925	6.505	6.419
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	492	558	579	611	691	517	551	558
Service Time	5.036	4.169	3.97	3.627	2.92	4.672	4.252	4.166
HCM Lane V/C Ratio	0.136	0.215	0.402	0.381	0.164	0.168	0.169	0.167
HCM Control Delay	11.2	10.9	13.2	12.2	8.9	11.1	10.6	10.4
HCM Lane LOS	B	B	B	B	A	B	B	B
HCM 95th Percentile Queue	0.5	0.8	2	1.9	0.6	0.6	0.6	0.6

Intersection	
Intersection Delay (sec/veh)	16.3
Intersection LOS	C

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Volume (vph)	115	50	180	520	125	95
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75
Heavy Vehicles(%)	5	5	5	14	5	5
Movement Flow Rate	153	67	240	693	167	127
Number of Lanes	2	1	1	2	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	3	3	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	3
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	3
HCM Control Delay	11.7	18.2	13.9
HCM LOS	B	C	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3
Volume Left (%)	100%	30%	0%	0%	0%	100%	0%	0%
Volume Thru (%)	0%	0%	100%	100%	0%	0%	100%	100%
Volume Right (%)	0%	70%	0%	0%	100%	0%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	83	137	57	57	50	180	260	260
Left Turning Volume	0	0	57	57	0	0	260	260
Through Volume	0	95	0	0	50	0	0	0
Right Turning Volume	83	42	0	0	0	180	0	0
Lane Flow Rate	111	182	77	77	67	240	347	347
Geometry Group	8	8	8	8	8	8	8	8
Degree of Utilization, X	0.249	0.365	0.166	0.166	0.13	0.46	0.63	0.606
Departure Headway, Hd	8.054	7.219	7.811	7.811	7.009	6.893	6.54	6.298
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	443	494	462	462	515	521	548	569
Service Time	5.853	5.018	5.511	5.511	4.709	4.668	4.316	4.074
HCM Lane V/C Ratio	0.251	0.368	0.167	0.167	0.13	0.461	0.633	0.61
HCM Control Delay	13.5	14.2	12.1	12.1	10.8	15.5	19.9	18.4
HCM Lane LOS	B	B	B	B	B	C	C	C
HCM 95th Percentile Queue	1	1.7	0.6	0.6	0.4	2.6	5.1	4.6

Intersection	
Intersection Delay (sec/veh)	9.3
Intersection LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Volume (vph)	105	65	60	225	55	60
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles(%)	10	5	5	27	5	5
Movement Flow Rate	118	73	67	253	62	67
Number of Lanes	2	1	1	2	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	3	3	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	3
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	3
HCM Control Delay	8.7	9.6	9.3
HCM LOS	A	A	A

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3
Volume Left (%)	100%	23%	0%	0%	0%	100%	0%	0%
Volume Thru (%)	0%	0%	100%	100%	0%	0%	100%	100%
Volume Right (%)	0%	77%	0%	0%	100%	0%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	37	78	52	52	65	60	112	112
Left Turning Volume	0	0	52	52	0	0	112	112
Through Volume	0	60	0	0	65	0	0	0
Right Turning Volume	37	18	0	0	0	60	0	0
Lane Flow Rate	41	88	59	59	73	67	126	126
Geometry Group	8	8	8	8	8	8	8	8
Degree of Utilization, X	0.073	0.134	0.094	0.093	0.099	0.11	0.202	0.186
Departure Headway, Hd	6.386	5.469	5.736	5.65	4.861	5.874	5.747	5.285
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	557	650	621	631	731	607	621	675
Service Time	4.164	3.247	3.505	3.419	2.63	3.641	3.514	3.053
HCM Lane V/C Ratio	0.074	0.135	0.095	0.094	0.1	0.11	0.203	0.187
HCM Control Delay	9.7	9.1	9.1	9	8.2	9.4	10	9.3
HCM Lane LOS	A	A	A	A	A	A	A	A
HCM 95th Percentile Queue	0.2	0.5	0.3	0.3	0.3	0.4	0.8	0.7

Intersection	
Intersection Delay (sec/veh)	9.2
Intersection LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Volume (vph)	140	60	40	180	60	65
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles(%)	10	5	5	32	5	5
Movement Flow Rate	157	67	45	202	67	73
Number of Lanes	2	1	1	2	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	3	3	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	3
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	3
HCM Control Delay	8.8	9.4	9.3
HCM LOS	A	A	A

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3
Volume Left (%)	100%	24%	0%	0%	0%	100%	0%	0%
Volume Thru (%)	0%	0%	100%	100%	0%	0%	100%	100%
Volume Right (%)	0%	76%	0%	0%	100%	0%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	40	85	70	70	60	40	90	90
Left Turning Volume	0	0	70	70	0	0	90	90
Through Volume	0	65	0	0	60	0	0	0
Right Turning Volume	40	20	0	0	0	40	0	0
Lane Flow Rate	45	96	79	79	67	45	101	101
Geometry Group	8	8	8	8	8	8	8	8
Degree of Utilization, X	0.079	0.143	0.123	0.121	0.089	0.075	0.166	0.151
Departure Headway, Hd	6.302	5.386	5.631	5.545	4.755	5.968	5.926	5.379
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	565	661	633	643	748	597	602	662
Service Time	4.076	3.16	3.399	3.313	2.523	3.737	3.695	3.148
HCM Lane V/C Ratio	0.08	0.145	0.125	0.123	0.09	0.075	0.168	0.153
HCM Control Delay	9.6	9.1	9.2	9.1	8	9.2	9.9	9.1
HCM Lane LOS	A	A	A	A	A	A	A	A
HCM 95th Percentile Queue	0.3	0.5	0.4	0.4	0.3	0.2	0.6	0.5

Intersection	
Intersection Delay (sec/veh)	10.7
Intersection LOS	B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Volume (vph)	265	80	60	185	70	60
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75
Heavy Vehicles(%)	5	0	0	31	0	0
Movement Flow Rate	353	107	80	247	93	80
Number of Lanes	2	1	1	2	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	3	3	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	3
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	3
HCM Control Delay	10.7	10.8	10.6
HCM LOS	B	B	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3
Volume Left (%)	100%	28%	0%	0%	0%	100%	0%	0%
Volume Thru (%)	0%	0%	100%	100%	0%	0%	100%	100%
Volume Right (%)	0%	72%	0%	0%	100%	0%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	47	83	132	132	80	60	92	92
Left Turning Volume	0	0	132	132	0	0	92	92
Through Volume	0	60	0	0	80	0	0	0
Right Turning Volume	47	23	0	0	0	60	0	0
Lane Flow Rate	62	111	177	177	107	80	123	123
Geometry Group	8	8	8	8	8	8	8	8
Degree of Utilization, X	0.123	0.194	0.295	0.291	0.155	0.147	0.228	0.21
Departure Headway, Hd	7.14	6.276	6.018	5.933	5.226	6.627	6.654	6.122
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	502	571	597	606	686	542	540	586
Service Time	4.882	4.017	3.754	3.668	2.961	4.365	4.392	3.859
HCM Lane V/C Ratio	0.124	0.194	0.296	0.292	0.156	0.148	0.228	0.21
HCM Control Delay	10.9	10.5	11.3	11.1	8.9	10.5	11.4	10.5
HCM Lane LOS	B	B	B	B	A	B	B	B
HCM 95th Percentile Queue	0.4	0.7	1.3	1.2	0.6	0.5	0.9	0.8

Intersection	
Intersection Delay (sec/veh)	19.2
Intersection LOS	C

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Volume (vph)	125	55	195	565	135	105
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75
Heavy Vehicles(%)	34	5	5	14	5	5
Movement Flow Rate	167	73	260	753	180	140
Number of Lanes	2	1	1	2	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	3	3	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	3
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	3
HCM Control Delay	12.7	21.9	15.3
HCM LOS	B	C	C

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3
Volume Left (%)	100%	30%	0%	0%	0%	100%	0%	0%
Volume Thru (%)	0%	0%	100%	100%	0%	0%	100%	100%
Volume Right (%)	0%	70%	0%	0%	100%	0%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	90	150	62	62	55	195	282	282
Left Turning Volume	0	0	62	62	0	0	282	282
Through Volume	0	105	0	0	55	0	0	0
Right Turning Volume	90	45	0	0	0	195	0	0
Lane Flow Rate	120	200	83	83	73	260	377	377
Geometry Group	8	8	8	8	8	8	8	8
Degree of Utilization, X	0.282	0.422	0.201	0.189	0.15	0.514	0.707	0.682
Departure Headway, Hd	8.446	7.604	8.663	8.158	7.354	7.229	6.875	6.633
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	427	476	416	442	489	502	531	550
Service Time	6.162	5.319	6.382	5.877	5.073	4.929	4.575	4.333
HCM Lane V/C Ratio	0.281	0.42	0.2	0.188	0.149	0.518	0.71	0.685
HCM Control Delay	14.5	15.8	13.6	12.8	11.4	17.3	24.5	22.4
HCM Lane LOS	B	C	B	B	B	C	C	C
HCM 95th Percentile Queue	1.2	2.2	0.8	0.7	0.5	3.2	7.2	6.4

Intersection	
Intersection Delay (sec/veh)	9.6
Intersection LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Volume (vph)	115	70	65	245	60	65
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles(%)	39	5	5	27	5	5
Movement Flow Rate	129	79	73	275	67	73
Number of Lanes	2	1	1	2	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	3	3	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	3
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	3
HCM Control Delay	9.1	9.9	9.6
HCM LOS	A	A	A

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3
Volume Left (%)	100%	24%	0%	0%	0%	100%	0%	0%
Volume Thru (%)	0%	0%	100%	100%	0%	0%	100%	100%
Volume Right (%)	0%	76%	0%	0%	100%	0%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	40	85	57	57	70	65	122	122
Left Turning Volume	0	0	57	57	0	0	122	122
Through Volume	0	65	0	0	70	0	0	0
Right Turning Volume	40	20	0	0	0	65	0	0
Lane Flow Rate	45	96	65	65	79	73	138	138
Geometry Group	8	8	8	8	8	8	8	8
Degree of Utilization, X	0.081	0.149	0.114	0.103	0.108	0.121	0.223	0.206
Departure Headway, Hd	6.514	5.598	6.332	5.75	4.96	5.965	5.838	5.377
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	546	634	562	618	715	597	611	662
Service Time	4.305	3.389	4.116	3.534	2.743	3.742	3.616	3.154
HCM Lane V/C Ratio	0.082	0.151	0.116	0.105	0.11	0.122	0.226	0.208
HCM Control Delay	9.9	9.4	9.9	9.2	8.4	9.6	10.3	9.6
HCM Lane LOS	A	A	A	A	A	A	B	A
HCM 95th Percentile Queue	0.3	0.5	0.4	0.3	0.4	0.4	0.9	0.8

Intersection	
Intersection Delay (sec/veh)	9.5
Intersection LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Volume (vph)	155	65	45	195	65	70
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles(%)	34	5	5	32	5	5
Movement Flow Rate	174	73	51	219	73	79
Number of Lanes	2	1	1	2	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	3	3	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	3
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	3
HCM Control Delay	9.2	9.7	9.5
HCM LOS	A	A	A

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3
Volume Left (%)	100%	24%	0%	0%	0%	100%	0%	0%
Volume Thru (%)	0%	0%	100%	100%	0%	0%	100%	100%
Volume Right (%)	0%	76%	0%	0%	100%	0%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	43	92	77	77	65	45	97	97
Left Turning Volume	0	0	77	77	0	0	97	97
Through Volume	0	70	0	0	65	0	0	0
Right Turning Volume	43	22	0	0	0	45	0	0
Lane Flow Rate	49	103	87	87	73	51	110	110
Geometry Group	8	8	8	8	8	8	8	8
Degree of Utilization, X	0.087	0.158	0.148	0.136	0.098	0.085	0.183	0.167
Departure Headway, Hd	6.433	5.519	6.133	5.637	4.847	6.069	6.028	5.48
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	553	644	581	631	732	586	590	649
Service Time	4.222	3.307	3.914	3.418	2.627	3.85	3.809	3.261
HCM Lane V/C Ratio	0.089	0.16	0.15	0.138	0.1	0.087	0.186	0.169
HCM Control Delay	9.8	9.4	10	9.3	8.2	9.4	10.2	9.4
HCM Lane LOS	A	A	A	A	A	A	B	A
HCM 95th Percentile Queue	0.3	0.6	0.5	0.5	0.3	0.3	0.7	0.6

Intersection	
Intersection Delay (sec/veh)	11.3
Intersection LOS	B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Volume (vph)	290	85	65	200	75	65
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75
Heavy Vehicles(%)	20	0	0	31	0	0
Movement Flow Rate	387	113	87	267	100	87
Number of Lanes	2	1	1	2	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	3	3	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	3
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	3
HCM Control Delay	11.4	11.3	11.1
HCM LOS	B	B	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3
Volume Left (%)	100%	28%	0%	0%	0%	100%	0%	0%
Volume Thru (%)	0%	0%	100%	100%	0%	0%	100%	100%
Volume Right (%)	0%	72%	0%	0%	100%	0%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	50	90	145	145	85	65	100	100
Left Turning Volume	0	0	145	145	0	0	100	100
Through Volume	0	65	0	0	85	0	0	0
Right Turning Volume	50	25	0	0	0	65	0	0
Lane Flow Rate	67	120	193	193	113	87	133	133
Geometry Group	8	8	8	8	8	8	8	8
Degree of Utilization, X	0.136	0.216	0.345	0.326	0.169	0.164	0.253	0.233
Departure Headway, Hd	7.351	6.483	6.418	6.074	5.367	6.804	6.832	6.299
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	487	552	561	592	668	527	525	569
Service Time	5.104	4.236	4.162	3.818	3.111	4.552	4.579	4.046
HCM Lane V/C Ratio	0.138	0.217	0.344	0.326	0.169	0.165	0.253	0.234
HCM Control Delay	11.3	11	12.5	11.7	9.2	10.9	11.9	11
HCM Lane LOS	B	B	B	B	A	B	B	B
HCM 95th Percentile Queue	0.5	0.8	1.6	1.5	0.6	0.6	1	0.9

Hall & Foreman, Inc.

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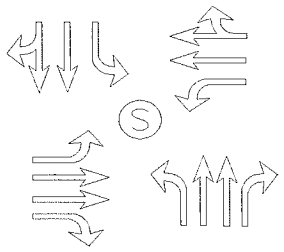
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	1 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : WINDSOR AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 5
ROUTE 1B, 1F

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
OAK GROVE DRIVE						
EB LEFT	20	5%		20	5	25
EB THRU	105	5%		105	10	115
EB RIGHT	40	5%	**55**	95	10	105
WB LEFT	555	5%		555	50	605
WB THRU	425	5%		425	40	465
WB RIGHT	45	10%		45	5	50
WINDSOR AVE						
NB LEFT	70	5%	**55**	125	10	135
NB THRU	605	5%		605	55	660
NB RIGHT	455	5%		455	40	495
SB LEFT	55	5%		55	5	60
SB THRU	590	5%		590	55	645
SB RIGHT	35	5%		35	5	40
TOTALS	**3000**		**110**	**3110**	**290**	**3400**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	2 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : WINDSOR AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 5
ROUTE 1C, 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
OAK GROVE DRIVE						
EB LEFT	20	5%		20	5	25
EB THRU	105	5%		105	10	115
EB RIGHT	40	5%	**55**	95	10	105
WB LEFT	555	5%		555	50	605
WB THRU	425	5%		425	40	465
WB RIGHT	45	10%		45	5	50
WINDSOR AVE						
NB LEFT	70	5%		70	5	75
NB THRU	605	5%		605	55	660
NB RIGHT	455	5%		455	40	495
SB LEFT	55	5%		55	5	60
SB THRU	590	5%		590	55	645
SB RIGHT	35	5%		35	5	40
TOTALS	**3000**		**55**	**3055**	**285**	**3340**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	3 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : WINDSOR AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 5
ROUTE 1D, 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
OAK GROVE DRIVE						
EB LEFT	20	5%		20	5	25
EB THRU	105	5%		105	10	115
EB RIGHT	40	5%		40	5	45
WB LEFT	555	5%		555	50	605
WB THRU	425	5%		425	40	465
WB RIGHT	45	10%		45	5	50
WINDSOR AVE						
NB LEFT	70	5%	**55**	125	10	135
NB THRU	605	5%		605	55	660
NB RIGHT	455	5%		455	40	495
SB LEFT	55	5%		55	5	60
SB THRU	590	5%		590	55	645
SB RIGHT	35	5%		35	5	40
TOTALS	**3000**		**55**	**3055**	**285**	**3340**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	4 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : WINDSOR AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 5
ROUTE 1B, 1F

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
OAK GROVE DRIVE						
EB LEFT	25	5%		25	5	30
EB THRU	140	5%		140	15	155
EB RIGHT	15	5%	**55**	70	5	75
WB LEFT	300	5%		300	25	325
WB THRU	160	5%		160	15	175
WB RIGHT	35	15%		35	5	40
WINDSOR AVE						
NB LEFT	30	5%	**55**	85	5	90
NB THRU	290	5%		290	25	315
NB RIGHT	365	5%		365	35	400
SB LEFT	40	5%		40	5	45
SB THRU	300	5%		300	25	325
SB RIGHT	10	10%		10	5	15
TOTALS	**1710**		**110**	**1820**	**170**	**1990**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	5 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : WINDSOR AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 5
ROUTE 1C, 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
OAK GROVE DRIVE						
EB LEFT	25	5%		25	5	30
EB THRU	140	5%		140	15	155
EB RIGHT	15	5%	**55**	70	5	75
WB LEFT	300	5%		300	25	325
WB THRU	160	5%		160	15	175
WB RIGHT	35	15%		35	5	40
WINDSOR AVE						
NB LEFT	30	5%		30	5	35
NB THRU	290	5%		290	25	315
NB RIGHT	365	5%		365	35	400
SB LEFT	40	5%		40	5	45
SB THRU	300	5%		300	25	325
SB RIGHT	10	10%		10	5	15
TOTALS	**1710**		**55**	**1765**	**170**	**1935**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	6 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : WINDSOR AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 5
ROUTE 1D, 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
OAK GROVE DRIVE						
EB LEFT	25	5%		25	5	30
EB THRU	140	5%		140	15	155
EB RIGHT	15	5%		15	5	20
WB LEFT	300	5%		300	25	325
WB THRU	160	5%		160	15	175
WB RIGHT	35	15%		35	5	40
WINDSOR AVE						
NB LEFT	30	5%	**55**	85	5	90
NB THRU	290	5%		290	25	315
NB RIGHT	365	5%		365	35	400
SB LEFT	40	5%		40	5	45
SB THRU	300	5%		300	25	325
SB RIGHT	10	10%		10	5	15
TOTALS	**1710**		**55**	**1765**	**170**	**1935**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	7 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : WINDSOR AVE
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 5
ROUTE 1B, 1F

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
OAK GROVE DRIVE						
EB LEFT	20	5%		20	5	25
EB THRU	140	5%		140	15	155
EB RIGHT	30	5%	**55**	85	5	90
WB LEFT	350	5%		350	30	380
WB THRU	110	5%		110	10	120
WB RIGHT	30	15%		30	5	35
WINDSOR AVE						
NB LEFT	20	5%	**55**	75	5	80
NB THRU	355	5%		355	30	385
NB RIGHT	435	5%		435	40	475
SB LEFT	40	5%		40	5	45
SB THRU	340	5%		340	30	370
SB RIGHT	20	10%		20	5	25
TOTALS	**1890**		**110**	**2000**	**185**	**2185**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	8 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : WINDSOR AVE
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 5
ROUTE 1C, 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
OAK GROVE DRIVE						
EB LEFT	20	5%		20	5	25
EB THRU	140	5%		140	15	155
EB RIGHT	30	5%	**55**	85	5	90
WB LEFT	350	5%		350	30	380
WB THRU	110	5%		110	10	120
WB RIGHT	30	15%		30	5	35
WINDSOR AVE						
NB LEFT	20	5%		20	5	25
NB THRU	355	5%		355	30	385
NB RIGHT	435	5%		435	40	475
SB LEFT	40	5%		40	5	45
SB THRU	340	5%		340	30	370
SB RIGHT	20	10%		20	5	25
TOTALS	**1890**		**55**	**1945**	**185**	**2130**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	9 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : WINDSOR AVE
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 5
ROUTE 1D, 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
OAK GROVE DRIVE						
EB LEFT	20	5%		20	5	25
EB THRU	140	5%		140	15	155
EB RIGHT	30	5%		30	5	35
WB LEFT	350	5%		350	30	380
WB THRU	110	5%		110	10	120
WB RIGHT	30	15%		30	5	35
WINDSOR AVE						
NB LEFT	20	5%	**55**	75	5	80
NB THRU	355	5%		355	30	385
NB RIGHT	435	5%		435	40	475
SB LEFT	40	5%		40	5	45
SB THRU	340	5%		340	30	370
SB RIGHT	20	10%		20	5	25
TOTALS	**1890**		**55**	**1945**	**185**	**2130**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	10 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : WINDSOR AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 5
ROUTE 1B, 1F

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
OAK GROVE DRIVE						
EB LEFT	40	5%		40	5	45
EB THRU	240	5%		240	20	260
EB RIGHT	25	5%	**55**	80	5	85
WB LEFT	440	5%		440	40	480
WB THRU	155	5%		155	15	170
WB RIGHT	50	5%		50	5	55
WINDSOR AVE						
NB LEFT	25	5%	**55**	80	5	85
NB THRU	495	5%		495	45	540
NB RIGHT	570	5%		570	50	620
SB LEFT	60	5%		60	5	65
SB THRU	525	5%		525	45	570
SB RIGHT	5	5%		5	5	10
TOTALS	**2630**		**110**	**2740**	**245**	**2985**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	11 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : WINDSOR AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 5
ROUTE 1C, 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
OAK GROVE DRIVE						
EB LEFT	40	5%		40	5	45
EB THRU	240	5%		240	20	260
EB RIGHT	25	5%	**55**	80	5	85
WB LEFT	440	5%		440	40	480
WB THRU	155	5%		155	15	170
WB RIGHT	50	5%		50	5	55
WINDSOR AVE						
NB LEFT	25	5%		25	5	30
NB THRU	495	5%		495	45	540
NB RIGHT	570	5%		570	50	620
SB LEFT	60	5%		60	5	65
SB THRU	525	5%		525	45	570
SB RIGHT	5	5%		5	5	10
TOTALS	**2630**		**55**	**2685**	**245**	**2930**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	12 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : WINDSOR AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 5
ROUTE 1D, 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
OAK GROVE DRIVE						
EB LEFT	40	5%		40	5	45
EB THRU	240	5%		240	20	260
EB RIGHT	25	5%		25	5	30
WB LEFT	440	5%		440	40	480
WB THRU	155	5%		155	15	170
WB RIGHT	50	5%		50	5	55
WINDSOR AVE						
NB LEFT	25	5%	**55**	80	5	85
NB THRU	495	5%		495	45	540
NB RIGHT	570	5%		570	50	620
SB LEFT	60	5%		60	5	65
SB THRU	525	5%		525	45	570
SB RIGHT	5	5%		5	5	10
TOTALS	**2630**		**55**	**2685**	**245**	**2930**

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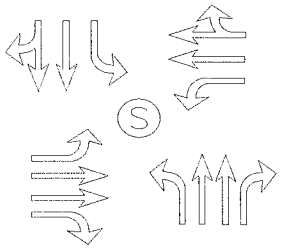
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	1 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : WINDSOR AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 5
ROUTE 1B, 1F

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								

OAK GROVE DRIVE

EB LEFT	18	1	3	20	**0**	20	5	25
EB THRU	100	5	15	115	**0**	115	10	125
EB RIGHT	41	1	3	45	**165**	210	20	230
WB LEFT	549	8	24	575	**0**	575	50	625
WB THRU	420	6	18	440	**0**	440	40	480
WB RIGHT	41	5	15	55	**0**	55	5	60

WINDSOR AVE

NB LEFT	68	2	6	75	**140**	215	20	235
NB THRU	599	4	12	610	**0**	610	55	665
NB RIGHT	431	22	66	495	**0**	495	45	540
SB LEFT	53	1	3	55	**0**	55	5	60
SB THRU	587	4	12	600	**0**	600	55	655
SB RIGHT	34	0	0	35	**0**	35	5	40
TOTALS	**2941**				**305**	**3425**	**315**	**3740**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	2 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : WINDSOR AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 5
ROUTE 1C, 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
OAK GROVE DRIVE								
EB LEFT	18	1	3	20	0	20	5	25
EB THRU	100	5	15	115	0	115	10	125
EB RIGHT	41	1	3	45	165	210	20	230
WB LEFT	549	8	24	575	0	575	50	625
WB THRU	420	6	18	440	0	440	40	480
WB RIGHT	41	5	15	55	0	55	5	60
WINDSOR AVE								
NB LEFT	68	2	6	75	0	75	5	80
NB THRU	599	4	12	610	0	610	55	665
NB RIGHT	431	22	66	495	0	495	45	540
SB LEFT	53	1	3	55	0	55	5	60
SB THRU	587	4	12	600	0	600	55	655
SB RIGHT	34	0	0	35	0	35	5	40
TOTALS	**2941**				**165**	**3285**	**300**	**3585**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	3 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : WINDSOR AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 5
ROUTE 1D, 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
OAK GROVE DRIVE								
EB LEFT	18	1	3	20	**0**	20	5	25
EB THRU	100	5	15	115	**0**	115	10	125
EB RIGHT	41	1	3	45	**0**	45	5	50
WB LEFT	549	8	24	575	**0**	575	50	625
WB THRU	420	6	18	440	**0**	440	40	480
WB RIGHT	41	5	15	55	**0**	55	5	60
WINDSOR AVE								
NB LEFT	68	2	6	75	**140**	215	20	235
NB THRU	599	4	12	610	**0**	610	55	665
NB RIGHT	431	22	66	495	**0**	495	45	540
SB LEFT	53	1	3	55	**0**	55	5	60
SB THRU	587	4	12	600	**0**	600	55	655
SB RIGHT	34	0	0	35	**0**	35	5	40
TOTALS	**2941**				**140**	**3260**	**300**	**3560**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	4 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : WINDSOR AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 5
ROUTE 1B, 1F

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
OAK GROVE DRIVE								
EB LEFT	27	0	0	25	**0**	25	5	30
EB THRU	134	5	15	150	**0**	150	15	165
EB RIGHT	14	1	3	15	**165**	180	15	195
WB LEFT	284	15	45	330	**0**	330	30	360
WB THRU	158	3	9	165	**0**	165	15	180
WB RIGHT	29	5	15	45	**0**	45	5	50
WINDSOR AVE								
NB LEFT	31	0	0	30	**140**	170	15	185
NB THRU	290	5	15	305	**0**	305	25	330
NB RIGHT	365	5	15	380	**0**	380	35	415
SB LEFT	40	0	0	40	**0**	40	5	45
SB THRU	300	4	12	310	**0**	310	30	340
SB RIGHT	10	1	3	15	**0**	15	5	20
TOTALS	**1682**				**305**	**2115**	**200**	**2315**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	5 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : WINDSOR AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 5
ROUTE 1C, 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
OAK GROVE DRIVE								
EB LEFT	27	0	0	25	**0**	25	5	30
EB THRU	134	5	15	150	**0**	150	15	165
EB RIGHT	14	1	3	15	**165**	180	15	195
WB LEFT	284	15	45	330	**0**	330	30	360
WB THRU	158	3	9	165	**0**	165	15	180
WB RIGHT	29	5	15	45	**0**	45	5	50
WINDSOR AVE								
NB LEFT	31	0	0	30	**0**	30	5	35
NB THRU	290	5	15	305	**0**	305	25	330
NB RIGHT	365	5	15	380	**0**	380	35	415
SB LEFT	40	0	0	40	**0**	40	5	45
SB THRU	300	4	12	310	**0**	310	30	340
SB RIGHT	10	1	3	15	**0**	15	5	20
TOTALS	**1682**				**165**	**1975**	**190**	**2165**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	6 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : WINDSOR AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 5
ROUTE 1D, 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
OAK GROVE DRIVE								
EB LEFT	27	0	0	25	**0**	25	5	30
EB THRU	134	5	15	150	**0**	150	15	165
EB RIGHT	14	1	3	15	**0**	15	5	20
WB LEFT	284	15	45	330	**0**	330	30	360
WB THRU	158	3	9	165	**0**	165	15	180
WB RIGHT	29	5	15	45	**0**	45	5	50
WINDSOR AVE								
NB LEFT	31	0	0	30	**140**	170	15	185
NB THRU	290	5	15	305	**0**	305	25	330
NB RIGHT	365	5	15	380	**0**	380	35	415
SB LEFT	40	0	0	40	**0**	40	5	45
SB THRU	300	4	12	310	**0**	310	30	340
SB RIGHT	10	1	3	15	**0**	15	5	20
TOTALS	**1682**				**140**	**1950**	**190**	**2140**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	7 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : WINDSOR AVE
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 5
ROUTE 1B, 1F

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
OAK GROVE DRIVE								
EB LEFT	20	0	0	20	**0**	20	5	25
EB THRU	140	7	21	160	**0**	160	15	175
EB RIGHT	30	2	6	35	**165**	200	20	220
WB LEFT	350	18	53	405	**0**	405	35	440
WB THRU	110	6	17	125	**0**	125	10	135
WB RIGHT	30	5	14	45	**0**	45	5	50
WINDSOR AVE								
NB LEFT	20	1	3	25	**140**	165	15	180
NB THRU	355	18	53	410	**0**	410	35	445
NB RIGHT	435	22	65	500	**0**	500	45	545
SB LEFT	40	0	0	40	**0**	40	5	45
SB THRU	340	17	51	390	**0**	390	35	425
SB RIGHT	20	2	6	25	**0**	25	5	30
TOTALS	**1890**				**305**	**2485**	**230**	**2715**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	8 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : WINDSOR AVE
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 5
ROUTE 1C, 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
OAK GROVE DRIVE								
EB LEFT	20	0	0	20	**0**	20	5	25
EB THRU	140	7	21	160	**0**	160	15	175
EB RIGHT	30	2	6	35	**165**	200	20	220
WB LEFT	350	18	53	405	**0**	405	35	440
WB THRU	110	6	17	125	**0**	125	10	135
WB RIGHT	30	5	14	45	**0**	45	5	50
WINDSOR AVE								
NB LEFT	20	1	3	25	**0**	25	5	30
NB THRU	355	18	53	410	**0**	410	35	445
NB RIGHT	435	22	65	500	**0**	500	45	545
SB LEFT	40	0	0	40	**0**	40	5	45
SB THRU	340	17	51	390	**0**	390	35	425
SB RIGHT	20	2	6	25	**0**	25	5	30
TOTALS	**1890**				**165**	**2345**	**220**	**2565**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	9 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : WINDSOR AVE
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 5
ROUTE 1D, 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
OAK GROVE DRIVE								
EB LEFT	20	0	0	20	**0**	20	5	25
EB THRU	140	7	21	160	**0**	160	15	175
EB RIGHT	30	2	6	35	**0**	35	5	40
WB LEFT	350	18	53	405	**0**	405	35	440
WB THRU	110	6	17	125	**0**	125	10	135
WB RIGHT	30	5	14	45	**0**	45	5	50
WINDSOR AVE								
NB LEFT	20	1	3	25	**140**	165	15	180
NB THRU	355	18	53	410	**0**	410	35	445
NB RIGHT	435	22	65	500	**0**	500	45	545
SB LEFT	40	0	0	40	**0**	40	5	45
SB THRU	340	17	51	390	**0**	390	35	425
SB RIGHT	20	2	6	25	**0**	25	5	30
TOTALS	**1890**				**140**	**2320**	**215**	**2535**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	10 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : WINDSOR AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 5
ROUTE 1B, 1F

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
OAK GROVE DRIVE								
EB LEFT	42	0	0	40	**0**	40	5	45
EB THRU	235	5	15	250	**0**	250	25	275
EB RIGHT	24	0	0	25	**165**	190	15	205
WB LEFT	439	2	6	445	**0**	445	40	485
WB THRU	149	8	24	175	**0**	175	15	190
WB RIGHT	48	1	3	50	**0**	50	5	55
WINDSOR AVE								
NB LEFT	25	0	0	25	**140**	165	15	180
NB THRU	497	0	0	495	**0**	495	45	540
NB RIGHT	567	2	6	575	**0**	575	50	625
SB LEFT	61	0	0	60	**0**	60	5	65
SB THRU	524	1	3	525	**0**	525	45	570
SB RIGHT	0	0	0	5	**0**	5	5	10
TOTALS	**2611**				**305**	**2975**	**270**	**3245**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	11 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : WINDSOR AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
5
ROUTE
1C, 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
OAK GROVE DRIVE								
EB LEFT	42	0	0	40	**0**	40	5	45
EB THRU	235	5	15	250	**0**	250	25	275
EB RIGHT	24	0	0	25	**165**	190	15	205
WB LEFT	439	2	6	445	**0**	445	40	485
WB THRU	149	8	24	175	**0**	175	15	190
WB RIGHT	48	1	3	50	**0**	50	5	55
WINDSOR AVE								
NB LEFT	25	0	0	25	**0**	25	5	30
NB THRU	497	0	0	495	**0**	495	45	540
NB RIGHT	567	2	6	575	**0**	575	50	625
SB LEFT	61	0	0	60	**0**	60	5	65
SB THRU	524	1	3	525	**0**	525	45	570
SB RIGHT	0	0	0	5	**0**	5	5	10
TOTALS	**2611**				**165**	**2835**	**260**	**3095**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	12 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : WINDSOR AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 5
ROUTE 1D, 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
OAK GROVE DRIVE								
EB LEFT	42	0	0	40	**0**	40	5	45
EB THRU	235	5	15	250	**0**	250	25	275
EB RIGHT	24	0	0	25	**0**	25	5	30
WB LEFT	439	2	6	445	**0**	445	40	485
WB THRU	149	8	24	175	**0**	175	15	190
WB RIGHT	48	1	3	50	**0**	50	5	55
WINDSOR AVE								
NB LEFT	25	0	0	25	**140**	165	15	180
NB THRU	497	0	0	495	**0**	495	45	540
NB RIGHT	567	2	6	575	**0**	575	50	625
SB LEFT	61	0	0	60	**0**	60	5	65
SB THRU	524	1	3	525	**0**	525	45	570
SB RIGHT	0	0	0	5	**0**	5	5	10
TOTALS	**2611**				**140**	**2810**	**260**	**3070**

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INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WINDSOR

EAST-WEST STREET: OAK GROVE

TIME: 07:00AM-08:00AM DATE: 05-31-11

NORTH LEG

Rt	Thru	Lt	
21	605	48	Total
1	121	13	1st
3	141	12	2nd
7	164	12	3rd
10	179	11	4th

	1st	2nd	3rd	4th	Total
Rt	7	8	12	10	37
Thru	44	91	96	178	409
Lt	87	107	134	111	439

Total	1st	2nd	3rd	4th	
12	1	2	4	5	Lt
111	21	31	30	29	Thru
45	10	8	16	11	Rt

	Lt	Thru	Rt
1st	10	98	44
2nd	12	103	55
3rd	23	123	91
4th	20	113	103
Total	65	437	293

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WINDSOR

EAST-WEST STREET: OAK GROVE

TIME: 08:00AM-09:00AM DATE: 05-31-11

NORTH LEG

Rt	Thru	Lt	
32	430	54	Total
4	101	12	1st
13	147	19	2nd
9	109	8	3rd
6	73	15	4th

	1st	2nd	3rd	4th	Total
Rt	14	10	15	9	48
Thru	40	112	49	116	317
Lt	116	196	130	138	580

Total	1st	2nd	3rd	4th	
23	7	3	6	7	Lt
114	24	22	25	43	Thru
34	9	6	7	12	Rt

	Lt	Thru	Rt
1st	15	151	117
2nd	12	216	142
3rd	9	149	84
4th	18	132	103
Total	54	648	446

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : WINDSOR — PASADENA
EAST-WEST STREET : OAK GROVE — 05-31-11
BEGINNING TIME : 07:00AM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
					NORTH LEG							
1	119	13	0	1	0	0	1	0	0	0	0	135
3	141	10	0	0	1	0	0	1	0	0	0	156
7	162	12	0	1	0	0	0	0	0	1	0	183
10	179	11	0	0	0	0	0	0	0	0	0	200
4	100	11	0	1	1	0	0	0	0	0	0	117
13	146	19	0	1	0	0	0	0	0	0	0	179
9	106	8	0	2 4	0	0	0 0	0	0	1 1	0	126
6	73	15	0	0	0	0	0	0	0	0	0	94
						TT=4+0+1=5						
53	1026	99	0	6	2	0	1	1	0	2	0	1190
					SOUTH LEG							
42	98	10	2	0	0	0	0	0	0	0	0	152
53	103	12	2	0	0	0	0	0	0	0	0	170
86	122	21	3	1	1	1	0	1	1	0	0	237
100	113	20	3	0	0	0	0	0	0	0	0	236
106	149	15	11	1	0	0	0	0	0	1	0	283
139	215	12	3	1	0	0	0	0	0	0	0	370
78	148	8	5	1	0	1	0	1	0	0	0	242
101	132	18	2	0	0	0	0	0	0	0	0	253
						TT=24+2+2=28						
705	1080	116	31	4	1	2	0	2	1	1	0	1943
					EAST LEG							
6	43	86	1	1	1	0	0	0	0	0	0	138
7	89	104	1	2	2	0	0	1	0	0	0	206
10	95	134	2	1	0	0	0	0	0	0	0	242
8	177	110	2	1	1	0	0	0	0	0	0	299
14	37	113	0	3	2	0	0	1	0	0	0	170
9	111	192	1	1	4	0	0	0	0	0	0	318
14	45	128	1	4 18	0	0	0 1	2	0	0 0	0	194
9	116	137	0	0	0	0	0	0	0	0	1	263
						TT=18+1+0=19						
77	7131	004	8	13	10	0	0	4	0	0	1	1830
					WEST LEG							
9	20	1	1	1	0	0	0	0	0	0	0	32
6	29	1	1	2	0	0	0	1	1	0	0	41
16	28	3	0	2	1	0	0	0	0	0	0	50
10	28	5	1	1	0	0	0	0	0	0	0	45
9	23	7	0	1	0	0	0	0	0	0	0	40
6	21	3	0	1	0	0	0	0	0	0	0	31
7	21	6	0	4 6	0	0	0 0	0	0	0 0	0	38
12	41	7	0	2	0	0	0	0	0	0	0	62
						TT=6+0+0=6						
75	211	33	3	14	1	0	0	1	1	0	0	339

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: WINDSOR
EAST-WEST STREET: OAK GROVE
JURISDICTION: PASADENA

DATE: 05-31-11

PEAK HOUR: 01:00PM

NORTH LEG (SB)

TOTAL: 352

Rt	Thru	Lt	
12 (10)	299 (300)	41 (40)	Total
2	72	12	1st
3	76	12	2nd
1	75	4	3rd
6	76	13	4th

TT = 5
TT% = 5/352 = 0.85 % ≈ 1%

TT = 23
TT% = 23/494 = 4.66 % ≈ 5%

EAST LEG TOTAL: (WB) 494

	1st	2nd	3rd	4th	Total
Rt	4	12	12	6	34 (35)
Thru	44	43	41	33	161 (160)
Lt	83	58	77	81	299 (300)

Total	1st	2nd	3rd	4th	
27 (25)	6	12	2	7	Lt
139 (140)	42	42	25	30	Thru
15 (15)	5	3	3	4	Rt

WEST LEG TOTAL: (EB) 181

TT = 6
TT% = 6/181 = 3.31 % ≈ 3 %

PEAK HOUR FACTORS

NORTH LEG = 0.93
SOUTH LEG = 0.81
EAST LEG = 0.94
WEST LEG = 0.79

ALL LEGS = 0.91

	Lt	Thru	Rt
1st	11	54	100
2nd	9	89	112
3rd	8	72	75
4th	3	75	76
Total	31 (30)	290	363 (365)

TT = 10
TT% = 10/684 = 1.46 % ≈ 1 %

TOTAL: 684

SOUTH LEG (NB)

HOUR TOTAL: 1,711

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WINDSOR

EAST-WEST STREET: OAK GROVE

TIME: 12:00PM-01:00PM DATE: 05-31-11

NORTH LEG

Rt	Thru	Lt	
7	282	34	Total
2	49	8	1st
0	75	8	2nd
5	99	12	3rd
0	59	6	4th

	1st	2nd	3rd	4th	Total
Rt	4	10	3	5	22
Thru	12	18	14	8	52
Lt	75	90	62	72	299

Total	1st	2nd	3rd	4th	
19	7	7	4	1	Lt
106	28	29	18	31	Thru
21	5	6	4	6	Rt

	Lt	Thru	Rt
1st	4	53	75
2nd	7	53	56
3rd	6	103	101
4th	7	73	84
Total	24	282	316

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WINDSOR

EAST-WEST STREET: OAK GROVE

TIME: 01:00PM-02:00PM DATE: 05-31-11

NORTH LEG

Rt	Thru	Lt	
12	299	41	Total
2	72	12	1st
3	76	12	2nd
1	75	4	3rd
6	76	13	4th

	1st	2nd	3rd	4th	Total
Rt	4	12	12	6	34
Thru	44	43	41	33	161
Lt	83	58	77	81	299

Total	1st	2nd	3rd	4th	
27	6	12	2	7	Lt
139	42	42	25	30	Thru
15	5	3	3	4	Rt

	Lt	Thru	Rt
1st	11	54	100
2nd	9	89	112
3rd	8	72	75
4th	3	75	76
Total	31	290	363

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : WINDSOR — PASADENA

EAST-WEST STREET : OAK GROVE — 05-31-11

BEGINNING TIME : 12:00PM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
					SB NORTH LEG							
2	49	8	0	0	0	0	0	0	0	0	0	59
0	72	8	0	2	0	0	1	0	0	0	0	83
5	99	12	0	0	0	0	0	0	0	0	0	116
0	59	6	0	0	0	0	0	0	0	0	0	65
2	69	12	0	2	0	0	1	0	0	0	0	86
3	76	12	0	0	0	0	0	0	0	0	0	91
0	74	4	1	0	0	0	0	0	0	1	0	80
6	76	13	0	0	0	0	0	0	0	0	0	95
				3			1			1		
						TT = 3+1+1 = 5						
18	574	75	1	4	0	0	2	0	0	1	0	675
					NB SOUTH LEG							
73	52	4	1	1	0	1	0	0	0	0	0	132
55	52	6	1	1	1	0	0	0	0	0	0	116
100	102	6	1	0	0	0	1	0	0	0	0	210
81	70	7	3	1	0	0	1	0	0	1	0	164
100	54	11	0	0	0	0	0	0	0	0	0	165
110	87	9	2	2	0	0	0	0	0	0	0	210
72	70	8	2	1	0	1	1	0	0	0	0	155
76	74	3	0	1	0	0	0	0	0	0	0	154
				8			2			0		
						TT = 8+2+0 = 10						
667	561	54	10	7	1	2	3	0	0	1	0	1306
					WB EAST LEG							
3	12	72	0	0	2	1	0	1	0	0	0	91
10	16	87	0	2	2	0	0	1	0	0	0	118
3	14	62	0	0	0	0	0	0	0	0	0	79
5	8	69	0	0	3	0	0	0	0	0	0	85
3	43	80	1	1	3	0	0	0	0	0	0	131
12	42	57	0	1	1	0	0	0	0	0	0	113
11	40	67	1	1	10	0	0	0	0	0	0	130
3	33	80	3	0	1	0	0	0	0	0	0	120
				23			0			0		
						TT = 23+0+0 = 23						
50	208	574	5	5	22	1	0	2	0	0	0	867
					EB WEST LEG							
5	27	7	0	1	0	0	0	0	0	0	0	40
6	28	7	0	1	0	0	0	0	0	0	0	42
4	18	4	0	0	0	0	0	0	0	0	0	26
5	29	1	1	2	0	0	0	0	0	0	0	38
5	39	6	0	3	0	0	0	0	0	0	0	53
3	41	12	0	0	0	0	1	0	0	0	0	57
2	24	2	1	1	0	0	0	0	0	0	0	30
4	30	7	0	0	0	0	0	0	0	0	0	41
				5			1			0		
						TT = 5+1+0 = 6						
34	236	46	2	8	0	0	1	0	0	0	0	327

Prepared by Newport Traffic Studies

(5)

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: WINDSOR
EAST-WEST STREET: OAK GROVE
JURISDICTION: LA CANADA

DATE: 04-10-12

PEAK HOUR: 03:00PM

NORTH LEG (SB)

TOTAL: 397

Rt	Thru	Lt	
17	342	38	Total
7	62	9	1st
4	89	12	2nd
1	102	8	3rd
5	89	9	4th

EAST LEG (WB) TOTAL: 491

	1st	2nd	3rd	4th	Total
Rt	5	9	7	9	30
Thru	25	25	31	28	109
Lt	92	91	83	86	352

WEST LEG (EB) TOTAL: 187

Total	1st	2nd	3rd	4th	
21	6	2	6	7	Lt
138	39	34	38	27	Thru
28	8	7	5	8	Rt

SOUTH LEG (NB) TOTAL: 809

	Lt	Thru	Rt
1st	3	71	93
2nd	6	96	118
3rd	4	89	93
4th	6	98	132
Total	19	354	436

PEAK HOUR FACTORS

NORTH LEG = 0.89
SOUTH LEG = 0.86
EAST LEG = 0.98
WEST LEG = 0.88

ALL LEGS = 0.93

HOUR TOTAL: 1,884

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WINDSOR

EAST-WEST STREET: OAK GROVE

TIME: 02:00PM-03:00PM DATE: 04-10-12

NORTH LEG

Rt	Thru	Lt	
12	373	25	Total
4	85	6	1st
2	73	7	2nd
5	92	5	3rd
1	123	7	4th

	1st	2nd	3rd	4th	Total
Rt	14	6	13	8	41
Thru	30	29	18	26	103
Lt	77	77	98	87	339

Total	1st	2nd	3rd	4th	
24	7	5	6	6	Lt
82	18	22	23	19	Thru
27	3	8	10	6	Rt

	Lt	Thru	Rt
1st	3	72	79
2nd	3	68	77
3rd	8	64	93
4th	5	81	100
Total	19	285	349

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WINDSOR

EAST-WEST STREET: OAK GROVE

TIME: 03:00PM-04:00PM DATE: 04-10-12

NORTH LEG

17	342	38	Total
7	62	9	1st
4	89	12	2nd
1	102	8	3rd
5	89	9	4th
Rt	Thru	Lt	

Rt	5	9	7	9	30
Thru	25	25	31	28	109
Lt	92	91	83	86	352
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
21	6	2	6	7	Lt
138	39	34	38	27	Thru
28	8	7	5	8	Rt

	Lt	Thru	Rt
1st	3	71	93
2nd	6	96	118
3rd	4	89	93
4th	6	98	132
Total	19	354	436

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: WINDSOR
EAST-WEST STREET: OAK GROVE
JURISDICTION: PASADENA

DATE: 05-31-11

PEAK HOUR: 04:45PM

NORTH LEG (SB)

TOTAL: 586

5	525	60 61	Total
0	136	24	1st
0	115	6	2nd
0	109	21	3rd
0	165	10	4th
Rt	Thru	Lt	

TT = 1

$TT\% = \frac{1}{586} = 0.17\% \approx 1\%$

TT = 10

$TT\% = \frac{10}{647} = 1.55\% \approx 2\%$

EAST LEG TOTAL: (WB) 647

Rt	8	12	15	14	50 49
Thru	42	24	56	35	155 157
Lt	85	141	102	113	440 441
	1st	2nd	3rd	4th	Total

WEST LEG TOTAL: (EB) 306

Total	1st	2nd	3rd	4th	
40 42	6	6	18	12	Lt
240	60	63	66	51	Thru
25 24	9	3	3	9	Rt

TT = 5

$TT\% = \frac{5}{306} = 1.63\% \approx 2\%$

	Lt	Thru	Rt	
1st	11	122	127	
2nd	2	119	137	
3rd	6	119	173	
4th	6	137	132	
Total	25	497 495	569 570	TOTAL: 1,091

SOUTH LEG (NB)

TT = 2

$TT\% = \frac{2}{1091} = 0.18\% \approx 1\%$

PEAK HOUR FACTORS

NORTH LEG = 0.84
SOUTH LEG = 0.92
EAST LEG = 0.91
WEST LEG = 0.88

ALL LEGS = 0.96

HOUR TOTAL: 2,630

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WINDSOR

EAST-WEST STREET: OAK GROVE

TIME: 04:00PM-05:00PM DATE: 05-31-11

NORTH LEG

Rt	Thru	Lt	
1	461	69	Total
1	92	18	1st
0	114	16	2nd
0	119	11	3rd
0	136	24	4th

	1st	2nd	3rd	4th	Total
Rt	20	12	11	8	51
Thru	57	42	31	42	172
Lt	54	83	114	85	336

Total	1st	2nd	3rd	4th	
22	9	5	2	6	Lt
232	56	59	57	60	Thru
18	3	2	4	9	Rt

	Lt	Thru	Rt
1st	10	76	101
2nd	1	78	116
3rd	9	87	126
4th	11	122	127
Total	31	363	470

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WINDSOR

EAST-WEST STREET: OAK GROVE

TIME: 05:00PM-06:00PM DATE: 05-31-11

NORTH LEG

Rt	Thru	Lt	
3	534	49	Total
0	115	6	1st
0	109	21	2nd
0	165	10	3rd
3	145	12	4th

	1st	2nd	3rd	4th	Total
Rt	12	15	14	18	59
Thru	24	56	35	45	160
Lt	141	102	113	78	434

Total	1st	2nd	3rd	4th	
42	6	18	12	6	Lt
225	63	66	51	45	Thru
21	3	3	9	6	Rt

	Lt	Thru	Rt
1st	2	119	137
2nd	6	119	173
3rd	6	137	132
4th	3	101	168
Total	17	476	610

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : WINDSOR — PASADENA

EAST-WEST STREET : OAK GROVE — 05-31-11

BEGINNING TIME : 04:00PM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
					SB NORTH LEG							
1	92	18	0	0	0	0	0	0	0	0	0	111
0	114	16	0	0	0	0	0	0	0	0	0	130
0	119	10	0	0	1	0	0	0	0	0	0	130
0	136	24	0	0	0	0	0	0	0	0	0	160
0	115	6	0	0	0	0	0	0	0	0	0	121
0	108	21	0	1	0	0	0	0	0	0	0	130
0	165	10	0	0	0	0	0	0	0	0	0	175
3	145	12	0	0	0	0	0	0	0	0	0	160
				1			0			0		
						TT=1+0+0=1						
4	994	117	0	1	1	0	0	0	0	0	0	1117
					NB SOUTH LEG							
95	76	9	6	0	0	0	0	0	0	0	1	187
112	78	1	4	0	0	0	0	0	0	0	0	195
120	87	9	5	0	0	0	0	0	1	0	0	222
126	122	11	1	0	0	0	0	0	0	0	0	260
137	119	2	0	0	0	0	0	0	0	0	0	258
172	119	6	1	0	0	0	0	0	0	0	0	298
132	137	6	0	0	0	0	0	0	0	0	0	275
168	101	3	0	0	0	0	0	0	0	0	0	272
				2			0			0		
						TT=2+0+0=2						
1062	839	47	17	0	0	0	0	0	1	0	1	1967
					WB EAST LEG							
19	52	51	1	5	3	0	0	0	0	0	0	131
11	41	83	1	1	0	0	0	0	0	0	0	137
10	29	113	1	2	1	0	0	0	0	0	0	156
7	38	85	1	4	0	0	0	0	0	0	0	135
12	23	141	0	1	0	0	0	0	0	0	0	177
15	55	101	0	1	0	0	0	0	0	0	1	173
14	33	112	0	2	1	0	0	0	0	0	0	162
18	44	77	0	1	1	0	0	0	0	0	0	141
				9			0			1		
						TT=9+0+1=10						
106	315	763	4	17	6	0	0	0	0	0	1	1212
					EB WEST LEG							
3	53	9	0	3	0	0	0	0	0	0	0	68
2	59	5	0	0	0	0	0	0	0	0	0	66
4	57	2	0	0	0	0	0	0	0	0	0	63
9	59	6	0	1	0	0	0	0	0	0	0	75
3	61	6	0	2	0	0	0	0	0	0	0	72
3	65	18	0	1	0	0	0	0	0	0	0	87
9	50	12	0	1	0	0	0	0	0	0	0	72
6	44	6	0	1	0	0	0	0	0	0	0	57
				5			0			0		
						TT=5+0+0=5						
39	448	64	0	9	0	0	0	0	0	0	0	560

Prepared by Newport Traffic Studies

HCM Signalized Intersection Capacity Analysis
5: Windsor Ave & Oak Grove Dr/Woodbury Rd/Woodbury Rd

3/25/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	105	40	555	425	45	70	605	455	55	590	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1719	3438	1538	1719	3373		1719	3438	1538	1719	3418	
Flt Permitted	0.95	1.00	1.00	0.44	1.00		0.95	1.00	1.00	0.22	1.00	
Satd. Flow (perm)	1719	3438	1538	805	3373		1719	3438	1538	404	3418	
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	24	125	48	661	506	54	83	720	542	65	702	42
RTOR Reduction (vph)	0	0	43	0	11	0	0	0	186	0	5	0
Lane Group Flow (vph)	24	125	5	661	549	0	83	720	356	65	739	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	10%	5%	5%	5%	5%	5%	0%
Turn Type	Prot	NA	Perm	pm+pt	NA		Prot	NA	pm+ov	pm+pt	NA	
Protected Phases	7	4		3	8		5	2	3	1	6	
Permitted Phases			4	8					2	6		
Actuated Green, G (s)	1.8	7.8	7.8	34.5	28.7		3.7	21.5	44.2	23.8	20.8	
Effective Green, g (s)	1.8	7.8	7.8	34.5	28.7		3.7	21.5	44.2	23.8	20.8	
Actuated g/C Ratio	0.03	0.11	0.11	0.49	0.40		0.05	0.30	0.62	0.34	0.29	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	44	378	169	683	1363		90	1041	1044	191	1001	
v/s Ratio Prot	0.01	0.04		c0.31	0.16		c0.05	0.21	0.11	0.01	c0.22	
v/s Ratio Perm			0.00	c0.16					0.12	0.10		
v/c Ratio	0.55	0.33	0.03	0.97	0.40		0.92	0.69	0.34	0.34	0.74	
Uniform Delay, d1	34.2	29.2	28.2	15.5	15.1		33.5	21.8	6.4	16.9	22.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	13.1	0.5	0.1	26.3	0.2		69.4	3.8	0.2	1.1	4.9	
Delay (s)	47.3	29.7	28.3	41.8	15.2		102.9	25.6	6.6	17.9	27.5	
Level of Service	D	C	C	D	B		F	C	A	B	C	
Approach Delay (s)		31.5			29.6			22.7			26.7	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	26.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	71.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	68.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
5: Windsor Ave & Oak Grove Dr/Woodbury Rd/Woodbury Rd

3/25/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	140	15	300	160	35	30	290	365	40	300	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3438	1538	1719	3291		1805	3438	1538	1805	3416	
Flt Permitted	0.62	1.00	1.00	0.44	1.00		0.55	1.00	1.00	0.56	1.00	
Satd. Flow (perm)	1174	3438	1538	802	3291		1039	3438	1538	1061	3416	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	27	154	16	330	176	38	33	319	401	44	330	11
RTOR Reduction (vph)	0	0	13	0	26	0	0	0	204	0	3	0
Lane Group Flow (vph)	27	154	3	330	188	0	33	319	197	44	338	0
Heavy Vehicles (%)	0%	5%	5%	5%	5%	15%	0%	5%	5%	0%	5%	10%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	pm+ov	pm+pt	NA	
Protected Phases	7	4		3	8		5	2	3	1	6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)	9.1	8.4	8.4	20.6	15.9		18.0	16.6	24.8	18.0	16.6	
Effective Green, g (s)	9.1	8.4	8.4	20.6	15.9		18.0	16.6	24.8	18.0	16.6	
Actuated g/C Ratio	0.18	0.17	0.17	0.41	0.31		0.36	0.33	0.49	0.36	0.33	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	220	571	255	475	1034		391	1128	875	398	1121	
v/s Ratio Prot	0.00	0.04		c0.11	0.06		0.00	0.09	0.04	c0.00	c0.10	
v/s Ratio Perm	0.02		0.00	c0.17			0.03		0.09	0.04		
v/c Ratio	0.12	0.27	0.01	0.69	0.18		0.08	0.28	0.22	0.11	0.30	
Uniform Delay, d1	17.3	18.4	17.6	11.2	12.6		10.7	12.6	7.4	10.8	12.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	0.3	0.0	4.4	0.1		0.1	0.6	0.1	0.1	0.7	
Delay (s)	17.5	18.7	17.6	15.6	12.7		10.8	13.2	7.5	10.9	13.4	
Level of Service	B	B	B	B	B		B	B	A	B	B	
Approach Delay (s)		18.4			14.5			10.1			13.1	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM Average Control Delay	12.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	50.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	45.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	140	30	350	110	30	20	355	435	40	340	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3438	1538	1719	3262		1805	3438	1538	1805	3400	
Flt Permitted	0.66	1.00	1.00	0.44	1.00		0.52	1.00	1.00	0.50	1.00	
Satd. Flow (perm)	1248	3438	1538	798	3262		993	3438	1538	945	3400	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	22	151	32	376	118	32	22	382	468	43	366	22
RTOR Reduction (vph)	0	0	27	0	22	0	0	0	234	0	6	0
Lane Group Flow (vph)	22	151	5	376	128	0	22	382	234	43	382	0
Heavy Vehicles (%)	0%	5%	5%	5%	5%	15%	0%	5%	5%	0%	5%	10%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	pm+ov	pm+pt	NA	
Protected Phases	7	4		3	8		5	2	3	1	6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)	8.9	8.2	8.2	20.5	15.8		17.9	17.2	25.5	19.3	17.9	
Effective Green, g (s)	8.9	8.2	8.2	20.5	15.8		17.9	17.2	25.5	19.3	17.9	
Actuated g/C Ratio	0.17	0.16	0.16	0.40	0.31		0.35	0.34	0.50	0.38	0.35	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	225	552	247	470	1009		359	1157	888	380	1191	
v/s Ratio Prot	0.00	0.04		c0.13	0.04		0.00	0.11	0.04	c0.00	c0.11	
v/s Ratio Perm	0.02		0.00	c0.19			0.02		0.11	0.04		
v/c Ratio	0.10	0.27	0.02	0.80	0.13		0.06	0.33	0.26	0.11	0.32	
Uniform Delay, d1	17.6	18.8	18.1	12.1	12.7		10.9	12.7	7.4	10.1	12.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.2	0.3	0.0	9.4	0.1		0.1	0.8	0.2	0.1	0.7	
Delay (s)	17.8	19.1	18.1	21.5	12.7		11.0	13.4	7.5	10.3	12.9	
Level of Service	B	B	B	C	B		B	B	A	B	B	
Approach Delay (s)		18.8			19.0			10.2			12.6	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM Average Control Delay	13.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	51.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	50.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	40	240	25	440	155	50	25	495	570	60	525	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3438	1615	1719	3312		1805	3610	1538	1805	3435	
Flt Permitted	0.62	1.00	1.00	0.44	1.00		0.41	1.00	1.00	0.36	1.00	
Satd. Flow (perm)	1175	3438	1615	805	3312		774	3610	1538	683	3435	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	42	250	26	458	161	52	26	516	594	62	547	5
RTOR Reduction (vph)	0	0	21	0	35	0	0	0	212	0	1	0
Lane Group Flow (vph)	42	250	5	458	178	0	26	516	382	62	551	0
Heavy Vehicles (%)	0%	5%	0%	5%	5%	5%	0%	0%	5%	0%	5%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	pm+ov	pm+pt	NA	
Protected Phases	7	4		3	8		5	2	3	1	6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)	13.1	11.7	11.7	23.8	18.4		18.4	17.7	25.8	21.4	19.2	
Effective Green, g (s)	13.1	11.7	11.7	23.8	18.4		18.4	17.7	25.8	21.4	19.2	
Actuated g/C Ratio	0.24	0.21	0.21	0.43	0.33		0.33	0.32	0.46	0.38	0.34	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	292	722	339	477	1094		269	1147	823	307	1184	
v/s Ratio Prot	0.00	0.07		c0.14	0.05		0.00	0.14	0.07	c0.01	c0.16	
v/s Ratio Perm	0.03		0.00	c0.27			0.03		0.18	0.07		
v/c Ratio	0.14	0.35	0.02	0.96	0.16		0.10	0.45	0.46	0.20	0.47	
Uniform Delay, d1	16.7	18.7	17.4	14.2	13.2		12.7	15.1	10.2	11.1	14.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.2	0.3	0.0	31.1	0.1		0.2	1.3	0.4	0.3	1.3	
Delay (s)	16.9	19.0	17.5	45.3	13.3		12.9	16.4	10.6	11.4	15.6	
Level of Service	B	B	B	D	B		B	B	B	B	B	
Approach Delay (s)		18.6			35.1			13.3			15.1	
Approach LOS		B			D			B			B	

Intersection Summary			
HCM Average Control Delay	19.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	55.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	62.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	105	95	555	425	45	125	605	455	55	590	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1719	3438	1022	1719	3373		1245	3438	1538	1719	3418	
Flt Permitted	0.44	1.00	1.00	0.49	1.00		0.14	1.00	1.00	0.30	1.00	
Satd. Flow (perm)	800	3438	1022	888	3373		188	3438	1538	537	3418	
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	24	125	113	661	506	54	149	720	542	65	702	42
RTOR Reduction (vph)	0	0	58	0	9	0	0	0	163	0	4	0
Lane Group Flow (vph)	24	125	55	661	551	0	149	720	379	65	740	0
Heavy Vehicles (%)	5%	5%	58%	5%	5%	10%	45%	5%	5%	5%	5%	0%
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA		pm+pt	NA	pm+ov	pm+pt	NA	
Protected Phases	7	4	5	3	8		5	2	3	1	6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)	12.4	10.8	19.8	40.8	35.2		36.9	29.7	55.7	27.1	23.9	
Effective Green, g (s)	12.4	10.8	19.8	40.8	35.2		36.9	29.7	55.7	27.1	23.9	
Actuated g/C Ratio	0.14	0.13	0.23	0.48	0.41		0.43	0.35	0.65	0.32	0.28	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	133	433	284	675	1385		192	1191	1071	214	953	
v/s Ratio Prot	0.00	0.04	0.02	c0.30	0.16		c0.08	0.21	0.11	0.01	0.22	
v/s Ratio Perm	0.02		0.03	c0.17			c0.25		0.14	0.08		
v/c Ratio	0.18	0.29	0.19	0.98	0.40		0.78	0.60	0.35	0.30	0.78	
Uniform Delay, d1	31.8	34.0	26.5	19.7	17.8		18.3	23.1	6.8	21.0	28.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.7	0.4	0.3	29.1	0.2		17.6	2.3	0.2	0.8	6.2	
Delay (s)	32.4	34.3	26.9	48.8	18.0		35.9	25.4	7.0	21.8	34.6	
Level of Service	C	C	C	D	B		D	C	A	C	C	
Approach Delay (s)		30.9			34.7			19.5			33.6	
Approach LOS		C			C			B			C	

Intersection Summary			
HCM Average Control Delay	28.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	85.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	71.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	140	70	300	160	35	85	290	365	40	300	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3438	907	1719	3291		1107	3438	1538	1805	3416	
Flt Permitted	0.62	1.00	1.00	0.44	1.00		0.50	1.00	1.00	0.56	1.00	
Satd. Flow (perm)	1174	3438	907	796	3291		586	3438	1538	1061	3416	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	27	154	77	330	176	38	93	319	401	44	330	11
RTOR Reduction (vph)	0	0	55	0	27	0	0	0	192	0	3	0
Lane Group Flow (vph)	27	154	22	330	187	0	93	319	209	44	338	0
Heavy Vehicles (%)	0%	5%	78%	5%	5%	15%	63%	5%	5%	0%	5%	10%
Turn Type	pm+pt	NA	pt+ov	pm+pt	NA		pm+pt	NA	pm+ov	pm+pt	NA	
Protected Phases	7	4	4 5	3	8		5	2	3	1	6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	8.9	8.2	15.2	20.4	15.7		22.7	19.7	27.9	19.5	18.1	
Effective Green, g (s)	8.9	8.2	15.2	20.4	15.7		22.7	19.7	27.9	19.5	18.1	
Actuated g/C Ratio	0.17	0.15	0.28	0.38	0.29		0.42	0.37	0.52	0.36	0.34	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	204	527	258	445	966		278	1266	917	406	1156	
v/s Ratio Prot	0.00	0.04	0.02	c0.11	0.06		c0.02	0.09	0.03	0.00	0.10	
v/s Ratio Perm	0.02			c0.17			c0.12		0.10	0.04		
v/c Ratio	0.13	0.29	0.08	0.74	0.19		0.33	0.25	0.23	0.11	0.29	
Uniform Delay, d1	18.9	20.1	14.0	12.9	14.2		9.7	11.8	7.0	11.1	13.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	0.3	0.1	6.5	0.1		0.7	0.5	0.1	0.1	0.6	
Delay (s)	19.2	20.4	14.2	19.4	14.3		10.4	12.2	7.1	11.2	13.6	
Level of Service	B	C	B	B	B		B	B	A	B	B	
Approach Delay (s)		18.4			17.4			9.5			13.4	
Approach LOS		B			B			A			B	

Intersection Summary			
HCM Average Control Delay	13.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	53.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	47.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	140	85	350	110	30	75	355	435	40	340	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3438	985	1719	3262		1056	3438	1538	1805	3400	
Flt Permitted	0.66	1.00	1.00	0.44	1.00		0.47	1.00	1.00	0.53	1.00	
Satd. Flow (perm)	1248	3438	985	798	3262		520	3438	1538	998	3400	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	22	151	91	376	118	32	81	382	468	43	366	22
RTOR Reduction (vph)	0	0	72	0	23	0	0	0	224	0	7	0
Lane Group Flow (vph)	22	151	19	376	127	0	81	382	244	43	381	0
Heavy Vehicles (%)	0%	5%	64%	5%	5%	15%	71%	5%	5%	0%	5%	10%
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA		pm+pt	NA	pm+ov	pm+pt	NA	
Protected Phases	7	4	5	3	8		5	2	3	1	6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)	8.9	8.2	11.2	20.5	15.8		22.6	19.6	27.9	19.6	18.1	
Effective Green, g (s)	8.9	8.2	11.2	20.5	15.8		22.6	19.6	27.9	19.6	18.1	
Actuated g/C Ratio	0.17	0.15	0.21	0.38	0.29		0.42	0.37	0.52	0.37	0.34	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	214	526	279	448	962		249	1257	915	388	1148	
v/s Ratio Prot	0.00	0.04	0.00	c0.13	0.04		c0.02	0.11	0.04	0.00	0.11	
v/s Ratio Perm	0.02		0.02	c0.19			c0.12		0.12	0.04		
v/c Ratio	0.10	0.29	0.07	0.84	0.13		0.33	0.30	0.27	0.11	0.33	
Uniform Delay, d1	18.9	20.1	17.0	13.7	13.9		9.8	12.1	7.2	11.0	13.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.2	0.3	0.1	13.0	0.1		0.8	0.6	0.2	0.1	0.8	
Delay (s)	19.1	20.4	17.1	26.7	13.9		10.5	12.8	7.3	11.2	14.0	
Level of Service	B	C	B	C	B		B	B	A	B	B	
Approach Delay (s)		19.2			23.0			9.8			13.7	
Approach LOS		B			C			A			B	

Intersection Summary			
HCM Average Control Delay	15.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	53.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	50.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
5: Windsor Ave & Oak Grove Dr/Woodbury Rd/Woodbury Rd

3/25/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	40	240	80	440	155	50	80	495	570	60	525	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3438	967	1719	3312		1081	3610	1538	1805	3438	
Flt Permitted	0.62	1.00	1.00	0.45	1.00		0.36	1.00	1.00	0.38	1.00	
Satd. Flow (perm)	1175	3438	967	807	3312		407	3610	1538	727	3438	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	42	250	83	458	161	52	83	516	594	62	547	0
RTOR Reduction (vph)	0	0	65	0	34	0	0	0	220	0	0	0
Lane Group Flow (vph)	42	250	18	458	179	0	83	516	374	62	547	0
Heavy Vehicles (%)	0%	5%	67%	5%	5%	5%	67%	0%	5%	0%	5%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	pm+ov	pm+pt	NA	
Protected Phases	7	4		3	8		5	2	3	1	6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)	13.2	11.8	11.8	23.9	18.5		18.4	16.2	24.3	18.4	16.2	
Effective Green, g (s)	13.2	11.8	11.8	23.9	18.5		18.4	16.2	24.3	18.4	16.2	
Actuated g/C Ratio	0.24	0.22	0.22	0.44	0.34		0.34	0.30	0.45	0.34	0.30	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	302	747	210	491	1128		165	1077	802	290	1026	
v/s Ratio Prot	0.00	0.07		c0.14	0.05		c0.02	0.14	0.07	0.01	c0.16	
v/s Ratio Perm	0.03		0.02	c0.27			0.15		0.17	0.06		
v/c Ratio	0.14	0.33	0.09	0.93	0.16		0.50	0.48	0.47	0.21	0.53	
Uniform Delay, d1	15.9	17.9	16.9	13.1	12.5		13.7	15.6	10.5	12.4	15.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.2	0.3	0.2	24.8	0.1		2.4	1.5	0.4	0.4	2.0	
Delay (s)	16.1	18.2	17.1	37.9	12.5		16.1	17.1	10.9	12.7	17.9	
Level of Service	B	B	B	D	B		B	B	B	B	B	
Approach Delay (s)		17.7			29.9			14.0			17.4	
Approach LOS		B			C			B			B	

Intersection Summary			
HCM Average Control Delay	18.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	54.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	63.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	115	105	605	465	50	135	660	495	60	645	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1719	3438	1022	1719	3372		1245	3438	1538	1719	3417	
Flt Permitted	0.42	1.00	1.00	0.49	1.00		0.14	1.00	1.00	0.25	1.00	
Satd. Flow (perm)	759	3438	1022	885	3372		188	3438	1538	453	3417	
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	24	137	125	720	554	60	161	786	589	71	768	48
RTOR Reduction (vph)	0	0	45	0	9	0	0	0	148	0	5	0
Lane Group Flow (vph)	24	137	80	720	605	0	161	786	441	71	811	0
Heavy Vehicles (%)	5%	5%	58%	5%	5%	10%	45%	5%	5%	5%	5%	0%
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA		pm+pt	NA	pm+ov	pm+pt	NA	
Protected Phases	7	4	5	3	8		5	2	3	1	6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)	12.7	11.1	20.1	41.1	35.5		36.9	29.7	55.7	27.1	23.9	
Effective Green, g (s)	12.7	11.1	20.1	41.1	35.5		36.9	29.7	55.7	27.1	23.9	
Actuated g/C Ratio	0.15	0.13	0.23	0.48	0.41		0.43	0.35	0.65	0.32	0.28	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	130	444	286	675	1392		191	1187	1068	190	950	
v/s Ratio Prot	0.00	0.04	0.03	c0.32	0.18		c0.09	0.23	0.12	0.01	0.24	
v/s Ratio Perm	0.02		0.05	c0.19			c0.27		0.16	0.10		
v/c Ratio	0.18	0.31	0.28	1.07	0.43		0.84	0.66	0.41	0.37	0.85	
Uniform Delay, d1	31.7	34.0	27.0	20.1	18.1		19.1	23.9	7.3	21.4	29.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.7	0.4	0.5	53.8	0.2		27.2	2.9	0.3	1.2	9.6	
Delay (s)	32.4	34.4	27.5	73.9	18.3		46.2	26.8	7.5	22.6	39.0	
Level of Service	C	C	C	E	B		D	C	A	C	D	
Approach Delay (s)		31.2			48.3			21.5			37.7	
Approach LOS		C			D			C			D	

Intersection Summary			
HCM Average Control Delay	34.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	86.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	76.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	155	75	325	175	40	95	315	400	45	325	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3438	907	1719	3284		1107	3438	1538	1805	3418	
Flt Permitted	0.60	1.00	1.00	0.44	1.00		0.48	1.00	1.00	0.54	1.00	
Satd. Flow (perm)	1149	3438	907	805	3284		559	3438	1538	1034	3418	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	27	170	82	357	192	44	104	346	440	49	357	11
RTOR Reduction (vph)	0	0	69	0	31	0	0	0	213	0	3	0
Lane Group Flow (vph)	27	170	13	357	205	0	104	346	227	49	365	0
Heavy Vehicles (%)	0%	5%	78%	5%	5%	15%	63%	5%	5%	0%	5%	10%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	pm+ov	pm+pt	NA	
Protected Phases	7	4		3	8		5	2	3	1	6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)	9.6	8.9	8.9	21.2	16.5		22.7	19.7	28.0	19.5	18.1	
Effective Green, g (s)	9.6	8.9	8.9	21.2	16.5		22.7	19.7	28.0	19.5	18.1	
Actuated g/C Ratio	0.18	0.16	0.16	0.39	0.30		0.42	0.36	0.52	0.36	0.33	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	212	564	149	454	998		264	1247	906	391	1139	
v/s Ratio Prot	0.00	0.05		c0.12	0.06		c0.02	0.10	0.04	0.00	0.11	
v/s Ratio Perm	0.02		0.01	c0.19			c0.14		0.11	0.04		
v/c Ratio	0.13	0.30	0.09	0.79	0.21		0.39	0.28	0.25	0.13	0.32	
Uniform Delay, d1	18.7	20.0	19.3	13.1	14.0		10.3	12.3	7.3	11.5	13.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	0.3	0.3	8.7	0.1		1.0	0.6	0.1	0.1	0.7	
Delay (s)	19.0	20.3	19.5	21.8	14.1		11.3	12.8	7.5	11.6	14.3	
Level of Service	B	C	B	C	B		B	B	A	B	B	
Approach Delay (s)		19.9			18.8			10.0			13.9	
Approach LOS		B			B			A			B	

Intersection Summary			
HCM Average Control Delay	14.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	54.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	50.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	155	95	380	120	35	80	385	475	45	370	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3438	985	1719	3250		1056	3438	1538	1805	3403	
Flt Permitted	0.65	1.00	1.00	0.44	1.00		0.44	1.00	1.00	0.51	1.00	
Satd. Flow (perm)	1228	3438	985	789	3250		491	3438	1538	968	3403	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	22	167	102	409	129	38	86	414	511	48	398	22
RTOR Reduction (vph)	0	0	81	0	27	0	0	0	246	0	6	0
Lane Group Flow (vph)	22	167	21	409	140	0	86	414	265	48	414	0
Heavy Vehicles (%)	0%	5%	64%	5%	5%	15%	71%	5%	5%	0%	5%	10%
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA		pm+pt	NA	pm+ov	pm+pt	NA	
Protected Phases	7	4	5	3	8		5	2	3	1	6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)	9.0	8.3	11.3	20.6	15.9		22.6	19.6	27.9	19.6	18.1	
Effective Green, g (s)	9.0	8.3	11.3	20.6	15.9		22.6	19.6	27.9	19.6	18.1	
Actuated g/C Ratio	0.17	0.15	0.21	0.38	0.30		0.42	0.36	0.52	0.36	0.34	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	213	531	281	446	962		238	1255	914	377	1147	
v/s Ratio Prot	0.00	0.05	0.00	c0.14	0.04		c0.02	0.12	0.04	0.00	0.12	
v/s Ratio Perm	0.02		0.02	c0.21			c0.13		0.13	0.04		
v/c Ratio	0.10	0.31	0.08	0.92	0.15		0.36	0.33	0.29	0.13	0.36	
Uniform Delay, d1	18.8	20.2	17.0	14.5	13.9		9.9	12.3	7.3	11.1	13.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.2	0.3	0.1	23.5	0.1		0.9	0.7	0.2	0.2	0.9	
Delay (s)	19.0	20.5	17.1	37.9	14.0		10.8	13.0	7.5	11.3	14.3	
Level of Service	B	C	B	D	B		B	B	A	B	B	
Approach Delay (s)		19.2			31.0			10.0			14.0	
Approach LOS		B			C			B			B	

Intersection Summary			
HCM Average Control Delay	17.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	53.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	54.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
5: Windsor Ave & Oak Grove Dr/Woodbury Rd/Woodbury Rd

3/25/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	45	260	85	480	170	55	85	540	620	65	570	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3438	967	1719	3312		1081	3610	1538	1805	3438	
Flt Permitted	0.61	1.00	1.00	0.44	1.00		0.31	1.00	1.00	0.37	1.00	
Satd. Flow (perm)	1151	3438	967	792	3312		349	3610	1538	703	3438	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	47	271	89	500	177	57	89	562	646	68	594	0
RTOR Reduction (vph)	0	0	48	0	38	0	0	0	196	0	0	0
Lane Group Flow (vph)	47	271	41	500	196	0	89	562	450	68	594	0
Heavy Vehicles (%)	0%	5%	67%	5%	5%	5%	67%	0%	5%	0%	5%	0%
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA		pm+pt	NA	pm+ov	pm+pt	NA	
Protected Phases	7	4	5	3	8		5	2	3	1	6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)	13.4	11.9	15.0	24.0	18.5		20.8	17.7	25.8	19.2	16.9	
Effective Green, g (s)	13.4	11.9	15.0	24.0	18.5		20.8	17.7	25.8	19.2	16.9	
Actuated g/C Ratio	0.24	0.21	0.27	0.43	0.33		0.37	0.32	0.46	0.34	0.30	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	293	731	328	474	1094		170	1141	818	286	1038	
v/s Ratio Prot	0.00	0.08	0.01	c0.15	0.06		c0.03	0.16	c0.08	0.01	0.17	
v/s Ratio Perm	0.03		0.04	c0.30			0.17		0.21	0.07		
v/c Ratio	0.16	0.37	0.12	1.05	0.18		0.52	0.49	0.55	0.24	0.57	
Uniform Delay, d1	16.6	18.8	15.5	14.7	13.3		12.4	15.5	10.9	12.6	16.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	0.3	0.2	56.6	0.1		2.9	1.5	0.8	0.4	2.3	
Delay (s)	16.9	19.2	15.7	71.3	13.4		15.3	17.0	11.7	13.1	18.8	
Level of Service	B	B	B	E	B		B	B	B	B	B	
Approach Delay (s)		18.1			52.8			14.2			18.2	
Approach LOS		B			D			B			B	

Intersection Summary			
HCM Average Control Delay	24.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	56.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	67.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	105	95	555	425	45	70	605	455	55	590	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1719	3438	1022	1719	3373		1719	3438	1538	1719	3418	
Flt Permitted	0.44	1.00	1.00	0.49	1.00		0.20	1.00	1.00	0.20	1.00	
Satd. Flow (perm)	800	3438	1022	893	3373		358	3438	1538	358	3418	
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	24	125	113	661	506	54	83	720	542	65	702	42
RTOR Reduction (vph)	0	0	96	0	10	0	0	0	200	0	5	0
Lane Group Flow (vph)	24	125	17	661	550	0	83	720	342	65	739	0
Heavy Vehicles (%)	5%	5%	58%	5%	5%	10%	5%	5%	5%	5%	5%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	pm+ov	pm+pt	NA	
Protected Phases	7	4		3	8		5	2	3	1	6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)	12.5	11.0	11.0	37.9	32.4		23.3	20.2	43.1	23.3	20.2	
Effective Green, g (s)	12.5	11.0	11.0	37.9	32.4		23.3	20.2	43.1	23.3	20.2	
Actuated g/C Ratio	0.17	0.15	0.15	0.52	0.44		0.32	0.28	0.59	0.32	0.28	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	155	517	154	721	1493		172	949	990	172	943	
v/s Ratio Prot	0.00	0.04		c0.29	0.16		c0.02	0.21	0.11	0.02	c0.22	
v/s Ratio Perm	0.02		0.02	c0.19			0.13		0.11	0.10		
v/c Ratio	0.15	0.24	0.11	0.92	0.37		0.48	0.76	0.35	0.38	0.78	
Uniform Delay, d1	25.5	27.4	26.9	14.1	13.6		18.8	24.3	7.8	18.4	24.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.5	0.2	0.3	16.4	0.2		2.1	5.7	0.2	1.4	6.5	
Delay (s)	26.0	27.7	27.2	30.4	13.7		20.9	29.9	8.0	19.8	31.0	
Level of Service	C	C	C	C	B		C	C	A	B	C	
Approach Delay (s)		27.3			22.8			20.5			30.1	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	23.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	73.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	68.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
5: Windsor Ave & Oak Grove Dr/Woodbury Rd/Woodbury Rd

3/25/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	140	70	300	160	35	30	290	365	40	300	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3438	907	1719	3291		1805	3438	1538	1805	3416	
Flt Permitted	0.95	1.00	1.00	0.45	1.00		0.55	1.00	1.00	0.47	1.00	
Satd. Flow (perm)	1805	3438	907	811	3291		1039	3438	1538	893	3416	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	27	154	77	330	176	38	33	319	401	44	330	11
RTOR Reduction (vph)	0	0	65	0	27	0	0	0	189	0	4	0
Lane Group Flow (vph)	27	154	12	330	187	0	33	319	212	44	337	0
Heavy Vehicles (%)	0%	5%	78%	5%	5%	15%	0%	5%	5%	0%	5%	10%
Turn Type	Prot	NA	Perm	pm+pt	NA		Perm	NA	pm+ov	pm+pt	NA	
Protected Phases	7	4		3	8			2	3	1	6	
Permitted Phases			4	8			2		2	6		
Actuated Green, G (s)	0.7	8.7	8.7	20.8	16.1		21.3	21.3	29.4	26.8	26.8	
Effective Green, g (s)	0.7	8.7	8.7	20.8	16.1		21.3	21.3	29.4	26.8	26.8	
Actuated g/C Ratio	0.01	0.16	0.16	0.37	0.29		0.38	0.38	0.53	0.48	0.48	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	23	538	142	436	953		398	1317	924	455	1647	
v/s Ratio Prot	0.01	0.04		c0.11	0.06			0.09	c0.03	0.00	c0.10	
v/s Ratio Perm			0.01	c0.17			0.03		0.10	0.04		
v/c Ratio	1.17	0.29	0.08	0.76	0.20		0.08	0.24	0.23	0.10	0.20	
Uniform Delay, d1	27.4	20.7	20.0	13.7	14.9		10.9	11.7	7.0	7.8	8.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	246.2	0.3	0.3	7.3	0.1		0.4	0.4	0.1	0.1	0.3	
Delay (s)	273.6	21.0	20.3	21.1	15.0		11.3	12.1	7.2	7.9	8.6	
Level of Service	F	C	C	C	B		B	B	A	A	A	
Approach Delay (s)		47.2			18.7			9.4			8.5	
Approach LOS		D			B			A			A	

Intersection Summary			
HCM Average Control Delay	16.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	55.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	45.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	140	85	350	110	30	20	355	435	40	340	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3438	985	1719	3262		1805	3438	1538	1805	3400	
Flt Permitted	0.95	1.00	1.00	0.45	1.00		0.52	1.00	1.00	0.44	1.00	
Satd. Flow (perm)	1805	3438	985	813	3262		993	3438	1538	828	3400	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	22	151	91	376	118	32	22	382	468	43	366	22
RTOR Reduction (vph)	0	0	77	0	23	0	0	0	221	0	6	0
Lane Group Flow (vph)	22	151	14	376	127	0	22	382	247	43	382	0
Heavy Vehicles (%)	0%	5%	64%	5%	5%	15%	0%	5%	5%	0%	5%	10%
Turn Type	Prot	NA	Perm	pm+pt	NA		Perm	NA	pm+ov	pm+pt	NA	
Protected Phases	7	4		3	8			2	3	1	6	
Permitted Phases			4	8			2		2	6		
Actuated Green, G (s)	0.7	8.7	8.7	20.8	16.1		21.3	21.3	29.4	26.8	26.8	
Effective Green, g (s)	0.7	8.7	8.7	20.8	16.1		21.3	21.3	29.4	26.8	26.8	
Actuated g/C Ratio	0.01	0.16	0.16	0.37	0.29		0.38	0.38	0.53	0.48	0.48	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	23	538	154	436	945		380	1317	924	425	1639	
v/s Ratio Prot	0.01	0.04		c0.13	0.04			c0.11	0.04	0.00	c0.11	
v/s Ratio Perm			0.01	c0.20			0.02		0.12	0.05		
v/c Ratio	0.96	0.28	0.09	0.86	0.13		0.06	0.29	0.27	0.10	0.23	
Uniform Delay, d1	27.4	20.7	20.1	14.8	14.6		10.8	11.9	7.2	7.8	8.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	166.5	0.3	0.3	16.0	0.1		0.3	0.6	0.2	0.1	0.3	
Delay (s)	194.0	21.0	20.3	30.8	14.7		11.1	12.5	7.3	7.9	8.7	
Level of Service	F	C	C	C	B		B	B	A	A	A	
Approach Delay (s)		35.2			26.2			9.7			8.7	
Approach LOS		D			C			A			A	

Intersection Summary			
HCM Average Control Delay	16.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	55.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	50.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	40	240	80	440	155	50	25	495	570	60	525	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3438	967	1719	3312		1805	3610	1538	1805	3435	
Flt Permitted	0.95	1.00	1.00	0.44	1.00		0.37	1.00	1.00	0.40	1.00	
Satd. Flow (perm)	1805	3438	967	799	3312		711	3610	1538	764	3435	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	42	250	83	458	161	52	26	516	594	62	547	5
RTOR Reduction (vph)	0	0	64	0	31	0	0	0	168	0	1	0
Lane Group Flow (vph)	42	250	19	458	182	0	26	516	426	62	551	0
Heavy Vehicles (%)	0%	5%	67%	5%	5%	5%	0%	0%	5%	0%	5%	0%
Turn Type	Prot	NA	Perm	pm+pt	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases	7	4		3	8			2	3		6	
Permitted Phases			4	8			2		2	6		
Actuated Green, G (s)	1.9	11.4	11.4	26.1	20.2		16.0	16.0	26.7	16.0	16.0	
Effective Green, g (s)	1.9	11.4	11.4	26.1	20.2		16.0	16.0	26.7	16.0	16.0	
Actuated g/C Ratio	0.04	0.23	0.23	0.52	0.40		0.32	0.32	0.53	0.32	0.32	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	68	782	220	613	1335		227	1153	942	244	1097	
v/s Ratio Prot	0.02	0.07		c0.16	0.05			0.14	c0.10		c0.16	
v/s Ratio Perm			0.02	c0.23			0.04		0.18	0.08		
v/c Ratio	0.62	0.32	0.09	0.75	0.14		0.11	0.45	0.45	0.25	0.50	
Uniform Delay, d1	23.7	16.1	15.2	8.1	9.4		12.0	13.5	7.2	12.6	13.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	15.5	0.2	0.2	5.0	0.0		1.0	1.3	0.3	2.5	1.6	
Delay (s)	39.3	16.4	15.4	13.1	9.5		13.1	14.8	7.5	15.1	15.5	
Level of Service	D	B	B	B	A		B	B	A	B	B	
Approach Delay (s)		18.7			11.9			11.0			15.4	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM Average Control Delay	13.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	50.1	Sum of lost time (s)	4.0
Intersection Capacity Utilization	62.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	115	105	605	465	50	75	660	495	60	645	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1719	3438	1022	1719	3372		1245	3438	1538	1719	3417	
Flt Permitted	0.42	1.00	1.00	0.49	1.00		0.15	1.00	1.00	0.18	1.00	
Satd. Flow (perm)	759	3438	1022	885	3372		196	3438	1538	335	3417	
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	24	137	125	720	554	60	89	786	589	71	768	48
RTOR Reduction (vph)	0	0	60	0	9	0	0	0	143	0	5	0
Lane Group Flow (vph)	24	137	65	720	605	0	89	786	446	71	811	0
Heavy Vehicles (%)	5%	5%	58%	5%	5%	10%	45%	5%	5%	5%	5%	0%
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA		pm+pt	NA	pm+ov	pm+pt	NA	
Protected Phases	7	4	5	3	8		5	2	3	1	6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)	12.7	11.1	16.1	44.1	38.5		31.7	26.7	55.7	28.1	24.9	
Effective Green, g (s)	12.7	11.1	16.1	44.1	38.5		31.7	26.7	55.7	28.1	24.9	
Actuated g/C Ratio	0.15	0.13	0.19	0.51	0.45		0.37	0.31	0.65	0.33	0.29	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	130	444	239	735	1510		133	1067	1068	161	989	
v/s Ratio Prot	0.00	0.04	0.02	c0.33	0.18		c0.04	0.23	0.14	0.02	c0.24	
v/s Ratio Perm	0.02		0.05	c0.17			0.21		0.15	0.13		
v/c Ratio	0.18	0.31	0.27	0.98	0.40		0.67	0.74	0.42	0.44	0.82	
Uniform Delay, d1	31.7	34.0	29.9	18.0	16.0		20.5	26.5	7.3	21.3	28.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.7	0.4	0.6	27.8	0.2		12.1	4.5	0.3	1.9	7.6	
Delay (s)	32.4	34.4	30.5	45.8	16.2		32.5	31.1	7.6	23.2	36.0	
Level of Service	C	C	C	D	B		C	C	A	C	D	
Approach Delay (s)		32.5			32.2			21.7			35.0	
Approach LOS		C			C			C			D	

Intersection Summary			
HCM Average Control Delay	29.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	86.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	73.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
5: Windsor Ave & Oak Grove Dr/Woodbury Rd/Woodbury Rd

3/25/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	155	75	325	175	40	35	315	400	45	325	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3438	907	1719	3284		1107	3438	1538	1805	3418	
Flt Permitted	0.60	1.00	1.00	0.44	1.00		0.48	1.00	1.00	0.54	1.00	
Satd. Flow (perm)	1149	3438	907	790	3284		564	3438	1538	1034	3418	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	27	170	82	357	192	44	38	346	440	49	357	11
RTOR Reduction (vph)	0	0	65	0	31	0	0	0	212	0	3	0
Lane Group Flow (vph)	27	170	17	357	205	0	38	346	228	49	365	0
Heavy Vehicles (%)	0%	5%	78%	5%	5%	15%	63%	5%	5%	0%	5%	10%
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA		pm+pt	NA	pm+ov	pm+pt	NA	
Protected Phases	7	4	5	3	8		5	2	3	1	6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)	9.1	8.4	11.4	20.7	16.0		22.6	19.6	27.9	19.6	18.1	
Effective Green, g (s)	9.1	8.4	11.4	20.7	16.0		22.6	19.6	27.9	19.6	18.1	
Actuated g/C Ratio	0.17	0.16	0.21	0.38	0.30		0.42	0.36	0.52	0.36	0.34	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	203	537	260	447	977		267	1253	912	398	1150	
v/s Ratio Prot	0.00	0.05	0.00	c0.12	0.06		c0.01	0.10	0.04	0.00	c0.11	
v/s Ratio Perm	0.02		0.02	c0.18			0.05		0.11	0.04		
v/c Ratio	0.13	0.32	0.07	0.80	0.21		0.14	0.28	0.25	0.12	0.32	
Uniform Delay, d1	18.9	20.2	16.9	13.2	14.2		9.4	12.1	7.2	11.2	13.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	0.3	0.1	9.6	0.1		0.2	0.5	0.1	0.1	0.7	
Delay (s)	19.2	20.5	17.1	22.8	14.3		9.6	12.6	7.3	11.3	14.0	
Level of Service	B	C	B	C	B		A	B	A	B	B	
Approach Delay (s)		19.4			19.4			9.7			13.7	
Approach LOS		B			B			A			B	

Intersection Summary			
HCM Average Control Delay	14.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	53.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	48.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
5: Windsor Ave & Oak Grove Dr/Woodbury Rd/Woodbury Rd

3/25/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	155	95	380	120	35	20	385	475	45	370	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3438	985	1719	3250		1056	3438	1538	1805	3403	
Flt Permitted	0.65	1.00	1.00	0.44	1.00		0.44	1.00	1.00	0.51	1.00	
Satd. Flow (perm)	1228	3438	985	789	3250		491	3438	1538	968	3403	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	22	167	102	409	129	38	22	414	511	48	398	22
RTOR Reduction (vph)	0	0	81	0	27	0	0	0	246	0	6	0
Lane Group Flow (vph)	22	167	21	409	140	0	22	414	265	48	414	0
Heavy Vehicles (%)	0%	5%	64%	5%	5%	15%	71%	5%	5%	0%	5%	10%
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA		pm+pt	NA	pm+ov	pm+pt	NA	
Protected Phases	7	4	5	3	8		5	2	3	1	6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)	9.0	8.3	11.3	20.6	15.9		22.6	19.6	27.9	19.6	18.1	
Effective Green, g (s)	9.0	8.3	11.3	20.6	15.9		22.6	19.6	27.9	19.6	18.1	
Actuated g/C Ratio	0.17	0.15	0.21	0.38	0.30		0.42	0.36	0.52	0.36	0.34	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	213	531	281	446	962		238	1255	914	377	1147	
v/s Ratio Prot	0.00	0.05	c0.00	c0.14	0.04		0.01	0.12	0.04	0.00	c0.12	
v/s Ratio Perm	0.02		0.02	c0.21			0.03		0.13	0.04		
v/c Ratio	0.10	0.31	0.08	0.92	0.15		0.09	0.33	0.29	0.13	0.36	
Uniform Delay, d1	18.8	20.2	17.0	14.5	13.9		9.3	12.3	7.3	11.1	13.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.2	0.3	0.1	23.5	0.1		0.2	0.7	0.2	0.2	0.9	
Delay (s)	19.0	20.5	17.1	37.9	14.0		9.4	13.0	7.5	11.3	14.3	
Level of Service	B	C	B	D	B		A	B	A	B	B	
Approach Delay (s)		19.2			31.0			9.9			14.0	
Approach LOS		B			C			A			B	

Intersection Summary			
HCM Average Control Delay	17.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	53.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	52.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	45	260	85	480	170	55	25	540	620	65	570	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3438	967	1719	3312		1081	3610	1538	1805	3438	
Flt Permitted	0.61	1.00	1.00	0.44	1.00		0.31	1.00	1.00	0.37	1.00	
Satd. Flow (perm)	1151	3438	967	792	3312		349	3610	1538	703	3438	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	47	271	89	500	177	57	26	562	646	68	594	0
RTOR Reduction (vph)	0	0	48	0	38	0	0	0	196	0	0	0
Lane Group Flow (vph)	47	271	41	500	196	0	26	562	450	68	594	0
Heavy Vehicles (%)	0%	5%	67%	5%	5%	5%	67%	0%	5%	0%	5%	0%
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA		pm+pt	NA	pm+ov	pm+pt	NA	
Protected Phases	7	4	5	3	8		5	2	3	1	6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)	13.4	11.9	15.0	24.0	18.5		20.8	17.7	25.8	19.2	16.9	
Effective Green, g (s)	13.4	11.9	15.0	24.0	18.5		20.8	17.7	25.8	19.2	16.9	
Actuated g/C Ratio	0.24	0.21	0.27	0.43	0.33		0.37	0.32	0.46	0.34	0.30	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	293	731	328	474	1094		170	1141	818	286	1038	
v/s Ratio Prot	0.00	0.08	c0.01	c0.15	0.06		0.01	0.16	c0.08	0.01	0.17	
v/s Ratio Perm	0.03		0.04	c0.30			0.05		0.21	0.07		
v/c Ratio	0.16	0.37	0.12	1.05	0.18		0.15	0.49	0.55	0.24	0.57	
Uniform Delay, d1	16.6	18.8	15.5	14.7	13.3		11.6	15.5	10.9	12.6	16.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	0.3	0.2	56.6	0.1		0.4	1.5	0.8	0.4	2.3	
Delay (s)	16.9	19.2	15.7	71.3	13.4		12.0	17.0	11.7	13.1	18.8	
Level of Service	B	B	B	E	B		B	B	B	B	B	
Approach Delay (s)		18.1			52.8			14.1			18.2	
Approach LOS		B			D			B			B	

Intersection Summary			
HCM Average Control Delay	24.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	56.0	Sum of lost time (s)	4.0
Intersection Capacity Utilization	66.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	105	40	555	425	45	125	605	455	55	590	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1719	3438	1538	1719	3373		1245	3438	1538	1719	3418	
Flt Permitted	0.44	1.00	1.00	0.49	1.00		0.14	1.00	1.00	0.30	1.00	
Satd. Flow (perm)	800	3438	1538	888	3373		188	3438	1538	537	3418	
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	24	125	48	661	506	54	149	720	542	65	702	42
RTOR Reduction (vph)	0	0	37	0	9	0	0	0	163	0	4	0
Lane Group Flow (vph)	24	125	11	661	551	0	149	720	379	65	740	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	10%	45%	5%	5%	5%	5%	0%
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA		pm+pt	NA	pm+ov	pm+pt	NA	
Protected Phases	7	4	5	3	8		5	2	3	1	6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)	12.4	10.8	19.8	40.8	35.2		36.9	29.7	55.7	27.1	23.9	
Effective Green, g (s)	12.4	10.8	19.8	40.8	35.2		36.9	29.7	55.7	27.1	23.9	
Actuated g/C Ratio	0.14	0.13	0.23	0.48	0.41		0.43	0.35	0.65	0.32	0.28	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	133	433	427	675	1385		192	1191	1071	214	953	
v/s Ratio Prot	0.00	0.04	0.00	c0.30	0.16		c0.08	0.21	0.11	0.01	0.22	
v/s Ratio Perm	0.02		0.00	c0.17			c0.25		0.14	0.08		
v/c Ratio	0.18	0.29	0.03	0.98	0.40		0.78	0.60	0.35	0.30	0.78	
Uniform Delay, d1	31.8	34.0	25.5	19.7	17.8		18.3	23.1	6.8	21.0	28.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.7	0.4	0.0	29.1	0.2		17.6	2.3	0.2	0.8	6.2	
Delay (s)	32.4	34.3	25.5	48.8	18.0		35.9	25.4	7.0	21.8	34.6	
Level of Service	C	C	C	D	B		D	C	A	C	C	
Approach Delay (s)		32.0			34.7			19.5			33.6	
Approach LOS		C			C			B			C	

Intersection Summary			
HCM Average Control Delay	28.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	85.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	71.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	140	15	300	160	35	85	290	365	40	300	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3438	1538	1719	3291		1107	3438	1538	1805	3416	
Flt Permitted	0.62	1.00	1.00	0.44	1.00		0.50	1.00	1.00	0.56	1.00	
Satd. Flow (perm)	1174	3438	1538	796	3291		588	3438	1538	1061	3416	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	27	154	16	330	176	38	93	319	401	44	330	11
RTOR Reduction (vph)	0	0	14	0	27	0	0	0	193	0	3	0
Lane Group Flow (vph)	27	154	2	330	187	0	93	319	208	44	338	0
Heavy Vehicles (%)	0%	5%	5%	5%	5%	15%	63%	5%	5%	0%	5%	10%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	pm+ov	pm+pt	NA	
Protected Phases	7	4		3	8		5	2	3	1	6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)	8.9	8.2	8.2	20.4	15.7		22.6	19.6	27.8	19.6	18.1	
Effective Green, g (s)	8.9	8.2	8.2	20.4	15.7		22.6	19.6	27.8	19.6	18.1	
Actuated g/C Ratio	0.17	0.15	0.15	0.38	0.29		0.42	0.37	0.52	0.37	0.34	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	204	527	236	445	966		277	1260	914	410	1156	
v/s Ratio Prot	0.00	0.04		c0.11	0.06		c0.02	0.09	0.03	0.00	0.10	
v/s Ratio Perm	0.02		0.00	c0.17			c0.12		0.10	0.04		
v/c Ratio	0.13	0.29	0.01	0.74	0.19		0.34	0.25	0.23	0.11	0.29	
Uniform Delay, d1	18.9	20.1	19.2	12.9	14.2		9.8	11.8	7.0	11.0	13.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	0.3	0.0	6.5	0.1		0.7	0.5	0.1	0.1	0.6	
Delay (s)	19.2	20.4	19.2	19.4	14.3		10.5	12.3	7.1	11.1	13.6	
Level of Service	B	C	B	B	B		B	B	A	B	B	
Approach Delay (s)		20.1			17.4			9.6			13.4	
Approach LOS		C			B			A			B	

Intersection Summary			
HCM Average Control Delay	13.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	53.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	47.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	140	30	350	110	30	75	355	435	40	340	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3438	1538	1719	3262		1031	3438	1538	1805	3400	
Flt Permitted	0.66	1.00	1.00	0.44	1.00		0.47	1.00	1.00	0.53	1.00	
Satd. Flow (perm)	1248	3438	1538	798	3262		508	3438	1538	998	3400	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	22	151	32	376	118	32	81	382	468	43	366	22
RTOR Reduction (vph)	0	0	25	0	23	0	0	0	224	0	7	0
Lane Group Flow (vph)	22	151	7	376	127	0	81	382	244	43	381	0
Heavy Vehicles (%)	0%	5%	5%	5%	5%	15%	75%	5%	5%	0%	5%	10%
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA		pm+pt	NA	pm+ov	pm+pt	NA	
Protected Phases	7	4	5	3	8		5	2	3	1	6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)	8.9	8.2	11.2	20.5	15.8		22.6	19.6	27.9	19.6	18.1	
Effective Green, g (s)	8.9	8.2	11.2	20.5	15.8		22.6	19.6	27.9	19.6	18.1	
Actuated g/C Ratio	0.17	0.15	0.21	0.38	0.29		0.42	0.37	0.52	0.37	0.34	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	214	526	436	448	962		243	1257	915	388	1148	
v/s Ratio Prot	0.00	0.04	0.00	c0.13	0.04		c0.02	0.11	0.04	0.00	0.11	
v/s Ratio Perm	0.02		0.00	c0.19			c0.12		0.12	0.04		
v/c Ratio	0.10	0.29	0.02	0.84	0.13		0.33	0.30	0.27	0.11	0.33	
Uniform Delay, d1	18.9	20.1	16.8	13.7	13.9		9.8	12.1	7.2	11.0	13.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.2	0.3	0.0	13.0	0.1		0.8	0.6	0.2	0.1	0.8	
Delay (s)	19.1	20.4	16.8	26.7	13.9		10.6	12.8	7.3	11.2	14.0	
Level of Service	B	C	B	C	B		B	B	A	B	B	
Approach Delay (s)		19.7			23.0			9.8			13.7	
Approach LOS		B			C			A			B	

Intersection Summary			
HCM Average Control Delay	14.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	53.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	50.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	40	240	25	440	155	50	80	495	570	60	525	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3438	1615	1719	3312		1081	3610	1538	1805	3435	
Flt Permitted	0.62	1.00	1.00	0.45	1.00		0.35	1.00	1.00	0.38	1.00	
Satd. Flow (perm)	1175	3438	1615	807	3312		403	3610	1538	727	3435	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	42	250	26	458	161	52	83	516	594	62	547	5
RTOR Reduction (vph)	0	0	20	0	34	0	0	0	220	0	1	0
Lane Group Flow (vph)	42	250	6	458	179	0	83	516	374	62	551	0
Heavy Vehicles (%)	0%	5%	0%	5%	5%	5%	67%	0%	5%	0%	5%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	pm+ov	pm+pt	NA	
Protected Phases	7	4		3	8		5	2	3	1	6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)	13.2	11.8	11.8	23.9	18.5		18.4	16.2	24.3	18.4	16.2	
Effective Green, g (s)	13.2	11.8	11.8	23.9	18.5		18.4	16.2	24.3	18.4	16.2	
Actuated g/C Ratio	0.24	0.22	0.22	0.44	0.34		0.34	0.30	0.45	0.34	0.30	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	302	747	351	491	1128		164	1077	802	290	1025	
v/s Ratio Prot	0.00	0.07		c0.14	0.05		c0.02	0.14	0.07	0.01	c0.16	
v/s Ratio Perm	0.03		0.00	c0.27			0.15		0.17	0.06		
v/c Ratio	0.14	0.33	0.02	0.93	0.16		0.51	0.48	0.47	0.21	0.54	
Uniform Delay, d1	15.9	17.9	16.7	13.1	12.5		13.8	15.6	10.5	12.4	15.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.2	0.3	0.0	24.8	0.1		2.4	1.5	0.4	0.4	2.0	
Delay (s)	16.1	18.2	16.7	37.9	12.5		16.2	17.1	10.9	12.7	17.9	
Level of Service	B	B	B	D	B		B	B	B	B	B	
Approach Delay (s)		17.8			29.9			14.0			17.4	
Approach LOS		B			C			B			B	

Intersection Summary			
HCM Average Control Delay	19.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	54.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	63.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	115	45	605	465	50	135	660	495	60	645	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1719	3438	1022	1719	3372		1245	3438	1538	1719	3417	
Flt Permitted	0.42	1.00	1.00	0.49	1.00		0.14	1.00	1.00	0.25	1.00	
Satd. Flow (perm)	759	3438	1022	885	3372		188	3438	1538	453	3417	
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	24	137	54	720	554	60	161	786	589	71	768	48
RTOR Reduction (vph)	0	0	41	0	9	0	0	0	148	0	5	0
Lane Group Flow (vph)	24	137	13	720	605	0	161	786	441	71	811	0
Heavy Vehicles (%)	5%	5%	58%	5%	5%	10%	45%	5%	5%	5%	5%	0%
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA		pm+pt	NA	pm+ov	pm+pt	NA	
Protected Phases	7	4	5	3	8		5	2	3	1	6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)	12.7	11.1	20.1	41.1	35.5		36.9	29.7	55.7	27.1	23.9	
Effective Green, g (s)	12.7	11.1	20.1	41.1	35.5		36.9	29.7	55.7	27.1	23.9	
Actuated g/C Ratio	0.15	0.13	0.23	0.48	0.41		0.43	0.35	0.65	0.32	0.28	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	130	444	286	675	1392		191	1187	1068	190	950	
v/s Ratio Prot	0.00	0.04	0.00	c0.32	0.18		c0.09	0.23	0.12	0.01	0.24	
v/s Ratio Perm	0.02		0.01	c0.19			c0.27		0.16	0.10		
v/c Ratio	0.18	0.31	0.04	1.07	0.43		0.84	0.66	0.41	0.37	0.85	
Uniform Delay, d1	31.7	34.0	25.5	20.1	18.1		19.1	23.9	7.3	21.4	29.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.7	0.4	0.1	53.8	0.2		27.2	2.9	0.3	1.2	9.6	
Delay (s)	32.4	34.4	25.6	73.9	18.3		46.2	26.8	7.5	22.6	39.0	
Level of Service	C	C	C	E	B		D	C	A	C	D	
Approach Delay (s)		31.9			48.3			21.5			37.7	
Approach LOS		C			D			C			D	

Intersection Summary			
HCM Average Control Delay	34.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	86.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	76.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	155	15	325	175	40	95	315	400	45	325	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3438	907	1719	3284		1107	3438	1538	1805	3418	
Flt Permitted	0.60	1.00	1.00	0.44	1.00		0.48	1.00	1.00	0.54	1.00	
Satd. Flow (perm)	1149	3438	907	790	3284		564	3438	1538	1034	3418	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	27	170	16	357	192	44	104	346	440	49	357	11
RTOR Reduction (vph)	0	0	13	0	31	0	0	0	212	0	3	0
Lane Group Flow (vph)	27	170	3	357	205	0	104	346	228	49	365	0
Heavy Vehicles (%)	0%	5%	78%	5%	5%	15%	63%	5%	5%	0%	5%	10%
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA		pm+pt	NA	pm+ov	pm+pt	NA	
Protected Phases	7	4	5	3	8		5	2	3	1	6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)	9.1	8.4	11.4	20.7	16.0		22.6	19.6	27.9	19.6	18.1	
Effective Green, g (s)	9.1	8.4	11.4	20.7	16.0		22.6	19.6	27.9	19.6	18.1	
Actuated g/C Ratio	0.17	0.16	0.21	0.38	0.30		0.42	0.36	0.52	0.36	0.34	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	203	537	260	447	977		267	1253	912	398	1150	
v/s Ratio Prot	0.00	0.05	0.00	c0.12	0.06		c0.02	0.10	0.04	0.00	0.11	
v/s Ratio Perm	0.02		0.00	c0.18			c0.14		0.11	0.04		
v/c Ratio	0.13	0.32	0.01	0.80	0.21		0.39	0.28	0.25	0.12	0.32	
Uniform Delay, d1	18.9	20.2	16.8	13.2	14.2		10.1	12.1	7.2	11.2	13.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	0.3	0.0	9.6	0.1		0.9	0.5	0.1	0.1	0.7	
Delay (s)	19.2	20.5	16.8	22.8	14.3		11.1	12.6	7.3	11.3	14.0	
Level of Service	B	C	B	C	B		B	B	A	B	B	
Approach Delay (s)		20.0			19.4			9.8			13.7	
Approach LOS		C			B			A			B	

Intersection Summary			
HCM Average Control Delay	14.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	53.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	50.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	155	35	380	120	35	80	385	475	45	370	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3438	985	1719	3250		1056	3438	1538	1805	3403	
Flt Permitted	0.65	1.00	1.00	0.44	1.00		0.44	1.00	1.00	0.51	1.00	
Satd. Flow (perm)	1228	3438	985	789	3250		491	3438	1538	968	3403	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	22	167	38	409	129	38	86	414	511	48	398	22
RTOR Reduction (vph)	0	0	30	0	27	0	0	0	246	0	6	0
Lane Group Flow (vph)	22	167	8	409	140	0	86	414	265	48	414	0
Heavy Vehicles (%)	0%	5%	64%	5%	5%	15%	71%	5%	5%	0%	5%	10%
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA		pm+pt	NA	pm+ov	pm+pt	NA	
Protected Phases	7	4	5	3	8		5	2	3	1	6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)	9.0	8.3	11.3	20.6	15.9		22.6	19.6	27.9	19.6	18.1	
Effective Green, g (s)	9.0	8.3	11.3	20.6	15.9		22.6	19.6	27.9	19.6	18.1	
Actuated g/C Ratio	0.17	0.15	0.21	0.38	0.30		0.42	0.36	0.52	0.36	0.34	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	213	531	281	446	962		238	1255	914	377	1147	
v/s Ratio Prot	0.00	0.05	0.00	c0.14	0.04		c0.02	0.12	0.04	0.00	0.12	
v/s Ratio Perm	0.02		0.01	c0.21			c0.13		0.13	0.04		
v/c Ratio	0.10	0.31	0.03	0.92	0.15		0.36	0.33	0.29	0.13	0.36	
Uniform Delay, d1	18.8	20.2	16.8	14.5	13.9		9.9	12.3	7.3	11.1	13.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.2	0.3	0.0	23.5	0.1		0.9	0.7	0.2	0.2	0.9	
Delay (s)	19.0	20.5	16.9	37.9	14.0		10.8	13.0	7.5	11.3	14.3	
Level of Service	B	C	B	D	B		B	B	A	B	B	
Approach Delay (s)		19.8			31.0			10.0			14.0	
Approach LOS		B			C			B			B	

Intersection Summary			
HCM Average Control Delay	17.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	53.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	54.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
5: Windsor Ave & Oak Grove Dr/Woodbury Rd/Woodbury Rd

3/25/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	45	260	25	480	170	55	85	540	620	65	570	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3438	967	1719	3312		1081	3610	1538	1805	3438	
Flt Permitted	0.61	1.00	1.00	0.44	1.00		0.31	1.00	1.00	0.37	1.00	
Satd. Flow (perm)	1151	3438	967	792	3312		349	3610	1538	703	3438	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	47	271	26	500	177	57	89	562	646	68	594	0
RTOR Reduction (vph)	0	0	19	0	38	0	0	0	196	0	0	0
Lane Group Flow (vph)	47	271	7	500	196	0	89	562	450	68	594	0
Heavy Vehicles (%)	0%	5%	67%	5%	5%	5%	67%	0%	5%	0%	5%	0%
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA		pm+pt	NA	pm+ov	pm+pt	NA	
Protected Phases	7	4	5	3	8		5	2	3	1	6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)	13.4	11.9	15.0	24.0	18.5		20.8	17.7	25.8	19.2	16.9	
Effective Green, g (s)	13.4	11.9	15.0	24.0	18.5		20.8	17.7	25.8	19.2	16.9	
Actuated g/C Ratio	0.24	0.21	0.27	0.43	0.33		0.37	0.32	0.46	0.34	0.30	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	293	731	328	474	1094		170	1141	818	286	1038	
v/s Ratio Prot	0.00	0.08	0.00	c0.15	0.06		c0.03	0.16	c0.08	0.01	0.17	
v/s Ratio Perm	0.03		0.01	c0.30			0.17		0.21	0.07		
v/c Ratio	0.16	0.37	0.02	1.05	0.18		0.52	0.49	0.55	0.24	0.57	
Uniform Delay, d1	16.6	18.8	15.1	14.7	13.3		12.4	15.5	10.9	12.6	16.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	0.3	0.0	56.6	0.1		2.9	1.5	0.8	0.4	2.3	
Delay (s)	16.9	19.2	15.1	71.3	13.4		15.3	17.0	11.7	13.1	18.8	
Level of Service	B	B	B	E	B		B	B	B	B	B	
Approach Delay (s)		18.6			52.8			14.2			18.2	
Approach LOS		B			D			B			B	

Intersection Summary			
HCM Average Control Delay	24.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	56.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	67.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

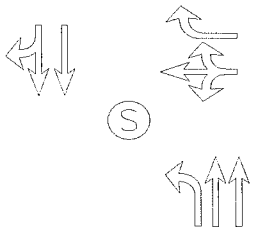
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	1 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1B

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY WB RAMPS						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	5	5%		5	5	10
WB THRU	5	5%		5	5	10
WB RIGHT	570	5%	**55**	625	55	680
WINDSOR AVE						
NB LEFT	40	5%		40	5	45
NB THRU	555	5%		555	50	605
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	585	5%	**55**	640	60	700
SB RIGHT	530	5%		530	50	580
TOTALS	**2290**		**110**	**2400**	**230**	**2630**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	10-Sep-13	VV.110264.0000	2 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY WB RAMPS						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	5	5%		5	5	10
WB THRU	5	5%		5	5	10
WB RIGHT	570	5%		570	50	620
WINDSOR AVE						
NB LEFT	40	5%		40	5	45
NB THRU	555	5%		555	50	605
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	585	5%	**55**	640	60	700
SB RIGHT	530	5%		530	50	580
TOTALS	**2290**		**55**	**2345**	**225**	**2570**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	10-Sep-13	VV.110264.0000	3 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1D

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY WB RAMPS						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	5	5%		5	5	10
WB THRU	5	5%		5	5	10
WB RIGHT	570	5%	**55**	625	55	680
WINDSOR AVE						
NB LEFT	40	5%		40	5	45
NB THRU	555	5%		555	50	605
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	585	5%		585	55	640
SB RIGHT	530	5%		530	50	580
TOTALS	**2290**		**55**	**2345**	**225**	**2570**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	10-Sep-13	VV.110264.0000	4 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1F

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY WB RAMPS						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	5	5%		5	5	10
WB THRU	5	5%		5	5	10
WB RIGHT	570	5%		570	50	620
WINDSOR AVE						
NB LEFT	40	5%		40	5	45
NB THRU	555	5%	**55**	610	55	665
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	585	5%		585	55	640
SB RIGHT	530	5%	**55**	585	55	640
TOTALS	**2290**		**110**	**2400**	**230**	**2630**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	10-Sep-13	VV.110264.0000	5 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY WB RAMPS						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	5	5%		5	5	10
WB THRU	5	5%		5	5	10
WB RIGHT	570	5%		570	50	620
WINDSOR AVE						
NB LEFT	40	5%		40	5	45
NB THRU	555	5%		555	50	605
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	585	5%		585	55	640
SB RIGHT	530	5%	**55**	585	55	640
TOTALS	**2290**		**55**	**2345**	**225**	**2570**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	10-Sep-13	VV.110264.0000	6 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY WB RAMPS						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	5	5%		5	5	10
WB THRU	5	5%		5	5	10
WB RIGHT	570	5%		570	50	620
WINDSOR AVE						
NB LEFT	40	5%		40	5	45
NB THRU	555	5%	**55**	610	55	665
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	585	5%		585	55	640
SB RIGHT	530	5%		530	50	580
TOTALS	**2290**		**55**	**2345**	**225**	**2570**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	7 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY WB RAMPS						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	20	5%		20	5	25
WB THRU	5	5%		5	5	10
WB RIGHT	275	5%	**55**	330	30	360
WINDSOR AVE						
NB LEFT	45	5%		45	5	50
NB THRU	420	5%		420	40	460
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	370	5%	**55**	425	40	465
SB RIGHT	280	5%		280	25	305
TOTALS	**1415**		**110**	**1525**	**150**	**1675**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	10-Sep-13	VV.110264.0000	8 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY WB RAMPS						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	20	5%		20	5	25
WB THRU	5	5%		5	5	10
WB RIGHT	275	5%		275	25	300
WINDSOR AVE						
NB LEFT	45	5%		45	5	50
NB THRU	420	5%		420	40	460
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	370	5%	**55**	425	40	465
SB RIGHT	280	5%		280	25	305
TOTALS	**1415**		**55**	**1470**	**145**	**1615**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	10-Sep-13	VV.110264.0000	9 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1D

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY WB RAMPS						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	20	5%		20	5	25
WB THRU	5	5%		5	5	10
WB RIGHT	275	5%	**55**	330	30	360
WINDSOR AVE						
NB LEFT	45	5%		45	5	50
NB THRU	420	5%		420	40	460
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	370	5%		370	35	405
SB RIGHT	280	5%		280	25	305
TOTALS	**1415**		**55**	**1470**	**145**	**1615**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	10-Sep-13	VV.110264.0000	10 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1F

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY WB RAMPS						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	20	5%		20	5	25
WB THRU	5	5%		5	5	10
WB RIGHT	275	5%		275	25	300
WINDSOR AVE						
NB LEFT	45	5%		45	5	50
NB THRU	420	5%	**55**	475	45	520
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	370	5%		370	35	405
SB RIGHT	280	5%	**55**	335	30	365
TOTALS	**1415**		**110**	**1525**	**150**	**1675**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	10-Sep-13	VV.110264.0000	11 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY WB RAMPS						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	20	5%		20	5	25
WB THRU	5	5%		5	5	10
WB RIGHT	275	5%		275	25	300
WINDSOR AVE						
NB LEFT	45	5%		45	5	50
NB THRU	420	5%		420	40	460
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	370	5%		370	35	405
SB RIGHT	280	5%	**55**	335	30	365
TOTALS	**1415**		**55**	**1470**	**145**	**1615**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	10-Sep-13	VV.110264.0000	12 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY WB RAMPS						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	20	5%		20	5	25
WB THRU	5	5%		5	5	10
WB RIGHT	275	5%		275	25	300
WINDSOR AVE						
NB LEFT	45	5%		45	5	50
NB THRU	420	5%	**55**	475	45	520
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	370	5%		370	35	405
SB RIGHT	280	5%		280	25	305
TOTALS	**1415**		**55**	**1470**	**145**	**1615**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	10-Sep-13	VV.110264.0000	13 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY WB RAMPS						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	20	5%		20	5	25
WB THRU	5	5%		5	5	10
WB RIGHT	335	5%	**55**	390	35	425
WINDSOR AVE						
NB LEFT	45	5%		45	5	50
NB THRU	500	5%		500	45	545
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	435	5%	**55**	490	45	535
SB RIGHT	275	5%		275	25	300
TOTALS	**1615**		**110**	**1725**	**165**	**1890**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	10-Sep-13	VV.110264.0000	14 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY WB RAMPS						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	20	5%		20	5	25
WB THRU	5	5%		5	5	10
WB RIGHT	335	5%		335	30	365
WINDSOR AVE						
NB LEFT	45	5%		45	5	50
NB THRU	500	5%		500	45	545
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	435	5%	**55**	490	45	535
SB RIGHT	275	5%		275	25	300
TOTALS	**1615**		**55**	**1670**	**160**	**1830**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	10-Sep-13	VV.110264.0000	15 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1D

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY WB RAMPS						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	20	5%		20	5	25
WB THRU	5	5%		5	5	10
WB RIGHT	335	5%	**55**	390	35	425
WINDSOR AVE						
NB LEFT	45	5%		45	5	50
NB THRU	500	5%		500	45	545
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	435	5%		435	40	475
SB RIGHT	275	5%		275	25	300
TOTALS	**1615**		**55**	**1670**	**160**	**1830**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	10-Sep-13	VV.110264.0000	16 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1F

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY WB RAMPS						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	20	5%		20	5	25
WB THRU	5	5%		5	5	10
WB RIGHT	335	5%		335	30	365
WINDSOR AVE						
NB LEFT	45	5%		45	5	50
NB THRU	500	5%	**55**	555	50	605
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	435	5%		435	40	475
SB RIGHT	275	5%	**55**	330	30	360
TOTALS	**1615**		**110**	**1725**	**165**	**1890**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	10-Sep-13	VV.110264.0000	17 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY WB RAMPS						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	20	5%		20	5	25
WB THRU	5	5%		5	5	10
WB RIGHT	335	5%		335	30	365
WINDSOR AVE						
NB LEFT	45	5%		45	5	50
NB THRU	500	5%		500	45	545
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	435	5%		435	40	475
SB RIGHT	275	5%	55	330	30	360
TOTALS	**1615**		**55**	**1670**	**160**	**1830**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	10-Sep-13	VV.110264.0000	18 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY WB RAMPS						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	20	5%		20	5	25
WB THRU	5	5%		5	5	10
WB RIGHT	335	5%		335	30	365
WINDSOR AVE						
NB LEFT	45	5%		45	5	50
NB THRU	500	5%	**55**	555	50	605
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	435	5%		435	40	475
SB RIGHT	275	5%		275	25	300
TOTALS	**1615**		**55**	**1670**	**160**	**1830**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	19 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY WB RAMPS						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	25	5%		25	5	30
WB THRU	5	5%		5	5	10
WB RIGHT	405	5%	**55**	460	40	500
WINDSOR AVE						
NB LEFT	100	5%		100	10	110
NB THRU	690	5%		690	60	750
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	550	5%	**55**	605	55	660
SB RIGHT	445	5%		445	40	485
TOTALS	**2220**		**110**	**2330**	**215**	**2545**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	10-Sep-13	VV.110264.0000	20 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY WB RAMPS						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	25	5%		25	5	30
WB THRU	5	5%		5	5	10
WB RIGHT	405	5%		405	35	440
WINDSOR AVE						
NB LEFT	100	5%		100	10	110
NB THRU	690	5%		690	60	750
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	550	5%	**55**	605	55	660
SB RIGHT	445	5%		445	40	485
TOTALS	**2220**		**55**	**2275**	**210**	**2485**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	10-Sep-13	VV.110264.0000	21 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1D

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY WB RAMPS						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	25	5%		25	5	30
WB THRU	5	5%		5	5	10
WB RIGHT	405	5%	**55**	460	40	500
WINDSOR AVE						
NB LEFT	100	5%		100	10	110
NB THRU	690	5%		690	60	750
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	550	5%		550	50	600
SB RIGHT	445	5%		445	40	485
TOTALS	**2220**		**55**	**2275**	**210**	**2485**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	10-Sep-13	VV.110264.0000	22 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1F

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY WB RAMPS						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	25	5%		25	5	30
WB THRU	5	5%		5	5	10
WB RIGHT	405	5%		405	35	440
WINDSOR AVE						
NB LEFT	100	5%		100	10	110
NB THRU	690	5%	**55**	745	65	810
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	550	5%		550	50	600
SB RIGHT	445	5%	**55**	500	45	545
TOTALS	**2220**		**110**	**2330**	**215**	**2545**

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TURN MOVEMENT SUMMARY	DJ	10-Sep-13	VV.110264.0000	23 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY WB RAMPS						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	25	5%		25	5	30
WB THRU	5	5%		5	5	10
WB RIGHT	405	5%		405	35	440
WINDSOR AVE						
NB LEFT	100	5%		100	10	110
NB THRU	690	5%		690	60	750
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	550	5%		550	50	600
SB RIGHT	445	5%	55	500	45	545
TOTALS	**2220**		**55**	**2275**	**210**	**2485**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	10-Sep-13	VV.110264.0000	24 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY WB RAMPS						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	25	5%		25	5	30
WB THRU	5	5%		5	5	10
WB RIGHT	405	5%		405	35	440
WINDSOR AVE						
NB LEFT	100	5%		100	10	110
NB THRU	690	5%	**55**	745	65	810
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	550	5%		550	50	600
SB RIGHT	445	5%		445	40	485
TOTALS	**2220**		**55**	**2275**	**210**	**2485**

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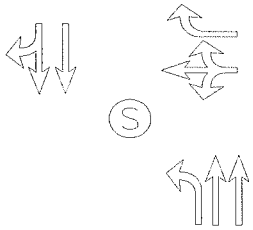
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	1 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1B

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY WB RAMPS								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	7	0	0	5	**0**	5	5	10
WB THRU	0	0	0	5	**0**	5	5	10
WB RIGHT	569	3	9	580	**140**	720	65	785
WINDSOR AVE								
NB LEFT	41	0	0	40	**0**	40	5	45
NB THRU	541	13	39	580	**0**	580	50	630
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	579	5	15	595	**165**	760	70	830
SB RIGHT	528	2	6	535	**0**	535	50	585
TOTALS	**2265**				**305**	**2645**	**250**	**2895**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	2 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY WB RAMPS								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	7	0	0	5	**0**	5	5	10
WB THRU	0	0	0	5	**0**	5	5	10
WB RIGHT	569	3	9	580	**0**	580	50	630
WINDSOR AVE								
NB LEFT	41	0	0	40	**0**	40	5	45
NB THRU	541	13	39	580	**0**	580	50	630
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	579	5	15	595	**165**	760	70	830
SB RIGHT	528	2	6	535	**0**	535	50	585
TOTALS	**2265**				**165**	**2505**	**235**	**2740**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	3 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1D

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY WB RAMPS								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	7	0	0	5	**0**	5	5	10
WB THRU	0	0	0	5	**0**	5	5	10
WB RIGHT	569	3	9	580	**140**	720	65	785
WINDSOR AVE								
NB LEFT	41	0	0	40	**0**	40	5	45
NB THRU	541	13	39	580	**0**	580	50	630
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	579	5	15	595	**0**	595	55	650
SB RIGHT	528	2	6	535	**0**	535	50	585
TOTALS	**2265**				**140**	**2480**	**235**	**2715**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	4 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1F

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY WB RAMPS								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	7	0	0	5	**0**	5	5	10
WB THRU	0	0	0	5	**0**	5	5	10
WB RIGHT	569	3	9	580	**0**	580	50	630
WINDSOR AVE								
NB LEFT	41	0	0	40	**0**	40	5	45
NB THRU	541	13	39	580	**140**	720	65	785
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	579	5	15	595	**0**	595	55	650
SB RIGHT	528	2	6	535	**165**	700	65	765
TOTALS	**2265**				**305**	**2645**	**250**	**2895**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	5 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY WB RAMPS								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	7	0	0	5	**0**	5	5	10
WB THRU	0	0	0	5	**0**	5	5	10
WB RIGHT	569	3	9	580	**0**	580	50	630
WINDSOR AVE								
NB LEFT	41	0	0	40	**0**	40	5	45
NB THRU	541	13	39	580	**0**	580	50	630
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	579	5	15	595	**0**	595	55	650
SB RIGHT	528	2	6	535	**165**	700	65	765
TOTALS	**2265**				**165**	**2505**	**235**	**2740**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	6 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY WB RAMPS								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	7	0	0	5	**0**	5	5	10
WB THRU	0	0	0	5	**0**	5	5	10
WB RIGHT	569	3	9	580	**0**	580	50	630
WINDSOR AVE								
NB LEFT	41	0	0	40	**0**	40	5	45
NB THRU	541	13	39	580	**140**	720	65	785
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	579	5	15	595	**0**	595	55	650
SB RIGHT	528	2	6	535	**0**	535	50	585
TOTALS	**2265**				**140**	**2480**	**235**	**2715**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	7 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY WB RAMPS								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	20	0	0	20	**0**	20	5	25
WB THRU	0	0	0	5	**0**	5	5	10
WB RIGHT	271	3	9	280	**140**	420	40	460
WINDSOR AVE								
NB LEFT	43	1	3	45	**0**	45	5	50
NB THRU	417	2	6	425	**0**	425	40	465
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	366	4	12	380	**165**	545	50	595
SB RIGHT	268	11	33	300	**0**	300	25	325
TOTALS	**1385**				**305**	**1760**	**170**	**1930**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	8 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY WB RAMPS								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	20	0	0	20	**0**	20	5	25
WB THRU	0	0	0	5	**0**	5	5	10
WB RIGHT	271	3	9	280	**0**	280	25	305
WINDSOR AVE								
NB LEFT	43	1	3	45	**0**	45	5	50
NB THRU	417	2	6	425	**0**	425	40	465
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	366	4	12	380	**165**	545	50	595
SB RIGHT	268	11	33	300	**0**	300	25	325
TOTALS	**1385**				**165**	**1620**	**155**	**1775**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
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E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1D

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY WB RAMPS								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	20	0	0	20	**0**	20	5	25
WB THRU	0	0	0	5	**0**	5	5	10
WB RIGHT	271	3	9	280	**140**	420	40	460
WINDSOR AVE								
NB LEFT	43	1	3	45	**0**	45	5	50
NB THRU	417	2	6	425	**0**	425	40	465
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	366	4	12	380	**0**	380	35	415
SB RIGHT	268	11	33	300	**0**	300	25	325
TOTALS	**1385**				**140**	**1595**	**155**	**1750**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	10 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1F

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY WB RAMPS								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	20	0	0	20	**0**	20	5	25
WB THRU	0	0	0	5	**0**	5	5	10
WB RIGHT	271	3	9	280	**0**	280	25	305
WINDSOR AVE								
NB LEFT	43	1	3	45	**0**	45	5	50
NB THRU	417	2	6	425	**140**	565	50	615
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	366	4	12	380	**0**	380	35	415
SB RIGHT	268	11	33	300	**165**	465	40	505
TOTALS	**1385**				**305**	**1760**	**165**	**1925**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	11 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY WB RAMPS								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	20	0	0	20	**0**	20	5	25
WB THRU	0	0	0	5	**0**	5	5	10
WB RIGHT	271	3	9	280	**0**	280	25	305
WINDSOR AVE								
NB LEFT	43	1	3	45	**0**	45	5	50
NB THRU	417	2	6	425	**0**	425	40	465
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	366	4	12	380	**0**	380	35	415
SB RIGHT	268	11	33	300	**165**	465	40	505
TOTALS	**1385**				**165**	**1620**	**155**	**1775**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	12 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY WB RAMPS								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	20	0	0	20	**0**	20	5	25
WB THRU	0	0	0	5	**0**	5	5	10
WB RIGHT	271	3	9	280	**0**	280	25	305
WINDSOR AVE								
NB LEFT	43	1	3	45	**0**	45	5	50
NB THRU	417	2	6	425	**140**	565	50	615
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	366	4	12	380	**0**	380	35	415
SB RIGHT	268	11	33	300	**0**	300	25	325
TOTALS	**1385**				**140**	**1595**	**150**	**1745**

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TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	13 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY WB RAMPS								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	20	0	0	20	**0**	20	5	25
WB THRU	5	0	0	5	**0**	5	5	10
WB RIGHT	335	17	50	385	**140**	525	45	570
WINDSOR AVE								
NB LEFT	45	2	7	50	**0**	50	5	55
NB THRU	500	25	75	575	**0**	575	50	625
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	435	22	65	500	**165**	665	60	725
SB RIGHT	275	14	41	315	**0**	315	30	345
TOTALS	**1615**				**305**	**2155**	**200**	**2355**

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TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	14 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY WB RAMPS								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	20	0	0	20	**0**	20	5	25
WB THRU	5	0	0	5	**0**	5	5	10
WB RIGHT	335	17	50	385	**0**	385	35	420
WINDSOR AVE								
NB LEFT	45	2	7	50	**0**	50	5	55
NB THRU	500	25	75	575	**0**	575	50	625
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	435	22	65	500	**165**	665	60	725
SB RIGHT	275	14	41	315	**0**	315	30	345
TOTALS	**1615**				**165**	**2015**	**190**	**2205**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	15 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1D

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY WB RAMPS								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	20	0	0	20	**0**	20	5	25
WB THRU	5	0	0	5	**0**	5	5	10
WB RIGHT	335	17	50	385	**140**	525	45	570
WINDSOR AVE								
NB LEFT	45	2	7	50	**0**	50	5	55
NB THRU	500	25	75	575	**0**	575	50	625
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	435	22	65	500	**0**	500	45	545
SB RIGHT	275	14	41	315	**0**	315	30	345
TOTALS	**1615**				**140**	**1990**	**185**	**2175**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	16 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1F

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY WB RAMPS								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	20	0	0	20	**0**	20	5	25
WB THRU	5	0	0	5	**0**	5	5	10
WB RIGHT	335	17	50	385	**0**	385	35	420
WINDSOR AVE								
NB LEFT	45	2	7	50	**0**	50	5	55
NB THRU	500	25	75	575	**140**	715	65	780
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	435	22	65	500	**0**	500	45	545
SB RIGHT	275	14	41	315	**165**	480	45	525
TOTALS	**1615**				**305**	**2155**	**205**	**2360**

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TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	17 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY WB RAMPS								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	20	0	0	20	**0**	20	5	25
WB THRU	5	0	0	5	**0**	5	5	10
WB RIGHT	335	17	50	385	**0**	385	35	420
WINDSOR AVE								
NB LEFT	45	2	7	50	**0**	50	5	55
NB THRU	500	25	75	575	**0**	575	50	625
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	435	22	65	500	**0**	500	45	545
SB RIGHT	275	14	41	315	**165**	480	45	525
TOTALS	**1615**				**165**	**2015**	**190**	**2205**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	18 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY WB RAMPS								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	20	0	0	20	**0**	20	5	25
WB THRU	5	0	0	5	**0**	5	5	10
WB RIGHT	335	17	50	385	**0**	385	35	420
WINDSOR AVE								
NB LEFT	45	2	7	50	**0**	50	5	55
NB THRU	500	25	75	575	**140**	715	65	780
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	435	22	65	500	**0**	500	45	545
SB RIGHT	275	14	41	315	**0**	315	30	345
TOTALS	**1615**				**140**	**1990**	**190**	**2180**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	19 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY WB RAMPS								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	26	0	0	25	**0**	25	5	30
WB THRU	3	0	0	5	**0**	5	5	10
WB RIGHT	405	2	6	410	**140**	550	50	600
WINDSOR AVE								
NB LEFT	98	0	0	100	**0**	100	10	110
NB THRU	689	1	3	690	**0**	690	60	750
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	550	0	0	550	**165**	715	65	780
SB RIGHT	442	4	12	455	**0**	455	40	495
TOTALS	**2213**				**305**	**2540**	**235**	**2775**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	20 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY WB RAMPS								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	26	0	0	25	**0**	25	5	30
WB THRU	3	0	0	5	**0**	5	5	10
WB RIGHT	405	2	6	410	**0**	410	35	445
WINDSOR AVE								
NB LEFT	98	0	0	100	**0**	100	10	110
NB THRU	689	1	3	690	**0**	690	60	750
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	550	0	0	550	**165**	715	65	780
SB RIGHT	442	4	12	455	**0**	455	40	495
TOTALS	**2213**				**165**	**2400**	**220**	**2620**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	21 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1D

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY WB RAMPS								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	26	0	0	25	**0**	25	5	30
WB THRU	3	0	0	5	**0**	5	5	10
WB RIGHT	405	2	6	410	**140**	550	50	600
WINDSOR AVE								
NB LEFT	98	0	0	100	**0**	100	10	110
NB THRU	689	1	3	690	**0**	690	60	750
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	550	0	0	550	**0**	550	50	600
SB RIGHT	442	4	12	455	**0**	455	40	495
TOTALS	**2213**				**140**	**2375**	**220**	**2595**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	22 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1F

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY WB RAMPS								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	26	0	0	25	**0**	25	5	30
WB THRU	3	0	0	5	**0**	5	5	10
WB RIGHT	405	2	6	410	**0**	410	35	445
WINDSOR AVE								
NB LEFT	98	0	0	100	**0**	100	10	110
NB THRU	689	1	3	690	**140**	830	75	905
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	550	0	0	550	**0**	550	50	600
SB RIGHT	442	4	12	455	**165**	620	55	675
TOTALS	**2213**				**305**	**2540**	**235**	**2775**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	23 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY WB RAMPS								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	26	0	0	25	**0**	25	5	30
WB THRU	3	0	0	5	**0**	5	5	10
WB RIGHT	405	2	6	410	**0**	410	35	445
WINDSOR AVE								
NB LEFT	98	0	0	100	**0**	100	10	110
NB THRU	689	1	3	690	**0**	690	60	750
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	550	0	0	550	**0**	550	50	600
SB RIGHT	442	4	12	455	**165**	620	55	675
TOTALS	**2213**				**165**	**2400**	**220**	**2620**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	24 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY WB RAMPS								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	26	0	0	25	**0**	25	5	30
WB THRU	3	0	0	5	**0**	5	5	10
WB RIGHT	405	2	6	410	**0**	410	35	445
WINDSOR AVE								
NB LEFT	98	0	0	100	**0**	100	10	110
NB THRU	689	1	3	690	**140**	830	75	905
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	550	0	0	550	**0**	550	50	600
SB RIGHT	442	4	12	455	**0**	455	40	495
TOTALS	**2213**				**140**	**2375**	**220**	**2595**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: WINDSOR
EAST-WEST STREET: I-210 WB RAMPS
JURISDICTION: PASADENA

DATE: 06-01-11

PEAK HOUR: 07:30AM

Windsor Ave (WB)

NORTH LEG

TOTAL: 1,114

Rt	Thru	Lt	
530	584 (585)		Total
135	159		1st
130	155		2nd
128	130		3rd
137	140		4th

TT = 7
TT% = 7/1114 = 0.63% ≈ 1%

TT = 3
TT% = 3/579 = 0.52% ≈ 1%

WB 210 Fwy

EAST LEG TOTAL: 579

	1st	2nd	3rd	4th	Total
Rt	136	140	141	155	572 (570)
Thru	0	0	0	0	5
Lt	0	1	2	4	5 7

Total	1st	2nd	3rd	4th	
					Lt
					Thru
					Rt

WEST LEG TOTAL: 0

PEAK HOUR FACTORS

NORTH LEG = 0.95
SOUTH LEG = 0.76
EAST LEG = 0.91
WEST LEG =

ALL LEGS = 0.95

	Lt	Thru	Rt
1st	9	109	
2nd	11	102	
3rd	13	182	
4th	8	161	
Total	40 41	555 554	

TT = 13
TT% = 13/595 = 2.18% ≈ 2%

TOTAL: 595

SOUTH LEG
Windsor Ave (EB)

HOUR TOTAL: 2,288

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WINDSOR

EAST-WEST STREET: I-210 WB RAMPS

TIME: 07:00AM-08:00AM DATE: 06-01-11

NORTH LEG

Rt	Thru	Lt	
479	599		Total
96	138		1st
118	147		2nd
135	159		3rd
130	155		4th

	1st	2nd	3rd	4th	Total
Rt	91	102	136	140	469
Thru	0	0	0	0	0
Lt	2	1	0	1	4

Total	1st	2nd	3rd	4th	
					Lt
					Thru
					Rt

	Lt	Thru	Rt
1st	9	72	
2nd	14	85	
3rd	9	109	
4th	11	102	
Total	43	368	

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WINDSOR

EAST-WEST STREET: I-210 WB RAMPS

TIME: 08:00AM-09:00AM DATE: 06-01-11

NORTH LEG

Rt	Thru	Lt	
475	538		Total
128	130		1st
137	140		2nd
86	129		3rd
124	139		4th

	1st	2nd	3rd	4th	Total
Rt	141	155	143	105	544
Thru	0	0	2	0	2
Lt	2	4	3	3	12

Total	1st	2nd	3rd	4th	
					Lt
					Thru
					Rt

	Lt	Thru	Rt
1st	13	182	
2nd	8	161	
3rd	10	133	
4th	19	159	
Total	50	635	

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : WINDSOR — PASADENA

EAST-WEST STREET : I-210 WB RAMPS — 06-01-11

BEGINNING TIME : 07:00AM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
						WB NORTH LEG						
96	137	0	0	0	0	0	1	0	0	0	0	234
118	147	0	0	0	0	0	0	0	0	0	0	265
135	158	0	0	1	0	0	0	0	0	0	0	294
129	152	0	0	1	0	0	2	0	1	0	0	285
127	129	0	0	1	0	0	0	0	1	0	0	258
137	140	0	0	0	0	0	0	0	0	0	0	277
85	129	0	0	0 3	0	0	0 2	0	1	0 2	0	215
122	139	0	0	0	0	0	0	0	2	0	0	263
						TT=3+2+2=7						
949	1131	0	0	3	0	0	3	0	5	0	0	2091
						EB SOUTH LEG						
0	70	9	0	2	0	0	0	0	0	0	0	81
0	82	14	0	3	0	0	0	0	0	0	0	99
0	107	9	0	2	0	0	0	0	0	0	0	118
0	97	11	0	4	0	0	1	0	0	0	0	113
0	178	13	0	4	0	0	0	0	0	0	0	195
0	159	8	0	2	0	0	0	0	0	0	0	169
0	130	10	0	2 12	0	0	1 1	0	0	0 0	0	143
0	159	19	0	0	0	0	0	0	0	0	0	178
						TT=12+1+0=13						
0	982	93	0	19	0	0	2	0	0	0	0	1096
						NB EAST LEG						
91	0	2	0	0	0	0	0	0	0	0	0	93
101	0	1	1	0	0	0	0	0	0	0	0	103
136	0	0	0	0	0	0	0	0	0	0	0	136
139	0	1	1	0	0	0	0	0	0	0	0	141
140	0	2	1	0	0	0	0	0	0	0	0	143
154	0	4	1	0	0	0	0	0	0	0	0	159
143	2	3	0	0 3	0	0	0 0	0	0	0 0	0	148
105	0	3	0	0	0	0	0	0	0	0	0	108
						TT=3+0+0=3						
1009	2	16	4	0	0	0	0	0	0	0	0	1031
						WEST LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: WINDSOR
EAST-WEST STREET: I-210 WB RAMPS
JURISDICTION: PASADENA

DATE: 06-01-11

PEAK HOUR: 12:30PM

Windsor Ave (WB)

NORTH LEG

TOTAL: 649

Rt	Thru	Lt	
279 (280)	370		Total
64	94		1st
70	88		2nd
70	89		3rd
75	99		4th

TT = 15

$TT\% = \frac{15}{649} = 2.31\% \approx 2\%$

TT = 3

$TT\% = \frac{3}{294} = 1.02\% \approx 1\%$

WB 210 FWY

EAST LEG TOTAL: 294

	1st	2nd	3rd	4th	Total
Rt	68	79	72	55	274 (295)
Thru	0	0	0	0	5
Lt	8	3	3	6	20

Total	1st	2nd	3rd	4th	
					Lt
					Thru
					Rt

WEST LEG TOTAL: 0

PEAK HOUR FACTORS

NORTH LEG = 0.93
SOUTH LEG = 0.89
EAST LEG = 0.90
WEST LEG =

ALL LEGS = 0.97

	Lt	Thru	Rt
1st	14	116	
2nd	9	104	
3rd	9	105	
4th	12	94	
Total	44 (45)	419 (420)	

TT = 3

$TT\% = \frac{3}{463} = 0.65\% \approx 1\%$

TOTAL: 463

SOUTH LEG
Windsor Ave (EB)

HOUR TOTAL: 1,406

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WINDSOR

EAST-WEST STREET: I-210 WB RAMPS

TIME: 12:00PM-01:00PM DATE: 06-01-11

NORTH LEG

Rt	Thru	Lt	
249	336		Total
50	77		1st
65	77		2nd
64	94		3rd
70	88		4th

	1st	2nd	3rd	4th	Total
Rt	51	64	68	79	262
Thru	0	0	0	0	0
Lt	15	5	8	3	31

Total	1st	2nd	3rd	4th	
					Lt
					Thru
					Rt

	Lt	Thru	Rt
1st	8	91	
2nd	11	80	
3rd	14	116	
4th	9	104	
Total	42	391	

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WINDSOR

EAST-WEST STREET: I-210 WB RAMPS

TIME: 01:00PM-02:00PM DATE: 06-01-11

NORTH LEG

Rt	Thru	Lt	
271	357		Total
70	89		1st
75	99		2nd
49	77		3rd
77	92		4th

	1st	2nd	3rd	4th	Total
Rt	72	55	58	65	250
Thru	0	0	0	0	0
Lt	3	6	3	4	16

Total	1st	2nd	3rd	4th	
					Lt
					Thru
					Rt

	Lt	Thru	Rt
1st	9	105	
2nd	12	94	
3rd	8	105	
4th	7	90	
Total	36	394	

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : WINDSOR — PASADENA

EAST-WEST STREET : I-210 WB RAMPS — 06-01-11

BEGINNING TIME : 12:00PM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
						WB NORTH LEG						
50	75	0	0	1	0	0	1	0	0	0	0	127
65	77	0	0	0	0	0	0	0	0	0	0	142
64	94	0	0	0	0	0	0	0	0	0	0	158
67	86	0	1	1	0	1	1	0	1	0	0	158
62	89	0	4	0	0	4	0	0	0	0	0	159
75	97	0	0	1	0	0	1	0	0	0	0	174
47	75	0	1	1	0	1	1	0	0	0	0	126
77	89	0	0	1	0	0	1	0	0	1	0	169
						TT=9+7+1=15						
507	682	0	6	5	0	6	5	0	1	1	0	1213
						EB SOUTH LEG						
0	91	8	0	0	0	0	0	0	0	0	0	99
0	80	11	0	0	0	0	0	0	0	0	0	91
0	115	13	0	0	0	0	1	1	0	0	0	130
0	103	9	0	1	0	0	0	0	0	0	0	113
0	105	9	0	0	0	0	0	0	0	0	0	114
0	94	12	0	0	0	0	0	0	0	0	0	106
0	104	8	0	0	0	0	1	2	0	0	0	113
0	87	7	0	1	0	0	2	0	0	0	0	97
						TT=1+2+0=3						
0	779	77	0	2	0	0	4	1	0	0	0	863
						NB EAST LEG						
50	0	15	1	0	0	0	0	0	0	0	0	66
64	0	5	0	0	0	0	0	0	0	0	0	69
67	0	8	0	0	0	1	0	0	0	0	0	76
79	0	3	0	0	0	0	0	0	0	0	0	82
71	0	3	1	0	0	0	0	0	0	0	0	75
54	0	6	0	0	0	0	0	0	1	0	0	61
58	0	3	0	0	0	0	0	1	0	0	1	61
64	0	4	1	0	0	0	0	0	0	0	0	69
						TT=1+1+1=3						
507	0	47	3	0	0	1	0	0	1	0	0	559
						WEST LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: WINDSOR/ ARROYO
EAST-WEST STREET: I-210 WB RAMPS
JURISDICTION: LA CANADA

DATE: 04-12-12

PEAK HOUR: 03:00PM

NORTH LEG (SB)

TOTAL: 709

Rt	Thru	Lt	
274	435		Total
72	107		1st
65	101		2nd
76	115		3rd
61	112		4th

(WB)

EAST LEG TOTAL: 355

	1st	2nd	3rd	4th	Total
Rt	72	85	92	86	335
Thru					
Lt	8	3	7	2	20

Total	1st	2nd	3rd	4th	
					Lt
					Thru
					Rt

WEST LEG TOTAL: 0

PEAK HOUR FACTORS

NORTH LEG = 0.93
SOUTH LEG = 0.96
EAST LEG = 0.90
WEST LEG =

ALL LEGS = 0.93

	Lt	Thru	Rt
1st	15	127	
2nd	11	115	
3rd	10	132	
4th	10	124	
Total	46	498	

TOTAL: 544

SOUTH LEG (NB)

HOUR TOTAL: 1,608

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WINDSOR/ ARROYO

EAST-WEST STREET: I-210 WB RAMPS

TIME: 02:00PM-03:00PM DATE: 04-12-12

NORTH LEG

Rt	Thru	Lt	
259	468		Total
48	119		1st
62	108		2nd
86	119		3rd
63	122		4th

	1st	2nd	3rd	4th	Total
Rt	69	72	73	81	295
Thru					
Lt	1	4	3	4	12

Total	1st	2nd	3rd	4th	
					Lt
					Thru
					Rt

	Lt	Thru	Rt
1st	5	96	
2nd	18	90	
3rd	13	126	
4th	5	87	
Total	41	399	

Prepared by NEWPORT TRAFFIC STUDIES

(6)

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WINDSOR/ ARROYO

EAST-WEST STREET: I-210 WB RAMPS

TIME: 03:00PM-04:00PM DATE: 04-12-12

NORTH LEG

274	435		Total
72	107		1st
65	101		2nd
76	115		3rd
61	112		4th
Rt	Thru	Lt	

Rt	72	85	92	86	335
Thru					
Lt	8	3	7	2	20
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
					Lt
					Thru
					Rt

	Lt	Thru	Rt
1st	15	127	
2nd	11	115	
3rd	10	132	
4th	10	124	
Total	46	498	

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: WINDSOR
EAST-WEST STREET: I-210 WB RAMPS
JURISDICTION: PASADENA

DATE: 06-01-11

PEAK HOUR: 05:00PM

Windsor Ave (WB)

NORTH LEG

TOTAL: 996

Rt	Thru	Lt	
446 (445)	550		Total
116	131		1st
114	120		2nd
119	140		3rd
97	159		4th

TT = 4

TT% = 4/996 = 0.40% ≈ 1%

TT = 2

TT% = 2/436 = 0.46% ≈ 1%

WB 210 Fwy

EAST LEG TOTAL: 436

	1st	2nd	3rd	4th	Total
Rt	103	102	100	102	407 (405)
Thru	0	0	3	0	3 (5)
Lt	5	4	9	8	25 26

Total	1st	2nd	3rd	4th	
					Lt
					Thru
					Rt

WEST LEG TOTAL: 0

PEAK HOUR FACTORS

NORTH LEG = 0.96
SOUTH LEG = 0.87
EAST LEG = 0.97
WEST LEG =

ALL LEGS = 0.96

	Lt	Thru	Rt
1st	22	204	
2nd	21	152	
3rd	28	170	
4th	27	164	
Total	100 98	690	

TT = 1

TT% = 1/788 = 0.13% ≈ 1%

TOTAL: 788

SOUTH LEG

Windsor Ave (EB)

HOUR TOTAL: 2,220

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WINDSOR

EAST-WEST STREET: I-210 WB RAMPS

TIME: 04:00PM-05:00PM DATE: 06-01-11

NORTH LEG

Rt	Thru	Lt	
361	467		Total
85	123		1st
75	100		2nd
93	120		3rd
108	124		4th

	1st	2nd	3rd	4th	Total
Rt	76	77	96	81	330
Thru	0	0	0	1	1
Lt	3	7	3	9	22

Total	1st	2nd	3rd	4th	
					Lt
					Thru
					Rt

	Lt	Thru	Rt
1st	15	126	
2nd	12	129	
3rd	17	137	
4th	19	161	
Total	63	553	

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WINDSOR

EAST-WEST STREET: I-210 WB RAMPS

TIME: 05:00PM-06:00PM DATE: 06-01-11

NORTH LEG

Rt	Thru	Lt	
446	550		Total
116	131		1st
114	120		2nd
119	140		3rd
97	159		4th

	1st	2nd	3rd	4th	Total
Rt	103	102	100	102	407
Thru	0	0	3	0	3
Lt	5	4	9	8	26

Total	1st	2nd	3rd	4th	
					Lt
					Thru
					Rt

	Lt	Thru	Rt
1st	22	204	
2nd	21	152	
3rd	28	170	
4th	27	164	
Total	98	690	

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : WINDSOR PASADENA

EAST-WEST STREET : I-210 WB RAMPS 06-01-11

BEGINNING TIME : 04:00PM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
					WB NORTH LEG							
85	123	0	0	0	0	0	0	0	0	0	0	208
74	100	0	0	0	0	0	0	0	1	0	0	175
92	120	0	0	0	0	1	0	0	0	0	0	213
106	123	0	1	1	0	1	0	0	0	0	0	232
115	131	0	0	0	0	1	0	0	0	0	0	247
113	120	0	0	0	0	1	0	0	0	0	0	234
118	140	0	0	0	0	0	0	0	1	0	0	259
96	159	0	0	0	0	0	0	0	1	0	0	256
						TT=0+2+2=4						
799	1016	0	1	1	0	4	0	0	3	0	0	1824
					EB SOUTH LEG							
0	126	15	0	0	0	0	0	0	0	0	0	141
0	128	12	0	1	0	0	0	0	0	0	0	141
0	137	17	0	0	0	0	0	0	0	0	0	154
0	161	19	0	0	0	0	0	0	0	0	0	180
0	204	22	0	0	0	0	0	0	0	0	0	226
0	151	21	0	0	0	0	1	0	0	0	0	173
0	170	28	0	0	0	0	0	0	0	0	0	198
0	164	27	0	0	0	0	0	0	0	0	0	191
						TT=0+1+0=1						
0	1241	161	0	1	0	0	1	0	0	0	0	1404
					NB EAST LEG							
71	0	3	5	0	0	0	0	0	0	0	0	79
76	0	7	1	0	0	0	0	0	0	0	0	84
92	0	3	4	0	0	0	0	0	0	0	0	99
81	1	9	0	0	0	0	0	0	0	0	0	91
101	0	5	1	0	0	1	0	0	0	0	0	108
102	0	4	0	0	0	0	0	0	0	0	0	106
100	3	9	0	0	0	0	0	0	0	0	0	112
102	0	8	0	0	0	0	0	0	0	0	0	110
						TT=1+1+0=2						
725	4	48	11	0	0	1	0	0	0	0	0	789
					WEST LEG							
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0

Prepared by Newport Traffic Studies

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	5	5	570	40	555	0	0	585	530
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.85	0.85	1.00	1.00			0.93	
Flt Protected					1.00	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1471	1461	1805	3438			3193	
Flt Permitted					1.00	1.00	0.24	1.00			1.00	
Satd. Flow (perm)					1471	1461	452	3438			3193	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	5	5	600	42	584	0	0	616	558
RTOR Reduction (vph)	0	0	0	0	113	113	0	0	0	0	290	0
Lane Group Flow (vph)	0	0	0	0	191	193	42	584	0	0	884	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	0%	5%	0%	0%	5%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					10.2	10.2	16.8	16.8			16.8	
Effective Green, g (s)					10.2	10.2	16.8	16.8			16.8	
Actuated g/C Ratio					0.29	0.29	0.48	0.48			0.48	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					429	426	217	1650			1533	
v/s Ratio Prot								0.17			c0.28	
v/s Ratio Perm					0.13	c0.13	0.09					
v/c Ratio					0.44	0.45	0.19	0.35			0.58	
Uniform Delay, d1					10.1	10.1	5.2	5.7			6.5	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					0.7	0.8	2.0	0.6			1.6	
Delay (s)					10.8	10.9	7.2	6.3			8.1	
Level of Service					B	B	A	A			A	
Approach Delay (s)		0.0			10.9			6.4			8.1	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	8.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	35.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	52.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Windsor Ave & WB 210 Fwy

8/10/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	20	5	275	45	420	0	0	370	280
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.87	0.85	1.00	1.00			0.94	
Flt Protected					0.99	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1506	1461	1719	3438			3216	
Flt Permitted					0.99	1.00	0.40	1.00			1.00	
Satd. Flow (perm)					1506	1461	718	3438			3216	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	0	0	21	5	284	46	433	0	0	381	289
RTOR Reduction (vph)	0	0	0	0	108	126	0	0	0	0	121	0
Lane Group Flow (vph)	0	0	0	0	49	27	46	433	0	0	549	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	5%	5%	0%	0%	5%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					5.9	5.9	19.4	19.4			19.4	
Effective Green, g (s)					5.9	5.9	19.4	19.4			19.4	
Actuated g/C Ratio					0.18	0.18	0.58	0.58			0.58	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					267	259	418	2003			1874	
v/s Ratio Prot								0.13			c0.17	
v/s Ratio Perm					0.03	0.02	0.06					
v/c Ratio					0.18	0.10	0.11	0.22			0.29	
Uniform Delay, d1					11.7	11.5	3.1	3.3			3.5	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					0.3	0.2	0.5	0.2			0.4	
Delay (s)					12.0	11.7	3.6	3.6			3.9	
Level of Service					B	B	A	A			A	
Approach Delay (s)		0.0			11.8			3.6			3.9	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	5.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.27		
Actuated Cycle Length (s)	33.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	39.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	20	5	335	45	500	0	0	435	275
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.87	0.85	1.00	1.00			0.94	
Flt Protected					0.99	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1498	1461	1719	3438			3238	
Flt Permitted					0.99	1.00	0.36	1.00			1.00	
Satd. Flow (perm)					1498	1461	650	3438			3238	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	0	0	0	22	5	360	48	538	0	0	468	296
RTOR Reduction (vph)	0	0	0	0	137	151	0	0	0	0	128	0
Lane Group Flow (vph)	0	0	0	0	59	40	48	538	0	0	636	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	5%	5%	0%	0%	5%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					6.4	6.4	18.9	18.9			18.9	
Effective Green, g (s)					6.4	6.4	18.9	18.9			18.9	
Actuated g/C Ratio					0.19	0.19	0.57	0.57			0.57	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					288	281	369	1951			1838	
v/s Ratio Prot								0.16			c0.20	
v/s Ratio Perm					0.04	0.03	0.07					
v/c Ratio					0.21	0.14	0.13	0.28			0.35	
Uniform Delay, d1					11.3	11.2	3.4	3.7			3.9	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					0.4	0.2	0.7	0.4			0.5	
Delay (s)					11.7	11.4	4.1	4.0			4.4	
Level of Service					B	B	A	A			A	
Approach Delay (s)		0.0			11.5			4.0			4.4	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	5.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	33.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	42.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

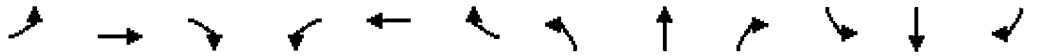
HCM Signalized Intersection Capacity Analysis
6: Windsor Ave & WB 210 Fwy

8/10/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	25	5	405	100	690	0	0	550	445
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.87	0.85	1.00	1.00			0.93	
Flt Protected					0.99	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1497	1461	1805	3438			3294	
Flt Permitted					0.99	1.00	0.25	1.00			1.00	
Satd. Flow (perm)					1497	1461	476	3438			3294	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	0	0	26	5	422	104	719	0	0	573	464
RTOR Reduction (vph)	0	0	0	0	165	171	0	0	0	0	154	0
Lane Group Flow (vph)	0	0	0	0	64	53	104	719	0	0	883	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	0%	5%	0%	0%	0%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					8.2	8.2	32.5	32.5			32.5	
Effective Green, g (s)					8.2	8.2	32.5	32.5			32.5	
Actuated g/C Ratio					0.17	0.17	0.67	0.67			0.67	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					252	246	318	2294			2198	
v/s Ratio Prot								0.21			c0.27	
v/s Ratio Perm					0.04	0.04	0.22					
v/c Ratio					0.26	0.21	0.33	0.31			0.40	
Uniform Delay, d1					17.6	17.5	3.4	3.4			3.7	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					0.5	0.4	2.7	0.4			0.5	
Delay (s)					18.1	17.9	6.2	3.8			4.2	
Level of Service					B	B	A	A			A	
Approach Delay (s)		0.0			18.0			4.1			4.2	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	6.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	48.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	55.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	5	5	625	40	555	0	0	640	530
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.85	0.85	1.00	1.00			0.93	
Flt Protected					1.00	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1369	1358	1805	3438			3092	
Flt Permitted					1.00	1.00	0.24	1.00			1.00	
Satd. Flow (perm)					1369	1358	463	3438			3092	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	5	5	658	42	584	0	0	674	558
RTOR Reduction (vph)	0	0	0	0	109	109	0	0	0	0	302	0
Lane Group Flow (vph)	0	0	0	0	223	227	42	584	0	0	930	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	13%	0%	5%	0%	0%	12%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					11.3	11.3	16.4	16.4			16.4	
Effective Green, g (s)					11.3	11.3	16.4	16.4			16.4	
Actuated g/C Ratio					0.32	0.32	0.46	0.46			0.46	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					433	430	213	1579			1420	
v/s Ratio Prot								0.17			c0.30	
v/s Ratio Perm					0.16	c0.17	0.09					
v/c Ratio					0.51	0.53	0.20	0.37			0.66	
Uniform Delay, d1					10.0	10.0	5.7	6.3			7.5	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					1.0	1.2	2.1	0.7			2.4	
Delay (s)					11.0	11.2	7.8	7.0			9.8	
Level of Service					B	B	A	A			A	
Approach Delay (s)		0.0			11.1			7.0			9.8	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	9.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	35.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	54.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Windsor Ave & WB 210 Fwy

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	20	5	330	45	420	0	0	425	280
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.87	0.85	1.00	1.00			0.94	
Flt Protected					0.99	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1499	1344	1719	3438			3041	
Flt Permitted					0.99	1.00	0.38	1.00			1.00	
Satd. Flow (perm)					1499	1344	679	3438			3041	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	0	0	21	5	340	46	433	0	0	438	289
RTOR Reduction (vph)	0	0	0	0	129	146	0	0	0	0	125	0
Lane Group Flow (vph)	0	0	0	0	57	34	46	433	0	0	602	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	5%	5%	0%	0%	16%	5%
Bus Blockages (#/hr)	0	0	0	0	0	20	0	0	0	0	0	0
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					6.4	6.4	19.0	19.0			19.0	
Effective Green, g (s)					6.4	6.4	19.0	19.0			19.0	
Actuated g/C Ratio					0.19	0.19	0.57	0.57			0.57	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					287	258	386	1956			1730	
v/s Ratio Prot								0.13			c0.20	
v/s Ratio Perm					0.04	0.03	0.07					
v/c Ratio					0.20	0.13	0.12	0.22			0.35	
Uniform Delay, d1					11.3	11.2	3.3	3.6			3.9	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					0.3	0.2	0.6	0.3			0.6	
Delay (s)					11.7	11.4	4.0	3.8			4.4	
Level of Service					B	B	A	A			A	
Approach Delay (s)		0.0			11.6			3.8			4.4	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	5.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	33.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	42.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	20	5	390	45	500	0	0	490	275
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.87	0.85	1.00	1.00			0.95	
Flt Protected					1.00	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1356	1311	1719	3438			3066	
Flt Permitted					1.00	1.00	0.32	1.00			1.00	
Satd. Flow (perm)					1356	1311	580	3438			3066	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	0	0	0	22	5	419	48	538	0	0	527	296
RTOR Reduction (vph)	0	0	0	0	143	143	0	0	0	0	137	0
Lane Group Flow (vph)	0	0	0	0	81	79	48	538	0	0	686	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	17%	5%	5%	0%	0%	15%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					8.3	8.3	18.8	18.8			18.8	
Effective Green, g (s)					8.3	8.3	18.8	18.8			18.8	
Actuated g/C Ratio					0.24	0.24	0.54	0.54			0.54	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					321	310	311	1841			1642	
v/s Ratio Prot								0.16			c0.22	
v/s Ratio Perm					0.06	c0.06	0.08					
v/c Ratio					0.25	0.26	0.15	0.29			0.42	
Uniform Delay, d1					10.9	10.9	4.1	4.5			4.9	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					0.4	0.4	1.1	0.4			0.8	
Delay (s)					11.3	11.3	5.2	4.9			5.7	
Level of Service					B	B	A	A			A	
Approach Delay (s)		0.0			11.3			4.9			5.7	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	6.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	35.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	45.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	25	5	460	100	690	0	0	605	445
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.87	0.85	1.00	1.00			0.94	
Flt Protected					0.99	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1493	1461	1805	3438			3310	
Flt Permitted					0.99	1.00	0.23	1.00			1.00	
Satd. Flow (perm)					1493	1461	433	3438			3310	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	0	0	26	5	479	104	719	0	0	630	464
RTOR Reduction (vph)	0	0	0	0	168	168	0	0	0	0	162	0
Lane Group Flow (vph)	0	0	0	0	88	86	104	719	0	0	932	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	0%	5%	0%	0%	0%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					9.1	9.1	31.9	31.9			31.9	
Effective Green, g (s)					9.1	9.1	31.9	31.9			31.9	
Actuated g/C Ratio					0.19	0.19	0.65	0.65			0.65	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					277	271	282	2238			2155	
v/s Ratio Prot								0.21			c0.28	
v/s Ratio Perm					0.06	0.06	0.24					
v/c Ratio					0.32	0.32	0.37	0.32			0.43	
Uniform Delay, d1					17.3	17.3	3.9	3.8			4.2	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					0.7	0.7	3.7	0.4			0.6	
Delay (s)					17.9	17.9	7.6	4.2			4.8	
Level of Service					B	B	A	A			A	
Approach Delay (s)		0.0			17.9			4.6			4.8	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	7.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	49.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	57.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	5	5	680	45	605	0	0	700	580
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.85	0.85	1.00	1.00			0.93	
Flt Protected					1.00	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1368	1358	1805	3438			3092	
Flt Permitted					1.00	1.00	0.25	1.00			1.00	
Satd. Flow (perm)					1368	1358	469	3438			3092	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	5	5	716	47	637	0	0	737	611
RTOR Reduction (vph)	0	0	0	0	89	89	0	0	0	0	337	0
Lane Group Flow (vph)	0	0	0	0	272	276	47	637	0	0	1011	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	13%	0%	5%	0%	0%	12%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					11.9	11.9	16.2	16.2			16.2	
Effective Green, g (s)					11.9	11.9	16.2	16.2			16.2	
Actuated g/C Ratio					0.33	0.33	0.45	0.45			0.45	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					451	448	210	1543			1388	
v/s Ratio Prot								0.19			c0.33	
v/s Ratio Perm					0.20	c0.20	0.10					
v/c Ratio					0.60	0.62	0.22	0.41			0.73	
Uniform Delay, d1					10.1	10.2	6.1	6.7			8.1	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					2.3	2.5	2.5	0.8			3.4	
Delay (s)					12.4	12.7	8.6	7.5			11.5	
Level of Service					B	B	A	A			B	
Approach Delay (s)		0.0			12.5			7.6			11.5	
Approach LOS		A			B			A			B	

Intersection Summary			
HCM Average Control Delay	10.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	36.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	59.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Windsor Ave & WB 210 Fwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	20	5	390	45	500	0	0	490	275
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.87	0.85	1.00	1.00			0.95	
Flt Protected					1.00	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1356	1311	1719	3438			3066	
Flt Permitted					1.00	1.00	0.32	1.00			1.00	
Satd. Flow (perm)					1356	1311	580	3438			3066	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	0	0	0	22	5	419	48	538	0	0	527	296
RTOR Reduction (vph)	0	0	0	0	143	143	0	0	0	0	137	0
Lane Group Flow (vph)	0	0	0	0	81	79	48	538	0	0	686	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	17%	5%	5%	0%	0%	15%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					8.3	8.3	18.8	18.8			18.8	
Effective Green, g (s)					8.3	8.3	18.8	18.8			18.8	
Actuated g/C Ratio					0.24	0.24	0.54	0.54			0.54	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					321	310	311	1841			1642	
v/s Ratio Prot								0.16			c0.22	
v/s Ratio Perm					0.06	c0.06	0.08					
v/c Ratio					0.25	0.26	0.15	0.29			0.42	
Uniform Delay, d1					10.9	10.9	4.1	4.5			4.9	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					0.4	0.4	1.1	0.4			0.8	
Delay (s)					11.3	11.3	5.2	4.9			5.7	
Level of Service					B	B	A	A			A	
Approach Delay (s)		0.0			11.3			4.9			5.7	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	6.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	35.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	45.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

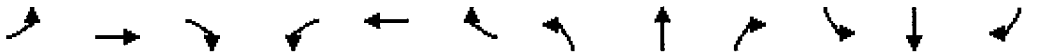
HCM Signalized Intersection Capacity Analysis
6: Windsor Ave & WB 210 Fwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	25	5	405	100	690	0	0	550	445
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.87	0.85	1.00	1.00			0.93	
Flt Protected					0.99	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1497	1461	1805	3438			3294	
Flt Permitted					0.99	1.00	0.25	1.00			1.00	
Satd. Flow (perm)					1497	1461	476	3438			3294	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	0	0	26	5	422	104	719	0	0	573	464
RTOR Reduction (vph)	0	0	0	0	165	171	0	0	0	0	154	0
Lane Group Flow (vph)	0	0	0	0	64	53	104	719	0	0	883	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	0%	5%	0%	0%	0%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					8.2	8.2	32.5	32.5			32.5	
Effective Green, g (s)					8.2	8.2	32.5	32.5			32.5	
Actuated g/C Ratio					0.17	0.17	0.67	0.67			0.67	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					252	246	318	2294			2198	
v/s Ratio Prot								0.21			c0.27	
v/s Ratio Perm					0.04	0.04	0.22					
v/c Ratio					0.26	0.21	0.33	0.31			0.40	
Uniform Delay, d1					17.6	17.5	3.4	3.4			3.7	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					0.5	0.4	2.7	0.4			0.5	
Delay (s)					18.1	17.9	6.2	3.8			4.2	
Level of Service					B	B	A	A			A	
Approach Delay (s)		0.0			18.0			4.1			4.2	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	6.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	48.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	55.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	25	5	500	110	750	0	0	660	485
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.87	0.85	1.00	1.00			0.94	
Flt Protected					1.00	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1491	1461	1805	3438			3311	
Flt Permitted					1.00	1.00	0.19	1.00			1.00	
Satd. Flow (perm)					1491	1461	368	3438			3311	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	0	0	26	5	521	115	781	0	0	688	505
RTOR Reduction (vph)	0	0	0	0	141	141	0	0	0	0	184	0
Lane Group Flow (vph)	0	0	0	0	135	135	115	781	0	0	1009	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	0%	5%	0%	0%	0%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					10.1	10.1	31.5	31.5			31.5	
Effective Green, g (s)					10.1	10.1	31.5	31.5			31.5	
Actuated g/C Ratio					0.20	0.20	0.64	0.64			0.64	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					304	298	234	2183			2103	
v/s Ratio Prot								0.23			0.30	
v/s Ratio Perm					0.09	c0.09	c0.31					
v/c Ratio					0.44	0.45	0.49	0.36			0.48	
Uniform Delay, d1					17.3	17.3	4.8	4.3			4.7	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					1.0	1.1	7.2	0.5			0.8	
Delay (s)					18.3	18.4	12.0	4.7			5.5	
Level of Service					B	B	B	A			A	
Approach Delay (s)		0.0			18.4			5.7			5.5	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	8.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	49.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	61.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	5	5	570	40	555	0	0	640	530
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.85	0.85	1.00	1.00			0.93	
Flt Protected					1.00	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1471	1461	1805	3438			3092	
Flt Permitted					1.00	1.00	0.24	1.00			1.00	
Satd. Flow (perm)					1471	1461	452	3438			3092	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	5	5	600	42	584	0	0	674	558
RTOR Reduction (vph)	0	0	0	0	113	113	0	0	0	0	290	0
Lane Group Flow (vph)	0	0	0	0	191	193	42	584	0	0	942	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	0%	5%	0%	0%	12%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					10.2	10.2	16.8	16.8			16.8	
Effective Green, g (s)					10.2	10.2	16.8	16.8			16.8	
Actuated g/C Ratio					0.29	0.29	0.48	0.48			0.48	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					429	426	217	1650			1484	
v/s Ratio Prot								0.17			c0.30	
v/s Ratio Perm					0.13	c0.13	0.09					
v/c Ratio					0.44	0.45	0.19	0.35			0.63	
Uniform Delay, d1					10.1	10.1	5.2	5.7			6.8	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					0.7	0.8	2.0	0.6			2.1	
Delay (s)					10.8	10.9	7.2	6.3			8.9	
Level of Service					B	B	A	A			A	
Approach Delay (s)		0.0			10.9			6.4			8.9	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	8.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	35.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	53.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Windsor Ave & WB 210 Fwy

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	20	5	275	45	420	0	0	425	280
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.87	0.85	1.00	1.00			0.94	
Flt Protected					0.99	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1506	1461	1719	3438			3041	
Flt Permitted					0.99	1.00	0.38	1.00			1.00	
Satd. Flow (perm)					1506	1461	679	3438			3041	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	0	0	21	5	284	46	433	0	0	438	289
RTOR Reduction (vph)	0	0	0	0	108	126	0	0	0	0	121	0
Lane Group Flow (vph)	0	0	0	0	49	27	46	433	0	0	606	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	5%	5%	0%	0%	16%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					5.9	5.9	19.4	19.4			19.4	
Effective Green, g (s)					5.9	5.9	19.4	19.4			19.4	
Actuated g/C Ratio					0.18	0.18	0.58	0.58			0.58	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					267	259	396	2003			1772	
v/s Ratio Prot								0.13			c0.20	
v/s Ratio Perm					0.03	0.02	0.07					
v/c Ratio					0.18	0.10	0.12	0.22			0.34	
Uniform Delay, d1					11.7	11.5	3.1	3.3			3.6	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					0.3	0.2	0.6	0.2			0.5	
Delay (s)					12.0	11.7	3.7	3.6			4.2	
Level of Service					B	B	A	A			A	
Approach Delay (s)		0.0			11.8			3.6			4.2	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	5.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	33.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	41.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	20	5	335	45	500	0	0	490	275
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.87	0.85	1.00	1.00			0.95	
Flt Protected					0.99	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1498	1461	1719	3438			3066	
Flt Permitted					0.99	1.00	0.33	1.00			1.00	
Satd. Flow (perm)					1498	1461	600	3438			3066	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	0	0	0	22	5	360	48	538	0	0	527	296
RTOR Reduction (vph)	0	0	0	0	137	151	0	0	0	0	128	0
Lane Group Flow (vph)	0	0	0	0	59	40	48	538	0	0	695	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	5%	5%	0%	0%	15%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					6.4	6.4	18.9	18.9			18.9	
Effective Green, g (s)					6.4	6.4	18.9	18.9			18.9	
Actuated g/C Ratio					0.19	0.19	0.57	0.57			0.57	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					288	281	341	1951			1740	
v/s Ratio Prot								0.16			c0.23	
v/s Ratio Perm					0.04	0.03	0.08					
v/c Ratio					0.21	0.14	0.14	0.28			0.40	
Uniform Delay, d1					11.3	11.2	3.4	3.7			4.0	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					0.4	0.2	0.9	0.4			0.7	
Delay (s)					11.7	11.4	4.2	4.0			4.7	
Level of Service					B	B	A	A			A	
Approach Delay (s)		0.0			11.5			4.1			4.7	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	6.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	33.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	43.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	25	5	405	100	690	0	0	605	445
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.87	0.85	1.00	1.00			0.94	
Flt Protected					0.99	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1497	1461	1805	3438			3167	
Flt Permitted					0.99	1.00	0.23	1.00			1.00	
Satd. Flow (perm)					1497	1461	441	3438			3167	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	0	0	26	5	422	104	719	0	0	630	464
RTOR Reduction (vph)	0	0	0	0	165	171	0	0	0	0	154	0
Lane Group Flow (vph)	0	0	0	0	64	53	104	719	0	0	940	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	0%	5%	0%	0%	8%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					8.2	8.2	32.5	32.5			32.5	
Effective Green, g (s)					8.2	8.2	32.5	32.5			32.5	
Actuated g/C Ratio					0.17	0.17	0.67	0.67			0.67	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					252	246	294	2294			2114	
v/s Ratio Prot								0.21			c0.30	
v/s Ratio Perm					0.04	0.04	0.24					
v/c Ratio					0.26	0.21	0.35	0.31			0.44	
Uniform Delay, d1					17.6	17.5	3.5	3.4			3.8	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					0.5	0.4	3.3	0.4			0.7	
Delay (s)					18.1	17.9	6.8	3.8			4.5	
Level of Service					B	B	A	A			A	
Approach Delay (s)		0.0			18.0			4.2			4.5	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	7.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	48.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	56.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Windsor Ave & WB 210 Fwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	5	5	620	45	605	0	0	700	580
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.85	0.85	1.00	1.00			0.93	
Flt Protected					1.00	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1369	1358	1805	3438			3092	
Flt Permitted					1.00	1.00	0.24	1.00			1.00	
Satd. Flow (perm)					1369	1358	463	3438			3092	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	5	5	653	47	637	0	0	737	611
RTOR Reduction (vph)	0	0	0	0	90	90	0	0	0	0	332	0
Lane Group Flow (vph)	0	0	0	0	240	243	47	637	0	0	1016	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	13%	0%	5%	0%	0%	12%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					11.5	11.5	16.4	16.4			16.4	
Effective Green, g (s)					11.5	11.5	16.4	16.4			16.4	
Actuated g/C Ratio					0.32	0.32	0.46	0.46			0.46	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					439	435	212	1571			1413	
v/s Ratio Prot								0.19			c0.33	
v/s Ratio Perm					0.18	c0.18	0.10					
v/c Ratio					0.55	0.56	0.22	0.41			0.72	
Uniform Delay, d1					10.0	10.1	5.9	6.5			7.9	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					1.4	1.6	2.4	0.8			3.2	
Delay (s)					11.4	11.6	8.3	7.3			11.1	
Level of Service					B	B	A	A			B	
Approach Delay (s)		0.0			11.5			7.3			11.1	
Approach LOS		A			B			A			B	

Intersection Summary			
HCM Average Control Delay	10.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	35.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	58.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	20	5	300	50	460	0	0	465	305
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.87	0.85	1.00	1.00			0.94	
Flt Protected					0.99	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1503	1344	1719	3438			3041	
Flt Permitted					0.99	1.00	0.35	1.00			1.00	
Satd. Flow (perm)					1503	1344	628	3438			3041	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	0	0	21	5	309	52	474	0	0	479	314
RTOR Reduction (vph)	0	0	0	0	116	136	0	0	0	0	133	0
Lane Group Flow (vph)	0	0	0	0	52	31	52	474	0	0	660	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	5%	5%	0%	0%	16%	5%
Bus Blockages (#/hr)	0	0	0	0	0	20	0	0	0	0	0	0
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					6.1	6.1	19.2	19.2			19.2	
Effective Green, g (s)					6.1	6.1	19.2	19.2			19.2	
Actuated g/C Ratio					0.18	0.18	0.58	0.58			0.58	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					275	246	362	1982			1753	
v/s Ratio Prot								0.14			c0.22	
v/s Ratio Perm					0.03	0.02	0.08					
v/c Ratio					0.19	0.12	0.14	0.24			0.38	
Uniform Delay, d1					11.5	11.4	3.3	3.5			3.8	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					0.3	0.2	0.8	0.3			0.6	
Delay (s)					11.8	11.6	4.1	3.7			4.4	
Level of Service					B	B	A	A			A	
Approach Delay (s)		0.0			11.7			3.8			4.4	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	5.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.33		
Actuated Cycle Length (s)	33.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	43.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Windsor Ave & WB 210 Fwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	20	5	365	50	545	0	0	535	300
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.87	0.85	1.00	1.00			0.95	
Flt Protected					0.99	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1359	1311	1719	3438			3066	
Flt Permitted					0.99	1.00	0.29	1.00			1.00	
Satd. Flow (perm)					1359	1311	533	3438			3066	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	0	0	0	22	5	392	54	586	0	0	575	323
RTOR Reduction (vph)	0	0	0	0	126	126	0	0	0	0	143	0
Lane Group Flow (vph)	0	0	0	0	85	82	54	586	0	0	756	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	17%	5%	5%	0%	0%	15%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					7.0	7.0	19.0	19.0			19.0	
Effective Green, g (s)					7.0	7.0	19.0	19.0			19.0	
Actuated g/C Ratio					0.21	0.21	0.56	0.56			0.56	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					280	270	298	1921			1713	
v/s Ratio Prot								0.17			c0.25	
v/s Ratio Perm					0.06	0.06	0.10					
v/c Ratio					0.30	0.30	0.18	0.31			0.44	
Uniform Delay, d1					11.4	11.4	3.7	4.0			4.4	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					0.6	0.6	1.3	0.4			0.8	
Delay (s)					12.0	12.1	5.0	4.4			5.2	
Level of Service					B	B	A	A			A	
Approach Delay (s)		0.0			12.1			4.5			5.2	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	6.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	34.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	46.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Windsor Ave & WB 210 Fwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	25	5	440	110	750	0	0	660	485
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.87	0.85	1.00	1.00			0.94	
Flt Protected					0.99	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1495	1461	1805	3438			3311	
Flt Permitted					0.99	1.00	0.20	1.00			1.00	
Satd. Flow (perm)					1495	1461	376	3438			3311	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	0	0	26	5	458	115	781	0	0	688	505
RTOR Reduction (vph)	0	0	0	0	144	144	0	0	0	0	176	0
Lane Group Flow (vph)	0	0	0	0	102	99	115	781	0	0	1017	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	0%	5%	0%	0%	0%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					9.2	9.2	32.1	32.1			32.1	
Effective Green, g (s)					9.2	9.2	32.1	32.1			32.1	
Actuated g/C Ratio					0.19	0.19	0.65	0.65			0.65	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					279	273	245	2239			2156	
v/s Ratio Prot								0.23			c0.31	
v/s Ratio Perm					0.07	0.07	0.31					
v/c Ratio					0.37	0.36	0.47	0.35			0.47	
Uniform Delay, d1					17.5	17.5	4.3	3.9			4.3	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					0.8	0.8	6.3	0.4			0.7	
Delay (s)					18.3	18.3	10.7	4.3			5.1	
Level of Service					B	B	B	A			A	
Approach Delay (s)		0.0			18.3			5.1			5.1	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	7.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	49.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	60.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	5	5	625	40	555	0	0	585	530
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.85	0.85	1.00	1.00			0.93	
Flt Protected					1.00	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1369	1358	1805	3438			3193	
Flt Permitted					1.00	1.00	0.24	1.00			1.00	
Satd. Flow (perm)					1369	1358	463	3438			3193	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	5	5	658	42	584	0	0	616	558
RTOR Reduction (vph)	0	0	0	0	109	109	0	0	0	0	302	0
Lane Group Flow (vph)	0	0	0	0	223	227	42	584	0	0	872	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	13%	0%	5%	0%	0%	5%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					11.3	11.3	16.4	16.4			16.4	
Effective Green, g (s)					11.3	11.3	16.4	16.4			16.4	
Actuated g/C Ratio					0.32	0.32	0.46	0.46			0.46	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					433	430	213	1579			1467	
v/s Ratio Prot								0.17			c0.27	
v/s Ratio Perm					0.16	c0.17	0.09					
v/c Ratio					0.51	0.53	0.20	0.37			0.59	
Uniform Delay, d1					10.0	10.0	5.7	6.3			7.2	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					1.0	1.2	2.1	0.7			1.8	
Delay (s)					11.0	11.2	7.8	7.0			9.0	
Level of Service					B	B	A	A			A	
Approach Delay (s)		0.0			11.1			7.0			9.0	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	9.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	35.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	53.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Windsor Ave & WB 210 Fwy

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	20	5	330	45	420	0	0	370	280
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.87	0.85	1.00	1.00			0.94	
Flt Protected					0.99	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1334	1279	1719	3438			3216	
Flt Permitted					0.99	1.00	0.40	1.00			1.00	
Satd. Flow (perm)					1334	1279	718	3438			3216	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	0	0	21	5	340	46	433	0	0	381	289
RTOR Reduction (vph)	0	0	0	0	129	145	0	0	0	0	126	0
Lane Group Flow (vph)	0	0	0	0	57	35	46	433	0	0	544	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	20%	5%	5%	0%	0%	5%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					6.6	6.6	19.0	19.0			19.0	
Effective Green, g (s)					6.6	6.6	19.0	19.0			19.0	
Actuated g/C Ratio					0.20	0.20	0.57	0.57			0.57	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					262	251	406	1944			1819	
v/s Ratio Prot								0.13			c0.17	
v/s Ratio Perm					0.04	0.03	0.06					
v/c Ratio					0.22	0.14	0.11	0.22			0.30	
Uniform Delay, d1					11.3	11.2	3.4	3.6			3.8	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					0.4	0.3	0.6	0.3			0.4	
Delay (s)					11.8	11.4	4.0	3.9			4.2	
Level of Service					B	B	A	A			A	
Approach Delay (s)		0.0			11.6			3.9			4.2	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	5.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.28		
Actuated Cycle Length (s)	33.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	40.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	20	5	390	45	500	0	0	435	275
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.87	0.85	1.00	1.00			0.94	
Flt Protected					1.00	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1356	1311	1719	3438			3238	
Flt Permitted					1.00	1.00	0.35	1.00			1.00	
Satd. Flow (perm)					1356	1311	631	3438			3238	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	0	0	0	22	5	419	48	538	0	0	468	296
RTOR Reduction (vph)	0	0	0	0	143	143	0	0	0	0	137	0
Lane Group Flow (vph)	0	0	0	0	81	79	48	538	0	0	627	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	17%	5%	5%	0%	0%	5%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					8.3	8.3	18.8	18.8			18.8	
Effective Green, g (s)					8.3	8.3	18.8	18.8			18.8	
Actuated g/C Ratio					0.24	0.24	0.54	0.54			0.54	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					321	310	338	1841			1734	
v/s Ratio Prot								0.16			c0.19	
v/s Ratio Perm					0.06	c0.06	0.08					
v/c Ratio					0.25	0.26	0.14	0.29			0.36	
Uniform Delay, d1					10.9	10.9	4.1	4.5			4.7	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					0.4	0.4	0.9	0.4			0.6	
Delay (s)					11.3	11.3	5.0	4.9			5.3	
Level of Service					B	B	A	A			A	
Approach Delay (s)		0.0			11.3			4.9			5.3	
Approach LOS		A			B			A			A	

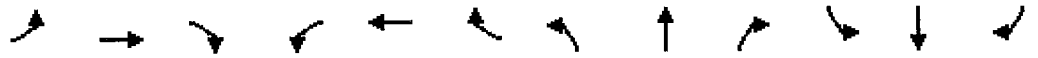
Intersection Summary			
HCM Average Control Delay	6.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.33		
Actuated Cycle Length (s)	35.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	43.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	25	5	460	100	690	0	0	550	445
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.87	0.85	1.00	1.00			0.93	
Flt Protected					0.99	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1378	1334	1805	3438			3294	
Flt Permitted					0.99	1.00	0.25	1.00			1.00	
Satd. Flow (perm)					1378	1334	467	3438			3294	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	0	0	26	5	479	104	719	0	0	573	464
RTOR Reduction (vph)	0	0	0	0	167	167	0	0	0	0	163	0
Lane Group Flow (vph)	0	0	0	0	89	87	104	719	0	0	874	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	15%	0%	5%	0%	0%	0%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					9.3	9.3	31.9	31.9			31.9	
Effective Green, g (s)					9.3	9.3	31.9	31.9			31.9	
Actuated g/C Ratio					0.19	0.19	0.65	0.65			0.65	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					260	252	303	2229			2136	
v/s Ratio Prot								0.21			c0.27	
v/s Ratio Perm					0.06	c0.07	0.22					
v/c Ratio					0.34	0.34	0.34	0.32			0.41	
Uniform Delay, d1					17.3	17.3	3.9	3.8			4.1	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					0.8	0.8	3.1	0.4			0.6	
Delay (s)					18.1	18.1	7.0	4.2			4.7	
Level of Service					B	B	A	A			A	
Approach Delay (s)		0.0			18.1			4.6			4.7	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	7.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	49.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	56.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	5	5	680	45	605	0	0	640	580
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.85	0.85	1.00	1.00			0.93	
Flt Protected					1.00	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1368	1358	1805	3438			3085	
Flt Permitted					1.00	1.00	0.25	1.00			1.00	
Satd. Flow (perm)					1368	1358	469	3438			3085	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	5	5	716	47	637	0	0	674	611
RTOR Reduction (vph)	0	0	0	0	89	89	0	0	0	0	337	0
Lane Group Flow (vph)	0	0	0	0	272	276	47	637	0	0	948	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	13%	0%	5%	0%	0%	12%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					11.9	11.9	16.2	16.2			16.2	
Effective Green, g (s)					11.9	11.9	16.2	16.2			16.2	
Actuated g/C Ratio					0.33	0.33	0.45	0.45			0.45	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					451	448	210	1543			1384	
v/s Ratio Prot								0.19			c0.31	
v/s Ratio Perm					0.20	c0.20	0.10					
v/c Ratio					0.60	0.62	0.22	0.41			0.69	
Uniform Delay, d1					10.1	10.2	6.1	6.7			7.9	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					2.3	2.5	2.5	0.8			2.8	
Delay (s)					12.4	12.7	8.6	7.5			10.7	
Level of Service					B	B	A	A			B	
Approach Delay (s)		0.0			12.5			7.6			10.7	
Approach LOS		A			B			A			B	

Intersection Summary			
HCM Average Control Delay	10.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	36.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	58.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Windsor Ave & WB 210 Fwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	20	5	360	50	460	0	0	405	305
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.87	0.85	1.00	1.00			0.94	
Flt Protected					0.99	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1496	1344	1719	3438			3035	
Flt Permitted					0.99	1.00	0.37	1.00			1.00	
Satd. Flow (perm)					1496	1344	676	3438			3035	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	0	0	21	5	371	52	474	0	0	418	314
RTOR Reduction (vph)	0	0	0	0	141	159	0	0	0	0	136	0
Lane Group Flow (vph)	0	0	0	0	59	38	52	474	0	0	596	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	5%	5%	0%	0%	16%	5%
Bus Blockages (#/hr)	0	0	0	0	0	20	0	0	0	0	0	0
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					6.4	6.4	18.9	18.9			18.9	
Effective Green, g (s)					6.4	6.4	18.9	18.9			18.9	
Actuated g/C Ratio					0.19	0.19	0.57	0.57			0.57	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					288	258	384	1951			1723	
v/s Ratio Prot								0.14			c0.20	
v/s Ratio Perm					0.04	0.03	0.08					
v/c Ratio					0.21	0.15	0.14	0.24			0.35	
Uniform Delay, d1					11.3	11.2	3.4	3.6			3.9	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					0.4	0.3	0.7	0.3			0.6	
Delay (s)					11.7	11.4	4.1	3.9			4.4	
Level of Service					B	B	A	A			A	
Approach Delay (s)		0.0			11.6			3.9			4.4	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	6.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	33.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	43.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
6: Windsor Ave & WB 210 Fwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	20	5	425	50	545	0	0	475	300
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.87	0.85	1.00	1.00			0.94	
Flt Protected					1.00	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1353	1311	1719	3438			3060	
Flt Permitted					1.00	1.00	0.31	1.00			1.00	
Satd. Flow (perm)					1353	1311	558	3438			3060	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	0	0	0	22	5	457	54	586	0	0	511	323
RTOR Reduction (vph)	0	0	0	0	117	117	0	0	0	0	157	0
Lane Group Flow (vph)	0	0	0	0	125	125	54	586	0	0	677	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	17%	5%	5%	0%	0%	15%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					9.4	9.4	18.5	18.5			18.5	
Effective Green, g (s)					9.4	9.4	18.5	18.5			18.5	
Actuated g/C Ratio					0.26	0.26	0.52	0.52			0.52	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					354	343	288	1772			1577	
v/s Ratio Prot								0.17			c0.22	
v/s Ratio Perm					0.09	c0.10	0.10					
v/c Ratio					0.35	0.36	0.19	0.33			0.43	
Uniform Delay, d1					10.8	10.8	4.7	5.1			5.4	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					0.6	0.7	1.4	0.5			0.9	
Delay (s)					11.4	11.5	6.1	5.6			6.3	
Level of Service					B	B	A	A			A	
Approach Delay (s)		0.0			11.4			5.6			6.3	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	7.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	35.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	46.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Windsor Ave & WB 210 Fwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	25	5	500	110	750	0	0	600	485
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.87	0.85	1.00	1.00			0.93	
Flt Protected					1.00	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1491	1461	1805	3438			3294	
Flt Permitted					1.00	1.00	0.21	1.00			1.00	
Satd. Flow (perm)					1491	1461	403	3438			3294	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	0	0	26	5	521	115	781	0	0	625	505
RTOR Reduction (vph)	0	0	0	0	141	141	0	0	0	0	184	0
Lane Group Flow (vph)	0	0	0	0	135	135	115	781	0	0	946	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	0%	5%	0%	0%	0%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					10.1	10.1	31.5	31.5			31.5	
Effective Green, g (s)					10.1	10.1	31.5	31.5			31.5	
Actuated g/C Ratio					0.20	0.20	0.64	0.64			0.64	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					304	298	256	2183			2092	
v/s Ratio Prot								0.23			c0.29	
v/s Ratio Perm					0.09	c0.09	0.29					
v/c Ratio					0.44	0.45	0.45	0.36			0.45	
Uniform Delay, d1					17.3	17.3	4.6	4.3			4.6	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					1.0	1.1	5.6	0.5			0.7	
Delay (s)					18.3	18.4	10.2	4.7			5.3	
Level of Service					B	B	B	A			A	
Approach Delay (s)		0.0			18.4			5.4			5.3	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	8.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	49.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	60.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Windsor Ave & WB 210 Fwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	5	5	570	40	610	0	0	585	585
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.85	0.85	1.00	1.00			0.93	
Flt Protected					1.00	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1471	1461	1805	3195			3180	
Flt Permitted					1.00	1.00	0.24	1.00			1.00	
Satd. Flow (perm)					1471	1461	452	3195			3180	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	5	5	600	42	642	0	0	616	616
RTOR Reduction (vph)	0	0	0	0	92	92	0	0	0	0	324	0
Lane Group Flow (vph)	0	0	0	0	212	214	42	642	0	0	908	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	0%	13%	0%	0%	5%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					10.6	10.6	16.8	16.8			16.8	
Effective Green, g (s)					10.6	10.6	16.8	16.8			16.8	
Actuated g/C Ratio					0.30	0.30	0.47	0.47			0.47	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					440	437	215	1516			1509	
v/s Ratio Prot								0.20			c0.29	
v/s Ratio Perm					0.14	c0.15	0.09					
v/c Ratio					0.48	0.49	0.20	0.42			0.60	
Uniform Delay, d1					10.2	10.2	5.4	6.1			6.8	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					0.8	0.9	2.0	0.9			1.8	
Delay (s)					11.0	11.0	7.4	7.0			8.6	
Level of Service					B	B	A	A			A	
Approach Delay (s)		0.0			11.0			7.0			8.6	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	8.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	35.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	53.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Windsor Ave & WB 210 Fwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	20	5	275	45	475	0	0	370	335
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.87	0.85	1.00	1.00			0.93	
Flt Protected					0.99	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1506	1461	1719	3139			3193	
Flt Permitted					0.99	1.00	0.38	1.00			1.00	
Satd. Flow (perm)					1506	1461	680	3139			3193	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	0	0	21	5	284	46	490	0	0	381	345
RTOR Reduction (vph)	0	0	0	0	108	126	0	0	0	0	144	0
Lane Group Flow (vph)	0	0	0	0	49	27	46	490	0	0	582	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	5%	15%	0%	0%	5%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					5.9	5.9	19.4	19.4			19.4	
Effective Green, g (s)					5.9	5.9	19.4	19.4			19.4	
Actuated g/C Ratio					0.18	0.18	0.58	0.58			0.58	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					267	259	396	1829			1860	
v/s Ratio Prot								0.16			c0.18	
v/s Ratio Perm					0.03	0.02	0.07					
v/c Ratio					0.18	0.10	0.12	0.27			0.31	
Uniform Delay, d1					11.7	11.5	3.1	3.4			3.5	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					0.3	0.2	0.6	0.4			0.4	
Delay (s)					12.0	11.7	3.7	3.8			4.0	
Level of Service					B	B	A	A			A	
Approach Delay (s)		0.0			11.8			3.8			4.0	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	5.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.28		
Actuated Cycle Length (s)	33.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	41.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Windsor Ave & WB 210 Fwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	20	5	335	45	555	0	0	435	330
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.87	0.85	1.00	1.00			0.94	
Flt Protected					0.99	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1498	1461	1719	3167			3216	
Flt Permitted					0.99	1.00	0.33	1.00			1.00	
Satd. Flow (perm)					1498	1461	598	3167			3216	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	0	0	0	22	5	360	48	597	0	0	468	355
RTOR Reduction (vph)	0	0	0	0	123	123	0	0	0	0	155	0
Lane Group Flow (vph)	0	0	0	0	73	68	48	597	0	0	668	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	5%	14%	0%	0%	5%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					6.6	6.6	18.9	18.9			18.9	
Effective Green, g (s)					6.6	6.6	18.9	18.9			18.9	
Actuated g/C Ratio					0.20	0.20	0.56	0.56			0.56	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					295	288	337	1787			1814	
v/s Ratio Prot								0.19			c0.21	
v/s Ratio Perm					0.05	0.05	0.08					
v/c Ratio					0.25	0.24	0.14	0.33			0.37	
Uniform Delay, d1					11.4	11.3	3.5	3.9			4.0	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					0.4	0.4	0.9	0.5			0.6	
Delay (s)					11.8	11.8	4.3	4.4			4.6	
Level of Service					B	B	A	A			A	
Approach Delay (s)		0.0			11.8			4.4			4.6	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	6.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.34		
Actuated Cycle Length (s)	33.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	44.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Windsor Ave & WB 210 Fwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	25	5	405	100	745	0	0	550	500
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.87	0.85	1.00	1.00			0.93	
Flt Protected					0.99	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1497	1461	1805	3252			3274	
Flt Permitted					0.99	1.00	0.23	1.00			1.00	
Satd. Flow (perm)					1497	1461	438	3252			3274	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	0	0	26	5	422	104	776	0	0	573	521
RTOR Reduction (vph)	0	0	0	0	148	148	0	0	0	0	176	0
Lane Group Flow (vph)	0	0	0	0	81	76	104	776	0	0	918	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	0%	11%	0%	0%	0%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					8.6	8.6	32.5	32.5			32.5	
Effective Green, g (s)					8.6	8.6	32.5	32.5			32.5	
Actuated g/C Ratio					0.18	0.18	0.66	0.66			0.66	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					262	256	290	2153			2167	
v/s Ratio Prot								0.24			c0.28	
v/s Ratio Perm					0.05	0.05	0.24					
v/c Ratio					0.31	0.30	0.36	0.36			0.42	
Uniform Delay, d1					17.7	17.6	3.7	3.7			3.9	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					0.7	0.7	3.4	0.5			0.6	
Delay (s)					18.3	18.3	7.1	4.2			4.5	
Level of Service					B	B	A	A			A	
Approach Delay (s)		0.0			18.3			4.5			4.5	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	7.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	49.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	56.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Windsor Ave & WB 210 Fwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	5	5	620	45	665	0	0	640	635
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.85	0.85	1.00	1.00			0.93	
Flt Protected					1.00	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1470	1461	1805	3195			3181	
Flt Permitted					1.00	1.00	0.24	1.00			1.00	
Satd. Flow (perm)					1470	1461	463	3195			3181	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	5	5	653	47	700	0	0	674	668
RTOR Reduction (vph)	0	0	0	0	73	73	0	0	0	0	364	0
Lane Group Flow (vph)	0	0	0	0	257	260	47	700	0	0	978	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	0%	13%	0%	0%	5%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					11.6	11.6	16.4	16.4			16.4	
Effective Green, g (s)					11.6	11.6	16.4	16.4			16.4	
Actuated g/C Ratio					0.32	0.32	0.46	0.46			0.46	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					474	471	211	1456			1449	
v/s Ratio Prot								0.22			c0.31	
v/s Ratio Perm					0.17	c0.18	0.10					
v/c Ratio					0.54	0.55	0.22	0.48			0.68	
Uniform Delay, d1					10.0	10.1	5.9	6.8			7.7	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					1.3	1.4	2.4	1.1			2.5	
Delay (s)					11.3	11.5	8.4	8.0			10.2	
Level of Service					B	B	A	A			B	
Approach Delay (s)		0.0			11.4			8.0			10.2	
Approach LOS		A			B			A			B	

Intersection Summary			
HCM Average Control Delay	9.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	36.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	58.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Windsor Ave & WB 210 Fwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	20	5	300	50	520	0	0	405	365
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.87	0.85	1.00	1.00			0.93	
Flt Protected					0.99	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1503	1461	1719	3139			3194	
Flt Permitted					0.99	1.00	0.35	1.00			1.00	
Satd. Flow (perm)					1503	1461	627	3139			3194	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	0	0	21	5	309	52	536	0	0	418	376
RTOR Reduction (vph)	0	0	0	0	116	136	0	0	0	0	159	0
Lane Group Flow (vph)	0	0	0	0	52	31	52	536	0	0	635	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	5%	15%	0%	0%	5%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					6.1	6.1	19.2	19.2			19.2	
Effective Green, g (s)					6.1	6.1	19.2	19.2			19.2	
Actuated g/C Ratio					0.18	0.18	0.58	0.58			0.58	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					275	268	362	1810			1842	
v/s Ratio Prot								0.17			c0.20	
v/s Ratio Perm					0.03	0.02	0.08					
v/c Ratio					0.19	0.11	0.14	0.30			0.34	
Uniform Delay, d1					11.5	11.3	3.3	3.6			3.7	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					0.3	0.2	0.8	0.4			0.5	
Delay (s)					11.8	11.5	4.1	4.0			4.2	
Level of Service					B	B	A	A			A	
Approach Delay (s)		0.0			11.7			4.0			4.2	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	5.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	33.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	43.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	20	5	275	45	475	0	0	370	280
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.87	0.85	1.00	1.00			0.94	
Flt Protected					0.99	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1506	1461	1719	3139			3216	
Flt Permitted					0.99	1.00	0.40	1.00			1.00	
Satd. Flow (perm)					1506	1461	718	3139			3216	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	0	0	21	5	284	46	490	0	0	381	289
RTOR Reduction (vph)	0	0	0	0	108	126	0	0	0	0	121	0
Lane Group Flow (vph)	0	0	0	0	49	27	46	490	0	0	549	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	5%	15%	0%	0%	5%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					5.9	5.9	19.4	19.4			19.4	
Effective Green, g (s)					5.9	5.9	19.4	19.4			19.4	
Actuated g/C Ratio					0.18	0.18	0.58	0.58			0.58	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					267	259	418	1829			1874	
v/s Ratio Prot								0.16			c0.17	
v/s Ratio Perm					0.03	0.02	0.06					
v/c Ratio					0.18	0.10	0.11	0.27			0.29	
Uniform Delay, d1					11.7	11.5	3.1	3.4			3.5	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					0.3	0.2	0.5	0.4			0.4	
Delay (s)					12.0	11.7	3.6	3.8			3.9	
Level of Service					B	B	A	A			A	
Approach Delay (s)		0.0			11.8			3.8			3.9	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	5.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.27		
Actuated Cycle Length (s)	33.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	39.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Windsor Ave & WB 210 Fwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	25	5	440	110	810	0	0	600	545
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.87	0.85	1.00	1.00			0.93	
Flt Protected					0.99	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1495	1461	1805	3252			3274	
Flt Permitted					0.99	1.00	0.20	1.00			1.00	
Satd. Flow (perm)					1495	1461	372	3252			3274	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	0	0	26	5	458	115	844	0	0	625	568
RTOR Reduction (vph)	0	0	0	0	122	122	0	0	0	0	202	0
Lane Group Flow (vph)	0	0	0	0	124	121	115	844	0	0	991	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	0%	11%	0%	0%	0%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					9.7	9.7	32.1	32.1			32.1	
Effective Green, g (s)					9.7	9.7	32.1	32.1			32.1	
Actuated g/C Ratio					0.19	0.19	0.64	0.64			0.64	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					291	285	240	2096			2110	
v/s Ratio Prot								0.26			0.30	
v/s Ratio Perm					0.08	0.08	c0.31					
v/c Ratio					0.42	0.42	0.48	0.40			0.47	
Uniform Delay, d1					17.6	17.6	4.6	4.2			4.5	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					1.0	1.0	6.7	0.6			0.8	
Delay (s)					18.6	18.6	11.3	4.8			5.3	
Level of Service					B	B	B	A			A	
Approach Delay (s)		0.0			18.6			5.6			5.3	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	7.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	49.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	60.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	5	5	570	40	555	0	0	585	585
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.85	0.85	1.00	1.00			0.93	
Flt Protected					1.00	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1471	1461	1805	3438			3064	
Flt Permitted					1.00	1.00	0.24	1.00			1.00	
Satd. Flow (perm)					1471	1461	452	3438			3064	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	5	5	600	42	584	0	0	616	616
RTOR Reduction (vph)	0	0	0	0	113	113	0	0	0	0	320	0
Lane Group Flow (vph)	0	0	0	0	191	193	42	584	0	0	912	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	0%	5%	0%	0%	5%	13%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					10.2	10.2	16.8	16.8			16.8	
Effective Green, g (s)					10.2	10.2	16.8	16.8			16.8	
Actuated g/C Ratio					0.29	0.29	0.48	0.48			0.48	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					429	426	217	1650			1471	
v/s Ratio Prot								0.17			c0.30	
v/s Ratio Perm					0.13	c0.13	0.09					
v/c Ratio					0.44	0.45	0.19	0.35			0.62	
Uniform Delay, d1					10.1	10.1	5.2	5.7			6.7	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					0.7	0.8	2.0	0.6			2.0	
Delay (s)					10.8	10.9	7.2	6.3			8.7	
Level of Service					B	B	A	A			A	
Approach Delay (s)		0.0			10.9			6.4			8.7	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	8.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	35.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	53.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Windsor Ave & WB 210 Fwy

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	20	5	275	45	420	0	0	370	335
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.87	0.85	1.00	1.00			0.93	
Flt Protected					0.99	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1506	1461	1719	3438			3003	
Flt Permitted					0.99	1.00	0.38	1.00			1.00	
Satd. Flow (perm)					1506	1461	680	3438			3003	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	0	0	21	5	284	46	433	0	0	381	345
RTOR Reduction (vph)	0	0	0	0	108	126	0	0	0	0	144	0
Lane Group Flow (vph)	0	0	0	0	49	27	46	433	0	0	582	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	5%	5%	0%	0%	5%	19%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					5.9	5.9	19.4	19.4			19.4	
Effective Green, g (s)					5.9	5.9	19.4	19.4			19.4	
Actuated g/C Ratio					0.18	0.18	0.58	0.58			0.58	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					267	259	396	2003			1749	
v/s Ratio Prot								0.13			c0.19	
v/s Ratio Perm					0.03	0.02	0.07					
v/c Ratio					0.18	0.10	0.12	0.22			0.33	
Uniform Delay, d1					11.7	11.5	3.1	3.3			3.6	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					0.3	0.2	0.6	0.2			0.5	
Delay (s)					12.0	11.7	3.7	3.6			4.1	
Level of Service					B	B	A	A			A	
Approach Delay (s)		0.0			11.8			3.6			4.1	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	5.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.30		
Actuated Cycle Length (s)	33.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	41.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Windsor Ave & WB 210 Fwy

8/11/2012

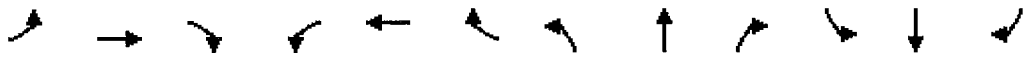
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	20	5	335	45	500	0	0	435	330
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.87	0.85	1.00	1.00			0.94	
Flt Protected					0.99	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1498	1461	1719	3438			3029	
Flt Permitted					0.99	1.00	0.33	1.00			1.00	
Satd. Flow (perm)					1498	1461	600	3438			3029	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	0	0	0	22	5	360	48	538	0	0	468	355
RTOR Reduction (vph)	0	0	0	0	137	151	0	0	0	0	154	0
Lane Group Flow (vph)	0	0	0	0	59	40	48	538	0	0	669	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	5%	5%	0%	0%	5%	20%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					6.4	6.4	18.9	18.9			18.9	
Effective Green, g (s)					6.4	6.4	18.9	18.9			18.9	
Actuated g/C Ratio					0.19	0.19	0.57	0.57			0.57	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					288	281	341	1951			1719	
v/s Ratio Prot								0.16			c0.22	
v/s Ratio Perm					0.04	0.03	0.08					
v/c Ratio					0.21	0.14	0.14	0.28			0.39	
Uniform Delay, d1					11.3	11.2	3.4	3.7			4.0	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					0.4	0.2	0.9	0.4			0.7	
Delay (s)					11.7	11.4	4.2	4.0			4.7	
Level of Service					B	B	A	A			A	
Approach Delay (s)		0.0			11.5			4.1			4.7	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	5.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.34		
Actuated Cycle Length (s)	33.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	44.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Windsor Ave & WB 210 Fwy

8/11/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	25	5	405	100	690	0	0	550	500
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.87	0.85	1.00	1.00			0.93	
Flt Protected					0.99	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1497	1461	1805	3438			3129	
Flt Permitted					0.99	1.00	0.23	1.00			1.00	
Satd. Flow (perm)					1497	1461	441	3438			3129	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	0	0	26	5	422	104	719	0	0	573	521
RTOR Reduction (vph)	0	0	0	0	165	171	0	0	0	0	173	0
Lane Group Flow (vph)	0	0	0	0	64	53	104	719	0	0	921	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	0%	5%	0%	0%	0%	15%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					8.2	8.2	32.5	32.5			32.5	
Effective Green, g (s)					8.2	8.2	32.5	32.5			32.5	
Actuated g/C Ratio					0.17	0.17	0.67	0.67			0.67	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					252	246	294	2294			2088	
v/s Ratio Prot								0.21			c0.29	
v/s Ratio Perm					0.04	0.04	0.24					
v/c Ratio					0.26	0.21	0.35	0.31			0.44	
Uniform Delay, d1					17.6	17.5	3.5	3.4			3.8	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					0.5	0.4	3.3	0.4			0.7	
Delay (s)					18.1	17.9	6.8	3.8			4.5	
Level of Service					B	B	A	A			A	
Approach Delay (s)		0.0			18.0			4.2			4.5	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	7.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	48.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	56.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Windsor Ave & WB 210 Fwy

8/14/2012

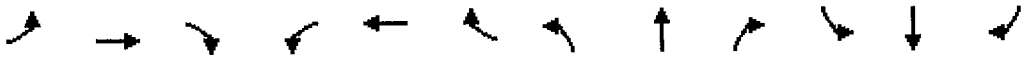
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	5	5	620	45	605	0	0	640	635
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.85	0.85	1.00	1.00			0.93	
Flt Protected					1.00	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1470	1461	1805	3195			3181	
Flt Permitted					1.00	1.00	0.24	1.00			1.00	
Satd. Flow (perm)					1470	1461	463	3195			3181	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	5	5	653	47	637	0	0	674	668
RTOR Reduction (vph)	0	0	0	0	91	91	0	0	0	0	361	0
Lane Group Flow (vph)	0	0	0	0	239	242	47	637	0	0	981	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	0%	13%	0%	0%	5%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					11.3	11.3	16.4	16.4			16.4	
Effective Green, g (s)					11.3	11.3	16.4	16.4			16.4	
Actuated g/C Ratio					0.32	0.32	0.46	0.46			0.46	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					465	462	213	1468			1461	
v/s Ratio Prot								0.20			c0.31	
v/s Ratio Perm					0.16	c0.17	0.10					
v/c Ratio					0.51	0.52	0.22	0.43			0.67	
Uniform Delay, d1					10.0	10.0	5.8	6.5			7.5	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					1.0	1.1	2.4	0.9			2.5	
Delay (s)					10.9	11.1	8.2	7.5			10.0	
Level of Service					B	B	A	A			B	
Approach Delay (s)		0.0			11.0			7.5			10.0	
Approach LOS		A			B			A			B	

Intersection Summary			
HCM Average Control Delay	9.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	35.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	58.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Windsor Ave & WB 210 Fwy

8/14/2012



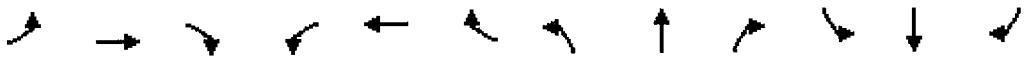
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	20	5	300	50	460	0	0	405	365
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.87	0.85	1.00	1.00			0.93	
Flt Protected					0.99	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1503	1461	1719	3139			3194	
Flt Permitted					0.99	1.00	0.35	1.00			1.00	
Satd. Flow (perm)					1503	1461	627	3139			3194	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	0	0	21	5	309	52	474	0	0	418	376
RTOR Reduction (vph)	0	0	0	0	116	136	0	0	0	0	159	0
Lane Group Flow (vph)	0	0	0	0	52	31	52	474	0	0	635	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	5%	15%	0%	0%	5%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					6.1	6.1	19.2	19.2			19.2	
Effective Green, g (s)					6.1	6.1	19.2	19.2			19.2	
Actuated g/C Ratio					0.18	0.18	0.58	0.58			0.58	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					275	268	362	1810			1842	
v/s Ratio Prot								0.15			c0.20	
v/s Ratio Perm					0.03	0.02	0.08					
v/c Ratio					0.19	0.11	0.14	0.26			0.34	
Uniform Delay, d1					11.5	11.3	3.3	3.5			3.7	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					0.3	0.2	0.8	0.4			0.5	
Delay (s)					11.8	11.5	4.1	3.9			4.2	
Level of Service					B	B	A	A			A	
Approach Delay (s)		0.0			11.7			3.9			4.2	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	5.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	33.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	43.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Windsor Ave & WB 210 Fwy

8/14/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	20	5	365	50	545	0	0	475	360
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.87	0.85	1.00	1.00			0.94	
Flt Protected					0.99	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1496	1461	1719	3167			3216	
Flt Permitted					0.99	1.00	0.30	1.00			1.00	
Satd. Flow (perm)					1496	1461	535	3167			3216	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	0	0	0	22	5	392	54	586	0	0	511	387
RTOR Reduction (vph)	0	0	0	0	127	127	0	0	0	0	170	0
Lane Group Flow (vph)	0	0	0	0	84	81	54	586	0	0	728	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	5%	14%	0%	0%	5%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					6.8	6.8	18.9	18.9			18.9	
Effective Green, g (s)					6.8	6.8	18.9	18.9			18.9	
Actuated g/C Ratio					0.20	0.20	0.56	0.56			0.56	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					302	295	300	1776			1804	
v/s Ratio Prot								0.19			c0.23	
v/s Ratio Perm					0.06	0.06	0.10					
v/c Ratio					0.28	0.27	0.18	0.33			0.40	
Uniform Delay, d1					11.4	11.4	3.6	4.0			4.2	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					0.5	0.5	1.3	0.5			0.7	
Delay (s)					11.9	11.9	4.9	4.5			4.9	
Level of Service					B	B	A	A			A	
Approach Delay (s)		0.0			11.9			4.5			4.9	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	6.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	33.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	46.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Windsor Ave & WB 210 Fwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	25	5	440	110	750	0	0	600	545
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.87	0.85	1.00	1.00			0.93	
Flt Protected					0.99	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1495	1461	1805	3252			3274	
Flt Permitted					0.99	1.00	0.20	1.00			1.00	
Satd. Flow (perm)					1495	1461	376	3252			3274	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	0	0	26	5	458	115	781	0	0	625	568
RTOR Reduction (vph)	0	0	0	0	144	144	0	0	0	0	198	0
Lane Group Flow (vph)	0	0	0	0	102	99	115	781	0	0	995	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	0%	11%	0%	0%	0%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					9.2	9.2	32.1	32.1			32.1	
Effective Green, g (s)					9.2	9.2	32.1	32.1			32.1	
Actuated g/C Ratio					0.19	0.19	0.65	0.65			0.65	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					279	273	245	2117			2132	
v/s Ratio Prot								0.24			0.30	
v/s Ratio Perm					0.07	0.07	c0.31					
v/c Ratio					0.37	0.36	0.47	0.37			0.47	
Uniform Delay, d1					17.5	17.5	4.3	3.9			4.3	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					0.8	0.8	6.3	0.5			0.7	
Delay (s)					18.3	18.3	10.7	4.4			5.0	
Level of Service					B	B	B	A			A	
Approach Delay (s)		0.0			18.3			5.2			5.0	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	7.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	49.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	60.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Windsor Ave & WB 210 Fwy

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	5	5	570	40	610	0	0	585	530
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.85	0.85	1.00	1.00			0.93	
Flt Protected					1.00	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1471	1461	1805	3195			3193	
Flt Permitted					1.00	1.00	0.24	1.00			1.00	
Satd. Flow (perm)					1471	1461	452	3195			3193	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	5	5	600	42	642	0	0	616	558
RTOR Reduction (vph)	0	0	0	0	92	92	0	0	0	0	293	0
Lane Group Flow (vph)	0	0	0	0	212	214	42	642	0	0	881	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	0%	13%	0%	0%	5%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					10.6	10.6	16.8	16.8			16.8	
Effective Green, g (s)					10.6	10.6	16.8	16.8			16.8	
Actuated g/C Ratio					0.30	0.30	0.47	0.47			0.47	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					440	437	215	1516			1515	
v/s Ratio Prot								0.20			c0.28	
v/s Ratio Perm					0.14	c0.15	0.09					
v/c Ratio					0.48	0.49	0.20	0.42			0.58	
Uniform Delay, d1					10.2	10.2	5.4	6.1			6.7	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					0.8	0.9	2.0	0.9			1.6	
Delay (s)					11.0	11.0	7.4	7.0			8.4	
Level of Service					B	B	A	A			A	
Approach Delay (s)		0.0			11.0			7.0			8.4	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	8.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	35.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	52.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	20	5	275	45	475	0	0	370	280
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.87	0.85	1.00	1.00			0.94	
Flt Protected					0.99	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1506	1461	1719	3139			3216	
Flt Permitted					0.99	1.00	0.40	1.00			1.00	
Satd. Flow (perm)					1506	1461	718	3139			3216	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	0	0	21	5	284	46	490	0	0	381	289
RTOR Reduction (vph)	0	0	0	0	108	126	0	0	0	0	121	0
Lane Group Flow (vph)	0	0	0	0	49	27	46	490	0	0	549	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	5%	15%	0%	0%	5%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					5.9	5.9	19.4	19.4			19.4	
Effective Green, g (s)					5.9	5.9	19.4	19.4			19.4	
Actuated g/C Ratio					0.18	0.18	0.58	0.58			0.58	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					267	259	418	1829			1874	
v/s Ratio Prot								0.16			c0.17	
v/s Ratio Perm					0.03	0.02	0.06					
v/c Ratio					0.18	0.10	0.11	0.27			0.29	
Uniform Delay, d1					11.7	11.5	3.1	3.4			3.5	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					0.3	0.2	0.5	0.4			0.4	
Delay (s)					12.0	11.7	3.6	3.8			3.9	
Level of Service					B	B	A	A			A	
Approach Delay (s)		0.0			11.8			3.8			3.9	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	5.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.27		
Actuated Cycle Length (s)	33.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	39.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	20	5	335	45	555	0	0	435	275
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.87	0.85	1.00	1.00			0.94	
Flt Protected					0.99	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1498	1461	1719	3167			3238	
Flt Permitted					0.99	1.00	0.36	1.00			1.00	
Satd. Flow (perm)					1498	1461	648	3167			3238	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	0	0	0	22	5	360	48	597	0	0	468	296
RTOR Reduction (vph)	0	0	0	0	123	123	0	0	0	0	129	0
Lane Group Flow (vph)	0	0	0	0	73	68	48	597	0	0	635	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	5%	14%	0%	0%	5%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					6.6	6.6	18.9	18.9			18.9	
Effective Green, g (s)					6.6	6.6	18.9	18.9			18.9	
Actuated g/C Ratio					0.20	0.20	0.56	0.56			0.56	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					295	288	366	1787			1827	
v/s Ratio Prot								0.19			c0.20	
v/s Ratio Perm					0.05	0.05	0.07					
v/c Ratio					0.25	0.24	0.13	0.33			0.35	
Uniform Delay, d1					11.4	11.3	3.4	3.9			4.0	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					0.4	0.4	0.7	0.5			0.5	
Delay (s)					11.8	11.8	4.2	4.4			4.5	
Level of Service					B	B	A	A			A	
Approach Delay (s)		0.0			11.8			4.4			4.5	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	6.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.32		
Actuated Cycle Length (s)	33.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	42.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	25	5	405	100	745	0	0	550	445
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.87	0.85	1.00	1.00			0.93	
Flt Protected					0.99	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1497	1461	1805	3252			3294	
Flt Permitted					0.99	1.00	0.25	1.00			1.00	
Satd. Flow (perm)					1497	1461	473	3252			3294	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	0	0	26	5	422	104	776	0	0	573	464
RTOR Reduction (vph)	0	0	0	0	148	148	0	0	0	0	157	0
Lane Group Flow (vph)	0	0	0	0	81	76	104	776	0	0	880	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	0%	11%	0%	0%	0%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					8.6	8.6	32.5	32.5			32.5	
Effective Green, g (s)					8.6	8.6	32.5	32.5			32.5	
Actuated g/C Ratio					0.18	0.18	0.66	0.66			0.66	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					262	256	313	2153			2180	
v/s Ratio Prot								0.24			c0.27	
v/s Ratio Perm					0.05	0.05	0.22					
v/c Ratio					0.31	0.30	0.33	0.36			0.40	
Uniform Delay, d1					17.7	17.6	3.6	3.7			3.8	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					0.7	0.7	2.8	0.5			0.6	
Delay (s)					18.3	18.3	6.4	4.2			4.4	
Level of Service					B	B	A	A			A	
Approach Delay (s)		0.0			18.3			4.4			4.4	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	7.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	49.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	55.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Windsor Ave & WB 210 Fwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	5	5	620	45	665	0	0	640	580
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.85	0.85	1.00	1.00			0.93	
Flt Protected					1.00	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1470	1461	1805	3195			3193	
Flt Permitted					1.00	1.00	0.24	1.00			1.00	
Satd. Flow (perm)					1470	1461	463	3195			3193	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	5	5	653	47	700	0	0	674	611
RTOR Reduction (vph)	0	0	0	0	73	73	0	0	0	0	333	0
Lane Group Flow (vph)	0	0	0	0	257	260	47	700	0	0	952	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	0%	13%	0%	0%	5%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					11.6	11.6	16.4	16.4			16.4	
Effective Green, g (s)					11.6	11.6	16.4	16.4			16.4	
Actuated g/C Ratio					0.32	0.32	0.46	0.46			0.46	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					474	471	211	1456			1455	
v/s Ratio Prot								0.22			c0.30	
v/s Ratio Perm					0.17	c0.18	0.10					
v/c Ratio					0.54	0.55	0.22	0.48			0.65	
Uniform Delay, d1					10.0	10.1	5.9	6.8			7.6	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					1.3	1.4	2.4	1.1			2.3	
Delay (s)					11.3	11.5	8.4	8.0			9.9	
Level of Service					B	B	A	A			A	
Approach Delay (s)		0.0			11.4			8.0			9.9	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	9.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	36.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	57.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	20	5	300	50	520	0	0	405	605
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.87	0.85	1.00	1.00			0.91	
Flt Protected					0.99	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1503	1461	1719	3139			3129	
Flt Permitted					0.99	1.00	0.24	1.00			1.00	
Satd. Flow (perm)					1503	1461	441	3139			3129	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	0	0	21	5	309	52	536	0	0	418	624
RTOR Reduction (vph)	0	0	0	0	116	136	0	0	0	0	264	0
Lane Group Flow (vph)	0	0	0	0	52	31	52	536	0	0	778	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	5%	15%	0%	0%	5%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					6.1	6.1	19.2	19.2			19.2	
Effective Green, g (s)					6.1	6.1	19.2	19.2			19.2	
Actuated g/C Ratio					0.18	0.18	0.58	0.58			0.58	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					275	268	254	1810			1804	
v/s Ratio Prot								0.17			c0.25	
v/s Ratio Perm					0.03	0.02	0.12					
v/c Ratio					0.19	0.11	0.20	0.30			0.43	
Uniform Delay, d1					11.5	11.3	3.4	3.6			4.0	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					0.3	0.2	1.8	0.4			0.8	
Delay (s)					11.8	11.5	5.2	4.0			4.7	
Level of Service					B	B	A	A			A	
Approach Delay (s)		0.0			11.7			4.1			4.7	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	5.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	33.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	51.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Windsor Ave & WB 210 Fwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	20	5	365	50	605	0	0	475	300
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.87	0.85	1.00	1.00			0.94	
Flt Protected					0.99	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1496	1461	1719	3167			3238	
Flt Permitted					0.99	1.00	0.32	1.00			1.00	
Satd. Flow (perm)					1496	1461	582	3167			3238	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	0	0	0	22	5	392	54	651	0	0	511	323
RTOR Reduction (vph)	0	0	0	0	100	100	0	0	0	0	144	0
Lane Group Flow (vph)	0	0	0	0	111	108	54	651	0	0	690	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	5%	14%	0%	0%	5%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					7.2	7.2	19.0	19.0			19.0	
Effective Green, g (s)					7.2	7.2	19.0	19.0			19.0	
Actuated g/C Ratio					0.21	0.21	0.56	0.56			0.56	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					315	308	323	1759			1799	
v/s Ratio Prot								0.21			c0.21	
v/s Ratio Perm					0.07	0.07	0.09					
v/c Ratio					0.35	0.35	0.17	0.37			0.38	
Uniform Delay, d1					11.5	11.5	3.7	4.3			4.3	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					0.7	0.7	1.1	0.6			0.6	
Delay (s)					12.2	12.2	4.8	4.9			4.9	
Level of Service					B	B	A	A			A	
Approach Delay (s)		0.0			12.2			4.9			4.9	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	6.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	34.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	45.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Windsor Ave & WB 210 Fwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	25	5	440	110	810	0	0	600	485
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.87	0.85	1.00	1.00			0.93	
Flt Protected					0.99	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1495	1461	1805	3252			3294	
Flt Permitted					0.99	1.00	0.21	1.00			1.00	
Satd. Flow (perm)					1495	1461	408	3252			3294	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	0	0	26	5	458	115	844	0	0	625	505
RTOR Reduction (vph)	0	0	0	0	122	122	0	0	0	0	179	0
Lane Group Flow (vph)	0	0	0	0	124	121	115	844	0	0	951	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	0%	11%	0%	0%	0%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					9.7	9.7	32.1	32.1			32.1	
Effective Green, g (s)					9.7	9.7	32.1	32.1			32.1	
Actuated g/C Ratio					0.19	0.19	0.64	0.64			0.64	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					291	285	263	2096			2123	
v/s Ratio Prot								0.26			c0.29	
v/s Ratio Perm					0.08	0.08	0.28					
v/c Ratio					0.42	0.42	0.44	0.40			0.45	
Uniform Delay, d1					17.6	17.6	4.4	4.2			4.4	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					1.0	1.0	5.2	0.6			0.7	
Delay (s)					18.6	18.6	9.6	4.8			5.1	
Level of Service					B	B	A	A			A	
Approach Delay (s)		0.0			18.6			5.4			5.1	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	7.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	49.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	58.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Hall & Foreman, Inc.
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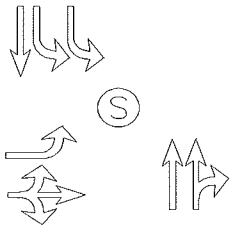
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	1 OF 8

E/W STREET : I-210 FWY EB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 7
ROUTE 1B, 1C

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY EB RAMPS						
EB LEFT	550	5%		550	50	600
EB THRU	5	5%		5	5	10
EB RIGHT	105	5%		105	10	115
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
WINDSOR AVE						
NB LEFT	0	0%		0	0	0
NB THRU	130	5%		130	10	140
NB RIGHT	20	5%		20	5	25
SB LEFT	415	5%	**55**	470	40	510
SB THRU	190	5%		190	15	205
SB RIGHT	0	0%		0	0	0
TOTALS	**1415**		**55**	**1470**	**135**	**1605**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Jul-11	VV.110264.0000	2 OF 8

E/W STREET : I-210 FWY EB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 7
ROUTE 1F, 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY EB RAMPS						
EB LEFT	550	5%	**55**	605	55	660
EB THRU	5	5%		5	5	10
EB RIGHT	105	5%		105	10	115
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
WINDSOR AVE						
NB LEFT	0	0%		0	0	0
NB THRU	130	5%		130	10	140
NB RIGHT	20	5%		20	5	25
SB LEFT	415	5%		415	35	450
SB THRU	190	5%		190	15	205
SB RIGHT	0	0%		0	0	0
TOTALS	**1415**		**55**	**1470**	**135**	**1605**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	28-Jun-12	VV.110264.0000	3 OF 8

E/W STREET : I-210 FWY EB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 7
ROUTE 1B, 1C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY EB RAMPS						
EB LEFT	320	5%		320	30	350
EB THRU	5	5%		5	5	10
EB RIGHT	55	5%		55	5	60
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
WINDSOR AVE						
NB LEFT	0	0%		0	0	0
NB THRU	145	5%		145	15	160
NB RIGHT	15	5%		15	5	20
SB LEFT	295	5%	**55**	350	30	380
SB THRU	100	5%		100	10	110
SB RIGHT	0	0%		0	0	0
TOTALS	**935**		**55**	**990**	**100**	**1090**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Jul-11	VV.110264.0000	4 OF 8

E/W STREET : I-210 FWY EB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 7
ROUTE 1F, 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY EB RAMPS						
EB LEFT	320	5%	**55**	375	35	410
EB THRU	5	5%		5	5	10
EB RIGHT	55	5%		55	5	60
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
WINDSOR AVE						
NB LEFT	0	0%		0	0	0
NB THRU	145	5%		145	15	160
NB RIGHT	15	5%		15	5	20
SB LEFT	295	5%		295	25	320
SB THRU	100	5%		100	10	110
SB RIGHT	0	0%		0	0	0
TOTALS	**935**		**55**	**990**	**100**	**1090**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Jul-11	VV.110264.0000	5 OF 8

E/W STREET : I-210 FWY EB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 7
ROUTE 1B, 1C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY EB RAMPS						
EB LEFT	370	5%		370	35	405
EB THRU	5	5%		5	5	10
EB RIGHT	50	5%		50	5	55
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
WINDSOR AVE						
NB LEFT	0	0%		0	0	0
NB THRU	160	5%		160	15	175
NB RIGHT	15	5%		15	5	20
SB LEFT	280	5%	**55**	335	30	365
SB THRU	160	5%		160	15	175
SB RIGHT	0	0%		0	0	0
TOTALS	**1040**		**55**	**1095**	**110**	**1205**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Jul-11	VV.110264.0000	6 OF 8

E/W STREET : I-210 FWY EB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 7
ROUTE 1F, 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY EB RAMPS						
EB LEFT	370	12%	**55**	425	40	465
EB THRU	5	5%		5	5	10
EB RIGHT	50	5%		50	5	55
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
WINDSOR AVE						
NB LEFT	0	0%		0	0	0
NB THRU	160	5%		160	15	175
NB RIGHT	15	5%		15	5	20
SB LEFT	280	5%		280	25	305
SB THRU	160	5%		160	15	175
SB RIGHT	0	0%		0	0	0
TOTALS	**1040**		**55**	**1095**	**110**	**1205**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	28-Jun-12	VV.110264.0000	7 OF 8

E/W STREET : I-210 FWY EB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 7
ROUTE 1B, 1C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY EB RAMPS						
EB LEFT	595	5%		595	55	650
EB THRU	5	5%		5	5	10
EB RIGHT	105	5%		105	10	115
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
WINDSOR AVE						
NB LEFT	0	0%		0	0	0
NB THRU	195	5%		195	20	215
NB RIGHT	15	5%		15	5	20
SB LEFT	415	5%	**55**	470	40	510
SB THRU	165	5%		165	15	180
SB RIGHT	0	0%		0	0	0
TOTALS	**1495**		**55**	**1550**	**150**	**1700**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Jul-11	VV.110264.0000	8 OF 8

E/W STREET : I-210 FWY EB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 7
ROUTE 1F, 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY EB RAMPS						
EB LEFT	595	5%	**55**	650	60	710
EB THRU	5	5%		5	5	10
EB RIGHT	105	5%		105	10	115
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
WINDSOR AVE						
NB LEFT	0	0%		0	0	0
NB THRU	195	5%		195	20	215
NB RIGHT	15	5%		15	5	20
SB LEFT	415	5%		415	35	450
SB THRU	165	5%		165	15	180
SB RIGHT	0	0%		0	0	0
TOTALS	**1495**		**55**	**1550**	**150**	**1700**

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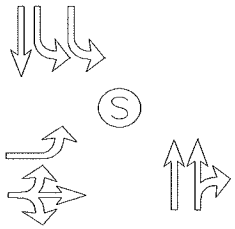
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	1 OF 8

E/W STREET : I-210 FWY EB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 7
ROUTE 1B, 1C

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY EB RAMPS								
EB LEFT	550	0	0	550	**0**	550	50	600
EB THRU	0	0	0	5	**0**	5	5	10
EB RIGHT	104	0	0	105	**0**	105	10	115
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
WINDSOR AVE								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	129	0	0	130	**0**	130	10	140
NB RIGHT	22	0	0	20	**0**	20	5	25
SB LEFT	413	2	6	420	**165**	585	55	640
SB THRU	187	4	12	200	**0**	200	20	220
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**1405**				**165**	**1595**	**155**	**1750**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	2 OF 8

E/W STREET : I-210 FWY EB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 7
ROUTE 1F, 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY EB RAMPS								
EB LEFT	550	0	0	550	**140**	690	60	750
EB THRU	0	0	0	5	**0**	5	5	10
EB RIGHT	104	0	0	105	**0**	105	10	115
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
WINDSOR AVE								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	129	0	0	130	**0**	130	10	140
NB RIGHT	22	0	0	20	**0**	20	5	25
SB LEFT	413	2	6	420	**0**	420	40	460
SB THRU	187	4	12	200	**0**	200	20	220
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**1405**				**140**	**1570**	**150**	**1720**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	3 OF 8

E/W STREET : I-210 FWY EB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 7
ROUTE 1B, 1C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY EB RAMPS								
EB LEFT	319	0	0	320	**0**	320	30	350
EB THRU	2	0	0	5	**0**	5	5	10
EB RIGHT	53	0	0	55	**0**	55	5	60
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
WINDSOR AVE								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	145	1	3	150	**0**	150	15	165
NB RIGHT	15	1	3	20	**0**	20	5	25
SB LEFT	290	3	9	300	**165**	465	40	505
SB THRU	97	3	9	105	**0**	105	10	115
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**921**				**165**	**1120**	**110**	**1230**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	4 OF 8

E/W STREET : I-210 FWY EB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 7
ROUTE 1F, 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY EB RAMPS								
EB LEFT	319	0	0	320	**140**	460	40	500
EB THRU	2	0	0	5	**0**	5	5	10
EB RIGHT	53	0	0	55	**0**	55	5	60
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
WINDSOR AVE								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	145	1	3	150	**0**	150	15	165
NB RIGHT	15	1	3	20	**0**	20	5	25
SB LEFT	290	3	9	300	**0**	300	25	325
SB THRU	97	3	9	105	**0**	105	10	115
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**921**				**140**	**1095**	**105**	**1200**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	5 OF 8

E/W STREET : I-210 FWY EB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 7
ROUTE 1B, 1C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY EB RAMPS								
EB LEFT	370	0	0	370	**0**	370	35	405
EB THRU	5	0	0	5	**0**	5	5	10
EB RIGHT	50	0	0	50	**0**	50	5	55
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
WINDSOR AVE								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	160	8	24	185	**0**	185	15	200
NB RIGHT	15	1	2	15	**0**	15	5	20
SB LEFT	280	14	42	320	**165**	485	45	530
SB THRU	160	8	24	185	**0**	185	15	200
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**1040**				**165**	**1295**	**125**	**1420**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	6 OF 8

E/W STREET : I-210 FWY EB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 7
ROUTE 1F, 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY EB RAMPS								
EB LEFT	370	0	0	370	**140**	510	45	555
EB THRU	5	0	0	5	**0**	5	5	10
EB RIGHT	50	0	0	50	**0**	50	5	55
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
WINDSOR AVE								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	160	8	24	185	**0**	185	15	200
NB RIGHT	15	1	2	15	**0**	15	5	20
SB LEFT	280	14	42	320	**0**	320	30	350
SB THRU	160	8	24	185	**0**	185	15	200
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**1040**				**140**	**1270**	**120**	**1390**

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Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	7 OF 8

E/W STREET : I-210 FWY EB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 7
ROUTE 1B, 1C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY EB RAMPS								
EB LEFT	594	0	0	595	**0**	595	55	650
EB THRU	2	0	0	5	**0**	5	5	10
EB RIGHT	105	0	0	105	**0**	105	10	115
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
WINDSOR AVE								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	194	0	0	195	**0**	195	20	215
NB RIGHT	16	0	0	15	**0**	15	5	20
SB LEFT	414	0	0	415	**165**	580	50	630
SB THRU	165	0	0	165	**0**	165	15	180
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**1490**				**165**	**1660**	**160**	**1820**

Tustin Office: 714.665.4500 Tel/ 714.665.4501 Fax
Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax
Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax
Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

Hall & Foreman, Inc.
Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	8 OF 8

E/W STREET : I-210 FWY EB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 7
ROUTE 1F, 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY EB RAMPS								
EB LEFT	594	0	0	595	**140**	735	65	800
EB THRU	2	0	0	5	**0**	5	5	10
EB RIGHT	105	0	0	105	**0**	105	10	115
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
WINDSOR AVE								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	194	0	0	195	**0**	195	20	215
NB RIGHT	16	0	0	15	**0**	15	5	20
SB LEFT	414	0	0	415	**0**	415	35	450
SB THRU	165	0	0	165	**0**	165	15	180
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**1490**				**140**	**1635**	**155**	**1790**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: WINDSOR
EAST-WEST STREET: I-210 EB RAMPS
JURISDICTION: PASADENA

DATE: 06-01-11

PEAK HOUR: 07:45AM

Windsor Ave (WB)
NORTH LEG

TOTAL: 606

TT = 5

TT% = 5/606 = 0.82% ≈ 1%

	~~191~~ 190	415	Total
	57	124	1st
	42	101	2nd
	42	95	3rd
	50	95	4th
Rt	Thru	Lt	

EAST LEG TOTAL: 0

Rt					
Thru					
Lt					
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
550	137	158	122	133	Lt
5	0	0	0	0	Thru
~~104~~ 105	31	21	29	23	Rt

WEST LEG TOTAL: 654

EB 210 Fwy

TT = 0

TT% = 0/654 = 0% ≈ 1%

PEAK HOUR FACTORS

NORTH LEG = 0.84
SOUTH LEG = 0.80
EAST LEG =
WEST LEG = 0.91

ALL LEGS = 0.93

	Lt	Thru	Rt
1st		28	2
2nd		39	8
3rd		32	9
4th		30	3
Total		~~129~~ 130	22 ~~20~~

TT = 0

TT% = 0/151 = 0% ≈ 1%

TOTAL: 151

SOUTH LEG
Windsor Ave (EB)

HOUR TOTAL: 1,411

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WINDSOR

EAST-WEST STREET: I-210 EB RAMPS

TIME: 07:00AM-08:00AM DATE: 06-01-11

NORTH LEG

	137	463	Total
	19	83	1st
	27	123	2nd
	34	133	3rd
	57	124	4th
Rt	Thru	Lt	

Rt					
Thru					
Lt					
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
292	21	41	93	137	Lt
0	0	0	0	0	Thru
73	8	13	21	31	Rt

	Lt	Thru	Rt
1st		25	2
2nd		23	4
3rd		38	9
4th		28	2
Total		114	17

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WINDSOR

EAST-WEST STREET: I-210 EB RAMPS

TIME: 08:00AM-09:00AM DATE: 06-01-11

NORTH LEG

	174	371	Total
	42	101	1st
	42	95	2nd
	50	95	3rd
	40	80	4th
	Rt	Thru	Lt

Rt					
Thru					
Lt					
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
540	158	122	133	127	Lt
1	0	0	0	1	Thru
103	21	29	23	30	Rt

	Lt	Thru	Rt
1st		39	8
2nd		32	9
3rd		30	3
4th		44	3
Total		145	23

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : WINDSOR PASADENA

EAST-WEST STREET : I-210 EB RAMPS 06-01-11

BEGINNING TIME : 07:00AM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
					WB NORTH LEG							
0	19	82	0	0	0	0	0	0	0	0	1	102
0	26	122	0	0	0	0	0	1	0	1	0	150
0	34	133	0	0	0	0	0	0	0	0	0	167
0	54	124	0	1	0	0	2	0	0	0	0	181
0	41	100	0	0	1	0	1	0	0	0	0	143
0	42	95	0	0	0	0	0	0	0	0	0	137
0	50	94	0	0	0	0	0	0	0	0	1	145
0	40	80	0	0 2	0	0	0 3	0	0	0 0	0	120
						TT= 2+3+0=5						
0	306	830	0	1	1	0	3	1	0	1	2	1145
					EB SOUTH LEG							
2	25	0	0	0	0	0	0	0	0	0	0	27
4	23	0	0	0	0	0	0	0	0	0	0	27
9	38	0	0	0	0	0	0	0	0	0	0	47
2	28	0	0	0	0	0	0	0	0	0	0	30
8	39	0	0	0	0	0	0	0	0	0	0	47
9	32	0	0	0	0	0	0	0	0	0	0	41
3	30	0	0	0	0	0	0	0	0	0	0	33
3	44	0	0	0 0	0	0	0 0	0	0	0 0	0	47
						TT= 0+0+0=0						
40	259	0	0	0	0	0	0	0	0	0	0	299
					EAST LEG							
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
					SB WEST LEG							
8	0	21	0	0	0	0	0	0	0	0	0	29
13	0	41	0	0	0	0	0	0	0	0	0	54
21	0	93	0	0	0	0	0	0	0	0	0	114
31	0	137	0	0	0	0	0	0	0	0	0	168
21	0	158	0	0	0	0	0	0	0	0	0	179
29	0	122	0	0	0	0	0	0	0	0	0	151
23	0	133	0	0	0	0	0	0	0	0	0	156
30	1	127	0	0 0	0	0	0 0	0	0	0 0	0	158
						TT= 0+0+0=0						
176	1	832	0	0	0	0	0	0	0	0	0	1009

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: WINDSOR
EAST-WEST STREET: I-210 EB RAMPS
JURISDICTION: PASADENA

DATE: 06-01-11

PEAK HOUR: 12:15PM

Windsor Ave (WB)
NORTH LEG

TOTAL: 393

TT = 6

TT% = 6/393 = 1.53% ≈ 2%

	100	293 (295)	Total
	30	66	1st
	28	71	2nd
	21	82	3rd
	21	74	4th
Rt	Thru	Lt	

EAST LEG TOTAL: 0

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
319 (320)	74	89	78	78	Lt
2 (5)	0	1	0	1	Thru
53 (55)	12	13	11	17	Rt

WEST LEG TOTAL: 374
EB 210 Fwy

TT = 0

TT% = 0/374 = 0% ≈ 1%

PEAK HOUR FACTORS

NORTH LEG = 0.95
SOUTH LEG = 0.84
EAST LEG =
WEST LEG = 0.91

ALL LEGS = 0.97

	Lt	Thru	Rt
1st		42	6
2nd		31	6
3rd		35	1
4th		38	3
Total		146 (145)	16 (15)

TT = 2

TT% = 2/162 = 1.23% ≈ 1%

TOTAL: 162

SOUTH LEG
Windsor Ave (EB)

HOUR TOTAL: 929

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WINDSOR

EAST-WEST STREET: I-210 EB RAMPS

TIME: 01:00PM-02:00PM DATE: 06-01-11

NORTH LEG

	81	297	Total
	21	74	1st
	23	82	2nd
	17	64	3rd
	20	77	4th

Rt Thru Lt

Rt					
Thru					
Lt					

1st 2nd 3rd 4th Total

Total	1st	2nd	3rd	4th	
312	78	73	89	72	Lt
1	1	0	0	0	Thru
52	17	14	11	10	Rt

	Lt	Thru	Rt
1st		38	3
2nd		24	4
3rd		28	3
4th		27	3
Total		117	13

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WINDSOR

EAST-WEST STREET: I-210 EB RAMPS

TIME: 12:00PM-01:00PM DATE: 06-01-11

NORTH LEG

	100	267	Total
	21	48	1st
	30	66	2nd
	28	71	3rd
	21	82	4th
Rt	Thru	Lt	

Rt					
Thru					
Lt					
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
327	86	74	89	78	Lt
2	1	0	1	0	Thru
48	12	12	13	11	Rt

	Lt	Thru	Rt
1st		19	3
2nd		42	6
3rd		31	6
4th		35	1
Total		127	16

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : WINDSOR PASADENA

EAST-WEST STREET : I-210 EB RAMPS 06-01-11

BEGINNING TIME : 12:00PM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
						WB NORTH LEG						
0	20	48	0	1	0	0	0	0	0	0	0	69
0	30	64	0	0	1	0	0	1	0	0	0	96
0	28	71	0	0	0	0	0	0	0	0	0	99
0	19	82	0	2	0	0	0	0	0	0	0	103
0	20	73	0	1	1	0	0	0	0	0	0	95
0	23	80	0	0	5 1	0	0	1 1	0	0	0 0	105
0	17	62	0	0	2	0	0	0	0	0	0	81
0	20	75	0	0	1	0	0	0	0	0	1	97
						TT= 5+1+0 = 6						
0	177	555	0	4	6	0	0	2	0	0	1	745
						EB SOUTH LEG						
3	19	0	0	0	0	0	0	0	0	0	0	22
6	42	0	0	0	0	0	0	0	0	0	0	48
5	31	0	1	0	0	0	0	0	0	0	0	37
1	34	0	0	1	0	0	0	0	0	0	0	36
3	38	0	0	0	0	0	0	0	0	0	0	41
4	24	0	0	0	2 0	0	0	0 0	0	0	0 0	28
3	27	0	0	1	0	0	0	0	0	0	0	31
3	27	0	0	0	0	0	0	0	0	0	0	30
						TT= 2+0+0 = 2						
28	242	0	1	2	0	0	0	0	0	0	0	273
						SB EAST LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
						WEST LEG						
12	1	86	0	0	0	0	0	0	0	0	0	99
12	0	74	0	0	0	0	0	0	0	0	0	86
13	1	89	0	0	0	0	0	0	0	0	0	103
11	0	78	0	0	0	0	0	0	0	0	0	89
17	1	78	0	0	0	0	0	0	0	0	0	96
14	0	73	0	0	0	0	0	0	0	0	0	87
11	0	89	0	0	0	0	0	0	0	0	0	100
10	0	72	0	0	0	0	0	0	0	0	0	82
						TT= 0+0+0 = 0						
100	3	639	0	0	0	0	0	0	0	0	0	742

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: WINDSOR/ ARROYO
EAST-WEST STREET: I-210 EB RAMPS
JURISDICTION: LA CANADA

DATE: 04-10-12

PEAK HOUR: 03:00PM

TOTAL: 443

NORTH LEG (SB)

	162	281	Total
	37	77	1st
	42	63	2nd
	44	71	3rd
	39	70	4th
Rt	Thru	Lt	

EAST LEG TOTAL: 0

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
369	100	80	96	93	Lt
					Thru
50	8	11	16	15	Rt

WEST LEG TOTAL: 419
(EB)

PEAK HOUR FACTORS

NORTH LEG = 0.96
SOUTH LEG = 0.94
EAST LEG =
WEST LEG = 0.94

ALL LEGS = 0.95

	Lt	Thru	Rt
1st		36	6
2nd		44	3
3rd		41	5
4th		40	1
Total		161	15

TOTAL: 176

SOUTH LEG (NB)

HOUR TOTAL: 1,038

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WINDSOR/ ARROYO

EAST-WEST STREET: I-210 EB RAMPS

TIME: 02:00PM-03:00PM DATE: 04-10-12

NORTH LEG

Rt	Thru	Lt	
	91	382	Total
	23	96	1st
	18	92	2nd
	27	93	3rd
	23	101	4th

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
320	61	80	111	68	Lt
					Thru
41	9	14	10	8	Rt

	Lt	Thru	Rt
1st		36	2
2nd		27	5
3rd		22	3
4th		28	3
Total		113	13

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WINDSOR/ ARROYO

EAST-WEST STREET: I-210 EB RAMPS

TIME: 03:00PM-04:00PM DATE: 04-10-12

NORTH LEG

	162	281	Total
	37	77	1st
	42	63	2nd
	44	71	3rd
	39	70	4th
	Rt	Thru	Lt

Rt					
Thru					
Lt					
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
369	100	80	96	93	Lt
					Thru
50	8	11	16	15	Rt

	Lt	Thru	Rt
1st		36	6
2nd		44	3
3rd		41	5
4th		40	1
Total		161	15

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: WINDSOR
EAST-WEST STREET: I-210 EB RAMPS
JURISDICTION: PASADENA

DATE: 06-01-11

PEAK HOUR: 05:00PM

Windsor Ave (WB)

NORTH LEG

TOTAL: 579

	Rt	Thru	Lt	
		165	414 (415)	Total
		42	106	1st
		28	90	2nd
		40	109	3rd
		55	109	4th

TT = 0

TT% = 0/579 = 0% ≈ 1%

EAST LEG TOTAL: 0

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
594 (595)	161	136	154	143	Lt
5 2	0	0	0	2	Thru
105	17	30	28	30	Rt

WEST LEG TOTAL: 701

EB 210 Fwy

TT = 2

TT% = 2/701 = 0.28% ≈ 1%

PEAK HOUR FACTORS

NORTH LEG = 0.88
SOUTH LEG = 0.73
EAST LEG =
WEST LEG = 0.96

ALL LEGS = 0.91

TT = 0

TT% = 0/210 = 0% ≈ 1%

	Lt	Thru	Rt	
1st		55	1	
2nd		33	6	
3rd		39	4	
4th		67	5	
Total		194 (195)	16 (15)	TOTAL: 210

SOUTH LEG

Windsor Ave (EB)

HOUR TOTAL: 1,490

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WINDSOR

EAST-WEST STREET: I-210 EB RAMPS

TIME: 04:00PM-05:00PM DATE: 06-01-11

NORTH LEG

	158	332	Total
	38	85	1st
	41	67	2nd
	33	83	3rd
	46	97	4th
Rt	Thru	Lt	

Rt					
Thru					
Lt					
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
453	105	98	119	131	Lt
6	0	5	0	1	Thru
74	22	18	14	20	Rt

	Lt	Thru	Rt
1st		37	2
2nd		30	4
3rd		41	1
4th		48	7
Total		156	14

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WINDSOR

EAST-WEST STREET: I-210 EB RAMPS

TIME: 05:00PM-06:00PM DATE: 06-01-11

NORTH LEG

	165	414	Total
	42	106	1st
	28	90	2nd
	40	109	3rd
	55	109	4th
Rt	Thru	Lt	

Rt					
Thru					
Lt					
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
594	161	136	154	143	Lt
2	0	0	0	2	Thru
105	17	30	28	30	Rt

	Lt	Thru	Rt
1st		55	1
2nd		33	6
3rd		39	4
4th		67	5
Total		194	16

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : WINDSOR
EAST-WEST STREET : I-210 EB RAMPS
BEGINNING TIME : 04:00PM

PASADENA
06-01-11

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
					WB NORTH LEG							
0	38	85	0	0	0	0	0	0	0	0	0	123
0	41	67	0	0	0	0	0	0	0	0	0	108
0	33	82	0	0	1	0	0	0	0	0	0	116
0	46	97	0	0	0	0	0	0	0	0	0	143
0	42	106	0	0	0	0	0	0	0	0	0	148
0	28	90	0	0	0	0	0	0	0	0	0	118
0	40	109	0	0	0	0	0	0	0	0	0	149
0	55	109	0	0	0	0	0	0	0	0	0	164
						TT=0+0+0=0						
0	323	745	0	0	1	0	0	0	0	0	0	1069
					EB SOUTH LEG							
2	37	0	0	0	0	0	0	0	0	0	0	39
4	30	0	0	0	0	0	0	0	0	0	0	34
1	41	0	0	0	0	0	0	0	0	0	0	42
7	48	0	0	0	0	0	0	0	0	0	0	55
1	55	0	0	0	0	0	0	0	0	0	0	56
6	33	0	0	0	0	0	0	0	0	0	0	39
4	39	0	0	0	0	0	0	0	0	0	0	43
5	67	0	0	0	0	0	0	0	0	0	0	72
						TT=0+0+0=0						
30	350	0	0	0	0	0	0	0	0	0	0	380
					EAST LEG							
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
					SB WEST LEG							
22	0	105	0	0	0	0	0	0	0	0	0	127
18	4	97	0	1	1	0	0	0	0	0	0	121
14	0	119	0	0	0	0	0	0	0	0	0	133
20	1	130	0	0	1	0	0	0	0	0	0	152
17	0	161	0	0	2 0	0	0	0 0	0	0	0 0	178
30	0	136	0	0	0	0	0	0	0	0	0	166
28	0	154	0	0	0	0	0	0	0	0	0	182
30	2	143	0	0	0	0	0	0	0	0	0	175
						TT=2+0+0=2						
179	71	045	0	1	2	0	0	0	0	0	0	1234

Prepared by Newport Traffic Studies

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	550	5	105	0	0	0	0	130	20	415	190	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0						4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95						0.95		0.97	1.00	
Frt	1.00	0.95						0.98		1.00	1.00	
Flt Protected	0.95	0.97						1.00		0.95	1.00	
Satd. Flow (prot)	1715	1662						3536		3335	1810	
Flt Permitted	0.95	0.97						1.00		0.95	1.00	
Satd. Flow (perm)	1715	1662						3536		3335	1810	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	591	5	113	0	0	0	0	140	22	446	204	0
RTOR Reduction (vph)	0	32	0	0	0	0	0	15	0	0	0	0
Lane Group Flow (vph)	361	316	0	0	0	0	0	147	0	446	204	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	5%	5%	0%
Turn Type	Perm	NA						NA		Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4											
Actuated Green, G (s)	14.6	14.6						17.3		9.8	31.1	
Effective Green, g (s)	14.6	14.6						17.3		9.8	31.1	
Actuated g/C Ratio	0.27	0.27						0.32		0.18	0.58	
Clearance Time (s)	4.0	4.0						4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)	466	452						1139		609	1048	
v/s Ratio Prot								0.04		c0.13	c0.11	
v/s Ratio Perm	c0.21	0.19										
v/c Ratio	0.77	0.70						0.13		0.73	0.19	
Uniform Delay, d1	18.0	17.6						12.9		20.7	5.4	
Progression Factor	1.00	1.00						1.00		1.00	1.00	
Incremental Delay, d2	7.9	4.7						0.2		4.5	0.4	
Delay (s)	25.9	22.3						13.1		25.2	5.8	
Level of Service	C	C						B		C	A	
Approach Delay (s)		24.1			0.0			13.1			19.1	
Approach LOS		C			A			B			B	

Intersection Summary			
HCM Average Control Delay	20.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	53.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	44.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

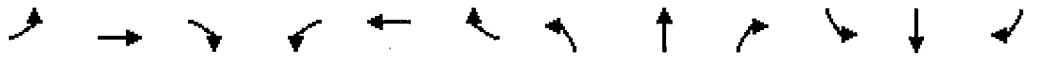
HCM Signalized Intersection Capacity Analysis
7: Windsor Ave & EB 210 Fwy

8/10/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	320	5	55	0	0	0	0	145	15	295	100	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0						4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95						0.95		0.97	1.00	
Frt	1.00	0.96						0.99		1.00	1.00	
Flt Protected	0.95	0.97						1.00		0.95	1.00	
Satd. Flow (prot)	1715	1669						3391		3335	1810	
Flt Permitted	0.95	0.97						1.00		0.95	1.00	
Satd. Flow (perm)	1715	1669						3391		3335	1810	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	330	5	57	0	0	0	0	149	15	304	103	0
RTOR Reduction (vph)	0	33	0	0	0	0	0	10	0	0	0	0
Lane Group Flow (vph)	198	161	0	0	0	0	0	154	0	304	103	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	5%	5%	5%	5%	0%
Turn Type	Perm	NA						NA		Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4											
Actuated Green, G (s)	10.7	10.7						16.1		6.0	26.1	
Effective Green, g (s)	10.7	10.7						16.1		6.0	26.1	
Actuated g/C Ratio	0.24	0.24						0.36		0.13	0.58	
Clearance Time (s)	4.0	4.0						4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)	410	399						1219		447	1054	
v/s Ratio Prot								c0.05		c0.09	0.06	
v/s Ratio Perm	c0.12	0.10										
v/c Ratio	0.48	0.40						0.13		0.68	0.10	
Uniform Delay, d1	14.7	14.4						9.6		18.5	4.1	
Progression Factor	1.00	1.00						1.00		1.00	1.00	
Incremental Delay, d2	0.9	0.7						0.2		4.2	0.2	
Delay (s)	15.6	15.0						9.8		22.7	4.3	
Level of Service	B	B						A		C	A	
Approach Delay (s)		15.3			0.0			9.8			18.1	
Approach LOS		B			A			A			B	

Intersection Summary			
HCM Average Control Delay	15.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.34		
Actuated Cycle Length (s)	44.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	33.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	370	5	50	0	0	0	0	160	15	280	160	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0						4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95						0.95		0.97	1.00	
Frt	1.00	0.96						0.99		1.00	1.00	
Flt Protected	0.95	0.96						1.00		0.95	1.00	
Satd. Flow (prot)	1715	1678						3393		3335	1810	
Flt Permitted	0.95	0.96						1.00		0.95	1.00	
Satd. Flow (perm)	1715	1678						3393		3335	1810	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	389	5	53	0	0	0	0	168	16	295	168	0
RTOR Reduction (vph)	0	25	0	0	0	0	0	10	0	0	0	0
Lane Group Flow (vph)	226	196	0	0	0	0	0	174	0	295	168	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	5%	5%	5%	5%	0%
Turn Type	Perm	NA						NA		Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4											
Actuated Green, G (s)	11.2	11.2						16.1		6.0	26.1	
Effective Green, g (s)	11.2	11.2						16.1		6.0	26.1	
Actuated g/C Ratio	0.25	0.25						0.36		0.13	0.58	
Clearance Time (s)	4.0	4.0						4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)	424	415						1206		442	1043	
v/s Ratio Prot								0.05		c0.09	c0.09	
v/s Ratio Perm	c0.13	0.12										
v/c Ratio	0.53	0.47						0.14		0.67	0.16	
Uniform Delay, d1	14.8	14.5						9.9		18.7	4.5	
Progression Factor	1.00	1.00						1.00		1.00	1.00	
Incremental Delay, d2	1.3	0.9						0.3		3.8	0.3	
Delay (s)	16.1	15.4						10.2		22.5	4.8	
Level of Service	B	B						B		C	A	
Approach Delay (s)		15.7			0.0			10.2			16.1	
Approach LOS		B			A			B			B	

Intersection Summary			
HCM Average Control Delay	14.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	45.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	34.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
7: Windsor Ave & EB 210 Fwy

8/10/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	595	5	105	0	0	0	0	195	15	415	165	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0						4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95						0.95		0.97	1.00	
Frt	1.00	0.95						0.99		1.00	1.00	
Flt Protected	0.95	0.97						1.00		0.95	1.00	
Satd. Flow (prot)	1715	1666						3572		3502	1900	
Flt Permitted	0.95	0.97						1.00		0.95	1.00	
Satd. Flow (perm)	1715	1666						3572		3502	1900	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	654	5	115	0	0	0	0	214	16	456	181	0
RTOR Reduction (vph)	0	27	0	0	0	0	0	9	0	0	0	0
Lane Group Flow (vph)	392	355	0	0	0	0	0	221	0	456	181	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA						NA		Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4											
Actuated Green, G (s)	17.3	17.3						17.5		10.6	32.1	
Effective Green, g (s)	17.3	17.3						17.5		10.6	32.1	
Actuated g/C Ratio	0.30	0.30						0.30		0.18	0.56	
Clearance Time (s)	4.0	4.0						4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)	517	502						1089		647	1063	
v/s Ratio Prot								c0.06		c0.13	0.10	
v/s Ratio Perm	c0.23	0.21										
v/c Ratio	0.76	0.71						0.20		0.70	0.17	
Uniform Delay, d1	18.2	17.8						14.8		21.9	6.2	
Progression Factor	1.00	1.00						1.00		1.00	1.00	
Incremental Delay, d2	6.3	4.5						0.4		3.5	0.3	
Delay (s)	24.5	22.3						15.2		25.4	6.5	
Level of Service	C	C						B		C	A	
Approach Delay (s)		23.4			0.0			15.2			20.1	
Approach LOS		C			A			B			C	

Intersection Summary			
HCM Average Control Delay	20.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	57.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	47.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	550	5	105	0	0	0	0	130	20	470	190	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0						4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95						0.95		0.97	1.00	
Frt	1.00	0.95						0.98		1.00	1.00	
Flt Protected	0.95	0.97						1.00		0.95	1.00	
Satd. Flow (prot)	1715	1662						3536		3045	1810	
Flt Permitted	0.95	0.97						1.00		0.95	1.00	
Satd. Flow (perm)	1715	1662						3536		3045	1810	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	591	5	113	0	0	0	0	140	22	505	204	0
RTOR Reduction (vph)	0	32	0	0	0	0	0	15	0	0	0	0
Lane Group Flow (vph)	361	316	0	0	0	0	0	147	0	505	204	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	15%	5%	0%
Turn Type	Perm	NA						NA		Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4											
Actuated Green, G (s)	14.6	14.6						17.1		10.0	31.1	
Effective Green, g (s)	14.6	14.6						17.1		10.0	31.1	
Actuated g/C Ratio	0.27	0.27						0.32		0.19	0.58	
Clearance Time (s)	4.0	4.0						4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)	466	452						1126		567	1048	
v/s Ratio Prot								0.04		c0.17	c0.11	
v/s Ratio Perm	c0.21	0.19										
v/c Ratio	0.77	0.70						0.13		0.89	0.19	
Uniform Delay, d1	18.0	17.6						13.0		21.3	5.4	
Progression Factor	1.00	1.00						1.00		1.00	1.00	
Incremental Delay, d2	7.9	4.7						0.2		16.1	0.4	
Delay (s)	25.9	22.3						13.3		37.4	5.8	
Level of Service	C	C						B		D	A	
Approach Delay (s)		24.1			0.0			13.3			28.3	
Approach LOS		C			A			B			C	

Intersection Summary			
HCM Average Control Delay	24.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	53.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	46.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
7: Windsor Ave & EB 210 Fwy

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	320	5	55	0	0	0	0	145	15	350	100	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0						4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95						0.95		0.97	1.00	
Frt	1.00	0.96						0.99		1.00	1.00	
Flt Protected	0.95	0.97						1.00		0.95	1.00	
Satd. Flow (prot)	1715	1669						3391		2943	1810	
Flt Permitted	0.95	0.97						1.00		0.95	1.00	
Satd. Flow (perm)	1715	1669						3391		2943	1810	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	330	5	57	0	0	0	0	149	15	361	103	0
RTOR Reduction (vph)	0	33	0	0	0	0	0	10	0	0	0	0
Lane Group Flow (vph)	198	161	0	0	0	0	0	154	0	361	103	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	5%	5%	19%	5%	0%
Turn Type	Perm	NA						NA		Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4											
Actuated Green, G (s)	10.7	10.7						16.1		6.0	26.1	
Effective Green, g (s)	10.7	10.7						16.1		6.0	26.1	
Actuated g/C Ratio	0.24	0.24						0.36		0.13	0.58	
Clearance Time (s)	4.0	4.0						4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)	410	399						1219		394	1054	
v/s Ratio Prot								c0.05		c0.12	0.06	
v/s Ratio Perm	c0.12	0.10										
v/c Ratio	0.48	0.40						0.13		0.92	0.10	
Uniform Delay, d1	14.7	14.4						9.6		19.2	4.1	
Progression Factor	1.00	1.00						1.00		1.00	1.00	
Incremental Delay, d2	0.9	0.7						0.2		25.5	0.2	
Delay (s)	15.6	15.0						9.8		44.7	4.3	
Level of Service	B	B						A		D	A	
Approach Delay (s)		15.3			0.0			9.8			35.7	
Approach LOS		B			A			A			D	

Intersection Summary			
HCM Average Control Delay	23.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	44.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	35.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
7: Windsor Ave & EB 210 Fwy

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	370	5	50	0	0	0	0	160	15	335	160	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0						4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95						0.95		0.97	1.00	
Frt	1.00	0.96						0.99		1.00	1.00	
Flt Protected	0.95	0.96						1.00		0.95	1.00	
Satd. Flow (prot)	1715	1678						3393		2943	1810	
Flt Permitted	0.95	0.96						1.00		0.95	1.00	
Satd. Flow (perm)	1715	1678						3393		2943	1810	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	389	5	53	0	0	0	0	168	16	353	168	0
RTOR Reduction (vph)	0	25	0	0	0	0	0	10	0	0	0	0
Lane Group Flow (vph)	226	196	0	0	0	0	0	174	0	353	168	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	5%	5%	19%	5%	0%
Turn Type	Perm	NA						NA		Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4											
Actuated Green, G (s)	11.2	11.2						16.1		6.0	26.1	
Effective Green, g (s)	11.2	11.2						16.1		6.0	26.1	
Actuated g/C Ratio	0.25	0.25						0.36		0.13	0.58	
Clearance Time (s)	4.0	4.0						4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)	424	415						1206		390	1043	
v/s Ratio Prot								0.05		c0.12	c0.09	
v/s Ratio Perm	c0.13	0.12										
v/c Ratio	0.53	0.47						0.14		0.91	0.16	
Uniform Delay, d1	14.8	14.5						9.9		19.4	4.5	
Progression Factor	1.00	1.00						1.00		1.00	1.00	
Incremental Delay, d2	1.3	0.9						0.3		23.8	0.3	
Delay (s)	16.1	15.4						10.2		43.1	4.8	
Level of Service	B	B						B		D	A	
Approach Delay (s)		15.7			0.0			10.2			30.8	
Approach LOS		B			A			B			C	

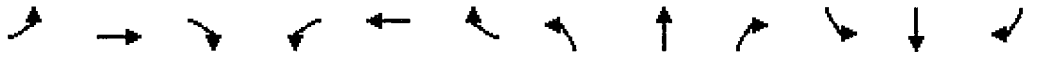
Intersection Summary			
HCM Average Control Delay	21.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	45.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	36.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	595	5	105	0	0	0	0	195	15	470	165	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0						4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95						0.95		0.97	1.00	
Frt	1.00	0.95						0.99		1.00	1.00	
Flt Protected	0.95	0.97						1.00		0.95	1.00	
Satd. Flow (prot)	1715	1666						3572		3155	1900	
Flt Permitted	0.95	0.97						1.00		0.95	1.00	
Satd. Flow (perm)	1715	1666						3572		3155	1900	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	654	5	115	0	0	0	0	214	16	516	181	0
RTOR Reduction (vph)	0	27	0	0	0	0	0	9	0	0	0	0
Lane Group Flow (vph)	392	355	0	0	0	0	0	221	0	516	181	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	11%	0%	0%
Turn Type	Perm	NA						NA		Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4											
Actuated Green, G (s)	17.3	17.3						17.1		11.0	32.1	
Effective Green, g (s)	17.3	17.3						17.1		11.0	32.1	
Actuated g/C Ratio	0.30	0.30						0.30		0.19	0.56	
Clearance Time (s)	4.0	4.0						4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)	517	502						1064		605	1063	
v/s Ratio Prot								c0.06		c0.16	0.10	
v/s Ratio Perm	c0.23	0.21										
v/c Ratio	0.76	0.71						0.21		0.85	0.17	
Uniform Delay, d1	18.2	17.8						15.1		22.4	6.2	
Progression Factor	1.00	1.00						1.00		1.00	1.00	
Incremental Delay, d2	6.3	4.5						0.4		11.2	0.3	
Delay (s)	24.5	22.3						15.5		33.6	6.5	
Level of Service	C	C						B		C	A	
Approach Delay (s)		23.4			0.0			15.5			26.6	
Approach LOS		C			A			B			C	

Intersection Summary			
HCM Average Control Delay	23.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	57.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	49.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	320	5	55	0	0	0	0	145	15	350	100	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0						4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95						0.95		0.97	1.00	
Frt	1.00	0.96						0.99		1.00	1.00	
Flt Protected	0.95	0.97						1.00		0.95	1.00	
Satd. Flow (prot)	1715	1669						3391		2943	1810	
Flt Permitted	0.95	0.97						1.00		0.95	1.00	
Satd. Flow (perm)	1715	1669						3391		2943	1810	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	330	5	57	0	0	0	0	149	15	361	103	0
RTOR Reduction (vph)	0	33	0	0	0	0	0	10	0	0	0	0
Lane Group Flow (vph)	198	161	0	0	0	0	0	154	0	361	103	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	5%	5%	19%	5%	0%
Turn Type	Perm	NA						NA		Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4											
Actuated Green, G (s)	10.7	10.7						16.1		6.0	26.1	
Effective Green, g (s)	10.7	10.7						16.1		6.0	26.1	
Actuated g/C Ratio	0.24	0.24						0.36		0.13	0.58	
Clearance Time (s)	4.0	4.0						4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)	410	399						1219		394	1054	
v/s Ratio Prot								c0.05		c0.12	0.06	
v/s Ratio Perm	c0.12	0.10										
v/c Ratio	0.48	0.40						0.13		0.92	0.10	
Uniform Delay, d1	14.7	14.4						9.6		19.2	4.1	
Progression Factor	1.00	1.00						1.00		1.00	1.00	
Incremental Delay, d2	0.9	0.7						0.2		25.5	0.2	
Delay (s)	15.6	15.0						9.8		44.7	4.3	
Level of Service	B	B						A		D	A	
Approach Delay (s)		15.3			0.0			9.8			35.7	
Approach LOS		B			A			A			D	

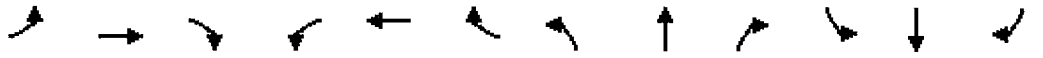
Intersection Summary			
HCM Average Control Delay	23.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	44.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	35.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	350	5	60	0	0	0	0	160	15	380	110	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0						4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95						0.95		0.97	1.00	
Frt	1.00	0.96						0.99		1.00	1.00	
Flt Protected	0.95	0.97						1.00		0.95	1.00	
Satd. Flow (prot)	1715	1669						3395		2943	1810	
Flt Permitted	0.95	0.97						1.00		0.95	1.00	
Satd. Flow (perm)	1715	1669						3395		2943	1810	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	361	5	62	0	0	0	0	165	15	392	113	0
RTOR Reduction (vph)	0	33	0	0	0	0	0	10	0	0	0	0
Lane Group Flow (vph)	217	178	0	0	0	0	0	170	0	392	113	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	5%	5%	19%	5%	0%
Turn Type	Perm	NA						NA		Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4											
Actuated Green, G (s)	11.0	11.0						16.1		6.0	26.1	
Effective Green, g (s)	11.0	11.0						16.1		6.0	26.1	
Actuated g/C Ratio	0.24	0.24						0.36		0.13	0.58	
Clearance Time (s)	4.0	4.0						4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)	418	407						1212		392	1047	
v/s Ratio Prot								c0.05		c0.13	0.06	
v/s Ratio Perm	c0.13	0.11										
v/c Ratio	0.52	0.44						0.14		1.00	0.11	
Uniform Delay, d1	14.8	14.4						9.8		19.6	4.3	
Progression Factor	1.00	1.00						1.00		1.00	1.00	
Incremental Delay, d2	1.1	0.8						0.2		45.5	0.2	
Delay (s)	15.9	15.2						10.1		65.0	4.5	
Level of Service	B	B						B		E	A	
Approach Delay (s)		15.5			0.0			10.1			51.5	
Approach LOS		B			A			B			D	

Intersection Summary			
HCM Average Control Delay	30.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	45.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	37.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	405	5	55	0	0	0	0	175	15	365	175	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0						4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95						0.95		0.97	1.00	
Frt	1.00	0.96						0.99		1.00	1.00	
Flt Protected	0.95	0.96						1.00		0.95	1.00	
Satd. Flow (prot)	1715	1678						3397		2943	1810	
Flt Permitted	0.95	0.96						1.00		0.95	1.00	
Satd. Flow (perm)	1715	1678						3397		2943	1810	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	426	5	58	0	0	0	0	184	16	384	184	0
RTOR Reduction (vph)	0	25	0	0	0	0	0	10	0	0	0	0
Lane Group Flow (vph)	247	217	0	0	0	0	0	190	0	384	184	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	5%	5%	19%	5%	0%
Turn Type	Perm	NA						NA		Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4											
Actuated Green, G (s)	11.8	11.8						16.1		6.0	26.1	
Effective Green, g (s)	11.8	11.8						16.1		6.0	26.1	
Actuated g/C Ratio	0.26	0.26						0.35		0.13	0.57	
Clearance Time (s)	4.0	4.0						4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)	441	431						1192		385	1029	
v/s Ratio Prot								0.06		c0.13	c0.10	
v/s Ratio Perm	c0.14	0.13										
v/c Ratio	0.56	0.50						0.16		1.00	0.18	
Uniform Delay, d1	14.8	14.6						10.2		19.9	4.8	
Progression Factor	1.00	1.00						1.00		1.00	1.00	
Incremental Delay, d2	1.6	0.9						0.3		44.9	0.4	
Delay (s)	16.4	15.5						10.5		64.8	5.1	
Level of Service	B	B						B		E	A	
Approach Delay (s)		16.0			0.0			10.5			45.5	
Approach LOS		B			A			B			D	

Intersection Summary			
HCM Average Control Delay	28.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	45.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	38.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

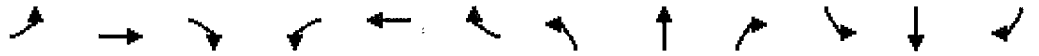
HCM Signalized Intersection Capacity Analysis
7: Windsor Ave & EB 210 Fwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	650	5	115	0	0	0	0	215	15	510	180	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0						4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95						0.95		0.97	1.00	
Frt	1.00	0.95						0.99		1.00	1.00	
Flt Protected	0.95	0.97						1.00		0.95	1.00	
Satd. Flow (prot)	1715	1666						3576		3155	1900	
Flt Permitted	0.95	0.97						1.00		0.95	1.00	
Satd. Flow (perm)	1715	1666						3576		3155	1900	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	714	5	126	0	0	0	0	236	16	560	198	0
RTOR Reduction (vph)	0	27	0	0	0	0	0	8	0	0	0	0
Lane Group Flow (vph)	428	390	0	0	0	0	0	244	0	560	198	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	11%	0%	0%
Turn Type	Perm	NA						NA		Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4											
Actuated Green, G (s)	18.1	18.1						17.1		11.0	32.1	
Effective Green, g (s)	18.1	18.1						17.1		11.0	32.1	
Actuated g/C Ratio	0.31	0.31						0.29		0.19	0.55	
Clearance Time (s)	4.0	4.0						4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)	533	518						1051		596	1048	
v/s Ratio Prot								c0.07		c0.18	0.10	
v/s Ratio Perm	c0.25	0.23										
v/c Ratio	0.80	0.75						0.23		0.94	0.19	
Uniform Delay, d1	18.4	18.0						15.6		23.3	6.5	
Progression Factor	1.00	1.00						1.00		1.00	1.00	
Incremental Delay, d2	8.5	6.1						0.5		22.7	0.4	
Delay (s)	27.0	24.2						16.1		46.0	6.9	
Level of Service	C	C						B		D	A	
Approach Delay (s)		25.6			0.0			16.1			35.8	
Approach LOS		C			A			B			D	

Intersection Summary			
HCM Average Control Delay	28.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	58.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	52.6%	ICU Level of Service	A
Analysis Period (min)	15		

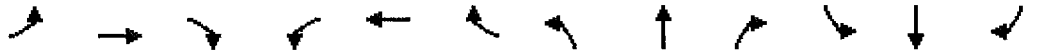
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	605	5	105	0	0	0	0	130	20	415	190	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0						4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95						0.95		0.97	1.00	
Frt	1.00	0.96						0.98		1.00	1.00	
Flt Protected	0.95	0.97						1.00		0.95	1.00	
Satd. Flow (prot)	1588	1580						3536		3335	1810	
Flt Permitted	0.95	0.97						1.00		0.95	1.00	
Satd. Flow (perm)	1588	1580						3536		3335	1810	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	651	5	113	0	0	0	0	140	22	446	204	0
RTOR Reduction (vph)	0	28	0	0	0	0	0	15	0	0	0	0
Lane Group Flow (vph)	391	350	0	0	0	0	0	147	0	446	204	0
Heavy Vehicles (%)	8%	0%	0%	0%	0%	0%	0%	0%	0%	5%	5%	0%
Turn Type	Perm	NA						NA		Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4											
Actuated Green, G (s)	15.4	15.4						17.2		9.8	31.0	
Effective Green, g (s)	15.4	15.4						17.2		9.8	31.0	
Actuated g/C Ratio	0.28	0.28						0.32		0.18	0.57	
Clearance Time (s)	4.0	4.0						4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)	450	447						1118		601	1031	
v/s Ratio Prot								0.04		c0.13	c0.11	
v/s Ratio Perm	c0.25	0.22										
v/c Ratio	0.87	0.78						0.13		0.74	0.20	
Uniform Delay, d1	18.5	18.0						13.3		21.1	5.7	
Progression Factor	1.00	1.00						1.00		1.00	1.00	
Incremental Delay, d2	16.1	8.7						0.2		4.9	0.4	
Delay (s)	34.7	26.7						13.5		26.0	6.1	
Level of Service	C	C						B		C	A	
Approach Delay (s)		30.7			0.0			13.5			19.8	
Approach LOS		C			A			B			B	

Intersection Summary			
HCM Average Control Delay	24.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	54.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	46.2%	ICU Level of Service	A
Analysis Period (min)	15		

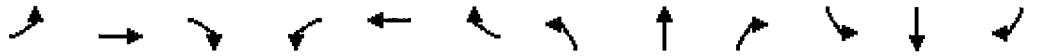
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	375	5	55	0	0	0	0	145	15	295	100	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0						4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95						0.95		0.97	1.00	
Frt	1.00	0.96						0.99		1.00	1.00	
Flt Protected	0.95	0.97						1.00		0.95	1.00	
Satd. Flow (prot)	1504	1522						3391		3335	1810	
Flt Permitted	0.95	0.97						1.00		0.95	1.00	
Satd. Flow (perm)	1504	1522						3391		3335	1810	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	387	5	57	0	0	0	0	149	15	304	103	0
RTOR Reduction (vph)	0	27	0	0	0	0	0	10	0	0	0	0
Lane Group Flow (vph)	228	194	0	0	0	0	0	154	0	304	103	0
Heavy Vehicles (%)	14%	0%	0%	0%	0%	0%	0%	5%	5%	5%	5%	0%
Turn Type	Perm	NA						NA		Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4											
Actuated Green, G (s)	11.9	11.9						16.1		6.0	26.1	
Effective Green, g (s)	11.9	11.9						16.1		6.0	26.1	
Actuated g/C Ratio	0.26	0.26						0.35		0.13	0.57	
Clearance Time (s)	4.0	4.0						4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)	389	394						1187		435	1027	
v/s Ratio Prot								c0.05		c0.09	0.06	
v/s Ratio Perm	c0.15	0.13										
v/c Ratio	0.59	0.49						0.13		0.70	0.10	
Uniform Delay, d1	14.9	14.5						10.2		19.1	4.6	
Progression Factor	1.00	1.00						1.00		1.00	1.00	
Incremental Delay, d2	2.3	1.0						0.2		4.9	0.2	
Delay (s)	17.2	15.4						10.4		24.0	4.8	
Level of Service	B	B						B		C	A	
Approach Delay (s)		16.3			0.0			10.4			19.1	
Approach LOS		B			A			B			B	

Intersection Summary			
HCM Average Control Delay	16.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	46.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	35.1%	ICU Level of Service	A
Analysis Period (min)	15		

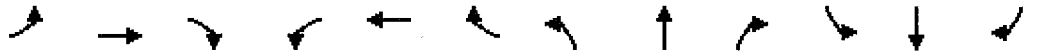
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	425	5	50	0	0	0	0	160	15	280	160	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0						4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95						0.95		0.97	1.00	
Frt	1.00	0.97						0.99		1.00	1.00	
Flt Protected	0.95	0.96						1.00		0.95	1.00	
Satd. Flow (prot)	1531	1541						3393		3335	1810	
Flt Permitted	0.95	0.96						1.00		0.95	1.00	
Satd. Flow (perm)	1531	1541						3393		3335	1810	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	447	5	53	0	0	0	0	168	16	295	168	0
RTOR Reduction (vph)	0	20	0	0	0	0	0	10	0	0	0	0
Lane Group Flow (vph)	255	230	0	0	0	0	0	174	0	295	168	0
Heavy Vehicles (%)	12%	0%	0%	0%	0%	0%	0%	5%	5%	5%	5%	0%
Turn Type	Perm	NA						NA		Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4											
Actuated Green, G (s)	12.5	12.5						16.1		6.0	26.1	
Effective Green, g (s)	12.5	12.5						16.1		6.0	26.1	
Actuated g/C Ratio	0.27	0.27						0.35		0.13	0.56	
Clearance Time (s)	4.0	4.0						4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)	411	413						1172		429	1014	
v/s Ratio Prot								0.05		c0.09	c0.09	
v/s Ratio Perm	c0.17	0.15										
v/c Ratio	0.62	0.56						0.15		0.69	0.17	
Uniform Delay, d1	15.0	14.7						10.5		19.4	5.0	
Progression Factor	1.00	1.00						1.00		1.00	1.00	
Incremental Delay, d2	2.9	1.6						0.3		4.5	0.4	
Delay (s)	17.9	16.3						10.8		23.9	5.3	
Level of Service	B	B						B		C	A	
Approach Delay (s)		17.1			0.0			10.8			17.2	
Approach LOS		B			A			B			B	

Intersection Summary			
HCM Average Control Delay	16.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	46.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	36.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	650	5	105	0	0	0	0	195	15	415	165	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0						4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95						0.95		0.97	1.00	
Frt	1.00	0.96						0.99		1.00	1.00	
Flt Protected	0.95	0.97						1.00		0.95	1.00	
Satd. Flow (prot)	1588	1581						3572		3502	1900	
Flt Permitted	0.95	0.97						1.00		0.95	1.00	
Satd. Flow (perm)	1588	1581						3572		3502	1900	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	714	5	115	0	0	0	0	214	16	456	181	0
RTOR Reduction (vph)	0	24	0	0	0	0	0	9	0	0	0	0
Lane Group Flow (vph)	421	389	0	0	0	0	0	221	0	456	181	0
Heavy Vehicles (%)	8%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA						NA		Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4											
Actuated Green, G (s)	18.5	18.5						17.5		10.6	32.1	
Effective Green, g (s)	18.5	18.5						17.5		10.6	32.1	
Actuated g/C Ratio	0.32	0.32						0.30		0.18	0.55	
Clearance Time (s)	4.0	4.0						4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)	501	499						1067		633	1041	
v/s Ratio Prot								c0.06		c0.13	0.10	
v/s Ratio Perm	c0.27	0.25										
v/c Ratio	0.84	0.78						0.21		0.72	0.17	
Uniform Delay, d1	18.7	18.2						15.4		22.6	6.6	
Progression Factor	1.00	1.00						1.00		1.00	1.00	
Incremental Delay, d2	12.0	7.6						0.4		4.0	0.4	
Delay (s)	30.7	25.8						15.8		26.6	7.0	
Level of Service	C	C						B		C	A	
Approach Delay (s)		28.3			0.0			15.8			21.1	
Approach LOS		C			A			B			C	

Intersection Summary			
HCM Average Control Delay	23.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	58.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	49.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
7: Windsor Ave & EB 210 Fwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	660	5	115	0	0	0	0	140	20	450	205	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0						4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95						0.95		0.97	1.00	
Frt	1.00	0.95						0.98		1.00	1.00	
Flt Protected	0.95	0.97						1.00		0.95	1.00	
Satd. Flow (prot)	1588	1580						3541		3335	1810	
Flt Permitted	0.95	0.97						1.00		0.95	1.00	
Satd. Flow (perm)	1588	1580						3541		3335	1810	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	710	5	124	0	0	0	0	151	22	484	220	0
RTOR Reduction (vph)	0	28	0	0	0	0	0	15	0	0	0	0
Lane Group Flow (vph)	426	385	0	0	0	0	0	158	0	484	220	0
Heavy Vehicles (%)	8%	0%	0%	0%	0%	0%	0%	0%	0%	5%	5%	0%
Turn Type	Perm	NA						NA		Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4											
Actuated Green, G (s)	15.9	15.9						17.0		10.0	31.0	
Effective Green, g (s)	15.9	15.9						17.0		10.0	31.0	
Actuated g/C Ratio	0.29	0.29						0.31		0.18	0.56	
Clearance Time (s)	4.0	4.0						4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)	460	458						1096		607	1022	
v/s Ratio Prot								0.04		c0.15	c0.12	
v/s Ratio Perm	c0.27	0.24										
v/c Ratio	0.93	0.84						0.14		0.80	0.22	
Uniform Delay, d1	18.9	18.3						13.7		21.5	5.9	
Progression Factor	1.00	1.00						1.00		1.00	1.00	
Incremental Delay, d2	24.6	12.7						0.3		7.2	0.5	
Delay (s)	43.5	31.0						14.0		28.7	6.4	
Level of Service	D	C						B		C	A	
Approach Delay (s)		37.4			0.0			14.0			21.7	
Approach LOS		D			A			B			C	

Intersection Summary			
HCM Average Control Delay	28.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	54.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	49.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
7: Windsor Ave & EB 210 Fwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	425	5	50	0	0	0	0	160	15	280	160	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0						4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95						0.95		0.97	1.00	
Frt	1.00	0.97						0.99		1.00	1.00	
Flt Protected	0.95	0.96						1.00		0.95	1.00	
Satd. Flow (prot)	1531	1541						3393		3335	1810	
Flt Permitted	0.95	0.96						1.00		0.95	1.00	
Satd. Flow (perm)	1531	1541						3393		3335	1810	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	447	5	53	0	0	0	0	168	16	295	168	0
RTOR Reduction (vph)	0	20	0	0	0	0	0	10	0	0	0	0
Lane Group Flow (vph)	255	230	0	0	0	0	0	174	0	295	168	0
Heavy Vehicles (%)	12%	0%	0%	0%	0%	0%	0%	5%	5%	5%	5%	0%
Turn Type	Perm	NA						NA		Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4											
Actuated Green, G (s)	12.5	12.5						16.1		6.0	26.1	
Effective Green, g (s)	12.5	12.5						16.1		6.0	26.1	
Actuated g/C Ratio	0.27	0.27						0.35		0.13	0.56	
Clearance Time (s)	4.0	4.0						4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)	411	413						1172		429	1014	
v/s Ratio Prot								0.05		c0.09	c0.09	
v/s Ratio Perm	c0.17	0.15										
v/c Ratio	0.62	0.56						0.15		0.69	0.17	
Uniform Delay, d1	15.0	14.7						10.5		19.4	5.0	
Progression Factor	1.00	1.00						1.00		1.00	1.00	
Incremental Delay, d2	2.9	1.6						0.3		4.5	0.4	
Delay (s)	17.9	16.3						10.8		23.9	5.3	
Level of Service	B	B						B		C	A	
Approach Delay (s)		17.1			0.0			10.8			17.2	
Approach LOS		B			A			B			B	

Intersection Summary			
HCM Average Control Delay	16.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	46.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	36.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	465	5	55	0	0	0	0	175	15	305	175	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0						4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95						0.95		0.97	1.00	
Frt	1.00	0.97						0.99		1.00	1.00	
Flt Protected	0.95	0.96						1.00		0.95	1.00	
Satd. Flow (prot)	1531	1541						3397		3335	1810	
Flt Permitted	0.95	0.96						1.00		0.95	1.00	
Satd. Flow (perm)	1531	1541						3397		3335	1810	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	489	5	58	0	0	0	0	184	16	321	184	0
RTOR Reduction (vph)	0	21	0	0	0	0	0	11	0	0	0	0
Lane Group Flow (vph)	279	252	0	0	0	0	0	189	0	321	184	0
Heavy Vehicles (%)	12%	0%	0%	0%	0%	0%	0%	5%	5%	5%	5%	0%
Turn Type	Perm	NA						NA		Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4											
Actuated Green, G (s)	13.0	13.0						16.1		6.0	26.1	
Effective Green, g (s)	13.0	13.0						16.1		6.0	26.1	
Actuated g/C Ratio	0.28	0.28						0.34		0.13	0.55	
Clearance Time (s)	4.0	4.0						4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)	423	425						1161		425	1003	
v/s Ratio Prot								0.06		c0.10	c0.10	
v/s Ratio Perm	c0.18	0.16										
v/c Ratio	0.66	0.59						0.16		0.76	0.18	
Uniform Delay, d1	15.1	14.8						10.8		19.8	5.2	
Progression Factor	1.00	1.00						1.00		1.00	1.00	
Incremental Delay, d2	3.7	2.2						0.3		7.5	0.4	
Delay (s)	18.8	17.0						11.1		27.3	5.6	
Level of Service	B	B						B		C	A	
Approach Delay (s)		17.9			0.0			11.1			19.4	
Approach LOS		B			A			B			B	

Intersection Summary			
HCM Average Control Delay	17.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	47.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	38.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	710	5	115	0	0	0	0	215	15	450	180	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0						4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95						0.95		0.97	1.00	
Frt	1.00	0.96						0.99		1.00	1.00	
Flt Protected	0.95	0.97						1.00		0.95	1.00	
Satd. Flow (prot)	1588	1580						3576		3502	1900	
Flt Permitted	0.95	0.97						1.00		0.95	1.00	
Satd. Flow (perm)	1588	1580						3576		3502	1900	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	780	5	126	0	0	0	0	236	16	495	198	0
RTOR Reduction (vph)	0	24	0	0	0	0	0	8	0	0	0	0
Lane Group Flow (vph)	460	427	0	0	0	0	0	244	0	495	198	0
Heavy Vehicles (%)	8%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA						NA		Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4											
Actuated Green, G (s)	19.3	19.3						17.2		10.8	32.0	
Effective Green, g (s)	19.3	19.3						17.2		10.8	32.0	
Actuated g/C Ratio	0.33	0.33						0.29		0.18	0.54	
Clearance Time (s)	4.0	4.0						4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)	517	514						1037		638	1025	
v/s Ratio Prot								c0.07		c0.14	0.10	
v/s Ratio Perm	c0.29	0.27										
v/c Ratio	0.89	0.83						0.24		0.78	0.19	
Uniform Delay, d1	19.0	18.5						16.0		23.1	7.0	
Progression Factor	1.00	1.00						1.00		1.00	1.00	
Incremental Delay, d2	16.9	11.0						0.5		5.9	0.4	
Delay (s)	35.9	29.5						16.6		29.0	7.4	
Level of Service	D	C						B		C	A	
Approach Delay (s)		32.7			0.0			16.6			22.8	
Approach LOS		C			A			B			C	

Intersection Summary			
HCM Average Control Delay	26.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	59.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	52.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

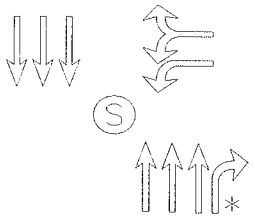
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	23-Sep-13	VV.110264.0000	1 OF 6

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : IRWINDALE AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 8
ROUTE 2A, 3

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY WB RAMPS						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	175	5%		175	15	190
WB THRU	0	0%		0	0	0
WB RIGHT	100	10%		100	10	110
IRWINDALE AVE						
NB LEFT	0	0%		0	0	0
NB THRU	845	10%		845	75	920
NB RIGHT	585	10%	**50**	635	55	690
SB LEFT	0	0%		0	0	0
SB THRU	470	10%		470	40	510
SB RIGHT	610	10%		610	55	665
TOTALS	**2785**		**50**	**2835**	**250**	**3085**

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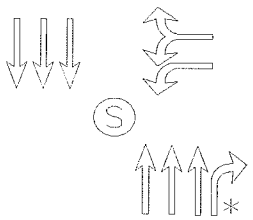
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	23-Sep-13	VV.110264.0000	2 OF 6

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : IRWINDALE AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 8
ROUTE 9

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY WB RAMPS						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	175	5%		175	15	190
WB THRU	0	0%		0	0	0
WB RIGHT	100	10%		100	10	110
IRWINDALE AVE						
NB LEFT	0	0%		0	0	0
NB THRU	845	10%	**50**	895	80	975
NB RIGHT	585	10%		585	55	640
SB LEFT	0	0%		0	0	0
SB THRU	470	10%		470	40	510
SB RIGHT	610	10%	**50**	660	60	720
TOTALS	**2785**		**100**	**2885**	**260**	**3145**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	23-Sep-13	VV.110264.0000	3 OF 6

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : IRWINDALE AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 8
ROUTE 2A, 3

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY WB RAMPS						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	255	10%		255	25	280
WB THRU	0	0%		0	0	0
WB RIGHT	110	5%		110	10	120
IRWINDALE AVE						
NB LEFT	0	0%		0	0	0
NB THRU	865	5%		865	80	945
NB RIGHT	420	10%	50	470	40	510
SB LEFT	0	0%		0	0	0
SB THRU	595	5%		595	55	650
SB RIGHT	545	5%		545	50	595
TOTALS	**2790**		**50**	**2840**	**260**	**3100**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	23-Sep-13	VV.110264.0000	4 OF 6

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : IRWINDALE AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 8
ROUTE 9

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY WB RAMPS						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	255	10%		255	25	280
WB THRU	0	0%		0	0	0
WB RIGHT	110	5%		110	10	120
IRWINDALE AVE						
NB LEFT	0	0%		0	0	0
NB THRU	865	5%	**50**	915	80	995
NB RIGHT	420	10%		420	40	460
SB LEFT	0	0%		0	0	0
SB THRU	595	5%		595	55	650
SB RIGHT	545	5%	**50**	595	55	650
TOTALS	**2790**		**100**	**2890**	**265**	**3155**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	23-Sep-13	VV.110264.0000	5 OF 6

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : IRWINDALE AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 8
ROUTE 2A, 3

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY WB RAMPS						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	145	5%		145	15	160
WB THRU	0	0%		0	0	0
WB RIGHT	145	5%		145	15	160
IRWINDALE AVE						
NB LEFT	0	0%		0	0	0
NB THRU	755	5%		755	70	825
NB RIGHT	475	5%	**50**	525	45	570
SB LEFT	0	0%		0	0	0
SB THRU	895	5%		895	80	975
SB RIGHT	475	5%		475	45	520
TOTALS	**2890**		**50**	**2940**	**270**	**3210**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	23-Sep-13	VV.110264.0000	6 OF 6

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : IRWINDALE AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 8
ROUTE 9

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY WB RAMPS						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	145	5%		145	15	160
WB THRU	0	0%		0	0	0
WB RIGHT	145	5%		145	15	160
IRWINDALE AVE						
NB LEFT	0	0%		0	0	0
NB THRU	755	5%	**50**	805	70	875
NB RIGHT	475	5%		475	45	520
SB LEFT	0	0%		0	0	0
SB THRU	895	5%		895	80	975
SB RIGHT	475	5%	**50**	525	45	570
TOTALS	**2890**		**100**	**2990**	**270**	**3260**

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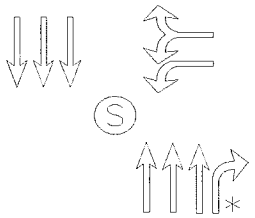
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	23-Sep-13	VV.110264.0000	1 OF 6

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : IRWINDALE AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 8
ROUTE 2A, 3

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY WB RAMPS								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	165	10	30	195	**0**	195	20	215
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	88	12	36	125	**0**	125	10	135
IRWINDALE AVE								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	778	66	198	975	**0**	975	90	1065
NB RIGHT	538	48	144	680	**150**	830	75	905
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	432	39	117	550	**0**	550	50	600
SB RIGHT	550	58	174	725	**0**	725	65	790
TOTALS	**2551**				**150**	**3400**	**310**	**3710**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	23-Sep-13	VV.110264.0000	1 OF 6

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : IRWINDALE AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 8
ROUTE 9

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY WB RAMPS								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	165	10	30	195	**0**	195	20	215
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	88	12	36	125	**0**	125	10	135
IRWINDALE AVE								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	778	66	198	975	**150**	1125	100	1225
NB RIGHT	538	48	144	680	**0**	680	60	740
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	432	39	117	550	**0**	550	50	600
SB RIGHT	550	58	174	725	**150**	875	80	955
TOTALS	**2551**				**300**	**3550**	**320**	**3870**

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TURN MOVEMENT SUMMARY	MC	23-Sep-13	VV.110264.0000	3 OF 6

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : IRWINDALE AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 8
ROUTE 2A, 3

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY WB RAMPS								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	228	29	87	315	**0**	315	30	345
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	107	4	12	120	**0**	120	10	130
IRWINDALE AVE								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	825	41	123	950	**0**	950	85	1035
NB RIGHT	370	50	150	520	**150**	670	60	730
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	572	24	72	645	**0**	645	60	705
SB RIGHT	504	39	117	620	**0**	620	55	675
TOTALS	**2606**				**150**	**3320**	**300**	**3620**

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TURN MOVEMENT SUMMARY	MC	23-Sep-13	VV.110264.0000	4 OF 6

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : IRWINDALE AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 8
ROUTE 9

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY WB RAMPS								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	228	29	87	315	**0**	315	30	345
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	107	4	12	120	**0**	120	10	130
IRWINDALE AVE								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	825	41	123	950	**150**	1100	100	1200
NB RIGHT	370	50	150	520	**0**	520	45	565
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	572	24	72	645	**0**	645	60	705
SB RIGHT	504	39	117	620	**150**	770	70	840
TOTALS	**2606**				**300**	**3470**	**315**	**3785**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	23-Sep-13	VV.110264.0000	5 OF 6

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : IRWINDALE AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 8
ROUTE 2A, 3

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY WB RAMPS								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	137	10	30	165	**0**	165	15	180
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	141	5	15	155	**0**	155	15	170
IRWINDALE AVE								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	740	14	42	780	**0**	780	70	850
NB RIGHT	461	16	48	510	**150**	660	60	720
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	884	9	27	910	**0**	910	80	990
SB RIGHT	463	10	30	495	**0**	495	45	540
TOTALS	**2826**				**150**	**3165**	**285**	**3450**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	23-Sep-13	VV.110264.0000	6 OF 6

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : IRWINDALE AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 8
ROUTE 9

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY WB RAMPS								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	137	10	30	165	**0**	165	15	180
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	141	5	15	155	**0**	155	15	170
IRWINDALE AVE								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	740	14	42	780	**150**	930	85	1015
NB RIGHT	461	16	48	510	**0**	510	45	555
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	884	9	27	910	**0**	910	80	990
SB RIGHT	463	10	30	495	**150**	645	60	705
TOTALS	**2826**				**300**	**3315**	**300**	**3615**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: IRWINDALE
EAST-WEST STREET: I-210 WB RAMPS
JURISDICTION: IRWINDALE

DATE: 06-02-11

PEAK HOUR: 07:00AM

NORTH LEG SB

TOTAL: 1,079

Rt	Thru	Lt	
608 (610)	471 (470)		Total
181	105		1st
185	95		2nd
144	132		3rd
98	139		4th

TT = 97
TT% = 97/1079 = 8.99% ≈ 9%

TT = 22
TT% = 22/275 = 8%

WB 210 Fwy
EAST LEG TOTAL: 275

	1st	2nd	3rd	4th	Total
Rt	30	17	36	17	100
Thru	0	0	0	0	
Lt	27	41	59	48	175

Total	1st	2nd	3rd	4th	
					Lt
					Thru
					Rt

WEST LEG TOTAL: 0

PEAK HOUR FACTORS

NORTH LEG = 0.94
SOUTH LEG = 0.96
EAST LEG = 0.72
WEST LEG =

ALL LEGS = 0.94

	Lt	Thru	Rt
1st		172	149
2nd		200	167
3rd		229	141
4th		243	129
Total		844 (845)	586 (585)

SOUTH LEG NB

TT = 114
TT% = 114/1430 = 7.97% ≈ 8%

TOTAL: 1,430

HOUR TOTAL: 2,784

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: IRWINDALE

EAST-WEST STREET: I-210 WB RAMPS

TIME: 07:00AM-08:00AM DATE: 06-02-11

NORTH LEG

Rt	Thru	Lt	
608	471		Total
181	105		1st
185	95		2nd
144	132		3rd
98	139		4th

	1st	2nd	3rd	4th	Total
Rt	30	17	36	17	100
Thru	0	0	0	0	0
Lt	27	41	59	48	175

Total	1st	2nd	3rd	4th	
					Lt
					Thru
					Rt

	Lt	Thru	Rt
1st		172	149
2nd		200	167
3rd		229	141
4th		243	129
Total		844	586

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: IRWINDALE

EAST-WEST STREET: I-210 WB RAMPS

TIME: 08:00AM-09:00AM DATE: 06-02-11

NORTH LEG

Rt	Thru	Lt	
401	388		Total
105	105		1st
108	100		2nd
91	91		3rd
97	92		4th

	1st	2nd	3rd	4th	Total
Rt	42	41	33	32	148
Thru	0	0	0	3	3
Lt	50	79	68	72	269

Total	1st	2nd	3rd	4th	
					Lt
					Thru
					Rt

	Lt	Thru	Rt
1st		213	104
2nd		180	122
3rd		189	96
4th		178	116
Total		760	438

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : IRWINDALE — IRWINDALE

EAST-WEST STREET : I-210 WB RAMPS — 06-02-11

BEGINNING TIME : 07:00AM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
						SB NORTH LEG						
169	98	0	0	0	0	0	2	0	12	5	0	286
167	86	0	0	1	0	7	6	0	11	2	0	280
128	120	0	0	1	0	4	3	0	12	8	0	276
86	128	0	0	1	0	2	5	0	10	5	0	237
91	105	0	0	0	0	10	0	0	4	0	0	210
				3			29			65		
96	91	0	0	1	0	6	4	0	6	4	0	208
82	84	0	0	0	0	3	2	0	6	5	0	182
87	83	0	0	1	0	2	4	0	8	4	0	189
						TT=3+29+65=97						
906	795	0	0	5	0	34	26	0	69	33	0	1868
						NB SOUTH LEG						
137	152	0	0	0	0	3	5	0	9	15	0	321
157	180	0	0	1	0	2	6	0	8	13	0	367
131	213	0	0	0	0	3	7	0	7	9	0	370
113	233	0	0	0	0	1	4	0	15	6	0	372
84	210	0	0	0	0	1	0	0	19	3	0	317
				1			31			82		
103	172	0	0	0	0	5	5	0	14	3	0	302
81	178	0	0	0	0	4	2	0	11	9	0	285
100	167	0	1	0	0	2	1	0	13	10	0	294
						TT=1+31+82=114						
906	1505	0	1	1	0	21	30	0	96	68	0	2628
						WB EAST LEG						
30	0	27	0	0	0	0	0	0	0	0	0	57
13	0	39	1	0	0	0	0	0	3	0	2	58
32	0	54	0	0	0	3	0	3	1	0	2	95
13	0	45	0	0	0	3	0	2	1	0	1	65
36	0	44	0	0	0	6	0	4	0	0	2	92
				1			11			10		
39	0	76	0	0	0	1	0	1	1	0	2	120
27	0	62	0	0	0	3	0	1	3	0	5	101
22	3	65	0	0	0	5	0	5	5	0	2	107
						TT=1+11+10=22						
212	3	412	1	0	0	21	0	16	14	0	16	695
						WEST LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: IRWINDALE
EAST-WEST STREET: I-210 WB RAMPS
JURISDICTION: IRWINDALE

DATE: 06-02-11

PEAK HOUR: 12:45PM

NORTH LEG (SB)

TOTAL: 1,139

TT = 63

TT = 63/1139 = 5.53% ≈ 6%

Rt	Thru	Lt	
543 (545)	596 (595)		Total
136	144		1st
118	153		2nd
153	133		3rd
136	166		4th

TT = 33

TT% = 33/368 = 8.97% ≈ 9%

WB 210 Fwy

EAST LEG TOTAL: 368

	1st	2nd	3rd	4th	Total
Rt	32	34	25	20	111 (110)
Thru	0	0	0	0	
Lt	66	57	56	78	257 (255)

WEST LEG TOTAL: 0

Total	1st	2nd	3rd	4th	
					Lt
					Thru
					Rt

PEAK HOUR FACTORS

NORTH LEG = 0.94
SOUTH LEG = 0.97
EAST LEG = 0.94
WEST LEG =

ALL LEGS = 0.98

TT = 91

TT% = 91/1286 = 7.08% ≈ 7%

SOUTH LEG (NB)

	Lt	Thru	Rt
1st		237	96
2nd		202	122
3rd		225	102
4th		202	100
Total		866 (865)	420

TOTAL: 1,286

HOUR TOTAL: 2,793

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: IRWINDALE

EAST-WEST STREET: I-210 WB RAMPS

TIME: 12:00PM-01:00PM DATE: 06-02-11

NORTH LEG

Rt	Thru	Lt	
537	508		Total
141	115		1st
134	103		2nd
126	146		3rd
136	144		4th

	1st	2nd	3rd	4th	Total
Rt	36	39	17	32	124
Thru	0	0	0	0	0
Lt	47	56	66	66	235

Total	1st	2nd	3rd	4th	
					Lt
					Thru
					Rt

	Lt	Thru	Rt
1st		242	134
2nd		235	115
3rd		199	99
4th		237	96
Total		913	444

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: IRWINDALE

EAST-WEST STREET: I-210 WB RAMPS

TIME: 01:00PM-02:00PM DATE: 06-02-11

NORTH LEG

Rt	Thru	Lt	
552	581		Total
118	153		1st
153	133		2nd
136	166		3rd
145	129		4th

	1st	2nd	3rd	4th	Total
Rt	34	25	20	31	110
Thru	0	0	0	0	0
Lt	57	56	78	53	244

Total	1st	2nd	3rd	4th	
					Lt
					Thru
					Rt

	Lt	Thru	Rt
1st		202	122
2nd		225	102
3rd		202	100
4th		229	87
Total		858	411

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : IRWINDALE — IRWINDALE

EAST-WEST STREET : I-210 WB RAMPS — 06-02-11

BEGINNING TIME : 12:00PM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
						SB NORTH LEG						
131	112	0	0	0	0	3	0	0	7	3	0	256
118	101	0	0	0	0	2	2	0	14	0	0	237
111	142	0	0	0	0	2	0	0	13	4	0	272
126	136	0	0	1	0	2	2	0	8	5	0	280
105	146	0	0	0	0	4	5	0	9	2	0	271
144	129	0	0	1	0	0	1	0	9	2	0	286
129	161	0	0	0	0	0	2	0	7	3	0	302
132	126	0	0	1	2 0	5	1	16 0	8	1	45 0	274
						TT=2+16+45=63						
996	1053	0	0	3	0	18	13	0	75	20	0	2178
						NB SOUTH LEG						
114	229	0	0	0	0	2	3	0	18	10	0	376
99	216	0	0	0	0	3	7	0	13	12	0	350
83	185	0	0	1	0	1	2	0	15	11	0	298
91	224	0	0	0	0	0	3	0	5	10	0	333
104	195	0	0	0	0	1	3	0	17	4	0	324
91	211	0	0	0	0	4	4	0	7	10	0	327
84	195	0	0	0	0	0	0	0	16	7	0	302
81	216	0	0	1	0 0	0	5	15 0	6	7	76 0	316
						TT=0+15+76=91						
747	1671	0	0	2	0	11	27	0	97	71	0	2626
						WB EAST LEG						
33	0	42	0	0	0	1	0	0	2	0	5	83
38	0	52	0	0	0	1	0	3	0	0	1	95
13	0	58	0	0	0	1	0	3	3	0	5	83
31	0	61	0	0	0	1	0	0	0	0	5	98
33	0	45	0	0	0	0	0	0	1	0	12	91
23	0	50	0	0	0	0	0	1	2	0	5	81
20	0	72	0	0	0	0	0	2	0	0	4	98
29	0	48	0	0	0 0	1	0	4 3	1	0	29 2	84
						TT=0+4+29=33						
220	0	428	0	0	0	5	0	12	9	0	39	713
						WEST LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: IRWINDALE
EAST-WEST STREET: I-210 WB RAMPS
JURISDICTION: IRWINDALE

DATE: 06-02-11

PEAK HOUR: 05:00PM

NORTH LEG (SB)

TOTAL: 1,366

475	891 890		Total
142	225		1st
107	232		2nd
115	222		3rd
111	212		4th
Rt	Thru	Lt	

TT = 19
TT% = 19/1366 = 1.39% ≈ 1%

TT = 15
TT% = 15/293 = 5.12% ≈ 5%

WB 210 Fwy

EAST LEG TOTAL: 293

Rt	30	35	32	49	146 145
Thru	0	0	0	0	
Lt	38	39	45	25	145 147
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
					Lt
					Thru
					Rt

WEST LEG TOTAL: 0

PEAK HOUR FACTORS

NORTH LEG = 0.93
SOUTH LEG = 0.85
EAST LEG = 0.95
WEST LEG =

ALL LEGS = 0.91

	Lt	Thru	Rt
1st		172	188
2nd		199	61
3rd		191	131
4th		192	97
Total		754 755	477 475

SOUTH LEG (NB)

TT = 30
TT% = 30/1231 = 2.44% ≈ 2%

TOTAL: 1,231

HOUR TOTAL: 2,890

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: IRWINDALE

EAST-WEST STREET: I-210 WB RAMPS

TIME: 04:00PM-05:00PM DATE: 06-02-11

NORTH LEG

Rt	Thru	Lt	
419	726		Total
104	209		1st
82	179		2nd
117	173		3rd
116	165		4th

	1st	2nd	3rd	4th	Total
Rt	33	26	47	36	142
Thru	0	1	0	0	1
Lt	53	39	57	45	194

Total	1st	2nd	3rd	4th	
					Lt
					Thru
					Rt

	Lt	Thru	Rt
1st		164	136
2nd		194	122
3rd		184	163
4th		181	129
Total		723	550

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: IRWINDALE

EAST-WEST STREET: I-210 WB RAMPS

TIME: 05:00PM-06:00PM DATE: 06-02-11

NORTH LEG

475	891		Total
142	225		1st
107	232		2nd
115	222		3rd
111	212		4th
Rt	Thru	Lt	

Rt	30	35	32	49	146
Thru	0	0	0	0	0
Lt	38	39	45	25	147
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
					Lt
					Thru
					Rt

	Lt	Thru	Rt
1st		172	188
2nd		199	61
3rd		191	131
4th		192	97
Total		754	477

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : IRWINDALE — IRWINDALE

EAST-WEST STREET : I-210 WB RAMPS — 06-02-11

BEGINNING TIME : 04:00PM

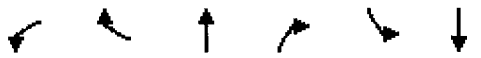
AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
						NORTH LEG						
97	207	0	0	1	0	2	0	0	5	1	0	313
80	172	0	0	1	0	2	4	0	0	2	0	261
111	171	0	0	0	0	3	2	0	3	0	0	290
111	161	0	0	1	0	0	2	0	5	1	0	281
139	223	0	0	0	0	0	1	0	3	1	0	367
104	231	0	0	0	0	1	1	0	2	0	0	339
111	219	0	0	1	0	0	1	0	4	1	0	337
109	211	0	0	1	0	0	0	0	2	0	0	323
				2			4			13		
						TT=2+4+13=19						
862	1595	0	0	5	0	8	11	0	24	6	0	2511
						SOUTH LEG						
124	160	0	0	1	0	1	1	0	11	2	0	300
116	190	0	0	1	0	0	2	0	6	1	0	316
158	181	0	0	0	0	2	0	0	3	3	0	347
124	177	0	0	1	0	1	3	0	4	0	0	310
182	169	0	0	0	0	1	1	0	5	2	0	360
58	196	0	0	1	0	0	0	0	3	2	0	260
128	188	0	0	0	0	0	1	0	3	2	0	322
93	187	0	0	1	0	0	0	0	4	4	0	289
				2			3			25		
						TT=2+3+25=30						
983	1448	0	0	5	0	5	8	0	39	16	0	2504
						EAST LEG						
32	0	48	0	0	0	1	0	4	0	0	1	86
26	1	35	0	0	0	0	0	1	0	0	3	66
46	0	53	0	0	0	0	0	1	1	0	3	104
33	0	42	0	0	0	0	0	0	3	0	3	81
30	0	37	0	0	0	0	0	0	0	0	1	68
35	0	36	0	0	0	0	0	2	0	0	1	74
31	0	42	0	0	0	0	0	0	1	0	3	77
45	0	22	0	0	0	2	0	3	2	0	0	74
				0			7			8		
						TT=0+7+8=15						
278	1	315	0	0	0	3	0	11	7	0	15	630
						WEST LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0

Prepared by Newport Traffic Studies

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	175	100	845	585	0	1080
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0			4.0
Lane Util. Factor	0.97		0.91			0.91
Frt	0.95		0.94			1.00
Flt Protected	0.97		1.00			1.00
Satd. Flow (prot)	3162		4426			4715
Flt Permitted	0.97		1.00			1.00
Satd. Flow (perm)	3162		4426			4715
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	186	106	899	622	0	1149
RTOR Reduction (vph)	42	0	237	0	0	0
Lane Group Flow (vph)	250	0	1284	0	0	1149
Heavy Vehicles (%)	5%	10%	10%	10%	10%	10%
Turn Type	NA		NA			NA
Protected Phases			2			6
Permitted Phases	8					
Actuated Green, G (s)	8.0		19.1			19.1
Effective Green, g (s)	8.0		19.1			19.1
Actuated g/C Ratio	0.23		0.54			0.54
Clearance Time (s)	4.0		4.0			4.0
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	721		2408			2566
v/s Ratio Prot			c0.29			0.24
v/s Ratio Perm	c0.08					
v/c Ratio	0.35		0.53			0.45
Uniform Delay, d1	11.4		5.1			4.8
Progression Factor	1.00		1.00			1.00
Incremental Delay, d2	0.3		0.8			0.6
Delay (s)	11.7		6.0			5.4
Level of Service	B		A			A
Approach Delay (s)	11.7		6.0			5.4
Approach LOS	B		A			A

Intersection Summary			
HCM Average Control Delay	6.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	35.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	44.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	255	110	865	420	0	1140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0			4.0
Lane Util. Factor	0.97		0.91			0.91
Frt	0.95		0.95			1.00
Flt Protected	0.97		1.00			1.00
Satd. Flow (prot)	3134		4626			4940
Flt Permitted	0.97		1.00			1.00
Satd. Flow (perm)	3134		4626			4940
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	260	112	883	429	0	1163
RTOR Reduction (vph)	43	0	178	0	0	0
Lane Group Flow (vph)	329	0	1134	0	0	1163
Heavy Vehicles (%)	10%	5%	5%	10%	5%	5%
Turn Type	NA		NA			NA
Protected Phases			2			6
Permitted Phases	8					
Actuated Green, G (s)	8.7		17.6			17.6
Effective Green, g (s)	8.7		17.6			17.6
Actuated g/C Ratio	0.25		0.51			0.51
Clearance Time (s)	4.0		4.0			4.0
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	795		2374			2535
v/s Ratio Prot			c0.25			0.24
v/s Ratio Perm	c0.11					
v/c Ratio	0.41		0.48			0.46
Uniform Delay, d1	10.7		5.4			5.3
Progression Factor	1.00		1.00			1.00
Incremental Delay, d2	0.4		0.7			0.6
Delay (s)	11.0		6.1			5.9
Level of Service	B		A			A
Approach Delay (s)	11.0		6.1			5.9
Approach LOS	B		A			A

Intersection Summary			
HCM Average Control Delay	6.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	34.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	43.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	145	145	755	475	0	1370
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0			4.0
Lane Util. Factor	0.97		0.91			0.91
Frt	0.93		0.94			1.00
Flt Protected	0.98		1.00			1.00
Satd. Flow (prot)	3168		4654			4940
Flt Permitted	0.98		1.00			1.00
Satd. Flow (perm)	3168		4654			4940
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	159	159	830	522	0	1505
RTOR Reduction (vph)	52	0	217	0	0	0
Lane Group Flow (vph)	266	0	1135	0	0	1505
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%
Turn Type	NA		NA			NA
Protected Phases			2			6
Permitted Phases	8					
Actuated Green, G (s)	8.1		18.9			18.9
Effective Green, g (s)	8.1		18.9			18.9
Actuated g/C Ratio	0.23		0.54			0.54
Clearance Time (s)	4.0		4.0			4.0
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	733		2513			2668
v/s Ratio Prot			0.24			c0.30
v/s Ratio Perm	c0.08					
v/c Ratio	0.36		0.45			0.56
Uniform Delay, d1	11.3		4.9			5.3
Progression Factor	1.00		1.00			1.00
Incremental Delay, d2	0.3		0.6			0.9
Delay (s)	11.6		5.5			6.2
Level of Service	B		A			A
Approach Delay (s)	11.6		5.5			6.2
Approach LOS	B		A			A

Intersection Summary			
HCM Average Control Delay	6.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	35.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	41.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	175	100	845	635	0	1080
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0			4.0
Lane Util. Factor	0.97		0.91			0.91
Frt	0.95		0.94			1.00
Flt Protected	0.97		1.00			1.00
Satd. Flow (prot)	3162		4262			4715
Flt Permitted	0.97		1.00			1.00
Satd. Flow (perm)	3162		4262			4715
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	186	106	899	676	0	1149
RTOR Reduction (vph)	42	0	258	0	0	0
Lane Group Flow (vph)	250	0	1317	0	0	1149
Heavy Vehicles (%)	5%	10%	10%	19%	10%	10%
Turn Type	NA		NA			NA
Protected Phases			2			6
Permitted Phases	8					
Actuated Green, G (s)	8.0		19.1			19.1
Effective Green, g (s)	8.0		19.1			19.1
Actuated g/C Ratio	0.23		0.54			0.54
Clearance Time (s)	4.0		4.0			4.0
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	721		2319			2566
v/s Ratio Prot			c0.31			0.24
v/s Ratio Perm	c0.08					
v/c Ratio	0.35		0.57			0.45
Uniform Delay, d1	11.4		5.3			4.8
Progression Factor	1.00		1.00			1.00
Incremental Delay, d2	0.3		1.0			0.6
Delay (s)	11.7		6.3			5.4
Level of Service	B		A			A
Approach Delay (s)	11.7		6.3			5.4
Approach LOS	B		A			A

Intersection Summary			
HCM Average Control Delay	6.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	35.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	45.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
8: Irwindale Ave & WB 210 Fwy

8/11/2012

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	255	110	865	470	0	1140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0			4.0
Lane Util. Factor	0.97		0.91			0.91
Frt	0.95		0.95			1.00
Flt Protected	0.97		1.00			1.00
Satd. Flow (prot)	3134		4427			4940
Flt Permitted	0.97		1.00			1.00
Satd. Flow (perm)	3134		4427			4940
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	260	112	883	480	0	1163
RTOR Reduction (vph)	43	0	199	0	0	0
Lane Group Flow (vph)	329	0	1164	0	0	1163
Heavy Vehicles (%)	10%	5%	5%	22%	5%	5%
Turn Type	NA		NA			NA
Protected Phases			2			6
Permitted Phases	8					
Actuated Green, G (s)	8.7		17.6			17.6
Effective Green, g (s)	8.7		17.6			17.6
Actuated g/C Ratio	0.25		0.51			0.51
Clearance Time (s)	4.0		4.0			4.0
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	795		2272			2535
v/s Ratio Prot			c0.26			0.24
v/s Ratio Perm	c0.11					
v/c Ratio	0.41		0.51			0.46
Uniform Delay, d1	10.7		5.5			5.3
Progression Factor	1.00		1.00			1.00
Incremental Delay, d2	0.4		0.8			0.6
Delay (s)	11.0		6.3			5.9
Level of Service	B		A			A
Approach Delay (s)	11.0		6.3			5.9
Approach LOS	B		A			A

Intersection Summary			
HCM Average Control Delay	6.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	34.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	44.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	145	145	755	525	0	1370
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0			4.0
Lane Util. Factor	0.97		0.91			0.91
Frt	0.93		0.94			1.00
Flt Protected	0.98		1.00			1.00
Satd. Flow (prot)	3168		4445			4940
Flt Permitted	0.98		1.00			1.00
Satd. Flow (perm)	3168		4445			4940
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	159	159	830	577	0	1505
RTOR Reduction (vph)	52	0	240	0	0	0
Lane Group Flow (vph)	266	0	1167	0	0	1505
Heavy Vehicles (%)	5%	5%	5%	16%	5%	5%
Turn Type	NA		NA			NA
Protected Phases			2			6
Permitted Phases	8					
Actuated Green, G (s)	8.1		18.9			18.9
Effective Green, g (s)	8.1		18.9			18.9
Actuated g/C Ratio	0.23		0.54			0.54
Clearance Time (s)	4.0		4.0			4.0
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	733		2400			2668
v/s Ratio Prot			0.26			c0.30
v/s Ratio Perm	c0.08					
v/c Ratio	0.36		0.49			0.56
Uniform Delay, d1	11.3		5.0			5.3
Progression Factor	1.00		1.00			1.00
Incremental Delay, d2	0.3		0.7			0.9
Delay (s)	11.6		5.7			6.2
Level of Service	B		A			A
Approach Delay (s)	11.6		5.7			6.2
Approach LOS	B		A			A

Intersection Summary			
HCM Average Control Delay	6.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	35.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	41.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	190	110	920	690	0	1175
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0			4.0
Lane Util. Factor	0.97		0.91			0.91
Frt	0.94		0.94			1.00
Flt Protected	0.97		1.00			1.00
Satd. Flow (prot)	3160		4263			4715
Flt Permitted	0.97		1.00			1.00
Satd. Flow (perm)	3160		4263			4715
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	202	117	979	734	0	1250
RTOR Reduction (vph)	30	0	263	0	0	0
Lane Group Flow (vph)	289	0	1450	0	0	1250
Heavy Vehicles (%)	5%	10%	10%	19%	10%	10%
Turn Type	NA		NA			NA
Protected Phases			2			6
Permitted Phases	8					
Actuated Green, G (s)	8.5		18.9			18.9
Effective Green, g (s)	8.5		18.9			18.9
Actuated g/C Ratio	0.24		0.53			0.53
Clearance Time (s)	4.0		4.0			4.0
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	759		2276			2517
v/s Ratio Prot			c0.34			0.27
v/s Ratio Perm	c0.09					
v/c Ratio	0.38		0.64			0.50
Uniform Delay, d1	11.2		5.8			5.2
Progression Factor	1.00		1.00			1.00
Incremental Delay, d2	0.3		1.4			0.7
Delay (s)	11.6		7.2			5.9
Level of Service	B		A			A
Approach Delay (s)	11.6		7.2			5.9
Approach LOS	B		A			A

Intersection Summary			
HCM Average Control Delay	7.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	35.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	48.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	280	120	945	510	0	1245
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0			4.0
Lane Util. Factor	0.97		0.91			0.91
Frt	0.96		0.95			1.00
Flt Protected	0.97		1.00			1.00
Satd. Flow (prot)	3135		4429			4940
Flt Permitted	0.97		1.00			1.00
Satd. Flow (perm)	3135		4429			4940
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	286	122	964	520	0	1270
RTOR Reduction (vph)	31	0	204	0	0	0
Lane Group Flow (vph)	377	0	1280	0	0	1270
Heavy Vehicles (%)	10%	5%	5%	22%	5%	5%
Turn Type	NA		NA			NA
Protected Phases			2			6
Permitted Phases	8					
Actuated Green, G (s)	9.2		17.1			17.1
Effective Green, g (s)	9.2		17.1			17.1
Actuated g/C Ratio	0.27		0.50			0.50
Clearance Time (s)	4.0		4.0			4.0
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	841		2208			2463
v/s Ratio Prot			c0.29			0.26
v/s Ratio Perm	c0.12					
v/c Ratio	0.45		0.58			0.52
Uniform Delay, d1	10.4		6.1			5.8
Progression Factor	1.00		1.00			1.00
Incremental Delay, d2	0.4		1.1			0.8
Delay (s)	10.8		7.2			6.6
Level of Service	B		A			A
Approach Delay (s)	10.8		7.2			6.6
Approach LOS	B		A			A

Intersection Summary			
HCM Average Control Delay	7.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	34.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	48.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	160	160	825	570	0	1495
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0			4.0
Lane Util. Factor	0.97		0.91			0.91
Frt	0.93		0.94			1.00
Flt Protected	0.98		1.00			1.00
Satd. Flow (prot)	3168		4447			4940
Flt Permitted	0.98		1.00			1.00
Satd. Flow (perm)	3168		4447			4940
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	176	176	907	626	0	1643
RTOR Reduction (vph)	39	0	249	0	0	0
Lane Group Flow (vph)	313	0	1284	0	0	1643
Heavy Vehicles (%)	5%	5%	5%	16%	5%	5%
Turn Type	NA		NA			NA
Protected Phases			2			6
Permitted Phases	8					
Actuated Green, G (s)	8.5		17.9			17.9
Effective Green, g (s)	8.5		17.9			17.9
Actuated g/C Ratio	0.25		0.52			0.52
Clearance Time (s)	4.0		4.0			4.0
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	783		2314			2571
v/s Ratio Prot			0.29			c0.33
v/s Ratio Perm	c0.10					
v/c Ratio	0.40		0.55			0.64
Uniform Delay, d1	10.8		5.6			5.9
Progression Factor	1.00		1.00			1.00
Incremental Delay, d2	0.3		1.0			1.2
Delay (s)	11.2		6.5			7.2
Level of Service	B		A			A
Approach Delay (s)	11.2		6.5			7.2
Approach LOS	B		A			A

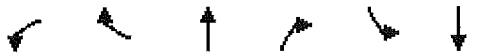
Intersection Summary			
HCM Average Control Delay	7.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	34.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	45.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	175	100	895	585	0	1130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0			4.0
Lane Util. Factor	0.97		0.91			0.91
Frt	0.95		0.94			1.00
Flt Protected	0.97		1.00			1.00
Satd. Flow (prot)	3162		4297			4715
Flt Permitted	0.97		1.00			1.00
Satd. Flow (perm)	3162		4297			4715
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	186	106	952	622	0	1202
RTOR Reduction (vph)	35	0	225	0	0	0
Lane Group Flow (vph)	257	0	1349	0	0	1202
Heavy Vehicles (%)	5%	10%	10%	19%	10%	10%
Turn Type	NA		NA			NA
Protected Phases			2			6
Permitted Phases	8					
Actuated Green, G (s)	8.1		19.1			19.1
Effective Green, g (s)	8.1		19.1			19.1
Actuated g/C Ratio	0.23		0.54			0.54
Clearance Time (s)	4.0		4.0			4.0
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	728		2332			2558
v/s Ratio Prot			c0.31			0.25
v/s Ratio Perm	c0.08					
v/c Ratio	0.35		0.58			0.47
Uniform Delay, d1	11.4		5.4			4.9
Progression Factor	1.00		1.00			1.00
Incremental Delay, d2	0.3		1.1			0.6
Delay (s)	11.7		6.4			5.6
Level of Service	B		A			A
Approach Delay (s)	11.7		6.4			5.6
Approach LOS	B		A			A

Intersection Summary			
HCM Average Control Delay	6.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	35.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	45.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	225	110	915	420	0	1190
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0			4.0
Lane Util. Factor	0.97		0.91			0.91
Frt	0.95		0.95			1.00
Flt Protected	0.97		1.00			1.00
Satd. Flow (prot)	3129		4479			4940
Flt Permitted	0.97		1.00			1.00
Satd. Flow (perm)	3129		4479			4940
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	230	112	934	429	0	1214
RTOR Reduction (vph)	35	0	165	0	0	0
Lane Group Flow (vph)	307	0	1198	0	0	1214
Heavy Vehicles (%)	10%	5%	5%	22%	5%	5%
Turn Type	NA		NA			NA
Protected Phases			2			6
Permitted Phases	8					
Actuated Green, G (s)	8.5		18.2			18.2
Effective Green, g (s)	8.5		18.2			18.2
Actuated g/C Ratio	0.24		0.52			0.52
Clearance Time (s)	4.0		4.0			4.0
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	766		2349			2591
v/s Ratio Prot			c0.27			0.25
v/s Ratio Perm	c0.10					
v/c Ratio	0.40		0.51			0.47
Uniform Delay, d1	11.0		5.4			5.2
Progression Factor	1.00		1.00			1.00
Incremental Delay, d2	0.3		0.8			0.6
Delay (s)	11.3		6.2			5.8
Level of Service	B		A			A
Approach Delay (s)	11.3		6.2			5.8
Approach LOS	B		A			A

Intersection Summary			
HCM Average Control Delay	6.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	34.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	43.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	145	145	805	475	0	1420
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0			4.0
Lane Util. Factor	0.97		0.91			0.91
Frt	0.93		0.94			1.00
Flt Protected	0.98		1.00			1.00
Satd. Flow (prot)	3168		4491			4940
Flt Permitted	0.98		1.00			1.00
Satd. Flow (perm)	3168		4491			4940
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	159	159	885	522	0	1560
RTOR Reduction (vph)	43	0	204	0	0	0
Lane Group Flow (vph)	275	0	1203	0	0	1560
Heavy Vehicles (%)	5%	5%	5%	16%	5%	5%
Turn Type	NA		NA			NA
Protected Phases			2			6
Permitted Phases	8					
Actuated Green, G (s)	8.2		18.9			18.9
Effective Green, g (s)	8.2		18.9			18.9
Actuated g/C Ratio	0.23		0.54			0.54
Clearance Time (s)	4.0		4.0			4.0
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	740		2418			2660
v/s Ratio Prot			0.27			c0.32
v/s Ratio Perm	c0.09					
v/c Ratio	0.37		0.50			0.59
Uniform Delay, d1	11.3		5.1			5.5
Progression Factor	1.00		1.00			1.00
Incremental Delay, d2	0.3		0.7			1.0
Delay (s)	11.6		5.8			6.4
Level of Service	B		A			A
Approach Delay (s)	11.6		5.8			6.4
Approach LOS	B		A			A

Intersection Summary			
HCM Average Control Delay	6.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	35.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	42.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	190	110	975	640	0	1230
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0			4.0
Lane Util. Factor	0.97		0.91			0.91
Frt	0.94		0.94			1.00
Flt Protected	0.97		1.00			1.00
Satd. Flow (prot)	3160		4296			4715
Flt Permitted	0.97		1.00			1.00
Satd. Flow (perm)	3160		4296			4715
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	202	117	1037	681	0	1309
RTOR Reduction (vph)	25	0	230	0	0	0
Lane Group Flow (vph)	294	0	1488	0	0	1309
Heavy Vehicles (%)	5%	10%	10%	19%	10%	10%
Turn Type	NA		NA			NA
Protected Phases			2			6
Permitted Phases	8					
Actuated Green, G (s)	8.5		18.9			18.9
Effective Green, g (s)	8.5		18.9			18.9
Actuated g/C Ratio	0.24		0.53			0.53
Clearance Time (s)	4.0		4.0			4.0
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	759		2294			2517
v/s Ratio Prot			c0.35			0.28
v/s Ratio Perm	c0.09					
v/c Ratio	0.39		0.65			0.52
Uniform Delay, d1	11.3		5.9			5.3
Progression Factor	1.00		1.00			1.00
Incremental Delay, d2	0.3		1.4			0.8
Delay (s)	11.6		7.3			6.1
Level of Service	B		A			A
Approach Delay (s)	11.6		7.3			6.1
Approach LOS	B		A			A

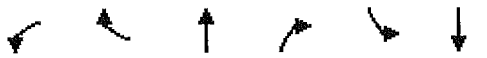
Intersection Summary			
HCM Average Control Delay	7.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	35.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	48.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	280	120	995	460	0	1300
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0			4.0
Lane Util. Factor	0.97		0.91			0.91
Frt	0.96		0.95			1.00
Flt Protected	0.97		1.00			1.00
Satd. Flow (prot)	3135		4477			4940
Flt Permitted	0.97		1.00			1.00
Satd. Flow (perm)	3135		4477			4940
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	286	122	1015	469	0	1327
RTOR Reduction (vph)	26	0	174	0	0	0
Lane Group Flow (vph)	382	0	1310	0	0	1327
Heavy Vehicles (%)	10%	5%	5%	22%	5%	5%
Turn Type	NA		NA			NA
Protected Phases			2			6
Permitted Phases	8					
Actuated Green, G (s)	9.2		17.1			17.1
Effective Green, g (s)	9.2		17.1			17.1
Actuated g/C Ratio	0.27		0.50			0.50
Clearance Time (s)	4.0		4.0			4.0
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	841		2232			2463
v/s Ratio Prot			c0.29			0.27
v/s Ratio Perm	c0.12					
v/c Ratio	0.45		0.59			0.54
Uniform Delay, d1	10.5		6.1			5.9
Progression Factor	1.00		1.00			1.00
Incremental Delay, d2	0.4		1.1			0.9
Delay (s)	10.8		7.2			6.7
Level of Service	B		A			A
Approach Delay (s)	10.8		7.2			6.7
Approach LOS	B		A			A

Intersection Summary			
HCM Average Control Delay	7.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	34.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	47.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	160	160	875	520	0	1545
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0			4.0
Lane Util. Factor	0.97		0.91			0.91
Frt	0.93		0.94			1.00
Flt Protected	0.98		1.00			1.00
Satd. Flow (prot)	3168		4489			4940
Flt Permitted	0.98		1.00			1.00
Satd. Flow (perm)	3168		4489			4940
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	176	176	962	571	0	1698
RTOR Reduction (vph)	32	0	215	0	0	0
Lane Group Flow (vph)	320	0	1318	0	0	1698
Heavy Vehicles (%)	5%	5%	5%	16%	5%	5%
Turn Type	NA		NA			NA
Protected Phases			2			6
Permitted Phases	8					
Actuated Green, G (s)	8.6		17.9			17.9
Effective Green, g (s)	8.6		17.9			17.9
Actuated g/C Ratio	0.25		0.52			0.52
Clearance Time (s)	4.0		4.0			4.0
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	790		2329			2563
v/s Ratio Prot			0.29			c0.34
v/s Ratio Perm	c0.10					
v/c Ratio	0.40		0.57			0.66
Uniform Delay, d1	10.8		5.7			6.1
Progression Factor	1.00		1.00			1.00
Incremental Delay, d2	0.3		1.0			1.4
Delay (s)	11.2		6.7			7.5
Level of Service	B		A			A
Approach Delay (s)	11.2		6.7			7.5
Approach LOS	B		A			A

Intersection Summary			
HCM Average Control Delay	7.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	34.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	46.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

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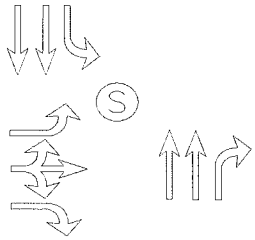
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	23-Sep-13	VV.110264.0000	1 OF 9

E/W STREET : I-210 FWY EB RAMPS
N/S STREET : IRWINDALE AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 9
ROUTE 2A, 3

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						

I-210 FWY EB RAMPS

EB LEFT	470	10%		470	40	510
EB THRU	5	5%		5	5	10
EB RIGHT	645	5%	**50**	695	65	760
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0

IRWINDALE AVE

NB LEFT	0	0%		0	0	0
NB THRU	895	5%	**50**	945	85	1030
NB RIGHT	195	5%		195	20	215
SB LEFT	175	10%		175	15	190
SB THRU	545	10%		545	50	595
SB RIGHT	0	0%		0	0	0
TOTALS	**2930**		**100**	**3030**	**280**	**3310**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	23-Sep-13	VV.110264.0000	2 OF 9

E/W STREET : I-210 FWY EB RAMPS
N/S STREET : IRWINDALE AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 9
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY EB RAMPS						
EB LEFT	470	10%		470	40	510
EB THRU	5	5%		5	5	10
EB RIGHT	645	5%	**50**	695	65	760
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
IRWINDALE AVE						
NB LEFT	0	0%		0	0	0
NB THRU	895	5%		895	80	975
NB RIGHT	195	5%		195	20	215
SB LEFT	175	10%		175	15	190
SB THRU	545	10%		545	50	595
SB RIGHT	0	0%		0	0	0
TOTALS	**2930**		**50**	**2980**	**275**	**3255**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	23-Sep-13	VV.110264.0000	3 OF 9

E/W STREET : I-210 FWY EB RAMPS
N/S STREET : IRWINDALE AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 9
ROUTE 9

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY EB RAMPS						
EB LEFT	470	10%	**50**	520	45	565
EB THRU	5	5%		5	5	10
EB RIGHT	645	5%		645	60	705
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
IRWINDALE AVE						
NB LEFT	0	0%		0	0	0
NB THRU	895	5%		895	80	975
NB RIGHT	195	5%		195	20	215
SB LEFT	175	10%		175	15	190
SB THRU	545	10%		545	50	595
SB RIGHT	0	0%		0	0	0
TOTALS	**2930**		**50**	**2980**	**275**	**3255**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	23-Sep-13	VV.110264.0000	4 OF 9

E/W STREET : I-210 FWY EB RAMPS
N/S STREET : IRWINDALE AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 9
ROUTE 2A, 3

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY EB RAMPS						
EB LEFT	590	10%		590	55	645
EB THRU	5	5%		5	5	10
EB RIGHT	365	10%	**50**	415	35	450
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
IRWINDALE AVE						
NB LEFT	0	0%		0	0	0
NB THRU	690	5%	**50**	740	65	805
NB RIGHT	240	10%		240	20	260
SB LEFT	200	5%		200	20	220
SB THRU	670	10%		670	60	730
SB RIGHT	0	0%		0	0	0
TOTALS	**2760**		**100**	**2860**	**260**	**3120**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	23-Sep-13	VV.110264.0000	5 OF 9

E/W STREET : I-210 FWY EB RAMPS
N/S STREET : IRWINDALE AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 9
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY EB RAMPS						
EB LEFT	590	10%		590	55	645
EB THRU	5	5%		5	5	10
EB RIGHT	365	10%	**50**	415	35	450
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
IRWINDALE AVE						
NB LEFT	0	0%		0	0	0
NB THRU	690	5%		690	60	750
NB RIGHT	240	10%		240	20	260
SB LEFT	200	5%		200	20	220
SB THRU	670	10%		670	60	730
SB RIGHT	0	0%		0	0	0
TOTALS	**2760**		**50**	**2810**	**255**	**3065**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	23-Sep-13	VV.110264.0000	6 OF 9

E/W STREET : I-210 FWY EB RAMPS
N/S STREET : IRWINDALE AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 9
ROUTE 9

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY EB RAMPS						
EB LEFT	590	10%	**50**	640	60	700
EB THRU	5	5%		5	5	10
EB RIGHT	365	10%		365	35	400
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
IRWINDALE AVE						
NB LEFT	0	0%		0	0	0
NB THRU	690	5%		690	60	750
NB RIGHT	240	10%		240	20	260
SB LEFT	200	5%		200	20	220
SB THRU	670	10%		670	60	730
SB RIGHT	0	0%		0	0	0
TOTALS	**2760**		**50**	**2810**	**260**	**3070**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	23-Sep-13	VV.110264.0000	7 OF 9

E/W STREET : I-210 FWY EB RAMPS
N/S STREET : IRWINDALE AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 9
ROUTE 2A, 3

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY EB RAMPS						
EB LEFT	375	5%		375	35	410
EB THRU	5	5%		5	5	10
EB RIGHT	385	5%	**50**	435	40	475
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
IRWINDALE AVE						
NB LEFT	0	0%		0	0	0
NB THRU	960	5%	**50**	1010	90	1100
NB RIGHT	385	5%		385	35	420
SB LEFT	300	5%		300	25	325
SB THRU	740	5%		740	65	805
SB RIGHT	0	0%		0	0	0
TOTALS	**3150**		**100**	**3250**	**295**	**3545**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	23-Sep-13	VV.110264.0000	8 OF 9

E/W STREET : I-210 FWY EB RAMPS
N/S STREET : IRWINDALE AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 9
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY EB RAMPS						
EB LEFT	375	5%		375	35	410
EB THRU	5	5%		5	5	10
EB RIGHT	385	5%	**50**	435	40	475
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
IRWINDALE AVE						
NB LEFT	0	0%		0	0	0
NB THRU	960	5%		960	85	1045
NB RIGHT	385	5%		385	35	420
SB LEFT	300	5%		300	25	325
SB THRU	740	5%		740	65	805
SB RIGHT	0	0%		0	0	0
TOTALS	**3150**		**50**	**3200**	**290**	**3490**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	23-Sep-13	VV.110264.0000	9 OF 9

E/W STREET : I-210 FWY EB RAMPS
N/S STREET : IRWINDALE AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 9
ROUTE 9

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY EB RAMPS						
EB LEFT	375	5%	**50**	425	40	465
EB THRU	5	5%		5	5	10
EB RIGHT	385	5%		385	35	420
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
IRWINDALE AVE						
NB LEFT	0	0%		0	0	0
NB THRU	960	5%		960	85	1045
NB RIGHT	385	5%		385	35	420
SB LEFT	300	5%		300	25	325
SB THRU	740	5%		740	65	805
SB RIGHT	0	0%		0	0	0
TOTALS	**3150**		**50**	**3200**	**290**	**3490**

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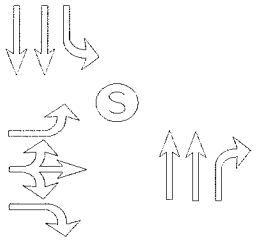
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	23-Sep-13	VV.110264.0000	1 OF 9

E/W STREET : I-210 FWY EB RAMPS
N/S STREET : IRWINDALE AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 9
ROUTE 2A, 3

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY EB RAMPS								
EB LEFT	434	36	108	540	**0**	540	50	590
EB THRU	3	0	0	5	**0**	5	5	10
EB RIGHT	597	48	144	740	**150**	890	80	970
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
IRWINDALE AVE								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	859	36	108	965	**150**	1115	100	1215
NB RIGHT	184	10	30	215	**0**	215	20	235
SB LEFT	155	22	66	220	**0**	220	20	240
SB THRU	484	59	177	660	**0**	660	60	720
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**2716**				**300**	**3645**	**335**	**3980**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	23-Sep-13	VV.110264.0000	2 OF 9

E/W STREET : I-210 FWY EB RAMPS
N/S STREET : IRWINDALE AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 9
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY EB RAMPS								
EB LEFT	434	36	108	540	**0**	540	50	590
EB THRU	3	0	0	5	**0**	5	5	10
EB RIGHT	597	48	144	740	**150**	890	80	970
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
IRWINDALE AVE								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	859	36	108	965	**0**	965	85	1050
NB RIGHT	184	10	30	215	**0**	215	20	235
SB LEFT	155	22	66	220	**0**	220	20	240
SB THRU	484	59	177	660	**0**	660	60	720
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**2716**				**150**	**3495**	**320**	**3815**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	TM	23-Sep-13	VV.110264.0000	3 OF 9

E/W STREET : I-210 FWY EB RAMPS
N/S STREET : IRWINDALE AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 9
ROUTE 9

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY EB RAMPS								
EB LEFT	434	36	108	540	**150**	690	60	750
EB THRU	3	0	0	5	**0**	5	5	10
EB RIGHT	597	48	144	740	**0**	740	65	805
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
IRWINDALE AVE								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	859	36	108	965	**0**	965	85	1050
NB RIGHT	184	10	30	215	**0**	215	20	235
SB LEFT	155	22	66	220	**0**	220	20	240
SB THRU	484	59	177	660	**0**	660	60	720
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**2716**				**150**	**3495**	**315**	**3810**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	23-Sep-13	VV.110264.0000	4 OF 9

E/W STREET : I-210 FWY EB RAMPS
N/S STREET : IRWINDALE AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 9
ROUTE 2A, 3

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY EB RAMPS								
EB LEFT	538	52	156	695	**0**	695	65	760
EB THRU	0	0	0	5	**0**	5	5	10
EB RIGHT	327	40	120	445	**150**	595	55	650
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
IRWINDALE AVE								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	648	42	126	775	**150**	925	85	1010
NB RIGHT	215	25	75	290	**0**	290	25	315
SB LEFT	194	6	18	210	**0**	210	20	230
SB THRU	597	71	213	810	**0**	810	75	885
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**2519**				**300**	**3530**	**330**	**3860**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	23-Sep-13	VV.110264.0000	5 OF 9

E/W STREET : I-210 FWY EB RAMPS
N/S STREET : IRWINDALE AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 9
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY EB RAMPS								
EB LEFT	538	52	156	695	**0**	695	65	760
EB THRU	0	0	0	5	**0**	5	5	10
EB RIGHT	327	40	120	445	**150**	595	55	650
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
IRWINDALE AVE								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	648	42	126	775	**0**	775	70	845
NB RIGHT	215	25	75	290	**0**	290	25	315
SB LEFT	194	6	18	210	**0**	210	20	230
SB THRU	597	71	213	810	**0**	810	75	885
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**2519**				**150**	**3380**	**315**	**3695**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	23-Sep-13	VV.110264.0000	6 OF 9

E/W STREET : I-210 FWY EB RAMPS
N/S STREET : IRWINDALE AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 9
ROUTE 9

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY EB RAMPS								
EB LEFT	538	52	156	695	**150**	845	75	920
EB THRU	0	0	0	5	**0**	5	5	10
EB RIGHT	327	40	120	445	**0**	445	40	485
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
IRWINDALE AVE								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	648	42	126	775	**0**	775	70	845
NB RIGHT	215	25	75	290	**0**	290	25	315
SB LEFT	194	6	18	210	**0**	210	20	230
SB THRU	597	71	213	810	**0**	810	75	885
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**2519**				**150**	**3380**	**310**	**3690**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	23-Sep-13	VV.110264.0000	7 OF 9

E/W STREET : I-210 FWY EB RAMPS
N/S STREET : IRWINDALE AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 9
ROUTE 2A, 3

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY EB RAMPS								
EB LEFT	368	6	18	385	**0**	385	35	420
EB THRU	5	0	0	5	**0**	5	5	10
EB RIGHT	380	4	12	390	**150**	540	50	590
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
IRWINDALE AVE								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	945	13	39	985	**150**	1135	100	1235
NB RIGHT	382	4	12	395	**0**	395	35	430
SB LEFT	295	6	18	315	**0**	315	30	345
SB THRU	717	21	63	780	**0**	780	70	850
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**3092**				**300**	**3555**	**325**	**3880**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	23-Sep-13	VV.110264.0000	8 OF 9

E/W STREET : I-210 FWY EB RAMPS
N/S STREET : IRWINDALE AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 9
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY EB RAMPS								
EB LEFT	368	6	18	385	**0**	385	35	420
EB THRU	5	0	0	5	**0**	5	5	10
EB RIGHT	380	4	12	390	**150**	540	50	590
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
IRWINDALE AVE								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	945	13	39	985	**0**	985	90	1075
NB RIGHT	382	4	12	395	**0**	395	35	430
SB LEFT	295	6	18	315	**0**	315	30	345
SB THRU	717	21	63	780	**0**	780	70	850
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**3092**				**150**	**3405**	**315**	**3720**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	TM	23-Sep-13	VV.110264.0000	9 OF 9

E/W STREET : I-210 FWY EB RAMPS
N/S STREET : IRWINDALE AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 9
ROUTE 9

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY EB RAMPS								
EB LEFT	368	6	18	385	**150**	535	50	585
EB THRU	5	0	0	5	**0**	5	5	10
EB RIGHT	380	4	12	390	**0**	390	35	425
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
IRWINDALE AVE								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	945	13	39	985	**0**	985	90	1075
NB RIGHT	382	4	12	395	**0**	395	35	430
SB LEFT	295	6	18	315	**0**	315	30	345
SB THRU	717	21	63	780	**0**	780	70	850
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**3092**				**150**	**3405**	**315**	**3720**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: IRWINDALE
EAST-WEST STREET: I-210 EB RAMPS
JURISDICTION: IRWINDALE

DATE: 06-02-11

PEAK HOUR: 07:30AM

NORTH LEG (SB)

TOTAL: 720

TT = 81

$TT\% = \frac{81}{720} = 11.25\% \approx 11\%$

	543 (545)	177 (175)	Total
	127	54	1st
	131	59	2nd
	123	29	3rd
	162	35	4th
Rt	Thru	Lt	

EAST LEG TOTAL: 0

Rt					
Thru					
Lt					
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
470	118	123	113	116	Lt
5 3	0	0	1	2	Thru
645	137	184	162	162	Rt

WEST LEG TOTAL: 1,118

EB 210 Fwy

TT = 84

$TT\% = \frac{84}{1118} = 7.51\% \approx 8\%$

	Lt	Thru	Rt
1st		254	48
2nd		251	49
3rd		203	52
4th		187	45
Total		895	194 (193)

SOUTH LEG (NB)

PEAK HOUR FACTORS

NORTH LEG = 0.91
SOUTH LEG = 0.90
EAST LEG =
WEST LEG = 0.91

ALL LEGS = 0.92

TT = 46

$TT\% = \frac{46}{1089} = 4.22\% \approx 4\%$

TOTAL: 1,089

HOUR TOTAL: 2,927

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: IRWINDALE

EAST-WEST STREET: I-210 EB RAMPS

TIME: 07:00AM-08:00AM DATE: 06-02-11

NORTH LEG

	455	182	Total
	101	32	1st
	96	37	2nd
	127	54	3rd
	131	59	4th
Rt	Thru	Lt	

Rt					
Thru					
Lt					
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
431	82	108	118	123	Lt
0	0	0	0	0	Thru
567	100	146	137	184	Rt

	Lt	Thru	Rt
1st		240	45
2nd		260	36
3rd		254	48
4th		251	49
Total		1005	178

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: IRWINDALE

EAST-WEST STREET: I-210 EB RAMPS

TIME: 08:00AM-09:00AM DATE: 06-02-11

NORTH LEG

	514	143	Total
	123	29	1st
	162	35	2nd
	112	37	3rd
	117	42	4th
Rt	Thru	Lt	

Rt					
Thru					
Lt					
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
439	113	116	116	94	Lt
4	1	2	0	1	Thru
576	162	162	137	115	Rt

	Lt	Thru	Rt
1st		203	52
2nd		187	45
3rd		169	61
4th		199	55
Total		758	213

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : IRWINDALE — IRWINDALE

EAST-WEST STREET : I-210 EB RAMPS — 06-02-11

BEGINNING TIME : 07:00AM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
						SB NORTH LEG						
0	91	25	0	0	0	0	0	0	0	10	7	133
0	86	37	0	0	0	0	0	0	0	10	0	133
0	111	48	0	0	0	0	6	0	0	10	6	181
0	120	52	0	0	0	0	6	0	0	5	7	190
0	106	26	0	0	0	0	8	0	0	9	3	152
0	147	29	0	0	0	0	6	0	0	9	6	197
0	108	37	0	0	0	0	1	0	0	3	0	149
0	111	40	0	0	0	0	1	0	0	5	2	159
						TT=0+26+55=81						
0	880	294	0	0	0	0	28	0	0	61	31	1294
						NB SOUTH LEG						
45	239	0	0	0	0	0	0	0	0	1	0	285
35	251	0	0	1	0	1	3	0	0	5	0	296
47	240	0	0	0	0	1	5	0	0	9	0	302
46	241	0	0	1	0	3	2	0	0	7	0	300
48	195	0	0	0	0	4	5	0	0	3	0	255
43	183	0	0	0	0	2	2	0	0	2	0	232
61	169	0	0	0	0	0	0	0	0	0	0	230
55	199	0	0	0	0	0	0	0	0	0	0	254
						TT=1+24+21=46						
380	1717	0	0	2	0	11	17	0	0	27	0	2154
						EAST LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
						EB WEST LEG						
87	0	69	0	0	0	3	0	2	10	0	11	182
131	0	87	0	0	0	5	0	5	10	0	16	254
124	0	116	0	0	0	3	0	1	10	0	1	255
171	0	113	0	0	0	2	0	2	11	0	8	307
149	1	107	0	0	0	3	0	2	10	0	4	276
153	2	98	0	0	0	2	0	7	7	0	11	280
130	0	114	0	0	0	0	0	0	7	0	2	253
108	1	89	0	0	0	0	0	0	7	0	5	210
						TT=0+22+62=84						
1053	4	793	0	0	0	18	0	19	72	0	58	2017

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: IRWINDALE
EAST-WEST STREET: I-210 EB RAMPS
JURISDICTION: IRWINDALE

DATE: 06-02-11

PEAK HOUR: 12:45PM

NORTH LEG (SB)

TOTAL: 868

TT = 78

TT% = 78/868 = 8.99% ≈ 9%

	668 (870)	200	Total
	174	50	1st
	154	56	2nd
	147	42	3rd
	193	52	4th
Rt	Thru	Lt	

EAST LEG TOTAL: 0

Rt					
Thru					
Lt					
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
590	159	150	154	127	Lt
5	0	0	0	0	Thru
367 (365)	96	99	91	81	Rt

WEST LEG TOTAL: 957

EB 210 FWY

TT = 92

TT% = 92/957 = 9.61% ≈ 10%

	Lt	Thru	Rt
1st		166	71
2nd		175	49
3rd		174	53
4th		175	67
Total		690	240

SOUTH LEG (NB)

PEAK HOUR FACTORS

NORTH LEG = 0.89
SOUTH LEG = 0.96
EAST LEG =
WEST LEG = 0.94

ALL LEGS = 0.96

TT = 67

TT% = 67/930 = 7.2% ≈ 7%

TOTAL: 930

HOUR TOTAL: 2,755

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: IRWINDALE

EAST-WEST STREET: I-210 EB RAMPS

TIME: 12:00PM-01:00PM DATE: 06-02-11

NORTH LEG

	590	159	Total
	131	32	1st
	133	43	2nd
	152	34	3rd
	174	50	4th
Rt	Thru	Lt	

Rt					
Thru					
Lt					
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
577	146	124	148	159	Lt
1	0	0	1	0	Thru
348	77	80	95	96	Rt

	Lt	Thru	Rt
1st		233	72
2nd		217	92
3rd		151	57
4th		166	71
Total		767	292

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: IRWINDALE

EAST-WEST STREET: I-210 EB RAMPS

TIME: 01:00PM-02:00PM DATE: 06-02-11

NORTH LEG

	635	188	Total
	154	56	1st
	147	42	2nd
	193	52	3rd
	141	38	4th
Rt	Thru	Lt	

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
579	150	154	127	148	Lt
0	0	0	0	0	Thru
348	99	91	81	77	Rt

	Lt	Thru	Rt
1st		175	49
2nd		174	53
3rd		175	67
4th		166	90
Total		690	259

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : IRWINDALE — IRWINDALE

EAST-WEST STREET : I-210 EB RAMPS — 06-02-11

BEGINNING TIME : 12:00PM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
						SB NORTH LEG						
0	111	30	0	1	0	0	4	0	0	15	2	163
0	117	37	0	0	0	0	1	0	0	15	6	176
0	133	30	0	1	0	0	2	0	0	16	4	186
0	157	50	0	0	0	0	1	0	0	16	0	224
0	129	50	0	0	0	0	10	1	0	15	5	210
0	133	42	0	0	0	0	2	0	0	12	0	189
0	178	52	0	0	0	0	0	0	0	15	0	245
0	129	38	0	1	0	0	3	14 0	0	8	63 0	179
						TT= 1+14+63=78						
0	1087	329	0	3	0	0	23	1	0	112	17	1572
						NB SOUTH LEG						
65	230	0	0	0	0	6	1	0	1	2	0	305
84	211	0	0	0	0	3	3	0	5	3	0	309
46	135	0	0	0	0	2	6	0	9	10	0	208
66	152	0	0	1	0	0	4	0	5	9	0	237
38	165	0	0	1	0	5	3	0	6	6	0	224
50	161	0	0	0	0	0	5	0	3	8	0	227
61	170	0	0	0	0	3	2	0	3	3	0	242
90	165	0	0	1	2 0	0	0	22 0	0	0	43 0	256
						TT= 2+22+43=67						
500	1389	0	0	3	0	19	24	0	32	41	0	2008
						EAST LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
						EB WEST LEG						
62	0	122	0	0	0	11	0	9	4	0	15	223
56	0	103	0	0	0	16	0	1	8	0	20	204
80	1	130	0	0	0	8	0	3	7	0	15	244
87	0	145	0	0	0	7	0	5	2	0	9	255
89	0	138	0	0	0	9	0	2	1	0	10	249
82	0	141	0	0	0	4	0	1	5	0	12	245
69	0	114	0	0	0	7	0	3	5	0	10	208
71	0	140	0	0	0 0	4	0	38 1	2	0	54 7	225
						TT= 0+38+54=92						
596	11033		0	0	0	66	0	25	34	0	98	1853

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: IRWINDALE
EAST-WEST STREET: I-210 EB RAMPS
JURISDICTION: IRWINDALE

DATE: 06-02-11

PEAK HOUR: 05:00PM

NORTH LEG (SB)

TOTAL: 1,039

TT = 27

TT% = 27/1039 = 2.60% ≈ 3%

	738 740	301 300	Total
	190	73	1st
	193	78	2nd
	193	74	3rd
	162	76	4th
Rt	Thru	Lt	

EAST LEG TOTAL: 0

Rt					
Thru					
Lt					
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
374 375	67	94	100	113	Lt
5	2	2	1	0	Thru
384 385	77	99	83	125	Rt

WEST LEG TOTAL: 763

EB 210 Fwy

TT = 10

TT% = 10/763 = 1.31% ≈ 1%

PEAK HOUR FACTORS

NORTH LEG = 0.96
SOUTH LEG = 0.79
EAST LEG =
WEST LEG = 0.80

ALL LEGS = 0.94

TT = 17

TT% = 17/1344 = 1.26% ≈ 1%

	Lt	Thru	Rt	
1st		294	134	
2nd		266	103	
3rd		222	75	
4th		176	74	
Total		958 960	386 385	TOTAL: 1,344

SOUTH LEG (NB)

HOUR TOTAL: 3,146

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: IRWINDALE

EAST-WEST STREET: I-210 EB RAMPS

TIME: 04:00PM-05:00PM DATE: 06-02-11

NORTH LEG

	636	282	Total
	196	66	1st
	148	70	2nd
	156	74	3rd
	136	72	4th
Rt	Thru	Lt	

Rt					
Thru					
Lt					
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
340	94	95	78	73	Lt
5	1	1	1	2	Thru
346	89	87	83	87	Rt

	Lt	Thru	Rt
1st		204	107
2nd		221	90
3rd		272	114
4th		238	80
Total		935	391

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: IRWINDALE

EAST-WEST STREET: I-210 EB RAMPS

TIME: 05:00PM-06:00PM DATE: 06-02-11

NORTH LEG

	738	301	Total
	190	73	1st
	193	78	2nd
	193	74	3rd
	162	76	4th
Rt	Thru	Lt	

Rt					
Thru					
Lt					
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
374	67	94	100	113	Lt
5	2	2	1	0	Thru
384	77	99	83	125	Rt

	Lt	Thru	Rt
1st		294	134
2nd		266	103
3rd		222	75
4th		176	74
Total		958	386

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : IRWINDALE — IRWINDALE

EAST-WEST STREET : I-210 EB RAMPS — 06-02-11

BEGINNING TIME : 04:00PM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
						SB NORTH LEG						
0	185	66	0	1	0	0	1	0	0	9	0	262
0	140	69	0	1	0	0	1	1	0	6	0	218
0	151	74	0	0	0	0	1	0	0	4	0	230
0	130	69	0	1	0	0	2	1	0	3	2	208
0	183	70	0	0	0	0	0	1	0	7	2	263
0	187	76	0	1	0	0	2	2	0	3	0	271
0	190	74	0	0	0	0	0	0	0	3	0	267
0	157	75	0	1	0	0	0	0	0	4	1	238
				2			5			20		
						TT = 245+20 = 27						
0	1323	573	0	5	0	0	7	5	0	39	5	1957
						NB SOUTH LEG						
106	202	0	0	1	0	0	1	0	1	0	0	311
88	214	0	0	0	0	0	3	0	2	4	0	311
113	266	0	0	1	0	1	1	0	0	4	0	386
79	231	0	0	1	0	0	2	0	1	4	0	318
134	292	0	0	0	0	0	2	0	0	0	0	428
103	263	0	0	0	0	0	2	0	0	1	0	369
71	219	0	0	1	0	1	1	0	3	1	0	297
74	171	0	0	1	0	0	0	0	0	4	0	250
				2			6			9		
						TT = 2+6+9 = 17						
768	1858	0	0	5	0	2	12	0	7	18	0	2670
						EAST LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
						EB WEST LEG						
88	1	89	0	0	0	1	0	2	0	0	3	184
83	1	93	0	0	0	1	0	1	3	0	1	183
80	1	76	0	0	0	0	0	0	3	0	2	162
87	2	69	0	0	0	0	0	4	0	0	0	162
74	2	67	0	0	0	1	0	0	2	0	0	146
98	2	94	0	0	0	0	0	0	1	0	0	195
83	1	97	0	0	0	0	0	1	0	0	2	184
125	0	110	0	0	0	0	0	0	0	0	3	238
				0			2			8		
						TT = 0+2+8 = 10						
718	10	695	0	0	0	3	0	8	9	0	11	1454

Prepared by Newport Traffic Studies

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	470	5	645	0	0	0	0	895	195	175	545	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Lane Util. Factor	0.95	0.91	0.95					0.95	1.00	1.00	0.95	
Frt	1.00	0.88	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.99	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1559	1427	1461					3438	1538	1641	3282	
Flt Permitted	0.95	0.99	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1559	1427	1461					3438	1538	1641	3282	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	511	5	701	0	0	0	0	973	212	190	592	0
RTOR Reduction (vph)	0	186	186	0	0	0	0	0	137	0	0	0
Lane Group Flow (vph)	424	214	207	0	0	0	0	973	75	190	592	0
Heavy Vehicles (%)	10%	0%	5%	0%	0%	0%	0%	5%	5%	10%	10%	0%
Turn Type	Perm	NA	Perm					NA	Perm	Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4						2			
Actuated Green, G (s)	18.3	18.3	18.3					21.0	21.0	8.0	33.0	
Effective Green, g (s)	18.3	18.3	18.3					21.0	21.0	8.0	33.0	
Actuated g/C Ratio	0.31	0.31	0.31					0.35	0.35	0.13	0.56	
Clearance Time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	481	440	451					1218	545	221	1826	
v/s Ratio Prot								c0.28		c0.12	0.18	
v/s Ratio Perm	c0.27	0.15	0.14						0.05			
v/c Ratio	0.88	0.49	0.46					0.80	0.14	0.86	0.32	
Uniform Delay, d1	19.5	16.7	16.5					17.2	13.0	25.1	7.1	
Progression Factor	1.00	1.00	1.00					1.00	1.00	1.00	1.00	
Incremental Delay, d2	17.0	0.8	0.7					5.5	0.5	26.7	0.5	
Delay (s)	36.5	17.5	17.3					22.8	13.5	51.8	7.6	
Level of Service	D	B	B					C	B	D	A	
Approach Delay (s)		24.1			0.0			21.1			18.3	
Approach LOS		C			A			C			B	

Intersection Summary			
HCM Average Control Delay	21.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	59.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	64.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Route 3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	590	5	365	0	0	0	0	690	240	200	670	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Lane Util. Factor	0.95	0.91	0.95					0.95	1.00	1.00	0.95	
Frt	1.00	0.97	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.96	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1559	1469	1395					3438	1468	1719	3282	
Flt Permitted	0.95	0.96	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1559	1469	1395					3438	1468	1719	3282	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	615	5	380	0	0	0	0	719	250	208	698	0
RTOR Reduction (vph)	0	17	156	0	0	0	0	0	165	0	0	0
Lane Group Flow (vph)	344	327	156	0	0	0	0	719	85	208	698	0
Heavy Vehicles (%)	10%	0%	10%	0%	0%	0%	0%	5%	10%	5%	10%	0%
Turn Type	Perm	NA	Perm					NA	Perm	Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4						2			
Actuated Green, G (s)	14.9	14.9	14.9					18.4	18.4	8.7	31.1	
Effective Green, g (s)	14.9	14.9	14.9					18.4	18.4	8.7	31.1	
Actuated g/C Ratio	0.28	0.28	0.28					0.34	0.34	0.16	0.58	
Clearance Time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	430	405	385					1171	500	277	1890	
v/s Ratio Prot								c0.21		c0.12	0.21	
v/s Ratio Perm	0.22	0.22	0.11						0.06			
v/c Ratio	0.80	0.81	0.40					0.61	0.17	0.75	0.37	
Uniform Delay, d1	18.2	18.2	15.9					14.8	12.5	21.6	6.2	
Progression Factor	1.00	1.00	1.00					1.00	1.00	1.00	1.00	
Incremental Delay, d2	10.2	11.3	0.7					2.4	0.7	10.9	0.6	
Delay (s)	28.4	29.5	16.6					17.3	13.2	32.5	6.7	
Level of Service	C	C	B					B	B	C	A	
Approach Delay (s)		25.1			0.0			16.2			12.6	
Approach LOS		C			A			B			B	

Intersection Summary			
HCM Average Control Delay	18.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	54.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	60.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
9: Irwindale Ave & EB 210 Fwy

8/10/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	375	5	385	0	0	0	0	960	385	300	740	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Lane Util. Factor	0.95	0.91	0.95					0.95	1.00	1.00	0.95	
Frt	1.00	0.92	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.98	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1633	1478	1461					3438	1538	1719	3438	
Flt Permitted	0.95	0.98	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1633	1478	1461					3438	1538	1719	3438	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	399	5	410	0	0	0	0	1021	410	319	787	0
RTOR Reduction (vph)	0	78	149	0	0	0	0	0	268	0	0	0
Lane Group Flow (vph)	283	195	109	0	0	0	0	1021	142	319	787	0
Heavy Vehicles (%)	5%	5%	5%	0%	0%	0%	0%	5%	5%	5%	5%	0%
Turn Type	Perm	NA	Perm					NA	Perm	Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4						2			
Actuated Green, G (s)	14.1	14.1	14.1					20.1	20.1	12.0	36.1	
Effective Green, g (s)	14.1	14.1	14.1					20.1	20.1	12.0	36.1	
Actuated g/C Ratio	0.24	0.24	0.24					0.35	0.35	0.21	0.62	
Clearance Time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	396	358	354					1187	531	354	2133	
v/s Ratio Prot								c0.30		c0.19	0.23	
v/s Ratio Perm	c0.17	0.13	0.07						0.09			
v/c Ratio	0.71	0.54	0.31					0.86	0.27	0.90	0.37	
Uniform Delay, d1	20.2	19.2	18.1					17.7	13.7	22.5	5.4	
Progression Factor	1.00	1.00	1.00					1.00	1.00	1.00	1.00	
Incremental Delay, d2	6.0	1.7	0.5					8.2	1.2	24.9	0.5	
Delay (s)	26.2	20.9	18.6					26.0	15.0	47.5	5.9	
Level of Service	C	C	B					C	B	D	A	
Approach Delay (s)		22.0			0.0			22.8			17.9	
Approach LOS		C			A			C			B	

Intersection Summary			
HCM Average Control Delay	21.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	58.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	67.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	470	5	695	0	0	0	0	895	195	175	545	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Lane Util. Factor	0.95	0.91	0.95					0.95	1.00	1.00	0.95	
Frt	1.00	0.88	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.99	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1559	1349	1370					3438	1538	1641	3282	
Flt Permitted	0.95	0.99	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1559	1349	1370					3438	1538	1641	3282	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	511	5	755	0	0	0	0	973	212	190	592	0
RTOR Reduction (vph)	0	184	184	0	0	0	0	0	138	0	0	0
Lane Group Flow (vph)	439	233	231	0	0	0	0	973	74	190	592	0
Heavy Vehicles (%)	10%	0%	12%	0%	0%	0%	0%	5%	5%	10%	10%	0%
Turn Type	Perm	NA	Perm					NA	Perm	Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4						2			
Actuated Green, G (s)	18.8	18.8	18.8					21.0	21.0	8.0	33.0	
Effective Green, g (s)	18.8	18.8	18.8					21.0	21.0	8.0	33.0	
Actuated g/C Ratio	0.31	0.31	0.31					0.35	0.35	0.13	0.55	
Clearance Time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	490	424	431					1207	540	220	1811	
v/s Ratio Prot								c0.28		c0.12	0.18	
v/s Ratio Perm	c0.28	0.17	0.17						0.05			
v/c Ratio	0.90	0.55	0.53					0.81	0.14	0.86	0.33	
Uniform Delay, d1	19.6	17.0	16.9					17.6	13.2	25.4	7.3	
Progression Factor	1.00	1.00	1.00					1.00	1.00	1.00	1.00	
Incremental Delay, d2	18.6	1.5	1.3					5.8	0.5	27.7	0.5	
Delay (s)	38.2	18.4	18.2					23.4	13.8	53.1	7.8	
Level of Service	D	B	B					C	B	D	A	
Approach Delay (s)		25.2			0.0			21.7			18.8	
Approach LOS		C			A			C			B	

Intersection Summary			
HCM Average Control Delay	22.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	59.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	64.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
9: Irwindale Ave & EB 210 Fwy

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	590	5	415	0	0	0	0	690	240	200	670	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Lane Util. Factor	0.95	0.91	0.95					0.95	1.00	1.00	0.95	
Frt	1.00	0.96	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.97	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1559	1417	1268					3438	1468	1719	3282	
Flt Permitted	0.95	0.97	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1559	1417	1268					3438	1468	1719	3282	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	615	5	432	0	0	0	0	719	250	208	698	0
RTOR Reduction (vph)	0	26	155	0	0	0	0	0	166	0	0	0
Lane Group Flow (vph)	363	330	178	0	0	0	0	719	84	208	698	0
Heavy Vehicles (%)	10%	0%	21%	0%	0%	0%	0%	5%	10%	5%	10%	0%
Turn Type	Perm	NA	Perm					NA	Perm	Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4						2			
Actuated Green, G (s)	15.3	15.3	15.3					18.3	18.3	8.8	31.1	
Effective Green, g (s)	15.3	15.3	15.3					18.3	18.3	8.8	31.1	
Actuated g/C Ratio	0.28	0.28	0.28					0.34	0.34	0.16	0.57	
Clearance Time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	438	399	357					1157	494	278	1876	
v/s Ratio Prot								c0.21		c0.12	0.21	
v/s Ratio Perm	0.23	0.23	0.14						0.06			
v/c Ratio	0.83	0.83	0.50					0.62	0.17	0.75	0.37	
Uniform Delay, d1	18.3	18.3	16.3					15.1	12.7	21.7	6.3	
Progression Factor	1.00	1.00	1.00					1.00	1.00	1.00	1.00	
Incremental Delay, d2	12.2	13.2	1.1					2.5	0.7	10.5	0.6	
Delay (s)	30.5	31.5	17.4					17.7	13.5	32.2	6.9	
Level of Service	C	C	B					B	B	C	A	
Approach Delay (s)		26.7			0.0			16.6			12.7	
Approach LOS		C			A			B			B	

Intersection Summary			
HCM Average Control Delay	19.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	54.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	60.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	375	5	435	0	0	0	0	960	385	300	740	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Lane Util. Factor	0.95	0.91	0.95					0.95	1.00	1.00	0.95	
Frt	1.00	0.90	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.98	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1633	1372	1323					3438	1538	1719	3438	
Flt Permitted	0.95	0.98	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1633	1372	1323					3438	1538	1719	3438	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	399	5	463	0	0	0	0	1021	410	319	787	0
RTOR Reduction (vph)	0	108	148	0	0	0	0	0	269	0	0	0
Lane Group Flow (vph)	299	182	130	0	0	0	0	1021	141	319	787	0
Heavy Vehicles (%)	5%	5%	16%	0%	0%	0%	0%	5%	5%	5%	5%	0%
Turn Type	Perm	NA	Perm					NA	Perm	Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4						2			
Actuated Green, G (s)	14.5	14.5	14.5					20.1	20.1	12.0	36.1	
Effective Green, g (s)	14.5	14.5	14.5					20.1	20.1	12.0	36.1	
Actuated g/C Ratio	0.25	0.25	0.25					0.34	0.34	0.20	0.62	
Clearance Time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	404	339	327					1179	528	352	2118	
v/s Ratio Prot								c0.30		c0.19	0.23	
v/s Ratio Perm	c0.18	0.13	0.10						0.09			
v/c Ratio	0.74	0.54	0.40					0.87	0.27	0.91	0.37	
Uniform Delay, d1	20.3	19.1	18.4					18.0	13.9	22.8	5.6	
Progression Factor	1.00	1.00	1.00					1.00	1.00	1.00	1.00	
Incremental Delay, d2	7.1	1.6	0.8					8.6	1.2	25.8	0.5	
Delay (s)	27.4	20.8	19.2					26.6	15.2	48.5	6.1	
Level of Service	C	C	B					C	B	D	A	
Approach Delay (s)		22.6			0.0			23.3			18.3	
Approach LOS		C			A			C			B	

Intersection Summary			
HCM Average Control Delay	21.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	58.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	68.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

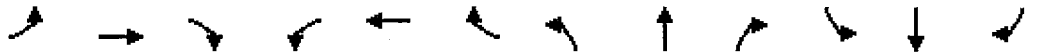
HCM Signalized Intersection Capacity Analysis
9: Irwindale Ave & EB 210 Fwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	510	5	760	0	0	0	0	975	215	190	595	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Lane Util. Factor	0.95	0.91	0.95					0.95	1.00	1.00	0.95	
Frt	1.00	0.88	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.99	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1559	1346	1370					3438	1538	1641	3282	
Flt Permitted	0.95	0.99	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1559	1346	1370					3438	1538	1641	3282	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	554	5	826	0	0	0	0	1060	234	207	647	0
RTOR Reduction (vph)	0	161	161	0	0	0	0	0	152	0	0	0
Lane Group Flow (vph)	482	296	285	0	0	0	0	1060	82	207	647	0
Heavy Vehicles (%)	10%	0%	12%	0%	0%	0%	0%	5%	5%	10%	10%	0%
Turn Type	Perm	NA	Perm					NA	Perm	Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4						2			
Actuated Green, G (s)	19.0	19.0	19.0					21.0	21.0	8.0	33.0	
Effective Green, g (s)	19.0	19.0	19.0					21.0	21.0	8.0	33.0	
Actuated g/C Ratio	0.32	0.32	0.32					0.35	0.35	0.13	0.55	
Clearance Time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	494	426	434					1203	538	219	1805	
v/s Ratio Prot								c0.31		c0.13	0.20	
v/s Ratio Perm	c0.31	0.22	0.21						0.05			
v/c Ratio	0.98	0.70	0.66					0.88	0.15	0.95	0.36	
Uniform Delay, d1	20.3	18.0	17.7					18.3	13.4	25.8	7.6	
Progression Factor	1.00	1.00	1.00					1.00	1.00	1.00	1.00	
Incremental Delay, d2	33.9	4.9	3.6					9.4	0.6	45.2	0.6	
Delay (s)	54.2	22.9	21.3					27.8	14.0	71.0	8.1	
Level of Service	D	C	C					C	B	E	A	
Approach Delay (s)		33.3			0.0			25.3			23.4	
Approach LOS		C			A			C			C	

Intersection Summary			
HCM Average Control Delay	27.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	69.5%	ICU Level of Service	C
Analysis Period (min)	15		

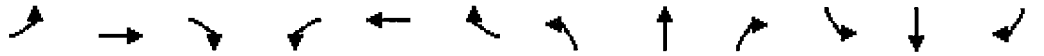
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	645	5	450	0	0	0	0	750	260	220	730	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Lane Util. Factor	0.95	0.91	0.95					0.95	1.00	1.00	0.95	
Frt	1.00	0.96	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.97	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1559	1417	1268					3438	1468	1719	3282	
Flt Permitted	0.95	0.97	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1559	1417	1268					3438	1468	1719	3282	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	672	5	469	0	0	0	0	781	271	229	760	0
RTOR Reduction (vph)	0	25	133	0	0	0	0	0	182	0	0	0
Lane Group Flow (vph)	396	364	228	0	0	0	0	781	89	229	760	0
Heavy Vehicles (%)	10%	0%	21%	0%	0%	0%	0%	5%	10%	5%	10%	0%
Turn Type	Perm	NA	Perm					NA	Perm	Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4						2			
Actuated Green, G (s)	15.7	15.7	15.7					18.0	18.0	9.0	31.0	
Effective Green, g (s)	15.7	15.7	15.7					18.0	18.0	9.0	31.0	
Actuated g/C Ratio	0.29	0.29	0.29					0.33	0.33	0.16	0.57	
Clearance Time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	447	407	364					1131	483	283	1860	
v/s Ratio Prot								c0.23		c0.13	0.23	
v/s Ratio Perm	0.25	0.26	0.18						0.06			
v/c Ratio	0.89	0.89	0.63					0.69	0.18	0.81	0.41	
Uniform Delay, d1	18.6	18.7	17.0					15.9	13.1	22.0	6.7	
Progression Factor	1.00	1.00	1.00					1.00	1.00	1.00	1.00	
Incremental Delay, d2	18.6	21.3	3.4					3.5	0.8	15.5	0.7	
Delay (s)	37.2	40.0	20.3					19.4	13.9	37.6	7.3	
Level of Service	D	D	C					B	B	D	A	
Approach Delay (s)		32.8			0.0			18.0			14.3	
Approach LOS		C			A			B			B	

Intersection Summary			
HCM Average Control Delay	22.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	54.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	65.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	410	5	475	0	0	0	0	1045	420	325	805	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Lane Util. Factor	0.95	0.91	0.95					0.95	1.00	1.00	0.95	
Frt	1.00	0.90	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.98	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1633	1372	1323					3438	1538	1719	3438	
Flt Permitted	0.95	0.98	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1633	1372	1323					3438	1538	1719	3438	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	436	5	505	0	0	0	0	1112	447	346	856	0
RTOR Reduction (vph)	0	108	125	0	0	0	0	0	295	0	0	0
Lane Group Flow (vph)	327	208	178	0	0	0	0	1112	152	346	856	0
Heavy Vehicles (%)	5%	5%	16%	0%	0%	0%	0%	5%	5%	5%	5%	0%
Turn Type	Perm	NA	Perm					NA	Perm	Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4						2			
Actuated Green, G (s)	14.9	14.9	14.9					20.0	20.0	12.0	36.0	
Effective Green, g (s)	14.9	14.9	14.9					20.0	20.0	12.0	36.0	
Actuated g/C Ratio	0.25	0.25	0.25					0.34	0.34	0.20	0.61	
Clearance Time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	413	347	335					1167	522	350	2101	
v/s Ratio Prot								c0.32		c0.20	0.25	
v/s Ratio Perm	c0.20	0.15	0.13						0.10			
v/c Ratio	0.79	0.60	0.53					0.95	0.29	0.99	0.41	
Uniform Delay, d1	20.6	19.4	19.0					19.0	14.3	23.4	5.9	
Progression Factor	1.00	1.00	1.00					1.00	1.00	1.00	1.00	
Incremental Delay, d2	10.0	2.8	1.6					17.2	1.4	44.6	0.6	
Delay (s)	30.5	22.1	20.6					36.2	15.7	67.9	6.5	
Level of Service	C	C	C					D	B	E	A	
Approach Delay (s)		24.6			0.0			30.3			24.2	
Approach LOS		C			A			C			C	

Intersection Summary			
HCM Average Control Delay	26.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	58.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	73.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
9: Irwindale Ave & EB 210 Fwy

8/10/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	470	5	645	0	0	0	0	895	195	175	545	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Lane Util. Factor	0.95	0.91	0.95					0.95	1.00	1.00	0.95	
Frt	1.00	0.88	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.99	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1559	1427	1461					3438	1538	1641	3282	
Flt Permitted	0.95	0.99	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1559	1427	1461					3438	1538	1641	3282	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	511	5	701	0	0	0	0	973	212	190	592	0
RTOR Reduction (vph)	0	186	186	0	0	0	0	0	137	0	0	0
Lane Group Flow (vph)	424	214	207	0	0	0	0	973	75	190	592	0
Heavy Vehicles (%)	10%	0%	5%	0%	0%	0%	0%	5%	5%	10%	10%	0%
Turn Type	Perm	NA	Perm					NA	Perm	Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4						2			
Actuated Green, G (s)	18.3	18.3	18.3					21.0	21.0	8.0	33.0	
Effective Green, g (s)	18.3	18.3	18.3					21.0	21.0	8.0	33.0	
Actuated g/C Ratio	0.31	0.31	0.31					0.35	0.35	0.13	0.56	
Clearance Time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	481	440	451					1218	545	221	1826	
v/s Ratio Prot								c0.28		c0.12	0.18	
v/s Ratio Perm	c0.27	0.15	0.14						0.05			
v/c Ratio	0.88	0.49	0.46					0.80	0.14	0.86	0.32	
Uniform Delay, d1	19.5	16.7	16.5					17.2	13.0	25.1	7.1	
Progression Factor	1.00	1.00	1.00					1.00	1.00	1.00	1.00	
Incremental Delay, d2	17.0	0.8	0.7					5.5	0.5	26.7	0.5	
Delay (s)	36.5	17.5	17.3					22.8	13.5	51.8	7.6	
Level of Service	D	B	B					C	B	D	A	
Approach Delay (s)		24.1			0.0			21.1			18.3	
Approach LOS		C			A			C			B	

Intersection Summary			
HCM Average Control Delay	21.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	59.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	64.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

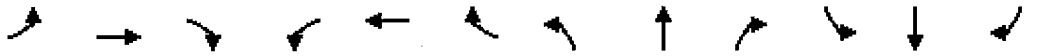
HCM Signalized Intersection Capacity Analysis
9: Irwindale Ave & EB 210 Fwy

8/10/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	590	5	365	0	0	0	0	690	240	200	670	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Lane Util. Factor	0.95	0.91	0.95					0.95	1.00	1.00	0.95	
Frt	1.00	0.97	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.96	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1559	1469	1395					3438	1468	1719	3282	
Flt Permitted	0.95	0.96	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1559	1469	1395					3438	1468	1719	3282	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	615	5	380	0	0	0	0	719	250	208	698	0
RTOR Reduction (vph)	0	17	156	0	0	0	0	0	165	0	0	0
Lane Group Flow (vph)	344	327	156	0	0	0	0	719	85	208	698	0
Heavy Vehicles (%)	10%	0%	10%	0%	0%	0%	0%	5%	10%	5%	10%	0%
Turn Type	Perm	NA	Perm					NA	Perm	Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4						2			
Actuated Green, G (s)	14.9	14.9	14.9					18.4	18.4	8.7	31.1	
Effective Green, g (s)	14.9	14.9	14.9					18.4	18.4	8.7	31.1	
Actuated g/C Ratio	0.28	0.28	0.28					0.34	0.34	0.16	0.58	
Clearance Time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	430	405	385					1171	500	277	1890	
v/s Ratio Prot								c0.21		c0.12	0.21	
v/s Ratio Perm	0.22	0.22	0.11						0.06			
v/c Ratio	0.80	0.81	0.40					0.61	0.17	0.75	0.37	
Uniform Delay, d1	18.2	18.2	15.9					14.8	12.5	21.6	6.2	
Progression Factor	1.00	1.00	1.00					1.00	1.00	1.00	1.00	
Incremental Delay, d2	10.2	11.3	0.7					2.4	0.7	10.9	0.6	
Delay (s)	28.4	29.5	16.6					17.3	13.2	32.5	6.7	
Level of Service	C	C	B					B	B	C	A	
Approach Delay (s)		25.1			0.0			16.2			12.6	
Approach LOS		C			A			B			B	

Intersection Summary			
HCM Average Control Delay	18.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	54.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	60.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	375	5	385	0	0	0	0	960	385	300	740	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Lane Util. Factor	0.95	0.91	0.95					0.95	1.00	1.00	0.95	
Frt	1.00	0.92	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.98	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1633	1478	1461					3438	1538	1719	3438	
Flt Permitted	0.95	0.98	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1633	1478	1461					3438	1538	1719	3438	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	399	5	410	0	0	0	0	1021	410	319	787	0
RTOR Reduction (vph)	0	78	149	0	0	0	0	0	268	0	0	0
Lane Group Flow (vph)	283	195	109	0	0	0	0	1021	142	319	787	0
Heavy Vehicles (%)	5%	5%	5%	0%	0%	0%	0%	5%	5%	5%	5%	0%
Turn Type	Perm	NA	Perm					NA	Perm	Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4						2			
Actuated Green, G (s)	14.1	14.1	14.1					20.1	20.1	12.0	36.1	
Effective Green, g (s)	14.1	14.1	14.1					20.1	20.1	12.0	36.1	
Actuated g/C Ratio	0.24	0.24	0.24					0.35	0.35	0.21	0.62	
Clearance Time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	396	358	354					1187	531	354	2133	
v/s Ratio Prot								c0.30		c0.19	0.23	
v/s Ratio Perm	c0.17	0.13	0.07						0.09			
v/c Ratio	0.71	0.54	0.31					0.86	0.27	0.90	0.37	
Uniform Delay, d1	20.2	19.2	18.1					17.7	13.7	22.5	5.4	
Progression Factor	1.00	1.00	1.00					1.00	1.00	1.00	1.00	
Incremental Delay, d2	6.0	1.7	0.5					8.2	1.2	24.9	0.5	
Delay (s)	26.2	20.9	18.6					26.0	15.0	47.5	5.9	
Level of Service	C	C	B					C	B	D	A	
Approach Delay (s)		22.0			0.0			22.8			17.9	
Approach LOS		C			A			C			B	

Intersection Summary			
HCM Average Control Delay	21.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	58.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	67.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	470	5	695	0	0	0	0	895	195	175	545	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Lane Util. Factor	0.95	0.91	0.95					0.95	1.00	1.00	0.95	
Frt	1.00	0.88	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.99	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1559	1349	1370					3438	1538	1641	3282	
Flt Permitted	0.95	0.99	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1559	1349	1370					3438	1538	1641	3282	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	511	5	755	0	0	0	0	973	212	190	592	0
RTOR Reduction (vph)	0	184	184	0	0	0	0	0	138	0	0	0
Lane Group Flow (vph)	439	233	231	0	0	0	0	973	74	190	592	0
Heavy Vehicles (%)	10%	0%	12%	0%	0%	0%	0%	5%	5%	10%	10%	0%
Turn Type	Perm	NA	Perm					NA	Perm	Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4						2			
Actuated Green, G (s)	18.8	18.8	18.8					21.0	21.0	8.0	33.0	
Effective Green, g (s)	18.8	18.8	18.8					21.0	21.0	8.0	33.0	
Actuated g/C Ratio	0.31	0.31	0.31					0.35	0.35	0.13	0.55	
Clearance Time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	490	424	431					1207	540	220	1811	
v/s Ratio Prot								c0.28		c0.12	0.18	
v/s Ratio Perm	c0.28	0.17	0.17						0.05			
v/c Ratio	0.90	0.55	0.53					0.81	0.14	0.86	0.33	
Uniform Delay, d1	19.6	17.0	16.9					17.6	13.2	25.4	7.3	
Progression Factor	1.00	1.00	1.00					1.00	1.00	1.00	1.00	
Incremental Delay, d2	18.6	1.5	1.3					5.8	0.5	27.7	0.5	
Delay (s)	38.2	18.4	18.2					23.4	13.8	53.1	7.8	
Level of Service	D	B	B					C	B	D	A	
Approach Delay (s)		25.2			0.0			21.7			18.8	
Approach LOS		C			A			C			B	

Intersection Summary			
HCM Average Control Delay	22.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	59.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	64.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
9: Irwindale Ave & EB 210 Fwy

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	590	5	415	0	0	0	0	690	240	200	670	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Lane Util. Factor	0.95	0.91	0.95					0.95	1.00	1.00	0.95	
Frt	1.00	0.96	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.97	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1559	1417	1268					3438	1468	1719	3282	
Flt Permitted	0.95	0.97	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1559	1417	1268					3438	1468	1719	3282	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	615	5	432	0	0	0	0	719	250	208	698	0
RTOR Reduction (vph)	0	26	155	0	0	0	0	0	166	0	0	0
Lane Group Flow (vph)	363	330	178	0	0	0	0	719	84	208	698	0
Heavy Vehicles (%)	10%	0%	21%	0%	0%	0%	0%	5%	10%	5%	10%	0%
Turn Type	Perm	NA	Perm					NA	Perm	Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4						2			
Actuated Green, G (s)	15.3	15.3	15.3					18.3	18.3	8.8	31.1	
Effective Green, g (s)	15.3	15.3	15.3					18.3	18.3	8.8	31.1	
Actuated g/C Ratio	0.28	0.28	0.28					0.34	0.34	0.16	0.57	
Clearance Time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	438	399	357					1157	494	278	1876	
v/s Ratio Prot								c0.21		c0.12	0.21	
v/s Ratio Perm	0.23	0.23	0.14						0.06			
v/c Ratio	0.83	0.83	0.50					0.62	0.17	0.75	0.37	
Uniform Delay, d1	18.3	18.3	16.3					15.1	12.7	21.7	6.3	
Progression Factor	1.00	1.00	1.00					1.00	1.00	1.00	1.00	
Incremental Delay, d2	12.2	13.2	1.1					2.5	0.7	10.5	0.6	
Delay (s)	30.5	31.5	17.4					17.7	13.5	32.2	6.9	
Level of Service	C	C	B					B	B	C	A	
Approach Delay (s)		26.7			0.0			16.6			12.7	
Approach LOS		C			A			B			B	

Intersection Summary			
HCM Average Control Delay	19.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	54.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	60.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	375	5	435	0	0	0	0	960	385	300	740	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Lane Util. Factor	0.95	0.91	0.95					0.95	1.00	1.00	0.95	
Frt	1.00	0.90	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.98	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1633	1372	1323					3438	1538	1719	3438	
Flt Permitted	0.95	0.98	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1633	1372	1323					3438	1538	1719	3438	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	399	5	463	0	0	0	0	1021	410	319	787	0
RTOR Reduction (vph)	0	108	148	0	0	0	0	0	269	0	0	0
Lane Group Flow (vph)	299	182	130	0	0	0	0	1021	141	319	787	0
Heavy Vehicles (%)	5%	5%	16%	0%	0%	0%	0%	5%	5%	5%	5%	0%
Turn Type	Perm	NA	Perm					NA	Perm	Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4						2			
Actuated Green, G (s)	14.5	14.5	14.5					20.1	20.1	12.0	36.1	
Effective Green, g (s)	14.5	14.5	14.5					20.1	20.1	12.0	36.1	
Actuated g/C Ratio	0.25	0.25	0.25					0.34	0.34	0.20	0.62	
Clearance Time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	404	339	327					1179	528	352	2118	
v/s Ratio Prot								c0.30		c0.19	0.23	
v/s Ratio Perm	c0.18	0.13	0.10						0.09			
v/c Ratio	0.74	0.54	0.40					0.87	0.27	0.91	0.37	
Uniform Delay, d1	20.3	19.1	18.4					18.0	13.9	22.8	5.6	
Progression Factor	1.00	1.00	1.00					1.00	1.00	1.00	1.00	
Incremental Delay, d2	7.1	1.6	0.8					8.6	1.2	25.8	0.5	
Delay (s)	27.4	20.8	19.2					26.6	15.2	48.5	6.1	
Level of Service	C	C	B					C	B	D	A	
Approach Delay (s)		22.6			0.0			23.3			18.3	
Approach LOS		C			A			C			B	

Intersection Summary			
HCM Average Control Delay	21.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	58.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	68.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

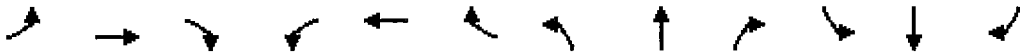
HCM Signalized Intersection Capacity Analysis
9: Irwindale Ave & EB 210 Fwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	510	5	760	0	0	0	0	975	215	190	595	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Lane Util. Factor	0.95	0.91	0.95					0.95	1.00	1.00	0.95	
Frt	1.00	0.88	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.99	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1559	1346	1370					3438	1538	1641	3282	
Flt Permitted	0.95	0.99	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1559	1346	1370					3438	1538	1641	3282	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	554	5	826	0	0	0	0	1060	234	207	647	0
RTOR Reduction (vph)	0	161	161	0	0	0	0	0	152	0	0	0
Lane Group Flow (vph)	482	296	285	0	0	0	0	1060	82	207	647	0
Heavy Vehicles (%)	10%	0%	12%	0%	0%	0%	0%	5%	5%	10%	10%	0%
Turn Type	Perm	NA	Perm					NA	Perm	Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4						2			
Actuated Green, G (s)	19.0	19.0	19.0					21.0	21.0	8.0	33.0	
Effective Green, g (s)	19.0	19.0	19.0					21.0	21.0	8.0	33.0	
Actuated g/C Ratio	0.32	0.32	0.32					0.35	0.35	0.13	0.55	
Clearance Time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	494	426	434					1203	538	219	1805	
v/s Ratio Prot								c0.31		c0.13	0.20	
v/s Ratio Perm	c0.31	0.22	0.21						0.05			
v/c Ratio	0.98	0.70	0.66					0.88	0.15	0.95	0.36	
Uniform Delay, d1	20.3	18.0	17.7					18.3	13.4	25.8	7.6	
Progression Factor	1.00	1.00	1.00					1.00	1.00	1.00	1.00	
Incremental Delay, d2	33.9	4.9	3.6					9.4	0.6	45.2	0.6	
Delay (s)	54.2	22.9	21.3					27.8	14.0	71.0	8.1	
Level of Service	D	C	C					C	B	E	A	
Approach Delay (s)		33.3			0.0			25.3			23.4	
Approach LOS		C			A			C			C	

Intersection Summary			
HCM Average Control Delay	27.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	69.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	645	5	450	0	0	0	0	750	260	220	730	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Lane Util. Factor	0.95	0.91	0.95					0.95	1.00	1.00	0.95	
Frt	1.00	0.96	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.97	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1559	1417	1268					3438	1468	1719	3282	
Flt Permitted	0.95	0.97	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1559	1417	1268					3438	1468	1719	3282	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	672	5	469	0	0	0	0	781	271	229	760	0
RTOR Reduction (vph)	0	25	133	0	0	0	0	0	182	0	0	0
Lane Group Flow (vph)	396	364	228	0	0	0	0	781	89	229	760	0
Heavy Vehicles (%)	10%	0%	21%	0%	0%	0%	0%	5%	10%	5%	10%	0%
Turn Type	Perm	NA	Perm					NA	Perm	Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4						2			
Actuated Green, G (s)	15.7	15.7	15.7					18.0	18.0	9.0	31.0	
Effective Green, g (s)	15.7	15.7	15.7					18.0	18.0	9.0	31.0	
Actuated g/C Ratio	0.29	0.29	0.29					0.33	0.33	0.16	0.57	
Clearance Time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	447	407	364					1131	483	283	1860	
v/s Ratio Prot								c0.23		c0.13	0.23	
v/s Ratio Perm	0.25	0.26	0.18						0.06			
v/c Ratio	0.89	0.89	0.63					0.69	0.18	0.81	0.41	
Uniform Delay, d1	18.6	18.7	17.0					15.9	13.1	22.0	6.7	
Progression Factor	1.00	1.00	1.00					1.00	1.00	1.00	1.00	
Incremental Delay, d2	18.6	21.3	3.4					3.5	0.8	15.5	0.7	
Delay (s)	37.2	40.0	20.3					19.4	13.9	37.6	7.3	
Level of Service	D	D	C					B	B	D	A	
Approach Delay (s)		32.8			0.0			18.0			14.3	
Approach LOS		C			A			B			B	

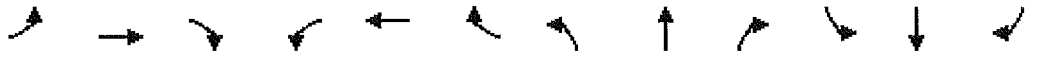
Intersection Summary			
HCM Average Control Delay	22.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	54.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	65.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	410	5	475	0	0	0	0	1045	420	325	805	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Lane Util. Factor	0.95	0.91	0.95					0.95	1.00	1.00	0.95	
Frt	1.00	0.90	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.98	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1633	1372	1323					3438	1538	1719	3438	
Flt Permitted	0.95	0.98	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1633	1372	1323					3438	1538	1719	3438	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	436	5	505	0	0	0	0	1112	447	346	856	0
RTOR Reduction (vph)	0	108	125	0	0	0	0	0	295	0	0	0
Lane Group Flow (vph)	327	208	178	0	0	0	0	1112	152	346	856	0
Heavy Vehicles (%)	5%	5%	16%	0%	0%	0%	0%	5%	5%	5%	5%	0%
Turn Type	Perm	NA	Perm					NA	Perm	Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4						2			
Actuated Green, G (s)	14.9	14.9	14.9					20.0	20.0	12.0	36.0	
Effective Green, g (s)	14.9	14.9	14.9					20.0	20.0	12.0	36.0	
Actuated g/C Ratio	0.25	0.25	0.25					0.34	0.34	0.20	0.61	
Clearance Time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	413	347	335					1167	522	350	2101	
v/s Ratio Prot								c0.32		c0.20	0.25	
v/s Ratio Perm	c0.20	0.15	0.13						0.10			
v/c Ratio	0.79	0.60	0.53					0.95	0.29	0.99	0.41	
Uniform Delay, d1	20.6	19.4	19.0					19.0	14.3	23.4	5.9	
Progression Factor	1.00	1.00	1.00					1.00	1.00	1.00	1.00	
Incremental Delay, d2	10.0	2.8	1.6					17.2	1.4	44.6	0.6	
Delay (s)	30.5	22.1	20.6					36.2	15.7	67.9	6.5	
Level of Service	C	C	C					D	B	E	A	
Approach Delay (s)		24.6			0.0			30.3			24.2	
Approach LOS		C			A			C			C	

Intersection Summary			
HCM Average Control Delay	26.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	58.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	73.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	520	5	645	0	0	0	0	895	195	175	545	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Lane Util. Factor	0.95	0.91	0.95					0.95	1.00	1.00	0.95	
Frt	1.00	0.90	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.99	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1559	1372	1370					3438	1538	1641	3282	
Flt Permitted	0.95	0.99	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1559	1372	1370					3438	1538	1641	3282	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	565	5	701	0	0	0	0	973	212	190	592	0
RTOR Reduction (vph)	0	137	184	0	0	0	0	0	138	0	0	0
Lane Group Flow (vph)	441	286	223	0	0	0	0	973	74	190	592	0
Heavy Vehicles (%)	10%	0%	12%	0%	0%	0%	0%	5%	5%	10%	10%	0%
Turn Type	Perm	NA	Perm					NA	Perm	Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4						2			
Actuated Green, G (s)	18.8	18.8	18.8					21.0	21.0	8.0	33.0	
Effective Green, g (s)	18.8	18.8	18.8					21.0	21.0	8.0	33.0	
Actuated g/C Ratio	0.31	0.31	0.31					0.35	0.35	0.13	0.55	
Clearance Time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	490	431	431					1207	540	220	1811	
v/s Ratio Prot								c0.28		c0.12	0.18	
v/s Ratio Perm	c0.28	0.21	0.16						0.05			
v/c Ratio	0.90	0.66	0.52					0.81	0.14	0.86	0.33	
Uniform Delay, d1	19.6	17.8	16.8					17.6	13.2	25.4	7.3	
Progression Factor	1.00	1.00	1.00					1.00	1.00	1.00	1.00	
Incremental Delay, d2	19.4	3.8	1.0					5.8	0.5	27.7	0.5	
Delay (s)	39.0	21.6	17.8					23.4	13.8	53.1	7.8	
Level of Service	D	C	B					C	B	D	A	
Approach Delay (s)		26.4			0.0			21.7			18.8	
Approach LOS		C			A			C			B	

Intersection Summary			
HCM Average Control Delay	22.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	59.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	65.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	640	5	365	0	0	0	0	690	240	200	670	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Lane Util. Factor	0.95	0.91	0.95					0.95	1.00	1.00	0.95	
Frt	1.00	0.98	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.96	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1559	1459	1268					3438	1468	1719	3282	
Flt Permitted	0.95	0.96	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1559	1459	1268					3438	1468	1719	3282	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	667	5	380	0	0	0	0	719	250	208	698	0
RTOR Reduction (vph)	0	11	144	0	0	0	0	0	170	0	0	0
Lane Group Flow (vph)	360	350	187	0	0	0	0	719	80	208	698	0
Heavy Vehicles (%)	10%	0%	21%	0%	0%	0%	0%	5%	10%	5%	10%	0%
Turn Type	Perm	NA	Perm					NA	Perm	Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4						2			
Actuated Green, G (s)	16.0	16.0	16.0					17.3	17.3	8.7	30.0	
Effective Green, g (s)	16.0	16.0	16.0					17.3	17.3	8.7	30.0	
Actuated g/C Ratio	0.30	0.30	0.30					0.32	0.32	0.16	0.56	
Clearance Time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	462	432	376					1101	470	277	1823	
v/s Ratio Prot								c0.21		c0.12	0.21	
v/s Ratio Perm	0.23	0.24	0.15						0.05			
v/c Ratio	0.78	0.81	0.50					0.65	0.17	0.75	0.38	
Uniform Delay, d1	17.4	17.6	15.7					15.8	13.2	21.6	6.8	
Progression Factor	1.00	1.00	1.00					1.00	1.00	1.00	1.00	
Incremental Delay, d2	8.1	11.0	1.0					3.0	0.8	10.9	0.6	
Delay (s)	25.5	28.6	16.7					18.8	14.0	32.5	7.4	
Level of Service	C	C	B					B	B	C	A	
Approach Delay (s)		23.8			0.0			17.5			13.2	
Approach LOS		C			A			B			B	

Intersection Summary			
HCM Average Control Delay	18.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	54.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	61.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	425	5	385	0	0	0	0	960	385	300	740	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Lane Util. Factor	0.95	0.91	0.95					0.95	1.00	1.00	0.95	
Frt	1.00	0.93	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.97	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1633	1426	1323					3438	1538	1719	3438	
Flt Permitted	0.95	0.97	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1633	1426	1323					3438	1538	1719	3438	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	452	5	410	0	0	0	0	1021	410	319	787	0
RTOR Reduction (vph)	0	52	148	0	0	0	0	0	269	0	0	0
Lane Group Flow (vph)	298	242	127	0	0	0	0	1021	141	319	787	0
Heavy Vehicles (%)	5%	5%	16%	0%	0%	0%	0%	5%	5%	5%	5%	0%
Turn Type	Perm	NA	Perm					NA	Perm	Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4						2			
Actuated Green, G (s)	14.5	14.5	14.5					20.1	20.1	12.0	36.1	
Effective Green, g (s)	14.5	14.5	14.5					20.1	20.1	12.0	36.1	
Actuated g/C Ratio	0.25	0.25	0.25					0.34	0.34	0.20	0.62	
Clearance Time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	404	353	327					1179	528	352	2118	
v/s Ratio Prot								c0.30		c0.19	0.23	
v/s Ratio Perm	c0.18	0.17	0.10						0.09			
v/c Ratio	0.74	0.69	0.39					0.87	0.27	0.91	0.37	
Uniform Delay, d1	20.3	20.0	18.4					18.0	13.9	22.8	5.6	
Progression Factor	1.00	1.00	1.00					1.00	1.00	1.00	1.00	
Incremental Delay, d2	6.9	5.4	0.8					8.6	1.2	25.8	0.5	
Delay (s)	27.2	25.4	19.1					26.6	15.2	48.5	6.1	
Level of Service	C	C	B					C	B	D	A	
Approach Delay (s)		24.0			0.0			23.3			18.3	
Approach LOS		C			A			C			B	

Intersection Summary			
HCM Average Control Delay	21.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	58.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	69.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	565	10	705	0	0	0	0	975	215	190	595	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Lane Util. Factor	0.95	0.91	0.95					0.95	1.00	1.00	0.95	
Frt	1.00	0.90	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.99	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1559	1374	1370					3438	1538	1641	3282	
Flt Permitted	0.95	0.99	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1559	1374	1370					3438	1538	1641	3282	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	614	11	766	0	0	0	0	1060	234	207	647	0
RTOR Reduction (vph)	0	119	152	0	0	0	0	0	154	0	0	0
Lane Group Flow (vph)	485	343	292	0	0	0	0	1060	80	207	647	0
Heavy Vehicles (%)	10%	0%	12%	0%	0%	0%	0%	5%	5%	10%	10%	0%
Turn Type	Perm	NA	Perm					NA	Perm	Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4						2			
Actuated Green, G (s)	23.8	23.8	23.8					24.0	24.0	10.0	38.0	
Effective Green, g (s)	23.8	23.8	23.8					24.0	24.0	10.0	38.0	
Actuated g/C Ratio	0.34	0.34	0.34					0.34	0.34	0.14	0.54	
Clearance Time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	532	468	467					1182	529	235	1787	
v/s Ratio Prot								c0.31		c0.13	0.20	
v/s Ratio Perm	c0.31	0.25	0.21						0.05			
v/c Ratio	0.91	0.73	0.63					0.90	0.15	0.88	0.36	
Uniform Delay, d1	22.0	20.2	19.3					21.7	15.9	29.3	9.0	
Progression Factor	1.00	1.00	1.00					1.00	1.00	1.00	1.00	
Incremental Delay, d2	19.9	5.9	2.6					10.7	0.6	29.5	0.6	
Delay (s)	41.9	26.1	21.9					32.5	16.5	58.8	9.6	
Level of Service	D	C	C					C	B	E	A	
Approach Delay (s)		30.3			0.0			29.6			21.5	
Approach LOS		C			A			C			C	

Intersection Summary			
HCM Average Control Delay	27.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	69.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	70.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	700	10	400	0	0	0	0	750	260	220	730	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Lane Util. Factor	0.95	0.91	0.95					0.95	1.00	1.00	0.95	
Frt	1.00	0.98	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.96	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1559	1458	1268					3438	1468	1719	3282	
Flt Permitted	0.95	0.96	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1559	1458	1268					3438	1468	1719	3282	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	729	10	417	0	0	0	0	781	271	229	760	0
RTOR Reduction (vph)	0	11	132	0	0	0	0	0	182	0	0	0
Lane Group Flow (vph)	401	385	227	0	0	0	0	781	89	229	760	0
Heavy Vehicles (%)	10%	0%	21%	0%	0%	0%	0%	5%	10%	5%	10%	0%
Turn Type	Perm	NA	Perm					NA	Perm	Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4						2			
Actuated Green, G (s)	16.0	16.0	16.0					18.0	18.0	9.0	31.0	
Effective Green, g (s)	16.0	16.0	16.0					18.0	18.0	9.0	31.0	
Actuated g/C Ratio	0.29	0.29	0.29					0.33	0.33	0.16	0.56	
Clearance Time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	454	424	369					1125	480	281	1850	
v/s Ratio Prot								c0.23		c0.13	0.23	
v/s Ratio Perm	0.26	0.26	0.18						0.06			
v/c Ratio	0.88	0.91	0.62					0.69	0.18	0.81	0.41	
Uniform Delay, d1	18.6	18.8	16.8					16.1	13.2	22.2	6.8	
Progression Factor	1.00	1.00	1.00					1.00	1.00	1.00	1.00	
Incremental Delay, d2	18.0	22.6	3.0					3.5	0.8	16.4	0.7	
Delay (s)	36.7	41.4	19.9					19.6	14.1	38.6	7.5	
Level of Service	D	D	B					B	B	D	A	
Approach Delay (s)		33.1			0.0			18.2			14.7	
Approach LOS		C			A			B			B	

Intersection Summary			
HCM Average Control Delay	22.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	55.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	66.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	465	10	420	0	0	0	0	1045	420	325	805	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Lane Util. Factor	0.95	0.91	0.95					0.95	1.00	1.00	0.95	
Frt	1.00	0.93	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.98	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1633	1427	1323					3438	1538	1719	3438	
Flt Permitted	0.95	0.98	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1633	1427	1323					3438	1538	1719	3438	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	495	11	447	0	0	0	0	1112	447	346	856	0
RTOR Reduction (vph)	0	44	153	0	0	0	0	0	278	0	0	0
Lane Group Flow (vph)	332	278	146	0	0	0	0	1112	169	346	856	0
Heavy Vehicles (%)	5%	5%	16%	0%	0%	0%	0%	5%	5%	5%	5%	0%
Turn Type	Perm	NA	Perm					NA	Perm	Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4						2			
Actuated Green, G (s)	15.7	15.7	15.7					26.4	26.4	15.6	46.0	
Effective Green, g (s)	15.7	15.7	15.7					26.4	26.4	15.6	46.0	
Actuated g/C Ratio	0.23	0.23	0.23					0.38	0.38	0.22	0.66	
Clearance Time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	368	321	298					1302	583	385	2269	
v/s Ratio Prot								c0.32		c0.20	0.25	
v/s Ratio Perm	c0.20	0.19	0.11						0.11			
v/c Ratio	0.90	0.87	0.49					0.85	0.29	0.90	0.38	
Uniform Delay, d1	26.3	26.0	23.5					19.9	15.1	26.3	5.4	
Progression Factor	1.00	1.00	1.00					1.00	1.00	1.00	1.00	
Incremental Delay, d2	24.4	20.8	1.3					7.3	1.3	22.8	0.5	
Delay (s)	50.6	46.8	24.8					27.2	16.4	49.1	5.8	
Level of Service	D	D	C					C	B	D	A	
Approach Delay (s)		41.2			0.0			24.1			18.3	
Approach LOS		D			A			C			B	

Intersection Summary			
HCM Average Control Delay	26.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	69.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	74.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

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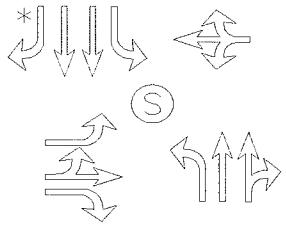
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	1 OF 6

E/W STREET : FIRST STREET
N/S STREET : IRWINDALE AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 10
ROUTE 2A, 3

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
FIRST STREET						
EB LEFT	80	40%		80	5	85
EB THRU	5	5%		5	5	10
EB RIGHT	20	35%		20	5	25
WB LEFT	5	5%		5	5	10
WB THRU	5	5%		5	5	10
WB RIGHT	10	10%		10	5	15
IRWINDALE AVE						
NB LEFT	45	5%		45	5	50
NB THRU	1000	10%	**50**	1050	95	1145
NB RIGHT	5	40%		5	5	10
SB LEFT	5	25%		5	5	10
SB THRU	1055	10%	**50**	1105	100	1205
SB RIGHT	125	20%		125	10	135
TOTALS	**2360**		**100**	**2460**	**250**	**2710**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	10-Sep-13	VV.110264.0000	2 OF 6

E/W STREET : FIRST STREET
N/S STREET : IRWINDALE AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 10
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
FIRST STREET						
EB LEFT	80	40%		80	5	85
EB THRU	5	5%		5	5	10
EB RIGHT	20	35%		20	5	25
WB LEFT	5	5%		5	5	10
WB THRU	5	5%		5	5	10
WB RIGHT	10	10%		10	5	15
IRWINDALE AVE						
NB LEFT	45	5%		45	5	50
NB THRU	1000	10%		1000	90	1090
NB RIGHT	5	40%		5	5	10
SB LEFT	5	25%		5	5	10
SB THRU	1055	10%	**50**	1105	100	1205
SB RIGHT	125	20%		125	10	135
TOTALS	**2360**		**50**	**2410**	**245**	**2655**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	3 OF 6

E/W STREET : FIRST STREET
N/S STREET : IRWINDALE AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 10
ROUTE 2A, 3

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
FIRST STREET						
EB LEFT	135	30%		135	10	145
EB THRU	10	5%		10	5	15
EB RIGHT	95	20%		95	10	105
WB LEFT	15	5%		15	5	20
WB THRU	5	5%		5	5	10
WB RIGHT	15	20%		15	5	20
IRWINDALE AVE						
NB LEFT	90	15%		90	10	100
NB THRU	975	10%	**50**	1025	90	1115
NB RIGHT	25	5%		25	5	30
SB LEFT	20	5%		20	5	25
SB THRU	750	15%	**50**	800	70	870
SB RIGHT	170	35%		170	15	185
TOTALS	**2305**		**100**	**2405**	**235**	**2640**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	10-Sep-13	VV.110264.0000	4 OF 6

E/W STREET : FIRST STREET
N/S STREET : IRWINDALE AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 10
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
FIRST STREET						
EB LEFT	135	30%		135	10	145
EB THRU	10	5%		10	5	15
EB RIGHT	95	20%		95	10	105
WB LEFT	15	5%		15	5	20
WB THRU	5	5%		5	5	10
WB RIGHT	15	20%		15	5	20
IRWINDALE AVE						
NB LEFT	90	15%		90	10	100
NB THRU	975	10%		975	90	1065
NB RIGHT	25	5%		25	0	25
SB LEFT	20	5%		20	0	20
SB THRU	750	15%	**50**	800	70	870
SB RIGHT	170	35%		170	15	185
TOTALS	**2305**		**50**	**2355**	**225**	**2580**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	10-Sep-13	VV.110264.0000	5 OF 6

E/W STREET : FIRST STREET
N/S STREET : IRWINDALE AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 10
ROUTE 2A, 3

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
FIRST STREET						
EB LEFT	190	10%		190	15	205
EB THRU	5	5%		5	5	10
EB RIGHT	35	15%		35	5	40
WB LEFT	15	5%		15	5	20
WB THRU	5	5%		5	5	10
WB RIGHT	15	15%		15	5	20
IRWINDALE AVE						
NB LEFT	30	5%		30	5	35
NB THRU	1305	5%	**50**	1355	120	1475
NB RIGHT	15	40%		15	5	20
SB LEFT	15	10%		15	5	20
SB THRU	970	5%	**50**	1020	90	1110
SB RIGHT	40	40%		40	5	45
TOTALS	**2640**		**100**	**2740**	**270**	**3010**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	10-Sep-13	VV.110264.0000	6 OF 6

E/W STREET : FIRST STREET
N/S STREET : IRWINDALE AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 10
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
FIRST STREET						
EB LEFT	190	10%		190	15	205
EB THRU	5	5%		5	5	10
EB RIGHT	35	15%		35	5	40
WB LEFT	15	5%		15	5	20
WB THRU	5	5%		5	5	10
WB RIGHT	15	15%		15	5	20
IRWINDALE AVE						
NB LEFT	30	5%		30	5	35
NB THRU	1305	5%		1305	115	1420
NB RIGHT	15	40%		15	5	20
SB LEFT	15	10%		15	5	20
SB THRU	970	5%	**50**	1020	90	1110
SB RIGHT	40	40%		40	5	45
TOTALS	**2640**		**50**	**2690**	**265**	**2955**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	1 OF 6

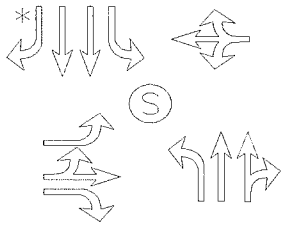
E/W STREET : FIRST STREET
N/S STREET : IRWINDALE AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 10

ROUTE 2A, 3

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
FIRST STREET						
EB LEFT	80	40%		80	5	85
EB THRU	5	5%		5	5	10
EB RIGHT	20	35%		20	5	25
WB LEFT	5	5%		5	5	10
WB THRU	5	5%		5	5	10
WB RIGHT	10	10%		10	5	15
IRWINDALE AVE						
NB LEFT	45	5%		45	5	50
NB THRU	1000	10%	**50**	1050	95	1145
NB RIGHT	5	40%		5	5	10
SB LEFT	5	25%		5	5	10
SB THRU	1055	10%	**50**	1105	100	1205
SB RIGHT	125	20%		125	10	135
TOTALS	**2360**		**100**	**2460**	**250**	**2710**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	10-Sep-13	VV.110264.0000	2 OF 6

E/W STREET : FIRST STREET
N/S STREET : IRWINDALE AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 10
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
FIRST STREET						
EB LEFT	80	40%		80	5	85
EB THRU	5	5%		5	5	10
EB RIGHT	20	35%		20	5	25
WB LEFT	5	5%		5	5	10
WB THRU	5	5%		5	5	10
WB RIGHT	10	10%		10	5	15
IRWINDALE AVE						
NB LEFT	45	5%		45	5	50
NB THRU	1000	10%		1000	90	1090
NB RIGHT	5	40%		5	5	10
SB LEFT	5	25%		5	5	10
SB THRU	1055	10%	**50**	1105	100	1205
SB RIGHT	125	20%		125	10	135
TOTALS	**2360**		**50**	**2410**	**245**	**2655**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	3 OF 6

E/W STREET : FIRST STREET
N/S STREET : IRWINDALE AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 10
ROUTE 2A, 3

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
FIRST STREET						
EB LEFT	135	30%		135	10	145
EB THRU	10	5%		10	5	15
EB RIGHT	95	20%		95	10	105
WB LEFT	15	5%		15	5	20
WB THRU	5	5%		5	5	10
WB RIGHT	15	20%		15	5	20
IRWINDALE AVE						
NB LEFT	90	15%		90	10	100
NB THRU	975	10%	**50**	1025	90	1115
NB RIGHT	25	5%		25	5	30
SB LEFT	20	5%		20	5	25
SB THRU	750	15%	**50**	800	70	870
SB RIGHT	170	35%		170	15	185
TOTALS	**2305**		**100**	**2405**	**235**	**2640**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	10-Sep-13	VV.110264.0000	4 OF 6

E/W STREET : FIRST STREET
N/S STREET : IRWINDALE AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 10
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
FIRST STREET						
EB LEFT	135	30%		135	10	145
EB THRU	10	5%		10	5	15
EB RIGHT	95	20%		95	10	105
WB LEFT	15	5%		15	5	20
WB THRU	5	5%		5	5	10
WB RIGHT	15	20%		15	5	20
IRWINDALE AVE						
NB LEFT	90	15%		90	10	100
NB THRU	975	10%		975	90	1065
NB RIGHT	25	5%		25	0	25
SB LEFT	20	5%		20	0	20
SB THRU	750	15%	**50**	800	70	870
SB RIGHT	170	35%		170	15	185
TOTALS	**2305**		**50**	**2355**	**225**	**2580**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	10-Sep-13	VV.110264.0000	5 OF 6

E/W STREET : FIRST STREET
N/S STREET : IRWINDALE AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 10
ROUTE 2A, 3

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
FIRST STREET						
EB LEFT	190	10%		190	15	205
EB THRU	5	5%		5	5	10
EB RIGHT	35	15%		35	5	40
WB LEFT	15	5%		15	5	20
WB THRU	5	5%		5	5	10
WB RIGHT	15	15%		15	5	20
IRWINDALE AVE						
NB LEFT	30	5%		30	5	35
NB THRU	1305	5%	**50**	1355	120	1475
NB RIGHT	15	40%		15	5	20
SB LEFT	15	10%		15	5	20
SB THRU	970	5%	**50**	1020	90	1110
SB RIGHT	40	40%		40	5	45
TOTALS	**2640**		**100**	**2740**	**270**	**3010**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	10-Sep-13	VV.110264.0000	6 OF 6

E/W STREET : FIRST STREET
N/S STREET : IRWINDALE AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 10
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
FIRST STREET						
EB LEFT	190	10%		190	15	205
EB THRU	5	5%		5	5	10
EB RIGHT	35	15%		35	5	40
WB LEFT	15	5%		15	5	20
WB THRU	5	5%		5	5	10
WB RIGHT	15	15%		15	5	20
IRWINDALE AVE						
NB LEFT	30	5%		30	5	35
NB THRU	1305	5%		1305	115	1420
NB RIGHT	15	40%		15	5	20
SB LEFT	15	10%		15	5	20
SB THRU	970	5%	**50**	1020	90	1110
SB RIGHT	40	40%		40	5	45
TOTALS	**2640**		**50**	**2690**	**265**	**2955**

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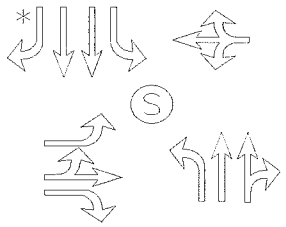
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	1 OF 6

E/W STREET : FIRST STREET
N/S STREET : IRWINDALE AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 10
ROUTE 2A, 3

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
FIRST STREET								
EB LEFT	48	30	90	140	**0**	140	15	155
EB THRU	0	0	0	5	**0**	5	5	10
EB RIGHT	12	6	18	30	**0**	30	5	35
WB LEFT	2	0	0	5	**0**	5	5	10
WB THRU	0	0	0	5	**0**	5	5	10
WB RIGHT	8	1	3	10	**0**	10	5	15
IRWINDALE AVE								
NB LEFT	41	3	9	50	**0**	50	5	55
NB THRU	893	106	318	1210	**150**	1360	120	1480
NB RIGHT	3	2	6	10	**0**	10	5	15
SB LEFT	3	1	3	5	**0**	5	5	10
SB THRU	974	81	243	1215	**150**	1365	125	1490
SB RIGHT	100	24	72	170	**0**	170	15	185
TOTALS	**2084**				**300**	**3155**	**315**	**3470**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	2 OF 6

E/W STREET : FIRST STREET
N/S STREET : IRWINDALE AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 10
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
FIRST STREET								
EB LEFT	48	30	90	140	**0**	140	15	155
EB THRU	0	0	0	5	**0**	5	5	10
EB RIGHT	12	6	18	30	**0**	30	5	35
WB LEFT	2	0	0	5	**0**	5	5	10
WB THRU	0	0	0	5	**0**	5	5	10
WB RIGHT	8	1	3	10	**0**	10	5	15
IRWINDALE AVE								
NB LEFT	41	3	9	50	**0**	50	5	55
NB THRU	893	106	318	1210	**0**	1210	110	1320
NB RIGHT	3	2	6	10	**0**	10	5	15
SB LEFT	3	1	3	5	**0**	5	5	10
SB THRU	974	81	243	1215	**150**	1365	125	1490
SB RIGHT	100	24	72	170	**0**	170	15	185
TOTALS	**2084**				**150**	**3005**	**305**	**3310**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	3 OF 6

E/W STREET : FIRST STREET
N/S STREET : IRWINDALE AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 10
ROUTE 2A, 3

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
FIRST STREET								
EB LEFT	94	43	129	225	**0**	225	20	245
EB THRU	10	0	0	10	**0**	10	5	15
EB RIGHT	77	18	54	130	**0**	130	10	140
WB LEFT	14	0	0	15	**0**	15	5	20
WB THRU	3	0	0	5	**0**	5	5	10
WB RIGHT	13	3	9	20	**0**	20	5	25
IRWINDALE AVE								
NB LEFT	78	14	42	120	**0**	120	10	130
NB THRU	875	102	306	1180	**150**	1330	120	1450
NB RIGHT	24	0	0	25	**0**	25	5	30
SB LEFT	21	1	3	25	**0**	25	5	30
SB THRU	656	95	285	940	**150**	1090	100	1190
SB RIGHT	111	57	171	280	**0**	280	25	305
TOTALS	**1976**				**300**	**3275**	**315**	**3590**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	4 OF 6

E/W STREET : FIRST STREET
N/S STREET : IRWINDALE AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 10
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
FIRST STREET								
EB LEFT	94	43	129	225	**0**	225	20	245
EB THRU	10	0	0	10	**0**	10	5	15
EB RIGHT	77	18	54	130	**0**	130	10	140
WB LEFT	14	0	0	15	**0**	15	5	20
WB THRU	3	0	0	5	**0**	5	5	10
WB RIGHT	13	3	9	20	**0**	20	5	25
IRWINDALE AVE								
NB LEFT	78	14	42	120	**0**	120	10	130
NB THRU	875	102	306	1180	**0**	1180	105	1285
NB RIGHT	24	0	0	25	**0**	25	0	25
SB LEFT	21	1	3	25	**0**	25	0	25
SB THRU	656	95	285	940	**150**	1090	100	1190
SB RIGHT	111	57	171	280	**0**	280	25	305
TOTALS	**1976**				**150**	**3125**	**290**	**3415**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	5 OF 6

E/W STREET : FIRST STREET
N/S STREET : IRWINDALE AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 10
ROUTE 2A, 3

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
FIRST STREET								
EB LEFT	168	22	66	235	**0**	235	20	255
EB THRU	0	0	0	5	**0**	5	5	10
EB RIGHT	29	5	15	45	**0**	45	5	50
WB LEFT	15	0	0	15	**0**	15	5	20
WB THRU	0	0	0	5	**0**	5	5	10
WB RIGHT	12	2	6	20	**0**	20	5	25
IRWINDALE AVE								
NB LEFT	28	2	6	35	**0**	35	5	40
NB THRU	1266	41	123	1390	**150**	1540	140	1680
NB RIGHT	9	6	18	25	**0**	25	5	30
SB LEFT	15	2	6	20	**0**	20	5	25
SB THRU	918	53	159	1075	**150**	1225	110	1335
SB RIGHT	26	16	48	75	**0**	75	5	80
TOTALS	**2486**				**300**	**3245**	**315**	**3560**

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TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	6 OF 6

E/W STREET : FIRST STREET
N/S STREET : IRWINDALE AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 10
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
FIRST STREET								
EB LEFT	168	22	66	235	0	235	20	255
EB THRU	0	0	0	5	0	5	5	10
EB RIGHT	29	5	15	45	0	45	5	50
WB LEFT	15	0	0	15	0	15	5	20
WB THRU	0	0	0	5	0	5	5	10
WB RIGHT	12	2	6	20	0	20	5	25
IRWINDALE AVE								
NB LEFT	28	2	6	35	0	35	5	40
NB THRU	1266	41	123	1390	0	1390	125	1515
NB RIGHT	9	6	18	25	0	25	5	30
SB LEFT	15	2	6	20	0	20	5	25
SB THRU	918	53	159	1075	150	1225	110	1335
SB RIGHT	26	16	48	75	0	75	5	80
TOTALS	**2486**				**150**	**3095**	**300**	**3395**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: IRWINDALE
EAST-WEST STREET: 1ST
JURISDICTION: IRWINDALE

DATE: 06-01-11

PEAK HOUR: 07:30AM

NORTH LEG SB

TOTAL: 1,183

TT = 105

TT% = 105/1183 = 8.88% ≈ 9%

Rt	Thru	Lt	
124 (125)	1055	4 (5)	Total
34	229	0	1st
34	277	1	2nd
37	243	3	3rd
19	306	0	4th

TT = 1

TT% = 1/11 = 9.09% ≈ 9%

EAST LEG TOTAL: WB 11

	1st	2nd	3rd	4th	Total
Rt	2	1	6	0	10 9
Thru	0	0	0	0	5
Lt	0	0	1	1	5 2

Total	1st	2nd	3rd	4th	
78 (80)	30	17	19	12	Lt
5	0	0	0	0	Thru
18 (20)	4	7	3	4	Rt

WEST LEG TOTAL: EB 96

TT = 36

TT% = 36/96 = 37.5% ≈ 38%

PEAK HOUR FACTORS

NORTH LEG = 0.91
SOUTH LEG = 0.88
EAST LEG = 0.39
WEST LEG = 0.71

ALL LEGS = 0.92

	Lt	Thru	Rt
1st	8	268	1
2nd	15	279	3
3rd	10	231	0
4th	11	221	1
Total	44 (45)	999 (1000)	5

TT = 111

TTT% = 111/1048 = 10.6% ≈ 11%

TOTAL: 1,048

SOUTH LEG NB

HOUR TOTAL: 2,338

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: IRWINDALE

EAST-WEST STREET: 1ST

TIME: 07:00AM-08:00AM DATE: 06-01-11

NORTH LEG

Rt	Thru	Lt	
139	874	1	Total
35	161	0	1st
36	207	0	2nd
34	229	0	3rd
34	277	1	4th

	1st	2nd	3rd	4th	Total
Rt	1	0	2	1	4
Thru	0	0	0	0	0
Lt	0	0	0	0	0

Total	1st	2nd	3rd	4th	
79	17	15	30	17	Lt
0	0	0	0	0	Thru
21	5	5	4	7	Rt

	Lt	Thru	Rt
1st	5	263	0
2nd	5	288	0
3rd	8	268	1
4th	15	279	3
Total	33	1098	4

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: IRWINDALE

EAST-WEST STREET: 1ST

TIME: 08:00AM-09:00AM DATE: 06-01-11

NORTH LEG

Rt	Thru	Lt	
119	966	6	Total
37	243	3	1st
19	306	0	2nd
27	223	1	3rd
36	194	2	4th

	1st	2nd	3rd	4th	Total
Rt	6	0	0	0	6
Thru	0	0	0	0	0
Lt	1	1	2	0	4

Total	1st	2nd	3rd	4th	
55	19	12	13	11	Lt
0	0	0	0	0	Thru
16	3	4	5	4	Rt

	Lt	Thru	Rt
1st	10	231	0
2nd	11	221	1
3rd	13	213	0
4th	16	241	1
Total	50	906	2

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : IRWINDALE — IRWINDALE

EAST-WEST STREET : 1ST — 06-01-11

BEGINNING TIME : 07:00AM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
				SB NORTH LEG								
22	149	0	3	3	0	1	1	0	9	8	0	196
33	192	0	2	9	0	0	1	0	1	5	0	243
31	210	0	3	5	0	0	0	0	0	14	0	263
26	258	0	1	6	1	1	2	0	6	11	0	312
29	219	3	2	5	0	2	2	0	4	17	0	283
14	287	0	0	7	0	3	2	0	2	10	0	325
23	204	1	1	7 (29)	0	0	2 (12)	0	3	10 (64)	0	251
26	166	2	1	11	0	0	2	0	9	15	0	232
						TT=29+12+64=105						
204	1685	6	13	53	1	7	12	0	34	90	0	2105
						NB SOUTH LEG						
0	247	5	0	9	0	0	1	0	0	6	0	268
0	265	5	0	10	0	0	2	0	0	11	0	293
1	239	8	0	9	0	0	7	0	0	13	0	277
2	254	13	0	9	2	1	2	0	0	14	0	297
0	209	10	0	4	0	0	1	0	0	17	0	241
0	191	10	1	11	1	0	4	0	0	15	0	233
0	192	10	0	6 (37)	1	0	5 (15)	1	0	10 (59)	1	226
1	220	15	0	8	0	0	5	0	0	8	1	258
						TT=37+15+59=111						
4	1817	76	1	66	4	1	27	1	0	94	2	2093
						WB EAST LEG						
1	0	0	0	0	0	0	0	0	0	0	0	1
0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	2
0	0	0	1	0	0	0	0	0	0	0	0	1
6	0	1	0	0	0	0	0	0	0	0	0	7
0	0	1	0	0	0	0	0	0	0	0	0	1
0	0	2	0	0 (1)	0	0	0 (0)	0	0	0 (0)	0	2
0	0	0	0	0	0	0	0	0	0	0	0	0
						TT=1+0+0=1						
9	0	4	1	0	0	0	0	0	0	0	0	14
						EB WEST LEG						
3	0	9	1	0	4	0	0	2	1	0	2	22
3	0	10	2	0	2	0	0	0	0	0	3	20
3	0	19	0	0	5	0	0	0	1	0	6	34
5	0	10	0	0	1	0	0	0	2	0	6	24
1	0	10	2	0	3	0	0	0	0	0	6	22
3	0	9	0	0	0	0	0	0	1	0	3	16
0	0	6	2	0 (11)	2	0	0 (0)	1	3	0 (25)	4	18
3	0	5	1	0	3	0	0	0	0	0	3	15
						TT=11+0+25=36						
21	0	78	8	0	20	0	0	3	8	0	33	171

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: IRWINDALE
EAST-WEST STREET: 1ST
JURISDICTION: IRWINDALE

DATE: 06-01-11

PEAK HOUR: 12:00PM

NORTH LEG (SB)

TOTAL: 941

TT = 153

TT% = $\frac{153}{941}$ = 16.26%
≈ 16%

168 170	751 730	22 20	Total
46	155	7	1st
50	163	3	2nd
46	188	12	3rd
26	245	0	4th
Rt	Thru	Lt	

TT = 3

TT% = $\frac{3}{33}$ = 9.09%
≈ 9%

EAST LEG TOTAL: (WB) 33

Rt	3	3	9	1	IS 16
Thru	0	0	3	0	5 3
Lt	3	3	8	0	IS 14
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
137 135	40	43	22	32	Lt
10	0	0	10	0	Thru
95	14	38	39	4	Rt

WEST LEG TOTAL: (EB) 242

TT = 61

TT% = $\frac{61}{242}$ = 25.2%
≈ 25%

PEAK HOUR FACTORS

NORTH LEG = 0.87
SOUTH LEG = 0.86
EAST LEG = 0.41
WEST LEG = 0.75

ALL LEGS = 0.93

	Lt	Thru	Rt	
1st	8	262	1	
2nd	40	267	12	
3rd	33	179	11	
4th	11	269	0	
Total	92 90	977 975	24 25	TOTAL: 1,093

SOUTH LEG (NB)

TT = 116

TT% = $\frac{116}{1093}$ = 10.61%
≈ 11%

HOUR TOTAL: 2,309

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: IRWINDALE

EAST-WEST STREET: 1ST

TIME: 12:00PM-01:00PM DATE: 06-01-11

NORTH LEG

Rt	Thru	Lt	
168	751	22	Total
46	155	7	1st
50	163	3	2nd
46	188	12	3rd
26	245	0	4th

	1st	2nd	3rd	4th	Total
Rt	3	3	9	1	16
Thru	0	0	3	0	3
Lt	3	3	8	0	14

Total	1st	2nd	3rd	4th	
137	40	43	22	32	Lt
10	0	0	10	0	Thru
95	14	38	39	4	Rt

	Lt	Thru	Rt
1st	8	262	1
2nd	40	267	12
3rd	33	179	11
4th	11	269	0
Total	92	977	24

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: IRWINDALE

EAST-WEST STREET: 1ST

TIME: 01:00PM-02:00PM DATE: 06-01-11

NORTH LEG

115	866	2	Total
26	227	0	1st
31	207	0	2nd
24	248	2	3rd
34	184	0	4th
Rt	Thru	Lt	

	1st	2nd	3rd	4th	Total
Rt	0	0	1	2	3
Thru	0	1	0	0	1
Lt	1	0	3	1	5

Total	1st	2nd	3rd	4th	
101	29	29	23	20	Lt
4	1	2	0	1	Thru
35	5	11	10	9	Rt

	Lt	Thru	Rt
1st	11	197	1
2nd	14	198	0
3rd	22	212	0
4th	16	234	5
Total	63	841	6

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : IRWINDALE — IRWINDALE

EAST-WEST STREET : 1ST — 06-01-11

BEGINNING TIME : 12:00PM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
						SB NORTH LEG						
28	131	7	4	10	0	0	3	0	14	11	0	208
40	140	2	5	5	0	2	4	0	3	14	1	216
32	165	12	5	9	0	3	5	0	6	9	0	246
11	220	0	5	7	0	3	8	0	7	10	0	271
14	203	0	3	4	50 0	3	7	28 0	6	13	75 0	253
15	184	0	4	7	0	2	3	0	10	13	0	238
14	227	2	0	8	0	4	3	0	6	10	0	274
27	160	0	0	11	0	2	4	0	5	9	0	218
						TT=50+28+75=153						
181	1430	23	26	61	0	19	37	0	57	89	1	1924
						NB SOUTH LEG						
1	236	6	0	6	0	0	6	0	0	14	2	271
12	243	35	0	9	2	0	6	0	0	9	3	319
11	150	28	0	13	0	0	7	0	0	9	5	223
0	246	9	0	7	1	0	4	0	0	12	1	280
1	174	7	0	7	38 0	0	3	23 0	0	13	55 4	209
0	172	8	0	9	2	0	4	0	0	13	4	212
0	190	20	0	7	1	0	6	0	0	9	1	234
4	208	12	0	11	2	0	6	0	1	9	2	255
						TT=38+23+55=116						
29	1619	125	0	69	8	0	42	0	1	88	22	2003
						WB EAST LEG						
3	0	3	0	0	0	0	0	0	0	0	0	6
1	0	3	2	0	0	0	0	0	0	0	0	6
9	3	8	0	0	0	0	0	0	0	0	0	20
0	0	0	1	0	0	0	0	0	0	0	0	1
0	0	1	0	0	3 0	0	0	0 0	0	0	0 0	1
0	1	0	0	0	0	0	0	0	0	0	0	1
0	0	3	1	0	0	0	0	0	0	0	0	4
0	0	1	2	0	0	0	0	0	0	0	0	3
						TT=3+0+0=3						
13	4	19	6	0	0	0	0	0	0	0	0	42
						EB WEST LEG						
11	0	29	1	0	4	0	0	2	2	0	5	54
31	0	34	2	0	2	2	0	1	3	0	6	81
34	10	9	1	0	2	2	0	4	2	0	7	71
1	0	22	2	0	4	0	0	2	1	0	4	36
1	1	12	1	0	18 6	0	0	13 3	3	0	30 8	35
6	2	17	3	0	3	0	0	2	2	0	7	42
7	0	13	2	0	1	0	0	1	1	0	8	33
6	1	10	3	0	5	0	0	2	0	0	3	30
						TT=18+13+30=61						
97	14	146	15	0	27	4	0	17	14	0	48	382

Prepared by Newport Traffic Studies

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	135	10	95	15	5	15	90	975	25	20	750	170
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95			1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.86			0.94		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00			0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1444	2497			1607		1626	3240		1556	3112	1392
Flt Permitted	0.95	1.00			0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1444	2497			1607		1626	3240		1556	3112	1392
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	145	11	102	16	5	16	97	1048	27	22	806	183
RTOR Reduction (vph)	0	82	0	0	13	0	0	2	0	0	0	113
Lane Group Flow (vph)	145	31	0	0	24	0	97	1073	0	22	806	70
Heavy Vehicles (%)	25%	25%	25%	9%	9%	9%	11%	11%	11%	16%	16%	16%
Turn Type	Split			Split			Prot			Prot		Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases												6
Actuated Green, G (s)	16.0	16.0			16.0		7.0	28.0		4.0	25.0	25.0
Effective Green, g (s)	16.0	16.0			16.0		7.0	28.0		4.0	25.0	25.0
Actuated g/C Ratio	0.20	0.20			0.20		0.09	0.35		0.05	0.31	0.31
Clearance Time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Lane Grp Cap (vph)	289	499			321		142	1134		78	973	435
v/s Ratio Prot	c0.10	0.01			c0.02		c0.06	c0.33		0.01	0.26	
v/s Ratio Perm												0.05
v/c Ratio	0.50	0.06			0.08		0.68	0.95		0.28	0.83	0.16
Uniform Delay, d1	28.5	25.9			26.0		35.4	25.3		36.6	25.5	19.9
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	6.1	0.2			0.5		23.5	16.6		8.8	8.1	0.8
Delay (s)	34.6	26.2			26.4		58.9	41.8		45.4	33.6	20.7
Level of Service	C	C			C		E	D		D	C	C
Approach Delay (s)		30.9			26.4			43.3			31.5	
Approach LOS		C			C			D			C	

Intersection Summary			
HCM Average Control Delay	36.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	55.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: IRWINDALE
EAST-WEST STREET: 1ST
JURISDICTION: IRWINDALE

DATE: 06-01-11

PEAK HOUR: 04:30PM

NORTH LEG (SB)

TOTAL: 1,030

TT = 70

TT% = 70/1030 = 6.80% ≈ 7%

Rt	Thru	Lt	
40 42	930 971	15 17	Total
19	219	4	1st
14	211	1	2nd
7	255	10	3rd
2	286	2	4th

TT = 2

TT% = 2/29 = 6.9% ≈ 7%

EAST LEG TOTAL: (WB) 29

	1st	2nd	3rd	4th	Total
Rt	2	2	5	5	15 14
Thru	0	0	0	0	5
Lt	3	4	4	4	15

Total	1st	2nd	3rd	4th	
190	50	34	62	44	Lt
5	0	0	0	0	Thru
35 34	7	11	15	1	Rt

WEST LEG TOTAL: (EB) 224

TT = 27

TT% = 27/224 = 12.05% ≈ 12%

PEAK HOUR FACTORS

NORTH LEG = 0.89
SOUTH LEG = 0.91
EAST LEG = 0.81
WEST LEG = 0.73

ALL LEGS = 0.90

	Lt	Thru	Rt
1st	10	337	7
2nd	8	285	4
3rd	3	365	3
4th	9	320	1
Total	30	1307 1305	15

TT = 49

TT% = 49/1352 = 3.62% ≈ 4%

TOTAL: 1,352

SOUTH LEG (NB)

HOUR TOTAL: 2,635

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INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: IRWINDALE

EAST-WEST STREET: 1ST

TIME: 04:00PM-05:00PM DATE: 06-01-11

NORTH LEG

Rt	Thru	Lt	
83	863	39	Total
16	263	5	1st
34	170	29	2nd
19	219	4	3rd
14	211	1	4th

	1st	2nd	3rd	4th	Total
Rt	3	4	2	2	11
Thru	1	0	0	0	1
Lt	1	3	3	4	11

Total	1st	2nd	3rd	4th	
196	53	59	50	34	Lt
0	0	0	0	0	Thru
44	11	15	7	11	Rt

	Lt	Thru	Rt
1st	9	253	7
2nd	27	249	2
3rd	10	337	7
4th	8	285	4
Total	54	1124	20

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: IRWINDALE

EAST-WEST STREET: 1ST

TIME: 05:00PM-06:00PM DATE: 06-01-11

NORTH LEG

Rt	Thru	Lt	
19	1081	24	Total
7	255	10	1st
2	286	2	2nd
5	266	7	3rd
5	274	5	4th

	1st	2nd	3rd	4th	Total
Rt	5	5	6	1	17
Thru	0	0	0	1	1
Lt	4	4	5	12	25

Total	1st	2nd	3rd	4th	
188	62	44	55	27	Lt
0	0	0	0	0	Thru
22	15	1	0	6	Rt

PEDS BY LEG

North	South	East	West	
0	0	0	0	1st
0	0	0	0	2nd
0	0	0	0	3rd
0	0	0	0	4th
59				Total

Lt	Thru	Rt
3	365	3
9	320	1
12	233	1
2	224	2
26	1142	7

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : IRWINDALE — IRWINDALE

EAST-WEST STREET : 1ST — 06-01-11

BEGINNING TIME : 04:00PM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
				SB NORTH LEG								
7	246	4	2	12	0	3	4	0	4	1	1	284
24	161	29	2	5	0	5	0	0	3	4	0	233
12	206	2	1	4	1	3	4	0	3	5	1	242
11	191	1	1	10	0	2	4	0	0	6	0	226
3	245	10	0	4	0	0	0	0	4	6	0	272
0	276	2	1	4	0	0	2	0	1	4	0	290
0	262	7	2	3 26	0	0	1 15	0	3	0 30	0	278
0	264	5	2	7	0	0	2	0	3	1	0	284
						TT=26+15+30=70						
57	1851	60	11	49	1	13	17	0	21	27	2	2109
				NB SOUTH LEG								
7	235	5	0	5	1	0	5	3	0	8	0	269
1	239	24	0	3	1	0	5	2	1	2	0	278
4	317	8	0	11	1	0	4	0	3	5	1	354
3	275	8	0	7	0	0	1	0	1	2	0	297
1	359	3	0	3	0	0	0	0	2	3	0	371
1	315	9	0	5	0	0	0	0	0	0	0	330
0	227	11	0	2 27	0	0	1 5	0	1	3 17	1	246
2	214	0	0	6	0	0	1	0	0	3	2	228
						TT=27+5+17=49						
19	2181	68	0	42	3	0	17	5	8	26	4	2373
				WB EAST LEG								
3	1	1	0	0	0	0	0	0	0	0	0	5
4	0	3	0	0	0	0	0	0	0	0	0	7
1	0	3	1	0	0	0	0	0	0	0	0	5
2	0	4	0	0	0	0	0	0	0	0	0	6
5	0	4	0	0	0	0	0	0	0	0	0	9
4	0	4	0	0	0	1	0	0	0	0	0	9
6	0	5	0	0 1	0	0	0 1	0	0	0 0	0	11
1	1	12	0	0	0	0	0	0	0	0	0	14
						TT=1+1+0=2						
26	2	36	1	0	0	1	0	0	0	0	0	66
				EB WEST LEG								
7	0	49	2	0	1	1	0	0	1	0	3	64
12	0	54	1	0	2	0	0	0	2	0	3	74
4	0	43	3	0	2	0	0	0	0	0	5	57
11	0	25	0	0	2	0	0	1	0	0	6	45
14	0	59	0	0	1	1	0	0	0	0	2	77
0	0	41	1	0	0	0	0	0	0	0	3	45
0	0	48	0	0 9	1	0	0 2	1	0	0 16	5	55
6	0	20	0	0	3	0	0	1	0	0	3	33
						TT=9+2+16=27						
54	0	339	7	0	12	2	0	3	3	0	30	450

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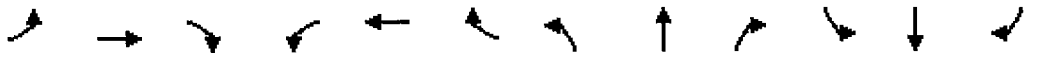
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	80	5	20	5	5	10	45	1000	5	5	1055	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95			1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.88			0.93		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00			0.99		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1289	2466			1621		1719	3275		1444	3282	1346
Flt Permitted	0.95	1.00			0.99		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1289	2466			1621		1719	3275		1444	3282	1346
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	87	5	22	5	5	11	49	1087	5	5	1147	136
RTOR Reduction (vph)	0	19	0	0	11	0	0	0	0	0	0	38
Lane Group Flow (vph)	87	8	0	0	10	0	49	1092	0	5	1147	98
Heavy Vehicles (%)	40%	0%	35%	0%	10%	10%	5%	10%	40%	25%	10%	20%
Turn Type	Split	NA		Split	NA		Prot	NA		Prot	NA	Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases												6
Actuated Green, G (s)	7.8	7.8			1.2		2.3	38.3		0.6	36.6	36.6
Effective Green, g (s)	7.8	7.8			1.2		2.3	38.3		0.6	36.6	36.6
Actuated g/C Ratio	0.12	0.12			0.02		0.04	0.60		0.01	0.57	0.57
Clearance Time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	157	301			30		62	1963		14	1880	771
v/s Ratio Prot	c0.07	0.00			c0.01		c0.03	0.33		0.00	c0.35	
v/s Ratio Perm												0.07
v/c Ratio	0.55	0.03			0.34		0.79	0.56		0.36	0.61	0.13
Uniform Delay, d1	26.4	24.7			31.0		30.6	7.7		31.5	9.0	6.3
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	4.2	0.0			6.7		48.2	1.1		14.9	1.5	0.3
Delay (s)	30.6	24.7			37.6		78.8	8.8		46.4	10.4	6.6
Level of Service	C	C			D		E	A		D	B	A
Approach Delay (s)		29.2			37.6			11.8			10.2	
Approach LOS		C			D			B			B	

Intersection Summary			
HCM Average Control Delay	12.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	63.9	Sum of lost time (s)	16.0
Intersection Capacity Utilization	53.6%	ICU Level of Service	A
Analysis Period (min)	15		

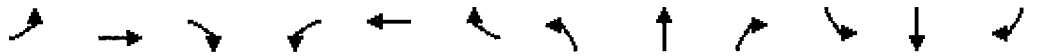
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	135	10	95	15	5	15	90	975	25	20	750	170
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95			1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.86			0.94		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00			0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1388	2644			1612		1570	3277		1719	3139	1196
Flt Permitted	0.95	1.00			0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1388	2644			1612		1570	3277		1719	3139	1196
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	145	11	102	16	5	16	97	1048	27	22	806	183
RTOR Reduction (vph)	0	85	0	0	15	0	0	1	0	0	0	88
Lane Group Flow (vph)	145	28	0	0	22	0	97	1074	0	22	806	95
Heavy Vehicles (%)	30%	0%	20%	0%	0%	20%	15%	10%	0%	5%	15%	35%
Turn Type	Split	NA		Split	NA		Prot	NA		Prot	NA	Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases												6
Actuated Green, G (s)	11.4	11.4			2.7		5.6	35.3		1.4	31.1	31.1
Effective Green, g (s)	11.4	11.4			2.7		5.6	35.3		1.4	31.1	31.1
Actuated g/C Ratio	0.17	0.17			0.04		0.08	0.53		0.02	0.47	0.47
Clearance Time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	237	451			65		132	1732		36	1461	557
v/s Ratio Prot	c0.10	0.01			c0.01		c0.06	c0.33		0.01	0.26	
v/s Ratio Perm												0.08
v/c Ratio	0.61	0.06			0.33		0.73	0.62		0.61	0.55	0.17
Uniform Delay, d1	25.7	23.2			31.2		29.9	11.0		32.4	12.8	10.4
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	4.6	0.1			3.0		19.0	1.7		27.0	1.5	0.7
Delay (s)	30.3	23.3			34.2		48.9	12.7		59.4	14.3	11.0
Level of Service	C	C			C		D	B		E	B	B
Approach Delay (s)		27.2			34.2			15.7			14.7	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM Average Control Delay	16.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	66.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	55.2%	ICU Level of Service	B
Analysis Period (min)	15		

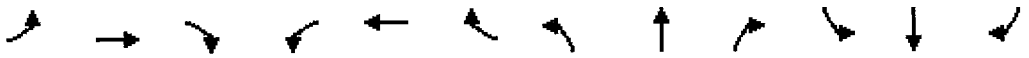
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	190	5	35	15	5	15	30	1305	15	15	970	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95			1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.87			0.94		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00			0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1641	2779			1649		1719	3419		1641	3438	1154
Flt Permitted	0.95	1.00			0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1641	2779			1649		1719	3419		1641	3438	1154
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	211	6	39	17	6	17	33	1450	17	17	1078	44
RTOR Reduction (vph)	0	32	0	0	16	0	0	1	0	0	0	14
Lane Group Flow (vph)	211	13	0	0	24	0	33	1466	0	17	1078	30
Heavy Vehicles (%)	10%	0%	15%	0%	0%	15%	5%	5%	40%	10%	5%	40%
Turn Type	Split	NA		Split	NA		Prot	NA		Prot	NA	Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases												6
Actuated Green, G (s)	13.8	13.8			4.3		2.8	45.2		0.7	43.1	43.1
Effective Green, g (s)	13.8	13.8			4.3		2.8	45.2		0.7	43.1	43.1
Actuated g/C Ratio	0.17	0.17			0.05		0.03	0.57		0.01	0.54	0.54
Clearance Time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	283	479			89		60	1932		14	1852	622
v/s Ratio Prot	c0.13	0.00			c0.01		c0.02	c0.43		0.01	0.31	
v/s Ratio Perm												0.03
v/c Ratio	0.75	0.03			0.27		0.55	0.76		1.21	0.58	0.05
Uniform Delay, d1	31.4	27.5			36.3		38.0	13.3		39.6	12.4	8.7
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	10.2	0.0			1.6		10.5	2.9		317.6	1.3	0.1
Delay (s)	41.6	27.5			38.0		48.4	16.1		357.3	13.7	8.9
Level of Service	D	C			D		D	B		F	B	A
Approach Delay (s)		39.2			38.0			16.8			18.7	
Approach LOS		D			D			B			B	

Intersection Summary			
HCM Average Control Delay	19.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	60.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	80	5	20	5	5	10	45	1050	5	5	1105	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95			1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.88			0.93		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00			0.99		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1289	2466			1621		1719	3161		1444	3167	1346
Flt Permitted	0.95	1.00			0.99		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1289	2466			1621		1719	3161		1444	3167	1346
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	87	5	22	5	5	11	49	1141	5	5	1201	136
RTOR Reduction (vph)	0	19	0	0	11	0	0	0	0	0	0	37
Lane Group Flow (vph)	87	8	0	0	10	0	49	1146	0	5	1201	99
Heavy Vehicles (%)	40%	0%	35%	0%	10%	10%	5%	14%	40%	25%	14%	20%
Turn Type	Split	NA		Split	NA		Prot	NA		Prot	NA	Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases												6
Actuated Green, G (s)	7.8	7.8			1.2		2.3	38.3		0.6	36.6	36.6
Effective Green, g (s)	7.8	7.8			1.2		2.3	38.3		0.6	36.6	36.6
Actuated g/C Ratio	0.12	0.12			0.02		0.04	0.60		0.01	0.57	0.57
Clearance Time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	157	301			30		62	1895		14	1814	771
v/s Ratio Prot	c0.07	0.00			c0.01		c0.03	0.36		0.00	c0.38	
v/s Ratio Perm												0.07
v/c Ratio	0.55	0.03			0.34		0.79	0.60		0.36	0.66	0.13
Uniform Delay, d1	26.4	24.7			31.0		30.6	8.0		31.5	9.4	6.3
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	4.2	0.0			6.7		48.2	1.4		14.9	1.9	0.3
Delay (s)	30.6	24.7			37.6		78.8	9.5		46.4	11.3	6.6
Level of Service	C	C			D		E	A		D	B	A
Approach Delay (s)		29.2			37.6			12.3			11.0	
Approach LOS		C			D			B			B	

Intersection Summary			
HCM Average Control Delay	12.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	63.9	Sum of lost time (s)	16.0
Intersection Capacity Utilization	55.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
10: Irwindale Ave & First St

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	135	10	95	15	5	15	90	1025	25	20	800	170
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95			1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.86			0.94		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00			0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1388	2644			1612		1570	3165		1719	3008	1196
Flt Permitted	0.95	1.00			0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1388	2644			1612		1570	3165		1719	3008	1196
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	145	11	102	16	5	16	97	1102	27	22	860	183
RTOR Reduction (vph)	0	85	0	0	15	0	0	1	0	0	0	82
Lane Group Flow (vph)	145	28	0	0	22	0	97	1128	0	22	860	101
Heavy Vehicles (%)	30%	0%	20%	0%	0%	20%	15%	14%	0%	5%	20%	35%
Turn Type	Split	NA		Split	NA		Prot	NA		Prot	NA	Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases												6
Actuated Green, G (s)	11.4	11.4			2.7		5.6	35.3		1.4	31.1	31.1
Effective Green, g (s)	11.4	11.4			2.7		5.6	35.3		1.4	31.1	31.1
Actuated g/C Ratio	0.17	0.17			0.04		0.08	0.53		0.02	0.47	0.47
Clearance Time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	237	451			65		132	1673		36	1400	557
v/s Ratio Prot	c0.10	0.01			c0.01		c0.06	c0.36		0.01	0.29	
v/s Ratio Perm												0.08
v/c Ratio	0.61	0.06			0.33		0.73	0.67		0.61	0.61	0.18
Uniform Delay, d1	25.7	23.2			31.2		29.9	11.5		32.4	13.4	10.4
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	4.6	0.1			3.0		19.0	2.2		27.0	2.0	0.7
Delay (s)	30.3	23.3			34.2		48.9	13.7		59.4	15.4	11.1
Level of Service	C	C			C		D	B		E	B	B
Approach Delay (s)		27.2			34.2			16.5			15.6	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM Average Control Delay	17.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	66.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	56.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
10: Irwindale Ave & First St

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	190	5	35	15	5	15	30	1355	15	15	1020	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95			1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.87			0.94		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00			0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1641	2779			1649		1719	2574		1641	3282	1154
Flt Permitted	0.95	1.00			0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1641	2779			1649		1719	2574		1641	3282	1154
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	211	6	39	17	6	17	33	1506	17	17	1133	44
RTOR Reduction (vph)	0	32	0	0	16	0	0	0	0	0	0	13
Lane Group Flow (vph)	211	13	0	0	24	0	33	1523	0	17	1133	31
Heavy Vehicles (%)	10%	0%	15%	0%	0%	15%	5%	40%	40%	10%	10%	40%
Turn Type	Split	NA		Split	NA		Prot	NA		Prot	NA	Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases												6
Actuated Green, G (s)	13.8	13.8			4.3		2.8	45.2		0.7	43.1	43.1
Effective Green, g (s)	13.8	13.8			4.3		2.8	45.2		0.7	43.1	43.1
Actuated g/C Ratio	0.17	0.17			0.05		0.03	0.57		0.01	0.54	0.54
Clearance Time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	283	479			89		60	1454		14	1768	622
v/s Ratio Prot	c0.13	0.00			c0.01		c0.02	c0.59		0.01	0.35	
v/s Ratio Perm												0.03
v/c Ratio	0.75	0.03			0.27		0.55	1.05		1.21	0.64	0.05
Uniform Delay, d1	31.4	27.5			36.3		38.0	17.4		39.6	13.0	8.7
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	10.2	0.0			1.6		10.5	37.0		317.6	1.8	0.1
Delay (s)	41.6	27.5			38.0		48.4	54.4		357.3	14.8	8.9
Level of Service	D	C			D		D	D		F	B	A
Approach Delay (s)		39.2			38.0			54.3			19.5	
Approach LOS		D			D			D			B	

Intersection Summary			
HCM Average Control Delay	39.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	61.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
10: Irwindale Ave & First St

3/26/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	85	5	20	5	0	10	50	1145	5	5	1205	135
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95			1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.88			0.91		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00			0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1289	2466			1588		1719	3162		1444	3167	1346
Flt Permitted	0.77	1.00			1.00		0.14	1.00		0.18	1.00	1.00
Satd. Flow (perm)	1044	2466			1613		261	3162		269	3167	1346
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	92	5	22	5	0	11	54	1245	5	5	1310	147
RTOR Reduction (vph)	0	18	0	0	11	0	0	0	0	0	0	32
Lane Group Flow (vph)	92	9	0	0	5	0	54	1250	0	5	1310	115
Heavy Vehicles (%)	40%	0%	35%	0%	10%	10%	5%	14%	40%	25%	14%	20%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	13.9	13.9			1.2		50.6	48.3		47.4	46.7	46.7
Effective Green, g (s)	13.9	13.9			1.2		50.6	48.3		47.4	46.7	46.7
Actuated g/C Ratio	0.19	0.19			0.02		0.68	0.64		0.63	0.62	0.62
Clearance Time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	222	458			26		221	2039		181	1975	839
v/s Ratio Prot	c0.05	0.00					c0.01	0.40		0.00	c0.41	
v/s Ratio Perm	c0.03				0.00		0.16			0.02		0.09
v/c Ratio	0.41	0.02			0.20		0.24	0.61		0.03	0.66	0.14
Uniform Delay, d1	26.8	24.9			36.4		5.8	7.8		5.7	9.1	5.8
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.3	0.0			3.7		0.6	1.4		0.1	1.8	0.3
Delay (s)	28.0	24.9			40.1		6.4	9.2		5.8	10.8	6.1
Level of Service	C	C			D		A	A		A	B	A
Approach Delay (s)		27.3			40.1			9.1			10.3	
Approach LOS		C			D			A			B	

Intersection Summary			
HCM Average Control Delay	10.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	74.9	Sum of lost time (s)	16.0
Intersection Capacity Utilization	58.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	145	10	105	15	5	15	100	1115	25	20	870	185
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95			1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.86			0.94		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00			0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1388	2636			1612		1570	3165		1719	3008	1196
Flt Permitted	0.68	1.00			1.00		0.21	1.00		0.15	1.00	1.00
Satd. Flow (perm)	987	2636			1647		347	3165		276	3008	1196
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	156	11	113	16	5	16	108	1199	27	22	935	199
RTOR Reduction (vph)	0	82	0	0	15	0	0	1	0	0	0	66
Lane Group Flow (vph)	156	42	0	0	22	0	108	1225	0	22	935	133
Heavy Vehicles (%)	30%	0%	20%	0%	0%	20%	15%	14%	0%	5%	20%	35%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	pm+ov
Protected Phases	7	4		3	8		5	2		1	6	7
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	18.1	18.1			2.6		37.9	34.8		33.1	32.4	43.9
Effective Green, g (s)	18.1	18.1			2.6		37.9	34.8		33.1	32.4	43.9
Actuated g/C Ratio	0.28	0.28			0.04		0.58	0.53		0.50	0.49	0.67
Clearance Time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	343	727			65		258	1679		155	1486	873
v/s Ratio Prot	c0.08	0.02					c0.02	c0.39		0.00	0.31	0.03
v/s Ratio Perm	c0.05				0.01		0.22			0.07		0.08
v/c Ratio	0.45	0.06			0.33		0.42	0.73		0.14	0.63	0.15
Uniform Delay, d1	19.4	17.5			30.7		7.4	11.8		9.1	12.2	4.0
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.0	0.0			3.0		1.1	2.8		0.4	2.0	0.1
Delay (s)	20.4	17.5			33.7		8.5	14.6		9.5	14.2	4.1
Level of Service	C	B			C		A	B		A	B	A
Approach Delay (s)		19.1			33.7			14.1			12.4	
Approach LOS		B			C			B			B	

Intersection Summary			
HCM Average Control Delay	14.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	65.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	59.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	205	5	40	15	5	15	35	1475	15	15	1110	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95			1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.87			0.94		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00			0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1641	2768			1649		1719	2575		1641	3282	1154
Flt Permitted	0.60	1.00			0.84		0.18	1.00		0.10	1.00	1.00
Satd. Flow (perm)	1036	2768			1411		319	2575		167	3282	1154
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	228	6	44	17	6	17	39	1639	17	17	1233	50
RTOR Reduction (vph)	0	35	0	0	16	0	0	0	0	0	0	10
Lane Group Flow (vph)	228	15	0	0	24	0	39	1656	0	17	1233	40
Heavy Vehicles (%)	10%	0%	15%	0%	0%	15%	5%	40%	40%	10%	10%	40%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	pm+ov
Protected Phases	7	4		3	8		5	2		1	6	7
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	26.1	26.1			6.4		96.3	93.2		93.3	91.7	107.4
Effective Green, g (s)	26.1	26.1			6.4		96.3	93.2		93.3	91.7	107.4
Actuated g/C Ratio	0.20	0.20			0.05		0.72	0.70		0.70	0.69	0.81
Clearance Time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	275	544			68		264	1806		135	2265	967
v/s Ratio Prot	c0.10	0.01					c0.00	c0.64		0.00	0.38	0.00
v/s Ratio Perm	c0.06				0.02		0.10			0.09		0.03
v/c Ratio	0.83	0.03			0.35		0.15	0.92		0.13	0.54	0.04
Uniform Delay, d1	50.5	43.1			61.2		6.9	16.6		10.0	10.2	2.5
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	18.3	0.0			3.1		0.3	8.9		0.4	0.9	0.0
Delay (s)	68.7	43.2			64.3		7.2	25.5		10.5	11.2	2.5
Level of Service	E	D			E		A	C		B	B	A
Approach Delay (s)		64.1			64.3			25.1			10.8	
Approach LOS		E			E			C			B	

Intersection Summary			
HCM Average Control Delay	23.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	132.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	65.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
10: Irwindale Ave & First St

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	80	5	20	5	5	10	45	1000	5	5	1105	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95			1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.88			0.93		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00			0.99		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1289	2466			1621		1719	3275		1444	3167	1346
Flt Permitted	0.95	1.00			0.99		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1289	2466			1621		1719	3275		1444	3167	1346
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	87	5	22	5	5	11	49	1087	5	5	1201	136
RTOR Reduction (vph)	0	19	0	0	11	0	0	0	0	0	0	37
Lane Group Flow (vph)	87	8	0	0	10	0	49	1092	0	5	1201	99
Heavy Vehicles (%)	40%	0%	35%	0%	10%	10%	5%	10%	40%	25%	14%	20%
Turn Type	Split	NA		Split	NA		Prot	NA		Prot	NA	Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases												6
Actuated Green, G (s)	7.8	7.8			1.2		2.3	38.3		0.6	36.6	36.6
Effective Green, g (s)	7.8	7.8			1.2		2.3	38.3		0.6	36.6	36.6
Actuated g/C Ratio	0.12	0.12			0.02		0.04	0.60		0.01	0.57	0.57
Clearance Time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	157	301			30		62	1963		14	1814	771
v/s Ratio Prot	c0.07	0.00			c0.01		c0.03	0.33		0.00	c0.38	
v/s Ratio Perm												0.07
v/c Ratio	0.55	0.03			0.34		0.79	0.56		0.36	0.66	0.13
Uniform Delay, d1	26.4	24.7			31.0		30.6	7.7		31.5	9.4	6.3
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	4.2	0.0			6.7		48.2	1.1		14.9	1.9	0.3
Delay (s)	30.6	24.7			37.6		78.8	8.8		46.4	11.3	6.6
Level of Service	C	C			D		E	A		D	B	A
Approach Delay (s)		29.2			37.6			11.8			11.0	
Approach LOS		C			D			B			B	

Intersection Summary			
HCM Average Control Delay	12.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	63.9	Sum of lost time (s)	16.0
Intersection Capacity Utilization	55.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
10: Irwindale Ave & First St

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	135	10	95	15	5	15	90	975	25	20	800	170
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95			1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.86			0.94		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00			0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1388	2644			1612		1570	3277		1719	3008	1196
Flt Permitted	0.95	1.00			0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1388	2644			1612		1570	3277		1719	3008	1196
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	145	11	102	16	5	16	97	1048	27	22	860	183
RTOR Reduction (vph)	0	85	0	0	15	0	0	1	0	0	0	82
Lane Group Flow (vph)	145	28	0	0	22	0	97	1074	0	22	860	101
Heavy Vehicles (%)	30%	0%	20%	0%	0%	20%	15%	10%	0%	5%	20%	35%
Turn Type	Split	NA		Split	NA		Prot	NA		Prot	NA	Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases												6
Actuated Green, G (s)	11.4	11.4			2.7		5.6	35.3		1.4	31.1	31.1
Effective Green, g (s)	11.4	11.4			2.7		5.6	35.3		1.4	31.1	31.1
Actuated g/C Ratio	0.17	0.17			0.04		0.08	0.53		0.02	0.47	0.47
Clearance Time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	237	451			65		132	1732		36	1400	557
v/s Ratio Prot	c0.10	0.01			c0.01		c0.06	c0.33		0.01	0.29	
v/s Ratio Perm												0.08
v/c Ratio	0.61	0.06			0.33		0.73	0.62		0.61	0.61	0.18
Uniform Delay, d1	25.7	23.2			31.2		29.9	11.0		32.4	13.4	10.4
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	4.6	0.1			3.0		19.0	1.7		27.0	2.0	0.7
Delay (s)	30.3	23.3			34.2		48.9	12.7		59.4	15.4	11.1
Level of Service	C	C			C		D	B		E	B	B
Approach Delay (s)		27.2			34.2			15.7			15.6	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM Average Control Delay	17.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	66.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	55.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

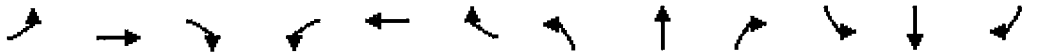
HCM Signalized Intersection Capacity Analysis
10: Irwindale Ave & First St

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	190	5	35	15	5	15	30	1305	15	15	1020	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95			1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.87			0.94		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00			0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1641	2779			1649		1719	3419		1641	3282	1154
Flt Permitted	0.95	1.00			0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1641	2779			1649		1719	3419		1641	3282	1154
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	211	6	39	17	6	17	33	1450	17	17	1133	44
RTOR Reduction (vph)	0	32	0	0	16	0	0	1	0	0	0	13
Lane Group Flow (vph)	211	13	0	0	24	0	33	1466	0	17	1133	31
Heavy Vehicles (%)	10%	0%	15%	0%	0%	15%	5%	5%	40%	10%	10%	40%
Turn Type	Split	NA		Split	NA		Prot	NA		Prot	NA	Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases												6
Actuated Green, G (s)	13.8	13.8			4.3		2.8	45.2		0.7	43.1	43.1
Effective Green, g (s)	13.8	13.8			4.3		2.8	45.2		0.7	43.1	43.1
Actuated g/C Ratio	0.17	0.17			0.05		0.03	0.57		0.01	0.54	0.54
Clearance Time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	283	479			89		60	1932		14	1768	622
v/s Ratio Prot	c0.13	0.00			c0.01		c0.02	c0.43		0.01	0.35	
v/s Ratio Perm												0.03
v/c Ratio	0.75	0.03			0.27		0.55	0.76		1.21	0.64	0.05
Uniform Delay, d1	31.4	27.5			36.3		38.0	13.3		39.6	13.0	8.7
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	10.2	0.0			1.6		10.5	2.9		317.6	1.8	0.1
Delay (s)	41.6	27.5			38.0		48.4	16.1		357.3	14.8	8.9
Level of Service	D	C			D		D	B		F	B	A
Approach Delay (s)		39.2			38.0			16.8			19.5	
Approach LOS		D			D			B			B	

Intersection Summary			
HCM Average Control Delay	20.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	60.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	85	5	20	5	0	10	50	1090	5	5	1205	135
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95			1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.88			0.91		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00			0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1289	2466			1588		1719	3162		1444	3167	1346
Flt Permitted	0.95	1.00			0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1289	2466			1588		1719	3162		1444	3167	1346
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	92	5	22	5	0	11	54	1185	5	5	1310	147
RTOR Reduction (vph)	0	19	0	0	11	0	0	0	0	0	0	37
Lane Group Flow (vph)	92	8	0	0	5	0	54	1190	0	5	1310	110
Heavy Vehicles (%)	40%	0%	35%	0%	10%	10%	5%	14%	40%	25%	14%	20%
Turn Type	Split	NA		Split	NA		Prot	NA		Prot	NA	Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases												6
Actuated Green, G (s)	8.0	8.0			1.2		2.3	38.3		0.7	36.7	36.7
Effective Green, g (s)	8.0	8.0			1.2		2.3	38.3		0.7	36.7	36.7
Actuated g/C Ratio	0.12	0.12			0.02		0.04	0.60		0.01	0.57	0.57
Clearance Time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	161	307			30		62	1886		16	1810	769
v/s Ratio Prot	c0.07	0.00			c0.00		c0.03	0.38		0.00	c0.41	
v/s Ratio Perm												0.08
v/c Ratio	0.57	0.03			0.17		0.87	0.63		0.31	0.72	0.14
Uniform Delay, d1	26.5	24.7			31.0		30.8	8.4		31.5	10.0	6.4
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	4.8	0.0			2.8		70.2	1.6		10.9	2.6	0.4
Delay (s)	31.3	24.7			33.8		101.0	10.0		42.4	12.6	6.8
Level of Service	C	C			C		F	A		D	B	A
Approach Delay (s)		29.8			33.8			13.9			12.1	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM Average Control Delay	13.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	64.2	Sum of lost time (s)	16.0
Intersection Capacity Utilization	58.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	145	10	105	15	5	15	100	1065	25	20	870	185
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95			1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.86			0.94		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00			0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1388	2636			1612		1570	3165		1719	3008	1196
Flt Permitted	0.95	1.00			0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1388	2636			1612		1570	3165		1719	3008	1196
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	156	11	113	16	5	16	108	1145	27	22	935	199
RTOR Reduction (vph)	0	93	0	0	15	0	0	1	0	0	0	86
Lane Group Flow (vph)	156	31	0	0	22	0	108	1171	0	22	935	113
Heavy Vehicles (%)	30%	0%	20%	0%	0%	20%	15%	14%	0%	5%	20%	35%
Turn Type	Split	NA		Split	NA		Prot	NA		Prot	NA	Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases												6
Actuated Green, G (s)	11.7	11.7			2.7		7.1	35.3		1.4	29.6	29.6
Effective Green, g (s)	11.7	11.7			2.7		7.1	35.3		1.4	29.6	29.6
Actuated g/C Ratio	0.17	0.17			0.04		0.11	0.53		0.02	0.44	0.44
Clearance Time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	242	460			65		166	1665		36	1327	528
v/s Ratio Prot	c0.11	0.01			c0.01		c0.07	c0.37		0.01	0.31	
v/s Ratio Perm												0.09
v/c Ratio	0.64	0.07			0.33		0.65	0.70		0.61	0.70	0.21
Uniform Delay, d1	25.8	23.1			31.3		28.8	12.0		32.6	15.2	11.6
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	5.8	0.1			3.0		8.8	2.5		27.0	3.2	0.9
Delay (s)	31.5	23.2			34.3		37.6	14.5		59.5	18.4	12.5
Level of Service	C	C			C		D	B		E	B	B
Approach Delay (s)		27.9			34.3			16.4			18.1	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM Average Control Delay	18.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	67.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	58.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
10: Irwindale Ave & First St

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	205	5	40	15	5	15	35	1420	15	15	1110	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95			1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.87			0.94		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00			0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1641	2768			1649		1719	2574		1641	3282	1154
Flt Permitted	0.95	1.00			0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1641	2768			1649		1719	2574		1641	3282	1154
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	228	6	44	17	6	17	39	1578	17	17	1233	50
RTOR Reduction (vph)	0	36	0	0	16	0	0	0	0	0	0	14
Lane Group Flow (vph)	228	14	0	0	24	0	39	1595	0	17	1233	36
Heavy Vehicles (%)	10%	0%	15%	0%	0%	15%	5%	40%	40%	10%	10%	40%
Turn Type	Split	NA		Split	NA		Prot	NA		Prot	NA	Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases												6
Actuated Green, G (s)	14.2	14.2			4.3		2.8	44.8		0.7	42.7	42.7
Effective Green, g (s)	14.2	14.2			4.3		2.8	44.8		0.7	42.7	42.7
Actuated g/C Ratio	0.18	0.18			0.05		0.03	0.56		0.01	0.53	0.53
Clearance Time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	291	491			89		60	1441		14	1752	616
v/s Ratio Prot	c0.14	0.00			c0.01		c0.02	c0.62		0.01	0.38	
v/s Ratio Perm												0.03
v/c Ratio	0.78	0.03			0.27		0.65	1.11		1.21	0.70	0.06
Uniform Delay, d1	31.4	27.2			36.3		38.1	17.6		39.6	13.9	9.0
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	12.9	0.0			1.6		22.4	58.6		317.6	2.4	0.2
Delay (s)	44.3	27.2			38.0		60.5	76.2		357.3	16.3	9.2
Level of Service	D	C			D		E	E		F	B	A
Approach Delay (s)		41.2			38.0			75.8			20.5	
Approach LOS		D			D			E			C	

Intersection Summary			
HCM Average Control Delay	50.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	64.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

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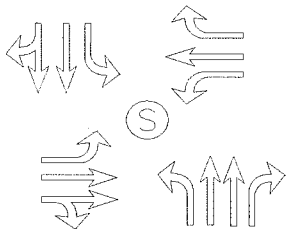
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	1 OF 6

E/W STREET : GLADSTONE STREET
N/S STREET : IRWINDALE AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 11
ROUTE 2A, 3

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
GLADSTONE STREET						
EB LEFT	5	5%		5	5	10
EB THRU	10	35%		10	5	15
EB RIGHT	10	25%		10	5	15
WB LEFT	495	5%		495	45	540
WB THRU	65	5%		65	5	70
WB RIGHT	580	10%	**50**	630	55	685
IRWINDALE AVE						
NB LEFT	10	20%		10	5	15
NB THRU	515	10%		515	45	560
NB RIGHT	55	10%		55	5	60
SB LEFT	185	25%	**50**	235	20	255
SB THRU	780	5%		780	70	850
SB RIGHT	5	5%		5	5	10
TOTALS	**2715**		**100**	**2815**	**270**	**3085**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	10-Sep-13	VV.110264.0000	2 OF 6

E/W STREET : GLADSTONE STREET
N/S STREET : IRWINDALE AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 11
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
GLADSTONE STREET						
EB LEFT	5	5%		5	5	10
EB THRU	10	35%		10	5	15
EB RIGHT	10	25%		10	5	15
WB LEFT	495	5%		495	45	540
WB THRU	65	5%		65	5	70
WB RIGHT	580	10%		580	50	630
IRWINDALE AVE						
NB LEFT	10	20%		10	5	15
NB THRU	515	10%		515	45	560
NB RIGHT	55	10%		55	5	60
SB LEFT	185	25%	**50**	235	20	255
SB THRU	780	5%		780	70	850
SB RIGHT	5	5%		5	5	10
TOTALS	**2715**		**50**	**2765**	**265**	**3030**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	3 OF 6

E/W STREET : GLADSTONE STREET
N/S STREET : IRWINDALE AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 11
ROUTE 2A, 3

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
GLADSTONE STREET						
EB LEFT	5	5%		5	5	10
EB THRU	25	20%		25	5	30
EB RIGHT	35	5%		35	5	40
WB LEFT	130	5%		130	10	140
WB THRU	20	10%		20	5	25
WB RIGHT	200	20%	**50**	250	25	275
IRWINDALE AVE						
NB LEFT	15	5%		15	5	20
NB THRU	770	10%		770	70	840
NB RIGHT	90	5%		90	10	100
SB LEFT	165	30%	**50**	215	20	235
SB THRU	750	10%		750	70	820
SB RIGHT	5	5%		5	5	10
TOTALS	**2210**		**100**	**2310**	**235**	**2545**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	10-Sep-13	VV.110264.0000	4 OF 6

E/W STREET : GLADSTONE STREET
N/S STREET : IRWINDALE AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 11
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
GLADSTONE STREET						
EB LEFT	5	5%		5	5	10
EB THRU	25	20%		25	5	30
EB RIGHT	35	5%		35	5	40
WB LEFT	130	5%		130	10	140
WB THRU	20	10%		20	5	25
WB RIGHT	200	20%		200	20	220
IRWINDALE AVE						
NB LEFT	15	5%		15	5	20
NB THRU	770	10%		770	70	840
NB RIGHT	90	5%		90	10	100
SB LEFT	165	30%	**50**	215	20	235
SB THRU	750	10%		750	70	820
SB RIGHT	5	5%		5	5	10
TOTALS	**2210**		**50**	**2260**	**230**	**2490**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	5 OF 6

E/W STREET : GLADSTONE STREET
N/S STREET : IRWINDALE AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 11
ROUTE 2A, 3

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
GLADSTONE STREET						
EB LEFT	5	5%		5	5	10
EB THRU	70	5%		70	5	75
EB RIGHT	30	5%		30	5	35
WB LEFT	130	5%		130	10	140
WB THRU	10	10%		10	5	15
WB RIGHT	175	5%	**50**	225	20	245
IRWINDALE AVE						
NB LEFT	10	40%		10	5	15
NB THRU	1170	5%		1170	105	1275
NB RIGHT	330	10%		330	30	360
SB LEFT	310	10%	**50**	360	30	390
SB THRU	700	5%		700	65	765
SB RIGHT	5	30%		5	5	10
TOTALS	**2945**		**100**	**3045**	**290**	**3335**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	10-Sep-13	VV.110264.0000	6 OF 6

E/W STREET : GLADSTONE STREET
N/S STREET : IRWINDALE AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 11
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
GLADSTONE STREET						
EB LEFT	5	5%		5	5	10
EB THRU	70	5%		70	5	75
EB RIGHT	30	5%		30	5	35
WB LEFT	130	5%		130	10	140
WB THRU	10	10%		10	5	15
WB RIGHT	175	5%		175	15	190
IRWINDALE AVE						
NB LEFT	10	40%		10	5	15
NB THRU	1170	5%		1170	105	1275
NB RIGHT	330	10%		330	30	360
SB LEFT	310	10%	**50**	360	30	390
SB THRU	700	5%		700	65	765
SB RIGHT	5	30%		5	5	10
TOTALS	**2945**		**50**	**2995**	**285**	**3280**

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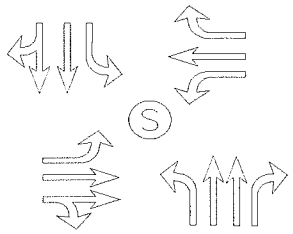
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	1 OF 6

E/W STREET : GLADSTONE STREET
N/S STREET : IRWINDALE AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 11
ROUTE 2A, 3

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
GLADSTONE STREET								
EB LEFT	2	0	0	5	**0**	5	5	10
EB THRU	6	3	9	15	**0**	15	5	20
EB RIGHT	9	3	9	20	**0**	20	5	25
WB LEFT	476	19	57	535	**0**	535	50	585
WB THRU	61	3	9	70	**0**	70	5	75
WB RIGHT	518	61	183	700	**150**	850	75	925
IRWINDALE AVE								
NB LEFT	9	2	6	15	**0**	15	5	20
NB THRU	476	39	117	595	**0**	595	55	650
NB RIGHT	51	5	15	65	**0**	65	5	70
SB LEFT	136	50	150	285	**150**	435	40	475
SB THRU	749	33	99	850	**0**	850	75	925
SB RIGHT	4	0	0	5	**0**	5	5	10
TOTALS	**2497**				**300**	**3460**	**330**	**3790**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	2 OF 6

E/W STREET : GLADSTONE STREET
N/S STREET : IRWINDALE AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 11
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
GLADSTONE STREET								
EB LEFT	2	0	0	5	**0**	5	5	10
EB THRU	6	3	9	15	**0**	15	5	20
EB RIGHT	9	3	9	20	**0**	20	5	25
WB LEFT	476	19	57	535	**0**	535	50	585
WB THRU	61	3	9	70	**0**	70	5	75
WB RIGHT	518	61	183	700	**0**	700	65	765
IRWINDALE AVE								
NB LEFT	9	2	6	15	**0**	15	5	20
NB THRU	476	39	117	595	**0**	595	55	650
NB RIGHT	51	5	15	65	**0**	65	5	70
SB LEFT	136	50	150	285	**150**	435	40	475
SB THRU	749	33	99	850	**0**	850	75	925
SB RIGHT	4	0	0	5	**0**	5	5	10
TOTALS	**2497**				**150**	**3310**	**320**	**3630**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	3 OF 6

E/W STREET : GLADSTONE STREET
N/S STREET : IRWINDALE AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 11
ROUTE 2A, 3

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
GLADSTONE STREET								
EB LEFT	1	0	0	5	**0**	5	5	10
EB THRU	18	5	15	35	**0**	35	5	40
EB RIGHT	32	1	3	35	**0**	35	5	40
WB LEFT	125	7	21	145	**0**	145	15	160
WB THRU	20	2	6	25	**0**	25	5	30
WB RIGHT	156	44	132	290	**150**	440	40	480
IRWINDALE AVE								
NB LEFT	15	1	3	20	**0**	20	5	25
NB THRU	712	59	177	890	**0**	890	80	970
NB RIGHT	89	3	9	100	**0**	100	10	110
SB LEFT	111	52	156	265	**150**	415	35	450
SB THRU	690	61	183	875	**0**	875	80	955
SB RIGHT	7	0	0	5	**0**	5	5	10
TOTALS	**1976**				**300**	**2990**	**290**	**3280**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	4 OF 6

E/W STREET : GLADSTONE STREET
N/S STREET : IRWINDALE AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 11
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
GLADSTONE STREET								
EB LEFT	1	0	0	5	**0**	5	5	10
EB THRU	18	5	15	35	**0**	35	5	40
EB RIGHT	32	1	3	35	**0**	35	5	40
WB LEFT	125	7	21	145	**0**	145	15	160
WB THRU	20	2	6	25	**0**	25	5	30
WB RIGHT	156	44	132	290	**0**	290	25	315
IRWINDALE AVE								
NB LEFT	15	1	3	20	**0**	20	5	25
NB THRU	712	59	177	890	**0**	890	80	970
NB RIGHT	89	3	9	100	**0**	100	10	110
SB LEFT	111	52	156	265	**150**	415	35	450
SB THRU	690	61	183	875	**0**	875	80	955
SB RIGHT	7	0	0	5	**0**	5	5	10
TOTALS	**1976**				**150**	**2840**	**275**	**3115**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	5 OF 6

E/W STREET : GLADSTONE STREET
N/S STREET : IRWINDALE AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 11
ROUTE 2A, 3

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
GLADSTONE STREET								
EB LEFT	4	0	0	5	**0**	5	5	10
EB THRU	72	0	0	70	**0**	70	5	75
EB RIGHT	31	1	3	35	**0**	35	5	40
WB LEFT	124	7	21	145	**0**	145	15	160
WB THRU	8	1	3	10	**0**	10	5	15
WB RIGHT	163	11	33	195	**150**	345	30	375
IRWINDALE AVE								
NB LEFT	5	3	9	15	**0**	15	5	20
NB THRU	1134	38	114	1250	**0**	1250	115	1365
NB RIGHT	291	38	114	405	**0**	405	35	440
SB LEFT	282	26	78	360	**150**	510	45	555
SB THRU	655	44	132	785	**0**	785	70	855
SB RIGHT	5	2	6	10	**0**	10	5	15
TOTALS	**2774**				**300**	**3585**	**340**	**3925**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	6 OF 6

E/W STREET : GLADSTONE STREET
N/S STREET : IRWINDALE AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 11
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
GLADSTONE STREET								
EB LEFT	4	0	0	5	**0**	5	5	10
EB THRU	72	0	0	70	**0**	70	5	75
EB RIGHT	31	1	3	35	**0**	35	5	40
WB LEFT	124	7	21	145	**0**	145	15	160
WB THRU	8	1	3	10	**0**	10	5	15
WB RIGHT	163	11	33	195	**0**	195	20	215
IRWINDALE AVE								
NB LEFT	5	3	9	15	**0**	15	5	20
NB THRU	1134	38	114	1250	**0**	1250	115	1365
NB RIGHT	291	38	114	405	**0**	405	35	440
SB LEFT	282	26	78	360	**150**	510	45	555
SB THRU	655	44	132	785	**0**	785	70	855
SB RIGHT	5	2	6	10	**0**	10	5	15
TOTALS	**2774**				**150**	**3435**	**330**	**3765**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: IRWINDALE
EAST-WEST STREET: GLADSTONE
JURISDICTION: IRWINDALE

DATE: 06-01-11

PEAK HOUR: 07:15AM

NORTH LEG (SB)

TOTAL: 972

TT = 83

$TT\% = \frac{83}{972} = 8.54\% \approx 9\%$

5 4	782 (788)	186 (185)	Total
1	170	41	1st
0	185	44	2nd
1	233	49	3rd
2	194	52	4th
Rt	Thru	Lt	

$TT = \frac{83}{1138} = 7.29\% \approx 7\%$

EAST LEG TOTAL: (WB) 1,138

Rt	154	131	181	113	579 (580)
Thru	9	13	21	21	64 (65)
Lt	138	118	135	104	495
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
5 2	0	0	1	1	Lt
10 9	3	2	1	3	Thru
10 12	3	2	3	4	Rt

WEST LEG TOTAL: (EB) 23

TT = 6

$TT\% = \frac{6}{23} = 26.09\% \approx 26\%$

	Lt	Thru	Rt
1st	1	138	9
2nd	6	149	12
3rd	1	119	15
4th	3	109	20
Total	10 11	515	55 56

SOUTH LEG (NB)

PEAK HOUR FACTORS

NORTH LEG = 0.86
SOUTH LEG = 0.87
EAST LEG = 0.84
WEST LEG = 0.72

ALL LEGS = 0.89

TT = 46

$TT\% = \frac{46}{582} = 7.9\% \approx 8\%$

TOTAL: 582

HOUR TOTAL: 2,715

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: IRWINDALE

EAST-WEST STREET: GLADSTONE

TIME: 07:00AM-08:00AM DATE: 06-01-11

NORTH LEG

Rt	Thru	Lt	
2	737	150	Total
0	149	16	1st
1	170	41	2nd
0	185	44	3rd
1	233	49	4th

	1st	2nd	3rd	4th	Total
Rt	137	154	131	181	603
Thru	18	9	13	21	61
Lt	134	138	118	135	525

Total	1st	2nd	3rd	4th	
1	0	0	0	1	Lt
6	0	3	2	1	Thru
11	3	3	2	3	Rt

	Lt	Thru	Rt
1st	4	133	8
2nd	1	138	9
3rd	6	149	12
4th	1	119	15
Total	12	539	44

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: IRWINDALE

EAST-WEST STREET: GLADSTONE

TIME: 08:00AM-09:00AM DATE: 06-01-11

NORTH LEG

Rt	Thru	Lt	
4	829	150	Total
2	194	52	1st
0	284	24	2nd
1	192	36	3rd
1	159	38	4th

	1st	2nd	3rd	4th	Total
Rt	113	135	99	76	423
Thru	21	9	6	5	41
Lt	104	29	26	58	217

Total	1st	2nd	3rd	4th	
2	1	0	1	0	Lt
4	3	1	0	0	Thru
7	4	0	2	1	Rt

	Lt	Thru	Rt
1st	3	109	20
2nd	1	97	12
3rd	1	127	15
4th	0	186	9
Total	5	519	56

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : IRWINDALE — IRWINDALE

EAST-WEST STREET : GLADSTONE — 06-01-11

BEGINNING TIME : 07:00AM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
				SB NORTH LEG								
0	138	12	0	3	0	0	1	0	0	7	4	165
1	163	33	0	6	4	0	0	2	0	1	2	212
0	182	31	0	1	3	0	0	0	0	2	10	229
1	226	36	0	5	3	0	0	1	0	2	9	283
2	178	36	0	9	3	0	2	3	0	5	10	248
0	274	11	0	5 34	4	0	1 8	0	0	4 41	9	308
0	179	25	1	8	3	0	0	2	0	5	6	229
1	145	25	0	10	2	0	1	1	0	3	10	198
						TT=34+8+41=83						
5	1485	209	1	47	22	0	5	9	0	29	60	1872
				NB SOUTH LEG								
6	123	4	2	8	0	0	0	0	0	2	0	145
9	130	1	0	6	0	0	0	0	0	2	0	148
9	139	4	0	4	2	0	2	0	3	4	0	167
14	112	1	1	6	0	0	0	0	0	1	0	135
19	95	3	1	7	0	0	0	0	0	7	0	132
10	88	1	1	5 27	0	1	0 2	0	0	4 17	0	110
15	117	1	0	7	0	0	1	0	0	2	0	143
9	167	0	0	11	0	0	2	0	0	6	0	195
						TT=27+2+17=46						
91	971	15	5	54	2	1	5	0	3	28	0	1175
				WB EAST LEG								
130	18	127	2	0	1	1	0	0	4	0	6	289
141	8	131	5	0	4	3	0	1	5	1	2	301
118	12	115	4	0	1	2	0	0	7	1	2	262
162	20	129	5	0	2	1	1	1	13	0	3	337
97	21	101	4	0	0	1	0	1	11	0	2	238
124	9	26	3	0 25	2	1	0 11	0	7	0 47	1	173
87	6	21	2	0	4	5	0	0	5	0	1	131
69	5	52	4	0	4	0	0	0	3	0	2	139
						TT=25+11+47=83						
928	99	702	29	0	18	14	1	3	55	2	19	1870
				EB WEST LEG								
3	0	0	0	0	0	0	0	0	0	0	0	3
3	1	0	0	0	0	0	1	0	0	1	0	6
0	2	0	2	0	0	0	0	0	0	0	0	4
3	1	1	0	0	0	0	0	0	0	0	0	5
3	2	1	1	0	0	0	0	0	0	1	0	8
0	1	0	0	0 3	0	0	0 1	0	0	0 2	0	1
2	0	1	0	0	0	0	0	0	0	0	0	3
1	0	0	0	0	0	0	0	0	0	0	0	1
						TT=3+1+2=6						
15	7	3	3	0	0	0	1	0	0	2	0	31

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: IRWINDALE
EAST-WEST STREET: GLADSTONE
JURISDICTION: IRWINDALE

DATE: 06-01-11

PEAK HOUR: 12:15PM

NORTH LEG (SB)

TOTAL: 921

TT= 113

$TT\% = \frac{113}{921} = 12.27\% \approx 12\%$

Rt	Thru	Lt	
5 7	751 750	163 165	Total
0	164	40	1st
3	190	42	2nd
3	206	40	3rd
1	191	41	4th

TT= 53

$TT\% = \frac{53}{354} = 14.97\% \approx 15\%$

EAST LEG TOTAL: (WB) 354

	1st	2nd	3rd	4th	Total
Rt	55	47	55	43	200
Thru	4	5	9	4	20 22
Lt	39	32	23	38	130 132

Total	1st	2nd	3rd	4th	
5 1	0	0	1	0	Lt
25 23	6	3	6	8	Thru
35 33	5	13	10	5	Rt

WEST LEG TOTAL: (EB) 57

TT= 6

$TT\% = \frac{6}{57} = 10.53\% \approx 11\%$

PEAK HOUR FACTORS

NORTH LEG = 0.92
SOUTH LEG = 0.78
EAST LEG = 0.90
WEST LEG = 0.84

ALL LEGS = 0.93

	Lt	Thru	Rt	
1st	2	260	20	
2nd	5	176	27	
3rd	6	167	19	
4th	3	168	26	
Total	15 16	770 771	90 92	TOTAL: 879

TT=63

$TT\% = \frac{63}{879} = 7.17\% \approx 7\%$

SOUTH LEG (NB)

HOUR TOTAL: 2,211

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: IRWINDALE

EAST-WEST STREET: GLADSTONE

TIME: 12:00PM-01:00PM DATE: 06-01-11

NORTH LEG

Rt	Thru	Lt	
8	691	161	Total
2	131	39	1st
0	164	40	2nd
3	190	42	3rd
3	206	40	4th

	1st	2nd	3rd	4th	Total
Rt	45	55	47	55	202
Thru	3	4	5	9	21
Lt	33	39	32	23	127

Total	1st	2nd	3rd	4th	
1	0	0	0	1	Lt
20	5	6	3	6	Thru
35	7	5	13	10	Rt

	Lt	Thru	Rt
1st	4	229	29
2nd	2	260	20
3rd	5	176	27
4th	6	167	19
Total	17	832	95

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: IRWINDALE

EAST-WEST STREET: GLADSTONE

TIME: 01:00PM-02:00PM DATE: 06-01-11

NORTH LEG

Rt	Thru	Lt	
9	751	147	Total
1	191	41	1st
1	180	37	2nd
2	227	33	3rd
5	153	36	4th

	1st	2nd	3rd	4th	Total
Rt	43	54	43	72	212
Thru	4	5	8	8	25
Lt	38	39	38	30	145

Total	1st	2nd	3rd	4th	
1	0	0	1	0	Lt
18	8	4	6	0	Thru
26	5	9	5	7	Rt

	Lt	Thru	Rt
1st	3	168	26
2nd	3	158	22
3rd	6	196	20
4th	2	183	30
Total	14	705	98

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SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : IRWINDALE — IRWINDALE

EAST-WEST STREET : GLADSTONE — 06-01-11

BEGINNING TIME : 12:00PM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
						SB NORTH LEG						
2	121	32	0	7	3	0	1	1	0	2	3	172
0	146	26	0	7	2	0	4	2	0	7	10	204
3	176	29	0	5	3	0	4	0	0	5	10	235
3	190	28	0	9	3	0	1	0	0	6	9	249
1	178	28	0	7	3	0	1	1	0	5	9	233
1	166	25	0	8 39	2	0	2 13	2	0	4 61	8	218
2	205	18	0	17	5	0	1	3	0	4	7	262
5	149	32	0	3	2	0	0	0	0	1	2	194
						TT=39+13+61=113						
17	1331	218	0	63	23	0	14	9	0	34	58	1767
						NB SOUTH LEG						
25	215	4	1	6	0	2	1	0	1	7	0	262
19	243	2	0	14	0	1	0	0	0	3	0	282
27	158	5	0	9	0	0	2	0	0	7	0	208
17	155	5	0	7	1	1	1	0	1	4	0	192
26	156	3	0	4	0	0	1	0	0	7	0	197
20	138	3	1	8 35	0	0	3 6	0	1	9 22	0	183
17	177	6	2	9	0	1	1	0	0	9	0	222
28	179	2	1	2	0	0	1	0	1	1	0	215
						TT=35+6+22=63						
179	1421	30	5	59	1	5	10	0	4	47	0	1761
						WB EAST LEG						
29	3	31	5	0	2	4	0	0	7	0	0	81
41	3	37	5	1	1	2	0	1	7	0	0	98
40	4	32	0	0	0	2	1	0	5	0	0	84
39	9	23	4	0	0	0	0	0	12	0	0	87
36	4	33	2	0	2	0	0	1	5	0	2	85
41	5	34	2	0 15	2	1	0 7	3	10	0 31	0	98
34	8	35	3	0	1	1	0	2	5	0	0	89
70	7	29	0	1	0	0	0	1	2	0	0	110
						TT=15+7+31=53						
330	43	254	21	2	8	10	1	8	53	0	2	732
						EB WEST LEG						
7	5	0	0	0	0	0	0	0	0	0	0	12
5	4	0	0	2	0	0	0	0	0	0	0	11
13	2	0	0	1	0	0	0	0	0	0	0	16
10	5	1	0	0	0	0	0	0	0	1	0	17
4	7	0	0	1	0	0	0	0	1	0	0	13
7	3	0	2	1 4	0	0	0 0	0	0	0 2	0	13
4	6	0	1	0	0	0	0	1	0	0	0	12
7	0	0	0	0	0	0	0	0	0	0	0	7
						TT=4+0+2=6						
57	32	1	3	5	0	0	0	1	1	1	0	101

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: IRWINDALE
EAST-WEST STREET: GLADSTONE
JURISDICTION: IRWINDALE

DATE: 06-01-11

PEAK HOUR: 04:30PM

NORTH LEG (SB)

TOTAL: 1,014

TT = 72

TT% = 72/1014 = 7.1% ≈ 7%

5 7	699 700	308 310	Total
2	155	74	1st
1	151	74	2nd
2	181	86	3rd
2	212	74	4th
Rt	Thru	Lt	

TT = 19

TT% = 19/314 = 6.05% ≈ 6%

EAST LEG TOTAL: (WB) 314

Rt	45	25	56	48	174 175
Thru	4	3	1	1	10 9
Lt	43	34	23	31	130 131
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
5 4	1	0	1	2	Lt
70 72	22	12	27	11	Thru
30 32	9	9	9	5	Rt

WEST LEG TOTAL: (EB) 108

TT = 1

TT% = 1/108 = 0.93% ≈ 1%

	Lt	Thru	Rt
1st	1	308	81
2nd	4	274	71
3rd	1	310	85
4th	2	280	92
Total	10 8	1170 1172	330 329

SOUTH LEG (NB)

TT = 79

TT% = 79/1509 = 5.24% ≈ 5%

TOTAL: 1,509

PEAK HOUR FACTORS

NORTH LEG = 0.88
SOUTH LEG = 0.95
EAST LEG = 0.85
WEST LEG = 0.73

ALL LEGS = 0.94

HOUR TOTAL: 2,945

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: IRWINDALE

EAST-WEST STREET: GLADSTONE

TIME: 04:00PM-05:00PM DATE: 06-01-11

NORTH LEG

Rt	Thru	Lt	
4	643	274	Total
1	213	58	1st
0	124	68	2nd
2	155	74	3rd
1	151	74	4th

	1st	2nd	3rd	4th	Total
Rt	54	46	45	25	170
Thru	1	1	4	3	9
Lt	28	21	43	34	126

Total	1st	2nd	3rd	4th	
4	1	2	1	0	Lt
53	6	13	22	12	Thru
30	5	7	9	9	Rt

	Lt	Thru	Rt
1st	3	219	58
2nd	5	229	61
3rd	1	308	81
4th	4	274	71
Total	13	1030	271

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: IRWINDALE

EAST-WEST STREET: GLADSTONE

TIME: 05:00PM-06:00PM DATE: 06-01-11

NORTH LEG

Rt	Thru	Lt	
7	772	344	Total
2	181	86	1st
2	212	74	2nd
1	172	94	3rd
2	207	90	4th

	1st	2nd	3rd	4th	Total
Rt	56	48	52	51	207
Thru	1	1	1	2	5
Lt	23	31	36	58	148

Total	1st	2nd	3rd	4th	
5	1	2	0	2	Lt
48	27	11	10	0	Thru
23	9	5	7	2	Rt

	Lt	Thru	Rt
1st	1	310	85
2nd	2	280	92
3rd	1	198	87
4th	9	180	99
Total	13	968	363

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : IRWINDALE — IRWINDALE

EAST-WEST STREET : GLADSTONE — 06-01-11

BEGINNING TIME : 04:00PM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
						SB NORTH LEG						
1	187	53	0	22	1	0	3	2	0	1	2	272
0	105	62	0	14	5	0	0	0	0	5	1	192
1	144	65	0	7	5	0	2	2	1	2	2	231
1	136	67	0	12	2	0	2	3	0	1	2	226
2	171	81	0	4	4	0	1	1	0	5	0	269
1	204	69	0	4	5	0	1	0	1	3	0	288
1	170	92	0	0 (43)	2	0	1 (12)	0	0	1 (17)	0	267
2	203	88	0	4	2	0	0	0	0	0	0	299
						TT=43+12+17=72						
9	1320	577	0	67	26	0	10	8	2	18	7	2044
						NB SOUTH LEG						
48	199	3	1	6	0	8	5	0	1	9	0	280
51	219	4	1	4	0	8	1	0	1	5	1	295
74	295	0	0	5	1	7	1	0	0	7	0	390
64	265	2	1	6	1	6	0	1	0	3	0	349
71	298	1	7	8	0	6	0	0	1	4	0	396
82	276	2	1	4	0	8	0	0	1	0	0	374
82	196	1	0	1 (34)	0	5	0 (29)	0	0	1 (16)	0	286
98	179	8	0	0	1	1	0	0	0	1	0	288
						TT=34+29+16=79						
570	1927	21	11	34	3	49	7	1	4	30	1	2658
						WB EAST LEG						
49	1	27	4	0	1	0	0	0	1	0	0	83
42	1	17	3	0	2	0	0	1	1	0	1	68
40	3	40	3	0	1	2	1	1	0	0	1	92
23	3	31	1	0	0	1	0	1	0	0	2	62
56	1	22	0	0	0	0	0	1	0	0	0	80
44	1	31	4	0	0	0	0	0	0	0	0	80
50	1	34	0	0 (9)	0	1	0 (7)	0	1	0 (3)	2	89
48	2	58	2	0	0	0	0	0	1	0	0	111
						TT=9+7+3=19						
352	13	260	17	0	4	4	1	4	4	0	6	665
						EB WEST LEG						
4	5	0	1	1	1	0	0	0	0	0	0	12
7	12	2	0	0	0	0	1	0	0	0	0	22
9	22	1	0	0	0	0	0	0	0	0	0	32
8	12	0	1	0	0	0	0	0	0	0	0	21
9	27	1	0	0	0	0	0	0	0	0	0	37
5	11	2	0	0	0	0	0	0	0	0	0	18
7	10	0	0	0 (1)	0	0	0 (0)	0	0	0 (0)	0	17
2	0	1	0	0	0	0	0	0	0	0	1	4
						TT=1+0+0=1						
51	99	7	2	1	1	0	1	0	0	0	1	163

Prepared by Newport Traffic Studies

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	10	10	495	65	580	10	515	55	185	780	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.92		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	2569		1719	1810	1468	1504	3282	1468	1444	3436	
Flt Permitted	0.64	1.00		0.74	1.00	1.00	0.26	1.00	1.00	0.22	1.00	
Satd. Flow (perm)	1218	2569		1343	1810	1468	404	3282	1468	340	3436	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	6	11	11	556	73	652	11	579	62	208	876	6
RTOR Reduction (vph)	0	6	0	0	0	93	0	0	45	0	1	0
Lane Group Flow (vph)	6	16	0	556	73	559	11	579	17	208	881	0
Heavy Vehicles (%)	0%	35%	25%	5%	5%	10%	20%	10%	10%	25%	5%	0%
Turn Type	pm+pt	NA		Perm	NA	pm+ov	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	7	4			8	1	5	2		1	6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)	42.1	42.1		37.4	37.4	48.3	24.0	23.3	23.3	38.2	33.5	
Effective Green, g (s)	42.1	42.1		37.4	37.4	48.3	24.0	23.3	23.3	38.2	33.5	
Actuated g/C Ratio	0.48	0.48		0.42	0.42	0.55	0.27	0.26	0.26	0.43	0.38	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	585	1225		569	767	869	119	866	387	283	1304	
v/s Ratio Prot	0.00	c0.01			0.04	c0.08	0.00	0.18		c0.09	0.26	
v/s Ratio Perm	0.00			c0.41		0.30	0.02		0.01	c0.23		
v/c Ratio	0.01	0.01		0.98	0.10	0.64	0.09	0.67	0.04	0.73	0.68	
Uniform Delay, d1	12.2	12.2		25.0	15.3	14.0	23.7	29.0	24.2	18.1	22.9	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.0	0.0		31.6	0.1	1.6	0.3	4.1	0.2	9.5	2.8	
Delay (s)	12.2	12.2		56.6	15.3	15.6	24.1	33.1	24.4	27.6	25.7	
Level of Service	B	B		E	B	B	C	C	C	C	C	
Approach Delay (s)		12.2			33.4			32.1			26.1	
Approach LOS		B			C			C			C	

Intersection Summary			
HCM Average Control Delay	30.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	88.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	69.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	25	35	130	20	200	15	770	90	165	750	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.91		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	2961		1719	1727	1346	1719	3282	1538	1388	3281	
Flt Permitted	0.74	1.00		0.71	1.00	1.00	0.35	1.00	1.00	0.23	1.00	
Satd. Flow (perm)	1412	2961		1289	1727	1346	625	3282	1538	331	3281	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	5	27	38	140	22	215	16	828	97	177	806	5
RTOR Reduction (vph)	0	31	0	0	0	31	0	0	53	0	0	0
Lane Group Flow (vph)	5	34	0	140	22	184	16	828	44	177	811	0
Heavy Vehicles (%)	0%	20%	5%	5%	10%	20%	5%	10%	5%	30%	10%	0%
Turn Type	Perm	NA		Perm	NA	pt+ov	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4			8	8 1	5	2		1	6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	11.1	11.1		11.1	11.1	23.2	26.6	25.9	25.9	38.0	33.3	
Effective Green, g (s)	11.1	11.1		11.1	11.1	23.2	26.6	25.9	25.9	38.0	33.3	
Actuated g/C Ratio	0.19	0.19		0.19	0.19	0.41	0.47	0.45	0.45	0.67	0.58	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	274	576		251	336	547	305	1489	698	370	1913	
v/s Ratio Prot		0.01			0.01	c0.14	0.00	c0.25		c0.07	0.25	
v/s Ratio Perm	0.00			c0.11			0.02		0.03	0.25		
v/c Ratio	0.02	0.06		0.56	0.07	0.34	0.05	0.56	0.06	0.48	0.42	
Uniform Delay, d1	18.6	18.7		20.8	18.8	11.7	8.2	11.4	8.8	5.0	6.6	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.0	0.0		2.7	0.1	0.4	0.1	1.5	0.2	1.0	0.7	
Delay (s)	18.6	18.8		23.5	18.9	12.0	8.3	12.9	8.9	6.0	7.3	
Level of Service	B	B		C	B	B	A	B	A	A	A	
Approach Delay (s)		18.8			16.7			12.4			7.0	
Approach LOS		B			B			B			A	

Intersection Summary			
HCM Average Control Delay	11.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	57.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	54.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	70	30	130	10	175	10	1170	330	310	700	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.95		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3395		1719	1727	1538	1289	3438	1468	1641	3429	
Flt Permitted	0.75	1.00		0.41	1.00	1.00	0.37	1.00	1.00	0.10	1.00	
Satd. Flow (perm)	1426	3395		746	1727	1538	498	3438	1468	175	3429	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	5	74	32	138	11	186	11	1245	351	330	745	5
RTOR Reduction (vph)	0	30	0	0	0	10	0	0	128	0	0	0
Lane Group Flow (vph)	5	76	0	138	11	176	11	1245	223	330	750	0
Heavy Vehicles (%)	0%	0%	5%	5%	10%	5%	40%	5%	10%	10%	5%	30%
Turn Type	Perm	NA		pm+pt	NA	pm+ov	pm+pt	NA	pm+ov	pm+pt	NA	
Protected Phases		4		3	8	1	5	2	3	1	6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)	5.7	5.7		14.1	14.1	26.1	36.3	35.5	39.9	51.5	46.7	
Effective Green, g (s)	5.7	5.7		14.1	14.1	26.1	36.3	35.5	39.9	51.5	46.7	
Actuated g/C Ratio	0.08	0.08		0.19	0.19	0.35	0.49	0.48	0.54	0.70	0.63	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	110	263		201	331	629	254	1658	876	361	2176	
v/s Ratio Prot		0.02		c0.04	0.01	0.05	0.00	0.36	0.02	c0.15	0.22	
v/s Ratio Perm	0.00			c0.09		0.07	0.02		0.14	c0.49		
v/c Ratio	0.05	0.29		0.69	0.03	0.28	0.04	0.75	0.25	0.91	0.34	
Uniform Delay, d1	31.4	32.0		26.8	24.2	17.0	9.5	15.5	8.9	19.8	6.3	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.2	0.6		9.3	0.0	0.2	0.1	3.2	0.2	26.8	0.4	
Delay (s)	31.6	32.7		36.2	24.2	17.3	9.6	18.6	9.1	46.6	6.7	
Level of Service	C	C		D	C	B	A	B	A	D	A	
Approach Delay (s)		32.6			25.3			16.5			18.9	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM Average Control Delay	18.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	73.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	73.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	10	10	495	65	630	10	515	55	235	780	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.92		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	2569		1719	1810	1380	1504	3282	1468	1280	3436	
Flt Permitted	0.71	1.00		0.74	1.00	1.00	0.32	1.00	1.00	0.22	1.00	
Satd. Flow (perm)	1348	2569		1343	1810	1380	510	3282	1468	301	3436	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	6	11	11	556	73	708	11	579	62	264	876	6
RTOR Reduction (vph)	0	6	0	0	0	14	0	0	46	0	1	0
Lane Group Flow (vph)	6	16	0	556	73	694	11	579	16	264	881	0
Heavy Vehicles (%)	0%	35%	25%	5%	5%	17%	20%	10%	10%	41%	5%	0%
Turn Type	Perm	NA		Perm	NA	pm+ov	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4			8	1	5	2		1	6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)	33.8	33.8		33.8	33.8	48.2	22.1	21.3	21.3	39.7	34.9	
Effective Green, g (s)	33.8	33.8		33.8	33.8	48.2	22.1	21.3	21.3	39.7	34.9	
Actuated g/C Ratio	0.41	0.41		0.41	0.41	0.59	0.27	0.26	0.26	0.49	0.43	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	559	1065		557	751	884	148	858	384	320	1471	
v/s Ratio Prot		0.01			0.04	c0.14	0.00	0.18		c0.15	0.26	
v/s Ratio Perm	0.00			c0.41		0.36	0.02		0.01	c0.26		
v/c Ratio	0.01	0.01		1.00	0.10	0.79	0.07	0.67	0.04	0.82	0.60	
Uniform Delay, d1	14.0	14.0		23.8	14.5	12.7	21.8	27.0	22.5	15.2	17.9	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.0	0.0		37.4	0.1	4.6	0.2	4.2	0.2	15.7	1.8	
Delay (s)	14.0	14.0		61.2	14.6	17.3	22.0	31.2	22.7	30.9	19.7	
Level of Service	B	B		E	B	B	C	C	C	C	B	
Approach Delay (s)		14.0			35.4			30.3			22.3	
Approach LOS		B			D			C			C	

Intersection Summary			
HCM Average Control Delay	29.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	81.5	Sum of lost time (s)	4.0
Intersection Capacity Utilization	71.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	25	35	130	20	250	15	770	90	215	750	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.91		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	2961		1719	1727	1106	1719	3282	1538	1236	3281	
Flt Permitted	0.74	1.00		0.71	1.00	1.00	0.35	1.00	1.00	0.20	1.00	
Satd. Flow (perm)	1412	2961		1289	1727	1106	625	3282	1538	265	3281	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	5	27	38	140	22	269	16	828	97	231	806	5
RTOR Reduction (vph)	0	30	0	0	0	21	0	0	58	0	0	0
Lane Group Flow (vph)	5	35	0	140	22	248	16	828	39	231	811	0
Heavy Vehicles (%)	0%	20%	5%	5%	10%	46%	5%	10%	5%	46%	10%	0%
Turn Type	Perm	NA		Perm	NA	pt+ov	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4			8	8 1	5	2		1	6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	12.4	12.4		12.4	12.4	26.6	24.2	23.5	23.5	37.7	33.0	
Effective Green, g (s)	12.4	12.4		12.4	12.4	26.6	24.2	23.5	23.5	37.7	33.0	
Actuated g/C Ratio	0.21	0.21		0.21	0.21	0.46	0.42	0.40	0.40	0.65	0.57	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	301	632		275	369	506	274	1327	622	342	1864	
v/s Ratio Prot		0.01			0.01	c0.22	0.00	0.25		c0.12	0.25	
v/s Ratio Perm	0.00			0.11			0.02		0.03	c0.32		
v/c Ratio	0.02	0.06		0.51	0.06	0.49	0.06	0.62	0.06	0.68	0.43	
Uniform Delay, d1	18.0	18.2		20.2	18.2	11.0	10.0	13.8	10.6	6.6	7.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.0	0.0		1.5	0.1	0.8	0.1	2.2	0.2	5.2	0.7	
Delay (s)	18.1	18.2		21.6	18.3	11.8	10.1	16.0	10.8	11.8	7.9	
Level of Service	B	B		C	B	B	B	B	B	B	A	
Approach Delay (s)		18.2			15.3			15.4			8.8	
Approach LOS		B			B			B			A	

Intersection Summary			
HCM Average Control Delay	12.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	58.1	Sum of lost time (s)	4.0
Intersection Capacity Utilization	57.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	70	30	130	10	225	10	1170	330	360	700	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.95		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3395		1719	1727	1282	1289	3438	1468	1467	3429	
Flt Permitted	0.75	1.00		0.69	1.00	1.00	0.37	1.00	1.00	0.10	1.00	
Satd. Flow (perm)	1426	3395		1240	1727	1282	498	3438	1468	153	3429	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	5	74	32	138	11	239	11	1245	351	383	745	5
RTOR Reduction (vph)	0	27	0	0	0	10	0	0	129	0	0	0
Lane Group Flow (vph)	5	79	0	138	11	229	11	1245	222	383	750	0
Heavy Vehicles (%)	0%	0%	5%	5%	10%	26%	40%	5%	10%	23%	5%	30%
Turn Type	Perm	NA		Perm	NA	pt+ov	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4			8	8 1	5	2		1	6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	13.1	13.1		13.1	13.1	34.9	37.2	36.4	36.4	58.2	53.4	
Effective Green, g (s)	13.1	13.1		13.1	13.1	34.9	37.2	36.4	36.4	58.2	53.4	
Actuated g/C Ratio	0.17	0.17		0.17	0.17	0.44	0.47	0.46	0.46	0.73	0.67	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	236	561		205	285	564	242	1578	674	407	2309	
v/s Ratio Prot		0.02			0.01	0.18	0.00	0.36		c0.21	0.22	
v/s Ratio Perm	0.00			c0.11			0.02		0.15	c0.48		
v/c Ratio	0.02	0.14		0.67	0.04	0.41	0.05	0.79	0.33	0.94	0.32	
Uniform Delay, d1	27.7	28.3		31.1	27.8	15.1	11.3	18.2	13.7	22.5	5.4	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.0	0.1		8.4	0.1	0.5	0.1	4.1	1.3	30.0	0.4	
Delay (s)	27.8	28.4		39.5	27.9	15.6	11.3	22.3	15.0	52.5	5.8	
Level of Service	C	C		D	C	B	B	C	B	D	A	
Approach Delay (s)		28.4			24.5			20.6			21.6	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	21.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	79.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	76.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	10	10	540	70	685	10	560	60	255	850	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.92		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	2569		1719	1810	1380	1504	3282	1468	1280	3436	
Flt Permitted	1.00	1.00		0.58	1.00	1.00	0.28	1.00	1.00	0.20	1.00	
Satd. Flow (perm)	1900	2569		1049	1810	1380	443	3282	1468	268	3436	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	6	11	11	607	79	770	11	629	67	287	955	6
RTOR Reduction (vph)	0	11	0	0	0	100	0	0	28	0	1	0
Lane Group Flow (vph)	6	11	0	607	79	670	11	629	39	287	960	0
Heavy Vehicles (%)	0%	35%	25%	5%	5%	17%	20%	10%	10%	41%	5%	0%
Turn Type	pm+pt	NA		pm+pt	NA	pt+ov	pm+pt	NA	pm+ov	pm+pt	NA	
Protected Phases	7	4		3	8	8 1	5	2	3	1	6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	3.6	2.9		29.7	25.0	41.1	20.1	19.4	42.2	35.5	30.8	
Effective Green, g (s)	3.6	2.9		29.7	25.0	41.1	20.1	19.4	42.2	35.5	30.8	
Actuated g/C Ratio	0.05	0.04		0.41	0.34	0.56	0.27	0.27	0.58	0.48	0.42	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	93	102		634	618	775	132	870	927	297	1446	
v/s Ratio Prot	0.00	0.00		c0.30	0.04	c0.49	0.00	0.19	0.01	c0.16	0.28	
v/s Ratio Perm	0.00			0.09			0.02		0.01	c0.31		
v/c Ratio	0.06	0.11		0.96	0.13	0.86	0.08	0.72	0.04	0.97	0.66	
Uniform Delay, d1	33.2	33.9		20.2	16.6	13.7	19.4	24.5	6.7	15.6	17.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	0.5		25.3	0.1	9.9	0.3	5.2	0.0	42.7	2.4	
Delay (s)	33.5	34.4		45.5	16.7	23.6	19.7	29.6	6.7	58.3	19.5	
Level of Service	C	C		D	B	C	B	C	A	E	B	
Approach Delay (s)		34.2			32.3			27.3			28.4	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	29.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	73.2	Sum of lost time (s)	4.0
Intersection Capacity Utilization	76.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	25	40	140	20	275	15	840	100	235	820	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.91		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	2958		1719	1727	1106	1719	3282	1538	1236	3281	
Flt Permitted	0.74	1.00		0.51	1.00	1.00	0.32	1.00	1.00	0.17	1.00	
Satd. Flow (perm)	1412	2958		916	1727	1106	580	3282	1538	223	3281	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	5	27	43	151	22	296	16	903	108	253	882	5
RTOR Reduction (vph)	0	38	0	0	0	108	0	0	51	0	0	0
Lane Group Flow (vph)	5	32	0	151	22	188	16	903	57	253	887	0
Heavy Vehicles (%)	0%	20%	5%	5%	10%	46%	5%	10%	5%	46%	10%	0%
Turn Type	pm+pt	NA		pm+pt	NA	pt+ov	pm+pt	NA	pt+ov	pm+pt	NA	
Protected Phases	7	4		3	8	8 1	5	2	2 3	1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	8.7	8.0		15.1	11.2	26.3	27.4	26.7	34.6	41.8	37.1	
Effective Green, g (s)	8.7	8.0		15.1	11.2	26.3	27.4	26.7	34.6	41.8	37.1	
Actuated g/C Ratio	0.13	0.12		0.23	0.17	0.40	0.42	0.41	0.53	0.64	0.56	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	191	360		258	294	443	254	1334	810	313	1853	
v/s Ratio Prot	0.00	0.01		c0.03	0.01	c0.17	0.00	0.28	0.04	c0.14	0.27	
v/s Ratio Perm	0.00			c0.10			0.03			c0.38		
v/c Ratio	0.03	0.09		0.59	0.07	0.42	0.06	0.68	0.07	0.81	0.48	
Uniform Delay, d1	24.8	25.6		22.0	22.9	14.2	11.3	16.0	7.6	10.9	8.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.1	0.1		3.4	0.1	0.7	0.1	2.8	0.0	14.2	0.9	
Delay (s)	24.9	25.7		25.4	23.0	14.9	11.4	18.7	7.7	25.0	9.4	
Level of Service	C	C		C	C	B	B	B	A	C	A	
Approach Delay (s)		25.7			18.7			17.5			12.9	
Approach LOS		C			B			B			B	

Intersection Summary			
HCM Average Control Delay	16.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	65.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	60.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	75	35	140	10	245	10	1275	360	390	765	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.95		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3385		1719	1727	1282	1289	3438	1468	1467	3430	
Flt Permitted	0.75	1.00		0.49	1.00	1.00	0.34	1.00	1.00	0.09	1.00	
Satd. Flow (perm)	1426	3385		879	1727	1282	465	3438	1468	146	3430	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	5	80	37	149	11	261	11	1356	383	415	814	5
RTOR Reduction (vph)	0	33	0	0	0	68	0	0	111	0	0	0
Lane Group Flow (vph)	5	84	0	149	11	193	11	1356	272	415	819	0
Heavy Vehicles (%)	0%	0%	5%	5%	10%	26%	40%	5%	10%	23%	5%	30%
Turn Type	pm+pt	NA		pm+pt	NA	pt+ov	pm+pt	NA	pt+ov	pm+pt	NA	
Protected Phases	7	4		3	8	8 1	5	2	2 3	1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	10.3	9.6		17.9	13.4	36.5	39.1	38.4	46.9	61.5	56.8	
Effective Green, g (s)	10.3	9.6		17.9	13.4	36.5	39.1	38.4	46.9	61.5	56.8	
Actuated g/C Ratio	0.12	0.11		0.20	0.15	0.42	0.45	0.44	0.54	0.70	0.65	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	171	371		223	264	534	214	1507	786	391	2224	
v/s Ratio Prot	0.00	0.02		c0.03	0.01	0.15	0.00	0.39	c0.19	c0.23	0.24	
v/s Ratio Perm	0.00			c0.10			0.02			c0.52		
v/c Ratio	0.03	0.23		0.67	0.04	0.36	0.05	0.90	0.35	1.06	0.37	
Uniform Delay, d1	34.2	35.6		31.7	31.6	17.6	13.5	22.8	11.6	26.9	7.1	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.1	0.3		7.4	0.1	0.4	0.1	8.9	0.3	62.7	0.5	
Delay (s)	34.3	35.9		39.0	31.7	18.0	13.6	31.8	11.9	89.6	7.6	
Level of Service	C	D		D	C	B	B	C	B	F	A	
Approach Delay (s)		35.9			25.8			27.3			35.2	
Approach LOS		D			C			C			D	

Intersection Summary			
HCM Average Control Delay	30.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	87.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	81.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	10	10	495	65	580	10	515	55	235	780	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.92		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	2569		1719	1810	1468	1504	3282	1468	1280	3436	
Flt Permitted	0.71	1.00		0.74	1.00	1.00	0.31	1.00	1.00	0.24	1.00	
Satd. Flow (perm)	1348	2569		1343	1810	1468	498	3282	1468	318	3436	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	6	11	11	556	73	652	11	579	62	264	876	6
RTOR Reduction (vph)	0	6	0	0	0	16	0	0	45	0	1	0
Lane Group Flow (vph)	6	16	0	556	73	636	11	579	17	264	881	0
Heavy Vehicles (%)	0%	35%	25%	5%	5%	10%	20%	10%	10%	41%	5%	0%
Turn Type	Perm	NA		Perm	NA	pt+ov	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4			8	8 1	5	2		1	6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	32.4	32.4		32.4	32.4	48.4	22.0	21.2	21.2	37.2	32.4	
Effective Green, g (s)	32.4	32.4		32.4	32.4	48.4	22.0	21.2	21.2	37.2	32.4	
Actuated g/C Ratio	0.42	0.42		0.42	0.42	0.62	0.28	0.27	0.27	0.48	0.42	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	563	1073		561	756	916	152	897	401	301	1435	
v/s Ratio Prot		0.01			0.04	c0.43	0.00	0.18		c0.14	0.26	
v/s Ratio Perm	0.00			c0.41			0.02		0.01	c0.28		
v/c Ratio	0.01	0.01		0.99	0.10	0.69	0.07	0.65	0.04	0.88	0.61	
Uniform Delay, d1	13.2	13.2		22.5	13.7	9.7	20.1	24.9	20.7	14.8	17.7	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.0	0.0		35.6	0.1	2.3	0.2	3.6	0.2	23.7	2.0	
Delay (s)	13.2	13.2		58.0	13.8	12.0	20.3	28.5	20.9	38.5	19.7	
Level of Service	B	B		E	B	B	C	C	C	D	B	
Approach Delay (s)		13.2			32.1			27.6			24.0	
Approach LOS		B			C			C			C	

Intersection Summary			
HCM Average Control Delay	28.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	77.6	Sum of lost time (s)	4.0
Intersection Capacity Utilization	71.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	25	35	130	20	200	15	770	90	215	750	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.91		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	2961		1719	1727	1346	1719	3282	1538	1236	3281	
Flt Permitted	0.74	1.00		0.71	1.00	1.00	0.35	1.00	1.00	0.21	1.00	
Satd. Flow (perm)	1412	2961		1289	1727	1346	625	3282	1538	272	3281	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	5	27	38	140	22	215	16	828	97	231	806	5
RTOR Reduction (vph)	0	31	0	0	0	21	0	0	57	0	0	0
Lane Group Flow (vph)	5	34	0	140	22	194	16	828	40	231	811	0
Heavy Vehicles (%)	0%	20%	5%	5%	10%	20%	5%	10%	5%	46%	10%	0%
Turn Type	Perm	NA		Perm	NA	pt+ov	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4			8	8 1	5	2		1	6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	11.1	11.1		11.1	11.1	25.2	24.2	23.5	23.5	37.6	32.9	
Effective Green, g (s)	11.1	11.1		11.1	11.1	25.2	24.2	23.5	23.5	37.6	32.9	
Actuated g/C Ratio	0.20	0.20		0.20	0.20	0.44	0.43	0.41	0.41	0.66	0.58	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	276	580		252	338	598	280	1360	637	352	1904	
v/s Ratio Prot		0.01			0.01	c0.14	0.00	0.25		c0.12	0.25	
v/s Ratio Perm	0.00			c0.11			0.02		0.03	c0.32		
v/c Ratio	0.02	0.06		0.56	0.07	0.32	0.06	0.61	0.06	0.66	0.43	
Uniform Delay, d1	18.4	18.6		20.6	18.6	10.2	9.4	13.0	10.0	6.0	6.6	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.0	0.0		2.6	0.1	0.3	0.1	2.0	0.2	4.4	0.7	
Delay (s)	18.4	18.6		23.2	18.7	10.5	9.5	15.0	10.2	10.4	7.3	
Level of Service	B	B		C	B	B	A	B	B	B	A	
Approach Delay (s)		18.6			15.7			14.4			8.0	
Approach LOS		B			B			B			A	

Intersection Summary			
HCM Average Control Delay	12.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	56.7	Sum of lost time (s)	4.0
Intersection Capacity Utilization	57.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	70	30	130	10	175	10	1170	330	360	700	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.95		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3395		1719	1727	1538	1289	3438	1468	1467	3429	
Flt Permitted	0.75	1.00		0.69	1.00	1.00	0.37	1.00	1.00	0.10	1.00	
Satd. Flow (perm)	1426	3395		1240	1727	1538	498	3438	1468	153	3429	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	5	74	32	138	11	186	11	1245	351	383	745	5
RTOR Reduction (vph)	0	27	0	0	0	10	0	0	128	0	0	0
Lane Group Flow (vph)	5	79	0	138	11	176	11	1245	223	383	750	0
Heavy Vehicles (%)	0%	0%	5%	5%	10%	5%	40%	5%	10%	23%	5%	30%
Turn Type	Perm	NA		Perm	NA	pt+ov	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4			8	8 1	5	2		1	6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	12.7	12.7		12.7	12.7	34.4	37.3	36.5	36.5	58.2	53.4	
Effective Green, g (s)	12.7	12.7		12.7	12.7	34.4	37.3	36.5	36.5	58.2	53.4	
Actuated g/C Ratio	0.16	0.16		0.16	0.16	0.44	0.47	0.46	0.46	0.74	0.68	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	230	546		200	278	671	243	1590	679	408	2321	
v/s Ratio Prot		0.02			0.01	0.11	0.00	0.36		c0.21	0.22	
v/s Ratio Perm	0.00			c0.11			0.02		0.15	c0.48		
v/c Ratio	0.02	0.14		0.69	0.04	0.26	0.05	0.78	0.33	0.94	0.32	
Uniform Delay, d1	27.9	28.4		31.2	28.0	14.2	11.2	17.9	13.4	22.4	5.3	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.0	0.1		9.8	0.1	0.2	0.1	3.9	1.3	29.2	0.4	
Delay (s)	27.9	28.6		41.0	28.0	14.4	11.3	21.8	14.7	51.6	5.6	
Level of Service	C	C		D	C	B	B	C	B	D	A	
Approach Delay (s)		28.5			25.8			20.2			21.2	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	21.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	78.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	76.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	10	10	540	70	630	10	560	60	255	850	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.92		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	2569		1719	1810	1380	1504	3282	1468	1280	3436	
Flt Permitted	0.71	1.00		0.44	1.00	1.00	0.29	1.00	1.00	0.21	1.00	
Satd. Flow (perm)	1341	2569		800	1810	1380	455	3282	1468	285	3436	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	6	11	11	607	79	708	11	629	67	287	955	6
RTOR Reduction (vph)	0	10	0	0	0	13	0	0	28	0	1	0
Lane Group Flow (vph)	6	12	0	607	79	695	11	629	39	287	960	0
Heavy Vehicles (%)	0%	35%	25%	5%	5%	17%	20%	10%	10%	41%	5%	0%
Turn Type	Perm	NA		pm+pt	NA	pt+ov	pm+pt	NA	pm+ov	pm+pt	NA	
Protected Phases		4		3	8	8 1	5	2	3	1	6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	5.9	5.9		36.7	36.7	55.8	26.2	25.5	52.3	44.6	39.9	
Effective Green, g (s)	5.9	5.9		36.7	36.7	55.8	26.2	25.5	52.3	44.6	39.9	
Actuated g/C Ratio	0.07	0.07		0.41	0.41	0.62	0.29	0.29	0.59	0.50	0.45	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	89	170		605	744	862	142	937	926	311	1535	
v/s Ratio Prot		0.00		c0.30	0.04	c0.50	0.00	0.19	0.01	c0.16	0.28	
v/s Ratio Perm	0.00			c0.11			0.02		0.01	c0.30		
v/c Ratio	0.07	0.07		1.00	0.11	0.81	0.08	0.67	0.04	0.92	0.63	
Uniform Delay, d1	39.1	39.1		24.3	16.2	12.7	22.5	28.2	7.9	16.9	19.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	0.2		37.4	0.1	5.6	0.2	3.8	0.0	31.6	1.9	
Delay (s)	39.4	39.3		61.8	16.3	18.2	22.7	32.0	7.9	48.5	20.9	
Level of Service	D	D		E	B	B	C	C	A	D	C	
Approach Delay (s)		39.3			37.1			29.6			27.3	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM Average Control Delay	31.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	89.3	Sum of lost time (s)	4.0
Intersection Capacity Utilization	76.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	25	40	140	20	220	15	840	100	235	820	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.91		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	2958		1719	1727	1106	1719	3282	1538	1236	3281	
Flt Permitted	0.74	1.00		0.44	1.00	1.00	0.32	1.00	1.00	0.17	1.00	
Satd. Flow (perm)	1412	2958		799	1727	1106	580	3282	1538	226	3281	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	5	27	43	151	22	237	16	903	108	253	882	5
RTOR Reduction (vph)	0	39	0	0	0	14	0	0	50	0	0	0
Lane Group Flow (vph)	5	31	0	151	22	223	16	903	58	253	887	0
Heavy Vehicles (%)	0%	20%	5%	5%	10%	46%	5%	10%	5%	46%	10%	0%
Turn Type	Perm	NA		pm+pt	NA	pt+ov	pm+pt	NA	pt+ov	pm+pt	NA	
Protected Phases		4		3	8	8 1	5	2	2 3	1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	6.6	6.6		15.1	15.1	30.2	27.1	26.4	34.9	41.5	36.8	
Effective Green, g (s)	6.6	6.6		15.1	15.1	30.2	27.1	26.4	34.9	41.5	36.8	
Actuated g/C Ratio	0.10	0.10		0.23	0.23	0.47	0.42	0.41	0.54	0.64	0.57	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	144	302		251	404	517	256	1341	831	319	1869	
v/s Ratio Prot		0.01		c0.04	0.01	c0.20	0.00	0.28	0.04	c0.14	0.27	
v/s Ratio Perm	0.00			c0.10			0.03			c0.37		
v/c Ratio	0.03	0.10		0.60	0.05	0.43	0.06	0.67	0.07	0.79	0.47	
Uniform Delay, d1	26.1	26.3		21.1	19.2	11.5	11.0	15.6	7.1	10.3	8.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.1	0.2		4.0	0.1	0.6	0.1	2.7	0.0	12.7	0.9	
Delay (s)	26.2	26.5		25.2	19.3	12.1	11.1	18.3	7.1	23.0	9.1	
Level of Service	C	C		C	B	B	B	B	A	C	A	
Approach Delay (s)		26.5			17.3			17.0			12.2	
Approach LOS		C			B			B			B	

Intersection Summary			
HCM Average Control Delay	15.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	64.6	Sum of lost time (s)	4.0
Intersection Capacity Utilization	60.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	75	35	140	10	190	10	1275	360	390	765	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.95		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3385		1719	1727	1282	1289	3438	1468	1467	3430	
Flt Permitted	0.75	1.00		0.42	1.00	1.00	0.34	1.00	1.00	0.09	1.00	
Satd. Flow (perm)	1426	3385		759	1727	1282	465	3438	1468	146	3430	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	5	80	37	149	11	202	11	1356	383	415	814	5
RTOR Reduction (vph)	0	34	0	0	0	5	0	0	105	0	0	0
Lane Group Flow (vph)	5	83	0	149	11	197	11	1356	278	415	819	0
Heavy Vehicles (%)	0%	0%	5%	5%	10%	26%	40%	5%	10%	23%	5%	30%
Turn Type	Perm	NA		pm+pt	NA	pt+ov	pm+pt	NA	pt+ov	pm+pt	NA	
Protected Phases		4		3	8	8 1	5	2	2 3	1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	6.5	6.5		15.4	15.4	38.4	39.2	38.4	47.3	61.4	56.6	
Effective Green, g (s)	6.5	6.5		15.4	15.4	38.4	39.2	38.4	47.3	61.4	56.6	
Actuated g/C Ratio	0.08	0.08		0.18	0.18	0.45	0.46	0.45	0.56	0.72	0.67	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	109	259		193	314	581	223	1557	819	402	2289	
v/s Ratio Prot		0.02		c0.04	0.01	0.15	0.00	0.39	0.19	c0.23	0.24	
v/s Ratio Perm	0.00			c0.10			0.02			c0.52		
v/c Ratio	0.05	0.32		0.77	0.04	0.34	0.05	0.87	0.34	1.03	0.36	
Uniform Delay, d1	36.3	37.1		32.2	28.6	15.0	12.4	21.0	10.2	25.9	6.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.2	0.7		17.2	0.0	0.3	0.1	7.0	0.2	53.5	0.4	
Delay (s)	36.5	37.8		49.5	28.6	15.3	12.5	27.9	10.5	79.3	6.6	
Level of Service	D	D		D	C	B	B	C	B	E	A	
Approach Delay (s)		37.7			29.8			24.0			31.1	
Approach LOS		D			C			C			C	

Intersection Summary			
HCM Average Control Delay	27.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	84.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	81.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

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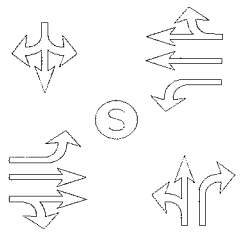
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	1 OF 9

E/W STREET : GLADSTONE STREET
N/S STREET : VINCENT AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 12
ROUTE 2A

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
GLADSTONE STREET						
EB LEFT	15	75%		15	5	20
EB THRU	105	5%		105	10	115
EB RIGHT	115	25%	**50**	165	15	180
WB LEFT	250	5%		250	25	275
WB THRU	760	5%		760	70	830
WB RIGHT	5	5%		5	5	10
VINCENT AVE						
NB LEFT	310	5%	**50**	360	30	390
NB THRU	10	90%		10	5	15
NB RIGHT	165	5%		165	15	180
SB LEFT	5	0%		5	5	10
SB THRU	15	15%		15	5	20
SB RIGHT	20	70%		20	5	25
TOTALS	**1775**		**100**	**1875**	**195**	**2070**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	10-Sep-13	VV.110264.0000	2 OF 9

E/W STREET : GLADSTONE STREET
N/S STREET : VINCENT AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 12
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
GLADSTONE STREET						
EB LEFT	15	75%		15	5	20
EB THRU	105	5%		105	10	115
EB RIGHT	115	25%	**50**	165	15	180
WB LEFT	250	5%		250	25	275
WB THRU	760	5%		760	70	830
WB RIGHT	5	5%		5	5	10
VINCENT AVE						
NB LEFT	310	5%		310	30	340
NB THRU	10	90%		10	5	15
NB RIGHT	165	5%		165	15	180
SB LEFT	5	0%		5	5	10
SB THRU	15	15%		15	5	20
SB RIGHT	20	70%		20	5	25
TOTALS	**1775**		**50**	**1825**	**195**	**2020**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	10-Sep-13	VV.110264.0000	3 OF 9

E/W STREET : GLADSTONE STREET
N/S STREET : VINCENT AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 12
ROUTE 3

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
GLADSTONE STREET						
EB LEFT	15	75%	**50**	65	5	70
EB THRU	105	5%		105	10	115
EB RIGHT	115	25%		115	10	125
WB LEFT	250	5%		250	25	275
WB THRU	760	5%		760	70	830
WB RIGHT	5	5%		5	5	10
VINCENT AVE						
NB LEFT	310	5%		310	30	340
NB THRU	10			10	5	15
NB RIGHT	165	5%		165	15	180
SB LEFT	5	0%		5	5	10
SB THRU	15	15%		15	5	20
SB RIGHT	20	70%		20	5	25
TOTALS	**1775**		**50**	**1825**	**190**	**2015**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	4 OF 9

E/W STREET : GLADSTONE STREET
N/S STREET : VINCENT AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 12
ROUTE 2A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
GLADSTONE STREET						
EB LEFT	10	70%		10	5	15
EB THRU	170	5%		170	15	185
EB RIGHT	105	49%	**50**	155	15	170
WB LEFT	115	0%		115	10	125
WB THRU	195	5%		195	20	215
WB RIGHT	5	0%		5	5	10
VINCENT AVE						
NB LEFT	140	37%	**50**	190	15	205
NB THRU	5	100%		5	5	10
NB RIGHT	170	5%		170	15	185
SB LEFT	10	20%		10	5	15
SB THRU	5	0%		5	5	10
SB RIGHT	10	65%		10	5	15
TOTALS	**940**		**100**	**1040**	**120**	**1160**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	10-Sep-13	VV.110264.0000	5 OF 9

E/W STREET : GLADSTONE STREET
N/S STREET : VINCENT AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 12
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
GLADSTONE STREET						
EB LEFT	10	70%		10	5	15
EB THRU	170	5%		170	15	185
EB RIGHT	105	49%	**50**	155	15	170
WB LEFT	115	0%		115	10	125
WB THRU	195	5%		195	20	215
WB RIGHT	5	0%		5	5	10
VINCENT AVE						
NB LEFT	140	15%		140	15	155
NB THRU	5	100%		5	5	10
NB RIGHT	170	5%		170	15	185
SB LEFT	10	20%		10	5	15
SB THRU	5	0%		5	5	10
SB RIGHT	10	65%		10	5	15
TOTALS	**940**		**50**	**990**	**120**	**1110**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	10-Sep-13	VV.110264.0000	6 OF 9

E/W STREET : GLADSTONE STREET
N/S STREET : VINCENT AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 12
ROUTE 3

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
GLADSTONE STREET						
EB LEFT	10	95%	**50**	60	5	65
EB THRU	170	5%		170	15	185
EB RIGHT	105	25%		105	10	115
WB LEFT	115	0%		115	10	125
WB THRU	195	5%		195	20	215
WB RIGHT	5	0%		5	5	10
VINCENT AVE						
NB LEFT	140	15%		140	15	155
NB THRU	5	100%		5	5	10
NB RIGHT	170	5%		170	15	185
SB LEFT	10	20%		10	5	15
SB THRU	5	0%		5	5	10
SB RIGHT	10	94%	**50**	60	5	65
TOTALS	**940**		**100**	**1040**	**115**	**1155**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	7 OF 9

E/W STREET : GLADSTONE STREET
N/S STREET : VINCENT AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 12
ROUTE 2A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
GLADSTONE STREET						
EB LEFT	5	5%		5	5	10
EB THRU	585	5%		585	55	640
EB RIGHT	150	33%	**50**	200	20	220
WB LEFT	150	5%		150	15	165
WB THRU	240	5%		240	20	260
WB RIGHT	5	5%		5	5	10
VINCENT AVE						
NB LEFT	90	56%	**50**	140	15	155
NB THRU	5	0%		5	5	10
NB RIGHT	355	5%		355	30	385
SB LEFT	5	0%		5	5	10
SB THRU	5	0%		5	5	10
SB RIGHT	5	35%		5	5	10
TOTALS	**1600**		**100**	**1700**	**185**	**1885**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	10-Sep-13	VV.110264.0000	8 OF 9

E/W STREET : GLADSTONE STREET
N/S STREET : VINCENT AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 12
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
GLADSTONE STREET						
EB LEFT	5	5%		5	5	10
EB THRU	585	5%		585	55	640
EB RIGHT	150	33%	**50**	200	20	220
WB LEFT	150	5%		150	15	165
WB THRU	240	5%		240	20	260
WB RIGHT	5	5%		5	5	10
VINCENT AVE						
NB LEFT	90	0%		90	10	100
NB THRU	5	0%		5	5	10
NB RIGHT	355	5%		355	30	385
SB LEFT	5	0%		5	5	10
SB THRU	5	0%		5	5	10
SB RIGHT	5	35%		5	5	10
TOTALS	**1600**		**50**	**1650**	**180**	**1830**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	10-Sep-13	VV.110264.0000	9 OF 9

E/W STREET : GLADSTONE STREET
N/S STREET : VINCENT AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 12
ROUTE 3

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
GLADSTONE STREET						
EB LEFT	5	100%	**50**	55	5	60
EB THRU	585	5%		585	55	640
EB RIGHT	150	10%		150	15	165
WB LEFT	150	5%		150	15	165
WB THRU	240	5%		240	20	260
WB RIGHT	5	5%		5	5	10
VINCENT AVE						
NB LEFT	90	0%		90	10	100
NB THRU	5	0%		5	5	10
NB RIGHT	355	5%		355	30	385
SB LEFT	5	0%		5	5	10
SB THRU	5	0%		5	5	10
SB RIGHT	5	94%	**50**	55	5	60
TOTALS	**1600**		**100**	**1700**	**175**	**1875**

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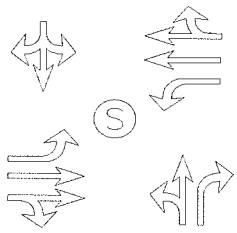
E/W STREET : GLADSTONE STREET
N/S STREET : VINCENT AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 12
ROUTE 2A

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
GLADSTONE STREET								
EB LEFT	3	10	30	35	**0**	35	5	40
EB THRU	101	5	15	115	**0**	115	10	125
EB RIGHT	88	29	87	175	**150**	325	30	355
WB LEFT	247	2	6	255	**0**	255	25	280
WB THRU	759	2	6	765	**0**	765	70	835
WB RIGHT	0	0	0	0	**0**	0	0	0
VINCENT AVE								
NB LEFT	310	2	6	315	**150**	465	40	505
NB THRU	1	7	21	20	**0**	20	5	25
NB RIGHT	154	12	36	190	**0**	190	15	205
SB LEFT	6	0	0	5	**0**	5	5	10
SB THRU	14	2	6	20	**0**	20	5	25
SB RIGHT	6	15	45	50	**0**	50	5	55
TOTALS	**1689**				**300**	**2245**	**215**	**2460**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	2 OF 9

E/W STREET : GLADSTONE STREET
N/S STREET : VINCENT AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 12
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
GLADSTONE STREET								
EB LEFT	3	10	30	35	**0**	35	5	40
EB THRU	101	5	15	115	**0**	115	10	125
EB RIGHT	88	29	87	175	**150**	325	30	355
WB LEFT	247	2	6	255	**0**	255	25	280
WB THRU	759	2	6	765	**0**	765	70	835
WB RIGHT	0	0	0	0	**0**	0	0	0
VINCENT AVE								
NB LEFT	310	2	6	315	**0**	315	30	345
NB THRU	1	7	21	20	**0**	20	5	25
NB RIGHT	154	12	36	190	**0**	190	15	205
SB LEFT	6	0	0	5	**0**	5	5	10
SB THRU	14	2	6	20	**0**	20	5	25
SB RIGHT	6	15	45	50	**0**	50	5	55
TOTALS	**1689**				**150**	**2095**	**205**	**2300**

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TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	3 OF 9

E/W STREET : GLADSTONE STREET
N/S STREET : VINCENT AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 12
ROUTE 3

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
GLADSTONE STREET								
EB LEFT	3	10	30	35	**150**	185	15	200
EB THRU	101	5	15	115	**0**	115	10	125
EB RIGHT	88	29	87	175	**0**	175	15	190
WB LEFT	247	2	6	255	**0**	255	25	280
WB THRU	759	2	6	765	**0**	765	70	835
WB RIGHT	0	0	0	0	**0**	0	0	0
VINCENT AVE								
NB LEFT	310	2	6	315	**0**	315	30	345
NB THRU	1	7	21	20	**0**	20	5	25
NB RIGHT	154	12	36	190	**0**	190	15	205
SB LEFT	6	0	0	5	**0**	5	5	10
SB THRU	14	2	6	20	**0**	20	5	25
SB RIGHT	6	15	45	50	**0**	50	5	55
TOTALS	**1689**				**150**	**2095**	**200**	**2295**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	4 OF 9

E/W STREET : GLADSTONE STREET
N/S STREET : VINCENT AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 12
ROUTE 2A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
GLADSTONE STREET								
EB LEFT	3	7	21	25	**0**	25	5	30
EB THRU	161	7	21	180	**0**	180	15	195
EB RIGHT	79	24	72	150	**150**	300	25	325
WB LEFT	117	0	0	115	**0**	115	10	125
WB THRU	190	5	15	205	**0**	205	20	225
WB RIGHT	2	0	0	5	**0**	5	5	10
VINCENT AVE								
NB LEFT	122	19	57	180	**150**	330	30	360
NB THRU	0	1	3	5	**0**	5	5	10
NB RIGHT	168	2	6	175	**0**	175	15	190
SB LEFT	7	2	6	15	**0**	15	5	20
SB THRU	4	0	0	5	**0**	5	5	10
SB RIGHT	3	5	15	20	**0**	20	5	25
TOTALS	**856**				**300**	**1380**	**145**	**1525**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	5 OF 9

E/W STREET : GLADSTONE STREET
N/S STREET : VINCENT AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 12
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
GLADSTONE STREET								
EB LEFT	3	7	21	25	**0**	25	5	30
EB THRU	161	7	21	180	**0**	180	15	195
EB RIGHT	79	24	72	150	**150**	300	25	325
WB LEFT	117	0	0	115	**0**	115	10	125
WB THRU	190	5	15	205	**0**	205	20	225
WB RIGHT	2	0	0	5	**0**	5	5	10
VINCENT AVE								
NB LEFT	122	19	57	180	**0**	180	15	195
NB THRU	0	1	3	5	**0**	5	5	10
NB RIGHT	168	2	6	175	**0**	175	15	190
SB LEFT	7	2	6	15	**0**	15	5	20
SB THRU	4	0	0	5	**0**	5	5	10
SB RIGHT	3	5	15	20	**0**	20	5	25
TOTALS	**856**				**150**	**1230**	**130**	**1360**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	6 OF 9

E/W STREET : GLADSTONE STREET
N/S STREET : VINCENT AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 12
ROUTE 3

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
GLADSTONE STREET								
EB LEFT	3	7	21	25	**150**	175	15	190
EB THRU	161	7	21	180	**0**	180	15	195
EB RIGHT	79	24	72	150	**0**	150	15	165
WB LEFT	117	0	0	115	**0**	115	10	125
WB THRU	190	5	15	205	**0**	205	20	225
WB RIGHT	2	0	0	5	**0**	5	5	10
VINCENT AVE								
NB LEFT	122	19	57	180	**0**	180	15	195
NB THRU	0	1	3	5	**0**	5	5	10
NB RIGHT	168	2	6	175	**0**	175	15	190
SB LEFT	7	2	6	15	**0**	15	5	20
SB THRU	4	0	0	5	**0**	5	5	10
SB RIGHT	3	5	15	20	**150**	170	15	185
TOTALS	**856**				**300**	**1380**	**140**	**1520**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	7 OF 9

E/W STREET : GLADSTONE STREET
N/S STREET : VINCENT AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 12
ROUTE 2A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
GLADSTONE STREET								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	581	2	6	585	**0**	585	55	640
EB RIGHT	135	17	51	185	**150**	335	30	365
WB LEFT	148	0	0	150	**0**	150	15	165
WB THRU	241	1	3	245	**0**	245	20	265
WB RIGHT	1	0	0	5	**0**	5	5	10
VINCENT AVE								
NB LEFT	92	0	0	90	**150**	240	20	260
NB THRU	1	0	0	5	**0**	5	5	10
NB RIGHT	356	1	3	360	**0**	360	30	390
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	2	1	3	5	**0**	5	5	10
TOTALS	**1557**				**300**	**1930**	**185**	**2115**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	8 OF 9

E/W STREET : GLADSTONE STREET
N/S STREET : VINCENT AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 12
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
GLADSTONE STREET								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	581	2	6	585	**0**	585	55	640
EB RIGHT	135	17	51	185	**150**	335	30	365
WB LEFT	148	0	0	150	**0**	150	15	165
WB THRU	241	1	3	245	**0**	245	20	265
WB RIGHT	1	0	0	5	**0**	5	5	10
VINCENT AVE								
NB LEFT	92	0	0	90	**0**	90	10	100
NB THRU	1	0	0	5	**0**	5	5	10
NB RIGHT	356	1	3	360	**0**	360	30	390
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	2	1	3	5	**0**	5	5	10
TOTALS	**1557**				**150**	**1780**	**175**	**1955**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	9 OF 9

E/W STREET : GLADSTONE STREET
N/S STREET : VINCENT AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 12
ROUTE 3

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
GLADSTONE STREET								
EB LEFT	0	0	0	0	**150**	150	15	165
EB THRU	581	2	6	585	**0**	585	55	640
EB RIGHT	135	17	51	185	**0**	185	15	200
WB LEFT	148	0	0	150	**0**	150	15	165
WB THRU	241	1	3	245	**0**	245	20	265
WB RIGHT	1	0	0	5	**0**	5	5	10
VINCENT AVE								
NB LEFT	92	0	0	90	**0**	90	10	100
NB THRU	1	0	0	5	**0**	5	5	10
NB RIGHT	356	1	3	360	**0**	360	30	390
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	2	1	3	5	**150**	155	15	170
TOTALS	**1557**				**300**	**1930**	**185**	**2115**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: VINCENT
EAST-WEST STREET: GLADSTONE
JURISDICTION: IRWINDALE

DATE: 06-08-11

PEAK HOUR: 07:15AM

NORTH LEG (SB)

TOTAL: 43

21 (20)	16 (15)	6 (5)	Total
2	12	4	1st
3	2	0	2nd
9	0	1	3rd
7	2	1	4th
Rt	Thru	Lt	

TT = 17
TT% = 17/43 = 39.53%
≈ 40%

TT = 4
TT% = 4/1010 = 0.40%
≈ 1%

EAST LEG TOTAL: (WB) 1,010

Rt	0	0	0	0	5
Thru	225	206	188	142	761 (760)
Lt	53	59	66	71	249 (250)
	1st	2nd	3rd	4th	Total

WEST LEG TOTAL: (EB) 236

Total	1st	2nd	3rd	4th	
13 (15)	3	4	3	3	Lt
106 (105)	21	18	31	36	Thru
117 (115)	25	24	31	37	Rt

TT = 44
TT% = 44/236 = 18.64%
≈ 19%

SOUTH LEG (NB)

	Lt	Thru	Rt
1st	73	2	32
2nd	77	1	43
3rd	90	2	46
4th	72	3	45
Total	312 (310)	10	166 (165)

TOTAL: 486

TT = 21/486 = 4.32%
≈ 4%

PEAK HOUR FACTORS

NORTH LEG = 0.60
SOUTH LEG = 0.88
EAST LEG = 0.91
WEST LEG = 0.78

ALL LEGS = 0.95

HOUR TOTAL: 1,775

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: VINCENT

EAST-WEST STREET: GLADSTONE

TIME: 07:00AM-08:00AM DATE: 06-08-11

NORTH LEG

16	15	6	Total
2	1	1	1st
2	12	4	2nd
3	2	0	3rd
9	0	1	4th
Rt	Thru	Lt	

	1st	2nd	3rd	4th	Total
Rt	0	0	0	0	0
Thru	208	225	206	188	827
Lt	37	53	59	66	215

Total	1st	2nd	3rd	4th	
14	4	3	4	3	Lt
85	15	21	18	31	Thru
97	17	25	24	31	Rt

	Lt	Thru	Rt
1st	45	2	21
2nd	73	2	32
3rd	77	1	43
4th	90	2	46
Total	285	7	142

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: VINCENT

EAST-WEST STREET: GLADSTONE

TIME: 08:00AM-09:00AM DATE: 06-08-11

NORTH LEG

35	6	5	Total
7	2	1	1st
16	0	1	2nd
8	1	2	3rd
4	3	1	4th
Rt	Thru	Lt	

Rt	0	0	0	0	0
Thru	142	116	95	70	423
Lt	71	50	39	30	190
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
17	3	7	2	5	Lt
114	36	32	20	26	Thru
88	37	16	22	13	Rt

	Lt	Thru	Rt
1st	72	3	45
2nd	72	0	31
3rd	57	0	21
4th	39	2	31
Total	240	5	128

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : VINCENT — IRWINDALE

EAST-WEST STREET : GLADSTONE — 06-08-11

BEGINNING TIME : 07:00AM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
SB NORTH LEG												
1	0	1	0	0	0	0	1	0	1	0	0	4
1	12	4	0	0	0	0	0	0	1	0	0	18
3	1	0	0	0	0	0	0	0	0	1	0	5
1	0	1	0	0	0	0	0	0	8	0	0	10
1	1	1	0	0	0	0	1	0	6	0	0	10
1	0	1	0	0	0	0	0	0	15	0	0	17
0	1	2	0	0	0	0	0	0	8	0	0	11
2	1	1	0	0	0	1	1	0	1	1	0	8
						TT=0+1+16=17						
10	16	11	0	0	0	1	3	0	40	2	0	83
NB SOUTH LEG												
19	0	44	0	0	0	0	1	0	2	1	1	68
29	0	72	0	0	0	0	0	1	3	2	0	107
40	0	76	0	0	0	1	1	0	2	0	1	121
42	1	90	0	0	0	0	0	0	4	1	0	138
43	0	72	0	0	0	1	0	0	1	3	0	120
28	0	72	0	0	0	0	0	4	3	0	17	103
18	0	56	0	0	0	2	0	0	1	0	1	78
28	0	39	0	0	0	0	0	0	3	2	0	72
						TT=0+4+17=21						
247	1	521	0	0	0	4	2	1	19	9	3	807
WB EAST LEG												
0	208	37	0	0	0	0	0	0	0	0	0	245
0	224	53	0	0	0	0	0	0	0	1	0	278
0	206	58	0	0	0	0	0	0	0	0	1	265
0	188	66	0	0	0	0	0	0	0	0	0	254
0	141	70	0	0	0	0	0	0	0	1	1	213
0	115	49	0	0	0	0	0	0	0	1	1	166
0	94	39	0	0	0	0	1	0	0	0	0	134
0	69	30	0	0	0	0	0	0	0	1	0	100
						TT=0+0+4=4						
0	1245	402	0	0	0	0	1	0	0	4	3	1655
EB WEST LEG												
17	12	0	0	0	0	0	0	1	0	3	3	36
25	19	2	0	0	0	0	0	0	0	2	1	49
17	17	0	0	0	0	0	0	0	7	1	4	46
24	30	1	0	0	0	0	0	0	7	1	2	65
22	35	0	0	0	0	0	0	0	15	1	3	76
7	32	2	0	0	0	0	0	0	9	0	5	55
19	19	0	0	0	0	0	0	0	3	1	2	44
12	26	1	0	0	0	0	0	0	1	0	4	44
						TT=0+0+44=44						
143	190	6	0	0	0	0	0	1	42	9	24	415

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: VINCENT
EAST-WEST STREET: GLADSTONE
JURISDICTION: IRWINDALE

DATE: 06-08-11

PEAK HOUR: 01:00PM

NORTH LEG (SB)

TOTAL: 21

TT = 7

TT% = $\frac{7}{21}$ = 33.33%
≈ 33%

10 8	5 4	10 9	Total
2	1	5	1st
1	1	3	2nd
2	1	1	3rd
3	1	0	4th
Rt	Thru	Lt	

TT = 5

TT% = $\frac{5}{314}$ = 1.59%
≈ 2%

EAST LEG TOTAL: (WB) 314

Rt	0	0	1	1	5 2
Thru	41	50	51	53	195
Lt	15	33	24	45	115 117
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
10	2	3	1	4	Lt
170 168	35	40	50	43	Thru
105 103	32	21	25	25	Rt

WEST LEG TOTAL: (EB) 281

TT = 38

TT% = $\frac{38}{281}$ = 13.52%
≈ 14%

PEAK HOUR FACTORS

NORTH LEG = 0.66
SOUTH LEG = 0.87
EAST LEG = 0.79
WEST LEG = 0.92

ALL LEGS = 0.94

	Lt	Thru	Rt
1st	36	0	54
2nd	40	0	43
3rd	27	1	39
4th	38	0	34
Total	140 141	5 1	170

SOUTH LEG (NB)

TT = 22

TT% = $\frac{22}{312}$ = 7.05%
≈ 7%

TOTAL: 312

HOUR TOTAL: 928

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: VINCENT

EAST-WEST STREET: GLADSTONE

TIME: 12:00PM-01:00PM DATE: 06-08-11

NORTH LEG

Rt	Thru	Lt	
9	4	6	Total
4	1	2	1st
4	0	1	2nd
1	1	1	3rd
0	2	2	4th

	1st	2nd	3rd	4th	Total
Rt	0	0	0	0	0
Thru	47	41	58	59	205
Lt	25	30	22	29	106

Total	1st	2nd	3rd	4th	
13	6	2	2	3	Lt
168	42	45	45	36	Thru
115	37	27	23	28	Rt

	Lt	Thru	Rt
1st	29	0	47
2nd	38	2	34
3rd	31	1	46
4th	30	0	34
Total	128	3	161

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: VINCENT

EAST-WEST STREET: GLADSTONE

TIME: 01:00PM-02:00PM DATE: 06-08-11

NORTH LEG

Rt	Thru	Lt	
8	4	9	Total
2	1	5	1st
1	1	3	2nd
2	1	1	3rd
3	1	0	4th

	1st	2nd	3rd	4th	Total
Rt	0	0	1	1	2
Thru	41	50	51	53	195
Lt	15	33	24	45	117

Total	1st	2nd	3rd	4th	
10	2	3	1	4	Lt
168	35	40	50	43	Thru
103	32	21	25	25	Rt

	Lt	Thru	Rt
1st	36	0	54
2nd	40	0	43
3rd	27	1	39
4th	38	0	34
Total	141	1	170

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : VINCENT — IRWINDALE

EAST-WEST STREET : GLADSTONE — 06-08-11

BEGINNING TIME : 12:00PM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
					SB NORTH LEG							
0	1	0	0	0	0	1	0	0	3	0	2	7
1	0	0	0	0	0	0	0	1	3	0	0	5
1	0	1	0	0	0	0	0	0	0	1	0	3
0	2	1	0	0	0	0	0	0	0	0	1	4
1	1	3	0	0	0	0	0	1	1	0	1	8
1	1	3	0	0	0	0	0	0	0	0	0	5
1	1	1	0	0	0	0	0	0	1	0	0	4
0	1	0	0	0	0	1	0	0	2	0	0	4
								0			5	
						TT=0+2+5=7						
5	7	9	0	0	0	2	0	2	10	1	4	40
					NB SOUTH LEG							
47	0	21	0	0	0	0	0	0	0	0	8	76
34	1	31	0	0	0	0	1	0	0	0	7	74
46	1	24	0	0	0	0	0	1	0	0	6	78
33	0	26	0	0	0	1	0	0	0	0	4	64
54	0	24	0	0	0	0	0	0	0	0	12	90
42	0	40	0	0	0	1	0	0	0	0	0	83
38	0	25	0	0	0	0	1	0	1	0	2	67
34	0	33	0	0	0	0	0	1	0	0	4	72
								3			19	
						TT=0+3+19=22						
328	2	224	0	0	0	2	2	2	1	0	43	604
					WB EAST LEG							
0	45	25	0	0	0	0	0	0	0	2	0	72
0	41	29	0	0	0	0	0	1	0	0	0	71
0	56	21	0	0	0	0	0	0	0	2	1	80
0	59	29	0	0	0	0	0	0	0	0	0	88
0	39	15	0	0	0	0	0	0	0	2	0	56
0	50	33	0	0	0	0	0	0	0	0	0	83
1	49	24	0	0	0	0	0	0	0	2	0	76
1	52	45	0	0	0	0	0	0	0	1	0	99
											5	
						TT=0+0+5=5						
2	391	221	0	0	0	0	0	1	0	9	1	625
					EB WEST LEG							
27	42	4	0	0	0	3	0	0	7	0	2	85
17	42	0	0	0	0	1	1	0	9	2	2	74
17	44	0	0	0	0	0	0	0	6	1	2	70
16	36	2	0	0	0	4	0	0	8	0	1	67
25	35	2	0	0	0	0	0	0	7	0	0	69
15	37	1	0	0	0	0	0	0	6	3	2	64
21	47	0	0	0	0	0	0	0	4	3	1	76
18	42	0	0	0	0	1	0	1	6	1	3	72
								2			36	
						TT=0+2+36=38						
156	325	9	0	0	0	9	1	1	53	10	13	577

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: VINCENT
EAST-WEST STREET: GLADSTONE
JURISDICTION: IRWINDALE

DATE: 06-08-11

PEAK HOUR: 05:00PM

NORTH LEG (SB)

TOTAL: 3

TT = 1

TT% = $\frac{1}{3}$ = 33.33% ≈ 33%

Rt	Thru	Lt	
5 3	5	5	Total
1	0	0	1st
0	0	0	2nd
0	0	0	3rd
2	0	0	4th

TT = 1

TT% = $\frac{1}{391}$ = 0.26% ≈ 1%

EAST LEG TOTAL: (WB) 391

	1st	2nd	3rd	4th	Total
Rt	0	0	1	0	5 1
Thru	52	64	66	60	242 240
Lt	34	33	31	50	148 150

WEST LEG TOTAL: (EB) 735

Total	1st	2nd	3rd	4th	
5	0	0	0	0	Lt
583 585	167	167	136	113	Thru
152 150	48	43	31	30	Rt

TT = 19

TT% = $\frac{19}{735}$ = 2.59% ≈ 3%

SOUTH LEG (NB)

	Lt	Thru	Rt	
1st	24	0	92	
2nd	27	0	88	
3rd	16	1	79	
4th	25	0	98	
Total	90 92	5 1	357 355	TOTAL: 450

PEAK HOUR FACTORS

NORTH LEG = 0.38
SOUTH LEG = 0.91
EAST LEG = 0.89
WEST LEG = 0.85

ALL LEGS = 0.94

TT = $\frac{1}{450}$ = 0.22% ≈ 1%

HOUR TOTAL: 1,579

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: VINCENT

EAST-WEST STREET: GLADSTONE

TIME: 04:00PM-05:00PM DATE: 06-08-11

NORTH LEG

Rt	Thru	Lt	
9	3	5	Total
0	2	0	1st
3	0	3	2nd
4	0	0	3rd
2	1	2	4th

	1st	2nd	3rd	4th	Total
Rt	0	0	0	0	0
Thru	33	46	38	42	159
Lt	43	36	27	26	132

Total	1st	2nd	3rd	4th	
4	1	0	0	3	Lt
484	92	109	146	137	Thru
143	42	39	29	33	Rt

	Lt	Thru	Rt
1st	31	0	114
2nd	34	0	103
3rd	22	1	85
4th	27	0	102
Total	114	1	404

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: VINCENT

EAST-WEST STREET: GLADSTONE

TIME: 05:00PM-06:00PM DATE: 06-08-11

NORTH LEG

Rt	Thru	Lt	
3	0	0	Total
1	0	0	1st
0	0	0	2nd
0	0	0	3rd
2	0	0	4th

	1st	2nd	3rd	4th	Total
Rt	0	0	1	0	1
Thru	52	64	66	60	242
Lt	34	33	31	50	148

Total	1st	2nd	3rd	4th	
0	0	0	0	0	Lt
583	167	167	136	113	Thru
152	48	43	31	30	Rt

	Lt	Thru	Rt
1st	24	0	92
2nd	27	0	88
3rd	16	1	79
4th	25	0	98
Total	92	1	357

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : VINCENT — IRWINDALE

EAST-WEST STREET : GLADSTONE — 06-08-11

BEGINNING TIME : 04:00PM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
						SB NORTH LEG						
0	1	0	0	0	0	0	0	0	0	1	0	2
0	0	1	0	0	1	3	0	1	0	0	0	6
3	0	0	0	0	0	0	0	0	1	0	0	4
1	1	2	0	0	0	1	0	0	0	0	0	5
0	0	0	0	0	0	0	0	0	1	0	0	1
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	2
						TT=0+0+1=1						
6	2	3	0	0	1	4	0	1	2	1	0	20
						NB SOUTH LEG						
112	0	30	0	0	0	0	0	0	2	0	1	145
103	0	34	0	0	0	0	0	0	0	0	0	137
85	1	22	0	0	0	0	0	0	0	0	0	108
101	0	26	0	0	0	0	0	0	1	0	1	129
92	0	24	0	0	0	0	0	0	0	0	0	116
88	0	27	0	0	0	0	0	0	0	0	0	115
79	1	16	0	0	0	0	0	0	0	0	0	96
97	0	25	0	0	0	0	0	0	1	0	0	123
						TT=0+0+1						
757	2	204	0	0	0	0	0	0	4	0	2	969
						WB EAST LEG						
0	32	41	0	0	0	0	1	0	0	0	2	76
0	46	36	0	0	0	0	0	0	0	0	0	82
0	37	26	0	0	0	0	0	0	0	1	1	65
0	40	25	0	0	0	0	1	0	0	1	1	68
0	51	34	0	0	0	0	0	0	0	1	0	86
0	64	33	0	0	0	0	0	0	0	0	0	97
1	66	31	0	0	0	0	0	0	0	0	0	98
0	60	50	0	0	0	0	0	0	0	0	0	110
						TT=0+0+1=1						
1	396	276	0	0	0	0	2	0	0	3	4	682
						EB WEST LEG						
34	91	0	0	0	0	6	1	0	2	0	1	135
29	106	0	0	0	0	10	3	0	0	0	0	148
24	145	0	0	0	0	4	0	0	1	1	0	175
28	133	2	0	0	0	5	2	0	0	2	1	173
40	166	0	0	0	0	8	0	0	0	1	0	215
42	167	0	0	0	0	1	0	0	0	0	0	210
29	136	0	0	0	0	2	0	0	0	0	0	167
24	112	0	0	0	0	6	0	0	0	1	0	143
						TT=0+1+2=19						
250	1056	2	0	0	0	42	6	0	3	5	2	1366

Prepared by Newport Traffic Studies

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	105	115	250	760	5	310	10	165	5	15	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00			1.00	
Frt	1.00	0.92		1.00	1.00		1.00	0.86			0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.99	
Satd. Flow (prot)	1031	2883		1719	3436		1719	1483			1252	
Flt Permitted	0.27	1.00		0.61	1.00		0.73	1.00			0.97	
Satd. Flow (perm)	297	2883		1099	3436		1320	1483			1224	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	16	111	121	263	800	5	326	11	174	5	16	21
RTOR Reduction (vph)	0	75	0	0	1	0	0	102	0	0	12	0
Lane Group Flow (vph)	16	157	0	263	804	0	326	83	0	0	30	0
Heavy Vehicles (%)	75%	5%	25%	5%	5%	0%	5%	90%	5%	0%	15%	70%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	14.6	14.6		14.6	14.6		16.1	16.1			16.1	
Effective Green, g (s)	14.6	14.6		14.6	14.6		16.1	16.1			16.1	
Actuated g/C Ratio	0.38	0.38		0.38	0.38		0.42	0.42			0.42	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	112	1088		415	1296		549	617			509	
v/s Ratio Prot		0.05			0.23			0.06				
v/s Ratio Perm	0.05			c0.24			c0.25				0.02	
v/c Ratio	0.14	0.14		0.63	0.62		0.59	0.14			0.06	
Uniform Delay, d1	7.9	7.9		9.9	9.8		8.8	7.0			6.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	0.6	0.1		3.2	0.9		4.7	0.5			0.2	
Delay (s)	8.5	8.0		13.0	10.7		13.4	7.4			7.0	
Level of Service	A	A		B	B		B	A			A	
Approach Delay (s)		8.0			11.3			11.3			7.0	
Approach LOS		A			B			B			A	

Intersection Summary			
HCM Average Control Delay	10.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	38.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	58.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	170	105	115	195	5	140	5	170	10	5	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00			1.00	
Frt	1.00	0.94		1.00	1.00		1.00	0.85			0.94	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.98	
Satd. Flow (prot)	1062	3021		1805	3430		1570	1541			1307	
Flt Permitted	0.62	1.00		0.57	1.00		0.74	1.00			0.91	
Satd. Flow (perm)	692	3021		1088	3430		1222	1541			1214	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	11	181	112	122	207	5	149	5	181	11	5	11
RTOR Reduction (vph)	0	82	0	0	4	0	0	90	0	0	5	0
Lane Group Flow (vph)	11	211	0	122	208	0	149	96	0	0	22	0
Heavy Vehicles (%)	70%	5%	25%	0%	5%	0%	15%	15%	5%	20%	0%	65%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	9.5	9.5		9.5	9.5		17.8	17.8			17.8	
Effective Green, g (s)	9.5	9.5		9.5	9.5		17.8	17.8			17.8	
Actuated g/C Ratio	0.27	0.27		0.27	0.27		0.50	0.50			0.50	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	186	813		293	923		616	777			612	
v/s Ratio Prot		0.07			0.06			0.06				
v/s Ratio Perm	0.02			c0.11			c0.12				0.02	
v/c Ratio	0.06	0.26		0.42	0.23		0.24	0.12			0.04	
Uniform Delay, d1	9.6	10.1		10.6	10.0		4.9	4.6			4.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	0.1	0.2		1.0	0.1		0.9	0.3			0.1	
Delay (s)	9.7	10.3		11.6	10.2		5.9	5.0			4.5	
Level of Service	A	B		B	B		A	A			A	
Approach Delay (s)		10.3			10.7			5.4			4.5	
Approach LOS		B			B			A			A	

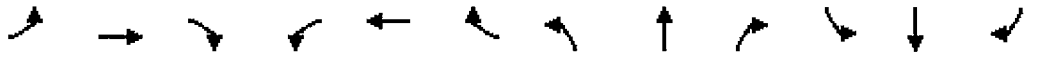
Intersection Summary			
HCM Average Control Delay	8.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.30		
Actuated Cycle Length (s)	35.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	38.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	585	150	150	240	5	90	5	355	5	5	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00			1.00	
Frt	1.00	0.97		1.00	1.00		1.00	0.85			0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.98	
Satd. Flow (prot)	1805	3300		1805	3431		1805	1543			1598	
Flt Permitted	0.59	1.00		0.28	1.00		0.75	1.00			0.91	
Satd. Flow (perm)	1123	3300		537	3431		1421	1543			1471	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	5	622	160	160	255	5	96	5	378	5	5	5
RTOR Reduction (vph)	0	54	0	0	3	0	0	127	0	0	3	0
Lane Group Flow (vph)	5	728	0	160	257	0	96	256	0	0	12	0
Heavy Vehicles (%)	0%	5%	10%	0%	5%	0%	0%	0%	5%	0%	0%	35%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	17.0	17.0		17.0	17.0		17.3	17.3			17.3	
Effective Green, g (s)	17.0	17.0		17.0	17.0		17.3	17.3			17.3	
Actuated g/C Ratio	0.40	0.40		0.40	0.40		0.41	0.41			0.41	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	451	1326		216	1379		581	631			602	
v/s Ratio Prot		0.22			0.07			c0.17				
v/s Ratio Perm	0.00			c0.30			0.07				0.01	
v/c Ratio	0.01	0.55		0.74	0.19		0.17	0.41			0.02	
Uniform Delay, d1	7.6	9.7		10.8	8.2		7.9	8.9			7.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	0.0	0.5		12.8	0.1		0.6	1.9			0.1	
Delay (s)	7.6	10.2		23.6	8.2		8.5	10.8			7.5	
Level of Service	A	B		C	A		A	B			A	
Approach Delay (s)		10.2			14.1			10.3			7.5	
Approach LOS		B			B			B			A	

Intersection Summary			
HCM Average Control Delay	11.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	42.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	61.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	105	165	250	760	5	360	10	165	5	15	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00			1.00	
Frt	1.00	0.91		1.00	1.00		1.00	0.86			0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.99	
Satd. Flow (prot)	1031	2499		1719	3436		1530	1483			1252	
Flt Permitted	0.27	1.00		0.58	1.00		0.73	1.00			0.97	
Satd. Flow (perm)	297	2499		1044	3436		1175	1483			1224	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	16	111	174	263	800	5	379	11	174	5	16	21
RTOR Reduction (vph)	0	108	0	0	1	0	0	102	0	0	12	0
Lane Group Flow (vph)	16	177	0	263	804	0	379	83	0	0	30	0
Heavy Vehicles (%)	75%	5%	48%	5%	5%	0%	18%	90%	5%	0%	15%	70%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	14.6	14.6		14.6	14.6		16.1	16.1			16.1	
Effective Green, g (s)	14.6	14.6		14.6	14.6		16.1	16.1			16.1	
Actuated g/C Ratio	0.38	0.38		0.38	0.38		0.42	0.42			0.42	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	112	943		394	1296		489	617			509	
v/s Ratio Prot		0.07			0.23			0.06				
v/s Ratio Perm	0.05			c0.25			c0.32				0.02	
v/c Ratio	0.14	0.19		0.67	0.62		0.78	0.14			0.06	
Uniform Delay, d1	7.9	8.1		10.0	9.8		9.7	7.0			6.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	0.6	0.1		4.2	0.9		11.4	0.5			0.2	
Delay (s)	8.5	8.2		14.3	10.7		21.1	7.4			7.0	
Level of Service	A	A		B	B		C	A			A	
Approach Delay (s)		8.2			11.6			16.6			7.0	
Approach LOS		A			B			B			A	

Intersection Summary			
HCM Average Control Delay	12.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	38.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	61.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
12: Vincent Ave & Gladstone St

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	170	155	115	195	5	190	5	170	10	5	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00			1.00	
Frt	1.00	0.93		1.00	1.00		1.00	0.85			0.94	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.98	
Satd. Flow (prot)	1062	2661		1805	3430		1318	1541			1307	
Flt Permitted	0.62	1.00		0.54	1.00		0.74	1.00			0.91	
Satd. Flow (perm)	692	2661		1034	3430		1026	1541			1212	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	11	181	165	122	207	5	202	5	181	11	5	11
RTOR Reduction (vph)	0	119	0	0	4	0	0	92	0	0	6	0
Lane Group Flow (vph)	11	227	0	122	208	0	202	94	0	0	21	0
Heavy Vehicles (%)	70%	5%	49%	0%	5%	0%	37%	15%	5%	20%	0%	65%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	9.6	9.6		9.6	9.6		17.1	17.1			17.1	
Effective Green, g (s)	9.6	9.6		9.6	9.6		17.1	17.1			17.1	
Actuated g/C Ratio	0.28	0.28		0.28	0.28		0.49	0.49			0.49	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	191	736		286	949		506	759			597	
v/s Ratio Prot		0.09			0.06			0.06				
v/s Ratio Perm	0.02			c0.12			c0.20				0.02	
v/c Ratio	0.06	0.31		0.43	0.22		0.40	0.12			0.04	
Uniform Delay, d1	9.2	9.9		10.3	9.7		5.6	4.8			4.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	0.1	0.2		1.0	0.1		2.3	0.3			0.1	
Delay (s)	9.4	10.2		11.3	9.8		7.9	5.1			4.7	
Level of Service	A	B		B	A		A	A			A	
Approach Delay (s)		10.1			10.3			6.6			4.7	
Approach LOS		B			B			A			A	

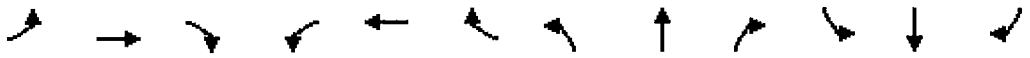
Intersection Summary			
HCM Average Control Delay	8.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	34.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	43.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	585	200	150	240	5	140	5	355	5	5	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00			1.00	
Frt	1.00	0.96		1.00	1.00		1.00	0.85			0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.98	
Satd. Flow (prot)	1805	3096		1805	3431		1157	1543			1598	
Flt Permitted	0.59	1.00		0.26	1.00		0.75	1.00			0.90	
Satd. Flow (perm)	1123	3096		493	3431		911	1543			1470	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	5	622	213	160	255	5	149	5	378	5	5	5
RTOR Reduction (vph)	0	79	0	0	3	0	0	129	0	0	3	0
Lane Group Flow (vph)	5	756	0	160	257	0	149	254	0	0	12	0
Heavy Vehicles (%)	0%	5%	33%	0%	5%	0%	56%	0%	5%	0%	0%	35%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	18.1	18.1		18.1	18.1		17.3	17.3			17.3	
Effective Green, g (s)	18.1	18.1		18.1	18.1		17.3	17.3			17.3	
Actuated g/C Ratio	0.42	0.42		0.42	0.42		0.40	0.40			0.40	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	468	1291		206	1431		363	615			586	
v/s Ratio Prot		0.24			0.07			c0.16				
v/s Ratio Perm	0.00			c0.32			0.16				0.01	
v/c Ratio	0.01	0.59		0.78	0.18		0.41	0.41			0.02	
Uniform Delay, d1	7.4	9.8		10.9	8.0		9.4	9.4			7.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	0.0	0.7		16.6	0.1		3.4	2.0			0.1	
Delay (s)	7.4	10.4		27.5	8.0		12.8	11.4			8.0	
Level of Service	A	B		C	A		B	B			A	
Approach Delay (s)		10.4			15.5			11.8			8.0	
Approach LOS		B			B			B			A	

Intersection Summary			
HCM Average Control Delay	12.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	43.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	63.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	115	180	275	830	5	390	10	180	5	15	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00			1.00	
Frt	1.00	0.91		1.00	1.00		1.00	0.86			0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.99	
Satd. Flow (prot)	1031	2500		1719	3436		1530	1487			1252	
Flt Permitted	0.27	1.00		0.56	1.00		0.73	1.00			0.97	
Satd. Flow (perm)	290	2500		1019	3436		1175	1487			1223	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	16	121	189	289	874	5	411	11	189	5	16	21
RTOR Reduction (vph)	0	116	0	0	1	0	0	111	0	0	12	0
Lane Group Flow (vph)	16	194	0	289	878	0	411	89	0	0	30	0
Heavy Vehicles (%)	75%	5%	48%	5%	5%	0%	18%	90%	5%	0%	15%	70%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	15.0	15.0		15.0	15.0		16.0	16.0			16.0	
Effective Green, g (s)	15.0	15.0		15.0	15.0		16.0	16.0			16.0	
Actuated g/C Ratio	0.38	0.38		0.38	0.38		0.41	0.41			0.41	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	112	962		392	1322		482	610			502	
v/s Ratio Prot		0.08			0.26			0.06				
v/s Ratio Perm	0.06			c0.28			c0.35				0.02	
v/c Ratio	0.14	0.20		0.74	0.66		0.85	0.15			0.06	
Uniform Delay, d1	7.8	8.0		10.3	9.9		10.4	7.2			7.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	0.6	0.1		7.1	1.3		17.2	0.5			0.2	
Delay (s)	8.4	8.1		17.4	11.2		27.6	7.7			7.2	
Level of Service	A	A		B	B		C	A			A	
Approach Delay (s)		8.1			12.7			21.1			7.2	
Approach LOS		A			B			C			A	

Intersection Summary			
HCM Average Control Delay	14.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	39.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	64.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

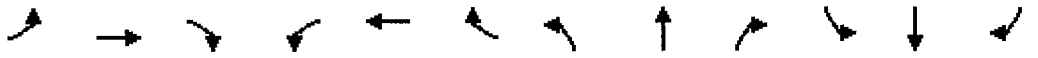
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	185	170	125	215	5	205	5	185	10	5	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00			1.00	
Frt	1.00	0.93		1.00	1.00		1.00	0.85			0.94	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.98	
Satd. Flow (prot)	1062	2658		1805	3431		1318	1541			1307	
Flt Permitted	0.61	1.00		0.53	1.00		0.74	1.00			0.90	
Satd. Flow (perm)	677	2658		1002	3431		1026	1541			1206	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	11	197	181	133	229	5	218	5	197	11	5	11
RTOR Reduction (vph)	0	128	0	0	4	0	0	103	0	0	6	0
Lane Group Flow (vph)	11	250	0	133	230	0	218	99	0	0	21	0
Heavy Vehicles (%)	70%	5%	49%	0%	5%	0%	37%	15%	5%	20%	0%	65%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	10.1	10.1		10.1	10.1		16.5	16.5			16.5	
Effective Green, g (s)	10.1	10.1		10.1	10.1		16.5	16.5			16.5	
Actuated g/C Ratio	0.29	0.29		0.29	0.29		0.48	0.48			0.48	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	198	776		292	1002		489	735			575	
v/s Ratio Prot		0.09			0.07			0.06				
v/s Ratio Perm	0.02			c0.13			c0.21				0.02	
v/c Ratio	0.06	0.32		0.46	0.23		0.45	0.13			0.04	
Uniform Delay, d1	8.8	9.6		10.0	9.3		6.0	5.1			4.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	0.1	0.2		1.1	0.1		2.9	0.4			0.1	
Delay (s)	8.9	9.8		11.1	9.4		8.9	5.4			4.9	
Level of Service	A	A		B	A		A	A			A	
Approach Delay (s)		9.8			10.0			7.3			4.9	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	8.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	34.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	45.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
12: Vincent Ave & Gladstone St

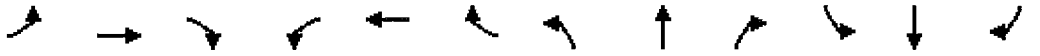
8/14/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	640	220	165	260	5	155	5	385	5	5	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00			1.00	
Frt	1.00	0.96		1.00	1.00		1.00	0.85			0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.98	
Satd. Flow (prot)	1805	3095		1805	3432		1157	1542			1598	
Flt Permitted	0.58	1.00		0.23	1.00		0.75	1.00			0.90	
Satd. Flow (perm)	1100	3095		442	3432		911	1542			1461	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	5	681	234	176	277	5	165	5	410	5	5	5
RTOR Reduction (vph)	0	75	0	0	3	0	0	114	0	0	3	0
Lane Group Flow (vph)	5	840	0	176	279	0	165	301	0	0	12	0
Heavy Vehicles (%)	0%	5%	33%	0%	5%	0%	56%	0%	5%	0%	0%	35%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	20.6	20.6		20.6	20.6		17.3	17.3			17.3	
Effective Green, g (s)	20.6	20.6		20.6	20.6		17.3	17.3			17.3	
Actuated g/C Ratio	0.45	0.45		0.45	0.45		0.38	0.38			0.38	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	494	1389		198	1540		343	581			551	
v/s Ratio Prot		0.27			0.08			c0.20				
v/s Ratio Perm	0.00			c0.40			0.18				0.01	
v/c Ratio	0.01	0.60		0.89	0.18		0.48	0.52			0.02	
Uniform Delay, d1	7.0	9.6		11.6	7.6		10.9	11.1			9.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	0.0	0.8		34.7	0.1		4.8	3.3			0.1	
Delay (s)	7.0	10.3		46.3	7.6		15.7	14.4			9.1	
Level of Service	A	B		D	A		B	B			A	
Approach Delay (s)		10.3			22.5			14.7			9.1	
Approach LOS		B			C			B			A	

Intersection Summary			
HCM Average Control Delay	14.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	45.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	68.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	105	165	250	760	5	310	10	165	5	15	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00			1.00	
Frt	1.00	0.91		1.00	1.00		1.00	0.86			0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.99	
Satd. Flow (prot)	1031	2499		1719	3436		1719	1483			1252	
Flt Permitted	0.27	1.00		0.58	1.00		0.73	1.00			0.97	
Satd. Flow (perm)	297	2499		1044	3436		1320	1483			1224	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	16	111	174	263	800	5	326	11	174	5	16	21
RTOR Reduction (vph)	0	108	0	0	1	0	0	102	0	0	12	0
Lane Group Flow (vph)	16	177	0	263	804	0	326	83	0	0	30	0
Heavy Vehicles (%)	75%	5%	48%	5%	5%	0%	5%	90%	5%	0%	15%	70%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	14.6	14.6		14.6	14.6		16.1	16.1			16.1	
Effective Green, g (s)	14.6	14.6		14.6	14.6		16.1	16.1			16.1	
Actuated g/C Ratio	0.38	0.38		0.38	0.38		0.42	0.42			0.42	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	112	943		394	1296		549	617			509	
v/s Ratio Prot		0.07			0.23			0.06				
v/s Ratio Perm	0.05			c0.25			c0.25				0.02	
v/c Ratio	0.14	0.19		0.67	0.62		0.59	0.14			0.06	
Uniform Delay, d1	7.9	8.1		10.0	9.8		8.8	7.0			6.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	0.6	0.1		4.2	0.9		4.7	0.5			0.2	
Delay (s)	8.5	8.2		14.3	10.7		13.4	7.4			7.0	
Level of Service	A	A		B	B		B	A			A	
Approach Delay (s)		8.2			11.6			11.3			7.0	
Approach LOS		A			B			B			A	

Intersection Summary			
HCM Average Control Delay	10.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	38.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	58.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
12: Vincent Ave & Gladstone St

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	170	155	115	195	5	140	5	170	10	5	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00			1.00	
Frt	1.00	0.93		1.00	1.00		1.00	0.85			0.94	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.98	
Satd. Flow (prot)	1062	2661		1805	3430		1570	1541			1307	
Flt Permitted	0.62	1.00		0.54	1.00		0.74	1.00			0.91	
Satd. Flow (perm)	692	2661		1034	3430		1222	1541			1212	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	11	181	165	122	207	5	149	5	181	11	5	11
RTOR Reduction (vph)	0	119	0	0	4	0	0	92	0	0	6	0
Lane Group Flow (vph)	11	227	0	122	208	0	149	94	0	0	21	0
Heavy Vehicles (%)	70%	5%	49%	0%	5%	0%	15%	15%	5%	20%	0%	65%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	9.6	9.6		9.6	9.6		17.1	17.1			17.1	
Effective Green, g (s)	9.6	9.6		9.6	9.6		17.1	17.1			17.1	
Actuated g/C Ratio	0.28	0.28		0.28	0.28		0.49	0.49			0.49	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	191	736		286	949		602	759			597	
v/s Ratio Prot		0.09			0.06			0.06				
v/s Ratio Perm	0.02			c0.12			c0.12				0.02	
v/c Ratio	0.06	0.31		0.43	0.22		0.25	0.12			0.04	
Uniform Delay, d1	9.2	9.9		10.3	9.7		5.1	4.8			4.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	0.1	0.2		1.0	0.1		1.0	0.3			0.1	
Delay (s)	9.4	10.2		11.3	9.8		6.1	5.1			4.7	
Level of Service	A	B		B	A		A	A			A	
Approach Delay (s)		10.1			10.3			5.5			4.7	
Approach LOS		B			B			A			A	

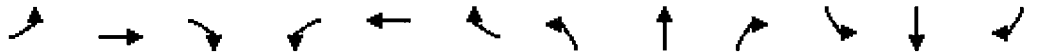
Intersection Summary			
HCM Average Control Delay	8.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	34.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	40.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	585	200	150	240	5	90	5	355	5	5	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00			1.00	
Frt	1.00	0.96		1.00	1.00		1.00	0.85			0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.98	
Satd. Flow (prot)	1805	3096		1805	3431		1805	1543			1598	
Flt Permitted	0.59	1.00		0.26	1.00		0.75	1.00			0.90	
Satd. Flow (perm)	1123	3096		493	3431		1421	1543			1470	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	5	622	213	160	255	5	96	5	378	5	5	5
RTOR Reduction (vph)	0	79	0	0	3	0	0	129	0	0	3	0
Lane Group Flow (vph)	5	756	0	160	257	0	96	254	0	0	12	0
Heavy Vehicles (%)	0%	5%	33%	0%	5%	0%	0%	0%	5%	0%	0%	35%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	18.1	18.1		18.1	18.1		17.3	17.3			17.3	
Effective Green, g (s)	18.1	18.1		18.1	18.1		17.3	17.3			17.3	
Actuated g/C Ratio	0.42	0.42		0.42	0.42		0.40	0.40			0.40	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	468	1291		206	1431		566	615			586	
v/s Ratio Prot		0.24			0.07			c0.16				
v/s Ratio Perm	0.00			c0.32			0.07				0.01	
v/c Ratio	0.01	0.59		0.78	0.18		0.17	0.41			0.02	
Uniform Delay, d1	7.4	9.8		10.9	8.0		8.4	9.4			7.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	0.0	0.7		16.6	0.1		0.6	2.0			0.1	
Delay (s)	7.4	10.4		27.5	8.0		9.1	11.4			8.0	
Level of Service	A	B		C	A		A	B			A	
Approach Delay (s)		10.4			15.5			11.0			8.0	
Approach LOS		B			B			B			A	

Intersection Summary			
HCM Average Control Delay	11.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	43.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	63.1%	ICU Level of Service	B
Analysis Period (min)	15		

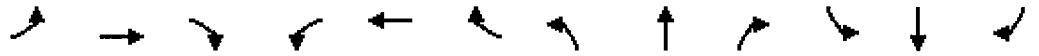
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	115	180	275	830	5	340	10	180	5	15	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00			1.00	
Frt	1.00	0.91		1.00	1.00		1.00	0.86			0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.99	
Satd. Flow (prot)	1031	2500		1719	3436		1530	1487			1252	
Flt Permitted	0.27	1.00		0.56	1.00		0.73	1.00			0.97	
Satd. Flow (perm)	290	2500		1019	3436		1175	1487			1223	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	16	121	189	289	874	5	358	11	189	5	16	21
RTOR Reduction (vph)	0	116	0	0	1	0	0	111	0	0	12	0
Lane Group Flow (vph)	16	194	0	289	878	0	358	89	0	0	30	0
Heavy Vehicles (%)	75%	5%	48%	5%	5%	0%	18%	90%	5%	0%	15%	70%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	15.0	15.0		15.0	15.0		16.0	16.0			16.0	
Effective Green, g (s)	15.0	15.0		15.0	15.0		16.0	16.0			16.0	
Actuated g/C Ratio	0.38	0.38		0.38	0.38		0.41	0.41			0.41	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	112	962		392	1322		482	610			502	
v/s Ratio Prot		0.08			0.26			0.06				
v/s Ratio Perm	0.06			c0.28			c0.30				0.02	
v/c Ratio	0.14	0.20		0.74	0.66		0.74	0.15			0.06	
Uniform Delay, d1	7.8	8.0		10.3	9.9		9.8	7.2			7.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	0.6	0.1		7.1	1.3		9.9	0.5			0.2	
Delay (s)	8.4	8.1		17.4	11.2		19.7	7.7			7.2	
Level of Service	A	A		B	B		B	A			A	
Approach Delay (s)		8.1			12.7			15.4			7.2	
Approach LOS		A			B			B			A	

Intersection Summary			
HCM Average Control Delay	12.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	39.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	61.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



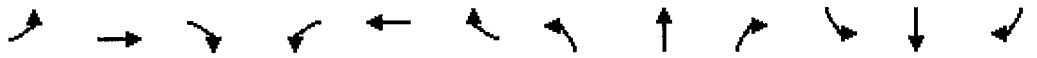
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	185	170	125	215	5	155	5	185	10	5	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00			1.00	
Frt	1.00	0.93		1.00	1.00		1.00	0.85			0.94	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.98	
Satd. Flow (prot)	1062	2658		1805	3431		1318	1541			1307	
Flt Permitted	0.61	1.00		0.53	1.00		0.74	1.00			0.90	
Satd. Flow (perm)	677	2658		1002	3431		1026	1541			1206	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	11	197	181	133	229	5	165	5	197	11	5	11
RTOR Reduction (vph)	0	128	0	0	4	0	0	103	0	0	6	0
Lane Group Flow (vph)	11	250	0	133	230	0	165	99	0	0	21	0
Heavy Vehicles (%)	70%	5%	49%	0%	5%	0%	37%	15%	5%	20%	0%	65%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	10.1	10.1		10.1	10.1		16.5	16.5			16.5	
Effective Green, g (s)	10.1	10.1		10.1	10.1		16.5	16.5			16.5	
Actuated g/C Ratio	0.29	0.29		0.29	0.29		0.48	0.48			0.48	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	198	776		292	1002		489	735			575	
v/s Ratio Prot		0.09			0.07			0.06				
v/s Ratio Perm	0.02			c0.13			c0.16				0.02	
v/c Ratio	0.06	0.32		0.46	0.23		0.34	0.13			0.04	
Uniform Delay, d1	8.8	9.6		10.0	9.3		5.6	5.1			4.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	0.1	0.2		1.1	0.1		1.9	0.4			0.1	
Delay (s)	8.9	9.8		11.1	9.4		7.5	5.4			4.9	
Level of Service	A	A		B	A		A	A			A	
Approach Delay (s)		9.8			10.0			6.4			4.9	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	8.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	34.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	42.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
12: Vincent Ave & Gladstone St

8/14/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	640	220	165	260	5	100	5	385	5	5	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00			1.00	
Frt	1.00	0.96		1.00	1.00		1.00	0.85			0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.98	
Satd. Flow (prot)	1805	3095		1805	3432		1157	1542			1598	
Flt Permitted	0.58	1.00		0.23	1.00		0.75	1.00			0.90	
Satd. Flow (perm)	1100	3095		442	3432		911	1542			1461	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	5	681	234	176	277	5	106	5	410	5	5	5
RTOR Reduction (vph)	0	75	0	0	3	0	0	114	0	0	3	0
Lane Group Flow (vph)	5	840	0	176	279	0	106	301	0	0	12	0
Heavy Vehicles (%)	0%	5%	33%	0%	5%	0%	56%	0%	5%	0%	0%	35%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	20.6	20.6		20.6	20.6		17.3	17.3			17.3	
Effective Green, g (s)	20.6	20.6		20.6	20.6		17.3	17.3			17.3	
Actuated g/C Ratio	0.45	0.45		0.45	0.45		0.38	0.38			0.38	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	494	1389		198	1540		343	581			551	
v/s Ratio Prot		0.27			0.08			c0.20				
v/s Ratio Perm	0.00			c0.40			0.12				0.01	
v/c Ratio	0.01	0.60		0.89	0.18		0.31	0.52			0.02	
Uniform Delay, d1	7.0	9.6		11.6	7.6		10.1	11.1			9.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	0.0	0.8		34.7	0.1		2.3	3.3			0.1	
Delay (s)	7.0	10.3		46.3	7.6		12.4	14.4			9.1	
Level of Service	A	B		D	A		B	B			A	
Approach Delay (s)		10.3			22.5			14.0			9.1	
Approach LOS		B			C			B			A	

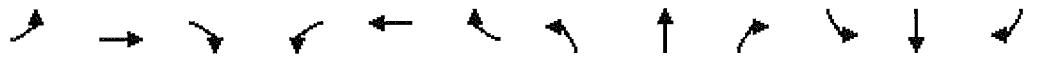
Intersection Summary			
HCM Average Control Delay	14.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	45.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	68.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	65	105	115	250	760	5	310	10	165	5	15	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00			1.00	
Frt	1.00	0.92		1.00	1.00		1.00	0.86			0.89	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			1.00	
Satd. Flow (prot)	930	2883		1719	3436		1719	1483			1080	
Flt Permitted	0.27	1.00		0.61	1.00		0.70	1.00			0.99	
Satd. Flow (perm)	268	2883		1099	3436		1258	1483			1069	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	68	111	121	263	800	5	326	11	174	5	16	74
RTOR Reduction (vph)	0	75	0	0	1	0	0	102	0	0	43	0
Lane Group Flow (vph)	68	157	0	263	804	0	326	83	0	0	52	0
Heavy Vehicles (%)	94%	5%	25%	5%	5%	0%	5%	90%	5%	0%	15%	70%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	14.6	14.6		14.6	14.6		16.1	16.1			16.1	
Effective Green, g (s)	14.6	14.6		14.6	14.6		16.1	16.1			16.1	
Actuated g/C Ratio	0.38	0.38		0.38	0.38		0.42	0.42			0.42	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	101	1088		415	1296		523	617			445	
v/s Ratio Prot		0.05			0.23			0.06				
v/s Ratio Perm	c0.25			0.24			c0.26				0.05	
v/c Ratio	0.67	0.14		0.63	0.62		0.62	0.14			0.12	
Uniform Delay, d1	10.1	7.9		9.9	9.8		8.9	7.0			6.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	16.3	0.1		3.2	0.9		5.5	0.5			0.5	
Delay (s)	26.3	8.0		13.0	10.7		14.4	7.4			7.5	
Level of Service	C	A		B	B		B	A			A	
Approach Delay (s)		12.2			11.3			11.9			7.5	
Approach LOS		B			B			B			A	

Intersection Summary			
HCM Average Control Delay	11.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	38.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	58.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	60	170	105	115	195	5	140	5	170	10	5	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00			1.00	
Frt	1.00	0.94		1.00	1.00		1.00	0.85			0.89	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.99	
Satd. Flow (prot)	926	3021		1805	3430		1570	1541			946	
Flt Permitted	0.62	1.00		0.57	1.00		0.70	1.00			0.96	
Satd. Flow (perm)	603	3021		1088	3430		1165	1541			919	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	64	181	112	122	207	5	149	5	181	11	5	64
RTOR Reduction (vph)	0	81	0	0	4	0	0	91	0	0	32	0
Lane Group Flow (vph)	64	212	0	122	208	0	149	96	0	0	48	0
Heavy Vehicles (%)	95%	5%	25%	0%	5%	0%	15%	15%	5%	20%	0%	94%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	9.9	9.9		9.9	9.9		17.9	17.9			17.9	
Effective Green, g (s)	9.9	9.9		9.9	9.9		17.9	17.9			17.9	
Actuated g/C Ratio	0.28	0.28		0.28	0.28		0.50	0.50			0.50	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	167	835		301	949		583	771			460	
v/s Ratio Prot		0.07			0.06			0.06				
v/s Ratio Perm	0.11			c0.11			c0.13				0.05	
v/c Ratio	0.38	0.25		0.41	0.22		0.26	0.12			0.10	
Uniform Delay, d1	10.5	10.1		10.6	10.0		5.1	4.8			4.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	1.5	0.2		0.9	0.1		1.1	0.3			0.5	
Delay (s)	11.9	10.2		11.4	10.1		6.2	5.1			5.2	
Level of Service	B	B		B	B		A	A			A	
Approach Delay (s)		10.5			10.6			5.6			5.2	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	8.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	35.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	38.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
12: Vincent Ave & Gladstone St

7/31/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	55	585	150	150	240	5	90	5	355	5	5	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00			1.00	
Frt	1.00	0.97		1.00	1.00		1.00	0.85			0.88	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			1.00	
Satd. Flow (prot)	902	3300		1805	3431		1805	1543			928	
Flt Permitted	0.59	1.00		0.28	1.00		0.71	1.00			0.97	
Satd. Flow (perm)	562	3300		537	3431		1353	1543			908	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	59	622	160	160	255	5	96	5	378	5	5	59
RTOR Reduction (vph)	0	54	0	0	3	0	0	127	0	0	35	0
Lane Group Flow (vph)	59	728	0	160	257	0	96	256	0	0	34	0
Heavy Vehicles (%)	100%	5%	10%	0%	5%	0%	0%	0%	5%	0%	0%	94%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	17.0	17.0		17.0	17.0		17.3	17.3			17.3	
Effective Green, g (s)	17.0	17.0		17.0	17.0		17.3	17.3			17.3	
Actuated g/C Ratio	0.40	0.40		0.40	0.40		0.41	0.41			0.41	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	226	1326		216	1379		553	631			371	
v/s Ratio Prot		0.22			0.07			c0.17				
v/s Ratio Perm	0.11			c0.30			0.07				0.04	
v/c Ratio	0.26	0.55		0.74	0.19		0.17	0.41			0.09	
Uniform Delay, d1	8.5	9.7		10.8	8.2		8.0	8.9			7.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	0.6	0.5		12.8	0.1		0.7	1.9			0.5	
Delay (s)	9.1	10.2		23.6	8.2		8.6	10.8			8.2	
Level of Service	A	B		C	A		A	B			A	
Approach Delay (s)		10.1			14.1			10.4			8.2	
Approach LOS		B			B			B			A	

Intersection Summary			
HCM Average Control Delay	11.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	42.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	61.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

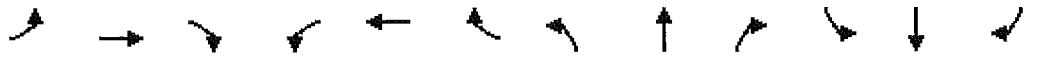
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	70	105	115	250	760	5	310	10	165	5	15	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00			1.00	
Frt	1.00	0.92		1.00	1.00		1.00	0.86			0.89	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			1.00	
Satd. Flow (prot)	930	2883		1719	3436		1719	1483			1074	
Flt Permitted	0.27	1.00		0.61	1.00		0.69	1.00			0.99	
Satd. Flow (perm)	268	2883		1099	3436		1253	1483			1063	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	74	111	121	263	800	5	326	11	174	5	16	79
RTOR Reduction (vph)	0	75	0	0	1	0	0	102	0	0	44	0
Lane Group Flow (vph)	74	157	0	263	804	0	326	83	0	0	56	0
Heavy Vehicles (%)	94%	5%	25%	5%	5%	0%	5%	90%	5%	0%	15%	70%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	14.6	14.6		14.6	14.6		16.1	16.1			16.1	
Effective Green, g (s)	14.6	14.6		14.6	14.6		16.1	16.1			16.1	
Actuated g/C Ratio	0.38	0.38		0.38	0.38		0.42	0.42			0.42	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	101	1088		415	1296		521	617			442	
v/s Ratio Prot		0.05			0.23			0.06				
v/s Ratio Perm	c0.28			0.24			c0.26				0.05	
v/c Ratio	0.73	0.14		0.63	0.62		0.63	0.14			0.13	
Uniform Delay, d1	10.4	7.9		9.9	9.8		8.9	7.0			7.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	23.7	0.1		3.2	0.9		5.6	0.5			0.6	
Delay (s)	34.1	8.0		13.0	10.7		14.5	7.4			7.5	
Level of Service	C	A		B	B		B	A			A	
Approach Delay (s)		14.3			11.3			12.0			7.5	
Approach LOS		B			B			B			A	

Intersection Summary			
HCM Average Control Delay	11.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	38.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	58.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
12: Vincent Ave & Gladstone St

7/31/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	65	170	105	115	195	5	140	5	170	10	5	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00			1.00	
Frt	1.00	0.94		1.00	1.00		1.00	0.85			0.89	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.99	
Satd. Flow (prot)	926	3021		1805	3430		1570	1541			940	
Flt Permitted	0.62	1.00		0.57	1.00		0.70	1.00			0.97	
Satd. Flow (perm)	603	3021		1088	3430		1160	1541			914	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	69	181	112	122	207	5	149	5	181	11	5	69
RTOR Reduction (vph)	0	81	0	0	4	0	0	91	0	0	35	0
Lane Group Flow (vph)	69	212	0	122	208	0	149	95	0	0	50	0
Heavy Vehicles (%)	95%	5%	25%	0%	5%	0%	15%	15%	5%	20%	0%	94%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	10.0	10.0		10.0	10.0		17.9	17.9			17.9	
Effective Green, g (s)	10.0	10.0		10.0	10.0		17.9	17.9			17.9	
Actuated g/C Ratio	0.28	0.28		0.28	0.28		0.50	0.50			0.50	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	168	842		303	955		578	768			456	
v/s Ratio Prot		0.07			0.06			0.06				
v/s Ratio Perm	c0.11			0.11			c0.13				0.06	
v/c Ratio	0.41	0.25		0.40	0.22		0.26	0.12			0.11	
Uniform Delay, d1	10.5	10.0		10.5	9.9		5.2	4.8			4.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	1.6	0.2		0.9	0.1		1.1	0.3			0.5	
Delay (s)	12.2	10.2		11.4	10.1		6.3	5.1			5.3	
Level of Service	B	B		B	B		A	A			A	
Approach Delay (s)		10.6			10.6			5.6			5.3	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	8.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	35.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	38.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
12: Vincent Ave & Gladstone St

7/31/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	60	585	150	150	240	5	90	5	355	5	5	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00			1.00	
Frt	1.00	0.97		1.00	1.00		1.00	0.85			0.88	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			1.00	
Satd. Flow (prot)	902	3300		1805	3431		1805	1543			923	
Flt Permitted	0.59	1.00		0.28	1.00		0.71	1.00			0.98	
Satd. Flow (perm)	562	3300		537	3431		1347	1543			903	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	64	622	160	160	255	5	96	5	378	5	5	64
RTOR Reduction (vph)	0	54	0	0	3	0	0	127	0	0	38	0
Lane Group Flow (vph)	64	728	0	160	257	0	96	256	0	0	36	0
Heavy Vehicles (%)	100%	5%	10%	0%	5%	0%	0%	0%	5%	0%	0%	94%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	17.0	17.0		17.0	17.0		17.3	17.3			17.3	
Effective Green, g (s)	17.0	17.0		17.0	17.0		17.3	17.3			17.3	
Actuated g/C Ratio	0.40	0.40		0.40	0.40		0.41	0.41			0.41	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	226	1326		216	1379		551	631			369	
v/s Ratio Prot		0.22			0.07			c0.17				
v/s Ratio Perm	0.11			c0.30			0.07				0.04	
v/c Ratio	0.28	0.55		0.74	0.19		0.17	0.41			0.10	
Uniform Delay, d1	8.5	9.7		10.8	8.2		8.0	8.9			7.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	0.7	0.5		12.8	0.1		0.7	1.9			0.5	
Delay (s)	9.2	10.2		23.6	8.2		8.6	10.8			8.2	
Level of Service	A	B		C	A		A	B			A	
Approach Delay (s)		10.1			14.1			10.4			8.2	
Approach LOS		B			B			B			A	

Intersection Summary			
HCM Average Control Delay	11.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	42.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	61.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Hall & Foreman, Inc.

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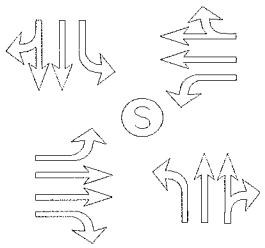
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	1 OF 6

E/W STREET : ARROW HWY
N/S STREET : VINCENT AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 13
ROUTE 2A

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
ARROW HWY						
EB LEFT	55	5%		55	5	60
EB THRU	530	5%		530	50	580
EB RIGHT	80	5%		80	5	85
WB LEFT	120	5%		120	10	130
WB THRU	1215	5%		1215	110	1325
WB RIGHT	90	5%		90	10	100
VINCENT AVE						
NB LEFT	170	5%		170	15	185
NB THRU	315	5%	**50**	365	35	400
NB RIGHT	85	5%		85	5	90
SB LEFT	30	5%		30	5	35
SB THRU	265	10%	**50**	315	30	345
SB RIGHT	70	10%		70	5	75
TOTALS	**3025**		**100**	**3125**	**285**	**3410**

Tustin Office: 714.665.4500 Tel/ 714.665.4501 Fax
Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax
Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax
Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	10-Sep-13	VV.110264.0000	2 OF 6

E/W STREET : ARROW HWY
N/S STREET : VINCENT AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 13
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						

ARROW HWY

EB LEFT	55	5%		55	5	60
EB THRU	530	5%		530	50	580
EB RIGHT	80	5%		80	5	85
WB LEFT	120	5%		120	10	130
WB THRU	1215	5%		1215	110	1325
WB RIGHT	90	5%		90	10	100

VINCENT AVE

NB LEFT	170	5%		170	15	185
NB THRU	315	5%		315	30	345
NB RIGHT	85	5%	**50**	135	10	145
SB LEFT	30	5%		30	5	35
SB THRU	265	10%	**50**	315	30	345
SB RIGHT	70	10%		70	5	75
TOTALS	**3025**		**100**	**3125**	**285**	**3410**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	3 OF 6

E/W STREET : ARROW HWY
N/S STREET : VINCENT AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 13
ROUTE 2A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
ARROW HWY						
EB LEFT	80	5%		80	5	85
EB THRU	655	5%		655	60	715
EB RIGHT	90	10%		90	10	100
WB LEFT	100	5%		100	10	110
WB THRU	575	5%		575	50	625
WB RIGHT	45	5%		45	5	50
VINCENT AVE						
NB LEFT	75	10%		75	5	80
NB THRU	175	15%	**50**	225	20	245
NB RIGHT	115	5%		115	10	125
SB LEFT	25	5%		25	5	30
SB THRU	155	20%	**50**	205	20	225
SB RIGHT	60	5%		60	5	65
TOTALS	**2150**		**100**	**2250**	**205**	**2455**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	10-Sep-13	VV.110264.0000	4 OF 6

E/W STREET : ARROW HWY
N/S STREET : VINCENT AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 13
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
ARROW HWY						
EB LEFT	80	5%		80	5	85
EB THRU	655	5%		655	60	715
EB RIGHT	90	10%		90	10	100
WB LEFT	100	5%		100	10	110
WB THRU	575	5%		575	50	625
WB RIGHT	45	5%		45	5	50
VINCENT AVE						
NB LEFT	75	10%		75	5	80
NB THRU	175	15%		175	15	190
NB RIGHT	115	5%	**50**	165	15	180
SB LEFT	25	5%		25	5	30
SB THRU	155	20%	**50**	205	20	225
SB RIGHT	60	5%		60	5	65
TOTALS	**2150**		**100**	**2250**	**205**	**2455**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	10-Sep-13	VV.110264.0000	5 OF 6

E/W STREET : ARROW HWY
N/S STREET : VINCENT AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 13
ROUTE 2A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
ARROW HWY						
EB LEFT	135	5%		135	10	145
EB THRU	1395	5%		1395	125	1520
EB RIGHT	210	5%		210	20	230
WB LEFT	110	5%		110	10	120
WB THRU	525	5%		525	45	570
WB RIGHT	75	5%		75	5	80
VINCENT AVE						
NB LEFT	40	5%		40	5	45
NB THRU	235	5%	**50**	285	25	310
NB RIGHT	105	5%		105	10	115
SB LEFT	45	5%		45	5	50
SB THRU	205	5%	**50**	255	25	280
SB RIGHT	55	5%		55	5	60
TOTALS	**3135**		**100**	**3235**	**290**	**3525**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	10-Sep-13	VV.110264.0000	6 OF 6

E/W STREET : ARROW HWY
N/S STREET : VINCENT AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 13
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
ARROW HWY						
EB LEFT	135	5%		135	10	145
EB THRU	1395	5%		1395	125	1520
EB RIGHT	210	5%		210	20	230
WB LEFT	110	5%		110	10	120
WB THRU	525	5%		525	45	570
WB RIGHT	75	5%		75	5	80
VINCENT AVE						
NB LEFT	40	5%		40	5	45
NB THRU	235	5%		235	20	255
NB RIGHT	105	5%	**50**	155	15	170
SB LEFT	45	5%		45	5	50
SB THRU	205	5%	**50**	255	25	280
SB RIGHT	55	5%		55	5	60
TOTALS	**3135**		**100**	**3235**	**290**	**3525**

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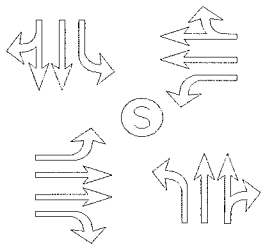
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	1 OF 6

E/W STREET : ARROW HWY
N/S STREET : VINCENT AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 13
ROUTE 2A

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
ARROW HWY								
EB LEFT	52	3	9	60	**0**	60	5	65
EB THRU	528	4	12	540	**0**	540	50	590
EB RIGHT	79	2	6	85	**0**	85	5	90
WB LEFT	120	2	6	125	**0**	125	10	135
WB THRU	1206	9	27	1235	**0**	1235	110	1345
WB RIGHT	89	0	0	90	**0**	90	10	100
VINCENT AVE								
NB LEFT	170	2	6	175	**0**	175	15	190
NB THRU	300	17	51	350	**150**	500	45	545
NB RIGHT	84	0	0	85	**0**	85	5	90
SB LEFT	28	0	0	30	**0**	30	5	35
SB THRU	244	22	66	310	**150**	460	40	500
SB RIGHT	61	8	24	85	**0**	85	5	90
TOTALS	**2961**				**300**	**3470**	**305**	**3775**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	2 OF 6

E/W STREET : ARROW HWY
N/S STREET : VINCENT AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 13
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
ARROW HWY								
EB LEFT	52	3	9	60	**0**	60	5	65
EB THRU	528	4	12	540	**0**	540	50	590
EB RIGHT	79	2	6	85	**0**	85	5	90
WB LEFT	120	2	6	125	**0**	125	10	135
WB THRU	1206	9	27	1235	**0**	1235	110	1345
WB RIGHT	89	0	0	90	**0**	90	10	100
VINCENT AVE								
NB LEFT	170	2	6	175	**0**	175	15	190
NB THRU	300	17	51	350	**0**	350	30	380
NB RIGHT	84	0	0	85	**150**	235	20	255
SB LEFT	28	0	0	30	**0**	30	5	35
SB THRU	244	22	66	310	**150**	460	40	500
SB RIGHT	61	8	24	85	**0**	85	5	90
TOTALS	**2961**				**300**	**3470**	**305**	**3775**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	3 OF 6

E/W STREET : ARROW HWY
N/S STREET : VINCENT AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 13
ROUTE 2A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
ARROW HWY								
EB LEFT	74	5	15	90	**0**	90	10	100
EB THRU	647	7	21	670	**0**	670	60	730
EB RIGHT	83	7	21	105	**0**	105	10	115
WB LEFT	97	1	3	100	**0**	100	10	110
WB THRU	572	4	12	585	**0**	585	55	640
WB RIGHT	46	0	0	45	**0**	45	5	50
VINCENT AVE								
NB LEFT	69	8	24	95	**0**	95	10	105
NB THRU	149	27	81	230	**150**	380	35	415
NB RIGHT	114	1	3	115	**0**	115	10	125
SB LEFT	25	0	0	25	**0**	25	5	30
SB THRU	126	27	81	205	**150**	355	30	385
SB RIGHT	58	3	9	65	**0**	65	5	70
TOTALS	**2060**				**300**	**2630**	**245**	**2875**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	4 OF 6

E/W STREET : ARROW HWY
N/S STREET : VINCENT AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 13
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
ARROW HWY								
EB LEFT	74	5	15	90	**0**	90	10	100
EB THRU	647	7	21	670	**0**	670	60	730
EB RIGHT	83	7	21	105	**0**	105	10	115
WB LEFT	97	1	3	100	**0**	100	10	110
WB THRU	572	4	12	585	**0**	585	55	640
WB RIGHT	46	0	0	45	**0**	45	5	50
VINCENT AVE								
NB LEFT	69	8	24	95	**0**	95	10	105
NB THRU	149	27	81	230	**0**	230	20	250
NB RIGHT	114	1	3	115	**150**	265	25	290
SB LEFT	25	0	0	25	**0**	25	5	30
SB THRU	126	27	81	205	**150**	355	30	385
SB RIGHT	58	3	9	65	**0**	65	5	70
TOTALS	**2060**				**300**	**2630**	**245**	**2875**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	5 OF 6

E/W STREET : ARROW HWY
N/S STREET : VINCENT AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 13
ROUTE 2A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
ARROW HWY								
EB LEFT	133	1	3	135	0	135	10	145
EB THRU	1392	4	12	1405	0	1405	125	1530
EB RIGHT	210	0	0	210	0	210	20	230
WB LEFT	110	0	0	110	0	110	10	120
WB THRU	525	2	6	530	0	530	50	580
WB RIGHT	73	0	0	75	0	75	5	80
VINCENT AVE								
NB LEFT	40	0	0	40	0	40	5	45
NB THRU	234	3	9	245	150	395	35	430
NB RIGHT	106	1	3	110	0	110	10	120
SB LEFT	46	0	0	45	0	45	5	50
SB THRU	204	0	0	205	150	355	30	385
SB RIGHT	53	0	0	55	0	55	5	60
TOTALS	**3126**				**300**	**3465**	**310**	**3775**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	6 OF 6

E/W STREET : ARROW HWY
N/S STREET : VINCENT AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 13
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
ARROW HWY								
EB LEFT	133	1	3	135	**0**	135	10	145
EB THRU	1392	4	12	1405	**0**	1405	125	1530
EB RIGHT	210	0	0	210	**0**	210	20	230
WB LEFT	110	0	0	110	**0**	110	10	120
WB THRU	525	2	6	530	**0**	530	50	580
WB RIGHT	73	0	0	75	**0**	75	5	80
VINCENT AVE								
NB LEFT	40	0	0	40	**0**	40	5	45
NB THRU	234	3	9	245	**0**	245	20	265
NB RIGHT	106	1	3	110	**150**	260	25	285
SB LEFT	46	0	0	45	**0**	45	5	50
SB THRU	204	0	0	205	**150**	355	30	385
SB RIGHT	53	0	0	55	**0**	55	5	60
TOTALS	**3126**				**300**	**3465**	**310**	**3775**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: VINCENT
EAST-WEST STREET: ARROW HWY
JURISDICTION: IRWINDALE

DATE: 06-08-11

PEAK HOUR: 07:15AM

NORTH LEG (SB)

TOTAL: 363

TT = 30

$TT\% = \frac{30}{363} = 8.26\% \approx 8\%$

Rt	Thru	Lt	
69 (70)	266 (265)	28 (30)	Total
21	55	3	1st
11	79	2	2nd
25	59	11	3rd
12	73	12	4th

TT = 11

$TT\% = \frac{11}{1426} = 0.77\% \approx 1\%$

EAST LEG TOTAL: (WB) 1,426

	1st	2nd	3rd	4th	Total
Rt	14	21	36	18	89 (90)
Thru	293	307	346	269	1215
Lt	33	24	40	25	122 (120)

WEST LEG TOTAL: (EB) 668

Total	1st	2nd	3rd	4th	
55	9	18	21	7	Lt
532 (530)	120	134	158	120	Thru
81 (80)	12	15	23	31	Rt

TT = 9

$TT\% = \frac{9}{668} = 1.35\% \approx 1\%$

SOUTH LEG (NB)

	Lt	Thru	Rt	
1st	48	74	9	
2nd	44	81	25	
3rd	44	85	34	
4th	36	77	16	
Total	172 (170)	317 (315)	84 (85)	TOTAL: 573

TT = 19

$TT\% = \frac{19}{573} = 3.32\% \approx 3\%$

PEAK HOUR FACTORS

NORTH LEG = 0.94
SOUTH LEG = 0.88
EAST LEG = 0.84
WEST LEG = 0.83

ALL LEGS = 0.86

HOUR TOTAL: 3,030

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: VINCENT

EAST-WEST STREET: ARROW HWY

TIME: 07:00AM-08:00AM DATE: 06-08-11

NORTH LEG

87	230	17	Total
30	37	1	1st
21	55	3	2nd
11	79	2	3rd
25	59	11	4th
Rt	Thru	Lt	

	1st	2nd	3rd	4th	Total
Rt	12	14	21	36	83
Thru	308	293	307	346	1254
Lt	14	33	24	40	111

Total	1st	2nd	3rd	4th	
63	15	9	18	21	Lt
531	119	120	134	158	Thru
64	14	12	15	23	Rt

	Lt	Thru	Rt
1st	56	65	11
2nd	48	74	9
3rd	44	81	25
4th	44	85	34
Total	192	305	79

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: VINCENT

EAST-WEST STREET: ARROW HWY

TIME: 08:00AM-09:00AM DATE: 06-08-11

NORTH LEG

64	199	27	Total
12	73	12	1st
21	45	1	2nd
19	53	3	3rd
12	28	11	4th
Rt	Thru	Lt	

Rt	18	28	20	28	94
Thru	269	261	264	188	982
Lt	25	37	25	22	109
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
59	7	13	14	25	Lt
451	120	105	101	125	Thru
83	31	12	20	20	Rt

	Lt	Thru	Rt
1st	36	77	16
2nd	30	66	17
3rd	22	51	22
4th	27	39	30
Total	115	233	85

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : VINCENT — IRWINDALE

EAST-WEST STREET : ARROW HWY — 06-08-11

BEGINNING TIME : 07:00AM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
						SB NORTH LEG						
26	36	1	0	1	0	1	0	0	3	0	0	68
18	55	3	0	0	0	0	0	0	3	0	0	79
10	74	2	0	0	0	1	0	0	0	5	0	92
24	52	11	0	0	0	0	0	0	1	7	0	95
9	63	12	0	0	0	0	0	0	3	10	0	97
21	35	1	0	0	0	0	0	1	0	10	29	67
17	48	3	0	0	0	0	0	0	2	5	0	75
11	28	11	0	0	0	0	0	0	1	0	0	51
						TT=0+1+29=30						
136	391	44	0	1	0	2	0	0	13	37	0	624
						NB SOUTH LEG						
11	65	56	0	0	0	0	0	0	0	0	0	132
9	74	48	0	0	0	0	0	0	0	0	0	131
25	81	44	0	0	0	0	0	0	0	0	0	150
34	75	44	0	0	0	0	0	0	0	10	0	163
16	70	34	0	0	0	0	0	0	0	7	2	129
14	55	29	0	0	0	1	0	0	0	3	11	19
22	41	22	0	0	0	0	0	0	0	10	0	95
29	36	26	0	0	0	0	0	0	1	3	1	96
						TT=0+0+19=19						
160	497	303	0	0	1	0	0	0	4	41	3	1009
						WB EAST LEG						
11	306	14	0	0	0	0	0	0	1	2	0	334
14	292	32	0	0	0	0	0	1	0	1	0	340
21	303	24	0	1	0	0	0	0	0	3	0	352
36	343	39	0	0	0	0	0	0	0	3	1	422
18	268	25	0	1	0	0	0	0	0	0	0	312
28	258	37	0	0	2	0	0	1	0	2	8	0
20	261	25	0	1	0	0	0	0	0	2	0	309
27	186	22	0	1	0	1	0	0	0	1	0	238
						TT=2+1+8=11						
175	2217	218	0	4	0	1	1	1	1	14	1	2633
						EB WEST LEG						
14	118	12	0	1	0	0	0	3	0	0	0	148
12	120	9	0	0	0	0	0	0	0	0	0	141
15	133	17	0	1	0	0	0	0	0	0	1	167
23	157	21	0	1	0	0	0	0	0	0	0	202
29	118	5	0	1	0	0	0	2	2	1	0	158
10	103	13	0	0	3	0	0	1	2	0	2	1
20	98	13	0	1	0	0	2	0	0	0	1	135
19	123	23	0	0	0	0	2	2	1	0	0	170
						TT=3+2+4=9						
142	970	113	0	5	0	0	5	7	5	2	2	1251

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: VINCENT
EAST-WEST STREET: ARROW HWY
JURISDICTION: IRWINDALE

DATE: 06-08-11

PEAK HOUR: 12:00PM

NORTH LEG (SB)

TOTAL: 239

TT = 30

TT% = 30/239 = 12.55% ≈ 13%

Rt	Thru	Lt	
61 (60)	153 (155)	25	Total
16	43	8	1st
21	41	5	2nd
16	26	5	3rd
8	43	7	4th

TT = 5

TT% = 5/720 = 0.69% ≈ 1%

EAST LEG TOTAL: (WB) 720

	1st	2nd	3rd	4th	Total
Rt	21	10	9	6	46 (45)
Thru	129	164	124	159	576 (575)
Lt	24	15	31	28	98 (100)

Total	1st	2nd	3rd	4th	
79 (80)	15	24	24	16	Lt
654 (655)	213	154	127	160	Thru
90	20	19	23	28	Rt

WEST LEG TOTAL: (EB) 823

TT = 17

TT% = 17/823 = 2.07% ≈ 2%

	Lt	Thru	Rt
1st	12	41	35
2nd	22	42	26
3rd	25	49	23
4th	18	44	31
Total	77 (75)	176 (175)	115

SOUTH LEG (NB)

TOTAL: 368

TT = 36

TT% = 36/368 = 9.78% ≈ 10%

PEAK HOUR FACTORS

NORTH LEG = 0.89
SOUTH LEG = 0.95
EAST LEG = 0.93
WEST LEG = 0.83

ALL LEGS = 0.93

HOUR TOTAL: 2,150

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: VINCENT

EAST-WEST STREET: ARROW HWY

TIME: 12:00PM-01:00PM DATE: 06-08-11

NORTH LEG

Rt	Thru	Lt	
61	153	25	Total
16	43	8	1st
21	41	5	2nd
16	26	5	3rd
8	43	7	4th

	1st	2nd	3rd	4th	Total
Rt	21	10	9	6	46
Thru	129	164	124	159	576
Lt	24	15	31	28	98

Total	1st	2nd	3rd	4th	
79	15	24	24	16	Lt
654	213	154	127	160	Thru
90	20	19	23	28	Rt

	Lt	Thru	Rt
1st	12	41	35
2nd	22	42	26
3rd	25	49	23
4th	18	44	31
Total	77	176	115

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: VINCENT

EAST-WEST STREET: ARROW HWY

TIME: 01:00PM-02:00PM DATE: 06-08-11

NORTH LEG

Rt	Thru	Lt	
61	159	25	Total
15	45	8	1st
16	33	11	2nd
17	42	3	3rd
13	39	3	4th

	1st	2nd	3rd	4th	Total
Rt	22	9	24	23	78
Thru	111	114	132	122	479
Lt	20	21	23	20	84

Total	1st	2nd	3rd	4th	
74	19	16	15	24	Lt
658	150	157	184	167	Thru
125	22	22	28	53	Rt

	Lt	Thru	Rt
1st	20	51	22
2nd	27	40	30
3rd	26	43	38
4th	39	41	21
Total	112	175	111

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : VINCENT — IRWINDALE

EAST-WEST STREET : ARROW HWY — 06-08-11

BEGINNING TIME : 12:00PM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
						SB NORTH LEG						
16	34	8	0	0	0	0	0	0	0	9	0	67
19	36	5	0	0	0	0	0	0	2	5	0	67
16	20	5	0	1	0	0	0	0	0	5	0	47
7	36	7	0	0	0	0	0	0	1	7	0	58
14	40	8	0	0	0	1	0	0	0	5	0	68
15	30	11	0	0	0	1	0	0	0	3	0	60
16	39	3	0	0	0	0	0	0	1	3	0	62
12	33	3	0	0	0	1	0	0	0	6	0	55
						TT=1+0+29=30						
115	268	50	0	1	0	3	0	0	4	43	0	484
						NB SOUTH LEG						
35	32	11	0	0	0	0	1	1	0	8	0	88
26	34	20	0	0	0	0	0	1	0	8	1	90
23	43	20	0	0	0	0	1	1	0	5	4	97
30	40	18	0	0	0	0	0	0	1	4	0	93
22	41	19	0	0	0	0	0	5	0	10	3	93
29	39	23	0	0	0	1	0	0	0	1	4	97
38	40	24	0	0	0	0	0	0	0	3	2	107
20	38	35	0	0	0	1	0	0	0	3	4	101
						TT=0+5+31=36						
223	307	170	0	0	0	2	2	3	1	42	16	766
						WB EAST LEG						
21	128	24	0	0	0	0	1	0	0	0	0	174
10	161	15	0	1	0	0	1	0	0	1	0	189
9	124	31	0	0	0	0	0	0	0	0	0	164
6	159	27	0	0	0	0	0	0	0	0	1	193
22	110	20	0	0	1	0	1	2	0	0	2	153
9	113	21	0	0	0	0	1	0	0	0	0	144
23	128	23	0	2	0	1	2	0	0	0	0	179
21	119	20	0	0	0	1	3	0	1	0	0	165
						TT=1+2+2=5						
121	1042	181	0	3	0	2	9	0	1	1	1	1361
						EB WEST LEG						
18	211	13	0	1	0	0	1	1	2	0	1	248
18	151	23	0	1	0	0	1	1	1	1	0	197
21	125	24	0	1	0	0	1	0	2	0	0	174
26	160	14	0	0	0	1	0	2	1	0	0	204
22	149	17	0	0	3	0	1	6	2	0	0	191
20	151	15	0	1	0	0	2	1	2	3	8	195
27	183	15	0	1	0	0	0	0	1	0	0	227
51	165	22	0	0	0	0	0	0	2	2	2	244
						TT=3+6+8=17						
203	1295	143	0	5	0	1	6	7	11	6	3	1680

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: VINCENT
EAST-WEST STREET: ARROW HWY
JURISDICTION: IRWINDALE

DATE: 06-08-11

PEAK HOUR: 05:00PM

NORTH LEG (SB)

TOTAL: 303

Rt	Thru	Lt	
53 (55)	204 (205)	46 (45)	Total
15	55	15	1st
13	53	9	2nd
14	45	6	3rd
11	51	16	4th

TT = 0

TT% = 0/303 = 0%
≈ 1%

TT = 2

TT% = 2/710 = 0.28%
≈ 1%

EAST LEG TOTAL: (WB) 710

	1st	2nd	3rd	4th	Total
Rt	15	26	11	21	73 (75)
Thru	126	141	132	128	527 (525)
Lt	21	32	32	25	110

WEST LEG TOTAL (EB) 1,740

Total	1st	2nd	3rd	4th	
134 (135)	36	29	28	41	Lt
1396 (1395)	353	347	355	341	Thru
210	43	56	47	64	Rt

TT = 5

TT% = 5/1740 = 0.29%
≈ 1%

SOUTH LEG (NB)

	Lt	Thru	Rt
1st	8	55	27
2nd	5	71	32
3rd	12	51	20
4th	15	60	28
Total	40	237 (235)	107 (105)

TT = 4

TT% = 4/384 = 1.04%
≈ 1%

TOTAL: 384

PEAK HOUR FACTORS

NORTH LEG = 0.89
SOUTH LEG = 0.89
EAST LEG = 0.89
WEST LEG = 0.98

ALL LEGS = 0.96

HOUR TOTAL: 3,137

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: VINCENT

EAST-WEST STREET: ARROW HWY

TIME: 04:00PM-05:00PM DATE: 06-08-11

NORTH LEG

Rt	Thru	Lt	
63	183	33	Total
14	51	10	1st
20	54	4	2nd
17	33	10	3rd
12	45	9	4th

	1st	2nd	3rd	4th	Total
Rt	20	11	25	20	76
Thru	110	119	130	91	450
Lt	18	24	37	36	115

Total	1st	2nd	3rd	4th	
177	57	54	35	31	Lt
1271	288	249	374	360	Thru
164	40	34	47	43	Rt

	Lt	Thru	Rt
1st	11	64	21
2nd	16	78	28
3rd	12	74	23
4th	9	46	24
Total	48	262	96

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: VINCENT

EAST-WEST STREET: ARROW HWY

TIME: 05:00PM-06:00PM DATE: 06-08-11

NORTH LEG

Rt	Thru	Lt	
53	204	46	Total
15	55	15	1st
13	53	9	2nd
14	45	6	3rd
11	51	16	4th

	1st	2nd	3rd	4th	Total
Rt	15	26	11	21	73
Thru	126	141	132	128	527
Lt	21	32	32	25	110

Total	1st	2nd	3rd	4th	
134	36	29	28	41	Lt
1396	353	347	355	341	Thru
210	43	56	47	64	Rt

	Lt	Thru	Rt
1st	8	55	27
2nd	5	71	32
3rd	12	51	20
4th	15	60	28
Total	40	237	107

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : VINCENT — IRWINDALE

EAST-WEST STREET : ARROW HWY — 06-08-11

BEGINNING TIME : 04:00PM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
						SB NORTH LEG						
12	51	10	0	0	0	1	0	0	1	0	0	75
18	54	4	0	0	0	0	0	0	2	0	0	78
16	33	10	0	0	0	0	0	0	1	0	0	60
12	44	9	0	0	0	0	0	0	0	1	0	66
15	55	15	0	0	0	0	0	0	0	0	0	85
13	53	9	0	0	0	0	0	0	0	0	0	75
14	45	6	0	0	0	0	0	0	0	0	0	65
11	51	16	0	0	0	0	0	0	0	0	0	78
				0			0			0		
						TT=0+0+0=0						
111	386	79	0	0	0	1	0	0	4	1	0	582
						NB SOUTH LEG						
21	64	11	0	0	0	0	0	0	0	0	0	96
28	77	16	0	0	0	0	1	0	0	0	0	122
23	68	11	0	0	0	0	5	1	0	1	0	109
24	46	9	0	0	0	0	0	0	0	0	0	79
26	55	8	0	0	0	0	0	0	1	0	0	90
32	69	5	0	0	0	0	2	0	0	0	0	108
20	51	12	0	0	0	0	0	0	0	0	0	83
28	59	15	0	0	0	0	1	0	0	0	0	103
				0			3			1		
						TT=0+3+1=4						
202	489	87	0	0	0	0	9	1	1	1	0	790
						WB EAST LEG						
20	109	18	0	0	0	0	1	0	0	0	0	148
11	114	23	0	2	0	0	0	0	0	3	1	154
25	130	37	0	0	0	0	0	0	0	0	0	192
20	91	36	0	0	0	0	0	0	0	0	0	147
15	125	21	0	1	0	0	0	0	0	0	0	162
26	141	32	0	0	0	0	0	0	0	0	0	199
11	131	32	0	1	0	0	0	0	0	0	0	175
21	128	25	0	0	0	0	0	0	0	0	0	174
				2			0			0		
						TT=2+0+0=2						
149	969	224	0	4	0	0	1	0	0	3	1	1351
						EB WEST LEG						
40	287	54	0	0	0	0	0	1	0	1	2	385
34	249	52	0	0	0	0	0	2	0	0	0	337
47	373	33	0	0	0	0	1	1	0	0	1	456
43	357	30	0	1	0	0	1	1	0	1	0	434
43	353	35	0	0	0	0	0	1	0	0	0	432
56	346	29	0	1	0	0	0	0	0	0	0	432
47	354	28	0	0	0	0	1	0	0	0	0	430
64	339	41	0	1	0	0	0	0	0	1	0	446
				2			2			1		
						TT=2+2+1=5						
374	2658	302	0	3	0	0	3	6	0	3	3	3352

Prepared by Newport Traffic Studies

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	55	530	80	120	1215	90	170	315	85	30	265	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.97		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3438	1538	1719	3414		1719	3362		1805	3179	
Flt Permitted	0.14	1.00	1.00	0.39	1.00		0.50	1.00		0.44	1.00	
Satd. Flow (perm)	256	3438	1538	712	3414		910	3362		834	3179	
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	64	616	93	140	1413	105	198	366	99	35	308	81
RTOR Reduction (vph)	0	0	45	0	10	0	0	44	0	0	19	0
Lane Group Flow (vph)	64	616	48	140	1508	0	198	421	0	35	370	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	0%	5%	5%	0%	0%	10%	10%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	28.3	28.3	28.3	28.3	28.3		18.0	18.0		18.0	18.0	
Effective Green, g (s)	28.3	28.3	28.3	28.3	28.3		18.0	18.0		18.0	18.0	
Actuated g/C Ratio	0.52	0.52	0.52	0.52	0.52		0.33	0.33		0.33	0.33	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	133	1792	802	371	1779		302	1114		276	1054	
v/s Ratio Prot		0.18			c0.44			0.13			0.12	
v/s Ratio Perm	0.25		0.03	0.20			c0.22			0.04		
v/c Ratio	0.48	0.34	0.06	0.38	0.85		0.66	0.38		0.13	0.35	
Uniform Delay, d1	8.3	7.6	6.4	7.7	11.2		15.5	13.9		12.7	13.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.7	0.1	0.0	0.6	4.0		10.6	1.0		0.9	0.9	
Delay (s)	11.0	7.7	6.5	8.4	15.1		26.1	14.8		13.6	14.6	
Level of Service	B	A	A	A	B		C	B		B	B	
Approach Delay (s)		7.8			14.5			18.2			14.6	
Approach LOS		A			B			B			B	

Intersection Summary			
HCM Average Control Delay	13.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	54.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	72.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	80	655	90	100	575	45	75	175	115	25	155	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.94		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3438	1468	1719	3413		1641	3058		1805	2986	
Flt Permitted	0.34	1.00	1.00	0.32	1.00		0.61	1.00		0.56	1.00	
Satd. Flow (perm)	624	3438	1468	580	3413		1049	3058		1068	2986	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	86	704	97	108	618	48	81	188	124	27	167	65
RTOR Reduction (vph)	0	0	62	0	15	0	0	61	0	0	37	0
Lane Group Flow (vph)	86	704	35	108	651	0	81	251	0	27	195	0
Heavy Vehicles (%)	5%	5%	10%	5%	5%	0%	10%	15%	5%	0%	20%	5%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	13.6	13.6	13.6	13.6	13.6		16.1	16.1		16.1	16.1	
Effective Green, g (s)	13.6	13.6	13.6	13.6	13.6		16.1	16.1		16.1	16.1	
Actuated g/C Ratio	0.36	0.36	0.36	0.36	0.36		0.43	0.43		0.43	0.43	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	225	1240	530	209	1231		448	1306		456	1275	
v/s Ratio Prot		c0.20			0.19			c0.08			0.07	
v/s Ratio Perm	0.14		0.02	0.19			0.08			0.03		
v/c Ratio	0.38	0.57	0.07	0.52	0.53		0.18	0.19		0.06	0.15	
Uniform Delay, d1	8.9	9.7	7.9	9.5	9.5		6.7	6.7		6.3	6.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.1	0.6	0.1	2.2	0.4		0.9	0.3		0.2	0.3	
Delay (s)	10.0	10.3	7.9	11.6	9.9		7.6	7.1		6.6	6.9	
Level of Service	B	B	A	B	A		A	A		A	A	
Approach Delay (s)		10.0			10.2			7.2			6.8	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	9.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	37.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	48.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	135	1395	210	110	525	75	40	235	105	45	205	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.95		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3438	1615	1805	3394		1805	3279		1805	3496	
Flt Permitted	0.40	1.00	1.00	0.11	1.00		0.58	1.00		0.50	1.00	
Satd. Flow (perm)	721	3438	1615	213	3394		1111	3279		956	3496	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	141	1453	219	115	547	78	42	245	109	47	214	57
RTOR Reduction (vph)	0	0	88	0	19	0	0	37	0	0	36	0
Lane Group Flow (vph)	141	1453	131	115	606	0	42	317	0	47	235	0
Heavy Vehicles (%)	5%	5%	0%	0%	5%	0%	0%	5%	5%	0%	0%	0%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	36.2	36.2	36.2	36.2	36.2		16.2	16.2		16.2	16.2	
Effective Green, g (s)	36.2	36.2	36.2	36.2	36.2		16.2	16.2		16.2	16.2	
Actuated g/C Ratio	0.60	0.60	0.60	0.60	0.60		0.27	0.27		0.27	0.27	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	432	2061	968	128	2034		298	879		256	938	
v/s Ratio Prot		0.42			0.18			c0.10			0.07	
v/s Ratio Perm	0.20		0.08	c0.54			0.04			0.05		
v/c Ratio	0.33	0.70	0.14	0.90	0.30		0.14	0.36		0.18	0.25	
Uniform Delay, d1	6.0	8.4	5.3	10.5	5.9		16.8	17.9		17.0	17.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	1.1	0.1	49.3	0.1		1.0	1.2		1.6	0.6	
Delay (s)	6.5	9.5	5.3	59.8	6.0		17.8	19.1		18.6	18.0	
Level of Service	A	A	A	E	A		B	B		B	B	
Approach Delay (s)		8.8			14.3			18.9			18.1	
Approach LOS		A			B			B			B	

Intersection Summary			
HCM Average Control Delay	12.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	60.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	71.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	55	530	80	120	1215	90	170	365	85	30	315	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.97		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3438	1538	1719	3414		1719	3061		1805	2891	
Flt Permitted	0.14	1.00	1.00	0.39	1.00		0.45	1.00		0.39	1.00	
Satd. Flow (perm)	256	3438	1538	712	3414		821	3061		747	2891	
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	64	616	93	140	1413	105	198	424	99	35	366	81
RTOR Reduction (vph)	0	0	45	0	10	0	0	37	0	0	19	0
Lane Group Flow (vph)	64	616	48	140	1508	0	198	486	0	35	428	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	0%	5%	18%	0%	0%	24%	10%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	28.3	28.3	28.3	28.3	28.3		18.0	18.0		18.0	18.0	
Effective Green, g (s)	28.3	28.3	28.3	28.3	28.3		18.0	18.0		18.0	18.0	
Actuated g/C Ratio	0.52	0.52	0.52	0.52	0.52		0.33	0.33		0.33	0.33	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	133	1792	802	371	1779		272	1015		248	958	
v/s Ratio Prot		0.18			c0.44			0.16			0.15	
v/s Ratio Perm	0.25		0.03	0.20			c0.24			0.05		
v/c Ratio	0.48	0.34	0.06	0.38	0.85		0.73	0.48		0.14	0.45	
Uniform Delay, d1	8.3	7.6	6.4	7.7	11.2		16.0	14.4		12.7	14.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.7	0.1	0.0	0.6	4.0		15.7	1.6		1.2	1.5	
Delay (s)	11.0	7.7	6.5	8.4	15.1		31.7	16.0		13.9	15.7	
Level of Service	B	A	A	A	B		C	B		B	B	
Approach Delay (s)		7.8			14.5			20.3			15.6	
Approach LOS		A			B			C			B	

Intersection Summary			
HCM Average Control Delay	14.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	54.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	73.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	80	655	90	100	575	45	75	225	115	25	205	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.95		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3438	1468	1719	3413		1641	2759		1805	2641	
Flt Permitted	0.34	1.00	1.00	0.32	1.00		0.58	1.00		0.53	1.00	
Satd. Flow (perm)	624	3438	1468	580	3413		997	2759		1014	2641	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	86	704	97	108	618	48	81	242	124	27	220	65
RTOR Reduction (vph)	0	0	62	0	15	0	0	61	0	0	37	0
Lane Group Flow (vph)	86	704	35	108	651	0	81	305	0	27	248	0
Heavy Vehicles (%)	5%	5%	10%	5%	5%	0%	10%	34%	5%	0%	40%	5%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	13.6	13.6	13.6	13.6	13.6		16.1	16.1		16.1	16.1	
Effective Green, g (s)	13.6	13.6	13.6	13.6	13.6		16.1	16.1		16.1	16.1	
Actuated g/C Ratio	0.36	0.36	0.36	0.36	0.36		0.43	0.43		0.43	0.43	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	225	1240	530	209	1231		426	1178		433	1128	
v/s Ratio Prot		c0.20			0.19			c0.11			0.09	
v/s Ratio Perm	0.14		0.02	0.19			0.08			0.03		
v/c Ratio	0.38	0.57	0.07	0.52	0.53		0.19	0.26		0.06	0.22	
Uniform Delay, d1	8.9	9.7	7.9	9.5	9.5		6.7	7.0		6.4	6.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.1	0.6	0.1	2.2	0.4		1.0	0.5		0.3	0.4	
Delay (s)	10.0	10.3	7.9	11.6	9.9		7.7	7.5		6.6	7.3	
Level of Service	B	B	A	B	A		A	A		A	A	
Approach Delay (s)		10.0			10.2			7.5			7.2	
Approach LOS		B			B			A			A	

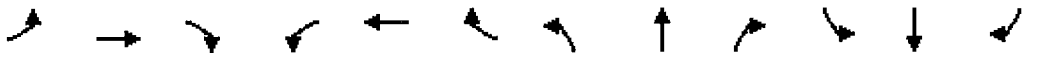
Intersection Summary			
HCM Average Control Delay	9.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	37.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	50.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	135	1395	210	110	525	75	40	285	105	45	255	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.96		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3438	1615	1805	3394		1805	2950		1805	3017	
Flt Permitted	0.40	1.00	1.00	0.11	1.00		0.54	1.00		0.45	1.00	
Satd. Flow (perm)	721	3438	1615	213	3394		1017	2950		858	3017	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	141	1453	219	115	547	78	42	297	109	47	266	57
RTOR Reduction (vph)	0	0	88	0	19	0	0	37	0	0	27	0
Lane Group Flow (vph)	141	1453	131	115	606	0	42	369	0	47	296	0
Heavy Vehicles (%)	5%	5%	0%	0%	5%	0%	0%	22%	5%	0%	20%	0%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	36.2	36.2	36.2	36.2	36.2		16.2	16.2		16.2	16.2	
Effective Green, g (s)	36.2	36.2	36.2	36.2	36.2		16.2	16.2		16.2	16.2	
Actuated g/C Ratio	0.60	0.60	0.60	0.60	0.60		0.27	0.27		0.27	0.27	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	432	2061	968	128	2034		273	791		230	809	
v/s Ratio Prot		0.42			0.18			c0.13			0.10	
v/s Ratio Perm	0.20		0.08	c0.54			0.04			0.05		
v/c Ratio	0.33	0.70	0.14	0.90	0.30		0.15	0.47		0.20	0.37	
Uniform Delay, d1	6.0	8.4	5.3	10.5	5.9		16.9	18.5		17.1	17.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	1.1	0.1	49.3	0.1		1.2	2.0		2.0	1.3	
Delay (s)	6.5	9.5	5.3	59.8	6.0		18.1	20.5		19.1	19.2	
Level of Service	A	A	A	E	A		B	C		B	B	
Approach Delay (s)		8.8			14.3			20.2			19.2	
Approach LOS		A			B			C			B	

Intersection Summary			
HCM Average Control Delay	12.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	60.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	72.6%	ICU Level of Service	C
Analysis Period (min)	15		

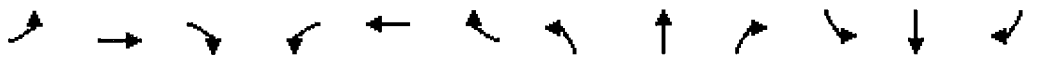
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	60	580	85	130	1325	100	185	400	95	35	345	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.97		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3438	1538	1719	3413		1719	3061		1805	2892	
Flt Permitted	0.14	1.00	1.00	0.36	1.00		0.42	1.00		0.35	1.00	
Satd. Flow (perm)	250	3438	1538	657	3413		755	3061		668	2892	
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	70	674	99	151	1541	116	215	465	110	41	401	87
RTOR Reduction (vph)	0	0	47	0	10	0	0	37	0	0	13	0
Lane Group Flow (vph)	70	674	52	151	1647	0	215	538	0	41	475	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	0%	5%	18%	0%	0%	24%	10%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	29.0	29.0	29.0	29.0	29.0		18.0	18.0		18.0	18.0	
Effective Green, g (s)	29.0	29.0	29.0	29.0	29.0		18.0	18.0		18.0	18.0	
Actuated g/C Ratio	0.53	0.53	0.53	0.53	0.53		0.33	0.33		0.33	0.33	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	132	1813	811	346	1800		247	1002		219	946	
v/s Ratio Prot		0.20			c0.48			0.18			0.16	
v/s Ratio Perm	0.28		0.03	0.23			c0.28			0.06		
v/c Ratio	0.53	0.37	0.06	0.44	0.92		0.87	0.54		0.19	0.50	
Uniform Delay, d1	8.5	7.6	6.4	8.0	11.9		17.4	15.1		13.3	14.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.0	0.1	0.0	0.9	7.7		31.7	2.1		1.9	1.9	
Delay (s)	12.6	7.8	6.4	8.9	19.6		49.1	17.2		15.1	16.8	
Level of Service	B	A	A	A	B		D	B		B	B	
Approach Delay (s)		8.0			18.7			25.9			16.7	
Approach LOS		A			B			C			B	

Intersection Summary			
HCM Average Control Delay	17.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	55.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	78.7%	ICU Level of Service	D
Analysis Period (min)	15		

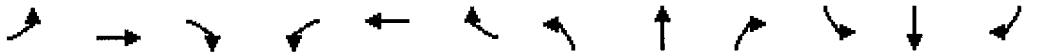
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	85	715	100	110	625	50	80	245	125	25	225	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.95		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3438	1468	1719	3412		1641	2759		1805	2640	
Flt Permitted	0.31	1.00	1.00	0.29	1.00		0.56	1.00		0.52	1.00	
Satd. Flow (perm)	559	3438	1468	517	3412		971	2759		984	2640	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	91	769	108	118	672	54	86	263	134	27	242	70
RTOR Reduction (vph)	0	0	68	0	16	0	0	49	0	0	40	0
Lane Group Flow (vph)	91	769	40	118	710	0	86	348	0	27	272	0
Heavy Vehicles (%)	5%	5%	10%	5%	5%	0%	10%	34%	5%	0%	40%	5%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	14.0	14.0	14.0	14.0	14.0		16.1	16.1		16.1	16.1	
Effective Green, g (s)	14.0	14.0	14.0	14.0	14.0		16.1	16.1		16.1	16.1	
Actuated g/C Ratio	0.37	0.37	0.37	0.37	0.37		0.42	0.42		0.42	0.42	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	205	1263	539	190	1254		410	1166		416	1116	
v/s Ratio Prot		0.22			0.21			c0.13			0.10	
v/s Ratio Perm	0.16		0.03	c0.23			0.09			0.03		
v/c Ratio	0.44	0.61	0.07	0.62	0.57		0.21	0.30		0.06	0.24	
Uniform Delay, d1	9.1	9.8	7.8	9.9	9.6		7.0	7.3		6.5	7.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.5	0.8	0.1	6.2	0.6		1.2	0.7		0.3	0.5	
Delay (s)	10.6	10.7	7.9	16.0	10.2		8.1	7.9		6.8	7.6	
Level of Service	B	B	A	B	B		A	A		A	A	
Approach Delay (s)		10.3			11.0			8.0			7.5	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	9.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	38.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	53.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	145	1520	230	120	570	80	45	310	115	50	280	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.96		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3438	1615	1805	3395		1805	2950		1805	3017	
Flt Permitted	0.38	1.00	1.00	0.10	1.00		0.48	1.00		0.39	1.00	
Satd. Flow (perm)	680	3438	1615	185	3395		920	2950		747	3017	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	151	1583	240	125	594	83	47	323	120	52	292	62
RTOR Reduction (vph)	0	0	86	0	17	0	0	28	0	0	28	0
Lane Group Flow (vph)	151	1583	154	125	660	0	47	415	0	52	326	0
Heavy Vehicles (%)	5%	5%	0%	0%	5%	0%	0%	22%	5%	0%	20%	0%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	41.0	41.0	41.0	41.0	41.0		16.0	16.0		16.0	16.0	
Effective Green, g (s)	41.0	41.0	41.0	41.0	41.0		16.0	16.0		16.0	16.0	
Actuated g/C Ratio	0.63	0.63	0.63	0.63	0.63		0.25	0.25		0.25	0.25	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	429	2169	1019	117	2141		226	726		184	743	
v/s Ratio Prot		0.46			0.19			c0.14			0.11	
v/s Ratio Perm	0.22		0.10	c0.67			0.05			0.07		
v/c Ratio	0.35	0.73	0.15	1.07	0.31		0.21	0.57		0.28	0.44	
Uniform Delay, d1	5.7	8.2	4.9	12.0	5.5		19.5	21.5		19.9	20.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	1.3	0.1	102.8	0.1		2.1	3.3		3.8	1.9	
Delay (s)	6.2	9.5	5.0	114.8	5.6		21.5	24.7		23.7	22.6	
Level of Service	A	A	A	F	A		C	C		C	C	
Approach Delay (s)		8.7			22.6			24.4			22.7	
Approach LOS		A			C			C			C	

Intersection Summary			
HCM Average Control Delay	15.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	77.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
13: Vincent Ave & Arrow Hwy

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	55	530	80	120	1215	90	170	315	135	30	315	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.95		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3438	1538	1719	3414		1719	3008		1805	2891	
Flt Permitted	0.14	1.00	1.00	0.39	1.00		0.45	1.00		0.39	1.00	
Satd. Flow (perm)	256	3438	1538	712	3414		821	3008		747	2891	
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	64	616	93	140	1413	105	198	366	157	35	366	81
RTOR Reduction (vph)	0	0	45	0	10	0	0	86	0	0	19	0
Lane Group Flow (vph)	64	616	48	140	1508	0	198	437	0	35	428	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	0%	5%	5%	37%	0%	24%	10%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	28.3	28.3	28.3	28.3	28.3		18.0	18.0		18.0	18.0	
Effective Green, g (s)	28.3	28.3	28.3	28.3	28.3		18.0	18.0		18.0	18.0	
Actuated g/C Ratio	0.52	0.52	0.52	0.52	0.52		0.33	0.33		0.33	0.33	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	133	1792	802	371	1779		272	997		248	958	
v/s Ratio Prot		0.18			c0.44			0.15			0.15	
v/s Ratio Perm	0.25		0.03	0.20			c0.24			0.05		
v/c Ratio	0.48	0.34	0.06	0.38	0.85		0.73	0.44		0.14	0.45	
Uniform Delay, d1	8.3	7.6	6.4	7.7	11.2		16.0	14.2		12.7	14.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.7	0.1	0.0	0.6	4.0		15.7	1.4		1.2	1.5	
Delay (s)	11.0	7.7	6.5	8.4	15.1		31.7	15.6		13.9	15.7	
Level of Service	B	A	A	A	B		C	B		B	B	
Approach Delay (s)		7.8			14.5			20.0			15.6	
Approach LOS		A			B			C			B	

Intersection Summary			
HCM Average Control Delay	14.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	54.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	73.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
13: Vincent Ave & Arrow Hwy

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	80	655	90	100	575	45	75	175	165	25	205	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.93		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3438	1468	1719	3413		1641	2695		1805	2641	
Flt Permitted	0.34	1.00	1.00	0.32	1.00		0.58	1.00		0.53	1.00	
Satd. Flow (perm)	624	3438	1468	580	3413		997	2695		1015	2641	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	86	704	97	108	618	48	81	188	177	27	220	65
RTOR Reduction (vph)	0	0	62	0	15	0	0	61	0	0	37	0
Lane Group Flow (vph)	86	704	35	108	651	0	81	304	0	27	248	0
Heavy Vehicles (%)	5%	5%	10%	5%	5%	0%	10%	15%	34%	0%	40%	5%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	13.6	13.6	13.6	13.6	13.6		16.1	16.1		16.1	16.1	
Effective Green, g (s)	13.6	13.6	13.6	13.6	13.6		16.1	16.1		16.1	16.1	
Actuated g/C Ratio	0.36	0.36	0.36	0.36	0.36		0.43	0.43		0.43	0.43	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	225	1240	530	209	1231		426	1151		433	1128	
v/s Ratio Prot		c0.20			0.19			c0.11			0.09	
v/s Ratio Perm	0.14		0.02	0.19			0.08			0.03		
v/c Ratio	0.38	0.57	0.07	0.52	0.53		0.19	0.26		0.06	0.22	
Uniform Delay, d1	8.9	9.7	7.9	9.5	9.5		6.7	7.0		6.4	6.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.1	0.6	0.1	2.2	0.4		1.0	0.6		0.3	0.4	
Delay (s)	10.0	10.3	7.9	11.6	9.9		7.7	7.5		6.6	7.3	
Level of Service	B	B	A	B	A		A	A		A	A	
Approach Delay (s)		10.0			10.2			7.6			7.2	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	9.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	37.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	50.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
13: Vincent Ave & Arrow Hwy

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	135	1395	210	110	525	75	40	235	155	45	255	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.94		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3438	1615	1805	3394		1805	2895		1805	3017	
Flt Permitted	0.40	1.00	1.00	0.11	1.00		0.54	1.00		0.45	1.00	
Satd. Flow (perm)	721	3438	1615	213	3394		1017	2895		858	3017	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	141	1453	219	115	547	78	42	245	161	47	266	57
RTOR Reduction (vph)	0	0	88	0	19	0	0	37	0	0	27	0
Lane Group Flow (vph)	141	1453	131	115	606	0	42	369	0	47	296	0
Heavy Vehicles (%)	5%	5%	0%	0%	5%	0%	0%	5%	36%	0%	20%	0%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	36.2	36.2	36.2	36.2	36.2		16.2	16.2		16.2	16.2	
Effective Green, g (s)	36.2	36.2	36.2	36.2	36.2		16.2	16.2		16.2	16.2	
Actuated g/C Ratio	0.60	0.60	0.60	0.60	0.60		0.27	0.27		0.27	0.27	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	432	2061	968	128	2034		273	776		230	809	
v/s Ratio Prot		0.42			0.18			c0.13			0.10	
v/s Ratio Perm	0.20		0.08	c0.54			0.04			0.05		
v/c Ratio	0.33	0.70	0.14	0.90	0.30		0.15	0.48		0.20	0.37	
Uniform Delay, d1	6.0	8.4	5.3	10.5	5.9		16.9	18.5		17.1	17.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	1.1	0.1	49.3	0.1		1.2	2.1		2.0	1.3	
Delay (s)	6.5	9.5	5.3	59.8	6.0		18.1	20.6		19.1	19.2	
Level of Service	A	A	A	E	A		B	C		B	B	
Approach Delay (s)		8.8			14.3			20.4			19.2	
Approach LOS		A			B			C			B	

Intersection Summary			
HCM Average Control Delay	12.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	60.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	72.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

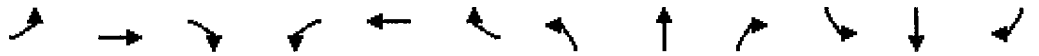
HCM Signalized Intersection Capacity Analysis
13: Vincent Ave & Arrow Hwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	60	580	85	130	1325	100	185	345	145	35	345	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.96		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3438	1538	1719	3413		1719	3062		1805	2892	
Flt Permitted	0.14	1.00	1.00	0.36	1.00		0.42	1.00		0.36	1.00	
Satd. Flow (perm)	250	3438	1538	657	3413		755	3062		675	2892	
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	70	674	99	151	1541	116	215	401	169	41	401	87
RTOR Reduction (vph)	0	0	47	0	10	0	0	85	0	0	13	0
Lane Group Flow (vph)	70	674	52	151	1647	0	215	485	0	41	475	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	0%	5%	18%	0%	0%	24%	10%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	29.0	29.0	29.0	29.0	29.0		18.0	18.0		18.0	18.0	
Effective Green, g (s)	29.0	29.0	29.0	29.0	29.0		18.0	18.0		18.0	18.0	
Actuated g/C Ratio	0.53	0.53	0.53	0.53	0.53		0.33	0.33		0.33	0.33	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	132	1813	811	346	1800		247	1002		221	946	
v/s Ratio Prot		0.20			c0.48			0.16			0.16	
v/s Ratio Perm	0.28		0.03	0.23			c0.28			0.06		
v/c Ratio	0.53	0.37	0.06	0.44	0.92		0.87	0.48		0.19	0.50	
Uniform Delay, d1	8.5	7.6	6.4	8.0	11.9		17.4	14.8		13.2	14.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.0	0.1	0.0	0.9	7.7		31.7	1.7		1.8	1.9	
Delay (s)	12.6	7.8	6.4	8.9	19.6		49.1	16.5		15.1	16.8	
Level of Service	B	A	A	A	B		D	B		B	B	
Approach Delay (s)		8.0			18.7			25.4			16.7	
Approach LOS		A			B			C			B	

Intersection Summary			
HCM Average Control Delay	17.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	55.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	78.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	85	715	100	110	625	50	80	190	180	25	225	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.93		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3438	1468	1719	3412		1641	2792		1805	2640	
Flt Permitted	0.31	1.00	1.00	0.29	1.00		0.56	1.00		0.52	1.00	
Satd. Flow (perm)	559	3438	1468	517	3412		971	2792		983	2640	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	91	769	108	118	672	54	86	204	194	27	242	70
RTOR Reduction (vph)	0	0	68	0	16	0	0	49	0	0	40	0
Lane Group Flow (vph)	91	769	40	118	710	0	86	349	0	27	272	0
Heavy Vehicles (%)	5%	5%	10%	5%	5%	0%	10%	34%	5%	0%	40%	5%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	14.0	14.0	14.0	14.0	14.0		16.1	16.1		16.1	16.1	
Effective Green, g (s)	14.0	14.0	14.0	14.0	14.0		16.1	16.1		16.1	16.1	
Actuated g/C Ratio	0.37	0.37	0.37	0.37	0.37		0.42	0.42		0.42	0.42	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	205	1263	539	190	1254		410	1180		415	1116	
v/s Ratio Prot		0.22			0.21			c0.12			0.10	
v/s Ratio Perm	0.16		0.03	c0.23			0.09			0.03		
v/c Ratio	0.44	0.61	0.07	0.62	0.57		0.21	0.30		0.07	0.24	
Uniform Delay, d1	9.1	9.8	7.8	9.9	9.6		7.0	7.3		6.5	7.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.5	0.8	0.1	6.2	0.6		1.2	0.6		0.3	0.5	
Delay (s)	10.6	10.7	7.9	16.0	10.2		8.1	7.9		6.8	7.6	
Level of Service	B	B	A	B	B		A	A		A	A	
Approach Delay (s)		10.3			11.0			7.9			7.5	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	9.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	38.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	53.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
13: Vincent Ave & Arrow Hwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	145	1520	230	120	570	80	45	255	170	50	280	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.94		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3438	1615	1805	3395		1805	2946		1805	3017	
Flt Permitted	0.38	1.00	1.00	0.10	1.00		0.48	1.00		0.39	1.00	
Satd. Flow (perm)	680	3438	1615	185	3395		920	2946		747	3017	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	151	1583	240	125	594	83	47	266	177	52	292	62
RTOR Reduction (vph)	0	0	86	0	17	0	0	28	0	0	28	0
Lane Group Flow (vph)	151	1583	154	125	660	0	47	415	0	52	326	0
Heavy Vehicles (%)	5%	5%	0%	0%	5%	0%	0%	22%	5%	0%	20%	0%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	41.0	41.0	41.0	41.0	41.0		16.0	16.0		16.0	16.0	
Effective Green, g (s)	41.0	41.0	41.0	41.0	41.0		16.0	16.0		16.0	16.0	
Actuated g/C Ratio	0.63	0.63	0.63	0.63	0.63		0.25	0.25		0.25	0.25	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	429	2169	1019	117	2141		226	725		184	743	
v/s Ratio Prot		0.46			0.19			c0.14			0.11	
v/s Ratio Perm	0.22		0.10	c0.67			0.05			0.07		
v/c Ratio	0.35	0.73	0.15	1.07	0.31		0.21	0.57		0.28	0.44	
Uniform Delay, d1	5.7	8.2	4.9	12.0	5.5		19.5	21.5		19.9	20.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	1.3	0.1	102.8	0.1		2.1	3.3		3.8	1.9	
Delay (s)	6.2	9.5	5.0	114.8	5.6		21.5	24.8		23.7	22.6	
Level of Service	A	A	A	F	A		C	C		C	C	
Approach Delay (s)		8.7			22.6			24.5			22.7	
Approach LOS		A			C			C			C	

Intersection Summary			
HCM Average Control Delay	15.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	77.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

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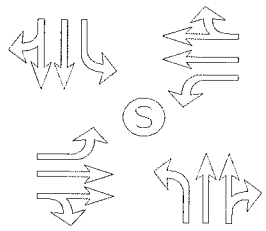
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : ARROW HWY
N/S STREET : LARK ELLEN AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 14
ROUTE 2B

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
ARROW HWY						
EB LEFT	75	5%		75	5	80
EB THRU	515	5%	**50**	565	50	615
EB RIGHT	90	5%		90	10	100
WB LEFT	115	5%		115	10	125
WB THRU	1205	5%		1205	110	1315
WB RIGHT	30	5%		30	5	35
LARK ELLEN AVE						
NB LEFT	165	5%		165	15	180
NB THRU	330	5%		330	30	360
NB RIGHT	170	5%		170	15	185
SB LEFT	110	5%		110	10	120
SB THRU	330	5%		330	30	360
SB RIGHT	70	5%		70	5	75
TOTALS	**3205**		**50**	**3255**	**295**	**3550**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : ARROW HWY
N/S STREET : LARK ELLEN AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 14
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
ARROW HWY						
EB LEFT	75	10%		75	5	80
EB THRU	675	5%	**50**	725	65	790
EB RIGHT	60	5%		60	5	65
WB LEFT	110	5%		110	10	120
WB THRU	540	5%		540	50	590
WB RIGHT	30	5%		30	5	35
LARK ELLEN AVE						
NB LEFT	65	5%		65	5	70
NB THRU	190	5%		190	15	205
NB RIGHT	110	5%		110	10	120
SB LEFT	70	5%		70	5	75
SB THRU	210	5%		210	20	230
SB RIGHT	25	15%		25	5	30
TOTALS	**2160**		**50**	**2210**	**200**	**2410**

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TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : ARROW HWY
N/S STREET : LARK ELLEN AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 14
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
ARROW HWY						
EB LEFT	115	5%		115	10	125
EB THRU	1345	5%	**50**	1395	125	1520
EB RIGHT	115	5%		115	10	125
WB LEFT	85	5%		85	5	90
WB THRU	595	5%		595	55	650
WB RIGHT	35	5%		35	5	40
LARK ELLEN AVE						
NB LEFT	75	5%		75	5	80
NB THRU	325	5%		325	30	355
NB RIGHT	115	5%		115	10	125
SB LEFT	100	5%		100	10	110
SB THRU	330	5%		330	30	360
SB RIGHT	55	5%		55	5	60
TOTALS	**3290**		**50**	**3340**	**300**	**3640**

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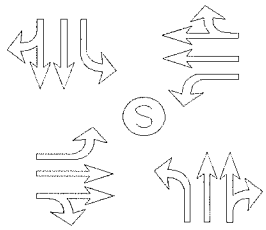
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : ARROW HWY
N/S STREET : LARK ELLEN AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 14
ROUTE 2B

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
ARROW HWY								
EB LEFT	72	3	9	80	**0**	80	5	85
EB THRU	480	33	99	580	**150**	730	65	795
EB RIGHT	89	3	9	100	**0**	100	10	110
WB LEFT	117	0	0	115	**0**	115	10	125
WB THRU	1157	46	138	1295	**0**	1295	115	1410
WB RIGHT	32	0	0	30	**0**	30	5	35
LARK ELLEN AVE								
NB LEFT	166	1	3	170	**0**	170	15	185
NB THRU	323	7	21	345	**0**	345	30	375
NB RIGHT	170	1	3	175	**0**	175	15	190
SB LEFT	105	3	9	115	**0**	115	10	125
SB THRU	325	5	15	340	**0**	340	30	370
SB RIGHT	66	3	9	75	**0**	75	5	80
TOTALS	**3102**				**150**	**3570**	**315**	**3885**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : ARROW HWY
N/S STREET : LARK ELLEN AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 14
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
ARROW HWY								
EB LEFT	69	6	18	85	**0**	85	5	90
EB THRU	633	42	126	760	**150**	910	80	990
EB RIGHT	55	3	9	65	**0**	65	5	70
WB LEFT	108	1	3	110	**0**	110	10	120
WB THRU	500	39	117	615	**0**	615	55	670
WB RIGHT	30	0	0	30	**0**	30	5	35
LARK ELLEN AVE								
NB LEFT	66	1	3	70	**0**	70	5	75
NB THRU	179	12	36	215	**0**	215	20	235
NB RIGHT	108	1	3	110	**0**	110	10	120
SB LEFT	70	1	3	75	**0**	75	5	80
SB THRU	206	4	12	220	**0**	220	20	240
SB RIGHT	21	3	9	30	**0**	30	5	35
TOTALS	**2045**				**150**	**2535**	**225**	**2760**

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TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : ARROW HWY
N/S STREET : LARK ELLEN AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 14
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
ARROW HWY								
EB LEFT	115	1	3	120	**0**	120	10	130
EB THRU	1323	21	63	1385	**150**	1535	140	1675
EB RIGHT	114	0	0	115	**0**	115	10	125
WB LEFT	87	0	0	85	**0**	85	5	90
WB THRU	585	8	24	610	**0**	610	55	665
WB RIGHT	34	0	0	35	**0**	35	5	40
LARK ELLEN AVE								
NB LEFT	75	1	3	80	**0**	80	5	85
NB THRU	323	0	0	325	**0**	325	30	355
NB RIGHT	112	1	3	115	**0**	115	10	125
SB LEFT	99	1	3	100	**0**	100	10	110
SB THRU	331	0	0	330	**0**	330	30	360
SB RIGHT	52	1	3	55	**0**	55	5	60
TOTALS	**3250**				**150**	**3505**	**315**	**3820**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: LARK ELLEN
EAST-WEST STREET: ARROW HWY
JURISDICTION: IRWINDALE

DATE: 06-02-11

PEAK HOUR: 07:30AM

NORTH LEG (SB)

TOTAL: 507

TT = 11
TT% = 11/507 = 2.17% ≈ 2%

Rt	Thru	Lt	
70 69	330	108 110	Total
18	98	28	1st
10	90	42	2nd
24	72	28	3rd
17	70	10	4th

TT = 46
TT% = 46/1352 = 3.4% ≈ 3%

EAST LEG TOTAL: (WB) 1,352

	1st	2nd	3rd	4th	Total
Rt	7	18	7	0	30 32
Thru	300	359	284	260	1203 1205
Lt	25	44	34	14	115 117

Total	1st	2nd	3rd	4th	
75	24	32	11	8	Lt
513 515	124	163	110	116	Thru
90 92	29	27	26	10	Rt

WEST LEG TOTAL: (EB) 680

TT = 39
TT% = 39/680 = 5.74% ≈ 6%

PEAK HOUR FACTORS

NORTH LEG = 0.88
SOUTH LEG = 0.86
EAST LEG = 0.80
WEST LEG = 0.77

ALL LEGS = 0.82

	Lt	Thru	Rt
1st	27	66	40
2nd	48	96	51
3rd	56	88	42
4th	36	80	38
Total	165 167	330	170 171

TT = 9
TT = 9/668 = 1.35% ≈ 1%

TOTAL: 668

SOUTH LEG (NB)

HOUR TOTAL: 3,207

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : LARK ELLEN — IRWINDALE

EAST-WEST STREET : ARROW HWY — 06-02-11

BEGINNING TIME : 07:00AM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
				SB NORTH LEG								
11	38	9	1	2	2	0	0	0	0	0	0	63
16	35	19	1	2	0	0	0	0	0	0	0	73
18	98	28	0	0	0	0	0	0	0	0	0	144
10	88	40	0	2	1	0	0	1	0	0	0	142
22	69	27	2	0	0	0	2	0	0	1	1	124
16	70	10	1	0	0	0	0	0	0	0	0	97
15	38	12	2	0 6	0	0	0 3	0	0	0 2	0	67
16	33	19	1	3	0	0	0	0	0	0	0	72
						TT=6+3+2=11						
124	469	164	8	9	3	0	2	1	0	1	1	782
				NB SOUTH LEG								
7	61	21	0	1	1	0	0	0	0	0	0	91
21	70	17	0	2	2	0	1	1	0	0	0	114
39	63	26	1	2	1	0	1	0	0	0	0	133
51	96	48	0	0	0	0	0	0	0	0	0	195
42	86	56	0	2	0	0	0	0	0	0	0	186
38	78	36	0	2	0	0	0	0	0	0	0	154
18	39	17	0	0 8	0	0	1 1	0	0	0 0	0	75
22	73	16	0	0	0	0	0	0	0	0	0	111
						TT=8+1+0=9						
238	566	237	1	9	4	0	3	1	0	0	0	1059
				WB EAST LEG								
4	296	12	0	7	0	0	0	0	0	7	0	326
2	297	11	0	12	0	0	0	0	0	2	0	324
7	288	25	0	4	0	0	3	0	0	5	0	332
18	352	44	0	5	0	0	2	0	0	0	0	421
7	275	34	0	6	0	0	2	0	0	1	0	325
0	242	14	0	9	0	0	5	0	0	4	0	274
5	214	25	0	6 24	1	0	2 12	0	0	4 10	0	257
7	210	17	0	11	0	0	3	0	0	2	0	250
						TT=24+12+10=46						
50	2174	182	0	60	1	0	17	0	0	25	0	2509
				EB WEST LEG								
1	99	0	0	11	8	0	2	0	0	4	0	125
9	84	8	1	6	7	0	0	0	0	2	0	117
27	114	24	1	5	0	0	0	0	1	5	0	177
27	156	32	0	5	0	0	0	0	0	2	0	222
25	103	9	1	5	2	0	1	0	0	1	0	147
10	107	7	0	6	1	0	1	0	0	2	0	134
11	95	18	0	7 26	0	0	1 2	0	0	1 11	0	133
15	128	11	0	7	1	0	1	0	0	0	0	163
						TT=26+2+11=39						
125	886	109	3	52	19	0	6	0	1	17	0	1218

Prepared by Newport Traffic Studies

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: LARK ELLEN

EAST-WEST STREET: ARROW HWY

TIME: 07:00AM-08:00AM DATE: 06-02-11

NORTH LEG

Rt	Thru	Lt	
57	265	100	Total
12	40	11	1st
17	37	19	2nd
18	98	28	3rd
10	90	42	4th

	1st	2nd	3rd	4th	Total
Rt	4	2	7	18	31
Thru	310	311	300	359	1280
Lt	12	11	25	44	92

Total	1st	2nd	3rd	4th	
79	8	15	24	32	Lt
495	116	92	124	163	Thru
67	1	10	29	27	Rt

	Lt	Thru	Rt
1st	22	62	7
2nd	20	73	21
3rd	27	66	40
4th	48	96	51
Total	117	297	119

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: LARK ELLEN

EAST-WEST STREET: ARROW HWY

TIME: 08:00AM-09:00AM DATE: 06-02-11

NORTH LEG

75	216	69	Total
24	72	28	1st
17	70	10	2nd
17	38	12	3rd
17	36	19	4th
Rt	Thru	Lt	

Rt	7	0	5	7	19
Thru	284	260	226	226	996
Lt	34	14	26	17	91
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
49	11	8	18	12	Lt
466	110	116	104	136	Thru
62	26	10	11	15	Rt

	Lt	Thru	Rt
1st	56	88	42
2nd	36	80	38
3rd	17	40	18
4th	16	73	22
Total	125	281	120

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: LARK ELLEN
EAST-WEST STREET: ARROW HWY
JURISDICTION: IRWINDALE

DATE: 06-02-11

PEAK HOUR: 01:00PM

NORTH LEG (SB)

TOTAL: 305

TT = 8
TT% = 8/305 = 2.62%
≈ 3%

Rt	Thru	Lt	
25 24	210	70 71	Total
10	48	13	1st
6	45	17	2nd
3	59	17	3rd
5	58	24	4th

TT = 39
TT% = 39/678 = 5.75%
≈ 6%

EAST LEG TOTAL: (WB) 678

	1st	2nd	3rd	4th	Total
Rt	7	10	7	6	30
Thru	127	167	101	144	540 539
Lt	32	32	23	22	110 109

WEST LEG TOTAL: (EB) 808

Total	1st	2nd	3rd	4th	
75	10	22	24	19	Lt
675	160	157	146	212	Thru
60 58	17	14	9	18	Rt

TT = 51
TT% = 51/808 = 6.31%
≈ 6%

SOUTH LEG (NB)

	Lt	Thru	Rt
1st	9	47	17
2nd	19	47	24
3rd	11	45	29
4th	28	52	39
Total	65 67	190 191	110 109

TT = 14
TT% = 14/367 = 3.81%
≈ 4%

TOTAL: 367

PEAK HOUR FACTORS

NORTH LEG = 0.88
SOUTH LEG = 0.77
EAST LEG = 0.81
WEST LEG = 0.81

ALL LEGS = 0.86

HOUR TOTAL: 2,158

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: LARK ELLEN

EAST-WEST STREET: ARROW HWY

TIME: 12:00PM-01:00PM DATE: 06-02-11

NORTH LEG

Rt	Thru	Lt	
58	165	84	Total
11	32	22	1st
15	37	18	2nd
19	48	26	3rd
13	48	18	4th

	1st	2nd	3rd	4th	Total
Rt	3	3	5	4	15
Thru	146	170	143	177	636
Lt	13	23	16	25	77

Total	1st	2nd	3rd	4th	
77	16	21	18	22	Lt
624	156	177	144	147	Thru
48	11	12	14	11	Rt

	Lt	Thru	Rt
1st	18	45	22
2nd	18	40	20
3rd	11	52	27
4th	9	45	19
Total	56	182	88

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: LARK ELLEN

EAST-WEST STREET: ARROW HWY

TIME: 01:00PM-02:00PM DATE: 06-02-11

NORTH LEG

Rt	Thru	Lt	
24	210	71	Total
10	48	13	1st
6	45	17	2nd
3	59	17	3rd
5	58	24	4th

	1st	2nd	3rd	4th	Total
Rt	7	10	7	6	30
Thru	127	167	101	144	539
Lt	32	32	23	22	109

Total	1st	2nd	3rd	4th	
75	10	22	24	19	Lt
675	160	157	146	212	Thru
58	17	14	9	18	Rt

	Lt	Thru	Rt
1st	9	47	17
2nd	19	47	24
3rd	11	45	29
4th	28	52	39
Total	67	191	109

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : LARK ELLEN — IRWINDALE

EAST-WEST STREET : ARROW HWY — 06-02-11

BEGINNING TIME : 12:00PM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
					SB NORTH LEG							
11	31	21	0	0	1	0	1	0	0	0	0	65
14	36	17	1	0	1	0	1	0	0	0	0	70
19	46	25	0	2	0	0	0	0	0	0	1	93
12	46	17	1	2	1	0	0	0	0	0	0	79
8	47	13	2	1	0	0	0	0	0	0	0	71
6	45	17	0	0	0	0	0	0	0	0	0	68
3	57	17	0	2	0	0	0	0	0	0	0	79
4	57	23	0	0	0	1	0	1	0	1	0	87
				5		TT=5+2+1=8	2			1		
77	365	150	4	7	3	1	2	1	0	1	1	612
					NB SOUTH LEG							
22	45	18	0	0	0	0	0	0	0	0	0	85
20	40	18	0	0	0	0	0	0	0	0	0	78
26	49	11	1	2	0	0	0	0	0	1	0	90
19	45	9	0	0	0	0	0	0	0	0	0	73
16	43	9	1	3	0	0	1	0	0	0	0	73
24	44	19	0	3	0	0	0	0	0	0	0	90
29	41	11	0	4	0	0	0	0	0	0	0	85
39	51	27	0	1	1	0	0	0	0	0	0	119
				13		TT=13+1+0=14	1			0		
195	358	122	2	13	1	0	1	0	0	1	0	693
					WB EAST LEG							
3	136	13	0	5	0	0	4	0	0	1	0	162
3	163	23	0	6	0	0	1	0	0	0	0	196
5	135	16	0	6	0	0	1	0	0	1	0	164
4	168	25	0	7	0	0	0	0	0	2	0	206
7	120	32	0	5	0	0	2	0	0	0	0	166
10	161	32	0	3	0	0	1	0	0	2	0	209
7	91	22	0	7	1	0	2	0	0	1	0	131
6	128	22	0	9	0	0	3	0	0	4	0	172
				24		TT=24+8+7=39	8			7		
45	1102	185	0	48	1	0	14	0	0	11	0	1406
					EB WEST LEG							
11	152	16	0	3	0	0	1	0	0	0	0	183
12	172	21	0	5	0	0	0	0	0	0	0	210
13	141	17	1	3	1	0	0	0	0	0	0	176
11	138	21	0	4	0	0	2	1	0	3	0	180
16	156	10	1	3	0	0	0	0	0	1	0	187
12	143	21	2	10	1	0	1	0	0	3	0	193
9	129	22	0	15	2	0	0	0	0	2	0	179
18	205	16	0	4	2	0	1	1	0	2	0	249
				40		TT=40+3+8=51	3			8		
102	1236	144	4	47	6	0	5	2	0	11	0	1557

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: LARK ELLEN
EAST-WEST STREET: ARROW HWY
JURISDICTION: IRWINDALE

DATE: 06-02-11

PEAK HOUR: 05:00PM

NORTH LEG (SB)

TOTAL: 484

TT = 2
TT% = 2/484 = 0.41%
≈ 1%

Rt	Thru	Lt	
55 53	331 330	100	Total
10	77	28	1st
16	75	28	2nd
13	80	18	3rd
14	99	26	4th

TT = 8
TT% = 8/714 = 1.12%
≈ 1%

EAST LEG TOTAL: (WB) 714

	1st	2nd	3rd	4th	Total
Rt	6	9	7	12	35 34
Thru	166	132	160	135	595 593
Lt	28	19	19	21	85 87

Total	1st	2nd	3rd	4th	
115 116	24	36	35	21	Lt
1345 1344	374	279	325	366	Thru
115 114	23	36	28	27	Rt

WEST LEG TOTAL: 1,574 (EB)

TT = 22
TT% = 22/1574 = 1.40%
≈ 1%

PEAK HOUR FACTORS

NORTH LEG = 0.87
SOUTH LEG = 0.89
EAST LEG = 0.89
WEST LEG = 0.93

ALL LEGS = 0.95

TT = 2
TT% = 2/512 = 0.39%
≈ 1%

	Lt	Thru	Rt
1st	14	84	28
2nd	18	64	26
3rd	20	85	29
4th	24	90	30
Total	75 76	325 323	115 113

TOTAL: 512

SOUTH LEG (NB)

HOUR TOTAL: 3,284

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: LARK ELLEN

EAST-WEST STREET: ARROW HWY

TIME: 04:00PM-05:00PM DATE: 06-02-11

NORTH LEG

Rt	Thru	Lt	
31	202	92	Total
7	30	14	1st
9	62	15	2nd
5	47	26	3rd
10	63	37	4th

	1st	2nd	3rd	4th	Total
Rt	3	3	4	3	13
Thru	141	136	160	140	577
Lt	15	32	23	23	93

Total	1st	2nd	3rd	4th	
82	18	24	13	27	Lt
1248	283	263	366	336	Thru
77	17	18	24	18	Rt

	Lt	Thru	Rt
1st	13	39	16
2nd	15	53	28
3rd	9	40	20
4th	13	72	23
Total	50	204	87

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: LARK ELLEN

EAST-WEST STREET: ARROW HWY

TIME: 05:00PM-06:00PM DATE: 06-02-11

NORTH LEG

Rt	Thru	Lt	
53	331	100	Total
10	77	28	1st
16	75	28	2nd
13	80	18	3rd
14	99	26	4th

	1st	2nd	3rd	4th	Total
Rt	6	9	7	12	34
Thru	166	132	160	135	593
Lt	28	19	19	21	87

Total	1st	2nd	3rd	4th	
116	24	36	35	21	Lt
1344	374	279	325	366	Thru
114	23	36	28	27	Rt

	Lt	Thru	Rt
1st	14	84	28
2nd	18	64	26
3rd	20	85	29
4th	24	90	30
Total	76	323	113

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : LARK ELLEN — IRWINDALE

EAST-WEST STREET : ARROW HWY — 06-02-11

BEGINNING TIME : 04:00PM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
					SB NORTH LEG							
5	30	13	2	0	1	0	0	0	0	0	0	51
9	60	15	0	2	0	0	0	0	0	0	0	86
5	46	26	0	1	0	0	0	0	0	0	0	78
10	63	37	0	0	0	0	0	0	0	0	0	110
10	77	27	0	0	1	0	0	0	0	0	0	115
15	75	28	1	0	0	0	0	0	0	0	0	119
13	80	18	0	0	0	0	0	0	0	0	0	111
14	99	26	0	0 (2)	0	0	0 (0)	0	0	0 (0)	0	139
						TT= 2+0+0 = 2						
81	530	190	3	3	2	0	0	0	0	0	0	809
					NB SOUTH LEG							
16	38	12	0	1	1	0	0	0	0	0	0	68
28	50	15	0	2	0	0	1	0	0	0	0	96
20	39	8	0	0	1	0	0	0	0	1	0	69
23	72	13	0	0	0	0	0	0	0	0	0	108
28	84	14	0	0	0	0	0	0	0	0	0	126
26	64	18	0	0	0	0	0	0	0	0	0	108
28	85	19	1	0	1	0	0	0	0	0	0	134
30	90	24	0	0 (2)	0	0	0 (0)	0	0	0 (0)	0	144
						TT= 2+0+0 = 2						
199	522	123	1	3	3	0	1	0	0	1	0	853
					WB EAST LEG							
3	135	15	0	4	0	0	1	0	0	1	0	159
2	131	31	0	4	0	0	1	1	1	0	0	171
4	145	23	0	11	0	0	0	0	0	4	0	187
3	136	23	0	1	0	0	2	0	0	1	0	166
6	163	28	0	2	0	0	0	0	0	1	0	200
9	129	19	0	2	0	0	0	0	0	1	0	160
7	158	19	0	2	0	0	0	0	0	0	0	186
12	135	21	0	0 (6)	0	0	0 (0)	0	0	0 (2)	0	168
						TT= 6+0+2 = 8						
46	1132	179	0	26	0	0	4	1	1	8	0	1397
					EB WEST LEG							
17	268	18	0	9	0	0	1	0	0	5	0	318
18	258	23	0	3	0	0	0	1	0	2	0	305
24	360	13	0	4	0	0	0	0	0	2	0	403
18	329	27	0	7	0	0	0	0	0	0	0	381
23	371	24	0	2	0	0	1	0	0	0	0	421
36	278	35	0	1	1	0	0	0	0	0	0	351
28	317	35	0	7	0	0	1	0	0	0	0	388
27	357	21	0	6 (17)	0	0	0 (2)	0	0	3 (3)	0	414
						TT= 17+2+3 = 22						
191	2538	196	0	39	1	0	3	1	0	12	0	2981

Prepared by Newport Traffic Studies

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	75	515	90	115	1205	30	165	330	170	110	330	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.98		1.00	1.00		1.00	0.95		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3361		1805	3429		1719	3263		1719	3348	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1719	3361		1805	3429		1719	3263		1719	3348	
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	91	628	110	140	1470	37	201	402	207	134	402	85
RTOR Reduction (vph)	0	15	0	0	2	0	0	73	0	0	20	0
Lane Group Flow (vph)	91	723	0	140	1505	0	201	536	0	134	467	0
Heavy Vehicles (%)	5%	5%	5%	0%	5%	0%	5%	5%	5%	5%	5%	5%
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	5.0	32.4		11.6	39.0		11.0	21.1		8.9	19.0	
Effective Green, g (s)	5.0	32.4		11.6	39.0		11.0	21.1		8.9	19.0	
Actuated g/C Ratio	0.06	0.36		0.13	0.43		0.12	0.23		0.10	0.21	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	96	1210		233	1486		210	765		170	707	
v/s Ratio Prot	c0.05	0.21		0.08	c0.44		c0.12	c0.16		0.08	0.14	
v/s Ratio Perm												
v/c Ratio	0.95	0.60		0.60	1.01		0.96	0.70		0.79	0.66	
Uniform Delay, d1	42.4	23.5		37.0	25.5		39.3	31.6		39.6	32.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	74.1	0.8		4.3	26.6		49.4	5.3		21.0	4.8	
Delay (s)	116.5	24.3		41.3	52.1		88.7	36.9		60.7	37.4	
Level of Service	F	C		D	D		F	D		E	D	
Approach Delay (s)		34.4			51.2			49.7			42.4	
Approach LOS		C			D			D			D	

Intersection Summary			
HCM Average Control Delay	45.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	75	675	60	110	540	30	65	190	110	70	210	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.99		1.00	0.99		1.00	0.94		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1641	3396		1719	3419		1719	3249		1719	3349	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1641	3396		1719	3419		1719	3249		1719	3349	
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	87	785	70	128	628	35	76	221	128	81	244	29
RTOR Reduction (vph)	0	11	0	0	6	0	0	89	0	0	15	0
Lane Group Flow (vph)	87	844	0	128	657	0	76	260	0	81	258	0
Heavy Vehicles (%)	10%	5%	5%	5%	5%	0%	5%	5%	5%	5%	5%	15%
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	4.4	16.4		4.4	16.4		3.0	17.6		3.0	17.6	
Effective Green, g (s)	4.4	16.4		4.4	16.4		3.0	17.6		3.0	17.6	
Actuated g/C Ratio	0.08	0.29		0.08	0.29		0.05	0.31		0.05	0.31	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	126	970		132	977		90	996		90	1027	
v/s Ratio Prot	0.05	c0.25		c0.07	0.19		0.04	c0.08		c0.05	0.08	
v/s Ratio Perm												
v/c Ratio	0.69	0.87		0.97	0.67		0.84	0.26		0.90	0.25	
Uniform Delay, d1	25.8	19.5		26.4	18.1		27.0	15.0		27.1	15.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	15.1	8.6		68.1	1.8		47.9	0.6		63.0	0.6	
Delay (s)	40.9	28.1		94.6	20.0		74.9	15.6		90.1	15.5	
Level of Service	D	C		F	B		E	B		F	B	
Approach Delay (s)		29.3			32.0			26.2			32.6	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	30.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	57.4	Sum of lost time (s)	16.0
Intersection Capacity Utilization	52.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
14: Lark Ellen Ave & Arrow Hwy

8/10/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	115	1345	115	85	595	35	75	325	115	100	330	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.99		1.00	0.99		1.00	0.96		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3410		1805	3418		1719	3424		1719	3507	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1719	3410		1805	3418		1719	3424		1719	3507	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	121	1416	121	89	626	37	79	342	121	105	347	58
RTOR Reduction (vph)	0	7	0	0	5	0	0	38	0	0	15	0
Lane Group Flow (vph)	121	1530	0	89	658	0	79	425	0	105	390	0
Heavy Vehicles (%)	5%	5%	0%	0%	5%	0%	5%	0%	5%	5%	0%	5%
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	9.1	42.0		4.6	37.5		5.4	19.1		7.0	20.7	
Effective Green, g (s)	9.1	42.0		4.6	37.5		5.4	19.1		7.0	20.7	
Actuated g/C Ratio	0.10	0.47		0.05	0.42		0.06	0.22		0.08	0.23	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	176	1615		94	1445		105	737		136	818	
v/s Ratio Prot	c0.07	c0.45		c0.05	0.19		0.05	c0.12		c0.06	0.11	
v/s Ratio Perm												
v/c Ratio	0.69	0.95		0.95	0.46		0.75	0.58		0.77	0.48	
Uniform Delay, d1	38.4	22.3		41.9	18.3		41.0	31.2		40.1	29.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	10.6	12.0		74.7	0.2		25.8	3.3		23.3	2.0	
Delay (s)	49.1	34.3		116.7	18.5		66.8	34.4		63.4	31.3	
Level of Service	D	C		F	B		E	C		E	C	
Approach Delay (s)		35.4			30.1			39.2			37.9	
Approach LOS		D			C			D			D	

Intersection Summary			
HCM Average Control Delay	35.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	88.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	77.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	75	565	90	115	1205	30	165	330	170	110	330	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.98		1.00	1.00		1.00	0.95		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3160		1805	3429		1719	3263		1719	3348	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1719	3160		1805	3429		1719	3263		1719	3348	
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	91	689	110	140	1470	37	201	402	207	134	402	85
RTOR Reduction (vph)	0	13	0	0	2	0	0	73	0	0	20	0
Lane Group Flow (vph)	91	786	0	140	1505	0	201	536	0	134	467	0
Heavy Vehicles (%)	5%	13%	5%	0%	5%	0%	5%	5%	5%	5%	5%	5%
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	5.0	32.4		11.6	39.0		11.0	21.1		8.9	19.0	
Effective Green, g (s)	5.0	32.4		11.6	39.0		11.0	21.1		8.9	19.0	
Actuated g/C Ratio	0.06	0.36		0.13	0.43		0.12	0.23		0.10	0.21	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	96	1138		233	1486		210	765		170	707	
v/s Ratio Prot	c0.05	0.25		0.08	c0.44		c0.12	c0.16		0.08	0.14	
v/s Ratio Perm												
v/c Ratio	0.95	0.69		0.60	1.01		0.96	0.70		0.79	0.66	
Uniform Delay, d1	42.4	24.5		37.0	25.5		39.3	31.6		39.6	32.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	74.1	1.8		4.3	26.6		49.4	5.3		21.0	4.8	
Delay (s)	116.5	26.4		41.3	52.1		88.7	36.9		60.7	37.4	
Level of Service	F	C		D	D		F	D		E	D	
Approach Delay (s)		35.6			51.2			49.7			42.4	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM Average Control Delay	46.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

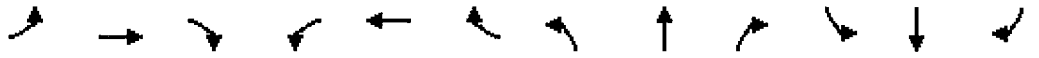
HCM Signalized Intersection Capacity Analysis
14: Lark Ellen Ave & Arrow Hwy

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	75	725	60	110	540	30	65	190	110	70	210	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.99		1.00	0.99		1.00	0.94		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1641	3201		1719	3419		1719	3249		1719	3349	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1641	3201		1719	3419		1719	3249		1719	3349	
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	87	843	70	128	628	35	76	221	128	81	244	29
RTOR Reduction (vph)	0	10	0	0	6	0	0	90	0	0	15	0
Lane Group Flow (vph)	87	903	0	128	657	0	76	259	0	81	258	0
Heavy Vehicles (%)	10%	12%	5%	5%	5%	0%	5%	5%	5%	5%	5%	15%
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	4.5	17.3		4.5	17.3		3.0	17.3		3.0	17.3	
Effective Green, g (s)	4.5	17.3		4.5	17.3		3.0	17.3		3.0	17.3	
Actuated g/C Ratio	0.08	0.30		0.08	0.30		0.05	0.30		0.05	0.30	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	127	953		133	1018		89	967		89	997	
v/s Ratio Prot	0.05	c0.28		c0.07	0.19		0.04	c0.08		c0.05	0.08	
v/s Ratio Perm												
v/c Ratio	0.69	0.95		0.96	0.65		0.85	0.27		0.91	0.26	
Uniform Delay, d1	26.1	20.0		26.7	17.7		27.3	15.6		27.4	15.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	14.2	17.7		66.1	1.4		50.7	0.7		66.4	0.6	
Delay (s)	40.3	37.6		92.8	19.1		78.1	16.2		93.8	16.2	
Level of Service	D	D		F	B		E	B		F	B	
Approach Delay (s)		37.9			31.1			27.3			33.9	
Approach LOS		D			C			C			C	

Intersection Summary			
HCM Average Control Delay	33.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	58.1	Sum of lost time (s)	16.0
Intersection Capacity Utilization	54.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	115	1395	115	85	595	35	75	325	115	100	330	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.99		1.00	0.99		1.00	0.96		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3323		1805	3418		1719	3424		1719	3507	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1719	3323		1805	3418		1719	3424		1719	3507	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	121	1468	121	89	626	37	79	342	121	105	347	58
RTOR Reduction (vph)	0	7	0	0	5	0	0	39	0	0	15	0
Lane Group Flow (vph)	121	1582	0	89	658	0	79	424	0	105	390	0
Heavy Vehicles (%)	5%	8%	0%	0%	5%	0%	5%	0%	5%	5%	0%	5%
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	9.2	43.1		4.7	38.6		5.5	19.0		7.0	20.5	
Effective Green, g (s)	9.2	43.1		4.7	38.6		5.5	19.0		7.0	20.5	
Actuated g/C Ratio	0.10	0.48		0.05	0.43		0.06	0.21		0.08	0.23	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	176	1595		94	1469		105	724		134	801	
v/s Ratio Prot	c0.07	c0.48		c0.05	0.19		0.05	c0.12		c0.06	0.11	
v/s Ratio Perm												
v/c Ratio	0.69	0.99		0.95	0.45		0.75	0.59		0.78	0.49	
Uniform Delay, d1	38.9	23.2		42.4	18.1		41.5	31.9		40.7	30.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	10.6	20.5		74.7	0.2		25.8	3.5		25.2	2.1	
Delay (s)	49.5	43.7		117.2	18.3		67.3	35.3		65.8	32.2	
Level of Service	D	D		F	B		E	D		E	C	
Approach Delay (s)		44.1			30.0			40.0			39.1	
Approach LOS		D			C			D			D	

Intersection Summary			
HCM Average Control Delay	39.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	89.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	78.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	80	615	100	125	1315	35	180	360	185	120	360	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.98		1.00	1.00		1.00	0.95		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3159		1805	3429		1719	3263		1719	3350	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1719	3159		1805	3429		1719	3263		1719	3350	
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	98	750	122	152	1604	43	220	439	226	146	439	91
RTOR Reduction (vph)	0	14	0	0	2	0	0	73	0	0	20	0
Lane Group Flow (vph)	98	858	0	152	1645	0	220	592	0	146	510	0
Heavy Vehicles (%)	5%	13%	5%	0%	5%	0%	5%	5%	5%	5%	5%	5%
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	5.0	32.1		11.9	39.0		11.0	21.0		9.0	19.0	
Effective Green, g (s)	5.0	32.1		11.9	39.0		11.0	21.0		9.0	19.0	
Actuated g/C Ratio	0.06	0.36		0.13	0.43		0.12	0.23		0.10	0.21	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	96	1127		239	1486		210	761		172	707	
v/s Ratio Prot	c0.06	0.27		0.08	c0.48		c0.13	c0.18		0.08	0.15	
v/s Ratio Perm												
v/c Ratio	1.02	0.76		0.64	1.11		1.05	0.78		0.85	0.72	
Uniform Delay, d1	42.5	25.6		37.0	25.5		39.5	32.3		39.8	33.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	97.6	3.1		5.5	58.4		75.2	7.7		30.3	6.3	
Delay (s)	140.1	28.7		42.4	83.9		114.7	40.0		70.1	39.3	
Level of Service	F	C		D	F		F	D		E	D	
Approach Delay (s)		39.9			80.4			58.6			46.0	
Approach LOS		D			F			E			D	

Intersection Summary			
HCM Average Control Delay	61.5	HCM Level of Service	E
HCM Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	77.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
14: Lark Ellen Ave & Arrow Hwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	80	790	65	120	590	35	70	205	120	75	230	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.99		1.00	0.99		1.00	0.94		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1641	3202		1719	3418		1719	3247		1719	3356	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1641	3202		1719	3418		1719	3247		1719	3356	
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	93	919	76	140	686	41	81	238	140	87	267	29
RTOR Reduction (vph)	0	10	0	0	7	0	0	100	0	0	14	0
Lane Group Flow (vph)	93	985	0	140	720	0	81	278	0	87	282	0
Heavy Vehicles (%)	10%	12%	5%	5%	5%	0%	5%	5%	5%	5%	5%	15%
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	4.7	18.0		6.0	19.3		3.1	17.1		3.1	17.1	
Effective Green, g (s)	4.7	18.0		6.0	19.3		3.1	17.1		3.1	17.1	
Actuated g/C Ratio	0.08	0.30		0.10	0.32		0.05	0.28		0.05	0.28	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	128	957		171	1096		89	922		89	953	
v/s Ratio Prot	0.06	c0.31		c0.08	0.21		0.05	c0.09		c0.05	0.08	
v/s Ratio Perm												
v/c Ratio	0.73	1.03		0.82	0.66		0.91	0.30		0.98	0.30	
Uniform Delay, d1	27.1	21.1		26.6	17.6		28.4	16.9		28.5	16.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	18.5	36.9		25.3	1.4		66.4	0.8		87.1	0.8	
Delay (s)	45.6	58.0		51.8	19.0		94.8	17.7		115.6	17.6	
Level of Service	D	E		D	B		F	B		F	B	
Approach Delay (s)		56.9			24.3			31.3			39.9	
Approach LOS		E			C			C			D	

Intersection Summary			
HCM Average Control Delay	40.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	60.2	Sum of lost time (s)	16.0
Intersection Capacity Utilization	57.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	125	1520	125	95	650	40	80	355	125	110	360	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.99		1.00	0.99		1.00	0.96		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3323		1805	3418		1719	3424		1719	3508	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1719	3323		1805	3418		1719	3424		1719	3508	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	132	1600	132	100	684	42	84	374	132	116	379	63
RTOR Reduction (vph)	0	7	0	0	5	0	0	39	0	0	15	0
Lane Group Flow (vph)	132	1725	0	100	721	0	84	467	0	116	427	0
Heavy Vehicles (%)	5%	8%	0%	0%	5%	0%	5%	0%	5%	5%	0%	5%
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	11.1	43.0		6.0	37.9		5.6	18.8		7.0	20.2	
Effective Green, g (s)	11.1	43.0		6.0	37.9		5.6	18.8		7.0	20.2	
Actuated g/C Ratio	0.12	0.47		0.07	0.42		0.06	0.21		0.08	0.22	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	210	1574		119	1427		106	709		133	780	
v/s Ratio Prot	0.08	c0.52		c0.06	0.21		0.05	c0.14		c0.07	0.12	
v/s Ratio Perm												
v/c Ratio	0.63	1.10		0.84	0.51		0.79	0.66		0.87	0.55	
Uniform Delay, d1	37.9	23.9		41.9	19.5		42.0	33.1		41.5	31.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	5.8	53.7		38.5	0.3		32.1	4.8		42.2	2.8	
Delay (s)	43.7	77.6		80.5	19.8		74.2	37.8		83.6	34.0	
Level of Service	D	E		F	B		E	D		F	C	
Approach Delay (s)		75.2			27.2			43.0			44.3	
Approach LOS		E			C			D			D	

Intersection Summary			
HCM Average Control Delay	55.4	HCM Level of Service	E
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	90.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	84.5%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Hall & Foreman, Inc.

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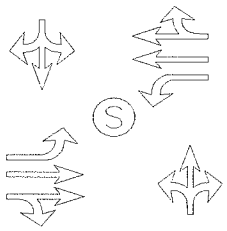
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : ARROW HWY
N/S STREET : ENID AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 15
ROUTE 2B

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
ARROW HWY						
EB LEFT	15	5%		15	5	20
EB THRU	640	5%	**50**	690	60	750
EB RIGHT	110	5%		110	10	120
WB LEFT	170	5%		170	15	185
WB THRU	1300	5%		1300	115	1415
WB RIGHT	20	5%		20	5	25
ENID AVE						
NB LEFT	95	5%		95	10	105
NB THRU	110	5%		110	10	120
NB RIGHT	155	5%		155	15	170
SB LEFT	30	5%		30	5	35
SB THRU	145	5%		145	15	160
SB RIGHT	60	5%		60	5	65
TOTALS	**2850**		**50**	**2900**	**270**	**3170**

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TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : ARROW HWY
N/S STREET : ENID AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 15
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
ARROW HWY						
EB LEFT	25	5%		25	5	30
EB THRU	810	5%	**50**	860	75	935
EB RIGHT	20	5%		20	5	25
WB LEFT	45	5%		45	5	50
WB THRU	635	5%		635	55	690
WB RIGHT	25	5%		25	5	30
ENID AVE						
NB LEFT	25	5%		25	5	30
NB THRU	20	5%		20	5	25
NB RIGHT	55	5%		55	5	60
SB LEFT	25	5%		25	5	30
SB THRU	20	5%		20	5	25
SB RIGHT	25	5%		25	5	30
TOTALS	**1730**		**50**	**1780**	**180**	**1960**

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E/W STREET : ARROW HWY
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CONDITION : PM PEAK HOUR

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PROJECTED GROWTH PER YEAR:

INTERSECTION 15
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
ARROW HWY						
EB LEFT	85	5%		85	5	90
EB THRU	1425	5%	**50**	1475	135	1610
EB RIGHT	60	5%		60	5	65
WB LEFT	50	5%		50	5	55
WB THRU	630	5%		630	55	685
WB RIGHT	30	5%		30	5	35
ENID AVE						
NB LEFT	35	5%		35	5	40
NB THRU	40	5%		40	5	45
NB RIGHT	55	5%		55	5	60
SB LEFT	25	5%		25	5	30
SB THRU	35	5%		35	5	40
SB RIGHT	30	5%		30	5	35
TOTALS	**2500**		**50**	**2550**	**240**	**2790**

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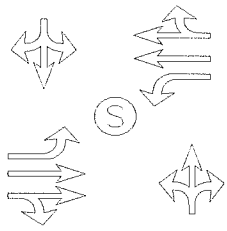
CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
ARROW HWY								
EB LEFT	13	1	3	15	**0**	15	5	20
EB THRU	601	41	123	725	**150**	875	80	955
EB RIGHT	112	0	0	110	**0**	110	10	120
WB LEFT	171	1	3	175	**0**	175	15	190
WB THRU	1254	44	132	1385	**0**	1385	125	1510
WB RIGHT	21	0	0	20	**0**	20	5	25
ENID AVE								
NB LEFT	95	0	0	95	**0**	95	10	105
NB THRU	111	1	3	115	**0**	115	10	125
NB RIGHT	155	1	3	160	**0**	160	15	175
SB LEFT	28	0	0	30	**0**	30	5	35
SB THRU	144	0	0	145	**0**	145	15	160
SB RIGHT	59	1	3	60	**0**	60	5	65
TOTALS	**2764**				**150**	**3185**	**300**	**3485**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : ARROW HWY
N/S STREET : ENID AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 15
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
ARROW HWY								
EB LEFT	25	1	3	30	**0**	30	5	35
EB THRU	750	58	174	925	**150**	1075	95	1170
EB RIGHT	20	0	0	20	**0**	20	5	25
WB LEFT	47	0	0	45	**0**	45	5	50
WB THRU	607	30	90	695	**0**	695	65	760
WB RIGHT	26	1	3	30	**0**	30	5	35
ENID AVE								
NB LEFT	27	0	0	25	**0**	25	5	30
NB THRU	18	1	3	20	**0**	20	5	25
NB RIGHT	55	0	0	55	**0**	55	5	60
SB LEFT	23	0	0	25	**0**	25	5	30
SB THRU	18	1	3	20	**0**	20	5	25
SB RIGHT	25	0	0	25	**0**	25	5	30
TOTALS	**1641**				**150**	**2065**	**210**	**2275**

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E/W STREET : ARROW HWY
N/S STREET : ENID AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 15
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
ARROW HWY								
EB LEFT	84	0	0	85	**0**	85	5	90
EB THRU	1402	22	66	1470	**150**	1620	145	1765
EB RIGHT	59	0	0	60	**0**	60	5	65
WB LEFT	47	1	3	50	**0**	50	5	55
WB THRU	625	7	21	645	**0**	645	60	705
WB RIGHT	31	1	3	35	**0**	35	5	40
ENID AVE								
NB LEFT	34	0	0	35	**0**	35	5	40
NB THRU	39	0	0	40	**0**	40	5	45
NB RIGHT	54	0	0	55	**0**	55	5	60
SB LEFT	24	1	3	25	**0**	25	5	30
SB THRU	34	0	0	35	**0**	35	5	40
SB RIGHT	30	1	3	35	**0**	35	5	40
TOTALS	**2463**				**150**	**2720**	**255**	**2975**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: ENID
EAST-WEST STREET: ARROW HWY
JURISDICTION: IRWINDALE

DATE: 06-02-11

PEAK HOUR: 07:15AM

NORTH LEG (SB)

TOTAL: 232

TT = 1
TT% = 1/232 = 0.43%
≈ 1%

Rt	Thru	Lt	
60	144 145	28 30	Total
12	10	8	1st
12	54	7	2nd
25	64	7	3rd
11	16	6	4th

TT = 45
TT% = 45/1491 = 3.02%
≈ 3%

EAST LEG TOTAL: (WB) 1,491

	1st	2nd	3rd	4th	Total
Rt	0	6	10	5	20 21
Thru	292	296	365	345	1298 1300
Lt	19	65	70	18	172 190

WEST LEG TOTAL: (EB) 768

Total	1st	2nd	3rd	4th	
14 15	1	3	5	5	Lt
642 640	114	158	188	182	Thru
112 110	11	28	49	24	Rt

TT = 30/768
TT% = 3.91%
≈ 4%

SOUTH LEG (NB)

	Lt	Thru	Rt	
1st	20	9	15	
2nd	21	42	57	
3rd	27	47	66	
4th	27	14	18	
Total	95	110 112	155 156	

TT = 2
TT% = 2/363 = 0.55%
≈ 1%

TOTAL: 363

PEAK HOUR FACTORS

NORTH LEG = 0.60
SOUTH LEG = 0.65
EAST LEG = 0.84
WEST LEG = 0.79

ALL LEGS = 0.77

HOUR TOTAL: 2,854

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: ENID

EAST-WEST STREET: ARROW HWY

TIME: 07:00AM-08:00AM DATE: 06-02-11

NORTH LEG

58	155	28	Total
9	27	6	1st
12	10	8	2nd
12	54	7	3rd
25	64	7	4th
Rt	Thru	Lt	

Rt	2	0	6	10	18
Thru	295	292	296	365	1248
Lt	9	19	65	70	163
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
11	2	1	3	5	Lt
583	123	114	158	188	Thru
99	11	11	28	49	Rt

	Lt	Thru	Rt
1st	23	18	27
2nd	20	9	15
3rd	21	42	57
4th	27	47	66
Total	91	116	165

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: ENID

EAST-WEST STREET: ARROW HWY

TIME: 08:00AM-09:00AM DATE: 06-02-11

NORTH LEG

Rt	Thru	Lt	
43	33	16	Total
11	16	6	1st
9	3	3	2nd
10	4	2	3rd
13	10	5	4th

	1st	2nd	3rd	4th	Total
Rt	5	1	2	8	16
Thru	345	255	205	205	1010
Lt	18	12	17	8	55

Total	1st	2nd	3rd	4th	
25	5	5	10	5	Lt
570	182	141	108	139	Thru
52	24	7	12	9	Rt

	Lt	Thru	Rt
1st	27	14	18
2nd	12	1	6
3rd	3	3	16
4th	13	4	13
Total	55	22	53

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : ENID — IRWINDALE

EAST-WEST STREET : ARROW HWY — 06-02-11

BEGINNING TIME : 07:00AM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
					SB NORTH LEG							
9	27	5	0	0	1	0	0	0	0	0	0	42
12	10	8	0	0	0	0	0	0	0	0	0	30
12	54	7	0	0	0	0	0	0	0	0	0	73
24	64	7	1	0	0	0	0	0	0	0	0	96
11	16	6	0	0	0	0	0	0	0	0	0	33
7	3	2	0	0	1 1	2	0	0 0	0	0	0 0	15
10	4	1	0	0	1	0	0	0	0	0	0	16
13	10	5	0	0	0	0	0	0	0	0	0	28
						TT = 1+0+0 = 1						
98	188	41	1	0	3	2	0	0	0	0	0	333
					NB SOUTH LEG							
27	17	23	0	1	0	0	0	0	0	0	0	68
15	9	20	0	0	0	0	0	0	0	0	0	44
57	41	21	0	1	0	0	0	0	0	0	0	120
66	47	27	0	0	0	0	0	0	0	0	0	140
17	14	27	1	0	0	0	0	0	0	0	0	59
6	1	12	0	0	2 0	0	0	0 0	0	0	0 0	19
16	3	3	0	0	0	0	0	0	0	0	0	22
13	4	13	0	0	0	0	0	0	0	0	0	30
						TT = 2+0+0 = 2						
217	136	146	1	2	0	0	0	0	0	0	0	502
					WB EAST LEG							
2	281	8	0	8	1	0	0	0	0	6	0	306
0	277	19	0	12	0	0	0	0	0	3	0	311
6	287	64	0	3	1	0	2	0	0	4	0	367
10	359	70	0	4	0	0	2	0	0	0	0	445
5	331	18	0	9	0	0	2	0	0	3	0	368
1	242	11	0	8 29	1	0	3 6	0	0	2 10	0	268
2	199	16	0	4	0	0	0	1	0	2	0	224
8	191	8	0	10	0	0	3	0	0	1	0	221
						TT = 29+6+10 = 45						
34	2167	214	0	58	3	0	12	1	0	21	0	2510
					EB WEST LEG							
11	106	2	0	11	0	0	3	0	0	3	0	136
11	105	1	0	7	0	0	1	0	0	1	0	126
28	144	3	0	6	0	0	2	0	0	6	0	189
49	180	4	0	5	1	0	0	0	0	3	0	242
24	172	5	0	6	0	0	2	0	0	2	0	211
7	128	5	0	9 13	0	0	2 5	0	0	2 12	0	153
12	92	10	0	9	0	0	3	0	0	4	0	130
9	125	5	0	12	0	0	2	0	0	0	0	153
						TT = 13+5+12 = 30						
151	1052	35	0	65	1	0	15	0	0	21	0	1340

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: ENID
EAST-WEST STREET: ARROW HWY
JURISDICTION: IRWINDALE

DATE: 06-02-11

PEAK HOUR: 01:00PM

NORTH LEG (SB)

TOTAL: 67

TT = 1
TT% = 1/67 = 1.5% ≈ 2%

Rt	Thru	Lt	
25	20 19	25 23	Total
4	3	6	1st
5	1	3	2nd
9	8	8	3rd
7	7	6	4th

TT = 31
TT% = 31/711 = 4.36% ≈ 4%

EAST LEG TOTAL: (WB) 711

	1st	2nd	3rd	4th	Total
Rt	9	4	5	9	25 27
Thru	130	206	126	175	635 637
Lt	13	12	10	12	45 47

WEST LEG TOTAL: (EB) 854

Total	1st	2nd	3rd	4th	
25 26	5	9	6	6	Lt
810 808	180	186	207	235	Thru
20	5	2	7	6	Rt

TT = 59
TT% = 59/854 = 6.91% ≈ 7%

SOUTH LEG (NB)

	Lt	Thru	Rt	
1st	3	4	6	
2nd	3	2	9	
3rd	3	4	13	
4th	18	9	27	
Total	25 27	20 19	55	TOTAL: 101

TT = 1
TT% = 1/101 = 0.99% ≈ 1%

PEAK HOUR FACTORS

NORTH LEG = 0.67
SOUTH LEG = 0.47
EAST LEG = 0.80
WEST LEG = 0.86

ALL LEGS = 0.84

HOUR TOTAL: 1,733

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: ENID

EAST-WEST STREET: ARROW HWY

TIME: 12:00PM-01:00PM DATE: 06-02-11

NORTH LEG

37	7	22	Total
11	1	8	1st
2	0	3	2nd
9	1	3	3rd
15	5	8	4th
Rt	Thru	Lt	

Rt	8	4	5	4	21
Thru	150	191	153	190	684
Lt	12	13	9	11	45
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
32	9	13	7	3	Lt
736	179	199	184	174	Thru
28	12	3	6	7	Rt

	Lt	Thru	Rt
1st	1	4	24
2nd	3	0	5
3rd	2	3	11
4th	1	3	17
Total	7	10	57

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: ENID

EAST-WEST STREET: ARROW HWY

TIME: 01:00PM-02:00PM DATE: 06-02-11

NORTH LEG

Rt	Thru	Lt	
25	19	23	Total
4	3	6	1st
5	1	3	2nd
9	8	8	3rd
7	7	6	4th

	1st	2nd	3rd	4th	Total
Rt	9	4	5	9	27
Thru	130	206	126	175	637
Lt	13	12	10	12	47

Total	1st	2nd	3rd	4th	
26	5	9	6	6	Lt
808	180	186	207	235	Thru
20	5	2	7	6	Rt

	Lt	Thru	Rt
1st	3	4	6
2nd	3	2	9
3rd	3	4	13
4th	18	9	27
Total	27	19	55

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : ENID — IRWINDALE

EAST-WEST STREET : ARROW HWY — 06-02-11

BEGINNING TIME : 12:00PM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
						SB NORTH LEG						
11	1	8	0	0	0	0	0	0	0	0	0	20
2	0	3	0	0	0	0	0	0	0	0	0	5
9	1	3	0	0	0	0	0	0	0	0	0	13
15	4	8	0	1	0	0	0	0	0	0	0	28
4	3	6	0	0	0	0	0	0	0	0	0	13
5	1	3	0	0	0	0	0	0	0	0	0	9
9	8	8	0	0	0	0	0	0	0	0	0	25
7	6	6	0	1	0	0	0	0	0	0	0	20
				1			0			0		
				TT = 1+0+0 = 1								
62	24	45	0	2	0	0	0	0	0	0	0	133
						NB SOUTH LEG						
23	4	1	0	0	0	1	0	0	0	0	0	29
5	0	3	0	0	0	0	0	0	0	0	0	8
11	3	2	0	0	0	0	0	0	0	0	0	16
17	3	1	0	0	0	0	0	0	0	0	0	21
6	3	3	0	1	0	0	0	0	0	0	0	13
9	2	3	0	0	0	0	0	0	0	0	0	14
13	4	3	0	0	0	0	0	0	0	0	0	20
27	9	18	0	0	0	0	0	0	0	0	0	54
				1			0			0		
						TT = 1+0+0 = 1						
111	28	34	0	1	0	1	0	0	0	0	0	175
						WB EAST LEG						
8	141	10	0	5	2	0	3	0	0	1	0	170
4	184	13	0	7	0	0	0	0	0	0	0	208
5	148	9	0	4	0	0	0	0	0	1	0	167
4	184	11	0	4	0	0	0	0	0	2	0	205
9	128	13	0	2	0	0	0	0	0	0	0	152
4	200	12	0	6	0	0	0	0	0	0	0	222
5	121	10	0	5	0	0	0	0	0	0	0	141
8	158	12	0	8	0	1	5	0	0	4	0	196
				21			6			4		
						TT = 21+6+4 = 31						
47	1264	90	0	41	2	1	8	0	0	8	0	1461
						EB WEST LEG						
11	174	9	1	4	0	0	1	0	0	0	0	200
3	190	13	0	7	0	0	2	0	0	0	0	215
6	181	7	0	3	0	0	0	0	0	0	0	197
7	162	3	0	6	0	0	2	0	0	4	0	184
5	169	4	0	9	1	0	1	0	0	1	0	190
2	170	9	0	9	0	0	1	0	0	6	0	197
7	186	6	0	15	0	0	3	0	0	3	0	220
6	225	6	0	6	0	0	2	0	0	2	0	247
				40			7			12		
						TT = 40+7+12 = 59						
47	1457	57	1	59	1	0	12	0	0	16	0	1650

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: ENID
EAST-WEST STREET: ARROW HWY
JURISDICTION: IRWINDALE

DATE: 06-02-11

PEAK HOUR: 05:00PM

NORTH LEG (SB)

TOTAL: 90

TT = 2
TT% = 2/90 = 2.22%
≈ 2%

Rt	Thru	Lt	
30 31	35 34	25	Total
5	7	3	1st
2	8	7	2nd
6	9	11	3rd
18	10	4	4th

TT = 9
TT% = 9/712
TT% = 1.26%
≈ 1%

EAST LEG TOTAL: (WB) 712

	1st	2nd	3rd	4th	Total
Rt	4	7	7	14	32 (30)
Thru	160	165	143	164	632 (634)
Lt	21	12	9	6	48 (50)

WEST LEG TOTAL: 1,568 (EB)

TT = 22
TT% = 22/1568 = 1.4%
≈ 1%

Total	1st	2nd	3rd	4th	
85 84	12	15	18	39	Lt
1425	362	342	330	391	Thru
60 59	12	17	15	15	Rt

SOUTH LEG (NB)

TT = 0
TT% = 0/127 = 0%
≈ 1%

	Lt	Thru	Rt	
1st	15	8	25	
2nd	6	8	7	
3rd	5	9	11	
4th	8	14	11	
Total	35 34	40 39	55 54	TOTAL: 127

PEAK HOUR FACTORS

NORTH LEG = 0.70
SOUTH LEG = 0.66
EAST LEG = 0.96
WEST LEG = 0.88

ALL LEGS = 0.90

HOUR TOTAL: 2,497

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: ENID

EAST-WEST STREET: ARROW HWY

TIME: 04:00PM-05:00PM DATE: 06-02-11

NORTH LEG

29	15	18	Total
8	2	0	1st
7	5	4	2nd
9	3	10	3rd
5	5	4	4th
Rt	Thru	Lt	

Rt	7	6	6	6	25
Thru	149	137	167	169	622
Lt	10	24	17	24	75
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
32	5	10	12	5	Lt
1221	266	306	312	337	Thru
45	8	15	13	9	Rt

	Lt	Thru	Rt
1st	6	3	16
2nd	13	7	21
3rd	10	7	11
4th	9	8	18
Total	38	25	66

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: ENID

EAST-WEST STREET: ARROW HWY

TIME: 05:00PM-06:00PM DATE: 06-02-11

NORTH LEG

31	34	25	Total
5	7	3	1st
2	8	7	2nd
6	9	11	3rd
18	10	4	4th
Rt	Thru	Lt	

	1st	2nd	3rd	4th	Total
Rt	4	7	7	14	32
Thru	160	165	143	164	632
Lt	21	12	9	6	48

Total	1st	2nd	3rd	4th	
84	12	15	18	39	Lt
1425	362	342	330	391	Thru
59	12	17	15	15	Rt

	Lt	Thru	Rt
1st	15	8	25
2nd	6	8	7
3rd	5	9	11
4th	8	14	11
Total	34	39	54

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : ENID — IRWINDALE

EAST-WEST STREET : ARROW HWY — 06-02-11

BEGINNING TIME : 04:00PM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
					SB NORTH LEG							
8	2	0	0	0	0	0	0	0	0	0	0	10
7	5	4	0	0	0	0	0	0	0	0	0	16
8	3	10	0	0	0	0	0	0	1	0	0	22
5	5	4	0	0	0	0	0	0	0	0	0	14
5	7	3	0	0	0	0	0	0	0	0	0	15
2	8	6	0	0	1	0	0	0	0	0	0	17
5	9	11	1	0	0	0	0	0	0	0	0	26
18	10	4	0	0 (2)	0	0	0 (0)	0	0	0 (0)	0	32
						TT=2+0+0=2						
58	49	42	1	0	1	0	0	0	1	0	0	152
					NB SOUTH LEG							
15	3	6	1	0	0	0	0	0	0	0	0	25
21	7	13	0	0	0	0	0	0	0	0	0	41
11	7	10	0	0	0	0	0	0	0	0	0	28
18	8	9	0	0	0	0	0	0	0	0	0	35
25	8	15	0	0	0	0	0	0	0	0	0	48
7	8	6	0	0	0	0	0	0	0	0	0	21
11	9	5	0	0	0	0	0	0	0	0	0	25
11	14	8	0	0 (0)	0	0	0 (0)	0	0	0 (0)	0	33
						TT=0+0+0=0						
119	64	72	1	0	0	0	0	0	0	0	0	256
					WB EAST LEG							
7	139	10	0	7	0	0	1	0	0	2	0	166
6	135	24	0	2	0	0	0	0	0	0	0	167
6	160	17	0	5	0	0	0	0	0	2	0	190
6	167	24	0	0	0	0	2	0	0	0	0	199
4	158	20	0	2	0	0	0	0	0	0	1	185
6	164	12	1	1	0	0	0	0	0	0	0	184
7	139	9	0	4	0	0	0	0	0	0	0	159
14	164	6	0	0 (8)	0	0	0 (0)	0	0	0 (1)	0	184
						TT=8+0+1=9						
56	1226	122	1	21	0	0	3	0	0	4	1	1434
					EB WEST LEG							
7	247	5	1	11	0	0	2	0	0	6	0	279
15	303	10	0	1	0	0	1	0	0	1	0	331
13	302	12	0	5	0	0	3	0	0	2	0	337
9	325	5	0	9	0	0	2	0	0	1	0	351
12	357	12	0	3	0	0	0	0	0	2	0	386
17	336	15	0	3	0	0	1	0	0	2	0	374
15	321	18	0	9	0	0	0	0	0	0	0	363
15	389	39	0	1 (16)	0	0	0 (1)	0	0	1 (5)	0	445
						TT=16+1+5=22						
103	2580	116	1	42	0	0	9	0	0	15	0	2866

Prepared by Newport Traffic Studies

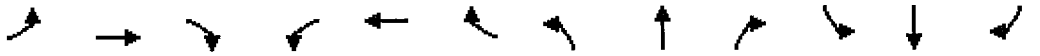
HCM Signalized Intersection Capacity Analysis
15: Enid Ave & Arrow Hwy

8/10/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	640	110	170	1300	20	95	110	155	30	145	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		0.95	0.95	
Frt	1.00	0.98		1.00	1.00			0.94		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00			0.99		0.95	1.00	
Satd. Flow (prot)	1719	3386		1719	3433			1704		1715	1701	
Flt Permitted	0.14	1.00		0.23	1.00			0.74		0.40	0.99	
Satd. Flow (perm)	250	3386		416	3433			1277		719	1691	
Peak-hour factor, PHF	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77
Adj. Flow (vph)	19	831	143	221	1688	26	123	143	201	39	188	78
RTOR Reduction (vph)	0	26	0	0	2	0	0	50	0	0	9	0
Lane Group Flow (vph)	19	948	0	221	1712	0	0	417	0	35	261	0
Heavy Vehicles (%)	5%	5%	0%	5%	5%	0%	0%	5%	5%	0%	0%	5%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	29.0	29.0		29.0	29.0			18.0		18.0	18.0	
Effective Green, g (s)	29.0	29.0		29.0	29.0			18.0		18.0	18.0	
Actuated g/C Ratio	0.53	0.53		0.53	0.53			0.33		0.33	0.33	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	132	1785		219	1810			418		235	553	
v/s Ratio Prot		0.28			0.50							
v/s Ratio Perm	0.08			c0.53				c0.33		0.05	0.15	
v/c Ratio	0.14	0.53		1.01	0.95			1.00		0.15	0.47	
Uniform Delay, d1	6.7	8.5		13.0	12.3			18.5		13.1	14.7	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	0.5	0.3		63.2	10.9			43.6		1.3	2.9	
Delay (s)	7.2	8.8		76.2	23.1			62.0		14.4	17.6	
Level of Service	A	A		E	C			E		B	B	
Approach Delay (s)		8.8			29.2			62.0			17.2	
Approach LOS		A			C			E			B	

Intersection Summary			
HCM Average Control Delay	26.9	HCM Level of Service	C
HCM Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	55.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	81.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	810	20	45	635	25	25	20	55	25	20	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		0.95	0.95	
Frt	1.00	1.00		1.00	0.99			0.93		1.00	0.92	
Flt Protected	0.95	1.00		0.95	1.00			0.99		0.95	1.00	
Satd. Flow (prot)	1719	3430		1805	3418			1721		1715	1624	
Flt Permitted	0.28	1.00		0.26	1.00			0.94		0.68	0.99	
Satd. Flow (perm)	508	3430		500	3418			1633		1228	1612	
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	30	964	24	54	756	30	30	24	65	30	24	30
RTOR Reduction (vph)	0	4	0	0	7	0	0	25	0	0	18	0
Lane Group Flow (vph)	30	984	0	54	779	0	0	94	0	27	39	0
Heavy Vehicles (%)	5%	5%	0%	0%	5%	5%	0%	5%	0%	0%	5%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	15.2	15.2		15.2	15.2			16.0		16.0	16.0	
Effective Green, g (s)	15.2	15.2		15.2	15.2			16.0		16.0	16.0	
Actuated g/C Ratio	0.39	0.39		0.39	0.39			0.41		0.41	0.41	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	197	1330		194	1325			667		501	658	
v/s Ratio Prot		c0.29			0.23							
v/s Ratio Perm	0.06			0.11				c0.06		0.02	0.02	
v/c Ratio	0.15	0.74		0.28	0.59			0.14		0.05	0.06	
Uniform Delay, d1	7.8	10.3		8.2	9.5			7.3		7.0	7.0	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	0.4	2.2		0.8	0.7			0.4		0.2	0.2	
Delay (s)	8.2	12.5		9.0	10.2			7.7		7.2	7.2	
Level of Service	A	B		A	B			A		A	A	
Approach Delay (s)		12.4			10.1			7.7			7.2	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	11.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	39.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	48.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
15: Enid Ave & Arrow Hwy

8/10/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	85	1425	60	50	630	30	35	40	55	25	35	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		0.95	0.95	
Frt	1.00	0.99		1.00	0.99			0.94		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00			0.99		0.95	1.00	
Satd. Flow (prot)	1805	3424		1719	3415			1767		1633	1643	
Flt Permitted	0.34	1.00		0.12	1.00			0.92		0.69	0.99	
Satd. Flow (perm)	650	3424		214	3415			1640		1180	1633	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	94	1583	67	56	700	33	39	44	61	28	39	33
RTOR Reduction (vph)	0	5	0	0	6	0	0	20	0	0	23	0
Lane Group Flow (vph)	94	1645	0	56	727	0	0	124	0	25	52	0
Heavy Vehicles (%)	0%	5%	0%	5%	5%	5%	0%	0%	0%	5%	0%	5%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	33.8	33.8		33.8	33.8			17.0		17.0	17.0	
Effective Green, g (s)	33.8	33.8		33.8	33.8			17.0		17.0	17.0	
Actuated g/C Ratio	0.57	0.57		0.57	0.57			0.29		0.29	0.29	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	374	1968		123	1963			474		341	472	
v/s Ratio Prot		c0.48			0.21							
v/s Ratio Perm	0.14			0.26				c0.08		0.02	0.03	
v/c Ratio	0.25	0.84		0.46	0.37			0.26		0.07	0.11	
Uniform Delay, d1	6.2	10.2		7.2	6.8			16.1		15.2	15.3	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	0.4	3.2		2.7	0.1			1.3		0.4	0.5	
Delay (s)	6.6	13.5		9.9	6.9			17.4		15.6	15.8	
Level of Service	A	B		A	A			B		B	B	
Approach Delay (s)		13.1			7.1			17.4			15.8	
Approach LOS		B			A			B			B	

Intersection Summary			
HCM Average Control Delay	11.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	58.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	68.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
15: Enid Ave & Arrow Hwy

8/11/2012

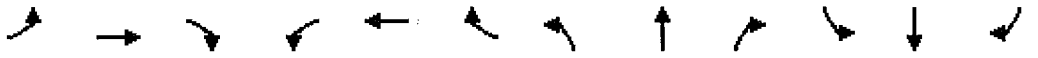
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	690	110	170	1300	20	95	110	155	30	145	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		0.95	0.95	
Frt	1.00	0.98		1.00	1.00			0.94		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00			0.99		0.95	1.00	
Satd. Flow (prot)	1719	3204		1719	3433			1704		1715	1701	
Flt Permitted	0.14	1.00		0.21	1.00			0.74		0.40	0.99	
Satd. Flow (perm)	250	3204		373	3433			1277		719	1691	
Peak-hour factor, PHF	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77
Adj. Flow (vph)	19	896	143	221	1688	26	123	143	201	39	188	78
RTOR Reduction (vph)	0	23	0	0	2	0	0	50	0	0	9	0
Lane Group Flow (vph)	19	1016	0	221	1712	0	0	417	0	35	261	0
Heavy Vehicles (%)	5%	12%	0%	5%	5%	0%	0%	5%	5%	0%	0%	5%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	29.0	29.0		29.0	29.0			18.0		18.0	18.0	
Effective Green, g (s)	29.0	29.0		29.0	29.0			18.0		18.0	18.0	
Actuated g/C Ratio	0.53	0.53		0.53	0.53			0.33		0.33	0.33	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	132	1689		197	1810			418		235	553	
v/s Ratio Prot		0.32			0.50							
v/s Ratio Perm	0.08			c0.59				c0.33		0.05	0.15	
v/c Ratio	0.14	0.60		1.12	0.95			1.00		0.15	0.47	
Uniform Delay, d1	6.7	9.0		13.0	12.3			18.5		13.1	14.7	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	0.5	0.6		100.7	10.9			43.6		1.3	2.9	
Delay (s)	7.2	9.6		113.7	23.1			62.0		14.4	17.6	
Level of Service	A	A		F	C			E		B	B	
Approach Delay (s)		9.6			33.5			62.0			17.2	
Approach LOS		A			C			E			B	

Intersection Summary			
HCM Average Control Delay	29.0	HCM Level of Service	C
HCM Volume to Capacity ratio	1.08		
Actuated Cycle Length (s)	55.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	81.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
15: Enid Ave & Arrow Hwy

8/11/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	860	20	45	635	25	25	20	55	25	20	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		0.95	0.95	
Frt	1.00	1.00		1.00	0.99			0.93		1.00	0.92	
Flt Protected	0.95	1.00		0.95	1.00			0.99		0.95	1.00	
Satd. Flow (prot)	1719	3248		1805	3418			1721		1715	1624	
Flt Permitted	0.28	1.00		0.25	1.00			0.94		0.68	0.99	
Satd. Flow (perm)	512	3248		484	3418			1633		1228	1612	
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	30	1024	24	54	756	30	30	24	65	30	24	30
RTOR Reduction (vph)	0	4	0	0	7	0	0	20	0	0	18	0
Lane Group Flow (vph)	30	1044	0	54	779	0	0	99	0	27	39	0
Heavy Vehicles (%)	5%	11%	0%	0%	5%	5%	0%	5%	0%	0%	5%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	15.7	15.7		15.7	15.7			16.0		16.0	16.0	
Effective Green, g (s)	15.7	15.7		15.7	15.7			16.0		16.0	16.0	
Actuated g/C Ratio	0.40	0.40		0.40	0.40			0.40		0.40	0.40	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	202	1284		191	1352			658		495	650	
v/s Ratio Prot		c0.32			0.23							
v/s Ratio Perm	0.06			0.11				c0.06		0.02	0.02	
v/c Ratio	0.15	0.81		0.28	0.58			0.15		0.05	0.06	
Uniform Delay, d1	7.7	10.7		8.2	9.4			7.5		7.2	7.2	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	0.3	4.0		0.8	0.6			0.5		0.2	0.2	
Delay (s)	8.0	14.7		9.0	10.0			8.0		7.4	7.4	
Level of Service	A	B		A	A			A		A	A	
Approach Delay (s)		14.6			9.9			8.0			7.4	
Approach LOS		B			A			A			A	

Intersection Summary			
HCM Average Control Delay	12.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	39.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	50.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	85	1475	60	50	630	30	35	40	55	25	35	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		0.95	0.95	
Frt	1.00	0.99		1.00	0.99			0.94		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00			0.99		0.95	1.00	
Satd. Flow (prot)	1805	3333		1719	3415			1767		1633	1643	
Flt Permitted	0.34	1.00		0.12	1.00			0.92		0.68	0.99	
Satd. Flow (perm)	651	3333		210	3415			1640		1176	1633	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	94	1639	67	56	700	33	39	44	61	28	39	33
RTOR Reduction (vph)	0	5	0	0	5	0	0	17	0	0	24	0
Lane Group Flow (vph)	94	1701	0	56	728	0	0	127	0	25	51	0
Heavy Vehicles (%)	0%	8%	0%	5%	5%	5%	0%	0%	0%	5%	0%	5%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	34.4	34.4		34.4	34.4			17.0		17.0	17.0	
Effective Green, g (s)	34.4	34.4		34.4	34.4			17.0		17.0	17.0	
Actuated g/C Ratio	0.58	0.58		0.58	0.58			0.29		0.29	0.29	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	377	1930		122	1978			469		337	467	
v/s Ratio Prot		c0.51			0.21							
v/s Ratio Perm	0.14			0.27				c0.08		0.02	0.03	
v/c Ratio	0.25	0.88		0.46	0.37			0.27		0.07	0.11	
Uniform Delay, d1	6.1	10.7		7.2	6.7			16.4		15.5	15.6	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	0.3	5.1		2.7	0.1			1.4		0.4	0.5	
Delay (s)	6.5	15.9		9.9	6.8			17.8		15.9	16.1	
Level of Service	A	B		A	A			B		B	B	
Approach Delay (s)		15.4			7.0			17.8			16.0	
Approach LOS		B			A			B			B	

Intersection Summary			
HCM Average Control Delay	13.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	59.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	70.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
15: Enid Ave & Arrow Hwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	750	120	185	1415	20	105	120	170	35	160	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		0.95	0.95	
Frt	1.00	0.98		1.00	1.00			0.94		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00			0.99		0.95	1.00	
Satd. Flow (prot)	1719	3204		1719	3433			1703		1715	1703	
Flt Permitted	0.14	1.00		0.18	1.00			0.67		0.37	0.99	
Satd. Flow (perm)	250	3204		317	3433			1158		675	1692	
Peak-hour factor, PHF	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77
Adj. Flow (vph)	19	974	156	240	1838	26	136	156	221	45	208	84
RTOR Reduction (vph)	0	23	0	0	2	0	0	50	0	0	6	0
Lane Group Flow (vph)	19	1107	0	240	1862	0	0	463	0	40	291	0
Heavy Vehicles (%)	5%	12%	0%	5%	5%	0%	0%	5%	5%	0%	0%	5%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	29.0	29.0		29.0	29.0			18.0		18.0	18.0	
Effective Green, g (s)	29.0	29.0		29.0	29.0			18.0		18.0	18.0	
Actuated g/C Ratio	0.53	0.53		0.53	0.53			0.33		0.33	0.33	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	132	1689		167	1810			379		221	554	
v/s Ratio Prot		0.35			0.54							
v/s Ratio Perm	0.08			c0.76				c0.40		0.06	0.17	
v/c Ratio	0.14	0.66		1.44	1.03			1.22		0.18	0.53	
Uniform Delay, d1	6.7	9.4		13.0	13.0			18.5		13.2	15.0	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	0.5	0.9		227.4	28.9			121.5		1.8	3.5	
Delay (s)	7.2	10.3		240.4	41.9			140.0		15.0	18.6	
Level of Service	A	B		F	D			F		B	B	
Approach Delay (s)		10.3			64.5			140.0			18.1	
Approach LOS		B			E			F			B	

Intersection Summary			
HCM Average Control Delay	55.0	HCM Level of Service	D
HCM Volume to Capacity ratio	1.35		
Actuated Cycle Length (s)	55.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	87.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
15: Enid Ave & Arrow Hwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	895	20	45	660	25	25	20	55	25	20	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		0.95	0.95	
Frt	1.00	1.00		1.00	0.99			0.93		1.00	0.92	
Flt Protected	0.95	1.00		0.95	1.00			0.99		0.95	1.00	
Satd. Flow (prot)	1719	3249		1805	3419			1721		1715	1624	
Flt Permitted	0.27	1.00		0.25	1.00			0.94		0.68	0.99	
Satd. Flow (perm)	484	3249		481	3419			1633		1228	1612	
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	30	1065	24	54	786	30	30	24	65	30	24	30
RTOR Reduction (vph)	0	4	0	0	7	0	0	18	0	0	18	0
Lane Group Flow (vph)	30	1085	0	54	809	0	0	101	0	27	39	0
Heavy Vehicles (%)	5%	11%	0%	0%	5%	5%	0%	5%	0%	0%	5%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	15.8	15.8		15.8	15.8			16.0		16.0	16.0	
Effective Green, g (s)	15.8	15.8		15.8	15.8			16.0		16.0	16.0	
Actuated g/C Ratio	0.40	0.40		0.40	0.40			0.40		0.40	0.40	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	192	1290		191	1357			656		494	648	
v/s Ratio Prot		c0.33			0.24							
v/s Ratio Perm	0.06			0.11				c0.06		0.02	0.02	
v/c Ratio	0.16	0.84		0.28	0.60			0.15		0.05	0.06	
Uniform Delay, d1	7.7	10.9		8.2	9.5			7.6		7.3	7.3	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	0.4	5.1		0.8	0.7			0.5		0.2	0.2	
Delay (s)	8.1	16.0		9.0	10.2			8.1		7.5	7.5	
Level of Service	A	B		A	B			A		A	A	
Approach Delay (s)		15.8			10.1			8.1			7.5	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	12.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	39.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	51.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	90	1535	60	50	655	30	35	40	55	25	35	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		0.95	0.95	
Frt	1.00	0.99		1.00	0.99			0.94		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00			0.99		0.95	1.00	
Satd. Flow (prot)	1805	3333		1719	3416			1767		1633	1643	
Flt Permitted	0.33	1.00		0.11	1.00			0.92		0.68	0.99	
Satd. Flow (perm)	628	3333		207	3416			1639		1172	1633	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	100	1706	67	56	728	33	39	44	61	28	39	33
RTOR Reduction (vph)	0	5	0	0	5	0	0	14	0	0	24	0
Lane Group Flow (vph)	100	1768	0	56	756	0	0	130	0	25	51	0
Heavy Vehicles (%)	0%	8%	0%	5%	5%	5%	0%	0%	0%	5%	0%	5%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	35.0	35.0		35.0	35.0			17.0		17.0	17.0	
Effective Green, g (s)	35.0	35.0		35.0	35.0			17.0		17.0	17.0	
Actuated g/C Ratio	0.58	0.58		0.58	0.58			0.28		0.28	0.28	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	366	1944		121	1993			464		332	463	
v/s Ratio Prot		c0.53			0.22							
v/s Ratio Perm	0.16			0.27				c0.08		0.02	0.03	
v/c Ratio	0.27	0.91		0.46	0.38			0.28		0.08	0.11	
Uniform Delay, d1	6.2	11.1		7.1	6.7			16.7		15.7	15.9	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	0.4	6.7		2.8	0.1			1.5		0.4	0.5	
Delay (s)	6.6	17.8		9.9	6.8			18.2		16.2	16.4	
Level of Service	A	B		A	A			B		B	B	
Approach Delay (s)		17.2			7.0			18.2			16.3	
Approach LOS		B			A			B			B	

Intersection Summary			
HCM Average Control Delay	14.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	71.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Hall & Foreman, Inc.

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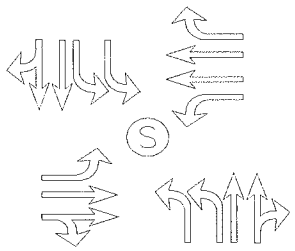
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : ARROW HWY
N/S STREET : AZUSA AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 16
ROUTE 2B

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
ARROW HWY						
EB LEFT	150	5%	**50**	200	20	220
EB THRU	510	10%		510	45	555
EB RIGHT	80	5%		80	5	85
WB LEFT	70	5%		70	5	75
WB THRU	895	5%		895	80	975
WB RIGHT	105	5%		105	10	115
AZUSA AVE						
NB LEFT	225	5%		225	20	245
NB THRU	520	5%		520	45	565
NB RIGHT	45	5%		45	5	50
SB LEFT	95	5%		95	10	105
SB THRU	490	5%		490	45	535
SB RIGHT	205	5%		205	20	225
TOTALS	**3390**		**50**	**3440**	**310**	**3750**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : ARROW HWY
N/S STREET : AZUSA AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 16
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
ARROW HWY						
EB LEFT	145	5%	**50**	195	20	215
EB THRU	495	5%		495	45	540
EB RIGHT	120	5%		120	10	130
WB LEFT	190	10%		190	15	205
WB THRU	395	5%		395	35	430
WB RIGHT	115	5%		115	10	125
AZUSA AVE						
NB LEFT	200	5%		200	20	220
NB THRU	670	5%		670	60	730
NB RIGHT	135	5%		135	10	145
SB LEFT	125	5%		125	10	135
SB THRU	760	5%		760	70	830
SB RIGHT	100	5%		100	10	110
TOTALS	**3450**		**50**	**3500**	**315**	**3815**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : ARROW HWY
N/S STREET : AZUSA AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 16
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
ARROW HWY						
EB LEFT	215	5%	**50**	265	25	290
EB THRU	1130	5%		1130	100	1230
EB RIGHT	135	5%		135	10	145
WB LEFT	125	5%		125	10	135
WB THRU	460	5%		460	40	500
WB RIGHT	95	5%		95	10	105
AZUSA AVE						
NB LEFT	160	5%		160	15	175
NB THRU	465	5%		465	40	505
NB RIGHT	230	5%		230	20	250
SB LEFT	260	5%		260	25	285
SB THRU	635	5%		635	55	690
SB RIGHT	85	5%		85	5	90
TOTALS	**3995**		**50**	**4045**	**355**	**4400**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : ARROW HWY
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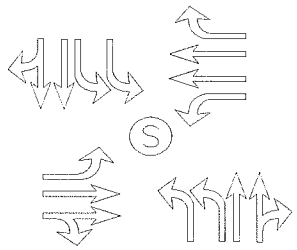
PROJECTED GROWTH PER YEAR:

INTERSECTION 16
ROUTE 2B

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
ARROW HWY								
EB LEFT	150	2	6	155	**150**	305	25	330
EB THRU	471	41	123	595	**0**	595	55	650
EB RIGHT	79	0	0	80	**0**	80	5	85
WB LEFT	66	2	6	70	**0**	70	5	75
WB THRU	873	22	66	940	**0**	940	85	1025
WB RIGHT	105	2	6	110	**0**	110	10	120
AZUSA AVE								
NB LEFT	215	8	24	240	**0**	240	20	260
NB THRU	506	16	48	555	**0**	555	50	605
NB RIGHT	46	0	0	45	**0**	45	5	50
SB LEFT	94	1	3	95	**0**	95	10	105
SB THRU	474	16	48	520	**0**	520	45	565
SB RIGHT	204	3	9	215	**0**	215	20	235
TOTALS	**3283**				**150**	**3770**	**335**	**4105**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : ARROW HWY
N/S STREET : AZUSA AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 16
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
ARROW HWY								
EB LEFT	143	4	12	155	**150**	305	25	330
EB THRU	482	13	39	520	**0**	520	45	565
EB RIGHT	117	5	15	130	**0**	130	10	140
WB LEFT	168	20	60	230	**0**	230	20	250
WB THRU	384	12	36	420	**0**	420	40	460
WB RIGHT	112	3	9	120	**0**	120	10	130
AZUSA AVE								
NB LEFT	194	5	15	210	**0**	210	20	230
NB THRU	654	16	48	700	**0**	700	65	765
NB RIGHT	128	6	18	145	**0**	145	15	160
SB LEFT	123	3	9	130	**0**	130	10	140
SB THRU	750	12	36	785	**0**	785	70	855
SB RIGHT	96	2	6	100	**0**	100	10	110
TOTALS	**3351**				**150**	**3795**	**340**	**4135**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : ARROW HWY
N/S STREET : AZUSA AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 16
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
ARROW HWY								
EB LEFT	212	3	9	220	**150**	370	35	405
EB THRU	1122	7	21	1145	**0**	1145	105	1250
EB RIGHT	133	2	6	140	**0**	140	15	155
WB LEFT	125	1	3	130	**0**	130	10	140
WB THRU	450	9	27	475	**0**	475	45	520
WB RIGHT	94	1	3	95	**0**	95	10	105
AZUSA AVE								
NB LEFT	162	0	0	160	**0**	160	15	175
NB THRU	457	6	18	475	**0**	475	45	520
NB RIGHT	224	4	12	235	**0**	235	20	255
SB LEFT	258	4	12	270	**0**	270	25	295
SB THRU	629	8	24	655	**0**	655	60	715
SB RIGHT	86	0	0	85	**0**	85	5	90
TOTALS	**3952**				**150**	**4235**	**390**	**4625**

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INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: AZUZA

EAST-WEST STREET: ARROW HWY

TIME: 07:00AM-08:00AM DATE: 06-09-11

NORTH LEG

Rt	Thru	Lt	
195	420	79	Total
32	73	14	1st
37	57	19	2nd
61	111	16	3rd
65	179	30	4th

	1st	2nd	3rd	4th	Total
Rt	13	21	29	41	104
Thru	222	251	256	233	962
Lt	13	19	16	22	70

Total	1st	2nd	3rd	4th	
136	18	24	33	61	Lt
501	92	113	138	158	Thru
74	15	16	17	26	Rt

	Lt	Thru	Rt
1st	49	116	4
2nd	49	107	15
3rd	57	147	13
4th	52	125	10
Total	207	495	42

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: AZUZA

EAST-WEST STREET: ARROW HWY

TIME: 08:00AM-09:00AM DATE: 06-09-11

NORTH LEG

145	418	104	Total
44	143	30	1st
27	100	28	2nd
38	87	24	3rd
36	88	22	4th
Rt	Thru	Lt	

Rt	16	17	24	22	79
Thru	155	190	177	163	685
Lt	11	15	15	30	71
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
133	34	29	38	32	Lt
402	103	115	78	106	Thru
68	20	16	12	20	Rt

	Lt	Thru	Rt
1st	65	143	8
2nd	43	114	11
3rd	41	112	17
4th	38	98	15
Total	187	467	51

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : AZUZA — IRWINDALE

EAST-WEST STREET : ARROW HWY — 06-09-11

BEGINNING TIME : 07:00AM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
				SB NORTH LEG								
31	69	12	1	2	2	0	1	0	0	1	0	119
36	54	18	1	3	1	0	0	0	0	0	0	113
61	108	16	0	3	0	0	0	0	0	0	0	188
64	171	30	1	5	0	0	1	0	0	2	0	274
43	141	30	1	2	0	0	0	0	0	0	0	217
26	97	28	0	2 17	0	1	0 1	0	0	1 2	0	155
38	85	23	0	2	0	0	0	0	0	0	1	149
34	84	19	2	3	2	0	1	1	0	0	0	146
						TT=17+1+2=20						
333	809	176	6	22	5	1	3	1	0	4	1	1361
				NB SOUTH LEG								
3	114	48	1	2	0	0	0	0	0	0	1	169
15	104	48	0	2	1	0	0	0	0	1	0	171
13	145	56	0	2	1	0	0	0	0	0	0	217
10	120	49	0	5	3	0	0	0	0	0	0	187
8	137	62	0	6	2	0	0	1	0	0	0	216
11	111	42	0	1 22	0	0	0 1	0	0	2 1	1	168
15	105	39	1	7	2	1	0	0	0	0	0	170
14	96	37	0	2	1	0	0	0	1	0	0	151
						TT=22+1+1=24						
89	932	381	2	27	10	1	0	1	1	3	2	1449
				WB EAST LEG								
12	219	13	1	1	0	0	2	0	0	0	0	248
21	247	19	0	1	0	0	0	0	0	3	0	291
29	249	15	0	2	1	0	3	0	0	2	0	301
40	225	22	0	4	0	1	3	0	0	1	0	296
15	152	10	0	2	1	1	0	0	0	1	0	182
14	179	14	1	6 11	0	2	3 8	0	0	2 7	1	222
24	163	15	0	9	0	0	3	0	0	2	0	216
21	157	30	1	4	0	0	1	0	0	1	0	215
						TT=11+8+7=26						
176	1591	138	3	29	2	4	15	0	0	12	1	1971
				EB WEST LEG								
14	84	16	1	6	2	0	1	0	0	1	0	125
16	102	24	0	7	0	0	0	0	0	4	0	153
17	128	32	0	6	1	0	1	0	0	3	0	188
26	154	61	0	3	0	0	1	0	0	0	0	245
20	87	33	0	13	1	0	1	0	0	2	0	157
15	107	28	1	6 31	1	0	2 3	0	0	0 9	0	160
11	69	35	1	8	3	0	1	0	0	0	0	128
16	102	31	3	4	1	0	0	0	1	0	0	158
						TT=31+3+9=43						
135	833	260	6	53	9	0	7	0	1	10	0	1314

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: AZUZA
EAST-WEST STREET: ARROW HWY
JURISDICTION: IRWINDALE

DATE: 06-09-11

PEAK HOUR: 12:15PM

NORTH LEG (SB)

TOTAL: 986

Rt	Thru	Lt	
98 (100)	762 (760)	126 (125)	Total
29	211	30	1st
24	158	33	2nd
20	204	34	3rd
25	189	29	4th

TT = 17

$TT\% = \frac{17}{986} = 1.72\% \approx 2\%$

TT = 35

$TT\% = \frac{35}{699} = 5.01\% \approx 5\%$

EAST LEG TOTAL: (WB) 699

	1st	2nd	3rd	4th	Total
Rt	29	20	31	35	115
Thru	114	88	98	96	396 (395)
Lt	46	50	41	51	188 (190)

Total	1st	2nd	3rd	4th	
147 (145)	48	35	32	32	Lt
495	144	119	118	114	Thru
122 (120)	34	27	26	35	Rt

WEST LEG TOTAL: (EB) 764

TT = 22

$TT\% = \frac{22}{764} = 2.88\% \approx 3\%$

PEAK HOUR FACTORS

NORTH LEG = 0.91
SOUTH LEG = 0.80
EAST LEG = 0.92
WEST LEG = 0.85

ALL LEGS = 0.86

	Lt	Thru	Rt
1st	49	233	31
2nd	47	158	31
3rd	49	120	24
4th	54	159	48
Total	199 (200)	670	134 (135)

SOUTH LEG (NB)

TT = 27

$TT\% = \frac{27}{1003} = 2.69\% \approx 3\%$

TOTAL: 1,003

HOUR TOTAL: 3,452

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: AZUZA

EAST-WEST STREET: ARROW HWY

TIME: 12:00PM-01:00PM DATE: 06-09-11

NORTH LEG

Rt	Thru	Lt	
103	708	134	Total
30	135	37	1st
29	211	30	2nd
24	158	33	3rd
20	204	34	4th

	1st	2nd	3rd	4th	Total
Rt	30	29	20	31	110
Thru	123	114	88	98	423
Lt	51	46	50	41	188

Total	1st	2nd	3rd	4th	
159	44	48	35	32	Lt
511	130	144	119	118	Thru
124	37	34	27	26	Rt

	Lt	Thru	Rt
1st	70	98	38
2nd	49	233	31
3rd	47	158	31
4th	49	120	24
Total	215	609	124

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: AZUZA

EAST-WEST STREET: ARROW HWY

TIME: 01:00PM-02:00PM DATE: 06-09-11

NORTH LEG

135	644	140	Total
25	189	29	1st
40	134	37	2nd
34	164	38	3rd
36	157	36	4th
Rt	Thru	Lt	

Rt	35	28	32	30	125
Thru	96	114	129	98	437
Lt	51	52	46	56	205
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
157	32	35	35	55	Lt
550	114	131	152	153	Thru
136	35	39	33	29	Rt

	Lt	Thru	Rt
1st	54	159	48
2nd	39	128	41
3rd	54	142	39
4th	50	120	37
Total	197	549	165

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : AZUZA — IRWINDALE

EAST-WEST STREET : ARROW HWY — 06-09-11

BEGINNING TIME : 12:00PM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
						SB NORTH LEG						
29	130	35	1	5	1	0	0	1	0	0	0	202
27	209	30	1	2	0	0	0	0	1	0	0	270
24	157	33	0	1	0	0	0	0	0	0	0	215
20	199	32	0	3	2	0	0	0	0	2	0	258
25	185	28	0	3	1	0	1	0	0	0	0	243
40	125	36	0	8 (13)	1	0	0 (1)	0	0	1 (3)	0	211
31	159	37	3	3	1	0	1	0	0	1	0	236
36	152	33	0	5	3	0	0	0	0	0	0	229
						TT=13+1+3=17						
232	1316	264	5	30	9	0	2	1	1	4	0	1864
						NB SOUTH LEG						
36	94	69	2	3	1	0	1	0	0	0	0	206
30	230	46	1	1	1	0	2	0	0	0	2	313
31	156	47	0	2	0	0	0	0	0	0	0	236
24	117	48	0	3	1	0	0	0	0	0	0	193
43	151	53	3	5	0	0	1	0	2	2	1	261
38	125	38	3	3 (17)	1	0	0 (3)	0	0	0 (7)	0	208
37	132	51	2	8	3	0	1	0	0	1	0	235
37	116	47	0	0	2	0	2	1	0	2	0	207
						TT=17+3+7=27						
276	1121	399	11	25	9	0	7	1	2	5	3	1859
						WB EAST LEG						
29	123	47	1	0	3	0	0	1	0	0	0	204
27	110	41	1	1	4	0	2	0	1	1	1	189
20	87	47	0	1	3	0	0	0	0	0	0	158
30	95	35	1	1	6	0	0	0	0	2	0	170
35	92	45	0	0	6	0	2	0	0	2	0	182
27	110	47	1	2 (24)	5	0	1 (4)	0	0	1 (7)	0	194
29	128	41	3	1	5	0	0	0	0	0	0	207
26	95	52	2	0	4	2	2	0	0	1	0	184
						TT=24+4+7=35						
223	840	355	9	6	36	2	7	1	1	7	1	1488
						EB WEST LEG						
37	124	44	0	5	0	0	0	0	0	1	0	211
33	139	47	1	3	1	0	1	0	0	1	0	226
27	117	34	0	2	1	0	0	0	0	0	0	181
24	115	30	1	3	2	0	0	0	1	0	0	176
33	111	32	0	3	0	0	0	0	2	0	0	181
38	123	34	1	6 (17)	1	0	1 (1)	0	0	1 (4)	0	205
31	142	32	2	8	1	0	0	0	0	2	2	220
26	141	54	3	10	1	0	2	0	0	0	0	237
						TT=17+1+4=22						
249	1012	307	8	40	7	0	4	0	3	5	2	1637

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: AZUZA
EAST-WEST STREET: ARROW HWY
JURISDICTION: IRWINDALE

DATE: 06-09-11

PEAK HOUR: 05:00PM

NORTH LEG (SB)

TOTAL: 985

TT = 11

$TT\% = \frac{11}{985} = 1.12\% \approx 1\%$

Rt	Thru	Lt	
86 (95)	637 (635)	262 (260)	Total
26	157	57	1st
23	166	72	2nd
20	159	70	3rd
17	155	63	4th

TT = 11

$TT\% = \frac{11}{680} = 1.62\% \approx 2\%$

EAST LEG TOTAL: (WB) 680

	1st	2nd	3rd	4th	Total
Rt	28	27	22	18	95
Thru	110	123	119	107	459 (460)
Lt	27	45	33	21	126 (125)

Total	1st	2nd	3rd	4th	
215	48	63	54	50	Lt
1129 (1130)	300	248	260	321	Thru
135	40	36	31	28	Rt

WEST LEG TOTAL: 1,479 (EB)

TT = 12

$TT\% = \frac{12}{1479} = 0.81\% \approx 1\%$

	Lt	Thru	Rt
1st	38	103	53
2nd	46	126	66
3rd	44	128	60
4th	34	106	49
Total	162 (160)	463 (465)	228 (230)

SOUTH LEG (NB)

PEAK HOUR FACTORS

NORTH LEG = 0.94
SOUTH LEG = 0.90
EAST LEG = 0.87
WEST LEG = 0.93

ALL LEGS = 0.96

TT = 10

$TT\% = \frac{10}{853} = 1.17\% \approx 1\%$

TOTAL: 853

HOUR TOTAL: 3,997

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: AZUZA

EAST-WEST STREET: ARROW HWY

TIME: 04:00PM-05:00PM DATE: 06-09-11

NORTH LEG

Rt	Thru	Lt	
100	618	176	Total
14	152	31	1st
25	171	45	2nd
32	145	46	3rd
29	150	54	4th

	1st	2nd	3rd	4th	Total
Rt	30	37	35	22	124
Thru	119	117	98	100	434
Lt	41	51	26	28	146

Total	1st	2nd	3rd	4th	
220	50	63	49	58	Lt
920	204	229	237	250	Thru
146	32	31	40	43	Rt

	Lt	Thru	Rt
1st	51	156	43
2nd	30	145	53
3rd	50	160	46
4th	37	122	51
Total	168	583	193

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: AZUZA

EAST-WEST STREET: ARROW HWY

TIME: 05:00PM-06:00PM DATE: 06-09-11

NORTH LEG

86	637	262	Total
26	157	57	1st
23	166	72	2nd
20	159	70	3rd
17	155	63	4th
Rt	Thru	Lt	

Rt	28	27	22	18	95
Thru	110	123	119	107	459
Lt	27	45	33	21	126
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
215	48	63	54	50	Lt
1129	300	248	260	321	Thru
135	40	36	31	28	Rt

	Lt	Thru	Rt
1st	38	103	53
2nd	46	126	66
3rd	44	128	60
4th	34	106	49
Total	162	463	228

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : AZUZA — IRWINDALE

EAST-WEST STREET : ARROW HWY — 06-09-11

BEGINNING TIME : 04:00PM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
						SB NORTH LEG						
13	148	31	1	4	0	0	0	0	0	0	0	197
25	169	43	0	2	2	0	0	0	0	0	0	241
32	142	46	0	1	0	0	0	0	0	2	0	223
29	146	54	0	2	0	0	1	0	0	1	0	233
26	153	54	0	3	3	0	0	0	0	1	0	240
23	165	72	0	1	0	0	0	0	0	0	0	261
20	157	70	0	2	0	0	0	0	0	0	0	249
17	154	62	0	1	1	0	0	0	0	0	0	235
				11		TT=11+0+0=11						
185	1234	432	1	16	6	0	1	0	0	4	0	1879
						NB SOUTH LEG						
42	153	49	1	3	1	0	0	0	0	0	1	250
52	140	30	1	3	0	0	1	0	0	1	0	228
46	154	49	0	4	0	0	2	1	0	0	0	256
50	120	37	1	1	0	0	1	0	0	0	0	210
53	99	38	0	4	0	0	0	0	0	0	0	194
64	125	46	2	1	0	0	0	0	0	0	0	238
59	127	44	1	1	0	0	0	0	0	0	0	232
48	106	34	1	0	0	0	0	0	0	0	0	189
				10		TT=10+0+0=10						
414	1024	327	7	17	1	0	4	1	0	1	1	1797
						WB EAST LEG						
30	117	41	0	1	0	0	0	0	0	1	0	190
36	111	50	1	5	0	0	0	0	0	1	1	205
34	94	26	1	2	0	0	2	0	0	0	0	159
21	97	28	1	2	0	0	1	0	0	0	0	150
28	107	26	0	3	1	0	0	0	0	0	0	165
26	121	45	0	2	0	1	0	0	0	0	0	195
22	117	33	0	1	0	0	0	0	0	1	0	174
18	105	21	0	2	0	0	0	0	0	0	0	146
				9		TT=9+1+1=11						
215	869	270	3	18	1	1	3	0	0	3	1	1384
						EB WEST LEG						
31	196	49	1	5	1	0	2	0	0	1	0	286
29	226	62	1	1	0	0	2	1	1	0	0	323
40	233	47	0	4	1	0	0	0	0	0	1	326
40	246	56	2	4	1	1	0	1	0	0	0	351
39	298	46	0	1	0	1	0	1	0	1	1	388
35	245	62	1	2	0	0	0	1	0	1	0	347
31	259	54	0	1	0	0	0	0	0	0	0	345
28	320	50	0	1	0	0	0	0	0	0	0	399
				6		TT=6+3+3=12						
273	2023	426	5	19	3	2	4	4	1	3	2	2765

Prepared by Newport Traffic Studies

HCM Signalized Intersection Capacity Analysis
16: Azusa Ave & Arrow Hwy

8/10/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	150	510	80	70	895	105	225	520	45	95	490	210
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	0.97	0.95		0.97	0.95	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.99		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3255		1719	3438	1538	3335	3410		3335	3283	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1719	3255		1719	3438	1538	3335	3410		3335	3283	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	176	600	94	82	1053	124	265	612	53	112	576	247
RTOR Reduction (vph)	0	16	0	0	0	62	0	8	0	0	63	0
Lane Group Flow (vph)	176	678	0	82	1053	62	265	657	0	112	760	0
Heavy Vehicles (%)	5%	10%	0%	5%	5%	5%	5%	5%	0%	5%	5%	5%
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						
Actuated Green, G (s)	8.0	25.9		6.9	24.8	24.8	7.0	24.6		3.2	20.8	
Effective Green, g (s)	8.0	25.9		6.9	24.8	24.8	7.0	24.6		3.2	20.8	
Actuated g/C Ratio	0.10	0.34		0.09	0.32	0.32	0.09	0.32		0.04	0.27	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	180	1101		155	1113	498	305	1095		139	891	
v/s Ratio Prot	c0.10	0.21		0.05	c0.31		c0.08	c0.19		0.03	c0.23	
v/s Ratio Perm						0.04						
v/c Ratio	0.98	0.62		0.53	0.95	0.12	0.87	0.60		0.81	0.85	
Uniform Delay, d1	34.2	21.2		33.3	25.2	18.2	34.3	21.9		36.4	26.4	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	59.9	1.0		3.2	15.6	0.1	22.1	2.4		27.7	10.1	
Delay (s)	94.1	22.2		36.5	40.9	18.4	56.4	24.3		64.1	36.6	
Level of Service	F	C		D	D	B	E	C		E	D	
Approach Delay (s)		36.8			38.4			33.4			39.9	
Approach LOS		D			D			C			D	

Intersection Summary			
HCM Average Control Delay	37.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	76.6	Sum of lost time (s)	20.0
Intersection Capacity Utilization	73.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	145	495	120	190	395	115	200	670	135	125	760	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	0.97	0.95		0.97	0.95	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.97		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3337		1641	3438	1538	3335	3352		3335	3378	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1719	3337		1641	3438	1538	3335	3352		3335	3378	
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	169	576	140	221	459	134	233	779	157	145	884	116
RTOR Reduction (vph)	0	30	0	0	0	103	0	24	0	0	14	0
Lane Group Flow (vph)	169	686	0	221	459	31	233	912	0	145	986	0
Heavy Vehicles (%)	5%	5%	5%	10%	5%	5%	5%	5%	5%	5%	5%	5%
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						
Actuated Green, G (s)	9.6	16.0		10.0	16.4	16.4	6.0	23.0		5.0	22.0	
Effective Green, g (s)	9.6	16.0		10.0	16.4	16.4	6.0	23.0		5.0	22.0	
Actuated g/C Ratio	0.14	0.23		0.14	0.23	0.23	0.09	0.33		0.07	0.31	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	236	763		234	805	360	286	1101		238	1062	
v/s Ratio Prot	0.10	c0.21		c0.13	0.13		c0.07	0.27		0.04	c0.29	
v/s Ratio Perm						0.02						
v/c Ratio	0.72	0.90		0.94	0.57	0.09	0.81	0.83		0.61	0.93	
Uniform Delay, d1	28.9	26.2		29.7	23.7	20.9	31.5	21.7		31.6	23.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	9.9	13.4		43.3	1.0	0.1	16.1	7.2		4.4	15.0	
Delay (s)	38.8	39.6		73.0	24.7	21.1	47.6	28.9		35.9	38.2	
Level of Service	D	D		E	C	C	D	C		D	D	
Approach Delay (s)		39.4			37.2			32.6			37.9	
Approach LOS		D			D			C			D	

Intersection Summary			
HCM Average Control Delay	36.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	71.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	215	1130	135	125	460	95	160	465	230	260	635	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	0.97	0.95		0.97	0.95	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.95		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3383		1719	3438	1538	3502	3267		3335	3396	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1719	3383		1719	3438	1538	3502	3267		3335	3396	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	224	1177	141	130	479	99	167	484	240	271	661	89
RTOR Reduction (vph)	0	12	0	0	0	72	0	82	0	0	14	0
Lane Group Flow (vph)	224	1306	0	130	479	27	167	642	0	271	736	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	0%	5%	5%	5%	5%	0%
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						
Actuated Green, G (s)	14.2	29.0		6.0	20.8	20.8	4.0	17.0		7.0	20.0	
Effective Green, g (s)	14.2	29.0		6.0	20.8	20.8	4.0	17.0		7.0	20.0	
Actuated g/C Ratio	0.19	0.39		0.08	0.28	0.28	0.05	0.23		0.09	0.27	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	325	1308		138	953	427	187	741		311	906	
v/s Ratio Prot	0.13	c0.39		c0.08	0.14		0.05	0.20		c0.08	c0.22	
v/s Ratio Perm						0.02						
v/c Ratio	0.69	1.00		0.94	0.50	0.06	0.89	0.87		0.87	0.81	
Uniform Delay, d1	28.3	23.0		34.3	22.8	19.9	35.3	27.9		33.6	25.7	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	6.0	24.3		58.8	0.4	0.1	37.3	13.0		22.4	7.9	
Delay (s)	34.3	47.3		93.2	23.2	20.0	72.6	40.9		55.9	33.6	
Level of Service	C	D		F	C	C	E	D		E	C	
Approach Delay (s)		45.4			35.6			46.8			39.5	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM Average Control Delay	42.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	83.4%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	200	510	80	70	895	105	225	520	45	95	490	210
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	0.97	0.95		0.97	0.95	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.99		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1399	3255		1719	3438	1538	3335	3410		3335	3283	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1399	3255		1719	3438	1538	3335	3410		3335	3283	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	235	600	94	82	1053	124	265	612	53	112	576	247
RTOR Reduction (vph)	0	16	0	0	0	62	0	8	0	0	63	0
Lane Group Flow (vph)	235	678	0	82	1053	62	265	657	0	112	760	0
Heavy Vehicles (%)	29%	10%	0%	5%	5%	5%	5%	5%	0%	5%	5%	5%
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						
Actuated Green, G (s)	8.0	25.9		6.9	24.8	24.8	7.0	24.6		3.2	20.8	
Effective Green, g (s)	8.0	25.9		6.9	24.8	24.8	7.0	24.6		3.2	20.8	
Actuated g/C Ratio	0.10	0.34		0.09	0.32	0.32	0.09	0.32		0.04	0.27	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	146	1101		155	1113	498	305	1095		139	891	
v/s Ratio Prot	c0.17	0.21		0.05	c0.31		c0.08	c0.19		0.03	c0.23	
v/s Ratio Perm						0.04						
v/c Ratio	1.61	0.62		0.53	0.95	0.12	0.87	0.60		0.81	0.85	
Uniform Delay, d1	34.3	21.2		33.3	25.2	18.2	34.3	21.9		36.4	26.4	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	303.7	1.0		3.2	15.6	0.1	22.1	2.4		27.7	10.1	
Delay (s)	338.0	22.2		36.5	40.9	18.4	56.4	24.3		64.1	36.6	
Level of Service	F	C		D	D	B	E	C		E	D	
Approach Delay (s)		102.1			38.4			33.4			39.9	
Approach LOS		F			D			C			D	

Intersection Summary			
HCM Average Control Delay	52.2	HCM Level of Service	D
HCM Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	76.6	Sum of lost time (s)	20.0
Intersection Capacity Utilization	75.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
16: Azusa Ave & Arrow Hwy

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	195	495	120	190	395	115	200	670	135	125	760	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	0.97	0.95		0.97	0.95	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.97		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1399	3337		1641	3438	1538	3335	3352		3335	3378	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1399	3337		1641	3438	1538	3335	3352		3335	3378	
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	227	576	140	221	459	134	233	779	157	145	884	116
RTOR Reduction (vph)	0	30	0	0	0	103	0	24	0	0	14	0
Lane Group Flow (vph)	227	686	0	221	459	31	233	912	0	145	986	0
Heavy Vehicles (%)	29%	5%	5%	10%	5%	5%	5%	5%	5%	5%	5%	5%
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						
Actuated Green, G (s)	10.0	16.0		10.0	16.0	16.0	6.0	23.0		5.0	22.0	
Effective Green, g (s)	10.0	16.0		10.0	16.0	16.0	6.0	23.0		5.0	22.0	
Actuated g/C Ratio	0.14	0.23		0.14	0.23	0.23	0.09	0.33		0.07	0.31	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	200	763		234	786	352	286	1101		238	1062	
v/s Ratio Prot	c0.16	c0.21		0.13	0.13		c0.07	0.27		0.04	c0.29	
v/s Ratio Perm						0.02						
v/c Ratio	1.14	0.90		0.94	0.58	0.09	0.81	0.83		0.61	0.93	
Uniform Delay, d1	30.0	26.2		29.7	24.0	21.3	31.5	21.7		31.6	23.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	104.7	13.4		43.3	1.1	0.1	16.1	7.2		4.4	15.0	
Delay (s)	134.7	39.6		73.0	25.1	21.4	47.6	28.9		35.9	38.2	
Level of Service	F	D		E	C	C	D	C		D	D	
Approach Delay (s)		62.5			37.5			32.6			37.9	
Approach LOS		E			D			C			D	

Intersection Summary			
HCM Average Control Delay	42.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	71.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	265	1130	135	125	460	95	160	465	230	260	635	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	0.97	0.95		0.97	0.95	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.95		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1467	3383		1719	3438	1538	3502	3267		3335	3396	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1467	3383		1719	3438	1538	3502	3267		3335	3396	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	276	1177	141	130	479	99	167	484	240	271	661	89
RTOR Reduction (vph)	0	12	0	0	0	74	0	82	0	0	14	0
Lane Group Flow (vph)	276	1306	0	130	479	25	167	642	0	271	736	0
Heavy Vehicles (%)	23%	5%	5%	5%	5%	5%	0%	5%	5%	5%	5%	0%
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						
Actuated Green, G (s)	16.3	29.0		6.0	18.7	18.7	4.0	17.0		7.0	20.0	
Effective Green, g (s)	16.3	29.0		6.0	18.7	18.7	4.0	17.0		7.0	20.0	
Actuated g/C Ratio	0.22	0.39		0.08	0.25	0.25	0.05	0.23		0.09	0.27	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	319	1308		138	857	383	187	741		311	906	
v/s Ratio Prot	c0.19	c0.39		0.08	0.14		0.05	0.20		c0.08	c0.22	
v/s Ratio Perm						0.02						
v/c Ratio	0.87	1.00		0.94	0.56	0.06	0.89	0.87		0.87	0.81	
Uniform Delay, d1	28.3	23.0		34.3	24.6	21.5	35.3	27.9		33.6	25.7	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	20.9	24.3		58.8	0.8	0.1	37.3	13.0		22.4	7.9	
Delay (s)	49.2	47.3		93.2	25.3	21.5	72.6	40.9		55.9	33.6	
Level of Service	D	D		F	C	C	E	D		E	C	
Approach Delay (s)		47.6			37.3			46.8			39.5	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM Average Control Delay	43.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	83.4%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
16: Azusa Ave & Arrow Hwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	220	555	85	75	975	115	245	565	50	105	535	225
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	0.97	0.95		0.97	0.95	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.99		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1399	3256		1719	3438	1538	3335	3409		3335	3285	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1399	3256		1719	3438	1538	3335	3409		3335	3285	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	259	653	100	88	1147	135	288	665	59	124	629	265
RTOR Reduction (vph)	0	15	0	0	0	62	0	9	0	0	62	0
Lane Group Flow (vph)	259	738	0	88	1147	73	288	715	0	124	832	0
Heavy Vehicles (%)	29%	10%	0%	5%	5%	5%	5%	5%	0%	5%	5%	5%
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						
Actuated Green, G (s)	8.0	25.9		6.9	24.8	24.8	7.0	23.0		4.0	20.0	
Effective Green, g (s)	8.0	25.9		6.9	24.8	24.8	7.0	23.0		4.0	20.0	
Actuated g/C Ratio	0.11	0.34		0.09	0.33	0.33	0.09	0.30		0.05	0.26	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	148	1113		156	1125	503	308	1034		176	867	
v/s Ratio Prot	c0.19	0.23		0.05	c0.33		c0.09	c0.21		0.04	c0.25	
v/s Ratio Perm						0.05						
v/c Ratio	1.75	0.66		0.56	1.02	0.15	0.94	0.69		0.70	0.96	
Uniform Delay, d1	33.9	21.2		33.0	25.5	18.0	34.2	23.3		35.3	27.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	363.8	1.5		4.6	31.8	0.1	34.4	3.8		12.1	22.2	
Delay (s)	397.7	22.7		37.6	57.3	18.1	68.5	27.1		47.4	49.7	
Level of Service	F	C		D	E	B	E	C		D	D	
Approach Delay (s)		118.7			52.2			38.9			49.5	
Approach LOS		F			D			D			D	

Intersection Summary			
HCM Average Control Delay	63.8	HCM Level of Service	E
HCM Volume to Capacity ratio	1.15		
Actuated Cycle Length (s)	75.8	Sum of lost time (s)	20.0
Intersection Capacity Utilization	81.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
16: Azusa Ave & Arrow Hwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	215	540	130	205	430	125	220	730	145	135	830	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	0.97	0.95		0.97	0.95	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1399	3338		1641	3438	1538	3335	3352		3335	3378	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1399	3338		1641	3438	1538	3335	3352		3335	3378	
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	250	628	151	238	500	145	256	849	169	157	965	128
RTOR Reduction (vph)	0	30	0	0	0	112	0	24	0	0	15	0
Lane Group Flow (vph)	250	749	0	238	500	33	256	994	0	157	1078	0
Heavy Vehicles (%)	29%	5%	5%	10%	5%	5%	5%	5%	5%	5%	5%	5%
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						
Actuated Green, G (s)	12.0	17.0		11.0	16.0	16.0	5.0	22.0		4.0	21.0	
Effective Green, g (s)	12.0	17.0		11.0	16.0	16.0	5.0	22.0		4.0	21.0	
Actuated g/C Ratio	0.17	0.24		0.16	0.23	0.23	0.07	0.31		0.06	0.30	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	240	811		258	786	352	238	1053		191	1013	
v/s Ratio Prot	c0.18	c0.22		0.15	0.15		c0.08	0.30		0.05	c0.32	
v/s Ratio Perm						0.02						
v/c Ratio	1.04	0.92		0.92	0.64	0.09	1.08	0.94		0.82	1.06	
Uniform Delay, d1	29.0	25.9		29.1	24.4	21.3	32.5	23.4		32.6	24.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	69.4	15.9		35.8	1.7	0.1	79.9	17.1		23.9	47.1	
Delay (s)	98.4	41.8		64.8	26.1	21.4	112.4	40.5		56.5	71.6	
Level of Service	F	D		E	C	C	F	D		E	E	
Approach Delay (s)		55.5			35.8			55.0			69.7	
Approach LOS		E			D			D			E	

Intersection Summary			
HCM Average Control Delay	55.4	HCM Level of Service	E
HCM Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	76.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
16: Azusa Ave & Arrow Hwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	290	1230	145	135	500	105	175	505	250	285	690	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	0.97	0.95		0.97	0.95	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.95		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1467	3384		1719	3438	1538	3502	3268		3335	3395	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1467	3384		1719	3438	1538	3502	3268		3335	3395	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	302	1281	151	141	521	109	182	526	260	297	719	99
RTOR Reduction (vph)	0	12	0	0	0	83	0	81	0	0	15	0
Lane Group Flow (vph)	302	1420	0	141	521	26	182	705	0	297	803	0
Heavy Vehicles (%)	23%	5%	5%	5%	5%	5%	0%	5%	5%	5%	5%	0%
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						
Actuated Green, G (s)	16.8	29.0		6.0	18.2	18.2	4.0	17.0		7.0	20.0	
Effective Green, g (s)	16.8	29.0		6.0	18.2	18.2	4.0	17.0		7.0	20.0	
Actuated g/C Ratio	0.22	0.39		0.08	0.24	0.24	0.05	0.23		0.09	0.27	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	329	1308		138	834	373	187	741		311	905	
v/s Ratio Prot	c0.21	c0.42		0.08	0.15		0.05	0.22		c0.09	c0.24	
v/s Ratio Perm						0.02						
v/c Ratio	0.92	1.09		1.02	0.62	0.07	0.97	0.95		0.95	0.89	
Uniform Delay, d1	28.4	23.0		34.5	25.4	21.9	35.4	28.6		33.8	26.4	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	29.2	51.5		82.5	1.5	0.1	57.6	23.1		38.8	12.6	
Delay (s)	57.7	74.5		117.0	26.8	22.0	93.1	51.7		72.6	39.0	
Level of Service	E	E		F	C	C	F	D		E	D	
Approach Delay (s)		71.6			42.6			59.4			48.0	
Approach LOS		E			D			E			D	

Intersection Summary			
HCM Average Control Delay	58.4	HCM Level of Service	E
HCM Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	89.5%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

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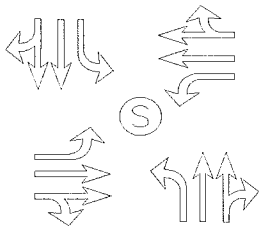
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : GLADSTONE STREET
N/S STREET : AZUSA AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 17
ROUTE 2B

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
GLADSTONE STREET						
EB LEFT	145	10%		145	15	160
EB THRU	160	5%		160	15	175
EB RIGHT	25	10%		25	5	30
WB LEFT	155	5%		155	15	170
WB THRU	825	5%		825	75	900
WB RIGHT	60	5%		60	5	65
AZUSA AVE						
NB LEFT	110	5%		110	10	120
NB THRU	660	5%	**50**	710	65	775
NB RIGHT	40	5%		40	5	45
SB LEFT	160	5%		160	15	175
SB THRU	630	5%		630	55	685
SB RIGHT	120	5%		120	10	130
TOTALS	**3090**		**50**	**3140**	**290**	**3430**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : GLADSTONE STREET
N/S STREET : AZUSA AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 17
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
GLADSTONE STREET						
EB LEFT	150	10%		150	15	165
EB THRU	195	5%		195	20	215
EB RIGHT	35	10%		35	5	40
WB LEFT	200	5%		200	20	220
WB THRU	180	5%		180	15	195
WB RIGHT	85	5%		85	5	90
AZUSA AVE						
NB LEFT	100	5%		100	10	110
NB THRU	740	5%	**50**	790	70	860
NB RIGHT	95	5%		95	10	105
SB LEFT	175	5%		175	15	190
SB THRU	765	5%		765	70	835
SB RIGHT	115	5%		115	10	125
TOTALS	**2835**		**50**	**2885**	**265**	**3150**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : GLADSTONE STREET
N/S STREET : AZUSA AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 17
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
GLADSTONE STREET						
EB LEFT	180	5%		180	15	195
EB THRU	670	5%		670	60	730
EB RIGHT	55	5%		55	5	60
WB LEFT	130	5%		130	10	140
WB THRU	255	5%		255	25	280
WB RIGHT	55	5%		55	5	60
AZUSA AVE						
NB LEFT	55	5%		55	5	60
NB THRU	685	5%	**50**	735	65	800
NB RIGHT	75	5%		75	5	80
SB LEFT	180	5%		180	15	195
SB THRU	825	5%		825	75	900
SB RIGHT	65	5%		65	5	70
TOTALS	**3230**		**50**	**3280**	**290**	**3570**

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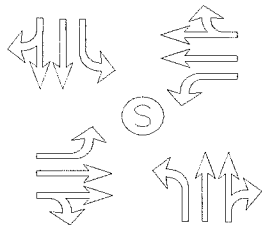
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : GLADSTONE STREET
N/S STREET : AZUSA AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 17
ROUTE 2B

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
GLADSTONE STREET								
EB LEFT	128	18	54	180	0	180	15	195
EB THRU	150	10	30	180	0	180	15	195
EB RIGHT	23	3	9	30	0	30	5	35
WB LEFT	155	1	3	160	0	160	15	175
WB THRU	810	14	42	850	0	850	75	925
WB RIGHT	54	4	12	65	0	65	5	70
AZUSA AVE								
NB LEFT	103	5	15	120	0	120	10	130
NB THRU	639	20	60	700	150	850	75	925
NB RIGHT	39	2	6	45	0	45	5	50
SB LEFT	147	11	33	180	0	180	15	195
SB THRU	598	33	99	695	0	695	65	760
SB RIGHT	115	6	18	135	0	135	10	145
TOTALS	**2961**				**150**	**3490**	**310**	**3800**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : GLADSTONE STREET
N/S STREET : AZUSA AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 17
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
GLADSTONE STREET								
EB LEFT	134	16	48	180	0	180	15	195
EB THRU	183	14	42	225	0	225	20	245
EB RIGHT	34	3	9	45	0	45	5	50
WB LEFT	194	5	15	210	0	210	20	230
WB THRU	168	13	39	205	0	205	20	225
WB RIGHT	82	3	9	90	0	90	10	100
AZUSA AVE								
NB LEFT	97	4	12	110	0	110	10	120
NB THRU	712	26	78	790	150	940	85	1025
NB RIGHT	92	3	9	100	0	100	10	110
SB LEFT	172	5	15	185	0	185	15	200
SB THRU	731	32	96	825	0	825	75	900
SB RIGHT	110	5	15	125	0	125	10	135
TOTALS	**2709**				**150**	**3240**	**295**	**3535**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : GLADSTONE STREET
N/S STREET : AZUSA AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 17
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
GLADSTONE STREET								
EB LEFT	176	6	18	195	**0**	195	20	215
EB THRU	661	11	33	695	**0**	695	65	760
EB RIGHT	57	0	0	55	**0**	55	5	60
WB LEFT	132	0	0	130	**0**	130	10	140
WB THRU	250	5	15	265	**0**	265	25	290
WB RIGHT	53	0	0	55	**0**	55	5	60
AZUSA AVE								
NB LEFT	56	1	3	60	**0**	60	5	65
NB THRU	676	11	33	710	**150**	860	75	935
NB RIGHT	75	1	3	80	**0**	80	5	85
SB LEFT	175	5	15	190	**0**	190	15	205
SB THRU	809	16	48	855	**0**	855	75	930
SB RIGHT	62	4	12	75	**0**	75	5	80
TOTALS	**3182**				**150**	**3515**	**310**	**3825**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: AZUZA
EAST-WEST STREET: GLADSTONE
JURISDICTION: IRWINDALE

DATE: 06-09-11

PEAK HOUR: 07:15AM

NORTH LEG (SB)

TOTAL: 910

Rt	Thru	Lt	
121 (120)	631 (630)	158 (160)	Total
16	75	28	1st
22	151	53	2nd
45	217	38	3rd
38	188	39	4th

TT = 50
TT% = 50/910 = 5.50% ≈ 6%

TT = 19
TT% = 19/1038 = 1.83% ≈ 2%

EAST LEG TOTAL: (WB) 1,038

	1st	2nd	3rd	4th	Total
Rt	10	13	16	19	60 58
Thru	250	231	198	145	825 824
Lt	23	35	60	38	155 156

Total	1st	2nd	3rd	4th	
146 (145)	25	37	49	35	Lt
160	38	38	29	55	Thru
26 (25)	7	4	10	5	Rt

WEST LEG TOTAL: (EB) 332

TT = 31
TT% = 31/332 = 9.34% ≈ 9%

PEAK HOUR FACTORS

NORTH LEG = 0.76
SOUTH LEG = 0.87
EAST LEG = 0.92
WEST LEG = 0.87

ALL LEGS = 0.86

	Lt	Thru	Rt
1st	24	131	5
2nd	20	184	9
3rd	37	183	13
4th	27	161	14
Total	108 (110)	659 (660)	41 (40)

TT = 27
TT% = 27/808 = 3.34% ≈ 3%

TOTAL: 808

SOUTH LEG (NB)

HOUR TOTAL: 3,088

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: AZUZA

EAST-WEST STREET: GLADSTONE

TIME: 07:00AM-08:00AM DATE: 06-09-11

NORTH LEG

Rt	Thru	Lt	
96	539	130	Total
13	96	11	1st
16	75	28	2nd
22	151	53	3rd
45	217	38	4th

	1st	2nd	3rd	4th	Total
Rt	17	10	13	16	56
Thru	235	250	231	198	914
Lt	26	23	35	60	144

Total	1st	2nd	3rd	4th	
132	21	25	37	49	Lt
125	20	38	38	29	Thru
24	3	7	4	10	Rt

	Lt	Thru	Rt
1st	18	131	8
2nd	24	131	5
3rd	20	184	9
4th	37	183	13
Total	99	629	35

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: AZUZA

EAST-WEST STREET: GLADSTONE

TIME: 08:00AM-09:00AM DATE: 06-09-11

NORTH LEG

86	547	133	Total
38	188	39	1st
20	127	32	2nd
20	126	38	3rd
8	106	24	4th
Rt	Thru	Lt	

Rt	19	18	16	19	72
Thru	145	164	92	72	473
Lt	38	22	20	25	105
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
120	35	34	27	24	Lt
158	55	36	35	32	Thru
33	5	9	4	15	Rt

	Lt	Thru	Rt
1st	27	161	14
2nd	22	118	17
3rd	22	136	17
4th	16	121	13
Total	87	536	61

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : AZUZA — IRWINDALE

EAST-WEST STREET : GLADSTONE — 06-09-11

BEGINNING TIME : 07:00AM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
				SB NORTH LEG								
12	91	9	1	2	1	0	2	0	0	1	1	120
14	68	24	0	6	2	0	0	1	2	1	1	119
21	142	50	0	7	2	1	0	0	0	2	1	226
44	206	38	1	8	0	0	1	0	0	2	0	300
36	182	35	1	6	3	0	0	0	1	0	1	265
19	121	26	0	4 (36)	5	1	1 (3)	0	0	1 (11)	1	179
19	122	37	0	3	0	1	1	0	0	0	1	184
5	99	22	2	6	1	0	0	1	1	1	0	138
						TT=36+3+11=50						
170	1031	241	5	42	14	3	5	2	4	8	6	1531
				NB SOUTH LEG								
7	125	18	1	5	0	0	0	0	0	1	0	157
4	124	24	0	5	0	1	1	0	0	1	0	160
9	181	19	0	3	1	0	0	0	0	0	0	213
13	177	34	0	5	2	0	1	1	0	0	0	233
13	157	26	1	4	1	0	0	0	0	0	0	202
17	114	20	0	3 (22)	2	0	0 (4)	0	0	1 (1)	0	157
14	127	20	3	8	2	0	0	0	0	1	0	175
13	116	16	0	5	0	0	0	0	0	0	0	150
						TT=22+4+1=27						
90	1121	177	5	38	8	1	2	1	0	4	0	1447
				WB EAST LEG								
17	231	24	0	4	2	0	0	0	0	0	0	278
9	247	23	0	3	0	0	0	0	1	0	0	283
13	226	34	0	5	1	0	0	0	0	0	0	279
14	196	60	2	1	0	0	1	0	0	0	0	274
18	141	38	1	4	0	0	0	0	0	0	0	202
18	160	21	0	3 (17)	1	0	1 (1)	0	0	0 (1)	0	204
16	88	20	0	4	0	0	0	0	0	0	0	128
15	69	23	3	2	1	0	1	0	1	0	1	116
						TT=17+1+1=19						
120	1358	243	6	26	5	0	3	0	2	0	1	1764
				EB WEST LEG								
3	16	19	0	3	1	0	1	0	0	0	1	44
5	37	24	2	1	1	0	0	0	0	0	0	70
4	36	28	0	2	5	0	0	2	0	0	2	79
10	24	44	0	5	3	0	0	1	0	0	1	88
4	53	32	1	2	1	0	0	1	0	0	1	95
9	35	30	0	1 (23)	2	0	0 (4)	1	0	0 (4)	1	79
2	33	25	2	2	1	0	0	0	0	0	1	66
13	29	23	1	2	0	1	0	0	0	1	1	71
						TT=23+4+4=31						
50	263	225	6	18	14	1	1	5	0	1	8	592

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: AZUZA
EAST-WEST STREET: GLADSTONE
JURISDICTION: IRWINDALE

DATE: 06-09-11

PEAK HOUR: 12:15PM

NORTH LEG (SB)

TOTAL: 1,055

115	763 765	177 175	Total
65	149	55	1st
19	191	39	2nd
14	223	53	3rd
17	200	30	4th
Rt	Thru	Lt	

TT = 42
TT% = 42/1055 = 3.98% ≈ 4%

TT = 21
TT% = 21/465 = 4.52% ≈ 5%

EAST LEG TOTAL: (WB) 465

Rt	35	15	17	18	85
Thru	39	41	37	64	180 181
Lt	82	27	34	56	200 199
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
150	50	31	30	39	Lt
200 197	48	43	35	71	Thru
40 37	9	8	12	8	Rt

WEST LEG TOTAL: (EB) 384

TT = 33
TT% = 33/384 = 8.6% ≈ 9%

	Lt	Thru	Rt
1st	34	252	30
2nd	17	132	26
3rd	25	179	18
4th	25	175	21
Total	100 101	740 738	95

SOUTH LEG (NB)

PEAK HOUR FACTORS

NORTH LEG = 0.91
SOUTH LEG = 0.74
EAST LEG = 0.75
WEST LEG = 0.81

ALL LEGS = 0.84

TT = 33
TT% = 33/934 = 3.53% ≈ 4%

TOTAL: 934

HOUR TOTAL: 2,838

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: AZUZA

EAST-WEST STREET: GLADSTONE

TIME: 12:00PM-01:00PM DATE: 06-09-11

NORTH LEG

Rt	Thru	Lt	
113	705	184	Total
15	142	37	1st
65	149	55	2nd
19	191	39	3rd
14	223	53	4th

	1st	2nd	3rd	4th	Total
Rt	17	35	15	17	84
Thru	48	39	41	37	165
Lt	40	82	27	34	183

Total	1st	2nd	3rd	4th	
149	38	50	31	30	Lt
157	31	48	43	35	Thru
36	7	9	8	12	Rt

	Lt	Thru	Rt
1st	7	127	14
2nd	34	252	30
3rd	17	132	26
4th	25	179	18
Total	83	690	88

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: AZUZA

EAST-WEST STREET: GLADSTONE

TIME: 01:00PM-02:00PM DATE: 06-09-11

NORTH LEG

Rt	Thru	Lt	
59	761	164	Total
17	200	30	1st
13	170	44	2nd
19	195	41	3rd
10	196	49	4th

	1st	2nd	3rd	4th	Total
Rt	18	18	21	24	81
Thru	64	45	55	27	191
Lt	56	36	27	26	145

Total	1st	2nd	3rd	4th	
139	39	29	32	39	Lt
235	71	50	54	60	Thru
39	8	6	14	11	Rt

	Lt	Thru	Rt
1st	25	175	21
2nd	25	164	19
3rd	22	139	21
4th	30	189	26
Total	102	667	87

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : AZUZA — IRWINDALE

EAST-WEST STREET : GLADSTONE — 06-09-11

BEGINNING TIME : 12:00PM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
							SB NORTH LEG					
15	134	37	0	6	0	0	1	0	0	1	0	194
64	143	54	1	5	1	0	1	0	0	0	0	269
17	186	35	2	3	4	0	1	0	0	1	0	249
14	214	53	0	7	0	0	0	0	0	2	0	290
15	188	30	1	7	0	0	4	0	1	1	0	247
9	161	44	3	8 31	0	0	1 6	0	1	0 5	0	227
18	187	40	1	6	1	0	2	0	0	0	0	255
10	190	49	0	5	0	0	1	0	0	0	0	255
						TT= 31+6+5 = 42						
162	1403	342	8	47	6	0	11	0	2	5	0	1986
							NB SOUTH LEG					
13	125	7	1	1	0	0	1	0	0	0	0	148
30	247	34	0	4	0	0	1	0	0	0	0	316
26	124	17	0	5	0	0	1	0	0	2	0	175
16	174	25	2	4	0	0	1	0	0	0	0	222
20	167	21	0	6	2	1	1	1	0	1	1	221
17	157	24	2	5 23	1	0	1 6	0	0	1 4	0	208
21	128	21	0	3	1	0	6	0	0	2	0	182
26	180	30	0	4	0	0	3	0	0	2	0	245
						TT=23+6+4 = 33						
169	1302	179	5	32	4	1	15	1	0	8	1	1717
							WB EAST LEG					
16	45	37	1	3	3	0	0	0	0	0	0	105
35	37	82	0	1	0	0	0	0	0	1	0	156
13	38	26	1	3	1	1	0	0	0	0	0	83
16	34	33	0	3	1	0	0	0	1	0	0	88
18	59	53	0	5	3	0	0	0	0	0	0	138
17	43	36	1	2 18	0	0	0 1	0	0	0 2	0	99
21	53	27	0	2	0	0	0	0	0	0	0	103
24	24	26	0	3	0	0	0	0	0	0	0	77
						TT= 18+1+2 = 21						
160	333	320	3	22	8	1	0	0	1	1	0	849
							EB WEST LEG					
7	29	38	0	2	0	0	0	0	0	0	0	76
9	46	49	0	2	1	0	0	0	0	0	0	107
8	37	27	0	5	1	0	1	1	0	0	2	82
11	34	27	1	1	2	0	0	0	0	0	1	77
6	66	31	2	5	6	0	0	1	0	0	1	118
5	48	27	1	2 26	1	0	0 3	0	0	0 4	1	85
13	51	29	1	3	2	0	0	1	0	0	0	100
11	57	33	0	3	2	0	0	1	0	0	3	110
						TT= 26+3+4 = 33						
70	368	261	5	23	15	0	1	4	0	0	8	755

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: AZUZA
EAST-WEST STREET: GLADSTONE
JURISDICTION: IRWINDALE

DATE: 06-09-11

PEAK HOUR: 04:45PM

NORTH LEG (SB)

TOTAL: 1,071

TT = 25

TT% = 25/1071 = 2.33% ≈ 2%

Rt	Thru	Lt	
66 (65)	825	180	Total
12	200	54	1st
19	183	36	2nd
17	224	48	3rd
18	218	42	4th

TT = 5

TT% = 5/440 = 1.14% ≈ 1%

EAST LEG TOTAL: (WB) 440

	1st	2nd	3rd	4th	Total
Rt	18	14	11	10	53 (55)
Thru	32	89	70	64	255
Lt	33	40	31	28	132 (130)

Total	1st	2nd	3rd	4th	
182 (180)	40	59	43	40	Lt
672 (670)	166	179	168	159	Thru
57 (55)	18	18	10	11	Rt

WEST LEG TOTAL: (EB) 911

TT = 17

TT% = 17/911 = 1.87% ≈ 2%

	Lt	Thru	Rt	
1st	25	210	14	
2nd	12	142	20	
3rd	11	172	25	
4th	9	163	17	
Total	57 (55)	687 (685)	76 (75)	

SOUTH LEG (NB)

PEAK HOUR FACTORS

NORTH LEG = 0.93
SOUTH LEG = 0.82
EAST LEG = 0.77
WEST LEG = 0.89

ALL LEGS = 0.98

TT = 13

TT% = 13/820 = 1.59% ≈ 2%

TOTAL: 820

HOUR TOTAL: 3,242

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: AZUZA

EAST-WEST STREET: GLADSTONE

TIME: 04:00PM-05:00PM DATE: 06-09-11

NORTH LEG

70	722	166	Total
18	161	37	1st
7	232	45	2nd
33	129	30	3rd
12	200	54	4th
Rt	Thru	Lt	

Rt	11	7	2	18	38
Thru	36	30	54	32	152
Lt	38	50	29	33	150
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
185	56	51	38	40	Lt
598	172	133	127	166	Thru
47	11	13	5	18	Rt

	Lt	Thru	Rt
1st	15	151	31
2nd	10	190	24
3rd	39	96	15
4th	25	210	14
Total	89	647	84

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: AZUZA

EAST-WEST STREET: GLADSTONE

TIME: 05:00PM-06:00PM DATE: 06-09-11

NORTH LEG

69	822	165	Total
19	183	36	1st
17	224	48	2nd
18	218	42	3rd
15	197	39	4th
Rt	Thru	Lt	

Rt	14	11	10	7	42
Thru	89	70	64	52	275
Lt	40	31	28	19	118
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
180	59	43	40	38	Lt
656	179	168	159	150	Thru
48	18	10	11	9	Rt

	Lt	Thru	Rt
1st	12	142	20
2nd	11	172	25
3rd	9	163	17
4th	6	149	12
Total	38	626	74

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : AZUZA — IRWINDALE

EAST-WEST STREET : GLADSTONE — 06-09-11

BEGINNING TIME : 04:00PM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
						SB NORTH LEG						
18	154	37	0	7	0	0	0	0	0	0	0	216
6	229	45	0	2	0	1	0	0	0	1	0	284
32	126	30	0	3	0	1	0	0	0	0	0	192
10	196	52	1	2	2	1	1	0	0	1	0	266
18	177	35	0	5	1	1	0	0	0	1	0	238
16	220	46	0	3	1	0	0	1	1	1	0	289
18	216	42	0	2	0	0	0	0	0	0	0	278
15	195	38	0	1 17	1	0	1 4	0	0	0 4	0	251
						TT = 17+4+4 = 25						
133	1513	325	1	25	5	4	2	1	1	4	0	2014
						NB SOUTH LEG						
30	149	14	1	2	1	0	0	0	0	0	0	197
24	186	10	0	2	0	0	1	0	0	1	0	224
15	91	39	0	3	0	0	1	0	0	1	0	150
14	206	24	0	2	1	0	1	0	0	1	0	249
19	140	12	1	2	0	0	0	0	0	0	0	174
25	169	11	0	3	0	0	0	0	0	0	0	208
17	161	9	0	2	0	0	0	0	0	0	0	189
12	148	6	0	1 11	0	0	0 1	0	0	0 1	0	167
						TT = 11+1+1 = 13						
156	1250	125	2	17	2	0	3	0	0	3	0	1558
						WB EAST LEG						
11	33	37	0	3	1	0	0	0	0	0	0	85
7	30	50	0	0	0	0	0	0	0	0	0	87
2	52	29	0	2	0	0	0	0	0	0	0	85
18	31	33	0	1	0	0	0	0	0	0	0	83
14	86	40	0	1	0	0	1	0	0	1	0	143
11	69	31	0	1	0	0	0	0	0	0	0	112
10	64	28	0	0	0	0	0	0	0	0	0	102
7	51	19	0	1 3	0	0	0 1	0	0	0 1	0	78
						TT = 3+1+1 = 5						
80	416	267	0	9	1	0	1	0	0	1	0	775
						EB WEST LEG						
10	169	53	1	3	1	0	0	1	0	0	1	239
13	133	48	0	0	3	0	0	0	0	0	0	197
4	125	36	1	2	2	0	0	0	0	0	0	170
18	162	39	0	2	1	0	1	0	0	1	0	224
18	175	58	0	2	1	0	1	0	0	1	0	256
10	166	39	0	2	0	0	0	2	0	0	2	221
11	158	40	0	1	0	0	0	0	0	0	0	210
9	149	38	0	1 9	0	0	0 4	0	0	0 4	0	197
						TT = 9+4+4 = 17						
93	1237	351	2	13	8	0	2	3	0	2	3	1714

Prepared by Newport Traffic Studies

HCM Signalized Intersection Capacity Analysis
17: Azusa Ave & Gladstone St

8/10/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	145	160	25	155	825	60	110	660	40	160	630	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.98		1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1641	3347		1719	3403		1719	3438	1538	1719	3438	1538
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1641	3347		1719	3403		1719	3438	1538	1719	3438	1538
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	169	186	29	180	959	70	128	767	47	186	733	140
RTOR Reduction (vph)	0	14	0	0	6	0	0	0	27	0	0	99
Lane Group Flow (vph)	169	201	0	180	1023	0	128	767	20	186	733	41
Heavy Vehicles (%)	10%	5%	10%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			6
Actuated Green, G (s)	10.9	25.3		13.6	28.0		8.8	24.0	24.0	11.0	26.2	26.2
Effective Green, g (s)	10.9	25.3		13.6	28.0		8.8	24.0	24.0	11.0	26.2	26.2
Actuated g/C Ratio	0.12	0.28		0.15	0.31		0.10	0.27	0.27	0.12	0.29	0.29
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	199	942		260	1060		168	918	411	210	1002	448
v/s Ratio Prot	c0.10	0.06		0.10	c0.30		0.07	c0.22		c0.11	0.21	
v/s Ratio Perm									0.01			0.03
v/c Ratio	0.85	0.21		0.69	0.96		0.76	0.84	0.05	0.89	0.73	0.09
Uniform Delay, d1	38.7	24.7		36.2	30.5		39.5	31.1	24.5	38.8	28.7	23.2
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	27.1	0.1		7.7	19.5		18.3	8.9	0.2	32.8	4.7	0.4
Delay (s)	65.8	24.8		43.9	50.0		57.8	40.0	24.7	71.6	33.4	23.6
Level of Service	E	C		D	D		E	D	C	E	C	C
Approach Delay (s)		42.8			49.1			41.6			38.8	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM Average Control Delay	43.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	89.9	Sum of lost time (s)	16.0
Intersection Capacity Utilization	73.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	150	195	35	200	180	85	100	740	95	175	765	115
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.98		1.00	0.95		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1641	3335		1719	3273		1719	3438	1538	1719	3438	1538
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1641	3335		1719	3273		1719	3438	1538	1719	3438	1538
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	179	232	42	238	214	101	119	881	113	208	911	137
RTOR Reduction (vph)	0	20	0	0	74	0	0	0	61	0	0	82
Lane Group Flow (vph)	179	254	0	238	241	0	119	881	52	208	911	55
Heavy Vehicles (%)	10%	5%	10%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			6
Actuated Green, G (s)	11.3	11.0		12.0	11.7		6.3	25.8	25.8	11.0	30.5	30.5
Effective Green, g (s)	11.3	11.0		12.0	11.7		6.3	25.8	25.8	11.0	30.5	30.5
Actuated g/C Ratio	0.15	0.15		0.16	0.15		0.08	0.34	0.34	0.15	0.40	0.40
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	245	484		272	505		143	1170	523	249	1383	619
v/s Ratio Prot	0.11	c0.08		c0.14	0.07		0.07	c0.26		c0.12	0.26	
v/s Ratio Perm									0.03			0.04
v/c Ratio	0.73	0.53		0.88	0.48		0.83	0.75	0.10	0.84	0.66	0.09
Uniform Delay, d1	30.8	30.0		31.2	29.3		34.2	22.2	17.1	31.5	18.4	14.0
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	10.7	1.0		25.3	0.7		31.9	4.5	0.4	20.8	2.5	0.3
Delay (s)	41.5	31.0		56.5	30.0		66.2	26.7	17.5	52.4	20.9	14.3
Level of Service	D	C		E	C		E	C	B	D	C	B
Approach Delay (s)		35.1			41.4			30.0			25.4	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM Average Control Delay	30.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	75.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	61.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
17: Azusa Ave & Gladstone St

8/10/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	180	670	55	130	255	55	55	685	75	180	825	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.99		1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	3411		1805	3375		1719	3438	1538	1719	3438	1538
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1719	3411		1805	3375		1719	3438	1538	1719	3438	1538
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	184	684	56	133	260	56	56	699	77	184	842	66
RTOR Reduction (vph)	0	10	0	0	29	0	0	0	55	0	0	41
Lane Group Flow (vph)	184	730	0	133	287	0	56	699	22	184	842	25
Heavy Vehicles (%)	5%	5%	0%	0%	5%	0%	5%	5%	5%	5%	5%	5%
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			6
Actuated Green, G (s)	8.0	17.6		5.4	15.0		2.3	18.7	18.7	8.0	24.4	24.4
Effective Green, g (s)	8.0	17.6		5.4	15.0		2.3	18.7	18.7	8.0	24.4	24.4
Actuated g/C Ratio	0.12	0.27		0.08	0.23		0.04	0.28	0.28	0.12	0.37	0.37
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	209	914		148	771		60	979	438	209	1277	571
v/s Ratio Prot	c0.11	c0.21		0.07	0.09		0.03	0.20		c0.11	c0.24	
v/s Ratio Perm									0.01			0.02
v/c Ratio	0.88	0.80		0.90	0.37		0.93	0.71	0.05	0.88	0.66	0.04
Uniform Delay, d1	28.4	22.4		29.9	21.4		31.6	21.1	17.1	28.4	17.2	13.2
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	32.1	4.9		44.8	0.3		91.8	4.4	0.2	32.1	2.7	0.1
Delay (s)	60.5	27.4		74.7	21.7		123.5	25.5	17.3	60.5	19.9	13.3
Level of Service	E	C		E	C		F	C	B	E	B	B
Approach Delay (s)		33.9			37.4			31.4			26.3	
Approach LOS		C			D			C			C	

Intersection Summary			
HCM Average Control Delay	31.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	65.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	69.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	145	160	25	155	825	60	110	710	40	160	630	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.98		1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1641	3347		1719	3403		1719	3223	1538	1719	3438	1538
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1641	3347		1719	3403		1719	3223	1538	1719	3438	1538
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	169	186	29	180	959	70	128	826	47	186	733	140
RTOR Reduction (vph)	0	14	0	0	6	0	0	0	25	0	0	99
Lane Group Flow (vph)	169	201	0	180	1023	0	128	826	22	186	733	41
Heavy Vehicles (%)	10%	5%	10%	5%	5%	5%	5%	12%	5%	5%	5%	5%
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			6
Actuated Green, G (s)	10.9	25.3		13.6	28.0		8.8	24.0	24.0	11.0	26.2	26.2
Effective Green, g (s)	10.9	25.3		13.6	28.0		8.8	24.0	24.0	11.0	26.2	26.2
Actuated g/C Ratio	0.12	0.28		0.15	0.31		0.10	0.27	0.27	0.12	0.29	0.29
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	199	942		260	1060		168	860	411	210	1002	448
v/s Ratio Prot	c0.10	0.06		0.10	c0.30		0.07	c0.26		c0.11	0.21	
v/s Ratio Perm									0.01			0.03
v/c Ratio	0.85	0.21		0.69	0.96		0.76	0.96	0.05	0.89	0.73	0.09
Uniform Delay, d1	38.7	24.7		36.2	30.5		39.5	32.5	24.5	38.8	28.7	23.2
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	27.1	0.1		7.7	19.5		18.3	22.5	0.2	32.8	4.7	0.4
Delay (s)	65.8	24.8		43.9	50.0		57.8	55.0	24.8	71.6	33.4	23.6
Level of Service	E	C		D	D		E	D	C	E	C	C
Approach Delay (s)		42.8			49.1			53.9			38.8	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM Average Control Delay	46.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	89.9	Sum of lost time (s)	16.0
Intersection Capacity Utilization	74.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
17: Azusa Ave & Gladstone St

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	150	195	35	200	180	85	100	790	95	175	765	115
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.98		1.00	0.95		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1641	3335		1719	3273		1719	3252	1538	1719	3438	1538
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1641	3335		1719	3273		1719	3252	1538	1719	3438	1538
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	179	232	42	238	214	101	119	940	113	208	911	137
RTOR Reduction (vph)	0	20	0	0	74	0	0	0	57	0	0	82
Lane Group Flow (vph)	179	254	0	238	241	0	119	940	56	208	911	55
Heavy Vehicles (%)	10%	5%	10%	5%	5%	5%	5%	11%	5%	5%	5%	5%
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			6
Actuated Green, G (s)	11.3	11.0		12.0	11.7		6.3	25.8	25.8	11.0	30.5	30.5
Effective Green, g (s)	11.3	11.0		12.0	11.7		6.3	25.8	25.8	11.0	30.5	30.5
Actuated g/C Ratio	0.15	0.15		0.16	0.15		0.08	0.34	0.34	0.15	0.40	0.40
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	245	484		272	505		143	1107	523	249	1383	619
v/s Ratio Prot	0.11	c0.08		c0.14	0.07		0.07	c0.29		c0.12	0.26	
v/s Ratio Perm									0.04			0.04
v/c Ratio	0.73	0.53		0.88	0.48		0.83	0.85	0.11	0.84	0.66	0.09
Uniform Delay, d1	30.8	30.0		31.2	29.3		34.2	23.2	17.1	31.5	18.4	14.0
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	10.7	1.0		25.3	0.7		31.9	8.2	0.4	20.8	2.5	0.3
Delay (s)	41.5	31.0		56.5	30.0		66.2	31.4	17.5	52.4	20.9	14.3
Level of Service	D	C		E	C		E	C	B	D	C	B
Approach Delay (s)		35.1			41.4			33.6			25.4	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM Average Control Delay	32.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	75.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	62.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	180	670	55	130	255	55	55	735	75	180	825	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.99		1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	3411		1805	3375		1719	3252	1538	1719	3438	1538
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1719	3411		1805	3375		1719	3252	1538	1719	3438	1538
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	184	684	56	133	260	56	56	750	77	184	842	66
RTOR Reduction (vph)	0	10	0	0	29	0	0	0	55	0	0	41
Lane Group Flow (vph)	184	730	0	133	287	0	56	750	22	184	842	25
Heavy Vehicles (%)	5%	5%	0%	0%	5%	0%	5%	11%	5%	5%	5%	5%
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			6
Actuated Green, G (s)	8.0	17.6		5.4	15.0		2.3	18.7	18.7	8.0	24.4	24.4
Effective Green, g (s)	8.0	17.6		5.4	15.0		2.3	18.7	18.7	8.0	24.4	24.4
Actuated g/C Ratio	0.12	0.27		0.08	0.23		0.04	0.28	0.28	0.12	0.37	0.37
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	209	914		148	771		60	926	438	209	1277	571
v/s Ratio Prot	c0.11	c0.21		0.07	0.09		0.03	c0.23		c0.11	0.24	
v/s Ratio Perm									0.01			0.02
v/c Ratio	0.88	0.80		0.90	0.37		0.93	0.81	0.05	0.88	0.66	0.04
Uniform Delay, d1	28.4	22.4		29.9	21.4		31.6	21.8	17.1	28.4	17.2	13.2
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	32.1	4.9		44.8	0.3		91.8	7.6	0.2	32.1	2.7	0.1
Delay (s)	60.5	27.4		74.7	21.7		123.5	29.5	17.3	60.5	19.9	13.3
Level of Service	E	C		E	C		F	C	B	E	B	B
Approach Delay (s)		33.9			37.4			34.4			26.3	
Approach LOS		C			D			C			C	

Intersection Summary			
HCM Average Control Delay	32.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	65.7	Sum of lost time (s)	16.0
Intersection Capacity Utilization	71.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
17: Azusa Ave & Gladstone St

8/14/2012

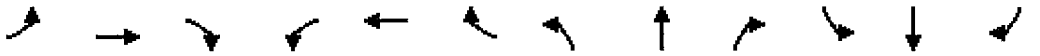
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	160	175	25	170	900	65	120	775	45	175	685	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.98		1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1641	3354		1719	3403		1719	3223	1538	1719	3438	1538
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1641	3354		1719	3403		1719	3223	1538	1719	3438	1538
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	186	203	29	198	1047	76	140	901	52	203	797	151
RTOR Reduction (vph)	0	12	0	0	6	0	0	0	26	0	0	107
Lane Group Flow (vph)	186	220	0	198	1117	0	140	901	26	203	797	44
Heavy Vehicles (%)	10%	5%	10%	5%	5%	5%	5%	12%	5%	5%	5%	5%
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			6
Actuated Green, G (s)	11.0	24.9		14.1	28.0		9.0	24.0	24.0	11.0	26.0	26.0
Effective Green, g (s)	11.0	24.9		14.1	28.0		9.0	24.0	24.0	11.0	26.0	26.0
Actuated g/C Ratio	0.12	0.28		0.16	0.31		0.10	0.27	0.27	0.12	0.29	0.29
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	201	928		269	1059		172	859	410	210	993	444
v/s Ratio Prot	c0.11	0.07		0.12	c0.33		0.08	c0.28		c0.12	0.23	
v/s Ratio Perm									0.02			0.03
v/c Ratio	0.93	0.24		0.74	1.05		0.81	1.05	0.06	0.97	0.80	0.10
Uniform Delay, d1	39.1	25.2		36.2	31.0		39.7	33.0	24.6	39.3	29.6	23.4
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	42.7	0.1		10.0	43.2		24.6	44.3	0.3	52.0	6.8	0.4
Delay (s)	81.7	25.3		46.2	74.2		64.3	77.3	24.9	91.4	36.5	23.9
Level of Service	F	C		D	E		E	E	C	F	D	C
Approach Delay (s)		50.4			70.0			73.2			44.5	
Approach LOS		D			E			E			D	

Intersection Summary			
HCM Average Control Delay	61.5	HCM Level of Service	E
HCM Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	80.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
17: Azusa Ave & Gladstone St

8/14/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	165	215	40	220	195	95	110	860	105	190	835	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.98		1.00	0.95		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1641	3332		1719	3269		1719	3252	1538	1719	3438	1538
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1641	3332		1719	3269		1719	3252	1538	1719	3438	1538
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	196	256	48	262	232	113	131	1024	125	226	994	149
RTOR Reduction (vph)	0	20	0	0	77	0	0	0	59	0	0	94
Lane Group Flow (vph)	196	284	0	262	268	0	131	1024	66	226	994	55
Heavy Vehicles (%)	10%	5%	10%	5%	5%	5%	5%	11%	5%	5%	5%	5%
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			6
Actuated Green, G (s)	11.6	11.8		12.0	12.2		7.9	25.0	25.0	11.0	28.1	28.1
Effective Green, g (s)	11.6	11.8		12.0	12.2		7.9	25.0	25.0	11.0	28.1	28.1
Actuated g/C Ratio	0.15	0.16		0.16	0.16		0.10	0.33	0.33	0.15	0.37	0.37
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	251	519		272	526		179	1073	507	249	1275	570
v/s Ratio Prot	0.12	c0.09		c0.15	0.08		0.08	c0.31		c0.13	c0.29	
v/s Ratio Perm									0.04			0.04
v/c Ratio	0.78	0.55		0.96	0.51		0.73	0.95	0.13	0.91	0.78	0.10
Uniform Delay, d1	30.9	29.5		31.7	29.1		32.9	24.8	17.8	31.9	21.1	15.6
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	14.5	1.2		44.2	0.8		14.3	18.5	0.5	33.2	4.8	0.3
Delay (s)	45.4	30.7		75.9	29.8		47.2	43.3	18.3	65.1	25.9	15.9
Level of Service	D	C		E	C		D	D	B	E	C	B
Approach Delay (s)		36.5			49.7			41.3			31.3	
Approach LOS		D			D			D			C	

Intersection Summary			
HCM Average Control Delay	38.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	75.8	Sum of lost time (s)	20.0
Intersection Capacity Utilization	67.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
17: Azusa Ave & Gladstone St

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	195	730	60	140	280	60	60	800	80	195	900	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.99		1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	3411		1805	3376		1719	3252	1538	1719	3438	1538
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1719	3411		1805	3376		1719	3252	1538	1719	3438	1538
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	199	745	61	143	286	61	61	816	82	199	918	71
RTOR Reduction (vph)	0	10	0	0	28	0	0	0	59	0	0	45
Lane Group Flow (vph)	199	796	0	143	319	0	61	816	23	199	918	26
Heavy Vehicles (%)	5%	5%	0%	0%	5%	0%	5%	11%	5%	5%	5%	5%
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			6
Actuated Green, G (s)	8.0	17.0		7.0	16.0		2.4	18.6	18.6	8.0	24.2	24.2
Effective Green, g (s)	8.0	17.0		7.0	16.0		2.4	18.6	18.6	8.0	24.2	24.2
Actuated g/C Ratio	0.12	0.26		0.11	0.24		0.04	0.28	0.28	0.12	0.36	0.36
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	206	871		190	811		62	908	430	206	1249	559
v/s Ratio Prot	c0.12	c0.23		0.08	0.09		0.04	c0.25		c0.12	0.27	
v/s Ratio Perm									0.01			0.02
v/c Ratio	0.97	0.91		0.75	0.39		0.98	0.90	0.05	0.97	0.73	0.05
Uniform Delay, d1	29.2	24.1		29.0	21.2		32.1	23.1	17.6	29.2	18.4	13.7
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	52.5	13.9		15.4	0.3		108.0	13.6	0.2	52.5	3.9	0.2
Delay (s)	81.6	38.0		44.4	21.5		140.1	36.6	17.8	81.6	22.3	13.9
Level of Service	F	D		D	C		F	D	B	F	C	B
Approach Delay (s)		46.6			28.2			41.6			31.7	
Approach LOS		D			C			D			C	

Intersection Summary			
HCM Average Control Delay	38.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	66.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	76.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

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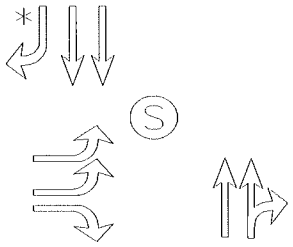
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : I-210 FWY EB RAMPS
N/S STREET : AZUSA AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 18
ROUTE 2B

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY EB RAMPS						
EB LEFT	250	5%		250	25	275
EB THRU	0	0%		0	0	0
EB RIGHT	235	5%		235	20	255
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
AZUSA AVE						
NB LEFT	0	0%		0	0	0
NB THRU	660	5%	**50**	710	65	775
NB RIGHT	195	10%		195	20	215
SB LEFT	0	0%		0	0	0
SB THRU	740	5%		740	65	805
SB RIGHT	210	10%		210	20	230
TOTALS	**2290**		**50**	**2340**	**215**	**2555**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : I-210 FWY EB RAMPS
N/S STREET : AZUSA AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 18
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY EB RAMPS						
EB LEFT	280	5%		280	25	305
EB THRU	0	0%		0	0	0
EB RIGHT	260	5%		260	25	285
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
AZUSA AVE						
NB LEFT	0	0%		0	0	0
NB THRU	815	5%	**50**	865	80	945
NB RIGHT	215	5%		215	20	235
SB LEFT	0	0%		0	0	0
SB THRU	720	5%		720	65	785
SB RIGHT	170	10%		170	15	185
TOTALS	**2460**		**50**	**2510**	**230**	**2740**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : I-210 FWY EB RAMPS
N/S STREET : AZUSA AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 18
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY EB RAMPS						
EB LEFT	225	5%		225	20	245
EB THRU	0	0%		0	0	0
EB RIGHT	215	5%		215	20	235
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
AZUSA AVE						
NB LEFT	0	0%		0	0	0
NB THRU	640	5%	**50**	690	60	750
NB RIGHT	245	5%		245	20	265
SB LEFT	0	0%		0	0	0
SB THRU	800	5%		800	70	870
SB RIGHT	190	5%		190	15	205
TOTALS	**2315**		**50**	**2365**	**205**	**2570**

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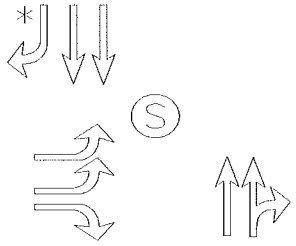
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : I-210 FWY EB RAMPS
N/S STREET : AZUSA AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 18
ROUTE 2B

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY EB RAMPS								
EB LEFT	243	8	24	265	**0**	265	25	290
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	224	10	30	255	**0**	255	25	280
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
AZUSA AVE								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	616	42	126	740	**150**	890	80	970
NB RIGHT	180	15	45	225	**0**	225	20	245
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	701	38	114	815	**0**	815	75	890
SB RIGHT	194	16	48	240	**0**	240	20	260
TOTALS	**2158**				**150**	**2690**	**245**	**2935**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : I-210 FWY EB RAMPS
N/S STREET : AZUSA AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 18
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY EB RAMPS								
EB LEFT	268	14	42	310	**0**	310	30	340
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	253	9	27	280	**0**	280	25	305
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
AZUSA AVE								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	788	27	81	870	**150**	1020	90	1110
NB RIGHT	199	14	42	240	**0**	240	20	260
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	692	29	87	780	**0**	780	70	850
SB RIGHT	154	17	51	205	**0**	205	20	225
TOTALS	**2354**				**150**	**2835**	**255**	**3090**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : I-210 FWY EB RAMPS
N/S STREET : AZUSA AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 18
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY EB RAMPS								
EB LEFT	218	9	27	245	**0**	245	20	265
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	199	15	45	245	**0**	245	20	265
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
AZUSA AVE								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	626	16	48	675	**150**	825	75	900
NB RIGHT	235	12	36	270	**0**	270	25	295
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	777	23	69	845	**0**	845	75	920
SB RIGHT	181	8	24	205	**0**	205	20	225
TOTALS	**2236**				**150**	**2635**	**235**	**2870**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: AZUZA
EAST-WEST STREET: I-210 EB RAMP
JURISDICTION: IRWINDALE

DATE: 06-08-11

PEAK HOUR: 07:30AM

NORTH LEG (SB)

TOTAL: 949

TT = 54

TT% = 54/949 = 5.69% ≈ 6%

Rt	Thru	Lt	
210	739 740		Total
58	195		1st
56	236		2nd
63	169		3rd
33	139		4th

EAST LEG TOTAL: 0

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
250 251	48	88	70	45	Lt
	0	0	0	0	Thru
235 234	30	61	98	45	Rt

WEST LEG TOTAL: (EB) 485

TT = 18

TT% = 18/485 = 3.71% ≈ 4%

	Lt	Thru	Rt
1st		189	49
2nd		194	51
3rd		162	54
4th		113	41
Total		658 660	195

SOUTH LEG (NB)

PEAK HOUR FACTORS

NORTH LEG = 0.81
SOUTH LEG = 0.87
EAST LEG =
WEST LEG = 0.72

ALL LEGS = 0.83

TT = 67

TT% = 67/853 = 7.85% ≈ 8%

TOTAL: 853

HOUR TOTAL: 2,287

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: AZUZA

EAST-WEST STREET: I-210 EB RAMP

TIME: 07:00AM-08:00AM DATE: 06-08-11

NORTH LEG

Rt	Thru	Lt	
162	612	0	Total
22	93	0	1st
26	88		2nd
58	195		3rd
56	236		4th

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
196	26	34	48	88	Lt
0	0	0	0	0	Thru
151	28	32	30	61	Rt

	Lt	Thru	Rt
1st		148	28
2nd		133	31
3rd		189	49
4th		194	51
Total		664	159

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: AZUZA

EAST-WEST STREET: I-210 EB RAMP

TIME: 08:00AM-09:00AM DATE: 06-08-11

NORTH LEG

Rt	Thru	Lt	
150	519		Total
63	169		1st
33	139		2nd
22	113		3rd
32	98		4th

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
239	70	45	71	53	Lt
1	0	0	1	0	Thru
260	98	45	74	43	Rt

	Lt	Thru	Rt
1st		162	54
2nd		113	41
3rd		155	28
4th		158	19
Total		588	142

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : AZUZA — IRWINDALE

EAST-WEST STREET : I-210 EB RAMP — 06-08-11

BEGINNING TIME : 07:00AM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
					SB NORTH LEG							
20	81	0	0	11	0	1	0	0	1	1	0	115
22	72	0	3	10	0	1	4	0	0	2	0	114
53	186	0	2	5	0	0	3	0	3	1	0	253
51	225	0	1	5	0	2	2	0	2	4	0	292
59	162	0	2	5	0	1	0	0	1	2	0	232
31	128	0	1	11	0	1	0	0	0	0	0	172
17	106	0	4	7 32	0	1	0 9	0	0	0 13	0	135
32	95	0	0	3	0	0	0	0	0	0	0	130
						TT=32+9+13=54						
285	1055	0	13	57	0	7	9	0	7	10	0	1443
					NB SOUTH LEG							
25	143	0	2	3	0	0	0	0	1	2	0	176
30	123	0	0	7	0	0	2	0	1	1	0	164
45	177	0	0	11	0	0	1	0	4	0	0	238
46	182	0	2	7	0	0	2	0	3	3	0	245
52	153	0	0	7	0	1	2	0	1	0	0	216
37	104	0	3	7	0	1	1	0	0	1	0	154
28	146	0	0	5 37	0	0	2 8	0	0	2 12	0	183
19	155	0	0	3	0	0	0	0	0	0	0	177
						TT=37+18+12=67						
282	1183	0	7	50	0	2	10	0	10	9	0	1553
					EAST LEG							
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
					EB WEST LEG							
25	0	22	2	0	3	0	0	1	1	0	0	54
32	0	32	0	0	2	0	0	0	0	0	0	66
30	0	44	0	0	3	0	0	0	0	0	1	78
57	0	85	2	0	1	0	0	0	2	0	2	149
96	0	69	2	0	1	0	0	0	0	0	0	168
41	0	45	3	0	0	0	0	0	1	0	0	90
74	1	70	0	0 12	0	0	0 0	0	0	0 6	1	146
43	0	53	0	0	0	0	0	0	0	0	0	96
						TT=12+0+6=18						
398	1	420	9	0	10	0	0	1	4	0	4	847

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: AZUZA
EAST-WEST STREET: I-210 EB RAMP
JURISDICTION: IRWINDALE

DATE: 06-08-11

PEAK HOUR: 12:30PM

NORTH LEG (SB)

TOTAL: 892

TT = 46
TT% = 46/892 = 5.16%
≈ 5%

Rt	Thru	Lt	
171 (170)	721 (720)		Total
33	198		1st
55	177		2nd
29	116		3rd
54	230		4th

EAST LEG TOTAL: 0

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
282 (280)	55	94	87	46	Lt
8 (10)	0	0	8	0	Thru
262 (260)	63	77	76	46	Rt

WEST LEG TOTAL: 552

TT = 23
TT% = 23/552 = 4.17%
≈ 4%

	Lt	Thru	Rt
1st		198	50
2nd		186	56
3rd		127	57
4th		304	50
Total		815	213 (215)

SOUTH LEG (NB)

PEAK HOUR FACTORS

NORTH LEG = 0.79
SOUTH LEG = 0.73
EAST LEG =
WEST LEG = 0.81

ALL LEGS = 0.85

TT = 41
TT% = 41/1028 = 3.99%
≈ 4%

TOTAL: 1,028

HOUR TOTAL: 2,472

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: AZUZA

EAST-WEST STREET: I-210 EB RAMP

TIME: 12:00PM-01:00PM DATE: 06-08-11

NORTH LEG

Rt	Thru	Lt	
170	709		Total
47	158		1st
35	176		2nd
33	198		3rd
55	177		4th

Rt	Thru	Lt

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
274	74	51	55	94	Lt
0	0	0	0	0	Thru
246	59	47	63	77	Rt

	Lt	Thru	Rt
1st		223	48
2nd		156	55
3rd		198	50
4th		186	56
Total		763	209

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: AZUZA

EAST-WEST STREET: I-210 EB RAMP

TIME: 01:00PM-02:00PM DATE: 06-08-11

NORTH LEG

Rt	Thru	Lt	
180	762		Total
29	116		1st
54	230		2nd
54	188		3rd
43	228		4th

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
304	87	46	80	91	Lt
8	8	0	0	0	Thru
253	76	46	66	65	Rt

	Lt	Thru	Rt
1st		127	57
2nd		304	50
3rd		129	59
4th		183	55
Total		743	221

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : AZUZA IRWINDALE

EAST-WEST STREET : I-210 EB RAMP 06-08-11

BEGINNING TIME : 12:00PM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
						SB NORTH LEG						
45	152	0	2	5	0	0	0	0	0	1	0	205
31	170	0	2	4	0	0	2	0	2	0	0	211
29	191	0	2	4	0	0	1	0	2	2	0	231
53	169	0	2	6	0	0	0	0	0	2	0	232
23	110	0	4	5	0	1	0	0	1	1	0	145
49	222	0	4	5	0	0	2	0	1	1	0	284
49	181	0	3	6	32	0	1	1 4	0	1	0 10	0 242
43	216	0	0	8	0	0	2	0	0	2	0	271
						TT = 32+4+10 = 46						
322	1411	0	19	43	0	2	8	0	7	9	0	1821
						NB SOUTH LEG						
44	212	0	3	7	0	0	4	0	1	0	0	271
50	146	0	3	8	0	1	1	0	1	1	0	211
46	192	0	2	4	0	2	1	0	0	1	0	248
54	184	0	2	2	0	0	0	0	0	0	0	242
52	120	0	3	6	0	1	1	0	1	0	0	184
47	292	0	1	6	0	1	1	0	1	5	0	354
53	123	0	2	5	26	0	0	0 7	0	4	1 8	0 188
50	170	0	4	11	0	0	0	0	0	1	2	0 238
						TT = 26+7+8 = 41						
396	1439	0	20	49	0	5	8	0	9	10	0	1936
						EAST LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
						EB WEST LEG						
57	0	70	1	0	1	0	0	0	1	0	3	133
47	0	47	0	0	3	0	0	0	0	0	1	98
60	0	52	2	0	2	1	0	1	0	0	0	118
75	0	91	2	0	2	0	0	0	0	0	1	171
75	8	82	1	0	5	0	0	0	0	0	0	171
43	0	43	2	0	2	1	0	0	0	0	1	92
63	0	76	2	0	18 4	1	0	3 0	0	0	2 0	146
63	0	88	2	0	3	0	0	0	0	0	0	156
						TT = 18+3+2 = 23						
483	8	549	12	0	22	3	0	1	1	0	6	1085

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: AZUZA
EAST-WEST STREET: I-210 EB RAMP
JURISDICTION: IRWINDALE

DATE: 06-08-11

PEAK HOUR: 04:00PM

NORTH LEG (SB)

TOTAL: 989

TT= 31

TT% = 31/989 = 3.13% ≈ 3%

Rt	Thru	Lt	
189 (190)	800		Total
60	194		1st
51	246		2nd
38	130		3rd
40	230		4th

EAST LEG TOTAL: 0

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
227 (225)	60	79	44	44	Lt
	0	0	0	0	Thru
214 (213)	61	68	39	46	Rt

WEST LEG TOTAL: (EB) 441

TT= 24

TT% = 24/441 = 5.44% ≈ 5%

	Lt	Thru	Rt
1st		180	49
2nd		126	82
3rd		153	37
4th		183	79
Total		642 (640)	247 (245)

SOUTH LEG (NB)

PEAK HOUR FACTORS

NORTH LEG = 0.83
SOUTH LEG = 0.85
EAST LEG =
WEST LEG = 0.75

ALL LEGS = 0.89

TT= 28

TT% = 28/889 = 3.15% ≈ 3%

TOTAL: 889

HOUR TOTAL: 2,319

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: AZUZA

EAST-WEST STREET: I-210 EB RAMP

TIME: 04:00PM-05:00PM DATE: 06-08-11

NORTH LEG

Rt	Thru	Lt	
189	800		Total
60	194		1st
51	246		2nd
38	130		3rd
40	230		4th

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
227	60	79	44	44	Lt
0	0	0	0	0	Thru
214	61	68	39	46	Rt

	Lt	Thru	Rt
1st		180	49
2nd		126	82
3rd		153	37
4th		183	79
Total		642	247

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: AZUZA

EAST-WEST STREET: I-210 EB RAMP

TIME: 05:00PM-06:00PM DATE: 06-08-11

NORTH LEG

Rt	Thru	Lt	
262	795		Total
93	172		1st
54	228		2nd
54	216		3rd
61	179		4th

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
247	40	70	47	90	Lt
0	0	0	0	0	Thru
255	54	57	68	76	Rt

	Lt	Thru	Rt
1st		131	77
2nd		150	70
3rd		50	60
4th		143	53
Total		474	260

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

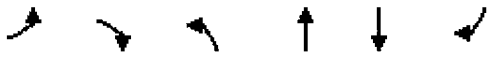
NORTH-SOUTH STREET : AZUZA — IRWINDALE

EAST-WEST STREET : I-210 EB RAMP — 06-08-11

BEGINNING TIME : 04:00PM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
						SB NORTH LEG						
57	185	0	3	4	0	0	2	0	0	3	0	254
50	241	0	1	4	0	0	0	0	0	1	0	297
35	125	0	2	3	0	0	1	0	1	1	0	168
39	226	0	1	3	0	0	0	0	0	1	0	270
90	164	0	3	7 21	0	0	0 3	0	0	1 7	0	265
51	222	0	3	5	0	0	0	0	0	1	0	282
53	212	0	1	3	0	0	0	0	0	1	0	270
57	176	0	2	3	0	1	0	0	1	0	0	240
						TT=21+3+7=31						
432	1551	0	16	32	0	1	3	0	2	9	0	2046
						NB SOUTH LEG						
48	178	0	0	2	0	0	0	0	1	0	0	229
79	120	0	1	5	0	0	1	0	2	0	0	208
33	148	0	2	4	0	0	1	0	2	0	0	190
75	180	0	2	3	0	0	0	0	2	0	0	262
73	123	0	3	7 19	0	0	0 2	0	1	1 7	0	208
68	146	0	1	4	0	0	0	0	1	0	0	220
60	45	0	0	2	0	0	1	0	0	2	0	110
50	136	0	0	5	0	2	2	0	1	0	0	196
						TT=19+2+7=28						
486	1076	0	9	32	0	2	5	0	10	3	0	1623
						EAST LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
						EB WEST LEG						
58	0	55	3	0	3	0	0	1	0	0	1	121
65	0	77	2	0	2	1	0	0	0	0	0	147
34	0	43	1	0	0	3	0	1	1	0	0	83
42	0	43	2	0	1	0	0	0	2	0	0	90
49	0	39	3	0 14	1	1	0 6	0	1	0 4	0	94
55	0	69	2	0	1	0	0	0	0	0	0	127
65	0	44	2	0	3	0	0	0	1	0	0	115
75	0	89	0	0	0	0	0	0	1	0	1	166
						TT=14+6+4=24						
443	0	459	15	0	11	5	0	2	6	0	2	943

Prepared by Newport Traffic Studies



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	250	235	0	855	740	210
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	1.00		0.95	0.95	
Frt	1.00	0.85		1.00	0.97	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	3335	1538		3282	3290	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	3335	1538		3282	3290	
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	301	283	0	1030	892	253
RTOR Reduction (vph)	0	39	0	0	56	0
Lane Group Flow (vph)	301	244	0	1030	1089	0
Heavy Vehicles (%)	5%	5%	5%	10%	5%	10%
Turn Type	NA	custom		NA	NA	
Protected Phases				2	6	
Permitted Phases	4	4				
Actuated Green, G (s)	10.7	10.7		17.1	17.1	
Effective Green, g (s)	10.7	10.7		17.1	17.1	
Actuated g/C Ratio	0.30	0.30		0.48	0.48	
Clearance Time (s)	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	997	460		1568	1571	
v/s Ratio Prot				0.31	c0.33	
v/s Ratio Perm	0.09	c0.16				
v/c Ratio	0.30	0.53		0.66	0.69	
Uniform Delay, d1	9.7	10.5		7.1	7.3	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	1.2		2.2	2.5	
Delay (s)	9.8	11.6		9.3	9.8	
Level of Service	A	B		A	A	
Approach Delay (s)	10.7			9.3	9.8	
Approach LOS	B			A	A	

Intersection Summary			
HCM Average Control Delay	9.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	35.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	48.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	280	260	0	1030	720	170
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	1.00		0.95	0.95	
Frt	1.00	0.85		1.00	0.97	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	3335	1538		3438	3309	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	3335	1538		3438	3309	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	329	306	0	1212	847	200
RTOR Reduction (vph)	0	71	0	0	40	0
Lane Group Flow (vph)	329	235	0	1212	1007	0
Heavy Vehicles (%)	5%	5%	0%	5%	5%	10%
Turn Type	NA	custom		NA	NA	
Protected Phases				2	6	
Permitted Phases	4	4				
Actuated Green, G (s)	11.1	11.1		21.4	21.4	
Effective Green, g (s)	11.1	11.1		21.4	21.4	
Actuated g/C Ratio	0.27	0.27		0.53	0.53	
Clearance Time (s)	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	914	422		1817	1748	
v/s Ratio Prot				c0.35	0.30	
v/s Ratio Perm	0.10	c0.15				
v/c Ratio	0.36	0.56		0.67	0.58	
Uniform Delay, d1	11.8	12.6		7.0	6.5	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	1.6		2.0	1.4	
Delay (s)	12.1	14.2		8.9	7.9	
Level of Service	B	B		A	A	
Approach Delay (s)	13.1			8.9	7.9	
Approach LOS	B			A	A	

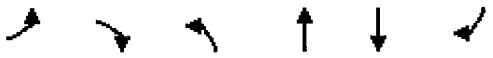
Intersection Summary			
HCM Average Control Delay	9.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	40.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	48.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	225	215	0	885	800	190
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	1.00		0.95	0.95	
Frt	1.00	0.85		1.00	0.97	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	3335	1538		3438	3339	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	3335	1538		3438	3339	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	253	242	0	994	899	213
RTOR Reduction (vph)	0	39	0	0	43	0
Lane Group Flow (vph)	253	203	0	994	1069	0
Heavy Vehicles (%)	5%	5%	0%	5%	5%	5%
Turn Type	NA	custom		NA	NA	
Protected Phases				2	6	
Permitted Phases	4	4				
Actuated Green, G (s)	10.0	10.0		18.3	18.3	
Effective Green, g (s)	10.0	10.0		18.3	18.3	
Actuated g/C Ratio	0.28	0.28		0.50	0.50	
Clearance Time (s)	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	919	424		1733	1683	
v/s Ratio Prot				0.29	c0.32	
v/s Ratio Perm	0.08	c0.13				
v/c Ratio	0.28	0.48		0.57	0.64	
Uniform Delay, d1	10.3	11.0		6.3	6.6	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.9		1.4	1.8	
Delay (s)	10.5	11.8		7.7	8.4	
Level of Service	B	B		A	A	
Approach Delay (s)	11.1			7.7	8.4	
Approach LOS	B			A	A	

Intersection Summary			
HCM Average Control Delay	8.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	36.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	48.2%	ICU Level of Service	A
Analysis Period (min)	15		

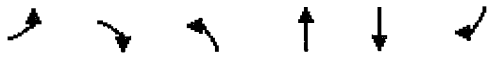
c Critical Lane Group



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	250	235	0	905	740	210
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	1.00		0.95	0.95	
Frt	1.00	0.85		1.00	0.97	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	3335	1538		3223	3290	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	3335	1538		3223	3290	
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	301	283	0	1090	892	253
RTOR Reduction (vph)	0	39	0	0	56	0
Lane Group Flow (vph)	301	244	0	1090	1089	0
Heavy Vehicles (%)	5%	5%	5%	12%	5%	10%
Turn Type	NA	custom		NA	NA	
Protected Phases				2	6	
Permitted Phases	4	4				
Actuated Green, G (s)	10.7	10.7		17.1	17.1	
Effective Green, g (s)	10.7	10.7		17.1	17.1	
Actuated g/C Ratio	0.30	0.30		0.48	0.48	
Clearance Time (s)	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	997	460		1539	1571	
v/s Ratio Prot				c0.34	0.33	
v/s Ratio Perm	0.09	c0.16				
v/c Ratio	0.30	0.53		0.71	0.69	
Uniform Delay, d1	9.7	10.5		7.4	7.3	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	1.2		2.8	2.5	
Delay (s)	9.8	11.6		10.2	9.8	
Level of Service	A	B		B	A	
Approach Delay (s)	10.7			10.2	9.8	
Approach LOS	B			B	A	

Intersection Summary			
HCM Average Control Delay	10.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	35.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	48.4%	ICU Level of Service	A
Analysis Period (min)	15		

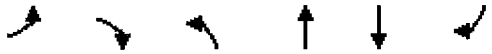
c Critical Lane Group



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	280	260	0	1080	720	170
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	1.00		0.95	0.95	
Frt	1.00	0.85		1.00	0.97	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	3335	1538		3282	3309	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	3335	1538		3282	3309	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	329	306	0	1271	847	200
RTOR Reduction (vph)	0	71	0	0	40	0
Lane Group Flow (vph)	329	235	0	1271	1007	0
Heavy Vehicles (%)	5%	5%	0%	10%	5%	10%
Turn Type	NA	custom		NA	NA	
Protected Phases				2	6	
Permitted Phases	4	4				
Actuated Green, G (s)	11.1	11.1		21.4	21.4	
Effective Green, g (s)	11.1	11.1		21.4	21.4	
Actuated g/C Ratio	0.27	0.27		0.53	0.53	
Clearance Time (s)	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	914	422		1734	1748	
v/s Ratio Prot				c0.39	0.30	
v/s Ratio Perm	0.10	c0.15				
v/c Ratio	0.36	0.56		0.73	0.58	
Uniform Delay, d1	11.8	12.6		7.4	6.5	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	1.6		2.8	1.4	
Delay (s)	12.1	14.2		10.1	7.9	
Level of Service	B	B		B	A	
Approach Delay (s)	13.1			10.1	7.9	
Approach LOS	B			B	A	

Intersection Summary			
HCM Average Control Delay	10.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	40.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	48.1%	ICU Level of Service	A
Analysis Period (min)	15		

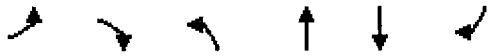
c Critical Lane Group



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	225	215	0	935	800	190
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	1.00		0.95	0.95	
Frt	1.00	0.85		1.00	0.97	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	3335	1538		3223	3339	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	3335	1538		3223	3339	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	253	242	0	1051	899	213
RTOR Reduction (vph)	0	39	0	0	43	0
Lane Group Flow (vph)	253	203	0	1051	1069	0
Heavy Vehicles (%)	5%	5%	0%	12%	5%	5%
Turn Type	NA	custom		NA	NA	
Protected Phases				2	6	
Permitted Phases	4	4				
Actuated Green, G (s)	10.0	10.0		18.3	18.3	
Effective Green, g (s)	10.0	10.0		18.3	18.3	
Actuated g/C Ratio	0.28	0.28		0.50	0.50	
Clearance Time (s)	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	919	424		1625	1683	
v/s Ratio Prot				c0.33	0.32	
v/s Ratio Perm	0.08	c0.13				
v/c Ratio	0.28	0.48		0.65	0.64	
Uniform Delay, d1	10.3	11.0		6.6	6.6	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.9		2.0	1.8	
Delay (s)	10.5	11.8		8.6	8.4	
Level of Service	B	B		A	A	
Approach Delay (s)	11.1			8.6	8.4	
Approach LOS	B			A	A	

Intersection Summary			
HCM Average Control Delay	9.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	36.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	48.2%	ICU Level of Service	A
Analysis Period (min)	15		

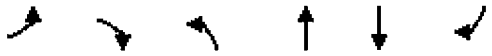
c Critical Lane Group



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	275	255	0	990	805	230
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	1.00		0.95	0.95	
Frt	1.00	0.85		1.00	0.97	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	3335	1538		3223	3289	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	3335	1538		3223	3289	
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	331	307	0	1193	970	277
RTOR Reduction (vph)	0	29	0	0	59	0
Lane Group Flow (vph)	331	278	0	1193	1188	0
Heavy Vehicles (%)	5%	5%	5%	12%	5%	10%
Turn Type	NA	custom		NA	NA	
Protected Phases				2	6	
Permitted Phases	4	4				
Actuated Green, G (s)	11.3	11.3		16.7	16.7	
Effective Green, g (s)	11.3	11.3		16.7	16.7	
Actuated g/C Ratio	0.31	0.31		0.46	0.46	
Clearance Time (s)	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	1047	483		1495	1526	
v/s Ratio Prot				c0.37	0.36	
v/s Ratio Perm	0.10	c0.18				
v/c Ratio	0.32	0.58		0.80	0.78	
Uniform Delay, d1	9.4	10.3		8.2	8.1	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	1.7		4.5	4.0	
Delay (s)	9.6	12.0		12.7	12.1	
Level of Service	A	B		B	B	
Approach Delay (s)	10.7			12.7	12.1	
Approach LOS	B			B	B	

Intersection Summary			
HCM Average Control Delay	12.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	36.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	52.1%	ICU Level of Service	A
Analysis Period (min)	15		

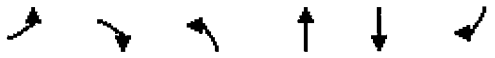
c Critical Lane Group



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	305	285	0	1180	785	185
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	1.00		0.95	0.95	
Frt	1.00	0.85		1.00	0.97	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	3335	1538		3282	3310	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	3335	1538		3282	3310	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	359	335	0	1388	924	218
RTOR Reduction (vph)	0	55	0	0	41	0
Lane Group Flow (vph)	359	280	0	1388	1101	0
Heavy Vehicles (%)	5%	5%	0%	10%	5%	10%
Turn Type	NA	custom		NA	NA	
Protected Phases				2	6	
Permitted Phases	4	4				
Actuated Green, G (s)	11.9	11.9		21.2	21.2	
Effective Green, g (s)	11.9	11.9		21.2	21.2	
Actuated g/C Ratio	0.29	0.29		0.52	0.52	
Clearance Time (s)	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	966	445		1693	1707	
v/s Ratio Prot				c0.42	0.33	
v/s Ratio Perm	0.11	c0.18				
v/c Ratio	0.37	0.63		0.82	0.64	
Uniform Delay, d1	11.6	12.7		8.3	7.2	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	2.8		4.6	1.9	
Delay (s)	11.9	15.5		12.9	9.1	
Level of Service	B	B		B	A	
Approach Delay (s)	13.6			12.9	9.1	
Approach LOS	B			B	A	

Intersection Summary			
HCM Average Control Delay	11.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	41.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	51.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	245	235	0	1015	870	205
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	1.00		0.95	0.95	
Frt	1.00	0.85		1.00	0.97	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	3335	1538		3223	3340	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	3335	1538		3223	3340	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	275	264	0	1140	978	230
RTOR Reduction (vph)	0	29	0	0	43	0
Lane Group Flow (vph)	275	235	0	1140	1165	0
Heavy Vehicles (%)	5%	5%	0%	12%	5%	5%
Turn Type	NA	custom		NA	NA	
Protected Phases				2	6	
Permitted Phases	4	4				
Actuated Green, G (s)	10.5	10.5		17.7	17.7	
Effective Green, g (s)	10.5	10.5		17.7	17.7	
Actuated g/C Ratio	0.29	0.29		0.49	0.49	
Clearance Time (s)	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	967	446		1576	1633	
v/s Ratio Prot				c0.35	0.35	
v/s Ratio Perm	0.08	c0.15				
v/c Ratio	0.28	0.53		0.72	0.71	
Uniform Delay, d1	9.9	10.8		7.3	7.3	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	1.1		2.9	2.7	
Delay (s)	10.1	11.9		10.2	9.9	
Level of Service	B	B		B	A	
Approach Delay (s)	11.0			10.2	9.9	
Approach LOS	B			B	A	

Intersection Summary			
HCM Average Control Delay	10.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	36.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	51.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

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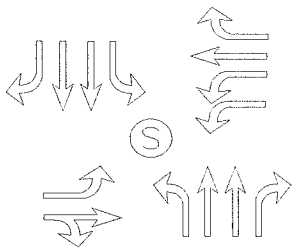
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : FIRST STREET
N/S STREET : AZUSA AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 19
ROUTE 2B

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
FIRST STREET						
EB LEFT	120	5%		120	10	130
EB THRU	305	5%		305	25	330
EB RIGHT	125	5%		125	10	135
WB LEFT	485	5%		485	45	530
WB THRU	500	5%		500	45	545
WB RIGHT	320	5%		320	30	350
AZUSA AVE						
NB LEFT	160	5%		160	15	175
NB THRU	375	5%		375	35	410
NB RIGHT	375	5%	**50**	425	40	465
SB LEFT	160	5%		160	15	175
SB THRU	365	15%		365	35	400
SB RIGHT	170	10%		170	15	185
TOTALS	**3460**		**50**	**3510**	**320**	**3830**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : FIRST STREET
N/S STREET : AZUSA AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 19
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
FIRST STREET						
EB LEFT	45	5%		45	5	50
EB THRU	85	5%		85	5	90
EB RIGHT	30	15%		30	5	35
WB LEFT	270	5%		270	25	295
WB THRU	130	5%		130	10	140
WB RIGHT	155	5%		155	15	170
AZUSA AVE						
NB LEFT	70	5%		70	5	75
NB THRU	655	5%		655	60	715
NB RIGHT	325	5%	**50**	375	35	410
SB LEFT	80	5%		80	5	85
SB THRU	645	5%		645	60	705
SB RIGHT	10	10%		10	5	15
TOTALS	**2500**		**50**	**2550**	**235**	**2785**

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E/W STREET : FIRST STREET
N/S STREET : AZUSA AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 19
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
FIRST STREET						
EB LEFT	90	5%		90	10	100
EB THRU	185	5%		185	15	200
EB RIGHT	35	5%		35	5	40
WB LEFT	255	5%		255	25	280
WB THRU	205	5%		205	20	225
WB RIGHT	220	5%		220	20	240
AZUSA AVE						
NB LEFT	50	5%		50	5	55
NB THRU	430	5%		430	40	470
NB RIGHT	330	5%	**50**	380	35	415
SB LEFT	120	5%		120	10	130
SB THRU	800	5%		800	70	870
SB RIGHT	20	5%		20	5	25
TOTALS	**2740**		**50**	**2790**	**260**	**3050**

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TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : FIRST STREET
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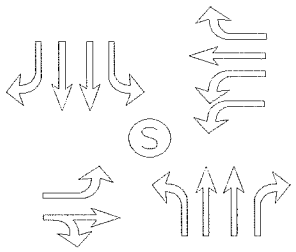
INTERSECTION 19
ROUTE 2B

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
FIRST STREET								
EB LEFT	119	0	0	120	**0**	120	10	130
EB THRU	305	0	0	305	**0**	305	25	330
EB RIGHT	127	0	0	125	**0**	125	10	135
WB LEFT	474	11	33	505	**0**	505	45	550
WB THRU	497	3	9	505	**0**	505	45	550
WB RIGHT	314	5	15	330	**0**	330	30	360
AZUSA AVE								
NB LEFT	160	1	3	165	**0**	165	15	180
NB THRU	347	26	78	425	**0**	425	40	465
NB RIGHT	360	15	45	405	**150**	555	50	605
SB LEFT	151	8	24	175	**0**	175	15	190
SB THRU	311	54	162	475	**0**	475	45	520
SB RIGHT	152	20	60	210	**0**	210	20	230
TOTALS	**3317**				**150**	**3895**	**350**	**4245**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : FIRST STREET
N/S STREET : AZUSA AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 19
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
FIRST STREET								
EB LEFT	44	0	0	45	0	45	5	50
EB THRU	84	3	9	95	0	95	10	105
EB RIGHT	28	4	12	40	0	40	5	45
WB LEFT	260	11	33	295	0	295	25	320
WB THRU	127	3	9	135	0	135	10	145
WB RIGHT	149	7	21	170	0	170	15	185
AZUSA AVE								
NB LEFT	67	1	3	70	0	70	5	75
NB THRU	625	28	84	710	0	710	65	775
NB RIGHT	315	10	30	345	150	495	45	540
SB LEFT	78	0	0	80	0	80	5	85
SB THRU	604	43	129	735	0	735	65	800
SB RIGHT	8	1	3	10	0	10	5	15
TOTALS	**2389**				**150**	**2880**	**260**	**3140**

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E/W STREET : FIRST STREET
N/S STREET : AZUSA AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 19
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
FIRST STREET								
EB LEFT	87	3	9	95	**0**	95	10	105
EB THRU	179	4	12	190	**0**	190	15	205
EB RIGHT	33	1	3	35	**0**	35	5	40
WB LEFT	250	6	18	270	**0**	270	25	295
WB THRU	199	5	15	215	**0**	215	20	235
WB RIGHT	220	2	6	225	**0**	225	20	245
AZUSA AVE								
NB LEFT	52	0	0	50	**0**	50	5	55
NB THRU	418	12	36	455	**0**	455	40	495
NB RIGHT	324	5	15	340	**150**	490	45	535
SB LEFT	121	1	3	125	**0**	125	10	135
SB THRU	788	13	39	825	**0**	825	75	900
SB RIGHT	21	0	0	20	**0**	20	5	25
TOTALS	**2692**				**150**	**2995**	**275**	**3270**

Tustin Office: 714.665.4500 Tel/ 714.665.4501 Fax
Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax
Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax
Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: AZUZA
EAST-WEST STREET: 1ST
JURISDICTION: IRWINDALE

DATE: 06-08-11

PEAK HOUR: 07:30AM

NORTH LEG (SB)

TOTAL: 696

TT = 82

TT% = 82/696 = 11.78% ≈ 12%

Rt	Thru	Lt	
172 (170)	365	159 (160)	Total
44	159	40	1st
64	83	70	2nd
42	84	34	3rd
22	39	15	4th

TT = 19

TT% = 19/1304 = 1.46% ≈ 1%

EAST LEG TOTAL: (WB) 1,304

	1st	2nd	3rd	4th	Total
Rt	53	90	88	88	319 (320)
Thru	77	142	137	144	500
Lt	83	137	143	122	485

Total	1st	2nd	3rd	4th	
119 (120)	34	31	14	40	Lt
305	55	82	97	71	Thru
127 (125)	19	76	7	25	Rt

WEST LEG TOTAL: (EB) 551

TT = 0

TT% = 0/551 = 0% ≈ 1%

PEAK HOUR FACTORS

NORTH LEG = 0.72
SOUTH LEG = 0.81
EAST LEG = 0.88
WEST LEG = 0.73

ALL LEGS = 0.82

TT = 42

TT% = 42/909 = 4.62% ≈ 5%

	Lt	Thru	Rt
1st	34	81	120
2nd	35	109	137
3rd	51	129	55
4th	41	54	63
Total	161 (160)	373 (375)	375

SOUTH LEG (NB)

TOTAL: 909

HOUR TOTAL: 3,460

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: AZUZA

EAST-WEST STREET: 1ST

TIME: 07:00AM-08:00AM DATE: 06-08-11

NORTH LEG

134	364	140	Total
11	71	13	1st
15	51	17	2nd
44	159	40	3rd
64	83	70	4th
Rt	Thru	Lt	

	1st	2nd	3rd	4th	Total
Rt	20	23	53	90	186
Thru	31	24	77	142	274
Lt	33	44	83	137	297

Total	1st	2nd	3rd	4th	
109	21	23	34	31	Lt
166	12	17	55	82	Thru
121	10	16	19	76	Rt

	Lt	Thru	Rt
1st	14	109	53
2nd	23	69	83
3rd	34	81	120
4th	35	109	137
Total	106	368	393

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: AZUZA

EAST-WEST STREET: 1ST

TIME: 08:00AM-09:00AM DATE: 06-08-11

NORTH LEG

103	189	95	Total
42	84	34	1st
22	39	15	2nd
26	33	14	3rd
13	33	32	4th
Rt	Thru	Lt	

Rt	88	88	25	49	250
Thru	137	144	65	40	386
Lt	143	122	79	71	415
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
80	14	40	14	12	Lt
217	97	71	19	30	Thru
76	7	25	21	23	Rt

	Lt	Thru	Rt
1st	51	129	55
2nd	41	54	63
3rd	19	159	53
4th	21	124	69
Total	132	466	240

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : AZUZA — IRWINDALE

EAST-WEST STREET : 1ST — 06-08-11

BEGINNING TIME : 07:00AM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
					SB NORTH LEG							
11	64	13	0	7	0	0	0	0	0	0	0	95
12	32	13	0	6	4	0	4	0	3	9	0	83
42	147	36	1	9	3	1	1	1	0	2	0	243
55	64	68	4	8	1	2	2	1	3	9	0	217
38	70	32	2	8	0	0	4	2	2	2	0	160
17	30	15	5	7	0	0	0	0	0	2	0	76
25	25	14	1	7 48	0	0	0 14	0	0	1 20	0	73
13	32	32	0	1	0	0	0	0	0	0	0	78
						TT=48+14+20=82						
213	464	223	13	53	8	3	11	4	8	25	0	1025
					NB SOUTH LEG							
51	102	14	1	4	0	0	0	0	1	3	0	176
78	58	23	3	4	0	2	7	0	0	0	0	175
119	77	33	0	4	1	1	0	0	0	0	0	235
128	101	35	7	4	0	0	0	0	2	4	0	281
52	123	51	3	5	0	0	1	0	0	0	0	235
61	46	41	2	7	0	0	1	0	0	0	0	158
48	152	19	3	5 33	0	0	1 3	0	2	1 6	0	231
68	124	20	1	0	1	0	0	0	0	0	0	214
						TT=33+3+6=42						
605	783	236	20	33	2	3	10	0	5	8	0	1705
					WB EAST LEG							
18	29	33	2	1	0	0	0	0	0	1	0	84
19	23	40	0	0	2	4	1	1	0	0	1	91
53	76	82	0	0	1	0	0	0	0	1	0	213
89	142	136	0	0	0	0	0	0	1	0	1	369
84	135	140	1	1	2	3	1	0	0	0	1	368
88	144	116	0	0	6	0	0	0	0	0	0	354
22	65	79	2	0 11	0	1	0 4	0	0	0 4	0	169
49	38	71	0	2	0	0	0	0	0	0	0	160
						TT=11+4+4=19						
422	652	697	5	4	11	8	2	1	1	2	3	1808
					EB WEST LEG							
8	12	21	0	0	0	0	0	0	2	0	0	43
14	15	19	0	2	0	1	0	2	1	0	2	56
19	55	34	0	0	0	0	0	0	0	0	0	108
76	82	31	0	0	0	0	0	0	0	0	0	189
7	97	14	0	0	0	0	0	0	0	0	0	118
25	71	40	0	0	0	0	0	0	0	0	0	136
21	19	14	0	0 0	0	0	0 0	0	0	0 0	0	54
23	30	12	0	0	0	0	0	0	0	0	0	65
						TT=0+0+0=0						
193	381	185	0	2	0	1	0	2	3	0	2	769

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: AZUZA
EAST-WEST STREET: 1ST
JURISDICTION: IRWINDALE

DATE: 06-08-11

PEAK HOUR: 01:00PM

NORTH LEG (SB)

TOTAL: 734

10 9	647 (643)	80 78	Total
3	71	15	1st
3	168	24	2nd
2	222	27	3rd
1	186	12	4th
Rt	Thru	Lt	

TT = 44
TT% = 44/734 = 5.99% ≈ 6%

TT = 21
TT% = 21/557 = 3.77% ≈ 4%

EAST LEG TOTAL: (WB) 557

	1st	2nd	3rd	4th	Total
Rt	42	35	33	46	155 156
Thru	27	28	42	33	130
Lt	67	69	59	76	271 270

WEST LEG TOTAL: (EB) 163

Total	1st	2nd	3rd	4th	
45 44	11	12	17	4	Lt
85 87	22	10	30	25	Thru
30 32	4	11	6	11	Rt

TT = 7
TT% = 7/163 = 4.29% ≈ 4%

SOUTH LEG (NB)

	Lt	Thru	Rt
1st	15	160	55
2nd	19	156	87
3rd	24	141	81
4th	10	196	102
Total	70 68	655 653	325

TT = 39
TT% = 39/1046 = 3.73% ≈ 4%

PEAK HOUR FACTORS

NORTH LEG = 0.73
SOUTH LEG = 0.85
EAST LEG = 0.90
WEST LEG = 0.77

ALL LEGS = 0.89

TOTAL: 1,046

HOUR TOTAL: 2,500

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: AZUZA

EAST-WEST STREET: 1ST

TIME: 12:00PM-01:00PM DATE: 06-08-11

NORTH LEG

38	531	90	Total
5	129	19	1st
12	140	9	2nd
10	124	36	3rd
11	138	26	4th
Rt	Thru	Lt	

Rt	42	36	42	40	160
Thru	35	39	42	49	165
Lt	71	60	96	88	315
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
55	17	12	15	11	Lt
54	8	15	14	17	Thru
34	14	6	6	8	Rt

	Lt	Thru	Rt
1st	21	192	80
2nd	12	144	54
3rd	12	169	72
4th	11	183	81
Total	56	688	287

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: AZUZA

EAST-WEST STREET: 1ST

TIME: 01:00PM-02:00PM DATE: 06-08-11

NORTH LEG

9	647	78	Total
3	71	15	1st
3	168	24	2nd
2	222	27	3rd
1	186	12	4th
Rt	Thru	Lt	

Rt	42	35	33	46	156
Thru	27	28	42	33	130
Lt	67	69	59	76	271
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
44	11	12	17	4	Lt
87	22	10	30	25	Thru
32	4	11	6	11	Rt

	Lt	Thru	Rt
1st	15	160	55
2nd	19	156	87
3rd	24	141	81
4th	10	196	102
Total	68	653	325

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : AZUZA — IRWINDALE

EAST-WEST STREET : 1ST — 06-08-11

BEGINNING TIME : 12:00PM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
						SB NORTH LEG						
5	121	19	0	5	0	0	1	0	0	2	0	153
12	138	9	0	1	0	0	0	0	0	1	0	161
10	123	36	0	0	0	0	1	0	0	0	0	170
11	138	26	0	0	0	0	0	0	0	0	0	175
3	66	15	0	4	0	0	1	0	0	0	0	89
2	158	24	0	10	0	0	0	0	1	0	0	195
2	206	27	0	11	0	0	4	0	0	1	0	251
1	174	12	0	7	0	0	4	0	0	1	0	199
				32			9			3		
						TT = 32+9+3 = 44						
46	1124	168	0	38	0	0	11	0	1	5	0	1393
						NB SOUTH LEG						
77	185	21	0	5	0	3	0	0	0	2	0	293
51	140	12	1	2	0	1	1	0	1	1	0	210
72	169	12	0	0	0	0	0	0	0	0	0	253
81	183	11	0	0	0	0	0	0	0	0	0	275
54	150	15	1	8	0	0	1	0	0	1	0	230
87	148	19	0	4	0	0	0	0	0	4	0	262
80	137	24	1	4	0	0	0	0	0	0	0	246
94	190	9	7	4	1	0	2	0	1	0	0	308
				30			3			6		
						TT = 30+3+6 = 39						
596	1302	123	10	27	1	4	4	0	2	8	0	2077
						WB EAST LEG						
40	35	70	0	0	1	0	0	0	2	0	0	148
36	39	60	0	0	0	0	0	0	0	0	0	135
39	42	95	0	0	0	0	0	0	3	0	1	180
40	49	88	0	0	0	0	0	0	0	0	0	177
39	26	66	1	1	0	1	0	0	1	0	1	136
32	27	65	1	0	3	0	1	1	2	0	0	132
32	42	57	0	0	2	0	0	0	1	0	0	134
46	32	72	0	0	2	0	0	1	0	1	1	155
				10			4			7		
						TT = 10+4+7 = 21						
304	292	573	2	1	8	1	1	2	9	1	3	1197
						EB WEST LEG						
13	8	17	1	0	0	0	0	0	0	0	0	39
6	14	12	0	1	0	0	0	0	0	0	0	33
6	14	15	0	0	0	0	0	0	0	0	0	35
8	17	11	0	0	0	0	0	0	0	0	0	36
2	22	11	2	0	0	0	0	0	0	0	0	37
11	8	12	0	1	0	0	1	0	0	0	0	33
5	29	17	1	1	0	0	0	0	0	0	0	53
10	25	4	1	0	0	0	0	0	0	0	0	40
				6			1			0		
						TT = 6+1+0 = 7						
61	137	99	5	3	0	0	1	0	0	0	0	306

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: AZUZA
EAST-WEST STREET: 1ST
JURISDICTION: IRWINDALE

DATE: 06-08-11

PEAK HOUR: 04:45PM

NORTH LEG (SB)

TOTAL: 944

Rt	Thru	Lt	
21 (20)	801 (800)	122 (120)	Total
3	193	15	1st
6	213	31	2nd
5	216	35	3rd
7	179	41	4th

TT = 14
TT% = 14/944 = 1.50% ≈ 2%

TT = 13
TT% = 13/682 = 1.91% ≈ 2%

EAST LEG TOTAL: (WB) 682

	1st	2nd	3rd	4th	Total
Rt	60	55	53	54	222 (220)
Thru	50	51	50	53	204 (205)
Lt	67	47	56	86	256 (255)

Total	1st	2nd	3rd	4th	
90	20	24	21	25	Lt
183 (185)	36	46	44	57	Thru
35 34	8	8	8	10	Rt

WEST LEG TOTAL: (EB) 307

TT = 8
TT% = 8/307 = 2.61% ≈ 3%

	Lt	Thru	Rt
1st	6	137	76
2nd	17	99	58
3rd	15	113	89
4th	14	81	106
Total	50 52	430	338 329

SOUTH LEG (NB)

PEAK HOUR FACTORS

NORTH LEG = 0.92
SOUTH LEG = 0.93
EAST LEG = 0.88
WEST LEG = 0.83

ALL LEGS = 0.96

TT = 17
TT% = 17/811 = 2.10% ≈ 2%

TOTAL: 811

HOUR TOTAL: 2,744

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: AZUZA

EAST-WEST STREET: 1ST

TIME: 04:00PM-05:00PM DATE: 06-08-11

NORTH LEG

Rt	Thru	Lt	
19	637	64	Total
5	182	21	1st
2	106	16	2nd
9	156	12	3rd
3	193	15	4th

	1st	2nd	3rd	4th	Total
Rt	50	45	48	60	203
Thru	35	48	24	50	157
Lt	58	65	67	67	257

Total	1st	2nd	3rd	4th	
79	13	16	30	20	Lt
132	33	24	39	36	Thru
45	11	8	18	8	Rt

	Lt	Thru	Rt
1st	17	134	82
2nd	5	135	69
3rd	15	123	60
4th	6	137	76
Total	43	529	287

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: AZUZA

EAST-WEST STREET: 1ST

TIME: 05:00PM-06:00PM DATE: 06-08-11

NORTH LEG

Rt	Thru	Lt	
20	719	121	Total
6	213	31	1st
5	216	35	2nd
7	179	41	3rd
2	111	14	4th

	1st	2nd	3rd	4th	Total
Rt	55	53	54	33	195
Thru	51	50	53	78	232
Lt	47	56	86	111	300

Total	1st	2nd	3rd	4th	
91	24	21	25	21	Lt
193	46	44	57	46	Thru
47	8	8	10	21	Rt

	Lt	Thru	Rt
1st	17	99	58
2nd	15	113	89
3rd	14	81	106
4th	9	152	72
Total	55	445	325

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : AZUZA — IRWINDALE

EAST-WEST STREET : 1ST — 06-08-11

BEGINNING TIME : 04:00PM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
						SB NORTH LEG						
4	176	20	1	5	1	0	1	0	0	0	0	208
2	100	15	0	5	1	0	0	0	0	1	0	124
8	150	12	1	2	0	0	3	0	0	1	0	177
3	184	14	0	6	1	0	2	0	0	1	0	211
6	210	31	0	2	0	0	0	0	0	1	0	250
5	216	35	0	0	0	0	0	0	0	0	0	256
7	178	41	0	1	0	0	0	0	0	0	0	227
2	109	14	0	2	10 0	0	0	2 0	0	0	2 0	127
						TT=10+2+2=14						
37	1323	182	2	23	3	0	6	0	0	4	0	1580
						NB SOUTH LEG						
81	133	17	1	1	0	0	0	0	0	0	0	233
69	130	5	0	4	0	0	1	0	0	0	0	209
60	120	15	0	2	0	0	1	0	0	0	0	198
76	134	6	0	1	0	0	2	0	0	0	0	219
55	96	17	2	3	0	0	0	0	1	0	0	174
89	109	15	0	4	0	0	0	0	0	0	0	217
104	79	14	2	0	0	0	0	0	0	2	0	201
71	151	8	1	1	12 1	0	0	2 0	0	0	3 0	233
						TT=12+2+3=17						
605	952	97	6	16	1	0	4	0	1	2	0	1684
						WB EAST LEG						
50	35	54	0	0	1	0	0	1	0	0	2	143
43	45	63	1	2	1	0	0	0	1	1	1	158
48	23	66	0	1	0	0	0	0	0	0	1	139
60	47	66	0	2	0	0	0	0	0	1	1	177
53	51	46	0	0	0	0	0	0	2	0	1	153
53	49	54	0	1	2	0	0	0	0	0	0	159
54	52	84	0	1	1	0	0	0	0	0	1	193
33	77	109	0	0	7 2	0	0	0 0	0	1	6 0	222
						TT=7+0+6=13						
394	379	542	1	7	7	0	0	1	3	3	7	1344
						EB WEST LEG						
11	33	13	0	0	0	0	0	0	0	0	0	57
8	24	16	0	0	0	0	0	0	0	0	0	48
18	38	29	0	1	1	0	0	0	0	0	0	87
7	34	18	1	1	0	0	0	1	0	1	1	64
8	45	23	0	1	0	0	0	0	0	0	1	78
8	43	21	0	1	0	0	0	0	0	0	0	73
10	57	25	0	0	0	0	0	0	0	0	0	92
21	46	21	0	0	4 0	0	0	1 0	0	0	3 0	88
						TT=4+1+3=8						
91	320	166	1	4	1	0	0	1	0	1	2	587

Prepared by Newport Traffic Studies

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	120	305	125	485	500	320	160	375	375	160	365	170
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1805	1817		3335	1810	1538	1719	3438	1538	1719	3139	1468
Flt Permitted	0.41	1.00		0.14	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	772	1817		503	1810	1538	1719	3438	1538	1719	3139	1468
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	146	372	152	591	610	390	195	457	457	195	445	207
RTOR Reduction (vph)	0	19	0	0	0	198	0	0	322	0	0	157
Lane Group Flow (vph)	146	505	0	591	610	192	195	457	135	195	445	50
Heavy Vehicles (%)	0%	0%	0%	5%	5%	5%	5%	5%	5%	5%	15%	10%
Turn Type	Perm	NA		pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4			8		8			2			6
Actuated Green, G (s)	23.9	23.9		38.9	38.9	38.9	10.0	18.0	18.0	10.0	18.0	18.0
Effective Green, g (s)	23.9	23.9		38.9	38.9	38.9	10.0	18.0	18.0	10.0	18.0	18.0
Actuated g/C Ratio	0.30	0.30		0.49	0.49	0.49	0.13	0.23	0.23	0.13	0.23	0.23
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	234	550		643	892	758	218	784	351	218	716	335
v/s Ratio Prot		0.28		c0.13	0.34		c0.11	0.13		0.11	c0.14	
v/s Ratio Perm	0.19			c0.32		0.13			0.09			0.03
v/c Ratio	0.62	0.92		0.92	0.68	0.25	0.89	0.58	0.38	0.89	0.62	0.15
Uniform Delay, d1	23.6	26.6		19.0	15.3	11.6	33.9	27.1	25.8	33.9	27.4	24.3
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.1	20.3		18.2	2.2	0.2	33.7	3.2	3.2	33.7	4.0	0.9
Delay (s)	28.7	46.9		37.2	17.5	11.8	67.7	30.3	28.9	67.7	31.4	25.3
Level of Service	C	D		D	B	B	E	C	C	E	C	C
Approach Delay (s)		42.9			23.4			36.3			38.3	
Approach LOS		D			C			D			D	

Intersection Summary			
HCM Average Control Delay	32.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	78.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	70.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	45	85	30	270	130	155	70	655	325	80	645	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1805	1696		3335	1810	1538	1719	3438	1538	1805	3438	1468
Flt Permitted	0.66	1.00		0.43	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1262	1696		1505	1810	1538	1719	3438	1538	1805	3438	1468
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	51	96	34	303	146	174	79	736	365	90	725	11
RTOR Reduction (vph)	0	25	0	0	0	120	0	0	223	0	0	7
Lane Group Flow (vph)	51	105	0	303	146	54	79	736	142	90	725	4
Heavy Vehicles (%)	0%	5%	15%	5%	5%	5%	5%	5%	5%	0%	5%	10%
Turn Type	Perm	NA		pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4			8		8			2			6
Actuated Green, G (s)	7.0	7.0		15.7	15.7	15.7	2.7	19.6	19.6	3.2	20.1	20.1
Effective Green, g (s)	7.0	7.0		15.7	15.7	15.7	2.7	19.6	19.6	3.2	20.1	20.1
Actuated g/C Ratio	0.14	0.14		0.31	0.31	0.31	0.05	0.39	0.39	0.06	0.40	0.40
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	175	235		638	563	478	92	1334	597	114	1368	584
v/s Ratio Prot		0.06		c0.04	0.08		0.05	c0.21		c0.05	0.21	
v/s Ratio Perm	0.04			c0.10		0.04			0.09			0.00
v/c Ratio	0.29	0.45		0.47	0.26	0.11	0.86	0.55	0.24	0.79	0.53	0.01
Uniform Delay, d1	19.5	20.0		13.4	13.0	12.4	23.7	12.0	10.4	23.3	11.6	9.2
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.9	1.4		0.6	0.2	0.1	50.4	1.6	0.9	29.5	1.5	0.0
Delay (s)	20.5	21.3		13.9	13.3	12.5	74.1	13.7	11.3	52.8	13.1	9.2
Level of Service	C	C		B	B	B	E	B	B	D	B	A
Approach Delay (s)		21.1			13.4			17.0			17.3	
Approach LOS		C			B			B			B	

Intersection Summary			
HCM Average Control Delay	16.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	50.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	49.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	90	185	35	255	205	220	50	430	330	120	800	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	1767		3335	1810	1538	1805	3438	1538	1719	3438	1538
Flt Permitted	0.62	1.00		0.36	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1129	1767		1269	1810	1538	1805	3438	1538	1719	3438	1538
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	94	193	36	266	214	229	52	448	344	125	833	21
RTOR Reduction (vph)	0	12	0	0	0	148	0	0	228	0	0	13
Lane Group Flow (vph)	94	217	0	266	214	81	52	448	116	125	833	8
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	0%	5%	5%	5%	5%	5%
Turn Type	Perm	NA		pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4			8		8			2			6
Actuated Green, G (s)	11.6	11.6		19.7	19.7	19.7	2.2	18.8	18.8	5.3	21.9	21.9
Effective Green, g (s)	11.6	11.6		19.7	19.7	19.7	2.2	18.8	18.8	5.3	21.9	21.9
Actuated g/C Ratio	0.21	0.21		0.35	0.35	0.35	0.04	0.34	0.34	0.09	0.39	0.39
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	235	367		600	639	543	71	1158	518	163	1349	604
v/s Ratio Prot		c0.12		c0.03	0.12		0.03	0.13		c0.07	c0.24	
v/s Ratio Perm	0.08			0.12		0.05			0.08			0.01
v/c Ratio	0.40	0.59		0.44	0.33	0.15	0.73	0.39	0.22	0.77	0.62	0.01
Uniform Delay, d1	19.1	20.0		13.1	13.2	12.3	26.5	14.1	13.3	24.6	13.6	10.4
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.1	2.6		0.5	0.3	0.1	31.9	1.0	1.0	19.2	2.1	0.0
Delay (s)	20.2	22.5		13.6	13.6	12.5	58.4	15.1	14.3	43.8	15.7	10.4
Level of Service	C	C		B	B	B	E	B	B	D	B	B
Approach Delay (s)		21.8			13.2			17.4			19.2	
Approach LOS		C			B			B			B	

Intersection Summary			
HCM Average Control Delay	17.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	55.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	57.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	120	305	125	485	500	320	160	375	425	160	365	170
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1805	1817		3335	1810	1538	1719	3438	1392	1719	3139	1468
Flt Permitted	0.35	1.00		0.14	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	668	1817		503	1810	1538	1719	3438	1392	1719	3139	1468
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	146	372	152	591	610	390	195	457	518	195	445	207
RTOR Reduction (vph)	0	19	0	0	0	208	0	0	288	0	0	154
Lane Group Flow (vph)	146	505	0	591	610	182	195	457	230	195	445	53
Heavy Vehicles (%)	0%	0%	0%	5%	5%	5%	5%	5%	16%	5%	15%	10%
Turn Type	Perm	NA		pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4			8		8			2			6
Actuated Green, G (s)	23.9	23.9		36.9	36.9	36.9	11.4	20.0	20.0	10.0	18.6	18.6
Effective Green, g (s)	23.9	23.9		36.9	36.9	36.9	11.4	20.0	20.0	10.0	18.6	18.6
Actuated g/C Ratio	0.30	0.30		0.47	0.47	0.47	0.14	0.25	0.25	0.13	0.24	0.24
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	202	550		558	847	719	248	871	353	218	740	346
v/s Ratio Prot		0.28		c0.12	0.34		c0.11	0.13		0.11	0.14	
v/s Ratio Perm	0.22			c0.37		0.12			c0.17			0.04
v/c Ratio	0.72	0.92		1.06	0.72	0.25	0.79	0.52	0.65	0.89	0.60	0.15
Uniform Delay, d1	24.5	26.6		19.3	16.9	12.7	32.6	25.4	26.3	33.9	26.8	23.9
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	12.0	20.3		54.7	3.0	0.2	15.1	2.3	9.0	33.7	3.6	0.9
Delay (s)	36.6	46.9		74.0	19.9	12.9	47.6	27.6	35.3	67.7	30.4	24.8
Level of Service	D	D		E	B	B	D	C	D	E	C	C
Approach Delay (s)		44.6			38.3			34.4			37.6	
Approach LOS		D			D			C			D	

Intersection Summary			
HCM Average Control Delay	38.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	78.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	70.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	45	85	30	270	130	155	70	655	375	80	645	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1805	1696		3335	1810	1538	1719	3438	1369	1805	3438	1468
Flt Permitted	0.66	1.00		0.43	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1262	1696		1505	1810	1538	1719	3438	1369	1805	3438	1468
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	51	96	34	303	146	174	79	736	421	90	725	11
RTOR Reduction (vph)	0	25	0	0	0	120	0	0	258	0	0	7
Lane Group Flow (vph)	51	105	0	303	146	54	79	736	163	90	725	4
Heavy Vehicles (%)	0%	5%	15%	5%	5%	5%	5%	5%	18%	0%	5%	10%
Turn Type	Perm	NA		pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4			8		8			2			6
Actuated Green, G (s)	7.0	7.0		15.7	15.7	15.7	2.7	19.6	19.6	3.2	20.1	20.1
Effective Green, g (s)	7.0	7.0		15.7	15.7	15.7	2.7	19.6	19.6	3.2	20.1	20.1
Actuated g/C Ratio	0.14	0.14		0.31	0.31	0.31	0.05	0.39	0.39	0.06	0.40	0.40
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	175	235		638	563	478	92	1334	531	114	1368	584
v/s Ratio Prot		0.06		c0.04	0.08		0.05	c0.21		c0.05	0.21	
v/s Ratio Perm	0.04			c0.10		0.04			0.12			0.00
v/c Ratio	0.29	0.45		0.47	0.26	0.11	0.86	0.55	0.31	0.79	0.53	0.01
Uniform Delay, d1	19.5	20.0		13.4	13.0	12.4	23.7	12.0	10.7	23.3	11.6	9.2
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.9	1.4		0.6	0.2	0.1	50.4	1.6	1.5	29.5	1.5	0.0
Delay (s)	20.5	21.3		13.9	13.3	12.5	74.1	13.7	12.2	52.8	13.1	9.2
Level of Service	C	C		B	B	B	E	B	B	D	B	A
Approach Delay (s)		21.1			13.4			17.0			17.3	
Approach LOS		C			B			B			B	

Intersection Summary			
HCM Average Control Delay	16.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	50.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	49.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	90	185	35	255	205	220	50	430	380	120	800	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	1767		3335	1810	1538	1805	3438	1369	1719	3438	1538
Flt Permitted	0.62	1.00		0.36	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1129	1767		1269	1810	1538	1805	3438	1369	1719	3438	1538
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	94	193	36	266	214	229	52	448	396	125	833	21
RTOR Reduction (vph)	0	12	0	0	0	148	0	0	263	0	0	13
Lane Group Flow (vph)	94	217	0	266	214	81	52	448	133	125	833	8
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	0%	5%	18%	5%	5%	5%
Turn Type	Perm	NA		pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4			8		8			2			6
Actuated Green, G (s)	11.6	11.6		19.7	19.7	19.7	2.2	18.8	18.8	5.3	21.9	21.9
Effective Green, g (s)	11.6	11.6		19.7	19.7	19.7	2.2	18.8	18.8	5.3	21.9	21.9
Actuated g/C Ratio	0.21	0.21		0.35	0.35	0.35	0.04	0.34	0.34	0.09	0.39	0.39
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	235	367		600	639	543	71	1158	461	163	1349	604
v/s Ratio Prot		c0.12		c0.03	0.12		0.03	0.13		c0.07	c0.24	
v/s Ratio Perm	0.08			0.12		0.05			0.10			0.01
v/c Ratio	0.40	0.59		0.44	0.33	0.15	0.73	0.39	0.29	0.77	0.62	0.01
Uniform Delay, d1	19.1	20.0		13.1	13.2	12.3	26.5	14.1	13.6	24.6	13.6	10.4
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.1	2.6		0.5	0.3	0.1	31.9	1.0	1.6	19.2	2.1	0.0
Delay (s)	20.2	22.5		13.6	13.6	12.5	58.4	15.1	15.2	43.8	15.7	10.4
Level of Service	C	C		B	B	B	E	B	B	D	B	B
Approach Delay (s)		21.8			13.2			17.6			19.2	
Approach LOS		C			B			B			B	

Intersection Summary			
HCM Average Control Delay	17.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	55.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	57.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	130	330	135	530	545	350	175	410	465	175	400	185
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1805	1817		3335	1810	1538	1719	3438	1392	1719	3139	1468
Flt Permitted	0.33	1.00		0.11	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	624	1817		401	1810	1538	1719	3438	1392	1719	3139	1468
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	159	402	165	646	665	427	213	500	567	213	488	226
RTOR Reduction (vph)	0	14	0	0	0	214	0	0	308	0	0	147
Lane Group Flow (vph)	159	553	0	646	665	214	213	500	260	213	488	79
Heavy Vehicles (%)	0%	0%	0%	5%	5%	5%	5%	5%	16%	5%	15%	10%
Turn Type	Perm	NA		pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4			8		8			2			6
Actuated Green, G (s)	31.0	31.0		50.0	50.0	50.0	15.1	25.0	25.0	13.0	22.9	22.9
Effective Green, g (s)	31.0	31.0		50.0	50.0	50.0	15.1	25.0	25.0	13.0	22.9	22.9
Actuated g/C Ratio	0.31	0.31		0.50	0.50	0.50	0.15	0.25	0.25	0.13	0.23	0.23
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	193	563		641	905	769	260	860	348	223	719	336
v/s Ratio Prot		0.30		c0.15	0.37		0.12	0.15		c0.12	0.16	
v/s Ratio Perm	0.25			c0.35		0.14			c0.19			0.05
v/c Ratio	0.82	0.98		1.01	0.73	0.28	0.82	0.58	0.75	0.96	0.68	0.23
Uniform Delay, d1	32.0	34.2		29.5	19.8	14.5	41.1	32.9	34.6	43.2	35.2	31.4
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	23.9	33.0		37.5	3.1	0.2	17.9	2.9	13.6	47.3	5.1	1.6
Delay (s)	55.8	67.2		67.0	22.9	14.7	59.0	35.8	48.1	90.5	40.3	33.0
Level of Service	E	E		E	C	B	E	D	D	F	D	C
Approach Delay (s)		64.7			37.3			45.1			50.1	
Approach LOS		E			D			D			D	

Intersection Summary			
HCM Average Control Delay	46.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	75.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	50	95	35	295	140	170	75	715	410	85	705	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1805	1694		3335	1810	1538	1719	3438	1369	1805	3438	1468
Flt Permitted	0.66	1.00		0.43	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1249	1694		1506	1810	1538	1719	3438	1369	1805	3438	1468
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	56	107	39	331	157	191	84	803	461	96	792	11
RTOR Reduction (vph)	0	26	0	0	0	131	0	0	284	0	0	7
Lane Group Flow (vph)	56	120	0	331	157	60	84	803	177	96	792	4
Heavy Vehicles (%)	0%	5%	15%	5%	5%	5%	5%	5%	18%	0%	5%	10%
Turn Type	Perm	NA		pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4			8		8			2			6
Actuated Green, G (s)	7.3	7.3		16.1	16.1	16.1	3.7	19.8	19.8	3.7	19.8	19.8
Effective Green, g (s)	7.3	7.3		16.1	16.1	16.1	3.7	19.8	19.8	3.7	19.8	19.8
Actuated g/C Ratio	0.14	0.14		0.31	0.31	0.31	0.07	0.38	0.38	0.07	0.38	0.38
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	177	240		640	565	480	123	1319	525	129	1319	563
v/s Ratio Prot		0.07		c0.05	0.09		0.05	c0.23		c0.05	0.23	
v/s Ratio Perm	0.04			c0.11		0.04			0.13			0.00
v/c Ratio	0.32	0.50		0.52	0.28	0.12	0.68	0.61	0.34	0.74	0.60	0.01
Uniform Delay, d1	19.9	20.5		13.7	13.4	12.7	23.4	12.8	11.3	23.5	12.7	9.8
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.0	1.6		0.7	0.3	0.1	14.5	2.1	1.7	20.5	2.0	0.0
Delay (s)	20.9	22.1		14.4	13.6	12.8	37.9	14.9	13.0	44.0	14.8	9.9
Level of Service	C	C		B	B	B	D	B	B	D	B	A
Approach Delay (s)		21.8			13.8			15.7			17.8	
Approach LOS		C			B			B			B	

Intersection Summary			
HCM Average Control Delay	16.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	51.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	53.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	100	200	40	280	225	240	55	470	415	130	870	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	1764		3335	1810	1538	1805	3438	1369	1719	3438	1538
Flt Permitted	0.61	1.00		0.33	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1109	1764		1176	1810	1538	1805	3438	1369	1719	3438	1538
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	104	208	42	292	234	250	57	490	432	135	906	21
RTOR Reduction (vph)	0	13	0	0	0	161	0	0	287	0	0	13
Lane Group Flow (vph)	104	237	0	292	234	89	57	490	145	135	906	8
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	0%	5%	18%	5%	5%	5%
Turn Type	Perm	NA		pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4			8		8			2			6
Actuated Green, G (s)	12.0	12.0		20.1	20.1	20.1	2.2	18.8	18.8	5.3	21.9	21.9
Effective Green, g (s)	12.0	12.0		20.1	20.1	20.1	2.2	18.8	18.8	5.3	21.9	21.9
Actuated g/C Ratio	0.21	0.21		0.36	0.36	0.36	0.04	0.33	0.33	0.09	0.39	0.39
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	237	377		578	647	550	71	1150	458	162	1340	599
v/s Ratio Prot		c0.13		c0.04	0.13		0.03	0.14		c0.08	c0.26	
v/s Ratio Perm	0.09			0.14		0.06			0.11			0.01
v/c Ratio	0.44	0.63		0.51	0.36	0.16	0.80	0.43	0.32	0.83	0.68	0.01
Uniform Delay, d1	19.2	20.1		13.2	13.3	12.3	26.8	14.5	13.9	25.0	14.2	10.5
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.3	3.3		0.7	0.3	0.1	46.2	1.2	1.8	29.1	2.8	0.0
Delay (s)	20.5	23.3		13.9	13.7	12.4	73.0	15.7	15.7	54.1	17.0	10.6
Level of Service	C	C		B	B	B	E	B	B	D	B	B
Approach Delay (s)		22.5			13.4			19.0			21.6	
Approach LOS		C			B			B			C	

Intersection Summary			
HCM Average Control Delay	18.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	56.2	Sum of lost time (s)	16.0
Intersection Capacity Utilization	61.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

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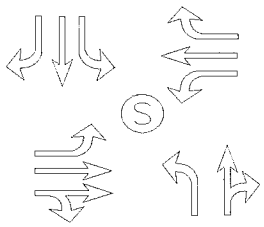
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : FIRST STREET
N/S STREET : ALAMEDA ST/WB I-210 FWY
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 20
ROUTE 2B

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
FIRST STREET						
EB LEFT	15	5%		15	5	20
EB THRU	320	5%		320	30	350
EB RIGHT	420	5%	**50**	470	40	510
WB LEFT	410	5%		410	35	445
WB THRU	640	5%		640	60	700
WB RIGHT	40	5%		40	5	45
ALAMEDA ST/WB I-210 FWY						
NB LEFT	310	5%		310	30	340
NB THRU	50	5%		50	5	55
NB RIGHT	15	5%		15	5	20
SB LEFT	45	5%		45	5	50
SB THRU	35	5%		35	5	40
SB RIGHT	80	5%		80	5	85
TOTALS	**2380**		**50**	**2430**	**230**	**2660**

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Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax
Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : FIRST STREET
N/S STREET : ALAMEDA ST/WB I-210 FWY
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 20
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
FIRST STREET						
EB LEFT	25	5%		25	5	30
EB THRU	210	5%		210	20	230
EB RIGHT	215	5%	**50**	265	25	290
WB LEFT	120	5%		120	10	130
WB THRU	220	5%		220	20	240
WB RIGHT	25	30%		25	5	30
ALAMEDA ST/WB I-210 FWY						
NB LEFT	350	10%		350	30	380
NB THRU	55	5%		55	5	60
NB RIGHT	45	5%		45	5	50
SB LEFT	30	5%		30	5	35
SB THRU	25	5%		25	5	30
SB RIGHT	65	5%		65	5	70
TOTALS	**1385**		**50**	**1435**	**140**	**1575**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : FIRST STREET
N/S STREET : ALAMEDA ST/WB I-210 FWY
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 20
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
FIRST STREET						
EB LEFT	20	5%		20	5	25
EB THRU	395	5%		395	35	430
EB RIGHT	215	5%	**50**	265	25	290
WB LEFT	150	5%		150	15	165
WB THRU	240	5%		240	20	260
WB RIGHT	35	5%		35	5	40
ALAMEDA ST/WB I-210 FWY						
NB LEFT	445	5%		445	40	485
NB THRU	75	5%		75	5	80
NB RIGHT	70	5%		70	5	75
SB LEFT	50	5%		50	5	55
SB THRU	35	5%		35	5	40
SB RIGHT	65	5%		65	5	70
TOTALS	**1795**		**50**	**1845**	**170**	**2015**

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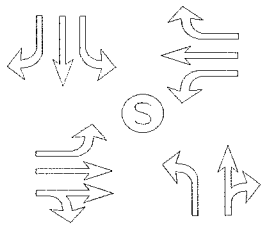
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : FIRST STREET
N/S STREET : ALAMEDA ST/WB I-210 FWY
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 20
ROUTE 2B

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
FIRST STREET								
EB LEFT	13	0	0	15	**0**	15	5	20
EB THRU	308	12	36	345	**0**	345	30	375
EB RIGHT	412	10	30	440	**150**	590	55	645
WB LEFT	402	7	21	425	**0**	425	40	465
WB THRU	626	13	39	665	**0**	665	60	725
WB RIGHT	39	1	3	40	**0**	40	5	45
ALAMEDA ST/WB I-210 FWY								
NB LEFT	292	20	60	350	**0**	350	30	380
NB THRU	47	2	6	55	**0**	55	5	60
NB RIGHT	14	0	0	15	**0**	15	5	20
SB LEFT	44	1	3	45	**0**	45	5	50
SB THRU	34	2	6	40	**0**	40	5	45
SB RIGHT	78	1	3	80	**0**	80	5	85
TOTALS	**2309**				**150**	**2665**	**250**	**2915**

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Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

Hall & Foreman, Inc.
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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : FIRST STREET
N/S STREET : ALAMEDA ST/WB I-210 FWY
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 20
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
FIRST STREET								
EB LEFT	22	1	3	25	**0**	25	5	30
EB THRU	204	4	12	215	**0**	215	20	235
EB RIGHT	202	11	33	235	**150**	385	35	420
WB LEFT	117	3	9	125	**0**	125	10	135
WB THRU	217	5	15	230	**0**	230	20	250
WB RIGHT	16	7	21	35	**0**	35	5	40
ALAMEDA ST/WB I-210 FWY								
NB LEFT	318	33	99	415	**0**	415	35	450
NB THRU	52	3	9	60	**0**	60	5	65
NB RIGHT	47	0	0	45	**0**	45	5	50
SB LEFT	27	1	3	30	**0**	30	5	35
SB THRU	24	0	0	25	**0**	25	5	30
SB RIGHT	67	0	0	65	**0**	65	5	70
TOTALS	**1313**				**150**	**1655**	**155**	**1810**

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Hall & Foreman, Inc.
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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : FIRST STREET
N/S STREET : ALAMEDA ST/WB I-210 FWY
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 20
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
FIRST STREET								
EB LEFT	18	0	0	20	**0**	20	5	25
EB THRU	387	6	18	405	**0**	405	35	440
EB RIGHT	212	4	12	225	**150**	375	35	410
WB LEFT	151	1	3	155	**0**	155	15	170
WB THRU	237	3	9	245	**0**	245	20	265
WB RIGHT	37	0	0	35	**0**	35	5	40
ALAMEDA ST/WB I-210 FWY								
NB LEFT	428	16	48	475	**0**	475	45	520
NB THRU	73	0	0	75	**0**	75	5	80
NB RIGHT	70	0	0	70	**0**	70	5	75
SB LEFT	50	0	0	50	**0**	50	5	55
SB THRU	36	1	3	40	**0**	40	5	45
SB RIGHT	63	1	3	65	**0**	65	5	70
TOTALS	**1762**				**150**	**2010**	**185**	**2195**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: ALAMEDA
EAST-WEST STREET: 1ST
JURISDICTION: IRWINDALE

DATE: 06-08-11

PEAK HOUR: 07:30AM

NORTH LEG (SB)

TOTAL: 160

79 (80)	36 (35)	45	Total
30	9	15	1st
18	16	17	2nd
13	6	8	3rd
18	5	5	4th
Rt	Thru	Lt	

TT = 4
TT% = 4/160 = 2.5% ≈ 3%

TT = 21
TT% = 21/1088 = 1.93% ≈ 2%

EAST LEG TOTAL: (WB) 1,088

Rt	12	12	15	1	40
Thru	161	155	165	158	639 (640)
Lt	158	68	126	57	409 (410)
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
13 (15)	3	3	3	4	Lt
320	51	118	103	48	Thru
422 (420)	121	136	95	70	Rt

WEST LEG TOTAL: (EB) 755

TT = 22
TT% = 22/755 = 2.91% ≈ 3%

PEAK HOUR FACTORS

NORTH LEG = 0.74
SOUTH LEG = 0.78
EAST LEG = 0.82
WEST LEG = 0.73

ALL LEGS = 0.91

	Lt	Thru	Rt
1st	51	9	3
2nd	61	18	5
3rd	105	13	2
4th	95	9	4
Total	312 (310)	49 (50)	14 (15)

SOUTH LEG (NB)

TT = 22
TT% = 22/375 = 5.87% ≈ 6%

TOTAL: 375

HOUR TOTAL: 2,378

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: ALAMEDA

EAST-WEST STREET: 1ST

TIME: 07:00AM-08:00AM DATE: 06-08-11

NORTH LEG

69	68	51	Total
10	20	9	1st
11	23	10	2nd
30	9	15	3rd
18	16	17	4th
Rt	Thru	Lt	

Rt	6	9	12	12	39
Thru	93	107	161	155	516
Lt	99	120	158	68	445
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
10	1	3	3	3	Lt
220	20	31	51	118	Thru
417	71	89	121	136	Rt

	Lt	Thru	Rt
1st	22	5	3
2nd	32	8	2
3rd	51	9	3
4th	61	18	5
Total	166	40	13

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: ALAMEDA

EAST-WEST STREET: 1ST

TIME: 08:00AM-09:00AM DATE: 06-08-11

NORTH LEG

Rt	Thru	Lt	
64	32	31	Total
13	6	8	1st
18	5	5	2nd
17	9	5	3rd
16	12	13	4th

	1st	2nd	3rd	4th	Total
Rt	15	1	3	6	25
Thru	165	158	135	154	612
Lt	126	57	48	20	251

Total	1st	2nd	3rd	4th	
9	3	4	1	1	Lt
241	103	48	30	60	Thru
302	95	70	60	77	Rt

	Lt	Thru	Rt
1st	105	13	2
2nd	95	9	4
3rd	91	7	2
4th	77	15	3
Total	368	44	11

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : ALAMEDA — IRWINDALE

EAST-WEST STREET : 1ST — 06-08-11

BEGINNING TIME : 07:00AM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
					SB NORTH LEG							
10	20	9	0	0	0	0	0	0	0	0	0	39
11	23	10	0	0	0	0	0	0	0	0	0	44
30	9	14	0	0	1	0	0	0	0	0	0	54
17	15	17	1	1	0	0	0	0	0	0	0	51
13	6	8	0	0	0	0	0	0	0	0	0	27
18	4	5	0	1	0	0	0	0	0	0	0	28
17	9	5	0	0	4 0	0	0	0 0	0	0	0 0	31
16	12	13	0	0	0	0	0	0	0	0	0	41
						TT=4+0+0=4						
132	98	81	1	2	1	0	0	0	0	0	0	315
					NB SOUTH LEG							
3	5	22	0	0	0	0	0	0	0	0	0	30
2	8	27	0	0	3	0	0	0	0	0	2	42
3	9	41	0	0	3	0	0	3	0	0	4	63
5	16	59	0	1	1	0	1	0	0	0	1	84
2	13	101	0	0	1	0	0	0	0	0	3	120
4	9	91	0	0	3	0	0	0	0	0	1	108
2	6	86	0	1	9 4	0	0	4 1	0	0	9 0	100
2	13	74	0	1	2	1	0	1	0	1	0	95
						TT=9+4+9=22						
23	79	501	0	3	17	1	1	5	0	1	11	642
					WB EAST LEG							
6	93	99	0	0	0	0	0	0	0	0	0	198
9	103	118	0	3	0	0	0	1	0	1	1	236
12	157	156	0	4	0	0	0	1	0	0	1	331
11	151	65	1	4	2	0	0	0	0	0	1	235
15	163	125	0	1	1	0	1	0	0	0	0	306
1	155	56	0	3	1	0	0	0	0	0	0	216
3	132	48	0	3	17 0	0	0	2 0	0	0	2 0	186
6	151	18	0	3	0	0	0	0	0	0	2	180
						TT=17+2+2=21						
63	1105	685	1	21	4	0	1	2	0	1	5	1888
					EB WEST LEG							
71	20	1	0	0	0	0	0	0	0	0	0	92
85	29	3	2	2	0	1	0	0	1	0	0	123
119	48	3	1	3	0	1	0	0	0	0	0	175
134	112	3	2	5	0	0	1	0	0	0	0	257
93	102	3	1	1	0	1	0	0	0	0	0	201
66	46	4	4	2	0	0	0	0	0	0	0	122
58	29	1	1	1	19 0	1	0	3 0	0	0	0 0	91
77	58	1	0	2	0	0	0	0	0	0	0	138
						TT=19+3+0=22						
703	444	19	11	16	0	4	1	0	1	0	0	1199

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: ALAMEDA
EAST-WEST STREET: 1ST
JURISDICTION: IRWINDALE

DATE: 06-08-11

PEAK HOUR: 12:00PM

NORTH LEG (SB)

TOTAL: 119

TT = 1
TT% = 1/119 = 0.84%
≈ 1%

Rt	Thru	Lt	
65 67	25 24	30 28	Total
22	6	6	1st
13	5	10	2nd
20	8	7	3rd
12	5	5	4th

TT = 15
TT% = 15/365 = 4.11%
≈ 4%

EAST LEG TOTAL: (WB) 365

	1st	2nd	3rd	4th	Total
Rt	8	6	5	4	25 23
Thru	61	49	53	59	220 222
Lt	28	26	32	34	120

Total	1st	2nd	3rd	4th	
25 23	3	5	7	8	Lt
210 208	50	44	58	56	Thru
215 213	62	49	47	55	Rt

WEST LEG TOTAL: (EB) 444

TT = 16
TT% = 16/444 = 3.6%
≈ 4%

PEAK HOUR FACTORS

NORTH LEG = 0.85
SOUTH LEG = 0.89
EAST LEG = 0.94
WEST LEG = 0.93

ALL LEGS = 0.95

	Lt	Thru	Rt
1st	85	12	9
2nd	93	14	9
3rd	83	8	13
4th	90	21	16
Total	350 351	55	45 47

SOUTH LEG (NB)

TT = 36
TT% = 36/453 = 7.95%
≈ 8%

TOTAL: 453

HOUR TOTAL: 1,381

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: ALAMEDA

EAST-WEST STREET: 1ST

TIME: 12:00PM-01:00PM DATE: 06-08-11

NORTH LEG

67	24	28	Total
22	6	6	1st
13	5	10	2nd
20	8	7	3rd
12	5	5	4th
Rt	Thru	Lt	

Rt	8	6	5	4	23
Thru	61	49	53	59	222
Lt	28	26	32	34	120
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
23	3	5	7	8	Lt
208	50	44	58	56	Thru
213	62	49	47	55	Rt

	Lt	Thru	Rt
1st	85	12	9
2nd	93	14	9
3rd	83	8	13
4th	90	21	16
Total	351	55	47

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: ALAMEDA

EAST-WEST STREET: 1ST

TIME: 01:00PM-02:00PM DATE: 06-08-11

NORTH LEG

Rt	Thru	Lt	
74	32	35	Total
12	9	5	1st
19	6	9	2nd
24	8	10	3rd
19	9	11	4th

	1st	2nd	3rd	4th	Total
Rt	10	10	14	12	46
Thru	38	34	53	73	198
Lt	28	24	35	26	113

Total	1st	2nd	3rd	4th	
19	5	9	1	4	Lt
230	52	53	60	65	Thru
241	46	64	64	67	Rt

	Lt	Thru	Rt
1st	78	14	12
2nd	61	17	6
3rd	65	15	9
4th	85	15	8
Total	289	61	35

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : ALAMEDA — IRWINDALE

EAST-WEST STREET : 1ST — 06-08-11

BEGINNING TIME : 12:00PM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
					SB NORTH LEG							
22	6	5	0	0	1	0	0	0	0	0	0	34
13	5	10	0	0	0	0	0	0	0	0	0	28
20	8	7	0	0	0	0	0	0	0	0	0	35
12	5	5	0	0	0	0	0	0	0	0	0	22
12	8	5	0	1	0	0	0	0	0	0	0	26
18	6	9	1	0	0	0	0	0	0	0	0	34
21	8	10	2	0	0	1	0	0	0	0	0	42
19	9	11	0	0	0	0	0	0	0	0	0	39
						TT=1+0+0=1						
137	55	62	3	1	1	1	0	0	0	0	0	260
					NB SOUTH LEG							
9	12	81	0	0	3	0	0	0	0	0	1	106
9	14	85	0	0	2	0	0	4	0	0	2	116
13	5	68	0	3	8	0	0	3	0	0	4	104
16	21	84	0	0	2	0	0	0	0	0	4	127
11	13	75	1	1	1	0	0	1	0	0	1	104
6	17	55	0	0	2	0	0	2	0	0	2	84
9	15	61	0	0	2	0	0	0	0	0	2	89
8	15	79	0	0	5	0	0	1	0	0	0	108
						TT=18+7+11=36						
81	112	588	1	4	25	0	0	11	0	0	16	838
					WB EAST LEG							
7	61	27	0	0	0	1	0	1	0	0	0	97
3	46	25	1	3	1	2	0	0	0	0	0	81
2	52	32	2	0	0	1	1	0	0	0	0	90
4	58	33	0	0	1	0	1	0	0	0	0	97
10	36	27	0	2	1	0	0	0	0	0	0	76
10	32	24	0	2	0	0	0	0	0	0	0	68
12	52	35	1	1	0	0	0	0	1	0	0	102
10	72	25	2	0	1	0	0	0	0	1	0	111
						TT=8+7+0=15						
58	409	228	6	8	4	4	2	1	1	1	0	722
					EB WEST LEG							
60	49	3	1	0	0	0	1	0	1	0	0	115
45	43	4	2	1	0	1	0	1	1	0	0	98
46	56	7	0	1	0	1	0	0	0	1	0	112
51	56	8	2	0	0	2	0	0	0	0	0	119
46	52	5	0	0	0	0	0	0	0	0	0	103
63	51	9	0	1	0	0	1	0	1	0	0	126
64	60	1	0	0	0	0	0	0	0	0	0	125
62	64	4	1	1	0	0	0	0	4	0	0	136
						TT=7+6+3=16						
437	431	41	6	4	0	4	2	1	7	1	0	934

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: ALAMEDA
EAST-WEST STREET: 1ST
JURISDICTION: IRWINDALE

DATE: 06-08-11

PEAK HOUR: 05:00PM

NORTH LEG (SB)

TOTAL: 151

TT = 2

TT% = 2/151 = 1.32% ≈ 1%

65 64	35 37	50	Total
12	13	15	1st
17	7	10	2nd
16	9	14	3rd
19	8	11	4th
Rt	Thru	Lt	

TT = 4

TT% = 4/429 = 0.93% ≈ 1%

EAST LEG TOTAL: (WB) 429

Rt	9	7	9	12	35 37
Thru	72	59	69	40	240
Lt	42	31	40	39	150 152
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
20 18	4	4	5	5	Lt
390 393	94	88	118	93	Thru
215 216	48	49	53	66	Rt

WEST LEG TOTAL: (EB) 627

TT = 10

TT% = 10/627 = 1.59% ≈ 2%

PEAK HOUR FACTORS

NORTH LEG = 0.94
SOUTH LEG = 0.91
EAST LEG = 0.87
WEST LEG = 0.89

ALL LEGS = 0.93

TT = 16

TT% = 16/587 = 2.73% ≈ 3%

	Lt	Thru	Rt
1st	108	18	15
2nd	121	20	21
3rd	120	14	14
4th	95	21	20
Total	444 445	73 75	70

SOUTH LEG (NB)

TOTAL: 587

HOUR TOTAL: 1,794

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: ALAMEDA

EAST-WEST STREET: 1ST

TIME: 04:00PM-05:00PM DATE: 06-08-11

NORTH LEG

58	40	40	Total
15	11	12	1st
16	10	12	2nd
12	11	8	3rd
15	8	8	4th
Rt	Thru	Lt	

Rt	8	4	7	10	29
Thru	54	57	45	66	222
Lt	40	25	36	40	141
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
23	5	1	6	11	Lt
273	62	62	72	77	Thru
189	53	43	49	44	Rt

	Lt	Thru	Rt
1st	93	20	21
2nd	99	19	19
3rd	69	16	17
4th	78	16	17
Total	339	71	74

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: ALAMEDA

EAST-WEST STREET: 1ST

TIME: 05:00PM-06:00PM DATE: 06-08-11

NORTH LEG

64	37	50	Total
12	13	15	1st
17	7	10	2nd
16	9	14	3rd
19	8	11	4th
Rt	Thru	Lt	

Rt	9	7	9	12	37
Thru	72	59	69	40	240
Lt	42	31	40	39	152
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
18	4	4	5	5	Lt
393	94	88	118	93	Thru
216	48	49	53	66	Rt

	Lt	Thru	Rt
1st	108	18	15
2nd	121	20	21
3rd	120	14	14
4th	95	21	20
Total	444	73	70

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : ALAMEDA — IRWINDALE

EAST-WEST STREET : 1ST — 06-08-11

BEGINNING TIME : 04:00PM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
					SB NORTH LEG							
15	11	12	0	0	0	0	0	0	0	0	0	38
16	10	12	0	0	0	0	0	0	0	0	0	38
12	11	8	0	0	0	0	0	0	0	0	0	31
15	8	8	0	0	0	0	0	0	0	0	0	31
12	12	15	0	1	0	0	0	0	0	0	0	40
17	7	10	0	0	0	0	0	0	0	0	0	34
16	9	14	0	0	0	0	0	0	0	0	0	39
18	8	11	1	0	2 0	0	0	0 0	0	0	0 0	38
					TT= 2+0+0= 2							
121	76	90	1	1	0	0	0	0	0	0	0	289
					NB SOUTH LEG							
21	18	88	0	2	2	0	0	1	0	0	2	134
19	18	93	0	1	3	0	0	0	0	0	3	137
16	16	67	1	0	0	0	0	1	0	0	1	102
17	15	74	0	1	1	0	0	0	0	0	3	111
15	18	104	0	0	2	0	0	0	0	0	2	141
21	20	116	0	0	4	0	0	0	0	0	1	162
14	14	116	0	0	3	0	0	0	0	0	1	148
20	21	92	0	0	10 1	0	0	1 1	0	0	5 1	136
					TT= 10+1+5= 16							
143	140	750	1	4	16	0	0	3	0	0	14	1071
					WB EAST LEG							
8	54	39	0	0	1	0	0	0	0	0	0	102
3	56	25	0	1	0	1	0	0	0	0	0	86
7	44	34	0	1	0	0	0	1	0	0	1	88
10	65	39	0	1	1	0	0	0	0	0	0	116
9	72	42	0	0	0	0	0	0	0	0	0	123
7	58	31	0	1	0	0	0	0	0	0	0	97
9	68	39	0	1	1	0	0	0	0	0	0	118
12	39	39	0	1	4 0	0	0	0 0	0	0	0 0	91
					TT= 4+0+0= 4							
65	456	288	0	6	3	1	0	1	0	0	1	821
					EB WEST LEG							
53	59	5	0	2	0	0	1	0	0	0	0	120
42	61	1	1	1	0	0	0	0	0	0	0	106
47	71	5	1	1	1	0	0	0	1	0	0	127
43	74	11	0	2	0	1	0	0	0	1	0	132
45	91	4	2	3	0	0	0	0	1	0	0	146
49	87	4	0	1	0	0	0	0	0	0	0	141
53	116	5	0	2	0	0	0	0	0	0	0	176
65	93	5	1	0	9 0	0	0	0 0	0	0	1 0	164
					TT= 9+0+1= 10							
397	652	40	5	12	1	1	1	0	2	1	0	1112

Prepared by Newport Traffic Studies

HCM Signalized Intersection Capacity Analysis
20: WB 210 Fwy/Alameda St & First St

8/10/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	320	420	410	640	40	310	50	15	45	35	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.91		1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1805	3145		1719	1810	1538	1719	1767		1719	1810	1538
Flt Permitted	0.30	1.00		0.31	1.00	1.00	0.73	1.00		0.71	1.00	1.00
Satd. Flow (perm)	579	3145		569	1810	1538	1325	1767		1286	1810	1538
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	16	352	462	451	703	44	341	55	16	49	38	88
RTOR Reduction (vph)	0	143	0	0	0	14	0	9	0	0	0	67
Lane Group Flow (vph)	16	671	0	451	703	30	341	62	0	49	38	21
Heavy Vehicles (%)	0%	5%	5%	5%	5%	5%	5%	5%	0%	5%	5%	5%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		6
Actuated Green, G (s)	76.0	76.0		76.0	76.0	76.0	26.0	26.0		26.0	26.0	26.0
Effective Green, g (s)	76.0	76.0		76.0	76.0	76.0	26.0	26.0		26.0	26.0	26.0
Actuated g/C Ratio	0.69	0.69		0.69	0.69	0.69	0.24	0.24		0.24	0.24	0.24
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	400	2173		393	1251	1063	313	418		304	428	364
v/s Ratio Prot		0.21			0.39			0.03			0.02	
v/s Ratio Perm	0.03			c0.79		0.02	c0.26			0.04		0.01
v/c Ratio	0.04	0.31		1.15	0.56	0.03	1.09	0.15		0.16	0.09	0.06
Uniform Delay, d1	5.4	6.7		17.0	8.6	5.4	42.0	33.2		33.3	32.8	32.5
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.0	0.1		92.1	0.6	0.0	76.9	0.7		1.1	0.4	0.3
Delay (s)	5.4	6.8		109.1	9.2	5.4	118.9	34.0		34.5	33.2	32.8
Level of Service	A	A		F	A	A	F	C		C	C	C
Approach Delay (s)		6.7			46.6			104.3			33.4	
Approach LOS		A			D			F			C	

Intersection Summary			
HCM Average Control Delay	42.2	HCM Level of Service	D
HCM Volume to Capacity ratio	1.13		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	78.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
20: WB 210 Fwy/Alameda St & First St

8/10/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	210	215	120	220	25	350	55	45	30	25	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.92		1.00	1.00	0.85	1.00	0.93		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1719	3177		1719	1810	1242	1641	1725		1719	1900	1615
Flt Permitted	0.60	1.00		0.48	1.00	1.00	0.74	1.00		0.69	1.00	1.00
Satd. Flow (perm)	1079	3177		861	1810	1242	1279	1725		1247	1900	1615
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	26	221	226	126	232	26	368	58	47	32	26	68
RTOR Reduction (vph)	0	164	0	0	0	19	0	22	0	0	0	32
Lane Group Flow (vph)	26	283	0	126	232	7	368	83	0	32	26	36
Heavy Vehicles (%)	5%	5%	5%	5%	5%	30%	10%	5%	0%	5%	0%	0%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		6
Actuated Green, G (s)	11.0	11.0		11.0	11.0	11.0	21.2	21.2		21.2	21.2	21.2
Effective Green, g (s)	11.0	11.0		11.0	11.0	11.0	21.2	21.2		21.2	21.2	21.2
Actuated g/C Ratio	0.27	0.27		0.27	0.27	0.27	0.53	0.53		0.53	0.53	0.53
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	295	869		236	495	340	674	910		658	1002	852
v/s Ratio Prot		0.09			0.13			0.05			0.01	
v/s Ratio Perm	0.02			c0.15		0.01	c0.29			0.03		0.02
v/c Ratio	0.09	0.33		0.53	0.47	0.02	0.55	0.09		0.05	0.03	0.04
Uniform Delay, d1	10.9	11.6		12.4	12.2	10.7	6.3	4.7		4.6	4.6	4.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.1	0.2		2.3	0.7	0.0	3.2	0.2		0.1	0.0	0.1
Delay (s)	11.0	11.9		14.7	12.9	10.7	9.5	4.9		4.7	4.6	4.7
Level of Service	B	B		B	B	B	A	A		A	A	A
Approach Delay (s)		11.8			13.3			8.5			4.7	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	10.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	40.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	55.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
20: WB 210 Fwy/Alameda St & First St

8/10/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	395	215	150	240	35	445	75	70	50	35	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.95		1.00	1.00	0.85	1.00	0.93		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1805	3256		1719	1810	1615	1719	1763		1805	1810	1538
Flt Permitted	0.56	1.00		0.32	1.00	1.00	0.73	1.00		0.66	1.00	1.00
Satd. Flow (perm)	1070	3256		580	1810	1615	1325	1763		1250	1810	1538
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	22	425	231	161	258	38	478	81	75	54	38	70
RTOR Reduction (vph)	0	155	0	0	0	25	0	39	0	0	0	36
Lane Group Flow (vph)	22	501	0	161	258	13	478	117	0	54	38	34
Heavy Vehicles (%)	0%	5%	5%	5%	5%	0%	5%	0%	0%	0%	5%	5%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		6
Actuated Green, G (s)	14.3	14.3		14.3	14.3	14.3	21.1	21.1		21.1	21.1	21.1
Effective Green, g (s)	14.3	14.3		14.3	14.3	14.3	21.1	21.1		21.1	21.1	21.1
Actuated g/C Ratio	0.33	0.33		0.33	0.33	0.33	0.49	0.49		0.49	0.49	0.49
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	353	1073		191	596	532	644	857		608	880	748
v/s Ratio Prot		0.15			0.14			0.07			0.02	
v/s Ratio Perm	0.02			c0.28		0.01	c0.36			0.04		0.02
v/c Ratio	0.06	0.47		0.84	0.43	0.02	0.74	0.14		0.09	0.04	0.05
Uniform Delay, d1	10.0	11.5		13.5	11.4	9.8	9.0	6.1		6.0	5.9	5.9
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.1	0.3		27.2	0.5	0.0	7.6	0.3		0.3	0.1	0.1
Delay (s)	10.0	11.9		40.7	11.9	9.9	16.5	6.5		6.3	5.9	6.0
Level of Service	B	B		D	B	A	B	A		A	A	A
Approach Delay (s)		11.8			21.9			14.0			6.1	
Approach LOS		B			C			B			A	

Intersection Summary			
HCM Average Control Delay	14.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	43.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	67.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
20: WB 210 Fwy/Alameda St & First St

8/11/2012

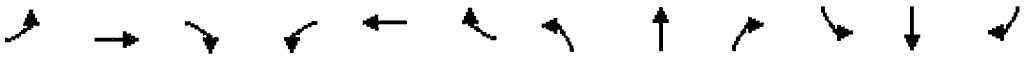
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	320	470	410	640	40	310	50	15	45	35	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.91		1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1805	2964		1719	1810	1538	1719	1767		1719	1810	1538
Flt Permitted	0.30	1.00		0.29	1.00	1.00	0.73	1.00		0.71	1.00	1.00
Satd. Flow (perm)	579	2964		532	1810	1538	1325	1767		1286	1810	1538
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	16	352	516	451	703	44	341	55	16	49	38	88
RTOR Reduction (vph)	0	159	0	0	0	14	0	9	0	0	0	67
Lane Group Flow (vph)	16	709	0	451	703	30	341	62	0	49	38	21
Heavy Vehicles (%)	0%	5%	15%	5%	5%	5%	5%	5%	0%	5%	5%	5%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		6
Actuated Green, G (s)	76.0	76.0		76.0	76.0	76.0	26.0	26.0		26.0	26.0	26.0
Effective Green, g (s)	76.0	76.0		76.0	76.0	76.0	26.0	26.0		26.0	26.0	26.0
Actuated g/C Ratio	0.69	0.69		0.69	0.69	0.69	0.24	0.24		0.24	0.24	0.24
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	400	2048		368	1251	1063	313	418		304	428	364
v/s Ratio Prot		0.24			0.39			0.03			0.02	
v/s Ratio Perm	0.03			c0.85		0.02	c0.26			0.04		0.01
v/c Ratio	0.04	0.35		1.23	0.56	0.03	1.09	0.15		0.16	0.09	0.06
Uniform Delay, d1	5.4	6.9		17.0	8.6	5.4	42.0	33.2		33.3	32.8	32.5
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.0	0.1		123.4	0.6	0.0	76.9	0.7		1.1	0.4	0.3
Delay (s)	5.4	7.0		140.4	9.2	5.4	118.9	34.0		34.5	33.2	32.8
Level of Service	A	A		F	A	A	F	C		C	C	C
Approach Delay (s)		7.0			58.4			104.3			33.4	
Approach LOS		A			E			F			C	

Intersection Summary			
HCM Average Control Delay	46.8	HCM Level of Service	D
HCM Volume to Capacity ratio	1.19		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	80.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
20: WB 210 Fwy/Alameda St & First St

8/11/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	210	265	120	220	25	350	55	45	30	25	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.92		1.00	1.00	0.85	1.00	0.93		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1719	2875		1719	1810	1242	1641	1725		1719	1900	1615
Flt Permitted	0.60	1.00		0.43	1.00	1.00	0.74	1.00		0.69	1.00	1.00
Satd. Flow (perm)	1080	2875		774	1810	1242	1279	1725		1247	1900	1615
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	26	221	279	126	232	26	368	58	47	32	26	68
RTOR Reduction (vph)	0	201	0	0	0	19	0	22	0	0	0	32
Lane Group Flow (vph)	26	299	0	126	232	7	368	83	0	32	26	36
Heavy Vehicles (%)	5%	5%	23%	5%	5%	30%	10%	5%	0%	5%	0%	0%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		6
Actuated Green, G (s)	11.4	11.4		11.4	11.4	11.4	21.2	21.2		21.2	21.2	21.2
Effective Green, g (s)	11.4	11.4		11.4	11.4	11.4	21.2	21.2		21.2	21.2	21.2
Actuated g/C Ratio	0.28	0.28		0.28	0.28	0.28	0.52	0.52		0.52	0.52	0.52
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	303	807		217	508	349	668	901		651	992	843
v/s Ratio Prot		0.10			0.13			0.05			0.01	
v/s Ratio Perm	0.02			c0.16		0.01	c0.29			0.03		0.02
v/c Ratio	0.09	0.37		0.58	0.46	0.02	0.55	0.09		0.05	0.03	0.04
Uniform Delay, d1	10.8	11.7		12.5	12.0	10.6	6.5	4.9		4.8	4.7	4.7
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.1	0.3		3.9	0.7	0.0	3.3	0.2		0.1	0.0	0.1
Delay (s)	10.9	12.0		16.5	12.7	10.6	9.8	5.1		4.9	4.7	4.8
Level of Service	B	B		B	B	B	A	A		A	A	A
Approach Delay (s)		12.0			13.8			8.7			4.8	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	10.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	40.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	57.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
20: WB 210 Fwy/Alameda St & First St

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	395	265	150	240	35	445	75	70	50	35	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.94		1.00	1.00	0.85	1.00	0.93		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1805	3067		1719	1810	1615	1719	1763		1805	1810	1538
Flt Permitted	0.57	1.00		0.29	1.00	1.00	0.73	1.00		0.66	1.00	1.00
Satd. Flow (perm)	1075	3067		525	1810	1615	1325	1763		1250	1810	1538
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	22	425	285	161	258	38	478	81	75	54	38	70
RTOR Reduction (vph)	0	188	0	0	0	25	0	39	0	0	0	37
Lane Group Flow (vph)	22	522	0	161	258	13	478	117	0	54	38	33
Heavy Vehicles (%)	0%	5%	19%	5%	5%	0%	5%	0%	0%	0%	5%	5%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		6
Actuated Green, G (s)	15.0	15.0		15.0	15.0	15.0	21.0	21.0		21.0	21.0	21.0
Effective Green, g (s)	15.0	15.0		15.0	15.0	15.0	21.0	21.0		21.0	21.0	21.0
Actuated g/C Ratio	0.34	0.34		0.34	0.34	0.34	0.48	0.48		0.48	0.48	0.48
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	366	1046		179	617	551	632	841		597	864	734
v/s Ratio Prot		0.17			0.14			0.07			0.02	
v/s Ratio Perm	0.02			c0.31		0.01	c0.36			0.04		0.02
v/c Ratio	0.06	0.50		0.90	0.42	0.02	0.76	0.14		0.09	0.04	0.05
Uniform Delay, d1	9.8	11.5		13.8	11.1	9.6	9.4	6.4		6.3	6.1	6.1
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.1	0.4		39.5	0.5	0.0	8.2	0.3		0.3	0.1	0.1
Delay (s)	9.8	11.9		53.3	11.6	9.7	17.6	6.8		6.6	6.2	6.3
Level of Service	A	B		D	B	A	B	A		A	A	A
Approach Delay (s)		11.8			26.1			15.0			6.4	
Approach LOS		B			C			B			A	

Intersection Summary			
HCM Average Control Delay	15.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	44.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	69.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
20: WB 210 Fwy/Alameda St & First St

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	350	510	445	700	45	340	55	15	50	40	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.91		1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1805	2965		1719	1810	1538	1719	1770		1719	1810	1538
Flt Permitted	0.27	1.00		0.27	1.00	1.00	0.73	1.00		0.71	1.00	1.00
Satd. Flow (perm)	511	2965		483	1810	1538	1318	1770		1280	1810	1538
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	16	385	560	489	769	49	374	60	16	55	44	93
RTOR Reduction (vph)	0	173	0	0	0	15	0	8	0	0	0	71
Lane Group Flow (vph)	16	772	0	489	769	34	374	68	0	55	44	22
Heavy Vehicles (%)	0%	5%	15%	5%	5%	5%	5%	5%	0%	5%	5%	5%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		6
Actuated Green, G (s)	76.0	76.0		76.0	76.0	76.0	26.0	26.0		26.0	26.0	26.0
Effective Green, g (s)	76.0	76.0		76.0	76.0	76.0	26.0	26.0		26.0	26.0	26.0
Actuated g/C Ratio	0.69	0.69		0.69	0.69	0.69	0.24	0.24		0.24	0.24	0.24
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	353	2049		334	1251	1063	312	418		303	428	364
v/s Ratio Prot		0.26			0.42			0.04			0.02	
v/s Ratio Perm	0.03			c1.01		0.02	c0.28			0.04		0.01
v/c Ratio	0.05	0.38		1.46	0.61	0.03	1.20	0.16		0.18	0.10	0.06
Uniform Delay, d1	5.4	7.1		17.0	9.1	5.4	42.0	33.3		33.5	32.9	32.5
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.1	0.1		224.6	0.9	0.0	116.2	0.8		1.3	0.5	0.3
Delay (s)	5.5	7.2		241.6	10.0	5.4	158.2	34.2		34.8	33.4	32.9
Level of Service	A	A		F	B	A	F	C		C	C	C
Approach Delay (s)		7.2			96.5			137.3			33.5	
Approach LOS		A			F			F			C	

Intersection Summary			
HCM Average Control Delay	69.2	HCM Level of Service	E
HCM Volume to Capacity ratio	1.40		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	86.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
20: WB 210 Fwy/Alameda St & First St

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	230	290	130	240	25	380	60	50	35	25	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.92		1.00	1.00	0.85	1.00	0.93		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1719	2876		1719	1810	1242	1641	1723		1719	1900	1615
Flt Permitted	0.56	1.00		0.39	1.00	1.00	0.74	1.00		0.68	1.00	1.00
Satd. Flow (perm)	1020	2876		705	1810	1242	1279	1723		1235	1900	1615
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	26	242	305	137	253	26	400	63	53	37	26	74
RTOR Reduction (vph)	0	216	0	0	0	18	0	26	0	0	0	36
Lane Group Flow (vph)	26	331	0	137	253	8	400	90	0	37	26	38
Heavy Vehicles (%)	5%	5%	23%	5%	5%	30%	10%	5%	0%	5%	0%	0%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		6
Actuated Green, G (s)	12.0	12.0		12.0	12.0	12.0	21.2	21.2		21.2	21.2	21.2
Effective Green, g (s)	12.0	12.0		12.0	12.0	12.0	21.2	21.2		21.2	21.2	21.2
Actuated g/C Ratio	0.29	0.29		0.29	0.29	0.29	0.51	0.51		0.51	0.51	0.51
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	297	838		205	527	362	658	887		635	978	831
v/s Ratio Prot		0.12			0.14			0.05			0.01	
v/s Ratio Perm	0.03			c0.19		0.01	c0.31			0.03		0.02
v/c Ratio	0.09	0.39		0.67	0.48	0.02	0.61	0.10		0.06	0.03	0.05
Uniform Delay, d1	10.6	11.7		12.8	12.0	10.4	7.1	5.1		5.0	4.9	5.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.1	0.3		8.0	0.7	0.0	4.1	0.2		0.2	0.1	0.1
Delay (s)	10.7	12.0		20.8	12.7	10.4	11.2	5.4		5.2	5.0	5.1
Level of Service	B	B		C	B	B	B	A		A	A	A
Approach Delay (s)		11.9			15.3			9.9			5.1	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	11.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	41.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	60.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
20: WB 210 Fwy/Alameda St & First St

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	340	290	165	260	40	485	80	75	55	40	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.93		1.00	1.00	0.85	1.00	0.93		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1805	3016		1719	1810	1615	1719	1762		1805	1810	1538
Flt Permitted	0.54	1.00		0.31	1.00	1.00	0.73	1.00		0.65	1.00	1.00
Satd. Flow (perm)	1019	3016		565	1810	1615	1319	1762		1238	1810	1538
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	22	366	312	177	280	43	522	86	81	59	43	75
RTOR Reduction (vph)	0	204	0	0	0	28	0	43	0	0	0	39
Lane Group Flow (vph)	22	474	0	177	280	15	522	124	0	59	43	36
Heavy Vehicles (%)	0%	5%	19%	5%	5%	0%	5%	0%	0%	0%	5%	5%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		6
Actuated Green, G (s)	15.3	15.3		15.3	15.3	15.3	21.0	21.0		21.0	21.0	21.0
Effective Green, g (s)	15.3	15.3		15.3	15.3	15.3	21.0	21.0		21.0	21.0	21.0
Actuated g/C Ratio	0.35	0.35		0.35	0.35	0.35	0.47	0.47		0.47	0.47	0.47
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	352	1042		195	625	558	625	835		587	858	729
v/s Ratio Prot		0.16			0.15			0.07			0.02	
v/s Ratio Perm	0.02			c0.31		0.01	c0.40			0.05		0.02
v/c Ratio	0.06	0.45		0.91	0.45	0.03	0.84	0.15		0.10	0.05	0.05
Uniform Delay, d1	9.7	11.3		13.8	11.2	9.6	10.1	6.6		6.4	6.3	6.3
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.1	0.3		39.2	0.5	0.0	12.5	0.4		0.3	0.1	0.1
Delay (s)	9.8	11.6		53.0	11.7	9.6	22.6	7.0		6.8	6.4	6.4
Level of Service	A	B		D	B	A	C	A		A	A	A
Approach Delay (s)		11.5			26.2			18.8			6.5	
Approach LOS		B			C			B			A	

Intersection Summary			
HCM Average Control Delay	17.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	44.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	71.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

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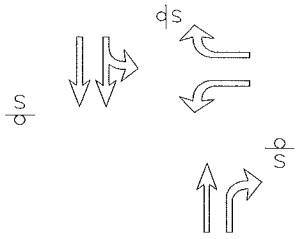
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	1 OF 6

E/W STREET : WB 134 FWY
N/S STREET : SCHOLL CANYON RD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 21
ROUTE 4A

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						

WB 134 FWY

EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	210	5%		210	20	230
WB THRU	0	0%		0	0	0
WB RIGHT	15	80%	**50**	65	5	70

SCHOLL CANYON RD

NB LEFT	0	0%		0	0	0
NB THRU	20	35%		20	5	25
NB RIGHT	635	5%		635	55	690
SB LEFT	5	60%		5	5	10
SB THRU	10	65%	**50**	60	5	65
SB RIGHT	0	0%		0	0	0
TOTALS	**895**		**100**	**995**	**95**	**1090**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	11-Sep-13	VV.110264.0000	2 OF 6

E/W STREET : WB 134 FWY
N/S STREET : SCHOLL CANYON RD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 21
ROUTE 4B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
WB 134 FWY						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	210	5%		210	20	230
WB THRU	0	0%		0	0	0
WB RIGHT	15	80%		15	5	20
SCHOLL CANYON RD						
NB LEFT	0	0%		0	0	0
NB THRU	20	35%	**50**	70	5	75
NB RIGHT	635	5%		635	55	690
SB LEFT	5	60%	**50**	55	5	60
SB THRU	10	65%		10	5	15
SB RIGHT	0	0%		0	0	0
TOTALS	**895**		**100**	**995**	**95**	**1090**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	3 OF 6

E/W STREET : WB 134 FWY
N/S STREET : SCHOLL CANYON RD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 21
ROUTE 4A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
WB 134 FWY						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	260	5%		260	25	285
WB THRU	0	0%		0	0	0
WB RIGHT	35	65%	**50**	85	5	90
SCHOLL CANYON RD						
NB LEFT	0	0%		0	0	0
NB THRU	35	65%		35	5	40
NB RIGHT	310	5%		310	30	340
SB LEFT	15	70%		15	5	20
SB THRU	45	60%	**50**	95	10	105
SB RIGHT	0	0%		0	0	0
TOTALS	**700**		**100**	**800**	**80**	**880**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	11-Sep-13	VV.110264.0000	4 OF 6

E/W STREET : WB 134 FWY
N/S STREET : SCHOLL CANYON RD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 21
ROUTE 4B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
WB 134 FWY						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	260	5%		260	25	285
WB THRU	0	0%		0	0	0
WB RIGHT	35	65%		35	5	40
SCHOLL CANYON RD						
NB LEFT	0	0%		0	0	0
NB THRU	35	65%	**50**	85	5	90
NB RIGHT	310	5%		310	30	340
SB LEFT	15	70%	**50**	65	5	70
SB THRU	45	60%		45	5	50
SB RIGHT	0	0%		0	0	0
TOTALS	**700**		**100**	**800**	**75**	**875**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	11-Sep-13	VV.110264.0000	5 OF 6

E/W STREET : WB 134 FWY
N/S STREET : SCHOLL CANYON RD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 21
ROUTE 4A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
WB 134 FWY						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	430	5%		430	40	470
WB THRU	0	0%		0	0	0
WB RIGHT	10	30%	**50**	60	5	65
SCHOLL CANYON RD						
NB LEFT	0	0%		0	0	0
NB THRU	10	5%		10	5	15
NB RIGHT	460	5%		460	40	500
SB LEFT	15	25%		15	5	20
SB THRU	35	30%	**50**	85	5	90
SB RIGHT	0	0%		0	0	0
TOTALS	**960**		**100**	**1060**	**100**	**1160**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	11-Sep-13	VV.110264.0000	6 OF 6

E/W STREET : WB 134 FWY
N/S STREET : SCHOLL CANYON RD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 21
ROUTE 4B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
WB 134 FWY						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	430	5%		430	40	470
WB THRU	0	0%		0	0	0
WB RIGHT	10	30%		10	5	15
SCHOLL CANYON RD						
NB LEFT	0	0%		0	0	0
NB THRU	10	5%	**50**	60	5	65
NB RIGHT	460	5%		460	40	500
SB LEFT	15	25%	**50**	65	5	70
SB THRU	35	30%		35	5	40
SB RIGHT	0	0%		0	0	0
TOTALS	**960**		**100**	**1060**	**100**	**1160**

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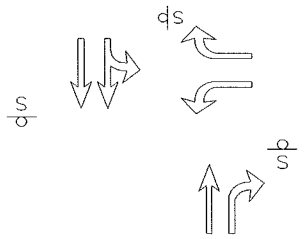
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	1 OF 6

E/W STREET : WB 134 FWY
N/S STREET : SCHOLL CANYON RD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 21
ROUTE 4A

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
WB 134 FWY								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	200	11	33	235	**0**	235	20	255
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	3	11	33	35	**150**	185	15	200
SCHOLL CANYON RD								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	14	8	24	40	**0**	40	5	45
NB RIGHT	631	4	12	645	**0**	645	60	705
SB LEFT	2	3	9	10	**0**	10	5	15
SB THRU	3	6	18	20	**150**	170	15	185
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**853**				**300**	**1285**	**120**	**1405**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	2 OF 6

E/W STREET : WB 134 FWY
N/S STREET : SCHOLL CANYON RD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 21
ROUTE 4B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
WB 134 FWY								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	200	11	33	235	**0**	235	20	255
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	3	11	33	35	**0**	35	5	40
SCHOLL CANYON RD								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	14	8	24	40	**150**	190	15	205
NB RIGHT	631	4	12	645	**0**	645	60	705
SB LEFT	2	3	9	10	**150**	160	15	175
SB THRU	3	6	18	20	**0**	20	5	25
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**853**				**300**	**1285**	**120**	**1405**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	3 OF 6

E/W STREET : WB 134 FWY
N/S STREET : SCHOLL CANYON RD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 21
ROUTE 4A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
WB 134 FWY								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	253	6	18	270	**0**	270	25	295
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	13	24	72	85	**150**	235	20	255
SCHOLL CANYON RD								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	12	22	66	80	**0**	80	5	85
NB RIGHT	303	7	21	325	**0**	325	30	355
SB LEFT	5	12	36	40	**0**	40	5	45
SB THRU	19	26	78	95	**150**	245	20	265
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**605**				**300**	**1195**	**105**	**1300**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	4 OF 6

E/W STREET : WB 134 FWY
N/S STREET : SCHOLL CANYON RD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 21
ROUTE 4B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
WB 134 FWY								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	253	6	18	270	**0**	270	25	295
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	13	24	72	85	**0**	85	5	90
SCHOLL CANYON RD								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	12	22	66	80	**150**	230	20	250
NB RIGHT	303	7	21	325	**0**	325	30	355
SB LEFT	5	12	36	40	**150**	190	15	205
SB THRU	19	26	78	95	**0**	95	10	105
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**605**				**300**	**1195**	**105**	**1300**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	5 OF 6

E/W STREET : WB 134 FWY
N/S STREET : SCHOLL CANYON RD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 21
ROUTE 4A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
WB 134 FWY								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	430	1	3	435	**0**	435	40	475
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	7	3	9	15	**150**	165	15	180
SCHOLL CANYON RD								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	9	0	0	10	**0**	10	5	15
NB RIGHT	452	6	18	470	**0**	470	40	510
SB LEFT	10	3	9	20	**0**	20	5	25
SB THRU	26	11	33	60	**150**	210	20	230
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**934**				**300**	**1310**	**125**	**1435**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	6 OF 6

E/W STREET : WB 134 FWY
N/S STREET : SCHOLL CANYON RD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 21
ROUTE 4B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
WB 134 FWY								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	430	1	3	435	**0**	435	40	475
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	7	3	9	15	**0**	15	5	20
SCHOLL CANYON RD								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	9	0	0	10	**150**	160	15	175
NB RIGHT	452	6	18	470	**0**	470	40	510
SB LEFT	10	3	9	20	**150**	170	15	185
SB THRU	26	11	33	60	**0**	60	5	65
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**934**				**300**	**1310**	**120**	**1430**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: SCHOLL CYN
EAST-WEST STREET: 134 FWY WB RAMPS DATE: 10-25-11
JURISDICTION: PASADENA

PEAK HOUR: 07:15AM

Scholl Canyon Rd (SB)

NORTH LEG

TOTAL: 14

	≈10 9	5	Total
	1	0	1st
	4	0	2nd
	2	1	3rd
	2	4	4th
	Rt	Thru	Lt

TT = 9

TT% = $\frac{9}{14}$ = 64.3% ≈ 64%

EAST LEG TOTAL: 225

Rt	2	4	1	7	14 ≈15
Thru					
Lt	61	51	47	52	211 ≈210
	1st	2nd	3rd	4th	Total

134 Fwy offramp (WB)

TT = 22

TT% = $\frac{22}{225}$ = 9.78 ≈ 10%

Total	1st	2nd	3rd	4th	
					Lt
					Thru
					Rt

WEST LEG TOTAL: 0

PEAK HOUR FACTORS

NORTH LEG = 0.58
SOUTH LEG = 0.90
EAST LEG = 0.89
WEST LEG =

ALL LEGS = 0.91

	Lt	Thru	Rt
1st		4	145
2nd		6	153
3rd		5	162
4th		7	175
Total		22 ≈20	635

TT = 12

TT% = $\frac{12}{657}$ = 1.83% ≈ 2%

TOTAL: 657

SOUTH LEG

Scholl Canyon Rd (NB)

HOUR TOTAL: 896

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: SCHOLL CYN

EAST-WEST STREET: 134 FWY WB RAMPS

TIME: 07:00AM-08:00AM DATE: 10-25-11

NORTH LEG

	8	1	Total
	1	0	1st
	1	0	2nd
	4	0	3rd
	2	1	4th

Rt Thru Lt

Rt	3	2	4	1	10
Thru					
Lt	48	61	51	47	207

1st 2nd 3rd 4th Total

Total	1st	2nd	3rd	4th	
					Lt
					Thru
					Rt

	Lt	Thru	Rt
1st		3	112
2nd		4	145
3rd		6	153
4th		5	162
Total		18	572

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: SCHOLL CYN

EAST-WEST STREET: 134 FWY WB RAMPS

TIME: 08:00AM-09:00AM DATE: 10-25-11

NORTH LEG

	22	12	Total
	2	4	1st
	3	1	2nd
	10	5	3rd
	7	2	4th

Rt Thru Lt

Rt	7	9	5	5	26
Thru					
Lt	52	45	67	57	221
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
					Lt
					Thru
					Rt

	Lt	Thru	Rt
1st		7	175
2nd		7	130
3rd		5	131
4th		6	138
Total		25	574

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : SCHOLL CYN — PASADENA

EAST-WEST STREET : 134 FWY WB RAMPS — 10-25-11

BEGINNING TIME : 07:00AM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
					(SB) NORTH LEG							
0	1	0	0	0	0	0	0	0	0	0	0	1
0	0	0	0	1	0	0	0	0	0	0	0	1
0	3	0	0	1	0	0	0	0	0	0	0	4
0	0	1	0	2	0	0	0	0	0	0	0	3
0	0	1	0	1	0	0	1	0	0	0	3	6
0	0	1	0	2 5	0	0	1 1	0	0	0 3	0	14 4
0	10	5	0	0	0	0	0	0	0	0	0	15
0	7	2	0	0	0	0	0	0	0	0	0	9
						TT=5+1+3=9						
0	21	10	0	7	0	0	2	0	0	0	3	43
					(NB) SOUTH LEG							
110	0	0	2	3	0	0	0	0	0	0	0	115
145	2	0	0	1	0	0	1	0	0	0	0	149
150	5	0	2	0	0	1	1	0	0	0	0	159
161	3	0	1	1	0	0	0	0	0	1	0	167
175	4	0	0	2	0	0	0	0	0	1	0	182
128	5	0	1	0 7	0	0	2 3	0	1	0 2	0	657 137
131	4	0	0	0	0	0	0	0	0	1	0	136
138	6	0	0	0	0	0	0	0	0	0	0	144
						TT=7+3+2=12						
1138	29	0	6	7	0	1	4	0	1	3	0	1189
					(WB) EAST LEG							
1	0	47	0	0	0	1	0	0	1	0	1	51
0	0	61	0	0	0	0	0	0	2	0	0	63
0	0	47	3	0	1	1	0	0	0	0	3	55
0	0	41	1	0	3	0	0	0	0	0	3	48
3	0	51	3	0	1	0	0	0	1	0	0	59
2	0	45	3	0 12	0	0	0 1	0	4	0 9	0	225 54
5	0	67	0	0	0	0	0	0	0	0	0	72
5	0	57	0	0	0	0	0	0	0	0	0	62
						TT=12+1+9=22						
16	0	416	10	0	5	2	0	0	8	0	7	464
					WEST LEG							
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: SCHOLL CYN
EAST-WEST STREET: 134 FWY WB RAMPS
JURISDICTION: PASADENA

DATE: 10-25-11

PEAK HOUR: 12:30PM

Scholl Canyon Rd (SB)

NORTH LEG

TOTAL: 62

	Rt	Thru	Lt	
Total		45	17 ≈15	
1st		5	5	
2nd		19	5	
3rd		14	5	
4th		7	2	

TT = 38

TT% = $\frac{38}{62}$ = 61.3% ≈ 61%

EAST LEG TOTAL: 296

	1st	2nd	3rd	4th	Total
Rt	12	7	10	8	37 ≈35
Thru					
Lt	68	60	66	65	259 ≈260

134 Fwy offramp (WB)

TT = 30

TT% = $\frac{30}{296}$ = 10.14% ≈ 10%

	Total	1st	2nd	3rd	4th
Lt					
Thru					
Rt					

WEST LEG TOTAL: 0

PEAK HOUR FACTORS

NORTH LEG = 0.65
SOUTH LEG = 0.90
EAST LEG = 0.93
WEST LEG =

ALL LEGS = 0.94

TT = 29

TT% = $\frac{29}{344}$ = 8.43% ≈ 8%

SOUTH LEG

Scholl Canyon Rd (NB)

	Lt	Thru	Rt	
1st		6	78	
2nd		7	66	
3rd		6	85	
4th		15	81	
Total		34 ≈35	310	

TOTAL: 344

HOUR TOTAL: 702

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: SCHOLL CYN

EAST-WEST STREET: 134 FWY WB RAMPS

TIME: 12:00PM-01:00PM DATE: 10-25-11

NORTH LEG

	38	18	Total
	7	5	1st
	7	3	2nd
	5	5	3rd
	19	5	4th

Rt Thru Lt

Rt	5	4	12	7	28
Thru					
Lt	63	66	68	60	257
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
					Lt
					Thru
					Rt

	Lt	Thru	Rt
1st		3	75
2nd		10	74
3rd		6	78
4th		7	66
Total		26	293

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: SCHOLL CYN

EAST-WEST STREET: 134 FWY WB RAMPS

TIME: 01:00PM-02:00PM DATE: 10-25-11

NORTH LEG

	31	17	Total
	14	5	1st
	7	2	2nd
	4	5	3rd
	6	5	4th
Rt	Thru	Lt	

Rt	10	8	4	7	29
Thru					
Lt	66	65	56	50	237
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
					Lt
					Thru
					Rt

	Lt	Thru	Rt
1st		6	85
2nd		15	81
3rd		7	79
4th		5	69
Total		33	314

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : SCHOLL CYN — PASADENA

EAST-WEST STREET : 134 FWY WB RAMPS — 10-25-11

BEGINNING TIME : 12:00PM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
						(SB) NORTH LEG						
0	3	0	0	1	2	0	3	3	0	0	0	12
0	0	2	0	1	0	0	5	1	0	1	0	10
0	0	2	0	1	0	0	2	3	0	2	0	10
0	13	1	0	1	0	0	5	4	0	0	0	24
0	6	1	0	2	2	0	5	2	0	1	0	19
0	0	1	0	2	1	0	5	0	0	0	0	9
0	2	0	0	0	0	0	1	4	0	1	1	9
0	4	2	0	0	1	0	2	2	0	0	0	11
				9			26			3		62
						TT = 9+26+3 = 38						
0	28	9	0	8	6	0	28	19	0	5	1	104
						(NB) SOUTH LEG						
73	1	0	0	1	0	2	0	0	0	1	0	78
73	5	0	1	0	0	0	4	0	0	1	0	84
78	1	0	0	1	0	0	3	0	0	1	0	84
62	1	0	2	1	0	1	4	0	1	1	0	73
83	3	0	2	0	0	0	3	0	0	0	0	91
80	7	0	1	4	0	0	3	0	0	1	0	96
78	3	0	0	1	0	0	2	0	1	1	0	86
				11			14			4		344
68	1	0	1	0	0	0	3	0	0	1	0	74
						TT = 11+14+4 = 29						
595	22	0	7	8	0	3	22	0	2	7	0	666
						(WB) EAST LEG						
0	0	63	4	0	0	0	0	0	1	0	0	68
0	0	66	0	0	0	3	0	0	1	0	0	70
2	0	67	0	0	1	6	0	0	4	0	0	80
3	0	58	1	0	1	3	0	0	0	0	1	67
6	0	64	2	0	1	2	0	0	0	0	1	76
2	0	64	0	0	1	1	0	0	5	0	0	73
0	0	56	0	0	7	1	0	12	3	0	11	60
					0			0			0	296
1	0	49	2	0	1	3	0	0	1	0	0	57
						TT = 7+12+11 = 30						
14	0	487	9	0	5	19	0	0	15	0	2	551
						WEST LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: SCHOLL CYN
EAST-WEST STREET: 134 FWY WB RAMPS DATE: 10-25-11
JURISDICTION: PASADENA

PEAK HOUR: 04:45PM

Scholl Canyon Rd (SB)

NORTH LEG

TOTAL: 50

	≈35 37	≈15 13	Total
	8	6	1st
	16	3	2nd
	5	1	3rd
	8	3	4th
	Rt	Thru	Lt

TT = 14

TT% = $\frac{14}{50}$ = 28%

EAST LEG TOTAL: 441

Rt	3	2	2	3	10
Thru					
Lt	102	118	117	94	431 ≈430
	1st	2nd	3rd	4th	Total

134 Fwy offramp (WB)

TT = 4

TT% = $\frac{4}{441}$ = 0.91% ≈ 1%

Total	1st	2nd	3rd	4th	
					Lt
					Thru
					Rt

WEST LEG TOTAL: 0

PEAK HOUR FACTORS

NORTH LEG = 0.66
SOUTH LEG = 0.96
EAST LEG = 0.92
WEST LEG =

ALL LEGS = 0.92

	Lt	Thru	Rt
1st		3	116
2nd		3	117
3rd		1	121
4th		2	104
Total		≈10 9	≈460 458

SOUTH LEG
Scholl Canyon Rd (NB)

TT = 6

TT% = $\frac{6}{467}$ = 1.28% ≈ 1%

TOTAL: 467

HOUR TOTAL: 958

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: SCHOLL CYN

EAST-WEST STREET: 134 FWY WB RAMPS

TIME: 04:00PM-05:00PM DATE: 10-25-11

NORTH LEG

	36	16	Total
	8	6	1st
	8	1	2nd
	12	3	3rd
	8	6	4th

Rt Thru Lt

Rt	2	10	10	3	25
Thru					
Lt	86	99	82	102	369
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
					Lt
					Thru
					Rt

	Lt	Thru	Rt
1st		5	99
2nd		5	92
3rd		3	96
4th		3	116
Total		16	403

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: SCHOLL CYN

EAST-WEST STREET: 134 FWY WB RAMPS

TIME: 05:00PM-06:00PM DATE: 10-25-11

NORTH LEG

	33	7	Total
	16	3	1st
	5	1	2nd
	8	3	3rd
	4	0	4th

Rt Thru Lt

Rt	2	2	3	1	8
Thru					
Lt	118	117	94	111	440
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
					Lt
					Thru
					Rt

	Lt	Thru	Rt
1st		3	117
2nd		1	121
3rd		2	104
4th		3	104
Total		9	446

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SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : SCHOLL CYN — PASADENA

EAST-WEST STREET : 134 FWY WB RAMPS — 10-25-11

BEGINNING TIME : 04:00PM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
						(SB) NORTH LEG						
0	2	5	0	2	1	0	2	0	0	2	0	14
0	5	0	0	1	0	0	1	1	0	1	0	9
0	10	0	0	1	1	0	0	2	0	1	0	15
0	3	4	0	2	1	0	3	1	0	0	0	14
0	10	2	0	1	0	0	4	1	0	1	0	19
0	5	1	0	0	0	0	0	0	0	0	0	6
0	8	3	0	0	0	0	0	0	0	0	0	11
0	4	0	0	0	4 0	0	0	9 0	0	0	1 0	50 4
						TT=4+9+1=14						
0	47	15	0	7	3	0	10	5	0	5	0	92
						(NB) SOUTH LEG						
96	3	0	2	1	0	0	0	0	1	1	0	104
91	3	0	1	1	0	0	1	0	0	0	0	97
93	2	0	1	0	0	1	0	0	1	1	0	99
114	3	0	1	0	0	0	0	0	1	0	0	119
117	3	0	0	0	0	0	0	0	0	0	0	120
118	1	0	2	0	0	1	0	0	0	0	0	122
103	2	0	1	0	0	0	0	0	0	0	0	106
104	2	0	0	0	4 0	0	0	1 0	0	1	1 0	467 107
						TT=4+1+1=6						
836	19	0	8	2	0	2	1	0	3	3	0	874
						(WB) EAST LEG						
0	0	85	1	0	1	1	0	0	0	0	0	88
4	0	99	4	0	0	2	0	0	0	0	0	109
5	0	80	1	0	0	3	0	0	1	0	2	92
2	0	102	1	0	0	0	0	0	0	0	0	105
2	0	118	0	0	0	0	0	0	0	0	0	120
1	0	117	1	0	0	0	0	0	0	0	0	119
2	0	93	1	0	1	0	0	0	0	0	0	97
1	0	110	0	0	4 1	0	0	0 0	0	0	0 0	441 112
						TT=4+0+0=4						
17	0	804	9	0	3	6	0	0	1	0	2	842
						WEST LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0

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Intersection	
Intersection Delay (sec/veh)	30.8
Intersection LOS	D

Movement	NWL	NWR	NET	NER	SWL	SWT	Lane	NELn1
Volume (vph)	210	15	20	635	5	10	Volume Left (%)	0%
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	Volume Thru (%)	100%
Heavy Vehicles(%)	5	80	35	5	60	35	Volume Right (%)	0%
Movement Flow Rate	231	16	22	698	5	11	Sign Control	Stop
Number of Lanes	1	1	1	1	1	2	Traffic Volume by Lane	20
							Left Turning Volume	20

Approach	NW	NE	SW		Through Volume	0
Opposing Approach		SW	NE		Right Turning Volume	0
Opposing Lanes	0	2	2		Lane Flow Rate	22
Conflicting Approach Left	NE		NW		Geometry Group	7
Conflicting Lanes Left	2	0	2		Degree of Utilization, X	0.036
Conflicting Approach Right	SW	NW			Departure Headway, Hd	5.966
Conflicting Lanes Right	2	2	0		Convergence(Y/N)	Yes
HCM Control Delay	14.7	36.8	10.3		Capacity	595
HCM LOS	B	E	B		Service Time	3.751
					HCM Lane V/C Ratio	0.037

HCM Control Delay	9	37.7	15	9.9	10.4	10.2	
HCM Lane LOS	A	E	B	A	B	B	
HCM 95th Percentile Queue	0.1	32.2	2.4	0.1	0.1	0	

Intersection	
Intersection Delay (sec/veh)	12.3
Intersection LOS	B

Movement	NWL	NWR	NET	NER	SWL	SWT	Lane	NELn1
Volume (vph)	260	35	35	310	15	45	Volume Left (%)	0%
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	Volume Thru (%)	100%
Heavy Vehicles(%)	0	65	65	5	70	80	Volume Right (%)	0%
Movement Flow Rate	277	37	37	330	16	48	Sign Control	Stop
Number of Lanes	1	1	1	1	1	2	Traffic Volume by Lane	35
							Left Turning Volume	35

Approach	NW	NE	SW		Through Volume	0
Opposing Approach		SW	NE		Right Turning Volume	0
Opposing Lanes	0	2	2		Lane Flow Rate	37
Conflicting Approach Left	NE		NW		Geometry Group	7
Conflicting Lanes Left	2	0	2		Degree of Utilization, X	0.069
Conflicting Approach Right	SW	NW			Departure Headway, Hd	6.664
Conflicting Lanes Right	2	2	0		Convergence(Y/N)	Yes
HCM Control Delay	13.5	11.5	10.5		Capacity	535
HCM LOS	B	B	B		Service Time	4.436
					HCM Lane V/C Ratio	0.069

HCM Control Delay	9.9	11.7	14.1	9.2	10.7	10.2	
HCM Lane LOS	A	B	B	A	B	B	
HCM 95th Percentile Queue	0.2	2.5	2.6	0.2	0.2	0.2	

Intersection	
Intersection Delay (sec/veh)	31.4
Intersection LOS	D

Movement	NWL	NWR	NET	NER	SWL	SWT	Lane	NELn1
Volume (vph)	430	10	10	460	15	85	Volume Left (%)	0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	Volume Thru (%)	100%
Heavy Vehicles(%)	5	30	0	5	25	30	Volume Right (%)	0%
Movement Flow Rate	467	11	11	500	16	92	Sign Control	Stop
Number of Lanes	1	1	1	1	1	2	Traffic Volume by Lane	10
							Left Turning Volume	10

Approach	NW	NE	SW		Through Volume	0
Opposing Approach		SW	NE		Right Turning Volume	0
Opposing Lanes	0	2	2		Lane Flow Rate	11
Conflicting Approach Left	NE		NW		Geometry Group	7
Conflicting Lanes Left	2	0	2		Degree of Utilization, X	0.019
Conflicting Approach Right	SW	NW			Departure Headway, Hd	6.311
Conflicting Lanes Right	2	2	0		Convergence(Y/N)	Yes
HCM Control Delay	39.3	26.2	11		Capacity	565
HCM LOS	E	D	B		Service Time	4.076
					HCM Lane V/C Ratio	0.019

HCM Control Delay	9.2	26.6	40	8.8	11.1	10.9	
HCM Lane LOS	A	D	E	A	B	B	
HCM 95th Percentile Queue	0.1	11.2	20	0.1	0.2	0.2	

Intersection	
Intersection Delay (sec/veh)	36.2
Intersection LOS	E

Movement	NWL	NWR	NET	NER	SWL	SWT	Lane	NELn1
Volume (vph)	210	65	20	635	5	60	Volume Left (%)	0%
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	Volume Thru (%)	100%
Heavy Vehicles(%)	5	95	35	5	60	34	Volume Right (%)	0%
Movement Flow Rate	231	71	22	698	5	36	Sign Control	Stop
Number of Lanes	1	1	1	1	1	2	Traffic Volume by Lane	20
							Left Turning Volume	20

Approach	NW	NE	SW		Through Volume	0
Opposing Approach		SW	NE		Right Turning Volume	0
Opposing Lanes	0	2	2		Lane Flow Rate	22
Conflicting Approach Left	NE		NW		Geometry Group	7
Conflicting Lanes Left	2	0	2		Degree of Utilization, X	0.038
Conflicting Approach Right	SW	NW			Departure Headway, Hd	6.36
Conflicting Lanes Right	2	2	0		Convergence(Y/N)	Yes
HCM Control Delay	14.8	47.7	11.4		Capacity	566
HCM LOS	B	E	B		Service Time	4.06
					HCM Lane V/C Ratio	0.039

HCM Control Delay	9.3	48.9	15.8	11.5	10.8	11.7	
HCM Lane LOS	A	E	C	B	B	B	
HCM 95th Percentile Queue	0.1	67.8	2.5	0.5	0.2	0.3	

Intersection	
Intersection Delay (sec/veh)	12.9
Intersection LOS	B

Movement	NWL	NWR	NET	NER	SWL	SWT	Lane	NELn1
Volume (vph)	260	85	35	310	15	95	Volume Left (%)	0%
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	Volume Thru (%)	100%
Heavy Vehicles(%)	0	86	65	5	70	81	Volume Right (%)	0%
Movement Flow Rate	277	90	37	330	16	101	Sign Control	Stop
Number of Lanes	1	1	1	1	1	2	Traffic Volume by Lane	35
							Left Turning Volume	35

Approach	NW	NE	SW		Through Volume	0
Opposing Approach		SW	NE		Right Turning Volume	0
Opposing Lanes	0	2	2		Lane Flow Rate	37
Conflicting Approach Left	NE		NW		Geometry Group	7
Conflicting Lanes Left	2	0	2		Degree of Utilization, X	0.073
Conflicting Approach Right	SW	NW			Departure Headway, Hd	7.01
Conflicting Lanes Right	2	2	0		Convergence(Y/N)	Yes
HCM Control Delay	13.9	12.5	11.3		Capacity	512
HCM LOS	B	B	B		Service Time	4.739
					HCM Lane V/C Ratio	0.072

HCM Control Delay	10.3	12.7	15	10.7	11.1	11.5	
HCM Lane LOS	B	B	B	B	B	B	
HCM 95th Percentile Queue	0.2	2.7	2.9	0.6	0.3	0.5	

Intersection	
Intersection Delay (sec/veh)	34
Intersection LOS	D

Movement	NWL	NWR	NET	NER	SWL	SWT	Lane	NELn1
Volume (vph)	430	60	10	460	15	85	Volume Left (%)	0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	Volume Thru (%)	100%
Heavy Vehicles(%)	5	88	0	5	25	71	Volume Right (%)	0%
Movement Flow Rate	467	65	11	500	16	92	Sign Control	Stop
Number of Lanes	1	1	1	1	1	2	Traffic Volume by Lane	10
							Left Turning Volume	10

Approach	NW	NE	SW		Through Volume	0
Opposing Approach		SW	NE		Right Turning Volume	0
Opposing Lanes	0	2	2		Lane Flow Rate	11
Conflicting Approach Left	NE		NW		Geometry Group	7
Conflicting Lanes Left	2	0	2		Degree of Utilization, X	0.02
Conflicting Approach Right	SW	NW			Departure Headway, Hd	6.594
Conflicting Lanes Right	2	2	0		Convergence(Y/N)	Yes
HCM Control Delay	41.5	30.9	12.3		Capacity	539
HCM LOS	E	D	B		Service Time	4.381
					HCM Lane V/C Ratio	0.02

HCM Control Delay	9.5	31.4	45.8	11	11.6	12.8	
HCM Lane LOS	A	D	E	B	B	B	
HCM 95th Percentile Queue	0.1	14.3	26.4	0.4	0.4	0.5	

Intersection	
Intersection Delay (sec/veh)	41.4
Intersection LOS	E

Movement	NWL	NWR	NET	NER	SWL	SWT	Lane	NELn1
Volume (vph)	230	70	20	690	5	65	Volume Left (%)	0%
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	Volume Thru (%)	100%
Heavy Vehicles(%)	5	95	35	5	60	34	Volume Right (%)	0%
Movement Flow Rate	253	77	22	758	5	71	Sign Control	Stop
Number of Lanes	1	1	1	1	1	2	Traffic Volume by Lane	20
							Left Turning Volume	20

Approach	NW	NE	SW		Through Volume	0
Opposing Approach		SW	NE		Right Turning Volume	0
Opposing Lanes	0	2	2		Lane Flow Rate	22
Conflicting Approach Left	NE		NW		Geometry Group	7
Conflicting Lanes Left	2	0	2		Degree of Utilization, X	0.039
Conflicting Approach Right	SW	NW			Departure Headway, Hd	6.462
Conflicting Lanes Right	2	2	0		Convergence(Y/N)	Yes
HCM Control Delay	15.6	55.2	11.5		Capacity	557
HCM LOS	C	F	B		Service Time	4.162
					HCM Lane V/C Ratio	0.039

HCM Control Delay	9.4	56.5	16.8	11.6	10.9	11.8	
HCM Lane LOS	A	F	C	B	B	B	
HCM 95th Percentile Queue	0.1	124.4	3	0.6	0.2	0.4	

Intersection	
Intersection Delay (sec/veh)	15.5
Intersection LOS	C

Movement	NWL	NWR	NET	NER	SWL	SWT	Lane	NELn1
Volume (vph)	230	70	20	690	5	65	Volume Left (%)	0%
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	Volume Thru (%)	6%
Heavy Vehicles(%)	5	95	35	5	60	94	Volume Right (%)	94%
Movement Flow Rate	253	77	22	758	5	71	Sign Control	Stop
Number of Lanes	2	0	1	1	1	2	Traffic Volume by Lane	358
							Left Turning Volume	20

Approach	NW	NE	SW		Through Volume	338
Opposing Approach		SW	NE		Right Turning Volume	0
Opposing Lanes	0	2	2		Lane Flow Rate	394
Conflicting Approach Left	NE		NW		Geometry Group	7
Conflicting Lanes Left	2	0	2		Degree of Utilization, X	0.633
Conflicting Approach Right	SW	NW			Departure Headway, Hd	5.788
Conflicting Lanes Right	2	2	0		Convergence(Y/N)	Yes
HCM Control Delay	14.4	16.3	11.7		Capacity	626
HCM LOS	B	C	B		Service Time	3.521
					HCM Lane V/C Ratio	0.629

HCM Control Delay	18	14.5	13.5	15.4	11.1	12.1	
HCM Lane LOS	C	B	B	C	B	B	
HCM 95th Percentile Queue	5.2	3.8	1.5	1.7	0.2	0.4	

Intersection	
Intersection Delay (sec/veh)	14.4
Intersection LOS	B

Movement	NWL	NWR	NET	NER	SWL	SWT	Lane	NELn1
Volume (vph)	285	95	40	340	15	105	Volume Left (%)	0%
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	Volume Thru (%)	100%
Heavy Vehicles(%)	0	86	65	5	70	81	Volume Right (%)	0%
Movement Flow Rate	303	101	43	362	16	112	Sign Control	Stop
Number of Lanes	1	1	1	1	Traffic Volume by Lane			40
							Left Turning Volume	40

Approach	NW	NE	SW	Through Volume	0
Opposing Approach		SW	NE	Right Turning Volume	0
Opposing Lanes	0	2	2	Lane Flow Rate	43
Conflicting Approach Left	NE		NW	Geometry Group	7
Conflicting Lanes Left	2	0	2	Degree of Utilization, X	0.085
Conflicting Approach Right	SW	NW		Departure Headway, Hd	7.176
Conflicting Lanes Right	2	2	0	Convergence(Y/N)	Yes
HCM Control Delay	15.5	14.1	11.8	Capacity	500
HCM LOS	C	B	B	Service Time	4.915
				HCM Lane V/C Ratio	0.086

HCM Control Delay	10.6	14.5	17	11.1	11.5	12	
HCM Lane LOS	B	B	C	B	B	B	
HCM 95th Percentile Queue	0.3	3.6	3.7	0.7	0.4	0.6	

Intersection	
Intersection Delay (sec/veh)	12.9
Intersection LOS	B

Movement	NWL	NWR	NET	NER	SWL	SWT	Lane	NELn1
Volume (vph)	285	95	40	340	15	105	Volume Left (%)	0%
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	Volume Thru (%)	21%
Heavy Vehicles(%)	0	86	65	5	70	81	Volume Right (%)	79%
Movement Flow Rate	303	101	43	362	16	112	Sign Control	Stop
Number of Lanes	2	0	1	1	1	2	Traffic Volume by Lane	193
							Left Turning Volume	40

Approach	NW	NE	SW		Through Volume	153
Opposing Approach		SW	NE		Right Turning Volume	0
Opposing Lanes	0	2	2		Lane Flow Rate	205
Conflicting Approach Left	NE		NW		Geometry Group	7
Conflicting Lanes Left	2	0	2		Degree of Utilization, X	0.379
Conflicting Approach Right	SW	NW			Departure Headway, Hd	6.642
Conflicting Lanes Right	2	2	0		Convergence(Y/N)	Yes
HCM Control Delay	14.2	12	11.9		Capacity	542
HCM LOS	B	B	B		Service Time	4.375
					HCM Lane V/C Ratio	0.378

HCM Control Delay	13.4	10.6	13.1	15.3	11.6	12.1	
HCM Lane LOS	B	B	B	C	B	B	
HCM 95th Percentile Queue	1.8	1.3	1.7	2.1	0.4	0.6	

Intersection	
Intersection Delay (sec/veh)	49.9
Intersection LOS	E

Movement	NWL	NWR	NET	NER	SWL	SWT	Lane	NELn1
Volume (vph)	470	65	10	500	15	85	Volume Left (%)	0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	Volume Thru (%)	100%
Heavy Vehicles(%)	5	88	0	5	25	7	Volume Right (%)	0%
Movement Flow Rate	511	71	11	543	16	103	Sign Control	Stop
Number of Lanes	1	1	1	1	1	2	Traffic Volume by Lane	10
							Left Turning Volume	10

Approach	NW	NE	SW		Through Volume	0
Opposing Approach		SW	NE		Right Turning Volume	0
Opposing Lanes	0	2	2		Lane Flow Rate	11
Conflicting Approach Left	NE		NW		Geometry Group	7
Conflicting Lanes Left	2	0	2		Degree of Utilization, X	0.021
Conflicting Approach Right	SW	NW			Departure Headway, Hd	6.843
Conflicting Lanes Right	2	2	0		Convergence(Y/N)	Yes
HCM Control Delay	60.3	47.1	12.6		Capacity	530
HCM LOS	F	E	B		Service Time	4.493
					HCM Lane V/C Ratio	0.021

HCM Control Delay	9.6	47.9	67.1	11.4	11.9	13.2	
HCM Lane LOS	A	E	F	B	B	B	
HCM 95th Percentile Queue	0.1	39.6	105.6	0.5	0.4	0.6	

Intersection	
Intersection Delay (sec/veh)	16.9
Intersection LOS	C

Movement	NWL	NWR	NET	NER	SWL	SWT	Lane	NELn1
Volume (vph)	470	65	10	500	15	85	Volume Left (%)	0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	Volume Thru (%)	4%
Heavy Vehicles(%)	5	88	0	5	25	71	Volume Right (%)	96%
Movement Flow Rate	511	71	11	543	16	92	Sign Control	Stop
Number of Lanes	2	0	1	1	0	2	Traffic Volume by Lane	255
							Left Turning Volume	10

Approach	NW	NE	SW	Through Volume	245
Opposing Approach		SW	NE	Right Turning Volume	0
Opposing Lanes	0	2	2	Lane Flow Rate	277
Conflicting Approach Left	NE		NW	Geometry Group	7
Conflicting Lanes Left	2	0	2	Degree of Utilization, X	0.458
Conflicting Approach Right	SW	NW		Departure Headway, Hd	5.949
Conflicting Lanes Right	2	2	0	Convergence(Y/N)	Yes
HCM Control Delay	20.9	13.8	12.2	Capacity	604
HCM LOS	C	B	B	Service Time	3.705
				HCM Lane V/C Ratio	0.459

HCM Control Delay	13.7	13.9	21.9	19.6	11.5	12.8	
HCM Lane LOS	B	B	C	C	B	B	
HCM 95th Percentile Queue	2.5	2.6	5.7	3.4	0.4	0.6	

Intersection	
Intersection Delay (sec/veh)	32.2
Intersection LOS	D

Movement	NWL	NWR	NET	NER	SWL	SWT	Lane	NELn1
Volume (vph)	210	15	70	635	55	10	Volume Left (%)	0%
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	Volume Thru (%)	100%
Heavy Vehicles(%)	5	80	81	5	96	85	Volume Right (%)	0%
Movement Flow Rate	231	16	77	698	60	11	Sign Control	Stop
Number of Lanes	1	1	1	1	1	2	Traffic Volume by Lane	70
							Left Turning Volume	70

Approach	NW				NE		SW		Through Volume	0
Opposing Approach					SW		NE		Right Turning Volume	0
Opposing Lanes	0				2		2		Lane Flow Rate	77
Conflicting Approach Left	NE						NW		Geometry Group	7
Conflicting Lanes Left	2				0		2		Degree of Utilization, X	0.147
Conflicting Approach Right	SW				NW				Departure Headway, Hd	6.998
Conflicting Lanes Right	2				2		0		Convergence(Y/N)	Yes
HCM Control Delay	15.6				39.3		12.5		Capacity	515
HCM LOS	C				E		B		Service Time	4.698
									HCM Lane V/C Ratio	0.15
HCM Control Delay		10.9	42.4	16	10.2	12.8	10.3			
HCM Lane LOS		B	E	C	B	B	B			
HCM 95th Percentile Queue		0.5	42.9	2.6	0.1	0.5	0			

Intersection	
Intersection Delay (sec/veh)	13.2
Intersection LOS	B

Movement	NWL	NWR	NET	NER	SWL	SWT	Lane
Volume (vph)	260	35	85	310	65	45	Volume Left (%)
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	Volume Thru (%)
Heavy Vehicles(%)	0	65	86	5	93	80	Volume Right (%)
Movement Flow Rate	277	37	90	330	69	48	Sign Control
Number of Lanes	1	1	1	1	1	2	Traffic Volume by Lane
							Left Turning Volume

Approach	NW	NE	SW		Through Volume
Opposing Approach		SW	NE		Right Turning Volume
Opposing Lanes	0	2	2		Lane Flow Rate
Conflicting Approach Left	NE		NW		Geometry Group
Conflicting Lanes Left	2	0	2		Degree of Utilization, X
Conflicting Approach Right	SW	NW			Departure Headway, Hd
Conflicting Lanes Right	2	2	0		Convergence(Y/N)
HCM Control Delay	14.9	12.3	12.1		Capacity
HCM LOS	B	B	B		Service Time
					HCM Lane V/C Ratio

HCM Control Delay	11.6	12.5	15.6	9.6	12.8	10.4	
HCM Lane LOS	B	B	C	A	B	B	
HCM 95th Percentile Queue	0.7	2.7	3	0.2	0.7	0.2	

NELn1
0%
100%
0%
Stop
85
85
0
0
90
7
0.182
7.262
Yes
496
4.989
0.181

Intersection	
Intersection Delay (sec/veh)	35.4
Intersection LOS	E

Movement	NWL	NWR	NET	NER	SWL	SWT	Lane	NELn1
Volume (vph)	430	10	60	460	65	85	Volume Left (%)	0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	Volume Thru (%)	100%
Heavy Vehicles(%)	5	30	83	5	83	30	Volume Right (%)	0%
Movement Flow Rate	467	11	65	500	71	92	Sign Control	Stop
Number of Lanes	1	1	1	1	1	2	Traffic Volume by Lane	60
							Left Turning Volume	60

Approach	NW	NE	SW		Through Volume	0
Opposing Approach		SW	NE		Right Turning Volume	0
Opposing Lanes	0	2	2		Lane Flow Rate	65
Conflicting Approach Left	NE		NW		Geometry Group	7
Conflicting Lanes Left	2	0	2		Degree of Utilization, X	0.145
Conflicting Approach Right	SW	NW			Departure Headway, Hd	7.999
Conflicting Lanes Right	2	2	0		Convergence(Y/N)	Yes
HCM Control Delay	48.3	28.7	13.7		Capacity	446
HCM LOS	E	D	B		Service Time	5.791
					HCM Lane V/C Ratio	0.146

HCM Control Delay	12.2	30.8	49.2	9.2	14.5	11.1	
HCM Lane LOS	B	D	E	A	B	B	
HCM 95th Percentile Queue	0.5	13.8	31.3	0.1	0.8	0.2	

Intersection	
Intersection Delay (sec/veh)	41.3
Intersection LOS	E

Movement	NWL	NWR	NET	NER	SWL	SWT	Lane	NELn1
Volume (vph)	230	70	20	690	5	65	Volume Left (%)	0%
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	Volume Thru (%)	100%
Heavy Vehicles(%)	5	80	81	5	96	85	Volume Right (%)	0%
Movement Flow Rate	253	77	22	758	5	71	Sign Control	Stop
Number of Lanes	1	1	1	1	1	2	Traffic Volume by Lane	20
							Left Turning Volume	20

Approach	NW	NE	SW		Through Volume	0
Opposing Approach		SW	NE		Right Turning Volume	0
Opposing Lanes	0	2	2		Lane Flow Rate	22
Conflicting Approach Left	NE		NW		Geometry Group	7
Conflicting Lanes Left	2	0	2		Degree of Utilization, X	0.044
Conflicting Approach Right	SW	NW			Departure Headway, Hd	7.246
Conflicting Lanes Right	2	2	0		Convergence(Y/N)	Yes
HCM Control Delay	15.6	55.1	11.4		Capacity	497
HCM LOS	C	F	B		Service Time	4.946
					HCM Lane V/C Ratio	0.044

HCM Control Delay	10.3	56.4	16.9	11.3	11.6	11.2	
HCM Lane LOS	B	F	C	B	B	B	
HCM 95th Percentile Queue	0.1	124.5	3	0.5	0.2	0.3	

Intersection	
Intersection Delay (sec/veh)	17.6
Intersection LOS	C

Movement	NWL	NWR	NET	NER	SWL	SWT	Lane	NELn1
Volume (vph)	230	70	20	690	5	65	Volume Left (%)	0%
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.94	Volume Thru (%)	6%
Heavy Vehicles(%)	5	80	81	5	96	65	Volume Right (%)	94%
Movement Flow Rate	253	77	22	758	5	71	Sign Control	Stop
Number of Lanes	2	0	1	1	1	2	Traffic Volume by Lane	358
							Left Turning Volume	20

Approach	NW	NE	SW		Through Volume	338
Opposing Approach		SW	NE		Right Turning Volume	0
Opposing Lanes	0	2	2		Lane Flow Rate	394
Conflicting Approach Left	NE		NW		Geometry Group	7
Conflicting Lanes Left	2	0	2		Degree of Utilization, X	0.719
Conflicting Approach Right	SW	NW			Departure Headway, Hd	6.577
Conflicting Lanes Right	2	2	0		Convergence(Y/N)	Yes
HCM Control Delay	14.3	19.5	11.7		Capacity	551
HCM LOS	B	C	B		Service Time	4.307
					HCM Lane V/C Ratio	0.715

HCM Control Delay	24.4	14.5	13.7	15	11.9	11.6	
HCM Lane LOS	C	B	B	B	B	B	
HCM 95th Percentile Queue	7.6	3.8	1.5	1.7	0.2	0.3	

Intersection	
Intersection Delay (sec/veh)	14.3
Intersection LOS	B

Movement	NWL	NWR	NET	NER	SWL	SWT	Lane	NELn1
Volume (vph)	285	95	40	340	15	105	Volume Left (%)	0%
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	Volume Thru (%)	100%
Heavy Vehicles(%)	0	65	86	5	93	80	Volume Right (%)	0%
Movement Flow Rate	303	101	43	362	16	112	Sign Control	Stop
Number of Lanes	1	1	1	1	1	2	Traffic Volume by Lane	40
							Left Turning Volume	40

Approach	NW	NE	SW		Through Volume	0
Opposing Approach		SW	NE		Right Turning Volume	0
Opposing Lanes	0	2	2		Lane Flow Rate	43
Conflicting Approach Left	NE		NW		Geometry Group	7
Conflicting Lanes Left	2	0	2		Degree of Utilization, X	0.089
Conflicting Approach Right	SW	NW			Departure Headway, Hd	7.524
Conflicting Lanes Right	2	2	0		Convergence(Y/N)	Yes
HCM Control Delay	15.4	14.1	11.7		Capacity	477
HCM LOS	C	B	B		Service Time	5.262
					HCM Lane V/C Ratio	0.09

HCM Control Delay	11	14.5	17	10.6	12	11.5	
HCM Lane LOS	B	B	C	B	B	B	
HCM 95th Percentile Queue	0.3	3.6	3.7	0.7	0.4	0.5	

Intersection	
Intersection Delay (sec/veh)	12.9
Intersection LOS	B

Movement	NWL	NWR	NET	NER	SWL	SWT	Lane	NELn1
Volume (vph)	285	95	40	340	15	105	Volume Left (%)	0%
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	Volume Thru (%)	21%
Heavy Vehicles(%)	0	65	86	5	93	80	Volume Right (%)	79%
Movement Flow Rate	303	101	43	362	16	112	Sign Control	Stop
Number of Lanes	2	0	1	1	0	2	Traffic Volume by Lane	193
							Left Turning Volume	40

Approach	NW	NE	SW		Through Volume	153
Opposing Approach		SW	NE		Right Turning Volume	0
Opposing Lanes	0	2	2		Lane Flow Rate	205
Conflicting Approach Left	NE		NW		Geometry Group	7
Conflicting Lanes Left	2	0	2		Degree of Utilization, X	0.398
Conflicting Approach Right	SW	NW			Departure Headway, Hd	6.975
Conflicting Lanes Right	2	2	0		Convergence(Y/N)	Yes
HCM Control Delay	13.8	12.4	11.8		Capacity	517
HCM LOS	B	B	B		Service Time	4.706
					HCM Lane V/C Ratio	0.397

HCM Control Delay	14.3	10.5	13.1	14.4	12	11.6	
HCM Lane LOS	B	B	B	B	B	B	
HCM 95th Percentile Queue	2	1.3	1.8	2	0.4	0.5	

Intersection	
Intersection Delay (sec/veh)	53.8
Intersection LOS	F

Movement	NWL	NWR	NET	NER	SWL	SWT	Lane	NELn1
Volume (vph)	470	65	10	500	10	500	Volume Left (%)	0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	Volume Thru (%)	100%
Heavy Vehicles(%)	5	30	83	5	83	30	Volume Right (%)	0%
Movement Flow Rate	511	71	11	543	11	543	Sign Control	Stop
Number of Lanes	1	1	1	1	1	2	Traffic Volume by Lane	10
							Left Turning Volume	10

Approach	NW	NE	SW		Through Volume	0
Opposing Approach		SW	NE		Right Turning Volume	0
Opposing Lanes	0	2	2		Lane Flow Rate	11
Conflicting Approach Left	NE		NW		Geometry Group	7
Conflicting Lanes Left	2	0	2		Degree of Utilization, X	0.027
Conflicting Approach Right	SW	NW			Departure Headway, Hd	8.981
Conflicting Lanes Right	2	2	0		Convergence(Y/N)	Yes
HCM Control Delay	64.1	64.9	31.9		Capacity	398
HCM LOS	F	F	D		Service Time	6.759
					HCM Lane V/C Ratio	0.028

HCM Control Delay	12	66	71.4	11.3	19.9	38.3	
HCM Lane LOS	B	F	F	B	C	E	
HCM 95th Percentile Queue	0.1	107.3	99.6	0.5	2.8	13.3	

Intersection	
Intersection Delay (sec/veh)	28.3
Intersection LOS	D

Movement	NWL	NWR	NET	NER	SWL	SWT	Lane	NELn1
Volume (vph)	470	65	10	500	10	500	Volume Left (%)	0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	Volume Thru (%)	4%
Heavy Vehicles(%)	5	30	83	5	83	30	Volume Right (%)	96%
Movement Flow Rate	511	71	11	543	11	543	Sign Control	Stop
Number of Lanes	2	0	1	1	1	2	Traffic Volume by Lane	255
							Left Turning Volume	10

Approach	NW	NE	SW		Through Volume	245
Opposing Approach		SW	NE		Right Turning Volume	0
Opposing Lanes	0	2	2		Lane Flow Rate	277
Conflicting Approach Left	NE		NW		Geometry Group	7
Conflicting Lanes Left	2	0	2		Degree of Utilization, X	0.657
Conflicting Approach Right	SW	NW			Departure Headway, Hd	8.535
Conflicting Lanes Right	2	2	0		Convergence(Y/N)	Yes
HCM Control Delay	29.7	22.3	32.9		Capacity	424
HCM LOS	D	C	D		Service Time	6.273
					HCM Lane V/C Ratio	0.653

HCM Control Delay	26.2	18.3	35.6	21.4	20.4	39.6	
HCM Lane LOS	D	C	E	C	C	E	
HCM 95th Percentile Queue	5.7	3.7	10.9	3.8	2.9	13.9	

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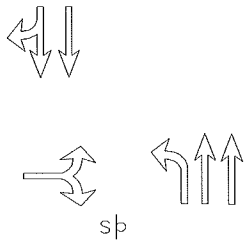
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	1 OF 6

E/W STREET : EAGLE VISTA DRIVE
N/S STREET : FIGUEROA ST
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 22
ROUTE 4A

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
EAGLE VISTA DRIVE						
EB LEFT	45	5%		45	5	50
EB THRU	0	0%		0	0	0
EB RIGHT	60	5%		60	5	65
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
FIGUEROA ST						
NB LEFT	25	30%		25	5	30
NB THRU	625	5%		625	55	680
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	220	5%	**50**	270	25	295
SB RIGHT	10	5%		10	5	15
TOTALS	**985**		**50**	**1035**	**100**	**1135**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	11-Sep-13	VV.110264.0000	2 OF 6

E/W STREET : EAGLE VISTA DRIVE
N/S STREET : FIGUEROA ST
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 22
ROUTE 4B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
EAGLE VISTA DRIVE						
EB LEFT	45	5%		45	5	50
EB THRU	0	0%		0	0	0
EB RIGHT	60	5%		60	5	65
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
FIGUEROA ST						
NB LEFT	25	30%		25	5	30
NB THRU	625	5%	**50**	675	60	735
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	220	5%		220	20	240
SB RIGHT	10	5%		10	5	15
TOTALS	**985**		**50**	**1035**	**100**	**1135**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	3 OF 6

E/W STREET : EAGLE VISTA DRIVE
N/S STREET : FIGUEROA ST
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 22
ROUTE 4A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
EAGLE VISTA DRIVE						
EB LEFT	30	5%		30	5	35
EB THRU	0	0%		0	0	0
EB RIGHT	50	5%		50	5	55
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
FIGUEROA ST						
NB LEFT	40	5%		40	5	45
NB THRU	325	10%		325	30	355
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	275	10%	**50**	325	30	355
SB RIGHT	15	5%		15	5	20
TOTALS	**735**		**50**	**785**	**80**	**865**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	11-Sep-13	VV.110264.0000	4 OF 6

E/W STREET : EAGLE VISTA DRIVE
N/S STREET : FIGUEROA ST
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 22
ROUTE 4B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
EAGLE VISTA DRIVE						
EB LEFT	30	5%		30	5	35
EB THRU	0	0%		0	0	0
EB RIGHT	50	5%		50	5	55
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
FIGUEROA ST						
NB LEFT	40	5%		40	5	45
NB THRU	325	10%	**50**	375	35	410
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	275	10%		275	25	300
SB RIGHT	15	5%		15	5	20
TOTALS	**735**		**50**	**785**	**80**	**865**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	5 OF 6

E/W STREET : EAGLE VISTA DRIVE
N/S STREET : FIGUEROA ST
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 22
ROUTE 4A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
EAGLE VISTA DRIVE						
EB LEFT	40	5%		40	5	45
EB THRU	0	0%		0	0	0
EB RIGHT	70	5%		70	5	75
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
FIGUEROA ST						
NB LEFT	105	5%		105	10	115
NB THRU	430	5%		430	40	470
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	435	5%	**50**	485	45	530
SB RIGHT	25	5%		25	5	30
TOTALS	**1105**		**50**	**1155**	**110**	**1265**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	11-Sep-13	VV.110264.0000	6 OF 6

E/W STREET : EAGLE VISTA DRIVE
N/S STREET : FIGUEROA ST
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 22
ROUTE 4B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
EAGLE VISTA DRIVE						
EB LEFT	40	5%		40	5	45
EB THRU	0	0%		0	0	0
EB RIGHT	70	5%		70	5	75
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
FIGUEROA ST						
NB LEFT	105	5%		105	10	115
NB THRU	430	5%	50	480	45	525
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	435	5%		435	40	475
SB RIGHT	25	5%		25	5	30
TOTALS	**1105**		**50**	**1155**	**110**	**1265**

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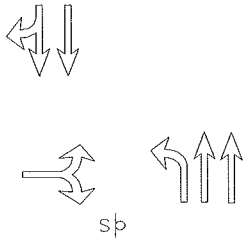
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	1 OF 6

E/W STREET : EAGLE VISTA DRIVE
N/S STREET : FIGUEROA ST
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 22
ROUTE 4A

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
EAGLE VISTA DRIVE								
EB LEFT	43	2	6	50	**0**	50	5	55
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	59	0	0	60	**0**	60	5	65
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
FIGUEROA ST								
NB LEFT	17	8	24	40	**0**	40	5	45
NB THRU	605	20	60	665	**0**	665	60	725
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	212	6	18	230	**150**	380	35	415
SB RIGHT	10	0	0	10	**0**	10	5	15
TOTALS	**946**				**150**	**1205**	**115**	**1320**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	2 OF 6

E/W STREET : EAGLE VISTA DRIVE
N/S STREET : FIGUEROA ST
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 22
ROUTE 4B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
EAGLE VISTA DRIVE								
EB LEFT	43	2	6	50	**0**	50	5	55
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	59	0	0	60	**0**	60	5	65
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
FIGUEROA ST								
NB LEFT	17	8	24	40	**0**	40	5	45
NB THRU	605	20	60	665	**150**	815	75	890
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	212	6	18	230	**0**	230	20	250
SB RIGHT	10	0	0	10	**0**	10	5	15
TOTALS	**946**				**150**	**1205**	**115**	**1320**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	3 OF 6

E/W STREET : EAGLE VISTA DRIVE
N/S STREET : FIGUEROA ST
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 22
ROUTE 4A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
EAGLE VISTA DRIVE								
EB LEFT	28	0	0	30	**0**	30	5	35
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	49	0	0	50	**0**	50	5	55
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
FIGUEROA ST								
NB LEFT	39	1	3	40	**0**	40	5	45
NB THRU	295	31	93	390	**0**	390	35	425
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	247	29	87	335	**150**	485	45	530
SB RIGHT	15	1	3	20	**0**	20	5	25
TOTALS	**673**				**150**	**1015**	**100**	**1115**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	4 OF 6

E/W STREET : EAGLE VISTA DRIVE
N/S STREET : FIGUEROA ST
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 22
ROUTE 4B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
EAGLE VISTA DRIVE								
EB LEFT	28	0	0	30	**0**	30	5	35
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	49	0	0	50	**0**	50	5	55
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
FIGUEROA ST								
NB LEFT	39	1	3	40	**0**	40	5	45
NB THRU	295	31	93	390	**150**	540	50	590
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	247	29	87	335	**0**	335	30	365
SB RIGHT	15	1	3	20	**0**	20	5	25
TOTALS	**673**				**150**	**1015**	**100**	**1115**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	5 OF 6

E/W STREET : EAGLE VISTA DRIVE
N/S STREET : FIGUEROA ST
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 22
ROUTE 4A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
EAGLE VISTA DRIVE								
EB LEFT	39	0	0	40	**0**	40	5	45
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	68	0	0	70	**0**	70	5	75
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
FIGUEROA ST								
NB LEFT	104	0	0	105	**0**	105	10	115
NB THRU	425	5	15	440	**0**	440	40	480
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	422	13	39	460	**150**	610	55	665
SB RIGHT	27	0	0	25	**0**	25	5	30
TOTALS	**1085**				**150**	**1290**	**120**	**1410**

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TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	6 OF 6

E/W STREET : EAGLE VISTA DRIVE
N/S STREET : FIGUEROA ST
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 22
ROUTE 4B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
EAGLE VISTA DRIVE								
EB LEFT	39	0	0	40	**0**	40	5	45
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	68	0	0	70	**0**	70	5	75
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
FIGUEROA ST								
NB LEFT	104	0	0	105	**0**	105	10	115
NB THRU	425	5	15	440	**150**	590	55	645
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	422	13	39	460	**0**	460	40	500
SB RIGHT	27	0	0	25	**0**	25	5	30
TOTALS	**1085**				**150**	**1290**	**120**	**1410**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: SCHOLL CYN/FIGUEROA
EAST-WEST STREET: EAGLE VISTA DR DATE: 10-25-11
JURISDICTION: PASADENA

PEAK HOUR: 07:15AM

Figueroa St (SB)
NORTH LEG

TOTAL: 228

Rt	Thru	Lt	
10	218 (≈220)		Total
1	70		1st
3	43		2nd
3	55		3rd
3	50		4th

TT = 6
TT% = $\frac{6}{228}$ = 2.63% ≈ 3%

EAST LEG TOTAL: 0

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
45	15	11	7	12	Lt
					Thru
59 (≈60)	10	23	10	16	Rt

WEST LEG TOTAL: 104
Eagle Vista Dr (EB)

TT = 2
TT% = $\frac{2}{104}$ = 1.92% ≈ 2%

PEAK HOUR FACTORS

NORTH LEG = 0.80
SOUTH LEG = 0.88
EAST LEG =
WEST LEG = 0.76

ALL LEGS = 0.93

	Lt	Thru	Rt	
1st	4	135		
2nd	3	141		
3rd	9	174		
4th	9	175		
Total	25	625		TOTAL: 650

TT = 28
TT% = $\frac{28}{650}$ = 4.31% ≈ 4%

SOUTH LEG
Figueroa St (NB)

HOUR TOTAL: 982

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: SCHOLL CYN/FIGUEROA

EAST-WEST STREET: EAGLE VISTA DR

TIME: 07:00AM-08:00AM DATE: 10-25-11

NORTH LEG

Rt	Thru	Lt	
8	215		Total
1	47		1st
1	70		2nd
3	43		3rd
3	55		4th

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
39	6	15	11	7	Lt
					Thru
48	5	10	23	10	Rt

	Lt	Thru	Rt
1st	6	100	
2nd	4	135	
3rd	3	141	
4th	9	174	
Total	22	550	

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: SCHOLL CYN/FIGUEROA

EAST-WEST STREET: EAGLE VISTA DR

TIME: 08:00AM-09:00AM DATE: 10-25-11

NORTH LEG

Rt	Thru	Lt	
11	228		Total
3	50		1st
1	50		2nd
5	73		3rd
2	55		4th

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
40	12	11	9	8	Lt
					Thru
53	16	13	13	11	Rt

	Lt	Thru	Rt
1st	9	175	
2nd	7	116	
3rd	2	146	
4th	13	125	
Total	31	562	

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : SCHOLL CYN/FIGUEROA PASADENA

EAST-WEST STREET : EAGLE VISTA DR 10-25-11

BEGINNING TIME : 07:00AM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
						SB NORTH LEG						
1	47	0	0	0	0	0	0	0	0	0	0	48
1	68	0	0	1	0	0	0	0	0	1	0	71
3	42	0	0	1	0	0	0	0	0	0	0	46
3	54	0	0	0	0	0	0	0	0	1	0	58
3	48	0	0	2	0	0	0	0	0	0	0	53
1	43	0	0	5 4	0	0	1 0	0	0	1 2	0	228 51
5	68	0	0	5	0	0	0	0	0	0	0	78
2	48	0	0	6	0	0	0	0	0	1	0	57
						TT = 4+0+2 = 6						
19	418	0	0	20	0	0	1	0	0	4	0	462
						NB SOUTH LEG						
0	100	6	0	0	0	0	0	0	0	0	0	106
0	131	3	0	3	1	0	0	0	0	1	0	139
0	134	2	0	6	1	0	1	0	0	0	0	144
0	171	4	0	1	4	0	1	1	0	1	0	183
0	169	8	0	5	1	0	1	0	0	0	0	184
0	112	5	0	2 22	2	0	0 4	0	0	2 2	0	650 123
0	143	2	0	2	0	0	0	0	0	1	0	148
0	121	13	0	1	0	0	3	0	0	0	0	138
						TT = 22+4+2 = 28						
0	1081	43	0	20	9	0	6	1	0	5	0	1165
						WB EAST LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
						EB WEST LEG						
5	0	6	0	0	0	0	0	0	0	0	0	11
10	0	15	0	0	0	0	0	0	0	0	0	25
23	0	9	0	0	2	0	0	0	0	0	0	34
10	0	7	0	0	0	0	0	0	0	0	0	17
16	0	12	0	0	0	0	0	0	0	0	0	28
13	0	11	0	0	2 0	0	0	0 0	0	0	0 0	104 24
13	0	9	0	0	0	0	0	0	0	0	0	22
10	0	8	1	0	0	0	0	0	0	0	0	19
						TT = 2+0+0 = 2						
100	0	77	1	0	2	0	0	0	0	0	0	180

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: SCHOLL CYN/FIGUEROA
EAST-WEST STREET: EAGLE VISTA DR DATE: 10-25-11
JURISDICTION: PASADENA

PEAK HOUR: 12:45PM

Figueroa St (SB)

NORTH LEG

TOTAL: 292

Rt	Thru	Lt	
16 (≈15)	276 (≈275)		Total
5	74		1st
4	76		2nd
1	70		3rd
6	56		4th

TT = 30

TT% = $\frac{30}{292}$ = 10.3% ≈ 10%

EAST LEG TOTAL: 0

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
28 (≈30)	7	11	5	5	Lt
					Thru
49 (≈50)	13	15	4	17	Rt

WEST LEG TOTAL: 77

Eagle Vista Dr (EB)

TT = 0

TT = $\frac{0}{77}$ = 0%

PEAK HOUR FACTORS

NORTH LEG = 0.91
SOUTH LEG = 0.89
EAST LEG =
WEST LEG = 0.74

ALL LEGS = 0.93

	Lt	Thru	Rt
1st	11	70	
2nd	12	80	
3rd	8	95	
4th	9	81	
Total	40	326 (≈325)	

TT = 32

TT% = $\frac{32}{366}$ = 8.74% ≈ 9%

TOTAL: 366

SOUTH LEG

Figueroa St (NB)

HOUR TOTAL: 735

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: SCHOLL CYN/FIGUEROA

EAST-WEST STREET: EAGLE VISTA DR

TIME: 12:00PM-01:00PM DATE: 10-25-11

NORTH LEG

Rt	Thru	Lt	
20	275		Total
4	66		1st
7	67		2nd
4	68		3rd
5	74		4th

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
27	7	5	8	7	Lt
					Thru
43	9	11	10	13	Rt

	Lt	Thru	Rt
1st	7	73	
2nd	4	82	
3rd	8	70	
4th	11	70	
Total	30	295	

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INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: SCHOLL CYN/FIGUEROA

EAST-WEST STREET: EAGLE VISTA DR

TIME: 01:00PM-02:00PM DATE: 10-25-11

NORTH LEG

Rt	Thru	Lt	
13	256		Total
4	76		1st
1	70		2nd
6	56		3rd
2	54		4th

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
29	11	5	5	8	Lt
					Thru
49	15	4	17	13	Rt

	Lt	Thru	Rt
1st	12	80	
2nd	8	95	
3rd	9	81	
4th	9	66	
Total	38	322	

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SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : SCHOLL CYN/FIGUEROA PASADENA

EAST-WEST STREET : EAGLE VISTA DR 10-25-11

BEGINNING TIME : 12:00PM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
						NORTH LEG						
4	59	0	0	2	0	0	5	0	0	0	0	70
7	59	0	0	2	0	0	5	0	0	1	0	74
4	62	0	0	3	0	0	2	0	0	1	0	72
5	61	0	0	2	0	0	9	0	0	2	0	79
4	65	0	0	3	0	0	6	0	0	2	0	80
1	67	0	0	3	0	0	0	0	0	0	0	71
5	54	0	1	1	0	0	1	0	0	0	0	62
2	51	0	0	0	10 0	0	2	16 0	0	1	4 0	292 56
						TT=10+16+4=30						
32	478	0	1	16	0	0	30	0	0	7	0	564
						SOUTH LEG						
0	69	7	0	1	0	0	2	0	0	1	0	80
0	75	4	0	2	0	0	5	0	0	0	0	86
0	65	8	0	0	0	0	4	0	0	1	0	78
0	58	11	0	5	0	0	5	0	0	2	0	81
0	76	12	0	3	0	0	1	0	0	0	0	92
0	86	8	0	5	0	0	3	0	0	1	0	103
0	75	8	0	2	1	0	2	0	0	2	0	90
0	61	9	0	1	16 0	0	3	11 0	0	1	5 0	366 75
						TT=16+11+5=32						
0	565	67	0	19	1	0	25	0	0	8	0	685
						EAST LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
						WEST LEG						
7	0	7	2	0	0	0	0	0	0	0	0	16
11	0	5	0	0	0	0	0	0	0	0	0	16
10	0	8	0	0	0	0	0	0	0	0	0	18
13	0	7	0	0	0	0	0	0	0	0	0	20
15	0	11	0	0	0	0	0	0	0	0	0	26
4	0	5	0	0	0	0	0	0	0	0	0	9
17	0	5	0	0	0	0	0	0	0	0	0	22
12	0	8	1	0	0 0	0	0	0 0	0	0	0 0	77 21
						TT=0+0+0=0						
89	0	56	3	0	0	0	0	0	0	0	0	148

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: SCHOLL CYN/FIGUEROA
EAST-WEST STREET: EAGLE VISTA DR DATE: 10-25-11
JURISDICTION: PASADENA

PEAK HOUR: 04:45PM

Figueroa St (SB)
NORTH LEG

TOTAL: 462

Rt	Thru	Lt	
27 ≈25	435		Total
9	97		1st
6	129		2nd
7	117		3rd
5	92		4th

TT=13

$TT\% = \frac{13}{462} = 2.81\% \approx 3\%$

EAST LEG TOTAL: 0

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
39 ≈40	10	14	12	3	Lt
					Thru
68 ≈70	25	27	9	7	Rt

WEST LEG TOTAL: 107

Eagle Vista Dr (EB)

TT=0

$TT = \frac{0}{107} = 0\%$

PEAK HOUR FACTORS

NORTH LEG = 0.86
SOUTH LEG = 0.95
EAST LEG =
WEST LEG = 0.65

ALL LEGS = 0.90

	Lt	Thru	Rt
1st	31	110	
2nd	23	106	
3rd	29	110	
4th	21	104	
Total	104 ≈105	430	

TT=5

$TT\% = \frac{5}{534} = 0.94\% \approx 1\%$

TOTAL: 534

SOUTH LEG
Figueroa St (NB)

HOUR TOTAL: 1,103

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INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: SCHOLL CYN/FIGUEROA

EAST-WEST STREET: EAGLE VISTA DR

TIME: 04:00PM-05:00PM DATE: 10-25-11

NORTH LEG

27	379		Total
10	79		1st
4	111		2nd
4	92		3rd
9	97		4th
Rt	Thru	Lt	

Rt					
Thru					
Lt					
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
27	7	4	6	10	Lt
					Thru
56	8	14	9	25	Rt

	Lt	Thru	Rt
1st	18	96	
2nd	18	95	
3rd	13	92	
4th	31	110	
Total	80	393	

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INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: SCHOLL CYN/FIGUEROA

EAST-WEST STREET: EAGLE VISTA DR

TIME: 05:00PM-06:00PM DATE: 10-25-11

NORTH LEG

Rt	Thru	Lt	
31	441		Total
6	129		1st
7	117		2nd
5	92		3rd
13	103		4th

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
34	14	12	3	5	Lt
					Thru
50	27	9	7	7	Rt

	Lt	Thru	Rt
1st	23	106	
2nd	29	110	
3rd	21	104	
4th	23	101	
Total	96	421	

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : SCHOLL CYN/FIGUEROA PASADENA

EAST-WEST STREET : EAGLE VISTA DR 10-25-11

BEGINNING TIME : 04:00PM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
						NORTH LEG						
10	72	0	0	3	0	0	3	0	0	1	0	89
4	108	0	0	1	0	0	1	0	0	1	0	115
4	89	0	0	2	0	0	0	0	0	1	0	96
9	93	0	0	2	0	0	2	0	0	0	0	106
6	122	0	0	1	0	0	5	0	0	1	0	135
7	117	0	0	0	0	0	0	0	0	0	0	124
5	90	0	0	2	0	0	0	0	0	0	0	97
13	102	0	0	1 5	0	0	0 7	0	0	0 1	0	462 116
						TT=5+1+1=13						
58	793	0	0	12	0	0	11	0	0	4	0	878
						SOUTH LEG						
0	93	18	0	2	0	0	0	0	0	1	0	114
0	89	17	0	4	1	0	1	0	0	1	0	113
0	90	13	0	0	0	0	0	0	0	2	0	105
0	109	31	0	1	0	0	0	0	0	0	0	141
0	105	23	0	0	0	0	0	0	0	1	0	129
0	108	29	0	1	0	0	1	0	0	0	0	139
0	103	21	0	1	0	0	0	0	0	0	0	125
0	100	23	0	0 3	0	0	0 1	0	0	1 1	0	534 124
						TT=3+1+1=5						
0	797	175	0	9	1	0	2	0	0	6	0	990
						EAST LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	00	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
						WEST LEG						
8	0	7	0	0	0	0	0	0	0	0	0	15
14	0	4	0	0	0	0	0	0	0	0	0	18
9	0	6	0	0	0	0	0	0	0	0	0	15
25	0	10	0	0	0	0	0	0	0	0	0	35
27	0	14	0	0	0	0	0	0	0	0	0	41
9	0	12	0	0	0	0	0	0	0	0	0	21
7	0	3	0	0	0	0	0	0	0	0	0	10
7	0	5	0	0 0	0	0	0 0	0	0	0	0 0	107 12
						TT=0+0+0=0						
106	0	61	0	0	0	0	0	0	0	0	0	167

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Intersection	
Intersection Delay (sec/veh):	1.5

Movement	NBL	NBT	SBT	SBR	SEL	SER
Volume (vph)	25	625	220	10	45	60
Conflicting Peds.(#/hr)	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None
Storage Length	50			0	0	0
Median Width		12	12		12	
Grade (%)		0%	0%		0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles(%)	5	0	30	5	5	0
Movement Flow Rate	27	672	237	11	48	65
Number of Lanes	1	2	2	0	1	0

Major/Minor	Major 1		Major 2			
Conflicting Flow Rate - All	247	0	0	0	632	124
Stage 1	0	0	0	0	242	0
Stage 2	0	0	0	0	390	0
Follow-up Headway	2.25	-	0	0	3.55	3.3
Pot Capacity-1 Maneuver	1298	-	-	-	406	907
Stage 1	-	-	-	-	767	-
Stage 2	-	-	-	-	645	-
Mov Capacity-1 Maneuver	1298	-	-	-	397.5	907
Mov Capacity-2 Maneuver	-	-	-	-	397.5	-
Stage 1	-	-	-	-	# 0	-
Stage 2	-	-	-	-	631.5	-

Approach	NB	SB	SE
HCM Control Delay (s)	0.3	0	12.6
HCM LOS	A	A	B

Lane	NBL	NBT	SELn1	SBT	SBR
Capacity (vph)			585		
HCM Control Delay (s)	7.832	-	12.6	-	-
HCM Lane VC Ratio	0.021	-	0.193	0	-
HCM Lane LOS	A	-	B	-	-
HCM 95th Percentile Queue (veh)	0.063	-	0.709	0	-

Intersection	
Intersection Delay (sec/veh):	1.7

Movement	NBL	NBT	SBT	SBR	SEL	SER
Volume (vph)	40	325	275	15	30	50
Conflicting Peds.(#/hr)	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None
Storage Length	50			0	0	0
Median Width		12	12		12	
Grade (%)		0%	0%		0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles(%)	5	10	10	5	0	0
Movement Flow Rate	43	349	296	16	32	54
Number of Lanes	1	2	2	0	1	0

Major/Minor	Major 1		Major 2			
Conflicting Flow Rate - All	312	0	0	0	565	156
Stage 1	0	0	0	0	304	0
Stage 2	0	0	0	0	261	0
Follow-up Headway	2.25	-	0	0	3.5	3.3
Pot Capacity-1 Maneuver	1224	-	-	-	460	868
Stage 1	-	-	-	-	728	-
Stage 2	-	-	-	-	765	-
Mov Capacity-1 Maneuver	1224	-	-	-	443.9	868
Mov Capacity-2 Maneuver	-	-	-	-	443.9	-
Stage 1	-	-	-	-	# 0	-
Stage 2	-	-	-	-	738.2	-

Approach	NB	SB	SE
HCM Control Delay (s)	0.9	0	11.5
HCM LOS	A	A	B

Lane	NBL	NBT	SELn1	SBT	SBR
Capacity (vph)			639		
HCM Control Delay (s)	8.048	-	11.5	-	-
HCM Lane VC Ratio	0.035	-	0.135	0	-
HCM Lane LOS	A	-	B	-	-
HCM 95th Percentile Queue (veh)	0.109	-	0.464	0	-

Intersection	
Intersection Delay (sec/veh):	2.6

Movement	NBL	NBT	SBT	SBR	SEL	SER
Volume (vph)	105	430	435	25	40	70
Conflicting Peds.(#/hr)	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None
Storage Length	50			0	0	0
Median Width		12	12		12	
Grade (%)		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles(%)	0	5	5	0	0	0
Movement Flow Rate	117	478	483	28	44	78
Number of Lanes	1	2	2	0	1	0

Major/Minor	Major 1		Major 2			
Conflicting Flow Rate - All	511	0	0	0	969	256
Stage 1	7.17329748772	037E-299	0	0	497	0
Stage 2	1.39067116156	707E-309	0	0	472	0
Follow-up Headway	2.2	-	0	0	3.5	3.3
Pot Capacity-1 Maneuver	1065	-	-	-	255	748
Stage 1	-	-	-	-	582	-
Stage 2	-	-	-	-	600	-
Mov Capacity-1 Maneuver	1065	-	-	-	227	748
Mov Capacity-2 Maneuver	-	-	-	-	227	-
Stage 1	-	-	-	-	# 0	-
Stage 2	-	-	-	-	534	-

Approach	NB	SB	SE
HCM Control Delay (s)	1.7	0	17.6
HCM LOS	A	A	C

Lane	NBL	NBT	SELn1	SBT	SBR
Capacity (vph)			408		
HCM Control Delay (s)	8.796	-	17.6	-	-
HCM Lane VC Ratio	0.11	-	0.3	0	-
HCM Lane LOS	A	-	C	-	-
HCM 95th Percentile Queue (veh)	0.368	-	1.24	0	-

Intersection	
Intersection Delay (sec/veh):	1.5

Movement	NBL	NBT	SBT	SBR	SEL	SER
Volume (vph)	25	625	270	10	45	60
Conflicting Peds.(#/hr)	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None
Storage Length	50			0	0	0
Median Width		12	12		12	
Grade (%)		0%	0%		0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles(%)	5	0	23	5	5	0
Movement Flow Rate	27	672	290	11	48	65
Number of Lanes	1	2	2	0	1	0

Major/Minor	Major 1		Major 2			
Conflicting Flow Rate - All	301	0	0	0	686	151
Stage 1	0	0	0	0	296	0
Stage 2	0	0	0	0	390	0
Follow-up Headway	2.25	-	0	0	3.55	3.3
Pot Capacity-1 Maneuver	1236	-	-	-	375	877
Stage 1	-	-	-	-	720	-
Stage 2	-	-	-	-	645	-
Mov Capacity-1 Maneuver	1236	-	-	-	366.8	877
Mov Capacity-2 Maneuver	-	-	-	-	366.8	-
Stage 1	-	-	-	-	# 0	-
Stage 2	-	-	-	-	630.8	-

Approach	NB	SB	SE
HCM Control Delay (s)	0.3	0	13.2
HCM LOS	A	A	B

Lane	NBL	NBT	SELn1	SBT	SBR
Capacity (vph)			549		
HCM Control Delay (s)	7.977	-	13.2	-	-
HCM Lane VC Ratio	0.022	-	0.206	0	-
HCM Lane LOS	A	-	B	-	-
HCM 95th Percentile Queue (veh)	0.067	-	0.766	0	-

Intersection	
Intersection Delay (sec/veh):	1.6

Movement	NBL	NBT	SBT	SBR	SEL	SER
Volume (vph)	40	325	325	15	30	50
Conflicting Peds.(#/hr)	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None
Storage Length	50			0	0	0
Median Width		12	12		12	
Grade (%)		0%	0%		0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles(%)	5	10	24	5	0	0
Movement Flow Rate	43	349	349	16	32	54
Number of Lanes	1	2	2	0	1	0

Major/Minor	Major 1		Major 2			
Conflicting Flow Rate - All	366	0	0	0	619	183
Stage 1	0	0	0	0	358	0
Stage 2	0	0	0	0	261	0
Follow-up Headway	2.25	-	0	0	3.5	3.3
Pot Capacity-1 Maneuver	1167	-	-	-	425	833
Stage 1	-	-	-	-	684	-
Stage 2	-	-	-	-	765	-
Mov Capacity-1 Maneuver	1167	-	-	-	409.3	833
Mov Capacity-2 Maneuver	-	-	-	-	409.3	-
Stage 1	-	-	-	-	# 0	-
Stage 2	-	-	-	-	736.7	-

Approach	NB	SB	SE
HCM Control Delay (s)	0.9	0	12
HCM LOS	A	A	B

Lane	NBL	NBT	SELn1	SBT	SBR
Capacity (vph)			600		
HCM Control Delay (s)	8.203	-	12	-	-
HCM Lane VC Ratio	0.037	-	0.143	0	-
HCM Lane LOS	A	-	B	-	-
HCM 95th Percentile Queue (veh)	0.115	-	0.498	0	-

Intersection	
Intersection Delay (sec/veh):	2.6

Movement	NBL	NBT	SBT	SBR	SEL	SER
Volume (vph)	105	430	485	25	40	70
Conflicting Peds.(#/hr)	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None
Storage Length	50			0	0	0
Median Width		12	12		12	
Grade (%)		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles(%)	0	5	15	0	0	0
Movement Flow Rate	117	478	539	28	44	78
Number of Lanes	1	2	2	0	1	0

Major/Minor	Major 1		Major 2			
Conflicting Flow Rate - All	567	0	0	0	1025	283
Stage 1	0	0	0	0	553	0
Stage 2	0	0	0	0	472	0
Follow-up Headway	2.2	-	0	0	3.5	3.3
Pot Capacity-1 Maneuver	1014	-	-	-	234	721
Stage 1	-	-	-	-	546	-
Stage 2	-	-	-	-	600	-
Mov Capacity-1 Maneuver	1014	-	-	-	207.1	721
Mov Capacity-2 Maneuver	-	-	-	-	207.1	-
Stage 1	-	-	-	-	# 0	-
Stage 2	-	-	-	-	531	-

Approach	NB	SB	SE
HCM Control Delay (s)	1.8	0	19
HCM LOS	A	A	C

Lane	NBL	NBT	SELn1	SBT	SBR
Capacity (vph)			379		
HCM Control Delay (s)	9.011	-	19	-	-
HCM Lane VC Ratio	0.115	-	0.322	0	-
HCM Lane LOS	A	-	C	-	-
HCM 95th Percentile Queue (veh)	0.389	-	1.37	0	-

Intersection	
Intersection Delay (sec/veh):	1.6

Movement	NBL	NBT	SBT	SBR	SEL	SER
Volume (vph)	25	680	295	10	50	65
Conflicting Peds.(#/hr)	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None
Storage Length	50			0	0	0
Median Width		12	12		12	
Grade (%)		0%	0%		0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles(%)	5	0	23	5	5	0
Movement Flow Rate	27	731	317	11	54	70
Number of Lanes	1	2	2	0	1	0

Major/Minor	Major 1		Major 2			
Conflicting Flow Rate - All	328	0	0	0	742	164
Stage 1	0	0	0	0	323	0
Stage 2	0	0	0	0	419	0
Follow-up Headway	2.25	-	0	0	3.55	3.3
Pot Capacity-1 Maneuver	1207	-	-	-	345	860
Stage 1	-	-	-	-	697	-
Stage 2	-	-	-	-	623	-
Mov Capacity-1 Maneuver	1207	-	-	-	337.4	860
Mov Capacity-2 Maneuver	-	-	-	-	337.4	-
Stage 1	-	-	-	-	# 0	-
Stage 2	-	-	-	-	609.3	-

Approach	NB	SB	SE
HCM Control Delay (s)	0.3	0	14.2
HCM LOS	A	A	B

Lane	NBL	NBT	SELn1	SBT	SBR
Capacity (vph)			514		
HCM Control Delay (s)	8.051	-	14.2	-	-
HCM Lane VC Ratio	0.022	-	0.241	0	-
HCM Lane LOS	A	-	B	-	-
HCM 95th Percentile Queue (veh)	0.068	-	0.933	0	-

Intersection	
Intersection Delay (sec/veh):	1.8

Movement	NBL	NBT	SBT	SBR	SEL	SER
Volume (vph)	45	355	355	15	35	55
Conflicting Peds.(#/hr)	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None
Storage Length	50			0	0	0
Median Width		12	12		12	
Grade (%)		0%	0%		0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles(%)	5	10	24	5	0	0
Movement Flow Rate	48	382	382	16	38	59
Number of Lanes	1	2	2	0	1	0

Major/Minor	Major 1		Major 2			
Conflicting Flow Rate - All	398	0	0	0	678	199
Stage 1	0	0	0	0	390	0
Stage 2	0	0	0	0	288	0
Follow-up Headway	2.25	-	0	0	3.5	3.3
Pot Capacity-1 Maneuver	1135	-	-	-	390	817
Stage 1	-	-	-	-	659	-
Stage 2	-	-	-	-	741	-
Mov Capacity-1 Maneuver	1135	-	-	-	373.2	817
Mov Capacity-2 Maneuver	-	-	-	-	373.2	-
Stage 1	-	-	-	-	# 0	-
Stage 2	-	-	-	-	709.1	-

Approach	NB	SB	SE
HCM Control Delay (s)	0.9	0	12.8
HCM LOS	A	A	B

Lane	NBL	NBT	SELn1	SBT	SBR
Capacity (vph)			559		
HCM Control Delay (s)	8.313	-	12.8	-	-
HCM Lane VC Ratio	0.043	-	0.173	0	-
HCM Lane LOS	A	-	B	-	-
HCM 95th Percentile Queue (veh)	0.133	-	0.621	0	-

Intersection	
Intersection Delay (sec/veh):	3

Movement	NBL	NBT	SBT	SBR	SEL	SER
Volume (vph)	115	470	530	25	45	75
Conflicting Peds.(#/hr)	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None
Storage Length	50			0	0	0
Median Width		12	12		12	
Grade (%)		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles(%)	0	5	15	0	0	0
Movement Flow Rate	128	522	589	28	50	83
Number of Lanes	1	2	2	0	1	0

Major/Minor	Major 1		Major 2			
Conflicting Flow Rate - All	617	0	0	0	1120	308
Stage 1	0	0	0	0	603	0
Stage 2	0	0	0	0	517	0
Follow-up Headway	2.2	-	0	0	3.5	3.3
Pot Capacity-1 Maneuver	973	-	-	-	204	695
Stage 1	-	-	-	-	515	-
Stage 2	-	-	-	-	569	-
Mov Capacity-1 Maneuver	973	-	-	-	177.3	695
Mov Capacity-2 Maneuver	-	-	-	-	177.3	-
Stage 1	-	-	-	-	# 0	-
Stage 2	-	-	-	-	494.5	-

Approach	NB	SB	SE
HCM Control Delay (s)	1.8	0	22.9
HCM LOS	A	A	C

Lane	NBL	NBT	SELn1	SBT	SBR
Capacity (vph)			332		
HCM Control Delay (s)	9.258	-	22.9	-	-
HCM Lane VC Ratio	0.131	-	0.402	0	-
HCM Lane LOS	A	-	C	-	-
HCM 95th Percentile Queue (veh)	0.452	-	1.872	0	-

Intersection	
Intersection Delay (sec/veh):	1.5

Movement	NBL	NBT	SBT	SBR	SEL	SER
Volume (vph)	25	675	220	10	45	60
Conflicting Peds.(#/hr)	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None
Storage Length	50			0	0	0
Median Width		12	12		12	
Grade (%)		0%	0%		0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles(%)	5	12	30	5	5	0
Movement Flow Rate	27	726	237	11	48	65
Number of Lanes	1	2	2	0	1	0

Major/Minor	Major 1		Major 2			
Conflicting Flow Rate - All	247	0	0	0	659	124
Stage 1	0	0	0	0	242	0
Stage 2	0	0	0	0	417	0
Follow-up Headway	2.25	-	0	0	3.55	3.3
Pot Capacity-1 Maneuver	1298	-	-	-	390	907
Stage 1	-	-	-	-	767	-
Stage 2	-	-	-	-	624	-
Mov Capacity-1 Maneuver	1298	-	-	-	381.8	907
Mov Capacity-2 Maneuver	-	-	-	-	381.8	-
Stage 1	-	-	-	-	# 0	-
Stage 2	-	-	-	-	610.9	-

Approach	NB	SB	SE
HCM Control Delay (s)	0.3	0	12.9
HCM LOS	A	A	B

Lane	NBL	NBT	SELn1	SBT	SBR
Capacity (vph)			571		
HCM Control Delay (s)	7.832	-	12.9	-	-
HCM Lane VC Ratio	0.021	-	0.198	0	-
HCM Lane LOS	A	-	B	-	-
HCM 95th Percentile Queue (veh)	0.063	-	0.73	0	-

Intersection	
Intersection Delay (sec/veh):	1.6

Movement	NBL	NBT	SBT	SBR	SEL	SER
Volume (vph)	40	375	275	15	30	50
Conflicting Peds.(#/hr)	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None
Storage Length	50			0	0	0
Median Width		12	12		12	
Grade (%)		0%	0%		0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles(%)	5	22	10	5	0	0
Movement Flow Rate	43	403	296	16	32	54
Number of Lanes	1	2	2	0	1	0

Major/Minor	Major 1		Major 2			
Conflicting Flow Rate - All	312	0	0	0	592	156
Stage 1	0	0	0	0	304	0
Stage 2	0	0	0	0	288	0
Follow-up Headway	2.25	-	0	0	3.5	3.3
Pot Capacity-1 Maneuver	1224	-	-	-	442	868
Stage 1	-	-	-	-	728	-
Stage 2	-	-	-	-	741	-
Mov Capacity-1 Maneuver	1224	-	-	-	426.5	868
Mov Capacity-2 Maneuver	-	-	-	-	426.5	-
Stage 1	-	-	-	-	# 0	-
Stage 2	-	-	-	-	715.1	-

Approach	NB	SB	SE
HCM Control Delay (s)	0.8	0	11.7
HCM LOS	A	A	B

Lane	NBL	NBT	SELn1	SBT	SBR
Capacity (vph)			625		
HCM Control Delay (s)	8.048	-	11.7	-	-
HCM Lane VC Ratio	0.035	-	0.138	0	-
HCM Lane LOS	A	-	B	-	-
HCM 95th Percentile Queue (veh)	0.109	-	0.475	0	-

Intersection	
Intersection Delay (sec/veh):	2.5

Movement	NBL	NBT	SBT	SBR	SEL	SER
Volume (vph)	105	480	435	25	40	70
Conflicting Peds.(#/hr)	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None
Storage Length	50			0	0	0
Median Width		12	12		12	
Grade (%)		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles(%)	0	15	5	0	0	0
Movement Flow Rate	117	533	483	28	44	78
Number of Lanes	1	2	2	0	1	0

Major/Minor	Major 1		Major 2			
Conflicting Flow Rate - All	511	0	0	0	997	256
Stage 1	9.256214219	00012E61	0	0	497	0
Stage 2	2.901167637240	187E-315	0	0	500	0
Follow-up Headway	2.2	-	0	0	3.5	3.3
Pot Capacity-1 Maneuver	1065	-	-	-	244	748
Stage 1	-	-	-	-	582	-
Stage 2	-	-	-	-	580	-
Mov Capacity-1 Maneuver	1065	-	-	-	217.2	748
Mov Capacity-2 Maneuver	-	-	-	-	217.2	-
Stage 1	-	-	-	-	# 0	-
Stage 2	-	-	-	-	516.2	-

Approach	NB	SB	SE
HCM Control Delay (s)	1.6	0	18.1
HCM LOS	A	A	C

Lane	NBL	NBT	SELn1	SBT	SBR
Capacity (vph)			396		
HCM Control Delay (s)	8.796	-	18.1	-	-
HCM Lane VC Ratio	0.11	-	0.309	0	-
HCM Lane LOS	A	-	C	-	-
HCM 95th Percentile Queue (veh)	0.368	-	1.291	0	-

Intersection	
Intersection Delay (sec/veh):	1.6

Movement	NBL	NBT	SBT	SBR	SEL	SER
Volume (vph)	25	680	295	10	50	65
Conflicting Peds.(#/hr)	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None
Storage Length	50			0	0	0
Median Width		12	12		12	
Grade (%)		0%	0%		0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles(%)	5	12	30	5	5	0
Movement Flow Rate	27	731	317	11	54	70
Number of Lanes	1	2	2	0	1	0

Major/Minor	Major 1		Major 2			
Conflicting Flow Rate - All	328	0	0	0	742	164
Stage 1	0	0	0	0	323	0
Stage 2	0	0	0	0	419	0
Follow-up Headway	2.25	-	0	0	3.55	3.3
Pot Capacity-1 Maneuver	1207	-	-	-	345	860
Stage 1	-	-	-	-	697	-
Stage 2	-	-	-	-	623	-
Mov Capacity-1 Maneuver	1207	-	-	-	337.4	860
Mov Capacity-2 Maneuver	-	-	-	-	337.4	-
Stage 1	-	-	-	-	# 0	-
Stage 2	-	-	-	-	609.3	-

Approach	NB	SB	SE
HCM Control Delay (s)	0.3	0	14.2
HCM LOS	A	A	B

Lane	NBL	NBT	SELn1	SBT	SBR
Capacity (vph)			514		
HCM Control Delay (s)	8.051	-	14.2	-	-
HCM Lane VC Ratio	0.022	-	0.241	0	-
HCM Lane LOS	A	-	B	-	-
HCM 95th Percentile Queue (veh)	0.068	-	0.933	0	-

Intersection	
Intersection Delay (sec/veh):	1.8

Movement	NBL	NBT	SBT	SBR	SEL	SER
Volume (vph)	45	355	355	15	35	55
Conflicting Peds.(#/hr)	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None
Storage Length	50			0	0	0
Median Width		12	12		12	
Grade (%)		0%	0%		0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles(%)	5	22	10	5	0	0
Movement Flow Rate	48	382	382	16	38	59
Number of Lanes	1	2	2	0	1	0

Major/Minor	Major 1		Major 2			
Conflicting Flow Rate - All	398	0	0	0	678	199
Stage 1	0	0	0	0	390	0
Stage 2	0	0	0	0	288	0
Follow-up Headway	2.25	-	0	0	3.5	3.3
Pot Capacity-1 Maneuver	1135	-	-	-	390	817
Stage 1	-	-	-	-	659	-
Stage 2	-	-	-	-	741	-
Mov Capacity-1 Maneuver	1135	-	-	-	373.2	817
Mov Capacity-2 Maneuver	-	-	-	-	373.2	-
Stage 1	-	-	-	-	# 0	-
Stage 2	-	-	-	-	709.1	-

Approach	NB	SB	SE
HCM Control Delay (s)	0.9	0	12.8
HCM LOS	A	A	B

Lane	NBL	NBT	SELn1	SBT	SBR
Capacity (vph)			559		
HCM Control Delay (s)	8.313	-	12.8	-	-
HCM Lane VC Ratio	0.043	-	0.173	0	-
HCM Lane LOS	A	-	B	-	-
HCM 95th Percentile Queue (veh)	0.133	-	0.621	0	-

Intersection	
Intersection Delay (sec/veh):	3

Movement	NBL	NBT	SBT	SBR	SEL	SER
Volume (vph)	115	470	530	25	45	75
Conflicting Peds.(#/hr)	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None
Storage Length	50			0	0	0
Median Width		12	12		12	
Grade (%)		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles(%)	0	15	5	0	0	0
Movement Flow Rate	128	522	589	28	50	83
Number of Lanes	1	2	2	0	1	0

Major/Minor	Major 1		Major 2			
Conflicting Flow Rate - All	617	0	0	0	1120	308
Stage 1	0	0	0	0	603	0
Stage 2	0	0	0	0	517	0
Follow-up Headway	2.2	-	0	0	3.5	3.3
Pot Capacity-1 Maneuver	973	-	-	-	204	695
Stage 1	-	-	-	-	515	-
Stage 2	-	-	-	-	569	-
Mov Capacity-1 Maneuver	973	-	-	-	177.3	695
Mov Capacity-2 Maneuver	-	-	-	-	177.3	-
Stage 1	-	-	-	-	# 0	-
Stage 2	-	-	-	-	494.5	-

Approach	NB	SB	SE
HCM Control Delay (s)	1.8	0	22.9
HCM LOS	A	A	C

Lane	NBL	NBT	SELn1	SBT	SBR
Capacity (vph)			332		
HCM Control Delay (s)	9.258	-	22.9	-	-
HCM Lane VC Ratio	0.131	-	0.402	0	-
HCM Lane LOS	A	-	C	-	-
HCM 95th Percentile Queue (veh)	0.452	-	1.872	0	-

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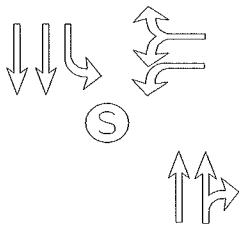
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	1 OF 6

E/W STREET : EB 134 FWY
N/S STREET : FIGUEROA ST
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 23
ROUTE 4A

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
EB 134 FWY						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	365	5%		365	35	400
WB THRU	0	0%		0	0	0
WB RIGHT	40	10%		40	5	45
FIGUEROA ST						
NB LEFT	0	0%		0	0	0
NB THRU	615	5%		615	55	670
NB RIGHT	285	5%		285	25	310
SB LEFT	50	5%	**50**	100	10	110
SB THRU	210	5%		210	20	230
SB RIGHT	0	0%		0	0	0
TOTALS	**1565**		**50**	**1615**	**150**	**1765**

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Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	11-Sep-13	VV.110264.0000	2 OF 6

E/W STREET : EB 134 FWY
N/S STREET : FIGUEROA ST
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 23
ROUTE 4B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
EB 134 FWY						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	365	5%		365	35	400
WB THRU	0	0%		0	0	0
WB RIGHT	40	10%	**50**	90	10	100
FIGUEROA ST						
NB LEFT	0	0%		0	0	0
NB THRU	615	5%		615	55	670
NB RIGHT	285	5%		285	25	310
SB LEFT	50	5%		50	5	55
SB THRU	210	5%		210	20	230
SB RIGHT	0	0%		0	0	0
TOTALS	**1565**		**50**	**1615**	**150**	**1765**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	3 OF 6

E/W STREET : EB 134 FWY
N/S STREET : FIGUEROA ST
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 23
ROUTE 4A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
EB 134 FWY						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	235	5%		235	20	255
WB THRU	0	0%		0	0	0
WB RIGHT	75	25%		75	5	80
FIGUEROA ST						
NB LEFT	0	0%		0	0	0
NB THRU	260	5%		260	25	285
NB RIGHT	225	5%		225	20	245
SB LEFT	65	35%	**50**	115	10	125
SB THRU	280	5%		280	25	305
SB RIGHT	0	0%		0	0	0
TOTALS	**1140**		**50**	**1190**	**105**	**1295**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	11-Sep-13	VV.110264.0000	4 OF 6

E/W STREET : EB 134 FWY
N/S STREET : FIGUEROA ST
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 23
ROUTE 4B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
EB 134 FWY						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	235	5%		235	20	255
WB THRU	0	0%		0	0	0
WB RIGHT	75	25%	**50**	125	10	135
FIGUEROA ST						
NB LEFT	0	0%		0	0	0
NB THRU	260	5%		260	25	285
NB RIGHT	225	5%		225	20	245
SB LEFT	65	35%		65	5	70
SB THRU	280	5%		280	25	305
SB RIGHT	0	0%		0	0	0
TOTALS	**1140**		**50**	**1190**	**105**	**1295**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	5 OF 6

E/W STREET : EB 134 FWY
N/S STREET : FIGUEROA ST
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 23
ROUTE 4A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
EB 134 FWY						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	455	5%		455	40	495
WB THRU	0	0%		0	0	0
WB RIGHT	55	5%		55	5	60
FIGUEROA ST						
NB LEFT	0	0%		0	0	0
NB THRU	480	5%		480	45	525
NB RIGHT	265	5%		265	25	290
SB LEFT	55	15%	**50**	105	10	115
SB THRU	445	5%		445	40	485
SB RIGHT	0	0%		0	0	0
TOTALS	**1755**		**50**	**1805**	**165**	**1970**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	11-Sep-13	VV.110264.0000	6 OF 6

E/W STREET : EB 134 FWY
N/S STREET : FIGUEROA ST
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 23
ROUTE 4B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
EB 134 FWY						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	455	5%		455	40	495
WB THRU	0	0%		0	0	0
WB RIGHT	55	5%	**50**	105	10	115
FIGUEROA ST						
NB LEFT	0	0%		0	0	0
NB THRU	480	5%		480	45	525
NB RIGHT	265	5%		265	25	290
SB LEFT	55	15%		55	5	60
SB THRU	445	5%		445	40	485
SB RIGHT	0	0%		0	0	0
TOTALS	**1755**		**50**	**1805**	**165**	**1970**

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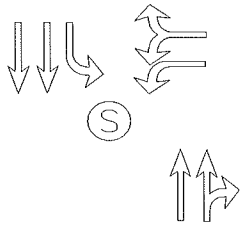
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	1 OF 6

E/W STREET : EB 134 FWY
N/S STREET : FIGUEROA ST
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 23
ROUTE 4A

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
EB 134 FWY								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	358	8	24	380	**0**	380	35	415
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	37	5	15	50	**0**	50	5	55
FIGUEROA ST								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	597	17	51	650	**0**	650	60	710
NB RIGHT	284	2	6	290	**0**	290	25	315
SB LEFT	51	0	0	50	**150**	200	20	220
SB THRU	205	5	15	220	**0**	220	20	240
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**1532**				**150**	**1790**	**165**	**1955**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	2 OF 6

E/W STREET : EB 134 FWY
N/S STREET : FIGUEROA ST
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 23
ROUTE 4B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
EB 134 FWY								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	358	8	24	380	**0**	380	35	415
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	37	5	15	50	**150**	200	20	220
FIGUEROA ST								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	597	17	51	650	**0**	650	60	710
NB RIGHT	284	2	6	290	**0**	290	25	315
SB LEFT	51	0	0	50	**0**	50	5	55
SB THRU	205	5	15	220	**0**	220	20	240
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**1532**				**150**	**1790**	**165**	**1955**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	3 OF 6

E/W STREET : EB 134 FWY
N/S STREET : FIGUEROA ST
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 23
ROUTE 4A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
EB 134 FWY								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	227	10	30	255	**0**	255	25	280
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	57	17	51	110	**0**	110	10	120
FIGUEROA ST								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	256	5	15	270	**0**	270	25	295
NB RIGHT	219	5	15	235	**0**	235	20	255
SB LEFT	42	22	66	110	**150**	260	25	285
SB THRU	272	6	18	290	**0**	290	25	315
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**1073**				**150**	**1420**	**130**	**1550**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	4 OF 6

E/W STREET : EB 134 FWY
N/S STREET : FIGUEROA ST
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 23
ROUTE 4B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
EB 134 FWY								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	227	10	30	255	**0**	255	25	280
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	57	17	51	110	**150**	260	25	285
FIGUEROA ST								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	256	5	15	270	**0**	270	25	295
NB RIGHT	219	5	15	235	**0**	235	20	255
SB LEFT	42	22	66	110	**0**	110	10	120
SB THRU	272	6	18	290	**0**	290	25	315
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**1073**				**150**	**1420**	**130**	**1550**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	5 OF 6

E/W STREET : EB 134 FWY
N/S STREET : FIGUEROA ST
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 23
ROUTE 4A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
EB 134 FWY								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	455	0	0	455	**0**	455	40	495
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	56	1	3	60	**0**	60	5	65
FIGUEROA ST								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	473	5	15	490	**0**	490	45	535
NB RIGHT	259	5	15	275	**0**	275	25	300
SB LEFT	46	9	27	75	**150**	225	20	245
SB THRU	446	1	3	450	**0**	450	40	490
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**1735**				**150**	**1955**	**175**	**2130**

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TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	6 OF 6

E/W STREET : EB 134 FWY
N/S STREET : FIGUEROA ST
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 23
ROUTE 4B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
EB 134 FWY								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	455	0	0	455	**0**	455	40	495
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	56	1	3	60	**150**	210	20	230
FIGUEROA ST								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	473	5	15	490	**0**	490	45	535
NB RIGHT	259	5	15	275	**0**	275	25	300
SB LEFT	46	9	27	75	**0**	75	5	80
SB THRU	446	1	3	450	**0**	450	40	490
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**1735**				**150**	**1955**	**175**	**2130**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: FIGUEROA
EAST-WEST STREET: FWY 134 EB RAMPS DATE: 10-25-11
JURISDICTION: PASADENA

PEAK HOUR: 07:30AM

Figueroa St (SB)
NORTH LEG

TOTAL: 261

	210	51 ≈50	Total
	52	15	1st
	54	12	2nd
	53	12	3rd
	51	12	4th
Rt	Thru	Lt	

TT = 5
TT% = $\frac{5}{261}$ = 1.92% ≈ 2%

EAST LEG TOTAL: 408

Rt	4	9	15	14	42 ≈40
Thru					
Lt	102	93	86	85	366 ≈365
	1st	2nd	3rd	4th	Total

134 Fwy offramp (EB)
TT = 13
TT% = $\frac{13}{408}$ = 3.19% ≈ 3%

Total	1st	2nd	3rd	4th	
					Lt
					Thru
					Rt

WEST LEG TOTAL: 0

PEAK HOUR FACTORS

NORTH LEG = 0.97
SOUTH LEG = 0.91
EAST LEG = 0.96
WEST LEG =

ALL LEGS = 0.95

	Lt	Thru	Rt
1st		150	82
2nd		165	75
3rd		173	74
4th		126	55
Total		614 ≈615	286 ≈285

TT = 19
TT% = $\frac{19}{900}$ = 2.11% ≈ 2%

TOTAL: 900

SOUTH LEG
Figueroa St (NB)

HOUR TOTAL: 1,569

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: FIGUEROA

EAST-WEST STREET: FWY 134 EB RAMPS

TIME: 07:00AM-08:00AM DATE: 10-25-11

NORTH LEG

	217	45	Total
	40	10	1st
	71	8	2nd
	52	15	3rd
	54	12	4th
Rt	Thru	Lt	

Rt	5	8	4	9	26
Thru					
Lt	55	67	102	93	317
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
					Lt
					Thru
					Rt

	Lt	Thru	Rt
1st		101	36
2nd		131	44
3rd		150	82
4th		165	75
Total		547	237

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: FIGUEROA

EAST-WEST STREET: FWY 134 EB RAMPS

TIME: 08:00AM-09:00AM DATE: 10-25-11

NORTH LEG

	236	46	Total
	53	12	1st
	51	12	2nd
	74	13	3rd
	58	9	4th
Rt	Thru	Lt	

Rt	15	14	9	13	51
Thru					
Lt	86	85	64	94	329
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
					Lt
					Thru
					Rt

	Lt	Thru	Rt
1st		173	74
2nd		126	55
3rd		123	80
4th		115	69
Total		537	278

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : FIGUEROA — PASADENA

EAST-WEST STREET : FWY 134 EB RAMPS — 10-25-11

BEGINNING TIME : 07:00AM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
						(SB) NORTH LEG						
0	40	10	0	0	0	0	0	0	0	0	0	50
0	69	8	0	1	0	0	0	0	0	1	0	79
0	52	15	0	0	0	0	0	0	0	0	0	67
0	53	12	0	0	0	0	0	0	0	1	0	66
0	52	12	0	1	0	0	0	0	0	0	0	65
0	48	12	0	1	0	0	1	0	0	1	0	63
0	73	11	0	1	2 2	0	0	1 0	0	0	2 0	261 87
0	56	7	0	1	1	0	0	1	0	1	0	67
						TT = 2+1+2 = 5						
0	443	87	0	5	3	0	1	1	0	4	0	544
						(NB) SOUTH LEG						
36	101	0	0	0	0	0	0	0	0	0	0	137
44	128	0	0	2	0	0	0	0	0	1	0	175
81	144	0	1	6	0	0	0	0	0	0	0	232
74	161	0	1	3	0	0	0	0	0	1	0	240
74	170	0	0	2	0	0	1	0	0	0	0	247
55	122	0	0	3	0	0	1	0	0	0	0	181
77	122	0	2	1 16	0	1	0 2	0	0	0 1	0	900 203
67	115	0	2	0	0	0	0	0	0	0	0	184
						TT = 16+2+1 = 19						
508	1063	0	6	17	0	1	2	0	0	2	0	1599
						(EB) EAST LEG						
5	0	55	0	0	0	0	0	0	0	0	0	60
8	0	67	0	0	0	0	0	0	0	0	0	75
2	0	98	1	0	3	1	0	0	0	0	1	106
8	0	91	1	0	2	0	0	0	0	0	0	102
15	0	85	0	0	1	0	0	0	0	0	0	101
12	0	84	1	0	1	0	0	0	1	0	0	99
6	0	63	1	0 10	0	1	0 1	0	1	0	2 1	408 73
11	0	92	0	0	2	2	0	0	0	0	0	107
						TT = 10+1+2 = 13						
67	0	635	4	0	9	4	0	0	2	0	2	723
						WEST LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: FIGUEROA
EAST-WEST STREET: FWY 134 EB RAMPS DATE: 10-25-11
JURISDICTION: PASADENA

PEAK HOUR: 12:15PM

Figueroa St (SB)
NORTH LEG

TOTAL: 342

	278 ≈280	64 ≈65	Total
	69	13	1st
	66	16	2nd
	73	14	3rd
	70	21	4th
Rt	Thru	Lt	

TT = 28
TT% = $\frac{28}{342}$ = 8.19% ≈ 8%

EAST LEG TOTAL: 311

Rt	17	16	21	20	74 ≈75
Thru					
Lt	65	47	57	68	237 ≈235
	1st	2nd	3rd	4th	Total

134 Fwy offramp (EB)
TT = 27
TT% = $\frac{27}{311}$ = 8.68% ≈ 9%

Total	1st	2nd	3rd	4th	
					Lt
					Thru
					Rt

WEST LEG TOTAL: 0

PEAK HOUR FACTORS

NORTH LEG = 0.94
SOUTH LEG = 0.89
EAST LEG = 0.88
WEST LEG =

ALL LEGS = 0.95

TT = 10
TT = $\frac{10}{485}$ = 2.06% ≈ 2%

	Lt	Thru	Rt
1st		70	66
2nd		61	62
3rd		59	47
4th		71	49
Total		261 ≈260	224 ≈225

TOTAL: 485

SOUTH LEG
Figueroa St (NB)

HOUR TOTAL: 1,138

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: FIGUEROA

EAST-WEST STREET: FWY 134 EB RAMPS

TIME: 12:00PM-01:00PM DATE: 10-25-11

NORTH LEG

	271	55	Total
	63	12	1st
	69	13	2nd
	66	16	3rd
	73	14	4th
Rt	Thru	Lt	

Rt	8	17	16	21	62
Thru					
Lt	37	65	47	57	206
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
					Lt
					Thru
					Rt

	Lt	Thru	Rt
1st		72	46
2nd		70	66
3rd		61	62
4th		59	47
Total		262	221

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: FIGUEROA

EAST-WEST STREET: FWY 134 EB RAMPS

TIME: 01:00PM-02:00PM DATE: 10-25-11

NORTH LEG

	253	53	Total
	70	21	1st
	63	11	2nd
	66	9	3rd
	54	12	4th

Rt Thru Lt

Rt	20	26	14	15	75
Thru					
Lt	68	36	40	39	183
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
					Lt
					Thru
					Rt

	Lt	Thru	Rt
1st		71	49
2nd		76	56
3rd		78	62
4th		61	50
Total		286	217

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : FIGUEROA — PASADENA

EAST-WEST STREET : FWY 134 EB RAMPS — 10-25-11

BEGINNING TIME : 12:00PM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
						(SB) NORTH LEG						
0	62	7	0	1	1	0	0	3	0	0	1	75
0	68	6	0	1	0	0	0	6	0	0	1	82
0	65	14	0	1	0	0	0	0	0	0	2	82
0	70	7	0	0	0	0	1	6	0	2	1	87
0	69	15	0	0	0	0	0	4	0	1	2	91
0	61	10	0	2	1	0	0	0	0	0	0	74
0	65	8	0	0	0	0	1	0	0	0	1	75
0	54	9	0	0	1	0	0	1	0	0	1	66
						TT=2+17+9=28						
0	514	76	0	5	3	0	2	20	0	3	9	632
						(NB) SOUTH LEG						
45	69	0	1	1	0	0	2	0	0	0	0	118
63	69	0	3	0	0	0	1	0	0	0	0	136
62	61	0	0	0	0	0	0	0	0	0	0	123
45	56	0	0	1	0	2	2	0	0	0	0	106
49	70	0	0	1	0	0	0	0	0	0	0	120
55	74	0	0	1	0	1	1	0	0	0	0	132
61	76	0	0	1	0	1	1	0	0	0	0	140
48	60	0	2	1	0	0	0	0	0	0	0	111
						TT=5+5+0=10						
428	535	0	6	6	0	4	7	0	0	0	0	986
						(EB) EAST LEG						
7	0	36	0	0	0	0	0	1	1	0	0	45
13	0	62	0	0	1	4	0	0	0	0	2	82
11	0	46	1	0	0	2	0	1	2	0	0	63
16	0	56	2	0	0	1	0	0	2	0	1	78
17	0	63	0	0	4	3	0	1	0	0	0	88
21	0	34	2	0	1	2	0	1	1	0	0	62
11	0	39	1	0	0	1	0	1	1	0	0	54
11	0	37	0	0	1	3	0	1	1	0	0	54
						TT=8+12+7=27						
107	0	373	6	0	7	16	0	6	8	0	3	526
						WEST LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: FIGUEROA
EAST-WEST STREET: FWY 134 EB RAMPS DATE: 10-25-11
JURISDICTION: PASADENA

PEAK HOUR: 04:45PM

Figueroa St (SB)

NORTH LEG

TOTAL: 502

	447 ≈445	55	Total
	101	20	1st
	130	25	2nd
	122	5	3rd
	94	5	4th
Rt	Thru	Lt	

TT=10

TT% = $\frac{10}{502}$ = 1.99% ≈ 2%

EAST LEG TOTAL: 512

Rt	17	18	14	8	≈55 57
Thru					
Lt	113	108	129	105	455
	1st	2nd	3rd	4th	Total

134 Fwy offramp (EB)

TT=1

TT = $\frac{1}{512}$ = 0.19% ≈ 1%

Total	1st	2nd	3rd	4th	
					Lt
					Thru
					Rt

WEST LEG TOTAL: 0

PEAK HOUR FACTORS

NORTH LEG = 0.81
SOUTH LEG = 0.93
EAST LEG = 0.90
WEST LEG =

ALL LEGS = 0.96

	Lt	Thru	Rt
1st		123	76
2nd		111	65
3rd		126	62
4th		118	61
Total		478 ≈480	264 ≈265

TOTAL: 742

TT=10

TT% = $\frac{10}{742}$ = 1.35% ≈ 1%

SOUTH LEG

Figueroa St (NB)

HOUR TOTAL: 1,756

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: FIGUEROA

EAST-WEST STREET: FWY 134 EB RAMPS

TIME: 04:00PM-05:00PM DATE: 10-25-11

NORTH LEG

	389	46	Total
	80	7	1st
	116	11	2nd
	92	8	3rd
	101	20	4th

Rt Thru Lt

Rt	24	21	13	17	75
Thru					
Lt	114	123	106	113	456

1st 2nd 3rd 4th Total

Total	1st	2nd	3rd	4th	
					Lt
					Thru
					Rt

	Lt	Thru	Rt
1st		91	61
2nd		93	63
3rd		92	64
4th		123	76
Total		399	264

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: FIGUEROA

EAST-WEST STREET: FWY 134 EB RAMPS

TIME: 05:00PM-06:00PM DATE: 10-25-11

NORTH LEG

	446	44	Total
	130	25	1st
	122	5	2nd
	94	5	3rd
	100	9	4th

Rt Thru Lt

Rt	18	14	8	15	55
Thru					
Lt	108	129	105	97	439

1st 2nd 3rd 4th Total

Total	1st	2nd	3rd	4th	
					Lt
					Thru
					Rt

	Lt	Thru	Rt
1st		111	65
2nd		126	62
3rd		118	61
4th		108	72
Total		463	260

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : FIGUEROA — PASADENA

EAST-WEST STREET : FWY 134 EB RAMPS — 10-25-11

BEGINNING TIME : 04:00PM

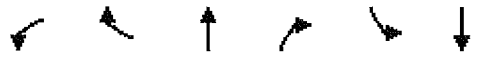
AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
NORTH LEG												
0	77	5	0	1	1	0	1	1	0	1	0	87
0	116	9	0	0	0	0	0	1	0	0	1	127
0	91	5	0	0	2	0	0	1	0	1	0	100
0	101	16	0	0	2	0	0	2	0	0	0	121
0	130	20	0	0	0	0	0	4	0	0	1	155
0	122	5	0	0	0	0	0	0	0	0	0	127
0	93	5	0	1	0	0	0	0	0	0	0	99
0	99	9	0	1 3	0	0	0 6	0	0	0 1	0	S02 109
						TT=3+6+1=10						
0	829	74	0	3	5	0	1	9	0	2	2	925
SOUTH LEG												
60	89	0	0	2	0	0	0	0	1	0	0	152
63	91	0	0	1	0	0	1	0	0	0	0	156
64	91	0	0	0	0	0	0	0	0	1	0	156
75	122	0	1	1	0	0	0	0	0	0	0	199
63	110	0	0	0	0	0	0	0	2	1	0	176
60	124	0	1	1	0	0	1	0	1	0	0	188
61	117	0	0	1	0	0	0	0	0	0	0	179
71	108	0	0	0 5	0	0	0 1	0	1	0 4	0	742 180
						TT=5+1+4=10						
517	852	0	2	6	0	0	2	0	5	2	0	1386
EAST LEG												
23	0	113	1	0	1	0	0	0	0	0	0	138
19	0	119	1	0	2	0	0	0	1	0	2	144
13	0	105	0	0	0	0	0	1	0	0	0	119
16	0	113	1	0	0	0	0	0	0	0	0	130
18	0	108	0	0	0	0	0	0	0	0	0	126
14	0	129	0	0	0	0	0	0	0	0	0	143
8	0	105	0	0	0	0	0	0	0	0	0	113
14	0	97	0	0 1	0	0	0 0	0	1	0 0	0	S12 112
						TT=1+0+0=1						
125	0	889	3	0	3	0	0	1	2	0	2	1025
WEST LEG												
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0

Prepared by Newport Traffic Studies

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	365	40	615	285	50	210
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0		4.0	4.0
Lane Util. Factor	0.97		0.95		1.00	0.95
Frt	0.99		0.95		1.00	1.00
Flt Protected	0.96		1.00		0.95	1.00
Satd. Flow (prot)	3294		3275		1805	3438
Flt Permitted	0.96		1.00		0.27	1.00
Satd. Flow (perm)	3294		3275		510	3438
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	384	42	647	300	53	221
RTOR Reduction (vph)	25	0	121	0	0	0
Lane Group Flow (vph)	401	0	826	0	53	221
Heavy Vehicles (%)	5%	10%	5%	5%	0%	5%
Turn Type	NA		NA		Perm	NA
Protected Phases	8		2			6
Permitted Phases					6	
Actuated Green, G (s)	9.1		14.9		14.9	14.9
Effective Green, g (s)	9.1		14.9		14.9	14.9
Actuated g/C Ratio	0.28		0.47		0.47	0.47
Clearance Time (s)	4.0		4.0		4.0	4.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	937		1525		237	1601
v/s Ratio Prot	c0.12		c0.25			0.06
v/s Ratio Perm					0.10	
v/c Ratio	0.43		0.54		0.22	0.14
Uniform Delay, d1	9.3		6.1		5.1	4.9
Progression Factor	1.00		1.00		1.00	1.00
Incremental Delay, d2	0.3		0.4		0.5	0.0
Delay (s)	9.6		6.5		5.6	4.9
Level of Service	A		A		A	A
Approach Delay (s)	9.6		6.5			5.0
Approach LOS	A		A			A

Intersection Summary			
HCM Average Control Delay	7.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	32.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	51.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	235	75	260	225	65	280
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0		4.0	4.0
Lane Util. Factor	0.97		0.95		1.00	0.95
Frt	0.96		0.93		1.00	1.00
Flt Protected	0.96		1.00		0.95	1.00
Satd. Flow (prot)	3116		3199		1337	3438
Flt Permitted	0.96		1.00		0.46	1.00
Satd. Flow (perm)	3116		3199		653	3438
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	247	79	274	237	68	295
RTOR Reduction (vph)	61	0	110	0	0	0
Lane Group Flow (vph)	265	0	401	0	68	295
Heavy Vehicles (%)	5%	25%	5%	5%	35%	5%
Turn Type	NA		NA		Perm	NA
Protected Phases	8		2			6
Permitted Phases					6	
Actuated Green, G (s)	8.1		18.7		18.7	18.7
Effective Green, g (s)	8.1		18.7		18.7	18.7
Actuated g/C Ratio	0.23		0.54		0.54	0.54
Clearance Time (s)	4.0		4.0		4.0	4.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	725		1719		351	1847
v/s Ratio Prot	c0.09		c0.13			0.09
v/s Ratio Perm					0.10	
v/c Ratio	0.37		0.23		0.19	0.16
Uniform Delay, d1	11.2		4.3		4.2	4.1
Progression Factor	1.00		1.00		1.00	1.00
Incremental Delay, d2	0.3		0.3		1.2	0.2
Delay (s)	11.5		4.6		5.4	4.3
Level of Service	B		A		A	A
Approach Delay (s)	11.5		4.6			4.5
Approach LOS	B		A			A

Intersection Summary			
HCM Average Control Delay	6.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.27		
Actuated Cycle Length (s)	34.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	37.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	455	55	480	265	55	445
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0		4.0	4.0
Lane Util. Factor	0.97		0.95		1.00	0.95
Frt	0.98		0.95		1.00	1.00
Flt Protected	0.96		1.00		0.95	1.00
Satd. Flow (prot)	3453		3255		1570	3438
Flt Permitted	0.96		1.00		0.33	1.00
Satd. Flow (perm)	3453		3255		542	3438
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	474	57	500	276	57	464
RTOR Reduction (vph)	26	0	164	0	0	0
Lane Group Flow (vph)	505	0	612	0	57	464
Heavy Vehicles (%)	0%	5%	5%	5%	15%	5%
Turn Type	NA		NA		Perm	NA
Protected Phases	8		2			6
Permitted Phases					6	
Actuated Green, G (s)	9.8		12.2		12.2	12.2
Effective Green, g (s)	9.8		12.2		12.2	12.2
Actuated g/C Ratio	0.33		0.41		0.41	0.41
Clearance Time (s)	4.0		4.0		4.0	4.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	1128		1324		220	1398
v/s Ratio Prot	c0.15		c0.19			0.13
v/s Ratio Perm					0.11	
v/c Ratio	0.45		0.46		0.26	0.33
Uniform Delay, d1	8.0		6.5		5.9	6.1
Progression Factor	1.00		1.00		1.00	1.00
Incremental Delay, d2	0.3		0.3		0.6	0.1
Delay (s)	8.2		6.8		6.5	6.2
Level of Service	A		A		A	A
Approach Delay (s)	8.2		6.8			6.3
Approach LOS	A		A			A

Intersection Summary			
HCM Average Control Delay	7.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	30.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	49.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	365	40	615	285	100	210
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0		4.0	4.0
Lane Util. Factor	0.97		0.95		1.00	0.95
Frt	0.99		0.95		1.00	1.00
Flt Protected	0.96		1.00		0.95	1.00
Satd. Flow (prot)	3294		3275		1203	3438
Flt Permitted	0.96		1.00		0.26	1.00
Satd. Flow (perm)	3294		3275		324	3438
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	384	42	647	300	105	221
RTOR Reduction (vph)	14	0	108	0	0	0
Lane Group Flow (vph)	412	0	839	0	105	221
Heavy Vehicles (%)	5%	10%	5%	5%	50%	5%
Turn Type	NA		NA		Perm	NA
Protected Phases	8		2			6
Permitted Phases					6	
Actuated Green, G (s)	10.6		20.4		20.4	20.4
Effective Green, g (s)	10.6		20.4		20.4	20.4
Actuated g/C Ratio	0.27		0.52		0.52	0.52
Clearance Time (s)	4.0		4.0		4.0	4.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	895		1713		169	1798
v/s Ratio Prot	c0.13		0.26			0.06
v/s Ratio Perm					c0.32	
v/c Ratio	0.46		0.49		0.62	0.12
Uniform Delay, d1	11.8		6.0		6.6	4.7
Progression Factor	1.00		1.00		1.00	1.00
Incremental Delay, d2	0.4		0.2		6.9	0.0
Delay (s)	12.2		6.2		13.5	4.8
Level of Service	B		A		B	A
Approach Delay (s)	12.2		6.2			7.6
Approach LOS	B		A			A

Intersection Summary			
HCM Average Control Delay	8.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	39.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	53.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	235	75	260	225	115	280
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0		4.0	4.0
Lane Util. Factor	0.97		0.95		1.00	0.95
Frt	0.96		0.93		1.00	1.00
Flt Protected	0.96		1.00		0.95	1.00
Satd. Flow (prot)	3116		3199		1107	3438
Flt Permitted	0.96		1.00		0.46	1.00
Satd. Flow (perm)	3116		3199		540	3438
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	247	79	274	237	121	295
RTOR Reduction (vph)	59	0	123	0	0	0
Lane Group Flow (vph)	267	0	388	0	121	295
Heavy Vehicles (%)	5%	25%	5%	5%	63%	5%
Turn Type	NA		NA		Perm	NA
Protected Phases	8		2			6
Permitted Phases					6	
Actuated Green, G (s)	8.0		14.9		14.9	14.9
Effective Green, g (s)	8.0		14.9		14.9	14.9
Actuated g/C Ratio	0.26		0.48		0.48	0.48
Clearance Time (s)	4.0		4.0		4.0	4.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	807		1543		260	1658
v/s Ratio Prot	c0.09		0.12			0.09
v/s Ratio Perm					c0.22	
v/c Ratio	0.33		0.25		0.47	0.18
Uniform Delay, d1	9.3		4.7		5.3	4.5
Progression Factor	1.00		1.00		1.00	1.00
Incremental Delay, d2	0.2		0.1		1.3	0.1
Delay (s)	9.5		4.8		6.7	4.6
Level of Service	A		A		A	A
Approach Delay (s)	9.5		4.8			5.2
Approach LOS	A		A			A

Intersection Summary			
HCM Average Control Delay	6.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	30.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	39.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	455	55	480	265	105	445
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0		4.0	4.0
Lane Util. Factor	0.97		0.95		1.00	0.95
Frt	0.98		0.95		1.00	1.00
Flt Protected	0.96		1.00		0.95	1.00
Satd. Flow (prot)	3453		3255		1165	3438
Flt Permitted	0.96		1.00		0.32	1.00
Satd. Flow (perm)	3453		3255		396	3438
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	474	57	500	276	109	464
RTOR Reduction (vph)	19	0	148	0	0	0
Lane Group Flow (vph)	512	0	628	0	109	464
Heavy Vehicles (%)	0%	5%	5%	5%	55%	5%
Turn Type	NA		NA		Perm	NA
Protected Phases	8		2			6
Permitted Phases					6	
Actuated Green, G (s)	11.0		16.4		16.4	16.4
Effective Green, g (s)	11.0		16.4		16.4	16.4
Actuated g/C Ratio	0.31		0.46		0.46	0.46
Clearance Time (s)	4.0		4.0		4.0	4.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	1073		1508		183	1593
v/s Ratio Prot	c0.15		0.19			0.13
v/s Ratio Perm					c0.28	
v/c Ratio	0.48		0.42		0.60	0.29
Uniform Delay, d1	9.9		6.3		7.0	5.9
Progression Factor	1.00		1.00		1.00	1.00
Incremental Delay, d2	0.3		0.2		5.1	0.1
Delay (s)	10.2		6.5		12.2	6.0
Level of Service	B		A		B	A
Approach Delay (s)	10.2		6.5			7.2
Approach LOS	B		A			A

Intersection Summary			
HCM Average Control Delay	7.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	35.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	52.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	400	45	670	310	110	230
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0		4.0	4.0
Lane Util. Factor	0.97		0.95		1.00	0.95
Frt	0.98		0.95		1.00	1.00
Flt Protected	0.96		1.00		0.95	1.00
Satd. Flow (prot)	3293		3275		1203	3438
Flt Permitted	0.96		1.00		0.23	1.00
Satd. Flow (perm)	3293		3275		287	3438
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	421	47	705	326	116	242
RTOR Reduction (vph)	15	0	101	0	0	0
Lane Group Flow (vph)	453	0	930	0	116	242
Heavy Vehicles (%)	5%	10%	5%	5%	50%	5%
Turn Type	NA		NA		Perm	NA
Protected Phases	8		2			6
Permitted Phases					6	
Actuated Green, G (s)	11.7		24.3		24.3	24.3
Effective Green, g (s)	11.7		24.3		24.3	24.3
Actuated g/C Ratio	0.27		0.55		0.55	0.55
Clearance Time (s)	4.0		4.0		4.0	4.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	876		1809		159	1899
v/s Ratio Prot	c0.14		0.28			0.07
v/s Ratio Perm					c0.40	
v/c Ratio	0.52		0.51		0.73	0.13
Uniform Delay, d1	13.7		6.2		7.4	4.7
Progression Factor	1.00		1.00		1.00	1.00
Incremental Delay, d2	0.5		0.2		15.4	0.0
Delay (s)	14.3		6.4		22.8	4.8
Level of Service	B		A		C	A
Approach Delay (s)	14.3		6.4			10.6
Approach LOS	B		A			B

Intersection Summary			
HCM Average Control Delay	9.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	44.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	57.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	255	80	270	235	120	290
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0		4.0	4.0
Lane Util. Factor	0.97		0.95		1.00	0.95
Frt	0.96		0.93		1.00	1.00
Flt Protected	0.96		1.00		0.95	1.00
Satd. Flow (prot)	3119		3198		1107	3438
Flt Permitted	0.96		1.00		0.45	1.00
Satd. Flow (perm)	3119		3198		530	3438
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	268	84	284	247	126	305
RTOR Reduction (vph)	62	0	128	0	0	0
Lane Group Flow (vph)	290	0	403	0	126	305
Heavy Vehicles (%)	5%	25%	5%	5%	63%	5%
Turn Type	NA		NA		Perm	NA
Protected Phases	8		2			6
Permitted Phases					6	
Actuated Green, G (s)	8.4		15.2		15.2	15.2
Effective Green, g (s)	8.4		15.2		15.2	15.2
Actuated g/C Ratio	0.27		0.48		0.48	0.48
Clearance Time (s)	4.0		4.0		4.0	4.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	829		1538		255	1654
v/s Ratio Prot	c0.09		0.13			0.09
v/s Ratio Perm					c0.24	
v/c Ratio	0.35		0.26		0.49	0.18
Uniform Delay, d1	9.4		4.9		5.6	4.7
Progression Factor	1.00		1.00		1.00	1.00
Incremental Delay, d2	0.3		0.1		1.5	0.1
Delay (s)	9.6		5.0		7.1	4.7
Level of Service	A		A		A	A
Approach Delay (s)	9.6		5.0			5.4
Approach LOS	A		A			A

Intersection Summary			
HCM Average Control Delay	6.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	31.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	41.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	495	60	525	290	115	485
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0		4.0	4.0
Lane Util. Factor	0.97		0.95		1.00	0.95
Frt	0.98		0.95		1.00	1.00
Flt Protected	0.96		1.00		0.95	1.00
Satd. Flow (prot)	3453		3255		1165	3438
Flt Permitted	0.96		1.00		0.29	1.00
Satd. Flow (perm)	3453		3255		353	3438
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	516	62	547	302	120	505
RTOR Reduction (vph)	19	0	155	0	0	0
Lane Group Flow (vph)	559	0	694	0	120	505
Heavy Vehicles (%)	0%	5%	5%	5%	55%	5%
Turn Type	NA		NA		Perm	NA
Protected Phases	8		2			6
Permitted Phases					6	
Actuated Green, G (s)	11.8		18.8		18.8	18.8
Effective Green, g (s)	11.8		18.8		18.8	18.8
Actuated g/C Ratio	0.31		0.49		0.49	0.49
Clearance Time (s)	4.0		4.0		4.0	4.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	1056		1585		172	1674
v/s Ratio Prot	c0.16		0.21			0.15
v/s Ratio Perm					c0.34	
v/c Ratio	0.53		0.44		0.70	0.30
Uniform Delay, d1	11.1		6.5		7.7	6.0
Progression Factor	1.00		1.00		1.00	1.00
Incremental Delay, d2	0.5		0.2		11.7	0.1
Delay (s)	11.6		6.6		19.3	6.1
Level of Service	B		A		B	A
Approach Delay (s)	11.6		6.6			8.6
Approach LOS	B		A			A

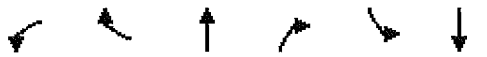
Intersection Summary			
HCM Average Control Delay	8.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	38.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	56.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	365	90	615	285	50	210
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0		4.0	4.0
Lane Util. Factor	0.97		0.95		1.00	0.95
Frt	0.97		0.95		1.00	1.00
Flt Protected	0.96		1.00		0.95	1.00
Satd. Flow (prot)	2967		3275		1805	3438
Flt Permitted	0.96		1.00		0.28	1.00
Satd. Flow (perm)	2967		3275		528	3438
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	384	95	647	300	53	221
RTOR Reduction (vph)	66	0	125	0	0	0
Lane Group Flow (vph)	413	0	822	0	53	221
Heavy Vehicles (%)	5%	60%	5%	5%	0%	5%
Turn Type	NA		NA		Perm	NA
Protected Phases	8		2			6
Permitted Phases					6	
Actuated Green, G (s)	9.7		14.4		14.4	14.4
Effective Green, g (s)	9.7		14.4		14.4	14.4
Actuated g/C Ratio	0.30		0.45		0.45	0.45
Clearance Time (s)	4.0		4.0		4.0	4.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	897		1469		237	1542
v/s Ratio Prot	c0.14		c0.25			0.06
v/s Ratio Perm					0.10	
v/c Ratio	0.46		0.56		0.22	0.14
Uniform Delay, d1	9.1		6.5		5.4	5.2
Progression Factor	1.00		1.00		1.00	1.00
Incremental Delay, d2	0.4		0.5		0.5	0.0
Delay (s)	9.5		7.0		5.9	5.3
Level of Service	A		A		A	A
Approach Delay (s)	9.5		7.0			5.4
Approach LOS	A		A			A

Intersection Summary			
HCM Average Control Delay	7.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	32.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	52.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	235	125	260	225	65	280
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0		4.0	4.0
Lane Util. Factor	0.97		0.95		1.00	0.95
Frt	0.95		0.93		1.00	1.00
Flt Protected	0.97		1.00		0.95	1.00
Satd. Flow (prot)	2764		3199		1337	3438
Flt Permitted	0.97		1.00		0.46	1.00
Satd. Flow (perm)	2764		3199		653	3438
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	247	132	274	237	68	295
RTOR Reduction (vph)	93	0	140	0	0	0
Lane Group Flow (vph)	286	0	371	0	68	295
Heavy Vehicles (%)	5%	55%	5%	5%	35%	5%
Turn Type	NA		NA		Perm	NA
Protected Phases	8		2			6
Permitted Phases					6	
Actuated Green, G (s)	7.9		11.0		11.0	11.0
Effective Green, g (s)	7.9		11.0		11.0	11.0
Actuated g/C Ratio	0.29		0.41		0.41	0.41
Clearance Time (s)	4.0		4.0		4.0	4.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	812		1308		267	1406
v/s Ratio Prot	c0.10		c0.12			0.09
v/s Ratio Perm					0.10	
v/c Ratio	0.35		0.28		0.25	0.21
Uniform Delay, d1	7.5		5.3		5.2	5.1
Progression Factor	1.00		1.00		1.00	1.00
Incremental Delay, d2	0.3		0.1		0.5	0.1
Delay (s)	7.7		5.4		5.8	5.2
Level of Service	A		A		A	A
Approach Delay (s)	7.7		5.4			5.3
Approach LOS	A		A			A

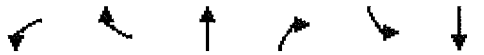
Intersection Summary			
HCM Average Control Delay	6.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	26.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	38.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	455	105	480	265	55	445
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0		4.0	4.0
Lane Util. Factor	0.97		0.95		1.00	0.95
Frt	0.97		0.95		1.00	1.00
Flt Protected	0.96		1.00		0.95	1.00
Satd. Flow (prot)	3148		3255		1570	3438
Flt Permitted	0.96		1.00		0.33	1.00
Satd. Flow (perm)	3148		3255		551	3438
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	474	109	500	276	57	464
RTOR Reduction (vph)	56	0	167	0	0	0
Lane Group Flow (vph)	527	0	609	0	57	464
Heavy Vehicles (%)	0%	50%	5%	5%	15%	5%
Turn Type	NA		NA		Perm	NA
Protected Phases	8		2			6
Permitted Phases					6	
Actuated Green, G (s)	10.5		12.0		12.0	12.0
Effective Green, g (s)	10.5		12.0		12.0	12.0
Actuated g/C Ratio	0.34		0.39		0.39	0.39
Clearance Time (s)	4.0		4.0		4.0	4.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	1084		1281		217	1353
v/s Ratio Prot	c0.17		c0.19			0.13
v/s Ratio Perm					0.10	
v/c Ratio	0.49		0.48		0.26	0.34
Uniform Delay, d1	7.9		6.9		6.3	6.5
Progression Factor	1.00		1.00		1.00	1.00
Incremental Delay, d2	0.3		0.3		0.6	0.2
Delay (s)	8.2		7.2		6.9	6.6
Level of Service	A		A		A	A
Approach Delay (s)	8.2		7.2			6.7
Approach LOS	A		A			A

Intersection Summary			
HCM Average Control Delay	7.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	30.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	51.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	400	45	670	310	110	230
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0		4.0	4.0
Lane Util. Factor	0.97		0.95		1.00	0.95
Frt	0.98		0.95		1.00	1.00
Flt Protected	0.96		1.00		0.95	1.00
Satd. Flow (prot)	3143		3275		1805	3438
Flt Permitted	0.96		1.00		0.22	1.00
Satd. Flow (perm)	3143		3275		415	3438
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	421	47	705	326	116	242
RTOR Reduction (vph)	16	0	110	0	0	0
Lane Group Flow (vph)	452	0	921	0	116	242
Heavy Vehicles (%)	5%	60%	5%	5%	0%	5%
Turn Type	NA		NA		Perm	NA
Protected Phases	8		2			6
Permitted Phases					6	
Actuated Green, G (s)	11.0		19.7		19.7	19.7
Effective Green, g (s)	11.0		19.7		19.7	19.7
Actuated g/C Ratio	0.28		0.51		0.51	0.51
Clearance Time (s)	4.0		4.0		4.0	4.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	893		1667		211	1750
v/s Ratio Prot	c0.14		c0.28			0.07
v/s Ratio Perm					0.28	
v/c Ratio	0.51		0.55		0.55	0.14
Uniform Delay, d1	11.6		6.5		6.5	5.0
Progression Factor	1.00		1.00		1.00	1.00
Incremental Delay, d2	0.5		0.4		2.9	0.0
Delay (s)	12.0		6.9		9.4	5.1
Level of Service	B		A		A	A
Approach Delay (s)	12.0		6.9			6.5
Approach LOS	B		A			A

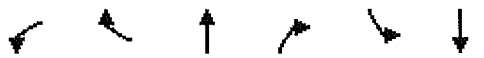
Intersection Summary			
HCM Average Control Delay	8.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	38.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	57.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	255	80	270	235	120	290
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0		4.0	4.0
Lane Util. Factor	0.97		0.95		1.00	0.95
Frt	0.96		0.93		1.00	1.00
Flt Protected	0.96		1.00		0.95	1.00
Satd. Flow (prot)	2928		3198		1337	3438
Flt Permitted	0.96		1.00		0.45	1.00
Satd. Flow (perm)	2928		3198		640	3438
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	268	84	284	247	126	305
RTOR Reduction (vph)	65	0	106	0	0	0
Lane Group Flow (vph)	287	0	425	0	126	305
Heavy Vehicles (%)	5%	55%	5%	5%	35%	5%
Turn Type	NA		NA		Perm	NA
Protected Phases	8		2			6
Permitted Phases					6	
Actuated Green, G (s)	8.9		22.6		22.6	22.6
Effective Green, g (s)	8.9		22.6		22.6	22.6
Actuated g/C Ratio	0.23		0.57		0.57	0.57
Clearance Time (s)	4.0		4.0		4.0	4.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	660		1830		366	1967
v/s Ratio Prot	c0.10		0.13			0.09
v/s Ratio Perm					c0.20	
v/c Ratio	0.43		0.23		0.34	0.16
Uniform Delay, d1	13.1		4.2		4.5	4.0
Progression Factor	1.00		1.00		1.00	1.00
Incremental Delay, d2	0.5		0.3		2.6	0.2
Delay (s)	13.6		4.5		7.1	4.1
Level of Service	B		A		A	A
Approach Delay (s)	13.6		4.5			5.0
Approach LOS	B		A			A

Intersection Summary			
HCM Average Control Delay	7.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	39.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	41.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	495	60	525	290	115	485
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0		4.0	4.0
Lane Util. Factor	0.97		0.95		1.00	0.95
Frt	0.98		0.95		1.00	1.00
Flt Protected	0.96		1.00		0.95	1.00
Satd. Flow (prot)	3295		3255		1570	3438
Flt Permitted	0.96		1.00		0.28	1.00
Satd. Flow (perm)	3295		3255		466	3438
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	516	62	547	302	120	505
RTOR Reduction (vph)	19	0	166	0	0	0
Lane Group Flow (vph)	559	0	683	0	120	505
Heavy Vehicles (%)	0%	50%	5%	5%	15%	5%
Turn Type	NA		NA		Perm	NA
Protected Phases	8		2			6
Permitted Phases					6	
Actuated Green, G (s)	11.4		15.8		15.8	15.8
Effective Green, g (s)	11.4		15.8		15.8	15.8
Actuated g/C Ratio	0.32		0.45		0.45	0.45
Clearance Time (s)	4.0		4.0		4.0	4.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	1067		1461		209	1543
v/s Ratio Prot	c0.17		0.21			0.15
v/s Ratio Perm					c0.26	
v/c Ratio	0.52		0.47		0.57	0.33
Uniform Delay, d1	9.7		6.8		7.2	6.3
Progression Factor	1.00		1.00		1.00	1.00
Incremental Delay, d2	0.5		0.2		3.8	0.1
Delay (s)	10.2		7.0		11.0	6.4
Level of Service	B		A		B	A
Approach Delay (s)	10.2		7.0			7.3
Approach LOS	B		A			A

Intersection Summary			
HCM Average Control Delay	8.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	35.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	56.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

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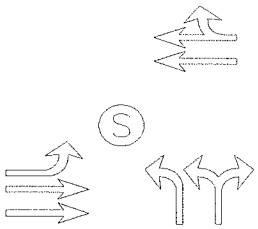
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : WB I-210 FWY RAMPS
N/S STREET : FOOTHILL BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 24
ROUTE 5A, 6A, 7A

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						

WB I-210 FWY RAMPS

EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	170	5%	**50**	220	20	240
WB THRU	0	0%		0	0	0
WB RIGHT	60	5%		60	5	65

FOOTHILL BLVD

NB LEFT	130	5%		130	10	140
NB THRU	570	5%		570	50	620
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	390	5%		390	35	425
SB RIGHT	490	5%		490	45	535
TOTALS	**1810**		**50**	**1860**	**165**	**2025**

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Hall & Foreman, Inc.
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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : WB I-210 FWY RAMPS
N/S STREET : FOOTHILL BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 24
ROUTE 5A, 6A, 7A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
WB I-210 FWY RAMPS						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	115	10%	**50**	165	15	180
WB THRU	0	0%		0	0	0
WB RIGHT	35	10%		35	5	40
FOOTHILL BLVD						
NB LEFT	105	5%		105	10	115
NB THRU	445	5%		445	40	485
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	255	5%		255	25	280
SB RIGHT	205	5%		205	20	225
TOTALS	**1160**		**50**	**1210**	**115**	**1325**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : WB I-210 FWY RAMPS
N/S STREET : FOOTHILL BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 24
ROUTE 5A, 6A, 7A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
WB I-210 FWY RAMPS						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	255	5%	**50**	305	25	330
WB THRU	0	0%		0	0	0
WB RIGHT	65	5%		65	5	70
FOOTHILL BLVD						
NB LEFT	210	5%		210	20	230
NB THRU	510	5%		510	45	555
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	260	5%		260	25	285
SB RIGHT	225	5%		225	20	245
TOTALS	**1525**		**50**	**1575**	**140**	**1715**

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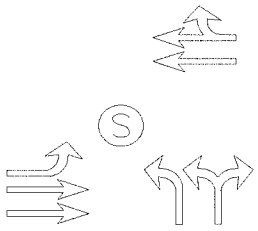
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : WB I-210 FWY RAMPS
N/S STREET : FOOTHILL BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 24
ROUTE 5A, 6A, 7A

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
WB I-210 FWY RAMPS								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	165	4	12	175	**150**	325	30	355
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	56	2	6	60	**0**	60	5	65
FOOTHILL BLVD								
NB LEFT	124	6	18	140	**0**	140	15	155
NB THRU	554	14	42	595	**0**	595	55	650
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	380	10	30	410	**0**	410	35	445
SB RIGHT	482	8	24	505	**0**	505	45	550
TOTALS	**1761**				**150**	**2035**	**185**	**2220**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : WB I-210 FWY RAMPS
N/S STREET : FOOTHILL BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
24
ROUTE
5A, 6A, 7A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
WB I-210 FWY RAMPS								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	100	13	39	140	**150**	290	25	315
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	30	3	9	40	**0**	40	5	45
FOOTHILL BLVD								
NB LEFT	99	4	12	110	**0**	110	10	120
NB THRU	425	18	54	480	**0**	480	45	525
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	235	19	57	290	**0**	290	25	315
SB RIGHT	196	7	21	215	**0**	215	20	235
TOTALS	**1085**				**150**	**1425**	**130**	**1555**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : WB I-210 FWY RAMPS
N/S STREET : FOOTHILL BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 24
ROUTE 5A, 6A, 7A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
WB I-210 FWY RAMPS								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	245	11	33	280	**150**	430	40	470
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	67	0	0	65	**0**	65	5	70
FOOTHILL BLVD								
NB LEFT	207	5	15	220	**0**	220	20	240
NB THRU	503	9	27	530	**0**	530	50	580
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	253	7	21	275	**0**	275	25	300
SB RIGHT	224	2	6	230	**0**	230	20	250
TOTALS	**1499**				**150**	**1750**	**160**	**1910**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: FOOTHILL BLVD
EAST-WEST STREET: I-210 WB RAMPS
JURISDICTION: LA

DATE: 05-23-12

PEAK HOUR: 07:00AM

NORTH LEG

TOTAL: 880

Rt	Thru	Lt	
490	390		Total
99	82		1st
134	92		2nd
147	116		3rd
110	100		4th

EAST LEG TOTAL: 227

	1st	2nd	3rd	4th	Total
Rt	11	17	21	9	58
Thru					
Lt	37	45	40	47	169

WEST LEG TOTAL: 0

Total	1st	2nd	3rd	4th	
					Lt
					Thru
					Rt

PEAK HOUR FACTORS

NORTH LEG = 0.84
SOUTH LEG = 0.79
EAST LEG = 0.92
WEST LEG =

ALL LEGS = 0.83

SOUTH LEG

TOTAL: 698

	Lt	Thru	Rt
1st	24	100	
2nd	39	129	
3rd	50	171	
4th	17	168	
Total	130	568	

HOUR TOTAL: 1,805

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: FOOTHILL BLVD

EAST-WEST STREET: I-210 WB RAMPS

TIME: 07:00AM-08:00AM DATE: 05-23-12

NORTH LEG

Rt	Thru	Lt	
490	390		Total
99	82		1st
134	92		2nd
147	116		3rd
110	100		4th

	1st	2nd	3rd	4th	Total
Rt	11	17	21	9	58
Thru					
Lt	37	45	40	47	169

Total	1st	2nd	3rd	4th	
					Lt
					Thru
					Rt

	Lt	Thru	Rt
1st	24	100	
2nd	39	129	
3rd	50	171	
4th	17	168	
Total	130	568	

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: FOOTHILL BLVD

EAST-WEST STREET: I-210 WB RAMPS

TIME: 08:00AM-09:00AM DATE: 05-23-12

NORTH LEG

Rt	Thru	Lt	
309	279		Total
99	90		1st
101	73		2nd
55	68		3rd
54	48		4th

	1st	2nd	3rd	4th	Total
Rt	23	17	10	12	62
Thru					
Lt	40	42	36	43	161

Total	1st	2nd	3rd	4th	
					Lt
					Thru
					Rt

	Lt	Thru	Rt
1st	16	55	
2nd	25	67	
3rd	22	37	
4th	25	31	
Total	88	190	

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : FOOTHILL BLVD LA

EAST-WEST STREET : I-210 WB RAMPS 05-23-12

BEGINNING TIME : 07:00AM (Peak Hr: 7 am)

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
					NORTH LEG							
98	79	0	1	1	0	0	0	0	0	2	0	181
134	89	0	0	1	0	0	1	0	0	1	0	226
145	116	0	1	0	0	0	0	0	1	0	0	263
105	96	0	5	4	0	0	0	0	0	0	0	210
97	89	0	0	1	0	0	0	0	2	0	0	189
99	64	0	2	7	0	0	0	0	0	2	0	174
55	64	0	0	4	0	0	0	0	0	0	0	123
54	46	0	0	2	0	0	0	0	0	0	0	102
787	643	0	9	20	0	0	1	0	3	5	0	1468
					SOUTH LEG							
0	98	21	0	2	2	0	0	1	0	0	0	124
0	127	38	0	2	1	0	0	0	0	0	0	168
0	166	49	0	5	1	0	0	0	0	0	0	221
0	163	16	0	3	1	0	1	0	0	1	0	185
0	51	15	0	2	0	0	0	0	0	2	1	71
0	59	23	0	7	2	0	1	0	0	0	0	92
0	32	20	0	4	0	0	0	2	0	1	0	59
0	25	21	0	4	3	0	1	0	0	1	1	56
0	721	203	0	29	10	0	3	3	0	5	2	976
					EAST LEG							
11	0	37	0	0	0	0	0	0	0	0	0	48
17	0	43	0	0	0	0	0	0	0	0	2	62
20	0	39	1	0	0	0	0	0	0	0	1	61
8	0	46	1	0	0	0	0	0	0	0	1	56
22	0	39	1	0	0	0	0	0	0	0	1	63
16	0	36	0	0	5	0	0	0	1	0	1	59
10	0	36	0	0	0	0	0	0	0	0	0	46
12	0	38	0	0	2	0	0	1	0	0	2	55
116	0	314	3	0	7	0	0	1	1	0	8	450
					WEST LEG							
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: FOOTHILL BLVD
EAST-WEST STREET: I-210 WB RAMPS
JURISDICTION: LA

DATE: 05-23-12

PEAK HOUR: 12:45PM

NORTH LEG

TOTAL: 457

Rt	Thru	Lt	
203	254		Total
57	66		1st
49	54		2nd
45	61		3rd
52	73		4th

EAST LEG TOTAL: 146

	1st	2nd	3rd	4th	Total
Rt	8	10	6	9	33
Thru					
Lt	25	25	33	30	113

WEST LEG TOTAL: 0

Total	1st	2nd	3rd	4th	
					Lt
					Thru
					Rt

PEAK HOUR FACTORS

NORTH LEG = 0.91
SOUTH LEG = 0.86
EAST LEG = 0.94
WEST LEG =

ALL LEGS = 0.94

SOUTH LEG

TOTAL: 548

	Lt	Thru	Rt
1st	19	132	
2nd	38	122	
3rd	25	96	
4th	23	93	
Total	105	443	

HOUR TOTAL: 1,151

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: FOOTHILL BLVD

EAST-WEST STREET: I-210 WB RAMPS

TIME: 12:00PM-01:00PM DATE: 05-23-12

NORTH LEG

Rt	Thru	Lt	
234	227		Total
51	50		1st
72	63		2nd
54	48		3rd
57	66		4th

	1st	2nd	3rd	4th	Total
Rt	10	9	8	8	35
Thru					
Lt	25	26	23	25	99

Total	1st	2nd	3rd	4th	
					Lt
					Thru
					Rt

	Lt	Thru	Rt
1st	24	103	
2nd	22	108	
3rd	17	90	
4th	19	132	
Total	82	433	

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: FOOTHILL BLVD

EAST-WEST STREET: I-210 WB RAMPS

TIME: 01:00PM-02:00PM DATE: 05-23-12

NORTH LEG

Rt	Thru	Lt	
181	259		Total
49	54		1st
45	61		2nd
52	73		3rd
35	71		4th

	1st	2nd	3rd	4th	Total
Rt	10	6	9	6	31
Thru					
Lt	25	33	30	32	120

Total	1st	2nd	3rd	4th	
					Lt
					Thru
					Rt

	Lt	Thru	Rt
1st	38	122	
2nd	25	96	
3rd	23	93	
4th	23	114	
Total	109	425	

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : FOOTHILL BLVD LA

EAST-WEST STREET : I-210 WB RAMPS 05-23-12

BEGINNING TIME : 12:00PM (PH: 12:45 PM)

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
50	49	0	1	1	0	0	0	0	0	0	0	101
67	60	0	4	3	0	1	0	0	0	0	0	135
51	44	0	2	4	0	1	0	0	0	0	0	102
54	61	0	1	3	0	2	0	0	0	2	0	123
47	52	0	1	0	0	0	2	0	1	0	0	103
43	53	0	1	2	0	0	2	0	1	4	0	106
52	69	0	0	1	0	0	1	0	0	2	0	125
34	69	0	0	2	0	1	0	0	0	0	0	106
398	457	0	10	16	0	5	5	0	2	8	0	901
						SOUTH LEG						
0	100	20	0	2	1	0	0	1	0	1	2	127
0	100	18	0	7	2	0	1	1	0	0	1	130
0	84	17	0	3	0	0	1	0	0	2	0	107
0	126	19	0	3	0	0	1	0	0	2	0	151
0	118	37	0	3	0	0	0	1	0	1	0	160
0	91	24	0	2	0	0	2	0	0	1	1	121
0	90	19	0	3	2	0	0	0	0	0	2	116
0	111	23	0	1	0	0	2	0	0	0	0	137
0	820	177	0	24	5	0	7	3	0	7	6	1049
						EAST LEG						
10	0	24	0	0	1	0	0	0	0	0	0	35
7	0	19	1	0	5	1	0	2	0	0	0	35
8	0	19	0	0	3	0	0	1	0	0	0	31
7	0	20	0	0	1	0	0	3	1	0	1	33
10	0	18	0	0	2	0	0	4	0	0	1	35
5	0	32	0	0	1	1	0	0	0	0	0	39
8	0	30	1	0	0	0	0	0	0	0	0	39
6	0	29	0	0	1	0	0	1	0	0	1	38
61	0	191	2	0	14	2	0	11	1	0	3	285
						WEST LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: FOOTHILL BLVD
EAST-WEST STREET: I-210 WB RAMPS
JURISDICTION: LA

DATE: 05-23-12

PEAK HOUR: 05:00PM

NORTH LEG

TOTAL: 486

Rt	Thru	Lt	
226	260		Total
65	67		1st
65	67		2nd
47	70		3rd
49	56		4th

EAST LEG TOTAL: 323

	1st	2nd	3rd	4th	Total
Rt	9	21	23	14	67
Thru					
Lt	71	64	56	65	256

WEST LEG TOTAL: 0

Total	1st	2nd	3rd	4th	
					Lt
					Thru
					Rt

PEAK HOUR FACTORS

NORTH LEG = 0.92
SOUTH LEG = 0.94
EAST LEG = 0.95
WEST LEG =

ALL LEGS = 0.95

SOUTH LEG

TOTAL: 724

	Lt	Thru	Rt
1st	61	131	
2nd	50	136	
3rd	45	118	
4th	56	127	
Total	212	512	

HOUR TOTAL: 1,533

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: FOOTHILL BLVD

EAST-WEST STREET: I-210 WB RAMPS

TIME: 04:00PM-05:00PM DATE: 05-23-12

NORTH LEG

Rt	Thru	Lt	
266	244		Total
88	73		1st
81	72		2nd
48	54		3rd
49	45		4th

	1st	2nd	3rd	4th	Total
Rt	16	7	13	15	51
Thru					
Lt	57	55	56	62	230

Total	1st	2nd	3rd	4th	
					Lt
					Thru
					Rt

	Lt	Thru	Rt
1st	59	95	
2nd	36	107	
3rd	44	126	
4th	42	151	
Total	181	479	

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: FOOTHILL BLVD

EAST-WEST STREET: I-210 WB RAMPS

TIME: 05:00PM-06:00PM DATE: 05-23-12

NORTH LEG

Rt	Thru	Lt	
226	260		Total
65	67		1st
65	67		2nd
47	70		3rd
49	56		4th

	1st	2nd	3rd	4th	Total
Rt	9	21	23	14	67
Thru					
Lt	71	64	56	65	256

Total	1st	2nd	3rd	4th	
					Lt
					Thru
					Rt

	Lt	Thru	Rt
1st	61	131	
2nd	50	136	
3rd	45	118	
4th	56	127	
Total	212	512	

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : FOOTHILL BLVD LA

EAST-WEST STREET : I-210 WB RAMPS 05-23-12

BEGINNING TIME : 04:00PM (PH 5:00 pm)

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
						NORTH LEG						
85	70	0	2	2	0	1	0	0	0	1	0	161
81	69	0	0	3	0	0	0	0	0	0	0	153
47	52	0	1	2	0	0	0	0	0	0	0	102
49	42	0	0	3	0	0	0	0	0	0	0	94
64	67	0	1	0	0	0	0	0	0	0	0	132
65	65	0	0	1	0	0	1	0	0	0	0	132
47	68	0	0	2	0	0	0	0	0	0	0	117
48	53	0	0	1	0	0	1	0	1	1	0	105
486	486	0	4	14	0	1	2	0	1	2	0	996
						SOUTH LEG						
0	91	55	0	3	3	0	0	0	0	1	1	154
0	101	32	0	4	1	0	1	2	0	1	1	143
0	115	41	0	8	2	0	2	0	0	1	1	170
0	147	38	0	3	2	0	0	1	0	1	1	193
0	128	59	0	2	0	0	0	1	0	1	1	192
0	133	49	0	2	0	0	1	0	0	0	1	186
0	116	44	0	1	1	0	1	0	0	0	0	163
0	126	55	0	0	1	0	1	0	0	0	0	183
0	957	373	0	23	10	0	6	4	0	5	6	1384
						EAST LEG						
16	0	52	0	0	3	0	0	1	0	0	1	73
7	0	49	0	0	1	0	0	3	0	0	2	62
12	0	53	1	0	2	0	0	0	0	0	1	69
15	0	58	0	0	2	0	0	0	0	0	2	77
9	0	67	0	0	1	0	0	0	0	0	3	80
21	0	61	0	0	1	0	0	0	0	0	2	85
23	0	54	0	0	0	0	0	2	0	0	0	79
14	0	63	0	0	0	0	0	1	0	0	1	79
117	0	457	1	0	10	0	0	7	0	0	12	604
						WEST LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0

Prepared by Newport Traffic Studies

HCM Signalized Intersection Capacity Analysis
24: Foothill Blvd & 210 WB

8/10/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	0	0	0	170	0	60	130	570	0	0	390	490
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor				0.95	0.95		1.00	0.95			0.95	
Frt				1.00	0.92		1.00	1.00			0.92	
Flt Protected				0.95	0.98		0.95	1.00			1.00	
Satd. Flow (prot)				1633	1545		1719	3438			3151	
Flt Permitted				0.95	0.98		0.25	1.00			1.00	
Satd. Flow (perm)				1633	1545		444	3438			3151	
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	0	0	0	205	0	72	157	687	0	0	470	590
RTOR Reduction (vph)	0	0	0	0	61	0	0	0	0	0	177	0
Lane Group Flow (vph)	0	0	0	143	73	0	157	687	0	0	883	0
Heavy Vehicles (%)	0%	0%	0%	5%	0%	5%	5%	5%	0%	0%	5%	5%
Turn Type				Perm	NA		Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8			2					
Actuated Green, G (s)				9.0	9.0		39.7	39.7			39.7	
Effective Green, g (s)				9.0	9.0		39.7	39.7			39.7	
Actuated g/C Ratio				0.16	0.16		0.70	0.70			0.70	
Clearance Time (s)				4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)				3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)				259	245		311	2407			2206	
v/s Ratio Prot								0.20			0.28	
v/s Ratio Perm				c0.09	0.05		c0.35					
v/c Ratio				0.55	0.30		0.50	0.29			0.40	
Uniform Delay, d1				22.0	21.1		3.9	3.2			3.5	
Progression Factor				1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2				2.5	0.7		5.8	0.3			0.5	
Delay (s)				24.5	21.8		9.7	3.5			4.1	
Level of Service				C	C		A	A			A	
Approach Delay (s)		0.0			23.2			4.6			4.1	
Approach LOS		A			C			A			A	

Intersection Summary			
HCM Average Control Delay	6.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	56.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	50.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	0	0	0	115	0	35	105	445	0	0	255	205
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor				0.95	0.95		1.00	0.95			0.95	
Frt				1.00	0.93		1.00	1.00			0.93	
Flt Protected				0.95	0.97		0.95	1.00			1.00	
Satd. Flow (prot)				1559	1484		1719	3438			3208	
Flt Permitted				0.95	0.97		0.47	1.00			1.00	
Satd. Flow (perm)				1559	1484		857	3438			3208	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	0	0	122	0	37	112	473	0	0	271	218
RTOR Reduction (vph)	0	0	0	0	32	0	0	0	0	0	79	0
Lane Group Flow (vph)	0	0	0	82	45	0	112	473	0	0	410	0
Heavy Vehicles (%)	0%	0%	0%	10%	0%	10%	5%	5%	0%	0%	5%	5%
Turn Type				Perm	NA		Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8			2					
Actuated Green, G (s)				4.9	4.9		22.9	22.9			22.9	
Effective Green, g (s)				4.9	4.9		22.9	22.9			22.9	
Actuated g/C Ratio				0.14	0.14		0.64	0.64			0.64	
Clearance Time (s)				4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)				3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)				213	203		548	2199			2052	
v/s Ratio Prot								c0.14			0.13	
v/s Ratio Perm				c0.05	0.03		0.13					
v/c Ratio				0.38	0.22		0.20	0.22			0.20	
Uniform Delay, d1				14.1	13.8		2.7	2.7			2.7	
Progression Factor				1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2				1.2	0.6		0.8	0.2			0.2	
Delay (s)				15.2	14.3		3.5	2.9			2.9	
Level of Service				B	B		A	A			A	
Approach Delay (s)		0.0			14.8			3.0			2.9	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	4.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.24		
Actuated Cycle Length (s)	35.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	33.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
24: Foothill Blvd & 210 WB

8/10/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	0	0	0	255	0	65	210	510	0	0	260	225
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor				0.95	0.95		1.00	0.95			0.95	
Frt				1.00	0.94		1.00	1.00			0.93	
Flt Protected				0.95	0.97		0.95	1.00			1.00	
Satd. Flow (prot)				1633	1598		1719	3438			3199	
Flt Permitted				0.95	0.97		0.46	1.00			1.00	
Satd. Flow (perm)				1633	1598		839	3438			3199	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	268	0	68	221	537	0	0	274	237
RTOR Reduction (vph)	0	0	0	0	54	0	0	0	0	0	96	0
Lane Group Flow (vph)	0	0	0	172	110	0	221	537	0	0	415	0
Heavy Vehicles (%)	0%	0%	0%	5%	0%	0%	5%	5%	0%	0%	5%	5%
Turn Type				Perm	NA		Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8			2					
Actuated Green, G (s)				8.5	8.5		24.3	24.3			24.3	
Effective Green, g (s)				8.5	8.5		24.3	24.3			24.3	
Actuated g/C Ratio				0.21	0.21		0.60	0.60			0.60	
Clearance Time (s)				4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)				3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)				340	333		500	2048			1905	
v/s Ratio Prot								0.16			0.13	
v/s Ratio Perm				c0.11	0.07		c0.26					
v/c Ratio				0.51	0.33		0.44	0.26			0.22	
Uniform Delay, d1				14.3	13.7		4.5	4.0			3.8	
Progression Factor				1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2				1.2	0.6		2.8	0.3			0.3	
Delay (s)				15.5	14.3		7.3	4.3			4.1	
Level of Service				B	B		A	A			A	
Approach Delay (s)		0.0			14.9			5.2			4.1	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	6.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	40.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	45.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
24: Foothill Blvd & 210 WB

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	0	0	0	220	0	60	130	570	0	0	390	490
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor				0.95	0.95		1.00	0.95			0.95	
Frt				1.00	0.93		1.00	1.00			0.92	
Flt Protected				0.95	0.97		0.95	1.00			1.00	
Satd. Flow (prot)				1350	1397		1719	3438			3151	
Flt Permitted				0.95	0.97		0.23	1.00			1.00	
Satd. Flow (perm)				1350	1397		425	3438			3151	
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	0	0	0	265	0	72	157	687	0	0	470	590
RTOR Reduction (vph)	0	0	0	0	50	0	0	0	0	0	202	0
Lane Group Flow (vph)	0	0	0	172	115	0	157	687	0	0	858	0
Heavy Vehicles (%)	0%	0%	0%	27%	0%	5%	5%	5%	0%	0%	5%	5%
Turn Type				Perm	NA		Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8			2					
Actuated Green, G (s)				12.2	12.2		38.9	38.9			38.9	
Effective Green, g (s)				12.2	12.2		38.9	38.9			38.9	
Actuated g/C Ratio				0.21	0.21		0.66	0.66			0.66	
Clearance Time (s)				4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)				3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)				279	288		280	2263			2074	
v/s Ratio Prot								0.20			0.27	
v/s Ratio Perm				c0.13	0.08		c0.37					
v/c Ratio				0.62	0.40		0.56	0.30			0.41	
Uniform Delay, d1				21.3	20.3		5.5	4.3			4.7	
Progression Factor				1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2				4.0	0.9		7.9	0.3			0.6	
Delay (s)				25.3	21.2		13.4	4.7			5.4	
Level of Service				C	C		B	A			A	
Approach Delay (s)		0.0			23.3			6.3			5.4	
Approach LOS		A			C			A			A	

Intersection Summary			
HCM Average Control Delay	8.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	59.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	51.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	0	0	0	165	0	35	105	445	0	0	255	205
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor				0.95	0.95		1.00	0.95			0.95	
Frt				1.00	0.95		1.00	1.00			0.93	
Flt Protected				0.95	0.97		0.95	1.00			1.00	
Satd. Flow (prot)				1252	1299		1719	3438			3208	
Flt Permitted				0.95	0.97		0.47	1.00			1.00	
Satd. Flow (perm)				1252	1299		857	3438			3208	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	0	0	176	0	37	112	473	0	0	271	218
RTOR Reduction (vph)	0	0	0	0	30	0	0	0	0	0	91	0
Lane Group Flow (vph)	0	0	0	109	74	0	112	473	0	0	398	0
Heavy Vehicles (%)	0%	0%	0%	37%	0%	10%	5%	5%	0%	0%	5%	5%
Turn Type				Perm	NA		Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8			2					
Actuated Green, G (s)				7.4	7.4		21.5	21.5			21.5	
Effective Green, g (s)				7.4	7.4		21.5	21.5			21.5	
Actuated g/C Ratio				0.20	0.20		0.58	0.58			0.58	
Clearance Time (s)				4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)				3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)				251	261		499	2003			1869	
v/s Ratio Prot								c0.14			0.12	
v/s Ratio Perm				c0.09	0.06		0.13					
v/c Ratio				0.43	0.29		0.22	0.24			0.21	
Uniform Delay, d1				12.9	12.5		3.7	3.7			3.7	
Progression Factor				1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2				1.2	0.6		1.0	0.3			0.3	
Delay (s)				14.1	13.1		4.7	4.0			3.9	
Level of Service				B	B		A	A			A	
Approach Delay (s)		0.0			13.6			4.1			3.9	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	5.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.29		
Actuated Cycle Length (s)	36.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	35.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	0	0	0	305	0	65	210	510	0	0	260	225
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor				0.95	0.95		1.00	0.95			0.95	
Frt				1.00	0.95		1.00	1.00			0.93	
Flt Protected				0.95	0.97		0.95	1.00			1.00	
Satd. Flow (prot)				1417	1458		1719	3438			3199	
Flt Permitted				0.95	0.97		0.46	1.00			1.00	
Satd. Flow (perm)				1417	1458		839	3438			3199	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	321	0	68	221	537	0	0	274	237
RTOR Reduction (vph)	0	0	0	0	50	0	0	0	0	0	106	0
Lane Group Flow (vph)	0	0	0	199	140	0	221	537	0	0	405	0
Heavy Vehicles (%)	0%	0%	0%	21%	0%	0%	5%	5%	0%	0%	5%	5%
Turn Type				Perm	NA		Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8			2					
Actuated Green, G (s)				11.2	11.2		23.8	23.8			23.8	
Effective Green, g (s)				11.2	11.2		23.8	23.8			23.8	
Actuated g/C Ratio				0.26	0.26		0.55	0.55			0.55	
Clearance Time (s)				4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)				3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)				369	380		464	1903			1771	
v/s Ratio Prot								0.16			0.13	
v/s Ratio Perm				c0.14	0.10		c0.26					
v/c Ratio				0.54	0.37		0.48	0.28			0.23	
Uniform Delay, d1				13.7	13.0		5.8	5.1			4.9	
Progression Factor				1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2				1.5	0.6		3.5	0.4			0.3	
Delay (s)				15.2	13.6		9.3	5.5			5.2	
Level of Service				B	B		A	A			A	
Approach Delay (s)		0.0			14.4			6.6			5.2	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	8.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	43.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	46.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	0	0	0	180	0	35	105	445	0	0	255	205
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor				0.95	0.95		1.00	0.95			0.95	
Frt				1.00	0.95		1.00	1.00			0.93	
Flt Protected				0.95	0.97		0.95	1.00			1.00	
Satd. Flow (prot)				1252	1296		1719	3438			3208	
Flt Permitted				0.95	0.97		0.47	1.00			1.00	
Satd. Flow (perm)				1252	1296		857	3438			3208	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	0	0	191	0	37	112	473	0	0	271	218
RTOR Reduction (vph)	0	0	0	0	29	0	0	0	0	0	93	0
Lane Group Flow (vph)	0	0	0	117	82	0	112	473	0	0	396	0
Heavy Vehicles (%)	0%	0%	0%	37%	0%	10%	5%	5%	0%	0%	5%	5%
Turn Type				Perm	NA		Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8			2					
Actuated Green, G (s)				7.7	7.7		21.0	21.0			21.0	
Effective Green, g (s)				7.7	7.7		21.0	21.0			21.0	
Actuated g/C Ratio				0.21	0.21		0.57	0.57			0.57	
Clearance Time (s)				4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)				3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)				263	272		490	1967			1836	
v/s Ratio Prot								c0.14			0.12	
v/s Ratio Perm				c0.09	0.06		0.13					
v/c Ratio				0.44	0.30		0.23	0.24			0.22	
Uniform Delay, d1				12.6	12.2		3.9	3.9			3.8	
Progression Factor				1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2				1.2	0.6		1.1	0.3			0.3	
Delay (s)				13.8	12.9		4.9	4.2			4.1	
Level of Service				B	B		A	A			A	
Approach Delay (s)		0.0			13.4			4.3			4.1	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	5.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.30		
Actuated Cycle Length (s)	36.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	35.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	0	0	0	180	0	40	115	485	0	0	280	225
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor				0.95	0.95		1.00	0.95			0.95	
Frt				1.00	0.94		1.00	1.00			0.93	
Flt Protected				0.95	0.97		0.95	1.00			1.00	
Satd. Flow (prot)				1252	1302		1719	3438			3209	
Flt Permitted				0.95	0.97		0.45	1.00			1.00	
Satd. Flow (perm)				1252	1302		818	3438			3209	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	0	0	191	0	43	122	516	0	0	298	239
RTOR Reduction (vph)	0	0	0	0	34	0	0	0	0	0	103	0
Lane Group Flow (vph)	0	0	0	120	80	0	122	516	0	0	434	0
Heavy Vehicles (%)	0%	0%	0%	37%	0%	10%	5%	5%	0%	0%	5%	5%
Turn Type				Perm	NA		Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8			2					
Actuated Green, G (s)				7.8	7.8		20.9	20.9			20.9	
Effective Green, g (s)				7.8	7.8		20.9	20.9			20.9	
Actuated g/C Ratio				0.21	0.21		0.57	0.57			0.57	
Clearance Time (s)				4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)				3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)				266	277		466	1958			1827	
v/s Ratio Prot								c0.15			0.14	
v/s Ratio Perm				c0.10	0.06		0.15					
v/c Ratio				0.45	0.29		0.26	0.26			0.24	
Uniform Delay, d1				12.6	12.1		4.0	4.0			3.9	
Progression Factor				1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2				1.2	0.6		1.4	0.3			0.3	
Delay (s)				13.8	12.7		5.4	4.3			4.2	
Level of Service				B	B		A	A			A	
Approach Delay (s)		0.0			13.3			4.5			4.2	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	5.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	36.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	37.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	0	0	0	330	0	70	230	555	0	0	285	245
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor				0.95	0.95		1.00	0.95			0.95	
Frt				1.00	0.95		1.00	1.00			0.93	
Flt Protected				0.95	0.97		0.95	1.00			1.00	
Satd. Flow (prot)				1417	1458		1719	3438			3200	
Flt Permitted				0.95	0.97		0.44	1.00			1.00	
Satd. Flow (perm)				1417	1458		801	3438			3200	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	347	0	74	242	584	0	0	300	258
RTOR Reduction (vph)	0	0	0	0	51	0	0	0	0	0	117	0
Lane Group Flow (vph)	0	0	0	215	155	0	242	584	0	0	441	0
Heavy Vehicles (%)	0%	0%	0%	21%	0%	0%	5%	5%	0%	0%	5%	5%
Turn Type				Perm	NA		Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8			2					
Actuated Green, G (s)				11.6	11.6		23.8	23.8			23.8	
Effective Green, g (s)				11.6	11.6		23.8	23.8			23.8	
Actuated g/C Ratio				0.27	0.27		0.55	0.55			0.55	
Clearance Time (s)				4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)				3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)				379	390		439	1885			1755	
v/s Ratio Prot								0.17			0.14	
v/s Ratio Perm				c0.15	0.11		c0.30					
v/c Ratio				0.57	0.40		0.55	0.31			0.25	
Uniform Delay, d1				13.7	13.0		6.3	5.3			5.1	
Progression Factor				1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2				1.9	0.7		4.9	0.4			0.3	
Delay (s)				15.7	13.7		11.3	5.8			5.5	
Level of Service				B	B		B	A			A	
Approach Delay (s)		0.0			14.7			7.4			5.5	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	8.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	43.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	49.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

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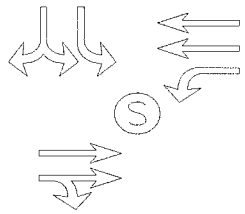
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : EB I-210 FWY RAMPS
N/S STREET : FOOTHILL BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 25
ROUTE 5A, 6A, 7A

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						

EB I-210 FWY RAMPS

EB LEFT	355	5%		355	30	385
EB THRU	0	0%		0	0	0
EB RIGHT	100	5%		100	10	110
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0

FOOTHILL BLVD

NB LEFT	0	0%		0	0	0
NB THRU	350	5%		350	30	380
NB RIGHT	290	5%	**50**	340	30	370
SB LEFT	195	5%		195	20	215
SB THRU	355	5%		355	30	385
SB RIGHT	0	0%		0	0	0
TOTALS	**1645**		**50**	**1695**	**150**	**1845**

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Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax
Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : EB I-210 FWY RAMPS
N/S STREET : FOOTHILL BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 25
ROUTE 5A, 6A, 7A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
EB I-210 FWY RAMPS						
EB LEFT	260	5%		260	25	285
EB THRU	0	0%		0	0	0
EB RIGHT	40	20%		40	5	45
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
FOOTHILL BLVD						
NB LEFT	0	0%		0	0	0
NB THRU	265	5%		265	25	290
NB RIGHT	160	10%	50	210	20	230
SB LEFT	75	5%		75	5	80
SB THRU	305	5%		305	25	330
SB RIGHT	0	0%		0	0	0
TOTALS	**1105**		**50**	**1155**	**105**	**1260**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : EB I-210 FWY RAMPS
N/S STREET : FOOTHILL BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 25
ROUTE 5A, 6A, 7A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
EB I-210 FWY RAMPS						
EB LEFT	335	5%		335	30	365
EB THRU	0	0%		0	0	0
EB RIGHT	80	5%		80	5	85
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
FOOTHILL BLVD						
NB LEFT	0	0%		0	0	0
NB THRU	390	5%		390	35	425
NB RIGHT	240	5%	**50**	290	25	315
SB LEFT	55	5%		55	5	60
SB THRU	460	5%		460	40	500
SB RIGHT	0	0%		0	0	0
TOTALS	**1560**		**50**	**1610**	**140**	**1750**

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Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

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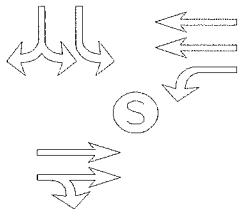
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : EB I-210 FWY RAMPS
N/S STREET : FOOTHILL BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 25
ROUTE 5A, 6A, 7A

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
EB I-210 FWY RAMPS								
EB LEFT	347	6	18	365	**0**	365	35	400
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	92	7	21	115	**0**	115	10	125
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
FOOTHILL BLVD								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	335	15	45	380	**0**	380	35	415
NB RIGHT	279	12	36	315	**150**	465	40	505
SB LEFT	190	3	9	200	**0**	200	20	220
SB THRU	336	17	51	385	**0**	385	35	420
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**1579**				**150**	**1910**	**175**	**2085**

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Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : EB I-210 FWY RAMPS
N/S STREET : FOOTHILL BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
25
ROUTE
5A, 6A, 7A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
EB I-210 FWY RAMPS								
EB LEFT	257	4	12	270	**0**	270	25	295
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	30	8	24	55	**0**	55	5	60
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
FOOTHILL BLVD								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	248	15	45	295	**0**	295	25	320
NB RIGHT	147	15	45	190	**150**	340	30	370
SB LEFT	73	1	3	75	**0**	75	5	80
SB THRU	288	16	48	335	**0**	335	30	365
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**1043**				**150**	**1370**	**120**	**1490**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : EB I-210 FWY RAMPS
N/S STREET : FOOTHILL BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 25
ROUTE 5A, 6A, 7A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
EB I-210 FWY RAMPS								
EB LEFT	326	7	21	345	**0**	345	30	375
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	79	3	9	90	**0**	90	10	100
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
FOOTHILL BLVD								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	375	14	42	415	**0**	415	35	450
NB RIGHT	234	5	15	250	**150**	400	35	435
SB LEFT	55	0	0	55	**0**	55	5	60
SB THRU	450	9	27	475	**0**	475	45	520
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**1519**				**150**	**1780**	**160**	**1940**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: FOOTHILL BLVD
EAST-WEST STREET: I-210 EB RAMPS
JURISDICTION: LA

DATE: 05-23-12

PEAK HOUR: 07:00AM

NORTH LEG

TOTAL: 546

	Rt	Thru	Lt	
		353	193	Total
		81	39	1st
		88	44	2nd
		87	64	3rd
		97	46	4th

EAST LEG TOTAL: 0

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
353	44	86	111	112	Lt
					Thru
99	23	22	17	37	Rt

WEST LEG TOTAL: 452

PEAK HOUR FACTORS

NORTH LEG = 0.90
SOUTH LEG = 0.88
EAST LEG =
WEST LEG = 0.76

ALL LEGS = 0.89

	Lt	Thru	Rt
1st		83	69
2nd		83	81
3rd		110	72
4th		74	69
Total		350	291

TOTAL: 641

SOUTH LEG

HOUR TOTAL: 1,639

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: FOOTHILL BLVD

EAST-WEST STREET: I-210 EB RAMPS

TIME: 07:00AM-08:00AM DATE: 05-23-12

NORTH LEG

	353	193	Total
	81	39	1st
	88	44	2nd
	87	64	3rd
	97	46	4th

Rt Thru Lt

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
353	44	86	111	112	Lt
					Thru
99	23	22	17	37	Rt

	Lt	Thru	Rt
1st		83	69
2nd		83	81
3rd		110	72
4th		74	69
Total		350	291

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: FOOTHILL BLVD

EAST-WEST STREET: I-210 EB RAMPS

TIME: 08:00AM-09:00AM DATE: 05-23-12

NORTH LEG

	318	110	Total
	90	31	1st
	94	29	2nd
	77	31	3rd
	57	19	4th
Rt	Thru	Lt	

Rt					
Thru					
Lt					
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
71	29	16	14	12	Lt
					Thru
177	57	44	46	30	Rt

	Lt	Thru	Rt
1st		44	54
2nd		71	60
3rd		43	45
4th		47	42
Total		205	201

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : FOOTHILL BLVD LA

EAST-WEST STREET : I-210 EB RAMPS 05-23-12

BEGINNING TIME : 07:00AM (PH 7am)

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
NORTH LEG												
0	75	39	0	3	0	0	1	0	0	2	0	120
0	86	42	0	1	0	0	1	1	0	0	1	132
0	83	64	0	2	0	0	0	0	0	2	0	151
0	92	45	0	5	0	0	0	0	0	0	1	143
0	88	31	0	2	0	0	0	0	0	0	0	121
0	86	28	0	7	0	0	0	0	0	1	1	123
0	71	31	0	4	0	0	2	0	0	0	0	108
0	52	19	0	5	0	0	0	0	0	0	0	76
0	633	299	0	29	0	0	4	1	0	5	3	974
SOUTH LEG												
66	81	0	3	2	0	0	0	0	0	0	0	152
79	81	0	2	2	0	0	0	0	0	0	0	164
67	104	0	3	6	0	1	0	0	1	0	0	182
67	69	0	1	3	0	0	1	0	1	1	0	143
50	40	0	3	2	0	0	0	0	1	2	0	98
57	63	0	2	6	0	1	1	0	0	1	0	131
42	38	0	2	4	0	0	0	0	1	1	0	88
39	41	0	3	3	0	0	2	0	0	1	0	89
467	517	0	19	28	0	2	4	0	4	6	0	1047
EAST LEG												
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
WEST LEG												
23	0	42	0	0	1	0	0	0	0	0	1	67
21	0	86	0	0	0	0	0	0	1	0	0	108
14	0	108	1	0	2	1	0	0	1	0	1	128
34	0	111	0	0	1	2	0	0	1	0	0	149
55	0	26	0	0	2	1	0	0	1	0	1	86
44	0	15	0	0	1	0	0	0	0	0	0	60
46	0	13	0	0	1	0	0	0	0	0	0	60
30	0	12	0	0	0	0	0	0	0	0	0	42
267	0	413	1	0	8	4	0	0	4	0	3	700

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: FOOTHILL BLVD
EAST-WEST STREET: I-210 EB RAMPS
JURISDICTION: LA

DATE: 05-23-12

PEAK HOUR: 01:00PM

NORTH LEG

TOTAL: 378

	Rt	Thru	Lt	
		304	74	Total
		77	22	1st
		72	26	2nd
		65	14	3rd
		90	12	4th

EAST LEG TOTAL: 0

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

WEST LEG TOTAL: 299

Total	1st	2nd	3rd	4th	
261	62	68	63	68	Lt
					Thru
38	8	11	8	11	Rt

SOUTH LEG

TOTAL: 425

	Lt	Thru	Rt
1st		62	45
2nd		59	44
3rd		70	37
4th		72	36
Total		263	162

PEAK HOUR FACTORS

NORTH LEG = 0.93
SOUTH LEG = 0.98
EAST LEG =
WEST LEG = 0.95

ALL LEGS = 0.95

HOUR TOTAL: 1,102

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: FOOTHILL BLVD

EAST-WEST STREET: I-210 EB RAMPS

TIME: 12:00PM-01:00PM DATE: 05-23-12

NORTH LEG

	257	67	Total
	66	17	1st
	62	20	2nd
	65	10	3rd
	64	20	4th

Rt Thru Lt

Rt					
Thru					
Lt					
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
259	68	73	54	64	Lt
					Thru
52	11	9	15	17	Rt

	Lt	Thru	Rt
1st		62	23
2nd		64	19
3rd		56	21
4th		68	33
Total		250	96

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: FOOTHILL BLVD

EAST-WEST STREET: I-210 EB RAMPS

TIME: 01:00PM-02:00PM DATE: 05-23-12

NORTH LEG

	304	74	Total
	77	22	1st
	72	26	2nd
	65	14	3rd
	90	12	4th
Rt	Thru	Lt	

Rt					
Thru					
Lt					
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
261	62	68	63	68	Lt
					Thru
38	8	11	8	11	Rt

	Lt	Thru	Rt
1st		62	45
2nd		59	44
3rd		70	37
4th		72	36
Total		263	162

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : FOOTHILL BLVD LA

EAST-WEST STREET : I-210 EB RAMPS 05-23-12

BEGINNING TIME : 12:00PM (PH 1:00pm)

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
					NORTH LEG							
0	65	17	0	1	0	0	0	0	0	0	0	83
0	59	18	0	3	1	0	0	0	0	0	1	82
0	61	7	0	4	1	0	0	0	0	0	2	75
0	57	18	0	3	2	0	2	0	0	2	0	84
0	72	21	0	2	1	0	2	0	0	1	0	99
0	66	26	0	2	0	0	1	0	0	3	0	98
0	63	14	0	1	0	0	0	0	0	1	0	79
0	87	12	0	2	0	0	0	0	0	1	0	102
0	530	133	0	18	5	0	5	0	0	8	3	702
					SOUTH LEG							
21	59	0	1	2	0	0	0	0	1	1	0	85
15	56	0	3	6	0	1	1	0	0	1	0	83
12	49	0	5	4	0	1	2	0	3	1	0	77
29	62	0	2	3	0	1	1	0	1	2	0	101
39	57	0	3	3	0	1	0	0	2	2	0	107
40	55	0	3	2	0	1	2	0	0	0	0	103
34	67	0	2	3	0	1	0	0	0	0	0	107
34	69	0	2	1	0	0	2	0	0	0	0	108
224	474	0	21	24	0	6	8	0	7	7	0	771
					EAST LEG							
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
					WEST LEG							
9	0	67	1	0	1	1	0	0	0	0	0	79
4	0	70	2	0	1	2	0	1	1	0	1	82
11	0	51	2	0	2	2	0	1	0	0	0	69
12	0	60	2	0	1	2	0	2	1	0	1	81
3	0	60	2	0	0	2	0	1	1	0	1	70
8	0	67	1	0	0	1	0	0	1	0	1	79
8	0	63	0	0	0	0	0	0	0	0	0	71
11	0	67	0	0	0	0	0	1	0	0	0	79
66	0	505	10	0	5	10	0	6	4	0	4	610

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: FOOTHILL BLVD
EAST-WEST STREET: I-210 EB RAMPS
JURISDICTION: LA

DATE: 05-23-12

PEAK HOUR: 05:00PM

NORTH LEG

TOTAL: 514

	Rt	Thru	Lt	
		459	55	Total
		117	19	1st
		115	16	2nd
		113	9	3rd
		114	11	4th

EAST LEG TOTAL: 0

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

WEST LEG TOTAL: 415

Total	1st	2nd	3rd	4th	
333	70	91	73	99	Lt
					Thru
82	14	14	26	28	Rt

SOUTH LEG

TOTAL: 628

	Lt	Thru	Rt
1st		123	54
2nd		70	66
3rd		101	60
4th		95	59
Total		389	239

PEAK HOUR FACTORS

NORTH LEG = 0.94
SOUTH LEG = 0.89
EAST LEG =
WEST LEG = 0.82

ALL LEGS = 0.96

HOUR TOTAL: 1,557

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: FOOTHILL BLVD

EAST-WEST STREET: I-210 EB RAMPS

TIME: 04:00PM-05:00PM DATE: 05-23-12

NORTH LEG

	386	88	Total
	102	24	1st
	96	32	2nd
	90	18	3rd
	98	14	4th

Rt Thru Lt

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
276	57	71	71	77	Lt
					Thru
88	19	19	24	26	Rt

	Lt	Thru	Rt
1st		94	55
2nd		79	51
3rd		94	51
4th		115	61
Total		382	218

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: FOOTHILL BLVD

EAST-WEST STREET: I-210 EB RAMPS

TIME: 05:00PM-06:00PM DATE: 05-23-12

NORTH LEG

	459	55	Total
	117	19	1st
	115	16	2nd
	113	9	3rd
	114	11	4th

Rt Thru Lt

Rt					
Thru					
Lt					

1st 2nd 3rd 4th Total

Total	1st	2nd	3rd	4th	
333	70	91	73	99	Lt
					Thru
82	14	14	26	28	Rt

	Lt	Thru	Rt
1st		123	54
2nd		70	66
3rd		101	60
4th		95	59
Total		389	239

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : FOOTHILL BLVD LA

EAST-WEST STREET : I-210 EB RAMPS 05-23-12

BEGINNING TIME : 04:00PM (PM 5pm)

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
0	99	23	0	2	1	0	0	0	0	1	0	126
0	93	32	0	3	0	0	0	0	0	0	0	128
0	88	18	0	2	0	0	0	0	0	0	0	108
0	95	14	0	3	0	0	0	0	0	0	0	112
0	117	19	0	0	0	0	0	0	0	0	0	136
0	113	16	0	1	0	0	1	0	0	0	0	131
0	110	9	0	2	0	0	0	0	0	1	0	122
0	110	11	0	1	0	0	1	0	0	2	0	125
0	825	142	0	14	1	0	2	0	0	4	0	988
						SOUTH LEG						
54	90	0	1	3	0	0	0	0	0	1	0	149
48	73	0	2	4	0	0	1	0	1	1	0	130
49	85	0	1	6	0	0	2	0	1	1	0	145
58	110	0	2	4	0	0	0	0	1	1	0	176
54	117	0	0	3	0	0	1	0	0	2	0	177
65	66	0	1	3	0	0	1	0	0	0	0	136
57	98	0	2	2	0	0	1	0	1	0	0	161
58	94	0	1	1	0	0	0	0	0	0	0	154
443	733	0	10	26	0	0	6	0	4	6	0	1228
						EAST LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
						WEST LEG						
18	0	55	1	0	0	0	0	0	0	0	2	76
16	0	68	2	0	1	0	0	2	1	0	0	90
23	0	70	0	0	0	0	0	0	1	0	1	95
26	0	76	0	0	0	0	0	0	0	0	1	103
11	0	69	1	0	0	0	0	0	2	0	1	84
14	0	89	0	0	1	0	0	0	0	0	1	105
26	0	71	0	0	1	0	0	0	0	0	1	99
28	0	97	0	0	1	0	0	0	0	0	1	127
162	0	595	4	0	4	0	0	2	4	0	8	779

Prepared by Newport Traffic Studies

HCM Signalized Intersection Capacity Analysis
3: Foothill Blvd & 210 EB

8/10/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	355	0	100	0	0	0	0	350	290	195	355	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0						4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95						0.95		1.00	0.95	
Frt	1.00	0.93						0.93		1.00	1.00	
Flt Protected	0.95	0.97						1.00		0.95	1.00	
Satd. Flow (prot)	1633	1560						3204		1719	3438	
Flt Permitted	0.95	0.97						1.00		0.36	1.00	
Satd. Flow (perm)	1633	1560						3204		647	3438	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	399	0	112	0	0	0	0	393	326	219	399	0
RTOR Reduction (vph)	0	64	0	0	0	0	0	141	0	0	0	0
Lane Group Flow (vph)	263	184	0	0	0	0	0	578	0	219	399	0
Heavy Vehicles (%)	5%	0%	5%	0%	0%	0%	0%	5%	5%	5%	5%	0%
Turn Type	Perm	NA						NA		Perm	NA	
Protected Phases		4						2			6	
Permitted Phases	4									6		
Actuated Green, G (s)	12.6	12.6						27.0		27.0	27.0	
Effective Green, g (s)	12.6	12.6						27.0		27.0	27.0	
Actuated g/C Ratio	0.26	0.26						0.57		0.57	0.57	
Clearance Time (s)	4.0	4.0						4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)	432	413						1817		367	1950	
v/s Ratio Prot								0.18			0.12	
v/s Ratio Perm	c0.16	0.12								c0.34		
v/c Ratio	0.61	0.45						0.32		0.60	0.20	
Uniform Delay, d1	15.3	14.6						5.4		6.7	5.0	
Progression Factor	1.00	1.00						1.00		1.00	1.00	
Incremental Delay, d2	2.4	0.8						0.5		7.0	0.2	
Delay (s)	17.8	15.4						5.9		13.7	5.3	
Level of Service	B	B						A		B	A	
Approach Delay (s)		16.6			0.0			5.9			8.3	
Approach LOS		B			A			A			A	

Intersection Summary			
HCM Average Control Delay	9.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	47.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	52.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

253 3: Foothill Blvd & 210 EB 8/10/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	260	0	40	0	0	0	0	265	160	75	305	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0						4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95						0.95		1.00	0.95	
Frt	1.00	0.96						0.94		1.00	1.00	
Flt Protected	0.95	0.96						1.00		0.95	1.00	
Satd. Flow (prot)	1633	1531						3187		1719	3438	
Flt Permitted	0.95	0.96						1.00		0.49	1.00	
Satd. Flow (perm)	1633	1531						3187		893	3438	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	274	0	42	0	0	0	0	279	168	79	321	0
RTOR Reduction (vph)	0	33	0	0	0	0	0	75	0	0	0	0
Lane Group Flow (vph)	162	121	0	0	0	0	0	372	0	79	321	0
Heavy Vehicles (%)	5%	0%	20%	2%	2%	2%	0%	5%	10%	5%	5%	0%
Turn Type	Perm	NA						NA		Perm	NA	
Protected Phases		4						2			6	
Permitted Phases	4									6		
Actuated Green, G (s)	7.6	7.6						19.5		19.5	19.5	
Effective Green, g (s)	7.6	7.6						19.5		19.5	19.5	
Actuated g/C Ratio	0.22	0.22						0.56		0.56	0.56	
Clearance Time (s)	4.0	4.0						4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)	354	331						1771		496	1910	
v/s Ratio Prot								c0.12			0.09	
v/s Ratio Perm	c0.10	0.08								0.09		
v/c Ratio	0.46	0.37						0.21		0.16	0.17	
Uniform Delay, d1	12.0	11.7						3.9		3.8	3.8	
Progression Factor	1.00	1.00						1.00		1.00	1.00	
Incremental Delay, d2	0.9	0.7						0.3		0.7	0.2	
Delay (s)	12.9	12.4						4.2		4.5	4.0	
Level of Service	B	B						A		A	A	
Approach Delay (s)		12.6			0.0			4.2			4.1	
Approach LOS		B			A			A			A	

Intersection Summary			
HCM Average Control Delay	6.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.28		
Actuated Cycle Length (s)	35.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	35.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

253 3: Foothill Blvd & 210 EB 8/10/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	335	0	80	0	0	0	0	390	240	55	460	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0						4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95						0.95		1.00	0.95	
Frt	1.00	0.94						0.94		1.00	1.00	
Flt Protected	0.95	0.97						1.00		0.95	1.00	
Satd. Flow (prot)	1633	1570						3242		1805	3438	
Flt Permitted	0.95	0.97						1.00		0.40	1.00	
Satd. Flow (perm)	1633	1570						3242		763	3438	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	349	0	83	0	0	0	0	406	250	57	479	0
RTOR Reduction (vph)	0	62	0	0	0	0	0	118	0	0	0	0
Lane Group Flow (vph)	220	150	0	0	0	0	0	538	0	57	479	0
Heavy Vehicles (%)	5%	0%	5%	0%	0%	0%	0%	5%	5%	0%	5%	0%
Turn Type	Perm	NA						NA		Perm	NA	
Protected Phases		4						2			6	
Permitted Phases	4									6		
Actuated Green, G (s)	9.0	9.0						19.1		19.1	19.1	
Effective Green, g (s)	9.0	9.0						19.1		19.1	19.1	
Actuated g/C Ratio	0.25	0.25						0.53		0.53	0.53	
Clearance Time (s)	4.0	4.0						4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)	407	391						1715		404	1819	
v/s Ratio Prot								c0.17			0.14	
v/s Ratio Perm	c0.13	0.10								0.07		
v/c Ratio	0.54	0.38						0.31		0.14	0.26	
Uniform Delay, d1	11.8	11.2						4.8		4.3	4.7	
Progression Factor	1.00	1.00						1.00		1.00	1.00	
Incremental Delay, d2	1.5	0.6						0.5		0.7	0.4	
Delay (s)	13.2	11.9						5.3		5.1	5.0	
Level of Service	B	B						A		A	A	
Approach Delay (s)		12.6			0.0			5.3			5.0	
Approach LOS		B			A			A			A	

Intersection Summary			
HCM Average Control Delay	7.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	36.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	43.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

3: Foothill Blvd & 210 EB

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	355	0	100	0	0	0	0	350	340	195	355	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0						4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95						0.95		1.00	0.95	
Frt	1.00	0.93						0.93		1.00	1.00	
Flt Protected	0.95	0.97						1.00		0.95	1.00	
Satd. Flow (prot)	1633	1560						2988		1719	3438	
Flt Permitted	0.95	0.97						1.00		0.33	1.00	
Satd. Flow (perm)	1633	1560						2988		599	3438	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	399	0	112	0	0	0	0	393	382	219	399	0
RTOR Reduction (vph)	0	64	0	0	0	0	0	165	0	0	0	0
Lane Group Flow (vph)	263	184	0	0	0	0	0	610	0	219	399	0
Heavy Vehicles (%)	5%	0%	5%	0%	0%	0%	0%	5%	19%	5%	5%	0%
Turn Type	Perm	NA						NA		Perm	NA	
Protected Phases		4						2			6	
Permitted Phases	4									6		
Actuated Green, G (s)	12.6	12.6						27.0		27.0	27.0	
Effective Green, g (s)	12.6	12.6						27.0		27.0	27.0	
Actuated g/C Ratio	0.26	0.26						0.57		0.57	0.57	
Clearance Time (s)	4.0	4.0						4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)	432	413						1695		340	1950	
v/s Ratio Prot								0.20			0.12	
v/s Ratio Perm	c0.16	0.12								c0.37		
v/c Ratio	0.61	0.45						0.36		0.64	0.20	
Uniform Delay, d1	15.3	14.6						5.6		7.0	5.0	
Progression Factor	1.00	1.00						1.00		1.00	1.00	
Incremental Delay, d2	2.4	0.8						0.6		9.1	0.2	
Delay (s)	17.8	15.4						6.2		16.1	5.3	
Level of Service	B	B						A		B	A	
Approach Delay (s)		16.6			0.0			6.2			9.1	
Approach LOS		B			A			A			A	

Intersection Summary			
HCM Average Control Delay	9.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	47.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	54.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	260	0	40	0	0	0	0	265	210	75	305	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0						4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95						0.95		1.00	0.95	
Frt	1.00	0.96						0.93		1.00	1.00	
Flt Protected	0.95	0.96						1.00		0.95	1.00	
Satd. Flow (prot)	1633	1531						2893		1719	3438	
Flt Permitted	0.95	0.96						1.00		0.47	1.00	
Satd. Flow (perm)	1633	1531						2893		848	3438	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	274	0	42	0	0	0	0	279	221	79	321	0
RTOR Reduction (vph)	0	33	0	0	0	0	0	98	0	0	0	0
Lane Group Flow (vph)	162	121	0	0	0	0	0	402	0	79	321	0
Heavy Vehicles (%)	5%	0%	20%	2%	2%	2%	0%	5%	31%	5%	5%	0%
Turn Type	Perm	NA						NA		Perm	NA	
Protected Phases		4						2			6	
Permitted Phases	4									6		
Actuated Green, G (s)	7.6	7.6						19.5		19.5	19.5	
Effective Green, g (s)	7.6	7.6						19.5		19.5	19.5	
Actuated g/C Ratio	0.22	0.22						0.56		0.56	0.56	
Clearance Time (s)	4.0	4.0						4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)	354	331						1607		471	1910	
v/s Ratio Prot								c0.14			0.09	
v/s Ratio Perm	c0.10	0.08								0.09		
v/c Ratio	0.46	0.37						0.25		0.17	0.17	
Uniform Delay, d1	12.0	11.7						4.0		3.8	3.8	
Progression Factor	1.00	1.00						1.00		1.00	1.00	
Incremental Delay, d2	0.9	0.7						0.4		0.8	0.2	
Delay (s)	12.9	12.4						4.4		4.6	4.0	
Level of Service	B	B						A		A	A	
Approach Delay (s)		12.6			0.0			4.4			4.1	
Approach LOS		B			A			A			A	

Intersection Summary			
HCM Average Control Delay	6.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	35.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	36.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

3: Foothill Blvd & 210 EB

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	335	0	80	0	0	0	0	390	290	55	460	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0						4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95						0.95		1.00	0.95	
Frt	1.00	0.94						0.94		1.00	1.00	
Flt Protected	0.95	0.97						1.00		0.95	1.00	
Satd. Flow (prot)	1633	1570						3022		1805	3438	
Flt Permitted	0.95	0.97						1.00		0.37	1.00	
Satd. Flow (perm)	1633	1570						3022		710	3438	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	349	0	83	0	0	0	0	406	302	57	479	0
RTOR Reduction (vph)	0	62	0	0	0	0	0	142	0	0	0	0
Lane Group Flow (vph)	220	150	0	0	0	0	0	566	0	57	479	0
Heavy Vehicles (%)	5%	0%	5%	0%	0%	0%	0%	5%	21%	0%	5%	0%
Turn Type	Perm	NA						NA		Perm	NA	
Protected Phases		4						2			6	
Permitted Phases	4									6		
Actuated Green, G (s)	9.0	9.0						19.1		19.1	19.1	
Effective Green, g (s)	9.0	9.0						19.1		19.1	19.1	
Actuated g/C Ratio	0.25	0.25						0.53		0.53	0.53	
Clearance Time (s)	4.0	4.0						4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)	407	391						1599		376	1819	
v/s Ratio Prot								c0.19			0.14	
v/s Ratio Perm	c0.13	0.10								0.08		
v/c Ratio	0.54	0.38						0.35		0.15	0.26	
Uniform Delay, d1	11.8	11.2						4.9		4.4	4.7	
Progression Factor	1.00	1.00						1.00		1.00	1.00	
Incremental Delay, d2	1.5	0.6						0.6		0.9	0.4	
Delay (s)	13.2	11.9						5.5		5.2	5.0	
Level of Service	B	B						A		A	A	
Approach Delay (s)		12.6			0.0			5.5			5.0	
Approach LOS		B			A			A			A	

Intersection Summary			
HCM Average Control Delay	7.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	36.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	45.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
25: Foothill Blvd & 210 EB

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	260	0	40	0	0	0	0	265	230	75	305	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0						4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95						0.95		1.00	0.95	
Frt	1.00	0.96						0.93		1.00	1.00	
Flt Protected	0.95	0.96						1.00		0.95	1.00	
Satd. Flow (prot)	1633	1531						2869		1719	3438	
Flt Permitted	0.95	0.96						1.00		0.46	1.00	
Satd. Flow (perm)	1633	1531						2869		831	3438	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	274	0	42	0	0	0	0	279	242	79	321	0
RTOR Reduction (vph)	0	33	0	0	0	0	0	108	0	0	0	0
Lane Group Flow (vph)	162	121	0	0	0	0	0	413	0	79	321	0
Heavy Vehicles (%)	5%	0%	20%	2%	2%	2%	0%	5%	31%	5%	5%	0%
Turn Type	Perm	NA						NA		Perm	NA	
Protected Phases		4						2			6	
Permitted Phases	4									6		
Actuated Green, G (s)	7.6	7.6						19.5		19.5	19.5	
Effective Green, g (s)	7.6	7.6						19.5		19.5	19.5	
Actuated g/C Ratio	0.22	0.22						0.56		0.56	0.56	
Clearance Time (s)	4.0	4.0						4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)	354	331						1594		462	1910	
v/s Ratio Prot								c0.14			0.09	
v/s Ratio Perm	c0.10	0.08								0.10		
v/c Ratio	0.46	0.37						0.26		0.17	0.17	
Uniform Delay, d1	12.0	11.7						4.1		3.8	3.8	
Progression Factor	1.00	1.00						1.00		1.00	1.00	
Incremental Delay, d2	0.9	0.7						0.4		0.8	0.2	
Delay (s)	12.9	12.4						4.4		4.6	4.0	
Level of Service	B	B						A		A	A	
Approach Delay (s)		12.6			0.0			4.4			4.1	
Approach LOS		B			A			A			A	

Intersection Summary			
HCM Average Control Delay	6.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.32		
Actuated Cycle Length (s)	35.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	37.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
25: Foothill Blvd & 210 EB

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	285	0	45	0	0	0	0	290	230	80	330	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0						4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95						0.95		1.00	0.95	
Frt	1.00	0.96						0.93		1.00	1.00	
Flt Protected	0.95	0.97						1.00		0.95	1.00	
Satd. Flow (prot)	1633	1530						2893		1719	3438	
Flt Permitted	0.95	0.97						1.00		0.45	1.00	
Satd. Flow (perm)	1633	1530						2893		810	3438	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	300	0	47	0	0	0	0	305	242	84	347	0
RTOR Reduction (vph)	0	36	0	0	0	0	0	111	0	0	0	0
Lane Group Flow (vph)	177	134	0	0	0	0	0	436	0	84	347	0
Heavy Vehicles (%)	5%	0%	20%	2%	2%	2%	0%	5%	31%	5%	5%	0%
Turn Type	Perm	NA						NA		Perm	NA	
Protected Phases		4						2			6	
Permitted Phases	4									6		
Actuated Green, G (s)	8.3	8.3						19.3		19.3	19.3	
Effective Green, g (s)	8.3	8.3						19.3		19.3	19.3	
Actuated g/C Ratio	0.23	0.23						0.54		0.54	0.54	
Clearance Time (s)	4.0	4.0						4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)	381	357						1568		439	1864	
v/s Ratio Prot								c0.15			0.10	
v/s Ratio Perm	c0.11	0.09								0.10		
v/c Ratio	0.46	0.38						0.28		0.19	0.19	
Uniform Delay, d1	11.7	11.5						4.4		4.2	4.2	
Progression Factor	1.00	1.00						1.00		1.00	1.00	
Incremental Delay, d2	0.9	0.7						0.4		1.0	0.2	
Delay (s)	12.6	12.1						4.8		5.1	4.4	
Level of Service	B	B						A		A	A	
Approach Delay (s)		12.4			0.0			4.8			4.5	
Approach LOS		B			A			A			A	

Intersection Summary			
HCM Average Control Delay	6.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.33		
Actuated Cycle Length (s)	35.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	39.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	365	0	85	0	0	0	0	425	315	60	500	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0						4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95						0.95		1.00	0.95	
Frt	1.00	0.94						0.94		1.00	1.00	
Flt Protected	0.95	0.97						1.00		0.95	1.00	
Satd. Flow (prot)	1633	1571						3023		1805	3438	
Flt Permitted	0.95	0.97						1.00		0.33	1.00	
Satd. Flow (perm)	1633	1571						3023		625	3438	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	380	0	89	0	0	0	0	443	328	62	521	0
RTOR Reduction (vph)	0	63	0	0	0	0	0	166	0	0	0	0
Lane Group Flow (vph)	239	167	0	0	0	0	0	605	0	62	521	0
Heavy Vehicles (%)	5%	0%	5%	0%	0%	0%	0%	5%	21%	0%	5%	0%
Turn Type	Perm	NA						NA		Perm	NA	
Protected Phases		4						2			6	
Permitted Phases	4									6		
Actuated Green, G (s)	11.2	11.2						18.7		18.7	18.7	
Effective Green, g (s)	11.2	11.2						18.7		18.7	18.7	
Actuated g/C Ratio	0.30	0.30						0.49		0.49	0.49	
Clearance Time (s)	4.0	4.0						4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)	483	464						1492		308	1696	
v/s Ratio Prot								c0.20			0.15	
v/s Ratio Perm	c0.15	0.11								0.10		
v/c Ratio	0.49	0.36						0.41		0.20	0.31	
Uniform Delay, d1	11.0	10.5						6.1		5.4	5.7	
Progression Factor	1.00	1.00						1.00		1.00	1.00	
Incremental Delay, d2	0.8	0.5						0.8		1.5	0.5	
Delay (s)	11.8	11.0						6.9		6.9	6.2	
Level of Service	B	B						A		A	A	
Approach Delay (s)		11.4			0.0			6.9			6.3	
Approach LOS		B			A			A			A	

Intersection Summary			
HCM Average Control Delay	7.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	37.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	47.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

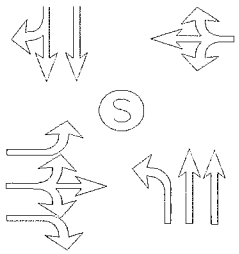
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : FOOTHILL BLVD
N/S STREET : OSBORNE STREET
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 26
ROUTE 5A, 6A, 7A

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						

FOOTHILL BLVD

EB LEFT	5	5%		5	5	10
EB THRU	320	5%		320	30	350
EB RIGHT	520	5%		520	45	565
WB LEFT	260	5%	**50**	310	30	340
WB THRU	245	5%		245	20	265
WB RIGHT	5	5%		5	5	10

OSBORNE STREET

NB LEFT	335	5%		335	30	365
NB THRU	10	5%		10	5	15
NB RIGHT	250	5%	**50**	300	25	325
SB LEFT	5	5%		5	5	10
SB THRU	5	5%		5	5	10
SB RIGHT	5	5%		5	5	10
TOTALS	**1965**		**100**	**2065**	**210**	**2275**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : FOOTHILL BLVD
N/S STREET : OSBORNE STREET
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 26
ROUTE 5A, 6A, 7A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
FOOTHILL BLVD						
EB LEFT	20	5%		20	5	25
EB THRU	225	10%		225	20	245
EB RIGHT	25	5%		25	5	30
WB LEFT	165	15%	**50**	215	20	235
WB THRU	200	10%		200	20	220
WB RIGHT	5	5%		5	5	10
OSBORNE STREET						
NB LEFT	230	10%		230	20	250
NB THRU	5	5%		5	5	10
NB RIGHT	210	10%	**50**	260	25	285
SB LEFT	5	5%		5	5	10
SB THRU	5	5%		5	5	10
SB RIGHT	15	5%		15	5	20
TOTALS	**1110**		**100**	**1210**	**140**	**1350**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : FOOTHILL BLVD
N/S STREET : OSBORNE STREET
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 26
ROUTE 5A, 6A, 7A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
FOOTHILL BLVD						
EB LEFT	15	5%		15	5	20
EB THRU	315	5%		315	30	345
EB RIGHT	265	5%		265	25	290
WB LEFT	205	5%	**50**	255	25	280
WB THRU	305	5%		305	25	330
WB RIGHT	5	5%		5	5	10
OSBORNE STREET						
NB LEFT	680	5%		680	60	740
NB THRU	5	5%		5	5	10
NB RIGHT	395	5%	**50**	445	40	485
SB LEFT	5	5%		5	5	10
SB THRU	5	5%		5	5	10
SB RIGHT	15	5%		15	5	20
TOTALS	**2215**		**100**	**2315**	**235**	**2550**

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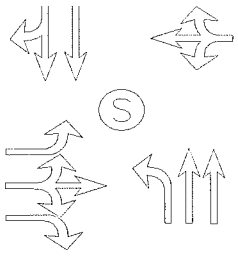
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : FOOTHILL BLVD
N/S STREET : OSBORNE STREET
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 26
ROUTE 5A, 6A, 7A

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
FOOTHILL BLVD								
EB LEFT	6	0	0	5	**0**	5	5	10
EB THRU	306	15	45	350	**0**	350	30	380
EB RIGHT	498	21	63	560	**0**	560	50	610
WB LEFT	256	6	18	275	**150**	425	40	465
WB THRU	243	3	9	250	**0**	250	25	275
WB RIGHT	4	0	0	5	**0**	5	5	10
OSBORNE STREET								
NB LEFT	324	11	33	355	**0**	355	30	385
NB THRU	12	0	0	10	**0**	10	5	15
NB RIGHT	243	8	24	265	**150**	415	35	450
SB LEFT	3	0	0	5	**0**	5	5	10
SB THRU	2	0	0	5	**0**	5	5	10
SB RIGHT	7	0	0	5	**0**	5	5	10
TOTALS	**1904**				**300**	**2390**	**240**	**2630**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : FOOTHILL BLVD
N/S STREET : OSBORNE STREET
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 26
ROUTE 5A, 6A, 7A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
FOOTHILL BLVD								
EB LEFT	18	0	0	20	**0**	20	5	25
EB THRU	203	21	63	265	**0**	265	25	290
EB RIGHT	24	1	3	25	**0**	25	5	30
WB LEFT	140	23	69	210	**150**	360	30	390
WB THRU	185	17	51	235	**0**	235	20	255
WB RIGHT	7	0	0	5	**0**	5	5	10
OSBORNE STREET								
NB LEFT	210	19	57	265	**0**	265	25	290
NB THRU	4	0	0	5	**0**	5	5	10
NB RIGHT	188	21	63	250	**150**	400	35	435
SB LEFT	3	0	0	5	**0**	5	5	10
SB THRU	0	0	0	5	**0**	5	5	10
SB RIGHT	14	0	0	15	**0**	15	5	20
TOTALS	**996**				**300**	**1605**	**170**	**1775**

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TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : FOOTHILL BLVD
N/S STREET : OSBORNE STREET
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
26
ROUTE
5A, 6A, 7A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
FOOTHILL BLVD								
EB LEFT	14	1	3	15	**0**	15	5	20
EB THRU	307	8	24	330	**0**	330	30	360
EB RIGHT	250	15	45	295	**0**	295	25	320
WB LEFT	196	10	30	225	**150**	375	35	410
WB THRU	286	19	57	345	**0**	345	30	375
WB RIGHT	5	0	0	5	**0**	5	5	10
OSBORNE STREET								
NB LEFT	650	28	84	735	**0**	735	65	800
NB THRU	7	0	0	5	**0**	5	5	10
NB RIGHT	386	11	33	420	**150**	570	50	620
SB LEFT	7	0	0	5	**0**	5	5	10
SB THRU	1	0	0	5	**0**	5	5	10
SB RIGHT	14	1	3	15	**0**	15	5	20
TOTALS	**2123**				**300**	**2700**	**265**	**2965**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: OSBORNE
EAST-WEST STREET: FOOTHILL BLVD
JURISDICTION: LA

DATE: 05-23-12

PEAK HOUR: 07:15AM

NORTH LEG

TOTAL: 12

Rt	Thru	Lt	
7	2	3	Total
0	2	0	1st
0	0	1	2nd
3	0	1	3rd
4	0	1	4th

EAST LEG TOTAL: 512

	1st	2nd	3rd	4th	Total
Rt	0	2	1	1	4
Thru	50	64	71	61	246
Lt	44	71	82	65	262

WEST LEG TOTAL: 846

Total	1st	2nd	3rd	4th	
6	1	0	3	2	Lt
321	88	92	85	56	Thru
519	134	152	132	101	Rt

PEAK HOUR FACTORS

SOUTH LEG	=	0.84
EAST LEG	=	0.83
WEST LEG	=	0.87
ALL LEGS	=	0.88

SOUTH LEG

TOTAL: 598

North	South	East	West		Lt	Thru	Rt
0	0	0	0	1st	76	2	77
0	0	0	1	2nd	89	3	86
0	0	0	0	3rd	116	4	54
0	0	0	0	4th	54	3	34
			1	Total	335	12	251

HOUR TOTAL: 1,968

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: OSBORNE

EAST-WEST STREET: FOOTHILL BLVD

TIME: 07:00AM-08:00AM DATE: 05-23-12

NORTH LEG

Rt	Thru	Lt	
3	2	2	Total
0	0	0	1st
0	2	0	2nd
0	0	1	3rd
3	0	1	4th

	1st	2nd	3rd	4th	Total
Rt	2	0	2	1	5
Thru	31	50	64	71	216
Lt	21	44	71	82	218

Total	1st	2nd	3rd	4th	
4	0	1	0	3	Lt
341	76	88	92	85	Thru
528	110	134	152	132	Rt

PEDS BY LEG

North	South	East	West	
0	0	0	0	1st
0	0	0	0	2nd
0	0	0	1	3rd
0	0	0	0	4th
0	0	0	1	Total

Lt	Thru	Rt
56	2	74
76	2	77
89	3	86
116	4	54
337	11	291

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: OSBORNE

EAST-WEST STREET: FOOTHILL BLVD

TIME: 08:00AM-09:00AM DATE: 05-23-12

NORTH LEG

Rt	Thru	Lt	
9	2	5	Total
4	0	1	1st
1	2	1	2nd
3	0	1	3rd
1	0	2	4th

	1st	2nd	3rd	4th	Total
Rt	1	0	4	1	6
Thru	61	62	51	50	224
Lt	65	69	65	37	236

Total	1st	2nd	3rd	4th	
7	2	1	2	2	Lt
211	56	61	45	49	Thru
316	101	88	60	67	Rt

PEDS BY LEG

North	South	East	West	
0	0	0	0	1st
0	0	0	0	2nd
0	1	0	1	3rd
0	0	0	2	4th
0	1	0	3	Total

Lt	Thru	Rt
54	3	34
60	2	55
58	0	48
47	3	50
219	8	187

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : OSBORNE LA

EAST-WEST STREET : FOOTHILL BLVD 05-23-12

BEGINNING TIME : 07:00AM (PH 7:15AM)

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	2	0	0	0	0	0	0	0	0	0	0	2
0	0	1	0	0	0	0	0	0	0	0	0	1
3	0	1	0	0	0	0	0	0	0	0	0	4
4	0	1	0	0	0	0	0	0	0	0	0	5
1	2	1	0	0	0	0	0	0	0	0	0	4
3	0	1	0	0	0	0	0	0	0	0	0	4
1	0	2	0	0	0	0	0	0	0	0	0	3
12	4	7	0	0	0	0	0	0	0	0	0	23
						SOUTH LEG						
73	2	56	1	0	0	0	0	0	0	0	0	132
76	2	76	1	0	0	0	0	0	0	0	0	155
82	3	86	2	0	2	0	0	1	2	0	0	178
54	4	113	0	0	2	0	0	1	0	0	0	174
31	3	49	2	0	2	1	0	3	0	0	0	91
47	2	52	5	0	7	3	0	1	0	0	0	117
44	0	57	2	0	0	2	0	0	0	0	1	106
41	3	46	3	0	1	2	0	0	4	0	0	100
448	19	535	16	0	14	8	0	6	6	0	1	1053
						EAST LEG						
2	31	19	0	0	0	0	0	0	0	0	2	54
0	49	42	0	1	0	0	0	0	0	0	2	94
2	64	68	0	0	1	0	0	0	0	0	2	137
1	69	82	0	2	0	0	0	0	0	0	0	154
1	61	64	0	0	0	0	0	1	0	0	0	127
0	58	65	0	4	3	0	0	0	0	0	1	131
4	48	63	0	3	1	0	0	0	0	0	1	120
1	47	33	0	3	3	0	0	0	0	0	1	88
11	427	436	0	13	8	0	0	1	0	0	9	905
						WEST LEG						
110	74	0	0	2	0	0	0	0	0	0	0	186
133	85	1	1	3	0	0	0	0	0	0	0	223
142	85	0	10	7	0	0	0	0	0	0	0	244
130	82	3	0	2	0	0	0	0	2	1	0	220
93	54	2	6	1	0	1	1	0	1	0	0	159
85	54	0	1	5	0	1	1	1	1	1	0	150
57	42	2	2	3	0	1	0	0	0	0	0	107
58	46	2	6	2	0	2	1	0	1	0	0	118
808	522	10	26	25	0	5	3	1	5	2	0	1407

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: OSBORNE
EAST-WEST STREET: FOOTHILL BLVD
JURISDICTION: LA

DATE: 05-23-12

PEAK HOUR: 01:00PM

NORTH LEG

TOTAL: 17

Rt	Thru	Lt	
14		3	Total
4	0	0	1st
3	0	0	2nd
0	0	1	3rd
7	0	2	4th

EAST LEG TOTAL: 372

	1st	2nd	3rd	4th	Total
Rt	1	4	1	1	7
Thru	44	49	50	59	202
Lt	43	44	34	42	163

WEST LEG TOTAL: 267

Total	1st	2nd	3rd	4th	
18	4	4	4	6	Lt
224	53	52	62	57	Thru
25	10	4	5	6	Rt

SOUTH LEG

TOTAL: 442

	Lt	Thru	Rt
1st	44	0	54
2nd	50	2	53
3rd	68	2	45
4th	67	0	57
Total	229	4	209

PEAK HOUR FACTORS

NORTH LEG = 0.47
SOUTH LEG = 0.89
EAST LEG = 0.91
WEST LEG = 0.94

ALL LEGS = 0.90

HOUR TOTAL: 1,098

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: OSBORNE

EAST-WEST STREET: FOOTHILL BLVD

TIME: 12:00PM-01:00PM DATE: 05-23-12

NORTH LEG

11	3	4	Total
8	0	1	1st
1	1	2	2nd
1	2	1	3rd
1	0	0	4th
Rt	Thru	Lt	

Rt	1	1	0	0	2
Thru	37	40	47	42	166
Lt	49	38	44	38	169
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
13	1	6	1	5	Lt
205	53	49	53	50	Thru
36	5	12	8	11	Rt

	Lt	Thru	Rt
1st	42	1	37
2nd	53	0	39
3rd	63	0	37
4th	52	0	43
Total	210	1	156

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: OSBORNE

EAST-WEST STREET: FOOTHILL BLVD

TIME: 01:00PM-02:00PM DATE: 05-23-12

NORTH LEG

Rt	Thru	Lt	
14	0	3	Total
4	0	0	1st
3	0	0	2nd
0	0	1	3rd
7	0	2	4th

	1st	2nd	3rd	4th	Total
Rt	1	4	1	1	7
Thru	44	49	50	59	202
Lt	43	44	34	42	163

Total	1st	2nd	3rd	4th	
18	4	4	4	6	Lt
224	53	52	62	57	Thru
25	10	4	5	6	Rt

	Lt	Thru	Rt
1st	44	0	54
2nd	50	2	53
3rd	68	2	45
4th	67	0	57
Total	229	4	209

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : FOOTHILL BLVD LA

EAST-WEST STREET : OSBORNE 05-23-12

BEGINNING TIME : 12:00PM (PH 1PM)

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
						NORTH LEG						
8	0	1	0	0	0	0	0	0	0	0	0	9
1	1	2	0	0	0	0	0	0	0	0	0	4
1	2	1	0	0	0	0	0	0	0	0	0	4
1	0	0	0	0	0	0	0	0	0	0	0	1
4	0	0	0	0	0	0	0	0	0	0	0	4
3	0	0	0	0	0	0	0	0	0	0	0	3
0	0	1	0	0	0	0	0	0	0	0	0	1
7	0	2	0	0	0	0	0	0	0	0	0	9
25	3	7	0	0	0	0	0	0	0	0	0	35
						SOUTH LEG						
33	1	37	1	0	2	1	0	2	2	0	1	80
36	0	49	1	0	1	1	0	2	1	0	1	92
32	0	62	5	0	1	0	0	0	0	0	0	100
36	0	50	5	0	1	0	0	1	2	0	0	95
49	0	42	3	0	1	1	0	1	1	0	0	98
52	2	46	1	0	0	0	0	3	0	0	1	105
37	2	61	5	0	2	2	0	2	1	0	3	115
50	0	61	6	0	3	1	0	2	0	0	1	124
325	5	408	27	0	11	6	0	13	7	0	7	809
						EAST LEG						
1	36	47	0	1	1	0	0	1	0	0	0	87
1	35	35	0	5	2	0	0	0	0	0	1	79
0	42	36	0	4	8	0	1	0	0	0	0	91
0	40	34	0	2	2	0	0	1	0	0	1	80
1	40	39	0	3	3	0	1	0	0	0	1	88
4	44	39	0	2	3	0	1	1	0	2	1	97
1	44	26	0	4	5	0	1	2	0	1	1	85
1	57	36	0	1	3	0	1	2	0	0	1	102
9	338	292	0	22	27	0	5	7	0	3	6	709
						WEST LEG						
5	50	1	0	2	0	0	0	0	0	1	0	59
12	42	6	0	6	0	0	0	0	0	1	0	67
7	50	1	0	3	0	0	0	0	1	0	0	62
11	47	5	0	2	0	0	1	0	0	0	0	66
10	46	4	0	6	0	0	1	0	0	0	0	67
4	49	4	0	3	0	0	0	0	0	0	0	60
4	54	4	0	3	0	1	3	0	0	2	0	71
6	54	6	0	1	0	0	0	0	0	2	0	69
59	392	31	0	26	0	1	5	0	1	6	0	521

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: OSBORNE
EAST-WEST STREET: FOOTHILL BLVD
JURISDICTION: LA

DATE: 05-23-12

PEAK HOUR: 04:45PM

NORTH LEG

TOTAL: 23

Rt	Thru	Lt	
15	1	7	Total
1	0	0	1st
2	0	0	2nd
9	1	3	3rd
3	0	4	4th

EAST LEG TOTAL: 516

	1st	2nd	3rd	4th	Total
Rt	1	1	1	2	5
Thru	71	80	87	67	305
Lt	48	53	52	53	206

WEST LEG TOTAL: 595

Total	1st	2nd	3rd	4th	
15	2	1	5	7	Lt
315	77	80	78	80	Thru
265	72	73	62	58	Rt

PEAK HOUR FACTORS

NORTH LEG = 0.44
SOUTH LEG = 0.94
EAST LEG = 0.92
WEST LEG = 0.97

ALL LEGS = 0.98

SOUTH LEG

TOTAL: 1,082

	Lt	Thru	Rt
1st	183	0	106
2nd	151	1	113
3rd	180	4	81
4th	164	2	97
Total	678	7	397

HOUR TOTAL: 2,216

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: OSBORNE

EAST-WEST STREET: FOOTHILL BLVD

TIME: 04:00PM-05:00PM DATE: 05-23-12

NORTH LEG

Rt	Thru	Lt	
6	0	5	Total
2	0	3	1st
0	0	2	2nd
3	0	0	3rd
1	0	0	4th

	1st	2nd	3rd	4th	Total
Rt	0	0	1	1	2
Thru	73	59	75	71	278
Lt	59	50	35	48	192

Total	1st	2nd	3rd	4th	
13	4	7	0	2	Lt
257	59	61	60	77	Thru
267	52	59	84	72	Rt

	Lt	Thru	Rt
1st	122	2	80
2nd	140	2	66
3rd	131	0	98
4th	183	0	106
Total	576	4	350

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: OSBORNE

EAST-WEST STREET: FOOTHILL BLVD

TIME: 05:00PM-06:00PM DATE: 05-23-12

NORTH LEG

21	2	9	Total
2	0	0	1st
9	1	3	2nd
3	0	4	3rd
7	1	2	4th
Rt	Thru	Lt	

Rt	1	1	2	3	7
Thru	80	87	67	71	305
Lt	53	52	53	48	206
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
17	1	5	7	4	Lt
294	80	78	80	56	Thru
272	73	62	58	79	Rt

	Lt	Thru	Rt
1st	151	1	113
2nd	180	4	81
3rd	164	2	97
4th	188	4	81
Total	683	11	372

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : FOOTHILL BLVD LA

EAST-WEST STREET : OSBORNE 05-23-12

BEGINNING TIME : 04:00PM (PH 4 45 PM)

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
						NORTH LEG						
2	0	3	0	0	0	0	0	0	0	0	0	5
0	0	2	0	0	0	0	0	0	0	0	0	2
3	0	0	0	0	0	0	0	0	0	0	0	3
1	0	0	0	0	0	0	0	0	0	0	0	1
2	0	0	0	0	0	0	0	0	0	0	0	2
8	1	3	1	0	0	0	0	0	0	0	0	13
3	0	4	0	0	0	0	0	0	0	0	0	7
7	1	2	0	0	0	0	0	0	0	0	0	10
26	2	14	1	0	0	0	0	0	0	0	0	43
						SOUTH LEG						
74	2	117	4	0	2	1	0	0	1	0	3	204
62	2	135	3	0	1	1	0	2	0	0	2	208
95	0	128	2	0	1	0	0	0	1	0	2	229
102	0	173	2	0	1	0	0	3	2	0	6	289
110	1	148	2	0	3	1	0	0	0	0	0	265
78	4	175	1	0	1	0	0	1	2	0	3	265
96	2	154	0	0	5	0	0	2	1	0	3	263
81	4	183	0	0	2	0	0	0	0	0	3	273
698	151	213	14	0	16	3	0	8	7	0	22	1996
						EAST LEG						
0	68	53	0	5	3	0	0	2	0	0	1	132
0	54	45	0	3	1	0	1	2	0	1	2	109
1	74	32	0	0	2	0	0	1	0	1	0	111
1	65	45	0	5	2	0	0	0	0	1	1	120
1	75	50	0	1	1	0	1	0	0	3	2	134
1	84	50	0	2	1	0	1	1	0	0	0	140
2	62	51	0	4	0	0	1	1	0	0	1	122
3	71	45	0	0	0	0	0	2	0	0	1	122
9	553	371	0	20	10	0	4	9	0	6	8	990
						WEST LEG						
49	56	4	1	3	0	1	0	0	1	0	0	115
52	58	7	3	2	0	2	0	0	2	1	0	127
80	59	0	3	1	0	1	0	0	0	0	0	144
69	74	1	2	1	1	0	1	0	1	1	0	151
67	78	1	2	1	0	2	1	0	2	0	0	154
61	75	5	0	2	0	0	0	0	1	1	0	145
53	80	7	3	0	0	1	0	0	1	0	0	145
75	56	4	3	0	0	1	0	0	0	0	0	139
506	536	29	17	10	1	8	2	0	8	3	0	1120

Prepared by Newport Traffic Studies

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	0	320	520	260	245	5	335	10	250	5	5	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0		4.0	4.0	4.0		4.0	
Lane Util. Factor		0.95		1.00	0.95		0.95	0.91	0.95		1.00	
Frt		0.91		1.00	1.00		1.00	0.95	0.85		0.95	
Flt Protected		1.00		0.95	1.00		0.95	0.97	1.00		0.98	
Satd. Flow (prot)		3119		1719	3431		1633	1525	1461		1785	
Flt Permitted		1.00		0.27	1.00		0.75	0.79	1.00		0.90	
Satd. Flow (perm)		3119		484	3431		1282	1250	1461		1638	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	0	364	591	295	278	6	381	11	284	6	6	6
RTOR Reduction (vph)	0	197	0	0	2	0	0	23	167	0	5	0
Lane Group Flow (vph)	0	758	0	295	282	0	232	208	46	0	13	0
Heavy Vehicles (%)	0%	5%	5%	5%	5%	0%	5%	0%	5%	0%	0%	0%
Turn Type		NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases				2			4		4	8		
Actuated Green, G (s)		46.0		46.0	46.0		15.0	15.0	15.0		15.0	
Effective Green, g (s)		46.0		46.0	46.0		15.0	15.0	15.0		15.0	
Actuated g/C Ratio		0.67		0.67	0.67		0.22	0.22	0.22		0.22	
Clearance Time (s)		4.0		4.0	4.0		4.0	4.0	4.0		4.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)		2079		323	2287		279	272	318		356	
v/s Ratio Prot		0.24			0.08							
v/s Ratio Perm				c0.61			c0.18	0.17	0.03		0.01	
v/c Ratio		0.36		0.91	0.12		0.83	0.76	0.15		0.04	
Uniform Delay, d1		5.1		9.8	4.2		25.8	25.3	21.8		21.3	
Progression Factor		1.00		1.00	1.00		1.00	1.00	1.00		1.00	
Incremental Delay, d2		0.5		32.2	0.1		18.6	12.0	0.2		0.0	
Delay (s)		5.6		42.0	4.3		44.4	37.3	22.0		21.3	
Level of Service		A		D	A		D	D	C		C	
Approach Delay (s)		5.6			23.5			34.9			21.3	
Approach LOS		A			C			C			C	

Intersection Summary			
HCM Average Control Delay	19.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	69.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	68.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	0	225	25	162	200	5	230	5	210	5	0	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0		4.0	4.0	4.0		4.0	
Lane Util. Factor		0.95		1.00	0.95		0.95	0.91	0.95		1.00	
Frt		0.98		1.00	1.00		1.00	0.93	0.85		0.90	
Flt Protected		1.00		0.95	1.00		0.95	0.98	1.00		0.99	
Satd. Flow (prot)		3247		1570	3277		1559	1432	1395		1688	
Flt Permitted		1.00		0.58	1.00		0.74	0.84	1.00		0.92	
Satd. Flow (perm)		3247		960	3277		1218	1227	1395		1568	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	250	28	180	222	6	256	6	233	6	0	17
RTOR Reduction (vph)	0	13	0	0	3	0	0	57	116	0	13	0
Lane Group Flow (vph)	0	265	0	180	225	0	172	110	40	0	10	0
Heavy Vehicles (%)	0%	10%	5%	15%	10%	0%	10%	0%	10%	0%	0%	0%
Turn Type		NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases				2			4		4	8		
Actuated Green, G (s)		19.2		19.2	19.2		9.5	9.5	9.5		9.5	
Effective Green, g (s)		19.2		19.2	19.2		9.5	9.5	9.5		9.5	
Actuated g/C Ratio		0.52		0.52	0.52		0.26	0.26	0.26		0.26	
Clearance Time (s)		4.0		4.0	4.0		4.0	4.0	4.0		4.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)		1699		502	1714		315	318	361		406	
v/s Ratio Prot		0.08			0.07							
v/s Ratio Perm				c0.19			c0.14	0.09	0.03		0.01	
v/c Ratio		0.16		0.36	0.13		0.55	0.35	0.11		0.03	
Uniform Delay, d1		4.5		5.1	4.5		11.7	11.1	10.4		10.1	
Progression Factor		1.00		1.00	1.00		1.00	1.00	1.00		1.00	
Incremental Delay, d2		0.2		2.0	0.2		1.9	0.7	0.1		0.0	
Delay (s)		4.7		7.1	4.6		13.7	11.7	10.5		10.2	
Level of Service		A		A	A		B	B	B		B	
Approach Delay (s)		4.7			5.7			12.0			10.2	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM Average Control Delay	8.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	36.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	41.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
26: Foothill Blvd

8/10/2012

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	0	315	265	205	305	5	680	5	395	5	5	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0		4.0	4.0	4.0		4.0	
Lane Util. Factor		0.95		1.00	0.95		0.95	0.91	0.95		1.00	
Frt		0.93		1.00	1.00		1.00	0.98	0.85		0.92	
Flt Protected		1.00		0.95	1.00		0.95	0.96	1.00		0.99	
Satd. Flow (prot)		3202		1719	3433		1633	1544	1461		1678	
Flt Permitted		1.00		0.41	1.00		0.74	0.75	1.00		0.93	
Satd. Flow (perm)		3202		740	3433		1274	1199	1461		1572	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	321	270	209	311	5	694	5	403	5	5	15
RTOR Reduction (vph)	0	158	0	0	3	0	0	17	213	0	9	0
Lane Group Flow (vph)	0	433	0	209	313	0	382	360	130	0	16	0
Heavy Vehicles (%)	0%	5%	5%	5%	5%	0%	5%	0%	5%	0%	0%	5%
Turn Type		NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases				2			4		4	8		
Actuated Green, G (s)		16.1		16.1	16.1		14.7	14.7	14.7		14.7	
Effective Green, g (s)		16.1		16.1	16.1		14.7	14.7	14.7		14.7	
Actuated g/C Ratio		0.41		0.41	0.41		0.38	0.38	0.38		0.38	
Clearance Time (s)		4.0		4.0	4.0		4.0	4.0	4.0		4.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)		1329		307	1425		483	454	554		596	
v/s Ratio Prot		0.14			0.09							
v/s Ratio Perm				c0.28			0.30	c0.30	0.09		0.01	
v/c Ratio		0.33		0.68	0.22		0.79	0.79	0.23		0.03	
Uniform Delay, d1		7.7		9.3	7.3		10.7	10.7	8.2		7.6	
Progression Factor		1.00		1.00	1.00		1.00	1.00	1.00		1.00	
Incremental Delay, d2		0.7		11.6	0.4		8.6	9.2	0.2		0.0	
Delay (s)		8.3		20.8	7.7		19.3	19.9	8.4		7.6	
Level of Service		A		C	A		B	B	A		A	
Approach Delay (s)		8.3			12.9			16.1			7.6	
Approach LOS		A			B			B			A	

Intersection Summary			
HCM Average Control Delay	13.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	38.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	68.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	0	320	520	310	245	5	335	10	300	5	5	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0		4.0	4.0	4.0		4.0	
Lane Util. Factor		0.95		1.00	0.95		0.95	0.91	0.95		1.00	
Frt		0.91		1.00	1.00		1.00	0.94	0.85		0.95	
Flt Protected		1.00		0.95	1.00		0.95	0.97	1.00		0.98	
Satd. Flow (prot)		3119		1504	3431		1633	1434	1311		1785	
Flt Permitted		1.00		0.27	1.00		0.75	0.83	1.00		0.90	
Satd. Flow (perm)		3119		422	3431		1282	1215	1311		1635	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	0	364	591	352	278	6	381	11	341	6	6	6
RTOR Reduction (vph)	0	199	0	0	2	0	0	39	183	0	5	0
Lane Group Flow (vph)	0	756	0	352	282	0	251	208	52	0	13	0
Heavy Vehicles (%)	0%	5%	5%	20%	5%	0%	5%	0%	17%	0%	0%	0%
Turn Type		NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases				2			4		4	8		
Actuated Green, G (s)		46.0		46.0	46.0		15.4	15.4	15.4		15.4	
Effective Green, g (s)		46.0		46.0	46.0		15.4	15.4	15.4		15.4	
Actuated g/C Ratio		0.66		0.66	0.66		0.22	0.22	0.22		0.22	
Clearance Time (s)		4.0		4.0	4.0		4.0	4.0	4.0		4.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)		2067		280	2274		284	270	291		363	
v/s Ratio Prot		0.24			0.08							
v/s Ratio Perm				c0.83			c0.20	0.17	0.04		0.01	
v/c Ratio		0.37		1.26	0.12		0.88	0.77	0.18		0.04	
Uniform Delay, d1		5.2		11.7	4.3		26.1	25.3	21.9		21.2	
Progression Factor		1.00		1.00	1.00		1.00	1.00	1.00		1.00	
Incremental Delay, d2		0.5		141.4	0.1		26.0	12.7	0.3		0.0	
Delay (s)		5.7		153.1	4.4		52.1	38.1	22.2		21.2	
Level of Service		A		F	A		D	D	C		C	
Approach Delay (s)		5.7			86.7			37.8			21.2	
Approach LOS		A			F			D			C	

Intersection Summary			
HCM Average Control Delay	37.9	HCM Level of Service	D
HCM Volume to Capacity ratio	1.16		
Actuated Cycle Length (s)	69.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	72.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	0	225	25	215	200	5	230	5	260	5	0	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0		4.0	4.0	4.0		4.0	
Lane Util. Factor		0.95		1.00	0.95		0.95	0.91	0.95		1.00	
Frt		0.98		1.00	1.00		1.00	0.91	0.85		0.90	
Flt Protected		1.00		0.95	1.00		0.95	0.98	1.00		0.99	
Satd. Flow (prot)		3247		1337	3277		1559	1286	1208		1688	
Flt Permitted		1.00		0.58	1.00		0.74	0.88	1.00		0.91	
Satd. Flow (perm)		3247		818	3277		1218	1158	1208		1565	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	250	28	239	222	6	256	6	289	6	0	17
RTOR Reduction (vph)	0	13	0	0	3	0	0	83	129	0	12	0
Lane Group Flow (vph)	0	265	0	239	225	0	189	103	47	0	11	0
Heavy Vehicles (%)	0%	10%	5%	35%	10%	0%	10%	0%	27%	0%	0%	0%
Turn Type		NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases				2			4		4	8		
Actuated Green, G (s)		19.2		19.2	19.2		9.8	9.8	9.8		9.8	
Effective Green, g (s)		19.2		19.2	19.2		9.8	9.8	9.8		9.8	
Actuated g/C Ratio		0.52		0.52	0.52		0.26	0.26	0.26		0.26	
Clearance Time (s)		4.0		4.0	4.0		4.0	4.0	4.0		4.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)		1685		424	1700		323	307	320		415	
v/s Ratio Prot		0.08			0.07							
v/s Ratio Perm				c0.29			c0.16	0.09	0.04		0.01	
v/c Ratio		0.16		0.56	0.13		0.59	0.34	0.15		0.03	
Uniform Delay, d1		4.7		6.1	4.6		11.8	11.0	10.4		10.1	
Progression Factor		1.00		1.00	1.00		1.00	1.00	1.00		1.00	
Incremental Delay, d2		0.2		5.3	0.2		2.7	0.6	0.2		0.0	
Delay (s)		4.9		11.4	4.8		14.5	11.6	10.6		10.1	
Level of Service		A		B	A		B	B	B		B	
Approach Delay (s)		4.9			8.2			12.3			10.1	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM Average Control Delay	9.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	37.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	44.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	0	315	265	255	305	5	680	5	445	5	5	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0		4.0	4.0	4.0		4.0	
Lane Util. Factor		0.95		1.00	0.95		0.95	0.91	0.95		1.00	
Frt		0.93		1.00	1.00		1.00	0.97	0.85		0.92	
Flt Protected		1.00		0.95	1.00		0.95	0.96	1.00		0.99	
Satd. Flow (prot)		3202		1456	3433		1633	1496	1323		1678	
Flt Permitted		1.00		0.41	1.00		0.74	0.76	1.00		0.93	
Satd. Flow (perm)		3202		626	3433		1274	1184	1323		1569	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	321	270	260	311	5	694	5	454	5	5	15
RTOR Reduction (vph)	0	158	0	0	3	0	0	28	225	0	9	0
Lane Group Flow (vph)	0	433	0	260	313	0	396	366	138	0	16	0
Heavy Vehicles (%)	0%	5%	5%	24%	5%	0%	5%	0%	16%	0%	0%	5%
Turn Type		NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases				2			4		4	8		
Actuated Green, G (s)		16.1		16.1	16.1		14.8	14.8	14.8		14.8	
Effective Green, g (s)		16.1		16.1	16.1		14.8	14.8	14.8		14.8	
Actuated g/C Ratio		0.41		0.41	0.41		0.38	0.38	0.38		0.38	
Clearance Time (s)		4.0		4.0	4.0		4.0	4.0	4.0		4.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)		1325		259	1421		485	450	503		597	
v/s Ratio Prot		0.14			0.09							
v/s Ratio Perm				c0.42			c0.31	0.31	0.10		0.01	
v/c Ratio		0.33		1.00	0.22		0.82	0.81	0.27		0.03	
Uniform Delay, d1		7.7		11.4	7.4		10.8	10.8	8.3		7.5	
Progression Factor		1.00		1.00	1.00		1.00	1.00	1.00		1.00	
Incremental Delay, d2		0.7		56.9	0.4		10.2	10.8	0.3		0.0	
Delay (s)		8.4		68.3	7.7		21.1	21.6	8.6		7.6	
Level of Service		A		E	A		C	C	A		A	
Approach Delay (s)		8.4			35.1			17.3			7.6	
Approach LOS		A			D			B			A	

Intersection Summary			
HCM Average Control Delay	19.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	38.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	71.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	0	350	565	340	265	5	365	10	325	5	5	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0		4.0	4.0	4.0		4.0	
Lane Util. Factor		0.95		1.00	0.95		0.95	0.91	0.95		1.00	
Frt		0.91		1.00	1.00		1.00	0.93	0.85		0.95	
Flt Protected		1.00		0.95	1.00		0.95	0.97	1.00		0.98	
Satd. Flow (prot)		3120		1504	3431		1633	1431	1311		1785	
Flt Permitted		1.00		0.17	1.00		0.73	0.76	1.00		1.00	
Satd. Flow (perm)		3120		270	3431		1250	1123	1311		1814	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	0	398	642	386	301	6	415	11	369	6	6	6
RTOR Reduction (vph)	0	396	0	0	2	0	0	41	126	0	6	0
Lane Group Flow (vph)	0	644	0	386	305	0	274	229	126	0	12	0
Heavy Vehicles (%)	0%	5%	5%	20%	5%	0%	5%	0%	17%	0%	0%	0%
Turn Type		NA		pm+pt	NA		pm+pt	NA	pm+ov	pm+pt	NA	
Protected Phases		6		5	2		7	4	5	3	8	
Permitted Phases				2			4		4	8		
Actuated Green, G (s)		19.5		38.1	38.1		16.9	16.9	31.5		1.5	
Effective Green, g (s)		19.5		38.1	38.1		16.9	16.9	31.5		1.5	
Actuated g/C Ratio		0.31		0.60	0.60		0.27	0.27	0.50		0.02	
Clearance Time (s)		4.0		4.0	4.0		4.0	4.0	4.0		4.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)		966		449	2075		405	357	739		43	
v/s Ratio Prot		0.21		c0.20	0.09		c0.12	0.12	0.04			
v/s Ratio Perm				c0.32			c0.06	0.06	0.06		0.01	
v/c Ratio		0.67		0.86	0.15		0.68	0.64	0.17		0.28	
Uniform Delay, d1		18.9		14.3	5.4		20.3	20.4	8.6		30.2	
Progression Factor		1.00		1.00	1.00		1.00	1.00	1.00		1.00	
Incremental Delay, d2		3.6		15.1	0.1		4.4	3.9	0.1		3.6	
Delay (s)		22.6		29.4	5.6		24.7	24.3	8.7		33.8	
Level of Service		C		C	A		C	C	A		C	
Approach Delay (s)		22.6			18.8			19.5			33.8	
Approach LOS		C			B			B			C	

Intersection Summary			
HCM Average Control Delay	20.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	63.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	77.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	0	245	25	235	220	5	250	5	285	5	0	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0		4.0	4.0	4.0		4.0	
Lane Util. Factor		0.95		1.00	0.95		0.95	0.91	0.95		1.00	
Frt		0.99		1.00	1.00		1.00	0.91	0.85		0.90	
Flt Protected		1.00		0.95	1.00		0.95	0.98	1.00		0.99	
Satd. Flow (prot)		3250		1337	3277		1559	1282	1208		1688	
Flt Permitted		1.00		0.46	1.00		0.64	0.92	1.00		0.97	
Satd. Flow (perm)		3250		649	3277		1052	1203	1208		1659	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	272	28	261	244	6	278	6	317	6	0	17
RTOR Reduction (vph)	0	12	0	0	2	0	0	92	100	0	16	0
Lane Group Flow (vph)	0	288	0	261	248	0	208	108	93	0	7	0
Heavy Vehicles (%)	0%	10%	5%	35%	10%	0%	10%	0%	27%	0%	0%	0%
Turn Type		NA		pm+pt	NA		pm+pt	NA	pt+ov	pm+pt	NA	
Protected Phases		6		5	2		7	4	4 5	3	8	
Permitted Phases				2			4			8		
Actuated Green, G (s)		17.2		28.2	28.2		12.5	12.5	23.5		2.6	
Effective Green, g (s)		17.2		28.2	28.2		12.5	12.5	23.5		2.6	
Actuated g/C Ratio		0.35		0.58	0.58		0.26	0.26	0.48		0.05	
Clearance Time (s)		4.0		4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)		1148		475	1898		331	318	583		89	
v/s Ratio Prot		0.09		c0.08	0.08		c0.08	0.04	0.08			
v/s Ratio Perm				c0.24			c0.09	0.05			0.00	
v/c Ratio		0.25		0.55	0.13		0.63	0.34	0.16		0.08	
Uniform Delay, d1		11.2		5.6	4.7		15.6	14.7	7.1		21.9	
Progression Factor		1.00		1.00	1.00		1.00	1.00	1.00		1.00	
Incremental Delay, d2		0.5		1.3	0.1		3.7	0.6	0.1		0.4	
Delay (s)		11.7		6.9	4.8		19.3	15.4	7.2		22.3	
Level of Service		B		A	A		B	B	A		C	
Approach Delay (s)		11.7			5.9			14.1			22.3	
Approach LOS		B			A			B			C	

Intersection Summary			
HCM Average Control Delay	10.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	48.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	47.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations		↑↑↱		↰	↑↑↱		↰	↕	↱		↕	
Volume (vph)	0	345	290	280	330	5	740	5	485	5	5	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0		4.0	4.0	4.0		4.0	
Lane Util. Factor		0.95		1.00	0.95		0.95	0.91	0.95		1.00	
Frt		0.93		1.00	1.00		1.00	0.97	0.85		0.92	
Flt Protected		1.00		0.95	1.00		0.95	0.96	1.00		0.99	
Satd. Flow (prot)		3203		1456	3433		1633	1496	1323		1678	
Flt Permitted		1.00		0.23	1.00		0.71	0.66	1.00		1.00	
Satd. Flow (perm)		3203		357	3433		1228	1029	1323		1695	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	352	296	286	337	5	755	5	495	5	5	15
RTOR Reduction (vph)	0	205	0	0	2	0	0	18	171	0	15	0
Lane Group Flow (vph)	0	443	0	286	340	0	430	411	225	0	10	0
Heavy Vehicles (%)	0%	5%	5%	24%	5%	0%	5%	0%	16%	0%	0%	5%
Turn Type		NA		pm+pt	NA		pm+pt	NA	pt+ov	pm+pt	NA	
Protected Phases		6		5	2		7	4	4 5	3	8	
Permitted Phases				2			4			8		
Actuated Green, G (s)		17.0		27.0	27.0		20.2	20.2	30.2		1.6	
Effective Green, g (s)		17.0		27.0	27.0		20.2	20.2	30.2		1.6	
Actuated g/C Ratio		0.31		0.49	0.49		0.37	0.37	0.55		0.03	
Clearance Time (s)		4.0		4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)		986		294	1679		556	500	724		49	
v/s Ratio Prot		0.14		c0.11	0.10		0.20	c0.22	0.17			
v/s Ratio Perm				c0.37			0.08	c0.08			0.01	
v/c Ratio		0.45		0.97	0.20		0.77	0.82	0.31		0.21	
Uniform Delay, d1		15.3		11.5	8.0		15.1	15.9	6.8		26.2	
Progression Factor		1.00		1.00	1.00		1.00	1.00	1.00		1.00	
Incremental Delay, d2		1.5		44.8	0.3		6.6	10.5	0.2		2.2	
Delay (s)		16.8		56.2	8.3		21.7	26.4	7.1		28.4	
Level of Service		B		E	A		C	C	A		C	
Approach Delay (s)		16.8			30.1			18.7			28.4	
Approach LOS		B			C			B			C	

Intersection Summary			
HCM Average Control Delay	21.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	55.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	76.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

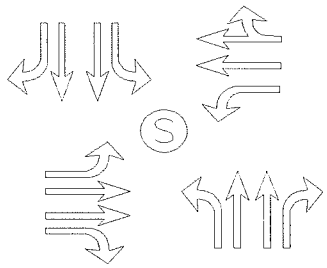
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : OSBORNE STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 27
ROUTE 5A, 6A, 7A

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						

OSBORNE STREET

EB LEFT	300	5%	**50**	350	30	380
EB THRU	535	5%		535	50	585
EB RIGHT	70	20%		70	5	75
WB LEFT	425	10%		425	40	465
WB THRU	630	5%		630	55	685
WB RIGHT	70	15%		70	5	75

GLEN OAKS BLVD

NB LEFT	50	45%		50	5	55
NB THRU	520	15%		520	45	565
NB RIGHT	135	20%	**50**	185	15	200
SB LEFT	45	20%		45	5	50
SB THRU	1070	5%		1070	95	1165
SB RIGHT	170	10%		170	15	185
TOTALS	**4020**		**100**	**4120**	**365**	**4485**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : OSBORNE STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 27
ROUTE 5A, 6A, 7A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
OSBORNE STREET						
EB LEFT	170	5%	**50**	220	20	240
EB THRU	425	10%		425	40	465
EB RIGHT	90	10%		90	10	100
WB LEFT	175	10%		175	15	190
WB THRU	500	5%		500	45	545
WB RIGHT	70	10%		70	5	75
GLEN OAKS BLVD						
NB LEFT	80	10%		80	5	85
NB THRU	635	10%		635	55	690
NB RIGHT	150	20%	**50**	200	20	220
SB LEFT	80	5%		80	5	85
SB THRU	425	10%		425	40	465
SB RIGHT	130	5%		130	10	140
TOTALS	**2930**		**100**	**3030**	**270**	**3300**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : OSBORNE STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 27
ROUTE 5A, 6A, 7A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
OSBORNE STREET						
EB LEFT	240	5%	**50**	290	25	315
EB THRU	690	5%		690	60	750
EB RIGHT	90	15%		90	10	100
WB LEFT	255	10%		255	25	280
WB THRU	535	5%		535	50	585
WB RIGHT	100	5%		100	10	110
GLEN OAKS BLVD						
NB LEFT	120	5%		120	10	130
NB THRU	875	5%		875	80	955
NB RIGHT	340	5%	**50**	390	35	425
SB LEFT	135	5%		135	10	145
SB THRU	575	10%		575	50	625
SB RIGHT	205	5%		205	20	225
TOTALS	**4160**		**100**	**4260**	**385**	**4645**

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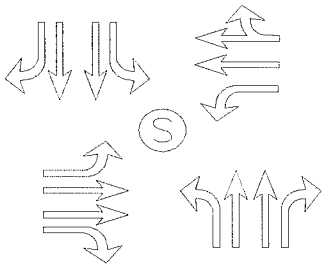
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : OSBORNE STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 27
ROUTE 5A, 6A, 7A

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
OSBORNE STREET								
EB LEFT	289	9	27	315	**150**	465	40	505
EB THRU	502	32	96	600	**0**	600	55	655
EB RIGHT	55	14	42	95	**0**	95	10	105
WB LEFT	392	33	99	490	**0**	490	45	535
WB THRU	595	34	102	695	**0**	695	65	760
WB RIGHT	62	10	30	90	**0**	90	10	100
GLEN OAKS BLVD								
NB LEFT	26	22	66	90	**0**	90	10	100
NB THRU	451	68	204	655	**0**	655	60	715
NB RIGHT	106	28	84	190	**150**	340	30	370
SB LEFT	38	9	27	65	**0**	65	5	70
SB THRU	994	74	222	1215	**0**	1215	110	1325
SB RIGHT	157	15	45	200	**0**	200	20	220
TOTALS	**3667**				**300**	**5000**	**460**	**5460**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : OSBORNE STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 27
ROUTE 5A, 6A, 7A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
OSBORNE STREET								
EB LEFT	162	9	27	190	**150**	340	30	370
EB THRU	390	34	102	490	**0**	490	45	535
EB RIGHT	83	7	21	105	**0**	105	10	115
WB LEFT	155	18	54	210	**0**	210	20	230
WB THRU	474	24	72	545	**0**	545	50	595
WB RIGHT	61	7	21	80	**0**	80	5	85
GLEN OAKS BLVD								
NB LEFT	72	9	27	100	**0**	100	10	110
NB THRU	585	50	150	735	**0**	735	65	800
NB RIGHT	118	32	96	215	**150**	365	35	400
SB LEFT	82	0	0	80	**0**	80	5	85
SB THRU	377	47	141	520	**0**	520	45	565
SB RIGHT	128	4	12	140	**0**	140	15	155
TOTALS	**2687**				**300**	**3710**	**335**	**4045**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : OSBORNE STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
27
ROUTE
5A, 6A, 7A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
OSBORNE STREET								
EB LEFT	240	21%	1	240	**150**	390	35	425
EB THRU	690	5%	0	690	**0**	690	60	750
EB RIGHT	90	15%	0	90	**0**	90	10	100
WB LEFT	255	10%	0	255	**0**	255	25	280
WB THRU	535	5%	0	535	**0**	535	50	585
WB RIGHT	100	5%	0	100	**0**	100	10	110
GLEN OAKS BLVD								
NB LEFT	120	5%	0	120	**0**	120	10	130
NB THRU	875	5%	0	875	**0**	875	80	955
NB RIGHT	340	17%	1	340	**150**	490	45	535
SB LEFT	135	5%	0	135	**0**	135	10	145
SB THRU	575	10%	0	575	**0**	575	50	625
SB RIGHT	205	5%	0	205	**0**	205	20	225
TOTALS	**4160**				**300**	**4460**	**405**	**4865**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: GLEN OAKS BLVD
EAST-WEST STREET: OSBORNE
JURISDICTION: LA

DATE: 05-22-12

PEAK HOUR: 07:15AM

NORTH LEG

TOTAL: 1,287

Rt	Thru	Lt	
172	1068	47	Total
32	258	6	1st
40	338	8	2nd
60	305	17	3rd
40	167	16	4th

EAST LEG TOTAL: 1,126

	1st	2nd	3rd	4th	Total
Rt	6	2	15	49	72
Thru	195	139	171	124	629
Lt	120	112	104	89	425

WEST LEG TOTAL: 901

Total	1st	2nd	3rd	4th	
298	48	72	95	83	Lt
534	129	134	187	84	Thru
69	14	15	27	13	Rt

PEAK HOUR FACTORS

NORTH LEG = 0.83
SOUTH LEG = 0.76
EAST LEG = 0.88
WEST LEG = 0.73

ALL LEGS = 0.83

SOUTH LEG

TOTAL: 701

	Lt	Thru	Rt
1st	9	106	29
2nd	5	114	34
3rd	13	176	41
4th	21	123	30
Total	48	519	134

HOUR TOTAL: 4,015

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: OSBORNE

TIME: 07:00AM-08:00AM DATE: 05-22-12

NORTH LEG

Rt	Thru	Lt	
164	1170	41	Total
32	269	10	1st
32	258	6	2nd
40	338	8	3rd
60	305	17	4th

	1st	2nd	3rd	4th	Total
Rt	4	6	2	15	27
Thru	105	195	139	171	610
Lt	89	120	112	104	425

Total	1st	2nd	3rd	4th	
250	35	48	72	95	Lt
543	93	129	134	187	Thru
62	6	14	15	27	Rt

	Lt	Thru	Rt
1st	10	66	40
2nd	9	106	29
3rd	5	114	34
4th	13	176	41
Total	37	462	144

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: OSBORNE

TIME: 08:00AM-09:00AM DATE: 05-22-12

NORTH LEG

Rt	Thru	Lt	
123	785	60	Total
40	167	16	1st
28	212	13	2nd
34	233	5	3rd
21	173	26	4th

	1st	2nd	3rd	4th	Total
Rt	49	5	0	0	54
Thru	124	116	76	85	401
Lt	89	117	57	73	336

Total	1st	2nd	3rd	4th	
179	83	47	17	32	Lt
363	84	93	112	74	Thru
32	13	7	2	10	Rt

	Lt	Thru	Rt
1st	21	123	30
2nd	17	170	30
3rd	2	153	4
4th	6	90	28
Total	46	536	92

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : GLEN OAKS BLVD LA

EAST-WEST STREET : OSBORNE 05-22-12

BEGINNING TIME : 07:00AM (PH 7:15AM)

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
						NORTH LEG						
28	251	8	3	6	2	0	5	0	1	7	0	311
31	242	4	1	6	2	0	6	0	0	4	0	296
35	321	6	2	9	2	2	2	0	1	6	0	386
55	287	15	3	7	2	1	4	0	1	7	0	382
36	144	13	2	11	3	1	5	0	1	7	0	223
23	194	10	2	7	3	1	5	0	2	6	0	253
31	218	3	1	7	2	1	3	0	1	5	0	272
21	156	25	0	12	1	0	2	0	0	3	0	220
260	1813	84	14	65	17	6	32	0	7	45	0	2343
						SOUTH LEG						
34	55	4	3	5	6	2	6	0	1	0	0	116
24	94	2	3	6	5	1	4	2	1	2	0	144
25	99	0	3	7	3	2	3	2	4	5	0	153
36	159	8	2	8	4	1	4	1	2	5	0	230
21	99	16	3	11	3	3	4	2	3	9	0	174
23	159	13	3	6	3	2	1	1	2	4	0	217
0	141	0	2	5	1	1	2	1	1	5	0	159
22	86	4	1	1	2	3	2	0	2	1	0	124
185	892	47	20	49	27	15	26	9	16	31	0	1317
						EAST LEG						
3	98	88	1	5	1	0	1	0	0	1	0	198
5	187	117	1	6	1	0	0	1	0	2	1	321
0	129	103	1	6	5	0	2	2	1	2	2	253
12	163	95	2	5	4	0	2	2	1	1	3	290
45	116	77	2	5	6	0	1	3	2	2	3	262
2	109	107	1	4	5	0	2	3	2	1	2	238
0	69	49	0	5	4	0	1	2	0	1	2	133
0	81	66	0	4	4	0	0	1	0	0	2	158
67	952	702	8	40	30	0	9	14	6	10	15	1853
						WEST LEG						
3	90	33	2	2	1	0	1	1	1	0	0	134
11	123	46	3	4	1	0	2	1	0	0	0	191
10	125	69	3	6	2	1	3	1	1	0	0	221
24	181	94	2	3	1	0	2	0	1	1	0	309
10	73	80	2	9	2	0	1	1	1	1	0	180
2	88	43	2	3	4	0	1	0	3	1	0	147
0	105	13	1	5	3	0	2	1	1	0	0	131
7	67	31	1	5	1	1	1	0	1	1	0	116
67	852	409	16	37	15	2	13	5	9	4	0	1429

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: GLEN OAKS BLVD
EAST-WEST STREET: OSBORNE
JURISDICTION: LA

DATE: 05-22-12

PEAK HOUR: 12:30PM

NORTH LEG

TOTAL: 638

Rt	Thru	Lt	
132	424	82	Total
27	95	16	1st
25	80	11	2nd
37	137	39	3rd
43	112	16	4th

EAST LEG TOTAL: 739

	1st	2nd	3rd	4th	Total
Rt	19	10	35	4	68
Thru	164	141	132	61	498
Lt	57	41	36	39	173

WEST LEG TOTAL: 685

Total	1st	2nd	3rd	4th	
171	41	40	41	49	Lt
424	130	107	110	77	Thru
90	28	31	25	6	Rt

PEAK HOUR FACTORS

NORTH LEG = 0.75
SOUTH LEG = 0.89
EAST LEG = 0.77
WEST LEG = 0.86

ALL LEGS = 0.88

SOUTH LEG

TOTAL: 866

	Lt	Thru	Rt
1st	29	149	51
2nd	17	144	46
3rd	20	201	22
4th	15	141	31
Total	81	635	150

HOUR TOTAL: 2,928

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: OSBORNE

TIME: 12:00PM-01:00PM DATE: 05-22-12

NORTH LEG

Rt	Thru	Lt	
103	335	42	Total
24	77	11	1st
27	83	4	2nd
27	95	16	3rd
25	80	11	4th

	1st	2nd	3rd	4th	Total
Rt	2	5	19	10	36
Thru	47	50	164	141	402
Lt	44	52	57	41	194

Total	1st	2nd	3rd	4th	
154	28	45	41	40	Lt
337	41	59	130	107	Thru
70	5	6	28	31	Rt

	Lt	Thru	Rt
1st	9	90	24
2nd	9	105	20
3rd	29	149	51
4th	17	144	46
Total	64	488	141

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: OSBORNE

TIME: 01:00PM-02:00PM DATE: 05-22-12

NORTH LEG

Rt	Thru	Lt	
154	507	99	Total
37	137	39	1st
43	112	16	2nd
41	139	28	3rd
33	119	16	4th

	1st	2nd	3rd	4th	Total
Rt	35	4	14	27	80
Thru	132	61	121	74	388
Lt	36	39	44	55	174

Total	1st	2nd	3rd	4th	
184	41	49	41	53	Lt
430	110	77	125	118	Thru
53	25	6	8	14	Rt

	Lt	Thru	Rt
1st	20	201	22
2nd	15	141	31
3rd	8	172	38
4th	20	143	33
Total	63	657	124

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : GLEN OAKS BLVD LA

EAST-WEST STREET : OSBORNE 05-22-12

BEGINNING TIME : 12:00PM (PH 12:30 pm)

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
						NORTH LEG						
21	64	11	3	7	0	0	3	0	0	3	0	112
24	71	4	3	7	0	0	3	0	0	2	0	114
26	84	16	1	6	0	0	3	0	0	2	0	138
24	68	11	1	6	0	0	3	0	0	3	0	116
36	125	39	1	5	0	0	4	0	0	3	0	213
42	100	16	1	5	0	0	3	0	0	4	0	171
39	124	27	2	8	0	0	3	0	0	4	1	208
30	105	16	3	7	0	0	3	0	0	4	0	168
242	741	140	15	51	0	0	25	0	0	25	1	1240
						SOUTH LEG						
17	82	8	1	2	1	2	3	0	4	3	0	123
16	89	7	0	5	2	2	4	0	2	7	0	134
42	136	26	3	5	3	2	3	0	4	5	0	229
40	133	15	2	5	2	2	2	0	2	4	0	207
14	185	17	3	7	3	3	4	0	2	5	0	243
22	131	14	2	4	1	3	2	0	4	4	0	187
28	160	6	4	6	2	4	1	0	2	5	0	218
27	132	18	2	6	2	2	1	0	2	4	0	196
206	1048	111	17	40	16	20	20	0	22	37	0	1537
						EAST LEG						
0	42	37	1	3	4	0	2	2	1	0	1	93
3	44	47	1	4	3	0	1	2	1	1	0	107
18	158	53	1	3	2	0	1	2	0	2	0	240
8	134	37	2	4	1	0	2	3	0	1	0	192
32	127	30	2	2	3	0	1	3	1	2	0	203
3	55	35	1	3	2	0	2	2	0	1	0	104
13	115	40	1	3	1	0	1	3	0	2	0	179
26	67	50	1	4	3	0	1	2	0	2	0	156
103	742	329	10	26	19	0	11	19	3	11	1	1274
						WEST LEG						
4	38	26	1	0	2	0	2	0	0	1	0	74
4	56	41	2	2	1	0	0	2	0	1	1	110
26	120	38	2	4	2	0	4	0	0	2	1	199
30	101	38	1	3	1	0	2	0	0	1	1	178
23	100	40	2	7	1	0	3	0	0	0	0	176
4	69	46	2	6	3	0	2	0	0	0	0	132
7	119	39	1	3	2	0	3	0	0	0	0	174
13	114	52	1	2	1	0	1	0	0	1	0	185
111	717	320	12	27	13	0	17	2	0	6	3	1228

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: GLEN OAKS BLVD
EAST-WEST STREET: OSBORNE
JURISDICTION: LA

DATE: 05-22-12

PEAK HOUR: 04:45PM

NORTH LEG

TOTAL: 916

Rt	Thru	Lt	
203	577	136	Total
45	151	13	1st
55	136	9	2nd
56	149	65	3rd
47	141	49	4th

EAST LEG TOTAL: 891

	1st	2nd	3rd	4th	Total
Rt	8	37	44	13	102
Thru	84	178	159	114	535
Lt	77	55	57	65	254

WEST LEG TOTAL: 1,022

Total	1st	2nd	3rd	4th	
242	64	49	69	60	Lt
690	152	207	187	144	Thru
90	4	33	27	26	Rt

SOUTH LEG

TOTAL: 1,335

	Lt	Thru	Rt
1st	23	234	100
2nd	30	197	82
3rd	51	207	47
4th	17	238	109
Total	121	876	338

PEAK HOUR FACTORS

NORTH LEG = 0.85
SOUTH LEG = 0.92
EAST LEG = 0.83
WEST LEG = 0.88

ALL LEGS = 0.93

HOUR TOTAL: 4,164

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: OSBORNE

TIME: 04:00PM-05:00PM DATE: 05-22-12

NORTH LEG

Rt	Thru	Lt	
114	497	71	Total
29	73	6	1st
18	116	31	2nd
22	157	21	3rd
45	151	13	4th

	1st	2nd	3rd	4th	Total
Rt	3	5	2	8	18
Thru	61	107	57	84	309
Lt	61	68	58	77	264

Total	1st	2nd	3rd	4th	
177	35	21	57	64	Lt
531	83	139	157	152	Thru
24	7	9	4	4	Rt

	Lt	Thru	Rt
1st	8	224	93
2nd	16	160	81
3rd	29	205	80
4th	23	234	100
Total	76	823	354

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: OSBORNE

TIME: 05:00PM-06:00PM DATE: 05-22-12

NORTH LEG

195	570	155	Total
55	136	9	1st
56	149	65	2nd
47	141	49	3rd
37	144	32	4th
Rt	Thru	Lt	

Rt	37	44	13	20	114
Thru	178	159	114	137	588
Lt	55	57	65	63	240
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
220	49	69	60	42	Lt
690	207	187	144	152	Thru
114	33	27	26	28	Rt

	Lt	Thru	Rt
1st	30	197	82
2nd	51	207	47
3rd	17	238	109
4th	20	202	72
Total	118	844	310

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

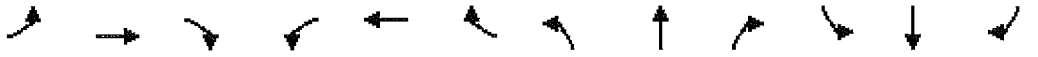
NORTH-SOUTH STREET : GLEN OAKS BLVD LA

EAST-WEST STREET : OSBORNE 05-22-12

BEGINNING TIME : 04:00PM (PH 4:45 PM)

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
						NORTH LEG						
27	61	6	0	7	0	2	2	0	0	3	0	108
17	104	31	0	4	0	1	4	0	0	4	0	165
21	146	21	0	5	0	1	3	0	0	3	0	200
44	140	12	1	2	1	0	2	0	0	7	0	209
55	125	9	0	4	0	0	3	0	0	4	0	200
54	137	65	1	3	0	1	4	0	0	5	0	270
46	131	49	0	5	0	1	2	0	0	3	0	237
34	134	32	1	4	0	2	2	0	0	4	0	213
298	978	225	3	34	1	8	22	0	0	33	0	1602
						SOUTH LEG						
91	209	7	2	9	1	0	3	0	0	3	0	325
77	151	14	2	4	2	1	1	0	1	4	0	257
77	194	27	2	5	2	0	3	0	1	3	0	314
96	224	23	2	6	0	0	2	0	2	2	0	357
79	185	30	1	6	0	1	2	0	1	4	0	309
44	194	51	2	5	0	0	3	0	1	5	0	305
105	231	17	2	3	0	0	1	0	2	3	0	364
68	196	20	3	2	0	0	1	0	1	3	0	294
637	1584	189	16	40	5	2	16	0	9	27	0	2525
						EAST LEG						
0	55	60	2	4	1	1	1	0	0	1	0	125
4	102	63	1	3	2	0	0	1	0	2	2	180
1	54	48	1	2	6	0	0	3	0	1	1	117
8	78	70	0	3	5	0	0	0	0	3	2	169
35	174	49	1	3	4	0	0	0	1	1	2	270
41	153	52	2	3	3	0	0	1	1	3	1	260
12	110	58	1	4	3	0	0	2	0	0	2	192
19	133	55	1	3	4	0	0	2	0	1	2	220
120	859	455	9	25	28	1	1	9	2	12	12	1533
						WEST LEG						
5	81	34	1	1	0	0	1	0	1	0	1	125
4	136	19	5	3	0	0	0	1	0	0	1	169
0	152	55	4	3	0	0	1	0	0	1	2	218
1	147	61	3	3	0	0	1	1	0	1	2	220
30	204	49	3	3	0	0	0	0	0	0	0	289
23	181	68	3	5	0	0	1	0	1	0	1	283
23	140	58	3	3	0	0	1	1	0	0	1	230
23	147	40	3	3	0	0	1	0	2	1	2	222
109	1188	384	25	24	0	0	6	3	4	3	10	1756

Prepared by Newport Traffic Studies



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	300	535	70	425	630	70	50	520	135	45	1070	170
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	3438	1346	1641	3355		1245	3139	1346	1504	3438	1468
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1719	3438	1346	1641	3355		1245	3139	1346	1504	3438	1468
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	361	645	84	512	759	84	60	627	163	54	1289	205
RTOR Reduction (vph)	0	0	69	0	7	0	0	0	42	0	0	21
Lane Group Flow (vph)	361	645	15	512	836	0	60	627	121	54	1289	184
Heavy Vehicles (%)	5%	5%	20%	10%	5%	15%	45%	15%	20%	20%	5%	10%
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	5	2		1	6		3	8	1	7	4	5
Permitted Phases			2						8			4
Actuated Green, G (s)	28.0	24.0	24.0	38.0	34.0		6.0	44.7	82.7	8.1	46.8	74.8
Effective Green, g (s)	28.0	24.0	24.0	38.0	34.0		6.0	44.7	82.7	8.1	46.8	74.8
Actuated g/C Ratio	0.21	0.18	0.18	0.29	0.26		0.05	0.34	0.63	0.06	0.36	0.57
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	368	631	247	477	872		57	1073	892	93	1230	884
v/s Ratio Prot	0.21	0.19		c0.31	c0.25		c0.05	0.20	0.04	0.04	c0.37	0.04
v/s Ratio Perm			0.01						0.05			0.08
v/c Ratio	0.98	1.02	0.06	1.07	0.96		1.05	0.58	0.14	0.58	1.05	0.21
Uniform Delay, d1	51.1	53.4	44.1	46.4	47.7		62.4	35.4	9.7	59.7	42.0	13.6
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	41.6	41.6	0.5	62.3	22.0		134.7	0.8	0.1	8.9	39.2	0.1
Delay (s)	92.8	95.0	44.6	108.7	69.7		197.1	36.2	9.7	68.6	81.2	13.7
Level of Service	F	F	D	F	E		F	D	A	E	F	B
Approach Delay (s)		90.4			84.5			42.5			71.8	
Approach LOS		F			F			D			E	

Intersection Summary			
HCM Average Control Delay	74.4	HCM Level of Service	E
HCM Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	130.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	84.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
27: Glenoaks Blvd & Osborne St

8/29/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	170	425	90	175	500	70	80	635	150	80	425	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	3282	1468	1641	3355		1641	3282	1346	1805	3282	1538
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1719	3282	1468	1641	3355		1641	3282	1346	1805	3282	1538
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	193	483	102	199	568	80	91	722	170	91	483	148
RTOR Reduction (vph)	0	0	74	0	18	0	0	0	69	0	0	60
Lane Group Flow (vph)	193	483	28	199	630	0	91	722	101	91	483	88
Heavy Vehicles (%)	5%	10%	10%	10%	5%	10%	10%	10%	20%	0%	10%	5%
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	5	2		1	6		3	8	1	7	4	5
Permitted Phases			2						8			4
Actuated Green, G (s)	7.1	16.1	16.1	8.1	17.1		3.1	15.2	23.3	3.1	15.2	22.3
Effective Green, g (s)	7.1	16.1	16.1	8.1	17.1		3.1	15.2	23.3	3.1	15.2	22.3
Actuated g/C Ratio	0.12	0.28	0.28	0.14	0.29		0.05	0.26	0.40	0.05	0.26	0.38
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	209	903	404	227	981		87	853	628	96	853	691
v/s Ratio Prot	0.11	0.15		c0.12	c0.19		c0.06	c0.22	0.02	0.05	0.15	0.02
v/s Ratio Perm			0.02						0.05			0.04
v/c Ratio	0.92	0.53	0.07	0.88	0.64		1.05	0.85	0.16	0.95	0.57	0.13
Uniform Delay, d1	25.4	18.0	15.7	24.7	18.0		27.7	20.5	11.3	27.6	18.8	11.8
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	41.2	2.3	0.3	29.2	3.2		109.6	7.8	0.1	74.1	0.9	0.1
Delay (s)	66.7	20.3	16.0	53.9	21.3		137.3	28.3	11.4	101.7	19.7	11.9
Level of Service	E	C	B	D	C		F	C	B	F	B	B
Approach Delay (s)		31.2			28.9			35.5			28.4	
Approach LOS		C			C			D			C	

Intersection Summary			
HCM Average Control Delay	31.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	58.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	60.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	240	690	90	255	535	100	120	875	340	135	575	205
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	3438	1404	1641	3357		1805	3438	1538	1719	3282	1538
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1719	3438	1404	1641	3357		1805	3438	1538	1719	3282	1538
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	258	742	97	274	575	108	129	941	366	145	618	220
RTOR Reduction (vph)	0	0	73	0	17	0	0	0	31	0	0	49
Lane Group Flow (vph)	258	742	24	274	666	0	129	941	335	145	618	171
Heavy Vehicles (%)	5%	5%	15%	10%	5%	5%	0%	5%	5%	5%	10%	5%
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	5	2		1	6		3	8	1	7	4	5
Permitted Phases			2						8			4
Actuated Green, G (s)	16.0	22.0	22.0	16.6	22.6		8.7	26.0	42.6	9.0	26.3	42.3
Effective Green, g (s)	16.0	22.0	22.0	16.6	22.6		8.7	26.0	42.6	9.0	26.3	42.3
Actuated g/C Ratio	0.18	0.25	0.25	0.19	0.25		0.10	0.29	0.48	0.10	0.29	0.47
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	307	844	345	304	847		175	998	800	173	963	795
v/s Ratio Prot	0.15	c0.22		c0.17	0.20		0.07	c0.27	0.08	c0.08	0.19	0.04
v/s Ratio Perm			0.02						0.14			0.07
v/c Ratio	0.84	0.88	0.07	0.90	0.79		0.74	0.94	0.42	0.84	0.64	0.22
Uniform Delay, d1	35.6	32.5	25.9	35.7	31.2		39.3	31.1	15.4	39.6	27.5	13.9
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	18.3	12.6	0.4	27.9	7.3		14.9	16.4	0.4	28.3	1.5	0.1
Delay (s)	53.9	45.1	26.3	63.6	38.5		54.2	47.5	15.7	67.8	29.0	14.0
Level of Service	D	D	C	E	D		D	D	B	E	C	B
Approach Delay (s)		45.5			45.7			40.0			31.4	
Approach LOS		D			D			D			C	

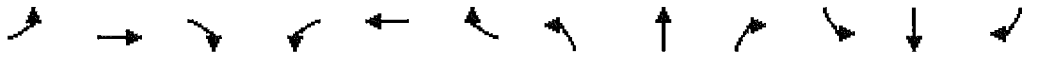
Intersection Summary			
HCM Average Control Delay	40.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	89.6	Sum of lost time (s)	16.0
Intersection Capacity Utilization	78.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	350	535	70	425	630	70	50	520	185	45	1070	170
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1517	3438	1346	1641	3355		1245	3139	1137	1504	3438	1468
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1517	3438	1346	1641	3355		1245	3139	1137	1504	3438	1468
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	422	645	84	512	759	84	60	627	223	54	1289	205
RTOR Reduction (vph)	0	0	67	0	8	0	0	0	40	0	0	12
Lane Group Flow (vph)	422	645	17	512	835	0	60	627	183	54	1289	193
Heavy Vehicles (%)	19%	5%	20%	10%	5%	15%	45%	15%	42%	20%	5%	10%
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	5	2		1	6		3	8	1	7	4	5
Permitted Phases			2						8			4
Actuated Green, G (s)	27.0	23.0	23.0	30.0	26.0		4.0	34.9	64.9	6.9	37.8	64.8
Effective Green, g (s)	27.0	23.0	23.0	30.0	26.0		4.0	34.9	64.9	6.9	37.8	64.8
Actuated g/C Ratio	0.24	0.21	0.21	0.27	0.23		0.04	0.31	0.59	0.06	0.34	0.58
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	370	714	279	444	787		45	989	707	94	1173	912
v/s Ratio Prot	0.28	0.19		c0.31	c0.25		c0.05	0.20	0.07	0.04	c0.37	0.05
v/s Ratio Perm			0.01						0.09			0.08
v/c Ratio	1.14	0.90	0.06	1.15	1.06		1.33	0.63	0.26	0.57	1.10	0.21
Uniform Delay, d1	41.9	42.8	35.2	40.4	42.4		53.4	32.5	11.2	50.5	36.5	10.9
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	90.8	17.0	0.4	91.8	49.6		247.1	1.3	0.2	8.2	57.7	0.1
Delay (s)	132.7	59.8	35.7	132.2	92.0		300.5	33.8	11.4	58.8	94.2	11.0
Level of Service	F	E	D	F	F		F	C	B	E	F	B
Approach Delay (s)		84.7			107.2			45.9			81.9	
Approach LOS		F			F			D			F	

Intersection Summary			
HCM Average Control Delay	82.9	HCM Level of Service	F
HCM Volume to Capacity ratio	1.13		
Actuated Cycle Length (s)	110.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	85.3%	ICU Level of Service	E
Analysis Period (min)	15		

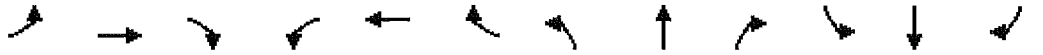
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	220	425	90	175	500	70	80	635	200	80	425	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1421	3282	1468	1641	3355		1641	3282	1154	1805	3282	1538
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1421	3282	1468	1641	3355		1641	3282	1154	1805	3282	1538
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	250	483	102	199	568	80	91	722	227	91	483	148
RTOR Reduction (vph)	0	0	73	0	17	0	0	0	68	0	0	45
Lane Group Flow (vph)	250	483	29	199	631	0	91	722	159	91	483	103
Heavy Vehicles (%)	27%	10%	10%	10%	5%	10%	10%	10%	40%	0%	10%	5%
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	5	2		1	6		3	8	1	7	4	5
Permitted Phases			2						8			4
Actuated Green, G (s)	12.0	18.6	18.6	10.4	17.0		4.0	16.5	26.9	3.1	15.6	27.6
Effective Green, g (s)	12.0	18.6	18.6	10.4	17.0		4.0	16.5	26.9	3.1	15.6	27.6
Actuated g/C Ratio	0.19	0.29	0.29	0.16	0.26		0.06	0.26	0.42	0.05	0.24	0.43
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	264	945	423	264	883		102	838	552	87	793	752
v/s Ratio Prot	c0.18	0.15		0.12	c0.19		c0.06	c0.22	0.05	0.05	0.15	0.03
v/s Ratio Perm			0.02						0.09			0.04
v/c Ratio	0.95	0.51	0.07	0.75	0.71		0.89	0.86	0.29	1.05	0.61	0.14
Uniform Delay, d1	26.0	19.2	16.7	25.9	21.6		30.1	23.0	12.5	30.7	21.8	11.3
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	40.7	2.0	0.3	11.5	4.9		55.9	9.1	0.3	109.6	1.3	0.1
Delay (s)	66.7	21.2	17.0	37.4	26.5		86.0	32.0	12.8	140.3	23.1	11.3
Level of Service	E	C	B	D	C		F	C	B	F	C	B
Approach Delay (s)		34.3			29.1			32.5			35.5	
Approach LOS		C			C			C			D	

Intersection Summary			
HCM Average Control Delay	32.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	64.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	63.6%	ICU Level of Service	B
Analysis Period (min)	15		

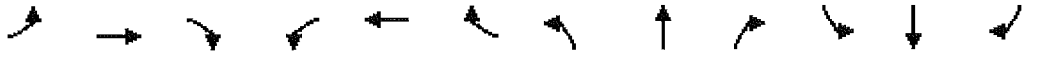
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	290	690	90	255	535	100	120	875	390	135	575	205
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1492	3438	1404	1641	3357		1805	3438	1380	1719	3282	1538
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1492	3438	1404	1641	3357		1805	3438	1380	1719	3282	1538
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	312	742	97	274	575	108	129	941	419	145	618	220
RTOR Reduction (vph)	0	0	72	0	19	0	0	0	28	0	0	43
Lane Group Flow (vph)	312	742	25	274	664	0	129	941	391	145	618	177
Heavy Vehicles (%)	21%	5%	15%	10%	5%	5%	0%	5%	17%	5%	10%	5%
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	5	2		1	6		3	8	1	7	4	5
Permitted Phases			2						8			4
Actuated Green, G (s)	17.0	21.0	21.0	14.0	18.0		7.9	22.0	36.0	7.0	21.1	38.1
Effective Green, g (s)	17.0	21.0	21.0	14.0	18.0		7.9	22.0	36.0	7.0	21.1	38.1
Actuated g/C Ratio	0.21	0.26	0.26	0.18	0.22		0.10	0.28	0.45	0.09	0.26	0.48
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	317	902	369	287	755		178	945	690	150	866	809
v/s Ratio Prot	c0.21	c0.22		0.17	0.20		0.07	c0.27	0.10	c0.08	0.19	0.05
v/s Ratio Perm			0.02						0.18			0.07
v/c Ratio	0.98	0.82	0.07	0.95	0.88		0.72	1.00	0.57	0.97	0.71	0.22
Uniform Delay, d1	31.4	27.7	22.2	32.7	29.9		35.0	29.0	16.2	36.4	26.7	12.2
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	45.9	8.4	0.4	40.6	13.8		13.6	28.0	1.1	62.8	2.8	0.1
Delay (s)	77.3	36.1	22.5	73.3	43.8		48.6	57.0	17.3	99.2	29.5	12.4
Level of Service	E	D	C	E	D		D	E	B	F	C	B
Approach Delay (s)		46.1			52.2			45.1			36.0	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM Average Control Delay	44.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	79.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	380	585	75	465	685	75	55	565	200	50	1165	185
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1517	3438	1346	1641	3356		1245	3139	1137	1504	3438	1468
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1517	3438	1346	1641	3356		1245	3139	1137	1504	3438	1468
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	458	705	90	560	825	90	66	681	241	60	1404	223
RTOR Reduction (vph)	0	0	69	0	6	0	0	0	40	0	0	10
Lane Group Flow (vph)	458	705	21	560	909	0	66	681	201	60	1404	213
Heavy Vehicles (%)	19%	5%	20%	10%	5%	15%	45%	15%	42%	20%	5%	10%
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	5	2		1	6		3	8	1	7	4	5
Permitted Phases			2						8			4
Actuated Green, G (s)	35.0	31.0	31.0	40.0	36.0		5.0	45.0	85.0	8.8	48.8	83.8
Effective Green, g (s)	35.0	31.0	31.0	40.0	36.0		5.0	45.0	85.0	8.8	48.8	83.8
Actuated g/C Ratio	0.25	0.22	0.22	0.28	0.26		0.04	0.32	0.60	0.06	0.35	0.60
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	377	757	296	466	858		44	1003	719	94	1192	915
v/s Ratio Prot	0.30	0.21		c0.34	c0.27		c0.05	0.22	0.08	0.04	c0.41	0.06
v/s Ratio Perm			0.02						0.10			0.09
v/c Ratio	1.21	0.93	0.07	1.20	1.06		1.50	0.68	0.28	0.64	1.18	0.23
Uniform Delay, d1	52.9	53.9	43.5	50.4	52.4		67.9	41.6	13.3	64.4	46.0	13.4
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	118.7	19.7	0.5	109.8	47.7		313.2	1.8	0.2	13.4	89.0	0.1
Delay (s)	171.6	73.5	44.0	160.2	100.1		381.1	43.5	13.5	77.8	135.0	13.5
Level of Service	F	E	D	F	F		F	D	B	E	F	B
Approach Delay (s)		107.3			122.9			58.7			116.9	
Approach LOS		F			F			E			F	

Intersection Summary			
HCM Average Control Delay	105.7	HCM Level of Service	F
HCM Volume to Capacity ratio	1.15		
Actuated Cycle Length (s)	140.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	91.2%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	240	465	100	190	545	75	85	690	220	85	465	140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1421	3282	1468	1641	3357		1641	3282	1154	1805	3282	1538
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1421	3282	1468	1641	3357		1641	3282	1154	1805	3282	1538
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	273	528	114	216	619	85	97	784	250	97	528	159
RTOR Reduction (vph)	0	0	81	0	15	0	0	0	183	0	0	41
Lane Group Flow (vph)	273	528	33	216	689	0	97	784	67	97	528	118
Heavy Vehicles (%)	27%	10%	10%	10%	5%	10%	10%	10%	40%	0%	10%	5%
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA	Perm	Prot	NA	pm+ov
Protected Phases	5	2		1	6		3	8		7	4	5
Permitted Phases			2						8			4
Actuated Green, G (s)	14.8	20.3	20.3	11.5	17.0		4.8	18.8	18.8	4.0	18.0	32.8
Effective Green, g (s)	14.8	20.3	20.3	11.5	17.0		4.8	18.8	18.8	4.0	18.0	32.8
Actuated g/C Ratio	0.21	0.29	0.29	0.16	0.24		0.07	0.27	0.27	0.06	0.25	0.46
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	298	944	422	267	808		112	874	307	102	837	802
v/s Ratio Prot	c0.19	c0.16		0.13	c0.21		c0.06	c0.24		0.05	0.16	0.03
v/s Ratio Perm			0.02						0.06			0.05
v/c Ratio	0.92	0.56	0.08	0.81	0.85		0.87	0.90	0.22	0.95	0.63	0.15
Uniform Delay, d1	27.3	21.4	18.3	28.5	25.6		32.6	25.0	20.2	33.2	23.4	10.9
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	31.0	2.4	0.4	16.3	11.0		45.8	11.8	0.4	73.1	1.6	0.1
Delay (s)	58.3	23.7	18.7	44.8	36.6		78.4	36.8	20.5	106.3	24.9	10.9
Level of Service	E	C	B	D	D		E	D	C	F	C	B
Approach Delay (s)		33.4			38.6			36.7			32.1	
Approach LOS		C			D			D			C	

Intersection Summary			
HCM Average Control Delay	35.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	70.6	Sum of lost time (s)	16.0
Intersection Capacity Utilization	67.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
27: Glenoaks Blvd & Osborne St

8/29/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	315	750	100	280	585	110	130	955	425	145	625	225
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1492	3438	1404	1641	3357		1805	3438	1380	1719	3282	1538
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1492	3438	1404	1641	3357		1805	3438	1380	1719	3282	1538
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	339	806	108	301	629	118	140	1027	457	156	672	242
RTOR Reduction (vph)	0	0	79	0	17	0	0	0	23	0	0	39
Lane Group Flow (vph)	339	806	29	301	730	0	140	1027	434	156	672	203
Heavy Vehicles (%)	21%	5%	15%	10%	5%	5%	0%	5%	17%	5%	10%	5%
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	5	2		1	6		3	8	1	7	4	5
Permitted Phases			2						8			4
Actuated Green, G (s)	20.0	24.0	24.0	16.0	20.0		9.6	26.0	42.0	8.0	24.4	44.4
Effective Green, g (s)	20.0	24.0	24.0	16.0	20.0		9.6	26.0	42.0	8.0	24.4	44.4
Actuated g/C Ratio	0.22	0.27	0.27	0.18	0.22		0.11	0.29	0.47	0.09	0.27	0.49
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	332	917	374	292	746		193	993	705	153	890	827
v/s Ratio Prot	c0.23	c0.23		0.18	0.22		0.08	c0.30	0.11	c0.09	0.20	0.05
v/s Ratio Perm			0.02						0.21			0.08
v/c Ratio	1.02	0.88	0.08	1.03	0.98		0.73	1.03	0.62	1.02	0.76	0.25
Uniform Delay, d1	35.0	31.6	24.7	37.0	34.8		38.9	32.0	18.0	41.0	30.1	13.1
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	54.9	11.7	0.4	60.9	28.1		12.7	37.8	1.6	78.0	3.7	0.2
Delay (s)	89.9	43.3	25.1	97.9	62.9		51.6	69.8	19.6	119.0	33.7	13.3
Level of Service	F	D	C	F	E		D	E	B	F	C	B
Approach Delay (s)		54.4			72.9			54.1			41.6	
Approach LOS		D			E			D			D	

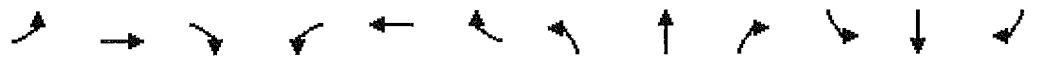
Intersection Summary			
HCM Average Control Delay	55.4	HCM Level of Service	E
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	84.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	380	585	75	465	685	75	55	565	200	50	1165	185
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.91	0.91	1.00	0.91	0.91		1.00	0.91	0.91	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.99	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.99	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1380	3231	1346	1493	3196		1245	2968	1035	1504	3438	1468
Flt Permitted	0.95	0.78	1.00	0.95	0.84		0.08	1.00	1.00	0.24	1.00	1.00
Satd. Flow (perm)	1380	2535	1346	1493	2707		101	2968	1035	384	3438	1468
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	458	705	90	560	825	90	66	681	241	60	1404	223
RTOR Reduction (vph)	0	0	43	0	5	0	0	2	63	0	0	72
Lane Group Flow (vph)	376	787	47	482	988	0	66	703	154	60	1404	151
Heavy Vehicles (%)	19%	5%	20%	10%	5%	15%	45%	15%	42%	20%	5%	10%
Turn Type	Prot	NA	pm+ov	Prot	NA		pm+pt	NA	pm+ov	pm+pt	NA	pm+ov
Protected Phases	5	2	3	1	6		3	8	1	7	4	5
Permitted Phases			2				8		8	4		4
Actuated Green, G (s)	36.0	53.0	21.0	41.0	62.0		56.0	52.0	93.0	57.6	52.8	88.8
Effective Green, g (s)	36.0	53.0	21.0	41.0	62.0		56.0	52.0	93.0	57.6	52.8	88.8
Actuated g/C Ratio	0.28	0.41	0.16	0.31	0.47		0.43	0.40	0.71	0.44	0.40	0.68
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	380	1219	257	468	1436		78	1180	768	210	1388	1042
v/s Ratio Prot	0.27	0.18	0.01	c0.32	0.22		c0.03	0.24	0.06	0.01	c0.41	0.04
v/s Ratio Perm		0.08	0.03		c0.11		0.34		0.09	0.12		0.06
v/c Ratio	0.99	0.65	0.18	1.03	0.69		0.85	0.60	0.20	0.29	1.01	0.15
Uniform Delay, d1	47.2	31.3	47.5	44.9	26.8		33.2	31.1	6.4	22.8	39.0	7.5
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	42.9	1.2	0.3	49.5	1.4		53.3	0.8	0.1	0.8	27.0	0.1
Delay (s)	90.1	32.5	47.8	94.4	28.2		86.5	31.9	6.5	23.5	66.0	7.5
Level of Service	F	C	D	F	C		F	C	A	C	E	A
Approach Delay (s)		50.9			49.9			30.0			56.8	
Approach LOS		D			D			C			E	

Intersection Summary			
HCM Average Control Delay	48.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	130.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	90.2%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group



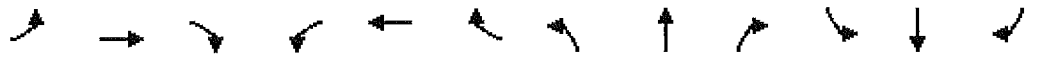
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	240	465	100	190	545	75	85	690	220	85	465	140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.91	0.91	1.00	0.91	0.91		1.00	0.91	0.91	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1293	3113	1468	1493	3208		1641	3103	1050	1805	3282	1538
Flt Permitted	0.95	0.94	1.00	0.95	0.95		0.29	1.00	1.00	0.20	1.00	1.00
Satd. Flow (perm)	1293	2919	1468	1493	3039		496	3103	1050	376	3282	1538
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	273	528	114	216	619	85	97	784	250	97	528	159
RTOR Reduction (vph)	0	0	72	0	12	0	0	3	125	0	0	83
Lane Group Flow (vph)	246	555	42	194	714	0	97	806	100	97	528	76
Heavy Vehicles (%)	27%	10%	10%	10%	5%	10%	10%	10%	40%	0%	10%	5%
Turn Type	Prot	NA	pm+ov	Prot	NA		pm+pt	NA	pm+ov	pm+pt	NA	pm+ov
Protected Phases	5	2	3	1	6		3	8	1	7	4	5
Permitted Phases			2				8		8	4		4
Actuated Green, G (s)	16.9	41.1	28.8	12.9	33.1		26.3	21.7	34.6	23.3	20.2	37.1
Effective Green, g (s)	16.9	41.1	28.8	12.9	33.1		26.3	21.7	34.6	23.3	20.2	37.1
Actuated g/C Ratio	0.22	0.53	0.37	0.17	0.42		0.34	0.28	0.44	0.30	0.26	0.48
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	281	1582	618	247	1319		235	864	520	169	851	811
v/s Ratio Prot	c0.19	c0.08	0.00	0.13	0.09		c0.02	c0.26	0.03	0.02	0.16	0.02
v/s Ratio Perm		0.11	0.02		c0.14		0.11		0.06	0.15		0.03
v/c Ratio	0.88	0.35	0.07	0.79	0.54		0.41	0.93	0.19	0.57	0.62	0.09
Uniform Delay, d1	29.5	10.7	15.9	31.2	16.7		18.6	27.4	13.2	21.4	25.5	11.2
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	24.7	0.1	0.0	15.0	0.5		1.2	16.6	0.2	4.7	1.4	0.1
Delay (s)	54.2	10.8	15.9	46.2	17.2		19.8	44.0	13.3	26.1	26.9	11.2
Level of Service	D	B	B	D	B		B	D	B	C	C	B
Approach Delay (s)		23.1			23.3			35.8			23.6	
Approach LOS		C			C			D			C	

Intersection Summary			
HCM Average Control Delay	27.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	77.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	68.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
27: Glenoaks Blvd & Osborne St

9/10/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	315	750	100	280	585	110	130	955	425	145	625	225
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.91	0.91	1.00	0.91	0.91		1.00	0.91	0.91	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.99	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1357	3267	1404	1493	3206		1805	3256	1256	1719	3282	1538
Flt Permitted	0.95	0.93	1.00	0.95	0.93		0.20	1.00	1.00	0.15	1.00	1.00
Satd. Flow (perm)	1357	3049	1404	1493	2995		382	3256	1256	275	3282	1538
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	339	806	108	301	629	118	140	1027	457	156	672	242
RTOR Reduction (vph)	0	0	56	0	15	0	0	3	141	0	0	115
Lane Group Flow (vph)	305	840	52	271	762	0	140	1070	270	156	672	127
Heavy Vehicles (%)	21%	5%	15%	10%	5%	5%	0%	5%	17%	5%	10%	5%
Turn Type	Prot	NA	pm+ov	Prot	NA		pm+pt	NA	pm+ov	pm+pt	NA	pm+ov
Protected Phases	5	2	3	1	6		3	8	1	7	4	5
Permitted Phases			2				8		8	4		4
Actuated Green, G (s)	21.0	44.0	30.7	17.0	36.0		36.7	29.0	46.0	31.3	26.3	47.3
Effective Green, g (s)	21.0	44.0	30.7	17.0	36.0		36.7	29.0	46.0	31.3	26.3	47.3
Actuated g/C Ratio	0.23	0.49	0.34	0.19	0.40		0.41	0.32	0.51	0.35	0.29	0.53
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	317	1541	541	282	1238		278	1049	698	176	959	877
v/s Ratio Prot	c0.22	c0.13	0.01	0.18	0.12		c0.04	c0.33	0.07	c0.05	0.20	0.03
v/s Ratio Perm		c0.14	0.03		0.13		0.16		0.14	0.26		0.05
v/c Ratio	0.96	0.55	0.10	0.96	0.62		0.50	1.02	0.39	0.89	0.70	0.15
Uniform Delay, d1	34.1	16.0	20.2	36.2	21.5		18.5	30.5	13.4	26.4	28.3	11.0
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	40.2	0.4	0.1	42.8	0.9		1.4	32.8	0.4	37.3	2.3	0.1
Delay (s)	74.3	16.4	20.3	79.0	22.4		19.9	63.3	13.8	63.7	30.7	11.0
Level of Service	E	B	C	E	C		B	E	B	E	C	B
Approach Delay (s)		30.8			37.0			47.0			31.1	
Approach LOS		C			D			D			C	

Intersection Summary			
HCM Average Control Delay	37.5	HCM Level of Service	D
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	91.6%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

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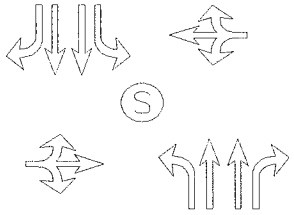
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : MONTAGUE STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 28
ROUTE 5A, 6A, 7A

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
MONTAGUE STREET						
EB LEFT	10	30%		10	5	15
EB THRU	5	5%		5	5	10
EB RIGHT	30	20%		30	5	35
WB LEFT	5	5%		5	5	10
WB THRU	5	5%		5	5	10
WB RIGHT	10	5%		10	5	15
GLEN OAKS BLVD						
NB LEFT	55	5%		55	5	60
NB THRU	640	10%	**50**	690	60	750
NB RIGHT	5	15%		5	5	10
SB LEFT	15	5%		15	5	20
SB THRU	1575	10%	**50**	1625	145	1770
SB RIGHT	55	15%		55	5	60
TOTALS	**2410**		**100**	**2510**	**255**	**2765**

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Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax
Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax
Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : MONTAGUE STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 28
ROUTE 5A, 6A, 7A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
MONTAGUE STREET						
EB LEFT	40	30%		40	5	45
EB THRU	5	5%		5	5	10
EB RIGHT	45	20%		45	5	50
WB LEFT	35	5%		35	5	40
WB THRU	5	5%		5	5	10
WB RIGHT	30	5%		30	5	35
GLEN OAKS BLVD						
NB LEFT	60	5%		60	5	65
NB THRU	560	10%	**50**	610	55	665
NB RIGHT	15	15%		15	5	20
SB LEFT	35	5%		35	5	40
SB THRU	525	10%	**50**	575	50	625
SB RIGHT	35	15%		35	5	40
TOTALS	**1390**		**100**	**1490**	**155**	**1645**

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Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax
Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : MONTAGUE STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 28
ROUTE 5A, 6A, 7A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
MONTAGUE STREET						
EB LEFT	55	10%		55	5	60
EB THRU	5	5%		5	5	10
EB RIGHT	60	5%		60	5	65
WB LEFT	10	5%		10	5	15
WB THRU	5	5%		5	5	10
WB RIGHT	30	5%		30	5	35
GLEN OAKS BLVD						
NB LEFT	50	25%		50	5	55
NB THRU	1180	5%	**50**	1230	110	1340
NB RIGHT	15	5%		15	5	20
SB LEFT	15	5%		15	5	20
SB THRU	855	5%	**50**	905	80	985
SB RIGHT	25	15%		25	5	30
TOTALS	**2305**		**100**	**2405**	**240**	**2645**

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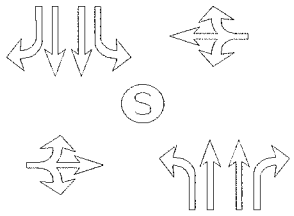
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : MONTAGUE STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
28
ROUTE
5A, 6A, 7A

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
MONTAGUE STREET								
EB LEFT	8	13	39	45	**0**	45	5	50
EB THRU	2	0	0	5	**0**	5	5	10
EB RIGHT	18	10	30	50	**0**	50	5	55
WB LEFT	2	1	3	5	**0**	5	5	10
WB THRU	4	0	0	5	**0**	5	5	10
WB RIGHT	9	0	0	10	**0**	10	5	15
GLEN OAKS BLVD								
NB LEFT	56	3	9	65	**0**	65	5	70
NB THRU	586	51	153	740	**150**	890	80	970
NB RIGHT	4	2	6	10	**0**	10	5	15
SB LEFT	16	2	6	20	**0**	20	5	25
SB THRU	1502	45	135	1635	**150**	1785	160	1945
SB RIGHT	53	6	18	70	**0**	70	5	75
TOTALS	**2260**				**300**	**2960**	**290**	**3250**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : MONTAGUE STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 28
ROUTE 5A, 6A, 7A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
MONTAGUE STREET								
EB LEFT	28	13	39	65	**0**	65	5	70
EB THRU	7	0	0	5	**0**	5	5	10
EB RIGHT	35	10	30	65	**0**	65	5	70
WB LEFT	36	1	3	40	**0**	40	5	45
WB THRU	3	0	0	5	**0**	5	5	10
WB RIGHT	28	0	0	30	**0**	30	5	35
GLEN OAKS BLVD								
NB LEFT	55	3	9	65	**0**	65	5	70
NB THRU	510	51	153	665	**150**	815	75	890
NB RIGHT	11	2	6	15	**0**	15	5	20
SB LEFT	33	2	6	40	**0**	40	5	45
SB THRU	481	45	135	615	**150**	765	70	835
SB RIGHT	30	6	18	50	**0**	50	5	55
TOTALS	**1257**				**300**	**1960**	**195**	**2155**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : MONTAGUE STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 28
ROUTE 5A, 6A, 7A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
MONTAGUE STREET								
EB LEFT	48	5	15	65	**0**	65	5	70
EB THRU	0	0	0	5	**0**	5	5	10
EB RIGHT	58	3	9	65	**0**	65	5	70
WB LEFT	10	0	0	10	**0**	10	5	15
WB THRU	1	0	0	5	**0**	5	5	10
WB RIGHT	32	0	0	30	**0**	30	5	35
GLEN OAKS BLVD								
NB LEFT	37	11	33	70	**0**	70	5	75
NB THRU	1148	33	99	1245	**150**	1395	125	1520
NB RIGHT	13	0	0	15	**0**	15	5	20
SB LEFT	16	1	3	20	**0**	20	5	25
SB THRU	802	53	159	960	**150**	1110	100	1210
SB RIGHT	21	3	9	30	**0**	30	5	35
TOTALS	**2186**				**300**	**2820**	**275**	**3095**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: GLEN OAKS BLVD
EAST-WEST STREET: MONTAGUE
JURISDICTION: LA

DATE: 05-22-12

PEAK HOUR: 07:15AM

NORTH LEG

TOTAL: 1,648

Rt	Thru	Lt	
56	1576	16	Total
6	405	2	1st
11	444	6	2nd
24	376	4	3rd
15	351	4	4th

EAST LEG TOTAL: 16

	1st	2nd	3rd	4th	Total
Rt	2	2	4	2	10
Thru	0	1	2	1	4
Lt	0	1	1	0	2

WEST LEG TOTAL: 45

Total	1st	2nd	3rd	4th	
12	2	4	3	3	Lt
2	0	1	0	1	Thru
31	6	9	10	6	Rt

PEAK HOUR FACTORS

NORTH LEG = 0.89
SOUTH LEG = 0.77
EAST LEG = 0.57
WEST LEG = 0.80

ALL LEGS = 0.92

SOUTH LEG

TOTAL: 703

	Lt	Thru	Rt
1st	8	146	0
2nd	6	149	1
3rd	19	208	2
4th	23	138	3
Total	56	641	6

HOUR TOTAL: 2,412

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: MONTAGUE

TIME: 07:00AM-08:00AM DATE: 05-22-12

NORTH LEG

Rt	Thru	Lt	
49	1574	14	Total
8	349	2	1st
6	405	2	2nd
11	444	6	3rd
24	376	4	4th

	1st	2nd	3rd	4th	Total
Rt	1	2	2	4	9
Thru	0	0	1	2	3
Lt	0	0	1	1	2

Total	1st	2nd	3rd	4th	
11	2	2	4	3	Lt
1	0	0	1	0	Thru
29	4	6	9	10	Rt

	Lt	Thru	Rt
1st	8	115	1
2nd	8	146	0
3rd	6	149	1
4th	19	208	2
Total	41	618	4

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: MONTAGUE

TIME: 08:00AM-09:00AM DATE: 05-22-12

NORTH LEG

Rt	Thru	Lt	
53	1117	18	Total
15	351	4	1st
16	270	4	2nd
9	262	8	3rd
13	234	2	4th

	1st	2nd	3rd	4th	Total
Rt	2	1	1	6	10
Thru	1	0	0	0	1
Lt	0	0	0	3	3

Total	1st	2nd	3rd	4th	
20	3	5	8	4	Lt
2	1	0	1	0	Thru
28	6	7	8	7	Rt

	Lt	Thru	Rt
1st	23	138	3
2nd	10	199	4
3rd	9	136	0
4th	8	108	0
Total	50	581	7

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : GLEN OAKS BLVD LA

EAST-WEST STREET : MONTAGUE 05-22-12

BEGINNING TIME : 07:00AM (7:15 AM) PH

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
					NORTH LEG							
8	336	2	0	5	0	0	2	0	0	6	0	359
6	391	2	0	5	0	0	3	0	0	6	0	413
11	428	6	0	6	0	0	5	0	0	5	0	461
21	359	4	3	6	0	0	1	0	0	10	0	404
15	324	4	0	6	0	0	4	0	0	17	0	370
16	247	4	0	12	0	0	2	0	0	9	0	290
9	244	8	0	10	0	0	3	0	0	5	0	279
13	208	2	0	16	0	0	4	0	0	6	0	249
99	2537	32	3	66	0	0	24	0	0	64	0	2825
					SOUTH LEG							
1	99	8	0	5	0	0	4	0	0	7	0	124
0	129	8	0	5	0	0	6	0	0	6	0	154
1	135	6	0	4	0	0	5	0	0	5	0	156
1	196	19	1	2	0	0	4	0	0	6	0	229
2	126	23	1	4	0	0	4	0	0	4	0	164
4	180	10	0	8	0	0	3	0	0	8	0	213
0	121	9	0	8	0	0	6	0	0	1	0	145
0	101	5	0	4	0	0	2	2	0	1	1	116
9	1087	88	2	40	0	0	34	2	0	38	1	1301
					EAST LEG							
0	0	0	1	0	0	0	0	0	0	0	0	1
2	0	0	0	0	0	0	0	0	0	0	0	2
2	1	1	0	0	0	0	0	0	0	0	0	4
3	2	1	1	0	0	0	0	0	0	0	0	7
2	1	0	0	0	0	0	0	0	0	0	0	3
1	0	0	0	0	0	0	0	0	0	0	0	1
1	0	0	0	0	0	0	0	0	0	0	0	1
6	0	3	0	0	0	0	0	0	0	0	0	9
17	4	5	2	0	0	0	0	0	0	0	0	28
					WEST LEG							
1	0	1	1	0	0	1	0	0	1	0	1	6
5	0	2	1	0	0	0	0	0	0	0	0	8
8	1	3	0	0	0	0	0	0	1	0	1	14
4	0	2	2	0	0	1	0	0	3	0	1	13
1	1	1	1	0	0	0	0	2	4	0	0	10
2	0	2	3	0	0	0	0	0	2	0	3	12
7	1	4	0	0	0	0	0	1	1	0	3	17
7	0	3	0	0	0	0	0	1	0	0	0	11
35	3	18	8	0	0	2	0	4	12	0	9	91

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: GLEN OAKS BLVD
EAST-WEST STREET: MONTAGUE
JURISDICTION: LA

DATE: 05-22-12

PEAK HOUR: 12:00PM

NORTH LEG

TOTAL: 597

Rt	Thru	Lt	
36	526	35	Total
10	119	5	1st
8	135	6	2nd
7	119	18	3rd
11	153	6	4th

EAST LEG TOTAL: 68

	1st	2nd	3rd	4th	Total
Rt	3	10	12	3	28
Thru	0	1	1	1	3
Lt	5	8	12	12	37

WEST LEG TOTAL: 93

Total	1st	2nd	3rd	4th	
41	17	6	9	9	Lt
7	5	0	0	2	Thru
45	11	7	19	8	Rt

PEAK HOUR FACTORS

NORTH LEG = 0.88
SOUTH LEG = 0.91
EAST LEG = 0.68
WEST LEG = 0.70

ALL LEGS = 0.92

SOUTH LEG

TOTAL: 632

	Lt	Thru	Rt
1st	13	135	5
2nd	9	131	3
3rd	18	144	1
4th	18	151	4
Total	58	561	13

HOUR TOTAL: 1,390

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: MONTAGUE

TIME: 12:00PM-01:00PM DATE: 05-22-12

NORTH LEG

Rt	Thru	Lt	
36	526	35	Total
10	119	5	1st
8	135	6	2nd
7	119	18	3rd
11	153	6	4th

	1st	2nd	3rd	4th	Total
Rt	3	10	12	3	28
Thru	0	1	1	1	3
Lt	5	8	12	12	37

Total	1st	2nd	3rd	4th	
41	17	6	9	9	Lt
7	5	0	0	2	Thru
45	11	7	19	8	Rt

	Lt	Thru	Rt
1st	13	135	5
2nd	9	131	3
3rd	18	144	1
4th	18	151	4
Total	58	561	13

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: MONTAGUE

TIME: 12:00AM-01:00AM DATE: 05-22-12

NORTH LEG

Rt	Thru	Lt	
35	627	17	Total
12	141	5	1st
10	170	2	2nd
7	152	4	3rd
6	164	6	4th

	1st	2nd	3rd	4th	Total
Rt	14	7	8	7	36
Thru	1	0	1	0	2
Lt	5	6	3	3	17

Total	1st	2nd	3rd	4th	
35	5	3	20	7	Lt
3	0	1	1	1	Thru
34	6	8	10	10	Rt

	Lt	Thru	Rt
1st	11	176	4
2nd	7	186	2
3rd	17	190	2
4th	15	206	4
Total	50	758	12

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : GLEN OAKS BLVD LA

EAST-WEST STREET : MONTAGUE 05-22-12

BEGINNING TIME : 12:00PM (PM 12 PM)

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
						NORTH LEG						
7	111	5	0	5	0	1	2	0	2	1	0	134
8	119	6	0	13	0	0	1	0	0	2	0	149
6	112	18	0	2	0	0	2	0	1	3	0	144
9	139	4	2	8	0	0	4	2	0	2	0	170
11	131	5	1	8	0	0	1	0	0	1	0	158
9	159	2	1	8	0	0	3	0	0	0	0	182
7	144	4	0	5	0	0	2	0	0	1	0	163
5	152	6	1	5	0	0	0	0	0	7	0	176
62	1067	50	5	54	0	1	15	2	3	17	0	1276
						SOUTH LEG						
5	122	12	0	5	1	0	5	0	0	3	0	153
3	119	8	0	7	0	0	2	1	0	3	0	143
1	132	17	0	7	0	0	0	0	0	5	1	163
2	137	18	2	7	0	0	1	0	0	6	0	173
3	166	10	1	9	0	0	1	0	0	0	1	191
2	169	4	0	8	2	0	6	1	0	3	0	195
2	172	15	0	11	1	0	4	1	0	3	0	209
4	185	11	0	14	1	0	4	1	0	3	2	225
22	1202	95	3	68	5	0	23	4	0	26	4	1452
						EAST LEG						
3	0	5	0	0	0	0	0	0	0	0	0	8
10	1	8	0	0	0	0	0	0	0	0	0	19
12	1	12	0	0	0	0	0	0	0	0	0	25
3	1	11	0	0	1	0	0	0	0	0	0	16
14	1	5	0	0	0	0	0	0	0	0	0	20
7	0	6	0	0	0	0	0	0	0	0	0	13
8	1	3	0	0	0	0	0	0	0	0	0	12
7	0	3	0	0	0	0	0	0	0	0	0	10
64	5	53	0	0	1	0	0	0	0	0	0	123
						WEST LEG						
9	5	9	0	0	7	2	0	0	0	0	1	33
5	0	3	0	0	2	1	0	1	1	0	0	13
16	0	7	1	0	0	2	0	1	0	0	1	28
5	2	9	1	0	0	1	0	0	1	0	0	19
6	0	5	0	0	0	0	0	0	0	0	0	11
8	0	1	0	0	2	0	0	0	0	1	0	12
9	1	17	0	0	2	0	0	0	1	0	1	31
10	1	7	0	0	0	0	0	0	0	0	0	18
68	9	58	2	0	13	6	0	2	3	1	3	165

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: GLEN OAKS BLVD
EAST-WEST STREET: MONTAGUE
JURISDICTION: LA

DATE: 05-22-12

PEAK HOUR: 05:00PM

NORTH LEG

TOTAL: 896

Rt	Thru	Lt	
24	855	17	Total
3	224	7	1st
6	216	1	2nd
11	216	6	3rd
4	199	3	4th

EAST LEG TOTAL: 43

	1st	2nd	3rd	4th	Total
Rt	7	12	3	10	32
Thru	0	1	0	0	1
Lt	0	4	1	5	10

WEST LEG TOTAL: 114

Total	1st	2nd	3rd	4th	
53	19	9	15	10	Lt
	0	0	0	0	Thru
61	27	13	14	7	Rt

PEAK HOUR FACTORS

NORTH LEG = 0.96
SOUTH LEG = 0.94
EAST LEG = 0.63
WEST LEG = 0.62

ALL LEGS = 0.93

SOUTH LEG

TOTAL: 1,242

	Lt	Thru	Rt
1st	17	308	5
2nd	8	302	3
3rd	17	287	4
4th	6	284	1
Total	48	1181	13

HOUR TOTAL: 2,295

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: MONTAGUE

TIME: 04:00PM-05:00PM DATE: 05-22-12

NORTH LEG

Rt	Thru	Lt	
45	688	21	Total
9	171	3	1st
12	181	5	2nd
11	162	5	3rd
13	174	8	4th

	1st	2nd	3rd	4th	Total
Rt	5	7	1	3	16
Thru	1	6	0	1	8
Lt	3	5	1	1	10

Total	1st	2nd	3rd	4th	
62	12	13	28	9	Lt
12	1	11	0	0	Thru
89	20	12	39	18	Rt

	Lt	Thru	Rt
1st	10	349	1
2nd	9	271	4
3rd	10	288	4
4th	10	277	1
Total	39	1185	10

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: MONTAGUE

TIME: 05:00PM-06:00PM DATE: 05-22-12

NORTH LEG

Rt	Thru	Lt	
24	855	17	Total
3	224	7	1st
6	216	1	2nd
11	216	6	3rd
4	199	3	4th

	1st	2nd	3rd	4th	Total
Rt	7	12	3	10	32
Thru	0	1	0	0	1
Lt	0	4	1	5	10

Total	1st	2nd	3rd	4th	
53	19	9	15	10	Lt
0	0	0	0	0	Thru
61	27	13	14	7	Rt

	Lt	Thru	Rt
1st	17	308	5
2nd	8	302	3
3rd	17	287	4
4th	6	284	1
Total	48	1181	13

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : GLEN OAKS BLVD LA

EAST-WEST STREET : MONTAGUE 05-22-12

BEGINNING TIME : 04:00PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
9	159	3	0	9	0	0	2	0	0	1	0	183
10	165	5	1	10	0	1	1	0	0	5	0	198
9	149	5	0	7	0	1	2	0	1	4	0	178
11	160	6	0	8	2	0	4	0	2	2	0	195
1	215	6	1	7	0	0	1	0	1	1	1	234
6	202	1	0	10	0	0	2	0	0	2	0	223
11	203	6	0	5	0	0	3	0	0	5	0	233
3	182	3	0	7	0	1	2	0	0	8	0	206
60	1435	35	2	63	2	3	17	0	4	28	1	1650
						SOUTH LEG						
1	330	10	0	10	0	0	7	0	0	2	0	360
4	260	7	0	3	0	0	1	1	0	7	1	284
4	275	9	0	6	0	0	5	0	0	2	1	302
1	272	7	0	3	0	0	1	2	0	1	1	288
5	297	11	0	6	1	0	2	1	0	3	4	330
3	292	6	0	4	1	0	2	1	0	4	0	313
4	282	16	0	4	0	0	0	0	0	1	1	308
1	277	4	0	4	0	0	1	0	0	2	2	291
23	2285	70	0	40	2	0	19	5	0	22	10	2476
						EAST LEG						
5	1	3	0	0	0	0	0	0	0	0	0	9
7	6	5	0	0	0	0	0	0	0	0	0	18
1	0	1	0	0	0	0	0	0	0	0	0	2
3	1	1	0	0	0	0	0	0	0	0	0	5
7	0	0	0	0	0	0	0	0	0	0	0	7
12	1	4	0	0	0	0	0	0	0	0	0	17
3	0	1	0	0	0	0	0	0	0	0	0	4
10	0	5	0	0	0	0	0	0	0	0	0	15
48	9	20	0	0	0	0	0	0	0	0	0	77
						WEST LEG						
18	1	11	0	0	0	1	0	0	1	0	1	33
11	11	10	0	0	2	0	0	0	1	0	1	36
39	0	28	0	0	0	0	0	0	0	0	0	67
16	0	8	0	0	0	0	0	0	2	0	1	27
27	0	19	0	0	0	0	0	0	0	0	0	46
13	0	7	0	0	1	0	0	0	0	0	1	22
12	0	14	0	0	0	1	0	0	1	0	1	29
6	0	8	0	0	0	0	0	0	1	0	2	17
142	12	105	0	0	3	2	0	0	6	0	7	277

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: GLEN OAKS BLVD
EAST-WEST STREET: MONTAGUE
JURISDICTION: LA

DATE: 05-22-12

PEAK HOUR: 12:00AM

NORTH LEG

TOTAL: 679

Rt	Thru	Lt	
35	627	17	Total
12	141	5	1st
10	170	2	2nd
7	152	4	3rd
6	164	6	4th

EAST LEG TOTAL: 55

	1st	2nd	3rd	4th	Total
Rt	14	7	8	7	36
Thru	1	0	1	0	2
Lt	5	6	3	3	17

WEST LEG TOTAL: 72

Total	1st	2nd	3rd	4th	
35	5	3	20	7	Lt
3	0	1	1	1	Thru
34	6	8	10	10	Rt

SOUTH LEG

	Lt	Thru	Rt
1st	11	176	4
2nd	7	186	2
3rd	17	190	2
4th	15	206	4
Total	50	758	12

TOTAL: 820

PEAK HOUR FACTORS

SOUTH LEG = 0.91
EAST LEG = 0.69
WEST LEG = 0.58

ALL LEGS = 0.95

North	South	East	West

HOUR TOTAL: 1,626

Prepared by NEWPORT TRAFFIC STUDIES

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	5	30	5	5	10	55	640	5	15	1575	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.91			0.93		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.99			0.99		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1421			1724		1719	3282	1404	1719	3282	1404
Flt Permitted		0.92			0.92		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1317			1600		1719	3282	1404	1719	3282	1404
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	5	33	5	5	11	60	696	5	16	1712	60
RTOR Reduction (vph)	0	31	0	0	10	0	0	0	1	0	0	11
Lane Group Flow (vph)	0	18	0	0	11	0	60	696	4	16	1712	49
Heavy Vehicles (%)	30%	0%	20%	5%	0%	0%	5%	10%	15%	5%	10%	15%
Turn Type	Perm	NA		Perm	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)		4.3			4.3		3.0	47.3	47.3	0.8	45.1	45.1
Effective Green, g (s)		4.3			4.3		3.0	47.3	47.3	0.8	45.1	45.1
Actuated g/C Ratio		0.07			0.07		0.05	0.73	0.73	0.01	0.70	0.70
Clearance Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		88			107		80	2411	1031	21	2298	983
v/s Ratio Prot							c0.03	0.21		0.01	c0.52	
v/s Ratio Perm		c0.01			0.01				0.00			0.03
v/c Ratio		0.21			0.10		0.75	0.29	0.00	0.76	0.74	0.05
Uniform Delay, d1		28.4			28.2		30.3	2.9	2.3	31.7	6.0	3.0
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		1.2			0.4		32.0	0.1	0.0	92.1	1.3	0.0
Delay (s)		29.6			28.6		62.4	2.9	2.3	123.8	7.4	3.0
Level of Service		C			C		E	A	A	F	A	A
Approach Delay (s)		29.6			28.6			7.6			8.3	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM Average Control Delay	8.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	64.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	55.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	40	5	45	35	5	30	60	560	15	35	525	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.93			0.94		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.98			0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1404			1702		1719	3282	1404	1719	3282	1404
Flt Permitted		0.82			0.86		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1178			1501		1719	3282	1404	1719	3282	1404
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	43	5	49	38	5	33	65	609	16	38	571	38
RTOR Reduction (vph)	0	43	0	0	29	0	0	0	7	0	0	18
Lane Group Flow (vph)	0	54	0	0	47	0	65	609	9	38	571	20
Heavy Vehicles (%)	30%	0%	20%	5%	0%	0%	5%	10%	15%	5%	10%	15%
Turn Type	Perm	NA		Perm	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)		4.6			4.6		1.8	20.6	20.6	0.7	19.5	19.5
Effective Green, g (s)		4.6			4.6		1.8	20.6	20.6	0.7	19.5	19.5
Actuated g/C Ratio		0.12			0.12		0.05	0.54	0.54	0.02	0.51	0.51
Clearance Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		143			182		82	1784	763	32	1689	722
v/s Ratio Prot							c0.04	c0.19		0.02	0.17	
v/s Ratio Perm		c0.05			0.03				0.01			0.01
v/c Ratio		0.38			0.26		0.79	0.34	0.01	1.19	0.34	0.03
Uniform Delay, d1		15.3			15.1		17.9	4.8	4.0	18.6	5.4	4.5
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		1.7			0.8		39.3	0.1	0.0	220.6	0.1	0.0
Delay (s)		17.0			15.9		57.2	5.0	4.0	239.2	5.5	4.5
Level of Service		B			B		E	A	A	F	A	A
Approach Delay (s)		17.0			15.9			9.9			19.2	
Approach LOS		B			B			A			B	

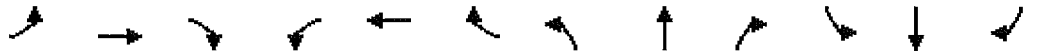
Intersection Summary			
HCM Average Control Delay	14.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.34		
Actuated Cycle Length (s)	37.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	35.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	55	5	60	10	5	30	50	1180	15	15	855	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.93			0.91		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.98			0.99		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1510			1709		1444	3438	1615	1719	3438	1404
Flt Permitted		0.83			0.94		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1282			1625		1444	3438	1615	1719	3438	1404
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	59	5	65	11	5	32	54	1269	16	16	919	27
RTOR Reduction (vph)	0	56	0	0	28	0	0	0	5	0	0	11
Lane Group Flow (vph)	0	73	0	0	20	0	54	1269	11	16	919	16
Heavy Vehicles (%)	10%	0%	20%	0%	0%	0%	25%	5%	0%	5%	5%	15%
Turn Type	Perm	NA		Perm	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)		6.7			6.7		2.3	30.3	30.3	0.6	28.6	28.6
Effective Green, g (s)		6.7			6.7		2.3	30.3	30.3	0.6	28.6	28.6
Actuated g/C Ratio		0.14			0.14		0.05	0.61	0.61	0.01	0.58	0.58
Clearance Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		173			220		67	2100	987	21	1982	810
v/s Ratio Prot							c0.04	c0.37		0.01	0.27	
v/s Ratio Perm		c0.06			0.01				0.01			0.01
v/c Ratio		0.42			0.09		0.81	0.60	0.01	0.76	0.46	0.02
Uniform Delay, d1		19.7			18.8		23.4	6.0	3.8	24.4	6.1	4.5
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		1.7			0.2		48.7	0.5	0.0	92.1	0.2	0.0
Delay (s)		21.3			19.0		72.1	6.4	3.8	116.5	6.2	4.5
Level of Service		C			B		E	A	A	F	A	A
Approach Delay (s)		21.3			19.0			9.1			8.0	
Approach LOS		C			B			A			A	

Intersection Summary			
HCM Average Control Delay	9.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	49.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	59.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↰	↑↑	↱	↰	↑↑	↱
Volume (vph)	10	5	30	5	5	10	55	690	5	15	1625	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.91			0.93		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.99			0.99		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1421			1724		1719	3085	1404	1719	3195	1404
Flt Permitted		0.92			0.93		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1317			1629		1719	3085	1404	1719	3195	1404
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	5	33	5	5	11	60	750	5	16	1766	60
RTOR Reduction (vph)	0	31	0	0	10	0	0	0	1	0	0	10
Lane Group Flow (vph)	0	18	0	0	11	0	60	750	4	16	1766	50
Heavy Vehicles (%)	30%	0%	20%	5%	0%	0%	5%	17%	15%	5%	13%	15%
Turn Type	Perm	NA		Perm	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)		4.3			4.3		3.0	51.9	51.9	0.8	49.7	49.7
Effective Green, g (s)		4.3			4.3		3.0	51.9	51.9	0.8	49.7	49.7
Actuated g/C Ratio		0.06			0.06		0.04	0.75	0.75	0.01	0.72	0.72
Clearance Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		82			102		75	2320	1056	20	2301	1011
v/s Ratio Prot							c0.03	0.24		0.01	c0.55	
v/s Ratio Perm		c0.01			0.01				0.00			0.04
v/c Ratio		0.22			0.10		0.80	0.32	0.00	0.80	0.77	0.05
Uniform Delay, d1		30.8			30.5		32.7	2.8	2.1	34.0	6.0	2.8
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		1.4			0.5		43.9	0.1	0.0	110.1	1.6	0.0
Delay (s)		32.1			31.0		76.6	2.9	2.1	144.1	7.6	2.8
Level of Service		C			C		E	A	A	F	A	A
Approach Delay (s)		32.1			31.0			8.3			8.7	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM Average Control Delay	9.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	69.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	55.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
28: Glenoaks Blvd & Montague St

8/29/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	40	5	45	35	5	30	60	610	15	35	575	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.93			0.94		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.98			0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1404			1702		1719	3085	1404	1719	3059	1404
Flt Permitted		0.82			0.87		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1178			1523		1719	3085	1404	1719	3059	1404
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	43	5	49	38	5	33	65	663	16	38	625	38
RTOR Reduction (vph)	0	43	0	0	29	0	0	0	7	0	0	18
Lane Group Flow (vph)	0	54	0	0	47	0	65	663	9	38	625	20
Heavy Vehicles (%)	30%	0%	20%	5%	0%	0%	5%	17%	15%	5%	18%	15%
Turn Type	Perm	NA		Perm	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)		4.5			4.5		1.9	21.5	21.5	0.8	20.4	20.4
Effective Green, g (s)		4.5			4.5		1.9	21.5	21.5	0.8	20.4	20.4
Actuated g/C Ratio		0.12			0.12		0.05	0.55	0.55	0.02	0.53	0.53
Clearance Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		137			177		84	1709	778	35	1608	738
v/s Ratio Prot							c0.04	c0.21		0.02	0.20	
v/s Ratio Perm		c0.05			0.03				0.01			0.01
v/c Ratio		0.39			0.26		0.77	0.39	0.01	1.09	0.39	0.03
Uniform Delay, d1		15.9			15.6		18.2	4.9	3.9	19.0	5.5	4.4
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		1.8			0.8		34.8	0.1	0.0	179.0	0.2	0.0
Delay (s)		17.7			16.4		53.1	5.1	3.9	198.0	5.6	4.4
Level of Service		B			B		D	A	A	F	A	A
Approach Delay (s)		17.7			16.4			9.2			16.0	
Approach LOS		B			B			A			B	

Intersection Summary			
HCM Average Control Delay	13.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	38.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	36.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	55	5	60	10	5	30	50	1230	15	15	905	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.93			0.91		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.98			0.99		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1510			1709		1444	3312	1615	1719	3282	1404
Flt Permitted		0.83			0.94		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1282			1625		1444	3312	1615	1719	3282	1404
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	59	5	65	11	5	32	54	1323	16	16	973	27
RTOR Reduction (vph)	0	56	0	0	28	0	0	0	5	0	0	11
Lane Group Flow (vph)	0	73	0	0	20	0	54	1323	11	16	973	16
Heavy Vehicles (%)	10%	0%	20%	0%	0%	0%	25%	9%	0%	5%	10%	15%
Turn Type	Perm	NA		Perm	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)		6.8			6.8		2.4	31.8	31.8	0.7	30.1	30.1
Effective Green, g (s)		6.8			6.8		2.4	31.8	31.8	0.7	30.1	30.1
Actuated g/C Ratio		0.13			0.13		0.05	0.62	0.62	0.01	0.59	0.59
Clearance Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		170			215		68	2053	1001	23	1926	824
v/s Ratio Prot							c0.04	c0.40		0.01	0.30	
v/s Ratio Perm		c0.06			0.01				0.01			0.01
v/c Ratio		0.43			0.09		0.79	0.64	0.01	0.70	0.51	0.02
Uniform Delay, d1		20.5			19.5		24.2	6.2	3.7	25.2	6.2	4.4
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		1.7			0.2		45.6	0.7	0.0	63.9	0.2	0.0
Delay (s)		22.2			19.7		69.8	6.9	3.7	89.1	6.4	4.4
Level of Service		C			B		E	A	A	F	A	A
Approach Delay (s)		22.2			19.7			9.3			7.7	
Approach LOS		C			B			A			A	

Intersection Summary			
HCM Average Control Delay	9.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	51.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	60.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
28: Glenoaks Blvd & Montague St

8/29/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	5	35	5	5	10	60	750	5	15	1770	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.91			0.93		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.99			0.99		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1416			1724		1719	3085	1404	1719	3195	1404
Flt Permitted		0.92			0.95		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1321			1662		1719	3085	1404	1719	3195	1404
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	5	38	5	5	11	65	815	5	16	1924	65
RTOR Reduction (vph)	0	36	0	0	10	0	0	0	1	0	0	9
Lane Group Flow (vph)	0	18	0	0	11	0	65	815	4	16	1924	56
Heavy Vehicles (%)	30%	0%	20%	5%	0%	0%	5%	17%	15%	5%	13%	15%
Turn Type	Perm	NA		Perm	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)		4.6			4.6		4.0	65.5	65.5	0.7	62.2	62.2
Effective Green, g (s)		4.6			4.6		4.0	65.5	65.5	0.7	62.2	62.2
Actuated g/C Ratio		0.06			0.06		0.05	0.79	0.79	0.01	0.75	0.75
Clearance Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		73			92		83	2440	1111	15	2400	1055
v/s Ratio Prot							c0.04	c0.26		0.01	c0.60	
v/s Ratio Perm		c0.01			0.01				0.00			0.04
v/c Ratio		0.25			0.12		0.78	0.33	0.00	1.07	0.80	0.05
Uniform Delay, d1		37.4			37.2		39.0	2.5	1.8	41.0	6.4	2.7
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		1.8			0.6		37.0	0.1	0.0	255.5	2.0	0.0
Delay (s)		39.2			37.7		76.0	2.5	1.8	296.5	8.5	2.7
Level of Service		D			D		E	A	A	F	A	A
Approach Delay (s)		39.2			37.7			7.9			10.6	
Approach LOS		D			D			A			B	

Intersection Summary			
HCM Average Control Delay	10.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	82.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	60.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	45	5	50	40	5	35	65	665	15	40	625	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.93			0.94		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.98			0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1402			1701		1719	3085	1404	1719	3059	1404
Flt Permitted		0.85			0.89		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1211			1557		1719	3085	1404	1719	3059	1404
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	49	5	54	43	5	38	71	723	16	43	679	43
RTOR Reduction (vph)	0	48	0	0	34	0	0	0	7	0	0	21
Lane Group Flow (vph)	0	60	0	0	52	0	71	723	9	43	679	22
Heavy Vehicles (%)	30%	0%	20%	5%	0%	0%	5%	17%	15%	5%	18%	15%
Turn Type	Perm	NA		Perm	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)		4.5			4.5		2.5	21.8	21.8	1.3	20.6	20.6
Effective Green, g (s)		4.5			4.5		2.5	21.8	21.8	1.3	20.6	20.6
Actuated g/C Ratio		0.11			0.11		0.06	0.55	0.55	0.03	0.52	0.52
Clearance Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		138			177		109	1698	773	56	1591	730
v/s Ratio Prot							c0.04	c0.23		0.03	0.22	
v/s Ratio Perm		c0.05			0.03				0.01			0.02
v/c Ratio		0.44			0.30		0.65	0.43	0.01	0.77	0.43	0.03
Uniform Delay, d1		16.4			16.1		18.1	5.2	4.0	19.0	5.9	4.6
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		2.2			0.9		13.1	0.2	0.0	46.0	0.2	0.0
Delay (s)		18.6			17.0		31.2	5.4	4.0	65.0	6.0	4.6
Level of Service		B			B		C	A	A	E	A	A
Approach Delay (s)		18.6			17.0			7.6			9.3	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	9.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	39.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	38.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
28: Glenoaks Blvd & Montague St

8/29/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↰	↑↑	↱	↰	↑↑	↱
Volume (vph)	60	5	65	10	5	35	55	1340	15	15	985	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.93			0.91		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.98			0.99		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1510			1702		1444	3312	1615	1719	3282	1404
Flt Permitted		0.82			0.94		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1275			1622		1444	3312	1615	1719	3282	1404
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	65	5	70	11	5	38	59	1441	16	16	1059	27
RTOR Reduction (vph)	0	61	0	0	33	0	0	0	6	0	0	11
Lane Group Flow (vph)	0	79	0	0	21	0	59	1441	10	16	1059	16
Heavy Vehicles (%)	10%	0%	20%	0%	0%	0%	25%	9%	0%	5%	10%	15%
Turn Type	Perm	NA		custom	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4					5	2		1	6	
Permitted Phases	4			8	8				2			6
Actuated Green, G (s)		7.1			7.1		2.8	33.7	33.7	0.7	31.6	31.6
Effective Green, g (s)		7.1			7.1		2.8	33.7	33.7	0.7	31.6	31.6
Actuated g/C Ratio		0.13			0.13		0.05	0.63	0.63	0.01	0.59	0.59
Clearance Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		169			215		76	2086	1017	22	1939	829
v/s Ratio Prot							c0.04	c0.44		0.01	0.32	
v/s Ratio Perm		c0.06			0.01				0.01			0.01
v/c Ratio		0.47			0.10		0.78	0.69	0.01	0.73	0.55	0.02
Uniform Delay, d1		21.5			20.4		25.0	6.5	3.7	26.3	6.6	4.5
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		2.1			0.2		38.1	1.0	0.0	76.4	0.3	0.0
Delay (s)		23.5			20.6		63.1	7.5	3.7	102.7	6.9	4.5
Level of Service		C			C		E	A	A	F	A	A
Approach Delay (s)		23.5			20.6			9.6			8.3	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM Average Control Delay	10.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	53.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	64.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Hall & Foreman, Inc.

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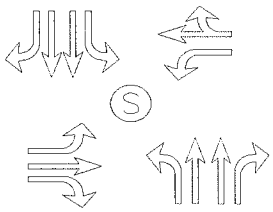
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : BRANFORD STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
29
ROUTE
5A, 6A, 7A

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						

BRANFORD STREET

EB LEFT	130	5%		130	10	135
EB THRU	15	10%		15	5	25
EB RIGHT	95	10%		95	10	100
WB LEFT	10	40%		10	5	15
WB THRU	5	50%		5	5	10
WB RIGHT	10	35%		10	5	10

GLEN OAKS BLVD

NB LEFT	95	5%		95	10	105
NB THRU	595	10%	**50**	645	60	705
NB RIGHT	10	50%		10	5	15
SB LEFT	15	45%		15	5	20
SB THRU	1360	5%	**50**	1410	125	1535
SB RIGHT	175	5%		175	15	190
TOTALS	**2515**		**100**	**2615**	**260**	**2865**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : BRANFORD STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 29
ROUTE 5A, 6A, 7A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BRANFORD STREET						
EB LEFT	150	5%		150	15	165
EB THRU	85	5%		85	5	90
EB RIGHT	90	5%		90	10	100
WB LEFT	70	10%		70	5	75
WB THRU	90	5%		90	10	100
WB RIGHT	85	5%		85	5	90
GLEN OAKS BLVD						
NB LEFT	90	10%		90	10	100
NB THRU	565	10%	**50**	615	55	670
NB RIGHT	70	10%		70	5	75
SB LEFT	70	15%		70	5	75
SB THRU	520	5%	**50**	570	50	620
SB RIGHT	80	5%		80	5	85
TOTALS	**1965**		**100**	**2065**	**180**	**2245**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : BRANFORD STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 29
ROUTE 5A, 6A, 7A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BRANFORD STREET						
EB LEFT	220	5%		220	20	240
EB THRU	110	5%		110	10	120
EB RIGHT	155	5%		155	15	170
WB LEFT	90	10%		90	10	100
WB THRU	190	5%		190	15	205
WB RIGHT	100	5%		100	10	110
GLEN OAKS BLVD						
NB LEFT	115	5%		115	10	125
NB THRU	945	5%	**50**	995	90	1085
NB RIGHT	105	5%		105	10	115
SB LEFT	115	5%		115	10	125
SB THRU	740	10%	**50**	790	70	860
SB RIGHT	80	15%		80	5	85
TOTALS	**2965**		**100**	**3065**	**275**	**3340**

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Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

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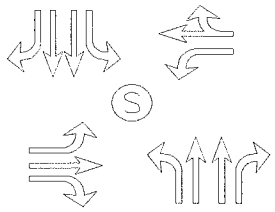
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : BRANFORD STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
29
ROUTE
5A, 6A, 7A

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BRANFORD STREET								
EB LEFT	127	1	3	130	**0**	130	10	135
EB THRU	12	1	3	15	**0**	15	5	25
EB RIGHT	87	9	27	115	**0**	115	10	120
WB LEFT	6	4	12	20	**0**	20	5	25
WB THRU	1	1	3	5	**0**	5	5	10
WB RIGHT	6	3	9	15	**0**	15	5	15
GLEN OAKS BLVD								
NB LEFT	90	5	15	105	**0**	105	10	115
NB THRU	533	60	180	715	**150**	865	80	945
NB RIGHT	6	6	18	25	**0**	25	5	30
SB LEFT	7	6	18	25	**0**	25	5	30
SB THRU	1310	49	147	1455	**150**	1605	145	1750
SB RIGHT	162	11	33	195	**0**	195	20	215
TOTALS	**2347**				**300**	**3120**	**305**	**3415**

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Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax
Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax
Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

Hall & Foreman, Inc.
Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : BRANFORD STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 29
ROUTE 5A, 6A, 7A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BRANFORD STREET								
EB LEFT	144	4	12	155	**0**	155	15	170
EB THRU	84	0	0	85	**0**	85	5	90
EB RIGHT	89	3	9	100	**0**	100	10	110
WB LEFT	63	8	24	85	**0**	85	5	90
WB THRU	88	1	3	90	**0**	90	10	100
WB RIGHT	81	5	15	95	**0**	95	10	105
GLEN OAKS BLVD								
NB LEFT	80	8	24	105	**0**	105	10	115
NB THRU	512	53	159	670	**150**	820	75	895
NB RIGHT	64	6	18	80	**0**	80	5	85
SB LEFT	62	9	27	90	**0**	90	10	100
SB THRU	483	39	117	600	**150**	750	70	820
SB RIGHT	82	0	0	80	**0**	80	5	85
TOTALS	**1832**				**300**	**2535**	**230**	**2765**

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Hall & Foreman, Inc.
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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : BRANFORD STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 29
ROUTE 5A, 6A, 7A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BRANFORD STREET								
EB LEFT	220	1	3	225	**0**	225	20	245
EB THRU	109	1	3	110	**0**	110	10	120
EB RIGHT	150	7	21	170	**0**	170	15	185
WB LEFT	86	7	21	105	**0**	105	10	115
WB THRU	189	2	6	195	**0**	195	20	215
WB RIGHT	97	2	6	105	**0**	105	10	115
GLEN OAKS BLVD								
NB LEFT	108	5	15	125	**0**	125	10	135
NB THRU	915	32	96	1010	**150**	1160	105	1265
NB RIGHT	103	2	6	110	**0**	110	10	120
SB LEFT	110	4	12	120	**0**	120	10	130
SB THRU	683	56	168	850	**150**	1000	90	1090
SB RIGHT	68	13	39	105	**0**	105	10	115
TOTALS	**2838**				**300**	**3530**	**320**	**3850**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: GLEN OAKS BLVD
EAST-WEST STREET: BRANFORD
JURISDICTION: LA

DATE: 05-22-12

PEAK HOUR: 07:15AM

NORTH LEG

TOTAL: 1,545

Rt	Thru	Lt	
173	1359	13	Total
36	377	2	1st
42	399	1	2nd
54	321	4	3rd
41	262	6	4th

EAST LEG TOTAL: 21

	1st	2nd	3rd	4th	Total
Rt	2	2	4	1	9
Thru	0	1	1	0	2
Lt	3	2	2	3	10

WEST LEG TOTAL: 237

Total	1st	2nd	3rd	4th	
128	21	36	40	31	Lt
13	0	2	5	6	Thru
96	15	21	18	42	Rt

PEAK HOUR FACTORS

NORTH LEG = 0.87
SOUTH LEG = 0.81
EAST LEG = 0.75
WEST LEG = 0.75

ALL LEGS = 0.94

SOUTH LEG

TOTAL: 700

	Lt	Thru	Rt
1st	16	138	1
2nd	21	128	3
3rd	29	183	4
4th	29	144	4
Total	95	593	12

HOUR TOTAL: 2,503

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: BRANFORD

TIME: 07:00AM-08:00AM DATE: 05-22-12

NORTH LEG

Rt	Thru	Lt	
154	1427	8	Total
22	330	1	1st
36	377	2	2nd
42	399	1	3rd
54	321	4	4th

	1st	2nd	3rd	4th	Total
Rt	1	2	2	4	9
Thru	0	0	1	1	2
Lt	2	3	2	2	9

Total	1st	2nd	3rd	4th	
113	16	21	36	40	Lt
7	0	0	2	5	Thru
65	11	15	21	18	Rt

	Lt	Thru	Rt
1st	12	117	0
2nd	16	138	1
3rd	21	128	3
4th	29	183	4
Total	78	566	8

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: BRANFORD

TIME: 08:00AM-09:00AM DATE: 05-22-12

NORTH LEG

Rt	Thru	Lt	
114	966	28	Total
41	262	6	1st
22	264	4	2nd
20	241	1	3rd
31	199	17	4th

	1st	2nd	3rd	4th	Total
Rt	1	9	2	3	15
Thru	0	2	0	0	2
Lt	3	2	2	3	10

Total	1st	2nd	3rd	4th	
92	31	26	17	18	Lt
32	6	8	10	8	Thru
136	42	35	33	26	Rt

	Lt	Thru	Rt
1st	29	144	4
2nd	24	168	1
3rd	18	127	0
4th	22	105	4
Total	93	544	9

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : GLEN OAKS BLVD LA

EAST-WEST STREET : BRANFORD 05-22-12

BEGINNING TIME : 07:00AM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
20	318	1	2	5	0	0	2	0	0	5	0	353
32	362	0	3	6	2	0	3	0	1	6	0	415
39	384	1	3	4	0	0	5	0	0	6	0	442
52	314	2	2	3	2	0	1	0	0	3	0	379
39	250	4	1	3	2	0	4	0	1	5	0	309
21	246	3	1	6	1	0	3	0	0	9	0	290
18	222	1	2	7	0	0	3	0	0	9	0	262
31	180	16	0	6	1	0	5	0	0	8	0	247
252	2276	28	14	40	8	0	26	0	2	51	0	2697
						SOUTH LEG						
0	102	10	0	4	0	0	5	1	0	6	1	129
0	121	15	1	5	1	0	6	0	0	6	0	155
2	113	21	0	4	0	1	6	0	0	5	0	152
0	171	28	2	4	1	2	5	0	0	3	0	216
4	128	26	0	3	3	0	5	0	0	8	0	177
1	154	22	0	5	2	0	3	0	0	6	0	193
0	113	18	0	5	0	0	4	0	0	5	0	145
4	93	21	0	3	1	0	5	0	0	4	0	131
11	995	161	3	33	8	3	39	1	0	43	1	1298
						EAST LEG						
0	0	0	0	0	2	1	0	0	0	0	0	3
2	0	3	0	0	0	0	0	0	0	0	0	5
0	1	0	1	0	1	0	0	1	1	0	0	5
4	0	2	0	0	0	0	0	0	0	1	0	7
0	0	1	0	0	1	1	0	1	0	0	0	4
8	2	0	1	0	1	0	0	0	0	0	1	13
1	0	1	0	0	1	1	0	0	0	0	0	4
3	0	2	0	0	1	0	0	0	0	0	0	6
18	3	9	2	0	7	3	0	2	1	1	1	47
						WEST LEG						
11	0	14	0	0	0	0	0	1	0	0	1	27
11	0	21	1	0	0	2	0	0	1	0	0	36
17	2	36	1	0	0	0	0	0	3	0	0	59
18	4	40	0	1	0	0	0	0	0	0	0	63
41	6	30	0	0	0	1	0	0	0	0	1	79
34	8	26	0	0	0	1	0	0	0	0	0	69
32	10	17	1	0	0	0	0	0	0	0	0	60
25	8	18	0	0	0	1	0	0	0	0	0	52
189	38	202	3	1	0	5	0	1	4	0	2	445

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: GLEN OAKS BLVD
EAST-WEST STREET: BRANFORD
JURISDICTION: LA

DATE: 05-22-12

PEAK HOUR: 12:45PM

NORTH LEG

TOTAL: 675

Rt	Thru	Lt	
82	522	71	Total
18	140	25	1st
20	114	11	2nd
17	110	16	3rd
27	158	19	4th

EAST LEG TOTAL: 246

	1st	2nd	3rd	4th	Total
Rt	12	22	19	33	86
Thru	15	22	21	31	89
Lt	17	11	16	27	71

WEST LEG TOTAL: 324

Total	1st	2nd	3rd	4th	
148	33	50	24	41	Lt
84	14	34	12	24	Thru
92	34	18	17	23	Rt

PEAK HOUR FACTORS

NORTH LEG = 0.83
SOUTH LEG = 0.84
EAST LEG = 0.68
WEST LEG = 0.79

ALL LEGS = 0.82

SOUTH LEG

TOTAL: 723

	Lt	Thru	Rt
1st	24	117	14
2nd	15	144	15
3rd	22	139	18
4th	27	165	23
Total	88	565	70

HOUR TOTAL: 1,968

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: BRANFORD

TIME: 12:00PM-01:00PM DATE: 05-22-12

NORTH LEG

Rt	Thru	Lt	
69	509	76	Total
15	106	7	1st
15	127	24	2nd
21	136	20	3rd
18	140	25	4th

	1st	2nd	3rd	4th	Total
Rt	12	14	24	12	62
Thru	6	11	15	15	47
Lt	11	16	33	17	77

Total	1st	2nd	3rd	4th	
113	33	20	27	33	Lt
49	8	10	17	14	Thru
110	22	19	35	34	Rt

	Lt	Thru	Rt
1st	26	93	9
2nd	16	123	24
3rd	35	98	19
4th	24	117	14
Total	101	431	66

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: BRANFORD

TIME: 01:00PM-02:00PM DATE: 05-22-12

NORTH LEG

Rt	Thru	Lt	
81	511	61	Total
20	114	11	1st
17	110	16	2nd
27	158	19	3rd
17	129	15	4th

	1st	2nd	3rd	4th	Total
Rt	22	19	33	13	87
Thru	22	21	31	18	92
Lt	11	16	27	10	64

Total	1st	2nd	3rd	4th	
134	50	24	41	19	Lt
90	34	12	24	20	Thru
81	18	17	23	23	Rt

	Lt	Thru	Rt
1st	15	144	15
2nd	22	139	18
3rd	27	165	23
4th	15	151	11
Total	79	599	67

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : GLEN OAKS BLVD LA

EAST-WEST STREET : BRANFORD 05-22-12

BEGINNING TIME : 12:00PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
15	98	5	0	5	1	0	2	1	0	1	0	128
15	114	22	0	10	2	0	1	0	0	2	0	166
21	128	16	0	3	3	0	2	1	0	3	0	177
18	126	23	0	9	2	0	3	0	0	2	0	183
20	107	7	0	7	3	0	0	1	0	0	0	145
17	102	14	0	6	2	0	2	0	0	0	0	143
27	148	18	0	6	1	0	2	0	0	2	0	204
17	118	13	0	5	2	0	1	0	0	5	0	161
150	941	118	0	51	16	0	13	3	0	15	0	1307
						SOUTH LEG						
9	80	23	0	5	1	0	5	1	0	3	1	128
20	111	15	1	8	0	1	2	0	2	2	1	163
18	87	30	1	6	3	0	1	2	0	4	0	152
12	106	22	0	6	1	1	1	1	1	4	0	155
12	130	12	2	8	1	0	0	2	1	6	0	174
17	125	20	0	8	1	0	3	1	1	3	0	179
23	151	26	0	9	0	0	3	1	0	2	0	215
10	135	13	1	9	2	0	4	0	0	3	0	177
121	925	161	5	59	9	2	19	8	5	27	2	1343
						EAST LEG						
10	6	8	2	0	3	0	0	0	0	0	0	29
11	11	13	2	0	3	1	0	0	0	0	0	41
21	15	29	2	0	2	1	0	0	0	0	2	72
10	15	14	2	0	2	0	0	0	0	0	1	44
20	21	11	2	0	0	0	1	0	0	0	0	55
18	21	15	1	0	1	0	0	0	0	0	0	56
33	31	23	0	0	4	0	0	0	0	0	0	91
12	18	9	1	0	1	0	0	0	0	0	0	41
135	138	122	12	0	16	2	1	0	0	0	3	429
						WEST LEG						
21	8	31	0	0	0	1	0	0	0	0	2	63
16	10	19	0	0	0	2	0	1	1	0	0	49
35	17	21	0	0	0	0	0	2	0	0	4	79
33	14	33	0	0	0	1	0	0	0	0	0	81
17	34	47	0	0	0	1	0	0	0	0	3	102
16	12	24	0	0	0	1	0	0	0	0	0	53
23	24	40	0	0	0	0	0	0	0	0	1	88
23	20	19	0	0	0	0	0	0	0	0	0	62
184	139	234	0	0	0	6	0	3	1	0	10	577

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: GLEN OAKS BLVD
EAST-WEST STREET: BRANFORD
JURISDICTION: LA

DATE: 05-22-12

PEAK HOUR: 05:00PM

NORTH LEG

TOTAL: 934

Rt	Thru	Lt	
81	739	114	Total
8	183	22	1st
21	148	21	2nd
22	188	32	3rd
30	220	39	4th

EAST LEG TOTAL: 383

	1st	2nd	3rd	4th	Total
Rt	16	26	31	26	99
Thru	56	60	44	31	191
Lt	14	27	27	25	93

WEST LEG TOTAL: 488

Total	1st	2nd	3rd	4th	
221	68	82	20	51	Lt
110	34	24	29	23	Thru
157	22	41	42	52	Rt

SOUTH LEG

TOTAL: 1,165

	Lt	Thru	Rt
1st	12	238	16
2nd	67	235	29
3rd	8	231	34
4th	26	243	26
Total	113	947	105

PEAK HOUR FACTORS

NORTH LEG = 0.81
SOUTH LEG = 0.88
EAST LEG = 0.85
WEST LEG = 0.83

ALL LEGS = 0.94

HOUR TOTAL: 2,970

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: BRANFORD

TIME: 04:00PM-05:00PM DATE: 05-22-12

NORTH LEG

Rt	Thru	Lt	
92	533	124	Total
31	150	26	1st
16	126	26	2nd
29	155	30	3rd
16	102	42	4th

	1st	2nd	3rd	4th	Total
Rt	20	52	29	40	141
Thru	70	60	70	48	248
Lt	20	33	34	38	125

Total	1st	2nd	3rd	4th	
215	61	24	51	79	Lt
119	14	44	18	43	Thru
148	40	26	39	43	Rt

	Lt	Thru	Rt
1st	32	237	18
2nd	32	195	42
3rd	30	256	37
4th	9	172	45
Total	103	860	142

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: BRANFORD

TIME: 05:00PM-06:00PM DATE: 05-22-12

NORTH LEG

Rt	Thru	Lt	
81	739	114	Total
8	183	22	1st
21	148	21	2nd
22	188	32	3rd
30	220	39	4th

	1st	2nd	3rd	4th	Total
Rt	16	26	31	26	99
Thru	56	60	44	31	191
Lt	14	27	27	25	93

Total	1st	2nd	3rd	4th	
221	68	82	20	51	Lt
110	34	24	29	23	Thru
157	22	41	42	52	Rt

	Lt	Thru	Rt
1st	12	238	16
2nd	67	235	29
3rd	8	231	34
4th	26	243	26
Total	113	947	105

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : GLEN OAKS BLVD LA

EAST-WEST STREET : BRANFORD 05-22-12

BEGINNING TIME : 04:00PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
28	139	25	3	8	1	0	2	0	0	1	0	207
14	109	26	2	12	0	0	1	0	0	4	0	168
25	139	28	3	8	2	0	2	0	1	6	0	214
11	89	42	5	9	0	0	2	0	0	2	0	160
4	171	21	3	7	1	0	3	0	1	2	0	213
16	135	19	5	7	2	0	1	0	0	5	0	190
20	175	32	2	6	0	0	1	0	0	6	0	242
28	202	38	2	6	1	0	4	0	0	8	0	289
146	1159	231	25	63	7	0	16	0	2	34	0	1683
						SOUTH LEG						
18	220	31	0	10	1	0	5	0	0	2	0	287
40	182	31	1	3	1	1	3	0	0	7	0	269
36	242	29	0	6	0	1	6	0	0	2	1	323
42	165	8	1	5	0	2	1	1	0	1	0	226
15	230	11	1	5	1	0	2	0	0	1	0	266
29	226	65	0	4	2	0	2	0	0	3	0	331
33	222	7	0	3	1	0	2	0	1	4	0	273
26	237	25	0	4	1	0	0	0	0	2	0	295
239	1724	207	3	40	7	4	21	1	1	22	1	2270
						EAST LEG						
20	70	17	0	0	2	0	0	1	0	0	0	110
51	60	33	0	0	0	1	0	0	0	0	0	145
25	69	31	1	0	1	2	1	1	1	0	1	133
38	48	36	1	0	2	1	0	0	0	0	0	126
15	54	9	0	0	2	1	1	2	0	1	1	86
26	60	26	0	0	0	0	0	1	0	0	0	113
31	44	26	0	0	1	0	0	0	0	0	0	102
25	31	25	1	0	0	0	0	0	0	0	0	82
231	436	203	3	0	8	5	2	5	1	1	2	897
						WEST LEG						
37	14	61	0	0	0	2	0	0	1	0	0	115
25	44	23	1	0	0	0	0	0	0	0	1	94
37	18	51	0	0	0	0	0	0	2	0	0	108
43	43	78	0	0	0	0	0	1	0	0	0	165
19	34	67	0	0	0	1	0	0	2	0	1	124
39	24	82	1	0	0	1	0	0	0	0	0	147
42	29	20	0	0	0	0	0	0	0	0	0	91
50	22	51	1	1	0	1	0	0	0	0	0	126
292	228	433	3	1	0	5	0	1	5	0	2	970

Prepared by Newport Traffic Studies

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	130	15	95	10	5	10	95	595	10	15	1360	175
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.90		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	1958	1468	1289	1220		1719	3282	1077	1245	3438	1538
Flt Permitted	0.75	1.00	1.00	0.75	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1352	1958	1468	1014	1220		1719	3282	1077	1245	3438	1538
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	138	16	101	11	5	11	101	633	11	16	1447	186
RTOR Reduction (vph)	0	0	85	0	9	0	0	0	4	0	0	59
Lane Group Flow (vph)	138	16	16	11	7	0	101	633	7	16	1447	127
Heavy Vehicles (%)	5%	10%	10%	40%	50%	35%	5%	10%	50%	45%	5%	5%
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8					2			6
Actuated Green, G (s)	9.3	9.3	9.3	9.3	9.3		4.0	36.4	36.4	0.7	33.1	33.1
Effective Green, g (s)	9.3	9.3	9.3	9.3	9.3		4.0	36.4	36.4	0.7	33.1	33.1
Actuated g/C Ratio	0.16	0.16	0.16	0.16	0.16		0.07	0.62	0.62	0.01	0.57	0.57
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	215	312	234	161	194		118	2046	671	15	1949	872
v/s Ratio Prot		0.01			0.01		c0.06	c0.19		0.01	c0.42	
v/s Ratio Perm	c0.10		0.01	0.01					0.01			0.08
v/c Ratio	0.64	0.05	0.07	0.07	0.03		0.86	0.31	0.01	1.07	0.74	0.15
Uniform Delay, d1	23.0	20.8	20.9	20.9	20.8		26.9	5.1	4.2	28.8	9.5	6.0
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	6.4	0.1	0.1	0.2	0.1		41.9	0.1	0.0	255.5	1.6	0.1
Delay (s)	29.4	20.9	21.0	21.0	20.8		68.8	5.2	4.2	284.3	11.0	6.0
Level of Service	C	C	C	C	C		E	A	A	F	B	A
Approach Delay (s)		25.5			20.9			13.8			13.1	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM Average Control Delay	14.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	58.4	Sum of lost time (s)	16.0
Intersection Capacity Utilization	66.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	150	85	90	70	90	85	90	565	70	70	520	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.93		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	2153	1538	1641	1678		1641	3282	1468	1570	3438	1615
Flt Permitted	0.59	1.00	1.00	0.69	1.00		0.95	1.00	1.00	0.39	1.00	1.00
Satd. Flow (perm)	1063	2153	1538	1192	1678		1641	3282	1468	644	3438	1615
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	183	104	110	85	110	104	110	689	85	85	634	98
RTOR Reduction (vph)	0	0	85	0	78	0	0	0	35	0	0	57
Lane Group Flow (vph)	183	104	25	85	136	0	110	689	50	85	634	41
Heavy Vehicles (%)	5%	0%	5%	10%	5%	5%	10%	10%	10%	15%	5%	0%
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA	Perm	Perm	NA	Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8					2	6		6
Actuated Green, G (s)	9.8	9.8	9.8	9.8	9.8		3.7	25.9	25.9	18.2	18.2	18.2
Effective Green, g (s)	9.8	9.8	9.8	9.8	9.8		3.7	25.9	25.9	18.2	18.2	18.2
Actuated g/C Ratio	0.22	0.22	0.22	0.22	0.22		0.08	0.59	0.59	0.42	0.42	0.42
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	238	483	345	267	376		139	1945	870	268	1432	673
v/s Ratio Prot		0.05			0.08		c0.07	0.21			c0.18	
v/s Ratio Perm	c0.17		0.02	0.07					0.03	0.13		0.03
v/c Ratio	0.77	0.22	0.07	0.32	0.36		0.79	0.35	0.06	0.32	0.44	0.06
Uniform Delay, d1	15.9	13.8	13.4	14.2	14.3		19.6	4.6	3.8	8.6	9.1	7.6
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	13.9	0.2	0.1	0.7	0.6		25.7	0.1	0.0	0.7	0.2	0.0
Delay (s)	29.7	14.0	13.5	14.9	14.9		45.3	4.7	3.8	9.3	9.3	7.7
Level of Service	C	B	B	B	B		D	A	A	A	A	A
Approach Delay (s)		21.1			14.9			9.7			9.1	
Approach LOS		C			B			A			A	

Intersection Summary			
HCM Average Control Delay	12.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	43.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	51.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	220	110	155	90	190	100	115	945	105	115	740	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.95		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	2051	1538	1719	1716		1719	3438	1538	1719	3282	1404
Flt Permitted	0.47	1.00	1.00	0.68	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	854	2051	1538	1234	1716		1719	3438	1538	1719	3282	1404
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	234	117	165	96	202	106	122	1005	112	122	787	85
RTOR Reduction (vph)	0	0	110	0	35	0	0	0	72	0	0	56
Lane Group Flow (vph)	234	117	55	96	273	0	122	1005	40	122	787	29
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	10%	15%
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8					2			6
Actuated Green, G (s)	17.1	17.1	17.1	17.1	17.1		4.4	18.3	18.3	3.7	17.6	17.6
Effective Green, g (s)	17.1	17.1	17.1	17.1	17.1		4.4	18.3	18.3	3.7	17.6	17.6
Actuated g/C Ratio	0.33	0.33	0.33	0.33	0.33		0.09	0.36	0.36	0.07	0.34	0.34
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	286	686	515	413	574		148	1231	551	124	1130	484
v/s Ratio Prot		0.06			0.16		c0.07	c0.29		0.07	0.24	
v/s Ratio Perm	c0.27		0.04	0.08					0.03			0.02
v/c Ratio	0.82	0.17	0.11	0.23	0.48		0.82	0.82	0.07	0.98	0.70	0.06
Uniform Delay, d1	15.6	12.0	11.7	12.3	13.5		23.0	14.9	10.8	23.7	14.4	11.2
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	16.4	0.1	0.1	0.3	0.6		29.6	4.3	0.1	75.3	1.9	0.1
Delay (s)	32.0	12.1	11.8	12.6	14.1		52.5	19.2	10.9	99.0	16.3	11.3
Level of Service	C	B	B	B	B		D	B	B	F	B	B
Approach Delay (s)		21.0			13.7			21.7			26.0	
Approach LOS		C			B			C			C	

Intersection Summary			
HCM Average Control Delay	21.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	51.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	74.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	130	15	95	10	5	10	95	645	10	15	1410	175
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.90		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	1958	1468	1289	1220		1719	3252	1077	1245	3343	1538
Flt Permitted	0.75	1.00	1.00	0.75	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1352	1958	1468	1014	1220		1719	3252	1077	1245	3343	1538
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	138	16	101	11	5	11	101	686	11	16	1500	186
RTOR Reduction (vph)	0	0	85	0	9	0	0	0	4	0	0	57
Lane Group Flow (vph)	138	16	16	11	7	0	101	686	7	16	1500	129
Heavy Vehicles (%)	5%	10%	10%	40%	50%	35%	5%	11%	50%	45%	8%	5%
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8					2			6
Actuated Green, G (s)	9.4	9.4	9.4	9.4	9.4		4.0	37.0	37.0	0.7	33.7	33.7
Effective Green, g (s)	9.4	9.4	9.4	9.4	9.4		4.0	37.0	37.0	0.7	33.7	33.7
Actuated g/C Ratio	0.16	0.16	0.16	0.16	0.16		0.07	0.63	0.63	0.01	0.57	0.57
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	215	311	233	161	194		116	2036	674	15	1906	877
v/s Ratio Prot		0.01			0.01		c0.06	c0.21		0.01	c0.45	
v/s Ratio Perm	c0.10		0.01	0.01					0.01			0.08
v/c Ratio	0.64	0.05	0.07	0.07	0.03		0.87	0.34	0.01	1.07	0.79	0.15
Uniform Delay, d1	23.3	21.1	21.1	21.1	21.0		27.3	5.2	4.2	29.2	9.9	6.0
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	6.4	0.1	0.1	0.2	0.1		46.1	0.1	0.0	255.5	2.2	0.1
Delay (s)	29.7	21.1	21.3	21.3	21.1		73.4	5.3	4.2	284.7	12.1	6.0
Level of Service	C	C	C	C	C		E	A	A	F	B	A
Approach Delay (s)		25.8			21.2			13.9			14.0	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM Average Control Delay	15.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	59.1	Sum of lost time (s)	16.0
Intersection Capacity Utilization	68.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	150	85	90	70	90	85	90	615	70	70	570	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.93		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	2153	1538	1641	1678		1641	3085	1468	1570	3195	1615
Flt Permitted	0.55	1.00	1.00	0.69	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	997	2153	1538	1192	1678		1641	3085	1468	1570	3195	1615
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	183	104	110	85	110	104	110	750	85	85	695	98
RTOR Reduction (vph)	0	0	87	0	71	0	0	0	43	0	0	55
Lane Group Flow (vph)	183	104	23	85	143	0	110	750	42	85	695	43
Heavy Vehicles (%)	5%	0%	5%	10%	5%	5%	10%	17%	10%	15%	13%	0%
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8					2			6
Actuated Green, G (s)	10.5	10.5	10.5	10.5	10.5		5.1	24.2	24.2	2.6	21.7	21.7
Effective Green, g (s)	10.5	10.5	10.5	10.5	10.5		5.1	24.2	24.2	2.6	21.7	21.7
Actuated g/C Ratio	0.21	0.21	0.21	0.21	0.21		0.10	0.49	0.49	0.05	0.44	0.44
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	212	459	328	254	357		170	1514	721	83	1406	711
v/s Ratio Prot		0.05			0.09		0.07	c0.24		c0.05	0.22	
v/s Ratio Perm	c0.18		0.02	0.07					0.03			0.03
v/c Ratio	0.86	0.23	0.07	0.33	0.40		0.65	0.50	0.06	1.02	0.49	0.06
Uniform Delay, d1	18.7	16.0	15.5	16.4	16.7		21.2	8.4	6.6	23.3	9.9	7.9
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	28.4	0.3	0.1	0.8	0.7		8.2	0.3	0.0	105.5	0.3	0.0
Delay (s)	47.1	16.3	15.6	17.2	17.4		29.4	8.7	6.6	128.9	10.1	8.0
Level of Service	D	B	B	B	B		C	A	A	F	B	A
Approach Delay (s)		30.3			17.4			10.9			21.4	
Approach LOS		C			B			B			C	

Intersection Summary			
HCM Average Control Delay	18.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	49.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	52.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
29: Glenoaks Blvd & Branford St

8/29/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	220	110	155	90	190	100	115	995	105	115	790	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.95		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	2051	1538	1719	1716		1719	3282	1538	1719	3252	1404
Flt Permitted	0.46	1.00	1.00	0.68	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	837	2051	1538	1234	1716		1719	3282	1538	1719	3252	1404
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	234	117	165	96	202	106	122	1059	112	122	840	85
RTOR Reduction (vph)	0	0	111	0	34	0	0	0	70	0	0	55
Lane Group Flow (vph)	234	117	54	96	274	0	122	1059	42	122	840	30
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	10%	5%	5%	11%	15%
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8					2			6
Actuated Green, G (s)	17.0	17.0	17.0	17.0	17.0		4.5	19.5	19.5	3.7	18.7	18.7
Effective Green, g (s)	17.0	17.0	17.0	17.0	17.0		4.5	19.5	19.5	3.7	18.7	18.7
Actuated g/C Ratio	0.33	0.33	0.33	0.33	0.33		0.09	0.37	0.37	0.07	0.36	0.36
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	273	668	501	402	559		148	1226	575	122	1165	503
v/s Ratio Prot		0.06			0.16		c0.07	c0.32		0.07	0.26	
v/s Ratio Perm	c0.28		0.03	0.08					0.03			0.02
v/c Ratio	0.86	0.18	0.11	0.24	0.49		0.82	0.86	0.07	1.00	0.72	0.06
Uniform Delay, d1	16.5	12.6	12.3	12.9	14.1		23.5	15.1	10.5	24.2	14.5	11.0
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	22.3	0.1	0.1	0.3	0.7		29.6	6.5	0.1	81.5	2.2	0.1
Delay (s)	38.8	12.7	12.4	13.2	14.8		53.0	21.7	10.6	105.7	16.7	11.0
Level of Service	D	B	B	B	B		D	C	B	F	B	B
Approach Delay (s)		24.4			14.4			23.7			26.6	
Approach LOS		C			B			C			C	

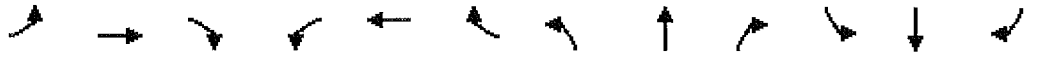
Intersection Summary			
HCM Average Control Delay	23.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	52.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	75.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	140	15	105	10	5	10	105	705	10	15	1535	190
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.90		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	1958	1468	1289	1220		1719	3252	1077	1245	3343	1538
Flt Permitted	0.75	1.00	1.00	0.75	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1352	1958	1468	1014	1220		1719	3252	1077	1245	3343	1538
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	149	16	112	11	5	11	112	750	11	16	1633	202
RTOR Reduction (vph)	0	0	93	0	9	0	0	0	4	0	0	52
Lane Group Flow (vph)	149	16	19	11	7	0	112	750	7	16	1633	150
Heavy Vehicles (%)	5%	10%	10%	40%	50%	35%	5%	11%	50%	45%	8%	5%
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8					2			6
Actuated Green, G (s)	12.2	12.2	12.2	12.2	12.2		5.0	46.7	46.7	0.8	42.5	42.5
Effective Green, g (s)	12.2	12.2	12.2	12.2	12.2		5.0	46.7	46.7	0.8	42.5	42.5
Actuated g/C Ratio	0.17	0.17	0.17	0.17	0.17		0.07	0.65	0.65	0.01	0.59	0.59
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	230	333	250	173	208		120	2118	701	14	1982	912
v/s Ratio Prot		0.01			0.01		c0.07	0.23		0.01	c0.49	
v/s Ratio Perm	c0.11		0.01	0.01					0.01			0.10
v/c Ratio	0.65	0.05	0.08	0.06	0.03		0.93	0.35	0.01	1.14	0.82	0.16
Uniform Delay, d1	27.7	24.9	25.0	25.0	24.8		33.2	5.7	4.4	35.5	11.6	6.6
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	6.2	0.1	0.1	0.2	0.1		61.3	0.1	0.0	291.3	2.9	0.1
Delay (s)	33.9	25.0	25.1	25.1	24.9		94.5	5.8	4.4	326.7	14.5	6.7
Level of Service	C	C	C	C	C		F	A	A	F	B	A
Approach Delay (s)		29.8			25.0			17.1			16.4	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM Average Control Delay	17.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	71.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	165	95	100	75	100	95	100	670	75	75	620	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.93		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	2153	1538	1641	1677		1641	3085	1468	1570	3195	1615
Flt Permitted	0.55	1.00	1.00	0.68	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	989	2153	1538	1179	1677		1641	3085	1468	1570	3195	1615
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	201	116	122	91	122	116	122	817	91	91	756	104
RTOR Reduction (vph)	0	0	88	0	65	0	0	0	54	0	0	65
Lane Group Flow (vph)	201	116	34	91	173	0	122	817	37	91	756	39
Heavy Vehicles (%)	5%	0%	5%	10%	5%	5%	10%	17%	10%	15%	13%	0%
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8					2			6
Actuated Green, G (s)	14.0	14.0	14.0	14.0	14.0		5.2	20.2	20.2	3.7	18.7	18.7
Effective Green, g (s)	14.0	14.0	14.0	14.0	14.0		5.2	20.2	20.2	3.7	18.7	18.7
Actuated g/C Ratio	0.28	0.28	0.28	0.28	0.28		0.10	0.40	0.40	0.07	0.37	0.37
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	277	604	432	331	471		171	1249	594	116	1197	605
v/s Ratio Prot		0.05			0.10		c0.07	c0.26		0.06	0.24	
v/s Ratio Perm	c0.20		0.02	0.08					0.03			0.02
v/c Ratio	0.73	0.19	0.08	0.27	0.37		0.71	0.65	0.06	0.78	0.63	0.06
Uniform Delay, d1	16.2	13.6	13.2	14.0	14.4		21.6	12.0	9.1	22.7	12.8	10.0
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	9.1	0.2	0.1	0.5	0.5		13.2	1.2	0.0	28.5	1.1	0.0
Delay (s)	25.3	13.8	13.3	14.4	14.9		34.8	13.3	9.1	51.2	13.9	10.0
Level of Service	C	B	B	B	B		C	B	A	D	B	B
Approach Delay (s)		18.9			14.8			15.4			17.0	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM Average Control Delay	16.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	49.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	56.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	240	120	170	100	205	110	125	1085	115	125	860	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.95		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	2051	1538	1719	1715		1719	3282	1538	1719	3252	1404
Flt Permitted	0.42	1.00	1.00	0.67	1.00		0.95	1.00	1.00	0.23	1.00	1.00
Satd. Flow (perm)	766	2051	1538	1221	1715		1719	3282	1538	419	3252	1404
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	255	128	181	106	218	117	133	1154	122	133	915	90
RTOR Reduction (vph)	0	0	119	0	32	0	0	0	58	0	0	57
Lane Group Flow (vph)	255	128	62	106	303	0	133	1154	64	133	915	33
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	10%	5%	5%	11%	15%
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA	Perm	Perm	NA	Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8					2	6		6
Actuated Green, G (s)	20.0	20.0	20.0	20.0	20.0		5.0	30.7	30.7	21.7	21.7	21.7
Effective Green, g (s)	20.0	20.0	20.0	20.0	20.0		5.0	30.7	30.7	21.7	21.7	21.7
Actuated g/C Ratio	0.34	0.34	0.34	0.34	0.34		0.09	0.52	0.52	0.37	0.37	0.37
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	261	699	524	416	584		146	1716	804	155	1202	519
v/s Ratio Prot		0.06			0.18		c0.08	0.35			0.28	
v/s Ratio Perm	c0.33		0.04	0.09					0.04	c0.32		0.02
v/c Ratio	0.98	0.18	0.12	0.25	0.52		0.91	0.67	0.08	0.86	0.76	0.06
Uniform Delay, d1	19.1	13.6	13.3	14.0	15.5		26.6	10.3	7.0	17.1	16.2	11.9
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	48.8	0.1	0.1	0.3	0.8		48.7	1.1	0.0	34.6	2.9	0.1
Delay (s)	67.9	13.7	13.4	14.3	16.3		75.4	11.4	7.0	51.7	19.1	12.0
Level of Service	E	B	B	B	B		E	B	A	D	B	B
Approach Delay (s)		38.1			15.8			17.0			22.4	
Approach LOS		D			B			B			C	

Intersection Summary			
HCM Average Control Delay	21.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	58.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	81.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

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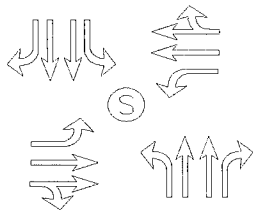
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	1 OF 21

E/W STREET : SHELDON STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 30
ROUTE 5A

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						

SHELDON STREET

EB LEFT	115	5%		115	10	125
EB THRU	405	5%		405	35	440
EB RIGHT	45	5%		45	5	50
WB LEFT	90	5%		90	10	100
WB THRU	595	5%		595	55	650
WB RIGHT	40	5%	**50**	90	10	100

GLEN OAKS BLVD

NB LEFT	80	10%		80	5	85
NB THRU	480	5%		480	45	525
NB RIGHT	45	10%		45	5	50
SB LEFT	85	30%	**50**	135	10	145
SB THRU	1235	5%		1235	110	1345
SB RIGHT	160	10%		160	15	175
TOTALS	**3375**		**100**	**3475**	**315**	**3790**

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Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax
Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax
Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Sep-13	VV.110264.0000	2 OF 21

E/W STREET : SHELDON STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 30
ROUTE 5B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
SHELDON STREET						
EB LEFT	115	5%		115	10	125
EB THRU	405	5%		405	35	440
EB RIGHT	45	5%		45	5	50
WB LEFT	90	5%	**50**	140	15	155
WB THRU	595	5%		595	55	650
WB RIGHT	40	5%		40	5	45
GLEN OAKS BLVD						
NB LEFT	80	10%		80	5	85
NB THRU	480	5%		480	45	525
NB RIGHT	45	10%	**50**	95	10	105
SB LEFT	85	30%		85	5	90
SB THRU	1235	5%		1235	110	1345
SB RIGHT	160	10%		160	15	175
TOTALS	**3375**		**100**	**3475**	**315**	**3790**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Sep-13	VV.110264.0000	3 OF 21

E/W STREET : SHELDON STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 30
ROUTE 6A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
SHELDON STREET						
EB LEFT	115	5%		115	10	125
EB THRU	405	5%		405	35	440
EB RIGHT	45	5%		45	5	50
WB LEFT	90	5%		90	10	100
WB THRU	595	5%		595	55	650
WB RIGHT	40	5%	**50**	90	10	100
GLEN OAKS BLVD						
NB LEFT	80	10%		80	5	85
NB THRU	480	5%		480	45	525
NB RIGHT	45	10%		45	5	50
SB LEFT	85	30%	**50**	135	10	145
SB THRU	1235	5%		1235	110	1345
SB RIGHT	160	10%		160	15	175
TOTALS	**3375**		**100**	**3475**	**315**	**3790**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Sep-13	VV.110264.0000	4 OF 21

E/W STREET : SHELDON STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 30
ROUTE 6B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
SHELDON STREET						
EB LEFT	115	5%		115	10	125
EB THRU	405	5%		405	35	440
EB RIGHT	45	5%		45	5	50
WB LEFT	90	5%		90	10	100
WB THRU	595	5%		595	55	650
WB RIGHT	40	5%		40	5	45
GLEN OAKS BLVD						
NB LEFT	80	10%		80	5	85
NB THRU	480	5%		480	45	525
NB RIGHT	45	10%	**50**	95	10	105
SB LEFT	85	30%		85	5	90
SB THRU	1235	5%		1235	110	1345
SB RIGHT	160	10%		160	15	175
TOTALS	**3375**		**50**	**3425**	**310**	**3735**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Sep-13	VV.110264.0000	5 OF 21

E/W STREET : SHELDON STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 30
ROUTE 7A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
SHELDON STREET						
EB LEFT	115	5%		115	10	125
EB THRU	405	5%		405	35	440
EB RIGHT	45	5%		45	5	50
WB LEFT	90	5%		90	10	100
WB THRU	595	5%		595	55	650
WB RIGHT	40	5%		40	5	45
GLEN OAKS BLVD						
NB LEFT	80	10%		80	5	85
NB THRU	480	5%	**50**	530	50	580
NB RIGHT	45	10%		45	5	50
SB LEFT	85	30%		85	5	90
SB THRU	1235	5%	**50**	1285	115	1400
SB RIGHT	160	10%		160	15	175
TOTALS	**3375**		**100**	**3475**	**315**	**3790**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Sep-13	VV.110264.0000	6 OF 21

E/W STREET : SHELDON STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 30
ROUTE 6C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
SHELDON STREET						
EB LEFT	115	5%		115	10	125
EB THRU	405	5%		405	35	440
EB RIGHT	45	5%		45	5	50
WB LEFT	90	5%		90	10	100
WB THRU	595	5%		595	55	650
WB RIGHT	40	5%		40	5	45
GLEN OAKS BLVD						
NB LEFT	80	10%		80	5	85
NB THRU	480	5%		480	45	525
NB RIGHT	45	10%	**50**	95	10	105
SB LEFT	85	30%		85	5	90
SB THRU	1235	5%		1235	110	1345
SB RIGHT	160	10%		160	15	175
TOTALS	**3375**		**50**	**3425**	**310**	**3735**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Sep-13	VV.110264.0000	7 OF 21

E/W STREET : SHELDON STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
30
ROUTE
7C, 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
SHELDON STREET						
EB LEFT	115	5%		115	10	125
EB THRU	405	5%		405	35	440
EB RIGHT	45	5%		45	5	50
WB LEFT	90	5%	**50**	140	15	155
WB THRU	595	5%		595	55	650
WB RIGHT	40	5%		40	5	45
GLEN OAKS BLVD						
NB LEFT	80	10%		80	5	85
NB THRU	480	5%		480	45	525
NB RIGHT	45	10%	**50**	95	10	105
SB LEFT	85	30%		85	5	90
SB THRU	1235	5%		1235	110	1345
SB RIGHT	160	10%		160	15	175
TOTALS	**3375**		**100**	**3475**	**315**	**3790**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	8 OF 21

E/W STREET : SHELDON STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 30
ROUTE 5A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
SHELDON STREET						
EB LEFT	130	5%		130	10	140
EB THRU	240	25%		240	20	260
EB RIGHT	80	25%		80	5	85
WB LEFT	45	10%		45	5	50
WB THRU	285	15%		285	25	310
WB RIGHT	50	10%	**50**	100	10	110
GLEN OAKS BLVD						
NB LEFT	80	20%		80	5	85
NB THRU	535	5%		535	50	585
NB RIGHT	50	25%		50	5	55
SB LEFT	50	5%	**50**	100	10	110
SB THRU	490	5%		490	45	535
SB RIGHT	95	15%		95	10	105
TOTALS	**2130**		**100**	**2230**	**200**	**2430**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Sep-13	VV.110264.0000	9 OF 21

E/W STREET : SHELDON STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 30
ROUTE 5B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
SHELDON STREET						
EB LEFT	130	5%		130	10	140
EB THRU	240	25%		240	20	260
EB RIGHT	80	25%		80	5	85
WB LEFT	45	10%	**50**	95	10	105
WB THRU	285	15%		285	25	310
WB RIGHT	50	10%		50	5	55
GLEN OAKS BLVD						
NB LEFT	80	20%		80	5	85
NB THRU	535	5%		535	50	585
NB RIGHT	50	25%	**50**	100	10	110
SB LEFT	50	5%		50	5	55
SB THRU	490	5%		490	45	535
SB RIGHT	95	15%		95	10	105
TOTALS	**2130**		**100**	**2230**	**200**	**2430**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Sep-13	VV.110264.0000	10 OF 21

E/W STREET : SHELDON STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 30
ROUTE 6A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
SHELDON STREET						
EB LEFT	130	5%		130	10	140
EB THRU	240	25%		240	20	260
EB RIGHT	80	25%		80	5	85
WB LEFT	45	10%		45	5	50
WB THRU	285	15%		285	25	310
WB RIGHT	50	10%	**50**	100	10	110
GLEN OAKS BLVD						
NB LEFT	80	20%		80	5	85
NB THRU	535	5%		535	50	585
NB RIGHT	50	25%		50	5	55
SB LEFT	50	5%	**50**	100	10	110
SB THRU	490	5%		490	45	535
SB RIGHT	95	15%		95	10	105
TOTALS	**2130**		**100**	**2230**	**200**	**2430**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Sep-13	VV.110264.0000	11 OF 21

E/W STREET : SHELDON STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 30
ROUTE 6B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
SHELDON STREET						
EB LEFT	130	5%		130	10	140
EB THRU	240	25%		240	20	260
EB RIGHT	80	25%		80	5	85
WB LEFT	45	10%		45	5	50
WB THRU	285	15%		285	25	310
WB RIGHT	50	10%		50	5	55
GLEN OAKS BLVD						
NB LEFT	80	20%		80	5	85
NB THRU	535	5%		535	50	585
NB RIGHT	50	25%	**50**	100	10	110
SB LEFT	50	5%		50	5	55
SB THRU	490	5%		490	45	535
SB RIGHT	95	15%		95	10	105
TOTALS	**2130**		**50**	**2180**	**195**	**2375**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Sep-13	VV.110264.0000	12 OF 21

E/W STREET : SHELDON STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 30
ROUTE 7A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
SHELDON STREET						
EB LEFT	130	5%		130	10	140
EB THRU	240	25%		240	20	260
EB RIGHT	80	25%		80	5	85
WB LEFT	45	10%		45	5	50
WB THRU	285	15%		285	25	310
WB RIGHT	50	10%		50	5	55
GLEN OAKS BLVD						
NB LEFT	80	20%		80	5	85
NB THRU	535	5%	**50**	585	55	640
NB RIGHT	50	25%		50	5	55
SB LEFT	50	5%		50	5	55
SB THRU	490	5%	**50**	540	50	590
SB RIGHT	95	15%		95	10	105
TOTALS	**2130**		**100**	**2230**	**200**	**2430**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Sep-13	VV.110264.0000	13 OF 21

E/W STREET : SHELDON STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 30
ROUTE 6C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
SHELDON STREET						
EB LEFT	130	5%		130	10	140
EB THRU	240	25%		240	20	260
EB RIGHT	80	25%		80	5	85
WB LEFT	45	10%		45	5	50
WB THRU	285	15%		285	25	310
WB RIGHT	50	10%		50	5	55
GLEN OAKS BLVD						
NB LEFT	80	20%		80	5	85
NB THRU	535	5%		535	50	585
NB RIGHT	50	25%	**50**	100	10	110
SB LEFT	50	5%		50	5	55
SB THRU	490	5%		490	45	535
SB RIGHT	95	15%		95	10	105
TOTALS	**2130**		**50**	**2180**	**195**	**2375**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Sep-13	VV.110264.0000	14 OF 21

E/W STREET : SHELDON STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 30
ROUTE 7C, 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
SHELDON STREET						
EB LEFT	130	5%		130	10	140
EB THRU	240	25%		240	20	260
EB RIGHT	80	25%		80	5	85
WB LEFT	45	10%	**50**	95	10	105
WB THRU	285	15%		285	25	310
WB RIGHT	50	10%		50	5	55
GLEN OAKS BLVD						
NB LEFT	80	20%		80	5	85
NB THRU	535	5%		535	50	585
NB RIGHT	50	25%	**50**	100	10	110
SB LEFT	50	5%		50	5	55
SB THRU	490	5%		490	45	535
SB RIGHT	95	15%		95	10	105
TOTALS	**2130**		**100**	**2230**	**200**	**2430**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	15 OF 21

E/W STREET : SHELDON STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 30
ROUTE 5A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
SHELDON STREET						
EB LEFT	300	5%		300	25	325
EB THRU	325	5%		325	30	355
EB RIGHT	65	5%		65	5	70
WB LEFT	40	20%		40	5	45
WB THRU	325	5%		325	30	355
WB RIGHT	60	5%	**50**	110	10	120
GLEN OAKS BLVD						
NB LEFT	120	10%		120	10	130
NB THRU	820	5%		820	75	895
NB RIGHT	70	10%		70	5	75
SB LEFT	90	5%	**50**	140	15	155
SB THRU	730	5%		730	65	795
SB RIGHT	145	5%		145	15	160
TOTALS	**3090**		**100**	**3190**	**290**	**3480**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Sep-13	VV.110264.0000	16 OF 21

E/W STREET : SHELDON STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 30
ROUTE 5B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
SHELDON STREET						
EB LEFT	300	5%		300	25	325
EB THRU	325	5%		325	30	355
EB RIGHT	65	5%		65	5	70
WB LEFT	40	20%	**50**	90	10	100
WB THRU	325	5%		325	30	355
WB RIGHT	60	5%		60	5	65
GLEN OAKS BLVD						
NB LEFT	120	10%		120	10	130
NB THRU	820	5%		820	75	895
NB RIGHT	70	10%	**50**	120	10	130
SB LEFT	90	5%		90	10	100
SB THRU	730	5%		730	65	795
SB RIGHT	145	5%		145	15	160
TOTALS	**3090**		**100**	**3190**	**290**	**3480**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Sep-13	VV.110264.0000	17 OF 21

E/W STREET : SHELDON STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
30
ROUTE
6A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
SHELDON STREET						
EB LEFT	300	5%		300	25	325
EB THRU	325	5%		325	30	355
EB RIGHT	65	5%		65	5	70
WB LEFT	40	20%		40	5	45
WB THRU	325	5%		325	30	355
WB RIGHT	60	5%	**50**	110	10	120
GLEN OAKS BLVD						
NB LEFT	120	10%		120	10	130
NB THRU	820	5%		820	75	895
NB RIGHT	70	10%		70	5	75
SB LEFT	90	5%	**50**	140	15	155
SB THRU	730	5%		730	65	795
SB RIGHT	145	5%		145	15	160
TOTALS	**3090**		**100**	**3190**	**290**	**3480**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Sep-13	VV.110264.0000	18 OF 21

E/W STREET : SHELDON STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 30
ROUTE 6B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
SHELDON STREET						
EB LEFT	300	5%		300	25	325
EB THRU	325	5%		325	30	355
EB RIGHT	65	5%		65	5	70
WB LEFT	40	20%		40	5	45
WB THRU	325	5%		325	30	355
WB RIGHT	60	5%		60	5	65
GLEN OAKS BLVD						
NB LEFT	120	10%		120	10	130
NB THRU	820	5%		820	75	895
NB RIGHT	70	10%	**50**	120	10	130
SB LEFT	90	5%		90	10	100
SB THRU	730	5%		730	65	795
SB RIGHT	145	5%		145	15	160
TOTALS	**3090**		**50**	**3140**	**285**	**3425**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Sep-13	VV.110264.0000	19 OF 21

E/W STREET : SHELDON STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 30
ROUTE 7A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
SHELDON STREET						
EB LEFT	300	5%		300	25	325
EB THRU	325	5%		325	30	355
EB RIGHT	65	5%		65	5	70
WB LEFT	40	20%		40	5	45
WB THRU	325	5%		325	30	355
WB RIGHT	60	5%		60	5	65
GLEN OAKS BLVD						
NB LEFT	120	10%		120	10	130
NB THRU	820	5%	**50**	870	80	950
NB RIGHT	70	10%		70	5	75
SB LEFT	90	5%		90	10	100
SB THRU	730	5%	**50**	780	70	850
SB RIGHT	145	5%		145	15	160
TOTALS	**3090**		**100**	**3190**	**290**	**3480**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Sep-13	VV.110264.0000	20 OF 21

E/W STREET : SHELDON STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 30
ROUTE 6C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
SHELDON STREET						
EB LEFT	300	5%		300	25	325
EB THRU	325	5%		325	30	355
EB RIGHT	65	5%		65	5	70
WB LEFT	40	20%		40	5	45
WB THRU	325	5%		325	30	355
WB RIGHT	60	5%		60	5	65
GLEN OAKS BLVD						
NB LEFT	120	10%		120	10	130
NB THRU	820	5%		820	75	895
NB RIGHT	70	10%	**50**	120	10	130
SB LEFT	90	5%		90	10	100
SB THRU	730	5%		730	65	795
SB RIGHT	145	5%		145	15	160
TOTALS	**3090**		**50**	**3140**	**285**	**3425**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Sep-13	VV.110264.0000	21 OF 21

E/W STREET : SHELDON STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 30
ROUTE 7C, 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
SHELDON STREET						
EB LEFT	300	5%		300	25	325
EB THRU	325	5%		325	30	355
EB RIGHT	65	5%		65	5	70
WB LEFT	40	20%	**50**	90	10	100
WB THRU	325	5%		325	30	355
WB RIGHT	60	5%		60	5	65
GLEN OAKS BLVD						
NB LEFT	120	10%		120	10	130
NB THRU	820	5%		820	75	895
NB RIGHT	70	10%	**50**	120	10	130
SB LEFT	90	5%		90	10	100
SB THRU	730	5%		730	65	795
SB RIGHT	145	5%		145	15	160
TOTALS	**3090**		**100**	**3190**	**290**	**3480**

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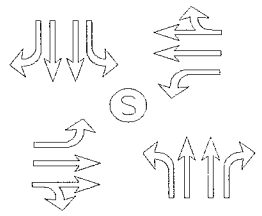
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	1 OF 21

E/W STREET : SHELDON STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
30
ROUTE
5A

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
SHELDON STREET								
EB LEFT	109	7	21	130	**0**	130	10	140
EB THRU	393	12	36	430	**0**	430	40	470
EB RIGHT	42	3	9	50	**0**	50	5	55
WB LEFT	85	6	18	105	**0**	105	10	115
WB THRU	559	34	102	660	**0**	660	60	720
WB RIGHT	39	3	9	50	**150**	200	20	220
GLEN OAKS BLVD								
NB LEFT	72	9	27	100	**0**	100	10	110
NB THRU	457	21	63	520	**0**	520	45	565
NB RIGHT	39	4	12	50	**0**	50	5	55
SB LEFT	62	24	72	135	**150**	285	25	310
SB THRU	1172	61	183	1355	**0**	1355	120	1475
SB RIGHT	144	18	54	200	**0**	200	20	220
TOTALS	**3173**				**300**	**4085**	**370**	**4455**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	2 OF 21

E/W STREET : SHELDON STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
30
ROUTE
5B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
SHELDON STREET								
EB LEFT	109	7	21	130	**0**	130	10	140
EB THRU	393	12	36	430	**0**	430	40	470
EB RIGHT	42	3	9	50	**0**	50	5	55
WB LEFT	85	6	18	105	**150**	255	25	280
WB THRU	559	34	102	660	**0**	660	60	720
WB RIGHT	39	3	9	50	**0**	50	5	55
GLEN OAKS BLVD								
NB LEFT	72	9	27	100	**0**	100	10	110
NB THRU	457	21	63	520	**0**	520	45	565
NB RIGHT	39	4	12	50	**150**	200	20	220
SB LEFT	62	24	72	135	**0**	135	10	145
SB THRU	1172	61	183	1355	**0**	1355	120	1475
SB RIGHT	144	18	54	200	**0**	200	20	220
TOTALS	**3173**				**300**	**4085**	**370**	**4455**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	3 OF 21

E/W STREET : SHELDON STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
30
ROUTE
6A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
SHELDON STREET								
EB LEFT	109	7	21	130	**0**	130	10	140
EB THRU	393	12	36	430	**0**	430	40	470
EB RIGHT	42	3	9	50	**0**	50	5	55
WB LEFT	85	6	18	105	**0**	105	10	115
WB THRU	559	34	102	660	**0**	660	60	720
WB RIGHT	39	3	9	50	**150**	200	20	220
GLEN OAKS BLVD								
NB LEFT	72	9	27	100	**0**	100	10	110
NB THRU	457	21	63	520	**0**	520	45	565
NB RIGHT	39	4	12	50	**0**	50	5	55
SB LEFT	62	24	72	135	**150**	285	25	310
SB THRU	1172	61	183	1355	**0**	1355	120	1475
SB RIGHT	144	18	54	200	**0**	200	20	220
TOTALS	**3173**				**300**	**4085**	**370**	**4455**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	4 OF 21

E/W STREET : SHELDON STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 30
ROUTE 6B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
SHELDON STREET								
EB LEFT	109	7	21	130	0	130	10	140
EB THRU	393	12	36	430	0	430	40	470
EB RIGHT	42	3	9	50	0	50	5	55
WB LEFT	85	6	18	105	0	105	10	115
WB THRU	559	34	102	660	0	660	60	720
WB RIGHT	39	3	9	50	0	50	5	55
GLEN OAKS BLVD								
NB LEFT	72	9	27	100	0	100	10	110
NB THRU	457	21	63	520	0	520	45	565
NB RIGHT	39	4	12	50	150	200	20	220
SB LEFT	62	24	72	135	0	135	10	145
SB THRU	1172	61	183	1355	0	1355	120	1475
SB RIGHT	144	18	54	200	0	200	20	220
TOTALS	**3173**				**150**	**3935**	**355**	**4290**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	5 OF 21

E/W STREET : SHELDON STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
30
ROUTE
7A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
SHELDON STREET								
EB LEFT	109	7	21	130	**0**	130	10	140
EB THRU	393	12	36	430	**0**	430	40	470
EB RIGHT	42	3	9	50	**0**	50	5	55
WB LEFT	85	6	18	105	**0**	105	10	115
WB THRU	559	34	102	660	**0**	660	60	720
WB RIGHT	39	3	9	50	**0**	50	5	55
GLEN OAKS BLVD								
NB LEFT	72	9	27	100	**0**	100	10	110
NB THRU	457	21	63	520	**150**	670	60	730
NB RIGHT	39	4	12	50	**0**	50	5	55
SB LEFT	62	24	72	135	**0**	135	10	145
SB THRU	1172	61	183	1355	**150**	1505	135	1640
SB RIGHT	144	18	54	200	**0**	200	20	220
TOTALS	**3173**				**300**	**4085**	**370**	**4455**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	6 OF 21

E/W STREET : SHELDON STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
30
ROUTE
6C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
SHELDON STREET								
EB LEFT	109	7	21	130	0	130	10	140
EB THRU	393	12	36	430	0	430	40	470
EB RIGHT	42	3	9	50	0	50	5	55
WB LEFT	85	6	18	105	0	105	10	115
WB THRU	559	34	102	660	0	660	60	720
WB RIGHT	39	3	9	50	0	50	5	55
GLEN OAKS BLVD								
NB LEFT	72	9	27	100	0	100	10	110
NB THRU	457	21	63	520	0	520	45	565
NB RIGHT	39	4	12	50	150	200	20	220
SB LEFT	62	24	72	135	0	135	10	145
SB THRU	1172	61	183	1355	0	1355	120	1475
SB RIGHT	144	18	54	200	0	200	20	220
TOTALS	**3173**				**150**	**3935**	**355**	**4290**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	7 OF 21

E/W STREET : SHELDON STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
30
ROUTE
7C, 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
SHELDON STREET								
EB LEFT	109	7	21	130	**0**	130	10	140
EB THRU	393	12	36	430	**0**	430	40	470
EB RIGHT	42	3	9	50	**0**	50	5	55
WB LEFT	85	6	18	105	**150**	255	25	280
WB THRU	559	34	102	660	**0**	660	60	720
WB RIGHT	39	3	9	50	**0**	50	5	55
GLEN OAKS BLVD								
NB LEFT	72	9	27	100	**0**	100	10	110
NB THRU	457	21	63	520	**0**	520	45	565
NB RIGHT	39	4	12	50	**150**	200	20	220
SB LEFT	62	24	72	135	**0**	135	10	145
SB THRU	1172	61	183	1355	**0**	1355	120	1475
SB RIGHT	144	18	54	200	**0**	200	20	220
TOTALS	**3173**				**300**	**4085**	**370**	**4455**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	8 OF 21

E/W STREET : SHELDON STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 30
ROUTE 5A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
SHELDON STREET								
EB LEFT	121	9	27	150	**0**	150	15	165
EB THRU	177	65	195	370	**0**	370	35	405
EB RIGHT	58	21	63	120	**0**	120	10	130
WB LEFT	39	4	12	50	**0**	50	5	55
WB THRU	245	41	123	370	**0**	370	35	405
WB RIGHT	44	5	15	60	**150**	210	20	230
GLEN OAKS BLVD								
NB LEFT	62	16	48	110	**0**	110	10	120
NB THRU	498	36	108	605	**0**	605	55	660
NB RIGHT	36	12	36	70	**0**	70	5	75
SB LEFT	49	3	9	60	**150**	210	20	230
SB THRU	458	33	99	555	**0**	555	50	605
SB RIGHT	78	16	48	125	**0**	125	10	135
TOTALS	**1865**				**300**	**2945**	**270**	**3215**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	9 OF 21

E/W STREET : SHELDON STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 30
ROUTE 5B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
SHELDON STREET								
EB LEFT	121	9	27	150	**0**	150	15	165
EB THRU	177	65	195	370	**0**	370	35	405
EB RIGHT	58	21	63	120	**0**	120	10	130
WB LEFT	39	4	12	50	**150**	200	20	220
WB THRU	245	41	123	370	**0**	370	35	405
WB RIGHT	44	5	15	60	**0**	60	5	65
GLEN OAKS BLVD								
NB LEFT	62	16	48	110	**0**	110	10	120
NB THRU	498	36	108	605	**0**	605	55	660
NB RIGHT	36	12	36	70	**150**	220	20	240
SB LEFT	49	3	9	60	**0**	60	5	65
SB THRU	458	33	99	555	**0**	555	50	605
SB RIGHT	78	16	48	125	**0**	125	10	135
TOTALS	**1865**				**300**	**2945**	**270**	**3215**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	10 OF 21

E/W STREET : SHELDON STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 30
ROUTE 6A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
SHELDON STREET								
EB LEFT	121	9	27	150	**0**	150	15	165
EB THRU	177	65	195	370	**0**	370	35	405
EB RIGHT	58	21	63	120	**0**	120	10	130
WB LEFT	39	4	12	50	**0**	50	5	55
WB THRU	245	41	123	370	**0**	370	35	405
WB RIGHT	44	5	15	60	**150**	210	20	230
GLEN OAKS BLVD								
NB LEFT	62	16	48	110	**0**	110	10	120
NB THRU	498	36	108	605	**0**	605	55	660
NB RIGHT	36	12	36	70	**0**	70	5	75
SB LEFT	49	3	9	60	**150**	210	20	230
SB THRU	458	33	99	555	**0**	555	50	605
SB RIGHT	78	16	48	125	**0**	125	10	135
TOTALS	**1865**				**300**	**2945**	**270**	**3215**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	11 OF 21

E/W STREET : SHELDON STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 30
ROUTE 6B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
SHELDON STREET								
EB LEFT	121	9	27	150	0	150	15	165
EB THRU	177	65	195	370	0	370	35	405
EB RIGHT	58	21	63	120	0	120	10	130
WB LEFT	39	4	12	50	0	50	5	55
WB THRU	245	41	123	370	0	370	35	405
WB RIGHT	44	5	15	60	0	60	5	65
GLEN OAKS BLVD								
NB LEFT	62	16	48	110	0	110	10	120
NB THRU	498	36	108	605	0	605	55	660
NB RIGHT	36	12	36	70	150	220	20	240
SB LEFT	49	3	9	60	0	60	5	65
SB THRU	458	33	99	555	0	555	50	605
SB RIGHT	78	16	48	125	0	125	10	135
TOTALS	**1865**				**150**	**2795**	**255**	**3050**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	12 OF 21

E/W STREET : SHELDON STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 30
ROUTE 7A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
SHELDON STREET								
EB LEFT	121	9	27	150	0	150	15	165
EB THRU	177	65	195	370	0	370	35	405
EB RIGHT	58	21	63	120	0	120	10	130
WB LEFT	39	4	12	50	0	50	5	55
WB THRU	245	41	123	370	0	370	35	405
WB RIGHT	44	5	15	60	0	60	5	65
GLEN OAKS BLVD								
NB LEFT	62	16	48	110	0	110	10	120
NB THRU	498	36	108	605	150	755	70	825
NB RIGHT	36	12	36	70	0	70	5	75
SB LEFT	49	3	9	60	0	60	5	65
SB THRU	458	33	99	555	150	705	65	770
SB RIGHT	78	16	48	125	0	125	10	135
TOTALS	**1865**				**300**	**2945**	**270**	**3215**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	13 OF 21

E/W STREET : SHELDON STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
30
ROUTE
6C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
SHELDON STREET								
EB LEFT	121	9	27	150	0	150	15	165
EB THRU	177	65	195	370	0	370	35	405
EB RIGHT	58	21	63	120	0	120	10	130
WB LEFT	39	4	12	50	0	50	5	55
WB THRU	245	41	123	370	0	370	35	405
WB RIGHT	44	5	15	60	0	60	5	65
GLEN OAKS BLVD								
NB LEFT	62	16	48	110	0	110	10	120
NB THRU	498	36	108	605	0	605	55	660
NB RIGHT	36	12	36	70	150	220	20	240
SB LEFT	49	3	9	60	0	60	5	65
SB THRU	458	33	99	555	0	555	50	605
SB RIGHT	78	16	48	125	0	125	10	135
TOTALS	**1865**				**150**	**2795**	**255**	**3050**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	14 OF 21

E/W STREET : SHELDON STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
30
ROUTE
7C, 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
SHELDON STREET								
EB LEFT	121	9	27	150	**0**	150	15	165
EB THRU	177	65	195	370	**0**	370	35	405
EB RIGHT	58	21	63	120	**0**	120	10	130
WB LEFT	39	4	12	50	**150**	200	20	220
WB THRU	245	41	123	370	**0**	370	35	405
WB RIGHT	44	5	15	60	**0**	60	5	65
GLEN OAKS BLVD								
NB LEFT	62	16	48	110	**0**	110	10	120
NB THRU	498	36	108	605	**0**	605	55	660
NB RIGHT	36	12	36	70	**150**	220	20	240
SB LEFT	49	3	9	60	**0**	60	5	65
SB THRU	458	33	99	555	**0**	555	50	605
SB RIGHT	78	16	48	125	**0**	125	10	135
TOTALS	**1865**				**300**	**2945**	**270**	**3215**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	15 OF 21

E/W STREET : SHELDON STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
30
ROUTE
5A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
SHELDON STREET								
EB LEFT	286	15	45	330	**0**	330	30	360
EB THRU	323	4	12	335	**0**	335	30	365
EB RIGHT	63	4	12	75	**0**	75	5	80
WB LEFT	31	7	21	50	**0**	50	5	55
WB THRU	315	12	36	350	**0**	350	30	380
WB RIGHT	57	2	6	65	**150**	215	20	235
GLEN OAKS BLVD								
NB LEFT	109	11	33	140	**0**	140	15	155
NB THRU	778	43	129	905	**0**	905	80	985
NB RIGHT	61	7	21	80	**0**	80	5	85
SB LEFT	88	4	12	100	**150**	250	25	275
SB THRU	705	26	78	785	**0**	785	70	855
SB RIGHT	141	5	15	155	**0**	155	15	170
TOTALS	**2957**				**300**	**3670**	**330**	**4000**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	16 OF 21

E/W STREET : SHELDON STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 30
ROUTE 5B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
SHELDON STREET								
EB LEFT	286	15	45	330	**0**	330	30	360
EB THRU	323	4	12	335	**0**	335	30	365
EB RIGHT	63	4	12	75	**0**	75	5	80
WB LEFT	31	7	21	50	**150**	200	20	220
WB THRU	315	12	36	350	**0**	350	30	380
WB RIGHT	57	2	6	65	**0**	65	5	70
GLEN OAKS BLVD								
NB LEFT	109	11	33	140	**0**	140	15	155
NB THRU	778	43	129	905	**0**	905	80	985
NB RIGHT	61	7	21	80	**150**	230	20	250
SB LEFT	88	4	12	100	**0**	100	10	110
SB THRU	705	26	78	785	**0**	785	70	855
SB RIGHT	141	5	15	155	**0**	155	15	170
TOTALS	**2957**				**300**	**3670**	**330**	**4000**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	17 OF 21

E/W STREET : SHELDON STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
30
ROUTE
6A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
SHELDON STREET								
EB LEFT	286	15	45	330	**0**	330	30	360
EB THRU	323	4	12	335	**0**	335	30	365
EB RIGHT	63	4	12	75	**0**	75	5	80
WB LEFT	31	7	21	50	**0**	50	5	55
WB THRU	315	12	36	350	**0**	350	30	380
WB RIGHT	57	2	6	65	**150**	215	20	235
GLEN OAKS BLVD								
NB LEFT	109	11	33	140	**0**	140	15	155
NB THRU	778	43	129	905	**0**	905	80	985
NB RIGHT	61	7	21	80	**0**	80	5	85
SB LEFT	88	4	12	100	**150**	250	25	275
SB THRU	705	26	78	785	**0**	785	70	855
SB RIGHT	141	5	15	155	**0**	155	15	170
TOTALS	**2957**				**300**	**3670**	**330**	**4000**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	18 OF 21

E/W STREET : SHELDON STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
30
ROUTE
6B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
SHELDON STREET								
EB LEFT	286	15	45	330	0	330	30	360
EB THRU	323	4	12	335	0	335	30	365
EB RIGHT	63	4	12	75	0	75	5	80
WB LEFT	31	7	21	50	0	50	5	55
WB THRU	315	12	36	350	0	350	30	380
WB RIGHT	57	2	6	65	0	65	5	70
GLEN OAKS BLVD								
NB LEFT	109	11	33	140	0	140	15	155
NB THRU	778	43	129	905	0	905	80	985
NB RIGHT	61	7	21	80	150	230	20	250
SB LEFT	88	4	12	100	0	100	10	110
SB THRU	705	26	78	785	0	785	70	855
SB RIGHT	141	5	15	155	0	155	15	170
TOTALS	**2957**				**150**	**3520**	**315**	**3835**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	19 OF 21

E/W STREET : SHELDON STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
30
ROUTE
7A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
SHELDON STREET								
EB LEFT	286	15	45	330	**0**	330	30	360
EB THRU	323	4	12	335	**0**	335	30	365
EB RIGHT	63	4	12	75	**0**	75	5	80
WB LEFT	31	7	21	50	**0**	50	5	55
WB THRU	315	12	36	350	**0**	350	30	380
WB RIGHT	57	2	6	65	**0**	65	5	70
GLEN OAKS BLVD								
NB LEFT	109	11	33	140	**0**	140	15	155
NB THRU	778	43	129	905	**150**	1055	95	1150
NB RIGHT	61	7	21	80	**0**	80	5	85
SB LEFT	88	4	12	100	**0**	100	10	110
SB THRU	705	26	78	785	**150**	935	85	1020
SB RIGHT	141	5	15	155	**0**	155	15	170
TOTALS	**2957**				**300**	**3670**	**330**	**4000**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	20 OF 21

E/W STREET : SHELDON STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 30
ROUTE 6C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
SHELDON STREET								
EB LEFT	286	15	45	330	0	330	30	360
EB THRU	323	4	12	335	0	335	30	365
EB RIGHT	63	4	12	75	0	75	5	80
WB LEFT	31	7	21	50	0	50	5	55
WB THRU	315	12	36	350	0	350	30	380
WB RIGHT	57	2	6	65	0	65	5	70
GLEN OAKS BLVD								
NB LEFT	109	11	33	140	0	140	15	155
NB THRU	778	43	129	905	0	905	80	985
NB RIGHT	61	7	21	80	150	230	20	250
SB LEFT	88	4	12	100	0	100	10	110
SB THRU	705	26	78	785	0	785	70	855
SB RIGHT	141	5	15	155	0	155	15	170
TOTALS	**2957**				**150**	**3520**	**315**	**3835**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	21 OF 21

E/W STREET : SHELDON STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
30
ROUTE
7C, 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
SHELDON STREET								
EB LEFT	286	15	45	330	**0**	330	30	360
EB THRU	323	4	12	335	**0**	335	30	365
EB RIGHT	63	4	12	75	**0**	75	5	80
WB LEFT	31	7	21	50	**150**	200	20	220
WB THRU	315	12	36	350	**0**	350	30	380
WB RIGHT	57	2	6	65	**0**	65	5	70
GLEN OAKS BLVD								
NB LEFT	109	11	33	140	**0**	140	15	155
NB THRU	778	43	129	905	**0**	905	80	985
NB RIGHT	61	7	21	80	**150**	230	20	250
SB LEFT	88	4	12	100	**0**	100	10	110
SB THRU	705	26	78	785	**0**	785	70	855
SB RIGHT	141	5	15	155	**0**	155	15	170
TOTALS	**2957**				**300**	**3670**	**330**	**4000**

Tustin Office: 714.665.4500 Tel/ 714.665.4501 Fax
Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax
Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax
Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: GLEN OAKS BLVD
EAST-WEST STREET: SHELDON
JURISDICTION: LA

DATE: 05-22-12

PEAK HOUR: 07:00AM

NORTH LEG

TOTAL: 1,481

Rt	Thru	Lt	
162	1233	86	Total
28	288	16	1st
32	340	19	2nd
48	336	26	3rd
54	269	25	4th

EAST LEG TOTAL: 726

	1st	2nd	3rd	4th	Total
Rt	10	8	14	10	42
Thru	113	166	144	170	593
Lt	14	25	21	31	91

WEST LEG TOTAL: 566

Total	1st	2nd	3rd	4th	
116	16	27	33	40	Lt
405	89	100	111	105	Thru
45	10	10	11	14	Rt

PEAK HOUR FACTORS

NORTH LEG = 0.90
SOUTH LEG = 0.80
EAST LEG = 0.86
WEST LEG = 0.89

ALL LEGS = 0.93

SOUTH LEG

TOTAL: 602

	Lt	Thru	Rt
1st	16	100	8
2nd	19	116	14
3rd	22	109	10
4th	24	153	11
Total	81	478	43

HOUR TOTAL: 3,375

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: SHELDON

TIME: 07:00AM-08:00AM DATE: 05-22-12

NORTH LEG

Rt	Thru	Lt	
162	1233	86	Total
28	288	16	1st
32	340	19	2nd
48	336	26	3rd
54	269	25	4th

	1st	2nd	3rd	4th	Total
Rt	10	8	14	10	42
Thru	113	166	144	170	593
Lt	14	25	21	31	91

Total	1st	2nd	3rd	4th	
116	16	27	33	40	Lt
405	89	100	111	105	Thru
45	10	10	11	14	Rt

	Lt	Thru	Rt
1st	16	100	8
2nd	19	116	14
3rd	22	109	10
4th	24	153	11
Total	81	478	43

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: SHELDON

TIME: 08:00AM-09:00AM DATE: 05-22-12

NORTH LEG

Rt	Thru	Lt	
132	800	90	Total
42	203	34	1st
45	202	19	2nd
25	215	20	3rd
20	180	17	4th

	1st	2nd	3rd	4th	Total
Rt	14	12	5	6	37
Thru	106	101	103	130	440
Lt	19	12	21	11	63

Total	1st	2nd	3rd	4th	
152	34	31	47	40	Lt
269	63	66	71	69	Thru
62	15	24	13	10	Rt

	Lt	Thru	Rt
1st	23	127	12
2nd	24	142	16
3rd	22	90	5
4th	20	117	10
Total	89	476	43

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : GLEN OAKS BLVD LA

EAST-WEST STREET : SHELDON 05-22-12

BEGINNING TIME : 07:00AM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
23	276	9	3	4	1	1	1	1	1	7	5	332
27	326	15	4	8	1	0	1	0	1	5	3	391
45	322	20	3	6	0	0	0	0	0	8	6	410
49	248	18	4	12	0	0	1	0	1	8	7	348
37	193	21	2	6	0	0	0	0	3	4	13	279
35	186	10	5	9	1	1	3	0	4	4	8	266
18	208	17	4	3	0	2	1	0	1	3	3	260
15	174	13	3	3	0	0	1	0	2	2	4	217
249	1933	123	28	51	3	4	8	1	13	41	49	2503
						SOUTH LEG						
5	94	14	1	5	1	1	0	1	1	1	0	124
14	111	15	0	3	2	0	1	1	0	1	1	149
10	104	22	0	3	0	0	1	0	0	1	0	141
10	148	21	1	5	3	0	0	0	0	0	0	188
7	121	16	5	4	2	0	1	0	0	1	5	162
12	127	21	1	5	1	0	5	0	3	5	2	182
3	82	20	0	4	0	2	3	1	0	1	1	117
10	108	19	0	6	0	0	2	1	0	1	0	147
71	895	148	8	35	9	3	13	4	4	11	9	1210
						EAST LEG						
9	105	13	1	1	0	0	1	0	0	6	1	137
6	160	23	2	2	1	0	0	1	0	4	0	199
14	136	19	0	1	0	0	0	0	0	7	2	179
10	158	30	0	0	1	0	1	0	0	11	0	211
13	92	15	1	3	1	0	0	1	0	11	2	139
10	92	11	0	0	0	2	0	0	0	9	1	125
4	95	20	1	2	0	0	0	1	0	6	0	129
6	128	11	0	1	0	0	1	0	0	0	0	147
72	966	142	5	10	3	2	3	3	0	54	6	1266
						WEST LEG						
9	86	15	1	1	0	0	0	0	0	2	1	115
10	97	26	0	2	1	0	1	0	0	0	0	137
10	108	31	0	1	1	0	1	0	1	1	1	155
13	102	37	1	2	1	0	0	0	0	1	2	159
14	60	31	1	3	2	0	0	0	0	0	1	112
20	62	27	3	2	1	0	0	1	1	2	2	121
11	64	42	2	1	3	0	1	1	0	5	1	131
10	65	40	0	1	0	0	1	0	0	2	0	119
97	644	249	8	13	9	0	4	2	2	13	8	1049

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: GLEN OAKS BLVD
EAST-WEST STREET: SHELDON
JURISDICTION: LA

DATE: 05-22-12

PEAK HOUR: 01:00PM

NORTH LEG

TOTAL: 637

Rt	Thru	Lt	
94	491	52	Total
19	116	12	1st
22	103	11	2nd
28	161	10	3rd
25	111	19	4th

EAST LEG TOTAL: 378

	1st	2nd	3rd	4th	Total
Rt	8	12	16	13	49
Thru	68	83	72	63	286
Lt	11	10	9	13	43

WEST LEG TOTAL: 451

Total	1st	2nd	3rd	4th	
130	23	25	43	39	Lt
242	51	67	55	69	Thru
79	20	22	14	23	Rt

SOUTH LEG

TOTAL: 660

	Lt	Thru	Rt
1st	17	135	10
2nd	14	132	10
3rd	19	151	15
4th	28	116	13
Total	78	534	48

PEAK HOUR FACTORS

NORTH LEG = 0.80
SOUTH LEG = 0.89
EAST LEG = 0.90
WEST LEG = 0.86

ALL LEGS = 0.90

HOUR TOTAL: 2,126

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: SHELDON

TIME: 12:00PM-01:00PM DATE: 05-22-12

NORTH LEG

Rt	Thru	Lt	
144	464	57	Total
30	109	10	1st
42	96	16	2nd
33	134	15	3rd
39	125	16	4th

	1st	2nd	3rd	4th	Total
Rt	8	4	4	6	22
Thru	85	57	81	52	275
Lt	5	8	7	9	29

Total	1st	2nd	3rd	4th	
112	23	30	31	28	Lt
259	61	66	71	61	Thru
73	14	26	21	12	Rt

	Lt	Thru	Rt
1st	15	89	10
2nd	16	128	15
3rd	9	111	12
4th	8	116	11
Total	48	444	48

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: SHELDON

TIME: 01:00PM-02:00PM DATE: 05-22-12

NORTH LEG

94	491	52	Total
19	116	12	1st
22	103	11	2nd
28	161	10	3rd
25	111	19	4th
Rt	Thru	Lt	

Rt	8	12	16	13	49
Thru	68	83	72	63	286
Lt	11	10	9	13	43
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
130	23	25	43	39	Lt
242	51	67	55	69	Thru
79	20	22	14	23	Rt

	Lt	Thru	Rt
1st	17	135	10
2nd	14	132	10
3rd	19	151	15
4th	28	116	13
Total	78	534	48

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : GLEN OAKS BLVD LA

EAST-WEST STREET : SHELDON 05-22-12

BEGINNING TIME : 12:00PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
27	102	7	3	4	1	0	1	1	0	2	1	149
32	88	14	8	6	2	1	1	0	1	1	0	154
33	127	14	0	2	1	0	3	0	0	2	0	182
33	115	15	3	6	1	1	2	0	2	2	0	180
16	109	11	1	2	1	2	4	0	0	1	0	147
16	94	11	6	6	0	0	2	0	0	1	0	136
26	153	8	2	5	1	0	3	0	0	0	1	199
20	102	19	4	7	0	0	0	0	1	2	0	155
203	890	99	27	38	7	4	16	1	4	11	2	1302
						SOUTH LEG						
10	83	13	0	2	0	0	1	2	0	3	0	114
8	122	13	3	0	0	1	2	3	3	4	0	159
9	106	7	3	3	1	0	1	1	0	1	0	132
9	110	6	1	2	0	1	1	2	0	3	0	135
9	129	17	1	5	0	0	0	0	0	1	0	162
5	119	13	2	7	1	1	1	0	2	5	0	156
14	145	16	1	4	1	0	0	0	0	2	2	185
8	105	16	2	5	3	0	2	3	3	4	6	157
72	919	101	13	28	6	3	8	11	8	23	8	1200
						EAST LEG						
8	79	4	0	1	1	0	0	0	0	5	0	98
4	45	5	0	2	2	0	0	1	0	10	0	69
4	74	6	0	2	1	0	0	0	0	5	0	92
6	45	8	0	1	1	0	0	0	0	6	0	67
6	61	9	2	1	0	0	0	0	0	6	2	87
11	76	9	1	2	1	0	0	0	0	5	0	105
14	55	9	1	2	0	0	2	0	1	13	0	97
13	53	12	0	1	1	0	0	0	0	9	0	89
66	488	62	4	12	7	0	2	1	1	59	2	704
						WEST LEG						
14	53	22	0	2	0	0	1	0	0	5	1	98
23	57	28	2	0	2	1	2	0	0	7	0	122
17	56	30	1	1	0	2	2	0	1	12	1	123
11	52	21	1	1	2	0	1	1	0	7	4	101
18	36	20	2	2	1	0	1	0	0	12	2	94
14	50	23	5	6	0	2	4	0	1	7	2	114
10	38	40	1	4	1	0	3	0	3	10	2	112
16	53	38	2	4	1	2	3	0	3	9	0	131
123	395	222	14	20	7	7	17	1	8	69	12	895

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: GLEN OAKS BLVD
EAST-WEST STREET: SHELDON
JURISDICTION: LA

DATE: 05-22-12

PEAK HOUR: 05:00PM

NORTH LEG

TOTAL: 969

Rt	Thru	Lt	
146	731	92	Total
58	187	26	1st
27	187	23	2nd
23	185	26	3rd
38	172	17	4th

EAST LEG TOTAL: 424

	1st	2nd	3rd	4th	Total
Rt	14	16	14	15	59
Thru	98	71	75	83	327
Lt	15	9	8	6	38

WEST LEG TOTAL: 695

Total	1st	2nd	3rd	4th	
301	68	89	79	65	Lt
327	68	92	85	82	Thru
67	21	16	14	16	Rt

PEAK HOUR FACTORS

NORTH LEG = 0.89
SOUTH LEG = 0.97
EAST LEG = 0.83
WEST LEG = 0.88

ALL LEGS = 0.95

SOUTH LEG

TOTAL: 1,009

	Lt	Thru	Rt
1st	26	209	25
2nd	30	203	16
3rd	31	207	14
4th	33	202	13
Total	120	821	68

HOUR TOTAL: 3,097

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: SHELDON

TIME: 04:00PM-05:00PM DATE: 05-22-12

NORTH LEG

Rt	Thru	Lt	
166	515	95	Total
28	134	35	1st
42	125	13	2nd
45	151	22	3rd
51	105	25	4th

	1st	2nd	3rd	4th	Total
Rt	13	13	15	13	54
Thru	74	77	62	70	283
Lt	8	12	9	9	38

Total	1st	2nd	3rd	4th	
283	78	72	65	68	Lt
332	61	69	99	103	Thru
70	22	14	15	19	Rt

	Lt	Thru	Rt
1st	38	184	11
2nd	27	175	17
3rd	25	241	22
4th	28	143	20
Total	118	743	70

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: SHELDON

TIME: 05:00PM-06:00PM DATE: 05-22-12

NORTH LEG

Rt	Thru	Lt	
146	731	92	Total
58	187	26	1st
27	187	23	2nd
23	185	26	3rd
38	172	17	4th

	1st	2nd	3rd	4th	Total
Rt	14	16	14	15	59
Thru	98	71	75	83	327
Lt	15	9	8	6	38

Total	1st	2nd	3rd	4th	
301	68	89	79	65	Lt
327	68	92	85	82	Thru
67	21	16	14	16	Rt

	Lt	Thru	Rt
1st	26	209	25
2nd	30	203	16
3rd	31	207	14
4th	33	202	13
Total	120	821	68

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : GLEN OAKS BLVD LA

EAST-WEST STREET : SHELDON 05-22-12

BEGINNING TIME : 04:00PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
23	119	35	2	7	0	2	4	0	1	4	0	197
37	116	9	4	5	2	0	3	2	1	1	0	180
41	144	20	3	4	1	1	2	0	0	1	1	218
50	99	25	1	3	0	0	1	0	0	2	0	181
58	181	25	0	5	0	0	1	1	0	0	0	271
25	181	23	2	4	0	0	1	0	0	1	0	237
21	176	25	1	5	1	1	3	0	0	1	0	234
37	167	15	0	4	1	0	0	1	1	1	0	227
292	1183	177	13	37	5	4	15	4	3	11	1	1745
						SOUTH LEG						
6	166	34	1	14	3	4	0	0	0	4	1	233
12	165	25	3	5	2	2	1	0	0	4	0	219
17	234	25	0	6	0	5	0	0	0	1	0	288
19	136	26	1	5	1	0	1	1	0	1	0	191
23	194	21	0	12	2	2	0	2	0	3	1	260
14	197	30	1	5	0	1	0	0	0	1	0	249
13	194	31	0	12	0	1	0	0	0	1	0	252
11	193	27	0	6	3	2	0	0	0	3	3	248
115	1479	219	6	65	11	17	2	3	0	18	5	1940
						EAST LEG						
11	73	1	1	0	1	1	0	6	0	1	0	95
13	73	11	0	2	0	0	2	0	0	0	1	102
13	59	8	1	1	1	1	0	0	0	2	0	86
13	69	8	0	0	1	0	1	0	0	0	0	92
14	91	11	0	3	0	0	4	4	0	0	0	127
14	68	8	0	2	0	1	1	1	1	0	0	96
14	74	7	0	1	0	0	0	1	0	0	0	97
15	82	5	0	1	0	0	0	1	0	0	0	104
107	589	59	2	10	3	3	8	13	1	3	1	799
						WEST LEG						
20	55	75	2	3	2	0	1	1	0	2	0	161
13	64	70	1	2	0	0	2	2	0	1	0	155
14	94	62	0	3	1	1	2	2	0	0	0	179
18	99	66	0	1	0	1	2	2	0	1	0	190
19	66	63	0	1	3	1	1	1	1	0	1	157
16	90	86	0	1	2	0	1	1	0	0	0	197
12	85	76	1	0	2	0	0	0	1	0	1	178
16	82	61	0	0	3	0	0	0	0	0	1	163
128	635	559	4	11	13	3	9	9	2	4	3	1380

Prepared by Newport Traffic Studies

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	85	1235	160	80	480	45	115	405	45	90	595	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1388	3438	1468	1641	3438	1468	1719	3387		1719	3406	
Flt Permitted	0.46	1.00	1.00	0.20	1.00	1.00	0.30	1.00		0.45	1.00	
Satd. Flow (perm)	674	3438	1468	340	3438	1468	552	3387		821	3406	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	91	1328	172	86	516	48	124	435	48	97	640	43
RTOR Reduction (vph)	0	0	52	0	0	25	0	15	0	0	11	0
Lane Group Flow (vph)	91	1328	120	86	516	23	124	468	0	97	672	0
Heavy Vehicles (%)	30%	5%	10%	10%	5%	10%	5%	5%	5%	5%	5%	5%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6		6	2		2	4			8		
Actuated Green, G (s)	20.3	20.3	20.3	20.3	20.3	20.3	13.8	13.8		13.8	13.8	
Effective Green, g (s)	20.3	20.3	20.3	20.3	20.3	20.3	13.8	13.8		13.8	13.8	
Actuated g/C Ratio	0.48	0.48	0.48	0.48	0.48	0.48	0.33	0.33		0.33	0.33	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	325	1658	708	164	1658	708	181	1110		269	1116	
v/s Ratio Prot		c0.39			0.15			0.14			0.20	
v/s Ratio Perm	0.13		0.08	0.25		0.02	c0.22			0.12		
v/c Ratio	0.28	0.80	0.17	0.52	0.31	0.03	0.69	0.42		0.36	0.60	
Uniform Delay, d1	6.5	9.2	6.1	7.6	6.6	5.7	12.3	11.0		10.8	11.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	2.9	0.1	3.0	0.1	0.0	10.2	0.3		0.8	0.9	
Delay (s)	7.0	12.1	6.3	10.6	6.7	5.8	22.5	11.3		11.6	12.8	
Level of Service	A	B	A	B	A	A	C	B		B	B	
Approach Delay (s)		11.2			7.2			13.6			12.6	
Approach LOS		B			A			B			B	

Intersection Summary			
HCM Average Control Delay	11.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	42.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	76.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Route 100

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	50	490	95	80	535	50	130	240	80	45	285	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3438	1404	1504	3438	1292	1719	2780		1641	3089	
Flt Permitted	0.43	1.00	1.00	0.45	1.00	1.00	0.53	1.00		0.54	1.00	
Satd. Flow (perm)	774	3438	1404	711	3438	1292	959	2780		931	3089	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	56	544	106	89	594	56	144	267	89	50	317	56
RTOR Reduction (vph)	0	0	65	0	0	34	0	58	0	0	37	0
Lane Group Flow (vph)	56	544	41	89	594	22	144	298	0	50	336	0
Heavy Vehicles (%)	5%	5%	15%	20%	5%	25%	5%	25%	25%	10%	15%	10%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6		6	2		2	4			8		
Actuated Green, G (s)	11.9	11.9	11.9	11.9	11.9	11.9	10.6	10.6		10.6	10.6	
Effective Green, g (s)	11.9	11.9	11.9	11.9	11.9	11.9	10.6	10.6		10.6	10.6	
Actuated g/C Ratio	0.39	0.39	0.39	0.39	0.39	0.39	0.35	0.35		0.35	0.35	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	302	1341	548	277	1341	504	333	966		324	1074	
v/s Ratio Prot		0.16			c0.17			0.11			0.11	
v/s Ratio Perm	0.07		0.03	0.13		0.02	c0.15			0.05		
v/c Ratio	0.19	0.41	0.08	0.32	0.44	0.04	0.43	0.31		0.15	0.31	
Uniform Delay, d1	6.1	6.7	5.8	6.5	6.9	5.8	7.6	7.3		6.9	7.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.2	0.1	0.7	0.2	0.0	0.9	0.2		0.2	0.2	
Delay (s)	6.4	6.9	5.9	7.2	7.1	5.8	8.5	7.5		7.1	7.5	
Level of Service	A	A	A	A	A	A	A	A		A	A	
Approach Delay (s)		6.7			7.0			7.8			7.4	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM Average Control Delay	7.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	30.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	48.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	90	730	145	120	820	70	300	325	65	40	325	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3438	1538	1641	3438	1468	1719	3353		1504	3358	
Flt Permitted	0.27	1.00	1.00	0.30	1.00	1.00	0.51	1.00		0.51	1.00	
Satd. Flow (perm)	492	3438	1538	510	3438	1468	930	3353		810	3358	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	95	768	153	126	863	74	316	342	68	42	342	63
RTOR Reduction (vph)	0	0	93	0	0	45	0	41	0	0	37	0
Lane Group Flow (vph)	95	768	60	126	863	29	316	369	0	42	368	0
Heavy Vehicles (%)	5%	5%	5%	10%	5%	10%	5%	5%	5%	20%	5%	5%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6		6	2		2	4			8		
Actuated Green, G (s)	14.7	14.7	14.7	14.7	14.7	14.7	15.0	15.0		15.0	15.0	
Effective Green, g (s)	14.7	14.7	14.7	14.7	14.7	14.7	15.0	15.0		15.0	15.0	
Actuated g/C Ratio	0.39	0.39	0.39	0.39	0.39	0.39	0.40	0.40		0.40	0.40	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	192	1341	600	199	1341	572	370	1334		322	1336	
v/s Ratio Prot		0.22			c0.25			0.11			0.11	
v/s Ratio Perm	0.19		0.04	0.25		0.02	c0.34			0.05		
v/c Ratio	0.49	0.57	0.10	0.63	0.64	0.05	0.85	0.28		0.13	0.28	
Uniform Delay, d1	8.7	9.0	7.3	9.3	9.4	7.2	10.4	7.7		7.2	7.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.0	0.6	0.1	6.4	1.1	0.0	17.2	0.1		0.2	0.1	
Delay (s)	10.7	9.6	7.4	15.7	10.4	7.2	27.5	7.8		7.4	7.8	
Level of Service	B	A	A	B	B	A	C	A		A	A	
Approach Delay (s)		9.4			10.8			16.4			7.8	
Approach LOS		A			B			B			A	

Intersection Summary			
HCM Average Control Delay	11.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	37.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	68.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	135	1235	160	80	480	45	115	405	45	90	595	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1157	3438	1468	1641	3438	1468	1719	3387		1719	3160	
Flt Permitted	0.46	1.00	1.00	0.18	1.00	1.00	0.27	1.00		0.44	1.00	
Satd. Flow (perm)	557	3438	1468	303	3438	1468	482	3387		804	3160	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	145	1328	172	86	516	48	124	435	48	97	640	97
RTOR Reduction (vph)	0	0	52	0	0	24	0	17	0	0	25	0
Lane Group Flow (vph)	145	1328	120	86	516	24	124	466	0	97	712	0
Heavy Vehicles (%)	56%	5%	10%	10%	5%	10%	5%	5%	5%	5%	5%	58%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6		6	2		2	4			8		
Actuated Green, G (s)	22.8	22.8	22.8	22.8	22.8	22.8	15.7	15.7		15.7	15.7	
Effective Green, g (s)	22.8	22.8	22.8	22.8	22.8	22.8	15.7	15.7		15.7	15.7	
Actuated g/C Ratio	0.49	0.49	0.49	0.49	0.49	0.49	0.34	0.34		0.34	0.34	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	273	1686	720	149	1686	720	163	1144		271	1067	
v/s Ratio Prot		c0.39			0.15			0.14			0.23	
v/s Ratio Perm	0.26		0.08	0.28		0.02	c0.26			0.12		
v/c Ratio	0.53	0.79	0.17	0.58	0.31	0.03	0.76	0.41		0.36	0.67	
Uniform Delay, d1	8.2	9.8	6.6	8.4	7.1	6.1	13.7	11.8		11.6	13.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.0	2.5	0.1	5.3	0.1	0.0	18.7	0.2		0.8	1.6	
Delay (s)	10.1	12.4	6.7	13.7	7.2	6.2	32.4	12.1		12.4	14.8	
Level of Service	B	B	A	B	A	A	C	B		B	B	
Approach Delay (s)		11.6			8.0			16.2			14.5	
Approach LOS		B			A			B			B	

Intersection Summary			
HCM Average Control Delay	12.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	46.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	77.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	100	490	95	80	535	50	130	240	80	45	285	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1180	3438	1404	1504	3438	1292	1719	2780		1641	2767	
Flt Permitted	0.43	1.00	1.00	0.45	1.00	1.00	0.50	1.00		0.54	1.00	
Satd. Flow (perm)	531	3438	1404	711	3438	1292	909	2780		931	2767	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	111	544	106	89	594	56	144	267	89	50	317	111
RTOR Reduction (vph)	0	0	64	0	0	34	0	58	0	0	73	0
Lane Group Flow (vph)	111	544	42	89	594	22	144	298	0	50	355	0
Heavy Vehicles (%)	53%	5%	15%	20%	5%	25%	5%	25%	25%	10%	15%	55%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6		6	2		2	4			8		
Actuated Green, G (s)	12.6	12.6	12.6	12.6	12.6	12.6	10.9	10.9		10.9	10.9	
Effective Green, g (s)	12.6	12.6	12.6	12.6	12.6	12.6	10.9	10.9		10.9	10.9	
Actuated g/C Ratio	0.40	0.40	0.40	0.40	0.40	0.40	0.35	0.35		0.35	0.35	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	212	1375	562	284	1375	517	315	962		322	957	
v/s Ratio Prot		0.16			0.17			0.11			0.13	
v/s Ratio Perm	c0.21		0.03	0.13		0.02	c0.16			0.05		
v/c Ratio	0.52	0.40	0.08	0.31	0.43	0.04	0.46	0.31		0.16	0.37	
Uniform Delay, d1	7.2	6.7	5.8	6.5	6.9	5.8	8.0	7.5		7.1	7.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.3	0.2	0.1	0.6	0.2	0.0	1.1	0.2		0.2	0.2	
Delay (s)	9.5	6.9	5.9	7.1	7.1	5.8	9.1	7.7		7.3	8.0	
Level of Service	A	A	A	A	A	A	A	A		A	A	
Approach Delay (s)		7.2			7.0			8.1			7.9	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM Average Control Delay	7.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	31.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	51.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	140	730	145	120	820	70	300	325	65	40	325	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1299	3438	1538	1641	3438	1468	1719	3353		1504	2997	
Flt Permitted	0.25	1.00	1.00	0.30	1.00	1.00	0.47	1.00		0.51	1.00	
Satd. Flow (perm)	345	3438	1538	516	3438	1468	852	3353		805	2997	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	147	768	153	126	863	74	316	342	68	42	342	116
RTOR Reduction (vph)	0	0	84	0	0	41	0	33	0	0	55	0
Lane Group Flow (vph)	147	768	69	126	863	33	316	377	0	42	403	0
Heavy Vehicles (%)	39%	5%	5%	10%	5%	10%	5%	5%	5%	20%	5%	48%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6		6	2		2	4			8		
Actuated Green, G (s)	22.2	22.2	22.2	22.2	22.2	22.2	19.0	19.0		19.0	19.0	
Effective Green, g (s)	22.2	22.2	22.2	22.2	22.2	22.2	19.0	19.0		19.0	19.0	
Actuated g/C Ratio	0.45	0.45	0.45	0.45	0.45	0.45	0.39	0.39		0.39	0.39	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	156	1551	694	233	1551	662	329	1295		311	1157	
v/s Ratio Prot		0.22			0.25			0.11			0.13	
v/s Ratio Perm	c0.43		0.04	0.24		0.02	c0.37			0.05		
v/c Ratio	0.94	0.50	0.10	0.54	0.56	0.05	0.96	0.29		0.14	0.35	
Uniform Delay, d1	12.9	9.5	7.8	9.8	9.9	7.6	14.7	10.4		9.8	10.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	54.8	0.3	0.1	2.6	0.4	0.0	39.0	0.1		0.2	0.2	
Delay (s)	67.7	9.8	7.8	12.4	10.3	7.6	53.7	10.6		10.0	10.9	
Level of Service	E	A	A	B	B	A	D	B		A	B	
Approach Delay (s)		17.5			10.4			29.4			10.8	
Approach LOS		B			B			C			B	

Intersection Summary			
HCM Average Control Delay	16.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	49.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	72.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	145	1345	175	85	525	50	125	440	50	100	650	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1157	3438	1468	1641	3438	1468	1719	3385		1719	3156	
Flt Permitted	0.43	1.00	1.00	0.19	1.00	1.00	0.26	1.00		0.42	1.00	
Satd. Flow (perm)	521	3438	1468	329	3438	1468	479	3385		756	3156	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	156	1446	188	91	565	54	134	473	54	108	699	108
RTOR Reduction (vph)	0	0	42	0	0	28	0	11	0	0	28	0
Lane Group Flow (vph)	156	1446	146	91	565	26	134	516	0	108	779	0
Heavy Vehicles (%)	56%	5%	10%	10%	5%	10%	5%	5%	5%	5%	5%	58%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6		6	2		2	4			8		
Actuated Green, G (s)	21.0	21.0	21.0	21.0	21.0	21.0	15.1	15.1		15.1	15.1	
Effective Green, g (s)	21.0	21.0	21.0	21.0	21.0	21.0	15.1	15.1		15.1	15.1	
Actuated g/C Ratio	0.48	0.48	0.48	0.48	0.48	0.48	0.34	0.34		0.34	0.34	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	248	1637	699	157	1637	699	164	1159		259	1081	
v/s Ratio Prot		c0.42			0.16			0.15			0.25	
v/s Ratio Perm	0.30		0.10	0.28		0.02	c0.28			0.14		
v/c Ratio	0.63	0.88	0.21	0.58	0.35	0.04	0.82	0.45		0.42	0.72	
Uniform Delay, d1	8.6	10.4	6.7	8.4	7.2	6.2	13.2	11.3		11.1	12.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.9	6.0	0.1	5.1	0.1	0.0	25.9	0.3		1.1	2.4	
Delay (s)	13.6	16.5	6.9	13.5	7.4	6.2	39.2	11.5		12.2	15.1	
Level of Service	B	B	A	B	A	A	D	B		B	B	
Approach Delay (s)		15.2			8.1			17.1			14.7	
Approach LOS		B			A			B			B	

Intersection Summary			
HCM Average Control Delay	14.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	44.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	83.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
30: Sheldon St & Glenoaks Blvd

3/26/2013

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	110	535	105	85	585	55	140	260	85	50	310	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1180	3438	1404	1504	3438	1292	1719	2782		1641	2764	
Flt Permitted	0.39	1.00	1.00	0.42	1.00	1.00	0.48	1.00		0.52	1.00	
Satd. Flow (perm)	482	3438	1404	671	3438	1292	877	2782		907	2764	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	122	594	117	94	650	61	156	289	94	56	344	122
RTOR Reduction (vph)	0	0	66	0	0	34	0	63	0	0	81	0
Lane Group Flow (vph)	122	594	51	94	650	27	156	320	0	56	385	0
Heavy Vehicles (%)	53%	5%	15%	20%	5%	25%	5%	25%	25%	10%	15%	55%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6		6	2		2	4			8		
Actuated Green, G (s)	15.3	15.3	15.3	15.3	15.3	15.3	11.7	11.7		11.7	11.7	
Effective Green, g (s)	15.3	15.3	15.3	15.3	15.3	15.3	11.7	11.7		11.7	11.7	
Actuated g/C Ratio	0.44	0.44	0.44	0.44	0.44	0.44	0.33	0.33		0.33	0.33	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	211	1503	614	293	1503	565	293	930		303	924	
v/s Ratio Prot		0.17			0.19			0.12			0.14	
v/s Ratio Perm	c0.25		0.04	0.14		0.02	c0.18			0.06		
v/c Ratio	0.58	0.40	0.08	0.32	0.43	0.05	0.53	0.34		0.18	0.42	
Uniform Delay, d1	7.4	6.7	5.8	6.4	6.8	5.7	9.4	8.8		8.3	9.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.8	0.2	0.1	0.6	0.2	0.0	1.9	0.2		0.3	0.3	
Delay (s)	11.2	6.9	5.8	7.1	7.0	5.7	11.3	9.0		8.6	9.3	
Level of Service	B	A	A	A	A	A	B	A		A	A	
Approach Delay (s)		7.4			6.9			9.7			9.2	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM Average Control Delay	8.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	35.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	55.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	155	795	160	130	895	75	325	355	70	45	355	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1299	3438	1538	1641	3438	1468	1719	3353		1504	2999	
Flt Permitted	0.25	1.00	1.00	0.26	1.00	1.00	0.47	1.00		0.49	1.00	
Satd. Flow (perm)	342	3438	1538	444	3438	1468	842	3353		780	2999	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	163	837	168	137	942	79	342	374	74	47	374	126
RTOR Reduction (vph)	0	0	101	0	0	47	0	40	0	0	28	0
Lane Group Flow (vph)	163	837	67	137	942	32	342	408	0	47	472	0
Heavy Vehicles (%)	39%	5%	5%	10%	5%	10%	5%	5%	5%	20%	5%	48%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6		6	2		2	4			8		
Actuated Green, G (s)	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0		16.0	16.0	
Effective Green, g (s)	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0		16.0	16.0	
Actuated g/C Ratio	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40		0.40	0.40	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	137	1375	615	178	1375	587	337	1341		312	1200	
v/s Ratio Prot		0.24			0.27			0.12			0.16	
v/s Ratio Perm	c0.48		0.04	0.31		0.02	c0.41			0.06		
v/c Ratio	1.19	0.61	0.11	0.77	0.69	0.05	1.01	0.30		0.15	0.39	
Uniform Delay, d1	12.0	9.5	7.5	10.4	9.9	7.4	12.0	8.2		7.7	8.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	136.8	0.8	0.1	18.0	1.4	0.0	52.8	0.1		0.2	0.2	
Delay (s)	148.8	10.3	7.6	28.4	11.4	7.4	64.8	8.3		7.9	8.8	
Level of Service	F	B	A	C	B	A	E	A		A	A	
Approach Delay (s)		29.2			13.1			32.8			8.7	
Approach LOS		C			B			C			A	

Intersection Summary			
HCM Average Control Delay	21.8	HCM Level of Service	C
HCM Volume to Capacity ratio	1.10		
Actuated Cycle Length (s)	40.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	78.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	85	1235	160	80	480	95	115	405	45	140	595	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1388	3438	1468	1641	3438	1029	1719	3387		1299	3406	
Flt Permitted	0.46	1.00	1.00	0.20	1.00	1.00	0.31	1.00		0.45	1.00	
Satd. Flow (perm)	674	3438	1468	340	3438	1029	556	3387		621	3406	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	91	1328	172	86	516	102	124	435	48	151	640	43
RTOR Reduction (vph)	0	0	52	0	0	53	0	15	0	0	11	0
Lane Group Flow (vph)	91	1328	120	86	516	49	124	468	0	151	672	0
Heavy Vehicles (%)	30%	5%	10%	10%	5%	57%	5%	5%	5%	39%	5%	5%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6		6	2		2	4			8		
Actuated Green, G (s)	20.3	20.3	20.3	20.3	20.3	20.3	14.2	14.2		14.2	14.2	
Effective Green, g (s)	20.3	20.3	20.3	20.3	20.3	20.3	14.2	14.2		14.2	14.2	
Actuated g/C Ratio	0.48	0.48	0.48	0.48	0.48	0.48	0.33	0.33		0.33	0.33	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	322	1642	701	162	1642	491	186	1132		207	1138	
v/s Ratio Prot		c0.39			0.15			0.14			0.20	
v/s Ratio Perm	0.13		0.08	0.25		0.05	0.22			c0.24		
v/c Ratio	0.28	0.81	0.17	0.53	0.31	0.10	0.67	0.41		0.73	0.59	
Uniform Delay, d1	6.7	9.4	6.3	7.8	6.8	6.1	12.1	10.9		12.5	11.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	3.0	0.1	3.3	0.1	0.1	8.7	0.2		12.1	0.8	
Delay (s)	7.2	12.5	6.4	11.1	6.9	6.2	20.8	11.2		24.6	12.6	
Level of Service	A	B	A	B	A	A	C	B		C	B	
Approach Delay (s)		11.5			7.3			13.1			14.7	
Approach LOS		B			A			B			B	

Intersection Summary			
HCM Average Control Delay	11.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	42.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	76.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	50	490	95	80	535	100	130	240	80	95	285	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3438	1404	1504	3438	991	1719	2780		1150	3089	
Flt Permitted	0.43	1.00	1.00	0.45	1.00	1.00	0.53	1.00		0.54	1.00	
Satd. Flow (perm)	774	3438	1404	711	3438	991	959	2780		652	3089	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	56	544	106	89	594	111	144	267	89	106	317	56
RTOR Reduction (vph)	0	0	64	0	0	68	0	58	0	0	36	0
Lane Group Flow (vph)	56	544	42	89	594	43	144	298	0	106	337	0
Heavy Vehicles (%)	5%	5%	15%	20%	5%	63%	5%	25%	25%	57%	15%	10%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6		6	2		2	4			8		
Actuated Green, G (s)	12.1	12.1	12.1	12.1	12.1	12.1	10.8	10.8		10.8	10.8	
Effective Green, g (s)	12.1	12.1	12.1	12.1	12.1	12.1	10.8	10.8		10.8	10.8	
Actuated g/C Ratio	0.39	0.39	0.39	0.39	0.39	0.39	0.35	0.35		0.35	0.35	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	303	1346	550	278	1346	388	335	972		228	1080	
v/s Ratio Prot		0.16			c0.17			0.11			0.11	
v/s Ratio Perm	0.07		0.03	0.13		0.04	0.15			c0.16		
v/c Ratio	0.18	0.40	0.08	0.32	0.44	0.11	0.43	0.31		0.46	0.31	
Uniform Delay, d1	6.2	6.8	5.9	6.5	6.9	6.0	7.7	7.3		7.8	7.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.2	0.1	0.7	0.2	0.1	0.9	0.2		1.5	0.2	
Delay (s)	6.5	7.0	6.0	7.2	7.1	6.1	8.6	7.5		9.3	7.5	
Level of Service	A	A	A	A	A	A	A	A		A	A	
Approach Delay (s)		6.8			7.0			7.8			7.9	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM Average Control Delay	7.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	30.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	48.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	90	730	145	120	820	120	300	325	65	90	325	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3438	1538	1641	3438	1091	1719	3353		1101	3358	
Flt Permitted	0.27	1.00	1.00	0.30	1.00	1.00	0.51	1.00		0.51	1.00	
Satd. Flow (perm)	492	3438	1538	510	3438	1091	930	3353		592	3358	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	95	768	153	126	863	126	316	342	68	95	342	63
RTOR Reduction (vph)	0	0	93	0	0	77	0	41	0	0	37	0
Lane Group Flow (vph)	95	768	60	126	863	49	316	369	0	95	368	0
Heavy Vehicles (%)	5%	5%	5%	10%	5%	48%	5%	5%	5%	64%	5%	5%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6		6	2		2	4			8		
Actuated Green, G (s)	14.7	14.7	14.7	14.7	14.7	14.7	15.0	15.0		15.0	15.0	
Effective Green, g (s)	14.7	14.7	14.7	14.7	14.7	14.7	15.0	15.0		15.0	15.0	
Actuated g/C Ratio	0.39	0.39	0.39	0.39	0.39	0.39	0.40	0.40		0.40	0.40	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	192	1341	600	199	1341	425	370	1334		236	1336	
v/s Ratio Prot		0.22			c0.25			0.11			0.11	
v/s Ratio Perm	0.19		0.04	0.25		0.05	c0.34			0.16		
v/c Ratio	0.49	0.57	0.10	0.63	0.64	0.12	0.85	0.28		0.40	0.28	
Uniform Delay, d1	8.7	9.0	7.3	9.3	9.4	7.3	10.4	7.7		8.1	7.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.0	0.6	0.1	6.4	1.1	0.1	17.2	0.1		1.1	0.1	
Delay (s)	10.7	9.6	7.4	15.7	10.4	7.5	27.5	7.8		9.3	7.8	
Level of Service	B	A	A	B	B	A	C	A		A	A	
Approach Delay (s)		9.4			10.7			16.4			8.1	
Approach LOS		A			B			B			A	

Intersection Summary			
HCM Average Control Delay	11.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	37.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	68.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	95	1345	175	85	525	105	125	440	50	155	650	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1388	3438	1468	1641	3438	1468	1719	3385		1719	3405	
Flt Permitted	0.43	1.00	1.00	0.19	1.00	1.00	0.27	1.00		0.42	1.00	
Satd. Flow (perm)	628	3438	1468	329	3438	1468	492	3385		754	3405	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	102	1446	188	91	565	113	134	473	54	167	699	48
RTOR Reduction (vph)	0	0	42	0	0	59	0	11	0	0	11	0
Lane Group Flow (vph)	102	1446	146	91	565	54	134	516	0	167	736	0
Heavy Vehicles (%)	30%	5%	10%	10%	5%	10%	5%	5%	5%	5%	5%	5%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6		6	2		2	4			8		
Actuated Green, G (s)	21.0	21.0	21.0	21.0	21.0	21.0	14.7	14.7		14.7	14.7	
Effective Green, g (s)	21.0	21.0	21.0	21.0	21.0	21.0	14.7	14.7		14.7	14.7	
Actuated g/C Ratio	0.48	0.48	0.48	0.48	0.48	0.48	0.34	0.34		0.34	0.34	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	302	1652	705	158	1652	705	166	1139		254	1145	
v/s Ratio Prot		c0.42			0.16			0.15			0.22	
v/s Ratio Perm	0.16		0.10	0.28		0.04	c0.27			0.22		
v/c Ratio	0.34	0.88	0.21	0.58	0.34	0.08	0.81	0.45		0.66	0.64	
Uniform Delay, d1	7.0	10.2	6.5	8.2	7.1	6.1	13.2	11.4		12.4	12.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	5.5	0.1	5.0	0.1	0.0	24.2	0.3		6.0	1.2	
Delay (s)	7.7	15.7	6.7	13.2	7.2	6.2	37.4	11.6		18.4	13.5	
Level of Service	A	B	A	B	A	A	D	B		B	B	
Approach Delay (s)		14.2			7.7			16.9			14.4	
Approach LOS		B			A			B			B	

Intersection Summary			
HCM Average Control Delay	13.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	43.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	81.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	55	535	105	85	585	110	140	260	85	105	310	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3438	1404	1504	3438	1292	1719	2782		1641	3088	
Flt Permitted	0.39	1.00	1.00	0.43	1.00	1.00	0.51	1.00		0.52	1.00	
Satd. Flow (perm)	705	3438	1404	676	3438	1292	930	2782		907	3088	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	61	594	117	94	650	122	156	289	94	117	344	61
RTOR Reduction (vph)	0	0	70	0	0	74	0	61	0	0	39	0
Lane Group Flow (vph)	61	594	47	94	650	48	156	322	0	117	366	0
Heavy Vehicles (%)	5%	5%	15%	20%	5%	25%	5%	25%	25%	10%	15%	10%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6		6	2		2	4			8		
Actuated Green, G (s)	12.6	12.6	12.6	12.6	12.6	12.6	11.1	11.1		11.1	11.1	
Effective Green, g (s)	12.6	12.6	12.6	12.6	12.6	12.6	11.1	11.1		11.1	11.1	
Actuated g/C Ratio	0.40	0.40	0.40	0.40	0.40	0.40	0.35	0.35		0.35	0.35	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	280	1367	558	269	1367	514	326	974		318	1081	
v/s Ratio Prot		0.17			c0.19			0.12			0.12	
v/s Ratio Perm	0.09		0.03	0.14		0.04	c0.17			0.13		
v/c Ratio	0.22	0.43	0.08	0.35	0.48	0.09	0.48	0.33		0.37	0.34	
Uniform Delay, d1	6.3	7.0	6.0	6.7	7.1	6.0	8.0	7.6		7.7	7.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	0.2	0.1	0.8	0.3	0.1	1.1	0.2		0.7	0.2	
Delay (s)	6.7	7.2	6.0	7.5	7.4	6.1	9.2	7.8		8.4	7.8	
Level of Service	A	A	A	A	A	A	A	A		A	A	
Approach Delay (s)		7.0			7.2			8.2			7.9	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM Average Control Delay	7.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	31.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	50.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	100	795	160	130	895	130	325	355	70	100	355	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3438	1538	1641	3438	1468	1719	3353		1504	3359	
Flt Permitted	0.26	1.00	1.00	0.26	1.00	1.00	0.50	1.00		0.49	1.00	
Satd. Flow (perm)	479	3438	1538	458	3438	1468	897	3353		780	3359	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	105	837	168	137	942	137	342	374	74	105	374	68
RTOR Reduction (vph)	0	0	103	0	0	84	0	40	0	0	27	0
Lane Group Flow (vph)	105	837	65	137	942	53	342	408	0	105	415	0
Heavy Vehicles (%)	5%	5%	5%	10%	5%	10%	5%	5%	5%	20%	5%	5%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6		6	2		2	4			8		
Actuated Green, G (s)	15.1	15.1	15.1	15.1	15.1	15.1	16.0	16.0		16.0	16.0	
Effective Green, g (s)	15.1	15.1	15.1	15.1	15.1	15.1	16.0	16.0		16.0	16.0	
Actuated g/C Ratio	0.39	0.39	0.39	0.39	0.39	0.39	0.41	0.41		0.41	0.41	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	185	1328	594	177	1328	567	367	1372		319	1375	
v/s Ratio Prot		0.24			0.27			0.12			0.12	
v/s Ratio Perm	0.22		0.04	c0.30		0.04	c0.38			0.13		
v/c Ratio	0.57	0.63	0.11	0.77	0.71	0.09	0.93	0.30		0.33	0.30	
Uniform Delay, d1	9.4	9.7	7.7	10.5	10.1	7.6	11.0	7.8		7.9	7.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.0	1.0	0.1	18.8	1.8	0.1	30.1	0.1		0.6	0.1	
Delay (s)	13.4	10.7	7.8	29.3	11.9	7.7	41.1	7.9		8.5	7.9	
Level of Service	B	B	A	C	B	A	D	A		A	A	
Approach Delay (s)		10.5			13.4			22.3			8.0	
Approach LOS		B			B			C			A	

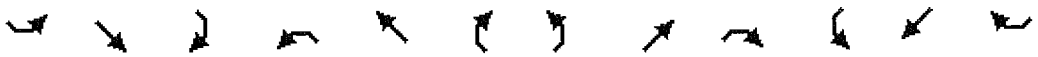
Intersection Summary			
HCM Average Control Delay	13.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	39.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	73.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	85	1235	160	80	480	95	115	405	45	90	595	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1388	3438	1468	1641	3438	1468	1719	3387		1719	3406	
Flt Permitted	0.46	1.00	1.00	0.20	1.00	1.00	0.30	1.00		0.45	1.00	
Satd. Flow (perm)	674	3438	1468	340	3438	1468	552	3387		821	3406	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	91	1328	172	86	516	102	124	435	48	97	640	43
RTOR Reduction (vph)	0	0	52	0	0	53	0	15	0	0	11	0
Lane Group Flow (vph)	91	1328	120	86	516	49	124	468	0	97	672	0
Heavy Vehicles (%)	30%	5%	10%	10%	5%	10%	5%	5%	5%	5%	5%	5%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6		6	2		2	4			8		
Actuated Green, G (s)	20.3	20.3	20.3	20.3	20.3	20.3	13.8	13.8		13.8	13.8	
Effective Green, g (s)	20.3	20.3	20.3	20.3	20.3	20.3	13.8	13.8		13.8	13.8	
Actuated g/C Ratio	0.48	0.48	0.48	0.48	0.48	0.48	0.33	0.33		0.33	0.33	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	325	1658	708	164	1658	708	181	1110		269	1116	
v/s Ratio Prot		c0.39			0.15			0.14			0.20	
v/s Ratio Perm	0.13		0.08	0.25		0.03	c0.22			0.12		
v/c Ratio	0.28	0.80	0.17	0.52	0.31	0.07	0.69	0.42		0.36	0.60	
Uniform Delay, d1	6.5	9.2	6.1	7.6	6.6	5.8	12.3	11.0		10.8	11.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	2.9	0.1	3.0	0.1	0.0	10.2	0.3		0.8	0.9	
Delay (s)	7.0	12.1	6.3	10.6	6.7	5.9	22.5	11.3		11.6	12.8	
Level of Service	A	B	A	B	A	A	C	B		B	B	
Approach Delay (s)		11.2			7.1			13.6			12.6	
Approach LOS		B			A			B			B	

Intersection Summary			
HCM Average Control Delay	11.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	42.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	76.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	50	490	95	80	535	100	130	240	80	45	285	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3438	1404	1504	3438	1292	1719	2780		1641	3089	
Flt Permitted	0.43	1.00	1.00	0.45	1.00	1.00	0.53	1.00		0.54	1.00	
Satd. Flow (perm)	774	3438	1404	711	3438	1292	959	2780		931	3089	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	56	544	106	89	594	111	144	267	89	50	317	56
RTOR Reduction (vph)	0	0	64	0	0	67	0	58	0	0	37	0
Lane Group Flow (vph)	56	544	42	89	594	44	144	298	0	50	336	0
Heavy Vehicles (%)	5%	5%	15%	20%	5%	25%	5%	25%	25%	10%	15%	10%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6		6	2		2	4			8		
Actuated Green, G (s)	12.1	12.1	12.1	12.1	12.1	12.1	10.7	10.7		10.7	10.7	
Effective Green, g (s)	12.1	12.1	12.1	12.1	12.1	12.1	10.7	10.7		10.7	10.7	
Actuated g/C Ratio	0.39	0.39	0.39	0.39	0.39	0.39	0.35	0.35		0.35	0.35	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	304	1351	552	279	1351	508	333	966		323	1073	
v/s Ratio Prot		0.16			c0.17			0.11			0.11	
v/s Ratio Perm	0.07		0.03	0.13		0.03	c0.15			0.05		
v/c Ratio	0.18	0.40	0.08	0.32	0.44	0.09	0.43	0.31		0.15	0.31	
Uniform Delay, d1	6.1	6.7	5.9	6.5	6.9	5.9	7.7	7.3		6.9	7.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.2	0.1	0.7	0.2	0.1	0.9	0.2		0.2	0.2	
Delay (s)	6.4	6.9	5.9	7.2	7.1	5.9	8.6	7.5		7.2	7.5	
Level of Service	A	A	A	A	A	A	A	A		A	A	
Approach Delay (s)		6.7			6.9			7.8			7.5	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM Average Control Delay	7.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	30.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	48.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	90	730	145	120	820	120	300	325	65	40	325	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3438	1538	1641	3438	1468	1719	3353		1504	3358	
Flt Permitted	0.27	1.00	1.00	0.30	1.00	1.00	0.51	1.00		0.51	1.00	
Satd. Flow (perm)	492	3438	1538	510	3438	1468	930	3353		810	3358	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	95	768	153	126	863	126	316	342	68	42	342	63
RTOR Reduction (vph)	0	0	93	0	0	77	0	41	0	0	37	0
Lane Group Flow (vph)	95	768	60	126	863	49	316	369	0	42	368	0
Heavy Vehicles (%)	5%	5%	5%	10%	5%	10%	5%	5%	5%	20%	5%	5%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6		6	2		2	4			8		
Actuated Green, G (s)	14.7	14.7	14.7	14.7	14.7	14.7	15.0	15.0		15.0	15.0	
Effective Green, g (s)	14.7	14.7	14.7	14.7	14.7	14.7	15.0	15.0		15.0	15.0	
Actuated g/C Ratio	0.39	0.39	0.39	0.39	0.39	0.39	0.40	0.40		0.40	0.40	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	192	1341	600	199	1341	572	370	1334		322	1336	
v/s Ratio Prot		0.22			c0.25			0.11			0.11	
v/s Ratio Perm	0.19		0.04	0.25		0.03	c0.34			0.05		
v/c Ratio	0.49	0.57	0.10	0.63	0.64	0.09	0.85	0.28		0.13	0.28	
Uniform Delay, d1	8.7	9.0	7.3	9.3	9.4	7.3	10.4	7.7		7.2	7.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.0	0.6	0.1	6.4	1.1	0.1	17.2	0.1		0.2	0.1	
Delay (s)	10.7	9.6	7.4	15.7	10.4	7.3	27.5	7.8		7.4	7.8	
Level of Service	B	A	A	B	B	A	C	A		A	A	
Approach Delay (s)		9.4			10.7			16.4			7.8	
Approach LOS		A			B			B			A	

Intersection Summary			
HCM Average Control Delay	11.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	37.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	68.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	90	1345	175	85	525	105	125	440	50	100	650	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1388	3438	1468	1641	3438	1468	1719	3385		1719	3405	
Flt Permitted	0.43	1.00	1.00	0.19	1.00	1.00	0.27	1.00		0.42	1.00	
Satd. Flow (perm)	628	3438	1468	329	3438	1468	492	3385		754	3405	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	97	1446	188	91	565	113	134	473	54	108	699	48
RTOR Reduction (vph)	0	0	42	0	0	59	0	11	0	0	11	0
Lane Group Flow (vph)	97	1446	146	91	565	54	134	516	0	108	736	0
Heavy Vehicles (%)	30%	5%	10%	10%	5%	10%	5%	5%	5%	5%	5%	5%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6		6	2		2	4			8		
Actuated Green, G (s)	21.0	21.0	21.0	21.0	21.0	21.0	14.7	14.7		14.7	14.7	
Effective Green, g (s)	21.0	21.0	21.0	21.0	21.0	21.0	14.7	14.7		14.7	14.7	
Actuated g/C Ratio	0.48	0.48	0.48	0.48	0.48	0.48	0.34	0.34		0.34	0.34	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	302	1652	705	158	1652	705	166	1139		254	1145	
v/s Ratio Prot		c0.42			0.16			0.15			0.22	
v/s Ratio Perm	0.15		0.10	0.28		0.04	c0.27			0.14		
v/c Ratio	0.32	0.88	0.21	0.58	0.34	0.08	0.81	0.45		0.43	0.64	
Uniform Delay, d1	7.0	10.2	6.5	8.2	7.1	6.1	13.2	11.4		11.2	12.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.6	5.5	0.1	5.0	0.1	0.0	24.2	0.3		1.1	1.2	
Delay (s)	7.6	15.7	6.7	13.2	7.2	6.2	37.4	11.6		12.4	13.5	
Level of Service	A	B	A	B	A	A	D	B		B	B	
Approach Delay (s)		14.3			7.7			16.9			13.4	
Approach LOS		B			A			B			B	

Intersection Summary			
HCM Average Control Delay	13.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	43.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	81.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	55	535	105	85	585	110	140	260	85	50	310	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3438	1404	1504	3438	1292	1719	2782		1641	3088	
Flt Permitted	0.39	1.00	1.00	0.43	1.00	1.00	0.51	1.00		0.52	1.00	
Satd. Flow (perm)	705	3438	1404	676	3438	1292	930	2782		907	3088	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	61	594	117	94	650	122	156	289	94	56	344	61
RTOR Reduction (vph)	0	0	70	0	0	74	0	61	0	0	39	0
Lane Group Flow (vph)	61	594	47	94	650	48	156	322	0	56	366	0
Heavy Vehicles (%)	5%	5%	15%	20%	5%	25%	5%	25%	25%	10%	15%	10%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6		6	2		2	4			8		
Actuated Green, G (s)	12.6	12.6	12.6	12.6	12.6	12.6	11.1	11.1		11.1	11.1	
Effective Green, g (s)	12.6	12.6	12.6	12.6	12.6	12.6	11.1	11.1		11.1	11.1	
Actuated g/C Ratio	0.40	0.40	0.40	0.40	0.40	0.40	0.35	0.35		0.35	0.35	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	280	1367	558	269	1367	514	326	974		318	1081	
v/s Ratio Prot		0.17			c0.19			0.12			0.12	
v/s Ratio Perm	0.09		0.03	0.14		0.04	c0.17			0.06		
v/c Ratio	0.22	0.43	0.08	0.35	0.48	0.09	0.48	0.33		0.18	0.34	
Uniform Delay, d1	6.3	7.0	6.0	6.7	7.1	6.0	8.0	7.6		7.1	7.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	0.2	0.1	0.8	0.3	0.1	1.1	0.2		0.3	0.2	
Delay (s)	6.7	7.2	6.0	7.5	7.4	6.1	9.2	7.8		7.4	7.8	
Level of Service	A	A	A	A	A	A	A	A		A	A	
Approach Delay (s)		7.0			7.2			8.2			7.7	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM Average Control Delay	7.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	31.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	50.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	100	795	160	130	895	130	325	355	70	45	355	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3438	1538	1641	3438	1468	1719	3353		1504	3359	
Flt Permitted	0.26	1.00	1.00	0.26	1.00	1.00	0.50	1.00		0.49	1.00	
Satd. Flow (perm)	479	3438	1538	458	3438	1468	897	3353		780	3359	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	105	837	168	137	942	137	342	374	74	47	374	68
RTOR Reduction (vph)	0	0	103	0	0	84	0	40	0	0	27	0
Lane Group Flow (vph)	105	837	65	137	942	53	342	408	0	47	415	0
Heavy Vehicles (%)	5%	5%	5%	10%	5%	10%	5%	5%	5%	20%	5%	5%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6		6	2		2	4			8		
Actuated Green, G (s)	15.1	15.1	15.1	15.1	15.1	15.1	16.0	16.0		16.0	16.0	
Effective Green, g (s)	15.1	15.1	15.1	15.1	15.1	15.1	16.0	16.0		16.0	16.0	
Actuated g/C Ratio	0.39	0.39	0.39	0.39	0.39	0.39	0.41	0.41		0.41	0.41	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	185	1328	594	177	1328	567	367	1372		319	1375	
v/s Ratio Prot		0.24			0.27			0.12			0.12	
v/s Ratio Perm	0.22		0.04	c0.30		0.04	c0.38			0.06		
v/c Ratio	0.57	0.63	0.11	0.77	0.71	0.09	0.93	0.30		0.15	0.30	
Uniform Delay, d1	9.4	9.7	7.7	10.5	10.1	7.6	11.0	7.8		7.3	7.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.0	1.0	0.1	18.8	1.8	0.1	30.1	0.1		0.2	0.1	
Delay (s)	13.4	10.7	7.8	29.3	11.9	7.7	41.1	7.9		7.5	7.9	
Level of Service	B	B	A	C	B	A	D	A		A	A	
Approach Delay (s)		10.5			13.4			22.3			7.9	
Approach LOS		B			B			C			A	

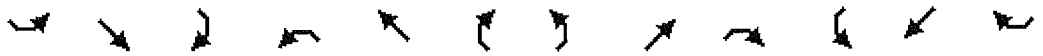
Intersection Summary			
HCM Average Control Delay	13.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	39.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	73.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	85	1235	160	80	480	95	115	405	45	90	595	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1388	3438	1468	1641	3438	1029	1719	3387		1719	3406	
Flt Permitted	0.46	1.00	1.00	0.20	1.00	1.00	0.30	1.00		0.45	1.00	
Satd. Flow (perm)	674	3438	1468	340	3438	1029	552	3387		821	3406	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	91	1328	172	86	516	102	124	435	48	97	640	43
RTOR Reduction (vph)	0	0	52	0	0	53	0	15	0	0	11	0
Lane Group Flow (vph)	91	1328	120	86	516	49	124	468	0	97	672	0
Heavy Vehicles (%)	30%	5%	10%	10%	5%	57%	5%	5%	5%	5%	5%	5%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6		6	2		2	4			8		
Actuated Green, G (s)	20.3	20.3	20.3	20.3	20.3	20.3	13.8	13.8		13.8	13.8	
Effective Green, g (s)	20.3	20.3	20.3	20.3	20.3	20.3	13.8	13.8		13.8	13.8	
Actuated g/C Ratio	0.48	0.48	0.48	0.48	0.48	0.48	0.33	0.33		0.33	0.33	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	325	1658	708	164	1658	496	181	1110		269	1116	
v/s Ratio Prot		c0.39			0.15			0.14			0.20	
v/s Ratio Perm	0.13		0.08	0.25		0.05	c0.22			0.12		
v/c Ratio	0.28	0.80	0.17	0.52	0.31	0.10	0.69	0.42		0.36	0.60	
Uniform Delay, d1	6.5	9.2	6.1	7.6	6.6	5.9	12.3	11.0		10.8	11.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	2.9	0.1	3.0	0.1	0.1	10.2	0.3		0.8	0.9	
Delay (s)	7.0	12.1	6.3	10.6	6.7	6.0	22.5	11.3		11.6	12.8	
Level of Service	A	B	A	B	A	A	C	B		B	B	
Approach Delay (s)		11.2			7.1			13.6			12.6	
Approach LOS		B			A			B			B	

Intersection Summary			
HCM Average Control Delay	11.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	42.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	76.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	50	490	95	80	535	100	130	240	80	45	285	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3438	1404	1504	3438	991	1719	2780		1641	3089	
Flt Permitted	0.43	1.00	1.00	0.45	1.00	1.00	0.53	1.00		0.54	1.00	
Satd. Flow (perm)	774	3438	1404	711	3438	991	959	2780		931	3089	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	56	544	106	89	594	111	144	267	89	50	317	56
RTOR Reduction (vph)	0	0	64	0	0	67	0	58	0	0	37	0
Lane Group Flow (vph)	56	544	42	89	594	44	144	298	0	50	336	0
Heavy Vehicles (%)	5%	5%	15%	20%	5%	63%	5%	25%	25%	10%	15%	10%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6		6	2		2	4			8		
Actuated Green, G (s)	12.1	12.1	12.1	12.1	12.1	12.1	10.7	10.7		10.7	10.7	
Effective Green, g (s)	12.1	12.1	12.1	12.1	12.1	12.1	10.7	10.7		10.7	10.7	
Actuated g/C Ratio	0.39	0.39	0.39	0.39	0.39	0.39	0.35	0.35		0.35	0.35	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	304	1351	552	279	1351	389	333	966		323	1073	
v/s Ratio Prot		0.16			c0.17			0.11			0.11	
v/s Ratio Perm	0.07		0.03	0.13		0.04	c0.15			0.05		
v/c Ratio	0.18	0.40	0.08	0.32	0.44	0.11	0.43	0.31		0.15	0.31	
Uniform Delay, d1	6.1	6.7	5.9	6.5	6.9	5.9	7.7	7.3		6.9	7.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.2	0.1	0.7	0.2	0.1	0.9	0.2		0.2	0.2	
Delay (s)	6.4	6.9	5.9	7.2	7.1	6.1	8.6	7.5		7.2	7.5	
Level of Service	A	A	A	A	A	A	A	A		A	A	
Approach Delay (s)		6.7			7.0			7.8			7.5	
Approach LOS		A			A			A			A	

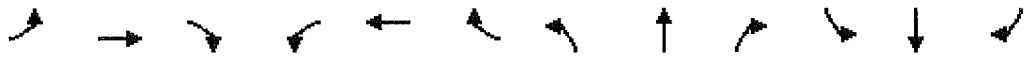
Intersection Summary			
HCM Average Control Delay	7.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	30.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	48.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	90	730	145	120	820	120	300	325	65	40	325	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3438	1538	1641	3438	1091	1719	3353		1504	3358	
Flt Permitted	0.27	1.00	1.00	0.30	1.00	1.00	0.51	1.00		0.51	1.00	
Satd. Flow (perm)	492	3438	1538	510	3438	1091	930	3353		810	3358	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	95	768	153	126	863	126	316	342	68	42	342	63
RTOR Reduction (vph)	0	0	93	0	0	77	0	41	0	0	37	0
Lane Group Flow (vph)	95	768	60	126	863	49	316	369	0	42	368	0
Heavy Vehicles (%)	5%	5%	5%	10%	5%	48%	5%	5%	5%	20%	5%	5%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6		6	2		2	4			8		
Actuated Green, G (s)	14.7	14.7	14.7	14.7	14.7	14.7	15.0	15.0		15.0	15.0	
Effective Green, g (s)	14.7	14.7	14.7	14.7	14.7	14.7	15.0	15.0		15.0	15.0	
Actuated g/C Ratio	0.39	0.39	0.39	0.39	0.39	0.39	0.40	0.40		0.40	0.40	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	192	1341	600	199	1341	425	370	1334		322	1336	
v/s Ratio Prot		0.22			c0.25			0.11			0.11	
v/s Ratio Perm	0.19		0.04	0.25		0.05	c0.34			0.05		
v/c Ratio	0.49	0.57	0.10	0.63	0.64	0.12	0.85	0.28		0.13	0.28	
Uniform Delay, d1	8.7	9.0	7.3	9.3	9.4	7.3	10.4	7.7		7.2	7.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.0	0.6	0.1	6.4	1.1	0.1	17.2	0.1		0.2	0.1	
Delay (s)	10.7	9.6	7.4	15.7	10.4	7.5	27.5	7.8		7.4	7.8	
Level of Service	B	A	A	B	B	A	C	A		A	A	
Approach Delay (s)		9.4			10.7			16.4			7.8	
Approach LOS		A			B			B			A	

Intersection Summary			
HCM Average Control Delay	11.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	37.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	68.5%	ICU Level of Service	C
Analysis Period (min)	15		

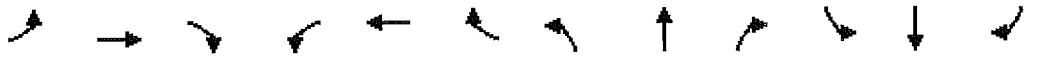
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	125	440	50	100	650	45	85	525	105	95	1345	175
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.98		1.00	0.99		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3385		1719	3405		1641	3097		1388	3360	
Flt Permitted	0.25	1.00		0.39	1.00		0.15	1.00		0.36	1.00	
Satd. Flow (perm)	455	3385		712	3405		266	3097		533	3360	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	134	473	54	108	699	48	91	565	113	102	1446	188
RTOR Reduction (vph)	0	17	0	0	10	0	0	33	0	0	20	0
Lane Group Flow (vph)	134	510	0	108	737	0	91	645	0	102	1614	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	10%	5%	57%	30%	5%	10%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	15.9	15.9		15.9	15.9		26.0	26.0		26.0	26.0	
Effective Green, g (s)	15.9	15.9		15.9	15.9		26.0	26.0		26.0	26.0	
Actuated g/C Ratio	0.32	0.32		0.32	0.32		0.52	0.52		0.52	0.52	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	145	1079		227	1085		139	1614		278	1751	
v/s Ratio Prot		0.15			0.22			0.21			c0.48	
v/s Ratio Perm	c0.29			0.15			0.34			0.19		
v/c Ratio	0.92	0.47		0.48	0.68		0.65	0.40		0.37	0.92	
Uniform Delay, d1	16.4	13.6		13.7	14.8		8.7	7.2		7.1	11.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	52.2	0.3		1.6	1.7		10.6	0.2		0.8	8.5	
Delay (s)	68.6	14.0		15.2	16.5		19.3	7.4		7.9	19.5	
Level of Service	E	B		B	B		B	A		A	B	
Approach Delay (s)		25.0			16.3			8.8			18.8	
Approach LOS		C			B			A			B	

Intersection Summary			
HCM Average Control Delay	17.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	49.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	87.1%	ICU Level of Service	E
Analysis Period (min)	15		

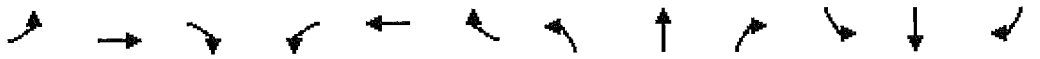
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	140	260	85	50	310	55	85	585	110	55	535	105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.96		1.00	0.98		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	2782		1641	3088		1504	3087		1719	3301	
Flt Permitted	0.51	1.00		0.52	1.00		0.35	1.00		0.32	1.00	
Satd. Flow (perm)	930	2782		907	3088		557	3087		572	3301	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	156	289	94	56	344	61	94	650	122	61	594	117
RTOR Reduction (vph)	0	62	0	0	39	0	0	38	0	0	40	0
Lane Group Flow (vph)	156	321	0	56	366	0	94	734	0	61	671	0
Heavy Vehicles (%)	5%	25%	25%	10%	15%	10%	20%	5%	63%	5%	5%	15%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	11.2	11.2		11.2	11.2		13.3	13.3		13.3	13.3	
Effective Green, g (s)	11.2	11.2		11.2	11.2		13.3	13.3		13.3	13.3	
Actuated g/C Ratio	0.34	0.34		0.34	0.34		0.41	0.41		0.41	0.41	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	320	959		313	1064		228	1263		234	1351	
v/s Ratio Prot		0.12			0.12			c0.24			0.20	
v/s Ratio Perm	c0.17			0.06			0.17			0.11		
v/c Ratio	0.49	0.34		0.18	0.34		0.41	0.58		0.26	0.50	
Uniform Delay, d1	8.4	7.9		7.4	7.9		6.8	7.4		6.3	7.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.2	0.2		0.3	0.2		1.2	0.7		0.6	0.3	
Delay (s)	9.6	8.1		7.7	8.1		8.0	8.1		6.9	7.4	
Level of Service	A	A		A	A		A	A		A	A	
Approach Delay (s)		8.5			8.1			8.1			7.4	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM Average Control Delay	8.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	32.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	54.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	325	355	70	45	355	65	130	895	130	100	795	160
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.98		1.00	0.98		1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3353		1504	3359		1641	3206		1719	3352	
Flt Permitted	0.50	1.00		0.49	1.00		0.25	1.00		0.25	1.00	
Satd. Flow (perm)	897	3353		780	3359		440	3206		461	3352	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	342	374	74	47	374	68	137	942	137	105	837	168
RTOR Reduction (vph)	0	40	0	0	27	0	0	29	0	0	42	0
Lane Group Flow (vph)	342	408	0	47	415	0	137	1050	0	105	963	0
Heavy Vehicles (%)	5%	5%	5%	20%	5%	5%	10%	5%	48%	5%	5%	5%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	16.0	16.0		16.0	16.0		15.7	15.7		15.7	15.7	
Effective Green, g (s)	16.0	16.0		16.0	16.0		15.7	15.7		15.7	15.7	
Actuated g/C Ratio	0.40	0.40		0.40	0.40		0.40	0.40		0.40	0.40	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	362	1351		314	1354		174	1268		182	1326	
v/s Ratio Prot		0.12			0.12			c0.33			0.29	
v/s Ratio Perm	c0.38			0.06			0.31			0.23		
v/c Ratio	0.94	0.30		0.15	0.31		0.79	0.83		0.58	0.73	
Uniform Delay, d1	11.4	8.1		7.5	8.1		10.5	10.8		9.4	10.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	33.0	0.1		0.2	0.1		20.6	4.6		4.4	2.0	
Delay (s)	44.4	8.2		7.8	8.2		31.1	15.4		13.8	12.2	
Level of Service	D	A		A	A		C	B		B	B	
Approach Delay (s)		23.9			8.2			17.2			12.3	
Approach LOS		C			A			B			B	

Intersection Summary			
HCM Average Control Delay	15.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	39.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	77.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	85	1285	160	80	530	45	115	405	45	90	595	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1388	3312	1468	1641	3167	1468	1719	3387		1719	3406	
Flt Permitted	0.43	1.00	1.00	0.17	1.00	1.00	0.29	1.00		0.44	1.00	
Satd. Flow (perm)	625	3312	1468	288	3167	1468	517	3387		788	3406	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	91	1382	172	86	570	48	124	435	48	97	640	43
RTOR Reduction (vph)	0	0	43	0	0	23	0	17	0	0	10	0
Lane Group Flow (vph)	91	1382	129	86	570	25	124	466	0	97	673	0
Heavy Vehicles (%)	30%	9%	10%	10%	14%	10%	5%	5%	5%	5%	5%	5%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6		6	2		2	4			8		
Actuated Green, G (s)	24.0	24.0	24.0	24.0	24.0	24.0	14.7	14.7		14.7	14.7	
Effective Green, g (s)	24.0	24.0	24.0	24.0	24.0	24.0	14.7	14.7		14.7	14.7	
Actuated g/C Ratio	0.51	0.51	0.51	0.51	0.51	0.51	0.31	0.31		0.31	0.31	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	321	1702	754	148	1628	754	163	1066		248	1072	
v/s Ratio Prot		c0.42			0.18			0.14			0.20	
v/s Ratio Perm	0.15		0.09	0.30		0.02	c0.24			0.12		
v/c Ratio	0.28	0.81	0.17	0.58	0.35	0.03	0.76	0.44		0.39	0.63	
Uniform Delay, d1	6.5	9.5	6.0	7.9	6.7	5.6	14.4	12.7		12.5	13.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	3.1	0.1	5.7	0.1	0.0	18.7	0.3		1.0	1.2	
Delay (s)	6.9	12.5	6.2	13.6	6.9	5.6	33.1	13.0		13.5	14.8	
Level of Service	A	B	A	B	A	A	C	B		B	B	
Approach Delay (s)		11.6			7.6			17.1			14.7	
Approach LOS		B			A			B			B	

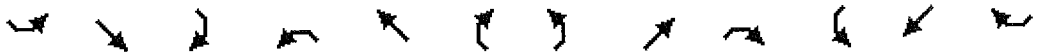
Intersection Summary			
HCM Average Control Delay	12.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	46.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	77.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	50	540	95	80	585	50	130	240	80	45	285	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3167	1404	1504	3195	1292	1719	2780		1641	3089	
Flt Permitted	0.39	1.00	1.00	0.43	1.00	1.00	0.53	1.00		0.54	1.00	
Satd. Flow (perm)	710	3167	1404	673	3195	1292	959	2780		931	3089	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	56	600	106	89	650	56	144	267	89	50	317	56
RTOR Reduction (vph)	0	0	63	0	0	33	0	59	0	0	37	0
Lane Group Flow (vph)	56	600	43	89	650	23	144	297	0	50	336	0
Heavy Vehicles (%)	5%	14%	15%	20%	13%	25%	5%	25%	25%	10%	15%	10%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6		6	2		2	4			8		
Actuated Green, G (s)	12.6	12.6	12.6	12.6	12.6	12.6	10.7	10.7		10.7	10.7	
Effective Green, g (s)	12.6	12.6	12.6	12.6	12.6	12.6	10.7	10.7		10.7	10.7	
Actuated g/C Ratio	0.40	0.40	0.40	0.40	0.40	0.40	0.34	0.34		0.34	0.34	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	286	1275	565	271	1286	520	328	950		318	1056	
v/s Ratio Prot		0.19			c0.20			0.11			0.11	
v/s Ratio Perm	0.08		0.03	0.13		0.02	c0.15			0.05		
v/c Ratio	0.20	0.47	0.08	0.33	0.51	0.04	0.44	0.31		0.16	0.32	
Uniform Delay, d1	6.1	6.9	5.8	6.4	7.0	5.7	8.0	7.6		7.2	7.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.3	0.1	0.7	0.3	0.0	0.9	0.2		0.2	0.2	
Delay (s)	6.4	7.2	5.8	7.2	7.3	5.7	8.9	7.8		7.4	7.8	
Level of Service	A	A	A	A	A	A	A	A		A	A	
Approach Delay (s)		6.9			7.2			8.1			7.7	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM Average Control Delay	7.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	31.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	49.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	90	780	145	120	870	70	300	325	65	40	325	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3252	1538	1641	3282	1468	1719	3353		1504	3358	
Flt Permitted	0.27	1.00	1.00	0.27	1.00	1.00	0.51	1.00		0.51	1.00	
Satd. Flow (perm)	486	3252	1538	464	3282	1468	930	3353		810	3358	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	95	821	153	126	916	74	316	342	68	42	342	63
RTOR Reduction (vph)	0	0	93	0	0	45	0	41	0	0	31	0
Lane Group Flow (vph)	95	821	60	126	916	29	316	369	0	42	374	0
Heavy Vehicles (%)	5%	11%	5%	10%	10%	10%	5%	5%	5%	20%	5%	5%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6		6	2		2	4			8		
Actuated Green, G (s)	14.9	14.9	14.9	14.9	14.9	14.9	15.0	15.0		15.0	15.0	
Effective Green, g (s)	14.9	14.9	14.9	14.9	14.9	14.9	15.0	15.0		15.0	15.0	
Actuated g/C Ratio	0.39	0.39	0.39	0.39	0.39	0.39	0.40	0.40		0.40	0.40	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	191	1278	605	182	1290	577	368	1327		321	1329	
v/s Ratio Prot		0.25			c0.28			0.11			0.11	
v/s Ratio Perm	0.20		0.04	0.27		0.02	c0.34			0.05		
v/c Ratio	0.50	0.64	0.10	0.69	0.71	0.05	0.86	0.28		0.13	0.28	
Uniform Delay, d1	8.7	9.3	7.3	9.6	9.7	7.1	10.5	7.8		7.3	7.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.0	1.1	0.1	10.8	1.9	0.0	17.7	0.1		0.2	0.1	
Delay (s)	10.7	10.5	7.3	20.4	11.5	7.2	28.2	7.9		7.5	7.9	
Level of Service	B	B	A	C	B	A	C	A		A	A	
Approach Delay (s)		10.0			12.3			16.7			7.9	
Approach LOS		B			B			B			A	

Intersection Summary			
HCM Average Control Delay	11.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	37.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	69.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	95	1400	175	85	580	50	125	440	50	100	650	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1388	3312	1468	1641	3167	1468	1719	3385		1719	3405	
Flt Permitted	0.39	1.00	1.00	0.15	1.00	1.00	0.25	1.00		0.39	1.00	
Satd. Flow (perm)	568	3312	1468	252	3167	1468	444	3385		712	3405	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	102	1505	188	91	624	54	134	473	54	108	699	48
RTOR Reduction (vph)	0	0	36	0	0	26	0	13	0	0	9	0
Lane Group Flow (vph)	102	1505	152	91	624	28	134	514	0	108	738	0
Heavy Vehicles (%)	30%	9%	10%	10%	14%	10%	5%	5%	5%	5%	5%	5%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6		6	2		2	4			8		
Actuated Green, G (s)	27.4	27.4	27.4	27.4	27.4	27.4	17.7	17.7		17.7	17.7	
Effective Green, g (s)	27.4	27.4	27.4	27.4	27.4	27.4	17.7	17.7		17.7	17.7	
Actuated g/C Ratio	0.52	0.52	0.52	0.52	0.52	0.52	0.33	0.33		0.33	0.33	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	293	1709	757	130	1634	757	148	1128		237	1135	
v/s Ratio Prot		c0.45			0.20			0.15			0.22	
v/s Ratio Perm	0.18		0.10	0.36		0.02	c0.30			0.15		
v/c Ratio	0.35	0.88	0.20	0.70	0.38	0.04	0.91	0.46		0.46	0.65	
Uniform Delay, d1	7.6	11.4	6.9	9.7	7.7	6.3	16.9	13.9		13.9	15.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	5.7	0.1	15.2	0.1	0.0	46.7	0.3		1.4	1.3	
Delay (s)	8.3	17.1	7.1	25.0	7.9	6.4	63.6	14.2		15.3	16.4	
Level of Service	A	B	A	C	A	A	E	B		B	B	
Approach Delay (s)		15.5			9.8			24.2			16.2	
Approach LOS		B			A			C			B	

Intersection Summary			
HCM Average Control Delay	16.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	53.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	83.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	55	590	105	85	640	55	140	260	85	50	310	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3167	1404	1504	3195	1292	1719	2782		1641	3088	
Flt Permitted	0.35	1.00	1.00	0.39	1.00	1.00	0.51	1.00		0.52	1.00	
Satd. Flow (perm)	635	3167	1404	610	3195	1292	930	2782		907	3088	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	61	656	117	94	711	61	156	289	94	56	344	61
RTOR Reduction (vph)	0	0	70	0	0	36	0	61	0	0	39	0
Lane Group Flow (vph)	61	656	47	94	711	25	156	322	0	56	366	0
Heavy Vehicles (%)	5%	14%	15%	20%	13%	25%	5%	25%	25%	10%	15%	10%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6		6	2		2	4			8		
Actuated Green, G (s)	13.1	13.1	13.1	13.1	13.1	13.1	11.2	11.2		11.2	11.2	
Effective Green, g (s)	13.1	13.1	13.1	13.1	13.1	13.1	11.2	11.2		11.2	11.2	
Actuated g/C Ratio	0.41	0.41	0.41	0.41	0.41	0.41	0.35	0.35		0.35	0.35	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	258	1284	569	247	1296	524	322	965		315	1071	
v/s Ratio Prot		0.21			c0.22			0.12			0.12	
v/s Ratio Perm	0.10		0.03	0.15		0.02	c0.17			0.06		
v/c Ratio	0.24	0.51	0.08	0.38	0.55	0.05	0.48	0.33		0.18	0.34	
Uniform Delay, d1	6.3	7.2	5.9	6.7	7.3	5.8	8.3	7.8		7.3	7.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	0.3	0.1	1.0	0.5	0.0	1.2	0.2		0.3	0.2	
Delay (s)	6.8	7.5	6.0	7.7	7.8	5.9	9.4	8.0		7.6	8.0	
Level of Service	A	A	A	A	A	A	A	A		A	A	
Approach Delay (s)		7.3			7.7			8.4			8.0	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM Average Control Delay	7.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	32.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	52.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	100	850	160	130	950	75	325	355	70	45	355	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3252	1538	1641	3282	1468	1719	3353		1504	3359	
Flt Permitted	0.26	1.00	1.00	0.26	1.00	1.00	0.50	1.00		0.49	1.00	
Satd. Flow (perm)	473	3252	1538	452	3282	1468	897	3353		780	3359	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	105	895	168	137	1000	79	342	374	74	47	374	68
RTOR Reduction (vph)	0	0	103	0	0	48	0	32	0	0	23	0
Lane Group Flow (vph)	105	895	65	137	1000	31	342	416	0	47	419	0
Heavy Vehicles (%)	5%	11%	5%	10%	10%	10%	5%	5%	5%	20%	5%	5%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6		6	2		2	4			8		
Actuated Green, G (s)	15.3	15.3	15.3	15.3	15.3	15.3	16.0	16.0		16.0	16.0	
Effective Green, g (s)	15.3	15.3	15.3	15.3	15.3	15.3	16.0	16.0		16.0	16.0	
Actuated g/C Ratio	0.39	0.39	0.39	0.39	0.39	0.39	0.41	0.41		0.41	0.41	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	184	1266	599	176	1278	572	365	1365		318	1368	
v/s Ratio Prot		0.28			c0.30			0.12			0.12	
v/s Ratio Perm	0.22		0.04	0.30		0.02	c0.38			0.06		
v/c Ratio	0.57	0.71	0.11	0.78	0.78	0.05	0.94	0.30		0.15	0.31	
Uniform Delay, d1	9.4	10.1	7.7	10.5	10.5	7.5	11.2	7.9		7.3	7.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.2	1.8	0.1	19.2	3.2	0.0	31.1	0.1		0.2	0.1	
Delay (s)	13.6	11.9	7.7	29.7	13.7	7.5	42.2	8.0		7.6	8.0	
Level of Service	B	B	A	C	B	A	D	A		A	A	
Approach Delay (s)		11.5			15.1			22.8			8.0	
Approach LOS		B			B			C			A	

Intersection Summary			
HCM Average Control Delay	14.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	39.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	75.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	85	1235	160	80	480	95	115	405	45	140	595	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1388	3438	1468	1641	3438	1029	1719	3387		1299	3406	
Flt Permitted	0.46	1.00	1.00	0.20	1.00	1.00	0.31	1.00		0.45	1.00	
Satd. Flow (perm)	674	3438	1468	340	3438	1029	556	3387		621	3406	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	91	1328	172	86	516	102	124	435	48	151	640	43
RTOR Reduction (vph)	0	0	52	0	0	53	0	15	0	0	11	0
Lane Group Flow (vph)	91	1328	120	86	516	49	124	468	0	151	672	0
Heavy Vehicles (%)	30%	5%	10%	10%	5%	57%	5%	5%	5%	39%	5%	5%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6		6	2		2	4			8		
Actuated Green, G (s)	20.3	20.3	20.3	20.3	20.3	20.3	14.2	14.2		14.2	14.2	
Effective Green, g (s)	20.3	20.3	20.3	20.3	20.3	20.3	14.2	14.2		14.2	14.2	
Actuated g/C Ratio	0.48	0.48	0.48	0.48	0.48	0.48	0.33	0.33		0.33	0.33	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	322	1642	701	162	1642	491	186	1132		207	1138	
v/s Ratio Prot		c0.39			0.15			0.14			0.20	
v/s Ratio Perm	0.13		0.08	0.25		0.05	0.22			c0.24		
v/c Ratio	0.28	0.81	0.17	0.53	0.31	0.10	0.67	0.41		0.73	0.59	
Uniform Delay, d1	6.7	9.4	6.3	7.8	6.8	6.1	12.1	10.9		12.5	11.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	3.0	0.1	3.3	0.1	0.1	8.7	0.2		12.1	0.8	
Delay (s)	7.2	12.5	6.4	11.1	6.9	6.2	20.8	11.2		24.6	12.6	
Level of Service	A	B	A	B	A	A	C	B		C	B	
Approach Delay (s)		11.5			7.3			13.1			14.7	
Approach LOS		B			A			B			B	

Intersection Summary			
HCM Average Control Delay	11.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	42.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	76.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

9
Route 7C

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	50	490	95	80	535	100	130	240	80	95	285	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3438	1404	1504	3438	991	1719	2780		1150	3089	
Flt Permitted	0.43	1.00	1.00	0.45	1.00	1.00	0.53	1.00		0.54	1.00	
Satd. Flow (perm)	774	3438	1404	711	3438	991	959	2780		652	3089	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	56	544	106	89	594	111	144	267	89	106	317	56
RTOR Reduction (vph)	0	0	64	0	0	68	0	58	0	0	36	0
Lane Group Flow (vph)	56	544	42	89	594	43	144	298	0	106	337	0
Heavy Vehicles (%)	5%	5%	15%	20%	5%	63%	5%	25%	25%	57%	15%	10%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6		6	2		2	4			8		
Actuated Green, G (s)	12.1	12.1	12.1	12.1	12.1	12.1	10.8	10.8		10.8	10.8	
Effective Green, g (s)	12.1	12.1	12.1	12.1	12.1	12.1	10.8	10.8		10.8	10.8	
Actuated g/C Ratio	0.39	0.39	0.39	0.39	0.39	0.39	0.35	0.35		0.35	0.35	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	303	1346	550	278	1346	388	335	972		228	1080	
v/s Ratio Prot		0.16			c0.17			0.11			0.11	
v/s Ratio Perm	0.07		0.03	0.13		0.04	0.15			c0.16		
v/c Ratio	0.18	0.40	0.08	0.32	0.44	0.11	0.43	0.31		0.46	0.31	
Uniform Delay, d1	6.2	6.8	5.9	6.5	6.9	6.0	7.7	7.3		7.8	7.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.2	0.1	0.7	0.2	0.1	0.9	0.2		1.5	0.2	
Delay (s)	6.5	7.0	6.0	7.2	7.1	6.1	8.6	7.5		9.3	7.5	
Level of Service	A	A	A	A	A	A	A	A		A	A	
Approach Delay (s)		6.8			7.0			7.8			7.9	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM Average Control Delay	7.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	30.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	48.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	90	730	145	120	820	120	300	325	65	90	325	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3438	1538	1641	3438	1091	1719	3353		1101	3358	
Flt Permitted	0.27	1.00	1.00	0.30	1.00	1.00	0.51	1.00		0.51	1.00	
Satd. Flow (perm)	492	3438	1538	510	3438	1091	930	3353		592	3358	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	95	768	153	126	863	126	316	342	68	95	342	63
RTOR Reduction (vph)	0	0	93	0	0	77	0	41	0	0	37	0
Lane Group Flow (vph)	95	768	60	126	863	49	316	369	0	95	368	0
Heavy Vehicles (%)	5%	5%	5%	10%	5%	48%	5%	5%	5%	64%	5%	5%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6		6	2		2	4			8		
Actuated Green, G (s)	14.7	14.7	14.7	14.7	14.7	14.7	15.0	15.0		15.0	15.0	
Effective Green, g (s)	14.7	14.7	14.7	14.7	14.7	14.7	15.0	15.0		15.0	15.0	
Actuated g/C Ratio	0.39	0.39	0.39	0.39	0.39	0.39	0.40	0.40		0.40	0.40	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	192	1341	600	199	1341	425	370	1334		236	1336	
v/s Ratio Prot		0.22			c0.25			0.11			0.11	
v/s Ratio Perm	0.19		0.04	0.25		0.05	c0.34			0.16		
v/c Ratio	0.49	0.57	0.10	0.63	0.64	0.12	0.85	0.28		0.40	0.28	
Uniform Delay, d1	8.7	9.0	7.3	9.3	9.4	7.3	10.4	7.7		8.1	7.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.0	0.6	0.1	6.4	1.1	0.1	17.2	0.1		1.1	0.1	
Delay (s)	10.7	9.6	7.4	15.7	10.4	7.5	27.5	7.8		9.3	7.8	
Level of Service	B	A	A	B	B	A	C	A		A	A	
Approach Delay (s)		9.4			10.7			16.4			8.1	
Approach LOS		A			B			B			A	

Intersection Summary			
HCM Average Control Delay	11.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	37.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	68.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	95	1345	175	85	525	105	125	440	50	155	650	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1388	3438	1468	1641	3438	1029	1719	3385		1299	3405	
Flt Permitted	0.43	1.00	1.00	0.19	1.00	1.00	0.27	1.00		0.42	1.00	
Satd. Flow (perm)	627	3438	1468	327	3438	1029	489	3385		569	3405	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	102	1446	188	91	565	113	134	473	54	167	699	48
RTOR Reduction (vph)	0	0	42	0	0	59	0	11	0	0	11	0
Lane Group Flow (vph)	102	1446	146	91	565	54	134	516	0	167	736	0
Heavy Vehicles (%)	30%	5%	10%	10%	5%	57%	5%	5%	5%	39%	5%	5%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6		6	2		2	4			8		
Actuated Green, G (s)	21.1	21.1	21.1	21.1	21.1	21.1	14.8	14.8		14.8	14.8	
Effective Green, g (s)	21.1	21.1	21.1	21.1	21.1	21.1	14.8	14.8		14.8	14.8	
Actuated g/C Ratio	0.48	0.48	0.48	0.48	0.48	0.48	0.34	0.34		0.34	0.34	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	301	1652	706	157	1652	495	165	1141		192	1148	
v/s Ratio Prot		c0.42			0.16			0.15			0.22	
v/s Ratio Perm	0.16		0.10	0.28		0.05	0.27			c0.29		
v/c Ratio	0.34	0.88	0.21	0.58	0.34	0.11	0.81	0.45		0.87	0.64	
Uniform Delay, d1	7.1	10.2	6.6	8.2	7.1	6.3	13.3	11.4		13.6	12.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	5.5	0.1	5.1	0.1	0.1	25.3	0.3		31.6	1.2	
Delay (s)	7.7	15.7	6.7	13.3	7.2	6.3	38.5	11.7		45.2	13.5	
Level of Service	A	B	A	B	A	A	D	B		D	B	
Approach Delay (s)		14.3			7.8			17.1			19.3	
Approach LOS		B			A			B			B	

Intersection Summary			
HCM Average Control Delay	14.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	43.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	81.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	55	535	105	85	585	110	140	260	85	105	310	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3438	1404	1504	3438	991	1719	2782		1150	3088	
Flt Permitted	0.39	1.00	1.00	0.43	1.00	1.00	0.51	1.00		0.52	1.00	
Satd. Flow (perm)	702	3438	1404	674	3438	991	930	2782		635	3088	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	61	594	117	94	650	122	156	289	94	117	344	61
RTOR Reduction (vph)	0	0	71	0	0	74	0	61	0	0	39	0
Lane Group Flow (vph)	61	594	46	94	650	48	156	322	0	117	366	0
Heavy Vehicles (%)	5%	5%	15%	20%	5%	63%	5%	25%	25%	57%	15%	10%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6		6	2		2	4			8		
Actuated Green, G (s)	12.7	12.7	12.7	12.7	12.7	12.7	11.3	11.3		11.3	11.3	
Effective Green, g (s)	12.7	12.7	12.7	12.7	12.7	12.7	11.3	11.3		11.3	11.3	
Actuated g/C Ratio	0.40	0.40	0.40	0.40	0.40	0.40	0.35	0.35		0.35	0.35	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	279	1364	557	267	1364	393	328	982		224	1090	
v/s Ratio Prot		0.17			c0.19			0.12			0.12	
v/s Ratio Perm	0.09		0.03	0.14		0.05	0.17			c0.18		
v/c Ratio	0.22	0.44	0.08	0.35	0.48	0.12	0.48	0.33		0.52	0.34	
Uniform Delay, d1	6.4	7.0	6.0	6.8	7.2	6.1	8.0	7.6		8.2	7.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	0.2	0.1	0.8	0.3	0.1	1.1	0.2		2.2	0.2	
Delay (s)	6.8	7.3	6.1	7.6	7.4	6.3	9.1	7.8		10.4	7.8	
Level of Service	A	A	A	A	A	A	A	A		B	A	
Approach Delay (s)		7.0			7.3			8.2			8.4	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM Average Control Delay	7.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	32.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	50.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	100	795	160	130	895	130	325	355	70	100	355	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3438	1538	1641	3438	1091	1719	3353		1101	3359	
Flt Permitted	0.26	1.00	1.00	0.26	1.00	1.00	0.50	1.00		0.49	1.00	
Satd. Flow (perm)	479	3438	1538	458	3438	1091	897	3353		571	3359	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	105	837	168	137	942	137	342	374	74	105	374	68
RTOR Reduction (vph)	0	0	103	0	0	84	0	40	0	0	27	0
Lane Group Flow (vph)	105	837	65	137	942	53	342	408	0	105	415	0
Heavy Vehicles (%)	5%	5%	5%	10%	5%	48%	5%	5%	5%	64%	5%	5%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6		6	2		2	4			8		
Actuated Green, G (s)	15.1	15.1	15.1	15.1	15.1	15.1	16.0	16.0		16.0	16.0	
Effective Green, g (s)	15.1	15.1	15.1	15.1	15.1	15.1	16.0	16.0		16.0	16.0	
Actuated g/C Ratio	0.39	0.39	0.39	0.39	0.39	0.39	0.41	0.41		0.41	0.41	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	185	1328	594	177	1328	421	367	1372		234	1375	
v/s Ratio Prot		0.24			0.27			0.12			0.12	
v/s Ratio Perm	0.22		0.04	c0.30		0.05	c0.38			0.18		
v/c Ratio	0.57	0.63	0.11	0.77	0.71	0.13	0.93	0.30		0.45	0.30	
Uniform Delay, d1	9.4	9.7	7.7	10.5	10.1	7.7	11.0	7.8		8.4	7.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.0	1.0	0.1	18.8	1.8	0.1	30.1	0.1		1.4	0.1	
Delay (s)	13.4	10.7	7.8	29.3	11.9	7.9	41.1	7.9		9.7	7.9	
Level of Service	B	B	A	C	B	A	D	A		A	A	
Approach Delay (s)		10.5			13.4			22.3			8.3	
Approach LOS		B			B			C			A	

Intersection Summary			
HCM Average Control Delay	13.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	39.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	73.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

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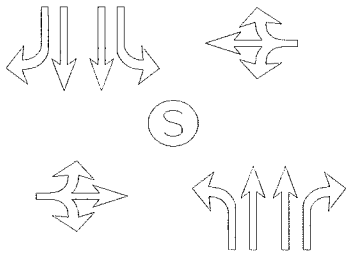
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	1 OF 9

E/W STREET : PEORIA STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
31
ROUTE
5B, 6B, 8C

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
PEORIA STREET						
EB LEFT	15	40%		15	5	20
EB THRU	5	80%		5	5	10
EB RIGHT	5	40%		5	5	10
WB LEFT	15	20%		15	5	20
WB THRU	5	20%		5	5	10
WB RIGHT	10	20%		10	5	15
GLEN OAKS BLVD						
NB LEFT	15	45%		15	5	20
NB THRU	525	10%	**50**	575	50	625
NB RIGHT	25	65%		25	5	30
SB LEFT	30	45%		30	5	35
SB THRU	1250	5%	**50**	1300	115	1415
SB RIGHT	40	20%		40	5	45
TOTALS	**1940**		**100**	**2040**	**215**	**2255**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Sep-13	VV.110264.0000	2 OF 9

E/W STREET : PEORIA STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
31
ROUTE
7A, 7C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
PEORIA STREET						
EB LEFT	15	40%	**50**	65	5	70
EB THRU	5	80%		5	5	10
EB RIGHT	5	40%		5	5	10
WB LEFT	15	20%		15	5	20
WB THRU	5	20%		5	5	10
WB RIGHT	10	20%		10	5	15
GLEN OAKS BLVD						
NB LEFT	15	45%		15	5	20
NB THRU	525	10%		525	45	570
NB RIGHT	25	65%		25	5	30
SB LEFT	30	45%		30	5	35
SB THRU	1250	5%		1250	115	1365
SB RIGHT	40	20%	**50**	90	10	100
TOTALS	**1940**		**100**	**2040**	**215**	**2255**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Sep-13	VV.110264.0000	3 OF 9

E/W STREET : PEORIA STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 31
ROUTE 7B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
PEORIA STREET						
EB LEFT	15	40%		15	5	20
EB THRU	5	80%		5	5	10
EB RIGHT	5	40%	**50**	55	5	60
WB LEFT	15	20%		15	5	20
WB THRU	5	20%		5	5	10
WB RIGHT	10	20%		10	5	15
GLEN OAKS BLVD						
NB LEFT	15	45%	**50**	65	5	70
NB THRU	525	10%		525	45	570
NB RIGHT	25	65%		25	5	30
SB LEFT	30	45%		30	5	35
SB THRU	1250	5%		1250	115	1365
SB RIGHT	40	20%		40	5	45
TOTALS	**1940**		**100**	**2040**	**210**	**2250**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	4 OF 9

E/W STREET : PEORIA STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 31
ROUTE 5B, 6B, 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
PEORIA STREET						
EB LEFT	25	40%		25	5	30
EB THRU	5	60%		5	5	10
EB RIGHT	30	45%		30	5	35
WB LEFT	20	30%		20	5	25
WB THRU	5	20%		5	5	10
WB RIGHT	15	5%		15	5	20
GLEN OAKS BLVD						
NB LEFT	25	15%		25	5	30
NB THRU	525	15%	**50**	575	50	625
NB RIGHT	15	45%		15	5	20
SB LEFT	10	40%		10	5	15
SB THRU	530	15%	**50**	580	50	630
SB RIGHT	15	45%		15	5	20
TOTALS	**1220**		**100**	**1320**	**150**	**1470**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Sep-13	VV.110264.0000	5 OF 9

E/W STREET : PEORIA STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 31
ROUTE 7A, 7C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
PEORIA STREET						
EB LEFT	25	40%	**50**	75	5	80
EB THRU	5	60%		5	5	10
EB RIGHT	30	45%		30	5	35
WB LEFT	20	30%		20	5	25
WB THRU	5	20%		5	5	10
WB RIGHT	15	5%		15	5	20
GLEN OAKS BLVD						
NB LEFT	25	15%		25	5	30
NB THRU	525	15%		525	45	570
NB RIGHT	15	45%		15	5	20
SB LEFT	10	40%		10	5	15
SB THRU	530	15%		530	50	580
SB RIGHT	15	45%	**50**	65	5	70
TOTALS	**1220**		**100**	**1320**	**145**	**1465**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Sep-13	VV.110264.0000	6 OF 9

E/W STREET : PEORIA STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 31
ROUTE 7B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
PEORIA STREET						
EB LEFT	25	40%		25	5	30
EB THRU	5	60%		5	5	10
EB RIGHT	30	45%	**50**	80	5	85
WB LEFT	20	30%		20	5	25
WB THRU	5	20%		5	5	10
WB RIGHT	15	5%		15	5	20
GLEN OAKS BLVD						
NB LEFT	25	15%	**50**	75	5	80
NB THRU	525	15%		525	45	570
NB RIGHT	15	45%		15	5	20
SB LEFT	10	40%		10	5	15
SB THRU	530	15%		530	50	580
SB RIGHT	15	45%		15	5	20
TOTALS	**1220**		**100**	**1320**	**145**	**1465**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	7 OF 9

E/W STREET : PEORIA STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 31
ROUTE 5B, 6B, 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
PEORIA STREET						
EB LEFT	40	20%		40	5	45
EB THRU	10	40%		10	5	15
EB RIGHT	20	45%		20	5	25
WB LEFT	30	55%		30	5	35
WB THRU	5	5%		5	5	10
WB RIGHT	55	20%		55	5	60
GLEN OAKS BLVD						
NB LEFT	25	45%		25	5	30
NB THRU	975	5%	**50**	1025	90	1115
NB RIGHT	25	50%		25	5	30
SB LEFT	35	50%		35	5	40
SB THRU	745	5%	**50**	795	70	865
SB RIGHT	15	45%		15	5	20
TOTALS	**1980**		**100**	**2080**	**210**	**2290**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Sep-13	VV.110264.0000	8 OF 9

E/W STREET : PEORIA STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 31
ROUTE 7A, 7C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
PEORIA STREET						
EB LEFT	40	20%	**50**	90	10	100
EB THRU	10	40%		10	5	15
EB RIGHT	20	45%		20	5	25
WB LEFT	30	55%		30	5	35
WB THRU	5	5%		5	5	10
WB RIGHT	55	20%		55	5	60
GLEN OAKS BLVD						
NB LEFT	25	45%		25	5	30
NB THRU	975	5%		975	90	1065
NB RIGHT	25	50%		25	5	30
SB LEFT	35	50%		35	5	40
SB THRU	745	5%		745	65	810
SB RIGHT	15	45%	**50**	65	5	70
TOTALS	**1980**		**100**	**2080**	**210**	**2290**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Sep-13	VV.110264.0000	9 OF 9

E/W STREET : PEORIA STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 31
ROUTE 7B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
PEORIA STREET						
EB LEFT	40	20%		40	5	45
EB THRU	10	40%		10	5	15
EB RIGHT	20	45%	**50**	70	5	75
WB LEFT	30	55%		30	5	35
WB THRU	5	5%		5	5	10
WB RIGHT	55	20%		55	5	60
GLEN OAKS BLVD						
NB LEFT	25	45%	**50**	75	5	80
NB THRU	975	5%		975	90	1065
NB RIGHT	25	50%		25	5	30
SB LEFT	35	50%		35	5	40
SB THRU	745	5%		745	65	810
SB RIGHT	15	45%		15	5	20
TOTALS	**1980**		**100**	**2080**	**205**	**2285**

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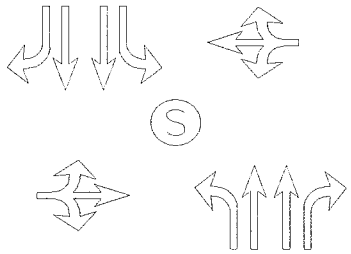
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	1 OF 9

E/W STREET : PEORIA STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 31
ROUTE 5B, 6B, 8C

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
PEORIA STREET								
EB LEFT	8	6	18	25	**0**	25	5	30
EB THRU	0	4	12	10	**0**	10	5	15
EB RIGHT	1	2	6	5	**0**	5	5	10
WB LEFT	12	3	9	20	**0**	20	5	25
WB THRU	5	1	3	10	**0**	10	5	15
WB RIGHT	10	2	6	15	**0**	15	5	20
GLEN OAKS BLVD								
NB LEFT	7	7	21	30	**0**	30	5	35
NB THRU	485	41	123	610	**150**	760	70	830
NB RIGHT	10	16	48	60	**0**	60	5	65
SB LEFT	15	14	42	55	**0**	55	5	60
SB THRU	1179	69	207	1385	**150**	1535	140	1675
SB RIGHT	32	8	24	55	**0**	55	5	60
TOTALS	**1764**				**300**	**2580**	**260**	**2840**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	2 OF 9

E/W STREET : PEORIA STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 31
ROUTE 7A, 7C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
PEORIA STREET								
EB LEFT	8	6	18	25	**150**	175	15	190
EB THRU	0	4	12	10	**0**	10	5	15
EB RIGHT	1	2	6	5	**0**	5	5	10
WB LEFT	12	3	9	20	**0**	20	5	25
WB THRU	5	1	3	10	**0**	10	5	15
WB RIGHT	10	2	6	15	**0**	15	5	20
GLEN OAKS BLVD								
NB LEFT	7	7	21	30	**0**	30	5	35
NB THRU	485	41	123	610	**0**	610	55	665
NB RIGHT	10	16	48	60	**0**	60	5	65
SB LEFT	15	14	42	55	**0**	55	5	60
SB THRU	1179	69	207	1385	**0**	1385	125	1510
SB RIGHT	32	8	24	55	**150**	205	20	225
TOTALS	**1764**				**300**	**2580**	**255**	**2835**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	3 OF 9

E/W STREET : PEORIA STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 31
ROUTE 7B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
PEORIA STREET								
EB LEFT	8	6	18	25	**0**	25	5	30
EB THRU	0	4	12	10	**0**	10	5	15
EB RIGHT	1	2	6	5	**150**	155	15	170
WB LEFT	12	3	9	20	**0**	20	5	25
WB THRU	5	1	3	10	**0**	10	5	15
WB RIGHT	10	2	6	15	**0**	15	5	20
GLEN OAKS BLVD								
NB LEFT	7	7	21	30	**150**	180	15	195
NB THRU	485	41	123	610	**0**	610	55	665
NB RIGHT	10	16	48	60	**0**	60	5	65
SB LEFT	15	14	42	55	**0**	55	5	60
SB THRU	1179	69	207	1385	**0**	1385	125	1510
SB RIGHT	32	8	24	55	**0**	55	5	60
TOTALS	**1764**				**300**	**2580**	**250**	**2830**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	4 OF 9

E/W STREET : PEORIA STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 31
ROUTE 5B, 6B, 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
PEORIA STREET								
EB LEFT	17	10	30	45	**0**	45	5	50
EB THRU	2	3	9	10	**0**	10	5	15
EB RIGHT	19	13	39	60	**0**	60	5	65
WB LEFT	12	6	18	30	**0**	30	5	35
WB THRU	4	1	3	5	**0**	5	5	10
WB RIGHT	12	1	3	15	**0**	15	5	20
GLEN OAKS BLVD								
NB LEFT	23	4	12	35	**0**	35	5	40
NB THRU	457	67	201	660	**150**	810	75	885
NB RIGHT	10	7	21	30	**0**	30	5	35
SB LEFT	8	4	12	20	**0**	20	5	25
SB THRU	440	88	264	705	**150**	855	75	930
SB RIGHT	7	7	21	30	**0**	30	5	35
TOTALS	**1011**				**300**	**1945**	**200**	**2145**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	5 OF 9

E/W STREET : PEORIA STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 31
ROUTE 7A, 7C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
PEORIA STREET								
EB LEFT	17	10	30	45	**150**	195	20	215
EB THRU	2	3	9	10	**0**	10	5	15
EB RIGHT	19	13	39	60	**0**	60	5	65
WB LEFT	12	6	18	30	**0**	30	5	35
WB THRU	4	1	3	5	**0**	5	5	10
WB RIGHT	12	1	3	15	**0**	15	5	20
GLEN OAKS BLVD								
NB LEFT	23	4	12	35	**0**	35	5	40
NB THRU	457	67	201	660	**0**	660	60	720
NB RIGHT	10	7	21	30	**0**	30	5	35
SB LEFT	8	4	12	20	**0**	20	5	25
SB THRU	440	88	264	705	**0**	705	65	770
SB RIGHT	7	7	21	30	**150**	180	15	195
TOTALS	**1011**				**300**	**1945**	**200**	**2145**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	6 OF 9

E/W STREET : PEORIA STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 31
ROUTE 7B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
PEORIA STREET								
EB LEFT	17	10	30	45	**0**	45	5	50
EB THRU	2	3	9	10	**0**	10	5	15
EB RIGHT	19	13	39	60	**150**	210	20	230
WB LEFT	12	6	18	30	**0**	30	5	35
WB THRU	4	1	3	5	**0**	5	5	10
WB RIGHT	12	1	3	15	**0**	15	5	20
GLEN OAKS BLVD								
NB LEFT	23	4	12	35	**150**	185	15	200
NB THRU	457	67	201	660	**0**	660	60	720
NB RIGHT	10	7	21	30	**0**	30	5	35
SB LEFT	8	4	12	20	**0**	20	5	25
SB THRU	440	88	264	705	**0**	705	65	770
SB RIGHT	7	7	21	30	**0**	30	5	35
TOTALS	**1011**				**300**	**1945**	**200**	**2145**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	7 OF 9

E/W STREET : PEORIA STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
31
ROUTE
5B, 6B, 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
PEORIA STREET								
EB LEFT	33	7	21	55	**0**	55	5	60
EB THRU	8	4	12	20	**0**	20	5	25
EB RIGHT	11	9	27	40	**0**	40	5	45
WB LEFT	13	17	51	65	**0**	65	5	70
WB THRU	5	0	0	5	**0**	5	5	10
WB RIGHT	44	10	30	75	**0**	75	5	80
GLEN OAKS BLVD								
NB LEFT	12	11	33	45	**0**	45	5	50
NB THRU	910	67	201	1110	**150**	1260	115	1375
NB RIGHT	14	12	36	50	**0**	50	5	55
SB LEFT	16	17	51	65	**0**	65	5	70
SB THRU	700	43	129	830	**150**	980	90	1070
SB RIGHT	9	7	21	30	**0**	30	5	35
TOTALS	**1775**				**300**	**2690**	**255**	**2945**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	8 OF 9

E/W STREET : PEORIA STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
31
ROUTE
7A, 7C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
PEORIA STREET								
EB LEFT	33	7	21	55	**150**	205	20	225
EB THRU	8	4	12	20	**0**	20	5	25
EB RIGHT	11	9	27	40	**0**	40	5	45
WB LEFT	13	17	51	65	**0**	65	5	70
WB THRU	5	0	0	5	**0**	5	5	10
WB RIGHT	44	10	30	75	**0**	75	5	80
GLEN OAKS BLVD								
NB LEFT	12	11	33	45	**0**	45	5	50
NB THRU	910	67	201	1110	**0**	1110	100	1210
NB RIGHT	14	12	36	50	**0**	50	5	55
SB LEFT	16	17	51	65	**0**	65	5	70
SB THRU	700	43	129	830	**0**	830	75	905
SB RIGHT	9	7	21	30	**150**	180	15	195
TOTALS	**1775**				**300**	**2690**	**250**	**2940**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	9 OF 9

E/W STREET : PEORIA STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 31
ROUTE 7B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
PEORIA STREET								
EB LEFT	33	7	21	55	**0**	55	5	60
EB THRU	8	4	12	20	**0**	20	5	25
EB RIGHT	11	9	27	40	**150**	190	15	205
WB LEFT	13	17	51	65	**0**	65	5	70
WB THRU	5	0	0	5	**0**	5	5	10
WB RIGHT	44	10	30	75	**0**	75	5	80
GLEN OAKS BLVD								
NB LEFT	12	11	33	45	**150**	195	20	215
NB THRU	910	67	201	1110	**0**	1110	100	1210
NB RIGHT	14	12	36	50	**0**	50	5	55
SB LEFT	16	17	51	65	**0**	65	5	70
SB THRU	700	43	129	830	**0**	830	75	905
SB RIGHT	9	7	21	30	**0**	30	5	35
TOTALS	**1775**				**300**	**2690**	**250**	**2940**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: GLEN OAKS BLVD
EAST-WEST STREET: PEORIA
JURISDICTION: LA

DATE: 05-30-12

PEAK HOUR: 07:00AM

NORTH LEG

TOTAL: 1,317

Rt	Thru	Lt	
40	1248	29	Total
9	290	5	1st
10	335	4	2nd
10	353	14	3rd
11	270	6	4th

EAST LEG TOTAL: 33

	1st	2nd	3rd	4th	Total
Rt	0	0	8	4	12
Thru	1	1	3	1	6
Lt	0	1	5	9	15

WEST LEG TOTAL: 21

Total	1st	2nd	3rd	4th	
14	2	4	4	4	Lt
4	0	0	2	2	Thru
3	0	0	2	1	Rt

PEAK HOUR FACTORS

NORTH LEG = 0.87
SOUTH LEG = 0.82
EAST LEG = 0.52
WEST LEG = 0.66

ALL LEGS = 0.91

SOUTH LEG

TOTAL: 566

	Lt	Thru	Rt
1st	5	112	4
2nd	6	129	6
3rd	3	121	7
4th	0	164	9
Total	14	526	26

HOUR TOTAL: 1,937

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: PEORIA

TIME: 07:00AM-08:00AM DATE: 05-30-12

NORTH LEG

Rt	Thru	Lt	
40	1248	29	Total
9	290	5	1st
10	335	4	2nd
10	353	14	3rd
11	270	6	4th

	1st	2nd	3rd	4th	Total
Rt	0	0	8	4	12
Thru	1	1	3	1	6
Lt	0	1	5	9	15

Total	1st	2nd	3rd	4th	
14	2	4	4	4	Lt
4	0	0	2	2	Thru
3	0	0	2	1	Rt

	Lt	Thru	Rt
1st	5	112	4
2nd	6	129	6
3rd	3	121	7
4th	0	164	9
Total	14	526	26

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: PEORIA

TIME: 08:00AM-09:00AM DATE: 05-30-12

NORTH LEG

Rt	Thru	Lt	
24	839	26	Total
7	249	8	1st
8	231	2	2nd
3	193	8	3rd
6	166	8	4th

	1st	2nd	3rd	4th	Total
Rt	1	4	6	1	12
Thru	3	3	3	3	12
Lt	8	10	8	6	32

Total	1st	2nd	3rd	4th	
5	0	1	2	2	Lt
3	0	1	1	1	Thru
11	2	2	4	3	Rt

	Lt	Thru	Rt
1st	3	105	2
2nd	2	126	4
3rd	6	95	5
4th	3	96	5
Total	14	422	16

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : GLEN OAKS BLVD LA

EAST-WEST STREET : PEORIA 05-30-12

BEGINNING TIME : 07:00AM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
5	268	1	2	12	2	1	5	2	1	5	0	304
10	318	0	0	8	0	0	5	3	0	4	1	349
7	338	9	1	9	0	1	2	5	1	4	0	377
10	255	5	1	6	0	0	3	0	0	6	1	287
4	236	5	1	6	1	1	4	2	1	3	0	264
7	221	0	0	4	2	1	4	0	0	2	0	241
0	188	6	2	4	0	1	0	1	0	1	1	204
4	155	1	0	8	2	0	2	4	2	1	1	180
47	1979	27	7	57	7	5	25	17	5	26	4	2206
						SOUTH LEG						
3	101	2	0	6	1	1	3	1	0	2	1	121
0	118	5	2	6	1	2	2	0	2	3	0	141
3	112	0	0	5	0	2	2	2	2	2	1	131
4	154	0	2	3	0	1	5	0	2	2	0	173
2	92	3	0	4	0	0	4	0	0	5	0	110
2	118	0	1	3	0	1	3	1	0	2	1	132
4	85	4	1	4	0	0	3	1	0	3	1	106
3	79	1	0	6	1	1	7	0	1	4	1	104
21	859	15	6	37	3	8	29	5	7	23	5	1018
						EAST LEG						
0	1	0	0	0	0	0	0	0	0	0	0	1
0	1	1	0	0	0	0	0	0	0	0	0	2
6	2	3	0	1	1	0	0	1	2	0	0	16
4	1	8	0	0	0	0	0	0	0	0	1	14
0	3	8	0	0	0	0	0	0	1	0	0	12
2	3	9	2	0	1	0	0	0	0	0	0	17
4	3	8	0	0	0	1	0	0	1	0	0	17
1	3	5	0	0	1	0	0	0	0	0	0	10
17	17	42	2	1	3	1	0	1	4	0	1	89
						WEST LEG						
0	0	1	0	0	1	0	0	0	0	0	0	2
0	0	3	0	0	0	0	0	1	0	0	0	4
1	0	1	1	0	2	0	2	0	0	0	1	8
0	0	3	0	1	0	0	0	1	1	1	0	7
0	0	-4	2	0	2	0	0	0	0	0	2	2
1	0	1	0	0	0	1	1	0	0	0	0	4
2	0	0	2	1	2	0	0	0	0	0	0	7
2	0	0	0	0	0	0	1	0	1	0	2	6
6	0	5	5	2	7	1	4	2	2	1	5	40

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: GLEN OAKS BLVD
EAST-WEST STREET: PEORIA
JURISDICTION: LA

DATE: 05-30-12

PEAK HOUR: 12:45PM

NORTH LEG

TOTAL: 554

Rt	Thru	Lt	
14	528	12	Total
4	144	3	1st
4	117	2	2nd
3	131	1	3rd
3	136	6	4th

EAST LEG TOTAL: 36

	1st	2nd	3rd	4th	Total
Rt	5	4	1	3	13
Thru	3	1	1	0	5
Lt	2	2	11	3	18

WEST LEG TOTAL: 64

Total	1st	2nd	3rd	4th	
27	6	4	6	11	Lt
5	0	2	0	3	Thru
32	13	9	4	6	Rt

SOUTH LEG

TOTAL: 568

	Lt	Thru	Rt
1st	4	112	7
2nd	7	127	6
3rd	9	133	2
4th	7	152	2
Total	27	524	17

PEAK HOUR FACTORS

NORTH LEG = 0.92
SOUTH LEG = 0.88
EAST LEG = 0.69
WEST LEG = 0.80

ALL LEGS = 0.92

HOUR TOTAL: 1,222

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: PEORIA

TIME: 12:00PM-01:00PM DATE: 05-30-12

NORTH LEG

Rt	Thru	Lt	
22	519	16	Total
9	129	3	1st
6	125	8	2nd
3	121	2	3rd
4	144	3	4th

	1st	2nd	3rd	4th	Total
Rt	1	4	3	5	13
Thru	1	2	2	3	8
Lt	3	3	7	2	15

Total	1st	2nd	3rd	4th	
25	6	3	10	6	Lt
5	1	3	1	0	Thru
33	9	6	5	13	Rt

	Lt	Thru	Rt
1st	2	128	1
2nd	3	135	9
3rd	9	126	7
4th	4	112	7
Total	18	501	24

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: PEORIA

TIME: 01:00PM-02:00PM DATE: 05-30-12

NORTH LEG

Rt	Thru	Lt	
22	488	15	Total
4	117	2	1st
3	131	1	2nd
3	136	6	3rd
12	104	6	4th

	1st	2nd	3rd	4th	Total
Rt	4	1	3	4	12
Thru	1	1	0	4	6
Lt	2	11	3	5	21

Total	1st	2nd	3rd	4th	
23	4	6	11	2	Lt
6	2	0	3	1	Thru
23	9	4	6	4	Rt

	Lt	Thru	Rt
1st	7	127	6
2nd	9	133	2
3rd	7	152	2
4th	3	105	8
Total	26	517	18

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : GLEN OAKS BLVD LA

EAST-WEST STREET : PEORIA 05-30-12

BEGINNING TIME : 12:00PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
6	112	3	2	6	0	1	6	0	0	5	0	141
4	104	4	1	10	4	1	2	0	0	9	0	139
3	101	2	0	8	0	0	4	0	0	8	0	126
2	120	2	2	9	1	0	8	0	0	7	0	151
3	91	1	1	15	1	0	6	0	0	5	0	123
1	110	1	2	7	0	0	4	0	0	10	0	135
1	119	4	2	7	2	0	4	0	0	6	0	145
5	65	2	3	15	0	4	10	3	0	14	1	122
25	822	19	13	77	8	6	44	3	0	64	1	1082
						SOUTH LEG						
1	107	2	0	10	0	0	3	0	0	8	0	131
6	117	3	1	5	0	1	3	0	1	10	0	147
4	110	8	1	7	0	2	3	0	0	6	1	142
3	93	2	1	6	1	1	6	1	2	7	0	123
4	108	6	2	9	1	0	1	0	0	9	0	140
2	119	9	0	6	0	0	2	0	0	6	0	144
1	137	6	1	6	1	0	0	0	0	9	0	161
6	74	0	2	19	2	0	3	0	0	9	1	116
27	865	36	8	68	5	4	21	1	3	64	2	1104
						EAST LEG						
1	0	3	0	1	0	0	0	0	0	0	0	5
0	1	0	2	0	1	2	0	2	0	1	0	9
2	1	5	0	0	2	0	0	0	1	1	0	12
4	3	2	0	0	0	1	0	0	0	0	0	10
4	0	1	0	0	1	0	1	0	0	0	0	7
1	1	8	0	0	2	0	0	1	0	0	0	13
3	0	1	0	0	2	0	0	0	0	0	0	6
0	3	3	2	1	1	1	0	0	1	0	1	13
15	9	23	4	2	9	4	1	3	2	2	1	75
						WEST LEG						
8	0	6	1	1	0	0	0	0	0	0	0	16
5	1	3	1	0	0	0	1	0	0	1	0	12
2	1	6	1	0	3	2	0	1	0	0	0	16
9	0	4	0	0	0	2	0	1	2	0	1	19
5	2	3	0	0	0	3	0	1	1	0	0	15
3	0	1	0	0	1	0	0	1	1	0	3	10
2	0	9	0	1	0	3	2	0	1	0	2	20
0	1	1	2	0	0	1	0	0	1	0	1	7
34	5	33	5	2	4	11	3	4	6	1	7	115

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: GLEN OAKS BLVD
EAST-WEST STREET: PEORIA
JURISDICTION: LA

DATE: 05-30-12

PEAK HOUR: 04:30PM

NORTH LEG

TOTAL: 792

Rt	Thru	Lt	
16	743	33	Total
2	185	9	1st
3	164	8	2nd
8	199	7	3rd
3	195	9	4th

EAST LEG TOTAL: 89

	1st	2nd	3rd	4th	Total
Rt	11	12	12	19	54
Thru	0	1	2	2	5
Lt	8	9	4	9	30

WEST LEG TOTAL: 72

Total	1st	2nd	3rd	4th	
40	13	13	8	6	Lt
12	5	2	2	3	Thru
20	8	2	4	6	Rt

PEAK HOUR FACTORS

NORTH LEG = 0.93
SOUTH LEG = 0.93
EAST LEG = 0.74
WEST LEG = 0.69

ALL LEGS = 0.95

SOUTH LEG

TOTAL: 1,026

	Lt	Thru	Rt
1st	2	250	3
2nd	5	222	7
3rd	7	260	8
4th	9	245	8
Total	23	977	26

HOUR TOTAL: 1,979

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: PEORIA

TIME: 04:00PM-05:00PM DATE: 05-30-12

NORTH LEG

Rt	Thru	Lt	
15	615	28	Total
4	131	5	1st
6	135	6	2nd
2	185	9	3rd
3	164	8	4th

	1st	2nd	3rd	4th	Total
Rt	4	5	11	12	32
Thru	1	1	0	1	3
Lt	1	4	8	9	22

Total	1st	2nd	3rd	4th	
45	9	10	13	13	Lt
12	1	4	5	2	Thru
17	3	4	8	2	Rt

	Lt	Thru	Rt
1st	5	213	9
2nd	6	191	9
3rd	2	250	3
4th	5	222	7
Total	18	876	28

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: PEORIA

TIME: 05:00PM-06:00PM DATE: 05-30-12

NORTH LEG

Rt	Thru	Lt	
14	751	32	Total
8	199	7	1st
3	195	9	2nd
1	180	13	3rd
2	177	3	4th

	1st	2nd	3rd	4th	Total
Rt	12	19	8	4	43
Thru	2	2	3	1	8
Lt	4	9	3	13	29

Total	1st	2nd	3rd	4th	
31	8	6	9	8	Lt
12	2	3	4	3	Thru
12	4	6	1	1	Rt

	Lt	Thru	Rt
1st	7	260	8
2nd	9	245	8
3rd	3	235	7
4th	0	239	9
Total	19	979	32

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : GLEN OAKS BLVD LA

EAST-WEST STREET : PEORIA 05-30-12

BEGINNING TIME : 04:00PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
0	105	2	2	17	0	1	4	3	1	5	0	140
3	123	1	0	8	0	1	2	5	2	2	0	147
1	173	5	1	8	2	0	2	2	0	2	0	196
2	153	3	0	5	2	1	3	3	0	3	0	175
4	184	5	3	8	0	1	4	2	0	3	0	214
2	190	3	0	3	1	1	1	5	0	1	0	207
0	170	6	1	7	4	0	2	2	0	1	1	194
2	169	0	0	2	1	0	2	1	0	4	1	182
14	1267	25	7	58	10	5	20	23	3	21	2	1455
						SOUTH LEG						
6	198	2	1	10	1	2	5	1	0	0	1	227
7	178	1	0	7	1	2	2	3	0	4	1	206
2	238	2	0	7	0	1	5	0	0	0	0	255
4	207	0	0	9	5	2	5	0	1	1	0	234
5	238	5	1	11	0	2	7	1	0	4	1	275
3	227	5	3	14	0	2	2	1	0	2	3	262
5	226	1	0	6	1	2	3	0	0	0	1	245
8	224	0	1	11	0	0	2	0	0	2	0	248
40	1736	16	6	75	8	13	31	6	1	13	7	1952
						EAST LEG						
3	1	1	0	0	0	1	0	0	0	0	0	6
5	0	4	0	1	0	0	0	0	0	0	0	10
10	0	5	0	0	3	0	0	0	1	0	0	19
8	1	0	3	0	8	0	0	1	1	0	0	22
8	2	2	4	0	2	0	0	0	0	0	0	18
18	2	6	0	0	3	0	0	0	1	0	0	30
6	3	3	2	0	0	0	0	0	0	0	0	14
4	1	11	0	0	2	0	0	0	0	0	0	18
62	10	32	9	1	18	1	0	1	3	0	0	137
						WEST LEG						
0	0	9	0	0	0	1	0	0	2	1	0	13
3	3	9	1	0	1	0	1	0	0	0	0	18
3	5	12	3	0	1	1	0	0	1	0	0	26
2	0	10	0	1	3	0	1	0	0	0	0	17
2	1	6	1	0	0	0	1	0	1	0	2	14
4	2	5	0	1	0	1	0	0	1	0	1	15
1	3	8	0	0	1	0	1	0	0	0	0	14
1	0	6	0	0	1	0	2	1	0	1	0	12
16	14	65	5	2	7	3	6	1	5	2	3	129

Prepared by Newport Traffic Studies

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	5	5	15	5	10	15	525	25	30	1250	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.97			0.95		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.97			0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1126			1504		1203	3282	1009	1203	3438	1346
Flt Permitted		1.00			1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1161			1542		1203	3282	1009	1203	3438	1346
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	16	5	5	16	5	11	16	577	27	33	1374	44
RTOR Reduction (vph)	0	5	0	0	11	0	0	0	8	0	0	13
Lane Group Flow (vph)	0	21	0	0	21	0	16	577	19	33	1374	31
Heavy Vehicles (%)	45%	100%	65%	20%	15%	15%	50%	10%	60%	50%	5%	20%
Turn Type	Perm	NA		Perm	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)		1.4			1.4		0.6	32.8	32.8	1.1	33.3	33.3
Effective Green, g (s)		1.4			1.4		0.6	32.8	32.8	1.1	33.3	33.3
Actuated g/C Ratio		0.03			0.03		0.01	0.69	0.69	0.02	0.70	0.70
Clearance Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		34			46		15	2276	700	28	2420	948
v/s Ratio Prot							0.01	0.18		c0.03	c0.40	
v/s Ratio Perm		c0.02			0.01				0.02			0.02
v/c Ratio		0.62			0.46		1.07	0.25	0.03	1.18	0.57	0.03
Uniform Delay, d1		22.7			22.6		23.3	2.7	2.3	23.1	3.5	2.1
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		30.4			7.2		255.5	0.1	0.0	229.1	0.3	0.0
Delay (s)		53.1			29.8		278.8	2.8	2.3	252.2	3.8	2.1
Level of Service		D			C		F	A	A	F	A	A
Approach Delay (s)		53.1			29.8			9.9			9.4	
Approach LOS		D			C			A			A	

Intersection Summary			
HCM Average Control Delay	10.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	47.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	44.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	5	30	20	5	15	25	525	15	10	530	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.93			0.95		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.98			0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1243			1420		1570	3139	1154	1337	3139	1077
Flt Permitted		1.00			1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1269			1456		1570	3139	1154	1337	3139	1077
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	27	5	33	22	5	16	27	571	16	11	576	16
RTOR Reduction (vph)	0	30	0	0	15	0	0	0	7	0	0	7
Lane Group Flow (vph)	0	35	0	0	28	0	27	571	9	11	576	9
Heavy Vehicles (%)	35%	60%	40%	35%	20%	10%	15%	15%	40%	35%	15%	50%
Turn Type	Perm	NA		Perm	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)		2.8			2.8		0.5	20.2	20.2	0.5	20.2	20.2
Effective Green, g (s)		2.8			2.8		0.5	20.2	20.2	0.5	20.2	20.2
Actuated g/C Ratio		0.08			0.08		0.01	0.57	0.57	0.01	0.57	0.57
Clearance Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		100			115		22	1786	657	19	1786	613
v/s Ratio Prot							c0.02	0.18		0.01	c0.18	
v/s Ratio Perm		c0.03			0.02				0.01			0.01
v/c Ratio		0.35			0.25		1.23	0.32	0.01	0.58	0.32	0.01
Uniform Delay, d1		15.5			15.4		17.5	4.0	3.3	17.4	4.0	3.3
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		2.1			1.1		269.8	0.1	0.0	36.3	0.1	0.0
Delay (s)		17.6			16.5		287.3	4.1	3.3	53.7	4.1	3.3
Level of Service		B			B		F	A	A	D	A	A
Approach Delay (s)		17.6			16.5			16.6			5.0	
Approach LOS		B			B			B			A	

Intersection Summary			
HCM Average Control Delay	11.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.34		
Actuated Cycle Length (s)	35.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	31.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	40	10	20	30	5	55	25	975	25	35	745	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.96			0.92		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.97			0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1374			1311		1203	3438	1114	1203	3438	1114
Flt Permitted		0.89			0.86		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1257			1149		1203	3438	1114	1203	3438	1114
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	42	11	21	32	5	58	26	1026	26	37	784	16
RTOR Reduction (vph)	0	19	0	0	52	0	0	0	11	0	0	6
Lane Group Flow (vph)	0	55	0	0	43	0	26	1026	15	37	784	10
Heavy Vehicles (%)	20%	35%	45%	55%	0%	20%	50%	5%	45%	50%	5%	45%
Turn Type	Perm	NA		Perm	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)		4.7			4.7		0.6	25.2	25.2	1.6	26.2	26.2
Effective Green, g (s)		4.7			4.7		0.6	25.2	25.2	1.6	26.2	26.2
Actuated g/C Ratio		0.11			0.11		0.01	0.58	0.58	0.04	0.60	0.60
Clearance Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		136			124		17	1992	645	44	2071	671
v/s Ratio Prot							0.02	c0.30		c0.03	0.23	
v/s Ratio Perm		c0.04			0.04				0.01			0.01
v/c Ratio		0.41			0.35		1.53	0.52	0.02	0.84	0.38	0.01
Uniform Delay, d1		18.1			18.0		21.4	5.5	3.9	20.8	4.5	3.5
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		2.0			1.7		414.2	0.2	0.0	77.3	0.1	0.0
Delay (s)		20.1			19.7		435.6	5.7	3.9	98.2	4.6	3.5
Level of Service		C			B		F	A	A	F	A	A
Approach Delay (s)		20.1			19.7			16.0			8.7	
Approach LOS		C			B			B			A	

Intersection Summary			
HCM Average Control Delay	13.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	43.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	42.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	5	5	15	5	10	15	575	25	30	1300	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.97			0.95		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.97			0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1126			1504		1203	3059	1009	1203	3312	1346
Flt Permitted		1.00			1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1161			1542		1203	3059	1009	1203	3312	1346
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	16	5	5	16	5	11	16	632	27	33	1429	44
RTOR Reduction (vph)	0	5	0	0	11	0	0	0	8	0	0	13
Lane Group Flow (vph)	0	21	0	0	21	0	16	632	19	33	1429	31
Heavy Vehicles (%)	45%	100%	65%	20%	15%	15%	50%	18%	60%	50%	9%	20%
Turn Type	Perm	NA		Perm	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)		1.4			1.4		0.6	34.6	34.6	1.1	35.1	35.1
Effective Green, g (s)		1.4			1.4		0.6	34.6	34.6	1.1	35.1	35.1
Actuated g/C Ratio		0.03			0.03		0.01	0.70	0.70	0.02	0.71	0.71
Clearance Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		33			44		15	2156	711	27	2368	962
v/s Ratio Prot							0.01	0.21		c0.03	c0.43	
v/s Ratio Perm		c0.02			0.01				0.02			0.02
v/c Ratio		0.64			0.48		1.07	0.29	0.03	1.22	0.60	0.03
Uniform Delay, d1		23.6			23.5		24.2	2.7	2.2	24.0	3.5	2.0
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		35.4			8.2		255.5	0.1	0.0	247.9	0.4	0.0
Delay (s)		59.0			31.7		279.7	2.8	2.2	271.9	3.9	2.1
Level of Service		E			C		F	A	A	F	A	A
Approach Delay (s)		59.0			31.7			9.3			9.8	
Approach LOS		E			C			A			A	

Intersection Summary			
HCM Average Control Delay	10.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	49.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	45.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	5	30	20	5	15	25	575	15	10	580	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95	1.00	1.00	0.95	
Frt		0.93			0.95		1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.98			0.98		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1243			1420		1570	2959	1154	1337	2931	
Flt Permitted		1.00			1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1269			1456		1570	2959	1154	1337	2931	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	27	5	33	22	5	16	27	625	16	11	630	16
RTOR Reduction (vph)	0	30	0	0	15	0	0	0	7	0	3	0
Lane Group Flow (vph)	0	35	0	0	28	0	27	625	9	11	643	0
Heavy Vehicles (%)	35%	60%	40%	35%	20%	10%	15%	22%	40%	35%	22%	50%
Turn Type	Perm	NA		Perm	NA		Prot	NA	Perm	Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8					2			
Actuated Green, G (s)		2.8			2.8		0.6	20.9	20.9	0.6	20.9	
Effective Green, g (s)		2.8			2.8		0.6	20.9	20.9	0.6	20.9	
Actuated g/C Ratio		0.08			0.08		0.02	0.58	0.58	0.02	0.58	
Clearance Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		98			112		26	1704	664	22	1688	
v/s Ratio Prot							c0.02	0.21		0.01	c0.22	
v/s Ratio Perm		c0.03			0.02				0.01			
v/c Ratio		0.35			0.25		1.04	0.37	0.01	0.50	0.38	
Uniform Delay, d1		15.9			15.8		17.8	4.1	3.3	17.7	4.2	
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		2.2			1.2		188.7	0.1	0.0	16.8	0.1	
Delay (s)		18.1			17.0		206.6	4.3	3.3	34.5	4.3	
Level of Service		B			B		F	A	A	C	A	
Approach Delay (s)		18.1			17.0			12.4			4.8	
Approach LOS		B			B			B			A	

Intersection Summary			
HCM Average Control Delay	9.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	36.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	31.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	40	10	20	30	5	55	25	1025	25	35	795	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.96			0.92		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.97			0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1374			1311		1203	3282	1114	1203	3252	1114
Flt Permitted		0.86			0.88		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1219			1168		1203	3282	1114	1203	3252	1114
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	42	11	21	32	5	58	26	1079	26	37	837	16
RTOR Reduction (vph)	0	18	0	0	50	0	0	0	11	0	0	6
Lane Group Flow (vph)	0	56	0	0	45	0	26	1079	15	37	837	10
Heavy Vehicles (%)	20%	35%	45%	55%	0%	20%	50%	10%	45%	50%	11%	45%
Turn Type	Perm	NA		Perm	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)		6.3			6.3		0.6	27.9	27.9	1.6	28.9	28.9
Effective Green, g (s)		6.3			6.3		0.6	27.9	27.9	1.6	28.9	28.9
Actuated g/C Ratio		0.13			0.13		0.01	0.58	0.58	0.03	0.60	0.60
Clearance Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		161			154		15	1916	650	40	1966	674
v/s Ratio Prot							0.02	c0.33		c0.03	0.26	
v/s Ratio Perm		c0.05			0.04				0.01			0.01
v/c Ratio		0.35			0.29		1.73	0.56	0.02	0.93	0.43	0.01
Uniform Delay, d1		18.9			18.7		23.6	6.2	4.2	23.0	5.0	3.8
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		1.3			1.0		512.6	0.4	0.0	112.0	0.1	0.0
Delay (s)		20.2			19.8		536.2	6.6	4.2	135.1	5.2	3.8
Level of Service		C			B		F	A	A	F	A	A
Approach Delay (s)		20.2			19.8			18.7			10.6	
Approach LOS		C			B			B			B	

Intersection Summary			
HCM Average Control Delay	15.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	47.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	42.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	5	5	15	5	10	15	625	25	35	1415	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.97			0.95		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.97			0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1126			1504		1203	3282	1009	1203	3438	1346
Flt Permitted		1.00			1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1161			1542		1203	3282	1009	1203	3438	1346
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	16	5	5	16	5	11	16	687	27	38	1555	49
RTOR Reduction (vph)	0	5	0	0	11	0	0	0	9	0	0	13
Lane Group Flow (vph)	0	21	0	0	21	0	16	687	18	38	1555	36
Heavy Vehicles (%)	45%	100%	65%	20%	15%	15%	50%	10%	60%	50%	5%	20%
Turn Type	Perm	NA		Perm	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)		1.5			1.5		0.7	33.7	33.7	3.0	36.0	36.0
Effective Green, g (s)		1.5			1.5		0.7	33.7	33.7	3.0	36.0	36.0
Actuated g/C Ratio		0.03			0.03		0.01	0.67	0.67	0.06	0.72	0.72
Clearance Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		35			46		17	2203	677	72	2465	965
v/s Ratio Prot							0.01	0.21		c0.03	c0.45	
v/s Ratio Perm		c0.02			0.01				0.02			0.03
v/c Ratio		0.60			0.46		0.94	0.31	0.03	0.53	0.63	0.04
Uniform Delay, d1		24.1			24.0		24.7	3.4	2.8	22.9	3.7	2.1
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		26.0			7.2		188.5	0.1	0.0	6.8	0.5	0.0
Delay (s)		50.1			31.2		213.3	3.5	2.8	29.7	4.2	2.1
Level of Service		D			C		F	A	A	C	A	A
Approach Delay (s)		50.1			31.2			8.1			4.7	
Approach LOS		D			C			A			A	

Intersection Summary			
HCM Average Control Delay	6.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	50.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	49.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	5	35	20	5	15	25	625	15	10	630	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.93			0.95		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.98			0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1238			1420		1570	3139	1154	1337	3139	1077
Flt Permitted		0.96			1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1206			1456		1570	3139	1154	1337	3139	1077
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	27	5	38	22	5	16	27	679	16	11	685	16
RTOR Reduction (vph)	0	35	0	0	15	0	0	0	7	0	0	7
Lane Group Flow (vph)	0	35	0	0	28	0	27	679	9	11	685	9
Heavy Vehicles (%)	35%	60%	40%	35%	20%	10%	15%	15%	40%	35%	15%	50%
Turn Type	Perm	NA		Perm	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)		2.9			2.9		0.6	21.4	21.4	0.6	21.4	21.4
Effective Green, g (s)		2.9			2.9		0.6	21.4	21.4	0.6	21.4	21.4
Actuated g/C Ratio		0.08			0.08		0.02	0.58	0.58	0.02	0.58	0.58
Clearance Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		95			114		26	1820	669	22	1820	625
v/s Ratio Prot							c0.02	0.22		0.01	c0.22	
v/s Ratio Perm		c0.03			0.02				0.01			0.01
v/c Ratio		0.37			0.25		1.04	0.37	0.01	0.50	0.38	0.01
Uniform Delay, d1		16.1			16.0		18.1	4.2	3.3	18.0	4.2	3.3
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		2.4			1.1		188.7	0.1	0.0	16.8	0.1	0.0
Delay (s)		18.5			17.1		206.9	4.3	3.3	34.8	4.3	3.3
Level of Service		B			B		F	A	A	C	A	A
Approach Delay (s)		18.5			17.1			11.8			4.7	
Approach LOS		B			B			B			A	

Intersection Summary			
HCM Average Control Delay	9.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	36.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	31.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	40	10	20	30	5	55	25	1115	25	40	865	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.96			0.92		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.97			0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1374			1311		1203	3438	1114	1203	3438	1114
Flt Permitted		0.84			0.91		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1180			1208		1203	3438	1114	1203	3438	1114
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	42	11	21	32	5	58	26	1174	26	42	911	16
RTOR Reduction (vph)	0	15	0	0	41	0	0	0	14	0	0	8
Lane Group Flow (vph)	0	59	0	0	54	0	26	1174	12	42	911	8
Heavy Vehicles (%)	20%	35%	45%	55%	0%	20%	50%	5%	45%	50%	5%	45%
Turn Type	Perm	NA		Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4								2			6
Actuated Green, G (s)		17.8			17.8		1.5	27.9	27.9	2.3	28.7	28.7
Effective Green, g (s)		17.8			17.8		1.5	27.9	27.9	2.3	28.7	28.7
Actuated g/C Ratio		0.30			0.30		0.02	0.46	0.46	0.04	0.48	0.48
Clearance Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		350			358		30	1599	518	46	1645	533
v/s Ratio Prot							0.02	c0.34		c0.03	0.26	
v/s Ratio Perm		c0.05			0.04				0.01			0.01
v/c Ratio		0.17			0.15		0.87	0.73	0.02	0.91	0.55	0.01
Uniform Delay, d1		15.6			15.5		29.2	13.0	8.7	28.8	11.1	8.2
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.2			0.2		108.1	1.8	0.0	99.4	0.4	0.0
Delay (s)		15.9			15.7		137.2	14.8	8.7	128.1	11.5	8.2
Level of Service		B			B		F	B	A	F	B	A
Approach Delay (s)		15.9			15.7			17.3			16.5	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM Average Control Delay	16.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	46.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	65	5	5	15	5	10	15	525	25	30	1250	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.99			0.95		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.96			0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		968			1504		1203	3282	1009	1203	3438	985
Flt Permitted		0.73			0.83		0.16	1.00	1.00	0.43	1.00	1.00
Satd. Flow (perm)		737			1276		203	3282	1009	551	3438	985
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	71	5	5	16	5	11	16	577	27	33	1374	99
RTOR Reduction (vph)	0	4	0	0	9	0	0	0	9	0	0	31
Lane Group Flow (vph)	0	77	0	0	23	0	16	577	18	33	1374	68
Heavy Vehicles (%)	87%	100%	65%	20%	15%	15%	50%	10%	60%	50%	5%	64%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)		6.8			6.8		31.8	31.8	31.8	31.8	31.8	31.8
Effective Green, g (s)		6.8			6.8		31.8	31.8	31.8	31.8	31.8	31.8
Actuated g/C Ratio		0.15			0.15		0.68	0.68	0.68	0.68	0.68	0.68
Clearance Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		108			186		139	2240	689	376	2346	672
v/s Ratio Prot								0.18			c0.40	
v/s Ratio Perm		c0.10			0.02		0.08		0.02	0.06		0.07
v/c Ratio		0.71			0.12		0.12	0.26	0.03	0.09	0.59	0.10
Uniform Delay, d1		19.0			17.3		2.6	2.9	2.4	2.5	3.9	2.5
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		19.7			0.3		0.4	0.1	0.0	0.1	0.4	0.1
Delay (s)		38.6			17.6		2.9	2.9	2.4	2.6	4.3	2.6
Level of Service		D			B		A	A	A	A	A	A
Approach Delay (s)		38.6			17.6			2.9			4.1	
Approach LOS		D			B			A			A	

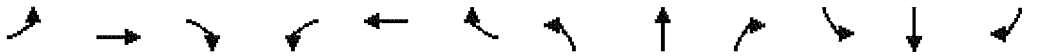
Intersection Summary			
HCM Average Control Delay	5.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	46.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	48.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	75	5	30	20	5	15	25	525	15	10	530	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.96			0.95		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.97			0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1061			1420		1570	3139	1154	1337	3139	859
Flt Permitted		0.77			0.79		0.44	1.00	1.00	0.44	1.00	1.00
Satd. Flow (perm)		843			1151		719	3139	1154	615	3139	859
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	82	5	33	22	5	16	27	571	16	11	576	71
RTOR Reduction (vph)	0	27	0	0	13	0	0	0	7	0	0	30
Lane Group Flow (vph)	0	93	0	0	30	0	27	571	9	11	576	41
Heavy Vehicles (%)	78%	60%	40%	35%	20%	10%	15%	15%	40%	35%	15%	88%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)		6.0			6.0		19.1	19.1	19.1	19.1	19.1	19.1
Effective Green, g (s)		6.0			6.0		19.1	19.1	19.1	19.1	19.1	19.1
Actuated g/C Ratio		0.18			0.18		0.58	0.58	0.58	0.58	0.58	0.58
Clearance Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		153			209		415	1811	666	355	1811	496
v/s Ratio Prot								0.18			c0.18	
v/s Ratio Perm		c0.11			0.03		0.04		0.01	0.02		0.05
v/c Ratio		0.61			0.14		0.07	0.32	0.01	0.03	0.32	0.08
Uniform Delay, d1		12.5			11.4		3.1	3.6	3.0	3.0	3.6	3.1
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		6.7			0.3		0.1	0.1	0.0	0.0	0.1	0.1
Delay (s)		19.1			11.7		3.1	3.7	3.0	3.1	3.7	3.2
Level of Service		B			B		A	A	A	A	A	A
Approach Delay (s)		19.1			11.7			3.7			3.7	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	5.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	33.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	36.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	90	10	20	30	5	55	25	975	25	35	745	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.98			0.92		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.96			0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1131			1311		1203	3438	1114	1203	3438	864
Flt Permitted		0.72			0.87		0.35	1.00	1.00	0.25	1.00	1.00
Satd. Flow (perm)		844			1161		442	3438	1114	315	3438	864
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	95	11	21	32	5	58	26	1026	26	37	784	68
RTOR Reduction (vph)	0	17	0	0	28	0	0	0	11	0	0	28
Lane Group Flow (vph)	0	110	0	0	67	0	26	1026	15	37	784	40
Heavy Vehicles (%)	64%	35%	45%	55%	0%	20%	50%	5%	45%	50%	5%	87%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)		6.6			6.6		20.6	20.6	20.6	20.6	20.6	20.6
Effective Green, g (s)		6.6			6.6		20.6	20.6	20.6	20.6	20.6	20.6
Actuated g/C Ratio		0.19			0.19		0.59	0.59	0.59	0.59	0.59	0.59
Clearance Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		158			218		259	2012	652	184	2012	506
v/s Ratio Prot								c0.30			0.23	
v/s Ratio Perm		c0.13			0.06		0.06		0.01	0.12		0.05
v/c Ratio		0.70			0.31		0.10	0.51	0.02	0.20	0.39	0.08
Uniform Delay, d1		13.4			12.3		3.2	4.3	3.1	3.4	3.9	3.2
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		12.5			0.8		0.2	0.2	0.0	0.5	0.1	0.1
Delay (s)		25.9			13.1		3.4	4.5	3.1	4.0	4.0	3.2
Level of Service		C			B		A	A	A	A	A	A
Approach Delay (s)		25.9			13.1			4.5			4.0	
Approach LOS		C			B			A			A	

Intersection Summary			
HCM Average Control Delay	5.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	35.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	49.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	70	5	5	15	5	10	15	570	25	35	1365	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.99			0.95		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.96			0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		968			1504		1203	3282	1009	1203	3438	985
Flt Permitted		0.73			0.85		0.14	1.00	1.00	0.41	1.00	1.00
Satd. Flow (perm)		736			1304		175	3282	1009	525	3438	985
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	77	5	5	16	5	11	16	626	27	38	1500	110
RTOR Reduction (vph)	0	4	0	0	10	0	0	0	8	0	0	31
Lane Group Flow (vph)	0	83	0	0	22	0	16	626	19	38	1500	79
Heavy Vehicles (%)	87%	100%	65%	20%	15%	15%	50%	10%	60%	50%	5%	64%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)		7.2			7.2		38.9	38.9	38.9	38.9	38.9	38.9
Effective Green, g (s)		7.2			7.2		38.9	38.9	38.9	38.9	38.9	38.9
Actuated g/C Ratio		0.13			0.13		0.72	0.72	0.72	0.72	0.72	0.72
Clearance Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		98			174		126	2360	726	377	2472	708
v/s Ratio Prot								0.19			c0.44	
v/s Ratio Perm		c0.11			0.02		0.09		0.02	0.07		0.08
v/c Ratio		0.84			0.13		0.13	0.27	0.03	0.10	0.61	0.11
Uniform Delay, d1		22.9			20.7		2.3	2.6	2.2	2.3	3.8	2.3
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		45.0			0.3		0.5	0.1	0.0	0.1	0.4	0.1
Delay (s)		67.9			21.0		2.8	2.7	2.2	2.4	4.2	2.4
Level of Service		E			C		A	A	A	A	A	A
Approach Delay (s)		67.9			21.0			2.7			4.1	
Approach LOS		E			C			A			A	

Intersection Summary			
HCM Average Control Delay	6.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	54.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	51.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	80	5	35	20	5	15	25	570	15	10	580	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.96			0.95		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.97			0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1063			1420		1570	3139	1154	1337	3139	859
Flt Permitted		0.77			0.81		0.41	1.00	1.00	0.42	1.00	1.00
Satd. Flow (perm)		848			1177		682	3139	1154	587	3139	859
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	87	5	38	22	5	16	27	620	16	11	630	76
RTOR Reduction (vph)	0	31	0	0	13	0	0	0	7	0	0	32
Lane Group Flow (vph)	0	99	0	0	30	0	27	620	9	11	630	44
Heavy Vehicles (%)	78%	60%	40%	35%	20%	10%	15%	15%	40%	35%	15%	88%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)		6.2			6.2		19.4	19.4	19.4	19.4	19.4	19.4
Effective Green, g (s)		6.2			6.2		19.4	19.4	19.4	19.4	19.4	19.4
Actuated g/C Ratio		0.18			0.18		0.58	0.58	0.58	0.58	0.58	0.58
Clearance Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		156			217		394	1812	666	339	1812	496
v/s Ratio Prot								0.20			c0.20	
v/s Ratio Perm		c0.12			0.03		0.04		0.01	0.02		0.05
v/c Ratio		0.63			0.14		0.07	0.34	0.01	0.03	0.35	0.09
Uniform Delay, d1		12.7			11.5		3.1	3.7	3.0	3.1	3.8	3.2
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		8.2			0.3		0.1	0.1	0.0	0.0	0.1	0.1
Delay (s)		20.8			11.8		3.2	3.9	3.0	3.1	3.9	3.2
Level of Service		C			B		A	A	A	A	A	A
Approach Delay (s)		20.8			11.8			3.8			3.8	
Approach LOS		C			B			A			A	

Intersection Summary			
HCM Average Control Delay	5.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	33.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	37.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	100	10	20	35	5	60	25	1065	25	40	810	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.98			0.92		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.96			0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1129			1306		1203	3438	1114	1203	3438	864
Flt Permitted		0.79			0.87		0.31	1.00	1.00	0.21	1.00	1.00
Satd. Flow (perm)		929			1156		392	3438	1114	269	3438	864
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	105	11	21	37	5	63	26	1121	26	42	853	74
RTOR Reduction (vph)	0	13	0	0	50	0	0	0	10	0	0	29
Lane Group Flow (vph)	0	124	0	0	55	0	26	1121	16	42	853	45
Heavy Vehicles (%)	64%	35%	45%	55%	0%	20%	50%	5%	45%	50%	5%	87%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)		9.5			9.5		27.6	27.6	27.6	27.6	27.6	27.6
Effective Green, g (s)		9.5			9.5		27.6	27.6	27.6	27.6	27.6	27.6
Actuated g/C Ratio		0.21			0.21		0.61	0.61	0.61	0.61	0.61	0.61
Clearance Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		196			244		240	2104	682	165	2104	529
v/s Ratio Prot								c0.33			0.25	
v/s Ratio Perm		c0.13			0.05		0.07		0.01	0.16		0.05
v/c Ratio		0.63			0.23		0.11	0.53	0.02	0.25	0.41	0.09
Uniform Delay, d1		16.2			14.8		3.6	5.0	3.4	4.0	4.5	3.6
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		6.5			0.5		0.2	0.3	0.0	0.8	0.1	0.1
Delay (s)		22.7			15.2		3.8	5.3	3.5	4.8	4.6	3.7
Level of Service		C			B		A	A	A	A	A	A
Approach Delay (s)		22.7			15.2			5.2			4.6	
Approach LOS		C			B			A			A	

Intersection Summary			
HCM Average Control Delay	6.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	45.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	53.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	5	55	15	5	10	65	525	25	30	1250	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.90			0.95		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.99			0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		906			1504		960	3282	1009	1203	3438	1346
Flt Permitted		0.93			0.89		0.17	1.00	1.00	0.43	1.00	1.00
Satd. Flow (perm)		849			1378		174	3282	1009	551	3438	1346
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	16	5	60	16	5	11	71	577	27	33	1374	44
RTOR Reduction (vph)	0	54	0	0	10	0	0	0	7	0	0	11
Lane Group Flow (vph)	0	27	0	0	22	0	71	577	20	33	1374	33
Heavy Vehicles (%)	45%	100%	97%	20%	15%	15%	88%	10%	60%	50%	5%	20%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)		6.5			6.5		45.7	45.7	45.7	45.7	45.7	45.7
Effective Green, g (s)		6.5			6.5		45.7	45.7	45.7	45.7	45.7	45.7
Actuated g/C Ratio		0.11			0.11		0.76	0.76	0.76	0.76	0.76	0.76
Clearance Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		92			149		132	2491	766	418	2610	1022
v/s Ratio Prot								0.18			0.40	
v/s Ratio Perm		c0.03			0.02		c0.41		0.02	0.06		0.02
v/c Ratio		0.30			0.15		0.54	0.23	0.03	0.08	0.53	0.03
Uniform Delay, d1		24.7			24.3		3.0	2.1	1.8	1.9	2.9	1.8
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		1.8			0.5		4.2	0.0	0.0	0.1	0.2	0.0
Delay (s)		26.6			24.8		7.1	2.2	1.8	1.9	3.1	1.8
Level of Service		C			C		A	A	A	A	A	A
Approach Delay (s)		26.6			24.8			2.7			3.0	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM Average Control Delay	4.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	60.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	52.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	5	80	20	5	15	75	525	15	10	530	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.90			0.95		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.99			0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1011			1420		1056	3139	1154	1337	3139	1077
Flt Permitted		0.91			0.84		0.44	1.00	1.00	0.44	1.00	1.00
Satd. Flow (perm)		930			1225		484	3139	1154	615	3139	1077
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	27	5	87	22	5	16	82	571	16	11	576	16
RTOR Reduction (vph)	0	74	0	0	14	0	0	0	6	0	0	6
Lane Group Flow (vph)	0	45	0	0	29	0	82	571	10	11	576	10
Heavy Vehicles (%)	35%	60%	78%	35%	20%	10%	71%	15%	40%	35%	15%	50%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)		4.8			4.8		19.1	19.1	19.1	19.1	19.1	19.1
Effective Green, g (s)		4.8			4.8		19.1	19.1	19.1	19.1	19.1	19.1
Actuated g/C Ratio		0.15			0.15		0.60	0.60	0.60	0.60	0.60	0.60
Clearance Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		140			184		290	1879	691	368	1879	645
v/s Ratio Prot								0.18			c0.18	
v/s Ratio Perm		c0.05			0.02		0.17		0.01	0.02		0.01
v/c Ratio		0.32			0.16		0.28	0.30	0.01	0.03	0.31	0.01
Uniform Delay, d1		12.1			11.8		3.1	3.1	2.6	2.6	3.1	2.6
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		1.3			0.4		0.5	0.1	0.0	0.0	0.1	0.0
Delay (s)		13.4			12.2		3.6	3.2	2.6	2.6	3.2	2.6
Level of Service		B			B		A	A	A	A	A	A
Approach Delay (s)		13.4			12.2			3.3			3.2	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	4.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	31.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	35.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	40	10	70	30	5	55	75	975	25	35	745	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.92			0.92		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.98			0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1086			1311		986	3438	1114	1203	3438	1114
Flt Permitted		0.85			0.89		0.35	1.00	1.00	0.26	1.00	1.00
Satd. Flow (perm)		941			1192		368	3438	1114	324	3438	1114
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	42	11	74	32	5	58	79	1026	26	37	784	16
RTOR Reduction (vph)	0	62	0	0	29	0	0	0	10	0	0	6
Lane Group Flow (vph)	0	65	0	0	66	0	79	1026	16	37	784	10
Heavy Vehicles (%)	20%	35%	84%	55%	0%	20%	83%	5%	45%	50%	5%	45%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)		5.5			5.5		21.0	21.0	21.0	21.0	21.0	21.0
Effective Green, g (s)		5.5			5.5		21.0	21.0	21.0	21.0	21.0	21.0
Actuated g/C Ratio		0.16			0.16		0.61	0.61	0.61	0.61	0.61	0.61
Clearance Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		150			190		224	2093	678	197	2093	678
v/s Ratio Prot								c0.30			0.23	
v/s Ratio Perm		c0.07			0.06		0.21		0.01	0.11		0.01
v/c Ratio		0.43			0.35		0.35	0.49	0.02	0.19	0.37	0.01
Uniform Delay, d1		13.1			12.9		3.4	3.8	2.7	3.0	3.4	2.7
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		2.0			1.1		1.0	0.2	0.0	0.5	0.1	0.0
Delay (s)		15.1			14.0		4.3	3.9	2.7	3.4	3.5	2.7
Level of Service		B			B		A	A	A	A	A	A
Approach Delay (s)		15.1			14.0			3.9			3.5	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	4.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	34.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	49.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
31: Glenoaks Blvd & Peoria Street

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	5	60	15	5	10	70	570	25	35	1365	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.90			0.95		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.99			0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		901			1504		960	3282	1009	1203	3438	1346
Flt Permitted		0.94			0.83		0.14	1.00	1.00	0.41	1.00	1.00
Satd. Flow (perm)		851			1285		138	3282	1009	525	3438	1346
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	16	5	66	16	5	11	77	626	27	38	1500	49
RTOR Reduction (vph)	0	19	0	0	10	0	0	0	8	0	0	14
Lane Group Flow (vph)	0	68	0	0	22	0	77	626	19	38	1500	35
Heavy Vehicles (%)	45%	100%	97%	20%	15%	15%	88%	10%	60%	50%	5%	20%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)		6.7			6.7		35.0	35.0	35.0	35.0	35.0	35.0
Effective Green, g (s)		6.7			6.7		35.0	35.0	35.0	35.0	35.0	35.0
Actuated g/C Ratio		0.13			0.13		0.70	0.70	0.70	0.70	0.70	0.70
Clearance Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		115			173		97	2311	711	370	2421	948
v/s Ratio Prot								0.19			0.44	
v/s Ratio Perm		c0.08			0.02		c0.56		0.02	0.07		0.03
v/c Ratio		0.59			0.13		0.79	0.27	0.03	0.10	0.62	0.04
Uniform Delay, d1		20.2			18.9		4.9	2.7	2.2	2.3	3.9	2.2
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		7.9			0.3		34.6	0.1	0.0	0.1	0.5	0.0
Delay (s)		28.1			19.3		39.6	2.8	2.2	2.5	4.3	2.2
Level of Service		C			B		D	A	A	A	A	A
Approach Delay (s)		28.1			19.3			6.6			4.2	
Approach LOS		C			B			A			A	

Intersection Summary			
HCM Average Control Delay	6.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	49.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	56.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
31: Glenoaks Blvd & Peoria Street

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	5	85	20	5	15	80	570	15	10	580	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.90			0.95		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.99			0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1007			1420		1056	3139	1154	1337	3139	1077
Flt Permitted		0.91			0.87		0.41	1.00	1.00	0.42	1.00	1.00
Satd. Flow (perm)		929			1269		459	3139	1154	587	3139	1077
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	27	5	92	22	5	16	87	620	16	11	630	16
RTOR Reduction (vph)	0	79	0	0	14	0	0	0	6	0	0	6
Lane Group Flow (vph)	0	45	0	0	29	0	87	620	10	11	630	10
Heavy Vehicles (%)	35%	60%	78%	35%	20%	10%	71%	15%	40%	35%	15%	50%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)		4.9			4.9		20.7	20.7	20.7	20.7	20.7	20.7
Effective Green, g (s)		4.9			4.9		20.7	20.7	20.7	20.7	20.7	20.7
Actuated g/C Ratio		0.15			0.15		0.62	0.62	0.62	0.62	0.62	0.62
Clearance Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		135			185		283	1934	711	362	1934	664
v/s Ratio Prot								0.20			c0.20	
v/s Ratio Perm		c0.05			0.02		0.19		0.01	0.02		0.01
v/c Ratio		0.34			0.16		0.31	0.32	0.01	0.03	0.33	0.01
Uniform Delay, d1		12.9			12.5		3.1	3.1	2.5	2.5	3.1	2.5
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		1.5			0.4		0.6	0.1	0.0	0.0	0.1	0.0
Delay (s)		14.4			13.0		3.7	3.2	2.5	2.6	3.2	2.5
Level of Service		B			B		A	A	A	A	A	A
Approach Delay (s)		14.4			13.0			3.2			3.2	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	4.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.33		
Actuated Cycle Length (s)	33.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	37.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	45	10	75	35	5	60	80	1065	25	40	810	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.92			0.92		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.98			0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1089			1306		986	3438	1114	1203	3438	1114
Flt Permitted		0.89			0.89		0.32	1.00	1.00	0.22	1.00	1.00
Satd. Flow (perm)		986			1176		331	3438	1114	284	3438	1114
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	47	11	79	37	5	63	84	1121	26	42	853	16
RTOR Reduction (vph)	0	66	0	0	53	0	0	0	9	0	0	5
Lane Group Flow (vph)	0	71	0	0	52	0	84	1121	17	42	853	11
Heavy Vehicles (%)	20%	35%	84%	55%	0%	20%	83%	5%	45%	50%	5%	45%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)		7.4			7.4		29.7	29.7	29.7	29.7	29.7	29.7
Effective Green, g (s)		7.4			7.4		29.7	29.7	29.7	29.7	29.7	29.7
Actuated g/C Ratio		0.16			0.16		0.66	0.66	0.66	0.66	0.66	0.66
Clearance Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		162			193		218	2264	734	187	2264	734
v/s Ratio Prot								c0.33			0.25	
v/s Ratio Perm		c0.07			0.04		0.25		0.02	0.15		0.01
v/c Ratio		0.44			0.27		0.39	0.50	0.02	0.22	0.38	0.01
Uniform Delay, d1		17.0			16.5		3.5	3.9	2.7	3.1	3.5	2.7
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		1.9			0.8		1.1	0.2	0.0	0.6	0.1	0.0
Delay (s)		18.9			17.3		4.7	4.1	2.7	3.7	3.6	2.7
Level of Service		B			B		A	A	A	A	A	A
Approach Delay (s)		18.9			17.3			4.1			3.6	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	5.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	45.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	52.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

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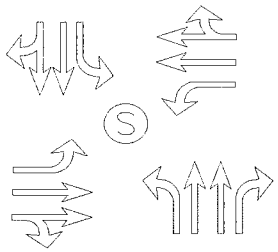
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	1 OF 6

E/W STREET : TUXFORD STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 32
ROUTE 5B, 6B, 7B

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						

TUXFORD STREET

EB LEFT	115	25%		115	10	125
EB THRU	470	5%		470	40	510
EB RIGHT	45	15%		45	5	50
WB LEFT	30	5%		30	5	35
WB THRU	565	5%		565	50	615
WB RIGHT	75	10%		75	5	80

GLEN OAKS BLVD

NB LEFT	95	15%		95	10	105
NB THRU	395	20%	**50**	445	40	485
NB RIGHT	20	20%		20	0	20
SB LEFT	90	5%		90	10	100
SB THRU	1015	9%	**50**	1065	95	1160
SB RIGHT	125	40%		125	10	135
TOTALS	**3040**		**100**	**3140**	**280**	**3420**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	3-Sep-13	VV.110264.0000	2 OF 6

E/W STREET : TUXFORD STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
32
ROUTE
8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
TUXFORD STREET						
EB LEFT	115	48%	**50**	165	15	180
EB THRU	470	5%		470	40	510
EB RIGHT	45	15%		45	5	50
WB LEFT	30	5%		30	5	35
WB THRU	565	5%		565	50	615
WB RIGHT	75	10%		75	5	80
GLEN OAKS BLVD						
NB LEFT	95	15%		95	10	105
NB THRU	395	10%		395	35	430
NB RIGHT	20	20%		20	5	25
SB LEFT	90	5%		90	10	100
SB THRU	1015	5%		1015	90	1105
SB RIGHT	125	57%	**50**	175	15	190
TOTALS	**3040**		**100**	**3140**	**285**	**3425**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	25-Jun-12	VV.110264.0000	3 OF 6

E/W STREET : TUXFORD STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
32
ROUTE
5B, 6B, 7B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
TUXFORD STREET						
EB LEFT	110	45%		110	10	120
EB THRU	390	5%		390	35	425
EB RIGHT	60	15%		60	5	65
WB LEFT	25	5%		25	5	30
WB THRU	425	5%		425	40	465
WB RIGHT	45	10%		45	5	50
GLEN OAKS BLVD						
NB LEFT	110	15%		110	10	120
NB THRU	435	19%	50	485	45	530
NB RIGHT	30	5%		30	5	35
SB LEFT	90	10%		90	10	100
SB THRU	355	25%	50	405	35	440
SB RIGHT	100	45%		100	10	110
TOTALS	**2175**		**100**	**2275**	**215**	**2490**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	3-Sep-13	VV.110264.0000	4 OF 6

E/W STREET : TUXFORD STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 32
ROUTE 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
TUXFORD STREET						
EB LEFT	110	62%	**50**	160	15	175
EB THRU	390	5%		390	35	425
EB RIGHT	60	15%		60	5	65
WB LEFT	25	5%		25	5	30
WB THRU	425	5%		425	40	465
WB RIGHT	45	10%		45	5	50
GLEN OAKS BLVD						
NB LEFT	110	15%		110	10	120
NB THRU	435	10%		435	40	475
NB RIGHT	30	5%		30	5	35
SB LEFT	90	10%		90	10	100
SB THRU	355	15%		355	30	385
SB RIGHT	100	63%	**50**	150	15	165
TOTALS	**2175**		**100**	**2275**	**215**	**2490**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	25-Jun-12	VV.110264.0000	5 OF 6

E/W STREET : TUXFORD STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
32
ROUTE
5B, 6B, 7B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
TUXFORD STREET						
EB LEFT	140	25%		140	15	155
EB THRU	505	5%		505	45	550
EB RIGHT	95	10%		95	10	105
WB LEFT	60	5%		60	5	65
WB THRU	345	5%		345	30	375
WB RIGHT	80	5%		80	5	85
GLEN OAKS BLVD						
NB LEFT	120	10%		120	10	130
NB THRU	800	15%	**50**	850	75	925
NB RIGHT	60	5%		60	5	65
SB LEFT	130	5%		130	10	140
SB THRU	590	12%	**50**	640	60	700
SB RIGHT	90	10%		90	10	100
TOTALS	**3015**		**100**	**3115**	**280**	**3395**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	3-Sep-13	VV.110264.0000	6 OF 6

E/W STREET : TUXFORD STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 32
ROUTE 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
TUXFORD STREET						
EB LEFT	140	45%	**50**	190	15	205
EB THRU	505	5%		505	45	550
EB RIGHT	95	10%		95	10	105
WB LEFT	60	5%		60	5	65
WB THRU	345	5%		345	30	375
WB RIGHT	80	5%		80	5	85
GLEN OAKS BLVD						
NB LEFT	120	10%		120	10	130
NB THRU	800	10%		800	70	870
NB RIGHT	60	5%		60	5	65
SB LEFT	130	5%		130	10	140
SB THRU	590	5%		590	55	645
SB RIGHT	90	42%	**50**	140	15	155
TOTALS	**3015**		**100**	**3115**	**275**	**3390**

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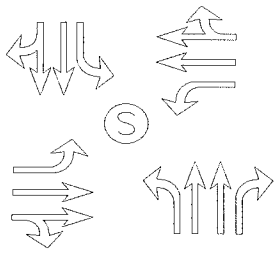
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	1 OF 6

E/W STREET : TUXFORD STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
32
ROUTE
5B, 6B, 7B

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
TUXFORD STREET								
EB LEFT	88	29	87	175	**0**	175	15	190
EB THRU	448	21	63	510	**0**	510	45	555
EB RIGHT	37	6	18	55	**0**	55	5	60
WB LEFT	28	1	3	30	**0**	30	5	35
WB THRU	540	25	75	615	**0**	615	55	670
WB RIGHT	67	8	24	90	**0**	90	10	100
GLEN OAKS BLVD								
NB LEFT	83	12	36	120	**0**	120	10	130
NB THRU	359	37	111	470	**150**	620	55	675
NB RIGHT	18	4	12	30	**0**	30	5	35
SB LEFT	83	5	15	100	**0**	100	10	110
SB THRU	963	52	156	1120	**150**	1270	115	1385
SB RIGHT	77	47	141	220	**0**	220	20	240
TOTALS	**2791**				**300**	**3835**	**350**	**4185**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	2 OF 6

E/W STREET : TUXFORD STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
32
ROUTE
8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
TUXFORD STREET								
EB LEFT	88	29	87	175	**150**	325	30	355
EB THRU	448	21	63	510	**0**	510	45	555
EB RIGHT	37	6	18	55	**0**	55	5	60
WB LEFT	28	1	3	30	**0**	30	5	35
WB THRU	540	25	75	615	**0**	615	55	670
WB RIGHT	67	8	24	90	**0**	90	10	100
GLEN OAKS BLVD								
NB LEFT	83	12	36	120	**0**	120	10	130
NB THRU	359	37	111	470	**0**	470	40	510
NB RIGHT	18	4	12	30	**0**	30	5	35
SB LEFT	83	5	15	100	**0**	100	10	110
SB THRU	963	52	156	1120	**0**	1120	100	1220
SB RIGHT	77	47	141	220	**150**	370	35	405
TOTALS	**2791**				**300**	**3835**	**350**	**4185**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	21-Sep-12	VV.110264.0000	3 OF 6

E/W STREET : TUXFORD STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
32
ROUTE
5B, 6B, 7B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
TUXFORD STREET								
EB LEFT	61	47	141	200	**0**	200	20	220
EB THRU	364	27	81	445	**0**	445	40	485
EB RIGHT	51	10	30	80	**0**	80	5	85
WB LEFT	26	1	3	30	**0**	30	5	35
WB THRU	412	12	36	450	**0**	450	40	490
WB RIGHT	39	5	15	55	**0**	55	5	60
GLEN OAKS BLVD								
NB LEFT	91	17	51	140	**0**	140	15	155
NB THRU	390	47	141	530	**150**	680	60	740
NB RIGHT	27	1	3	30	**0**	30	5	35
SB LEFT	81	8	24	105	**0**	105	10	115
SB THRU	308	49	147	455	**150**	605	55	660
SB RIGHT	53	47	141	195	**0**	195	20	215
TOTALS	**1903**				**300**	**3015**	**280**	**3295**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	4 OF 6

E/W STREET : TUXFORD STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 32
ROUTE 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
TUXFORD STREET								
EB LEFT	61	47	141	200	**150**	350	30	380
EB THRU	364	27	81	445	**0**	445	40	485
EB RIGHT	51	10	30	80	**0**	80	5	85
WB LEFT	26	1	3	30	**0**	30	5	35
WB THRU	412	12	36	450	**0**	450	40	490
WB RIGHT	39	5	15	55	**0**	55	5	60
GLEN OAKS BLVD								
NB LEFT	91	17	51	140	**0**	140	15	155
NB THRU	390	47	141	530	**0**	530	50	580
NB RIGHT	27	1	3	30	**0**	30	5	35
SB LEFT	81	8	24	105	**0**	105	10	115
SB THRU	308	49	147	455	**0**	455	40	495
SB RIGHT	53	47	141	195	**150**	345	30	375
TOTALS	**1903**				**300**	**3015**	**275**	**3290**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	25-Jun-12	VV.110264.0000	5 OF 6

E/W STREET : TUXFORD STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
32
ROUTE
5B, 6B, 7B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
TUXFORD STREET								
EB LEFT	107	34	102	210	**0**	210	20	230
EB THRU	487	18	54	540	**0**	540	50	590
EB RIGHT	86	11	33	120	**0**	120	10	130
WB LEFT	56	2	6	60	**0**	60	5	65
WB THRU	332	14	42	375	**0**	375	35	410
WB RIGHT	77	5	15	90	**0**	90	10	100
GLEN OAKS BLVD								
NB LEFT	106	13	39	145	**0**	145	15	160
NB THRU	725	73	219	945	**150**	1095	100	1195
NB RIGHT	55	4	12	65	**0**	65	5	70
SB LEFT	122	7	21	145	**0**	145	15	160
SB THRU	561	28	84	645	**150**	795	70	865
SB RIGHT	80	9	27	105	**0**	105	10	115
TOTALS	**2794**				**300**	**3745**	**345**	**4090**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	6 OF 6

E/W STREET : TUXFORD STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
32
ROUTE
8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
TUXFORD STREET								
EB LEFT	107	34	102	210	**150**	257	25	282
EB THRU	487	18	54	540	**0**	487	45	532
EB RIGHT	86	11	33	120	**0**	86	5	91
WB LEFT	56	2	6	60	**0**	56	5	61
WB THRU	332	14	42	375	**0**	332	30	362
WB RIGHT	77	5	15	90	**0**	77	5	82
GLEN OAKS BLVD								
NB LEFT	106	13	39	145	**0**	106	10	116
NB THRU	725	73	219	945	**0**	725	65	790
NB RIGHT	55	4	12	65	**0**	55	5	60
SB LEFT	122	7	21	145	**0**	122	10	132
SB THRU	561	28	84	645	**0**	561	50	611
SB RIGHT	80	9	27	105	**150**	230	20	250
TOTALS	**2794**				**300**	**3094**	**275**	**3369**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: GLEN OAKS BLVD
EAST-WEST STREET: TUXFORD
JURISDICTION: LA

DATE: 05-30-12

PEAK HOUR: 07:00AM

NORTH LEG

TOTAL: 1,227

Rt	Thru	Lt	
124	1015	88	Total
22	239	19	1st
26	266	23	2nd
47	274	23	3rd
29	236	23	4th

EAST LEG TOTAL: 669

	1st	2nd	3rd	4th	Total
Rt	19	26	12	18	75
Thru	123	119	155	168	565
Lt	2	3	9	15	29

WEST LEG TOTAL: 629

Total	1st	2nd	3rd	4th	
117	22	28	37	30	Lt
469	112	104	116	137	Thru
43	6	12	18	7	Rt

PEAK HOUR FACTORS

NORTH LEG = 0.89
SOUTH LEG = 0.76
EAST LEG = 0.83
WEST LEG = 0.90

ALL LEGS = 0.91

SOUTH LEG

TOTAL: 513

	Lt	Thru	Rt
1st	21	81	4
2nd	22	89	8
3rd	24	89	6
4th	28	137	4
Total	95	396	22

HOUR TOTAL: 3,038

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: TUXFORD

TIME: 07:00AM-08:00AM DATE: 05-30-12

NORTH LEG

Rt	Thru	Lt	
124	1015	88	Total
22	239	19	1st
26	266	23	2nd
47	274	23	3rd
29	236	23	4th

	1st	2nd	3rd	4th	Total
Rt	19	26	12	18	75
Thru	123	119	155	168	565
Lt	2	3	9	15	29

Total	1st	2nd	3rd	4th	
117	22	28	37	30	Lt
469	112	104	116	137	Thru
43	6	12	18	7	Rt

	Lt	Thru	Rt
1st	21	81	4
2nd	22	89	8
3rd	24	89	6
4th	28	137	4
Total	95	396	22

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: TUXFORD

TIME: 08:00AM-09:00AM DATE: 05-30-12

NORTH LEG

111	689	70	Total
18	195	11	1st
37	188	21	2nd
25	158	18	3rd
31	148	20	4th
Rt	Thru	Lt	

Rt	21	14	14	11	60
Thru	136	132	102	79	449
Lt	12	1	3	4	20
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
98	20	30	30	18	Lt
318	80	87	82	69	Thru
75	12	19	22	22	Rt

	Lt	Thru	Rt
1st	23	68	4
2nd	16	86	12
3rd	22	89	9
4th	18	75	6
Total	79	318	31

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : GLEN OAKS BLVD LA

EAST-WEST STREET : TUXFORD 05-30-12

BEGINNING TIME : 07:00AM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
13	223	17	2	11	2	2	4	0	5	1	0	280
5	252	22	4	7	1	6	3	0	11	4	0	315
38	262	21	4	7	2	2	4	0	3	1	0	344
21	226	23	3	5	0	2	2	0	3	3	0	288
11	180	10	3	7	1	2	4	0	2	4	0	224
18	185	19	4	2	1	5	0	1	10	1	0	246
18	148	18	0	5	0	3	5	0	4	0	0	201
14	133	15	3	7	2	6	5	2	8	3	1	199
138	1609	145	23	51	9	28	27	3	46	17	1	2097
						SOUTH LEG						
2	68	16	2	7	4	0	2	0	0	4	1	106
7	81	19	1	3	3	0	3	0	0	2	0	119
5	80	22	1	4	2	0	3	0	0	2	0	119
4	130	26	0	3	2	0	2	0	0	2	0	169
4	61	21	0	4	2	0	1	0	0	2	0	95
9	77	12	1	5	3	2	2	0	0	2	1	114
9	73	17	0	6	5	0	5	0	0	5	0	120
5	56	15	0	7	1	1	8	0	0	4	2	99
45	626	148	5	39	22	3	26	0	0	23	4	941
						EAST LEG						
15	113	1	3	5	0	0	3	0	1	2	1	144
24	114	3	2	4	0	0	0	0	0	1	0	148
10	149	9	1	4	0	0	1	0	1	1	0	176
18	164	15	0	4	0	0	0	0	0	0	0	201
20	125	11	1	10	0	0	1	0	0	0	1	169
9	122	1	3	6	0	1	3	0	1	1	0	147
12	96	3	1	3	0	1	2	0	0	1	0	119
8	72	4	3	5	0	0	1	0	0	1	0	94
116	955	47	14	41	0	2	11	0	3	7	2	1198
						WEST LEG						
6	108	10	0	4	2	0	0	7	0	0	3	140
9	99	23	2	5	1	1	0	4	0	0	0	144
16	108	31	2	7	1	0	1	2	0	0	3	171
6	133	24	1	3	0	0	1	3	0	0	3	174
10	77	9	2	2	2	0	1	4	0	0	5	112
18	84	17	1	2	6	0	1	5	0	0	2	136
21	78	19	1	2	3	0	1	4	0	1	4	134
18	62	7	3	6	4	1	1	5	0	0	2	109
104	749	140	12	31	19	2	6	34	0	1	22	1120

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: GLEN OAKS BLVD
EAST-WEST STREET: TUXFORD
JURISDICTION: LA

DATE: 05-30-12

PEAK HOUR: 01:00PM

NORTH LEG

TOTAL: 546

Rt	Thru	Lt	
100	357	89	Total
15	103	25	1st
32	86	27	2nd
29	91	26	3rd
24	77	11	4th

EAST LEG TOTAL: 495

	1st	2nd	3rd	4th	Total
Rt	8	10	10	16	44
Thru	107	107	101	109	424
Lt	5	5	11	6	27

WEST LEG TOTAL: 560

Total	1st	2nd	3rd	4th	
108	24	24	31	29	Lt
391	91	92	86	122	Thru
61	16	21	10	14	Rt

SOUTH LEG

TOTAL: 573

	Lt	Thru	Rt
1st	41	118	10
2nd	23	91	5
3rd	26	137	7
4th	18	91	6
Total	108	437	28

PEAK HOUR FACTORS

NORTH LEG = 0.93
SOUTH LEG = 0.84
EAST LEG = 0.94
WEST LEG = 0.85

ALL LEGS = 0.96

HOUR TOTAL: 2,174

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: TUXFORD

TIME: 12:00PM-01:00PM DATE: 05-30-12

NORTH LEG

Rt	Thru	Lt	
131	414	56	Total
44	108	13	1st
23	97	14	2nd
36	104	15	3rd
28	105	14	4th

	1st	2nd	3rd	4th	Total
Rt	20	11	15	10	56
Thru	75	63	53	61	252
Lt	14	0	7	11	32

Total	1st	2nd	3rd	4th	
127	27	34	34	32	Lt
279	63	55	71	90	Thru
99	27	26	25	21	Rt

	Lt	Thru	Rt
1st	28	89	8
2nd	25	106	5
3rd	33	92	10
4th	22	98	7
Total	108	385	30

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: TUXFORD

TIME: 01:00PM-02:00PM DATE: 05-30-12

NORTH LEG

Rt	Thru	Lt	
100	357	89	Total
15	103	25	1st
32	86	27	2nd
29	91	26	3rd
24	77	11	4th

	1st	2nd	3rd	4th	Total
Rt	8	10	10	16	44
Thru	107	107	101	109	424
Lt	5	5	11	6	27

Total	1st	2nd	3rd	4th	
108	24	24	31	29	Lt
391	91	92	86	122	Thru
61	16	21	10	14	Rt

	Lt	Thru	Rt
1st	41	118	10
2nd	23	91	5
3rd	26	137	7
4th	18	91	6
Total	108	437	28

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : GLEN OAKS BLVD LA

EAST-WEST STREET : TUXFORD 05-30-12

BEGINNING TIME : 12:00PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
33	99	13	3	3	0	5	5	0	3	1	0	165
14	90	11	2	3	1	1	1	1	6	3	1	134
28	96	14	2	5	1	3	3	0	3	0	0	155
19	87	12	2	4	2	4	9	0	3	5	0	147
6	96	24	2	3	1	1	3	0	6	1	0	143
21	72	27	3	5	0	2	3	0	6	6	0	145
19	79	20	3	7	5	3	3	0	4	2	1	146
7	61	10	4	8	0	6	3	1	7	5	0	112
147	680	131	21	38	10	25	30	2	38	23	2	1147
						SOUTH LEG						
8	76	25	0	6	0	0	5	2	0	2	1	125
5	97	20	0	5	5	0	2	0	0	2	0	136
10	82	29	0	4	1	0	3	2	0	3	1	135
6	85	21	1	8	1	0	2	0	0	3	0	127
10	109	37	0	5	1	0	2	2	0	2	1	169
4	81	19	1	5	4	0	3	0	0	2	0	119
7	121	21	0	8	2	0	4	2	0	4	1	170
6	79	14	0	10	2	0	0	2	0	2	0	115
56	730	186	2	51	16	0	21	10	0	20	4	1096
						EAST LEG						
20	71	14	0	3	0	0	1	0	0	0	0	109
5	58	0	1	4	0	2	0	0	3	1	0	74
14	47	7	0	4	0	1	1	0	0	1	0	75
10	55	11	0	4	0	0	0	0	0	2	0	82
6	105	5	1	2	0	1	0	0	0	0	0	120
10	103	5	0	3	0	0	1	0	0	0	0	122
9	100	10	0	1	0	0	0	0	1	0	1	122
14	104	6	1	3	0	0	0	0	1	2	0	131
88	643	58	3	24	0	4	3	0	5	6	1	835
						WEST LEG						
26	61	9	1	2	4	0	0	7	0	0	7	117
23	53	25	3	2	5	0	0	2	0	0	2	115
23	67	21	0	3	3	2	1	5	0	0	5	130
19	85	22	2	3	3	0	0	3	0	2	4	143
11	88	16	4	3	0	0	0	6	1	0	2	131
19	82	11	2	6	4	0	3	6	0	1	3	137
8	77	18	1	7	4	0	1	5	1	1	4	127
13	117	16	1	5	5	0	0	5	0	0	3	165
142	630	138	14	31	28	2	5	39	2	4	30	1065

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: GLEN OAKS BLVD
EAST-WEST STREET: TUXFORD
JURISDICTION: LA

DATE: 05-30-12

PEAK HOUR: 04:45PM

NORTH LEG

TOTAL: 807

Rt	Thru	Lt	
89	589	129	Total
26	120	33	1st
37	164	44	2nd
17	159	34	3rd
9	146	18	4th

EAST LEG TOTAL: 486

	1st	2nd	3rd	4th	Total
Rt	36	19	11	16	82
Thru	85	66	105	90	346
Lt	35	7	6	10	58

WEST LEG TOTAL: 743

Total	1st	2nd	3rd	4th	
141	48	38	32	23	Lt
505	102	130	137	136	Thru
97	41	24	15	17	Rt

PEAK HOUR FACTORS

NORTH LEG = 0.82
SOUTH LEG = 0.96
EAST LEG = 0.78
WEST LEG = 0.97

ALL LEGS = 0.98

SOUTH LEG

TOTAL: 976

	Lt	Thru	Rt
1st	32	169	35
2nd	22	212	9
3rd	31	204	8
4th	34	213	7
Total	119	798	59

HOUR TOTAL: 3,012

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: TUXFORD

TIME: 04:00PM-05:00PM DATE: 05-30-12

NORTH LEG

Rt	Thru	Lt	
96	431	144	Total
35	103	34	1st
17	100	26	2nd
18	108	51	3rd
26	120	33	4th

	1st	2nd	3rd	4th	Total
Rt	20	11	14	36	81
Thru	63	94	74	85	316
Lt	3	2	4	35	44

Total	1st	2nd	3rd	4th	
158	36	35	39	48	Lt
393	78	103	110	102	Thru
80	10	16	13	41	Rt

	Lt	Thru	Rt
1st	20	159	8
2nd	39	155	5
3rd	30	171	7
4th	32	169	35
Total	121	654	55

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: TUXFORD

TIME: 05:00PM-06:00PM DATE: 05-30-12

NORTH LEG

Rt	Thru	Lt	
71	583	110	Total
37	164	44	1st
17	159	34	2nd
9	146	18	3rd
8	114	14	4th

	1st	2nd	3rd	4th	Total
Rt	19	11	16	11	57
Thru	66	105	90	69	330
Lt	7	6	10	8	31

Total	1st	2nd	3rd	4th	
105	38	32	23	12	Lt
504	130	137	136	101	Thru
71	24	15	17	15	Rt

	Lt	Thru	Rt
1st	22	212	9
2nd	31	204	8
3rd	34	213	7
4th	21	216	10
Total	108	845	34

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : GLEN OAKS BLVD LA

EAST-WEST STREET : TUXFORD 05-30-12

BEGINNING TIME : 04:00PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
24	97	33	5	3	1	2	1	0	4	2	0	172
11	86	24	2	7	1	2	2	1	2	5	0	143
13	94	47	2	8	3	1	3	1	2	3	0	177
21	110	31	0	5	2	2	3	0	3	2	0	179
34	158	41	0	2	2	0	2	1	3	2	0	245
16	155	33	0	1	1	0	2	0	1	1	0	210
9	138	17	0	5	1	0	3	0	0	0	0	173
6	110	13	1	3	1	0	0	0	1	1	0	136
134	948	239	10	34	12	7	16	3	16	16	0	1435
						SOUTH LEG						
7	137	17	1	10	2	0	6	1	0	6	0	187
4	133	32	1	6	2	0	10	3	0	6	2	199
5	152	25	2	7	2	0	8	2	0	4	1	208
34	150	26	1	7	2	0	8	3	0	4	1	236
8	193	19	1	5	3	0	10	0	0	4	0	243
8	183	29	0	7	2	0	9	0	0	5	0	243
5	199	32	1	6	2	0	6	0	1	2	0	254
10	206	21	0	5	0	0	4	0	0	1	0	247
81	1353	201	7	53	15	0	61	9	1	32	4	1817
						EAST LEG						
17	58	0	2	3	1	0	2	2	1	0	0	86
11	85	2	0	7	0	0	2	0	0	0	0	107
12	66	3	0	7	1	1	1	0	1	0	0	92
33	80	35	0	4	0	3	1	0	0	0	0	156
18	61	6	0	4	1	1	1	0	0	0	0	92
10	102	5	0	2	1	0	1	0	1	0	0	122
16	89	10	0	0	0	0	0	0	0	1	0	116
7	66	8	2	2	0	1	1	0	1	0	0	88
124	607	69	4	29	4	6	9	2	4	1	0	859
						WEST LEG						
8	75	29	1	3	3	1	0	3	0	0	1	124
11	95	30	4	5	2	0	3	3	1	0	0	154
10	103	24	3	5	2	0	2	9	0	0	4	162
39	96	36	2	4	3	0	2	5	0	0	4	191
21	127	29	3	2	5	0	1	2	0	0	2	192
13	129	26	2	4	1	0	3	2	0	1	3	184
13	135	16	3	1	2	0	0	4	1	0	1	176
10	99	9	5	2	2	0	0	1	0	0	0	128
125	859	199	23	26	20	1	11	29	2	1	15	1311

Prepared by Newport Traffic Studies

HCM Signalized Intersection Capacity Analysis
32: Glenoaks Blvd & Tuxford Street/Tuxford

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	115	470	45	30	565	75	95	395	20	90	1015	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.99		1.00	0.98		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1637	3366		1719	3359		1570	3282	1346	1719	3263	
Flt Permitted	0.30	1.00		0.39	1.00		0.20	1.00	1.00	0.50	1.00	
Satd. Flow (perm)	510	3366		709	3359		332	3282	1346	904	3263	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	126	516	49	33	621	82	104	434	22	99	1115	137
RTOR Reduction (vph)	0	17	0	0	23	0	0	0	12	0	20	0
Lane Group Flow (vph)	126	548	0	33	680	0	104	434	10	99	1232	0
Heavy Vehicles (%)	25%	5%	15%	5%	5%	10%	15%	10%	20%	5%	5%	40%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	14.0	14.0		14.0	14.0		19.9	19.9	19.9	19.9	19.9	
Effective Green, g (s)	14.0	14.0		14.0	14.0		19.9	19.9	19.9	19.9	19.9	
Actuated g/C Ratio	0.33	0.33		0.33	0.33		0.47	0.47	0.47	0.47	0.47	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	170	1125		237	1122		158	1559	639	429	1550	
v/s Ratio Prot		0.16			0.20			0.13			c0.38	
v/s Ratio Perm	c0.25			0.05			0.31		0.01	0.11		
v/c Ratio	0.74	0.49		0.14	0.61		0.66	0.28	0.02	0.23	0.79	
Uniform Delay, d1	12.3	11.1		9.7	11.6		8.4	6.7	5.8	6.5	9.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	15.9	0.3		0.3	0.9		9.5	0.1	0.0	0.3	2.9	
Delay (s)	28.2	11.4		10.0	12.6		17.9	6.8	5.8	6.8	12.2	
Level of Service	C	B		B	B		B	A	A	A	B	
Approach Delay (s)		14.5			12.5			8.8			11.8	
Approach LOS		B			B			A			B	

Intersection Summary			
HCM Average Control Delay	12.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	41.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	75.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	110	390	60	25	425	45	110	435	30	90	355	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.98		1.00	0.99		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1411	3328		1719	3373		1570	3282	1538	1641	2871	
Flt Permitted	0.47	1.00		0.48	1.00		0.48	1.00	1.00	0.49	1.00	
Satd. Flow (perm)	703	3328		875	3373		794	3282	1538	847	2871	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	115	406	62	26	443	47	115	453	31	94	370	104
RTOR Reduction (vph)	0	32	0	0	21	0	0	0	20	0	66	0
Lane Group Flow (vph)	115	436	0	26	469	0	115	453	11	94	408	0
Heavy Vehicles (%)	45%	5%	15%	5%	5%	10%	15%	10%	5%	10%	15%	45%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	11.0	11.0		11.0	11.0		10.9	10.9	10.9	10.9	10.9	
Effective Green, g (s)	11.0	11.0		11.0	11.0		10.9	10.9	10.9	10.9	10.9	
Actuated g/C Ratio	0.37	0.37		0.37	0.37		0.36	0.36	0.36	0.36	0.36	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	259	1224		322	1241		289	1196	561	309	1047	
v/s Ratio Prot		0.13			0.14			0.14			0.14	
v/s Ratio Perm	c0.16			0.03			c0.14		0.01	0.11		
v/c Ratio	0.44	0.36		0.08	0.38		0.40	0.38	0.02	0.30	0.39	
Uniform Delay, d1	7.1	6.9		6.2	6.9		7.1	7.0	6.1	6.8	7.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.2	0.2		0.1	0.2		0.9	0.2	0.0	0.6	0.2	
Delay (s)	8.4	7.1		6.3	7.1		8.0	7.2	6.1	7.3	7.3	
Level of Service	A	A		A	A		A	A	A	A	A	
Approach Delay (s)		7.3			7.1			7.3			7.3	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM Average Control Delay	7.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	29.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	51.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	140	505	95	60	345	80	120	800	60	130	590	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.98		1.00	0.97		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1637	3331		1719	3341		1641	3282	1538	1719	3349	
Flt Permitted	0.50	1.00		0.37	1.00		0.36	1.00	1.00	0.29	1.00	
Satd. Flow (perm)	861	3331		676	3341		621	3282	1538	532	3349	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	143	515	97	61	352	82	122	816	61	133	602	92
RTOR Reduction (vph)	0	36	0	0	46	0	0	0	34	0	28	0
Lane Group Flow (vph)	143	576	0	61	388	0	122	816	27	133	666	0
Heavy Vehicles (%)	25%	5%	10%	5%	5%	5%	10%	10%	5%	5%	5%	10%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	12.5	12.5		12.5	12.5		16.7	16.7	16.7	16.7	16.7	
Effective Green, g (s)	12.5	12.5		12.5	12.5		16.7	16.7	16.7	16.7	16.7	
Actuated g/C Ratio	0.34	0.34		0.34	0.34		0.45	0.45	0.45	0.45	0.45	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	289	1119		227	1123		279	1473	690	239	1503	
v/s Ratio Prot		c0.17			0.12			0.25			0.20	
v/s Ratio Perm	0.17			0.09			0.20		0.02	c0.25		
v/c Ratio	0.49	0.51		0.27	0.35		0.44	0.55	0.04	0.56	0.44	
Uniform Delay, d1	9.8	9.9		9.0	9.3		7.0	7.5	5.8	7.5	7.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.3	0.4		0.6	0.2		1.1	0.5	0.0	2.8	0.2	
Delay (s)	11.2	10.3		9.7	9.5		8.1	8.0	5.8	10.3	7.3	
Level of Service	B	B		A	A		A	A	A	B	A	
Approach Delay (s)		10.5			9.5			7.9			7.8	
Approach LOS		B			A			A			A	

Intersection Summary			
HCM Average Control Delay	8.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	37.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	63.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	115	470	45	30	565	75	95	445	20	90	1065	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.99		1.00	0.98		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1637	3366		1719	3359		1570	3008	1346	1719	3165	
Flt Permitted	0.29	1.00		0.39	1.00		0.20	1.00	1.00	0.47	1.00	
Satd. Flow (perm)	506	3366		706	3359		326	3008	1346	857	3165	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	126	516	49	33	621	82	104	489	22	99	1170	137
RTOR Reduction (vph)	0	17	0	0	23	0	0	0	11	0	19	0
Lane Group Flow (vph)	126	548	0	33	680	0	104	489	11	99	1288	0
Heavy Vehicles (%)	25%	5%	15%	5%	5%	10%	15%	20%	20%	5%	9%	40%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	14.1	14.1		14.1	14.1		20.3	20.3	20.3	20.3	20.3	
Effective Green, g (s)	14.1	14.1		14.1	14.1		20.3	20.3	20.3	20.3	20.3	
Actuated g/C Ratio	0.33	0.33		0.33	0.33		0.48	0.48	0.48	0.48	0.48	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	168	1119		235	1117		156	1440	644	410	1515	
v/s Ratio Prot		0.16			0.20			0.16			c0.41	
v/s Ratio Perm	c0.25			0.05			0.32		0.01	0.12		
v/c Ratio	0.75	0.49		0.14	0.61		0.67	0.34	0.02	0.24	0.85	
Uniform Delay, d1	12.6	11.3		9.9	11.8		8.5	6.9	5.8	6.5	9.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	17.0	0.3		0.3	0.9		10.3	0.1	0.0	0.3	4.7	
Delay (s)	29.6	11.6		10.2	12.8		18.7	7.0	5.8	6.8	14.4	
Level of Service	C	B		B	B		B	A	A	A	B	
Approach Delay (s)		14.9			12.7			9.0			13.9	
Approach LOS		B			B			A			B	

Intersection Summary			
HCM Average Control Delay	12.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	42.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	76.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	110	390	60	25	425	45	110	485	30	90	405	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.98		1.00	0.99		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1411	3328		1719	3373		1570	3034	1538	1641	2716	
Flt Permitted	0.47	1.00		0.48	1.00		0.46	1.00	1.00	0.47	1.00	
Satd. Flow (perm)	703	3328		875	3373		755	3034	1538	806	2716	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	115	406	62	26	443	47	115	505	31	94	422	104
RTOR Reduction (vph)	0	33	0	0	21	0	0	0	19	0	56	0
Lane Group Flow (vph)	115	435	0	26	469	0	115	505	12	94	470	0
Heavy Vehicles (%)	45%	5%	15%	5%	5%	10%	15%	19%	5%	10%	25%	45%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	11.1	11.1		11.1	11.1		11.6	11.6	11.6	11.6	11.6	
Effective Green, g (s)	11.1	11.1		11.1	11.1		11.6	11.6	11.6	11.6	11.6	
Actuated g/C Ratio	0.36	0.36		0.36	0.36		0.38	0.38	0.38	0.38	0.38	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	254	1203		316	1220		285	1146	581	305	1026	
v/s Ratio Prot		0.13			0.14			0.17			c0.17	
v/s Ratio Perm	c0.16			0.03			0.15		0.01	0.12		
v/c Ratio	0.45	0.36		0.08	0.38		0.40	0.44	0.02	0.31	0.46	
Uniform Delay, d1	7.5	7.2		6.4	7.3		7.0	7.1	6.0	6.7	7.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.3	0.2		0.1	0.2		0.9	0.3	0.0	0.6	0.3	
Delay (s)	8.8	7.4		6.6	7.5		7.9	7.4	6.0	7.3	7.5	
Level of Service	A	A		A	A		A	A	A	A	A	
Approach Delay (s)		7.7			7.4			7.4			7.5	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM Average Control Delay	7.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	30.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	53.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	140	505	95	60	345	80	120	850	60	130	640	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.98		1.00	0.97		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1637	3331		1719	3341		1641	3139	1538	1719	3171	
Flt Permitted	0.50	1.00		0.37	1.00		0.33	1.00	1.00	0.27	1.00	
Satd. Flow (perm)	861	3331		670	3341		573	3139	1538	489	3171	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	143	515	97	61	352	82	122	867	61	133	653	92
RTOR Reduction (vph)	0	36	0	0	47	0	0	0	33	0	25	0
Lane Group Flow (vph)	143	576	0	61	387	0	122	867	28	133	720	0
Heavy Vehicles (%)	25%	5%	10%	5%	5%	5%	10%	15%	5%	5%	12%	10%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	12.6	12.6		12.6	12.6		17.2	17.2	17.2	17.2	17.2	
Effective Green, g (s)	12.6	12.6		12.6	12.6		17.2	17.2	17.2	17.2	17.2	
Actuated g/C Ratio	0.33	0.33		0.33	0.33		0.46	0.46	0.46	0.46	0.46	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	287	1110		223	1114		261	1428	700	223	1443	
v/s Ratio Prot		c0.17			0.12			c0.28			0.23	
v/s Ratio Perm	0.17			0.09			0.21		0.02	0.27		
v/c Ratio	0.50	0.52		0.27	0.35		0.47	0.61	0.04	0.60	0.50	
Uniform Delay, d1	10.1	10.2		9.2	9.5		7.1	7.8	5.7	7.7	7.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.4	0.4		0.7	0.2		1.3	0.7	0.0	4.2	0.3	
Delay (s)	11.4	10.6		9.9	9.7		8.5	8.5	5.7	11.9	7.5	
Level of Service	B	B		A	A		A	A	A	B	A	
Approach Delay (s)		10.7			9.7			8.3			8.2	
Approach LOS		B			A			A			A	

Intersection Summary			
HCM Average Control Delay	9.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	37.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	64.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	125	510	50	35	615	80	105	485	20	100	1160	135
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.99		1.00	0.98		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1637	3363		1719	3360		1570	3282	1346	1719	3271	
Flt Permitted	0.27	1.00		0.35	1.00		0.19	1.00	1.00	0.45	1.00	
Satd. Flow (perm)	459	3363		639	3360		315	3282	1346	812	3271	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	137	560	55	38	676	88	115	533	22	110	1275	148
RTOR Reduction (vph)	0	16	0	0	23	0	0	0	12	0	19	0
Lane Group Flow (vph)	137	599	0	38	741	0	115	533	11	110	1404	0
Heavy Vehicles (%)	25%	5%	15%	5%	5%	10%	15%	10%	20%	5%	5%	40%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	15.0	15.0		15.0	15.0		21.0	21.0	21.0	21.0	21.0	
Effective Green, g (s)	15.0	15.0		15.0	15.0		21.0	21.0	21.0	21.0	21.0	
Actuated g/C Ratio	0.34	0.34		0.34	0.34		0.48	0.48	0.48	0.48	0.48	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	156	1146		218	1145		150	1566	642	388	1561	
v/s Ratio Prot		0.18			0.22			0.16			c0.43	
v/s Ratio Perm	c0.30			0.06			0.37		0.01	0.14		
v/c Ratio	0.88	0.52		0.17	0.65		0.77	0.34	0.02	0.28	0.90	
Uniform Delay, d1	13.6	11.6		10.2	12.3		9.5	7.2	6.1	7.0	10.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	38.6	0.4		0.4	1.3		20.6	0.1	0.0	0.4	7.3	
Delay (s)	52.3	12.1		10.5	13.5		30.1	7.3	6.1	7.4	17.8	
Level of Service	D	B		B	B		C	A	A	A	B	
Approach Delay (s)		19.4			13.4			11.2			17.1	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM Average Control Delay	15.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	44.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	82.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
32: Glenoaks Blvd & Tuxford Street/Tuxford

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	120	425	65	25	465	50	120	530	35	100	440	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.98		1.00	0.99		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1411	3327		1719	3372		1570	3282	1538	1641	2893	
Flt Permitted	0.45	1.00		0.46	1.00		0.44	1.00	1.00	0.45	1.00	
Satd. Flow (perm)	672	3327		839	3372		721	3282	1538	770	2893	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	125	443	68	26	484	52	125	552	36	104	458	115
RTOR Reduction (vph)	0	32	0	0	21	0	0	0	22	0	57	0
Lane Group Flow (vph)	125	479	0	26	515	0	125	552	14	104	516	0
Heavy Vehicles (%)	45%	5%	15%	5%	5%	10%	15%	10%	5%	10%	15%	45%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	11.7	11.7		11.7	11.7		12.1	12.1	12.1	12.1	12.1	
Effective Green, g (s)	11.7	11.7		11.7	11.7		12.1	12.1	12.1	12.1	12.1	
Actuated g/C Ratio	0.37	0.37		0.37	0.37		0.38	0.38	0.38	0.38	0.38	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	247	1224		309	1241		274	1249	585	293	1101	
v/s Ratio Prot		0.14			0.15			0.17			c0.18	
v/s Ratio Perm	c0.19			0.03			0.17		0.01	0.14		
v/c Ratio	0.51	0.39		0.08	0.41		0.46	0.44	0.02	0.35	0.47	
Uniform Delay, d1	7.8	7.4		6.6	7.5		7.4	7.3	6.2	7.1	7.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.6	0.2		0.1	0.2		1.2	0.3	0.0	0.7	0.3	
Delay (s)	9.4	7.6		6.7	7.7		8.6	7.6	6.2	7.8	7.7	
Level of Service	A	A		A	A		A	A	A	A	A	
Approach Delay (s)		8.0			7.7			7.7			7.8	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM Average Control Delay	7.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	31.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	56.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	155	550	105	65	375	85	130	925	65	140	700	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.98		1.00	0.97		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1637	3330		1719	3343		1641	3282	1538	1719	3354	
Flt Permitted	0.48	1.00		0.33	1.00		0.29	1.00	1.00	0.23	1.00	
Satd. Flow (perm)	820	3330		594	3343		505	3282	1538	422	3354	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	158	561	107	66	383	87	133	944	66	143	714	102
RTOR Reduction (vph)	0	36	0	0	45	0	0	0	36	0	25	0
Lane Group Flow (vph)	158	632	0	66	425	0	133	944	30	143	791	0
Heavy Vehicles (%)	25%	5%	10%	5%	5%	5%	10%	10%	5%	5%	5%	10%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	13.5	13.5		13.5	13.5		18.2	18.2	18.2	18.2	18.2	
Effective Green, g (s)	13.5	13.5		13.5	13.5		18.2	18.2	18.2	18.2	18.2	
Actuated g/C Ratio	0.34	0.34		0.34	0.34		0.46	0.46	0.46	0.46	0.46	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	279	1132		202	1137		232	1505	705	193	1538	
v/s Ratio Prot		0.19			0.13			0.29			0.24	
v/s Ratio Perm	c0.19			0.11			0.26		0.02	c0.34		
v/c Ratio	0.57	0.56		0.33	0.37		0.57	0.63	0.04	0.74	0.51	
Uniform Delay, d1	10.7	10.7		9.7	9.9		7.9	8.2	5.9	8.8	7.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.6	0.6		0.9	0.2		3.4	0.8	0.0	14.2	0.3	
Delay (s)	13.3	11.3		10.7	10.1		11.3	9.0	6.0	23.0	7.9	
Level of Service	B	B		B	B		B	A	A	C	A	
Approach Delay (s)		11.7			10.2			9.1			10.2	
Approach LOS		B			B			A			B	

Intersection Summary			
HCM Average Control Delay	10.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	39.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	68.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
32: Glenoaks Blvd & Tuxford Street/Tuxford

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	165	470	45	30	565	75	95	395	20	90	1015	175
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.99		1.00	0.98		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1382	3366		1719	3359		1570	3282	1346	1719	3134	
Flt Permitted	0.31	1.00		0.40	1.00		0.18	1.00	1.00	0.50	1.00	
Satd. Flow (perm)	454	3366		719	3359		300	3282	1346	901	3134	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	181	516	49	33	621	82	104	434	22	99	1115	192
RTOR Reduction (vph)	0	14	0	0	20	0	0	0	12	0	28	0
Lane Group Flow (vph)	181	551	0	33	683	0	104	434	10	99	1279	0
Heavy Vehicles (%)	48%	5%	15%	5%	5%	10%	15%	10%	20%	5%	5%	57%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	20.0	20.0		20.0	20.0		22.0	22.0	22.0	22.0	22.0	
Effective Green, g (s)	20.0	20.0		20.0	20.0		22.0	22.0	22.0	22.0	22.0	
Actuated g/C Ratio	0.40	0.40		0.40	0.40		0.44	0.44	0.44	0.44	0.44	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	182	1346		288	1344		132	1444	592	396	1379	
v/s Ratio Prot		0.16			0.20			0.13			c0.41	
v/s Ratio Perm	c0.40			0.05			0.35		0.01	0.11		
v/c Ratio	0.99	0.41		0.11	0.51		0.79	0.30	0.02	0.25	0.93	
Uniform Delay, d1	14.9	10.8		9.4	11.3		12.0	9.0	7.9	8.8	13.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	64.8	0.2		0.2	0.3		26.0	0.1	0.0	0.3	10.9	
Delay (s)	79.7	11.0		9.6	11.6		38.0	9.2	7.9	9.1	24.2	
Level of Service	E	B		A	B		D	A	A	A	C	
Approach Delay (s)		27.6			11.5			14.5			23.1	
Approach LOS		C			B			B			C	

Intersection Summary			
HCM Average Control Delay	20.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	79.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
32: Glenoaks Blvd & Tuxford Street/Tuxford

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	160	390	60	25	425	45	110	435	30	90	355	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.98		1.00	0.99		1.00	1.00	0.85	1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1263	3328		1719	3373		1570	3282	1538	1641	2669	
Flt Permitted	0.47	1.00		0.48	1.00		0.46	1.00	1.00	0.49	1.00	
Satd. Flow (perm)	629	3328		875	3373		755	3282	1538	847	2669	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	167	406	62	26	443	47	115	453	31	94	370	156
RTOR Reduction (vph)	0	31	0	0	20	0	0	0	20	0	101	0
Lane Group Flow (vph)	167	437	0	26	470	0	115	453	11	94	425	0
Heavy Vehicles (%)	62%	5%	15%	5%	5%	10%	15%	10%	5%	10%	15%	63%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	12.9	12.9		12.9	12.9		11.3	11.3	11.3	11.3	11.3	
Effective Green, g (s)	12.9	12.9		12.9	12.9		11.3	11.3	11.3	11.3	11.3	
Actuated g/C Ratio	0.40	0.40		0.40	0.40		0.35	0.35	0.35	0.35	0.35	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	252	1333		351	1351		265	1152	540	297	937	
v/s Ratio Prot		0.13			0.14			0.14			c0.16	
v/s Ratio Perm	c0.27			0.03			0.15		0.01	0.11		
v/c Ratio	0.66	0.33		0.07	0.35		0.43	0.39	0.02	0.32	0.45	
Uniform Delay, d1	7.9	6.7		6.0	6.7		8.0	7.9	6.8	7.6	8.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	6.4	0.1		0.1	0.2		1.1	0.2	0.0	0.6	0.3	
Delay (s)	14.3	6.8		6.1	6.9		9.1	8.1	6.8	8.2	8.4	
Level of Service	B	A		A	A		A	A	A	A	A	
Approach Delay (s)		8.8			6.8			8.2			8.4	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM Average Control Delay	8.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	32.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	56.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	190	505	95	60	345	80	120	800	60	130	590	140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.98		1.00	0.97		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1411	3331		1719	3341		1641	3282	1538	1719	3128	
Flt Permitted	0.50	1.00		0.38	1.00		0.32	1.00	1.00	0.28	1.00	
Satd. Flow (perm)	742	3331		682	3341		556	3282	1538	515	3128	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	194	515	97	61	352	82	122	816	61	133	602	143
RTOR Reduction (vph)	0	35	0	0	45	0	0	0	34	0	49	0
Lane Group Flow (vph)	194	577	0	61	389	0	122	816	27	133	696	0
Heavy Vehicles (%)	45%	5%	10%	5%	5%	5%	10%	10%	5%	5%	5%	42%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	14.1	14.1		14.1	14.1		17.0	17.0	17.0	17.0	17.0	
Effective Green, g (s)	14.1	14.1		14.1	14.1		17.0	17.0	17.0	17.0	17.0	
Actuated g/C Ratio	0.36	0.36		0.36	0.36		0.43	0.43	0.43	0.43	0.43	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	268	1201		246	1205		242	1427	669	224	1360	
v/s Ratio Prot		0.17			0.12			0.25			0.22	
v/s Ratio Perm	c0.26			0.09			0.22		0.02	c0.26		
v/c Ratio	0.72	0.48		0.25	0.32		0.50	0.57	0.04	0.59	0.51	
Uniform Delay, d1	10.8	9.7		8.8	9.0		8.0	8.3	6.4	8.4	8.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	9.3	0.3		0.5	0.2		1.7	0.6	0.0	4.2	0.3	
Delay (s)	20.1	10.0		9.3	9.2		9.7	8.9	6.4	12.6	8.4	
Level of Service	C	A		A	A		A	A	A	B	A	
Approach Delay (s)		12.4			9.2			8.8			9.0	
Approach LOS		B			A			A			A	

Intersection Summary			
HCM Average Control Delay	9.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	39.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	65.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	180	510	50	35	615	80	105	430	20	100	1105	190
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.99		1.00	0.98		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1382	3363		1719	3360		1570	3282	1346	1719	3134	
Flt Permitted	0.30	1.00		0.38	1.00		0.22	1.00	1.00	0.47	1.00	
Satd. Flow (perm)	430	3363		690	3360		367	3282	1346	854	3134	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	198	560	55	38	676	88	115	473	22	110	1214	209
RTOR Reduction (vph)	0	10	0	0	23	0	0	0	13	0	31	0
Lane Group Flow (vph)	198	605	0	38	741	0	115	473	9	110	1392	0
Heavy Vehicles (%)	48%	5%	15%	5%	5%	10%	15%	10%	20%	5%	5%	57%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	19.0	19.0		19.0	19.0		18.0	18.0	18.0	18.0	18.0	
Effective Green, g (s)	19.0	19.0		19.0	19.0		18.0	18.0	18.0	18.0	18.0	
Actuated g/C Ratio	0.42	0.42		0.42	0.42		0.40	0.40	0.40	0.40	0.40	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	182	1420		291	1419		147	1313	538	342	1254	
v/s Ratio Prot		0.18			0.22			0.14			c0.44	
v/s Ratio Perm	c0.46			0.06			0.31		0.01	0.13		
v/c Ratio	1.09	0.43		0.13	0.52		0.78	0.36	0.02	0.32	1.11	
Uniform Delay, d1	13.0	9.2		7.9	9.6		11.8	9.5	8.2	9.3	13.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	92.1	0.2		0.2	0.3		23.2	0.2	0.0	0.5	61.2	
Delay (s)	105.1	9.4		8.2	10.0		35.0	9.6	8.2	9.8	74.7	
Level of Service	F	A		A	A		C	A	A	A	E	
Approach Delay (s)		32.7			9.9			14.4			70.0	
Approach LOS		C			A			B			E	

Intersection Summary			
HCM Average Control Delay	40.1	HCM Level of Service	D
HCM Volume to Capacity ratio	1.10		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	85.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
32: Glenoaks Blvd & Tuxford Street/Tuxford

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	175	425	65	25	465	50	120	475	35	100	385	165
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.98		1.00	0.99		1.00	1.00	0.85	1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1263	3327		1719	3372		1570	3282	1538	1641	2664	
Flt Permitted	0.45	1.00		0.46	1.00		0.42	1.00	1.00	0.47	1.00	
Satd. Flow (perm)	601	3327		839	3372		691	3282	1538	813	2664	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	182	443	68	26	484	52	125	495	36	104	401	172
RTOR Reduction (vph)	0	30	0	0	20	0	0	0	23	0	111	0
Lane Group Flow (vph)	182	481	0	26	516	0	125	495	13	104	462	0
Heavy Vehicles (%)	62%	5%	15%	5%	5%	10%	15%	10%	5%	10%	15%	63%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	14.4	14.4		14.4	14.4		12.2	12.2	12.2	12.2	12.2	
Effective Green, g (s)	14.4	14.4		14.4	14.4		12.2	12.2	12.2	12.2	12.2	
Actuated g/C Ratio	0.42	0.42		0.42	0.42		0.35	0.35	0.35	0.35	0.35	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	250	1385		349	1403		244	1157	542	287	939	
v/s Ratio Prot		0.14			0.15			0.15			0.17	
v/s Ratio Perm	c0.30			0.03			c0.18		0.01	0.13		
v/c Ratio	0.73	0.35		0.07	0.37		0.51	0.43	0.02	0.36	0.49	
Uniform Delay, d1	8.5	6.9		6.1	7.0		8.8	8.5	7.3	8.3	8.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	10.1	0.2		0.1	0.2		1.8	0.3	0.0	0.8	0.4	
Delay (s)	18.6	7.0		6.2	7.1		10.7	8.8	7.3	9.1	9.2	
Level of Service	B	A		A	A		B	A	A	A	A	
Approach Delay (s)		10.1			7.1			9.1			9.2	
Approach LOS		B			A			A			A	

Intersection Summary			
HCM Average Control Delay	8.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	34.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	60.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
32: Glenoaks Blvd & Tuxford Street/Tuxford

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	205	550	105	65	375	85	130	870	65	140	645	155
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.98		1.00	0.97		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1411	3330		1719	3343		1641	3282	1538	1719	3125	
Flt Permitted	0.48	1.00		0.35	1.00		0.28	1.00	1.00	0.27	1.00	
Satd. Flow (perm)	717	3330		641	3343		476	3282	1538	486	3125	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	209	561	107	66	383	87	133	888	66	143	658	158
RTOR Reduction (vph)	0	41	0	0	35	0	0	0	39	0	52	0
Lane Group Flow (vph)	209	627	0	66	435	0	133	888	27	143	764	0
Heavy Vehicles (%)	45%	5%	10%	5%	5%	5%	10%	10%	5%	5%	5%	42%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	14.2	14.2		14.2	14.2		14.9	14.9	14.9	14.9	14.9	
Effective Green, g (s)	14.2	14.2		14.2	14.2		14.9	14.9	14.9	14.9	14.9	
Actuated g/C Ratio	0.38	0.38		0.38	0.38		0.40	0.40	0.40	0.40	0.40	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	274	1275		245	1280		191	1318	618	195	1255	
v/s Ratio Prot		0.19			0.13			0.27			0.24	
v/s Ratio Perm	c0.29			0.10			0.28		0.02	c0.29		
v/c Ratio	0.76	0.49		0.27	0.34		0.70	0.67	0.04	0.73	0.61	
Uniform Delay, d1	10.0	8.7		7.9	8.1		9.2	9.1	6.8	9.4	8.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	11.9	0.3		0.6	0.2		10.5	1.4	0.0	13.3	0.8	
Delay (s)	21.8	9.0		8.5	8.3		19.7	10.5	6.8	22.7	9.6	
Level of Service	C	A		A	A		B	B	A	C	A	
Approach Delay (s)		12.1			8.3			11.4			11.6	
Approach LOS		B			A			B			B	

Intersection Summary			
HCM Average Control Delay	11.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	37.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	69.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Hall & Foreman, Inc.

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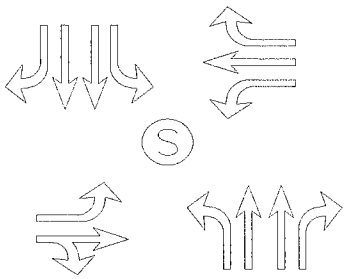
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : PENROSE STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 33
ROUTE 5B, 6B, 7B

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
PENROSE STREET						
EB LEFT	120	5%		120	10	130
EB THRU	125	5%		125	10	135
EB RIGHT	20	25%		20	5	25
WB LEFT	5	0%		5	5	10
WB THRU	70	5%		70	5	75
WB RIGHT	35	10%		35	5	40
GLEN OAKS BLVD						
NB LEFT	25	0%		25	5	30
NB THRU	365	21%	50	415	35	450
NB RIGHT	5	0%		5	5	10
SB LEFT	35	15%		35	5	40
SB THRU	920	10%	50	970	85	1055
SB RIGHT	95	5%		95	10	105
TOTALS	**1820**		**100**	**1920**	**185**	**2105**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : PENROSE STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 33
ROUTE 5B, 6B, 7B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
PENROSE STREET						
EB LEFT	90	10%		90	10	100
EB THRU	130	5%		130	10	140
EB RIGHT	50	5%		50	5	55
WB LEFT	20	10%		20	5	25
WB THRU	85	5%		85	5	90
WB RIGHT	35	5%		35	5	40
GLEN OAKS BLVD						
NB LEFT	45	0%		45	5	50
NB THRU	465	14%	**50**	515	45	560
NB RIGHT	25	5%		25	5	30
SB LEFT	25	10%		25	5	30
SB THRU	440	19%	**50**	490	45	535
SB RIGHT	35	10%		35	5	40
TOTALS	**1445**		**100**	**1545**	**150**	**1695**

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TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : PENROSE STREET
N/S STREET : GLEN OAKS BLVD
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PROJECTED GROWTH PER YEAR:

INTERSECTION 33
ROUTE 5B, 6B, 7B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
PENROSE STREET						
EB LEFT	185	5%		185	15	200
EB THRU	200	5%		200	20	220
EB RIGHT	55	10%		55	5	60
WB LEFT	45	5%		45	5	50
WB THRU	140	10%		140	15	155
WB RIGHT	75	5%		75	5	80
GLEN OAKS BLVD						
NB LEFT	75	0%		75	5	80
NB THRU	700	16%	50	750	70	820
NB RIGHT	40	0%		40	5	45
SB LEFT	45	0%		45	5	50
SB THRU	520	18%	50	570	50	620
SB RIGHT	110	5%		110	10	120
TOTALS	**2190**		**100**	**2290**	**210**	**2500**

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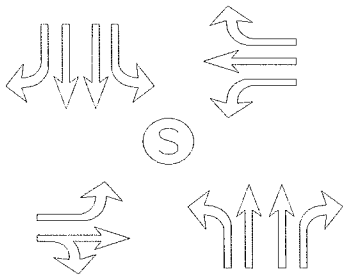
N/S STREET : GLEN OAKS BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
33
ROUTE
5B, 6B, 7B

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
PENROSE STREET								
EB LEFT	110	8	24	135	**0**	135	10	145
EB THRU	121	3	9	130	**0**	130	10	140
EB RIGHT	17	5	15	30	**0**	30	5	35
WB LEFT	2	0	0	5	**0**	5	5	10
WB THRU	68	3	9	75	**0**	75	5	80
WB RIGHT	31	4	12	45	**0**	45	5	50
GLEN OAKS BLVD								
NB LEFT	25	0	0	25	**0**	25	5	30
NB THRU	332	35	105	435	**150**	585	55	640
NB RIGHT	2	0	0	5	**0**	5	5	10
SB LEFT	32	5	15	45	**0**	45	5	50
SB THRU	871	47	141	1010	**150**	1160	105	1265
SB RIGHT	89	4	12	100	**0**	100	10	110
TOTALS	**1700**				**300**	**2340**	**225**	**2565**

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TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : PENROSE STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
33
ROUTE
5B, 6B, 7B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
PENROSE STREET								
EB LEFT	82	10	30	110	**0**	110	10	120
EB THRU	127	2	6	135	**0**	135	10	145
EB RIGHT	51	1	3	55	**0**	55	5	60
WB LEFT	20	2	6	25	**0**	25	5	30
WB THRU	83	2	6	90	**0**	90	10	100
WB RIGHT	36	1	3	40	**0**	40	5	45
GLEN OAKS BLVD								
NB LEFT	44	0	0	45	**0**	45	5	50
NB THRU	432	31	93	525	**150**	675	60	735
NB RIGHT	23	1	3	25	**0**	25	5	30
SB LEFT	23	3	9	30	**0**	30	5	35
SB THRU	406	35	105	510	**150**	660	60	720
SB RIGHT	29	4	12	40	**0**	40	5	45
TOTALS	**1356**				**300**	**1930**	**185**	**2115**

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E/W STREET : PENROSE STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
33
ROUTE
5B, 6B, 7B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
PENROSE STREET								
EB LEFT	175	12	36	210	**0**	210	20	230
EB THRU	190	8	24	215	**0**	215	20	235
EB RIGHT	52	5	15	65	**0**	65	5	70
WB LEFT	41	3	9	50	**0**	50	5	55
WB THRU	128	11	33	160	**0**	160	15	175
WB RIGHT	74	3	9	85	**0**	85	5	90
GLEN OAKS BLVD								
NB LEFT	75	0	0	75	**0**	75	5	80
NB THRU	646	54	162	810	**150**	960	85	1045
NB RIGHT	38	0	0	40	**0**	40	5	45
SB LEFT	47	0	0	45	**0**	45	5	50
SB THRU	457	62	186	645	**150**	795	70	865
SB RIGHT	106	3	9	115	**0**	115	10	125
TOTALS	**2029**				**300**	**2815**	**250**	**3065**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: GLEN OAKS BLVD
EAST-WEST STREET: PENROE
JURISDICTION: LA

DATE: 05-30-12

PEAK HOUR: 07:15AM

NORTH LEG

TOTAL: 1,048

Rt	Thru	Lt	
93	918	37	Total
18	250	4	1st
21	266	10	2nd
27	212	14	3rd
27	190	9	4th

EAST LEG TOTAL: 108

	1st	2nd	3rd	4th	Total
Rt	8	6	12	9	35
Thru	12	14	19	26	71
Lt	0	0	0	2	2

WEST LEG TOTAL: 264

Total	1st	2nd	3rd	4th	
118	22	38	33	25	Lt
124	18	38	50	18	Thru
22	4	5	4	9	Rt

PEAK HOUR FACTORS

NORTH LEG = 0.88
SOUTH LEG = 0.82
EAST LEG = 0.73
WEST LEG = 0.76

ALL LEGS = 0.92

SOUTH LEG

TOTAL: 394

	Lt	Thru	Rt
1st	6	82	1
2nd	4	81	0
3rd	6	114	0
4th	9	90	1
Total	25	367	2

HOUR TOTAL: 1,814

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: PENROE

TIME: 07:00AM-08:00AM DATE: 05-30-12

NORTH LEG

Rt	Thru	Lt	
81	947	34	Total
15	219	6	1st
18	250	4	2nd
21	266	10	3rd
27	212	14	4th

	1st	2nd	3rd	4th	Total
Rt	6	8	6	12	32
Thru	10	12	14	19	55
Lt	0	0	0	0	0

Total	1st	2nd	3rd	4th	
112	19	22	38	33	Lt
117	11	18	38	50	Thru
18	5	4	5	4	Rt

	Lt	Thru	Rt
1st	5	80	0
2nd	6	82	1
3rd	4	81	0
4th	6	114	0
Total	21	357	1

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: PENROE

TIME: 08:00AM-09:00AM DATE: 05-30-12

NORTH LEG

Rt	Thru	Lt	
86	635	35	Total
27	190	9	1st
22	158	6	2nd
21	140	10	3rd
16	147	10	4th

	1st	2nd	3rd	4th	Total
Rt	9	6	7	15	37
Thru	26	14	19	14	73
Lt	2	3	7	1	13

Total	1st	2nd	3rd	4th	
109	25	27	32	25	Lt
76	18	14	20	24	Thru
28	9	4	10	5	Rt

	Lt	Thru	Rt
1st	9	90	1
2nd	6	79	3
3rd	12	71	4
4th	7	61	2
Total	34	301	10

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : GLEN OAKS BLVD LA

EAST-WEST STREET : PENROE 05-30-12

BEGINNING TIME : 07:00AM PH: 7:15AM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
14	207	5	0	7	0	0	2	0	1	3	1	240
18	236	2	0	6	2	0	4	0	0	4	0	272
17	257	8	3	5	2	1	4	0	0	0	0	297
27	196	13	0	6	1	0	4	0	0	6	0	253
27	182	9	0	3	0	0	3	0	0	2	0	226
21	147	5	0	8	0	1	3	1	0	0	0	186
20	130	9	0	6	0	1	2	1	0	2	0	171
11	138	9	2	6	1	2	2	0	1	1	0	173
155	1493	60	5	47	6	5	24	2	2	18	1	1818
						SOUTH LEG						
0	74	5	0	4	0	0	0	0	0	2	0	85
1	72	6	0	6	0	0	3	0	0	1	0	89
0	74	4	0	5	0	0	0	0	0	2	0	85
0	107	6	0	3	0	0	3	0	0	1	0	120
1	79	9	0	3	0	0	5	0	0	3	0	100
3	74	6	0	2	0	0	2	0	0	1	0	88
4	60	12	0	5	0	0	1	0	0	5	0	87
1	50	7	0	4	0	0	4	0	1	3	0	70
10	590	55	0	32	0	0	18	0	1	18	0	724
						EAST LEG						
6	10	0	0	0	0	0	0	0	0	0	0	16
8	12	0	0	0	0	0	0	0	0	0	0	20
2	12	0	3	2	0	1	0	0	0	0	0	20
12	19	0	0	0	0	0	0	0	0	0	0	31
9	25	2	0	1	0	0	0	0	0	0	0	37
6	14	3	0	0	0	0	0	0	0	0	0	23
7	19	7	0	0	0	0	0	0	0	0	0	33
14	14	1	0	0	0	1	0	0	0	0	0	30
64	125	13	3	3	0	2	0	0	0	0	0	210
						WEST LEG						
5	10	17	0	1	1	0	0	0	0	0	1	35
2	15	21	1	3	1	1	0	0	0	0	0	44
4	38	36	1	0	0	0	0	1	0	0	1	81
2	50	33	1	0	0	0	0	0	1	0	0	87
9	18	20	0	0	2	0	0	2	0	0	1	52
2	12	26	1	0	0	0	2	1	1	0	0	45
10	15	31	0	3	0	0	0	0	0	2	1	62
4	24	22	1	0	0	0	0	2	0	0	1	54
38	182	206	5	7	4	1	2	6	2	2	5	460

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: GLEN OAKS BLVD
EAST-WEST STREET: PENROE
JURISDICTION: LA

DATE: 05-30-12

PEAK HOUR: 01:00PM

NORTH LEG

TOTAL: 500

Rt	Thru	Lt	
33	441	26	Total
4	123	3	1st
14	113	11	2nd
8	74	5	3rd
7	131	7	4th

EAST LEG TOTAL: 144

	1st	2nd	3rd	4th	Total
Rt	7	12	11	7	37
Thru	14	20	26	25	85
Lt	1	5	14	2	22

WEST LEG TOTAL: 273

Total	1st	2nd	3rd	4th	
92	20	16	37	19	Lt
129	27	27	39	36	Thru
52	14	9	21	8	Rt

SOUTH LEG

TOTAL: 531

	Lt	Thru	Rt
1st	7	131	4
2nd	23	129	2
3rd	10	90	10
4th	4	113	8
Total	44	463	24

PEAK HOUR FACTORS

NORTH LEG = 0.86
SOUTH LEG = 0.86
EAST LEG = 0.71
WEST LEG = 0.70

ALL LEGS = 0.95

HOUR TOTAL: 1,448

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: PENROE

TIME: 12:00PM-01:00PM DATE: 05-30-12

NORTH LEG

Rt	Thru	Lt	
49	479	41	Total
13	117	10	1st
17	113	8	2nd
11	140	10	3rd
8	109	13	4th

	1st	2nd	3rd	4th	Total
Rt	13	14	10	8	45
Thru	4	10	17	13	44
Lt	3	3	1	5	12

Total	1st	2nd	3rd	4th	
83	22	19	21	21	Lt
81	24	15	24	18	Thru
48	19	9	11	9	Rt

	Lt	Thru	Rt
1st	11	111	1
2nd	17	108	5
3rd	12	103	2
4th	15	108	5
Total	55	430	13

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: PENROE

TIME: 01:00PM-02:00PM DATE: 05-30-12

NORTH LEG

Rt	Thru	Lt	
33	441	26	Total
4	123	3	1st
14	113	11	2nd
8	74	5	3rd
7	131	7	4th

	1st	2nd	3rd	4th	Total
Rt	7	12	11	7	37
Thru	14	20	26	25	85
Lt	1	5	14	2	22

Total	1st	2nd	3rd	4th	
92	20	16	37	19	Lt
129	27	27	39	36	Thru
52	14	9	21	8	Rt

	Lt	Thru	Rt
1st	7	131	4
2nd	23	129	2
3rd	10	90	10
4th	4	113	8
Total	44	463	24

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : GLEN OAKS BLVD LA

EAST-WEST STREET : PENROE 05-30-12

BEGINNING TIME : 12:00PM PH: 1:00 PM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
					NORTH LEG							
13	108	10	0	3	0	0	5	0	0	1	0	140
17	98	6	0	5	1	0	3	1	0	7	0	138
11	130	10	0	4	0	0	6	0	0	0	0	161
8	82	12	0	10	0	0	10	1	0	7	0	130
4	112	3	0	8	0	0	2	0	0	1	0	130
14	101	11	0	7	0	0	2	0	0	3	0	138
7	71	3	0	3	0	0	0	1	1	0	1	87
4	122	6	1	6	0	0	3	1	2	0	0	145
78	824	61	1	46	1	0	31	4	3	19	1	1069
					SOUTH LEG							
1	102	11	0	5	0	0	2	0	0	2	0	123
5	90	16	0	9	1	0	4	0	0	5	0	130
2	93	12	0	7	0	0	1	0	0	2	0	117
5	83	15	0	7	0	0	10	0	0	8	0	128
4	125	7	0	6	0	0	0	0	0	0	0	142
2	118	23	0	5	0	0	1	0	0	5	0	154
10	84	10	0	5	0	0	0	0	0	1	0	110
7	105	4	0	3	0	0	3	0	1	2	0	125
36	800	98	0	47	1	0	21	0	1	25	0	1029
					EAST LEG							
11	4	3	1	0	0	1	0	0	0	0	0	20
14	9	3	0	0	0	0	1	0	0	0	0	27
9	16	1	1	0	0	0	1	0	0	0	0	28
7	13	4	1	0	1	0	0	0	0	0	0	26
7	12	1	0	1	0	0	1	0	0	0	0	22
11	20	3	0	0	0	0	0	1	1	0	1	37
11	26	14	0	0	0	0	0	0	0	0	0	51
7	25	2	0	0	0	0	0	0	0	0	0	34
77	125	31	3	1	1	1	3	1	1	0	1	245
					WEST LEG							
18	24	21	1	0	0	0	0	1	0	0	0	65
8	14	19	0	1	0	1	0	0	0	0	0	43
9	24	21	2	0	0	0	0	0	0	0	0	56
7	17	20	2	0	1	0	1	0	0	0	0	48
14	25	18	0	2	0	0	0	2	0	0	0	61
9	27	13	0	0	1	0	0	0	0	0	2	52
21	39	35	0	0	2	0	0	0	0	0	0	97
7	36	16	1	0	1	0	0	1	0	0	1	63
93	206	163	6	3	5	1	1	4	0	0	3	485

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: GLEN OAKS BLVD
EAST-WEST STREET: PENROE
JURISDICTION: LA

DATE: 05-30-12

PEAK HOUR: 05:00PM

NORTH LEG

TOTAL: 675

Rt	Thru	Lt	
109	519	47	Total
23	114	11	1st
46	167	15	2nd
19	137	6	3rd
21	101	15	4th

EAST LEG

EAST LEG TOTAL: 260

	1st	2nd	3rd	4th	Total
Rt	13	25	11	28	77
Thru	35	54	25	25	139
Lt	12	22	6	4	44

WEST LEG

Total	1st	2nd	3rd	4th	
187	48	82	10	47	Lt
198	52	65	37	44	Thru
57	11	16	17	13	Rt

WEST LEG TOTAL: 442

SOUTH LEG

	Lt	Thru	Rt
1st	13	157	1
2nd	22	206	14
3rd	19	167	12
4th	21	170	11
Total	75	700	38

TOTAL: 813

PEAK HOUR FACTORS

NORTH LEG = 0.74
SOUTH LEG = 0.84
EAST LEG = 0.64
WEST LEG = 0.68

ALL LEGS = 0.75

HOUR TOTAL: 2,190

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: PENROE

TIME: 04:00PM-05:00PM DATE: 05-30-12

NORTH LEG

Rt	Thru	Lt	
75	478	24	Total
22	125	10	1st
17	108	2	2nd
12	118	6	3rd
24	127	6	4th

	1st	2nd	3rd	4th	Total
Rt	20	17	8	13	58
Thru	26	25	11	19	81
Lt	7	9	0	8	24

Total	1st	2nd	3rd	4th	
172	52	43	46	31	Lt
97	23	24	27	23	Thru
52	22	11	7	12	Rt

	Lt	Thru	Rt
1st	13	148	5
2nd	9	138	5
3rd	3	147	2
4th	13	166	3
Total	38	599	15

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: PENROE

TIME: 05:00PM-06:00PM DATE: 05-30-12

NORTH LEG

Rt	Thru	Lt	
109	519	47	Total
23	114	11	1st
46	167	15	2nd
19	137	6	3rd
21	101	15	4th

	1st	2nd	3rd	4th	Total
Rt	13	25	11	28	77
Thru	35	54	25	25	139
Lt	12	22	6	4	44

Total	1st	2nd	3rd	4th	
187	48	82	10	47	Lt
198	52	65	37	44	Thru
57	11	16	17	13	Rt

	Lt	Thru	Rt
1st	13	157	1
2nd	22	206	14
3rd	19	167	12
4th	21	170	11
Total	75	700	38

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : GLEN OAKS BLVD LA

EAST-WEST STREET : PENROE 05-30-12

BEGINNING TIME : 04:00PM PM 5:00PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
18	113	10	3	8	0	0	2	0	1	2	0	157
16	94	2	1	6	0	0	4	0	0	4	0	127
12	106	6	0	8	0	0	3	0	0	1	0	136
23	113	6	0	8	0	1	3	0	0	3	0	157
21	105	11	1	6	0	0	1	0	1	2	0	148
45	154	15	1	8	0	0	0	0	0	5	0	228
19	110	6	0	9	0	0	10	0	0	8	0	162
21	88	15	0	8	0	0	3	0	0	2	0	137
175	883	71	6	61	0	1	26	0	2	27	0	1252
						SOUTH LEG						
5	134	13	0	7	0	0	6	0	0	1	0	166
4	117	9	1	7	0	0	7	0	0	7	0	152
2	139	3	0	6	0	0	1	0	0	1	0	152
3	154	13	0	6	0	0	3	0	0	3	0	182
1	147	13	0	7	0	0	2	0	0	1	0	171
14	195	22	0	6	0	0	3	0	0	2	0	242
12	145	19	0	12	0	0	5	0	0	5	0	198
11	159	21	0	11	0	0	0	0	0	0	0	202
52	1190	113	1	62	0	0	27	0	0	20	0	1465
						EAST LEG						
20	25	7	0	1	0	0	0	0	0	0	0	53
17	25	9	0	0	0	0	0	0	0	0	0	51
8	11	0	0	0	0	0	0	0	0	0	0	19
13	17	8	0	2	0	0	0	0	0	0	0	40
12	32	12	0	2	0	1	1	0	0	0	0	60
24	51	21	0	1	0	1	2	1	0	0	0	101
10	21	6	1	2	0	0	2	0	0	0	0	42
28	24	2	0	0	0	0	1	2	0	0	0	57
132	206	65	1	8	0	2	6	3	0	0	0	423
						WEST LEG						
22	23	48	0	0	2	0	0	0	0	0	2	97
11	23	37	0	1	0	0	0	6	0	0	0	78
7	25	37	0	2	4	0	0	5	0	0	0	80
12	20	25	0	2	2	0	1	3	0	0	1	66
11	52	42	0	0	1	0	0	1	0	0	4	111
15	63	78	0	0	0	1	1	2	0	1	2	163
14	36	10	0	0	0	1	1	0	2	0	0	64
12	39	45	0	1	0	0	1	0	1	3	2	104
104	281	322	0	6	9	2	4	17	3	4	11	763

Prepared by Newport Traffic Studies

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	120	125	20	5	70	35	25	365	5	35	920	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	12	10
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	1726		1805	1810	1468	1805	3282	1615	1570	3438	1436
Flt Permitted	0.71	1.00		0.66	1.00	1.00	0.25	1.00	1.00	0.52	1.00	1.00
Satd. Flow (perm)	1280	1726		1248	1810	1468	474	3282	1615	856	3438	1436
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	130	136	22	5	76	38	27	397	5	38	1000	103
RTOR Reduction (vph)	0	17	0	0	0	30	0	0	2	0	0	47
Lane Group Flow (vph)	130	141	0	5	76	8	27	397	3	38	1000	56
Heavy Vehicles (%)	5%	5%	25%	0%	5%	10%	0%	10%	0%	15%	5%	5%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2		2	6		6
Actuated Green, G (s)	7.4	7.4		7.4	7.4	7.4	18.2	18.2	18.2	18.2	18.2	18.2
Effective Green, g (s)	7.4	7.4		7.4	7.4	7.4	18.2	18.2	18.2	18.2	18.2	18.2
Actuated g/C Ratio	0.22	0.22		0.22	0.22	0.22	0.54	0.54	0.54	0.54	0.54	0.54
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	282	380		275	399	323	257	1778	875	464	1862	778
v/s Ratio Prot		0.08			0.04			0.12			c0.29	
v/s Ratio Perm	c0.10			0.00		0.01	0.06		0.00	0.04		0.04
v/c Ratio	0.46	0.37		0.02	0.19	0.03	0.11	0.22	0.00	0.08	0.54	0.07
Uniform Delay, d1	11.4	11.1		10.3	10.7	10.3	3.7	4.0	3.5	3.7	5.0	3.7
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.2	0.6		0.0	0.2	0.0	0.2	0.1	0.0	0.1	0.3	0.0
Delay (s)	12.6	11.7		10.3	10.9	10.3	3.9	4.1	3.5	3.8	5.3	3.7
Level of Service	B	B		B	B	B	A	A	A	A	A	A
Approach Delay (s)		12.1			10.7			4.1			5.1	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	6.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	33.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	49.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
33: Glenoaks Blvd & Penrose St

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	90	130	50	20	85	35	45	465	25	25	440	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1641	1734		1641	1810	1538	1805	3438	1538	1641	3282	1468
Flt Permitted	0.70	1.00		0.64	1.00	1.00	0.49	1.00	1.00	0.47	1.00	1.00
Satd. Flow (perm)	1208	1734		1102	1810	1538	923	3438	1538	818	3282	1468
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	95	137	53	21	89	37	47	489	26	26	463	37
RTOR Reduction (vph)	0	40	0	0	0	28	0	0	14	0	0	19
Lane Group Flow (vph)	95	150	0	21	89	9	47	489	12	26	463	18
Heavy Vehicles (%)	10%	5%	5%	10%	5%	5%	0%	5%	5%	10%	10%	10%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2		2	6		6
Actuated Green, G (s)	6.7	6.7		6.7	6.7	6.7	13.6	13.6	13.6	13.6	13.6	13.6
Effective Green, g (s)	6.7	6.7		6.7	6.7	6.7	13.6	13.6	13.6	13.6	13.6	13.6
Actuated g/C Ratio	0.24	0.24		0.24	0.24	0.24	0.48	0.48	0.48	0.48	0.48	0.48
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	286	411		261	429	364	444	1652	739	393	1577	705
v/s Ratio Prot		c0.09			0.05			c0.14			0.14	
v/s Ratio Perm	0.08			0.02		0.01	0.05		0.01	0.03		0.01
v/c Ratio	0.33	0.36		0.08	0.21	0.02	0.11	0.30	0.02	0.07	0.29	0.03
Uniform Delay, d1	8.9	9.0		8.4	8.7	8.3	4.0	4.5	3.8	3.9	4.4	3.9
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.7	0.6		0.1	0.2	0.0	0.1	0.1	0.0	0.1	0.1	0.0
Delay (s)	9.6	9.6		8.5	8.9	8.3	4.1	4.6	3.9	4.0	4.5	3.9
Level of Service	A	A		A	A	A	A	A	A	A	A	A
Approach Delay (s)		9.6			8.7			4.5			4.5	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM Average Control Delay	5.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.32		
Actuated Cycle Length (s)	28.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	42.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	185	200	55	45	140	75	75	700	40	45	520	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	1734		1719	1727	1538	1805	3282	1615	1805	3282	1538
Flt Permitted	0.64	1.00		0.47	1.00	1.00	0.36	1.00	1.00	0.24	1.00	1.00
Satd. Flow (perm)	1158	1734		859	1727	1538	682	3282	1615	453	3282	1538
Peak-hour factor, PHF	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
Adj. Flow (vph)	247	267	73	60	187	100	100	933	53	60	693	147
RTOR Reduction (vph)	0	23	0	0	0	44	0	0	29	0	0	80
Lane Group Flow (vph)	247	317	0	60	187	56	100	933	24	60	693	67
Heavy Vehicles (%)	5%	5%	10%	5%	10%	5%	0%	10%	0%	0%	10%	5%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2		2	6		6
Actuated Green, G (s)	12.9	12.9		12.9	12.9	12.9	17.3	17.3	17.3	17.3	17.3	17.3
Effective Green, g (s)	12.9	12.9		12.9	12.9	12.9	17.3	17.3	17.3	17.3	17.3	17.3
Actuated g/C Ratio	0.34	0.34		0.34	0.34	0.34	0.45	0.45	0.45	0.45	0.45	0.45
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	391	586		290	583	519	309	1486	731	205	1486	697
v/s Ratio Prot		0.18			0.11			c0.28			0.21	
v/s Ratio Perm	c0.21			0.07		0.04	0.15		0.01	0.13		0.04
v/c Ratio	0.63	0.54		0.21	0.32	0.11	0.32	0.63	0.03	0.29	0.47	0.10
Uniform Delay, d1	10.7	10.2		9.0	9.4	8.7	6.7	8.0	5.8	6.6	7.2	6.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.3	1.0		0.4	0.3	0.1	0.6	0.8	0.0	0.8	0.2	0.1
Delay (s)	14.0	11.3		9.4	9.7	8.8	7.3	8.8	5.8	7.4	7.5	6.0
Level of Service	B	B		A	A	A	A	A	A	A	A	A
Approach Delay (s)		12.4			9.4			8.5			7.2	
Approach LOS		B			A			A			A	

Intersection Summary			
HCM Average Control Delay	9.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	38.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	53.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
33: Glenoaks Blvd & Penrose St

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	120	125	20	5	70	35	25	415	5	35	970	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	1726		1805	1810	1468	1805	2983	1615	1570	3282	1538
Flt Permitted	0.71	1.00		0.66	1.00	1.00	0.23	1.00	1.00	0.49	1.00	1.00
Satd. Flow (perm)	1280	1726		1248	1810	1468	435	2983	1615	812	3282	1538
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	130	136	22	5	76	38	27	451	5	38	1054	103
RTOR Reduction (vph)	0	17	0	0	0	30	0	0	2	0	0	47
Lane Group Flow (vph)	130	141	0	5	76	8	27	451	3	38	1054	56
Heavy Vehicles (%)	5%	5%	25%	0%	5%	10%	0%	21%	0%	15%	10%	5%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2		2	6		6
Actuated Green, G (s)	7.5	7.5		7.5	7.5	7.5	18.6	18.6	18.6	18.6	18.6	18.6
Effective Green, g (s)	7.5	7.5		7.5	7.5	7.5	18.6	18.6	18.6	18.6	18.6	18.6
Actuated g/C Ratio	0.22	0.22		0.22	0.22	0.22	0.55	0.55	0.55	0.55	0.55	0.55
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	282	380		274	398	323	237	1627	881	443	1790	839
v/s Ratio Prot		0.08			0.04			0.15			c0.32	
v/s Ratio Perm	c0.10			0.00		0.01	0.06		0.00	0.05		0.04
v/c Ratio	0.46	0.37		0.02	0.19	0.03	0.11	0.28	0.00	0.09	0.59	0.07
Uniform Delay, d1	11.5	11.3		10.4	10.8	10.4	3.8	4.2	3.5	3.7	5.2	3.7
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.2	0.6		0.0	0.2	0.0	0.2	0.1	0.0	0.1	0.5	0.0
Delay (s)	12.7	11.9		10.4	11.1	10.5	4.0	4.2	3.5	3.8	5.7	3.7
Level of Service	B	B		B	B	B	A	A	A	A	A	A
Approach Delay (s)		12.3			10.8			4.2			5.5	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	6.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	34.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	49.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
33: Glenoaks Blvd & Penrose St

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	90	130	50	20	85	35	45	515	25	25	490	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1641	1734		1641	1810	1538	1805	3167	1538	1641	3034	1468
Flt Permitted	0.70	1.00		0.64	1.00	1.00	0.46	1.00	1.00	0.45	1.00	1.00
Satd. Flow (perm)	1208	1734		1102	1810	1538	877	3167	1538	777	3034	1468
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	95	137	53	21	89	37	47	542	26	26	516	37
RTOR Reduction (vph)	0	41	0	0	0	28	0	0	13	0	0	19
Lane Group Flow (vph)	95	149	0	21	89	9	47	542	13	26	516	18
Heavy Vehicles (%)	10%	5%	5%	10%	5%	5%	0%	14%	5%	10%	19%	10%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2		2	6		6
Actuated Green, G (s)	6.7	6.7		6.7	6.7	6.7	14.3	14.3	14.3	14.3	14.3	14.3
Effective Green, g (s)	6.7	6.7		6.7	6.7	6.7	14.3	14.3	14.3	14.3	14.3	14.3
Actuated g/C Ratio	0.23	0.23		0.23	0.23	0.23	0.49	0.49	0.49	0.49	0.49	0.49
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	279	401		255	418	355	432	1562	758	383	1496	724
v/s Ratio Prot		c0.09			0.05			c0.17			0.17	
v/s Ratio Perm	0.08			0.02		0.01	0.05		0.01	0.03		0.01
v/c Ratio	0.34	0.37		0.08	0.21	0.02	0.11	0.35	0.02	0.07	0.34	0.03
Uniform Delay, d1	9.3	9.4		8.7	9.0	8.6	3.9	4.5	3.8	3.9	4.5	3.8
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.7	0.6		0.1	0.3	0.0	0.1	0.1	0.0	0.1	0.1	0.0
Delay (s)	10.0	10.0		8.9	9.3	8.6	4.0	4.6	3.8	3.9	4.6	3.8
Level of Service	B	A		A	A	A	A	A	A	A	A	A
Approach Delay (s)		10.0			9.1			4.5			4.5	
Approach LOS		A			A			A			A	

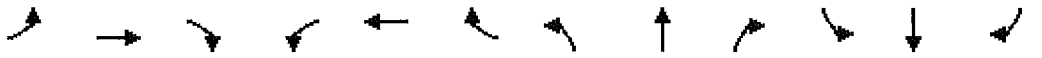
Intersection Summary			
HCM Average Control Delay	5.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	29.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	44.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	185	200	55	45	140	75	75	750	40	45	570	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	1734		1719	1727	1538	1805	3112	1615	1805	3059	1538
Flt Permitted	0.64	1.00		0.46	1.00	1.00	0.33	1.00	1.00	0.22	1.00	1.00
Satd. Flow (perm)	1158	1734		830	1727	1538	619	3112	1615	411	3059	1538
Peak-hour factor, PHF	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
Adj. Flow (vph)	247	267	73	60	187	100	100	1000	53	60	760	147
RTOR Reduction (vph)	0	23	0	0	0	42	0	0	28	0	0	77
Lane Group Flow (vph)	247	317	0	60	187	58	100	1000	25	60	760	70
Heavy Vehicles (%)	5%	5%	10%	5%	10%	5%	0%	16%	0%	0%	18%	5%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2		2	6		6
Actuated Green, G (s)	12.8	12.8		12.8	12.8	12.8	18.8	18.8	18.8	18.8	18.8	18.8
Effective Green, g (s)	12.8	12.8		12.8	12.8	12.8	18.8	18.8	18.8	18.8	18.8	18.8
Actuated g/C Ratio	0.32	0.32		0.32	0.32	0.32	0.47	0.47	0.47	0.47	0.47	0.47
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	374	560		268	558	497	294	1477	767	195	1452	730
v/s Ratio Prot		0.18			0.11			c0.32			0.25	
v/s Ratio Perm	c0.21			0.07		0.04	0.16		0.02	0.15		0.05
v/c Ratio	0.66	0.57		0.22	0.34	0.12	0.34	0.68	0.03	0.31	0.52	0.10
Uniform Delay, d1	11.5	11.1		9.8	10.2	9.4	6.5	8.1	5.5	6.4	7.3	5.7
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.3	1.3		0.4	0.4	0.1	0.7	1.2	0.0	0.9	0.3	0.1
Delay (s)	15.9	12.4		10.2	10.5	9.5	7.2	9.3	5.6	7.3	7.6	5.8
Level of Service	B	B		B	B	A	A	A	A	A	A	A
Approach Delay (s)		13.9			10.2			8.9			7.3	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	9.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	39.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	55.0%	ICU Level of Service	B
Analysis Period (min)	15		

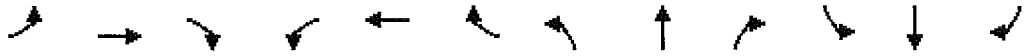
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	130	135	20	5	75	40	25	450	5	40	1055	105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	1731		1805	1810	1468	1805	3282	1615	1570	3438	1538
Flt Permitted	0.70	1.00		0.65	1.00	1.00	0.22	1.00	1.00	0.47	1.00	1.00
Satd. Flow (perm)	1273	1731		1236	1810	1468	413	3282	1615	783	3438	1538
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	141	147	22	5	82	43	27	489	5	43	1147	114
RTOR Reduction (vph)	0	17	0	0	0	33	0	0	2	0	0	53
Lane Group Flow (vph)	141	152	0	5	82	10	27	489	3	43	1147	61
Heavy Vehicles (%)	5%	5%	25%	0%	5%	10%	0%	10%	0%	15%	5%	5%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2		2	6		6
Actuated Green, G (s)	7.8	7.8		7.8	7.8	7.8	18.4	18.4	18.4	18.4	18.4	18.4
Effective Green, g (s)	7.8	7.8		7.8	7.8	7.8	18.4	18.4	18.4	18.4	18.4	18.4
Actuated g/C Ratio	0.23	0.23		0.23	0.23	0.23	0.54	0.54	0.54	0.54	0.54	0.54
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	290	395		282	413	335	222	1766	869	421	1850	827
v/s Ratio Prot		0.09			0.05			0.15			c0.33	
v/s Ratio Perm	c0.11			0.00		0.01	0.07		0.00	0.05		0.04
v/c Ratio	0.49	0.38		0.02	0.20	0.03	0.12	0.28	0.00	0.10	0.62	0.07
Uniform Delay, d1	11.5	11.2		10.2	10.7	10.3	3.9	4.3	3.7	3.9	5.5	3.8
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.3	0.6		0.0	0.2	0.0	0.2	0.1	0.0	0.1	0.6	0.0
Delay (s)	12.7	11.8		10.3	10.9	10.3	4.2	4.4	3.7	4.0	6.1	3.8
Level of Service	B	B		B	B	B	A	A	A	A	A	A
Approach Delay (s)		12.2			10.7			4.4			5.8	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	6.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	34.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	53.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	100	140	55	20	95	40	50	560	25	25	535	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1641	1733		1641	1810	1538	1805	3438	1538	1641	3282	1468
Flt Permitted	0.69	1.00		0.63	1.00	1.00	0.44	1.00	1.00	0.43	1.00	1.00
Satd. Flow (perm)	1196	1733		1087	1810	1538	837	3438	1538	742	3282	1468
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	105	147	58	21	100	42	53	589	26	26	563	42
RTOR Reduction (vph)	0	44	0	0	0	32	0	0	13	0	0	21
Lane Group Flow (vph)	105	161	0	21	100	10	53	589	13	26	563	21
Heavy Vehicles (%)	10%	5%	5%	10%	5%	5%	0%	5%	5%	10%	10%	10%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2		2	6		6
Actuated Green, G (s)	6.9	6.9		6.9	6.9	6.9	14.5	14.5	14.5	14.5	14.5	14.5
Effective Green, g (s)	6.9	6.9		6.9	6.9	6.9	14.5	14.5	14.5	14.5	14.5	14.5
Actuated g/C Ratio	0.23	0.23		0.23	0.23	0.23	0.49	0.49	0.49	0.49	0.49	0.49
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	281	407		255	425	361	413	1696	759	366	1619	724
v/s Ratio Prot		c0.09			0.06			0.17			c0.17	
v/s Ratio Perm	0.09			0.02		0.01	0.06		0.01	0.04		0.01
v/c Ratio	0.37	0.39		0.08	0.24	0.03	0.13	0.35	0.02	0.07	0.35	0.03
Uniform Delay, d1	9.4	9.5		8.8	9.1	8.7	4.0	4.6	3.8	3.9	4.6	3.8
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.8	0.6		0.1	0.3	0.0	0.1	0.1	0.0	0.1	0.1	0.0
Delay (s)	10.3	10.1		8.9	9.4	8.7	4.2	4.7	3.8	4.0	4.7	3.8
Level of Service	B	B		A	A	A	A	A	A	A	A	A
Approach Delay (s)		10.2			9.2			4.6			4.6	
Approach LOS		B			A			A			A	

Intersection Summary			
HCM Average Control Delay	6.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	29.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	45.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	200	220	60	50	155	80	80	820	45	50	620	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1719	1734		1719	1727	1538	1805	3282	1615	1805	3226	
Flt Permitted	0.63	1.00		0.44	1.00	1.00	0.22	1.00	1.00	0.22	1.00	
Satd. Flow (perm)	1137	1734		789	1727	1538	409	3282	1615	409	3226	
Peak-hour factor, PHF	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
Adj. Flow (vph)	267	293	80	67	207	107	107	1093	60	67	827	160
RTOR Reduction (vph)	0	22	0	0	0	25	0	0	33	0	36	0
Lane Group Flow (vph)	267	351	0	67	207	82	107	1093	27	67	951	0
Heavy Vehicles (%)	5%	5%	10%	5%	10%	5%	0%	10%	0%	0%	10%	5%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)	15.4	15.4		15.4	15.4	15.4	18.6	18.6	18.6	18.6	18.6	
Effective Green, g (s)	15.4	15.4		15.4	15.4	15.4	18.6	18.6	18.6	18.6	18.6	
Actuated g/C Ratio	0.37	0.37		0.37	0.37	0.37	0.44	0.44	0.44	0.44	0.44	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	417	636		289	633	564	181	1453	715	181	1429	
v/s Ratio Prot		0.20			0.12			c0.33			0.29	
v/s Ratio Perm	c0.23			0.08		0.05	0.26		0.02	0.16		
v/c Ratio	0.64	0.55		0.23	0.33	0.14	0.59	0.75	0.04	0.37	0.67	
Uniform Delay, d1	11.0	10.6		9.2	9.6	8.9	8.8	9.8	6.6	7.8	9.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	3.3	1.0		0.4	0.3	0.1	5.1	2.2	0.0	1.3	1.2	
Delay (s)	14.4	11.6		9.6	9.9	9.0	13.9	12.0	6.6	9.1	10.4	
Level of Service	B	B		A	A	A	B	B	A	A	B	
Approach Delay (s)		12.7			9.6			11.9			10.3	
Approach LOS		B			A			B			B	

Intersection Summary			
HCM Average Control Delay	11.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	42.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	58.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Hall & Foreman, Inc.

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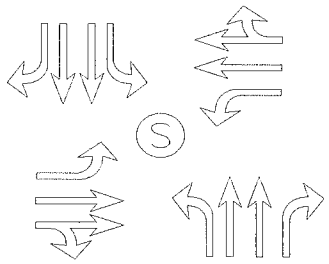
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : SUNLAND BLVD
N/S STREET : GLEN OAKS BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 34
ROUTE 5B, 6B, 7B

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
SUNLAND BLVD						
EB LEFT	70	15%		70	5	75
EB THRU	670	5%		670	60	730
EB RIGHT	30	0%		30	5	35
WB LEFT	205	5%		205	20	225
WB THRU	750	5%		750	70	820
WB RIGHT	20	5%		20	5	25
GLEN OAKS BLVD						
NB LEFT	10	35%		10	5	15
NB THRU	310	23%	**50**	360	30	390
NB RIGHT	80	5%		80	5	85
SB LEFT	10	35%		10	5	15
SB THRU	640	12%	**50**	690	60	750
SB RIGHT	205	5%		205	20	225
TOTALS	**3000**		**100**	**3100**	**290**	**3390**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : SUNLAND BLVD
N/S STREET : GLEN OAKS BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 34
ROUTE 5B, 6B, 7B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
SUNLAND BLVD						
EB LEFT	165	5%		165	15	180
EB THRU	430	5%		430	40	470
EB RIGHT	20	5%		20	5	25
WB LEFT	320	5%		320	30	350
WB THRU	355	5%		355	30	385
WB RIGHT	15	0%		15	5	20
GLEN OAKS BLVD						
NB LEFT	25	10%		25	5	30
NB THRU	350	21%	**50**	400	35	435
NB RIGHT	245	5%		245	20	265
SB LEFT	35	5%		35	5	40
SB THRU	305	23%	**50**	355	30	385
SB RIGHT	170	15%		170	15	185
TOTALS	**2435**		**100**	**2535**	**235**	**2770**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : SUNLAND BLVD
N/S STREET : GLEN OAKS BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
34
ROUTE
5B, 6B, 7B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
SUNLAND BLVD						
EB LEFT	165	10%		165	15	180
EB THRU	650	5%		650	60	710
EB RIGHT	55	0%		55	5	60
WB LEFT	360	5%		360	30	390
WB THRU	395	5%		395	35	430
WB RIGHT	5	0%		5	5	10
GLEN OAKS BLVD						
NB LEFT	20	0%		20	5	25
NB THRU	640	12%	**50**	690	60	750
NB RIGHT	385	5%		385	35	420
SB LEFT	50	10%		50	5	55
SB THRU	510	13%	**50**	560	50	610
SB RIGHT	50	10%		50	5	55
TOTALS	**3285**		**100**	**3385**	**310**	**3695**

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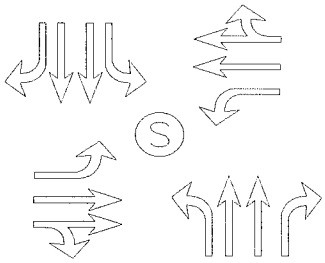
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : SUNLAND BLVD
N/S STREET : GLEN OAKS BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
34
ROUTE
5B, 6B, 7B

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
SUNLAND BLVD								
EB LEFT	59	9	27	85	**0**	85	5	90
EB THRU	643	25	75	720	**0**	720	65	785
EB RIGHT	32	0	0	30	**0**	30	5	35
WB LEFT	197	7	21	220	**0**	220	20	240
WB THRU	726	22	66	790	**0**	790	70	860
WB RIGHT	21	1	3	25	**0**	25	5	30
GLEN OAKS BLVD								
NB LEFT	8	4	12	20	**0**	20	5	25
NB THRU	283	26	78	360	**150**	510	45	555
NB RIGHT	76	3	9	85	**0**	85	5	90
SB LEFT	7	4	12	20	**0**	20	5	25
SB THRU	605	34	102	705	**150**	855	75	930
SB RIGHT	190	15	45	235	**0**	235	20	255
TOTALS	**2847**				**300**	**3595**	**325**	**3920**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : SUNLAND BLVD
N/S STREET : GLEN OAKS BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
34
ROUTE
5B, 6B, 7B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
SUNLAND BLVD								
EB LEFT	155	11	33	190	**0**	190	15	205
EB THRU	411	20	60	470	**0**	470	40	510
EB RIGHT	17	1	3	20	**0**	20	5	25
WB LEFT	313	9	27	340	**0**	340	30	370
WB THRU	336	21	63	400	**0**	400	35	435
WB RIGHT	15	0	0	15	**0**	15	5	20
GLEN OAKS BLVD								
NB LEFT	21	2	6	25	**0**	25	5	30
NB THRU	325	27	81	405	**150**	555	50	605
NB RIGHT	240	6	18	260	**0**	260	25	285
SB LEFT	34	2	6	40	**0**	40	5	45
SB THRU	275	31	93	370	**150**	520	45	565
SB RIGHT	144	28	84	230	**0**	230	20	250
TOTALS	**2286**				**300**	**3065**	**280**	**3345**

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E/W STREET : SUNLAND BLVD
N/S STREET : GLEN OAKS BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
34
ROUTE
5B, 6B, 7B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
SUNLAND BLVD								
EB LEFT	145	18	54	200	**0**	200	20	220
EB THRU	643	9	27	670	**0**	670	60	730
EB RIGHT	54	0	0	55	**0**	55	5	60
WB LEFT	352	6	18	370	**0**	370	35	405
WB THRU	390	5	15	405	**0**	405	35	440
WB RIGHT	5	0	0	5	**0**	5	5	10
GLEN OAKS BLVD								
NB LEFT	19	0	0	20	**0**	20	5	25
NB THRU	604	37	111	715	**150**	865	80	945
NB RIGHT	374	13	39	415	**0**	415	35	450
SB LEFT	44	5	15	60	**0**	60	5	65
SB THRU	492	17	51	545	**150**	695	65	760
SB RIGHT	45	5	15	60	**0**	60	5	65
TOTALS	**3167**				**300**	**3820**	**355**	**4175**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: GLEN OAKS BLVD
EAST-WEST STREET: SUNLAND BLVD
JURISDICTION: LA

DATE: 05-30-12

PEAK HOUR: 07:30AM

NORTH LEG

TOTAL: 855

Rt	Thru	Lt	
205	639	11	Total
74	193	4	1st
54	163	2	2nd
45	155	3	3rd
32	128	2	4th

EAST LEG TOTAL: 974

	1st	2nd	3rd	4th	Total
Rt	1	7	5	9	22
Thru	77	257	210	204	748
Lt	57	55	51	41	204

WEST LEG TOTAL: 768

Total	1st	2nd	3rd	4th	
68	11	27	18	12	Lt
668	123	215	200	130	Thru
32	3	10	14	5	Rt

SOUTH LEG

TOTAL: 400

	Lt	Thru	Rt
1st	7	85	29
2nd	1	77	30
3rd	1	73	11
4th	3	74	9
Total	12	309	79

PEAK HOUR FACTORS

NORTH LEG = 0.79
SOUTH LEG = 0.83
EAST LEG = 0.76
WEST LEG = 0.76

ALL LEGS = 0.83

HOUR TOTAL: 2,997

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: SUNLAND BLVD

TIME: 07:00AM-08:00AM DATE: 05-30-12

NORTH LEG

Rt	Thru	Lt	
218	732	14	Total
24	195	3	1st
66	181	5	2nd
74	193	4	3rd
54	163	2	4th

	1st	2nd	3rd	4th	Total
Rt	2	3	1	7	13
Thru	61	87	77	257	482
Lt	32	41	57	55	185

Total	1st	2nd	3rd	4th	
54	8	8	11	27	Lt
585	114	133	123	215	Thru
22	4	5	3	10	Rt

	Lt	Thru	Rt
1st	6	88	14
2nd	6	71	21
3rd	7	85	29
4th	1	77	30
Total	20	321	94

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: SUNLAND BLVD

TIME: 08:00AM-09:00AM DATE: 05-30-12

NORTH LEG

Rt	Thru	Lt	
119	538	10	Total
45	155	3	1st
32	128	2	2nd
19	129	4	3rd
23	126	1	4th

	1st	2nd	3rd	4th	Total
Rt	5	9	2	1	17
Thru	210	204	135	141	690
Lt	51	41	60	54	206

Total	1st	2nd	3rd	4th	
83	18	12	23	30	Lt
467	200	130	66	71	Thru
27	14	5	5	3	Rt

	Lt	Thru	Rt
1st	1	73	11
2nd	3	74	9
3rd	7	70	14
4th	3	51	24
Total	14	268	58

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : GLEN OAKS BLVD LA

EAST-WEST STREET : SUNLAND BLVD 05-30-12

BEGINNING TIME : 07:00AM PM: 7:30 AM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
					NORTH LEG							
22	192	3	2	2	0	0	1	0	0	0	0	222
63	176	5	3	4	0	0	0	0	0	1	0	252
70	181	3	3	8	1	0	3	0	1	1	0	271
51	158	1	1	3	1	1	2	0	1	0	0	219
40	146	2	1	6	1	2	2	0	2	1	0	203
29	120	1	1	5	1	0	2	0	2	1	0	162
17	124	3	2	5	1	0	0	0	0	0	0	152
23	126	0	0	0	1	0	0	0	0	0	0	150
315	1223	18	13	33	6	3	10	0	6	4	0	1631
					SOUTH LEG							
14	86	5	0	2	1	0	0	0	0	0	0	108
21	70	6	0	1	0	0	0	0	0	0	0	98
28	79	4	1	4	2	0	2	1	0	0	0	121
29	71	1	1	6	0	0	0	0	0	0	0	108
10	69	1	1	2	0	0	1	0	0	1	0	85
9	64	2	0	6	1	0	3	0	0	1	0	86
14	70	7	0	0	0	0	0	0	0	0	0	91
24	51	3	0	0	0	0	0	0	0	0	0	78
149	560	29	3	21	4	0	6	1	0	2	0	775
					EAST LEG							
1	56	31	1	4	1	0	1	0	0	0	0	95
3	85	40	0	2	0	0	0	0	0	0	1	131
1	72	54	0	3	2	0	0	1	0	2	0	135
7	253	53	0	4	2	0	0	0	0	0	0	319
5	204	50	0	6	1	0	0	0	0	0	0	266
8	197	40	1	4	1	0	3	0	0	0	0	254
0	126	59	2	6	0	0	2	0	0	1	1	197
0	127	53	0	8	0	1	2	0	0	4	1	196
25	1120	380	4	37	7	1	8	1	0	7	3	1593
					WEST LEG							
4	112	7	0	2	1	0	0	0	0	0	0	126
5	132	6	0	1	1	0	0	0	0	0	1	146
3	117	8	0	4	2	0	1	0	0	1	1	137
10	212	24	0	3	2	0	0	0	0	0	1	252
14	199	17	0	1	0	0	0	0	0	0	1	232
5	115	10	0	7	2	0	2	0	0	6	0	147
0	66	19	5	0	3	0	0	0	0	0	1	94
2	59	26	1	7	4	0	1	0	0	4	0	104
43	1012	117	6	25	15	0	4	0	0	11	5	1238

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: GLEN OAKS BLVD
EAST-WEST STREET: SUNLAND BLVD
JURISDICTION: LA

DATE: 05-30-12

PEAK HOUR: 01:00PM

NORTH LEG

TOTAL: 514

Rt	Thru	Lt	
172	306	36	Total
50	77	10	1st
48	76	7	2nd
35	67	6	3rd
39	86	13	4th

EAST LEG TOTAL: 694

	1st	2nd	3rd	4th	Total
Rt	5	3	2	5	15
Thru	81	106	91	79	357
Lt	77	85	73	87	322

WEST LEG TOTAL: 615

Total	1st	2nd	3rd	4th	
166	40	40	50	36	Lt
431	99	95	120	117	Thru
18	8	4	4	2	Rt

PEAK HOUR FACTORS

NORTH LEG = 0.93
SOUTH LEG = 0.96
EAST LEG = 0.89
WEST LEG = 0.88

ALL LEGS = 0.98

SOUTH LEG

TOTAL: 621

	Lt	Thru	Rt
1st	5	101	55
2nd	4	83	69
3rd	6	80	56
4th	8	88	66
Total	23	352	246

HOUR TOTAL: 2,444

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: SUNLAND BLVD

TIME: 12:00PM-01:00PM DATE: 05-30-12

NORTH LEG

Rt	Thru	Lt	
124	374	34	Total
33	100	6	1st
34	83	7	2nd
33	110	5	3rd
24	81	16	4th

	1st	2nd	3rd	4th	Total
Rt	2	0	1	3	6
Thru	103	98	74	74	349
Lt	66	71	71	78	286

Total	1st	2nd	3rd	4th	
176	44	53	40	39	Lt
394	96	86	105	107	Thru
26	4	5	7	10	Rt

	Lt	Thru	Rt
1st	9	75	33
2nd	8	68	34
3rd	5	72	45
4th	1	85	29
Total	23	300	141

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: SUNLAND BLVD

TIME: 01:00PM-02:00PM DATE: 05-30-12

NORTH LEG

Rt	Thru	Lt	
172	306	36	Total
50	77	10	1st
48	76	7	2nd
35	67	6	3rd
39	86	13	4th

	1st	2nd	3rd	4th	Total
Rt	5	3	2	5	15
Thru	81	106	91	79	357
Lt	77	85	73	87	322

Total	1st	2nd	3rd	4th	
166	40	40	50	36	Lt
431	99	95	120	117	Thru
18	8	4	4	2	Rt

	Lt	Thru	Rt
1st	5	101	55
2nd	4	83	69
3rd	6	80	56
4th	8	88	66
Total	23	352	246

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : SUNLAND BLVD LA

EAST-WEST STREET : GLEN OAKS BLVD 05-30-12

BEGINNING TIME : 12:00PM PH: 1:00 PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
32	94	6	1	3	0	0	2	0	0	1	0	139
31	79	5	2	4	0	0	0	0	1	0	2	124
30	101	5	2	6	0	0	3	0	1	0	0	148
22	72	15	1	7	0	0	2	1	1	0	0	121
49	68	9	1	7	0	0	2	0	0	0	1	137
33	69	6	9	5	0	3	0	1	3	2	0	131
30	58	6	1	6	0	0	2	0	4	1	0	108
32	80	13	3	4	0	3	1	0	1	1	0	138
259	621	65	20	42	0	6	12	2	11	5	3	1046
						SOUTH LEG						
33	73	9	0	2	0	0	0	0	0	0	0	117
34	62	6	0	3	1	0	2	0	0	1	1	110
45	71	3	0	1	2	0	0	0	0	0	0	122
29	76	1	0	6	0	0	2	0	0	1	0	115
54	95	5	1	4	0	0	2	0	0	0	0	161
67	77	3	1	6	1	1	0	0	0	0	0	156
56	73	6	0	1	0	0	2	0	0	4	0	142
63	80	7	3	6	0	0	1	0	0	1	1	162
381	607	40	5	29	4	1	9	0	0	7	2	1085
						EAST LEG						
2	101	66	0	2	0	0	0	0	0	0	0	171
0	97	64	0	0	6	0	1	1	0	0	0	169
1	72	68	0	2	2	0	0	1	0	0	0	146
3	72	77	0	2	1	0	0	0	0	0	0	155
5	74	77	0	4	0	0	1	0	0	2	0	163
3	100	81	0	5	3	0	0	0	0	1	1	194
2	86	72	0	3	1	0	1	0	0	1	0	166
5	76	83	0	2	3	0	0	1	0	1	0	171
21	678	588	0	20	16	0	3	3	0	5	1	1335
						WEST LEG						
3	94	44	1	2	0	0	0	0	0	0	0	144
5	79	43	0	4	2	0	2	4	0	1	4	144
7	100	35	0	3	2	0	2	1	0	0	2	152
10	102	35	0	2	2	0	3	0	0	0	2	156
8	92	40	0	5	0	0	1	0	0	1	0	147
3	92	36	0	2	0	0	0	3	1	1	1	139
4	115	45	0	4	4	0	0	1	0	1	0	174
2	112	34	0	5	2	0	0	0	0	0	0	155
42	786	312	1	27	12	0	8	9	1	4	9	1211

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: GLEN OAKS BLVD
EAST-WEST STREET: SUNLAND BLVD
JURISDICTION: LA

DATE: 05-30-12

PEAK HOUR: 05:00PM

NORTH LEG

TOTAL: 608

Rt	Thru	Lt	
50	509	49	Total
9	127	9	1st
19	148	15	2nd
6	129	11	3rd
16	105	14	4th

EAST LEG TOTAL: 758

	1st	2nd	3rd	4th	Total
Rt	2	1	1	1	5
Thru	85	112	100	98	395
Lt	99	101	70	88	358

Total	1st	2nd	3rd	4th	
163	46	32	51	34	Lt
652	148	169	180	155	Thru
54	10	14	20	10	Rt

WEST LEG TOTAL: 869

PEAK HOUR FACTORS

NORTH LEG = 0.84
SOUTH LEG = 0.88
EAST LEG = 0.89
WEST LEG = 0.87

ALL LEGS = 0.91

	Lt	Thru	Rt
1st	3	127	80
2nd	6	177	106
3rd	5	184	108
4th	5	153	93
Total	19	641	387

TOTAL: 1,047

SOUTH LEG

HOUR TOTAL: 3,282

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: SUNLAND BLVD

TIME: 04:00PM-05:00PM DATE: 05-30-12

NORTH LEG

68	448	41	Total
20	121	10	1st
30	85	14	2nd
11	108	9	3rd
7	134	8	4th
Rt	Thru	Lt	

Rt	2	3	5	4	14
Thru	92	103	84	101	380
Lt	42	55	77	54	228
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
208	45	66	47	50	Lt
590	138	154	148	150	Thru
51	13	13	12	13	Rt

	Lt	Thru	Rt
1st	5	117	88
2nd	7	84	90
3rd	0	103	87
4th	1	130	101
Total	13	434	366

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: SUNLAND BLVD

TIME: 05:00PM-06:00PM DATE: 05-30-12

NORTH LEG

Rt	Thru	Lt	
50	509	49	Total
9	127	9	1st
19	148	15	2nd
6	129	11	3rd
16	105	14	4th

	1st	2nd	3rd	4th	Total
Rt	2	1	1	1	5
Thru	85	112	100	98	395
Lt	99	101	70	88	358

Total	1st	2nd	3rd	4th	
163	46	32	51	34	Lt
652	148	169	180	155	Thru
54	10	14	20	10	Rt

	Lt	Thru	Rt
1st	3	127	80
2nd	6	177	106
3rd	5	184	108
4th	5	153	93
Total	19	641	387

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : SUNLAND BLVD LA

EAST-WEST STREET : GLEN OAKS BLVD 05-30-12

BEGINNING TIME : 04:00PM PM: 5:00 PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
19	121	10	0	0	0	0	0	0	1	0	0	151
20	80	13	4	2	1	0	0	0	6	3	0	129
7	103	9	4	3	0	0	1	0	0	1	0	128
5	128	8	1	2	0	0	2	0	1	2	0	149
7	122	7	2	3	1	0	1	1	0	1	0	145
17	144	14	1	2	0	0	1	1	1	1	0	182
6	125	10	0	4	0	0	0	0	0	0	1	146
15	101	13	0	4	0	0	0	0	1	0	1	135
96	924	84	12	20	2	0	5	2	10	8	2	1165
						SOUTH LEG						
88	113	5	0	1	0	0	2	0	0	1	0	210
90	77	7	0	3	0	0	2	0	0	2	0	181
86	95	0	1	4	0	0	3	0	0	1	0	190
99	125	1	0	2	0	0	2	0	2	1	0	232
74	115	3	3	8	0	1	4	0	2	0	0	210
102	164	6	3	6	0	0	5	0	1	2	0	289
106	176	5	1	5	0	0	3	0	1	0	0	297
92	149	5	1	4	0	0	0	0	0	0	0	251
737	1014	32	9	33	0	1	21	0	6	7	0	1860
						EAST LEG						
2	91	41	0	1	1	0	0	0	0	0	0	136
3	100	53	0	3	0	0	0	1	0	0	1	161
5	80	74	0	3	2	0	0	0	0	1	1	166
4	95	54	0	6	0	0	0	0	0	0	0	159
2	85	96	0	0	2	0	0	0	0	0	1	186
1	110	101	0	2	0	0	0	0	0	0	0	214
1	100	69	0	0	1	0	0	0	0	0	0	171
1	95	86	0	2	2	0	0	0	0	1	0	187
19	756	574	0	17	8	0	0	1	0	2	3	1380
						WEST LEG						
13	134	45	0	3	0	0	0	0	0	1	0	196
13	142	57	0	8	3	0	1	4	0	3	2	233
12	146	43	0	1	3	0	0	1	0	1	0	207
13	145	46	0	3	2	0	0	0	0	2	2	213
10	143	41	0	3	3	0	1	2	0	1	0	204
14	167	25	0	2	3	0	0	2	0	0	2	215
20	179	47	0	1	3	0	0	1	0	0	0	251
10	154	32	0	1	2	0	0	0	0	0	0	199
105	1210	336	0	22	19	0	2	10	0	8	6	1718

Prepared by Newport Traffic Studies

HCM Signalized Intersection Capacity Analysis
34: Glenoaks Blvd & Sunland Blvd

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	70	670	30	205	750	20	10	310	80	10	640	205
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.99		1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1570	3423		1719	3425		1337	3282	1538	1337	3438	1538
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1570	3423		1719	3425		1337	3282	1538	1337	3438	1538
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	84	807	36	247	904	24	12	373	96	12	771	247
RTOR Reduction (vph)	0	5	0	0	3	0	0	0	49	0	0	102
Lane Group Flow (vph)	84	838	0	247	925	0	12	373	47	12	771	145
Heavy Vehicles (%)	15%	5%	0%	5%	5%	5%	35%	10%	5%	35%	5%	5%
Turn Type	Prot	NA		Prot	NA		Prot	NA	pt+ov	Prot	NA	pt+ov
Protected Phases	5	2		1	6		3	8	8 1	7	4	4 5
Permitted Phases												
Actuated Green, G (s)	6.0	18.3		10.0	22.3		0.7	15.9	29.9	0.7	15.9	25.9
Effective Green, g (s)	6.0	18.3		10.0	22.3		0.7	15.9	29.9	0.7	15.9	25.9
Actuated g/C Ratio	0.10	0.30		0.16	0.37		0.01	0.26	0.49	0.01	0.26	0.43
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	155	1029		282	1254		15	857	755	15	898	654
v/s Ratio Prot	0.05	0.24		c0.14	c0.27		c0.01	0.11	0.03	0.01	c0.22	0.09
v/s Ratio Perm												
v/c Ratio	0.54	0.81		0.88	0.74		0.80	0.44	0.06	0.80	0.86	0.22
Uniform Delay, d1	26.1	19.7		24.8	16.8		30.0	18.8	8.1	30.0	21.4	11.1
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.8	5.0		24.7	2.3		132.2	0.4	0.0	132.2	8.2	0.2
Delay (s)	30.0	24.8		49.6	19.1		162.2	19.1	8.2	162.2	29.6	11.3
Level of Service	C	C		D	B		F	B	A	F	C	B
Approach Delay (s)		25.2			25.5			20.5			26.8	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	25.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	60.9	Sum of lost time (s)	16.0
Intersection Capacity Utilization	58.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
34: Glenoaks Blvd & Sunland Blvd

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	165	430	20	320	355	15	25	350	245	35	305	170
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.99		1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	3416		1719	3424		1641	3282	1538	1719	3282	1404
Flt Permitted	0.95	1.00		0.95	1.00		0.56	1.00	1.00	0.52	1.00	1.00
Satd. Flow (perm)	1719	3416		1719	3424		972	3282	1538	942	3282	1404
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	168	439	20	327	362	15	26	357	250	36	311	173
RTOR Reduction (vph)	0	5	0	0	5	0	0	0	50	0	0	83
Lane Group Flow (vph)	168	454	0	327	372	0	26	357	200	36	311	90
Heavy Vehicles (%)	5%	5%	5%	5%	5%	0%	10%	10%	5%	5%	10%	15%
Turn Type	Prot	NA		Prot	NA		Perm	NA	pt+ov	Perm	NA	pt+ov
Protected Phases	5	2		1	6			8	8 1		4	4 5
Permitted Phases							8			4		
Actuated Green, G (s)	9.7	12.1		13.6	16.0		12.1	12.1	29.7	12.1	12.1	25.8
Effective Green, g (s)	9.7	12.1		13.6	16.0		12.1	12.1	29.7	12.1	12.1	25.8
Actuated g/C Ratio	0.19	0.24		0.27	0.32		0.24	0.24	0.60	0.24	0.24	0.52
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	335	830		469	1100		236	797	917	229	797	727
v/s Ratio Prot	0.10	c0.13		c0.19	c0.11			c0.11	0.13		0.09	0.06
v/s Ratio Perm							0.03			0.04		
v/c Ratio	0.50	0.55		0.70	0.34		0.11	0.45	0.22	0.16	0.39	0.12
Uniform Delay, d1	17.9	16.5		16.3	12.9		14.7	16.0	4.7	14.8	15.8	6.2
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.2	0.7		4.5	0.2		0.2	0.4	0.1	0.3	0.3	0.1
Delay (s)	19.1	17.2		20.7	13.1		14.9	16.4	4.8	15.2	16.1	6.3
Level of Service	B	B		C	B		B	B	A	B	B	A
Approach Delay (s)		17.7			16.6			11.8			12.7	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM Average Control Delay	14.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	49.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	56.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
34: Glenoaks Blvd & Sunland Blvd

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	165	650	55	360	395	5	20	640	385	50	510	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.99		1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1641	3411		1719	3434		1805	3438	1538	1641	3438	1468
Flt Permitted	0.95	1.00		0.95	1.00		0.31	1.00	1.00	0.26	1.00	1.00
Satd. Flow (perm)	1641	3411		1719	3434		592	3438	1538	443	3438	1468
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	181	714	60	396	434	5	22	703	423	55	560	55
RTOR Reduction (vph)	0	10	0	0	1	0	0	0	12	0	0	41
Lane Group Flow (vph)	181	764	0	396	438	0	22	703	411	55	560	14
Heavy Vehicles (%)	10%	5%	0%	5%	5%	0%	0%	5%	5%	10%	5%	10%
Turn Type	Prot	NA		Prot	NA		Perm	NA	pt+ov	Perm	NA	Perm
Protected Phases	5	2		1	6			8	8 1		4	
Permitted Phases							8			4		4
Actuated Green, G (s)	9.3	16.5		15.4	22.6		15.6	15.6	35.0	15.6	15.6	15.6
Effective Green, g (s)	9.3	16.5		15.4	22.6		15.6	15.6	35.0	15.6	15.6	15.6
Actuated g/C Ratio	0.16	0.28		0.26	0.38		0.26	0.26	0.59	0.26	0.26	0.26
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	256	946		445	1304		155	901	905	116	901	385
v/s Ratio Prot	0.11	c0.22		c0.23	0.13			c0.20	0.27		0.16	
v/s Ratio Perm							0.04			0.12		0.01
v/c Ratio	0.71	0.81		0.89	0.34		0.14	0.78	0.45	0.47	0.62	0.04
Uniform Delay, d1	23.8	20.0		21.2	13.1		16.8	20.4	6.9	18.5	19.3	16.4
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	8.6	5.1		19.1	0.2		0.4	4.4	0.4	3.0	1.3	0.0
Delay (s)	32.4	25.1		40.3	13.3		17.2	24.8	7.2	21.5	20.7	16.4
Level of Service	C	C		D	B		B	C	A	C	C	B
Approach Delay (s)		26.5			26.1			18.2			20.4	
Approach LOS		C			C			B			C	

Intersection Summary			
HCM Average Control Delay	22.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	59.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	74.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
34: Glenoaks Blvd & Sunland Blvd

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	70	670	30	205	750	20	10	360	80	10	690	205
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.99		1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1570	3423		1719	3425		1337	2935	1538	1337	3223	1538
Flt Permitted	0.95	1.00		0.95	1.00		0.25	1.00	1.00	0.45	1.00	1.00
Satd. Flow (perm)	1570	3423		1719	3425		354	2935	1538	635	3223	1538
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	84	807	36	247	904	24	12	434	96	12	831	247
RTOR Reduction (vph)	0	6	0	0	4	0	0	0	14	0	0	29
Lane Group Flow (vph)	84	837	0	247	924	0	12	434	82	12	831	218
Heavy Vehicles (%)	15%	5%	0%	5%	5%	5%	35%	23%	5%	35%	12%	5%
Turn Type	Prot	NA		Prot	NA		Perm	NA	pt+ov	Perm	NA	pt+ov
Protected Phases	5	2		1	6			8	8 1		4	4 5
Permitted Phases							8			4		
Actuated Green, G (s)	5.0	16.4		9.8	21.2		15.9	15.9	29.7	15.9	15.9	24.9
Effective Green, g (s)	5.0	16.4		9.8	21.2		15.9	15.9	29.7	15.9	15.9	24.9
Actuated g/C Ratio	0.09	0.30		0.18	0.39		0.29	0.29	0.55	0.29	0.29	0.46
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	145	1038		311	1342		104	863	844	187	947	708
v/s Ratio Prot	0.05	c0.24		c0.14	0.27			0.15	0.05		c0.26	0.14
v/s Ratio Perm							0.03			0.02		
v/c Ratio	0.58	0.81		0.79	0.69		0.12	0.50	0.10	0.06	0.88	0.31
Uniform Delay, d1	23.5	17.4		21.2	13.7		14.0	15.8	5.8	13.7	18.2	9.2
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.5	4.7		13.0	1.5		0.5	0.5	0.1	0.1	9.2	0.2
Delay (s)	29.1	22.1		34.2	15.2		14.5	16.3	5.9	13.9	27.4	9.4
Level of Service	C	C		C	B		B	B	A	B	C	A
Approach Delay (s)		22.7			19.2			14.4			23.2	
Approach LOS		C			B			B			C	

Intersection Summary			
HCM Average Control Delay	20.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	54.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	59.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
34: Glenoaks Blvd & Sunland Blvd

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	165	430	20	320	355	15	25	400	245	35	355	170
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.99		1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	3416		1719	3424		1641	2983	1538	1719	2935	1404
Flt Permitted	0.95	1.00		0.95	1.00		0.52	1.00	1.00	0.47	1.00	1.00
Satd. Flow (perm)	1719	3416		1719	3424		890	2983	1538	845	2935	1404
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	168	439	20	327	362	15	26	408	250	36	362	173
RTOR Reduction (vph)	0	5	0	0	5	0	0	0	49	0	0	82
Lane Group Flow (vph)	168	454	0	327	372	0	26	408	201	36	362	91
Heavy Vehicles (%)	5%	5%	5%	5%	5%	0%	10%	21%	5%	5%	23%	15%
Turn Type	Prot	NA		Prot	NA		Perm	NA	pt+ov	Perm	NA	pt+ov
Protected Phases	5	2		1	6			8	8 1		4	4 5
Permitted Phases							8			4		
Actuated Green, G (s)	9.8	12.2		13.8	16.2		13.0	13.0	30.8	13.0	13.0	26.8
Effective Green, g (s)	9.8	12.2		13.8	16.2		13.0	13.0	30.8	13.0	13.0	26.8
Actuated g/C Ratio	0.19	0.24		0.27	0.32		0.25	0.25	0.60	0.25	0.25	0.53
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	330	817		465	1088		227	760	929	215	748	738
v/s Ratio Prot	0.10	c0.13		c0.19	c0.11			c0.14	0.13		0.12	0.06
v/s Ratio Perm							0.03			0.04		
v/c Ratio	0.51	0.56		0.70	0.34		0.11	0.54	0.22	0.17	0.48	0.12
Uniform Delay, d1	18.4	17.0		16.8	13.3		14.6	16.4	4.6	14.8	16.1	6.1
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.2	0.8		4.8	0.2		0.2	0.7	0.1	0.4	0.5	0.1
Delay (s)	19.7	17.8		21.5	13.5		14.8	17.1	4.7	15.2	16.6	6.2
Level of Service	B	B		C	B		B	B	A	B	B	A
Approach Delay (s)		18.3			17.2			12.5			13.4	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM Average Control Delay	15.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	51.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	58.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
34: Glenoaks Blvd & Sunland Blvd

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	165	650	55	360	395	5	20	690	385	50	560	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.99		1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1641	3411		1719	3434		1805	3223	1538	1641	3195	1468
Flt Permitted	0.95	1.00		0.95	1.00		0.27	1.00	1.00	0.25	1.00	1.00
Satd. Flow (perm)	1641	3411		1719	3434		515	3223	1538	432	3195	1468
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	181	714	60	396	434	5	22	758	423	55	615	55
RTOR Reduction (vph)	0	10	0	0	1	0	0	0	12	0	0	28
Lane Group Flow (vph)	181	764	0	396	438	0	22	758	411	55	615	27
Heavy Vehicles (%)	10%	5%	0%	5%	5%	0%	0%	12%	5%	10%	13%	10%
Turn Type	Prot	NA		Prot	NA		Perm	NA	pt+ov	Perm	NA	pt+ov
Protected Phases	5	2		1	6			8	8 1		4	4 5
Permitted Phases							8			4		
Actuated Green, G (s)	9.4	16.5		15.5	22.6		16.0	16.0	35.5	16.0	16.0	29.4
Effective Green, g (s)	9.4	16.5		15.5	22.6		16.0	16.0	35.5	16.0	16.0	29.4
Actuated g/C Ratio	0.16	0.28		0.26	0.38		0.27	0.27	0.59	0.27	0.27	0.49
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	257	938		444	1293		137	859	910	115	852	719
v/s Ratio Prot	0.11	c0.22		c0.23	0.13			c0.24	0.27		0.19	0.02
v/s Ratio Perm							0.04			0.13		
v/c Ratio	0.70	0.81		0.89	0.34		0.16	0.88	0.45	0.48	0.72	0.04
Uniform Delay, d1	24.0	20.3		21.4	13.4		16.9	21.1	6.8	18.5	20.0	7.9
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	8.5	5.5		19.6	0.2		0.6	10.6	0.4	3.1	3.0	0.0
Delay (s)	32.5	25.8		41.1	13.5		17.4	31.7	7.2	21.6	23.0	8.0
Level of Service	C	C		D	B		B	C	A	C	C	A
Approach Delay (s)		27.1			26.6			22.8			21.8	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	24.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	75.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
34: Glenoaks Blvd & Sunland Blvd

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	75	730	35	225	820	20	10	390	85	10	750	225
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.99		1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1570	3422		1719	3426		1337	3282	1538	1337	3438	1538
Flt Permitted	0.95	1.00		0.95	1.00		0.25	1.00	1.00	0.42	1.00	1.00
Satd. Flow (perm)	1570	3422		1719	3426		352	3282	1538	586	3438	1538
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	90	880	42	271	988	24	12	470	102	12	904	271
RTOR Reduction (vph)	0	6	0	0	3	0	0	0	10	0	0	21
Lane Group Flow (vph)	90	916	0	271	1009	0	12	470	92	12	904	250
Heavy Vehicles (%)	15%	5%	0%	5%	5%	5%	35%	10%	5%	35%	5%	5%
Turn Type	Prot	NA		Prot	NA		Perm	NA	pt+ov	Perm	NA	pt+ov
Protected Phases	5	2		1	6			8	8 1		4	4 5
Permitted Phases							8			4		
Actuated Green, G (s)	5.0	16.8		10.0	21.8		16.0	16.0	30.0	16.0	16.0	25.0
Effective Green, g (s)	5.0	16.8		10.0	21.8		16.0	16.0	30.0	16.0	16.0	25.0
Actuated g/C Ratio	0.09	0.31		0.18	0.40		0.29	0.29	0.55	0.29	0.29	0.46
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	143	1049		314	1363		103	958	842	171	1004	702
v/s Ratio Prot	0.06	c0.27		c0.16	0.29			0.14	0.06		c0.26	0.16
v/s Ratio Perm							0.03			0.02		
v/c Ratio	0.63	0.87		0.86	0.74		0.12	0.49	0.11	0.07	0.90	0.36
Uniform Delay, d1	24.0	18.0		21.7	14.1		14.2	16.0	6.0	14.0	18.6	9.7
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	8.4	8.2		20.9	2.2		0.5	0.4	0.1	0.2	10.9	0.3
Delay (s)	32.4	26.2		42.7	16.3		14.7	16.4	6.0	14.2	29.6	10.0
Level of Service	C	C		D	B		B	B	A	B	C	A
Approach Delay (s)		26.7			21.9			14.6			24.9	
Approach LOS		C			C			B			C	

Intersection Summary			
HCM Average Control Delay	22.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	54.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	64.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	180	470	20	350	385	15	25	435	265	40	405	185
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.99		1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	3417		1719	3425		1641	3282	1538	1719	3282	1404
Flt Permitted	0.95	1.00		0.95	1.00		0.46	1.00	1.00	0.42	1.00	1.00
Satd. Flow (perm)	1719	3417		1719	3425		787	3282	1538	768	3282	1404
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	184	480	20	357	393	15	26	444	270	41	413	189
RTOR Reduction (vph)	0	5	0	0	5	0	0	0	40	0	0	90
Lane Group Flow (vph)	184	495	0	357	403	0	26	444	230	41	413	99
Heavy Vehicles (%)	5%	5%	5%	5%	5%	0%	10%	10%	5%	5%	10%	15%
Turn Type	Prot	NA		Prot	NA		Perm	NA	pt+ov	Perm	NA	pt+ov
Protected Phases	5	2		1	6			8	8 1		4	4 5
Permitted Phases							8			4		
Actuated Green, G (s)	10.4	13.0		14.3	16.9		13.1	13.1	31.4	13.1	13.1	27.5
Effective Green, g (s)	10.4	13.0		14.3	16.9		13.1	13.1	31.4	13.1	13.1	27.5
Actuated g/C Ratio	0.20	0.25		0.27	0.32		0.25	0.25	0.60	0.25	0.25	0.52
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	341	848		469	1105		197	821	922	192	821	737
v/s Ratio Prot	0.11	c0.14		c0.21	c0.12			c0.14	0.15		0.13	0.07
v/s Ratio Perm							0.03			0.05		
v/c Ratio	0.54	0.58		0.76	0.36		0.13	0.54	0.25	0.21	0.50	0.13
Uniform Delay, d1	18.9	17.3		17.5	13.6		15.2	17.0	4.9	15.6	16.9	6.4
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.6	1.0		7.2	0.2		0.3	0.7	0.1	0.6	0.5	0.1
Delay (s)	20.5	18.3		24.6	13.8		15.5	17.8	5.1	16.1	17.3	6.4
Level of Service	C	B		C	B		B	B	A	B	B	A
Approach Delay (s)		18.9			18.9			13.1			14.1	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM Average Control Delay	16.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	52.4	Sum of lost time (s)	16.0
Intersection Capacity Utilization	61.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
34: Glenoaks Blvd & Sunland Blvd

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	180	710	60	390	430	5	20	750	420	55	610	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.99		1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1641	3411		1719	3434		1805	3438	1538	1641	3438	1468
Flt Permitted	0.95	1.00		0.95	1.00		0.25	1.00	1.00	0.25	1.00	1.00
Satd. Flow (perm)	1641	3411		1719	3434		475	3438	1538	432	3438	1468
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	198	780	66	429	473	5	22	824	462	60	670	60
RTOR Reduction (vph)	0	10	0	0	1	0	0	0	8	0	0	28
Lane Group Flow (vph)	198	836	0	429	477	0	22	824	454	60	670	32
Heavy Vehicles (%)	10%	5%	0%	5%	5%	0%	0%	5%	5%	10%	5%	10%
Turn Type	Prot	NA		Prot	NA		Perm	NA	pt+ov	Perm	NA	pt+ov
Protected Phases	5	2		1	6			8	8 1		4	4 5
Permitted Phases							8			4		
Actuated Green, G (s)	11.7	16.0		16.0	20.3		16.0	16.0	36.0	16.0	16.0	31.7
Effective Green, g (s)	11.7	16.0		16.0	20.3		16.0	16.0	36.0	16.0	16.0	31.7
Actuated g/C Ratio	0.19	0.27		0.27	0.34		0.27	0.27	0.60	0.27	0.27	0.53
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	320	910		458	1162		127	917	923	115	917	776
v/s Ratio Prot	0.12	c0.25		c0.25	0.14			c0.24	0.30		0.19	0.02
v/s Ratio Perm							0.05			0.14		
v/c Ratio	0.62	0.92		0.94	0.41		0.17	0.90	0.49	0.52	0.73	0.04
Uniform Delay, d1	22.1	21.4		21.5	15.3		16.9	21.2	6.8	18.7	20.0	6.8
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.5	13.8		26.7	0.2		0.7	11.5	0.4	4.2	3.0	0.0
Delay (s)	25.7	35.2		48.2	15.5		17.6	32.7	7.2	23.0	23.1	6.8
Level of Service	C	D		D	B		B	C	A	C	C	A
Approach Delay (s)		33.4			30.9			23.4			21.8	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	27.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	80.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

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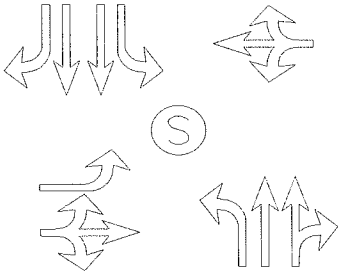
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : ROSCOE BLVD
N/S STREET : GLEN OAKS BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
35
ROUTE
5B, 6B, 7B

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						

ROSCOE BLVD

EB LEFT	175	26%	**50**	225	20	245
EB THRU	0	0%		0	0	0
EB RIGHT	75	10%		75	5	80
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0

GLEN OAKS BLVD

NB LEFT	70	10%		70	5	75
NB THRU	275	5%		275	25	300
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	520	5%		520	45	565
SB RIGHT	420	15%	**50**	470	40	510
TOTALS	**1535**		**100**	**1635**	**140**	**1775**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : ROSCOE BLVD
N/S STREET : GLEN OAKS BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
35
ROUTE
5B, 6B, 7B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
ROSCOE BLVD						
EB LEFT	240	21%	**50**	290	25	315
EB THRU	0	0%		0	0	0
EB RIGHT	90	20%		90	10	100
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
GLEN OAKS BLVD						
NB LEFT	75	10%		75	5	80
NB THRU	370	5%		370	35	405
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	355	10%		355	30	385
SB RIGHT	305	18%	**50**	355	30	385
TOTALS	**1435**		**100**	**1535**	**135**	**1670**

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TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : ROSCOE BLVD
N/S STREET : GLEN OAKS BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
35
ROUTE
5B, 6B, 7B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
ROSCOE BLVD						
EB LEFT	545	13%	**50**	595	55	650
EB THRU	0	0%		0	0	0
EB RIGHT	120	10%		120	10	130
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
GLEN OAKS BLVD						
NB LEFT	65	10%		65	5	70
NB THRU	540	5%		540	50	590
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	530	5%		530	50	580
SB RIGHT	420	15%	**50**	470	40	510
TOTALS	**2220**		**100**	**2320**	**210**	**2530**

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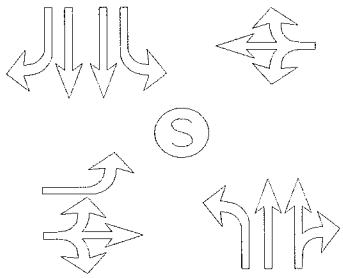
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : ROSCOE BLVD
N/S STREET : GLEN OAKS BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
35
ROUTE
5B, 6B, 7B

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
ROSCOE BLVD								
EB LEFT	169	7	21	190	**150**	340	30	370
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	70	6	18	90	**0**	90	10	100
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
GLEN OAKS BLVD								
NB LEFT	63	7	21	85	**0**	85	5	90
NB THRU	258	15	45	305	**0**	305	25	330
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	501	19	57	560	**0**	560	50	610
SB RIGHT	415	7	21	435	**150**	585	55	640
TOTALS	**1476**				**300**	**1965**	**175**	**2140**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : ROSCOE BLVD
N/S STREET : GLEN OAKS BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 35
ROUTE 5B, 6B, 7B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
ROSCOE BLVD								
EB LEFT	231	7	21	250	**150**	400	35	435
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	70	18	54	125	**0**	125	10	135
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
GLEN OAKS BLVD								
NB LEFT	66	9	27	95	**0**	95	10	105
NB THRU	349	20	60	410	**0**	410	35	445
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	327	29	87	415	**0**	415	35	450
SB RIGHT	287	17	51	340	**150**	490	45	535
TOTALS	**1330**				**300**	**1935**	**170**	**2105**

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TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : ROSCOE BLVD
N/S STREET : GLEN OAKS BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
35
ROUTE
5B, 6B, 7B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
ROSCOE BLVD								
EB LEFT	539	6	18	555	**150**	705	65	770
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	108	13	39	145	**0**	145	15	160
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
GLEN OAKS BLVD								
NB LEFT	60	7	21	80	**0**	80	5	85
NB THRU	520	20	60	580	**0**	580	50	630
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	511	21	63	575	**0**	575	50	625
SB RIGHT	411	8	24	435	**150**	585	55	640
TOTALS	**2149**				**300**	**2670**	**240**	**2910**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: ROSCOE BLVD
EAST-WEST STREET: GLEN OAKS BLVD DATE:
JURISDICTION: LA

PEAK HOUR: 07:00AM

NORTH LEG

TOTAL: 0

Rt	Thru	Lt	
			Total
			1st
			2nd
			3rd
			4th

EAST LEG TOTAL: 343

	1st	2nd	3rd	4th	Total
Rt					
Thru	62	59	73	79	273
Lt	12	19	23	16	70

WEST LEG TOTAL: 942

Total	1st	2nd	3rd	4th	
					Lt
520	112	142	129	137	Thru
422	109	91	108	114	Rt

PEAK HOUR FACTORS

NORTH LEG =
SOUTH LEG = 0.90
EAST LEG = 0.89
WEST LEG = 0.94

ALL LEGS = 0.95

SOUTH LEG

TOTAL: 252

	Lt	Thru	Rt
1st	48		14
2nd	44		22
3rd	51		19
4th	33		21
Total	176		76

HOUR TOTAL: 1,537

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: ROSCOE BLVD

EAST-WEST STREET: GLEN OAKS BLVD

TIME: 07:00AM-08:00AM DATE:

NORTH LEG

			Total
			1st
			2nd
			3rd
			4th
Rt	Thru	Lt	

Rt					
Thru	62	59	73	79	273
Lt	12	19	23	16	70
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
					Lt
520	112	142	129	137	Thru
422	109	91	108	114	Rt

	Lt	Thru	Rt
1st	48		14
2nd	44		22
3rd	51		19
4th	33		21
Total	176		76

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: ROSCOE BLVD

EAST-WEST STREET: GLEN OAKS BLVD

TIME: 08:00AM-09:00AM DATE:

NORTH LEG

			Total
			1st
			2nd
			3rd
			4th
Rt	Thru	Lt	

Rt					
Thru	48	66	69	59	242
Lt	19	22	20	14	75
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
					Lt
493	144	132	118	99	Thru
287	79	51	76	81	Rt

	Lt	Thru	Rt
1st	41		23
2nd	23		19
3rd	29		19
4th	21		16
Total	114		77

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : ROSCOE BLVD LA

EAST-WEST STREET : GLEN OAKS BLVD

BEGINNING TIME : 07:00AM = 7:00AM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
						SOUTH LEG						
10	0	46	2	0	1	1	0	1	1	0	0	62
22	0	42	0	0	1	0	0	1	0	0	0	66
19	0	49	0	0	1	0	0	0	0	0	1	70
19	0	32	1	0	0	0	0	0	1	0	1	54
20	0	41	1	0	0	1	0	0	1	0	0	64
18	0	22	0	0	1	0	0	0	1	0	0	42
19	0	28	0	0	1	0	0	0	0	0	0	48
14	0	20	1	0	1	1	0	0	0	0	0	37
141	0	280	5	0	6	3	0	2	4	0	2	443
						EAST LEG						
0	60	9	0	2	1	0	0	1	0	0	1	74
0	58	17	0	1	0	0	0	1	0	0	1	78
0	67	22	0	4	0	0	2	1	0	0	0	96
0	73	15	0	5	1	0	0	0	0	1	0	95
0	40	17	0	7	1	0	1	0	0	0	1	67
0	62	21	0	3	1	0	1	0	0	0	0	88
0	61	20	0	5	0	0	2	0	0	1	0	89
0	57	12	0	1	1	0	0	1	0	1	0	73
0	478	133	0	28	5	0	6	4	0	3	3	660
						WEST LEG						
106	109	0	1	2	0	1	1	0	1	0	0	221
89	138	0	2	3	0	0	0	0	0	1	0	233
108	123	0	0	5	0	0	0	0	0	1	0	237
112	131	0	1	4	0	0	2	0	1	0	0	251
77	138	0	1	4	0	1	2	0	0	0	0	223
51	127	0	0	3	0	0	1	0	0	1	0	183
76	113	0	0	4	0	0	0	0	0	1	0	194
78	95	0	2	2	0	1	1	0	0	1	0	180
697	974	0	7	27	0	3	7	0	2	5	0	1722

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: ROSCOE BLVD
EAST-WEST STREET: GLEN OAKS BLVD
JURISDICTION: LA

DATE: 05-22-12

PEAK HOUR: 12:45PM

NORTH LEG

TOTAL: 0

Rt	Thru	Lt	
			Total
			1st
			2nd
			3rd
			4th

EAST LEG TOTAL: 444

	1st	2nd	3rd	4th	Total
Rt					
Thru	83	103	98	85	369
Lt	14	20	21	20	75

WEST LEG TOTAL: 660

Total	1st	2nd	3rd	4th	
					Lt
356	101	93	70	92	Thru
304	65	86	60	93	Rt

PEAK HOUR FACTORS

NORTH LEG =
SOUTH LEG = 0.94
EAST LEG = 0.90
WEST LEG = 0.89

ALL LEGS = 0.92

SOUTH LEG

TOTAL: 326

	Lt	Thru	Rt
1st	45		29
2nd	62		25
3rd	67		19
4th	64		15
Total	238		88

HOUR TOTAL: 1,430

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: ROSCOE BLVD

EAST-WEST STREET: GLEN OAKS BLVD

TIME: 12:00PM-01:00PM DATE: 05-22-12

NORTH LEG

			Total
			1st
			2nd
			3rd
			4th
Rt	Thru	Lt	

Rt					
Thru	71	60	73	83	287
Lt	13	15	17	14	59
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
					Lt
406	92	100	113	101	Thru
311	82	75	89	65	Rt

	Lt	Thru	Rt
1st	41		21
2nd	41		14
3rd	43		23
4th	45		29
Total	170		87

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: ROSCOE BLVD

EAST-WEST STREET: GLEN OAKS BLVD

TIME: 01:00PM-02:00PM DATE: 05-22-12

NORTH LEG

			Total
			1st
			2nd
			3rd
			4th
Rt	Thru	Lt	

Rt					
Thru	103	98	85	80	366
Lt	20	21	20	19	80
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
					Lt
355	93	70	92	100	Thru
307	86	60	93	68	Rt

	Lt	Thru	Rt
1st	62		25
2nd	67		19
3rd	64		15
4th	55		11
Total	248		70

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : ROSCOE BLVD LA

EAST-WEST STREET : GLEN OAKS BLVD 05-22-12

BEGINNING TIME : 12:00PM PH: 12:45PM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
					NORTH LEG							
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
					SOUTH LEG							
18	0	35	2	0	3	0	0	2	1	0	1	62
10	0	36	3	0	2	0	0	2	1	0	1	55
18	0	41	4	0	1	1	0	1	0	0	0	66
21	0	43	4	0	1	2	0	1	2	0	0	74
22	0	60	2	0	2	1	0	0	0	0	0	87
14	0	66	5	0	1	0	0	0	0	0	0	86
13	0	62	2	0	1	0	0	0	0	0	1	79
7	0	55	2	0	0	1	0	0	1	0	0	66
123	0	398	24	0	11	5	0	6	5	0	3	575
					EAST LEG							
0	66	10	0	2	1	0	2	1	0	1	1	84
0	57	14	0	3	1	0	0	0	0	0	0	75
0	69	17	0	2	0	0	1	0	0	1	0	90
0	79	11	0	2	0	0	1	1	0	1	2	97
0	96	17	0	5	1	0	0	0	0	2	2	123
0	95	19	0	3	1	0	0	0	0	0	1	119
0	79	19	0	4	1	0	2	0	0	0	0	105
0	74	19	0	2	0	0	1	0	0	3	0	99
0	615	126	0	23	5	0	7	2	0	8	6	792
					WEST LEG							
78	86	0	2	3	0	1	2	0	1	1	0	174
73	95	0	1	5	0	0	0	0	1	0	0	175
86	106	0	1	4	0	0	3	0	2	0	0	202
62	93	0	3	3	0	0	3	0	0	2	0	166
83	89	0	2	2	0	1	1	0	0	1	0	179
56	62	0	2	6	0	2	1	0	0	1	0	130
86	83	0	5	6	0	1	0	0	1	3	0	185
67	91	0	1	7	0	0	2	0	0	0	0	168
591	705	0	17	36	0	5	12	0	5	8	0	1379

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: ROSCOE BLVD
EAST-WEST STREET: GLEN OAKS BLVD
JURISDICTION: LA

DATE: 05-22-12

PEAK HOUR: 05:00PM

NORTH LEG

TOTAL: 0

			Total
			1st
			2nd
			3rd
			4th
Rt	Thru	Lt	

EAST LEG TOTAL: 607

	1st	2nd	3rd	4th	Total
Rt					
Thru	130	149	152	109	540
Lt	16	20	10	21	67

WEST LEG TOTAL: 951

Total	1st	2nd	3rd	4th	
					Lt
532	123	140	153	116	Thru
419	92	125	115	87	Rt

SOUTH LEG

	Lt	Thru	Rt
1st	145		23
2nd	132		21
3rd	132		32
4th	136		45
Total	545		121

TOTAL: 666

PEAK HOUR FACTORS

NORTH LEG =
SOUTH LEG = 0.92
EAST LEG = 0.90
WEST LEG = 0.89

ALL LEGS = 0.94

HOUR TOTAL: 2,224

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: ROSCOE BLVD

EAST-WEST STREET: GLEN OAKS BLVD

TIME: 04:00PM-05:00PM DATE: 05-22-12

NORTH LEG

			Total
			1st
			2nd
			3rd
			4th
Rt	Thru	Lt	

	1st	2nd	3rd	4th	Total
Rt					
Thru	137	79	75	114	405
Lt	17	17	16	20	70

Total	1st	2nd	3rd	4th	
					Lt
421	105	87	113	116	Thru
337	87	88	90	72	Rt

	Lt	Thru	Rt
1st	79		17
2nd	107		14
3rd	126		35
4th	132		31
Total	444		97

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: ROSCOE BLVD

EAST-WEST STREET: GLEN OAKS BLVD

TIME: 05:00PM-06:00PM DATE: 05-22-12

NORTH LEG

			Total
			1st
			2nd
			3rd
			4th
Rt	Thru	Lt	

Rt					
Thru	130	149	152	109	540
Lt	16	20	10	21	67
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
					Lt
532	123	140	153	116	Thru
419	92	125	115	87	Rt

	Lt	Thru	Rt
1st	145		23
2nd	132		21
3rd	132		32
4th	136		45
Total	545		121

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

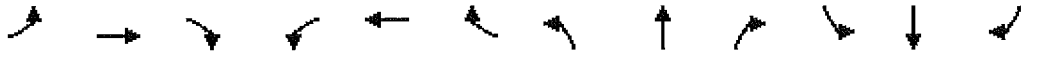
NORTH-SOUTH STREET : ROSCOE BLVD LA

EAST-WEST STREET : GLEN OAKS BLVD 05-22-12

BEGINNING TIME : 04:00PM PH: 5 PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
						SOUTH LEG						
10	0	74	3	0	2	3	0	2	1	0	1	96
7	0	103	5	0	2	1	0	1	1	0	1	121
28	0	123	4	0	1	1	0	1	2	0	1	161
26	0	130	2	0	1	0	0	0	3	0	1	163
21	0	145	2	0	0	0	0	0	0	0	0	168
18	0	130	3	0	2	0	0	0	0	0	0	153
28	0	131	3	0	1	1	0	0	0	0	0	164
41	0	133	3	0	2	0	0	0	1	0	1	181
179	0	969	25	0	11	6	0	4	8	0	5	1207
						EAST LEG						
0	135	13	0	2	3	0	0	0	0	0	1	154
0	76	13	0	3	2	0	0	1	0	0	1	96
0	69	14	0	4	1	0	1	1	0	1	0	91
0	109	17	0	2	1	0	1	2	0	2	0	134
0	125	16	0	2	0	0	2	0	0	1	0	146
0	145	20	0	3	0	0	0	0	0	1	0	169
0	148	8	0	3	1	0	0	1	0	1	0	162
0	102	16	0	4	2	0	2	2	0	1	1	130
0	909	117	0	23	10	0	6	7	0	7	3	1082
						WEST LEG						
84	101	0	2	3	0	1	0	0	0	1	0	192
84	80	0	3	4	0	0	0	0	1	3	0	175
83	107	0	5	3	0	0	1	0	2	2	0	203
65	110	0	4	5	0	1	1	0	2	0	0	188
90	119	0	2	2	0	0	2	0	0	0	0	215
123	137	0	2	2	0	0	0	0	0	1	0	265
113	145	0	2	5	0	0	1	0	0	2	0	268
85	110	0	1	4	0	0	1	0	1	1	0	203
727	909	0	21	28	0	2	6	0	6	10	0	1709

Prepared by Newport Traffic Studies



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	175	0	75	0	0	0	70	275	0	0	520	420
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0					4.0	4.0			4.0	4.0
Lane Util. Factor	0.95	0.95					1.00	0.95			0.95	1.00
Frt	1.00	0.91					1.00	1.00			1.00	0.85
Flt Protected	0.95	0.98					0.95	1.00			1.00	1.00
Satd. Flow (prot)	1633	1684					1641	3438			3438	1538
Flt Permitted	0.76	0.90					0.45	1.00			1.00	1.00
Satd. Flow (perm)	1302	1537					773	3438			3438	1538
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	184	0	79	0	0	0	74	289	0	0	547	442
RTOR Reduction (vph)	0	55	0	0	0	0	0	0	0	0	0	256
Lane Group Flow (vph)	136	72	0	0	0	0	74	289	0	0	547	186
Heavy Vehicles (%)	5%	0%	10%	0%	0%	0%	10%	5%	0%	0%	5%	5%
Turn Type	Perm	NA		Perm			Perm	NA		Perm	NA	Perm
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		4
Actuated Green, G (s)	8.7	8.7					12.1	12.1			12.1	12.1
Effective Green, g (s)	8.7	8.7					12.1	12.1			12.1	12.1
Actuated g/C Ratio	0.30	0.30					0.42	0.42			0.42	0.42
Clearance Time (s)	4.0	4.0					4.0	4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0					3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	393	464					325	1444			1444	646
v/s Ratio Prot								0.08			c0.16	
v/s Ratio Perm	c0.10	0.05					0.10					0.12
v/c Ratio	0.35	0.15					0.23	0.20			0.38	0.29
Uniform Delay, d1	7.8	7.4					5.4	5.3			5.8	5.5
Progression Factor	1.00	1.00					1.00	1.00			1.00	1.00
Incremental Delay, d2	0.5	0.2					0.4	0.1			0.2	0.2
Delay (s)	8.4	7.5					5.7	5.4			5.9	5.8
Level of Service	A	A					A	A			A	A
Approach Delay (s)		8.0			0.0			5.4			5.8	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM Average Control Delay	6.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	28.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	36.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	240	0	90	0	0	0	75	370	0	0	355	305
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0					4.0	4.0			4.0	4.0
Lane Util. Factor	0.95	0.95					1.00	0.95			0.95	1.00
Frt	1.00	0.92					1.00	1.00			1.00	0.85
Flt Protected	0.95	0.98					0.95	1.00			1.00	1.00
Satd. Flow (prot)	1633	1616					1641	3438			3282	1538
Flt Permitted	0.76	0.88					0.52	1.00			1.00	1.00
Satd. Flow (perm)	1302	1448					904	3438			3282	1538
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	261	0	98	0	0	0	82	402	0	0	386	332
RTOR Reduction (vph)	0	64	0	0	0	0	0	0	0	0	0	208
Lane Group Flow (vph)	185	110	0	0	0	0	82	402	0	0	386	124
Heavy Vehicles (%)	5%	0%	20%	0%	0%	0%	10%	5%	0%	0%	10%	5%
Turn Type	Perm	NA		Perm			Perm	NA		Perm	NA	Perm
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		4
Actuated Green, G (s)	9.8	9.8					10.6	10.6			10.6	10.6
Effective Green, g (s)	9.8	9.8					10.6	10.6			10.6	10.6
Actuated g/C Ratio	0.35	0.35					0.37	0.37			0.37	0.37
Clearance Time (s)	4.0	4.0					4.0	4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0					3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	449	500					337	1283			1225	574
v/s Ratio Prot								0.12			c0.12	
v/s Ratio Perm	c0.14	0.08					0.09					0.08
v/c Ratio	0.41	0.22					0.24	0.31			0.32	0.22
Uniform Delay, d1	7.1	6.6					6.1	6.3			6.3	6.1
Progression Factor	1.00	1.00					1.00	1.00			1.00	1.00
Incremental Delay, d2	0.6	0.2					0.4	0.1			0.1	0.2
Delay (s)	7.7	6.8					6.5	6.5			6.5	6.3
Level of Service	A	A					A	A			A	A
Approach Delay (s)		7.3			0.0			6.5			6.4	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM Average Control Delay	6.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	28.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	33.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
35: Glenoaks Blvd & Roscoe Blvd

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	545	0	120	0	0	0	65	540	0	0	530	420
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0					4.0	4.0			4.0	4.0
Lane Util. Factor	0.95	0.95					1.00	0.95			0.95	1.00
Frt	1.00	0.94					1.00	1.00			1.00	0.85
Flt Protected	0.95	0.97					0.95	1.00			1.00	1.00
Satd. Flow (prot)	1633	1754					1641	3438			3438	1538
Flt Permitted	0.76	0.81					0.43	1.00			1.00	1.00
Satd. Flow (perm)	1302	1461					744	3438			3438	1538
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	580	0	128	0	0	0	69	574	0	0	564	447
RTOR Reduction (vph)	0	53	0	0	0	0	0	0	0	0	0	278
Lane Group Flow (vph)	360	295	0	0	0	0	69	574	0	0	564	169
Heavy Vehicles (%)	5%	0%	10%	0%	0%	0%	10%	5%	0%	0%	5%	5%
Turn Type	Perm	NA		Perm			Perm	NA		Perm	NA	Perm
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		4
Actuated Green, G (s)	13.7	13.7					13.2	13.2			13.2	13.2
Effective Green, g (s)	13.7	13.7					13.2	13.2			13.2	13.2
Actuated g/C Ratio	0.39	0.39					0.38	0.38			0.38	0.38
Clearance Time (s)	4.0	4.0					4.0	4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0					3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	511	574					281	1300			1300	582
v/s Ratio Prot								c0.17			0.16	
v/s Ratio Perm	c0.28	0.20					0.09					0.11
v/c Ratio	0.70	0.51					0.25	0.44			0.43	0.29
Uniform Delay, d1	8.9	8.1					7.4	8.1			8.1	7.6
Progression Factor	1.00	1.00					1.00	1.00			1.00	1.00
Incremental Delay, d2	4.4	0.8					0.5	0.2			0.2	0.3
Delay (s)	13.3	8.8					7.9	8.3			8.3	7.9
Level of Service	B	A					A	A			A	A
Approach Delay (s)		11.1			0.0			8.3			8.1	
Approach LOS		B			A			A			A	

Intersection Summary			
HCM Average Control Delay	9.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	34.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	47.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	225	0	75	0	0	0	70	275	0	0	520	470
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0					4.0	4.0			4.0	4.0
Lane Util. Factor	0.95	0.95					1.00	0.95			0.95	1.00
Frt	1.00	0.92					1.00	1.00			1.00	0.85
Flt Protected	0.95	0.98					0.95	1.00			1.00	1.00
Satd. Flow (prot)	1361	1565					1641	3438			3438	1404
Flt Permitted	0.76	0.87					0.45	1.00			1.00	1.00
Satd. Flow (perm)	1085	1389					773	3438			3438	1404
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	237	0	79	0	0	0	74	289	0	0	547	495
RTOR Reduction (vph)	0	53	0	0	0	0	0	0	0	0	0	288
Lane Group Flow (vph)	164	99	0	0	0	0	74	289	0	0	547	207
Heavy Vehicles (%)	26%	0%	10%	0%	0%	0%	10%	5%	0%	0%	5%	15%
Turn Type	Perm	NA		Perm			Perm	NA		Perm	NA	Perm
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		4
Actuated Green, G (s)	10.1	10.1					13.0	13.0			13.0	13.0
Effective Green, g (s)	10.1	10.1					13.0	13.0			13.0	13.0
Actuated g/C Ratio	0.32	0.32					0.42	0.42			0.42	0.42
Clearance Time (s)	4.0	4.0					4.0	4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0					3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	352	451					323	1437			1437	587
v/s Ratio Prot								0.08			c0.16	
v/s Ratio Perm	c0.15	0.07					0.10					0.15
v/c Ratio	0.47	0.22					0.23	0.20			0.38	0.35
Uniform Delay, d1	8.4	7.6					5.8	5.8			6.3	6.2
Progression Factor	1.00	1.00					1.00	1.00			1.00	1.00
Incremental Delay, d2	1.0	0.2					0.4	0.1			0.2	0.4
Delay (s)	9.3	7.9					6.2	5.8			6.4	6.5
Level of Service	A	A					A	A			A	A
Approach Delay (s)		8.6			0.0			5.9			6.5	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM Average Control Delay	6.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	31.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	39.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	290	0	90	0	0	0	75	370	0	0	355	355
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0					4.0	4.0			4.0	4.0
Lane Util. Factor	0.95	0.95					1.00	0.95			0.95	1.00
Frt	1.00	0.93					1.00	1.00			1.00	0.85
Flt Protected	0.95	0.97					0.95	1.00			1.00	1.00
Satd. Flow (prot)	1417	1534					1641	3438			3282	1369
Flt Permitted	0.76	0.85					0.52	1.00			1.00	1.00
Satd. Flow (perm)	1130	1341					904	3438			3282	1369
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	315	0	98	0	0	0	82	402	0	0	386	386
RTOR Reduction (vph)	0	62	0	0	0	0	0	0	0	0	0	245
Lane Group Flow (vph)	211	140	0	0	0	0	82	402	0	0	386	141
Heavy Vehicles (%)	21%	0%	20%	0%	0%	0%	10%	5%	0%	0%	10%	18%
Turn Type	Perm	NA		Perm			Perm	NA		Perm	NA	Perm
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		4
Actuated Green, G (s)	10.8	10.8					10.8	10.8			10.8	10.8
Effective Green, g (s)	10.8	10.8					10.8	10.8			10.8	10.8
Actuated g/C Ratio	0.36	0.36					0.36	0.36			0.36	0.36
Clearance Time (s)	4.0	4.0					4.0	4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0					3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	412	489					330	1254			1197	500
v/s Ratio Prot								0.12			c0.12	
v/s Ratio Perm	c0.19	0.10					0.09					0.10
v/c Ratio	0.51	0.29					0.25	0.32			0.32	0.28
Uniform Delay, d1	7.3	6.7					6.6	6.8			6.8	6.7
Progression Factor	1.00	1.00					1.00	1.00			1.00	1.00
Incremental Delay, d2	1.1	0.3					0.4	0.1			0.2	0.3
Delay (s)	8.4	7.0					7.0	6.9			6.9	7.0
Level of Service	A	A					A	A			A	A
Approach Delay (s)		7.7			0.0			6.9			6.9	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM Average Control Delay	7.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	29.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	34.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	595	0	120	0	0	0	65	540	0	0	530	470
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0					4.0	4.0			4.0	4.0
Lane Util. Factor	0.95	0.95					1.00	0.95			0.95	1.00
Frt	1.00	0.95					1.00	1.00			1.00	0.85
Flt Protected	0.95	0.97					0.95	1.00			1.00	1.00
Satd. Flow (prot)	1517	1678					1641	3438			3438	1404
Flt Permitted	0.76	0.80					0.41	1.00			1.00	1.00
Satd. Flow (perm)	1210	1389					710	3438			3438	1404
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	633	0	128	0	0	0	69	574	0	0	564	500
RTOR Reduction (vph)	0	44	0	0	0	0	0	0	0	0	0	323
Lane Group Flow (vph)	386	331	0	0	0	0	69	574	0	0	564	177
Heavy Vehicles (%)	13%	0%	10%	0%	0%	0%	10%	5%	0%	0%	5%	15%
Turn Type	Perm	NA		Perm			Perm	NA		Perm	NA	Perm
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		4
Actuated Green, G (s)	16.9	16.9					13.7	13.7			13.7	13.7
Effective Green, g (s)	16.9	16.9					13.7	13.7			13.7	13.7
Actuated g/C Ratio	0.44	0.44					0.35	0.35			0.35	0.35
Clearance Time (s)	4.0	4.0					4.0	4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0					3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	530	608					252	1220			1220	498
v/s Ratio Prot								c0.17			0.16	
v/s Ratio Perm	c0.32	0.24					0.10					0.13
v/c Ratio	0.73	0.54					0.27	0.47			0.46	0.36
Uniform Delay, d1	9.0	8.0					8.9	9.6			9.6	9.2
Progression Factor	1.00	1.00					1.00	1.00			1.00	1.00
Incremental Delay, d2	5.0	1.0					0.6	0.3			0.3	0.4
Delay (s)	13.9	9.0					9.5	9.9			9.9	9.6
Level of Service	B	A					A	A			A	A
Approach Delay (s)		11.5			0.0			9.9			9.8	
Approach LOS		B			A			A			A	

Intersection Summary			
HCM Average Control Delay	10.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	38.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	48.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	245	0	80	0	0	0	75	300	0	0	565	510
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0					4.0	4.0			4.0	4.0
Lane Util. Factor	0.95	0.95					1.00	0.95			0.95	1.00
Frt	1.00	0.92					1.00	1.00			1.00	0.85
Flt Protected	0.95	0.98					0.95	1.00			1.00	1.00
Satd. Flow (prot)	1633	1716					1641	3438			3438	1538
Flt Permitted	0.76	0.86					0.43	1.00			1.00	1.00
Satd. Flow (perm)	1302	1508					738	3438			3438	1538
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	258	0	84	0	0	0	79	316	0	0	595	537
RTOR Reduction (vph)	0	57	0	0	0	0	0	0	0	0	0	307
Lane Group Flow (vph)	175	110	0	0	0	0	79	316	0	0	595	230
Heavy Vehicles (%)	5%	0%	10%	0%	0%	0%	10%	5%	0%	0%	5%	5%
Turn Type	Perm	NA		Perm			Perm	NA		Perm	NA	Perm
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		4
Actuated Green, G (s)	10.0	10.0					13.5	13.5			13.5	13.5
Effective Green, g (s)	10.0	10.0					13.5	13.5			13.5	13.5
Actuated g/C Ratio	0.32	0.32					0.43	0.43			0.43	0.43
Clearance Time (s)	4.0	4.0					4.0	4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0					3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	413	479					316	1473			1473	659
v/s Ratio Prot								0.09			c0.17	
v/s Ratio Perm	c0.13	0.07					0.11					0.15
v/c Ratio	0.42	0.23					0.25	0.21			0.40	0.35
Uniform Delay, d1	8.5	7.9					5.8	5.7			6.2	6.0
Progression Factor	1.00	1.00					1.00	1.00			1.00	1.00
Incremental Delay, d2	0.7	0.2					0.4	0.1			0.2	0.3
Delay (s)	9.2	8.2					6.2	5.7			6.4	6.4
Level of Service	A	A					A	A			A	A
Approach Delay (s)		8.7			0.0			5.8			6.4	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM Average Control Delay	6.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	31.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	42.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
35: Glenoaks Blvd & Roscoe Blvd

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	315	0	100	0	0	0	80	405	0	0	385	385
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0					4.0	4.0			4.0	4.0
Lane Util. Factor	0.95	0.95					1.00	0.95			0.95	1.00
Frt	1.00	0.93					1.00	1.00			1.00	0.85
Flt Protected	0.95	0.98					0.95	1.00			1.00	1.00
Satd. Flow (prot)	1633	1641					1641	3438			3282	1538
Flt Permitted	0.76	0.85					0.51	1.00			1.00	1.00
Satd. Flow (perm)	1302	1435					877	3438			3282	1538
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	342	0	109	0	0	0	87	440	0	0	418	418
RTOR Reduction (vph)	0	70	0	0	0	0	0	0	0	0	0	261
Lane Group Flow (vph)	233	148	0	0	0	0	87	440	0	0	418	157
Heavy Vehicles (%)	5%	0%	20%	0%	0%	0%	10%	5%	0%	0%	10%	5%
Turn Type	Perm	NA		Perm			Perm	NA		Perm	NA	Perm
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		4
Actuated Green, G (s)	10.8	10.8					11.3	11.3			11.3	11.3
Effective Green, g (s)	10.8	10.8					11.3	11.3			11.3	11.3
Actuated g/C Ratio	0.36	0.36					0.38	0.38			0.38	0.38
Clearance Time (s)	4.0	4.0					4.0	4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0					3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	467	515					329	1291			1232	577
v/s Ratio Prot								c0.13			0.13	
v/s Ratio Perm	c0.18	0.10					0.10					0.10
v/c Ratio	0.50	0.29					0.26	0.34			0.34	0.27
Uniform Delay, d1	7.5	6.9					6.5	6.7			6.7	6.5
Progression Factor	1.00	1.00					1.00	1.00			1.00	1.00
Incremental Delay, d2	0.8	0.3					0.4	0.2			0.2	0.3
Delay (s)	8.4	7.2					7.0	6.9			6.9	6.8
Level of Service	A	A					A	A			A	A
Approach Delay (s)		7.8			0.0			6.9			6.8	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM Average Control Delay	7.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	30.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	36.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
35: Glenoaks Blvd & Roscoe Blvd

9/3/2013

Movement	EBL2	EBL	EBR	NBL	NBT	NBR	SBL	SBT	SBR	SWL	SWR
Lane Configurations											
Volume (vph)	650	0	130	70	590	0	0	580	510	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0	4.0		
Lane Util. Factor	0.95	0.95		1.00	0.95			0.95	1.00		
Frt	1.00	0.95		1.00	1.00			1.00	0.85		
Flt Protected	0.95	0.97		0.95	1.00			1.00	1.00		
Satd. Flow (prot)	1633	1762		1641	3438			3438	1538		
Flt Permitted	0.76	0.80		0.39	1.00			1.00	1.00		
Satd. Flow (perm)	1302	1457		670	3438			3438	1538		
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	691	0	138	74	628	0	0	617	543	0	0
RTOR Reduction (vph)	0	46	0	0	0	0	0	0	337	0	0
Lane Group Flow (vph)	422	361	0	74	628	0	0	617	206	0	0
Heavy Vehicles (%)	5%	0%	10%	10%	5%	0%	0%	5%	5%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm		custom
Protected Phases		2			8			4			6
Permitted Phases	2			8			4		4		
Actuated Green, G (s)	14.7	14.7		13.9	13.9			13.9	13.9		
Effective Green, g (s)	14.7	14.7		13.9	13.9			13.9	13.9		
Actuated g/C Ratio	0.40	0.40		0.38	0.38			0.38	0.38		
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0	4.0		
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		
Lane Grp Cap (vph)	523	585		254	1306			1306	584		
v/s Ratio Prot					c0.18			0.18			
v/s Ratio Perm	c0.32	0.25		0.11					0.13		
v/c Ratio	0.81	0.62		0.29	0.48			0.47	0.35		
Uniform Delay, d1	9.7	8.7		7.9	8.6			8.6	8.1		
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		
Incremental Delay, d2	8.9	1.9		0.6	0.3			0.3	0.4		
Delay (s)	18.6	10.7		8.6	8.9			8.8	8.5		
Level of Service	B	B		A	A			A	A		
Approach Delay (s)		14.7			8.9			8.7		0.0	
Approach LOS		B			A			A		A	

Intersection Summary			
HCM Average Control Delay	10.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	36.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	51.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

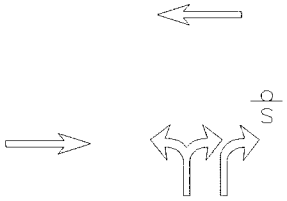
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : ROSCOE BLVD
N/S STREET : NB I-5 FREEWAY RAMPS
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 36
ROUTE 5B, 6B, 7B

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
ROSCOE BLVD						
EB LEFT	0	0%		0	0	0
EB THRU	90	10%		90	10	100
EB RIGHT	0	0%		0	0	0
WB LEFT	0	0%		0	0	0
WB THRU	490	14%	**50**	540	50	590
WB RIGHT	0	0%		0	0	0
NB I-5 FREEWAY RAMPS						
NB LEFT	70	15%		70	5	75
NB THRU	0	0%		0	0	0
NB RIGHT	215	23%	**50**	265	25	290
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**865**		**100**	**965**	**90**	**1055**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : ROSCOE BLVD
N/S STREET : NB I-5 FREEWAY RAMPS
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 36
ROUTE 5B, 6B, 7B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
ROSCOE BLVD						
EB LEFT	0	0%		0	0	0
EB THRU	120	10%		120	10	130
EB RIGHT	0	0%		0	0	0
WB LEFT	0	0%		0	0	0
WB THRU	375	16%	**50**	425	40	465
WB RIGHT	0	0%		0	0	0
NB I-5 FREEWAY RAMPS						
NB LEFT	60	20%		60	5	65
NB THRU	0	0%		0	0	0
NB RIGHT	235	22%	**50**	285	25	310
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**790**		**100**	**890**	**80**	**970**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	3-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : ROSCOE BLVD
N/S STREET : NB I-5 FREEWAY RAMPS
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 36
ROUTE 5B, 6B, 7B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
ROSCOE BLVD						
EB LEFT	0	0%		0	0	0
EB THRU	110	15%		110	10	120
EB RIGHT	0	0%		0	0	0
WB LEFT	0	0%		0	0	0
WB THRU	490	14%	**50**	540	50	590
WB RIGHT	0	0%		0	0	0
NB I-5 FREEWAY RAMPS						
NB LEFT	65	20%		65	5	70
NB THRU	0	0%		0	0	0
NB RIGHT	565	13%	**50**	615	55	670
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**1230**		**100**	**1330**	**120**	**1450**

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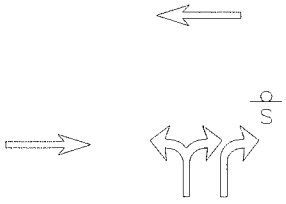
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : ROSCOE BLVD
N/S STREET : NB I-5 FREEWAY RAMPS
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 36
ROUTE 5B, 6B, 7B

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
ROSCOE BLVD								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	81	7	21	100	**0**	100	10	110
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	481	10	30	510	**150**	660	60	720
WB RIGHT	0	0	0	0	**0**	0	0	0
NB I-5 FREEWAY RAMPS								
NB LEFT	62	10	30	90	**0**	90	10	100
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	208	7	21	230	**150**	380	35	415
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**832**				**300**	**1230**	**115**	**1345**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : ROSCOE BLVD
N/S STREET : NB I-5 FREEWAY RAMPS
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 36
ROUTE 5B, 6B, 7B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
ROSCOE BLVD								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	106	12	36	140	**0**	140	15	155
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	363	13	39	400	**150**	550	50	600
WB RIGHT	0	0	0	0	**0**	0	0	0
NB I-5 FREEWAY RAMPS								
NB LEFT	49	12	36	85	**0**	85	5	90
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	231	4	12	245	**150**	395	35	430
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**749**				**300**	**1170**	**105**	**1275**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	mc	3-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : ROSCOE BLVD
N/S STREET : NB I-5 FREEWAY RAMPS
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 36
ROUTE 5B, 6B, 7B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
ROSCOE BLVD								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	94	14	42	135	**0**	135	10	145
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	482	8	24	505	**150**	655	60	715
WB RIGHT	0	0	0	0	**0**	0	0	0
NB I-5 FREEWAY RAMPS								
NB LEFT	54	12	36	90	**0**	90	10	100
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	559	6	18	575	**150**	725	65	790
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**1189**				**300**	**1605**	**145**	**1750**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: ROSCOE BLVD
EAST-WEST STREET: I-5 NB RAMPS
JURISDICTION: LA

DATE: 05-23-12

PEAK HOUR: 07:00AM

NORTH LEG

TOTAL: 491

	491		Total
	123		1st
	113		2nd
	133		3rd
	122		4th
Rt	Thru	Lt	

EAST LEG

EAST LEG TOTAL: 287

	1st	2nd	3rd	4th	Total
Rt	41	60	55	59	215
Thru					
Lt	11	21	17	23	72

WEST LEG

	Total	1st	2nd	3rd	4th
Lt					
Thru					
Rt					

WEST LEG TOTAL: 0

SOUTH LEG

	Lt	Thru	Rt
1st		25	
2nd		21	
3rd		22	
4th		20	
Total		88	

TOTAL: 88

PEAK HOUR FACTORS

NORTH LEG = 0.92
SOUTH LEG = 0.88
EAST LEG = 0.88
WEST LEG =

ALL LEGS = 0.95

HOUR TOTAL: 866

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: ROSCOE BLVD

EAST-WEST STREET: I-5 NB RAMPS

TIME: 07:00AM-08:00AM DATE: 05-23-12

NORTH LEG

	491		Total
	123		1st
	113		2nd
	133		3rd
	122		4th
Rt	Thru	Lt	

	1st	2nd	3rd	4th	Total
Rt	41	60	55	59	215
Thru					
Lt	11	21	17	23	72

Total	1st	2nd	3rd	4th	
					Lt
					Thru
					Rt

	Lt	Thru	Rt
1st		25	
2nd		21	
3rd		22	
4th		20	
Total		88	

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: ROSCOE BLVD

EAST-WEST STREET: I-5 NB RAMPS

TIME: 08:00AM-09:00AM DATE: 05-23-12

NORTH LEG

	364		Total
	99		1st
	77		2nd
	90		3rd
	98		4th
Rt	Thru	Lt	

Rt	50	45	42	39	176
Thru					
Lt	16	12	10	7	45
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
					Lt
					Thru
					Rt

	Lt	Thru	Rt
1st		24	
2nd		21	
3rd		16	
4th		11	
Total		72	

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : ROSCOE BLVD LA

EAST-WEST STREET : I-5 NB RAMPS 05-23-12

BEGINNING TIME : 07:00AM - PM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
					NORTH LEG							
0	119	0	0	0	0	0	2	0	0	2	0	123
0	113	0	0	0	0	0	0	0	0	0	0	113
0	130	0	0	2	0	0	1	0	0	0	0	133
0	119	0	0	2	0	0	1	0	0	0	0	122
0	96	0	0	0	0	0	0	0	0	3	0	99
0	72	0	0	3	0	0	0	0	0	2	0	77
0	87	0	0	2	0	0	1	0	0	0	0	90
0	96	0	0	2	0	0	0	0	0	0	0	98
0	832	0	0	11	0	0	5	0	0	7	0	855
					SOUTH LEG							
0	22	0	0	1	0	0	1	0	0	1	0	25
0	19	0	0	0	0	0	1	0	0	1	0	21
0	22	0	0	0	0	0	0	0	0	0	0	22
0	18	0	0	2	0	0	0	0	0	0	0	20
0	22	0	0	1	0	0	0	0	0	1	0	24
0	20	0	0	0	0	0	1	0	0	0	0	21
0	16	0	0	0	0	0	0	0	0	0	0	16
0	11	0	0	0	0	0	0	0	0	0	0	11
0	150	0	0	4	0	0	3	0	0	3	0	160
					EAST LEG							
38	0	9	2	0	0	0	0	2	1	0	0	52
59	0	19	0	0	2	0	0	0	1	0	0	81
54	0	15	0	0	0	1	0	0	0	0	2	72
57	0	19	1	0	2	1	0	2	0	0	0	82
47	0	13	2	0	2	1	0	0	0	0	1	66
43	0	7	2	0	3	0	0	1	0	0	1	57
42	0	5	0	0	2	0	0	1	0	0	2	52
36	0	4	1	0	2	1	0	0	1	0	1	46
376	0	91	8	0	13	4	0	6	3	0	7	508
					WEST LEG							
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: ROSCOE BLVD
EAST-WEST STREET: I-5 NB RAMPS
JURISDICTION: LA

DATE: 05-23-12

PEAK HOUR: 12:45PM

NORTH LEG

TOTAL: 376

	376		Total
	72		1st
	107		2nd
	83		3rd
	114		4th
Rt	Thru	Lt	

EAST LEG TOTAL: 296

Rt	63	62	73	37	235
Thru					
Lt	21	11	15	14	61
	1st	2nd	3rd	4th	Total

WEST LEG TOTAL: 0

Total	1st	2nd	3rd	4th	
					Lt
					Thru
					Rt

PEAK HOUR FACTORS

NORTH LEG = 0.82
SOUTH LEG = 0.80
EAST LEG = 0.84
WEST LEG =

ALL LEGS = 0.95

SOUTH LEG

TOTAL: 118

	Lt	Thru	Rt
1st		36	
2nd		23	
3rd		37	
4th		22	
Total		118	

HOUR TOTAL: 790

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: ROSCOE BLVD

EAST-WEST STREET: I-5 NB RAMPS

TIME: 12:00PM-01:00PM DATE: 05-23-12

NORTH LEG

	361		Total
	96		1st
	90		2nd
	103		3rd
	72		4th
Rt	Thru	Lt	

	1st	2nd	3rd	4th	Total
Rt	41	42	28	63	174
Thru					
Lt	11	10	14	21	56

Total	1st	2nd	3rd	4th	
					Lt
					Thru
					Rt

	Lt	Thru	Rt
1st		23	
2nd		28	
3rd		31	
4th		36	
Total		118	

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: ROSCOE BLVD

EAST-WEST STREET: I-5 NB RAMPS

TIME: 01:00PM-02:00PM DATE: 05-23-12

NORTH LEG

	393		Total
	107		1st
	83		2nd
	114		3rd
	89		4th
Rt	Thru	Lt	

	1st	2nd	3rd	4th	Total
Rt	62	73	37	50	222
Thru					
Lt	11	15	14	22	62

Total	1st	2nd	3rd	4th	
					Lt
					Thru
					Rt

	Lt	Thru	Rt
1st		23	
2nd		37	
3rd		22	
4th		28	
Total		110	

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : ROSCOE BLVD LA

EAST-WEST STREET : I-5 NB RAMPS 05-23-12

BEGINNING TIME : 12:00PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
0	92	0	0	2	0	0	2	0	0	0	0	96
0	88	0	0	0	0	0	2	0	0	0	0	90
0	102	0	0	1	0	0	0	0	0	0	0	103
0	69	0	0	1	0	0	1	0	0	1	0	72
0	102	0	0	2	0	0	2	0	0	1	0	107
0	79	0	0	0	0	0	2	0	0	2	0	83
0	113	0	0	0	0	0	0	0	0	1	0	114
0	87	0	0	1	0	0	1	0	0	0	0	89
0	732	0	0	7	0	0	10	0	0	5	0	754
						SOUTH LEG						
0	21	0	0	0	0	0	1	0	0	1	0	23
0	27	0	0	0	0	0	1	0	0	0	0	28
0	28	0	0	2	0	0	1	0	0	0	0	31
0	32	0	0	2	0	0	2	0	0	0	0	36
0	21	0	0	2	0	0	0	0	0	0	0	23
0	34	0	0	2	0	0	0	0	0	1	0	37
0	19	0	0	1	0	0	1	0	0	1	0	22
0	27	0	0	1	0	0	0	0	0	0	0	28
0	209	0	0	10	0	0	6	0	0	3	0	228
						EAST LEG						
39	0	6	2	0	2	0	0	1	0	0	2	52
40	0	4	0	0	2	2	0	2	0	0	2	52
23	0	9	2	0	3	2	0	2	1	0	0	42
63	0	17	0	0	4	0	0	0	0	0	0	84
61	0	9	1	0	2	0	0	0	0	0	0	73
71	0	12	1	0	3	0	0	0	1	0	0	88
36	0	11	0	0	2	0	0	1	1	0	0	51
50	0	18	0	0	3	0	0	0	0	0	1	72
383	0	86	6	0	21	4	0	6	3	0	5	514
						WEST LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: ROSCOE BLVD
EAST-WEST STREET: I-5 NB RAMPS
JURISDICTION: LA

DATE: 05-23-12

PEAK HOUR: 05:00PM

NORTH LEG

TOTAL: 490

	490		Total
	106		1st
	147		2nd
	129		3rd
	108		4th
Rt	Thru	Lt	

EAST LEG

EAST LEG TOTAL: 631

	1st	2nd	3rd	4th	Total
Rt	139	153	145	128	565
Thru					
Lt	13	19	20	14	66

WEST LEG

Total	1st	2nd	3rd	4th	
					Lt
					Thru
					Rt

WEST LEG TOTAL: 0

SOUTH LEG

	Lt	Thru	Rt
1st		19	
2nd		34	
3rd		26	
4th		29	
Total		108	

TOTAL: 108

PEAK HOUR FACTORS

NORTH LEG = 0.83
SOUTH LEG = 0.79
EAST LEG = 0.92
WEST LEG =

ALL LEGS = 0.87

HOUR TOTAL: 1,229

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: ROSCOE BLVD

EAST-WEST STREET: I-5 NB RAMPS

TIME: 04:00PM-05:00PM DATE: 05-23-12

NORTH LEG

	424		Total
	108		1st
	108		2nd
	109		3rd
	99		4th
Rt	Thru	Lt	

	1st	2nd	3rd	4th	Total
Rt	109	138	143	126	516
Thru					
Lt	13	25	25	19	82

Total	1st	2nd	3rd	4th	
					Lt
					Thru
					Rt

	Lt	Thru	Rt
1st		9	
2nd		22	
3rd		16	
4th		11	
Total		58	

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: ROSCOE BLVD

EAST-WEST STREET: I-5 NB RAMPS

TIME: 05:00PM-06:00PM DATE: 05-23-12

NORTH LEG

	490		Total
	106		1st
	147		2nd
	129		3rd
	108		4th
Rt	Thru	Lt	

Rt	139	153	145	128	565
Thru					
Lt	13	19	20	14	66
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
					Lt
					Thru
					Rt

	Lt	Thru	Rt
1st		19	
2nd		34	
3rd		26	
4th		29	
Total		108	

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : ROSCOE BLVD LA

EAST-WEST STREET : I-5 NB RAMPS 05-23-12

BEGINNING TIME : 04:00PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
0	105	0	0	2	0	0	1	0	0	0	0	108
0	108	0	0	0	0	0	0	0	0	0	0	108
0	107	0	0	0	0	0	1	0	0	1	0	109
0	94	0	0	1	0	0	2	0	0	2	0	99
0	104	0	0	1	0	0	0	0	0	1	0	106
0	145	0	0	1	0	0	0	0	0	1	0	147
0	128	0	0	0	0	0	1	0	0	0	0	129
0	105	0	0	1	0	0	1	0	0	1	0	108
0	896	0	0	6	0	0	6	0	0	6	0	914
						SOUTH LEG						
0	5	0	0	2	0	0	1	0	0	1	0	9
0	20	0	0	2	0	0	0	0	0	0	0	22
0	16	0	0	0	0	0	0	0	0	0	0	16
0	10	0	0	1	0	0	0	0	0	0	0	11
0	13	0	0	2	0	0	2	0	0	2	0	19
0	30	0	0	2	0	0	1	0	0	1	0	34
0	24	0	0	2	0	0	0	0	0	0	0	26
0	27	0	0	2	0	0	0	0	0	0	0	29
0	145	0	0	13	0	0	4	0	0	4	0	166
						EAST LEG						
107	0	11	2	0	2	0	0	0	0	0	0	122
133	0	20	3	0	3	1	0	1	1	0	1	163
141	0	19	0	0	2	1	0	2	1	0	2	168
124	0	11	0	0	2	1	0	3	1	0	3	145
139	0	11	0	0	2	0	0	0	0	0	0	152
152	0	17	1	0	2	0	0	0	0	0	0	172
140	0	15	1	0	4	2	0	0	2	0	1	165
128	0	11	0	0	2	0	0	1	0	0	0	142
1064	0	115	7	0	19	5	0	7	5	0	7	1229
						WEST LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0

Prepared by Newport Traffic Studies

Intersection	
Intersection Delay (sec/veh):	3.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT	Lane	NBT
Volume (vph)	70	215	90	0	0	Capacity (vph)		
Conflicting Peds.(#/hr)	0	0	0	0	HCM Control Delay (s)			-
Sign Control	Stop	Stop	Free	Free	Free	HCM Lane V/C Ratio		0
Right Turn Channelized	None	None	None	None	None	HCM Lane LOS		-
Storage Length	250	0			HCM 95th Percentile Queue (veh)			0
Median Width	12		0			0		
Grade (%)	0%		0%			0%		
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95		
Heavy Vehicles(%)	15	5	10	0	0	5		
Movement Flow Rate	74	226	95	0	0	516		
Number of Lanes	1	1	1	0	0	1		

Major/Minor			Major 1			Major 2
Conflicting Flow Rate - All	611	95	0	-	-	0
Stage 1	95	0	0	-	-	0
Stage 2	516	0	0	-	-	0
Follow-up Headway	3.635	3.345	-	-	-	0
Pot Capacity-1 Maneuver	437	956	-	-	-	-
Stage 1	897	-	-	-	-	-
Stage 2	574	-	-	-	-	-
Mov Capacity-1 Maneuver	437	956	-	-	-	-
Mov Capacity-2 Maneuver	437	-	-	-	-	-
Stage 1	# 0	-	-	-	-	-
Stage 2	# 0	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay (s)	11.128	0	0
HCM LOS	B	A	A

Intersection	
Intersection Delay (sec/veh):	4.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT	Lane	NBT
Volume (vph)	60	235	120	0	0	375	Capacity (vph)	
Conflicting Peds.(#/hr)	0	0	0	0	HCM	Control	Delay (s)	-
Sign Control	Stop	Stop	Free	Free	Free	HCM	Lane V/C Ratio	0
Right Turn Channelized	None	None	None	None	None	HCM	Lane LOS	-
Storage Length	250	0		HCM	95th Per	centile	Queue (veh)	0
Median Width	12		0			0		
Grade (%)	0%		0%			0%		
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95		
Heavy Vehicles(%)	20	5	10	0	0	5		
Movement Flow Rate	63	247	126	0	0	395		
Number of Lanes	1	1	1	0	0	1		

Major/Minor			Major 1			Major 2
Conflicting Flow Rate - All	521	126	0	-	-	0
Stage 1	126	2.731	93876999208E-311	-	-	0
Stage 2	395	-3.78	6696930434535E19	-	-	0
Follow-up Headway	3.68	3.345	-	-	-	0
Pot Capacity-1 Maneuver	485	917	-	-	-	-
Stage 1	857	-	-	-	-	-
Stage 2	643	-	-	-	-	-
Mov Capacity-1 Maneuver	485	917	-	-	-	-
Mov Capacity-2 Maneuver	485	-	-	-	-	-
Stage 1	# 0	-	-	-	-	-
Stage 2	# 0	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay (s)	11.031	0	0
HCM LOS	B	A	A

Intersection	
Intersection Delay (sec/veh):	9.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT	Lane	NBT
Volume (vph)	65	565	110	0	0	490	Capacity (vph)	
Conflicting Peds.(#/hr)	0	0	0	0	HCM	Control	Delay (s)	-
Sign Control	Stop	Stop	Free	Free	Free	HCM	Lane V/C Ratio	0
Right Turn Channelized	None	None	None	None	None	HCM	Lane LOS	-
Storage Length	250	0			HCM	95th Percentile	Queue (veh)	0
Median Width	12		0			0		
Grade (%)	0%		0%			0%		
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87		
Heavy Vehicles(%)	20	5	15	0	0	5		
Movement Flow Rate	75	649	126	0	0	563		
Number of Lanes	1	1	1	0	0	1		

Major/Minor			Major 1			Major 2
Conflicting Flow Rate - All	689	126	0	-	-	0
Stage 1	126	0	0	-	-	0
Stage 2	563	0	0	-	-	0
Follow-up Headway	3.68	3.345	-	-	-	0
Pot Capacity-1 Maneuver	385	917	-	-	-	-
Stage 1	857	-	-	-	-	-
Stage 2	536	-	-	-	-	-
Mov Capacity-1 Maneuver	385	917	-	-	-	-
Mov Capacity-2 Maneuver	385	-	-	-	-	-
Stage 1	# 0	-	-	-	-	-
Stage 2	# 0	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay (s)	17.676	0	0
HCM LOS	C	A	A

Intersection	
Intersection Delay (sec/veh):	4.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT	Lane	NBT
Volume (vph)	70	265	90	0	0	Capacity (vph)		
Conflicting Peds.(#/hr)	0	0	0	0	HCM Control Delay (s)			-
Sign Control	Stop	Stop	Free	Free	Free	HCM Lane V/C Ratio		0
Right Turn Channelized	None	None	None	None	None	HCM Lane LOS		-
Storage Length	250	0			HCM 95th Percentile Queue (veh)			0
Median Width	12		0			0		
Grade (%)	0%		0%			0%		
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95		
Heavy Vehicles(%)	15	23	10	0	0	14		
Movement Flow Rate	74	279	95	0	0	568		
Number of Lanes	1	1	1	0	0	1		

Major/Minor			Major 1			Major 2
Conflicting Flow Rate - All	663	95	0	-	-	0
Stage 1	95	0	0	-	-	0
Stage 2	568	0	0	-	-	0
Follow-up Headway	3.635	3.507	-	-	-	0
Pot Capacity-1 Maneuver	407	903	-	-	-	-
Stage 1	897	-	-	-	-	-
Stage 2	542	-	-	-	-	-
Mov Capacity-1 Maneuver	407	903	-	-	-	-
Mov Capacity-2 Maneuver	407	-	-	-	-	-
Stage 1	# 0	-	-	-	-	-
Stage 2	# 0	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay (s)	11.809	0	0
HCM LOS	B	A	A

Intersection	
Intersection Delay (sec/veh):	4.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT	Lane	NBT
Volume (vph)	60	285	120	0	0	405	Capacity (vph)	
Conflicting Peds.(#/hr)	0	0	0	0	HCM	Control	Delay (s)	-
Sign Control	Stop	Stop	Free	Free	Free	HCM	Lane V/C Ratio	0
Right Turn Channelized	None	None	None	None	None	HCM	Lane LOS	-
Storage Length	250	0			HCM	95th Percentile	Queue (veh)	0
Median Width	12		0			0		
Grade (%)	0%		0%			0%		
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95		
Heavy Vehicles(%)	20	22	10	0	0	16		
Movement Flow Rate	63	300	126	0	0	447		
Number of Lanes	1	1	1	0	0	1		

Major/Minor			Major 1			Major 2
Conflicting Flow Rate - All	573	126	0	-	-	0
Stage 1	126	0	0	-	-	0
Stage 2	447	0	0	-	-	0
Follow-up Headway	3.68	3.498	-	-	-	0
Pot Capacity-1 Maneuver	452	876	-	-	-	-
Stage 1	857	-	-	-	-	-
Stage 2	608	-	-	-	-	-
Mov Capacity-1 Maneuver	452	876	-	-	-	-
Mov Capacity-2 Maneuver	452	-	-	-	-	-
Stage 1	# 0	-	-	-	-	-
Stage 2	# 0	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay (s)	11.739	0	0
HCM LOS	B	A	A

Intersection	
Intersection Delay (sec/veh):	11.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT	Lane	NBT
Volume (vph)	65	615	110	0	0	540	Capacity (vph)	
Conflicting Peds.(#/hr)	0	0	0	0	HCM Control Delay (s)			-
Sign Control	Stop	Stop	Free	Free	Free	HCM Lane V/C Ratio		0
Right Turn Channelized	None	None	None	None	None	HCM Lane LOS		-
Storage Length	250	0			HCM 95th Percentile Queue (veh)			0
Median Width	12		0			0		
Grade (%)	0%		0%			0%		
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87		
Heavy Vehicles(%)	20	13	15	0	0	14		
Movement Flow Rate	75	707	126	0	0	621		
Number of Lanes	1	1	1	0	0	1		

Major/Minor			Major 1			Major 2
Conflicting Flow Rate - All	747	126	0	-	-	0
Stage 1	126	0	0	-	-	0
Stage 2	621	0	0	-	-	0
Follow-up Headway	3.68	3.417	-	-	-	0
Pot Capacity-1 Maneuver	356	892	-	-	-	-
Stage 1	857	-	-	-	-	-
Stage 2	503	-	-	-	-	-
Mov Capacity-1 Maneuver	356	892	-	-	-	-
Mov Capacity-2 Maneuver	356	-	-	-	-	-
Stage 1	# 0	-	-	-	-	-
Stage 2	# 0	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay (s)	22.051	0	0
HCM LOS	C	A	A

Intersection	
Intersection Delay (sec/veh):	4.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT	Lane	NBT
Volume (vph)	75	290	100	0	0	Capacity (vph)		
Conflicting Peds.(#/hr)	0	0	0	0	HCM Control Delay (s)			-
Sign Control	Stop	Stop	Free	Free	Free	HCM Lane V/C Ratio		0
Right Turn Channelized	None	None	None	None	None	HCM Lane LOS		-
Storage Length	250	0		HCM 95th Percentile Queue (veh)				0
Median Width	12		0			0		
Grade (%)	0%		0%			0%		
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95		
Heavy Vehicles(%)	15	5	10	0	0	5		
Movement Flow Rate	79	305	105	0	0	621		
Number of Lanes	1	1	1	0	0	1		

Major/Minor			Major 1			Major 2
Conflicting Flow Rate - All	726	105	0	-	-	0
Stage 1	105	0	0	-	-	0
Stage 2	621	0	0	-	-	0
Follow-up Headway	3.635	3.345	-	-	-	0
Pot Capacity-1 Maneuver	373	938	-	-	-	-
Stage 1	888	-	-	-	-	-
Stage 2	512	-	-	-	-	-
Mov Capacity-1 Maneuver	373	938	-	-	-	-
Mov Capacity-2 Maneuver	373	-	-	-	-	-
Stage 1	# 0	-	-	-	-	-
Stage 2	# 0	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay (s)	12.036	0	0
HCM LOS	B	A	A

Intersection	
Intersection Delay (sec/veh):	4.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT	Lane	NBT
Volume (vph)	65	310	120	0	0	Capacity (vph)		
Conflicting Peds.(#/hr)	0	0	0	0	HCM Control Delay (s)			-
Sign Control	Stop	Stop	Free	Free	Free	HCM Lane V/C Ratio		0
Right Turn Channelized	None	None	None	None	None	HCM Lane LOS		-
Storage Length	250	0			HCM 95th Percentile Queue (veh)			0
Median Width	12		0			0		
Grade (%)	0%		0%			0%		
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95		
Heavy Vehicles(%)	20	5	10	0	0	5		
Movement Flow Rate	68	326	126	0	0	489		
Number of Lanes	1	1	1	0	0	1		

Major/Minor			Major 1			Major 2
Conflicting Flow Rate - All	615	126	0	-	-	0
Stage 1	126	0	0	-	-	0
Stage 2	489	0	0	-	-	0
Follow-up Headway	3.68	3.345	-	-	-	0
Pot Capacity-1 Maneuver	427	917	-	-	-	-
Stage 1	857	-	-	-	-	-
Stage 2	581	-	-	-	-	-
Mov Capacity-1 Maneuver	427	917	-	-	-	-
Mov Capacity-2 Maneuver	427	-	-	-	-	-
Stage 1	# 0	-	-	-	-	-
Stage 2	# 0	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay (s)	11.776	0	0
HCM LOS	B	A	A

Intersection	
Intersection Delay (sec/veh):	13.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT	Lane	NBT
Volume (vph)	70	670	120	0	0	Capacity (vph)		
Conflicting Peds.(#/hr)	0	0	0	0	HCM	Control Delay (s)		-
Sign Control	Stop	Stop	Free	Free	Free	HCM Lane V/C Ratio		1.66438646060188E-316
Right Turn Channelized	None	None	None	None	None	HCM Lane LOS		-
Storage Length	250	0		HCM	95th Per	entile Queue (veh)		0
Median Width	12		0			0		
Grade (%)	0%		0%			0%		
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87		
Heavy Vehicles(%)	20	5	15	0	0	5		
Movement Flow Rate	80	770	138	0	0	678		
Number of Lanes	1	1	1	0	0	1		

Major/Minor			Major 1			Major 2
Conflicting Flow Rate - All	816	138	0	-	-	0
Stage 1	138	1.06099789548264E-312		-	-	0
Stage 2	678	0	0	-	-	0
Follow-up Headway	3.68	3.345	-	-	-	0
Pot Capacity-1 Maneuver	323	904	-	-	-	-
Stage 1	846	-	-	-	-	-
Stage 2	472	-	-	-	-	-
Mov Capacity-1 Maneuver	323	904	-	-	-	-
Mov Capacity-2 Maneuver	323	-	-	-	-	-
Stage 1	# 0	-	-	-	-	-
Stage 2	# 0	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay (s)	26.319	0	0
HCM LOS	D	A	A

Hall & Foreman, Inc.

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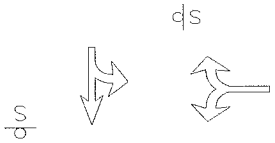
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : ROSCOE BLVD
N/S STREET : SB I-5 FREEWAY RAMPS
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 37
ROUTE 5B, 6B, 7B

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						

ROSCOE BLVD

EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	565	13%	**50**	615	55	670
WB THRU	0	0%		0	0	0
WB RIGHT	25	15%		25	5	30

SB I-5 FREEWAY RAMPS

NB LEFT	0	0%		0	0	0
NB THRU	0	0%		0	0	0
NB RIGHT	0	0%		0	0	0
SB LEFT	90	5%		90	10	100
SB THRU	35	5%		35	5	40
SB RIGHT	0	0%		0	0	0
TOTALS	**715**		**50**	**765**	**75**	**840**

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Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax
Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax
Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : ROSCOE BLVD
N/S STREET : SB I-5 FREEWAY RAMPS
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 37
ROUTE 5B, 6B, 7B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
ROSCOE BLVD						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	330	18%	**50**	380	35	415
WB THRU	0	0%		0	0	0
WB RIGHT	45	5%		45	5	50
SB I-5 FREEWAY RAMPS						
NB LEFT	0	0%		0	0	0
NB THRU	0	0%		0	0	0
NB RIGHT	0	0%		0	0	0
SB LEFT	120	0%		120	10	130
SB THRU	40	0%		40	5	45
SB RIGHT	0	0%		0	0	0
TOTALS	**535**		**50**	**585**	**55**	**640**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : ROSCOE BLVD
N/S STREET : SB I-5 FREEWAY RAMPS
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 37
ROUTE 5B, 6B, 7B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
ROSCOE BLVD						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	375	16%	**50**	425	40	465
WB THRU	0	0%		0	0	0
WB RIGHT	100	5%		100	10	110
SB I-5 FREEWAY RAMPS						
NB LEFT	0	0%		0	0	0
NB THRU	0	0%		0	0	0
NB RIGHT	0	0%		0	0	0
SB LEFT	110	0%		110	10	120
SB THRU	30	0%		30	5	35
SB RIGHT	0	0%		0	0	0
TOTALS	**615**		**50**	**665**	**65**	**730**

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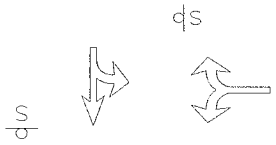
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : ROSCOE BLVD
N/S STREET : SB I-5 FREEWAY RAMPS
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 37
ROUTE 5B, 6B, 7B

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
ROSCOE BLVD								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	556	10	30	585	**150**	735	65	800
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	21	4	12	35	**0**	35	5	40
SB I-5 FREEWAY RAMPS								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	89	3	9	100	**0**	100	10	110
SB THRU	35	2	6	40	**0**	40	5	45
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**701**				**150**	**910**	**85**	**995**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : ROSCOE BLVD
N/S STREET : SB I-5 FREEWAY RAMPS
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 37
ROUTE 5B, 6B, 7B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
ROSCOE BLVD								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	315	14	42	355	**150**	505	45	550
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	42	2	6	50	**0**	50	5	55
SB I-5 FREEWAY RAMPS								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	122	0	0	120	**0**	120	10	130
SB THRU	42	0	0	40	**0**	40	5	45
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**521**				**150**	**715**	**65**	**780**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : ROSCOE BLVD
N/S STREET : SB I-5 FREEWAY RAMPS
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 37
ROUTE 5B, 6B, 7B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
ROSCOE BLVD								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	362	13	39	400	**150**	550	50	600
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	98	1	3	100	**0**	100	10	110
SB I-5 FREEWAY RAMPS								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	108	0	0	110	**0**	110	10	120
SB THRU	31	0	0	30	**0**	30	5	35
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**599**				**150**	**790**	**75**	**865**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: ROSCOE BLVD
EAST-WEST STREET: I-5 SB RAMPS DATE:
JURISDICTION: LA

PEAK HOUR: 07:00AM

NORTH LEG

TOTAL: 591

Rt	Thru	Lt	
25		566	Total
5		130	1st
5		141	2nd
6		150	3rd
9		145	4th

EAST LEG TOTAL: 0

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
92	26	26	19	21	Lt
37	3	10	14	10	Thru
					Rt

WEST LEG TOTAL: 129

PEAK HOUR FACTORS

NORTH LEG = 0.95
SOUTH LEG =
EAST LEG =
WEST LEG = 0.90

ALL LEGS = 0.95

	Lt	Thru	Rt
1st			
2nd			
3rd			
4th			
Total			

TOTAL: 0

SOUTH LEG

HOUR TOTAL: 720

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: ROSCOE BLVD

EAST-WEST STREET: I-5 SB RAMPS

TIME: 07:00AM-08:00AM DATE:

NORTH LEG

Rt	Thru	Lt	
25		566	Total
5		130	1st
5		141	2nd
6		150	3rd
9		145	4th

	Rt	Thru	Lt
1st			
2nd			
3rd			
4th			
Total			

Total	1st	2nd	3rd	4th	
92	26	26	19	21	Lt
37	3	10	14	10	Thru
					Rt

	Lt	Thru	Rt
1st			
2nd			
3rd			
4th			
Total			

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: ROSCOE BLVD

EAST-WEST STREET: I-5 SB RAMPS

TIME: 08:00AM-09:00AM DATE:

NORTH LEG

Rt	Thru	Lt	
34		393	Total
6		111	1st
8		91	2nd
11		90	3rd
9		101	4th

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
77	23	22	19	13	Lt
37	5	8	14	10	Thru
					Rt

	Lt	Thru	Rt
1st			
2nd			
3rd			
4th			
Total			

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : ROSCOE BLVD LA

EAST-WEST STREET : I-5 SB RAMPS

BEGINNING TIME : 07:00AM = PH

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
4	0	127	1	0	2	0	0	0	0	0	1	135
5	0	139	0	0	2	0	0	0	0	0	0	146
5	0	147	0	0	2	1	0	1	0	0	0	156
7	0	143	0	0	1	2	0	0	0	0	1	154
5	0	111	1	0	0	0	0	0	0	0	0	117
7	0	89	0	0	2	1	0	0	0	0	0	99
9	0	90	2	0	0	0	0	0	0	0	0	101
8	0	101	1	0	0	0	0	0	0	0	0	110
50	0	947	5	0	9	4	0	1	0	0	2	1018
						SOUTH LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
						EAST LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
						WEST LEG						
0	1	25	0	1	0	0	1	1	0	0	0	29
0	10	25	0	0	0	0	0	0	0	0	1	36
0	14	18	0	0	0	0	0	0	0	0	1	33
0	10	21	0	0	0	0	0	0	0	0	0	31
0	3	21	0	1	1	0	0	1	0	1	0	28
0	4	22	0	2	0	0	1	0	0	1	0	30
0	13	19	0	0	0	0	1	0	0	0	0	33
0	10	12	0	0	0	0	0	1	0	0	0	23
0	65	163	0	4	1	0	3	3	0	2	2	243

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: ROSCOE BLVD
EAST-WEST STREET: I-5 SB RAMPS
JURISDICTION: LA

DATE: 05-30-12

PEAK HOUR: 12:30PM

NORTH LEG

TOTAL: 373

Rt	Thru	Lt	
44		329	Total
14		91	1st
11		65	2nd
11		96	3rd
8		77	4th

EAST LEG TOTAL: 0

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

WEST LEG TOTAL: 164

Total	1st	2nd	3rd	4th	
122	29	37	22	34	Lt
42	14	15	6	7	Thru
					Rt

SOUTH LEG

TOTAL: 0

	Lt	Thru	Rt
1st			
2nd			
3rd			
4th			
Total			

PEAK HOUR FACTORS

NORTH LEG = 0.87
SOUTH LEG =
EAST LEG =
WEST LEG = 0.79

ALL LEGS = 0.91

HOUR TOTAL: 537

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: ROSCOE BLVD

EAST-WEST STREET: I-5 SB RAMPS

TIME: 12:00PM-01:00PM DATE: 05-30-12

NORTH LEG

74		296	Total
26		77	1st
23		63	2nd
14		91	3rd
11		65	4th
Rt	Thru	Lt	

Rt					
Thru					
Lt					
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
115	24	25	29	37	Lt
44	5	10	14	15	Thru
					Rt

	Lt	Thru	Rt
1st			
2nd			
3rd			
4th			
Total			

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: ROSCOE BLVD

EAST-WEST STREET: I-5 SB RAMPS

TIME: 01:00PM-02:00PM DATE: 05-30-12

NORTH LEG

Rt	Thru	Lt	
67		333	Total
11		96	1st
8		77	2nd
20		94	3rd
28		66	4th

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
109	22	34	22	31	Lt
27	6	7	12	2	Thru
					Rt

	Lt	Thru	Rt
1st			
2nd			
3rd			
4th			
Total			

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : ROSCOE BLVD LA

EAST-WEST STREET : I-5 SB RAMPS 05-30-12

BEGINNING TIME : 12:00PM PH = 12:30PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
NORTH LEG												
25	0	57	1	0	12	0	0	6	0	0	2	103
23	0	58	0	0	2	0	0	3	0	0	0	86
14	0	88	0	0	2	0	0	1	0	0	0	105
10	0	62	1	0	2	0	0	0	0	0	1	76
11	0	95	0	0	1	0	0	0	0	0	0	107
7	0	70	1	0	5	0	0	0	0	0	2	85
19	0	85	1	0	8	0	0	0	0	0	1	114
28	0	57	0	0	7	0	0	2	0	0	0	94
137	0	572	4	0	39	0	0	12	0	0	6	770
SOUTH LEG												
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
EAST LEG												
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
WEST LEG												
0	4	22	0	1	2	0	0	0	0	0	0	29
0	10	25	0	0	0	0	0	0	0	0	0	35
0	14	29	0	0	0	0	0	0	0	0	0	43
0	15	37	0	0	0	0	0	0	0	0	0	52
0	6	22	0	0	0	0	0	0	0	0	0	28
0	7	34	0	0	0	0	0	0	0	0	0	41
0	12	22	0	0	0	0	0	0	0	0	0	34
0	2	31	0	0	0	0	0	0	0	0	0	33
0	70	222	0	1	2	0	0	0	0	0	0	295

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: ROSCOE BLVD
EAST-WEST STREET: I-5 SB RAMPS
JURISDICTION: LA

DATE: 05-30-12

PEAK HOUR: 05:00PM

NORTH LEG

TOTAL: 473

Rt	Thru	Lt	
99		374	Total
15		98	1st
36		85	2nd
24		109	3rd
24		82	4th

EAST LEG TOTAL: 0

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
108	21	35	29	23	Lt
31	11	6	11	3	Thru
					Rt

WEST LEG TOTAL: 139

PEAK HOUR FACTORS

NORTH LEG = 0.89
SOUTH LEG =
EAST LEG =
WEST LEG = 0.85

ALL LEGS = 0.88

	Lt	Thru	Rt
1st			
2nd			
3rd			
4th			
Total			

TOTAL: 0

SOUTH LEG

HOUR TOTAL: 612

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: ROSCOE BLVD

EAST-WEST STREET: I-5 SB RAMPS

TIME: 04:00PM-05:00PM DATE: 05-30-12

NORTH LEG

113		311	Total
22		88	1st
29		73	2nd
30		76	3rd
32		74	4th
Rt	Thru	Lt	

						Rt
						Thru
						Lt
	1st	2nd	3rd	4th	Total	

Total	1st	2nd	3rd	4th	
71	16	26	19	10	Lt
30	10	6	7	7	Thru
					Rt

	Lt	Thru	Rt
1st			
2nd			
3rd			
4th			
Total			

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: ROSCOE BLVD

EAST-WEST STREET: I-5 SB RAMPS

TIME: 05:00PM-06:00PM DATE: 05-30-12

NORTH LEG

Rt	Thru	Lt	
99		374	Total
15		98	1st
36		85	2nd
24		109	3rd
24		82	4th

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
108	21	35	29	23	Lt
31	11	6	11	3	Thru
					Rt

	Lt	Thru	Rt
1st			
2nd			
3rd			
4th			
Total			

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : ROSCOE BLVD LA

EAST-WEST STREET : I-5 SB RAMPS 05-30-12

BEGINNING TIME : 04:00PM PH = 5:00 PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
					NORTH LEG							
20	0	80	1	0	5	0	0	1	1	0	2	110
29	0	72	0	0	1	0	0	0	0	0	0	102
30	0	74	0	0	1	0	0	0	0	0	1	106
29	0	72	2	0	2	0	0	0	1	0	0	106
15	0	94	0	0	2	0	0	1	0	0	1	113
36	0	82	0	0	2	0	0	1	0	0	0	121
23	0	106	1	0	2	0	0	0	0	0	1	133
24	0	80	0	0	1	0	0	0	0	0	1	106
206	0	660	4	0	16	0	0	3	2	0	6	897
					SOUTH LEG							
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
					EAST LEG							
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
					WEST LEG							
0	10	15	0	0	1	0	0	0	0	0	0	26
0	6	25	0	0	1	0	0	0	0	0	0	32
0	6	19	0	0	0	0	0	0	0	1	0	26
0	6	10	0	1	0	0	0	0	0	0	0	17
0	11	21	0	0	0	0	0	0	0	0	0	32
0	6	35	0	0	0	0	0	0	0	0	0	41
0	11	29	0	0	0	0	0	0	0	0	0	40
0	3	23	0	0	0	0	0	0	0	0	0	26
0	59	177	0	1	2	0	0	0	0	1	0	240

Prepared by Newport Traffic Studies

Intersection	
Intersection Delay (sec/veh):	0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Volume (vph)	90	35	0	0	565	25
Conflicting Peds.(#/hr)	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
Right Turn Channelized	None	None	None	None	None	None
Storage Length	0			0	0	0
Median Width		0	0		16	
Grade (%)		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles(%)	5	5	2	2	5	15
Movement Flow Rate	95	37	0	0	595	26
Number of Lanes	0	1	0	0	1	0

Major/Minor	Minor 1					
Conflicting Flow Rate - All	0	1203			0	0
Stage 1	0	1203			0	0
Stage 2	0	0			0	0
Follow-up Headway	-	0.05			-	0
Pot Capacity-1 Maneuver	-	70217			-	-
Stage 1	-	70217			-	-
Stage 2	-	-			-	-
Mov Capacity-1 Maneuver	-	# 0			-	-
Mov Capacity-2 Maneuver	-	# 0			-	-
Stage 1	-	# 0			-	-
Stage 2	-	# 0			-	-

Approach	EB	SB
HCM Control Delay (s)	-	0
HCM LOS	-	A

Lane	EBLn1	SBL	SBR
Capacity (vph)	-		
HCM Control Delay (s)	-	-	-
HCM Lane VC Ratio	-	-	0
HCM Lane LOS	-	-	-
HCM 95th Percentile Queue (veh)	-	-	0

Intersection	
Intersection Delay (sec/veh):	0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Volume (vph)	120	40	0	0	330	45
Conflicting Peds.(#/hr)	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
Right Turn Channelized	None	None	None	None	None	None
Storage Length	0			0	0	0
Median Width		0	0		16	
Grade (%)		0%	0%		0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles(%)	0	0	2	2	5	5
Movement Flow Rate	132	44	0	0	363	49
Number of Lanes	0	1	0	0	1	0

Major/Minor	Minor 1			
Conflicting Flow Rate - All	0	750	0	0
Stage 1	0	750	0	0
Stage 2	0	0	0	0
Follow-up Headway	-	0	-	0
Pot Capacity-1 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Mov Capacity-1 Maneuver	-	# 0	-	-
Mov Capacity-2 Maneuver	-	# 0	-	-
Stage 1	-	# 0	-	-
Stage 2	-	# 0	-	-

Approach	EB	SB
HCM Control Delay (s)	-	0
HCM LOS	-	A

Lane	EBLn1	SBL	SBR
Capacity (vph)	-		
HCM Control Delay (s)	-	-	-
HCM Lane VC Ratio	-	-	0
HCM Lane LOS	-	-	-
HCM 95th Percentile Queue (veh)	-	-	0

Intersection	
Intersection Delay (sec/veh):	0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Volume (vph)	110	30	0	0	375	100
Conflicting Peds.(#/hr)	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
Right Turn Channelized	None	None	None	None	None	None
Storage Length	0			0	0	0
Median Width		0	0		16	
Grade (%)		0%	0%		0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles(%)	0	0	2	2	5	5
Movement Flow Rate	125	34	0	0	426	114
Number of Lanes	0	1	0	0	1	0

Major/Minor	Minor 1			
Conflicting Flow Rate - All	0	909	0	0
Stage 1	0	909	0	0
Stage 2	0	0	0	0
Follow-up Headway	-	0	-	0
Pot Capacity-1 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Mov Capacity-1 Maneuver	-	# 0	-	-
Mov Capacity-2 Maneuver	-	# 0	-	-
Stage 1	-	# 0	-	-
Stage 2	-	# 0	-	-

Approach	EB	SB
HCM Control Delay (s)	-	0
HCM LOS	-	A

Lane	EBLn1	SBL	SBR
Capacity (vph)	-		
HCM Control Delay (s)	-	-	-
HCM Lane VC Ratio	-	-	0
HCM Lane LOS	-	-	-
HCM 95th Percentile Queue (veh)	-	-	0

Intersection	
Intersection Delay (sec/veh):	0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Volume (vph)	90	35	0	0	615	25
Conflicting Peds.(#/hr)	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
Right Turn Channelized	None	None	None	None	None	None
Storage Length	0			0	0	0
Median Width		0	0		16	
Grade (%)		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles(%)	5	5	2	2	13	15
Movement Flow Rate	95	37	0	0	647	26
Number of Lanes	0	1	0	0	1	0

Major/Minor	Minor 1					
Conflicting Flow Rate - All	0	1308			0	0
Stage 1	0	1308			0	0
Stage 2	0	0			0	0
Follow-up Headway	-	0.05			-	0
Pot Capacity-1 Maneuver	-	70064			-	-
Stage 1	-	70064			-	-
Stage 2	-	-			-	-
Mov Capacity-1 Maneuver	-	# 0			-	-
Mov Capacity-2 Maneuver	-	# 0			-	-
Stage 1	-	# 0			-	-
Stage 2	-	# 0			-	-

Approach	EB	SB
HCM Control Delay (s)	-	0
HCM LOS	-	A

Lane	EBLn1	SBL	SBR
Capacity (vph)	-		
HCM Control Delay (s)	-	-	-
HCM Lane VC Ratio	-	-	0
HCM Lane LOS	-	-	-
HCM 95th Percentile Queue (veh)	-	-	0

Intersection	
Intersection Delay (sec/veh):	0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Volume (vph)	120	40	0	0	380	45
Conflicting Peds.(#/hr)	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
Right Turn Channelized	None	None	None	None	None	None
Storage Length	0			0	0	0
Median Width		0	0		16	
Grade (%)		0%	0%		0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles(%)	0	0	2	2	18	5
Movement Flow Rate	132	44	0	0	418	49
Number of Lanes	0	1	0	0	1	0

Major/Minor	Minor 1			
Conflicting Flow Rate - All	0	860	0	0
Stage 1	0	860	0	0
Stage 2	0	0	0	0
Follow-up Headway	-	0	-	0
Pot Capacity-1 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Mov Capacity-1 Maneuver	-	# 0	-	-
Mov Capacity-2 Maneuver	-	# 0	-	-
Stage 1	-	# 0	-	-
Stage 2	-	# 0	-	-

Approach	EB	SB
HCM Control Delay (s)	-	0
HCM LOS	-	A

Lane	EBLn1	SBL	SBR
Capacity (vph)	-		
HCM Control Delay (s)	-	-	-
HCM Lane VC Ratio	-	-	0
HCM Lane LOS	-	-	-
HCM 95th Percentile Queue (veh)	-	-	0

Intersection	
Intersection Delay (sec/veh):	0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Volume (vph)	110	30	0	0	425	100
Conflicting Peds.(#/hr)	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
Right Turn Channelized	None	None	None	None	None	None
Storage Length	0			0	0	0
Median Width		0	0		16	
Grade (%)		0%	0%		0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles(%)	0	0	2	2	16	5
Movement Flow Rate	125	34	0	0	483	114
Number of Lanes	0	1	0	0	1	0

Major/Minor	Minor 1			
Conflicting Flow Rate - All	0	1023	0	0
Stage 1	0	1023	0	0
Stage 2	0	0	0	0
Follow-up Headway	-	0	-	0
Pot Capacity-1 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Mov Capacity-1 Maneuver	-	# 0	-	-
Mov Capacity-2 Maneuver	-	# 0	-	-
Stage 1	-	# 0	-	-
Stage 2	-	# 0	-	-

Approach	EB	SB
HCM Control Delay (s)	-	0
HCM LOS	-	A

Lane	EBLn1	SBL	SBR
Capacity (vph)	-		
HCM Control Delay (s)	-	-	-
HCM Lane VC Ratio	-	-	0
HCM Lane LOS	-	-	-
HCM 95th Percentile Queue (veh)	-	-	0

Intersection	
Intersection Delay (sec/veh):	0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Volume (vph)	100	40	0	0	670	25
Conflicting Peds.(#/hr)	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
Right Turn Channelized	None	None	None	None	None	None
Storage Length	0			0	0	0
Median Width		0	0		16	
Grade (%)		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles(%)	5	5	2	2	5	15
Movement Flow Rate	105	42	0	0	705	26
Number of Lanes	0	1	0	0	1	0

Major/Minor	Minor 1			
Conflicting Flow Rate - All	0	1424	0	0
Stage 1	0	1424	0	0
Stage 2	0	0	0	0
Follow-up Headway	-	0.05	-	0
Pot Capacity-1 Maneuver	-	69894	-	-
Stage 1	-	69894	-	-
Stage 2	-	-	-	-
Mov Capacity-1 Maneuver	-	# 0	-	-
Mov Capacity-2 Maneuver	-	# 0	-	-
Stage 1	-	# 0	-	-
Stage 2	-	# 0	-	-

Approach	EB	SB
HCM Control Delay (s)	-	0
HCM LOS	-	A

Lane	EBLn1	SBL	SBR
Capacity (vph)	-		
HCM Control Delay (s)	-	-	-
HCM Lane VC Ratio	-	-	0
HCM Lane LOS	-	-	-
HCM 95th Percentile Queue (veh)	-	-	0

Intersection	
Intersection Delay (sec/veh):	0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Volume (vph)	130	45	0	0	415	50
Conflicting Peds.(#/hr)	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
Right Turn Channelized	None	None	None	None	None	None
Storage Length	0			0	0	0
Median Width		0	0		16	
Grade (%)		0%	0%		0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles(%)	0	0	2	2	5	5
Movement Flow Rate	143	49	0	0	456	55
Number of Lanes	0	1	0	0	1	0

Major/Minor	Minor 1					
Conflicting Flow Rate - All	0	940			0	0
Stage 1	0	940			0	0
Stage 2	0	0			0	0
Follow-up Headway	-	0			-	0
Pot Capacity-1 Maneuver	-	-			-	-
Stage 1	-	-			-	-
Stage 2	-	-			-	-
Mov Capacity-1 Maneuver	-	# 0			-	-
Mov Capacity-2 Maneuver	-	# 0			-	-
Stage 1	-	# 0			-	-
Stage 2	-	# 0			-	-

Approach	EB	SB
HCM Control Delay (s)	-	0
HCM LOS	-	A

Lane	EBLn1	SBL	SBR
Capacity (vph)	-		
HCM Control Delay (s)	-	-	-
HCM Lane VC Ratio	-	-	0
HCM Lane LOS	-	-	-
HCM 95th Percentile Queue (veh)	-	-	0

Intersection	
Intersection Delay (sec/veh):	0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Volume (vph)	120	35	0	0	465	110
Conflicting Peds.(#/hr)	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
Right Turn Channelized	None	None	None	None	None	None
Storage Length	0			0	0	0
Median Width		0	0		16	
Grade (%)		0%	0%		0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles(%)	0	0	2	2	5	5
Movement Flow Rate	136	40	0	0	528	125
Number of Lanes	0	1	0	0	1	0

Major/Minor	Minor 1					
Conflicting Flow Rate - All	0	1119			0	0
Stage 1	0	1119			0	0
Stage 2	0	0			0	0
Follow-up Headway	-	0			-	0
Pot Capacity-1 Maneuver	-	-			-	-
Stage 1	-	-			-	-
Stage 2	-	-			-	-
Mov Capacity-1 Maneuver	-	# 0			-	-
Mov Capacity-2 Maneuver	-	# 0			-	-
Stage 1	-	# 0			-	-
Stage 2	-	# 0			-	-

Approach	EB	SB
HCM Control Delay (s)	-	0
HCM LOS	-	A

Lane	EBLn1	SBL	SBR
Capacity (vph)	-		
HCM Control Delay (s)	-	-	-
HCM Lane VC Ratio	-	-	0
HCM Lane LOS	-	-	-
HCM 95th Percentile Queue (veh)	-	-	0

Hall & Foreman, Inc.

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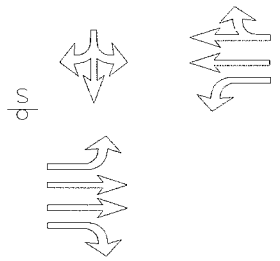
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	3-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : BRANFORD STREET
N/S STREET : SB I-5 FREEWAY RAMPS
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 38
ROUTE 8A

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						

BRANFORD STREET

EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0

SB I-5 FREEWAY RAMPS

NB LEFT	0	0%		0	0	0
NB THRU	0	0%		0	0	0
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**0**		**0**	**0**	**0**	**0**

Tustin Office: 714.665.4500 Tel/ 714.665.4501 Fax
Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax
Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax
Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	3-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : BRANFORD STREET
N/S STREET : SB I-5 FREEWAY RAMPS
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 38
ROUTE 8A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BRANFORD STREET						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
SB I-5 FREEWAY RAMPS						
NB LEFT	0	0%		0	0	0
NB THRU	0	0%		0	0	0
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**0**		**0**	**0**	**0**	**0**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	3-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : BRANFORD STREET
N/S STREET : SB I-5 FREEWAY RAMPS
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 38
ROUTE 8A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BRANFORD STREET						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
SB I-5 FREEWAY RAMPS						
NB LEFT	0	0%		0	0	0
NB THRU	0	0%		0	0	0
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**0**		**0**	**0**	**0**	**0**

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Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax
Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax
Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

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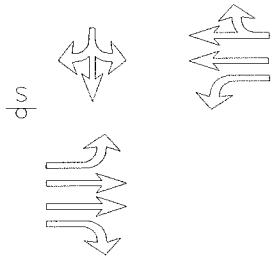
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : BRANFORD STREET
N/S STREET : SB I-5 FREEWAY RAMPS
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 38
ROUTE 8A

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BRANFORD STREET								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
SB I-5 FREEWAY RAMPS								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**0**				**0**	**0**	**0**	**0**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	3-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : BRANFORD STREET
N/S STREET : SB I-5 FREEWAY RAMPS
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 38
ROUTE 8A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								

BRANFORD STREET

EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0

SB I-5 FREEWAY RAMPS

NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**0**				**0**	**0**	**0**	**0**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	3-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : BRANFORD STREET
N/S STREET : SB I-5 FREEWAY RAMPS
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 38
ROUTE 8A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BRANFORD STREET								
EB LEFT	0	0	0	0	0	0	0	0
EB THRU	0	0	0	0	0	0	0	0
EB RIGHT	0	0	0	0	0	0	0	0
WB LEFT	0	0	0	0	0	0	0	0
WB THRU	0	0	0	0	0	0	0	0
WB RIGHT	0	0	0	0	0	0	0	0
SB I-5 FREEWAY RAMPS								
NB LEFT	0	0	0	0	0	0	0	0
NB THRU	0	0	0	0	0	0	0	0
NB RIGHT	0	0	0	0	0	0	0	0
SB LEFT	0	0	0	0	0	0	0	0
SB THRU	0	0	0	0	0	0	0	0
SB RIGHT	0	0	0	0	0	0	0	0
TOTALS	0				0	0	0	0

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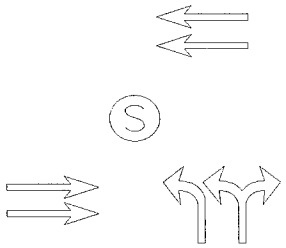
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	3-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : BRANFORD STREET
N/S STREET : NB I-5 FREEWAY RAMPS
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 39
ROUTE 8A

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BRANFORD STREET						
EB LEFT	0	0		0	0	0
EB THRU	0	0		0	0	0
EB RIGHT	0	0		0	0	0
WB LEFT	0	0		0	0	0
WB THRU	0	0		0	0	0
WB RIGHT	0	0		0	0	0
NB I-5 FREEWAY RAMPS						
NB LEFT	0	0		0	0	0
NB THRU	0	0		0	0	0
NB RIGHT	0	0		0	0	0
SB LEFT	0	0		0	0	0
SB THRU	0	0		0	0	0
SB RIGHT	0	0		0	0	0
TOTALS	**0**		**0**	**0**	**0**	**0**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	3-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : BRANFORD STREET
N/S STREET : NB I-5 FREEWAY RAMPS
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 39
ROUTE 8A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BRANFORD STREET						
EB LEFT	0	0		0	0	0
EB THRU	0	0		0	0	0
EB RIGHT	0	0		0	0	0
WB LEFT	0	0		0	0	0
WB THRU	0	0		0	0	0
WB RIGHT	0	0		0	0	0
NB I-5 FREEWAY RAMPS						
NB LEFT	0	0		0	0	0
NB THRU	0	0		0	0	0
NB RIGHT	0	0		0	0	0
SB LEFT	0	0		0	0	0
SB THRU	0	0		0	0	0
SB RIGHT	0	0		0	0	0
TOTALS	**0**		**0**	**0**	**0**	**0**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	3-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : BRANFORD STREET
N/S STREET : NB I-5 FREEWAY RAMPS
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 39
ROUTE 8A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BRANFORD STREET						
EB LEFT	0	0		0	0	0
EB THRU	0	0		0	0	0
EB RIGHT	0	0		0	0	0
WB LEFT	0	0		0	0	0
WB THRU	0	0		0	0	0
WB RIGHT	0	0		0	0	0
NB I-5 FREEWAY RAMPS						
NB LEFT	0	0		0	0	0
NB THRU	0	0		0	0	0
NB RIGHT	0	0		0	0	0
SB LEFT	0	0		0	0	0
SB THRU	0	0		0	0	0
SB RIGHT	0	0		0	0	0
TOTALS	**0**		**0**	**0**	**0**	**0**

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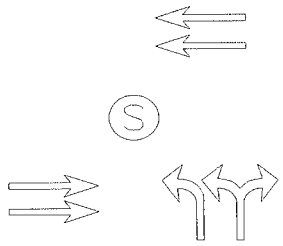
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	3-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : BRANFORD STREET
N/S STREET : NB I-5 FREEWAY RAMPS
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 39
ROUTE 8A

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BRANFORD STREET								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
NB I-5 FREEWAY RAMPS								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**0**				**0**	**0**	**0**	**0**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	3-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : BRANFORD STREET
N/S STREET : NB I-5 FREEWAY RAMPS
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 39
ROUTE 8A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BRANFORD STREET								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
NB I-5 FREEWAY RAMPS								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**0**				**0**	**0**	**0**	**0**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	3-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : BRANFORD STREET
N/S STREET : NB I-5 FREEWAY RAMPS
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 39
ROUTE 8A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BRANFORD STREET								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
NB I-5 FREEWAY RAMPS								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**0**				**0**	**0**	**0**	**0**

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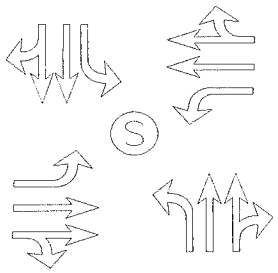
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	1 OF 6

E/W STREET : BRANFORD STREET
N/S STREET : LAUREL CANYON BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
40
ROUTE
8A

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BRANFORD STREET						
EB LEFT	150	5%		150	15	165
EB THRU	145	37%	**50**	195	20	215
EB RIGHT	65	10%		65	5	70
WB LEFT	85	5%		85	5	90
WB THRU	205	28%	**50**	255	25	280
WB RIGHT	110	5%		110	10	120
LAUREL CANYON BLVD						
NB LEFT	90	0%		90	10	100
NB THRU	585	5%		585	55	640
NB RIGHT	140	5%		140	15	155
SB LEFT	130	5%		130	10	140
SB THRU	365	5%		365	35	400
SB RIGHT	150	5%		150	15	165
TOTALS	**2220**		**100**	**2320**	**220**	**2540**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	3-Sep-13	VV.110264.0000	2 OF 6

E/W STREET : BRANFORD STREET
N/S STREET : LAUREL CANYON BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
40
ROUTE
8B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BRANFORD STREET						
EB LEFT	150	5%		150	15	165
EB THRU	145	15%		145	15	160
EB RIGHT	65	10%		65	5	70
WB LEFT	85	5%		85	5	90
WB THRU	205	10%		205	20	225
WB RIGHT	110	35%	**50**	160	15	175
LAUREL CANYON BLVD						
NB LEFT	90	0%		90	10	100
NB THRU	585	5%		585	55	640
NB RIGHT	140	5%		140	15	155
SB LEFT	130	31%	**50**	180	15	195
SB THRU	365	5%		365	35	400
SB RIGHT	150	5%		150	15	165
TOTALS	**2220**		**100**	**2320**	**220**	**2540**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	3 OF 6

E/W STREET : BRANFORD STREET
N/S STREET : LAUREL CANYON BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 40
ROUTE 8A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BRANFORD STREET						
EB LEFT	115	5%		115	10	125
EB THRU	170	34%	**50**	220	20	240
EB RIGHT	210	5%		210	20	230
WB LEFT	90	5%		90	10	100
WB THRU	160	35%	**50**	210	20	230
WB RIGHT	85	5%		85	5	90
LAUREL CANYON BLVD						
NB LEFT	85	5%		85	5	90
NB THRU	460	5%		460	40	500
NB RIGHT	85	5%		85	5	90
SB LEFT	65	0%		65	5	70
SB THRU	585	5%		585	55	640
SB RIGHT	95	0%		95	10	105
TOTALS	**2205**		**100**	**2305**	**205**	**2510**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	3-Sep-13	VV.110264.0000	4 OF 6

E/W STREET : BRANFORD STREET
N/S STREET : LAUREL CANYON BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
40
ROUTE
8B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BRANFORD STREET						
EB LEFT	115	5%		115	10	125
EB THRU	170	15%		170	15	185
EB RIGHT	210	5%		210	20	230
WB LEFT	90	5%		90	10	100
WB THRU	160	15%		160	15	175
WB RIGHT	85	40%	**50**	135	10	145
LAUREL CANYON BLVD						
NB LEFT	85	5%		85	5	90
NB THRU	460	5%		460	40	500
NB RIGHT	85	5%		85	5	90
SB LEFT	65	43%	**50**	115	10	125
SB THRU	585	5%		585	55	640
SB RIGHT	95	0%		95	10	105
TOTALS	**2205**		**100**	**2305**	**205**	**2510**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	5 OF 6

E/W STREET : BRANFORD STREET
N/S STREET : LAUREL CANYON BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 40
ROUTE 8A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BRANFORD STREET						
EB LEFT	190	5%		190	15	205
EB THRU	380	20%	**50**	430	40	470
EB RIGHT	185	5%		185	15	200
WB LEFT	100	5%		100	10	110
WB THRU	365	21%	**50**	415	35	450
WB RIGHT	125	5%		125	10	135
LAUREL CANYON BLVD						
NB LEFT	115	5%		115	10	125
NB THRU	1120	5%		1120	100	1220
NB RIGHT	120	5%		120	10	130
SB LEFT	60	5%		60	5	65
SB THRU	445	5%		445	40	485
SB RIGHT	135	5%		135	10	145
TOTALS	**3340**		**100**	**3440**	**300**	**3740**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	3-Sep-13	VV.110264.0000	6 OF 6

E/W STREET : BRANFORD STREET
N/S STREET : LAUREL CANYON BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 40
ROUTE 8B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BRANFORD STREET						
EB LEFT	190	5%		190	15	205
EB THRU	380	10%		380	35	415
EB RIGHT	185	5%		185	15	200
WB LEFT	100	5%		100	10	110
WB THRU	365	10%		365	35	400
WB RIGHT	125	32%	**50**	175	15	190
LAUREL CANYON BLVD						
NB LEFT	115	5%		115	10	125
NB THRU	1120	5%		1120	100	1220
NB RIGHT	120	5%		120	10	130
SB LEFT	60	48%	**50**	110	10	120
SB THRU	445	5%		445	40	485
SB RIGHT	135	5%		135	10	145
TOTALS	**3340**		**100**	**3440**	**305**	**3745**

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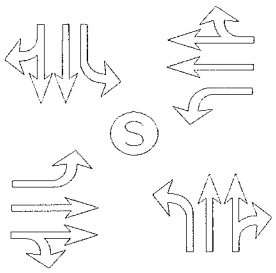
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	1 OF 6

E/W STREET : BRANFORD STREET
N/S STREET : LAUREL CANYON BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 40
ROUTE 8A

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BRANFORD STREET								
EB LEFT	146	3	9	155	**0**	155	15	170
EB THRU	125	18	54	180	**150**	330	30	360
EB RIGHT	60	7	21	80	**0**	80	5	85
WB LEFT	78	5	15	95	**0**	95	10	105
WB THRU	188	19	57	245	**150**	395	35	430
WB RIGHT	107	4	12	120	**0**	120	10	130
LAUREL CANYON BLVD								
NB LEFT	89	0	0	90	**0**	90	10	100
NB THRU	582	5	15	595	**0**	595	55	650
NB RIGHT	141	1	3	145	**0**	145	15	160
SB LEFT	129	2	6	135	**0**	135	10	145
SB THRU	354	9	27	380	**0**	380	35	415
SB RIGHT	146	2	6	150	**0**	150	15	165
TOTALS	**2145**				**300**	**2670**	**245**	**2915**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	2 OF 6

E/W STREET : BRANFORD STREET
N/S STREET : LAUREL CANYON BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
40
ROUTE
8B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BRANFORD STREET								
EB LEFT	146	3	9	155	**0**	155	15	170
EB THRU	125	18	54	180	**0**	180	15	195
EB RIGHT	60	7	21	80	**0**	80	5	85
WB LEFT	78	5	15	95	**0**	95	10	105
WB THRU	188	19	57	245	**0**	245	20	265
WB RIGHT	107	4	12	120	**150**	270	25	295
LAUREL CANYON BLVD								
NB LEFT	89	0	0	90	**0**	90	10	100
NB THRU	582	5	15	595	**0**	595	55	650
NB RIGHT	141	1	3	145	**0**	145	15	160
SB LEFT	129	2	6	135	**150**	285	25	310
SB THRU	354	9	27	380	**0**	380	35	415
SB RIGHT	146	2	6	150	**0**	150	15	165
TOTALS	**2145**				**300**	**2670**	**245**	**2915**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	3 OF 6

E/W STREET : BRANFORD STREET
N/S STREET : LAUREL CANYON BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 40
ROUTE 8A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BRANFORD STREET								
EB LEFT	108	5	15	125	**0**	125	10	135
EB THRU	143	28	84	225	**150**	375	35	410
EB RIGHT	201	7	21	220	**0**	220	20	240
WB LEFT	84	4	12	95	**0**	95	10	105
WB THRU	136	26	78	215	**150**	365	35	400
WB RIGHT	80	6	18	100	**0**	100	10	110
LAUREL CANYON BLVD								
NB LEFT	84	1	3	85	**0**	85	5	90
NB THRU	452	7	21	475	**0**	475	45	520
NB RIGHT	78	6	18	95	**0**	95	10	105
SB LEFT	63	0	0	65	**0**	65	5	70
SB THRU	579	8	24	605	**0**	605	55	660
SB RIGHT	93	0	0	95	**0**	95	10	105
TOTALS	**2101**				**300**	**2700**	**250**	**2950**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	4 OF 6

E/W STREET : BRANFORD STREET
N/S STREET : LAUREL CANYON BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 40
ROUTE 8B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BRANFORD STREET								
EB LEFT	108	5	15	125	**0**	125	10	135
EB THRU	143	28	84	225	**0**	225	20	245
EB RIGHT	201	7	21	220	**0**	220	20	240
WB LEFT	84	4	12	95	**0**	95	10	105
WB THRU	136	26	78	215	**0**	215	20	235
WB RIGHT	80	6	18	100	**150**	250	25	275
LAUREL CANYON BLVD								
NB LEFT	84	1	3	85	**0**	85	5	90
NB THRU	452	7	21	475	**0**	475	45	520
NB RIGHT	78	6	18	95	**0**	95	10	105
SB LEFT	63	0	0	65	**150**	215	20	235
SB THRU	579	8	24	605	**0**	605	55	660
SB RIGHT	93	0	0	95	**0**	95	10	105
TOTALS	**2101**				**300**	**2700**	**250**	**2950**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	5 OF 6

E/W STREET : BRANFORD STREET
N/S STREET : LAUREL CANYON BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 40
ROUTE 8A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BRANFORD STREET								
EB LEFT	184	4	12	195	**0**	195	20	215
EB THRU	343	36	108	450	**150**	600	55	655
EB RIGHT	181	5	15	195	**0**	195	20	215
WB LEFT	96	3	9	105	**0**	105	10	115
WB THRU	331	33	99	430	**150**	580	50	630
WB RIGHT	119	4	12	130	**0**	130	10	140
LAUREL CANYON BLVD								
NB LEFT	110	4	12	120	**0**	120	10	130
NB THRU	1110	10	30	1140	**0**	1140	105	1245
NB RIGHT	116	4	12	130	**0**	130	10	140
SB LEFT	58	3	9	65	**0**	65	5	70
SB THRU	438	7	21	460	**0**	460	40	500
SB RIGHT	133	3	9	140	**0**	140	15	155
TOTALS	**3219**				**300**	**3860**	**350**	**4210**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	6 OF 6

E/W STREET : BRANFORD STREET
N/S STREET : LAUREL CANYON BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 40
ROUTE 8B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BRANFORD STREET								
EB LEFT	184	4	12	195	**0**	195	20	215
EB THRU	343	36	108	450	**0**	450	40	490
EB RIGHT	181	5	15	195	**0**	195	20	215
WB LEFT	96	3	9	105	**0**	105	10	115
WB THRU	331	33	99	430	**0**	430	40	470
WB RIGHT	119	4	12	130	**150**	280	25	305
LAUREL CANYON BLVD								
NB LEFT	110	4	12	120	**0**	120	10	130
NB THRU	1110	10	30	1140	**0**	1140	105	1245
NB RIGHT	116	4	12	130	**0**	130	10	140
SB LEFT	58	3	9	65	**150**	215	20	235
SB THRU	438	7	21	460	**0**	460	40	500
SB RIGHT	133	3	9	140	**0**	140	15	155
TOTALS	**3219**				**300**	**3860**	**355**	**4215**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: LAUREL CANYON
EAST-WEST STREET: BRANFORD
JURISDICTION: LA

DATE: 06-05-12

PEAK HOUR: 07:15AM

NORTH LEG

TOTAL: 642

Rt	Thru	Lt	
148	363	131	Total
35	71	20	1st
46	97	41	2nd
39	101	34	3rd
28	94	36	4th

EAST LEG TOTAL: 401

	1st	2nd	3rd	4th	Total
Rt	23	33	29	26	111
Thru	41	49	53	64	207
Lt	20	31	21	11	83

WEST LEG TOTAL: 359

Total	1st	2nd	3rd	4th	
149	52	36	38	23	Lt
143	35	28	35	45	Thru
67	11	26	16	14	Rt

SOUTH LEG

TOTAL: 818

	Lt	Thru	Rt
1st	22	152	25
2nd	16	137	44
3rd	40	155	34
4th	11	143	39
Total	89	587	142

PEAK HOUR FACTORS

NORTH LEG = 0.87
SOUTH LEG = 0.89
EAST LEG = 0.89
WEST LEG = 0.92

ALL LEGS = 0.93

HOUR TOTAL: 2,220

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: LAUREL CANYON

EAST-WEST STREET: BRANFORD

TIME: 07:00AM-08:00AM DATE: 06-05-12

NORTH LEG

Rt	Thru	Lt	
149	310	119	Total
29	41	24	1st
35	71	20	2nd
46	97	41	3rd
39	101	34	4th

	1st	2nd	3rd	4th	Total
Rt	13	23	33	29	98
Thru	37	41	49	53	180
Lt	9	20	31	21	81

Total	1st	2nd	3rd	4th	
152	26	52	36	38	Lt
120	22	35	28	35	Thru
68	15	11	26	16	Rt

	Lt	Thru	Rt
1st	21	128	22
2nd	22	152	25
3rd	16	137	44
4th	40	155	34
Total	99	572	125

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: LAUREL CANYON

EAST-WEST STREET: BRANFORD

TIME: 08:00AM-09:00AM DATE: 06-05-12

NORTH LEG

110	275	111	Total
28	94	36	1st
34	65	26	2nd
21	65	30	3rd
27	51	19	4th
Rt	Thru	Lt	

Rt	26	25	23	23	97
Thru	64	53	38	42	197
Lt	11	12	27	14	64
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
73	23	16	21	13	Lt
183	45	50	45	43	Thru
58	14	9	21	14	Rt

	Lt	Thru	Rt
1st	11	143	39
2nd	14	114	13
3rd	20	139	24
4th	16	87	10
Total	61	483	86

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : LAUREL CANYON LA

EAST-WEST STREET : BRANFORD 06-05-12

BEGINNING TIME : 07:00AM PH = 7:15

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
NORTH LEG												
29	37	24	0	3	0	0	0	0	0	1	0	94
34	69	19	1	1	1	0	1	0	0	0	0	126
46	95	40	0	2	1	0	0	0	0	0	0	184
38	100	34	0	1	0	0	0	0	1	0	0	174
28	90	36	0	3	0	0	1	0	0	0	0	158
32	64	26	2	1	0	0	0	0	0	0	0	125
21	63	29	0	2	1	0	0	0	0	0	0	116
27	48	19	0	1	0	0	1	0	0	1	0	97
255	566	227	3	14	3	0	3	0	1	2	0	1074
SOUTH LEG												
21	126	21	1	1	0	0	1	0	0	0	0	171
25	152	22	0	0	0	0	0	0	0	0	0	199
44	133	16	0	1	0	0	1	0	0	2	0	197
33	154	40	1	1	0	0	0	0	0	0	0	229
39	143	11	0	0	0	0	0	0	0	0	0	193
12	109	13	1	2	0	0	1	0	0	2	1	141
23	139	20	1	0	0	0	0	0	0	0	0	183
9	86	16	1	1	0	0	0	0	0	0	0	113
206	1042	159	5	6	0	0	3	0	0	4	1	1426
EAST LEG												
13	32	8	0	3	1	0	1	0	0	1	0	59
23	35	19	0	3	0	0	0	1	0	3	0	84
31	45	30	0	3	1	2	1	0	0	0	0	113
27	46	19	0	3	1	0	3	0	2	1	1	103
26	62	10	0	2	0	0	0	1	0	0	0	101
24	48	12	0	3	0	1	0	0	0	2	0	90
23	31	26	0	5	0	0	2	0	0	0	1	88
23	34	11	0	7	1	0	0	2	0	1	0	79
190	333	135	0	29	4	3	7	4	2	8	2	717
WEST LEG												
15	18	26	0	2	0	0	1	0	0	1	0	63
9	30	51	1	2	1	0	1	0	1	2	0	98
24	25	36	0	1	0	0	2	0	2	0	0	90
15	28	37	1	3	1	0	1	0	0	3	0	89
12	42	22	0	1	0	1	2	0	1	0	1	82
9	47	15	0	1	1	0	0	0	0	2	0	75
19	38	21	0	2	0	2	2	0	0	3	0	87
14	37	13	0	1	0	0	3	0	0	2	0	70
117	265	221	2	13	3	3	12	0	4	13	1	654

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: LAUREL CANYON
EAST-WEST STREET: BRANFORD
JURISDICTION: LA

DATE: 06-05-12

PEAK HOUR: 12:30PM

NORTH LEG

TOTAL: 743

Rt	Thru	Lt	
93	587	63	Total
31	161	16	1st
23	139	12	2nd
20	143	16	3rd
19	144	19	4th

EAST LEG TOTAL: 336

	1st	2nd	3rd	4th	Total
Rt	31	21	20	14	86
Thru	41	33	34	54	162
Lt	20	18	19	31	88

WEST LEG TOTAL: 492

Total	1st	2nd	3rd	4th	
113	22	33	32	26	Lt
171	48	49	33	41	Thru
208	44	60	60	44	Rt

PEAK HOUR FACTORS

NORTH LEG = 0.89
SOUTH LEG = 0.89
EAST LEG = 0.85
WEST LEG = 0.87

ALL LEGS = 0.97

SOUTH LEG

TOTAL: 628

	Lt	Thru	Rt
1st	16	116	22
2nd	23	109	20
3rd	14	111	21
4th	32	123	21
Total	85	459	84

HOUR TOTAL: 2,199

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: LAUREL CANYON

EAST-WEST STREET: BRANFORD

TIME: 12:00PM-01:00PM DATE: 06-05-12

NORTH LEG

Rt	Thru	Lt	
102	537	61	Total
22	114	14	1st
26	123	19	2nd
31	161	16	3rd
23	139	12	4th

	1st	2nd	3rd	4th	Total
Rt	14	22	31	21	88
Thru	33	37	41	33	144
Lt	20	22	20	18	80

Total	1st	2nd	3rd	4th	
122	36	31	22	33	Lt
156	23	36	48	49	Thru
207	61	42	44	60	Rt

	Lt	Thru	Rt
1st	20	90	22
2nd	20	112	23
3rd	16	116	22
4th	23	109	20
Total	79	427	87

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: LAUREL CANYON

EAST-WEST STREET: BRANFORD

TIME: 01:00PM-02:00PM DATE: 06-05-12

NORTH LEG

Rt	Thru	Lt	
78	535	75	Total
20	143	16	1st
19	144	19	2nd
16	136	23	3rd
23	112	17	4th

	1st	2nd	3rd	4th	Total
Rt	20	14	22	29	85
Thru	34	54	45	41	174
Lt	19	31	26	18	94

Total	1st	2nd	3rd	4th	
109	32	26	29	22	Lt
147	33	41	37	36	Thru
166	60	44	32	30	Rt

	Lt	Thru	Rt
1st	14	111	21
2nd	32	123	21
3rd	22	103	21
4th	21	99	16
Total	89	436	79

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : LAUREL CANYON LA

EAST-WEST STREET : BRANFORD 06-05-12

BEGINNING TIME : 12:00PM PH = 12:30 PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
NORTH LEG												
22	112	14	0	0	0	0	0	0	0	2	0	150
26	123	19	0	0	0	0	0	0	0	0	0	168
31	158	16	0	2	0	0	1	0	0	0	0	208
23	139	12	0	0	0	0	0	0	0	0	0	174
20	140	16	0	2	0	0	0	0	0	1	0	179
19	142	19	0	0	0	0	2	0	0	0	0	182
16	133	23	0	2	0	0	1	0	0	0	0	175
23	111	17	0	0	0	0	1	0	0	0	0	152
180	1058	136	0	6	0	0	5	0	0	3	0	1388
SOUTH LEG												
21	89	20	0	1	0	0	0	0	1	0	0	132
23	112	19	0	0	0	0	0	1	0	0	0	155
19	115	16	0	1	0	0	0	0	3	0	0	154
19	105	22	0	2	0	1	1	0	0	1	1	152
21	110	14	0	0	0	0	1	0	0	0	0	146
19	122	32	1	0	0	1	0	0	0	1	0	176
20	103	21	0	0	0	1	0	0	0	0	1	146
16	98	21	0	0	0	0	0	0	0	1	0	136
158	854	165	1	4	0	3	2	1	4	3	2	1197
EAST LEG												
14	26	20	0	4	0	0	1	0	0	2	0	67
22	30	21	0	3	0	0	1	0	0	3	1	81
30	37	19	0	2	0	0	0	0	1	2	1	92
18	29	17	2	2	1	1	1	0	0	1	0	72
18	22	18	1	6	0	0	4	0	1	2	1	73
14	48	30	0	3	1	0	2	0	0	1	0	99
20	39	25	0	2	0	1	1	0	1	3	1	93
27	34	18	1	3	0	1	2	0	0	2	0	88
163	265	168	4	25	2	3	12	0	3	16	4	665
WEST LEG												
59	14	34	1	4	1	1	2	0	0	3	1	120
42	29	30	0	3	0	0	3	0	0	1	1	109
43	41	20	1	3	0	0	2	1	0	2	1	114
57	41	32	0	3	1	1	3	0	2	2	0	142
57	28	32	1	3	0	1	2	0	1	0	0	125
44	33	24	0	3	0	0	4	1	0	1	1	111
30	29	27	2	4	1	0	2	0	0	2	1	98
30	32	22	0	2	0	0	1	0	0	1	0	88
362	247	221	5	25	3	3	19	2	3	12	5	907

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: LAUREL CANYON
EAST-WEST STREET: BRANFORD
JURISDICTION: LA

DATE: 06-05-12

PEAK HOUR: 04:30PM

NORTH LEG

TOTAL: 642

Rt	Thru	Lt	
136	445	61	Total
26	122	19	1st
33	99	20	2nd
33	114	12	3rd
44	110	10	4th

EAST LEG TOTAL: 586

	1st	2nd	3rd	4th	Total
Rt	36	33	31	23	123
Thru	71	62	112	119	364
Lt	26	20	31	22	99

WEST LEG TOTAL: 753

Total	1st	2nd	3rd	4th	
188	51	50	44	43	Lt
379	90	87	99	103	Thru
186	42	49	53	42	Rt

SOUTH LEG

TOTAL: 1,354

	Lt	Thru	Rt
1st	33	283	19
2nd	30	288	32
3rd	22	283	36
4th	29	266	33
Total	114	1120	120

PEAK HOUR FACTORS

NORTH LEG = 0.96
SOUTH LEG = 0.97
EAST LEG = 0.84
WEST LEG = 0.96

ALL LEGS = 0.96

HOUR TOTAL: 3,335

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INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: LAUREL CANYON

EAST-WEST STREET: BRANFORD

TIME: 04:00PM-05:00PM DATE: 06-05-12

NORTH LEG

Rt	Thru	Lt	
122	434	74	Total
34	99	14	1st
29	114	21	2nd
26	122	19	3rd
33	99	20	4th

	1st	2nd	3rd	4th	Total
Rt	26	31	36	33	126
Thru	79	47	71	62	259
Lt	31	22	26	20	99

Total	1st	2nd	3rd	4th	
191	46	44	51	50	Lt
360	93	90	90	87	Thru
192	51	50	42	49	Rt

	Lt	Thru	Rt
1st	25	214	31
2nd	33	269	29
3rd	33	283	19
4th	30	288	32
Total	121	1054	111

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: LAUREL CANYON

EAST-WEST STREET: BRANFORD

TIME: 05:00PM-06:00PM DATE: 06-05-12

NORTH LEG

Rt	Thru	Lt	
149	417	63	Total
33	114	12	1st
44	110	10	2nd
41	93	22	3rd
31	100	19	4th

	1st	2nd	3rd	4th	Total
Rt	31	23	22	19	95
Thru	112	119	89	99	419
Lt	31	22	25	29	107

Total	1st	2nd	3rd	4th	
189	44	43	53	49	Lt
351	99	103	78	71	Thru
186	53	42	36	55	Rt

	Lt	Thru	Rt
1st	22	283	36
2nd	29	266	33
3rd	31	243	31
4th	26	251	25
Total	108	1043	125

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : LAUREL CANYON LA

EAST-WEST STREET : BRANFORD 06-05-12

BEGINNING TIME : 04:00PM PH = 4:30

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
34	97	14	0	1	0	0	0	0	0	1	0	147
29	112	17	0	0	2	0	1	2	0	1	0	164
26	122	19	0	0	0	0	0	0	0	0	0	167
33	96	19	0	2	1	0	0	0	0	1	0	152
33	111	10	0	0	0	0	2	2	0	1	0	159
41	109	10	1	0	0	2	0	0	0	1	0	164
40	92	22	1	0	0	0	0	0	0	1	0	156
30	97	18	0	2	0	1	0	1	0	1	0	150
266	836	129	2	5	3	3	3	5	0	7	0	1259
						SOUTH LEG						
30	211	24	0	1	0	0	2	0	1	0	1	270
28	269	31	1	0	1	0	0	0	0	0	1	331
18	280	31	0	1	0	1	1	1	0	1	1	335
31	284	30	0	4	0	0	0	0	1	0	0	350
36	283	22	0	0	0	0	0	0	0	0	0	341
31	263	27	1	0	1	0	1	0	1	2	1	328
31	243	31	0	0	0	0	0	0	0	0	0	305
25	251	25	0	0	0	0	0	0	0	0	1	302
230	2084	221	2	6	2	1	4	1	3	3	5	2562
						EAST LEG						
25	74	28	0	2	1	0	2	1	1	1	1	136
31	37	22	0	3	0	0	4	0	0	3	0	100
36	62	26	0	4	0	0	4	0	0	1	0	133
31	55	18	1	3	1	1	3	0	0	1	1	115
30	103	30	0	4	0	0	3	1	1	2	0	174
22	111	22	0	5	0	1	2	0	0	1	0	164
22	79	23	0	3	1	0	5	0	0	2	1	136
17	94	28	1	2	0	0	2	0	1	1	1	147
214	615	197	2	26	3	2	25	2	3	12	4	1105
						WEST LEG						
51	85	46	0	3	0	0	2	0	0	3	0	190
50	83	43	0	3	0	0	2	1	0	2	0	184
41	82	50	0	3	0	1	3	0	0	2	1	183
48	78	49	1	3	1	0	5	0	0	1	0	186
53	91	43	0	2	0	0	4	1	0	2	0	196
39	92	42	1	5	0	2	5	0	0	1	1	188
36	70	53	0	2	0	0	5	0	0	1	0	167
55	66	49	0	1	0	0	3	0	0	1	0	175
373	647	375	2	22	1	3	29	2	0	13	2	1469

Prepared by Newport Traffic Studies

HCM Signalized Intersection Capacity Analysis
40: Laurel Canyon & Branford St

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	150	145	65	85	205	110	90	585	140	130	365	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.95		1.00	0.95		1.00	0.97		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3034		1719	3160		1805	3338		1719	3288	
Flt Permitted	0.55	1.00		0.61	1.00		0.43	1.00		0.30	1.00	
Satd. Flow (perm)	992	3034		1105	3160		820	3338		550	3288	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	161	156	70	91	220	118	97	629	151	140	392	161
RTOR Reduction (vph)	0	45	0	0	76	0	0	46	0	0	86	0
Lane Group Flow (vph)	161	181	0	91	262	0	97	734	0	140	467	0
Heavy Vehicles (%)	5%	15%	10%	5%	10%	5%	0%	5%	5%	5%	5%	5%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	16.0	16.0		16.0	16.0		21.0	21.0		21.0	21.0	
Effective Green, g (s)	16.0	16.0		16.0	16.0		21.0	21.0		21.0	21.0	
Actuated g/C Ratio	0.36	0.36		0.36	0.36		0.47	0.47		0.47	0.47	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	353	1079		393	1124		383	1558		257	1534	
v/s Ratio Prot		0.06			0.08			0.22			0.14	
v/s Ratio Perm	c0.16			0.08			0.12			c0.25		
v/c Ratio	0.46	0.17		0.23	0.23		0.25	0.47		0.54	0.30	
Uniform Delay, d1	11.2	9.9		10.2	10.2		7.3	8.2		8.6	7.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.2	0.3		1.4	0.5		1.6	1.0		8.1	0.5	
Delay (s)	15.4	10.3		11.6	10.7		8.8	9.2		16.6	8.0	
Level of Service	B	B		B	B		A	A		B	A	
Approach Delay (s)		12.4			10.9			9.2			9.7	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	10.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	58.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
40: Laurel Canyon & Branford St

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	115	170	210	90	160	85	85	460	85	65	585	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.92		1.00	0.95		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3024		1719	3068		1719	3357		1805	3389	
Flt Permitted	0.60	1.00		0.52	1.00		0.33	1.00		0.42	1.00	
Satd. Flow (perm)	1077	3024		943	3068		602	3357		801	3389	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	119	175	216	93	165	88	88	474	88	67	603	98
RTOR Reduction (vph)	0	90	0	0	53	0	0	38	0	0	32	0
Lane Group Flow (vph)	119	301	0	93	200	0	88	524	0	67	669	0
Heavy Vehicles (%)	5%	15%	5%	5%	15%	5%	5%	5%	5%	0%	5%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	16.0	16.0		16.0	16.0		16.0	16.0		16.0	16.0	
Effective Green, g (s)	16.0	16.0		16.0	16.0		16.0	16.0		16.0	16.0	
Actuated g/C Ratio	0.40	0.40		0.40	0.40		0.40	0.40		0.40	0.40	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	431	1210		377	1227		241	1343		320	1356	
v/s Ratio Prot		0.10			0.07			0.16			c0.20	
v/s Ratio Perm	c0.11			0.10			0.15			0.08		
v/c Ratio	0.28	0.25		0.25	0.16		0.37	0.39		0.21	0.49	
Uniform Delay, d1	8.1	8.0		8.0	7.7		8.4	8.5		7.9	9.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.6	0.5		1.6	0.3		4.2	0.9		1.5	1.3	
Delay (s)	9.7	8.5		9.5	8.0		12.7	9.4		9.3	10.3	
Level of Service	A	A		A	A		B	A		A	B	
Approach Delay (s)		8.8			8.4			9.8			10.2	
Approach LOS		A			A			A			B	

Intersection Summary			
HCM Average Control Delay	9.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	40.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	53.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
40: Laurel Canyon & Branford St

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	190	380	185	100	365	125	115	1120	120	60	445	135
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.95		1.00	0.96		1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3168		1719	3193		1719	3388		1719	3318	
Flt Permitted	0.43	1.00		0.38	1.00		0.40	1.00		0.19	1.00	
Satd. Flow (perm)	783	3168		679	3193		723	3388		345	3318	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	198	396	193	104	380	130	120	1167	125	62	464	141
RTOR Reduction (vph)	0	124	0	0	24	0	0	18	0	0	63	0
Lane Group Flow (vph)	198	465	0	104	486	0	120	1274	0	62	542	0
Heavy Vehicles (%)	5%	10%	5%	5%	10%	5%	5%	5%	5%	5%	5%	5%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	16.0	16.0		16.0	16.0		21.0	21.0		21.0	21.0	
Effective Green, g (s)	16.0	16.0		16.0	16.0		21.0	21.0		21.0	21.0	
Actuated g/C Ratio	0.36	0.36		0.36	0.36		0.47	0.47		0.47	0.47	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	278	1126		241	1135		337	1581		161	1548	
v/s Ratio Prot		0.15			0.15			c0.38			0.16	
v/s Ratio Perm	c0.25			0.15			0.17			0.18		
v/c Ratio	0.71	0.41		0.43	0.43		0.36	0.81		0.39	0.35	
Uniform Delay, d1	12.5	11.0		11.0	11.0		7.7	10.3		7.8	7.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	14.4	1.1		5.5	1.2		2.9	4.5		6.8	0.6	
Delay (s)	26.9	12.1		16.6	12.2		10.6	14.7		14.6	8.3	
Level of Service	C	B		B	B		B	B		B	A	
Approach Delay (s)		15.8			12.9			14.4			8.9	
Approach LOS		B			B			B			A	

Intersection Summary			
HCM Average Control Delay	13.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	76.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	150	195	65	85	255	110	90	585	140	130	365	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.96		1.00	0.95		1.00	0.97		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	2668		1719	2847		1805	3338		1719	3288	
Flt Permitted	0.52	1.00		0.58	1.00		0.43	1.00		0.30	1.00	
Satd. Flow (perm)	942	2668		1049	2847		820	3338		550	3288	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	161	210	70	91	274	118	97	629	151	140	392	161
RTOR Reduction (vph)	0	45	0	0	76	0	0	46	0	0	86	0
Lane Group Flow (vph)	161	235	0	91	316	0	97	734	0	140	467	0
Heavy Vehicles (%)	5%	37%	10%	5%	28%	5%	0%	5%	5%	5%	5%	5%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8	8		2			6	6	
Actuated Green, G (s)	16.0	16.0		16.0	16.0		21.0	21.0		21.0	21.0	
Effective Green, g (s)	16.0	16.0		16.0	16.0		21.0	21.0		21.0	21.0	
Actuated g/C Ratio	0.36	0.36		0.36	0.36		0.47	0.47		0.47	0.47	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	335	949		373	1012		383	1558		257	1534	
v/s Ratio Prot		0.09			0.11			0.22			0.14	
v/s Ratio Perm	c0.17			0.09			0.12			c0.25		
v/c Ratio	0.48	0.25		0.24	0.31		0.25	0.47		0.54	0.30	
Uniform Delay, d1	11.3	10.2		10.2	10.5		7.3	8.2		8.6	7.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.9	0.6		1.6	0.8		1.6	1.0		8.1	0.5	
Delay (s)	16.1	10.9		11.8	11.3		8.8	9.2		16.6	8.0	
Level of Service	B	B		B	B		A	A		B	A	
Approach Delay (s)		12.8			11.4			9.2			9.7	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	10.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	60.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	115	220	210	90	210	85	85	460	85	65	585	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.93		1.00	0.96		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	2792		1719	2734		1719	3357		1805	3389	
Flt Permitted	0.57	1.00		0.50	1.00		0.33	1.00		0.42	1.00	
Satd. Flow (perm)	1025	2792		896	2734		602	3357		801	3389	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	119	227	216	93	216	88	88	474	88	67	603	98
RTOR Reduction (vph)	0	90	0	0	53	0	0	38	0	0	32	0
Lane Group Flow (vph)	119	353	0	93	251	0	88	524	0	67	669	0
Heavy Vehicles (%)	5%	34%	5%	5%	35%	5%	5%	5%	5%	0%	5%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	16.0	16.0		16.0	16.0		16.0	16.0		16.0	16.0	
Effective Green, g (s)	16.0	16.0		16.0	16.0		16.0	16.0		16.0	16.0	
Actuated g/C Ratio	0.40	0.40		0.40	0.40		0.40	0.40		0.40	0.40	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	410	1117		358	1094		241	1343		320	1356	
v/s Ratio Prot		c0.13			0.09			0.16			c0.20	
v/s Ratio Perm	0.12			0.10			0.15			0.08		
v/c Ratio	0.29	0.32		0.26	0.23		0.37	0.39		0.21	0.49	
Uniform Delay, d1	8.1	8.2		8.0	7.9		8.4	8.5		7.9	9.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.8	0.7		1.8	0.5		4.2	0.9		1.5	1.3	
Delay (s)	9.9	9.0		9.8	8.4		12.7	9.4		9.3	10.3	
Level of Service	A	A		A	A		B	A		A	B	
Approach Delay (s)		9.2			8.7			9.8			10.2	
Approach LOS		A			A			A			B	

Intersection Summary			
HCM Average Control Delay	9.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	40.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	55.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	190	430	185	100	415	125	115	1120	120	60	445	135
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.95		1.00	0.97		1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	2985		1719	2971		1719	3388		1719	3318	
Flt Permitted	0.39	1.00		0.34	1.00		0.40	1.00		0.19	1.00	
Satd. Flow (perm)	713	2985		615	2971		723	3388		345	3318	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	198	448	193	104	432	130	120	1167	125	62	464	141
RTOR Reduction (vph)	0	107	0	0	24	0	0	18	0	0	63	0
Lane Group Flow (vph)	198	534	0	104	538	0	120	1274	0	62	542	0
Heavy Vehicles (%)	5%	20%	5%	5%	21%	5%	5%	5%	5%	5%	5%	5%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	16.0	16.0		16.0	16.0		21.0	21.0		21.0	21.0	
Effective Green, g (s)	16.0	16.0		16.0	16.0		21.0	21.0		21.0	21.0	
Actuated g/C Ratio	0.36	0.36		0.36	0.36		0.47	0.47		0.47	0.47	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	254	1061		219	1056		337	1581		161	1548	
v/s Ratio Prot		0.18			0.18			c0.38			0.16	
v/s Ratio Perm	c0.28			0.17			0.17			0.18		
v/c Ratio	0.78	0.50		0.47	0.51		0.36	0.81		0.39	0.35	
Uniform Delay, d1	12.9	11.4		11.2	11.4		7.7	10.3		7.8	7.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	20.7	1.7		7.2	1.8		2.9	4.5		6.8	0.6	
Delay (s)	33.7	13.1		18.5	13.2		10.6	14.7		14.6	8.3	
Level of Service	C	B		B	B		B	B		B	A	
Approach Delay (s)		17.9			14.0			14.4			8.9	
Approach LOS		B			B			B			A	

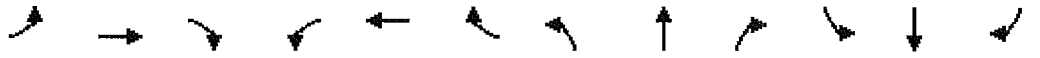
Intersection Summary			
HCM Average Control Delay	14.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	77.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	165	215	70	95	280	120	100	640	155	140	400	165
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.96		1.00	0.96		1.00	0.97		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	2667		1719	2847		1805	3337		1719	3288	
Flt Permitted	0.50	1.00		0.57	1.00		0.40	1.00		0.27	1.00	
Satd. Flow (perm)	898	2667		1023	2847		757	3337		485	3288	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	177	231	75	102	301	129	108	688	167	151	430	177
RTOR Reduction (vph)	0	48	0	0	83	0	0	47	0	0	94	0
Lane Group Flow (vph)	177	258	0	102	347	0	108	808	0	151	513	0
Heavy Vehicles (%)	5%	37%	10%	5%	28%	5%	0%	5%	5%	5%	5%	5%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	16.0	16.0		16.0	16.0		21.0	21.0		21.0	21.0	
Effective Green, g (s)	16.0	16.0		16.0	16.0		21.0	21.0		21.0	21.0	
Actuated g/C Ratio	0.36	0.36		0.36	0.36		0.47	0.47		0.47	0.47	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	319	948		364	1012		353	1557		226	1534	
v/s Ratio Prot		0.10			0.12			0.24			0.16	
v/s Ratio Perm	c0.20			0.10			0.14			c0.31		
v/c Ratio	0.55	0.27		0.28	0.34		0.31	0.52		0.67	0.33	
Uniform Delay, d1	11.6	10.3		10.4	10.6		7.5	8.4		9.3	7.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	6.8	0.7		1.9	0.9		2.2	1.2		14.6	0.6	
Delay (s)	18.4	11.1		12.3	11.6		9.7	9.7		23.9	8.2	
Level of Service	B	B		B	B		A	A		C	A	
Approach Delay (s)		13.8			11.7			9.7			11.3	
Approach LOS		B			B			A			B	

Intersection Summary			
HCM Average Control Delay	11.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	64.4%	ICU Level of Service	C
Analysis Period (min)	15		

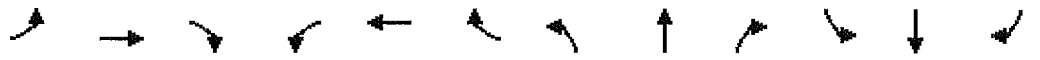
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	125	240	230	100	230	95	95	500	95	70	640	105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.93		1.00	0.96		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	2792		1719	2734		1719	3356		1805	3388	
Flt Permitted	0.55	1.00		0.48	1.00		0.29	1.00		0.39	1.00	
Satd. Flow (perm)	995	2792		861	2734		532	3356		736	3388	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	129	247	237	103	237	98	98	515	98	72	660	108
RTOR Reduction (vph)	0	74	0	0	59	0	0	39	0	0	33	0
Lane Group Flow (vph)	129	410	0	103	276	0	98	574	0	72	735	0
Heavy Vehicles (%)	5%	34%	5%	5%	35%	5%	5%	5%	5%	0%	5%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	16.0	16.0		16.0	16.0		16.0	16.0		16.0	16.0	
Effective Green, g (s)	16.0	16.0		16.0	16.0		16.0	16.0		16.0	16.0	
Actuated g/C Ratio	0.40	0.40		0.40	0.40		0.40	0.40		0.40	0.40	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	398	1117		344	1094		213	1342		294	1355	
v/s Ratio Prot		c0.15			0.10			0.17			c0.22	
v/s Ratio Perm	0.13			0.12			0.18			0.10		
v/c Ratio	0.32	0.37		0.30	0.25		0.46	0.43		0.24	0.54	
Uniform Delay, d1	8.3	8.4		8.2	8.0		8.8	8.7		8.0	9.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.2	0.9		2.2	0.6		7.0	1.0		2.0	1.6	
Delay (s)	10.4	9.4		10.4	8.6		15.8	9.7		10.0	10.8	
Level of Service	B	A		B	A		B	A		A	B	
Approach Delay (s)		9.6			9.0			10.5			10.7	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM Average Control Delay	10.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	40.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	59.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	205	470	200	110	450	135	125	1220	130	65	485	145
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.96		1.00	0.97		1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	2985		1719	2971		1719	3389		1719	3319	
Flt Permitted	0.36	1.00		0.31	1.00		0.36	1.00		0.17	1.00	
Satd. Flow (perm)	652	2985		554	2971		652	3389		315	3319	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	214	490	208	115	469	141	130	1271	135	68	505	151
RTOR Reduction (vph)	0	94	0	0	16	0	0	16	0	0	56	0
Lane Group Flow (vph)	214	604	0	115	594	0	130	1390	0	68	600	0
Heavy Vehicles (%)	5%	20%	5%	5%	21%	5%	5%	5%	5%	5%	5%	5%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	19.0	19.0		19.0	19.0		23.0	23.0		23.0	23.0	
Effective Green, g (s)	19.0	19.0		19.0	19.0		23.0	23.0		23.0	23.0	
Actuated g/C Ratio	0.38	0.38		0.38	0.38		0.46	0.46		0.46	0.46	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	248	1134		211	1129		300	1559		145	1527	
v/s Ratio Prot		0.20			0.20			c0.41			0.18	
v/s Ratio Perm	c0.33			0.21			0.20			0.22		
v/c Ratio	0.86	0.53		0.55	0.53		0.43	0.89		0.47	0.39	
Uniform Delay, d1	14.3	12.0		12.1	12.0		9.1	12.4		9.3	8.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	30.6	1.8		9.8	1.8		4.5	8.1		10.5	0.8	
Delay (s)	44.9	13.8		21.9	13.8		13.6	20.5		19.8	9.7	
Level of Service	D	B		C	B		B	C		B	A	
Approach Delay (s)		21.1			15.1			19.9			10.6	
Approach LOS		C			B			B			B	

Intersection Summary			
HCM Average Control Delay	17.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	82.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

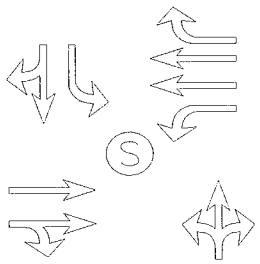
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : OSBORNE STREET
N/S STREET : SB I-5 FREEWAY RAMPS
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 41
ROUTE 8B

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						

OSBORNE STREET

EB LEFT	0	0%		0	0	0
EB THRU	795	5%		795	70	865
EB RIGHT	685	0%		685	60	745
WB LEFT	60	0%		60	5	65
WB THRU	1155	5%		1155	105	1260
WB RIGHT	515	5%		515	45	560

SB I-5 FREEWAY RAMPS

NB LEFT	0	0%		0	0	0
NB THRU	0	0%		0	0	0
NB RIGHT	0	0%		0	0	0
SB LEFT	145	41%	50	195	20	215
SB THRU	20	0%		20	5	25
SB RIGHT	190	10%		190	15	205
TOTALS	**3565**		**50**	**3615**	**325**	**3940**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : OSBORNE STREET
N/S STREET : SB I-5 FREEWAY RAMPS
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 41
ROUTE 8B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
OSBORNE STREET						
EB LEFT	0	0%		0	0	0
EB THRU	595	5%		595	55	650
EB RIGHT	165	0%		165	15	180
WB LEFT	35	0%		35	5	40
WB THRU	910	5%		910	80	990
WB RIGHT	220	5%		220	20	240
SB I-5 FREEWAY RAMPS						
NB LEFT	0	0%		0	0	0
NB THRU	0	0%		0	0	0
NB RIGHT	0	0%		0	0	0
SB LEFT	380	16%	50	430	40	470
SB THRU	20	0%		20	5	25
SB RIGHT	360	5%		360	30	390
TOTALS	**2685**		**50**	**2735**	**250**	**2985**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : OSBORNE STREET
N/S STREET : SB I-5 FREEWAY RAMPS
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 41
ROUTE 8B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
OSBORNE STREET						
EB LEFT	0	0%		0	0	0
EB THRU	895	5%		895	80	975
EB RIGHT	275	0%		275	25	300
WB LEFT	35	0%		35	5	40
WB THRU	1220	5%		1220	110	1330
WB RIGHT	225	5%		225	20	245
SB I-5 FREEWAY RAMPS						
NB LEFT	0	0%		0	0	0
NB THRU	0	0%		0	0	0
NB RIGHT	0	0%		0	0	0
SB LEFT	455	14%	**50**	505	45	550
SB THRU	20	0%		20	5	25
SB RIGHT	610	5%		610	55	665
TOTALS	**3735**		**50**	**3785**	**345**	**4130**

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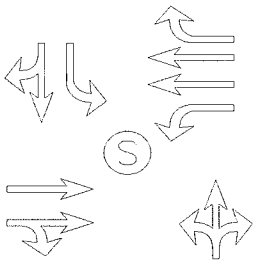
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : OSBORNE STREET
N/S STREET : SB I-5 FREEWAY RAMPS
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 41
ROUTE 8B

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
OSBORNE STREET								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	754	39	117	870	**0**	870	80	950
EB RIGHT	686	0	0	685	**0**	685	60	745
WB LEFT	59	0	0	60	**0**	60	5	65
WB THRU	1122	33	99	1220	**0**	1220	110	1330
WB RIGHT	492	22	66	560	**0**	560	50	610
SB I-5 FREEWAY RAMPS								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	118	27	81	200	**150**	350	30	380
SB THRU	22	0	0	20	**0**	20	5	25
SB RIGHT	169	22	66	235	**0**	235	20	255
TOTALS	**3422**				**150**	**4000**	**360**	**4360**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : OSBORNE STREET
N/S STREET : SB I-5 FREEWAY RAMPS
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 41
ROUTE 8B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
OSBORNE STREET								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	571	24	72	645	**0**	645	60	705
EB RIGHT	163	0	0	165	**0**	165	15	180
WB LEFT	35	0	0	35	**0**	35	5	40
WB THRU	896	12	36	930	**0**	930	85	1015
WB RIGHT	209	13	39	250	**0**	250	25	275
SB I-5 FREEWAY RAMPS								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	355	26	78	435	**150**	585	55	640
SB THRU	19	0	0	20	**0**	20	5	25
SB RIGHT	343	19	57	400	**0**	400	35	435
TOTALS	**2591**				**150**	**3030**	**285**	**3315**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : OSBORNE STREET
N/S STREET : SB I-5 FREEWAY RAMPS
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 41
ROUTE 8B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
OSBORNE STREET								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	864	29	87	950	**0**	950	85	1035
EB RIGHT	276	0	0	275	**0**	275	25	300
WB LEFT	33	0	0	35	**0**	35	5	40
WB THRU	1192	29	87	1280	**0**	1280	115	1395
WB RIGHT	221	5	15	235	**0**	235	20	255
SB I-5 FREEWAY RAMPS								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	443	13	39	480	**150**	630	55	685
SB THRU	19	0	0	20	**0**	20	5	25
SB RIGHT	603	5	15	620	**0**	620	55	675
TOTALS	**3651**				**150**	**4045**	**365**	**4410**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: I-5 SB RAMPS
EAST-WEST STREET: OSBORNE
JURISDICTION: LA

DATE: 05-24-12

PEAK HOUR: 07:00AM

NORTH LEG

TOTAL: 358

Rt	Thru	Lt	
191	22	145	Total
32	1	38	1st
37	10	24	2nd
41	4	38	3rd
81	7	45	4th

EAST LEG TOTAL: 1,728

	1st	2nd	3rd	4th	Total
Rt	163	141	131	79	514
Thru	225	270	390	270	1155
Lt	20	25	8	6	59

WEST LEG TOTAL: 1,479

Total	1st	2nd	3rd	4th	
					Lt
793	168	206	235	184	Thru
686	200	172	166	148	Rt

PEAK HOUR FACTORS

NORTH LEG = 0.67
SOUTH LEG =
EAST LEG = 0.82
WEST LEG = 0.92

ALL LEGS = 0.88

SOUTH LEG

TOTAL: 0

	Lt	Thru	Rt
1st			
2nd			
3rd			
4th			
Total			

HOUR TOTAL: 3,565

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: I-5 SB RAMPS

EAST-WEST STREET: OSBORNE

TIME: 07:00AM-08:00AM DATE: 05-24-12

NORTH LEG

191	22	145	Total
32	1	38	1st
37	10	24	2nd
41	4	38	3rd
81	7	45	4th
Rt	Thru	Lt	

Rt	163	141	131	79	514
Thru	225	270	390	270	1155
Lt	20	25	8	6	59
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
					Lt
793	168	206	235	184	Thru
686	200	172	166	148	Rt

	Lt	Thru	Rt
1st			
2nd			
3rd			
4th			
Total			

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: I-5 SB RAMPS

EAST-WEST STREET: OSBORNE

TIME: 08:00AM-09:00AM DATE: 05-24-12

NORTH LEG

Rt	Thru	Lt	
301	22	230	Total
74	5	56	1st
76	10	74	2nd
76	1	48	3rd
75	6	52	4th

	1st	2nd	3rd	4th	Total
Rt	68	68	80	59	275
Thru	237	198	171	146	752
Lt	11	11	6	5	33

Total	1st	2nd	3rd	4th	
					Lt
572	187	154	129	102	Thru
434	142	112	105	75	Rt

	Lt	Thru	Rt
1st			
2nd			
3rd			
4th			
Total			

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : I-5 SB RAMPS LA

EAST-WEST STREET : OSBORNE 05-24-12

BEGINNING TIME : 07:00AM = PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
NORTH LEG												
23	1	28	5	0	2	0	0	4	4	0	4	71
31	10	17	4	0	3	2	0	1	0	0	3	71
38	4	32	2	0	2	1	0	2	0	0	2	83
77	7	41	4	0	2	0	0	1	0	0	1	133
68	5	51	3	0	3	1	0	1	2	0	1	135
71	10	70	4	0	2	1	0	0	0	0	2	160
74	1	45	2	0	1	0	0	1	0	0	1	125
72	6	50	2	0	2	1	0	0	0	0	0	133
454	44	334	26	0	17	6	0	10	6	0	14	911
SOUTH LEG												
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
EAST LEG												
156	216	20	4	4	0	0	4	0	3	1	0	408
134	260	25	3	6	0	2	3	0	2	1	0	436
128	383	8	2	3	0	0	2	0	1	2	0	529
74	263	6	2	5	0	2	1	0	1	1	0	355
65	232	11	3	4	0	0	0	0	0	1	0	316
62	189	11	4	6	0	2	2	0	0	1	0	277
76	166	6	3	3	0	0	2	0	1	0	0	257
55	140	5	2	4	0	1	1	0	1	1	0	210
750	1849	92	23	35	0	7	15	0	9	8	0	2788
WEST LEG												
200	157	0	0	4	0	0	4	0	0	3	0	368
172	199	0	0	3	0	0	4	0	0	0	0	378
166	225	0	0	5	0	0	3	0	0	2	0	401
148	173	0	0	6	0	0	5	0	0	0	0	332
142	182	0	0	2	0	0	2	0	0	1	0	329
112	146	0	0	5	0	0	2	0	0	1	0	266
105	123	0	0	3	0	0	3	0	0	0	0	234
75	95	0	0	4	0	0	2	0	0	1	0	177
1120	1300	0	0	32	0	0	25	0	0	8	0	2485

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: I-5 SB RAMPS
EAST-WEST STREET: OSBORNE
JURISDICTION: LA

DATE: 05-24-12

PEAK HOUR: 01:00PM

NORTH LEG

TOTAL: 762

Rt	Thru	Lt	
362	19	381	Total
123	6	129	1st
84	2	80	2nd
80	6	77	3rd
75	5	95	4th

EAST LEG TOTAL: 1,165

	1st	2nd	3rd	4th	Total
Rt	53	60	62	47	222
Thru	253	205	216	234	908
Lt	8	10	8	9	35

WEST LEG TOTAL: 758

Total	1st	2nd	3rd	4th	
					Lt
595	137	156	158	144	Thru
163	41	36	44	42	Rt

SOUTH LEG

TOTAL: 0

	Lt	Thru	Rt
1st			
2nd			
3rd			
4th			
Total			

PEAK HOUR FACTORS

NORTH LEG = 0.74
SOUTH LEG =
EAST LEG = 0.93
WEST LEG = 0.94

ALL LEGS = 0.90

HOUR TOTAL: 2,685

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: I-5 SB RAMPS

EAST-WEST STREET: OSBORNE

TIME: 12:00PM-01:00PM DATE: 05-24-12

NORTH LEG

Rt	Thru	Lt	
279	12	245	Total
79	2	69	1st
77	4	78	2nd
57	4	42	3rd
66	2	56	4th

	1st	2nd	3rd	4th	Total
Rt	50	61	45	40	196
Thru	207	214	170	215	806
Lt	7	7	6	5	25

Total	1st	2nd	3rd	4th	
					Lt
513	138	137	115	123	Thru
136	43	30	30	33	Rt

	Lt	Thru	Rt
1st			
2nd			
3rd			
4th			
Total			

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: I-5 SB RAMPS

EAST-WEST STREET: OSBORNE

TIME: 01:00PM-02:00PM DATE: 05-24-12

NORTH LEG

Rt	Thru	Lt	
362	19	381	Total
123	6	129	1st
84	2	80	2nd
80	6	77	3rd
75	5	95	4th

	1st	2nd	3rd	4th	Total
Rt	53	60	62	47	222
Thru	253	205	216	234	908
Lt	8	10	8	9	35

Total	1st	2nd	3rd	4th	
					Lt
595	137	156	158	144	Thru
163	41	36	44	42	Rt

	Lt	Thru	Rt
1st			
2nd			
3rd			
4th			
Total			

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : I-5 SB RAMPS LA

EAST-WEST STREET : OSBORNE 05-24-12

BEGINNING TIME : 12:00PM PH=1:00PM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
						NORTH LEG						
71	2	63	2	0	2	3	0	2	3	0	2	150
74	4	69	3	0	3	0	0	3	0	0	3	159
52	4	34	2	0	4	1	0	0	2	0	4	103
61	2	46	4	0	5	0	0	1	1	0	4	124
117	6	122	3	0	2	2	0	2	1	0	3	258
80	2	76	2	0	1	2	0	1	0	0	2	166
76	6	67	4	0	5	0	0	3	0	0	2	163
70	5	90	3	0	3	1	0	1	1	0	1	175
601	31	567	23	0	25	9	0	13	8	0	21	1298
						SOUTH LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	00	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
						EAST LEG						
44	203	7	4	1	0	1	1	0	1	2	0	264
55	212	7	3	1	0	1	1	0	2	0	0	282
41	167	6	2	1	0	2	2	0	0	0	0	221
38	212	5	2	2	0	0	0	0	0	1	0	260
49	252	8	1	0	0	2	0	0	1	1	0	314
57	199	10	2	2	0	0	1	0	1	3	0	275
58	213	8	3	2	0	1	1	0	0	0	0	286
45	232	9	2	1	0	0	0	0	0	1	0	290
387	1690	60	19	10	0	7	6	0	5	8	0	2192
						WEST LEG						
43	132	0	0	3	0	0	1	0	0	2	0	181
30	134	0	0	2	0	0	1	0	0	0	0	167
30	110	0	0	3	0	0	1	0	0	1	0	145
33	119	0	0	1	0	0	3	0	0	0	0	156
41	131	0	0	2	0	0	2	0	0	2	0	178
36	151	0	0	2	0	0	1	0	0	2	0	192
44	149	0	0	5	0	0	1	0	0	3	0	202
42	140	0	0	3	0	0	1	0	0	0	0	186
299	1066	0	0	21	0	0	11	0	0	10	0	1407

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: I-5 SB RAMPS
EAST-WEST STREET: OSBORNE
JURISDICTION: LA

DATE: 05-24-12

PEAK HOUR: 04:30PM

NORTH LEG

TOTAL: 1,083

Rt	Thru	Lt	
608	19	456	Total
131	4	106	1st
160	7	134	2nd
149	6	113	3rd
168	2	103	4th

EAST LEG TOTAL: 1,480

	1st	2nd	3rd	4th	Total
Rt	64	66	51	45	226
Thru	284	281	329	327	1221
Lt	9	11	8	5	33

WEST LEG TOTAL: 1,169

Total	1st	2nd	3rd	4th	
					Lt
893	253	189	227	224	Thru
276	62	76	80	58	Rt

PEAK HOUR FACTORS

NORTH LEG = 0.90
SOUTH LEG =
EAST LEG = 0.95
WEST LEG = 0.93

ALL LEGS = 0.97

SOUTH LEG

TOTAL: 0

	Lt	Thru	Rt
1st			
2nd			
3rd			
4th			
Total			

HOUR TOTAL: 3,732

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: I-5 SB RAMPS

EAST-WEST STREET: OSBORNE

TIME: 04:00PM-05:00PM DATE: 05-24-12

NORTH LEG

Rt	Thru	Lt	
573	17	466	Total
124	4	116	1st
158	2	110	2nd
131	4	106	3rd
160	7	134	4th

	1st	2nd	3rd	4th	Total
Rt	37	47	64	66	214
Thru	273	286	284	281	1124
Lt	11	8	9	11	39

Total	1st	2nd	3rd	4th	
					Lt
862	204	216	253	189	Thru
256	58	60	62	76	Rt

	Lt	Thru	Rt
1st			
2nd			
3rd			
4th			
Total			

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: I-5 SB RAMPS

EAST-WEST STREET: OSBORNE

TIME: 05:00PM-06:00PM DATE: 05-24-12

NORTH LEG

Rt	Thru	Lt	
628	19	441	Total
149	6	113	1st
168	2	103	2nd
162	2	118	3rd
149	9	107	4th

	1st	2nd	3rd	4th	Total
Rt	51	45	42	45	183
Thru	329	327	286	260	1202
Lt	8	5	3	3	19

Total	1st	2nd	3rd	4th	
					Lt
915	227	224	232	232	Thru
249	80	58	52	59	Rt

	Lt	Thru	Rt
1st			
2nd			
3rd			
4th			
Total			

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : I-5 SB RAMPS LA

EAST-WEST STREET : OSBORNE 05-24-12

BEGINNING TIME : 04:00PM PH = 4:30PM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
						NORTH LEG						
120	4	113	2	0	1	1	0	0	1	0	2	244
157	2	105	1	0	1	0	0	1	0	0	3	270
130	4	104	0	0	0	0	0	0	1	0	2	241
158	7	129	1	0	2	1	0	1	0	0	2	301
148	6	111	0	0	0	1	0	1	0	0	1	268
167	2	99	1	0	1	0	0	1	0	0	2	273
162	2	114	0	0	3	0	0	0	0	0	1	282
149	9	105	0	0	0	0	0	2	0	0	0	265
1191	36	880	5	0	8	3	0	6	2	0	13	2144
						SOUTH LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
						EAST LEG						
34	262	11	2	6	0	1	4	0	0	1	0	321
46	281	8	0	5	0	0	0	0	1	0	0	341
63	277	9	0	3	0	1	2	0	0	2	0	357
65	274	11	1	6	0	0	1	0	0	0	0	358
50	322	8	0	5	0	0	1	0	1	1	0	388
43	319	5	1	5	0	1	2	0	0	1	0	377
41	279	3	0	4	0	0	3	0	1	0	0	331
44	256	3	0	3	0	0	1	0	1	0	0	308
386	2270	58	4	37	0	3	14	0	4	5	0	2781
						WEST LEG						
58	198	0	0	3	0	0	2	0	0	1	0	262
60	208	0	0	5	0	0	1	0	0	2	0	276
62	245	0	0	4	0	0	3	0	0	1	0	315
76	182	0	0	5	0	0	1	0	0	1	0	265
80	221	0	0	3	0	0	1	0	0	2	0	307
58	216	0	0	5	0	0	2	0	0	1	0	282
52	223	0	0	6	0	0	1	0	0	2	0	284
59	228	0	0	2	0	0	1	0	0	1	0	291
505	1721	0	0	33	0	0	12	0	0	11	0	2282

Prepared by Newport Traffic Studies

HCM Signalized Intersection Capacity Analysis
41: Osborne St & I-5 SB

8/10/2012

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	145	20	190	0	0	0	0	795	685	60	1155	515
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0						4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00						0.95		1.00	0.95	1.00
Frt	1.00	0.86						0.93		1.00	1.00	0.85
Flt Protected	0.95	1.00						1.00		0.95	1.00	1.00
Satd. Flow (prot)	1504	1506						3272		1805	3438	1538
Flt Permitted	0.76	1.00						1.00		0.12	1.00	1.00
Satd. Flow (perm)	1199	1506						3272		233	3438	1538
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	165	23	216	0	0	0	0	903	778	68	1312	585
RTOR Reduction (vph)	0	38	0	0	0	0	0	271	0	0	0	254
Lane Group Flow (vph)	165	201	0	0	0	0	0	1410	0	68	1312	331
Heavy Vehicles (%)	20%	0%	10%	0%	0%	0%	0%	5%	0%	0%	5%	5%
Turn Type	Perm	NA		Perm				NA		Perm	NA	Perm
Protected Phases		6			2			4			8	
Permitted Phases	6			2						8		8
Actuated Green, G (s)	17.1	17.1						32.6		32.6	32.6	32.6
Effective Green, g (s)	17.1	17.1						32.6		32.6	32.6	32.6
Actuated g/C Ratio	0.30	0.30						0.56		0.56	0.56	0.56
Clearance Time (s)	4.0	4.0						4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	355	446						1849		132	1942	869
v/s Ratio Prot		0.13						c0.43			0.38	
v/s Ratio Perm	c0.14									0.29		0.21
v/c Ratio	0.46	0.45						0.76		0.52	0.68	0.38
Uniform Delay, d1	16.6	16.5						9.6		7.7	8.8	7.0
Progression Factor	1.00	1.00						1.00		1.00	1.00	1.00
Incremental Delay, d2	4.3	3.3						1.9		3.4	0.9	0.3
Delay (s)	20.9	19.8						11.5		11.1	9.8	7.2
Level of Service	C	B						B		B	A	A
Approach Delay (s)		20.2			0.0			11.5			9.1	
Approach LOS		C			A			B			A	

Intersection Summary			
HCM Average Control Delay	11.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	57.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	69.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	380	20	360	0	0	0	0	595	165	35	910	220
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0						4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00						0.95		1.00	0.95	1.00
Frt	1.00	0.86						0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00						1.00		0.95	1.00	1.00
Satd. Flow (prot)	1719	1556						3361		1805	3438	1538
Flt Permitted	0.76	1.00						1.00		0.26	1.00	1.00
Satd. Flow (perm)	1370	1556						3361		490	3438	1538
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	422	22	400	0	0	0	0	661	183	39	1011	244
RTOR Reduction (vph)	0	21	0	0	0	0	0	64	0	0	0	148
Lane Group Flow (vph)	422	401	0	0	0	0	0	780	0	39	1011	96
Heavy Vehicles (%)	5%	0%	5%	0%	0%	0%	0%	5%	0%	0%	5%	5%
Turn Type	Perm	NA		Perm				NA		Perm	NA	Perm
Protected Phases		6			2			4			8	
Permitted Phases	6			2						8		8
Actuated Green, G (s)	16.0	16.0						15.5		15.5	15.5	15.5
Effective Green, g (s)	16.0	16.0						15.5		15.5	15.5	15.5
Actuated g/C Ratio	0.41	0.41						0.39		0.39	0.39	0.39
Clearance Time (s)	4.0	4.0						4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	555	630						1319		192	1349	604
v/s Ratio Prot		0.26						0.23			c0.29	
v/s Ratio Perm	c0.31									0.08		0.06
v/c Ratio	0.76	0.64						0.59		0.20	0.75	0.16
Uniform Delay, d1	10.1	9.4						9.5		7.9	10.3	7.8
Progression Factor	1.00	1.00						1.00		1.00	1.00	1.00
Incremental Delay, d2	9.5	4.8						0.7		0.5	2.3	0.1
Delay (s)	19.6	14.3						10.2		8.4	12.7	7.9
Level of Service	B	B						B		A	B	A
Approach Delay (s)		16.9			0.0			10.2			11.6	
Approach LOS		B			A			B			B	

Intersection Summary			
HCM Average Control Delay	12.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	39.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	58.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	455	20	610	0	0	0	0	895	275	35	1220	225
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0						4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00						0.95		1.00	0.95	1.00
Frt	1.00	0.85						0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00						1.00		0.95	1.00	1.00
Satd. Flow (prot)	1719	1549						3354		1805	3438	1538
Flt Permitted	0.76	1.00						1.00		0.18	1.00	1.00
Satd. Flow (perm)	1370	1549						3354		345	3438	1538
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	469	21	629	0	0	0	0	923	284	36	1258	232
RTOR Reduction (vph)	0	8	0	0	0	0	0	53	0	0	0	139
Lane Group Flow (vph)	469	642	0	0	0	0	0	1154	0	36	1258	93
Heavy Vehicles (%)	5%	0%	5%	0%	0%	0%	0%	5%	0%	0%	5%	5%
Turn Type	Perm	NA		Perm				NA		Perm	NA	Perm
Protected Phases		6			2			4			8	
Permitted Phases	6			2						8		8
Actuated Green, G (s)	25.0	25.0						22.0		22.0	22.0	22.0
Effective Green, g (s)	25.0	25.0						22.0		22.0	22.0	22.0
Actuated g/C Ratio	0.45	0.45						0.40		0.40	0.40	0.40
Clearance Time (s)	4.0	4.0						4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	623	704						1342		138	1375	615
v/s Ratio Prot		c0.41						0.34			c0.37	
v/s Ratio Perm	0.34									0.10		0.06
v/c Ratio	0.75	0.91						0.86		0.26	0.91	0.15
Uniform Delay, d1	12.4	14.0						15.1		11.1	15.6	10.5
Progression Factor	1.00	1.00						1.00		1.00	1.00	1.00
Incremental Delay, d2	8.2	18.1						5.9		1.0	9.6	0.1
Delay (s)	20.6	32.1						20.9		12.1	25.2	10.7
Level of Service	C	C						C		B	C	B
Approach Delay (s)		27.3			0.0			20.9			22.7	
Approach LOS		C			A			C			C	

Intersection Summary			
HCM Average Control Delay	23.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	55.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	79.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	195	20	190	0	0	0	0	795	685	60	1155	515
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0						4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00						0.95		1.00	0.95	1.00
Frt	1.00	0.86						0.93		1.00	1.00	0.85
Flt Protected	0.95	1.00						1.00		0.95	1.00	1.00
Satd. Flow (prot)	1280	1506						3272		1805	3438	1538
Flt Permitted	0.76	1.00						1.00		0.12	1.00	1.00
Satd. Flow (perm)	1020	1506						3272		233	3438	1538
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	222	23	216	0	0	0	0	903	778	68	1312	585
RTOR Reduction (vph)	0	38	0	0	0	0	0	271	0	0	0	254
Lane Group Flow (vph)	222	201	0	0	0	0	0	1410	0	68	1312	331
Heavy Vehicles (%)	41%	0%	10%	0%	0%	0%	0%	5%	0%	0%	5%	5%
Turn Type	Perm	NA		Perm				NA		Perm	NA	Perm
Protected Phases		6			2			4			8	
Permitted Phases	6			2						8		8
Actuated Green, G (s)	17.1	17.1						32.6		32.6	32.6	32.6
Effective Green, g (s)	17.1	17.1						32.6		32.6	32.6	32.6
Actuated g/C Ratio	0.30	0.30						0.56		0.56	0.56	0.56
Clearance Time (s)	4.0	4.0						4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	302	446						1849		132	1942	869
v/s Ratio Prot		0.13						c0.43			0.38	
v/s Ratio Perm	c0.22									0.29		0.21
v/c Ratio	0.74	0.45						0.76		0.52	0.68	0.38
Uniform Delay, d1	18.3	16.5						9.6		7.7	8.8	7.0
Progression Factor	1.00	1.00						1.00		1.00	1.00	1.00
Incremental Delay, d2	14.7	3.3						1.9		3.4	0.9	0.3
Delay (s)	33.0	19.8						11.5		11.1	9.8	7.2
Level of Service	C	B						B		B	A	A
Approach Delay (s)		26.1			0.0			11.5			9.1	
Approach LOS		C			A			B			A	

Intersection Summary			
HCM Average Control Delay	12.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	57.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	69.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
41: Osborne St & I-5 SB

8/13/2012

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	430	20	360	0	0	0	0	595	165	35	910	220
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0						4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00						0.95		1.00	0.95	1.00
Frt	1.00	0.86						0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00						1.00		0.95	1.00	1.00
Satd. Flow (prot)	1556	1556						3361		1805	3438	1538
Flt Permitted	0.76	1.00						1.00		0.26	1.00	1.00
Satd. Flow (perm)	1240	1556						3361		490	3438	1538
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	478	22	400	0	0	0	0	661	183	39	1011	244
RTOR Reduction (vph)	0	21	0	0	0	0	0	64	0	0	0	148
Lane Group Flow (vph)	478	401	0	0	0	0	0	780	0	39	1011	96
Heavy Vehicles (%)	16%	0%	5%	0%	0%	0%	0%	5%	0%	0%	5%	5%
Turn Type	Perm	NA		Perm				NA		Perm	NA	Perm
Protected Phases		6			2			4			8	
Permitted Phases	6			2						8		8
Actuated Green, G (s)	16.0	16.0						15.5		15.5	15.5	15.5
Effective Green, g (s)	16.0	16.0						15.5		15.5	15.5	15.5
Actuated g/C Ratio	0.41	0.41						0.39		0.39	0.39	0.39
Clearance Time (s)	4.0	4.0						4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	502	630						1319		192	1349	604
v/s Ratio Prot		0.26						0.23			c0.29	
v/s Ratio Perm	c0.39									0.08		0.06
v/c Ratio	0.95	0.64						0.59		0.20	0.75	0.16
Uniform Delay, d1	11.4	9.4						9.5		7.9	10.3	7.8
Progression Factor	1.00	1.00						1.00		1.00	1.00	1.00
Incremental Delay, d2	29.9	4.8						0.7		0.5	2.3	0.1
Delay (s)	41.3	14.3						10.2		8.4	12.7	7.9
Level of Service	D	B						B		A	B	A
Approach Delay (s)		28.6			0.0			10.2			11.6	
Approach LOS		C			A			B			B	

Intersection Summary			
HCM Average Control Delay	16.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	39.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	58.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	505	20	610	0	0	0	0	895	275	35	1220	225
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0						4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00						0.95		1.00	0.95	1.00
Frt	1.00	0.85						0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00						1.00		0.95	1.00	1.00
Satd. Flow (prot)	1583	1549						3354		1805	3438	1538
Flt Permitted	0.76	1.00						1.00		0.18	1.00	1.00
Satd. Flow (perm)	1262	1549						3354		345	3438	1538
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	521	21	629	0	0	0	0	923	284	36	1258	232
RTOR Reduction (vph)	0	8	0	0	0	0	0	53	0	0	0	139
Lane Group Flow (vph)	521	642	0	0	0	0	0	1154	0	36	1258	93
Heavy Vehicles (%)	14%	0%	5%	0%	0%	0%	0%	5%	0%	0%	5%	5%
Turn Type	Perm	NA		Perm				NA		Perm	NA	Perm
Protected Phases		6			2			4			8	
Permitted Phases	6			2						8		8
Actuated Green, G (s)	25.0	25.0						22.0		22.0	22.0	22.0
Effective Green, g (s)	25.0	25.0						22.0		22.0	22.0	22.0
Actuated g/C Ratio	0.45	0.45						0.40		0.40	0.40	0.40
Clearance Time (s)	4.0	4.0						4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	574	704						1342		138	1375	615
v/s Ratio Prot		c0.41						0.34			c0.37	
v/s Ratio Perm	0.41									0.10		0.06
v/c Ratio	0.91	0.91						0.86		0.26	0.91	0.15
Uniform Delay, d1	13.9	14.0						15.1		11.1	15.6	10.5
Progression Factor	1.00	1.00						1.00		1.00	1.00	1.00
Incremental Delay, d2	20.6	18.1						5.9		1.0	9.6	0.1
Delay (s)	34.5	32.1						20.9		12.1	25.2	10.7
Level of Service	C	C						C		B	C	B
Approach Delay (s)		33.2			0.0			20.9			22.7	
Approach LOS		C			A			C			C	

Intersection Summary			
HCM Average Control Delay	25.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	55.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	79.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
41: Osborne St & I-5 SB

8/15/2012

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	215	20	205	0	0	0	0	865	745	65	1260	560
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0						4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00						0.95		1.00	0.95	1.00
Frt	1.00	0.86						0.93		1.00	1.00	0.85
Flt Protected	0.95	1.00						1.00		0.95	1.00	1.00
Satd. Flow (prot)	1280	1504						3272		1805	3438	1538
Flt Permitted	0.76	1.00						1.00		0.12	1.00	1.00
Satd. Flow (perm)	1020	1504						3272		226	3438	1538
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	244	23	233	0	0	0	0	983	847	74	1432	636
RTOR Reduction (vph)	0	28	0	0	0	0	0	265	0	0	0	271
Lane Group Flow (vph)	244	228	0	0	0	0	0	1565	0	74	1432	365
Heavy Vehicles (%)	41%	0%	10%	0%	0%	0%	0%	5%	0%	0%	5%	5%
Turn Type	Perm	NA		Perm				NA		Perm	NA	Perm
Protected Phases		6			2			4			8	
Permitted Phases	6			2						8		8
Actuated Green, G (s)	17.0	17.0						33.7		33.7	33.7	33.7
Effective Green, g (s)	17.0	17.0						33.7		33.7	33.7	33.7
Actuated g/C Ratio	0.29	0.29						0.57		0.57	0.57	0.57
Clearance Time (s)	4.0	4.0						4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	295	436						1878		130	1974	883
v/s Ratio Prot		0.15						c0.48			0.42	
v/s Ratio Perm	c0.24									0.33		0.24
v/c Ratio	0.83	0.52						0.83		0.57	0.73	0.41
Uniform Delay, d1	19.5	17.4						10.2		7.9	9.1	7.0
Progression Factor	1.00	1.00						1.00		1.00	1.00	1.00
Incremental Delay, d2	22.6	4.4						3.3		5.6	1.4	0.3
Delay (s)	42.1	21.9						13.5		13.5	10.5	7.3
Level of Service	D	C						B		B	B	A
Approach Delay (s)		31.7			0.0			13.5			9.6	
Approach LOS		C			A			B			A	

Intersection Summary			
HCM Average Control Delay	13.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	58.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	74.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
41: Osborne St & I-5 SB

8/15/2012

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	470	20	390	0	0	0	0	650	180	40	990	240
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0						4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00						0.95		1.00	0.95	1.00
Frt	1.00	0.86						0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00						1.00		0.95	1.00	1.00
Satd. Flow (prot)	1556	1555						3361		1805	3438	1538
Flt Permitted	0.76	1.00						1.00		0.25	1.00	1.00
Satd. Flow (perm)	1240	1555						3361		484	3438	1538
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	522	22	433	0	0	0	0	722	200	44	1100	267
RTOR Reduction (vph)	0	16	0	0	0	0	0	63	0	0	0	161
Lane Group Flow (vph)	522	439	0	0	0	0	0	859	0	44	1100	106
Heavy Vehicles (%)	16%	0%	5%	0%	0%	0%	0%	5%	0%	0%	5%	5%
Turn Type	Perm	NA		Perm				NA		Perm	NA	Perm
Protected Phases		6			2			4			8	
Permitted Phases	6			2						8		8
Actuated Green, G (s)	16.0	16.0						15.7		15.7	15.7	15.7
Effective Green, g (s)	16.0	16.0						15.7		15.7	15.7	15.7
Actuated g/C Ratio	0.40	0.40						0.40		0.40	0.40	0.40
Clearance Time (s)	4.0	4.0						4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	500	627						1329		191	1360	608
v/s Ratio Prot		0.28						0.26			c0.32	
v/s Ratio Perm	c0.42									0.09		0.07
v/c Ratio	1.04	0.70						0.65		0.23	0.81	0.17
Uniform Delay, d1	11.9	9.9						9.7		8.0	10.7	7.8
Progression Factor	1.00	1.00						1.00		1.00	1.00	1.00
Incremental Delay, d2	52.2	6.4						1.1		0.6	3.7	0.1
Delay (s)	64.1	16.3						10.8		8.6	14.3	7.9
Level of Service	E	B						B		A	B	A
Approach Delay (s)		41.8			0.0			10.8			12.9	
Approach LOS		D			A			B			B	

Intersection Summary			
HCM Average Control Delay	20.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	39.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	63.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	550	20	665	0	0	0	0	975	300	40	1330	245
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0						4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00						0.95		1.00	0.95	1.00
Frt	1.00	0.85						0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00						1.00		0.95	1.00	1.00
Satd. Flow (prot)	1583	1548						3354		1805	3438	1538
Flt Permitted	0.76	1.00						1.00		0.18	1.00	1.00
Satd. Flow (perm)	1262	1548						3354		345	3438	1538
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	567	21	686	0	0	0	0	1005	309	41	1371	253
RTOR Reduction (vph)	0	5	0	0	0	0	0	53	0	0	0	152
Lane Group Flow (vph)	567	702	0	0	0	0	0	1261	0	41	1371	101
Heavy Vehicles (%)	14%	0%	5%	0%	0%	0%	0%	5%	0%	0%	5%	5%
Turn Type	Perm	NA		Perm				NA		Perm	NA	Perm
Protected Phases		6			2			4			8	
Permitted Phases	6			2						8		8
Actuated Green, G (s)	25.0	25.0						22.0		22.0	22.0	22.0
Effective Green, g (s)	25.0	25.0						22.0		22.0	22.0	22.0
Actuated g/C Ratio	0.45	0.45						0.40		0.40	0.40	0.40
Clearance Time (s)	4.0	4.0						4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	574	704						1342		138	1375	615
v/s Ratio Prot		c0.45						0.38			c0.40	
v/s Ratio Perm	0.45									0.12		0.07
v/c Ratio	0.99	1.00						0.94		0.30	1.00	0.16
Uniform Delay, d1	14.8	15.0						15.9		11.2	16.5	10.6
Progression Factor	1.00	1.00						1.00		1.00	1.00	1.00
Incremental Delay, d2	34.7	33.1						12.7		1.2	23.4	0.1
Delay (s)	49.5	48.0						28.5		12.4	39.9	10.7
Level of Service	D	D						C		B	D	B
Approach Delay (s)		48.7			0.0			28.5			34.8	
Approach LOS		D			A			C			C	

Intersection Summary			
HCM Average Control Delay	37.0	HCM Level of Service	D
HCM Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	55.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	85.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

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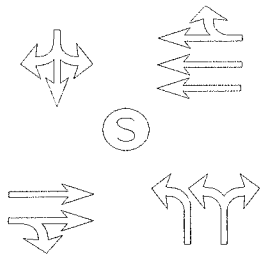
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : OSBORNE STREET
N/S STREET : NB I-5 FREEWAY RAMPS
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 42
ROUTE 8B

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
OSBORNE STREET						
EB LEFT	5	0%		5	5	10
EB THRU	955	10%	**50**	1005	90	1095
EB RIGHT	0	0%		0	0	0
WB LEFT	0	0%		0	0	0
WB THRU	1500	5%		1500	135	1635
WB RIGHT	25	67%	**50**	75	5	80
NB I-5 FREEWAY RAMPS						
NB LEFT	230	10%		230	20	250
NB THRU	0	0%		0	0	0
NB RIGHT	180	10%		180	15	195
SB LEFT	5	0%		5	5	10
SB THRU	0	0%		0	0	0
SB RIGHT	5	0%		5	5	10
TOTALS	**2905**		**100**	**3005**	**280**	**3285**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : OSBORNE STREET
N/S STREET : NB I-5 FREEWAY RAMPS
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 42
ROUTE 8B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
OSBORNE STREET						
EB LEFT	5	0%		5	5	10
EB THRU	955	10%	**50**	1005	90	1095
EB RIGHT	0	0%		0	0	0
WB LEFT	0	0%		0	0	0
WB THRU	820	5%		820	75	895
WB RIGHT	15	77%	**50**	65	5	70
NB I-5 FREEWAY RAMPS						
NB LEFT	305	5%		305	25	330
NB THRU	0	0%		0	0	0
NB RIGHT	220	5%		220	20	240
SB LEFT	5	0%		5	5	10
SB THRU	0	0%		0	0	0
SB RIGHT	5	0%		5	5	10
TOTALS	**2330**		**100**	**2430**	**230**	**2660**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : OSBORNE STREET
N/S STREET : NB I-5 FREEWAY RAMPS
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 42
ROUTE 8B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
OSBORNE STREET						
EB LEFT	5	0%		5	5	10
EB THRU	1340	5%	**50**	1390	125	1515
EB RIGHT	0	0%		0	0	0
WB LEFT	0	0%		0	0	0
WB THRU	1075	5%		1075	95	1170
WB RIGHT	30	63%	**50**	80	5	85
NB I-5 FREEWAY RAMPS						
NB LEFT	410	5%		410	35	445
NB THRU	0	0%		0	0	0
NB RIGHT	205	5%		205	20	225
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	5	0%		5	5	10
TOTALS	**3070**		**100**	**3170**	**290**	**3460**

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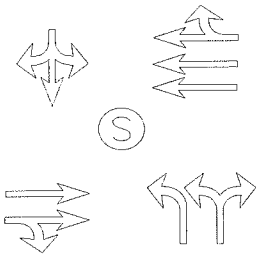
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	21-Sep-12	VV.110264.0000	1 OF 3

E/W STREET : OSBORNE STREET
N/S STREET : NB I-5 FREEWAY RAMPS
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
42
ROUTE
8B

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
OSBORNE STREET								
EB LEFT	2	0	0	5	**0**	5	5	10
EB THRU	918	5	15	935	**150**	1085	100	1185
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	1474	5	15	1490	**0**	1490	135	1625
WB RIGHT	27	0	0	25	**150**	175	15	190
NB I-5 FREEWAY RAMPS								
NB LEFT	212	10	30	240	**0**	240	20	260
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	166	10	30	195	**0**	195	20	215
SB LEFT	2	0	0	5	**0**	5	5	10
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	1	0	0	5	**0**	5	5	10
TOTALS	**2802**				**300**	**3200**	**305**	**3505**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	21-Sep-12	VV.110264.0000	2 OF 3

E/W STREET : OSBORNE STREET
N/S STREET : NB I-5 FREEWAY RAMPS
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 42
ROUTE 8B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
OSBORNE STREET								
EB LEFT	1	0	0	5	**0**	5	5	10
EB THRU	927	29	87	1015	**150**	1165	105	1270
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	794	28	84	880	**0**	880	80	960
WB RIGHT	17	0	0	15	**150**	165	15	180
NB I-5 FREEWAY RAMPS								
NB LEFT	298	5	15	315	**0**	315	30	345
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	207	13	39	245	**0**	245	20	265
SB LEFT	2	0	0	5	**0**	5	5	10
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	1	0	0	5	**0**	5	5	10
TOTALS	**2247**				**300**	**2785**	**265**	**3050**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	21-Sep-12	VV.110264.0000	3 OF 3

E/W STREET : OSBORNE STREET
N/S STREET : NB I-5 FREEWAY RAMPS
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 42
ROUTE 8B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
OSBORNE STREET								
EB LEFT	3	0	0	5	**0**	5	5	10
EB THRU	1306	32	96	1400	**150**	1550	140	1690
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	1035	42	126	1160	**0**	1160	105	1265
WB RIGHT	28	0	0	30	**150**	180	15	195
NB I-5 FREEWAY RAMPS								
NB LEFT	406	6	18	425	**0**	425	40	465
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	198	6	18	215	**0**	215	20	235
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	1	0	0	5	**0**	5	5	10
TOTALS	**2977**				**300**	**3540**	**330**	**3870**

Tustin Office: 714.665.4500 Tel/ 714.665.4501 Fax
Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax
Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax
Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: I-5 NB RAMPS
EAST-WEST STREET: OSBORNE
JURISDICTION: LA

DATE: 05-31-12

PEAK HOUR: 07:00AM

NORTH LEG

TOTAL: 3

Rt	Thru	Lt	
1		2	Total
0		0	1st
0		1	2nd
0		1	3rd
1		0	4th

EAST LEG TOTAL: 1,527

	1st	2nd	3rd	4th	Total
Rt	6	5	5	11	27
Thru	359	377	471	293	1500
Lt					

WEST LEG TOTAL: 958

Total	1st	2nd	3rd	4th	
2	0	0	1	1	Lt
956	215	233	277	231	Thru
					Rt

PEAK HOUR FACTORS

NORTH LEG = 0.75
SOUTH LEG = 0.85
EAST LEG = 0.80
WEST LEG = 0.86

ALL LEGS = 0.84

SOUTH LEG

TOTAL: 411

	Lt	Thru	Rt
1st	45		33
2nd	62		44
3rd	57		49
4th	66		55
Total	230		181

HOUR TOTAL: 2,899

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: I-5 NB RAMPS

EAST-WEST STREET: OSBORNE

TIME: 07:00AM-08:00AM DATE: 05-31-12

NORTH LEG

Rt	Thru	Lt	
1		2	Total
0		0	1st
0		1	2nd
0		1	3rd
1		0	4th

	1st	2nd	3rd	4th	Total
Rt	6	5	5	11	27
Thru	359	377	471	293	1500
Lt					

Total	1st	2nd	3rd	4th	
2	0	0	1	1	Lt
956	215	233	277	231	Thru
					Rt

	Lt	Thru	Rt
1st	45		33
2nd	62		44
3rd	57		49
4th	66		55
Total	230		181

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: I-5 NB RAMPS

EAST-WEST STREET: OSBORNE

TIME: 08:00AM-09:00AM DATE: 05-31-12

NORTH LEG

Rt	Thru	Lt	
2		1	Total
0		0	1st
1		1	2nd
1		0	3rd
0		0	4th

	1st	2nd	3rd	4th	Total
Rt	10	6	6	0	22
Thru	233	189	201	187	810
Lt					

Total	1st	2nd	3rd	4th	
5	0	0	4	1	Lt
837	245	195	194	203	Thru
					Rt

	Lt	Thru	Rt
1st	67		40
2nd	52		57
3rd	55		49
4th	63		60
Total	237		206

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : I-5 NB RAMPS LA

EAST-WEST STREET : OSBORNE 05-31-12

BEGINNING TIME : 07:00AM PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	1	0	0	0	0	0	0	0	0	0	1
0	0	1	0	0	0	0	0	0	0	0	0	1
1	0	0	0	0	0	0	0	0	0	0	0	1
0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	1	0	0	0	0	0	0	0	0	0	2
1	0	0	0	0	0	0	0	0	0	0	0	1
0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	3	0	0	0	0	0	0	0	0	0	6
						SOUTH LEG						
29	0	42	1	0	1	2	0	1	1	0	1	78
39	0	58	3	0	2	0	0	1	2	0	1	106
46	0	53	1	0	3	1	0	0	1	0	1	106
52	0	59	2	0	3	1	0	2	0	0	2	121
36	0	63	1	0	4	3	0	0	0	0	0	107
52	0	48	2	0	2	1	0	1	2	0	1	109
46	0	53	2	0	1	0	0	0	1	0	1	104
54	0	54	2	0	4	1	0	3	3	0	2	123
354	0	430	14	0	20	9	0	8	10	0	9	854
						EAST LEG						
6	353	0	0	4	0	0	1	0	0	1	0	365
5	371	0	0	4	0	0	2	0	0	0	0	382
5	465	0	0	5	0	0	1	0	0	0	0	476
11	285	0	0	4	0	0	2	0	0	2	0	304
10	221	0	0	9	0	0	3	0	0	0	0	243
6	181	0	0	7	0	0	1	0	0	0	0	195
6	190	0	0	5	0	0	4	0	0	2	0	207
0	183	0	0	4	0	0	0	0	0	0	0	187
49	2249	0	0	42	0	0	14	0	0	5	0	2359
						WEST LEG						
0	205	0	0	5	0	0	3	0	0	2	0	215
0	224	0	0	5	0	0	3	0	0	1	0	233
0	266	1	0	6	0	0	4	0	0	1	0	278
0	223	1	0	3	0	0	3	0	0	2	0	232
0	232	0	0	7	0	0	3	0	0	3	0	245
0	183	0	0	6	0	0	3	0	0	3	0	195
0	183	4	0	4	0	0	3	0	0	4	0	198
0	189	1	0	10	0	0	3	0	0	1	0	204
0	1705	7	0	46	0	0	25	0	0	17	0	1800

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: I-5 NB RAMPS
EAST-WEST STREET: OSBORNE
JURISDICTION: LA

DATE: 05-31-12

PEAK HOUR: 01:00PM

NORTH LEG

TOTAL: 3

Rt	Thru	Lt	
1		2	Total
0		0	1st
0		1	2nd
0		0	3rd
1		1	4th

EAST LEG TOTAL: 839

	1st	2nd	3rd	4th	Total
Rt	3	3	5	6	17
Thru	192	202	207	221	822
Lt					

WEST LEG TOTAL: 957

Total	1st	2nd	3rd	4th	
1	0	0	1	0	Lt
956	253	241	231	231	Thru
					Rt

PEAK HOUR FACTORS

NORTH LEG = 0.38
SOUTH LEG = 0.93
EAST LEG = 0.92
WEST LEG = 0.95

ALL LEGS = 0.99

SOUTH LEG

TOTAL: 523

	Lt	Thru	Rt
1st	85		53
2nd	69		60
3rd	78		62
4th	71		45
Total	303		220

HOUR TOTAL: 2,322

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: I-5 NB RAMPS

EAST-WEST STREET: OSBORNE

TIME: 12:00PM-01:00PM DATE: 05-31-12

NORTH LEG

Rt	Thru	Lt	
4		0	Total
0		0	1st
2		0	2nd
2		0	3rd
0		0	4th

	1st	2nd	3rd	4th	Total
Rt	1	4	3	1	9
Thru	148	215	169	200	732
Lt					

Total	1st	2nd	3rd	4th	
2	0	0	1	1	Lt
787	153	230	212	192	Thru
					Rt

	Lt	Thru	Rt
1st	60		36
2nd	74		50
3rd	69		44
4th	65		44
Total	268		174

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: I-5 NB RAMPS

EAST-WEST STREET: OSBORNE

TIME: 01:00PM-02:00PM DATE: 05-31-12

NORTH LEG

Rt	Thru	Lt	
1		2	Total
0		0	1st
0		1	2nd
0		0	3rd
1		1	4th

	1st	2nd	3rd	4th	Total
Rt	3	3	5	6	17
Thru	192	202	207	221	822
Lt					

Total	1st	2nd	3rd	4th	
1	0	0	1	0	Lt
956	253	241	231	231	Thru
					Rt

	Lt	Thru	Rt
1st	85		53
2nd	69		60
3rd	78		62
4th	71		45
Total	303		220

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : I-5 NB RAMPS LA

EAST-WEST STREET : OSBORNE 05-31-12

BEGINNING TIME : 12:00PM PM = 1:00 PM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
NORTH LEG												
0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	2
2	0	0	0	0	0	0	0	0	0	0	0	2
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	1	0	0	0	0	0	0	0	0	0	1
0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	1	0	0	0	0	0	0	0	0	0	2
5	0	2	0	0	0	0	0	0	0	0	0	7
SOUTH LEG												
31	0	59	5	0	0	0	0	0	0	0	1	96
50	0	73	0	0	1	0	0	0	0	0	0	124
42	0	65	1	0	2	0	0	1	1	0	1	113
43	0	64	0	0	1	0	0	0	1	0	0	109
51	0	84	1	0	0	1	0	0	0	0	1	138
55	0	68	5	0	1	0	0	0	0	0	0	129
59	0	76	2	0	1	0	0	1	1	0	0	140
42	0	70	3	0	0	0	0	0	0	0	1	116
373	0	559	17	0	6	1	0	2	3	0	4	965
EAST LEG												
1	137	0	0	7	0	0	1	0	0	3	0	149
4	200	0	0	13	0	0	2	0	0	0	0	219
3	166	0	0	1	0	0	1	0	0	1	0	172
1	194	0	0	5	0	0	0	0	0	1	0	201
3	189	0	0	2	0	0	0	0	0	1	0	195
3	189	0	0	9	0	0	0	0	0	4	0	205
5	200	0	0	6	0	0	1	0	0	0	0	212
6	216	0	0	3	0	0	1	0	0	1	0	227
26	1491	0	0	46	0	0	6	0	0	11	0	1580
WEST LEG												
0	144	0	0	3	0	0	5	0	0	1	0	153
0	215	0	0	4	0	0	4	0	0	7	0	230
0	207	1	0	2	0	0	3	0	0	0	0	213
0	182	1	0	7	0	0	2	0	0	1	0	193
0	245	0	0	5	0	0	1	0	0	2	0	253
0	229	0	0	8	0	0	2	0	0	2	0	241
0	225	1	0	4	0	0	1	0	0	1	0	232
0	228	0	0	2	0	0	1	0	0	0	0	231
0	1675	3	0	35	0	0	19	0	0	14	0	1746

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: I-5 NB RAMPS
EAST-WEST STREET: OSBORNE
JURISDICTION: LA

DATE: 05-31-12

PEAK HOUR: 04:45PM

NORTH LEG

TOTAL: 1

Rt	Thru	Lt	
1			Total
0		0	1st
1		0	2nd
0		0	3rd
0		0	4th

EAST LEG TOTAL: 1,105

	1st	2nd	3rd	4th	Total
Rt	2	7	15	4	28
Thru	257	284	261	275	1077
Lt					

WEST LEG TOTAL: 1,341

Total	1st	2nd	3rd	4th	
3	1	1	0	1	Lt
1338	303	315	409	311	Thru
					Rt

SOUTH LEG

	Lt	Thru	Rt
1st	108		48
2nd	101		62
3rd	96		51
4th	107		43
Total	412		204

TOTAL: 616

PEAK HOUR FACTORS

NORTH LEG = 0.25
SOUTH LEG = 0.94
EAST LEG = 0.95
WEST LEG = 0.82

ALL LEGS = 0.92

HOUR TOTAL: 3,063

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: I-5 NB RAMPS

EAST-WEST STREET: OSBORNE

TIME: 04:00PM-05:00PM DATE: 05-31-12

NORTH LEG

Rt	Thru	Lt	
1		0	Total
0		0	1st
0		0	2nd
1		0	3rd
0		0	4th

	1st	2nd	3rd	4th	Total
Rt	1	5	4	2	12
Thru	255	251	244	257	1007
Lt					

Total	1st	2nd	3rd	4th	
1	0	0	0	1	Lt
1291	321	320	347	303	Thru
					Rt

	Lt	Thru	Rt
1st	69		38
2nd	89		46
3rd	95		44
4th	108		48
Total	361		176

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: I-5 NB RAMPS

EAST-WEST STREET: OSBORNE

TIME: 05:00PM-06:00PM DATE: 05-31-12

NORTH LEG

Rt	Thru	Lt	
2		0	Total
1		0	1st
0		0	2nd
0		0	3rd
1		0	4th

	1st	2nd	3rd	4th	Total
Rt	7	15	4	1	27
Thru	284	261	275	213	1033
Lt					

Total	1st	2nd	3rd	4th	
2	1	0	1	0	Lt
1335	315	409	311	300	Thru
					Rt

	Lt	Thru	Rt
1st	101		62
2nd	96		51
3rd	107		43
4th	60		42
Total	364		198

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : I-5 NB RAMPS LA

EAST-WEST STREET : OSBORNE 05-31-12

BEGINNING TIME : 04:00PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
NORTH LEG												
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0	0	1
0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0	0	1
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0	0	1
3	0	0	0	0	0	0	0	0	0	0	0	3
SOUTH LEG												
37	0	66	1	0	3	0	0	0	0	0	0	107
45	0	87	1	0	2	0	0	0	0	0	0	135
42	0	94	2	0	1	0	0	0	0	0	0	139
47	0	107	1	0	1	0	0	0	0	0	0	156
60	0	99	1	0	1	1	0	0	0	0	1	163
49	0	94	2	0	1	0	0	0	0	0	1	147
42	0	106	0	0	1	0	0	0	1	0	0	150
42	0	57	0	0	2	0	0	0	0	0	1	102
364	0	710	8	0	12	1	0	0	1	0	3	1099
EAST LEG												
1	249	0	0	4	0	0	1	0	0	1	0	256
5	243	0	0	5	0	0	1	0	0	2	0	256
4	236	0	0	5	0	0	2	0	0	1	0	248
2	245	0	0	9	0	0	1	0	0	2	0	259
7	272	0	0	9	0	0	2	0	0	1	0	291
15	253	0	0	7	0	0	1	0	0	0	0	276
4	265	0	0	5	0	0	3	0	0	2	0	279
1	205	0	0	5	0	0	1	0	0	2	0	214
39	1968	0	0	49	0	0	12	0	0	11	0	2079
WEST LEG												
0	316	0	0	4	0	0	0	0	0	1	0	321
0	311	0	0	5	0	0	1	0	0	3	0	320
0	331	0	0	10	0	0	3	0	0	3	0	347
0	296	1	0	5	0	0	1	0	0	1	0	304
0	306	1	0	7	0	0	1	0	0	1	0	316
0	402	0	0	4	0	0	1	0	0	2	0	409
0	302	1	0	6	0	0	2	0	0	1	0	312
0	294	0	0	3	0	0	1	0	0	2	0	300
0	2558	3	0	44	0	0	10	0	0	14	0	2629

Prepared by Newport Traffic Studies

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	5	0	5	230	0	180	0	955	0	0	1500	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor		1.00		0.95	0.95			0.95			0.91	
Frt		0.93		1.00	0.87			1.00			1.00	
Flt Protected		0.98		0.95	0.99			1.00			1.00	
Satd. Flow (prot)		1729		1559	1414			3438			4932	
Flt Permitted		0.89		0.75	0.98			1.00			1.00	
Satd. Flow (perm)		1575		1230	1387			3438			4932	
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	6	0	6	274	0	214	0	1137	0	0	1786	30
RTOR Reduction (vph)	0	2	0	0	22	0	0	0	0	0	4	0
Lane Group Flow (vph)	0	10	0	247	219	0	0	1137	0	0	1812	0
Heavy Vehicles (%)	0%	0%	0%	10%	0%	10%	0%	5%	0%	0%	5%	0%
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		6			2			4			8	
Permitted Phases	6			2								
Actuated Green, G (s)		17.0		17.0	17.0			20.0			20.0	
Effective Green, g (s)		17.0		17.0	17.0			20.0			20.0	
Actuated g/C Ratio		0.38		0.38	0.38			0.44			0.44	
Clearance Time (s)		4.0		4.0	4.0			4.0			4.0	
Vehicle Extension (s)		3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)		595		465	524			1528			2192	
v/s Ratio Prot								0.33			c0.37	
v/s Ratio Perm		0.01		c0.20	0.16							
v/c Ratio		0.02		0.53	0.42			0.74			0.83	
Uniform Delay, d1		8.8		10.9	10.3			10.4			11.0	
Progression Factor		1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2		0.0		4.3	2.4			2.0			2.7	
Delay (s)		8.8		15.2	12.8			12.4			13.7	
Level of Service		A		B	B			B			B	
Approach Delay (s)		8.8			14.0			12.4			13.7	
Approach LOS		A			B			B			B	

Intersection Summary			
HCM Average Control Delay	13.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	51.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	5	0	5	305	0	220	0	955	0	0	820	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor		1.00		0.95	0.95			0.95			0.91	
Frt		0.93		1.00	0.87			1.00			1.00	
Flt Protected		0.98		0.95	0.99			1.00			1.00	
Satd. Flow (prot)		1729		1633	1484			3438			4931	
Flt Permitted		0.89		0.75	0.97			1.00			1.00	
Satd. Flow (perm)		1577		1291	1452			3438			4931	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	5	0	5	308	0	222	0	965	0	0	828	15
RTOR Reduction (vph)	0	3	0	0	25	0	0	0	0	0	5	0
Lane Group Flow (vph)	0	7	0	277	228	0	0	965	0	0	838	0
Heavy Vehicles (%)	0%	0%	0%	5%	0%	5%	0%	5%	0%	0%	5%	0%
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		6			2			4			8	
Permitted Phases	6			2								
Actuated Green, G (s)		16.0		16.0	16.0			15.1			15.1	
Effective Green, g (s)		16.0		16.0	16.0			15.1			15.1	
Actuated g/C Ratio		0.41		0.41	0.41			0.39			0.39	
Clearance Time (s)		4.0		4.0	4.0			4.0			4.0	
Vehicle Extension (s)		3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)		645		528	594			1328			1904	
v/s Ratio Prot								c0.28			0.17	
v/s Ratio Perm		0.00		c0.21	0.16							
v/c Ratio		0.01		0.52	0.38			0.73			0.44	
Uniform Delay, d1		6.9		8.7	8.1			10.2			8.9	
Progression Factor		1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2		0.0		3.7	1.9			2.0			0.2	
Delay (s)		6.9		12.4	10.0			12.3			9.0	
Level of Service		A		B	A			B			A	
Approach Delay (s)		6.9			11.2			12.3			9.0	
Approach LOS		A			B			B			A	

Intersection Summary			
HCM Average Control Delay	10.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	39.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	53.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	5	0	5	410	0	205	0	1340	0	0	1075	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor		1.00		0.95	0.95			0.95			0.91	
Frt		0.93		1.00	0.90			1.00			1.00	
Flt Protected		0.98		0.95	0.98			1.00			1.00	
Satd. Flow (prot)		1729		1633	1517			3438			4926	
Flt Permitted		0.88		0.75	0.91			1.00			1.00	
Satd. Flow (perm)		1552		1291	1396			3438			4926	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	5	0	5	446	0	223	0	1457	0	0	1168	33
RTOR Reduction (vph)	0	3	0	0	14	0	0	0	0	0	6	0
Lane Group Flow (vph)	0	7	0	348	307	0	0	1457	0	0	1195	0
Heavy Vehicles (%)	0%	0%	0%	5%	0%	5%	0%	5%	0%	0%	5%	0%
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		6			2			4			8	
Permitted Phases	6			2								
Actuated Green, G (s)		17.0		17.0	17.0			24.6			24.6	
Effective Green, g (s)		17.0		17.0	17.0			24.6			24.6	
Actuated g/C Ratio		0.34		0.34	0.34			0.50			0.50	
Clearance Time (s)		4.0		4.0	4.0			4.0			4.0	
Vehicle Extension (s)		3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)		532		442	478			1705			2443	
v/s Ratio Prot								c0.42			0.24	
v/s Ratio Perm		0.00		c0.27	0.22							
v/c Ratio		0.01		0.79	0.64			0.85			0.49	
Uniform Delay, d1		10.8		14.7	13.7			10.9			8.3	
Progression Factor		1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2		0.0		13.2	6.5			4.4			0.2	
Delay (s)		10.8		27.9	20.2			15.4			8.5	
Level of Service		B		C	C			B			A	
Approach Delay (s)		10.8			24.2			15.4			8.5	
Approach LOS		B			C			B			A	

Intersection Summary			
HCM Average Control Delay	14.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	49.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	68.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	5	0	5	230	0	180	0	1005	0	0	1500	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor		1.00		0.95	0.95			0.95			0.91	
Frt		0.93		1.00	0.87			1.00			0.99	
Flt Protected		0.98		0.95	0.99			1.00			1.00	
Satd. Flow (prot)		1729		1559	1414			3282			4771	
Flt Permitted		0.89		0.75	0.97			1.00			1.00	
Satd. Flow (perm)		1577		1230	1387			3282			4771	
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	6	0	6	274	0	214	0	1196	0	0	1786	89
RTOR Reduction (vph)	0	4	0	0	24	0	0	0	0	0	11	0
Lane Group Flow (vph)	0	8	0	247	217	0	0	1196	0	0	1864	0
Heavy Vehicles (%)	0%	0%	0%	10%	0%	10%	0%	10%	0%	0%	5%	67%
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		6			2			4			8	
Permitted Phases	6			2								
Actuated Green, G (s)		18.0		18.0	18.0			24.0			24.0	
Effective Green, g (s)		18.0		18.0	18.0			24.0			24.0	
Actuated g/C Ratio		0.36		0.36	0.36			0.48			0.48	
Clearance Time (s)		4.0		4.0	4.0			4.0			4.0	
Vehicle Extension (s)		3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)		568		443	499			1575			2290	
v/s Ratio Prot								0.36			c0.39	
v/s Ratio Perm		0.01		c0.20	0.16							
v/c Ratio		0.01		0.56	0.43			0.76			0.81	
Uniform Delay, d1		10.3		12.8	12.1			10.6			11.1	
Progression Factor		1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2		0.0		5.0	2.7			2.2			2.3	
Delay (s)		10.3		17.8	14.9			12.8			13.4	
Level of Service		B		B	B			B			B	
Approach Delay (s)		10.3			16.4			12.8			13.4	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM Average Control Delay	13.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	52.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	5	0	5	305	0	220	0	1005	0	0	820	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor		1.00		0.95	0.95			0.95			0.91	
Frt		0.93		1.00	0.87			1.00			0.99	
Flt Protected		0.98		0.95	0.99			1.00			1.00	
Satd. Flow (prot)		1729		1633	1484			3282			4650	
Flt Permitted		0.89		0.75	0.97			1.00			1.00	
Satd. Flow (perm)		1577		1291	1452			3282			4650	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	5	0	5	308	0	222	0	1015	0	0	828	66
RTOR Reduction (vph)	0	3	0	0	21	0	0	0	0	0	23	0
Lane Group Flow (vph)	0	7	0	277	232	0	0	1015	0	0	871	0
Heavy Vehicles (%)	0%	0%	0%	5%	0%	5%	0%	10%	0%	0%	5%	77%
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		6			2			4			8	
Permitted Phases	6			2								
Actuated Green, G (s)		16.0		16.0	16.0			15.4			15.4	
Effective Green, g (s)		16.0		16.0	16.0			15.4			15.4	
Actuated g/C Ratio		0.41		0.41	0.41			0.39			0.39	
Clearance Time (s)		4.0		4.0	4.0			4.0			4.0	
Vehicle Extension (s)		3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)		640		524	590			1283			1818	
v/s Ratio Prot								c0.31			0.19	
v/s Ratio Perm		0.00		c0.21	0.16							
v/c Ratio		0.01		0.53	0.39			0.79			0.48	
Uniform Delay, d1		7.0		8.8	8.3			10.6			9.0	
Progression Factor		1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2		0.0		3.8	2.0			3.4			0.2	
Delay (s)		7.0		12.6	10.2			14.0			9.2	
Level of Service		A		B	B			B			A	
Approach Delay (s)		7.0			11.5			14.0			9.2	
Approach LOS		A			B			B			A	

Intersection Summary			
HCM Average Control Delay	11.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	39.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	54.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	5	0	5	410	0	205	0	1390	0	0	1075	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor		1.00		0.95	0.95			0.95			0.91	
Frt		0.93		1.00	0.90			1.00			0.99	
Flt Protected		0.98		0.95	0.98			1.00			1.00	
Satd. Flow (prot)		1729		1633	1517			3438			4708	
Flt Permitted		0.88		0.75	0.91			1.00			1.00	
Satd. Flow (perm)		1562		1291	1396			3438			4708	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	5	0	5	446	0	223	0	1511	0	0	1168	87
RTOR Reduction (vph)	0	3	0	0	12	0	0	0	0	0	15	0
Lane Group Flow (vph)	0	7	0	348	309	0	0	1511	0	0	1240	0
Heavy Vehicles (%)	0%	0%	0%	5%	0%	5%	0%	5%	0%	0%	5%	63%
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		6			2			4			8	
Permitted Phases	6			2								
Actuated Green, G (s)		19.0		19.0	19.0			27.7			27.7	
Effective Green, g (s)		19.0		19.0	19.0			27.7			27.7	
Actuated g/C Ratio		0.35		0.35	0.35			0.51			0.51	
Clearance Time (s)		4.0		4.0	4.0			4.0			4.0	
Vehicle Extension (s)		3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)		543		448	485			1741			2384	
v/s Ratio Prot								c0.44			0.26	
v/s Ratio Perm		0.00		c0.27	0.22							
v/c Ratio		0.01		0.78	0.64			0.87			0.52	
Uniform Delay, d1		11.7		16.0	15.0			11.9			9.0	
Progression Factor		1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2		0.0		12.4	6.3			4.9			0.2	
Delay (s)		11.7		28.4	21.2			16.8			9.3	
Level of Service		B		C	C			B			A	
Approach Delay (s)		11.7			24.9			16.8			9.3	
Approach LOS		B			C			B			A	

Intersection Summary			
HCM Average Control Delay	15.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	54.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	69.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	5	0	5	250	0	195	0	1095	0	0	1635	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor		1.00		0.95	0.95			0.95			0.91	
Frt		0.93		1.00	0.87			1.00			0.99	
Flt Protected		0.98		0.95	0.99			1.00			1.00	
Satd. Flow (prot)		1729		1559	1415			3282			4774	
Flt Permitted		0.89		0.75	0.97			1.00			1.00	
Satd. Flow (perm)		1571		1230	1385			3282			4774	
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	6	0	6	298	0	232	0	1304	0	0	1946	95
RTOR Reduction (vph)	0	3	0	0	22	0	0	0	0	0	9	0
Lane Group Flow (vph)	0	9	0	268	240	0	0	1304	0	0	2032	0
Heavy Vehicles (%)	0%	0%	0%	10%	0%	10%	0%	10%	0%	0%	5%	67%
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		6			2			4			8	
Permitted Phases	6			2								
Actuated Green, G (s)		19.0		19.0	19.0			28.0			28.0	
Effective Green, g (s)		19.0		19.0	19.0			28.0			28.0	
Actuated g/C Ratio		0.35		0.35	0.35			0.51			0.51	
Clearance Time (s)		4.0		4.0	4.0			4.0			4.0	
Vehicle Extension (s)		3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)		543		425	478			1671			2430	
v/s Ratio Prot								0.40			c0.43	
v/s Ratio Perm		0.01		c0.22	0.17							
v/c Ratio		0.02		0.63	0.50			0.78			0.84	
Uniform Delay, d1		11.8		15.1	14.3			11.0			11.5	
Progression Factor		1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2		0.0		6.9	3.7			2.4			2.7	
Delay (s)		11.9		22.0	18.0			13.4			14.2	
Level of Service		B		C	B			B			B	
Approach Delay (s)		11.9			20.0			13.4			14.2	
Approach LOS		B			C			B			B	

Intersection Summary			
HCM Average Control Delay	14.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	55.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	56.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	5	0	5	330	0	240	0	1095	0	0	895	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor		1.00		0.95	0.95			0.95			0.91	
Frt		0.93		1.00	0.87			1.00			0.99	
Flt Protected		0.98		0.95	0.99			1.00			1.00	
Satd. Flow (prot)		1729		1633	1483			3282			4654	
Flt Permitted		0.89		0.75	0.97			1.00			1.00	
Satd. Flow (perm)		1573		1291	1451			3282			4654	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	5	0	5	333	0	242	0	1106	0	0	904	71
RTOR Reduction (vph)	0	3	0	0	23	0	0	0	0	0	20	0
Lane Group Flow (vph)	0	7	0	300	252	0	0	1106	0	0	955	0
Heavy Vehicles (%)	0%	0%	0%	5%	0%	5%	0%	10%	0%	0%	5%	77%
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		6			2			4			8	
Permitted Phases	6			2								
Actuated Green, G (s)		17.0		17.0	17.0			19.0			19.0	
Effective Green, g (s)		17.0		17.0	17.0			19.0			19.0	
Actuated g/C Ratio		0.39		0.39	0.39			0.43			0.43	
Clearance Time (s)		4.0		4.0	4.0			4.0			4.0	
Vehicle Extension (s)		3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)		608		499	561			1417			2010	
v/s Ratio Prot								c0.34			0.21	
v/s Ratio Perm		0.00		c0.23	0.17							
v/c Ratio		0.01		0.60	0.45			0.78			0.47	
Uniform Delay, d1		8.3		10.8	10.0			10.7			8.9	
Progression Factor		1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2		0.0		5.3	2.6			2.9			0.2	
Delay (s)		8.3		16.1	12.6			13.6			9.1	
Level of Service		A		B	B			B			A	
Approach Delay (s)		8.3			14.4			13.6			9.1	
Approach LOS		A			B			B			A	

Intersection Summary			
HCM Average Control Delay	12.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	44.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	58.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	5	0	5	445	0	225	0	1515	0	0	1170	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor		1.00		0.95	0.95			0.95			0.91	
Frt		0.93		1.00	0.90			1.00			0.99	
Flt Protected		0.98		0.95	0.99			1.00			1.00	
Satd. Flow (prot)		1729		1633	1516			3438			4714	
Flt Permitted		0.88		0.75	0.91			1.00			1.00	
Satd. Flow (perm)		1559		1291	1393			3438			4714	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	5	0	5	484	0	245	0	1647	0	0	1272	92
RTOR Reduction (vph)	0	3	0	0	9	0	0	0	0	0	14	0
Lane Group Flow (vph)	0	7	0	378	342	0	0	1647	0	0	1350	0
Heavy Vehicles (%)	0%	0%	0%	5%	0%	5%	0%	5%	0%	0%	5%	63%
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		6			2			4			8	
Permitted Phases	6			2								
Actuated Green, G (s)		21.0		21.0	21.0			31.0			31.0	
Effective Green, g (s)		21.0		21.0	21.0			31.0			31.0	
Actuated g/C Ratio		0.35		0.35	0.35			0.52			0.52	
Clearance Time (s)		4.0		4.0	4.0			4.0			4.0	
Vehicle Extension (s)		3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)		546		452	488			1776			2436	
v/s Ratio Prot								c0.48			0.29	
v/s Ratio Perm		0.00		c0.29	0.25							
v/c Ratio		0.01		0.84	0.70			0.93			0.55	
Uniform Delay, d1		12.7		17.9	16.8			13.5			9.8	
Progression Factor		1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2		0.0		16.6	8.1			8.9			0.3	
Delay (s)		12.7		34.5	24.9			22.3			10.1	
Level of Service		B		C	C			C			B	
Approach Delay (s)		12.7			29.9			22.3			10.1	
Approach LOS		B			C			C			B	

Intersection Summary			
HCM Average Control Delay	19.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	74.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

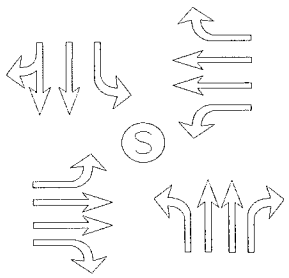
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : OSBORNE STREET
N/S STREET : LAUREL CANYON BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 43
ROUTE 8B

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						

OSBORNE STREET

EB LEFT	120	5%		120	10	130
EB THRU	840	5%		840	75	915
EB RIGHT	80	45%	**50**	130	10	140
WB LEFT	110	5%		110	10	120
WB THRU	1375	5%		1375	125	1500
WB RIGHT	170	5%		170	15	185

LAUREL CANYON BLVD

NB LEFT	85	40%	**50**	135	10	145
NB THRU	605	5%		605	55	660
NB RIGHT	105	5%		105	10	115
SB LEFT	110	5%		110	10	120
SB THRU	335	5%		335	30	365
SB RIGHT	50	10%		50	5	55
TOTALS	**3985**		**100**	**4085**	**365**	**4450**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : OSBORNE STREET
N/S STREET : LAUREL CANYON BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 43
ROUTE 8B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
OSBORNE STREET						
EB LEFT	90	5%		90	10	100
EB THRU	995	5%		995	90	1085
EB RIGHT	80	42%	**50**	130	10	140
WB LEFT	80	10%		80	5	85
WB THRU	690	5%		690	60	750
WB RIGHT	110	5%		110	10	120
LAUREL CANYON BLVD						
NB LEFT	80	42%	**50**	130	10	140
NB THRU	460	5%		460	40	500
NB RIGHT	90	5%		90	10	100
SB LEFT	75	5%		75	5	80
SB THRU	515	5%		515	45	560
SB RIGHT	90	5%		90	10	100
TOTALS	**3355**		**100**	**3455**	**305**	**3760**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	3-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : OSBORNE STREET
N/S STREET : LAUREL CANYON BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 43
ROUTE 8B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
OSBORNE STREET						
EB LEFT	95	5%		95	10	105
EB THRU	1315	5%		1315	120	1435
EB RIGHT	65	52%	**50**	115	10	125
WB LEFT	120	5%		120	10	130
WB THRU	850	5%		850	75	925
WB RIGHT	110	5%		110	10	120
LAUREL CANYON BLVD						
NB LEFT	160	36%	**50**	210	20	230
NB THRU	1130	5%		1130	100	1230
NB RIGHT	120	5%		120	10	130
SB LEFT	75	5%		75	5	80
SB THRU	460	5%		460	40	500
SB RIGHT	75	5%		75	5	80
TOTALS	**4575**		**100**	**4675**	**415**	**5090**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
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E/W STREET : OSBORNE STREET
N/S STREET : LAUREL CANYON BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
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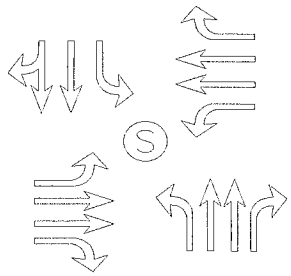
INTERSECTION 43
ROUTE 8B

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
OSBORNE STREET								
EB LEFT	114	4	12	125	**0**	125	10	135
EB THRU	810	30	90	900	**0**	900	80	980
EB RIGHT	73	9	27	100	**150**	250	25	275
WB LEFT	102	6	18	120	**0**	120	10	130
WB THRU	1350	25	75	1425	**0**	1425	130	1555
WB RIGHT	164	5	15	180	**0**	180	15	195
LAUREL CANYON BLVD								
NB LEFT	84	2	6	90	**150**	240	20	260
NB THRU	600	7	21	620	**0**	620	55	675
NB RIGHT	97	6	18	115	**0**	115	10	125
SB LEFT	111	1	3	115	**0**	115	10	125
SB THRU	326	7	21	345	**0**	345	30	375
SB RIGHT	48	4	12	60	**0**	60	5	65
TOTALS	**3879**				**300**	**4495**	**400**	**4895**

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TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : OSBORNE STREET
N/S STREET : LAUREL CANYON BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 43
ROUTE 8B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
OSBORNE STREET								
EB LEFT	91	1	3	95	**0**	95	10	105
EB THRU	968	29	87	1055	**0**	1055	95	1150
EB RIGHT	78	4	12	90	**150**	240	20	260
WB LEFT	73	9	27	100	**0**	100	10	110
WB THRU	666	23	69	735	**0**	735	65	800
WB RIGHT	109	1	3	110	**0**	110	10	120
LAUREL CANYON BLVD								
NB LEFT	76	2	6	80	**150**	230	20	250
NB THRU	455	5	15	470	**0**	470	40	510
NB RIGHT	88	4	12	100	**0**	100	10	110
SB LEFT	73	4	12	85	**0**	85	5	90
SB THRU	515	1	3	520	**0**	520	45	565
SB RIGHT	83	6	18	100	**0**	100	10	110
TOTALS	**3275**				**300**	**3840**	**340**	**4180**

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TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : OSBORNE STREET
N/S STREET : LAUREL CANYON BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 43
ROUTE 8B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
OSBORNE STREET								
EB LEFT	89	4	12	100	**0**	100	10	110
EB THRU	1283	30	90	1375	**0**	1375	125	1500
EB RIGHT	57	9	27	85	**150**	235	20	255
WB LEFT	112	6	18	130	**0**	130	10	140
WB THRU	811	38	114	925	**0**	925	85	1010
WB RIGHT	105	5	15	120	**0**	120	10	130
LAUREL CANYON BLVD								
NB LEFT	157	1	3	160	**150**	310	30	340
NB THRU	1124	4	12	1135	**0**	1135	100	1235
NB RIGHT	117	5	15	130	**0**	130	10	140
SB LEFT	68	5	15	85	**0**	85	5	90
SB THRU	454	4	12	465	**0**	465	40	505
SB RIGHT	73	3	9	80	**0**	80	5	85
TOTALS	**4450**				**300**	**5090**	**450**	**5540**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: LAUREL CANYON
EAST-WEST STREET: OSBORNE
JURISDICTION: LA

DATE: 06-05-12

PEAK HOUR: 07:00AM

NORTH LEG

TOTAL: 497

Rt	Thru	Lt	
52	333	112	Total
11	77	35	1st
10	89	27	2nd
20	107	33	3rd
11	60	17	4th

EAST LEG TOTAL: 1,652

	1st	2nd	3rd	4th	Total
Rt	34	42	45	48	169
Thru	328	346	431	270	1375
Lt	27	24	32	25	108

WEST LEG TOTAL: 1,040

Total	1st	2nd	3rd	4th	
118	25	26	36	31	Lt
840	183	221	214	222	Thru
82	30	22	22	8	Rt

PEAK HOUR FACTORS

NORTH LEG = 0.78
SOUTH LEG = 0.94
EAST LEG = 0.81
WEST LEG = 0.96

ALL LEGS = 0.87

SOUTH LEG

TOTAL: 796

	Lt	Thru	Rt
1st	24	164	22
2nd	16	168	22
3rd	24	159	28
4th	22	116	31
Total	86	607	103

HOUR TOTAL: 3,985

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: LAUREL CANYON

EAST-WEST STREET: OSBORNE

TIME: 07:00AM-08:00AM DATE: 06-05-12

NORTH LEG

52	333	112	Total
11	77	35	1st
10	89	27	2nd
20	107	33	3rd
11	60	17	4th
Rt	Thru	Lt	

	1st	2nd	3rd	4th	Total
Rt	34	42	45	48	169
Thru	328	346	431	270	1375
Lt	27	24	32	25	108

Total	1st	2nd	3rd	4th	
118	25	26	36	31	Lt
840	183	221	214	222	Thru
82	30	22	22	8	Rt

	Lt	Thru	Rt
1st	24	164	22
2nd	16	168	22
3rd	24	159	28
4th	22	116	31
Total	86	607	103

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: LAUREL CANYON

EAST-WEST STREET: OSBORNE

TIME: 08:00AM-09:00AM DATE: 06-05-12

NORTH LEG

Rt	Thru	Lt	
31	351	78	Total
6	126	20	1st
10	89	19	2nd
9	81	23	3rd
6	55	16	4th

	1st	2nd	3rd	4th	Total
Rt	31	33	29	26	119
Thru	224	166	177	159	726
Lt	18	23	19	31	91

Total	1st	2nd	3rd	4th	
89	21	23	26	19	Lt
869	266	194	187	222	Thru
64	13	14	21	16	Rt

	Lt	Thru	Rt
1st	11	177	7
2nd	23	116	12
3rd	20	144	23
4th	16	89	19
Total	70	526	61

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : LAUREL CANYON LA

EAST-WEST STREET : OSBORNE 06-05-12

BEGINNING TIME : 07:00AM = PH

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
11	75	35	0	1	0	0	0	0	0	1	0	123
8	88	26	2	1	1	0	0	0	0	0	0	126
19	104	33	0	2	0	0	1	0	1	0	0	160
10	59	17	1	1	0	0	0	0	0	0	0	88
6	124	19	0	1	0	0	1	0	0	0	1	152
10	87	18	0	2	1	0	0	0	0	0	0	118
7	77	23	1	2	0	1	0	0	0	2	0	113
5	52	16	1	2	0	0	1	0	0	0	0	77
76	666	187	5	12	2	1	3	0	1	3	1	957
						SOUTH LEG						
21	162	23	1	1	0	0	1	1	0	0	0	210
21	167	16	0	0	0	1	1	0	0	0	0	206
27	156	23	1	1	0	0	0	1	0	2	0	211
28	115	22	1	1	0	1	0	0	1	0	0	169
6	176	11	1	0	0	0	1	0	0	0	0	195
10	112	22	2	2	0	0	1	0	0	1	1	151
22	143	20	1	1	0	0	0	0	0	0	0	187
19	89	16	0	0	0	0	0	0	0	0	0	124
154	1120	153	7	6	0	2	4	2	1	3	1	1453
						EAST LEG						
32	321	25	1	5	1	1	1	1	0	1	0	389
41	341	23	0	4	1	1	1	0	0	0	0	412
45	424	30	0	5	2	0	1	0	0	1	0	508
46	264	24	1	5	1	0	1	0	1	0	0	343
30	212	16	1	8	1	0	1	1	0	3	0	273
33	162	21	0	3	2	0	1	0	0	0	0	222
28	170	17	0	3	2	1	3	0	0	1	0	225
25	154	30	0	4	0	0	1	1	1	0	0	216
280	2048	186	3	37	10	3	10	3	2	6	0	2588
						WEST LEG						
29	175	24	0	4	1	1	2	0	0	2	0	238
20	214	26	1	4	0	0	2	0	1	1	0	269
20	208	35	1	4	1	1	1	0	0	1	0	272
4	213	29	1	5	1	2	2	0	1	2	1	261
12	256	21	1	4	0	0	1	0	0	5	0	300
12	181	22	1	6	0	1	4	1	0	3	0	231
19	180	25	1	4	0	1	1	0	0	2	1	234
13	213	19	0	7	0	1	1	0	2	1	0	257
129	1640	201	6	38	3	7	14	1	4	17	2	2062

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: LAUREL CANYON
EAST-WEST STREET: OSBORNE
JURISDICTION: LA

DATE: 06-05-12

PEAK HOUR: 01:00PM

NORTH LEG

TOTAL: 682

Rt	Thru	Lt	
89	516	77	Total
19	133	14	1st
27	140	21	2nd
22	133	22	3rd
21	110	20	4th

EAST LEG TOTAL: 881

	1st	2nd	3rd	4th	Total
Rt	28	31	26	25	110
Thru	166	159	173	191	689
Lt	20	19	23	20	82

WEST LEG TOTAL: 1,171

Total	1st	2nd	3rd	4th	
92	26	27	19	20	Lt
997	249	255	249	244	Thru
82	23	22	16	21	Rt

PEAK HOUR FACTORS

NORTH LEG = 0.91
SOUTH LEG = 0.98
EAST LEG = 0.93
WEST LEG = 0.96

ALL LEGS = 0.98

SOUTH LEG

TOTAL: 630

	Lt	Thru	Rt
1st	16	119	26
2nd	23	116	22
3rd	19	111	25
4th	20	114	19
Total	78	460	92

HOUR TOTAL: 3,364

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: LAUREL CANYON

EAST-WEST STREET: OSBORNE

TIME: 12:00PM-01:00PM DATE: 06-05-12

NORTH LEG

59	525	81	Total
14	109	13	1st
10	122	23	2nd
19	161	25	3rd
16	133	20	4th
Rt	Thru	Lt	

Rt	26	31	33	36	126
Thru	122	191	133	169	615
Lt	22	26	22	20	90
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
88	16	22	19	31	Lt
796	155	239	214	188	Thru
80	23	16	22	19	Rt

	Lt	Thru	Rt
1st	16	99	26
2nd	23	114	31
3rd	22	123	25
4th	19	122	21
Total	80	458	103

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: LAUREL CANYON

EAST-WEST STREET: OSBORNE

TIME: 01:00PM-02:00PM DATE: 06-05-12

NORTH LEG

Rt	Thru	Lt	
89	516	77	Total
19	133	14	1st
27	140	21	2nd
22	133	22	3rd
21	110	20	4th

	1st	2nd	3rd	4th	Total
Rt	28	31	26	25	110
Thru	166	159	173	191	689
Lt	20	19	23	20	82

Total	1st	2nd	3rd	4th	
92	26	27	19	20	Lt
997	249	255	249	244	Thru
82	23	22	16	21	Rt

	Lt	Thru	Rt
1st	16	119	26
2nd	23	116	22
3rd	19	111	25
4th	20	114	19
Total	78	460	92

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : LAUREL CANYON LA

EAST-WEST STREET : OSBORNE 06-05-12

BEGINNING TIME : 12:00PM PH=1:00 PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
NORTH LEG												
14	108	12	0	0	0	0	0	1	0	1	0	136
10	120	22	0	2	1	0	0	0	0	0	0	155
18	161	25	1	0	0	0	0	0	0	0	0	205
16	132	20	0	0	0	0	1	0	0	0	0	169
17	132	12	0	0	1	1	0	0	1	1	1	166
26	140	19	1	0	1	0	0	1	0	0	0	188
21	133	22	0	0	0	0	0	0	1	0	0	177
19	110	20	0	0	0	1	0	0	1	0	0	151
141	1036	152	2	2	3	2	1	2	3	2	1	1347
SOUTH LEG												
25	99	15	0	0	0	1	0	1	0	0	0	141
31	112	23	0	2	0	0	0	0	0	0	0	168
23	121	20	0	2	1	1	0	1	1	0	0	170
20	121	19	1	0	0	0	0	0	0	1	0	162
25	117	16	1	0	0	0	1	0	0	1	0	161
20	115	23	1	1	0	1	0	0	0	0	0	161
25	110	18	0	0	0	0	1	1	0	0	0	155
18	113	19	0	0	1	1	0	0	0	1	0	153
187	908	153	3	5	2	4	2	3	1	3	0	1271
EAST LEG												
25	116	20	1	4	2	0	1	0	0	1	0	170
31	184	24	0	3	1	0	3	0	0	1	1	248
33	124	21	0	7	1	0	1	0	0	1	0	188
35	163	18	1	6	1	0	0	1	0	0	0	225
28	162	17	0	3	2	0	1	0	0	0	1	214
30	153	15	1	4	2	0	1	1	0	1	1	209
26	167	22	0	4	1	0	1	0	0	1	0	222
25	184	19	0	4	1	0	0	0	0	3	0	236
233	1253	156	3	35	11	0	8	2	0	8	3	1712
WEST LEG												
20	148	16	1	2	0	1	5	0	1	0	0	194
15	232	22	1	3	0	0	3	0	0	1	0	277
19	206	18	2	4	0	0	3	1	1	1	0	255
19	179	31	0	3	0	0	3	0	0	3	0	238
22	242	25	0	4	1	0	2	0	1	1	0	298
20	247	27	1	6	0	1	2	0	0	0	0	304
16	241	19	0	5	0	0	1	0	0	2	0	284
20	238	20	1	4	0	0	2	0	0	0	0	285
151	1733	178	6	31	1	2	21	1	3	8	0	2135

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: LAUREL CANYON
EAST-WEST STREET: OSBORNE
JURISDICTION: LA

DATE: 06-05-12

PEAK HOUR: 04:30PM

NORTH LEG

TOTAL: 607

Rt	Thru	Lt	
76	458	73	Total
23	131	22	1st
16	111	14	2nd
17	100	16	3rd
20	116	21	4th

EAST LEG TOTAL: 1,077

	1st	2nd	3rd	4th	Total
Rt	29	28	31	22	110
Thru	188	203	238	220	849
Lt	25	29	31	33	118

WEST LEG TOTAL: 1,472

Total	1st	2nd	3rd	4th	
93	22	26	23	22	Lt
1313	349	214	329	421	Thru
66	14	15	21	16	Rt

PEAK HOUR FACTORS

NORTH LEG = 0.86
SOUTH LEG = 0.96
EAST LEG = 0.90
WEST LEG = 0.80

ALL LEGS = 0.93

SOUTH LEG

TOTAL: 1,408

	Lt	Thru	Rt
1st	36	283	31
2nd	44	291	33
3rd	42	288	27
4th	36	266	31
Total	158	1128	122

HOUR TOTAL: 4,564

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INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: LAUREL CANYON

EAST-WEST STREET: OSBORNE

TIME: 04:00PM-05:00PM DATE: 06-05-12

NORTH LEG

Rt	Thru	Lt	
68	475	75	Total
19	111	16	1st
10	122	23	2nd
23	131	22	3rd
16	111	14	4th

	1st	2nd	3rd	4th	Total
Rt	33	38	29	28	128
Thru	219	209	188	203	819
Lt	23	16	25	29	93

Total	1st	2nd	3rd	4th	
84	12	24	22	26	Lt
1208	323	322	349	214	Thru
68	16	23	14	15	Rt

	Lt	Thru	Rt
1st	33	222	26
2nd	42	271	29
3rd	36	283	31
4th	44	291	33
Total	155	1067	119

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: LAUREL CANYON

EAST-WEST STREET: OSBORNE

TIME: 05:00PM-06:00PM DATE: 06-05-12

NORTH LEG

Rt	Thru	Lt	
67	448	73	Total
17	100	16	1st
20	116	21	2nd
16	121	20	3rd
14	111	16	4th

	1st	2nd	3rd	4th	Total
Rt	31	22	24	20	97
Thru	238	220	241	178	877
Lt	31	33	28	24	116

Total	1st	2nd	3rd	4th	
82	23	22	16	21	Lt
1369	329	421	320	299	Thru
63	21	16	12	14	Rt

	Lt	Thru	Rt
1st	42	288	27
2nd	36	266	31
3rd	31	259	22
4th	26	263	19
Total	135	1076	99

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : LAUREL CANYON LA

EAST-WEST STREET : OSBORNE 06-05-12

BEGINNING TIME : 04:00PM PH = 4:30 PM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
						NORTH LEG						
19	110	15	0	1	0	0	0	0	0	0	1	146
10	122	22	0	0	0	0	0	1	0	0	0	155
22	129	21	0	1	0	0	1	0	1	0	1	176
16	111	13	0	0	0	0	0	1	0	0	0	141
16	99	16	1	0	0	0	0	0	0	1	0	133
19	115	18	0	1	1	1	0	1	0	0	1	157
16	121	20	0	0	0	0	0	0	0	0	0	157
12	111	14	0	0	0	1	0	1	1	0	1	141
130	918	139	1	3	1	2	1	4	2	1	4	1206
						SOUTH LEG						
25	220	32	0	1	0	0	1	0	1	0	1	281
29	271	41	0	0	0	0	0	1	0	0	0	342
30	281	36	1	1	0	0	0	0	0	1	0	350
31	291	44	1	0	0	0	0	0	1	0	0	368
26	286	42	0	1	0	1	1	0	0	0	0	357
30	266	35	0	0	0	0	0	0	1	0	1	333
20	259	31	2	0	0	0	0	0	0	0	0	312
18	263	24	0	0	0	0	0	1	1	0	1	308
209	2137	285	4	3	0	1	2	2	4	1	3	2651
						EAST LEG						
33	212	21	0	4	1	0	2	1	0	1	0	275
38	200	14	0	6	1	0	1	0	0	2	1	263
29	180	24	0	5	1	0	2	0	0	1	0	242
27	193	26	1	8	1	0	1	1	0	1	1	260
28	228	30	1	9	1	1	1	0	1	0	0	300
21	210	32	0	8	1	0	1	0	1	1	0	275
24	234	28	0	5	0	0	1	0	0	1	0	293
19	167	20	1	6	2	0	3	0	0	2	2	222
219	1624	195	3	51	8	1	12	2	2	9	4	2130
						WEST LEG						
12	317	11	2	4	0	1	1	1	1	1	0	351
23	313	24	0	6	0	0	1	0	0	2	0	369
10	341	21	3	6	1	0	1	0	1	1	0	385
13	206	24	1	6	0	1	0	1	0	2	1	255
20	322	22	1	3	0	0	3	0	0	1	1	373
14	414	22	0	5	0	1	2	0	1	0	0	459
10	313	15	2	4	1	0	1	0	0	2	0	348
14	291	21	0	5	0	0	2	0	0	1	0	334
116	2517	160	9	39	2	3	11	2	3	10	2	2874

Prepared by Newport Traffic Studies

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	110	335	50	85	605	105	120	840	80	110	1375	170
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	3351		1719	3438	1538	1719	3438	1468	1719	3438	1538
Flt Permitted	0.18	1.00		0.35	1.00	1.00	0.10	1.00	1.00	0.17	1.00	1.00
Satd. Flow (perm)	332	3351		640	3438	1538	177	3438	1468	310	3438	1538
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	126	385	57	98	695	121	138	966	92	126	1580	195
RTOR Reduction (vph)	0	13	0	0	0	65	0	0	36	0	0	38
Lane Group Flow (vph)	126	429	0	98	695	56	138	966	56	126	1580	157
Heavy Vehicles (%)	5%	5%	10%	5%	5%	5%	5%	5%	10%	5%	5%	5%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6			2		2	4		4	8		8
Actuated Green, G (s)	25.8	21.8		25.8	21.8	21.8	46.0	41.0	41.0	52.0	44.0	44.0
Effective Green, g (s)	25.8	21.8		25.8	21.8	21.8	46.0	41.0	41.0	52.0	44.0	44.0
Actuated g/C Ratio	0.28	0.24		0.28	0.24	0.24	0.51	0.45	0.45	0.57	0.48	0.48
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	155	805		229	825	369	175	1552	663	302	1666	745
v/s Ratio Prot	c0.04	0.13		0.02	c0.20		c0.04	0.28		c0.04	c0.46	
v/s Ratio Perm	0.19			0.10		0.04	0.36		0.04	0.20		0.10
v/c Ratio	0.81	0.53		0.43	0.84	0.15	0.79	0.62	0.08	0.42	0.95	0.21
Uniform Delay, d1	28.9	30.1		24.9	32.9	27.2	19.1	19.0	14.2	11.4	22.3	13.4
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	26.7	2.5		1.3	10.2	0.9	20.6	0.8	0.1	0.9	11.9	0.1
Delay (s)	55.6	32.6		26.2	43.1	28.1	39.7	19.8	14.3	12.4	34.2	13.6
Level of Service	E	C		C	D	C	D	B	B	B	C	B
Approach Delay (s)		37.7			39.3			21.7			30.6	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM Average Control Delay	30.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	90.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	80.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	75	515	90	80	460	90	90	995	80	80	690	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	3361		1719	3438	1538	1719	3438	1538	1641	3438	1538
Flt Permitted	0.44	1.00		0.28	1.00	1.00	0.26	1.00	1.00	0.21	1.00	1.00
Satd. Flow (perm)	790	3361		506	3438	1538	474	3438	1538	358	3438	1538
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	77	526	92	82	469	92	92	1015	82	82	704	112
RTOR Reduction (vph)	0	23	0	0	0	64	0	0	46	0	0	73
Lane Group Flow (vph)	77	595	0	82	469	28	92	1015	36	82	704	39
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	10%	5%	5%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6			2		2	4		4	8		8
Actuated Green, G (s)	19.3	17.1		20.9	17.9	17.9	22.3	19.3	19.3	22.3	19.3	19.3
Effective Green, g (s)	19.3	17.1		20.9	17.9	17.9	22.3	19.3	19.3	22.3	19.3	19.3
Actuated g/C Ratio	0.33	0.29		0.36	0.31	0.31	0.38	0.33	0.33	0.38	0.33	0.33
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	296	984		243	1054	471	245	1136	508	203	1136	508
v/s Ratio Prot	0.01	c0.18		c0.02	0.14		0.02	c0.30		c0.02	0.20	
v/s Ratio Perm	0.08			0.10		0.02	0.12		0.02	0.13		0.03
v/c Ratio	0.26	0.61		0.34	0.44	0.06	0.38	0.89	0.07	0.40	0.62	0.08
Uniform Delay, d1	13.7	17.7		13.0	16.3	14.3	12.2	18.6	13.4	13.2	16.5	13.4
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	2.8		0.8	1.4	0.2	1.0	9.2	0.1	1.3	1.0	0.1
Delay (s)	14.2	20.5		13.8	17.6	14.5	13.1	27.8	13.5	14.5	17.5	13.5
Level of Service	B	C		B	B	B	B	C	B	B	B	B
Approach Delay (s)		19.8			16.7			25.6			16.7	
Approach LOS		B			B			C			B	

Intersection Summary			
HCM Average Control Delay	20.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	58.4	Sum of lost time (s)	16.0
Intersection Capacity Utilization	66.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
43: Osborne St & Laurel Canyon

8/10/2012

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	75	460	75	160	1130	120	95	1315	65	120	850	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	3366		1719	3438	1538	1719	3438	1404	1719	3438	1538
Flt Permitted	0.15	1.00		0.24	1.00	1.00	0.17	1.00	1.00	0.11	1.00	1.00
Satd. Flow (perm)	279	3366		439	3438	1538	309	3438	1404	202	3438	1538
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	81	495	81	172	1215	129	102	1414	70	129	914	118
RTOR Reduction (vph)	0	14	0	0	0	40	0	0	19	0	0	38
Lane Group Flow (vph)	81	562	0	172	1215	89	102	1414	51	129	914	80
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	15%	5%	5%	5%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6			2		2	4		4	8		8
Actuated Green, G (s)	29.1	25.9		39.4	32.2	32.2	39.8	35.8	35.8	39.8	35.8	35.8
Effective Green, g (s)	29.1	25.9		39.4	32.2	32.2	39.8	35.8	35.8	39.8	35.8	35.8
Actuated g/C Ratio	0.32	0.28		0.43	0.35	0.35	0.44	0.39	0.39	0.44	0.39	0.39
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	140	956		323	1214	543	197	1350	551	155	1350	604
v/s Ratio Prot	0.02	0.17		c0.06	c0.35		0.02	c0.41		c0.04	0.27	
v/s Ratio Perm	0.16			0.17		0.06	0.20		0.04	0.33		0.05
v/c Ratio	0.58	0.59		0.53	1.00	0.16	0.52	1.05	0.09	0.83	0.68	0.13
Uniform Delay, d1	24.9	28.1		17.6	29.5	20.3	17.2	27.7	17.5	22.4	22.9	17.7
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.7	2.6		1.7	26.0	0.6	2.3	37.9	0.1	30.0	1.4	0.1
Delay (s)	30.6	30.7		19.3	55.5	20.9	19.4	65.6	17.5	52.4	24.3	17.8
Level of Service	C	C		B	E	C	B	E	B	D	C	B
Approach Delay (s)		30.7			48.5			60.5			26.8	
Approach LOS		C			D			E			C	

Intersection Summary			
HCM Average Control Delay	44.9	HCM Level of Service	D
HCM Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	91.2	Sum of lost time (s)	16.0
Intersection Capacity Utilization	91.7%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	110	335	50	135	605	105	120	840	130	110	1375	170
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	3351		1289	3438	1538	1719	3438	1114	1719	3438	1538
Flt Permitted	0.20	1.00		0.32	1.00	1.00	0.10	1.00	1.00	0.17	1.00	1.00
Satd. Flow (perm)	362	3351		436	3438	1538	177	3438	1114	313	3438	1538
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	126	385	57	155	695	121	138	966	149	126	1580	195
RTOR Reduction (vph)	0	13	0	0	0	66	0	0	58	0	0	37
Lane Group Flow (vph)	126	429	0	155	695	55	138	966	91	126	1580	158
Heavy Vehicles (%)	5%	5%	10%	40%	5%	5%	5%	5%	45%	5%	5%	5%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6			2		2	4		4	8		8
Actuated Green, G (s)	24.0	20.0		26.0	21.0	21.0	46.0	41.0	41.0	52.0	44.0	44.0
Effective Green, g (s)	24.0	20.0		26.0	21.0	21.0	46.0	41.0	41.0	52.0	44.0	44.0
Actuated g/C Ratio	0.27	0.22		0.29	0.23	0.23	0.51	0.46	0.46	0.58	0.49	0.49
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	157	745		173	802	359	176	1566	507	306	1681	752
v/s Ratio Prot	0.04	0.13		c0.05	0.20		c0.04	0.28		c0.04	c0.46	
v/s Ratio Perm	0.18			c0.21		0.04	0.36		0.08	0.20		0.10
v/c Ratio	0.80	0.58		0.90	0.87	0.15	0.78	0.62	0.18	0.41	0.94	0.21
Uniform Delay, d1	29.7	31.2		29.9	33.2	27.4	18.7	18.6	14.5	11.1	21.8	13.1
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	24.8	3.2		39.9	12.1	0.9	20.1	0.7	0.2	0.9	10.7	0.1
Delay (s)	54.5	34.4		69.7	45.3	28.3	38.8	19.3	14.7	12.0	32.4	13.2
Level of Service	D	C		E	D	C	D	B	B	B	C	B
Approach Delay (s)		38.9			47.1			20.9			29.1	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM Average Control Delay	31.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	80.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	75	515	90	130	460	90	90	995	130	80	690	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	3361		1271	3438	1538	1719	3438	1137	1641	3438	1538
Flt Permitted	0.44	1.00		0.28	1.00	1.00	0.26	1.00	1.00	0.21	1.00	1.00
Satd. Flow (perm)	790	3361		374	3438	1538	474	3438	1137	358	3438	1538
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	77	526	92	133	469	92	92	1015	133	82	704	112
RTOR Reduction (vph)	0	23	0	0	0	64	0	0	75	0	0	73
Lane Group Flow (vph)	77	595	0	133	469	28	92	1015	58	82	704	39
Heavy Vehicles (%)	5%	5%	5%	42%	5%	5%	5%	5%	42%	10%	5%	5%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6			2		2	4		4	8		8
Actuated Green, G (s)	19.3	17.1		20.9	17.9	17.9	22.3	19.3	19.3	22.3	19.3	19.3
Effective Green, g (s)	19.3	17.1		20.9	17.9	17.9	22.3	19.3	19.3	22.3	19.3	19.3
Actuated g/C Ratio	0.33	0.29		0.36	0.31	0.31	0.38	0.33	0.33	0.38	0.33	0.33
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	296	984		180	1054	471	245	1136	376	203	1136	508
v/s Ratio Prot	0.01	0.18		c0.04	0.14		0.02	c0.30		c0.02	0.20	
v/s Ratio Perm	0.08			c0.23		0.02	0.12		0.05	0.13		0.03
v/c Ratio	0.26	0.61		0.74	0.44	0.06	0.38	0.89	0.15	0.40	0.62	0.08
Uniform Delay, d1	13.7	17.7		15.6	16.3	14.3	12.2	18.6	13.8	13.2	16.5	13.4
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	2.8		14.6	1.4	0.2	1.0	9.2	0.2	1.3	1.0	0.1
Delay (s)	14.2	20.5		30.3	17.6	14.5	13.1	27.8	14.0	14.5	17.5	13.5
Level of Service	B	C		C	B	B	B	C	B	B	B	B
Approach Delay (s)		19.8			19.6			25.2			16.7	
Approach LOS		B			B			C			B	

Intersection Summary			
HCM Average Control Delay	20.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	58.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	69.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
43: Osborne St & Laurel Canyon

8/13/2012

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	75	460	75	210	1130	120	95	1315	115	120	850	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	3366		1327	3438	1538	1719	3438	1062	1719	3438	1538
Flt Permitted	0.16	1.00		0.24	1.00	1.00	0.17	1.00	1.00	0.11	1.00	1.00
Satd. Flow (perm)	281	3366		336	3438	1538	307	3438	1062	202	3438	1538
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	81	495	81	226	1215	129	102	1414	124	129	914	118
RTOR Reduction (vph)	0	14	0	0	0	40	0	0	34	0	0	38
Lane Group Flow (vph)	81	562	0	226	1215	89	102	1414	90	129	914	80
Heavy Vehicles (%)	5%	5%	5%	36%	5%	5%	5%	5%	52%	5%	5%	5%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6			2		2	4		4	8		8
Actuated Green, G (s)	29.0	25.8		39.8	32.6	32.6	39.8	35.8	35.8	39.8	35.8	35.8
Effective Green, g (s)	29.0	25.8		39.8	32.6	32.6	39.8	35.8	35.8	39.8	35.8	35.8
Actuated g/C Ratio	0.32	0.28		0.43	0.36	0.36	0.43	0.39	0.39	0.43	0.39	0.39
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	139	948		254	1224	547	195	1344	415	154	1344	601
v/s Ratio Prot	0.02	0.17		c0.10	c0.35		0.02	c0.41		c0.04	0.27	
v/s Ratio Perm	0.16			0.29		0.06	0.20		0.09	0.33		0.05
v/c Ratio	0.58	0.59		0.89	0.99	0.16	0.52	1.05	0.22	0.84	0.68	0.13
Uniform Delay, d1	25.1	28.4		19.9	29.4	20.2	17.4	27.9	18.6	22.7	23.1	17.9
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	6.1	2.7		29.1	24.0	0.6	2.5	39.5	0.3	30.9	1.4	0.1
Delay (s)	31.2	31.1		49.0	53.4	20.8	19.9	67.4	18.8	53.6	24.6	18.0
Level of Service	C	C		D	D	C	B	E	B	D	C	B
Approach Delay (s)		31.1			50.1			60.8			27.1	
Approach LOS		C			D			E			C	

Intersection Summary			
HCM Average Control Delay	45.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	91.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	91.7%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	120	365	55	145	660	115	130	915	140	120	1500	185
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	3350		1289	3438	1538	1719	3438	1114	1719	3438	1538
Flt Permitted	0.20	1.00		0.28	1.00	1.00	0.10	1.00	1.00	0.14	1.00	1.00
Satd. Flow (perm)	362	3350		385	3438	1538	177	3438	1114	257	3438	1538
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	138	420	63	167	759	132	149	1052	161	138	1724	213
RTOR Reduction (vph)	0	13	0	0	0	66	0	0	57	0	0	38
Lane Group Flow (vph)	138	470	0	167	759	66	149	1052	104	138	1724	175
Heavy Vehicles (%)	5%	5%	10%	40%	5%	5%	5%	5%	45%	5%	5%	5%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6			2		2	4		4	8		8
Actuated Green, G (s)	24.0	20.0		26.0	21.0	21.0	45.8	40.8	40.8	52.2	44.0	44.0
Effective Green, g (s)	24.0	20.0		26.0	21.0	21.0	45.8	40.8	40.8	52.2	44.0	44.0
Actuated g/C Ratio	0.27	0.22		0.29	0.23	0.23	0.51	0.45	0.45	0.58	0.49	0.49
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	157	744		161	802	359	176	1559	505	282	1681	752
v/s Ratio Prot	0.04	0.14		c0.06	0.22		c0.05	0.31		c0.04	c0.50	
v/s Ratio Perm	0.20			c0.24		0.04	0.38		0.09	0.24		0.11
v/c Ratio	0.88	0.63		1.04	0.95	0.18	0.85	0.67	0.21	0.49	1.03	0.23
Uniform Delay, d1	31.4	31.7		31.1	33.9	27.6	20.1	19.4	14.8	12.1	23.0	13.3
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	38.6	4.0		81.1	21.1	1.1	29.4	1.2	0.2	1.3	28.7	0.2
Delay (s)	70.0	35.7		112.2	55.1	28.8	49.5	20.5	15.0	13.4	51.7	13.4
Level of Service	E	D		F	E	C	D	C	B	B	D	B
Approach Delay (s)		43.3			60.8			23.1			45.2	
Approach LOS		D			E			C			D	

Intersection Summary			
HCM Average Control Delay	42.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	86.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	120	365	55	145	660	115	130	915	140	120	1500	185
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		0.91	0.91	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	3350		1173	3266	1538	1719	3438	1114	1719	3438	1538
Flt Permitted	0.29	1.00		0.20	0.95	1.00	0.10	1.00	1.00	0.14	1.00	1.00
Satd. Flow (perm)	518	3350		252	3093	1538	177	3438	1114	252	3438	1538
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	138	420	63	167	759	132	149	1052	161	138	1724	213
RTOR Reduction (vph)	0	13	0	0	0	62	0	0	57	0	0	30
Lane Group Flow (vph)	138	470	0	150	776	70	149	1052	104	138	1724	184
Heavy Vehicles (%)	5%	5%	10%	40%	5%	5%	5%	5%	45%	5%	5%	5%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6			2		2	4		4	8		8
Actuated Green, G (s)	21.0	17.0		29.0	29.0	21.0	44.8	40.8	40.8	53.0	45.0	45.0
Effective Green, g (s)	21.0	17.0		29.0	29.0	21.0	44.8	40.8	40.8	53.0	45.0	45.0
Actuated g/C Ratio	0.23	0.19		0.32	0.32	0.23	0.50	0.45	0.45	0.59	0.50	0.50
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	174	633		163	1012	359	157	1559	505	282	1719	769
v/s Ratio Prot	0.04	0.14		c0.08	c0.07		c0.04	0.31		0.04	c0.50	
v/s Ratio Perm	0.15			c0.21	0.18	0.05	0.43		0.09	0.24		0.12
v/c Ratio	0.79	0.74		0.92	0.77	0.19	0.95	0.67	0.21	0.49	1.00	0.24
Uniform Delay, d1	30.4	34.4		26.0	27.5	27.7	22.0	19.4	14.8	12.0	22.5	12.8
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	21.5	7.7		47.7	3.5	1.2	56.0	1.2	0.2	1.3	22.4	0.2
Delay (s)	51.8	42.1		73.7	31.0	28.9	78.0	20.5	15.0	13.3	44.9	12.9
Level of Service	D	D		E	C	C	E	C	B	B	D	B
Approach Delay (s)		44.3			36.8			26.2			39.5	
Approach LOS		D			D			C			D	

Intersection Summary			
HCM Average Control Delay	36.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	92.1%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
43: Osborne St & Laurel Canyon

8/15/2012

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	80	560	100	140	500	100	100	1085	140	85	750	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	3360		1271	3438	1538	1719	3438	1137	1641	3438	1538
Flt Permitted	0.40	1.00		0.23	1.00	1.00	0.23	1.00	1.00	0.20	1.00	1.00
Satd. Flow (perm)	715	3360		307	3438	1538	409	3438	1137	344	3438	1538
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	82	571	102	143	510	102	102	1107	143	87	765	122
RTOR Reduction (vph)	0	24	0	0	0	72	0	0	73	0	0	73
Lane Group Flow (vph)	82	649	0	143	510	30	102	1107	70	87	765	49
Heavy Vehicles (%)	5%	5%	5%	42%	5%	5%	5%	5%	42%	10%	5%	5%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6			2		2	4		4	8		8
Actuated Green, G (s)	20.0	16.9		21.8	17.8	17.8	23.2	20.1	20.1	23.2	20.1	20.1
Effective Green, g (s)	20.0	16.9		21.8	17.8	17.8	23.2	20.1	20.1	23.2	20.1	20.1
Actuated g/C Ratio	0.33	0.28		0.36	0.30	0.30	0.39	0.33	0.33	0.39	0.33	0.33
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	290	945		176	1018	456	225	1150	380	200	1150	514
v/s Ratio Prot	0.01	0.19		c0.05	0.15		c0.02	c0.32		0.02	0.22	
v/s Ratio Perm	0.08			c0.24		0.02	0.15		0.06	0.15		0.03
v/c Ratio	0.28	0.69		0.81	0.50	0.07	0.45	0.96	0.18	0.43	0.67	0.10
Uniform Delay, d1	14.1	19.2		15.6	17.5	15.2	12.6	19.6	14.2	14.0	17.1	13.8
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	4.1		24.0	1.8	0.3	1.5	18.1	0.2	1.5	1.5	0.1
Delay (s)	14.6	23.3		39.6	19.2	15.5	14.1	37.8	14.4	15.5	18.6	13.8
Level of Service	B	C		D	B	B	B	D	B	B	B	B
Approach Delay (s)		22.4			22.6			33.5			17.7	
Approach LOS		C			C			C			B	

Intersection Summary			
HCM Average Control Delay	25.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	60.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	74.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	80	560	100	140	500	100	100	1085	140	85	750	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		0.91	0.91	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	3360		1157	3258	1538	1719	3438	1137	1641	3438	1538
Flt Permitted	0.45	1.00		0.23	0.94	1.00	0.23	1.00	1.00	0.20	1.00	1.00
Satd. Flow (perm)	810	3360		279	3069	1538	409	3438	1137	344	3438	1538
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	82	571	102	143	510	102	102	1107	143	87	765	122
RTOR Reduction (vph)	0	24	0	0	0	72	0	0	73	0	0	73
Lane Group Flow (vph)	82	649	0	129	524	30	102	1107	70	87	765	49
Heavy Vehicles (%)	5%	5%	5%	42%	5%	5%	5%	5%	42%	10%	5%	5%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6			2		2	4		4	8		8
Actuated Green, G (s)	20.0	16.9		21.8	21.8	17.8	23.2	20.1	20.1	23.2	20.1	20.1
Effective Green, g (s)	20.0	16.9		21.8	21.8	17.8	23.2	20.1	20.1	23.2	20.1	20.1
Actuated g/C Ratio	0.33	0.28		0.36	0.36	0.30	0.39	0.33	0.33	0.39	0.33	0.33
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	316	945		160	1126	456	225	1150	380	200	1150	514
v/s Ratio Prot	0.01	0.19		c0.05	0.03		c0.02	c0.32		0.02	0.22	
v/s Ratio Perm	0.07			c0.24	0.14	0.02	0.15		0.06	0.15		0.03
v/c Ratio	0.26	0.69		0.81	0.47	0.07	0.45	0.96	0.18	0.44	0.67	0.10
Uniform Delay, d1	14.0	19.2		15.5	14.7	15.2	12.6	19.6	14.2	14.0	17.1	13.8
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	4.1		24.8	0.3	0.3	1.5	18.1	0.2	1.5	1.5	0.1
Delay (s)	14.5	23.3		40.3	15.0	15.5	14.1	37.8	14.4	15.5	18.6	13.8
Level of Service	B	C		D	B	B	B	D	B	B	B	B
Approach Delay (s)		22.4			19.4			33.5			17.7	
Approach LOS		C			B			C			B	

Intersection Summary			
HCM Average Control Delay	24.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	60.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	80.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
43: Osborne St & Laurel Canyon

8/15/2012

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	80	500	80	230	1230	130	105	1435	125	130	925	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	3367		1327	3438	1538	1719	3438	1062	1719	3438	1538
Flt Permitted	0.16	1.00		0.21	1.00	1.00	0.12	1.00	1.00	0.12	1.00	1.00
Satd. Flow (perm)	281	3367		298	3438	1538	219	3438	1062	213	3438	1538
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	86	538	86	247	1323	140	113	1543	134	140	995	129
RTOR Reduction (vph)	0	14	0	0	0	39	0	0	33	0	0	39
Lane Group Flow (vph)	86	610	0	247	1323	101	113	1543	101	140	995	90
Heavy Vehicles (%)	5%	5%	5%	36%	5%	5%	5%	5%	52%	5%	5%	5%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6			2		2	4		4	8		8
Actuated Green, G (s)	29.0	25.8		39.8	32.6	32.6	40.0	35.0	35.0	38.0	34.0	34.0
Effective Green, g (s)	29.0	25.8		39.8	32.6	32.6	40.0	35.0	35.0	38.0	34.0	34.0
Actuated g/C Ratio	0.32	0.28		0.44	0.36	0.36	0.44	0.39	0.39	0.42	0.37	0.37
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	140	957		244	1234	552	179	1325	409	155	1287	576
v/s Ratio Prot	0.02	0.18		c0.11	c0.38		0.03	c0.45		c0.04	0.29	
v/s Ratio Perm	0.17			0.33		0.07	0.24		0.09	0.34		0.06
v/c Ratio	0.61	0.64		1.01	1.07	0.18	0.63	1.16	0.25	0.90	0.77	0.16
Uniform Delay, d1	25.1	28.4		21.5	29.1	20.0	18.1	27.9	18.9	24.8	25.0	18.9
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	7.8	3.2		60.8	47.3	0.7	7.1	82.7	0.3	44.9	3.0	0.1
Delay (s)	32.9	31.6		82.3	76.4	20.7	25.2	110.6	19.3	69.7	28.0	19.0
Level of Service	C	C		F	E	C	C	F	B	E	C	B
Approach Delay (s)		31.8			72.7			98.3			31.7	
Approach LOS		C			E			F			C	

Intersection Summary			
HCM Average Control Delay	66.3	HCM Level of Service	E
HCM Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	90.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	98.6%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	80	500	80	230	1230	130	105	1435	125	130	925	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		0.91	0.91	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	3367		1208	3272	1538	1719	3438	1062	1719	3438	1538
Flt Permitted	0.16	1.00		0.15	0.94	1.00	0.12	1.00	1.00	0.09	1.00	1.00
Satd. Flow (perm)	285	3367		189	3083	1538	212	3438	1062	170	3438	1538
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	86	538	86	247	1323	140	113	1543	134	140	995	129
RTOR Reduction (vph)	0	12	0	0	0	16	0	0	21	0	0	34
Lane Group Flow (vph)	86	612	0	222	1348	124	113	1543	113	140	995	95
Heavy Vehicles (%)	5%	5%	5%	36%	5%	5%	5%	5%	52%	5%	5%	5%
Turn Type	pm+pt	NA		pm+pt	NA	pm+ov	pm+pt	NA	pm+ov	pm+pt	NA	pm+ov
Protected Phases	1	6		5	2	3	7	4	5	3	8	1
Permitted Phases	6			2		2	4		4	8		8
Actuated Green, G (s)	29.4	25.4		47.0	47.0	43.0	55.0	47.0	64.6	46.6	42.6	46.6
Effective Green, g (s)	29.4	25.4		47.0	47.0	43.0	55.0	47.0	64.6	46.6	42.6	46.6
Actuated g/C Ratio	0.27	0.23		0.43	0.43	0.39	0.50	0.43	0.59	0.42	0.39	0.42
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	128	777		244	1348	657	221	1469	662	128	1331	707
v/s Ratio Prot	0.02	0.18		0.15	c0.16	0.01	0.04	c0.45	0.03	c0.04	0.29	0.00
v/s Ratio Perm	0.15			0.24	c0.27	0.07	0.22		0.08	0.42		0.06
v/c Ratio	0.67	0.79		0.91	1.00	0.19	0.51	1.05	0.17	1.09	0.75	0.13
Uniform Delay, d1	33.6	39.8		27.9	31.5	22.0	19.2	31.5	10.4	32.2	29.1	19.4
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	13.0	8.0		34.0	24.5	0.1	2.0	37.9	0.1	106.9	2.3	0.1
Delay (s)	46.6	47.7		61.9	56.0	22.2	21.1	69.4	10.5	139.1	31.4	19.5
Level of Service	D	D		E	E	C	C	E	B	F	C	B
Approach Delay (s)		47.6			54.0			62.0			42.1	
Approach LOS		D			D			E			D	

Intersection Summary			
HCM Average Control Delay	53.0	HCM Level of Service	D
HCM Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	110.6%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

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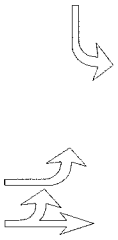
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : EB I-210 FWY RAMPS
N/S STREET : WHEATLAND AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
44
ROUTE
5C, 6C, 7C, 8C

CONDITION DIAGRAMS



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EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
EB I-210 FWY RAMPS						
EB LEFT	105	5%		105	10	115
EB THRU	5	15%		5	5	10
EB RIGHT	0	0%		0	0	0
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
WHEATLAND AVE						
NB LEFT	0	0%		0	0	0
NB THRU	0	0%		0	0	0
NB RIGHT	0	0%		0	0	0
SB LEFT	120	33%	**50**	170	15	185
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**230**		**50**	**280**	**30**	**310**

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Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax
Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax
Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : EB I-210 FWY RAMPS
N/S STREET : WHEATLAND AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 44
ROUTE 5C, 6C, 7C, 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
EB I-210 FWY RAMPS						
EB LEFT	75	5%		75	5	80
EB THRU	5	15%		5	5	10
EB RIGHT	0	0%		0	0	0
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
WHEATLAND AVE						
NB LEFT	0	0%		0	0	0
NB THRU	0	0%		0	0	0
NB RIGHT	0	0%		0	0	0
SB LEFT	60	45%	**50**	110	10	120
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**140**		**50**	**190**	**20**	**210**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : EB I-210 FWY RAMPS
N/S STREET : WHEATLAND AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 44
ROUTE 5C, 6C, 7C, 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
EB I-210 FWY RAMPS						
EB LEFT	100	5%		100	10	110
EB THRU	5	100%		5	5	10
EB RIGHT	0	0%		0	0	0
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
WHEATLAND AVE						
NB LEFT	0	0%		0	0	0
NB THRU	0	0%		0	0	0
NB RIGHT	0	0%		0	0	0
SB LEFT	85	40%	**50**	135	10	145
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**190**		**50**	**240**	**25**	**265**

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Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax
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Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

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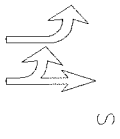
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : EB I-210 FWY RAMPS
N/S STREET : WHEATLAND AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 44
ROUTE 5C, 6C, 7C, 8C

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
EB I-210 FWY RAMPS								
EB LEFT	101	5	15	115	**0**	115	10	125
EB THRU	5	1	3	10	**0**	10	5	15
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
WHEATLAND AVE								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	117	3	9	125	**150**	275	25	300
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**223**				**150**	**400**	**40**	**440**

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Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax
Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax
Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : EB I-210 FWY RAMPS
N/S STREET : WHEATLAND AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 44
ROUTE 5C, 6C, 7C, 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
EB I-210 FWY RAMPS								
EB LEFT	71	4	12	85	**0**	85	5	90
EB THRU	5	1	3	10	**0**	10	5	15
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
WHEATLAND AVE								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	61	0	0	60	**150**	210	20	230
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**137**				**150**	**305**	**30**	**335**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : EB I-210 FWY RAMPS
N/S STREET : WHEATLAND AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 44
ROUTE 5C, 6C, 7C, 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
EB I-210 FWY RAMPS								
EB LEFT	98	1	3	100	**0**	100	10	110
EB THRU	0	2	6	5	**0**	5	5	10
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
WHEATLAND AVE								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	85	1	3	90	**150**	240	20	260
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**183**				**150**	**345**	**35**	**380**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: WHEATLAND
EAST-WEST STREET: I-210 EB RAMPS
JURISDICTION: LA

DATE: 05-24-12

PEAK HOUR: 07:45AM

NORTH LEG

TOTAL: 120

Rt	Thru	Lt	
		120	Total
		29	1st
		28	2nd
		34	3rd
		29	4th

EAST LEG TOTAL: 0

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
106	32	20	27	27	Lt
6	0	3	1	2	Thru
					Rt

WEST LEG TOTAL: 112

PEAK HOUR FACTORS

NORTH LEG = 0.88
SOUTH LEG =
EAST LEG =
WEST LEG = 0.88

ALL LEGS = 0.94

	Lt	Thru	Rt
1st			
2nd			
3rd			
4th			
Total			

SOUTH LEG

TOTAL: 0

HOUR TOTAL: 232

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INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WHEATLAND

EAST-WEST STREET: I-210 EB RAMPS

TIME: 07:00AM-08:00AM DATE: 05-24-12

NORTH LEG

Rt	Thru	Lt	
		119	Total
		30	1st
		35	2nd
		25	3rd
		29	4th

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
91	14	20	25	32	Lt
4	1	2	1	0	Thru
					Rt

	Lt	Thru	Rt
1st			
2nd			
3rd			
4th			
Total			

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WHEATLAND

EAST-WEST STREET: I-210 EB RAMPS

TIME: 08:00AM-09:00AM DATE: 05-24-12

NORTH LEG

Rt	Thru	Lt	
		108	Total
		28	1st
		34	2nd
		29	3rd
		17	4th

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
102	20	27	27	28	Lt
6	3	1	2	0	Thru
					Rt

	Lt	Thru	Rt
1st			
2nd			
3rd			
4th			
Total			

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SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : WHEATLAND LA

EAST-WEST STREET : I-210 EB RAMPS 05-24-12

BEGINNING TIME : 07:00AM PH= 7:45 AM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
					NORTH LEG							
0	0	30	0	0	0	0	0	0	0	0	0	30
0	0	35	0	0	0	0	0	0	0	0	0	35
0	0	25	0	0	0	0	0	0	0	0	0	25
0	0	28	0	0	1	0	0	0	0	0	0	29
0	0	27	0	0	1	0	0	0	0	0	0	28
0	0	33	0	0	1	0	0	0	0	0	0	34
0	0	29	0	0	0	0	0	0	0	0	0	29
0	0	17	0	0	0	0	0	0	0	0	0	17
0	0	224	0	0	3	0	0	0	0	0	0	227
					SOUTH LEG							
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
					EAST LEG							
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
					WEST LEG							
0	1	14	0	0	0	0	0	0	0	0	0	15
0	2	20	0	0	0	0	0	0	0	0	0	22
0	0	21	0	1	3	0	0	1	0	0	0	26
0	0	29	0	0	1	0	0	0	0	0	2	32
0	3	20	0	0	0	0	0	0	0	0	0	23
0	1	26	0	0	0	0	0	0	0	0	1	28
0	1	26	0	0	0	0	0	0	0	1	1	29
0	0	27	0	0	1	0	0	0	0	0	0	28
0	8	183	0	1	5	0	0	1	0	1	4	203

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: WHEATLAND
EAST-WEST STREET: I-210 EB RAMPS
JURISDICTION: LA

DATE: 05-24-12

PEAK HOUR: 12:00PM

NORTH LEG

TOTAL: 61

Rt	Thru	Lt	
		61	Total
		9	1st
		20	2nd
		22	3rd
		10	4th

EAST LEG TOTAL: 0

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
75	19	19	20	17	Lt
6	1	3	2	0	Thru
					Rt

WEST LEG TOTAL: 81

PEAK HOUR FACTORS

NORTH LEG = 0.69
SOUTH LEG =
EAST LEG =
WEST LEG = 0.92

ALL LEGS = 0.81

	Lt	Thru	Rt
1st			
2nd			
3rd			
4th			
Total			

TOTAL: 0

SOUTH LEG

HOUR TOTAL: 142

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INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WHEATLAND

EAST-WEST STREET: I-210 EB RAMPS

TIME: 12:00PM-01:00PM DATE: 05-24-12

NORTH LEG

Rt	Thru	Lt	
		61	Total
		9	1st
		20	2nd
		22	3rd
		10	4th

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
75	19	19	20	17	Lt
6	1	3	2	0	Thru
					Rt

	Lt	Thru	Rt
1st			
2nd			
3rd			
4th			
Total			

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INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WHEATLAND

EAST-WEST STREET: I-210 EB RAMPS

TIME: 01:00PM-02:00PM DATE: 05-24-12

NORTH LEG

Rt	Thru	Lt	
		62	Total
		12	1st
		17	2nd
		21	3rd
		12	4th

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
57	12	10	14	21	Lt
3	0	1	2	0	Thru
					Rt

	Lt	Thru	Rt
1st			
2nd			
3rd			
4th			
Total			

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SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : WHEATLAND LA

EAST-WEST STREET : I-210 EB RAMPS 05-24-12

BEGINNING TIME : 12:00PM = PH

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
					NORTH LEG							
0	0	9	0	0	0	0	0	0	0	0	0	9
0	0	20	0	0	0	0	0	0	0	0	0	20
0	0	22	0	0	0	0	0	0	0	0	0	22
0	0	10	0	0	0	0	0	0	0	0	0	10
0	0	12	0	0	0	0	0	0	0	0	0	12
0	0	17	0	0	0	0	0	0	0	0	0	17
0	0	21	0	0	0	0	0	0	0	0	0	21
0	0	12	0	0	0	0	0	0	0	0	0	12
0	0	123	0	0	0	0	0	0	0	0	0	123
					SOUTH LEG							
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
					EAST LEG							
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
					WEST LEG							
0	1	17	0	0	1	0	0	0	0	0	1	20
0	2	19	0	0	0	0	0	0	0	1	0	22
0	2	19	0	0	0	0	0	0	0	0	1	22
0	0	16	0	0	0	0	0	0	0	0	1	17
0	0	12	0	0	0	0	0	0	0	0	0	12
0	0	9	0	0	0	0	0	0	0	1	1	11
0	2	13	0	0	0	0	0	0	0	0	1	16
0	0	17	0	0	1	0	0	1	0	0	2	21
0	7	122	0	0	2	0	0	1	0	2	7	141

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: WHEATLAND
EAST-WEST STREET: I-210 EB RAMPS
JURISDICTION: LA

DATE: 05-24-12

PEAK HOUR: 05:00PM

NORTH LEG

TOTAL: 86

Rt	Thru	Lt	
		86	Total
		20	1st
		24	2nd
		23	3rd
		19	4th

EAST LEG TOTAL: 0

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
99	27	20	25	27	Lt
2	1	0	1	0	Thru
					Rt

WEST LEG TOTAL: 101

PEAK HOUR FACTORS

NORTH LEG = 0.90
SOUTH LEG =
EAST LEG =
WEST LEG = 0.90

ALL LEGS = 0.95

	Lt	Thru	Rt
1st			
2nd			
3rd			
4th			
Total			

TOTAL: 0

SOUTH LEG

HOUR TOTAL: 187

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INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WHEATLAND

EAST-WEST STREET: I-210 EB RAMPS

TIME: 04:00PM-05:00PM DATE: 05-24-12

NORTH LEG

Rt	Thru	Lt	
		64	Total
		19	1st
		17	2nd
		15	3rd
		13	4th

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
108	32	26	23	27	Lt
3	2	0	0	1	Thru
					Rt

	Lt	Thru	Rt
1st			
2nd			
3rd			
4th			
Total			

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INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WHEATLAND

EAST-WEST STREET: I-210 EB RAMPS

TIME: 05:00PM-06:00PM DATE: 05-24-12

NORTH LEG

Rt	Thru	Lt	
		86	Total
		20	1st
		24	2nd
		23	3rd
		19	4th

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
99	27	20	25	27	Lt
2	1	0	1	0	Thru
					Rt

	Lt	Thru	Rt
1st			
2nd			
3rd			
4th			
Total			

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SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : WHEATLAND LA

EAST-WEST STREET : I-210 EB RAMPS 05-24-12

BEGINNING TIME : 04:00PM PM=5:00 PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
NORTH LEG												
0	0	19	0	0	0	0	0	0	0	0	0	19
0	0	15	0	0	1	0	0	1	0	0	0	17
0	0	13	0	0	1	0	0	0	0	0	1	15
0	0	13	0	0	0	0	0	0	0	0	0	13
0	0	20	0	0	0	0	0	0	0	0	0	20
0	0	24	0	0	0	0	0	0	0	0	0	24
0	0	23	0	0	0	0	0	0	0	0	0	23
0	0	18	0	0	1	0	0	0	0	0	0	19
0	0	145	0	0	3	0	0	1	0	0	1	150
SOUTH LEG												
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
EAST LEG												
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
WEST LEG												
0	1	32	0	0	0	0	1	0	0	0	0	34
0	0	25	0	0	1	0	0	0	0	0	0	26
0	0	23	0	0	0	0	0	0	0	0	0	23
0	1	26	0	0	0	0	0	1	0	0	0	28
0	0	26	0	0	1	0	1	0	0	0	0	28
0	0	20	0	0	0	0	0	0	0	0	0	20
0	0	25	0	0	0	0	0	0	0	1	0	26
0	0	27	0	0	0	0	0	0	0	0	0	27
0	2	204	0	0	2	0	2	1	0	1	0	212

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Intersection	
Intersection Delay (sec/veh):	0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	105	5	0	0	0	0	0	0	0	120	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	0		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles(%)	5	15	0	2	2	2	2	2	2	5	0	0
Movement Flow Rate	112	5	0	0	0	0	0	0	0	128	0	0
Number of Lanes	1	1	0	0	0	0	0	0	0	0	1	0

Major/Minor	Minor 1									Major 2		
Conflicting Flow Rate - All	255	255	-							0	0	-
Stage 1	255	255	-							0	0	-
Stage 2	0	0	-							0	0	-
Follow-up Headway	-	4.135	-							-	0	-
Pot Capacity-1 Maneuver	-	673	-							-	-	-
Stage 1	-	673	-							-	-	-
Stage 2	-	-	-							-	-	-
Mov Capacity-1 Maneuver	-	673	-							-	-	-
Mov Capacity-2 Maneuver	-	673	-							-	-	-
Stage 1	-	673	-							-	-	-
Stage 2	-	-	-							-	-	-

Approach	EB	SB
HCM Control Delay (s)	-	0
HCM LOS	-	A

Lane	EBLn1	EBLn2	SBL	SBT
Capacity (vph)	-	-		
HCM Control Delay (s)	-	-	-	-
HCM Lane VC Ratio	-	-	-	-
HCM Lane LOS	-	-	-	-
HCM 95th Percentile Queue (veh)	-	-	-	-

Intersection	
Intersection Delay (sec/veh):	0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	75	5	0	0	0	0	0	0	0	60	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	0		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Heavy Vehicles(%)	5	15	0	2	2	2	2	2	2	0	0	0
Movement Flow Rate	93	6	0	0	0	0	0	0	0	74	0	0
Number of Lanes	1	1	0	0	0	0	0	0	0	0	1	0

Major/Minor	Minor 1									Major 2		
Conflicting Flow Rate - All	148	148	-							0	0	-
Stage 1	148	148	-							0	0	-
Stage 2	0	0	-							0	0	-
Follow-up Headway	-	4.135	-							-	0	-
Pot Capacity-1 Maneuver	-	750	-							-	-	-
Stage 1	-	750	-							-	-	-
Stage 2	-	-	-							-	-	-
Mov Capacity-1 Maneuver	-	750	-							-	-	-
Mov Capacity-2 Maneuver	-	750	-							-	-	-
Stage 1	-	750	-							-	-	-
Stage 2	-	-	-							-	-	-

Approach	EB	SB
HCM Control Delay (s)	-	0
HCM LOS	-	A

Lane	EBLn1	EBLn2	SBL	SBT
Capacity (vph)	-	-		
HCM Control Delay (s)	-	-	-	-
HCM Lane VC Ratio	-	-	-	-
HCM Lane LOS	-	-	-	-
HCM 95th Percentile Queue (veh)	-	-	-	-

Intersection	
Intersection Delay (sec/veh):	0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	100	5	0	0	0	0	0	0	0	85	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	0		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles(%)	5	80	0	2	2	2	2	2	2	5	0	0
Movement Flow Rate	105	5	0	0	0	0	0	0	0	89	0	0
Number of Lanes	1	1	0	0	0	0	0	0	0	0	1	0

Major/Minor	Minor 1									Major 2		
Conflicting Flow Rate - All	179	179	-							0	0	-
Stage 1	179	179	-							0	0	-
Stage 2	0	0	-							0	0	-
Follow-up Headway	-	4.72	-							-	0	-
Pot Capacity-1 Maneuver	-	626	-							-	-	-
Stage 1	-	626	-							-	-	-
Stage 2	-	-	-							-	-	-
Mov Capacity-1 Maneuver	-	626	-							-	-	-
Mov Capacity-2 Maneuver	-	626	-							-	-	-
Stage 1	-	626	-							-	-	-
Stage 2	-	-	-							-	-	-

Approach	EB	SB
HCM Control Delay (s)	-	0
HCM LOS	-	A

Lane	EBLn1	EBLn2	SBL	SBT
Capacity (vph)	-	-		
HCM Control Delay (s)	-	-	-	-
HCM Lane VC Ratio	-	-	-	-
HCM Lane LOS	-	-	-	-
HCM 95th Percentile Queue (veh)	-	-	-	-

Intersection	
Intersection Delay (sec/veh):	0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	75	5	0	0	0	0	0	0	0	60	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	0		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Heavy Vehicles(%)	5	15	0	2	2	2	2	2	2	0	0	0
Movement Flow Rate	93	6	0	0	0	0	0	0	0	74	0	0
Number of Lanes	1	1	0	0	0	0	0	0	0	0	1	0

Major/Minor	Minor 1									Major 2		
Conflicting Flow Rate - All	148	148	-							0	0	-
Stage 1	148	148	-							0	0	-
Stage 2	0	0	-							0	0	-
Follow-up Headway	-	4.135	-							-	0	-
Pot Capacity-1 Maneuver	-	750	-							-	-	-
Stage 1	-	750	-							-	-	-
Stage 2	-	-	-							-	-	-
Mov Capacity-1 Maneuver	-	750	-							-	-	-
Mov Capacity-2 Maneuver	-	750	-							-	-	-
Stage 1	-	750	-							-	-	-
Stage 2	-	-	-							-	-	-

Approach	EB	SB
HCM Control Delay (s)	-	0
HCM LOS	-	A

Lane	EBLn1	EBLn2	SBL	SBT
Capacity (vph)	-	-		
HCM Control Delay (s)	-	-	-	-
HCM Lane VC Ratio	-	-	-	-
HCM Lane LOS	-	-	-	-
HCM 95th Percentile Queue (veh)	-	-	-	-

Intersection	
Intersection Delay (sec/veh):	0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	75	5	0	0	0	0	0	0	0	110	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	0		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Heavy Vehicles(%)	5	15	0	2	2	2	2	2	2	45	0	0
Movement Flow Rate	93	6	0	0	0	0	0	0	0	136	0	0
Number of Lanes	1	1	0	0	0	0	0	0	0	0	1	0

Major/Minor	Minor 1									Major 2		
Conflicting Flow Rate - All	272	272	-							0	0	-
Stage 1	272	272	-							0	0	-
Stage 2	0	0	-							0	0	-
Follow-up Headway	-	4.135	-							-	0	-
Pot Capacity-1 Maneuver	-	661	-							-	-	-
Stage 1	-	661	-							-	-	-
Stage 2	-	-	-							-	-	-
Mov Capacity-1 Maneuver	-	661	-							-	-	-
Mov Capacity-2 Maneuver	-	661	-							-	-	-
Stage 1	-	661	-							-	-	-
Stage 2	-	-	-							-	-	-

Approach	EB	SB
HCM Control Delay (s)	-	0
HCM LOS	-	A

Lane	EBLn1	EBLn2	SBL	SBT
Capacity (vph)	-	-		
HCM Control Delay (s)	-	-	-	-
HCM Lane VC Ratio	-	-	-	-
HCM Lane LOS	-	-	-	-
HCM 95th Percentile Queue (veh)	-	-	-	-

Intersection	
Intersection Delay (sec/veh):	0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	100	5	0	0	0	0	0	0	0	135	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	0		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles(%)	5	80	0	2	2	2	2	2	2	40	0	0
Movement Flow Rate	105	5	0	0	0	0	0	0	0	142	0	0
Number of Lanes	1	1	0	0	0	0	0	0	0	0	1	0

Major/Minor	Minor 1									Major 2		
Conflicting Flow Rate - All	284	284	-							0	0	-
Stage 1	284	284	-							0	0	-
Stage 2	0	0	-							0	0	-
Follow-up Headway	-	4.72	-							-	0	-
Pot Capacity-1 Maneuver	-	556	-							-	-	-
Stage 1	-	556	-							-	-	-
Stage 2	-	-	-							-	-	-
Mov Capacity-1 Maneuver	-	556	-							-	-	-
Mov Capacity-2 Maneuver	-	556	-							-	-	-
Stage 1	-	556	-							-	-	-
Stage 2	-	-	-							-	-	-

Approach	EB	SB
HCM Control Delay (s)	-	0
HCM LOS	-	A

Lane	EBLn1	EBLn2	SBL	SBT
Capacity (vph)	-	-		
HCM Control Delay (s)	-	-	-	-
HCM Lane VC Ratio	-	-	-	-
HCM Lane LOS	-	-	-	-
HCM 95th Percentile Queue (veh)	-	-	-	-

Intersection	
Intersection Delay (sec/veh):	0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	75	5	0	0	0	0	0	0	0	110	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	0		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Heavy Vehicles(%)	5	15	0	2	2	2	2	2	2	45	0	0
Movement Flow Rate	93	6	0	0	0	0	0	0	0	136	0	0
Number of Lanes	1	1	0	0	0	0	0	0	0	0	1	0

Major/Minor	Minor 1									Major 2		
Conflicting Flow Rate - All	272	272	-							0	0	-
Stage 1	272	272	-							0	0	-
Stage 2	0	0	-							0	0	-
Follow-up Headway	-	4.135	-							-	0	-
Pot Capacity-1 Maneuver	-	661	-							-	-	-
Stage 1	-	661	-							-	-	-
Stage 2	-	-	-							-	-	-
Mov Capacity-1 Maneuver	-	661	-							-	-	-
Mov Capacity-2 Maneuver	-	661	-							-	-	-
Stage 1	-	661	-							-	-	-
Stage 2	-	-	-							-	-	-

Approach	EB	SB
HCM Control Delay (s)	-	0
HCM LOS	-	A

Lane	EBLn1	EBLn2	SBL	SBT
Capacity (vph)	-	-		
HCM Control Delay (s)	-	-	-	-
HCM Lane VC Ratio	-	-	-	-
HCM Lane LOS	-	-	-	-
HCM 95th Percentile Queue (veh)	-	-	-	-

Intersection	
Intersection Delay (sec/veh):	0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	80	5	0	0	0	0	0	0	0	120	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	0		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Heavy Vehicles(%)	5	15	0	2	2	2	2	2	2	45	0	0
Movement Flow Rate	99	6	0	0	0	0	0	0	0	148	0	0
Number of Lanes	1	1	0	0	0	0	0	0	0	0	1	0

Major/Minor	Minor 1									Major 2		
Conflicting Flow Rate - All	296	296	-							0	0	-
Stage 1	296	296	-							0	0	-
Stage 2	0	0	-							0	0	-
Follow-up Headway	-	4.135	-							-	0	-
Pot Capacity-1 Maneuver	-	645	-							-	-	-
Stage 1	-	645	-							-	-	-
Stage 2	-	-	-							-	-	-
Mov Capacity-1 Maneuver	-	645	-							-	-	-
Mov Capacity-2 Maneuver	-	645	-							-	-	-
Stage 1	-	645	-							-	-	-
Stage 2	-	-	-							-	-	-

Approach	EB	SB
HCM Control Delay (s)	-	0
HCM LOS	-	A

Lane	EBLn1	EBLn2	SBL	SBT
Capacity (vph)	-	-		
HCM Control Delay (s)	-	-	-	-
HCM Lane VC Ratio	-	-	-	-
HCM Lane LOS	-	-	-	-
HCM 95th Percentile Queue (veh)	-	-	-	-

Intersection	
Intersection Delay (sec/veh):	0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	110	5	0	0	0	0	0	0	0	145	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	0		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles(%)	5	80	0	2	2	2	2	2	2	40	0	0
Movement Flow Rate	116	5	0	0	0	0	0	0	0	153	0	0
Number of Lanes	1	1	0	0	0	0	0	0	0	0	1	0

Major/Minor	Minor 1									Major 2		
Conflicting Flow Rate - All	305	305	-							0	0	-
Stage 1	305	305	-							0	0	-
Stage 2	0	0	-							0	0	-
Follow-up Headway	-	4.72	-							-	0	-
Pot Capacity-1 Maneuver	-	543	-							-	-	-
Stage 1	-	543	-							-	-	-
Stage 2	-	-	-							-	-	-
Mov Capacity-1 Maneuver	-	543	-							-	-	-
Mov Capacity-2 Maneuver	-	543	-							-	-	-
Stage 1	-	543	-							-	-	-
Stage 2	-	-	-							-	-	-

Approach	EB	SB
HCM Control Delay (s)	-	0
HCM LOS	-	A

Lane	EBLn1	EBLn2	SBL	SBT
Capacity (vph)	-	-		
HCM Control Delay (s)	-	-	-	-
HCM Lane VC Ratio	-	-	-	-
HCM Lane LOS	-	-	-	-
HCM 95th Percentile Queue (veh)	-	-	-	-

Hall & Foreman, Inc.

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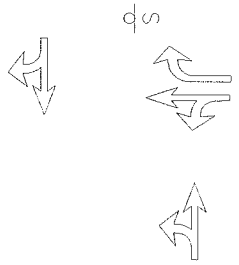
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : WB I-210 FWY RAMPS
N/S STREET : WHEATLAND AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
45
ROUTE
5C, 6C, 7C, 8C

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
WB I-210 FWY RAMPS						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	5	50%		5	5	10
WB THRU	0	0%		0	0	0
WB RIGHT	100	37%	**50**	150	15	165
WHEATLAND AVE						
NB LEFT	5	20%		5	5	10
NB THRU	100	5%		100	10	110
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	110	35%	**50**	160	15	175
SB RIGHT	65	5%		65	5	70
TOTALS	**385**		**100**	**485**	**55**	**540**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : WB I-210 FWY RAMPS
N/S STREET : WHEATLAND AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 45
ROUTE 5C, 6C, 7C, 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
WB I-210 FWY RAMPS						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	5	0%		5	5	10
WB THRU	5	0%		5	5	10
WB RIGHT	40	56%	**50**	90	10	100
WHEATLAND AVE						
NB LEFT	5	0%		5	5	10
NB THRU	55	10%		55	5	60
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	60	48%	**50**	110	10	120
SB RIGHT	55	5%		55	5	60
TOTALS	**225**		**100**	**325**	**45**	**370**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : WB I-210 FWY RAMPS
N/S STREET : WHEATLAND AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
45
ROUTE
5C, 6C, 7C, 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
WB I-210 FWY RAMPS						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	5	0%		5	5	10
WB THRU	0	0%		0	0	0
WB RIGHT	120	29%	**50**	170	15	185
WHEATLAND AVE						
NB LEFT	5	100%		5	5	10
NB THRU	95	5%		95	10	105
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	80	38%	**50**	130	10	140
SB RIGHT	105	0%		105	10	115
TOTALS	**410**		**100**	**510**	**55**	**565**

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Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax
Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

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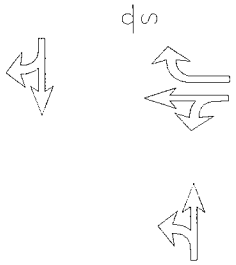
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : WB I-210 FWY RAMPS
N/S STREET : WHEATLAND AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 45
ROUTE 5C, 6C, 7C, 8C

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
WB I-210 FWY RAMPS								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	1	1	3	5	**0**	5	5	10
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	97	4	12	110	**150**	260	25	285
WHEATLAND AVE								
NB LEFT	4	1	3	5	**0**	5	5	10
NB THRU	94	4	12	105	**0**	105	10	115
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	106	3	9	115	**150**	265	25	290
SB RIGHT	63	4	12	75	**0**	75	5	80
TOTALS	**365**				**300**	**715**	**75**	**790**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : WB I-210 FWY RAMPS
N/S STREET : WHEATLAND AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 45
ROUTE 5C, 6C, 7C, 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
WB I-210 FWY RAMPS								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	3	0	0	5	**0**	5	5	10
WB THRU	2	0	0	5	**0**	5	5	10
WB RIGHT	41	0	0	40	**150**	190	15	205
WHEATLAND AVE								
NB LEFT	3	0	0	5	**0**	5	5	10
NB THRU	49	5	15	65	**0**	65	5	70
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	60	1	3	65	**150**	215	20	235
SB RIGHT	53	3	9	60	**0**	60	5	65
TOTALS	**211**				**300**	**545**	**60**	**605**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : WB I-210 FWY RAMPS
N/S STREET : WHEATLAND AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 45
ROUTE 5C, 6C, 7C, 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
WB I-210 FWY RAMPS								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	4	0	0	5	**0**	5	5	10
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	120	0	0	120	**150**	270	25	295
WHEATLAND AVE								
NB LEFT	0	1	3	5	**0**	5	5	10
NB THRU	95	2	6	100	**0**	100	10	110
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	82	0	0	80	**150**	230	20	250
SB RIGHT	107	0	0	105	**0**	105	10	115
TOTALS	**408**				**300**	**715**	**75**	**790**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: WHEATLAND
EAST-WEST STREET: I-210 WB RAMPS
JURISDICTION: LA

DATE: 05-24-12

PEAK HOUR: 01:00PM

NORTH LEG

TOTAL: 117

Rt	Thru	Lt	
56	61		Total
6	12		1st
17	16		2nd
6	19		3rd
27	14		4th

EAST LEG TOTAL: 46

	1st	2nd	3rd	4th	Total
Rt	4	13	7	17	41
Thru	0	1	0	1	2
Lt	0	2	0	1	3

Total	1st	2nd	3rd	4th	
					Lt
					Thru
					Rt

WEST LEG TOTAL: 0

PEAK HOUR FACTORS

NORTH LEG = 0.71
SOUTH LEG = 0.65
EAST LEG = 0.61
WEST LEG =

ALL LEGS = 0.67

	Lt	Thru	Rt
1st	0	11	
2nd	0	10	
3rd	2	12	
4th	1	21	
Total	3	54	

TOTAL: 57

SOUTH LEG

HOUR TOTAL: 220

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WHEATLAND

EAST-WEST STREET: I-210 WB RAMPS

TIME: 12:00PM-01:00PM DATE: 05-24-12

NORTH LEG

Rt	Thru	Lt	
21	58		Total
10	10		1st
9	19		2nd
2	20		3rd
0	9		4th

	1st	2nd	3rd	4th	Total
Rt	6	7	2	0	15
Thru	1	0	0	1	2
Lt	0	1	1	1	3

Total	1st	2nd	3rd	4th	
					Lt
					Thru
					Rt

	Lt	Thru	Rt
1st	1	19	
2nd	2	17	
3rd	1	19	
4th	2	15	
Total	6	70	

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WHEATLAND

EAST-WEST STREET: I-210 WB RAMPS

TIME: 01:00PM-02:00PM DATE: 05-24-12

NORTH LEG

Rt	Thru	Lt	
56	61		Total
6	12		1st
17	16		2nd
6	19		3rd
27	14		4th

	1st	2nd	3rd	4th	Total
Rt	4	13	7	17	41
Thru	0	1	0	1	2
Lt	0	2	0	1	3

Total	1st	2nd	3rd	4th	
					Lt
					Thru
					Rt

	Lt	Thru	Rt
1st	0	11	
2nd	0	10	
3rd	2	12	
4th	1	21	
Total	3	54	

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : WHEATLAND LA

EAST-WEST STREET : I-210 WB RAMPS 05-24-12

BEGINNING TIME : 12:00PM PH = 1:00PM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
					NORTH LEG							
9	9	0	1	1	0	0	0	0	0	0	0	20
9	18	0	0	1	0	0	0	0	0	0	0	28
2	20	0	0	0	0	0	0	0	0	0	0	22
0	9	0	0	0	0	0	0	0	0	0	0	9
4	12	0	2	0	0	0	0	0	0	0	0	18
17	16	0	0	0	0	0	0	0	0	0	0	33
6	19	0	0	0	0	0	0	0	0	0	0	25
26	13	0	1	0	0	0	0	0	0	1	0	41
73	116	0	4	2	0	0	0	0	0	1	0	196
					SOUTH LEG							
0	18	1	0	0	0	0	0	0	0	1	0	20
0	17	2	0	0	0	0	0	0	0	0	0	19
0	18	1	0	1	0	0	0	0	0	0	0	20
0	15	2	0	0	0	0	0	0	0	0	0	17
0	10	0	0	1	0	0	0	0	0	0	0	11
0	9	0	0	0	0	0	0	0	0	1	0	10
0	11	2	0	0	0	0	0	0	0	1	0	14
0	19	1	0	0	0	0	1	0	0	1	0	22
0	117	9	0	2	0	0	1	0	0	4	0	133
					EAST LEG							
6	1	0	0	0	0	0	0	0	0	0	0	7
7	0	1	0	0	0	0	0	0	0	0	0	8
2	0	1	0	0	0	0	0	0	0	0	0	3
0	1	1	0	0	0	0	0	0	0	0	0	2
4	0	0	0	0	0	0	0	0	0	0	0	4
13	1	2	0	0	0	0	0	0	0	0	0	16
7	0	0	0	0	0	0	0	0	0	0	0	7
17	1	1	0	0	0	0	0	0	0	0	0	19
56	4	6	0	0	0	0	0	0	0	0	0	66
					WEST LEG							
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: WHEATLAND
EAST-WEST STREET: I-210 WB RAMPS
JURISDICTION: LA

DATE: 05-24-12

PEAK HOUR: 08:00AM

NORTH LEG

TOTAL: 176

Rt	Thru	Lt	
67	109		Total
16	31		1st
20	35		2nd
8	27		3rd
23	16		4th

EAST LEG TOTAL: 103

	1st	2nd	3rd	4th	Total
Rt	23	32	18	28	101
Thru	0	0	0	0	
Lt	0	1	1	0	2

Total	1st	2nd	3rd	4th	
					Lt
					Thru
					Rt

WEST LEG TOTAL: 0

PEAK HOUR FACTORS

NORTH LEG = 0.80
SOUTH LEG = 0.86
EAST LEG = 0.78
WEST LEG =

ALL LEGS = 0.81

	Lt	Thru	Rt
1st	1	20	
2nd	3	27	
3rd	0	22	
4th	1	29	
Total	5	98	

SOUTH LEG

TOTAL: 103

HOUR TOTAL: 382

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INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WHEATLAND

EAST-WEST STREET: I-210 WB RAMPS

TIME: 07:00AM-08:00AM DATE: 05-24-12

NORTH LEG

Rt	Thru	Lt	
67	117		Total
19	31		1st
18	31		2nd
13	30		3rd
17	25		4th

	1st	2nd	3rd	4th	Total
Rt	7	9	12	13	41
Thru	2	0	0	0	2
Lt	1	2	1	0	4

Total	1st	2nd	3rd	4th	
					Lt
					Thru
					Rt

	Lt	Thru	Rt
1st	3	14	
2nd	0	20	
3rd	2	22	
4th	1	31	
Total	6	87	

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WHEATLAND

EAST-WEST STREET: I-210 WB RAMPS

TIME: 08:00AM-09:00AM DATE: 05-24-12

NORTH LEG

Rt	Thru	Lt	
67	109		Total
16	31		1st
20	35		2nd
8	27		3rd
23	16		4th

	1st	2nd	3rd	4th	Total
Rt	23	32	18	28	101
Thru	0	0	0	0	0
Lt	0	1	1	0	2

Total	1st	2nd	3rd	4th	
					Lt
					Thru
					Rt

	Lt	Thru	Rt
1st	1	20	
2nd	3	27	
3rd	0	22	
4th	1	29	
Total	5	98	

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : WHEATLAND LA

EAST-WEST STREET : I-210 WB RAMPS 05-24-12

BEGINNING TIME : 07:00AM PM = 8:00AM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
NORTH LEG												
18	31	0	1	0	0	0	0	0	0	0	0	50
18	30	0	0	1	0	0	0	0	0	0	0	49
13	28	0	0	2	0	0	0	0	0	0	0	43
17	25	0	0	0	0	0	0	0	0	0	0	42
15	29	0	1	2	0	0	0	0	0	0	0	47
19	34	0	1	1	0	0	0	0	0	0	0	55
8	27	0	0	0	0	0	0	0	0	0	0	35
21	16	0	1	0	0	0	0	0	1	0	0	39
129	220	0	4	6	0	0	0	0	1	0	0	360
SOUTH LEG												
0	14	3	0	0	0	0	0	0	0	0	0	17
0	20	0	0	0	0	0	0	0	0	0	0	20
0	20	2	0	2	0	0	0	0	0	0	0	24
0	28	1	0	2	0	0	0	0	0	1	0	32
0	19	1	0	1	0	0	0	0	0	0	0	21
0	26	3	0	0	0	0	0	0	0	1	0	30
0	21	0	0	0	0	0	0	0	0	1	0	22
0	28	0	0	1	1	0	0	0	0	0	0	30
0	176	10	0	6	1	0	0	0	0	3	0	196
EAST LEG												
6	2	1	1	0	0	0	0	0	0	0	0	10
9	0	2	0	0	0	0	0	0	0	0	0	11
11	0	1	1	0	0	0	0	0	0	0	0	13
13	0	0	0	0	0	0	0	0	0	0	0	13
22	0	0	1	0	0	0	0	0	0	0	0	23
32	0	0	0	0	1	0	0	0	0	0	0	33
18	0	1	0	0	0	0	0	0	0	0	0	19
25	0	0	3	0	0	0	0	0	0	0	0	28
136	2	5	6	0	1	0	0	0	0	0	0	150
WEST LEG												
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: WHEATLAND
EAST-WEST STREET: I-210 WB RAMPS
JURISDICTION: LA

DATE: 05-24-12

PEAK HOUR: 05:00PM

NORTH LEG

TOTAL: 189

Rt	Thru	Lt	
107	82		Total
32	21		1st
35	21		2nd
22	22		3rd
18	18		4th

EAST LEG TOTAL: 124

	1st	2nd	3rd	4th	Total
Rt	37	22	26	35	120
Thru	0	0	0	0	
Lt	1	1	1	1	4

WEST LEG TOTAL: 0

Total	1st	2nd	3rd	4th	
					Lt
					Thru
					Rt

PEAK HOUR FACTORS

NORTH LEG = 0.84
SOUTH LEG = 0.88
EAST LEG = 0.82
WEST LEG =

ALL LEGS = 0.89

SOUTH LEG

TOTAL: 98

	Lt	Thru	Rt
1st	1	24	
2nd	0	20	
3rd	0	25	
4th	0	28	
Total	1	97	

HOUR TOTAL: 411

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INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WHEATLAND

EAST-WEST STREET: I-210 WB RAMPS

TIME: 04:00PM-05:00PM DATE: 05-24-12

NORTH LEG

Rt	Thru	Lt	
71	65		Total
16	18		1st
24	19		2nd
20	15		3rd
11	13		4th

	1st	2nd	3rd	4th	Total
Rt	25	20	27	31	103
Thru	2	3	0	0	5
Lt	1	1	0	0	2

Total	1st	2nd	3rd	4th	
					Lt
					Thru
					Rt

	Lt	Thru	Rt
1st	0	33	
2nd	0	26	
3rd	0	25	
4th	5	22	
Total	5	106	

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WHEATLAND

EAST-WEST STREET: I-210 WB RAMPS

TIME: 05:00PM-06:00PM DATE: 05-24-12

NORTH LEG

Rt	Thru	Lt	
107	82		Total
32	21		1st
35	21		2nd
22	22		3rd
18	18		4th

	1st	2nd	3rd	4th	Total
Rt	37	22	26	35	120
Thru	0	0	0	0	0
Lt	1	1	1	1	4

Total	1st	2nd	3rd	4th	
					Lt
					Thru
					Rt

	Lt	Thru	Rt
1st	1	24	
2nd	0	20	
3rd	0	25	
4th	0	28	
Total	1	97	

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : WHEATLAND LA

EAST-WEST STREET : I-210 WB RAMPS 05-24-12

BEGINNING TIME : 04:00PM PH = 5:00PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
16	18	0	0	0	0	0	0	0	0	0	0	34
24	17	0	0	1	0	0	0	0	0	1	0	43
19	13	0	0	1	0	0	0	0	1	1	0	35
10	12	0	0	1	0	0	0	0	1	0	0	24
32	21	0	0	0	0	0	0	0	0	0	0	53
35	21	0	0	0	0	0	0	0	0	0	0	56
22	22	0	0	0	0	0	0	0	0	0	0	44
18	18	0	0	0	0	0	0	0	0	0	0	36
176	142	0	0	3	0	0	0	0	2	2	0	325
						SOUTH LEG						
0	33	0	0	0	0	0	0	0	0	0	0	33
0	26	0	0	0	0	0	0	0	0	0	0	26
0	24	0	0	1	0	0	0	0	0	0	0	25
0	22	5	0	0	0	0	0	0	0	0	0	27
0	22	0	0	1	1	0	0	0	0	1	0	25
0	20	0	0	0	0	0	0	0	0	0	0	20
0	25	0	0	0	0	0	0	0	0	0	0	25
0	28	0	0	0	0	0	0	0	0	0	0	28
0	200	5	0	2	1	0	0	0	0	1	0	209
						EAST LEG						
25	2	1	0	0	0	0	0	0	0	0	0	28
20	3	1	0	0	0	0	0	0	0	0	0	24
27	0	0	0	0	0	0	0	0	0	0	0	27
31	0	0	0	0	0	0	0	0	0	0	0	31
37	0	1	0	0	0	0	0	0	0	0	0	38
22	0	1	0	0	0	0	0	0	0	0	0	23
26	0	1	0	0	0	0	0	0	0	0	0	27
35	0	1	0	0	0	0	0	0	0	0	0	36
223	5	6	0	0	0	0	0	0	0	0	0	234
						WEST LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0

Prepared by Newport Traffic Studies

Intersection	
Intersection Delay (sec/veh):	2.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	0	0	0	5	0	100	5	100	0	0	110	65
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	0		0	0		0	0		0	0		0
Median Width		0			0			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67
Heavy Vehicles(%)	2	2	2	50	0	5	20	5	0	0	5	5
Movement Flow Rate	0	0	0	7	0	149	7	149	0	0	164	97
Number of Lanes	0	0	0	0	1	1	0	1	0	0	1	0

Major/Minor	Minor 1			Major 1			Major 2		
Conflicting Flow Rate - All	377	425	149	261	0	-	-	0	0
Stage 1	164	164	0	0	0	-	-	0	0
Stage 2	213	261	0	0	0	-	-	0	0
Follow-up Headway	3.95	4	3.345	2.38	-	-	-	0	0
Pot Capacity-1 Maneuver	502	524	892	1203	-	-	-	-	-
Stage 1	737	766	-	-	-	-	-	-	-
Stage 2	692	696	-	-	-	-	-	-	-
Mov Capacity-1 Maneuver	-	520.9	892	1203	-	-	-	-	-
Mov Capacity-2 Maneuver	-	520.9	-	-	-	-	-	-	-
Stage 1	737	761.4	-	-	-	-	-	-	-
Stage 2	692	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay (s)	9.286	0.4	0
HCM LOS	A	A	A

Lane	NBL	NBT	WBLn1	WBLn2	SBT	SBR
Capacity (vph)			-	892		
HCM Control Delay (s)	8.011	0	-	9.8	-	-
HCM Lane VC Ratio	0.006	-	-	0.167	0	-
HCM Lane LOS	A	-	-	A	-	-
HCM 95th Percentile Queue (veh)	0.019	-	-	0.599	0	-

Intersection	
Intersection Delay (sec/veh):	1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	0	0	0	5	5	40	5	55	0	0	60	55
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	0		0	0		0	0		0	0		0
Median Width		0			0			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Heavy Vehicles(%)	2	2	2	0	0	0	0	10	0	0	5	5
Movement Flow Rate	0	0	0	6	6	49	6	68	0	0	74	68
Number of Lanes	0	0	0	0	1	1	0	1	0	0	1	0

Major/Minor	Minor 1			Major 1			Major 2		
Conflicting Flow Rate - All	188	222	68	142	0	-	-	0	0
Stage 1	80	80	0	0	0	-	-	0	0
Stage 2	108	142	0	0	0	-	-	0	0
Follow-up Headway	3.5	4	3.3	2.2	-	-	-	0	0
Pot Capacity-1 Maneuver	777	680	1006	1449	-	-	-	-	-
Stage 1	934	832	-	-	-	-	-	-	-
Stage 2	902	783	-	-	-	-	-	-	-
Mov Capacity-1 Maneuver	-	677.3	1006	1449	-	-	-	-	-
Mov Capacity-2 Maneuver	-	677.3	-	-	-	-	-	-	-
Stage 1	934	828.7	-	-	-	-	-	-	-
Stage 2	902	# 0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay (s)	6.64	0.6	0
HCM LOS	A	A	A

Lane	NBL	NBT	WBLn1	WBLn2	SBT	SBR
Capacity (vph)			~	1006		
HCM Control Delay (s)	7.495	0	~	8.8	-	-
HCM Lane VC Ratio	0.004	-	~	0.049	0	-
HCM Lane LOS	A	-	-	A	-	-
HCM 95th Percentile Queue (veh)	0.013	-	~	0.155	0	-

Intersection	
Intersection Delay (sec/veh):	2.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	0	0	0	5	0	120	5	95	0	0	80	105
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	0		0	0		0	0		0	0		0
Median Width		0			0			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles(%)	2	2	2	0	0	0	80	5	0	0	0	0
Movement Flow Rate	0	0	0	6	0	135	6	107	0	0	90	118
Number of Lanes	0	0	0	0	1	1	0	1	0	0	1	0

Major/Minor	Minor 1				Major 1			Major 2	
Conflicting Flow Rate - All	267	326	107	208	0	-	-	0	0
Stage 1	118	118	0	0	0	-	-	0	0
Stage 2	149	208	0	0	0	-	-	0	0
Follow-up Headway	3.5	4	3.3	2.92	-	-	-	0	0
Pot Capacity-1 Maneuver	690	596	954	1008	-	-	-	-	-
Stage 1	891	802	-	-	-	-	-	-	-
Stage 2	858	734	-	-	-	-	-	-	-
Mov Capacity-1 Maneuver	-	592.4	954	1008	-	-	-	-	-
Mov Capacity-2 Maneuver	-	592.4	-	-	-	-	-	-	-
Stage 1	891	797.2	-	-	-	-	-	-	-
Stage 2	858	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay (s)	8.984	0.4	0
HCM LOS	A	A	A

Lane	NBL	NBT	WBLn1	WBLn2	SBT	SBR
Capacity (vph)			-	954		
HCM Control Delay (s)	8.591	0	-	9.4	-	-
HCM Lane VC Ratio	0.006	-	-	0.141	0	-
HCM Lane LOS	A	-	-	A	-	-
HCM 95th Percentile Queue (veh)	0.017	-	-	0.491	0	-

Intersection	
Intersection Delay (sec/veh):	3.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	0	0	0	5	0	150	5	100	0	0	160	65
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	0		0	0		0	0		0	0		0
Median Width		0			0			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67
Heavy Vehicles(%)	2	2	2	50	0	37	20	5	0	0	35	5
Movement Flow Rate	0	0	0	7	0	224	7	149	0	0	239	97
Number of Lanes	0	0	0	0	1	1	0	1	0	0	1	0

Major/Minor	Minor 1			Major 1			Major 2		
Conflicting Flow Rate - All	451	500	149	336	0	-	-	0	0
Stage 1	164	164	0	0	0	-	-	0	0
Stage 2	287	336	0	0	0	-	-	0	0
Follow-up Headway	3.95	4	3.633	2.38	-	-	-	0	0
Pot Capacity-1 Maneuver	446	476	815	1130	-	-	-	-	-
Stage 1	737	766	-	-	-	-	-	-	-
Stage 2	628	645	-	-	-	-	-	-	-
Mov Capacity-1 Maneuver	-	472.7	815	1130	-	-	-	-	-
Mov Capacity-2 Maneuver	-	472.7	-	-	-	-	-	-	-
Stage 1	737	760.6	-	-	-	-	-	-	-
Stage 2	628	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay (s)	10.71	0.4	0
HCM LOS	B	A	A

Lane	NBL	NBT	WBLn1	WBLn2	SBT	SBR
Capacity (vph)			-	815		
HCM Control Delay (s)	8.207	0	-	11.1	-	-
HCM Lane VC Ratio	0.007	-	-	0.275	0	-
HCM Lane LOS	A	-	-	B	-	-
HCM 95th Percentile Queue (veh)	0.02	-	-	1.119	0	-

Intersection	
Intersection Delay (sec/veh):	2.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	0	0	0	5	0	120	5	95	0	0	80	105
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	0		0	0		0	0		0	0		0
Median Width		0			0			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles(%)	2	2	2	0	0	0	80	5	0	0	0	0
Movement Flow Rate	0	0	0	6	0	135	6	107	0	0	90	118
Number of Lanes	0	0	0	0	1	1	0	1	0	0	1	0

Major/Minor	Minor 1			Major 1			Major 2		
Conflicting Flow Rate - All	267	326	107	208	0	-	-	0	0
Stage 1	118	118	0	0	0	-	-	0	0
Stage 2	149	208	0	0	0	-	-	0	0
Follow-up Headway	3.5	4	3.3	2.92	-	-	-	0	0
Pot Capacity-1 Maneuver	690	596	954	1008	-	-	-	-	-
Stage 1	891	802	-	-	-	-	-	-	-
Stage 2	858	734	-	-	-	-	-	-	-
Mov Capacity-1 Maneuver	-	592.4	954	1008	-	-	-	-	-
Mov Capacity-2 Maneuver	-	592.4	-	-	-	-	-	-	-
Stage 1	891	797.2	-	-	-	-	-	-	-
Stage 2	858	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay (s)	8.984	0.4	0
HCM LOS	A	A	A

Lane	NBL	NBT	WBLn1	WBLn2	SBT	SBR
Capacity (vph)			-	954		
HCM Control Delay (s)	8.591	0	-	9.4	-	-
HCM Lane VC Ratio	0.006	-	-	0.141	0	-
HCM Lane LOS	A	-	-	A	-	-
HCM 95th Percentile Queue (veh)	0.017	-	-	0.491	0	-

Intersection	
Intersection Delay (sec/veh):	2.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	0	0	0	5	5	90	5	110	0	0	60	55
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	0		0	0		0	0		0	0		0
Median Width		0			0			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Heavy Vehicles(%)	2	2	2	0	0	56	0	48	0	0	5	5
Movement Flow Rate	0	0	0	6	6	111	6	136	0	0	74	68
Number of Lanes	0	0	0	0	1	1	0	1	0	0	1	0

Major/Minor	Minor 1			Major 1			Major 2		
Conflicting Flow Rate - All	256	290	136	142	0	-	-	0	0
Stage 1	148	148	0	0	0	-	-	0	0
Stage 2	108	142	0	0	0	-	-	0	0
Follow-up Headway	3.5	4	3.804	2.2	-	-	-	0	0
Pot Capacity-1 Maneuver	701	624	786	1449	-	-	-	-	-
Stage 1	859	779	-	-	-	-	-	-	-
Stage 2	902	783	-	-	-	-	-	-	-
Mov Capacity-1 Maneuver	-	621.5	786	1449	-	-	-	-	-
Mov Capacity-2 Maneuver	-	621.5	-	-	-	-	-	-	-
Stage 1	859	775.9	-	-	-	-	-	-	-
Stage 2	902	# 0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay (s)	9.07	0.3	0
HCM LOS	A	A	A

Lane	NBL	NBT	WBLn1	WBLn2	SBT	SBR
Capacity (vph)			~	786		
HCM Control Delay (s)	7.495	0	~	10.3	-	-
HCM Lane VC Ratio	0.004	-	~	0.141	0	-
HCM Lane LOS	A	-	-	B	-	-
HCM 95th Percentile Queue (veh)	0.013	-	~	0.491	0	-

Intersection	
Intersection Delay (sec/veh):	3.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	0	0	0	5	0	165	5	110	0	0	175	70
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	0		0	0		0	0		0	0		0
Median Width		0			0			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67
Heavy Vehicles(%)	2	2	2	50	0	37	20	5	0	0	35	5
Movement Flow Rate	0	0	0	7	0	246	7	164	0	0	261	104
Number of Lanes	0	0	0	0	1	1	0	1	0	0	1	0

Major/Minor	Minor 1			Major 1			Major 2		
Conflicting Flow Rate - All	492	545	164	366	0	-	-	0	0
Stage 1	179	179	0	0	0	-	-	0	0
Stage 2	313	366	0	0	0	-	-	0	0
Follow-up Headway	3.95	4	3.633	2.38	-	-	-	0	0
Pot Capacity-1 Maneuver	417	449	795	1100	-	-	-	-	-
Stage 1	723	755	-	-	-	-	-	-	-
Stage 2	607	626	-	-	-	-	-	-	-
Mov Capacity-1 Maneuver	-	445.9	795	1100	-	-	-	-	-
Mov Capacity-2 Maneuver	-	445.9	-	-	-	-	-	-	-
Stage 1	723	749.7	-	-	-	-	-	-	-
Stage 2	607	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay (s)	11.132	0.4	0
HCM LOS	B	A	A

Lane	NBL	NBT	WBLn1	WBLn2	SBT	SBR
Capacity (vph)			-	795		
HCM Control Delay (s)	8.295	0	-	11.5	-	-
HCM Lane VC Ratio	0.007	-	-	0.31	0	-
HCM Lane LOS	A	-	-	B	-	-
HCM 95th Percentile Queue (veh)	0.02	-	-	1.321	0	-

Intersection	
Intersection Delay (sec/veh):	2.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	0	0	0	5	5	100	5	60	0	0	120	60
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	0		0	0		0	0		0	0		0
Median Width		0			0			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Heavy Vehicles(%)	2	2	2	0	0	56	0	0	0	0	48	5
Movement Flow Rate	0	0	0	6	6	123	6	74	0	0	148	74
Number of Lanes	0	0	0	0	1	1	0	1	0	0	1	0

Major/Minor	Minor 1			Major 1			Major 2		
Conflicting Flow Rate - All	271	308	74	222	0	-	-	0	0
Stage 1	86	86	0	0	0	-	-	0	0
Stage 2	185	222	0	0	0	-	-	0	0
Follow-up Headway	3.5	4	3.804	2.2	-	-	-	0	0
Pot Capacity-1 Maneuver	686	609	858	1356	-	-	-	-	-
Stage 1	927	827	-	-	-	-	-	-	-
Stage 2	821	723	-	-	-	-	-	-	-
Mov Capacity-1 Maneuver	-	606	858	1356	-	-	-	-	-
Mov Capacity-2 Maneuver	-	606	-	-	-	-	-	-	-
Stage 1	927	822.9	-	-	-	-	-	-	-
Stage 2	821	# 0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay (s)	8.818	0.6	0
HCM LOS	A	A	A

Lane	NBL	NBT	WBLn1	WBLn2	SBT	SBR
Capacity (vph)			~	858		
HCM Control Delay (s)	7.667	0	~	9.9	-	-
HCM Lane VC Ratio	0.005	-	~	0.144	0	-
HCM Lane LOS	A	-	-	A	-	-
HCM 95th Percentile Queue (veh)	0.014	-	~	0.501	0	-

Intersection	
Intersection Delay (sec/veh):	3.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	0	0	0	5	0	185	5	105	0	0	140	115
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	0		0	0		0	0		0	0		0
Median Width		0			0			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles(%)	2	2	2	0	0	29	80	5	0	0	38	0
Movement Flow Rate	0	0	0	6	0	208	6	118	0	0	157	129
Number of Lanes	0	0	0	0	1	1	0	1	0	0	1	0

Major/Minor	Minor 1			Major 1				Major 2	
Conflicting Flow Rate - All	351	416	118	287	0	-	-	0	0
Stage 1	129	129	9.2	5621421	90012E61	-	-	0	0
Stage 2	222	287	2.901	0676372	4187E-315	-	-	0	0
Follow-up Headway	3.5	4	3.561	2.92	-	-	-	0	0
Pot Capacity-1 Maneuver	608	530	864	934	-	-	-	-	-
Stage 1	880	793	-	-	-	-	-	-	-
Stage 2	785	678	-	-	-	-	-	-	-
Mov Capacity-1 Maneuver	-	526.8	864	934	-	-	-	-	-
Mov Capacity-2 Maneuver	-	526.8	-	-	-	-	-	-	-
Stage 1	880	788.2	-	-	-	-	-	-	-
Stage 2	785	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay (s)	10.197	0.4	0
HCM LOS	B	A	A

Lane	NBL	NBT	WBLn1	WBLn2	SBT	SBR
Capacity (vph)			-	864		
HCM Control Delay (s)	8.878	0	-	10.5	-	-
HCM Lane VC Ratio	0.006	-	-	0.241	0	-
HCM Lane LOS	A	-	-	B	-	-
HCM 95th Percentile Queue (veh)	0.018	-	-	0.94	0	-

Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

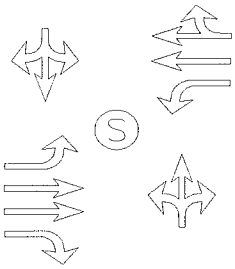
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : FOOTHILL BLVD
N/S STREET : WHEATLAND AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
46
ROUTE
5C, 6C, 7C, 8C

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
FOOTHILL BLVD						
EB LEFT	5	30%		5	5	10
EB THRU	195	5%		195	20	215
EB RIGHT	90	0%		90	10	100
WB LEFT	80	42%	**50**	130	10	140
WB THRU	220	5%		220	20	240
WB RIGHT	5	0%		5	5	10
WHEATLAND AVE						
NB LEFT	70	5%		70	5	75
NB THRU	10	0%		10	5	15
NB RIGHT	110	35%	**50**	160	15	175
SB LEFT	15	20%		15	5	20
SB THRU	15	0%		15	5	20
SB RIGHT	5	0%		5	5	10
TOTALS	**820**		**100**	**920**	**110**	**1030**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : FOOTHILL BLVD
N/S STREET : WHEATLAND AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 46
ROUTE 5C, 6C, 7C, 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
FOOTHILL BLVD						
EB LEFT	10	0%		10	5	15
EB THRU	135	5%		135	10	145
EB RIGHT	35	5%		35	5	40
WB LEFT	65	49%	**50**	115	10	125
WB THRU	130	5%		130	10	140
WB RIGHT	20	0%		20	5	25
WHEATLAND AVE						
NB LEFT	40	0%		40	5	45
NB THRU	25	0%		25	5	30
NB RIGHT	50	58%	**50**	100	10	110
SB LEFT	5	0%		5	5	10
SB THRU	20	0%		20	5	25
SB RIGHT	15	0%		15	5	20
TOTALS	**550**		**100**	**650**	**80**	**730**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	3-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : FOOTHILL BLVD
N/S STREET : WHEATLAND AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 46
ROUTE 5C, 6C, 7C, 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
FOOTHILL BLVD						
EB LEFT	0	0%		0	0	0
EB THRU	170	5%		170	15	185
EB RIGHT	80	0%		80	5	85
WB LEFT	95	34%	**50**	145	15	160
WB THRU	215	5%		215	20	235
WB RIGHT	15	0%		15	5	20
WHEATLAND AVE						
NB LEFT	90	0%		90	10	100
NB THRU	25	0%		25	5	30
NB RIGHT	100	33%	**50**	150	15	165
SB LEFT	10	0%		10	5	15
SB THRU	20	0%		20	5	25
SB RIGHT	5	0%		5	5	10
TOTALS	**825**		**100**	**925**	**105**	**1030**

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TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : FOOTHILL BLVD
N/S STREET : WHEATLAND AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
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INTERSECTION
46
ROUTE
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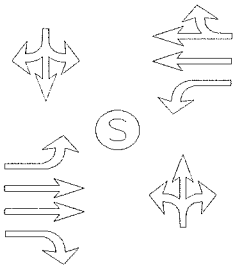
CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
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FOOTHILL BLVD						
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EB THRU	195	5%		195	20	215
EB RIGHT	90	0%		90	10	100
WB LEFT	80	42%	**50**	130	10	140
WB THRU	220	5%		220	20	240
WB RIGHT	5	0%		5	5	10
WHEATLAND AVE						
NB LEFT	70	5%		70	5	75
NB THRU	10	0%		10	5	15
NB RIGHT	110	35%	**50**	160	15	175
SB LEFT	15	20%		15	5	20
SB THRU	15	0%		15	5	20
SB RIGHT	5	0%		5	5	10
TOTALS	**820**		**100**	**920**	**110**	**1030**

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TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : FOOTHILL BLVD
N/S STREET : WHEATLAND AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 46
ROUTE 5C, 6C, 7C, 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
FOOTHILL BLVD						
EB LEFT	10	0%		10	5	15
EB THRU	135	5%		135	10	145
EB RIGHT	35	5%		35	5	40
WB LEFT	65	49%	**50**	115	10	125
WB THRU	130	5%		130	10	140
WB RIGHT	20	0%		20	5	25
WHEATLAND AVE						
NB LEFT	40	0%		40	5	45
NB THRU	25	0%		25	5	30
NB RIGHT	50	58%	**50**	100	10	110
SB LEFT	5	0%		5	5	10
SB THRU	20	0%		20	5	25
SB RIGHT	15	0%		15	5	20
TOTALS	**550**		**100**	**650**	**80**	**730**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	3-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : FOOTHILL BLVD
N/S STREET : WHEATLAND AVE
CONDITION : PM PEAK HOUR

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PROJECTED GROWTH PER YEAR:

INTERSECTION 46
ROUTE 5C, 6C, 7C, 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
FOOTHILL BLVD						
EB LEFT	0	0%		0	0	0
EB THRU	170	5%		170	15	185
EB RIGHT	80	0%		80	5	85
WB LEFT	95	34%	**50**	145	15	160
WB THRU	215	5%		215	20	235
WB RIGHT	15	0%		15	5	20
WHEATLAND AVE						
NB LEFT	90	0%		90	10	100
NB THRU	25	0%		25	5	30
NB RIGHT	100	33%	**50**	150	15	165
SB LEFT	10	0%		10	5	15
SB THRU	20	0%		20	5	25
SB RIGHT	5	0%		5	5	10
TOTALS	**825**		**100**	**925**	**105**	**1030**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: WHEATLAND
EAST-WEST STREET: FOOTHILL
JURISDICTION: LA

DATE: 05-24-12

PEAK HOUR: 07:30AM

NORTH LEG

TOTAL: 31

Rt	Thru	Lt	
1	16	14	Total
0	4	5	1st
1	7	3	2nd
0	3	5	3rd
0	2	1	4th

EAST LEG TOTAL: 306

	1st	2nd	3rd	4th	Total
Rt	0	2	1	1	4
Thru	43	65	52	61	221
Lt	21	18	20	22	81

WEST LEG TOTAL: 296

Total	1st	2nd	3rd	4th	
7	2	1	3	1	Lt
197	62	68	30	37	Thru
92	21	24	20	27	Rt

PEAK HOUR FACTORS

NORTH LEG = 0.70
SOUTH LEG = 0.85
EAST LEG = 0.90
WEST LEG = 0.80

ALL LEGS = 0.86

SOUTH LEG

TOTAL: 188

	Lt	Thru	Rt
1st	4	0	28
2nd	13	3	33
3rd	24	4	24
4th	27	2	26
Total	68	9	111

HOUR TOTAL: 821

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WHEATLAND

EAST-WEST STREET: FOOTHILL

TIME: 07:00AM-08:00AM DATE: 05-24-12

NORTH LEG

Rt	Thru	Lt	
1	32	17	Total
0	11	2	1st
0	10	7	2nd
0	4	5	3rd
1	7	3	4th

	1st	2nd	3rd	4th	Total
Rt	0	0	0	2	2
Thru	29	39	43	65	176
Lt	16	12	21	18	67

Total	1st	2nd	3rd	4th	
3	0	0	2	1	Lt
218	36	52	62	68	Thru
94	25	24	21	24	Rt

	Lt	Thru	Rt
1st	6	3	15
2nd	7	3	20
3rd	4	0	28
4th	13	3	33
Total	30	9	96

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WHEATLAND

EAST-WEST STREET: FOOTHILL

TIME: 08:00AM-09:00AM DATE: 05-24-12

NORTH LEG

Rt	Thru	Lt	
3	15	11	Total
0	3	5	1st
0	2	1	2nd
2	5	3	3rd
1	5	2	4th

	1st	2nd	3rd	4th	Total
Rt	1	1	4	2	8
Thru	52	61	33	20	166
Lt	20	22	9	15	66

Total	1st	2nd	3rd	4th	
4	3	1	0	0	Lt
146	30	37	41	38	Thru
83	20	27	21	15	Rt

	Lt	Thru	Rt
1st	24	4	24
2nd	27	2	26
3rd	10	1	33
4th	14	2	42
Total	75	9	125

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : WHEATLAND LA

EAST-WEST STREET : FOOTHILL 05-24-12

BEGINNING TIME : 07:00AM PH: 7:30AM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
					NORTH LEG							
0	11	2	0	0	0	0	0	0	0	0	0	13
0	10	7	0	0	0	0	0	0	0	0	0	17
0	4	4	0	0	1	0	0	0	0	0	0	9
1	7	1	0	0	1	0	0	0	0	0	1	11
0	3	5	0	0	0	0	0	0	0	0	0	8
0	2	1	0	0	0	0	0	0	0	0	0	3
2	5	3	0	0	0	0	0	0	0	0	0	10
1	5	2	0	0	0	0	0	0	0	0	0	8
4	47	25	0	0	2	0	0	0	0	0	1	79
					SOUTH LEG							
15	3	5	0	0	1	0	0	0	0	0	0	24
19	3	7	1	0	0	0	0	0	0	0	0	30
27	0	2	1	0	2	0	0	0	0	0	0	32
33	3	12	0	0	1	0	0	0	0	0	0	49
23	4	23	1	0	1	0	0	0	0	0	0	52
26	2	26	0	0	0	0	0	0	0	0	1	55
32	1	10	0	0	0	0	0	0	1	0	0	44
41	2	12	1	0	2	0	0	0	0	0	0	58
216	18	97	4	0	7	0	0	0	1	0	1	344
					EAST LEG							
0	24	16	0	4	0	0	1	0	0	0	0	45
0	37	11	0	2	1	0	0	0	0	0	0	51
0	41	21	0	1	0	0	0	0	0	1	0	64
2	61	17	0	3	1	0	1	0	0	0	0	85
1	50	17	0	1	3	0	0	0	0	1	0	73
1	56	22	0	3	0	0	2	0	0	0	0	84
4	29	8	0	4	1	0	0	0	0	0	0	46
2	19	13	0	0	1	0	0	0	0	1	1	37
10	317	125	0	18	7	0	4	0	0	3	1	485
					WEST LEG							
25	36	-1	0	0	1	0	0	0	0	0	0	61
24	47	0	0	5	0	0	0	0	0	0	0	76
21	62	0	0	0	1	0	0	0	0	0	1	85
24	63	1	0	5	0	0	0	0	0	0	0	93
20	28	3	0	1	0	0	0	0	0	1	0	53
27	34	1	0	3	0	0	0	0	0	0	0	65
21	37	0	0	3	0	0	0	0	0	1	0	62
15	36	0	0	1	0	0	1	0	0	0	0	53
177	343	4	0	18	2	0	1	0	0	2	1	548

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: WHEATLAND
EAST-WEST STREET: FOOTHILL
JURISDICTION: LA

DATE: 05-24-12

PEAK HOUR: 01:00PM

NORTH LEG

TOTAL: 39

Rt	Thru	Lt	
14	19	6	Total
0	3	1	1st
3	5	2	2nd
5	7	1	3rd
6	4	2	4th

EAST LEG TOTAL: 214

	1st	2nd	3rd	4th	Total
Rt	2	2	9	6	19
Thru	32	25	34	37	128
Lt	15	14	18	20	67

WEST LEG TOTAL: 182

Total	1st	2nd	3rd	4th	
10	1	1	4	4	Lt
136	32	27	44	33	Thru
36	10	9	11	6	Rt

PEAK HOUR FACTORS

NORTH LEG = 0.75
SOUTH LEG = 0.92
EAST LEG = 0.85
WEST LEG = 0.77

ALL LEGS = 0.84

SOUTH LEG

TOTAL: 110

	Lt	Thru	Rt
1st	13	5	12
2nd	7	3	16
3rd	7	10	12
4th	11	6	8
Total	38	24	48

HOUR TOTAL: 545

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WHEATLAND

EAST-WEST STREET: FOOTHILL

TIME: 12:00PM-01:00PM DATE: 05-24-12

NORTH LEG

Rt	Thru	Lt	
1	6	6	Total
0	1	0	1st
0	4	2	2nd
1	0	3	3rd
0	1	1	4th

	1st	2nd	3rd	4th	Total
Rt	1	4	0	5	10
Thru	25	36	39	28	128
Lt	8	19	14	12	53

Total	1st	2nd	3rd	4th	
3	0	0	1	2	Lt
105	19	24	38	24	Thru
37	7	14	13	3	Rt

	Lt	Thru	Rt
1st	6	3	13
2nd	7	8	15
3rd	10	5	11
4th	9	4	8
Total	32	20	47

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WHEATLAND

EAST-WEST STREET: FOOTHILL

TIME: 01:00PM-02:00PM DATE: 05-24-12

NORTH LEG

Rt	Thru	Lt	
14	19	6	Total
0	3	1	1st
3	5	2	2nd
5	7	1	3rd
6	4	2	4th

	1st	2nd	3rd	4th	Total
Rt	2	2	9	6	19
Thru	32	25	34	37	128
Lt	15	14	18	20	67

Total	1st	2nd	3rd	4th	
10	1	1	4	4	Lt
136	32	27	44	33	Thru
36	10	9	11	6	Rt

	Lt	Thru	Rt
1st	13	5	12
2nd	7	3	16
3rd	7	10	12
4th	11	6	8
Total	38	24	48

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : WHEATLAND LA

EAST-WEST STREET : FOOTHILL 05-24-12

BEGINNING TIME : 12:00PM PM: 1:00PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
NORTH LEG												
0	1	0	0	0	0	0	0	0	0	0	0	1
0	4	2	0	0	0	0	0	0	0	0	0	6
1	0	3	0	0	0	0	0	0	0	0	0	4
0	1	1	0	0	0	0	0	0	0	0	0	2
0	3	1	0	0	0	0	0	0	0	0	0	4
3	5	2	0	0	0	0	0	0	0	0	0	10
5	7	1	0	0	0	0	0	0	0	0	0	13
6	4	2	0	0	0	0	0	0	0	0	0	12
15	25	12	0	0	0	0	0	0	0	0	0	52
SOUTH LEG												
12	3	6	0	0	0	0	0	0	1	0	0	22
14	8	6	1	0	1	0	0	0	0	0	0	30
9	5	9	1	0	1	0	0	0	1	0	0	26
8	3	9	0	0	0	0	0	0	0	1	0	21
10	5	13	2	0	0	0	0	0	0	0	0	30
15	3	7	0	0	0	0	0	0	1	0	0	26
11	10	7	0	0	0	0	0	0	1	0	0	29
5	6	11	1	0	0	0	0	0	2	0	0	25
84	43	68	5	0	2	0	0	0	6	1	0	209
EAST LEG												
1	22	4	0	2	3	0	0	0	0	1	1	34
4	35	19	0	1	0	0	0	0	0	0	0	59
0	38	12	0	1	2	0	0	0	0	0	0	53
5	28	12	0	0	0	0	0	0	0	0	0	45
2	30	13	0	2	1	0	0	1	0	0	0	49
2	23	13	0	2	1	0	0	0	0	0	0	41
9	32	16	0	2	2	0	0	0	0	0	0	61
6	34	19	0	2	1	0	1	0	0	0	0	63
29	242	108	0	12	10	0	1	1	0	1	1	405
WEST LEG												
5	17	0	1	2	0	0	0	0	1	0	0	26
14	24	0	0	0	0	0	0	0	0	0	0	38
13	35	1	0	3	0	0	0	0	0	0	0	52
3	23	2	0	1	0	0	0	0	0	0	0	29
10	29	1	0	3	0	0	0	0	0	0	0	43
9	26	1	0	1	0	0	0	0	0	0	0	37
11	42	4	0	2	0	0	0	0	0	0	0	59
5	32	4	0	1	0	1	0	0	0	0	0	43
70	228	13	1	13	0	1	0	0	1	0	0	327

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: WHEATLAND
EAST-WEST STREET: FOOTHILL
JURISDICTION: LA

DATE: 05-24-12

PEAK HOUR: 05:00PM

NORTH LEG

TOTAL: 30

Rt	Thru	Lt	
1	21	8	Total
1	9	2	1st
0	7	1	2nd
0	2	2	3rd
0	3	3	4th

EAST LEG TOTAL: 327

	1st	2nd	3rd	4th	Total
Rt	4	3	5	5	17
Thru	53	69	51	41	214
Lt	28	24	23	21	96

WEST LEG TOTAL: 248

Total	1st	2nd	3rd	4th	
	0	0	0	0	Lt
169	53	46	38	32	Thru
79	20	26	19	14	Rt

PEAK HOUR FACTORS

NORTH LEG = 0.63
SOUTH LEG = 0.87
EAST LEG = 0.85
WEST LEG = 0.85

ALL LEGS = 0.90

SOUTH LEG

TOTAL: 215

	Lt	Thru	Rt
1st	32	8	19
2nd	16	4	22
3rd	17	6	29
4th	25	5	32
Total	90	23	102

HOUR TOTAL: 820

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WHEATLAND

EAST-WEST STREET: FOOTHILL

TIME: 04:00PM-05:00PM DATE: 05-24-12

NORTH LEG

0	3	7	Total
0	1	4	1st
0	0	0	2nd
0	1	2	3rd
0	1	1	4th
Rt	Thru	Lt	

Rt	1	3	4	4	12
Thru	54	46	49	43	192
Lt	20	16	18	14	68
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
3	1	1	0	1	Lt
133	31	39	27	36	Thru
67	14	27	16	10	Rt

	Lt	Thru	Rt
1st	27	7	23
2nd	17	4	27
3rd	24	4	20
4th	34	4	24
Total	102	19	94

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WHEATLAND

EAST-WEST STREET: FOOTHILL

TIME: 05:00PM-06:00PM DATE: 05-24-12

NORTH LEG

Rt	Thru	Lt	
1	21	8	Total
1	9	2	1st
0	7	1	2nd
0	2	2	3rd
0	3	3	4th

	1st	2nd	3rd	4th	Total
Rt	4	3	5	5	17
Thru	53	69	51	41	214
Lt	28	24	23	21	96

Total	1st	2nd	3rd	4th	
0	0	0	0	0	Lt
169	53	46	38	32	Thru
79	20	26	19	14	Rt

	Lt	Thru	Rt
1st	32	8	19
2nd	16	4	22
3rd	17	6	29
4th	25	5	32
Total	90	23	102

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

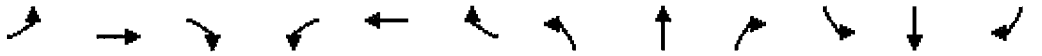
NORTH-SOUTH STREET : WHEATLAND LA

EAST-WEST STREET : FOOTHILL 05-24-12

BEGINNING TIME : 04:00PM PM = 5:00 PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
0	1	4	0	0	0	0	0	0	0	0	0	5
0	0	0	0	0	0	0	0	0	0	0	0	0
0	1	2	0	0	0	0	0	0	0	0	0	3
0	1	1	0	0	0	0	0	0	0	0	0	2
1	9	2	0	0	0	0	0	0	0	0	0	12
0	7	1	0	0	0	0	0	0	0	0	0	8
0	2	2	0	0	0	0	0	0	0	0	0	4
0	3	3	0	0	0	0	0	0	0	0	0	6
1	24	15	0	0	0	0	0	0	0	0	0	40
						SOUTH LEG						
23	7	26	0	0	1	0	0	0	0	0	0	57
27	4	16	0	0	1	0	0	0	0	0	0	48
19	4	24	1	0	0	0	0	0	0	0	0	48
24	4	33	0	0	0	0	0	1	0	0	0	62
19	8	32	0	0	0	0	0	0	0	0	0	59
22	4	16	0	0	0	0	0	0	0	0	0	42
29	6	17	0	0	0	0	0	0	0	0	0	52
32	5	25	0	0	0	0	0	0	0	0	0	62
195	42	189	1	0	2	0	0	1	0	0	0	430
						EAST LEG						
1	52	20	0	2	0	0	0	0	0	0	0	75
3	44	15	0	2	1	0	0	0	0	0	0	65
4	46	17	0	2	0	0	0	0	0	1	1	71
4	42	14	0	1	0	0	0	0	0	0	0	61
4	50	28	0	3	0	0	0	0	0	0	0	85
3	69	24	0	0	0	0	0	0	0	0	0	96
5	47	23	0	2	0	0	0	0	0	2	0	79
5	39	21	0	1	0	0	1	0	0	0	0	67
29	389	162	0	13	1	0	1	0	0	3	1	599
						WEST LEG						
14	30	1	0	1	0	0	0	0	0	0	0	46
24	38	1	2	1	0	0	0	0	1	0	0	67
14	27	0	1	0	0	0	0	0	1	0	0	43
9	36	1	1	0	0	0	0	0	0	0	0	47
20	52	0	0	1	0	0	0	0	0	0	0	73
26	46	0	0	0	0	0	0	0	0	0	0	72
19	36	0	0	2	0	0	0	0	0	0	0	57
14	32	0	0	0	0	0	0	0	0	0	0	46
140	297	3	4	5	0	0	0	0	2	0	0	451

Prepared by Newport Traffic Studies



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	195	90	80	220	5	70	10	110	15	15	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95			1.00			1.00	
Frt	1.00	1.00	0.85	1.00	1.00			0.92			0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.98			0.98	
Satd. Flow (prot)	1388	3438	1615	1719	3430			1642			1637	
Flt Permitted	0.59	1.00	1.00	0.61	1.00			0.90			0.89	
Satd. Flow (perm)	862	3438	1615	1104	3430			1504			1492	
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	6	227	105	93	256	6	81	12	128	17	17	6
RTOR Reduction (vph)	0	0	82	0	5	0	0	58	0	0	3	0
Lane Group Flow (vph)	6	227	23	93	257	0	0	163	0	0	37	0
Heavy Vehicles (%)	30%	5%	0%	5%	5%	0%	5%	0%	5%	20%	5%	5%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	7.7	7.7	7.7	7.7	7.7			19.0			19.0	
Effective Green, g (s)	7.7	7.7	7.7	7.7	7.7			19.0			19.0	
Actuated g/C Ratio	0.22	0.22	0.22	0.22	0.22			0.55			0.55	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0			4.0			4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	191	763	358	245	761			824			817	
v/s Ratio Prot		0.07			0.08							
v/s Ratio Perm	0.01		0.01	c0.08				c0.11			0.02	
v/c Ratio	0.03	0.30	0.07	0.38	0.34			0.20			0.05	
Uniform Delay, d1	10.6	11.2	10.7	11.5	11.4			4.0			3.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.1	0.2	0.1	1.0	0.3			0.5			0.1	
Delay (s)	10.6	11.5	10.7	12.5	11.6			4.5			3.7	
Level of Service	B	B	B	B	B			A			A	
Approach Delay (s)		11.2			11.8			4.5			3.7	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	9.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.25		
Actuated Cycle Length (s)	34.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	33.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	135	35	65	130	20	40	25	50	5	20	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95			1.00			1.00	
Frt	1.00	1.00	0.85	1.00	0.98			0.94			0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.98			0.99	
Satd. Flow (prot)	1805	3438	1538	1641	3391			1650			1793	
Flt Permitted	0.64	1.00	1.00	0.65	1.00			0.92			0.98	
Satd. Flow (perm)	1214	3438	1538	1123	3391			1539			1761	
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	12	161	42	77	155	24	48	30	60	6	24	18
RTOR Reduction (vph)	0	0	34	0	19	0	0	26	0	0	8	0
Lane Group Flow (vph)	12	161	8	77	160	0	0	112	0	0	40	0
Heavy Vehicles (%)	0%	5%	5%	10%	5%	0%	0%	0%	15%	0%	0%	0%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	6.8	6.8	6.8	6.8	6.8			18.9			18.9	
Effective Green, g (s)	6.8	6.8	6.8	6.8	6.8			18.9			18.9	
Actuated g/C Ratio	0.20	0.20	0.20	0.20	0.20			0.56			0.56	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0			4.0			4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	245	694	310	227	684			863			988	
v/s Ratio Prot		0.05			0.05							
v/s Ratio Perm	0.01		0.01	c0.07				c0.07			0.02	
v/c Ratio	0.05	0.23	0.03	0.34	0.23			0.13			0.04	
Uniform Delay, d1	10.8	11.3	10.8	11.5	11.3			3.5			3.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.1	0.2	0.0	0.9	0.2			0.3			0.1	
Delay (s)	10.9	11.4	10.8	12.4	11.4			3.8			3.4	
Level of Service	B	B	B	B	B			A			A	
Approach Delay (s)		11.3			11.7			3.8			3.4	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	9.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.19		
Actuated Cycle Length (s)	33.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	30.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
46: Wheatland Ave & Foothill Ave/Foothill Blvd

8/10/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	170	80	95	215	15	90	25	100	10	20	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95			1.00			1.00	
Frt	1.00	1.00	0.85	1.00	0.99			0.94			0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.98			0.99	
Satd. Flow (prot)	1805	3438	1615	1805	3415			1744			1835	
Flt Permitted	0.59	1.00	1.00	0.63	1.00			0.88			0.93	
Satd. Flow (perm)	1127	3438	1615	1202	3415			1568			1728	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	6	189	89	106	239	17	100	28	111	11	22	6
RTOR Reduction (vph)	0	0	69	0	13	0	0	50	0	0	3	0
Lane Group Flow (vph)	6	189	20	106	243	0	0	189	0	0	36	0
Heavy Vehicles (%)	0%	5%	0%	0%	5%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	7.7	7.7	7.7	7.7	7.7			19.0			19.0	
Effective Green, g (s)	7.7	7.7	7.7	7.7	7.7			19.0			19.0	
Actuated g/C Ratio	0.22	0.22	0.22	0.22	0.22			0.55			0.55	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0			4.0			4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	250	763	358	267	758			859			946	
v/s Ratio Prot		0.05			0.07							
v/s Ratio Perm	0.01		0.01	c0.09				c0.12			0.02	
v/c Ratio	0.02	0.25	0.06	0.40	0.32			0.22			0.04	
Uniform Delay, d1	10.6	11.1	10.6	11.5	11.3			4.0			3.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.0	0.2	0.1	1.0	0.2			0.6			0.1	
Delay (s)	10.6	11.3	10.7	12.5	11.6			4.6			3.7	
Level of Service	B	B	B	B	B			A			A	
Approach Delay (s)		11.1			11.8			4.6			3.7	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	9.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.27		
Actuated Cycle Length (s)	34.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	39.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	195	90	130	220	5	70	10	160	15	15	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95			1.00			1.00	
Frt	1.00	1.00	0.85	1.00	1.00			0.91			0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.99			0.98	
Satd. Flow (prot)	1388	3438	1615	1271	3430			1366			1637	
Flt Permitted	0.59	1.00	1.00	0.61	1.00			0.92			0.88	
Satd. Flow (perm)	862	3438	1615	816	3430			1270			1469	
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	6	227	105	151	256	6	81	12	186	17	17	6
RTOR Reduction (vph)	0	0	76	0	4	0	0	91	0	0	3	0
Lane Group Flow (vph)	6	227	29	151	258	0	0	188	0	0	37	0
Heavy Vehicles (%)	30%	5%	0%	42%	5%	0%	5%	0%	35%	20%	5%	5%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	10.2	10.2	10.2	10.2	10.2			19.2			19.2	
Effective Green, g (s)	10.2	10.2	10.2	10.2	10.2			19.2			19.2	
Actuated g/C Ratio	0.27	0.27	0.27	0.27	0.27			0.51			0.51	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0			4.0			4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	235	938	440	223	935			652			754	
v/s Ratio Prot		0.07			0.08							
v/s Ratio Perm	0.01		0.02	c0.18				c0.15			0.03	
v/c Ratio	0.03	0.24	0.07	0.68	0.28			0.29			0.05	
Uniform Delay, d1	10.0	10.6	10.1	12.1	10.7			5.2			4.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.0	0.1	0.1	7.9	0.2			1.1			0.1	
Delay (s)	10.0	10.7	10.1	20.0	10.9			6.3			4.7	
Level of Service	B	B	B	C	B			A			A	
Approach Delay (s)		10.5			14.2			6.3			4.7	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	10.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	37.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	38.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	135	35	115	130	20	40	25	100	5	20	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95			1.00			1.00	
Frt	1.00	1.00	0.85	1.00	0.98			0.92			0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1805	3438	1538	1211	3391			1277			1793	
Flt Permitted	0.64	1.00	1.00	0.65	1.00			0.94			0.97	
Satd. Flow (perm)	1214	3438	1538	829	3391			1212			1754	
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	12	161	42	137	155	24	48	30	119	6	24	18
RTOR Reduction (vph)	0	0	31	0	18	0	0	57	0	0	9	0
Lane Group Flow (vph)	12	161	11	137	161	0	0	140	0	0	39	0
Heavy Vehicles (%)	0%	5%	5%	49%	5%	0%	0%	0%	58%	0%	0%	0%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	9.5	9.5	9.5	9.5	9.5			19.2			19.2	
Effective Green, g (s)	9.5	9.5	9.5	9.5	9.5			19.2			19.2	
Actuated g/C Ratio	0.26	0.26	0.26	0.26	0.26			0.52			0.52	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0			4.0			4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	314	890	398	215	878			634			918	
v/s Ratio Prot		0.05			0.05							
v/s Ratio Perm	0.01		0.01	c0.17				c0.12			0.02	
v/c Ratio	0.04	0.18	0.03	0.64	0.18			0.22			0.04	
Uniform Delay, d1	10.2	10.6	10.2	12.1	10.6			4.7			4.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.1	0.1	0.0	6.1	0.1			0.8			0.1	
Delay (s)	10.2	10.7	10.2	18.1	10.7			5.5			4.4	
Level of Service	B	B	B	B	B			A			A	
Approach Delay (s)		10.6			13.9			5.5			4.4	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	10.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	36.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	36.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
46: Wheatland Ave & Foothill Ave/Foothill Blvd

8/13/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	170	80	145	215	15	90	25	150	10	20	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95			1.00			1.00	
Frt	1.00	1.00	0.85	1.00	0.99			0.92			0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.98			0.99	
Satd. Flow (prot)	1805	3438	1615	1347	3415			1454			1835	
Flt Permitted	0.59	1.00	1.00	0.63	1.00			0.90			0.92	
Satd. Flow (perm)	1127	3438	1615	897	3415			1328			1712	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	6	189	89	161	239	17	100	28	167	11	22	6
RTOR Reduction (vph)	0	0	65	0	12	0	0	81	0	0	3	0
Lane Group Flow (vph)	6	189	24	161	244	0	0	214	0	0	36	0
Heavy Vehicles (%)	0%	5%	0%	34%	5%	0%	0%	0%	33%	0%	0%	0%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	10.0	10.0	10.0	10.0	10.0			19.2			19.2	
Effective Green, g (s)	10.0	10.0	10.0	10.0	10.0			19.2			19.2	
Actuated g/C Ratio	0.27	0.27	0.27	0.27	0.27			0.52			0.52	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0			4.0			4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	303	924	434	241	918			685			884	
v/s Ratio Prot		0.05			0.07							
v/s Ratio Perm	0.01		0.01	c0.18				c0.16			0.02	
v/c Ratio	0.02	0.20	0.06	0.67	0.27			0.31			0.04	
Uniform Delay, d1	10.0	10.5	10.1	12.1	10.7			5.2			4.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.0	0.1	0.1	6.8	0.2			1.2			0.1	
Delay (s)	10.0	10.6	10.1	19.0	10.9			6.4			4.5	
Level of Service	B	B	B	B	B			A			A	
Approach Delay (s)		10.5			14.0			6.4			4.5	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	10.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	37.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	44.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	215	100	140	240	5	75	10	175	15	15	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95			1.00			1.00	
Frt	1.00	1.00	0.85	1.00	1.00			0.91			0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.99			0.98	
Satd. Flow (prot)	1388	3438	1615	1271	3431			1363			1637	
Flt Permitted	0.58	1.00	1.00	0.60	1.00			0.91			0.87	
Satd. Flow (perm)	843	3438	1615	799	3431			1265			1460	
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	6	250	116	163	279	6	87	12	203	17	17	6
RTOR Reduction (vph)	0	0	84	0	4	0	0	100	0	0	3	0
Lane Group Flow (vph)	6	250	32	163	281	0	0	202	0	0	37	0
Heavy Vehicles (%)	30%	5%	0%	42%	5%	0%	5%	0%	35%	20%	5%	5%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	10.1	10.1	10.1	10.1	10.1			18.6			18.6	
Effective Green, g (s)	10.1	10.1	10.1	10.1	10.1			18.6			18.6	
Actuated g/C Ratio	0.28	0.28	0.28	0.28	0.28			0.51			0.51	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0			4.0			4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	232	946	444	220	944			641			740	
v/s Ratio Prot		0.07			0.08							
v/s Ratio Perm	0.01		0.02	c0.20				c0.16			0.03	
v/c Ratio	0.03	0.26	0.07	0.74	0.30			0.31			0.05	
Uniform Delay, d1	9.7	10.4	9.8	12.1	10.5			5.3			4.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.0	0.2	0.1	12.6	0.2			1.3			0.1	
Delay (s)	9.8	10.5	9.9	24.7	10.7			6.6			4.7	
Level of Service	A	B	A	C	B			A			A	
Approach Delay (s)		10.3			15.8			6.6			4.7	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	11.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	36.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	41.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	145	40	125	140	20	45	25	110	5	20	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95			1.00			1.00	
Frt	1.00	1.00	0.85	1.00	0.98			0.92			0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1805	3438	1538	1211	3394			1272			1793	
Flt Permitted	0.63	1.00	1.00	0.64	1.00			0.93			0.97	
Satd. Flow (perm)	1200	3438	1538	819	3394			1203			1752	
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	12	173	48	149	167	24	54	30	131	6	24	18
RTOR Reduction (vph)	0	0	35	0	18	0	0	64	0	0	9	0
Lane Group Flow (vph)	12	173	13	149	173	0	0	151	0	0	39	0
Heavy Vehicles (%)	0%	5%	5%	49%	5%	0%	0%	0%	58%	0%	0%	0%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	10.1	10.1	10.1	10.1	10.1			19.2			19.2	
Effective Green, g (s)	10.1	10.1	10.1	10.1	10.1			19.2			19.2	
Actuated g/C Ratio	0.27	0.27	0.27	0.27	0.27			0.51			0.51	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0			4.0			4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	325	931	416	222	919			619			902	
v/s Ratio Prot		0.05			0.05							
v/s Ratio Perm	0.01		0.01	c0.18				c0.13			0.02	
v/c Ratio	0.04	0.19	0.03	0.67	0.19			0.24			0.04	
Uniform Delay, d1	10.0	10.4	10.0	12.1	10.5			5.0			4.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.0	0.1	0.0	7.7	0.1			0.9			0.1	
Delay (s)	10.1	10.5	10.0	19.9	10.6			6.0			4.6	
Level of Service	B	B	B	B	B			A			A	
Approach Delay (s)		10.4			14.6			6.0			4.6	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	10.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	37.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	38.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	185	85	160	235	15	100	25	165	10	20	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95			1.00			1.00	
Frt	1.00	1.00	0.85	1.00	0.99			0.92			0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.98			0.99	
Satd. Flow (prot)	1805	3438	1615	1347	3417			1452			1835	
Flt Permitted	0.58	1.00	1.00	0.62	1.00			0.89			0.91	
Satd. Flow (perm)	1104	3438	1615	883	3417			1317			1698	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	6	206	94	178	261	17	111	28	183	11	22	6
RTOR Reduction (vph)	0	0	65	0	12	0	0	96	0	0	3	0
Lane Group Flow (vph)	6	206	29	178	266	0	0	226	0	0	36	0
Heavy Vehicles (%)	0%	5%	0%	34%	5%	0%	0%	0%	33%	0%	0%	0%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	11.8	11.8	11.8	11.8	11.8			17.9			17.9	
Effective Green, g (s)	11.8	11.8	11.8	11.8	11.8			17.9			17.9	
Actuated g/C Ratio	0.31	0.31	0.31	0.31	0.31			0.47			0.47	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0			4.0			4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	346	1076	505	276	1070			625			806	
v/s Ratio Prot		0.06			0.08							
v/s Ratio Perm	0.01		0.02	c0.20				c0.17			0.02	
v/c Ratio	0.02	0.19	0.06	0.64	0.25			0.36			0.04	
Uniform Delay, d1	8.9	9.5	9.1	11.1	9.6			6.3			5.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.0	0.1	0.0	5.1	0.1			1.6			0.1	
Delay (s)	9.0	9.6	9.1	16.2	9.8			7.9			5.4	
Level of Service	A	A	A	B	A			A			A	
Approach Delay (s)		9.4			12.3			7.9			5.4	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	10.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	37.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	47.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

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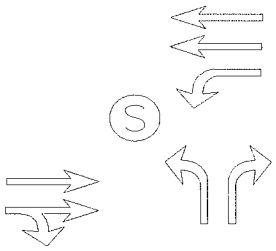
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : FOOTHILL BLVD
N/S STREET : WENTWORTH STREET
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
47
ROUTE
5C, 6C, 7C, 8C

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
FOOTHILL BLVD						
EB LEFT	0	0%		0	0	0
EB THRU	200	5%		200	20	220
EB RIGHT	115	34%	**50**	165	15	180
WB LEFT	440	5%		440	40	480
WB THRU	175	5%		175	15	190
WB RIGHT	0	0%		0	0	0
WENTWORTH STREET						
NB LEFT	50	53%	**50**	100	10	110
NB THRU	0	0%		0	0	0
NB RIGHT	225	5%		225	20	245
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**1205**		**100**	**1305**	**120**	**1425**

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Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax
Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax
Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : FOOTHILL BLVD
N/S STREET : WENTWORTH STREET
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 47
ROUTE 5C, 6C, 7C, 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
FOOTHILL BLVD						
EB LEFT	0	0%		0	0	0
EB THRU	165	5%		165	15	180
EB RIGHT	45	55%	**50**	95	10	105
WB LEFT	215	5%		215	20	235
WB THRU	155	5%		155	15	170
WB RIGHT	0	0%		0	0	0
WENTWORTH STREET						
NB LEFT	50	53%	**50**	100	10	110
NB THRU	0	0%		0	0	0
NB RIGHT	185	5%		185	15	200
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**815**		**100**	**915**	**85**	**1000**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : FOOTHILL BLVD
N/S STREET : WENTWORTH STREET
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
47
ROUTE
5C, 6C, 7C, 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
FOOTHILL BLVD						
EB LEFT	0	0%		0	0	0
EB THRU	200	5%		200	20	220
EB RIGHT	75	43%	**50**	125	10	135
WB LEFT	215	5%		215	20	235
WB THRU	295	5%		295	25	320
WB RIGHT	0	0%		0	0	0
WENTWORTH STREET						
NB LEFT	110	35%	**50**	160	15	175
NB THRU	0	0%		0	0	0
NB RIGHT	420	5%		420	40	460
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**1315**		**100**	**1415**	**130**	**1545**

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Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

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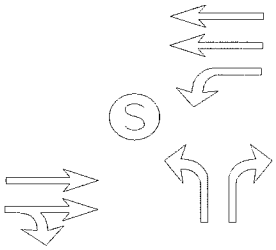
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : FOOTHILL BLVD
N/S STREET : WENTWORTH STREET
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 47
ROUTE 5C, 6C, 7C, 8C

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
FOOTHILL BLVD								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	196	3	9	205	**0**	205	20	225
EB RIGHT	112	3	9	120	**150**	270	25	295
WB LEFT	439	3	9	450	**0**	450	40	490
WB THRU	174	3	9	185	**0**	185	15	200
WB RIGHT	0	0	0	0	**0**	0	0	0
WENTWORTH STREET								
NB LEFT	51	1	3	55	**150**	205	20	225
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	215	8	24	240	**0**	240	20	260
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**1187**				**300**	**1555**	**140**	**1695**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : FOOTHILL BLVD
N/S STREET : WENTWORTH STREET
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 47
ROUTE 5C, 6C, 7C, 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
FOOTHILL BLVD								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	161	5	15	175	**0**	175	15	190
EB RIGHT	44	2	6	50	**150**	200	20	220
WB LEFT	207	6	18	225	**0**	225	20	245
WB THRU	154	3	9	165	**0**	165	15	180
WB RIGHT	0	0	0	0	**0**	0	0	0
WENTWORTH STREET								
NB LEFT	48	2	6	55	**150**	205	20	225
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	180	3	9	190	**0**	190	15	205
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**794**				**300**	**1160**	**105**	**1265**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : FOOTHILL BLVD
N/S STREET : WENTWORTH STREET
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 47
ROUTE 5C, 6C, 7C, 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
FOOTHILL BLVD								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	197	1	3	200	**0**	200	20	220
EB RIGHT	73	2	6	80	**150**	230	20	250
WB LEFT	205	12	36	240	**0**	240	20	260
WB THRU	292	3	9	300	**0**	300	25	325
WB RIGHT	0	0	0	0	**0**	0	0	0
WENTWORTH STREET								
NB LEFT	108	2	6	115	**150**	265	25	290
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	415	3	9	425	**0**	425	40	465
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**1290**				**300**	**1660**	**150**	**1810**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: WENTWORTH
EAST-WEST STREET: FOOTHILL
JURISDICTION: LA

DATE: 05-31-12

PEAK HOUR: 07:15AM

NORTH LEG

TOTAL: 0

			Total
			1st
			2nd
			3rd
			4th
Rt	Thru	Lt	

EAST LEG TOTAL: 619

	1st	2nd	3rd	4th	Total
Rt					
Thru	28	37	59	53	177
Lt	120	102	128	92	442

WEST LEG TOTAL: 314

Total	1st	2nd	3rd	4th	
					Lt
199	51	55	58	35	Thru
115	30	28	40	17	Rt

SOUTH LEG

	Lt	Thru	Rt
1st	4		38
2nd	15		69
3rd	15		58
4th	18		58
Total	52		223

TOTAL: 275

PEAK HOUR FACTORS

NORTH LEG =
SOUTH LEG = 0.82
EAST LEG = 0.83
WEST LEG = 0.80

ALL LEGS = 0.84

HOUR TOTAL: 1,208

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WENTWORTH

EAST-WEST STREET: FOOTHILL

TIME: 07:00AM-08:00AM DATE: 05-31-12

NORTH LEG

			Total
			1st
			2nd
			3rd
			4th
Rt	Thru	Lt	

Rt					
Thru	22	28	37	59	146
Lt	101	120	102	128	451
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
					Lt
208	44	51	55	58	Thru
124	26	30	28	40	Rt

	Lt	Thru	Rt
1st	5		22
2nd	4		38
3rd	15		69
4th	15		58
Total	39		187

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WENTWORTH

EAST-WEST STREET: FOOTHILL

TIME: 08:00AM-09:00AM DATE: 05-31-12

NORTH LEG

			Total
			1st
			2nd
			3rd
			4th
Rt	Thru	Lt	

	1st	2nd	3rd	4th	Total
Rt					
Thru	53	60	46	27	186
Lt	92	73	72	86	323

Total	1st	2nd	3rd	4th	
					Lt
151	35	36	40	40	Thru
87	17	22	26	22	Rt

	Lt	Thru	Rt
1st	18		58
2nd	20		45
3rd	13		37
4th	15		44
Total	66		184

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : WENTWORTH LA

EAST-WEST STREET : FOOTHILL 05-31-12

BEGINNING TIME : 07:00AM PH = 7:15 AM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
						SOUTH LEG						
22	0	5	0	0	0	0	0	0	0	0	0	27
36	0	3	2	0	0	0	0	1	0	0	0	42
67	0	15	2	0	0	0	0	0	0	0	0	84
54	0	15	2	0	0	2	0	0	0	0	0	73
58	0	18	0	0	0	0	0	0	0	0	0	76
43	0	18	1	0	0	1	0	1	0	0	1	65
37	0	13	0	0	0	0	0	0	0	0	0	50
43	0	13	1	0	1	0	0	0	0	0	1	59
360	0	100	8	0	1	3	0	2	0	0	2	476
						EAST LEG						
0	20	101	0	1	0	0	1	0	0	0	0	123
0	27	120	0	1	0	0	0	0	0	0	0	148
0	37	102	0	0	0	0	0	0	0	0	0	139
0	58	125	0	1	1	0	0	2	0	0	0	187
0	52	92	0	1	0	0	0	0	0	0	0	145
0	59	73	0	0	0	0	1	0	0	0	0	133
0	45	71	0	1	1	0	0	0	0	0	0	118
0	27	84	0	0	1	0	0	0	0	0	1	113
0	325	768	0	5	3	0	2	2	0	0	1	1106
						WEST LEG						
25	42	0	1	2	0	0	0	0	0	0	0	70
30	50	0	0	1	0	0	0	0	0	0	0	81
28	55	0	0	0	0	0	0	0	0	0	0	83
38	56	0	1	1	0	0	0	0	1	1	0	98
16	35	0	0	0	0	0	0	0	1	0	0	52
22	36	0	0	0	0	0	0	0	0	0	0	58
25	39	0	1	1	0	0	0	0	0	0	0	66
21	38	0	1	2	0	0	0	0	0	0	0	62
205	351	0	4	7	0	0	0	0	2	1	0	570

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: WENTWORTH
EAST-WEST STREET: FOOTHILL
JURISDICTION: LA

DATE: 05-31-12

PEAK HOUR: 01:00PM

NORTH LEG

TOTAL: 0

			Total
			1st
			2nd
			3rd
			4th
Rt	Thru	Lt	

EAST LEG TOTAL: 370

	1st	2nd	3rd	4th	Total
Rt					
Thru	33	46	42	36	157
Lt	38	49	63	63	213

WEST LEG TOTAL: 212

Total	1st	2nd	3rd	4th	
					Lt
166	37	42	48	39	Thru
46	7	10	13	16	Rt

SOUTH LEG

TOTAL: 233

	Lt	Thru	Rt
1st	14		49
2nd	9		49
3rd	10		35
4th	17		50
Total	50		183

PEAK HOUR FACTORS

NORTH LEG =
SOUTH LEG = 0.87
EAST LEG = 0.88
WEST LEG = 0.87

ALL LEGS = 0.92

HOUR TOTAL: 815

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WENTWORTH

EAST-WEST STREET: FOOTHILL

TIME: 12:00PM-01:00PM DATE: 05-31-12

NORTH LEG

			Total
			1st
			2nd
			3rd
			4th
Rt	Thru	Lt	

Rt					
Thru	38	48	43	36	165
Lt	47	48	53	54	202
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
					Lt
156	29	43	42	42	Thru
48	13	12	6	17	Rt

	Lt	Thru	Rt
1st	8		53
2nd	11		34
3rd	4		38
4th	13		47
Total	36		172

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WENTWORTH

EAST-WEST STREET: FOOTHILL

TIME: 01:00PM-02:00PM DATE: 05-31-12

NORTH LEG

			Total
			1st
			2nd
			3rd
			4th
Rt	Thru	Lt	

Rt					
Thru	33	46	42	36	157
Lt	38	49	63	63	213
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
					Lt
166	37	42	48	39	Thru
46	7	10	13	16	Rt

	Lt	Thru	Rt
1st	14		49
2nd	9		49
3rd	10		35
4th	17		50
Total	50		183

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : WENTWORTH LA

EAST-WEST STREET : FOOTHILL 05-31-12

BEGINNING TIME : 12:00PM PM = 1:00 PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
NORTH LEG												
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
SOUTH LEG												
51	0	7	1	0	1	1	0	0	0	0	0	61
31	0	10	2	0	0	0	0	0	1	0	1	45
37	0	4	0	0	0	1	0	0	0	0	0	42
45	0	12	1	0	1	0	0	0	1	0	0	60
48	0	13	0	0	0	1	0	0	0	0	1	63
47	0	8	0	0	0	1	0	0	1	0	1	58
35	0	10	0	0	0	0	0	0	0	0	0	45
50	0	17	0	0	0	0	0	0	0	0	0	67
344	0	81	4	0	2	4	0	0	3	0	3	441
EAST LEG												
0	36	47	0	1	0	0	0	0	0	1	0	85
0	45	47	0	2	1	0	1	0	0	0	0	96
0	41	53	0	0	0	0	1	0	0	1	0	96
0	34	54	0	1	0	0	1	0	0	0	0	90
0	31	37	0	1	0	0	0	0	0	1	1	71
0	46	45	0	0	2	0	0	1	0	0	1	95
0	41	63	0	1	0	0	0	0	0	0	0	105
0	36	62	0	0	1	0	0	0	0	0	0	99
0	310	408	0	6	4	0	3	1	0	3	2	737
WEST LEG												
13	27	0	0	0	0	0	2	0	0	0	0	42
10	39	0	0	3	0	1	1	0	1	0	0	55
6	41	0	0	1	0	0	0	0	0	0	0	48
15	41	0	1	0	0	0	0	0	1	1	0	59
7	36	0	0	0	0	0	1	0	0	0	0	44
9	39	0	0	2	0	0	1	0	1	0	0	52
12	47	0	0	1	0	1	0	0	0	0	0	61
16	39	0	0	0	0	0	0	0	0	0	0	55
88	309	0	1	7	0	2	5	0	3	1	0	416

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: WENTWORTH
EAST-WEST STREET: FOOTHILL
JURISDICTION: LA

DATE: 05-31-12

PEAK HOUR: 04:45PM

NORTH LEG

TOTAL: 0

	Rt	Thru	Lt
Total			
1st			
2nd			
3rd			
4th			

EAST LEG TOTAL: 512

	1st	2nd	3rd	4th	Total
Rt					
Thru	69	64	79	83	295
Lt	65	47	51	54	217

WEST LEG TOTAL: 273

Total	1st	2nd	3rd	4th	
					Lt
198	52	51	51	44	Thru
75	15	21	21	18	Rt

SOUTH LEG

TOTAL: 528

	Lt	Thru	Rt
1st	29		94
2nd	33		111
3rd	28		103
4th	20		110
Total	110		418

PEAK HOUR FACTORS

NORTH LEG =
SOUTH LEG = 0.92
EAST LEG = 0.93
WEST LEG = 0.95

ALL LEGS = 0.99

HOUR TOTAL: 1,313

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WENTWORTH

EAST-WEST STREET: FOOTHILL

TIME: 04:00PM-05:00PM DATE: 05-31-12

NORTH LEG

			Total
			1st
			2nd
			3rd
			4th
Rt	Thru	Lt	

Rt					
Thru	41	53	56	69	219
Lt	36	60	46	65	207
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
					Lt
208	53	49	54	52	Thru
54	15	15	9	15	Rt

	Lt	Thru	Rt
1st	15		60
2nd	21		84
3rd	20		80
4th	29		94
Total	85		318

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WENTWORTH

EAST-WEST STREET: FOOTHILL

TIME: 05:00PM-06:00PM DATE: 05-31-12

NORTH LEG

			Total
			1st
			2nd
			3rd
			4th
Rt	Thru	Lt	

Rt					
Thru	64	79	83	44	270
Lt	47	51	54	72	224
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
					Lt
193	51	51	44	47	Thru
71	21	21	18	11	Rt

	Lt	Thru	Rt
1st	33		111
2nd	28		103
3rd	20		110
4th	31		112
Total	112		436

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : WENTWORTH LA

EAST-WEST STREET : FOOTHILL 05-31-12

BEGINNING TIME : 04:00PM PH= 4:45 PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
						SOUTH LEG						
60	0	15	0	0	0	0	0	0	0	0	0	75
82	0	19	2	0	2	0	0	0	0	0	0	105
79	0	20	0	0	0	1	0	0	0	0	0	100
94	0	28	0	0	0	0	0	1	0	0	0	123
109	0	32	2	0	0	0	0	0	0	0	1	144
102	0	28	0	0	0	0	0	0	1	0	0	131
110	0	20	0	0	0	0	0	0	0	0	0	130
112	0	31	0	0	0	0	0	0	0	0	0	143
748	0	193	4	0	2	1	0	1	1	0	1	951
						EAST LEG						
0	40	35	0	1	1	0	0	0	0	0	0	77
0	51	57	0	0	1	0	0	1	0	2	1	113
0	54	43	0	2	0	0	0	2	0	0	1	102
0	68	63	0	1	2	0	0	0	0	0	0	134
0	63	43	0	1	0	0	0	3	0	0	1	111
0	79	47	0	0	1	0	0	3	0	0	0	130
0	82	52	0	0	1	0	1	1	0	0	0	137
0	43	71	0	0	0	0	1	1	0	0	0	116
0	480	411	0	5	6	0	2	11	0	2	3	920
						WEST LEG						
14	52	0	0	1	0	1	0	0	0	0	0	68
15	47	0	0	1	0	0	0	0	0	1	0	64
9	53	0	0	1	0	0	0	0	0	0	0	63
15	52	0	0	0	0	0	0	0	0	0	0	67
20	50	0	1	1	0	0	0	0	0	0	0	72
20	51	0	0	0	0	1	0	0	0	0	0	72
18	44	0	0	0	0	0	0	0	0	0	0	62
11	47	0	0	0	0	0	0	0	0	0	0	58
122	396	0	1	4	0	2	0	0	0	1	0	526

Prepared by Newport Traffic Studies

Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Volume (vph)	200	115	440	175	50	225
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.95		1.00	0.95	1.00	1.00
Frt	0.95		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	3250		1719	3438	1719	1538
Flt Permitted	1.00		0.53	1.00	0.95	1.00
Satd. Flow (perm)	3250		957	3438	1719	1538
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	238	137	524	208	60	268
RTOR Reduction (vph)	55	0	0	0	0	195
Lane Group Flow (vph)	320	0	524	208	60	73
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%
Turn Type	NA		Perm	NA	NA	Perm
Protected Phases	4			8	2	
Permitted Phases			8			2
Actuated Green, G (s)	35.7		35.7	35.7	16.3	16.3
Effective Green, g (s)	35.7		35.7	35.7	16.3	16.3
Actuated g/C Ratio	0.60		0.60	0.60	0.27	0.27
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1934		569	2046	467	418
v/s Ratio Prot	0.10			0.06	0.03	
v/s Ratio Perm			c0.55			c0.05
v/c Ratio	0.17		0.92	0.10	0.13	0.17
Uniform Delay, d1	5.5		10.9	5.2	16.5	16.7
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.0		20.4	0.0	0.6	0.9
Delay (s)	5.5		31.3	5.3	17.1	17.6
Level of Service	A		C	A	B	B
Approach Delay (s)	5.5			23.9	17.5	
Approach LOS	A			C	B	

Intersection Summary			
HCM Average Control Delay	17.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	46.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Volume (vph)	165	45	215	155	50	185
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.95		1.00	0.95	1.00	1.00
Frt	0.97		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	3327		1719	3438	1719	1538
Flt Permitted	1.00		0.61	1.00	0.95	1.00
Satd. Flow (perm)	3327		1103	3438	1719	1538
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	179	49	234	168	54	201
RTOR Reduction (vph)	35	0	0	0	0	99
Lane Group Flow (vph)	193	0	234	168	54	102
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%
Turn Type	NA		Perm	NA	NA	Perm
Protected Phases	4			8	2	
Permitted Phases			8			2
Actuated Green, G (s)	10.7		10.7	10.7	19.3	19.3
Effective Green, g (s)	10.7		10.7	10.7	19.3	19.3
Actuated g/C Ratio	0.28		0.28	0.28	0.51	0.51
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	937		311	968	873	781
v/s Ratio Prot	0.06			0.05	0.03	
v/s Ratio Perm			c0.21			c0.07
v/c Ratio	0.21		0.75	0.17	0.06	0.13
Uniform Delay, d1	10.4		12.4	10.3	4.8	4.9
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1		9.9	0.1	0.1	0.3
Delay (s)	10.5		22.3	10.4	4.9	5.3
Level of Service	B		C	B	A	A
Approach Delay (s)	10.5			17.3	5.2	
Approach LOS	B			B	A	

Intersection Summary			
HCM Average Control Delay	12.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	38.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	31.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Volume (vph)	200	75	215	295	110	420
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.95		1.00	0.95	1.00	1.00
Frt	0.96		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	3297		1719	3438	1719	1538
Flt Permitted	1.00		0.58	1.00	0.95	1.00
Satd. Flow (perm)	3297		1051	3438	1719	1538
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	202	76	217	298	111	424
RTOR Reduction (vph)	51	0	0	0	0	233
Lane Group Flow (vph)	227	0	217	298	111	191
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%
Turn Type	NA		Perm	NA	NA	Perm
Protected Phases	4			8	2	
Permitted Phases			8			2
Actuated Green, G (s)	12.1		12.1	12.1	16.4	16.4
Effective Green, g (s)	12.1		12.1	12.1	16.4	16.4
Actuated g/C Ratio	0.33		0.33	0.33	0.45	0.45
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1093		348	1140	772	691
v/s Ratio Prot	0.07			0.09	0.06	
v/s Ratio Perm			c0.21			c0.12
v/c Ratio	0.21		0.62	0.26	0.14	0.28
Uniform Delay, d1	8.8		10.3	8.9	5.9	6.3
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1		3.5	0.1	0.4	1.0
Delay (s)	8.9		13.7	9.1	6.3	7.3
Level of Service	A		B	A	A	A
Approach Delay (s)	8.9			11.0	7.1	
Approach LOS	A			B	A	

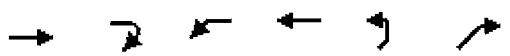
Intersection Summary			
HCM Average Control Delay	9.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	36.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	40.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Volume (vph)	200	165	440	175	100	225
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.95		1.00	0.95	1.00	1.00
Frt	0.93		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	2850		1719	3438	1180	1538
Flt Permitted	1.00		0.50	1.00	0.95	1.00
Satd. Flow (perm)	2850		904	3438	1180	1538
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	238	196	524	208	119	268
RTOR Reduction (vph)	76	0	0	0	0	199
Lane Group Flow (vph)	358	0	524	208	119	69
Heavy Vehicles (%)	5%	34%	5%	5%	53%	5%
Turn Type	NA		Perm	NA	NA	Perm
Protected Phases	4			8	2	
Permitted Phases			8			2
Actuated Green, G (s)	38.2		38.2	38.2	16.1	16.1
Effective Green, g (s)	38.2		38.2	38.2	16.1	16.1
Actuated g/C Ratio	0.61		0.61	0.61	0.26	0.26
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1748		554	2108	305	397
v/s Ratio Prot	0.13			0.06	c0.10	
v/s Ratio Perm			c0.58			0.05
v/c Ratio	0.20		0.95	0.10	0.39	0.17
Uniform Delay, d1	5.3		11.1	5.0	19.1	17.9
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1		25.2	0.0	3.7	1.0
Delay (s)	5.4		36.3	5.0	22.8	18.9
Level of Service	A		D	A	C	B
Approach Delay (s)	5.4			27.4	20.1	
Approach LOS	A			C	C	

Intersection Summary			
HCM Average Control Delay	19.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	62.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	50.7%	ICU Level of Service	A
Analysis Period (min)	15		

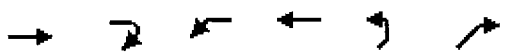
c Critical Lane Group



Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Volume (vph)	165	95	215	155	100	185
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.95		1.00	0.95	1.00	1.00
Frt	0.95		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	2768		1719	3438	1180	1538
Flt Permitted	1.00		0.58	1.00	0.95	1.00
Satd. Flow (perm)	2768		1047	3438	1180	1538
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	179	103	234	168	109	201
RTOR Reduction (vph)	74	0	0	0	0	100
Lane Group Flow (vph)	208	0	234	168	109	101
Heavy Vehicles (%)	5%	55%	5%	5%	53%	5%
Turn Type	NA		Perm	NA	NA	Perm
Protected Phases	4			8	2	
Permitted Phases			8			2
Actuated Green, G (s)	10.6		10.6	10.6	18.8	18.8
Effective Green, g (s)	10.6		10.6	10.6	18.8	18.8
Actuated g/C Ratio	0.28		0.28	0.28	0.50	0.50
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	785		297	974	593	773
v/s Ratio Prot	0.08			0.05	c0.09	
v/s Ratio Perm			c0.22			0.07
v/c Ratio	0.27		0.79	0.17	0.18	0.13
Uniform Delay, d1	10.4		12.4	10.1	5.1	5.0
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2		12.9	0.1	0.7	0.3
Delay (s)	10.6		25.3	10.2	5.8	5.3
Level of Service	B		C	B	A	A
Approach Delay (s)	10.6			19.0	5.5	
Approach LOS	B			B	A	

Intersection Summary			
HCM Average Control Delay	12.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	37.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	35.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Volume (vph)	200	125	215	295	160	420
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.95		1.00	0.95	1.00	1.00
Frt	0.94		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	2845		1719	3438	1337	1538
Flt Permitted	1.00		0.55	1.00	0.95	1.00
Satd. Flow (perm)	2845		1002	3438	1337	1538
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	202	126	217	298	162	424
RTOR Reduction (vph)	84	0	0	0	0	235
Lane Group Flow (vph)	244	0	217	298	162	189
Heavy Vehicles (%)	5%	43%	5%	5%	35%	5%
Turn Type	NA		Perm	NA	NA	Perm
Protected Phases	4			8	2	
Permitted Phases			8			2
Actuated Green, G (s)	12.2		12.2	12.2	16.2	16.2
Effective Green, g (s)	12.2		12.2	12.2	16.2	16.2
Actuated g/C Ratio	0.34		0.34	0.34	0.45	0.45
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	954		336	1152	595	684
v/s Ratio Prot	0.09			0.09	0.12	
v/s Ratio Perm			c0.22			c0.12
v/c Ratio	0.26		0.65	0.26	0.27	0.28
Uniform Delay, d1	8.8		10.3	8.8	6.4	6.4
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1		4.2	0.1	1.1	1.0
Delay (s)	8.9		14.5	8.9	7.5	7.4
Level of Service	A		B	A	A	A
Approach Delay (s)	8.9			11.3	7.4	
Approach LOS	A			B	A	

Intersection Summary			
HCM Average Control Delay	9.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	36.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	42.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Volume (vph)	220	180	480	190	110	245
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.95		1.00	0.95	1.00	1.00
Frt	0.93		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	2852		1719	3438	1180	1538
Flt Permitted	1.00		0.48	1.00	0.95	1.00
Satd. Flow (perm)	2852		868	3438	1180	1538
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	262	214	571	226	131	292
RTOR Reduction (vph)	79	0	0	0	0	220
Lane Group Flow (vph)	397	0	571	226	131	72
Heavy Vehicles (%)	5%	34%	5%	5%	53%	5%
Turn Type	NA		Perm	NA	NA	Perm
Protected Phases	4			8	2	
Permitted Phases			8			2
Actuated Green, G (s)	41.0		41.0	41.0	16.0	16.0
Effective Green, g (s)	41.0		41.0	41.0	16.0	16.0
Actuated g/C Ratio	0.63		0.63	0.63	0.25	0.25
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1799		548	2169	290	379
v/s Ratio Prot	0.14			0.07	c0.11	
v/s Ratio Perm			c0.66			0.05
v/c Ratio	0.22		1.04	0.10	0.45	0.19
Uniform Delay, d1	5.1		12.0	4.7	20.8	19.4
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1		49.8	0.0	5.0	1.1
Delay (s)	5.2		61.8	4.8	25.8	20.5
Level of Service	A		E	A	C	C
Approach Delay (s)	5.2			45.6	22.1	
Approach LOS	A			D	C	

Intersection Summary			
HCM Average Control Delay	28.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	54.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Volume (vph)	180	105	235	170	110	200
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.95		1.00	0.95	1.00	1.00
Frt	0.94		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	2764		1719	3438	1180	1538
Flt Permitted	1.00		0.56	1.00	0.95	1.00
Satd. Flow (perm)	2764		1019	3438	1180	1538
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	196	114	255	185	120	217
RTOR Reduction (vph)	75	0	0	0	0	121
Lane Group Flow (vph)	235	0	255	185	120	96
Heavy Vehicles (%)	5%	55%	5%	5%	53%	5%
Turn Type	NA		Perm	NA	NA	Perm
Protected Phases	4			8	2	
Permitted Phases			8			2
Actuated Green, G (s)	13.1		13.1	13.1	16.8	16.8
Effective Green, g (s)	13.1		13.1	13.1	16.8	16.8
Actuated g/C Ratio	0.35		0.35	0.35	0.44	0.44
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	955		352	1188	523	682
v/s Ratio Prot	0.09			0.05	c0.10	
v/s Ratio Perm			c0.25			0.06
v/c Ratio	0.25		0.72	0.16	0.23	0.14
Uniform Delay, d1	8.9		10.8	8.6	6.5	6.3
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1		7.2	0.1	1.0	0.4
Delay (s)	9.0		18.0	8.6	7.6	6.7
Level of Service	A		B	A	A	A
Approach Delay (s)	9.0			14.1	7.0	
Approach LOS	A			B	A	

Intersection Summary			
HCM Average Control Delay	10.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	37.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	37.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Volume (vph)	220	135	235	320	175	460
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.95		1.00	0.95	1.00	1.00
Frt	0.94		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	2850		1719	3438	1337	1538
Flt Permitted	1.00		0.54	1.00	0.95	1.00
Satd. Flow (perm)	2850		973	3438	1337	1538
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	222	136	237	323	177	465
RTOR Reduction (vph)	89	0	0	0	0	262
Lane Group Flow (vph)	269	0	237	323	177	203
Heavy Vehicles (%)	5%	43%	5%	5%	35%	5%
Turn Type	NA		Perm	NA	NA	Perm
Protected Phases	4			8	2	
Permitted Phases			8			2
Actuated Green, G (s)	12.9		12.9	12.9	16.2	16.2
Effective Green, g (s)	12.9		12.9	12.9	16.2	16.2
Actuated g/C Ratio	0.35		0.35	0.35	0.44	0.44
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	991		338	1195	584	672
v/s Ratio Prot	0.09			0.09	c0.13	
v/s Ratio Perm			c0.24			0.13
v/c Ratio	0.27		0.70	0.27	0.30	0.30
Uniform Delay, d1	8.7		10.4	8.7	6.8	6.8
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1		6.4	0.1	1.3	1.2
Delay (s)	8.9		16.9	8.8	8.1	7.9
Level of Service	A		B	A	A	A
Approach Delay (s)	8.9			12.2	8.0	
Approach LOS	A			B	A	

Intersection Summary			
HCM Average Control Delay	9.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	37.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	45.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

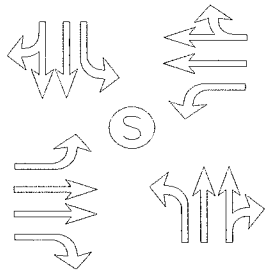
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : TUXFORD STREET
N/S STREET : SAN FERNANDO ROAD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 48
ROUTE 8C

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
TUXFORD STREET						
EB LEFT	65	5%	**0**	65	5	70
EB THRU	515	15%	**0**	515	45	560
EB RIGHT	110	5%	**0**	110	10	120
WB LEFT	115	5%	**0**	115	10	125
WB THRU	650	20%	**0**	650	60	710
WB RIGHT	105	39%	**50**	155	15	170
SAN FERNANDO ROAD						
NB LEFT	250	10%	**0**	250	25	275
NB THRU	210	30%	**0**	210	20	230
NB RIGHT	60	5%	**0**	60	5	65
SB LEFT	125	43%	**50**	175	15	190
SB THRU	325	20%	**0**	325	30	355
SB RIGHT	70	10%	**0**	70	5	75
TOTALS	**2600**		**100**	**2700**	**245**	**2945**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : TUXFORD STREET
N/S STREET : SAN FERNANDO ROAD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 48
ROUTE 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
TUXFORD STREET						
EB LEFT	80	15%	**0**	80	5	85
EB THRU	380	15%	**0**	380	35	415
EB RIGHT	185	5%	**0**	185	15	200
WB LEFT	175	5%	**0**	175	15	190
WB THRU	355	40%	**0**	355	30	385
WB RIGHT	100	37%	**50**	150	15	165
SAN FERNANDO ROAD						
NB LEFT	315	5%	**0**	315	30	345
NB THRU	185	30%	**0**	185	15	200
NB RIGHT	135	10%	**0**	135	10	145
SB LEFT	60	54%	**50**	110	10	120
SB THRU	220	35%	**0**	220	20	240
SB RIGHT	70	10%	**0**	70	5	75
TOTALS	**2260**		**100**	**2360**	**205**	**2565**

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TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : TUXFORD STREET
N/S STREET : SAN FERNANDO ROAD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 48
ROUTE 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
TUXFORD STREET						
EB LEFT	30	10%	**0**	30	5	35
EB THRU	570	10%	**0**	570	50	620
EB RIGHT	145	5%	**0**	145	15	160
WB LEFT	80	5%	**0**	80	5	85
WB THRU	430	10%	**0**	430	40	470
WB RIGHT	130	35%	**50**	180	15	195
SAN FERNANDO ROAD						
NB LEFT	330	5%	**0**	330	30	360
NB THRU	580	5%	**0**	580	50	630
NB RIGHT	65	10%	**0**	65	5	70
SB LEFT	90	39%	**50**	140	15	155
SB THRU	275	5%	**0**	275	25	300
SB RIGHT	40	5%	**0**	40	5	45
TOTALS	**2765**		**100**	**2865**	**260**	**3125**

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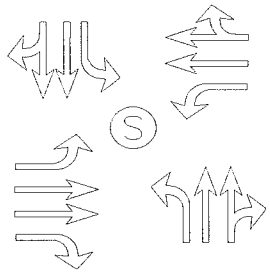
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : TUXFORD STREET
N/S STREET : SAN FERNANDO ROAD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 48
ROUTE 8C

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
TUXFORD STREET								
EB LEFT	60	4	12	70	**0**	70	5	75
EB THRU	448	67	201	650	**0**	650	60	710
EB RIGHT	102	8	24	125	**0**	125	10	135
WB LEFT	108	5	15	125	**0**	125	10	135
WB THRU	518	131	393	910	**0**	910	80	990
WB RIGHT	96	8	24	120	**150**	270	25	295
SAN FERNANDO ROAD								
NB LEFT	221	31	93	315	**0**	315	30	345
NB THRU	147	65	195	340	**0**	340	30	370
NB RIGHT	57	2	6	65	**0**	65	5	70
SB LEFT	100	24	72	170	**150**	320	30	350
SB THRU	263	60	180	445	**0**	445	40	485
SB RIGHT	66	6	18	85	**0**	85	5	90
TOTALS	**2186**				**300**	**3720**	**330**	**4050**

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TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : TUXFORD STREET
N/S STREET : SAN FERNANDO ROAD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 48
ROUTE 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
TUXFORD STREET								
EB LEFT	67	13	39	105	**0**	105	10	115
EB THRU	316	64	192	510	**0**	510	45	555
EB RIGHT	177	9	27	205	**0**	205	20	225
WB LEFT	166	11	33	200	**0**	200	20	220
WB THRU	206	151	453	660	**0**	660	60	720
WB RIGHT	97	5	15	110	**150**	260	25	285
SAN FERNANDO ROAD								
NB LEFT	302	13	39	340	**0**	340	30	370
NB THRU	126	60	180	305	**0**	305	25	330
NB RIGHT	123	12	36	160	**0**	160	15	175
SB LEFT	53	9	27	80	**150**	230	20	250
SB THRU	147	71	213	360	**0**	360	30	390
SB RIGHT	62	8	24	85	**0**	85	5	90
TOTALS	**1842**				**300**	**3420**	**305**	**3725**

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TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : TUXFORD STREET
N/S STREET : SAN FERNANDO ROAD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 48
ROUTE 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								

TUXFORD STREET

EB LEFT	27	3	9	35	**0**	35	5	40
EB THRU	511	57	171	680	**0**	680	60	740
EB RIGHT	134	9	27	160	**0**	160	15	175
WB LEFT	75	5	15	90	**0**	90	10	100
WB THRU	388	44	132	520	**0**	520	45	565
WB RIGHT	116	16	48	165	**150**	315	30	345

SAN FERNANDO ROAD

NB LEFT	322	9	27	350	**0**	350	30	380
NB THRU	540	38	114	655	**0**	655	60	715
NB RIGHT	61	5	15	75	**0**	75	5	80
SB LEFT	66	23	69	135	**150**	285	25	310
SB THRU	254	20	60	315	**0**	315	30	345
SB RIGHT	36	2	6	40	**0**	40	5	45
TOTALS	**2530**				**300**	**3520**	**320**	**3840**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: SAN FERNANDO
EAST-WEST STREET: TUXFORD
JURISDICTION: LA

DATE: 05-31-12

PEAK HOUR: 07:15AM

NORTH LEG

TOTAL: 519

Rt	Thru	Lt	
72	323	124	Total
19	78	29	1st
22	65	27	2nd
25	62	31	3rd
6	118	37	4th

EAST LEG TOTAL: 866

	1st	2nd	3rd	4th	Total
Rt	27	34	19	24	104
Thru	159	173	187	130	649
Lt	22	26	18	47	113

WEST LEG TOTAL: 689

Total	1st	2nd	3rd	4th	
64	14	17	23	10	Lt
515	126	152	146	91	Thru
110	27	30	18	35	Rt

PEAK HOUR FACTORS

NORTH LEG = 0.81
SOUTH LEG = 0.74
EAST LEG = 0.93
WEST LEG = 0.87

ALL LEGS = 0.96

SOUTH LEG

TOTAL: 523

	Lt	Thru	Rt
1st	49	55	24
2nd	55	45	22
3rd	38	55	4
4th	110	57	9
Total	252	212	59

HOUR TOTAL: 2,597

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: SAN FERNANDO

EAST-WEST STREET: TUXFORD

TIME: 07:00AM-08:00AM DATE: 05-31-12

NORTH LEG

Rt	Thru	Lt	
82	274	109	Total
16	69	22	1st
19	78	29	2nd
22	65	27	3rd
25	62	31	4th

	1st	2nd	3rd	4th	Total
Rt	19	27	34	19	99
Thru	133	159	173	187	652
Lt	18	22	26	18	84

Total	1st	2nd	3rd	4th	
69	15	14	17	23	Lt
538	114	126	152	146	Thru
97	22	27	30	18	Rt

	Lt	Thru	Rt
1st	43	39	18
2nd	49	55	24
3rd	55	45	22
4th	38	55	4
Total	185	194	68

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: SAN FERNANDO

EAST-WEST STREET: TUXFORD

TIME: 08:00AM-09:00AM DATE: 05-31-12

NORTH LEG

Rt	Thru	Lt	
73	353	106	Total
6	118	37	1st
21	79	22	2nd
27	88	26	3rd
19	68	21	4th

	1st	2nd	3rd	4th	Total
Rt	24	14	7	19	64
Thru	130	127	139	135	531
Lt	47	21	24	25	117

Total	1st	2nd	3rd	4th	
67	10	23	9	25	Lt
420	91	115	113	101	Thru
126	35	31	35	25	Rt

	Lt	Thru	Rt
1st	110	57	9
2nd	42	41	29
3rd	81	44	24
4th	33	47	12
Total	266	189	74

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : SAN FERNANDO LA

EAST-WEST STREET : TUXFORD 05-31-12

BEGINNING TIME : 07:00AM PM=7:15 PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
13	58	13	3	2	0	0	4	4	0	5	5	107
19	64	24	0	5	0	0	3	2	0	6	3	126
18	50	20	2	3	0	0	5	1	2	7	6	114
24	50	26	1	4	0	0	3	2	0	5	3	118
5	99	30	1	5	0	0	7	3	0	7	4	161
20	63	19	1	4	0	0	7	1	0	5	2	122
26	74	20	1	4	0	0	5	2	0	5	4	141
18	53	17	1	5	0	0	4	1	0	6	3	108
143	511	169	10	32	0	0	38	16	2	46	30	997
						SOUTH LEG						
17	35	33	0	2	0	0	2	5	1	0	5	100
24	37	43	0	6	0	0	5	3	0	7	3	128
21	35	46	0	6	0	0	2	4	1	2	5	122
4	35	29	0	7	0	0	7	2	0	6	7	97
8	40	103	0	6	0	0	4	2	1	7	5	176
29	27	38	0	5	0	0	4	1	0	5	3	112
24	32	76	0	4	0	0	3	1	0	5	4	149
12	36	29	0	3	0	0	2	1	0	6	3	92
139	277	397	0	39	0	0	29	19	3	38	35	976
						EAST LEG						
17	100	12	0	8	0	2	12	3	0	13	3	170
26	131	22	0	3	0	0	13	0	1	12	0	208
28	140	26	4	2	0	2	16	0	0	15	0	233
18	151	15	1	4	0	0	19	1	0	13	2	224
24	96	45	0	4	0	0	17	1	0	13	1	201
14	106	19	0	4	0	0	8	0	0	9	2	162
6	121	24	0	4	0	0	6	0	1	8	0	170
17	118	24	1	3	0	1	5	0	0	9	1	179
150	963	187	6	32	0	5	96	5	2	92	9	1547
						WEST LEG						
21	95	15	0	5	0	0	7	0	1	7	0	151
24	106	12	0	4	1	1	8	1	2	8	0	167
30	145	16	0	2	0	0	2	1	0	3	0	199
17	124	23	0	5	0	0	7	0	1	10	0	187
31	73	9	0	3	1	1	8	0	3	7	0	136
30	101	21	0	5	1	0	4	1	1	5	0	169
35	99	9	0	3	0	0	6	0	0	5	0	157
25	91	25	0	2	0	0	5	0	0	3	0	151
213	834	130	0	29	3	2	47	3	8	48	0	1317

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: SAN FERNANDO
EAST-WEST STREET: TUXFORD
JURISDICTION: LA

DATE: 05-31-12

PEAK HOUR: 01:00PM

NORTH LEG

TOTAL: 350

Rt	Thru	Lt	
70	218	62	Total
17	74	11	1st
25	45	23	2nd
14	48	13	3rd
14	51	15	4th

EAST LEG TOTAL: 636

	1st	2nd	3rd	4th	Total
Rt	22	32	20	28	102
Thru	84	92	75	106	357
Lt	45	37	39	56	177

WEST LEG TOTAL: 646

Total	1st	2nd	3rd	4th	
80	20	30	14	16	Lt
380	96	98	79	107	Thru
186	44	37	47	58	Rt

PEAK HOUR FACTORS

NORTH LEG = 0.86
SOUTH LEG = 0.89
EAST LEG = 0.84
WEST LEG = 0.89

ALL LEGS = 0.90

SOUTH LEG

TOTAL: 636

	Lt	Thru	Rt
1st	79	42	22
2nd	84	32	37
3rd	70	57	35
4th	82	55	41
Total	315	186	135

HOUR TOTAL: 2,268

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: SAN FERNANDO

EAST-WEST STREET: TUXFORD

TIME: 12:00PM-01:00PM DATE: 05-31-12

NORTH LEG

73	190	91	Total
27	56	13	1st
11	34	24	2nd
10	55	26	3rd
25	45	28	4th
Rt	Thru	Lt	

Rt	26	21	22	18	87
Thru	83	87	68	91	329
Lt	27	21	24	18	90
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
70	22	25	7	16	Lt
357	89	72	88	108	Thru
104	32	31	19	22	Rt

	Lt	Thru	Rt
1st	76	58	12
2nd	97	33	25
3rd	77	73	21
4th	78	44	25
Total	328	208	83

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: SAN FERNANDO

EAST-WEST STREET: TUXFORD

TIME: 01:00PM-02:00PM DATE: 05-31-12

NORTH LEG

70	218	62	Total
17	74	11	1st
25	45	23	2nd
14	48	13	3rd
14	51	15	4th
Rt	Thru	Lt	

Rt	22	32	20	28	102
Thru	84	92	75	106	357
Lt	45	37	39	56	177
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
80	20	30	14	16	Lt
380	96	98	79	107	Thru
186	44	37	47	58	Rt

	Lt	Thru	Rt
1st	79	42	22
2nd	84	32	37
3rd	70	57	35
4th	82	55	41
Total	315	186	135

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : SAN FERNANDO LA

EAST-WEST STREET : TUXFORD 05-31-12

BEGINNING TIME : 12:00PM PM = 1:00 PM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
						NORTH LEG						
9	41	6	5	5	2	5	6	3	8	4	2	96
0	17	22	0	6	0	7	6	1	4	5	1	69
1	37	24	1	5	1	4	6	1	4	7	0	91
21	28	27	0	7	0	2	6	1	2	4	0	98
13	55	10	2	7	1	1	7	0	1	5	0	102
23	27	21	1	10	1	0	4	0	1	4	1	93
13	33	10	0	4	1	1	6	1	0	5	1	75
13	32	12	0	6	1	0	7	1	1	6	1	80
93	270	132	9	50	7	20	48	8	21	40	6	704
						SOUTH LEG						
4	42	69	5	8	0	0	4	2	3	4	5	146
19	22	91	5	4	0	0	4	1	1	3	5	155
20	55	74	0	7	0	1	4	0	0	7	3	171
25	25	76	0	4	0	0	7	1	0	8	1	147
19	28	77	3	3	0	0	5	1	0	6	1	143
33	16	82	2	4	1	1	7	0	1	5	1	153
32	42	66	1	5	1	1	4	1	1	6	2	162
39	40	77	1	3	1	1	6	1	0	6	3	178
191	270	612	17	38	3	4	41	7	6	45	21	1255
						EAST LEG						
23	44	20	1	3	3	1	19	2	1	17	2	136
21	53	13	0	4	2	0	17	1	0	13	5	129
22	33	20	0	5	1	0	13	0	0	17	3	114
16	56	16	2	3	1	0	15	0	0	17	1	127
21	50	43	1	5	0	0	16	0	0	13	2	151
32	49	36	0	6	1	0	19	0	0	18	0	161
20	40	37	0	7	1	0	12	0	0	16	1	134
24	67	50	2	7	1	0	16	0	2	16	5	190
179	392	235	6	40	10	1	127	3	3	127	19	1142
						WEST LEG						
30	68	18	1	3	1	0	10	2	1	8	1	143
30	48	19	0	4	2	0	11	3	1	9	1	128
16	65	2	1	5	1	0	8	2	2	10	2	114
19	88	13	3	3	1	0	6	0	0	11	2	146
41	77	18	0	5	1	0	7	0	3	7	1	160
34	83	27	2	4	1	0	3	1	1	8	1	165
46	65	9	1	6	3	0	2	1	0	6	1	140
56	91	13	0	0	0	0	11	1	2	5	2	181
272	585	119	8	30	10	0	58	10	10	64	11	1177

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: SAN FERNANDO
EAST-WEST STREET: TUXFORD
JURISDICTION: LA

DATE: 05-31-12

PEAK HOUR: 04:30PM

NORTH LEG

TOTAL: 401

Rt	Thru	Lt	
38	274	89	Total
12	55	21	1st
6	98	20	2nd
13	78	27	3rd
7	43	21	4th

EAST LEG

EAST LEG TOTAL: 644

	1st	2nd	3rd	4th	Total
Rt	38	23	42	29	132
Thru	111	114	111	96	432
Lt	12	19	24	25	80

WEST LEG

WEST LEG TOTAL: 741

Total	1st	2nd	3rd	4th	
30	4	7	11	8	Lt
568	133	131	161	143	Thru
143	31	36	29	47	Rt

SOUTH LEG

TOTAL: 975

	Lt	Thru	Rt
1st	74	151	20
2nd	84	142	12
3rd	83	129	18
4th	90	156	16
Total	331	578	66

PEAK HOUR FACTORS

NORTH LEG = 0.81
SOUTH LEG = 0.93
EAST LEG = 0.91
WEST LEG = 0.92

ALL LEGS = 0.95

HOUR TOTAL: 2,761

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: SAN FERNANDO

EAST-WEST STREET: TUXFORD

TIME: 04:00PM-05:00PM DATE: 05-31-12

NORTH LEG

Rt	Thru	Lt	
34	276	89	Total
6	65	19	1st
10	58	29	2nd
12	55	21	3rd
6	98	20	4th

	1st	2nd	3rd	4th	Total
Rt	24	23	38	23	108
Thru	83	79	111	114	387
Lt	20	21	12	19	72

Total	1st	2nd	3rd	4th	
44	17	16	4	7	Lt
478	83	131	133	131	Thru
125	24	34	31	36	Rt

	Lt	Thru	Rt
1st	74	95	9
2nd	70	112	12
3rd	74	151	20
4th	84	142	12
Total	302	500	53

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: SAN FERNANDO

EAST-WEST STREET: TUXFORD

TIME: 05:00PM-06:00PM DATE: 05-31-12

NORTH LEG

Rt	Thru	Lt	
40	213	91	Total
13	78	27	1st
7	43	21	2nd
5	48	23	3rd
15	44	20	4th

	1st	2nd	3rd	4th	Total
Rt	42	29	26	19	116
Thru	111	96	95	71	373
Lt	24	25	23	22	94

Total	1st	2nd	3rd	4th	
33	11	8	7	7	Lt
597	161	143	149	144	Thru
155	29	47	45	34	Rt

	Lt	Thru	Rt
1st	83	129	18
2nd	90	156	16
3rd	72	100	5
4th	80	130	15
Total	325	515	54

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : SAN FERNANDO LA

EAST-WEST STREET : TUXFORD 05-31-12

BEGINNING TIME : 04:00PM PM = 4:30 PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
5	59	6	1	3	3	0	1	8	0	2	2	90
9	53	16	1	0	4	0	1	7	0	4	2	97
11	51	9	1	3	4	0	1	8	0	0	0	88
5	92	15	0	3	3	0	0	1	1	3	1	124
13	71	24	0	6	1	0	0	1	0	1	1	118
7	40	18	0	1	0	0	1	1	0	1	2	71
5	43	18	0	5	2	0	0	2	0	0	1	76
14	41	18	1	3	0	0	0	1	0	0	1	79
69	450	124	4	24	17	0	4	29	1	11	10	743
						SOUTH LEG						
8	88	71	0	2	1	0	1	2	1	4	0	178
11	102	61	1	4	3	0	5	2	0	1	4	194
20	146	72	0	2	1	0	1	0	0	2	1	245
11	132	82	0	7	2	0	1	0	1	2	0	238
16	118	78	2	8	3	0	0	0	0	3	2	230
14	144	90	0	9	0	1	2	0	1	1	0	262
2	93	68	2	4	2	1	2	1	0	1	1	177
13	125	74	0	4	0	2	0	1	0	1	5	225
95	948	596	5	40	12	4	12	6	3	15	13	1749
						EAST LEG						
20	62	16	2	5	1	1	5	1	1	11	2	127
20	61	21	1	4	0	1	6	0	1	8	0	123
33	101	11	4	7	1	1	0	0	0	3	0	161
20	100	16	2	7	2	0	1	1	1	6	0	156
38	100	23	0	4	1	1	3	0	3	4	0	177
25	87	25	3	6	0	0	1	0	1	2	0	150
21	84	23	1	4	0	1	3	0	3	4	0	144
16	59	21	0	5	1	1	3	0	2	4	0	112
193	654	156	13	42	6	6	22	2	12	42	2	1150
						WEST LEG						
22	69	16	1	2	0	1	5	1	0	7	0	124
28	111	14	4	8	0	1	7	1	1	5	1	181
29	117	3	1	7	0	1	4	1	0	5	0	168
33	121	7	1	4	0	0	3	0	2	3	0	174
27	144	10	1	6	0	0	7	1	1	4	0	201
45	129	7	0	7	1	0	3	0	2	4	0	198
44	138	7	0	4	0	1	3	0	0	4	0	201
33	130	7	0	6	0	0	5	0	1	3	0	185
261	959	71	8	44	1	4	37	4	7	35	1	1432

Prepared by Newport Traffic Studies

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	65	515	110	115	650	105	250	210	60	125	325	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.97		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3139	1538	1719	2980		1641	2804		1504	2972	
Flt Permitted	0.35	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	641	3139	1538	1719	2980		1641	2804		1504	2972	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	68	536	115	120	677	109	260	219	62	130	339	73
RTOR Reduction (vph)	0	0	69	0	20	0	0	38	0	0	27	0
Lane Group Flow (vph)	68	536	46	120	766	0	260	243	0	130	385	0
Heavy Vehicles (%)	5%	15%	5%	5%	20%	10%	10%	30%	5%	20%	20%	10%
Turn Type	Perm	NA	pm+ov	Prot	NA		Prot	NA		Prot	NA	
Protected Phases		4	5	3	8		5	2		1	6	
Permitted Phases	4		4									
Actuated Green, G (s)	14.8	14.8	25.8	5.0	23.8		11.0	22.6		6.3	17.9	
Effective Green, g (s)	14.8	14.8	25.8	5.0	23.8		11.0	22.6		6.3	17.9	
Actuated g/C Ratio	0.23	0.23	0.40	0.08	0.37		0.17	0.35		0.10	0.28	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	147	718	708	133	1096		279	979		146	822	
v/s Ratio Prot		0.17	0.01	0.07	c0.26		c0.16	0.09		0.09	c0.13	
v/s Ratio Perm	0.11		0.02									
v/c Ratio	0.46	0.75	0.06	0.90	0.70		0.93	0.25		0.89	0.47	
Uniform Delay, d1	21.5	23.2	12.0	29.6	17.4		26.5	15.0		28.9	19.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.3	4.2	0.0	49.4	2.0		36.0	0.6		43.7	1.9	
Delay (s)	23.8	27.4	12.0	79.0	19.4		62.5	15.6		72.6	21.4	
Level of Service	C	C	B	E	B		E	B		E	C	
Approach Delay (s)		24.6			27.3			38.1			33.6	
Approach LOS		C			C			D			C	

Intersection Summary			
HCM Average Control Delay	30.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	64.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	63.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	80	380	185	175	355	100	315	185	135	60	220	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	0.94		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1570	3139	1538	1719	2639		1719	2782		1570	2698	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1570	3139	1538	1719	2639		1719	2782		1570	2698	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	89	422	206	194	394	111	350	206	150	67	244	78
RTOR Reduction (vph)	0	0	119	0	34	0	0	90	0	0	40	0
Lane Group Flow (vph)	89	422	87	194	471	0	350	266	0	67	282	0
Heavy Vehicles (%)	15%	15%	5%	5%	40%	5%	5%	30%	10%	15%	35%	10%
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4									
Actuated Green, G (s)	5.5	15.1	31.7	9.9	19.5		16.6	30.2		4.1	17.7	
Effective Green, g (s)	5.5	15.1	31.7	9.9	19.5		16.6	30.2		4.1	17.7	
Actuated g/C Ratio	0.07	0.20	0.42	0.13	0.26		0.22	0.40		0.05	0.24	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	115	629	729	226	683		379	1116		85	634	
v/s Ratio Prot	0.06	0.13	0.03	c0.11	c0.18		c0.20	0.10		0.04	c0.10	
v/s Ratio Perm			0.03									
v/c Ratio	0.77	0.67	0.12	0.86	0.69		0.92	0.24		0.79	0.45	
Uniform Delay, d1	34.3	27.8	13.3	32.0	25.2		28.7	14.9		35.2	24.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	27.0	2.8	0.1	26.0	2.9		27.7	0.5		37.0	2.3	
Delay (s)	61.3	30.6	13.4	58.1	28.1		56.4	15.4		72.2	26.9	
Level of Service	E	C	B	E	C		E	B		E	C	
Approach Delay (s)		29.5			36.4			35.8			34.7	
Approach LOS		C			D			D			C	

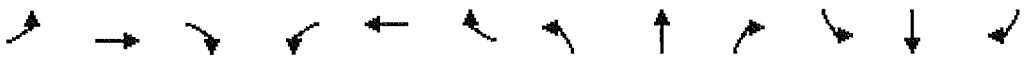
Intersection Summary			
HCM Average Control Delay	34.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	75.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	59.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	30	570	145	80	430	130	330	580	65	90	275	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1641	3282	1538	1719	3168		1719	3370		1444	3373	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1641	3282	1538	1719	3168		1719	3370		1444	3373	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	32	600	153	84	453	137	347	611	68	95	289	42
RTOR Reduction (vph)	0	0	84	0	42	0	0	12	0	0	17	0
Lane Group Flow (vph)	32	600	69	84	548	0	347	667	0	95	314	0
Heavy Vehicles (%)	10%	10%	5%	5%	10%	10%	5%	5%	10%	25%	5%	5%
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4									
Actuated Green, G (s)	1.5	16.4	29.5	3.1	18.0		13.1	23.0		7.2	17.1	
Effective Green, g (s)	1.5	16.4	29.5	3.1	18.0		13.1	23.0		7.2	17.1	
Actuated g/C Ratio	0.02	0.25	0.45	0.05	0.27		0.20	0.35		0.11	0.26	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	37	819	784	81	868		343	1180		158	878	
v/s Ratio Prot	0.02	c0.18	0.02	c0.05	0.17		c0.20	c0.20		0.07	0.09	
v/s Ratio Perm			0.03									
v/c Ratio	0.86	0.73	0.09	1.04	0.63		1.01	0.57		0.60	0.36	
Uniform Delay, d1	32.0	22.6	10.4	31.3	20.9		26.3	17.3		27.9	19.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	94.6	3.4	0.0	110.5	1.5		51.6	2.0		6.3	1.1	
Delay (s)	126.6	26.0	10.4	141.8	22.4		77.9	19.3		34.2	21.0	
Level of Service	F	C	B	F	C		E	B		C	C	
Approach Delay (s)		27.1			37.3			39.1			23.9	
Approach LOS		C			D			D			C	

Intersection Summary			
HCM Average Control Delay	33.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	65.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	60.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	65	515	110	115	650	155	250	210	60	175	325	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	0.97		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3139	1538	1719	2835		1641	2804		1262	2972	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1719	3139	1538	1719	2835		1641	2804		1262	2972	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	68	536	115	120	677	161	260	219	62	182	339	73
RTOR Reduction (vph)	0	0	66	0	29	0	0	37	0	0	26	0
Lane Group Flow (vph)	68	536	49	120	809	0	260	244	0	182	386	0
Heavy Vehicles (%)	5%	15%	5%	5%	20%	39%	10%	30%	5%	43%	20%	10%
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4									
Actuated Green, G (s)	3.1	17.7	29.7	5.5	20.1		12.0	19.0		11.0	18.0	
Effective Green, g (s)	3.1	17.7	29.7	5.5	20.1		12.0	19.0		11.0	18.0	
Actuated g/C Ratio	0.04	0.26	0.43	0.08	0.29		0.17	0.27		0.16	0.26	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	77	803	749	137	823		285	770		201	773	
v/s Ratio Prot	0.04	0.17	0.01	c0.07	c0.29		c0.16	0.09		0.14	c0.13	
v/s Ratio Perm			0.02									
v/c Ratio	0.88	0.67	0.07	0.88	0.98		0.91	0.32		0.91	0.50	
Uniform Delay, d1	32.9	23.1	11.6	31.5	24.4		28.1	19.9		28.6	21.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	64.2	2.1	0.0	41.9	27.0		31.3	1.1		38.0	2.3	
Delay (s)	97.1	25.2	11.6	73.5	51.4		59.4	21.0		66.6	24.1	
Level of Service	F	C	B	E	D		E	C		E	C	
Approach Delay (s)		29.8			54.1			39.5			37.1	
Approach LOS		C			D			D			D	

Intersection Summary			
HCM Average Control Delay	41.5	HCM Level of Service	D
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	69.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	64.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	80	380	185	175	355	150	315	185	135	110	220	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.96		1.00	0.94		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1570	3139	1538	1719	2479		1719	2782		1172	2698	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1570	3139	1538	1719	2479		1719	2782		1172	2698	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	89	422	206	194	394	167	350	206	150	122	244	78
RTOR Reduction (vph)	0	0	117	0	61	0	0	105	0	0	40	0
Lane Group Flow (vph)	89	422	89	194	500	0	350	251	0	122	282	0
Heavy Vehicles (%)	15%	15%	5%	5%	40%	37%	5%	30%	10%	54%	35%	10%
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4									
Actuated Green, G (s)	5.5	15.7	32.3	9.9	20.1		16.6	22.5		10.9	16.8	
Effective Green, g (s)	5.5	15.7	32.3	9.9	20.1		16.6	22.5		10.9	16.8	
Actuated g/C Ratio	0.07	0.21	0.43	0.13	0.27		0.22	0.30		0.15	0.22	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	115	657	744	227	664		380	835		170	604	
v/s Ratio Prot	0.06	0.13	0.03	c0.11	c0.20		c0.20	0.09		0.10	c0.10	
v/s Ratio Perm			0.03									
v/c Ratio	0.77	0.64	0.12	0.85	0.75		0.92	0.30		0.72	0.47	
Uniform Delay, d1	34.1	27.1	12.8	31.8	25.2		28.6	20.2		30.6	25.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	27.0	2.2	0.1	25.5	4.8		27.3	0.9		13.5	2.6	
Delay (s)	61.2	29.2	12.9	57.3	30.0		55.8	21.1		44.1	27.8	
Level of Service	E	C	B	E	C		E	C		D	C	
Approach Delay (s)		28.5			37.0			38.3			32.3	
Approach LOS		C			D			D			C	

Intersection Summary			
HCM Average Control Delay	34.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	59.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

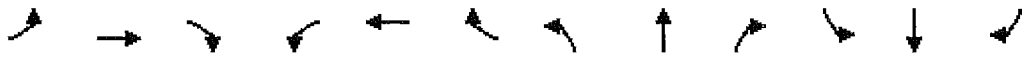
HCM Signalized Intersection Capacity Analysis
48: San Fernando Rd & Tuxford St

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	30	570	145	80	430	180	330	580	65	140	275	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.96		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1641	3282	1538	1719	2940		1719	3370		1299	3373	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1641	3282	1538	1719	2940		1719	3370		1299	3373	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	32	600	153	84	453	189	347	611	68	147	289	42
RTOR Reduction (vph)	0	0	84	0	67	0	0	12	0	0	17	0
Lane Group Flow (vph)	32	600	69	84	575	0	347	667	0	147	314	0
Heavy Vehicles (%)	10%	10%	5%	5%	10%	35%	5%	5%	10%	39%	5%	5%
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4									
Actuated Green, G (s)	1.5	16.5	29.6	3.1	18.1		13.1	21.8		8.4	17.1	
Effective Green, g (s)	1.5	16.5	29.6	3.1	18.1		13.1	21.8		8.4	17.1	
Actuated g/C Ratio	0.02	0.25	0.45	0.05	0.28		0.20	0.33		0.13	0.26	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	37	823	785	81	809		342	1117		166	877	
v/s Ratio Prot	0.02	0.18	0.02	c0.05	c0.20		c0.20	c0.20		0.11	0.09	
v/s Ratio Perm			0.03									
v/c Ratio	0.86	0.73	0.09	1.04	0.71		1.01	0.60		0.89	0.36	
Uniform Delay, d1	32.0	22.6	10.4	31.3	21.5		26.3	18.3		28.2	19.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	94.6	3.3	0.0	110.5	3.0		52.4	2.4		38.7	1.1	
Delay (s)	126.6	25.9	10.4	141.9	24.4		78.8	20.7		66.9	21.0	
Level of Service	F	C	B	F	C		E	C		E	C	
Approach Delay (s)		27.0			38.0			40.3			35.1	
Approach LOS		C			D			D			D	

Intersection Summary			
HCM Average Control Delay	35.5	HCM Level of Service	D
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	65.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	61.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	70	560	120	125	710	170	275	230	65	190	355	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	0.97		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3139	1538	1719	2835		1641	2804		1262	2973	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1719	3139	1538	1719	2835		1641	2804		1262	2973	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	73	583	125	130	740	177	286	240	68	198	370	78
RTOR Reduction (vph)	0	0	67	0	26	0	0	32	0	0	22	0
Lane Group Flow (vph)	73	583	58	130	891	0	286	276	0	198	426	0
Heavy Vehicles (%)	5%	15%	5%	5%	20%	39%	10%	30%	5%	43%	20%	10%
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4									
Actuated Green, G (s)	4.0	21.3	36.9	8.7	26.0		15.6	18.6		15.0	18.0	
Effective Green, g (s)	4.0	21.3	36.9	8.7	26.0		15.6	18.6		15.0	18.0	
Actuated g/C Ratio	0.05	0.27	0.46	0.11	0.33		0.20	0.23		0.19	0.23	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	86	840	790	188	926		322	655		238	672	
v/s Ratio Prot	0.04	0.19	0.01	c0.08	c0.31		c0.17	0.10		0.16	c0.14	
v/s Ratio Perm			0.02									
v/c Ratio	0.85	0.69	0.07	0.69	0.96		0.89	0.42		0.83	0.63	
Uniform Delay, d1	37.5	26.2	11.9	34.2	26.3		31.2	25.9		31.1	27.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	50.3	2.5	0.0	10.5	20.8		24.2	2.0		21.3	4.5	
Delay (s)	87.8	28.7	11.9	44.6	47.1		55.4	27.9		52.4	32.3	
Level of Service	F	C	B	D	D		E	C		D	C	
Approach Delay (s)		31.5			46.8			41.1			38.5	
Approach LOS		C			D			D			D	

Intersection Summary			
HCM Average Control Delay	40.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	79.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	69.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
48: San Fernando Rd & Tuxford St

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	85	415	200	190	385	165	345	200	145	120	240	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.96		1.00	0.94		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1570	3139	1538	1719	2479		1719	2782		1172	2697	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1570	3139	1538	1719	2479		1719	2782		1172	2697	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	94	461	222	211	428	183	383	222	161	133	267	83
RTOR Reduction (vph)	0	0	106	0	59	0	0	114	0	0	38	0
Lane Group Flow (vph)	94	461	116	211	552	0	383	269	0	133	312	0
Heavy Vehicles (%)	15%	15%	5%	5%	40%	37%	5%	30%	10%	54%	35%	10%
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4									
Actuated Green, G (s)	6.1	14.9	33.9	11.1	19.9		19.0	22.0		11.4	14.4	
Effective Green, g (s)	6.1	14.9	33.9	11.1	19.9		19.0	22.0		11.4	14.4	
Actuated g/C Ratio	0.08	0.20	0.45	0.15	0.26		0.25	0.29		0.15	0.19	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	127	620	773	253	654		433	812		177	515	
v/s Ratio Prot	0.06	0.15	0.04	c0.12	c0.22		c0.22	0.10		0.11	c0.12	
v/s Ratio Perm			0.04									
v/c Ratio	0.74	0.74	0.15	0.83	0.84		0.88	0.33		0.75	0.61	
Uniform Delay, d1	33.9	28.5	12.2	31.3	26.3		27.1	20.9		30.6	27.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	20.5	4.8	0.1	20.4	9.7		18.9	1.1		16.4	2.0	
Delay (s)	54.4	33.3	12.3	51.7	36.0		46.0	22.0		47.0	29.9	
Level of Service	D	C	B	D	D		D	C		D	C	
Approach Delay (s)		29.8			40.0			34.0			34.6	
Approach LOS		C			D			C			C	

Intersection Summary			
HCM Average Control Delay	34.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	75.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	63.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
48: San Fernando Rd & Tuxford St

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	35	620	160	85	470	195	360	630	70	155	300	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.96		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1641	3282	1538	1719	2942		1719	3370		1299	3371	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1641	3282	1538	1719	2942		1719	3370		1299	3371	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	37	653	168	89	495	205	379	663	74	163	316	47
RTOR Reduction (vph)	0	0	86	0	60	0	0	12	0	0	17	0
Lane Group Flow (vph)	37	653	82	89	640	0	379	725	0	163	346	0
Heavy Vehicles (%)	10%	10%	5%	5%	10%	35%	5%	5%	10%	39%	5%	5%
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4									
Actuated Green, G (s)	1.6	18.2	35.0	4.0	20.6		16.8	22.5		11.3	17.0	
Effective Green, g (s)	1.6	18.2	35.0	4.0	20.6		16.8	22.5		11.3	17.0	
Actuated g/C Ratio	0.02	0.25	0.49	0.06	0.29		0.23	0.31		0.16	0.24	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	36	830	833	96	842		401	1053		204	796	
v/s Ratio Prot	0.02	0.20	0.02	c0.05	c0.22		c0.22	c0.22		0.13	0.10	
v/s Ratio Perm			0.03									
v/c Ratio	1.03	0.79	0.10	0.93	0.76		0.95	0.69		0.80	0.43	
Uniform Delay, d1	35.2	25.1	10.0	33.9	23.4		27.1	21.7		29.3	23.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	158.4	5.0	0.1	67.8	4.1		31.0	3.7		19.3	1.7	
Delay (s)	193.6	30.1	10.0	101.7	27.5		58.1	25.4		48.5	25.1	
Level of Service	F	C	B	F	C		E	C		D	C	
Approach Delay (s)		33.2			35.9			36.5			32.4	
Approach LOS		C			D			D			C	

Intersection Summary			
HCM Average Control Delay	34.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	72.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	65.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

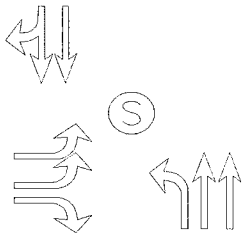
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : LANKERSHIM BLVD
N/S STREET : SAN FERNANDO ROAD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 49
ROUTE 8C

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
LANKERSHIM BLVD						
EB LEFT	225	15%		225	20	245
EB THRU	0	0%		0	0	0
EB RIGHT	35	20%		35	5	40
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
SAN FERNANDO ROAD						
NB LEFT	50	15%		50	5	55
NB THRU	260	29%	**50**	310	30	340
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	445	24%	**50**	495	45	540
SB RIGHT	470	15%		470	40	510
TOTALS	**1485**		**100**	**1585**	**145**	**1730**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : LANKERSHIM BLVD
N/S STREET : SAN FERNANDO ROAD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 49
ROUTE 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
LANKERSHIM BLVD						
EB LEFT	275	10%		275	25	300
EB THRU	0	0%		0	0	0
EB RIGHT	60	25%		60	5	65
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
SAN FERNANDO ROAD						
NB LEFT	55	25%		55	5	60
NB THRU	285	28%	**50**	335	30	365
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	305	27%	**50**	355	30	385
SB RIGHT	280	10%		280	25	305
TOTALS	**1260**		**100**	**1360**	**120**	**1480**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : LANKERSHIM BLVD
N/S STREET : SAN FERNANDO ROAD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 49
ROUTE 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
LANKERSHIM BLVD						
EB LEFT	550	5%		550	50	600
EB THRU	0	0%		0	0	0
EB RIGHT	55	15%		55	5	60
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
SAN FERNANDO ROAD						
NB LEFT	80	15%		80	5	85
NB THRU	620	12%	**50**	670	60	730
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	310	23%	**50**	360	30	390
SB RIGHT	360	5%		360	30	390
TOTALS	**1975**		**100**	**2075**	**180**	**2255**

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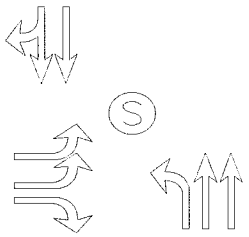
E/W STREET : LANKERSHIM BLVD
N/S STREET : SAN FERNANDO ROAD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 49
ROUTE 8C

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
LANKERSHIM BLVD								
EB LEFT	189	36	108	295	**0**	295	25	320
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	27	6	18	45	**0**	45	5	50
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
SAN FERNANDO ROAD								
NB LEFT	43	7	21	65	**0**	65	5	70
NB THRU	226	35	105	330	**150**	480	45	525
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	379	66	198	575	**150**	725	65	790
SB RIGHT	395	76	228	625	**0**	625	55	680
TOTALS	**1259**				**300**	**2235**	**200**	**2435**

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TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : LANKERSHIM BLVD
N/S STREET : SAN FERNANDO ROAD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 49
ROUTE 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
LANKERSHIM BLVD								
EB LEFT	241	32	96	335	**0**	335	30	365
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	47	14	42	90	**0**	90	10	100
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
SAN FERNANDO ROAD								
NB LEFT	42	13	39	80	**0**	80	5	85
NB THRU	246	39	117	365	**150**	515	45	560
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	258	45	135	395	**150**	545	50	595
SB RIGHT	255	25	75	330	**0**	330	30	360
TOTALS	**1089**				**300**	**1895**	**170**	**2065**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : LANKERSHIM BLVD
N/S STREET : SAN FERNANDO ROAD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 49
ROUTE 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
LANKERSHIM BLVD								
EB LEFT	511	38	114	625	**0**	625	55	680
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	48	8	24	70	**0**	70	5	75
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
SAN FERNANDO ROAD								
NB LEFT	65	13	39	105	**0**	105	10	115
NB THRU	573	45	135	710	**150**	860	75	935
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	281	28	84	365	**150**	515	45	560
SB RIGHT	338	20	60	400	**0**	400	35	435
TOTALS	**1816**				**300**	**2575**	**225**	**2800**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: SAN FERNANDO
EAST-WEST STREET: LANKERSHIM
JURISDICTION: LA

DATE: 05-31-12

PEAK HOUR: 07:30AM

NORTH LEG

TOTAL: 916

Rt	Thru	Lt	
471	445		Total
126	83		1st
125	108		2nd
121	147		3rd
99	107		4th

EAST LEG TOTAL: 0

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

WEST LEG TOTAL: 258

Total	1st	2nd	3rd	4th	
225	47	81	55	42	Lt
					Thru
33	10	8	5	10	Rt

SOUTH LEG

TOTAL: 311

	Lt	Thru	Rt
1st	12	78	
2nd	12	64	
3rd	19	57	
4th	7	62	
Total	50	261	

PEAK HOUR FACTORS

NORTH LEG = 0.85
SOUTH LEG = 0.86
EAST LEG =
WEST LEG = 0.72

ALL LEGS = 0.92

HOUR TOTAL: 1,485

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: SAN FERNANDO

EAST-WEST STREET: LANKERSHIM

TIME: 07:00AM-08:00AM DATE: 05-31-12

NORTH LEG

Rt	Thru	Lt	
465	338		Total
101	69		1st
113	78		2nd
126	83		3rd
125	108		4th

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
200	33	39	47	81	Lt
					Thru
38	9	11	10	8	Rt

	Lt	Thru	Rt
1st	8	43	
2nd	10	54	
3rd	12	78	
4th	12	64	
Total	42	239	

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: SAN FERNANDO

EAST-WEST STREET: LANKERSHIM

TIME: 08:00AM-09:00AM DATE: 05-31-12

NORTH LEG

Rt	Thru	Lt	
368	469		Total
121	147		1st
99	107		2nd
84	121		3rd
64	94		4th

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
209	55	42	59	53	Lt
					Thru
31	5	10	6	10	Rt

	Lt	Thru	Rt
1st	19	57	
2nd	7	62	
3rd	7	57	
4th	11	65	
Total	44	241	

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : SAN FERNANDO LA

EAST-WEST STREET : LANKERSHIM 05-31-12

BEGINNING TIME : 07:00AM PH = 7:30 AM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
					NORTH LEG							
93	56	0	5	5	0	2	3	0	1	5	0	170
102	69	0	7	4	0	3	2	0	1	3	0	191
105	64	0	18	15	0	2	4	0	1	0	0	209
105	89	0	15	10	0	4	7	0	1	2	0	233
102	129	0	13	7	0	6	9	0	0	2	0	268
83	97	0	10	5	0	4	4	0	2	1	0	206
74	111	0	8	6	0	2	4	0	0	0	0	205
56	89	0	6	0	0	2	4	0	0	1	0	158
720	704	0	82	52	0	25	37	0	6	14	0	1640
					SOUTH LEG							
0	36	6	0	4	1	0	2	1	0	1	0	51
0	46	8	0	5	0	0	1	2	0	2	0	64
0	69	9	0	5	0	0	3	3	0	1	0	90
0	56	10	0	6	1	0	1	1	0	1	0	76
0	51	19	0	3	0	0	2	0	0	1	0	76
0	50	5	0	4	0	0	5	1	0	3	1	69
0	51	4	0	3	0	0	2	2	0	1	1	64
0	59	8	0	2	0	0	3	2	0	1	1	76
0	418	69	0	32	2	0	19	12	0	11	3	566
					EAST LEG							
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
					WEST LEG							
7	0	31	1	0	1	1	0	1	0	0	0	42
10	0	34	1	0	3	0	0	2	0	0	0	50
7	0	37	1	0	5	1	0	4	1	0	1	57
7	0	74	1	0	3	0	0	2	0	0	2	89
5	0	45	0	0	5	0	0	4	0	0	1	60
8	0	33	0	0	2	1	0	5	1	0	2	52
6	0	52	0	0	2	0	0	2	0	0	3	65
10	0	49	0	0	2	0	0	2	0	0	0	63
60	0	355	4	0	23	3	0	22	2	0	9	478

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: SAN FERNANDO
EAST-WEST STREET: LANKERSHIM
JURISDICTION: LA

DATE: 05-31-12

PEAK HOUR: 12:30PM

NORTH LEG

TOTAL: 583

Rt	Thru	Lt	
280	303		Total
85	73		1st
69	73		2nd
60	87		3rd
66	70		4th

EAST LEG TOTAL: 0

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

WEST LEG TOTAL: 334

Total	1st	2nd	3rd	4th	
273	82	75	67	49	Lt
					Thru
61	21	17	15	8	Rt

SOUTH LEG

TOTAL: 340

	Lt	Thru	Rt
1st	19	79	
2nd	9	64	
3rd	13	67	
4th	14	75	
Total	55	285	

PEAK HOUR FACTORS

NORTH LEG = 0.92
SOUTH LEG = 0.87
EAST LEG =
WEST LEG = 0.81

ALL LEGS = 0.88

HOUR TOTAL: 1,257

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: SAN FERNANDO

EAST-WEST STREET: LANKERSHIM

TIME: 12:00PM-01:00PM DATE: 05-31-12

NORTH LEG

Rt	Thru	Lt	
274	277		Total
67	69		1st
53	62		2nd
85	73		3rd
69	73		4th

	Rt	Thru	Lt
1st			
2nd			
3rd			
4th			
Total			

Total	1st	2nd	3rd	4th	
288	55	76	82	75	Lt
					Thru
66	16	12	21	17	Rt

	Lt	Thru	Rt
1st	16	83	
2nd	9	58	
3rd	19	79	
4th	9	64	
Total	53	284	

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: SAN FERNANDO

EAST-WEST STREET: LANKERSHIM

TIME: 01:00PM-02:00PM DATE: 05-31-12

NORTH LEG

Rt	Thru	Lt	
256	277		Total
60	87		1st
66	70		2nd
64	63		3rd
66	57		4th

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
263	67	49	69	78	Lt
					Thru
38	15	8	7	8	Rt

	Lt	Thru	Rt
1st	13	67	
2nd	14	75	
3rd	13	71	
4th	11	75	
Total	51	288	

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : SAN FERNANDO LA

EAST-WEST STREET : LANKERSHIM 05-31-12

BEGINNING TIME : 12:00PM PH = 12:30 PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
59	56	0	3	10	0	3	3	0	2	0	0	136
47	53	0	3	3	0	3	3	0	0	3	0	115
80	63	0	3	6	0	1	3	0	1	1	0	158
59	61	0	9	8	0	1	0	0	0	4	0	142
57	77	0	2	5	0	1	4	0	0	1	0	147
59	57	0	6	10	0	1	2	0	0	1	0	136
52	47	0	8	9	0	2	5	0	2	2	0	127
52	47	0	9	7	0	3	3	0	2	0	0	123
465	461	0	43	58	0	15	23	0	7	12	0	1084
						SOUTH LEG						
0	72	13	0	4	0	0	3	3	0	4	0	99
0	45	7	0	9	0	0	0	2	0	4	0	67
0	67	14	0	8	2	0	3	1	0	1	2	98
0	49	5	0	10	3	0	3	1	0	2	0	73
0	62	13	0	3	0	0	1	0	0	1	0	80
0	68	10	0	4	1	0	2	2	0	1	1	89
0	64	9	0	3	3	0	4	1	0	0	0	84
0	64	8	0	6	1	0	3	2	0	2	0	86
0	491	79	0	47	10	0	19	12	0	15	3	676
						EAST LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
						WEST LEG						
16	0	50	0	0	4	0	0	0	0	0	1	71
11	0	67	0	0	7	1	0	1	0	0	1	88
15	0	72	1	0	10	2	0	0	3	0	0	103
13	0	66	1	0	7	2	0	1	1	0	1	92
14	0	64	1	0	2	0	0	1	0	0	0	82
5	0	39	2	0	9	0	0	1	1	0	0	57
7	0	59	0	0	8	0	0	1	0	0	1	76
4	0	66	1	0	6	1	0	6	2	0	0	86
85	0	483	6	0	53	6	0	11	7	0	4	655

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: SAN FERNANDO
EAST-WEST STREET: LANKERSHIM
JURISDICTION: LA

DATE: 05-31-12

PEAK HOUR: 04:15PM

NORTH LEG

TOTAL: 667

Rt	Thru	Lt	
358	309		Total
77	69		1st
101	72		2nd
92	85		3rd
88	83		4th

EAST LEG TOTAL: 0

1st	2nd	3rd	4th	Total	
					Rt
					Thru
					Lt

WEST LEG TOTAL: 605

Total	1st	2nd	3rd	4th	
549	123	140	145	141	Lt
					Thru
56	18	13	15	10	Rt

SOUTH LEG

TOTAL: 696

	Lt	Thru	Rt
1st	16	150	
2nd	20	164	
3rd	19	152	
4th	23	152	
Total	78	618	

PEAK HOUR FACTORS

NORTH LEG = 0.94
SOUTH LEG = 0.95
EAST LEG =
WEST LEG = 0.95

ALL LEGS = 0.96

HOUR TOTAL: 1,968

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: SAN FERNANDO

EAST-WEST STREET: LANKERSHIM

TIME: 04:00PM-05:00PM DATE: 05-31-12

NORTH LEG

Rt	Thru	Lt	
367	305		Total
97	79		1st
77	69		2nd
101	72		3rd
92	85		4th

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
538	130	123	140	145	Lt
					Thru
57	11	18	13	15	Rt

	Lt	Thru	Rt
1st	19	151	
2nd	16	150	
3rd	20	164	
4th	19	152	
Total	74	617	

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: SAN FERNANDO

EAST-WEST STREET: LANKERSHIM

TIME: 05:00PM-06:00PM DATE: 05-31-12

NORTH LEG

Rt	Thru	Lt	
312	255		Total
88	83		1st
69	57		2nd
71	54		3rd
84	61		4th

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
506	141	140	131	94	Lt
					Thru
43	10	9	7	17	Rt

	Lt	Thru	Rt
1st	23	152	
2nd	15	160	
3rd	15	133	
4th	15	124	
Total	68	569	

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : SAN FERNANDO LA

EAST-WEST STREET : LANKERSHIM 05-31-12

BEGINNING TIME : 04:00PM PH = 4:15 PM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
					NORTH LEG							
92	69	0	2	5	0	3	2	0	0	3	0	176
71	60	0	2	2	0	1	4	0	3	3	0	146
96	67	0	2	2	0	3	2	0	0	1	0	173
88	77	0	4	6	0	0	0	0	0	2	0	177
83	77	0	1	4	0	3	1	0	1	1	0	171
63	48	0	2	5	0	3	4	0	1	0	0	126
69	50	0	0	2	0	1	2	0	1	0	0	125
75	57	0	2	3	0	2	1	0	5	0	0	145
637	505	0	15	29	0	16	16	0	11	10	0	1239
					SOUTH LEG							
0	143	17	0	6	1	0	1	1	0	1	0	170
0	137	12	0	5	2	0	4	2	0	4	0	166
0	156	17	0	4	1	0	2	2	0	2	0	184
0	141	17	0	7	1	0	2	1	0	2	0	171
0	139	19	0	5	2	0	5	1	0	3	1	175
0	143	11	0	13	2	0	3	2	0	1	0	175
0	126	13	0	2	0	0	3	2	0	2	0	148
0	118	12	0	4	1	0	2	2	0	0	0	139
0	1103	118	0	46	10	0	22	13	0	15	1	1328
					EAST LEG							
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
					WEST LEG							
9	0	122	0	0	4	1	0	4	1	0	0	141
14	0	115	3	0	3	1	0	4	0	0	1	141
12	0	128	1	0	6	0	0	4	0	0	2	153
13	0	136	1	0	4	1	0	3	0	0	2	160
9	0	132	0	0	4	1	0	3	0	0	2	151
7	0	129	2	0	5	0	0	4	0	0	2	149
6	0	122	0	0	3	1	0	4	0	0	2	138
15	0	85	2	0	5	0	0	4	0	0	0	111
85	0	969	9	0	34	5	0	30	1	0	11	1144

Prepared by Newport Traffic Studies

Movement	NBL	NBR	SET	SER	NWL	NWT
Lane Configurations						
Volume (vph)	225	35	445	470	50	260
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	0.97	1.00	0.95		1.00	0.95
Frt	1.00	0.85	0.92		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	3045	1346	2897		1570	3139
Flt Permitted	0.95	1.00	1.00		0.00	1.00
Satd. Flow (perm)	3045	1346	2897		0	3139
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	245	38	484	511	54	283
RTOR Reduction (vph)	0	17	228	0	0	0
Lane Group Flow (vph)	245	21	767	0	54	283
Heavy Vehicles (%)	15%	20%	15%	15%	15%	15%
Turn Type	NA	Perm	NA		pm+pt	NA
Protected Phases	2!		6!		3	8
Permitted Phases		2			8	
Actuated Green, G (s)	18.9	18.9	18.9		7.2	7.2
Effective Green, g (s)	18.9	18.9	18.9		7.2	7.2
Actuated g/C Ratio	0.55	0.55	0.55		0.21	0.21
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	1688	746	1606		331	663
v/s Ratio Prot	0.08		c0.26		0.03	c0.09
v/s Ratio Perm		0.02				
v/c Ratio	0.15	0.03	0.48		0.16	0.43
Uniform Delay, d1	3.7	3.4	4.6		11.0	11.7
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.2	0.1	1.0		0.2	0.4
Delay (s)	3.9	3.5	5.6		11.2	12.1
Level of Service	A	A	A		B	B
Approach Delay (s)	3.8		5.6			12.0
Approach LOS	A		A			B

Intersection Summary			
HCM Average Control Delay	6.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	34.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	47.2%	ICU Level of Service	A
Analysis Period (min)	15		

! Phase conflict between lane groups.
c Critical Lane Group

Movement	NBL	NBR	SET	SER	NWL	NWT
Lane Configurations						
Volume (vph)	275	60	305	280	55	285
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	0.97	1.00	0.95		1.00	0.95
Frt	1.00	0.85	0.93		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	3183	1292	2976		1444	3139
Flt Permitted	0.95	1.00	1.00		0.00	1.00
Satd. Flow (perm)	3183	1292	2976		0	3139
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	312	68	347	318	62	324
RTOR Reduction (vph)	0	33	154	0	0	0
Lane Group Flow (vph)	312	35	511	0	62	324
Heavy Vehicles (%)	10%	25%	15%	10%	25%	15%
Turn Type	NA	Perm	NA		pm+pt	NA
Protected Phases	2!		6!		3	8
Permitted Phases		2			8	
Actuated Green, G (s)	18.2	18.2	18.2		9.0	9.0
Effective Green, g (s)	18.2	18.2	18.2		9.0	9.0
Actuated g/C Ratio	0.52	0.52	0.52		0.26	0.26
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	1646	668	1539		369	803
v/s Ratio Prot	0.10		c0.17		0.04	c0.10
v/s Ratio Perm		0.03				
v/c Ratio	0.19	0.05	0.33		0.17	0.40
Uniform Delay, d1	4.6	4.2	5.0		10.2	10.9
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.3	0.1	0.6		0.2	0.3
Delay (s)	4.8	4.4	5.5		10.4	11.2
Level of Service	A	A	A		B	B
Approach Delay (s)	4.7		5.5			11.1
Approach LOS	A		A			B

Intersection Summary			
HCM Average Control Delay	6.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	35.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	38.6%	ICU Level of Service	A
Analysis Period (min)	15		

! Phase conflict between lane groups.
c Critical Lane Group

Movement	NBL	NBR	SET	SER	NWL	NWT
Lane Configurations						
Volume (vph)	550	55	310	360	80	620
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	0.97	1.00	0.95		1.00	0.95
Frt	1.00	0.85	0.92		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	3335	1404	3093		1570	3438
Flt Permitted	0.95	1.00	1.00		0.00	1.00
Satd. Flow (perm)	3335	1404	3093		0	3438
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	573	57	323	375	83	646
RTOR Reduction (vph)	0	32	211	0	0	0
Lane Group Flow (vph)	573	25	487	0	83	646
Heavy Vehicles (%)	5%	15%	10%	5%	15%	5%
Turn Type	NA	Perm	NA		pm+pt	NA
Protected Phases	2!		6!		3	8
Permitted Phases		2			8	
Actuated Green, G (s)	16.1	16.1	16.1		12.7	12.7
Effective Green, g (s)	16.1	16.1	16.1		12.7	12.7
Actuated g/C Ratio	0.44	0.44	0.44		0.35	0.35
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	1459	614	1353		542	1186
v/s Ratio Prot	c0.17		0.16		0.05	c0.19
v/s Ratio Perm		0.02				
v/c Ratio	0.39	0.04	0.36		0.15	0.54
Uniform Delay, d1	7.0	5.9	6.9		8.3	9.7
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.8	0.1	0.7		0.1	0.5
Delay (s)	7.8	6.1	7.7		8.5	10.2
Level of Service	A	A	A		A	B
Approach Delay (s)	7.7		7.7			10.0
Approach LOS	A		A			B

Intersection Summary			
HCM Average Control Delay	8.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	36.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	50.3%	ICU Level of Service	A
Analysis Period (min)	15		

! Phase conflict between lane groups.
c Critical Lane Group

Movement	NBL	NBR	SET	SER	NWL	NWT
Lane Configurations						
Volume (vph)	225	35	495	470	50	310
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	0.97	1.00	0.95		1.00	0.95
Frt	1.00	0.85	0.93		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	3045	1346	2797		1570	2798
Flt Permitted	0.95	1.00	1.00		0.00	1.00
Satd. Flow (perm)	3045	1346	2797		0	2798
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	245	38	538	511	54	337
RTOR Reduction (vph)	0	19	253	0	0	0
Lane Group Flow (vph)	245	19	796	0	54	337
Heavy Vehicles (%)	15%	20%	24%	15%	15%	29%
Turn Type	NA	Perm	NA		pm+pt	NA
Protected Phases	2!		6!		3	8
Permitted Phases		2			8	
Actuated Green, G (s)	17.9	17.9	17.9		9.6	9.6
Effective Green, g (s)	17.9	17.9	17.9		9.6	9.6
Actuated g/C Ratio	0.50	0.50	0.50		0.27	0.27
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	1535	679	1410		425	757
v/s Ratio Prot	0.08		c0.28		0.03	c0.12
v/s Ratio Perm		0.01				
v/c Ratio	0.16	0.03	0.56		0.13	0.45
Uniform Delay, d1	4.7	4.4	6.1		9.8	10.7
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.2	0.1	1.6		0.1	0.4
Delay (s)	5.0	4.5	7.7		9.9	11.2
Level of Service	A	A	A		A	B
Approach Delay (s)	4.9		7.7			11.0
Approach LOS	A		A			B

Intersection Summary			
HCM Average Control Delay	8.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	35.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	48.5%	ICU Level of Service	A
Analysis Period (min)	15		

! Phase conflict between lane groups.
c Critical Lane Group

Movement	NBL	NBR	SET	SER	NWL	NWT
Lane Configurations						
Volume (vph)	275	60	355	280	55	335
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	0.97	1.00	0.95		1.00	0.95
Frt	1.00	0.85	0.93		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	3183	1292	2821		1444	2820
Flt Permitted	0.95	1.00	1.00		0.00	1.00
Satd. Flow (perm)	3183	1292	2821		0	2820
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	312	68	403	318	62	381
RTOR Reduction (vph)	0	35	163	0	0	0
Lane Group Flow (vph)	312	33	558	0	62	381
Heavy Vehicles (%)	10%	25%	27%	10%	25%	28%
Turn Type	NA	Perm	NA		pm+pt	NA
Protected Phases	2!		6!		3	8
Permitted Phases		2			8	
Actuated Green, G (s)	17.2	17.2	17.2		10.2	10.2
Effective Green, g (s)	17.2	17.2	17.2		10.2	10.2
Actuated g/C Ratio	0.49	0.49	0.49		0.29	0.29
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	1547	628	1371		416	813
v/s Ratio Prot	0.10		c0.20		0.04	c0.14
v/s Ratio Perm		0.03				
v/c Ratio	0.20	0.05	0.41		0.15	0.47
Uniform Delay, d1	5.2	4.8	5.8		9.4	10.4
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.3	0.2	0.9		0.2	0.4
Delay (s)	5.5	5.0	6.7		9.5	10.8
Level of Service	A	A	A		A	B
Approach Delay (s)	5.4		6.7			10.6
Approach LOS	A		A			B

Intersection Summary			
HCM Average Control Delay	7.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	35.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	40.0%	ICU Level of Service	A
Analysis Period (min)	15		

! Phase conflict between lane groups.
c Critical Lane Group

Movement	NBL	NBR	SET	SER	NWL	NWT
Lane Configurations						
Volume (vph)	550	55	360	360	80	670
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	0.97	1.00	0.95		1.00	0.95
Frt	1.00	0.85	0.93		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	3335	1404	2929		1570	3223
Flt Permitted	0.95	1.00	1.00		0.00	1.00
Satd. Flow (perm)	3335	1404	2929		0	3223
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	573	57	375	375	83	698
RTOR Reduction (vph)	0	33	214	0	0	0
Lane Group Flow (vph)	573	24	536	0	83	698
Heavy Vehicles (%)	5%	15%	23%	5%	15%	12%
Turn Type	NA	Perm	NA		pm+pt	NA
Protected Phases	2!		6!		3	8
Permitted Phases		2			8	
Actuated Green, G (s)	16.1	16.1	16.1		13.4	13.4
Effective Green, g (s)	16.1	16.1	16.1		13.4	13.4
Actuated g/C Ratio	0.43	0.43	0.43		0.36	0.36
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	1432	603	1258		561	1152
v/s Ratio Prot	0.17		c0.18		0.05	c0.22
v/s Ratio Perm		0.02				
v/c Ratio	0.40	0.04	0.43		0.15	0.61
Uniform Delay, d1	7.4	6.2	7.5		8.2	9.9
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.8	0.1	1.1		0.1	0.9
Delay (s)	8.2	6.3	8.5		8.3	10.8
Level of Service	A	A	A		A	B
Approach Delay (s)	8.0		8.5			10.5
Approach LOS	A		A			B

Intersection Summary			
HCM Average Control Delay	9.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	37.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	51.6%	ICU Level of Service	A
Analysis Period (min)	15		

! Phase conflict between lane groups.
c Critical Lane Group

Movement	NBL	NBR	SET	SER	NWL	NWT
Lane Configurations						
Volume (vph)	245	40	540	510	55	340
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	0.97	1.00	0.95		1.00	0.95
Frt	1.00	0.85	0.93		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	3045	1346	2798		1570	2798
Flt Permitted	0.95	1.00	1.00		0.00	1.00
Satd. Flow (perm)	3045	1346	2798		0	2798
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	266	43	587	554	60	370
RTOR Reduction (vph)	0	22	282	0	0	0
Lane Group Flow (vph)	266	21	859	0	60	370
Heavy Vehicles (%)	15%	20%	24%	15%	15%	29%
Turn Type	NA	Perm	NA		pm+pt	NA
Protected Phases	2!		6!		3	8
Permitted Phases		2			8	
Actuated Green, G (s)	17.3	17.3	17.3		9.9	9.9
Effective Green, g (s)	17.3	17.3	17.3		9.9	9.9
Actuated g/C Ratio	0.49	0.49	0.49		0.28	0.28
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	1497	662	1375		442	787
v/s Ratio Prot	0.09		c0.31		0.04	c0.13
v/s Ratio Perm		0.02				
v/c Ratio	0.18	0.03	0.62		0.14	0.47
Uniform Delay, d1	5.0	4.6	6.6		9.5	10.5
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.3	0.1	2.2		0.1	0.4
Delay (s)	5.2	4.7	8.7		9.6	10.9
Level of Service	A	A	A		A	B
Approach Delay (s)	5.2		8.7			10.7
Approach LOS	A		A			B

Intersection Summary			
HCM Average Control Delay	8.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	35.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	51.6%	ICU Level of Service	A
Analysis Period (min)	15		

! Phase conflict between lane groups.
c Critical Lane Group

Movement	NBL	NBR	SET	SER	NWL	NWT
Lane Configurations						
Volume (vph)	300	65	385	305	60	365
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	0.97	1.00	0.95		1.00	0.95
Frt	1.00	0.85	0.93		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	3183	1292	2821		1444	2820
Flt Permitted	0.95	1.00	1.00		0.00	1.00
Satd. Flow (perm)	3183	1292	2821		0	2820
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	341	74	438	347	68	415
RTOR Reduction (vph)	0	39	183	0	0	0
Lane Group Flow (vph)	341	35	602	0	68	415
Heavy Vehicles (%)	10%	25%	27%	10%	25%	28%
Turn Type	NA	Perm	NA		pm+pt	NA
Protected Phases	2!		6!		3	8
Permitted Phases		2			8	
Actuated Green, G (s)	16.8	16.8	16.8		10.7	10.7
Effective Green, g (s)	16.8	16.8	16.8		10.7	10.7
Actuated g/C Ratio	0.47	0.47	0.47		0.30	0.30
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	1506	611	1335		435	850
v/s Ratio Prot	0.11		c0.21		0.05	c0.15
v/s Ratio Perm		0.03				
v/c Ratio	0.23	0.06	0.45		0.16	0.49
Uniform Delay, d1	5.5	5.1	6.3		9.1	10.2
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.3	0.2	1.1		0.2	0.4
Delay (s)	5.9	5.2	7.4		9.3	10.6
Level of Service	A	A	A		A	B
Approach Delay (s)	5.8		7.4			10.4
Approach LOS	A		A			B

Intersection Summary			
HCM Average Control Delay	7.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	35.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	42.3%	ICU Level of Service	A
Analysis Period (min)	15		

! Phase conflict between lane groups.
c Critical Lane Group

Movement	NBL	NBR	SET	SER	NWL	NWT
Lane Configurations						
Volume (vph)	600	60	390	390	85	730
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	0.97	1.00	0.95		1.00	0.95
Frt	1.00	0.85	0.93		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	3335	1404	2929		1570	3223
Flt Permitted	0.95	1.00	1.00		0.00	1.00
Satd. Flow (perm)	3335	1404	2929		0	3223
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	625	62	406	406	89	760
RTOR Reduction (vph)	0	36	234	0	0	0
Lane Group Flow (vph)	625	26	578	0	89	760
Heavy Vehicles (%)	5%	15%	23%	5%	15%	12%
Turn Type	NA	Perm	NA		pm+pt	NA
Protected Phases	2!		6!		3	8
Permitted Phases		2			8	
Actuated Green, G (s)	16.1	16.1	16.1		13.9	13.9
Effective Green, g (s)	16.1	16.1	16.1		13.9	13.9
Actuated g/C Ratio	0.42	0.42	0.42		0.37	0.37
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	1413	595	1241		574	1179
v/s Ratio Prot	0.19		c0.20		0.06	c0.24
v/s Ratio Perm		0.02				
v/c Ratio	0.44	0.04	0.47		0.16	0.64
Uniform Delay, d1	7.8	6.4	7.9		8.1	10.0
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	1.0	0.1	1.3		0.1	1.2
Delay (s)	8.8	6.6	9.1		8.2	11.2
Level of Service	A	A	A		A	B
Approach Delay (s)	8.6		9.1			10.9
Approach LOS	A		A			B

Intersection Summary			
HCM Average Control Delay	9.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	38.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	55.1%	ICU Level of Service	B
Analysis Period (min)	15		

! Phase conflict between lane groups.
c Critical Lane Group

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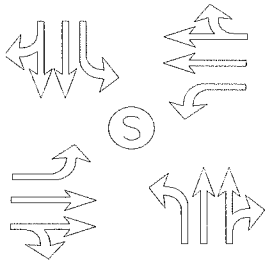
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : SHELDON STREET
N/S STREET : SAN FERNANDO ROAD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
50
ROUTE
8C

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
SHELDON STREET						
EB LEFT	60	15%		60	5	65
EB THRU	355	5%		355	30	385
EB RIGHT	75	20%		75	5	80
WB LEFT	220	10%		220	20	240
WB THRU	635	5%		635	55	690
WB RIGHT	55	15%		55	5	60
SAN FERNANDO ROAD						
NB LEFT	35	30%		35	5	40
NB THRU	290	23%	**50**	340	30	370
NB RIGHT	80	25%		80	5	85
SB LEFT	65	15%		65	5	70
SB THRU	610	12%	**50**	660	60	720
SB RIGHT	85	30%		85	5	90
TOTALS	**2565**		**100**	**2665**	**230**	**2895**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : SHELDON STREET
N/S STREET : SAN FERNANDO ROAD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 50
ROUTE 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
SHELDON STREET						
EB LEFT	60	0%		60	5	65
EB THRU	320	5%		320	30	350
EB RIGHT	40	5%		40	5	45
WB LEFT	125	5%		125	10	135
WB THRU	320	15%		320	30	350
WB RIGHT	55	5%		55	5	60
SAN FERNANDO ROAD						
NB LEFT	50	15%		50	5	55
NB THRU	375	16%	**50**	425	40	465
NB RIGHT	95	5%		95	10	105
SB LEFT	65	5%		65	5	70
SB THRU	335	22%	**50**	385	35	420
SB RIGHT	45	0%		45	5	50
TOTALS	**1885**		**100**	**1985**	**185**	**2170**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	26-Jun-12	VV.110264.0000	3 OF 3

E/W STREET : SHELDON STREET
N/S STREET : SAN FERNANDO ROAD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 50
ROUTE 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
SHELDON STREET						
EB LEFT	125	15%		125	10	135
EB THRU	560	5%		560	50	610
EB RIGHT	65	20%		65	5	70
WB LEFT	165	15%		165	15	180
WB THRU	405	5%		405	35	440
WB RIGHT	100	25%		100	10	110
SAN FERNANDO ROAD						
NB LEFT	115	5%		115	10	125
NB THRU	975	10%	**50**	1025	90	1115
NB RIGHT	160	10%		160	15	175
SB LEFT	75	25%		75	5	80
SB THRU	595	12%	**50**	645	60	705
SB RIGHT	30	45%		30	5	35
TOTALS	**3370**		**100**	**3470**	**310**	**3780**

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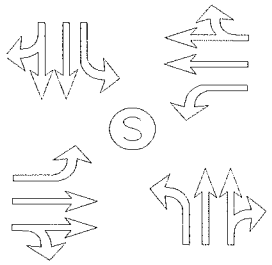
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : SHELDON STREET
N/S STREET : SAN FERNANDO ROAD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 50
ROUTE 8C

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
SHELDON STREET								
EB LEFT	50	8	24	75	**0**	75	5	80
EB THRU	343	13	39	380	**0**	380	35	415
EB RIGHT	61	13	39	100	**0**	100	10	110
WB LEFT	202	17	51	255	**0**	255	25	280
WB THRU	615	18	54	670	**0**	670	60	730
WB RIGHT	44	9	27	70	**0**	70	5	75
SAN FERNANDO ROAD								
NB LEFT	26	11	33	60	**0**	60	5	65
NB THRU	261	27	81	340	**150**	490	45	535
NB RIGHT	57	21	63	120	**0**	120	10	130
SB LEFT	56	9	27	85	**0**	85	5	90
SB THRU	587	23	69	655	**150**	805	70	875
SB RIGHT	57	26	78	135	**0**	135	10	145
TOTALS	**2359**				**300**	**3245**	**285**	**3530**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : SHELDON STREET
N/S STREET : SAN FERNANDO ROAD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 50
ROUTE 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
SHELDON STREET								
EB LEFT	61	0	0	60	**0**	60	5	65
EB THRU	295	23	69	365	**0**	365	35	400
EB RIGHT	39	1	3	40	**0**	40	5	45
WB LEFT	118	6	18	135	**0**	135	10	145
WB THRU	278	43	129	405	**0**	405	35	440
WB RIGHT	54	1	3	55	**0**	55	5	60
SAN FERNANDO ROAD								
NB LEFT	41	7	21	60	**0**	60	5	65
NB THRU	353	22	66	420	**150**	570	50	620
NB RIGHT	91	2	6	95	**0**	95	10	105
SB LEFT	64	1	3	65	**0**	65	5	70
SB THRU	299	34	102	400	**150**	550	50	600
SB RIGHT	43	0	0	45	**0**	45	5	50
TOTALS	**1736**				**300**	**2445**	**220**	**2665**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : SHELDON STREET
N/S STREET : SAN FERNANDO ROAD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 50
ROUTE 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
SHELDON STREET								
EB LEFT	125	15%	0	125	**0**	125	10	135
EB THRU	560	5%	0	560	**0**	560	50	610
EB RIGHT	65	20%	1	65	**0**	65	5	70
WB LEFT	165	15%	0	165	**0**	165	15	180
WB THRU	405	5%	0	405	**0**	405	35	440
WB RIGHT	100	25%	1	100	**0**	100	10	110
SAN FERNANDO ROAD								
NB LEFT	115	5%	0	115	**0**	115	10	125
NB THRU	975	10%	0	975	**150**	1125	100	1225
NB RIGHT	160	10%	0	160	**0**	160	15	175
SB LEFT	75	25%	1	75	**0**	75	5	80
SB THRU	595	12%	0	595	**150**	745	65	810
SB RIGHT	30	45%	1	30	**0**	30	5	35
TOTALS	**3370**				**300**	**3670**	**325**	**3995**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: SAN FERNANDO
EAST-WEST STREET: SHELDON
JURISDICTION: LA

DATE: 05-31-12

PEAK HOUR: 07:15AM

NORTH LEG

TOTAL: 758

Rt	Thru	Lt	
83	610	65	Total
19	122	13	1st
25	133	18	2nd
22	201	17	3rd
17	154	17	4th

EAST LEG TOTAL: 905

	1st	2nd	3rd	4th	Total
Rt	12	11	16	14	53
Thru	167	153	172	141	633
Lt	48	51	63	57	219

WEST LEG TOTAL: 488

Total	1st	2nd	3rd	4th	
58	10	10	25	13	Lt
356	67	71	89	129	Thru
74	8	11	31	24	Rt

SOUTH LEG

TOTAL: 403

	Lt	Thru	Rt
1st	8	55	19
2nd	15	58	12
3rd	7	92	21
4th	7	83	26
Total	37	288	78

PEAK HOUR FACTORS

NORTH LEG = 0.79
SOUTH LEG = 0.84
EAST LEG = 0.90
WEST LEG = 0.73

ALL LEGS = 0.84

HOUR TOTAL: 2,554

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: SAN FERNANDO

EAST-WEST STREET: SHELDON

TIME: 07:00AM-08:00AM DATE: 05-31-12

NORTH LEG

Rt	Thru	Lt	
76	571	62	Total
10	115	14	1st
19	122	13	2nd
25	133	18	3rd
22	201	17	4th

	1st	2nd	3rd	4th	Total
Rt	9	12	11	16	48
Thru	132	167	153	172	624
Lt	36	48	51	63	198

Total	1st	2nd	3rd	4th	
50	5	10	10	25	Lt
293	66	67	71	89	Thru
57	7	8	11	31	Rt

	Lt	Thru	Rt
1st	8	49	14
2nd	8	55	19
3rd	15	58	12
4th	7	92	21
Total	38	254	66

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: SAN FERNANDO

EAST-WEST STREET: SHELDON

TIME: 08:00AM-09:00AM DATE: 05-31-12

NORTH LEG

Rt	Thru	Lt	
47	571	62	Total
17	154	17	1st
7	157	16	2nd
13	147	13	3rd
10	113	16	4th

	1st	2nd	3rd	4th	Total
Rt	14	13	13	17	57
Thru	141	108	88	129	466
Lt	57	44	44	30	175

Total	1st	2nd	3rd	4th	
33	13	4	7	9	Lt
351	129	65	65	92	Thru
58	24	7	13	14	Rt

	Lt	Thru	Rt
1st	7	83	26
2nd	17	75	16
3rd	14	70	11
4th	18	66	25
Total	56	294	78

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : SAN FERNANDO LA

EAST-WEST STREET : SHELDON 05-31-12

BEGINNING TIME : 07:00AM PM 7:15 AM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
6	106	12	1	5	0	1	2	1	2	2	1	139
14	116	12	2	4	0	1	2	0	2	0	1	154
17	128	18	0	3	0	5	1	0	3	1	0	176
18	196	15	0	4	0	1	1	1	3	0	1	240
8	147	11	1	5	1	1	1	5	7	1	0	188
2	148	7	0	4	0	0	5	3	5	0	6	180
8	142	8	0	2	0	0	2	0	5	1	5	173
9	110	11	0	2	0	1	1	0	0	0	5	139
82	1093	94	4	29	1	10	15	10	27	5	19	1389
						SOUTH LEG						
6	41	6	1	2	1	6	5	1	1	1	0	71
15	44	6	0	5	1	3	5	1	1	1	0	82
8	53	12	0	1	0	4	4	1	0	0	2	85
13	87	5	0	1	1	3	4	1	5	0	0	120
21	77	3	0	3	0	5	3	1	0	0	3	116
14	63	16	0	4	0	2	3	1	0	5	0	108
9	62	13	0	5	0	2	3	1	0	0	0	95
23	57	17	0	6	0	2	3	1	0	0	0	109
109	484	78	1	27	3	27	30	8	7	7	5	786
						EAST LEG						
8	127	30	1	2	5	0	1	1	0	2	0	177
9	162	45	3	5	3	0	0	0	0	0	0	227
6	152	50	2	0	0	1	0	1	2	1	0	215
15	163	52	1	5	5	0	3	1	0	1	5	251
14	138	55	0	3	2	0	0	0	0	0	0	212
13	104	41	0	4	0	0	0	3	0	0	0	165
8	82	44	0	2	0	0	4	0	5	0	0	145
17	117	29	0	2	1	0	5	0	0	5	0	176
90	1045	346	7	23	16	1	13	6	7	9	5	1568
						WEST LEG						
1	61	1	6	5	2	0	0	1	0	0	1	78
0	63	9	0	0	0	5	4	1	3	0	0	85
11	67	9	0	0	0	0	0	1	0	4	0	92
29	84	23	0	0	0	2	5	1	0	0	1	145
21	129	9	0	0	0	3	0	4	0	0	0	166
5	60	4	0	0	0	2	5	0	0	0	0	76
11	65	7	0	0	0	2	0	0	0	0	0	85
14	91	9	0	0	0	0	0	0	0	1	0	115
92	620	71	6	5	2	14	14	8	3	5	2	842

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: SAN FERNANDO
EAST-WEST STREET: SHELDON
JURISDICTION: LA

DATE: 05-31-12

PEAK HOUR: 12:00PM

NORTH LEG

TOTAL: 441

Rt	Thru	Lt	
43	333	65	Total
4	96	20	1st
16	85	8	2nd
10	89	20	3rd
13	63	17	4th

EAST LEG TOTAL: 500

	1st	2nd	3rd	4th	Total
Rt	11	9	17	18	55
Thru	83	87	73	78	321
Lt	35	27	34	28	124

WEST LEG TOTAL: 419

Total	1st	2nd	3rd	4th	
61	13	17	15	16	Lt
318	89	76	80	73	Thru
40	11	10	7	12	Rt

PEAK HOUR FACTORS

NORTH LEG = 0.92
SOUTH LEG = 0.93
EAST LEG = 0.97
WEST LEG = 0.93

ALL LEGS = 0.97

SOUTH LEG

TOTAL: 516

	Lt	Thru	Rt
1st	15	90	15
2nd	6	94	24
3rd	19	90	29
4th	8	101	25
Total	48	375	93

HOUR TOTAL: 1,876

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: SAN FERNANDO

EAST-WEST STREET: SHELDON

TIME: 12:00PM-01:00PM DATE: 05-31-12

NORTH LEG

Rt	Thru	Lt	
43	333	65	Total
4	96	20	1st
16	85	8	2nd
10	89	20	3rd
13	63	17	4th

	1st	2nd	3rd	4th	Total
Rt	11	9	17	18	55
Thru	83	87	73	78	321
Lt	35	27	34	28	124

Total	1st	2nd	3rd	4th	
61	13	17	15	16	Lt
318	89	76	80	73	Thru
40	11	10	7	12	Rt

	Lt	Thru	Rt
1st	15	90	15
2nd	6	94	24
3rd	19	90	29
4th	8	101	25
Total	48	375	93

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: SAN FERNANDO

EAST-WEST STREET: SHELDON

TIME: 01:00PM-02:00PM DATE: 05-31-12

NORTH LEG

Rt	Thru	Lt	
49	342	62	Total
13	82	15	1st
10	97	13	2nd
12	88	19	3rd
14	75	15	4th

	1st	2nd	3rd	4th	Total
Rt	18	16	15	12	61
Thru	70	69	79	85	303
Lt	34	31	46	23	134

Total	1st	2nd	3rd	4th	
46	11	12	9	14	Lt
313	73	82	84	74	Thru
49	10	17	11	11	Rt

	Lt	Thru	Rt
1st	13	97	14
2nd	10	92	18
3rd	24	95	15
4th	10	85	27
Total	57	369	74

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : SAN FERNANDO LA

EAST-WEST STREET : SHELDON 05-31-12

BEGINNING TIME : 12:00PM 2PH

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
4	89	20	0	2	0	0	1	0	0	4	0	120
16	79	8	0	2	0	0	2	0	0	2	0	109
10	75	20	0	5	0	0	3	0	0	6	0	119
13	56	16	0	5	1	0	2	0	0	0	0	93
12	81	15	1	1	0	0	0	0	0	0	0	110
9	92	13	0	1	0	0	2	0	1	2	0	120
11	83	18	0	2	1	0	1	0	1	2	0	119
14	67	15	0	4	0	0	2	0	0	2	0	104
89	622	125	1	22	2	0	13	0	2	18	0	894
						SOUTH LEG						
15	82	13	0	5	0	0	1	2	0	2	0	120
24	90	4	0	0	0	0	3	0	0	1	2	124
29	81	16	0	5	2	0	3	0	0	1	1	138
23	100	8	0	0	0	1	1	0	1	0	0	134
13	93	12	1	3	0	0	1	1	0	0	0	124
18	88	10	0	1	0	0	0	0	0	3	0	120
15	80	14	0	5	9	0	4	0	0	6	1	134
26	82	7	0	2	2	1	0	0	0	1	1	122
163	696	84	1	21	13	2	13	3	1	14	5	1016
						EAST LEG						
10	73	34	0	5	0	1	2	1	0	3	0	129
9	81	27	0	1	0	0	0	0	0	5	0	123
17	55	30	0	2	1	0	3	0	0	13	3	124
18	69	27	0	2	0	0	3	0	0	4	1	124
17	68	34	0	0	0	1	2	0	0	0	0	122
16	64	31	0	1	0	0	1	0	0	3	0	116
12	67	46	2	3	0	1	2	0	0	7	0	140
9	80	22	1	0	0	2	0	1	0	5	0	120
108	557	251	3	14	1	5	13	2	0	40	4	998
						WEST LEG						
10	84	13	1	2	0	0	2	0	0	1	0	113
10	74	17	0	0	0	0	0	0	0	2	0	103
7	69	15	0	3	0	0	2	0	0	6	0	102
12	68	16	0	0	0	0	2	0	0	3	0	101
10	72	10	0	1	0	0	0	0	0	0	1	94
17	78	12	0	0	0	0	1	0	0	3	0	111
9	70	8	1	4	1	0	1	0	1	9	0	104
10	73	13	0	1	0	0	0	1	1	0	0	99
85	588	104	2	11	1	0	8	1	2	24	1	827

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: SAN FERNANDO
EAST-WEST STREET: SHELDON
JURISDICTION: LA

DATE: 05-31-12

PEAK HOUR: 04:30PM

NORTH LEG

TOTAL: 703

Rt	Thru	Lt	
32	596	75	Total
9	140	20	1st
11	233	10	2nd
4	125	25	3rd
8	98	20	4th

EAST LEG TOTAL: 668

	1st	2nd	3rd	4th	Total
Rt	26	19	31	24	100
Thru	80	91	110	122	403
Lt	36	45	48	36	165

WEST LEG TOTAL: 748

Total	1st	2nd	3rd	4th	
123	38	24	30	31	Lt
558	143	141	112	162	Thru
67	15	15	18	19	Rt

SOUTH LEG

	Lt	Thru	Rt
1st	23	230	26
2nd	34	252	46
3rd	35	246	42
4th	22	246	47
Total	114	974	161

TOTAL: 1,249

PEAK HOUR FACTORS

NORTH LEG = 0.69
SOUTH LEG = 0.94
EAST LEG = 0.88
WEST LEG = 0.88

ALL LEGS = 0.91

HOUR TOTAL: 3,368

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: SAN FERNANDO

EAST-WEST STREET: SHELDON

TIME: 04:00PM-05:00PM DATE: 05-31-12

NORTH LEG

Rt	Thru	Lt	
59	645	71	Total
19	96	23	1st
20	176	18	2nd
9	140	20	3rd
11	233	10	4th

	1st	2nd	3rd	4th	Total
Rt	18	19	26	19	82
Thru	94	95	80	91	360
Lt	44	33	36	45	158

Total	1st	2nd	3rd	4th	
102	18	22	38	24	Lt
508	110	114	143	141	Thru
62	17	15	15	15	Rt

	Lt	Thru	Rt
1st	31	196	34
2nd	20	254	40
3rd	23	230	26
4th	34	252	46
Total	108	932	146

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: SAN FERNANDO

EAST-WEST STREET: SHELDON

TIME: 05:00PM-06:00PM DATE: 05-31-12

NORTH LEG

Rt	Thru	Lt	
45	428	69	Total
4	125	25	1st
8	98	20	2nd
19	115	12	3rd
14	90	12	4th

	1st	2nd	3rd	4th	Total
Rt	31	24	17	11	83
Thru	110	122	67	92	391
Lt	48	36	30	37	151

Total	1st	2nd	3rd	4th	
101	30	31	13	27	Lt
522	112	162	119	129	Thru
57	18	19	9	11	Rt

	Lt	Thru	Rt
1st	35	246	42
2nd	22	246	47
3rd	23	232	45
4th	20	183	24
Total	100	907	158

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

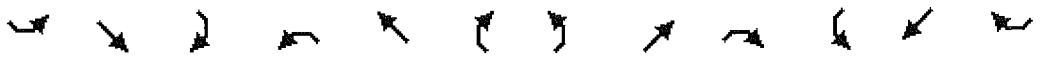
NORTH-SOUTH STREET : SAN FERNANDO LA

EAST-WEST STREET : SHELDON 05-31-12

BEGINNING TIME : 04:00PM PH= 4:30PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
17	84	22	1	9	1	0	2	0	1	1	0	138
19	171	18	0	4	0	0	0	0	1	1	0	214
7	131	19	0	6	0	0	1	0	2	2	1	169
9	226	7	0	5	0	0	0	1	2	2	2	254
1	119	22	0	0	0	0	3	0	3	3	3	154
0	88	10	4	5	5	0	0	0	4	5	5	126
13	108	4	4	5	5	0	0	0	2	2	3	146
6	79	0	1	6	2	2	3	5	5	2	5	116
72	1006	102	10	40	13	2	9	6	20	18	19	1317
						SOUTH LEG						
34	191	30	0	5	0	0	0	0	0	0	1	261
36	243	17	1	2	2	0	6	0	3	3	1	314
24	224	22	1	5	1	1	1	0	0	0	0	279
44	248	33	0	4	1	0	0	0	2	0	0	332
41	242	34	0	2	1	1	0	0	0	2	0	323
37	240	20	0	3	1	5	2	0	5	1	1	315
41	214	15	2	3	4	2	5	3	0	10	1	300
18	172	12	2	3	2	2	5	3	2	3	3	227
275	1774	183	6	27	12	11	19	6	12	19	7	2351
						EAST LEG						
15	87	41	2	3	3	1	4	0	0	0	0	156
14	87	32	2	2	1	2	4	0	1	2	0	147
22	72	31	4	5	1	0	1	3	0	2	1	142
14	86	37	2	2	4	1	1	2	2	2	2	155
25	106	41	0	2	2	3	2	2	3	0	3	189
15	119	35	0	0	0	5	1	1	4	2	0	182
5	55	23	5	9	6	6	3	1	1	0	0	114
5	86	31	1	3	3	2	2	1	3	1	2	140
115	698	271	16	26	20	20	18	10	14	9	8	1225
						WEST LEG						
15	106	11	0	2	1	2	2	1	0	0	5	145
12	113	17	2	0	1	0	0	3	1	1	1	151
14	139	32	0	0	1	0	1	4	1	3	1	196
9	131	18	0	3	0	3	4	3	3	3	3	180
17	111	27	0	0	3	1	1	0	0	0	0	160
13	157	27	2	2	0	3	2	2	1	1	2	212
8	118	11	0	1	2	1	0	0	0	0	0	141
6	116	17	2	5	2	1	2	5	2	6	3	167
94	991	160	6	13	10	11	12	18	8	14	15	1352

Prepared by Newport Traffic Studies



Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	65	610	85	35	290	80	60	355	75	220	635	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.98		1.00	0.97		1.00	0.97		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1570	3280		1388	3085		1570	3267		1641	3372	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1570	3280		1388	3085		1570	3267		1641	3372	
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	77	726	101	42	345	95	71	423	89	262	756	65
RTOR Reduction (vph)	0	16	0	0	37	0	0	28	0	0	10	0
Lane Group Flow (vph)	77	811	0	42	403	0	71	484	0	262	811	0
Heavy Vehicles (%)	15%	5%	30%	30%	10%	25%	15%	5%	20%	10%	5%	15%
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases												
Actuated Green, G (s)	3.1	19.8		2.3	19.0		3.8	14.9		11.1	22.2	
Effective Green, g (s)	3.1	19.8		2.3	19.0		3.8	14.9		11.1	22.2	
Actuated g/C Ratio	0.05	0.31		0.04	0.30		0.06	0.23		0.17	0.35	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	76	1013		50	914		93	759		284	1168	
v/s Ratio Prot	c0.05	c0.25		0.03	0.13		0.05	0.15		c0.16	c0.24	
v/s Ratio Perm												
v/c Ratio	1.01	0.80		0.84	0.44		0.76	0.64		0.92	0.69	
Uniform Delay, d1	30.5	20.3		30.7	18.2		29.7	22.2		26.1	18.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	106.9	6.6		70.9	1.5		30.3	1.8		33.5	1.8	
Delay (s)	137.4	27.0		101.6	19.8		60.0	23.9		59.6	19.8	
Level of Service	F	C		F	B		E	C		E	B	
Approach Delay (s)		36.4			26.9			28.3			29.5	
Approach LOS		D			C			C			C	

Intersection Summary			
HCM Average Control Delay	30.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	64.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	60.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
50: Sheldon St & San Fernando Rd

7/31/2013

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	65	335	45	50	375	95	60	320	40	125	320	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.98		1.00	0.97		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3259		1570	3334		1805	3381		1719	3110	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1719	3259		1570	3334		1805	3381		1719	3110	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	67	345	46	52	387	98	62	330	41	129	330	57
RTOR Reduction (vph)	0	16	0	0	34	0	0	17	0	0	24	0
Lane Group Flow (vph)	67	375	0	52	451	0	62	354	0	129	363	0
Heavy Vehicles (%)	5%	10%	0%	15%	5%	5%	0%	5%	5%	5%	15%	5%
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases												
Actuated Green, G (s)	2.1	17.9		2.1	17.9		3.1	11.6		5.2	13.7	
Effective Green, g (s)	2.1	17.9		2.1	17.9		3.1	11.6		5.2	13.7	
Actuated g/C Ratio	0.04	0.34		0.04	0.34		0.06	0.22		0.10	0.26	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	68	1105		62	1130		106	743		169	807	
v/s Ratio Prot	c0.04	0.12		0.03	c0.14		0.03	0.10		c0.08	c0.12	
v/s Ratio Perm												
v/c Ratio	0.99	0.34		0.84	0.40		0.58	0.48		0.76	0.45	
Uniform Delay, d1	25.3	13.0		25.2	13.3		24.2	18.0		23.2	16.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	103.3	0.8		60.1	1.1		8.0	0.5		18.3	0.4	
Delay (s)	128.7	13.9		85.3	14.4		32.2	18.4		41.5	16.8	
Level of Service	F	B		F	B		C	B		D	B	
Approach Delay (s)		30.7			21.3			20.4			23.0	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	23.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	52.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	47.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	75	595	30	115	975	160	125	560	65	165	405	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.99		1.00	0.98		1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1444	3352		1719	3343		1570	3335		1570	3215	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1444	3352		1719	3343		1570	3335		1570	3215	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	82	654	33	126	1071	176	137	615	71	181	445	110
RTOR Reduction (vph)	0	5	0	0	18	0	0	12	0	0	29	0
Lane Group Flow (vph)	82	682	0	126	1229	0	137	674	0	181	526	0
Heavy Vehicles (%)	25%	5%	45%	5%	5%	10%	15%	5%	20%	15%	5%	25%
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases												
Actuated Green, G (s)	5.0	26.5		8.3	29.8		8.7	16.0		9.0	16.3	
Effective Green, g (s)	5.0	26.5		8.3	29.8		8.7	16.0		9.0	16.3	
Actuated g/C Ratio	0.07	0.35		0.11	0.39		0.11	0.21		0.12	0.22	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	95	1172		188	1314		180	704		186	691	
v/s Ratio Prot	0.06	0.20		c0.07	c0.37		0.09	c0.20		c0.12	0.16	
v/s Ratio Perm												
v/c Ratio	0.86	0.58		0.67	0.94		0.76	0.96		0.97	0.76	
Uniform Delay, d1	35.1	20.1		32.4	22.1		32.5	29.6		33.3	27.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	50.8	2.1		9.0	13.6		17.1	23.7		57.8	5.0	
Delay (s)	85.9	22.2		41.5	35.6		49.7	53.3		91.0	32.9	
Level of Service	F	C		D	D		D	D		F	C	
Approach Delay (s)		29.0			36.2			52.7			47.2	
Approach LOS		C			D			D			D	

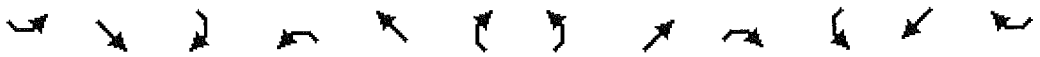
Intersection Summary			
HCM Average Control Delay	40.5	HCM Level of Service	D
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	75.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	76.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	65	660	85	35	340	80	60	355	75	220	635	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.98		1.00	0.97		1.00	0.97		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1570	3111		1388	2843		1570	3267		1641	3372	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1570	3111		1388	2843		1570	3267		1641	3372	
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	77	786	101	42	405	95	71	423	89	262	756	65
RTOR Reduction (vph)	0	13	0	0	28	0	0	26	0	0	9	0
Lane Group Flow (vph)	77	874	0	42	472	0	71	486	0	262	812	0
Heavy Vehicles (%)	15%	12%	30%	30%	23%	25%	15%	5%	20%	10%	5%	15%
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases												
Actuated Green, G (s)	3.8	22.8		2.3	21.3		3.8	15.1		12.6	23.9	
Effective Green, g (s)	3.8	22.8		2.3	21.3		3.8	15.1		12.6	23.9	
Actuated g/C Ratio	0.06	0.33		0.03	0.31		0.06	0.22		0.18	0.35	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	87	1031		46	880		87	717		301	1171	
v/s Ratio Prot	c0.05	c0.28		0.03	0.17		0.05	0.15		c0.16	c0.24	
v/s Ratio Perm												
v/c Ratio	0.89	0.85		0.91	0.54		0.82	0.68		0.87	0.69	
Uniform Delay, d1	32.3	21.4		33.2	19.7		32.2	24.6		27.3	19.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	59.7	8.6		99.4	2.3		42.3	2.6		22.9	1.8	
Delay (s)	92.0	30.0		132.5	22.0		74.4	27.2		50.2	21.1	
Level of Service	F	C		F	C		E	C		D	C	
Approach Delay (s)		34.9			30.6			32.9			28.1	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	31.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	68.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	62.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	65	385	45	50	425	95	60	320	40	125	320	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.98		1.00	0.97		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	2969		1570	3080		1805	3381		1719	3110	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1719	2969		1570	3080		1805	3381		1719	3110	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	67	397	46	52	438	98	62	330	41	129	330	57
RTOR Reduction (vph)	0	14	0	0	30	0	0	17	0	0	24	0
Lane Group Flow (vph)	67	429	0	52	506	0	62	354	0	129	363	0
Heavy Vehicles (%)	5%	22%	0%	15%	16%	5%	0%	5%	5%	5%	15%	5%
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases												
Actuated Green, G (s)	2.1	17.9		2.1	17.9		3.1	11.6		5.2	13.7	
Effective Green, g (s)	2.1	17.9		2.1	17.9		3.1	11.6		5.2	13.7	
Actuated g/C Ratio	0.04	0.34		0.04	0.34		0.06	0.22		0.10	0.26	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	68	1007		62	1044		106	743		169	807	
v/s Ratio Prot	c0.04	0.14		0.03	c0.16		0.03	0.10		c0.08	c0.12	
v/s Ratio Perm												
v/c Ratio	0.99	0.43		0.84	0.48		0.58	0.48		0.76	0.45	
Uniform Delay, d1	25.3	13.5		25.2	13.8		24.2	18.0		23.2	16.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	103.3	1.3		60.1	1.6		8.0	0.5		18.3	0.4	
Delay (s)	128.7	14.8		85.3	15.4		32.2	18.4		41.5	16.8	
Level of Service	F	B		F	B		C	B		D	B	
Approach Delay (s)		29.8			21.6			20.4			23.0	
Approach LOS		C			C			C			C	

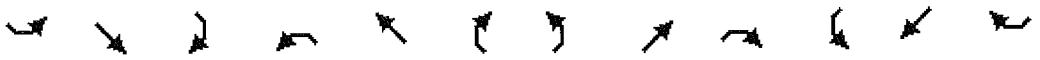
Intersection Summary			
HCM Average Control Delay	23.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	52.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	48.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	75	645	30	115	1025	160	125	560	65	165	405	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.99		1.00	0.98		1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1444	3160		1719	3215		1570	3335		1570	3215	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1444	3160		1719	3215		1570	3335		1570	3215	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	82	709	33	126	1126	176	137	615	71	181	445	110
RTOR Reduction (vph)	0	4	0	0	14	0	0	10	0	0	24	0
Lane Group Flow (vph)	82	738	0	126	1288	0	137	676	0	181	531	0
Heavy Vehicles (%)	25%	12%	45%	5%	10%	10%	15%	5%	20%	15%	5%	25%
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases												
Actuated Green, G (s)	6.0	34.0		11.0	39.0		10.5	18.0		11.0	18.5	
Effective Green, g (s)	6.0	34.0		11.0	39.0		10.5	18.0		11.0	18.5	
Actuated g/C Ratio	0.07	0.38		0.12	0.43		0.12	0.20		0.12	0.21	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	96	1194		210	1393		183	667		192	661	
v/s Ratio Prot	c0.06	0.23		0.07	c0.40		0.09	c0.20		c0.12	0.17	
v/s Ratio Perm												
v/c Ratio	0.85	0.62		0.60	0.92		0.75	1.01		0.94	0.80	
Uniform Delay, d1	41.6	22.7		37.4	24.1		38.5	36.0		39.2	34.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	48.1	2.4		4.8	11.8		15.4	38.4		48.4	7.0	
Delay (s)	89.7	25.1		42.2	35.9		53.8	74.4		87.6	41.0	
Level of Service	F	C		D	D		D	E		F	D	
Approach Delay (s)		31.6			36.5			71.0			52.5	
Approach LOS		C			D			E			D	

Intersection Summary			
HCM Average Control Delay	46.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	77.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	70	720	95	40	375	85	65	385	80	240	690	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.98		1.00	0.97		1.00	0.97		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1570	3109		1388	2845		1570	3269		1641	3371	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1570	3109		1388	2845		1570	3269		1641	3371	
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	83	857	113	48	446	101	77	458	95	286	821	71
RTOR Reduction (vph)	0	13	0	0	26	0	0	24	0	0	9	0
Lane Group Flow (vph)	83	957	0	48	521	0	77	529	0	286	883	0
Heavy Vehicles (%)	15%	12%	30%	30%	23%	25%	15%	5%	20%	10%	5%	15%
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases												
Actuated Green, G (s)	5.4	25.1		3.1	22.8		4.6	15.9		14.1	25.4	
Effective Green, g (s)	5.4	25.1		3.1	22.8		4.6	15.9		14.1	25.4	
Actuated g/C Ratio	0.07	0.34		0.04	0.31		0.06	0.21		0.19	0.34	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	114	1052		58	874		97	701		312	1154	
v/s Ratio Prot	c0.05	c0.31		0.03	0.18		0.05	0.16		c0.17	c0.26	
v/s Ratio Perm												
v/c Ratio	0.73	0.91		0.83	0.60		0.79	0.76		0.92	0.77	
Uniform Delay, d1	33.7	23.5		35.3	21.8		34.3	27.3		29.5	21.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	20.6	13.0		59.9	3.0		34.6	4.6		30.1	3.1	
Delay (s)	54.2	36.5		95.2	24.8		69.0	32.0		59.6	24.8	
Level of Service	D	D		F	C		E	C		E	C	
Approach Delay (s)		37.9			30.5			36.5			33.3	
Approach LOS		D			C			D			C	

Intersection Summary			
HCM Average Control Delay	34.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	74.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	66.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
50: Sheldon St & San Fernando Rd

7/31/2013

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	70	420	50	55	465	105	65	350	45	135	350	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.98		1.00	0.97		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	2969		1570	3080		1805	3380		1719	3110	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1719	2969		1570	3080		1805	3380		1719	3110	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	72	433	52	57	479	108	67	361	46	139	361	62
RTOR Reduction (vph)	0	14	0	0	30	0	0	17	0	0	24	0
Lane Group Flow (vph)	72	471	0	57	557	0	67	390	0	139	399	0
Heavy Vehicles (%)	5%	22%	0%	15%	16%	5%	0%	5%	5%	5%	15%	5%
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases												
Actuated Green, G (s)	2.9	19.5		2.2	18.8		3.2	12.4		5.1	14.3	
Effective Green, g (s)	2.9	19.5		2.2	18.8		3.2	12.4		5.1	14.3	
Actuated g/C Ratio	0.05	0.35		0.04	0.34		0.06	0.22		0.09	0.26	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	90	1049		63	1049		105	759		159	806	
v/s Ratio Prot	c0.04	0.16		0.04	c0.18		0.04	0.12		c0.08	c0.13	
v/s Ratio Perm												
v/c Ratio	0.80	0.45		0.90	0.53		0.64	0.51		0.87	0.50	
Uniform Delay, d1	25.9	13.7		26.4	14.7		25.4	18.8		24.7	17.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	38.2	1.4		79.7	1.9		12.0	0.6		37.5	0.5	
Delay (s)	64.1	15.1		106.1	16.6		37.5	19.3		62.2	17.9	
Level of Service	E	B		F	B		D	B		E	B	
Approach Delay (s)		21.4			24.5			21.9			28.8	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	24.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	55.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	52.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	80	705	35	125	1115	175	135	610	70	180	440	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.99		1.00	0.98		1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1444	3157		1719	3215		1570	3336		1570	3213	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1444	3157		1719	3215		1570	3336		1570	3213	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	88	775	38	137	1225	192	148	670	77	198	484	121
RTOR Reduction (vph)	0	4	0	0	14	0	0	9	0	0	25	0
Lane Group Flow (vph)	88	809	0	137	1403	0	148	738	0	198	580	0
Heavy Vehicles (%)	25%	12%	45%	5%	10%	10%	15%	5%	20%	15%	5%	25%
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases												
Actuated Green, G (s)	6.0	34.4		9.6	38.0		10.0	19.0		11.0	20.0	
Effective Green, g (s)	6.0	34.4		9.6	38.0		10.0	19.0		11.0	20.0	
Actuated g/C Ratio	0.07	0.38		0.11	0.42		0.11	0.21		0.12	0.22	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	96	1207		183	1357		174	704		192	714	
v/s Ratio Prot	0.06	0.26		c0.08	c0.44		0.09	c0.22		c0.13	0.18	
v/s Ratio Perm												
v/c Ratio	0.92	0.67		0.75	1.03		0.85	1.05		1.03	0.81	
Uniform Delay, d1	41.8	23.1		39.0	26.0		39.3	35.5		39.5	33.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	64.7	3.0		15.4	33.6		30.7	47.1		73.4	7.0	
Delay (s)	106.5	26.1		54.4	59.6		70.0	82.6		112.9	40.2	
Level of Service	F	C		D	E		E	F		F	D	
Approach Delay (s)		33.9			59.2			80.5			58.1	
Approach LOS		C			E			F			E	

Intersection Summary			
HCM Average Control Delay	58.1	HCM Level of Service	E
HCM Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	83.2%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

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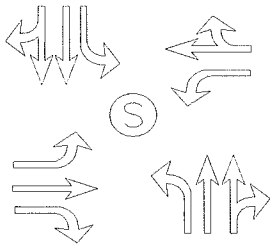
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : BRANFORD STREET
N/S STREET : SAN FERNANDO ROAD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 51
ROUTE 8C

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BRANFORD STREET						
EB LEFT	35	5%		35	5	40
EB THRU	300	5%		300	25	325
EB RIGHT	105	39%	**50**	155	15	170
WB LEFT	55	20%		55	5	60
WB THRU	145	5%		145	15	160
WB RIGHT	20	5%		20	5	25
SAN FERNANDO ROAD						
NB LEFT	50	60%	**50**	100	10	110
NB THRU	240	5%		240	20	260
NB RIGHT	90	15%		90	10	100
SB LEFT	40	10%		40	5	45
SB THRU	635	5%		635	55	690
SB RIGHT	70	5%		70	5	75
TOTALS	**1785**		**100**	**1885**	**175**	**2060**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : BRANFORD STREET
N/S STREET : SAN FERNANDO ROAD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 51
ROUTE 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BRANFORD STREET						
EB LEFT	35	10%		35	5	40
EB THRU	180	10%		180	15	195
EB RIGHT	45	62%	**50**	95	10	105
WB LEFT	70	10%		70	5	75
WB THRU	150	15%		150	15	165
WB RIGHT	45	15%		45	5	50
SAN FERNANDO ROAD						
NB LEFT	50	58%	**50**	100	10	110
NB THRU	345	10%		345	30	375
NB RIGHT	70	25%		70	5	75
SB LEFT	65	5%		65	5	70
SB THRU	330	5%		330	30	360
SB RIGHT	55	5%		55	5	60
TOTALS	**1440**		**100**	**1540**	**140**	**1680**

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TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : BRANFORD STREET
N/S STREET : SAN FERNANDO ROAD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 51
ROUTE 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BRANFORD STREET						
EB LEFT	90	15%		90	10	100
EB THRU	385	15%		385	35	420
EB RIGHT	105	36%	**50**	155	15	170
WB LEFT	125	10%		125	10	135
WB THRU	285	15%		285	25	310
WB RIGHT	105	5%		105	10	115
SAN FERNANDO ROAD						
NB LEFT	170	27%	**50**	220	20	240
NB THRU	820	5%		820	75	895
NB RIGHT	130	5%		130	10	140
SB LEFT	100	10%		100	10	110
SB THRU	530	10%		530	50	580
SB RIGHT	115	5%		115	10	125
TOTALS	**2960**		**100**	**3060**	**280**	**3340**

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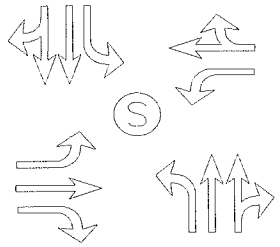
INTERSECTION 51
ROUTE 8C

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								

BRANFORD STREET

EB LEFT	33	2	6	40	**0**	40	5	45
EB THRU	283	15	45	330	**0**	330	30	360
EB RIGHT	94	11	33	125	**150**	275	25	300
WB LEFT	44	12	36	80	**0**	80	5	85
WB THRU	134	10	30	165	**0**	165	15	180
WB RIGHT	18	1	3	20	**0**	20	5	25

SAN FERNANDO ROAD

NB LEFT	42	10	30	70	**150**	220	20	240
NB THRU	226	16	48	275	**0**	275	25	300
NB RIGHT	79	12	36	115	**0**	115	10	125
SB LEFT	36	4	12	50	**0**	50	5	55
SB THRU	596	39	117	715	**0**	715	65	780
SB RIGHT	65	3	9	75	**0**	75	5	80
TOTALS	**1650**				**300**	**2360**	**215**	**2575**

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TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : BRANFORD STREET
N/S STREET : SAN FERNANDO ROAD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 51
ROUTE 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BRANFORD STREET								
EB LEFT	32	4	12	45	**0**	45	5	50
EB THRU	157	21	63	220	**0**	220	20	240
EB RIGHT	35	10	30	65	**150**	215	20	235
WB LEFT	63	6	18	80	**0**	80	5	85
WB THRU	132	19	57	190	**0**	190	15	205
WB RIGHT	37	6	18	55	**0**	55	5	60
SAN FERNANDO ROAD								
NB LEFT	42	8	24	65	**150**	215	20	235
NB THRU	312	35	105	415	**0**	415	35	450
NB RIGHT	55	16	48	105	**0**	105	10	115
SB LEFT	63	3	9	70	**0**	70	5	75
SB THRU	312	19	57	370	**0**	370	35	405
SB RIGHT	54	3	9	65	**0**	65	5	70
TOTALS	**1294**				**300**	**2045**	**180**	**2225**

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TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : BRANFORD STREET
N/S STREET : SAN FERNANDO ROAD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 51
ROUTE 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BRANFORD STREET								
EB LEFT	77	14	42	120	**0**	120	10	130
EB THRU	336	51	153	490	**0**	490	45	535
EB RIGHT	99	4	12	110	**150**	260	25	285
WB LEFT	109	14	42	150	**0**	150	15	165
WB THRU	241	46	138	380	**0**	380	35	415
WB RIGHT	101	2	6	105	**0**	105	10	115
SAN FERNANDO ROAD								
NB LEFT	164	7	21	185	**150**	335	30	365
NB THRU	772	50	150	920	**0**	920	85	1005
NB RIGHT	129	3	9	140	**0**	140	15	155
SB LEFT	89	10	30	120	**0**	120	10	130
SB THRU	483	45	135	620	**0**	620	55	675
SB RIGHT	112	3	9	120	**0**	120	10	130
TOTALS	**2712**				**300**	**3760**	**345**	**4105**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: SAN FERNANDO
EAST-WEST STREET: BRANFORD
JURISDICTION: LA

DATE: 05-31-12

PEAK HOUR: 07:30AM

NORTH LEG

TOTAL: 743

Rt	Thru	Lt	
68	635	40	Total
18	149	6	1st
18	193	15	2nd
14	170	11	3rd
18	123	8	4th

EAST LEG TOTAL: 219

	1st	2nd	3rd	4th	Total
Rt	6	6	3	4	19
Thru	33	59	21	31	144
Lt	16	14	12	14	56

WEST LEG TOTAL: 438

Total	1st	2nd	3rd	4th	
35	3	13	12	7	Lt
298	48	105	79	66	Thru
105	21	43	23	18	Rt

PEAK HOUR FACTORS

NORTH LEG = 0.82
SOUTH LEG = 0.74
EAST LEG = 0.69
WEST LEG = 0.68

ALL LEGS = 0.75

SOUTH LEG

TOTAL: 385

	Lt	Thru	Rt
1st	16	45	14
2nd	19	73	38
3rd	9	67	21
4th	8	57	18
Total	52	242	91

HOUR TOTAL: 1,785

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: SAN FERNANDO

EAST-WEST STREET: BRANFORD

TIME: 07:00AM-08:00AM DATE: 05-31-12

NORTH LEG

Rt	Thru	Lt	
61	580	31	Total
11	109	5	1st
14	129	5	2nd
18	149	6	3rd
18	193	15	4th

	1st	2nd	3rd	4th	Total
Rt	5	5	6	6	22
Thru	17	31	33	59	140
Lt	13	13	16	14	56

Total	1st	2nd	3rd	4th	
24	2	6	3	13	Lt
214	22	39	48	105	Thru
99	16	19	21	43	Rt

	Lt	Thru	Rt
1st	9	39	12
2nd	13	44	12
3rd	16	45	14
4th	19	73	38
Total	57	201	76

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: SAN FERNANDO

EAST-WEST STREET: BRANFORD

TIME: 08:00AM-09:00AM DATE: 05-31-12

NORTH LEG

48	521	40	Total
14	170	11	1st
18	123	8	2nd
9	115	9	3rd
7	113	12	4th
Rt	Thru	Lt	

Rt	3	4	8	11	26
Thru	21	31	42	31	125
Lt	12	14	13	19	58
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
38	12	7	7	12	Lt
244	79	66	39	60	Thru
80	23	18	18	21	Rt

	Lt	Thru	Rt
1st	9	67	21
2nd	8	57	18
3rd	12	50	21
4th	8	57	15
Total	37	231	75

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : SAN FERNANDO LA

EAST-WEST STREET : BRANFORD 05-31-12

BEGINNING TIME : 07:00AM PM = 7:30 AM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
					NORTH LEG							
9	103	4	1	4	1	0	1	0	1	1	0	125
14	123	5	0	5	0	0	0	0	0	1	0	148
18	140	5	0	5	1	0	1	0	0	3	0	173
17	184	15	1	6	0	0	1	0	0	2	0	226
12	161	8	1	7	0	0	2	2	1	0	1	195
18	111	8	0	7	0	0	2	0	0	3	0	149
9	103	5	0	6	2	0	4	2	0	2	0	133
7	101	12	0	8	0	0	1	0	0	3	0	132
104	1026	62	3	48	4	0	12	4	2	15	1	1281
					SOUTH LEG							
11	36	8	1	2	1	0	0	0	0	1	0	60
10	38	13	2	4	0	0	1	0	0	1	0	69
13	43	14	0	2	1	1	0	1	0	0	0	75
34	70	18	3	3	0	0	0	0	1	0	1	130
16	59	5	2	6	2	3	1	1	0	1	1	97
16	54	5	0	3	3	1	0	0	1	0	0	83
16	45	7	2	4	5	3	0	0	0	1	0	83
9	43	3	3	9	5	2	2	0	1	3	0	80
125	388	73	13	33	17	10	4	2	3	7	2	677
					EAST LEG							
5	15	11	0	1	1	0	0	1	0	1	0	35
5	28	10	0	2	2	0	1	1	0	0	0	49
6	31	15	0	2	0	0	0	1	0	0	0	55
5	58	13	1	1	0	0	0	1	0	0	0	79
3	15	6	0	2	4	0	1	1	0	3	1	36
4	30	10	0	0	3	0	0	1	0	1	0	49
5	39	11	2	1	0	1	0	1	0	2	1	63
6	22	14	3	4	3	1	4	1	1	1	1	61
39	238	90	6	13	13	2	6	8	1	8	3	427
					WEST LEG							
16	19	2	0	2	0	0	1	0	0	0	0	40
19	36	6	0	1	0	0	0	0	0	2	0	64
20	47	3	0	1	0	0	0	0	1	0	0	72
40	103	12	2	1	1	1	1	0	0	0	0	161
21	73	11	2	2	0	0	0	0	0	4	1	114
13	60	7	3	1	0	2	0	0	0	5	0	91
12	34	5	2	1	2	3	3	0	1	1	0	64
17	50	9	2	5	3	2	4	0	0	1	0	93
158	422	55	11	14	6	8	9	0	2	13	1	699

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: SAN FERNANDO
EAST-WEST STREET: BRANFORD
JURISDICTION: LA

DATE: 05-31-12

PEAK HOUR: 12:30PM

NORTH LEG

TOTAL: 454

Rt	Thru	Lt	
57	331	66	Total
16	101	22	1st
13	66	14	2nd
16	83	16	3rd
12	81	14	4th

EAST LEG TOTAL: 263

	1st	2nd	3rd	4th	Total
Rt	10	9	17	7	43
Thru	33	30	40	48	151
Lt	13	12	20	24	69

WEST LEG TOTAL: 259

Total	1st	2nd	3rd	4th	
36	8	12	9	7	Lt
178	40	44	42	52	Thru
45	10	6	17	12	Rt

PEAK HOUR FACTORS

NORTH LEG = 0.82
SOUTH LEG = 0.94
EAST LEG = 0.83
WEST LEG = 0.91

ALL LEGS = 0.95

SOUTH LEG

TOTAL: 468

	Lt	Thru	Rt
1st	12	88	16
2nd	13	91	20
3rd	13	92	15
4th	12	76	20
Total	50	347	71

HOUR TOTAL: 1,444

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: SAN FERNANDO

EAST-WEST STREET: BRANFORD

TIME: 12:00PM-01:00PM DATE: 05-31-12

NORTH LEG

Rt	Thru	Lt	
65	312	68	Total
17	68	13	1st
19	77	19	2nd
16	101	22	3rd
13	66	14	4th

	1st	2nd	3rd	4th	Total
Rt	13	14	10	9	46
Thru	48	35	33	30	146
Lt	20	21	13	12	66

Total	1st	2nd	3rd	4th	
33	7	6	8	12	Lt
171	36	51	40	44	Thru
32	10	6	10	6	Rt

	Lt	Thru	Rt
1st	19	78	16
2nd	12	85	16
3rd	12	88	16
4th	13	91	20
Total	56	342	68

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: SAN FERNANDO

EAST-WEST STREET: BRANFORD

TIME: 01:00PM-02:00PM DATE: 05-31-12

NORTH LEG

Rt	Thru	Lt	
65	298	45	Total
16	83	16	1st
12	81	14	2nd
21	82	8	3rd
16	52	7	4th

	1st	2nd	3rd	4th	Total
Rt	17	7	12	3	39
Thru	40	48	41	24	153
Lt	20	24	16	14	74

Total	1st	2nd	3rd	4th	
38	9	7	14	8	Lt
187	42	52	46	47	Thru
41	17	12	4	8	Rt

	Lt	Thru	Rt
1st	13	92	15
2nd	12	76	20
3rd	10	91	11
4th	11	70	19
Total	46	329	65

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : SAN FERNANDO LA

EAST-WEST STREET : BRANFORD 05-31-12

BEGINNING TIME : 12:00PM PM : 12:30PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
14	62	10	3	5	2	0	0	1	0	1	0	98
17	72	19	2	3	0	0	2	0	0	0	0	115
15	98	21	1	3	0	0	0	1	0	0	0	139
11	61	14	1	4	0	1	1	0	0	0	0	93
16	81	15	0	1	1	0	0	0	0	1	0	115
12	72	13	0	7	0	0	0	0	0	2	1	107
20	74	7	1	6	0	0	0	0	0	2	1	111
15	43	5	1	7	1	0	1	0	0	1	1	75
120	563	104	9	36	4	1	4	2	0	7	3	853
						SOUTH LEG						
11	71	15	3	5	2	1	0	1	1	2	1	113
14	80	11	2	1	1	0	0	0	0	4	0	113
9	76	9	3	9	2	1	3	0	3	0	1	116
17	87	10	2	2	3	1	0	0	0	2	0	124
12	81	12	3	9	0	0	2	0	0	0	1	120
17	68	11	2	7	1	0	0	0	1	1	0	108
9	86	8	2	5	0	0	0	0	0	0	2	112
17	64	7	1	5	4	0	0	0	1	1	0	100
106	613	83	18	43	13	3	5	1	6	10	5	906
						EAST LEG						
12	42	16	1	3	3	0	1	0	0	2	1	81
12	28	16	0	3	1	1	1	3	1	3	1	70
10	29	13	0	2	0	0	1	0	0	1	0	56
9	30	10	0	0	1	0	0	0	0	0	1	51
15	35	16	2	4	2	0	1	1	0	0	1	77
3	38	24	2	6	0	0	3	0	2	1	0	79
12	34	14	0	2	0	0	3	0	0	2	2	69
3	20	11	0	3	1	0	0	1	0	1	1	41
76	256	120	5	23	8	1	10	5	3	10	7	524
						WEST LEG						
7	26	7	3	5	0	0	2	0	0	3	0	53
5	40	5	1	5	1	0	4	0	0	2	0	63
8	33	5	0	4	3	1	1	0	1	2	0	58
3	40	11	3	0	1	0	3	0	0	1	0	62
13	37	9	3	4	0	1	1	0	0	0	0	68
11	47	7	0	3	0	1	1	0	0	1	0	71
3	39	12	1	4	2	0	1	0	0	2	0	64
6	35	8	2	5	0	0	7	0	0	0	0	63
56	297	64	13	30	7	3	20	0	1	11	0	502

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: SAN FERNANDO
EAST-WEST STREET: BRANFORD
JURISDICTION: LA

DATE: 05-31-12

PEAK HOUR: 04:45PM

NORTH LEG

TOTAL: 742

Rt	Thru	Lt	
115	528	99	Total
29	168	35	1st
27	95	13	2nd
26	105	15	3rd
33	160	36	4th

EAST LEG TOTAL: 513

	1st	2nd	3rd	4th	Total
Rt	43	14	17	29	103
Thru	51	74	71	91	287
Lt	55	13	19	36	123

WEST LEG TOTAL: 581

Total	1st	2nd	3rd	4th	
91	33	12	11	35	Lt
387	107	58	80	142	Thru
103	49	12	11	31	Rt

SOUTH LEG

TOTAL: 1,125

	Lt	Thru	Rt
1st	19	259	24
2nd	45	164	27
3rd	37	190	21
4th	70	209	60
Total	171	822	132

PEAK HOUR FACTORS

NORTH LEG = 0.80
SOUTH LEG = 0.83
EAST LEG = 0.82
WEST LEG = 0.70

ALL LEGS = 0.79

HOUR TOTAL: 2,961

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: SAN FERNANDO

EAST-WEST STREET: BRANFORD

TIME: 04:00PM-05:00PM DATE: 05-31-12

NORTH LEG

Rt	Thru	Lt	
87	518	82	Total
17	94	13	1st
26	136	25	2nd
15	120	9	3rd
29	168	35	4th

	1st	2nd	3rd	4th	Total
Rt	6	20	17	43	86
Thru	67	53	77	51	248
Lt	26	37	32	55	150

Total	1st	2nd	3rd	4th	
80	12	15	20	33	Lt
313	62	92	52	107	Thru
108	13	35	11	49	Rt

	Lt	Thru	Rt
1st	17	188	26
2nd	29	246	26
3rd	23	247	28
4th	19	259	24
Total	88	940	104

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: SAN FERNANDO

EAST-WEST STREET: BRANFORD

TIME: 05:00PM-06:00PM DATE: 05-31-12

NORTH LEG

Rt	Thru	Lt	
106	453	70	Total
27	95	13	1st
26	105	15	2nd
33	160	36	3rd
20	93	6	4th

	1st	2nd	3rd	4th	Total
Rt	14	17	29	8	68
Thru	74	71	91	60	296
Lt	13	19	36	7	75

Total	1st	2nd	3rd	4th	
72	12	11	35	14	Lt
328	58	80	142	48	Thru
66	12	11	31	12	Rt

	Lt	Thru	Rt
1st	45	164	27
2nd	37	190	21
3rd	70	209	60
4th	41	155	22
Total	193	718	130

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : SAN FERNANDO LA

EAST-WEST STREET : BRANFORD 05-31-12

BEGINNING TIME : 04:00PM PM - 4:45 PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
14	76	9	2	5	0	0	6	1	1	7	3	124
26	124	24	0	3	0	0	2	1	0	7	0	187
13	100	7	2	3	0	0	7	0	0	10	2	144
28	154	32	0	5	0	0	4	1	1	5	2	232
27	85	11	0	3	1	0	4	0	0	3	1	135
25	95	12	0	5	1	0	3	2	1	2	0	146
32	149	34	0	2	0	0	5	1	1	4	1	229
20	84	5	0	3	1	0	3	0	0	3	0	119
185	867	134	4	29	3	0	34	6	4	41	9	1316
						SOUTH LEG						
26	176	16	0	2	0	0	5	0	0	5	1	231
25	235	26	0	4	0	1	4	1	0	3	2	301
27	231	21	0	6	0	0	5	1	1	5	1	298
24	243	18	0	3	0	0	6	0	0	7	1	302
25	153	42	1	2	1	1	4	1	0	5	1	236
21	179	37	0	3	0	0	6	0	0	2	0	248
59	197	67	0	4	1	1	4	1	0	4	1	339
22	148	40	0	2	1	0	2	0	0	3	0	218
229	1562	267	1	26	3	3	36	4	1	34	7	2173
						EAST LEG						
6	59	26	0	2	0	0	2	0	0	4	0	99
20	40	37	0	3	0	0	5	0	0	5	0	110
17	60	32	0	7	0	0	4	0	0	6	0	126
41	38	50	0	5	2	2	5	2	0	3	1	149
14	65	10	0	3	1	0	2	0	0	4	2	101
17	63	17	0	2	1	0	3	0	0	3	1	107
29	75	32	0	5	2	0	6	2	0	5	0	156
7	50	7	0	3	0	1	3	0	0	4	0	75
151	450	211	0	30	6	3	30	4	0	34	4	923
						WEST LEG						
12	52	5	0	2	0	1	5	6	0	3	1	87
34	82	13	0	3	0	0	3	1	1	4	1	142
11	41	16	0	3	1	0	5	1	0	3	2	83
48	92	27	0	4	1	0	7	2	1	4	3	189
11	45	9	0	2	1	1	6	1	0	5	1	82
10	68	10	0	4	0	0	6	0	1	2	1	102
30	131	31	0	3	1	1	4	1	0	4	2	208
12	36	12	0	6	0	0	3	2	0	3	0	74
168	547	123	0	27	4	3	39	14	3	28	11	967

Prepared by Newport Traffic Studies

HCM Signalized Intersection Capacity Analysis
51: SAN FERNANDO RD & BRANFORD ST

7/31/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	35	300	105	55	145	20	50	240	90	40	635	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.96		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	1810	1468	1504	1776		1504	3214		1641	3387	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1719	1810	1468	1504	1776		1504	3214		1641	3387	
Peak-hour factor, PHF	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
Adj. Flow (vph)	47	400	140	73	193	27	67	320	120	53	847	93
RTOR Reduction (vph)	0	0	48	0	8	0	0	60	0	0	13	0
Lane Group Flow (vph)	47	400	92	73	212	0	67	380	0	53	927	0
Heavy Vehicles (%)	5%	5%	10%	20%	5%	5%	20%	5%	15%	10%	5%	5%
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2	3	1	6		3	8		7	4	
Permitted Phases			2									
Actuated Green, G (s)	2.7	16.1	19.0	2.9	16.3		2.9	20.4		2.7	20.2	
Effective Green, g (s)	2.7	16.1	19.0	2.9	16.3		2.9	20.4		2.7	20.2	
Actuated g/C Ratio	0.05	0.28	0.33	0.05	0.28		0.05	0.35		0.05	0.35	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	80	502	581	75	498		75	1128		76	1178	
v/s Ratio Prot	0.03	c0.22	0.01	c0.05	0.12		c0.04	0.12		0.03	c0.27	
v/s Ratio Perm			0.05									
v/c Ratio	0.59	0.80	0.16	0.97	0.43		0.89	0.34		0.70	0.79	
Uniform Delay, d1	27.2	19.5	13.9	27.6	17.1		27.4	13.9		27.3	17.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	10.6	8.6	0.1	94.2	0.6		68.3	0.8		24.3	3.5	
Delay (s)	37.7	28.0	14.0	121.8	17.7		95.8	14.7		51.6	20.6	
Level of Service	D	C	B	F	B		F	B		D	C	
Approach Delay (s)		25.5			43.6			25.4			22.2	
Approach LOS		C			D			C			C	

Intersection Summary			
HCM Average Control Delay	26.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	58.1	Sum of lost time (s)	16.0
Intersection Capacity Utilization	55.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
51: SAN FERNANDO RD & BRANFORD ST

7/31/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	35	180	45	70	150	45	50	345	70	65	330	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	0.97		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1641	1727	1346	1641	1595		1570	3126		1719	3364	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1641	1727	1346	1641	1595		1570	3126		1719	3364	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	37	189	47	74	158	47	53	363	74	68	347	58
RTOR Reduction (vph)	0	0	34	0	19	0	0	25	0	0	20	0
Lane Group Flow (vph)	37	189	13	74	186	0	53	412	0	68	385	0
Heavy Vehicles (%)	10%	10%	20%	10%	15%	15%	15%	10%	25%	5%	5%	5%
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2	3	1	6		3	8		7	4	
Permitted Phases			2									
Actuated Green, G (s)	1.6	11.3	13.8	3.0	12.7		2.5	17.4		2.5	17.4	
Effective Green, g (s)	1.6	11.3	13.8	3.0	12.7		2.5	17.4		2.5	17.4	
Actuated g/C Ratio	0.03	0.23	0.27	0.06	0.25		0.05	0.35		0.05	0.35	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	52	389	477	98	404		78	1084		86	1166	
v/s Ratio Prot	0.02	0.11	0.00	c0.05	c0.12		0.03	c0.13		c0.04	0.11	
v/s Ratio Perm			0.01									
v/c Ratio	0.71	0.49	0.03	0.76	0.46		0.68	0.38		0.79	0.33	
Uniform Delay, d1	24.1	16.9	13.3	23.2	15.9		23.5	12.3		23.6	12.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	36.8	1.0	0.0	27.6	0.8		21.0	1.0		37.6	0.2	
Delay (s)	60.9	17.9	13.3	50.9	16.7		44.5	13.4		61.2	12.3	
Level of Service	E	B	B	D	B		D	B		E	B	
Approach Delay (s)		22.9			25.8			16.7			19.3	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM Average Control Delay	20.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	50.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	42.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
51: SAN FERNANDO RD & BRANFORD ST

7/31/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	90	385	105	125	285	105	170	820	130	100	530	115
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.96		1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1570	1652	1538	1641	1623		1719	3367		1641	3220	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1570	1652	1538	1641	1623		1719	3367		1641	3220	
Peak-hour factor, PHF	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Adj. Flow (vph)	114	487	133	158	361	133	215	1038	165	127	671	146
RTOR Reduction (vph)	0	0	35	0	15	0	0	14	0	0	20	0
Lane Group Flow (vph)	114	487	98	158	479	0	215	1189	0	127	797	0
Heavy Vehicles (%)	15%	15%	5%	10%	15%	5%	5%	5%	5%	10%	10%	5%
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2	3	1	6		3	8		7	4	
Permitted Phases			2									
Actuated Green, G (s)	7.0	27.6	39.6	9.0	29.6		12.0	30.0		7.0	25.0	
Effective Green, g (s)	7.0	27.6	39.6	9.0	29.6		12.0	30.0		7.0	25.0	
Actuated g/C Ratio	0.08	0.31	0.44	0.10	0.33		0.13	0.33		0.08	0.28	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	123	509	748	165	536		230	1127		128	898	
v/s Ratio Prot	0.07	0.29	0.02	c0.10	c0.30		c0.13	c0.35		0.08	0.25	
v/s Ratio Perm			0.05									
v/c Ratio	0.93	0.96	0.13	0.96	0.89		0.93	1.06		0.99	0.89	
Uniform Delay, d1	41.0	30.4	14.8	40.1	28.5		38.4	29.8		41.3	31.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	58.3	28.9	0.1	56.9	17.2		41.3	42.6		76.9	12.6	
Delay (s)	99.4	59.4	14.9	97.0	45.7		79.8	72.4		118.1	43.6	
Level of Service	F	E	B	F	D		E	E		F	D	
Approach Delay (s)		57.5			58.1			73.5			53.6	
Approach LOS		E			E			E			D	

Intersection Summary			
HCM Average Control Delay	62.7	HCM Level of Service	E
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	89.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	72.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	40	635	70	100	240	90	35	300	155	55	145	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	0.96		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1641	3387		1128	3214		1719	1810	1162	1504	1776	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1641	3387		1128	3214		1719	1810	1162	1504	1776	
Peak-hour factor, PHF	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
Adj. Flow (vph)	53	847	93	133	320	120	47	400	207	73	193	27
RTOR Reduction (vph)	0	12	0	0	52	0	0	0	36	0	7	0
Lane Group Flow (vph)	53	928	0	133	388	0	47	400	171	73	213	0
Heavy Vehicles (%)	10%	5%	5%	60%	5%	15%	5%	5%	39%	20%	5%	5%
Turn Type	Prot	NA		Prot	NA		Prot	NA	pm+ov	Prot	NA	
Protected Phases	1	6		5	2		7	4	5	3	8	
Permitted Phases									4			
Actuated Green, G (s)	3.6	24.6		9.8	30.8		3.0	18.4	28.2	4.0	19.4	
Effective Green, g (s)	3.6	24.6		9.8	30.8		3.0	18.4	28.2	4.0	19.4	
Actuated g/C Ratio	0.05	0.34		0.13	0.42		0.04	0.25	0.39	0.05	0.27	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	81	1145		152	1360		71	457	514	83	473	
v/s Ratio Prot	0.03	c0.27		c0.12	0.12		0.03	c0.22	0.04	c0.05	0.12	
v/s Ratio Perm									0.10			
v/c Ratio	0.65	0.81		0.88	0.29		0.66	0.88	0.33	0.88	0.45	
Uniform Delay, d1	34.0	22.0		30.9	13.8		34.4	26.1	15.7	34.2	22.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	17.4	6.3		38.8	0.5		20.8	16.8	0.4	59.7	0.7	
Delay (s)	51.4	28.2		69.7	14.3		55.2	42.9	16.1	93.8	22.9	
Level of Service	D	C		E	B		E	D	B	F	C	
Approach Delay (s)		29.5			27.2			35.3			40.6	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM Average Control Delay	31.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	72.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	57.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	65	330	55	100	345	70	35	180	95	70	150	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	0.97		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1719	3364		1142	3126		1641	1727	997	1641	1595	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1719	3364		1142	3126		1641	1727	997	1641	1595	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	68	347	58	105	363	74	37	189	100	74	158	47
RTOR Reduction (vph)	0	19	0	0	23	0	0	0	71	0	19	0
Lane Group Flow (vph)	68	386	0	105	414	0	37	189	29	74	186	0
Heavy Vehicles (%)	5%	5%	5%	58%	10%	25%	10%	10%	62%	10%	15%	15%
Turn Type	Prot	NA		Prot	NA		Prot	NA	pm+ov	Prot	NA	
Protected Phases	1	6		5	2		7	4	5	3	8	
Permitted Phases									4			
Actuated Green, G (s)	3.3	22.0		5.9	24.6		1.4	10.7	16.6	3.0	12.3	
Effective Green, g (s)	3.3	22.0		5.9	24.6		1.4	10.7	16.6	3.0	12.3	
Actuated g/C Ratio	0.06	0.38		0.10	0.43		0.02	0.19	0.29	0.05	0.21	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	98	1285		117	1335		40	321	357	85	341	
v/s Ratio Prot	0.04	0.11		c0.09	c0.13		0.02	0.11	0.01	c0.05	c0.12	
v/s Ratio Perm									0.02			
v/c Ratio	0.69	0.30		0.90	0.31		0.92	0.59	0.08	0.87	0.55	
Uniform Delay, d1	26.7	12.4		25.6	10.9		28.0	21.4	14.9	27.1	20.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	19.2	0.6		52.1	0.6		112.0	2.8	0.1	57.0	1.8	
Delay (s)	45.8	13.0		77.7	11.5		140.1	24.2	15.0	84.1	21.9	
Level of Service	D	B		E	B		F	C	B	F	C	
Approach Delay (s)		17.7			24.3			34.5			38.4	
Approach LOS		B			C			C			D	

Intersection Summary			
HCM Average Control Delay	26.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	57.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	43.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	100	530	115	220	820	130	90	385	155	125	285	105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.97		1.00	0.98		1.00	1.00	0.85	1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1641	3220		1421	3367		1570	1652	1188	1641	1623	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1641	3220		1421	3367		1570	1652	1188	1641	1623	
Peak-hour factor, PHF	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Adj. Flow (vph)	127	671	146	278	1038	165	114	487	196	158	361	133
RTOR Reduction (vph)	0	20	0	0	14	0	0	0	28	0	14	0
Lane Group Flow (vph)	127	797	0	278	1189	0	114	487	168	158	480	0
Heavy Vehicles (%)	10%	10%	5%	27%	5%	5%	15%	15%	36%	10%	15%	5%
Turn Type	Prot	NA		Prot	NA		Prot	NA	pm+ov	Prot	NA	
Protected Phases	1	6		5	2		7	4	5	3	8	
Permitted Phases									4			
Actuated Green, G (s)	8.0	22.0		17.0	31.0		7.0	26.0	43.0	9.0	28.0	
Effective Green, g (s)	8.0	22.0		17.0	31.0		7.0	26.0	43.0	9.0	28.0	
Actuated g/C Ratio	0.09	0.24		0.19	0.34		0.08	0.29	0.48	0.10	0.31	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	146	787		268	1160		122	477	620	164	505	
v/s Ratio Prot	0.08	0.25		c0.20	c0.35		0.07	0.29	0.05	c0.10	c0.30	
v/s Ratio Perm									0.09			
v/c Ratio	0.87	1.01		1.04	1.02		0.93	1.02	0.27	0.96	0.95	
Uniform Delay, d1	40.5	34.0		36.5	29.5		41.3	32.0	14.1	40.3	30.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	38.6	35.1		65.0	32.9		60.9	46.6	0.2	59.0	27.5	
Delay (s)	79.0	69.1		101.5	62.4		102.2	78.6	14.3	99.3	57.8	
Level of Service	E	E		F	E		F	E	B	F	E	
Approach Delay (s)		70.5			69.7			66.2			67.8	
Approach LOS		E			E			E			E	

Intersection Summary			
HCM Average Control Delay	68.9	HCM Level of Service	E
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	72.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
51: BRANFORD ST & SAN FERNANDO RD

7/31/2013

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	45	690	75	110	260	100	40	325	170	60	160	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	0.96		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1641	3388		1128	3210		1719	1810	1162	1504	1779	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1641	3388		1128	3210		1719	1810	1162	1504	1779	
Peak-hour factor, PHF	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
Adj. Flow (vph)	60	920	100	147	347	133	53	433	227	80	213	27
RTOR Reduction (vph)	0	10	0	0	47	0	0	0	35	0	5	0
Lane Group Flow (vph)	60	1010	0	147	433	0	53	433	192	80	235	0
Heavy Vehicles (%)	10%	5%	5%	60%	5%	15%	5%	5%	39%	20%	5%	5%
Turn Type	Prot	NA		Prot	NA		Prot	NA	pm+ov	Prot	NA	
Protected Phases	1	6		5	2		7	4	5	3	8	
Permitted Phases									4			
Actuated Green, G (s)	4.2	29.6		11.0	36.4		3.6	21.6	32.6	5.0	23.0	
Effective Green, g (s)	4.2	29.6		11.0	36.4		3.6	21.6	32.6	5.0	23.0	
Actuated g/C Ratio	0.05	0.36		0.13	0.44		0.04	0.26	0.39	0.06	0.28	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	83	1205		149	1404		74	470	511	90	492	
v/s Ratio Prot	0.04	c0.30		c0.13	0.13		0.03	c0.24	0.05	c0.05	0.13	
v/s Ratio Perm									0.12			
v/c Ratio	0.72	0.84		0.99	0.31		0.72	0.92	0.38	0.89	0.48	
Uniform Delay, d1	38.9	24.6		36.0	15.2		39.3	30.0	18.0	38.8	25.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	26.5	7.0		69.1	0.6		27.9	23.5	0.5	59.2	0.7	
Delay (s)	65.4	31.6		105.1	15.8		67.2	53.5	18.5	98.0	25.8	
Level of Service	E	C		F	B		E	D	B	F	C	
Approach Delay (s)		33.5			36.7			43.4			43.9	
Approach LOS		C			D			D			D	

Intersection Summary			
HCM Average Control Delay	38.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	83.2	Sum of lost time (s)	16.0
Intersection Capacity Utilization	61.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
51: Branford St & San Fernando Rd

7/31/2013

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	70	360	60	110	375	75	40	195	105	75	165	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	0.98		1.00	1.00	0.85	1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1719	3365		1142	3129		1641	1727	997	1641	1594	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1719	3365		1142	3129		1641	1727	997	1641	1594	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	74	379	63	116	395	79	42	205	111	79	174	53
RTOR Reduction (vph)	0	20	0	0	25	0	0	0	74	0	19	0
Lane Group Flow (vph)	74	422	0	116	449	0	42	205	37	79	208	0
Heavy Vehicles (%)	5%	5%	5%	58%	10%	25%	10%	10%	62%	10%	15%	15%
Turn Type	Prot	NA		Prot	NA		Prot	NA	pm+ov	Prot	NA	
Protected Phases	1	6		5	2		7	4	5	3	8	
Permitted Phases									4			
Actuated Green, G (s)	3.3	19.3		6.0	22.0		1.4	13.1	19.1	3.0	14.7	
Effective Green, g (s)	3.3	19.3		6.0	22.0		1.4	13.1	19.1	3.0	14.7	
Actuated g/C Ratio	0.06	0.34		0.10	0.38		0.02	0.23	0.33	0.05	0.26	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	99	1131		119	1199		40	394	401	86	408	
v/s Ratio Prot	0.04	0.13		c0.10	c0.14		0.03	0.12	0.01	c0.05	c0.13	
v/s Ratio Perm									0.03			
v/c Ratio	0.75	0.37		0.97	0.37		1.05	0.52	0.09	0.92	0.51	
Uniform Delay, d1	26.6	14.5		25.6	12.7		28.0	19.4	13.2	27.1	18.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	26.1	0.9		74.0	0.9		157.5	1.2	0.1	69.7	1.1	
Delay (s)	52.7	15.4		99.6	13.6		185.5	20.6	13.3	96.8	19.4	
Level of Service	D	B		F	B		F	C	B	F	B	
Approach Delay (s)		20.8			30.5			37.7			39.3	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM Average Control Delay	30.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	57.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	46.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	110	580	125	240	895	140	100	420	170	135	310	115
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.97		1.00	0.98		1.00	1.00	0.85	1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1641	3221		1421	3368		1570	1652	1188	1641	1623	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1641	3221		1421	3368		1570	1652	1188	1641	1623	
Peak-hour factor, PHF	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Adj. Flow (vph)	139	734	158	304	1133	177	127	532	215	171	392	146
RTOR Reduction (vph)	0	15	0	0	10	0	0	0	24	0	11	0
Lane Group Flow (vph)	139	877	0	304	1300	0	127	532	192	171	527	0
Heavy Vehicles (%)	10%	10%	5%	27%	5%	5%	15%	15%	36%	10%	15%	5%
Turn Type	Prot	NA		Prot	NA		Prot	NA	pm+ov	Prot	NA	
Protected Phases	1	6		5	2		7	4	5	3	8	
Permitted Phases									4			
Actuated Green, G (s)	10.0	32.0		24.0	46.0		10.0	36.0	60.0	12.0	38.0	
Effective Green, g (s)	10.0	32.0		24.0	46.0		10.0	36.0	60.0	12.0	38.0	
Actuated g/C Ratio	0.08	0.27		0.20	0.38		0.08	0.30	0.50	0.10	0.32	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	137	859		284	1291		131	496	634	164	514	
v/s Ratio Prot	0.08	0.27		c0.21	c0.39		0.08	0.32	0.06	c0.10	c0.32	
v/s Ratio Perm									0.10			
v/c Ratio	1.01	1.02		1.07	1.01		0.97	1.07	0.30	1.04	1.03	
Uniform Delay, d1	55.0	44.0		48.0	37.0		54.8	42.0	17.7	54.0	41.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	80.8	36.0		73.3	26.7		68.3	61.3	0.3	82.0	46.3	
Delay (s)	135.8	80.0		121.3	63.7		123.2	103.3	17.9	136.0	87.3	
Level of Service	F	E		F	E		F	F	B	F	F	
Approach Delay (s)		87.5			74.5			85.2			99.1	
Approach LOS		F			E			F			F	

Intersection Summary			
HCM Average Control Delay	84.0	HCM Level of Service	F
HCM Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	78.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Hall & Foreman, Inc.

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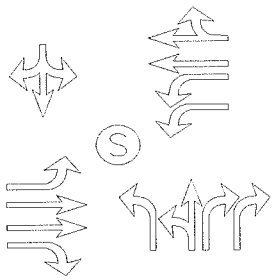
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	TM	26-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : FOOTHILL BOULEVARD
N/S STREET : IRWINDALE AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 52
ROUTE 9

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						

FOOTHILL BOULEVARD

EB LEFT	5	5%	0	5	5	10
EB THRU	235	20%	0	235	20	255
EB RIGHT	255	5%	0	255	25	280
WB LEFT	960	5%	0	960	85	1045
WB THRU	1135	5%	0	1135	100	1235
WB RIGHT	5	5%	0	5	5	10

IRWINDALE AVE

NB LEFT	385	5%	0	385	35	420
NB THRU	35	95%	50	85	5	90
NB RIGHT	390	5%	0	390	35	425
SB LEFT	5	5%	0	5	5	10
SB THRU	20	100%	50	70	5	75
SB RIGHT	5	25%	0	5	5	10
TOTALS	**3435**		**100**	**3535**	**330**	**3865**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	TM	26-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : FOOTHILL BOULEVARD
N/S STREET : IRWINDALE AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 52
ROUTE 9

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
FOOTHILL BOULEVARD						
EB LEFT	10	5%	**0**	10	5	15
EB THRU	385	5%	**0**	385	35	420
EB RIGHT	210	5%	**0**	210	20	230
WB LEFT	1065	5%	**0**	1065	95	1160
WB THRU	355	5%	**0**	355	30	385
WB RIGHT	5	5%	**0**	5	5	10
IRWINDALE AVE						
NB LEFT	320	5%	**0**	320	30	350
NB THRU	40	75%	**50**	90	10	100
NB RIGHT	865	5%	**0**	865	80	945
SB LEFT	5	50%	**0**	5	5	10
SB THRU	45	80%	**50**	95	10	105
SB RIGHT	5	15%	**0**	5	5	10
TOTALS	**3310**		**100**	**3410**	**330**	**3740**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	TM	26-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : FOOTHILL BOULEVARD
N/S STREET : IRWINDALE AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 52
ROUTE 9

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
FOOTHILL BOULEVARD						
EB LEFT	5	5%	**0**	5	5	10
EB THRU	1645	5%	**0**	1645	150	1795
EB RIGHT	680	5%	**0**	680	60	740
WB LEFT	785	5%	**0**	785	70	855
WB THRU	380	5%	**0**	380	35	415
WB RIGHT	5	5%	**0**	5	5	10
IRWINDALE AVE						
NB LEFT	270	5%	**0**	270	25	295
NB THRU	20	75%	**50**	70	5	75
NB RIGHT	590	5%	**0**	590	55	645
SB LEFT	5	5%	**0**	5	5	10
SB THRU	20	75%	**50**	70	5	75
SB RIGHT	5	5%	**0**	5	5	10
TOTALS	**4410**		**100**	**4510**	**425**	**4935**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	TM	26-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : FOOTHILL BOULEVARD
N/S STREET : IRWINDALE AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 52
ROUTE 9

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
FOOTHILL BOULEVARD								
EB LEFT	3	0	0	5	**0**	5	5	10
EB THRU	193	41	123	315	**0**	315	30	345
EB RIGHT	250	7	21	270	**0**	270	25	295
WB LEFT	958	2	6	965	**0**	965	85	1050
WB THRU	1124	10	30	1155	**0**	1155	105	1260
WB RIGHT	1	0	0	5	**0**	5	5	10
IRWINDALE AVE								
NB LEFT	373	14	42	415	**0**	415	35	450
NB THRU	2	32	96	100	**150**	250	25	275
NB RIGHT	372	19	57	430	**0**	430	40	470
SB LEFT	0	0	0	5	**0**	5	5	10
SB THRU	1	19	57	60	**150**	210	20	230
SB RIGHT	3	1	3	5	**0**	5	5	10
TOTALS	**3280**				**300**	**4030**	**385**	**4415**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	TM	26-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : FOOTHILL BOULEVARD
N/S STREET : IRWINDALE AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
52
ROUTE
9

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
FOOTHILL BOULEVARD								
EB LEFT	11	0	0	10	**0**	10	5	15
EB THRU	373	11	33	405	**0**	405	35	440
EB RIGHT	201	11	33	235	**0**	235	20	255
WB LEFT	1063	0	0	1065	**0**	1065	95	1160
WB THRU	345	8	24	370	**0**	370	35	405
WB RIGHT	4	0	0	5	**0**	5	5	10
IRWINDALE AVE								
NB LEFT	306	14	42	350	**0**	350	30	380
NB THRU	22	17	51	75	**150**	225	20	245
NB RIGHT	817	48	144	960	**0**	960	85	1045
SB LEFT	2	2	6	10	**0**	10	5	15
SB THRU	18	27	81	100	**150**	250	25	275
SB RIGHT	6	1	3	10	**0**	10	5	15
TOTALS	**3168**				**300**	**3895**	**365**	**4260**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	TM	26-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : FOOTHILL BOULEVARD
N/S STREET : IRWINDALE AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 52
ROUTE 9

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
FOOTHILL BOULEVARD								
EB LEFT	3	0	0	5	**0**	5	5	10
EB THRU	1643	0	0	1645	**0**	1645	150	1795
EB RIGHT	676	2	6	680	**0**	680	60	740
WB LEFT	781	2	6	785	**0**	785	70	855
WB THRU	369	10	30	400	**0**	400	35	435
WB RIGHT	3	0	0	5	**0**	5	5	10
IRWINDALE AVE								
NB LEFT	270	1	3	275	**0**	275	25	300
NB THRU	17	1	3	20	**150**	170	15	185
NB RIGHT	572	19	57	630	**0**	630	55	685
SB LEFT	2	0	0	5	**0**	5	5	10
SB THRU	15	3	9	25	**150**	175	15	190
SB RIGHT	2	0	0	5	**0**	5	5	10
TOTALS	**4353**				**300**	**4780**	**445**	**5225**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: IRWINDALE AVE
EAST-WEST STREET: FOOTHILL BLVD
JURISDICTION: IRWINDALE

DATE: 09-25-13

PEAK HOUR: 07:00AM

NORTH LEG

TOTAL: 24

4	20		Total
1	2	0	1st
0	5	0	2nd
2	11	0	3rd
1	2	0	4th

Rt Thru Lt

EAST LEG TOTAL: 2,095

	1st	2nd	3rd	4th	Total
Rt	0	0	1	0	1
Thru	366	329	240	199	1134
Lt	260	279	232	189	960

Total	1st	2nd	3rd	4th	
3	0	2	1	0	Lt
234	37	55	61	81	Thru
257	57	58	77	65	Rt

WEST LEG TOTAL: 494

PEAK HOUR FACTORS

NORTH LEG = 0.46
SOUTH LEG = 0.94
EAST LEG = 0.84
WEST LEG = 0.85

ALL LEGS = 0.91

	Lt	Thru	Rt
1st	97	9	90
2nd	105	7	103
3rd	81	12	117
4th	104	6	81
Total	387	34	391

SOUTH LEG

TOTAL: 812

HOUR TOTAL: 3,425

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : IRWINDALE AVE — IRWINDALE

EAST-WEST STREET : FOOTHILL BLVD — 09-25-13

BEGINNING TIME : 07:00AM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
						NORTH LEG						
0	0	0	0	0	0	0	1	0	1	1	0	3
0	0	0	0	2	0	0	2	0	0	1	0	5
2	1	0	0	0	0	0	0	0	0	10	0	13
1	0	0	0	0	0	0	2	0	0	0	0	3
1	2	0	0	0	0	0	0	0	0	1	0	4
1	0	0	0	0	0	0	0	0	0	0	0	1
0	0	0	0	0	0	0	1	0	0	2	0	3
0	1	0	0	0	0	0	0	0	0	4	0	5
5	4	0	0	2	0	0	6	0	1	19	0	37
						SOUTH LEG						
89	0	94	0	0	0	1	0	3	0	9	0	196
100	0	98	0	0	7	0	2	0	3	5	0	215
108	2	79	1	0	0	4	2	1	4	8	1	210
75	0	102	3	1	1	3	3	0	0	2	1	191
74	2	112	0	0	1	0	2	1	5	2	0	199
199	0	103	2	3	0	2	1	0	3	3	0	316
188	0	117	1	0	0	2	3	0	2	4	1	318
131	0	71	4	0	1	7	0	7	8	2	0	231
964	4	776	11	4	10	19	13	12	25	35	3	1876
						EAST LEG						
0	366	258	0	0	1	0	0	1	0	0	0	626
0	324	279	0	0	0	0	5	0	0	0	0	608
1	237	232	0	2	0	0	1	0	0	0	0	473
0	197	189	0	0	0	0	1	0	0	1	0	388
0	235	187	0	1	0	0	0	0	0	0	0	423
0	238	181	0	0	0	1	3	0	0	0	0	423
0	196	196	0	9	3	0	0	0	0	0	0	404
0	122	185	0	5	0	0	1	0	0	0	0	313
1	1915	1707	0	17	4	1	11	1	0	1	0	3658
						WEST LEG						
55	26	0	2	7	0	0	4	0	0	0	0	94
54	40	2	1	10	0	3	4	0	0	1	0	115
77	49	1	0	5	0	0	7	0	0	0	0	139
64	78	0	1	0	0	0	3	0	0	0	0	146
47	89	2	0	3	0	0	3	0	0	0	0	144
47	105	0	9	2	0	0	0	0	0	0	0	163
101	166	4	3	3	0	1	1	0	0	0	0	279
54	61	0	3	0	1	0	0	0	0	0	0	119
499	614	9	19	30	1	4	22	0	0	1	0	1199

Prepared by Newport Traffic Studies

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: IRWINDALE AVE

EAST-WEST STREET: FOOTHILL BLVD

TIME: 07:00AM-08:00AM DATE: 09-25-13

NORTH LEG

Rt	Thru	Lt	
4	20	0	Total
1	2	0	1st
0	5	0	2nd
2	11	0	3rd
1	2	0	4th

	1st	2nd	3rd	4th	Total
Rt	0	0	1	0	1
Thru	366	329	240	199	1134
Lt	260	279	232	189	960

Total	1st	2nd	3rd	4th	
3	0	2	1	0	Lt
234	37	55	61	81	Thru
257	57	58	77	65	Rt

	Lt	Thru	Rt
1st	97	9	90
2nd	105	7	103
3rd	81	12	117
4th	104	6	81
Total	387	34	391

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: IRWINDALE AVE

EAST-WEST STREET: FOOTHILL BLVD

TIME: 08:00AM-09:00AM DATE: 09-25-13

NORTH LEG

Rt	Thru	Lt	
2	11	0	Total
1	3	0	1st
1	0	0	2nd
0	3	0	3rd
0	5	0	4th

	1st	2nd	3rd	4th	Total
Rt	0	1	0	0	1
Thru	236	241	205	128	810
Lt	187	181	199	185	752

Total	1st	2nd	3rd	4th	
7	2	0	4	1	Lt
433	95	107	170	61	Thru
265	47	56	105	57	Rt

	Lt	Thru	Rt
1st	114	6	79
2nd	103	7	206
3rd	118	7	193
4th	79	2	150
Total	414	22	628

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: IRWINDALE AVE
EAST-WEST STREET: FOOTHILL BLVD
JURISDICTION: IRWINDALE

DATE: 09-25-13

PEAK HOUR: 12:15PM

NORTH LEG

TOTAL: 56

Rt	Thru	Lt	
7	45	4	Total
3	18	2	1st
4	14	1	2nd
0	6	1	3rd
0	7	0	4th

EAST LEG TOTAL: 1,420

	1st	2nd	3rd	4th	Total
Rt	2	0	1	1	4
Thru	120	84	72	77	353
Lt	332	302	240	189	1063

WEST LEG TOTAL: 607

Total	1st	2nd	3rd	4th	
11	2	2	4	3	Lt
384	107	121	73	83	Thru
212	61	48	46	57	Rt

PEAK HOUR FACTORS

NORTH LEG = 0.61
SOUTH LEG = 0.84
EAST LEG = 0.78
WEST LEG = 0.89

ALL LEGS = 0.82

SOUTH LEG

TOTAL: 1,224

	Lt	Thru	Rt
1st	100	15	251
2nd	92	14	248
3rd	64	6	178
4th	64	4	188
Total	320	39	865

HOUR TOTAL: 3,307

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : IRWINDALE AVE — IRWINDALE

EAST-WEST STREET : FOOTHILL BLVD — 09-25-13

BEGINNING TIME : 12:00PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
3	0	2	0	0	0	0	3	0	0	6	0	14
3	12	0	0	1	0	0	1	2	0	4	0	23
3	0	1	0	0	0	1	4	0	0	10	0	19
0	1	1	0	0	0	0	1	0	0	4	0	7
0	5	0	0	0	0	0	0	0	0	2	0	7
4	4	0	0	0	0	0	1	0	0	3	0	12
0	0	1	0	0	0	0	1	0	0	2	0	4
0	1	1	0	0	0	0	1	0	0	0	0	3
13	23	6	0	1	0	1	12	2	0	31	0	89
						SOUTH LEG						
191	1	52	0	0	2	3	0	1	1	5	1	257
244	9	97	0	0	1	2	0	0	5	6	2	366
239	8	91	0	0	0	3	0	0	6	6	1	354
165	3	56	2	0	4	5	1	4	6	2	0	248
169	2	62	2	0	1	10	1	1	7	1	0	256
75	1	66	5	0	0	2	2	0	6	8	1	166
195	3	55	2	0	0	6	0	1	11	0	0	273
112	2	81	5	0	0	4	2	1	6	2	1	216
1390	29	560	16	0	8	35	6	8	48	30	6	2136
						EAST LEG						
0	56	165	1	2	0	0	0	0	0	2	0	226
2	120	332	0	0	0	0	0	0	0	0	0	454
0	80	302	0	0	0	0	3	0	0	1	0	386
1	71	240	0	1	0	0	0	0	0	0	0	313
1	74	189	0	3	0	0	0	0	0	0	0	267
0	74	202	0	2	0	0	0	0	0	1	0	279
1	86	242	0	1	0	0	0	0	0	0	0	330
1	51	157	0	1	0	1	0	0	1	0	0	212
6	6121	829	1	10	0	1	3	0	1	4	0	2467
						WEST LEG						
33	67	1	0	3	0	0	0	0	1	0	0	105
58	106	2	0	1	0	0	0	0	3	0	0	170
41	120	2	0	1	0	5	0	0	2	0	0	171
46	68	4	0	2	0	0	2	0	0	1	0	123
56	79	3	0	4	0	1	0	0	0	0	0	143
49	90	1	0	0	0	0	0	0	0	0	0	140
51	78	1	0	2	0	0	0	0	0	2	0	134
28	71	0	0	2	0	1	0	0	0	0	0	102
362	679	14	0	15	0	7	2	0	6	3	0	1088

Prepared by Newport Traffic Studies

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: IRWINDALE AVE

EAST-WEST STREET: FOOTHILL BLVD

TIME: 12:00PM-01:00PM DATE: 09-25-13

NORTH LEG

Rt	Thru	Lt	
10	47	6	Total
3	9	2	1st
3	18	2	2nd
4	14	1	3rd
0	6	1	4th

	1st	2nd	3rd	4th	Total
Rt	1	2	0	1	4
Thru	60	120	84	72	336
Lt	165	332	302	240	1039

Total	1st	2nd	3rd	4th	
9	1	2	2	4	Lt
371	70	107	121	73	Thru
189	34	61	48	46	Rt

	Lt	Thru	Rt
1st	56	6	195
2nd	100	15	251
3rd	92	14	248
4th	64	6	178
Total	312	41	872

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: IRWINDALE AVE

EAST-WEST STREET: FOOTHILL BLVD

TIME: 01:00PM-02:00PM DATE: 09-25-13

NORTH LEG

Rt	Thru	Lt	
4	20	2	Total
0	7	0	1st
4	8	0	2nd
0	3	1	3rd
0	2	1	4th

	1st	2nd	3rd	4th	Total
Rt	1	0	1	3	5
Thru	77	77	87	52	293
Lt	189	202	242	157	790

Total	1st	2nd	3rd	4th	
5	3	1	1	0	Lt
328	83	90	82	73	Thru
186	57	49	51	29	Rt

	Lt	Thru	Rt
1st	64	4	188
2nd	67	11	88
3rd	56	3	214
4th	83	6	127
Total	270	24	617

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: IRWINDALE AVE
EAST-WEST STREET: FOOTHILL BLVD
JURISDICTION: IRWINDALE

DATE: 09-25-13

PEAK HOUR: 05:00PM

NORTH LEG

TOTAL: 23

Rt	Thru	Lt	
2	19	2	Total
0	3	0	1st
2	5	0	2nd
0	8	0	3rd
0	3	2	4th

EAST LEG TOTAL: 1,165

	1st	2nd	3rd	4th	Total
Rt	1	2	0	0	3
Thru	104	114	101	60	379
Lt	163	229	237	154	783

Total	1st	2nd	3rd	4th	
3	1	0	1	1	Lt
1643	416	404	339	484	Thru
678	194	158	154	172	Rt

WEST LEG TOTAL: 2,324

PEAK HOUR FACTORS

NORTH LEG = 0.72
SOUTH LEG = 0.89
EAST LEG = 0.84
WEST LEG = 0.88

ALL LEGS = 0.96

	Lt	Thru	Rt
1st	60	12	125
2nd	71	4	152
3rd	66	2	142
4th	74	0	172
Total	271	18	591

TOTAL: 880

SOUTH LEG

HOUR TOTAL: 4,392

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : IRWINDALE AVE — IRWINDALE

EAST-WEST STREET : FOOTHILL BLVD — 09-25-13

BEGINNING TIME : 04:00PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
0	9	1	0	0	0	0	0	0	0	0	0	10
0	5	0	0	0	0	0	0	0	0	0	0	5
0	8	2	0	0	0	0	0	0	0	0	0	10
0	5	3	0	0	0	0	0	0	0	0	0	8
0	2	0	0	0	0	0	0	0	0	1	0	3
2	4	0	0	0	0	0	0	0	0	1	0	7
0	7	0	0	0	0	0	0	0	0	1	0	8
0	3	2	0	0	0	0	0	0	0	0	0	5
2	43	8	0	0	0	0	0	0	0	3	0	56
						SOUTH LEG						
138	0	56	1	0	1	3	0	2	8	0	0	209
142	3	54	0	0	0	0	0	0	5	0	0	204
162	5	87	4	0	0	0	0	0	2	0	0	260
136	0	93	0	0	0	0	1	0	4	1	0	235
119	12	59	2	0	0	1	0	0	3	0	1	197
147	4	71	1	0	0	2	0	0	2	0	0	227
136	1	66	2	0	0	3	0	0	1	1	0	210
170	0	74	0	0	0	2	0	0	0	0	0	246
1150	25	560	10	0	1	11	1	2	25	2	1	1788
						EAST LEG						
0	58	198	1	7	1	0	5	0	0	2	0	272
0	86	181	0	0	0	0	4	0	0	0	0	271
0	82	216	0	6	0	0	1	0	0	1	0	306
1	89	178	0	4	2	0	5	1	0	0	0	280
1	102	163	0	0	0	0	0	0	0	2	0	268
2	113	227	0	1	2	0	0	0	0	0	0	345
0	96	237	0	4	0	0	1	0	0	0	0	338
0	58	154	0	2	0	0	0	0	0	0	0	214
4	6841	554	1	24	5	0	16	1	0	5	0	2294
						WEST LEG						
130	302	1	0	1	0	0	0	0	0	0	0	434
137	345	2	0	0	0	0	0	0	0	0	0	484
113	319	0	0	3	0	0	0	0	0	0	0	435
115	328	1	0	0	0	0	0	0	0	0	0	444
192	416	1	2	0	0	0	0	0	0	0	0	611
158	404	0	0	0	0	0	0	0	0	0	0	562
154	339	1	0	0	0	0	0	0	0	0	0	494
172	484	1	0	0	0	0	0	0	0	0	0	657
1171	2937	7	2	4	0	0	0	0	0	0	0	4121

Prepared by Newport Traffic Studies

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: IRWINDALE AVE

EAST-WEST STREET: FOOTHILL BLVD

TIME: 04:00PM-05:00PM DATE: 09-25-13

NORTH LEG

0	27	6	Total
0	9	1	1st
0	5	0	2nd
0	8	2	3rd
0	5	3	4th

Rt Thru Lt

Rt	1	0	0	1	2
Thru	72	90	90	98	350
Lt	199	181	216	181	777
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
4	1	2	0	1	Lt
1298	303	345	322	328	Thru
495	130	137	113	115	Rt

	Lt	Thru	Rt
1st	59	0	150
2nd	54	3	147
3rd	87	5	168
4th	93	2	140
Total	293	10	605

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: IRWINDALE AVE

EAST-WEST STREET: FOOTHILL BLVD

TIME: 05:00PM-06:00PM DATE: 09-25-13

NORTH LEG

Rt	Thru	Lt	
2	19	2	Total
0	3	0	1st
2	5	0	2nd
0	8	0	3rd
0	3	2	4th

	1st	2nd	3rd	4th	Total
Rt	1	2	0	0	3
Thru	104	114	101	60	379
Lt	163	229	237	154	783

Total	1st	2nd	3rd	4th	
3	1	0	1	1	Lt
1643	416	404	339	484	Thru
678	194	158	154	172	Rt

	Lt	Thru	Rt
1st	60	12	125
2nd	71	4	152
3rd	66	2	142
4th	74	0	172
Total	271	18	591

Prepared by NEWPORT TRAFFIC STUDIES

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	235	255	960	1135	5	385	35	390	5	20	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95		0.95	0.95	0.88		1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85		0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00		0.99	
Satd. Flow (prot)	1719	3008	1538	3335	3436		1633	1448	2707		1086	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.74	0.74	1.00		0.96	
Satd. Flow (perm)	1719	3008	1538	3335	3436		1266	1114	2707		1045	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	5	258	280	1055	1247	5	423	38	429	5	22	5
RTOR Reduction (vph)	0	0	219	0	0	0	0	0	171	0	4	0
Lane Group Flow (vph)	5	258	61	1055	1252	0	228	233	258	0	28	0
Heavy Vehicles (%)	5%	20%	5%	5%	5%	5%	5%	95%	5%	5%	95%	25%
Turn Type	Prot	NA	Perm	Prot	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases	5	2		1	6			8	1		4	
Permitted Phases			2				8		8	4		
Actuated Green, G (s)	0.7	14.7	14.7	23.2	37.2		17.1	17.1	40.3		17.1	
Effective Green, g (s)	0.7	14.7	14.7	23.2	37.2		17.1	17.1	40.3		17.1	
Actuated g/C Ratio	0.01	0.22	0.22	0.35	0.56		0.26	0.26	0.60		0.26	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	18	660	337	1155	1908		323	284	1790		267	
v/s Ratio Prot	0.00	0.09		c0.32	c0.36				0.05			
v/s Ratio Perm			0.04				0.18	c0.21	0.05		0.03	
v/c Ratio	0.28	0.39	0.18	0.91	0.66		0.71	0.82	0.14		0.11	
Uniform Delay, d1	32.9	22.3	21.3	20.9	10.4		22.7	23.5	5.8		19.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	
Incremental Delay, d2	8.3	0.4	0.3	11.0	0.8		12.2	22.6	0.0		0.8	
Delay (s)	41.2	22.7	21.5	31.9	11.2		34.9	46.1	5.9		19.9	
Level of Service	D	C	C	C	B		C	D	A		B	
Approach Delay (s)		22.3			20.7			23.8			19.9	
Approach LOS		C			C			C			B	

Intersection Summary			
HCM Average Control Delay	21.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	67.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	63.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	385	210	1065	355	5	320	40	865	5	45	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95		0.95	0.95	0.88		1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85		0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00		1.00	
Satd. Flow (prot)	1719	3438	1538	3335	3431		1633	1526	2707		1205	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.79	0.78	1.00		0.97	
Satd. Flow (perm)	1719	3438	1538	3335	3431		1358	1243	2707		1175	
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	12	470	256	1299	433	6	390	49	1055	6	55	6
RTOR Reduction (vph)	0	0	195	0	1	0	0	0	48	0	5	0
Lane Group Flow (vph)	12	470	61	1299	438	0	218	221	1007	0	62	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	45%	5%	50%	60%	15%
Turn Type	Prot	NA	Perm	Prot	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases	5	2		1	6			8	1		4	
Permitted Phases			2				8		8	4		
Actuated Green, G (s)	0.8	18.2	18.2	30.0	47.4		16.0	16.0	46.0		16.0	
Effective Green, g (s)	0.8	18.2	18.2	30.0	47.4		16.0	16.0	46.0		16.0	
Actuated g/C Ratio	0.01	0.24	0.24	0.39	0.62		0.21	0.21	0.60		0.21	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	18	821	367	1313	2134		285	261	1776		247	
v/s Ratio Prot	0.01	c0.14		c0.39	0.13				c0.22			
v/s Ratio Perm			0.04				0.16	c0.18	0.15		0.05	
v/c Ratio	0.67	0.57	0.17	0.99	0.21		0.76	0.85	0.57		0.25	
Uniform Delay, d1	37.6	25.6	23.0	22.9	6.2		28.3	28.9	9.1		25.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	
Incremental Delay, d2	66.1	1.0	0.2	22.0	0.0		17.6	27.3	0.4		2.4	
Delay (s)	103.7	26.5	23.2	45.0	6.3		45.9	56.2	9.5		27.5	
Level of Service	F	C	C	D	A		D	E	A		C	
Approach Delay (s)		26.6			35.2			21.7			27.5	
Approach LOS		C			D			C			C	

Intersection Summary			
HCM Average Control Delay	28.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	76.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	67.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	1645	680	785	380	5	270	20	590	5	20	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95		0.95	0.95	0.88		1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85		0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00		0.99	
Satd. Flow (prot)	1719	3438	1538	3335	3432		1633	1648	2707		1485	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.74	0.73	1.00		0.96	
Satd. Flow (perm)	1719	3438	1538	3335	3432		1267	1261	2707		1431	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	5	1714	708	818	396	5	281	21	615	5	21	5
RTOR Reduction (vph)	0	0	210	0	1	0	0	0	9	0	4	0
Lane Group Flow (vph)	5	1714	498	818	400	0	149	153	606	0	27	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	15%	5%
Parking (#/hr)											0	
Turn Type	Prot	NA	Perm	Prot	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases	5	2		1	6			8	1		4	
Permitted Phases			2				8		8	4		
Actuated Green, G (s)	0.8	51.2	51.2	24.0	74.4		16.0	16.0	40.0		16.0	
Effective Green, g (s)	0.8	51.2	51.2	24.0	74.4		16.0	16.0	40.0		16.0	
Actuated g/C Ratio	0.01	0.50	0.50	0.23	0.72		0.16	0.16	0.39		0.16	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	13	1706	763	776	2474		196	196	1154		222	
v/s Ratio Prot	0.00	c0.50		c0.25	0.12				c0.12			
v/s Ratio Perm			0.32				0.12	c0.12	0.10		0.02	
v/c Ratio	0.38	1.00	0.65	1.05	0.16		0.76	0.78	0.53		0.12	
Uniform Delay, d1	51.0	26.0	19.4	39.6	4.5		41.8	41.9	24.3		37.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	
Incremental Delay, d2	17.9	22.9	2.0	47.5	0.0		23.8	25.9	0.4		1.1	
Delay (s)	68.8	48.9	21.4	87.1	4.6		65.6	67.8	24.7		38.7	
Level of Service	E	D	C	F	A		E	E	C		D	
Approach Delay (s)		40.9			60.0			38.6			38.7	
Approach LOS		D			E			D			D	

Intersection Summary			
HCM Average Control Delay	45.5	HCM Level of Service	D
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	103.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	92.5%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	235	255	960	1135	5	385	85	390	5	70	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95		0.95	0.95	0.88		1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85		0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.97	1.00		1.00	
Satd. Flow (prot)	1719	3008	1538	3335	3436		1633	1277	2707		988	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.74	0.78	1.00		0.98	
Satd. Flow (perm)	1719	3008	1538	3335	3436		1275	1029	2707		975	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	5	258	280	1055	1247	5	423	93	429	5	77	5
RTOR Reduction (vph)	0	0	225	0	0	0	0	0	138	0	3	0
Lane Group Flow (vph)	5	258	55	1055	1252	0	254	262	291	0	84	0
Heavy Vehicles (%)	5%	20%	5%	5%	5%	5%	5%	95%	5%	5%	100%	25%
Turn Type	Prot	NA	Perm	Prot	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases	5	2		1	6			8	1		4	
Permitted Phases			2				8		8	4		
Actuated Green, G (s)	0.7	15.3	15.3	26.5	41.1		24.1	24.1	50.6		24.1	
Effective Green, g (s)	0.7	15.3	15.3	26.5	41.1		24.1	24.1	50.6		24.1	
Actuated g/C Ratio	0.01	0.20	0.20	0.34	0.53		0.31	0.31	0.65		0.31	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	15	591	302	1134	1813		394	318	1897		302	
v/s Ratio Prot	0.00	0.09		c0.32	c0.36				0.05			
v/s Ratio Perm			0.04				0.20	c0.25	0.06		0.09	
v/c Ratio	0.33	0.44	0.18	0.93	0.69		0.64	0.82	0.15		0.28	
Uniform Delay, d1	38.4	27.5	26.1	24.8	13.7		23.2	24.9	5.3		20.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	
Incremental Delay, d2	12.7	0.5	0.3	13.2	1.2		7.9	20.9	0.0		2.3	
Delay (s)	51.0	28.0	26.4	38.0	14.8		31.1	45.9	5.4		22.6	
Level of Service	D	C	C	D	B		C	D	A		C	
Approach Delay (s)		27.4			25.4			23.5			22.6	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	25.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	77.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	64.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	385	210	1065	355	5	320	90	865	5	95	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95		0.95	0.95	0.88		1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85		0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.97	1.00		1.00	
Satd. Flow (prot)	1719	3438	1538	3335	3431		1633	1301	2707		1073	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.63	0.72	1.00		0.99	
Satd. Flow (perm)	1719	3438	1538	3335	3431		1083	961	2707		1060	
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	12	470	256	1299	433	6	390	110	1055	6	116	6
RTOR Reduction (vph)	0	0	203	0	1	0	0	0	23	0	2	0
Lane Group Flow (vph)	12	470	53	1299	438	0	242	258	1032	0	126	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	75%	5%	50%	80%	15%
Turn Type	Prot	NA	Perm	Prot	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases	5	2		1	6			8	1		4	
Permitted Phases			2				8		8	4		
Actuated Green, G (s)	0.8	19.2	19.2	36.0	54.4		25.0	25.0	61.0		25.0	
Effective Green, g (s)	0.8	19.2	19.2	36.0	54.4		25.0	25.0	61.0		25.0	
Actuated g/C Ratio	0.01	0.21	0.21	0.39	0.59		0.27	0.27	0.66		0.27	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	15	716	320	1302	2024		294	261	1908		287	
v/s Ratio Prot	0.01	c0.14		c0.39	0.13				c0.21			
v/s Ratio Perm			0.03				0.22	c0.27	0.17		0.12	
v/c Ratio	0.80	0.66	0.17	1.00	0.22		0.82	0.99	0.54		0.44	
Uniform Delay, d1	45.6	33.5	29.9	28.1	8.9		31.5	33.5	8.2		27.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	
Incremental Delay, d2	132.2	2.2	0.2	24.2	0.1		22.3	52.9	0.3		4.8	
Delay (s)	177.8	35.7	30.2	52.3	8.9		53.8	86.3	8.5		32.6	
Level of Service	F	D	C	D	A		D	F	A		C	
Approach Delay (s)		36.1			41.3			28.5			32.6	
Approach LOS		D			D			C			C	

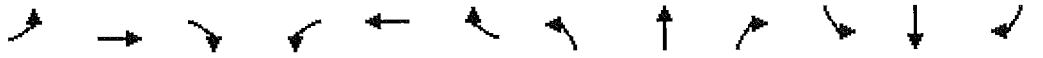
Intersection Summary			
HCM Average Control Delay	35.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	92.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	68.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	1645	680	785	380	5	270	70	590	5	70	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95		0.95	0.95	0.88		1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85		0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.97	1.00		1.00	
Satd. Flow (prot)	1719	3438	1538	3335	3432		1633	1318	2707		1015	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.66	0.74	1.00		0.98	
Satd. Flow (perm)	1719	3438	1538	3335	3432		1139	1006	2707		1000	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	5	1714	708	818	396	5	281	73	615	5	73	5
RTOR Reduction (vph)	0	0	152	0	1	0	0	0	9	0	3	0
Lane Group Flow (vph)	5	1714	556	818	400	0	171	183	606	0	80	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	75%	5%	5%	75%	5%
Parking (#/hr)											0	
Turn Type	Prot	NA	Perm	Prot	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases	5	2		1	6			8	1		4	
Permitted Phases			2				8		8	4		
Actuated Green, G (s)	0.8	51.2	51.2	23.0	73.4		17.0	17.0	40.0		17.0	
Effective Green, g (s)	0.8	51.2	51.2	23.0	73.4		17.0	17.0	40.0		17.0	
Actuated g/C Ratio	0.01	0.50	0.50	0.22	0.71		0.16	0.16	0.39		0.16	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	13	1706	763	743	2441		188	166	1154		165	
v/s Ratio Prot	0.00	c0.50		c0.25	0.12				0.12			
v/s Ratio Perm			0.36				0.15	c0.18	0.11		0.08	
v/c Ratio	0.38	1.00	0.73	1.10	0.16		0.91	1.10	0.53		0.49	
Uniform Delay, d1	51.0	26.0	20.5	40.1	4.9		42.3	43.1	24.3		39.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	
Incremental Delay, d2	17.9	22.9	3.5	64.1	0.0		45.5	99.9	0.4		10.0	
Delay (s)	68.8	48.9	24.0	104.2	4.9		87.8	143.0	24.7		49.1	
Level of Service	E	D	C	F	A		F	F	C		D	
Approach Delay (s)		41.7			71.6			58.2			49.1	
Approach LOS		D			E			E			D	

Intersection Summary			
HCM Average Control Delay	53.0	HCM Level of Service	D
HCM Volume to Capacity ratio	1.05		
Actuated Cycle Length (s)	103.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	93.9%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	255	280	1045	1235	10	420	90	425	10	75	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95		0.95	0.95	0.88		1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85		0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.97	1.00		0.99	
Satd. Flow (prot)	1719	3008	1538	3335	3434		1633	1286	2707		1024	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.69	0.75	1.00		0.96	
Satd. Flow (perm)	1719	3008	1538	3335	3434		1193	991	2707		989	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	11	280	308	1148	1357	11	462	99	467	11	82	11
RTOR Reduction (vph)	0	0	250	0	0	0	0	0	88	0	5	0
Lane Group Flow (vph)	11	280	58	1148	1368	0	273	288	379	0	99	0
Heavy Vehicles (%)	5%	20%	5%	5%	5%	5%	5%	95%	5%	5%	100%	25%
Turn Type	Prot	NA	Perm	Prot	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases	5	2		1	6			8	1		4	
Permitted Phases			2				8		8	4		
Actuated Green, G (s)	0.8	16.7	16.7	32.2	48.1		28.1	28.1	60.3		28.1	
Effective Green, g (s)	0.8	16.7	16.7	32.2	48.1		28.1	28.1	60.3		28.1	
Actuated g/C Ratio	0.01	0.19	0.19	0.36	0.54		0.32	0.32	0.68		0.32	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	15	564	289	1207	1856		377	313	1956		312	
v/s Ratio Prot	0.01	0.09		c0.34	c0.40				0.07			
v/s Ratio Perm			0.04				0.23	c0.29	0.07		0.10	
v/c Ratio	0.73	0.50	0.20	0.95	0.74		0.72	0.92	0.19		0.32	
Uniform Delay, d1	44.0	32.4	30.5	27.6	15.6		27.0	29.4	5.3		23.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	
Incremental Delay, d2	103.2	0.7	0.3	15.6	1.6		11.5	34.0	0.0		2.7	
Delay (s)	147.2	33.1	30.9	43.2	17.2		38.5	63.4	5.4		25.8	
Level of Service	F	C	C	D	B		D	E	A		C	
Approach Delay (s)		34.0			29.1			30.4			25.8	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	30.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	89.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	68.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
52: Irwindale Ave & Foothill Blvd

9/26/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	420	230	1160	385	10	350	100	945	10	105	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95		0.95	0.95	0.88		1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85		0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.97	1.00		1.00	
Satd. Flow (prot)	1719	3438	1538	3335	3425		1633	1299	2707		1085	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.60	0.69	1.00		0.97	
Satd. Flow (perm)	1719	3438	1538	3335	3425		1025	921	2707		1055	
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	18	512	280	1415	470	12	427	122	1152	12	128	12
RTOR Reduction (vph)	0	0	225	0	2	0	0	0	12	0	4	0
Lane Group Flow (vph)	18	512	55	1415	480	0	265	284	1140	0	148	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	75%	5%	50%	80%	15%
Turn Type	Prot	NA	Perm	Prot	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases	5	2		1	6			8	1		4	
Permitted Phases			2				8		8	4		
Actuated Green, G (s)	1.6	18.1	18.1	36.0	52.5		26.0	26.0	62.0		26.0	
Effective Green, g (s)	1.6	18.1	18.1	36.0	52.5		26.0	26.0	62.0		26.0	
Actuated g/C Ratio	0.02	0.20	0.20	0.39	0.57		0.28	0.28	0.67		0.28	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	30	676	302	1304	1952		289	260	1940		298	
v/s Ratio Prot	0.01	c0.15		c0.42	0.14				0.23			
v/s Ratio Perm			0.04				0.26	c0.31	0.19		0.14	
v/c Ratio	0.60	0.76	0.18	1.09	0.25		0.92	1.09	0.59		0.50	
Uniform Delay, d1	44.9	34.9	30.8	28.0	9.9		32.0	33.0	8.1		27.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	
Incremental Delay, d2	28.3	4.9	0.3	51.4	0.1		35.3	82.7	0.5		5.8	
Delay (s)	73.2	39.8	31.1	79.5	10.0		67.3	115.7	8.6		33.4	
Level of Service	E	D	C	E	A		E	F	A		C	
Approach Delay (s)		37.5			61.8			35.6			33.4	
Approach LOS		D			E			D			C	

Intersection Summary			
HCM Average Control Delay	46.8	HCM Level of Service	D
HCM Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	92.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	73.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	1795	740	855	415	10	295	75	645	10	75	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95		0.95	0.95	0.88		1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85		0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.97	1.00		0.99	
Satd. Flow (prot)	1719	3438	1538	3335	3426		1633	1321	2707		1044	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.59	0.67	1.00		0.96	
Satd. Flow (perm)	1719	3438	1538	3335	3426		1010	909	2707		1011	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	10	1870	771	891	432	10	307	78	672	10	78	10
RTOR Reduction (vph)	0	0	143	0	1	0	0	0	7	0	3	0
Lane Group Flow (vph)	10	1870	628	891	441	0	187	198	665	0	95	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	75%	5%	5%	75%	5%
Parking (#/hr)											0	
Turn Type	Prot	NA	Perm	Prot	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases	5	2		1	6			8	1		4	
Permitted Phases			2				8		8	4		
Actuated Green, G (s)	0.8	68.2	68.2	30.0	97.4		23.0	23.0	53.0		23.0	
Effective Green, g (s)	0.8	68.2	68.2	30.0	97.4		23.0	23.0	53.0		23.0	
Actuated g/C Ratio	0.01	0.51	0.51	0.23	0.73		0.17	0.17	0.40		0.17	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	10	1760	787	751	2505		174	157	1158		175	
v/s Ratio Prot	0.01	c0.54		c0.27	0.13				c0.13			
v/s Ratio Perm			0.41				0.19	c0.22	0.12		0.09	
v/c Ratio	1.00	1.06	0.80	1.19	0.18		1.07	1.26	0.57		0.54	
Uniform Delay, d1	66.2	32.5	26.8	51.6	5.5		55.1	55.1	31.3		50.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	
Incremental Delay, d2	284.6	40.3	5.6	97.1	0.0		89.5	158.6	0.7		11.5	
Delay (s)	350.8	72.8	32.4	148.7	5.6		144.6	213.7	32.0		61.8	
Level of Service	F	E	C	F	A		F	F	C		E	
Approach Delay (s)		62.1			101.2			85.9			61.8	
Approach LOS		E			F			F			E	

Intersection Summary			
HCM Average Control Delay	77.1	HCM Level of Service	E
HCM Volume to Capacity ratio	1.09		
Actuated Cycle Length (s)	133.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	100.8%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

APPENDIX C: FREEWAY SEGMENT CAPACITY ANALYSIS WORKSHEETS

Devil's Gate Reservoir Sediment Removal and Management Project

Los Angeles County, California

TRAFFIC IMPACT ANALYSIS

TUSTIN

SANTA CLARITA

TEMECULA

VICTORVILLE

www.hfinc.com

Prepared by:

Hall & Foreman, Inc.

14297 Cajon Street #101
Victorville, CA 92392
Telephone: (760) 524-9100 Fax: (760) 524-9101

September 23, 2013

Hall & Foreman, Inc.
Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
FWY SEGMENT SUMMARY	TM	23-Sep-13	VV.110264.0000	1 OF 1

SEGMENT NAME : Berkshire Place and Windsor Avenue
FREEWAY : I-210
PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%
SEGMENT
ROUTE

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
EASTBOUND								
AM	5570	7%	50	5620	8%	500	6120	8%
MID	3510	18%	50	3560	19%	315	3875	19%
PM	4335	12%	50	4385	13%	390	4775	13%
WESTBOUND								
AM	3365	1%	50	3415	3%	305	3720	3%
MID	2460	5%	50	2510	7%	220	2730	7%
PM	4060	2%	50	4110	3%	365	4475	3%

Tustin Office: 714.665.4500 Tel/ 714.665.4501 Fax
Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax
Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax
Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

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Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Berkshire Place/Windsor Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5570	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1466	v
Trucks and buses	7	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.966	
Driver population factor, fp	1.00	
Flow rate, vp	1517	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1517	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	72.0	mi/h
Number of lanes, N	4	
Density, D	21.1	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Berkshire Place/Windsor Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3510	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	924	v
Trucks and buses		%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.966	
Driver population factor, fp	1.00	
Flow rate, vp	956	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	956	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	12.7	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Berkshire Place/Windsor Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	4335	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1141	v
Trucks and buses	12	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	1209	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1209	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.5	mi/h
Number of lanes, N	4	
Density, D	16.2	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Berkshire Place/Windsor Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5620	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1479	v
Trucks and buses	8	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.962	
Driver population factor, fp	1.00	
Flow rate, vp	1538	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1538	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	71.8	mi/h
Number of lanes, N	4	
Density, D	21.4	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Berkshire Place/Windsor Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3560	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	937	v
Trucks and buses	19	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.913	
Driver population factor, fp	1.00	
Flow rate, vp	1026	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1026	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	13.7	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Berkshire Place/Windsor Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	4385	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1154	v
Trucks and buses	13	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.939	
Driver population factor, fp	1.00	
Flow rate, vp	1229	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1229	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.4	mi/h
Number of lanes, N	4	
Density, D	16.5	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Berkshire Place/Windsor Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5620	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1479	v
Trucks and buses	8	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.962	
Driver population factor, fp	1.00	
Flow rate, vp	1538	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1538	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	71.8	mi/h
Number of lanes, N	4	
Density, D	21.4	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Berkshire Place/Windsor Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3875	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1020	v
Trucks and buses	19	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.913	
Driver population factor, fp	1.00	
Flow rate, vp	1117	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1117	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.8	mi/h
Number of lanes, N	4	
Density, D	14.9	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

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Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Berkshire Place/Windsor Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	4775	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1257	v
Trucks and buses	13	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.939	
Driver population factor, fp	1.00	
Flow rate, vp	1338	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1338	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.7	mi/h
Number of lanes, N	4	
Density, D	18.1	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Berkshire Place/Windsor Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3365	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	886	v
Trucks and buses	1	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.995	
Driver population factor, fp	1.00	
Flow rate, vp	890	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	890	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	11.9	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Berkshire Place/Windsor Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	2460	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	647	v
Trucks and buses	5	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.976	
Driver population factor, fp	1.00	
Flow rate, vp	664	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	664	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	8.9	pc/mi/ln
Level of service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Berkshire Place/Windsor Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	4060	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1068	v
Trucks and buses		%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.976	
Driver population factor, fp	1.00	
Flow rate, vp	1095	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1095	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.9	mi/h
Number of lanes, N	4	
Density, D	14.6	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Berkshire Place/Windsor Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3415	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	899	v
Trucks and buses	3	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.985	
Driver population factor, fp	1.00	
Flow rate, vp	912	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	912	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	12.2	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	
Freeway/Direction:	I-210/WB
From/To:	Berkshire Place/Windsor Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	2510	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	661	v
Trucks and buses	7	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.966	
Driver population factor, fp	1.00	
Flow rate, vp	684	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	684	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	9.1	pc/mi/ln
Level of service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Berkshire Place/Windsor Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	4110	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1082	v
Trucks and buses	3	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.985	
Driver population factor, fp	1.00	
Flow rate, vp	1098	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1098	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.9	mi/h
Number of lanes, N	4	
Density, D	14.7	pc/mi/ln
Level of service, LOS	B	

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HCS 2010: Basic Freeway Segments Release 6.3

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Berkshire Place/Windsor Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3720	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	979	v
Trucks and buses	3	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.985	
Driver population factor, fp	1.00	
Flow rate, vp	994	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	994	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	13.3	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Berkshire Place/Windsor Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	2730	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	718	v
Trucks and buses	7	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.966	
Driver population factor, fp	1.00	
Flow rate, vp	744	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	744	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	9.9	pc/mi/ln
Level of service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Berkshire Place/Windsor Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	4475	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1178	v
Trucks and buses		%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.966	
Driver population factor, fp	1.00	
Flow rate, vp	1219	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1219	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.5	mi/h
Number of lanes, N	4	
Density, D	16.4	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
FWY SEGMENT SUMMARY	TM	23-Sep-13	VV.110264.0000	1 OF 1

SEGMENT NAME : Windsor Avenue and Lincoln Avenue

FREEWAY : I-210

PROJECTED YEAR :

PROJECTED GROWTH PER YEAR : 4.50%

SEGMENT

ROUTE

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
EASTBOUND								
AM	5715	1%	**50**	5765	2%	515	6280	2%
MID	3650	3%	**50**	3700	5%	330	4030	5%
PM	4400	2%	**50**	4450	3%	395	4845	3%
WESTBOUND								
AM	3780	12%	**50**	3830	13%	340	4170	13%
MID	3635	19%	**50**	3685	20%	325	4010	20%
PM	5610	11%	**50**	5660	12%	505	6165	12%

Tustin Office: 714.665.4500 Tel/ 714.665.4501 Fax

Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax

Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax

Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Windsor Avenue/Lincoln Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5715	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1504	v
Trucks and buses	1	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.995	
Driver population factor, fp	1.00	
Flow rate, vp	1511	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1511	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	72.1	mi/h
Number of lanes, N	4	
Density, D	21.0	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Windsor Avenue/Lincoln Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3650	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	961	v
Trucks and buses	3	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.985	
Driver population factor, fp	1.00	
Flow rate, vp	975	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	975	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	13.0	pc/mi/ln
Level of service, LOS	B	

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Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Windsor Avenue/Lincoln Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	4400	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1158	v
Trucks and buses	2	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.990	
Driver population factor, fp	1.00	
Flow rate, vp	1169	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1169	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.7	mi/h
Number of lanes, N	4	
Density, D	15.7	pc/mi/ln
Level of service, LOS	B	

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Operational Analysis

Analyst:	TM
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Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Windsor Avenue/Lincoln Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5765	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1517	v
Trucks and buses	2	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.990	
Driver population factor, fp	1.00	
Flow rate, vp	1532	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1532	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	71.9	mi/h
Number of lanes, N	4	
Density, D	21.3	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Windsor Avenue/Lincoln Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3700	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	974	v
Trucks and buses	5	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.976	
Driver population factor, fp	1.00	
Flow rate, vp	998	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	998	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	13.3	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
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Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Windsor Avenue/Lincoln Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description:	VV.110264

Flow Inputs and Adjustments

Volume, V	4450	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1171	v
Trucks and buses	3	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.985	
Driver population factor, fp	1.00	
Flow rate, vp	1189	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1189	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.6	mi/h
Number of lanes, N	4	
Density, D	15.9	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Windsor Avenue/Lincoln Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6280	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1653	v
Trucks and buses	2	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.990	
Driver population factor, fp	1.00	
Flow rate, vp	1669	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1669	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	4	
Density, D	23.8	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Windsor Avenue/Lincoln Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	4030	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1061	v
Trucks and buses	5	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.976	
Driver population factor, fp	1.00	
Flow rate, vp	1087	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1087	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.9	mi/h
Number of lanes, N	4	
Density, D	14.5	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Windsor Avenue/Lincoln Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	4845	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1275	v
Trucks and buses	3	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.985	
Driver population factor, fp	1.00	
Flow rate, vp	1294	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1294	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.0	mi/h
Number of lanes, N	4	
Density, D	17.5	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Windsor Avenue/Lincoln Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3780	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	995	v
Trucks and buses		%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.990	
Driver population factor, fp	1.00	
Flow rate, vp	1005	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1005	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	13.4	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Windsor Avenue/Lincoln Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3635	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	957	v
Trucks and buses	19	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.913	
Driver population factor, fp	1.00	
Flow rate, vp	1047	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1047	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	14.0	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Windsor Avenue/Lincoln Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5610	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1476	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1558	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1558	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	71.6	mi/h
Number of lanes, N	4	
Density, D	21.8	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Windsor Avenue/Lincoln Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description:	VV.110264

Flow Inputs and Adjustments

Volume, V	3830	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1008	v
Trucks and buses	13	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.939	
Driver population factor, fp	1.00	
Flow rate, vp	1073	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1073	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.9	mi/h
Number of lanes, N	4	
Density, D	14.3	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Windsor Avenue/Lincoln Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3685	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	970	v
Trucks and buses	20	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.909	
Driver population factor, fp	1.00	
Flow rate, vp	1067	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1067	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	14.2	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Windsor Avenue/Lincoln Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5660	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1489	v
Trucks and buses	12	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	1579	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1579	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	71.3	mi/h
Number of lanes, N	4	
Density, D	22.1	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Windsor Avenue/Lincoln Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	4170	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1097	v
Trucks and buses	13	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.939	
Driver population factor, fp	1.00	
Flow rate, vp	1169	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1169	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.7	mi/h
Number of lanes, N	4	
Density, D	15.7	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Windsor Avenue/Lincoln Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	4010	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1055	v
Trucks and buses	20	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.909	
Driver population factor, fp	1.00	
Flow rate, vp	1161	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1161	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.7	mi/h
Number of lanes, N	4	
Density, D	15.5	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

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Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Windsor Avenue/Lincoln Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6165	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1622	v
Trucks and buses	12	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	1720	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1720	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	69.3	mi/h
Number of lanes, N	4	
Density, D	24.8	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
FWY SEGMENT SUMMARY	TM	23-Sep-13	VV.110264.0000	1 OF 1

SEGMENT NAME : Mountain Street and SR-134 Interchange

FREEWAY : I-210

PROJECTED YEAR : SEGMENT

PROJECTED GROWTH PER YEAR : 4.50%

ROUTE

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
EASTBOUND								
AM	5520	5%	**50**	5570	6%	495	6065	6%
MID	3495	11%	**50**	3545	13%	315	3860	13%
PM	4100	7%	**50**	4150	8%	370	4520	8%
WESTBOUND								
AM	4775	2%	**50**	4825	3%	430	5255	3%
MID	3905	11%	**50**	3955	12%	350	4305	12%
PM	5615	6%	**50**	5665	7%	505	6170	7%

Tustin Office: 714.665.4500 Tel/ 714.665.4501 Fax

Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax

Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax

Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Mountain Street/SR-134
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5520	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1453	v
Trucks and buses	5	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.976	
Driver population factor, fp	1.00	
Flow rate, vp	1489	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1489	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	72.4	mi/h
Number of lanes, N	4	
Density, D	20.6	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Mountain Street/SR-134
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3495	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	920	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	970	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	970	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	12.9	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Mountain Street/SR-134
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	4100	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1079	v
Trucks and buses	7	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.966	
Driver population factor, fp	1.00	
Flow rate, vp	1117	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1117	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.8	mi/h
Number of lanes, N	4	
Density, D	14.9	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Mountain Street/SR-134
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5570	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1466	v
Trucks and buses	6	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.971	
Driver population factor, fp	1.00	
Flow rate, vp	1510	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1510	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	72.1	mi/h
Number of lanes, N	4	
Density, D	20.9	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Mountain Street/SR-134
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3545	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	933	v
Trucks and buses		%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.971	
Driver population factor, fp	1.00	
Flow rate, vp	961	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	961	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	12.8	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Mountain Street/SR-134
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	4150	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1092	v
Trucks and buses	8	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.962	
Driver population factor, fp	1.00	
Flow rate, vp	1136	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1136	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.8	mi/h
Number of lanes, N	4	
Density, D	15.2	pc/mi/ln
Level of service, LOS	B	

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Mountain Street/SR-134
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6065	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1596	v
Trucks and buses	6	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.971	
Driver population factor, fp	1.00	
Flow rate, vp	1644	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1644	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	70.4	mi/h
Number of lanes, N	4	
Density, D	23.3	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Mountain Street/SR-134
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3860	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1016	v
Trucks and buses	13	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.939	
Driver population factor, fp	1.00	
Flow rate, vp	1082	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1082	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.9	mi/h
Number of lanes, N	4	
Density, D	14.4	pc/mi/ln
Level of service, LOS	B	

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Mountain Street/SR-134
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	4520	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1189	v
Trucks and buses	8	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.962	
Driver population factor, fp	1.00	
Flow rate, vp	1237	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1237	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.4	mi/h
Number of lanes, N	4	
Density, D	16.6	pc/mi/ln
Level of service, LOS	B	

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Mountain Street/SR-134
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	4775	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1257	v
Trucks and buses	2	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.990	
Driver population factor, fp	1.00	
Flow rate, vp	1015	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1015	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	5	
Density, D	13.5	pc/mi/ln
Level of service, LOS	B	

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Mountain Street/SR-134
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3905	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1028	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	867	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	867	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	5	
Density, D	11.6	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Mountain Street/SR-134
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5615	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1478	v
Trucks and buses	6	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.971	
Driver population factor, fp	1.00	
Flow rate, vp	1218	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1218	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.5	mi/h
Number of lanes, N	5	
Density, D	16.4	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Mountain Street/SR-134
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	4825	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1270	v
Trucks and buses	3	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.985	
Driver population factor, fp	1.00	
Flow rate, vp	1031	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1031	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	5	
Density, D	13.7	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Mountain Street/SR-134
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3955	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1041	v
Trucks and buses	12	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	883	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	883	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	5	
Density, D	11.8	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Mountain Street/SR-134
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5665	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1491	v
Trucks and buses	7	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.966	
Driver population factor, fp	1.00	
Flow rate, vp	1234	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1234	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.4	mi/h
Number of lanes, N	5	
Density, D	16.6	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
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Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Mountain Street/SR-134
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5255	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1383	v
Trucks and buses	3	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.985	
Driver population factor, fp	1.00	
Flow rate, vp	1123	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1123	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.8	mi/h
Number of lanes, N	5	
Density, D	15.0	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Mountain Street/SR-134
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	4305	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1133	v
Trucks and buses	12	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	961	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	961	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	5	
Density, D	12.8	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Mountain Street/SR-134
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6170	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1624	v
Trucks and buses	7	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.966	
Driver population factor, fp	1.00	
Flow rate, vp	1344	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1344	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.7	mi/h
Number of lanes, N	5	
Density, D	18.2	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

Hall & Foreman, Inc.

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
FWY SEGMENT SUMMARY	TM	23-Sep-13	VV.110264.0000	1 OF 1

SEGMENT NAME : Figueroa Street and San Rafael Avenue

FREEWAY : SR-134

PROJECTED YEAR : SEGMENT

PROJECTED GROWTH PER YEAR : 4.50%

ROUTE

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
EASTBOUND								
AM	5970	0%	**50**	6020	1%	535	6555	1%
MID	5610	0%	**50**	5660	1%	505	6165	1%
PM	6725	0%	**50**	6775	1%	605	7380	1%
WESTBOUND								
AM	7980	3%	**50**	8030	4%	720	8750	4%
MID	5605	5%	**50**	5655	6%	505	6160	6%
PM	7375	4%	**50**	7425	5%	665	8090	5%

Tustin Office: 714.665.4500 Tel/ 714.665.4501 Fax

Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax

Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax

Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

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Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	SR-134/EB
From/To:	Figueroa Street/San Rafael Ave
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5970	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1571	v
Trucks and buses	0	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	1.000	
Driver population factor, fp	1.00	
Flow rate, vp	1257	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1257	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.3	mi/h
Number of lanes, N	5	
Density, D	16.9	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	SR-134/EB
From/To:	Figueroa Street/San Rafael Ave
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5610	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1476	v
Trucks and buses	0	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	1.000	
Driver population factor, fp	1.00	
Flow rate, vp	1181	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1181	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.6	mi/h
Number of lanes, N	5	
Density, D	15.8	pc/mi/ln
Level of service, LOS	B	

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Flow Inputs and Adjustments

Volume, V	6725	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1770	v
Trucks and buses	0	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	1.000	
Driver population factor, fp	1.00	
Flow rate, vp	1416	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1416	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.1	mi/h
Number of lanes, N	5	
Density, D	19.4	pc/mi/ln
Level of service, LOS	C	

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Flow Inputs and Adjustments

Volume, V	6020	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1584	v
Trucks and buses	1	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.995	
Driver population factor, fp	1.00	
Flow rate, vp	1274	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1274	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.2	mi/h
Number of lanes, N	5	
Density, D	17.2	pc/mi/ln
Level of service, LOS	B	

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Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5660	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1489	v
Trucks and buses	1	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.995	
Driver population factor, fp	1.00	
Flow rate, vp	1198	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1198	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.6	mi/h
Number of lanes, N	5	
Density, D	16.1	pc/mi/ln
Level of service, LOS	B	

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Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6775	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1783	v
Trucks and buses	1	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.995	
Driver population factor, fp	1.00	
Flow rate, vp	1433	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1433	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	72.9	mi/h
Number of lanes, N	5	
Density, D	19.7	pc/mi/ln
Level of service, LOS	C	

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From/To:	Figueroa Street/San Rafael Ave
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6555	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1725	v
Trucks and buses	1	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.995	
Driver population factor, fp	1.00	
Flow rate, vp	1387	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1387	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.3	mi/h
Number of lanes, N	5	
Density, D	18.9	pc/mi/ln
Level of service, LOS	C	

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From/To:	Figueroa Street/San Rafael Ave
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6165	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1622	v
Trucks and buses	1	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.995	
Driver population factor, fp	1.00	
Flow rate, vp	1304	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1304	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.0	mi/h
Number of lanes, N	5	
Density, D	17.6	pc/mi/ln
Level of service, LOS	B	

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Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR-134/EB
From/To:	Figueroa Street/San Rafael Ave
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7380	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1942	v
Trucks and buses	1	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.995	
Driver population factor, fp	1.00	
Flow rate, vp	1561	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1561	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	71.5	mi/h
Number of lanes, N	5	
Density, D	21.8	pc/mi/ln
Level of service, LOS	C	

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Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	Figueroa Street/San Rafael Ave
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description:	VV.110264

Flow Inputs and Adjustments

Volume, V	7980	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2100	v
Trucks and buses	3	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.985	
Driver population factor, fp	1.00	
Flow rate, vp	1705	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1705	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	69.5	mi/h
Number of lanes, N	5	
Density, D	24.5	pc/mi/ln
Level of service, LOS	C	

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Analysis Time Period:	MID Peak Hour
Freeway/Direction:	SR-134/WB
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Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5605	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1475	v
Trucks and buses	5	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.976	
Driver population factor, fp	1.00	
Flow rate, vp	1209	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1209	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.5	mi/h
Number of lanes, N	5	
Density, D	16.2	pc/mi/ln
Level of service, LOS	B	

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Analysis Time Period:	PM Peak Hour
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Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7375	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1941	v
Trucks and buses		%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	1.000	
Driver population factor, fp	1.00	
Flow rate, vp	1553	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1553	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	71.6	mi/h
Number of lanes, N	5	
Density, D	21.7	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	8030	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2113	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	1724	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1724	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	69.2	mi/h
Number of lanes, N	5	
Density, D	24.9	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	Figueroa Street/San Rafael Ave
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5655	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1488	v
Trucks and buses	6	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.971	
Driver population factor, fp	1.00	
Flow rate, vp	1226	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1226	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.4	mi/h
Number of lanes, N	5	
Density, D	16.5	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	Figueroa Street/San Rafael Ave
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7425	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1954	v
Trucks and buses	5	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.976	
Driver population factor, fp	1.00	
Flow rate, vp	1602	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1602	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	71.0	mi/h
Number of lanes, N	5	
Density, D	22.6	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	Figueroa Street/San Rafael Ave
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	8750	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2303	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	1879	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1879	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	66.4	mi/h
Number of lanes, N	5	
Density, D	28.3	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	Figueroa Street/San Rafael Ave
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6160	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1621	v
Trucks and buses	6	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.971	
Driver population factor, fp	1.00	
Flow rate, vp	1336	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1336	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.8	mi/h
Number of lanes, N	5	
Density, D	18.1	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	Figueroa Street/San Rafael Ave
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	8090	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2129	v
Trucks and buses	5	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.976	
Driver population factor, fp	1.00	
Flow rate, vp	1746	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1746	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	68.8	mi/h
Number of lanes, N	5	
Density, D	25.4	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
FWY SEGMENT SUMMARY	TM	23-Sep-13	VV.110264.0000	1 OF 1

SEGMENT NAME : San Rafael Avenue and I-210 Interchange

FREEWAY : SR-134

PROJECTED YEAR : SEGMENT

PROJECTED GROWTH PER YEAR : 4.50%

ROUTE

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
EASTBOUND								
AM	7415	0%	**50**	7465	1%	665	8130	1%
MID	6630	0%	**50**	6680	1%	595	7275	1%
PM	8085	0%	**50**	8135	1%	730	8865	1%
WESTBOUND								
AM	7470	10%	**50**	7520	11%	670	8190	11%
MID	5215	10%	**50**	5265	8%	470	5735	8%
PM	7100	10%	**50**	7150	10%	640	7790	10%

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Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	SR-134/EB
From/To:	San Rafael Ave/I-210 FWY
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7415	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1951	v
Trucks and buses	0	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	1.000	
Driver population factor, fp	1.00	
Flow rate, vp	1561	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1561	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	71.5	mi/h
Number of lanes, N	5	
Density, D	21.8	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	SR-134/EB
From/To:	San Rafael Ave/I-210 FWY
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6630	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1745	v
Trucks and buses	0	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	1.000	
Driver population factor, fp	1.00	
Flow rate, vp	1396	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1396	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.3	mi/h
Number of lanes, N	5	
Density, D	19.1	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR-134/EB
From/To:	San Rafael Ave/I-210 FWY
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6725	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1770	v
Trucks and buses	0	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	1.000	
Driver population factor, fp	1.00	
Flow rate, vp	1416	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1416	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.1	mi/h
Number of lanes, N	5	
Density, D	19.4	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	SR-134/EB
From/To:	San Rafael Ave/I-210 FWY
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description:	VV.110264

Flow Inputs and Adjustments

Volume, V	6020	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1584	v
Trucks and buses	1	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.995	
Driver population factor, fp	1.00	
Flow rate, vp	1274	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1274	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.2	mi/h
Number of lanes, N	5	
Density, D	17.2	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	SR-134/EB
From/To:	San Rafael Ave/I-210 FWY
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6680	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1758	v
Trucks and buses	1	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.995	
Driver population factor, fp	1.00	
Flow rate, vp	1413	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1413	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.1	mi/h
Number of lanes, N	5	
Density, D	19.3	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR-134/EB
From/To:	San Rafael Ave/I-210 FWY
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	8135	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2141	v
Trucks and buses	1	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.995	
Driver population factor, fp	1.00	
Flow rate, vp	1721	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1721	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	69.2	mi/h
Number of lanes, N	5	
Density, D	24.9	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	SR-134/EB
From/To:	San Rafael Ave/I-210 FWY
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	8130	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2139	v
Trucks and buses	1	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.995	
Driver population factor, fp	1.00	
Flow rate, vp	1720	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1720	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	69.3	mi/h
Number of lanes, N	5	
Density, D	24.8	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	SR-134/EB
From/To:	San Rafael Ave/I-210 FWY
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7275	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1914	v
Trucks and buses	1	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.995	
Driver population factor, fp	1.00	
Flow rate, vp	1539	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1539	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	71.8	mi/h
Number of lanes, N	5	
Density, D	21.4	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR-134/EB
From/To:	San Rafael Ave/I-210 FWY
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	8865	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2333	v
Trucks and buses	1	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.995	
Driver population factor, fp	1.00	
Flow rate, vp	1876	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1876	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	66.5	mi/h
Number of lanes, N	5	
Density, D	28.2	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	San Rafael Ave/I-210 FWY
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7470	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1966	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1651	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1651	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	70.3	mi/h
Number of lanes, N	5	
Density, D	23.5	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	San Rafael Ave/I-210 FWY
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5215	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1372	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1153	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1153	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.7	mi/h
Number of lanes, N	5	
Density, D	15.4	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	San Rafael Ave/I-210 FWY
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7100	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1868	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1569	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1569	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	71.4	mi/h
Number of lanes, N	5	
Density, D	22.0	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	San Rafael Ave/I-210 FWY
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7520	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1979	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1670	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1670	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	5	
Density, D	23.8	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	San Rafael Ave/I-210 FWY
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5265	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1386	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1169	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1169	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.7	mi/h
Number of lanes, N	5	
Density, D	15.7	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	San Rafael Ave/I-210 FWY
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7150	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1882	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1588	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1588	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	71.2	mi/h
Number of lanes, N	5	
Density, D	22.3	pc/mi/ln
Level of service, LOS	C	

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	San Rafael Ave/I-210 FWY
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	8190	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2155	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1819	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1819	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	67.6	mi/h
Number of lanes, N	5	
Density, D	26.9	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	San Rafael Ave/I-210 FWY
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5735	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1509	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1274	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1274	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.2	mi/h
Number of lanes, N	5	
Density, D	17.2	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	San Rafael Ave/I-210 FWY
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7790	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2050	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1730	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1730	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	69.1	mi/h
Number of lanes, N	5	
Density, D	25.0	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
FWY SEGMENT SUMMARY	TM	23-Sep-13	VV.110264.0000	1 OF 1

SEGMENT NAME : SR-134 Interchange and Lake Avenue

FREEWAY : I-210

PROJECTED YEAR : SEGMENT

PROJECTED GROWTH PER YEAR : 4.50%

ROUTE

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
EASTBOUND								
AM	9270	1%	**50**	9320	2%	835	10155	2%
MID	9100	5%	**50**	9150	5%	820	9970	5%
PM	9575	4%	**50**	9625	4%	860	10485	4%
WESTBOUND								
AM	9710	3%	**50**	9760	3%	875	10635	3%
MID	7420	8%	**50**	7470	9%	670	8140	9%
PM	8400	12%	**50**	8450	13%	755	9205	13%

Tustin Office: 714.665.4500 Tel/ 714.665.4501 Fax

Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax

Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax

Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	SR-134/Lake Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	9270	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2439	v
Trucks and buses	2	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.990	
Driver population factor, fp	1.00	
Flow rate, vp	1971	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1971	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	64.6	mi/h
Number of lanes, N	5	
Density, D	30.5	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/EB
From/To:	SR-134/Lake Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	9100	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2395	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	2021	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2021	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	63.5	mi/h
Number of lanes, N	5	
Density, D	31.8	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	SR-134/Lake Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	9575	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2520	v
Trucks and buses	8	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.962	
Driver population factor, fp	1.00	
Flow rate, vp	2096	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2096	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	61.7	mi/h
Number of lanes, N	5	
Density, D	34.0	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	SR-134/Lake Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description:	VV.110264

Flow Inputs and Adjustments

Volume, V	9320	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2453	v
Trucks and buses	3	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.985	
Driver population factor, fp	1.00	
Flow rate, vp	1992	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1992	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	64.1	mi/h
Number of lanes, N	5	
Density, D	31.1	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/EB
From/To:	SR-134/Lake Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description:	VV.110264

Flow Inputs and Adjustments

Volume, V	9150	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2408	v
Trucks and buses	12	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	2042	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2042	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	63.0	mi/h
Number of lanes, N	5	
Density, D	32.4	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	SR-134/Lake Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	9625	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2533	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	2118	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2118	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	61.2	mi/h
Number of lanes, N	5	
Density, D	34.6	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	SR-134/Lake Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	10155	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2672	v
Trucks and buses	3	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.985	
Driver population factor, fp	1.00	
Flow rate, vp	2170	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2170	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	59.8	mi/h
Number of lanes, N	5	
Density, D	36.3	pc/mi/ln
Level of service, LOS	E	

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/EB
From/To:	SR-134/Lake Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	9970	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2624	v
Trucks and buses	12	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	2225	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2225	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	58.4	mi/h
Number of lanes, N	5	
Density, D	38.1	pc/mi/ln
Level of service, LOS	E	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	SR-134/Lake Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	10485	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2759	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	2307	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2307	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	56.1	mi/h
Number of lanes, N	5	
Density, D	41.1	pc/mi/ln
Level of service, LOS	E	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	SR-134/Lake Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	9710	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2555	v
Trucks and buses	3	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.985	
Driver population factor, fp	1.00	
Flow rate, vp	2075	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2075	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	62.2	mi/h
Number of lanes, N	5	
Density, D	33.4	pc/mi/ln
Level of service, LOS	D	

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/WB
From/To:	SR-134/Lake Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7420	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1953	v
Trucks and buses	8	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.962	
Driver population factor, fp	1.00	
Flow rate, vp	1625	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1625	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	70.7	mi/h
Number of lanes, N	5	
Density, D	23.0	pc/mi/ln
Level of service, LOS	C	

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	SR-134/Lake Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	8400	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2211	v
Trucks and buses	12	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	1875	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1875	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	66.5	mi/h
Number of lanes, N	5	
Density, D	28.2	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	SR-134/Lake Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	9760	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2568	v
Trucks and buses	3	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.985	
Driver population factor, fp	1.00	
Flow rate, vp	2086	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2086	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	61.9	mi/h
Number of lanes, N	5	
Density, D	33.7	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/WB
From/To:	SR-134/Lake Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7470	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1966	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1643	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1643	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	70.4	mi/h
Number of lanes, N	5	
Density, D	23.3	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	SR-134/Lake Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	8450	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2224	v
Trucks and buses	13	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.939	
Driver population factor, fp	1.00	
Flow rate, vp	1895	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1895	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	66.1	mi/h
Number of lanes, N	5	
Density, D	28.7	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

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Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	SR-134/Lake Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	10635	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2799	v
Trucks and buses	3	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.985	
Driver population factor, fp	1.00	
Flow rate, vp	2273	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2273	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	57.1	mi/h
Number of lanes, N	5	
Density, D	39.8	pc/mi/ln
Level of service, LOS	E	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/WB
From/To:	SR-134/Lake Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	8140	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2142	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1791	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1791	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	68.1	mi/h
Number of lanes, N	5	
Density, D	26.3	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
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Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	SR-134/Lake Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	9205	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2422	v
Trucks and buses	13	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.939	
Driver population factor, fp	1.00	
Flow rate, vp	2064	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2064	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	62.5	mi/h
Number of lanes, N	5	
Density, D	33.0	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
FWY SEGMENT SUMMARY	TM	23-Sep-13	VV.110264.0000	1 OF 1

SEGMENT NAME : I-605 Interchange and Irwindale Avenue

FREEWAY : I-210

PROJECTED YEAR :

PROJECTED GROWTH PER YEAR : 4.50%

SEGMENT ROUTE

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
EASTBOUND								
AM	5515	2%	**50**	5565	3%	495	6060	3%
MID	5200	4%	**50**	5250	5%	470	5720	5%
PM	5615	4%	**50**	5665	5%	505	6170	5%
WESTBOUND								
AM	7070	5%	**50**	7120	5%	635	7755	5%
MID	6825	4%	**50**	6875	5%	615	7490	5%
PM	7520	6%	**50**	7570	7%	675	8245	7%

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Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax

Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax

Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	I-605/Irwindale Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5515	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1451	v
Trucks and buses	2	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.990	
Driver population factor, fp	1.00	
Flow rate, vp	1173	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1173	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.7	mi/h
Number of lanes, N	5	
Density, D	15.7	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/EB
From/To:	I-605/Irwindale Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5200	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1368	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	1117	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1117	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.8	mi/h
Number of lanes, N	5	
Density, D	14.9	pc/mi/ln
Level of service, LOS	B	

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	I-605/Irwindale Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5615	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1478	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	1206	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1206	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.5	mi/h
Number of lanes, N	5	
Density, D	16.2	pc/mi/ln
Level of service, LOS	B	

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	I-605/Irwindale Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5565	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1464	v
Trucks and buses	3	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.985	
Driver population factor, fp	1.00	
Flow rate, vp	1189	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1189	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.6	mi/h
Number of lanes, N	5	
Density, D	15.9	pc/mi/ln
Level of service, LOS	B	

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Operational Analysis

Analyst:	TM
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Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/EB
From/To:	I-605/Irwindale Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5250	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1382	v
Trucks and buses	5	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.976	
Driver population factor, fp	1.00	
Flow rate, vp	1133	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1133	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.8	mi/h
Number of lanes, N	5	
Density, D	15.1	pc/mi/ln
Level of service, LOS	B	

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Operational Analysis

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Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	I-605/Irwindale Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5665	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1491	v
Trucks and buses	5	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.976	
Driver population factor, fp	1.00	
Flow rate, vp	1222	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1222	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.5	mi/h
Number of lanes, N	5	
Density, D	16.4	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
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Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	I-605/Irwindale Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6060	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1595	v
Trucks and buses	3	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.985	
Driver population factor, fp	1.00	
Flow rate, vp	1295	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1295	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.0	mi/h
Number of lanes, N	5	
Density, D	17.5	pc/mi/ln
Level of service, LOS	B	

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Operational Analysis

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Date Performed:	8/11/2012
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Freeway/Direction:	I-210/EB
From/To:	I-605/Irwindale Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5720	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1505	v
Trucks and buses	5	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.976	
Driver population factor, fp	1.00	
Flow rate, vp	1234	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1234	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.4	mi/h
Number of lanes, N	5	
Density, D	16.6	pc/mi/ln
Level of service, LOS	B	

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Operational Analysis

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Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	I-605/Irwindale Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6170	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1624	v
Trucks and buses	5	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.976	
Driver population factor, fp	1.00	
Flow rate, vp	1331	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1331	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.8	mi/h
Number of lanes, N	5	
Density, D	18.0+	pc/mi/ln
Level of service, LOS	C	

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	I-605/Irwindale Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7070	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1861	v
Trucks and buses	5	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.976	
Driver population factor, fp	1.00	
Flow rate, vp	1526	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1526	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	71.9	mi/h
Number of lanes, N	5	
Density, D	21.2	pc/mi/ln
Level of service, LOS	C	

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Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/WB
From/To:	I-605/Irwindale Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6825	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1796	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	1466	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1466	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	72.6	mi/h
Number of lanes, N	5	
Density, D	20.2	pc/mi/ln
Level of service, LOS	C	

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Operational Analysis

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Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	I-605/Irwindale Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7520	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1979	v
Trucks and buses	6	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.971	
Driver population factor, fp	1.00	
Flow rate, vp	1631	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1631	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	70.6	mi/h
Number of lanes, N	5	
Density, D	23.1	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
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Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	I-605/Irwindale Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7120	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1874	v
Trucks and buses	5	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.976	
Driver population factor, fp	1.00	
Flow rate, vp	1536	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1536	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	71.8	mi/h
Number of lanes, N	5	
Density, D	21.4	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

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Date Performed:	8/11/2012
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Freeway/Direction:	I-210/WB
From/To:	I-605/Irwindale Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6875	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1809	v
Trucks and buses	5	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.976	
Driver population factor, fp	1.00	
Flow rate, vp	1484	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1484	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	72.4	mi/h
Number of lanes, N	5	
Density, D	20.5	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

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Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	I-605/Irwindale Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7570	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1992	v
Trucks and buses	7	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.966	
Driver population factor, fp	1.00	
Flow rate, vp	1649	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1649	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	70.3	mi/h
Number of lanes, N	5	
Density, D	23.4	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Phone: Fax:
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Operational Analysis

Analyst:	TM
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Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	I-605/Irwindale Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7755	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2041	v
Trucks and buses	5	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.976	
Driver population factor, fp	1.00	
Flow rate, vp	1673	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1673	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	5	
Density, D	23.9	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/WB
From/To:	I-605/Irwindale Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7490	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1971	v
Trucks and buses	5	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.976	
Driver population factor, fp	1.00	
Flow rate, vp	1616	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1616	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	70.8	mi/h
Number of lanes, N	5	
Density, D	22.8	pc/mi/ln
Level of service, LOS	C	

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	I-605/Irwindale Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	8245	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2170	v
Trucks and buses	7	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.966	
Driver population factor, fp	1.00	
Flow rate, vp	1797	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1797	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	68.0	mi/h
Number of lanes, N	5	
Density, D	26.4	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

Hall & Foreman, Inc.
Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
FWY SEGMENT SUMMARY	TM	23-Sep-13	VV.110264.0000	1 OF 1

SEGMENT NAME : Irwindale Avenue and Azusa Avenue
FREEWAY : I-210
PROJECTED YEAR : SEGMENT
PROJECTED GROWTH PER YEAR : 4.50%
ROUTE

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
EASTBOUND								
AM	6225	4%	50	6275	5%	560	6835	5%
MID	6660	4%	50	6710	5%	600	7310	5%
PM	6265	7%	50	6315	8%	565	6880	8%
WESTBOUND								
AM	6715	4%	50	6765	4%	605	7370	4%
MID	6630	4%	50	6680	4%	595	7275	4%
PM	8500	4%	50	8550	4%	765	9315	4%

Tustin Office: 714.665.4500 Tel/ 714.665.4501 Fax
Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax
Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax
Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Irwindale Avenue/Azusa Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6225	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1638	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	1337	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1337	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.7	mi/h
Number of lanes, N	5	
Density, D	18.1	pc/mi/ln
Level of service, LOS	C	

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Irwindale Avenue/Azusa Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6660	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1753	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	1430	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1430	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.0	mi/h
Number of lanes, N	5	
Density, D	19.6	pc/mi/ln
Level of service, LOS	C	

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Irwindale Avenue/Azusa Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6265	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1649	v
Trucks and buses	7	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.966	
Driver population factor, fp	1.00	
Flow rate, vp	1365	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1365	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.5	mi/h
Number of lanes, N	5	
Density, D	18.6	pc/mi/ln
Level of service, LOS	C	

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Irwindale Avenue/Azusa Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6275	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1651	v
Trucks and buses	5	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.976	
Driver population factor, fp	1.00	
Flow rate, vp	1354	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1354	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.6	mi/h
Number of lanes, N	5	
Density, D	18.4	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Irwindale Avenue/Azusa Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6710	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1766	v
Trucks and buses	5	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.976	
Driver population factor, fp	1.00	
Flow rate, vp	1448	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1448	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	72.8	mi/h
Number of lanes, N	5	
Density, D	19.9	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
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Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Irwindale Avenue/Azusa Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6315	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1662	v
Trucks and buses	8	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.962	
Driver population factor, fp	1.00	
Flow rate, vp	1383	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1383	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.4	mi/h
Number of lanes, N	5	
Density, D	18.8	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
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Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Project Conditions Year 2014
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6835	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1799	v
Trucks and buses	5	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.976	
Driver population factor, fp	1.00	
Flow rate, vp	1475	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1475	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	72.5	mi/h
Number of lanes, N	5	
Density, D	20.3	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
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Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Irwindale Avenue/Azusa Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7310	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1924	v
Trucks and buses	5	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.976	
Driver population factor, fp	1.00	
Flow rate, vp	1577	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1577	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	71.3	mi/h
Number of lanes, N	5	
Density, D	22.1	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Irwindale Avenue/Azusa Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6880	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1811	v
Trucks and buses	8	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.962	
Driver population factor, fp	1.00	
Flow rate, vp	1506	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1506	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	72.2	mi/h
Number of lanes, N	5	
Density, D	20.9	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
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Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Irwindale Avenue/Azusa Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6835	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1799	v
Trucks and buses	5	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.976	
Driver population factor, fp	1.00	
Flow rate, vp	1475	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1475	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	72.5	mi/h
Number of lanes, N	5	
Density, D	20.3	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Irwindale Avenue/Azusa Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6715	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1767	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	1442	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1442	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	72.8	mi/h
Number of lanes, N	5	
Density, D	19.8	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Irwindale Avenue/Azusa Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6630	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1745	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	1424	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1424	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.0	mi/h
Number of lanes, N	5	
Density, D	19.5	pc/mi/ln
Level of service, LOS	C	

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HCS 2010: Basic Freeway Segments Release 6.3

Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Irwindale Avenue/Azusa Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	8500	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2237	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	1825	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1825	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	67.5	mi/h
Number of lanes, N	5	
Density, D	27.1	pc/mi/ln
Level of service, LOS	D	

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Irwindale Avenue/Azusa Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description:	VV.110264

Flow Inputs and Adjustments

Volume, V	6765	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1780	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	1453	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1453	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	72.7	mi/h
Number of lanes, N	5	
Density, D	20.0	pc/mi/ln
Level of service, LOS	C	

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Irwindale Avenue/Azusa Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description:	VV.110264

Flow Inputs and Adjustments

Volume, V	6680	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1758	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	1434	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1434	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	72.9	mi/h
Number of lanes, N	5	
Density, D	19.7	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Irwindale Avenue/Azusa Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	8550	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2250	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	1836	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1836	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	67.3	mi/h
Number of lanes, N	5	
Density, D	27.3	pc/mi/ln
Level of service, LOS	D	

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Irwindale Avenue/Azusa Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7370	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1939	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	1583	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1583	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	71.2	mi/h
Number of lanes, N	5	
Density, D	22.2	pc/mi/ln
Level of service, LOS	C	

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Operational Analysis

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Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Irwindale Avenue/Azusa Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7275	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1914	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	1562	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1562	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	71.5	mi/h
Number of lanes, N	5	
Density, D	21.8	pc/mi/ln
Level of service, LOS	C	

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Operational Analysis

Analyst:	TM
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Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Irwindale Avenue/Azusa Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	9315	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2451	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	2000	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2000	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	63.9	mi/h
Number of lanes, N	5	
Density, D	31.3	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

Hall & Foreman, Inc.
Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
FWY SEGMENT SUMMARY	TM	23-Sep-13	VV.110264.0000	1 OF 1

SEGMENT NAME : Foothill Boulevard and Berkshire Avenue
FREEWAY : I-210
PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%
SEGMENT
ROUTE

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
EASTBOUND								
AM	5570	10%	**50**	5620	11%	500	6120	11%
MID	3560	10%	**50**	3610	11%	320	3930	11%
PM	4175	10%	**50**	4225	11%	375	4600	11%
WESTBOUND								
AM	3705	11%	**50**	3755	12%	335	4090	12%
MID	3645	17%	**50**	3695	19%	330	4025	19%
PM	5765	9%	**50**	5815	10%	520	6335	10%

ote: Asterick (*) denotes value calculated from Caltrans data

Tustin Office: 714.665.4500 Tel/ 714.665.4501 Fax
Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax
Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax
Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

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Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Foothill Boulevard/Berkshire A
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5570	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1466	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1539	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1539	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	71.8	mi/h
Number of lanes, N	4	
Density, D	21.4	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Foothill Boulevard/Berkshire A
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3560	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	937	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	984	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	984	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	13.1	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Foothill Boulevard/Berkshire A
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	4175	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1099	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1154	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1154	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.7	mi/h
Number of lanes, N	4	
Density, D	15.4	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Foothill Boulevard/Berkshire A
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5620	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1479	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1560	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1560	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	71.5	mi/h
Number of lanes, N	4	
Density, D	21.8	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Foothill Boulevard/Berkshire A
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions.
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3610	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	950	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1002	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1002	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	13.4	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Foothill Boulevard/Berkshire A
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	4225	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1112	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1173	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1173	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.7	mi/h
Number of lanes, N	4	
Density, D	15.7	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Foothill Boulevard/Berkshire A
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6120	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1611	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1699	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1699	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	69.6	mi/h
Number of lanes, N	4	
Density, D	24.4	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Foothill Boulevard/Berkshire A
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3930	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1034	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1091	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1091	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.9	mi/h
Number of lanes, N	4	
Density, D	14.6	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Foothill Boulevard/Berkshire A
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	4600	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1211	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1277	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1277	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.2	mi/h
Number of lanes, N	4	
Density, D	17.2	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Foothill Boulevard/Berkshire A
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3705	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	975	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1029	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1029	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	13.7	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Foothill Boulevard/Berkshire A
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3645	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	959	v
Trucks and buses	17	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.922	
Driver population factor, fp	1.00	
Flow rate, vp	1041	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1041	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	13.9	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Foothill Boulevard/Berkshire A
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5765	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1517	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1585	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1585	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	71.2	mi/h
Number of lanes, N	4	
Density, D	22.3	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Foothill Boulevard/Berkshire A
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3755	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	988	v
Trucks and buses	12	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	1047	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1047	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	14.0	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Foothill Boulevard/Berkshire A
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3695	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	972	v
Trucks and buses	19	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.913	
Driver population factor, fp	1.00	
Flow rate, vp	1065	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1065	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	14.2	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Foothill Boulevard/Berkshire A
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5815	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1530	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1607	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1607	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	70.9	mi/h
Number of lanes, N	4	
Density, D	22.7	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Foothill Boulevard/Berkshire A
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	4090	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1076	v
Trucks and buses	12	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	1141	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1141	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.8	mi/h
Number of lanes, N	4	
Density, D	15.3	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Foothill Boulevard/Berkshire A
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	4025	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1059	v
Trucks and buses	19	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.913	
Driver population factor, fp	1.00	
Flow rate, vp	1160	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1160	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.7	mi/h
Number of lanes, N	4	
Density, D	15.5	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Foothill Boulevard/Berkshire A
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6335	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1667	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1750	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1750	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	68.8	mi/h
Number of lanes, N	4	
Density, D	25.4	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
FWY SEGMENT SUMMARY	TM	23-Sep-13	VV.110264.0000	1 OF 1

SEGMENT NAME : SR-2 Interchange and Angeles Crest Highway
FREEWAY : I-210
PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%
SEGMENT ROUTE

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
EASTBOUND								
AM	N/D	N/D	**50**	N/D	N/D	N/D	N/D	N/D
MID	N/D	N/D	**50**	N/D	N/D	N/D	N/D	N/D
PM	N/D	N/D	**50**	N/D	N/D	N/D	N/D	N/D
WESTBOUND								
AM	3450	5%	**50**	3500	7%	310	3810	7%
MID	3305	11%	**50**	3355	13%	295	3650	13%
PM	5495	5%	**50**	5545	6%	495	6040	6%

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Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax
Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax
Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

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Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	SR-2/Angeles Crest Highway
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3450	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	908	v
Trucks and buses	5	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.976	
Driver population factor, fp	1.00	
Flow rate, vp	931	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	931	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	12.4	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/WB
From/To:	SR-2/Angeles Crest Highway
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description:	VV.110264

Flow Inputs and Adjustments

Volume, V	3305	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	870	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	918	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	918	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	12.2	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	SR-2/Angeles Crest Highway
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5495	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1446	v
Trucks and buses	5	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.976	
Driver population factor, fp	1.00	
Flow rate, vp	1482	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1482	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	72.4	mi/h
Number of lanes, N	4	
Density, D	20.5	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	SR-2/Angeles Crest Highway
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3500	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	921	v
Trucks and buses	7	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.966	
Driver population factor, fp	1.00	
Flow rate, vp	953	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	953	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	12.7	pc/mi/ln
Level of service, LOS	B	

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/WB
From/To:	SR-2/Angeles Crest Highway
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description:	VV.110264

Flow Inputs and Adjustments

Volume, V	3355	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	883	v
Trucks and buses	13	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.939	
Driver population factor, fp	1.00	
Flow rate, vp	940	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	940	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	12.5	pc/mi/ln
Level of service, LOS	B	

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	SR-2/Angeles Crest Highway
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5545	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1459	v
Trucks and buses	6	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.971	
Driver population factor, fp	1.00	
Flow rate, vp	1503	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1503	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	72.2	mi/h
Number of lanes, N	4	
Density, D	20.8	pc/mi/ln
Level of service, LOS	C	

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Operational Analysis

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Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	SR-2/Angeles Crest Highway
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3810	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1003	v
Trucks and buses	7	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.966	
Driver population factor, fp	1.00	
Flow rate, vp	1038	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1038	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	13.8	pc/mi/ln
Level of service, LOS	B	

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Operational Analysis

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Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/WB
From/To:	SR-2/Angeles Crest Highway
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3650	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	961	v
Trucks and buses	13	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.939	
Driver population factor, fp	1.00	
Flow rate, vp	1023	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1023	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	13.6	pc/mi/ln
Level of service, LOS	B	

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Operational Analysis

Analyst:	TM
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Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	SR-2/Angeles Crest Highway
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6040	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1589	v
Trucks and buses	6	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.971	
Driver population factor, fp	1.00	
Flow rate, vp	1637	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1637	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	70.5	mi/h
Number of lanes, N	4	
Density, D	23.2	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
FWY SEGMENT SUMMARY	TM	23-Sep-13	VV.110264.0000	1 OF 1

SEGMENT NAME : Mountain Street and I-210 Interchange
PROJECTED YEAR :
SEGMENT
FREEWAY : SR-2
PROJECTED GROWTH PER YEAR : 4.50%
ROUTE

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
NORTHBOUND								
AM	2590	10%	**50**	2640	12%	235	2875	12%
MID	5200	10%	**50**	5250	11%	470	5720	11%
PM	5610	10%	**50**	5660	11%	505	6165	11%
SOUTHBOUND								
AM	6015	10%	**50**	6065	11%	540	6605	11%
MID	2095	10%	**50**	2145	12%	190	2335	12%
PM	2790	10%	**50**	2840	12%	250	3090	12%

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Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax
Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax
Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	SR-2/NB
From/To:	Mountain Street/I-210 FWY
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description:	VV.110264

Flow Inputs and Adjustments

Volume, V	2590	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	682	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	573	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	573	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	5	
Density, D	7.6	pc/mi/ln
Level of service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	SR-2/NB
From/To:	Mountain Street/I-210 FWY
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5200	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1368	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1149	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1149	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.8	mi/h
Number of lanes, N	5	
Density, D	15.4	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR-2/NB
From/To:	Mountain Street/I-210 FWY
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5610	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1476	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1240	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1240	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.4	mi/h
Number of lanes, N	5	
Density, D	16.7	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	SR-2/NB
From/To:	Mountain Street/I-210 FWY
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description:	VV.110264

Flow Inputs and Adjustments

Volume, V	2640	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	695	v
Trucks and buses	12	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	589	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	589	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	5	
Density, D	7.9	pc/mi/ln
Level of service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

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Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	SR-2/NB
From/To:	Mountain Street/I-210 FWY
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description:	VV.110264

Flow Inputs and Adjustments

Volume, V	5250	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1382	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1166	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1166	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.7	mi/h
Number of lanes, N	5	
Density, D	15.6	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR-2/NB
From/To:	Mountain Street/I-210 FWY
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5660	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1489	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1257	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1257	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.3	mi/h
Number of lanes, N	5	
Density, D	16.9	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	SR-2/NB
From/To:	Mountain Street/I-210 FWY
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	2875	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	757	v
Trucks and buses	12	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	642	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	642	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	5	
Density, D	8.6	pc/mi/ln
Level of service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	SR-2/NB
From/To:	Mountain Street/I-210 FWY
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5720	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1505	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1270	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1270	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.2	mi/h
Number of lanes, N	5	
Density, D	17.1	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR-2/NB
From/To:	Mountain Street/I-210 FWY
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6165	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1622	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1369	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1369	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.5	mi/h
Number of lanes, N	5	
Density, D	18.6	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	SR-2/SB
From/To:	Mountain Street/I-210 FWY
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6015	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1583	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1662	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1662	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	70.1	mi/h
Number of lanes, N	4	
Density, D	23.7	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	SR-2/SB
From/To:	Mountain Street/I-210 FWY
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	2095	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	551	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	579	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	579	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	7.7	pc/mi/ln
Level of service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR-2/SB
From/To:	Mountain Street/I-210 FWY
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	2790	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	734	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	771	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	771	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	10.3	pc/mi/ln
Level of service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	SR-2/SB
From/To:	Mountain Street/I-210 FWY
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6065	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1596	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1684	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1684	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	69.8	mi/h
Number of lanes, N	4	
Density, D	24.1	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	SR-2/SB
From/To:	Mountain Street/I-210 FWY
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	2145	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	564	v
Trucks and buses	12	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	598	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	598	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	8.0	pc/mi/ln
Level of service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR-2/SB
From/To:	Mountain Street/I-210 FWY
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	2840	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	747	v
Trucks and buses	12	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	792	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	792	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	10.6	pc/mi/ln
Level of service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

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Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	SR-2/SB
From/To:	Mountain Street/I-210 FWY
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6605	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1738	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1834	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1834	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	67.3	mi/h
Number of lanes, N	4	
Density, D	27.3	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	SR-2/SB
From/To:	Mountain Street/I-210 FWY
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	2335	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	614	v
Trucks and buses	12	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	651	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	651	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	8.7	pc/mi/ln
Level of service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR-2/SB
From/To:	Mountain Street/I-210 FWY
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3090	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	813	v
Trucks and buses	12	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	862	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	862	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	11.5	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
FWY SEGMENT SUMMARY	TM	23-Sep-13	VV.110264.0000	1 OF 1

SEGMENT NAME : SR-134 Interchange and Mountain Street
FREEWAY : SR-2
PROJECTED YEAR : SEGMENT
PROJECTED GROWTH PER YEAR : 4.50%
ROUTE

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
NORTHBOUND								
AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
SOUTHBOUND								
AM	6475	10%	50	6525	11%	585	7110	11%
MID	2580	10%	50	2630	12%	230	2860	12%
PM	3235	10%	50	3285	11%	290	3575	11%

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Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax
Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax
Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

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Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	SR-2/SB
From/To:	SR-134/Mountain Street
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6475	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1704	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1789	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1789	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	68.1	mi/h
Number of lanes, N	4	
Density, D	26.3	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	SR-2/SB
From/To:	SR-134/Mountain Street
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	2580	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	679	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	713	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	713	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	9.5	pc/mi/ln
Level of service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR-2/SB
From/To:	SR-134/Mountain Street
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3235	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	851	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	894	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	894	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	11.9	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	SR-2/SB
From/To:	SR-134/Mountain Street
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6525	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1717	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1812	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1812	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	67.7	mi/h
Number of lanes, N	4	
Density, D	26.8	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	SR-2/SB
From/To:	SR-134/Mountain Street
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	2630	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	692	v
Trucks and buses	12	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	734	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	734	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	9.8	pc/mi/ln
Level of service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR-2/SB
From/To:	SR-134/Mountain Street
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3285	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	864	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	912	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	912	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	12.2	pc/mi/ln
Level of service, LOS	B	

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	SR-2/SB
From/To:	SR-134/Mountain Street
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7110	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1871	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1974	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1974	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	64.5	mi/h
Number of lanes, N	4	
Density, D	30.6	pc/mi/ln
Level of service, LOS	D	

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	SR-2/SB
From/To:	SR-134/Mountain Street
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	2860	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	753	v
Trucks and buses	12	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	798	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	798	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	10.6	pc/mi/ln
Level of service, LOS	A	

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR-2/SB
From/To:	SR-134/Mountain Street
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3575	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	941	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	993	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	993	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	13.2	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
FWY SEGMENT SUMMARY	TM	23-Sep-13	VV.110264.0000	1 OF 1

SEGMENT NAME : SR-2 Interchange and Figueroa Avenue

FREEWAY : SR-134

PROJECTED YEAR : SEGMENT

PROJECTED GROWTH PER YEAR : 4.50%

ROUTE

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
EASTBOUND								
AM	6030	10%	**50**	6080	11%	545	6625	11%
MID	6245	10%	**50**	6295	11%	560	6855	11%
PM	6905	10%	**50**	6955	11%	620	7575	11%
WESTBOUND								
AM	6300	2%	**50**	6350	3%	565	6915	3%
MID	5035	2%	**50**	5085	3%	455	5540	3%
PM	6325	2%	**50**	6375	3%	570	6945	3%

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	SR-134/EB
From/To:	SR-2/Figueroa Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6030	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1587	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1333	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1333	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.8	mi/h
Number of lanes, N	5	
Density, D	18.1	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	SR-134/EB
From/To:	SR-2/Figueroa Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6245	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1643	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1380	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1380	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.4	mi/h
Number of lanes, N	5	
Density, D	18.8	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR-134/EB
From/To:	SR-2/Figueroa Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6905	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1817	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1526	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1526	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	71.9	mi/h
Number of lanes, N	5	
Density, D	21.2	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	SR-134/EB
From/To:	SR-2/Figueroa Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6080	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1600	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1350	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1350	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.6	mi/h
Number of lanes, N	5	
Density, D	18.3	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	SR-134/EB
From/To:	SR-2/Figueroa Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6295	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1657	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1398	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1398	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.2	mi/h
Number of lanes, N	5	
Density, D	19.1	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR-134/EB
From/To:	SR-2/Figueroa Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6955	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1830	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1537	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1537	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	71.8	mi/h
Number of lanes, N	5	
Density, D	21.4	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	SR-134/EB
From/To:	SR-2/Figueroa Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6625	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1743	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1471	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1471	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	72.5	mi/h
Number of lanes, N	5	
Density, D	20.3	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	SR-134/EB
From/To:	SR-2/Figueroa Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6855	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1804	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1523	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1523	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	72.0	mi/h
Number of lanes, N	5	
Density, D	21.2	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR-134/EB
From/To:	SR-2/Figueroa Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7575	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1993	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1682	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1682	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	69.9	mi/h
Number of lanes, N	5	
Density, D	24.1	pc/mi/ln
Level of service, LOS	C	

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	SR-2/Figueroa Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6300	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1658	v
Trucks and buses	2	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.990	
Driver population factor, fp	1.00	
Flow rate, vp	1340	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1340	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.7	mi/h
Number of lanes, N	5	
Density, D	18.2	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

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E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	SR-2/Figueroa Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5035	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1325	v
Trucks and buses	2	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.990	
Driver population factor, fp	1.00	
Flow rate, vp	1071	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1071	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.9	mi/h
Number of lanes, N	5	
Density, D	14.3	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	SR-2/Figueroa Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6325	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1664	v
Trucks and buses	2	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.990	
Driver population factor, fp	1.00	
Flow rate, vp	1345	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1345	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.7	mi/h
Number of lanes, N	5	
Density, D	18.3	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	SR-2/Figueroa Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6350	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1671	v
Trucks and buses	3	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.985	
Driver population factor, fp	1.00	
Flow rate, vp	1357	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1357	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.6	mi/h
Number of lanes, N	5	
Density, D	18.4	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	SR-2/Figueroa Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5085	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1338	v
Trucks and buses	3	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.985	
Driver population factor, fp	1.00	
Flow rate, vp	1087	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1087	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.9	mi/h
Number of lanes, N	5	
Density, D	14.5	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	SR-2/Figueroa Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6375	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1678	v
Trucks and buses	3	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.985	
Driver population factor, fp	1.00	
Flow rate, vp	1362	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1362	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.5	mi/h
Number of lanes, N	5	
Density, D	18.5	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	SR-2/Figueroa Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6915	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1820	v
Trucks and buses	3	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.985	
Driver population factor, fp	1.00	
Flow rate, vp	1478	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1478	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	72.5	mi/h
Number of lanes, N	5	
Density, D	20.4	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	SR-2/Figueroa Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5540	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1458	v
Trucks and buses	3	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.985	
Driver population factor, fp	1.00	
Flow rate, vp	1184	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1184	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.6	mi/h
Number of lanes, N	5	
Density, D	15.9	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	SR-2/Figueroa Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6945	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1828	v
Trucks and buses	3	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.985	
Driver population factor, fp	1.00	
Flow rate, vp	1484	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1484	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	72.4	mi/h
Number of lanes, N	5	
Density, D	20.5	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
FWY SEGMENT SUMMARY	TM	23-Sep-13	VV.110264.0000	1 OF 1

SEGMENT NAME : Glendale Avenue and SR-2 Interchange

FREEWAY : SR-134

PROJECTED YEAR : SEGMENT

PROJECTED GROWTH PER YEAR : 4.50%

ROUTE

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
EASTBOUND								
AM	6490	10%	50	6540	11%	585	7125	11%
MID	7175	10%	50	7225	11%	645	7870	11%
PM	8435	10%	50	8485	11%	760	9245	11%
WESTBOUND								
AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D

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Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax

Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax

Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	SR-134/EB
From/To:	Glendale Avenue/SR-2
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6490	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1708	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1435	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1435	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	72.9	mi/h
Number of lanes, N	5	
Density, D	19.7	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	SR-134/EB
From/To:	Glendale Avenue/SR-2
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7175	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1888	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1586	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1586	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	71.2	mi/h
Number of lanes, N	5	
Density, D	22.3	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR-134/EB
From/To:	Glendale Avenue/SR-2
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	8435	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2220	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1865	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1865	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	66.7	mi/h
Number of lanes, N	5	
Density, D	28.0	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	SR-134/EB
From/To:	Glendale Avenue/SR-2
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6540	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1721	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1453	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1453	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	72.7	mi/h
Number of lanes, N	5	
Density, D	20.0	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	SR-134/EB
From/To:	Glendale Avenue/SR-2
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7225	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1901	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1605	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1605	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	70.9	mi/h
Number of lanes, N	5	
Density, D	22.6	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR-134/EB
From/To:	Glendale Avenue/SR-2
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions.
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	8485	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2233	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1885	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1885	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	66.3	mi/h
Number of lanes, N	5	
Density, D	28.4	pc/mi/ln
Level of service, LOS	D	

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	SR-134/EB
From/To:	Glendale Avenue/SR-2
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7125	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1875	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1583	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1583	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	71.2	mi/h
Number of lanes, N	5	
Density, D	22.2	pc/mi/ln
Level of service, LOS	C	

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	SR-134/EB
From/To:	Glendale Avenue/SR-2
Jurisdiction:	Caltrans
Analysis Year:	
Description:	VV.110264

Flow Inputs and Adjustments

Volume, V	7870	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2071	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1748	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1748	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	68.8	mi/h
Number of lanes, N	5	
Density, D	25.4	pc/mi/ln
Level of service, LOS	C	

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR-134/EB
From/To:	Glendale Avenue/SR-2
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	9245	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2433	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	2053	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2053	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	62.7	mi/h
Number of lanes, N	5	
Density, D	32.7	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
FWY SEGMENT SUMMARY	TM	23-Sep-13	VV.110264.0000	1 OF 1

SEGMENT NAME : San Fernando Street and Pacific Avenue

FREEWAY : SR-134

PROJECTED YEAR : SEGMENT

PROJECTED GROWTH PER YEAR : 4.50%

ROUTE

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
EASTBOUND								
AM	7185	10%	50	7235	11%	645	7880	11%
MID	6960	10%	50	7010	11%	625	7635	11%
PM	7455	10%	50	7505	11%	670	8175	11%
WESTBOUND								
AM	8330	10%	50	8380	11%	750	9130	11%
MID	6055	10%	50	6105	11%	545	6650	11%
PM	6470	10%	50	6520	11%	580	7100	11%

Tustin Office: 714.665.4500 Tel/ 714.665.4501 Fax

Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax

Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax

Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

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Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	SR-134/EB
From/To:	San Fernando/Pacific Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7185	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1891	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1985	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1985	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	64.3	mi/h
Number of lanes, N	4	
Density, D	30.9	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	SR-134/EB
From/To:	San Fernando/Pacific Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6960	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1832	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1923	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1923	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	65.6	mi/h
Number of lanes, N	4	
Density, D	29.3	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR-134/EB
From/To:	San Fernando/Pacific Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7455	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1962	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	2060	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2060	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	62.6	mi/h
Number of lanes, N	4	
Density, D	32.9	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

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E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	SR-134/EB
From/To:	San Fernando/Pacific Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7235	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1904	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	2009	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2009	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	63.7	mi/h
Number of lanes, N	4	
Density, D	31.5	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

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Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	SR-134/EB
From/To:	San Fernando/Pacific Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7010	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1845	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1946	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1946	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	65.1	mi/h
Number of lanes, N	4	
Density, D	29.9	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR-134/EB
From/To:	San Fernando/Pacific Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7505	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1975	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	2084	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2084	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	62.0	mi/h
Number of lanes, N	4	
Density, D	33.6	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

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Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	SR-134/EB
From/To:	San Fernando/Pacific Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7880	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2074	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	2188	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2188	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	59.4	mi/h
Number of lanes, N	4	
Density, D	36.8	pc/mi/ln
Level of service, LOS	E	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	SR-134/EB
From/To:	San Fernando/Pacific Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7635	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2009	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	2120	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2120	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	61.1	mi/h
Number of lanes, N	4	
Density, D	34.7	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR-134/EB
From/To:	San Fernando/Pacific Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	8175	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2151	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	2270	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2270	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	57.1	mi/h
Number of lanes, N	4	
Density, D	39.7	pc/mi/ln
Level of service, LOS	E	

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	San Fernando/Pacific Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	8330	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2192	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1841	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1841	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	67.2	mi/h
Number of lanes, N	5	
Density, D	27.4	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	San Fernando/Pacific Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6055	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1593	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1338	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1338	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.7	mi/h
Number of lanes, N	5	
Density, D	18.1	pc/mi/ln
Level of service, LOS	C	

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	San Fernando/Pacific Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6470	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1703	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1430	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1430	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.0	mi/h
Number of lanes, N	5	
Density, D	19.6	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	San Fernando/Pacific Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	8380	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2205	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1861	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1861	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	66.8	mi/h
Number of lanes, N	5	
Density, D	27.9	pc/mi/ln
Level of service, LOS	D	

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	San Fernando/Pacific Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6105	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1607	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1356	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1356	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.6	mi/h
Number of lanes, N	5	
Density, D	18.4	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	San Fernando/Pacific Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6520	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1716	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1448	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1448	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	72.8	mi/h
Number of lanes, N	5	
Density, D	19.9	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

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Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	San Fernando/Pacific Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	9130	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2403	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	2028	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2028	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	63.3	mi/h
Number of lanes, N	5	
Density, D	32.0	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

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Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	San Fernando/Pacific Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6650	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1750	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1477	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1477	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	72.5	mi/h
Number of lanes, N	5	
Density, D	20.4	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
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Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	San Fernando/Pacific Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7100	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1868	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1577	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1577	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	71.3	mi/h
Number of lanes, N	5	
Density, D	22.1	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

Hall & Foreman, Inc.

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
FWY SEGMENT SUMMARY	TM	23-Sep-13	VV.110264.0000	1 OF 1

SEGMENT NAME : I-5 Interchange and San Fernando Street

FREEWAY : SR-134

PROJECTED YEAR : SEGMENT

PROJECTED GROWTH PER YEAR : 4.50%

ROUTE

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
EASTBOUND								
AM	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D
MID	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D
PM	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D
WESTBOUND								
AM	6370	10%	50	6420	11%	575	6995	11%
MID	5000	10%	50	5050	11%	450	5500	11%
PM	8385	10%	50	8435	11%	755	9190	11%

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Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax

Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax

Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	I-5/San Fernando Street
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6370	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1676	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1760	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1760	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	68.6	mi/h
Number of lanes, N	4	
Density, D	25.7	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	I-5/San Fernando Street
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5000	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1316	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1382	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1382	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.4	mi/h
Number of lanes, N	4	
Density, D	18.8	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	I-5/San Fernando Street
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	8385	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2207	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	2317	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2317	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	55.8	mi/h
Number of lanes, N	4	
Density, D	41.5	pc/mi/ln
Level of service, LOS	E	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	I-5/San Fernando Street
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6420	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1689	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1782	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1782	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	68.2	mi/h
Number of lanes, N	4	
Density, D	26.1	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	I-5/San Fernando Street
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5050	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1329	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1402	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1402	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.2	mi/h
Number of lanes, N	4	
Density, D	19.2	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	I-5/San Fernando Street
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	8435	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2220	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	2342	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2342	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	55.1	mi/h
Number of lanes, N	4	
Density, D	42.5	pc/mi/ln
Level of service, LOS	E	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	I-5/San Fernando Street
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6995	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1841	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1942	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1942	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	65.2	mi/h
Number of lanes, N	4	
Density, D	29.8	pc/mi/ln
Level of service, LOS	D	

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	I-5/San Fernando Street
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5500	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1447	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1527	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1527	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	71.9	mi/h
Number of lanes, N	4	
Density, D	21.2	pc/mi/ln
Level of service, LOS	C	

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	I-5/San Fernando Street
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	9190	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2418	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	2551	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2551	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	48.4	mi/h
Number of lanes, N	4	
Density, D	52.7	pc/mi/ln
Level of service, LOS	F	

Overall results are not computed when free-flow speed is less than 55 mph.

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Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
FWY SEGMENT SUMMARY	TM	23-Sep-13	VV.110264.0000	1 OF 1

SEGMENT NAME : Western Avenue and SR-134 Interchange

FREEWAY : I-5

PROJECTED YEAR :

PROJECTED GROWTH PER YEAR : 4.50%

SEGMENT

ROUTE

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
SOUTHBOUND								
AM	6450	9%	50	6500	10%	580	7080	10%
MID	7095	12%	50	7145	13%	640	7785	13%
PM	6995	12%	50	7045	12%	630	7675	12%
NORTHBOUND								
AM	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D
MID	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D
PM	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D

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Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax

Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax

Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-5/SB
From/To:	Western Avenue/SR-134
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6450	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1697	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1774	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1774	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	68.4	mi/h
Number of lanes, N	4	
Density, D	25.9	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-5/SB
From/To:	Western Avenue/SR-134
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7095	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1867	v
Trucks and buses	12	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	1979	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1979	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	64.4	mi/h
Number of lanes, N	4	
Density, D	30.7	pc/mi/ln
Level of service, LOS	D	

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-5/SB
From/To:	Western Avenue/SR-134
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6995	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1841	v
Trucks and buses	12	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	1951	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1951	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	4	
Density, D	30.0	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-5/SB
From/To:	Western Avenue/SR-134
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6500	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1711	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1796	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1796	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	68.0	mi/h
Number of lanes, N	4	
Density, D	26.4	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-5/SB
From/To:	Western Avenue/SR-134
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7145	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1880	v
Trucks and buses	13	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.939	
Driver population factor, fp	1.00	
Flow rate, vp	2002	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2002	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	63.9	mi/h
Number of lanes, N	4	
Density, D	31.3	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-5/SB
From/To:	Western Avenue/SR-134
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description:	VV.110264

Flow Inputs and Adjustments

Volume, V	7045	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1854	v
Trucks and buses	12	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	1965	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1965	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	64.7	mi/h
Number of lanes, N	4	
Density, D	30.4	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-5/SB
From/To:	Western Avenue/SR-134
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7080	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1863	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1956	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1956	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	64.9	mi/h
Number of lanes, N	4	
Density, D	30.1	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-5/SB
From/To:	Western Avenue/SR-134
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014.
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7785	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2049	v
Trucks and buses	13	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.939	
Driver population factor, fp	1.00	
Flow rate, vp	2182	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2182	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	59.5	mi/h
Number of lanes, N	4	
Density, D	36.7	pc/mi/ln
Level of service, LOS	E	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-5/SB
From/To:	Western Avenue/SR-134
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7675	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2020	v
Trucks and buses	12	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	2141	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2141	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	60.6	mi/h
Number of lanes, N	4	
Density, D	35.3	pc/mi/ln
Level of service, LOS	E	

Overall results are not computed when free-flow speed is less than 55 mph.

Hall & Foreman, Inc.
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SUBJECT	BY	DATE	JOB NO.	SHEET OF
FWY SEGMENT SUMMARY	TM	23-Sep-13	VV.110264.0000	1 OF 1

SEGMENT NAME : Roscoe Boulevard and Hollywood Way
FREEWAY : I-5
PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%
SEGMENT ROUTE

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
SOUTHBOUND								
AM	5990	10%	50	6040	11%	540	6580	11%
MID	4960	10%	50	5010	11%	445	5455	11%
PM	4625	10%	50	4675	11%	415	5090	11%
NORTHBOUND								
AM	5490	4%	50	5540	5%	495	6035	5%
MID	6030	4%	50	6080	5%	545	6625	5%
PM	6570	3%	50	6620	4%	590	7210	4%

Tustin Office: 714.665.4500 Tel/ 714.665.4501 Fax
Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax
Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax
Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-5/SB
From/To:	Roscoe Boulevard/Hollywood Way
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5990	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1576	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1655	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1655	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	70.3	mi/h
Number of lanes, N	4	
Density, D	23.6	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-5/SB
From/To:	Roscoe Boulevard/Hollywood Way
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	4960	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1305	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1371	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1371	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.5	mi/h
Number of lanes, N	4	
Density, D	18.7	pc/mi/ln
Level of service, LOS	C	

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-5/SB
From/To:	Roscoe Boulevard/Hollywood Way
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	4625	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1217	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1278	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1278	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.1	mi/h
Number of lanes, N	4	
Density, D	17.2	pc/mi/ln
Level of service, LOS	B	

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-5/SB
From/To:	Roscoe Boulevard/Hollywood Way
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6040	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1589	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1677	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1677	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	69.9	mi/h
Number of lanes, N	4	
Density, D	24.0	pc/mi/ln
Level of service, LOS	C	

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-5/SB
From/To:	Roscoe Boulevard/Hollywood Way
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5010	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1318	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1391	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1391	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.3	mi/h
Number of lanes, N	4	
Density, D	19.0	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
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Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-5/SB
From/To:	Roscoe Boulevard/Hollywood Way
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	4675	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1230	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1298	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1298	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.0	mi/h
Number of lanes, N	4	
Density, D	17.5	pc/mi/ln
Level of service, LOS	B	

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-5/SB
From/To:	Roscoe Boulevard/Hollywood Way
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6580	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1732	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1827	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1827	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	67.4	mi/h
Number of lanes, N	4	
Density, D	27.1	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-5/SB
From/To:	Roscoe Boulevard/Hollywood Way
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5455	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1436	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1514	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1514	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	72.1	mi/h
Number of lanes, N	4	
Density, D	21.0	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-5/SB
From/To:	Roscoe Boulevard/Hollywood Way
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5090	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1339	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1413	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1413	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.1	mi/h
Number of lanes, N	4	
Density, D	19.3	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
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Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-5/NB
From/To:	Roscoe Boulevard/Hollywood Way
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5490	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1445	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	1474	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1474	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	72.5	mi/h
Number of lanes, N	4	
Density, D	20.3	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-5/NB
From/To:	Roscoe Boulevard/Hollywood Way
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6030	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1587	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	1619	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1619	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	70.8	mi/h
Number of lanes, N	4	
Density, D	22.9	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-5/NB
From/To:	Roscoe Boulevard/Hollywood Way
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6570	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1729	v
Trucks and buses	3	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.985	
Driver population factor, fp	1.00	
Flow rate, vp	1755	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1755	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	68.7	mi/h
Number of lanes, N	4	
Density, D	25.5	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-5/NB
From/To:	Roscoe Boulevard/Hollywood Way
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5540	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1458	v
Trucks and buses	5	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.976	
Driver population factor, fp	1.00	
Flow rate, vp	1494	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1494	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	72.3	mi/h
Number of lanes, N	4	
Density, D	20.7	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

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E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-5/NB
From/To:	Roscoe Boulevard/Hollywood Way
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6080	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1600	v
Trucks and buses	5	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.976	
Driver population factor, fp	1.00	
Flow rate, vp	1640	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1640	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	70.5	mi/h
Number of lanes, N	4	
Density, D	23.3	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-5/NB
From/To:	Roscoe Boulevard/Hollywood Way
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6620	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1742	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	1777	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1777	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	68.3	mi/h
Number of lanes, N	4	
Density, D	26.0+	pc/mi/ln
Level of service, LOS	D	

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HCS 2010: Basic Freeway Segments Release 6.3

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Operational Analysis

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Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-5/NB
From/To:	Roscoe Boulevard/Hollywood Way
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6035	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1588	v
Trucks and buses	5	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.976	
Driver population factor, fp	1.00	
Flow rate, vp	1628	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1628	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	70.6	mi/h
Number of lanes, N	4	
Density, D	23.0	pc/mi/ln
Level of service, LOS	C	

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-5/NB
From/To:	Roscoe Boulevard/Hollywood Way
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6625	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1743	v
Trucks and buses	5	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.976	
Driver population factor, fp	1.00	
Flow rate, vp	1787	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1787	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	68.1	mi/h
Number of lanes, N	4	
Density, D	26.2	pc/mi/ln
Level of service, LOS	D	

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-5/NB
From/To:	Roscoe Boulevard/Hollywood Way
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7210	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1897	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	1935	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1935	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	65.3	mi/h
Number of lanes, N	4	
Density, D	29.6	pc/mi/ln
Level of service, LOS	D	

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Hall & Foreman, Inc.
Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
FWY SEGMENT SUMMARY	TM	23-Sep-13	VV.110264.0000	1 OF 1

SEGMENT NAME : SR-170 Interchange and Sheldon Street
FREEWAY : I-5
PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%
SEGMENT
ROUTE

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
SOUTHBOUND								
AM	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D
MID	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D
PM	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D
NORTHBOUND								
AM	4950	10%	50	5000	11%	445	5445	11%
MID	5445	9%	50	5495	10%	490	5985	10%
PM	4755	4%	50	4805	5%	430	5235	5%

Tustin Office: 714.665.4500 Tel/ 714.665.4501 Fax
Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax
Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax
Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-5/NB
From/To:	SR-170/Sheldon Street
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	4950	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1303	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1368	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1368	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.5	mi/h
Number of lanes, N	4	
Density, D	18.6	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-5/NB
From/To:	SR-170/Sheldon Street
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5445	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1433	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1497	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1497	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	72.3	mi/h
Number of lanes, N	4	
Density, D	20.7	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-5/NB
From/To:	SR-170/Sheldon Street
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	4755	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1251	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	1276	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1276	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.2	mi/h
Number of lanes, N	4	
Density, D	17.2	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-5/NB
From/To:	SR-170/Sheldon Street
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5000	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1316	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1388	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1388	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.3	mi/h
Number of lanes, N	4	
Density, D	18.9	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-5/NB
From/To:	SR-170/Sheldon Street
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5495	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1446	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1526	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1526	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	71.9	mi/h
Number of lanes, N	4	
Density, D	21.2	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
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Operational Analysis

Analyst:	TM
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Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-5/NB
From/To:	SR-170/Sheldon Street
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	4805	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1264	v
Trucks and buses	5	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.976	
Driver population factor, fp	1.00	
Flow rate, vp	1296	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1296	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.0	mi/h
Number of lanes, N	4	
Density, D	17.5	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-5/NB
From/To:	SR-170/Sheldon Street
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5445	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1433	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1512	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1512	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	72.1	mi/h
Number of lanes, N	4	
Density, D	21.0	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
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Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-5/NB
From/To:	SR-170/Sheldon Street
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5985	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1575	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1654	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1654	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	70.3	mi/h
Number of lanes, N	4	
Density, D	23.5	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-5/NB
From/To:	SR-170/Sheldon Street
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5235	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1378	v
Trucks and buses	5	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.976	
Driver population factor, fp	1.00	
Flow rate, vp	1412	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1412	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.1	mi/h
Number of lanes, N	4	
Density, D	19.3	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
FWY SEGMENT SUMMARY	TM	23-Sep-13	VV.110264.0000	1 OF 1

SEGMENT NAME : Branford Street and SR-170 Interchange

FREEWAY : I-5

PROJECTED YEAR : SEGMENT

PROJECTED GROWTH PER YEAR : 4.50%

ROUTE

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
SOUTHBOUND								
AM	12595	3%	50	12645	3%	1135	13780	3%
MID	8420	5%	50	8470	5%	760	9230	5%
PM	9245	3%	50	9295	4%	830	10125	4%
NORTHBOUND								
AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D

Tustin Office: 714.665.4500 Tel/ 714.665.4501 Fax
Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax
Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax
Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

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Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-5/SB
From/To:	BranfordStreet/SR-170
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	12595	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	3314	v
Trucks and buses	3	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.985	
Driver population factor, fp	1.00	
Flow rate, vp	3364	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	3364	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	13.1	mi/h
Number of lanes, N	4	
Density, D	256.1	pc/mi/ln
Level of service, LOS	F	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-5/SB
From/To:	BranfordStreet/SR-170
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	8420	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2216	v
Trucks and buses	5	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.976	
Driver population factor, fp	1.00	
Flow rate, vp	2271	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2271	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	57.1	mi/h
Number of lanes, N	4	
Density, D	39.8	pc/mi/ln
Level of service, LOS	E	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-5/SB
From/To:	BranfordStreet/SR-170
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	9245	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2433	v
Trucks and buses	3	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.985	
Driver population factor, fp	1.00	
Flow rate, vp	2469	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2469	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	51.1	mi/h
Number of lanes, N	4	
Density, D	48.3	pc/mi/ln
Level of service, LOS	F	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-5/SB
From/To:	BranfordStreet/SR-170
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	12645	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	3328	v
Trucks and buses	3	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.985	
Driver population factor, fp	1.00	
Flow rate, vp	3378	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	3378	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	12.4	mi/h
Number of lanes, N	4	
Density, D	272.4	pc/mi/ln
Level of service, LOS	F	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-5/SB
From/To:	BranfordStreet/SR-170
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	8470	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2229	v
Trucks and buses	5	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.976	
Driver population factor, fp	1.00	
Flow rate, vp	2285	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2285	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	56.7	mi/h
Number of lanes, N	4	
Density, D	40.3	pc/mi/ln
Level of service, LOS	E	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-5/SB
From/To:	BranfordStreet/SR-170
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	9295	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2446	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	2495	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2495	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	50.3	mi/h
Number of lanes, N	4	
Density, D	49.6	pc/mi/ln
Level of service, LOS	F	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-5/SB
From/To:	BranfordStreet/SR-170
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	13780	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	3626	v
Trucks and buses	3	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.985	
Driver population factor, fp	1.00	
Flow rate, vp	3681	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	3681	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S		mi/h
Number of lanes, N	4	
Density, D		pc/mi/ln
Level of service, LOS	F	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-5/SB
From/To:	BranfordStreet/SR-170
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	9230	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2429	v
Trucks and buses	5	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.976	
Driver population factor, fp	1.00	
Flow rate, vp	2490	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2490	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	50.4	mi/h
Number of lanes, N	4	
Density, D	49.4	pc/mi/ln
Level of service, LOS	F	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-5/SB
From/To:	BranfordStreet/SR-170
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	10125	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2664	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	2718	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2718	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	42.3	mi/h
Number of lanes, N	4	
Density, D	64.2	pc/mi/ln
Level of service, LOS	F	

Overall results are not computed when free-flow speed is less than 55 mph.

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
FWY SEGMENT SUMMARY	TM	23-Sep-13	VV.110264.0000	1 OF 1

SEGMENT NAME : Montrose Avenue and SR-2 Interchange

FREEWAY : I-210

PROJECTED YEAR :

PROJECTED GROWTH PER YEAR : 4.50%

SEGMENT

ROUTE

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
EASTBOUND								
AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
WESTBOUND								
AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
FWY SEGMENT SUMMARY	TM	23-Sep-13	VV.110264.0000	1 OF 1

SEGMENT NAME : Wheatland Avenue and Sunland Avenue
FREEWAY : I-210
PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%
SEGMENT
ROUTE

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
EASTBOUND								
AM	4735	3%	50	4785	4%	425	5210	4%
MID	2670	13%	50	2720	15%	240	2960	15%
PM	3650	6%	50	3700	18%	330	4030	18%
WESTBOUND								
AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Wheatland Avenue/Sunland Avenu
Jurisdiction:	Caltrans
Analysis Year:	
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	4735	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1246	v
Trucks and buses	3	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.985	
Driver population factor, fp	1.00	
Flow rate, vp	1265	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1265	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.2	mi/h
Number of lanes, N	4	
Density, D	17.0	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Wheatland Avenue/Sunland Avenu
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	2670	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	703	v
Trucks and buses	13	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.939	
Driver population factor, fp	1.00	
Flow rate, vp	748	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	748	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	10.0	pc/mi/ln
Level of service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Wheatland Avenue/Sunland Avenu
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3650	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	961	v
Trucks and buses	6	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.971	
Driver population factor, fp	1.00	
Flow rate, vp	989	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	989	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	13.2	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Wheatland Avenue/Sunland Avenu
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	4785	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1259	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	1284	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1284	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.1	mi/h
Number of lanes, N	4	
Density, D	17.3	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Wheatland Avenue/Sunland Avenu
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	2720	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	716	v
Trucks and buses	15	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.930	
Driver population factor, fp	1.00	
Flow rate, vp	769	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	769	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	10.3	pc/mi/ln
Level of service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Wheatland Avenue/Sunland Avenu
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3700	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	974	v
Trucks and buses	18	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.917	
Driver population factor, fp	1.00	
Flow rate, vp	1061	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1061	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	14.2	pc/mi/ln
Level of service, LOS	B	

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Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Wheatland Avenue/Sunland Avenu
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5210	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1371	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	1398	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1398	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.2	mi/h
Number of lanes, N	4	
Density, D	19.1	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Wheatland Avenue/Sunland Avenu
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	2960	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	779	v
Trucks and buses	15	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.930	
Driver population factor, fp	1.00	
Flow rate, vp	837	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	837	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	11.2	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Wheatland Avenue/Sunland Avenu
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	4030	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1061	v
Trucks and buses	18	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.917	
Driver population factor, fp	1.00	
Flow rate, vp	1156	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1156	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.7	mi/h
Number of lanes, N	4	
Density, D	15.5	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
FWY SEGMENT SUMMARY	TM	23-Sep-13	VV.110264.0000	1 OF 1

SEGMENT NAME : Foothill Boulevard and Wheatland Avenue

FREEWAY : I-210

PROJECTED YEAR :

PROJECTED GROWTH PER YEAR : 4.50%

SEGMENT

ROUTE

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
EASTBOUND								
AM	4405	9%	50	4455	10%	395	4850	10%
MID	3430	11%	50	3480	12%	310	3790	12%
PM	4850	13%	50	4900	14%	435	5335	14%
WESTBOUND								
AM	4080	3%	50	4130	4%	365	4495	4%
MID	3480	10%	50	3530	11%	315	3845	11%
PM	6690	3%	50	6740	4%	600	7340	4%

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Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax

Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax

Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Foothill Boulevard/Wheatland A
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	4405	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1159	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1211	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1211	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.5	mi/h
Number of lanes, N	4	
Density, D	16.3	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Foothill Boulevard/Wheatland A
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3430	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	903	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	952	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	952	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	12.7	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Foothill Boulevard/Wheatland A
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	4850	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1276	v
Trucks and buses	13	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.939	
Driver population factor, fp	1.00	
Flow rate, vp	1359	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1359	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.6	mi/h
Number of lanes, N	4	
Density, D	18.5	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Foothill Boulevard/Wheatland A
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	4455	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1172	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1231	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1231	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.4	mi/h
Number of lanes, N	4	
Density, D	16.5	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Foothill Boulevard/Wheatland A
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3480	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	916	v
Trucks and buses	12	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	971	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	971	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	12.9	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Phone: Fax:
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Operational Analysis

Analyst:	TM
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Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Foothill Boulevard/Wheatland A
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description:	VV.110264

Flow Inputs and Adjustments

Volume, V	4900	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1289	v
Trucks and buses	14	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.935	
Driver population factor, fp	1.00	
Flow rate, vp	1380	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1380	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.4	mi/h
Number of lanes, N	4	
Density, D	18.8	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Foothill Boulevard/Wheatland A
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	4850	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1276	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1340	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1340	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.7	mi/h
Number of lanes, N	4	
Density, D	18.2	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Foothill Boulevard/Wheatland A
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3790	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	997	v
Trucks and buses	12	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	1057	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1057	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	14.1	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Foothill Boulevard/Wheatland A
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5335	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1404	v
Trucks and buses	14	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.935	
Driver population factor, fp	1.00	
Flow rate, vp	1502	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1502	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	72.2	mi/h
Number of lanes, N	4	
Density, D	20.8	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Foothill Boulevard/Wheatland A
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	4080	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1074	v
Trucks and buses	3	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.985	
Driver population factor, fp	1.00	
Flow rate, vp	1090	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1090	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.9	mi/h
Number of lanes, N	4	
Density, D	14.6	pc/mi/ln
Level of service, LOS	B	

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HCS 2010: Basic Freeway Segments Release 6.3

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Foothill Boulevard/Wheatland A
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3480	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	916	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	962	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	962	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	12.8	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Foothill Boulevard/Wheatland A
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6690	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1761	v
Trucks and buses	3	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.985	
Driver population factor, fp	1.00	
Flow rate, vp	1787	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1787	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	68.1	mi/h
Number of lanes, N	4	
Density, D	26.2	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Foothill Boulevard/Wheatland A
Jurisdiction:	Caltrans
Analysis Year:	Exisiting + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	4130	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1087	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	1109	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1109	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.9	mi/h
Number of lanes, N	4	
Density, D	14.8	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Foothill Boulevard/Wheatland A
Jurisdiction:	Caltrans
Analysis Year:	Exisiting + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3530	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	929	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	980	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	980	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	13.1	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Foothill Boulevard/Wheatland A
Jurisdiction:	Caltrans
Analysis Year:	Exisiting + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6740	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1774	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	1809	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1809	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	67.8	mi/h
Number of lanes, N	4	
Density, D	26.7	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
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Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Foothill Boulevard/Wheatland A
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	4495	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1183	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	1207	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1207	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.5	mi/h
Number of lanes, N	4	
Density, D	16.2	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Foothill Boulevard/Wheatland A
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3845	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1012	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1067	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1067	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	14.2	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Foothill Boulevard/Wheatland A
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7340	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1932	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	1970	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1970	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	64.6	mi/h
Number of lanes, N	4	
Density, D	30.5	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

Hall & Foreman, Inc.
Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
FWY SEGMENT SUMMARY	TM	23-Sep-13	VV.110264.0000	1 OF 1

SEGMENT NAME : SR-118 Interchange and Foothill Boulevard
PROJECTED YEAR : SEGMENT
FREEWAY : I-210
PROJECTED GROWTH PER YEAR : 4.50%
ROUTE

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
EASTBOUND								
AM	0	N/D	50	N/D	N/D	N/D	N/D	N/D
MID	0	N/D	50	N/D	N/D	N/D	N/D	N/D
PM	0	N/D	50	N/D	N/D	N/D	N/D	N/D
WESTBOUND								
AM	4030	11%	50	4080	12%	365	4445	12%
MID	3330	11%	50	3380	12%	300	3680	12%
PM	5640	11%	50	5690	12%	510	6200	12%

Tustin Office: 714.665.4500 Tel/ 714.665.4501 Fax
Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax
Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax
Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

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Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	SR-118/Foothill Boulevard
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description:	VV.110264

Flow Inputs and Adjustments

Volume, V	4030	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1061	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1119	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1119	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.8	mi/h
Number of lanes, N	4	
Density, D	15.0	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/WB
From/To:	SR-118/Foothill Boulevard
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description:	VV.110264

Flow Inputs and Adjustments

Volume, V	3330	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	876	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	925	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	925	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	12.3	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	SR-118/Foothill Boulevard
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5640	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1484	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1566	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1566	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	71.5	mi/h
Number of lanes, N	4	
Density, D	21.9	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	SR-118/Foothill Boulevard
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description:	VV.110264

Flow Inputs and Adjustments

Volume, V	4080	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1074	v
Trucks and buses	12	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	1138	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1138	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.8	mi/h
Number of lanes, N	4	
Density, D	15.2	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/WB
From/To:	SR-118/Foothill Boulevard
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3380	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	889	v
Trucks and buses	12	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	943	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	943	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	12.6	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	SR-118/Foothill Boulevard
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5690	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1497	v
Trucks and buses	12	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	1587	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1587	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	71.2	mi/h
Number of lanes, N	4	
Density, D	22.3	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	SR-118/Foothill Boulevard
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	4445	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1170	v
Trucks and buses	12	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	1240	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1240	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.4	mi/h
Number of lanes, N	4	
Density, D	16.7	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/WB
From/To:	SR-118/Foothill Boulevard
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3680	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	968	v
Trucks and buses	12	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	1027	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1027	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	13.7	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

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E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	SR-118/Foothill Boulevard
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6200	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1632	v
Trucks and buses	12	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	1729	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1729	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	69.1	mi/h
Number of lanes, N	4	
Density, D	25.0	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
FWY SEGMENT SUMMARY	TM	23-Sep-13	VV.110264.0000	1 OF 1

SEGMENT NAME : Glen Oaks Blvd and SR-118 Interchange
FREEWAY : SR-118
PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:
SEGMENT ROUTE

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
EASTBOUND								
AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
WESTBOUND								
AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D

Tustin Office: 714.665.4500 Tel/ 714.665.4501 Fax
Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax
Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax
Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
FWY SEGMENT SUMMARY	TM	23-Sep-13	VV.110264.0000	1 OF 1

SEGMENT NAME : I-210 Interchange and San Fernando Avenue
PROJECTED YEAR : SEGMENT
FREEWAY : SR-118
PROJECTED GROWTH PER YEAR : 4.50%
ROUTE

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
EASTBOUND								
AM	0	N/D	50	N/D	N/D	N/D	N/D	N/D
MID	0	N/D	50	N/D	N/D	N/D	N/D	N/D
PM	0	N/D	50	N/D	N/D	N/D	N/D	N/D
WESTBOUND								
AM	6215	10%	50	6265	11%	560	6825	11%
MID	3550	10%	50	3600	11%	320	3920	11%
PM	5690	10%	50	5740	11%	510	6250	11%

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	SR-118/WB
From/To:	I-210/ San Fernando Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6215	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1636	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	2290	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2290	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	56.6	mi/h
Number of lanes, N	3	
Density, D	40.5	pc/mi/ln
Level of service, LOS	E	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	SR-118/WB
From/To:	I-210/ San Fernando Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3550	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	934	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1308	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1308	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.9	mi/h
Number of lanes, N	3	
Density, D	17.7	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR-118/WB
From/To:	I-210/ San Fernando Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5690	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1497	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	2096	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2096	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	61.7	mi/h
Number of lanes, N	3	
Density, D	34.0	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	SR-118/WB
From/To:	I-210/ San Fernando Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6265	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1649	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	2319	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2319	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	55.7	mi/h
Number of lanes, N	3	
Density, D	41.6	pc/mi/ln
Level of service, LOS	E	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	SR-118/WB
From/To:	I-210/ San Fernando Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3600	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	947	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1333	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1333	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.8	mi/h
Number of lanes, N	3	
Density, D	18.1	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR-118/WB
From/To:	I-210/ San Fernando Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5740	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1511	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	2125	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2125	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	61.0	mi/h
Number of lanes, N	3	
Density, D	34.8	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	SR-118/WB
From/To:	I-210/ San Fernando Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6825	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1796	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	2526	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2526	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	49.2	mi/h
Number of lanes, N	3	
Density, D	51.3	pc/mi/ln
Level of service, LOS	F	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	SR-118/WB
From/To:	I-210/ San Fernando Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3920	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1032	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1451	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1451	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	72.7	mi/h
Number of lanes, N	3	
Density, D	19.9	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR-118/WB
From/To:	I-210/ San Fernando Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6250	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1645	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	2314	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2314	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	55.9	mi/h
Number of lanes, N	3	
Density, D	41.4	pc/mi/ln
Level of service, LOS	E	

Overall results are not computed when free-flow speed is less than 55 mph.

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Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
FWY SEGMENT SUMMARY	TM	23-Sep-13	VV.110264.0000	1 OF 1

SEGMENT NAME : SR-118 Interchange and Van Nuys Blvd
FREEWAY : I-5
PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%
SEGMENT
ROUTE

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
SOUTHBOUND								
AM	9070	10%	50	9120	10%	815	9935	10%
MID	7105	10%	50	7155	11%	640	7795	11%
PM	7810	10%	50	7860	11%	705	8565	11%
NORTHBOUND								
AM	7985	2%	50	8035	3%	720	8755	3%
MID	8340	3%	50	8390	4%	750	9140	4%
PM	8505	3%	50	8555	4%	765	9320	4%

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-5/NB
From/To:	SR-118/Van Nuys Boulevard
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7985	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2101	v
Trucks and buses	2	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.990	
Driver population factor, fp	1.00	
Flow rate, vp	2122	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2122	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	61.1	mi/h
Number of lanes, N	4	
Density, D	34.8	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

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Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-5/NB
From/To:	SR-118/Van Nuys Boulevard
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	8340	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2195	v
Trucks and buses	3	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.985	
Driver population factor, fp	1.00	
Flow rate, vp	2228	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2228	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	58.3	mi/h
Number of lanes, N	4	
Density, D	38.2	pc/mi/ln
Level of service, LOS	E	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-5/NB
From/To:	SR-118/Van Nuys Boulevard
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	8505	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2238	v
Trucks and buses	3	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.985	
Driver population factor, fp	1.00	
Flow rate, vp	2272	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2272	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	57.1	mi/h
Number of lanes, N	4	
Density, D	39.8	pc/mi/ln
Level of service, LOS	E	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-5/NB
From/To:	SR-118/Van Nuys Boulevard
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	8035	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2114	v
Trucks and buses	3	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.985	
Driver population factor, fp	1.00	
Flow rate, vp	2146	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2146	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	60.5	mi/h
Number of lanes, N	4	
Density, D	35.5	pc/mi/ln
Level of service, LOS	E	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-5/NB
From/To:	SR-118/Van Nuys Boulevard
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	8390	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2208	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	2252	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2252	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	57.6	mi/h
Number of lanes, N	4	
Density, D	39.1	pc/mi/ln
Level of service, LOS	E	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-5/NB
From/To:	SR-118/Van Nuys Boulevard
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	8555	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2251	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	2296	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2296	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	56.4	mi/h
Number of lanes, N	4	
Density, D	40.7	pc/mi/ln
Level of service, LOS	E	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-5/NB
From/To:	SR-118/Van Nuys Boulevard
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	8755	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2304	v
Trucks and buses	3	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.985	
Driver population factor, fp	1.00	
Flow rate, vp	2339	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2339	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	55.2	mi/h
Number of lanes, N	4	
Density, D	42.4	pc/mi/ln
Level of service, LOS	E	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-5/NB
From/To:	SR-118/Van Nuys Boulevard
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	9140	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2405	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	2453	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2453	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	51.6	mi/h
Number of lanes, N	4	
Density, D	47.5	pc/mi/ln
Level of service, LOS	F	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-5/NB
From/To:	SR-118/Van Nuys Boulevard
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	9320	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2453	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	2502	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2502	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	50.0	mi/h
Number of lanes, N	4	
Density, D	50.0	pc/mi/ln
Level of service, LOS	F	

Overall results are not computed when free-flow speed is less than 55 mph.

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Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-5/SB
From/To:	SR-118/Van Nuys Boulevard
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	9070	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2387	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1671	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	6	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1671	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	6	
Density, D	23.9	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-5/SB
From/To:	SR-118/Van Nuys Boulevard
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7105	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1870	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1309	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	6	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1309	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.9	mi/h
Number of lanes, N	6	
Density, D	17.7	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-5/SB
From/To:	SR-118/Van Nuys Boulevard
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7810	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2055	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1439	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	6	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1439	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	72.9	mi/h
Number of lanes, N	6	
Density, D	19.7	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-5/SB
From/To:	SR-118/Van Nuys Boulevard
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	9120	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2400	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1680	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	6	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1680	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	69.9	mi/h
Number of lanes, N	6	
Density, D	24.0	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-5/SB
From/To:	SR-118/Van Nuys Boulevard
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7155	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1883	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1324	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	6	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1324	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.8	mi/h
Number of lanes, N	6	
Density, D	17.9	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-5/SB
From/To:	SR-118/Van Nuys Boulevard
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7860	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2068	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1455	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	6	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1455	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	72.7	mi/h
Number of lanes, N	6	
Density, D	20.0	pc/mi/ln
Level of service, LOS	C	

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Operational Analysis

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Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-5/SB
From/To:	SR-118/Van Nuys Boulevard
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	9935	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2614	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1830	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	6	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1830	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	67.4	mi/h
Number of lanes, N	6	
Density, D	27.2	pc/mi/ln
Level of service, LOS	D	

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-5/SB
From/To:	SR-118/Van Nuys Boulevard
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7795	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2051	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1443	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	6	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1443	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	72.8	mi/h
Number of lanes, N	6	
Density, D	19.8	pc/mi/ln
Level of service, LOS	C	

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Operational Analysis

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Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-5/SB
From/To:	SR-118/Van Nuys Boulevard
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	8565	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2254	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1585	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	6	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1585	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	71.2	mi/h
Number of lanes, N	6	
Density, D	22.3	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
FWY SEGMENT SUMMARY	TM	23-Sep-13	VV.110264.0000	1 OF 1

SEGMENT NAME : Terra Bella Street and Osborne Street
FREEWAY : I-5
PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%
SEGMENT ROUTE

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
SOUTHBOUND								
AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
NORTHBOUND								
AM	7985	12%	50	8035	12%	720	8755	12%
MID	8340	13%	50	8390	13%	750	9140	13%
PM	8505	10%	50	8555	10%	765	9320	10%

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Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax
Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax
Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-5/NB
From/To:	Terra Bella Street/Osborne St
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7985	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2101	v
Trucks and buses	12	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	2227	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2227	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	58.3	mi/h
Number of lanes, N	4	
Density, D	38.2	pc/mi/ln
Level of service, LOS	E	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
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Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-5/NB
From/To:	Terra Bella Street/Osborne St
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	8340	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2195	v
Trucks and buses	13	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.939	
Driver population factor, fp	1.00	
Flow rate, vp	2337	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2337	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	55.2	mi/h
Number of lanes, N	4	
Density, D	42.3	pc/mi/ln
Level of service, LOS	E	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
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Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-5/NB
From/To:	Terra Bella Street/Osborne St
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	8505	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2238	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	2350	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2350	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	54.8	mi/h
Number of lanes, N	4	
Density, D	42.9	pc/mi/ln
Level of service, LOS	E	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-5/NB
From/To:	Terra Bella Street/Osborne St
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	8035	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2114	v
Trucks and buses	12	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	2241	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2241	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	4	
Density, D	38.7	pc/mi/ln
Level of service, LOS	E	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-5/NB
From/To:	Terra Bella Street/Osborne St
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	8390	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2208	v
Trucks and buses	13	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.939	
Driver population factor, fp	1.00	
Flow rate, vp	2351	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2351	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	54.8	mi/h
Number of lanes, N	4	
Density, D	42.9	pc/mi/ln
Level of service, LOS	E	

Overall results are not computed when free-flow speed is less than 55 mph.

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Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-5/NB
From/To:	Terra Bella Street/Osborne St
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	8555	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2251	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	2364	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2364	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	54.4	mi/h
Number of lanes, N	4	
Density, D	43.5	pc/mi/ln
Level of service, LOS	E	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-5/NB
From/To:	Terra Bella Street/Osborne St
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	8755	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2304	v
Trucks and buses	12	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	2442	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2442	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	52.0	mi/h
Number of lanes, N	4	
Density, D	47.0	pc/mi/ln
Level of service, LOS	F	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-5/NB
From/To:	Terra Bella Street/Osborne St
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	9140	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2405	v
Trucks and buses	13	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.939	
Driver population factor, fp	1.00	
Flow rate, vp	2562	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2562	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	48.0	mi/h
Number of lanes, N	4	
Density, D	53.4	pc/mi/ln
Level of service, LOS	F	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-5/NB
From/To:	Terra Bella Street/Osborne St
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	9320	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2453	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	2575	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2575	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	47.5	mi/h
Number of lanes, N	4	
Density, D	54.2	pc/mi/ln
Level of service, LOS	F	

Overall results are not computed when free-flow speed is less than 55 mph.

I-210 EB Main Line Volume

From SR-118 to Azusa Ave

October, 2011

Date / Time	Osborne Foothill	Wheatland Ave	Angeles Crest Hwy	Berkshire Place	Arroyo Blvd	Lincoln Ave	Mountain St	EB SR-134 to WB I-210	Lake Ave	San Gabriel River (EB I-605 to WB I-210)	Irwindale Ave	Azusa Ave
	PM 7.73	PM 9.3	PM 19.78	PM 21.39	PM 22.30	PM 23.00	PM 23.90	PM 24.49	PM 26.12	PM 37.39	PM 38.21	PM 39.62
Hour	Flow (veh/hr)	Flow (veh/hr)	Flow veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (Veh/Hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)
10/6/2011 0:00	783	445	341	348	328	496	865	738	1587	927	1454	1171
10/6/2011 1:00	678	313	250	261	263	628	919	718	1201	617	949	720
10/6/2011 2:00	591	307	209	223	216	805	874	663	1008	531	795	616
10/6/2011 3:00	614	276	241	246	239	420	851	652	937	575	754	609
10/6/2011 4:00	957	531	456	446	414	642	1000	875	1341	1085	1211	1012
10/6/2011 5:00	1901	1186	1178	1168	1189	1288	1896	1795	2468	2790	2464	1979
10/6/2011 6:00	2814	2689	2953	2789	2841	2604	3115	3688	5257	4670	4353	3660
10/6/2011 7:00	4403	4733	5274	4963	5359	4882	5522	5115	8683	5517	6226	5597
10/6/2011 8:00	3727	3952	5333	5572	5713	5007	5378	4439	9269	5285	6147	5527
10/6/2011 9:00	3125	2775	3674	4147	4360	3822	4252	4152	7792	4786	5686	5055
10/6/2011 10:00	3005	2254	2838	3290	3356	3005	3322	3781	7475	4630	5403	4640
10/6/2011 11:00	2634	2059	2502	2857	2959	2827	3177	3501	7544	4650	5702	5241
10/6/2011 12:00	2628	2211	2827	3014	3049	2810	3164	3853	8168	4738	6170	5573
10/6/2011 13:00	2840	2270	2743	2881	3024	2788	3101	3690	8212	4884	6590	6068
10/6/2011 14:00	3432	2669	3407	3509	3651	3347	3496	4140	9098	5201	6658	6314
10/6/2011 15:00	4029	2965	3715	4066	4195	3844	4008	4102	8748	5441	5912	6175
10/6/2011 16:00	4638	3312	3608	3905	4027	3513	3722	4304	8788	5613	6175	6267
10/6/2011 17:00	4851	3650	4059	4334	4402	3929	4099	4265	9577	5506	5856	6120
10/6/2011 18:00	4319	3206	3651	3804	3730	3399	3566	4324	9347	5011	6267	6315
10/6/2011 19:00	2979	2200	2618	2758	2738	2596	2828	3497	8372	4135	6360	5937
10/6/2011 20:00	2021	1639	1537	1740	1672	1624	1877	2232	6180	3346	5505	5017
10/6/2011 21:00	1757	1264	1328	1616	1608	1483	1702	2082	5483	3001	4600	4155
10/6/2011 22:00	1414	1058	1020	1205	1184	1136	1352	1690	4419	2435	3682	3222
10/6/2011 23:00	1171	669	648	685	661	737	879	1107	2978	1593	2386	2014

I-210 EB Truck Volume

From SR-118 to Azusa Ave

October, 2011

Date / Time	Osborne Foothill	Wheatland Ave	Angeles Crest Hwy	Berkshire Place	Arroyo Blvd	Lincoln Ave	Mountain St	EB SR-134 to WB I-210	Lake Ave	San Gabriel River	Irwindale Ave	Azusa Ave
	PM 8.0	PM 9.5	PM 19.78	PM 21.58	PM 22.60	PM 23.14	PM 23.79	PM 24.49	PM 26.47	PM 37.39	PM 38.30	PM 40.0
Hour	Flow (veh/hr)	Flow (veh/hr)	Flow veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (Veh/Hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)
10/6/2011 0:00	73	101	74	82	55	19	123	228	96	39	116	82
10/6/2011 1:00	62	78	79	87	60	49	111	188	109	35	21	61
10/6/2011 2:00	69	78	60	68	46	19	98	163	79	33	19	64
10/6/2011 3:00	63	79	66	66	55	31	78	124	107	39	50	72
10/6/2011 4:00	82	141	132	151	106	127	318	286	169	87	90	75
10/6/2011 5:00	203	199	185	238	113	286	511	361	182	213	59	113
10/6/2011 6:00	296	136	168	299	70	368	975	341	206	226	81	161
10/6/2011 7:00	432	133	182	403	45	445	785	105	269	121	338	236
10/6/2011 8:00	393	145	196	390	55	479	258	95	317	96	262	228
10/6/2011 9:00	346	238	314	509	163	607	362	410	445	124	49	175
10/6/2011 10:00	356	321	361	565	208	610	451	440	654	196	244	174
10/6/2011 11:00	304	286	282	460	125	522	303	407	229	190	265	173
10/6/2011 12:00	290	296	346	567	153	602	443	453	414	196	273	194
10/6/2011 13:00	341	358	408	616	142	656	412	354	402	195	244	199
10/6/2011 14:00	366	348	366	627	125	674	401	438	603	200	286	239
10/6/2011 15:00	468	303	356	552	99	671	370	344	911	216	244	305
10/6/2011 16:00	593	277	328	557	121	675	379	439	1010	230	299	319
10/6/2011 17:00	608	214	267	527	76	624	290	359	1040	225	459	309
10/6/2011 18:00	572	231	316	530	112	584	330	532	992	200	352	313
10/6/2011 19:00	370	243	258	412	78	467	297	318	365	135	158	192
10/6/2011 20:00	251	211	230	329	82	370	237	201	160	99	104	204
10/6/2011 21:00	206	164	215	278	90	326	205	225	101	99	94	175
10/6/2011 22:00	194	174	187	260	100	307	245	333	144	96	88	139
10/6/2011 23:00	142	164	134	177	74	197	175	263	142	55	78	117

I-210 EB Off & On Ramps Traffic Volume

From SR-118 to Irwindale Ave

October, 2011

Date / Time	Osborne St		Wheatland Ave		Berkshire Place		Arroyo Blvd		Irwindale Ave		
		PM 8.0		PM 9.5	PM 21.58	PM 21.58	PM 22.62	PM 22.62			
	Off Ramp (Lanes 1)	On Ramp (Lanes 1)	Off Ramp (Lanes 1)	On Ramp (Lanes 1)	Off Ramp (Lanes 1)	On Ramp (Lanes 1)	Off Ramp (Lanes 1)	On Ramp (Lanes 1)	Off Ramp (Lanes 1)	On Ramp (Lanes 1)	
Hour	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (Veh/Hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	
10/6/2011 0:00		n/d		2	5	6	n/d	n/d	n/l		
10/6/2011 1:00		n/d		3	0	29	n/d	n/d	n/l		
10/6/2011 2:00		n/d		4	1	6	n/d	n/d	n/l		
10/6/2011 3:00		n/d		3	1	7	n/d	n/d	n/l		
10/6/2011 4:00		n/d		15	7	3	n/d	n/d	n/l		
10/6/2011 5:00		n/d		24	44	13	n/d	n/d	n/l		
10/6/2011 6:00		n/d		92	232	40	n/d	n/d	n/l		
10/6/2011 7:00		n/d		135	593	231	n/d	n/d	n/l		
10/6/2011 8:00		n/d		105	349	153	n/d	n/d	n/l		
10/6/2011 9:00		n/d		78	200	122	n/d	n/d	n/l		
10/6/2011 10:00		n/d		77	123	122	n/d	n/d	n/l		
10/6/2011 11:00		n/d		84	131	213	n/d	n/d	n/l		
10/6/2011 12:00		n/d		78	187	152	n/d	n/d	n/l		
10/6/2011 13:00		n/d		79	125	119	n/d	n/d	n/l		
10/6/2011 14:00		n/d		86	246	193	n/d	n/d	n/l		
10/6/2011 15:00		n/d		62	286	309	n/d	n/d	n/l		
10/6/2011 16:00		n/d		78	163	312	n/d	n/d	n/l		
10/6/2011 17:00		n/d		99	252	409	n/d	n/d	n/l		
10/6/2011 18:00		n/d		73	221	271	n/d	n/d	n/l		
10/6/2011 19:00		n/d		40	132	153	n/d	n/d	n/l		
10/6/2011 20:00		n/d		32	89	81	n/d	n/d	n/l		
10/6/2011 21:00		n/d		25	68	95	n/d	n/d	n/l		
10/6/2011 22:00		n/d		33	37	55	n/d	n/d	n/l		
10/6/2011 23:00		n/d		13	16	19	n/d	n/d	n/l		

I-210 WB Main Line Volume

From Azusa Ave to SR-118

October, 2011

Date / Time	Osborne Foothill	Wheatland Ave	Angeles Crest Hwy	Berkshire Place	Arroyo Blvd	Lincoln Ave	Mountain St	EB SR-134 to WB I-210	Lake Ave	San Gabriel River (EB I-605 to WB I-210)	Irwindale Ave	Azusa Ave
	PM 7.73	PM 9.3	PM 19.78	PM 21.39	PM 22.30	PM 23.00	PM 23.90	PM 24.49	PM 26.12	PM 37.39	PM 38.21	PM 39.62
Hour	Flow (veh/hr)	Flow (veh/hr)	Flow veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (Veh/Hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)
10/6/2011 0:00	575	444	385	346	339	314	1430	835	852	1249	920	1756
10/6/2011 1:00	453	295	311	273	267	340	1048	762	636	1146	685	1466
10/6/2011 2:00	416	273	244	230	219	229	902	648	536	1118	633	1262
10/6/2011 3:00	454	293	258	244	263	269	514	703	710	1240	1068	1317
10/6/2011 4:00	750	591	589	577	576	576	1243	1070	1729	2518	3010	1760
10/6/2011 5:00	1760	1714	1474	1500	1487	1518	2257	2069	5174	5738	6919	2945
10/6/2011 6:00	2737	2621	2240	2268	2171	2398	3539	3022	8124	6164	8037	4644
10/6/2011 7:00	4028	4078	3394	3706	3364	3781	4873	4774	9710	4209	7068	6595
10/6/2011 8:00	3814	3794	3449	3697	3358	3648	3923	4740	8932	3734	6901	6715
10/6/2011 9:00	3063	3011	2954	3173	2942	3222	3473	3809	8171	4406	6655	5256
10/6/2011 10:00	2901	2705	2801	2988	2784	2971	3299	3355	7672	5272	6871	5310
10/6/2011 11:00	2715	2545	2522	2769	2564	2770	3125	3326	6615	5134	6574	5368
10/6/2011 12:00	2616	2506	2655	2944	2159	2957	3380	3314	6851	5294	6598	5869
10/6/2011 13:00	2936	2849	2910	3214	2165	3224	3619	3345	6973	5249	6698	5946
10/6/2011 14:00	3332	3482	3306	3643	2462	3635	4195	3907	7421	5384	6826	6632
10/6/2011 15:00	4313	4934	4087	4326	3042	4407	4957	4591	7626	5858	7029	8141
10/6/2011 16:00	5102	6048	4851	4942	3545	4950	5721	4958	8126	6173	7251	8500
10/6/2011 17:00	5642	6691	5496	5765	4059	5611	6374	5614	8402	6190	7521	8401
10/6/2011 18:00	4837	5560	4391	4678	3333	4595	5376	4862	7716	5391	6587	8456
10/6/2011 19:00	3022	3423	3029	3155	2116	3107	3796	3460	5729	3668	5249	5442
10/6/2011 20:00	1957	2036	2004	2106	1530	2199	2762	2611	4371	2737	4242	6347
10/6/2011 21:00	1627	1617	1879	1794	1275	1918	2437	2302	4017	2696	4031	5050
10/6/2011 22:00	1339	1269	1401	1345	1197	1395	1767	1885	2836	2647	3207	3948
10/6/2011 23:00	989	864	798	784	508	831	1065	1297	1636	1629	2030	2788

I-210 WB Truck Volume

From Azusa Ave to SR-118

October, 2011

Date / Time	Osborne Foothill	Wheatland Ave	Angeles Crest Hwy	Berkshire Place	Arroyo Blvd	Lincoln Ave	Mountain St	EB SR-134 to WB I-210	Lake Ave	San Gabriel River	Irwindale Ave	Azusa Ave
	PM 8.0	PM 9.5	PM 19.78	PM 21.58	PM 22.60	PM 23.14	PM 23.79	PM 24.49	PM 26.47	PM 37.39	PM 38.30	PM 40.0
Hour	Flow (veh/hr)	Flow (veh/hr)	Flow veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (Veh/Hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)
10/6/2011 0:00	73	101	74	82	55	19	123	228	96	39	116	82
10/6/2011 1:00	62	78	79	87	60	49	111	188	109	35	21	61
10/6/2011 2:00	69	78	60	68	46	19	98	163	79	33	19	64
10/6/2011 3:00	63	79	66	66	55	31	78	124	107	39	50	72
10/6/2011 4:00	82	141	132	151	106	127	318	286	169	87	90	75
10/6/2011 5:00	203	199	185	238	113	286	511	361	182	213	59	113
10/6/2011 6:00	296	136	168	299	70	368	975	341	206	226	81	161
10/6/2011 7:00	432	133	182	403	45	445	785	105	269	121	338	236
10/6/2011 8:00	393	145	196	390	55	479	258	95	317	96	262	228
10/6/2011 9:00	346	238	314	509	163	607	362	410	445	124	49	175
10/6/2011 10:00	356	321	361	565	208	610	451	440	654	196	244	174
10/6/2011 11:00	304	286	282	460	125	522	303	407	229	190	265	173
10/6/2011 12:00	290	296	346	567	153	602	443	453	414	196	273	194
10/6/2011 13:00	341	358	408	616	142	656	412	354	402	195	244	199
10/6/2011 14:00	366	348	366	627	125	674	401	438	603	200	286	239
10/6/2011 15:00	468	303	356	552	99	671	370	344	911	216	244	305
10/6/2011 16:00	593	277	328	557	121	675	379	439	1010	230	299	319
10/6/2011 17:00	608	214	267	527	76	624	290	359	1040	225	459	309
10/6/2011 18:00	572	231	316	530	112	584	330	532	992	200	352	313
10/6/2011 19:00	370	243	258	412	78	467	297	318	365	135	158	192
10/6/2011 20:00	251	211	230	329	82	370	237	201	160	99	104	204
10/6/2011 21:00	206	164	215	278	90	326	205	225	101	99	94	175
10/6/2011 22:00	194	174	187	260	100	307	245	333	144	96	88	139
10/6/2011 23:00	142	164	134	177	74	197	175	263	142	55	78	117

I-210 WB Off & On Ramps Traffic Volume

From Azusa Ave to SR-118

October, 2011

Date / Time	Osborne St		Wheatland Ave		Berkshire Place		Arroyo Blvd		Irwindale Ave		Azusa Ave
	PM 7.73		PM 9.61		PM 21.39	PM 21.68	PM 22.60	PM 22.27		PM 38.21	PM 39.91
	Off Ramp	On Ramp	Off Ramp	On Ramp	Off Ramp	On Ramp	Off Ramp	On Ramp	Off Ramp	On Ramp	On Ramp
10/6/2011 0:00	n/d		5		2	9	n/l	n/d		n/d	n/d
10/6/2011 1:00	n/d		3		4	4	n/l	n/d		n/d	n/d
10/6/2011 2:00	n/d		1		13	2	n/l	n/d		n/d	n/d
10/6/2011 3:00	n/d		4		21	4	n/l	n/d		n/d	n/d
10/6/2011 4:00	n/d		21		110	12	n/l	n/d		n/d	n/d
10/6/2011 5:00	n/d		24		225	83	n/l	n/d		n/d	n/d
10/6/2011 6:00	n/d		55		328	614	n/l	n/d		n/d	n/d
10/6/2011 7:00	n/d		106		338	207	n/l	n/d		n/d	n/d
10/6/2011 8:00	n/d		59		191	148	n/l	n/d		n/d	n/d
10/6/2011 9:00	n/d		52		131	119	n/l	n/d		n/d	n/d
10/6/2011 10:00	n/d		63		125	187	n/l	n/d		n/d	n/d
10/6/2011 11:00	n/d		57		135	206	n/l	n/d		n/d	n/d
10/6/2011 12:00	n/d		80		122	155	n/l	n/d		n/d	n/d
10/6/2011 13:00	n/d		59		156	263	n/l	n/d		n/d	n/d
10/6/2011 14:00	n/d		105		182	572	n/l	n/d		n/d	n/d
10/6/2011 15:00	n/d		113		140	451	n/l	n/d		n/d	n/d
10/6/2011 16:00	n/d		147		211	510	n/l	n/d		n/d	n/d
10/6/2011 17:00	n/d		111		166	369	n/l	n/d		n/d	n/d
10/6/2011 18:00	n/d		97		126	302	n/l	n/d		n/d	n/d
10/6/2011 19:00	n/d		60		81	85	n/l	n/d		n/d	n/d
10/6/2011 20:00	n/d		46		61	114	n/l	n/d		n/d	n/d
10/6/2011 21:00	n/d		37		34	41	n/l	n/d		n/d	n/d
10/6/2011 22:00	n/d		20		13	12	n/l	n/d		n/d	n/d
10/6/2011 23:00	n/d		20		13	12	n/l	n/d		n/d	n/d

Interchange Connector Volume

SR-134 & I-5, SR-134 & I-210

October, 2011

Date / Time	EB SR-134 to SB I-5	WB SR-134 to SB I-5	WB SR-134 to NB I-5	NB I-5 to EB SR-134	NB I-5 to WB SR-134	SB I-5 to EB SR-134		EB SR-134 to WB I-210	EB I-210 to WB SR-134		
Hour	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)		Flow (veh/hr)	Flow (veh/hr)		
10/6/2011 0:00	328	115	314	N/D	342	N/D		N/D	N/D		
10/6/2011 1:00	211	66	228	N/D	184	N/D		N/D	N/D		
10/6/2011 2:00	155	85	167	N/D	143	N/D		N/D	N/D		
10/6/2011 3:00	140	65	206	N/D	143	N/D		N/D	N/D		
10/6/2011 4:00	245	180	325	N/D	323	N/D		N/D	N/D		
10/6/2011 5:00	576	381	876	N/D	1074	N/D		N/D	N/D		
10/6/2011 6:00	1574	909	1668	N/D	1678	N/D		N/D	N/D		
10/6/2011 7:00	2832	1402	2505	N/D	2790	N/D		N/D	N/D		
10/6/2011 8:00	2872	1090	2795	N/D	2879	N/D		N/D	N/D		
10/6/2011 9:00	2644	883	2718	N/D	2661	N/D		N/D	N/D		
10/6/2011 10:00	2127	882	2206	N/D	2362	N/D		N/D	N/D		
10/6/2011 11:00	2162	824	1804	N/D	2282	N/D		N/D	N/D		
10/6/2011 12:00	2301	851	1872	N/D	2623	N/D		N/D	N/D		
10/6/2011 13:00	2368	814	1901	N/D	2447	N/D		N/D	N/D		
10/6/2011 14:00	2630	783	2279	N/D	2397	N/D		N/D	N/D		
10/6/2011 15:00	2638	850	2352	N/D	2501	N/D		N/D	N/D		
10/6/2011 16:00	2973	894	2755	N/D	2465	N/D		N/D	N/D		
10/6/2011 17:00	2986	1096	2640	N/D	2757	N/D		N/D	N/D		
10/6/2011 18:00	2917	850	2199	N/D	2528	N/D		N/D	N/D		
10/6/2011 19:00	2308	698	2206	N/D	2506	N/D		N/D	N/D		
10/6/2011 20:00	1643	539	1563	N/D	1749	N/D		N/D	N/D		
10/6/2011 21:00	1620	510	1093	N/D	1753	N/D		N/D	N/D		
10/6/2011 22:00	1175	364	959	N/D	1234	N/D		N/D	N/D		
10/6/2011 23:00	639	202	729	N/D	718	N/D		N/D	N/D		
Total (vh/hr/day):	42064	15333	38360	N/D	42539	N/D		N/D	N/D		

Interchange Connector Volume

I-210 & SR-2, I-210 & SR-118

October, 2011

Date / Time	EB I-210 to SB SR-2	WB I-210 to SB SR-2	EB/NB SR-2 to WB I-210	EB/NB SR-2 to EB I-210		EB I-210 to WB SR-118	WB I-210 to WB-SR-118	EB SR-118 to WB I-210	EB SR-118 to EB I-210		
Hour	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)		Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)		
10/6/2011 0:00	143	40	N/D	58		N/D	N/D	N/D	N/D		
10/6/2011 1:00	92	36	N/D	27		N/D	N/D	N/D	N/D		
10/6/2011 2:00	84	18	N/D	17		N/D	N/D	N/D	N/D		
10/6/2011 3:00	91	22	N/D	7		N/D	N/D	N/D	N/D		
10/6/2011 4:00	252	52	N/D	21		N/D	N/D	N/D	N/D		
10/6/2011 5:00	979	248	N/D	37		N/D	N/D	N/D	N/D		
10/6/2011 6:00	3084	710	N/D	186		N/D	N/D	N/D	N/D		
10/6/2011 7:00	4531	1486	N/D	527		N/D	N/D	N/D	N/D		
10/6/2011 8:00	3960	1399	N/D	479		N/D	N/D	N/D	N/D		
10/6/2011 9:00	2766	1022	N/D	305		N/D	N/D	N/D	N/D		
10/6/2011 10:00	1852	689	N/D	289		N/D	N/D	N/D	N/D		
10/6/2011 11:00	1497	723	N/D	312		N/D	N/D	N/D	N/D		
10/6/2011 12:00	1322	658	N/D	367		N/D	N/D	N/D	N/D		
10/6/2011 13:00	1433	638	N/D	377		N/D	N/D	N/D	N/D		
10/6/2011 14:00	1387	641	N/D	561		N/D	N/D	N/D	N/D		
10/6/2011 15:00	1727	806	N/D	629		N/D	N/D	N/D	N/D		
10/6/2011 16:00	1767	870	N/D	692		N/D	N/D	N/D	N/D		
10/6/2011 17:00	1909	868	N/D	787		N/D	N/D	N/D	N/D		
10/6/2011 18:00	1919	792	N/D	704		N/D	N/D	N/D	N/D		
10/6/2011 19:00	1173	523	N/D	484		N/D	N/D	N/D	N/D		
10/6/2011 20:00	737	330	N/D	351		N/D	N/D	N/D	N/D		
10/6/2011 21:00	630	436	N/D	299		N/D	N/D	N/D	N/D		
10/6/2011 22:00	466	257	N/D	183		N/D	N/D	N/D	N/D		
10/6/2011 23:00	304	118	N/D	120		N/D	N/D	N/D	N/D		
Total (vh/hr/day):	34105	13382	N/D	7819		N/D	N/D	N/D	N/D		

I-5 SB Main Line Volume

From SR-118 to SR-134

October, 2010

Date / Time	Western Ave	Hollywood way	Sheldon St	Bradford St	Osborne St	Van Nuys Blvd
	PM 144.23	PM 148.85	PM 152.41	PM 153.49	PM 154.04	PM 155.12
Hour	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)
10/21/2010 0:00	1387	903	876	1300	1503	1680
10/21/2010 1:00	793	647	626	909	1201	1416
10/21/2010 2:00	800	641	577	875	1164	1374
10/21/2010 3:00	942	828	892	1347	1569	1730
10/21/2010 4:00	1684	1569	1801	2887	2885	2912
10/21/2010 5:00	3877	3884	4479	8207	7531	7061
10/21/2010 6:00	7112	6264	6713	12165	10821	9536
10/21/2010 7:00	6448	6777	6954	12597	10985	9071
10/21/2010 8:00	6081	5923	6781	11469	10174	8537
10/21/2010 9:00	6236	5832	5981	10526	9472	8292
10/21/2010 10:00	6291	5114	5482	9061	8319	7542
10/21/2010 11:00	6425	4966	5225	8516	7303	7044
10/21/2010 12:00	6397	4911	4959	8057	6347	6805
10/21/2010 13:00	6041	4208	4428	7258	6802	6290
10/21/2010 14:00	7095	5403	5280	8420	7600	7106
10/21/2010 15:00	7290	5280	5377	8949	8338	7650
10/21/2010 16:00	6997	5063	5544	9246	8435	7811
10/21/2010 17:00	6506	5091	5112	8935	8317	7534
10/21/2010 18:00	6109	4328	4656	8371	7771	7000
10/21/2010 19:00	5465	3644	3659	6127	5557	5214
10/21/2010 20:00	4492	2924	3051	4900	4562	4438
10/21/2010 21:00	4036	2665	2788	4597	4248	4130
10/21/2010 22:00	3471	2265	2268	3711	3621	3493
10/21/2010 23:00	2201	1619	1524	2531	2602	2626

I-5 SB Truck Volume

From SR-118 to SR-134

October, 2010

Date / Time	Western Ave	Hollywood way	Sheldon St	Bradford St	Osborne St	Van Nuys Blvd
	PM 144.23	PM 148.85	PM 152.41	PM 153.49	PM 154.04	PM 155.12
Hour	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)
10/21/2010 0:00	286	179	196	180	77	97
10/21/2010 1:00	187	147	162	146	64	98
10/21/2010 2:00	165	148	142	146	63	99
10/21/2010 3:00	193	166	217	203	124	96
10/21/2010 4:00	322	224	319	262	159	96
10/21/2010 5:00	528	407	510	434	505	157
10/21/2010 6:00	773	432	550	572	906	194
10/21/2010 7:00	602	420	432	365	1034	222
10/21/2010 8:00	634	377	454	109	723	158
10/21/2010 9:00	763	522	522	446	561	174
10/21/2010 10:00	881	501	685	491	462	151
10/21/2010 11:00	889	469	672	462	316	138
10/21/2010 12:00	820	476	628	425	211	130
10/21/2010 13:00	755	388	453	140	887	213
10/21/2010 14:00	883	433	580	386	397	147
10/21/2010 15:00	787	433	532	343	407	123
10/21/2010 16:00	821	377	480	288	431	143
10/21/2010 17:00	799	365	412	289	402	126
10/21/2010 18:00	772	303	420	289	420	122
10/21/2010 19:00	666	311	391	266	262	124
10/21/2010 20:00	553	282	386	236	177	118
10/21/2010 21:00	535	291	355	234	182	115
10/21/2010 22:00	478	284	337	224	103	97
10/21/2010 23:00	406	257	289	241	108	97

I-5 Off & On Ramps Traffic Volume

For SB I-5

October, 2010

Date / Time	WB Osborne St 2		EB Osborne St		Sunland Blvd		Roscoe Blvd		Branford St	
	PM 154.04	PM 154.04		PM 153.87		PM 150.15		PM 148.80		
	Off Ramp (Lanes 1)	On Ramp (Lanes 1)		On Ramp (Lanes 1)	Off Ramp (Lanes 1)	On Ramp (Lanes 1)		On Ramp (Lanes 1)		On Ramp (Lanes 1)
10/21/2010 0:00	45	n/d		24	n/d	64		28		n/l
10/21/2010 1:00	30	n/d		11	n/d	32		13		n/l
10/21/2010 2:00	20	n/d		9	n/d	33		31		n/l
10/21/2010 3:00	40	n/d		20	n/d	56		34		n/l
10/21/2010 4:00	46	n/d		45	n/d	89		78		n/l
10/21/2010 5:00	168	n/d		151	n/d	255		271		n/l
10/21/2010 6:00	195	n/d		271	n/d	360		463		n/l
10/21/2010 7:00	168	n/d		354	n/d	513		789		n/l
10/21/2010 8:00	180	n/d		312	n/d	439		591		n/l
10/21/2010 9:00	177	n/d		221	n/d	385		455		n/l
10/21/2010 10:00	110	n/d		186	n/d	349		394		n/l
10/21/2010 11:00	135	n/d		183	n/d	382		381		n/l
10/21/2010 12:00	120	n/d		193	n/d	406		387		n/l
10/21/2010 13:00	128	n/d		186	n/d	381		371		n/l
10/21/2010 14:00	100	n/d		174	n/d	433		442		n/l
10/21/2010 15:00	110	n/d		194	n/d	424		444		n/l
10/21/2010 16:00	120	n/d		159	n/d	408		420		n/l
10/21/2010 17:00	205	n/d		220	n/d	374		468		n/l
10/21/2010 18:00	355	n/d		167	n/d	369		330		n/l
10/21/2010 19:00	264	n/d		160	n/d	278		256		n/l
10/21/2010 20:00	193	n/d		122	n/d	265		208		n/l
10/21/2010 21:00	143	n/d		102	n/d	202		147		n/l
10/21/2010 22:00	114	n/d		101	n/d	170		121		n/l
10/21/2010 23:00	89	n/d		36	n/d	102		80		n/l

I-5 NB Main Line Volume
From SR-134 to SR-118
October, 2010

Date / Time	Western Ave	Hollywood way	Sheldon St	Bradford St	Osborne St		Van Nuys Blvd
	PM 144.4	PM 149.04	PM 152.47	PM 153.55	PM 154.18		PM 155.18
Hour	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)		Flow (veh/hr)
10/21/2010 0:00	1284	1329	1065	898	1536	1188	2724
10/21/2010 1:00	817	923	721	630	994	1187	2181
10/21/2010 2:00	1325	820	565	638	769	1201	1970
10/21/2010 3:00	1500	980	644	952	699	1269	1968
10/21/2010 4:00	1989	1421	1085	1944	1226	1295	2521
10/21/2010 5:00	3595	2933	2434	5542	2864	1343	4207
10/21/2010 6:00	5327	4252	3756	8340	4586	1250	5836
10/21/2010 7:00	6883	5492	4951	8319	6769	1218	7987
10/21/2010 8:00	7533	5214	4480	7384	5879	1033	6912
10/21/2010 9:00	6547	4595	4012	6856	4818	1109	5927
10/21/2010 10:00	6229	4990	4271	6100	5183	949	6132
10/21/2010 11:00	5577	5022	4450	5657	5240	818	6058
10/21/2010 12:00	5475	4964	4434	5330	5550	756	6306
10/21/2010 13:00	5751	5504	4443	4643	5727	949	6676
10/21/2010 14:00	6092	6029	5446	5607	7298	1044	8342
10/21/2010 15:00	6078	6247	4831	6012	7293	1371	8664
10/21/2010 16:00	5875	6572	4757	6088	7295	1209	8504
10/21/2010 17:00	6098	5774	4507	5789	6901	1310	8211
10/21/2010 18:00	6122	5040	4494	5360	6617	1262	7879
10/21/2010 19:00	6224	5162	4307	3928	6176	1074	7250
10/21/2010 20:00	5046	4719	4209	3219	5774	1080	6854
10/21/2010 21:00	4327	4136	3680	3046	4837	883	5720
10/21/2010 22:00	3278	3181	2877	2414	3876	946	4822
10/21/2010 23:00	2202	2090	1682	1634	2492	1105	3597

I-5 NB Truck Volume
From SR-134 to SR-118
October, 2010

Date / Time	Western Ave	Hollywood way	Sheldon St	Bradford St	Osborne St	Van Nuys Blvd
	PM 144.4	PM 149.04	PM 152.47	PM 153.55	PM 154.18	PM 155.18
Hour	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)
10/21/2010 0:00	131	125	179	132	279	113
10/21/2010 1:00	160	96	119	99	200	105
10/21/2010 2:00	183	90	122	90	208	103
10/21/2010 3:00	122	110	149	127	316	103
10/21/2010 4:00	248	150	218	129	368	107
10/21/2010 5:00	344	197	390	106	527	150
10/21/2010 6:00	264	212	445	79	647	169
10/21/2010 7:00	589	241	507	14	930	196
10/21/2010 8:00	383	264	540	8	823	171
10/21/2010 9:00	574	297	603	97	840	152
10/21/2010 10:00	532	319	631	151	836	148
10/21/2010 11:00	412	303	702	169	900	161
10/21/2010 12:00	341	281	666	142	793	173
10/21/2010 13:00	177	286	389	112	870	203
10/21/2010 14:00	141	253	494	109	1045	273
10/21/2010 15:00	30	224	210	61	894	305
10/21/2010 16:00	37	200	87	25	831	287
10/21/2010 17:00	94	166	113	30	822	275
10/21/2010 18:00	10	339	115	36	873	252
10/21/2010 19:00	114	172	216	75	756	243
10/21/2010 20:00	324	163	359	78	640	224
10/21/2010 21:00	491	166	355	96	539	178
10/21/2010 22:00	233	158	323	97	441	153
10/21/2010 23:00	342	149	258	139	367	145

I-5 Off & On Ramps Traffic Volume
For NB I-5
October, 2010

Date / Time	EB Osborne St 1		WB Osborne St 2		Sunland Blvd		Branford St	
		PM 154.0		PM 154.18	PM 150.21	PM 150.35		
	Off Ramp (Lanes 1)	On Ramp (Lanes 1)	Off Ramp (Lanes 1)	On Ramp (Lanes 1)	Off Ramp (Lanes 1)	On Ramp (Lanes 1)	Off Ramp (Lanes 1)	
Hour	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (Veh/Hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	
10/21/2010 0:00	n/l	46	n/l	42	116	69	n/l	
10/21/2010 1:00	n/l	19	n/l	33	43	34	n/l	
10/21/2010 2:00	n/l	14	n/l	25	48	42	n/l	
10/21/2010 3:00	n/l	34	n/l	34	48	35	n/l	
10/21/2010 4:00	n/l	80	n/l	62	93	80	n/l	
10/21/2010 5:00	n/l	239	n/l	220	229	227	n/l	
10/21/2010 6:00	n/l	397	n/l	381	316	337	n/l	
10/21/2010 7:00	n/l	586	n/l	514	369	550	n/l	
10/21/2010 8:00	n/l	414	n/l	316	360	399	n/l	
10/21/2010 9:00	n/l	274	n/l	276	291	346	n/l	
10/21/2010 10:00	n/l	262	n/l	250	320	324	n/l	
10/21/2010 11:00	n/l	276	n/l	285	355	318	n/l	
10/21/2010 12:00	n/l	254	n/l	324	390	369	n/l	
10/21/2010 13:00	n/l	379	n/l	369	399	440	n/l	
10/21/2010 14:00	n/l	423	n/l	349	433	436	n/l	
10/21/2010 15:00	n/l	450	n/l	454	494	471	n/l	
10/21/2010 16:00	n/l	462	n/l	454	567	408	n/l	
10/21/2010 17:00	n/l	476	n/l	475	621	349	n/l	
10/21/2010 18:00	n/l	446	n/l	414	523	309	n/l	
10/21/2010 19:00	n/l	364	n/l	273	496	330	n/l	
10/21/2010 20:00	n/l	220	n/l	262	334	257	n/l	
10/21/2010 21:00	n/l	226	n/l	162	285	227	n/l	
10/21/2010 22:00	n/l	135	n/l	133	247	191	n/l	
10/21/2010 23:00	n/l	76	n/l	64	133	95	n/l	

From San Fernando Rd to Glenoaks Blvd & February, 2011			
Date / Time	(EB SR-118) San Fernando Rd		(WB SR-118) San Fernando Rd
	PM 45.83		PM 45.83
Hour	Flow (veh/hr)		Flow (veh/hr)
10/6/2011 0:00	572		367
10/6/2011 1:00	330		240
10/6/2011 2:00	251		213
10/6/2011 3:00	278		363
10/6/2011 4:00	406		780
10/6/2011 5:00	1220		2498
10/6/2011 6:00	2947		4358
10/6/2011 7:00	5094		6214
10/6/2011 8:00	4919		4626
10/6/2011 9:00	3177		3561
10/6/2011 10:00	2764		3296
10/6/2011 11:00	2605		2959
10/6/2011 12:00	2981		3111
10/6/2011 13:00	3125		3127
10/6/2011 14:00	4108		3551
10/6/2011 15:00	4745		4520
10/6/2011 16:00	5141		5091
10/6/2011 17:00	5665		5688
10/6/2011 18:00	5094		4985
10/6/2011 19:00	3877		3170
10/6/2011 20:00	2790		2131
10/6/2011 21:00	2459		1787
10/6/2011 22:00	1764		1412
10/6/2011 23:00	1142		748

Interchange Connector Volume

SR-134 & I-5, SR-134 & I-210

MAY, 2011

Date / Time	EB SR-134 to SB I-5	WB SR-134 to SB I-5	WB SR-134 to NB I-5	NB I-5 to EB SR-134	NB I-5 to WB SR-134	SB I-5 to EB SR-134		EB SR-134 to WB I-210	EB I-210 to WB SR-134		
Hour	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)		Flow (veh/hr)	Flow (veh/hr)		
5/11/2011 0:00	n/d	113	n/d	n/d	326	n/d		n/d	n/d		
5/11/2011 1:00	n/d	61	n/d	n/d	177	n/d		n/d	n/d		
5/11/2011 2:00	n/d	75	n/d	n/d	151	n/d		n/d	n/d		
5/11/2011 3:00	n/d	61	n/d	n/d	162	n/d		n/d	n/d		
5/11/2011 4:00	n/d	162	n/d	n/d	328	n/d		n/d	n/d		
5/11/2011 5:00	n/d	416	n/d	n/d	988	n/d		n/d	n/d		
5/11/2011 6:00	n/d	919	n/d	n/d	1820	n/d		n/d	n/d		
5/11/2011 7:00	n/d	1312	n/d	n/d	2898	n/d		n/d	n/d		
5/11/2011 8:00	n/d	1079	n/d	n/d	2926	n/d		n/d	n/d		
5/11/2011 9:00	n/d	880	n/d	n/d	2578	n/d		n/d	n/d		
5/11/2011 10:00	n/d	827	n/d	n/d	2493	n/d		n/d	n/d		
5/11/2011 11:00	n/d	726	n/d	n/d	2391	n/d		n/d	n/d		
5/11/2011 12:00	n/d	837	n/d	n/d	2491	n/d		n/d	n/d		
5/11/2011 13:00	n/d	775	n/d	n/d	2490	n/d		n/d	n/d		
5/11/2011 14:00	n/d	769	n/d	n/d	2345	n/d		n/d	n/d		
5/11/2011 15:00	n/d	845	n/d	n/d	2478	n/d		n/d	n/d		
5/11/2011 16:00	n/d	818	n/d	n/d	2477	n/d		n/d	n/d		
5/11/2011 17:00	n/d	995	n/d	n/d	2754	n/d		n/d	n/d		
5/11/2011 18:00	n/d	906	n/d	n/d	2412	n/d		n/d	n/d		
5/11/2011 19:00	n/d	712	n/d	n/d	2182	n/d		n/d	n/d		
5/11/2011 20:00	n/d	516	n/d	n/d	1815	n/d		n/d	n/d		
5/11/2011 21:00	n/d	504	n/d	n/d	1738	n/d		n/d	n/d		
5/11/2011 22:00	n/d	375	n/d	n/d	1236	n/d		n/d	n/d		
5/11/2011 23:00	n/d	228	n/d	n/d	633	n/d		n/d	n/d		

Interchange Connector Volume

From SR-134 & SR-2

MAY, 2011

Date / Time	EB SR-134 to SB SR-2	EB SR-134 to NB SR-2	WB SR-134 to SB SR-2	WB SR-134 to NB SR-2		SB SR-2 to EB-SR-134	SB SR-2 to WB SR-134	EB/NB SR-2 to EB SR-134	EB/NB SR-2 to WB SR-134		
Hour	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)		Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)		
5/11/2011 0:00	68	219	125	N/D		N/D	N/D	234	102		
5/11/2011 1:00	46	106	89	N/D		N/D	N/D	134	71		
5/11/2011 2:00	43	58	57	N/D		N/D	N/D	89	45		
5/11/2011 3:00	38	33	97	N/D		N/D	N/D	64	34		
5/11/2011 4:00	78	38	154	N/D		N/D	N/D	124	72		
5/11/2011 5:00	221	125	468	N/D		N/D	N/D	271	181		
5/11/2011 6:00	528	395	1126	N/D		N/D	N/D	666	534		
5/11/2011 7:00	912	1268	1072	N/D		N/D	N/D	1431	664		
5/11/2011 8:00	779	1222	804	N/D		N/D	N/D	1543	645		
5/11/2011 9:00	620	953	905	N/D		N/D	N/D	1059	719		
5/11/2011 10:00	525	941	831	N/D		N/D	N/D	962	595		
5/11/2011 11:00	506	1104	783	N/D		N/D	N/D	957	625		
5/11/2011 12:00	543	1233	757	N/D		N/D	N/D	946	732		
5/11/2011 13:00	549	1366	740	N/D		N/D	N/D	1057	712		
5/11/2011 14:00	650	1612	804	N/D		N/D	N/D	1330	760		
5/11/2011 15:00	727	1765	880	N/D		N/D	N/D	1387	850		
5/11/2011 16:00	766	1994	955	N/D		N/D	N/D	1586	965		
5/11/2011 17:00	812	2372	1179	N/D		N/D	N/D	1656	998		
5/11/2011 18:00	755	1998	1077	N/D		N/D	N/D	1627	791		
5/11/2011 19:00	598	1524	728	N/D		N/D	N/D	1190	695		
5/11/2011 20:00	408	1273	641	N/D		N/D	N/D	860	533		
5/11/2011 21:00	308	1052	572	N/D		N/D	N/D	775	526		
5/11/2011 22:00	248	665	397	N/D		N/D	N/D	629	355		
5/11/2011 23:00	173	418	264	N/D		N/D	N/D	365	243		

SR-134 WB Main Line Volume

From Orange Grove Blvd to I-5

MAY, 2011

Date / Time	San Fernando St	Pacific Ave	Glendale Ave	Figueroa Ave	San Rafeal Ave	Orange Grove Blvd
	PM 5.98	PM 6.52	PM 7.67	PM 11.47	PM 12.25	PM 12.76
Hour	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)
5/11/2011 0:00	1289	1073	768	881	844	810
5/11/2011 1:00	938	703	428	572	502	481
5/11/2011 2:00	844	657	328	484	353	367
5/11/2011 3:00	890	658	400	561	478	523
5/11/2011 4:00	1266	1246	915	900	1022	1083
5/11/2011 5:00	2544	3240	2979	2344	3253	3211
5/11/2011 6:00	4520	5977	5779	4347	6157	5969
5/11/2011 7:00	6167	8332	8635	6112	7981	7638
5/11/2011 8:00	6370	8113	8405	6298	7811	7392
5/11/2011 9:00	6064	7338	7412	5502	6755	6406
5/11/2011 10:00	5032	6330	5935	5013	5602	5366
5/11/2011 11:00	4736	5892	5458	4757	5140	4899
5/11/2011 12:00	4612	6057	5376	4811	5291	4996
5/11/2011 13:00	4537	5745	5158	4646	5090	4766
5/11/2011 14:00	5003	6008	5514	5037	5607	5042
5/11/2011 15:00	5251	6423	6027	5610	6246	5758
5/11/2011 16:00	5384	6415	5958	5690	6561	6061
5/11/2011 17:00	5245	6469	6488	6323	7377	6710
5/11/2011 18:00	4661	5780	5468	5414	6306	5795
5/11/2011 19:00	3922	4862	4363	4330	4758	4412
5/11/2011 20:00	3394	4348	3607	3704	3988	3602
5/11/2011 21:00	3209	4188	3345	3563	3804	3413
5/11/2011 22:00	2727	3145	2507	2582	2644	2426
5/11/2011 23:00	1870	1820	1399	1650	1538	1416

SR-134 WBTruck Volume MAY, 2011		
Date / Time	Figueroa Ave	San Rafael Ave
	PM 11.47	PM 12.25
Hour	Flow (veh/hr)	Flow (veh/hr)
5/11/2011 0:00	20	64
5/11/2011 1:00	7	42
5/11/2011 2:00	6	49
5/11/2011 3:00	7	73
5/11/2011 4:00	16	116
5/11/2011 5:00	50	215
5/11/2011 6:00	95	254
5/11/2011 7:00	126	276
5/11/2011 8:00	119	299
5/11/2011 9:00	108	329
5/11/2011 10:00	106	280
5/11/2011 11:00	101	252
5/11/2011 12:00	106	271
5/11/2011 13:00	100	273
5/11/2011 14:00	116	267
5/11/2011 15:00	121	253
5/11/2011 16:00	121	258
5/11/2011 17:00	133	306
5/11/2011 18:00	120	243
5/11/2011 19:00	102	171
5/11/2011 20:00	87	155
5/11/2011 21:00	84	168
5/11/2011 22:00	73	79
5/11/2011 23:00	57	59

SR-134 WB Off & On Ramps Traffic Volume MAY, 2011		
Date / Time	Figueroa St	
	PM 11.47	PM 11.49
	Off Ramp (Lanes 1)	On Ramp (Lanes 1)
Hour	Flow (veh/hr)	Flow (Veh/Hr)
5/18/2010 0:00	42	n/d
5/18/2010 1:00	27	n/d
5/18/2010 2:00	16	n/d
5/18/2010 3:00	14	n/d
5/18/2010 4:00	23	n/d
5/18/2010 5:00	62	n/d
5/18/2010 6:00	133	n/d
5/18/2010 7:00	281	n/d
5/18/2010 8:00	262	n/d
5/18/2010 9:00	251	n/d
5/18/2010 10:00	232	n/d
5/18/2010 11:00	287	n/d
5/18/2010 12:00	265	n/d
5/18/2010 13:00	283	n/d
5/18/2010 14:00	288	n/d
5/18/2010 15:00	377	n/d
5/18/2010 16:00	371	n/d
5/18/2010 17:00	429	n/d
5/18/2010 18:00	323	n/d
5/18/2010 19:00	263	n/d
5/18/2010 20:00	232	n/d
5/18/2010 21:00	186	n/d
5/18/2010 22:00	150	n/d
5/18/2010 23:00	82	n/d

SR-134 EB Main Line Volume

From I-5 to Orange Grove Blvd

MAY, 2011

Date / Time	San Fernando St	Pacific Ave	Glendale Ave	Figueroa Ave	San Rafeal Ave	Orange Grove Blvd
	PM 5.98	PM 6.52	PM 7.67	PM 11.47	PM 12.25	PM 12.76
Hour	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)
5/11/2011 0:00	1157	987	1138	696	938	735
5/11/2011 1:00	671	556	684	419	570	452
5/11/2011 2:00	464	397	513	323	446	332
5/11/2011 3:00	347	338	427	262	412	330
5/11/2011 4:00	557	545	655	462	655	536
5/11/2011 5:00	1443	1249	1533	1123	1552	1233
5/11/2011 6:00	3774	3063	3574	2924	3595	2890
5/11/2011 7:00	7051	5543	6466	5682	7073	5510
5/11/2011 8:00	7183	5293	6488	5970	7416	5791
5/11/2011 9:00	6151	4634	5569	4536	5610	4241
5/11/2011 10:00	5583	4404	5245	4104	4976	3964
5/11/2011 11:00	5747	4602	5541	4139	5183	3997
5/11/2011 12:00	6074	4951	6004	4404	5423	4102
5/11/2011 13:00	6367	5385	6370	4759	5654	4388
5/11/2011 14:00	6958	5868	7175	5609	6629	5252
5/11/2011 15:00	7283	6353	7818	6294	7264	5580
5/11/2011 16:00	7328	6288	7996	6405	7249	5686
5/11/2011 17:00	7345	6589	8433	6725	8084	6077
5/11/2011 18:00	7455	6617	8058	6496	7510	5726
5/11/2011 19:00	6389	5447	6554	4984	5908	4541
5/11/2011 20:00	5065	4267	5088	3537	4291	3310
5/11/2011 21:00	4392	3584	4560	2973	3820	2899
5/11/2011 22:00	3416	2818	3380	2344	2870	2220
5/11/2011 23:00	2138	1794	2140	1318	1715	1336

SR-134 EB Truck Volume
MAY, 2011

Date / Time	Figueroa Ave	San Rafael Ave
	PM 11.52	PM 12.45
Hour	Flow (veh/hr)	Flow (veh/hr)
5/11/2011 0:00	0	0
5/11/2011 1:00	0	1
5/11/2011 2:00	0	3
5/11/2011 3:00	0	5
5/11/2011 4:00	0	0
5/11/2011 5:00	0	0
5/11/2011 6:00	0	0
5/11/2011 7:00	0	0
5/11/2011 8:00	0	0
5/11/2011 9:00	0	0
5/11/2011 10:00	0	0
5/11/2011 11:00	0	0
5/11/2011 12:00	0	0
5/11/2011 13:00	0	0
5/11/2011 14:00	0	0
5/11/2011 15:00	0	0
5/11/2011 16:00	0	0
5/11/2011 17:00	0	0
5/11/2011 18:00	1	0
5/11/2011 19:00	0	0
5/11/2011 20:00	0	0
5/11/2011 21:00	0	0
5/11/2011 22:00	0	0
5/11/2011 23:00	0	0

SR-134 EB Off & On Ramps Traffic Volume
MAY, 2011

Date / Time	Figueroa St	
	PM 11.42	PM 11.52
	Off Ramp (Lanes 1)	On Ramp (Lanes 1)
Hour	Flow (veh/hr)	Flow (veh/hr)
5/18/2010 0:00	23	n/d
5/18/2010 1:00	13	n/d
5/18/2010 2:00	16	n/d
5/18/2010 3:00	12	n/d
5/18/2010 4:00	7	n/d
5/18/2010 5:00	18	n/d
5/18/2010 6:00	96	n/d
5/18/2010 7:00	289	n/d
5/18/2010 8:00	322	n/d
5/18/2010 9:00	217	n/d
5/18/2010 10:00	195	n/d
5/18/2010 11:00	176	n/d
5/18/2010 12:00	194	n/d
5/18/2010 13:00	192	n/d
5/18/2010 14:00	245	n/d
5/18/2010 15:00	296	n/d
5/18/2010 16:00	352	n/d
5/18/2010 17:00	384	n/d
5/18/2010 18:00	330	n/d
5/18/2010 19:00	264	n/d
5/18/2010 20:00	155	n/d
5/18/2010 21:00	142	n/d
5/18/2010 22:00	117	n/d
5/18/2010 23:00	104	n/d

Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

APPENDIX D: FREEWAY RAMP CAPACITY ANALYSIS WORKSHEETS

Devil's Gate Reservoir Sediment Removal and Management Project

Los Angeles County, California

TRAFFIC IMPACT ANALYSIS

TUSTIN

SANTA CLARITA

TEMECULA

VICTORVILLE

Prepared by:

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September 23, 2013

Hall & Foreman, Inc.
Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
Volume	TM	20-Sep-13	VV.110264.0000	1 OF 1

STREET : Berkshire Place
FREEWAY : I-210

PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION 1
ROUTE 1E,1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
EASTBOUND DIVERGE								
Mainline AM	5570	7%	50	5620	8%	500	6120	8%
Mainline MID	3510	18%	50	3560	19%	315	3875	19%
Mainline PM	4335	12%	50	4385	13%	390	4775	13%
Ramp AM	415	1%	50	465	12%	35	500	12%
Ramp MID	155	4%	50	205	27%	15	220	27%
Ramp PM	260	0%	50	310	16%	25	335	16%

Tustin Office: 714.665.4500 Tel/ 714.665.4501 Fax
Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax
Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax
Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Berkshire Place Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	5570	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	415	vph
Length of first accel/decel lane	1310	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5570	415		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1466	109		v
Trucks and buses	7	1		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %		%
Length	0.00 mi	0.00 mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.966	0.995	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6068	439	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2893 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6068	9600	No
$v_{FO} = v_F - v_R$	5629	9600	No
v_R	439	2000	No
v_3 or v_{av34}	1587 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	No	

If yes, v_{12A} = 2893 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2893	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 17.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	D_S = 0.468	
Space mean speed in ramp influence area,	S_R = 56.9	mph
Space mean speed in outer lanes,	S_O = 74.5	mph
Space mean speed for all vehicles,	S = 64.9	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Berkshire Place Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description:	VV.110264

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3510	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	155	vph
Length of first accel/decel lane	1310	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	3510		155			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	924		41			v
Trucks and buses	18		4			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.917	0.980	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4027	166	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1849 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4027	9600	No
$v_{FO} = v_F - v_R$	3861	9600	No
v_R	166	2000	No
v_3 or v_{av34}	1089 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	

If yes, v_{12A} = 1849 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1849	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 8.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable,	D_S = 0.443	
Space mean speed in ramp influence area,	S_R = 57.6	mph
Space mean speed in outer lanes,	S_O = 76.4	mph
Space mean speed for all vehicles,	S = 66.5	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Berkshire Place Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	4335	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	260	vph
Length of first accel/decel lane	1310	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	4335		260			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1141		68			v
Trucks and buses	12		0			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.943	1.000	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4837	274	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2263 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4837	9600	No
$v_{FO} = v_F - v_R$	4563	9600	No
v_R	274	2000	No
v_3 or v_{av34}	1287 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	

If yes, v_{12A} = 2263 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2263	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 11.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	D_S = 0.453	
Space mean speed in ramp influence area,	S_R = 57.3	mph
Space mean speed in outer lanes,	S_O = 75.7	mph
Space mean speed for all vehicles,	S = 65.8	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Berkshire Place Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	5620	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	465	vph
Length of first accel/decel lane	1310	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5620	465		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1479	122		v
Trucks and buses	8	12		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %		%
Length	0.00 mi	0.00 mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.962	0.943	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6152	519	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2975 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6152	9600	No
$v_{FO} = v_F - v_R$	5633	9600	No
v_R	519	2000	No
v_3 or v_{av34}	1588 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	No	

If yes, v_{12A} = 2975 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2975	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 18.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, D_S = 0.475

Space mean speed in ramp influence area, S_R = 56.7 mph

Space mean speed in outer lanes, S_O = 74.5 mph

Space mean speed for all vehicles, S = 64.7 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Berkshire Place Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3560	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	205	vph
Length of first accel/decel lane	1310	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	3560		205			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	937		54			v
Trucks and buses	19		27			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.913	0.881	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4103	245	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1927 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4103	9600	No
$v_{FO} = v_F - v_R$	3858	9600	No
v_R	245	2000	No
v_3 or v_{av34}	1088 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	

If yes, v_{12A} = 1927 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1927	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 9.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable,	D_S = 0.450	
Space mean speed in ramp influence area,	S_R = 57.4	mph
Space mean speed in outer lanes,	S_O = 76.4	mph
Space mean speed for all vehicles,	S = 66.1	mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Berkshire Place Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	4385	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	310	vph
Length of first accel/decel lane	1310	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4385	310		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1154	82		v
Trucks and buses	13	16		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %		%
Length	0.00 mi	0.00 mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.939	0.926	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4916	352	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2342 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4916	9600	No
$v_{FO} = v_F - v_R$	4564	9600	No
v_R	352	2000	No
v_3 or v_{av34}	1287 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 2342 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2342	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 12.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	D_S = 0.460	
Space mean speed in ramp influence area,	S_R = 57.1	mph
Space mean speed in outer lanes,	S_O = 75.7	mph
Space mean speed for all vehicles,	S = 65.5	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Berkshire Place Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	6120	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	500	vph
Length of first accel/decel lane	1310	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6120	500		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1611	132		v
Trucks and buses	8	12		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %		%
Length	0.00 mi	0.00 mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.962	0.943	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6700	558	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3236 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6700	9600	No
$v_{FO} = v_F - v_R$	6142	9600	No
v_R	558	2000	No
v_3 or v_{av34}	1732 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	

If yes, v_{12A} = 3236 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3236	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 20.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D_S = 0.478	
Space mean speed in ramp influence area,	S_R = 56.6	mph
Space mean speed in outer lanes,	S_O = 73.9	mph
Space mean speed for all vehicles,	S = 64.4	mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Berkshire Place Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3875	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	220	vph
Length of first accel/decel lane	1310	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	3875		220			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1020		58			v
Trucks and buses	19		27			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.913	0.881	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4466	263	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2096 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4466	9600	No
$v_{FO} = v_F - v_R$	4203	9600	No
v_R	263	2000	No
v_3 or v_{av34}	1185 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	

If yes, v_{12A} = 2096 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2096	4400	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v_R - 0.009 L_D$ = 10.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	D_S = 0.452	
Space mean speed in ramp influence area,	S_R = 57.4	mph
Space mean speed in outer lanes,	S_O = 76.1	mph
Space mean speed for all vehicles,	S = 66.0	mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Berkshire Place Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	4775	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	335	vph
Length of first accel/decel lane	1310	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	4775		335			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1257		88			v
Trucks and buses	13		16			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.939	0.926	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5353	381	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2549 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5353	9600	No
$v_{FO} = v_F - v_R$	4972	9600	No
v_R	381	2000	No
v_3 or v_{av34}	1402 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	

If yes, v_{12A} = 2549 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2549	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 14.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	D_S = 0.462	
Space mean speed in ramp influence area,	S_R = 57.1	mph
Space mean speed in outer lanes,	S_O = 75.2	mph
Space mean speed for all vehicles,	S = 65.3	mph

Hall & Foreman, Inc.
Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
Volume	TM	20-Sep-13	VV.110264.0000	1 OF 1

STREET : Berkshire Place
FREEWAY : I-210

PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION
2
ROUTE
1E,1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								

WESTBOUND MERGE

Mainline AM	3365	12%	50	3415	13%	305	3720	13%
Mainline MID	3515	18%	50	3565	19%	315	3880	19%
Mainline PM	5585	9%	50	5635	10%	505	6140	10%
Ramp AM	350	2%	50	400	14%	30	430	14%
Ramp MID	220	2%	50	270	20%	20	290	20%
Ramp PM	475	1%	50	525	10%	45	570	10%

Tustin Office: 714.665.4500 Tel/ 714.665.4501 Fax
Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax
Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax
Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Berkshire Place On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description:	VV.110264

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3365	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	350	vph
Length of first accel/decel lane	1140	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3365	350		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	886	92		v
Trucks and buses	12	2		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.943	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3755	372	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.171 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 643 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4127	9600	No
v_3 or v_{av34}	1556 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	

If yes, v_{12A} = 1502 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	4127	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 12.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.267	
Space mean speed in ramp influence area,	S_R = 62.5	mph
Space mean speed in outer lanes,	S_0 = 67.7	mph
Space mean speed for all vehicles,	S = 65.3	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Berkshire Place On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description:	VV.110264

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3515	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	220	vph
Length of first accel/decel lane	1140	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3515	220		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	925	58		v
Trucks and buses	18	2		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.917	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4033	234	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.189 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 760 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4267	9600	No
v_3 or v_{av34}	1636 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	

If yes, v_{12A} = 1613 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	4267	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 12.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.266	
Space mean speed in ramp influence area,	S_R = 62.6	mph
Space mean speed in outer lanes,	S_0 = 67.4	mph
Space mean speed for all vehicles,	S = 65.2	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Berkshire Place On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	5585	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	475	vph
Length of first accel/decel lane	1140	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5585	475		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1470	125		v
Trucks and buses	9	1		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%		%
Length	mi	mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.957	0.995	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6144	503	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.155 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 952 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6647	9600	No
v_3 or v_{av34}	2596 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 Yes

If yes, v_{12A} = 2457 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	6647	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 21.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.316	
Space mean speed in ramp influence area,	S_R = 61.1	mph
Space mean speed in outer lanes,	S_O = 65.2	mph
Space mean speed for all vehicles,	S = 63.3	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Berkshire Place On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3415	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	400	vph
Length of first accel/decel lane	1140	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3415	400		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	899	105		v
Trucks and buses	13	14		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV		0.939	0.935
Driver population factor, fP		1.00	1.00
Flow rate, vp		3828	451 pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.161 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 618 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4279	9600	No
v_3 or v_{av34}	1605 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	

If yes, v_{12A} = 1531 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	4279	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 13.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.270	
Space mean speed in ramp influence area,	S_R = 62.5	mph
Space mean speed in outer lanes,	S_0 = 67.7	mph
Space mean speed for all vehicles,	S = 65.1	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Berkshire Place On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3565	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	270	vph
Length of first accel/decel lane	1140	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3565	270		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	938	71		v
Trucks and buses	19	20		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%		%
Length	mi	mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.913	0.909	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4109	313	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.179 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 734 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4422	9600	No
v_3 or v_{av34}	1687 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	

If yes, v_{12A} = 1643 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	4422	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 13.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.269	
Space mean speed in ramp influence area,	S_R = 62.5	mph
Space mean speed in outer lanes,	S_O = 67.4	mph
Space mean speed for all vehicles,	S = 65.1	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Berkshire Place On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description:	VV.110264

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	5635	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	525	vph
Length of first accel/decel lane	1140	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5635	525		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1483	138		v
Trucks and buses	10	10		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%		%
Length	mi	mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV		0.952	0.952
Driver population factor, fP		1.00	1.00
Flow rate, vp		6228	580 pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.145 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 905 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6808	9600	No
v_3 or v_{av34}	2661 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	
If yes, v_{12A} = 2491		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	6808	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 22.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.325	
Space mean speed in ramp influence area,	S_R = 60.9	mph
Space mean speed in outer lanes,	S_O = 65.1	mph
Space mean speed for all vehicles,	S = 63.1	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Berkshire Place On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3720	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	430	vph
Length of first accel/decel lane	1140	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3720	430		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	979	113		v
Trucks and buses	13	14		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.939	0.935	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4170	484	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.157 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 656 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4654	9600	No
v_3 or v_{av34}	1757 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	Yes	

If yes, v_{12A} = 1668 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	4654	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 14.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.275	
Space mean speed in ramp influence area,	S_R = 62.3	mph
Space mean speed in outer lanes,	S_O = 67.3	mph
Space mean speed for all vehicles,	S = 64.9	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Berkshire Place On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3880	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	290	vph
Length of first accel/decel lane	1140	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3880	290		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1021	76		v
Trucks and buses	19	20		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.913	0.909	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4472	336	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.176 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 786 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4808	9600	No
v_3 or v_{av34}	1843 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	

If yes, v_{12A} = 1788 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	4808	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 14.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.274	
Space mean speed in ramp influence area,	S_R = 62.3	mph
Space mean speed in outer lanes,	S_0 = 67.0	mph
Space mean speed for all vehicles,	S = 64.8	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Berkshire Place On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	6140	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	570	vph
Length of first accel/decel lane	1140	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6140	570		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1616	150		v
Trucks and buses	10	10		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%		%
Length	mi	mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.952	0.952	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6786	630	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.139 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 944 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	7416	9600	No
v_3 or v_{av34}	2921 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? Yes

Is v_3 or v_{av34} > 1.5 v_{12} /2 Yes

If yes, v_{12A} = 2714 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	7416	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 24.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.352	
Space mean speed in ramp influence area,	S_R = 60.2	mph
Space mean speed in outer lanes,	S_O = 64.5	mph
Space mean speed for all vehicles,	S = 62.4	mph

Hall & Foreman, Inc.
Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
Volume	TM	20-Sep-13	VV.110264.0000	1 OF 1

STREET : Berkshire Place
FREEWAY : I-210

PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION
3
ROUTE
1A,1D

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								

EASTBOUND MERGE

Mainline AM	5155	7%	50	5205	8%	465	5670	8%
Mainline MID	3355	19%	50	3405	20%	300	3705	20%
Mainline PM	4075	13%	50	4125	14%	365	4490	14%
Ramp AM	265	2%	50	315	17%	25	340	17%
Ramp MID	135	3%	50	185	29%	10	195	29%
Ramp PM	405	0%	50	455	11%	35	490	11%

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Berkshire Place On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	5155	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	265	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5155	265		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1357	70		v
Trucks and buses	7	2		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.966	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5616	282	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.183 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 1025 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5898	9600	No
v_3 or v_{av34}	2295 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 Yes

If yes, v_{12A} = 2246 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	5898	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 25.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.370	
Space mean speed in ramp influence area,	S_R = 59.6	mph
Space mean speed in outer lanes,	S_O = 65.7	mph
Space mean speed for all vehicles,	S = 63.0	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Berkshire Place On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description:	VV.110264

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3355	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	135	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3355	135		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	883	36		v
Trucks and buses	19	3		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.913	0.985	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3867	144	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.200 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 773 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4011	9600	No
v_3 or v_{av34}	1547 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 Yes

If yes, v_{12A} = 1546 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	4011	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 18.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.342	
Space mean speed in ramp influence area,	S_R = 60.4	mph
Space mean speed in outer lanes,	S_O = 67.6	mph
Space mean speed for all vehicles,	S = 64.4	mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Berkshire Place On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	4075	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	405	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4075	405		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1072	107		v
Trucks and buses	13	0		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.939	1.000	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4568	426	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.165 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 752 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4994	9600	No
v_3 or v_{av34}	1908 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 Yes

If yes, v_{12A} = 1827 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	4994	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 22.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.358	
Space mean speed in ramp influence area,	S_R = 60.0	mph
Space mean speed in outer lanes,	S_O = 66.9	mph
Space mean speed for all vehicles,	S = 63.6	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Berkshire Place On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	5205	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	315	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5205	315		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1370	83		v
Trucks and buses	8	17		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.962	0.922	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5698	360	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.173 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 985 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6058	9600	No
v_3 or v_{av34}	2356 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	

If yes, v_{12A} = 2279 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	6058	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 25.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.376	
Space mean speed in ramp influence area,	S_R = 59.5	mph
Space mean speed in outer lanes,	S_O = 65.6	mph
Space mean speed for all vehicles,	S = 62.8	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Berkshire Place On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description:	VV.110264

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3405	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	185	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3405	185		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	896	49		v
Trucks and buses	20	29		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.909	0.873	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3943	223	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.190 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 749 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4166	9600	No
v_3 or v_{av34}	1597 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	

If yes, v_{12A} = 1577 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	4166	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 19.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.345	
Space mean speed in ramp influence area,	S_R = 60.4	mph
Space mean speed in outer lanes,	S_O = 67.5	mph
Space mean speed for all vehicles,	S = 64.2	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Berkshire Place On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	4125	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	455	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4125	455		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1086	120		v
Trucks and buses	14	11		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.935	0.948	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4646	505	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.155 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 719 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5151	9600	No
v_3 or v_{av34}	1963 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	

If yes, v_{12A} = 1858 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	5151	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 23.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.362	
Space mean speed in ramp influence area,	S_R = 59.9	mph
Space mean speed in outer lanes,	S_O = 66.8	mph
Space mean speed for all vehicles,	S = 63.4	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Berkshire Place On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	5670	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	340	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5670	340		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1492	89		v
Trucks and buses	8	17		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.962	0.922	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6207	388	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.169 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 1051 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6595	9600	No
v_3 or v_{av34}	2578 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 Yes

If yes, v_{12A} = 2482 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	6595	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 27.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.390	
Space mean speed in ramp influence area,	S_R = 59.1	mph
Space mean speed in outer lanes,	S_O = 65.1	mph
Space mean speed for all vehicles,	S = 62.3	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Berkshire Place On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3705	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	195	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3705	195		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	975	51		v
Trucks and buses	20	29		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.909	0.873	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4290	235	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.188 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 808 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4525	9600	No
v_3 or v_{av34}	1741 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	

If yes, v_{12A} = 1716 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	4525	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 20.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.348	
Space mean speed in ramp influence area,	S_R = 60.2	mph
Space mean speed in outer lanes,	S_O = 67.2	mph
Space mean speed for all vehicles,	S = 64.0	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Berkshire Place On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	4490	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	490	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4490	490		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1182	129		v
Trucks and buses	14	11		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.935	0.948	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5057	544	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.150 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 758 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5601	9600	No
v_3 or v_{av34}	2149 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 Yes

If yes, v_{12A} = 2022 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	5601	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 25.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.372	
Space mean speed in ramp influence area,	S_R = 59.6	mph
Space mean speed in outer lanes,	S_O = 66.3	mph
Space mean speed for all vehicles,	S = 63.1	mph

Hall & Foreman, Inc.
Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
Volume	TM	20-Sep-13	VV.110264.0000	1 OF 1

STREET : Berkshire Place
FREEWAY : I-210

PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION
4
ROUTE
1A,1D

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
WESTBOUND DIVERGE								
Mainline AM	3705	11%	50	3755	12%	335	4090	12%
Mainline MID	3645	17%	50	3695	18%	330	4025	18%
Mainline PM	5765	9%	50	5815	10%	520	6335	10%
Ramp AM	340	1%	50	390	14%	30	420	14%
Ramp MID	130	2%	50	180	29%	10	190	29%
Ramp PM	180	1%	50	230	23%	15	245	23%

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Berkshire Place Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3705	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	340	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	3705		340			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	975		89			v
Trucks and buses	11		1			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.948	0.995	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4115	360	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1997 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4115	9600	No
$v_{FO} = v_F - v_R$	3755	9600	No
v_R	360	2000	No
v_3 or v_{av34}	1059 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 1997 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1997	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 21.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D_S = 0.460	
Space mean speed in ramp influence area,	S_R = 57.1	mph
Space mean speed in outer lanes,	S_O = 76.6	mph
Space mean speed for all vehicles,	S = 65.7	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Berkshire Place Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3645	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	130	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	3645		130			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	959		34			v
Trucks and buses	17		2			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.922	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4163	138	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1893 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4163	9600	No
$v_{FO} = v_F - v_R$	4025	9600	No
v_R	138	2000	No
v_3 or v_{av34}	1135 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 1893 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1893	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 20.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D_S = 0.440	
Space mean speed in ramp influence area,	S_R = 57.7	mph
Space mean speed in outer lanes,	S_O = 76.3	mph
Space mean speed for all vehicles,	S = 66.5	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Berkshire Place Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	5765	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	180	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5765	180		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1517	47		v
Trucks and buses	9	1		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %		%
Length	0.00 mi	0.00 mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.957	0.995	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6342	190	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2872 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6342	9600	No
$v_{FO} = v_F - v_R$	6152	9600	No
v_R	190	2000	No
v_3 or v_{av34}	1735 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 2872 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2872	4400	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086\, v_R - 0.009\, L_{12}$ = 29.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	D_S = 0.445	
Space mean speed in ramp influence area,	S_R = 57.5	mph
Space mean speed in outer lanes,	S_O = 73.9	mph
Space mean speed for all vehicles,	S = 65.5	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Berkshire Place Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3755	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	390	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	3755		390			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	988		103			v
Trucks and buses	12		14			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.943	0.935	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4190	439	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2074 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4190	9600	No
$v_{FO} = v_F - v_R$	3751	9600	No
v_R	439	2000	No
v_3 or v_{av34}	1058 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 2074 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2074	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 22.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D_S = 0.468	
Space mean speed in ramp influence area,	S_R = 56.9	mph
Space mean speed in outer lanes,	S_O = 76.6	mph
Space mean speed for all vehicles,	S = 65.4	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Berkshire Place Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3695	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	180	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	3695		180			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	972		47			v
Trucks and buses	18		29			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.917	0.873	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4240	217	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1971 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4240	9600	No
$v_{FO} = v_F - v_R$	4023	9600	No
v_R	217	2000	No
v_3 or v_{av34}	1134 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 1971 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1971	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 21.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D_S = 0.448	
Space mean speed in ramp influence area,	S_R = 57.5	mph
Space mean speed in outer lanes,	S_O = 76.3	mph
Space mean speed for all vehicles,	S = 66.2	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Berkshire Place Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	6335	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	245	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	6335		245			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1667		64			v
Trucks and buses	10		23			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.952	0.897	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	7002	288	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3215 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	7002	9600	No
$v_{FO} = v_F - v_R$	6714	9600	No
v_R	288	2000	No
v_3 or v_{av34}	1893 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	

If yes, v_{12A} = 3215 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3215	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 31.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.454

Space mean speed in ramp influence area, S_R = 57.3 mph

Space mean speed in outer lanes, S_O = 73.3 mph

Space mean speed for all vehicles, S = 65.0 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Berkshire Place Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	4090	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	420	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	4090		420			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1076		111			v
Trucks and buses	12		14			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.943	0.935	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4564	473	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2257 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4564	9600	No
$v_{FO} = v_F - v_R$	4091	9600	No
v_R	473	2000	No
v_3 or v_{av34}	1153 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 2257 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2257	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 23.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D_S = 0.471	
Space mean speed in ramp influence area,	S_R = 56.8	mph
Space mean speed in outer lanes,	S_O = 76.2	mph
Space mean speed for all vehicles,	S = 65.2	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Berkshire Place Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	4025	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	190	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4025	190		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1059	50		v
Trucks and buses	18	29		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %		%
Length	0.00 mi	0.00 mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.917	0.873	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4618	229	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2143 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4618	9600	No
$v_{FO} = v_F - v_R$	4389	9600	No
v_R	229	2000	No
v_3 or v_{av34}	1237 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 2143 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2143	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 22.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D_S = 0.449	
Space mean speed in ramp influence area,	S_R = 57.4	mph
Space mean speed in outer lanes,	S_O = 75.9	mph
Space mean speed for all vehicles,	S = 66.0	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Berkshire Place Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	6335	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	245	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6335	245		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1667	64		v
Trucks and buses	10	23		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %		%
Length	0.00 mi	0.00 mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.952	0.897	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	7002	288	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3215 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	7002	9600	No
$v_{FO} = v_F - v_R$	6714	9600	No
v_R	288	2000	No
v_3 or v_{av34}	1893 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 3215 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3215	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 31.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	D_S = 0.454	
Space mean speed in ramp influence area,	S_R = 57.3	mph
Space mean speed in outer lanes,	S_O = 73.3	mph
Space mean speed for all vehicles,	S = 65.0	mph

Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
Volume	TM	20-Sep-13	VV.110264.0000	1 OF 1

STREET : Windsor Avenue/Arroyo Boulevard
FREEWAY : I-210

PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION
5
ROUTE
1F, 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
EASTBOUND DIVERGE								
Mainline AM	5715	1%	50	5765	2%	515	6280	2%
Mainline MID	3650	3%	50	3700	5%	330	4030	5%
Mainline PM	4400	2%	50	4450	3%	395	4845	3%
Ramp AM	660	0%	50	710	7%	60	770	7%
Ramp MID	380	0%	50	430	12%	35	465	12%
Ramp PM	705	0%	50	755	7%	65	820	7%

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Windsor Avenue Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	5715	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	660	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	5715		660			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1504		174			v
Trucks and buses	1		0			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.995	1.000	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6046	695	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v - v_F) P_{FD}$ = 3028 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6046	9600	No
$v_{FO} = v - v_F - v_R$	5351	9600	No
v_R	695	2000	No
v_3 or v_{av34}	1509 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	

If yes, v_{12A} = 3028 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3028	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 30.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	D_S = 0.491	
Space mean speed in ramp influence area,	S_R = 56.3	mph
Space mean speed in outer lanes,	S_O = 74.8	mph
Space mean speed for all vehicles,	S = 64.2	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Windsor Avenue Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3650	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	380	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	3650		380			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	961		100			v
Trucks and buses	3		0			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.985	1.000	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3900	400	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1926 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3900	9600	No
$v_{FO} = v_F - v_R$	3500	9600	No
v_R	400	2000	No
v_3 or v_{av34}	987 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	

If yes, v_{12A} = 1926 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1926	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 20.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.464

Space mean speed in ramp influence area, S_R = 57.0 mph

Space mean speed in outer lanes, S_O = 76.8 mph

Space mean speed for all vehicles, S = 65.6 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Windsor Avenue Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	4400	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	705	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4400	705		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1158	186		v
Trucks and buses	2	0		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %		%
Length	0.00 mi	0.00 mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.990	1.000	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4678	742	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2458 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4678	9600	No
$v_{FO} = v_F - v_R$	3936	9600	No
v_R	742	2000	No
v_3 or v_{av34}	1110 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	

If yes, v_{12A} = 2458 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2458	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 25.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.495

Space mean speed in ramp influence area, S_R = 56.1 mph

Space mean speed in outer lanes, S_O = 76.4 mph

Space mean speed for all vehicles, S = 64.2 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Windsor Avenue Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	5765	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	710	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	5765		710			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1517		187			v
Trucks and buses	2		7			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.990	0.966	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6129	774	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3109 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6129	9600	No
$v_{FO} = v_F - v_R$	5355	9600	No
v_R	774	2000	No
v_3 or v_{av34}	1510 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 3109 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3109	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 31.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	D_S = 0.498	
Space mean speed in ramp influence area,	S_R = 56.1	mph
Space mean speed in outer lanes,	S_O = 74.8	mph
Space mean speed for all vehicles,	S = 64.0	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Windsor Avenue Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description:	VV.110264

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3700	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	430	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	3700		430			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	974		113			v
Trucks and buses	5		12			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.976	0.943	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3992	480	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2011 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3992	9600	No
$v_{FO} = v_F - v_R$	3512	9600	No
v_R	480	2000	No
v_3 or v_{av34}	990 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	

If yes, v_{12A} = 2011 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2011	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 21.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D_S = 0.471	
Space mean speed in ramp influence area,	S_R = 56.8	mph
Space mean speed in outer lanes,	S_O = 76.8	mph
Space mean speed for all vehicles,	S = 65.2	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Windsor Avenue Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	4450	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	755	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	4450		755			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1171		199			v
Trucks and buses	3		7			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.985	0.966	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4754	823	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2537 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4754	9600	No
$v_{FO} = v_F - v_R$	3931	9600	No
v_R	823	2000	No
v_3 or v_{av34}	1108 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	

If yes, v_{12A} = 2537 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2537	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 26.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D_S = 0.502	
Space mean speed in ramp influence area,	S_R = 55.9	mph
Space mean speed in outer lanes,	S_O = 76.4	mph
Space mean speed for all vehicles,	S = 63.9	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Windsor Avenue Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	6280	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	770	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	6280		770			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1653		203			v
Trucks and buses	2		7			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.990	0.966	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6677	839	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3384 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6677	9600	No
$v_{FO} = v_F - v_R$	5838	9600	No
v_R	839	2000	No
v_3 or v_{av34}	1646 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 3384 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3384	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 33.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	D_S = 0.504	
Space mean speed in ramp influence area,	S_R = 55.9	mph
Space mean speed in outer lanes,	S_O = 74.3	mph
Space mean speed for all vehicles,	S = 63.7	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Windsor Avenue Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	4030	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	465	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	4030		465			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1061		122			v
Trucks and buses	5		12			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.976	0.943	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4348	519	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2188 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4348	9600	No
$v_{FO} = v_F - v_R$	3829	9600	No
v_R	519	2000	No
v_3 or v_{av34}	1080 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	

If yes, v_{12A} = 2188 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2188	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 23.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.475

Space mean speed in ramp influence area, S_R = 56.7 mph

Space mean speed in outer lanes, S_0 = 76.5 mph

Space mean speed for all vehicles, S = 65.1 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Windsor Avenue Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	4845	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	820	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	4845		820			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1275		216			v
Trucks and buses	3		7			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.985	0.966	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5177	893	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2761 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5177	9600	No
$v_{FO} = v_F - v_R$	4284	9600	No
v_R	893	2000	No
v_3 or v_{av34}	1208 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	

If yes, v_{12A} = 2761 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2761	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 28.0- pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D_S = 0.508	
Space mean speed in ramp influence area,	S_R = 55.8	mph
Space mean speed in outer lanes,	S_O = 76.0	mph
Space mean speed for all vehicles,	S = 63.7	mph

Hall & Foreman, Inc.
Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
Volume	TM	20-Sep-13	VV.110264.0000	1 OF 1

STREET : Windsor Avenue/Arroyo Boulevard
FREEWAY : I-210
PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%
INTERSECTION 6
ROUTE 1F,1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								

WESTBOUND MERGE

Mainline AM	3365	1%	50	3415	3%	305	3720	3%
Mainline MID	2460	5%	50	2510	7%	220	2730	7%
Mainline PM	4060	2%	50	4110	3%	365	4475	3%
Ramp AM	575	0%	50	625	8%	50	675	8%
Ramp MID	330	4%	50	380	16%	30	410	16%
Ramp PM	550	1%	50	600	9%	50	650	9%

Tustin Office: 714.665.4500 Tel/ 714.665.4501 Fax
Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax
Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax
Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Windsor Avenue On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3365	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	575	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3365	575		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	886	151		v
Trucks and buses	1	0		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.995	1.000	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3560	605	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.142 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 506 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4165	9600	No
v_3 or v_{av34}	1527 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	

If yes, v_{12A} = 1424 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	4165	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 21.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.351	
Space mean speed in ramp influence area,	S_R = 60.2	mph
Space mean speed in outer lanes,	S_0 = 68.0	mph
Space mean speed for all vehicles,	S = 63.9	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Windsor Avenue On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	2460	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	330	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2460	330		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	647	87		v
Trucks and buses	5	4		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.976	0.980	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2654	354	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.174 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 461 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3008	9600	No
v_3 or v_{av34}	1096 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	
If yes, v_{12A} = 1061		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	3008	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 16.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.337	
Space mean speed in ramp influence area,	S_R = 60.6	mph
Space mean speed in outer lanes,	S_O = 68.9	mph
Space mean speed for all vehicles,	S = 64.7	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Windsor Avenue On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	4060	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	550	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4060	550		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1068	145		v
Trucks and buses	2	1		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.990	0.995	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4316	582	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.145 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 626 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4898	9600	No
v_3 or v_{av34}	1845 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	

If yes, v_{12A} = 1726 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	4898	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 23.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.360	
Space mean speed in ramp influence area,	S_R = 59.9	mph
Space mean speed in outer lanes,	S_0 = 67.1	mph
Space mean speed for all vehicles,	S = 63.5	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Windsor Avenue On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3415	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	625	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3415	625		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	899	164		v
Trucks and buses	3	8		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.985	0.962	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3649	684	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.132 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 483 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4333	9600	No
v_3 or v_{av34}	1583 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	
If yes, v_{12A} = 1459		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	4333	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 21.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.354	
Space mean speed in ramp influence area,	S_R = 60.1	mph
Space mean speed in outer lanes,	S_0 = 67.9	mph
Space mean speed for all vehicles,	S = 63.8	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Windsor Avenue On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	2510	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	380	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2510	380		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	661	100		v
Trucks and buses	7	16		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.966	0.926	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2735	432	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.164 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 448 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3167	9600	No
v_3 or v_{av34}	1143 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	

If yes, v_{12A} = 1094 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	3167	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 17.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.339	
Space mean speed in ramp influence area,	S_R = 60.5	mph
Space mean speed in outer lanes,	S_0 = 68.8	mph
Space mean speed for all vehicles,	S = 64.6	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Windsor Avenue On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	4110	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	600	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4110	600		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1082	158		v
Trucks and buses	3	9		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.985	0.957	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4391	660	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.135 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 594 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5051	9600	No
v_3 or v_{av34}	1898 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	
If yes, v_{12A} = 1756		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	5051	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 24.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.365	
Space mean speed in ramp influence area,	S_R = 59.8	mph
Space mean speed in outer lanes,	S_O = 67.1	mph
Space mean speed for all vehicles,	S = 63.4	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Windsor Avenue On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3720	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	675	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3720	675		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	979	178		v
Trucks and buses	3	8		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.985	0.962	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3975	739	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.125 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 499 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4714	9600	No
v_3 or v_{av34}	1738 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	
If yes, v_{12A} = 1590		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	4714	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 23.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.361	
Space mean speed in ramp influence area,	S_R = 59.9	mph
Space mean speed in outer lanes,	S_0 = 67.5	mph
Space mean speed for all vehicles,	S = 63.5	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Windsor Avenue On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	2730	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	410	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2730	410		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	718	108		v
Trucks and buses	7	16		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.966	0.926	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2974	466	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.160 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 475 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3440	9600	No
v_3 or v_{av34}	1249 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	

If yes, v_{12A} = 1189 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	3440	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 18.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.341	
Space mean speed in ramp influence area,	S_R = 60.4	mph
Space mean speed in outer lanes,	S_O = 68.6	mph
Space mean speed for all vehicles,	S = 64.4	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Windsor Avenue On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	4475	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	650	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4475	650		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1178	171		v
Trucks and buses	3	9		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%		%
Length	mi	mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.985	0.957	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4781	715	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.128 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 614 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5496	9600	No
v_3 or v_{av34}	2083 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	

If yes, v_{12A} = 1912 (Equation 13-15, 13-16, 18, or 19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	5496	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 25.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.375	
Space mean speed in ramp influence area,	S_R = 59.5	mph
Space mean speed in outer lanes,	S_O = 66.6	mph
Space mean speed for all vehicles,	S = 63.0	mph

Hall & Foreman, Inc.
Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
Volume	TM	20-Sep-13	VV.110264.0000	1 OF 1

STREET : Windsor Avenue/Arroyo Boulevard
FREEWAY : I-210

PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION
7
ROUTE
1B,1C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								

EASTBOUND MERGE

Mainline AM	5055	1%	50	5105	2%	455	5560	2%
Mainline MID	3270	4%	50	3320	5%	295	3615	5%
Mainline PM	3695	2%	50	3745	3%	335	4080	3%
Ramp AM	435	0%	50	485	11%	40	525	11%
Ramp MID	310	1%	50	360	15%	30	390	15%
Ramp PM	430	0%	50	480	10%	40	520	10%

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Windsor Avenue On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	5055	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	435	vph
Length of first accel/decel lane	1450	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5055	435		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1330	114		v
Trucks and buses	1	0		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.995	1.000	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5348	458	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.161 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 859 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5806	9600	No
v_3 or v_{av34}	2244 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 Yes

If yes, v_{12A} = 2139 (Equation 13-15, 13-16, 18, or 19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	5806	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 16.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.272	
Space mean speed in ramp influence area,	S_R = 62.4	mph
Space mean speed in outer lanes,	S_O = 66.0	mph
Space mean speed for all vehicles,	S = 64.3	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Windsor Avenue On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3270	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	310	vph
Length of first accel/decel lane	1450	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp	0	vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp	1000	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	3270		310		0	vph
Peak-hour factor, PHF	0.95		0.95		0.90	
Peak 15-min volume, v15	861		82		0	v
Trucks and buses	4		1		0	%
Recreational vehicles	0		0		0	%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%	0.00	%
Length	0.00	mi	0.00	mi	0.00	mi
Trucks and buses PCE, ET	1.5		1.5		1.5	
Recreational vehicle PCE, ER	1.2		1.2		1.2	

Heavy vehicle adjustment, fHV	0.980	0.995	1.000	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	3511	328	0	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.177 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 621 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3839	9600	No
v_3 or v_{av34}	1445 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	

If yes, v_{12A} = 1404 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	3839	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 9.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable,	M_S = 0.242	
Space mean speed in ramp influence area,	S_R = 63.2	mph
Space mean speed in outer lanes,	S_0 = 68.0	mph
Space mean speed for all vehicles,	S = 65.8	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Windsor Avenue On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3695	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	430	vph
Length of first accel/decel lane	1450	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3695	430		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	972	113		v
Trucks and buses	2	0		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.990	1.000	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3928	453	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.161 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 633 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4381	9600	No
v_3 or v_{av34}	1647 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	

If yes, v_{12A} = 1571 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	4381	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 12.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.249	
Space mean speed in ramp influence area,	S_R = 63.0	mph
Space mean speed in outer lanes,	S_0 = 67.6	mph
Space mean speed for all vehicles,	S = 65.4	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Windsor Avenue On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	5105	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	485	vph
Length of first accel/decel lane	1450	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5105	485		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1343	128		v
Trucks and buses	2	11		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.990	0.948	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5427	539	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.150 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 816 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5966	9600	No
v_3 or v_{av34}	2305 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	

If yes, v_{12A} = 2170 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	5966	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 17.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.278	
Space mean speed in ramp influence area,	S_R = 62.2	mph
Space mean speed in outer lanes,	S_O = 65.9	mph
Space mean speed for all vehicles,	S = 64.2	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Windsor Avenue On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3320	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	360	vph
Length of first accel/decel lane	1450	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3320	360		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	874	95		v
Trucks and buses	5	15		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.976	0.930	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3582	407	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.167 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 598 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3989	9600	No
v_3 or v_{av34}	1492 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	

If yes, v_{12A} = 1432 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	3989	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 10.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.244	
Space mean speed in ramp influence area,	S_R = 63.2	mph
Space mean speed in outer lanes,	S_O = 67.9	mph
Space mean speed for all vehicles,	S = 65.6	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Windsor Avenue On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3745	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	480	vph
Length of first accel/decel lane	1450	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3745	480		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	986	126		v
Trucks and buses	3	10		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%		%
Length	mi	mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.985	0.952	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4001	531	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.151 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 606 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4532	9600	No
v_3 or v_{av34}	1697 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	
If yes, v_{12A} = 1600		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	4532	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 12.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.252	
Space mean speed in ramp influence area,	S_R = 62.9	mph
Space mean speed in outer lanes,	S_0 = 67.5	mph
Space mean speed for all vehicles,	S = 65.3	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Windsor Avenue On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	5560	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	525	vph
Length of first accel/decel lane	1450	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp	0	vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp	1000	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	5560		525		0	vph
Peak-hour factor, PHF	0.95		0.95		0.90	
Peak 15-min volume, v15	1463		138		0	v
Trucks and buses	2		11		0	%
Recreational vehicles	0		0		0	%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%	0.00	%
Length	0.00	mi	0.00	mi	0.00	mi
Trucks and buses PCE, ET	1.5		1.5		1.5	
Recreational vehicle PCE, ER	1.2		1.2		1.2	

Heavy vehicle adjustment, fHV	0.990	0.948	1.000	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5911	583	0	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.145 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 857 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6494	9600	No
v_3 or v_{av34}	2527 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	
If yes, v_{12A} = 2364		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	6494	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 19.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.294	
Space mean speed in ramp influence area,	S_R = 61.8	mph
Space mean speed in outer lanes,	S_O = 65.4	mph
Space mean speed for all vehicles,	S = 63.7	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Windsor Avenue On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3615	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	390	vph
Length of first accel/decel lane	1450	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3615	390		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	951	103		v
Trucks and buses	5	15		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV		0.976	0.930
Driver population factor, fP		1.00	1.00
Flow rate, vp		3900	441 pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.163 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 634 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4341	9600	No
v_3 or v_{av34}	1633 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	

If yes, v_{12A} = 1560 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	4341	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 11.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.248	
Space mean speed in ramp influence area,	S_R = 63.0	mph
Space mean speed in outer lanes,	S_0 = 67.6	mph
Space mean speed for all vehicles,	S = 65.4	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Windsor Avenue On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	4080	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	520	vph
Length of first accel/decel lane	1450	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4080	520		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1074	137		v
Trucks and buses	3	10		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.985	0.952	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4359	575	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.146 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 636 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4934	9600	No
v_3 or v_{av34}	1861 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	

If yes, v_{12A} = 1743 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	4934	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 14.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.259	
Space mean speed in ramp influence area,	S_R = 62.7	mph
Space mean speed in outer lanes,	S_0 = 67.1	mph
Space mean speed for all vehicles,	S = 65.0	mph

Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
Volume	TM	20-Sep-13	VV.110264.0000	1 OF 1

STREET : Windsor Avenue/Arroyo Boulevard

FREEWAY : I-210

PROJECTED YEAR :

PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION 8

ROUTE 1B,1D

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
WESTBOUND DIVERGE								
Mainline AM	3365	1%	50	3415	3%	305	3720	3%
Mainline MID	2460	5%	50	2510	7%	220	2730	7%
Mainline PM	4060	2%	50	4110	3%	365	4475	3%
Ramp AM	580	1%	50	630	8%	50	680	8%
Ramp MID	200	2%	50	250	21%	20	270	21%
Ramp PM	435	0%	50	485	11%	40	525	11%

Tustin Office: 714.665.4500 Tel/ 714.665.4501 Fax

Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax

Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax

Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Windsor Avenue Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3365	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	580	vph
Length of first accel/decel lane	1300	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3365	580		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	886	153		v
Trucks and buses	1	1		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %		%
Length	0.00 mi	0.00 mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.995	0.995	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3560	614	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1898 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3560	9600	No
$v_{FO} = v_F - v_R$	2946	9600	No
v_R	614	2000	No
v_3 or v_{av34}	831 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	

If yes, v_{12A} = 1898 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1898	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 8.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable,	D_S = 0.483	
Space mean speed in ramp influence area,	S_R = 56.5	mph
Space mean speed in outer lanes,	S_0 = 76.8	mph
Space mean speed for all vehicles,	S = 64.4	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Windsor Avenue Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	2460	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	200	vph
Length of first accel/decel lane	1300	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	2460		200			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	647		53			v
Trucks and buses	5		2			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.976	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2654	213	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1277 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2654	9600	No
$v_{FO} = v_F - v_R$	2441	9600	No
v_R	213	2000	No
v_3 or v_{av34}	688 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 1277 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1277	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 3.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable,	D_S = 0.447	
Space mean speed in ramp influence area,	S_R = 57.5	mph
Space mean speed in outer lanes,	S_0 = 76.8	mph
Space mean speed for all vehicles,	S = 66.1	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Windsor Avenue Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	4060	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	435	vph
Length of first accel/decel lane	1300	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	4060		435			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1068		114			v
Trucks and buses	2		0			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.990	1.000	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4316	458	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v - v_F) P_{FD}$ = 2140 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4316	9600	No
$v_{FO} = v - v_F - v_R$	3858	9600	No
v_R	458	2000	No
v_3 or v_{av34}	1088 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 2140 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2140	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 11.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	D_S = 0.469	
Space mean speed in ramp influence area,	S_R = 56.9	mph
Space mean speed in outer lanes,	S_O = 76.4	mph
Space mean speed for all vehicles,	S = 65.3	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Windsor Avenue Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3415	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	630	vph
Length of first accel/decel lane	1300	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	3415		630			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	899		166			v
Trucks and buses	3		8			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.985	0.962	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3649	690	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1980 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3649	9600	No
$v_{FO} = v_F - v_R$	2959	9600	No
v_R	690	2000	No
v_3 or v_{av34}	834 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	

If yes, v_{12A} = 1980 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1980	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 9.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable,	D_S = 0.490	
Space mean speed in ramp influence area,	S_R = 56.3	mph
Space mean speed in outer lanes,	S_O = 76.8	mph
Space mean speed for all vehicles,	S = 64.1	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Windsor Avenue Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	2510	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	250	vph
Length of first accel/decel lane	1300	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	2510		250			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	661		66			v
Trucks and buses	7		21			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.966	0.905	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2735	291	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1357 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2735	9600	No
$v_{FO} = v_F - v_R$	2444	9600	No
v_R	291	2000	No
v_3 or v_{av34}	689 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	

If yes, v_{12A} = 1357 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1357	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 4.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable,	D_S = 0.454	
Space mean speed in ramp influence area,	S_R = 57.3	mph
Space mean speed in outer lanes,	S_O = 76.8	mph
Space mean speed for all vehicles,	S = 65.7	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Windsor Avenue Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	4110	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	485	vph
Length of first accel/decel lane	1300	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	4110		485			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1082		128			v
Trucks and buses	3		11			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.985	0.948	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4391	539	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2218 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4391	9600	No
$v_{FO} = v_F - v_R$	3852	9600	No
v_R	539	2000	No
v_3 or v_{av34}	1086 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	

If yes, v_{12A} = 2218 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2218	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 11.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	D_S = 0.477	
Space mean speed in ramp influence area,	S_R = 56.7	mph
Space mean speed in outer lanes,	S_O = 76.5	mph
Space mean speed for all vehicles,	S = 65.0	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Windsor Avenue Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3720	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	680	vph
Length of first accel/decel lane	1300	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	3720		680			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	979		179			v
Trucks and buses	3		8			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.985	0.962	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3975	744	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2153 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3975	9600	No
$v_{FO} = v_F - v_R$	3231	9600	No
v_R	744	2000	No
v_3 or v_{av34}	911 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 2153 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2153	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 11.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	D_S = 0.495	
Space mean speed in ramp influence area,	S_R = 56.1	mph
Space mean speed in outer lanes,	S_O = 76.8	mph
Space mean speed for all vehicles,	S = 64.0	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Windsor Avenue Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	2730	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	270	vph
Length of first accel/decel lane	1300	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	2730		270			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	718		71			v
Trucks and buses	7		21			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.966	0.905	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2974	314	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1474 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2974	9600	No
$v_{FO} = v_F - v_R$	2660	9600	No
v_R	314	2000	No
v_3 or v_{av34}	750 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	

If yes, v_{12A} = 1474 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1474	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 5.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable, D_S = 0.456

Space mean speed in ramp influence area, S_R = 57.2 mph

Space mean speed in outer lanes, S_O = 76.8 mph

Space mean speed for all vehicles, S = 65.7 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Windsor Avenue Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	4475	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	525	vph
Length of first accel/decel lane	1300	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	4475		525			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1178		138			v
Trucks and buses	3		11			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.985	0.948	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4781	583	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v - v_F) P_{FD}$ = 2413 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4781	9600	No
$v_{FO} = v - v_F - v_R$	4198	9600	No
v_R	583	2000	No
v_3 or v_{av34}	1184 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 2413 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2413	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 13.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, D_S = 0.480

Space mean speed in ramp influence area, S_R = 56.5 mph

Space mean speed in outer lanes, S_O = 76.1 mph

Space mean speed for all vehicles, S = 64.8 mph

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
Interchange	TM	20-Sep-13	VV.110264.0000	1 OF 1

FREEWAY : SR-134
FREEWAY : I-210

PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION 9
ROUTE 4A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
EASTBOUND DIVERGE								
Mainline AM	5115	2%	50	5165	3%	460	5625	3%
Mainline MID	4140	11%	50	4190	12%	375	4565	12%
Mainline PM	4325	8%	50	4375	9%	390	4765	9%
Ramp AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
Interchange	TM	20-Sep-13	VV.110264.0000	1 OF 1

FREEWAY : SR-134
FREEWAY : I-210

PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION
10
ROUTE
2A, 2B,3

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
WESTBOUND MERGE								
Mainline AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Mainline MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Mainline PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D

Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
Interchange	TM	20-Sep-13	VV.110264.0000	1 OF 1

FREEWAY : SR-134
FREEWAY : I-210

PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION
11
ROUTE
2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								

WESTBOUND SR-134 MERGE

Mainline AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Mainline MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Mainline PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D

Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
Interchange	TM	20-Sep-13	VV.110264.0000	1 OF 1

FREEWAY : SR-134
FREEWAY : I-210

PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION 12
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
EASTBOUND SR-134 DIVERGE								
Mainline AM	5790	10%	50	5840	11%	520	6360	11%
Mainline MID	5250	10%	50	5300	11%	475	5775	11%
Mainline PM	6075	10%	50	6125	11%	545	6670	11%
Ramp AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D

Hall & Foreman, Inc.
Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
Volume	TM	20-Sep-13	VV.110264.0000	1 OF 1

STREET : Figueroa Street/Scholl Canyon Road
FREEWAY : SR-134
PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%
INTERSECTION 13
ROUTE 4A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
WESTBOUND DIVERGE								
Mainline AM	6300	2%	50	6350	1%	565	6915	1%
Mainline MID	5035	2%	50	5085	1%	455	5540	1%
Mainline PM	6325	2%	50	6375	1%	570	6945	1%
Ramp AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D

Tustin Office: 714.665.4500 Tel/ 714.665.4501 Fax
Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax
Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax
Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
Volume	TM	20-Sep-13	VV.110264.0000	1 OF 1

STREET : Figueroa Street/Scholl Canyon Road
FREEWAY : SR-134
PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%
INTERSECTION 14
ROUTE 4A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
EASTBOUND MERGE								
Mainline AM	5565	10%	50	5615	11%	500	6115	11%
Mainline MID	5300	10%	50	5350	11%	475	5825	11%
Mainline PM	6215	10%	50	6265	11%	560	6825	11%
Ramp AM	335	1%	50	385	14%	30	415	14%
Ramp MID	290	9%	50	340	23%	25	365	23%
Ramp PM	320	4%	50	370	17%	30	400	17%

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	SR-134/EB
Junction:	Figueroa Street On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description:	VV.110264

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	5565	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	335	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5565	335		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1464	88		v
Trucks and buses	10	1		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.952	0.995	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6151	354	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.174 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 811 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5029	9400	No
v_3 or v_{av34}	1932 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 Yes

If yes, v_{12A} = 1870 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	5029	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 22.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, M_S = 0.357

Space mean speed in ramp influence area, S_R = 56.8 mph

Space mean speed in outer lanes, S_O = 61.8 mph

Space mean speed for all vehicles, S = 59.5 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	SR-134/EB
Junction:	Figueroa Street On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description:	VV.110264

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	5300	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	290	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp	0	vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp	1000	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	5300		290		0		vph
Peak-hour factor, PHF	0.95		0.95		0.90		
Peak 15-min volume, v15	1395		76		0		v
Trucks and buses	10				0		%
Recreational vehicles	0		0		0		%
Terrain type:	Level		Level				
Grade	0.00	%	0.00	%	0.00	%	
Length	0.00	mi	0.00	mi	0.00	mi	
Trucks and buses PCE, ET	1.5		1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		1.2		

Heavy vehicle adjustment, fHV	0.952	0.995	1.000	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5858	307	0	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.179 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 799 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4760	9400	No
v_3 or v_{av34}	1827 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 Yes

If yes, v_{12A} = 1781 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	4760	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 21.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.352	
Space mean speed in ramp influence area,	S_R = 56.9	mph
Space mean speed in outer lanes,	S_O = 62.0	mph
Space mean speed for all vehicles,	S = 59.6	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	SR-134/EB
Junction:	Figueroa Street On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	6215	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	320	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6215	320		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1636	84		v
Trucks and buses	10	4		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.952	0.980	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6869	344	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.175 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 877 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5359	9400	No
v_3 or v_{av34}	2069 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 Yes

If yes, v_{12A} = 2006 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	5359	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 23.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.362	
Space mean speed in ramp influence area,	S_R = 56.7	mph
Space mean speed in outer lanes,	S_O = 61.4	mph
Space mean speed for all vehicles,	S = 59.2	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	SR-134/EB
Junction:	Figueroa Street On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	5615	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	385	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5615	385		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1478	101		v
Trucks and buses	11	14		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.948	0.935	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6236	434	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.164 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 775 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5174	9400	No
v_3 or v_{av34}	1982 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	

If yes, v_{12A} = 1896 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	5174	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 23.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.361	
Space mean speed in ramp influence area,	S_R = 56.7	mph
Space mean speed in outer lanes,	S_O = 61.7	mph
Space mean speed for all vehicles,	S = 59.3	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	SR-134/EB
Junction:	Figueroa Street On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	5350	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	340	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5350	340		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1408	89		v
Trucks and buses	11			%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.948	0.935	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5941	383	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.170 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 767 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4899	9400	No
v_3 or v_{av34}	1874 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	Yes	

If yes, v_{12A} = 1806 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	4899	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 22.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.356	
Space mean speed in ramp influence area,	S_R = 56.8	mph
Space mean speed in outer lanes,	S_O = 61.9	mph
Space mean speed for all vehicles,	S = 59.5	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	SR-134/EB
Junction:	Figueroa Street On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	6265	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	370	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6265	370		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1649	97		v
Trucks and buses	11			%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.948	0.897	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6957	434	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.164 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 831 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5513	9400	No
v_3 or v_{av34}	2124 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	

If yes, v_{12A} = 2031 (Equation 13-15, 13-16, 18, or 19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	5513	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 24.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.367	
Space mean speed in ramp influence area,	S_R = 56.6	mph
Space mean speed in outer lanes,	S_O = 61.3	mph
Space mean speed for all vehicles,	S = 59.1	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	SR-134/EB
Junction:	Figueroa Street On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	6115	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	415	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6115	415		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1609	109		v
Trucks and buses	11	14		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%		%
Length	mi	mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.948	0.935	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6791	467	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.159 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 1083 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	7258	9600	No
v_3 or v_{av34}	2854 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	Yes	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	Yes	

If yes, v_{12A} = 2716 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	7258	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 30.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	M_S = 0.415	
Space mean speed in ramp influence area,	S_R = 58.4	mph
Space mean speed in outer lanes,	S_O = 64.5	mph
Space mean speed for all vehicles,	S = 61.6	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	SR-134/EB
Junction:	Figueroa Street On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	5825	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	365	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5825	365		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1533	96		v
Trucks and buses	11			%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.948	0.935	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6469	411	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.166 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 1077 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6880	9600	No
v_3 or v_{av34}	2696 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	Yes	

If yes, v_{12A} = 2587 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	6880	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 28.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	M_S = 0.399	
Space mean speed in ramp influence area,	S_R = 58.8	mph
Space mean speed in outer lanes,	S_O = 64.8	mph
Space mean speed for all vehicles,	S = 62.1	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	SR-134/EB
Junction:	Figueroa Street On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	6825	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	400	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6825	400		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1796	105		v
Trucks and buses	11	17		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.948	0.922	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	7579	457	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.161 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 1218 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	8036	9600	No
v_3 or v_{av34}	3180 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? Yes

Is v_3 or v_{av34} > 1.5 v_{12} /2 Yes

If yes, v_{12A} = 3031 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	8036	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 32.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	M_S = 0.449	
Space mean speed in ramp influence area,	S_R = 57.4	mph
Space mean speed in outer lanes,	S_O = 63.6	mph
Space mean speed for all vehicles,	S = 60.8	mph

Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
Interchange	TM	20-Sep-13	VV.110264.0000	1 OF 1

FREEWAY : SR-134
FREEWAY : I-210

PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION
15
ROUTE
2A, 3

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
EASTBOUND I-210 MERGE								
Mainline AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Mainline MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Mainline PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D

Hall & Foreman, Inc.
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SUBJECT	BY	DATE	JOB NO.	SHEET OF
Interchange	TM	20-Sep-13	VV.110264.0000	1 OF 1

FREEWAY : SR-134
FREEWAY : I-210

PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION 16
ROUTE 2A, 3

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
WESTBOUND DIVERGE								
Mainline AM	4775	2%	50	4825	3%	430	5255	3%
Mainline MID	3905	11%	50	3955	12%	350	4305	12%
Mainline PM	5615	6%	50	5665	7%	505	6170	7%
Ramp AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D

Hall & Foreman, Inc.
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SUBJECT	BY	DATE	JOB NO.	SHEET OF
Volume	TM	20-Sep-13	VV.110264.0000	1 OF 1

STREET : Irwindale Avenue
FREEWAY : I-210

PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION
17
ROUTE
2A, 2B, 3, 9

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
EASTBOUND DIVERGE								
Mainline AM	6225	4%	50	6275	5%	560	6835	5%
Mainline MID	6660	4%	50	6710	5%	600	7310	5%
Mainline PM	6265	7%	50	6315	8%	565	6880	8%
Ramp AM	1120	8%	50	1170	11%	100	1270	11%
Ramp MID	960	10%	50	1010	14%	85	1095	14%
Ramp PM	765	1%	50	815	7%	70	885	7%

Tustin Office: 714.665.4500 Tel/ 714.665.4501 Fax
Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax
Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax
Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Irwindale Avenue Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	6225	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1120	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	6225		1120			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1638		295			v
Trucks and buses	4		8			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.980	0.962	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6684	1226	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2385 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5682	9600	No
$v_{FO} = v_F - v_R$	4456	9600	No
v_R	1226	4000	No
v_3 or v_{av34}	1648 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	

If yes, v_{12A} = 2385 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2385	4400	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v_R - 0.009 L_D$ = -2.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable, D_S = 0.538

Space mean speed in ramp influence area, S_R = 54.9 mph

Space mean speed in outer lanes, S_0 = 74.3 mph

Space mean speed for all vehicles, S = 64.7 mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Irwindale Avenue Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	6660	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	960	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	6660		960			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1753		253			v
Trucks and buses	4		10			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.980	0.952	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	7151	1061	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2273 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5721	9600	No
$v_{FO} = v_F - v_R$	4660	9600	No
v_R	1061	4000	No
v_3 or v_{av34}	1724 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 Yes

If yes, v_{12A} = 2288 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	2288	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = -3.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable,	D_S = 0.523	
Space mean speed in ramp influence area,	S_R = 55.3	mph
Space mean speed in outer lanes,	S_O = 74.0	mph
Space mean speed for all vehicles,	S = 65.2	mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Irwindale Avenue Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	6265	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	765	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6265	765		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1649	201		v
Trucks and buses	7	1		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %		%
Length	0.00 mi	0.00 mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.966	0.995	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6826	809	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2107 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5803	9600	No
$v_{FO} = v_F - v_R$	4994	9600	No
v_R	809	4000	No
v_3 or v_{av34}	1848 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	

If yes, v_{12A} = 2321 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	2321	4400	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086\, v_R - 0.009\, L_D$ = -2.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable,	D_S = 0.501	
Space mean speed in ramp influence area,	S_R = 56.0	mph
Space mean speed in outer lanes,	S_O = 73.9	mph
Space mean speed for all vehicles,	S = 65.5	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Irwindale Avenue Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	6275	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1170	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6275	1170		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1651	308		v
Trucks and buses	5	11		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %		%
Length	0.00 mi	0.00 mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.976	0.948	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6770	1299	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2458 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5755	9600	No
$v_{FO} = v_F - v_R$	4456	9600	No
v_R	1299	4000	No
v_3 or v_{av34}	1648 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	

If yes, v_{12A} = 2458 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2458	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = -1.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable,	D_S = 0.545	
Space mean speed in ramp influence area,	S_R = 54.7	mph
Space mean speed in outer lanes,	S_0 = 74.3	mph
Space mean speed for all vehicles,	S = 64.4	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Irwindale Avenue Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description:	VV.110264

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	6710	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1010	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6710	1010		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1766	266		v
Trucks and buses	5	14		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %		%
Length	0.00 mi	0.00 mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.976	0.935	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	7240	1138	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2348 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5792	9600	No
$v_{FO} = v_F - v_R$	4654	9600	No
v_R	1138	4000	No
v_3 or v_{av34}	1722 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	

If yes, v_{12A} = 2348 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2348	4400	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v_R - 0.009 L_D$ = -2.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable,	D_S = 0.530	
Space mean speed in ramp influence area,	S_R = 55.1	mph
Space mean speed in outer lanes,	S_0 = 74.0	mph
Space mean speed for all vehicles,	S = 65.0	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Irwindale Avenue Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description:	VV.110264

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	6315	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	815	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6315	815		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1662	214		v
Trucks and buses	8	7		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %		%
Length	0.00 mi	0.00 mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.962	0.966	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6913	888	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2185 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5877	9600	No
$v_{FO} = v_F - v_R$	4989	9600	No
v_R	888	4000	No
v_3 or v_{av34}	1846 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 Yes

If yes, v_{12A} = 2350 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	2350	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = -2.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable, D_S = 0.508

Space mean speed in ramp influence area, S_R = 55.8 mph

Space mean speed in outer lanes, S_O = 73.8 mph

Space mean speed for all vehicles, S = 65.4 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Irwindale Avenue Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	6835	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1270	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6835	1270		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1799	334		v
Trucks and buses	5	11		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %		%
Length	0.00 mi	0.00 mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.976	0.948	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	7375	1410	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2577 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5900	9600	No
$v_{FO} = v_F - v_R$	4490	9600	No
v_R	1410	4000	No
v_3 or v_{av34}	1661 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 2577 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2577	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = -0.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable,	D_S = 0.555	
Space mean speed in ramp influence area,	S_R = 54.5	mph
Space mean speed in outer lanes,	S_0 = 74.2	mph
Space mean speed for all vehicles,	S = 64.1	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Irwindale Avenue Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description:	VV.110264

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	7310	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1095	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	7310		1095			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1924		288			v
Trucks and buses	5		14			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.976	0.935	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	7887	1233	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2553 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6310	9600	No
$v_{FO} = v_F - v_R$	5077	9600	No
v_R	1233	4000	No
v_3 or v_{av34}	1878 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	

If yes, v_{12A} = 2553 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2553	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = -0.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable, D_S = 0.539

Space mean speed in ramp influence area, S_R = 54.9 mph

Space mean speed in outer lanes, S_O = 73.4 mph

Space mean speed for all vehicles, S = 64.6 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Irwindale Avenue Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	6880	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	885	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6880	885		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1811	233		v
Trucks and buses	8	7		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %		%
Length	0.00 mi	0.00 mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.962	0.966	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	7532	964	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2280 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6026	9600	No
$v_{FO} = v_F - v_R$	5062	9600	No
v_R	964	4000	No
v_3 or v_{av34}	1873 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	Yes	

If yes, v_{12A} = 2410 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	2410	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = -2.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable,	D_S = 0.515	
Space mean speed in ramp influence area,	S_R = 55.6	mph
Space mean speed in outer lanes,	S_0 = 73.6	mph
Space mean speed for all vehicles,	S = 65.2	mph

Hall & Foreman, Inc.
Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
Volume	TM	20-Sep-13	VV.110264.0000	1 OF 1

STREET : Irwindale Ave
FREEWAY : I-210

PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION
18
ROUTE
2A, 3

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
WESTBOUND LOOP MERGE								
Mainline AM	7070	5%	50	7120	5%	635	7755	5%
Mainline MID	6825	4%	50	6875	5%	690	7565	5%
Mainline PM	7520	6%	50	7570	7%	675	8245	7%
Ramp AM	585	8%	50	635	15%	55	690	15%
Ramp MID	420	12%	50	470	21%	40	510	21%
Ramp PM	475	3%	50	525	13%	45	570	13%

Tustin Office: 714.665.4500 Tel/ 714.665.4501 Fax
Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax
Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax
Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	9/23/2013
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Irwindale Avenue Loop On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description:	VV.110264

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	7070	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	585	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	7070	585		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1861	154		v
Trucks and buses	5	8		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.976	0.962	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	7628	640	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.138 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 752 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6095	9600	No
v_3 or v_{av34}	2351 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	

If yes, v_{12A} = 2182 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	6095	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 17.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.282	
Space mean speed in ramp influence area,	S_R = 62.1	mph
Space mean speed in outer lanes,	S_O = 65.9	mph
Space mean speed for all vehicles,	S = 64.1	mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	9/23/2013
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Irwindale Avenue Loop On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	6825	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	420	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6825	420		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1796	111		v
Trucks and buses	4	12		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.980	0.943	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	7328	469	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.159 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 852 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5819	9600	No
v_3 or v_{av34}	2249 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	Yes	

If yes, v_{12A} = 2140 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	5819	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 16.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.269	
Space mean speed in ramp influence area,	S_R = 62.5	mph
Space mean speed in outer lanes,	S_O = 66.0	mph
Space mean speed for all vehicles,	S = 64.4	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.41

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	9/23/2013
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Irwindale Avenue Loop On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	7520	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	475	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	7520	475		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1979	125		v
Trucks and buses	6	3		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.971	0.985	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	8153	508	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.154 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 900 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6338	9600	No
v_3 or v_{av34}	2465 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	Yes	

If yes, v_{12A} = 2332 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	6338	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 18.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.283	
Space mean speed in ramp influence area,	S_R = 62.1	mph
Space mean speed in outer lanes,	S_O = 65.5	mph
Space mean speed for all vehicles,	S = 63.9	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.41

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	9/23/2013
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Irwindale Avenue Loop On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	7120	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	635	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	7120	635		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1874	167		v
Trucks and buses	5	15		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.976	0.930	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	7682	719	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.128 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 703 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6212	9600	No
v_3 or v_{av34}	2395 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 Yes

If yes, v_{12A} = 2197 (Equation 13-15, 13-16, 18, or 19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	6212	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 18.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.288	
Space mean speed in ramp influence area,	S_R = 61.9	mph
Space mean speed in outer lanes,	S_O = 65.9	mph
Space mean speed for all vehicles,	S = 64.0	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.41

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	9/23/2013
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Irwindale Avenue Loop On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	6875	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	470	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6875	470		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1809	124		v
Trucks and buses	5	21		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.976	0.905	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	7418	547	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.149 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 809 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5963	9600	No
v_3 or v_{av34}	2303 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	

If yes, v_{12A} = 2166 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	5963	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 17.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.275	
Space mean speed in ramp influence area,	S_R = 62.3	mph
Space mean speed in outer lanes,	S_O = 65.9	mph
Space mean speed for all vehicles,	S = 64.2	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.41

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	9/23/2013
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Irwindale Avenue Loop On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	7570	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	525	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	7570	525		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1992	138		v
Trucks and buses	7	13		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.966	0.939	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	8247	589	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.144 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 850 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6486	9600	No
v_3 or v_{av34}	2523 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	

If yes, v_{12A} = 2358 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	6486	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 18.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.290	
Space mean speed in ramp influence area,	S_R = 61.9	mph
Space mean speed in outer lanes,	S_O = 65.4	mph
Space mean speed for all vehicles,	S = 63.8	mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	9/23/2013
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Irwindale Avenue Loop On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description:	VV.110264

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	7755	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	690	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	7755	690		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	2041	182		v
Trucks and buses	5	15		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.976	0.930	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	8367	781	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.120 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 719 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6764	9600	No
v_3 or v_{av34}	2632 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 Yes

If yes, v_{12A} = 2393 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	6764	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 20.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.309	
Space mean speed in ramp influence area,	S_R = 61.3	mph
Space mean speed in outer lanes,	S_O = 65.3	mph
Space mean speed for all vehicles,	S = 63.4	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.41

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	9/23/2013
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Irwindale Avenue Loop On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	7565	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	510	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	7565	510		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1991	134		v
Trucks and buses	5	21		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.976	0.905	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	8162	593	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.144 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 838 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6429	9600	No
v_3 or v_{av34}	2499 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 Yes

If yes, v_{12A} = 2334 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	6429	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 18.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, M_S = 0.289

Space mean speed in ramp influence area, S_R = 61.9 mph

Space mean speed in outer lanes, S_O = 65.5 mph

Space mean speed for all vehicles, S = 63.8 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.41

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	9/23/2013
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Irwindale Avenue Loop On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	8245	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	570	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	8245	570		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	2170	150		v
Trucks and buses	7	13		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.966	0.939	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	8983	639	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.138 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 894 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	7122	9600	No
v_3 or v_{av34}	2794 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		Yes	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	

If yes, v_{12A} = 2593 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	7122	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 21.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.315	
Space mean speed in ramp influence area,	S_R = 61.2	mph
Space mean speed in outer lanes,	S_O = 64.8	mph
Space mean speed for all vehicles,	S = 63.1	mph

Hall & Foreman, Inc.
Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
Volume	TM	20-Sep-13	VV.110264.0000	1 OF 1

STREET : Irwindale Ave
FREEWAY : I-210

PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION
19
ROUTE
9

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
WESTBOUND SLIP MERGE								
Mainline AM	7655	5%	50	7705	6%	690	8395	6%
Mainline MID	7245	5%	50	7295	5%	650	7945	5%
Mainline PM	7995	6%	50	8045	7%	720	8765	7%
Ramp AM	610	10%	50	660	16%	55	715	16%
Ramp MID	545	7%	50	595	15%	50	645	15%
Ramp PM	475	2%	50	525	11%	45	570	11%

Tustin Office: 714.665.4500 Tel/ 714.665.4501 Fax
Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax
Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax
Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

HCS 2010: Freeway Merge and Diverge Segments Release 6.41

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	9/23/2013
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Irwindale Avenue Slip On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description:	VV.110264

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	7655	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	610	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	7655	610		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	2014	161		v
Trucks and buses	5	10		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.976	0.952	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	8259	674	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.134 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 789 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6580	9600	No
v_3 or v_{av34}	2558 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 Yes

If yes, v_{12A} = 2362 (Equation 13-15, 13-16, 18, or 19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	6580	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 19.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.297	
Space mean speed in ramp influence area,	S_R = 61.7	mph
Space mean speed in outer lanes,	S_O = 65.4	mph
Space mean speed for all vehicles,	S = 63.6	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.41

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	9/23/2013
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Irwindale Avenue Slip On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	7245	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	545	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	7245	545		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1907	143		v
Trucks and buses	5	7		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV		0.976	0.966
Driver population factor, fP		1.00	1.00
Flow rate, vp		7817	594 pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.144 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 802 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6184	9600	No
v_3 or v_{av34}	2394 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	

If yes, v_{12A} = 2236 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	6184	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 17.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.282	
Space mean speed in ramp influence area,	S_R = 62.1	mph
Space mean speed in outer lanes,	S_0 = 65.8	mph
Space mean speed for all vehicles,	S = 64.0	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.41

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	9/23/2013
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Irwindale Avenue Slip On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	7995	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	475	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	7995	475		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	2104	125		v
Trucks and buses	6	2		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.971	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	8668	505	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.155 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 954 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6673	9600	No
v_3 or v_{av34}	2607 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	Yes	

If yes, v_{12A} = 2467 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	6673	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 19.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.292	
Space mean speed in ramp influence area,	S_R = 61.8	mph
Space mean speed in outer lanes,	S_0 = 65.1	mph
Space mean speed for all vehicles,	S = 63.6	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.41

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	9/23/2013
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Irwindale Avenue Slip On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	7705	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	660	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	7705	660		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	2028	174		v
Trucks and buses	6	16		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.971	0.926	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	8354	750	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.124 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 741 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6724	9600	No
v_3 or v_{av34}	2616 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	

If yes, v_{12A} = 2389 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	6724	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 20.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.306	
Space mean speed in ramp influence area,	S_R = 61.4	mph
Space mean speed in outer lanes,	S_O = 65.3	mph
Space mean speed for all vehicles,	S = 63.5	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.41

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	9/23/2013
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Irwindale Avenue Slip On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description:	VV.110264

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	7295	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	595	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	7295	595		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1920	157		v
Trucks and buses	5	15		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.976	0.930	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	7871	673	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.134 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 752 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6301	9600	No
v_3 or v_{av34}	2438 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	

If yes, v_{12A} = 2251 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	6301	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 18.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.289	
Space mean speed in ramp influence area,	S_R = 61.9	mph
Space mean speed in outer lanes,	S_O = 65.7	mph
Space mean speed for all vehicles,	S = 63.9	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.41

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	9/23/2013
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Irwindale Avenue Slip On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	8045	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	525	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	8045	525		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	2117	138		v
Trucks and buses	7	11		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.966	0.948	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	8765	583	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.145 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 908 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6848	9600	No
v_3 or v_{av34}	2678 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	

If yes, v_{12A} = 2506 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	6848	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 19.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.302	
Space mean speed in ramp influence area,	S_R = 61.6	mph
Space mean speed in outer lanes,	S_O = 65.0	mph
Space mean speed for all vehicles,	S = 63.4	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.41

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	9/23/2013
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Irwindale Avenue Slip On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	8395	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	715	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	8395	715		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	2209	188		v
Trucks and buses	6	16		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV		0.971	0.926
Driver population factor, fP		1.00	1.00
Flow rate, vp		9102	813 pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.116 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 767 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	7415	9600	No
v_3 or v_{av34}	2917 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	Yes	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	Yes	

If yes, v_{12A} = 2640 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	7415	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 22.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.339	
Space mean speed in ramp influence area,	S_R = 60.5	mph
Space mean speed in outer lanes,	S_O = 64.7	mph
Space mean speed for all vehicles,	S = 62.7	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.41

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	9/23/2013
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Irwindale Avenue Slip On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description:	VV.110264

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	7945	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	645	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	7945	645		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	2091	170		v
Trucks and buses	5	15		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.976	0.930	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	8572	730	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.127 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 768 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6802	9600	No
v_3 or v_{av34}	2652 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	

If yes, v_{12A} = 2428 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	6802	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 20.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.308	
Space mean speed in ramp influence area,	S_R = 61.4	mph
Space mean speed in outer lanes,	S_O = 65.2	mph
Space mean speed for all vehicles,	S = 63.4	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.41

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	9/23/2013
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Irwindale Avenue Slip On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	8765	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	570	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	8765	570		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	2307	150		v
Trucks and buses	7	11		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.966	0.948	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	9549	633	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.139 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 978 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	7682	9600	No
v_3 or v_{av34}	3035 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		Yes	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	

If yes, v_{12A} = 2819 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	7682	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 22.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.339	
Space mean speed in ramp influence area,	S_R = 60.5	mph
Space mean speed in outer lanes,	S_O = 64.2	mph
Space mean speed for all vehicles,	S = 62.5	mph

Hall & Foreman, Inc.
Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
Volume	TM	20-Sep-13	VV.110264.0000	1 OF 1

STREET : First Street/Azusa Avenue
FREEWAY : I-210

PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION
20
ROUTE
2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
WESTBOUND MERGE								
Mainline AM	6715	4%	50	6765	4%	605	7370	4%
Mainline MID	6630	4%	50	6680	4%	595	7275	4%
Mainline PM	8500	4%	50	8550	4%	765	9315	4%
Ramp AM	865	2%	50	915	8%	80	995	8%
Ramp MID	360	4%	50	410	16%	30	440	16%
Ramp PM	400	2%	50	450	12%	35	485	12%

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	First Street On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	6715	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	865	vph
Length of first accel/decel lane	1150	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6715	865		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1767	228		v
Trucks and buses	4	2		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.980	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	7210	920	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.103 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 541 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6184	9600	No
v_3 or v_{av34}	2361 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	

If yes, v_{12A} = 2105 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	6184	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 21.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.321	
Space mean speed in ramp influence area,	S_R = 61.0	mph
Space mean speed in outer lanes,	S_O = 66.1	mph
Space mean speed for all vehicles,	S = 63.5	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	First Street On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	6630	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	360	vph
Length of first accel/decel lane	1150	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6630	360		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1745	95		v
Trucks and buses	4	4		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.980	0.980	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	7119	387	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.169 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 881 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5584	9600	No
v_3 or v_{av34}	2158 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	Yes	

If yes, v_{12A} = 2078 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	5584	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 17.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.286	
Space mean speed in ramp influence area,	S_R = 62.0	mph
Space mean speed in outer lanes,	S_O = 66.2	mph
Space mean speed for all vehicles,	S = 64.3	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	First Street On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	8500	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	400	vph
Length of first accel/decel lane	1150	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	8500	400		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	2237	105		v
Trucks and buses	4	2		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.980	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	9126	425	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.165 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 1091 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	7051	9600	No
v_3 or v_{av34}	2767 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	Yes	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	Yes	

If yes, v_{12A} = 2650 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	7051	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 22.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.325	
Space mean speed in ramp influence area,	S_R = 60.9	mph
Space mean speed in outer lanes,	S_0 = 64.6	mph
Space mean speed for all vehicles,	S = 63.0	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	First Street On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing +Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	6765	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	915	vph
Length of first accel/decel lane	1150	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6765	915		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1780	241		v
Trucks and buses	4	8		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%		%
Length	mi	mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.980	0.962	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	7263	1002	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.093 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 491 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6304	9600	No
v_3 or v_{av34}	2405 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	Yes	

If yes, v_{12A} = 2120 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	6304	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 22.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.329	
Space mean speed in ramp influence area,	S_R = 60.8	mph
Space mean speed in outer lanes,	S_O = 66.1	mph
Space mean speed for all vehicles,	S = 63.3	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	First Street On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	6680	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	410	vph
Length of first accel/decel lane	1150	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6680	410		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1758	108		v
Trucks and buses	4	16		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.980	0.926	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	7172	466	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.160 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 835 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5702	9600	No
v_3 or v_{av34}	2200 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	

If yes, v_{12A} = 2094 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	5702	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 18.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.291	
Space mean speed in ramp influence area,	S_R = 61.9	mph
Space mean speed in outer lanes,	S_O = 66.1	mph
Space mean speed for all vehicles,	S = 64.1	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	First Street On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	8550	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	450	vph
Length of first accel/decel lane	1150	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	8550	450		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	2250	118		v
Trucks and buses	4	12		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.980	0.943	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	9180	502	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.155 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 1036 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	7182	9600	No
v_3 or v_{av34}	2822 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	Yes	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	Yes	

If yes, v_{12A} = 2672 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	7182	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 22.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.334	
Space mean speed in ramp influence area,	S_R = 60.7	mph
Space mean speed in outer lanes,	S_O = 64.6	mph
Space mean speed for all vehicles,	S = 62.8	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	First Street On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	7370	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	995	vph
Length of first accel/decel lane	1150	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	7370	995		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1939	262		v
Trucks and buses	4	8		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.980	0.962	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	7913	1089	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.082 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 462 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6747	9600	No
v_3 or v_{av34}	2598 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	

If yes, v_{12A} = 2263 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	6747	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 23.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.352	
Space mean speed in ramp influence area,	S_R = 60.1	mph
Space mean speed in outer lanes,	S_O = 65.7	mph
Space mean speed for all vehicles,	S = 62.8	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	First Street On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	7275	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	440	vph
Length of first accel/decel lane	1150	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	7275	440		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1914	116		v
Trucks and buses	4	16		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.980	0.926	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	7811	500	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.155 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 867 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6085	9600	No
v_3 or v_{av34}	2359 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	

If yes, v_{12A} = 2234 (Equation 13-15, 13-16, 18, or 19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	6085	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 19.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.301	
Space mean speed in ramp influence area,	S_R = 61.6	mph
Space mean speed in outer lanes,	S_0 = 65.8	mph
Space mean speed for all vehicles,	S = 63.8	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	First Street On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	9315	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	485	vph
Length of first accel/decel lane	1150	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	9315	485		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	2451	128		v
Trucks and buses	4	12		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.980	0.943	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	10001	541	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.150 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 1126 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	8042	9600	No
v_3 or v_{av34}	3187 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		Yes	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	

If yes, v_{12A} = 3000 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	8042	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 25.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.375	
Space mean speed in ramp influence area,	S_R = 59.5	mph
Space mean speed in outer lanes,	S_O = 63.7	mph
Space mean speed for all vehicles,	S = 61.8	mph

Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
Interchange	TM	20-Sep-13	VV.110264.0000	1 OF 1

FREEWAY : SR-2
FREEWAY : I-210

PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION 21
ROUTE 2A, 4B,5B, 6B, 7B, 8A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								

WESTBOUND DIVERGE

Mainline AM	3450	5%	50	3500	7%	310	3810	7%
Mainline MID	3350	11%	50	3400	12%	300	3700	12%
Mainline PM	5495	5%	50	5545	6%	495	6040	6%
Ramp AM	1485	10%	50	1535	13%	135	1670	13%
Ramp MID	660	10%	50	710	16%	60	770	16%
Ramp PM	870	10%	50	920	15%	80	1000	15%

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	SB SR-2 Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3450	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1485	vph
Length of first accel/decel lane	1400	ft
Length of second accel/decel lane	1400	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	3450		1485			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	908		391			v
Trucks and buses	5		10			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.976	0.952	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3722	1641	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2182 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3722	9600	No
$v_{FO} = v_F - v_R$	2081	9600	No
v_R	1641	4000	No
v_3 or v_{av34}	770 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	

If yes, v_{12A} = 2182 (Equation 13-15, 13-16, 18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2182	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = -14.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable,	D_S = 0.576	
Space mean speed in ramp influence area,	S_R = 53.9	mph
Space mean speed in outer lanes,	S_0 = 76.8	mph
Space mean speed for all vehicles,	S = 61.5	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	SB SR-2 Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3350	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	660	vph
Length of first accel/decel lane	1400	ft
Length of second accel/decel lane	1400	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	3350		660			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	882		174			v
Trucks and buses	11		10			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.948	0.952	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3720	729	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1507 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3720	9600	No
$v_{FO} = v_F - v_R$	2991	9600	No
v_R	729	4000	No
v_3 or v_{av34}	1106 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	

If yes, v_{12A} = 1507 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1507	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = -20.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable,	D_S = 0.494	
Space mean speed in ramp influence area,	S_R = 56.2	mph
Space mean speed in outer lanes,	S_O = 76.4	mph
Space mean speed for all vehicles,	S = 66.7	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	SB SR-2 Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	5495	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	870	vph
Length of first accel/decel lane	1400	ft
Length of second accel/decel lane	1400	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	5495		870			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1446		229			v
Trucks and buses	5		10			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.976	0.952	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5929	962	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2253 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5929	9600	No
$v_{FO} = v_F - v_R$	4967	9600	No
v_R	962	4000	No
v_3 or v_{av34}	1838 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	

If yes, v_{12A} = 2371 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	2371	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = -13.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable,	D_S = 0.515	
Space mean speed in ramp influence area,	S_R = 55.6	mph
Space mean speed in outer lanes,	S_O = 73.8	mph
Space mean speed for all vehicles,	S = 65.2	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	SB SR-2 Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3500	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1535	vph
Length of first accel/decel lane	1400	ft
Length of second accel/decel lane	1400	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	3500		1535			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	921		404			v
Trucks and buses	7		13			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.966	0.939	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3813	1721	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2265 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3813	9600	No
$v_{FO} = v_F - v_R$	2092	9600	No
v_R	1721	4000	No
v_3 or v_{av34}	774 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 2265 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2265	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = -14.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable,	D_S = 0.583	
Space mean speed in ramp influence area,	S_R = 53.7	mph
Space mean speed in outer lanes,	S_0 = 76.8	mph
Space mean speed for all vehicles,	S = 61.2	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	SB SR-2 Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3400	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	710	vph
Length of first accel/decel lane	1400	ft
Length of second accel/decel lane	1400	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	3400		710			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	895		187			v
Trucks and buses	12		16			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.943	0.926	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3794	807	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1584 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3794	9600	No
$v_{FO} = v_F - v_R$	2987	9600	No
v_R	807	4000	No
v_3 or v_{av34}	1105 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 1584 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1584	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = -19.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable,	D_S = 0.501	
Space mean speed in ramp influence area,	S_R = 56.0	mph
Space mean speed in outer lanes,	S_0 = 76.4	mph
Space mean speed for all vehicles,	S = 66.3	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	SB SR-2 Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	5545	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	920	vph
Length of first accel/decel lane	1400	ft
Length of second accel/decel lane	1400	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5545	920		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1459	242		v
Trucks and buses	6	15		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %		%
Length	0.00 mi	0.00 mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.971	0.930	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6012	1041	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2333 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6012	9600	No
$v_{FO} = v_F - v_R$	4971	9600	No
v_R	1041	4000	No
v_3 or v_{av34}	1839 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	

If yes, v_{12A} = 2404 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	2404	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = -12.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable,	D_S = 0.522	
Space mean speed in ramp influence area,	S_R = 55.4	mph
Space mean speed in outer lanes,	S_O = 73.7	mph
Space mean speed for all vehicles,	S = 65.1	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	SB SR-2 Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3810	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1670	vph
Length of first accel/decel lane	1400	ft
Length of second accel/decel lane	1400	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	3810		1670			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1003		439			v
Trucks and buses	7		13			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.966	0.939	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4151	1872	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2465 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4151	9600	No
$v_{FO} = v_F - v_R$	2279	9600	No
v_R	1872	4000	No
v_3 or v_{av34}	843 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 2465 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2465	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = -12.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable,	D_S = 0.596	
Space mean speed in ramp influence area,	S_R = 53.3	mph
Space mean speed in outer lanes,	S_0 = 76.8	mph
Space mean speed for all vehicles,	S = 60.9	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	SB SR-2 Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3700	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	770	vph
Length of first accel/decel lane	1400	ft
Length of second accel/decel lane	1400	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	3700		770			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	974		203			v
Trucks and buses	12		16			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.943	0.926	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4128	875	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1721 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4128	9600	No
$v_{FO} = v_F - v_R$	3253	9600	No
v_R	875	4000	No
v_3 or v_{av34}	1203 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 1721 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1721	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = -18.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable,	D_S = 0.507	
Space mean speed in ramp influence area,	S_R = 55.8	mph
Space mean speed in outer lanes,	S_O = 76.0	mph
Space mean speed for all vehicles,	S = 66.0	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	SB SR-2 Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description:	VV.110264

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	6040	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1000	vph
Length of first accel/decel lane	1400	ft
Length of second accel/decel lane	1400	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	6040		1000			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1589		263			v
Trucks and buses	6		15			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.971	0.930	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6549	1132	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2540 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6549	9600	No
$v_{FO} = v_F - v_R$	5417	9600	No
v_R	1132	4000	No
v_3 or v_{av34}	2004 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 Yes

If yes, v_{12A} = 2619 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	2619	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = -11.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable,	D_S = 0.530	
Space mean speed in ramp influence area,	S_R = 55.2	mph
Space mean speed in outer lanes,	S_0 = 73.0	mph
Space mean speed for all vehicles,	S = 64.7	mph

Hall & Foreman, Inc.
Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
Interchange	TM	20-Sep-13	VV.110264.0000	1 OF 1

STREET : SR-2
FREEWAY : I-210

PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION 22
ROUTE 2B, 4B,5B, 6B, 7B, 8A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
EASTBOUND MERGE								
Mainline AM	5335	4%	50	5385	5%	480	5865	5%
Mainline MID	3405	11%	50	3455	12%	305	3760	12%
Mainline PM	4060	7%	50	4110	8%	365	4475	8%
Ramp AM	525	10%	50	575	18%	45	620	18%
Ramp MID	560	10%	50	610	17%	50	660	17%
Ramp PM	785	10%	50	835	15%	70	905	15%

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	SR-2/NB
Junction:	EB I-210 OFF RAMP
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	5520	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	525	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	5520		525			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1453		138			v
Trucks and buses	10		10			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.952	0.952	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6101	580	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1778 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5186	9400	No
$v_{FO} = v_F - v_R$	4606	9400	No
v_R	580	4000	No
v_3 or v_{av34}	1704 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 Yes

If yes, v_{12A} = 2074 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	2074	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 22.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.480

Space mean speed in ramp influence area, S_R = 54.0 mph

Space mean speed in outer lanes, S_O = 69.1 mph

Space mean speed for all vehicles, S = 62.1 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	SR-2/NB
Junction:	EB I-210 OFF RAMP
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	5200	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	560	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5200	560		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1368	147		v
Trucks and buses	10	10		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %		%
Length	0.00 mi	0.00 mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.952	0.952	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5747	619	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1728 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4885	9400	No
$v_{FO} = v_F - v_R$	4266	9400	No
v_R	619	4000	No
v_3 or v_{av34}	1578 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 Yes

If yes, v_{12A} = 1954 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	1954	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 21.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D_S = 0.484	
Space mean speed in ramp influence area,	S_R = 53.9	mph
Space mean speed in outer lanes,	S_O = 69.5	mph
Space mean speed for all vehicles,	S = 62.3	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	SR-2/NB
Junction:	EB I-210 OFF RAMP
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	5610	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	785	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5610	785		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1476	207		v
Trucks and buses	10	10		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %		%
Length	0.00 mi	0.00 mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.952	0.952	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6201	868	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v - v_F) P_{FD}$ = 2013 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5271	9400	No
$v_{FO} = v - v_F - v_R$	4403	9400	No
v_R	868	4000	No
v_3 or v_{av34}	1629 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	

If yes, v_{12A} = 2108 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	2108	4400	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086\ v_R - 0.009\ L_D$ = 22.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D_S = 0.506	
Space mean speed in ramp influence area,	S_R = 53.4	mph
Space mean speed in outer lanes,	S_O = 69.0	mph
Space mean speed for all vehicles,	S = 61.8	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	SR-2/NB
Junction:	EB I-210 OFF RAMP
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	5570	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	575	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	5570		575			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1466		151			v
Trucks and buses	11		18			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.948	0.917	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6186	660	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1856 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5259	9400	No
$v_{FO} = v_F - v_R$	4599	9400	No
v_R	660	4000	No
v_3 or v_{av34}	1701 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 Yes

If yes, v_{12A} = 2103 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	2103	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 22.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D_S = 0.487	
Space mean speed in ramp influence area,	S_R = 53.8	mph
Space mean speed in outer lanes,	S_O = 69.1	mph
Space mean speed for all vehicles,	S = 62.0	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	SR-2/NB
Junction:	EB I-210 OFF RAMP
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description:	VV.110264

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	5250	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	610	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	5250		610			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1382		161			v
Trucks and buses	11		17			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV		0.948	0.922
Driver population factor, fP		1.00	1.00
Flow rate, vp		5830	697 pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1804 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4956	9400	No
$v_{FO} = v_F - v_R$	4259	9400	No
v_R	697	4000	No
v_3 or v_{av34}	1576 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	

If yes, v_{12A} = 1982 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	1982	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 21.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D_S = 0.491	
Space mean speed in ramp influence area,	S_R = 53.7	mph
Space mean speed in outer lanes,	S_0 = 69.4	mph
Space mean speed for all vehicles,	S = 62.1	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	SR-2/NB
Junction:	EB I-210 OFF RAMP
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description:	VV.110264

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	5660	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	835	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5660	835		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1489	220		v
Trucks and buses	11	15		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %		%
Length	0.00 mi	0.00 mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.948	0.930	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6286	945	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v - v_F) P_{FD}$ = 2089 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5344	9400	No
$v_{FO} = v - v_F - v_R$	4399	9400	No
v_R	945	4000	No
v_3 or v_{av34}	1627 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 Yes

If yes, v_{12A} = 2137 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	2137	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 22.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D_S = 0.513	
Space mean speed in ramp influence area,	S_R = 53.2	mph
Space mean speed in outer lanes,	S_O = 69.0	mph
Space mean speed for all vehicles,	S = 61.7	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	SR-2/NB
Junction:	EB I-210 OFF RAMP
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	6065	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	620	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	6065		620			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1596		163			v
Trucks and buses	11		18			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.948	0.917	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6735	711	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2015 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5725	9400	No
$v_{FO} = v_F - v_R$	5014	9400	No
v_R	711	4000	No
v_3 or v_{av34}	1855 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	

If yes, v_{12A} = 2290 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	2290	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 23.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D_S = 0.492	
Space mean speed in ramp influence area,	S_R = 53.7	mph
Space mean speed in outer lanes,	S_O = 68.5	mph
Space mean speed for all vehicles,	S = 61.7	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	SR-2/NB
Junction:	EB I-210 OFF RAMP
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	5720	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	660	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5720	660		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1505	174		v
Trucks and buses	11	17		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %		%
Length	0.00 mi	0.00 mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.948	0.922	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6352	754	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1962 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5400	9400	No
$v_{FO} = v_F - v_R$	4646	9400	No
v_R	754	4000	No
v_3 or v_{av34}	1719 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 Yes

If yes, v_{12A} = 2160 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	2160	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 22.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D_S = 0.496	
Space mean speed in ramp influence area,	S_R = 53.6	mph
Space mean speed in outer lanes,	S_O = 68.9	mph
Space mean speed for all vehicles,	S = 61.8	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	SR-2/NB
Junction:	EB I-210 OFF RAMP
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	6165	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	905	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	6165		905			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1622		238			v
Trucks and buses	11		15			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.948	0.930	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6846	1024	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2271 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5820	9400	No
$v_{FO} = v_F - v_R$	4796	9400	No
v_R	1024	4000	No
v_3 or v_{av34}	1774 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 Yes

If yes, v_{12A} = 2328 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	2328	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 24.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D_S = 0.520	
Space mean speed in ramp influence area,	S_R = 53.0	mph
Space mean speed in outer lanes,	S_O = 68.4	mph
Space mean speed for all vehicles,	S = 61.3	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	SR-2/SB
Junction:	WB I-210 On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	65.0	mph
Volume on freeway	4530	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-flow speed on ramp	35.0	mph
Volume on ramp	1485	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4530	1485		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1192	391		v
Trucks and buses	10	10		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV		0.952	0.952
Driver population factor, fP		1.00	1.00
Flow rate, vp		5007	1641 pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.555 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 2779 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6648	7050	No
v_3 or v_{av34}	2228 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	Yes	

If yes, v_{12A} = 2861 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	6648	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 21.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.463	
Space mean speed in ramp influence area,	S_R = 54.4	mph
Space mean speed in outer lanes,	S_O = 59.1	mph
Space mean speed for all vehicles,	S = 55.8	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	SR-2/SB
Junction:	WB I-210 On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1435	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-flow speed on ramp	35.0	mph
Volume on ramp	660	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1435	660		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	378	174		v
Trucks and buses	10	10		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.952	0.952	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1586	729	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.555 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 880 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	2315	7050	No
v_3 or v_{av34}	706 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	Yes	

If yes, v_{12A} = 906 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	2315	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = -0.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable,	M_S = 0.131	
Space mean speed in ramp influence area,	S_R = 62.0	mph
Space mean speed in outer lanes,	S_0 = 64.4	mph
Space mean speed for all vehicles,	S = 62.7	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	SR-2/SB
Junction:	WB I-210 On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1920	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-flow speed on ramp	35.0	mph
Volume on ramp	870	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1920	870		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	505	229		v
Trucks and buses	10	10		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV		0.952	0.952	
Driver population factor, fP		1.00	1.00	
Flow rate, vp		2122	962	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.555 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1178 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3084	7050	No
v_3 or v_{av34}	944 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	Yes	

If yes, v_{12A} = 1212 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	3084	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 3.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable,	M_S = 0.145	
Space mean speed in ramp influence area,	S_R = 61.7	mph
Space mean speed in outer lanes,	S_O = 63.5	mph
Space mean speed for all vehicles,	S = 62.2	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	SR-2/SB
Junction:	WB I-210 On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	65.0	mph
Volume on freeway	4580	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-flow speed on ramp	35.0	mph
Volume on ramp	1535	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4580	1535		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1205	404		v
Trucks and buses	11	13		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.948	0.939	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5086	1721	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.555 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 2823 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6807	7050	No
v_3 or v_{av34}	2263 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	

If yes, v_{12A} = 2906 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	6807	4600	Yes

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 22.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.510	
Space mean speed in ramp influence area,	S_R = 53.3	mph
Space mean speed in outer lanes,	S_O = 59.0	mph
Space mean speed for all vehicles,	S = 55.0	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	SR-2/SB
Junction:	WB I-210 On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description:	VV.110264

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1485	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-flow speed on ramp	35.0	mph
Volume on ramp	710	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1485	710		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	391	187		v
Trucks and buses	13	16		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.939	0.926	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1665	807	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.555 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 924 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	2472	7050	No
v_3 or v_{av34}	741 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	Yes	

If yes, v_{12A} = 951 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	2472	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 0.0+ pc/mi/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable,	M_S = 0.134	
Space mean speed in ramp influence area,	S_R = 61.9	mph
Space mean speed in outer lanes,	S_O = 64.2	mph
Space mean speed for all vehicles,	S = 62.6	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	SR-2/SB
Junction:	WB I-210 On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1970	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-flow speed on ramp	35.0	mph
Volume on ramp	920	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1970	920		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	518	242		v
Trucks and buses	12	15		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.943	0.930	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2198	1041	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.555 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1220 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3239	7050	No
v_3 or v_{av34}	978 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	

If yes, v_{12A} = 1256 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	3239	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 4.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable,	M_S = 0.150	
Space mean speed in ramp influence area,	S_R = 61.6	mph
Space mean speed in outer lanes,	S_O = 63.4	mph
Space mean speed for all vehicles,	S = 62.1	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	SR-2/SB
Junction:	WB I-210 On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description:	VV.110264

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	65.0	mph
Volume on freeway	4990	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-flow speed on ramp	35.0	mph
Volume on ramp	1670	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4990	1670		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1313	439		v
Trucks and buses	11	13		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.948	0.939	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5542	1872	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.555 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 3076 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	7414	7050	Yes
v_3 or v_{av34}	2466 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	Yes	

If yes, v_{12A} = 3166 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	7414	4600	Yes

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 25.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable,	M_S = 0.712	
Space mean speed in ramp influence area,	S_R = 48.6	mph
Space mean speed in outer lanes,	S_0 = 58.0	mph
Space mean speed for all vehicles,	S = 51.3	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	SR-2/SB
Junction:	WB I-210 On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1615	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-flow speed on ramp	35.0	mph
Volume on ramp	770	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1615	770		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	425	203		v
Trucks and buses	13	16		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.939	0.926	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1811	875	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.555 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1005 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	2686	7050	No
v_3 or v_{av34}	806 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	Yes	

If yes, v_{12A} = 1034 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	2686	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 1.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable,	M_S = 0.137	
Space mean speed in ramp influence area,	S_R = 61.8	mph
Space mean speed in outer lanes,	S_O = 64.0	mph
Space mean speed for all vehicles,	S = 62.5	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	SR-2/SB
Junction:	WB I-210 On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2145	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-flow speed on ramp	35.0	mph
Volume on ramp	1000	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2145	1000		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	564	263		v
Trucks and buses	12	15		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.943	0.930	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2393	1132	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.555 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1328 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3525	7050	No
v_3 or v_{av34}	1065 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	

If yes, v_{12A} = 1367 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	3525	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 5.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable,	M_S = 0.158	
Space mean speed in ramp influence area,	S_R = 61.4	mph
Space mean speed in outer lanes,	S_0 = 63.1	mph
Space mean speed for all vehicles,	S = 61.9	mph

Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
Interchange	TM	20-Sep-13	VV.110264.0000	1 OF 1

FREEWAY : SR-2
FREEWAY : I-210

PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION
23
ROUTE
2B, 4B,5B,
6B, 7B, 8A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
SOUTHBOUND MERGE								
Mainline AM	4530	10%	50	4580	11%	410	4990	11%
Mainline MID	1435	10%	50	1485	13%	130	1615	13%
Mainline PM	1920	10%	50	1970	12%	175	2145	12%
Ramp AM	1485	10%	50	1535	13%	135	1670	13%
Ramp MID	660	10%	50	710	16%	60	770	16%
Ramp PM	870	10%	50	920	15%	80	1000	15%

Tustin Office: 714.665.4500 Tel/ 714.665.4501 Fax
Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax
Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax
Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	NB SR-2 On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	5335	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	525	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5335	525		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1404	138		v
Trucks and buses	4	10		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.980	0.952	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5728	580	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.145 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 832 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6308	9600	No
v_3 or v_{av34}	2448 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	

If yes, v_{12A} = 2291 (Equation 13-15, 13-16, 18, or 19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	6308	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 18.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.285	
Space mean speed in ramp influence area,	S_R = 62.0	mph
Space mean speed in outer lanes,	S_O = 65.6	mph
Space mean speed for all vehicles,	S = 63.9	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	NB SR-2 On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3405	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	560	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3405	560		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	896	147		v
Trucks and buses	11	10		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.948	0.952	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3781	619	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.140 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 531 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4400	9600	No
v_3 or v_{av34}	1625 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	

If yes, v_{12A} = 1512 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	4400	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 12.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.249	
Space mean speed in ramp influence area,	S_R = 63.0	mph
Space mean speed in outer lanes,	S_0 = 67.7	mph
Space mean speed for all vehicles,	S = 65.4	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	NB SR-2 On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	4060	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	785	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4060	785		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1068	207		v
Trucks and buses	7	10		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.966	0.952	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4423	868	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.109 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 483 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5291	9600	No
v_3 or v_{av34}	1970 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 Yes

If yes, v_{12A} = 1769 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	5291	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 16.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.270	
Space mean speed in ramp influence area,	S_R = 62.4	mph
Space mean speed in outer lanes,	S_O = 67.0	mph
Space mean speed for all vehicles,	S = 64.7	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	NB SR-2 On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	5385	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	575	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5385	575		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1417	151		v
Trucks and buses	5	18		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.976	0.917	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5810	660	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.135 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 786 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6470	9600	No
v_3 or v_{av34}	2512 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 Yes

If yes, v_{12A} = 2324 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	6470	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 19.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.293	
Space mean speed in ramp influence area,	S_R = 61.8	mph
Space mean speed in outer lanes,	S_O = 65.5	mph
Space mean speed for all vehicles,	S = 63.7	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	NB SR-2 On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3455	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	610	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3455	610		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	909	161		v
Trucks and buses	12	17		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.943	0.922	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3855	697	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.131 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 504 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4552	9600	No
v_3 or v_{av34}	1675 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	

If yes, v_{12A} = 1542 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	4552	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 13.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.253	
Space mean speed in ramp influence area,	S_R = 62.9	mph
Space mean speed in outer lanes,	S_O = 67.6	mph
Space mean speed for all vehicles,	S = 65.2	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	NB SR-2 On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	4110	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	835	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4110	835		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1082	220		v
Trucks and buses	8	15		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%		%
Length	mi	mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.962	0.930	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4499	945	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.100 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 448 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5444	9600	No
v_3 or v_{av34}	2025 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 Yes

If yes, v_{12A} = 1799 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	5444	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 17.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.277	
Space mean speed in ramp influence area,	S_R = 62.3	mph
Space mean speed in outer lanes,	S_O = 66.9	mph
Space mean speed for all vehicles,	S = 64.5	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	NB SR-2 On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description:	VV.110264

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	5865	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	620	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5865	620		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1543	163		v
Trucks and buses	5	18		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.976	0.917	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6328	711	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.129 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 816 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	7039	9600	No
v_3 or v_{av34}	2756 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		Yes	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	

If yes, v_{12A} = 2531 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	7039	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 21.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.316	
Space mean speed in ramp influence area,	S_R = 61.2	mph
Space mean speed in outer lanes,	S_0 = 65.0	mph
Space mean speed for all vehicles,	S = 63.2	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	NB SR-2 On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description:	VV.110264

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3760	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	660	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3760	660		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	989	174		v
Trucks and buses	12	17		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.943	0.922	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4195	754	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.124 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 518 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4949	9600	No
v_3 or v_{av34}	1838 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 Yes

If yes, v_{12A} = 1678 (Equation 13-15, 13-16, 18, or 19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	4949	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 14.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.260	
Space mean speed in ramp influence area,	S_R = 62.7	mph
Space mean speed in outer lanes,	S_O = 67.3	mph
Space mean speed for all vehicles,	S = 64.9	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	NB SR-2 On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	4475	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	905	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4475	905		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1178	238		v
Trucks and buses	8	15		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.962	0.930	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4899	1024	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.090 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 440 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5923	9600	No
v_3 or v_{av34}	2229 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	

If yes, v_{12A} = 1959 (Equation 13-15, 13-16, 18, or 19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	5923	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 18.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.293	
Space mean speed in ramp influence area,	S_R = 61.8	mph
Space mean speed in outer lanes,	S_O = 66.5	mph
Space mean speed for all vehicles,	S = 64.0	mph

Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
Interchange	TM	20-Sep-13	VV.110264.0000	1 OF 1

STREET : SR-2
FREEWAY : I-210

PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION
24
ROUTE
2B, 4B,5B, 6B, 7B, 8A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
NORTHBOUND DIVERGE								
Mainline AM	5520	10%	50	5570	11%	495	6065	11%
Mainline MID	5200	10%	50	5250	11%	470	5720	11%
Mainline PM	5610	10%	50	5660	11%	505	6165	11%
Ramp AM	670	10%	50	720	14%	60	780	14%
Ramp MID	560	10%	50	610	17%	50	660	17%
Ramp PM	785	10%	50	835	15%	70	905	15%

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Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax
Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax
Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
Interchange	TM	20-Sep-13	VV.110264.0000	1 OF 1

FREEWAY : SR-2
FREEWAY : SR-134

PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION 25
ROUTE 2B, 4B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								

SOUTHBOUND DIVERGE

Mainline AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Mainline MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Mainline PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D

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Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax
Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax
Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
Interchange	TM	20-Sep-13	VV.110264.0000	1 OF 1

FREEWAY : SR-2
FREEWAY : SR-134

PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION 26
ROUTE 2B, 4B,5B, 6B, 7B, 8A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								

NORTHBOUND MERGE

Mainline AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Mainline MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Mainline PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp AM	1220	10%	50	1270	14%	110	1380	14%
Ramp MID	1610	10%	50	1660	13%	145	1805	13%
Ramp PM	2370	10%	50	2420	12%	215	2635	12%

Hall & Foreman, Inc.
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SUBJECT	BY	DATE	JOB NO.	SHEET OF
Interchange	TM	20-Sep-13	VV.110264.0000	1 OF 1

FREEWAY : SR-2
FREEWAY : SR-134
PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%
INTERSECTION 27
ROUTE 2B, 4B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								

EASTBOUND MERGE

Mainline AM	4675	10%	50	4725	15%	420	5145	15%
Mainline MID	4740	10%	50	4790	16%	425	5215	16%
Mainline PM	4725	10%	50	4775	18%	425	5200	18%
Ramp AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D

Hall & Foreman, Inc.

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
Interchange	TM	20-Sep-13	VV.110264.0000	1 OF 1

FREEWAY : SR-2
FREEWAY : SR-134
PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%
INTERSECTION 28
ROUTE 2B, 4B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
WESTBOUND DIVERGE								
Mainline AM	6300	10%	50	6350	11%	565	6915	11%
Mainline MID	5035	10%	50	5085	11%	455	5540	11%
Mainline PM	6325	10%	50	6375	11%	570	6945	11%
Ramp AM	1070	10%	50	1120	15%	95	1215	15%
Ramp MID	740	10%	50	790	27%	65	855	27%
Ramp PM	1180	10%	50	1230	23%	105	1335	23%

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Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax
Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax
Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	SR-134/WB
Junction:	NB SR-2 Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	6300	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1070	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6300	1070		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1658	282		v
Trucks and buses	10	10		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %		%
Length	0.00 mi	0.00 mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.952	0.952	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6963	1183	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2414 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5919	9400	No
$v_{FO} = v_F - v_R$	4736	9400	No
v_R	1183	4000	No
v_3 or v_{av34}	1752 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	

If yes, v_{12A} = 2414 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2414	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 25.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D_S = 0.534	
Space mean speed in ramp influence area,	S_R = 52.7	mph
Space mean speed in outer lanes,	S_O = 68.4	mph
Space mean speed for all vehicles,	S = 61.0	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	SR-134/WB
Junction:	NB SR-2 Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	5035	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	740	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	5035		740			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1325		195			v
Trucks and buses	10		10			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.952	0.952	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5565	818	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1835 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4731	9400	No
$v_{FO} = v_F - v_R$	3913	9400	No
v_R	818	4000	No
v_3 or v_{av34}	1448 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 Yes

If yes, v_{12A} = 1892 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	1892	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 20.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D_S = 0.502	
Space mean speed in ramp influence area,	S_R = 53.5	mph
Space mean speed in outer lanes,	S_O = 69.7	mph
Space mean speed for all vehicles,	S = 62.1	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	SR-134/WB
Junction:	NB SR-2 Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description:	VV.110264

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	6325	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1180	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	6325		1180			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1664		311			v
Trucks and buses	10		10			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.952	0.952	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6991	1304	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2510 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5943	9400	No
$v_{FO} = v_F - v_R$	4639	9400	No
v_R	1304	4000	No
v_3 or v_{av34}	1716 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 2510 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2510	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 25.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D_S = 0.545	
Space mean speed in ramp influence area,	S_R = 52.5	mph
Space mean speed in outer lanes,	S_O = 68.5	mph
Space mean speed for all vehicles,	S = 60.7	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	SR-134/WB
Junction:	NB SR-2 Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description:	VV.110264

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	6350	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1120	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6350	1120		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1671	295		v
Trucks and buses	11	15		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %		%
Length	0.00 mi	0.00 mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.948	0.930	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	7052	1267	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2404 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5642	9400	No
$v_{FO} = v_F - v_R$	4375	9400	No
v_R	1267	4000	No
v_3 or v_{av34}	1619 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 2404 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2404	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 24.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D_S = 0.542	
Space mean speed in ramp influence area,	S_R = 52.5	mph
Space mean speed in outer lanes,	S_O = 68.9	mph
Space mean speed for all vehicles,	S = 60.8	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	SR-134/WB
Junction:	NB SR-2 Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description:	VV.110264

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	5085	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	790	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	5085		790			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1338		208			v
Trucks and buses	11		27			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.948	0.881	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5647	944	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1947 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4800	9400	No
$v_{FO} = v_F - v_R$	3856	9400	No
v_R	944	4000	No
v_3 or v_{av34}	1426 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 1947 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1947	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 21.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D_S = 0.513	
Space mean speed in ramp influence area,	S_R = 53.2	mph
Space mean speed in outer lanes,	S_O = 69.6	mph
Space mean speed for all vehicles,	S = 61.9	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	SR-134/WB
Junction:	NB SR-2 Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	6375	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1230	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6375	1230		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1678	324		v
Trucks and buses	11	23		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %		%
Length	0.00 mi	0.00 mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.948	0.897	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	7080	1444	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2541 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5664	9400	No
$v_{FO} = v_F - v_R$	4220	9400	No
v_R	1444	4000	No
v_3 or v_{av34}	1561 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	

If yes, v_{12A} = 2541 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2541	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 26.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D_S = 0.558	
Space mean speed in ramp influence area,	S_R = 52.2	mph
Space mean speed in outer lanes,	S_O = 69.1	mph
Space mean speed for all vehicles,	S = 60.3	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	SR-134/WB
Junction:	NB SR-2 Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description:	VV.110264

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	6915	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1215	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	6915		1215			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1820		320			v
Trucks and buses	11		15			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.948	0.930	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	7679	1375	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2615 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6144	9400	No
$v_{FO} = v_F - v_R$	4769	9400	No
v_R	1375	4000	No
v_3 or v_{av34}	1764 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	

If yes, v_{12A} = 2615 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2615	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 26.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.552

Space mean speed in ramp influence area, S_R = 52.3 mph

Space mean speed in outer lanes, S_O = 68.3 mph

Space mean speed for all vehicles, S = 60.4 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	SR-134/WB
Junction:	NB SR-2 Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	5540	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	855	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	5540		855			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1458		225			v
Trucks and buses	11		27			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.948	0.881	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6152	1022	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2116 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5230	9400	No
$v_{FO} = v_F - v_R$	4208	9400	No
v_R	1022	4000	No
v_3 or v_{av34}	1557 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	

If yes, v_{12A} = 2116 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2116	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 22.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D_S = 0.520	
Space mean speed in ramp influence area,	S_R = 53.0	mph
Space mean speed in outer lanes,	S_O = 69.1	mph
Space mean speed for all vehicles,	S = 61.6	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	SR-134/WB
Junction:	NB SR-2 Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description:	VV.110264

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	6945	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1335	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	6945		1335			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1828		351			v
Trucks and buses	11		23			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.948	0.897	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	7713	1567	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2764 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6171	9400	No
$v_{FO} = v_F - v_R$	4604	9400	No
v_R	1567	4000	No
v_3 or v_{av34}	1703 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	

If yes, v_{12A} = 2764 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2764	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 28.0+ pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	D_S = 0.569	
Space mean speed in ramp influence area,	S_R = 51.9	mph
Space mean speed in outer lanes,	S_O = 68.6	mph
Space mean speed for all vehicles,	S = 60.0	mph

Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
Volume	TM	20-Sep-13	VV.110264.0000	1 OF 1

STREET : Figueroa Street/Scholl Canyon Road
FREEWAY : SR-134

PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION
29
ROUTE
4B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
EASTBOUND DIVERGE								
Mainline AM	5970	10%	50	6020	11%	535	6555	11%
Mainline MID	5610	10%	50	5660	11%	505	6165	11%
Mainline PM	6725	10%	50	6775	11%	605	7380	11%
Ramp AM	405	3%	50	455	14%	35	490	14%
Ramp MID	310	9%	50	360	21%	30	390	21%
Ramp PM	510	0%	50	560	9%	45	605	9%

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	SR-134/EB
Junction:	Figueroa Street Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description:	VV.110264

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	5970	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	405	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp	0	vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp	1000	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	5970		405		0		vph
Peak-hour factor, PHF	0.95		0.95		0.90		
Peak 15-min volume, v15	1571		107		0		v
Trucks and buses	10		3		0		%
Recreational vehicles	0		0		0		%
Terrain type:	Level		Level				
Grade	0.00	%	0.00	%	0.00	%	
Length	0.00	mi	0.00	mi	0.00	mi	
Trucks and buses PCE, ET	1.5		1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		1.2		

Heavy vehicle adjustment, fHV	0.952	0.985	1.000	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	6598	433	0	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v - v_F) P_{FD}$ = 2690 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5609	9400	No
$v_{FO} = v - v_F - v_R$	5176	9400	No
v_R	433	2000	No
v_3 or v_{av34}	1459 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	

If yes, v_{12A} = 2690 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2690	4400	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086\ v_R - 0.009\ L_D$ = 27.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D_S = 0.467	
Space mean speed in ramp influence area,	S_R = 54.3	mph
Space mean speed in outer lanes,	S_O = 69.5	mph
Space mean speed for all vehicles,	S = 61.3	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	SR-134/EB
Junction:	Figueroa Street Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	5610	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	310	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	5610		310			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1476		82			v
Trucks and buses	10		9			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.952	0.957	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6201	341	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2490 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5271	9400	No
$v_{FO} = v_F - v_R$	4930	9400	No
v_R	341	2000	No
v_3 or v_{av34}	1390 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 2490 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2490	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 25.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D_S = 0.459	
Space mean speed in ramp influence area,	S_R = 54.5	mph
Space mean speed in outer lanes,	S_O = 69.8	mph
Space mean speed for all vehicles,	S = 61.6	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	SR-134/EB
Junction:	Figueroa Street Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	6725	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	510	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	6725		510			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1770		134			v
Trucks and buses	10		0			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.952	1.000	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	7433	537	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v - v_F) P_{FD} = 2896$ pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5947	9400	No
$v_{FO} = v - v_F - v_R$	5410	9400	No
v_R	537	2000	No
v_3 or v_{av34}	1525 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	

If yes, v_{12A} = 2896 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2896	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 29.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	D_S = 0.476	
Space mean speed in ramp influence area,	S_R = 54.0	mph
Space mean speed in outer lanes,	S_O = 69.3	mph
Space mean speed for all vehicles,	S = 60.9	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	SR-134/EB
Junction:	Figueroa Street Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description:	VV.110264

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	6020	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	455	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	6020		455			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1584		120			v
Trucks and buses	11		14			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.948	0.935	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6685	512	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2767 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5683	9400	No
$v_{FO} = v_F - v_R$	5171	9400	No
v_R	512	2000	No
v_3 or v_{av34}	1458 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	

If yes, v_{12A} = 2767 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2767	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 28.0+ pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.474

Space mean speed in ramp influence area, S_R = 54.1 mph

Space mean speed in outer lanes, S_0 = 69.5 mph

Space mean speed for all vehicles, S = 61.0 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	SR-134/EB
Junction:	Figueroa Street Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description:	VV.110264

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	5660	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	360	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	5660		360			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1489		95			v
Trucks and buses	11					%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.948	0.935	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6286	405	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2558 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5344	9400	No
$v_{FO} = v_F - v_R$	4939	9400	No
v_R	405	2000	No
v_3 or v_{av34}	1393 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	

If yes, v_{12A} = 2558 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2558	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 26.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D_S = 0.464	
Space mean speed in ramp influence area,	S_R = 54.3	mph
Space mean speed in outer lanes,	S_O = 69.8	mph
Space mean speed for all vehicles,	S = 61.4	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	SR-134/EB
Junction:	Figueroa Street Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description:	VV.110264

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	6775	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	560	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	6775		560			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1783		147			v
Trucks and buses	11		9			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.948	0.957	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	7524	616	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2972 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6020	9400	No
$v_{FO} = v_F - v_R$	5404	9400	No
v_R	616	2000	No
v_3 or v_{av34}	1524 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 2972 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2972	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 29.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	D_S = 0.483	
Space mean speed in ramp influence area,	S_R = 53.9	mph
Space mean speed in outer lanes,	S_O = 69.3	mph
Space mean speed for all vehicles,	S = 60.7	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	SR-134/EB
Junction:	Figueroa Street Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	6555	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	490	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	6555		490			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1725		129			v
Trucks and buses	11					%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.948	0.943	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	7280	547	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2848 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5824	9400	No
$v_{FO} = v_F - v_R$	5277	9400	No
v_R	547	2000	No
v_3 or v_{av34}	1488 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	

If yes, v_{12A} = 2848 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2848	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 28.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	D_S = 0.477	
Space mean speed in ramp influence area,	S_R = 54.0	mph
Space mean speed in outer lanes,	S_0 = 69.4	mph
Space mean speed for all vehicles,	S = 60.9	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	SR-134/EB
Junction:	Figueroa Street Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	6165	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	390	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	6165		390			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1622		103			v
Trucks and buses	11		21			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.948	0.905	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6846	454	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2794 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5820	9400	No
$v_{FO} = v_F - v_R$	5366	9400	No
v_R	454	2000	No
v_3 or v_{av34}	1513 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 2794 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2794	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 28.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	D_S = 0.469	
Space mean speed in ramp influence area,	S_R = 54.2	mph
Space mean speed in outer lanes,	S_O = 69.3	mph
Space mean speed for all vehicles,	S = 61.1	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	SR-134/EB
Junction:	Figueroa Street Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	7380	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	605	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	7380		605			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1942		159			v
Trucks and buses	11		9			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.948	0.957	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	8196	666	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3234 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6557	9400	No
$v_{FO} = v_F - v_R$	5891	9400	No
v_R	666	2000	No
v_3 or v_{av34}	1661 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	

If yes, v_{12A} = 3234 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3234	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 32.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	D_S = 0.488	
Space mean speed in ramp influence area,	S_R = 53.8	mph
Space mean speed in outer lanes,	S_O = 68.7	mph
Space mean speed for all vehicles,	S = 60.4	mph

Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
Volume	TM	20-Sep-13	VV.110264.0000	1 OF 1

STREET : Figueroa Street/Scholl Canyon Road
FREEWAY : SR-134

PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION 30
ROUTE 4B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
WESTBOUND MERGE								
Mainline AM	6580	10%	50	6630	1%	590	7220	1%
Mainline MID	5320	10%	50	5370	1%	480	5850	1%
Mainline PM	6755	10%	50	6805	1%	610	7415	1%
Ramp AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
Interchange	TM	20-Sep-13	VV.110264.0000	1 OF 1

FREEWAY : SR-2
FREEWAY : SR-134

PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION
31
ROUTE
5B, 6B, 7B, 8A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								

WESTBOUND DIVERGE

Mainline AM	5230	10%	50	5280	13%	470	5750	13%
Mainline MID	4295	10%	50	4345	13%	385	4730	13%
Mainline PM	5145	10%	50	5195	13%	465	5660	13%
Ramp AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
Interchange	TM	20-Sep-13	VV.110264.0000	1 OF 1

FREEWAY : SR-2
FREEWAY : SR-134

PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION 32
ROUTE 5B, 6B, 7B, 8A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
EASTBOUND DIVERGE								
Mainline AM	6675	10%	50	6725	11%	600	7325	11%
Mainline MID	7000	10%	50	7050	11%	630	7680	11%
Mainline PM	7905	10%	50	7955	11%	710	8665	11%
Ramp AM	2000	10%	50	2050	12%	180	2230	12%
Ramp MID	2260	10%	50	2310	12%	205	2515	12%
Ramp PM	3180	10%	50	3230	11%	285	3515	11%

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	SR-134/EB
Junction:	NB SR-2 Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description:	VV.110264

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	6675	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	2000	vph
Length of first accel/decel lane	1250	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	6675		2000			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1757		526			v
Trucks and buses	10		10			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV		0.952	0.952
Driver population factor, fP		1.00	1.00
Flow rate, vp		7378	2211 pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v - v_F) P_{FD}$ = 3171 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5903	9400	No
$v_{FO} = v - v_F - v_R$	3692	9400	No
v_R	2211	4000	No
v_3 or v_{av34}	1366 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	No	

If yes, v_{12A} = 3171 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3171	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 9.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable,	D_S = 0.627	
Space mean speed in ramp influence area,	S_R = 50.6	mph
Space mean speed in outer lanes,	S_O = 69.9	mph
Space mean speed for all vehicles,	S = 58.0	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	SR-134/EB
Junction:	NB SR-2 Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description:	VV.110264

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	7000	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	2260	vph
Length of first accel/decel lane	1250	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	7000		2260				vph
Peak-hour factor, PHF	0.95		0.95				
Peak 15-min volume, v15	1842		595				v
Trucks and buses	10		10				%
Recreational vehicles	0		0				%
Terrain type:	Level		Level				
Grade	0.00	%	0.00	%		%	
Length	0.00	mi	0.00	mi		mi	
Trucks and buses PCE, ET	1.5		1.5				
Recreational vehicle PCE, ER	1.2		1.2				

Heavy vehicle adjustment, fHV	0.952	0.952	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	7737	2498	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3458 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6190	9400	No
$v_{FO} = v_F - v_R$	3692	9400	No
v_R	2498	4000	No
v_3 or v_{av34}	1366 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 3458 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3458	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 11.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	D_S = 0.653	
Space mean speed in ramp influence area,	S_R = 50.0	mph
Space mean speed in outer lanes,	S_O = 69.9	mph
Space mean speed for all vehicles,	S = 57.2	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	SR-134/EB
Junction:	NB SR-2 Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description:	VV.110264

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	7905	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	3180	vph
Length of first accel/decel lane	1250	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	7905		3180			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	2080		837			v
Trucks and buses	10		10			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.952	0.952	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	8737	3515	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4418 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6990	9400	No
$v_{FO} = v_F - v_R$	3475	9400	No
v_R	3515	4000	No
v_3 or v_{av34}	1286 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 4418 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	4418	4400	Yes

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 19.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	D_S = 0.744	
Space mean speed in ramp influence area,	S_R = 47.9	mph
Space mean speed in outer lanes,	S_O = 70.2	mph
Space mean speed for all vehicles,	S = 54.2	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	SR-134/EB
Junction:	NB SR-2 Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description:	VV.110264

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	6725	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	2050	vph
Length of first accel/decel lane	1250	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6725	2050		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1770	539		v
Trucks and buses	11	12		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %		%
Length	0.00 mi	0.00 mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.948	0.943	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	7468	2287	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3246 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5975	9400	No
$v_{FO} = v_F - v_R$	3688	9400	No
v_R	2287	4000	No
v_3 or v_{av34}	1364 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	

If yes, v_{12A} = 3246 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3246	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 9.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable,	D_S = 0.634	
Space mean speed in ramp influence area,	S_R = 50.4	mph
Space mean speed in outer lanes,	S_O = 69.9	mph
Space mean speed for all vehicles,	S = 57.8	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	SR-134/EB
Junction:	NB SR-2 Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description:	VV.110264

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	7050	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	2310	vph
Length of first accel/decel lane	1250	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	7050	2310		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1855	608		v
Trucks and buses	11	12		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %		%
Length	0.00 mi	0.00 mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.948	0.943	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	7829	2577	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3536 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6264	9400	No
$v_{FO} = v_F - v_R$	3687	9400	No
v_R	2577	4000	No
v_3 or v_{av34}	1364 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	

If yes, v_{12A} = 3536 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3536	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 12.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	D_S = 0.660	
Space mean speed in ramp influence area,	S_R = 49.8	mph
Space mean speed in outer lanes,	S_O = 69.9	mph
Space mean speed for all vehicles,	S = 56.9	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	SR-134/EB
Junction:	NB SR-2 Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description:	VV.110264

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	7955	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	3230	vph
Length of first accel/decel lane	1250	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	7955		3230			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	2093		850			v
Trucks and buses	11		11			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.948	0.948	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	8834	3587	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4492 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	7068	9400	No
$v_{FO} = v_F - v_R$	3481	9400	No
v_R	3587	4000	No
v_3 or v_{av34}	1288 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 4492 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	4492	4400	Yes

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 20.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D_S = 0.751	
Space mean speed in ramp influence area,	S_R = 47.7	mph
Space mean speed in outer lanes,	S_O = 70.2	mph
Space mean speed for all vehicles,	S = 54.0	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	SR-134/EB
Junction:	NB SR-2 Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	7325	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	2230	vph
Length of first accel/decel lane	1250	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	7325	2230		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1928	587		v
Trucks and buses	11	12		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %		%
Length	0.00 mi	0.00 mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.948	0.943	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	8135	2488	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v - v_F) P_{FD}$ = 3533 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6508	9400	No
$v_{FO} = v - v_R$	4020	9400	No
v_R	2488	4000	No
v_3 or v_{av34}	1487 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 3533 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3533	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 12.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	D_S = 0.652	
Space mean speed in ramp influence area,	S_R = 50.0	mph
Space mean speed in outer lanes,	S_O = 69.4	mph
Space mean speed for all vehicles,	S = 57.3	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	SR-134/EB
Junction:	NB SR-2 Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	7680	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	2515	vph
Length of first accel/decel lane	1250	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	7680		2515			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	2021		662			v
Trucks and buses	11		12			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.948	0.943	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	8529	2806	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3851 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6824	9400	No
$v_{FO} = v_F - v_R$	4018	9400	No
v_R	2806	4000	No
v_3 or v_{av34}	1486 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 3851 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3851	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 14.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, D_S = 0.681

Space mean speed in ramp influence area, S_R = 49.3 mph

Space mean speed in outer lanes, S_O = 69.4 mph

Space mean speed for all vehicles, S = 56.5 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	SR-134/EB
Junction:	NB SR-2 Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	8665	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	3515	vph
Length of first accel/decel lane	1250	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	8665		3515			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	2280		925			v
Trucks and buses	11		11			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.948	0.948	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	9623	3904	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4891 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	7699	9400	No
$v_{FO} = v_F - v_R$	3795	9400	No
v_R	3904	4000	No
v_3 or v_{av34}	1404 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 4891 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	4891	4400	Yes

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 23.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D_S = 0.779	
Space mean speed in ramp influence area,	S_R = 47.1	mph
Space mean speed in outer lanes,	S_O = 69.7	mph
Space mean speed for all vehicles,	S = 53.4	mph

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
Interchange	TM	20-Sep-13	VV.110264.0000	1 OF 1

FREEWAY : I-5
FREEWAY : SR-134
PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%
INTERSECTION 33
ROUTE 5B, 6B,7B,8A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
WESTBOUND SR-134 DIVERGE								
Mainline AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Mainline MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Mainline PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp AM	2880	10%	50	2930	12%	260	3190	12%
Ramp MID	2625	10%	50	2675	12%	235	2910	12%
Ramp PM	2755	10%	50	2805	12%	250	3055	12%

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
Interchange	TM	20-Sep-13	VV.110264.0000	1 OF 1

FREEWAY : I-5
FREEWAY : SR-134
PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%
INTERSECTION 34
ROUTE 5B, 6B,7B,8A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
EASTBOUND SR-134 MERGE								
Mainline AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Mainline MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Mainline PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp AM	2870	10%	50	2920	12%	260	3180	12%
Ramp MID	2630	10%	50	2680	12%	235	2915	12%
Ramp PM	2985	10%	50	3035	11%	270	3305	11%

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
Interchange	TM	20-Sep-13	VV.110264.0000	1 OF 1

FREEWAY : I-5
FREEWAY : SR-134

PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION
35
ROUTE
5B, 6B, 7B,8A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
NORTHBOUND I-5 MERGE								
Mainline AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Mainline MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Mainline PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp AM	2900	10%	50	2950	12%	260	3210	12%
Ramp MID	2490	10%	50	2540	12%	225	2765	12%
Ramp PM	2755	10%	50	2805	12%	250	3055	12%

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
Interchange	TM	20-Sep-13	VV.110264.0000	1 OF 1

FREEWAY : I-5
FREEWAY : SR-134
PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%
INTERSECTION 36
ROUTE 5B, 6B, 7B, 8A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
SOUTHBOUND I-5 DIVERGE								
Mainline AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Mainline MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Mainline PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
Volume	TM	20-Sep-13	VV.110264.0000	1 OF 1

STREET : Roscoe Boulevard/Glen Oaks Boulevard
FREEWAY : I-5
PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%
INTERSECTION 37
ROUTE 5B,6B,7B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
NORTHBOUND DIVERGE								
Mainline AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Mainline MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Mainline PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp AM	285	6%	50	335	20%	25	360	20%
Ramp MID	295	5%	50	345	15%	25	370	15%
Ramp PM	630	3%	50	680	8%	55	735	8%

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
Volume	TM	20-Sep-13	VV.110264.0000	1 OF 1

STREET : Roscoe Boulevard/Glen Oaks Boulevard

FREEWAY : I-5

PROJECTED YEAR :

PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION 38

ROUTE 5B,6B,7B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
SOUTHBOUND MERGE								
Mainline AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Mainline MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Mainline PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp AM	600	2%	50	650	10%	55	705	10%
Ramp MID	370	4%	50	420	15%	35	455	15%
Ramp PM	405	3%	50	455	14%	35	490	14%

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
Volume	TM	28-Aug-13	VV.110264.0000	1 OF 1

STREET : Branford Street
FREEWAY : I-5

PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION 39
ROUTE 8A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
SOUTHBOUND MERGE								
Mainline AM	12595	3%	50	12645	3%	1135	13780	3%
Mainline MID	8420	5%	50	8470	5%	760	9230	5%
Mainline PM	9245	3%	50	9295	4%	830	10125	4%
Ramp AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
Volume	TM	28-Aug-13	VV.110264.0000	1 OF 1

STREET : Branford Street
FREEWAY : I-5

PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION
40
ROUTE
8A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
NORTHBOUND DIVERGE								
Mainline AM	8320	0%	50	8370	1%	750	9120	1%
Mainline MID	5605	2%	50	5655	3%	505	6160	3%
Mainline PM	6090	0%	50	6140	1%	550	6690	1%
Ramp AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
Volume	TM	20-Sep-13	VV.110264.0000	1 OF 1

STREET : Wheatland Avenue
FREEWAY : I-210

PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION
41
ROUTE
5C,6C,7C,8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
WESTBOUND DIVERGE								
Mainline AM	4080	3%	50	4130	4%	365	4495	4%
Mainline MID	3480	10%	50	3530	11%	315	3845	11%
Mainline PM	6690	3%	50	6740	4%	600	7340	4%
Ramp AM	70	7%	50	120	46%	5	125	46%
Ramp MID	65	5%	50	115	46%	5	120	46%
Ramp PM	110	1%	50	160	32%	10	170	32%

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HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Wheatland Avenue Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	4080	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	70	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	4080		70			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1074		18			v
Trucks and buses	3		7			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.985	0.966	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4359	76	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1943 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4359	9600	No
$v_{FO} = v_F - v_R$	4283	9600	No
v_R	76	2000	No
v_3 or v_{av34}	1208 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 1943 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1943	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 21.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D_S = 0.435	
Space mean speed in ramp influence area,	S_R = 57.8	mph
Space mean speed in outer lanes,	S_O = 76.0	mph
Space mean speed for all vehicles,	S = 66.7	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Wheatland Avenue Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3480	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	65	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3480	65		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	916	17		v
Trucks and buses	10	5		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %		%
Length	0.00 mi	0.00 mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.952	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3846	70	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1716 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3846	9600	No
$v_{FO} = v_F - v_R$	3776	9600	No
v_R	70	2000	No
v_3 or v_{av34}	1065 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 1716 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1716	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 19.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	D_S = 0.434	
Space mean speed in ramp influence area,	S_R = 57.8	mph
Space mean speed in outer lanes,	S_O = 76.5	mph
Space mean speed for all vehicles,	S = 66.9	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Wheatland Avenue Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	6690	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	110	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6690	110		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1761	29		v
Trucks and buses	3	1		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %		%
Length	0.00 mi	0.00 mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.985	0.995	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	7148	116	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3182 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	7148	9600	No
$v_{FO} = v_F - v_R$	7032	9600	No
v_R	116	2000	No
v_3 or v_{av34}	1983 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 3182 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3182	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 31.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	D_S = 0.438	
Space mean speed in ramp influence area,	S_R = 57.7	mph
Space mean speed in outer lanes,	S_0 = 73.0	mph
Space mean speed for all vehicles,	S = 65.3	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Wheatland Avenue Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	4130	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	120	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	4130		120			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1087		32			v
Trucks and buses	4		46			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.980	0.813	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4434	155	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2021 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4434	9600	No
$v_{FO} = v_F - v_R$	4279	9600	No
v_R	155	2000	No
v_3 or v_{av34}	1206 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 2021 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2021	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 21.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D_S = 0.442	
Space mean speed in ramp influence area,	S_R = 57.6	mph
Space mean speed in outer lanes,	S_0 = 76.0	mph
Space mean speed for all vehicles,	S = 66.4	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Wheatland Avenue Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3530	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	115	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3530	115		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	929	30		v
Trucks and buses	11	46		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %		%
Length	0.00 mi	0.00 mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.948	0.813	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3920	149	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1793 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3920	9600	No
$v_{FO} = v_F - v_R$	3771	9600	No
v_R	149	2000	No
v_3 or v_{av34}	1063 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 1793 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1793	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 19.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, D_S = 0.441

Space mean speed in ramp influence area, S_R = 57.6 mph

Space mean speed in outer lanes, S_O = 76.5 mph

Space mean speed for all vehicles, S = 66.6 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Wheatland Avenue Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	6740	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	160	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6740	160		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1774	42		v
Trucks and buses	4	32		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %		%
Length	0.00 mi	0.00 mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.980	0.862	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	7237	195	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3265 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	7237	9600	No
$v_{FO} = v_F - v_R$	7042	9600	No
v_R	195	2000	No
v_3 or v_{av34}	1986 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 3265 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3265	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 32.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	D_S = 0.446	
Space mean speed in ramp influence area,	S_R = 57.5	mph
Space mean speed in outer lanes,	S_0 = 72.9	mph
Space mean speed for all vehicles,	S = 65.1	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Wheatland Avenue Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	4495	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	125	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4495	125		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1183	33		v
Trucks and buses	4	46		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %		%
Length	0.00 mi	0.00 mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.980	0.813	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4826	162	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2196 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4826	9600	No
$v_{FO} = v_F - v_R$	4664	9600	No
v_R	162	2000	No
v_3 or v_{av34}	1315 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 2196 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2196	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 23.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D_S = 0.443	
Space mean speed in ramp influence area,	S_R = 57.6	mph
Space mean speed in outer lanes,	S_0 = 75.6	mph
Space mean speed for all vehicles,	S = 66.2	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Wheatland Avenue Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3845	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	120	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3845	120		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1012	32		v
Trucks and buses	11	46		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %		%
Length	0.00 mi	0.00 mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.948	0.813	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4270	155	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1949 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4270	9600	No
$v_{FO} = v_F - v_R$	4115	9600	No
v_R	155	2000	No
v_3 or v_{av34}	1160 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 1949 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1949	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 21.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.442

Space mean speed in ramp influence area, S_R = 57.6 mph

Space mean speed in outer lanes, S_O = 76.2 mph

Space mean speed for all vehicles, S = 66.4 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Wheatland Avenue Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	7340	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	170	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	7340	170		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1932	45		v
Trucks and buses	4	32		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %		%
Length	0.00 mi	0.00 mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.980	0.862	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	7881	208	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3553 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	7881	9600	No
$v_{FO} = v_F - v_R$	7673	9600	No
v_R	208	2000	No
v_3 or v_{av34}	2164 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 3553 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3553	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 34.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	D_S = 0.447	
Space mean speed in ramp influence area,	S_R = 57.5	mph
Space mean speed in outer lanes,	S_O = 72.3	mph
Space mean speed for all vehicles,	S = 64.8	mph

Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
Volume	TM	20-Sep-13	VV.110264.0000	1 OF 1

STREET : Wheatland Avenue
FREEWAY : I-210

PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION
42
ROUTE
5C,6C,7C,8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
EASTBOUND MERGE								
Mainline AM	4735	10%	50	4785	10%	425	5210	10%
Mainline MID	2670	10%	50	2720	10%	240	2960	10%
Mainline PM	3650	10%	50	3700	10%	330	4030	10%
Ramp AM	125	3%	50	175	31%	10	185	31%
Ramp MID	65	2%	50	115	44%	5	120	44%
Ramp PM	90	3%	50	140	38%	10	150	38%

Tustin Office: 714.665.4500 Tel/ 714.665.4501 Fax
Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax
Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax
Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Wheatland Avenue On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	4735	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	125	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4735	125		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1246	33		v
Trucks and buses	10	3		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.952	0.985	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5233	134	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.201 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 1052 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5367	9600	No
v_3 or v_{av34}	2090 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	

If yes, v_{12A} = 2093 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	5367	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 22.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.357	
Space mean speed in ramp influence area,	S_R = 60.0	mph
Space mean speed in outer lanes,	S_O = 66.1	mph
Space mean speed for all vehicles,	S = 63.5	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Wheatland Avenue On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	2670	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	65	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2670	65		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	703	17		v
Trucks and buses	10	2		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.952	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2951	69	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.209 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 617 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3020	9600	No
v_3 or v_{av34}	1167 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	

If yes, v_{12A} = 1180 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	3020	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 15.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.335	
Space mean speed in ramp influence area,	S_R = 60.6	mph
Space mean speed in outer lanes,	S_O = 68.6	mph
Space mean speed for all vehicles,	S = 65.1	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Wheatland Avenue On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3650	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	90	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3650	90		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	961	24		v
Trucks and buses	10	3		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.952	0.985	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4034	96	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.206 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 830 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4130	9600	No
v_3 or v_{av34}	1602 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	

If yes, v_{12A} = 1613 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	4130	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 18.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.343	
Space mean speed in ramp influence area,	S_R = 60.4	mph
Space mean speed in outer lanes,	S_O = 67.4	mph
Space mean speed for all vehicles,	S = 64.3	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Wheatland Avenue On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	4785	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	175	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4785	175		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1259	46		v
Trucks and buses	10	31		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.952	0.866	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5289	213	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.191 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 1011 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5502	9600	No
v_3 or v_{av34}	2139 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	Yes	

If yes, v_{12A} = 2115 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	5502	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 23.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.361	
Space mean speed in ramp influence area,	S_R = 59.9	mph
Space mean speed in outer lanes,	S_O = 66.1	mph
Space mean speed for all vehicles,	S = 63.3	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Wheatland Avenue On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3680	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	140	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3680	140		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	968	37		v
Trucks and buses	10	44		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.952	0.820	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4067	180	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.195 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 794 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4247	9600	No
v_3 or v_{av34}	1636 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 Yes

If yes, v_{12A} = 1626 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	4247	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 19.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.345	
Space mean speed in ramp influence area,	S_R = 60.3	mph
Space mean speed in outer lanes,	S_O = 67.4	mph
Space mean speed for all vehicles,	S = 64.2	mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Wheatland Avenue On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	5015	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	175	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5015	175		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1320	46		v
Trucks and buses	10	38		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%		%
Length	mi	mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.952	0.840	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5543	219	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.190 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 1056 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5762	9600	No
v_3 or v_{av34}	2243 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	

If yes, v_{12A} = 2217 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	5762	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 24.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.366	
Space mean speed in ramp influence area,	S_R = 59.8	mph
Space mean speed in outer lanes,	S_O = 65.8	mph
Space mean speed for all vehicles,	S = 63.1	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Wheatland Avenue On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	5210	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	185	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5210	185		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1371	49		v
Trucks and buses	10	31		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.952	0.866	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5758	225	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.190 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 1092 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5983	9600	No
v_3 or v_{av34}	2333 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	

If yes, v_{12A} = 2303 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	5983	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 25.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.370	
Space mean speed in ramp influence area,	S_R = 59.6	mph
Space mean speed in outer lanes,	S_O = 65.6	mph
Space mean speed for all vehicles,	S = 62.9	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Wheatland Avenue On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	2960	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	120	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2960	120		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	779	32		v
Trucks and buses	10	44		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.952	0.820	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3272	154	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.199 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 650 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3426	9600	No
v_3 or v_{av34}	1311 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 Yes

If yes, v_{12A} = 1308 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	3426	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 16.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.338	
Space mean speed in ramp influence area,	S_R = 60.5	mph
Space mean speed in outer lanes,	S_O = 68.3	mph
Space mean speed for all vehicles,	S = 64.7	mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Wheatland Avenue On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	4030	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	150	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4030	150		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1061	39		v
Trucks and buses	10	38		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.952	0.840	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4454	188	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.194 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 865 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4642	9600	No
v_3 or v_{av34}	1794 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	

If yes, v_{12A} = 1781 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	4642	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 20.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.349	
Space mean speed in ramp influence area,	S_R = 60.2	mph
Space mean speed in outer lanes,	S_O = 67.0	mph
Space mean speed for all vehicles,	S = 63.9	mph

Hall & Foreman, Inc.
Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
Volume	TM	20-Sep-13	VV.110264.0000	1 OF 1

STREET : Foothill Boulevard/Osborne Street
FREEWAY : I-210

PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION
43
ROUTE
5A, 6A, 7A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
WESTBOUND DIVERGE								
Mainline AM	4030	11%	50	4080	12%	365	4445	12%
Mainline MID	3330	11%	50	3380	12%	300	3680	12%
Mainline PM	5640	11%	50	5690	12%	510	6200	12%
Ramp AM	230	3%	50	280	20%	20	300	20%
Ramp MID	150	11%	50	200	33%	15	215	33%
Ramp PM	320	3%	50	370	16%	30	400	16%

Tustin Office: 714.665.4500 Tel/ 714.665.4501 Fax
Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax
Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax
Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Foothill Boulevard Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	4030	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	485	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	4030		485			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1061		128			v
Trucks and buses	11		3			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.948	0.985	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4475	518	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2243 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4475	9600	No
$v_{FO} = v_F - v_R$	3957	9600	No
v_R	518	2000	No
v_3 or v_{av34}	1116 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 2243 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2243	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 23.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D_S = 0.475	
Space mean speed in ramp influence area,	S_R = 56.7	mph
Space mean speed in outer lanes,	S_O = 76.3	mph
Space mean speed for all vehicles,	S = 65.1	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Foothill Boulevard Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3330	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	235	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp	0	vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp	1000	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	3330		235		0		vph
Peak-hour factor, PHF	0.95		0.95		0.90		
Peak 15-min volume, v15	876		62		0		v
Trucks and buses	11		7		0		%
Recreational vehicles	0		0		0		%
Terrain type:	Level		Level				
Grade	0.00	%	0.00	%	0.00	%	
Length	0.00	mi	0.00	mi	0.00	mi	
Trucks and buses PCE, ET	1.5		1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		1.2		

Heavy vehicle adjustment, fHV	0.948	0.966	1.000	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	3698	256	0	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1757 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3698	9600	No
$v_{FO} = v_F - v_R$	3442	9600	No
v_R	256	2000	No
v_3 or v_{av34}	970 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	

If yes, v_{12A} = 1757 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1757	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 19.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, D_S = 0.451

Space mean speed in ramp influence area, S_R = 57.4 mph

Space mean speed in outer lanes, S_O = 76.8 mph

Space mean speed for all vehicles, S = 66.2 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Foothill Boulevard Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	5640	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	295	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	5640		295			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1484		78			v
Trucks and buses	11		2			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.948	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6263	314	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2908 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6263	9600	No
$v_{FO} = v_F - v_R$	5949	9600	No
v_R	314	2000	No
v_3 or v_{av34}	1677 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	

If yes, v_{12A} = 2908 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2908	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 29.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	D_S = 0.456	
Space mean speed in ramp influence area,	S_R = 57.2	mph
Space mean speed in outer lanes,	S_O = 74.1	mph
Space mean speed for all vehicles,	S = 65.2	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Foothill Boulevard Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing +Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	4080	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	535	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	4080		535			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1074		141			v
Trucks and buses	12		12			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.943	0.943	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4552	597	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v - v_F) P_{FD}$ = 2321 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4552	9600	No
$v_{FO} = v - v_F - v_R$	3955	9600	No
v_R	597	2000	No
v_3 or v_{av34}	1115 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	No	

If yes, v_{12A} = 2321 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2321	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 24.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.482

Space mean speed in ramp influence area, S_R = 56.5 mph

Space mean speed in outer lanes, S_O = 76.3 mph

Space mean speed for all vehicles, S = 64.8 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Foothill Boulevard Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing +Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3380	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	285	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	3380		285			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	889		75			v
Trucks and buses	12		23			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.943	0.897	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3771	334	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1833 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3771	9600	No
$v_{FO} = v_F - v_R$	3437	9600	No
v_R	334	2000	No
v_3 or v_{av34}	969 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	

If yes, v_{12A} = 1833 (Equation 13-15, 13-16, 18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1833	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 20.0+ pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D_S = 0.458	
Space mean speed in ramp influence area,	S_R = 57.2	mph
Space mean speed in outer lanes,	S_O = 76.8	mph
Space mean speed for all vehicles,	S = 65.8	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Foothill Boulevard Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing +Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	5690	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	345	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5690	345		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1497	91		v
Trucks and buses	12	17		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %		%
Length	0.00 mi	0.00 mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV		0.943	0.922
Driver population factor, fP		1.00	1.00
Flow rate, vp		6349	394 pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2990 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6349	9600	No
$v_{FO} = v_F - v_R$	5955	9600	No
v_R	394	2000	No
v_3 or v_{av34}	1679 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 2990 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2990	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 30.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	D_S = 0.463	
Space mean speed in ramp influence area,	S_R = 57.0	mph
Space mean speed in outer lanes,	S_O = 74.1	mph
Space mean speed for all vehicles,	S = 65.0	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Foothill Boulevard Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	4445	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	580	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4445	580		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1170	153		v
Trucks and buses	12	12		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %		%
Length	0.00 mi	0.00 mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV		0.943	0.943
Driver population factor, fP		1.00	1.00
Flow rate, vp		4960	647 pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2527 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4960	9600	No
$v_{FO} = v_F - v_R$	4313	9600	No
v_R	647	2000	No
v_3 or v_{av34}	1216 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 2527 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2527	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 26.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.486

Space mean speed in ramp influence area, S_R = 56.4 mph

Space mean speed in outer lanes, S_O = 75.9 mph

Space mean speed for all vehicles, S = 64.5 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Foothill Boulevard Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3680	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	305	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	3680		305			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	968		80			v
Trucks and buses	12		23			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.943	0.897	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4106	358	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1992 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4106	9600	No
$v_{FO} = v_F - v_R$	3748	9600	No
v_R	358	2000	No
v_3 or v_{av34}	1057 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 1992 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1992	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 21.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D_S = 0.460	
Space mean speed in ramp influence area,	S_R = 57.1	mph
Space mean speed in outer lanes,	S_O = 76.6	mph
Space mean speed for all vehicles,	S = 65.7	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Foothill Boulevard Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	6200	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	370	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	6200		370			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1632		97			v
Trucks and buses	12		17			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.943	0.922	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6918	423	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3255 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6918	9600	No
$v_{FO} = v_F - v_R$	6495	9600	No
v_R	423	2000	No
v_3 or v_{av34}	1831 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	

If yes, v_{12A} = 3255 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3255	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 32.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	D_S = 0.466	
Space mean speed in ramp influence area,	S_R = 57.0	mph
Space mean speed in outer lanes,	S_O = 73.5	mph
Space mean speed for all vehicles,	S = 64.7	mph

Hall & Foreman, Inc.
Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
Volume	TM	20-Sep-13	VV.110264.0000	1 OF 1

STREET : Foothill Boulevard/Osborne Street
FREEWAY : I-210

PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION
44
ROUTE
5A,6A,7A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
EASTBOUND MERGE								
Mainline AM	3950	10%	50	4000	11%	355	4355	11%
Mainline MID	3105	10%	50	3155	11%	280	3435	11%
Mainline PM	4435	10%	50	4485	11%	400	4885	11%
Ramp AM	485	4%	50	535	12%	45	580	12%
Ramp MID	235	7%	50	285	23%	20	305	23%
Ramp PM	295	2%	50	345	16%	25	370	16%

Tustin Office: 714.665.4500 Tel/ 714.665.4501 Fax
Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax
Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax
Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Foothill Boulevard On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3950	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	485	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3950	485		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1039	128		v
Trucks and buses	10	3		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV		0.952	0.985
Driver population factor, fP		1.00	1.00
Flow rate, vp		4366	518 pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.153 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 668 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4884	9600	No
v_3 or v_{av34}	1849 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	

If yes, v_{12A} = 1746 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	4884	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 22.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.359	
Space mean speed in ramp influence area,	S_R = 60.0	mph
Space mean speed in outer lanes,	S_O = 67.1	mph
Space mean speed for all vehicles,	S = 63.6	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Foothill Boulevard On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3105	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	235	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3105	235		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	817	62		v
Trucks and buses	10	7		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.952	0.966	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3432	256	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.186 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 638 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3688	9600	No
v_3 or v_{av34}	1397 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	Yes	

If yes, v_{12A} = 1372 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	3688	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 18.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.341	
Space mean speed in ramp influence area,	S_R = 60.5	mph
Space mean speed in outer lanes,	S_O = 68.1	mph
Space mean speed for all vehicles,	S = 64.5	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Foothill Boulevard On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	4435	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	295	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4435	295		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1167	78		v
Trucks and buses	10	2		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV		0.952	0.990
Driver population factor, fP		1.00	1.00
Flow rate, vp		4902	314 pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.179 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 875 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5216	9600	No
v_3 or v_{av34}	2013 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	Yes	

If yes, v_{12A} = 1960 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	5216	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 23.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.359	
Space mean speed in ramp influence area,	S_R = 60.0	mph
Space mean speed in outer lanes,	S_O = 66.5	mph
Space mean speed for all vehicles,	S = 63.5	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Foothill Boulevard On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	4000	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	535	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4000	535		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1053	141		v
Trucks and buses	11	12		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.948	0.943	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4442	597	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.143 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 636 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5039	9600	No
v_3 or v_{av34}	1903 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	

If yes, v_{12A} = 1776 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	5039	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 23.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.363	
Space mean speed in ramp influence area,	S_R = 59.8	mph
Space mean speed in outer lanes,	S_O = 67.0	mph
Space mean speed for all vehicles,	S = 63.4	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Foothill Boulevard On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3155	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	285	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3155	285		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	830	75		v
Trucks and buses	11	23		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV		0.948	0.897
Driver population factor, fP		1.00	1.00
Flow rate, vp		3504	334 pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.176 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 617 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3838	9600	No
v_3 or v_{av34}	1443 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	Yes	

If yes, v_{12A} = 1401 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	3838	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 18.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.343	
Space mean speed in ramp influence area,	S_R = 60.4	mph
Space mean speed in outer lanes,	S_O = 68.0	mph
Space mean speed for all vehicles,	S = 64.3	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Foothill Boulevard On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	4485	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	345	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4485	345		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1180	91		v
Trucks and buses	11	17		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%		%
Length	mi	mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.948	0.922	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4981	394	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.169 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 840 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5375	9600	No
v_3 or v_{av34}	2070 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	

If yes, v_{12A} = 1992 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	5375	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 23.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.363	
Space mean speed in ramp influence area,	S_R = 59.8	mph
Space mean speed in outer lanes,	S_O = 66.4	mph
Space mean speed for all vehicles,	S = 63.3	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Foothill Boulevard On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	4355	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	580	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4355	580		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1146	153		v
Trucks and buses	11	12		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.948	0.943	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4836	647	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.137 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 662 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5483	9600	No
v_3 or v_{av34}	2087 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	Yes	

If yes, v_{12A} = 1934 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	5483	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 25.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.373	
Space mean speed in ramp influence area,	S_R = 59.6	mph
Space mean speed in outer lanes,	S_O = 66.6	mph
Space mean speed for all vehicles,	S = 63.1	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Foothill Boulevard On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3435	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	305	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3435	305		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	904	80		v
Trucks and buses	11	23		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.948	0.897	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3815	358	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.173 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 660 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4173	9600	No
v_3 or v_{av34}	1577 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	Yes	

If yes, v_{12A} = 1526 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	4173	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 20.0+ pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.347	
Space mean speed in ramp influence area,	S_R = 60.3	mph
Space mean speed in outer lanes,	S_O = 67.7	mph
Space mean speed for all vehicles,	S = 64.1	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Foothill Boulevard On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	4885	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	370	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4885	370		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1286	97		v
Trucks and buses	11	17		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.948	0.922	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5425	423	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.165 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 895 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5848	9600	No
v_3 or v_{av34}	2265 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	Yes	

If yes, v_{12A} = 2170 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	5848	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 25.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.373	
Space mean speed in ramp influence area,	S_R = 59.6	mph
Space mean speed in outer lanes,	S_0 = 65.9	mph
Space mean speed for all vehicles,	S = 62.9	mph

Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
Interchange	TM	20-Sep-13	VV.110264.0000	1 OF 1

FREEWAY : SR-118
FREEWAY : I-210

PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION 45
ROUTE 8B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
WESTBOUND DIVERGE								
Mainline AM	4650	10%	50	4700	11%	420	5120	11%
Mainline MID	3640	10%	50	3690	11%	330	4020	11%
Mainline PM	6075	10%	50	6125	11%	545	6670	11%
Ramp AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D

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Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax
Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
Interchange	TM	20-Sep-13	VV.110264.0000	1 OF 1

STREET : SR-118
FREEWAY : I-210

PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION
46
ROUTE
8B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
EASTBOUND MERGE								
Mainline AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Mainline MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Mainline PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D

Hall & Foreman, Inc.

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
Interchange	TM	20-Sep-13	VV.110264.0000	1 OF 1

FREEWAY : SR-118
FREEWAY : I-210

PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION
47
ROUTE
8B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
WESTBOUND MERGE								
Mainline AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Mainline MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Mainline PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D

Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
Interchange	TM	20-Sep-13	VV.110264.0000	1 OF 1

STREET : SR-118
FREEWAY : I-210

PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION
48
ROUTE
8B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
EASTBOUND DIVERGE								
Mainline AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Mainline MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Mainline PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D

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Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax
Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
Interchange	TM	20-Sep-13	VV.110264.0000	1 OF 1

FREEWAY : I-5
FREEWAY : SR-118

PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION
49
ROUTE
8B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								

WESTBOUND SR-118 DIVERGE

Mainline AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Mainline MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Mainline PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
Interchange	TM	20-Sep-13	VV.110264.0000	1 OF 1

FREEWAY : I-5
FREEWAY : SR-118

PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION 50
ROUTE 8B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								

EASTBOUND SR-118 MERGE

Mainline AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Mainline MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Mainline PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D

Hall & Foreman, Inc.

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
Interchange	TM	20-Sep-13	VV.110264.0000	1 OF 1

FREEWAY : I-5
FREEWAY : SR-118

PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION
51
ROUTE
8B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								

SOUTHBOUND I-5 MERGE

Mainline AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Mainline MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Mainline PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
Interchange	TM	20-Sep-13	VV.110264.0000	1 OF 1

FREEWAY : I-5
FREEWAY : SR-118

PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION
52
8B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
NORTHBOUND I-5 DIVERGE								
Mainline AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Mainline MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Mainline PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D

Hall & Foreman, Inc.
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SUBJECT	BY	DATE	JOB NO.	SHEET OF
Volume	TM	20-Sep-13	VV.110264.0000	1 OF 1

STREET : Osborne Street
FREEWAY : I-5

PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION
53
ROUTE
8B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
SOUTHBOUND MERGE								
Mainline AM	10815	10%	50	10865	10%	975	11840	10%
Mainline MID	7500	5%	50	7550	6%	675	8225	6%
Mainline PM	8230	5%	50	8280	6%	740	9020	6%
Ramp AM	355	14%	50	405	24%	30	435	24%
Ramp MID	760	3%	50	810	9%	70	880	9%
Ramp PM	1085	0%	50	1135	5%	100	1235	5%

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Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/11/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-5/SB
Junction:	Osborne Street On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description:	VV.110264

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	10815	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-flow speed on ramp	35.0	mph
Volume on ramp	1200	vph
Length of first accel/decel lane	1080	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	10815	1200		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	2846	316		v
Trucks and buses	10	2		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.952	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	11953	1276	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.209 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1976 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	10729	9400	Yes
v_3 or v_{av34}	3738 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		Yes	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	

If yes, v_{12A} = 3781 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	10729	4600	Yes

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 30.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable,	M_S = 0.783	
Space mean speed in ramp influence area,	S_R = 47.0	mph
Space mean speed in outer lanes,	S_O = 55.3	mph
Space mean speed for all vehicles,	S = 51.0	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/11/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-5/SB
Junction:	Osborne Street On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description:	VV.110264

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	7500	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-flow speed on ramp	35.0	mph
Volume on ramp	385	vph
Length of first accel/decel lane	1080	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	7500	385		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1974	101		v
Trucks and buses	5	3		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV		0.976	0.985
Driver population factor, fP		1.00	1.00
Flow rate, vp		8092	411 pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.209 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1209 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6197	9400	No
v_3 or v_{av34}	2288 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	

If yes, v_{12A} = 2314 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	6197	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 13.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.229	
Space mean speed in ramp influence area,	S_R = 59.7	mph
Space mean speed in outer lanes,	S_0 = 60.6	mph
Space mean speed for all vehicles,	S = 60.2	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/11/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-5/SB
Junction:	Osborne Street On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description:	VV.110264

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	8230	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-flow speed on ramp	35.0	mph
Volume on ramp	500	vph
Length of first accel/decel lane	1080	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	8230	500		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	2166	132		v
Trucks and buses	5	1		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV		0.976	0.995
Driver population factor, fP		1.00	1.00
Flow rate, vp		8880	529 pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.209 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1333 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6909	9400	No
v_3 or v_{av34}	2523 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	Yes	

If yes, v_{12A} = 2552 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	6909	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 15.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.255	
Space mean speed in ramp influence area,	S_R = 59.1	mph
Space mean speed in outer lanes,	S_O = 59.9	mph
Space mean speed for all vehicles,	S = 59.6	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/11/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-5/SB
Junction:	Osborne Street On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	10865	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-flow speed on ramp	35.0	mph
Volume on ramp	1250	vph
Length of first accel/decel lane	1080	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	10865	1250		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	2859	329		v
Trucks and buses	10	6		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.952	0.971	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	12009	1355	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.209 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1987 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	10864	9400	Yes
v_3 or v_{av34}	3761 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		Yes	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	

If yes, v_{12A} = 3803 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	10864	4600	Yes

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 31.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable,	M_S = 0.848	
Space mean speed in ramp influence area,	S_R = 45.5	mph
Space mean speed in outer lanes,	S_O = 55.2	mph
Space mean speed for all vehicles,	S = 50.1	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/11/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-5/SB
Junction:	Osborne Street On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description:	VV.110264

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	7550	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-flow speed on ramp	35.0	mph
Volume on ramp	435	vph
Length of first accel/decel lane	1080	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	7550	435		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1987	114		v
Trucks and buses	6	14		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.971	0.935	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	8186	490	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.209 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1223 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6343	9400	No
v_3 or v_{av34}	2315 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	Yes	

If yes, v_{12A} = 2341 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	6343	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 13.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.236	
Space mean speed in ramp influence area,	S_R = 59.6	mph
Space mean speed in outer lanes,	S_0 = 60.5	mph
Space mean speed for all vehicles,	S = 60.1	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/11/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-5/SB
Junction:	Osborne Street On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description:	VV.110264

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	8280	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-flow speed on ramp	35.0	mph
Volume on ramp	550	vph
Length of first accel/decel lane	1080	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	8280	550		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	2179	145		v
Trucks and buses	6	10		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.971	0.952	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	8977	608	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.209 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1354 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	7085	9400	No
v_3 or v_{av34}	2561 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	Yes	

If yes, v_{12A} = 2590 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	7085	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 16.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.265	
Space mean speed in ramp influence area,	S_R = 58.9	mph
Space mean speed in outer lanes,	S_0 = 59.8	mph
Space mean speed for all vehicles,	S = 59.4	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/11/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-5/SB
Junction:	Osborne Street On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description:	VV.110264

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	11840	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-flow speed on ramp	35.0	mph
Volume on ramp	1360	vph
Length of first accel/dècel lane	1080	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	11840	1360		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	3116	358		v
Trucks and buses	10	6		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.952	0.971	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	13086	1475	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.209 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 2212 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	12061	9400	Yes
v_3 or v_{av34}	4187 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		Yes	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	

If yes, v_{12A} = 4234 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	12061	4600	Yes

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 35.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable,	M_S = 1.346	
Space mean speed in ramp influence area,	S_R = 34.0	mph
Space mean speed in outer lanes,	S_0 = 53.2	mph
Space mean speed for all vehicles,	S = 42.0	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/11/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-5/SB
Junction:	Osborne Street On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description:	VV.110264

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	8225	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-flow speed on ramp	35.0	mph
Volume on ramp	470	vph
Length of first accel/decel lane	1080	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	8225	470		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	2164	124		v
Trucks and buses	6	14		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.971	0.935	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	8918	529	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.209 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1341 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6947	9400	No
v_3 or v_{av34}	2538 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	

If yes, v_{12A} = 2567 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	6947	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 15.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.256	
Space mean speed in ramp influence area,	S_R = 59.1	mph
Space mean speed in outer lanes,	S_0 = 59.9	mph
Space mean speed for all vehicles,	S = 59.5	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/11/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-5/SB
Junction:	Osborne Street On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description:	VV.110264

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	9020	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-flow speed on ramp	35.0	mph
Volume on ramp	595	vph
Length of first accel/decel lane	1080	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	9020	595		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	2374	157		v
Trucks and buses	6	10		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.971	0.952	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	9780	658	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.209 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1522 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	7938	9400	No
v_3 or v_{av34}	2879 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		Yes	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	

If yes, v_{12A} = 2912 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	7938	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 19.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.308	
Space mean speed in ramp influence area,	S_R = 57.9	mph
Space mean speed in outer lanes,	S_O = 58.9	mph
Space mean speed for all vehicles,	S = 58.5	mph

Hall & Foreman, Inc.
Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
Volume	TM	20-Sep-13	VV.110264.0000	1 OF 1

STREET : Osborne Street
FREEWAY : I-5

PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION
54
ROUTE
8B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
NORTHBOUND DIVERGE								
Mainline AM	6770	14%	50	6820	14%	610	7430	14%
Mainline MID	7300	14%	50	7350	15%	655	8005	15%
Mainline PM	7295	11%	50	7345	12%	655	8000	12%
Ramp AM	410	8%	50	460	18%	35	495	18%
Ramp MID	525	2%	50	575	11%	45	620	11%
Ramp PM	615	1%	50	665	9%	55	720	9%

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-5/NB
Junction:	Osborne Street Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	6770	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	410	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	6770		410			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1782		108			v
Trucks and buses	14		8			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.935	0.962	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	7625	449	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2913 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6100	9600	No
$v_{FO} = v_F - v_R$	5651	9600	No
v_R	449	2000	No
v_3 or v_{av34}	1593 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	

If yes, v_{12A} = 2913 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2913	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 29.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	D_S = 0.468	
Space mean speed in ramp influence area,	S_R = 56.9	mph
Space mean speed in outer lanes,	S_O = 74.5	mph
Space mean speed for all vehicles,	S = 64.9	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-5/NB
Junction:	Osborne Street Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	7300	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	525	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	7300		525			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1921		138			v
Trucks and buses	14		3			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.935	0.985	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	8222	561	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3184 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6578	9600	No
$v_{FO} = v_F - v_R$	6017	9600	No
v_R	561	2000	No
v_3 or v_{av34}	1697 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 3184 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3184	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 31.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	D_S = 0.478	
Space mean speed in ramp influence area,	S_R = 56.6	mph
Space mean speed in outer lanes,	S_O = 74.1	mph
Space mean speed for all vehicles,	S = 64.4	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-5/NB
Junction:	Osborne Street Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	7295	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	615	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	7295		615			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1920		162			v
Trucks and buses	11		2			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.948	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	8101	654	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3195 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6481	9600	No
$v_{FO} = v_F - v_R$	5827	9600	No
v_R	654	2000	No
v_3 or v_{av34}	1643 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 3195 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3195	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 31.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	D_S = 0.487	
Space mean speed in ramp influence area,	S_R = 56.4	mph
Space mean speed in outer lanes,	S_O = 74.3	mph
Space mean speed for all vehicles,	S = 64.2	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-5/NB
Junction:	Osborne Street Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	6820	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	460	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	6820		460			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1795		121			v
Trucks and buses	14		18			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.935	0.917	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	7681	528	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2977 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6145	9600	No
$v_{FO} = v_F - v_R$	5617	9600	No
v_R	528	2000	No
v_3 or v_{av34}	1584 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 No

If yes, v_{12A} = 2977 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2977	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 29.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	D_S = 0.476	
Space mean speed in ramp influence area,	S_R = 56.7	mph
Space mean speed in outer lanes,	S_O = 74.5	mph
Space mean speed for all vehicles,	S = 64.7	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-5/NB
Junction:	Osborne Street Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	7350	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	575	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	7350		575			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1934		151			v
Trucks and buses	15		12			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.930	0.943	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	8317	642	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3263 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6654	9600	No
$v_{FO} = v_F - v_R$	6012	9600	No
v_R	642	2000	No
v_3 or v_{av34}	1695 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	

If yes, v_{12A} = 3263 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3263	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 32.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	D_S = 0.486	
Space mean speed in ramp influence area,	S_R = 56.4	mph
Space mean speed in outer lanes,	S_O = 74.1	mph
Space mean speed for all vehicles,	S = 64.2	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-5/NB
Junction:	Osborne Street Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	7345	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	665	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	7345		665			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1933		175			v
Trucks and buses	12		9			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.943	0.957	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	8195	732	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3271 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6556	9600	No
$v_{FO} = v_F - v_R$	5824	9600	No
v_R	732	2000	No
v_3 or v_{av34}	1642 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	

If yes, v_{12A} = 3271 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3271	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 32.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	D_S = 0.494	
Space mean speed in ramp influence area,	S_R = 56.2	mph
Space mean speed in outer lanes,	S_O = 74.3	mph
Space mean speed for all vehicles,	S = 64.0	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-5/NB
Junction:	Osborne Street Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	7430	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	495	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	7430		495			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1955		130			v
Trucks and buses	14		18			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.935	0.917	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	8369	568	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3240 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6696	9600	No
$v_{FO} = v_F - v_R$	6128	9600	No
v_R	568	2000	No
v_3 or v_{av34}	1728 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	

If yes, v_{12A} = 3240 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3240	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 32.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	D_S = 0.479	
Space mean speed in ramp influence area,	S_R = 56.6	mph
Space mean speed in outer lanes,	S_O = 74.0	mph
Space mean speed for all vehicles,	S = 64.4	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-5/NB
Junction:	Osborne Street Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	8005	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	620	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	8005		620			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	2107		163			v
Trucks and buses	15		12			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.930	0.943	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	9058	692	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3550 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	7247	9600	No
$v_{FO} = v_F - v_R$	6555	9600	No
v_R	692	2000	No
v_3 or v_{av34}	1848 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	

If yes, v_{12A} = 3550 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3550	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 34.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	D_S = 0.490	
Space mean speed in ramp influence area,	S_R = 56.3	mph
Space mean speed in outer lanes,	S_O = 73.5	mph
Space mean speed for all vehicles,	S = 63.9	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-5/NB
Junction:	Osborne Street Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	8000	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	720	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	8000		720			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	2105		189			v
Trucks and buses	12		9			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.943	0.957	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	8926	792	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3560 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	7141	9600	No
$v_{FO} = v_F - v_R$	6349	9600	No
v_R	792	2000	No
v_3 or v_{av34}	1790 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	

If yes, v_{12A} = 3560 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3560	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 34.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	D_S = 0.499	
Space mean speed in ramp influence area,	S_R = 56.0	mph
Space mean speed in outer lanes,	S_O = 73.7	mph
Space mean speed for all vehicles,	S = 63.7	mph

APPENDIX K – Sediment Transport Capacity Analysis

Final
Detailed Sediment Transport Capacity Analysis for the Arroyo Seco Channel

Devils Gate Reservoir Sediment Removal and Management Project

January 7, 2013
Prepared for:
Los Angeles County Flood Control District
900 South Fremont Avenue, 2nd Floor
Alhambra, CA 91803-1331

BUREAU VERITAS NORTH AMERICA, INC.
10620 Treena Street, Suite 200
San Diego, CA 92131
(858) 451-6100
www.us.bureauveritas.com

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Engineer's Certification

This report was prepared under the supervision of Charles S. Mohrlock, a Registered Civil Engineer in the State of California. The Registered Civil Engineer attests to the technical information contained herein and the engineering data upon which recommendations, conclusions, and decisions are based.

Charles S. Mohrlock, M.S., P.E., CFM
R.C.E. Number 78322

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Abbreviations

ac-ft – acre-feet

cfs – cubic feet per second

fps – feet per second

Acronyms

HEC-HMS – Hydrologic Engineering Center – Hydrologic Modeling System

HEC-RAS – Hydrologic Engineering Center River Analysis System

LACFCD - Los Angeles County Flood Control District

LIDAR – Light Detection and Ranging

WMS – Watershed Modeling System

Executive Summary

This Sediment Transport Capacity Analysis for the Arroyo Seco Channel has been prepared per the request of the Los Angeles County Flood Control District (LACFCD) in order to determine if natural storm flows anticipated to occur over a 3-5 year time period are capable of conveying accumulated sediment from behind the Devils Gate Dam, down the entire length of the Arroyo Seco Channel, to the Los Angeles River confluence.

Per direction from the LACFCD, three different sediment transport scenarios, referred to herein as Conditions 1, 2, and 3, have been analyzed within the scope of this report. All three of the conditions analyzed have been modeled with identical Sediment Transport Events which discharge stormwater outflows through one fully opened 5'x5' sluice gate and are comprised of 9.5 months of historical inflow data extending from January 1, 2006 through October 14, 2006; however, the subsequent Sediment Flushing Event, which discharges stormwater outflows through two fully opened 7'x10' slide gates, varies for each condition as described below.

The Condition 1 Sediment Flushing Event represents the anticipated long-term conditions that can be expected to occur if historically typical stormwater flows are utilized to flush sediment deposition from within the Channel under typical Dam operating conditions, which are comprised of 6 months of historical inflows extending from October 15, 2006 through, April 15, 2007. The results of this analysis indicate that the Condition 1 Sediment Flushing Event is not capable of flushing excess sediment down the length of the Channel.

The Condition 2 Sediment Flushing Event represents an idealized sediment flushing scenario that utilizes a constant flow rate of 4,900 cfs, which corresponds with the maximum possible controlled stormwater flow rate of that can be discharged through the Dam's two fully open 7'x10' slide gates. The results of this analysis indicate that the Condition 2 Sediment Flushing Event is capable of flushing excess sediment down the entire length of the Channel provided that this constant maximum flow rate of 4,900 cfs is maintained for a duration of 3 days; however, maintaining these flow characteristics requires unrealistic reservoir inflow rates and potentially hazardous Dam operating conditions.

The Condition 3 Sediment Flushing Event represents a theoretical sediment flushing scenario that utilizes a constant flow rate of 2,500 cfs, which corresponds with the minimum effective sediment flushing stormwater flow rate that was determined by this analysis. The results of this analysis indicate that a constant stormwater flow rate of no less than 2,500 cfs is capable of providing complete flushing of the Channel in approximately 6 days; however, maintaining these flow characteristics requires unrealistic reservoir inflow rates and potentially hazardous Dam operating conditions.

Overall, the sediment transport characteristics determined within the scope of this analysis indicate that historically typical stormwater flows available to this system are not capable of producing the conditions necessary to provide a complete and effective cycle of sediment transport and sediment flushing.

1 Introduction

1.1 Purpose

This Sediment Transport Capacity Analysis for the Arroyo Seco Channel has been prepared per the request of the Los Angeles County Flood Control District (LACFCD) in order to determine if natural storm flows anticipated to occur over a 3-5 year time period are capable of conveying accumulated sediment from behind the Devils Gate Dam, down the entire length of the Arroyo Seco Channel, to the Los Angeles River confluence.

Characteristics of sediment transport occurring upstream of the Dam outlet are not analyzed within the scope of this report; instead, per the direction of the LACFCD, the assumption that the Sediment Transport and Sediment Flushing Events contain sediment concentrations of 5% and 0% respectively has been made. The natural storm flows utilized for this analysis are comprised of 15.5 months of historical Devils Gate Dam inflow data that are categorized into two different events: the Sediment Transport Event, and the Sediment Flushing Event which are further discussed in Sections 2.1.1 and 2.1.2 of this report.

Analysis with respect to the determination of flow rates occurring at the Devils Gate Dam outlet as well as a general discussion of the models and methodologies utilized within this analysis are discussed herein. For a more detailed analysis of sediment transport characteristics of the Arroyo Seco Channel, including sediment deposition profile maps, plan view maps, and cross sections, reference the "Modeling of Sluicing and Flushing Conditions in the Arroyo Seco Channel Below the Devil's Gate Dam" report by Chang Consultants dated January 7, 2013 in Appendix B of this report.

This analysis utilizes information from several sources including: LACFCD provided historical Devils Gate Reservoir inflow data at hourly intervals for a 15.5 month period of time (January 1, 2006 through April 15, 2007); LACFCD provided Devils Gate Dam elevation-storage-discharge information for the sluice gate and slide gates; excerpts from LACFCD provided Devils Gate draft soils report by Leighton, dated October, 2011; excerpts from sediment gradation information obtained through NV5 soil samples performed on October 31, 2012; LACFCD provided LIDAR topographic information with a fly date of January 12, 2006; and the "Final Sediment Transport Capability Analysis For the Arroyo Seco Channel" report prepared by Bureau Veritas North America, Inc. dated August 3, 2012.

1.2 Project Description

The Devils Gate Dam (Dam) is located in the Los Angeles River Watershed in the City of Pasadena, CA. Situated immediately north of Interstate Highway 210, near the Rose Bowl Stadium, the Dam separates the upper and lower watersheds of the Arroyo Seco Channel and provides significant storage capacity for stormwater runoff originating north of the Dam in the San Gabriel Mountains.

Figure 1: Vicinity Map

The Dam was the first flood control facility built by the Los Angeles County Flood Control District and was completed in 1920 for flood control and groundwater recharge purposes. In 1971, the Dam was damaged by the Sylmar earthquake and was subsequently renovated and repaired in 1997 in order to perform its primary role of flood control for the downstream communities of Pasadena, South Pasadena, and Los Angeles. The Arroyo Seco Wash flows through the reservoir, now called Hahamongna Watershed Park, and proceeds through the outlet of the Dam.

In 2009, the Station fire burned through more than 160,000 acres of Los Angeles County. Approximately 68% of the 31.9 square mile Arroyo Seco Channel watershed tributary to the Devils Gate facility was burned during this event. Due to the denuding of this large natural tributary area, large sediment loads (in excess of 1 million cubic yards) were deposited within the reservoir area and adjacent Hahamongna Watershed Park.

Due to the volume of sediment deposited within the Dam reservoir, the Dam discharge structures are now under threat of becoming covered with sediment. These sediment deposits have also allowed for native and non-native vegetation to establish itself within the Dam reservoir.

The Devils Gate Dam directly discharges runoff to the Arroyo Seco Channel. The Channel is a natural creek for several hundred feet downstream of the Devils Gate Dam; however, this rapidly converts to an engineered concrete lined flood control Channel which was constructed in 1935. The Arroyo Seco Channel continues to flow in a southerly direction through Pasadena, meandering through Brookside Park and passed the Rose Bowl Stadium, ultimately draining to the Los Angeles River located approximately nine (9) miles downstream of Devils Gate Dam. The Arroyo Seco Channel lower

watershed is approximately 95% urbanized with a large amount of developed areas located adjacent to the Arroyo Seco Channel.

In an effort to restore the flood control capacity of the Dam, while minimizing negative excavation and hauling related impacts to the Hahamongna Watershed Park, the LACFCD is interested in exploring the feasibility of sluicing excess sediment out of the reservoir and down the entire length of the Arroyo Seco Channel with natural storm flows occurring over a 3-5 year period.

A previous analysis performed by Bureau Veritas North America, Inc., dated August 3, 2012, utilized HEC-HMS, WMS, HEC-RAS, and FLUVIAL-12 models to explore one scenario which made the assumption that mechanical agitation of sediment near the Dam outlet would produce a 10% sediment concentration in natural stormwater flows leaving the Dam outlet. A combination of events including a typical storm event (150 cfs, 24 hr event) and a maximum storm event (2-year, 4-day storm) were utilized to transport then flush sediment down the length of the Arroyo Seco Channel. The results from the previous study indicated that the majority of the sediment introduced into stormwater flows would settle out and deposit along the Arroyo Seco Channel, particularly in the natural upstream reaches of the Channel, prior to reaching the Los Angeles River confluence.

In an effort to explore additional sediment transport methods that may be utilized to naturally remove excess sediment from behind the Dam, this analysis will create models for three different sluicing scenarios, as specified by the LACFCD and further described in Section 3 of this report, which analyze sediment transport characteristics over a much longer time period of 15.5 months and consider flows derived from historical data for the years of 2006 and 2007. This longer window of analysis will allow sediment transport trends to be analyzed more dynamically than was possible for the previously modeled 1-day and 4-day durations. Additionally, a lower sediment concentration of 5.0% will be assumed during the Sediment Transport Event, as the previously performed analysis indicated that a 10% concentration resulted in sediment deposition along the Channel.

2 Sediment Transport Capacity Methodology

2.1 Devils Gate Dam Characteristics

In its current impacted condition, the Devils Gate Dam is not providing the level of flood control that it was originally designed for. In an effort to restore the Dam's flood control capacity, the LACFCD is exploring the feasibility of sluicing accumulated sediment out of the Devils Gate Reservoir and down the Arroyo Seco Channel utilizing natural storm flows anticipated to occur over a period of 3-5 years.

LACFCD has provided the Consultant with historical Devils Gate Reservoir inflow data at hourly intervals for a 15.5 month period of time extending from January 1, 2006 through April 15, 2007. Figure 2 below represents this data graphically while extensive tabular format data is included in Appendix A.3 of this report. These flows are representative of a typical rainy season cycle and may commonly occur over the next 3-5 years. During this time period, the average and maximum observed reservoir inflow rates were 8.4 and 1,469 cfs respectively, and the total reservoir inflow volume was 8,600,000 cubic yards.

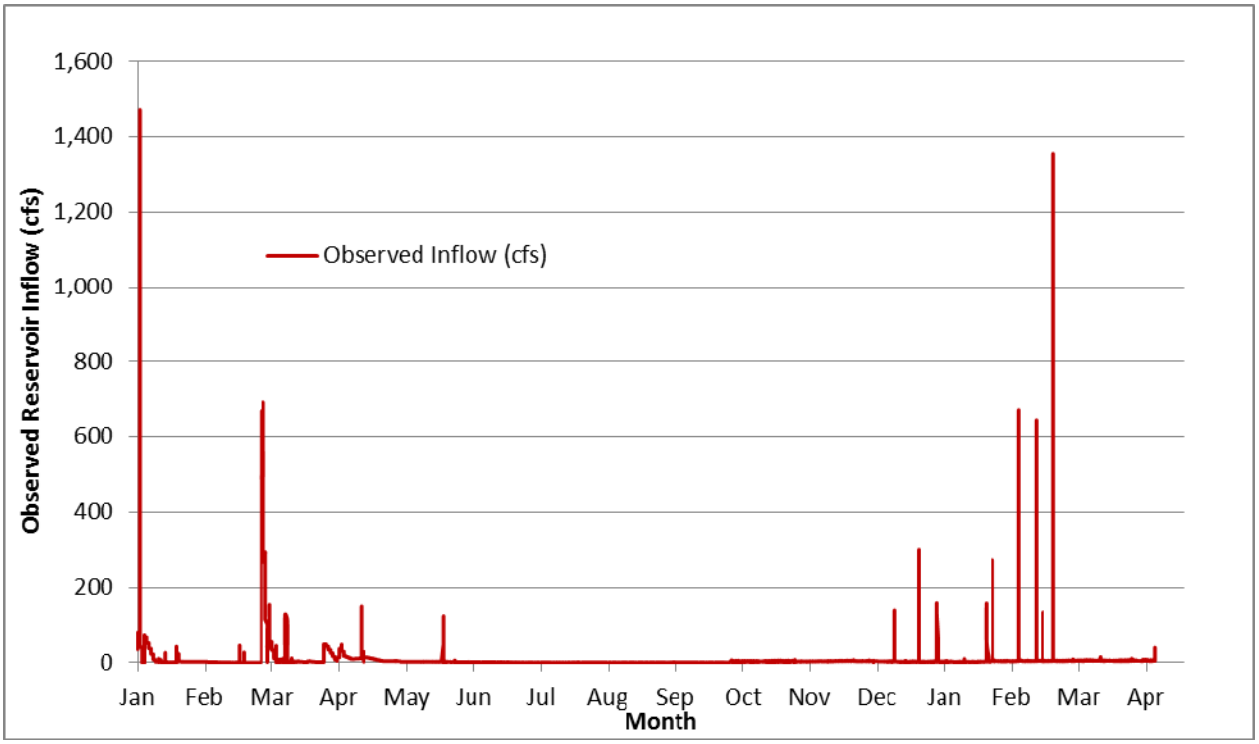

Figure 2: Graph of LACFCD Provided Reservoir Inflow Data from January 1, 2006 through April 15, 2007

This LACFCD provided inflow data and elevation-storage-discharge relationships for the Dam have been modeled in HEC-HMS software in order to produce hydrographs for three different scenarios as further described in Section 3 of this report. Regardless of the scenario being considered, all Dam outflows modeled in this analysis can be categorized as either Sediment Transport Event flows or Sediment Flushing Event flows as further described in Sections 2.1.1 and 2.1.2.

2.1.1 Sediment Transport Event

The Sediment Transport Event is used to sluice sediment deposits from within the Reservoir and is derived from observed Dam inflow rates that occurred over the 9.5 month time period extending from January 1, 2006 through October 14, 2006. These observed inflow rates have been routed through the Dam under the assumption that the Dam's sluice gate is fully opened to a width of 5' throughout the entire Sediment Transport Event. Figure 3 below illustrates the elevation-storage-discharge relationship for the Dam during the Sediment Transport Event as determined per LACFCD provided information included in Appendix A.1 of this report. During the Sediment Transport Event, it is assumed that the necessary Dam operations will occur to introduce a sediment concentration of 5.0% into stormwater flows discharging from the Dam outlet.

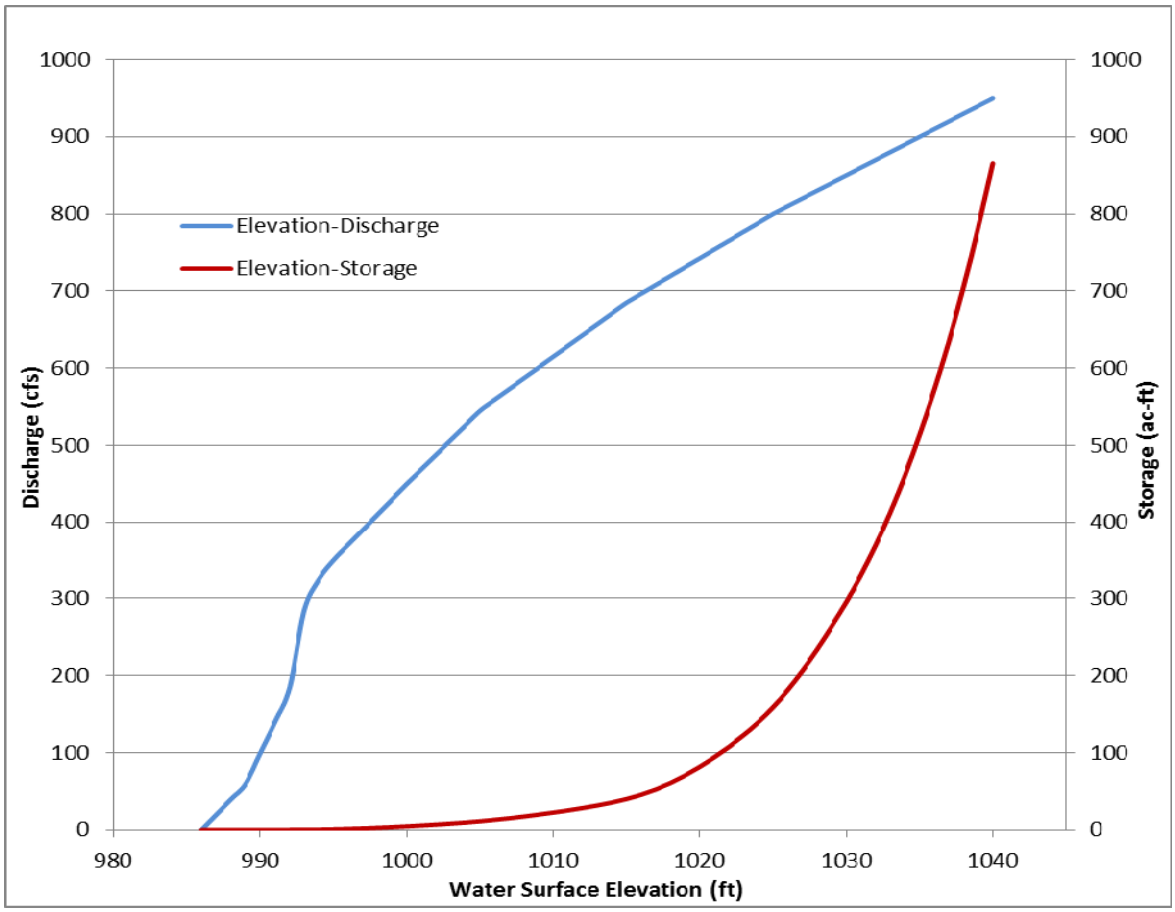

Figure 3: Elevation-Storage-Discharge Relationship for Sediment Transport Event – Fully Opened 5'x5' Devils Gate Dam Sluice Gate

2.1.2 Sediment Flushing Event

The Sediment Flushing Event is used to flush sediment deposits associated with the previously executed Sediment Transport Event down the entire length of the Channel. Per direction by the LACFCD, this analysis will consider three different Sediment Flushing Event scenarios as further described in Section 3 of this report. Depending on the scenario being analyzed, flows associated with the Sediment Flushing Event are derived from observed Dam inflow rates that occurred over the 6 month time period extending from October 15, 2006 through April 15, 2007, or are idealized flow rates developed to provide insight on what conditions may produce favorable Sediment Flushing characteristics. The observed inflow rates have been routed through the Dam under the assumption that the Dam's sluice gate is fully closed while two 7'x10' slide gates are fully opened throughout the duration of the Sediment Flushing Event. Figure 4 below illustrates the elevation-storage-discharge relationship for the Dam during the Sediment Flushing Event as determined per LACFCD provided information included in Appendix A.1. During the Sediment Flushing Event, it is assumed that the sediment concentration at the Dam outlet is 0.0%.

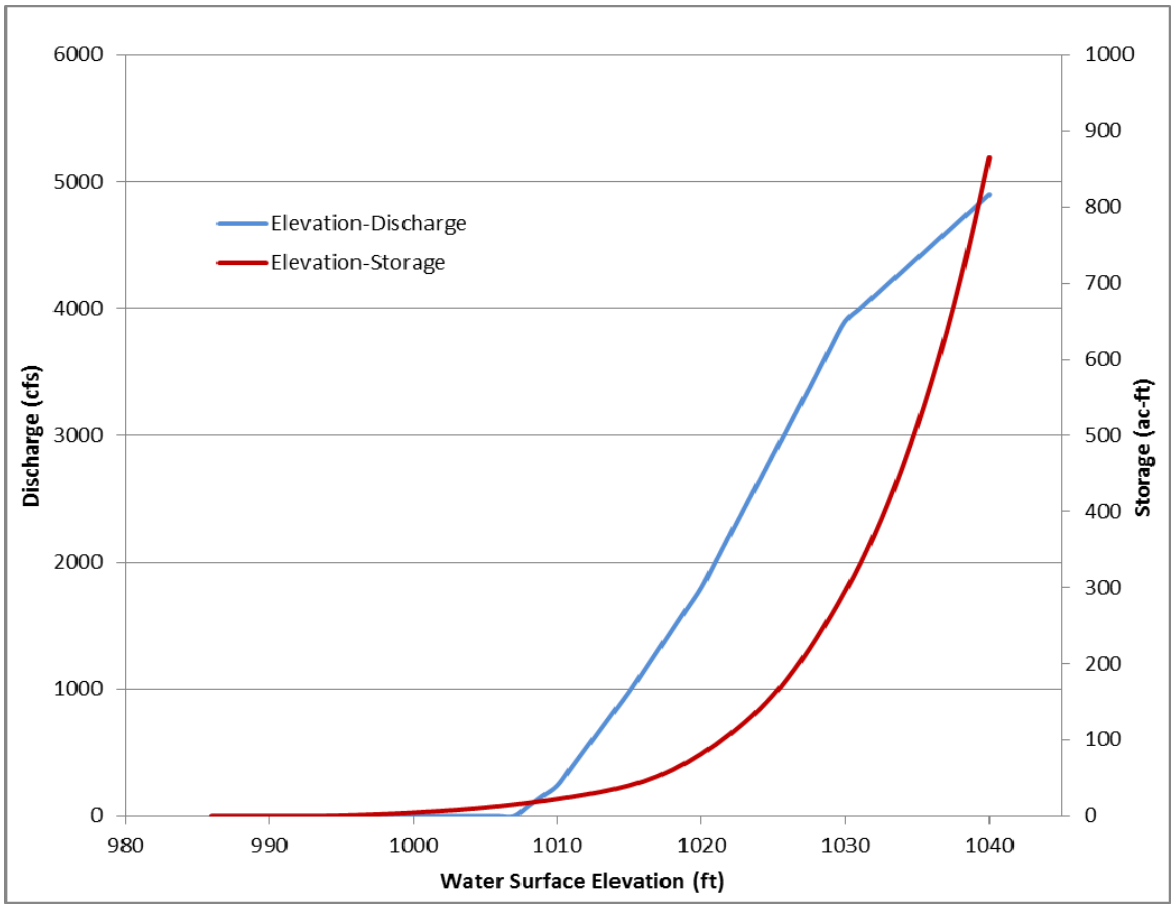

Figure 4: Elevation-Storage-Discharge Relationship for Sediment Flushing Event – Two Fully Opened 7'x10' Slide Gates

2.2 Sediment Gradation Characteristics

Sediment gradation characteristics for the sediment deposits located within the Reservoir have been determined per excerpts from the Draft Soils Report prepared by Leighton, dated October 2011. Sediment gradation characteristics for the native sediment located in the two natural downstream areas of the Arroyo Seco Channel have been determined per sediment gradation information obtained through soil sampling performed by NV5 Testing Engineers on October 31, 2012. The soil sampling information for these locations is included in Appendix A.2 of this report.

2.3 Arroyo Seco Channel Characteristics

Geometric characteristics of the Arroyo Seco Channel utilized in this analysis have been derived from the HEC-RAS model previously developed in the Final Arroyo Seco Channel Hydraulic Analysis, prepared by Bureau Veritas, dated April 25, 2012. However, the model reflected in the previous report omitted approximately 1,200' of the most upstream natural portion of the Arroyo Seco Channel in order to allow large stormwater flows associated with the Capital Storm Event to normalize prior to entering the domain of the HEC-RAS model. As this natural portion of the Channel adjacent to the Dam now plays a key role in the sediment transport analysis performed within the scope of this report, the previous HEC-RAS model has been modified to include geometric data for this upstream portion of the Channel.

Cross sections for this portion of the Channel have been added to the HEC-RAS model through examination of LACFCD provided 2-foot contour LIDAR topographic information with a fly date of January 12, 2006. Per VERTCON software and conversion maps provided on the National Geodetic Survey website, the datum related elevation differences between the HEC-RAS model (NGVD29) and LIDAR (NAVD88) elevations range from 2.572 to 2.625 feet for the Arroyo Seco Channel project area. Therefore, all LIDAR elevations entered into the HEC-RAS model have been reduced by 2.6' in order to reflect the conversion from NAVD88 to NGVD29.

This analysis has been performed under the assumption that the natural stormwater flows occurring in the Arroyo Seco Channel over the period of time being analyzed are governed entirely by the conditions at the outlet of the Devils Gate Dam. Due to the extremely long duration of analysis, and the subsequent amount of hourly flow data, conventional routing methods used to confluence the Dam outflows with additional downstream tributaries as the Channel extends downstream were not a feasible option for this analysis. Omitting the effects of additional downstream inflows into the Channel may reduce the sediment transport capacity of the Channel, particularly in the most downstream reaches of the Channel as the area of the additional tributaries increases. However, omitting these effects will have a negligible effect on the sediment transport capacity of the Channel in the most upstream reaches, such as in the most upstream natural reach of the Channel where additional tributary areas are negligible and stormwater flow rates are entirely governed by the Dam outflow. Given that the previously performed sediment transport capacity analysis indicated a large volume of sediment would settle out in this natural upstream portion of the Channel, the results presented herein are anticipated to produce an

accurate model of the sediment transport characteristics of the Channel, particularly for the previously identified problem areas.

3 Sediment Transport Scenarios

Per direction from the LACFCD, three different sediment transport scenarios, referred to herein as Conditions 1, 2, and 3, have been analyzed within the scope of this report. All three of the conditions analyzed have been modeled with identical Sediment Transport Events (9.5 month duration of historical inflows from January 1, 2006 through October 14, 2006); however, the subsequent Sediment Flushing Event for each condition varies. A summary of these conditions is presented in Table 1 below and a more detailed discussion of the conditions is included in the sections that follow.

Condition Modeled	Sediment Transport Event			Sediment Flushing Event		
	Dates	Flow	Sediment Concentration	Dates	Flow	Sediment Concentration
Condition 1	January 1, 2006 through October 14, 2006	Historical	5.0%	October 15, 2006 through April 15, 2007	Historical	0.0%
Condition 2	January 1, 2006 through October 14, 2006	Historical	5.0%	October 15, 2006 through October 17, 2006	4,900 cfs	0.0%
Condition 3	January 1, 2006 through October 14, 2006	Historical	5.0%	October 15, 2006 through October 20, 2006	2,500 cfs	0.0%

Table 1: Summary of Dam Outflow Conditions Analyzed

3.1 Condition 1 – Historical Sediment Flushing Scenario: Typical Dam Outflow

The Condition 1 analysis ran the Sediment Transport Event (9.5 month duration from January 1, 2006 through October 14, 2006) assuming a 5.0% sediment concentration, and then ran the Sediment Flushing Event (6 month duration from October 15, 2006 through April 15, 2007) assuming a 0% sediment concentration subsequent to the Sediment Transport Event. All flow rates associated with the Sediment Transport and Sediment Flushing Events for Condition 1 have been generated by routing LACFCD provided historical inflow data through the Reservoir under the appropriate Dam operating conditions, as described in Sections 3.1.1 and 3.1.2, resulting in the Dam conditions illustrated in Figure 5 below.

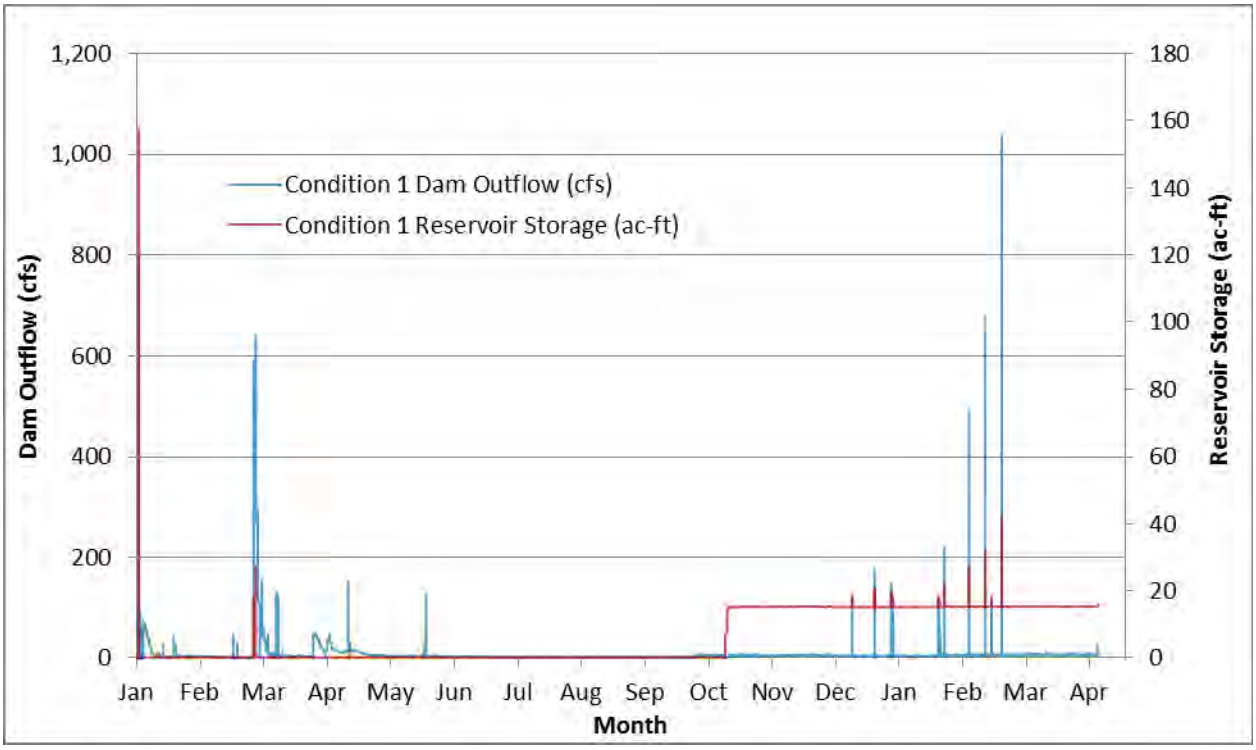

Figure 5: Condition 1 Dam Outflow and Storage

The Condition 1 analysis reflects the anticipated long-term conditions that can be expected to occur if historically typical stormwater flows are utilized to remove excess sediment deposition from within the reservoir and flush it down the length of the Channel under typical Dam operating conditions.

3.1.1 Condition 1 Sediment Transport Event

The Condition 1 Sediment Transport Event is used to sluice sediment deposits from behind the Dam through utilization of naturally occurring Dam inflow rates that were observed over the 9.5 month time period extending from January 1, 2006 through October 14, 2006. The corresponding Dam outflow rates have been determined by routing the historically observed inflows through the Dam utilizing the LACFCD provided elevation-storage-discharge relationship assuming that the sluice gate is fully opened to a width of 5'. During the Condition 1 Sediment Transport Event, it is assumed that the necessary Dam operations will occur to introduce a sediment concentration of 5.0% into stormwater flows discharging from the Dam outlet. Based on the historical stormwater inflow rates provided, a 5.0% sediment concentration in the Dam outflows results in a cumulative total of approximately 263,000 cubic yards of sediment that will be removed from the reservoir during the Sediment Transport Event.

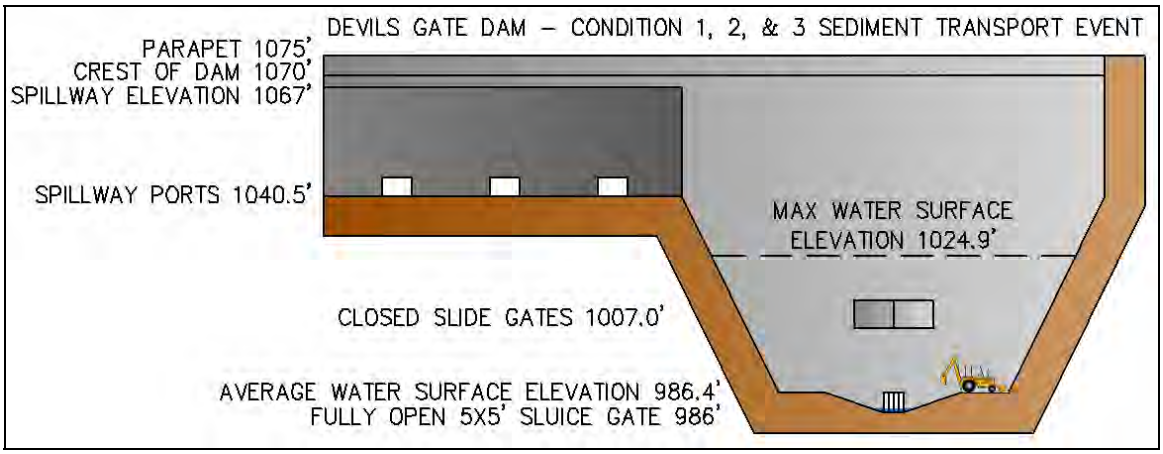

Figure 6: Condition 1 Sediment Transport Event

It should be noted that the average water surface elevation occurring behind the Dam during the Condition 2 Sediment Transport Event is a very shallow 986.4'. However, during the peak events from the 2006-2007 data, a much higher maximum water surface elevation of 1024.9' is anticipated. Any activities occurring within the reservoir area during these events, such as mechanical introduction of sediment into stormwater flows, should only be executed with appropriate caution.

3.1.2 Condition 1 Sediment Flushing Event

The Condition 1 Sediment Flushing Event is used to flush sediment deposits associated with the previously executed Sediment Transport Event down the entire length of the Channel through utilization of naturally occurring Dam inflow rates that were observed over the 6 month time period extending from October 15, 2006 through April 15, 2007. The corresponding Dam outflow rates have been determined by routing the historically observed flows through the Dam utilizing the LACFCD provided elevation-storage-discharge relationship for the two, fully opened 7'x10' slide gates. The sluice gate will remain closed during this process and it is assumed that the sediment concentration at the Dam outlet is 0.0%.

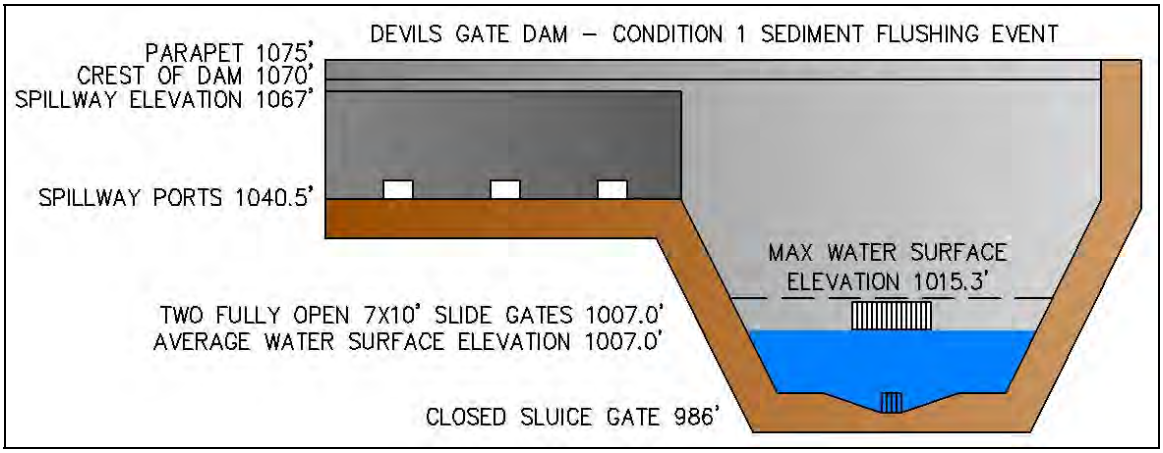

Figure 7: Condition 1 Sediment Flushing Event

It should be noted that the average and maximum water surface elevations occurring behind the Dam during the Condition 1 Sediment Flushing Event are 1007.0' and 1015.3' respectively. Based on the historical 2006-2007 inflow data utilized for the Condition 1 Sediment Flushing Event, approximately 4,000,000 cubic yards of stormwater inflow are anticipated during the 6 month Sediment Flushing period. Upon completion of the Condition 1 Sediment Transport and Sediment Flushing Events, approximately 20,000 cubic yards of sediment will be effectively transported down the length of the Channel and approximately 243,000 cubic yards will be deposited along the Channel.

A summary of results produced by the Condition 1 scenario is included in Section 3.4 of this report.

3.2 Condition 2 – Idealized Sediment Flushing Scenario: Maximum Dam Outflow

The Condition 2 analysis ran the Sediment Transport Event (9.5 month duration from January 1, 2006 through October 14, 2006) assuming a 5.0% sediment concentration, and then ran the Sediment Flushing Event with a constant flow rate of 4,900 cfs for a duration of 3 days assuming a 0% sediment concentration subsequent to the Sediment Transport Event. Flow rates associated with the Sediment Transport Event for Condition 2 have been generated by routing LACFCD provided historical inflow data through the Reservoir under the appropriate Dam operating conditions as described Section 3.2.1. Flow rates associated with the Sediment Flushing Event for Condition 2 have been generated by routing idealized flows through the Reservoir under the Dam operating conditions described in 3.3.2. A constant flow rate of 4,900 cfs is assumed throughout the entire duration of the Condition 2 Sediment Flushing Event which represents the maximum, idealized flow rate that can be discharged through the Dam's two fully opened slide gates. A duration of 3 days was selected for this analysis as it was found to correspond with the minimum amount of time necessary to provide complete flushing of the Channel at this flow rate. The resulting Condition 2 Dam conditions are illustrated in Figure 8 below

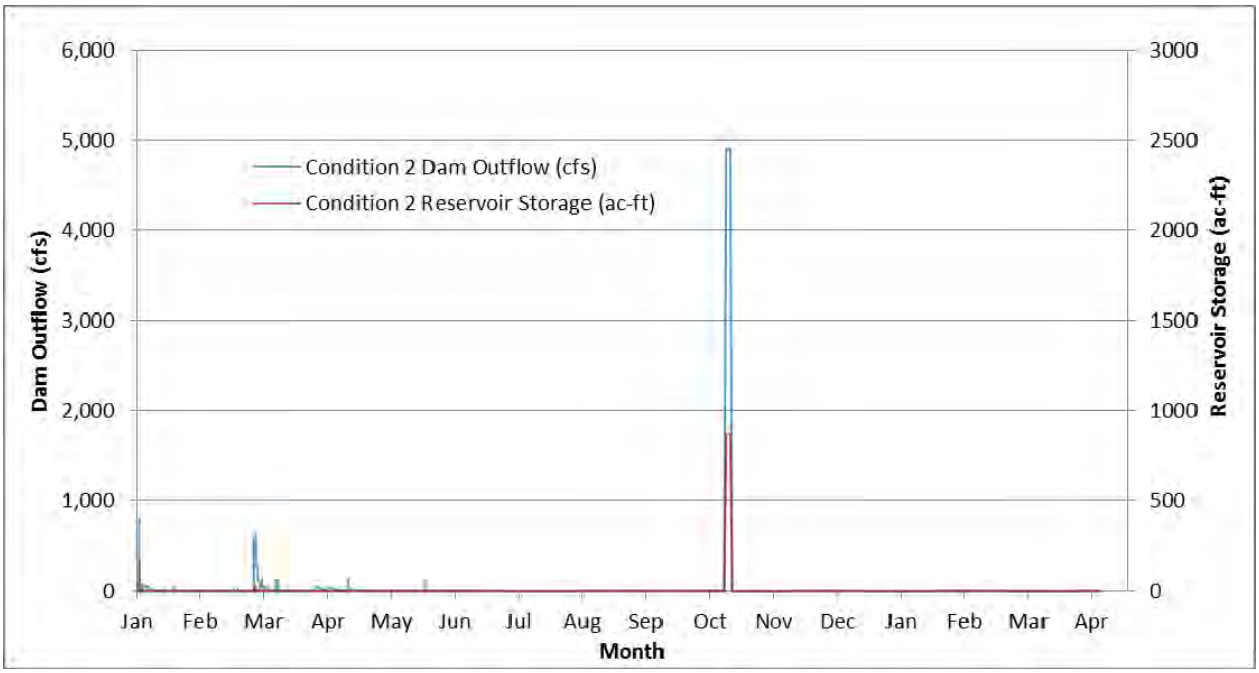

Figure 8: Condition 2 Dam Outflow and Storage

The Condition 2 analysis reflects the anticipated long-term conditions that can be expected to occur if historically typical stormwater flows are utilized to remove excess sediment deposition from within the reservoir and then a constant flow rate of 4,900 cfs occurring over a duration of 3 days is utilized to flush remaining sediment down the length of the Channel.

3.2.1 Condition 2 Sediment Transport Event

The Condition 2 Sediment Transport Event is used to sluice sediment deposits from behind the Dam through utilization of naturally occurring Dam inflow rates that were observed over the 9.5 month time period extending from January 1, 2006 through October 14, 2006. The corresponding Dam outflow rates have been determined by routing the historically observed inflows through the Dam utilizing the LACFCD provided elevation-storage-discharge relationship assuming that the sluice gate is fully opened to a width of 5'. During the Condition 2 Sediment Transport Event, it is assumed that the necessary Dam operations will occur to introduce a sediment concentration of 5.0% into stormwater flows discharging from the Dam outlet. Based on the historical stormwater inflow rates provided, a 5.0% sediment concentration in the Dam outflows results in a cumulative total of approximately 263,000 cubic yards of sediment that will be removed from the reservoir during the Sediment Transport Event.

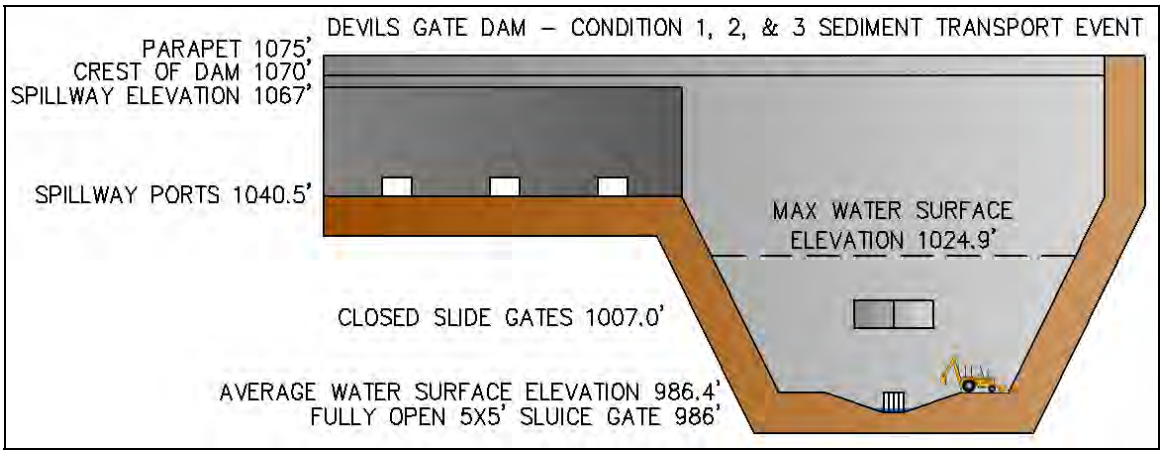

Figure 9: Condition 2 Sediment Transport Event

It should be noted that the average water surface elevation occurring behind the Dam during the Condition 2 Sediment Transport Event is a very shallow 986.4'. However, during the peak events from the 2006-2007 data, a much higher maximum water surface elevation of 1024.9' is anticipated. Any activities occurring within the reservoir area during these events, such as mechanical introduction of sediment into stormwater flows, should only be executed with appropriate caution.

3.2.2 Condition 2 Sediment Flushing Event

The Condition 2 Sediment Flushing Event is used to flush sediment deposits associated with the previously executed Sediment Transport Event down the entire length of the Channel through utilization of an idealized Dam outflow condition that is not based on historical Dam inflow data. The idealized Dam outflow condition utilized for the Condition 2 Sediment Flushing Event represents the maximum discharge anticipated to discharge through two fully opened 7'x10' slide gates. The sluice gate will remain closed during this process and it is assumed that the sediment concentration at the Dam outlet is 0.0%. The constant flow rate of 4,900 cfs associated with the Condition 2 Sediment Flushing Event represents the maximum, idealized flow rate that can be discharged through the Dam's two fully opened slide gates as determined per LACFCD provided elevation-storage-discharge relationships located in Appendix A.1. A duration of 3 days was selected for this analysis as it was found to correspond with the minimum amount of time necessary to provide complete flushing of the Channel at this flow rate.

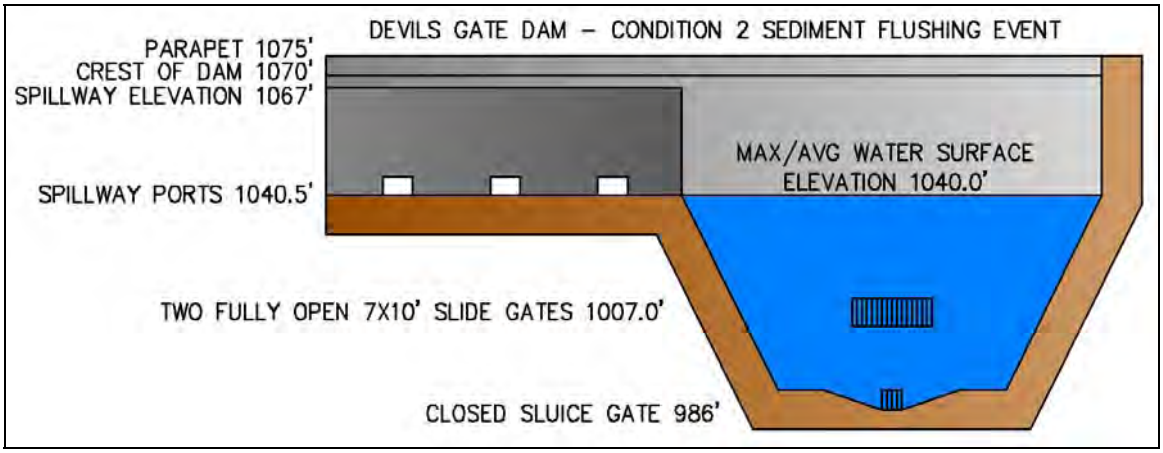

Figure 10: Condition 2 Sediment Flushing Event

It should be noted that, in order to produce a constant Dam outflow rate of 4,900 cfs, the water surface elevation behind the Dam must remain at 1040.0' with the two 7'x10' slide gates fully opened. With a constant Dam outflow of 4,900 cfs, it was determined that complete flushing of the Channel was feasible in 3 days. In order to produce an event of this magnitude, approximately 47,000,000 cubic yards of stormwater inflow would be required over the 6 month Sediment Flushing Event period, which is approximately 12 times greater than the stormwater volume indicated by the historical 2006-2007 inflow data.

A summary of results produced by the Condition 2 scenario is included in Section 3.4 of this report.

3.3 Condition 3 – Idealized Sediment Flushing Scenario: Minimum Effective Sediment Flushing Flow Rate

The Condition 3 analysis ran the Sediment Transport Event (9.5 month duration from January 1, 2006 through October 14, 2006) assuming a 5.0% sediment concentration, and then ran the Sediment Flushing Event with a constant flow rate of 2,500 cfs for a duration of 6 days assuming a 0% sediment concentration subsequent to the Sediment Transport Event. Flow rates associated with the Sediment Transport Event for Condition 3 have been generated by routing LACFCD provided historical inflow data through the Reservoir under the appropriate Dam operating conditions as described Section 3.3.1. Flow rates associated with the Sediment Flushing Event for Condition 3 have been generated by routing idealized flows through the Reservoir under the Dam operating conditions described in 3.3.2. A constant flow rate of 2,500 cfs is assumed throughout the entire duration of the Condition 3 Sediment Flushing Event which corresponds with the minimum effective sediment flushing stormwater flow rate that was determined by the analysis in Appendix B of this report. A duration of 6 days was selected for this analysis as it was found to correspond with the minimum amount of time necessary to provide complete flushing of the Channel at this flow rate. The resulting Condition 3 Dam conditions are illustrated in Figure 11 below.

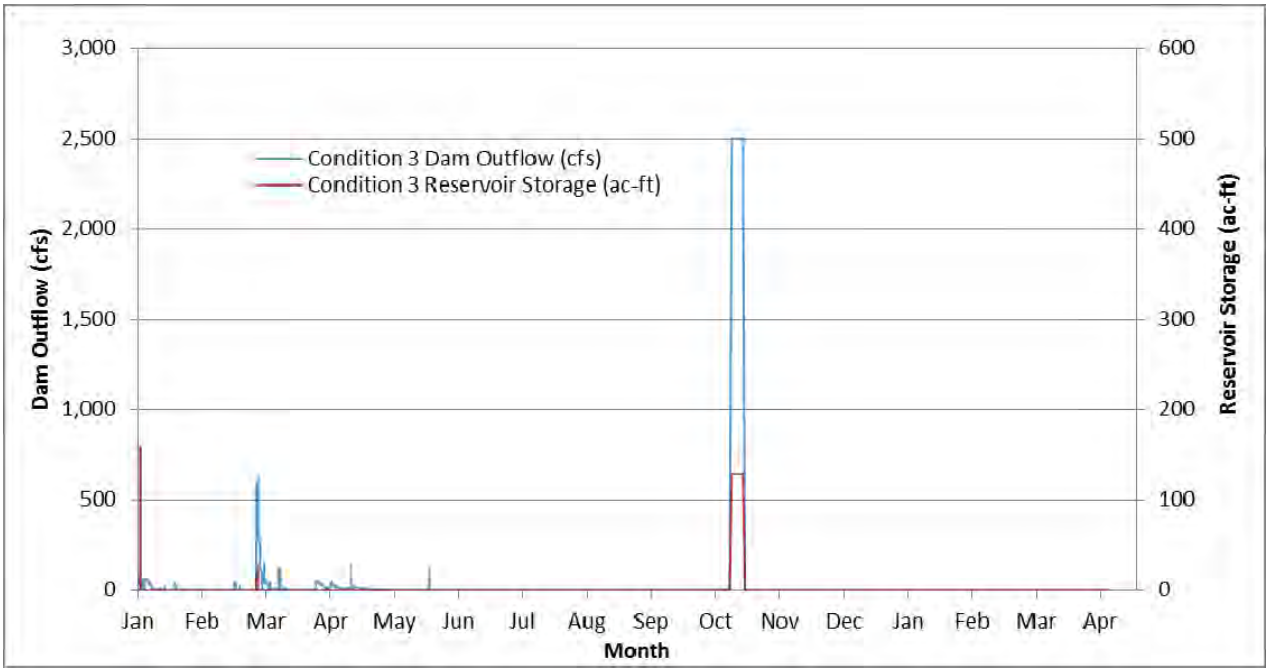

Figure 11: Condition 3 Dam Outflow and Storage

The Condition 3 analysis reflects the anticipated long-term conditions that can be expected to occur if historically typical stormwater flows are utilized to remove excess sediment deposition from within the reservoir and then a minimum recommended constant flushing rate of 2,500 cfs occurring over a duration of 6 days is utilized to flush remaining sediment down the length of the Channel.

3.3.1 Condition 3 Sediment Transport Event

The Condition 3 Sediment Transport Event is used to sluice sediment deposits from behind the Dam through utilization of naturally occurring Dam inflow rates that were observed over the 9.5 month time period extending from January 1, 2006 through October 14, 2006. The corresponding Dam outflow rates have been determined by routing the historically observed inflows through the Dam utilizing the LACFCD provided elevation-storage-discharge relationship assuming that the sluice gate is fully opened to a width of 5'. During the Condition 3 Sediment Transport Event, it is assumed that the necessary Dam operations will occur to introduce a sediment concentration of 5.0% into stormwater flows discharging from the Dam outlet. Based on the historical stormwater inflow rates provided, a 5.0% sediment concentration in the Dam outflows results in a cumulative total of approximately 263,000 cubic yards of sediment that will be removed from the reservoir during the Sediment Transport Event.

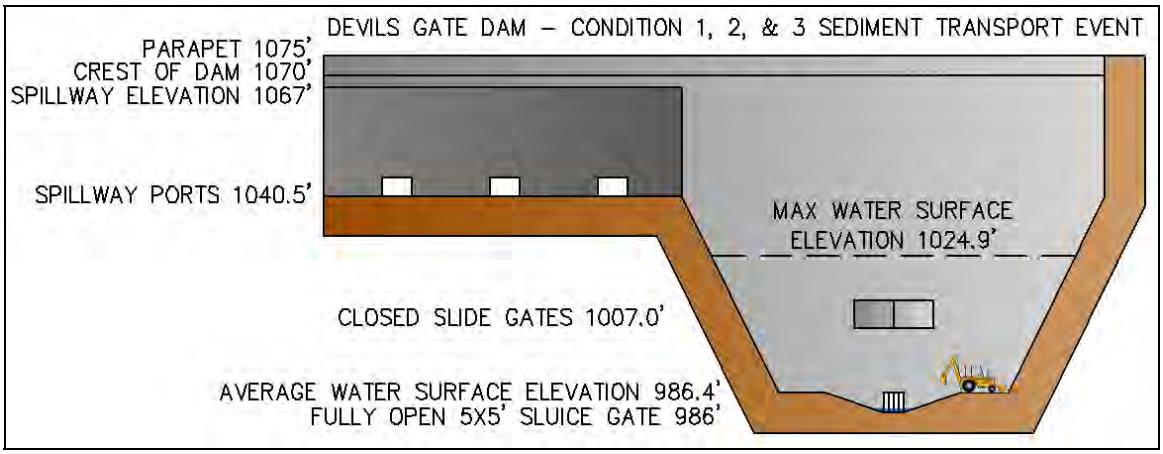

Figure 12: Condition 3 Sediment Transport Event

It should be noted that the average water surface elevation occurring behind the Dam during the Condition 2 Sediment Transport Event is a very shallow 986.4'. However, during the peak events from the 2006-2007 data, a much higher maximum water surface elevation of 1024.9' is anticipated. Any activities occurring within the reservoir area during these events, such as mechanical introduction of sediment into stormwater flows, should only be executed with appropriate caution.

3.3.2 Condition 3 Sediment Flushing Event

The Condition 3 Sediment Flushing Event is used to flush sediment deposits associated with the previously executed Sediment Transport Event down the entire length of the Channel through utilization of an idealized Dam outflow condition that is not based on historical Dam inflow data. The idealized Dam outflow condition utilized for the Condition 3 Sediment Flushing Event represents the minimum Dam outflow recommended for effective use of Channel flushing operations. Per the "Modeling of Sluicing and Flushing Conditions in the Arroyo Seco Channel Below the Devil's Gate Dam" report by Chang Consultants January 7, 2013, a minimum constant flow rate of 2,500 cfs occurring over a duration of 6 days may be capable of providing complete flushing of the Channel. This flow rate can be discharged through the Dam's two fully opened slide gates as determined per LACFCD provided elevation-storage-discharge relationships located in Appendix A.1.

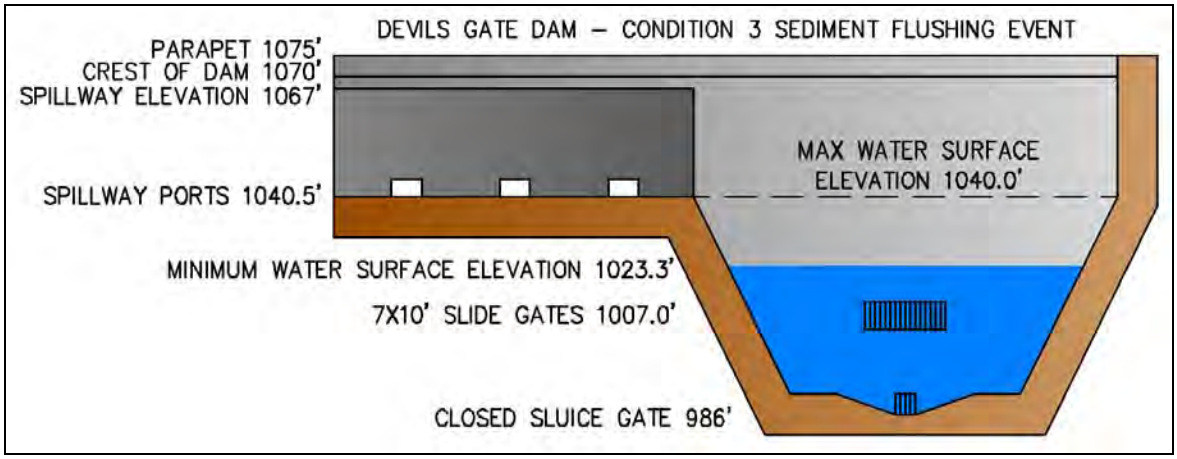

Figure 13: Condition 3 Sediment Flushing Event

It should be noted that, in order to produce a constant minimum Dam outflow rate of 2,500 cfs, water surface elevations behind the Dam will need to range from 1023.3' with the two 7'x10' slide gates fully opened, or will need to remain at an elevation of 1040.0' with the slide gates partially closed, for a total duration of 6 days. In order to produce an event of this magnitude, approximately 48,000,000 cubic yards of stormwater inflow would be required over the 6 month Sediment Flushing Event period, which is approximately 12 times greater than the stormwater volume indicated by the historical 2006-2007 inflow data.

A summary of results produced by the Condition 3 scenario is included in Section 3.4 of this report.

3.4 Conclusion

As indicated by the results included in Appendix B of this report, the accumulated sediment within the Devils Gate Reservoir cannot be effectively transported down the length of the Arroyo Seco Channel with natural storm flows anticipated to occur over a 3-5 year period under any of the 3 conditions that were modeled within the scope of this report.

The Condition 1 Sediment Flushing Event, which modeled the sediment transport characteristics of the Channel during historically typical flows and standard Dam operations, was found to be incapable of flushing excess sediment down the length of the Arroyo Seco Channel. After 9.5 months of historically typical sediment sluicing flows and 6 months of historically typical sediment flushing flows, approximately 20,000 cubic yards of sediment will be conveyed to the Los Angeles River, leaving approximately 243,000 cubic yards of sediment generated by the Sediment Transport Event in the Arroyo Seco Channel with deposits primarily occurring in and around the natural reaches. The Condition 1 Sediment Flushing Event experienced an average discharge rate of 6.7 cfs, a peak discharge rate of 1036.5 cfs, a total stormwater discharge volume of approximately 4,000,000 cubic yards, and Dam operating conditions that produced water surface elevations ranging from 1007.0' to 1015.3'.

The Condition 2 Sediment Flushing Event, which modeled the sediment transport characteristics of the Channel during an idealized sediment flushing scenario producing a constant flow rate of 4,900 cfs, was found to be capable of flushing excess sediment down the length of the Arroyo Seco Channel but was also realistically infeasible. After 9.5 months of historically typical sediment sluicing flows and 3 days of idealized sediment flushing flows of 4,900 cfs, approximately 250,000 cubic yards of sediment will be conveyed to the Los Angeles River, leaving approximately 13,000 cubic yards of sediment generated by the Sediment Transport Event in the Arroyo Seco Channel with deposits primarily occurring in and around the natural reaches. The Condition 2 Sediment Flushing Event experienced an average/peak discharge rate of 4,900 cfs, a total stormwater discharge volume of approximately 47,000,000 cubic yards, and Dam operating conditions that produced a consistent water surface elevation of 1040.0'. This condition has been deemed infeasible because maintaining these flow characteristics would require unrealistic reservoir inflow rates that are approximately 12 times greater than historically typical data and would also require the Dam to operate in a potentially hazardous condition that provides limited flood control capabilities.

The Condition 3 Sediment Flushing Event, which modeled the sediment transport characteristics of the Channel during a theoretical sediment flushing scenario producing the minimum recommended constant flushing rate of 2,500 cfs, was found to be capable of flushing excess sediment down the length of the Arroyo Seco Channel but was also realistically infeasible. After 9.5 months of historically typical sediment sluicing flows and 6 days of idealized sediment flushing flows of 2,500 cfs, approximately 250,000 cubic yards of sediment will be conveyed to the Los Angeles River, leaving approximately 13,000 cubic yards of sediment generated by the Sediment Transport Event in the Arroyo Seco Channel with deposits primarily occurring in and around the natural reaches. The Condition 3 Sediment Flushing

Event experienced an average/peak discharge rate of 2,500 cfs, a total stormwater discharge volume of approximately 48,000,000 cubic yards, and Dam operating conditions that produced a consistent water surface elevation of 1023.3'. This condition has been deemed infeasible because maintaining these flow characteristics would require unrealistic reservoir inflow rates that are approximately 12 times greater than historically typical data and would also require the Dam to operate in a potentially hazardous condition that provides limited flood control capabilities.

For a more detailed analysis of sediment transport characteristics of the Arroyo Seco Channel, including sediment deposition profile maps, plan view maps, and cross sections, reference the "Modeling of Sluicing and Flushing Conditions in the Arroyo Seco Channel Below the Devil's Gate Dam" report by Chang Consultants dated January 7, 2013 in Appendix B of this report. Should there be any discrepancies between the data and/or recommendations presented herein and in the data presented Appendix B, the information in Appendix B shall supersede. Additionally, all information presented in this report is intended to identify the potential feasibility of utilizing stormwater flows to convey accumulated sediment from behind the Devils Gate Dam, down the entire length of the Arroyo Seco Channel, to the Los Angeles River confluence, and this report is not intended to provide an operating procedure for such activities should they be executed. Additional implications including, but not limited to the maintenance stable cross sections within sensitive Channel reaches and the potential impacts of sediment transport activities on the level of Capital Flood protection provided by the Channel, are a few items that would require more study prior to implementation. However, because the results of this analysis do not identify any potentially feasible options for sediment sluicing, it is not likely that these items will be pursued any further.

3.5 References

Excerpts from LACFCD Provided Draft Soils Report, prepared by Leighton, dated October 2011.

Excerpts from Soil Sampling performed by NV5 Testing Engineers on October 31, 2012.

Final Sediment Transport Capability Analysis for the Arroyo Seco Channel, prepared by Bureau Veritas, dated August 3, 2012.

Final Arroyo Seco Channel Hydraulic Analysis, prepared by Bureau Veritas, dated April 25, 2012

Sediment Transport Analyses for the Arroyo Seco Channel, prepared by Chang Consultants, dated August 3, 2012

Los Angeles County Flood Control District – Devils Gate Dam Background/Reference Information.

Los Angeles County Flood Control District - Devils Gate Dam and Reservoir Post-Fire Sediment Removal - Short Term Solution Report for Sediment Accumulation Along the Face of the Dam, March 2011.

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4 Appendices

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Appendix A.1

Elevation-Storage-Discharge Relationship for Devils Gate Dam

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Elevation-Storage-Discharge Relationship for Sediment Transport Event
(Fully Opened 5'x5' Devils Gate Dam Sluice Gate)

Water Surface Elevation (ft)		LACFCD Storage (ac-ft) [1]	Discharge at Dam Outlet (cfs) [2]
Sill of Sluice Gate	986.0	0.00	0.0
	987.0	0.01	20.0
	988.0	0.02	40.0
	989.0	0.03	60.0
	990.0	0.04	100.0
Top of Sluice Gate	991.0	0.05	140.0
	992.0	0.06	185.0
	993.0	0.09	285.0
	994.0	0.38	325.0
	995.0	0.81	350.0
	996.0	1.35	370.0
	997.0	2.01	390.0
	998.0	2.77	410.0
	999.0	3.64	430.0
	1000.0	4.61	450.0
	1001.0	5.69	469.0
	1002.0	6.87	488.0
	1003.0	8.15	507.0
	1004.0	9.58	526.0
	1005.0	11.21	545.0
	1006.0	13.06	559.0
	1007.0	15.12	573.0
	1008.0	17.39	587.0
	1009.0	19.87	601.0
	1010.0	22.53	615.0
	1011.0	25.39	629.0
	1012.0	28.44	643.0
	1013.0	31.80	657.0
	1014.0	35.63	671.0
	1015.0	40.17	685.0
	1016.0	45.72	696.5
	1017.0	52.56	708.0
	1018.0	60.84	719.5
	1019.0	70.59	731.0
	1020.0	81.76	742.5
	1021.0	94.21	754.0
	1022.0	107.92	765.5
	1023.0	123.05	777.0
	1024.0	139.87	788.5
	1025.0	159.11	800.0
	1026.0	181.23	810.0
	1027.0	206.21	820.0
	1028.0	233.87	830.0
	1029.0	263.86	840.0
	1030.0	295.56	850.0
	1031.0	330.39	860.0
	1032.0	369.49	870.0
	1033.0	412.67	880.0
	1034.0	460.75	890.0
	1035.0	513.74	900.0
	1036.0	571.57	910.0
	1037.0	634.89	920.0
	1038.0	705.16	930.0
	1039.0	782.57	940.0
Port (1040.5)	1040.0	865.62	950.0
	1041.0	*Sluice Gates Closed (Head limited to 50')**	

1. LACFCD provided storage volume values per LACFCD provided survey information dated March 8, 2012. Survey information was available for elevations of 993' and higher, volumes from 986'-992' were linearly interpolated.

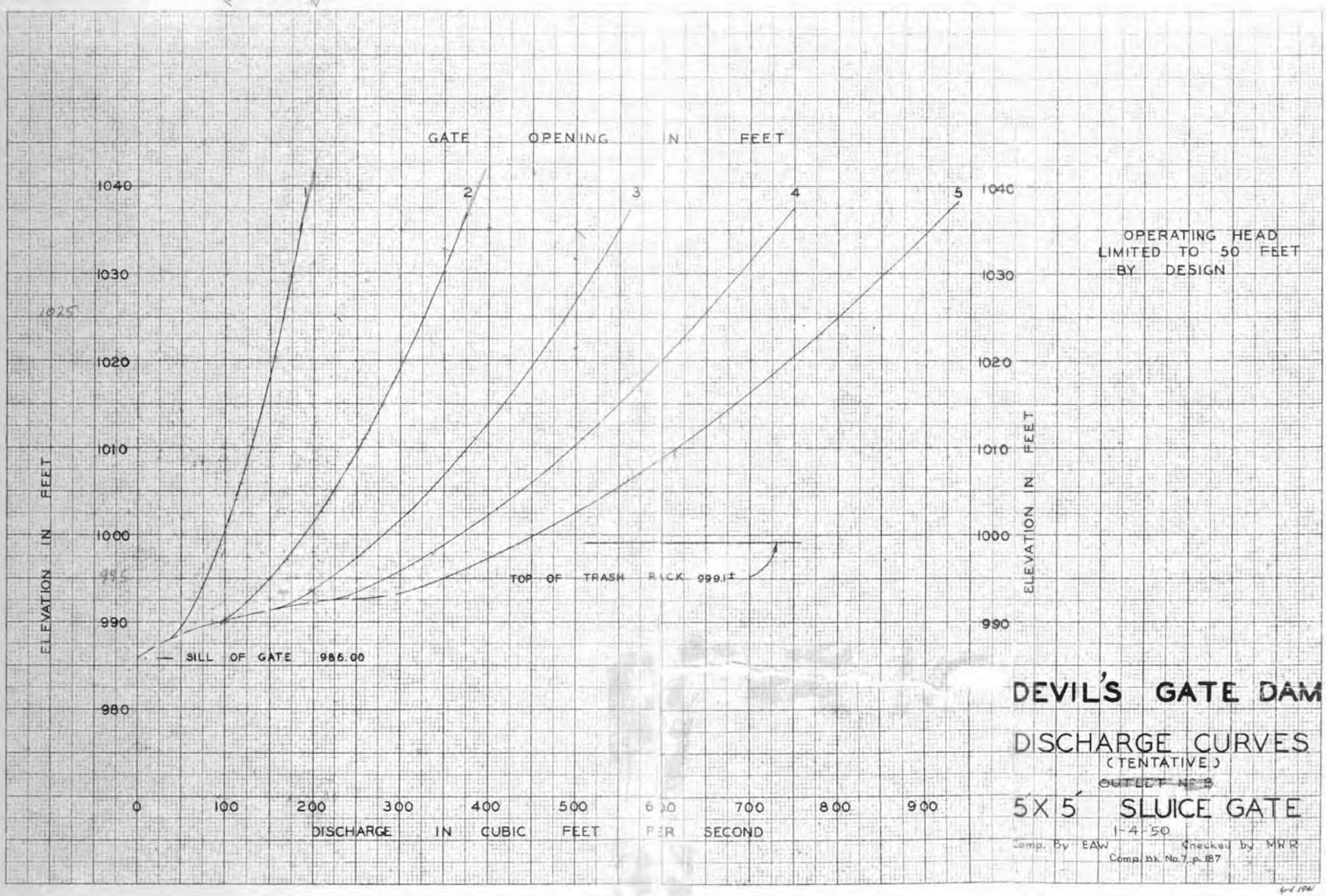
2. Discharge as interpreted from LACFCD provided discharge curve (see attached sluice gate curve). Sluice gate is assumed to be fully opened to for the entire storm duration and operating head is limited to 50'.

Elevation-Storage-Discharge Relationship for Sediment Flushing Event
(Two Fully Opened 7'x10' Slide Gates)

Water Surface Elevation (ft)		LACFCD Storage (ac-ft) [1]	Discharge at Dam Outlet (cfs) [2]
Sill of Sluice Gate	986.0	0.00	0.0
	987.0	0.01	0.0
	988.0	0.02	0.0
	989.0	0.03	0.0
	990.0	0.04	0.0
Top of Sluice Gate	991.0	0.05	0.0
	992.0	0.06	0.0
	993.0	0.09	0.0
	994.0	0.38	0.0
	995.0	0.81	0.0
	996.0	1.35	0.0
	997.0	2.01	0.0
	998.0	2.77	0.0
	999.0	3.64	0.0
	1000.0	4.61	0.0
	1001.0	5.69	0.0
	1002.0	6.87	0.0
	1003.0	8.15	0.0
	1004.0	9.58	0.0
	1005.0	11.21	0.0
	1006.0	13.06	0.0
Start Slide Gate	1007.0	15.12	0.0
	1008.0	17.39	80.0
	1009.0	19.87	160.0
	1010.0	22.53	240.0
	1011.0	25.39	388.0
	1012.0	28.44	536.0
	1013.0	31.80	684.0
	1014.0	35.63	832.0
	1015.0	40.17	980.0
	1016.0	45.72	1144.0
	1017.0	52.56	1308.0
	1018.0	60.84	1472.0
	1019.0	70.59	1636.0
	1020.0	81.76	1800.0
	1021.0	94.21	2010.0
	1022.0	107.92	2220.0
	1023.0	123.05	2430.0
	1024.0	139.87	2640.0
	1025.0	159.11	2850.0
	1026.0	181.23	3060.0
	1027.0	206.21	3270.0
	1028.0	233.87	3480.0
	1029.0	263.86	3700.0
	1030.0	295.56	3900.0
	1031.0	330.39	4000.0
	1032.0	369.49	4100.0
	1033.0	412.67	4200.0
	1034.0	460.75	4300.0
	1035.0	513.74	4400.0
	1036.0	571.57	4500.0
	1037.0	634.89	4600.0
	1038.0	705.16	4700.0
	1039.0	782.57	4800.0
Port (1040.5)	1040.0	865.62	4900.0

1. LACFCD provided storage volume values per LACFCD provided survey information dated March 8, 2012. Survey information was available for elevations of 993' and higher, volumes from 986'-992' were linearly interpolated.

2. Discharge as interpreted from LACFCD provided discharge curve (see slide gate curve). During the Sediment Flushing Event, the sluice gate will be closed and two 7'x10' slide gates will be fully opened.



DEVIL'S GATE DAM

DISCHARGE CURVES

(TENTATIVE)

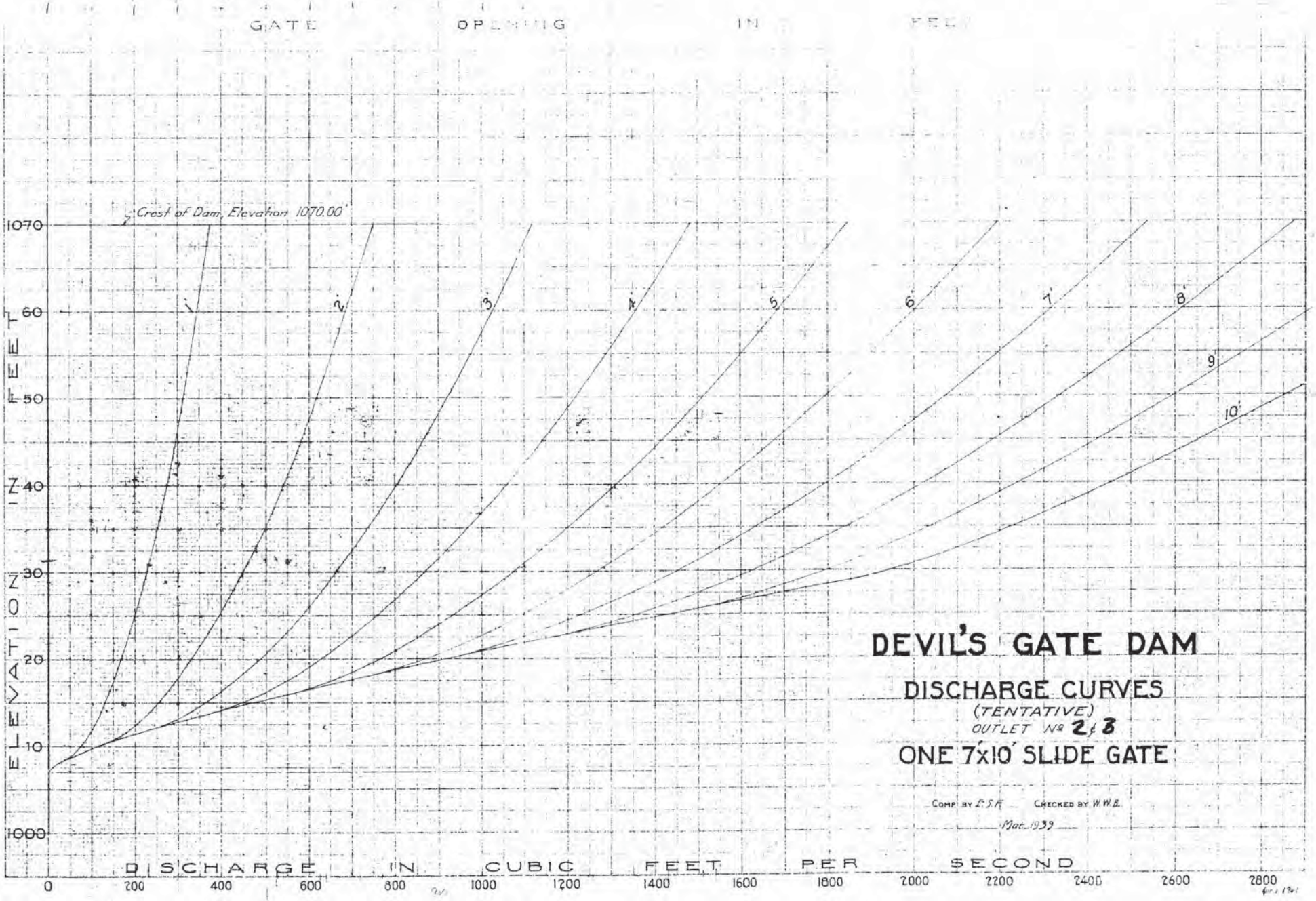
OUTLET No. 8

5 X 5' SLUICE GATE

1-4-50

Comp. By EAW Checked by MWR

Comp. bk. No. 7, p. 187


GATE OPENING IN FEET
Crest of Dam, Elevation 1070.00'
1
2
3
4
5
6
7
8
9
10'
ELEVATION IN FEET
1070
60
50
40
30
20
10
1000
DISCHARGE IN CUBIC FEET PER SECOND
0
200
400
600
800
1000
1200
1400
1600
1800
2000
2200
2400
2600
2800
DEVIL'S GATE DAM
DISCHARGE CURVES
(TENTATIVE)
OUTLET No 2 & 3
ONE 7'x10' SLIDE GATE
COMP. BY E.S.F. CHECKED BY W.W.B.
Mar. 1939

Appendix A.2

Sediment Gradation Information

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Excerpt from Draft Soils Report Upstream of Devils Gate Dam

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Project: 603211-001	Eng/Geol: VPI/RML
Scale: 1 " = 1,000 '	Date: October, 2011

Base Map: ESRI Resource Center, 2010
Thematic Info: Leighton
Author: (mmurphy)

BORING LOCATION MAP

Devil's Gate Reservoir
Pasadena, California

Figure 2

Leighton

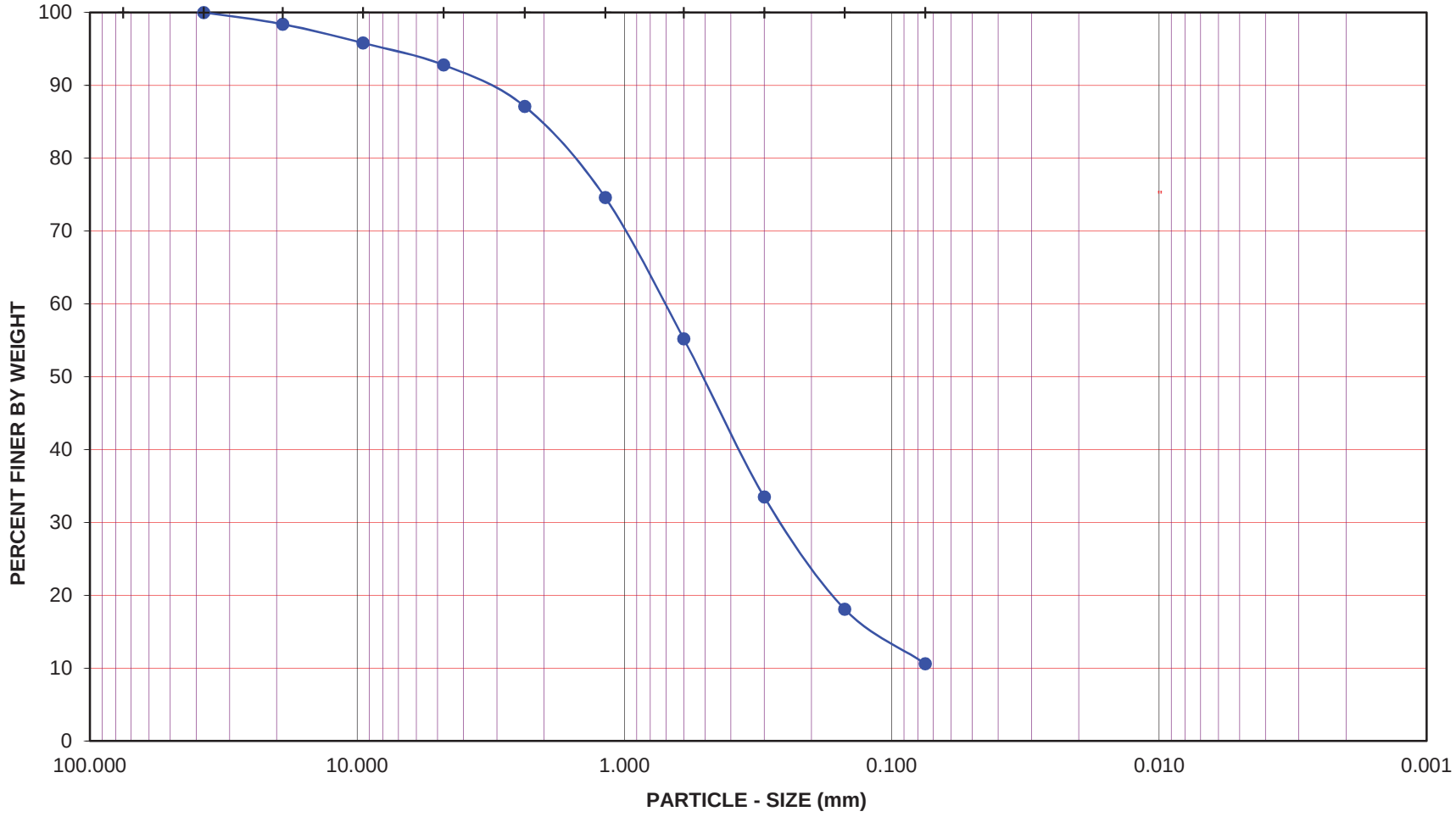
Map Saved as P:\drafting\603211\001\GIS\of_2011-10-27\Figure2.mxd on 10/27/2011 2:56:18 PM

GRAVEL		SAND			FINES	
COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY

U.S. STANDARD SIEVE OPENING: 3.0" 1 1/2" 3/4" 3/8"

U.S. STANDARD SIEVE NUMBER: #4 #8 #16 #30 #50 #100 #200

HYDROMETER



Project Name: Devil's Gate

Project No.: 603211-001

Exploration No.: B-1 Sample No.: B3

Depth (feet): 15.0 Soil Type : SW-SM

Soil Identification: Olive brown well-graded sand with silt (SW-SM)

GR:SA:FI : (%) 7 : 82 : 11

Leighton

PARTICLE - SIZE DISTRIBUTION ASTM D 6913

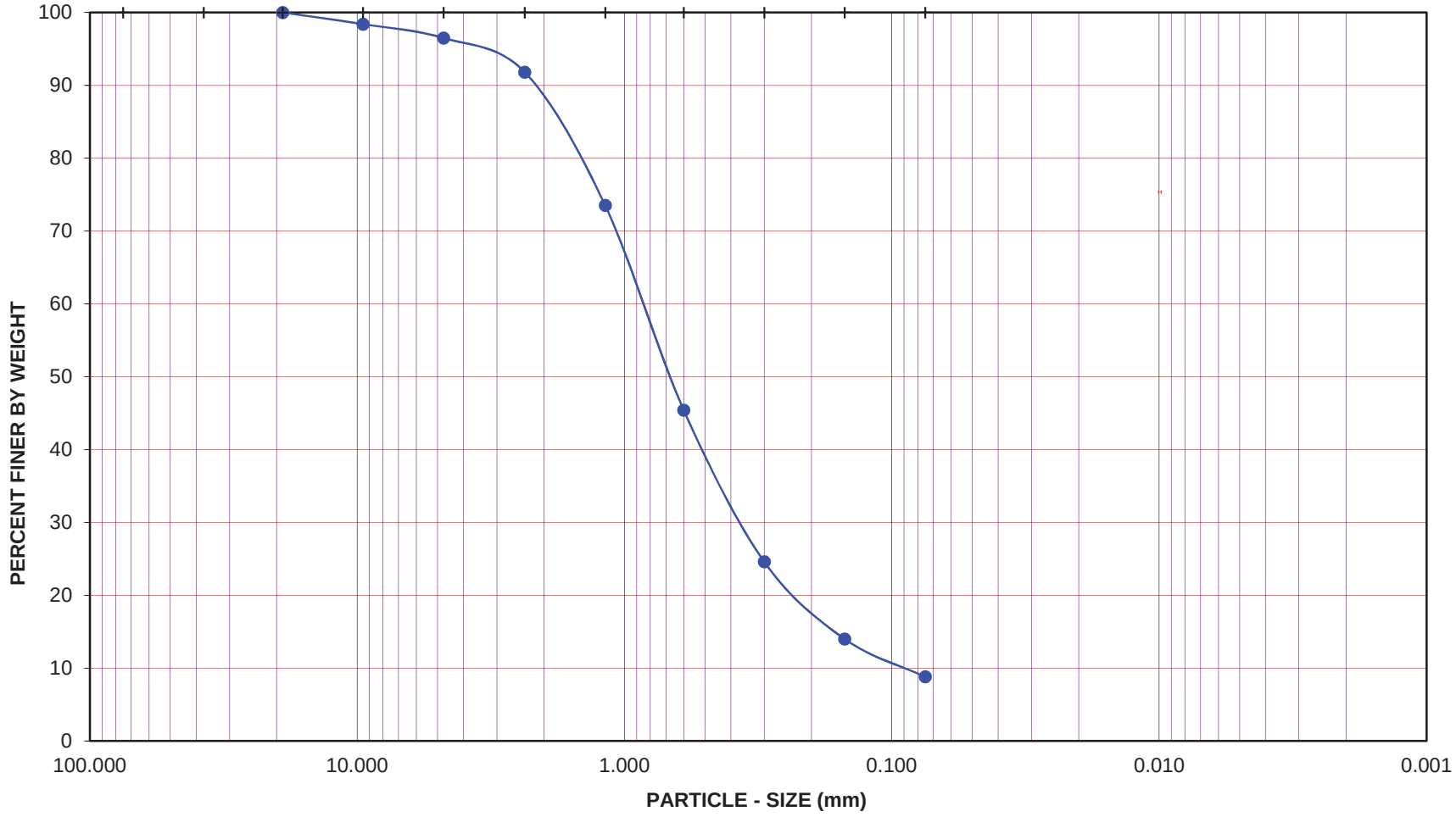
Oct-11

GRAVEL		SAND			FINES	
COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY

U.S. STANDARD SIEVE OPENING: 3.0" 1 1/2" 3/4" 3/8"

U.S. STANDARD SIEVE NUMBER: #4 #8 #16 #30 #50 #100 #200

HYDROMETER



Project Name: Devil's Gate

Project No.: 603211-001

Exploration No.: B-3 Sample No.: B2

Depth (feet): 10.0 Soil Type : SW-SM

Soil Identification: Olive gray well-graded sand with silt (SW-SM)

GR:SA:FI : (%) 4 : 87 : 9

Leighton

PARTICLE - SIZE DISTRIBUTION ASTM D 6913

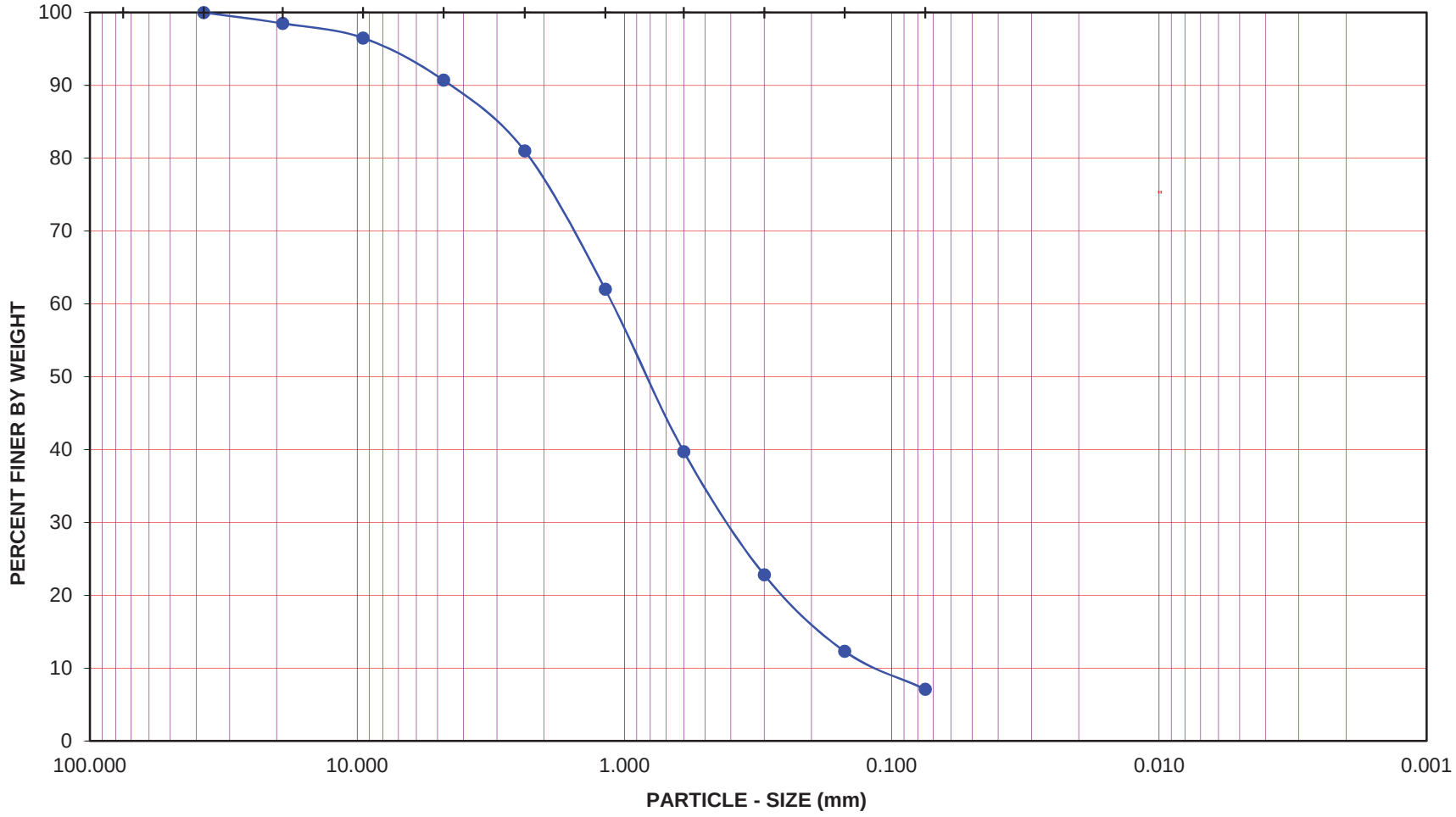
Oct-11

GRAVEL		SAND			FINES	
COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY

U.S. STANDARD SIEVE OPENING: 3.0" 1 1/2" 3/4" 3/8"

U.S. STANDARD SIEVE NUMBER: #4 #8 #16 #30 #50 #100 #200

HYDROMETER



Project Name: Devil's Gate

Project No.: 603211-001

Exploration No.: B-4 Sample No.: B2

Depth (feet): 10.0 Soil Type : SW-SM

Soil Identification: Olive brown well-graded sand with silt (SW-SM)

GR:SA:FI : (%) 9 : 84 : 7

Leighton

PARTICLE - SIZE DISTRIBUTION ASTM D 6913

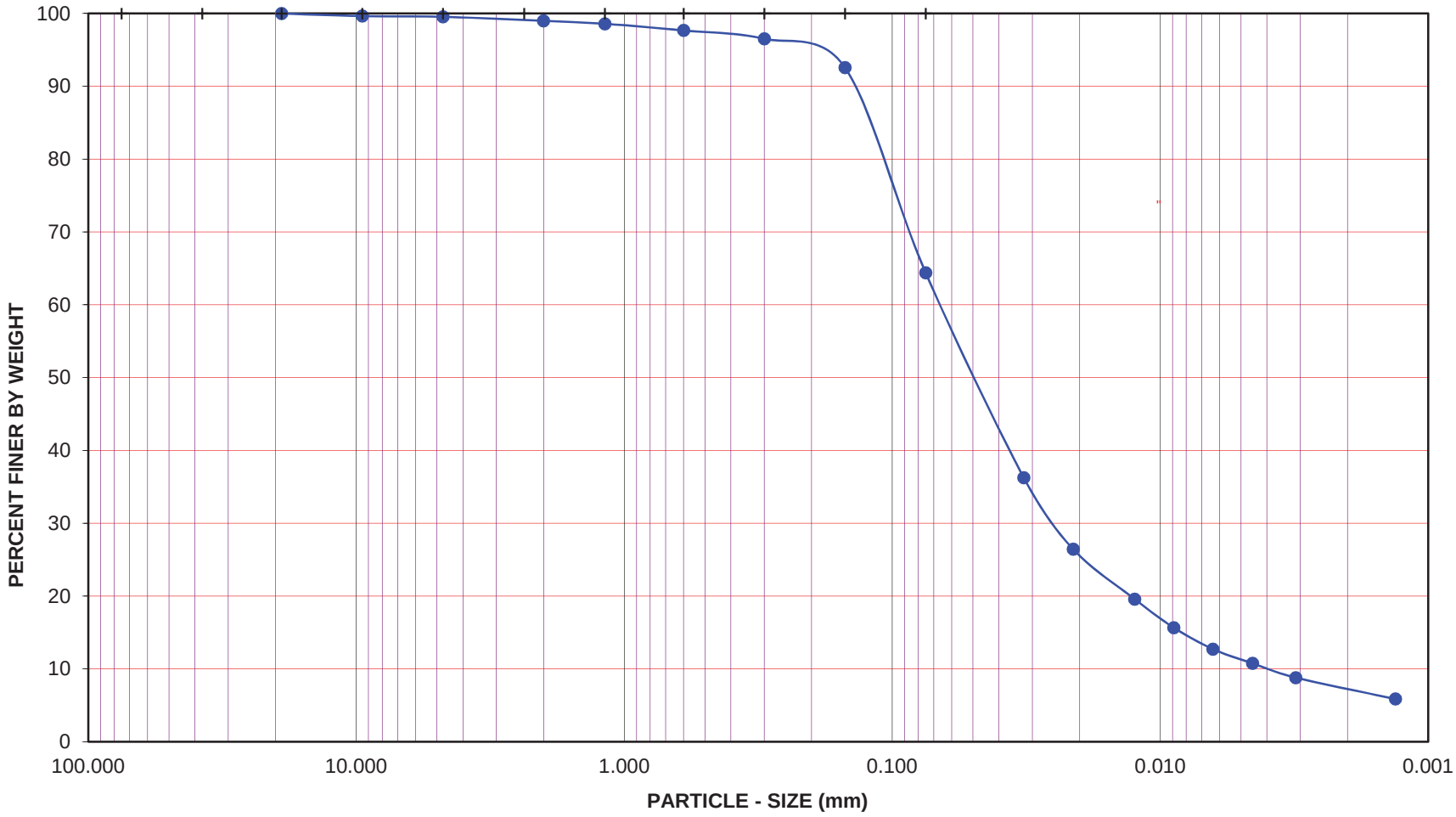
Oct-11

GRAVEL		SAND			FINES	
COARSE	FINE	CRSE	MEDIUM	FINE	SILT	CLAY

U.S. STANDARD SIEVE OPENING: 3.0" | 1 1/2" | 3/4" | 3/8"

U.S. STANDARD SIEVE NUMBER: #4 | #8 | #16 | #30 | #50 | #100 | #200

HYDROMETER



Project Name: Devil's Gate

Project No.: 603211-001

Exploration No.: B-9 Sample No.: B2

Depth (feet) : 10.0 Soil Type : s(ML)

Soil Identification: Olive gray sandy silt s(ML); organic material noted

GR:SA:FI : (%) 0 : 36 : 64

Leighton

PARTICLE - SIZE DISTRIBUTION ASTM D 422

Oct-11

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Gradations for Soil Sampling Downstream of the Devils Gate Dam

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N|V|5

TESTING ENGINEERS VERTICALFIVE

Bureau Veritas North America
10620 Treena Street, Suite 200
San Diego, CA 92131

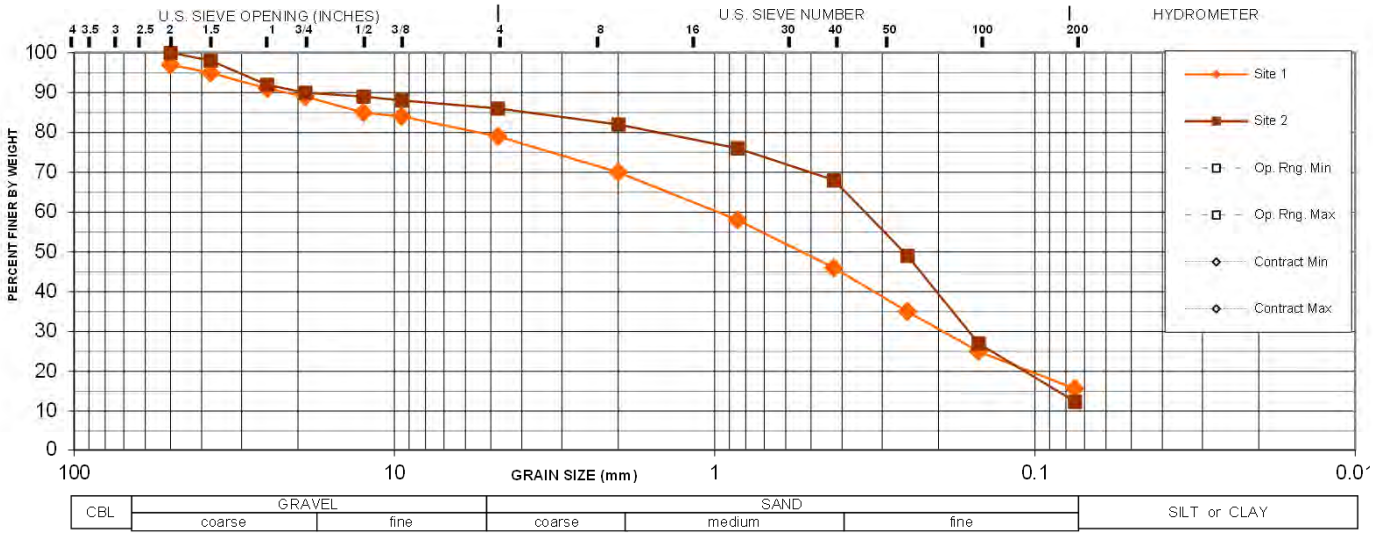
November 5, 2012
JOB No: **149466**
LAB No: 9350-51
Report No: 2646

Project: **Arroyo Seco Channel**

REPORT OF SIEVE ANALYSIS TEST

ASTM D422 - Soil

SAMPLE INFO:	**Site 1**	**Site 2**				
Description	Brown SAND with some organics	Gray brown SAND with organics				
Material	Native upper 2 feet	Native upper 2 feet				
Sample Location	Site 1: 10 ft north of creek	Site 2: 10 feet from creek				
Date Sampled	10/31/2012	10/31/2012				
Sampled By	M. Allen	M. Allen				
Date Tested	11/5/2012	11/5/2012				
Tested By	N. Regalado	N. Regalado				



Sample ID:	**Site 1**	**Site 2**				
Sieve Size	% Passing					
63mm (2 1/2")	100	100				
50mm (2")	97	100				
37.5mm (1 1/2")	**95**	**98**				
25mm (1")	**91**	**92**				
19mm (3/4")	**89**	**90**				
12.5mm (1/2")	**85**	**89**				
9.5mm (3/8")	**84**	**88**				
4.75mm (#4)	**79**	**86**				
2.36mm (#8)	**70**	**82**				
1.18mm (#16)	**58**	**76**				
600um (#30)	**46**	**68**				
300um (#50)	**35**	**49**				
150um (#100)	**25**	**27**				
75um (#200)	**15.7**	**12.4**				
Fineness Modulus	2.6	2.5				
Shape (sand & gravel)	N.R.	N.R.				
Hardness (sand & gravel)	N.R.	N.R.				
Specific Gravity	2.60	2.60				
Coef. of Curvature (C_C)	5.0	2.9				
Coef. of Uniformity (C_U)	194.1	21.5				
% Gravel	21	14				
% Sand	63	74				
% Fines	15.7	12.4				
USCS Class:	**???**	**???**				

Notes: *Hardness: H&D = Hard & Durable; W&F = Weathered & Friable*
N.R.: Not Recorded; N/A: Not Available.

Reviewed By:

As mutual protection to clients, the public, and BVNA, all reports are the confidential property of clients. Authorization for publication of statements, conclusions, or extracts from our reports is reserved pending written approval.

Testing Engineers - Vertical V
7895 Convoy Court, Suite 18
San Diego, Ca 92111

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www.nv5.com

Foothill Fwy Over
Sample Site 1
210
Linda Vista Ave

159
N San Rafael Ave
El Circulo Dr
El Portolo
Las Palmas Rd
134
Sample Site 2
Arroyo Dr
N Orange Grove Blvd
W Colorado Blvd
Westminster Dr
S Grand Ave
Del Rosa

Appendix A.3

Devils Gate Dam Outflow Hydrographs for Conditions 1, 2, and 3

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Excerpt of Sediment Transport and Sediment Flushing Event Calculations - Refer to Excel Spreadsheet in Appendix A.4 for Complete Calculations

Date	Time (hrs)	Sediment Concentration (% By Weight)	Condition 1				Condition 2				Condition 3			
			Inflow (cfs)	Storage (Ac-ft)	Elevation (ft)	Outflow (cfs)	Inflow (cfs)	Storage (Ac-ft)	Elevation (ft)	Outflow (cfs)	Inflow (cfs)	Storage (Ac-ft)	Elevation (ft)	Outflow (cfs)
1-Jan-06	0:00	5.0%	39.3	0	988.0	39.3	39.3	0	988.0	39.3	39.3	0	988.0	39.3
1-Jan-06	1:00	5.0%	39.5	0	988.0	39.5	39.5	0	988.0	39.5	39.5	0	988.0	39.5
1-Jan-06	2:00	5.0%	39.7	0	988.0	39.7	39.7	0	988.0	39.7	39.7	0	988.0	39.7
1-Jan-06	3:00	5.0%	40.2	0	988.0	40.2	40.2	0	988.0	40.2	40.2	0	988.0	40.2
1-Jan-06	4:00	5.0%	40.7	0	988.0	40.7	40.7	0	988.0	40.7	40.7	0	988.0	40.7
1-Jan-06	5:00	5.0%	40.7	0	988.0	40.7	40.7	0	988.0	40.7	40.7	0	988.0	40.7
1-Jan-06	6:00	5.0%	41.2	0	988.1	41.2	41.2	0	988.1	41.2	41.2	0	988.1	41.2
1-Jan-06	7:00	5.0%	41.5	0	988.1	41.5	41.5	0	988.1	41.5	41.5	0	988.1	41.5
1-Jan-06	8:00	5.0%	41.7	0	988.1	41.7	41.7	0	988.1	41.7	41.7	0	988.1	41.7
1-Jan-06	9:00	5.0%	42.2	0	988.1	42.2	42.2	0	988.1	42.2	42.2	0	988.1	42.2
1-Jan-06	10:00	5.0%	42.5	0	988.1	42.5	42.5	0	988.1	42.5	42.5	0	988.1	42.5
1-Jan-06	11:00	5.0%	43.0	0	988.1	43.0	43.0	0	988.1	43.0	43.0	0	988.1	43.0
1-Jan-06	12:00	5.0%	43.3	0	988.2	43.3	43.3	0	988.2	43.3	43.3	0	988.2	43.3
1-Jan-06	13:00	5.0%	43.5	0	988.2	43.5	43.5	0	988.2	43.5	43.5	0	988.2	43.5
1-Jan-06	14:00	5.0%	43.8	0	988.2	43.8	43.8	0	988.2	43.8	43.8	0	988.2	43.8
1-Jan-06	15:00	5.0%	44.2	0	988.2	44.2	44.2	0	988.2	44.2	44.2	0	988.2	44.2
1-Jan-06	16:00	5.0%	79.8	0	989.5	79.5	79.8	0	989.5	79.5	79.8	0	989.5	79.5
1-Jan-06	17:00	5.0%	80.6	0	989.5	80.9	80.6	0	989.5	80.9	80.6	0	989.5	80.9
1-Jan-06	18:00	5.0%	37.0	0	987.9	37.1	37.0	0	987.9	37.1	37.0	0	987.9	37.1
1-Jan-06	19:00	5.0%	36.7	0	987.8	36.6	36.7	0	987.8	36.6	36.7	0	987.8	36.6
1-Jan-06	20:00	5.0%	48.9	0	988.4	48.9	48.9	0	988.4	48.9	48.9	0	988.4	48.9
1-Jan-06	21:00	5.0%	46.2	0	988.3	46.3	46.2	0	988.3	46.3	46.2	0	988.3	46.3
1-Jan-06	22:00	5.0%	42.6	0	988.1	42.6	42.6	0	988.1	42.6	42.6	0	988.1	42.6
1-Jan-06	23:00	5.0%	46.1	0	988.3	46.1	46.1	0	988.3	46.1	46.1	0	988.3	46.1
2-Jan-06	0:00	5.0%	47.5	0	988.4	47.5	47.5	0	988.4	47.5	47.5	0	988.4	47.5
2-Jan-06	1:00	5.0%	47.7	0	988.4	47.7	47.7	0	988.4	47.7	47.7	0	988.4	47.7
2-Jan-06	2:00	5.0%	102.0	0	990.0	101.6	102.0	0	990.0	101.6	102.0	0	990.0	101.6
2-Jan-06	3:00	5.0%	112.7	0	990.3	113.0	112.7	0	990.3	113.0	112.7	0	990.3	113.0
2-Jan-06	4:00	5.0%	76.6	0	989.4	76.5	76.6	0	989.4	76.5	76.6	0	989.4	76.5
2-Jan-06	5:00	5.0%	85.2	0	989.6	85.3	85.2	0	989.6	85.3	85.2	0	989.6	85.3
2-Jan-06	6:00	5.0%	80.3	0	989.5	80.3	80.3	0	989.5	80.3	80.3	0	989.5	80.3
2-Jan-06	7:00	5.0%	135.8	0	990.9	135.5	135.8	0	990.9	135.5	135.8	0	990.9	135.5
2-Jan-06	8:00	5.0%	185.5	0.1	992.0	185.5	185.5	0.1	992.0	185.5	185.5	0.1	992.0	185.5
2-Jan-06	9:00	5.0%	432.6	1.9	996.9	387.4	432.6	1.9	996.9	387.4	432.6	1.9	996.9	387.4
2-Jan-06	10:00	5.0%	815.7	14.1	1006.5	566.1	815.7	14.1	1006.5	566.1	815.7	14.1	1006.5	566.1
2-Jan-06	11:00	5.0%	1290.9	48.8	1016.4	701.6	1290.9	48.8	1016.4	701.6	1290.9	48.8	1016.4	701.6
2-Jan-06	12:00	5.0%	1469.7	102.4	1021.6	760.9	1469.7	102.4	1021.6	760.9	1469.7	102.4	1021.6	760.9
2-Jan-06	13:00	5.0%	1128.5	145.6	1024.3	791.9	1128.5	145.6	1024.3	791.9	1128.5	145.6	1024.3	791.9
2-Jan-06	14:00	5.0%	756.2	157.7	1024.9	799.2	756.2	157.7	1024.9	799.2	756.2	157.7	1024.9	799.2
2-Jan-06	15:00	5.0%	493.4	143.7	1024.2	790.8	493.4	143.7	1024.2	790.8	493.4	143.7	1024.2	790.8
2-Jan-06	16:00	5.0%	372.1	114.9	1022.5	770.8	372.1	114.9	1022.5	770.8	372.1	114.9	1022.5	770.8
2-Jan-06	17:00	5.0%	222.2	77.1	1019.6	737.7	222.2	77.1	1019.6	737.7	222.2	77.1	1019.6	737.7
2-Jan-06	18:00	5.0%	116.5	33.3	1013.4	662.4	116.5	33.3	1013.4	662.4	116.5	33.3	1013.4	662.4
2-Jan-06	19:00	5.0%	91.7	0.6	994.5	336.9	91.7	0.6	994.5	336.9	91.7	0.6	994.5	336.9
2-Jan-06	20:00	5.0%	85.0	0	986.0	0.0	85.0	0	986.0	0.0	85.0	0	986.0	0.0
2-Jan-06	21:00	5.0%	72.2	0.1	991.4	155.9	72.2	0.1	991.4	155.9	72.2	0.1	991.4	155.9
2-Jan-06	22:00	5.0%	53.7	0	986.0	0.0	53.7	0	986.0	0.0	53.7	0	986.0	0.0
2-Jan-06	23:00	5.0%	46.2	0	990.0	98.9	46.2	0	990.0	98.9	46.2	0	990.0	98.9
3-Jan-06	0:00	5.0%	38.6	0	986.0	0.0	38.6	0	986.0	0.0	38.6	0	986.0	0.0
3-Jan-06	1:00	5.0%	28.3	0	989.2	66.1	28.3	0	989.2	66.1	28.3	0	989.2	66.1
3-Jan-06	2:00	5.0%	23.6	0	986.0	0.0	23.6	0	986.0	0.0	23.6	0	986.0	0.0
3-Jan-06	3:00	5.0%	24.4	0	988.4	47.4	24.4	0	988.4	47.4	24.4	0	988.4	47.4
3-Jan-06	4:00	5.0%	20.0	0	986.0	0.0	20.0	0	986.0	0.0	20.0	0	986.0	0.0
3-Jan-06	5:00	5.0%	21.2	0	988.0	40.7	21.2	0	988.0	40.7	21.2	0	988.0	40.7
3-Jan-06	6:00	5.0%	25.3	0	986.3	6.2	25.3	0	986.3	6.2	25.3	0	986.3	6.2
3-Jan-06	7:00	5.0%	26.7	0	988.3	45.3	26.7	0	988.3	45.3	26.7	0	988.3	45.3
3-Jan-06	8:00	5.0%	33.5	0	986.8	15.2	33.5	0	986.8	15.2	33.5	0	986.8	15.2
3-Jan-06	9:00	5.0%	37.1	0	988.7	54.9	37.1	0	988.7	54.9	37.1	0	988.7	54.9

Excerpt of Sediment Transport and Sediment Flushing Event Calculations - Refer to Excel Spreadsheet in Appendix A.4 for Complete Calculations

Date	Time (hrs)	Sediment Concentration (% By Weight)	Condition 1				Condition 2				Condition 3			
			Inflow (cfs)	Storage (Ac-ft)	Elevation (ft)	Outflow (cfs)	Inflow (cfs)	Storage (Ac-ft)	Elevation (ft)	Outflow (cfs)	Inflow (cfs)	Storage (Ac-ft)	Elevation (ft)	Outflow (cfs)
14-Apr-07	20:00	0.0%	5.2	15.3	1007.1	5.5	*n/a*	*n/a*	*n/a*	*n/a*	n/a	n/a	n/a	n/a
14-Apr-07	21:00	0.0%	5.6	15.3	1007.1	5.4	*n/a*	*n/a*	*n/a*	*n/a*	n/a	n/a	n/a	n/a
14-Apr-07	22:00	0.0%	5.6	15.3	1007.1	5.6	*n/a*	*n/a*	*n/a*	*n/a*	n/a	n/a	n/a	n/a
14-Apr-07	23:00	0.0%	5.2	15.3	1007.1	5.4	*n/a*	*n/a*	*n/a*	*n/a*	n/a	n/a	n/a	n/a
15-Apr-07	0:00	0.0%	5.4	15.3	1007.1	5.3	*n/a*	*n/a*	*n/a*	*n/a*	n/a	n/a	n/a	n/a
15-Apr-07	1:00	0.0%	5.7	15.3	1007.1	5.6	*n/a*	*n/a*	*n/a*	*n/a*	n/a	n/a	n/a	n/a
15-Apr-07	2:00	0.0%	5.6	15.3	1007.1	5.7	*n/a*	*n/a*	*n/a*	*n/a*	n/a	n/a	n/a	n/a
15-Apr-07	3:00	0.0%	5.6	15.3	1007.1	5.6	*n/a*	*n/a*	*n/a*	*n/a*	n/a	n/a	n/a	n/a
15-Apr-07	4:00	0.0%	5.7	15.3	1007.1	5.7	*n/a*	*n/a*	*n/a*	*n/a*	n/a	n/a	n/a	n/a
15-Apr-07	5:00	0.0%	41.1	15.9	1007.3	26.7	*n/a*	*n/a*	*n/a*	*n/a*	n/a	n/a	n/a	n/a
15-Apr-07	6:00	0.0%	12.4	15.9	1007.3	26.8	*n/a*	*n/a*	*n/a*	*n/a*	n/a	n/a	n/a	n/a
15-Apr-07	7:00	0.0%	8.6	15.3	1007.1	7.5	*n/a*	*n/a*	*n/a*	*n/a*	n/a	n/a	n/a	n/a
15-Apr-07	8:00	0.0%	7.8	15.4	1007.1	8.3	*n/a*	*n/a*	*n/a*	*n/a*	n/a	n/a	n/a	n/a
15-Apr-07	9:00	0.0%	7.3	15.3	1007.1	7.4	*n/a*	*n/a*	*n/a*	*n/a*	n/a	n/a	n/a	n/a
15-Apr-07	10:00	0.0%	7.4	15.3	1007.1	7.3	*n/a*	*n/a*	*n/a*	*n/a*	n/a	n/a	n/a	n/a
15-Apr-07	11:00	0.0%	7.9	15.3	1007.1	7.7	*n/a*	*n/a*	*n/a*	*n/a*	n/a	n/a	n/a	n/a
15-Apr-07	12:00	0.0%	7.4	15.3	1007.1	7.6	*n/a*	*n/a*	*n/a*	*n/a*	n/a	n/a	n/a	n/a
15-Apr-07	13:00	0.0%	6.7	15.3	1007.1	6.9	*n/a*	*n/a*	*n/a*	*n/a*	n/a	n/a	n/a	n/a
15-Apr-07	14:00	0.0%	6.4	15.3	1007.1	6.5	*n/a*	*n/a*	*n/a*	*n/a*	n/a	n/a	n/a	n/a
15-Apr-07	15:00	0.0%	6.6	15.3	1007.1	6.5	*n/a*	*n/a*	*n/a*	*n/a*	n/a	n/a	n/a	n/a
15-Apr-07	16:00	0.0%	6.4	15.3	1007.1	6.5	*n/a*	*n/a*	*n/a*	*n/a*	n/a	n/a	n/a	n/a
15-Apr-07	17:00	0.0%	6.2	15.3	1007.1	6.3	*n/a*	*n/a*	*n/a*	*n/a*	n/a	n/a	n/a	n/a
15-Apr-07	18:00	0.0%	5.9	15.3	1007.1	6.0	*n/a*	*n/a*	*n/a*	*n/a*	n/a	n/a	n/a	n/a
15-Apr-07	19:00	0.0%	5.7	15.3	1007.1	5.8	*n/a*	*n/a*	*n/a*	*n/a*	n/a	n/a	n/a	n/a
15-Apr-07	20:00	0.0%	5.6	15.3	1007.1	5.6	*n/a*	*n/a*	*n/a*	*n/a*	n/a	n/a	n/a	n/a
15-Apr-07	21:00	0.0%	5.4	15.3	1007.1	5.5	*n/a*	*n/a*	*n/a*	*n/a*	n/a	n/a	n/a	n/a
15-Apr-07	22:00	0.0%	5.4	15.3	1007.1	5.4	*n/a*	*n/a*	*n/a*	*n/a*	n/a	n/a	n/a	n/a
15-Apr-07	23:00	0.0%	5.4	15.3	1007.1	5.4	*n/a*	*n/a*	*n/a*	*n/a*	n/a	n/a	n/a	n/a
Sediment Transport Event Characteristics		**Average**	**9.4**	**0.2**	**986.4**	**9.4**	**9.4**	**0.2**	**986.4**	**9.4**	**9.4**	**0.2**	**986.4**	**9.4**
		Maximum	**1469.7**	**157.7**	**1024.9**	**799.2**	**1469.7**	**157.7**	**1024.9**	**799.2**	**1469.7**	**157.7**	**1024.9**	**799.2**
		Minimum	**0.0**	**0.0**	**986.0**	**0.0**	**0.0**	**0.0**	**986.0**	**0.0**	**0.0**	**0.0**	**986.0**	**0.0**
Sediment Flushing Event Characteristics		**Average**	**6.8**	**15.2**	**1007.0**	**6.7**	**4900.0**	**865.6**	**1040.0**	**4900.0**	**2500.0**	**128.7**	**1023.3**	**2500.0**
		Maximum	**1353.7**	**42.1**	**1015.3**	**1036.5**	**4900.0**	**865.6**	**1040.0**	**4900.0**	**2500.0**	**128.7**	**1023.3**	**2500.0**
		Minimum	**0.0**	**0.0**	**986.0**	**0.0**	**4900.0**	**865.6**	**1040.0**	**4900.0**	**2500.0**	**128.7**	**1023.3**	**2500.0**
Total Sediment Transport Event Stormwater Volume (yd^3)			**8,642,480**				**8,642,480**				**8,642,480**			
Total Sediment Flushing Event Stormwater Volume (yd^3)			**3,947,773**				**47,040,000**				**48,000,000**			
Ratio: Historical Flushing Event Volume vs Modeled Flushing Event Volume			**1.00**				**11.92**				**12.16**			

Appendix A.4

Electronic Information

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Contact: County of Los Angeles Department of Public Works, 900 South Fremont Avenue, Alhambra

2nd floor public counter

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Appendix B

Modeling of Sluicing and Flushing Conditions in the Arroyo Seco Channel Below the Devils Gate Dam by Chang Consultants

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APPENDIX B

"FINAL DRAFT"
MODELING OF SLUICING AND FLUSHING CONDITIONS IN THE ARROYO SECO CHANNEL BELOW THE DEVIL'S GATE DAM

January 7, 2013

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INTRODUCTION

Sediment transport analyses were previously performed for the Arroyo Seco Channel downstream of the Devil's Gate Dam (Dam). The analyses are included in the August 3, 2012, Chang Consultants report titled, *Sediment Transport Analyses for the Arroyo Seco Channel.* The Dam is located north of Interstate 210 (Foothill Freeway) and the Foothill Freeway overpass in the city of Pasadena (see Vicinity Map). Just below the Dam, the natural Arroyo Seco Channel passes under Interstate 210, then becomes an engineered, concrete-lined channel near the north end of the Brookside Golf Course. The channel below the dam extends over approximately 9 miles to its confluence with the Los Angeles River, and is concrete-lined except for the reach between the Dam and Brookside Golf Course (station 31+30 to 43+15) as well as a reach under Highway 134 (station 27+70 to 28+20). At the downstream end of each natural channel reach is a grade control structure used to stabilize the channel bed.

Vicinity Map

This report includes additional FLUVIAL-12 sediment transport modeling of the Arroyo Seco Channel in order to determine sediment transport processes in the predominately concrete-lined channel between the Devil's Gate Dam and the Los Angeles River confluence. The analyses were performed for three new conditions outlined by the Los Angeles County Flood Control District

(LACFCD). The conditions are described in detail below and are all based on sluicing sediment laden flow from the Dam over a 9.5 month duration. The conditions also model various sediment flushing events in which the sediment deposited by the sluicing is transported by subsequent flows. Furthermore, a fourth condition was added because it was determined during course of analyses that one of LACFCD's conditions should be altered. The fourth condition provides support for the alteration.

The following sections outline the four conditions that were analyzed, and then discuss the FLUVIAL-12 model and its results.

MODELING SCOPE

This study covers two types of water and sediment flows: sediment sluicing from the reservoir (natural sediment transport) followed by water flow to flush sediment from the channel (natural or idealized sediment flushing). For sluicing, water and sediment are released from the reservoir into the channel downstream based on flow records from January 1, 2006 to October 14, 2006 with a sediment concentration of 5 percent (by weight). This operation will result in sediment deposition along the Arroyo Seco Channel, mostly along the natural channel reach just below the dam.

The sluicing will be followed by flow events that flush the deposited sediment from the channel. The flushing is derived from either observed Dam inflow rates between October 15, 2006 to April 15, 2007 (natural flushing) or from simulated flow rates (idealized flushing). The flushing assumes zero percent sediment concentration at the Dam outlet. During the process of sediment flushing, the two natural channel reaches can undergo both erosion and deposition. The extended low flows can only deliver a small amount of sediment to the Los Angeles River. For the purpose of sediment management, three different options for sediment flushing requested by LACFCD are simulated that cover a variety of flow rates and durations. The purpose of the study is to determine the amount of sediment that can be flushed out of the Arroyo Seco Channel into the Los Angeles River under the options that were considered.

The study will determine sediment deposition and net capacity of the Arroyo Seco Channel to the Los Angeles River confluence. Specifically, the study shall provide the following items:

- Channel profiles illustrating the sediment deposition elevations with respect to the invert elevation of the channel

- Channel cross-sections depicting sediment deposition at key locations of the Channel.

The three LACFCD study conditions are as follows.

Condition 1. Natural Sediment Transport and Natural Sediment Flushing – This modeling run includes sediment sluicing and flushing phases simulating natural conditions as described below.

Phase 1. Sediment sluicing: Phase 1 is based on flow records from January 1, 2006 to October 14, 2006 for a total duration of about 9.5 months. A 5 percent sediment concentration by weight is

assumed within the flow. The total amount of sediment flushed out of the reservoir is calculated from the total volume of the water flow during the same period.

As a first step, the total volume of water flow for the period of record is approximately 233,350,000 cubic feet. The total weight of water is determined by multiplying the volume by the unit weight of water (62.4 pounds per cubic feet). Based on this, the total weight was estimated at just over 7,280,000 tons. The sediment weight is 5 percent of the water weight or approximately 364,000 tons.

The weight of sediment is converted into a volume using the specific gravity of sediment of 2.65 and a void ratio of 0.62 for deposited sediment:

Weight of sediment per cubic foot = 62.4 × 2.65 × 0.62 = 102.52 pounds per cubic foot
Weight of sediment per cubic yard = 102.52 × 27 / 2,000 = 1.384 tons per cubic yard
Total volume of sediment released from reservoir by sluicing = 364,018 / 1.384
= 263,000 cubic yards

Phase 2. Sediment flushing: The subsequent flushing phase is based on flow records from October 15, 2006 through April 15, 2007 for a total duration of 6 months. A zero percent sediment concentration is assumed for the flow as it exits the Dam following the end of sluicing.

Condition 2: Natural Sediment Transport Followed by Three Days of Maximum Idealized Sediment Flushing at 4,900 cfs – This condition has two phases.

Phase 1. Sediment sluicing: The first phase of sediment sluicing is identical to that in Condition 1.

Phase 2. Sediment flushing: The second phase is a simulated sediment flushing event with a constant "idealized" flow rate of 4,900 cubic feet per second (cfs) for a duration that is necessary to completely clear the channel of sediment that was deposited during the Phase 1 sluicing of 263,000 cubic yards. FLUVIAL-12 was used to determine the minimum sediment flushing duration necessary to complete the flushing process. After several trial runs, the total duration of flushing was selected to be 3 days (the results for all of the conditions are discussed further in the next section).

Condition 3: Natural Sediment Transport and 6 Month Duration Idealized Sediment Flushing
The intent of this condition was to perform the same sluicing event as Conditions 1 and 2, and then determine the constant flow rate "idealized" flushing event that would remove the deposited sediment from Phase 1 over an approximately 6 month period. However, after performing trial runs, it was determined that flushing over a 6 month period was not a feasible condition. The sediment deposited by the sluicing requires a relatively high flow rate (determined to be 2,500 cfs) to adequately transport the sediment downstream. Under such a high flow rate, the sediment will be removed in a matter of days rather than months. A fourth condition (discussed next) was added to demonstrate that lower flow rates will not adequately transport the sediment. Based on this information, Condition 3 was modified as follows:

Phase 1. Sediment sluicing: The first phase of sediment sluicing is identical to that in Conditions 1 and 2.

Phase 2. Sediment flushing: The second phase is a simulated sediment flushing event to estimate the minimum constant "idealized" flow rate (2,500 cfs) needed to transport the deposited sediment and clear the channel. The required duration of flushing was determined to be 6 days.

Condition 4: Natural Sediment Transport Followed by Sediment Flushing at 1,000 cfs – This condition was added to demonstrate that lower flows will not adequately transport sediment and clear the channel. This finding led to the modification of Condition 3 as discussed above. Condition 4 includes the following:

Phase 1. Sediment sluicing: The first phase of sediment sluicing is identical to that in Conditions 1, 2, and 3.

Phase 2. Sediment flushing: The second phase is a simulated sediment flushing event under a constant "idealized" flow rate of 1,000 cfs. The duration of flushing was performed for up to 16 days.

MODELING INPUT

Stream hydraulics, sediment transport, and channel changes may be studied through physical modeling, mathematical modeling, or both. Physical modeling has been relied upon traditionally for stream projects, but mathematical modeling has become popular as this capability expands rapidly. The FLUVIAL-12 program is a mathematical model that has been formulated and developed in southern California since 1972 for water and sediment routing in natural and improved streams. The combined effects of flow hydraulics, sediment transport, and stream channel changes are simulated for given flow events and periods.

FLUVIAL-12 is applicable to ephemeral streams as well as streams with long-term, continuous flow. Because dynamic changes have transient behavior, ephemeral streams require more complicated model formulation techniques. Stream impacts simulated by the FLUVIAL-12 model include channel bed scour and fill (aggradation and degradation), width variation, and bed topography changes induced by channel curvature (i.e., bend scour associated with channel curvature). These inter-related changes are coupled at individual time steps over an entire flow event or series of flow events. While the model is applicable for erodible channels, physical constraints such as channel lining, bank protection or armoring, grade control structures, bedrock outcroppings, etc. may also be specified. Furthermore, the erodible material limits, bank erodibility, angle of repose, and channel roughness (e.g., channel bed and bank material, vegetation density, etc.) are included. Typical model applications include evaluations of sand and gravel mining, channelization, sediment delivery, etc.

This study provides FLUVIAL-12 modeling of the Arroyo Seco Channel in order to determine sediment transport processes in the predominately concrete-lined channel between the Dam and the Los Angeles River confluence. The FLUVIAL-12 model is based on cross-sectional data similar to the HEC-2 and HEC-RAS models. In addition, FLUVIAL-12 requires a sediment transport formula, flow hydrograph, bed material gradations, and sediment inflow. The following describes the basis of the model and the selected input parameters.

Analytical Basis of Model – FLUVIAL-12 is employed to simulate the hydraulics of flow, sediment transport and delivery, and stream channel changes of a stream channel for different cases. For a given flood hydrograph, the model simulates spatial and temporal variations in water surface elevation, sediment transport, and channel geometry. Scour and fill of the stream bed are coupled with width variation in the prediction of stream channel changes. Computations are based on finite difference approximations to energy and mass conservation that are representative of open channel flow.

The model simulates the inter-related changes in channel bed profile and channel width based upon a streams tendency to seek uniformities in sediment discharge and power expenditure. At each time step, scour and fill of the channel bed are computed based on the spatial variation in sediment discharge along the channel. Channel-bed corrections for scour and fill will reduce the non-uniformity in sediment discharge. Width changes are also made at each time step, resulting in a movement toward uniformity in power expenditure along the channel. Because the energy gradient is a measure of the power expenditure, uniformity in power expenditure also means a uniform energy gradient or linear water surface profile. A stream channel may not have a uniform power expenditure or linear water surface profile, but it is constantly adjusting itself toward that direction.

Engelund-Hansen Formula – A sediment transport formula is used in the FLUVIAL-12 model. The Engelund-Hansen (1967) formula was selected for this study. This formula applied Bagnold's stream power concept and the similarity principle to obtain their sediment transport equation:

$$f'\,\varphi = 0.1\,(\tau_*)^{5/2} \tag{1}$$

with $$f' = \frac{2gRS}{U^2} \tag{2}$$

$$\varphi = \frac{q_s}{\gamma_s\left[(s-1)gd^3\right]^{1/2}}, \qquad \tau_* = \frac{\tau_0}{(\gamma_s - \gamma)d} \tag{3}$$

where f' is the friction factor, d is the median fall diameter of the bed material, φ is the dimensionless sediment discharge, s is the specific gravity of sediment, and τ_* is the dimensionless shear stress or the Shields stress. Substituting equations 2 and 3 into Eq. 1 yields

$$C_s = 0.05\frac{s}{s-1}\frac{US}{\left[(s-1)gd\right]^{1/2}}\left[\frac{RS}{(s-1)d}\right]^{1/2} \tag{4}$$

where C_s (= Q_s/Q) is the sediment concentration by weight. This equation relates sediment concentration to the *US* product (which is the rate of energy expenditure per unit weight of water) and the *RS* product (which is the shear stress).

The Engelund-Hansen formula was selected for the study for the following reasons:

1. An extensive evaluation of formulas was made by Brownlie in which the Engelund-Hansen formula had the best correlation with field data.

2. The Engelund-Hansen formula was used in many studies in this region. The results of these studies have verified by field data.

3. In a calibration study of the FLUVIAL-12 model, the results generated by the Engelund-Hansen formula were correlated with the measured channel changes in a southern California stream during a 1993 flood.

Additional Model Input – Basic data for the stream channel analyses was provided by Bureau Veritas, and include a HEC-RAS model of the Arroyo Seco Channel populated with hydraulic characteristics, sediment gradations for the natural channel sections, and dam outflow hydrographs for 15.5 months of historical reservoir inflow data. Furthermore, the sediment inflow was input based on the percentages described in the previous section. The given flow records for the study have a long duration extending over several months. This requires excessive simulation time for the FLUVIAL-12 model. In general, the smaller flow rates require more computing time. In order to reduce computer simulation time, flows smaller than 2.5 cfs were excluded from the simulation. These flow rates are so small as to have a minor impact on the results.

MODELING RESULTS

Sediment delivery is defined as the cumulative amount of sediment delivered past a certain channel section for a specified period of time:

$$Y = \int_T Q_s dt \tag{5}$$

where Y is sediment delivery (yield); Q_s is sediment discharge; t is time; and T is the duration. The sediment discharge Q_s pertains only to bed-material load of sand, gravel and cobble. Fine sediment such as clay and silt constitute the wash load, and are not computed by a sediment transport formula. Sediment delivery is widely employed by hydrologists for watershed management; it is used herein to keep track of sediment supply and removal along the channel reach.

Spatial variations in sediment delivery are manifested as channel storage or depletion of sediment associated stream channel changes since the sediment supply from upstream may be different from the removal. The spatial variation of sediment delivery depicts the erosion and deposition along a stream reach. A decreasing delivery in the downstream direction, i.e. negative gradient for the delivery-distance curve, signifies that sediment load is partially stored in the channel to result in a net deposition. On the other hand, an increasing delivery in the downstream direction (positive gradient for the delivery-distance curve) indicates sediment removal from the channel boundary or net scour. A uniform sediment delivery along the channel (horizontal curve) indicates sediment balance, i.e., zero storage or depletion. Channel reaches with net sediment storage or depletion may be designated in each figure on the basis of the gradient. From the engineering viewpoint, it is best to achieve a uniform delivery, the non-silt and non-scour condition, for dynamic equilibrium.

Figure 1 contains simulated time and spatial variations in sediment delivery for Condition 1. The delivery at the upstream channel entrance is the sediment released from the reservoir through the dam during the sediment sluicing phase of 287 days. Sluicing is followed by flushing over a long

duration of low flows for 183 days. From the upstream channel entrance toward downstream, the delivery decreases rapidly indicating that the sediment settles rapidly in the natural channel below the dam. For the remaining channel reach, the delivery becomes limited indicating that only a small amount of sediment is transported along the channel to reach the Los Angeles River. The two curves for sluicing and flushing nearly overlap since only a small amount of sediment is transported during the low flows during flushing. The longitudinal profiles of the channel for Condition 1 are shown in Figure 2. The most noticeable physical changes (deposition) occur near the dam.

Figure 3 shows time and spatial variations of sediment delivery along the channel for Condition 2. The initial sluicing is followed by flushing over 3 days at a constant 4,900 cfs. The figure indicates major sediment deposition along the natural channel reach below the dam during the sluicing phase. The deposition is followed by gradual sediment removal by the constant flow. The removed sediment is transported downstream through the concrete-lined channel reaches without significant deposition. The delivery curves show some variations along the second natural channel reach near river mile 6.7. The top curve in the figure is the spatial variation of sediment delivery over a flushing duration of 3 days. This curve is more or less level along the channel from the dam to the Los Angeles River, indicating that a total amount of approximately 250,000 cubic yards of sediment can be delivered from the dam all the way to the Los Angeles River.

Longitudinal channel profiles of the channel for Condition 2 are shown in Figures 4 and 5. Sample cross-sectional changes are shown in Figures 6 through 10. These figures illustrate the pattern of channel changes in connection with sediment erosion and deposition along the channel.

Simulated results for sediment delivery, longitudinal channel profiles, and cross-sectional changes for Condition 3 are included in Figures 11 through 18. Condition 3 is based on a constant flushing discharge of 2,500 cfs for a total duration of up to 6 days. It can be seen that the effects from Condition 3 at 6 days are similar to those for Condition 2 at 3 days, i.e., a total amount of approximately 250,000 cubic yards of sediment can be delivered from the dam all the way to the Los Angeles River.

Condition 4 is based on a constant flushing discharge of 1,000 cfs for a total flushing duration of up to 16 days. Figures 19 through 26 illustrate the results for Condition 4. Over a 16 day duration, a total of approximately 200,000 cubic yards of sediment can be delivered to the Los Angeles River. However, a closer review of the results indicates that sediment will settle along the concrete-lined channel reaches just downstream of both natural areas. In addition, the sediment storage in the natural reach below the dam will only partially be removed by flushing. Therefore, the smaller flows will cause deposition and will not deliver all of the sediment downstream. Figures 27 and 28 contain the plan view locations where deposition is predicted to occur during this lower flow event.

CONCLUSION

The Los Angeles County Flood Control District requested three conditions be analyzed for sediment transport in the Arroyo Seco Channel between the Devil's Gate Dam and Los Angeles River. All three conditions assumed the same initial long-term sluicing out of the Dam. The natural flushing assumed under Condition 1 will not transport all of the deposited sediment downstream. In fact, the sediment delivery is rather low. On the other hand, the constant flow rates under Conditions 2 and 3 can transport the deposited sediment downstream in a matter of 3 to 6 days. These conditions were based on idealized constant flow rates. It is unknown how feasible it is to generate constant flow rates over the multi-day periods. Finally, the lower range of flows represented by Condition 4 can transport sediment downstream, but the flows will allow some sediment to deposit and remain in the Arroyo Seco Channel.

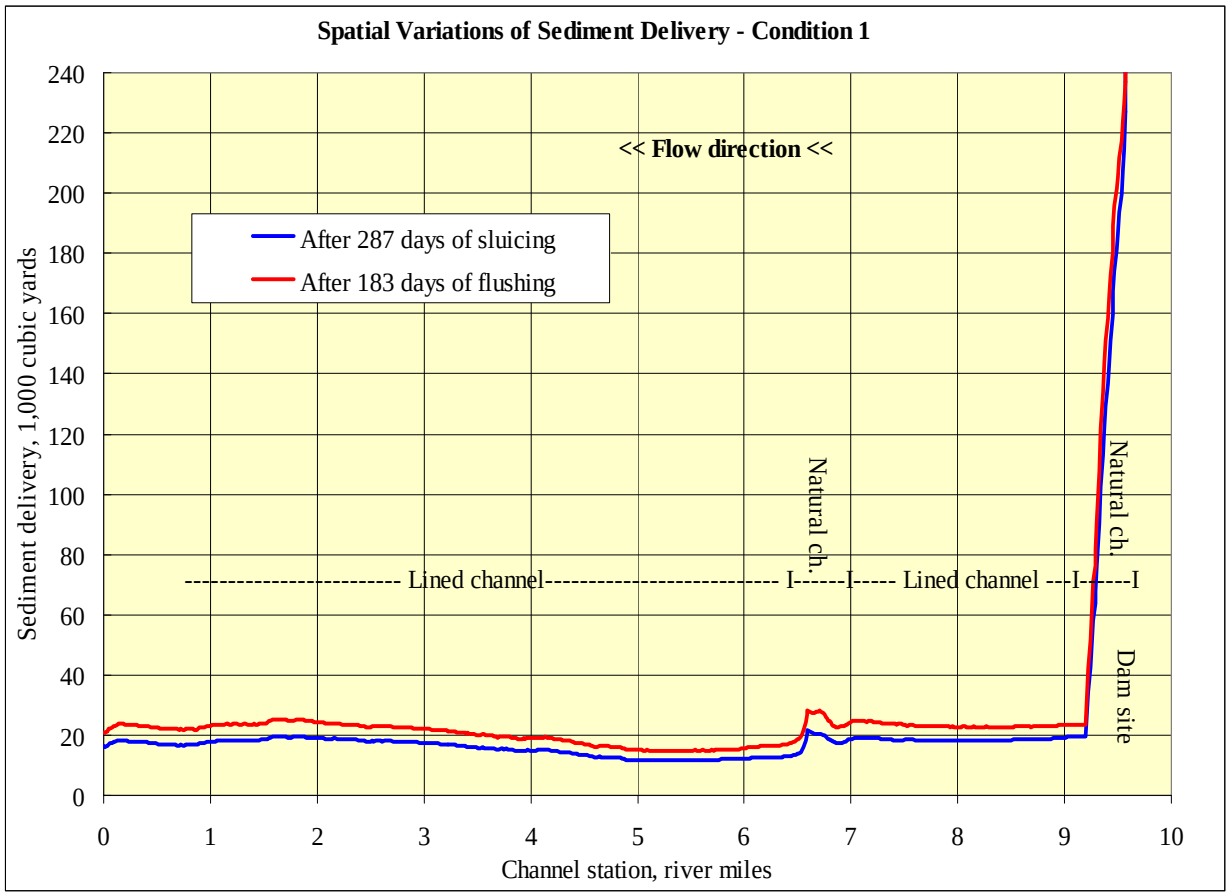
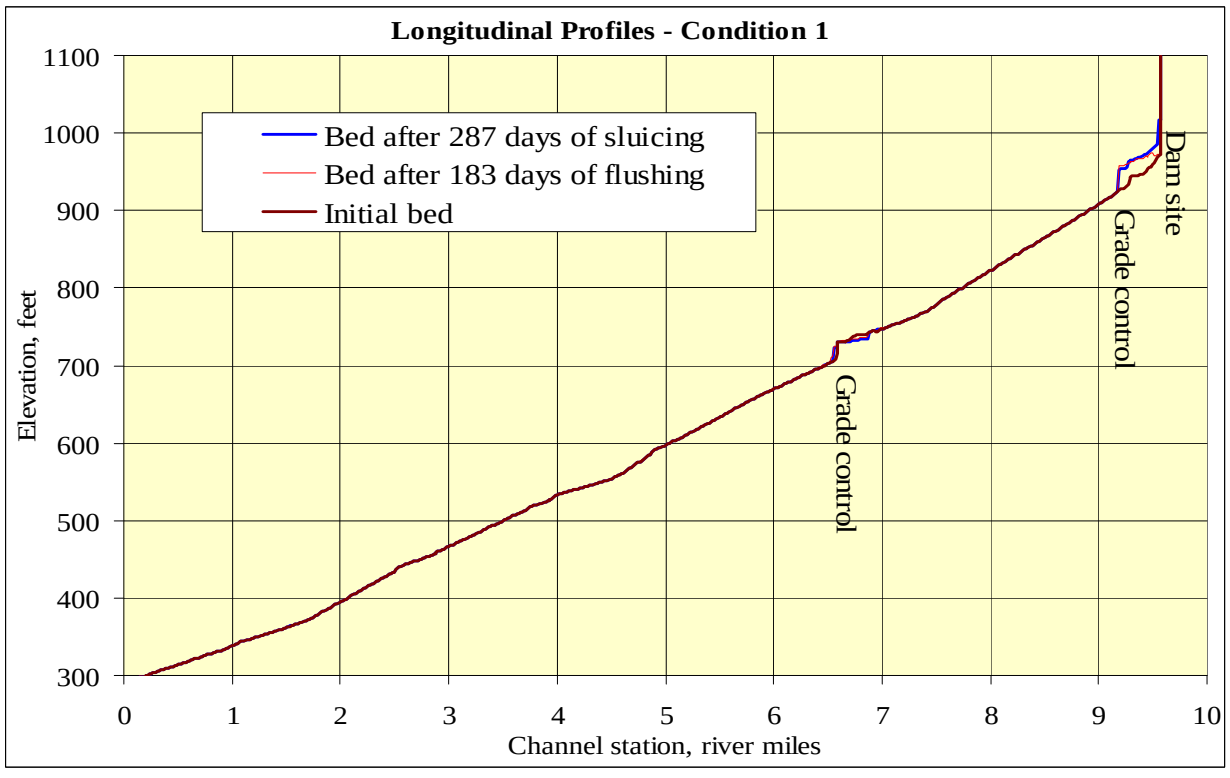


Figure 1



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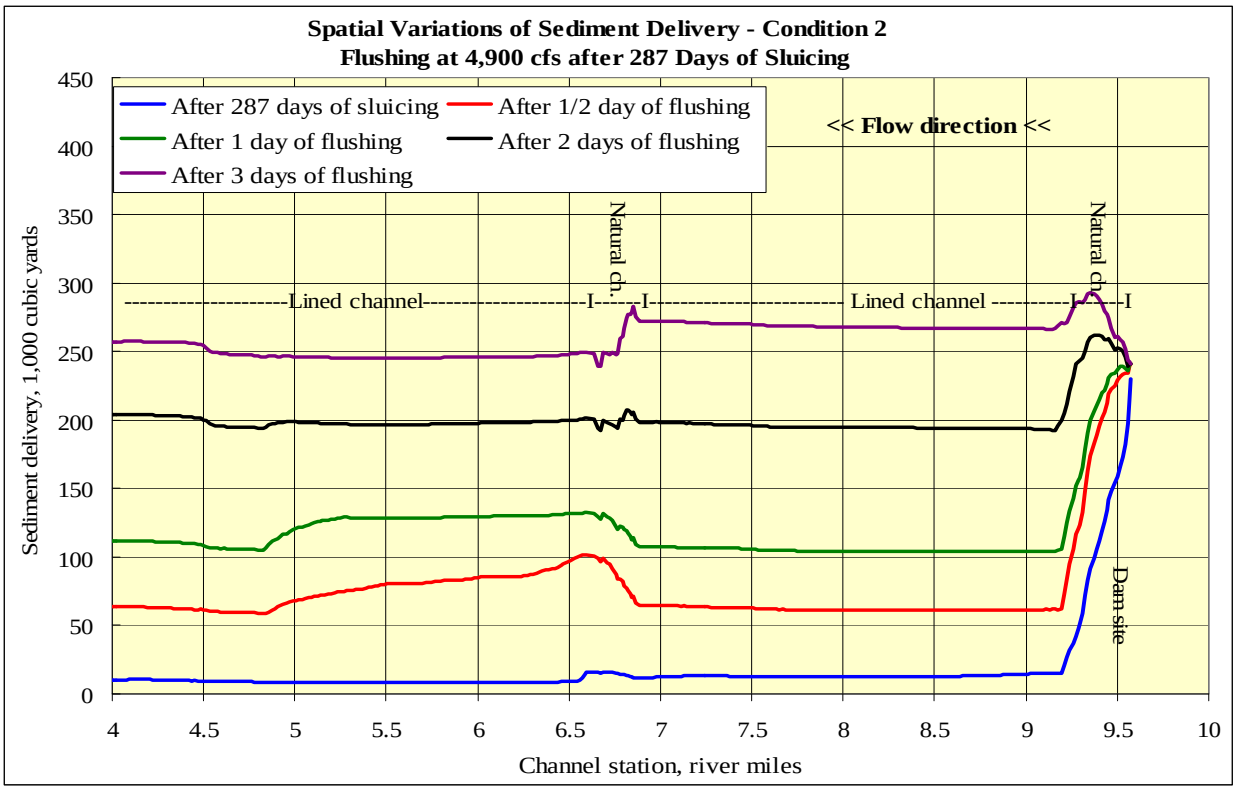

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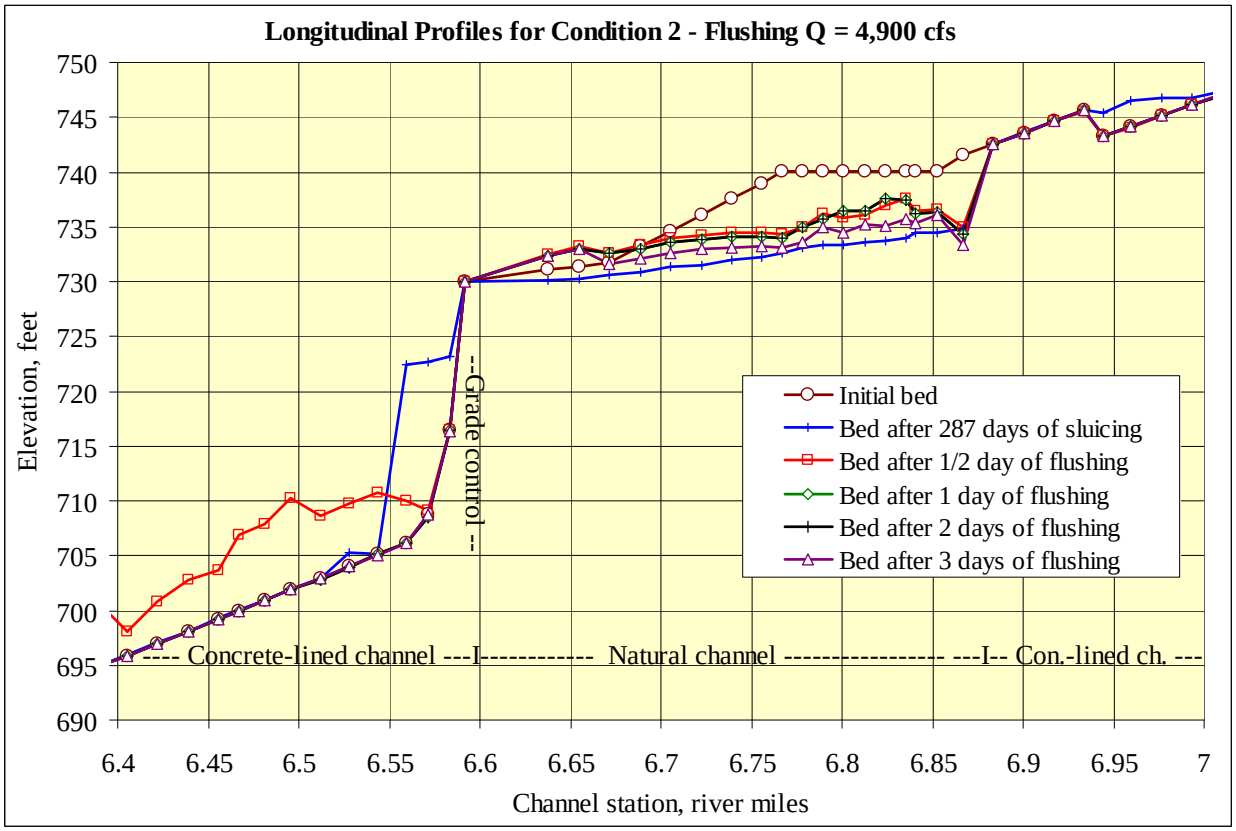

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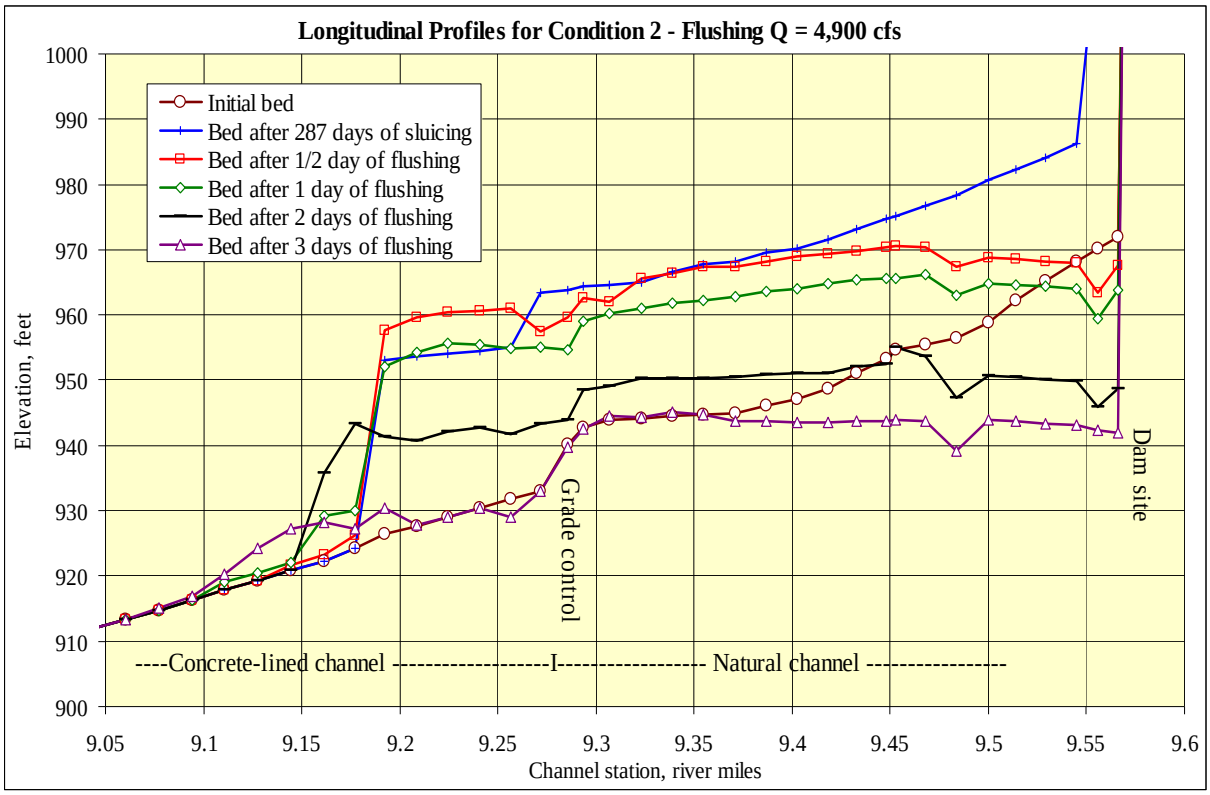

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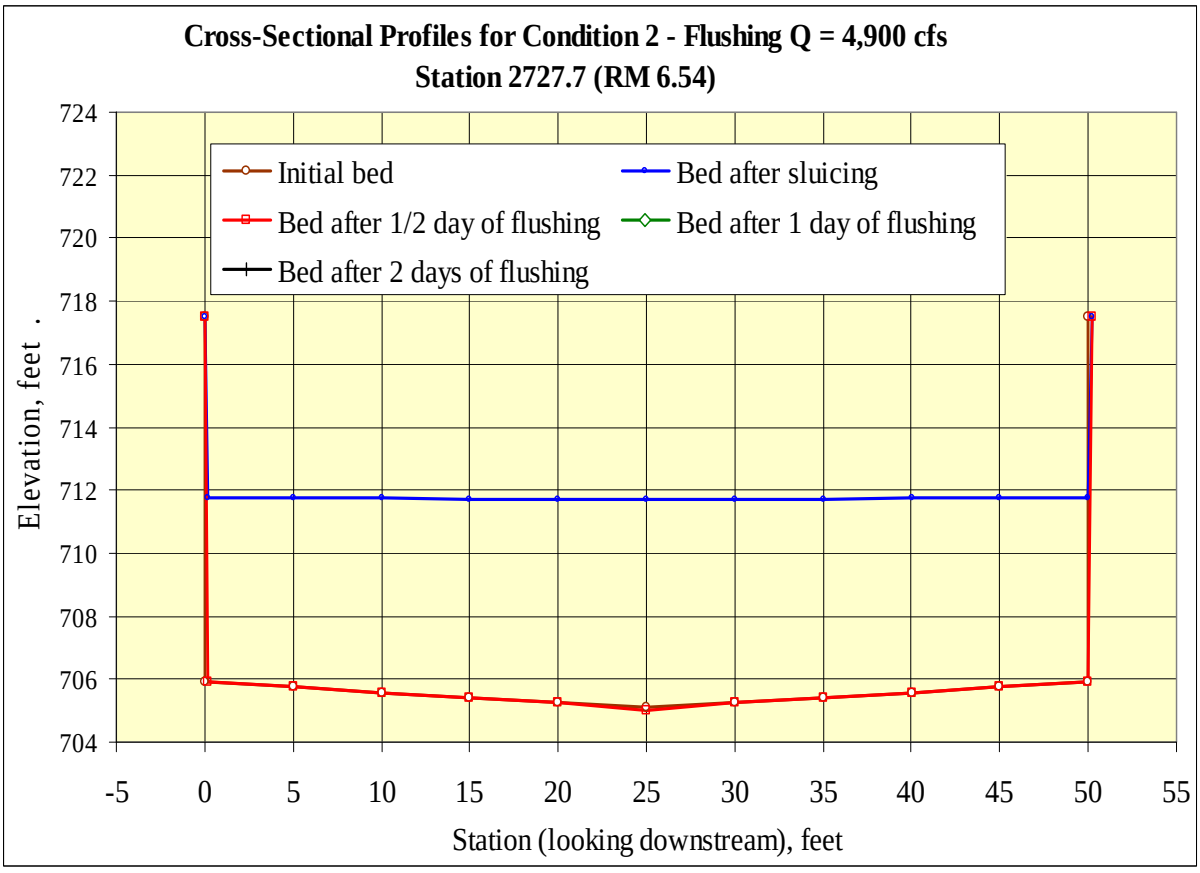

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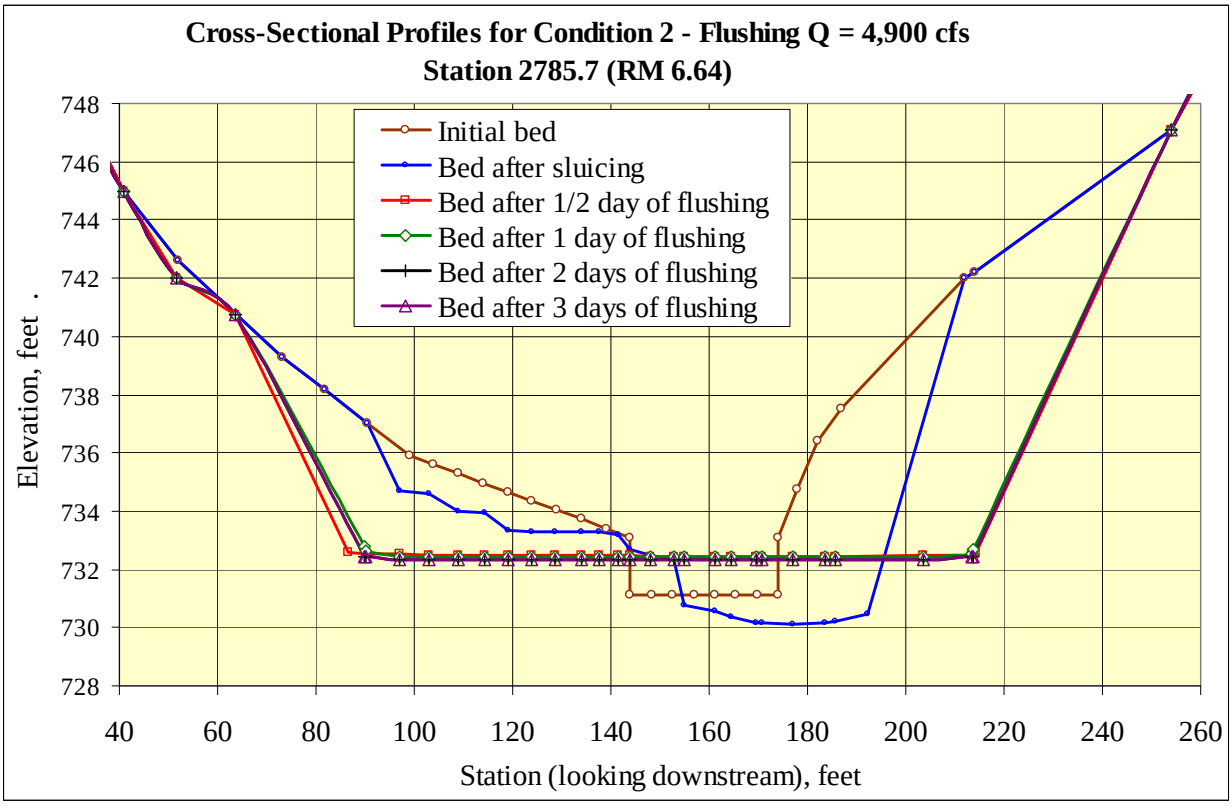

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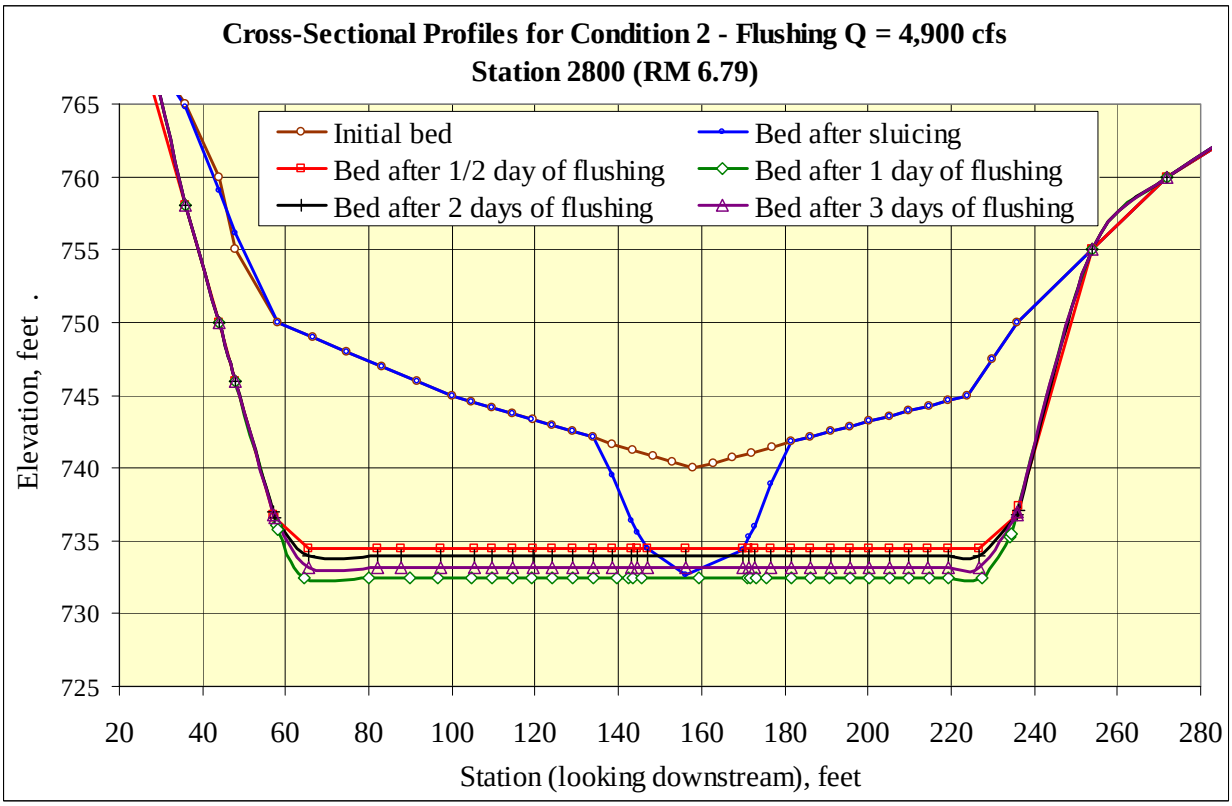

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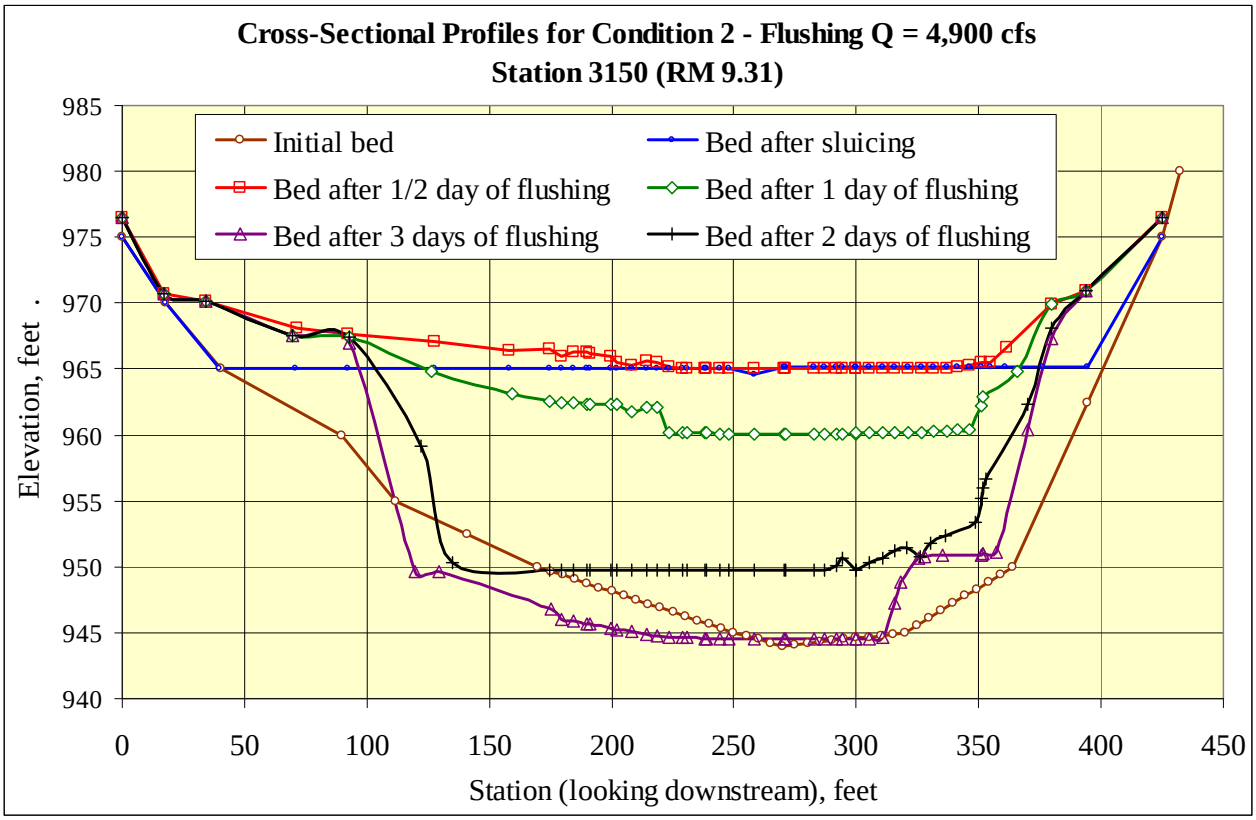

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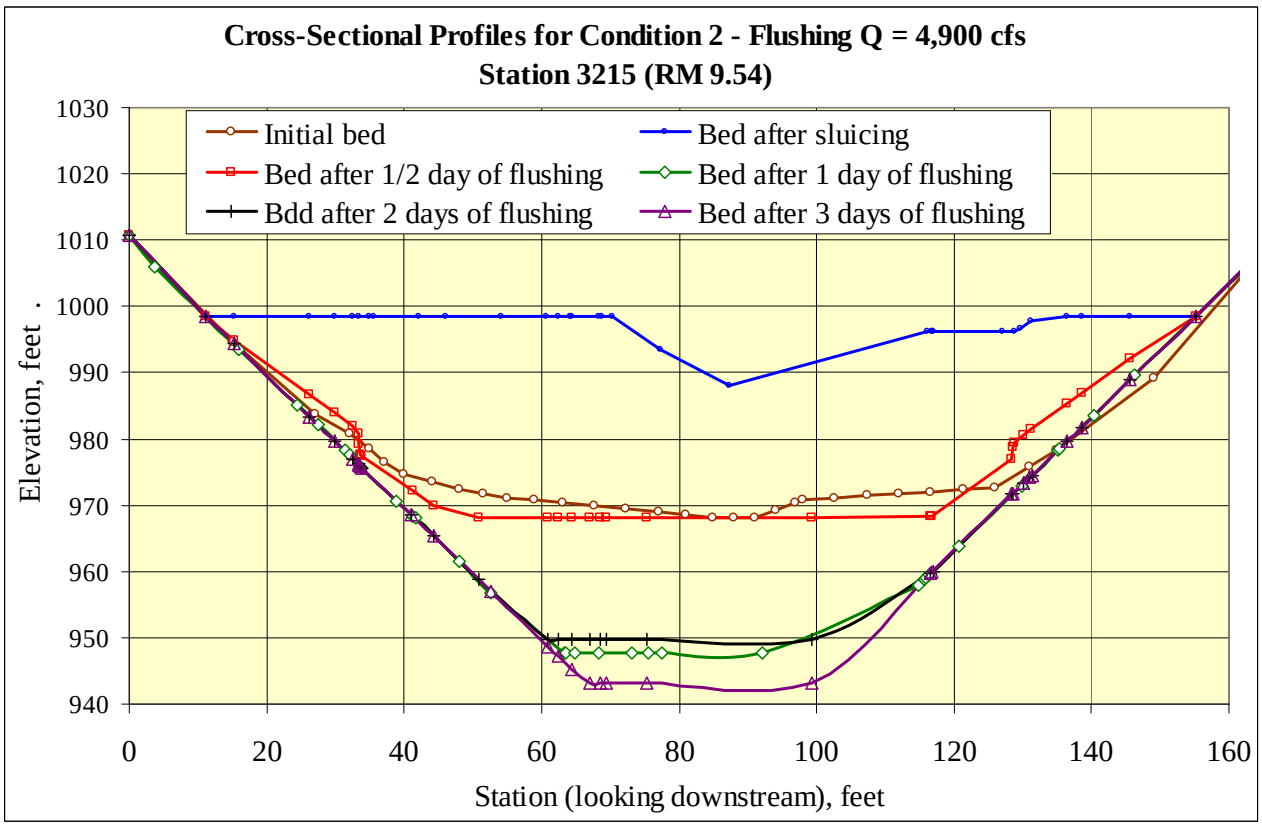

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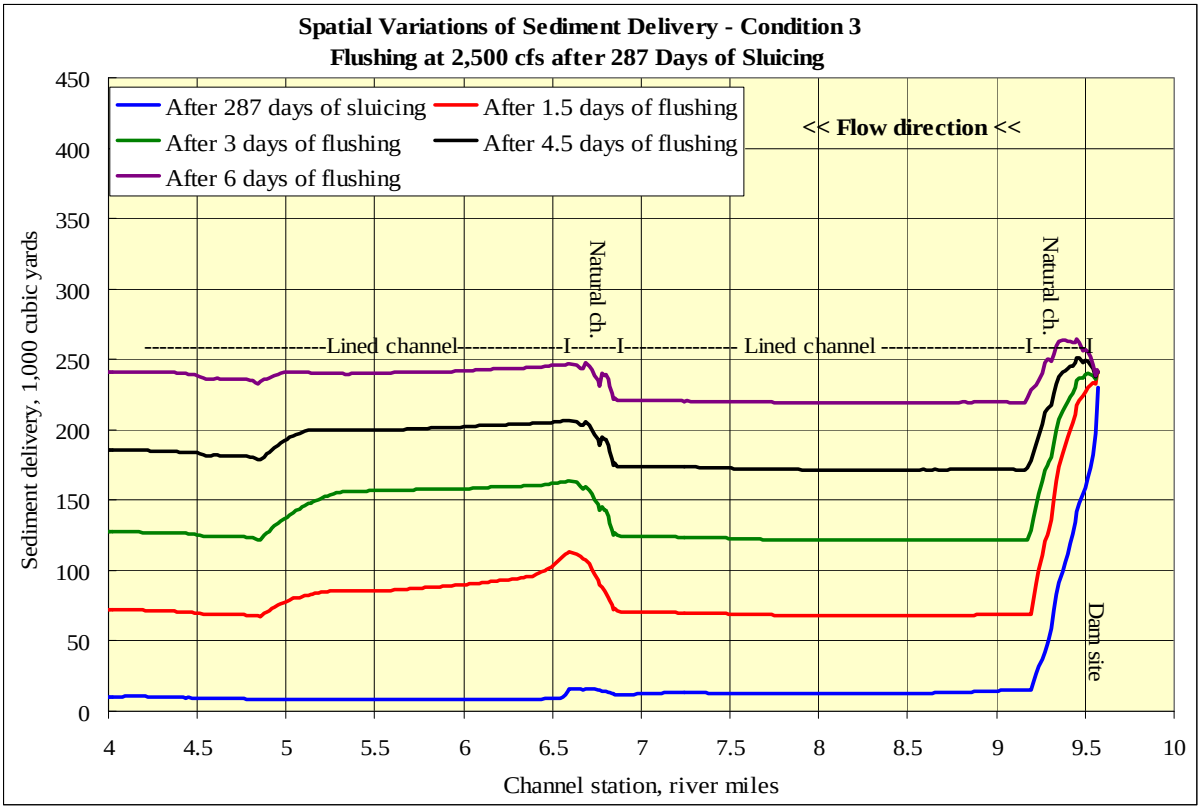

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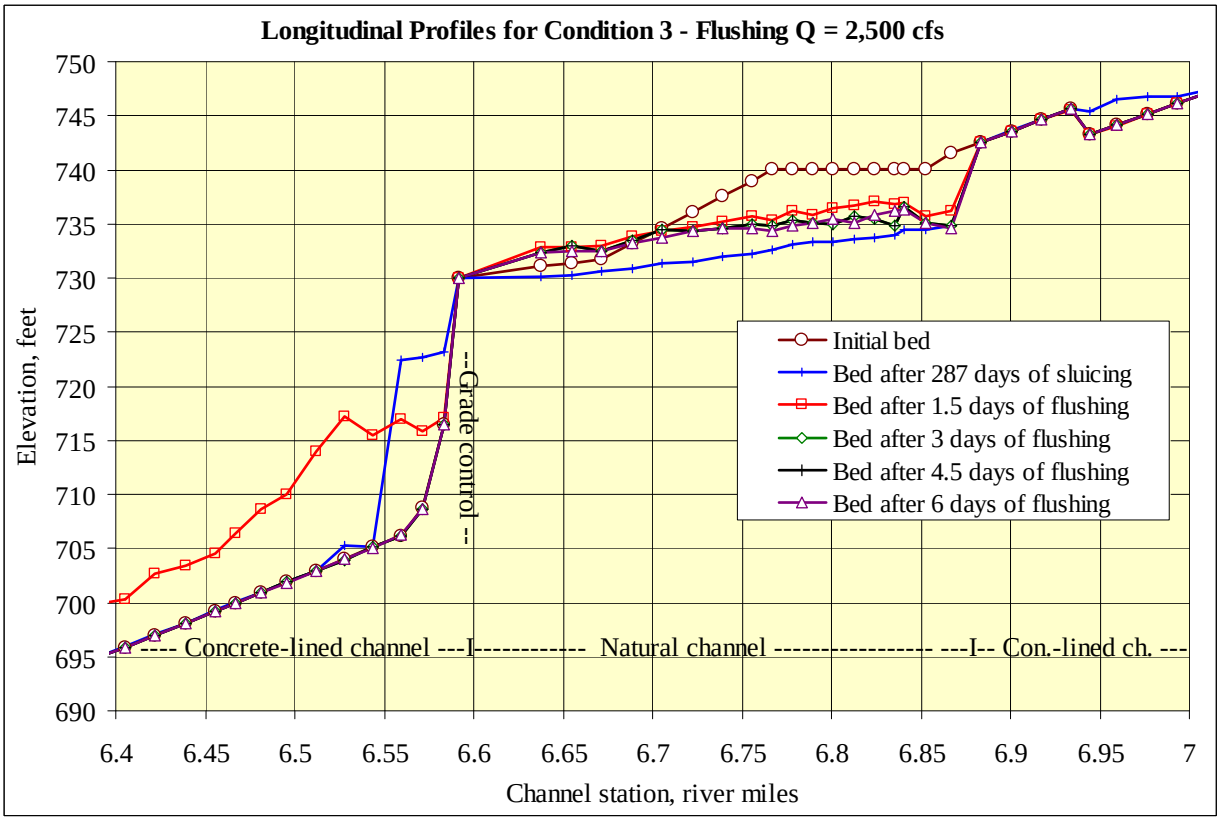

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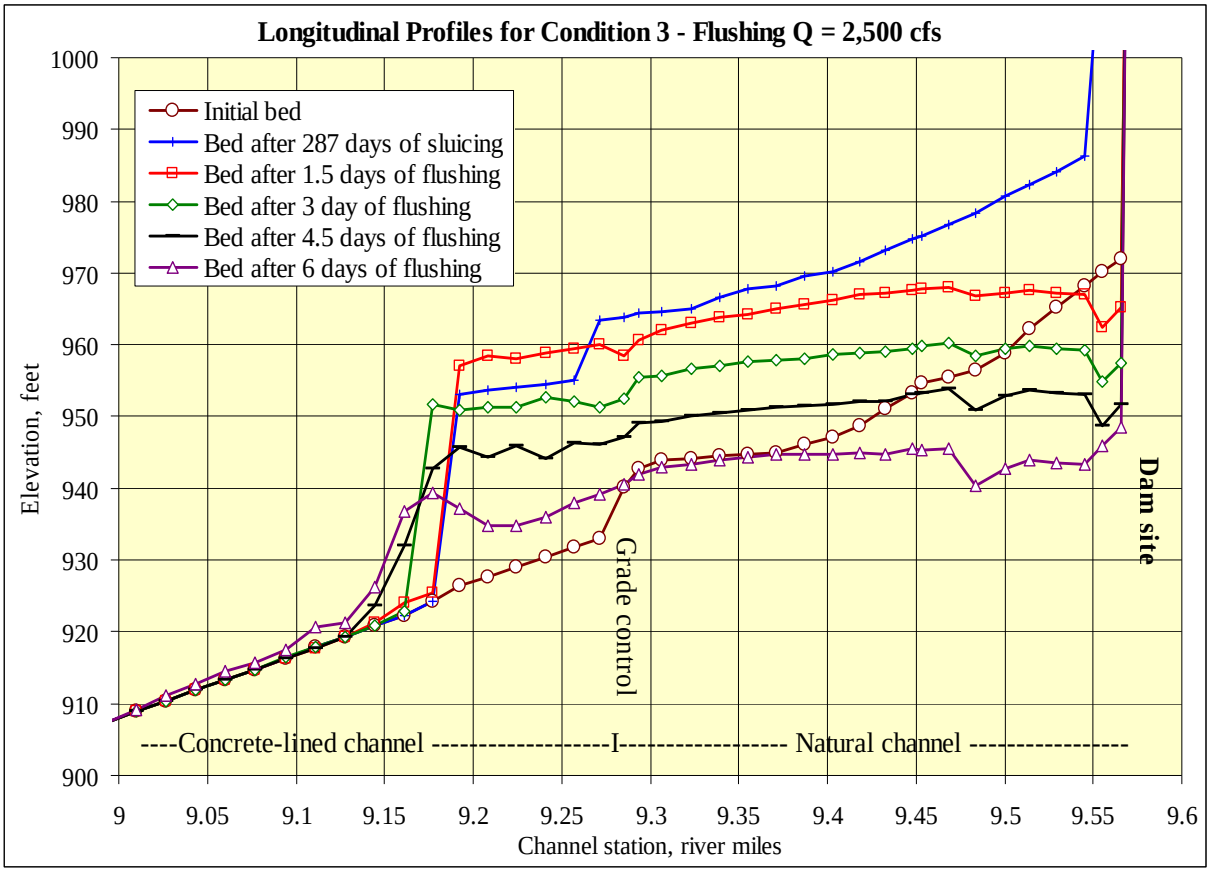

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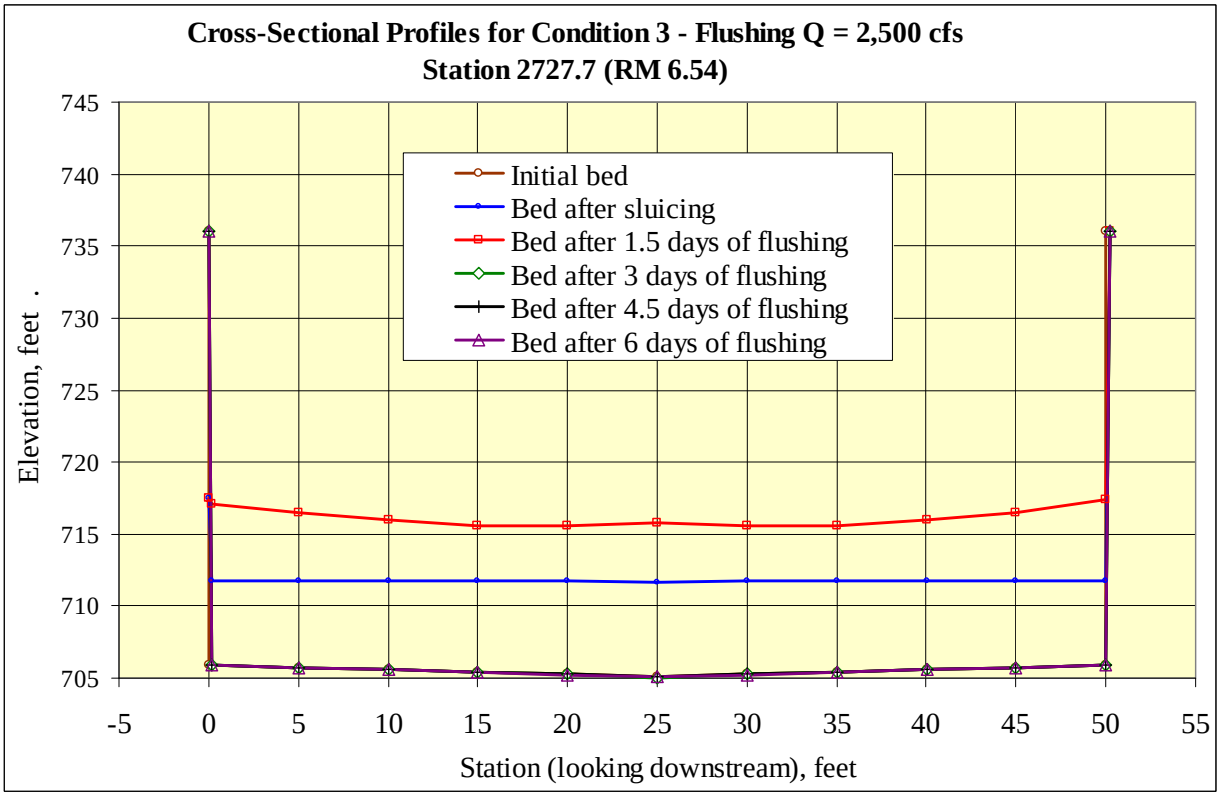

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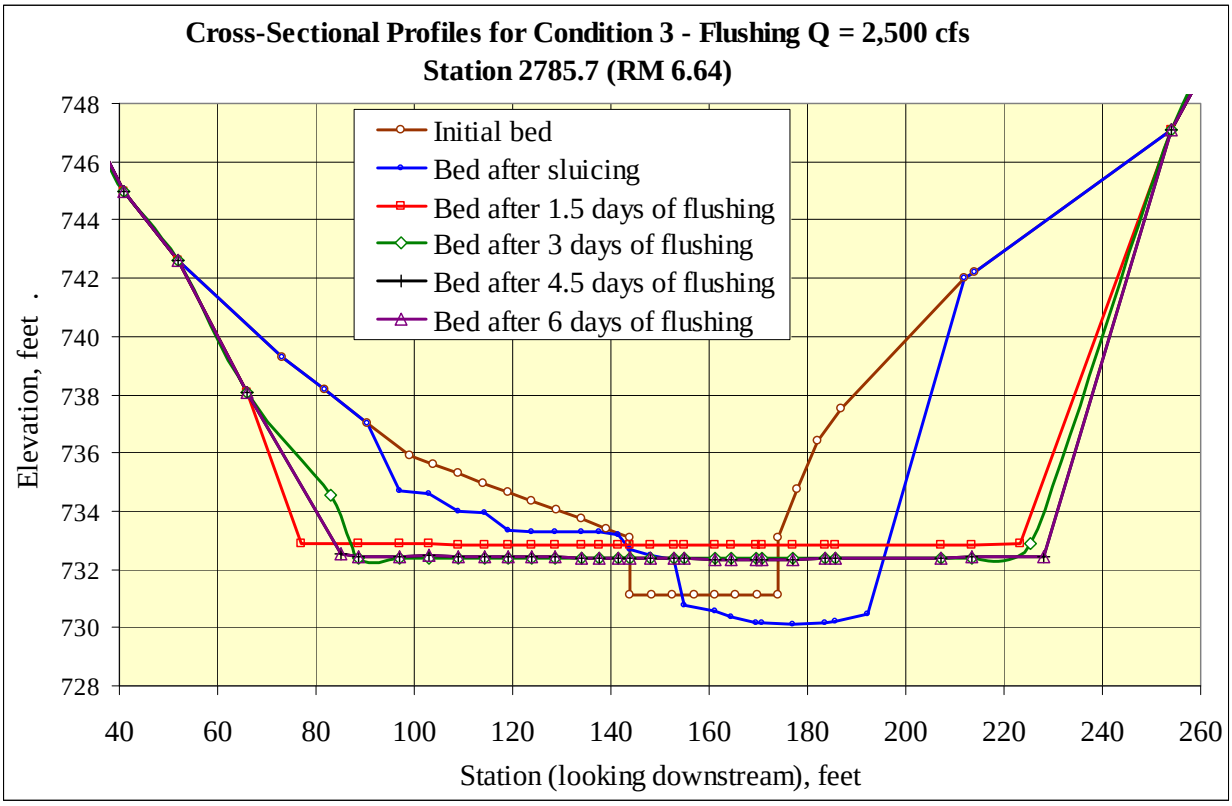

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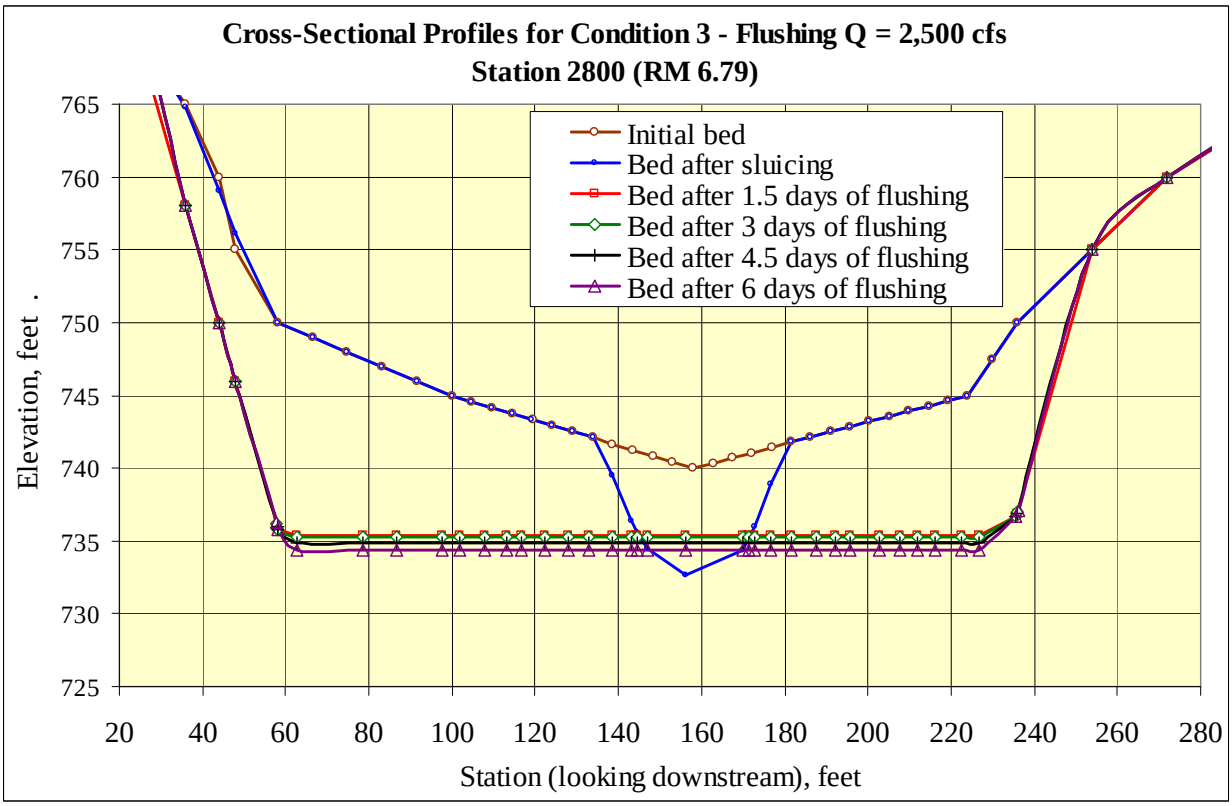

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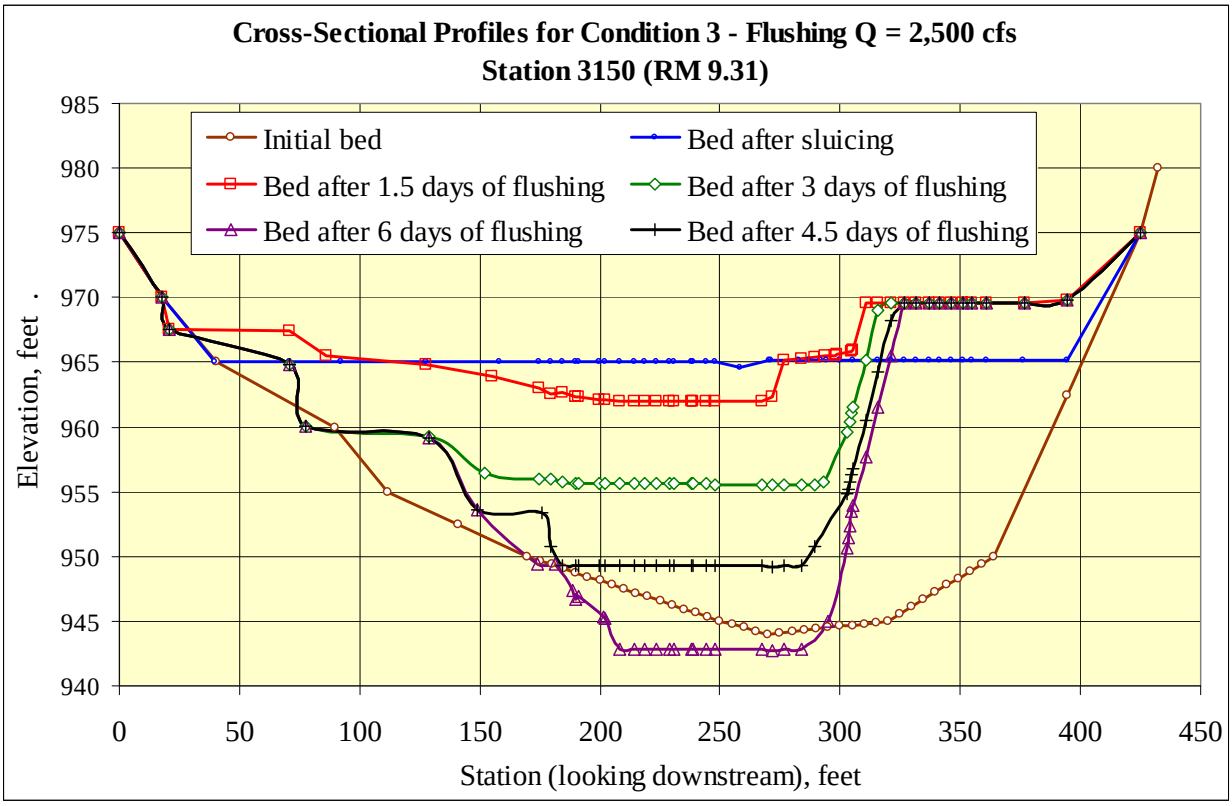

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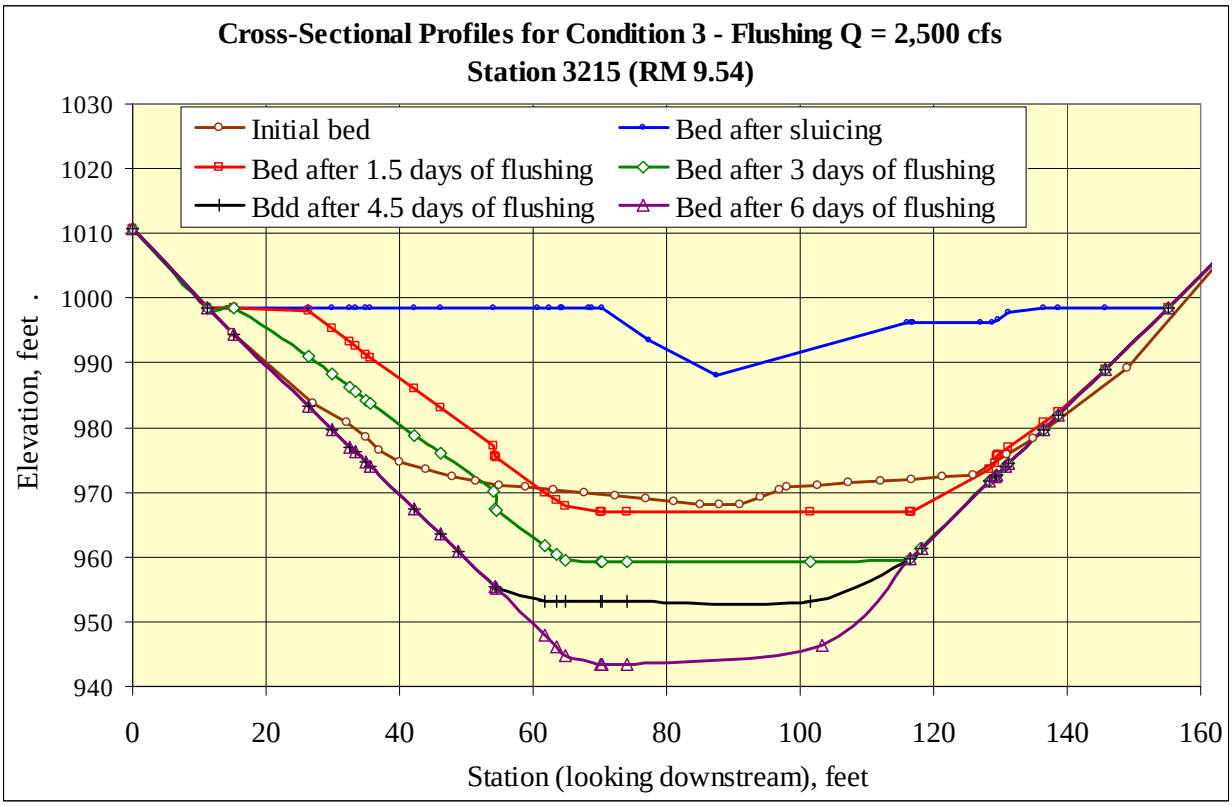

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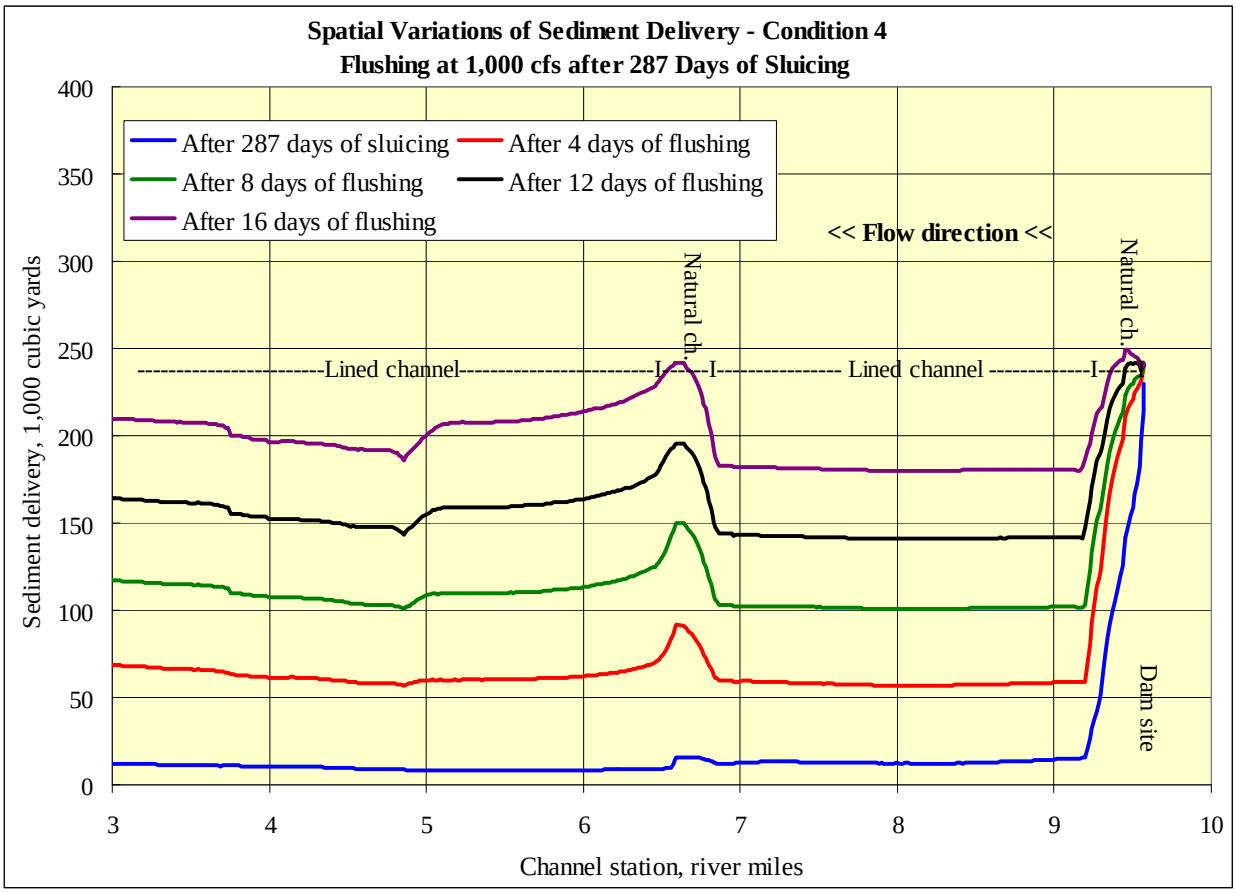

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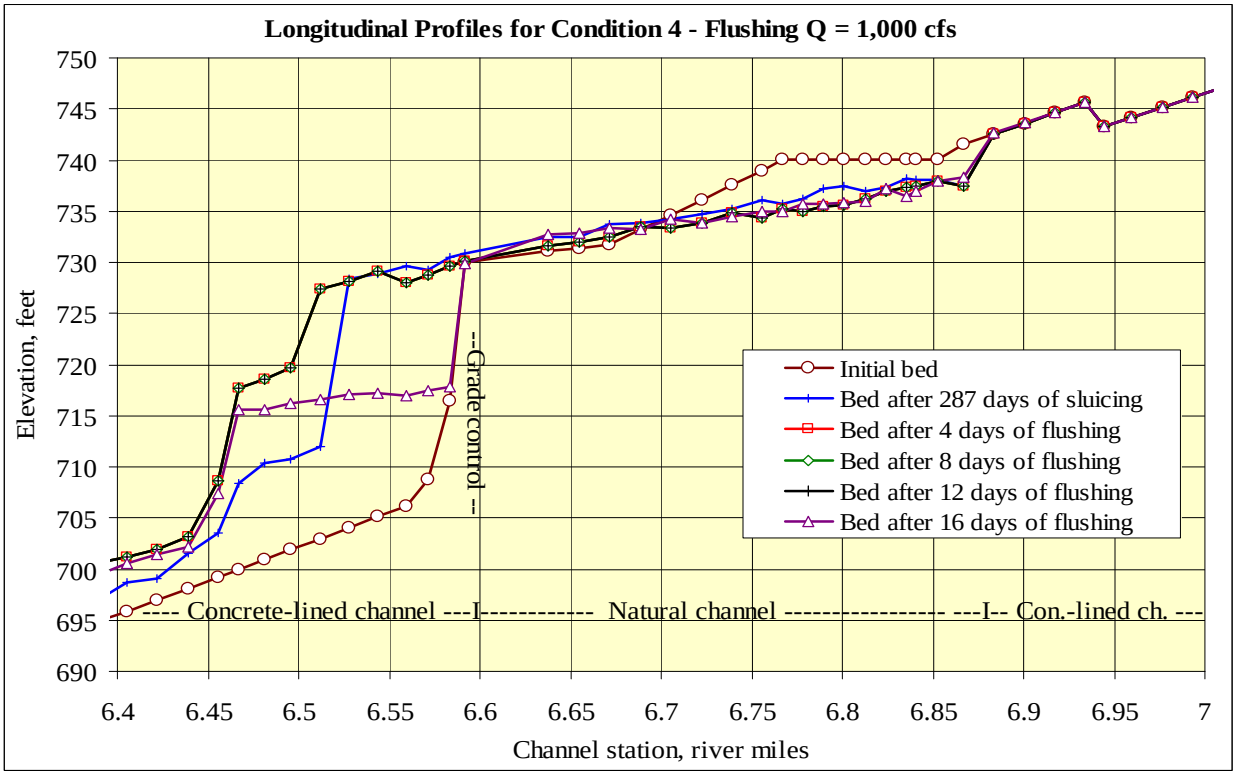

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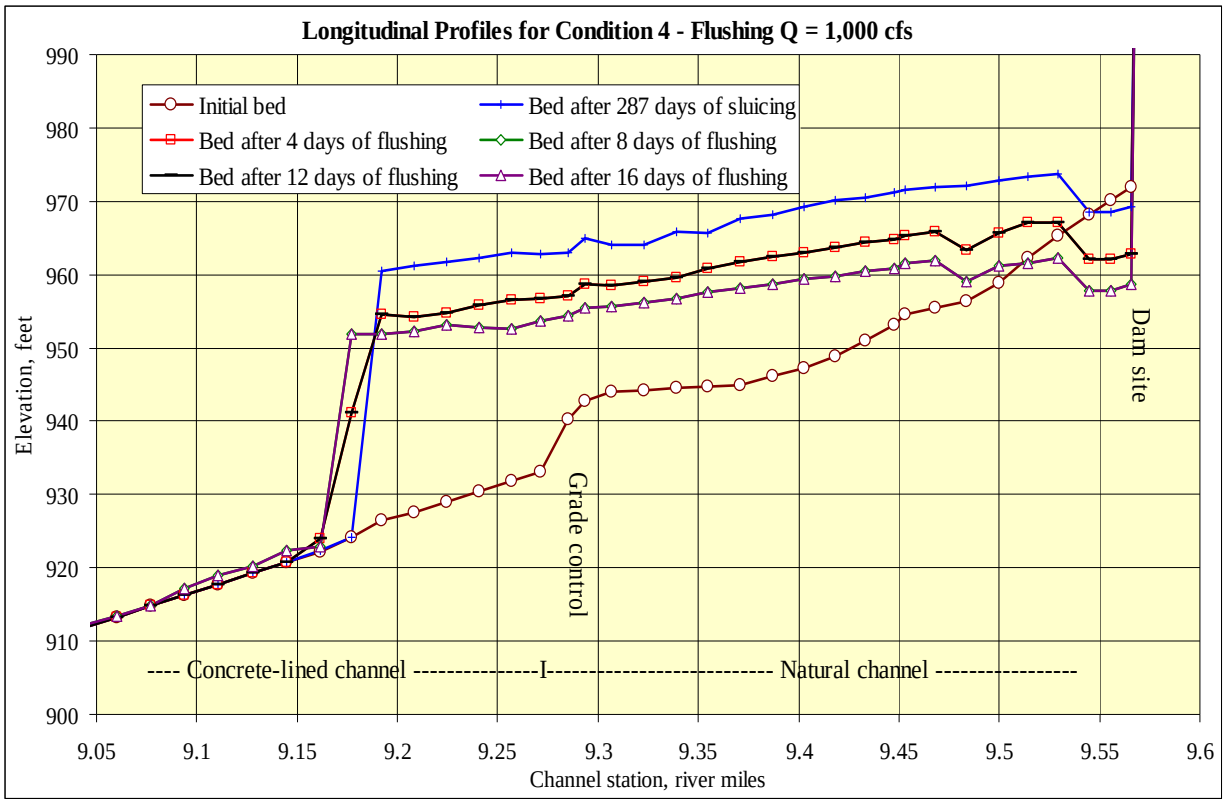

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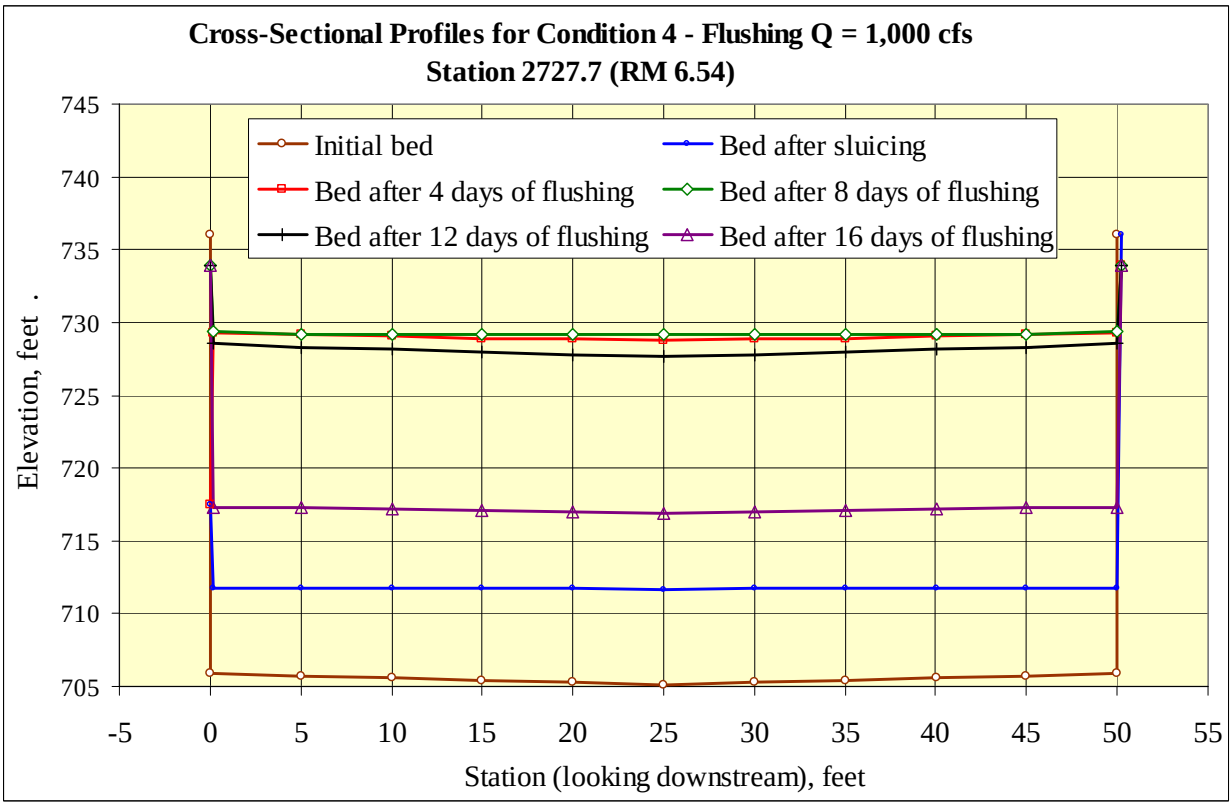

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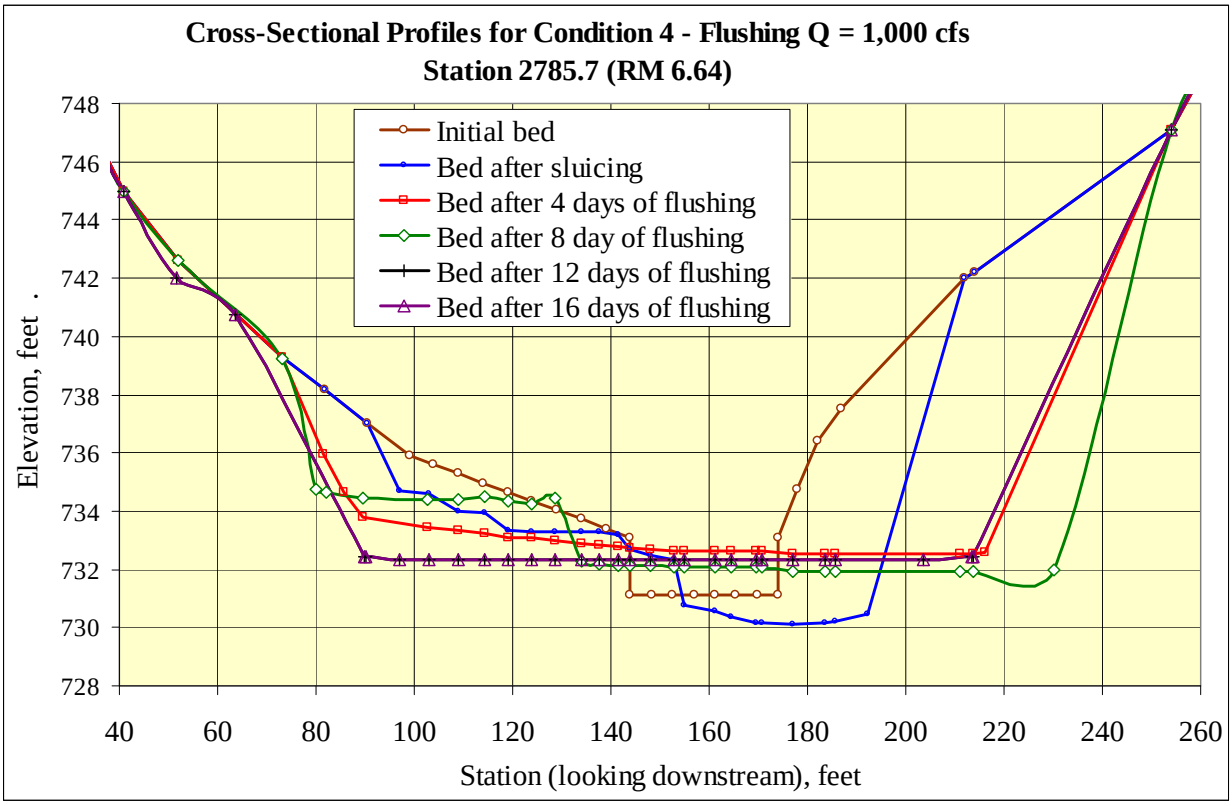

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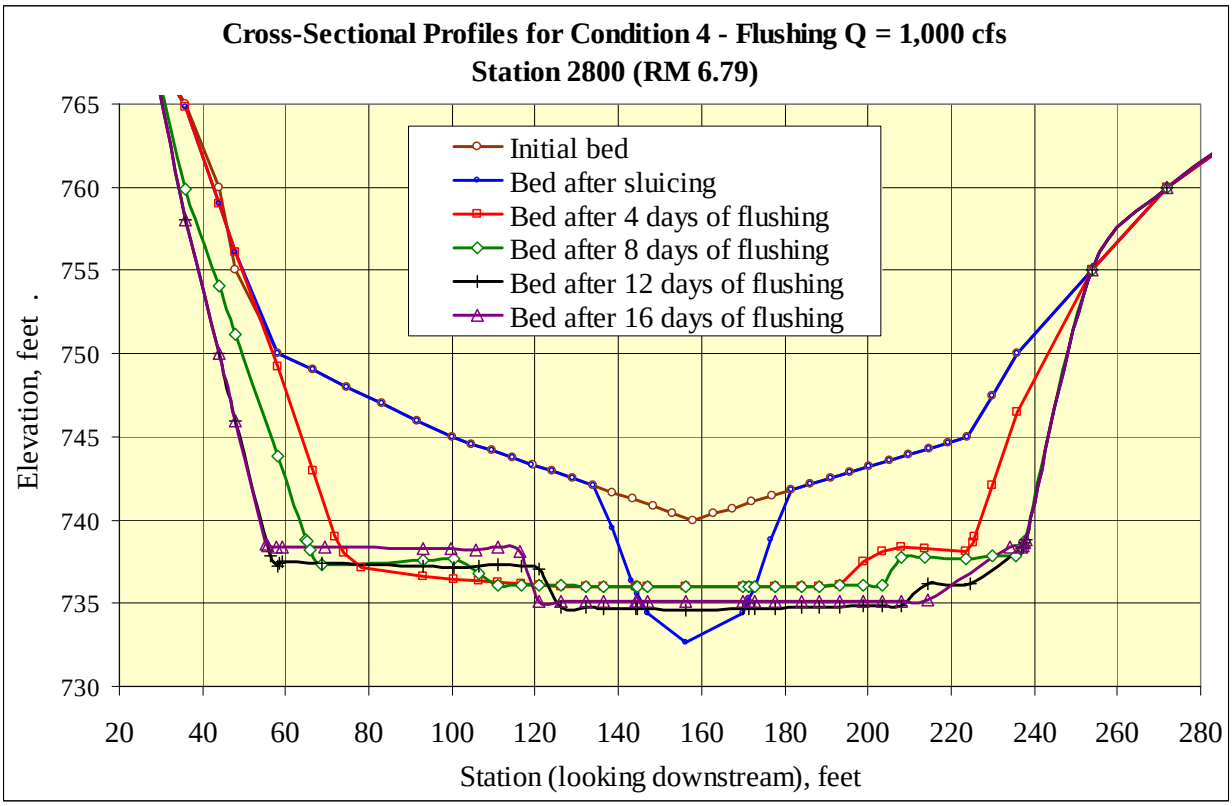

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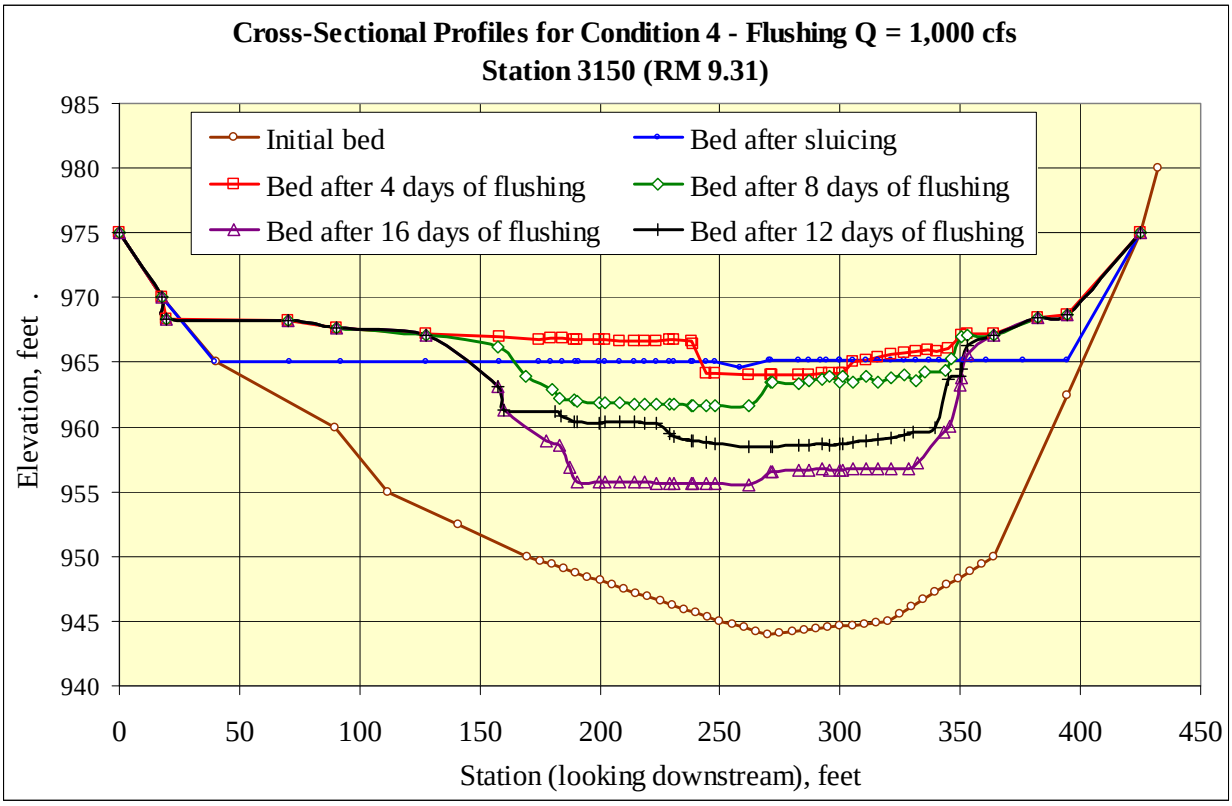

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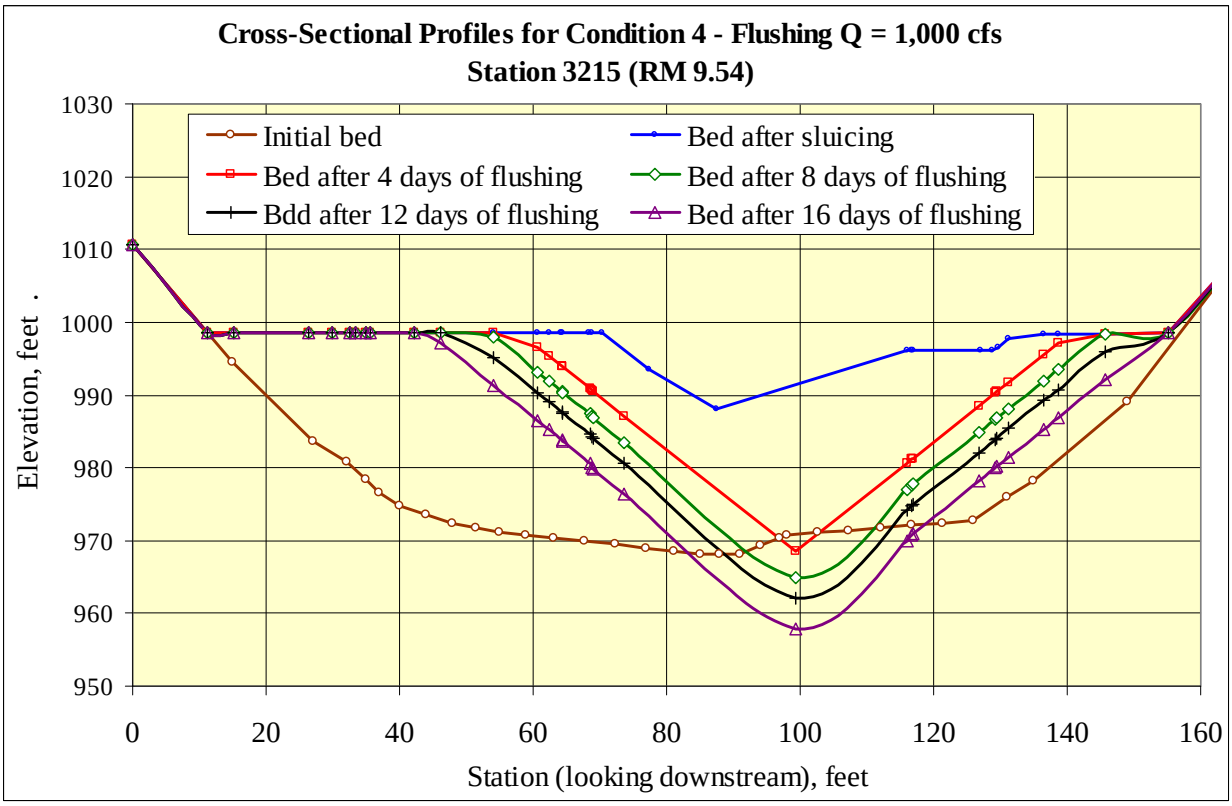

Figure 26

Figure 27. Deposition near Upper Grade Control under Condition 4

Figure 28. Deposition near Lower Grade Control Under Condition 4